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Annexes

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1. Annex 1 – Bridge 2A2 – Span 4 – L/2 - Sensor 3099D

The Bridge 2A2 counts 2 monitored decks: span 4 and span 5 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 4 are:

- 3099D – situated in the midspan;
- 30EB4 – situated at a distance of L/4;
- 31639 – situated at a distance of L/8;
- 30D41 – situated nearby the pilar.

The sensors present on deck number 5 are:

- 2B7E4 – situated in the midspan;
- 3187F – situated at a distance of L/4 of the deck;
- 2B988 – situated at a distance of L/8 of the deck;
- 2C1EA – situated by the pilar.

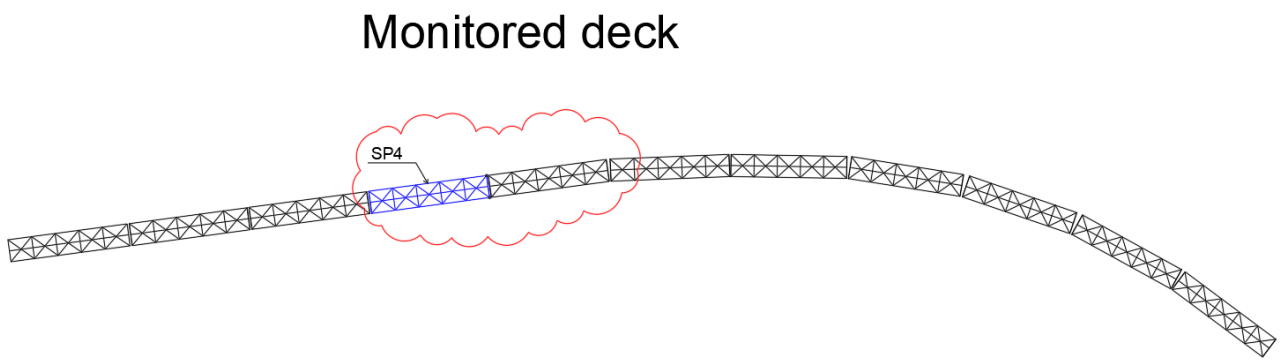


Figure 1-1 Monitored decks of 2A2 bridge

The accelerograms of the 3099D sensor have been analyzed and the results are represented in the following paragraphs.

1.1 January

The results obtained for the January dataset are shown in the following tables.

Table 1-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-01-27_01-00-20	2.12E-03
	2°	3099D_2023-01-06_01-00-20	1.72E-03
	3°	3099D_2023-01-02_07-00-21	1.48E-03
Longitudinal direction (y)	1°	3099D_2023-01-26_07-00-20	4.92E-04
	2°	3099D_2023-01-17_07-00-20	4.66E-04
	3°	3099D_2023-01-19_13-00-20	4.40E-04
Transverse direction (z)	1°	3099D_2023-01-19_13-00-20	6.24E-04
	2°	3099D_2023-01-31_07-00-20	5.04E-04
	3°	3099D_2023-01-20_13-00-20	4.78E-04

Table 1-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-01-27_01-00-20	1.33E-05	3099D_2023-01-27_01-00-20	9.00E-07
2	3099D_2023-01-06_01-00-20	7.60E-06	3099D_2023-01-06_01-00-20	5.96E-07
3	3099D_2023-01-10_13-00-20	7.12E-06	3099D_2023-01-31_07-00-20	4.51E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-01-26_07-00-20	3.81E-07	3099D_2023-01-26_07-00-20	4.71E-08
2	3099D_2023-01-19_13-00-20	3.64E-07	3099D_2023-01-17_07-00-20	4.38E-08
3	3099D_2023-01-17_07-00-20	3.31E-07	3099D_2023-01-19_13-00-20	4.03E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-01-19_13-00-20	3.57E-07	3099D_2023-01-19_13-00-20	7.65E-08
2	3099D_2023-01-31_07-00-20	2.47E-07	3099D_2023-01-31_07-00-20	5.33E-08
3	3099D_2023-01-14_13-00-20	2.29E-07	3099D_2023-01-20_13-00-20	4.83E-08

Table 1-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	C	C	E	E	E
2	B	B	B	D	E	D	F	F	F
3	-	-	-	E	D	E	G	-	G

1.1.1 Vertical direction (x)

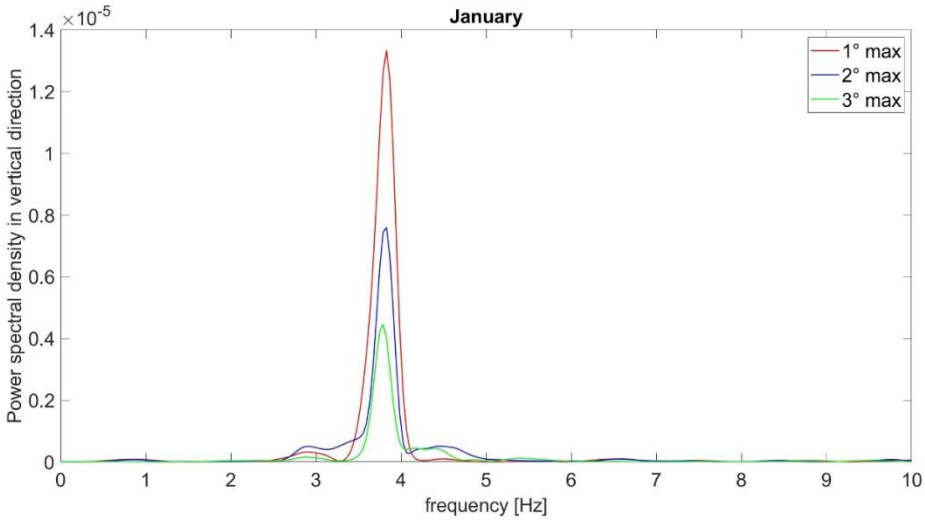


Figure 1-2: Results obtained from the 3 accelerograms with maximum SD in time domain

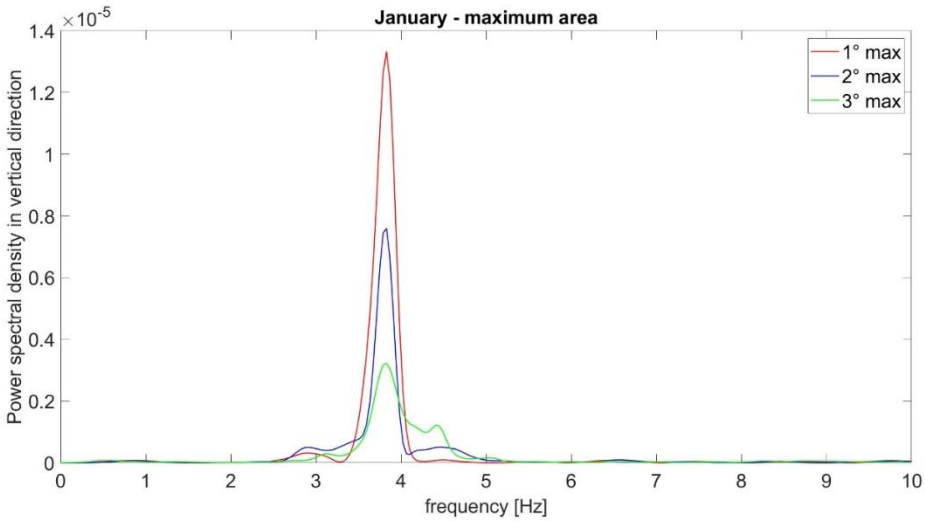
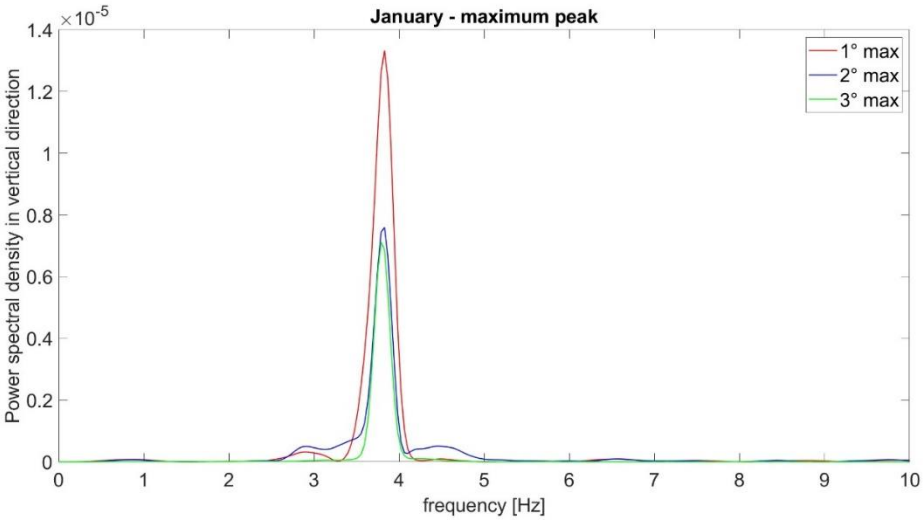


Figure 1-3: Results obtained from the 3 accelerograms with maximum area of PSD



V

Figure 1-4: Results obtained from the 3 accelerograms with highest peak if PSD

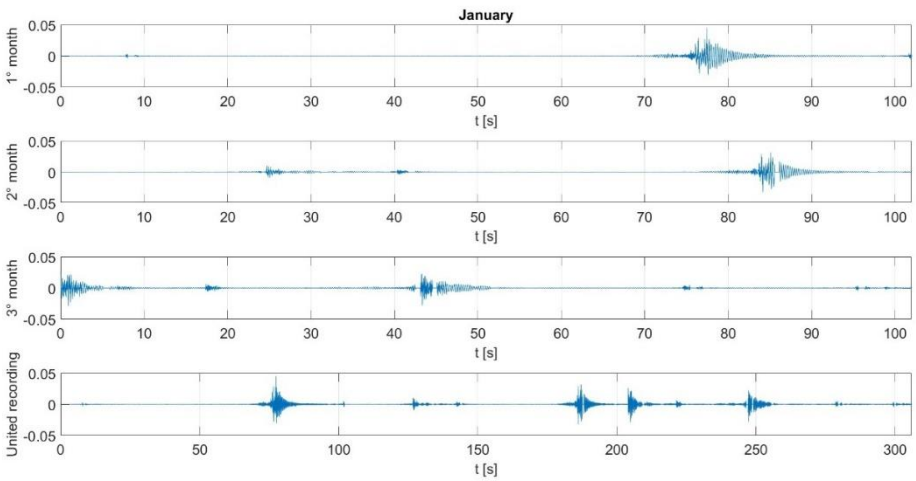


Figure 1-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.1.2 Longitudinal direction (y)

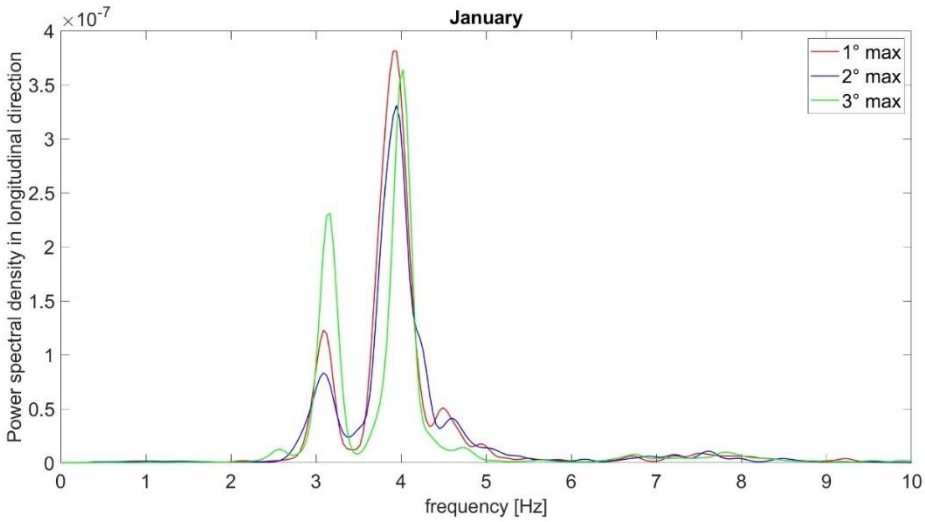


Figure 1-6: Results obtained from the 3 accelerograms with maximum SD in time domain

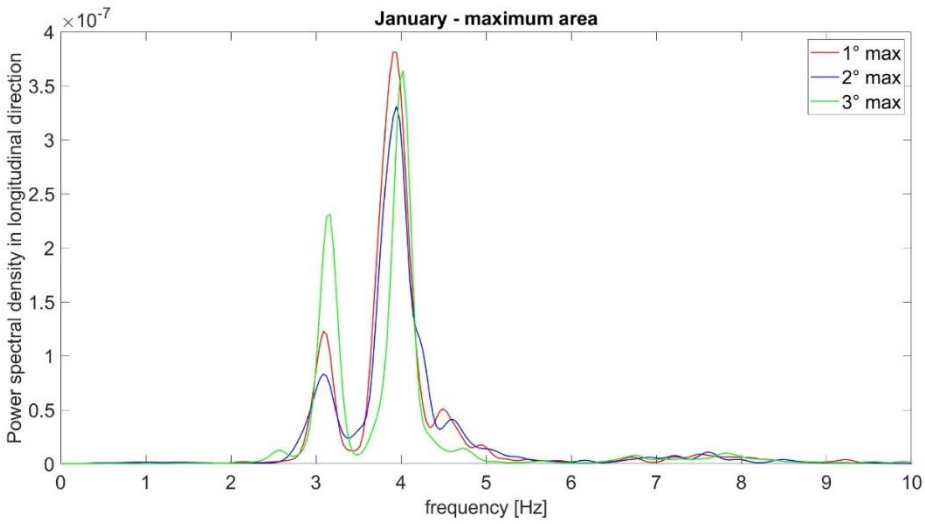


Figure 1-7: Results obtained from the 3 accelerograms with maximum area of PSD

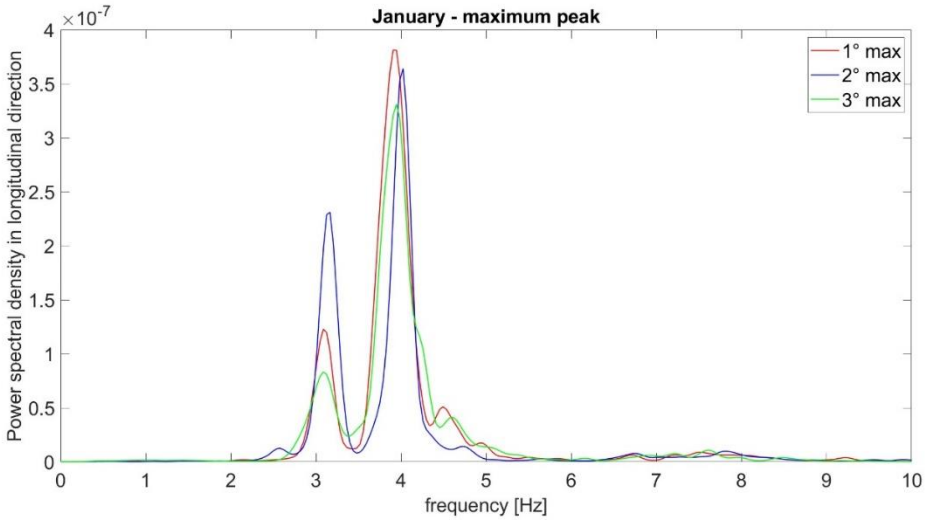


Figure 1-8: Results obtained from the 3 accelerograms with highest peak in PSD

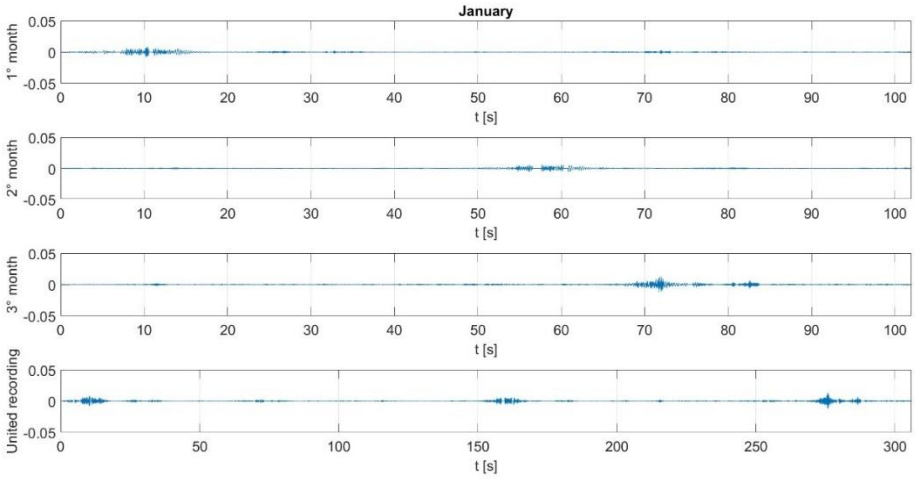


Figure 1-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.1.3 Transverse direction (z)

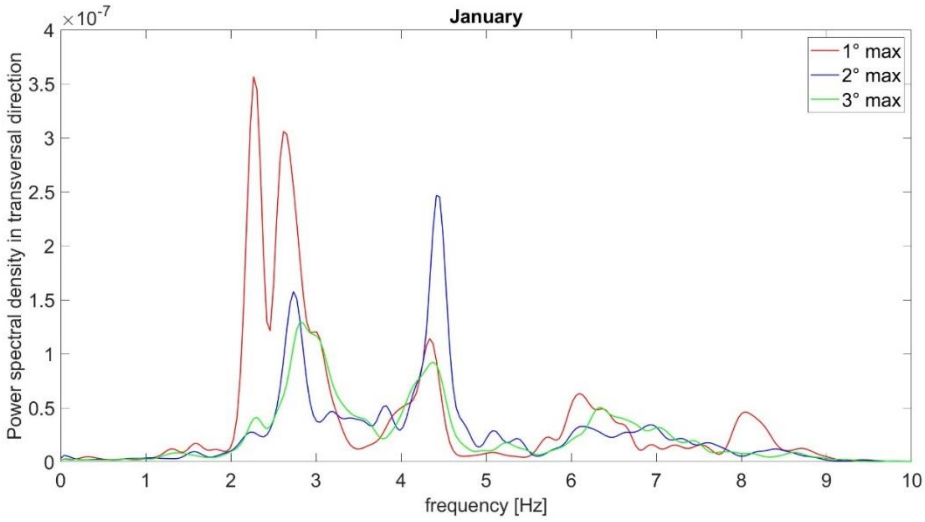


Figure 1-10: Results obtained from the 3 accelerograms with maximum SD in time domain

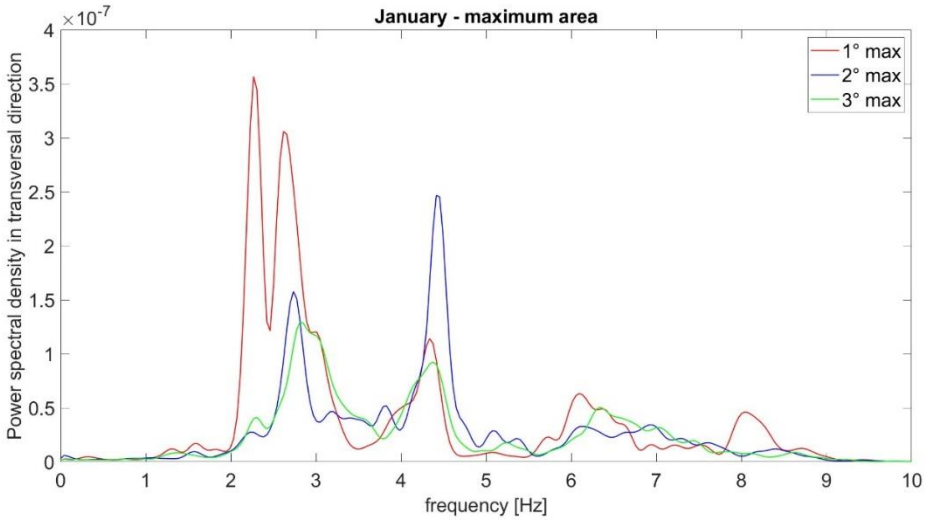


Figure 1-11: Results obtained from the 3 accelerograms with maximum area of PSD

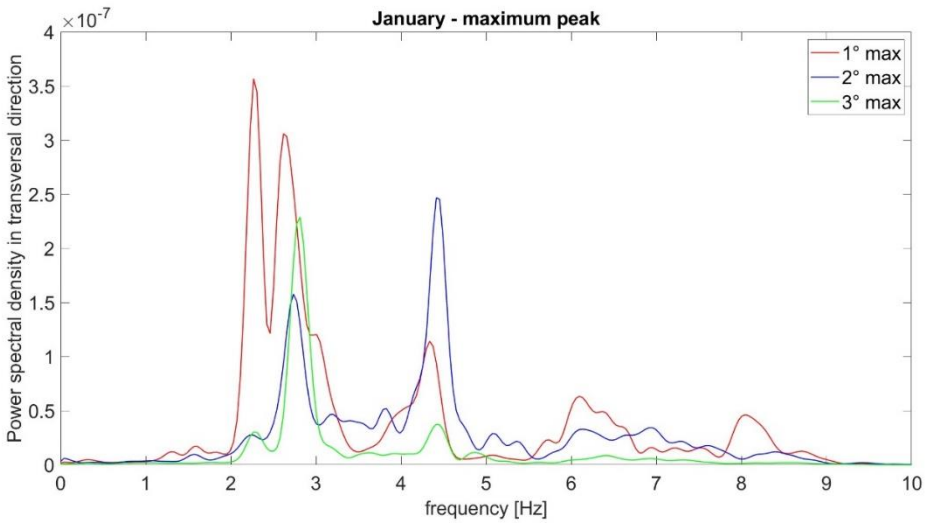


Figure 1-12: Results obtained from the 3 accelerograms with highest peak in PSD

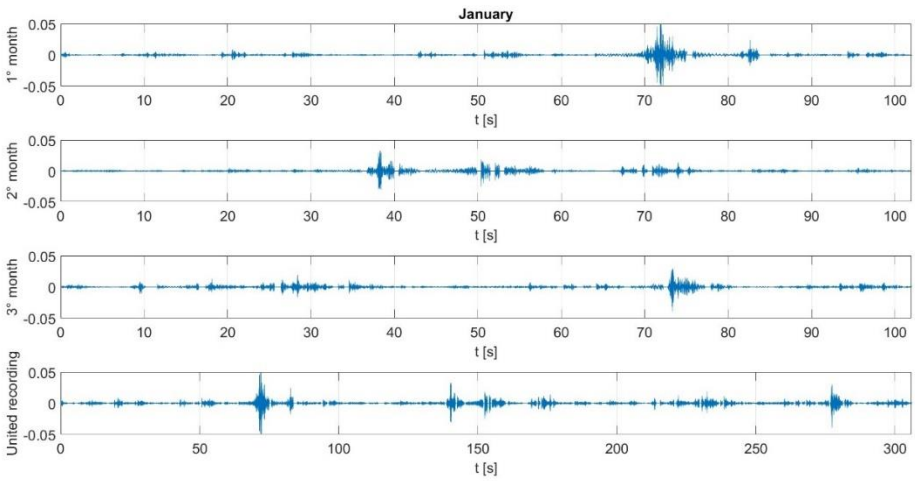


Figure 1-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

1.2 February

The results obtained for the February dataset are shown in the following tables.

Table 1-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-02-01_13-00-20	2.71E-03
	2°	3099D_2023-02-20_13-00-20	2.62E-03
	3°	3099D_2023-02-14_19-00-21	2.49E-03
Longitudinal direction (y)	1°	3099D_2023-02-01_13-00-20	9.67E-04
	2°	3099D_2023-02-06_13-00-20	6.37E-04
	3°	3099D_2023-02-03_13-00-20	5.37E-04
Transverse direction (z)	1°	3099D_2023-02-03_13-00-20	9.70E-04
	2°	3099D_2023-02-01_13-00-20	8.77E-04
	3°	3099D_2023-02-06_13-00-20	7.90E-04

Table 1-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-02-20_13-00-20	2.08E-05	3099D_2023-02-01_13-00-20	1.43E-06
2	3099D_2023-02-14_19-00-21	1.82E-05	3099D_2023-02-20_13-00-20	1.38E-06
3	3099D_2023-02-01_13-00-20	1.28E-05	3099D_2023-02-14_19-00-21	1.37E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-02-01_13-00-20	1.23E-06	3099D_2023-02-01_13-00-20	1.88E-07
2	3099D_2023-02-06_13-00-20	3.79E-07	3099D_2023-02-06_13-00-20	7.49E-08
3	3099D_2023-02-14_19-00-21	3.74E-07	3099D_2023-02-03_13-00-20	5.83E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-02-03_13-00-20	2.04E-06	3099D_2023-02-03_13-00-20	1.93E-07
2	3099D_2023-02-06_13-00-20	7.69E-07	3099D_2023-02-01_13-00-20	1.47E-07
3	3099D_2023-02-01_13-00-20	6.46E-07	3099D_2023-02-06_13-00-20	1.21E-07

Table 1-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	E	E	E
2	B	C	B	D	D	D	A	D	A
3	C	A	C	E	-	E	D	A	D

1.2.1 Vertical direction (x)

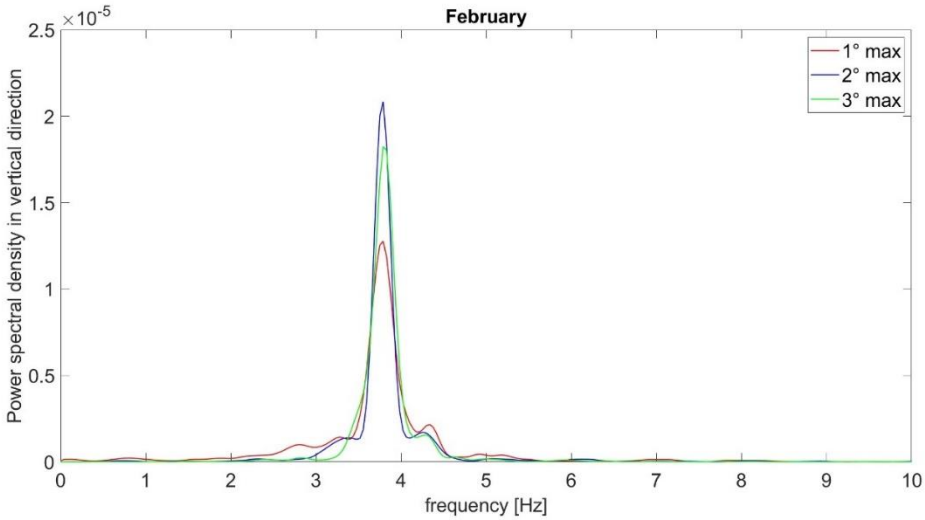


Figure 1-14: Results obtained from the 3 accelerograms with maximum SD in time domain

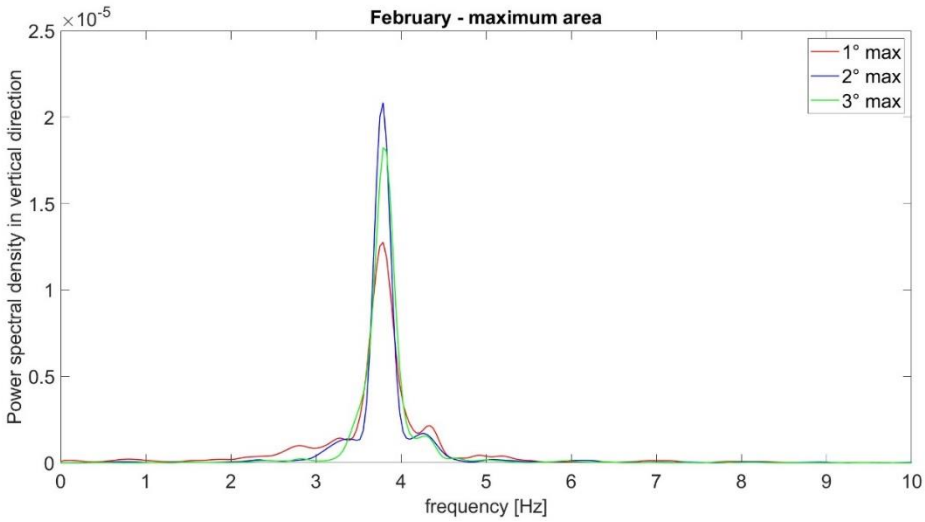


Figure 1-15: Results obtained from the 3 accelerograms with maximum area of PSD

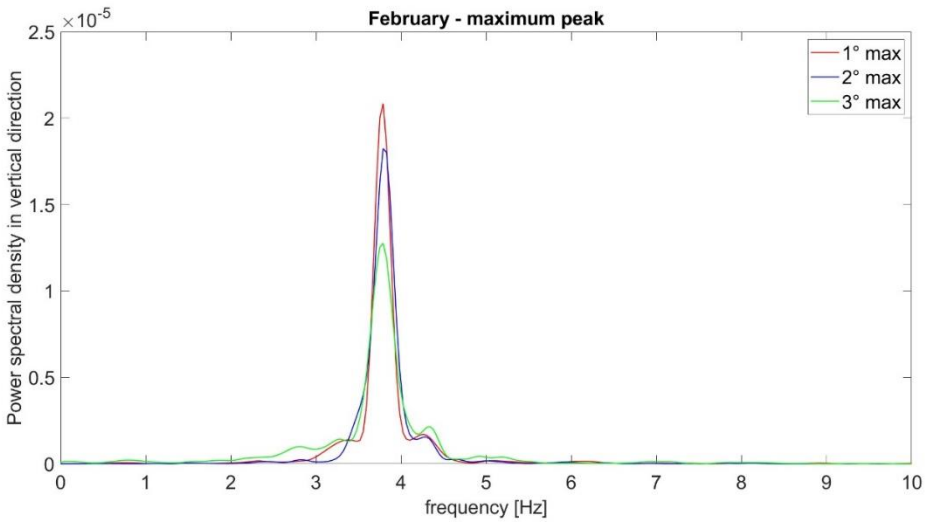


Figure 1-16: Results obtained from the 3 accelerograms with highest peak if PSD

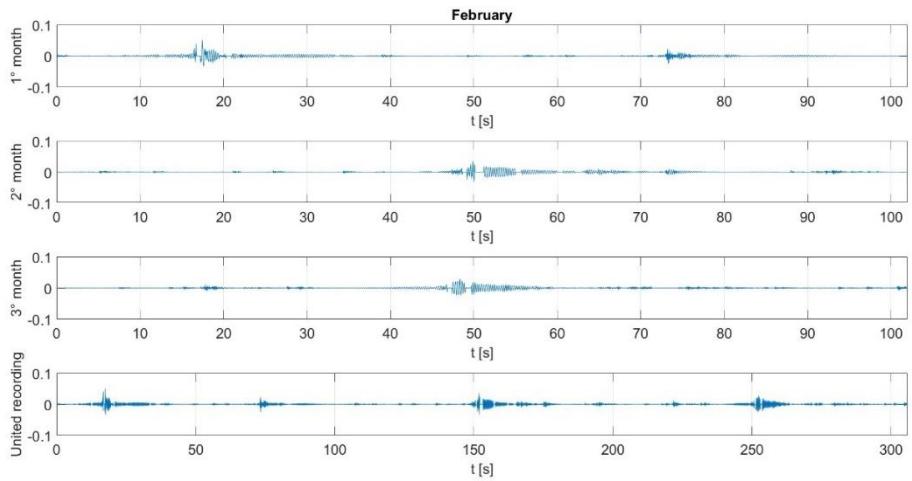


Figure 1-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.2.2 Longitudinal direction (y)

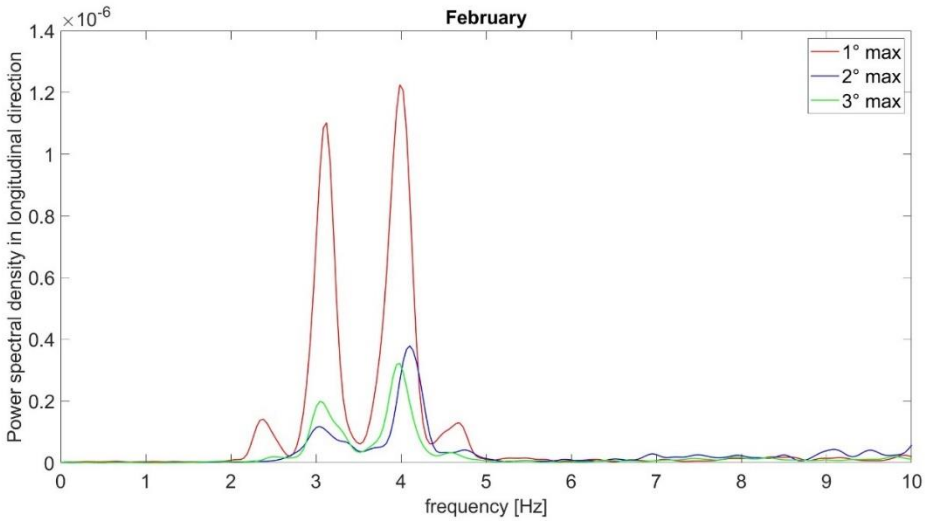


Figure 1-18: Results obtained from the 3 accelerograms with maximum SD in time domain

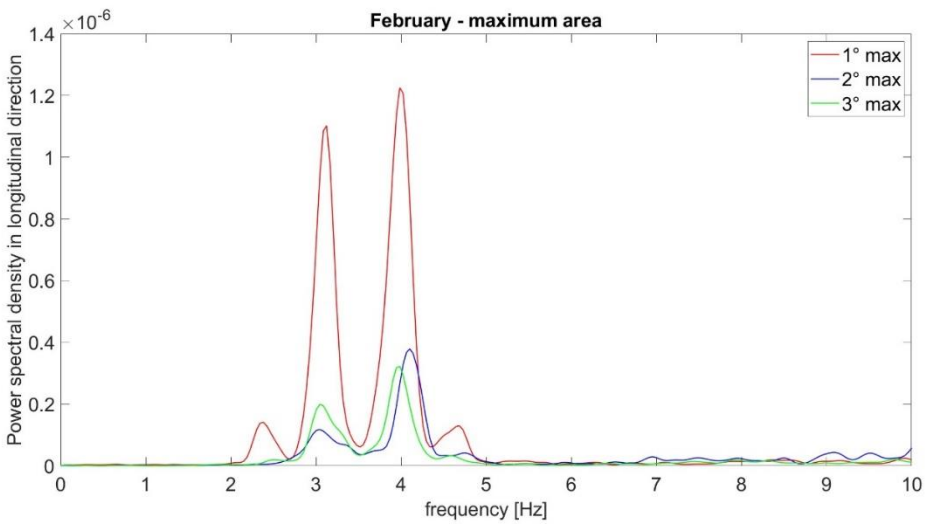


Figure 1-19: Results obtained from the 3 accelerograms with maximum area of PSD

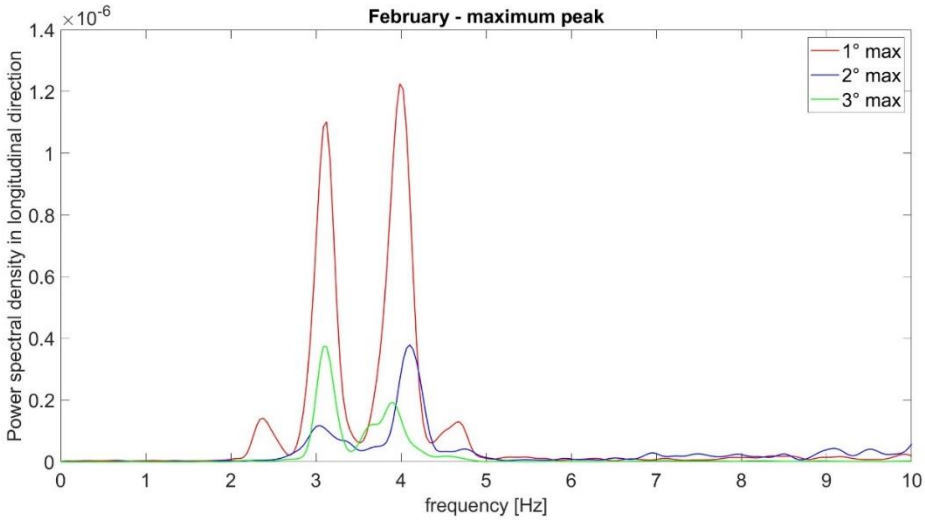


Figure 1-20: Results obtained from the 3 accelerograms with highest peak if PSD

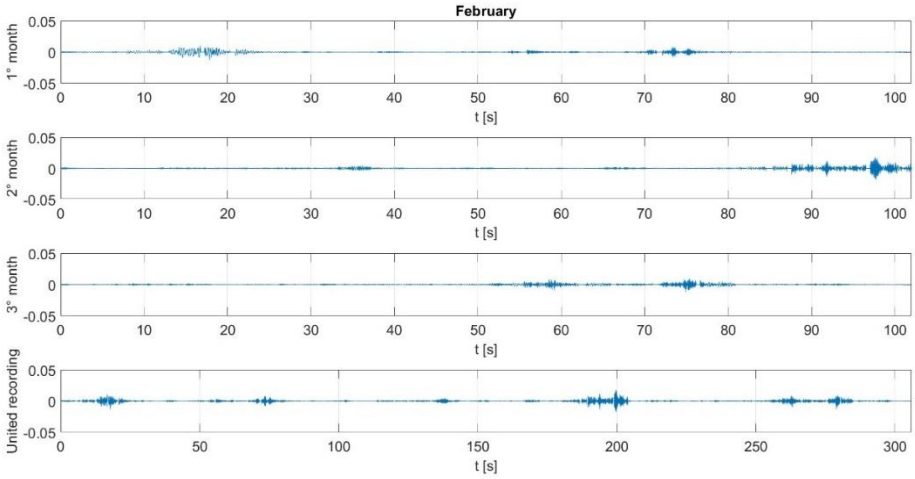


Figure 1-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.2.3 Transverse direction (z)

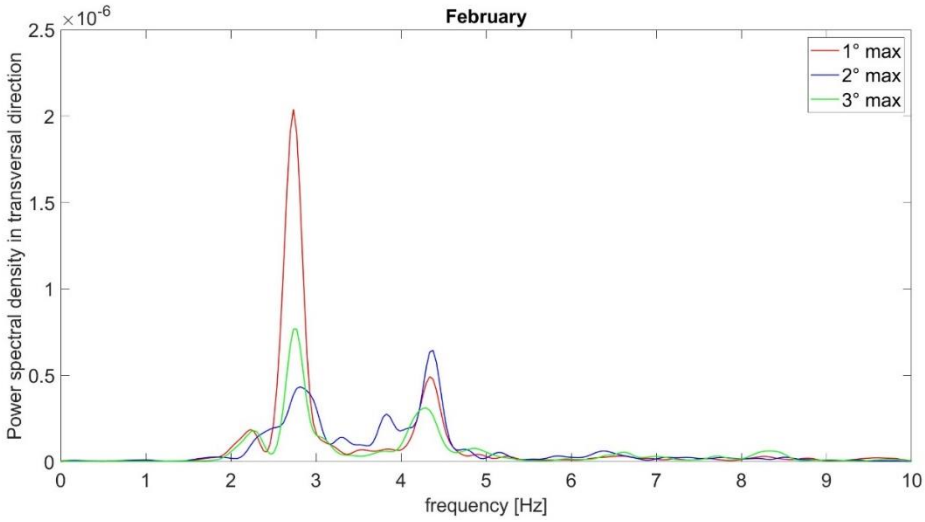


Figure 1-22: Results obtained from the 3 accelerograms with maximum SD in time domain

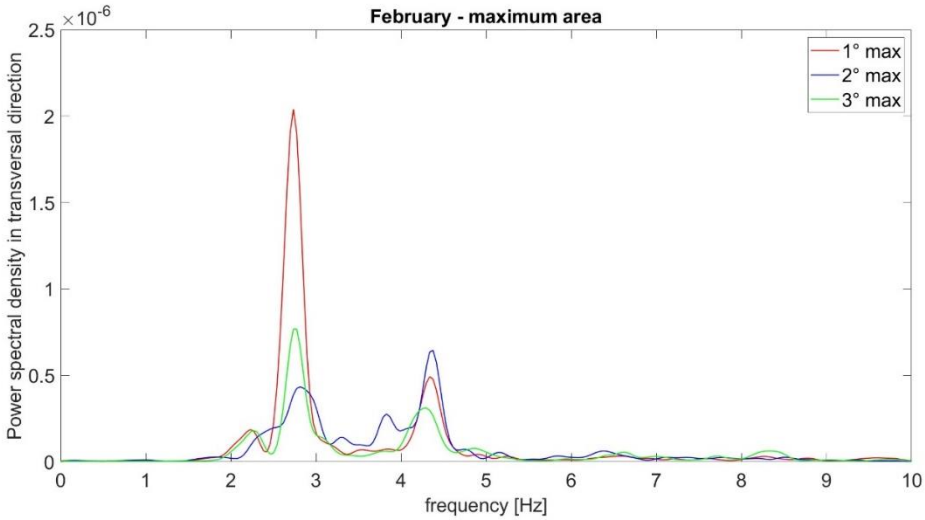


Figure 1-23: Results obtained from the 3 accelerograms with maximum area of PSD

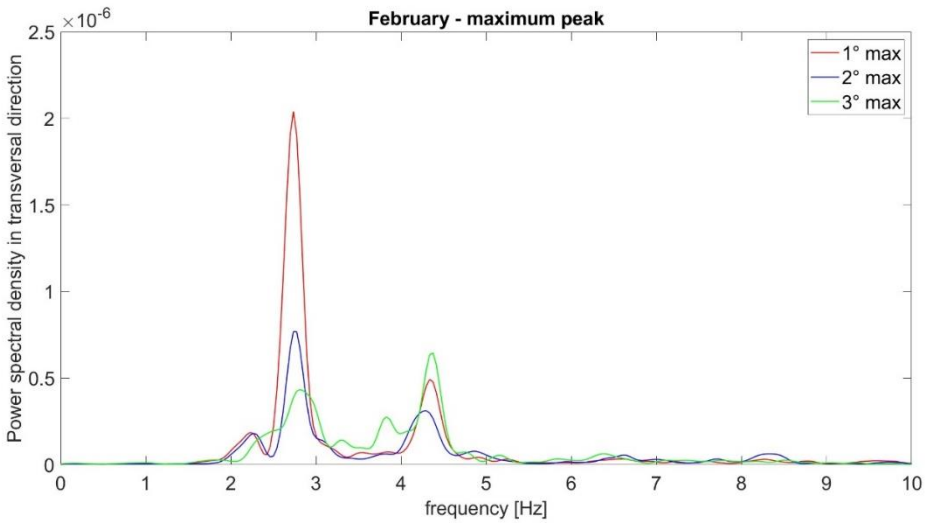


Figure 1-24: Results obtained from the 3 accelerograms with highest peak if PSD

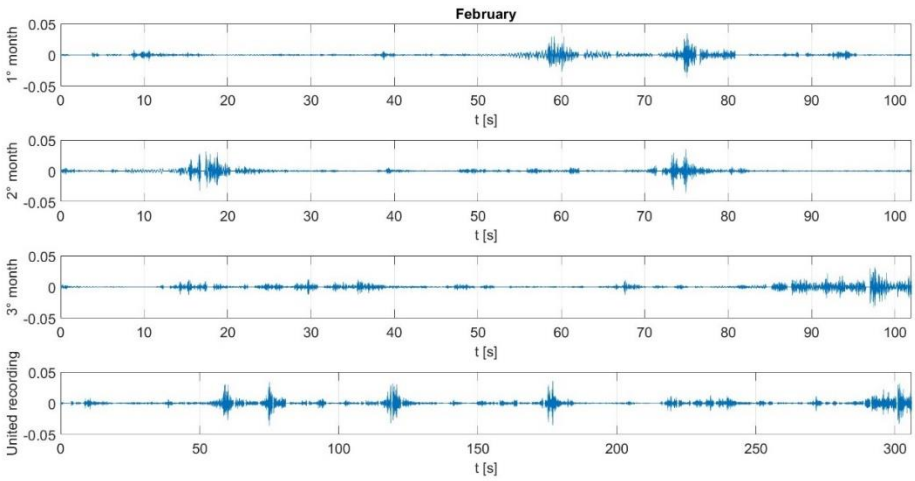


Figure 1-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

1.3 March

The results obtained for the March dataset are shown in the following tables.

Table 1-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-03-04_13-00-20	8.36E-03
	2°	3099D_2023-03-16_13-00-20	4.32E-03
	3°	3099D_2023-03-09_13-00-20	3.14E-03
Longitudinal direction (y)	1°	3099D_2023-03-04_13-00-20	1.79E-03
	2°	3099D_2023-03-16_13-00-20	1.41E-03
	3°	3099D_2023-03-08_13-00-21	1.08E-03
Transverse direction (z)	1°	3099D_2023-03-04_13-00-20	1.61E-03
	2°	3099D_2023-03-15_07-00-21	1.06E-03
	3°	3099D_2023-03-16_13-00-20	1.02E-03

Table 1-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-03-04_13-00-20	1.51E-04	3099D_2023-03-04_13-00-20	1.48E-05
2	3099D_2023-03-16_13-00-20	4.75E-05	3099D_2023-03-16_13-00-20	3.63E-06
3	3099D_2023-03-09_13-00-20	3.19E-05	3099D_2023-03-09_13-00-20	2.07E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-03-04_13-00-20	8.94E-06	3099D_2023-03-04_13-00-20	6.61E-07
2	3099D_2023-03-16_13-00-20	3.19E-06	3099D_2023-03-16_13-00-20	4.02E-07
3	3099D_2023-03-08_13-00-21	2.73E-06	3099D_2023-03-08_13-00-21	2.43E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-03-04_13-00-20	7.27E-06	3099D_2023-03-04_13-00-20	5.21E-07
2	3099D_2023-03-23_07-00-21	1.59E-06	3099D_2023-03-15_07-00-21	2.22E-07
3	3099D_2023-03-16_13-00-20	1.53E-06	3099D_2023-03-16_13-00-20	2.10E-07

Table 1-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	B	B	B	E	-	E
3	C	C	C	D	D	D	B	B	B

1.3.1 Vertical direction (x)

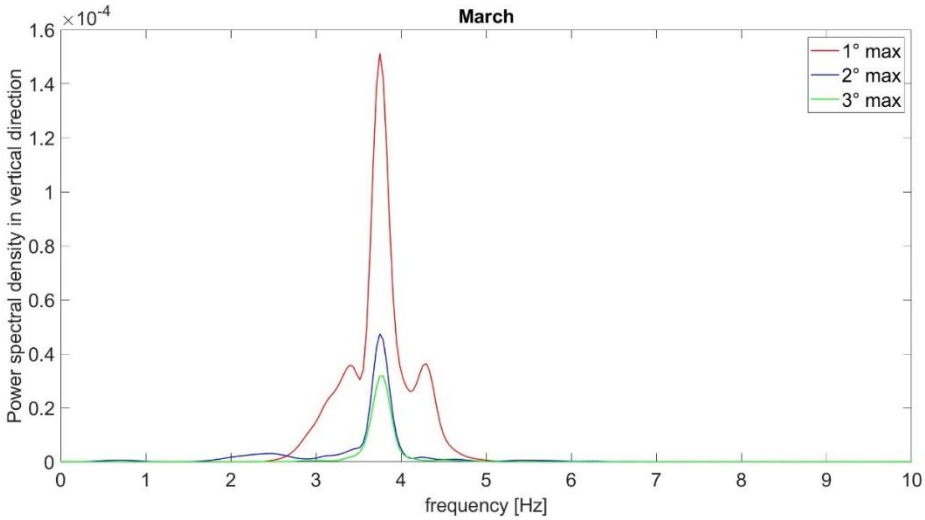


Figure 1-26: Results obtained from the 3 accelerograms with maximum SD in time domain

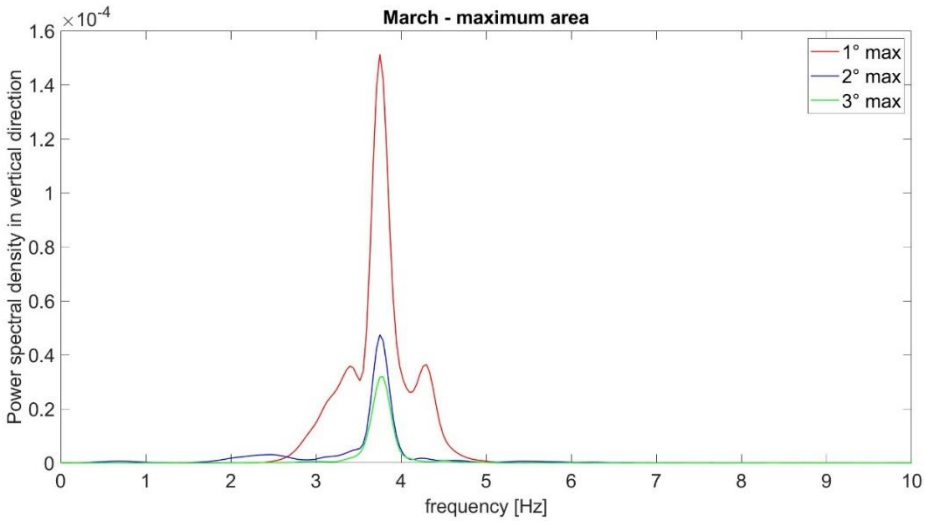


Figure 1-27: Results obtained from the 3 accelerograms with maximum area of PSD

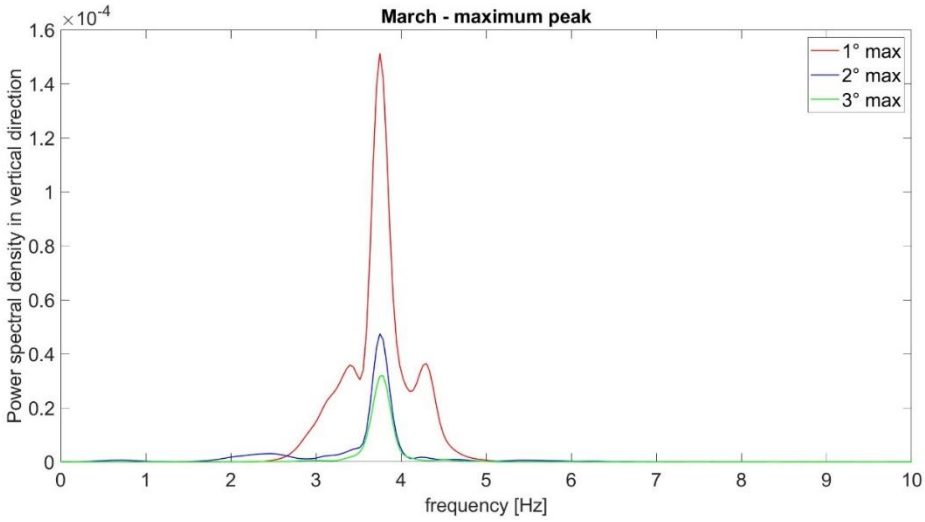


Figure 1-28: Results obtained from the 3 accelerograms with highest peak if PSD

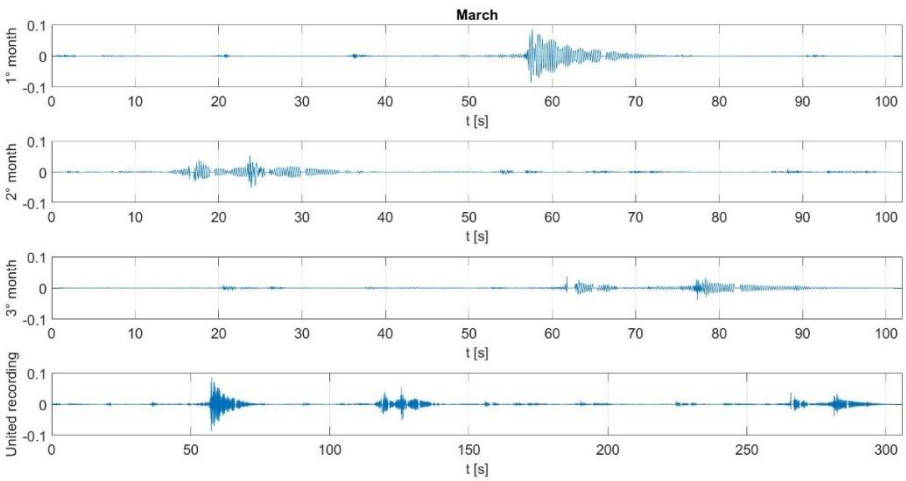


Figure 1-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.3.2 Longitudinal direction (y)

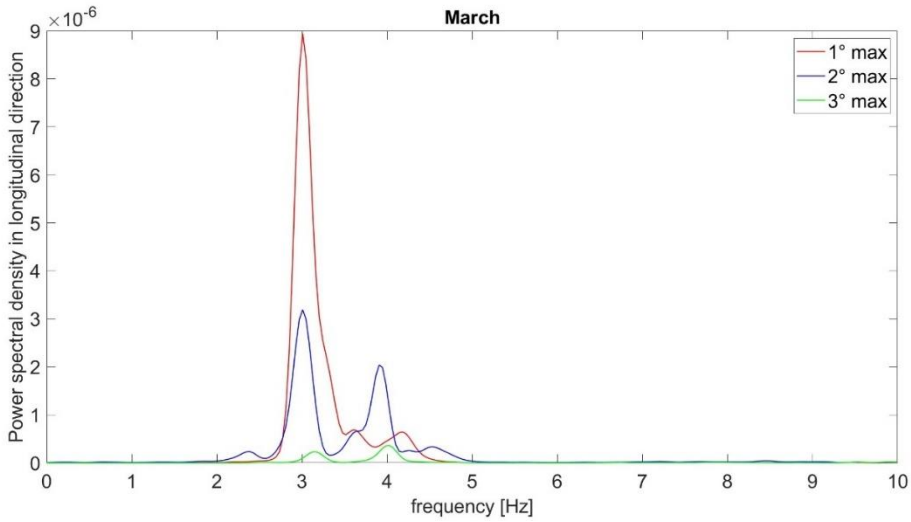


Figure 1-30: Results obtained from the 3 accelerograms with maximum SD in time domain

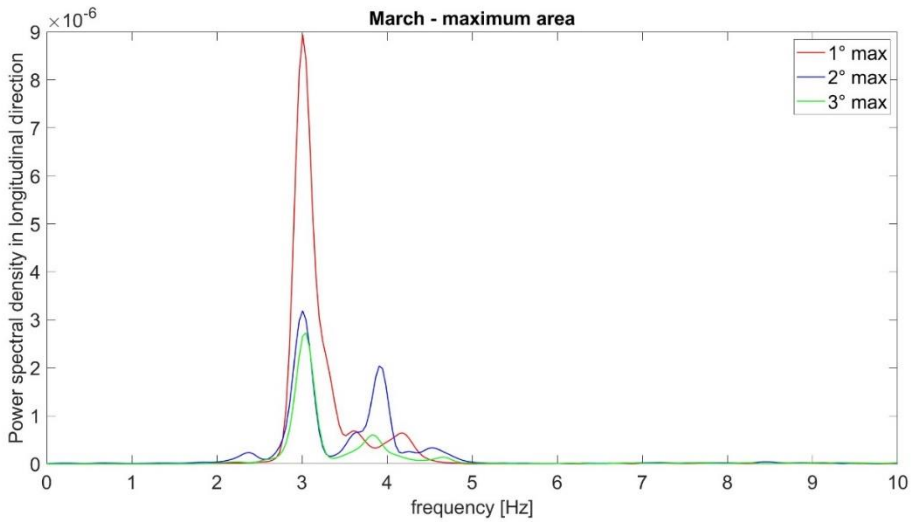


Figure 1-31: Results obtained from the 3 accelerograms with maximum area of PSD

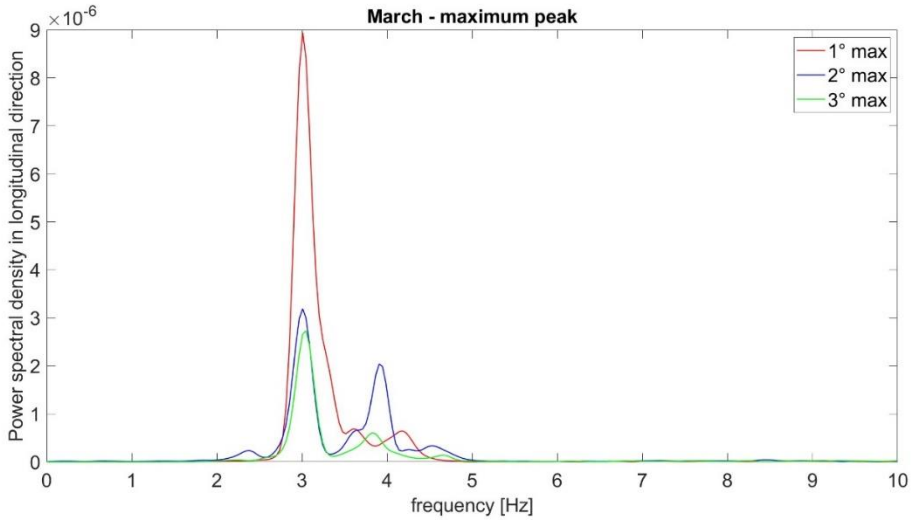


Figure 1-32: Results obtained from the 3 accelerograms with highest peak if PSD

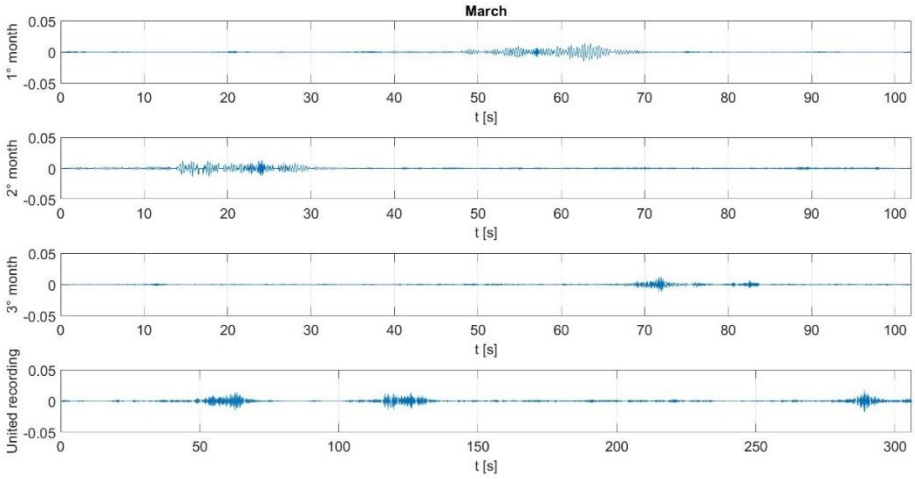


Figure 1-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.3.3 Transverse direction (z)

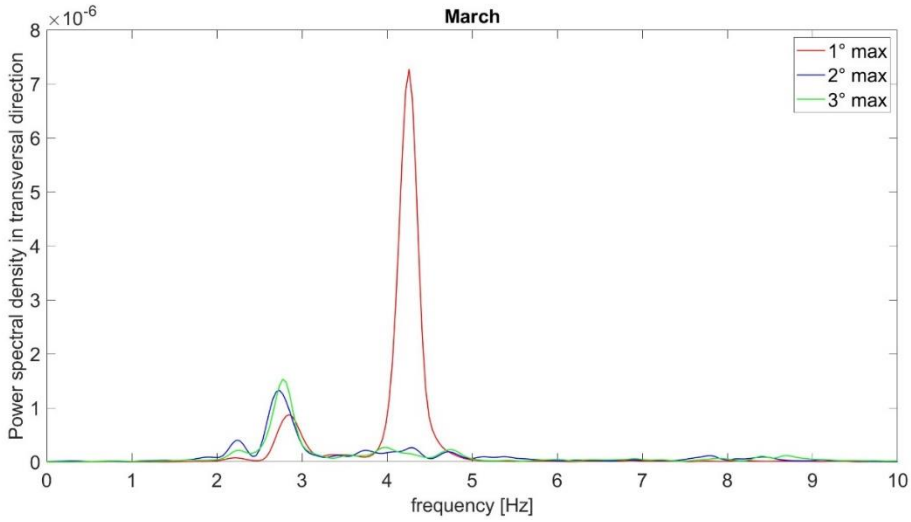


Figure 1-34: Results obtained from the 3 accelerograms with maximum SD in time domain

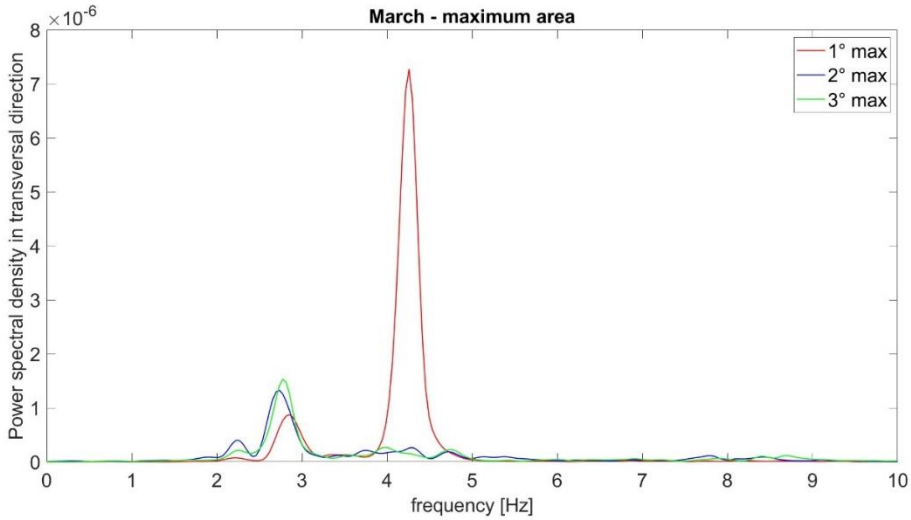


Figure 1-35: Results obtained from the 3 accelerograms with maximum area of PSD

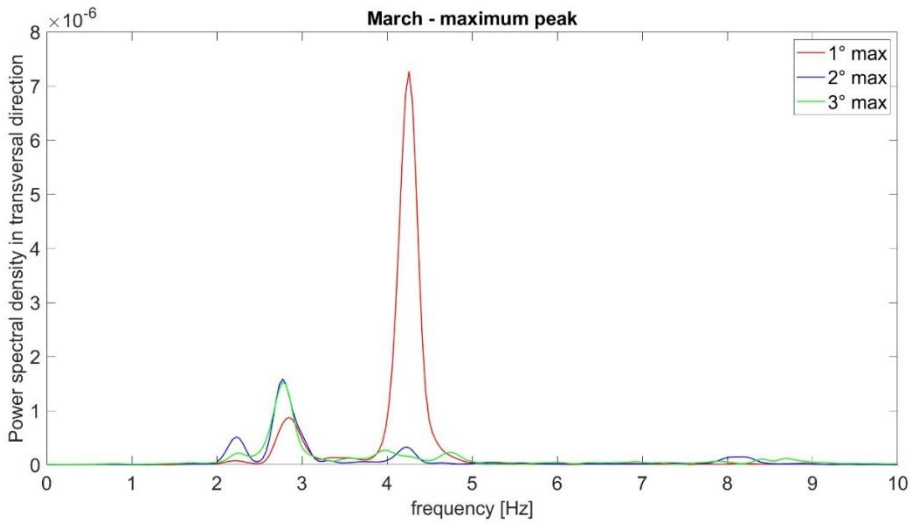


Figure 1-36: Results obtained from the 3 accelerograms with highest peak if PSD

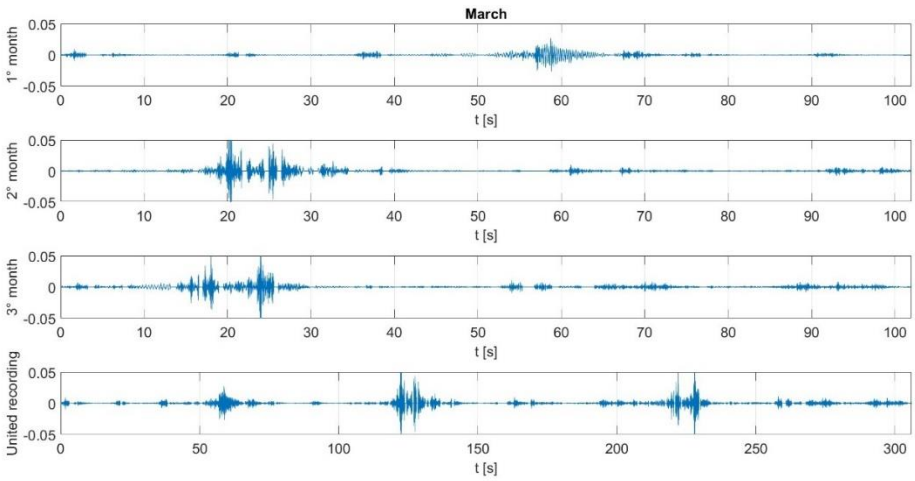


Figure 1-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

1.4 April

The results obtained for the April dataset are shown in the following tables.

Table 1-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-04-18_14-00-21	2.73E-03
	2°	3099D_2023-04-20_08-00-21	2.44E-03
	3°	3099D_2023-04-16_08-00-21	2.10E-03
Longitudinal direction (y)	1°	3099D_2023-04-07_08-00-21	5.20E-04
	2°	3099D_2023-04-11_08-00-21	4.81E-04
	3°	3099D_2023-04-20_08-00-21	4.65E-04
Transverse direction (z)	1°	3099D_2023-04-20_08-00-21	8.08E-04
	2°	3099D_2023-04-03_08-00-21	8.07E-04
	3°	3099D_2023-04-11_08-00-21	7.71E-04

Table 1-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-04-18_14-00-21	2.11E-05	3099D_2023-04-18_14-00-21	1.49E-06
2	3099D_2023-04-20_08-00-21	1.77E-05	3099D_2023-04-20_08-00-21	1.28E-06
3	3099D_2023-04-16_08-00-21	1.46E-05	3099D_2023-04-16_08-00-21	8.88E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-04-21_08-00-20	4.02E-07	3099D_2023-04-07_08-00-21	5.46E-08
2	3099D_2023-04-07_08-00-21	3.66E-07	3099D_2023-04-11_08-00-21	4.99E-08
3	3099D_2023-04-11_08-00-21	3.30E-07	3099D_2023-04-20_08-00-21	4.50E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-04-20_08-00-21	9.50E-07	3099D_2023-04-11_08-00-21	1.43E-07
2	3099D_2023-04-11_08-00-21	8.55E-07	3099D_2023-04-03_08-00-21	1.38E-07
3	3099D_2023-04-07_08-00-21	5.80E-07	3099D_2023-04-20_08-00-21	1.36E-07

Table 1-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	-	D	F	F	G
2	B	B	B	E	D	E	H	G	H
3	C	C	C	B	E	B	G	-	F

1.4.1 Vertical direction (x)

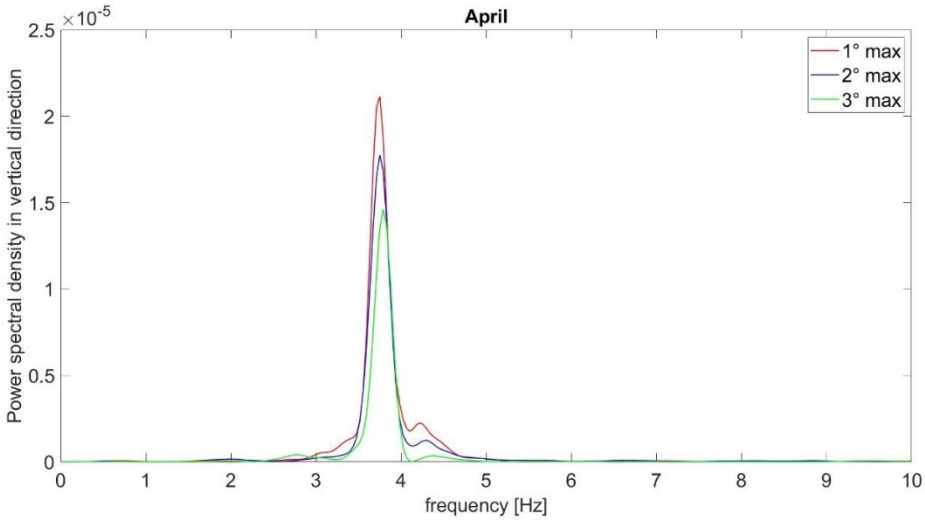


Figure 1-38: Results obtained from the 3 accelerograms with maximum SD in time domain

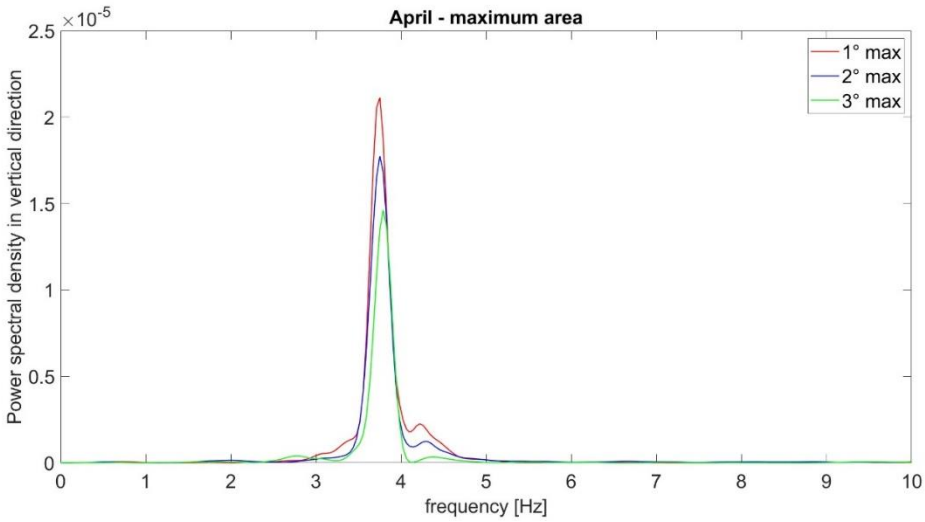


Figure 1-39: Results obtained from the 3 accelerograms with maximum area of PSD

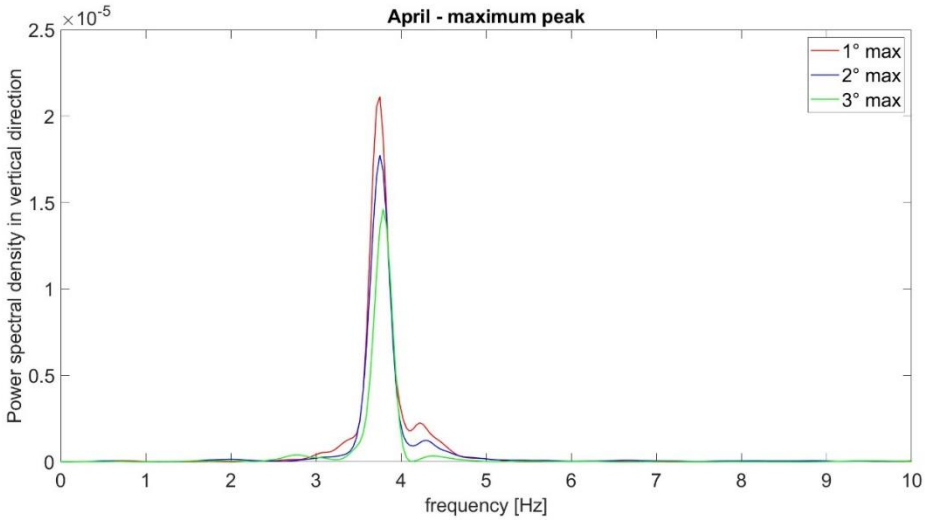


Figure 1-40: Results obtained from the 3 accelerograms with highest peak if PSD

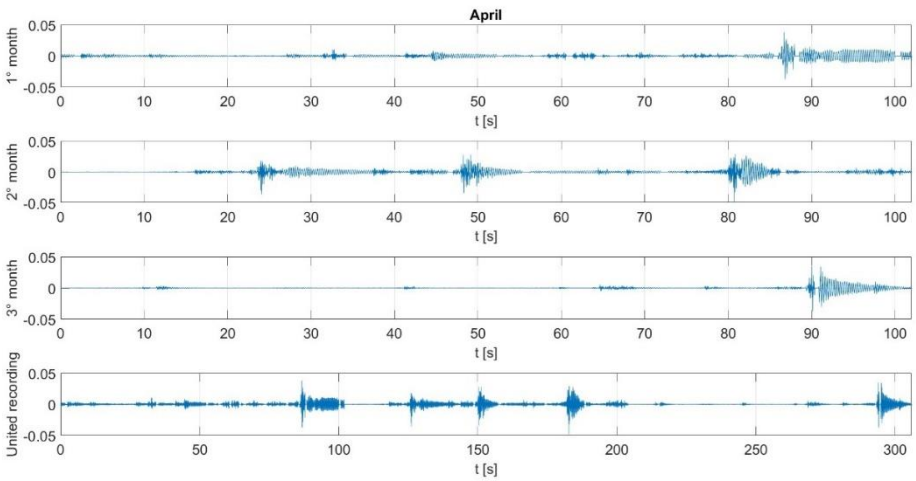


Figure 1-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.4.2 Longitudinal direction (y)

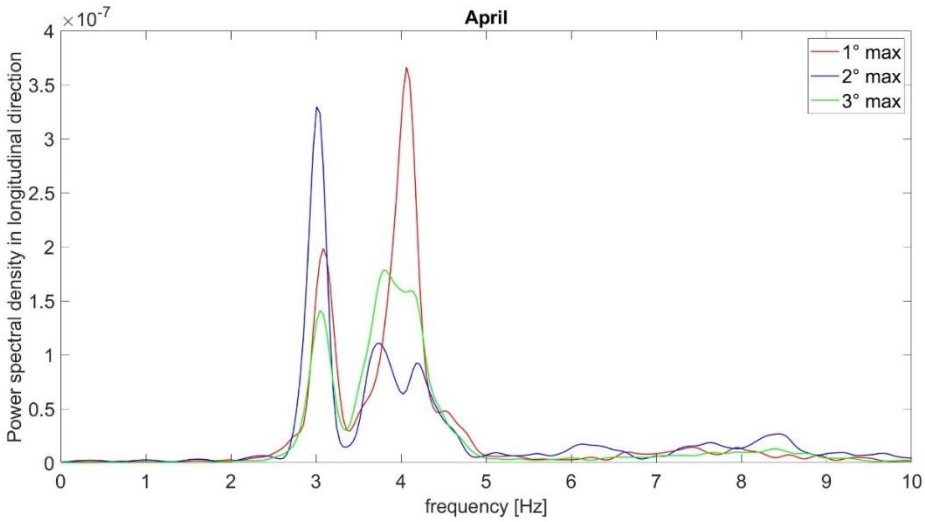


Figure 1-42: Results obtained from the 3 accelerograms with maximum SD in time domain

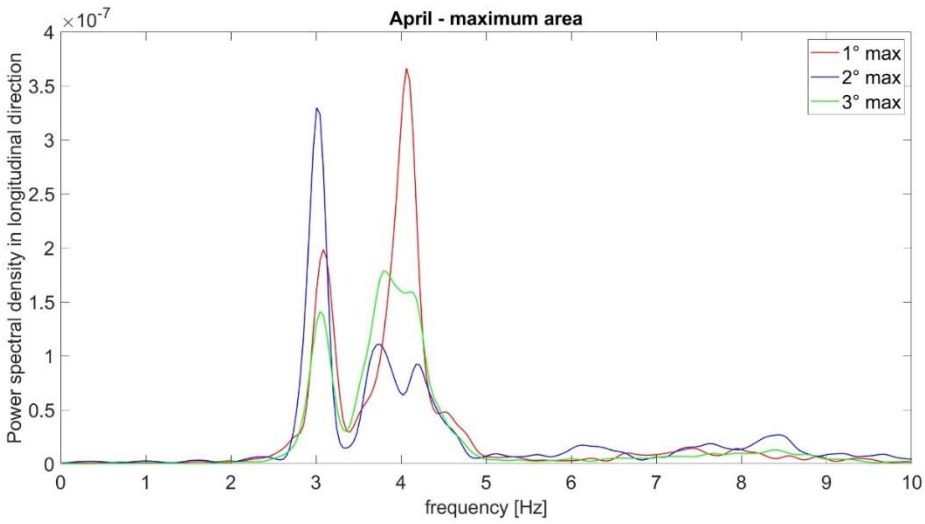


Figure 1-43: Results obtained from the 3 accelerograms with maximum area of PSD

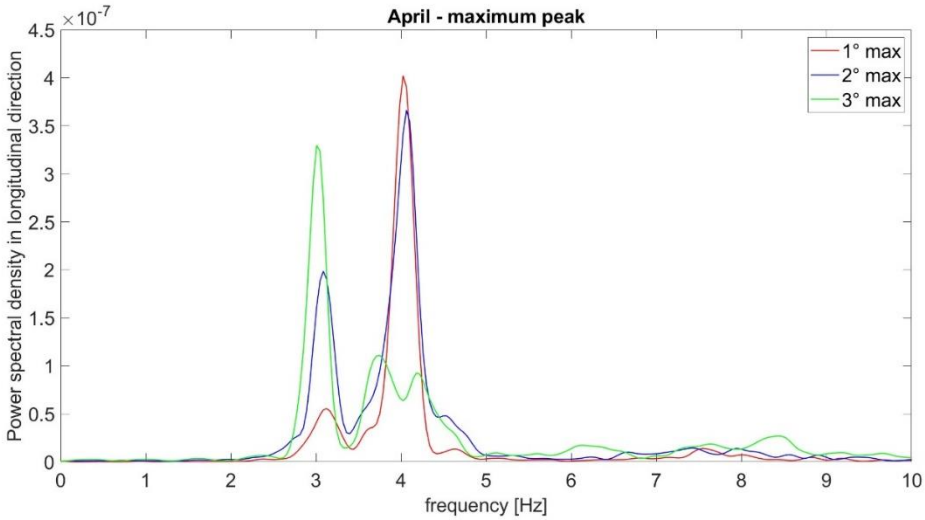


Figure 1-44: Results obtained from the 3 accelerograms with highest peak if PSD

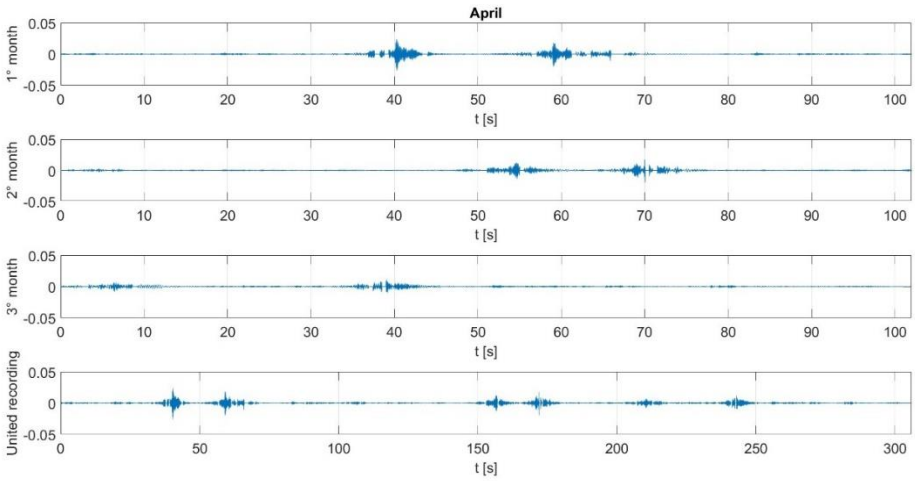


Figure 1-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.4.3 Transverse direction (z)

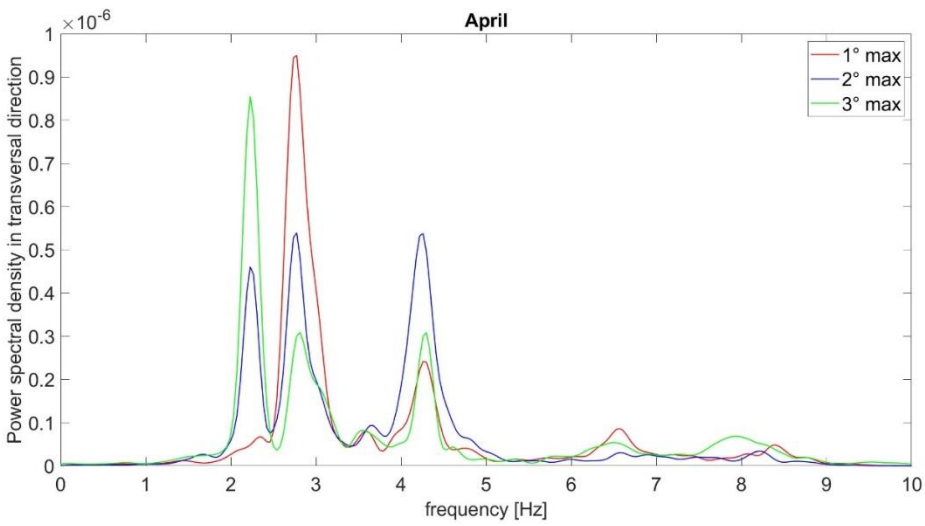


Figure 1-46: Results obtained from the 3 accelerograms with maximum SD in time domain

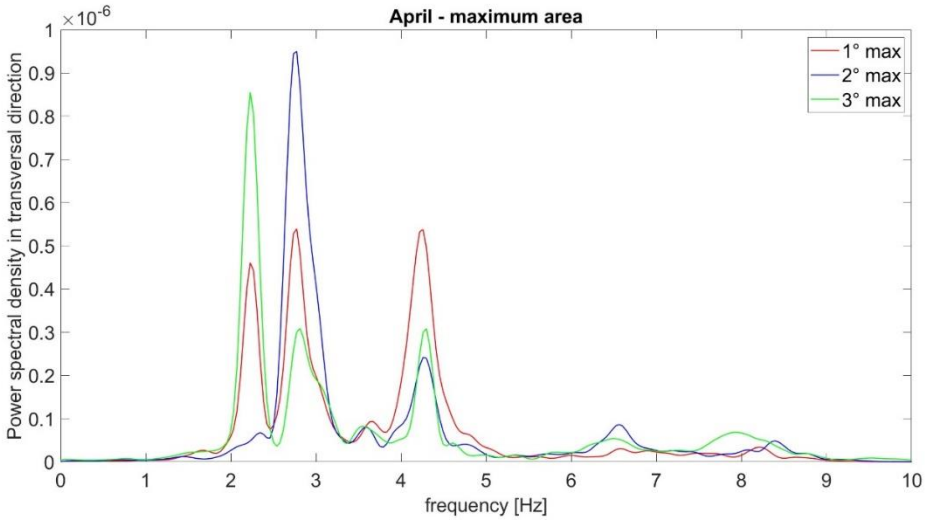


Figure 1-47: Results obtained from the 3 accelerograms with maximum area of PSD

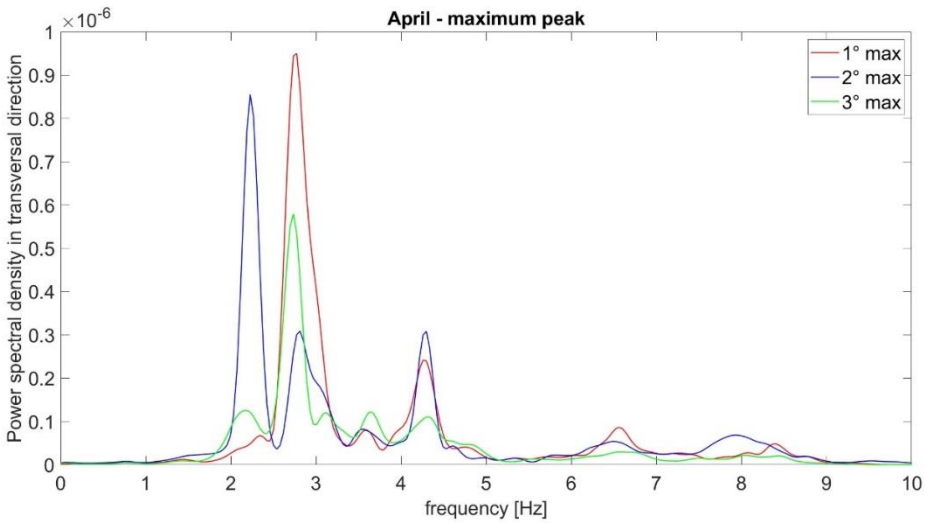


Figure 1-48: Results obtained from the 3 accelerograms with highest peak if PSD

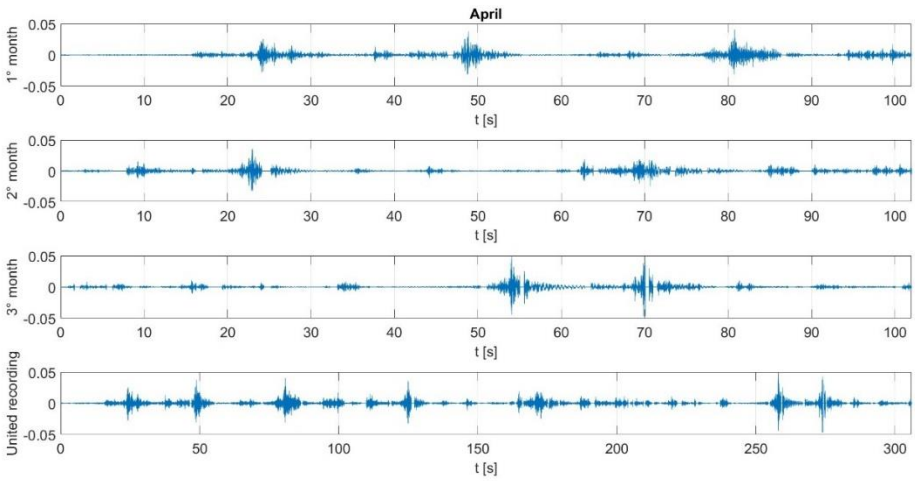


Figure 1-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

1.5 May

The results obtained for the May dataset are shown in the following tables.

Table 1-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-05-23_14-00-21	4.08E-03
	2°	3099D_2023-05-01_20-00-21	2.93E-03
	3°	3099D_2023-05-04_14-00-21	2.88E-03
Longitudinal direction (y)	1°	3099D_2023-05-19_14-00-21	1.40E-03
	2°	3099D_2023-05-23_14-00-21	8.26E-04
	3°	3099D_2023-05-04_14-00-21	6.16E-04
Transverse direction (z)	1°	3099D_2023-05-23_14-00-21	1.20E-03
	2°	3099D_2023-05-04_14-00-21	7.39E-04
	3°	3099D_2023-05-09_14-00-20	6.77E-04

Table 1-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-05-01_20-00-21	2.86E-05	3099D_2023-05-23_14-00-21	3.49E-06
2	3099D_2023-05-23_14-00-21	2.47E-05	3099D_2023-05-04_14-00-21	1.78E-06
3	3099D_2023-05-11_14-00-20	2.30E-05	3099D_2023-05-01_20-00-21	1.71E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-05-19_14-00-21	2.88E-06	3099D_2023-05-19_14-00-21	1.54E-07
2	3099D_2023-05-23_14-00-21	5.31E-07	3099D_2023-05-23_14-00-21	1.35E-07
3	3099D_2023-05-11_14-00-20	4.21E-07	3099D_2023-05-04_14-00-21	7.65E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-05-23_14-00-21	2.00E-06	3099D_2023-05-23_14-00-21	3.04E-07
2	3099D_2023-05-19_14-00-21	6.37E-07	3099D_2023-05-04_14-00-21	1.13E-07
3	3099D_2023-05-02_20-00-21	3.97E-07	3099D_2023-05-09_14-00-20	9.49E-08

Table 1-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	D	D	D	A	A	A
2	B	A	C	A	A	A	C	-	C
3	C	-	B	C	-	C	E	-	E

1.5.1 Vertical direction (x)

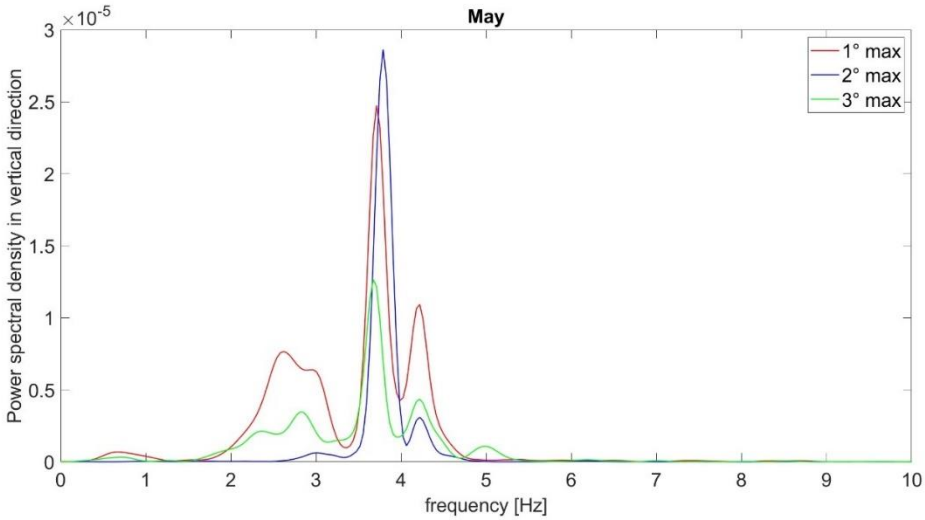


Figure 1-50: Results obtained from the 3 accelerograms with maximum SD in time domain

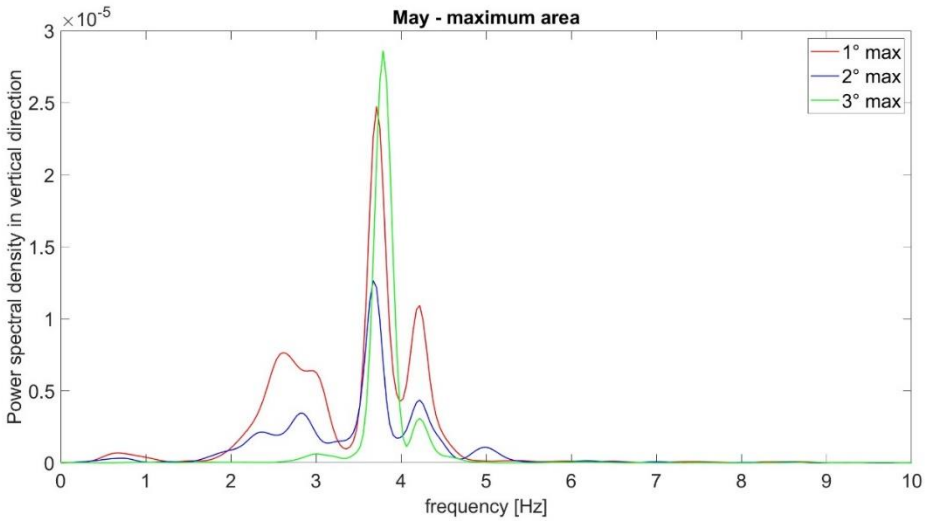


Figure 1-51: Results obtained from the 3 accelerograms with maximum area of PSD

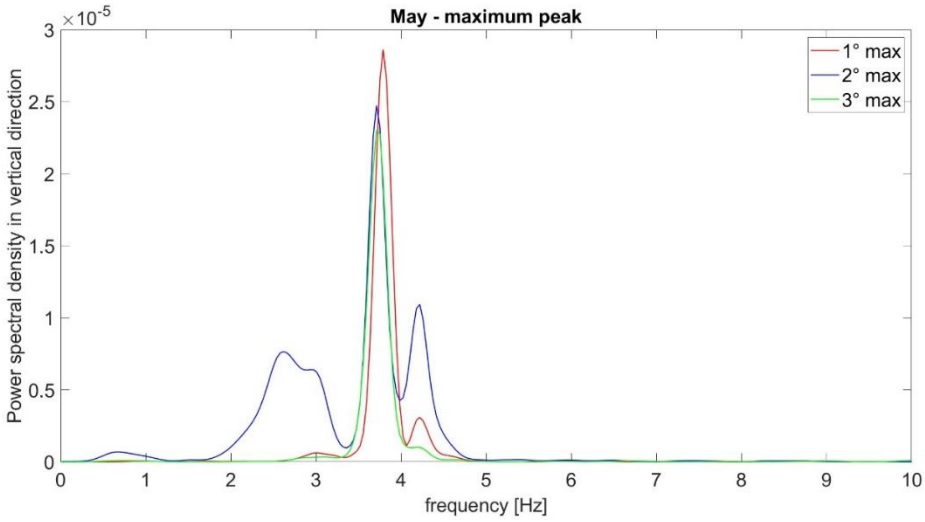


Figure 1-52: Results obtained from the 3 accelerograms with highest peak if PSD

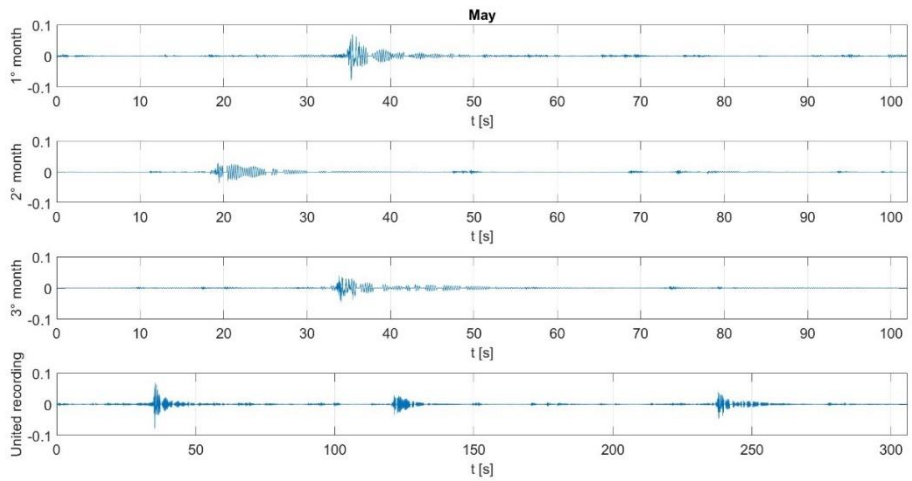


Figure 1-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.5.2 Longitudinal direction (y)

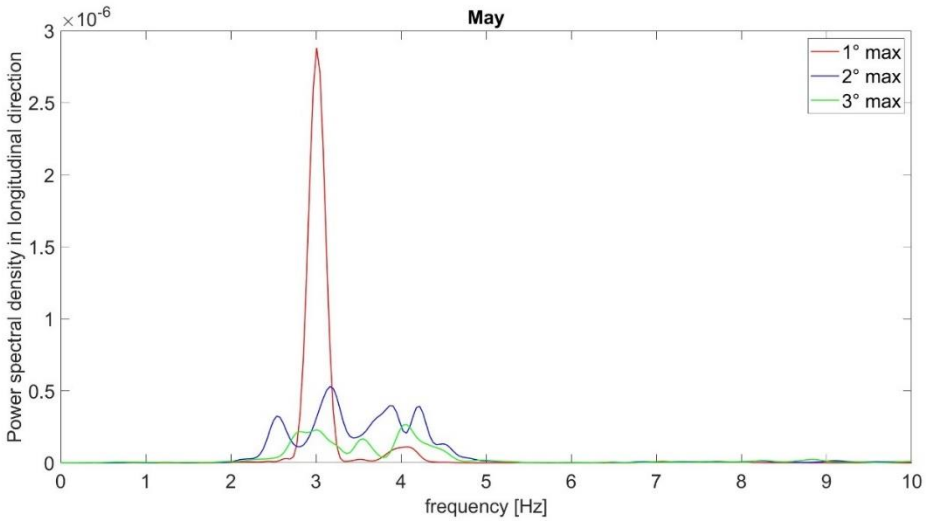


Figure 1-54: Results obtained from the 3 accelerograms with maximum SD in time domain

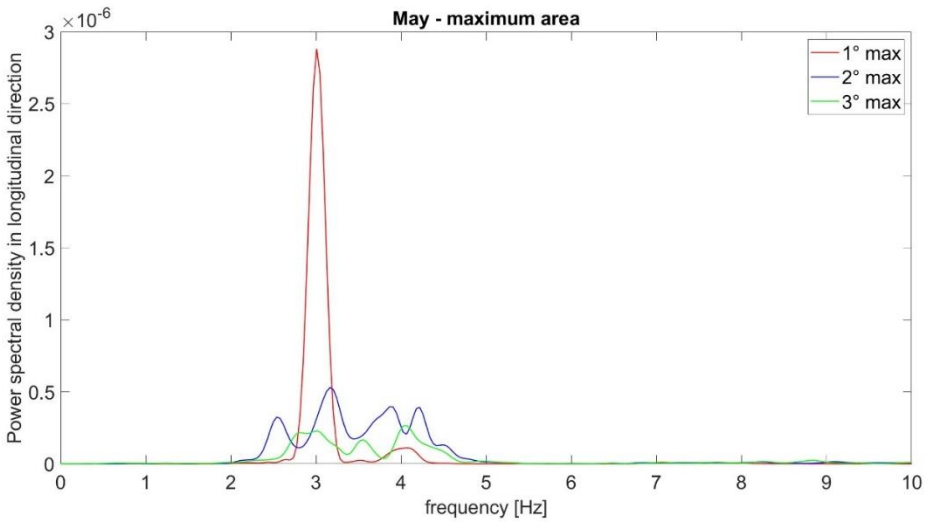


Figure 1-55: Results obtained from the 3 accelerograms with maximum area of PSD

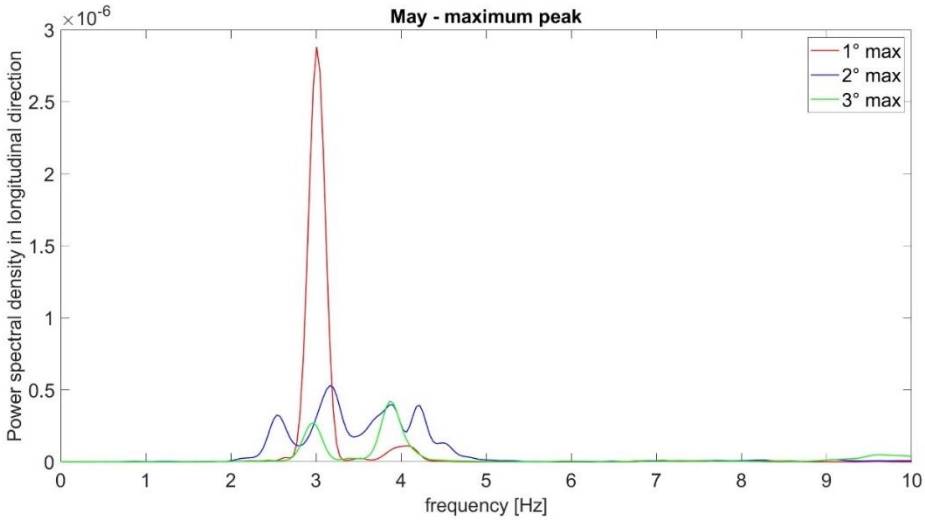


Figure 1-56: Results obtained from the 3 accelerograms with highest peak if PSD

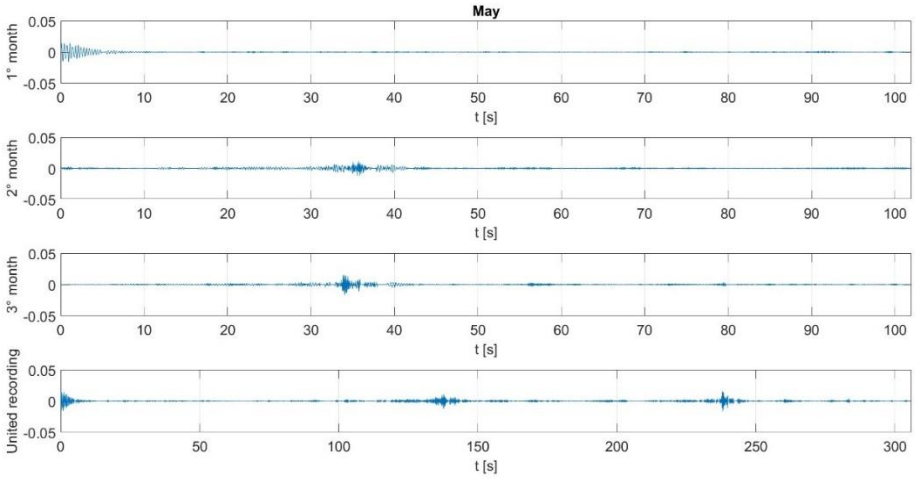


Figure 1-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.5.3 Transverse direction (z)

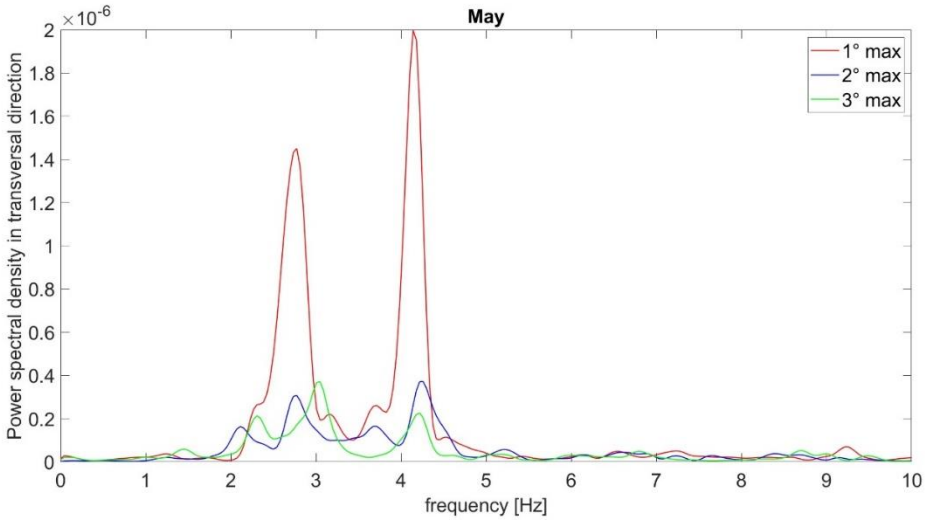


Figure 1-58: Results obtained from the 3 accelerograms with maximum SD in time domain

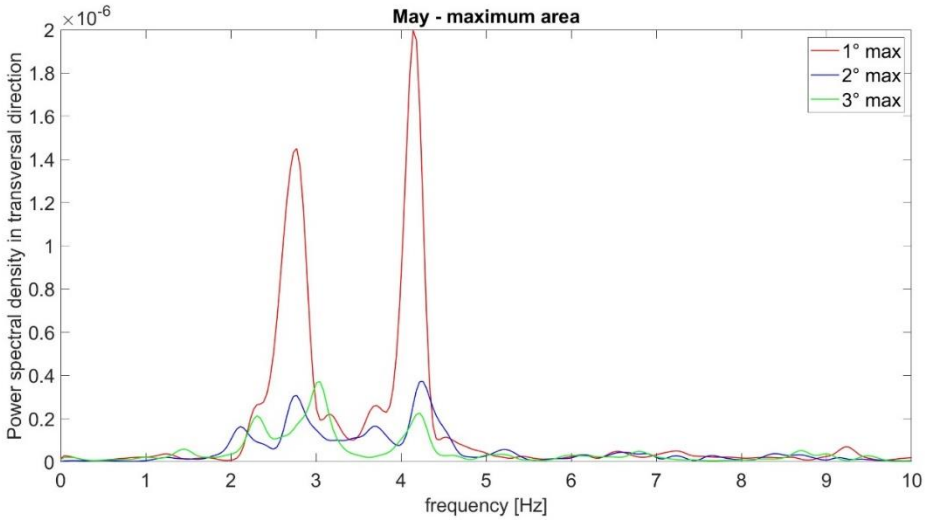


Figure 1-59: Results obtained from the 3 accelerograms with maximum area of PSD

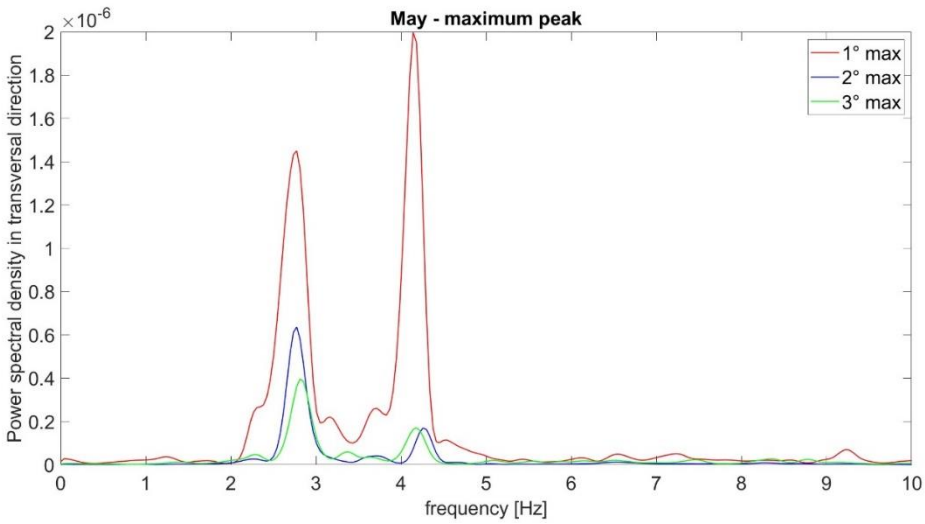


Figure 1-60: Results obtained from the 3 accelerograms with highest peak if PSD

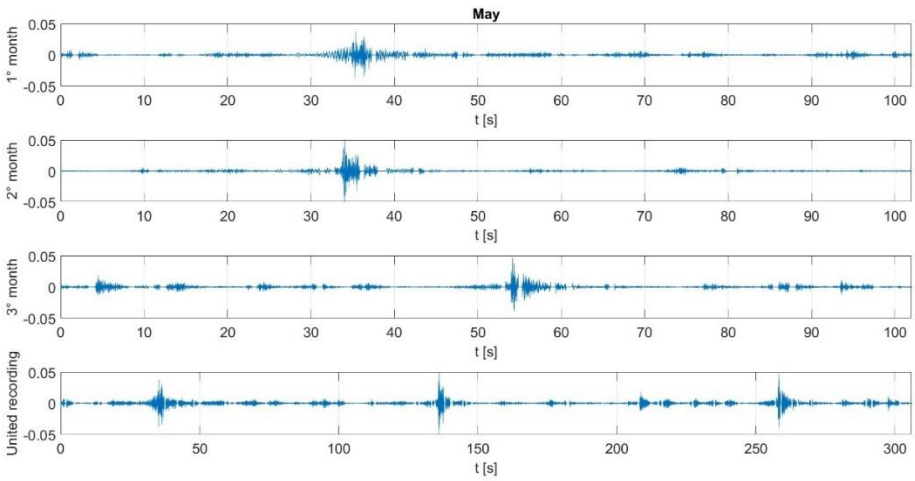


Figure 1-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

1.6 June

The results obtained for the June dataset are shown in the following tables.

Table 1-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-06-13_08-00-20	3.50E-03
	2°	3099D_2023-06-27_14-00-21	3.41E-03
	3°	3099D_2023-06-23_20-00-21	3.01E-03
Longitudinal direction (y)	1°	3099D_2023-06-13_08-00-20	1.25E-03
	2°	3099D_2023-06-27_14-00-21	5.23E-04
	3°	3099D_2023-06-20_08-00-21	4.96E-04
Transverse direction (z)	1°	3099D_2023-06-13_08-00-20	8.70E-04
	2°	3099D_2023-06-09_14-00-20	7.60E-04
	3°	3099D_2023-06-28_14-00-21	7.28E-04

Table 1-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-06-27_14-00-21	3.83E-05	3099D_2023-06-13_08-00-20	2.47E-06
2	3099D_2023-06-23_20-00-21	2.83E-05	3099D_2023-06-27_14-00-21	2.43E-06
3	3099D_2023-06-13_08-00-20	2.66E-05	3099D_2023-06-23_20-00-21	1.95E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-06-13_08-00-20	2.67E-06	3099D_2023-06-13_08-00-20	3.20E-07
2	3099D_2023-06-28_14-00-21	4.15E-07	3099D_2023-06-27_14-00-21	5.93E-08
3	3099D_2023-06-20_08-00-21	4.13E-07	3099D_2023-06-20_08-00-21	4.99E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-06-10_20-00-21	8.39E-07	3099D_2023-06-13_08-00-20	1.59E-07
2	3099D_2023-06-09_14-00-20	7.98E-07	3099D_2023-06-09_14-00-20	1.23E-07
3	3099D_2023-06-13_08-00-20	5.53E-07	3099D_2023-06-28_14-00-21	1.06E-07

Table 1-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	A	-	A
2	B	C	B	B	-	B	E	E	E
3	C	A	C	D	D	D	F	A	F

1.6.1 Vertical direction (x)

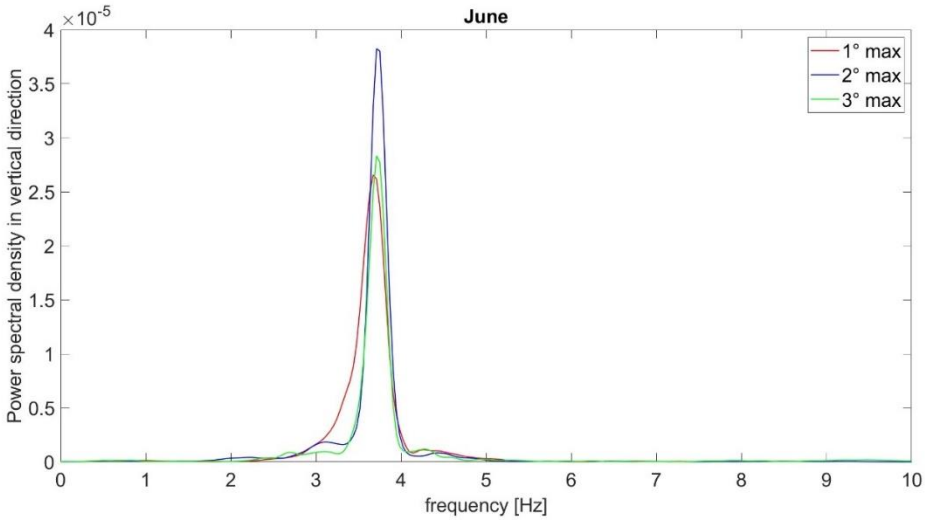


Figure 1-62: Results obtained from the 3 accelerograms with maximum SD in time domain

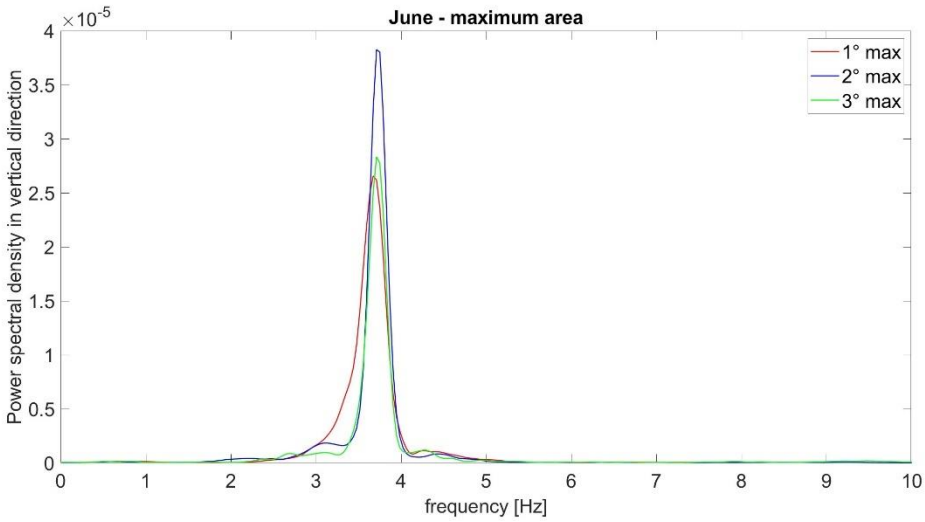


Figure 1-63: Results obtained from the 3 accelerograms with maximum area of PSD

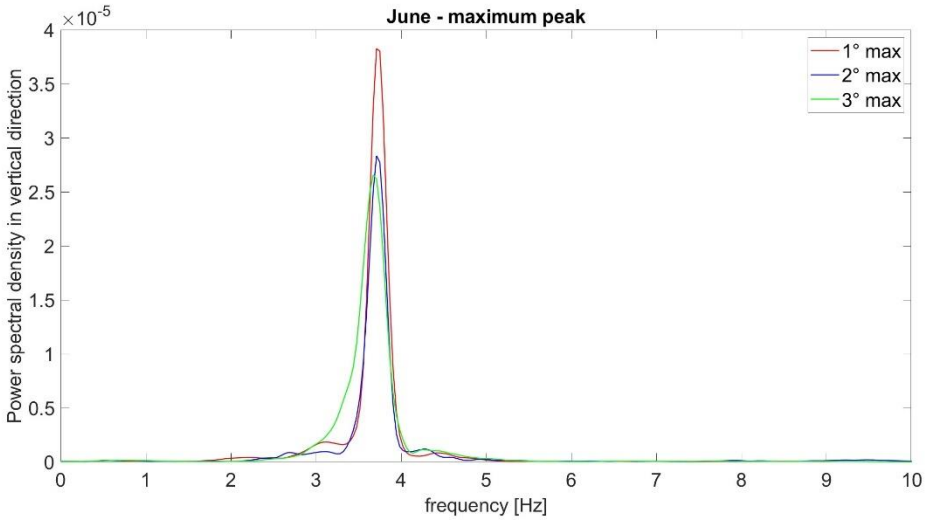


Figure 1-64: Results obtained from the 3 accelerograms with highest peak if PSD

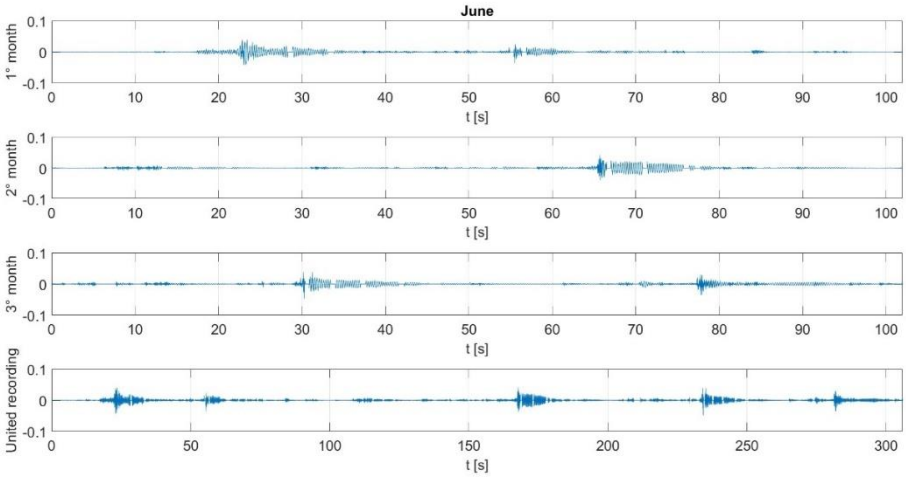


Figure 1-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.6.2 Longitudinal direction (y)

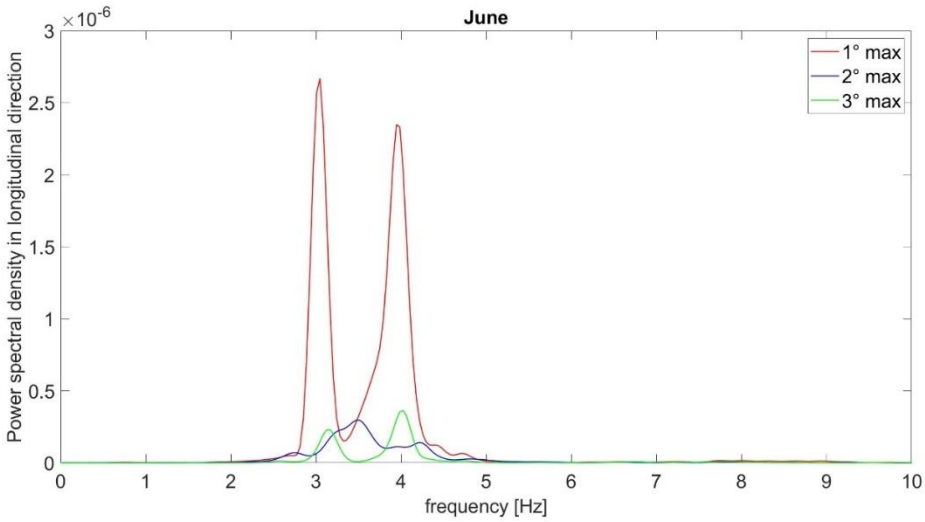


Figure 1-66: Results obtained from the 3 accelerograms with maximum SD in time domain

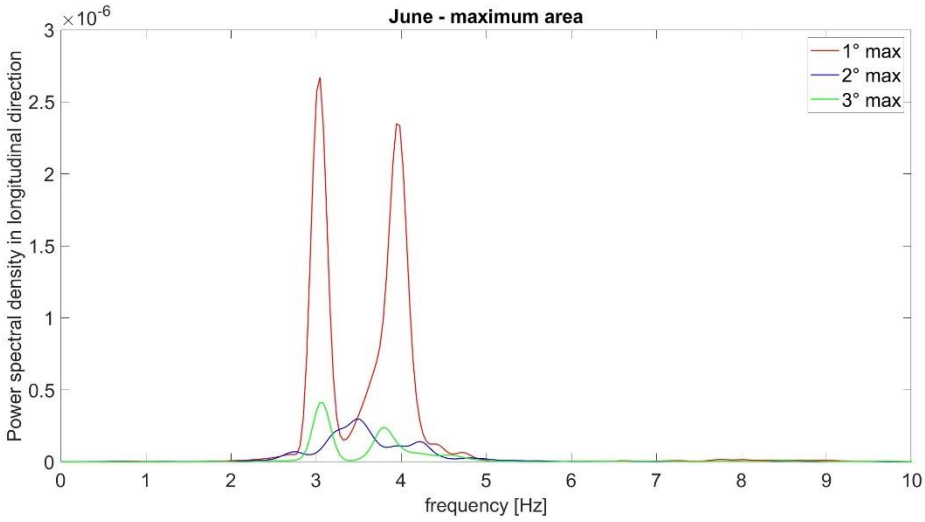


Figure 1-67: Results obtained from the 3 accelerograms with maximum area of PSD

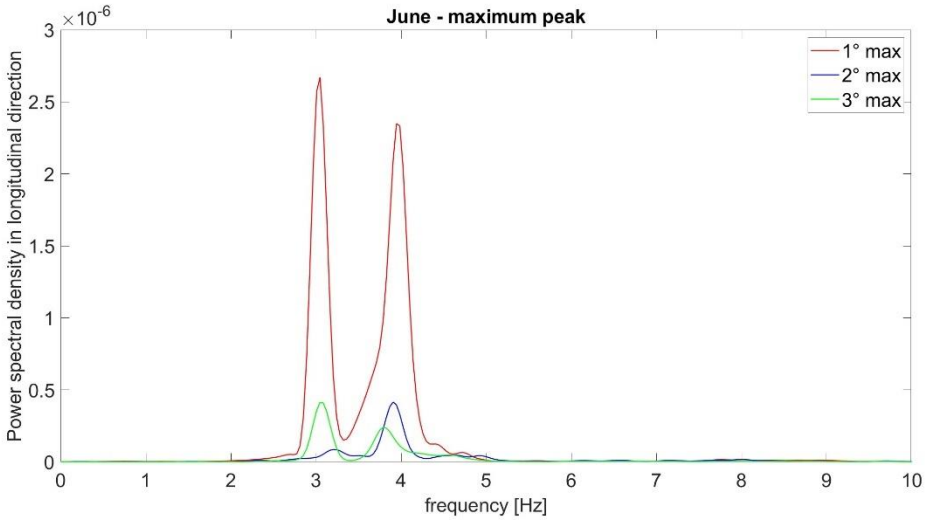


Figure 1-68: Results obtained from the 3 accelerograms with highest peak if PSD

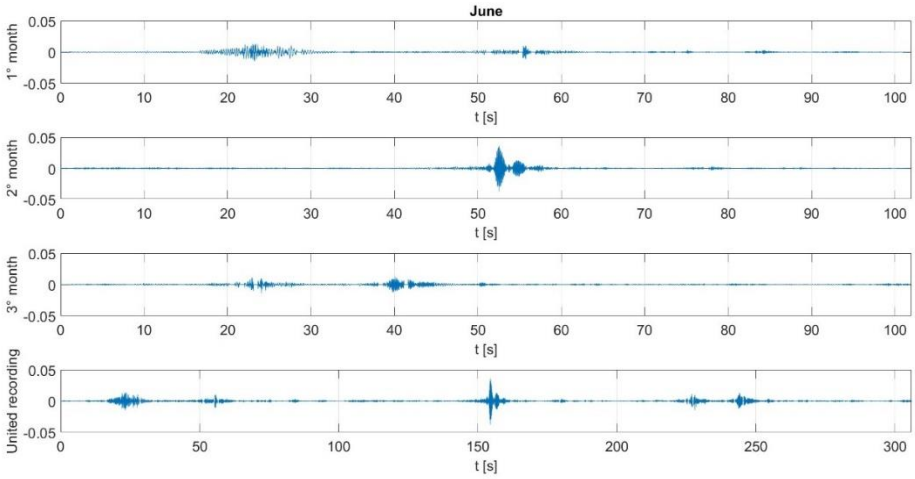


Figure 1-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.6.3 Transverse direction (z)

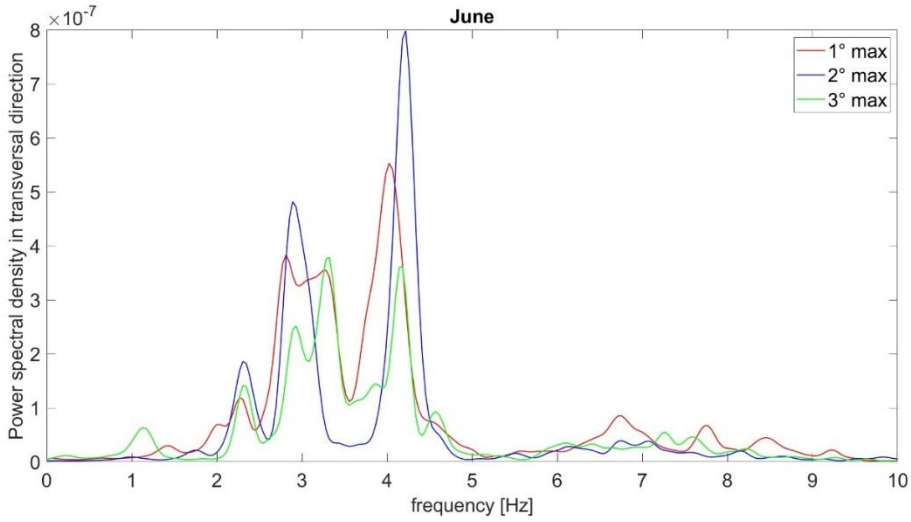


Figure 1-70: Results obtained from the 3 accelerograms with maximum SD in time domain

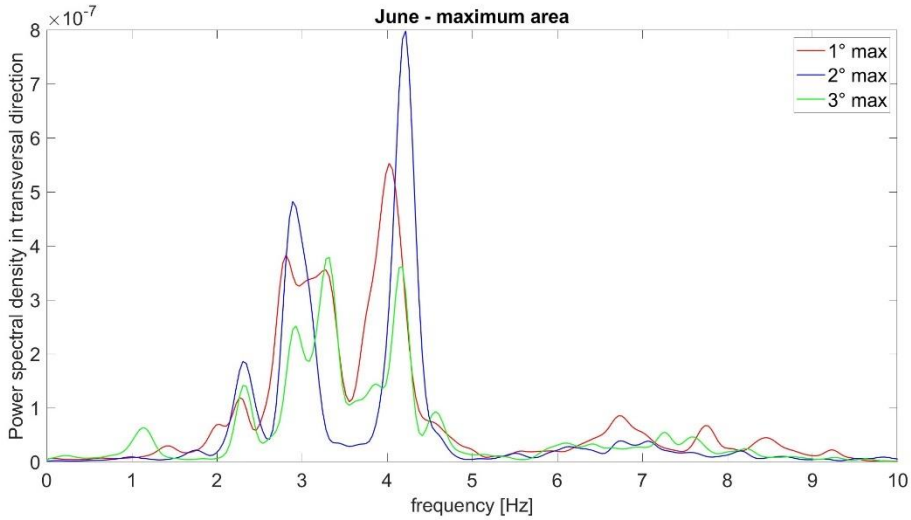


Figure 1-71: Results obtained from the 3 accelerograms with maximum area of PSD

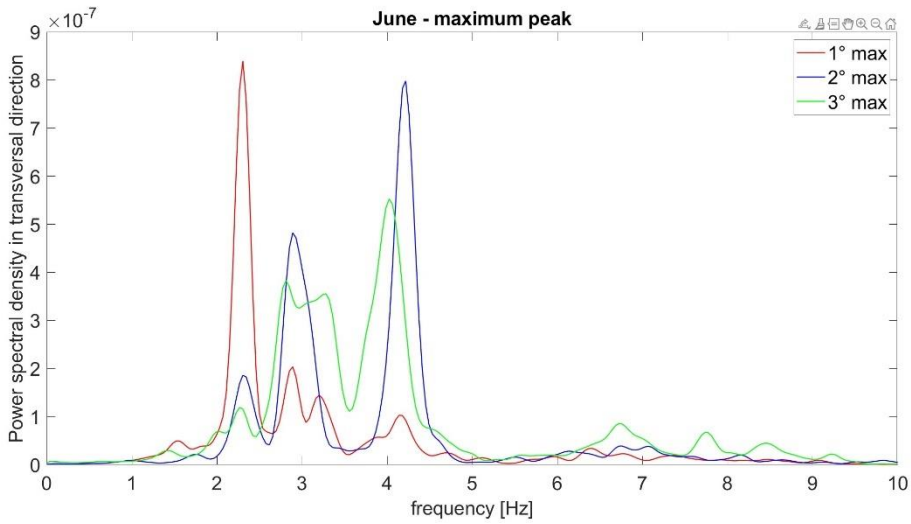


Figure 1-72: Results obtained from the 3 accelerograms with highest peak if PSD

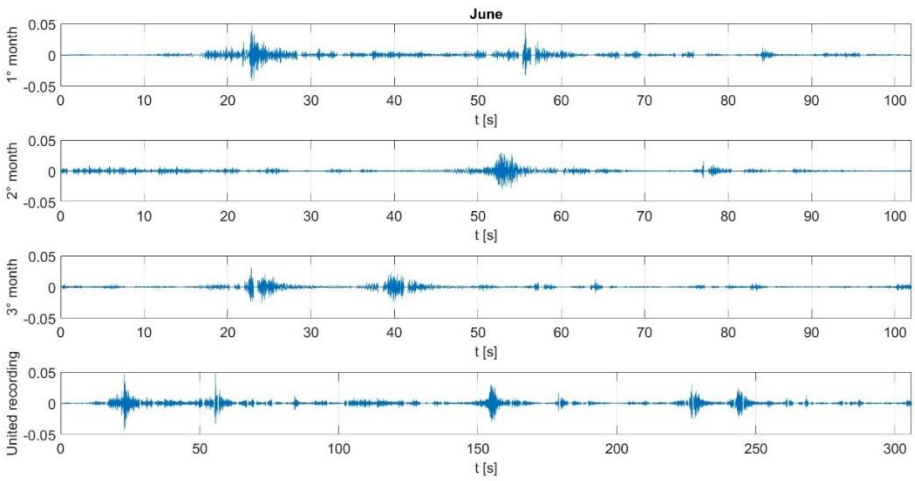


Figure 1-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

1.7 July

The results obtained for the July dataset are shown in the following tables.

Table 1-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-07-20_14-00-21	3.58E-03
	2°	3099D_2023-07-07_08-00-21	2.81E-03
	3°	3099D_2023-07-17_08-00-22	2.63E-03
Longitudinal direction (y)	1°	3099D_2023-07-17_14-00-21	6.63E-04
	2°	3099D_2023-07-07_14-00-20	6.07E-04
	3°	3099D_2023-07-20_14-00-21	5.65E-04
Transverse direction (z)	1°	3099D_2023-07-14_08-00-21	8.69E-04
	2°	3099D_2023-07-17_14-00-21	8.07E-04
	3°	3099D_2023-07-20_14-00-21	7.50E-04

Table 1-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-07-20_14-00-21	4.46E-05	3099D_2023-07-20_14-00-21	2.73E-06
2	3099D_2023-07-07_08-00-21	2.53E-05	3099D_2023-07-07_08-00-21	1.69E-06
3	3099D_2023-07-15_20-00-21	2.09E-05	3099D_2023-07-17_08-00-22	1.43E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-07-07_14-00-20	8.80E-07	3099D_2023-07-17_14-00-21	9.32E-08
2	3099D_2023-07-17_14-00-21	4.58E-07	3099D_2023-07-07_14-00-20	8.03E-08
3	3099D_2023-07-07_02-00-20	3.05E-07	3099D_2023-07-20_14-00-21	6.18E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-07-14_08-00-21	1.23E-06	3099D_2023-07-14_08-00-21	1.69E-07
2	3099D_2023-07-20_14-00-21	9.22E-07	3099D_2023-07-17_14-00-21	1.38E-07
3	3099D_2023-07-17_14-00-21	8.69E-07	3099D_2023-07-20_14-00-21	1.14E-07

Table 1-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	F	F	F
2	B	B	B	E	-	E	D	A	D
3	C	-	C	A	-	A	A	D	A

1.7.1 Vertical direction (x)

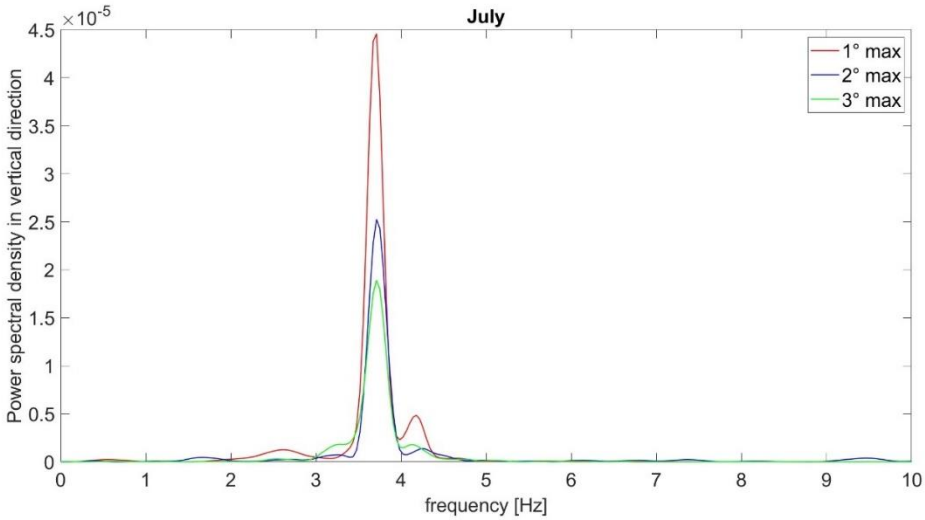


Figure 1-74: Results obtained from the 3 accelerograms with maximum SD in time domain

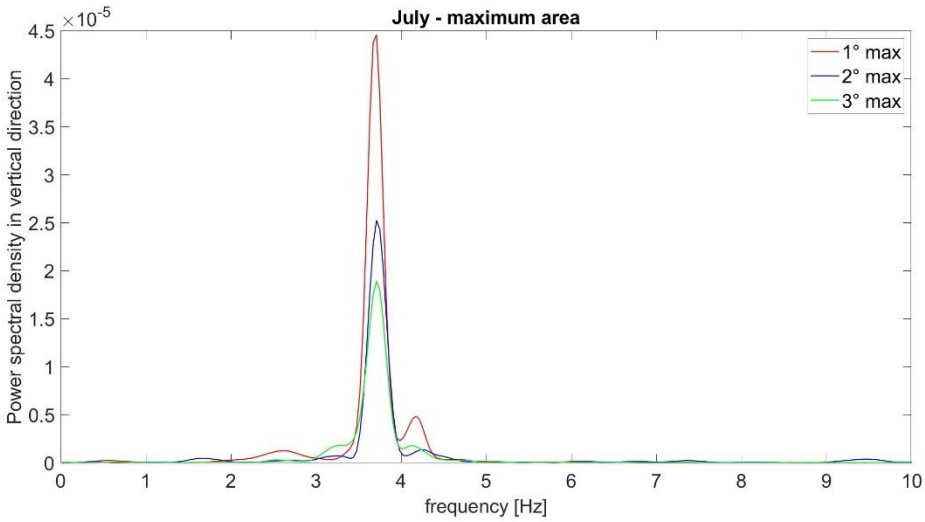


Figure 1-75: Results obtained from the 3 accelerograms with maximum area of PSD

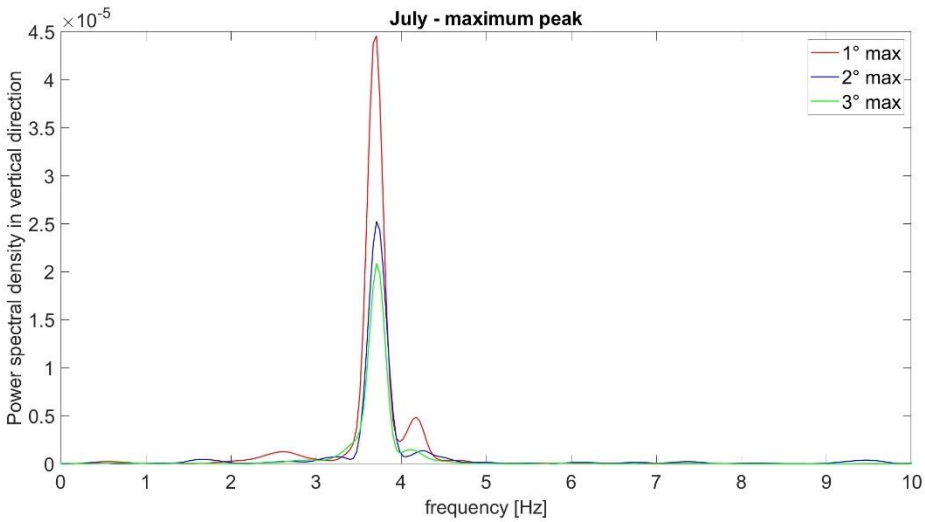


Figure 1-76: Results obtained from the 3 accelerograms with highest peak if PSD

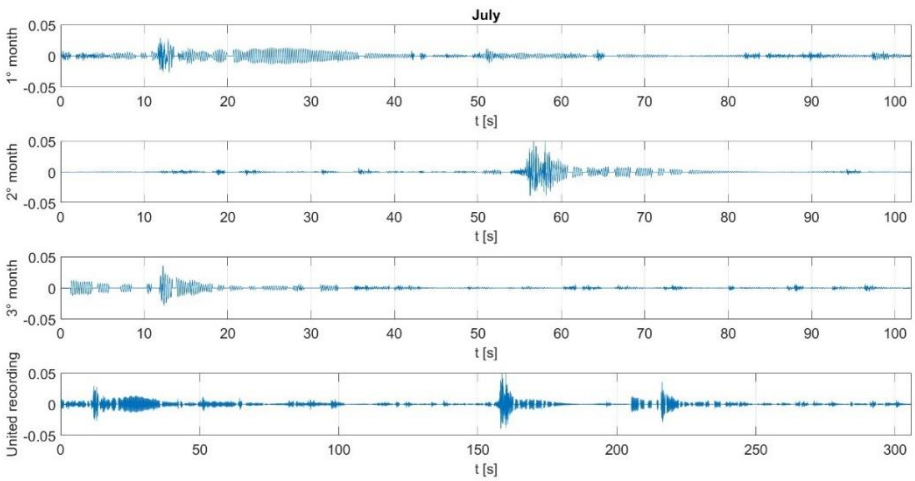


Figure 1-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.7.2 Longitudinal direction (y)

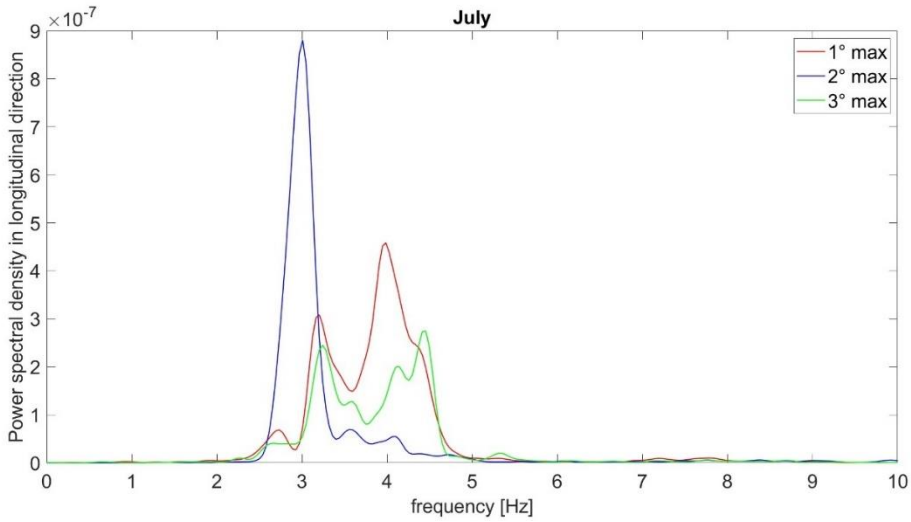


Figure 1-78: Results obtained from the 3 accelerograms with maximum SD in time domain

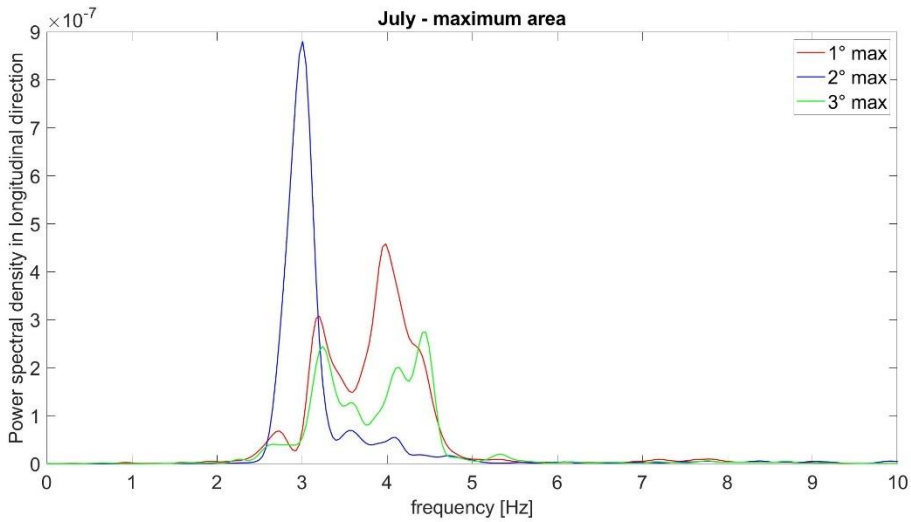


Figure 1-79: Results obtained from the 3 accelerograms with maximum area of PSD

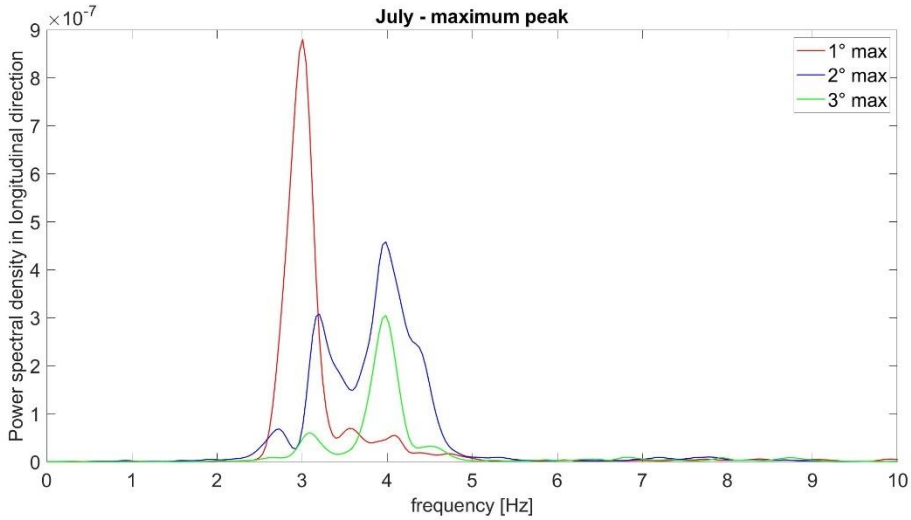


Figure 1-80: Results obtained from the 3 accelerograms with highest peak if PSD

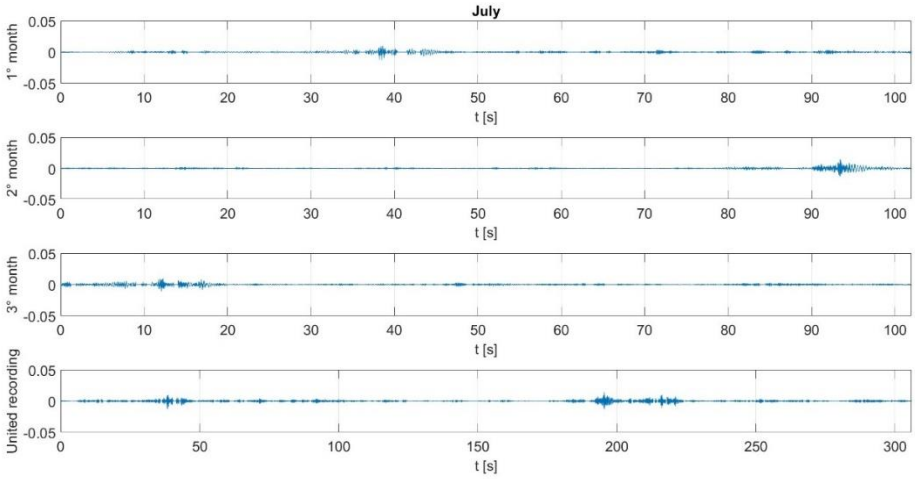


Figure 1-81: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.7.3 Transverse direction (z)

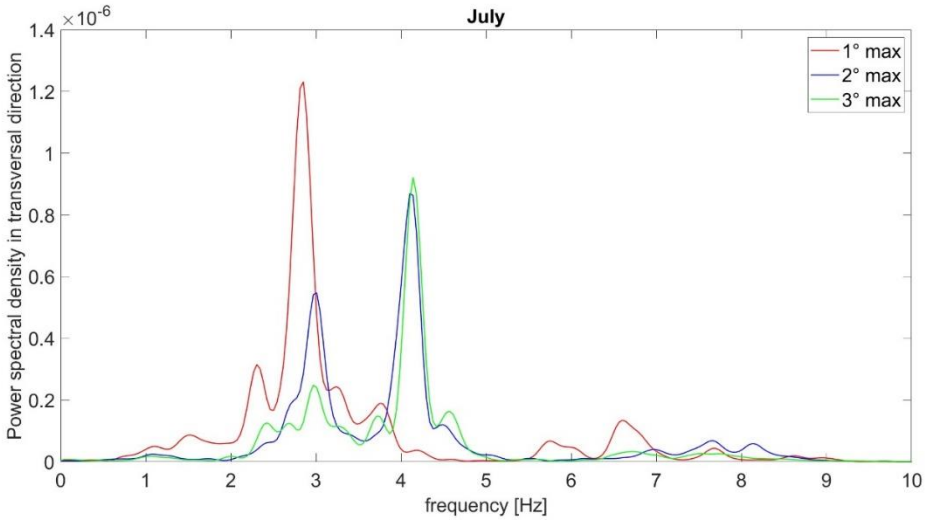


Figure 1-82: Results obtained from the 3 accelerograms with maximum SD in time domain

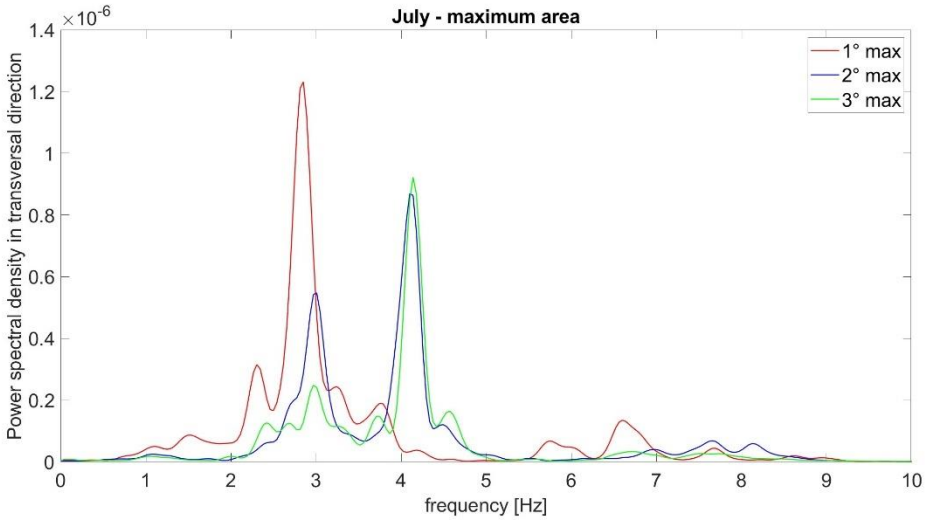


Figure 1-83: Results obtained from the 3 accelerograms with maximum area of PSD

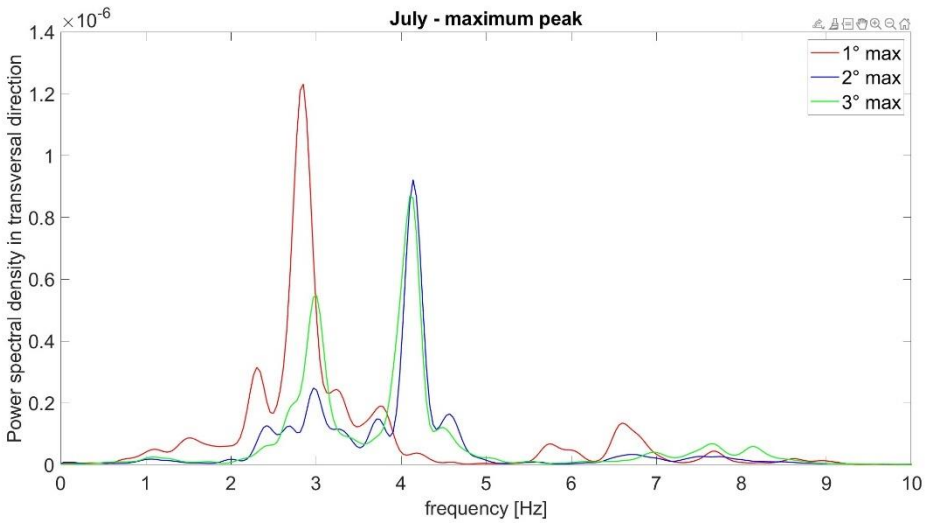


Figure 1-84: Results obtained from the 3 accelerograms with highest peak if PSD

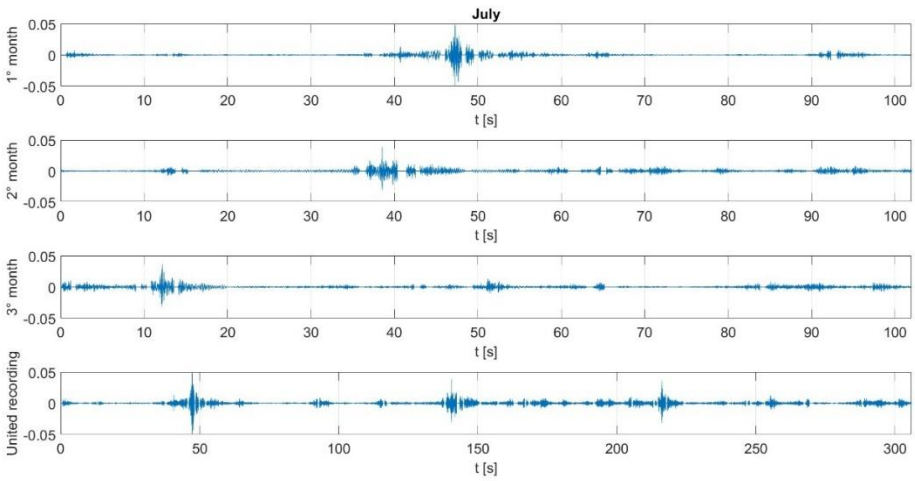


Figure 1-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

1.8 August

The results obtained for the August dataset are shown in the following tables.

Table 1-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-08-07_14-00-21	4.87E-03
	2°	3099D_2023-08-25_14-00-21	2.74E-03
	3°	3099D_2023-08-29_08-00-21	2.22E-03
Longitudinal direction (y)	1°	3099D_2023-08-07_14-00-21	7.10E-04
	2°	3099D_2023-08-29_08-00-21	4.88E-04
	3°	3099D_2023-08-02_08-00-21	3.93E-04
Transverse direction (z)	1°	3099D_2023-08-29_08-00-21	8.07E-04
	2°	3099D_2023-08-07_14-00-21	7.92E-04
	3°	3099D_2023-08-22_08-00-20	5.54E-04

Table 1-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-08-07_14-00-21	7.90E-05	3099D_2023-08-07_14-00-21	4.66E-06
2	3099D_2023-08-25_14-00-21	2.19E-05	3099D_2023-08-25_14-00-21	1.48E-06
3	3099D_2023-08-21_14-00-20	1.60E-05	3099D_2023-08-29_08-00-21	1.05E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-08-07_14-00-21	7.48E-07	3099D_2023-08-07_14-00-21	1.01E-07
2	3099D_2023-08-29_08-00-21	3.52E-07	3099D_2023-08-29_08-00-21	4.76E-08
3	3099D_2023-08-02_08-00-21	2.56E-07	3099D_2023-08-02_08-00-21	3.27E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-08-22_08-00-20	7.69E-07	3099D_2023-08-29_08-00-21	1.33E-07
2	3099D_2023-08-31_14-00-21	5.70E-07	3099D_2023-08-07_14-00-21	1.23E-07
3	3099D_2023-08-29_08-00-21	5.01E-07	3099D_2023-08-22_08-00-20	6.19E-08

Table 1-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	C	D	C
2	B	B	B	C	C	C	A	-	A
3	C	-	C	E	E	E	D	C	D

1.8.1 Vertical direction (x)

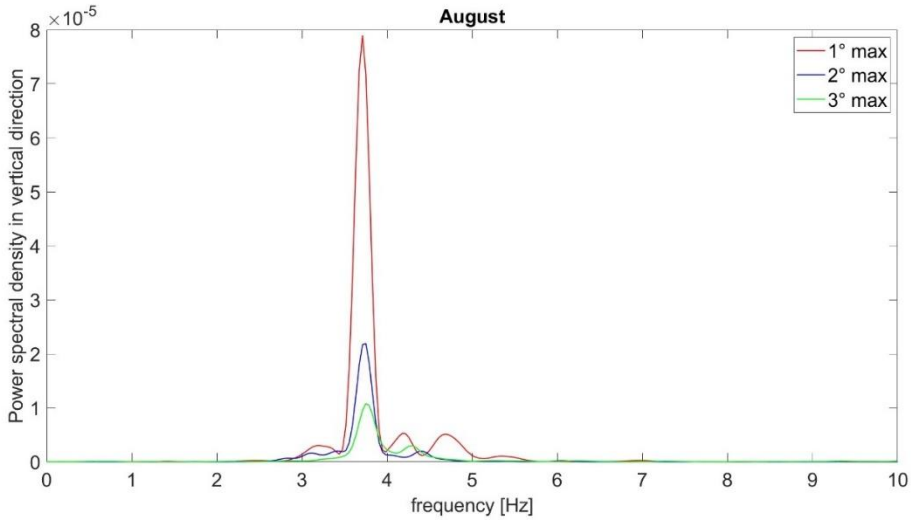


Figure 1-86: Results obtained from the 3 accelerograms with maximum SD in time domain

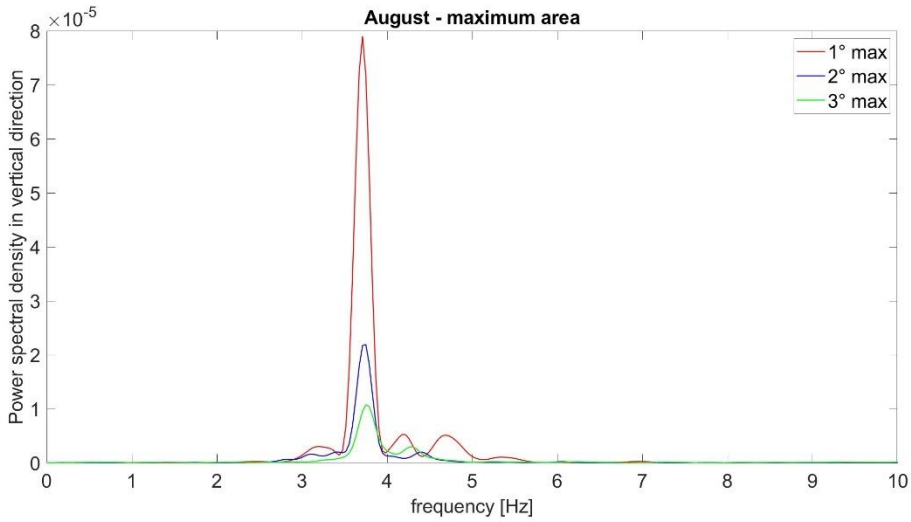


Figure 1-87: Results obtained from the 3 accelerograms with maximum area of PSD

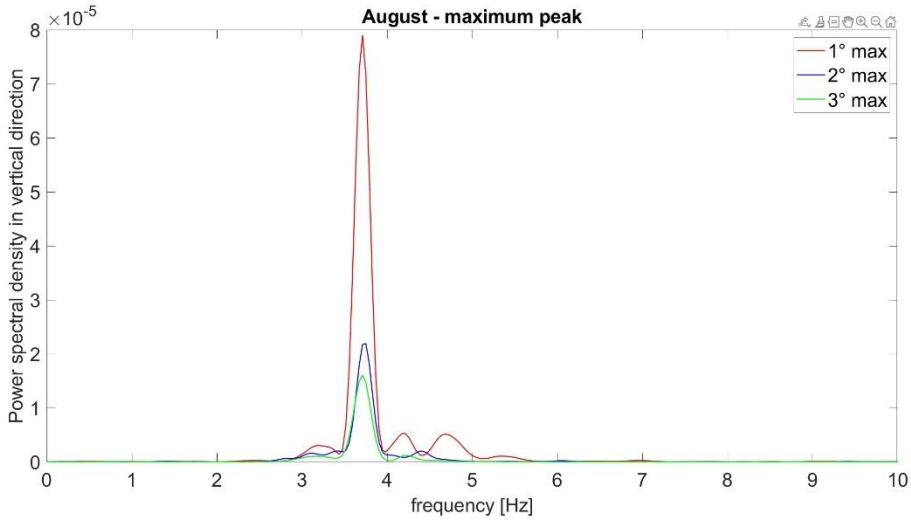


Figure 1-88: Results obtained from the 3 accelerograms with highest peak if PSD

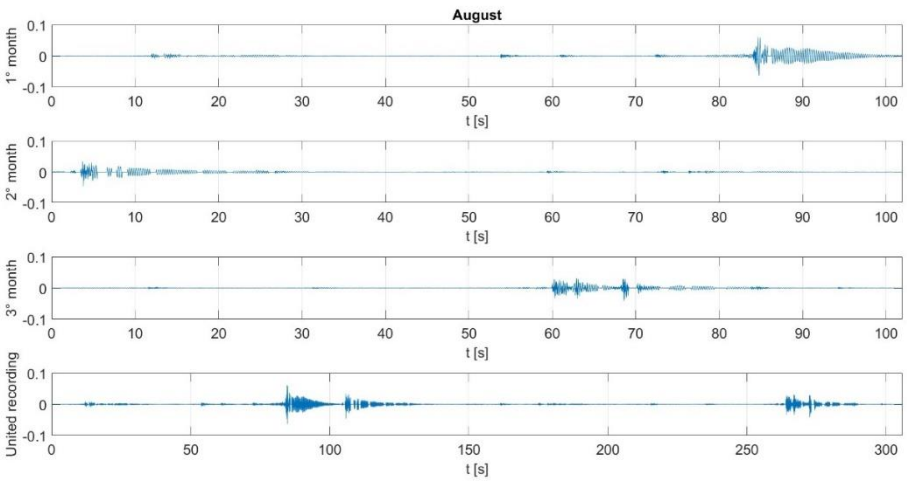


Figure 1-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.8.2 Longitudinal direction (y)

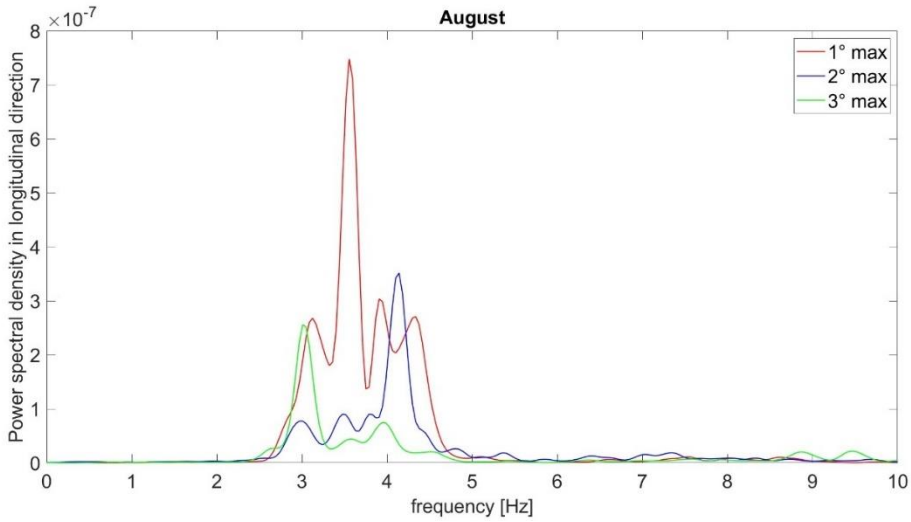


Figure 1-90: Results obtained from the 3 accelerograms with maximum SD in time domain

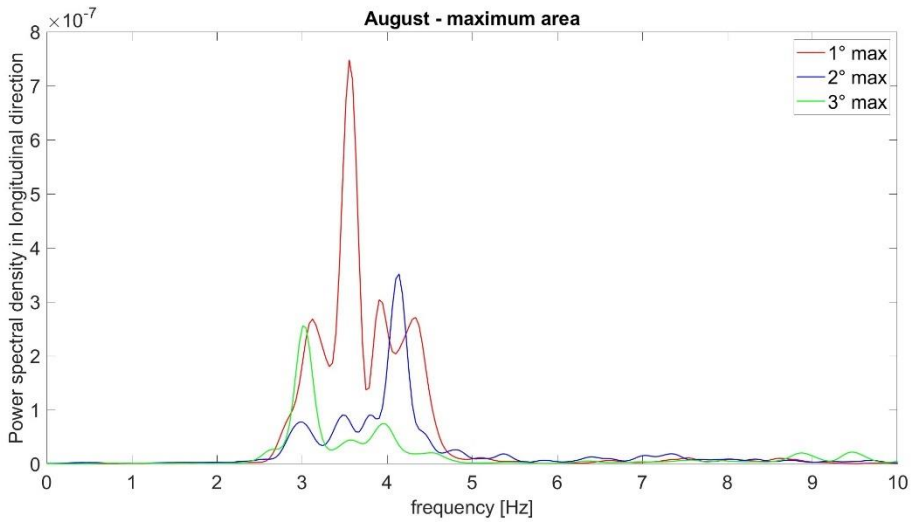


Figure 1-91: Results obtained from the 3 accelerograms with maximum area of PSD

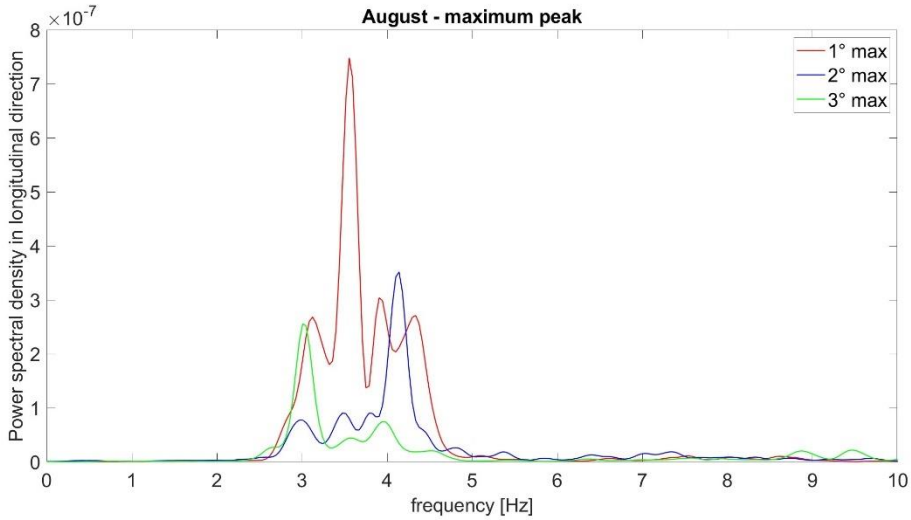


Figure 1-92: Results obtained from the 3 accelerograms with highest peak if PSD

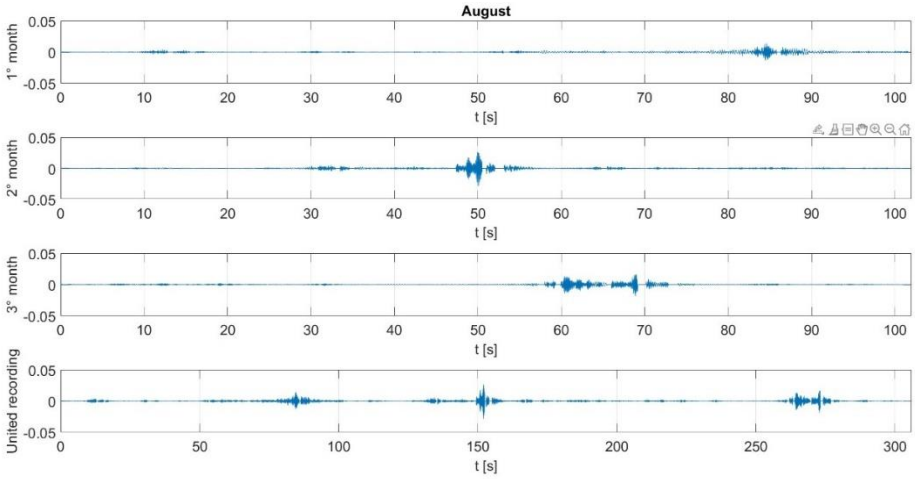


Figure 1-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.8.3 Transverse direction (z)

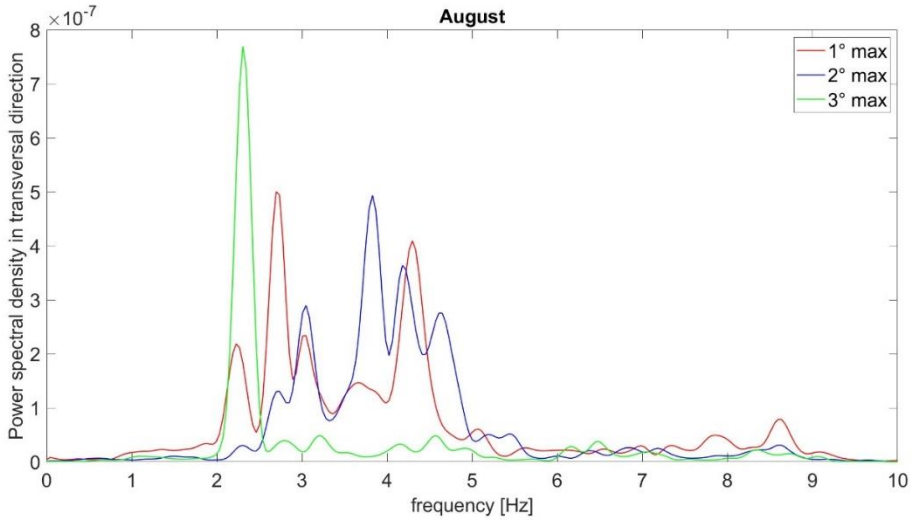


Figure 1-94: Results obtained from the 3 accelerograms with maximum SD in time domain

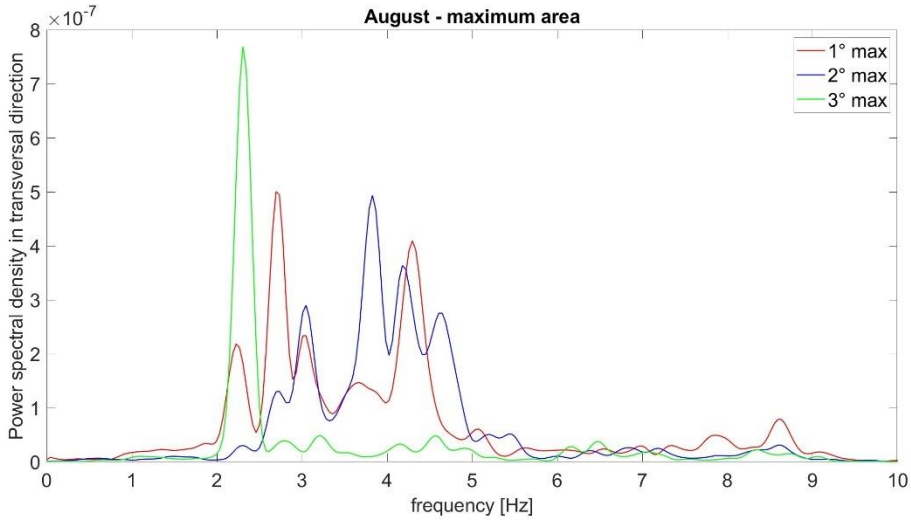


Figure 1-95: Results obtained from the 3 accelerograms with maximum area of PSD

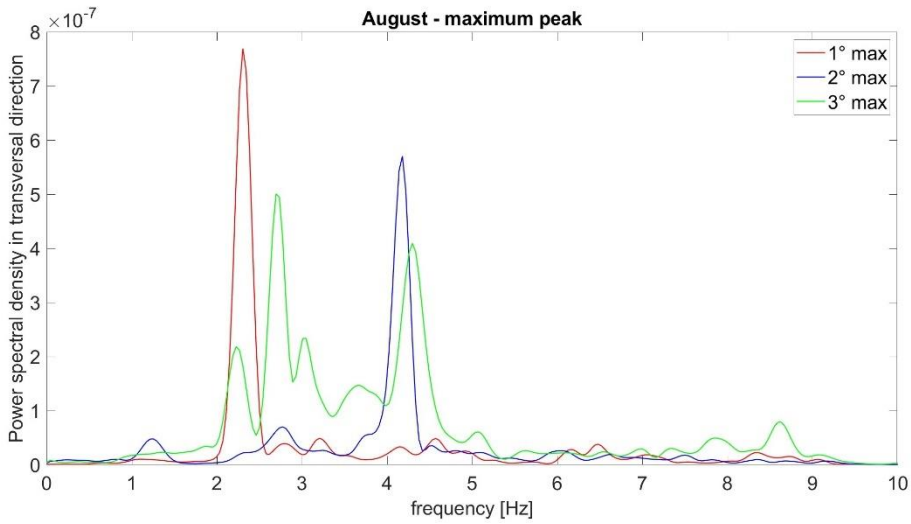


Figure 1-96: Results obtained from the 3 accelerograms with highest peak if PSD

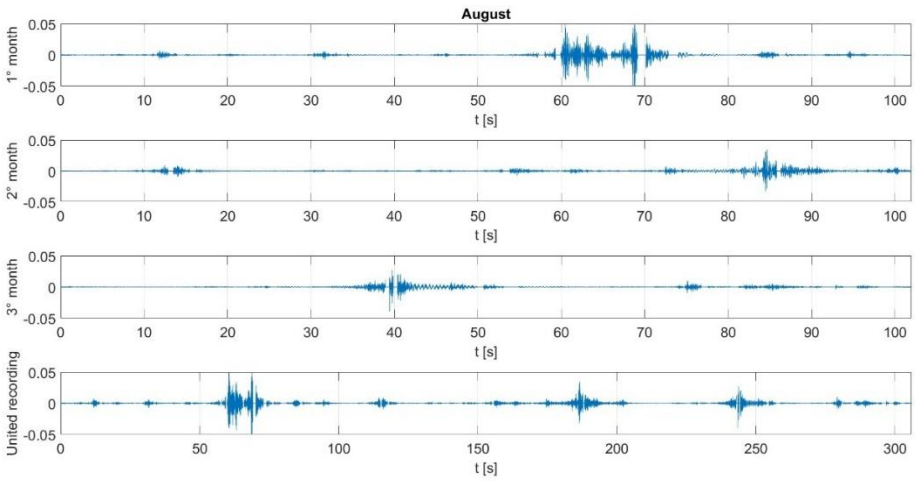


Figure 1-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

1.9 September

The results obtained for the September dataset are shown in the following tables.

Table 1-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-09-26_09-00-20	7.55E-03
	2°	3099D_2023-09-20_11-00-21	5.61E-03
	3°	3099D_2023-09-14_11-00-20	4.15E-03
Longitudinal direction (y)	1°	3099D_2023-09-26_09-00-20	2.32E-03
	2°	3099D_2023-09-14_11-00-20	1.56E-03
	3°	3099D_2023-09-20_11-00-21	1.42E-03
Transverse direction (z)	1°	3099D_2023-09-26_15-00-21	2.07E-03
	2°	3099D_2023-09-20_11-00-21	1.37E-03
	3°	3099D_2023-09-14_11-00-20	1.32E-03

Table 1-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-09-26_09-00-20	1.44E-04	3099D_2023-09-26_09-00-20	1.17E-05
2	3099D_2023-09-20_11-00-21	6.37E-05	3099D_2023-09-20_11-00-21	6.45E-06
3	3099D_2023-09-14_11-00-20	4.10E-05	3099D_2023-09-14_11-00-20	3.57E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-09-26_09-00-20	1.78E-05	3099D_2023-09-26_09-00-20	1.08E-06
2	3099D_2023-09-14_11-00-20	5.80E-06	3099D_2023-09-14_11-00-20	5.25E-07
3	3099D_2023-09-20_11-00-21	2.96E-06	3099D_2023-09-20_11-00-21	4.27E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-09-26_15-00-21	1.15E-05	3099D_2023-09-26_15-00-21	8.65E-07
2	3099D_2023-09-20_11-00-21	3.27E-06	3099D_2023-09-20_11-00-21	3.86E-07
3	3099D_2023-09-14_11-00-20	2.41E-06	3099D_2023-09-14_11-00-20	3.62E-07

Table 1-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	D	D	D
2	B	B	B	C	C	C	-	B	B
3	C	C	C	B	B	B	B	E	E

1.9.1 Vertical direction (x)

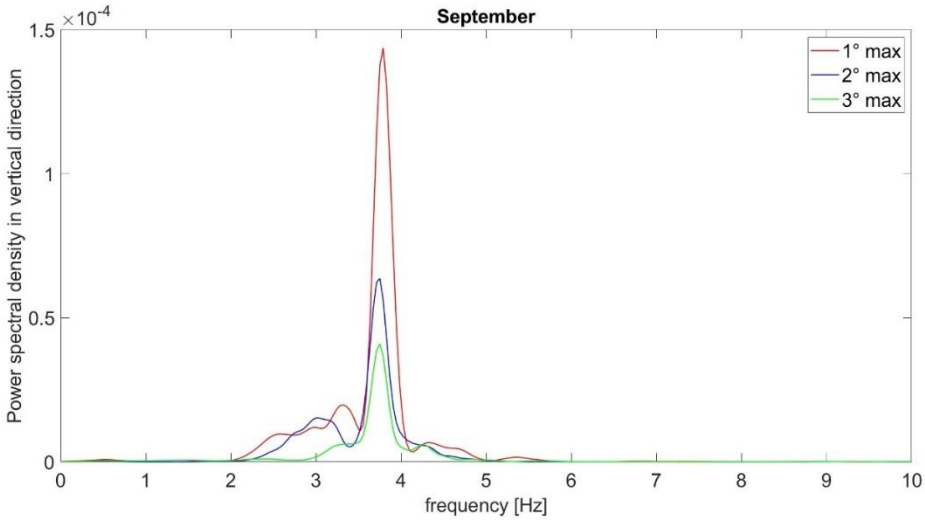


Figure 1-98: Results obtained from the 3 accelerograms with maximum SD in time domain

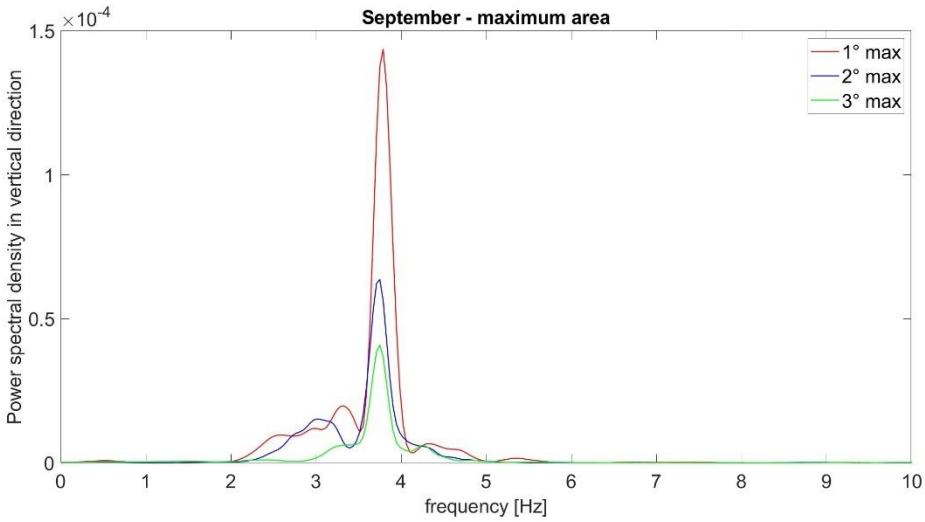


Figure 1-99: Results obtained from the 3 accelerograms with maximum area of PSD

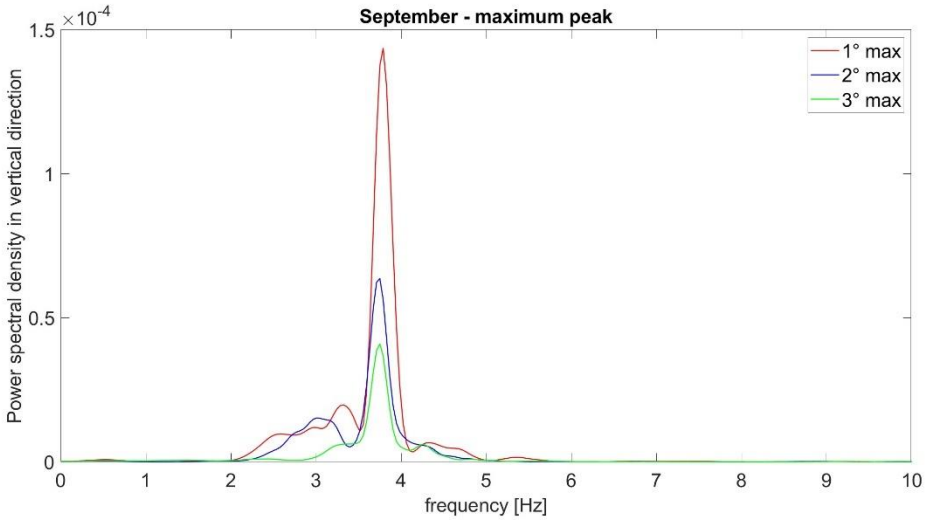


Figure 1-100: Results obtained from the 3 accelerograms with highest peak if PSD

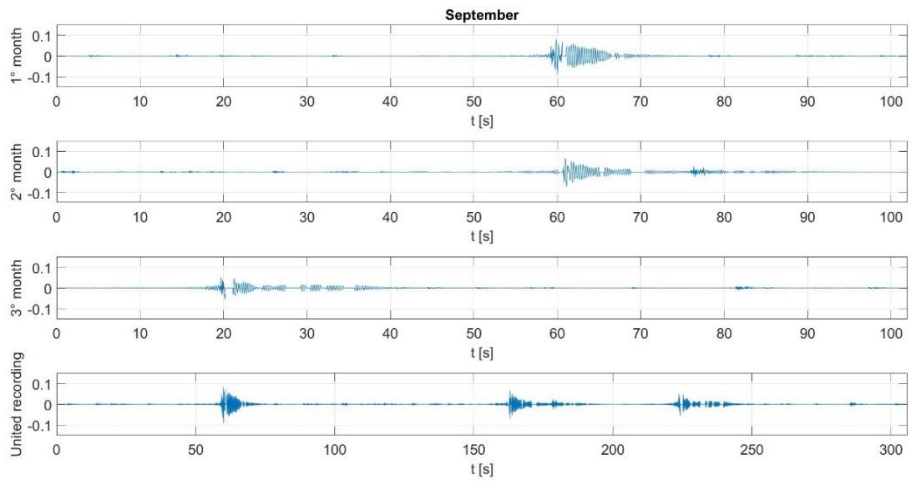


Figure 1-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.9.2 Longitudinal direction (y)

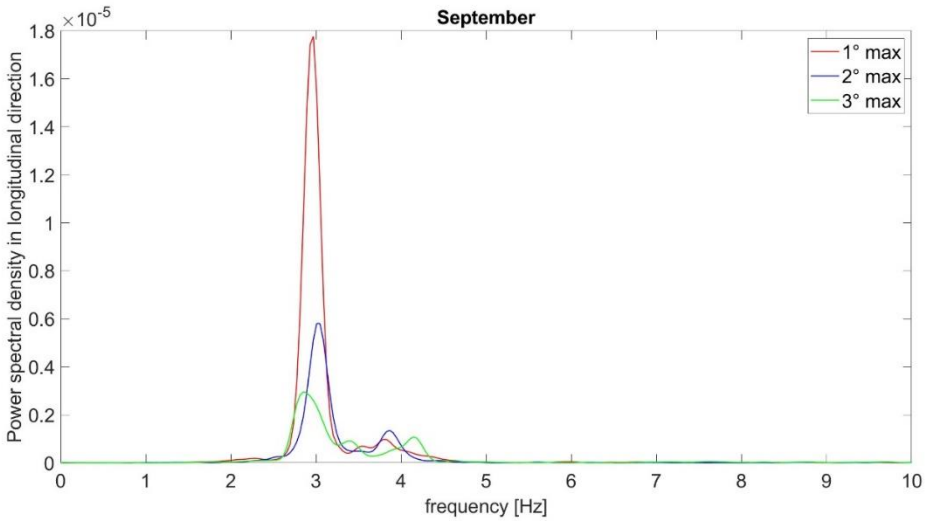


Figure 1-102: Results obtained from the 3 accelerograms with maximum SD in time domain

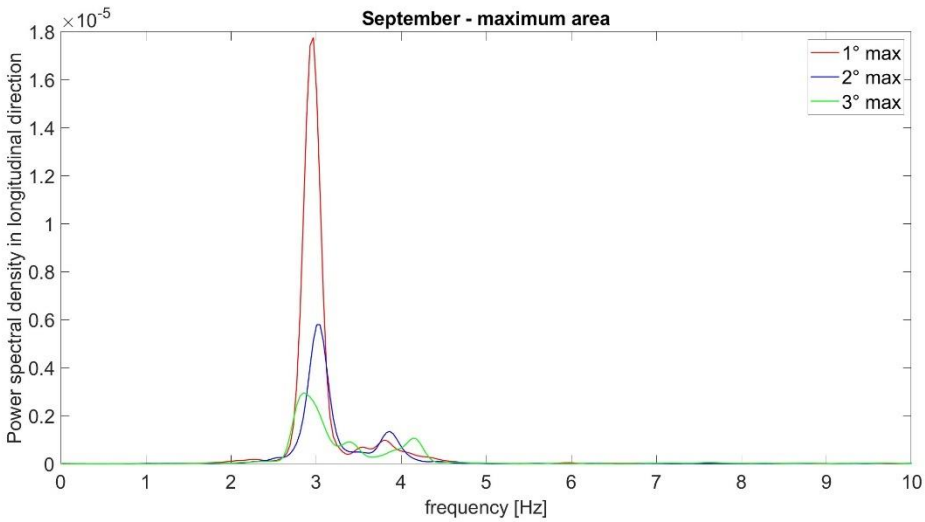


Figure 1-103: Results obtained from the 3 accelerograms with maximum area of PSD

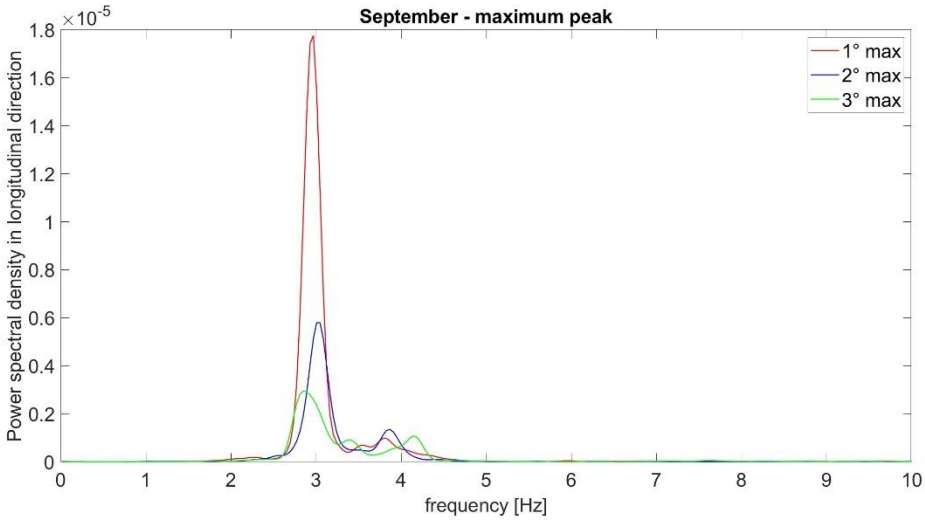


Figure 1-104: Results obtained from the 3 accelerograms with highest peak if PSD

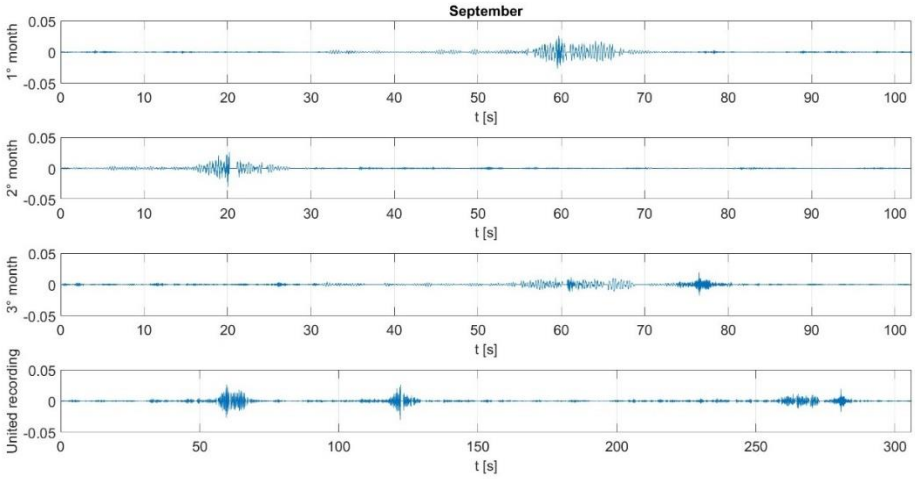


Figure 1-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.9.3 Transverse direction (z)

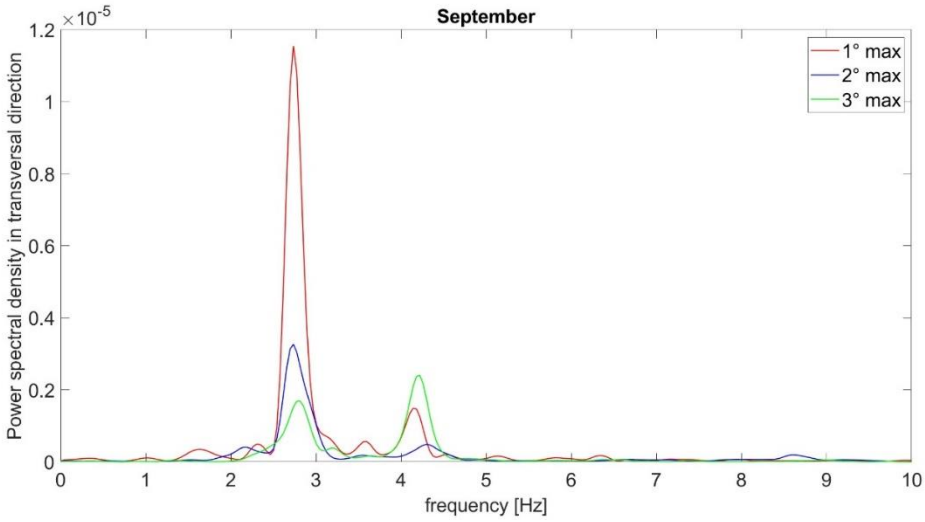


Figure 1-106: Results obtained from the 3 accelerograms with maximum SD in time domain

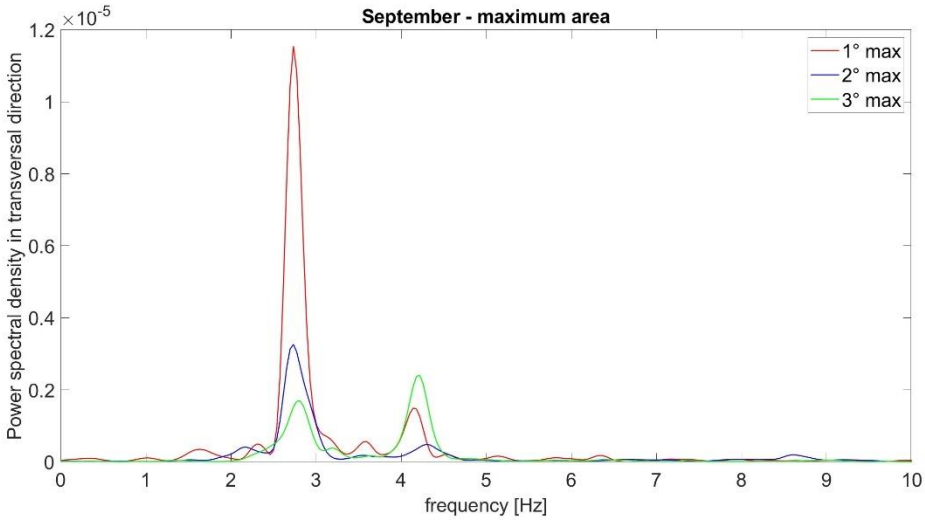


Figure 1-107: Results obtained from the 3 accelerograms with maximum area of PSD

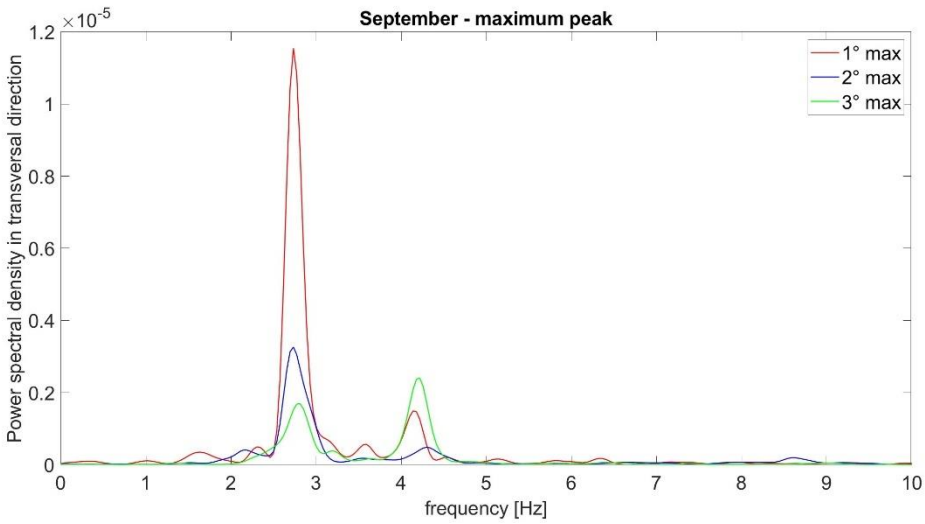


Figure 1-108: Results obtained from the 3 accelerograms with highest peak if PSD

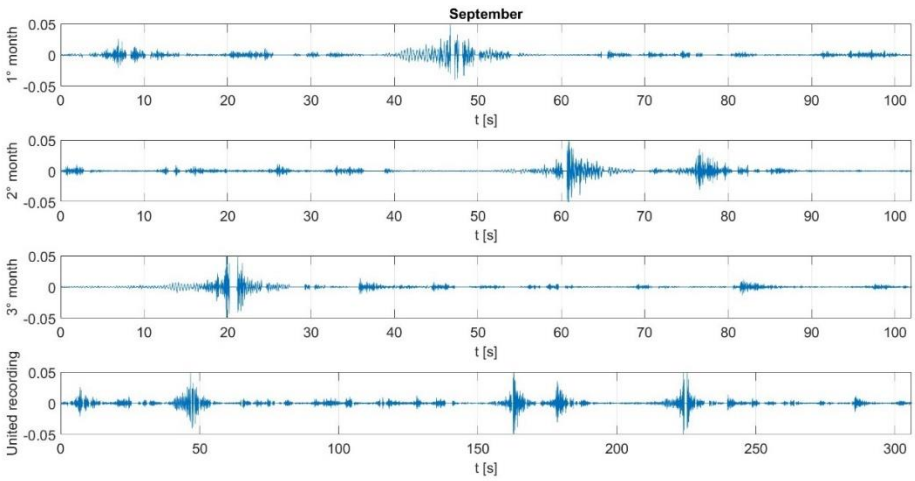


Figure 1-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

1.10 October

The results obtained for the October dataset are shown in the following tables.

Table 1-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-10-19_12-00-20	4.74E-03
	2°	3099D_2023-10-07_08-00-21	4.24E-03
	3°	3099D_2023-10-02_08-00-21	4.06E-03
Longitudinal direction (y)	1°	3099D_2023-10-19_12-00-20	1.79E-03
	2°	3099D_2023-10-02_08-00-21	1.03E-03
	3°	3099D_2023-10-10_12-00-20	8.02E-04
Transverse direction (z)	1°	3099D_2023-10-19_12-00-20	1.20E-03
	2°	3099D_2023-10-07_08-00-21	1.11E-03
	3°	3099D_2023-10-02_08-00-21	8.40E-04

Table 1-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-10-07_08-00-21	4.37E-05	3099D_2023-10-19_12-00-20	4.06E-06
2	3099D_2023-10-03_22-00-21	2.90E-05	3099D_2023-10-02_08-00-21	3.75E-06
3	3099D_2023-10-23_19-00-20	2.66E-05	3099D_2023-10-07_08-00-21	3.60E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-10-19_12-00-20	1.12E-05	3099D_2023-10-19_12-00-20	6.48E-07
2	3099D_2023-10-02_08-00-21	1.88E-06	3099D_2023-10-02_08-00-21	2.26E-07
3	3099D_2023-10-01_11-00-21	1.03E-06	3099D_2023-10-10_12-00-20	1.24E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-10-19_12-00-20	3.12E-06	3099D_2023-10-19_12-00-20	2.93E-07
2	3099D_2023-10-07_08-00-21	1.74E-06	3099D_2023-10-07_08-00-21	2.50E-07
3	3099D_2023-10-10_12-00-20	9.97E-07	3099D_2023-10-02_08-00-21	1.47E-07

Table 1-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	A	A	A
2	B	-	C	C	C	C	B	B	B
3	C	-	B	D	-	D	C	-	C

1.10.1 Vertical direction (x)

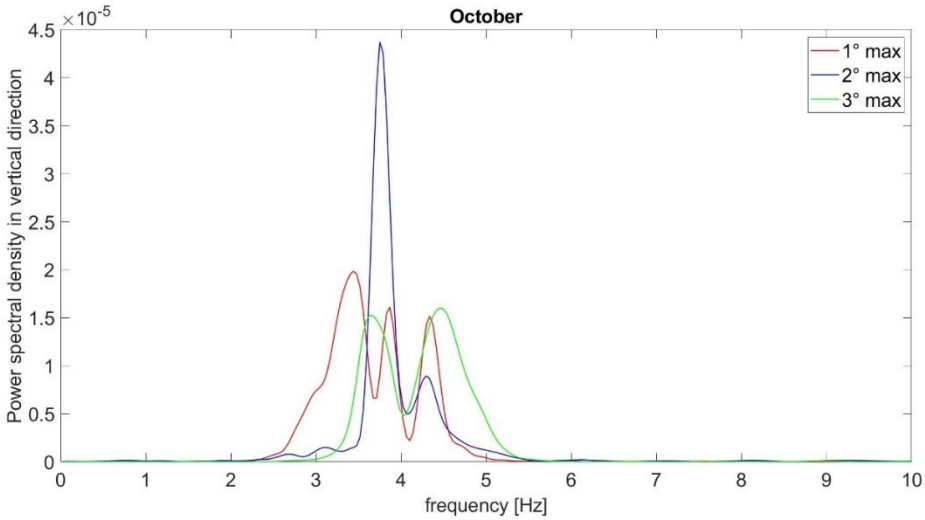


Figure 1-110: Results obtained from the 3 accelerograms with maximum SD in time domain

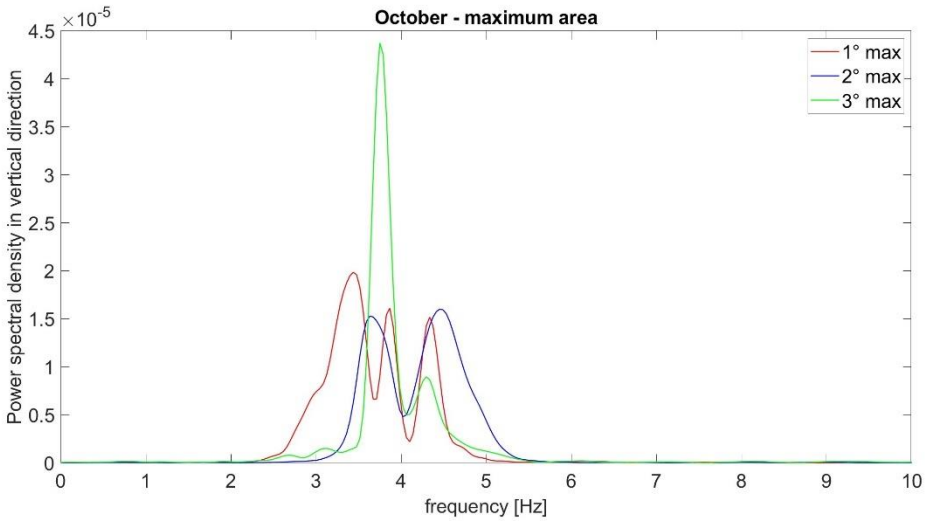


Figure 1-111: Results obtained from the 3 accelerograms with maximum area of PSD

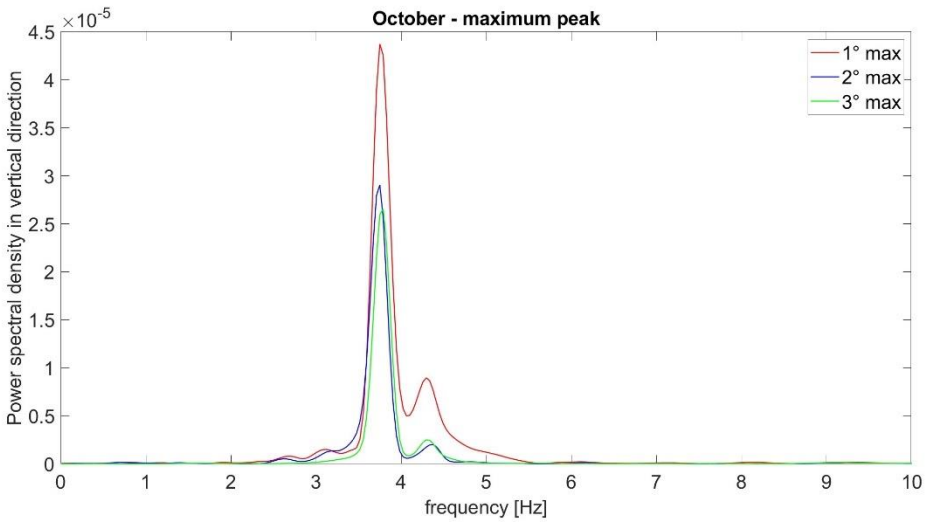


Figure 1-112: Results obtained from the 3 accelerograms with highest peak if PSD

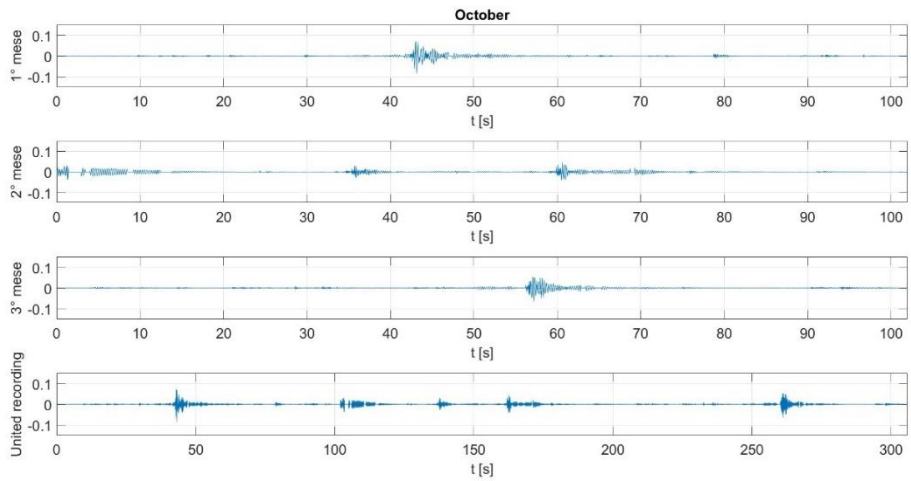


Figure 1-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.10.2 Longitudinal direction (y)

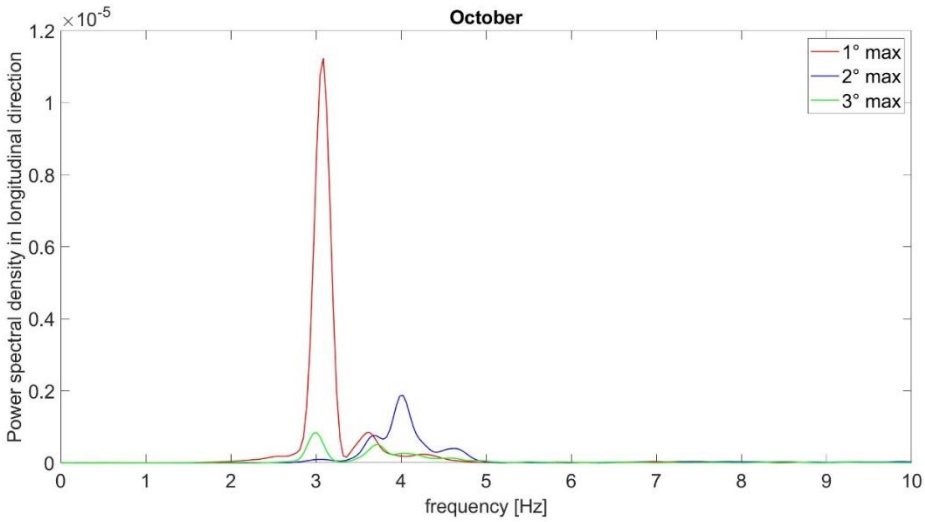


Figure 1-114: Results obtained from the 3 accelerograms with maximum SD in time domain

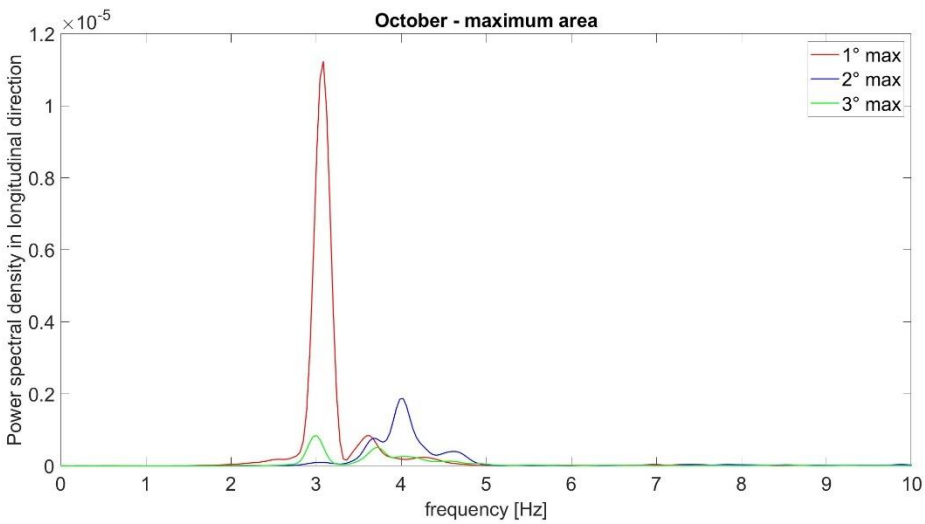


Figure 1-115: Results obtained from the 3 accelerograms with maximum area of PSD

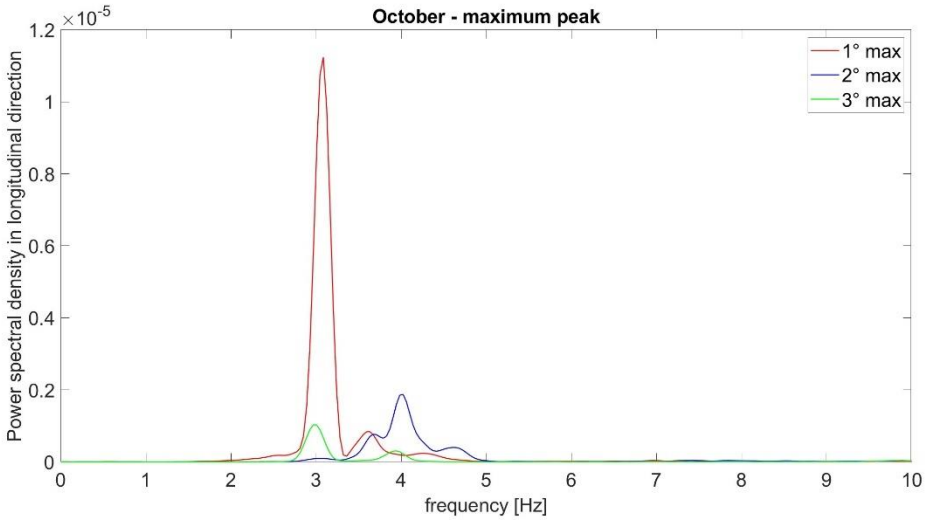


Figure 1-116: Results obtained from the 3 accelerograms with highest peak if PSD

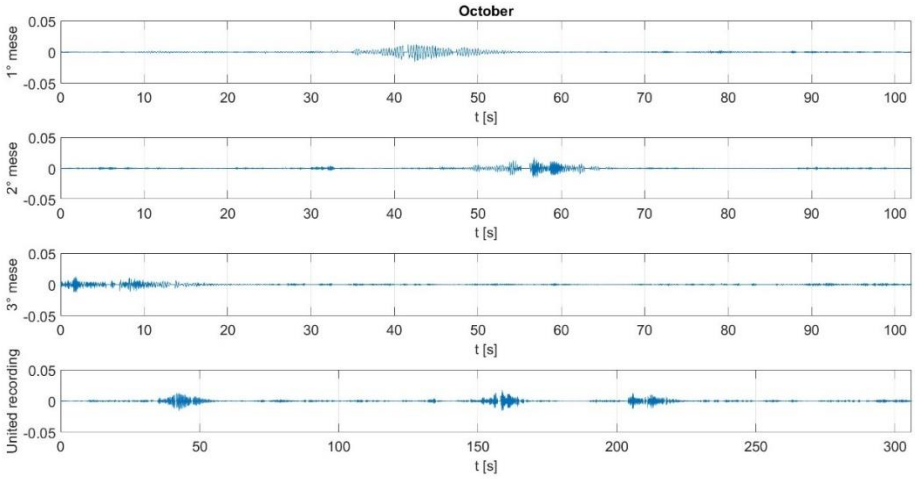


Figure 1-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.10.3 Transverse direction (z)

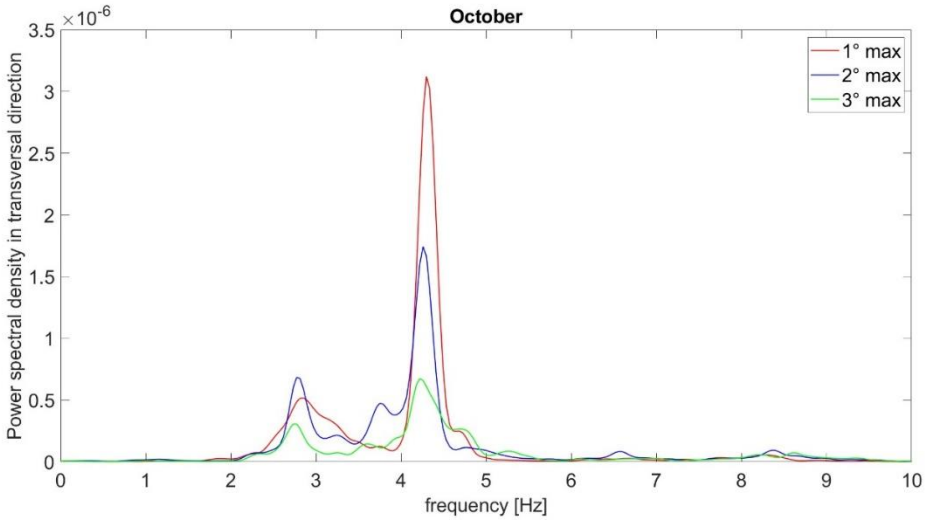


Figure 1-118: Results obtained from the 3 accelerograms with maximum SD in time domain

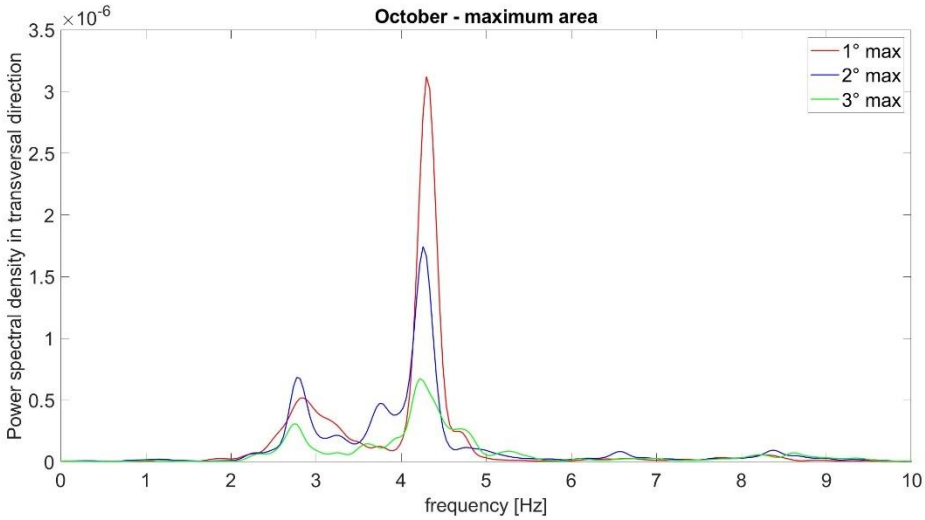


Figure 1-119: Results obtained from the 3 accelerograms with maximum area of PSD

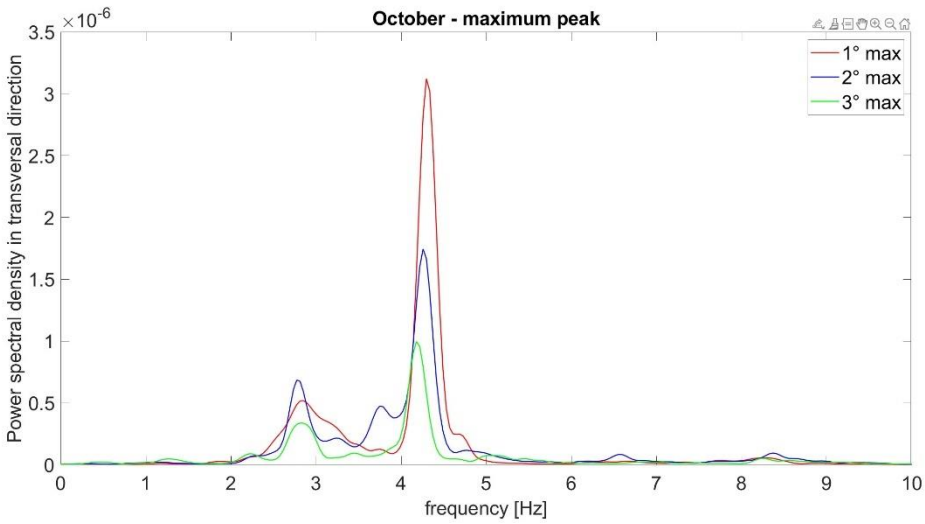


Figure 1-120: Results obtained from the 3 accelerograms with highest peak if PSD

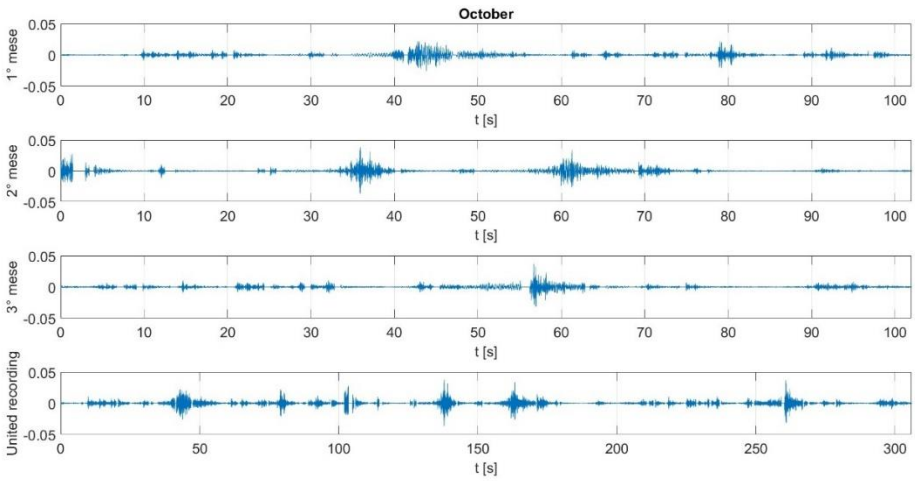


Figure 1-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

1.11 November

The results obtained for the November dataset are shown in the following tables.

Table 1-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-11-07_17-00-21	6.29E-03
	2°	3099D_2023-11-08_07-00-20	2.92E-03
	3°	3099D_2023-11-07_09-00-21	2.77E-03
Longitudinal direction (y)	1°	3099D_2023-11-07_17-00-21	1.27E-03
	2°	3099D_2023-11-06_17-00-20	8.51E-04
	3°	3099D_2023-11-29_02-00-21	7.75E-04
Transverse direction (z)	1°	3099D_2023-11-07_17-00-21	1.51E-03
	2°	3099D_2023-11-07_13-00-21	1.10E-03
	3°	3099D_2023-11-14_09-00-21	9.90E-04

Table 1-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-11-07_17-00-21	7.17E-05	3099D_2023-11-07_17-00-21	7.54E-06
2	3099D_2023-11-28_21-00-20	2.74E-05	3099D_2023-11-08_07-00-20	1.74E-06
3	3099D_2023-11-07_09-00-21	2.67E-05	3099D_2023-11-07_09-00-21	1.65E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-11-07_17-00-21	2.54E-06	3099D_2023-11-07_17-00-21	3.20E-07
2	3099D_2023-11-06_17-00-20	1.56E-06	3099D_2023-11-06_17-00-20	1.48E-07
3	3099D_2023-11-29_02-00-21	1.26E-06	3099D_2023-11-17_08-00-21	9.52E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-11-07_17-00-21	3.72E-06	3099D_2023-11-07_17-00-21	4.73E-07
2	3099D_2023-11-07_13-00-21	1.55E-06	3099D_2023-11-07_13-00-21	2.50E-07
3	3099D_2023-11-14_09-00-21	1.20E-06	3099D_2023-11-14_09-00-21	1.71E-07

Table 1-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	-	B	D	D	D	F	F	F
3	C	C	C	E	E	-	G	G	G

1.11.1 Vertical direction (x)

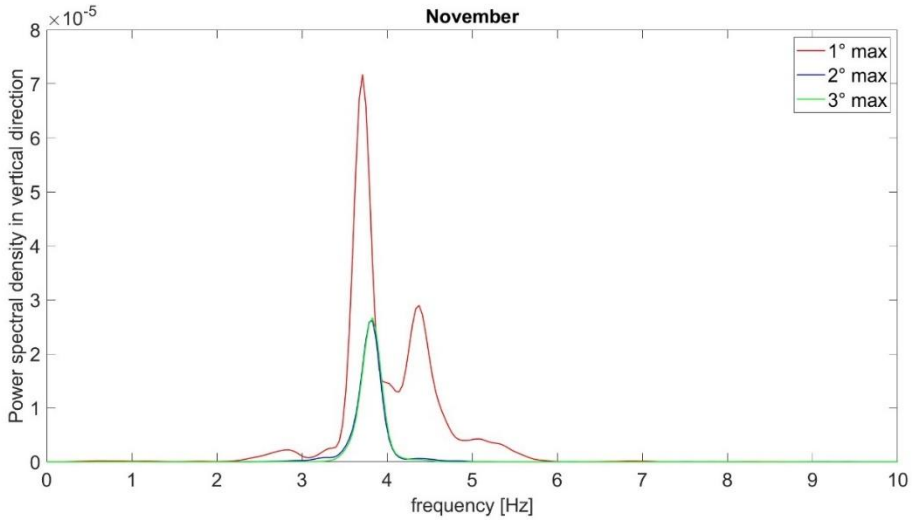


Figure 1-122: Results obtained from the 3 accelerograms with maximum SD in time domain

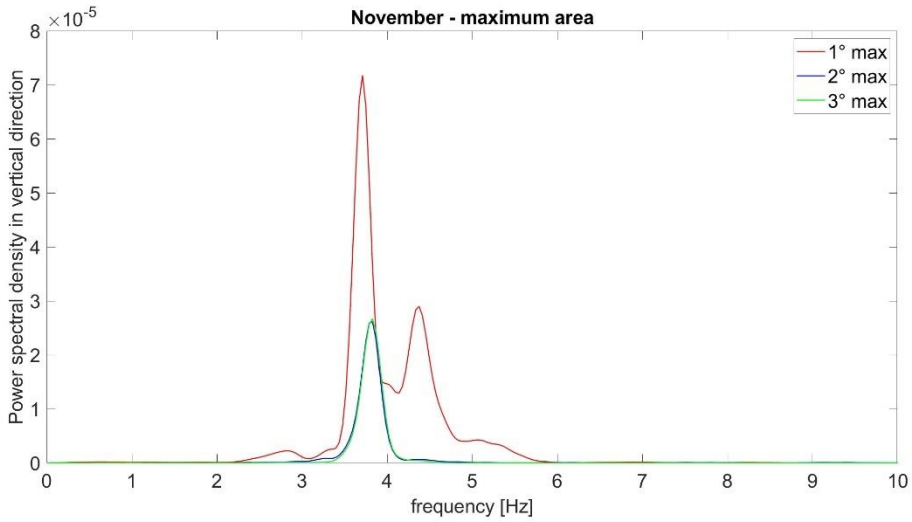


Figure 1-123: Results obtained from the 3 accelerograms with maximum area of PSD

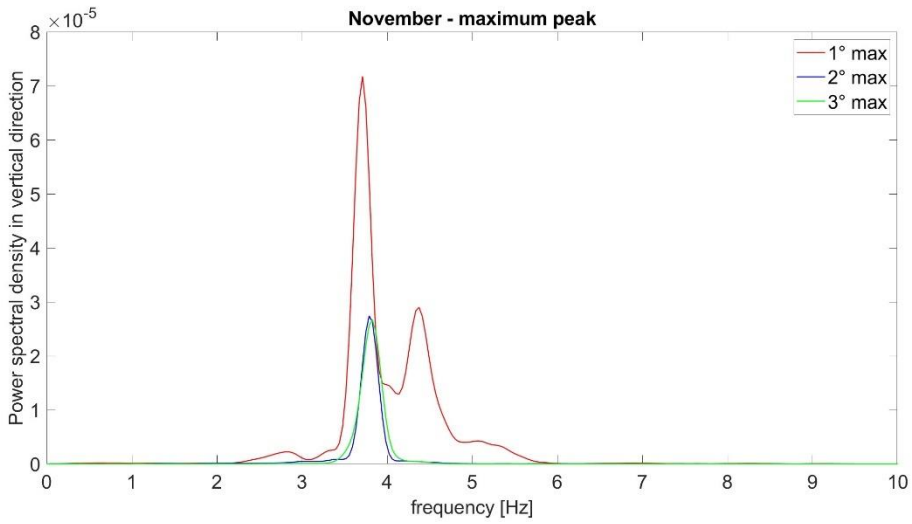


Figure 1-124: Results obtained from the 3 accelerograms with highest peak if PSD

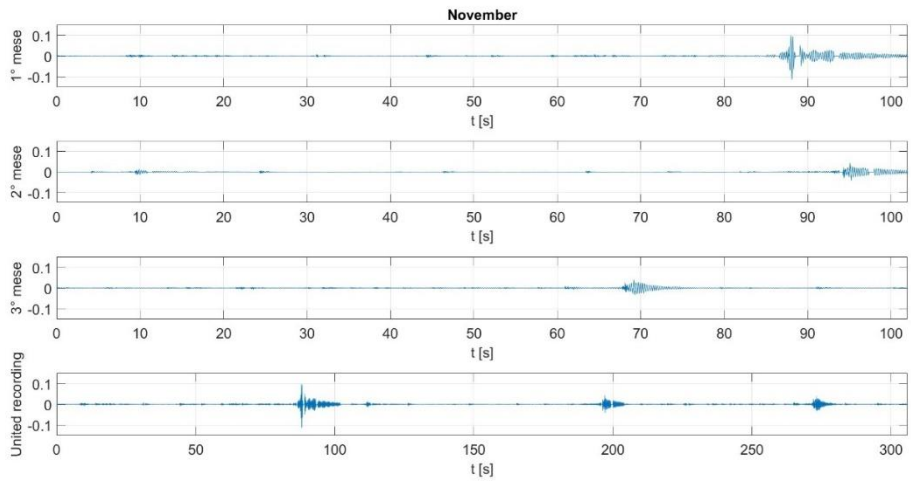


Figure 1-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.11.2 Longitudinal direction (y)

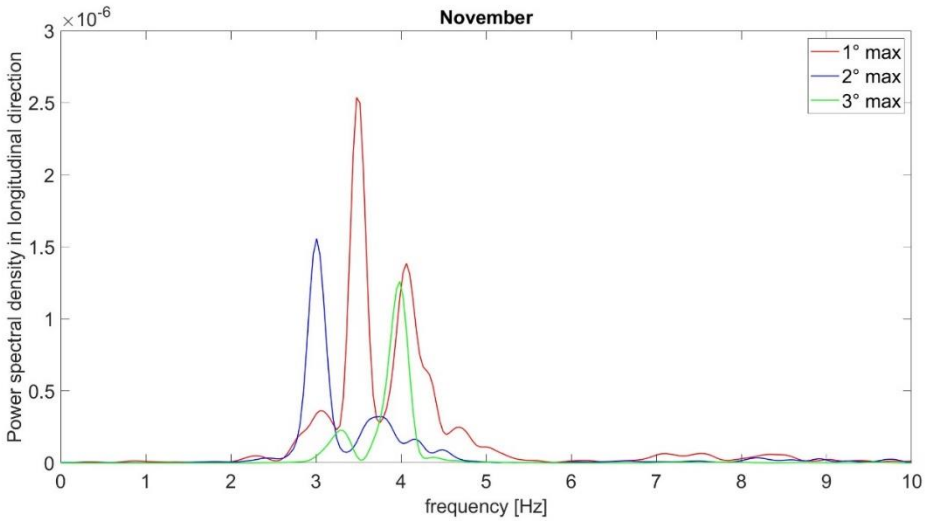


Figure 1-126: Results obtained from the 3 accelerograms with maximum SD in time domain

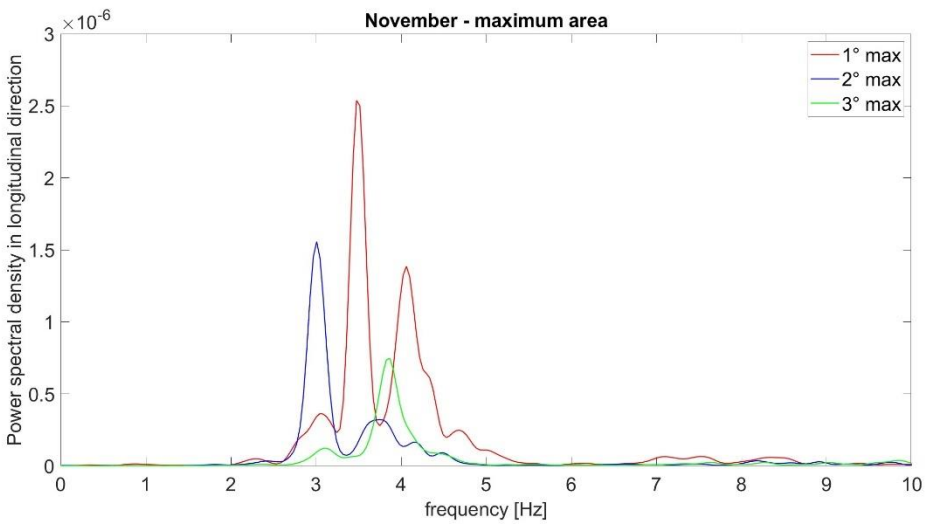


Figure 1-127: Results obtained from the 3 accelerograms with maximum area of PSD

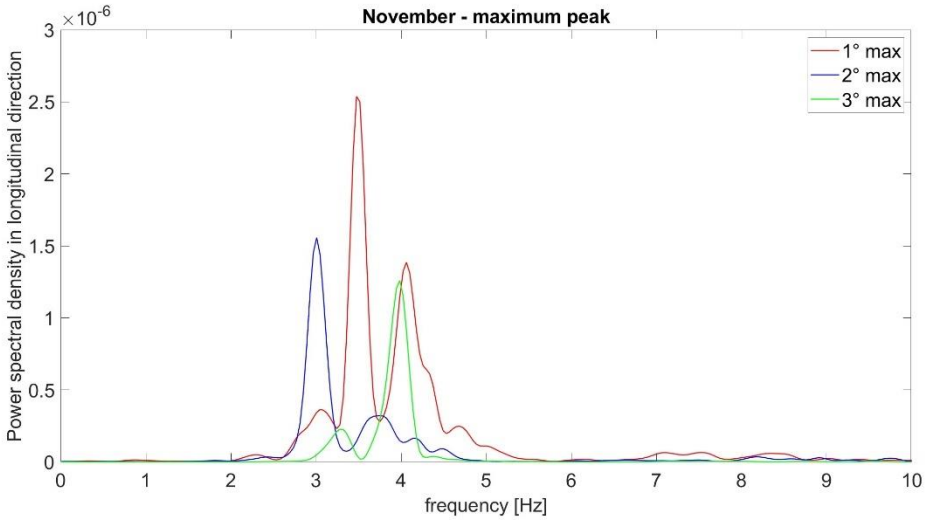


Figure 1-128: Results obtained from the 3 accelerograms with highest peak if PSD

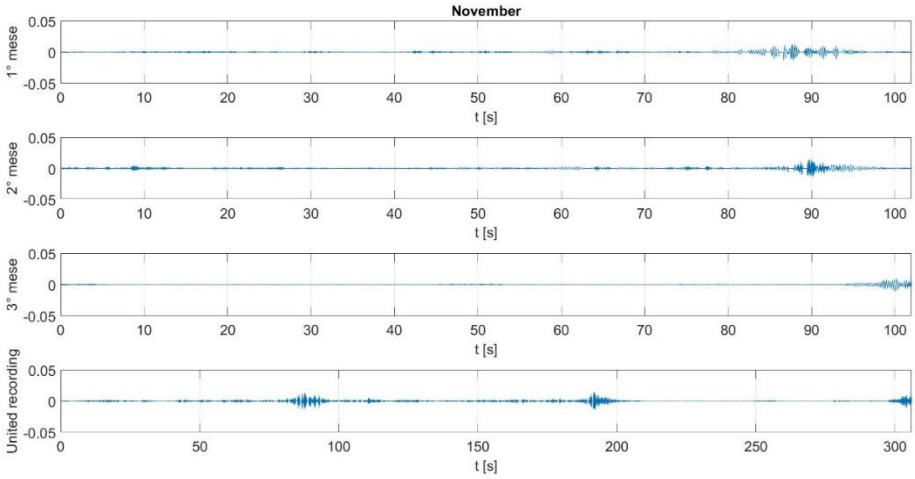


Figure 1-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.11.3 Transverse direction (z)

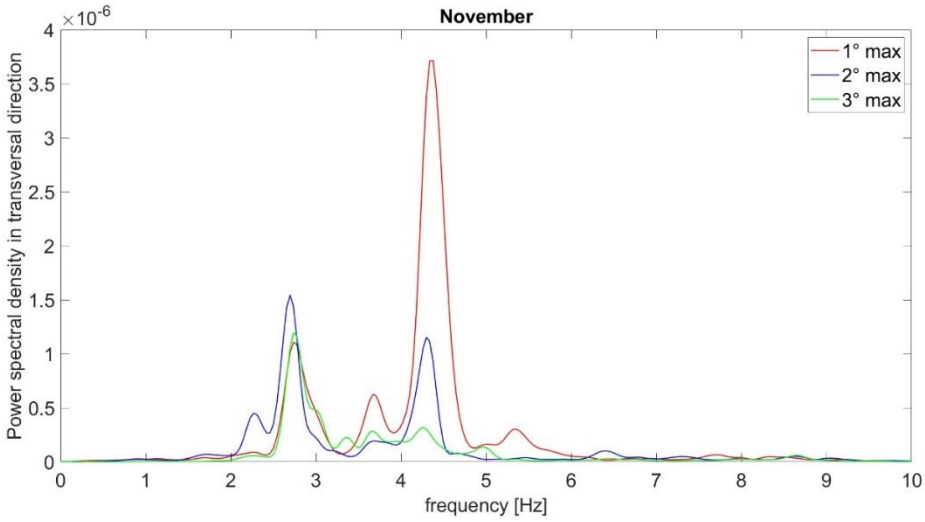


Figure 1-130: Results obtained from the 3 accelerograms with maximum SD in time domain

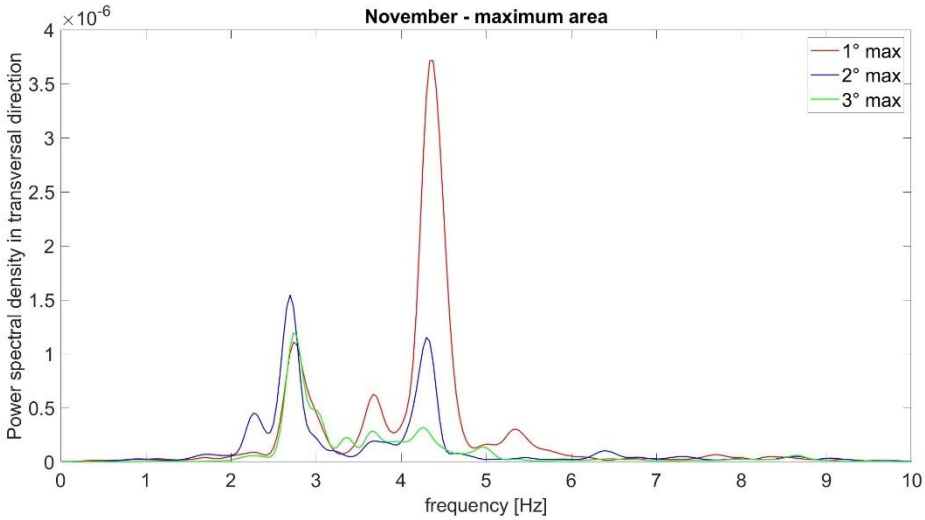


Figure 1-131: Results obtained from the 3 accelerograms with maximum area of PSD

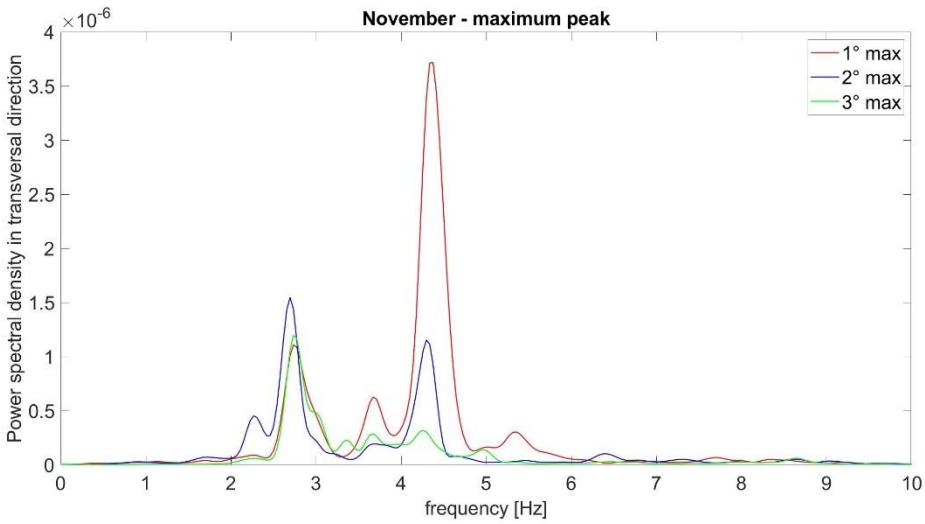


Figure 1-132: Results obtained from the 3 accelerograms with highest peak if PSD

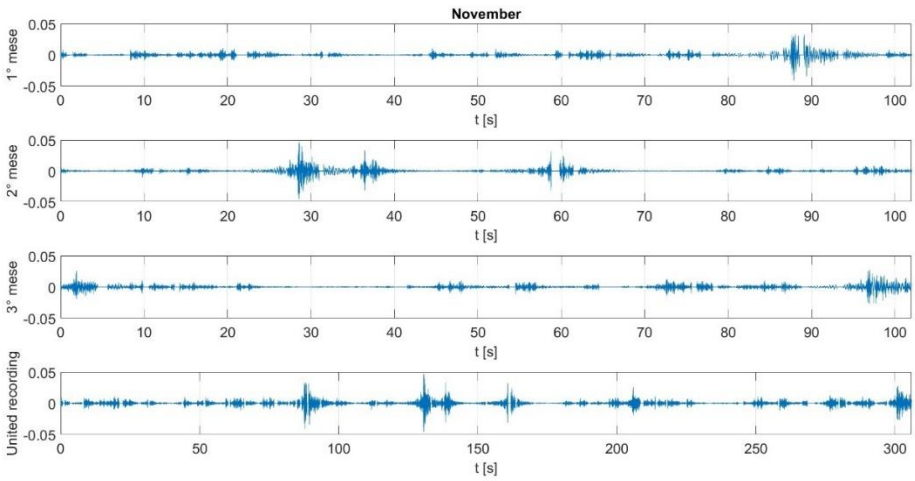


Figure 1-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

1.12 December

The results obtained for the December dataset are shown in the following tables.

Table 1-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3099D_2023-12-13_08-00-20	4.90E-03
	2°	3099D_2023-12-06_10-00-21	4.65E-03
	3°	3099D_2023-12-22_09-00-21	3.68E-03
Longitudinal direction (y)	1°	3099D_2023-12-06_10-00-21	1.53E-03
	2°	3099D_2023-12-13_08-00-20	9.23E-04
	3°	3099D_2023-12-28_13-00-20	9.17E-04
Transverse direction (z)	1°	3099D_2023-12-13_08-00-20	1.18E-03
	2°	3099D_2023-12-12_15-00-21	8.91E-04
	3°	3099D_2023-12-04_12-00-21	8.55E-04

Table 1-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-12-06_10-00-21	5.23E-05	3099D_2023-12-13_08-00-20	5.08E-06
2	3099D_2023-12-22_16-00-20	3.24E-05	3099D_2023-12-06_10-00-21	4.49E-06
3	3099D_2023-12-13_08-00-20	2.92E-05	3099D_2023-12-22_09-00-21	2.92E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-12-06_10-00-21	4.27E-06	3099D_2023-12-06_10-00-21	4.90E-07
2	3099D_2023-12-22_09-00-21	1.51E-06	3099D_2023-12-28_13-00-20	1.79E-07
3	3099D_2023-12-28_13-00-20	1.44E-06	3099D_2023-12-13_08-00-20	1.74E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3099D_2023-12-13_08-00-20	2.02E-06	3099D_2023-12-13_08-00-20	2.92E-07
2	3099D_2023-12-22_14-00-20	1.07E-06	3099D_2023-12-12_15-00-21	1.60E-07
3	3099D_2023-12-04_12-00-21	9.11E-07	3099D_2023-12-04_12-00-21	1.50E-07

Table 1-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	B	B	B	A	A	A
2	B	-	B	A	-	D	E	-	E
3	C	-	C	D	D	A	F	F	F

1.12.1 Vertical direction (x)

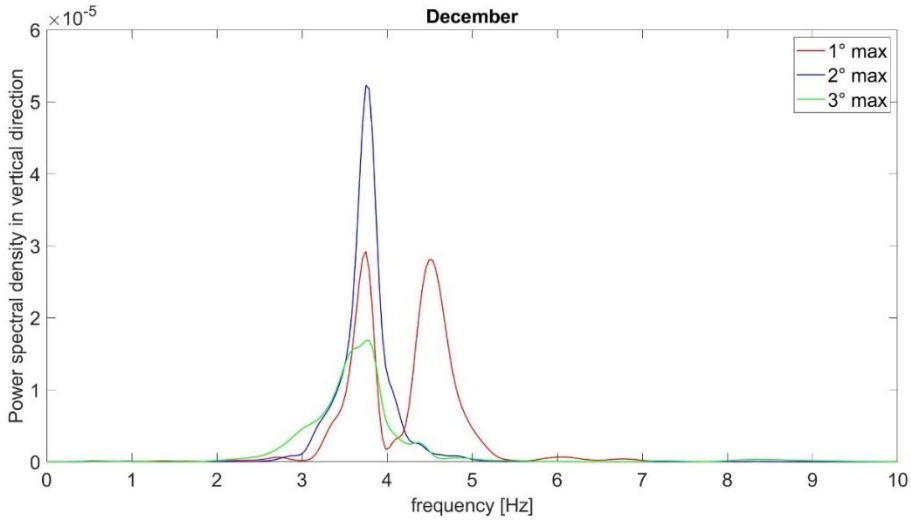


Figure 1-134: Results obtained from the 3 accelerograms with maximum SD in time domain

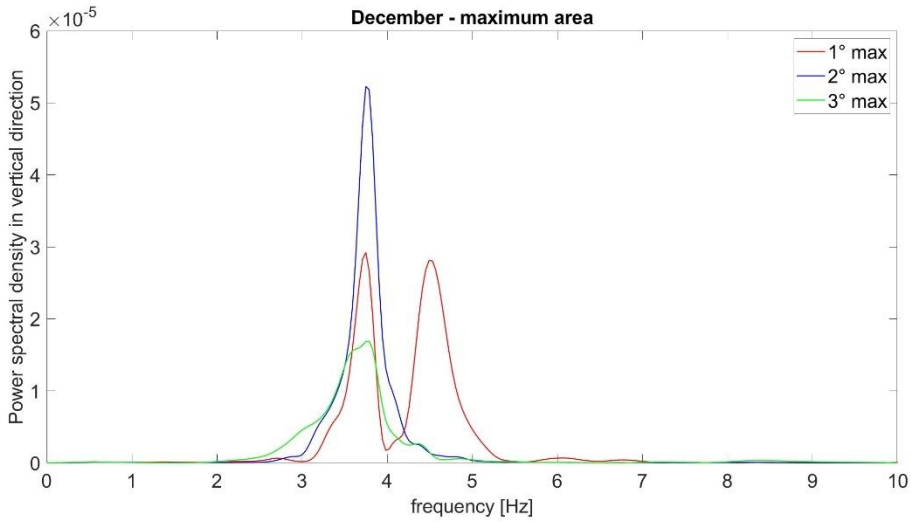


Figure 1-135: Results obtained from the 3 accelerograms with maximum area of PSD

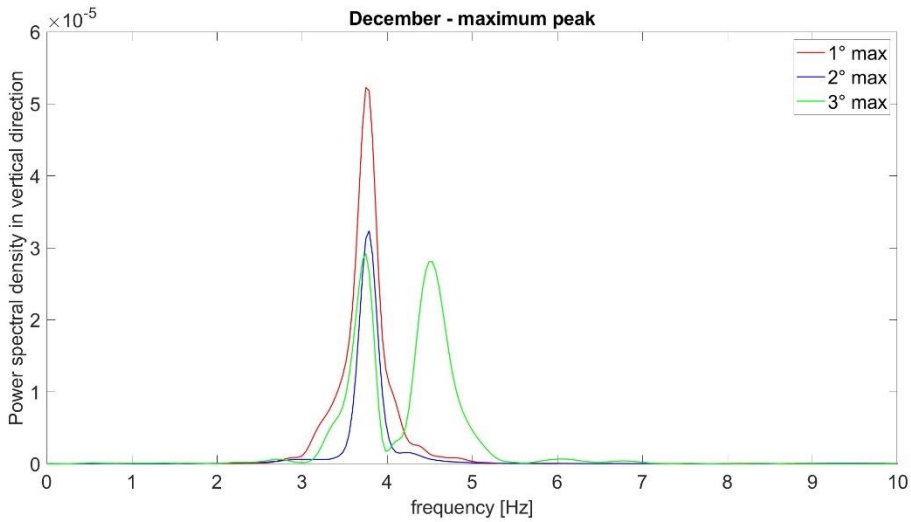


Figure 1-136: Results obtained from the 3 accelerograms with highest peak if PSD

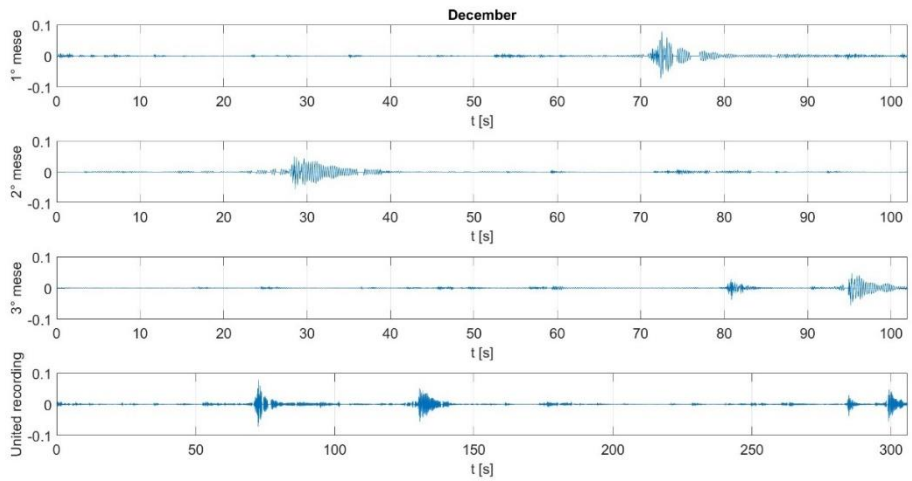


Figure 1-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

1.12.2 Longitudinal direction (y)

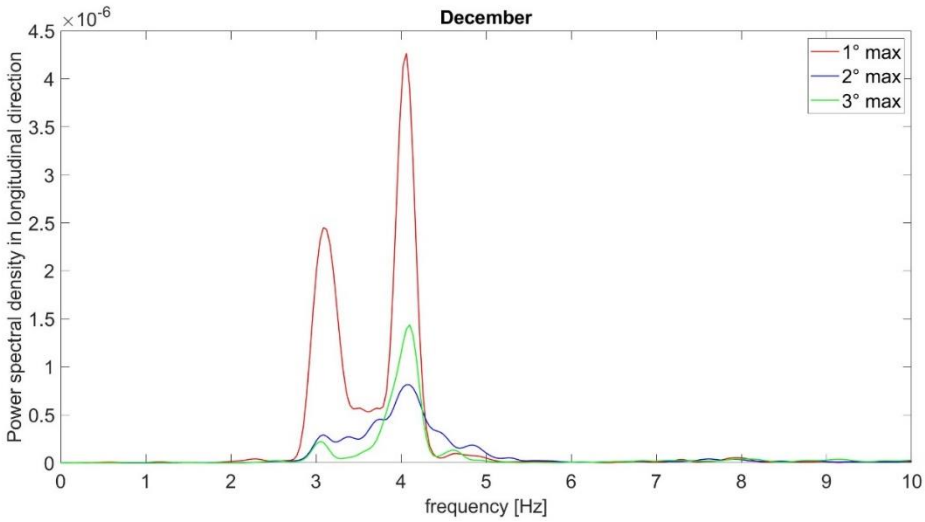


Figure 1-138: Results obtained from the 3 accelerograms with maximum SD in time domain

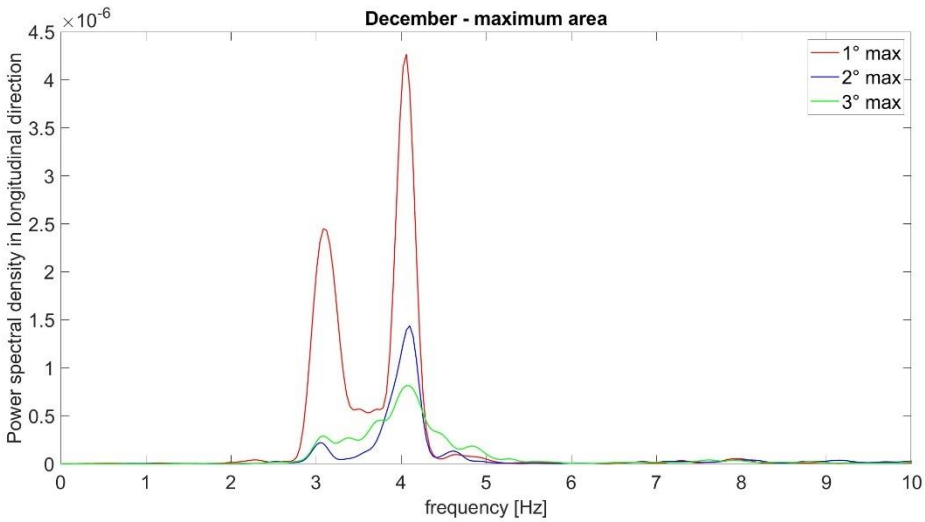


Figure 1-139: Results obtained from the 3 accelerograms with maximum area of PSD

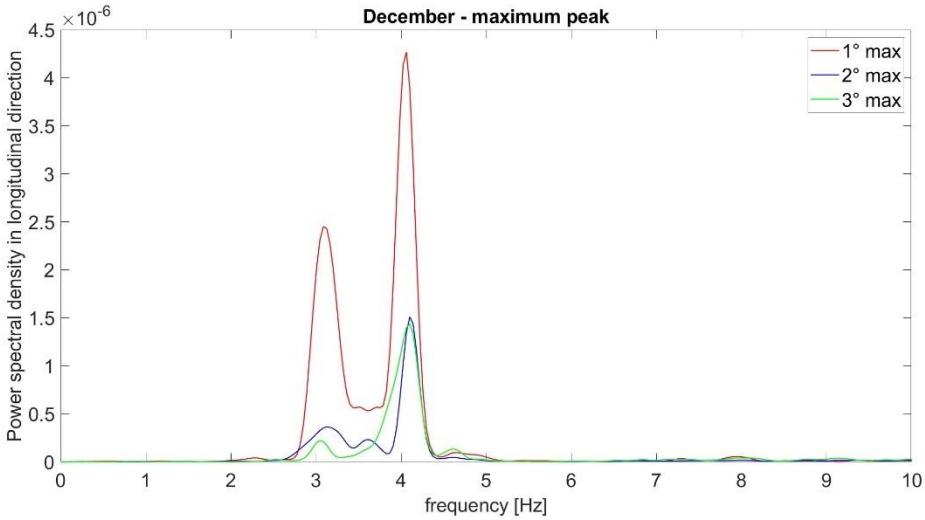


Figure 1-140: Results obtained from the 3 accelerograms with highest peak if PSD

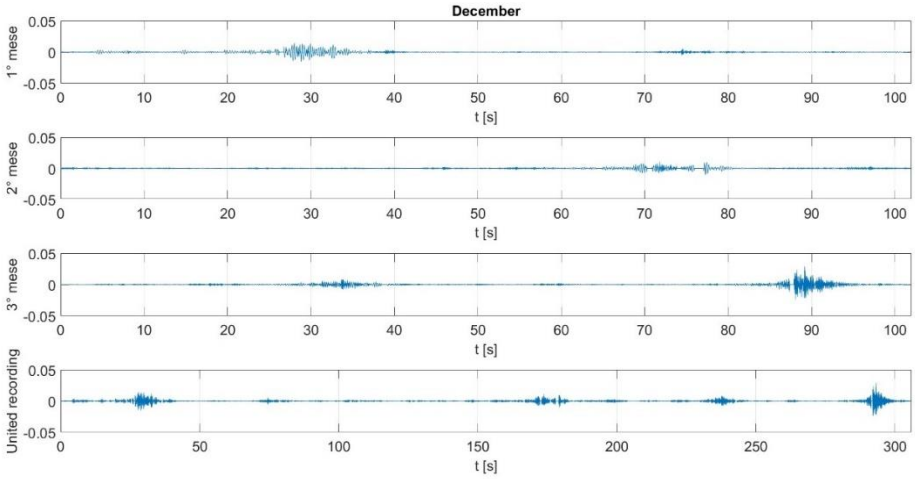


Figure 1-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

1.12.3 Transverse direction (z)

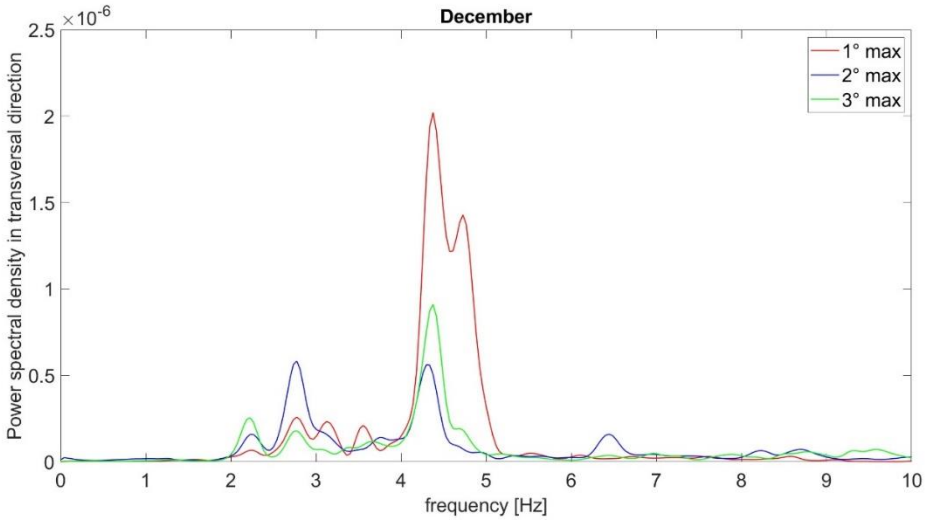


Figure 1-142: Results obtained from the 3 accelerograms with maximum SD in time domain

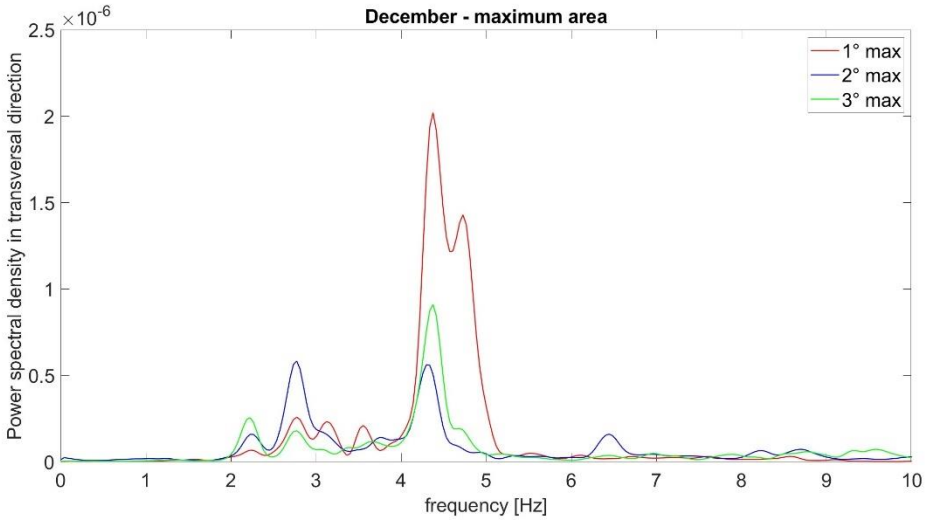


Figure 1-143: Results obtained from the 3 accelerograms with maximum area of PSD

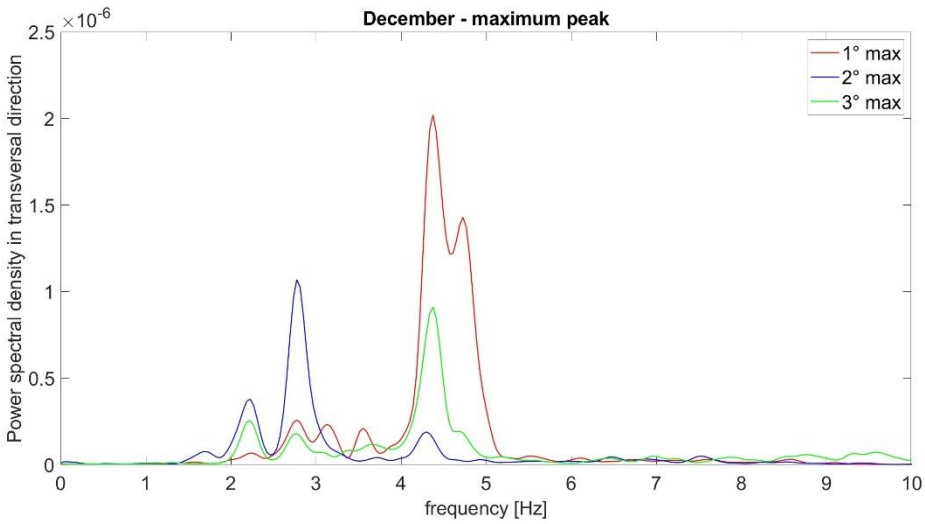


Figure 1-144: Results obtained from the 3 accelerograms with highest peak if PSD

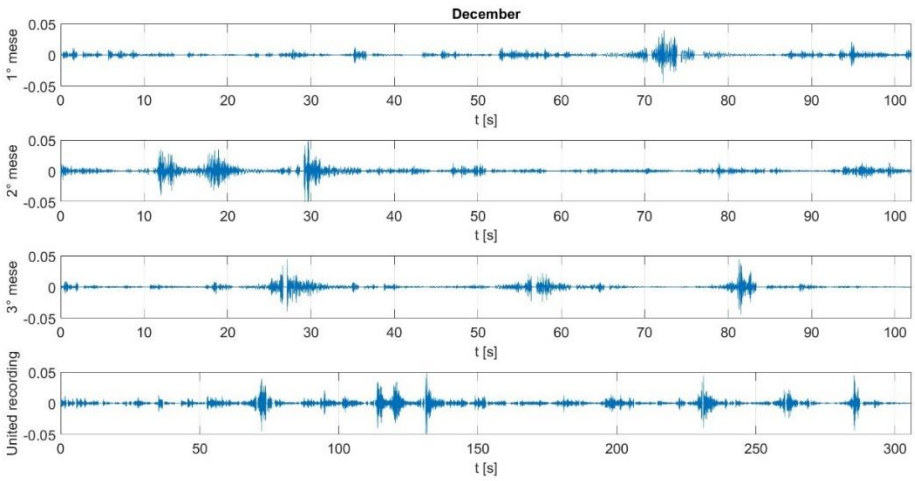


Figure 1-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

1.13 Analysis of the complete 2023 year

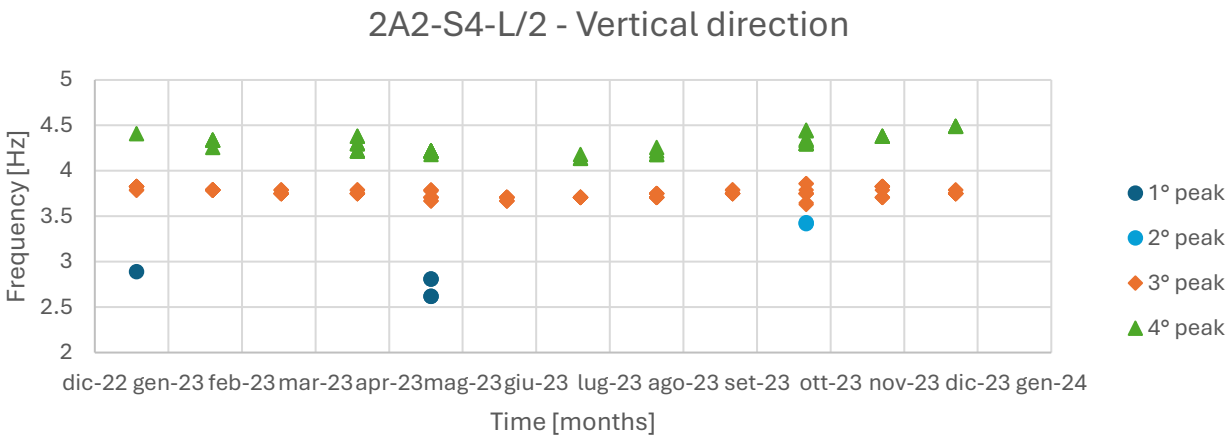
All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

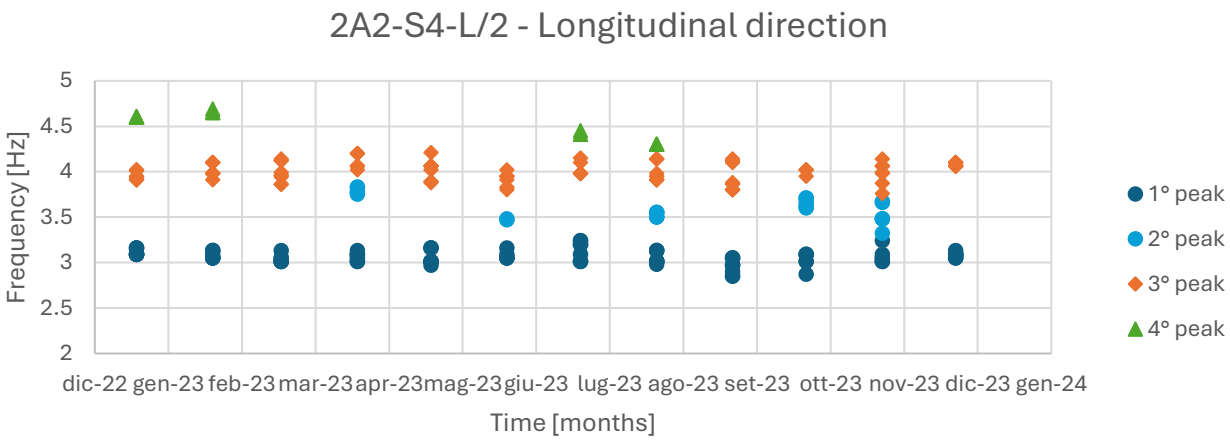
Table 1-37: Main identified frequencies for sensor 3099D – bridge 2A2 – Sp4 – L/2

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	5	2	107	42	100	25	94	14	39	104	8	98
	MEAN	**2.75**	**3.43**	**3.75**	**4.29**	**3.06**	**3.60**	**4.00**	**4.53**	**2.25**	**2.80**	**3.70**	**4.26**
	SD	0.11	0.01	0.05	0.09	0.07	0.13	0.10	0.14	0.05	0.11	0.06	0.09
	C.o.V.	4.0%	0.1%	1.3%	2.1%	2.4%	3.6%	2.5%	3.0%	2.4%	3.9%	1.5%	2.2%
	Rating	**4%**	**2%**	**100%**	**36%**	**85%**	**19%**	**79%**	**11%**	**33%**	**79%**	**7%**	**85%**
1	gen-23	2.89		3.83		3.09		3.91	4.6	2.26	2.62		4.34
2	gen-23			3.83		3.09		3.94	4.6		2.73		4.41
3	gen-23			3.79		3.16		4.01			2.8		4.38
1	gen-23			3.83		3.09		3.91	4.6	2.27	2.62		4.34
2	gen-23			3.83		3.09		4.02			2.73		4.41
3	gen-23			3.79	4.41	3.16		3.94	4.6		2.81		4.38
1	gen-23			3.83		3.09		3.91	4.6	2.27	2.62		4.33
2	gen-23			3.83		3.16		4.02			2.73		4.41
3	gen-23			3.79		3.09		3.95	4.6		2.81		4.41
1	feb-23			3.79	4.34	3.13		3.98	4.65		2.73		4.33
2	feb-23			3.79	4.26	3.05		4.1			2.81		4.38
3	feb-23			3.79		3.05		3.98			2.73		4.3
1	feb-23			3.79	4.34	3.13		3.98	4.69		2.73		4.34
2	feb-23			3.79		3.05		4.1			2.73		4.38
3	feb-23			3.79		3.05		3.98			2.77		4.3
1	feb-23			3.79		3.13		3.98	4.65		2.73		4.34
2	feb-23			3.79		3.05		4.1			2.77		4.38
3	feb-23			3.79	4.34	3.09		3.91			2.77		4.3
1	mar-23			3.75		3.01		4.14			2.81		4.26
2	mar-23			3.75		3.01		3.94		2.2	2.73		
3	mar-23			3.79		3.13		3.99			2.77		
1	mar-23			3.75		3.01		4.12			2.85		4.26
2	mar-23			3.75		3.01		3.96		2.2	2.77		4.26
3	mar-23			3.79		3.05		3.86			2.77		
1	mar-23			3.75		3.01		4.12			2.85		4.26
2	mar-23			3.75		3.01		3.96		2.2	2.77		4.22
3	mar-23			3.79		3.05		3.86			2.77		
1	apr-23			3.75	4.22	3.09		4.06			2.77		4.26
2	apr-23			3.75	4.3	3.01	3.75	4.2		2.23	2.77		4.26
3	apr-23			3.79		3.05	3.83			2.23	2.81		4.3
1	apr-23			3.75	4.22	3.09		4.06		2.23	2.77		4.26
2	apr-23			3.75	4.3	3.01	3.78	4.2			2.77		4.26

3	apr-23		3.79	4.38	3.05	3.83			2.23	2.81		4.3
1	apr-23		3.75	4.22	3.13		4.02			2.77		4.26
2	apr-23		3.75	4.3	3.09		4.06		2.23	2.81		4.3
3	apr-23		3.79	4.38	3.01	3.77	4.2		2.19	2.73		4.3
1	mag-23	2.62	3.71	4.22	3.01		4.21			2.77		4.14
2	mag-23		3.79	4.22	3.16		4.06		2.1	2.77		4.25
3	mag-23	2.81	3.67	4.22	3.01		4.06		2.3	3.05		4.21
1	mag-23	2.62	3.71	4.22	3.01		4.06			2.77		4.14
2	mag-23	2.81	3.67	4.22	3.16		3.89			2.77		4.23
3	mag-23		3.78	4.22	3.01		4.02			3.01		4.22
1	mag-23		3.79	4.22	3.01		4.06			2.73		4.14
2	mag-23		3.71	4.18	3.16		3.88		2.1	2.77		4.25
3	mag-23		3.71		2.97		3.89		2.3	2.81		4.18
1	giu-23		3.71		3.05		3.95		2.27	2.83		4.02
2	giu-23		3.67			3.47			2.31	2.89		4.22
3	giu-23		3.71		3.16		4.02		2.3	3.2		4.18
1	giu-23		3.71		3.05		3.95		2.3	2.81		4.02
2	giu-23		3.71				3.91		2.3	2.89		4.22
3	giu-23		3.67		3.05		3.83		2.34	3.32		4.18
1	giu-23		3.67		3.05		3.95		2.3	2.89		4.18
2	giu-23		3.71			3.48			2.3	2.89		4.22
3	giu-23		3.71		3.09		3.8		2.27	2.81		4.02
1	lug-23		3.71	4.18	3.2		3.98		2.3	2.85		
2	lug-23		3.71		3.01					3.01		4.1
3	lug-23		3.71		3.24		4.1	4.41		2.97		4.14
1	lug-23		3.71	4.14	3.2		3.98		2.3	2.85	3.79	
2	lug-23		3.71		3.01					3.01		4.14
3	lug-23		3.71		3.24		4.15	4.45		2.97		4.14
1	lug-23		3.71	4.14	3.01				2.3	2.85	3.81	
2	lug-23		3.71		3.2		3.98			2.97		4.14
3	lug-23		3.71		3.09		3.98			3.01		4.14
1	ago-23		3.71	4.22	3.13	3.55	3.91	4.3	2.23	2.7		4.21
2	ago-23		3.71		3.01	3.5	4.14			3.05		4.1
3	ago-23		3.75	4.26	3.01		3.98		2.3			
1	ago-23		3.71	4.18	3.13	3.55	3.91	4.3	2.23	2.7		4.29
2	ago-23		3.75		2.98	3.5	4.14			3.04		4.17
3	ago-23		3.75		3.01		3.95		2.3			
1	ago-23		3.71	4.18	3.13	3.55	3.91	4.3	2.3			4.14
2	ago-23		3.75		3.01	3.5	4.14			2.77		4.18
3	ago-23		3.71		3.01		3.95		2.23	2.7		4.3
1	set-23		3.79		2.97		3.8			2.73		4.14
2	set-23		3.75		3.05		3.88			2.73		4.28
3	set-23		3.75		2.85		4.12			2.81		4.14
1	set-23		3.79		2.97		3.8			2.73		4.18
2	set-23		3.75		3.05		3.86			2.73		4.34
3	set-23		3.75		2.85		4.14			2.81		4.18
1	set-23		3.79		2.97		3.8			2.73		4.18

2	set-23		3.75		3.05		3.87		2.73		4.3
3	set-23		3.75		2.9		4.1		2.81		4.22
1	ott-23	3.42	3.86	4.34	3.09	3.61			2.81		4.3
2	ott-23		3.75	4.3			4.02		2.77		4.25
3	ott-23		3.65	4.44	3.01	3.71			2.73		4.22
1	ott-23	3.43	3.86	4.35	3.09	3.6			2.81		4.3
2	ott-23		3.63	4.45		3.67	4.02		2.77		4.26
3	ott-23		3.75	4.3	3.01	3.71			2.77		4.22
1	ott-23		3.75	4.3	3.09	3.63			2.81		4.3
2	ott-23		3.75	4.33			4.02		2.77		4.26
3	ott-23		3.79	4.3	2.87		3.95		2.81		4.18
1	nov-23		3.71	4.38	-	3.48	4.06		2.7	3.67	4.37
2	nov-23		3.83		3.01	3.67			2.73		4.3
3	nov-23		3.83		3.24		3.99		2.73	3.67	4.25
1	nov-23		3.71	4.38	3.05	3.48	4.06		2.73	3.67	4.38
2	nov-23		3.83		3.01		3.76		2.73		4.3
3	nov-23		3.83		3.09		3.87		2.7	3.67	4.25
1	nov-23		3.71	4.38	3.05	3.48	4.06		2.73	3.67	4.38
2	nov-23		3.79		3.01	3.66	3.98		2.73		4.3
3	nov-23		3.83			3.32	4.14		2.7	3.67	4.26
1	dic-23		3.75	4.49	3.09		4.06		2.77		4.38
2	dic-23		3.75		3.09		4.06	2.23	2.77		4.3
3	dic-23		3.79		3.05		4.1	2.19	2.77		4.37
1	dic-23		3.75	4.49	3.09		4.06		2.77		4.38
2	dic-23		3.75		3.05		4.1	2.23	2.77		4.38
3	dic-23		3.75		3.09		4.06	2.23	2.77		4.34
1	dic-23		3.75		3.09		4.06		2.77		4.38
2	dic-23		3.79		3.13		4.1	2.23	2.77		4.38
3	dic-23		3.75	4.49	3.05		4.1	2.18	2.77		4.3





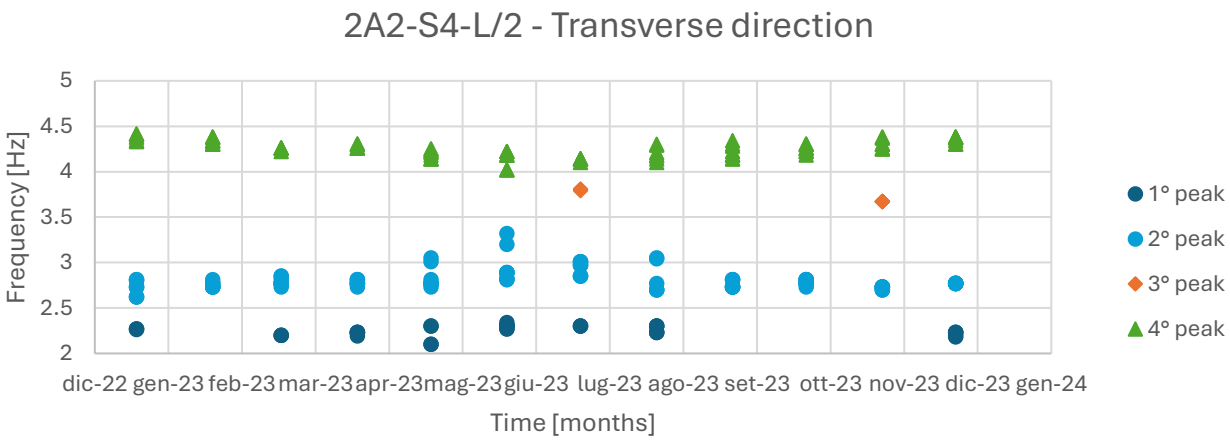


Figure 1-146: Main identified frequencies for sensor 3099D – bridge 2A2 – Sp4 – L/2

2. Annex 2 – Bridge 2A2 – Span 4 – L/4 - Sensor 30EB4

The Bridge 2A2 counts 2 monitored decks: span 4 and span 5 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 4 are:

- 3099D – situated in the midspan;
- 30EB4 – situated at a distance of L/4;
- 31639 – situated at a distance of L/8;
- 30D41 – situated nearby the pilar.

The sensors present on deck number 5 are:

- 2B7E4 – situated in the midspan;
- 3187F – situated at a distance of L/4 of the deck;
- 2B988 – situated at a distance of L/8 of the deck;
- 2C1EA – situated by the pilar.

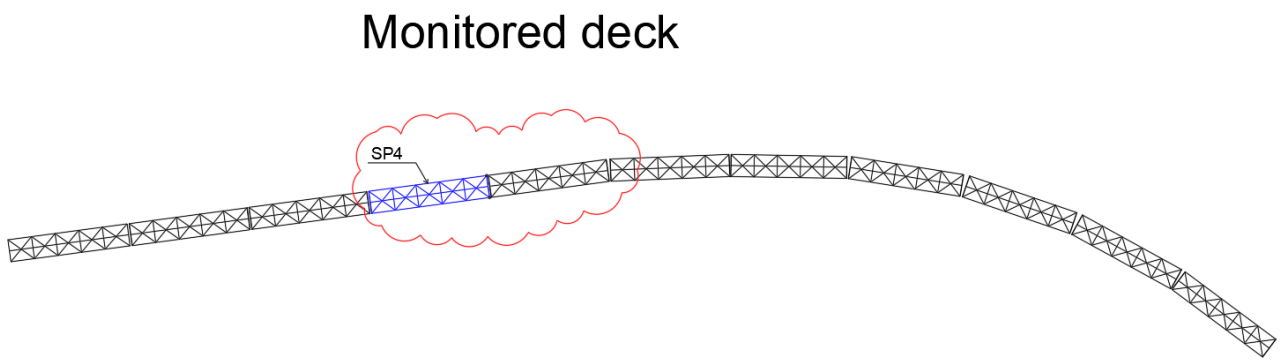


Figure 2-1 Monitored decks of 2A2 bridge

The accelerograms of the 30EB4 sensor have been analyzed and the results are represented in the following paragraphs.

2.1 January

The results obtained for the January dataset are shown in the following tables.

Table 2-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-01-27_01-00-20	1.60E-03
	2°	30EB4_2023-01-06_01-00-20	1.36E-03
	3°	30EB4_2023-01-02_07-00-20	1.33E-03
Longitudinal direction (y)	1°	30EB4_2023-01-26_07-00-21	4.76E-04
	2°	30EB4_2023-01-17_07-00-20	4.65E-04
	3°	30EB4_2023-01-19_13-00-20	4.26E-04
Transverse direction (z)	1°	30EB4_2023-01-19_13-00-20	5.76E-04
	2°	30EB4_2023-01-31_07-00-19	5.34E-04
	3°	30EB4_2023-01-20_13-00-20	5.27E-04

Table 2-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-01-27_01-00-20	7.15E-06	30EB4_2023-01-27_01-00-20	5.05E-07
2	30EB4_2023-01-06_01-00-20	4.48E-06	30EB4_2023-01-06_01-00-20	3.74E-07
3	30EB4_2023-01-10_13-00-21	4.23E-06	30EB4_2023-01-31_07-00-19	2.87E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-01-26_07-00-21	3.31E-07	30EB4_2023-01-17_07-00-20	4.55E-08
2	30EB4_2023-01-17_07-00-20	3.01E-07	30EB4_2023-01-26_07-00-21	4.41E-08
3	30EB4_2023-01-19_13-00-20	2.47E-07	30EB4_2023-01-19_13-00-20	3.77E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-01-19_13-00-20	4.19E-07	30EB4_2023-01-19_13-00-20	6.51E-08
2	30EB4_2023-01-14_13-00-21	3.34E-07	30EB4_2023-01-31_07-00-19	5.89E-08
3	30EB4_2023-01-31_07-00-19	3.23E-07	30EB4_2023-01-20_13-00-20	5.80E-08

Table 2-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	C	D	E	E	E
2	B	B	B	D	D	C	F	-	F
3	-	-	-	E	E	E	G	F	G

2.1.1 Vertical direction (x)

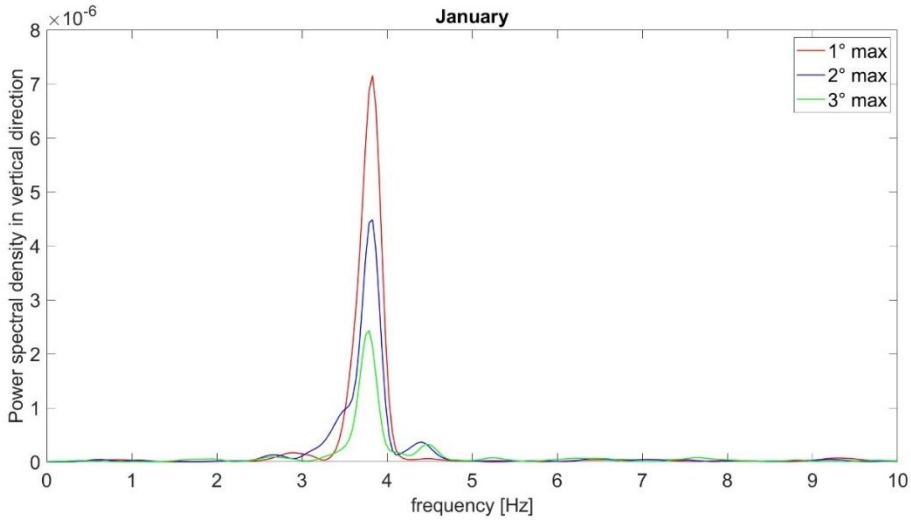


Figure 2-2: Results obtained from the 3 accelerograms with maximum SD in time domain

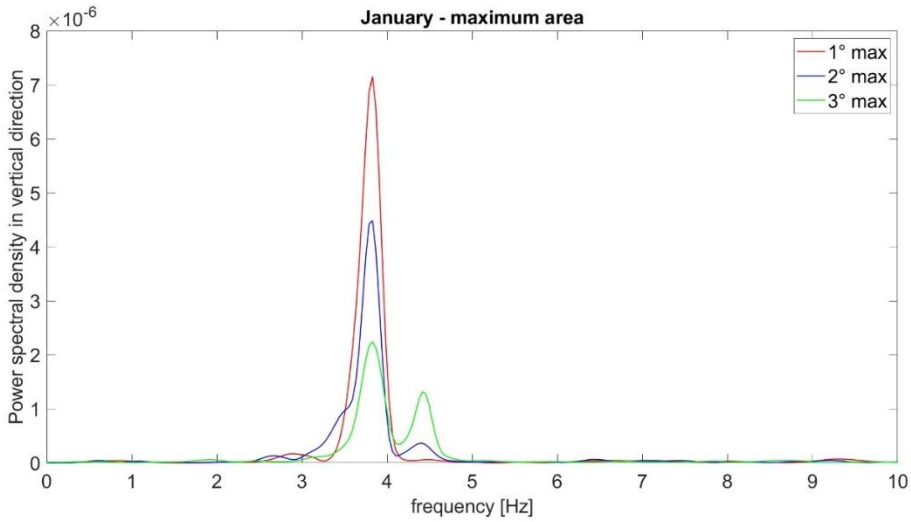


Figure 2-3: Results obtained from the 3 accelerograms with maximum area of PSD

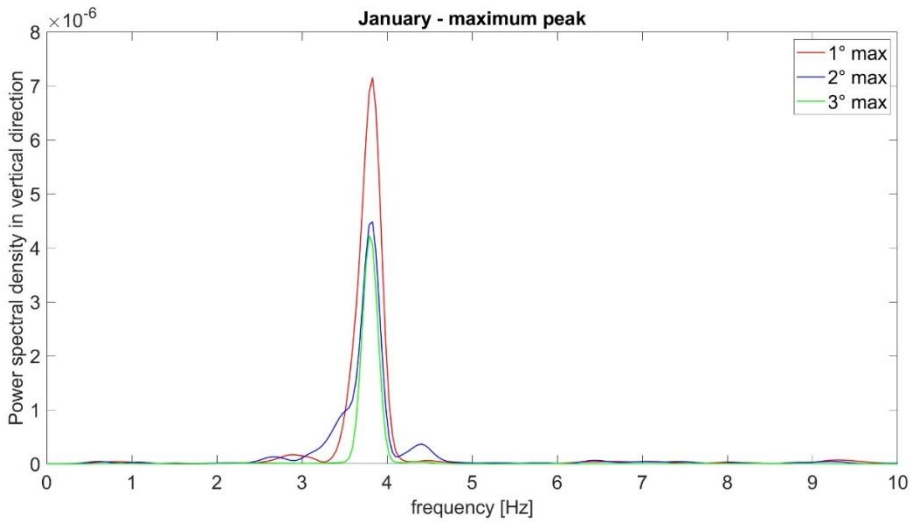


Figure 2-4: Results obtained from the 3 accelerograms with highest peak if PSD

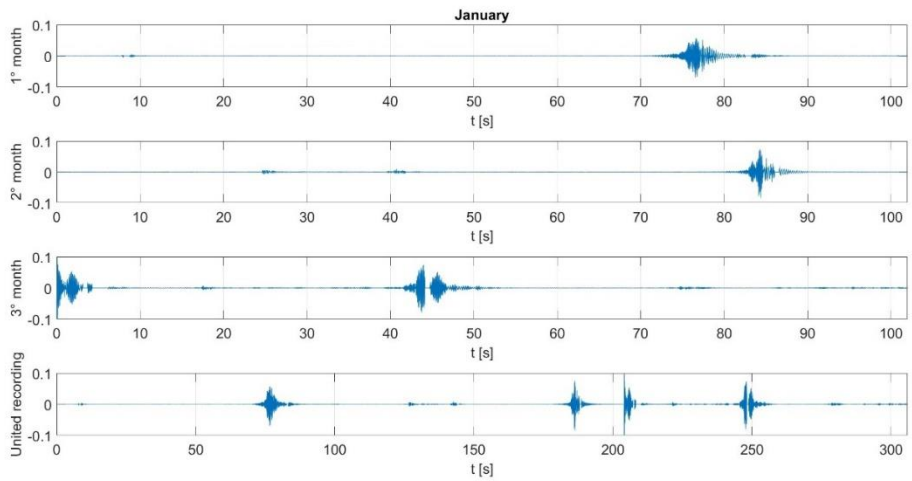


Figure 2-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.1.2 Longitudinal direction (y)

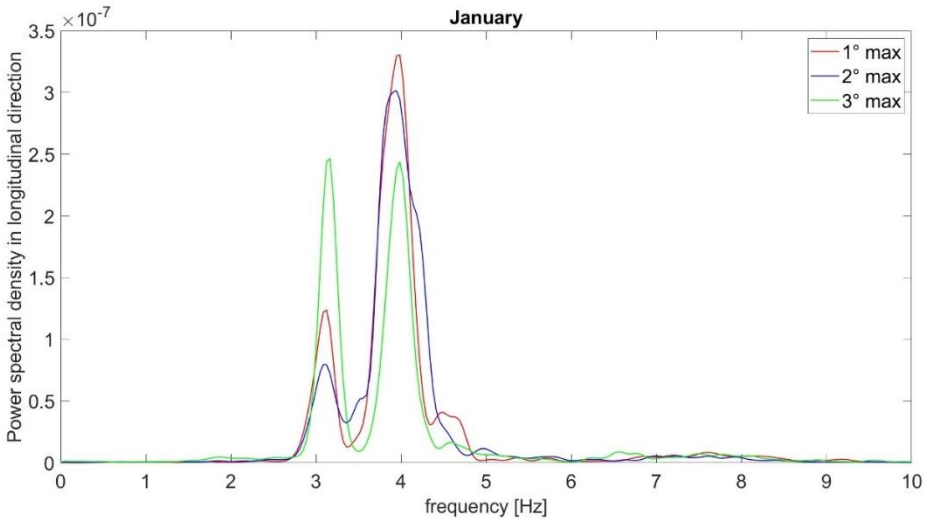


Figure 2-6: Results obtained from the 3 accelerograms with maximum SD in time domain

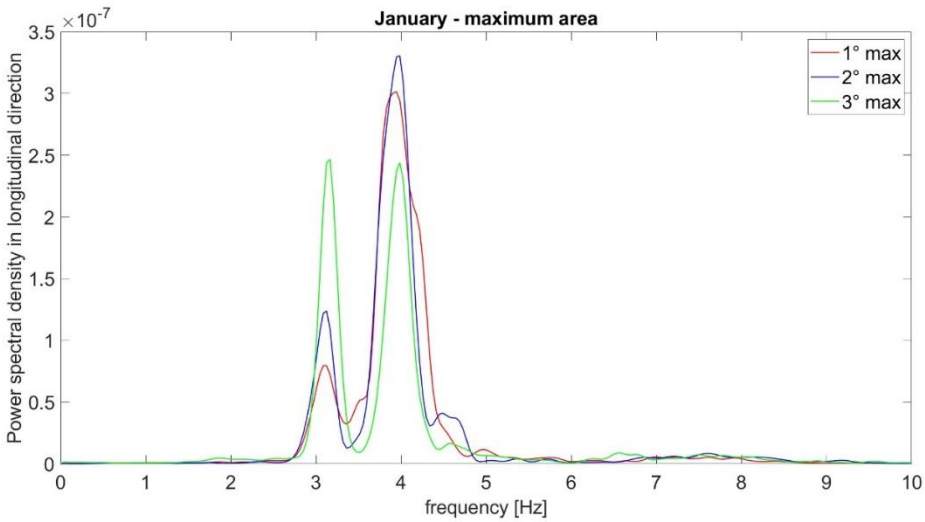


Figure 2-7: Results obtained from the 3 accelerograms with maximum area of PSD

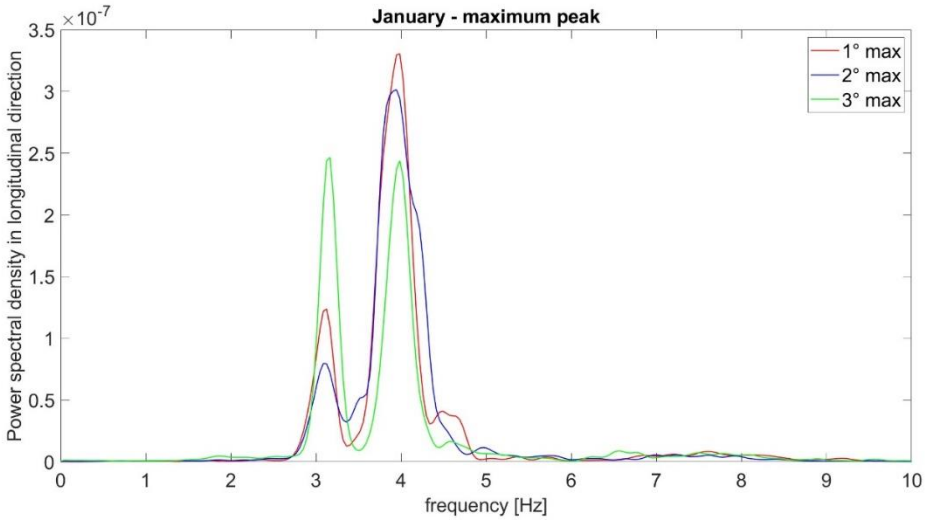


Figure 2-8: Results obtained from the 3 accelerograms with highest peak in PSD

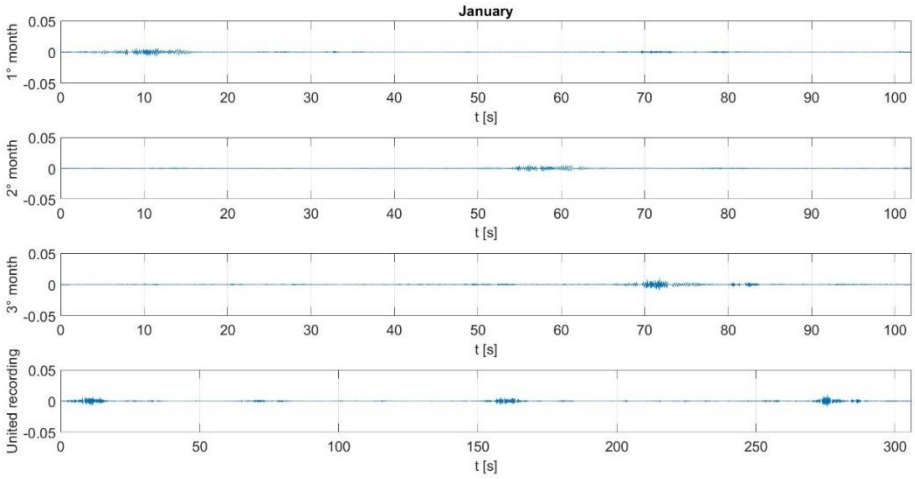


Figure 2-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.1.3 Transverse direction (z)

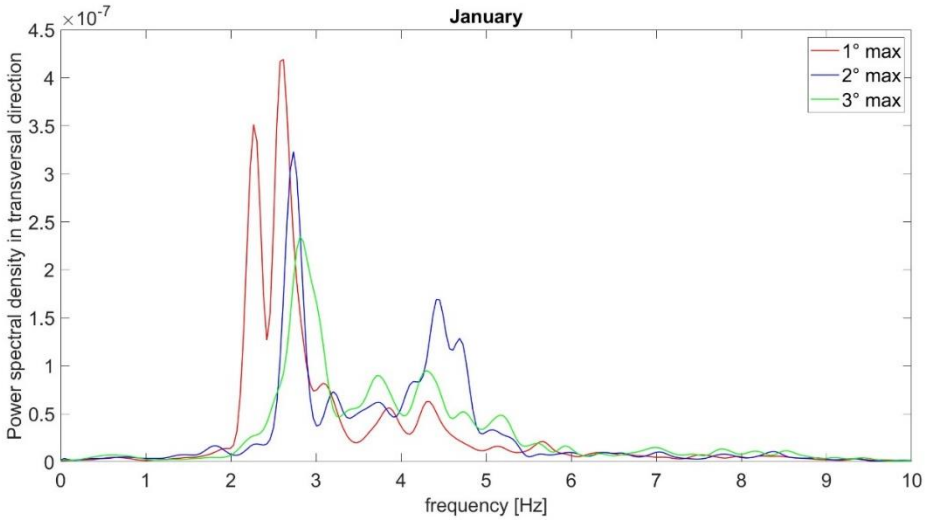


Figure 2-10: Results obtained from the 3 accelerograms with maximum SD in time domain

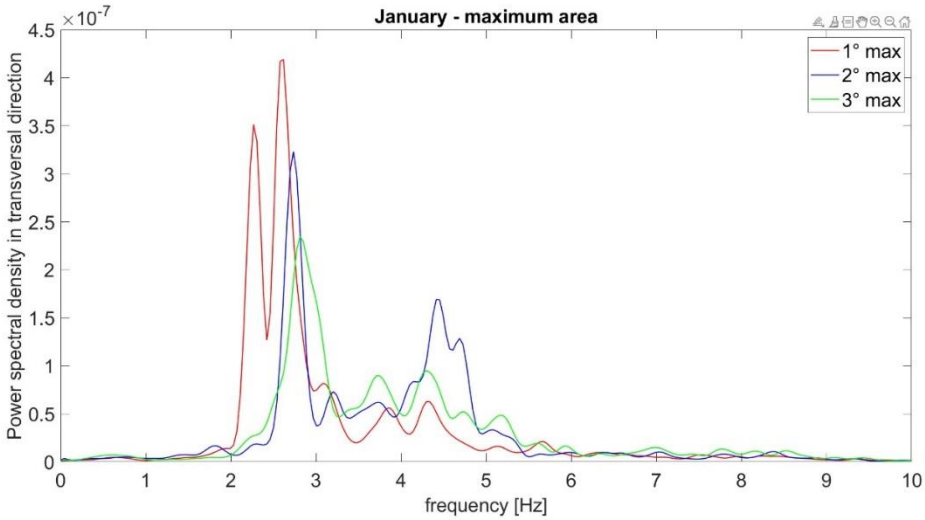


Figure 2-11: Results obtained from the 3 accelerograms with maximum area of PSD

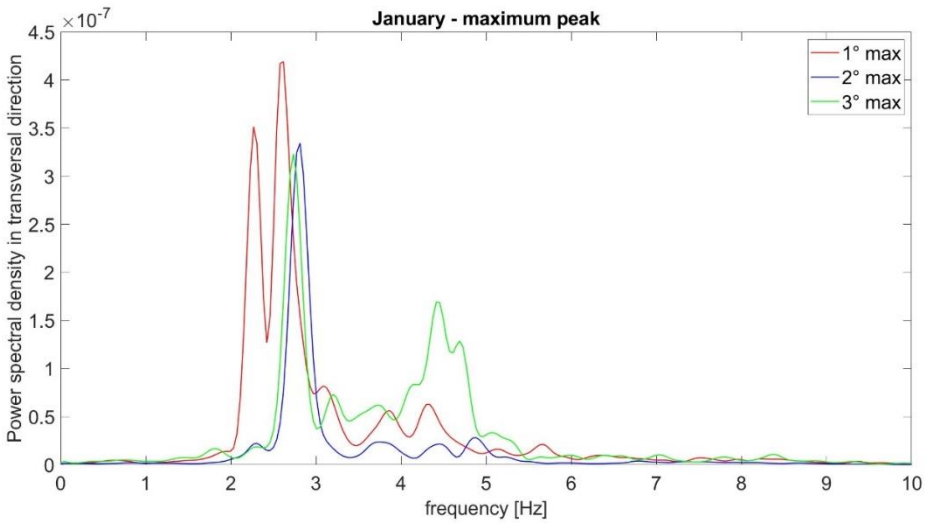


Figure 2-12: Results obtained from the 3 accelerograms with highest peak in PSD

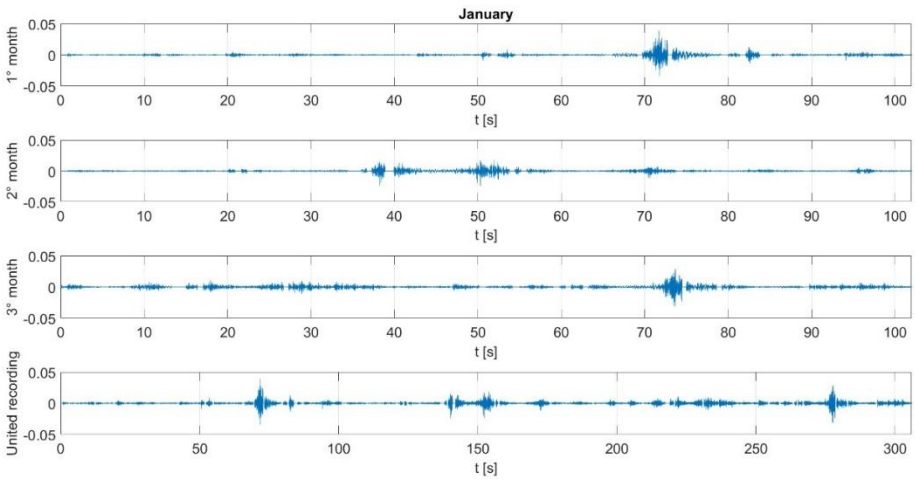


Figure 2-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

2.2 February

The results obtained for the February dataset are shown in the following tables.

Table 2-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-02-01_13-00-20	2.74E-03
	2°	30EB4_2023-02-20_13-00-21	2.18E-03
	3°	30EB4_2023-02-14_19-00-22	2.07E-03
Longitudinal direction (y)	1°	30EB4_2023-02-01_13-00-20	9.05E-04
	2°	30EB4_2023-02-06_13-00-20	5.40E-04
	3°	30EB4_2023-02-03_13-00-20	4.95E-04
Transverse direction (z)	1°	30EB4_2023-02-03_13-00-20	9.83E-04
	2°	30EB4_2023-02-01_13-00-20	9.36E-04
	3°	30EB4_2023-02-06_13-00-20	8.42E-04

Table 2-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-02-20_13-00-21	1.64E-05	30EB4_2023-02-01_13-00-20	1.41E-06
2	30EB4_2023-02-14_19-00-22	1.39E-05	30EB4_2023-02-20_13-00-21	9.76E-07
3	30EB4_2023-02-01_13-00-20	9.06E-06	30EB4_2023-02-14_19-00-22	8.80E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-02-01_13-00-20	1.00E-06	30EB4_2023-02-01_13-00-20	1.67E-07
2	30EB4_2023-02-14_19-00-22	3.71E-07	30EB4_2023-02-06_13-00-20	5.40E-08
3	30EB4_2023-02-06_13-00-20	3.12E-07	30EB4_2023-02-03_13-00-20	4.99E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-02-03_13-00-20	2.01E-06	30EB4_2023-02-03_13-00-20	1.96E-07
2	30EB4_2023-02-06_13-00-20	1.02E-06	30EB4_2023-02-01_13-00-20	1.75E-07
3	30EB4_2023-02-22_19-00-21	6.77E-07	30EB4_2023-02-06_13-00-20	1.34E-07

Table 2-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	D	D	D	F	F	F
2	B	C	B	E	-	E	G	H	G
3	C	A	C	F	E	F	H	-	H

2.2.1 Vertical direction (x)

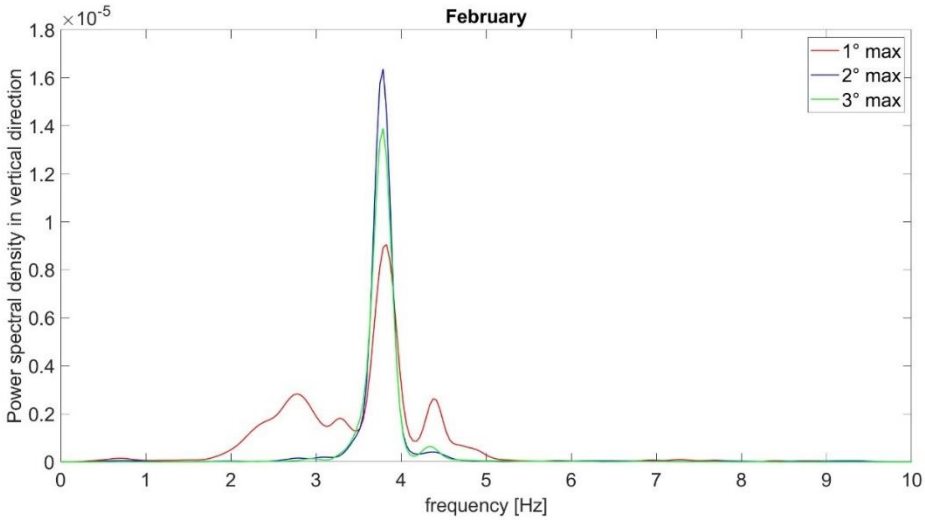


Figure 2-14: Results obtained from the 3 accelerograms with maximum SD in time domain

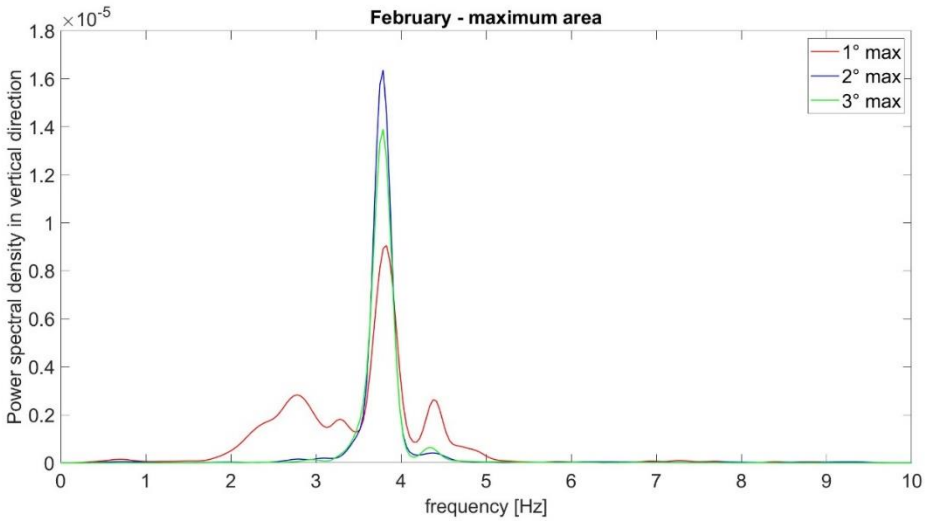


Figure 2-15: Results obtained from the 3 accelerograms with maximum area of PSD

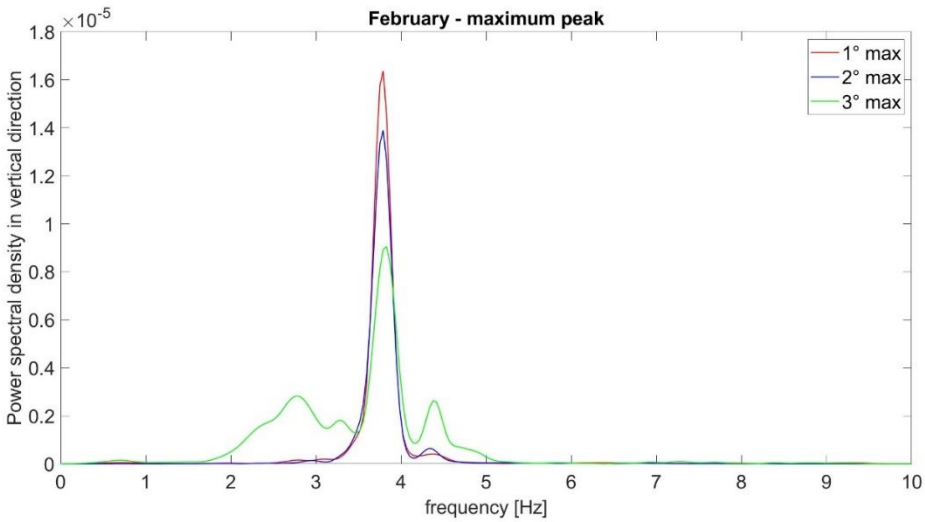


Figure 2-16: Results obtained from the 3 accelerograms with highest peak if PSD

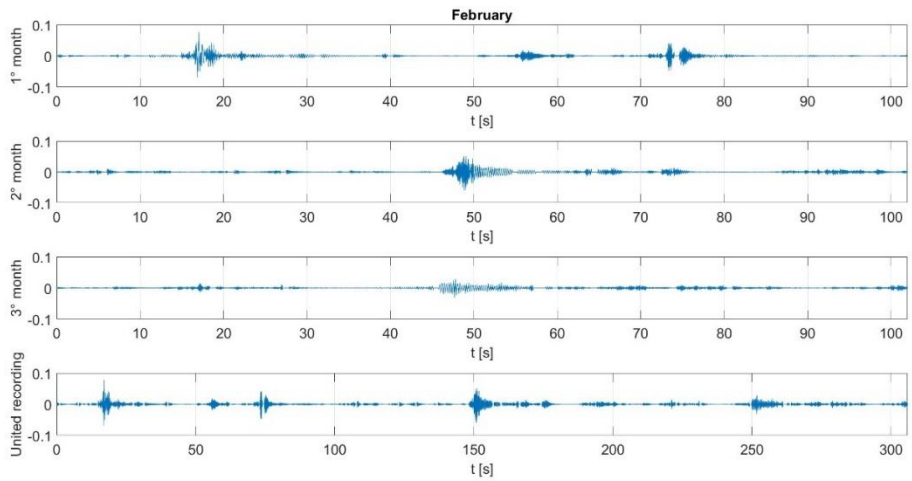


Figure 2-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.2.2 Longitudinal direction (y)

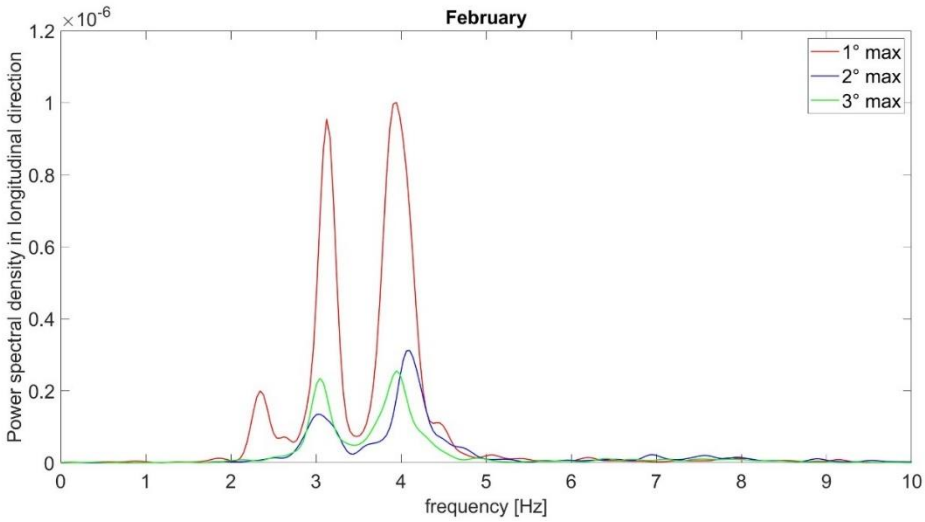


Figure 2-18: Results obtained from the 3 accelerograms with maximum SD in time domain

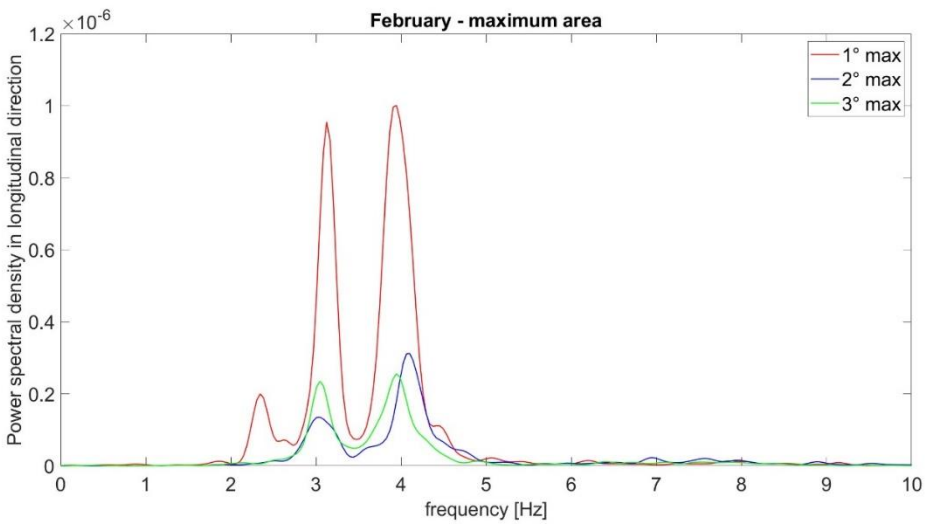


Figure 2-19: Results obtained from the 3 accelerograms with maximum area of PSD

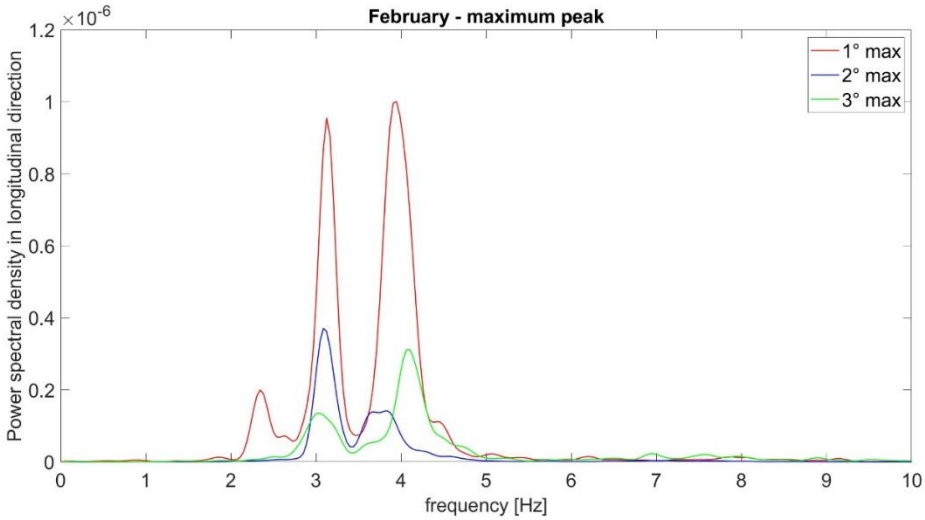


Figure 2-20: Results obtained from the 3 accelerograms with highest peak if PSD

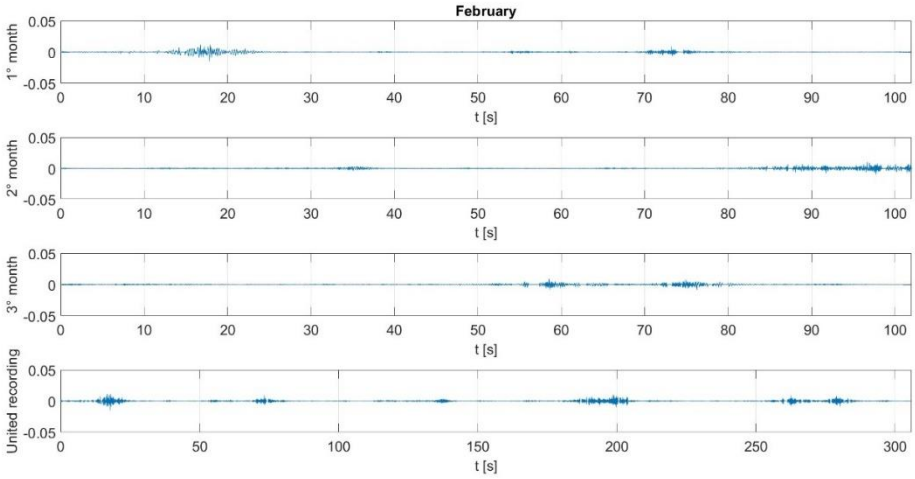


Figure 2-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.2.3 Transverse direction (z)

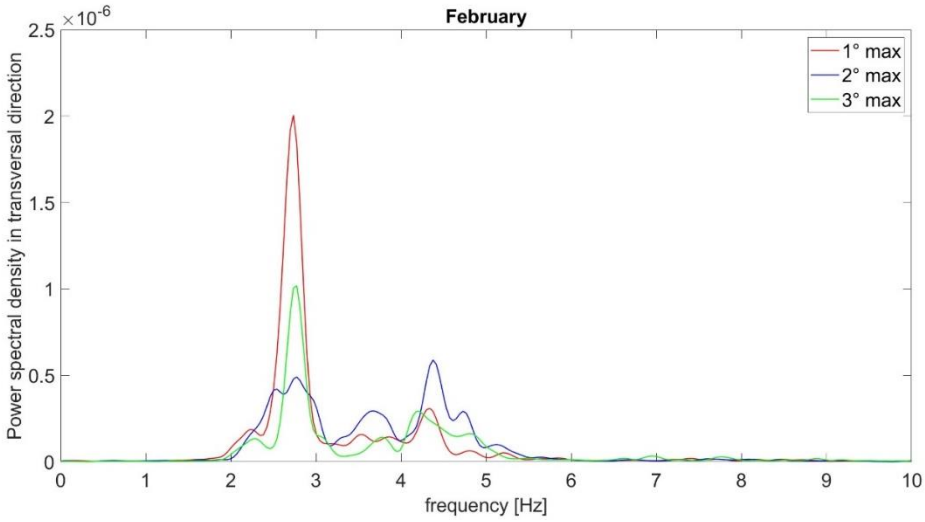


Figure 2-22: Results obtained from the 3 accelerograms with maximum SD in time domain

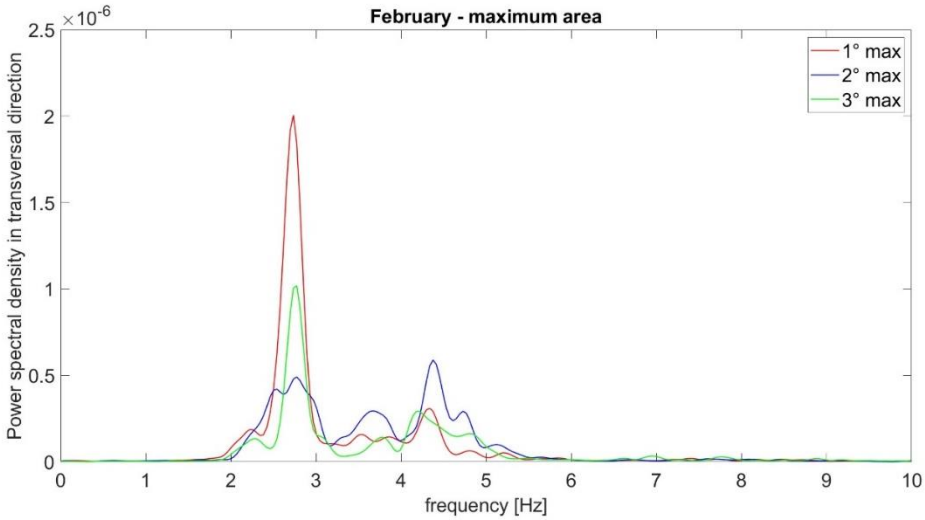


Figure 2-23: Results obtained from the 3 accelerograms with maximum area of PSD

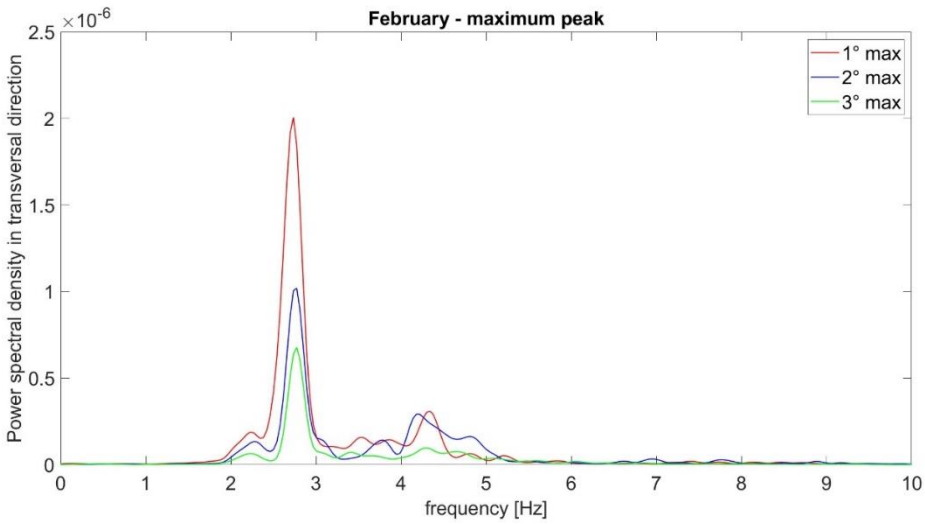


Figure 2-24: Results obtained from the 3 accelerograms with highest peak if PSD

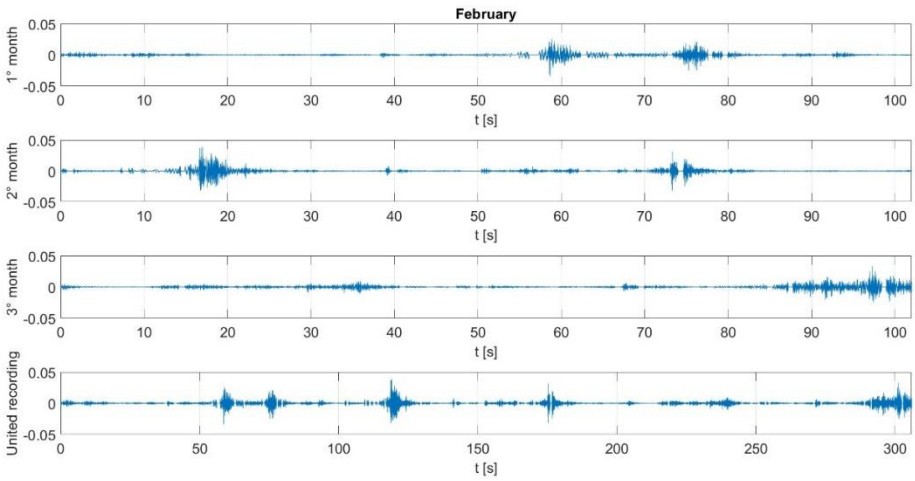


Figure 2-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

2.3 March

The results obtained for the March dataset are shown in the following tables.

Table 2-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-03-04_13-00-20	5.99E-03
	2°	30EB4_2023-03-16_13-00-20	3.17E-03
	3°	30EB4_2023-03-08_13-00-21	2.40E-03
Longitudinal direction (y)	1°	30EB4_2023-03-04_13-00-20	1.74E-03
	2°	30EB4_2023-03-16_13-00-20	1.37E-03
	3°	30EB4_2023-03-08_13-00-21	1.09E-03
Transverse direction (z)	1°	30EB4_2023-03-04_13-00-20	1.34E-03
	2°	30EB4_2023-03-16_13-00-20	1.17E-03
	3°	30EB4_2023-03-15_07-00-21	1.09E-03

Table 2-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-03-04_13-00-20	7.21E-05	30EB4_2023-03-04_13-00-20	7.78E-06
2	30EB4_2023-03-16_13-00-20	2.17E-05	30EB4_2023-03-16_13-00-20	1.97E-06
3	30EB4_2023-03-09_13-00-20	1.80E-05	30EB4_2023-03-08_13-00-21	1.17E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-03-04_13-00-20	7.53E-06	30EB4_2023-03-04_13-00-20	6.24E-07
2	30EB4_2023-03-16_13-00-20	3.51E-06	30EB4_2023-03-16_13-00-20	3.90E-07
3	30EB4_2023-03-08_13-00-21	3.03E-06	30EB4_2023-03-08_13-00-21	2.53E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-03-04_13-00-20	3.27E-06	30EB4_2023-03-04_13-00-20	3.69E-07
2	30EB4_2023-03-20_07-00-21	1.73E-06	30EB4_2023-03-16_13-00-20	2.87E-07
3	30EB4_2023-03-16_13-00-20	1.70E-06	30EB4_2023-03-15_07-00-21	2.36E-07

Table 2-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	B	B	B	B	-	B
3	C	-	C	C	C	C	D	B	D

2.3.1 Vertical direction (x)

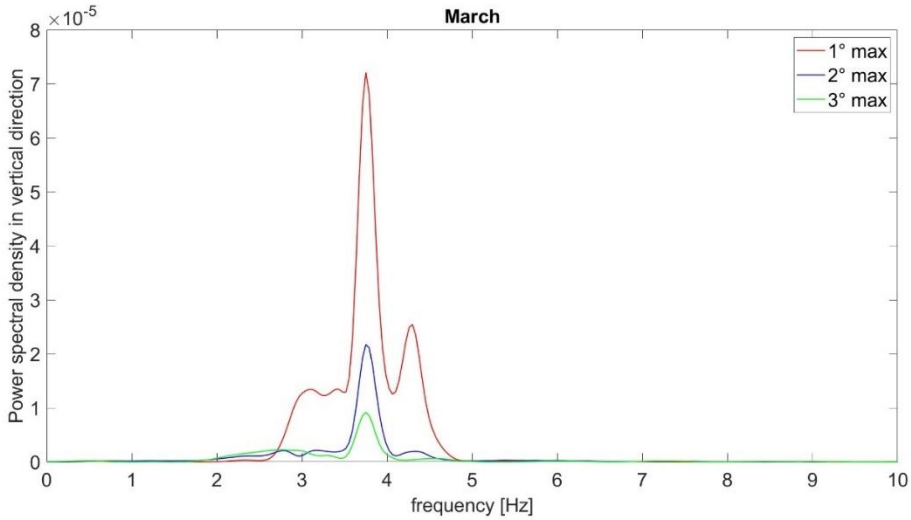


Figure 2-26: Results obtained from the 3 accelerograms with maximum SD in time domain

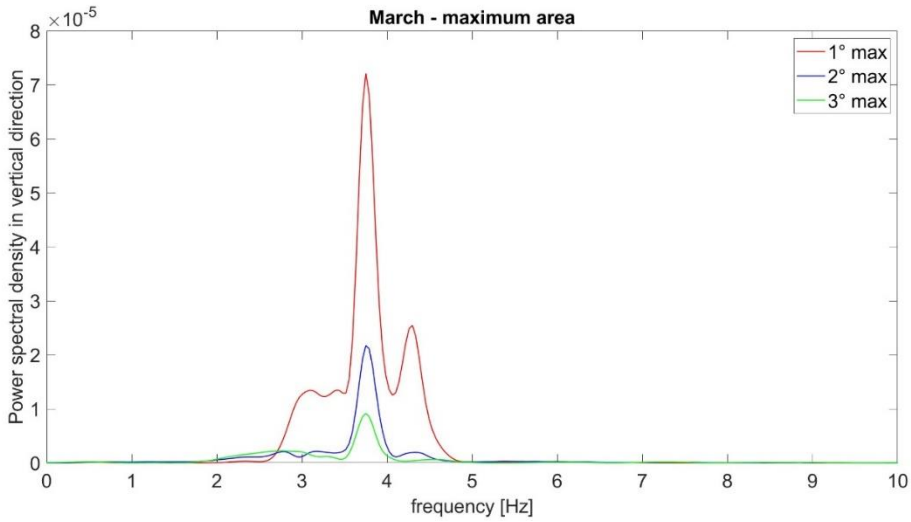


Figure 2-27: Results obtained from the 3 accelerograms with maximum area of PSD

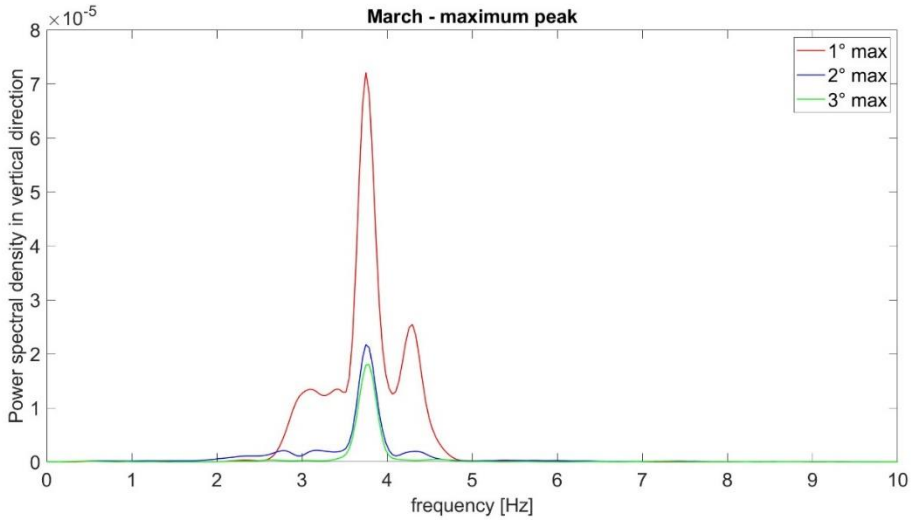


Figure 2-28: Results obtained from the 3 accelerograms with highest peak if PSD

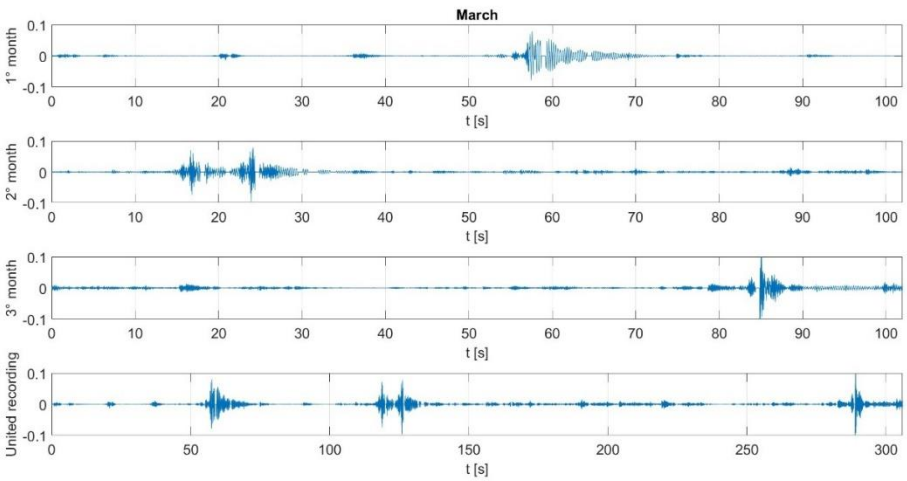


Figure 2-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.3.2 Longitudinal direction (y)

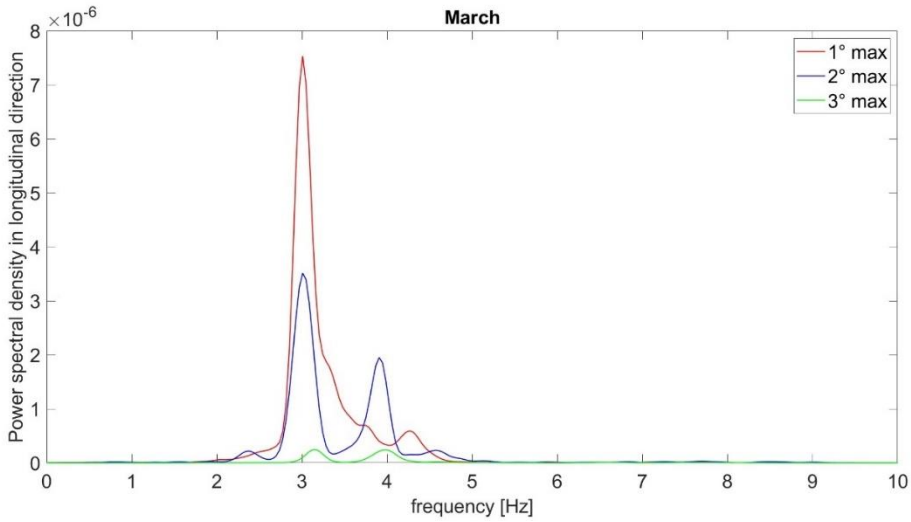


Figure 2-30: Results obtained from the 3 accelerograms with maximum SD in time domain

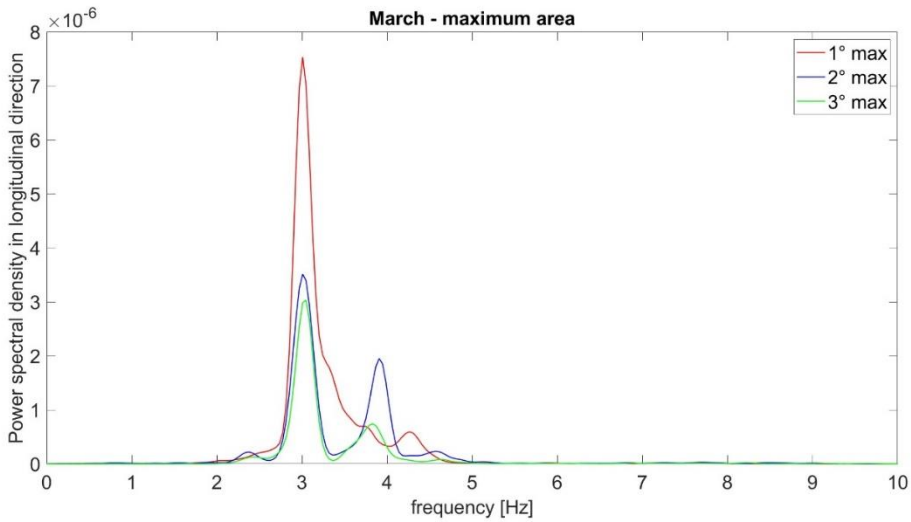


Figure 2-31: Results obtained from the 3 accelerograms with maximum area of PSD

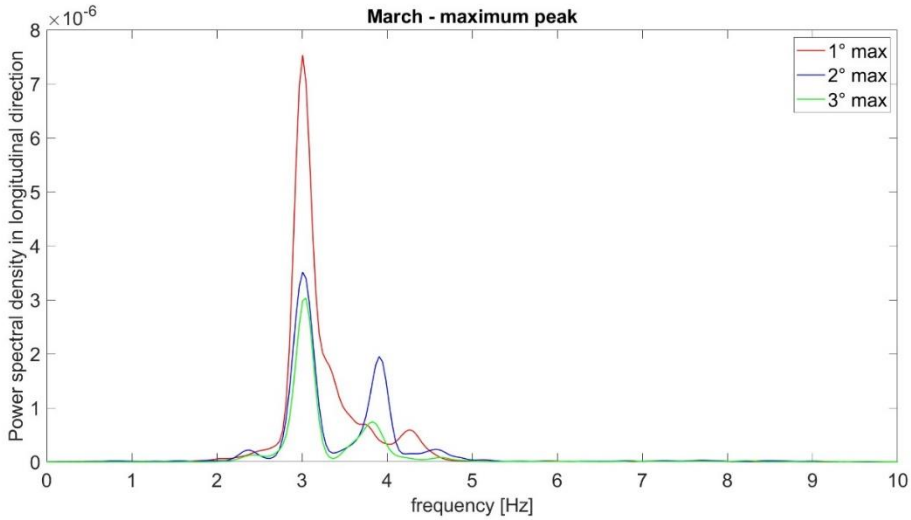


Figure 2-32: Results obtained from the 3 accelerograms with highest peak if PSD

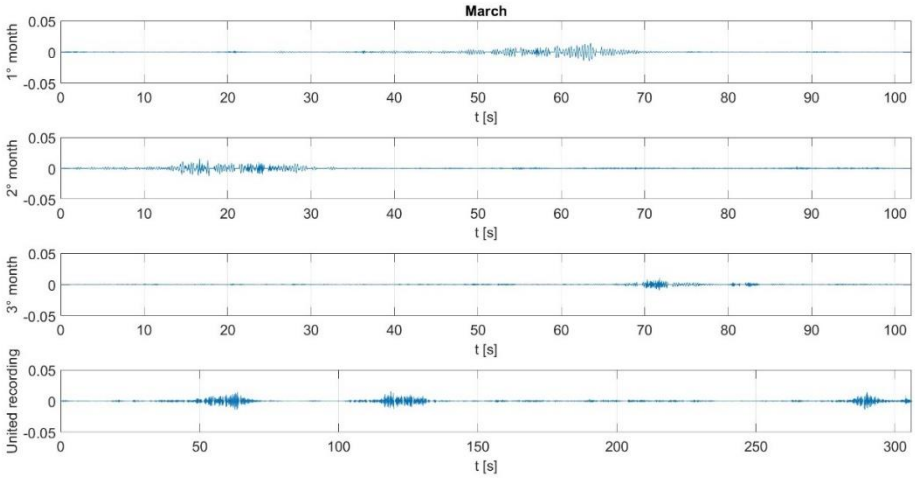


Figure 2-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.3.3 Transverse direction (z)

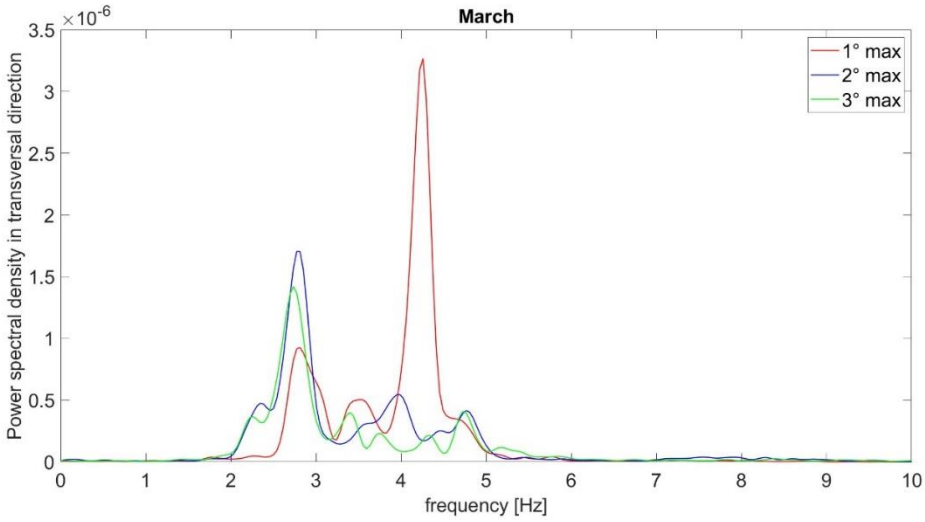


Figure 2-34: Results obtained from the 3 accelerograms with maximum SD in time domain

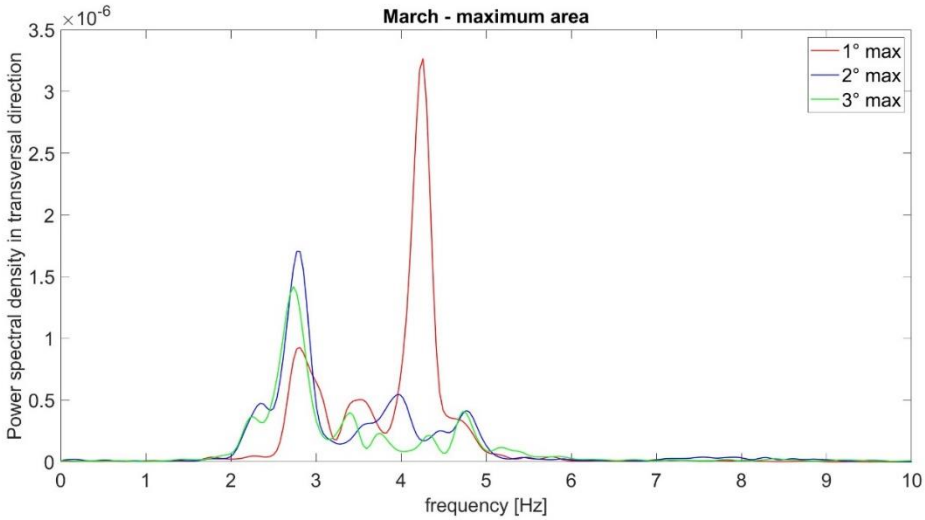


Figure 2-35: Results obtained from the 3 accelerograms with maximum area of PSD

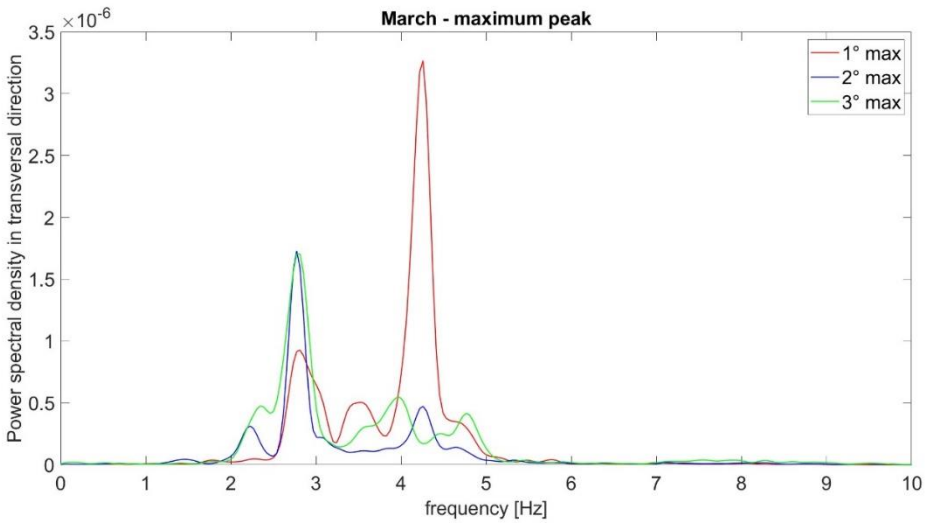


Figure 2-36: Results obtained from the 3 accelerograms with highest peak if PSD

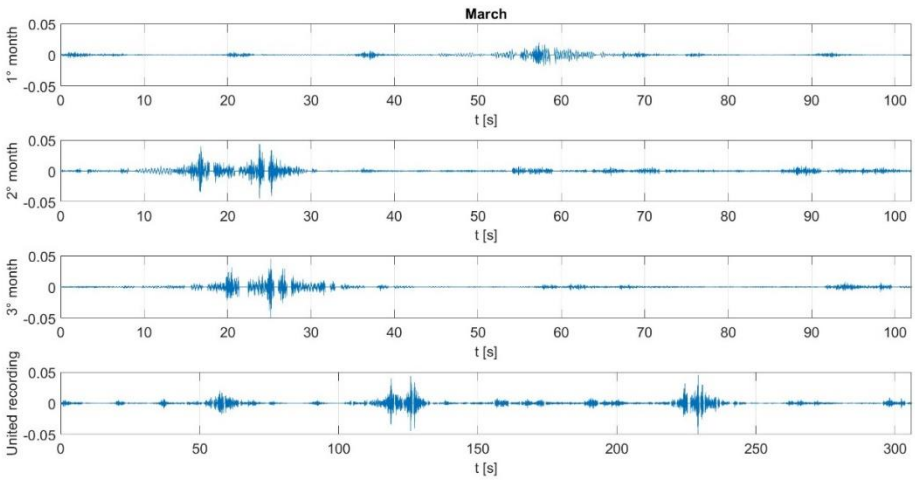


Figure 2-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

2.4 April

The results obtained for the April dataset are shown in the following tables.

Table 2-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-04-18_14-00-21	2.05E-03
	2°	30EB4_2023-04-06_20-00-20	1.85E-03
	3°	30EB4_2023-04-20_08-00-20	1.83E-03
Longitudinal direction (y)	1°	30EB4_2023-04-07_08-00-20	5.01E-04
	2°	30EB4_2023-04-14_08-00-20	4.78E-04
	3°	30EB4_2023-04-18_14-00-21	4.67E-04
Transverse direction (z)	1°	30EB4_2023-04-03_08-00-21	8.75E-04
	2°	30EB4_2023-04-20_08-00-20	8.46E-04
	3°	30EB4_2023-04-07_08-00-20	7.82E-04

Table 2-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-04-18_14-00-21	1.21E-05	30EB4_2023-04-18_14-00-21	8.27E-07
2	30EB4_2023-04-20_08-00-20	8.80E-06	30EB4_2023-04-20_08-00-20	6.88E-07
3	30EB4_2023-04-14_08-00-20	5.38E-06	30EB4_2023-04-06_20-00-20	6.37E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-04-07_08-00-20	3.60E-07	30EB4_2023-04-07_08-00-20	4.93E-08
2	30EB4_2023-04-21_08-00-20	3.40E-07	30EB4_2023-04-14_08-00-20	4.56E-08
3	30EB4_2023-04-18_14-00-21	2.97E-07	30EB4_2023-04-20_08-00-20	4.48E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-04-20_08-00-20	1.10E-06	30EB4_2023-04-03_08-00-21	1.58E-07
2	30EB4_2023-04-07_08-00-20	9.62E-07	30EB4_2023-04-20_08-00-20	1.41E-07
3	30EB4_2023-04-03_08-00-21	9.57E-07	30EB4_2023-04-07_08-00-20	1.24E-07

Table 2-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	F	G	F
2	B	C	C	E	-	E	G	D	G
3	C	-	B	A	A	-	D	F	D

2.4.1 Vertical direction (x)

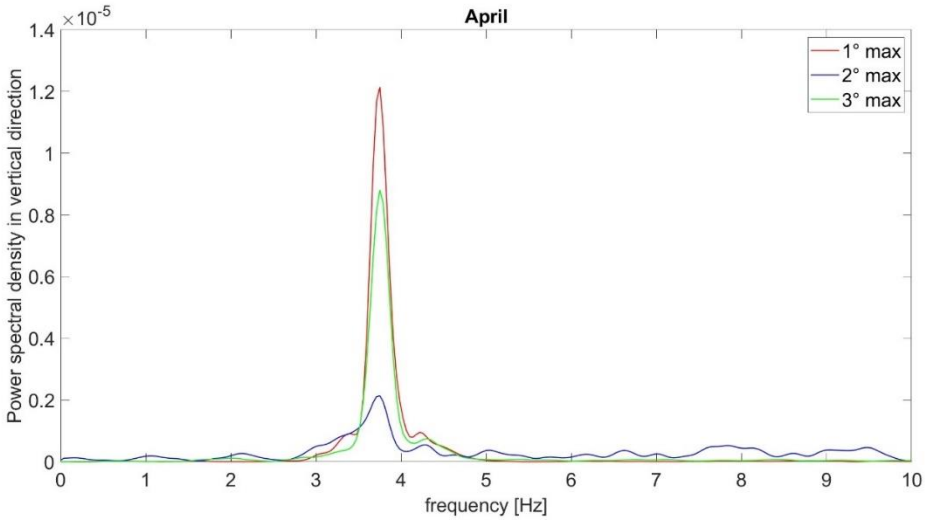


Figure 2-38: Results obtained from the 3 accelerograms with maximum SD in time domain

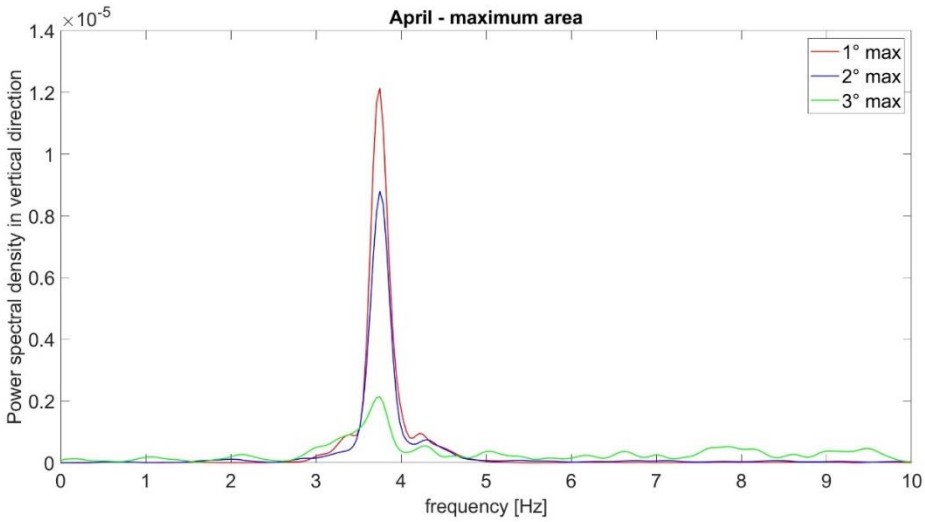


Figure 2-39: Results obtained from the 3 accelerograms with maximum area of PSD

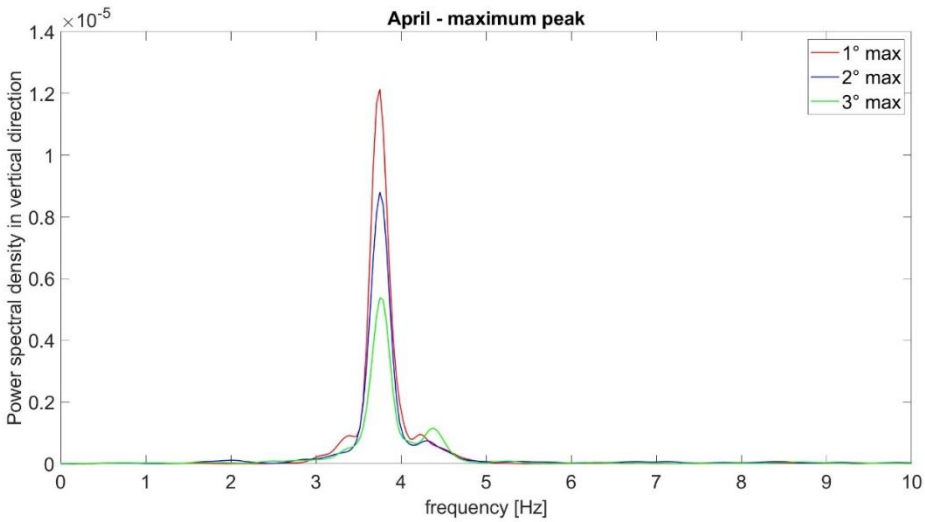


Figure 2-40: Results obtained from the 3 accelerograms with highest peak if PSD

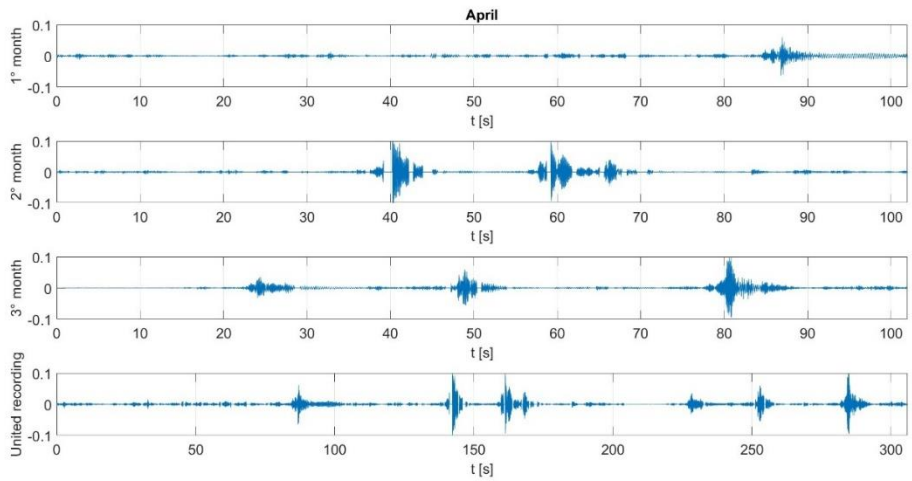


Figure 2-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.4.2 Longitudinal direction (y)

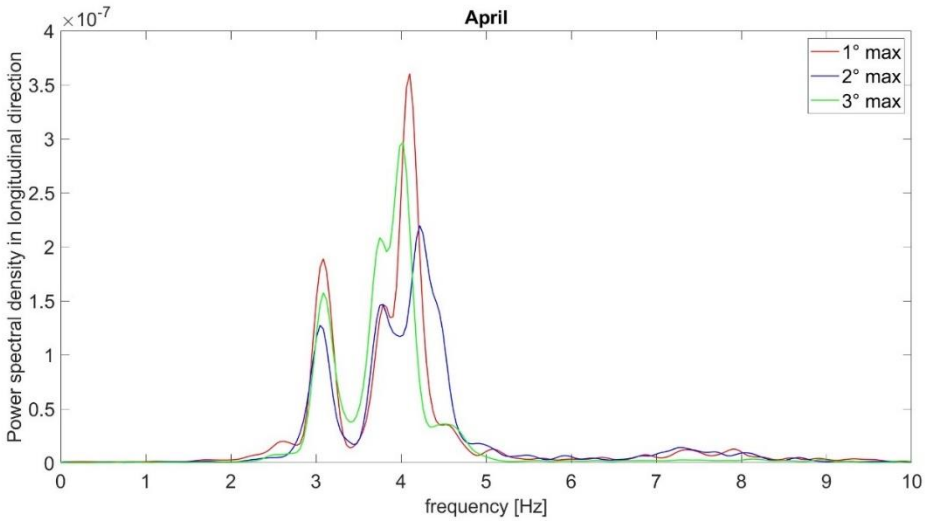


Figure 2-42: Results obtained from the 3 accelerograms with maximum SD in time domain

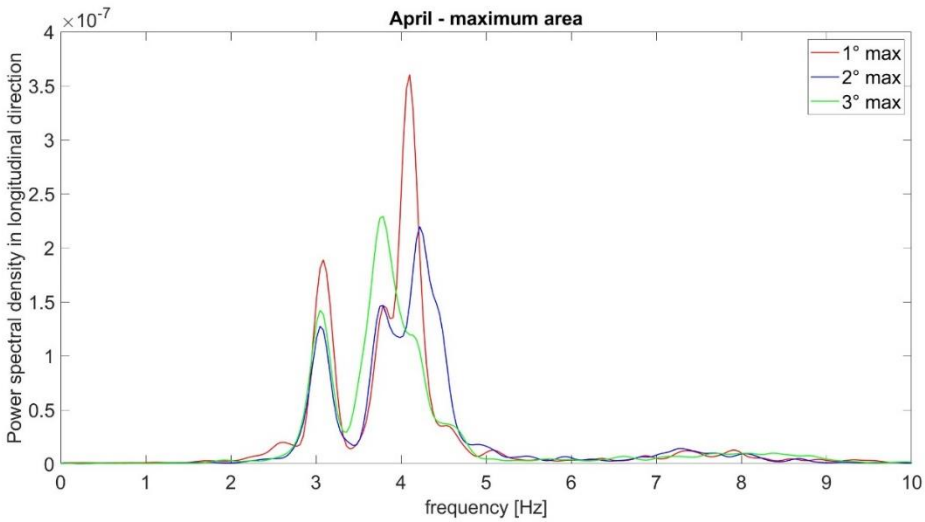


Figure 2-43: Results obtained from the 3 accelerograms with maximum area of PSD

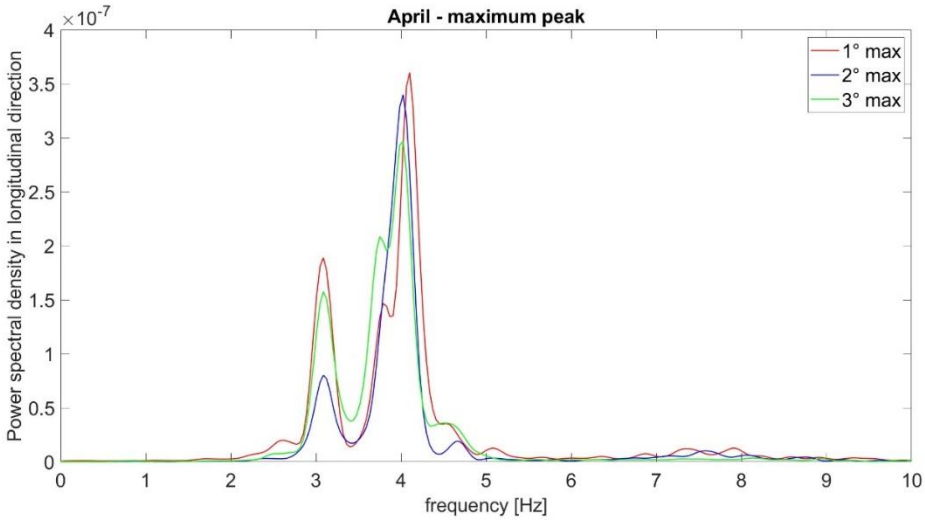


Figure 2-44: Results obtained from the 3 accelerograms with highest peak if PSD

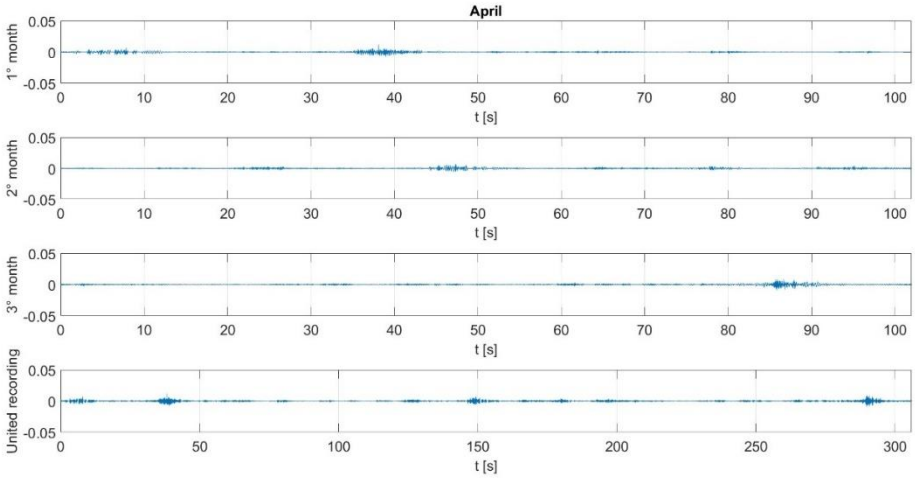


Figure 2-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.4.3 Transverse direction (z)

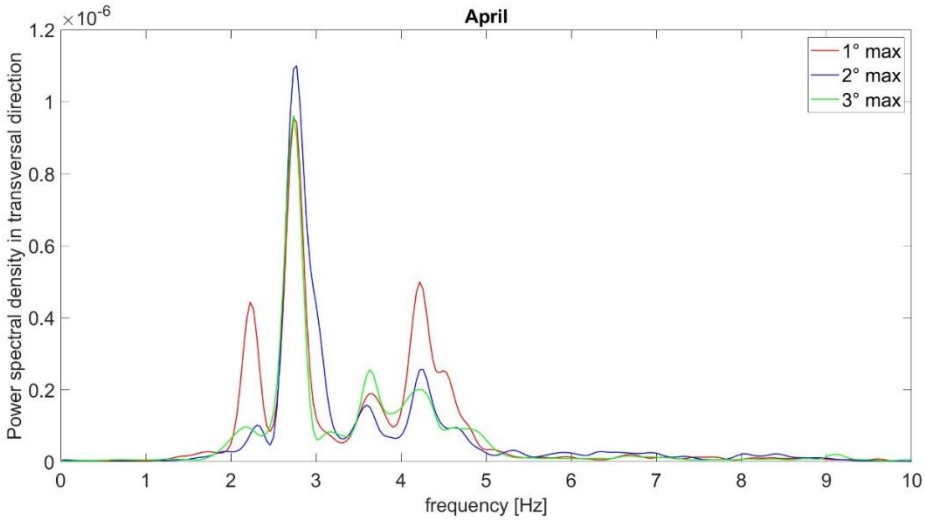


Figure 2-46: Results obtained from the 3 accelerograms with maximum SD in time domain

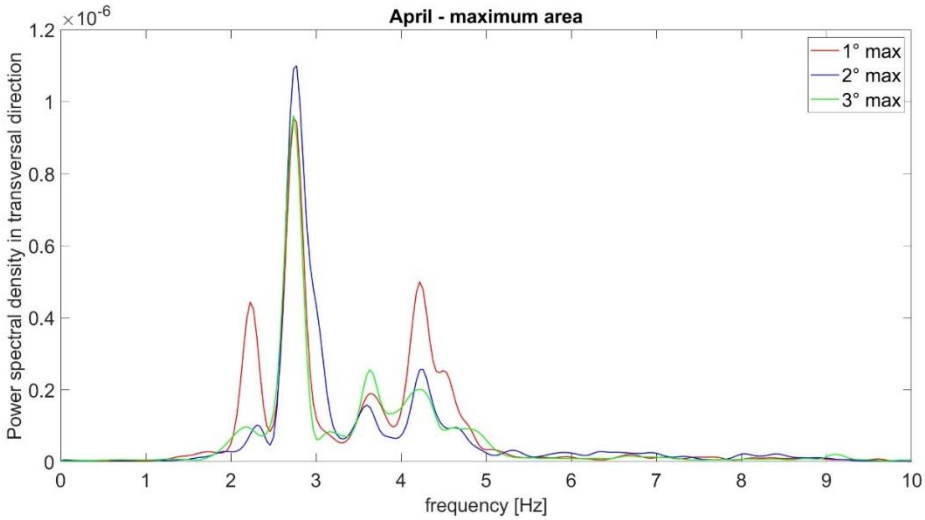


Figure 2-47: Results obtained from the 3 accelerograms with maximum area of PSD

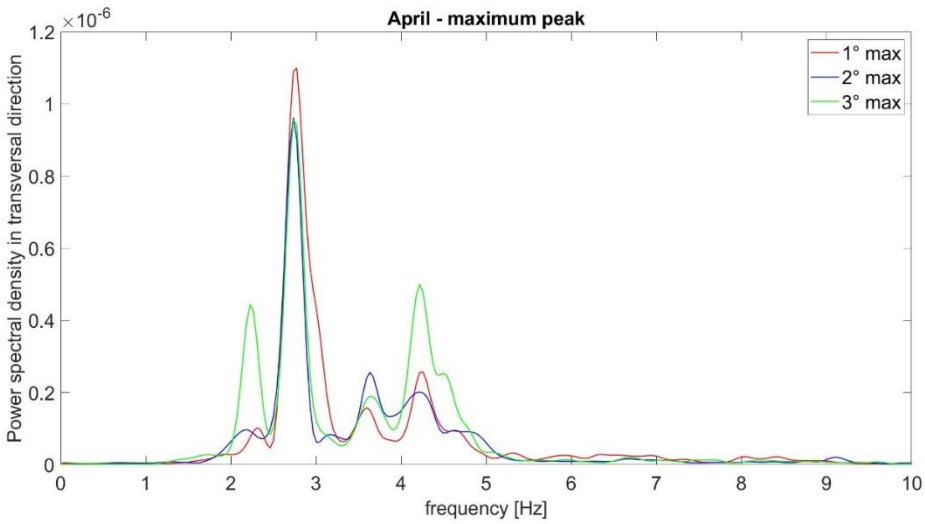


Figure 2-48: Results obtained from the 3 accelerograms with highest peak if PSD

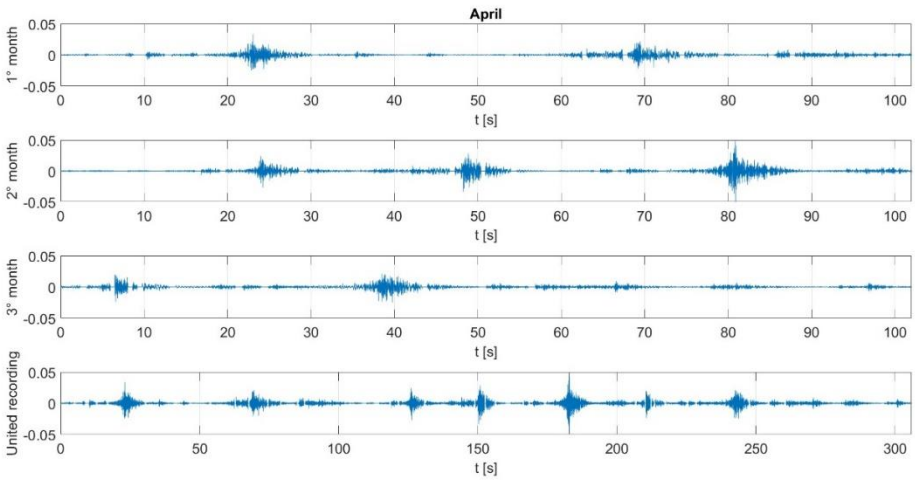


Figure 2-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

2.5 May

The results obtained for the May dataset are shown in the following tables.

Table 2-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-05-23_14-00-21	3.02E-03
	2°	30EB4_2023-05-01_20-00-21	2.32E-03
	3°	30EB4_2023-05-04_14-00-20	2.21E-03
Longitudinal direction (y)	1°	30EB4_2023-05-19_14-00-20	1.38E-03
	2°	30EB4_2023-05-23_14-00-21	8.19E-04
	3°	30EB4_2023-05-04_14-00-20	6.67E-04
Transverse direction (z)	1°	30EB4_2023-05-23_14-00-21	1.17E-03
	2°	30EB4_2023-05-04_14-00-20	7.67E-04
	3°	30EB4_2023-05-09_14-00-20	7.20E-04

Table 2-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-05-01_20-00-21	2.05E-05	30EB4_2023-05-23_14-00-21	1.95E-06
2	30EB4_2023-05-11_14-00-20	1.36E-05	30EB4_2023-05-01_20-00-21	1.07E-06
3	30EB4_2023-05-23_14-00-21	1.30E-05	30EB4_2023-05-04_14-00-20	1.04E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-05-19_14-00-20	2.46E-06	30EB4_2023-05-19_14-00-20	1.37E-07
2	30EB4_2023-05-23_14-00-21	5.71E-07	30EB4_2023-05-23_14-00-21	1.34E-07
3	30EB4_2023-05-11_14-00-20	4.46E-07	30EB4_2023-05-04_14-00-20	9.12E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-05-23_14-00-21	1.86E-06	30EB4_2023-05-23_14-00-21	2.83E-07
2	30EB4_2023-05-19_14-00-20	5.97E-07	30EB4_2023-05-04_14-00-20	1.21E-07
3	30EB4_2023-05-22_08-00-20	5.52E-07	30EB4_2023-05-09_14-00-20	1.04E-07

Table 2-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	D	D	D	A	A	A
2	B	-	B	A	A	A	C	-	C
3	C	A	C	C	-	C	E	-	E

2.5.1 Vertical direction (x)

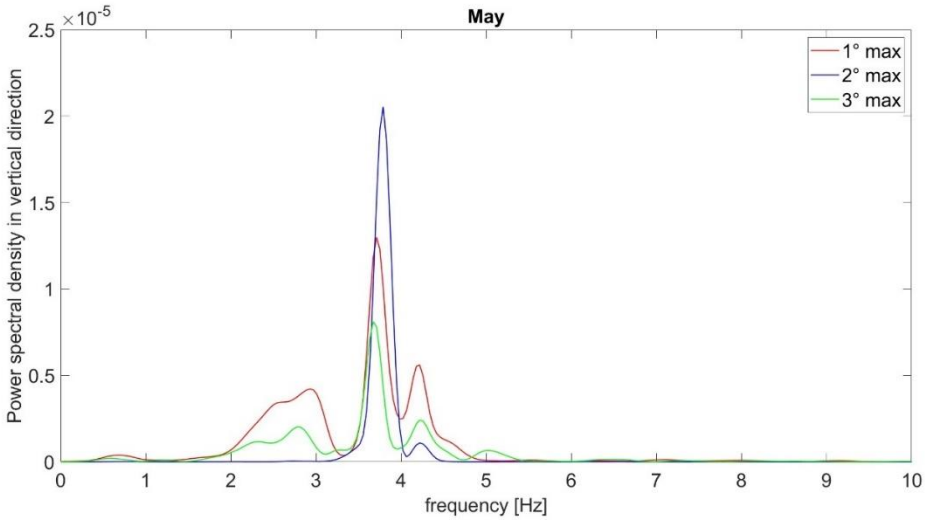


Figure 2-50: Results obtained from the 3 accelerograms with maximum SD in time domain

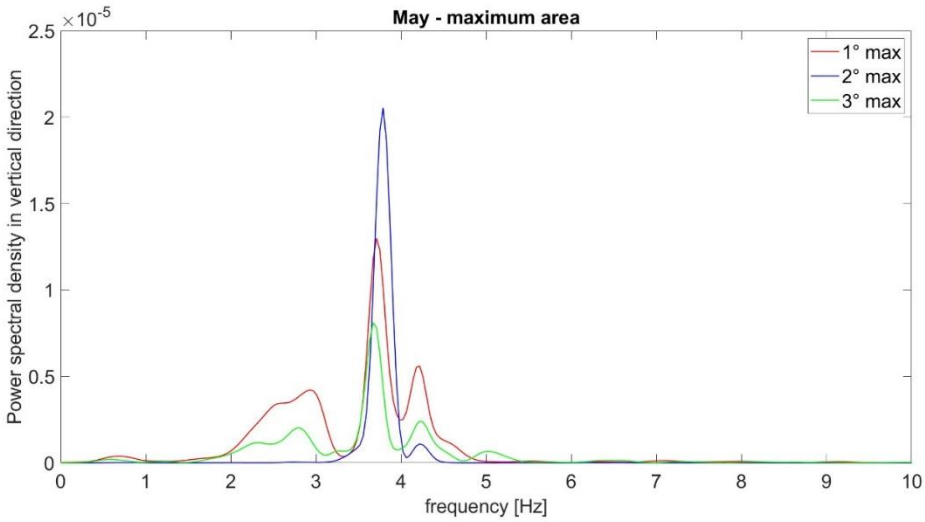


Figure 2-51: Results obtained from the 3 accelerograms with maximum area of PSD

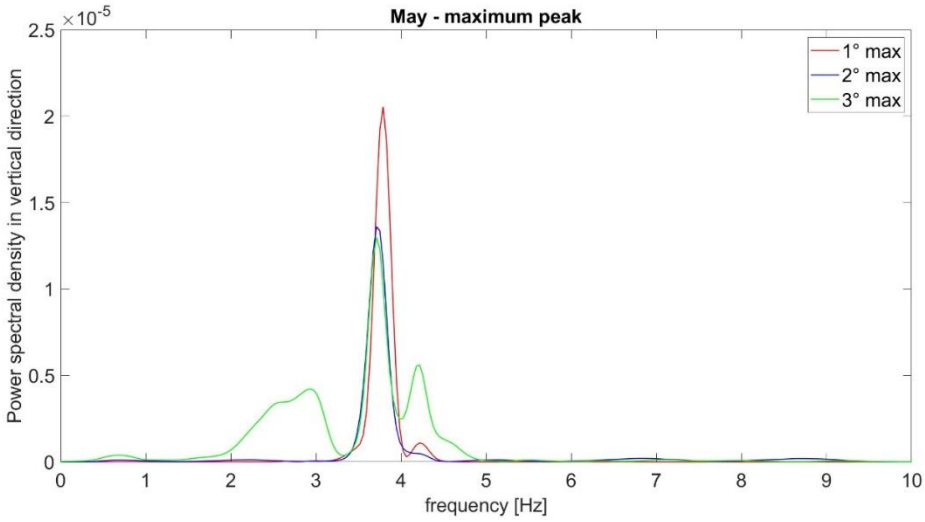


Figure 2-52: Results obtained from the 3 accelerograms with highest peak if PSD

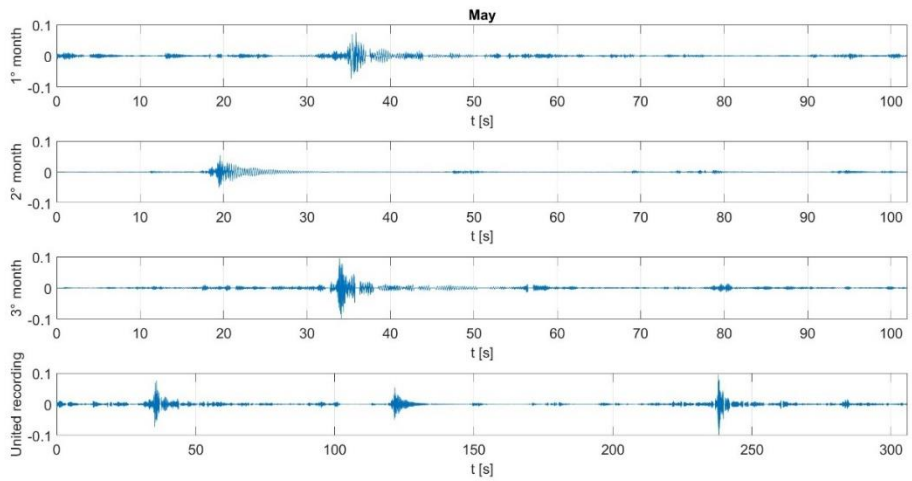


Figure 2-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.5.2 Longitudinal direction (y)

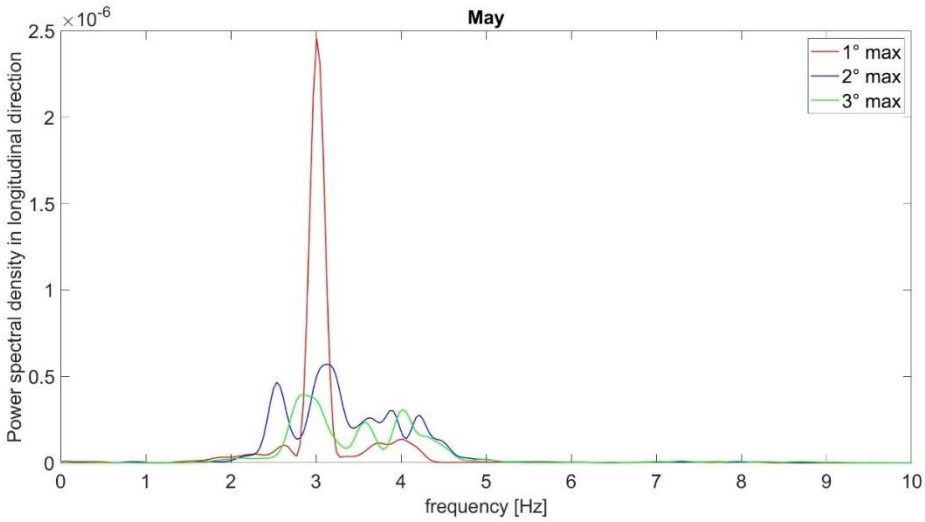


Figure 2-54: Results obtained from the 3 accelerograms with maximum SD in time domain

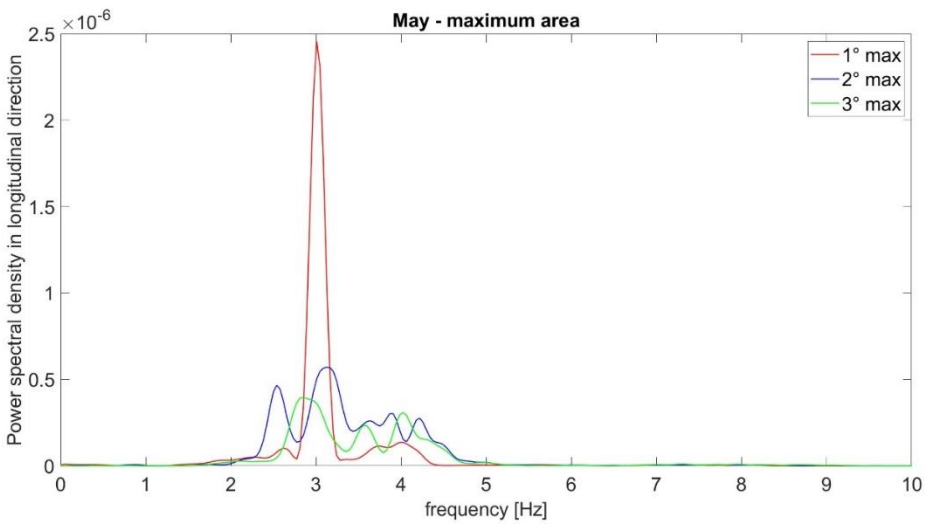


Figure 2-55: Results obtained from the 3 accelerograms with maximum area of PSD

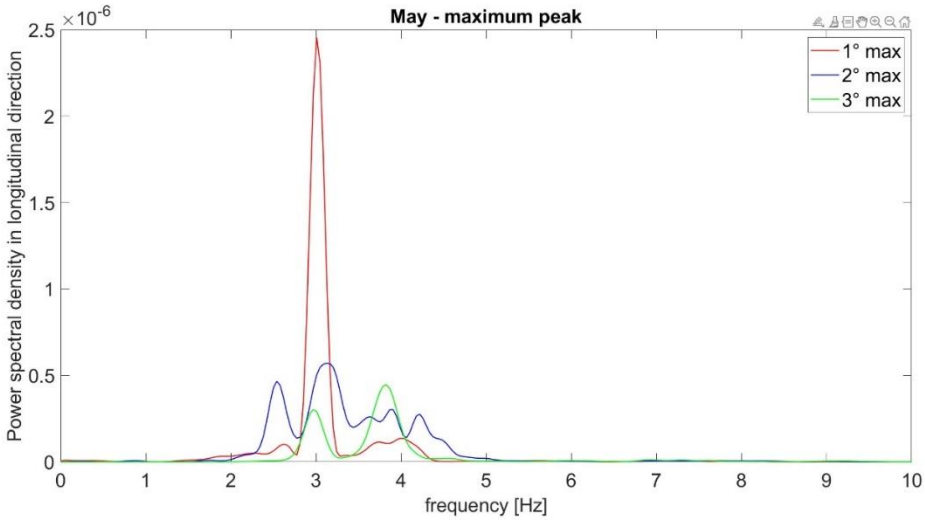


Figure 2-56: Results obtained from the 3 accelerograms with highest peak if PSD

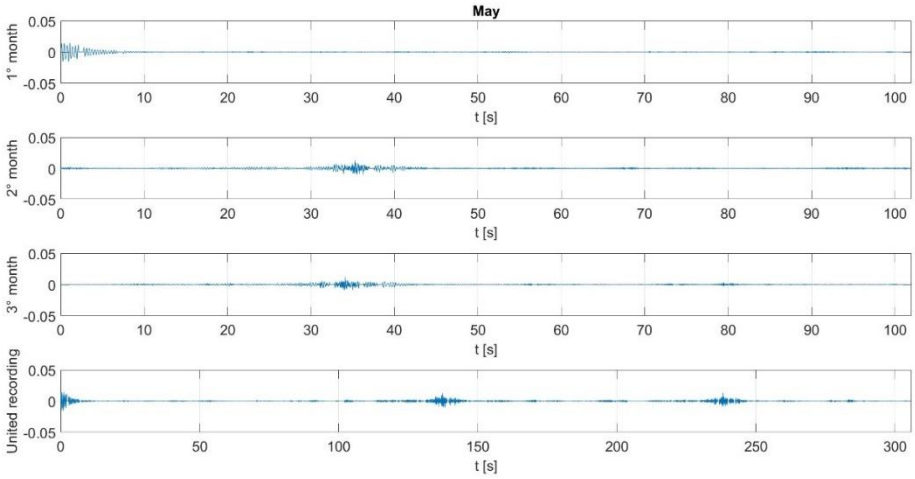


Figure 2-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.5.3 Transverse direction (z)

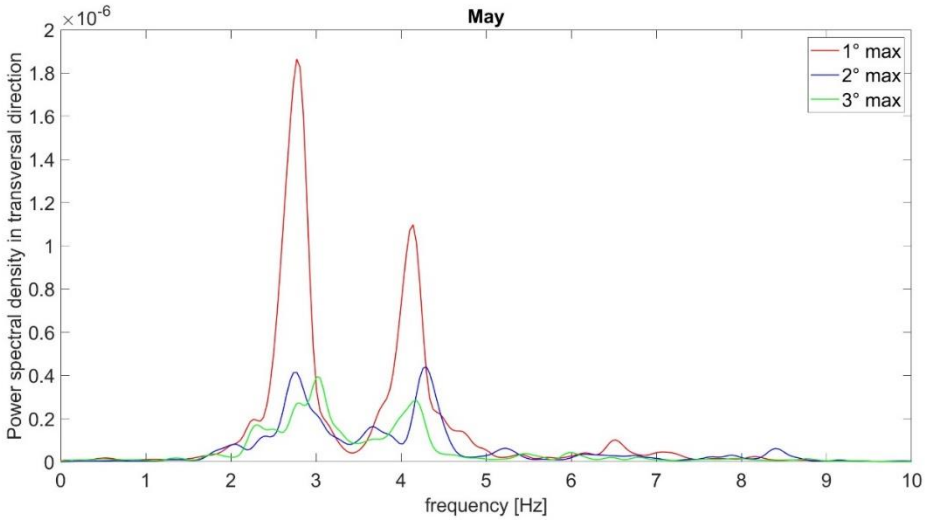


Figure 2-58: Results obtained from the 3 accelerograms with maximum SD in time domain

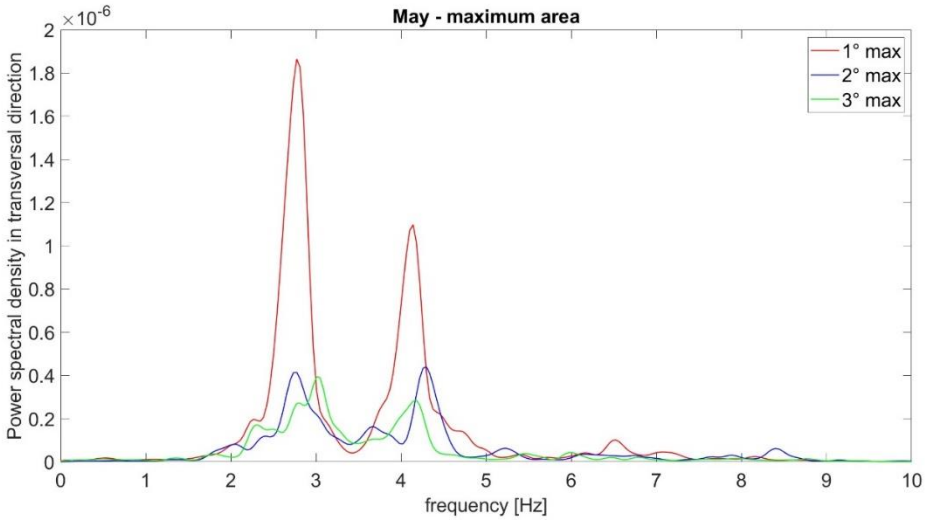


Figure 2-59: Results obtained from the 3 accelerograms with maximum area of PSD

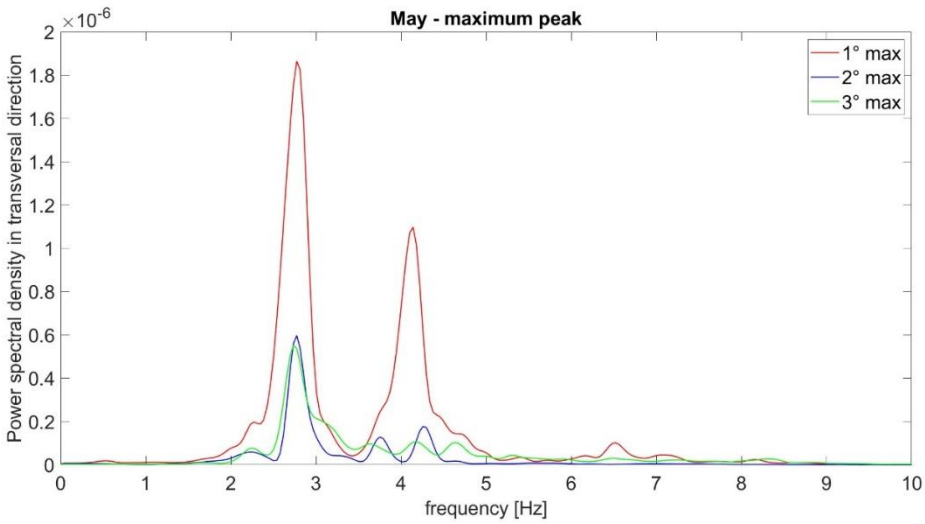


Figure 2-60: Results obtained from the 3 accelerograms with highest peak if PSD

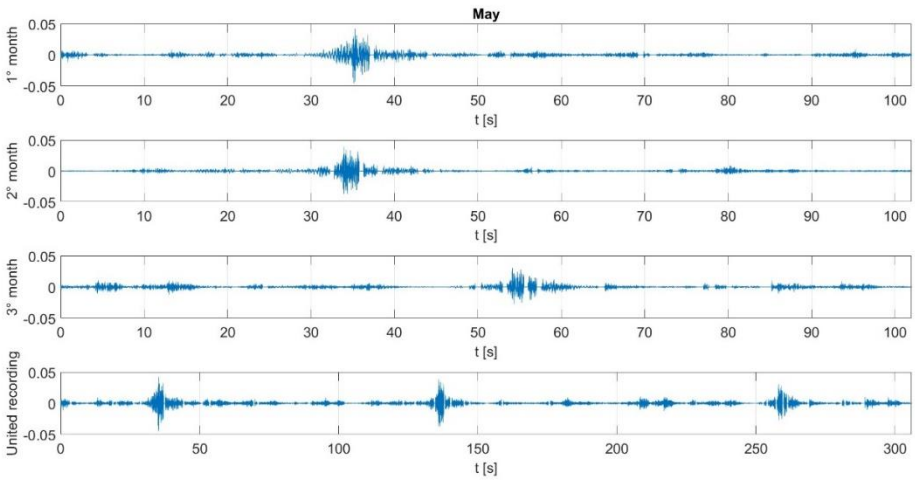


Figure 2-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

2.6 June

The results obtained for the June dataset are shown in the following tables.

Table 2-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-06-13_08-00-20	2.73E-03
	2°	30EB4_2023-06-27_14-00-20	2.63E-03
	3°	30EB4_2023-06-23_20-00-20	2.37E-03
Longitudinal direction (y)	1°	30EB4_2023-06-13_08-00-20	1.19E-03
	2°	30EB4_2023-06-27_14-00-20	6.05E-04
	3°	30EB4_2023-06-20_08-00-20	5.04E-04
Transverse direction (z)	1°	30EB4_2023-06-13_08-00-20	1.03E-03
	2°	30EB4_2023-06-28_14-00-20	8.02E-04
	3°	30EB4_2023-06-27_14-00-20	7.52E-04

Table 2-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-06-27_14-00-20	2.29E-05	30EB4_2023-06-13_08-00-20	1.49E-06
2	30EB4_2023-06-23_20-00-20	1.73E-05	30EB4_2023-06-27_14-00-20	1.45E-06
3	30EB4_2023-06-13_08-00-20	1.56E-05	30EB4_2023-06-23_20-00-20	1.15E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-06-13_08-00-20	2.54E-06	30EB4_2023-06-13_08-00-20	2.92E-07
2	30EB4_2023-06-20_08-00-20	4.18E-07	30EB4_2023-06-27_14-00-20	7.83E-08
3	30EB4_2023-06-27_14-00-20	3.97E-07	30EB4_2023-06-20_08-00-20	5.20E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-06-13_08-00-20	8.85E-07	30EB4_2023-06-13_08-00-20	2.23E-07
2	30EB4_2023-06-10_20-00-20	8.29E-07	30EB4_2023-06-28_14-00-20	1.30E-07
3	30EB4_2023-06-09_14-00-20	5.68E-07	30EB4_2023-06-27_14-00-20	1.19E-07

Table 2-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	A	A	A
2	B	C	B	D	E	D	F	-	F
3	C	A	C	E	D	E	G	-	G

2.6.1 Vertical direction (x)

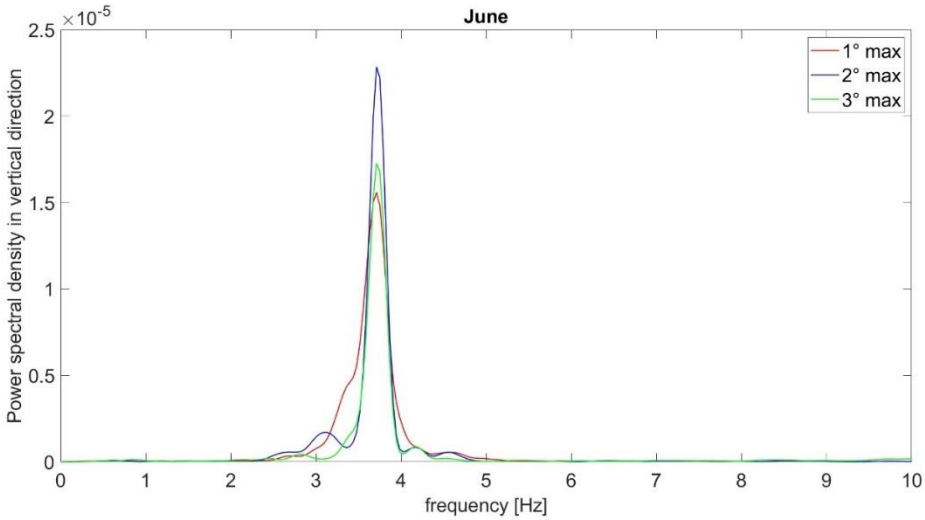


Figure 2-62: Results obtained from the 3 accelerograms with maximum SD in time domain

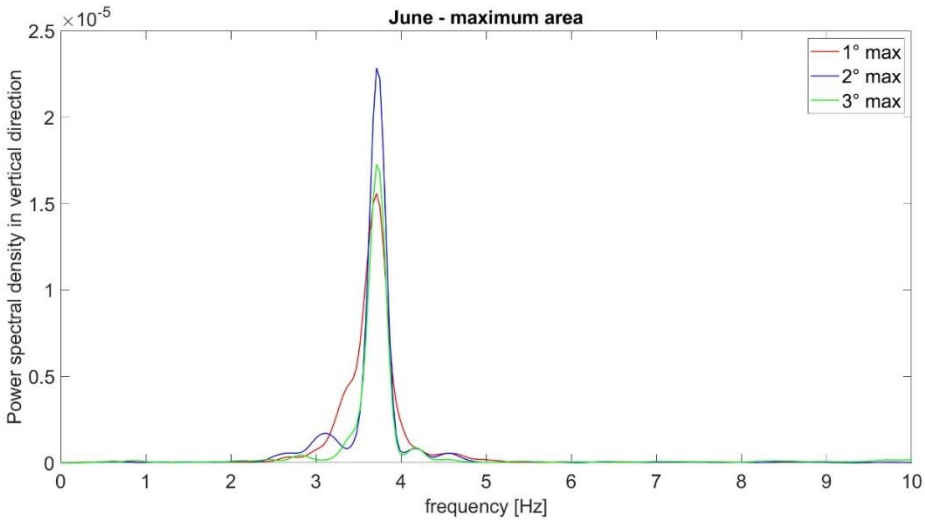


Figure 2-63: Results obtained from the 3 accelerograms with maximum area of PSD

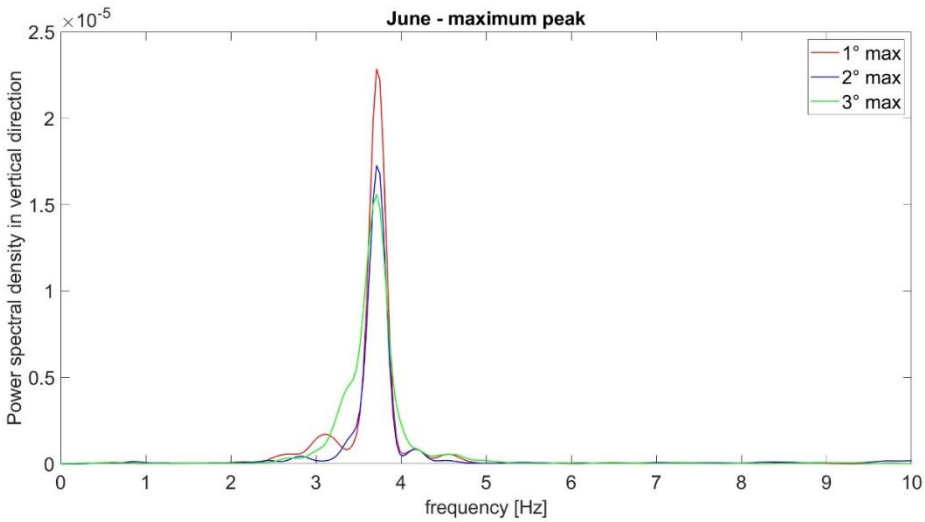


Figure 2-64: Results obtained from the 3 accelerograms with highest peak if PSD

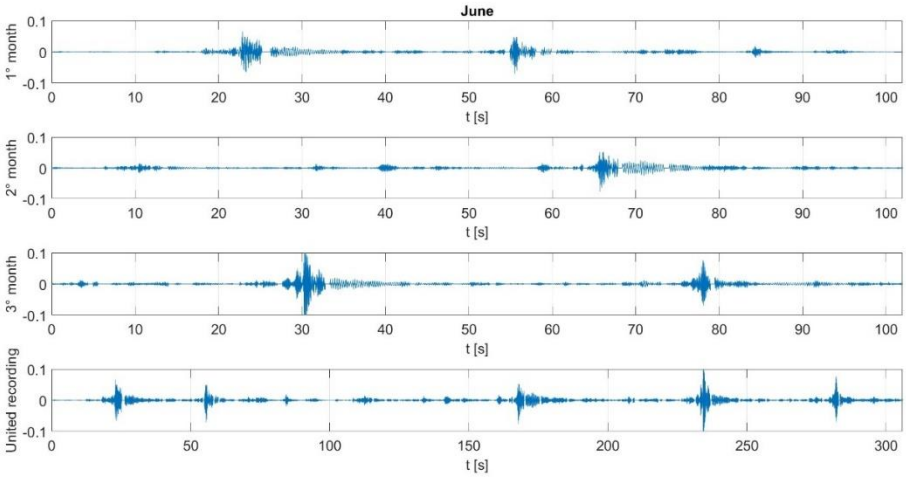


Figure 2-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.6.2 Longitudinal direction (y)

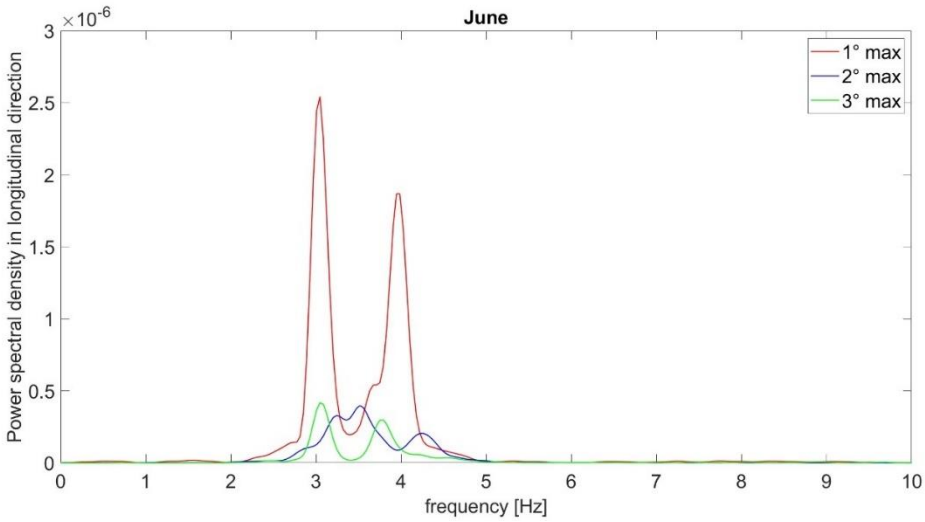


Figure 2-66: Results obtained from the 3 accelerograms with maximum SD in time domain

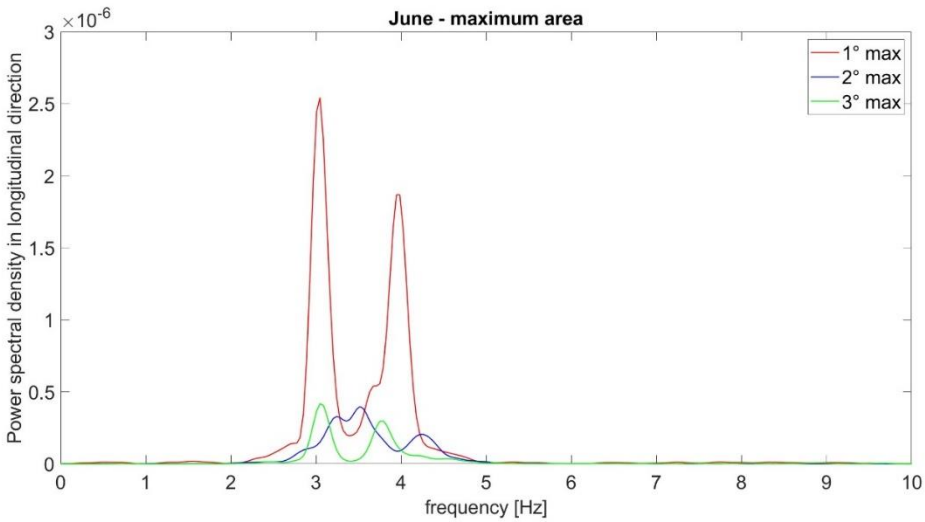


Figure 2-67: Results obtained from the 3 accelerograms with maximum area of PSD

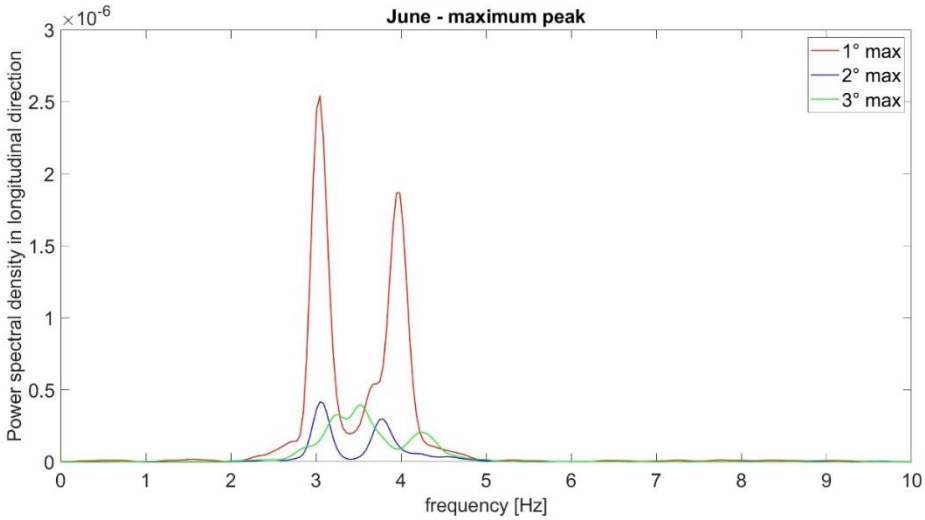


Figure 2-68: Results obtained from the 3 accelerograms with highest peak if PSD

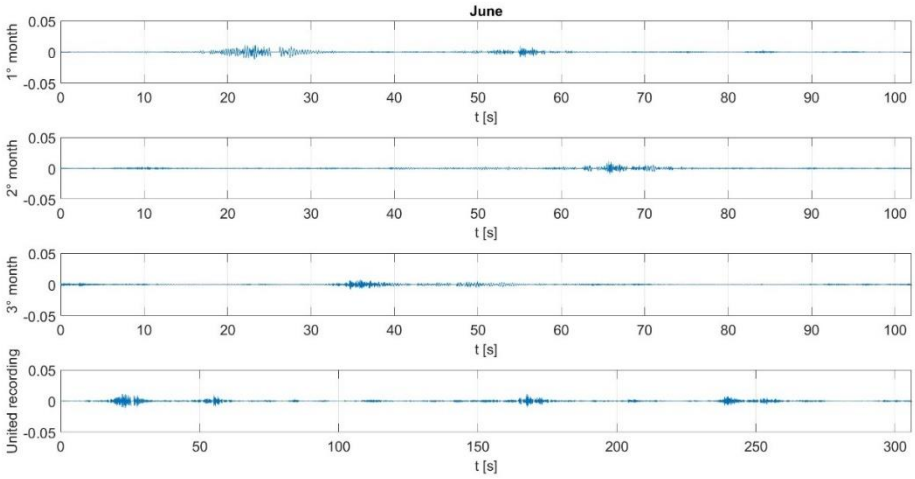


Figure 2-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.6.3 Transverse direction (z)

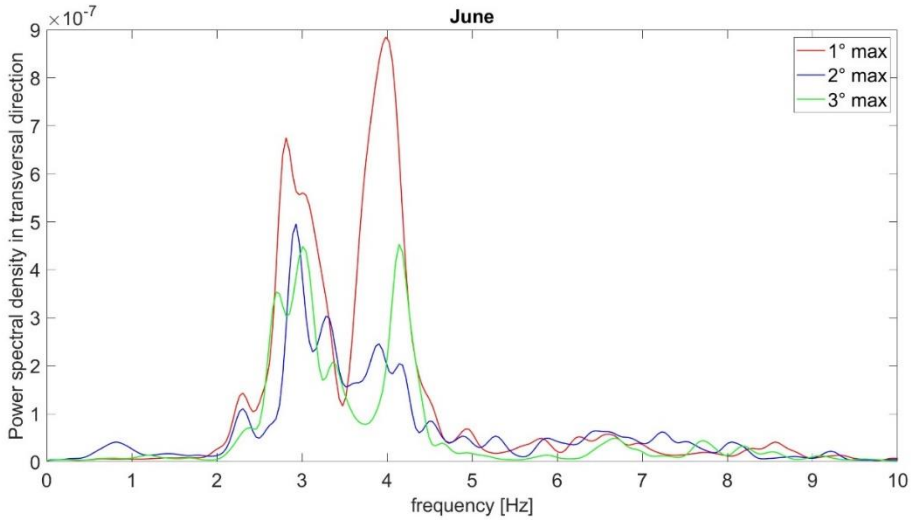


Figure 2-70: Results obtained from the 3 accelerograms with maximum SD in time domain

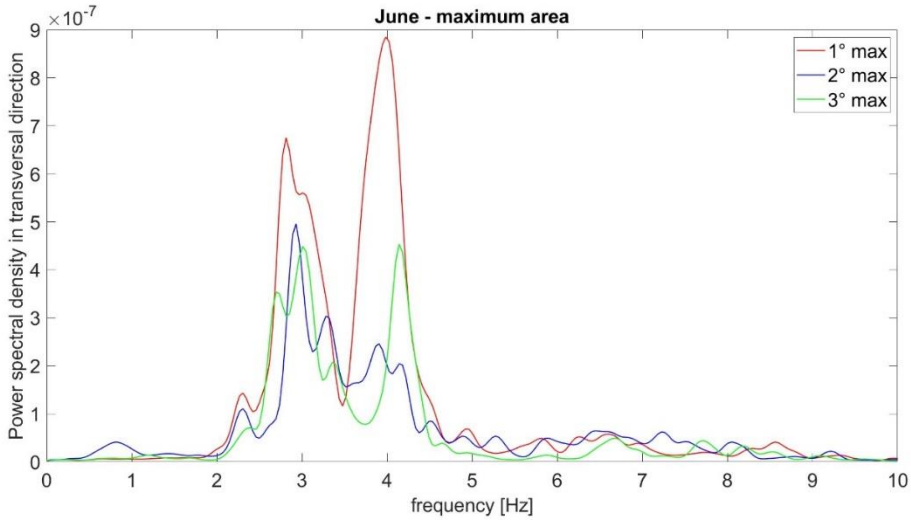


Figure 2-71: Results obtained from the 3 accelerograms with maximum area of PSD

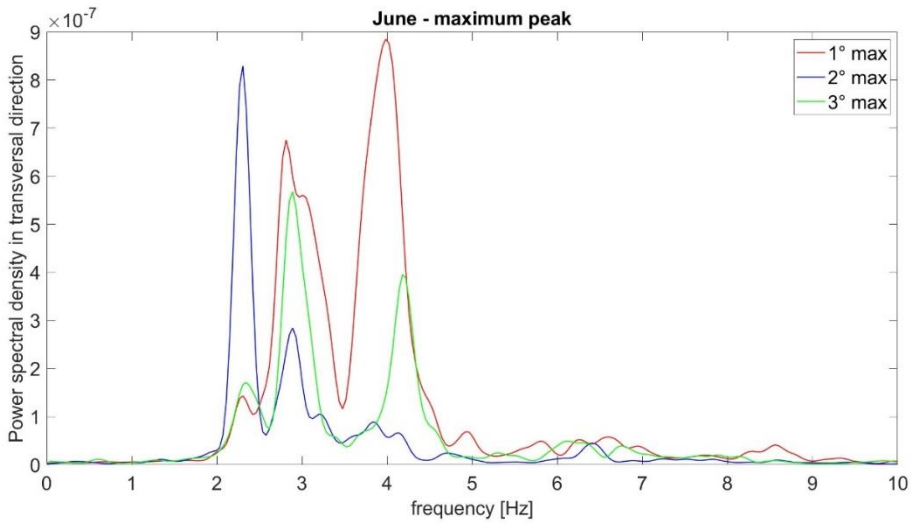


Figure 2-72: Results obtained from the 3 accelerograms with highest peak if PSD

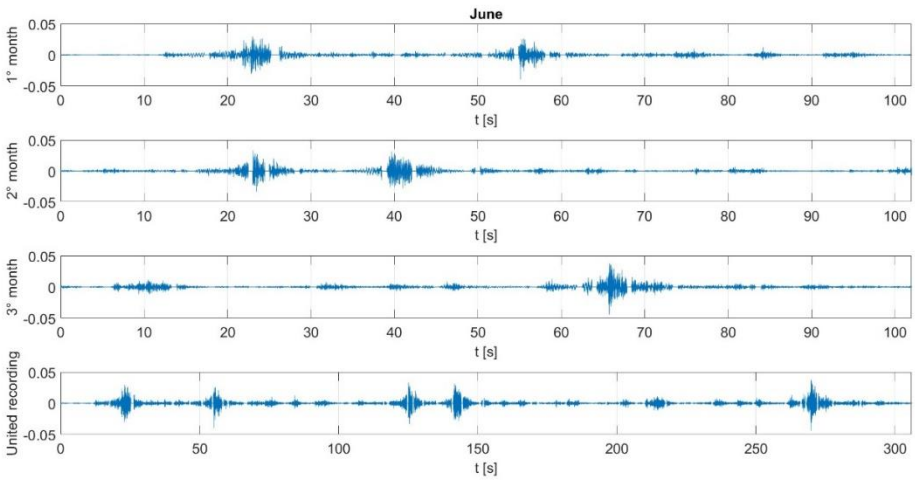


Figure 2-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

2.7 July

The results obtained for the July dataset are shown in the following tables.

Table 2-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-07-20_14-00-21	2.63E-03
	2°	30EB4_2023-07-17_08-00-22	2.27E-03
	3°	30EB4_2023-07-07_08-00-21	2.00E-03
Longitudinal direction (y)	1°	30EB4_2023-07-17_14-00-20	6.39E-04
	2°	30EB4_2023-07-20_14-00-21	6.34E-04
	3°	30EB4_2023-07-07_14-00-20	6.08E-04
Transverse direction (z)	1°	30EB4_2023-07-14_08-00-21	9.32E-04
	2°	30EB4_2023-07-17_14-00-20	8.54E-04
	3°	30EB4_2023-07-20_14-00-21	8.02E-04

Table 2-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-07-20_14-00-21	2.20E-05	30EB4_2023-07-20_14-00-21	1.46E-06
2	30EB4_2023-07-17_08-00-22	1.49E-05	30EB4_2023-07-17_08-00-22	9.71E-07
3	30EB4_2023-07-15_20-00-21	1.31E-05	30EB4_2023-07-07_08-00-21	8.26E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-07-07_14-00-20	8.61E-07	30EB4_2023-07-17_14-00-20	8.55E-08
2	30EB4_2023-07-20_14-00-21	3.21E-07	30EB4_2023-07-07_14-00-20	8.09E-08
3	30EB4_2023-07-17_14-00-20	3.09E-07	30EB4_2023-07-20_14-00-21	7.99E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-07-14_08-00-21	1.61E-06	30EB4_2023-07-14_08-00-21	1.87E-07
2	30EB4_2023-07-20_14-00-21	8.71E-07	30EB4_2023-07-17_14-00-20	1.54E-07
3	30EB4_2023-07-17_14-00-20	7.97E-07	30EB4_2023-07-20_14-00-21	1.28E-07

Table 2-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	E	D	B	B	B
2	B	B	B	A	A	E	D	A	D
3	C	-	C	E	D	A	A	D	A

2.7.1 Vertical direction (x)

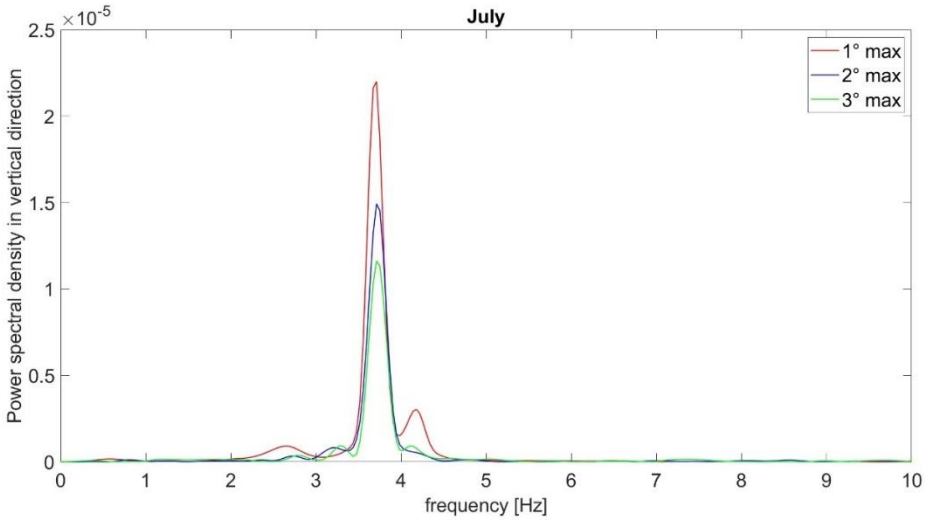


Figure 2-74: Results obtained from the 3 accelerograms with maximum SD in time domain

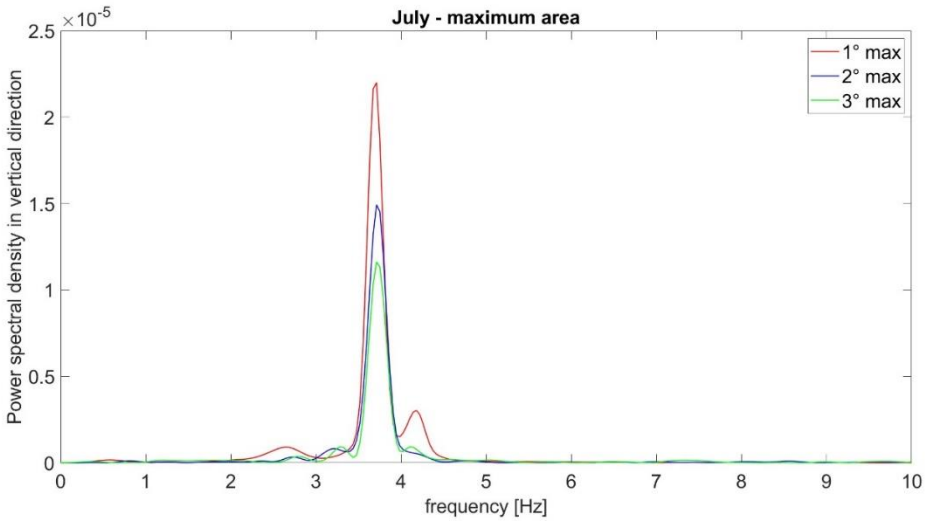


Figure 2-75: Results obtained from the 3 accelerograms with maximum area of PSD

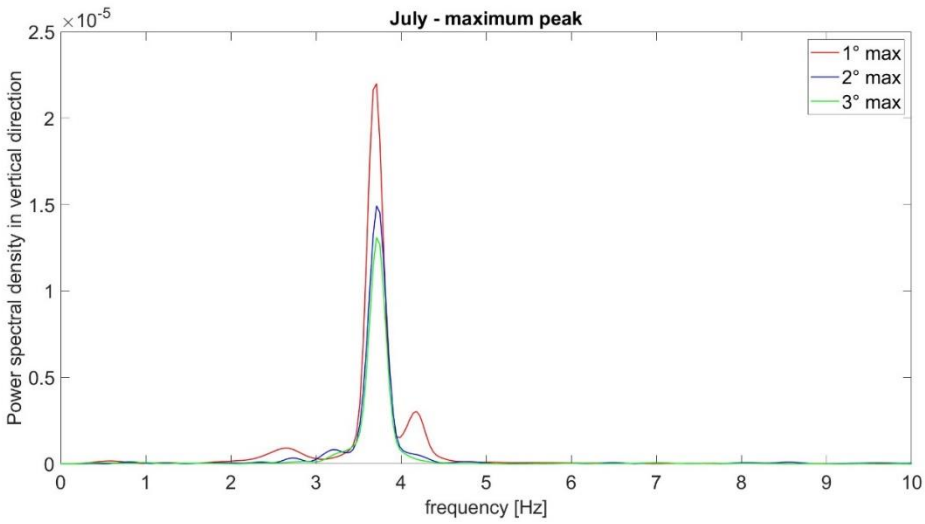


Figure 2-76: Results obtained from the 3 accelerograms with highest peak if PSD

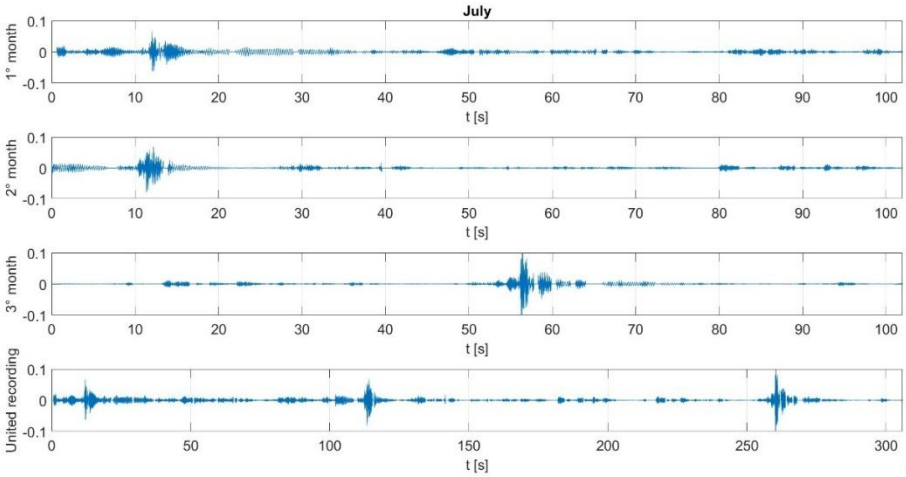


Figure 2-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.7.2 Longitudinal direction (y)

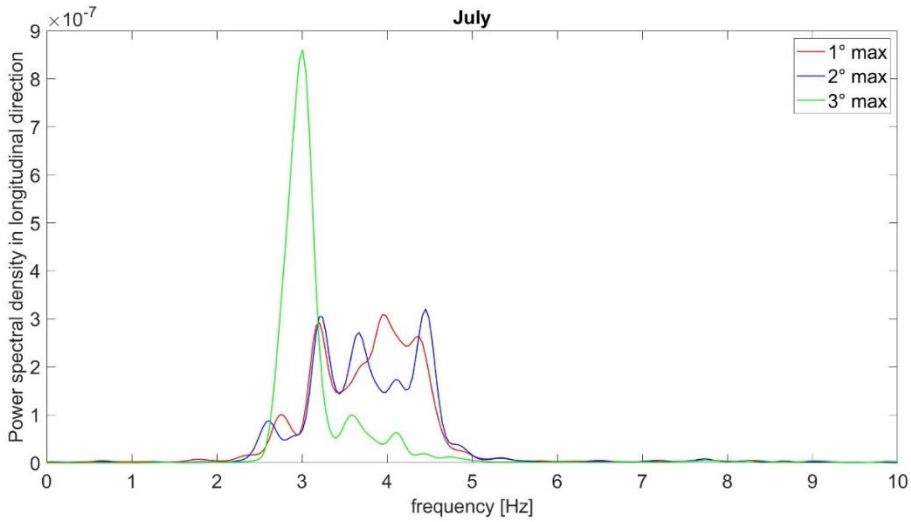


Figure 2-78: Results obtained from the 3 accelerograms with maximum SD in time domain

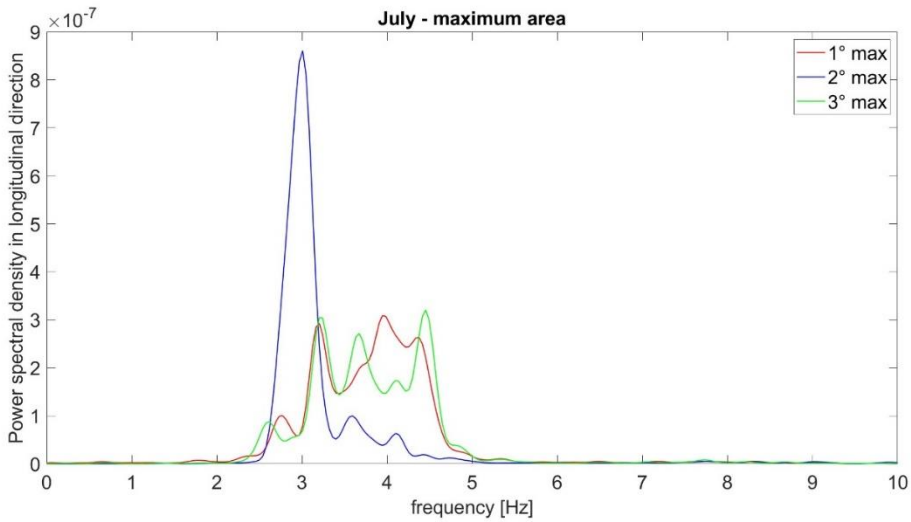


Figure 2-79: Results obtained from the 3 accelerograms with maximum area of PSD

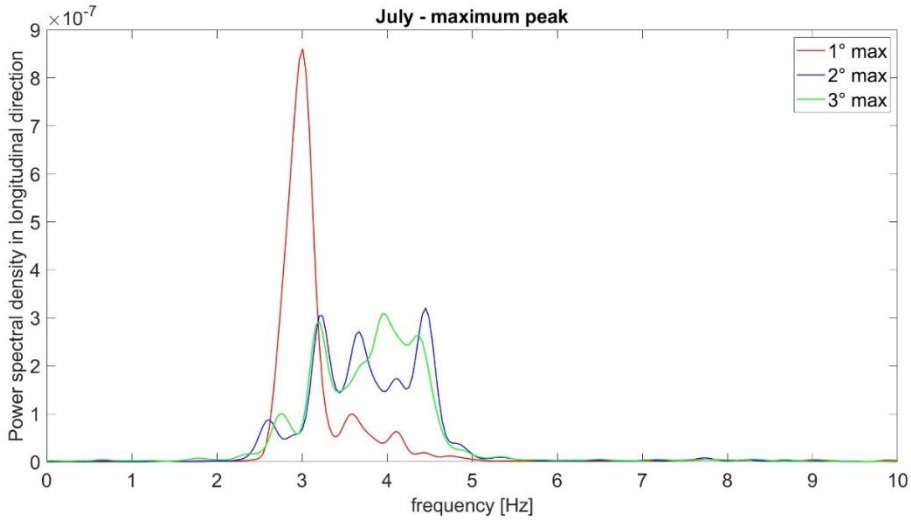


Figure 2-80: Results obtained from the 3 accelerograms with highest peak if PSD

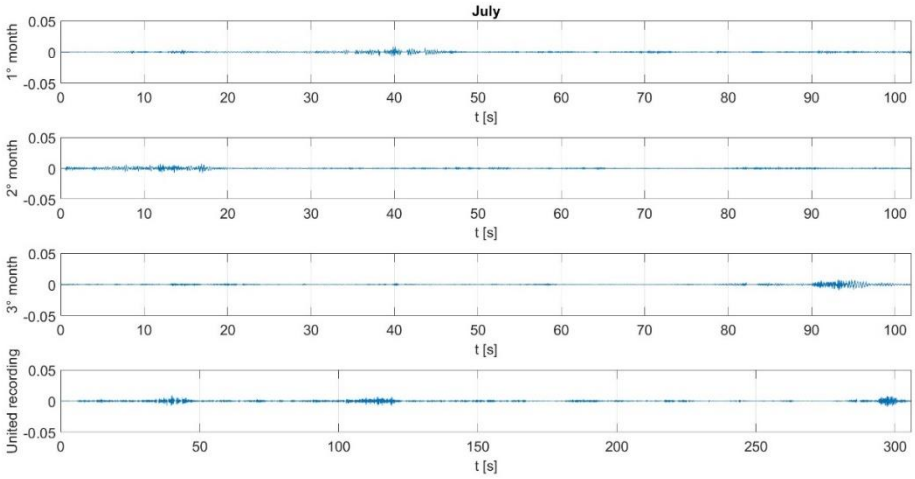


Figure 2-81: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.7.3 Transverse direction (z)

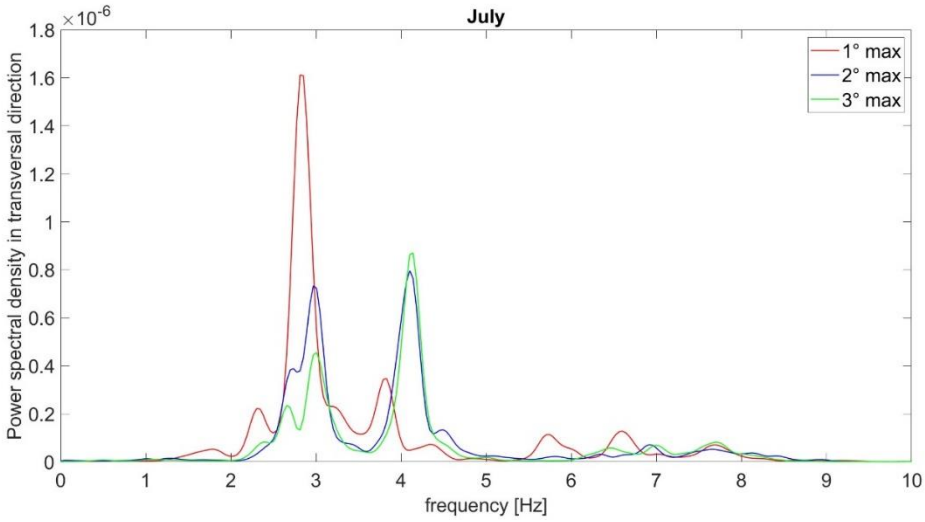


Figure 2-82: Results obtained from the 3 accelerograms with maximum SD in time domain

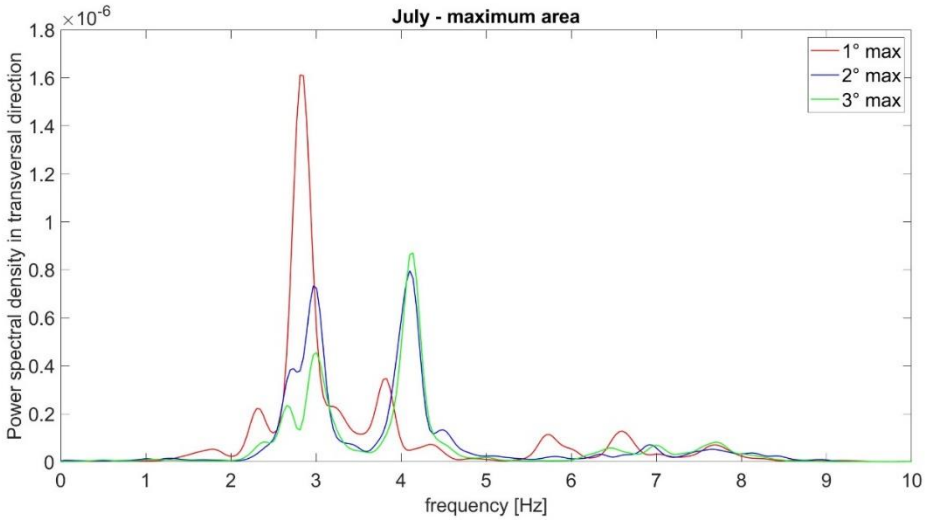


Figure 2-83: Results obtained from the 3 accelerograms with maximum area of PSD

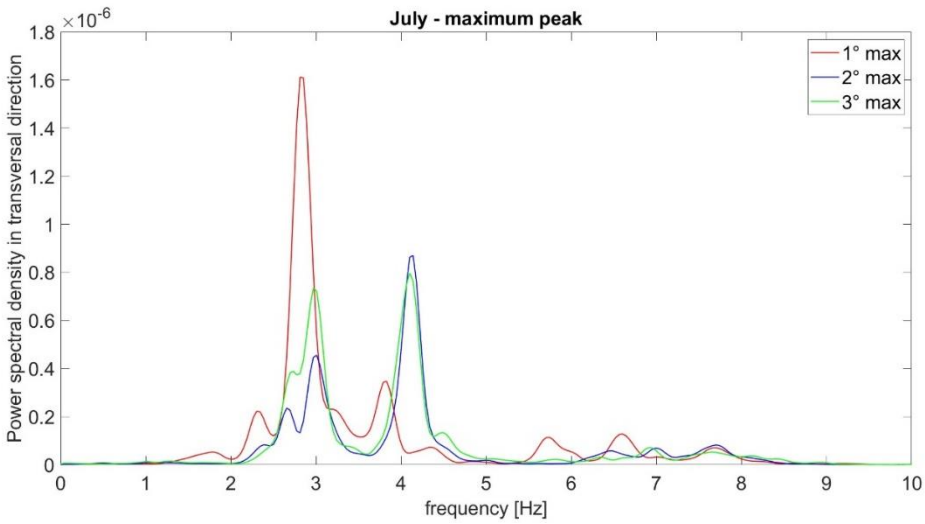


Figure 2-84: Results obtained from the 3 accelerograms with highest peak if PSD

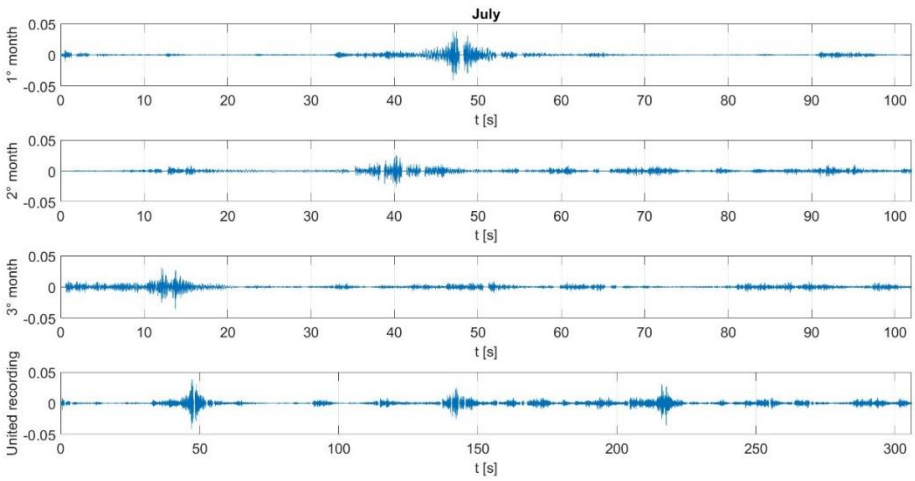


Figure 2-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

2.8 August

The results obtained for the August dataset are shown in the following tables.

Table 2-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-08-07_14-00-21	3.42E-03
	2°	30EB4_2023-08-25_14-00-20	2.29E-03
	3°	30EB4_2023-08-21_14-00-20	1.84E-03
Longitudinal direction (y)	1°	30EB4_2023-08-07_14-00-21	7.23E-04
	2°	30EB4_2023-08-29_08-00-21	4.77E-04
	3°	30EB4_2023-08-02_08-00-21	4.18E-04
Transverse direction (z)	1°	30EB4_2023-08-29_08-00-21	9.05E-04
	2°	30EB4_2023-08-07_14-00-21	7.74E-04
	3°	30EB4_2023-08-22_08-00-21	5.61E-04

Table 2-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-08-07_14-00-21	4.13E-05	30EB4_2023-08-07_14-00-21	2.45E-06
2	30EB4_2023-08-25_14-00-20	1.83E-05	30EB4_2023-08-25_14-00-20	1.02E-06
3	30EB4_2023-08-21_14-00-20	1.01E-05	30EB4_2023-08-21_14-00-20	6.67E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-08-07_14-00-21	7.63E-07	30EB4_2023-08-07_14-00-21	1.06E-07
2	30EB4_2023-08-02_08-00-21	3.94E-07	30EB4_2023-08-29_08-00-21	4.71E-08
3	30EB4_2023-08-29_08-00-21	3.73E-07	30EB4_2023-08-02_08-00-21	3.58E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-08-29_08-00-21	1.05E-06	30EB4_2023-08-29_08-00-21	1.66E-07
2	30EB4_2023-08-22_08-00-21	5.31E-07	30EB4_2023-08-07_14-00-21	1.24E-07
3	30EB4_2023-08-30_08-00-21	4.19E-07	30EB4_2023-08-22_08-00-21	6.13E-08

Table 2-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	D	D	D
2	B	B	B	D	G	D	A	E	A
3	C	C	C	G	D	G	E	-	E

2.8.1 Vertical direction (x)

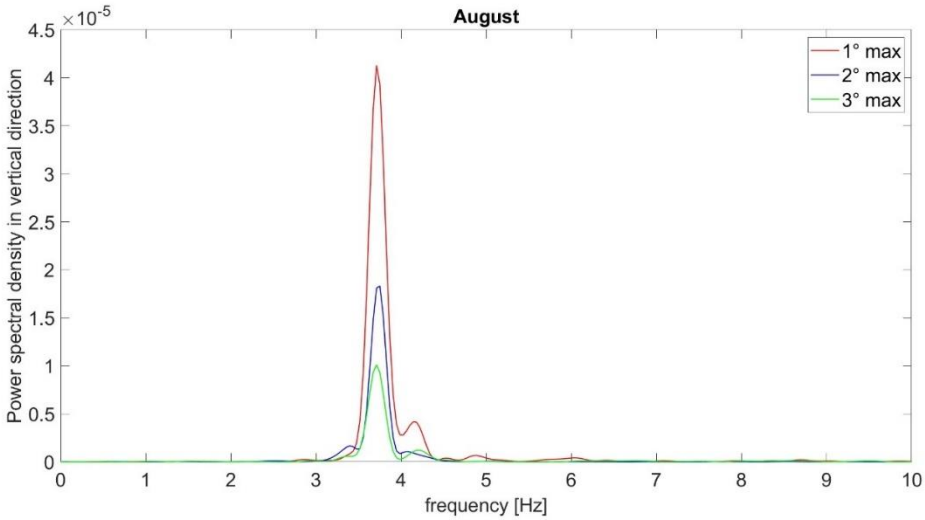


Figure 2-86: Results obtained from the 3 accelerograms with maximum SD in time domain

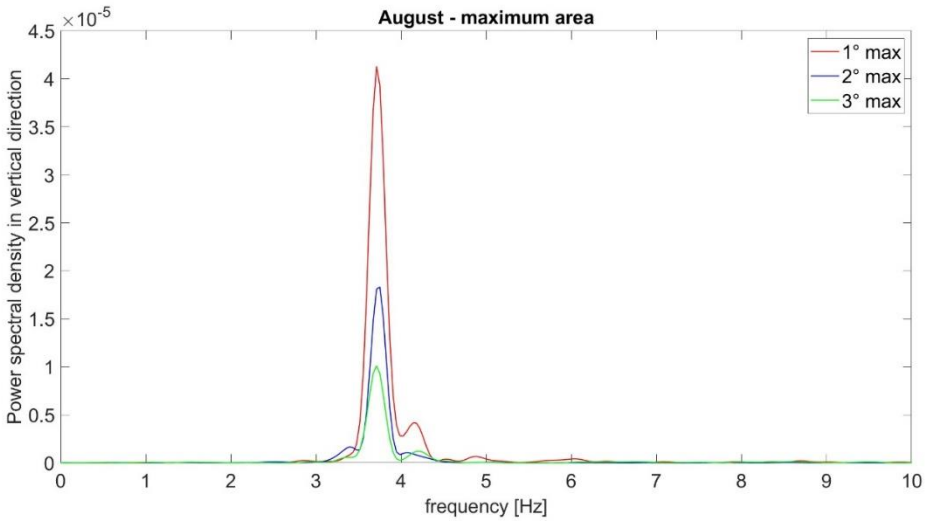


Figure 2-87: Results obtained from the 3 accelerograms with maximum area of PSD

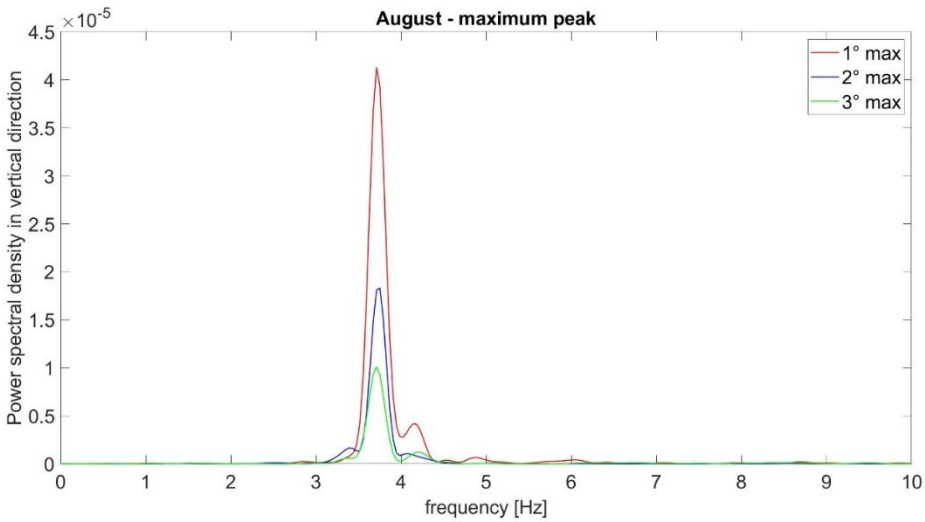


Figure 2-88: Results obtained from the 3 accelerograms with highest peak if PSD

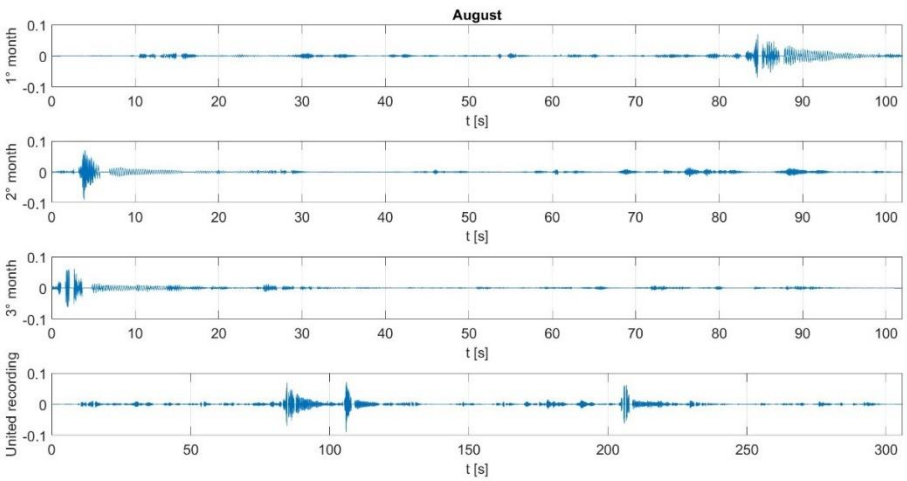


Figure 2-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.8.2 Longitudinal direction (y)

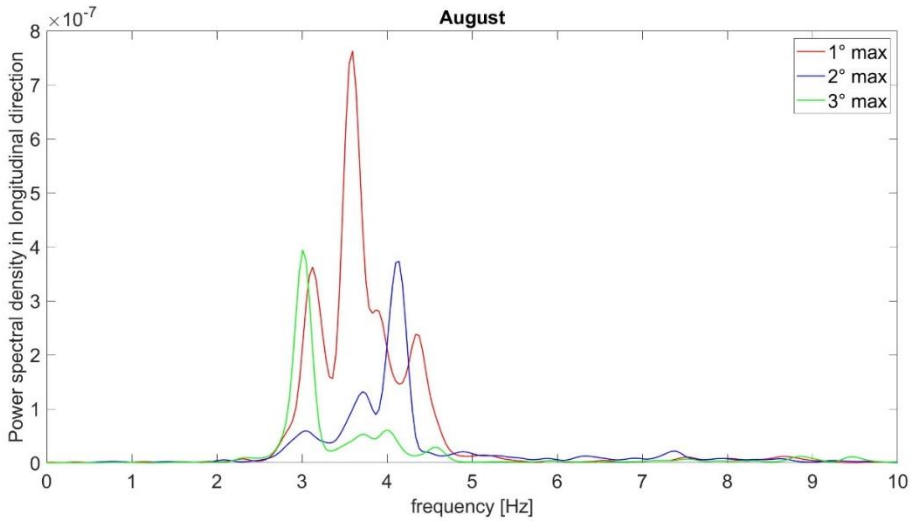


Figure 2-90: Results obtained from the 3 accelerograms with maximum SD in time domain

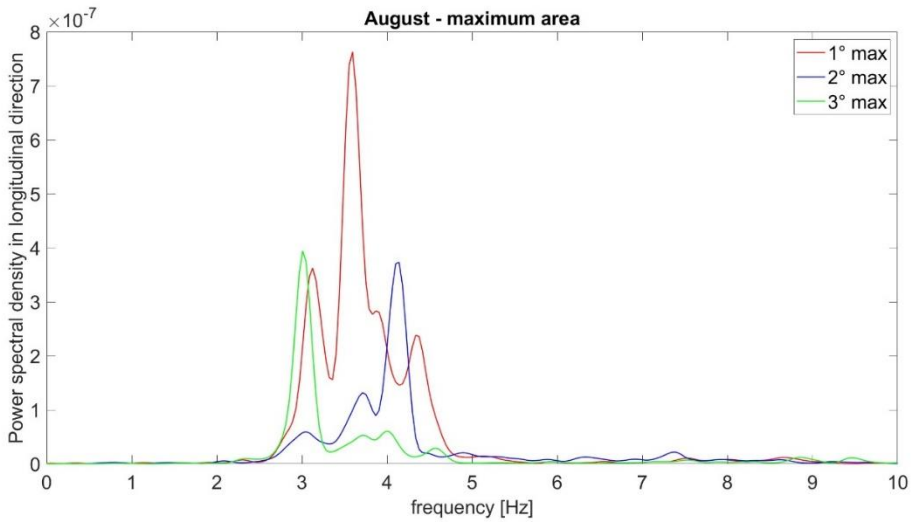


Figure 2-91: Results obtained from the 3 accelerograms with maximum area of PSD

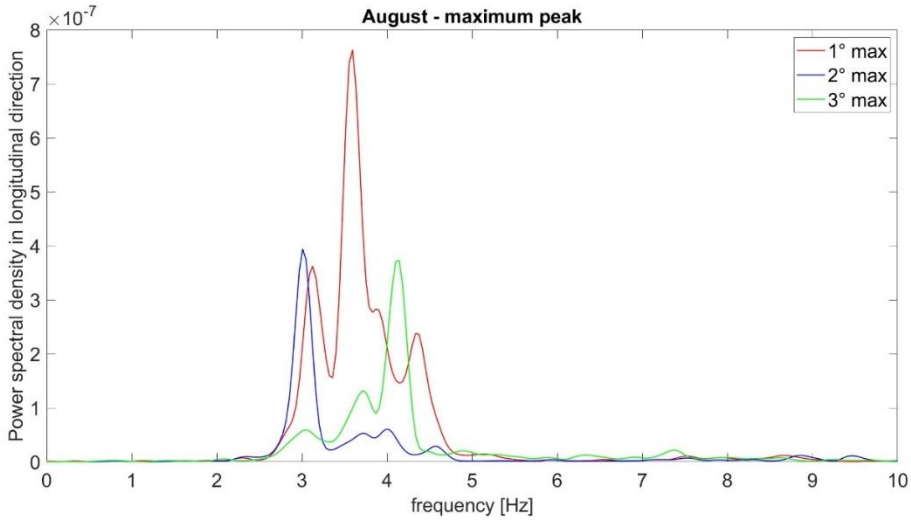


Figure 2-92: Results obtained from the 3 accelerograms with highest peak if PSD

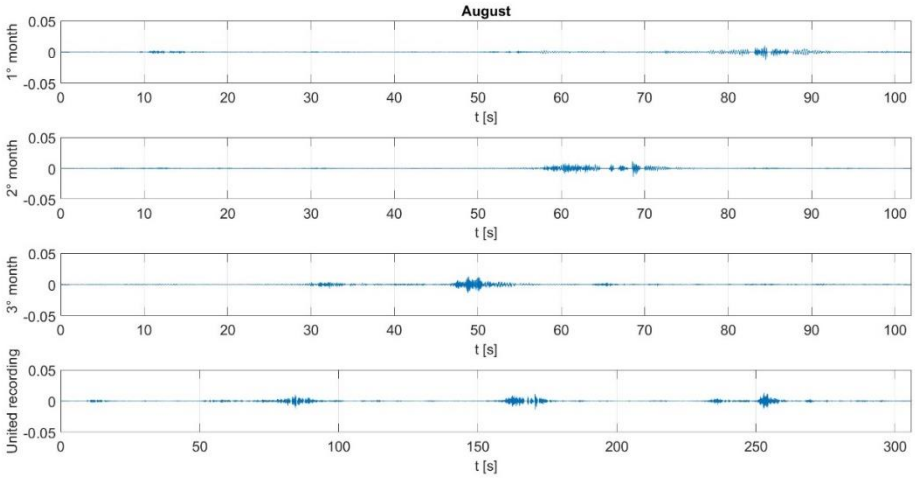


Figure 2-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.8.3 Transverse direction (z)

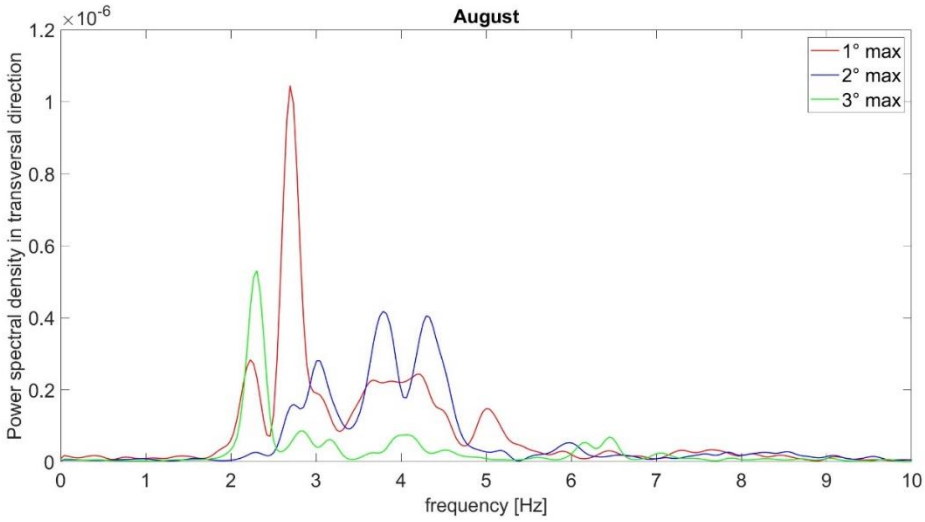


Figure 2-94: Results obtained from the 3 accelerograms with maximum SD in time domain

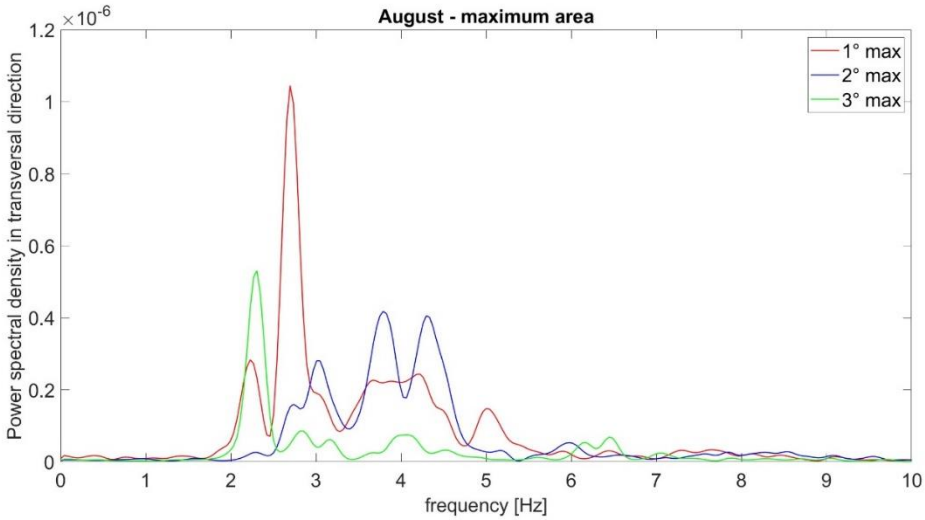


Figure 2-95: Results obtained from the 3 accelerograms with maximum area of PSD

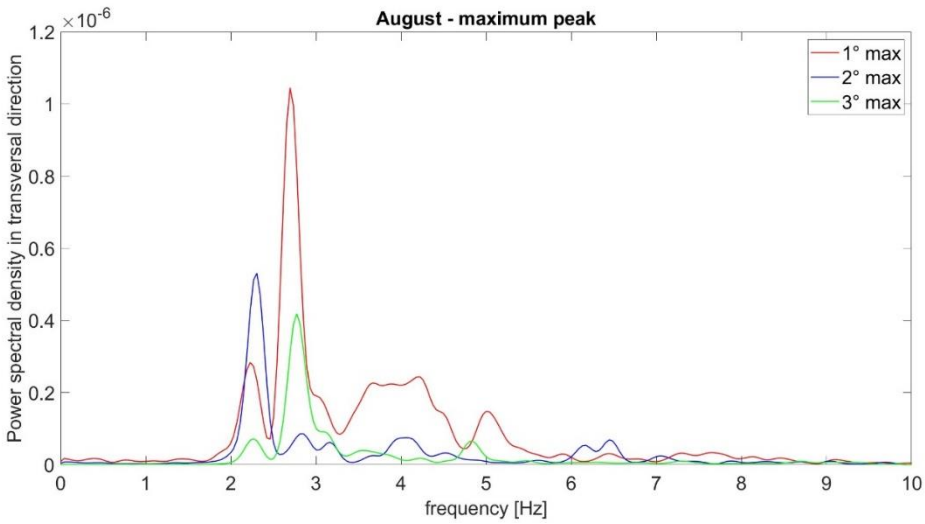


Figure 2-96: Results obtained from the 3 accelerograms with highest peak if PSD

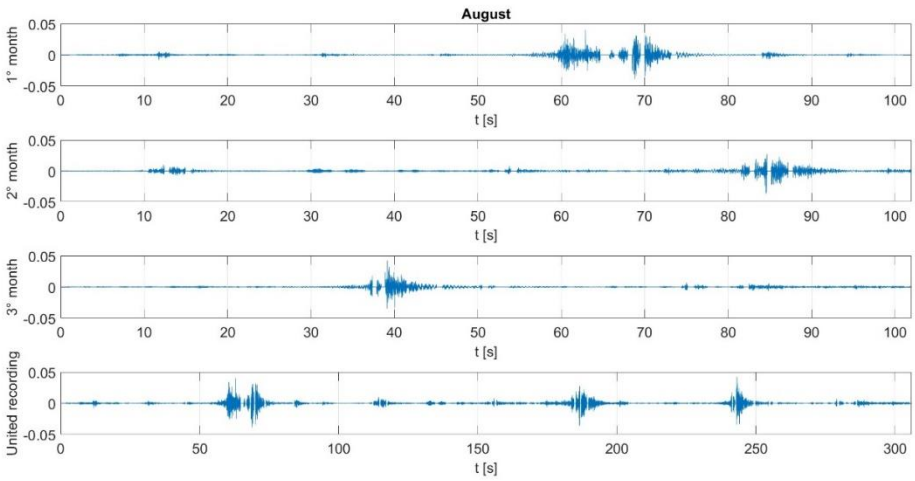


Figure 2-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

2.9 September

The results obtained for the September dataset are shown in the following tables.

Table 2-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-09-26_09-00-20	5.13E-03
	2°	30EB4_2023-09-20_11-00-20	4.32E-03
	3°	30EB4_2023-09-14_11-00-20	3.57E-03
Longitudinal direction (y)	1°	30EB4_2023-09-26_09-00-20	2.25E-03
	2°	30EB4_2023-09-14_11-00-20	1.71E-03
	3°	30EB4_2023-09-20_11-00-20	1.55E-03
Transverse direction (z)	1°	30EB4_2023-09-26_15-00-21	2.47E-03
	2°	30EB4_2023-09-20_11-00-20	1.46E-03
	3°	30EB4_2023-09-14_11-00-20	1.37E-03

Table 2-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-09-20_11-00-20	4.51E-05	30EB4_2023-09-26_09-00-20	5.83E-06
2	30EB4_2023-09-26_09-00-20	4.36E-05	30EB4_2023-09-20_11-00-20	3.83E-06
3	30EB4_2023-09-14_11-00-20	3.45E-05	30EB4_2023-09-14_11-00-20	2.57E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-09-26_09-00-20	1.48E-05	30EB4_2023-09-26_09-00-20	1.06E-06
2	30EB4_2023-09-14_11-00-20	7.52E-06	30EB4_2023-09-14_11-00-20	6.11E-07
3	30EB4_2023-09-20_11-00-20	3.73E-06	30EB4_2023-09-20_11-00-20	5.15E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-09-26_15-00-21	1.76E-05	30EB4_2023-09-26_15-00-21	1.24E-06
2	30EB4_2023-09-20_11-00-20	5.03E-06	30EB4_2023-09-20_11-00-20	4.36E-07
3	30EB4_2023-09-18_10-00-20	2.01E-06	30EB4_2023-09-14_11-00-20	3.80E-07

Table 2-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	E	E	E
2	B	A	B	C	C	C	B	B	B
3	C	C	C	B	B	B	F	-	F

2.9.1 Vertical direction (x)

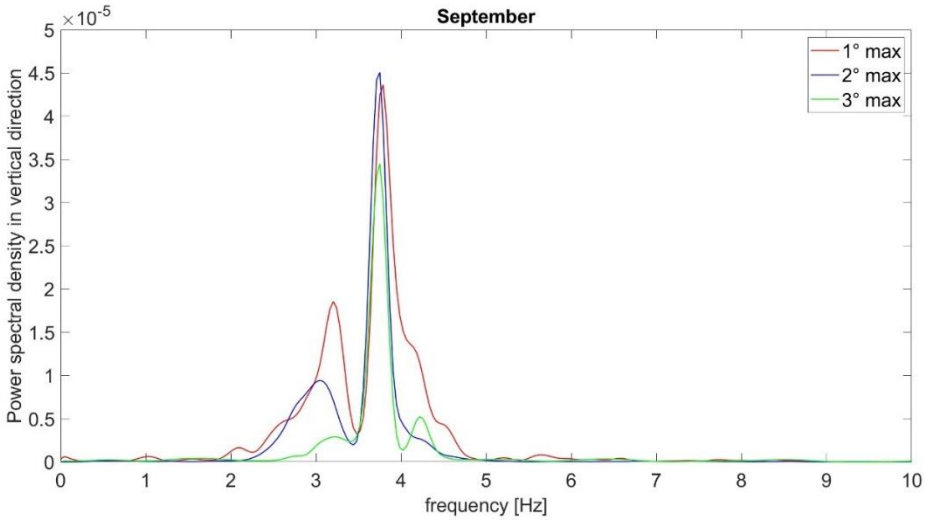


Figure 2-98: Results obtained from the 3 accelerograms with maximum SD in time domain

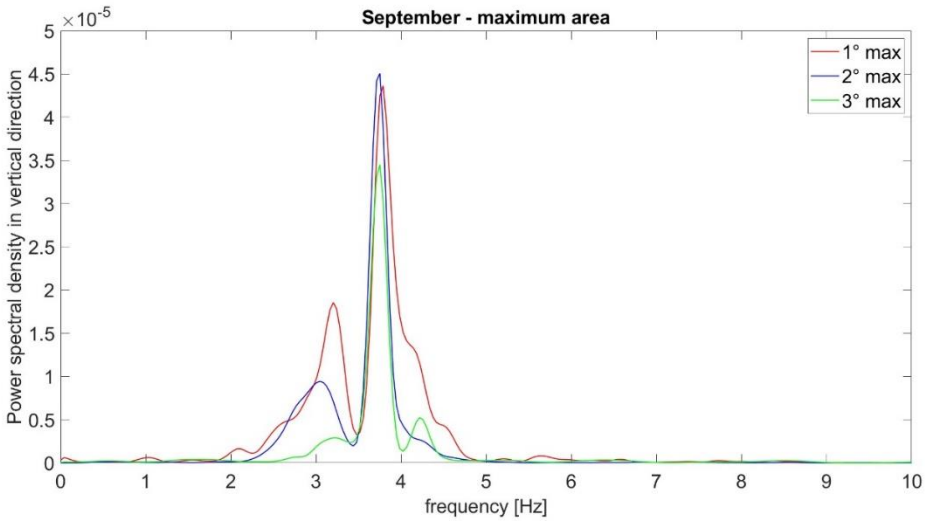


Figure 2-99: Results obtained from the 3 accelerograms with maximum area of PSD

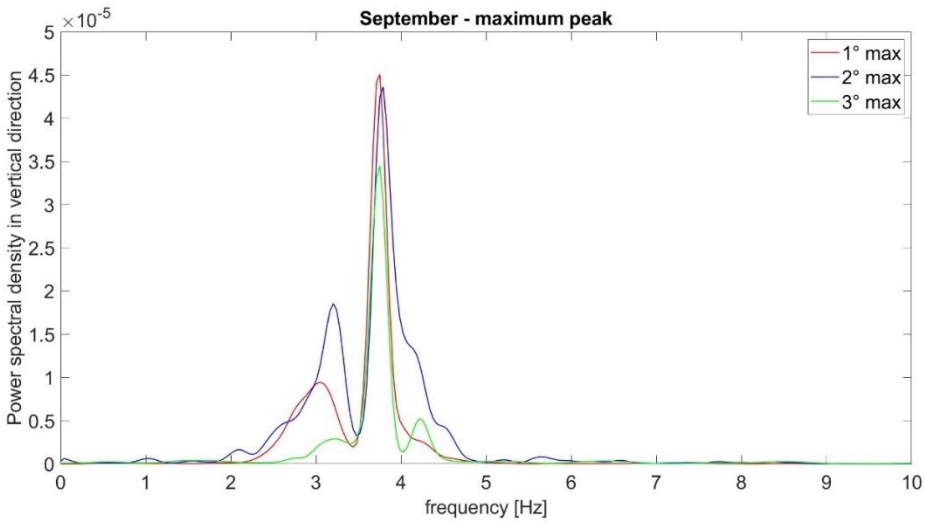


Figure 2-100: Results obtained from the 3 accelerograms with highest peak if PSD

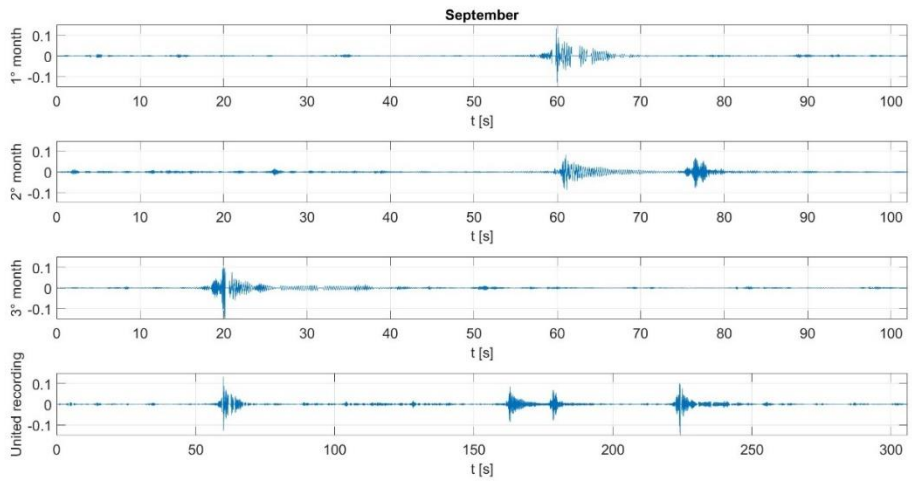


Figure 2-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.9.2 Longitudinal direction (y)

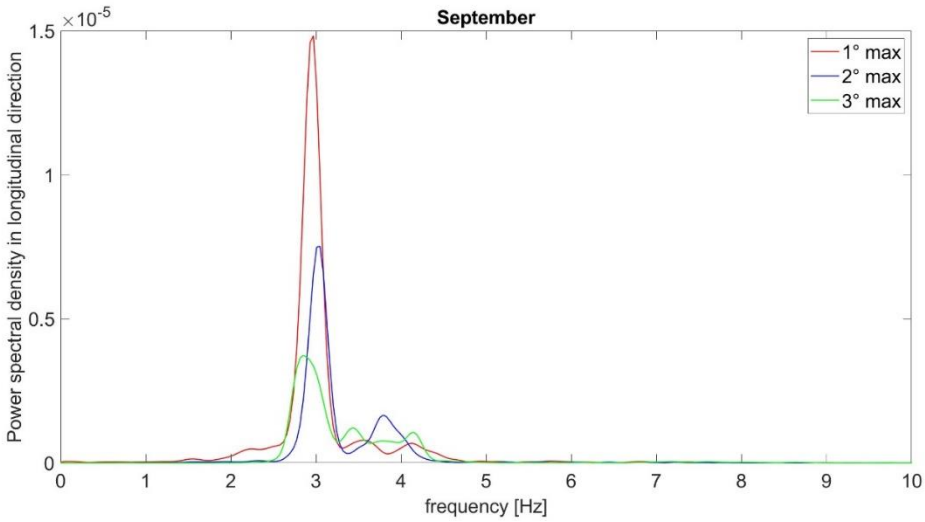


Figure 2-102: Results obtained from the 3 accelerograms with maximum SD in time domain

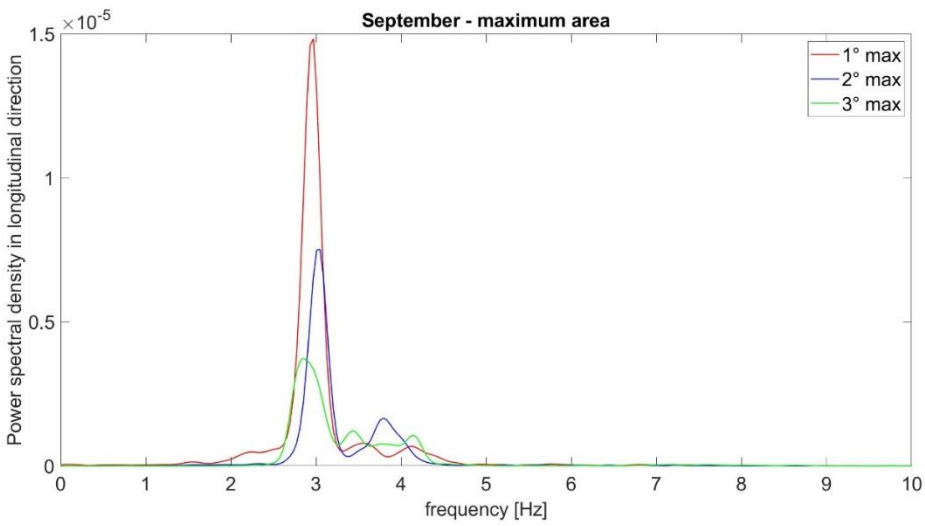


Figure 2-103: Results obtained from the 3 accelerograms with maximum area of PSD

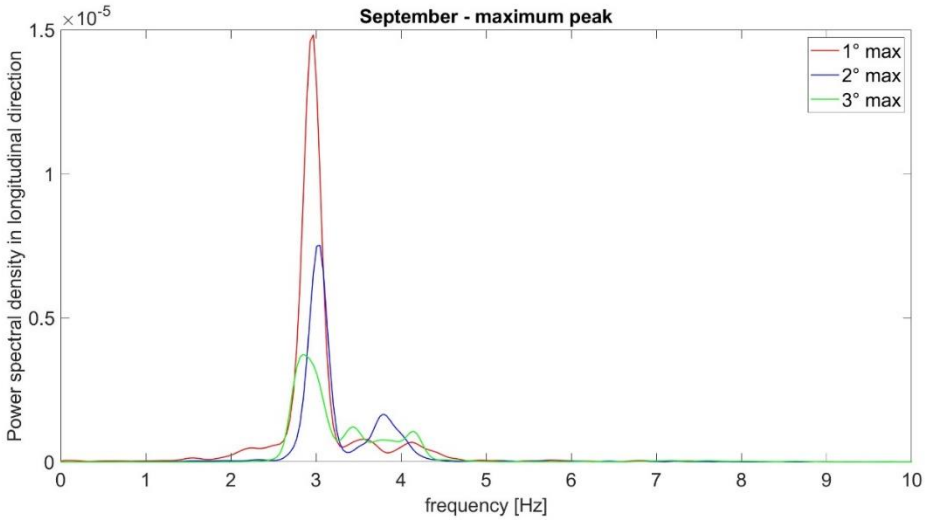


Figure 2-104: Results obtained from the 3 accelerograms with highest peak if PSD

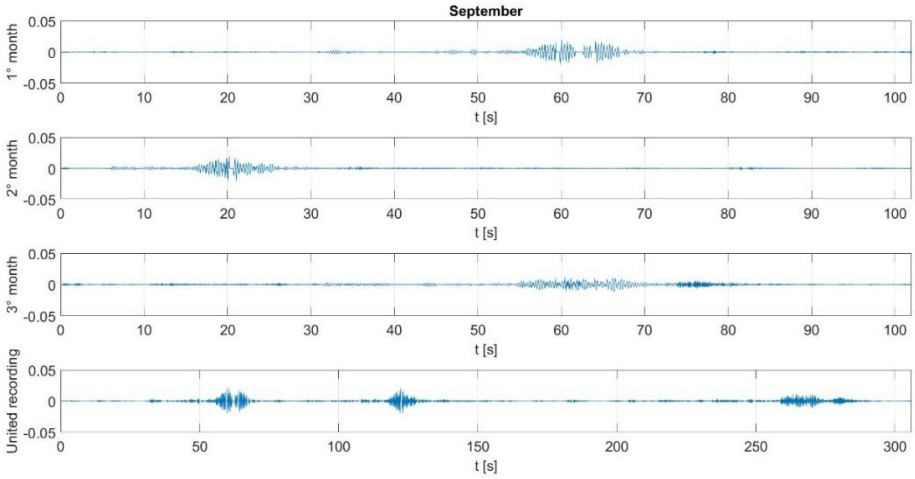


Figure 2-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.9.3 Transverse direction (z)

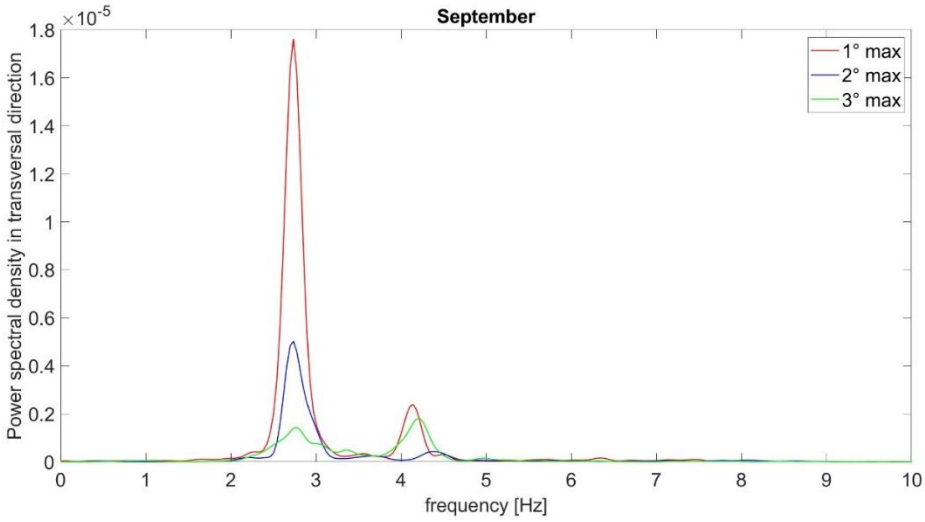


Figure 2-106: Results obtained from the 3 accelerograms with maximum SD in time domain

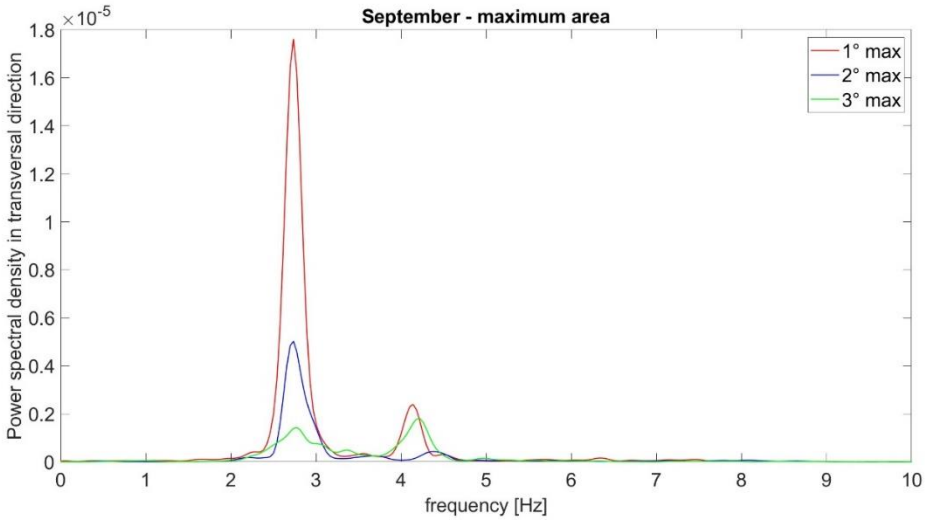


Figure 2-107: Results obtained from the 3 accelerograms with maximum area of PSD

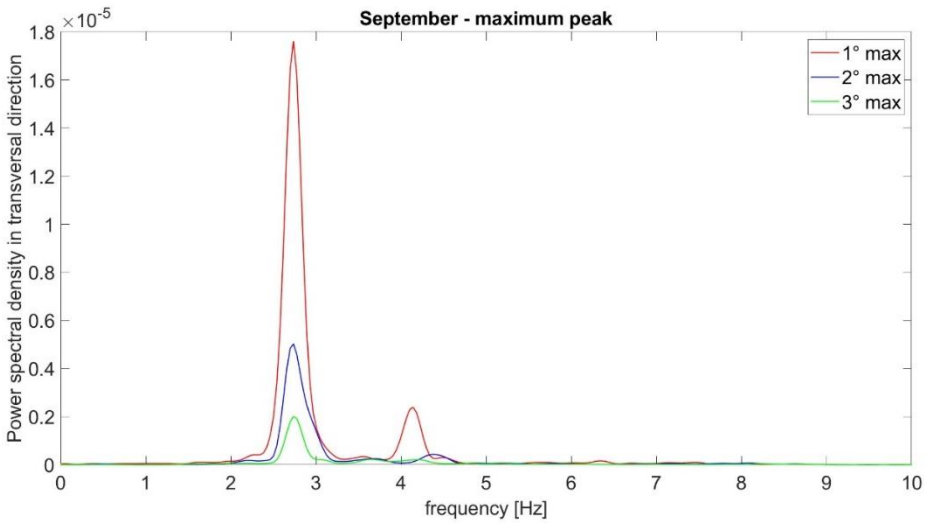


Figure 2-108: Results obtained from the 3 accelerograms with highest peak if PSD

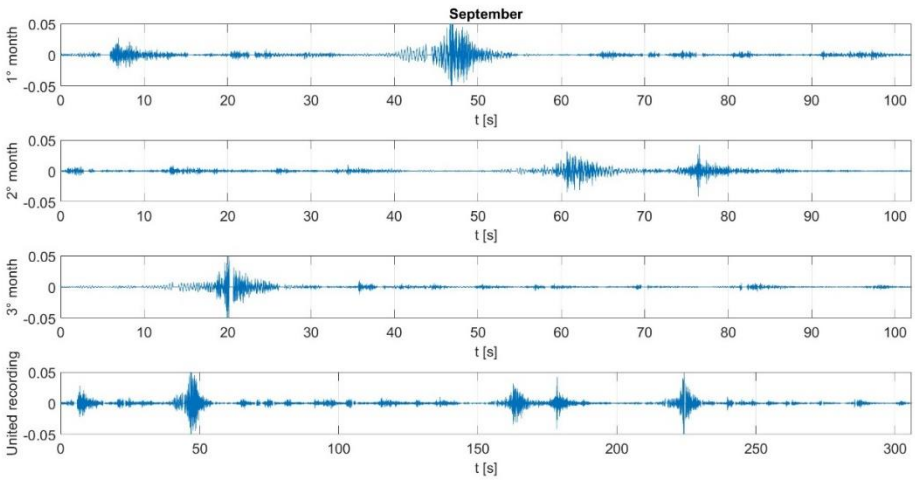


Figure 2-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

2.10 October

The results obtained for the October dataset are shown in the following tables.

Table 2-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-10-19_12-00-21	3.58E-03
	2°	30EB4_2023-10-07_08-00-21	3.31E-03
	3°	30EB4_2023-10-02_08-00-20	3.01E-03
Longitudinal direction (y)	1°	30EB4_2023-10-19_12-00-21	1.87E-03
	2°	30EB4_2023-10-02_08-00-20	1.11E-03
	3°	30EB4_2023-10-10_12-00-20	8.29E-04
Transverse direction (z)	1°	30EB4_2023-10-19_12-00-21	1.12E-03
	2°	30EB4_2023-10-02_08-00-20	1.10E-03
	3°	30EB4_2023-10-07_08-00-21	1.06E-03

Table 2-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-10-07_08-00-21	2.69E-05	30EB4_2023-10-19_12-00-21	2.34E-06
2	30EB4_2023-10-03_22-00-21	1.91E-05	30EB4_2023-10-07_08-00-21	2.19E-06
3	30EB4_2023-10-24_14-00-21	1.57E-05	30EB4_2023-10-02_08-00-20	2.07E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-10-19_12-00-21	1.31E-05	30EB4_2023-10-19_12-00-21	7.22E-07
2	30EB4_2023-10-02_08-00-20	2.17E-06	30EB4_2023-10-02_08-00-20	2.39E-07
3	30EB4_2023-10-10_12-00-20	8.38E-07	30EB4_2023-10-10_12-00-20	1.37E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-10-19_12-00-21	1.86E-06	30EB4_2023-10-19_12-00-21	2.61E-07
2	30EB4_2023-10-07_08-00-21	1.24E-06	30EB4_2023-10-02_08-00-20	2.32E-07
3	30EB4_2023-10-10_12-00-20	8.72E-07	30EB4_2023-10-07_08-00-21	2.29E-07

Table 2-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	A	A	A
2	B	-	B	C	C	C	C	B	C
3	C	-	C	D	D	D	B	-	B

2.10.1 Vertical direction (x)

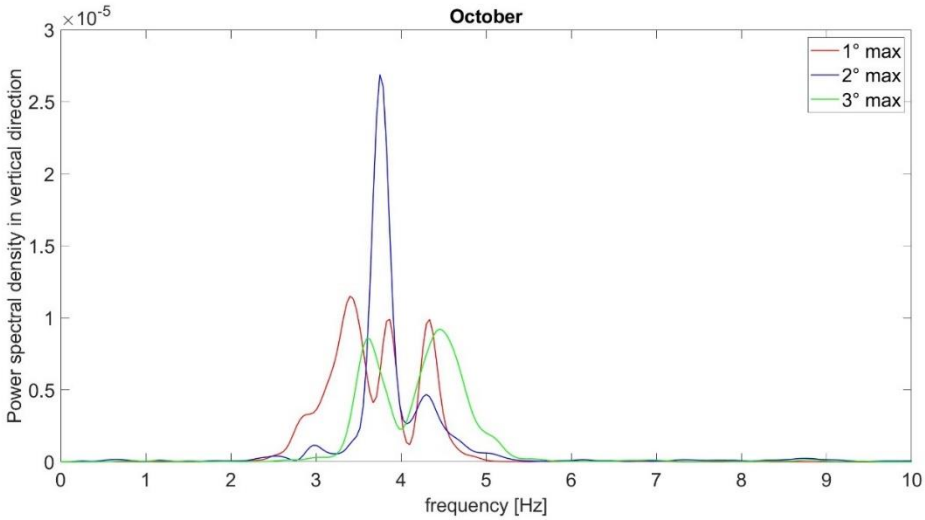


Figure 2-110: Results obtained from the 3 accelerograms with maximum SD in time domain

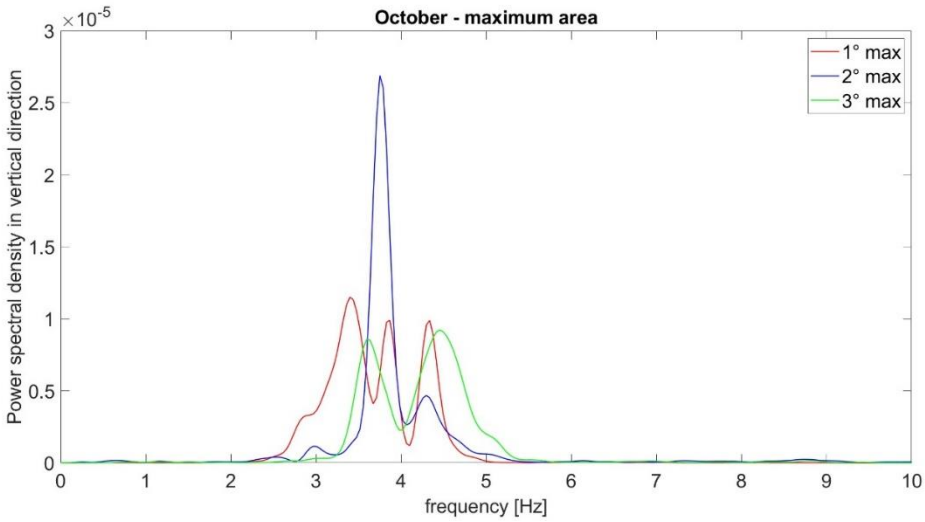


Figure 2-111: Results obtained from the 3 accelerograms with maximum area of PSD

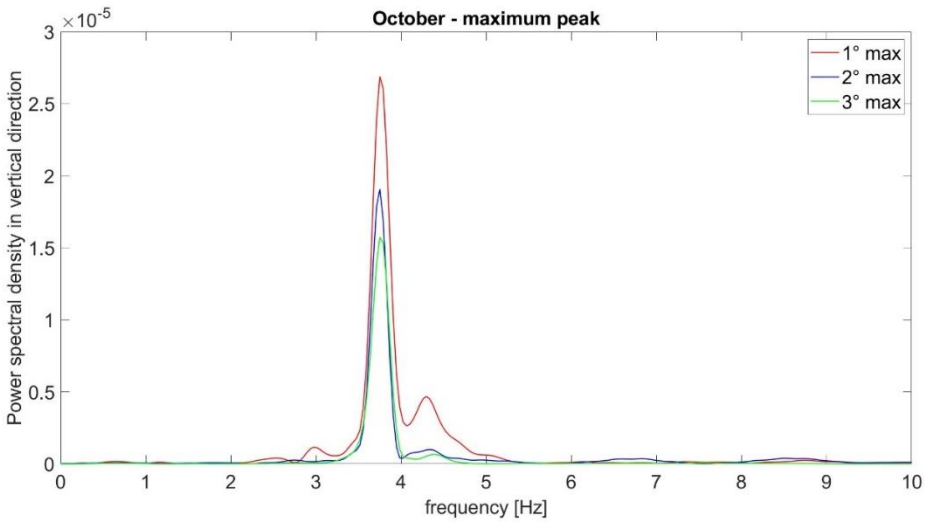


Figure 2-112: Results obtained from the 3 accelerograms with highest peak if PSD

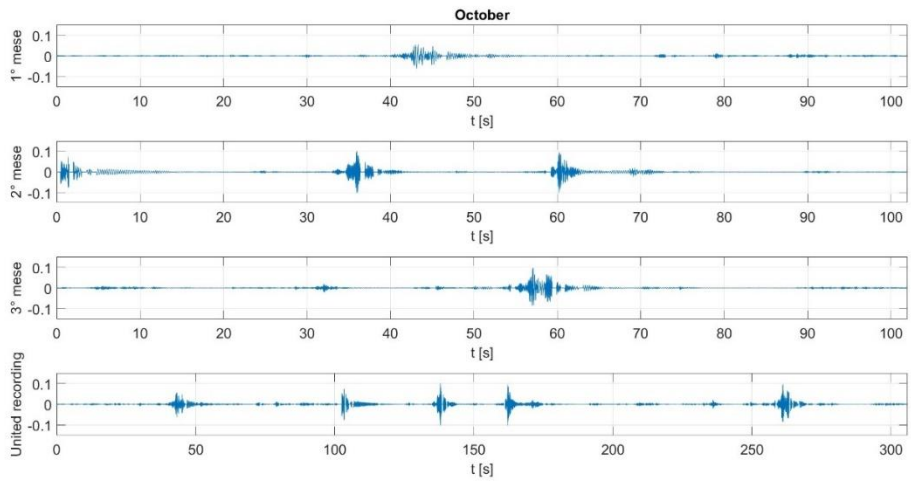


Figure 2-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.10.2 Longitudinal direction (y)

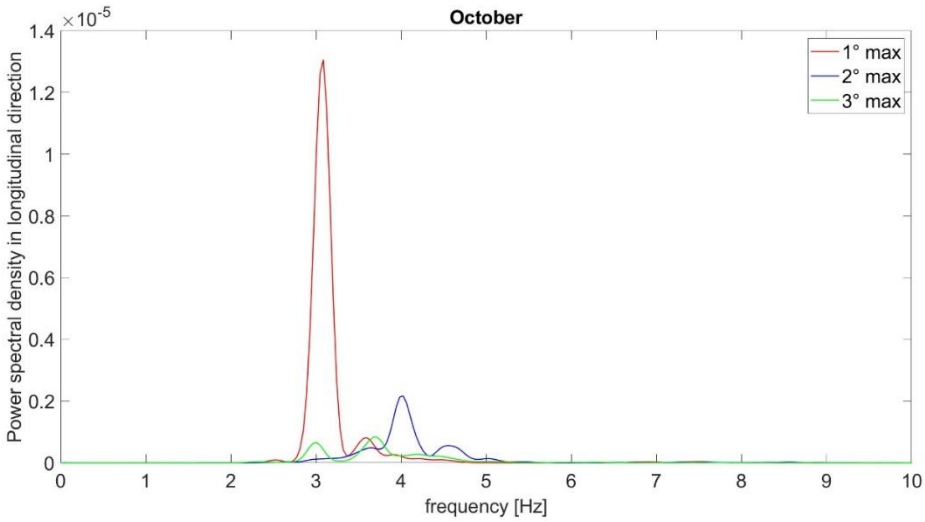


Figure 2-114: Results obtained from the 3 accelerograms with maximum SD in time domain

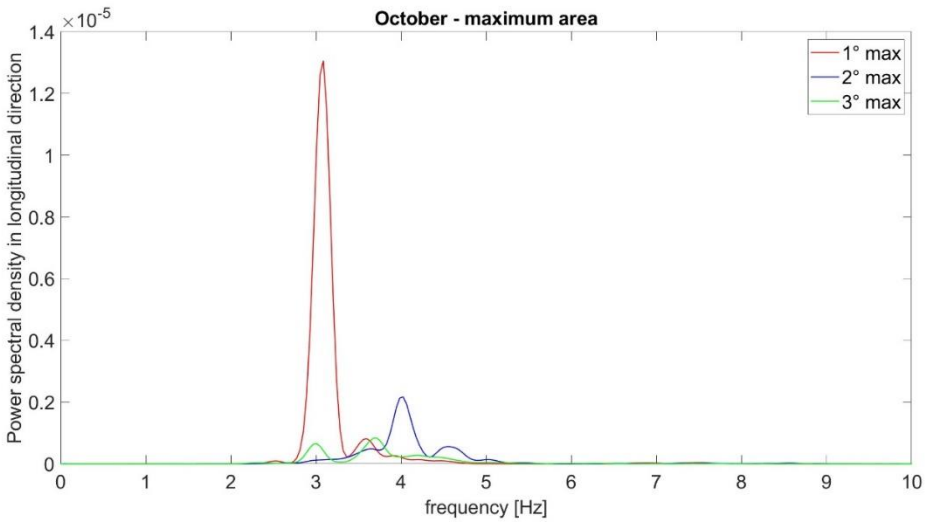


Figure 2-115: Results obtained from the 3 accelerograms with maximum area of PSD

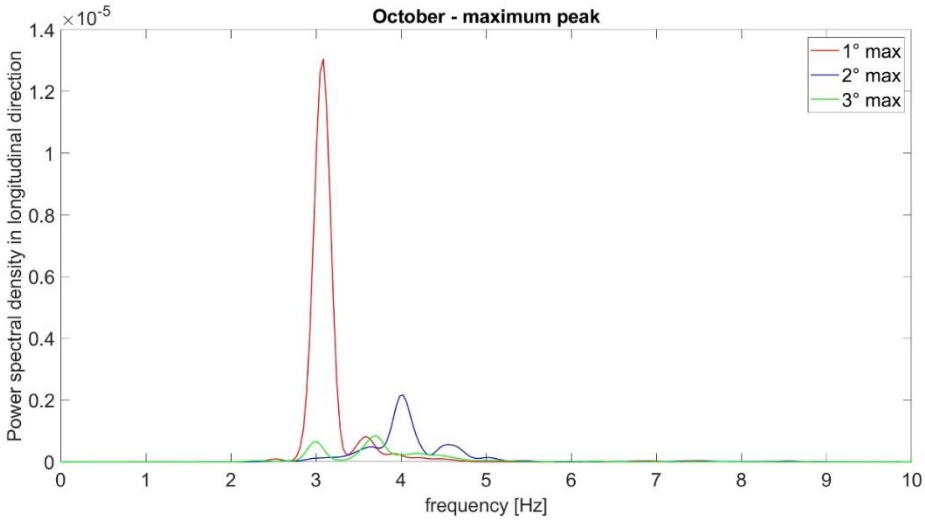


Figure 2-116: Results obtained from the 3 accelerograms with highest peak if PSD

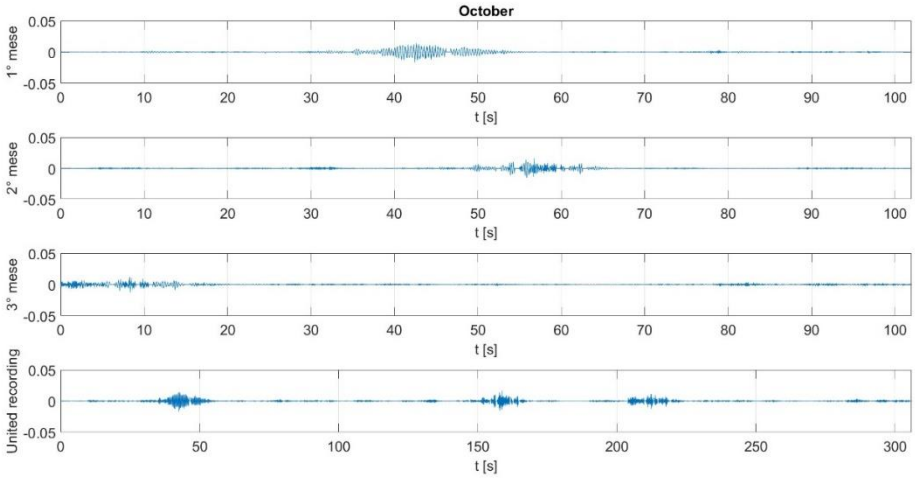


Figure 2-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.10.3 Transverse direction (z)

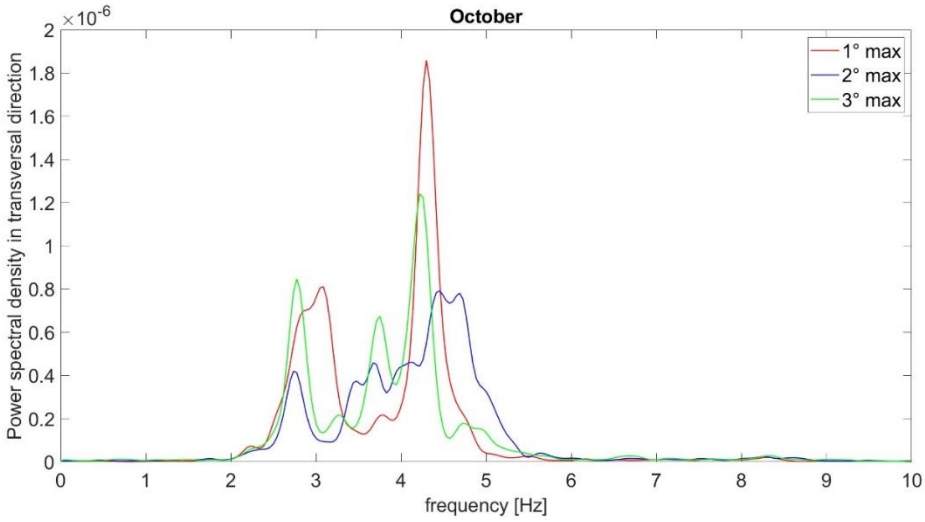


Figure 2-118: Results obtained from the 3 accelerograms with maximum SD in time domain

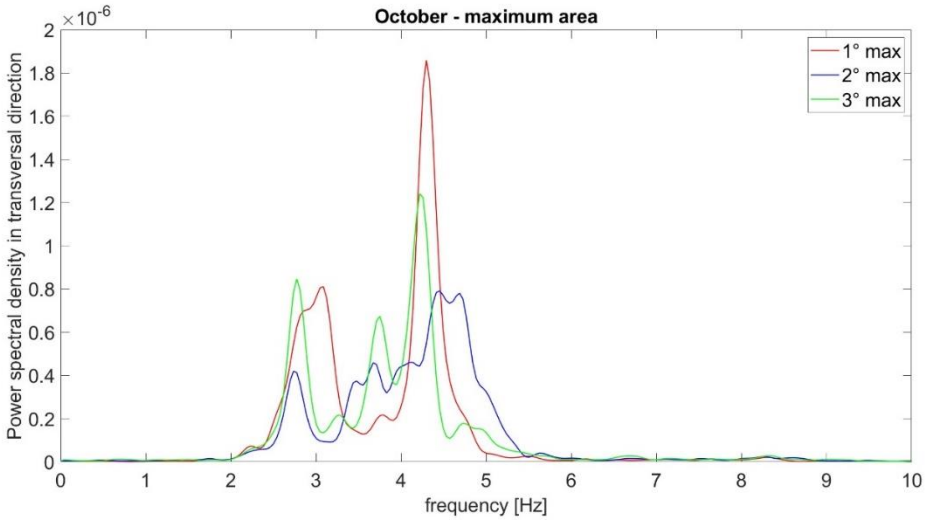


Figure 2-119: Results obtained from the 3 accelerograms with maximum area of PSD

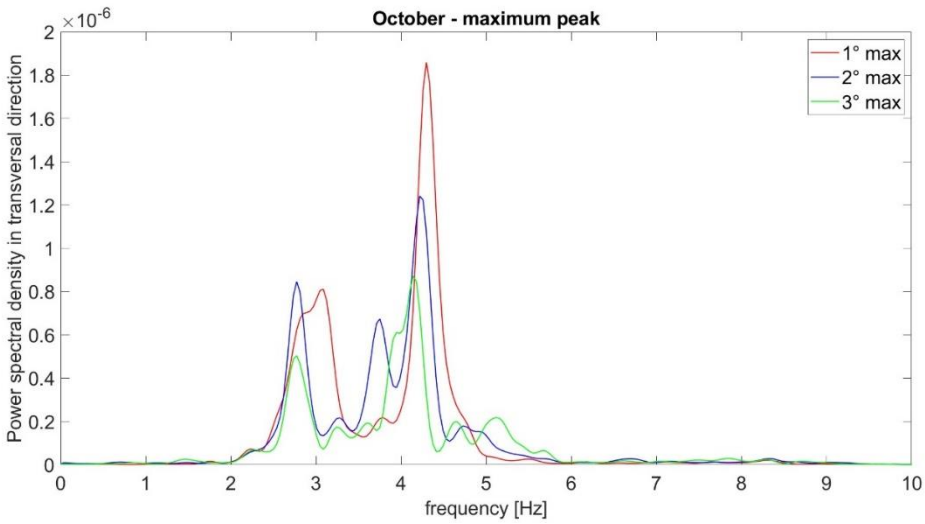


Figure 2-120: Results obtained from the 3 accelerograms with highest peak if PSD

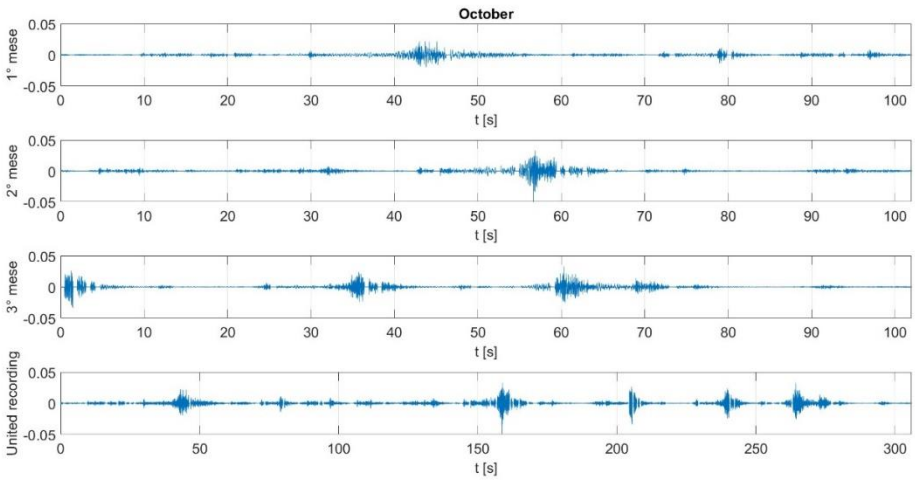


Figure 2-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

2.11 November

The results obtained for the November dataset are shown in the following tables.

Table 2-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-11-07_17-00-22	4.62E-03
	2°	30EB4_2023-11-08_07-00-21	2.31E-03
	3°	30EB4_2023-11-17_08-00-20	2.10E-03
Longitudinal direction (y)	1°	30EB4_2023-11-07_17-00-22	1.34E-03
	2°	30EB4_2023-11-06_17-00-20	8.43E-04
	3°	30EB4_2023-11-29_02-00-21	7.28E-04
Transverse direction (z)	1°	30EB4_2023-11-07_17-00-22	1.51E-03
	2°	30EB4_2023-11-07_13-00-21	1.16E-03
	3°	30EB4_2023-11-14_09-00-20	1.06E-03

Table 2-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-11-07_17-00-22	4.42E-05	30EB4_2023-11-07_17-00-22	4.19E-06
2	30EB4_2023-11-08_07-00-21	1.67E-05	30EB4_2023-11-08_07-00-21	1.05E-06
3	30EB4_2023-11-28_14-00-21	1.56E-05	30EB4_2023-11-11_14-00-20	9.44E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-11-07_17-00-22	3.25E-06	30EB4_2023-11-07_17-00-22	3.64E-07
2	30EB4_2023-11-06_17-00-20	1.93E-06	30EB4_2023-11-06_17-00-20	1.46E-07
3	30EB4_2023-11-29_02-00-21	9.64E-07	30EB4_2023-11-29_02-00-21	8.11E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-11-07_17-00-22	3.34E-06	30EB4_2023-11-07_17-00-22	4.78E-07
2	30EB4_2023-11-07_13-00-21	2.23E-06	30EB4_2023-11-07_13-00-21	2.86E-07
3	30EB4_2023-11-14_09-00-20	1.58E-06	30EB4_2023-11-14_09-00-20	1.98E-07

Table 2-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	C	C	C	E	E	E
3	-	-	-	D	D	D	F	F	F

2.11.1 Vertical direction (x)

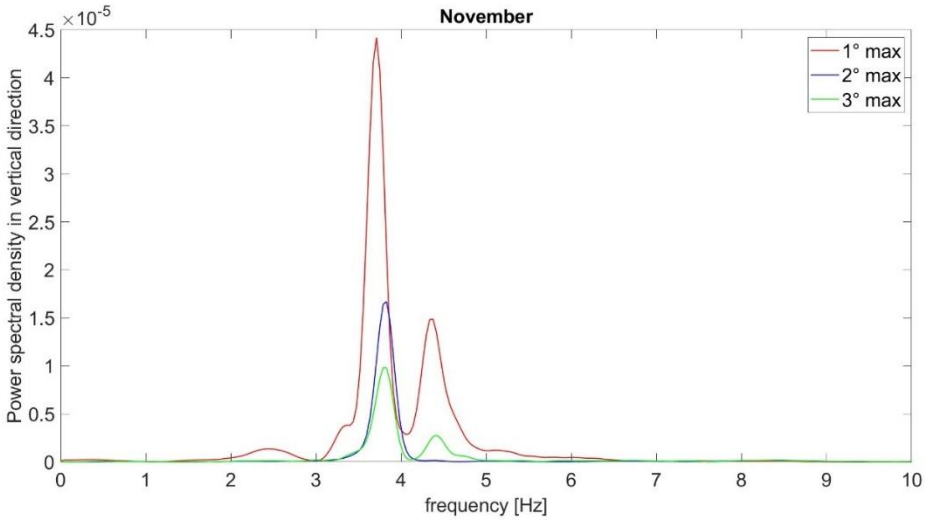


Figure 2-122: Results obtained from the 3 accelerograms with maximum SD in time domain

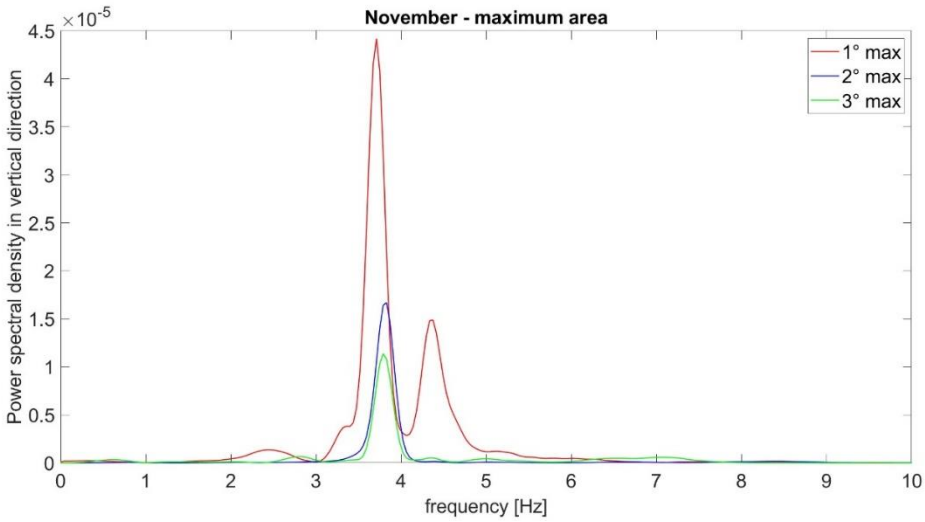


Figure 2-123: Results obtained from the 3 accelerograms with maximum area of PSD

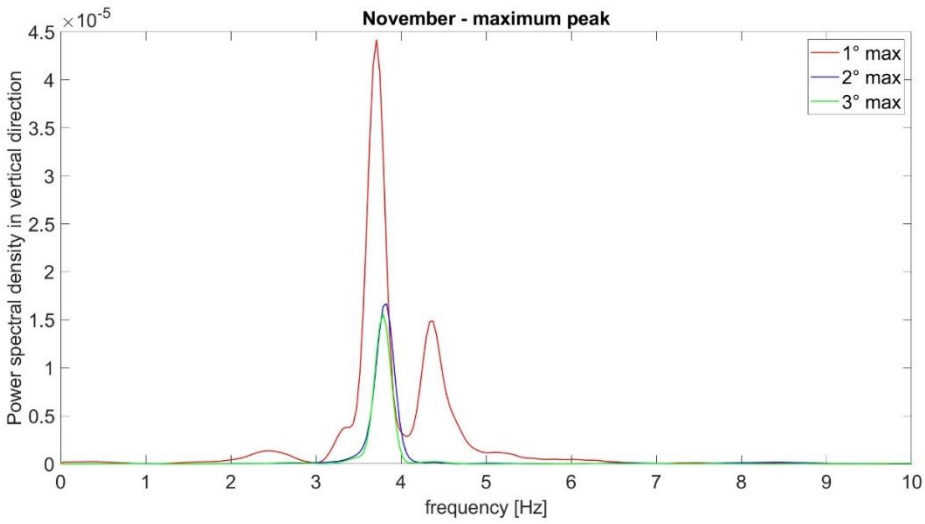


Figure 2-124: Results obtained from the 3 accelerograms with highest peak if PSD

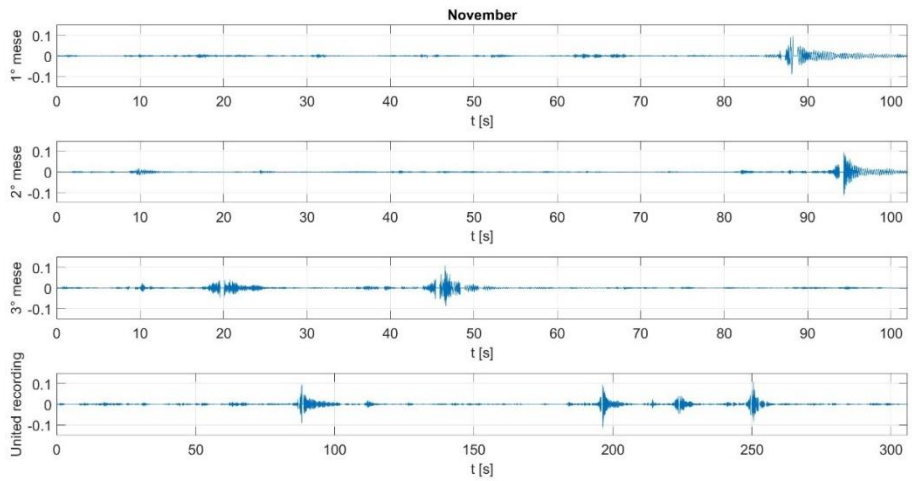


Figure 2-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.11.2 Longitudinal direction (y)

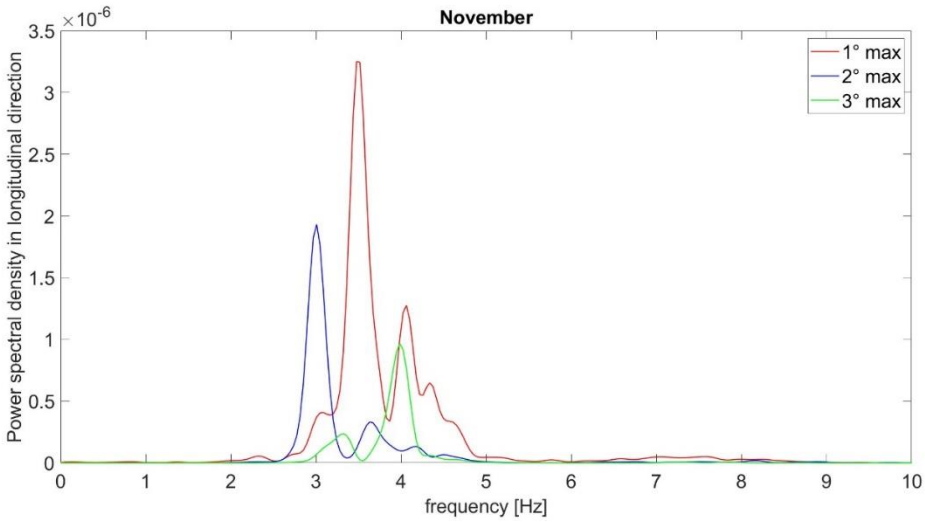


Figure 2-126: Results obtained from the 3 accelerograms with maximum SD in time domain

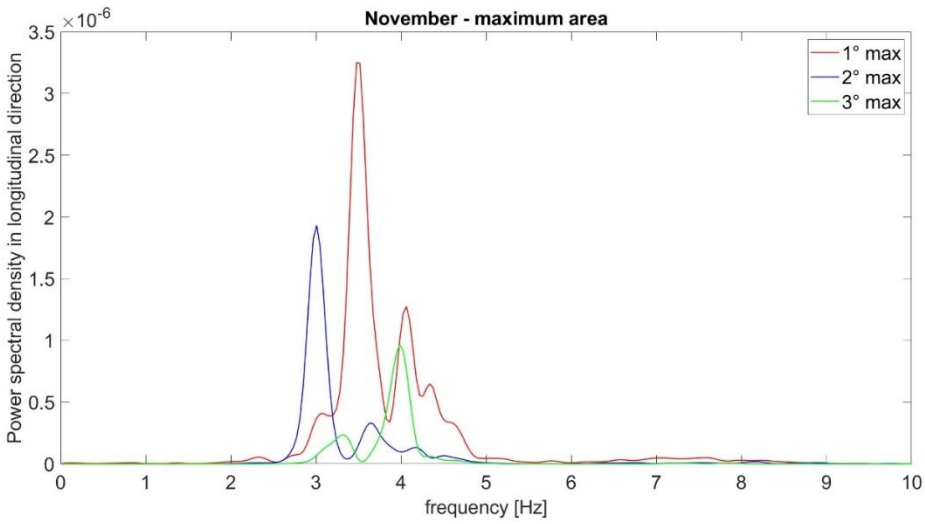


Figure 2-127: Results obtained from the 3 accelerograms with maximum area of PSD

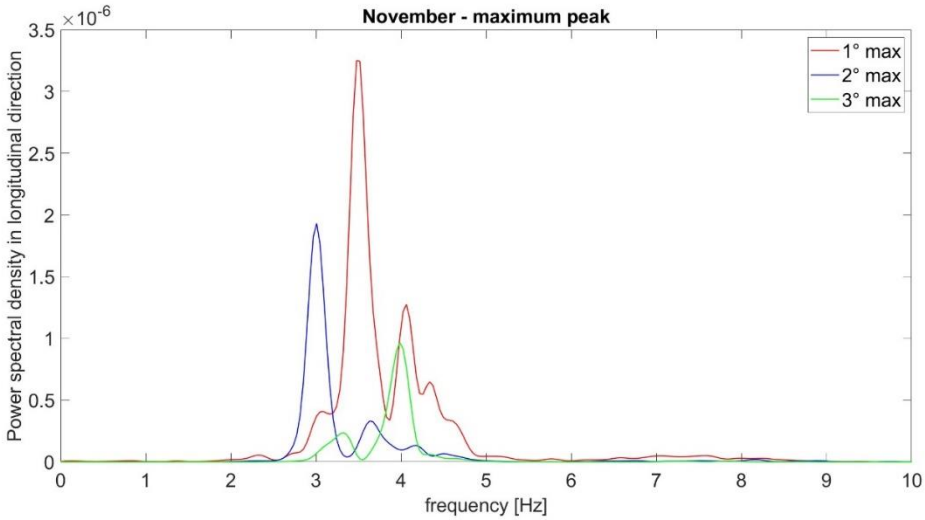


Figure 2-128: Results obtained from the 3 accelerograms with highest peak if PSD

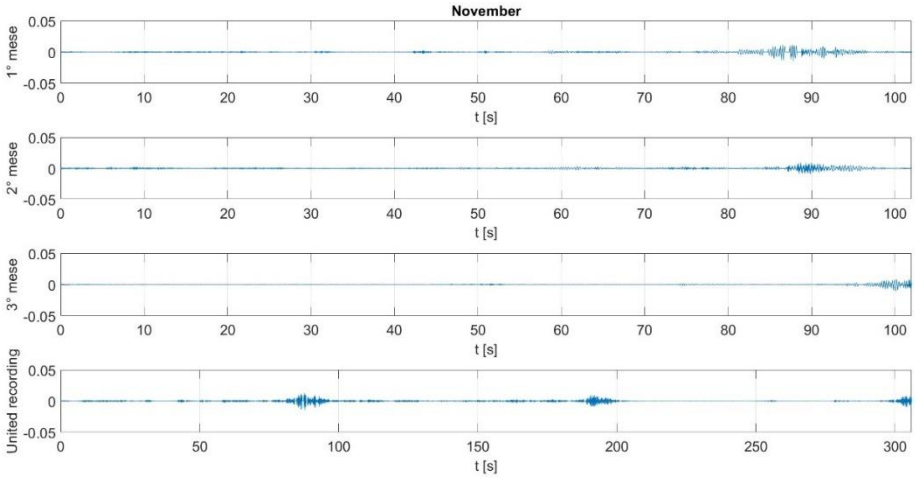


Figure 2-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.11.3 Transverse direction (z)

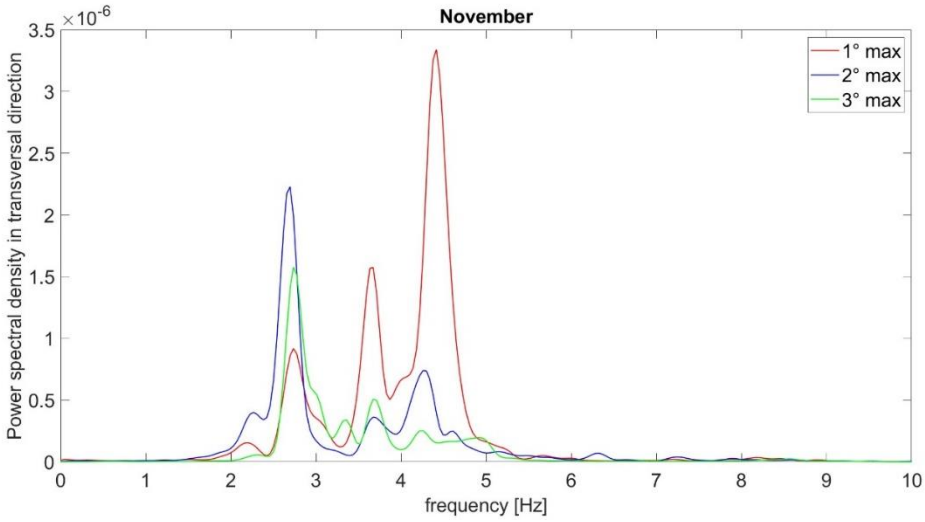


Figure 2-130: Results obtained from the 3 accelerograms with maximum SD in time domain

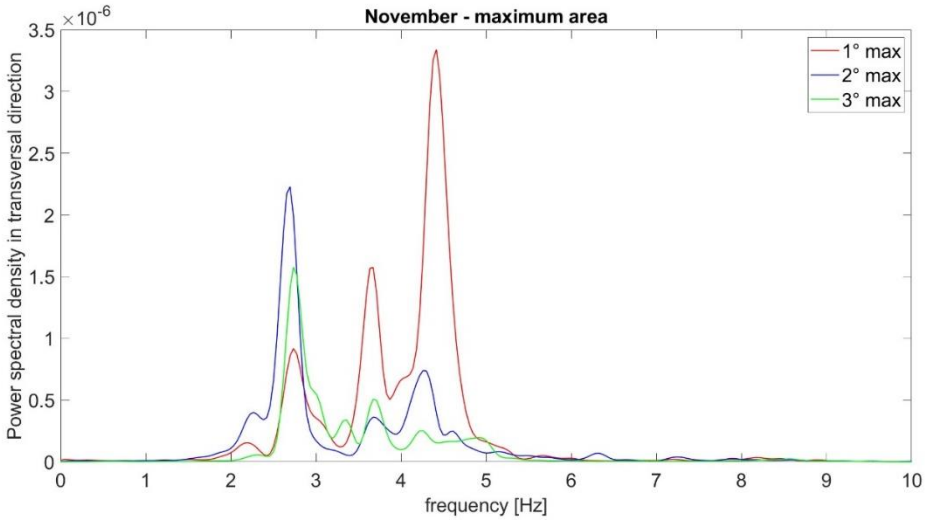


Figure 2-131: Results obtained from the 3 accelerograms with maximum area of PSD

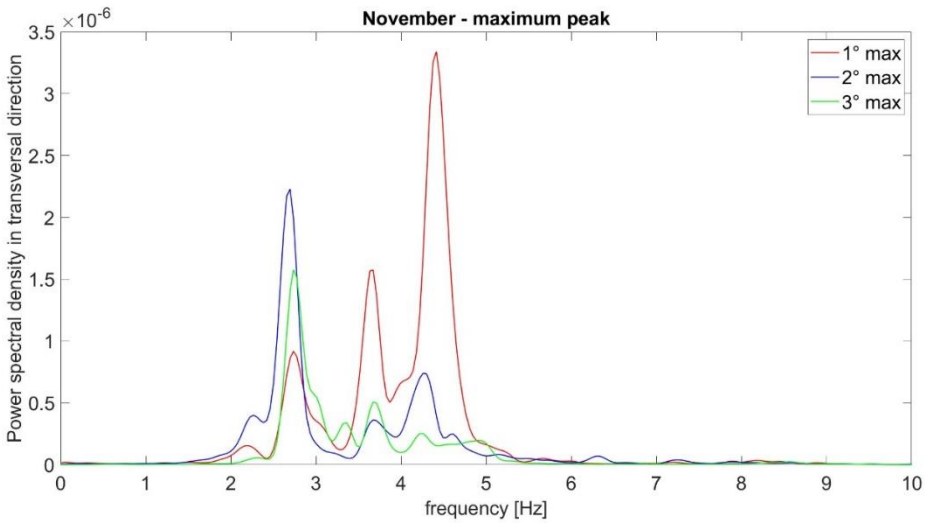


Figure 2-132: Results obtained from the 3 accelerograms with highest peak if PSD

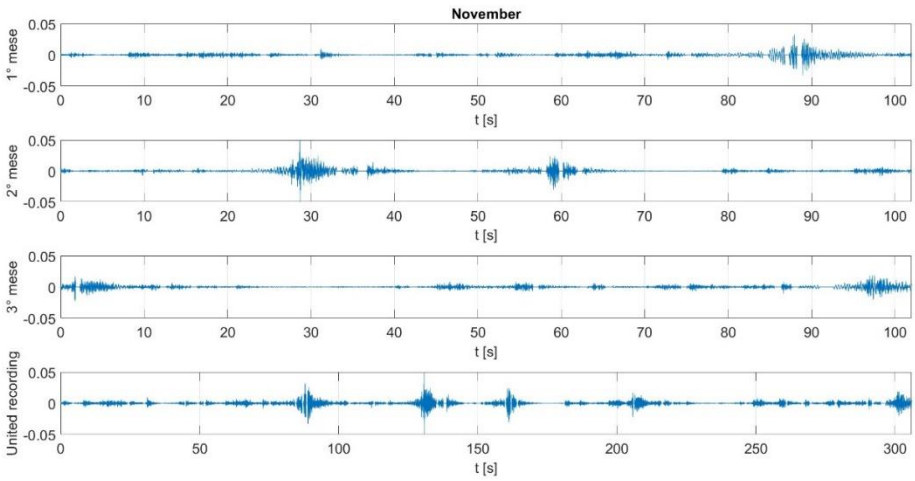


Figure 2-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

2.12 December

The results obtained for the December dataset are shown in the following tables.

Table 2-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30EB4_2023-12-06_10-00-21	3.49E-03
	2°	30EB4_2023-12-13_08-00-20	3.41E-03
	3°	30EB4_2023-12-22_09-00-21	2.78E-03
Longitudinal direction (y)	1°	30EB4_2023-12-06_10-00-21	1.51E-03
	2°	30EB4_2023-12-13_08-00-20	9.88E-04
	3°	30EB4_2023-12-28_10-00-21	8.07E-04
Transverse direction (z)	1°	30EB4_2023-12-13_08-00-20	1.20E-03
	2°	30EB4_2023-12-06_10-00-21	1.09E-03
	3°	30EB4_2023-12-12_15-00-21	9.05E-04

Table 2-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-12-06_10-00-21	2.61E-05	30EB4_2023-12-06_10-00-21	2.52E-06
2	30EB4_2023-12-22_16-00-20	1.85E-05	30EB4_2023-12-13_08-00-20	2.36E-06
3	30EB4_2023-12-13_08-00-20	1.78E-05	30EB4_2023-12-22_09-00-21	1.66E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-12-06_10-00-21	3.52E-06	30EB4_2023-12-06_10-00-21	4.68E-07
2	30EB4_2023-12-22_09-00-21	1.26E-06	30EB4_2023-12-13_08-00-20	2.03E-07
3	30EB4_2023-12-28_10-00-21	1.19E-06	30EB4_2023-12-28_10-00-21	1.33E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30EB4_2023-12-13_08-00-20	1.47E-06	30EB4_2023-12-13_08-00-20	2.93E-07
2	30EB4_2023-12-28_08-00-21	1.19E-06	30EB4_2023-12-06_10-00-21	2.41E-07
3	30EB4_2023-12-30_13-00-20	1.06E-06	30EB4_2023-12-12_15-00-21	1.65E-07

Table 2-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	D	D	D
2	B	-	B	B	-	B	A	-	A
3	C	B	C	E	E	E	F	-	F

2.12.1 Vertical direction (x)

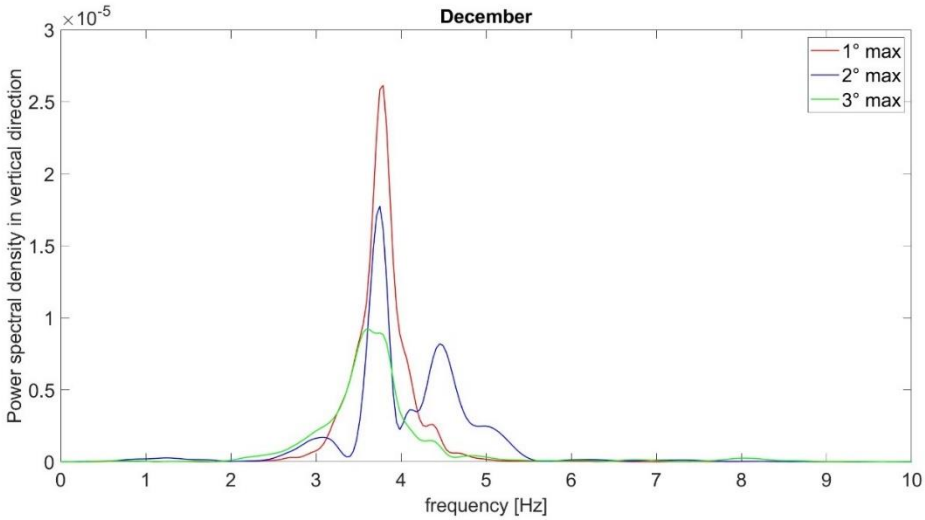


Figure 2-134: Results obtained from the 3 accelerograms with maximum SD in time domain

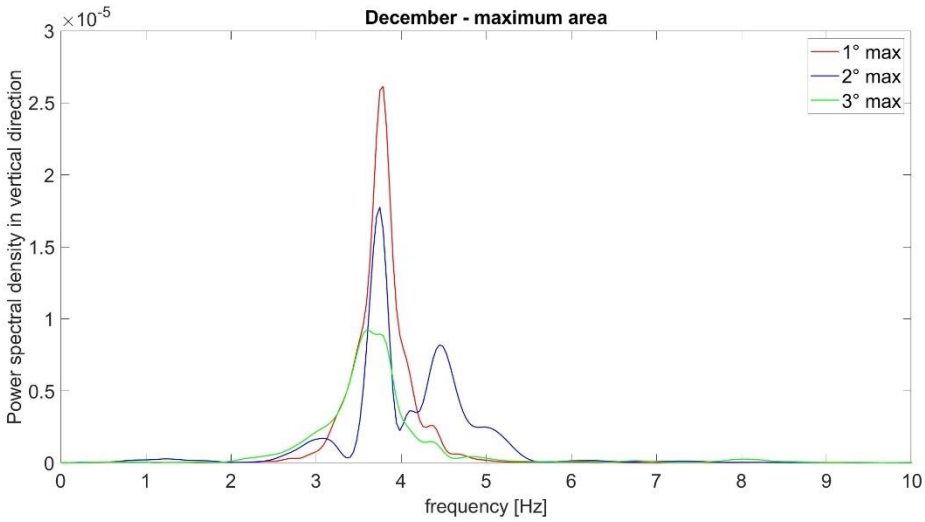


Figure 2-135: Results obtained from the 3 accelerograms with maximum area of PSD

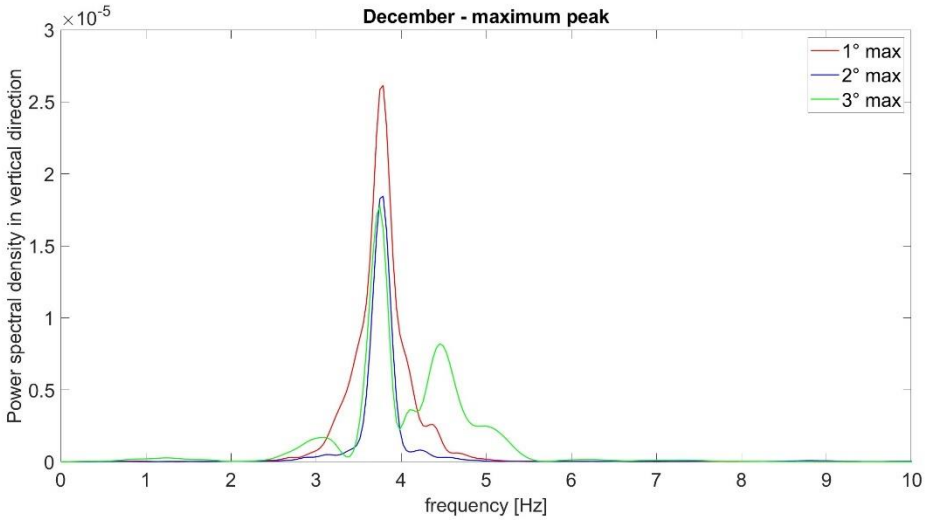


Figure 2-136: Results obtained from the 3 accelerograms with highest peak if PSD

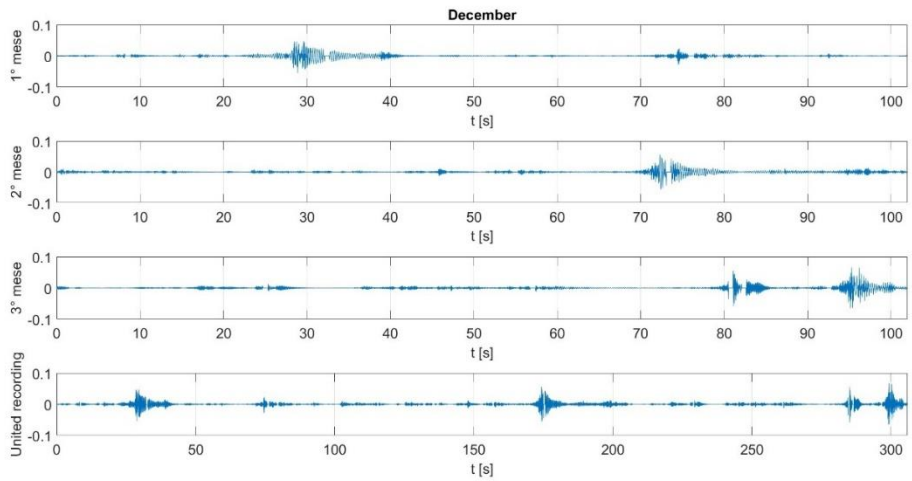


Figure 2-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

2.12.2 Longitudinal direction (y)

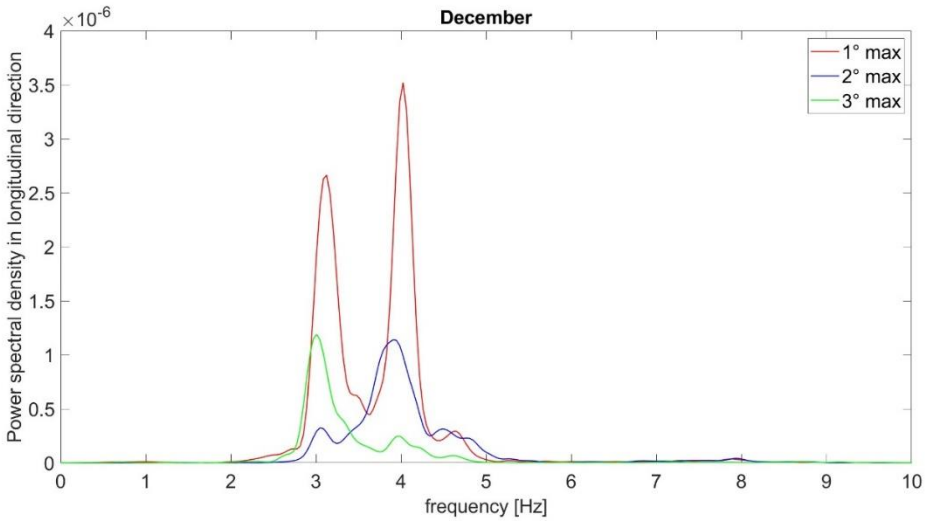


Figure 2-138: Results obtained from the 3 accelerograms with maximum SD in time domain

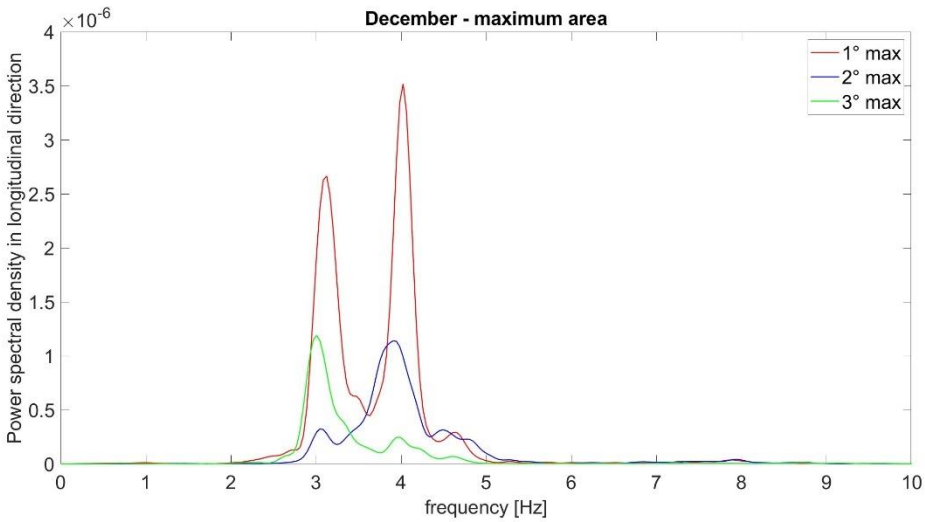


Figure 2-139: Results obtained from the 3 accelerograms with maximum area of PSD

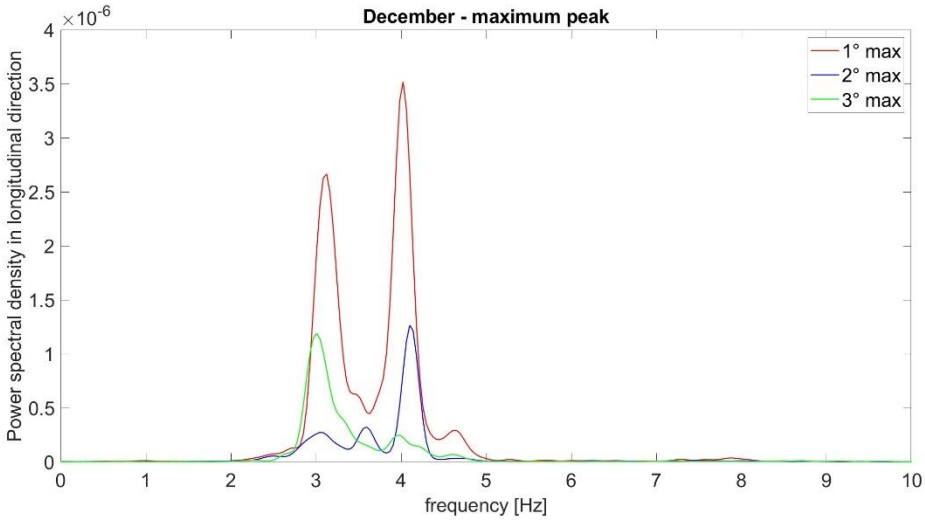


Figure 2-140: Results obtained from the 3 accelerograms with highest peak if PSD

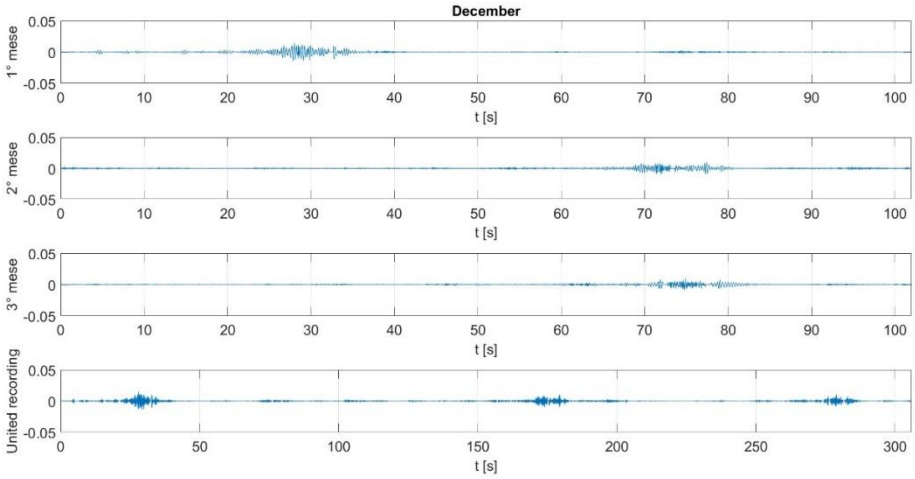


Figure 2-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

2.12.3 Transverse direction (z)

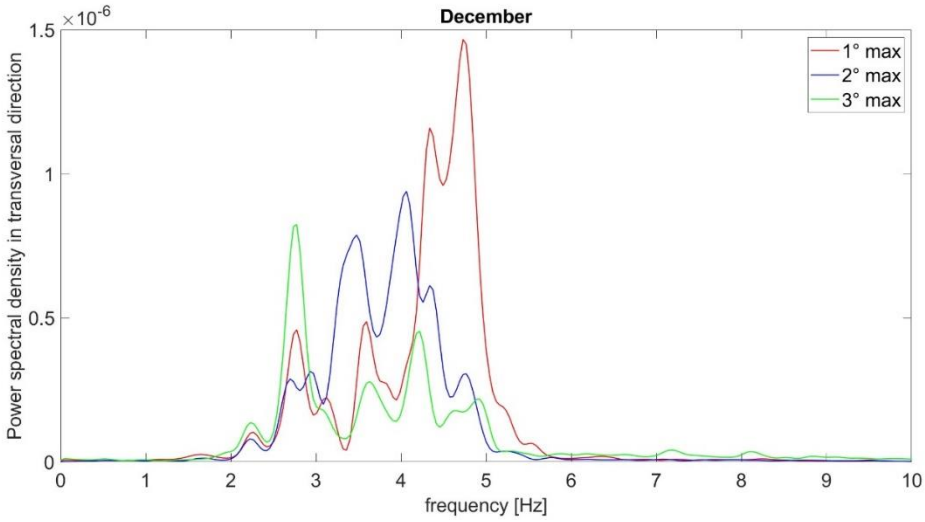


Figure 2-142: Results obtained from the 3 accelerograms with maximum SD in time domain

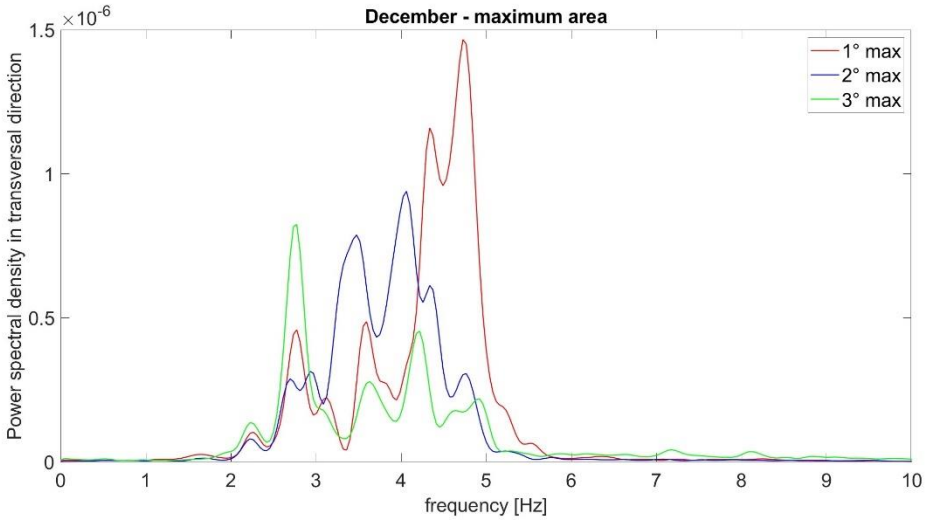


Figure 2-143: Results obtained from the 3 accelerograms with maximum area of PSD

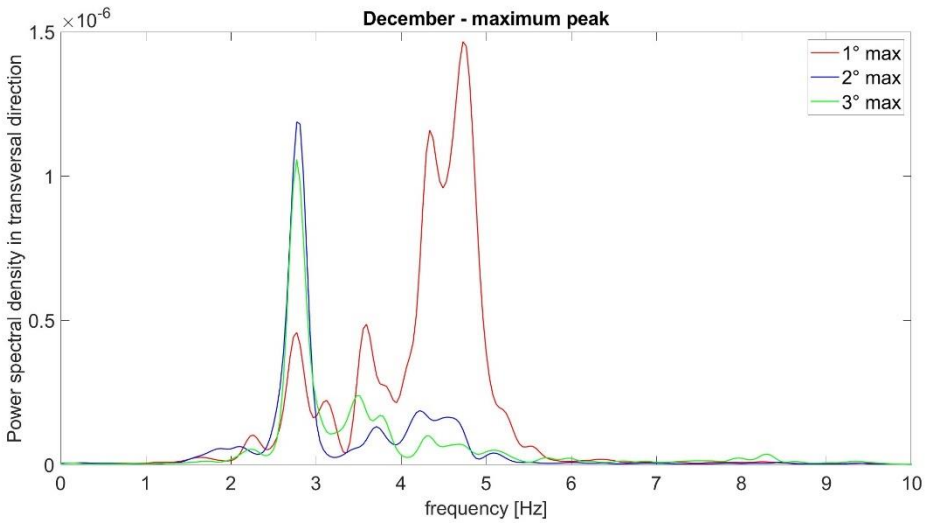


Figure 2-144: Results obtained from the 3 accelerograms with highest peak if PSD

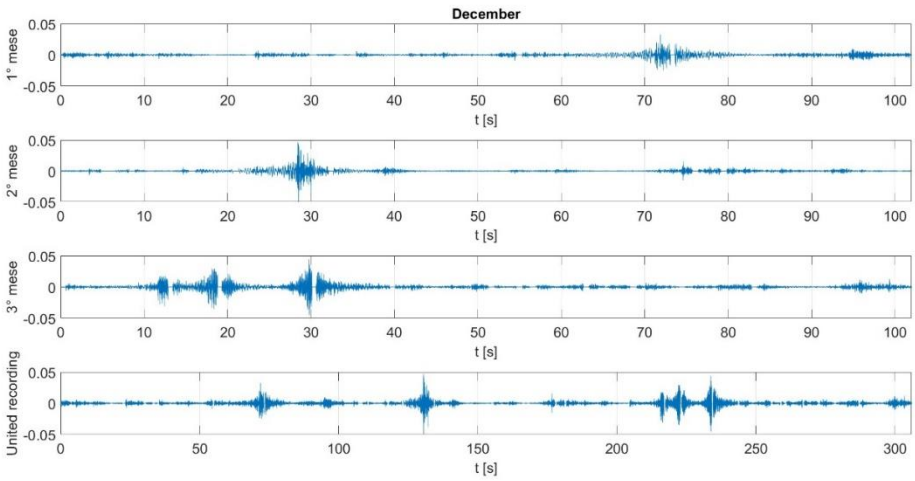


Figure 2-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

2.13 Analysis of the complete 2023 year

All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

Table 2-37: Main identified frequencies for sensor 30EB4 – bridge 2A2 – Sp4 – L/4

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	18	28	107	63	96	33	79	37	52	102	59	102
	MEAN	**2.70**	**3.18**	**3.75**	**4.31**	**3.06**	**3.60**	**3.99**	**4.55**	**2.26**	**2.79**	**3.65**	**4.30**
	SD	0.10	0.13	0.05	0.10	0.08	0.10	0.10	0.16	0.06	0.10	0.10	0.19
	C.o.V.	3.7%	4.0%	1.3%	2.4%	2.6%	2.9%	2.5%	3.4%	2.9%	3.5%	2.7%	4.4%
	Rating	**14%**	**21%**	**100%**	**54%**	**81%**	**27%**	**67%**	**29%**	**43%**	**80%**	**49%**	**75%**
1	gen-23			3.83		3.13		3.98	4.49		2.62	3.83	4.34
2	gen-23			3.83	4.68	3.13		3.95			2.73	3.71	4.45
3	gen-23			3.79	4.5	3.16		3.98			2.81	3.71	4.45
1	gen-23	2.81		3.83		3.09		3.98	4.96	2.27	2.62	3.87	4.3
2	gen-23			3.83	4.41	3.13		3.95	4.49		2.73	3.71	4.45
3	gen-23			3.83	4.41	3.16		3.98	4.57		2.81	3.75	4.34
1	gen-23	2.81		3.83		3.13		3.98	4.49	2.27	2.62	3.87	4.34
2	gen-23			3.83	4.41	3.13		3.95			2.81	3.79	4.45
3	gen-23			3.83		3.16		3.98	4.96		2.73	3.75	4.45
1	feb-23	2.77		3.83	4.38	3.13		3.95			2.73		4.33
2	feb-23			3.79		3.01		4.06			2.77	3.68	4.38
3	feb-23			3.79	4.34	3.05		3.95			2.73	3.71	4.22
1	feb-23	2.77	3.28	3.83	4.38	3.13		3.95	4.45	2.23	2.73		4.34
2	feb-23			3.79	4.34	3.05		4.06			2.77	3.63	4.38
3	feb-23			3.79		3.05		3.95			2.77	3.55	4.18
1	feb-23			3.79		3.13		3.95	4.45	2.22	2.73	3.51	4.34
2	feb-23			3.79	4.34	3.09		3.83		2.27	2.77	3.78	4.22
3	feb-23	2.77		3.83	4.38	3.01		4.1		2.22	2.77		4.3
1	mar-23		3.13	3.75	4.3	3.01		4.16			2.77	3.58	4.26
2	mar-23	2.78		3.75	4.3	3.01		3.91		2.34	2.77		4.73
3	mar-23			3.75		3.13		3.98			2.73	3.49	4.73
1	mar-23			3.75	4.3	3.01		4.16			2.81	3.48	4.26
2	mar-23	2.77		3.75	4.33	3.01		3.91	4.57	2.34	2.81		4.73
3	mar-23			3.75		3.05		3.83		2.22	2.73	3.4	4.3
1	mar-23			3.75	4.3	3.01		4.16			2.77	3.48	4.26
2	mar-23	2.77		3.75	4.34	3.01		3.91	4.57	2.23	2.81		4.26
3	mar-23			3.79		3.05		3.83		2.3	2.77		4.75
1	apr-23			3.75	4.22	3.09		4.1	4.74	2.23	2.73	3.61	4.22
2	apr-23			3.75	4.3	3.05		4.21	4.64	2.3	2.77	3.47	4.26
3	apr-23			3.75		3.09		3.75	4.69			3.61	4.22
1	apr-23		3.36	3.75	4.22	3.09		4.1		2.23	2.73	3.64	4.22
2	apr-23			3.75	4.34	3.05		4.22		2.29	2.77	3.6	4.25

3	apr-23			3.75	4.3	3.05		3.79				3.63	4.22
1	apr-23		3.36	3.75		3.09		4.1			2.77	3.59	4.26
2	apr-23			3.75		3.09		4.02		2.23	2.73	3.63	4.22
3	apr-23			3.75	4.38	3.09		4.02	4.61			3.63	4.22
1	mag-23		3.04	3.71	4.22	3.01		4.02			2.77		4.14
2	mag-23	2.77		3.79	4.22	3.09		3.91		2.01	2.73	3.69	4.3
3	mag-23			3.67	4.26	2.9	3.51	4.02		2.29	3.01		4.14
1	mag-23		3.04	3.71	4.22	3.01		3.98			2.77		4.14
2	mag-23			3.79	4.22	3.13		3.91	4.47	2.01	2.77	3.69	4.3
3	mag-23	2.77		3.67	4.26	2.89		4.02		2.29	3.01		4.18
1	mag-23		3.04	3.79	4.22	3.01		3.98			2.77		4.14
2	mag-23			3.71		3.09		3.86			2.77	3.69	4.26
3	mag-23			3.71	4.22	2.97		3.83		2.29	2.73		4.14
1	giu-23			3.71		3.05		3.98	4.74	2.3	2.81		3.98
2	giu-23		3.09	3.71	4.18		3.51			2.31	2.93		4.14
3	giu-23			3.71	4.18	3.05		3.79			3.01		4.18
1	giu-23		3.09	3.71	4.38	3.05		3.95		2.31	2.81		3.98
2	giu-23			3.71	4.38		3.52			2.3	2.93		3.91
3	giu-23			3.71		3.05		3.79			3.01		4.14
1	giu-23			3.71		3.05		3.95		2.31	2.81		3.98
2	giu-23		3.09	3.71	4.38	3.05		3.79		2.3	2.89		4.18
3	giu-23	2.71		3.71	4.38		3.52			2.38	2.89		
1	lug-23	2.66		3.71	4.18	3.19		3.95		2.3	2.81	3.71	
2	lug-23			3.71		3.21	3.67		4.45		2.95		4.1
3	lug-23		3.28	3.71		3.01		4.02			3.01		4.1
1	lug-23	2.66		3.71	4.18	3.2		3.95	4.38	2.3	2.81	3.71	
2	lug-23			3.71		3.01					2.97		4.1
3	lug-23		3.28	3.71		3.2	3.67		4.45		3.01		4.1
1	lug-23	2.66		3.71	4.18	3.01				2.3	2.81	3.71	
2	lug-23			3.71		3.2	3.67		4.45		3.01		4.1
3	lug-23		3.28	3.71		3.2		3.95	4.38		2.97		4.1
1	ago-23			3.71	4.14	3.13	3.6		4.34	2.22	2.7		4.22
2	ago-23		3.32	3.75			3.71					3.69	4.3
3	ago-23			3.71	4.18	3.01			4.63	2.31			4.14
1	ago-23			3.71	4.14	3.13	3.59		4.34	2.23	2.7		4.22
2	ago-23		3.32	3.75		3.05	3.71				3.01	3.69	4.3
3	ago-23			3.71	4.18	3.01		4.02	4.63	2.3	2.81		4.14
1	ago-23			3.71	4.14	3.13	3.59		4.34	2.23	2.7		4.22
2	ago-23		3.32	3.75		3.01		4.02	4.63	2.3	2.81		4.1
3	ago-23			3.71	4.18	3.05	3.71			2.27	2.77		
1	set-23		3.2	3.79		2.97					2.73		4.14
2	set-23		3.06	3.75		3.05	3.74				2.73		4.18
3	set-23			3.75	4.22	2.85	3.41	4.14			2.77		4.34
1	set-23		3.2	3.79		2.97		4.1			2.73		4.14
2	set-23		3.05	3.75		3.05	3.76				2.73		4.3
3	set-23			3.75	4.22	2.85	3.54	4.14			2.77		4.22
1	set-23			3.75		2.97		4.14			2.73		4.1

2	set-23		3.2	3.79		3.01	3.76				2.73		4.33
3	set-23		3.05	3.75	4.22	2.85	3.54	4.14			2.73		
1	ott-23		3.36	3.87	4.34	3.08	3.59			2.27			4.3
2	ott-23	2.56		3.75	4.3			4.02	4.63		2.73	3.67	4.22
3	ott-23				4.45	3.01	3.71				2.77	3.75	4.41
1	ott-23		3.36	3.87	4.34	3.08	3.59				3.05		4.3
2	ott-23			3.75	4.3			4.02	4.63		2.73	3.67	4.22
3	ott-23			3.63	4.45	3.01	3.71				2.77	3.75	4.41
1	ott-23		3.04	3.75	4.3	3.09	3.59				3.09		4.3
2	ott-23			3.75				4.02	4.63		2.77	3.75	4.22
3	ott-23			3.75		3.01	3.71				2.77		4.14
1	nov-23	2.53		3.71	4.38		3.48	4.06	4.34	2.27	2.73	3.67	4.41
2	nov-23			3.83		3.01	3.64	3.98		2.31	2.7	3.67	4.3
3	nov-23			3.83	4.41		3.33				2.73	3.67	4.25
1	nov-23	2.53		3.71	4.38		3.48	4.06	4.34	2.31	2.73	3.63	4.41
2	nov-23			3.83		3.01	3.63			2.27	2.7	3.67	4.3
3	nov-23			3.79		3.33		3.98			2.73	3.67	4.22
1	nov-23	2.53		3.71	4.38		3.48	4.06	4.34	2.31	2.73	3.67	4.41
2	nov-23			3.83		3.01	3.63			2.27	2.7	3.67	4.3
3	nov-23			3.79				3.98			2.73	3.67	4.26
1	dic-23			3.79		3.13		4.02	4.65	2.23	2.77	3.6	4.73
2	dic-23			3.75	4.45	3.05		3.91	4.51	2.2	2.7	3.48	4.71
3	dic-23		3.04	3.65		3.01		3.95		2.21	2.77	3.64	4.76
1	dic-23			3.79		3.13		4.02	4.65	2.23	2.77	3.6	4.73
2	dic-23		3.04	3.75	4.45	3.05		3.91		2.2	2.7	3.48	4.73
3	dic-23			3.6		3.01		3.98		2.21	2.77	3.59	4.88
1	dic-23			3.79		3.13		4.02	4.65	2.23	2.77	3.6	4.73
2	dic-23			3.75		3.05	3.59				2.77		4.32
3	dic-23		3.04	3.79	4.45	3.01		3.98			2.77	3.52	4.3

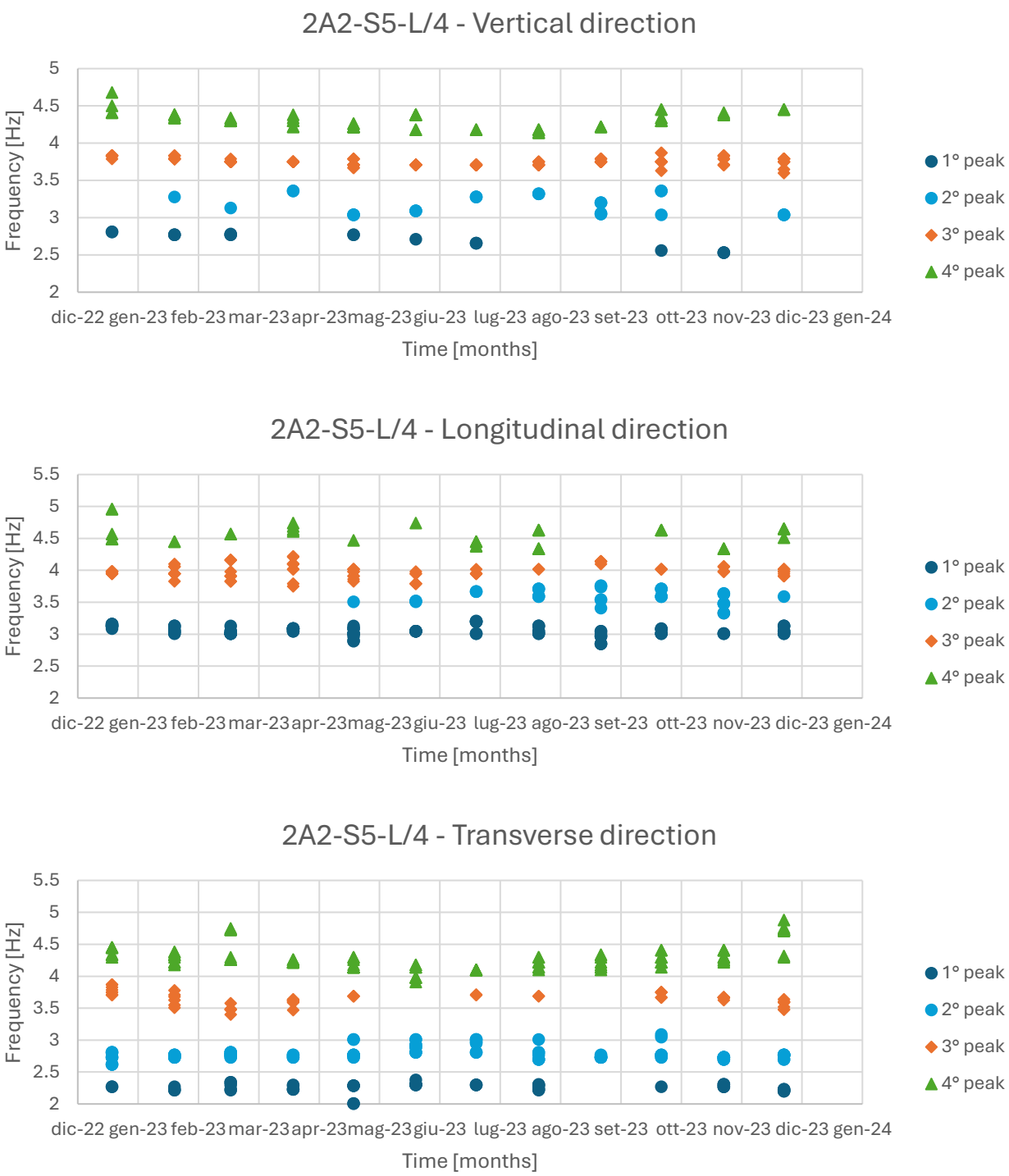


Figure 2-146: Main identified frequencies for sensor 30EB4 – bridge 2A2 – Sp4 – L/4

3. Annex 3 – Bridge 2A2 – Span 4 – L/8 - Sensor 31639

The Bridge 2A2 counts 2 monitored decks: span 4 and span 5 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 4 are:

- 3099D – situated in the midspan;
- 30EB4 – situated at a distance of L/4;
- 31639 – situated at a distance of L/8;
- 30D41 – situated nearby the pilar.

The sensors present on deck number 5 are:

- 2B7E4 – situated in the midspan;
- 3187F – situated at a distance of L/4 of the deck;
- 2B988 – situated at a distance of L/8 of the deck;
- 2C1EA – situated by the pilar.

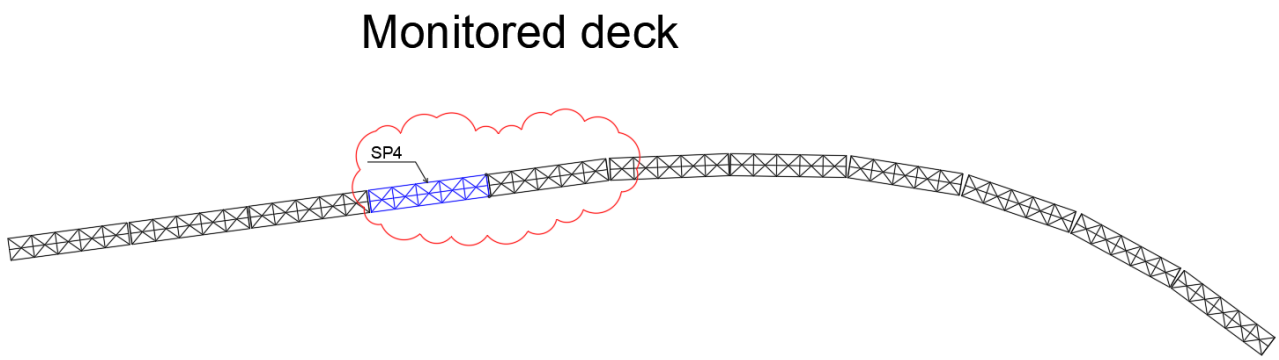


Figure 3-1 Monitored decks of 2A2 bridge

The accelerograms of the 31639 sensor have been analyzed and the results are represented in the following paragraphs.

3.1 January

The results obtained for the January dataset are shown in the following tables.

Table 3-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-01-02_07-00-21	1.09E-03
	2°	31639_2023-01-27_01-00-20	9.59E-04
	3°	31639_2023-01-06_01-00-19	8.20E-04
Longitudinal direction (y)	1°	31639_2023-01-31_07-00-21	4.75E-04
	2°	31639_2023-01-26_07-00-21	4.74E-04
	3°	31639_2023-01-17_07-00-19	4.52E-04
Transverse direction (z)	1°	31639_2023-01-19_13-00-20	6.50E-04
	2°	31639_2023-01-26_07-00-21	6.37E-04
	3°	31639_2023-01-31_07-00-21	6.28E-04

Table 3-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-01-27_01-00-20	2.02E-06	31639_2023-01-27_01-00-20	1.87E-07
2	31639_2023-01-06_01-00-19	1.42E-06	31639_2023-01-20_13-00-20	1.41E-07
3	31639_2023-01-26_07-00-21	1.37E-06	31639_2023-01-02_07-00-21	1.35E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-01-17_07-00-19	3.39E-07	31639_2023-01-31_07-00-21	4.49E-08
2	31639_2023-01-26_07-00-21	3.14E-07	31639_2023-01-26_07-00-21	4.35E-08
3	31639_2023-01-19_13-00-20	2.80E-07	31639_2023-01-17_07-00-19	4.31E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-01-19_13-00-20	4.80E-07	31639_2023-01-19_13-00-20	8.50E-08
2	31639_2023-01-31_07-00-21	4.17E-07	31639_2023-01-26_07-00-21	8.27E-08
3	31639_2023-01-14_13-00-20	3.48E-07	31639_2023-01-31_07-00-21	8.17E-08

Table 3-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	B	D	F	D	G	G	G
2	B	C	-	E	E	E	H	I	H
3	C	-	A	F	-	F	I	-	I

3.1.1 Vertical direction (x)

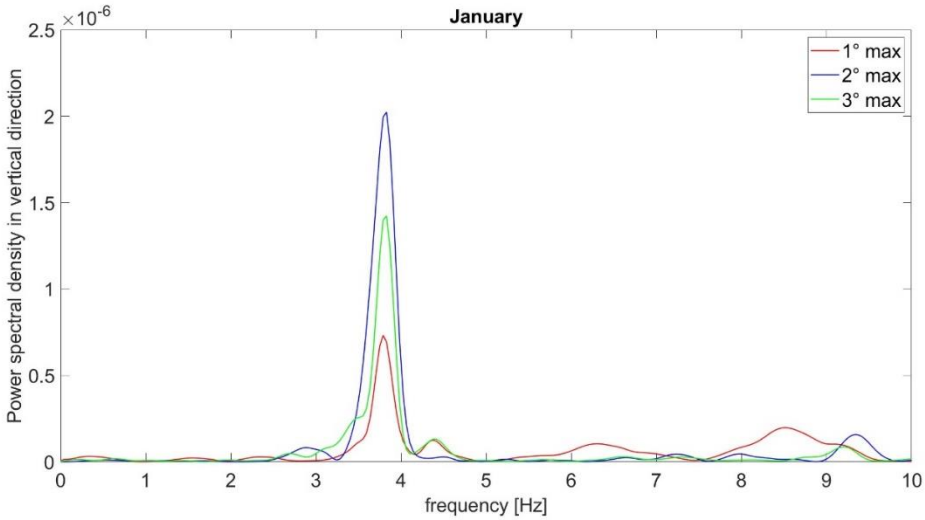


Figure 3-2: Results obtained from the 3 accelerograms with maximum SD in time domain

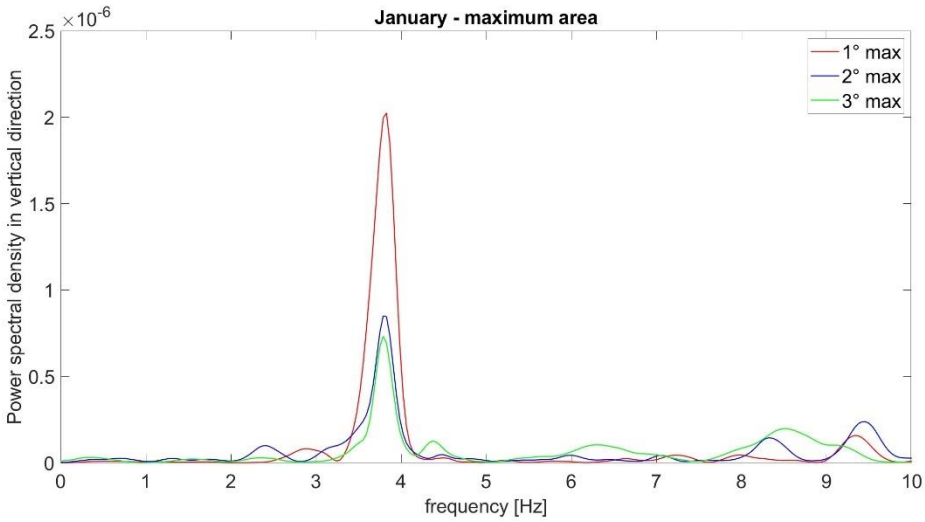


Figure 3-3: Results obtained from the 3 accelerograms with maximum area of PSD

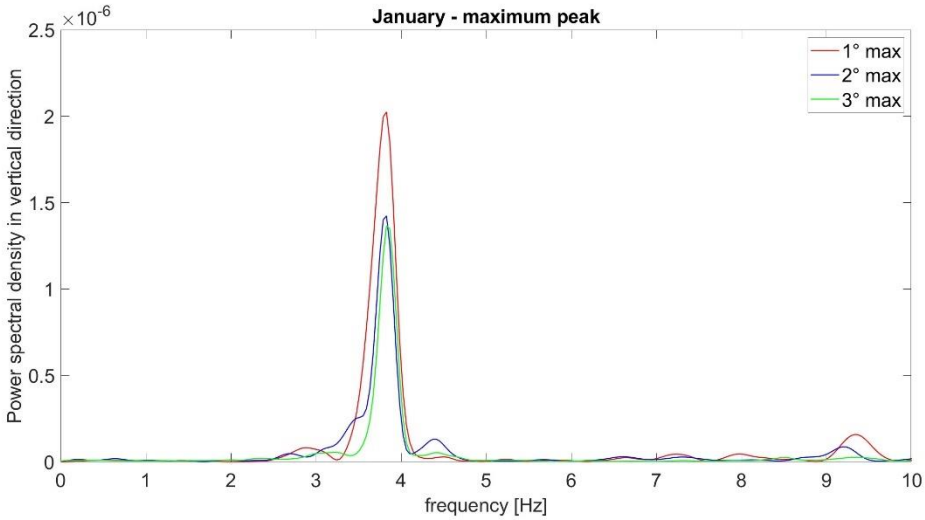


Figure 3-4: Results obtained from the 3 accelerograms with highest peak if PSD

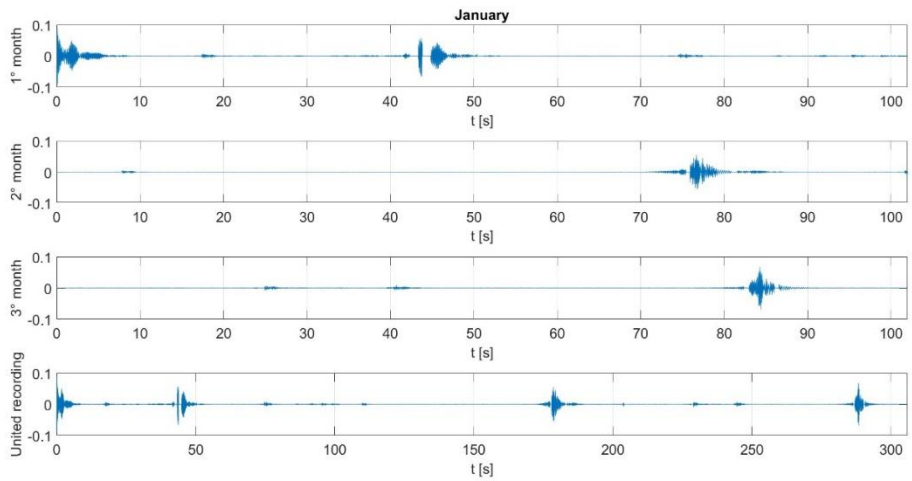


Figure 3-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.1.2 Longitudinal direction (y)

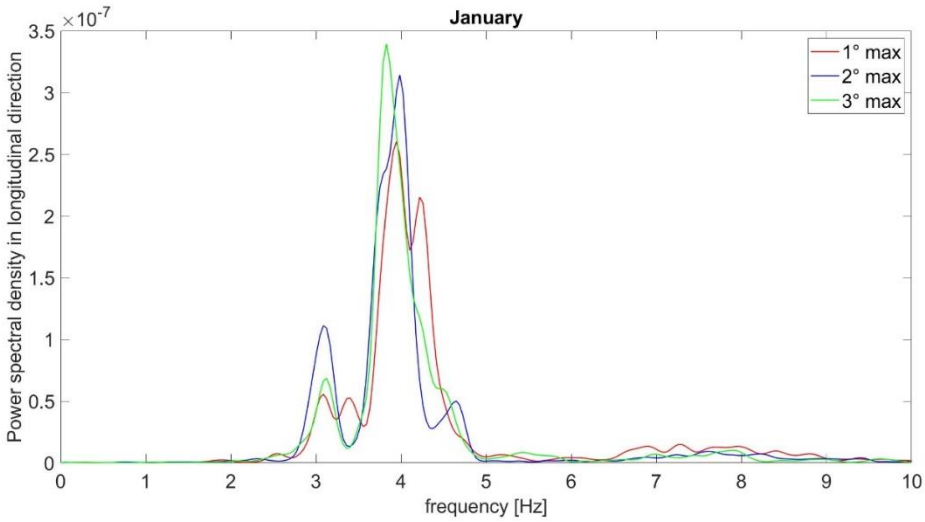


Figure 3-6: Results obtained from the 3 accelerograms with maximum SD in time domain

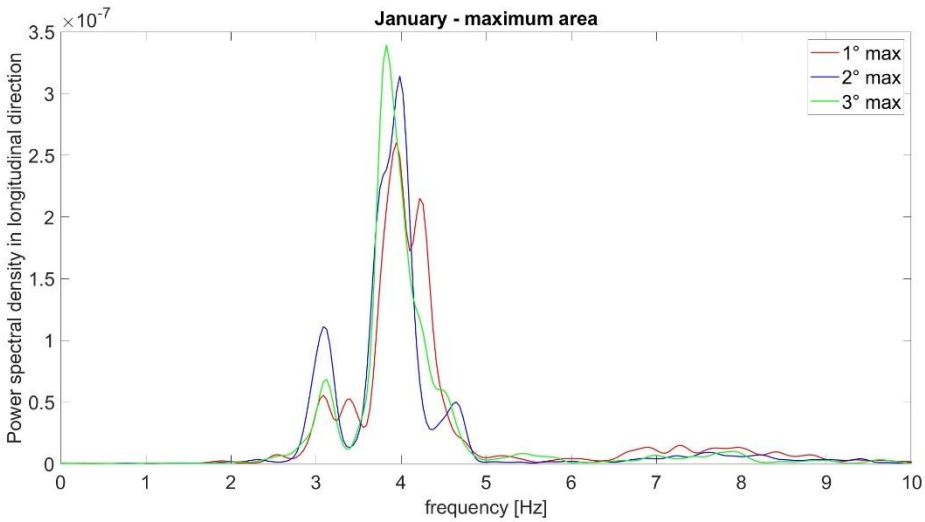


Figure 3-7: Results obtained from the 3 accelerograms with maximum area of PSD

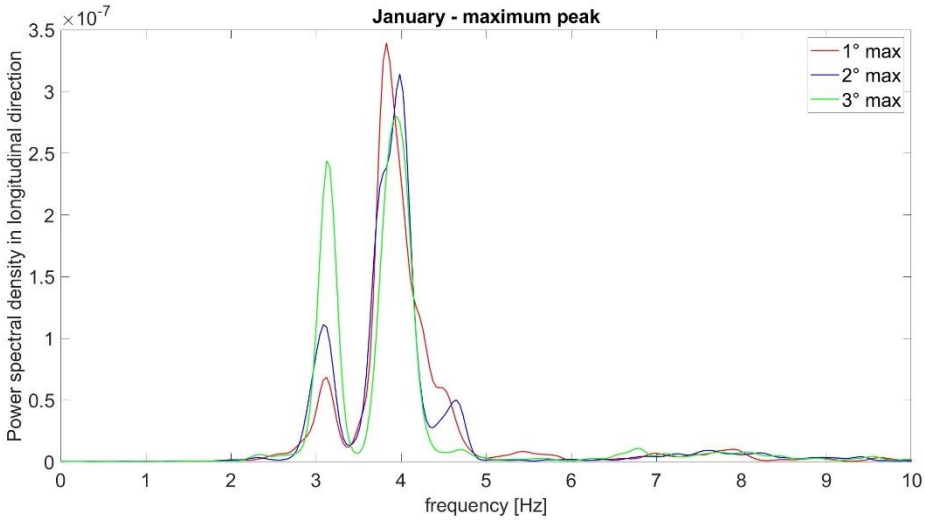


Figure 3-8: Results obtained from the 3 accelerograms with highest peak in PSD

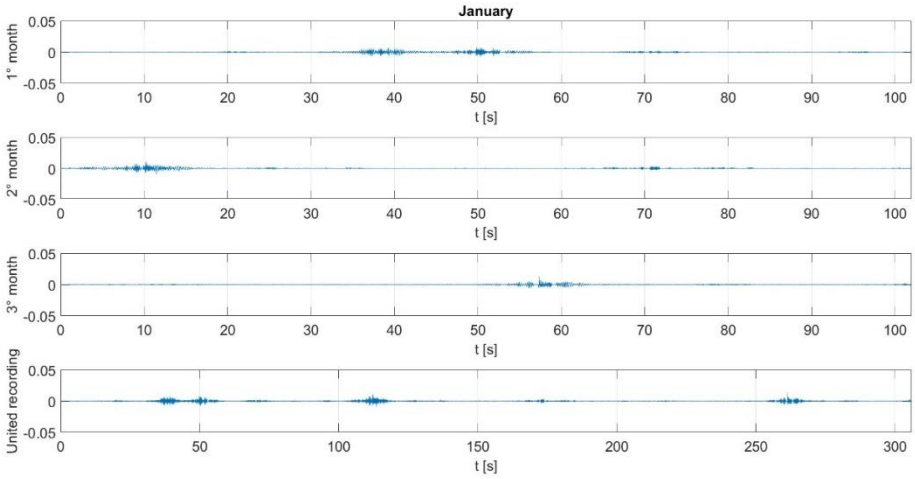


Figure 3-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

3.1.3 Transverse direction (z)

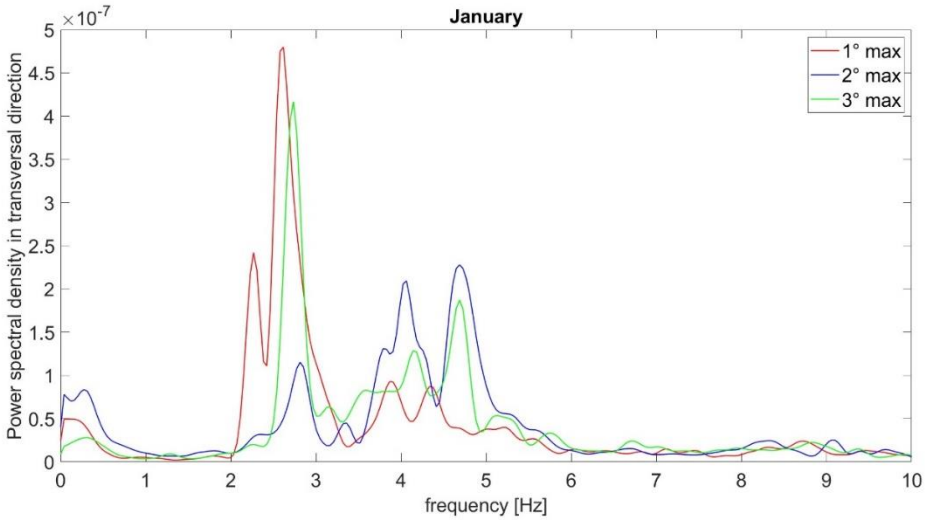


Figure 3-10: Results obtained from the 3 accelerograms with maximum SD in time domain

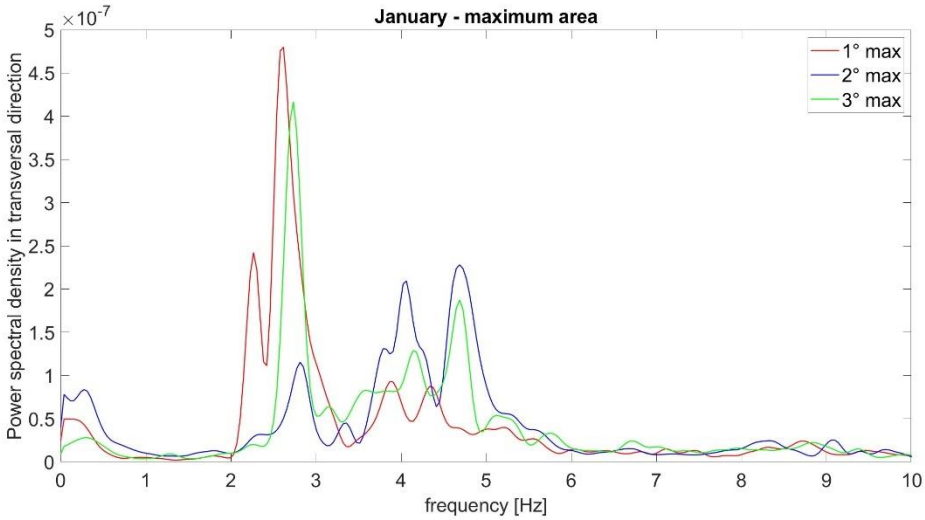


Figure 3-11: Results obtained from the 3 accelerograms with maximum area of PSD

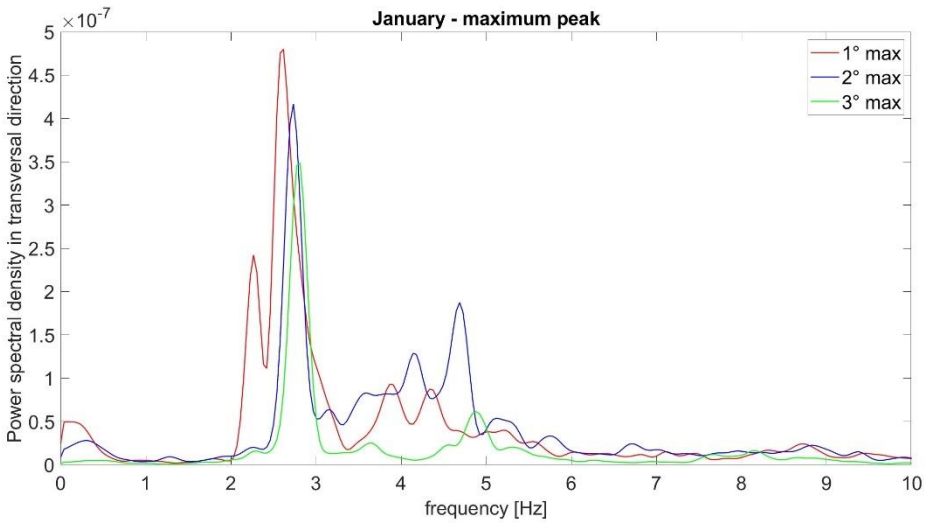


Figure 3-12: Results obtained from the 3 accelerograms with highest peak in PSD

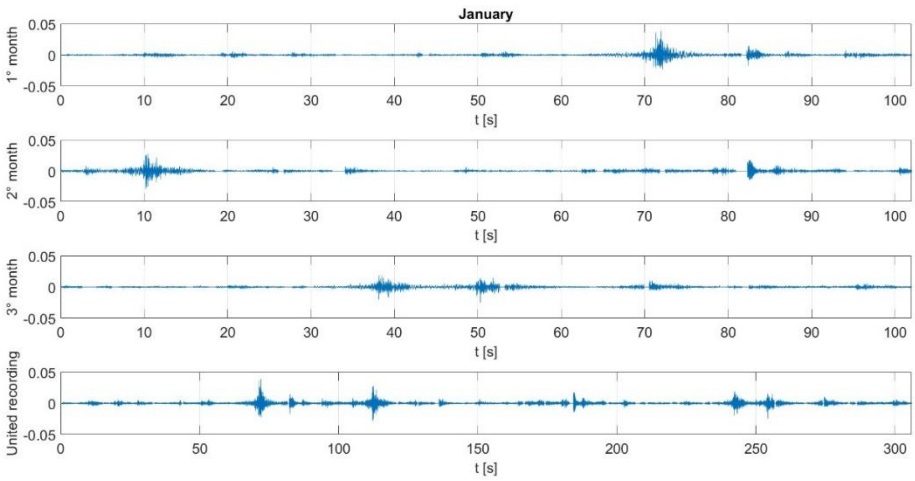


Figure 3-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

3.2 February

The results obtained for the February dataset are shown in the following tables.

Table 3-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-02-01_13-00-20	1.65E-03
	2°	31639_2023-02-20_13-00-20	1.25E-03
	3°	31639_2023-02-14_19-00-21	1.09E-03
Longitudinal direction (y)	1°	31639_2023-02-01_13-00-20	9.48E-04
	2°	31639_2023-02-06_13-00-19	5.53E-04
	3°	31639_2023-02-03_13-00-20	5.14E-04
Transverse direction (z)	1°	31639_2023-02-03_13-00-20	1.00E-03
	2°	31639_2023-02-06_13-00-19	9.65E-04
	3°	31639_2023-02-01_13-00-20	9.63E-04

Table 3-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-02-20_13-00-20	4.92E-06	31639_2023-02-01_13-00-20	5.13E-07
2	31639_2023-02-14_19-00-21	3.23E-06	31639_2023-02-20_13-00-20	3.18E-07
3	31639_2023-02-01_13-00-20	3.10E-06	31639_2023-02-14_19-00-21	2.48E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-02-01_13-00-20	1.03E-06	31639_2023-02-01_13-00-20	1.81E-07
2	31639_2023-02-14_19-00-21	4.11E-07	31639_2023-02-06_13-00-19	5.87E-08
3	31639_2023-02-06_13-00-19	3.08E-07	31639_2023-02-03_13-00-20	5.45E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-02-03_13-00-20	1.98E-06	31639_2023-02-03_13-00-20	2.09E-07
2	31639_2023-02-06_13-00-19	1.24E-06	31639_2023-02-01_13-00-20	1.83E-07
3	31639_2023-02-20_07-00-21	5.98E-07	31639_2023-02-06_13-00-19	1.79E-07

Table 3-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	E	E	E
2	B	C	B	D	-	D	D	D	A
3	C	A	C	E	D	E	A	-	D

3.2.1 Vertical direction (x)

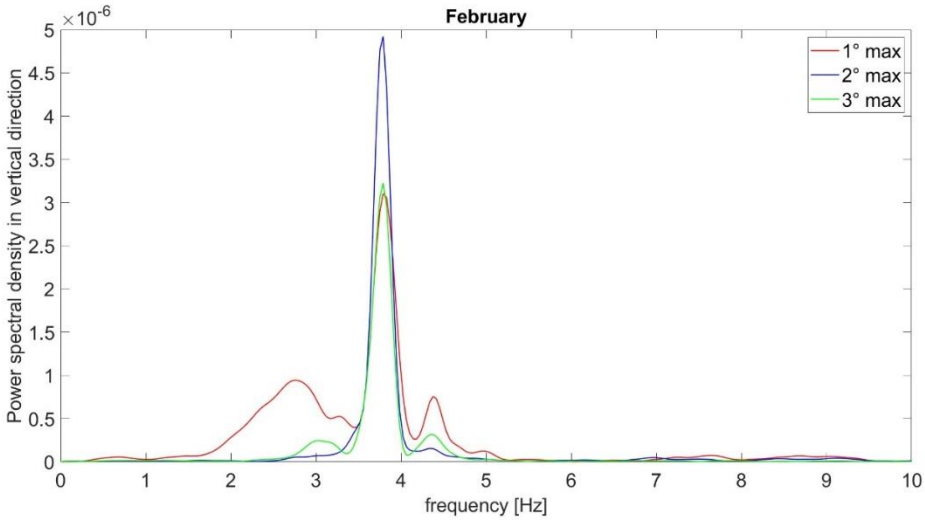


Figure 3-14: Results obtained from the 3 accelerograms with maximum SD in time domain

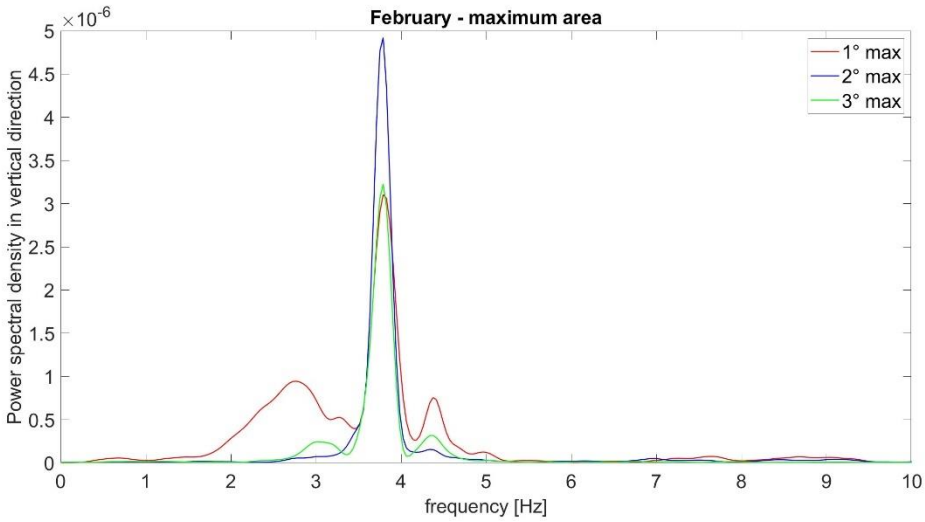


Figure 3-15: Results obtained from the 3 accelerograms with maximum area of PSD

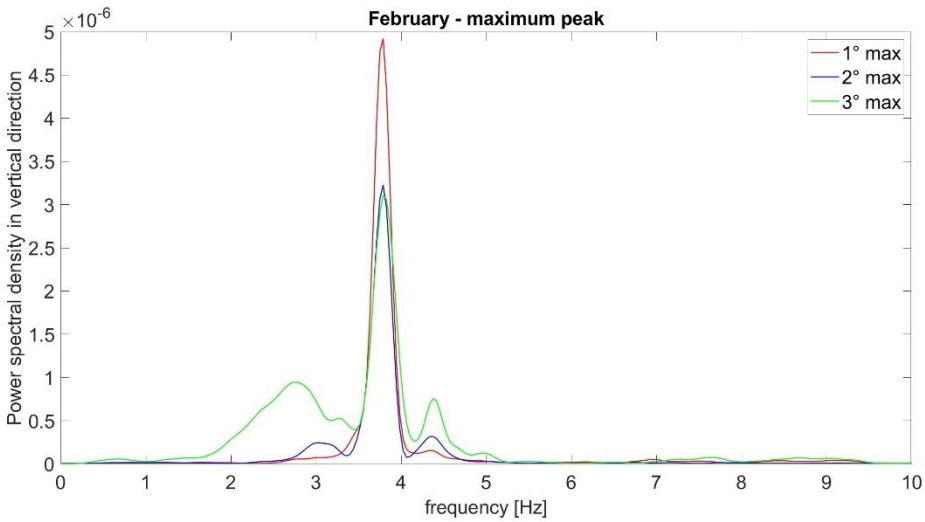


Figure 3-16: Results obtained from the 3 accelerograms with highest peak if PSD

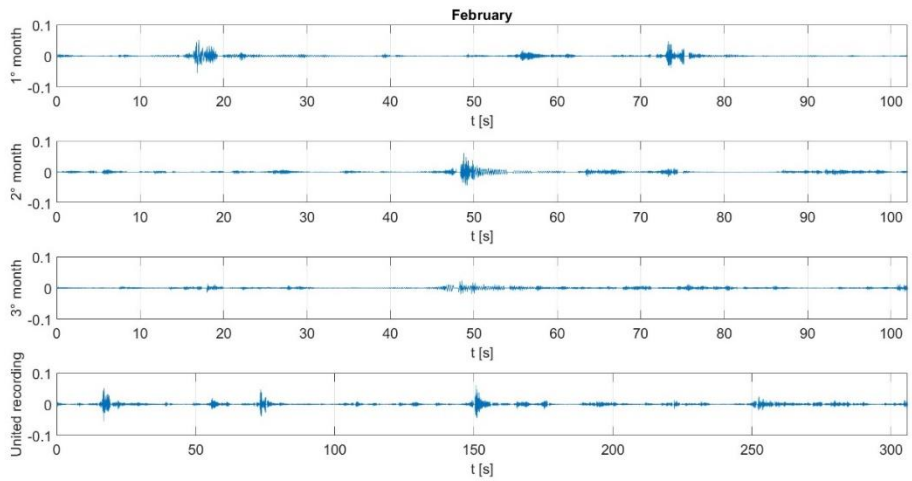


Figure 3-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.2.2 Longitudinal direction (y)

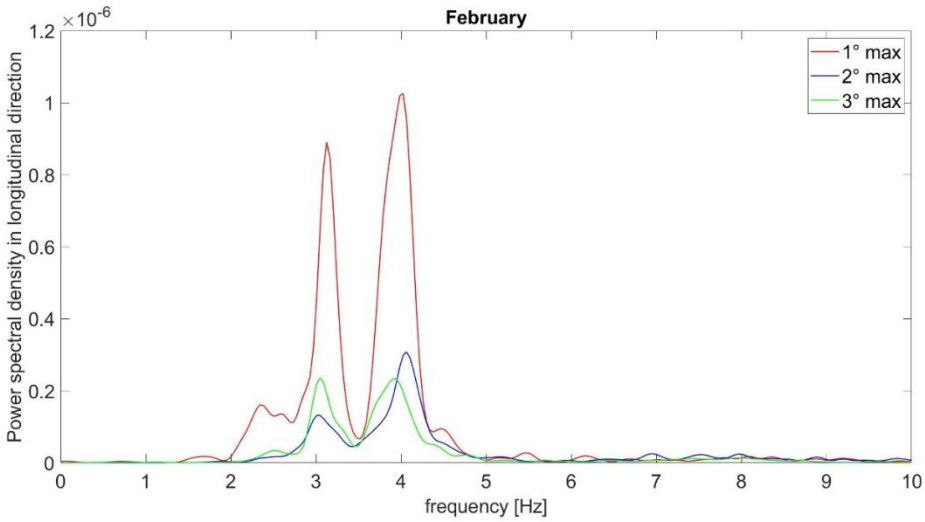


Figure 3-18: Results obtained from the 3 accelerograms with maximum SD in time domain

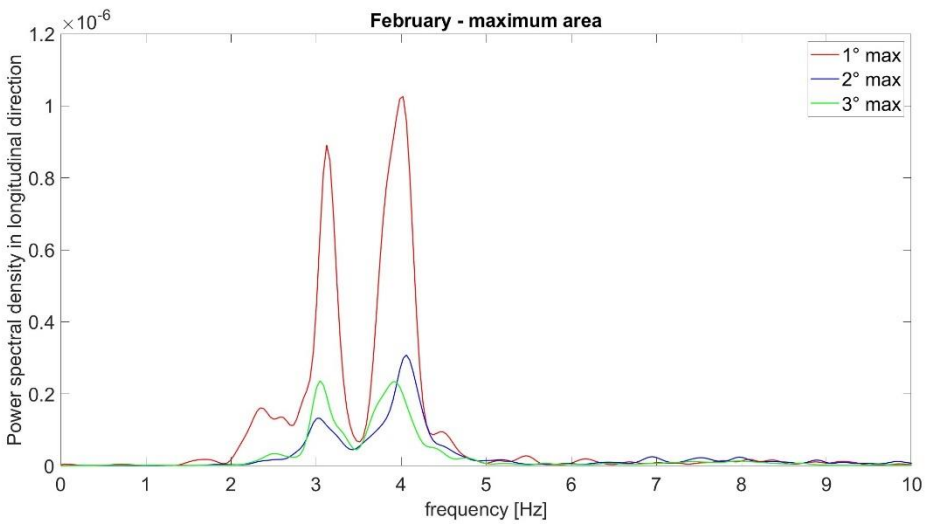


Figure 3-19: Results obtained from the 3 accelerograms with maximum area of PSD

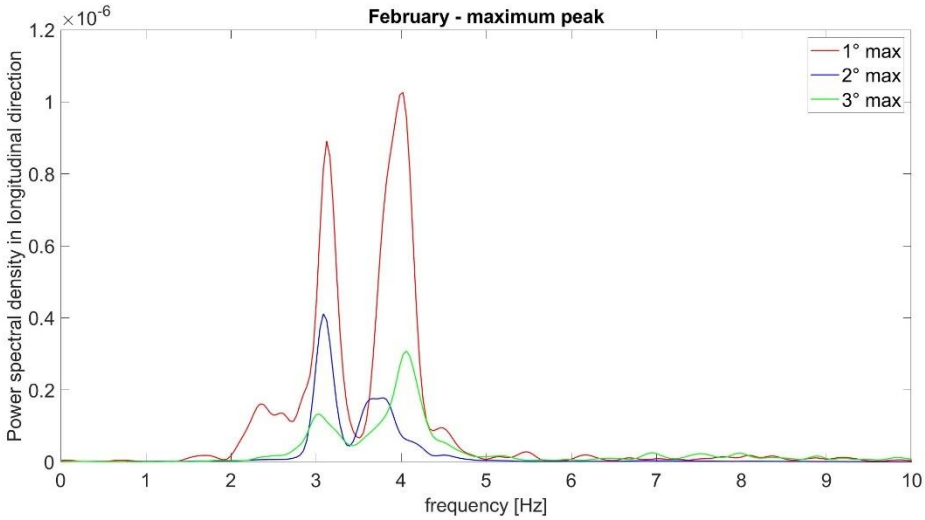


Figure 3-20: Results obtained from the 3 accelerograms with highest peak if PSD

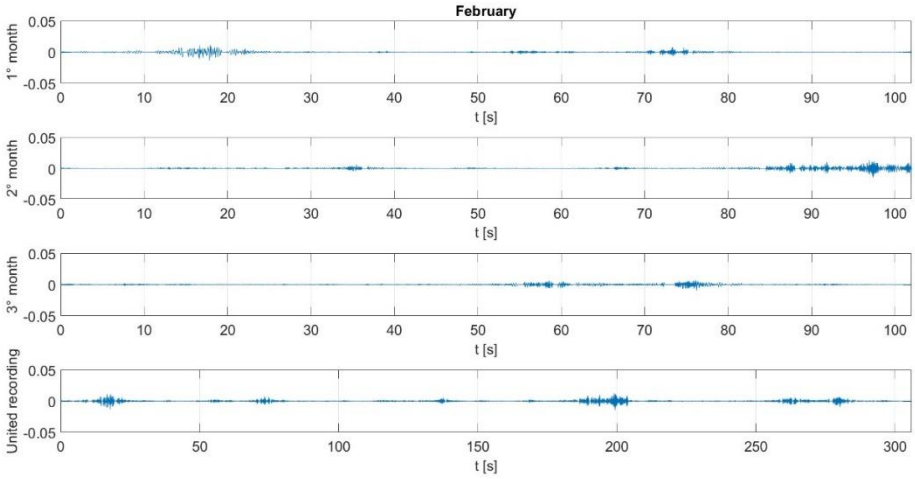


Figure 3-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

3.2.3 Transverse direction (z)

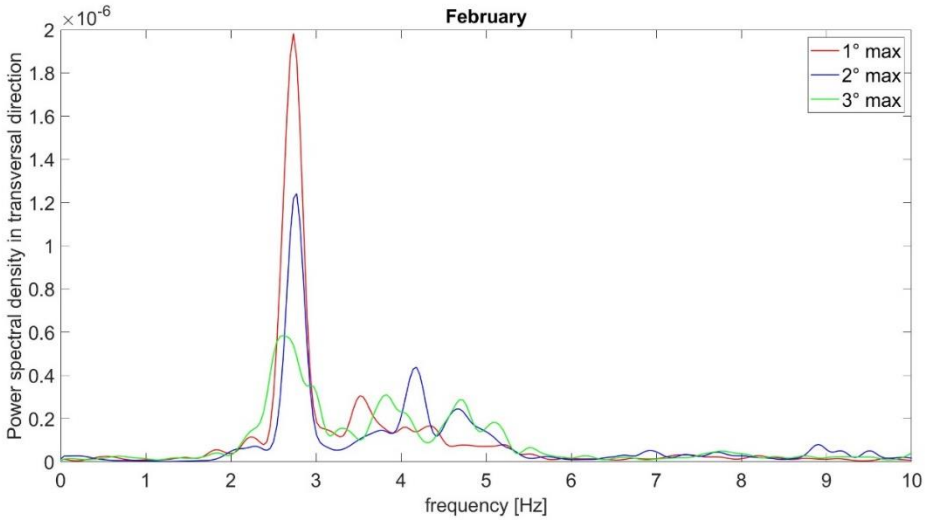


Figure 3-22: Results obtained from the 3 accelerograms with maximum SD in time domain

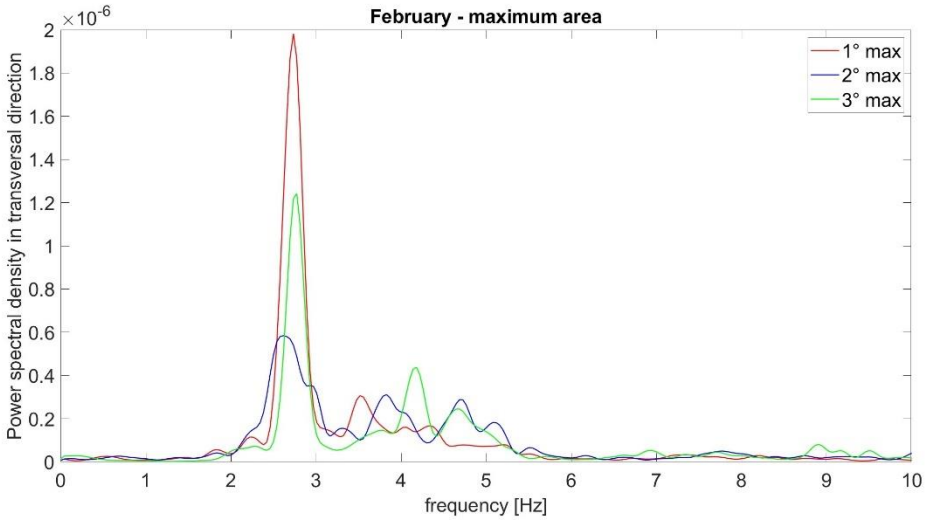


Figure 3-23: Results obtained from the 3 accelerograms with maximum area of PSD

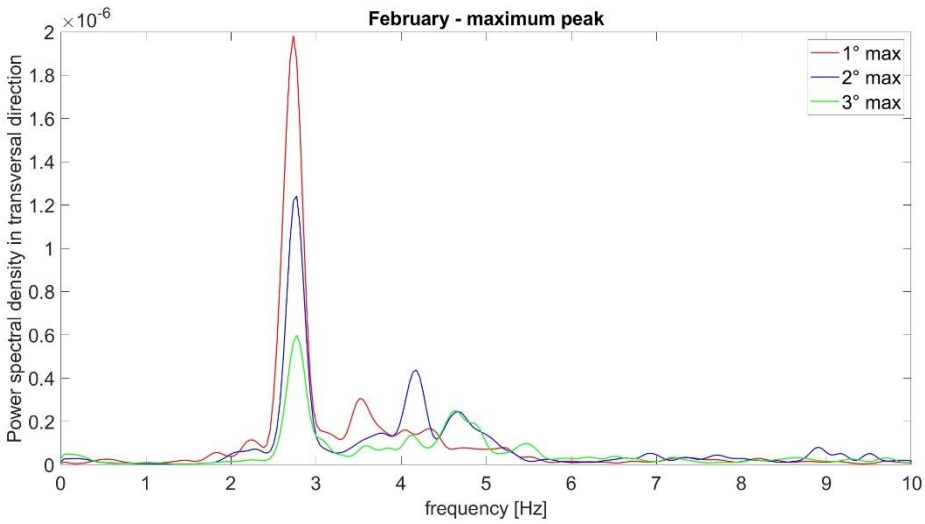


Figure 3-24: Results obtained from the 3 accelerograms with highest peak if PSD

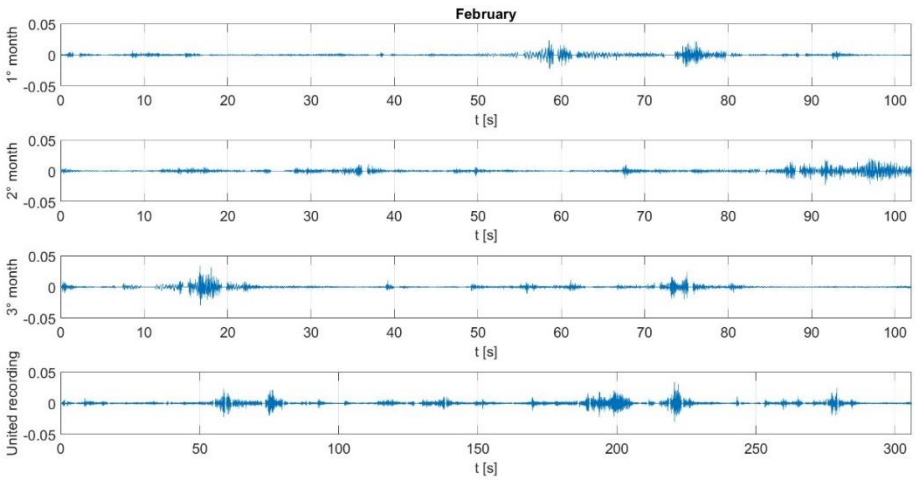


Figure 3-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

3.3 March

The results obtained for the March dataset are shown in the following tables.

Table 3-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-03-04_13-00-20	3.45E-03
	2°	31639_2023-03-16_13-00-19	1.80E-03
	3°	31639_2023-03-09_13-00-20	1.45E-03
Longitudinal direction (y)	1°	31639_2023-03-04_13-00-20	1.79E-03
	2°	31639_2023-03-16_13-00-19	1.25E-03
	3°	31639_2023-03-08_13-00-21	1.14E-03
Transverse direction (z)	1°	31639_2023-03-16_13-00-19	1.32E-03
	2°	31639_2023-03-15_07-00-21	1.22E-03
	3°	31639_2023-03-09_13-00-20	1.18E-03

Table 3-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-03-04_13-00-20	2.36E-05	31639_2023-03-04_13-00-20	2.55E-06
2	31639_2023-03-16_13-00-19	7.86E-06	31639_2023-03-16_13-00-19	6.48E-07
3	31639_2023-03-09_13-00-20	5.67E-06	31639_2023-03-09_13-00-20	4.22E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-03-04_13-00-20	6.13E-06	31639_2023-03-04_13-00-20	6.82E-07
2	31639_2023-03-08_13-00-21	3.36E-06	31639_2023-03-16_13-00-19	3.17E-07
3	31639_2023-03-16_13-00-19	2.65E-06	31639_2023-03-08_13-00-21	2.72E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-03-15_07-00-21	2.07E-06	31639_2023-03-16_13-00-19	3.49E-07
2	31639_2023-03-23_07-00-21	1.93E-06	31639_2023-03-15_07-00-21	3.12E-07
3	31639_2023-03-20_07-00-20	1.66E-06	31639_2023-03-04_13-00-20	2.70E-07

Table 3-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	B	E	B
2	B	B	B	B	D	B	E	-	E
3	C	C	C	D	B	D	-	-	-

3.3.1 Vertical direction (x)

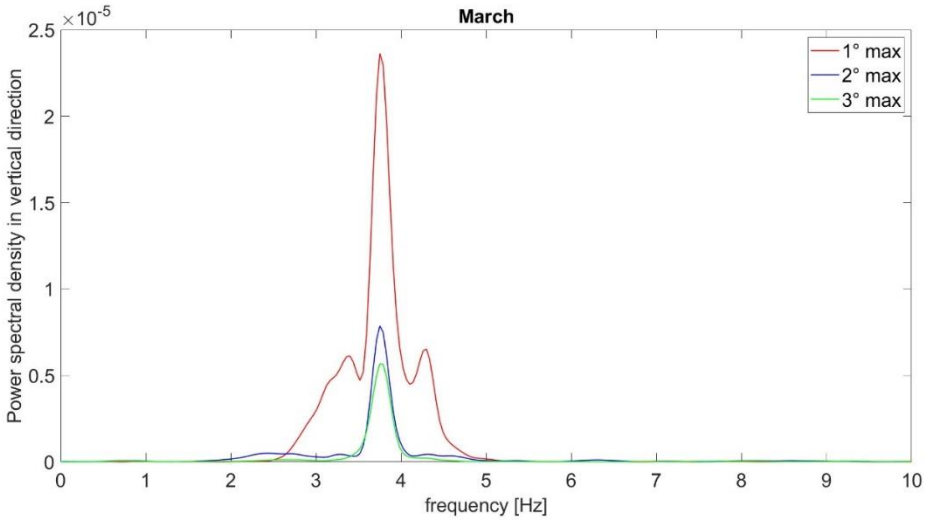


Figure 3-26: Results obtained from the 3 accelerograms with maximum SD in time domain

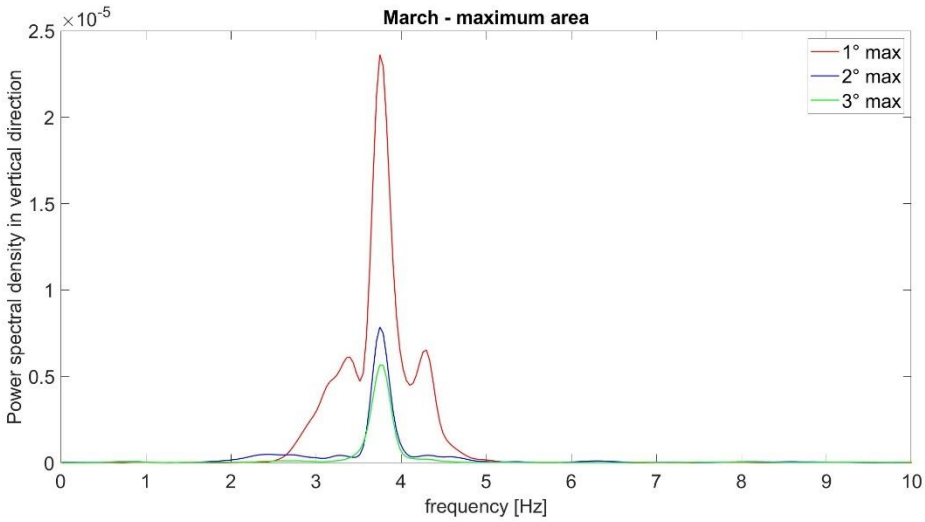


Figure 3-27: Results obtained from the 3 accelerograms with maximum area of PSD

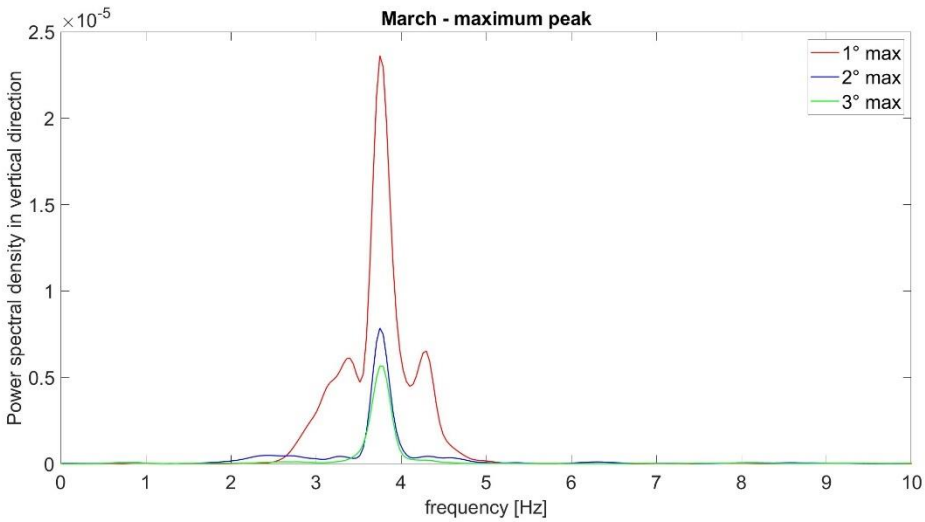


Figure 3-28: Results obtained from the 3 accelerograms with highest peak if PSD

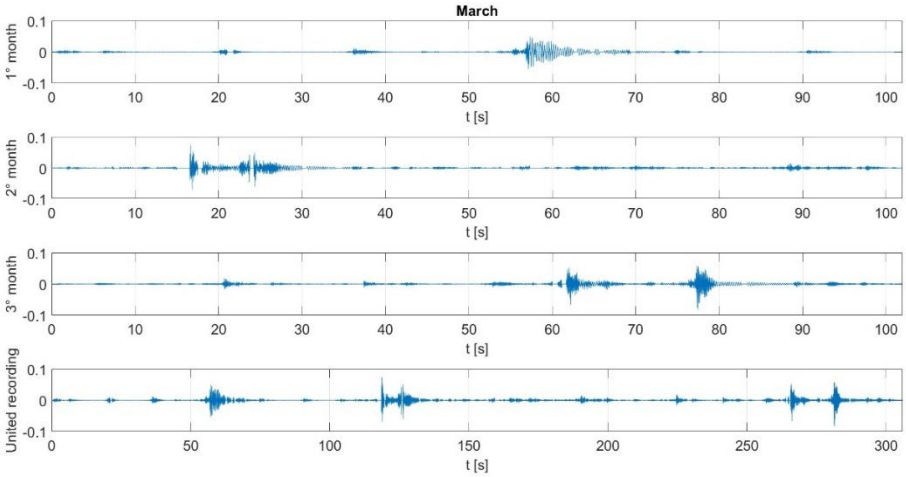


Figure 3-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.3.2 Longitudinal direction (y)

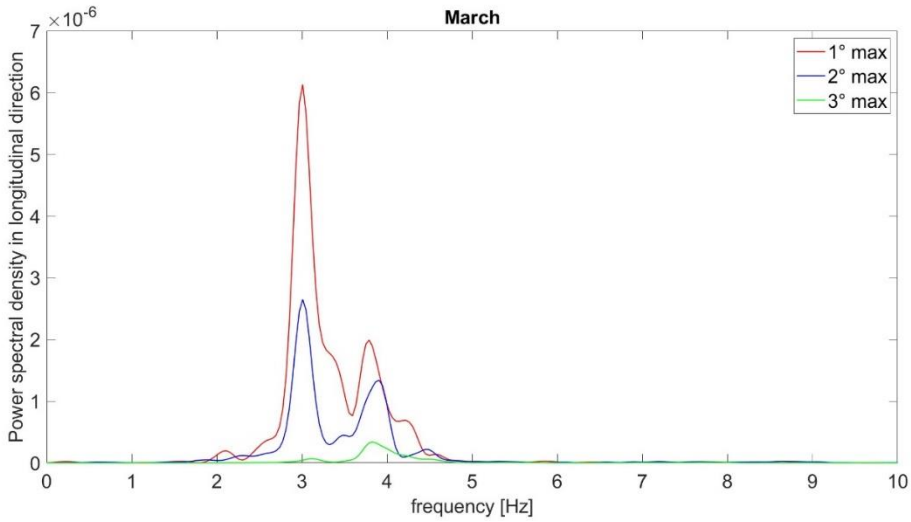


Figure 3-30: Results obtained from the 3 accelerograms with maximum SD in time domain

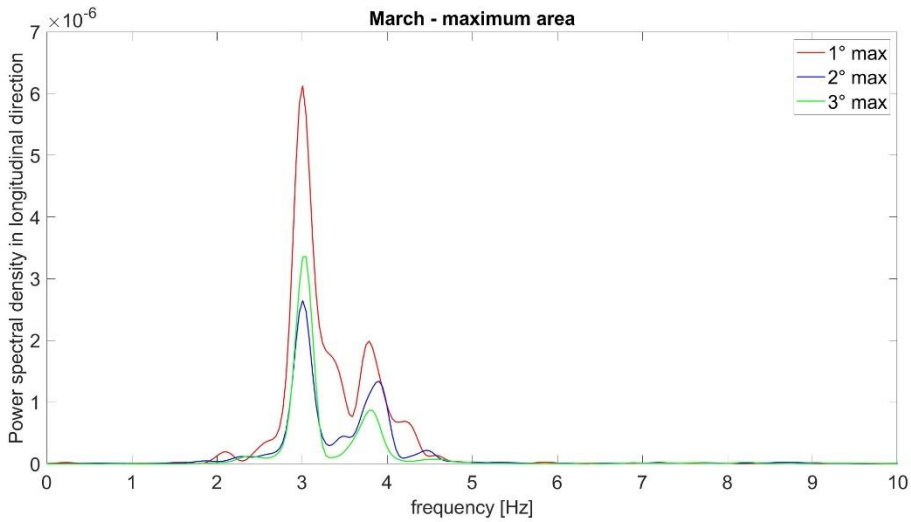


Figure 3-31: Results obtained from the 3 accelerograms with maximum area of PSD

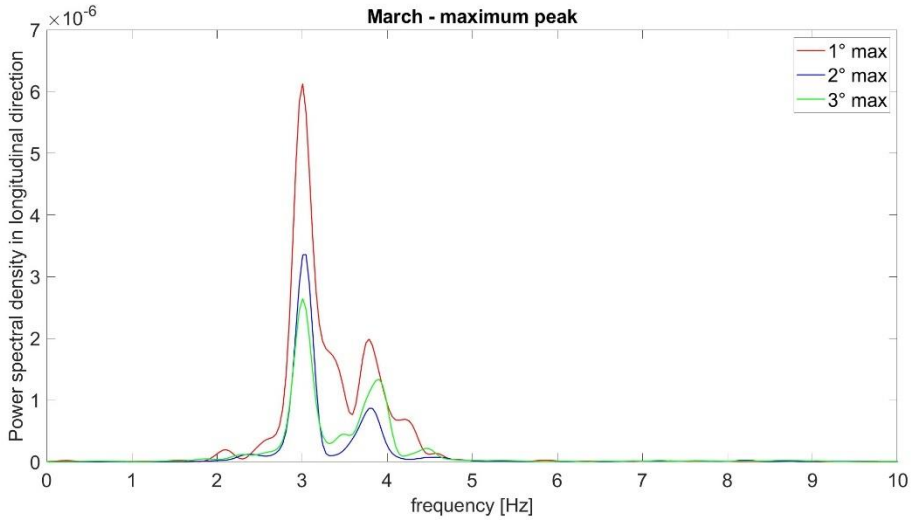


Figure 3-32: Results obtained from the 3 accelerograms with highest peak if PSD

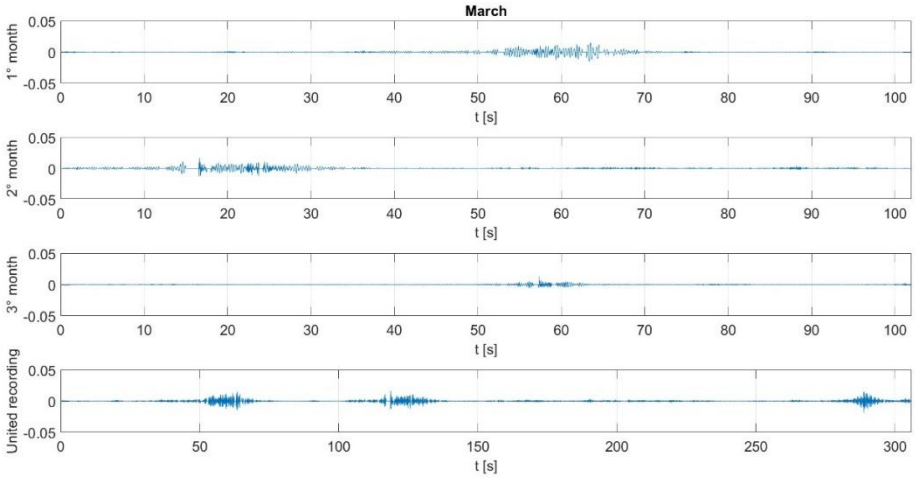


Figure 3-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

3.3.3 Transverse direction (z)

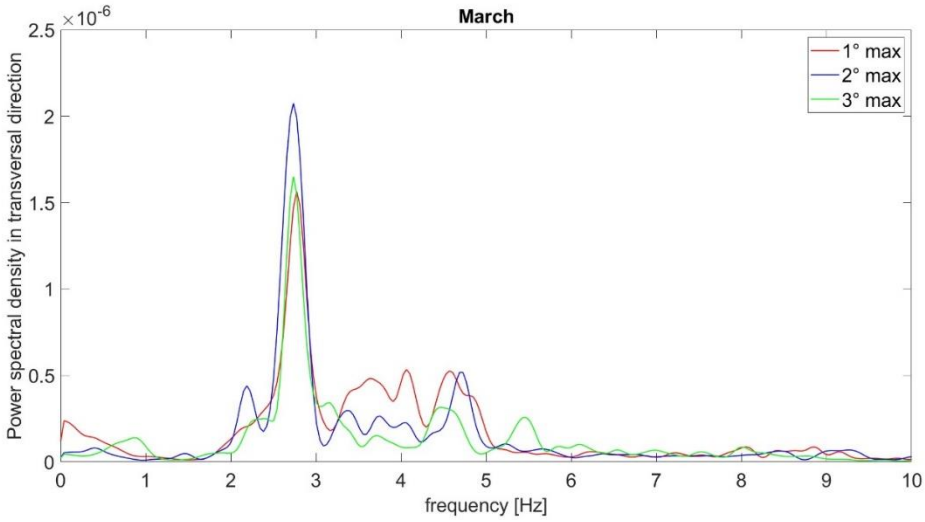


Figure 3-34: Results obtained from the 3 accelerograms with maximum SD in time domain

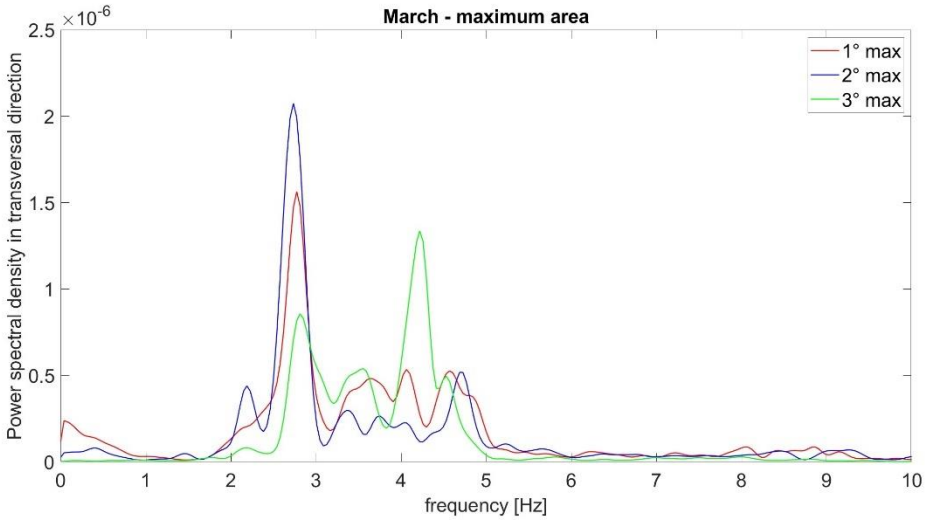


Figure 3-35: Results obtained from the 3 accelerograms with maximum area of PSD

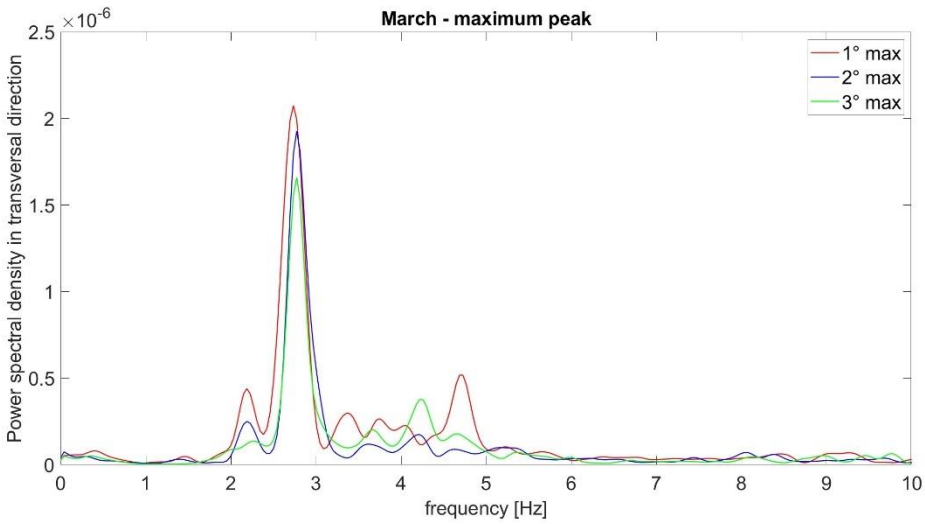


Figure 3-36: Results obtained from the 3 accelerograms with highest peak if PSD

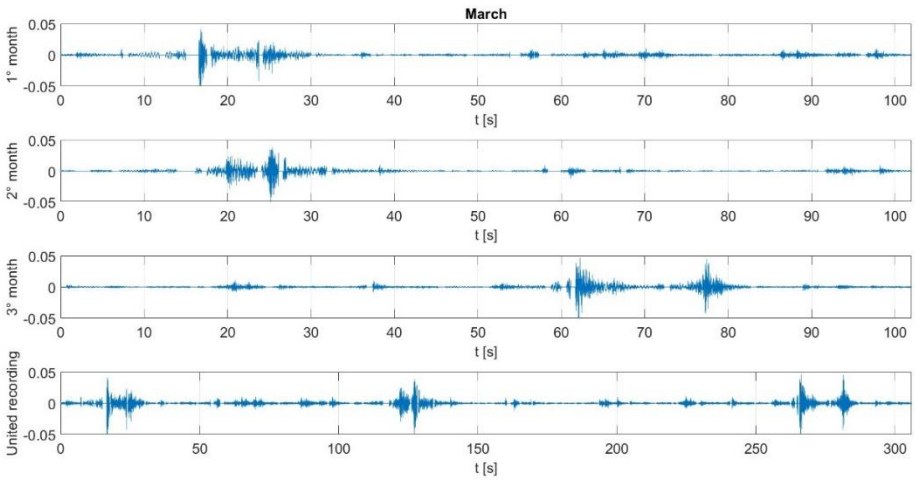


Figure 3-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

3.4 April

The results obtained for the April dataset are shown in the following tables.

Table 3-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-04-06_20-00-21	1.28E-03
	2°	31639_2023-04-18_14-00-20	1.20E-03
	3°	31639_2023-04-11_08-00-21	1.10E-03
Longitudinal direction (y)	1°	31639_2023-04-07_08-00-21	5.24E-04
	2°	31639_2023-04-14_08-00-20	5.20E-04
	3°	31639_2023-04-20_08-00-21	5.01E-04
Transverse direction (z)	1°	31639_2023-04-20_08-00-21	9.44E-04
	2°	31639_2023-04-14_08-00-20	9.19E-04
	3°	31639_2023-04-03_08-00-21	9.08E-04

Table 3-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-04-18_14-00-20	3.85E-06	31639_2023-04-06_20-00-21	3.00E-07
2	31639_2023-04-23_20-00-21	2.22E-06	31639_2023-04-18_14-00-20	2.85E-07
3	31639_2023-04-20_08-00-21	2.11E-06	31639_2023-04-11_08-00-21	2.73E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-04-18_14-00-20	3.66E-07	31639_2023-04-07_08-00-21	5.45E-08
2	31639_2023-04-14_08-00-20	3.36E-07	31639_2023-04-14_08-00-20	5.42E-08
3	31639_2023-04-23_20-00-21	3.33E-07	31639_2023-04-20_08-00-21	5.26E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-04-20_08-00-21	1.19E-06	31639_2023-04-14_08-00-20	1.81E-07
2	31639_2023-04-07_08-00-21	1.04E-06	31639_2023-04-20_08-00-21	1.76E-07
3	31639_2023-04-03_08-00-21	9.38E-07	31639_2023-04-03_08-00-21	1.68E-07

Table 3-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	D	-	D	F	F	E
2	B	-	B	E	E	E	E	-	F
3	C	-	C	F	-	F	G	G	G

3.4.1 Vertical direction (x)

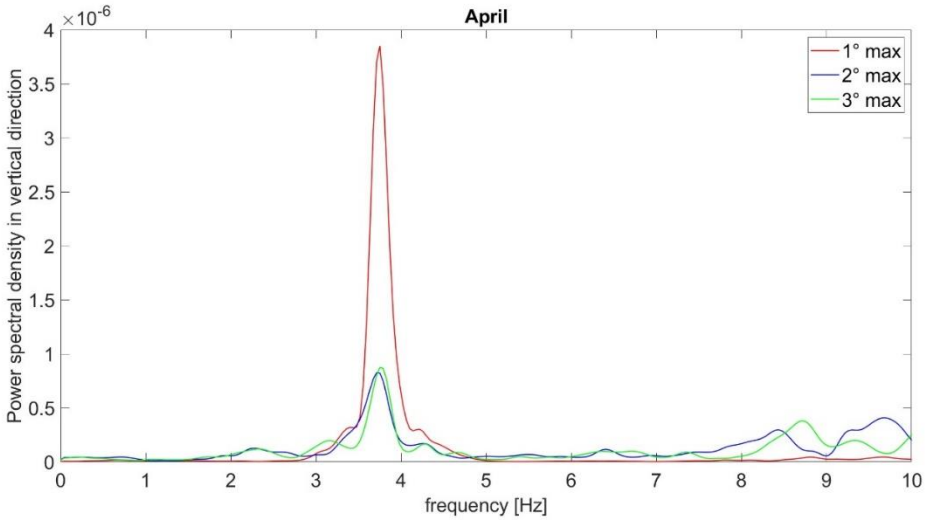


Figure 3-38: Results obtained from the 3 accelerograms with maximum SD in time domain

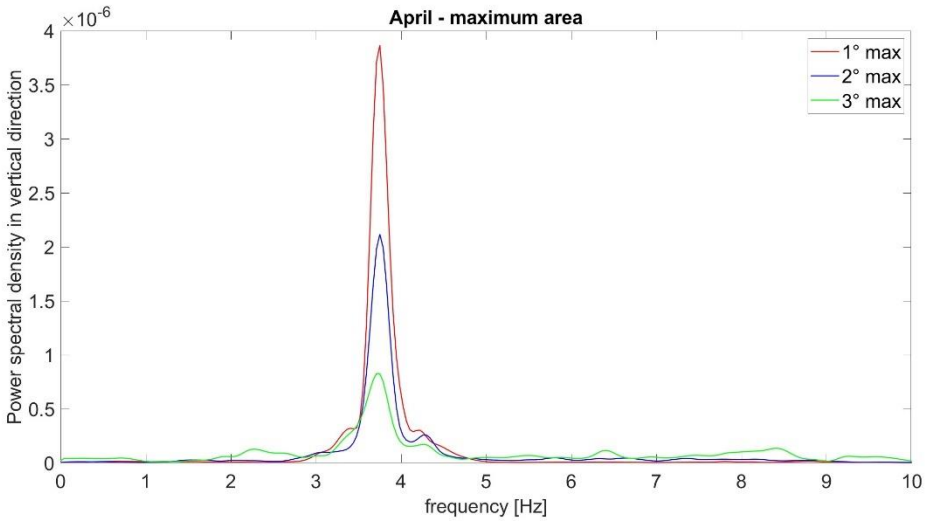


Figure 3-39: Results obtained from the 3 accelerograms with maximum area of PSD

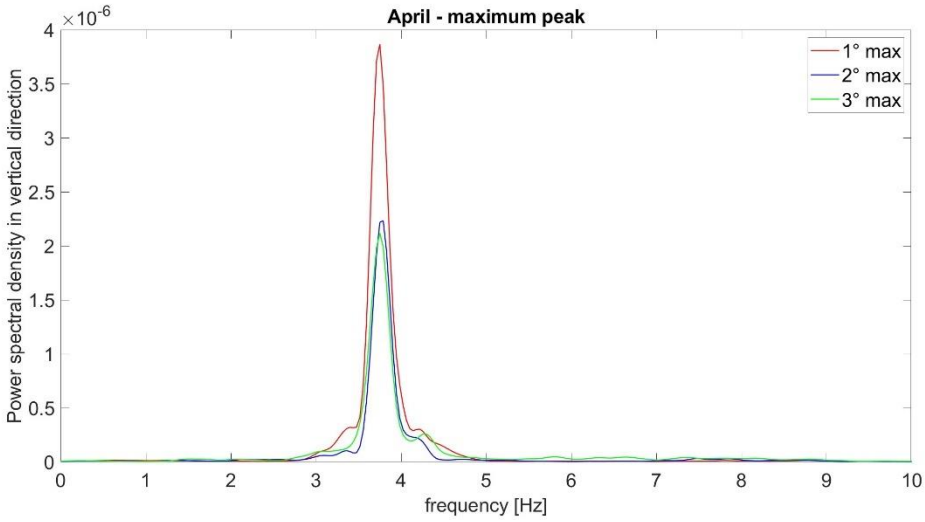


Figure 3-40: Results obtained from the 3 accelerograms with highest peak if PSD

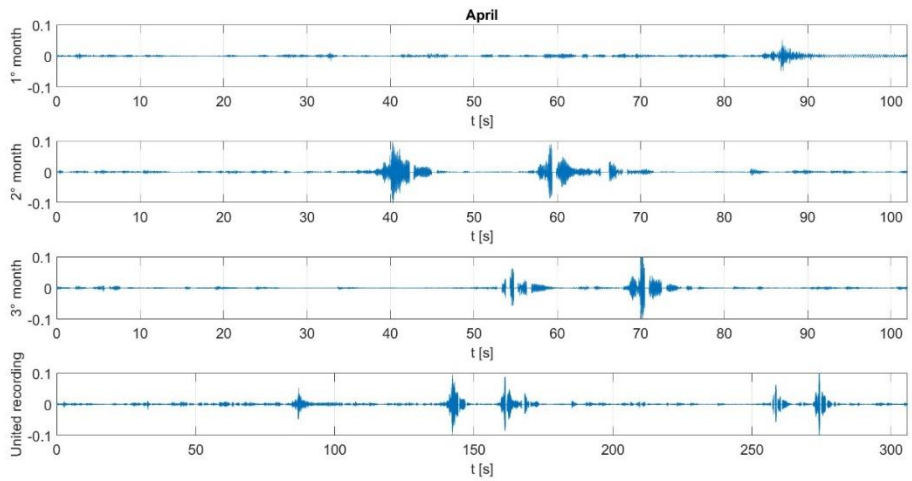


Figure 3-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.4.2 Longitudinal direction (y)

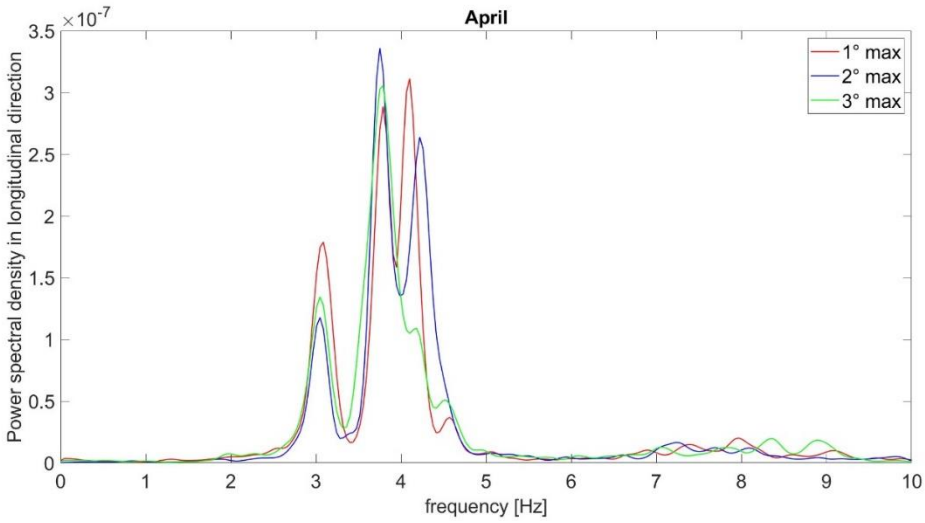


Figure 3-42: Results obtained from the 3 accelerograms with maximum SD in time domain

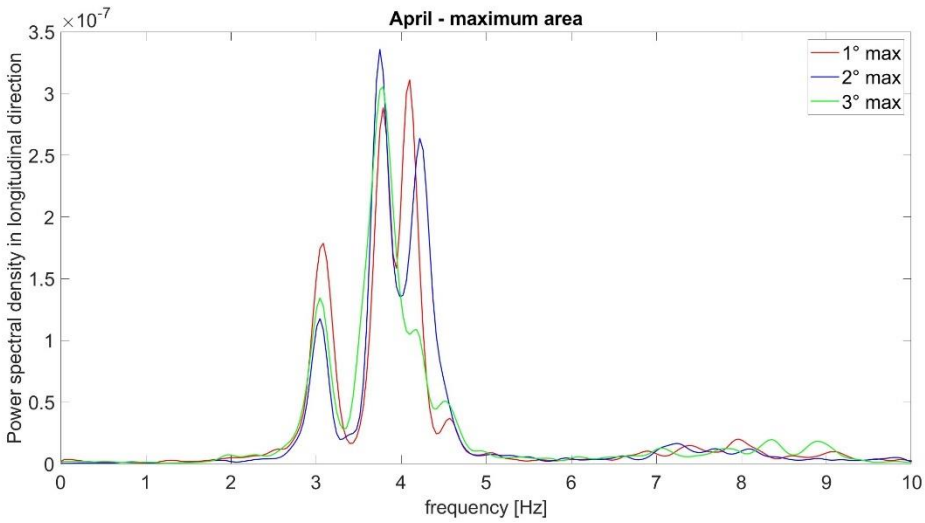


Figure 3-43: Results obtained from the 3 accelerograms with maximum area of PSD

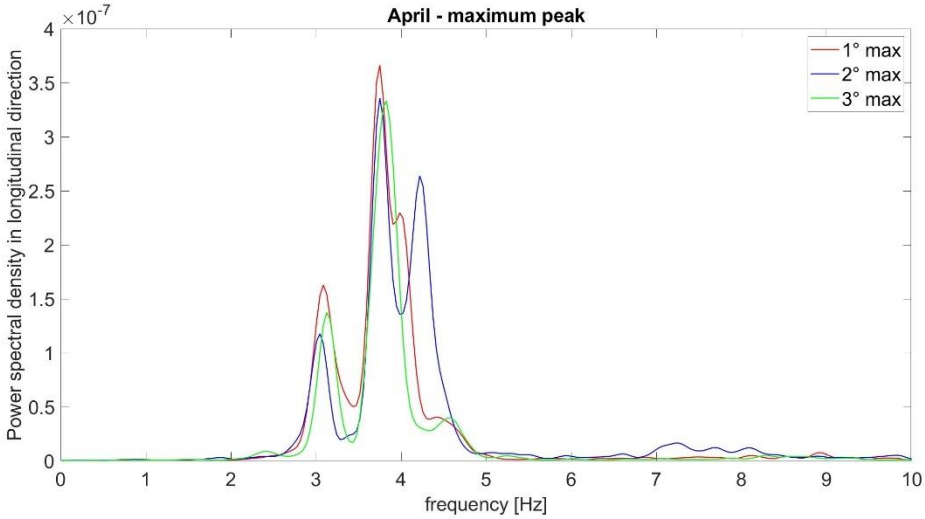


Figure 3-44: Results obtained from the 3 accelerograms with highest peak if PSD

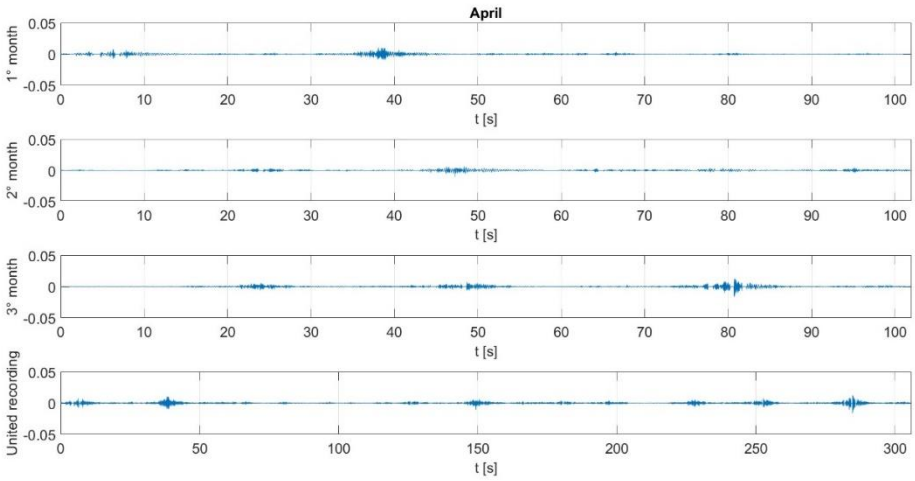


Figure 3-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

3.4.3 Transverse direction (z)

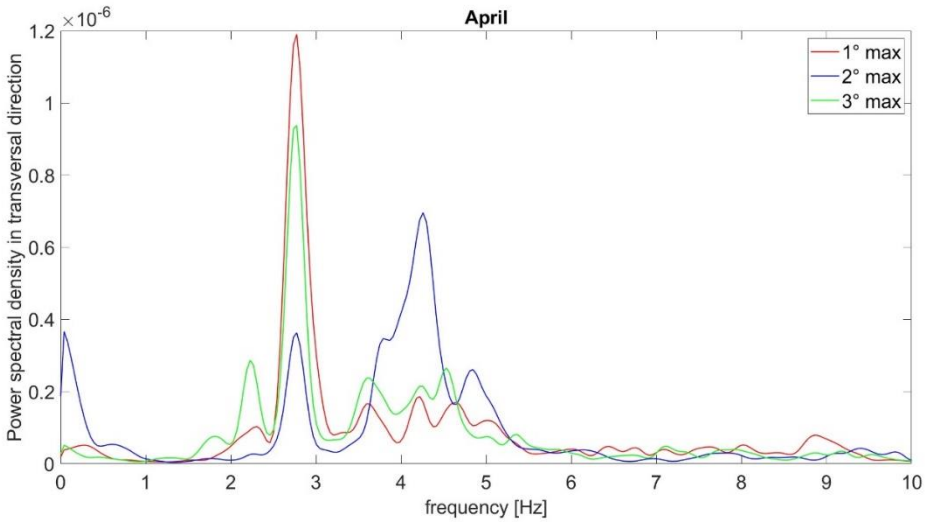


Figure 3-46: Results obtained from the 3 accelerograms with maximum SD in time domain

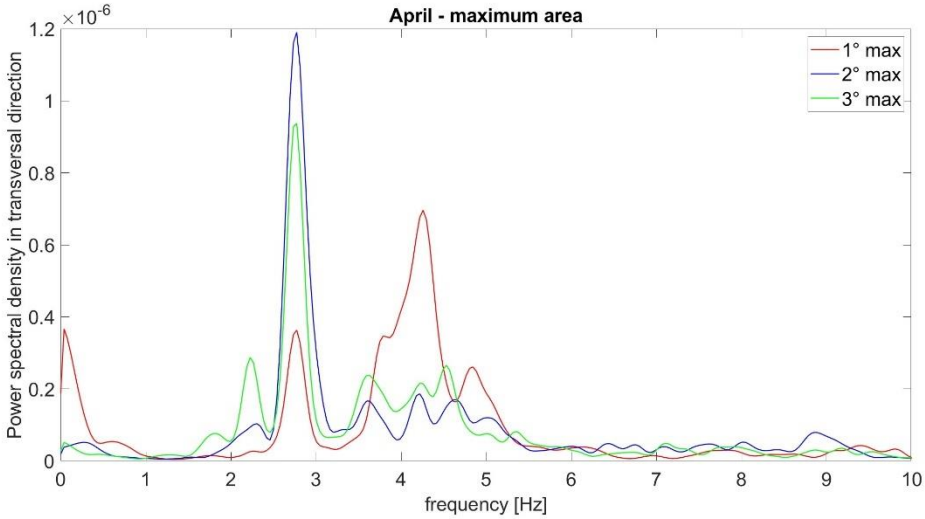


Figure 3-47: Results obtained from the 3 accelerograms with maximum area of PSD

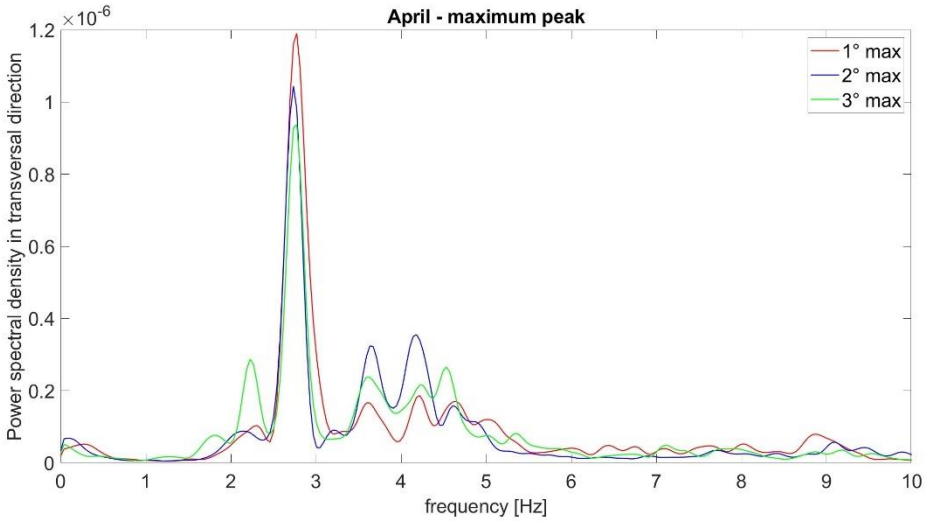


Figure 3-48: Results obtained from the 3 accelerograms with highest peak if PSD

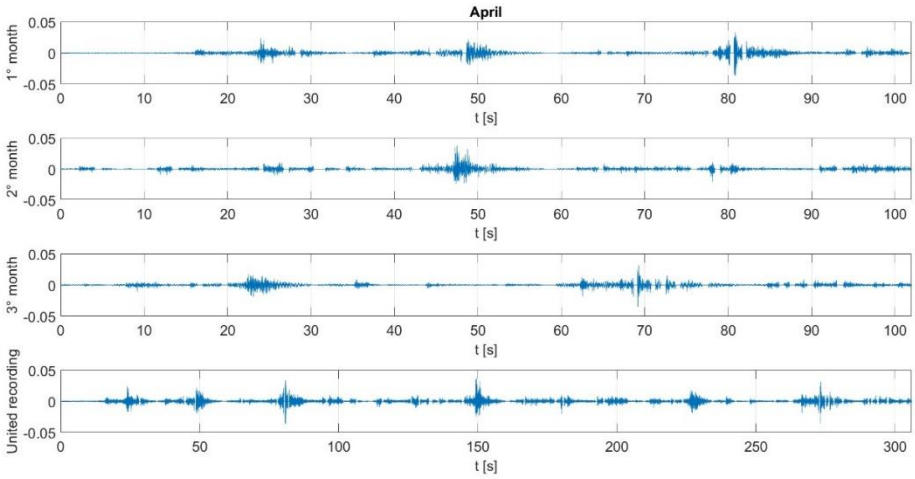


Figure 3-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

3.5 May

The results obtained for the May dataset are shown in the following tables.

Table 3-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-05-23_14-00-20	1.77E-03
	2°	31639_2023-05-24_08-00-21	1.30E-03
	3°	31639_2023-05-11_14-00-20	1.26E-03
Longitudinal direction (y)	1°	31639_2023-05-19_14-00-20	1.38E-03
	2°	31639_2023-05-23_14-00-20	8.51E-04
	3°	31639_2023-05-04_14-00-20	6.57E-04
Transverse direction (z)	1°	31639_2023-05-23_14-00-20	1.24E-03
	2°	31639_2023-05-04_14-00-20	8.68E-04
	3°	31639_2023-05-11_14-00-20	8.22E-04

Table 3-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-05-23_14-00-20	4.97E-06	31639_2023-05-23_14-00-20	6.63E-07
2	31639_2023-05-11_14-00-20	4.50E-06	31639_2023-05-24_08-00-21	3.98E-07
3	31639_2023-05-01_20-00-20	3.58E-06	31639_2023-05-11_14-00-20	3.35E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-05-19_14-00-20	2.42E-06	31639_2023-05-23_14-00-20	1.47E-07
2	31639_2023-05-11_14-00-20	7.89E-07	31639_2023-05-19_14-00-20	1.40E-07
3	31639_2023-05-23_14-00-20	6.43E-07	31639_2023-05-04_14-00-20	8.77E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-05-23_14-00-20	1.80E-06	31639_2023-05-23_14-00-20	3.26E-07
2	31639_2023-05-22_08-00-21	6.58E-07	31639_2023-05-04_14-00-20	1.50E-07
3	31639_2023-05-19_14-00-20	6.36E-07	31639_2023-05-11_14-00-20	1.42E-07

Table 3-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	E	A	A	A
2	B	C	B	E	-	D	F	-	F
3	C	-	C	F	E	F	G	-	G

3.5.1 Vertical direction (x)

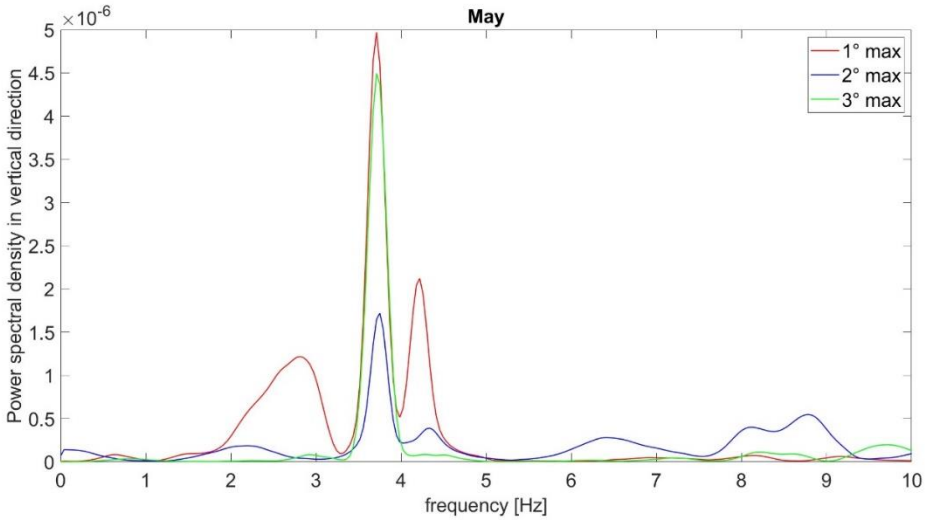


Figure 3-50: Results obtained from the 3 accelerograms with maximum SD in time domain

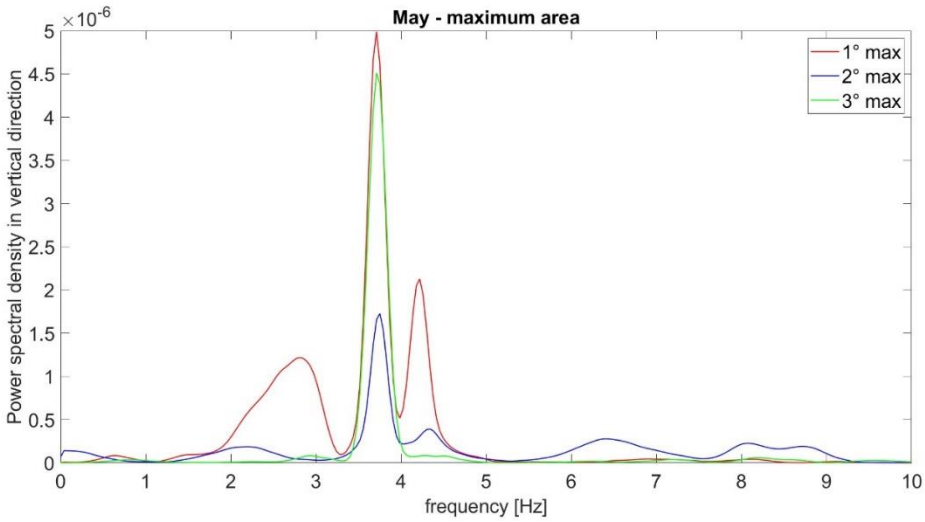


Figure 3-51: Results obtained from the 3 accelerograms with maximum area of PSD

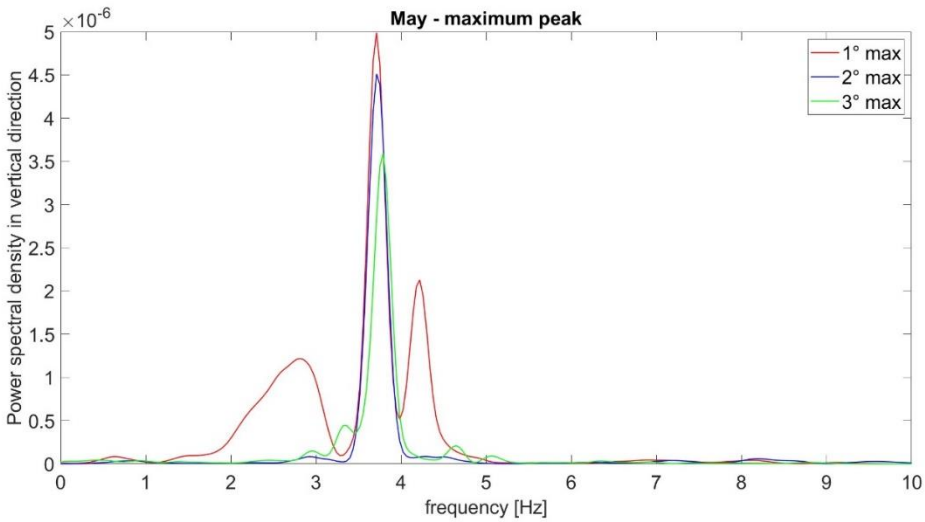


Figure 3-52: Results obtained from the 3 accelerograms with highest peak if PSD

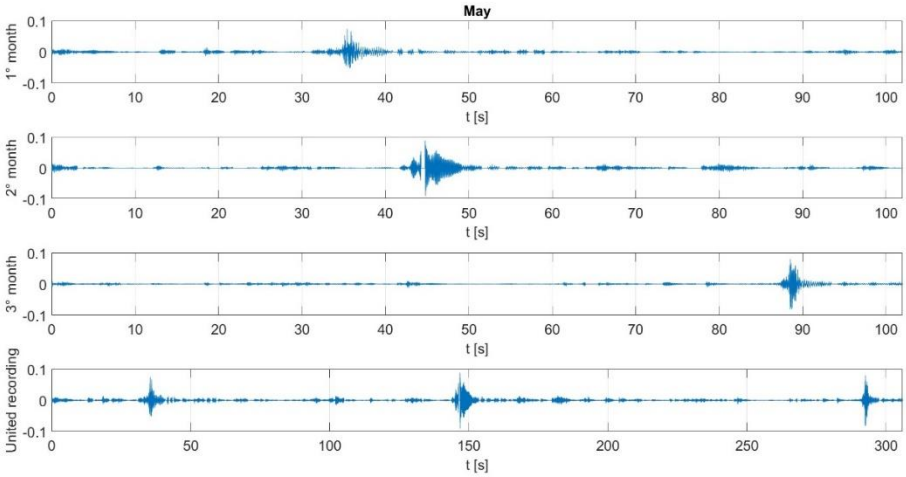


Figure 3-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.5.2 Longitudinal direction (y)

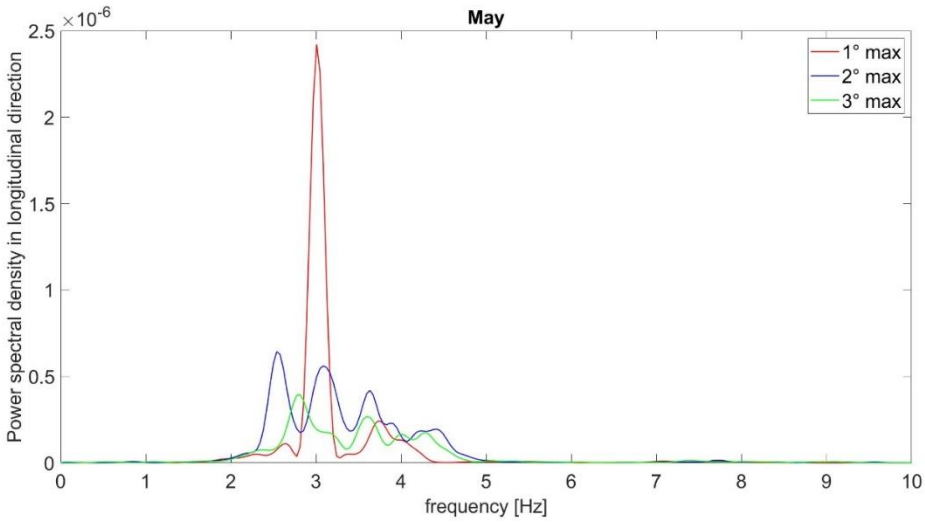


Figure 3-54: Results obtained from the 3 accelerograms with maximum SD in time domain

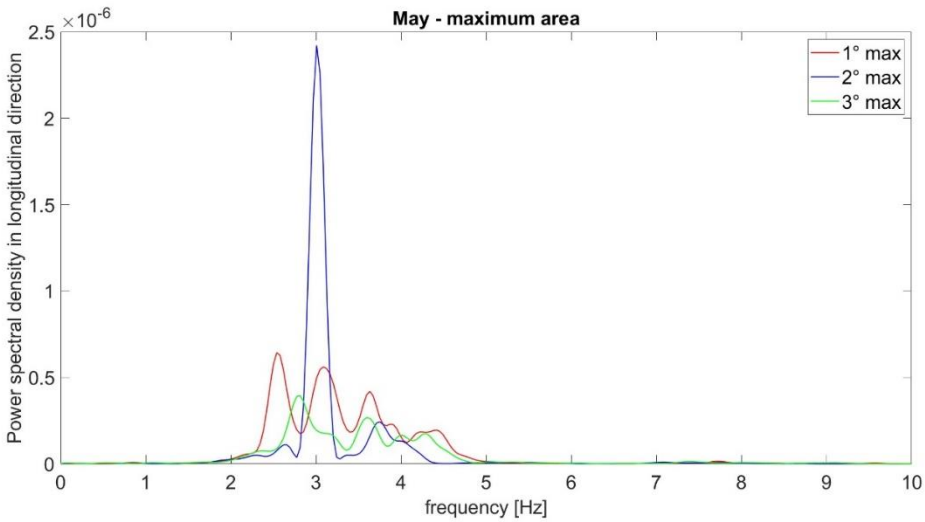


Figure 3-55: Results obtained from the 3 accelerograms with maximum area of PSD

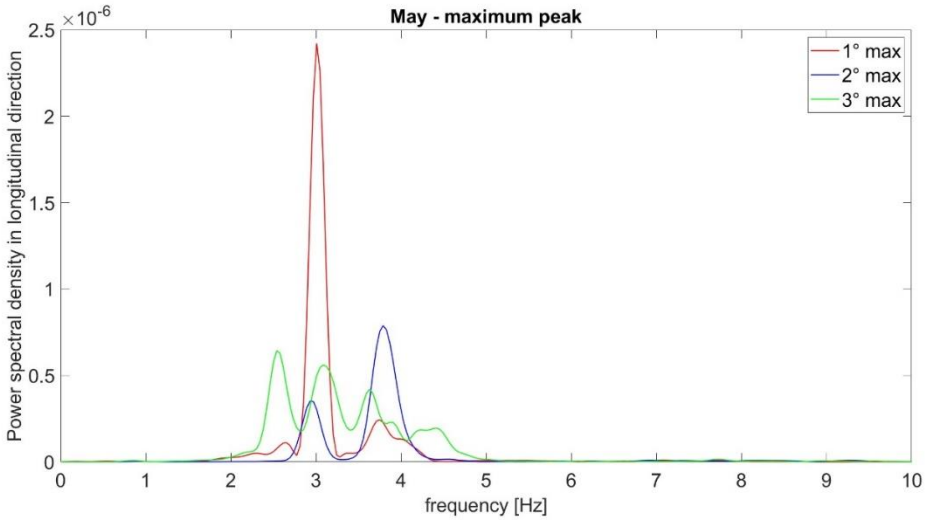


Figure 3-56: Results obtained from the 3 accelerograms with highest peak if PSD

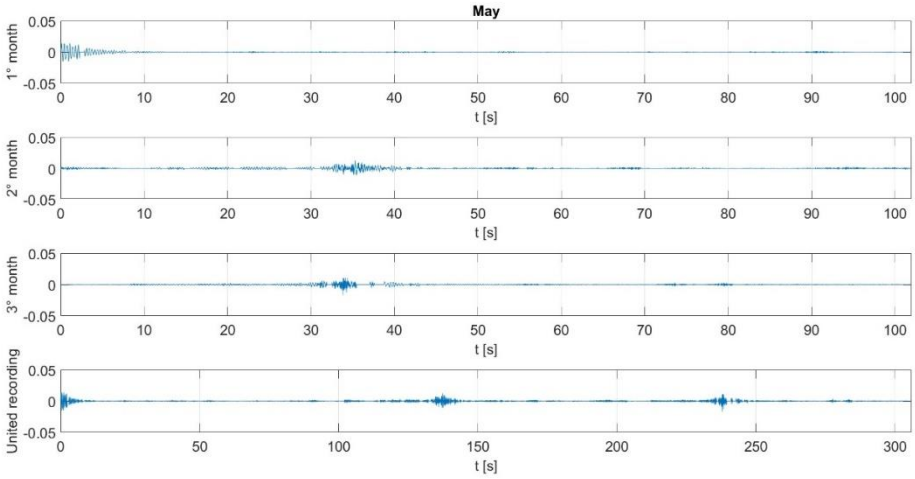


Figure 3-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

3.5.3 Transverse direction (z)

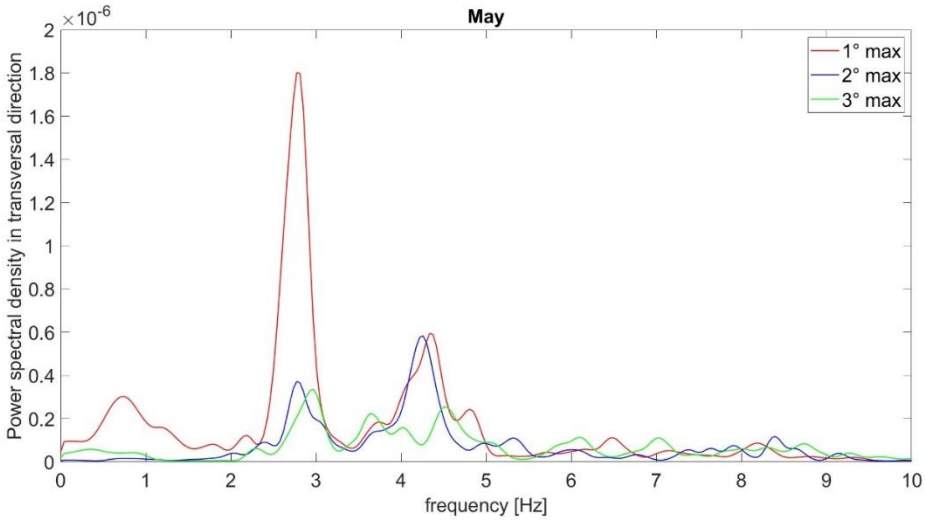


Figure 3-58: Results obtained from the 3 accelerograms with maximum SD in time domain

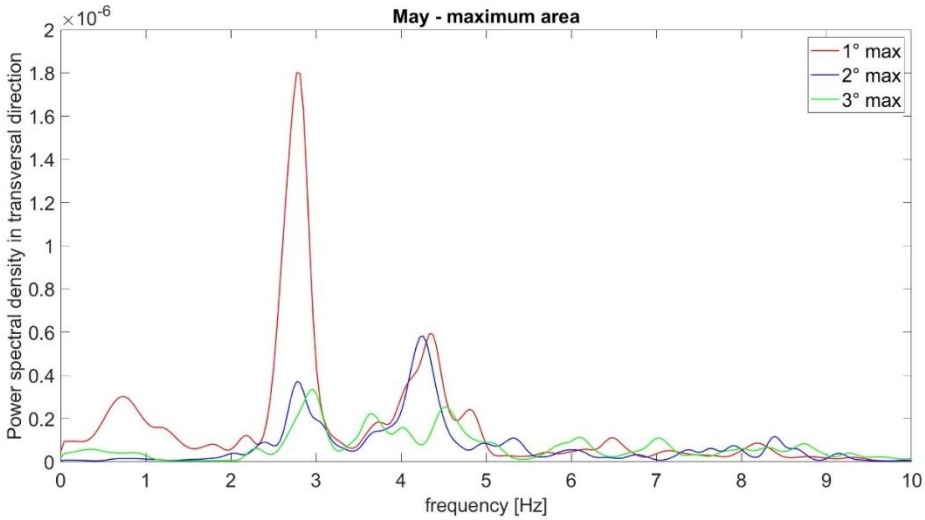


Figure 3-59: Results obtained from the 3 accelerograms with maximum area of PSD

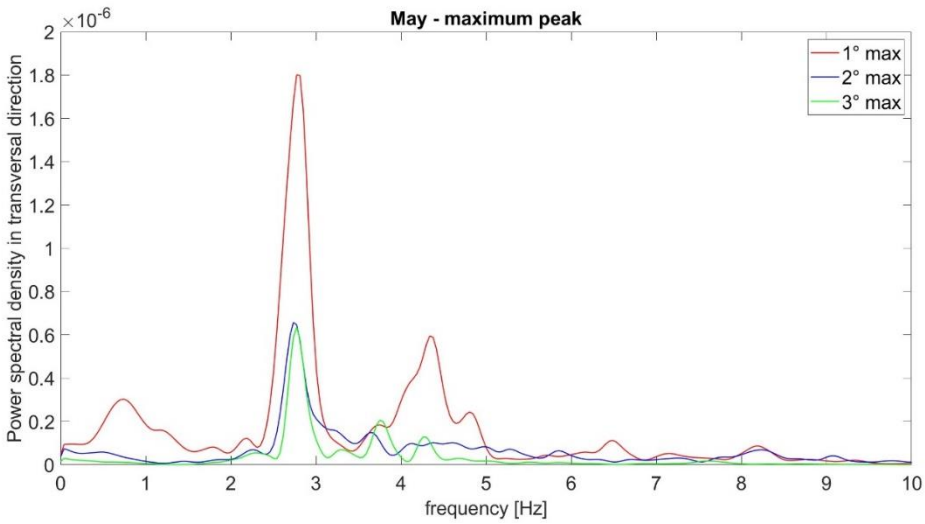


Figure 3-60: Results obtained from the 3 accelerograms with highest peak if PSD

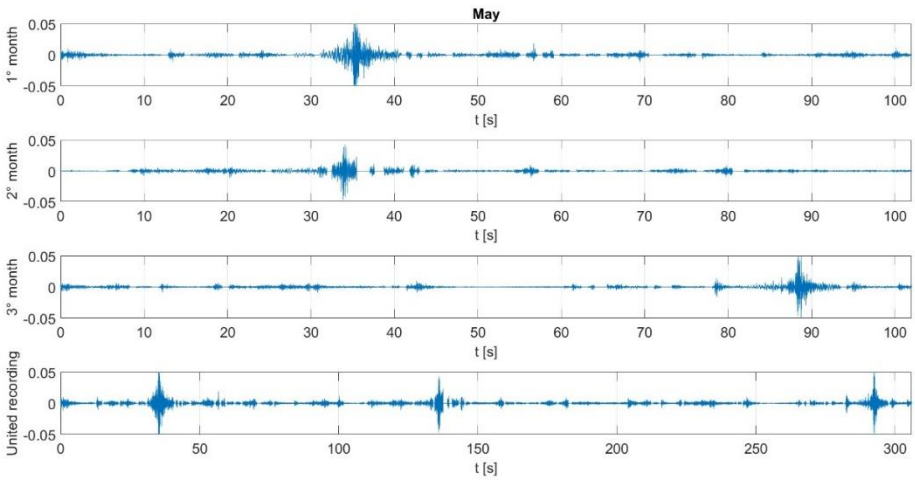


Figure 3-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

3.6 June

The results obtained for the June dataset are shown in the following tables.

Table 3-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-06-13_08-00-20	1.62E-03
	2°	31639_2023-06-23_20-00-21	1.53E-03
	3°	31639_2023-06-27_14-00-20	1.32E-03
Longitudinal direction (y)	1°	31639_2023-06-13_08-00-20	1.19E-03
	2°	31639_2023-06-27_14-00-20	5.94E-04
	3°	31639_2023-06-20_08-00-21	5.11E-04
Transverse direction (z)	1°	31639_2023-06-13_08-00-20	1.15E-03
	2°	31639_2023-06-09_14-00-20	8.35E-04
	3°	31639_2023-06-28_14-00-19	8.15E-04

Table 3-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-06-27_14-00-20	5.75E-06	31639_2023-06-13_08-00-20	5.27E-07
2	31639_2023-06-13_08-00-20	5.52E-06	31639_2023-06-23_20-00-21	4.53E-07
3	31639_2023-06-23_20-00-21	4.82E-06	31639_2023-06-27_14-00-20	3.65E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-06-13_08-00-20	2.55E-06	31639_2023-06-13_08-00-20	2.94E-07
2	31639_2023-06-27_14-00-20	4.46E-07	31639_2023-06-27_14-00-20	7.69E-08
3	31639_2023-06-23_20-00-21	3.80E-07	31639_2023-06-20_08-00-21	5.34E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-06-13_08-00-20	9.58E-07	31639_2023-06-13_08-00-20	2.79E-07
2	31639_2023-06-10_20-00-21	7.05E-07	31639_2023-06-09_14-00-20	1.36E-07
3	31639_2023-06-09_14-00-20	5.44E-07	31639_2023-06-28_14-00-19	1.33E-07

Table 3-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	A	A	A	A	-	A
2	B	-	B	C	C	C	E	-	E
3	C	B	C	D	-	D	F	E	F

3.6.1 Vertical direction (x)

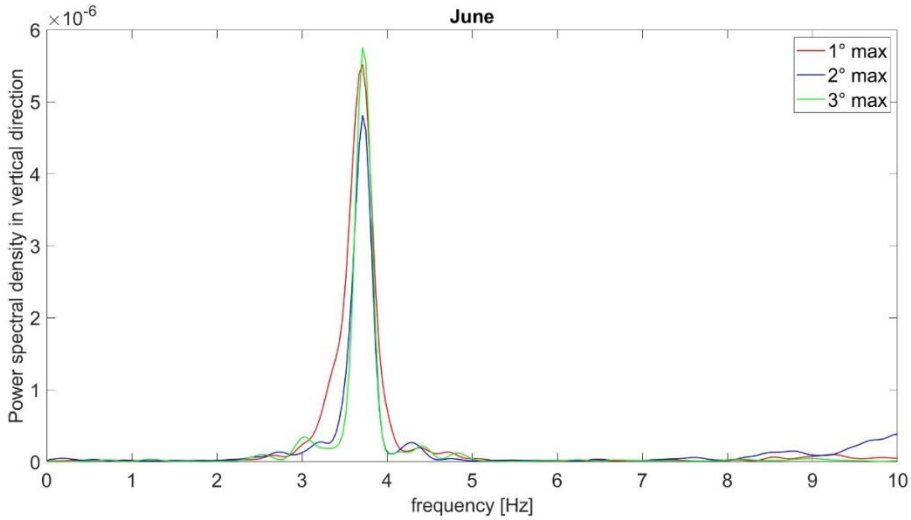


Figure 3-62: Results obtained from the 3 accelerograms with maximum SD in time domain

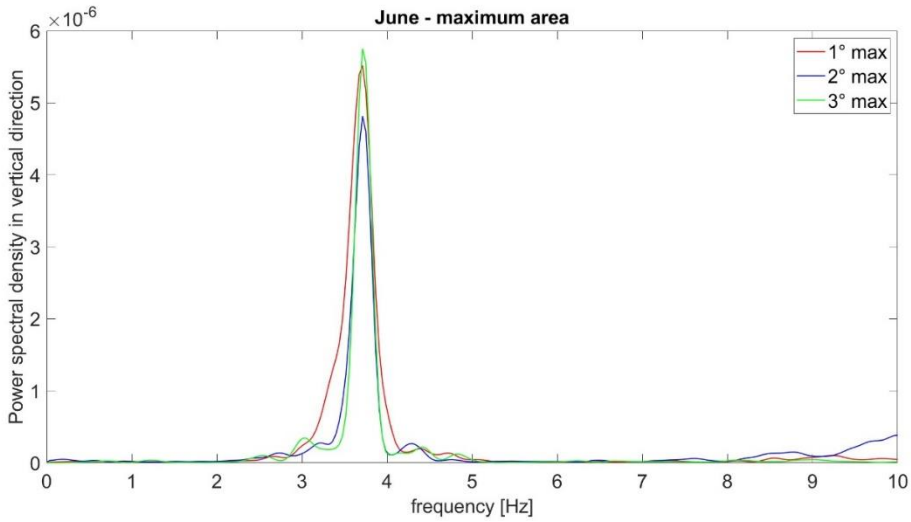


Figure 3-63: Results obtained from the 3 accelerograms with maximum area of PSD

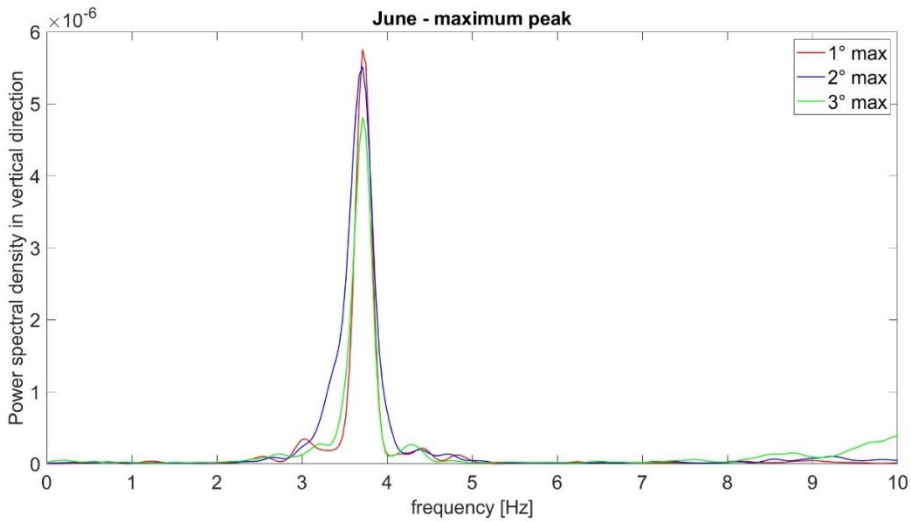


Figure 3-64: Results obtained from the 3 accelerograms with highest peak if PSD

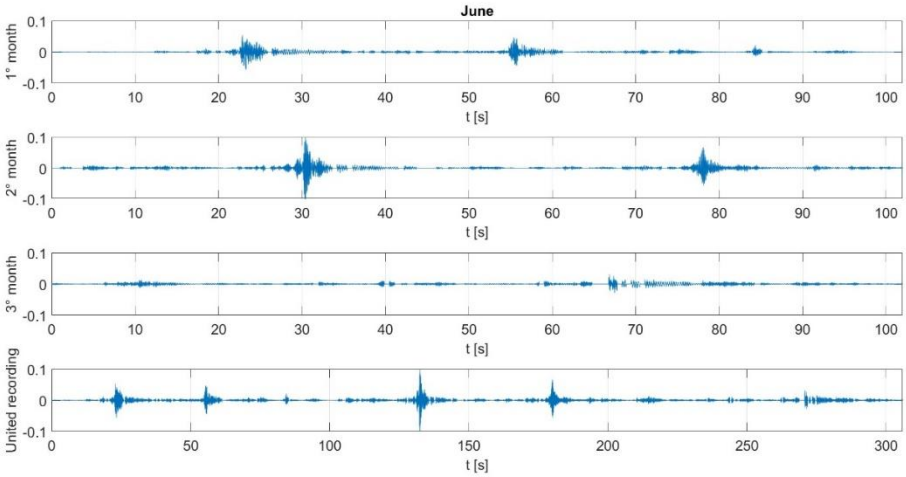


Figure 3-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.6.2 Longitudinal direction (y)

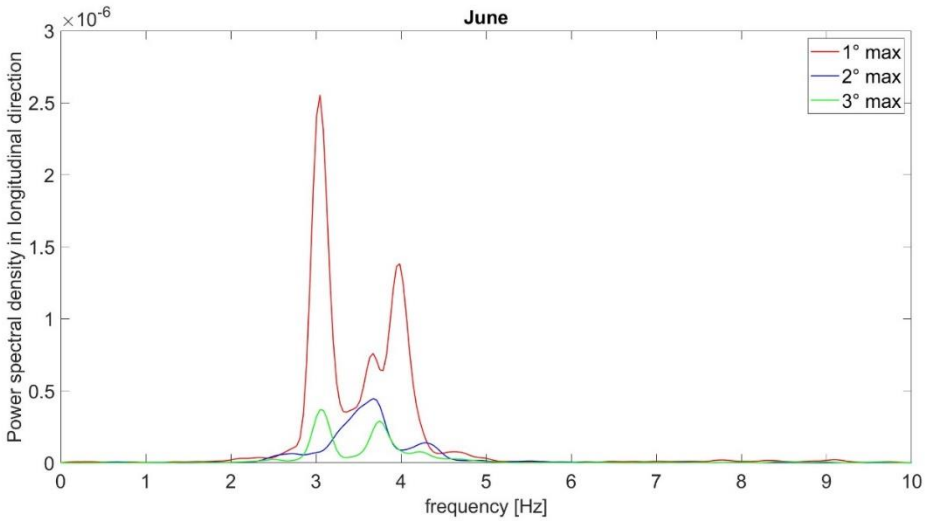


Figure 3-66: Results obtained from the 3 accelerograms with maximum SD in time domain

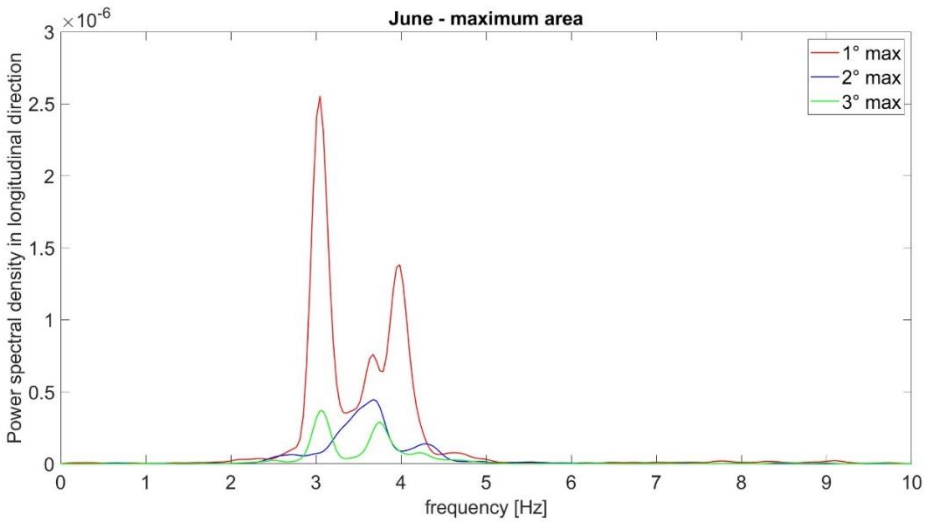


Figure 3-67: Results obtained from the 3 accelerograms with maximum area of PSD

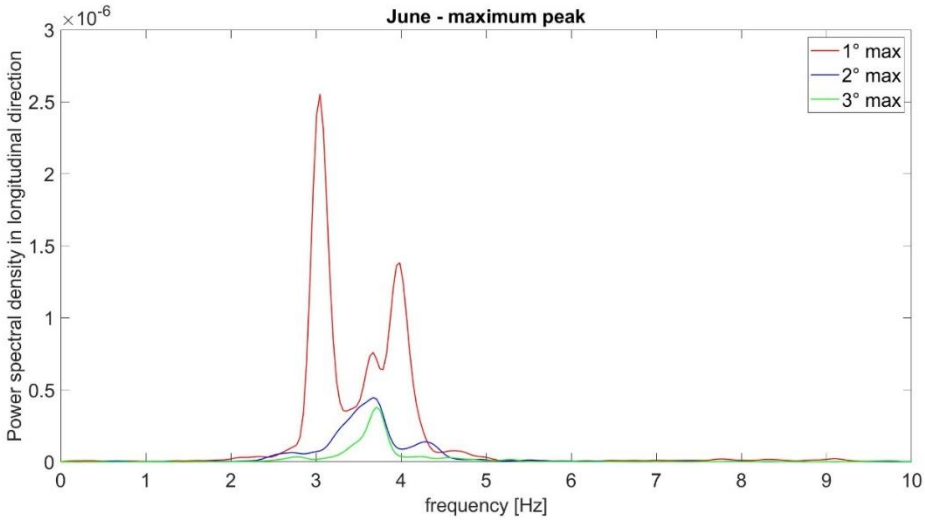


Figure 3-68: Results obtained from the 3 accelerograms with highest peak if PSD

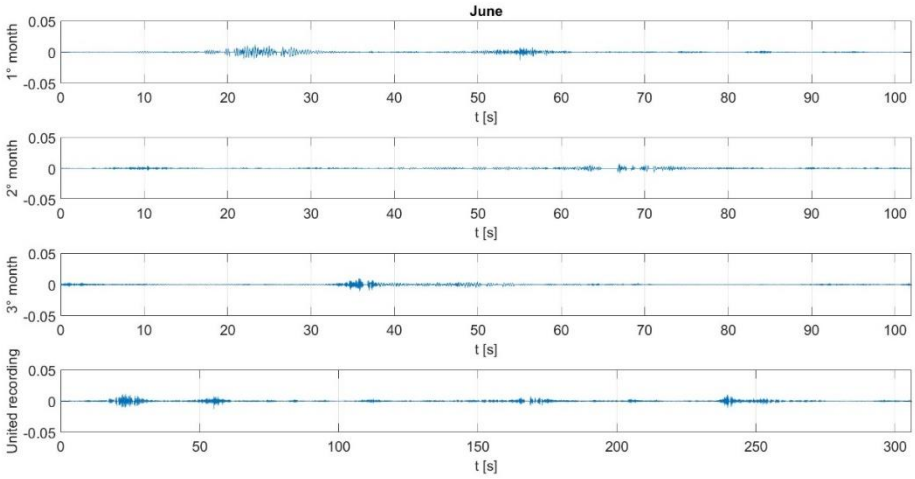


Figure 3-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

3.6.3 Transverse direction (z)

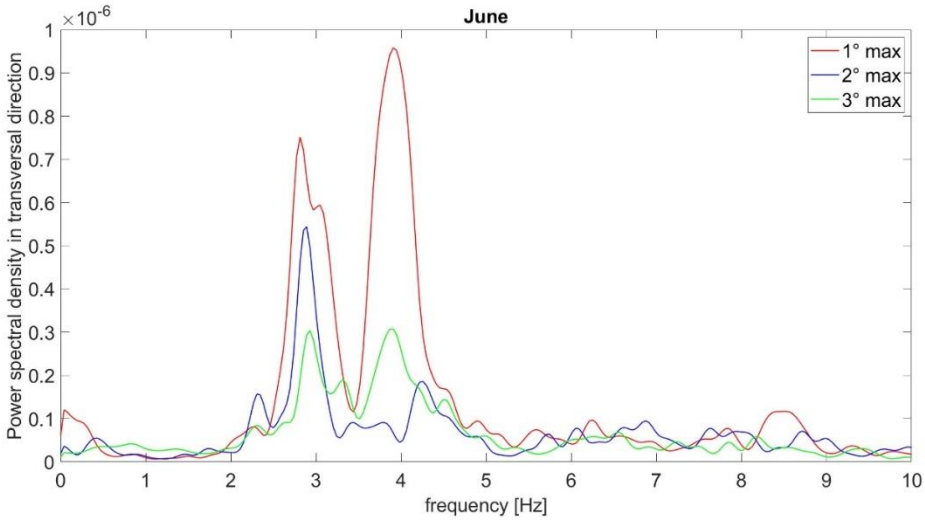


Figure 3-70: Results obtained from the 3 accelerograms with maximum SD in time domain

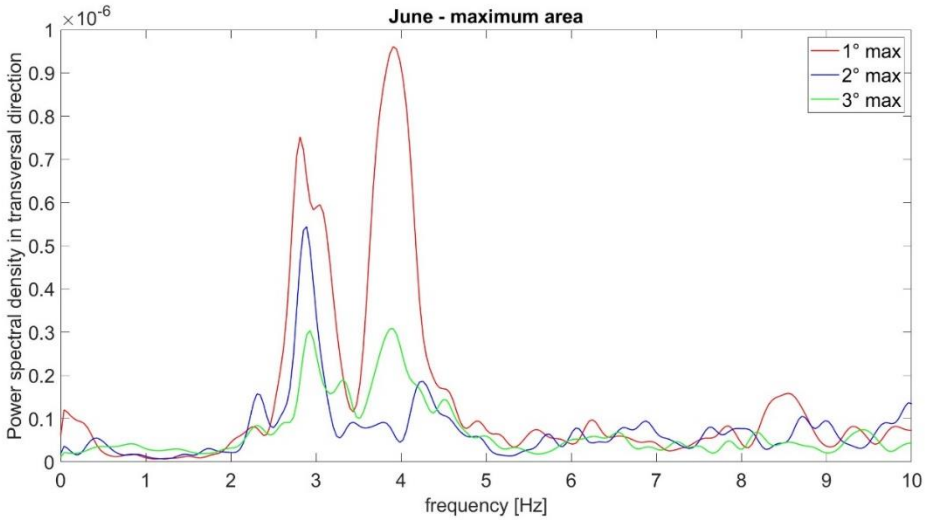


Figure 3-71: Results obtained from the 3 accelerograms with maximum area of PSD

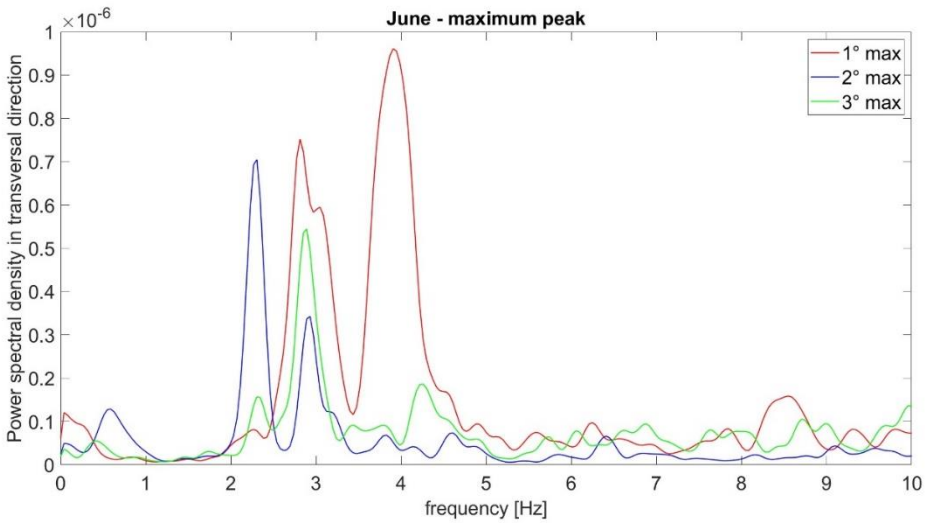


Figure 3-72: Results obtained from the 3 accelerograms with highest peak if PSD

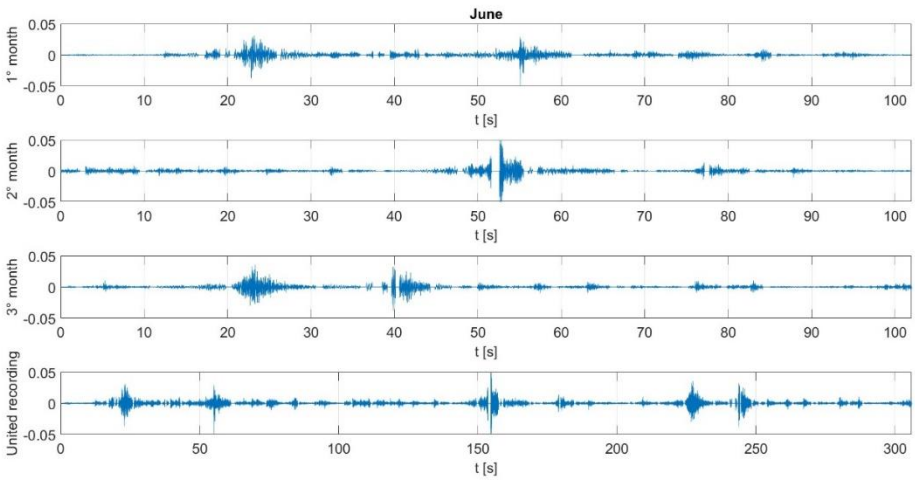


Figure 3-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

3.7 July

The results obtained for the July dataset are shown in the following tables.

Table 3-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-07-20_14-00-21	1.56E-03
	2°	31639_2023-07-07_08-00-20	1.24E-03
	3°	31639_2023-07-28_08-00-21	1.22E-03
Longitudinal direction (y)	1°	31639_2023-07-20_14-00-21	6.84E-04
	2°	31639_2023-07-17_14-00-20	6.76E-04
	3°	31639_2023-07-07_14-00-21	6.16E-04
Transverse direction (z)	1°	31639_2023-07-14_08-00-20	1.05E-03
	2°	31639_2023-07-17_14-00-20	9.46E-04
	3°	31639_2023-07-28_08-00-21	8.47E-04

Table 3-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-07-20_14-00-21	7.97E-06	31639_2023-07-20_14-00-21	5.14E-07
2	31639_2023-07-15_20-00-20	4.20E-06	31639_2023-07-25_08-00-19	3.29E-07
3	31639_2023-07-19_08-00-20	2.98E-06	31639_2023-07-15_20-00-20	3.16E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-07-07_14-00-21	8.35E-07	31639_2023-07-17_14-00-20	9.76E-08
2	31639_2023-07-20_14-00-21	6.72E-07	31639_2023-07-20_14-00-21	9.38E-08
3	31639_2023-07-17_14-00-20	3.96E-07	31639_2023-07-07_14-00-21	8.31E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-07-14_08-00-20	1.79E-06	31639_2023-07-14_08-00-20	2.34E-07
2	31639_2023-07-07_08-00-20	9.08E-07	31639_2023-07-17_14-00-20	1.92E-07
3	31639_2023-07-17_14-00-20	9.02E-07	31639_2023-07-28_08-00-21	1.44E-07

Table 3-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	E	D	F	F	F
2	-	B	-	D	A	A	G	-	G
3	-	-	B	E	D	E	H	G	H

3.7.1 Vertical direction (x)

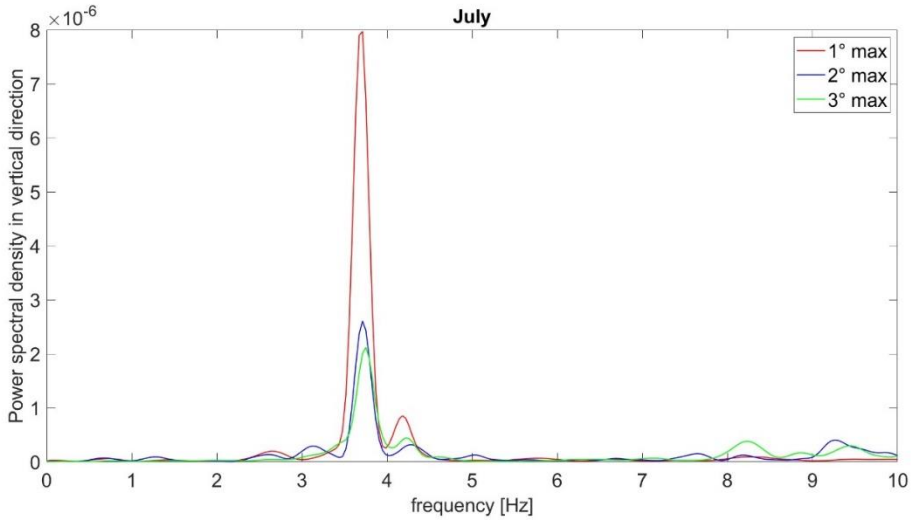


Figure 3-74: Results obtained from the 3 accelerograms with maximum SD in time domain

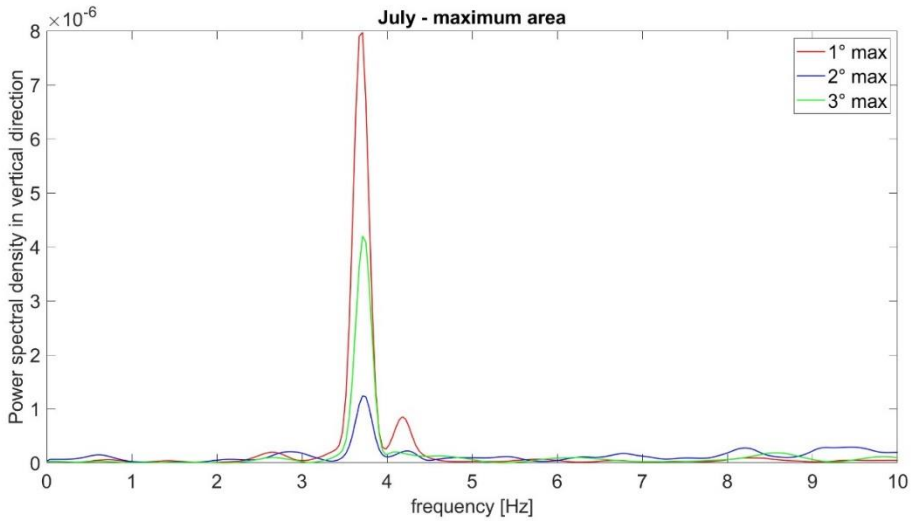


Figure 3-75: Results obtained from the 3 accelerograms with maximum area of PSD

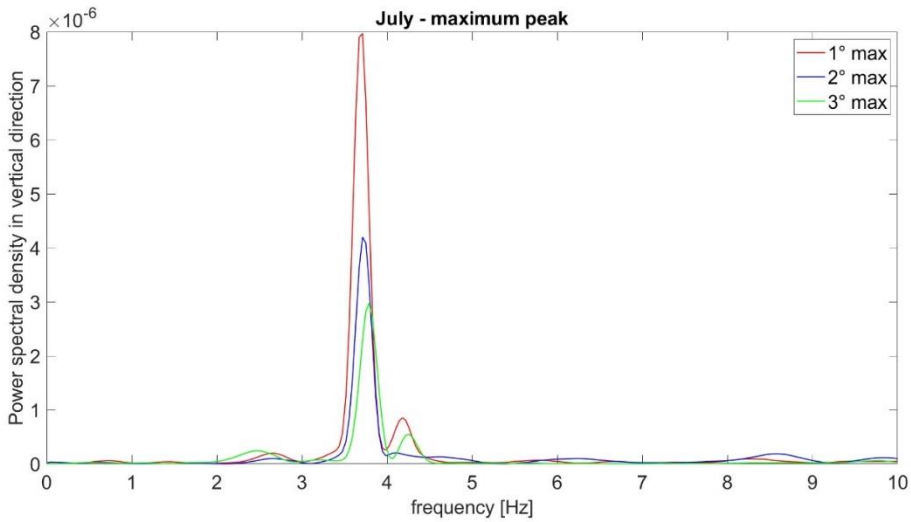


Figure 3-76: Results obtained from the 3 accelerograms with highest peak if PSD

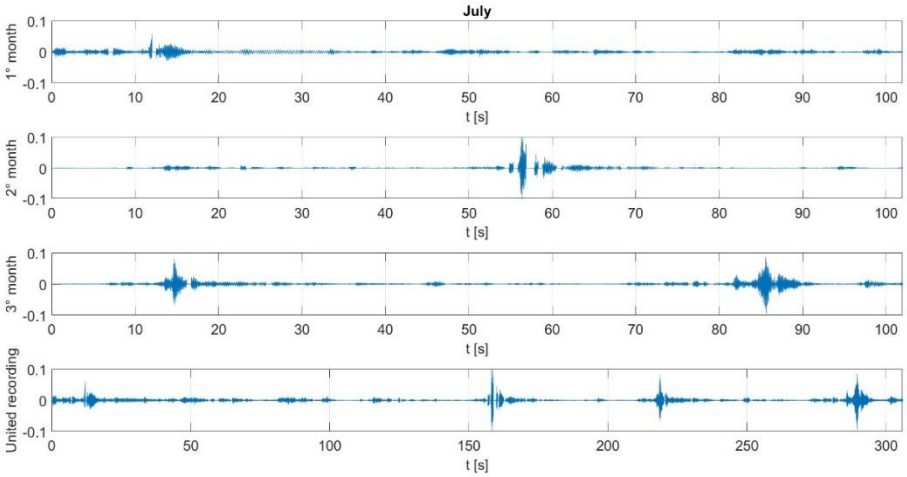


Figure 3-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.7.2 Longitudinal direction (y)

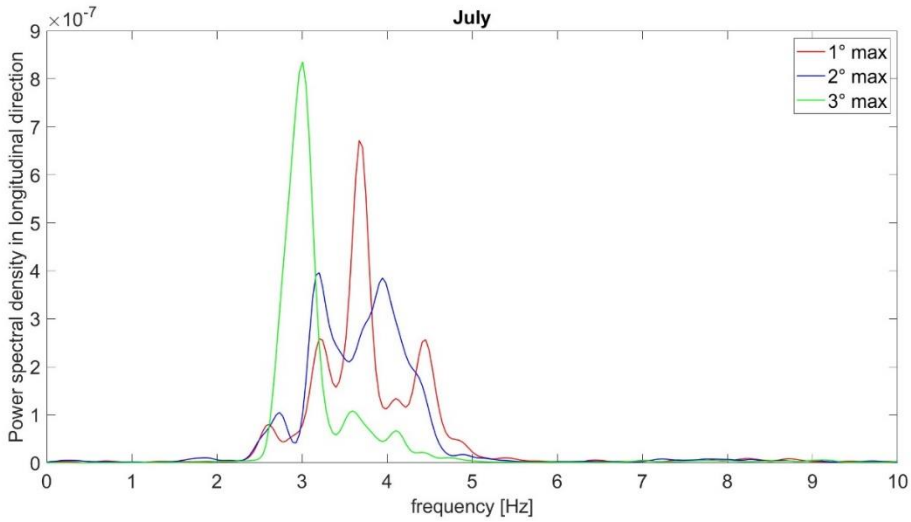


Figure 3-78: Results obtained from the 3 accelerograms with maximum SD in time domain

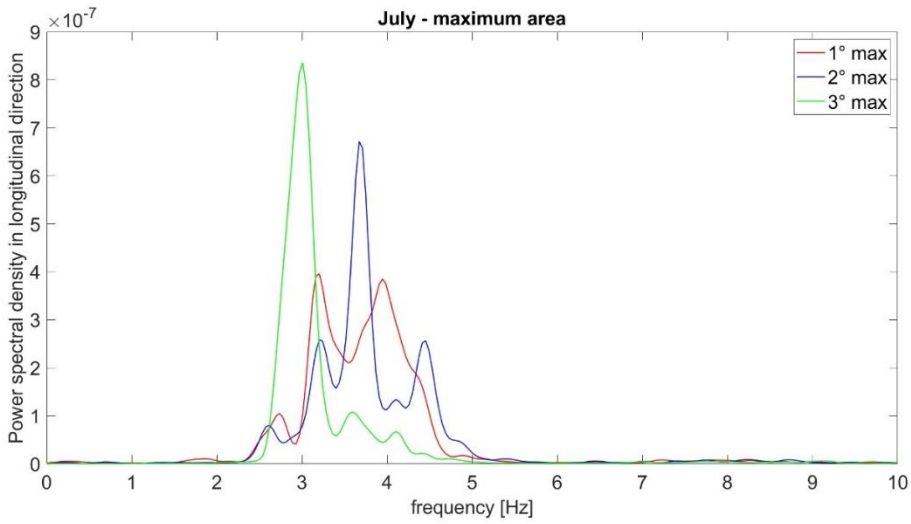


Figure 3-79: Results obtained from the 3 accelerograms with maximum area of PSD

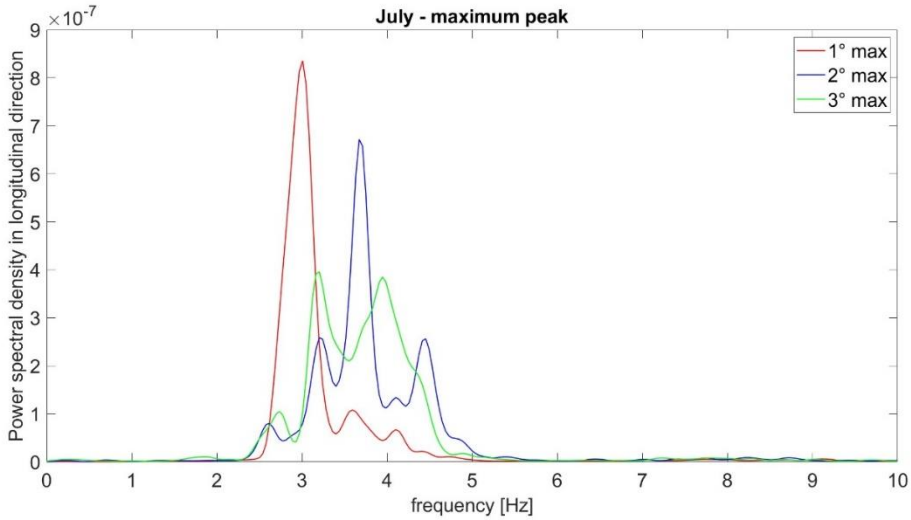


Figure 3-80: Results obtained from the 3 accelerograms with highest peak if PSD

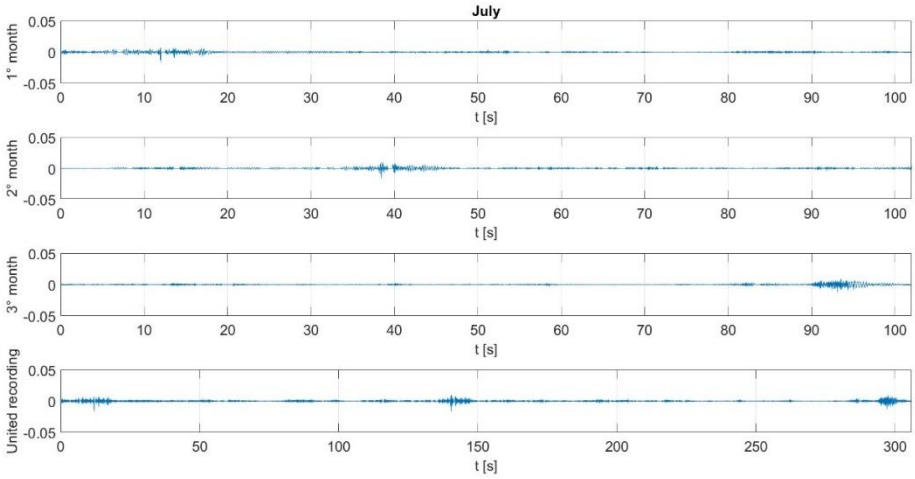


Figure 3-81: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.7.3 Transverse direction (z)

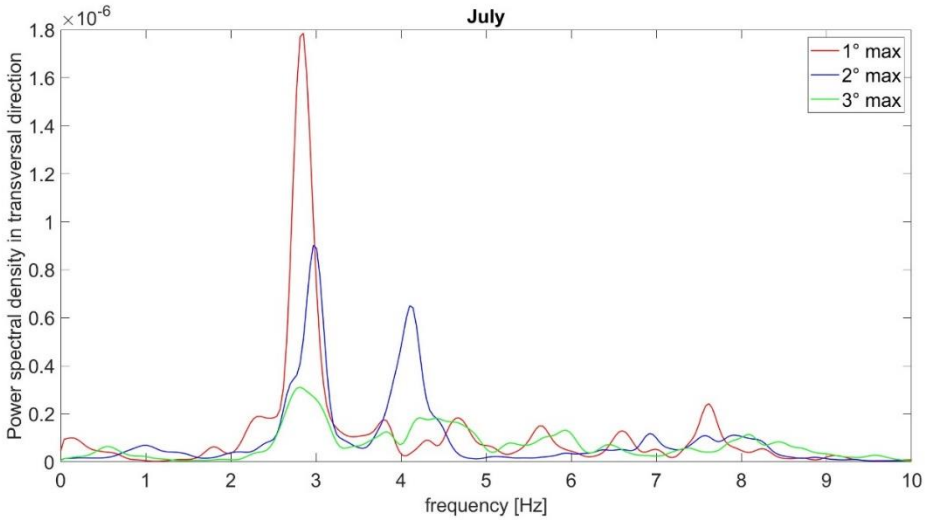


Figure 3-82: Results obtained from the 3 accelerograms with maximum SD in time domain

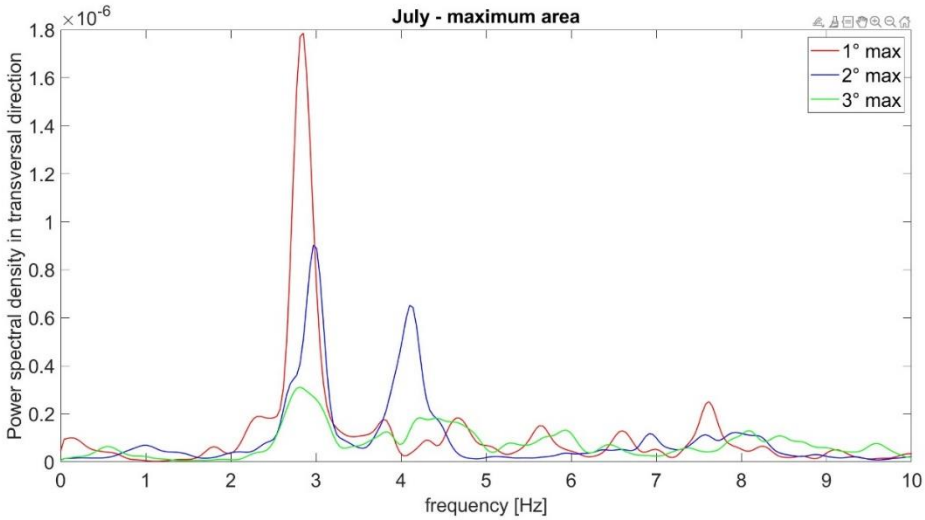


Figure 3-83: Results obtained from the 3 accelerograms with maximum area of PSD

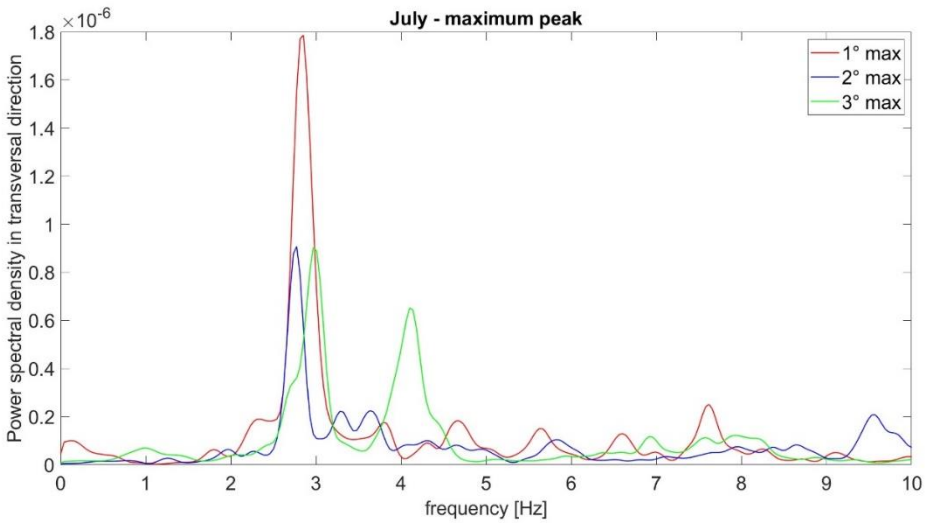


Figure 3-84: Results obtained from the 3 accelerograms with highest peak if PSD

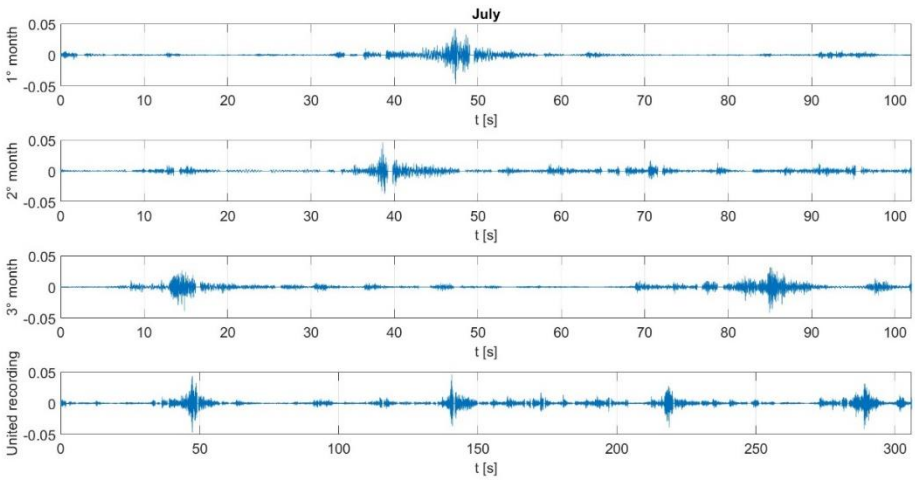


Figure 3-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

3.8 August

The results obtained for the August dataset are shown in the following tables.

Table 3-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-08-07_14-00-20	2.06E-03
	2°	31639_2023-08-29_08-00-21	1.26E-03
	3°	31639_2023-08-25_14-00-20	1.19E-03
Longitudinal direction (y)	1°	31639_2023-08-07_14-00-20	7.85E-04
	2°	31639_2023-08-29_08-00-21	4.95E-04
	3°	31639_2023-08-02_08-00-21	4.19E-04
Transverse direction (z)	1°	31639_2023-08-07_14-00-20	8.43E-04
	2°	31639_2023-08-29_08-00-21	8.40E-04
	3°	31639_2023-08-31_14-00-20	6.30E-04

Table 3-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-08-07_14-00-20	1.39E-05	31639_2023-08-07_14-00-20	8.69E-07
2	31639_2023-08-25_14-00-20	3.44E-06	31639_2023-08-29_08-00-21	3.35E-07
3	31639_2023-08-21_14-00-20	3.16E-06	31639_2023-08-25_14-00-20	2.99E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-08-07_14-00-20	1.02E-06	31639_2023-08-07_14-00-20	1.28E-07
2	31639_2023-08-02_08-00-21	2.92E-07	31639_2023-08-29_08-00-21	5.10E-08
3	31639_2023-08-25_14-00-20	2.75E-07	31639_2023-08-02_08-00-21	3.58E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-08-29_08-00-21	7.17E-07	31639_2023-08-07_14-00-20	1.51E-07
2	31639_2023-08-07_14-00-20	5.77E-07	31639_2023-08-29_08-00-21	1.44E-07
3	31639_2023-08-22_08-00-21	5.30E-07	31639_2023-08-02_08-00-21	7.80E-08

Table 3-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	B	A
2	B	C	B	B	D	B	B	A	B
3	C	-	C	D	-	D	-	-	-

3.8.1 Vertical direction (x)

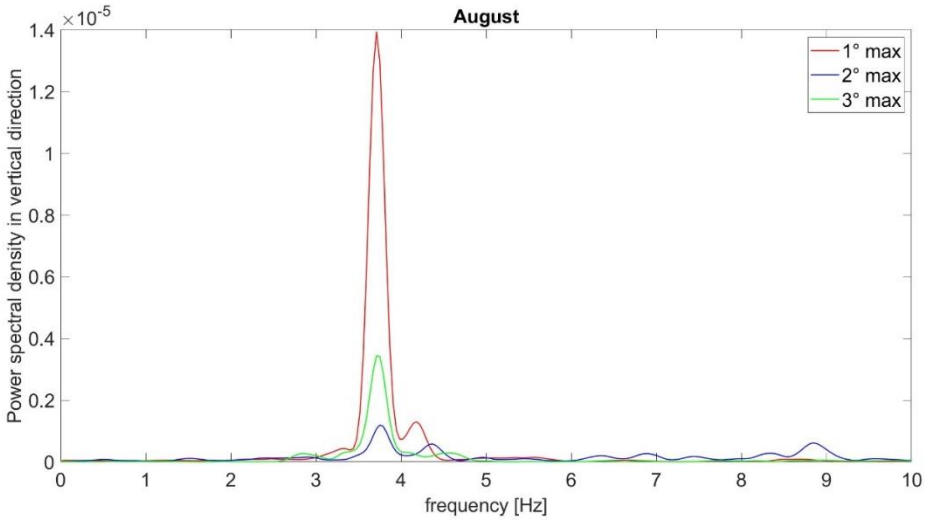


Figure 3-86: Results obtained from the 3 accelerograms with maximum SD in time domain

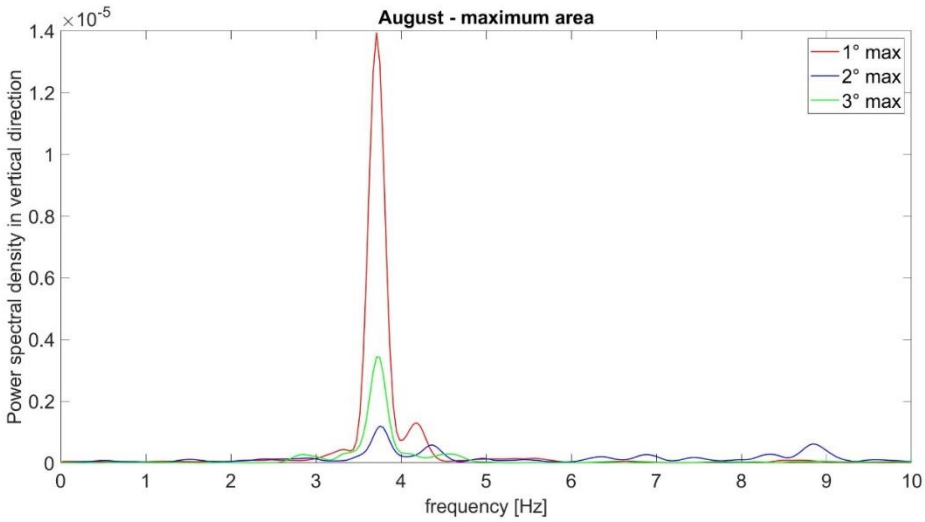


Figure 3-87: Results obtained from the 3 accelerograms with maximum area of PSD

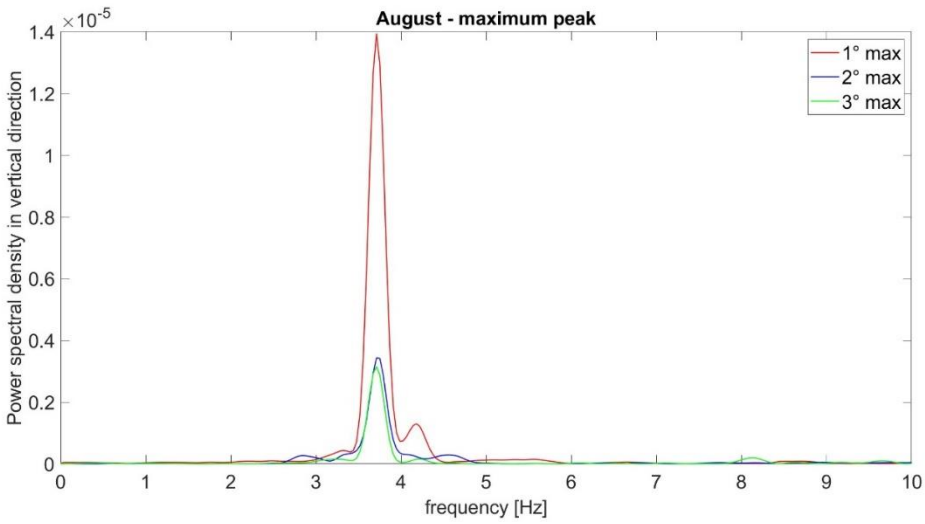


Figure 3-88: Results obtained from the 3 accelerograms with highest peak if PSD

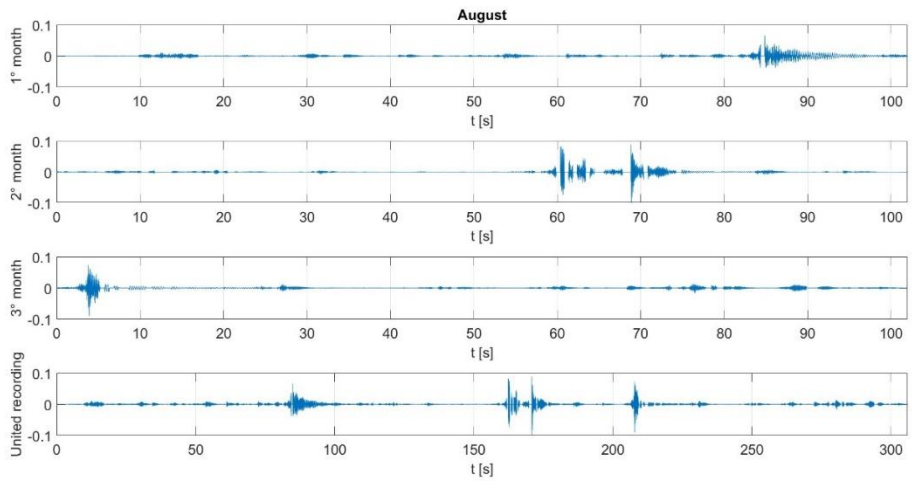


Figure 3-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.8.2 Longitudinal direction (y)

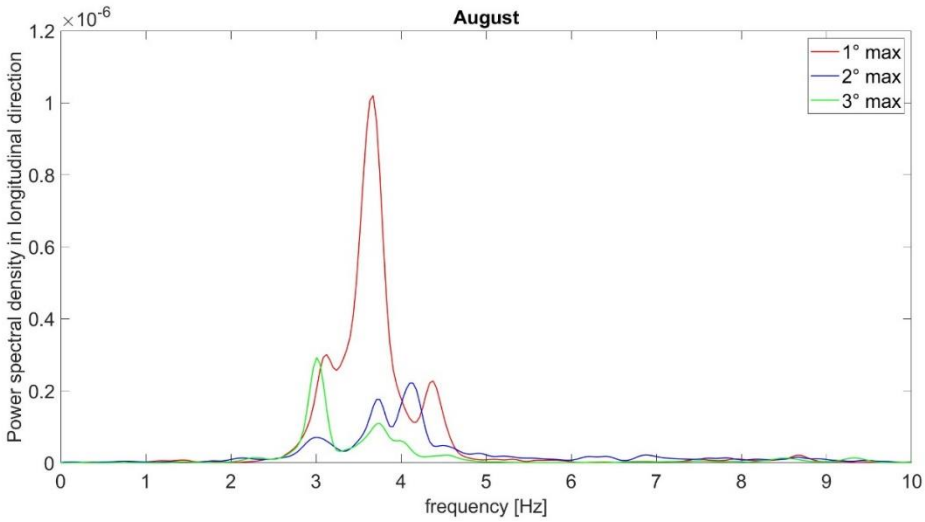


Figure 3-90: Results obtained from the 3 accelerograms with maximum SD in time domain

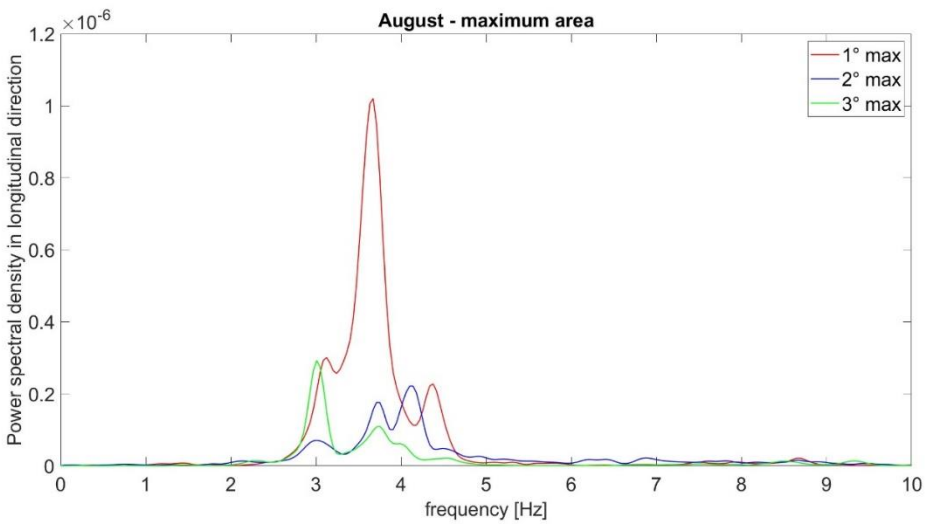


Figure 3-91: Results obtained from the 3 accelerograms with maximum area of PSD

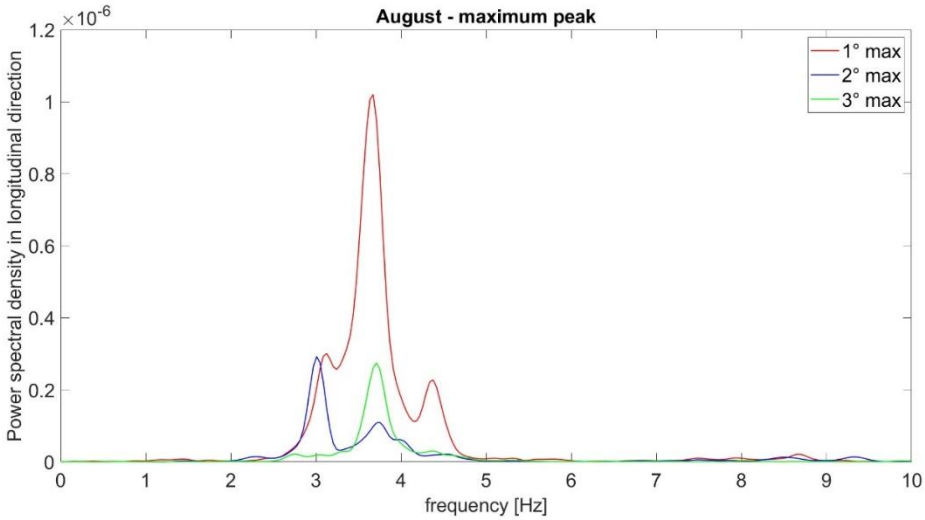


Figure 3-92: Results obtained from the 3 accelerograms with highest peak if PSD

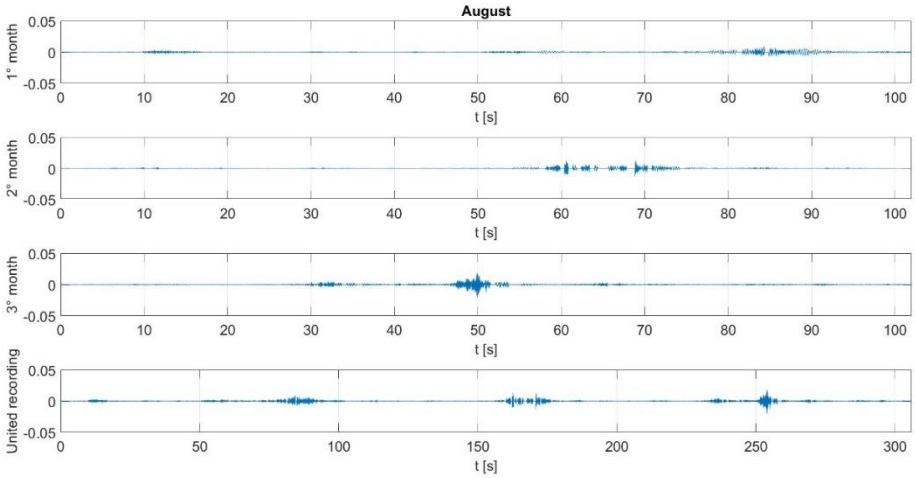


Figure 3-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

3.8.3 Transverse direction (z)

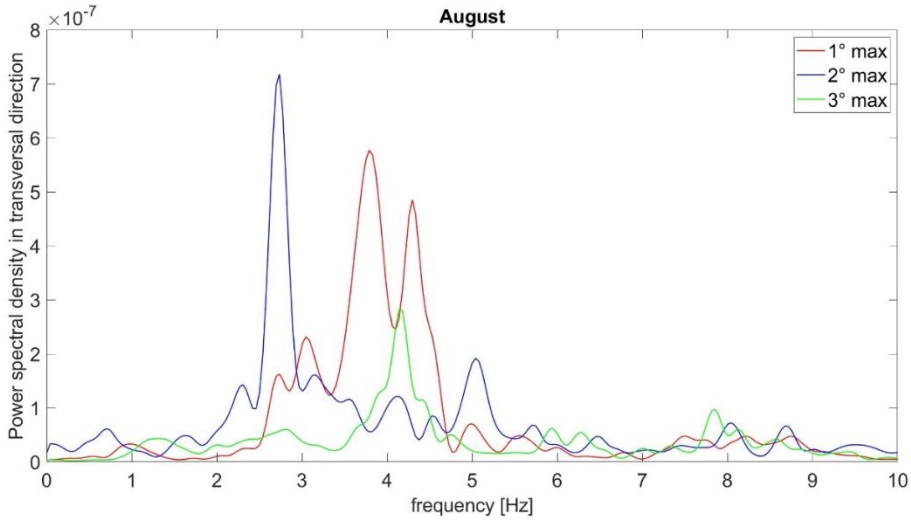


Figure 3-94: Results obtained from the 3 accelerograms with maximum SD in time domain

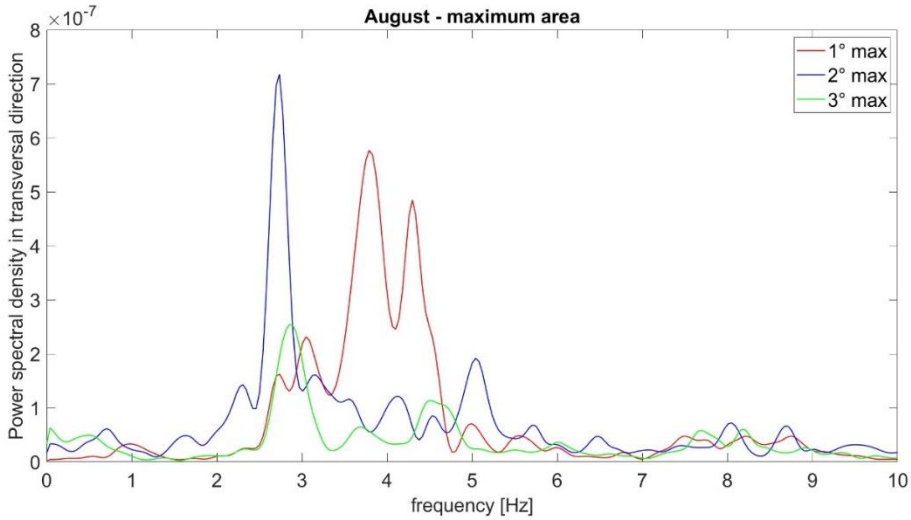


Figure 3-95: Results obtained from the 3 accelerograms with maximum area of PSD

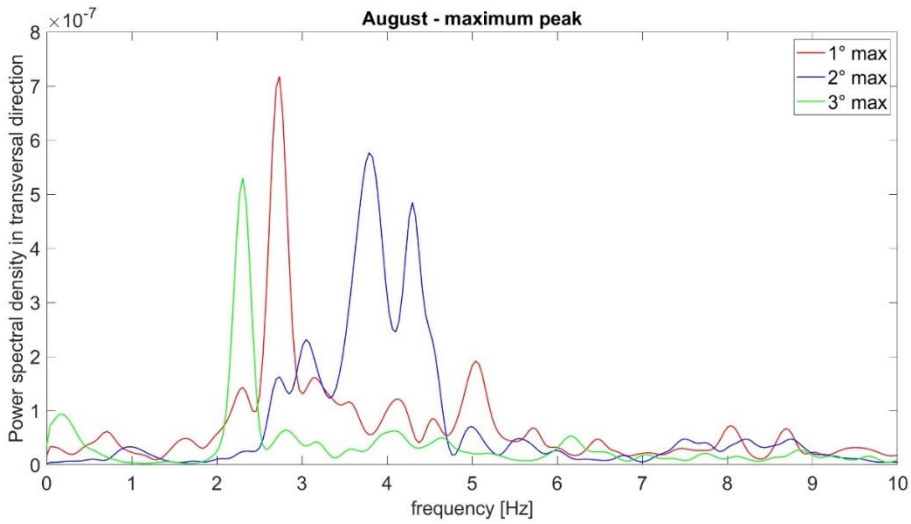


Figure 3-96: Results obtained from the 3 accelerograms with highest peak if PSD

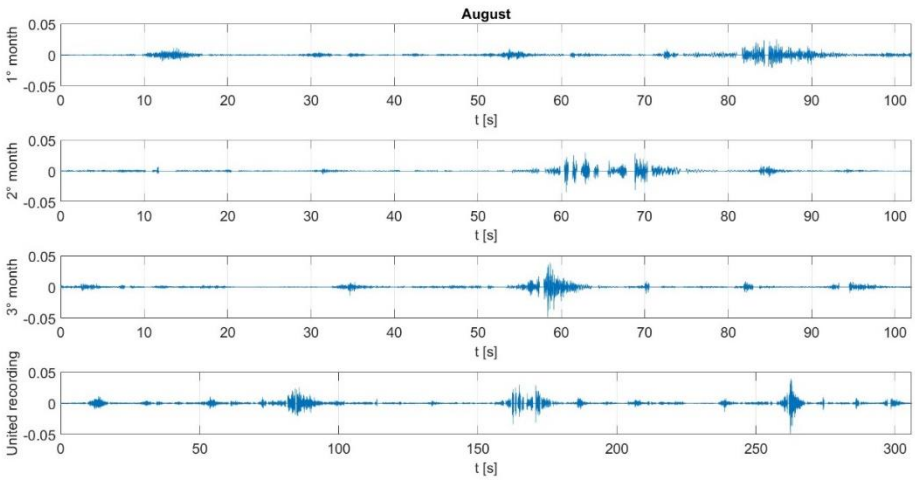


Figure 3-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

3.9 September

The results obtained for the September dataset are shown in the following tables.

Table 3-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-09-26_09-00-20	3.32E-03
	2°	31639_2023-09-14_11-00-20	2.33E-03
	3°	31639_2023-09-20_11-00-20	2.22E-03
Longitudinal direction (y)	1°	31639_2023-09-26_09-00-20	2.41E-03
	2°	31639_2023-09-14_11-00-20	1.79E-03
	3°	31639_2023-09-20_11-00-20	1.49E-03
Transverse direction (z)	1°	31639_2023-09-26_15-00-21	2.81E-03
	2°	31639_2023-09-20_11-00-20	1.43E-03
	3°	31639_2023-09-14_11-00-20	1.43E-03

Table 3-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-09-26_09-00-20	2.68E-05	31639_2023-09-26_09-00-20	2.34E-06
2	31639_2023-09-20_11-00-20	1.03E-05	31639_2023-09-14_11-00-20	1.05E-06
3	31639_2023-09-14_11-00-20	9.83E-06	31639_2023-09-20_11-00-20	1.03E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-09-26_09-00-20	1.89E-05	31639_2023-09-26_09-00-20	1.22E-06
2	31639_2023-09-14_11-00-20	7.26E-06	31639_2023-09-14_11-00-20	6.58E-07
3	31639_2023-09-20_11-00-20	2.84E-06	31639_2023-09-20_11-00-20	4.85E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-09-26_15-00-21	1.79E-05	31639_2023-09-26_15-00-21	1.58E-06
2	31639_2023-09-20_11-00-20	3.69E-06	31639_2023-09-20_11-00-20	4.26E-07
3	31639_2023-09-18_10-00-20	2.22E-06	31639_2023-09-14_11-00-20	4.07E-07

Table 3-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	D	D	D
2	B	C	B	B	B	B	C	C	C
3	C	B	-	C	C	C	B	-	B

3.9.1 Vertical direction (x)

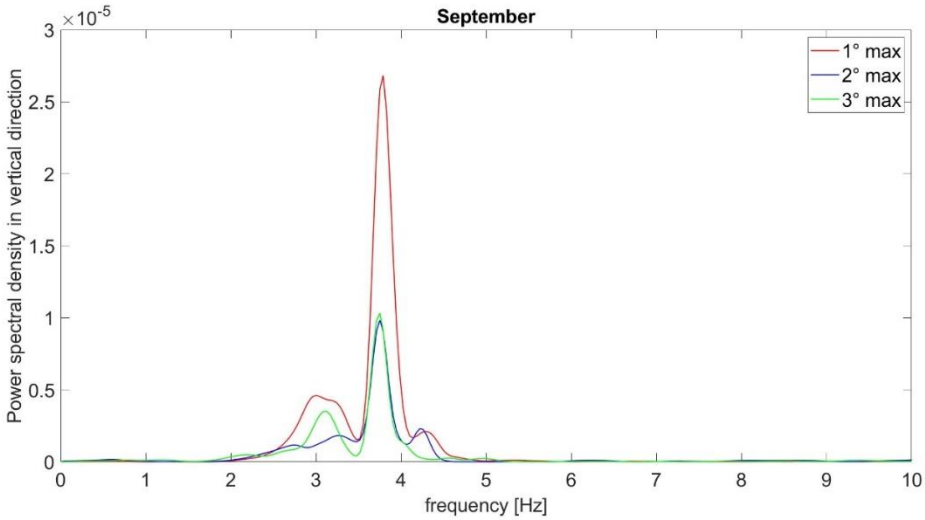


Figure 3-98: Results obtained from the 3 accelerograms with maximum SD in time domain

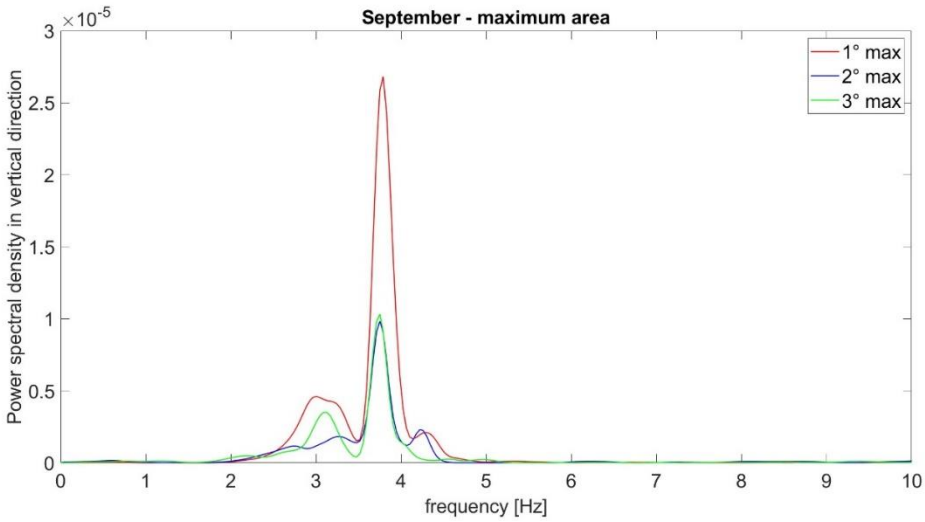


Figure 3-99: Results obtained from the 3 accelerograms with maximum area of PSD

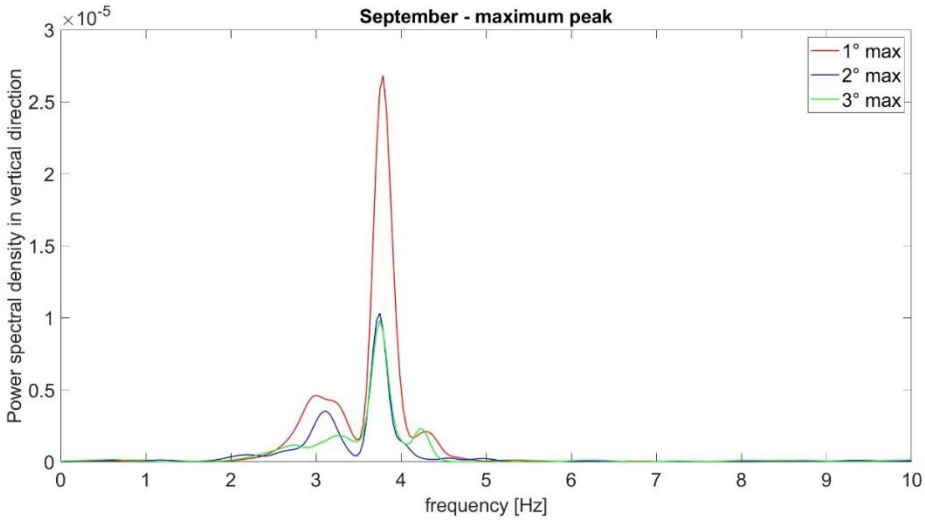


Figure 3-100: Results obtained from the 3 accelerograms with highest peak if PSD

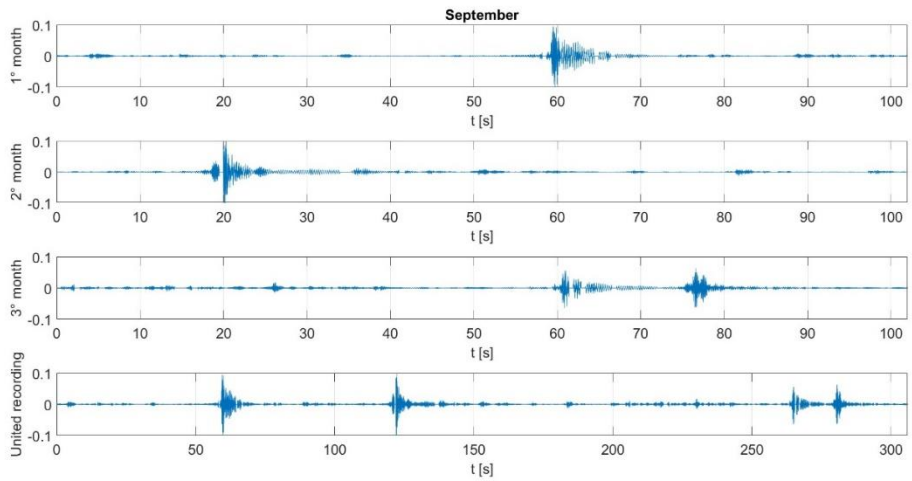


Figure 3-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.9.2 Longitudinal direction (y)

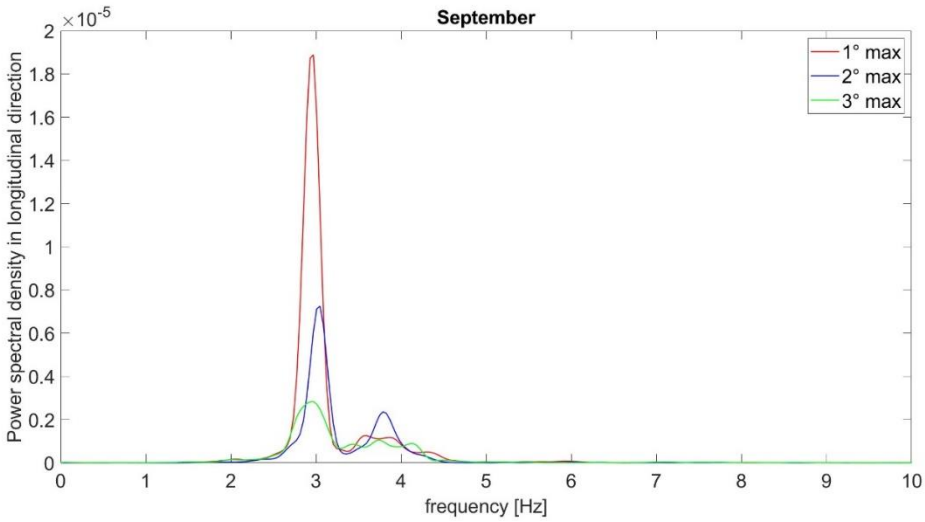


Figure 3-102: Results obtained from the 3 accelerograms with maximum SD in time domain

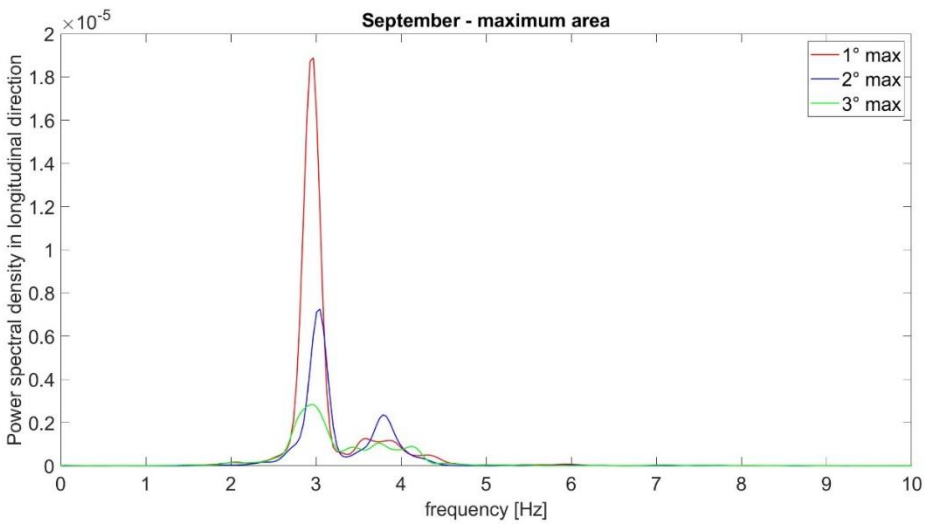


Figure 3-103: Results obtained from the 3 accelerograms with maximum area of PSD

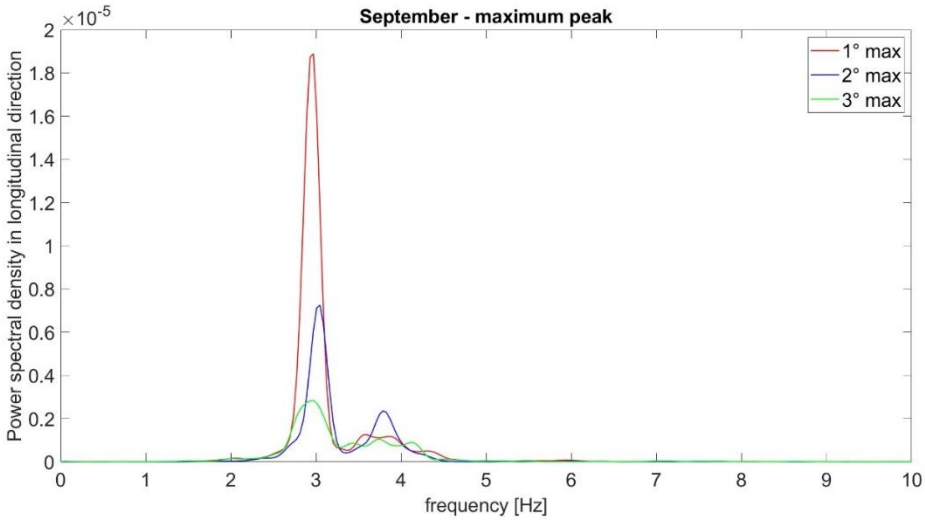


Figure 3-104: Results obtained from the 3 accelerograms with highest peak if PSD

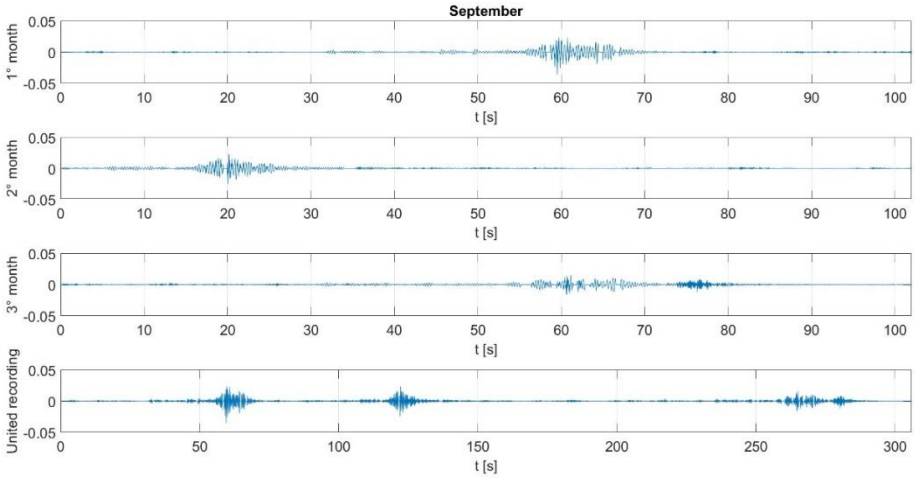


Figure 3-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

3.9.3 Transverse direction (z)

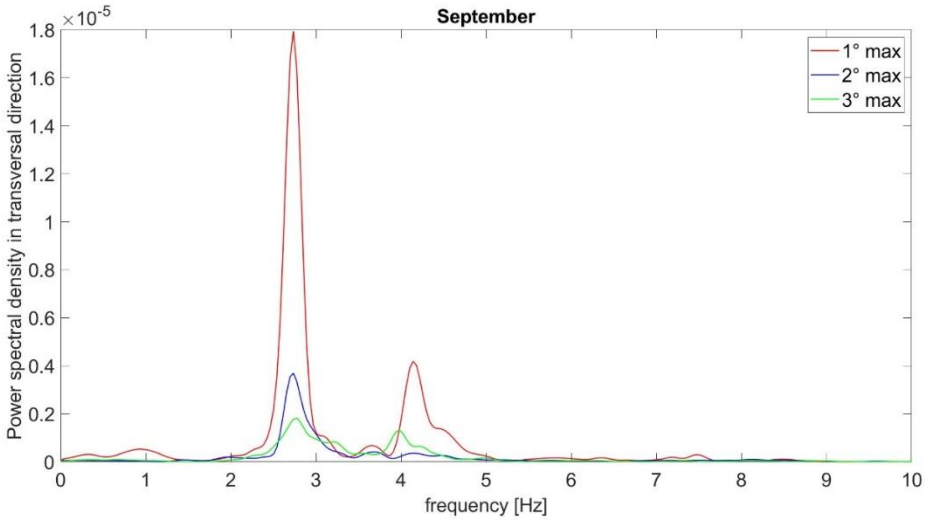


Figure 3-106: Results obtained from the 3 accelerograms with maximum SD in time domain

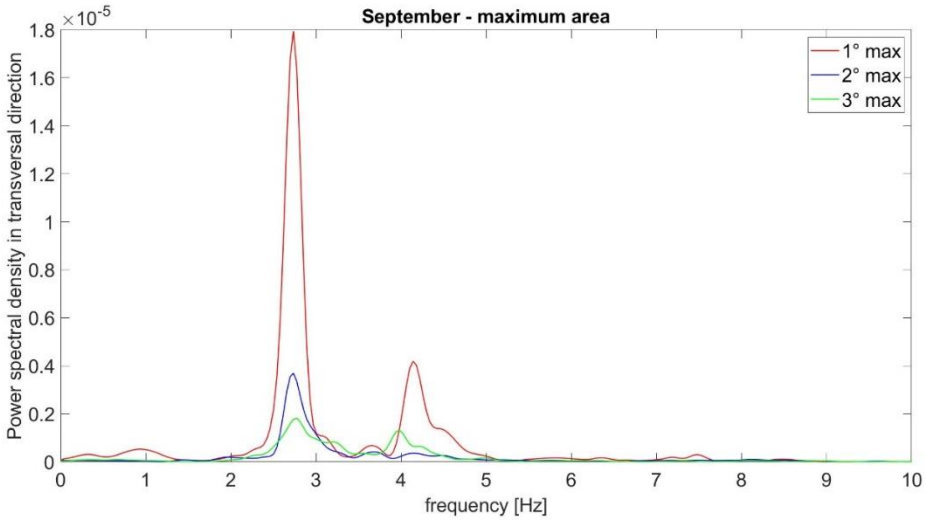


Figure 3-107: Results obtained from the 3 accelerograms with maximum area of PSD

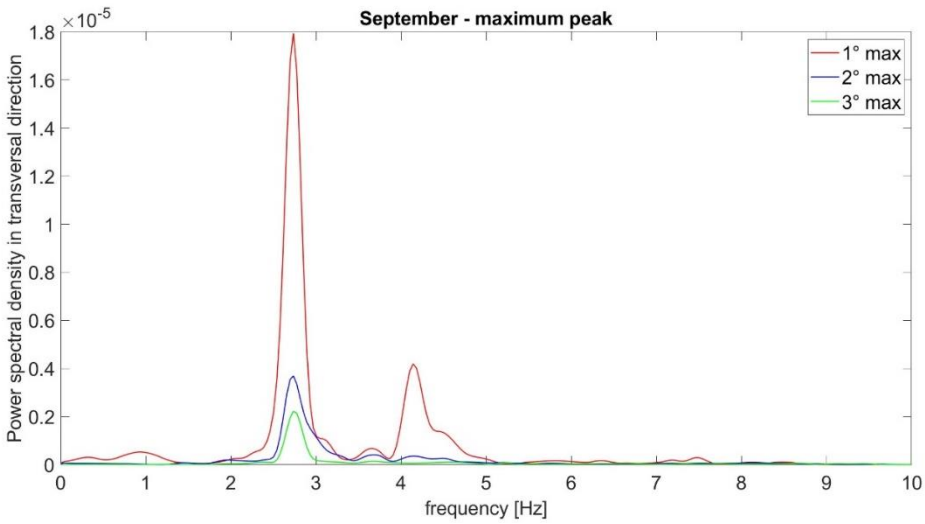


Figure 3-108: Results obtained from the 3 accelerograms with highest peak if PSD

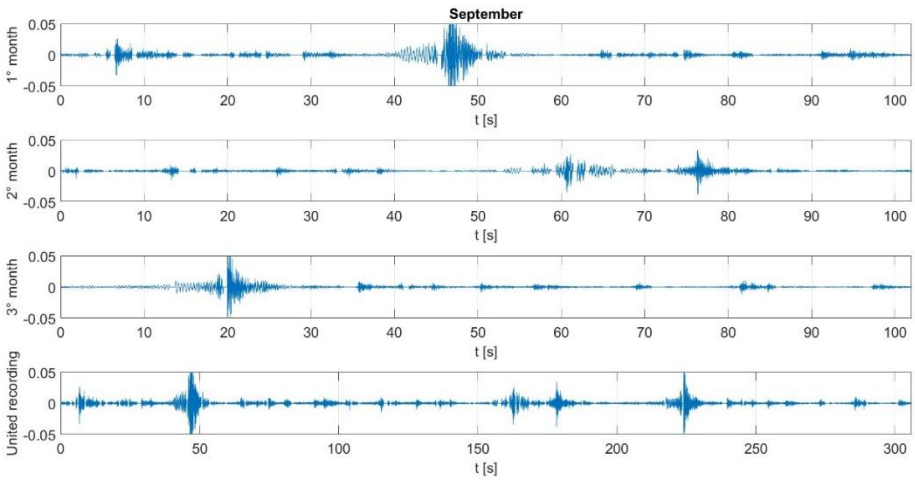


Figure 3-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

3.10 October

The results obtained for the October dataset are shown in the following tables.

Table 3-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-10-07_08-00-21	1.83E-03
	2°	31639_2023-10-02_08-00-20	1.78E-03
	3°	31639_2023-10-19_12-00-19	1.58E-03
Longitudinal direction (y)	1°	31639_2023-10-19_12-00-19	1.72E-03
	2°	31639_2023-10-02_08-00-20	1.14E-03
	3°	31639_2023-10-10_12-00-20	8.18E-04
Transverse direction (z)	1°	31639_2023-10-02_08-00-20	1.38E-03
	2°	31639_2023-10-07_08-00-21	1.06E-03
	3°	31639_2023-10-19_12-00-19	1.05E-03

Table 3-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-10-07_08-00-21	7.36E-06	31639_2023-10-02_08-00-20	7.15E-07
2	31639_2023-10-05_13-00-20	5.70E-06	31639_2023-10-07_08-00-21	6.09E-07
3	31639_2023-10-03_22-00-20	5.02E-06	31639_2023-10-19_12-00-19	5.01E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-10-19_12-00-19	9.66E-06	31639_2023-10-19_12-00-19	6.16E-07
2	31639_2023-10-02_08-00-20	1.93E-06	31639_2023-10-02_08-00-20	2.52E-07
3	31639_2023-10-01_11-00-19	1.09E-06	31639_2023-10-10_12-00-20	1.33E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-10-02_08-00-20	2.08E-06	31639_2023-10-02_08-00-20	3.62E-07
2	31639_2023-10-19_12-00-19	1.16E-06	31639_2023-10-19_12-00-19	2.29E-07
3	31639_2023-10-23_19-00-20	1.01E-06	31639_2023-10-07_08-00-21	2.04E-07

Table 3-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	B	C	C	C	D	D	D
2	B	-	A	D	D	D	F	C	C
3	C	-	C	E	-	E	C	-	F

3.10.1 Vertical direction (x)

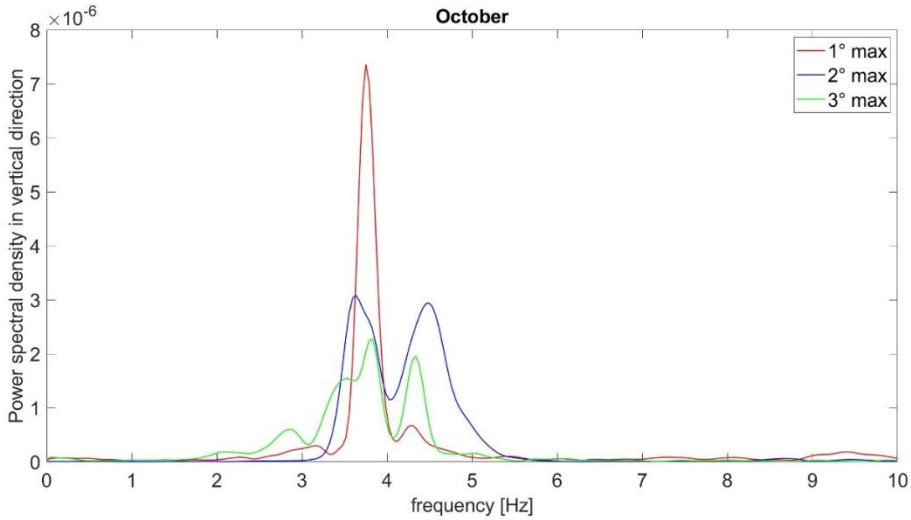


Figure 3-110: Results obtained from the 3 accelerograms with maximum SD in time domain

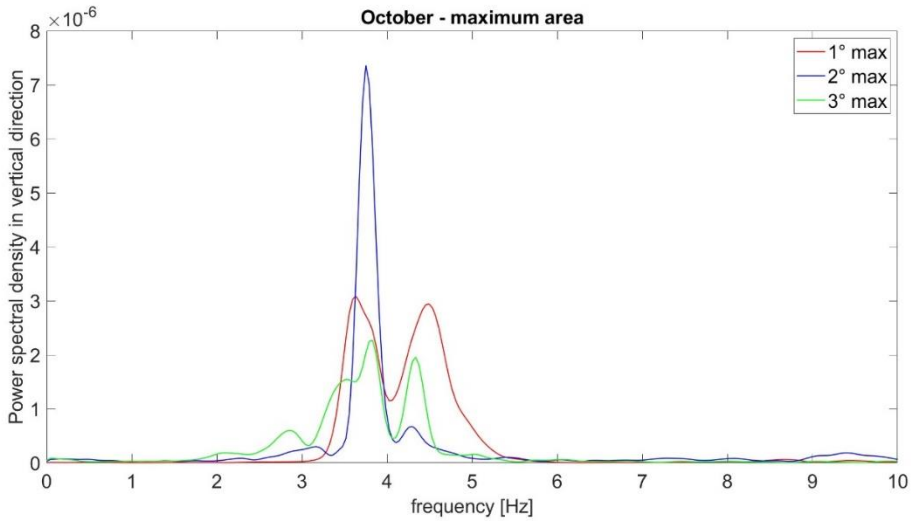


Figure 3-111: Results obtained from the 3 accelerograms with maximum area of PSD

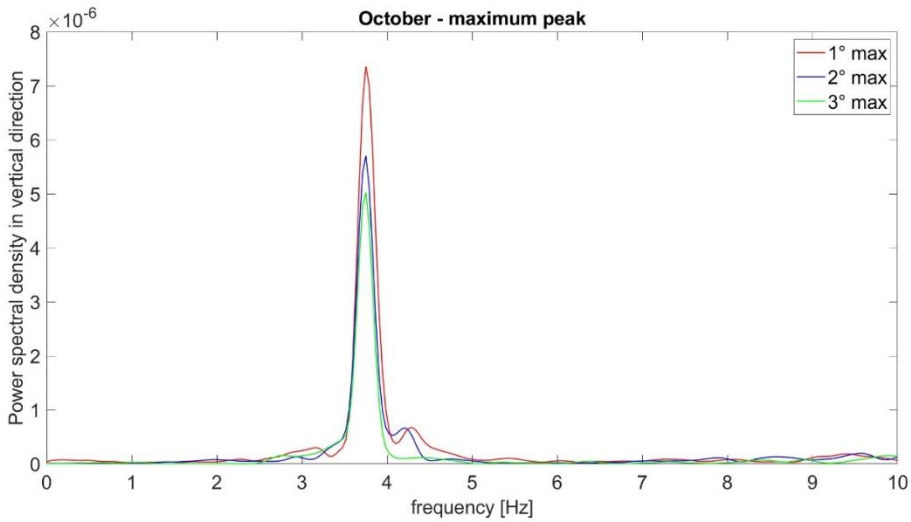


Figure 3-112: Results obtained from the 3 accelerograms with highest peak if PSD

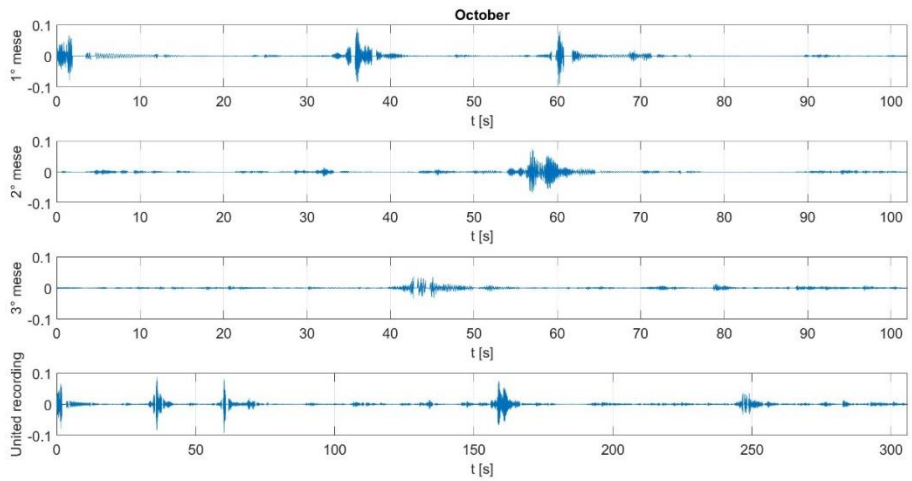


Figure 3-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.10.2 Longitudinal direction (y)

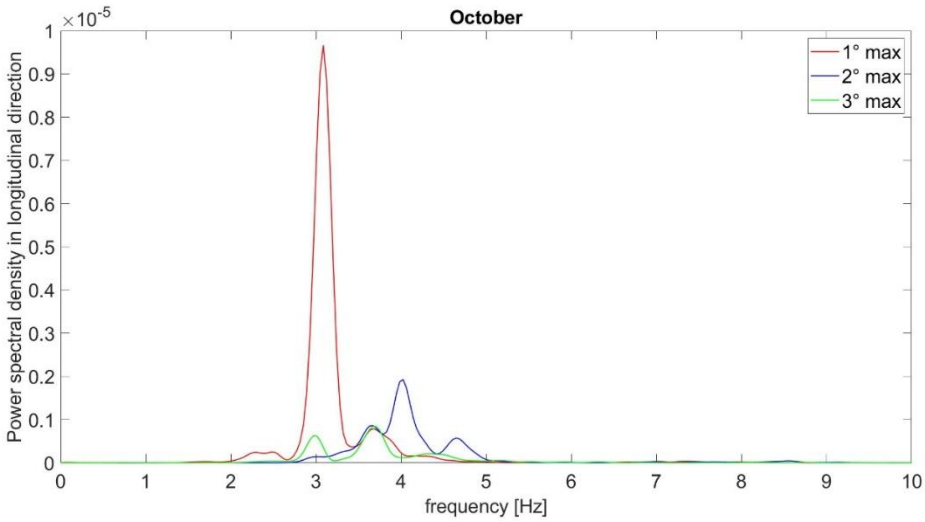


Figure 3-114: Results obtained from the 3 accelerograms with maximum SD in time domain

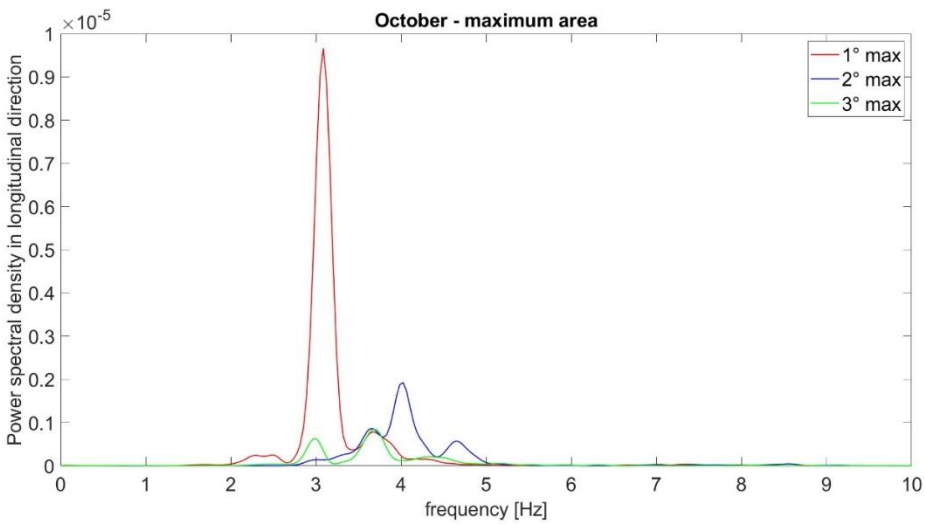


Figure 3-115: Results obtained from the 3 accelerograms with maximum area of PSD

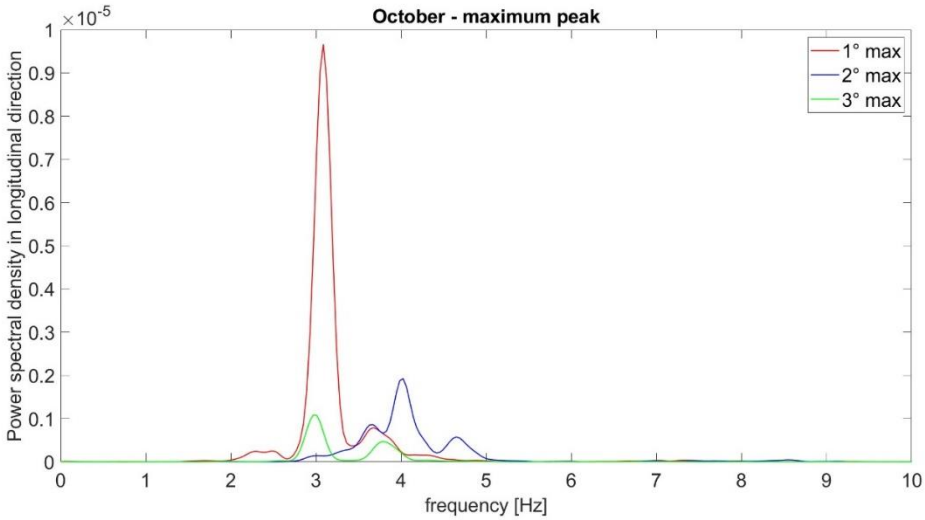


Figure 3-116: Results obtained from the 3 accelerograms with highest peak if PSD

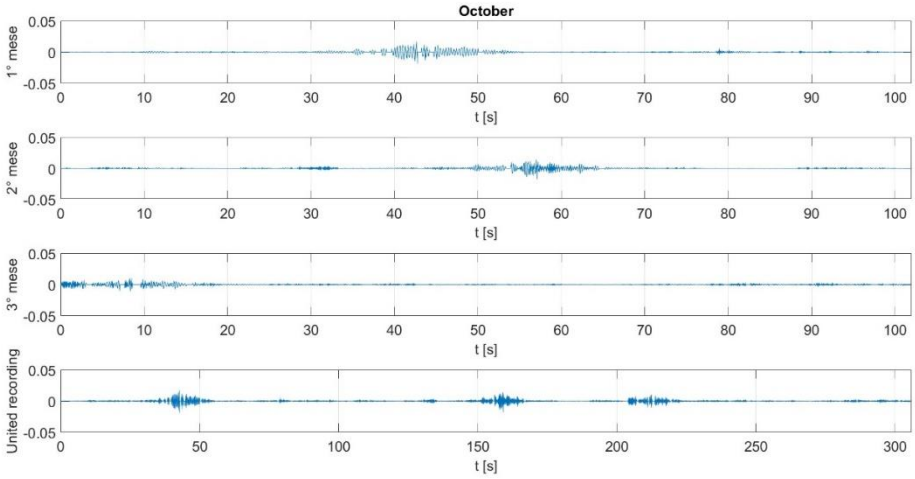


Figure 3-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

3.10.3 Transverse direction (z)

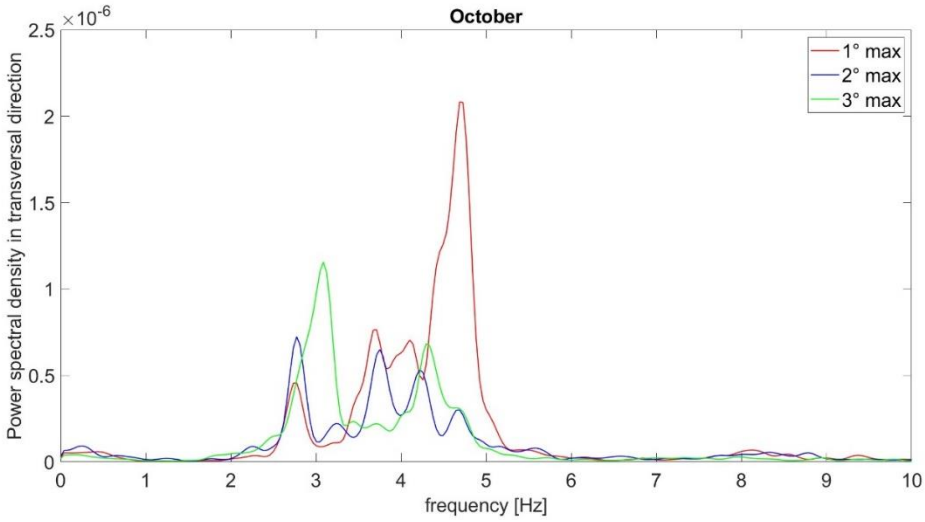


Figure 3-118: Results obtained from the 3 accelerograms with maximum SD in time domain

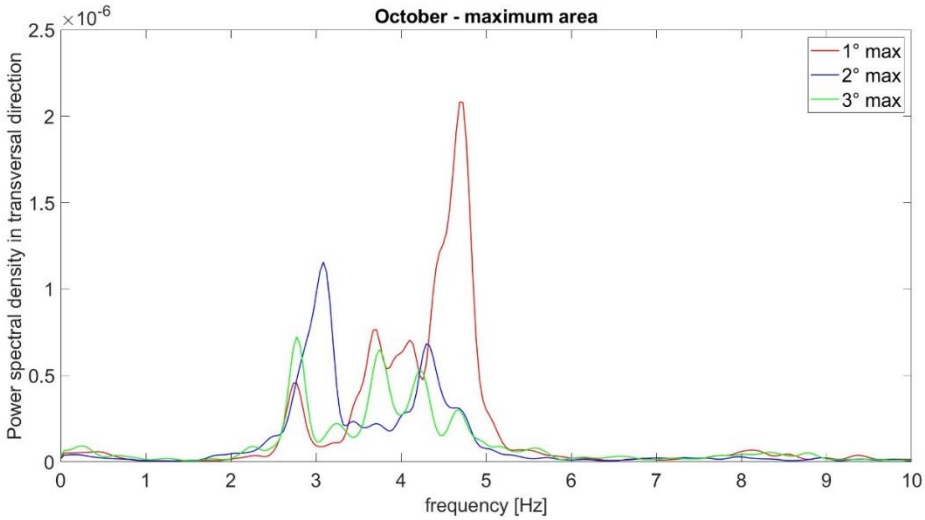


Figure 3-119: Results obtained from the 3 accelerograms with maximum area of PSD

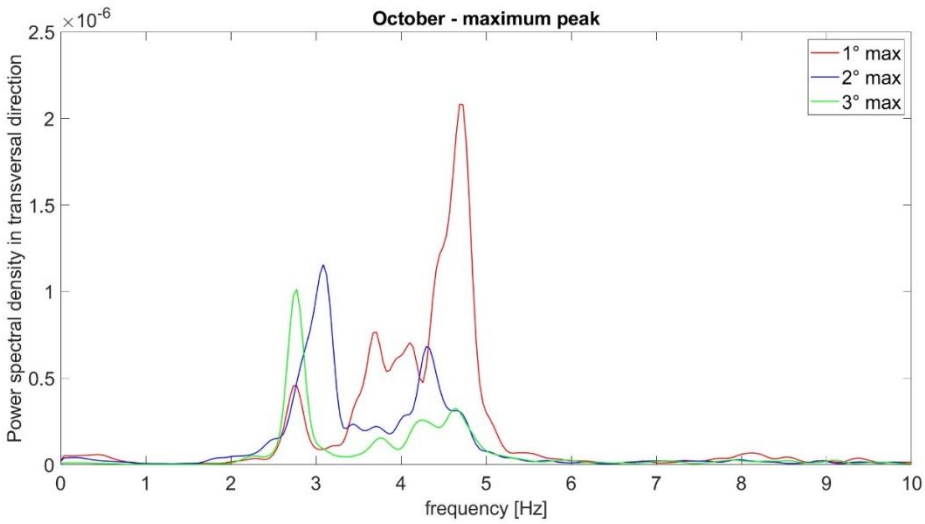


Figure 3-120: Results obtained from the 3 accelerograms with highest peak if PSD

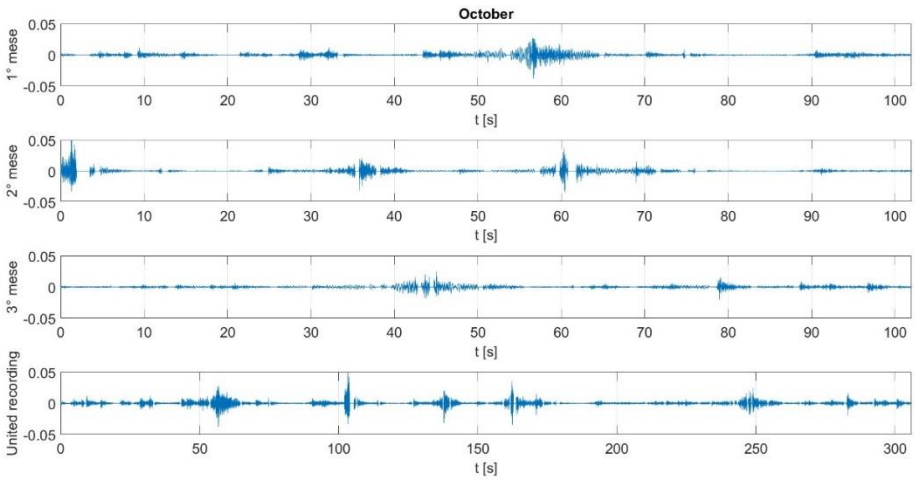


Figure 3-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

3.11 November

The results obtained for the November dataset are shown in the following tables.

Table 3-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-11-07_17-00-20	2.82E-03
	2°	31639_2023-11-09_06-00-19	1.36E-03
	3°	31639_2023-11-17_08-00-21	1.35E-03
Longitudinal direction (y)	1°	31639_2023-11-07_17-00-20	1.47E-03
	2°	31639_2023-11-06_17-00-19	8.51E-04
	3°	31639_2023-11-29_02-00-21	7.05E-04
Transverse direction (z)	1°	31639_2023-11-07_17-00-20	1.72E-03
	2°	31639_2023-11-07_13-00-20	1.13E-03
	3°	31639_2023-11-14_09-00-20	1.08E-03

Table 3-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-11-07_17-00-20	1.48E-05	31639_2023-11-07_17-00-20	1.58E-06
2	31639_2023-11-08_07-00-21	5.68E-06	31639_2023-11-17_08-00-21	3.69E-07
3	31639_2023-11-28_21-00-20	5.68E-06	31639_2023-11-08_07-00-21	3.59E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-11-07_17-00-20	3.98E-06	31639_2023-11-07_17-00-20	4.23E-07
2	31639_2023-11-06_17-00-19	1.99E-06	31639_2023-11-06_17-00-19	1.49E-07
3	31639_2023-11-29_02-00-21	8.83E-07	31639_2023-11-17_08-00-21	9.03E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-11-07_17-00-20	4.73E-06	31639_2023-11-07_17-00-20	6.07E-07
2	31639_2023-11-07_13-00-20	1.64E-06	31639_2023-11-07_13-00-20	2.69E-07
3	31639_2023-11-14_09-00-20	1.64E-06	31639_2023-11-14_09-00-20	2.14E-07

Table 3-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	-	-	B	C	C	C	E	E	E
3	B	-	-	D	D	-	F	F	F

3.11.1 Vertical direction (x)

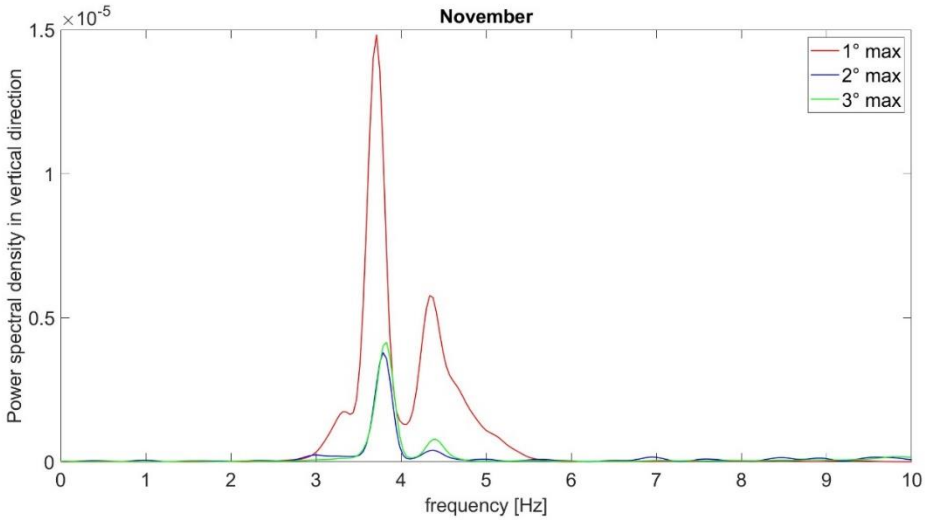


Figure 3-122: Results obtained from the 3 accelerograms with maximum SD in time domain

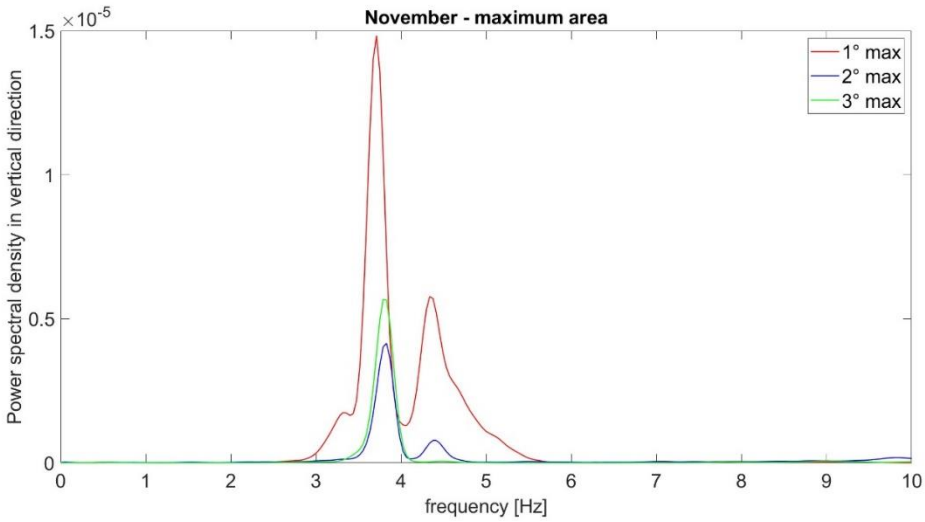


Figure 3-123: Results obtained from the 3 accelerograms with maximum area of PSD

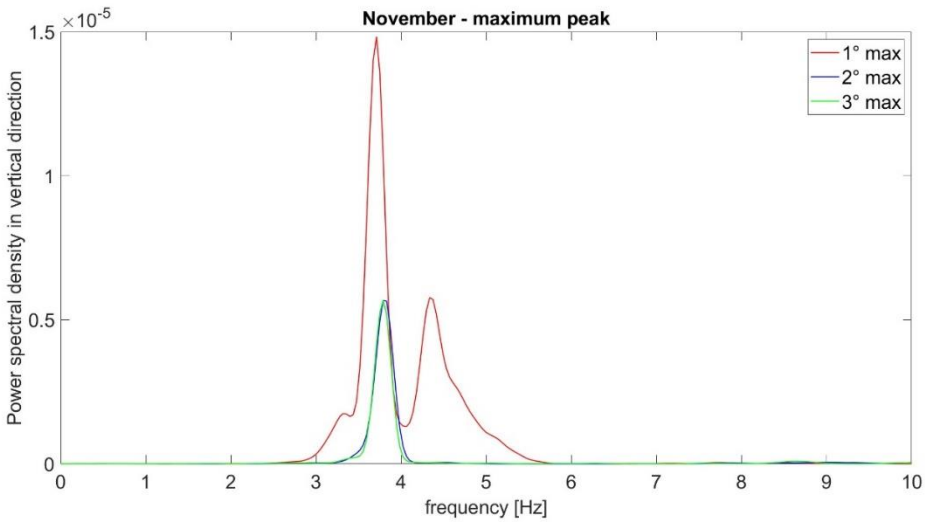


Figure 3-124: Results obtained from the 3 accelerograms with highest peak if PSD

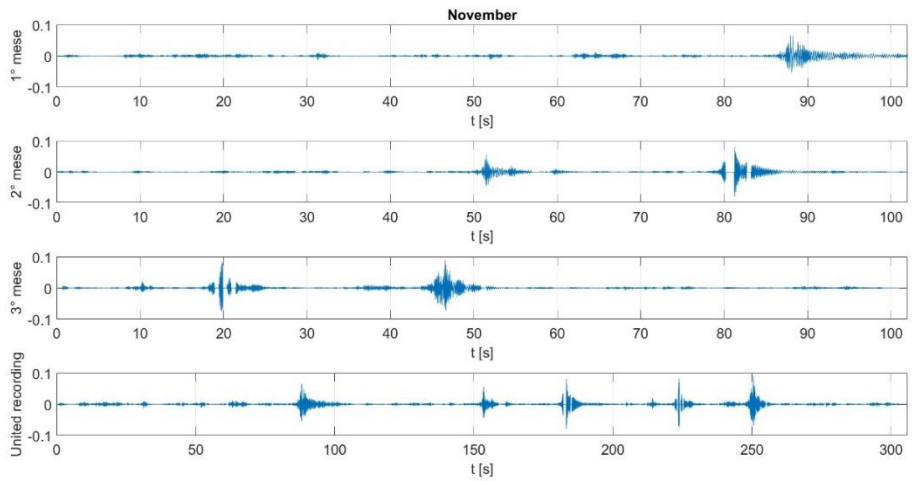


Figure 3-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.11.2 Longitudinal direction (y)

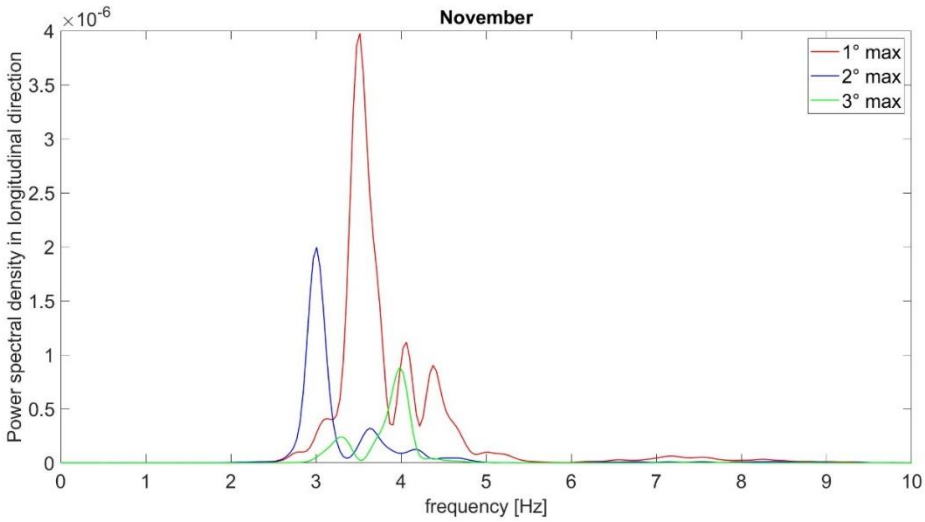


Figure 3-126: Results obtained from the 3 accelerograms with maximum SD in time domain

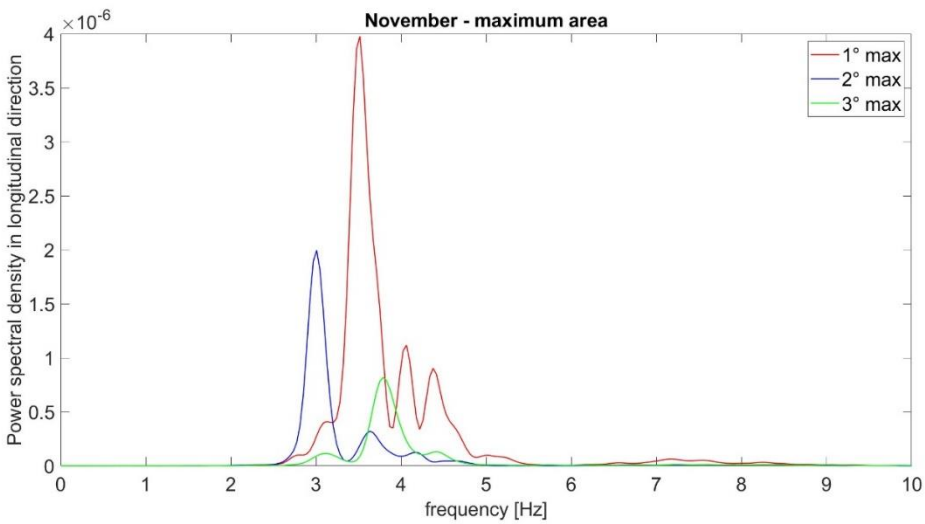


Figure 3-127: Results obtained from the 3 accelerograms with maximum area of PSD

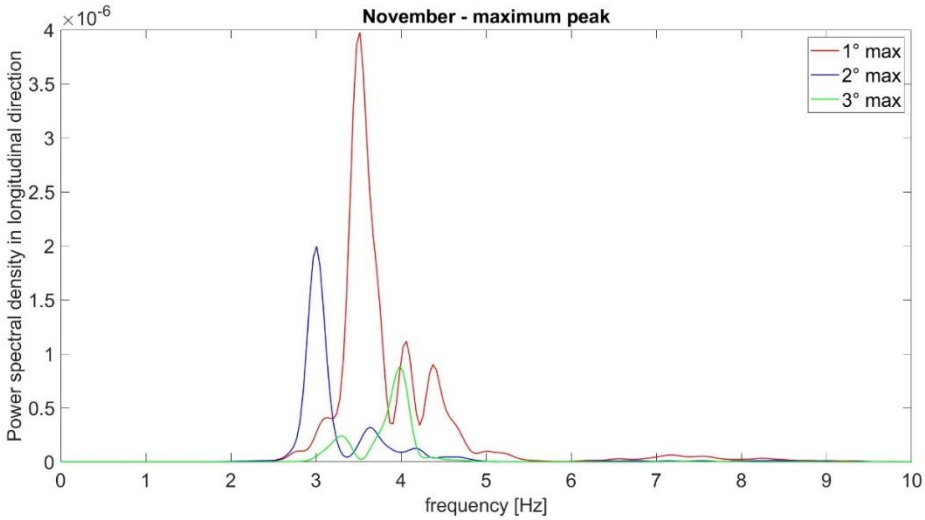


Figure 3-128: Results obtained from the 3 accelerograms with highest peak if PSD

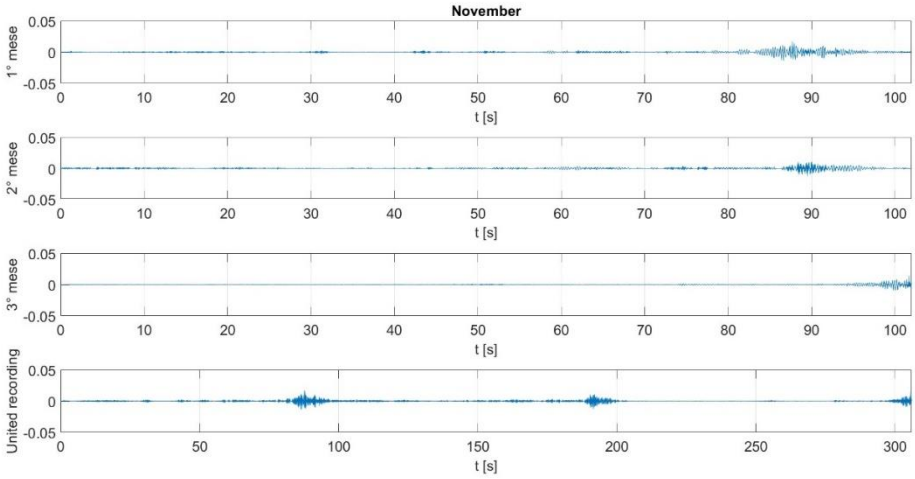


Figure 3-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

3.11.3 Transverse direction (z)

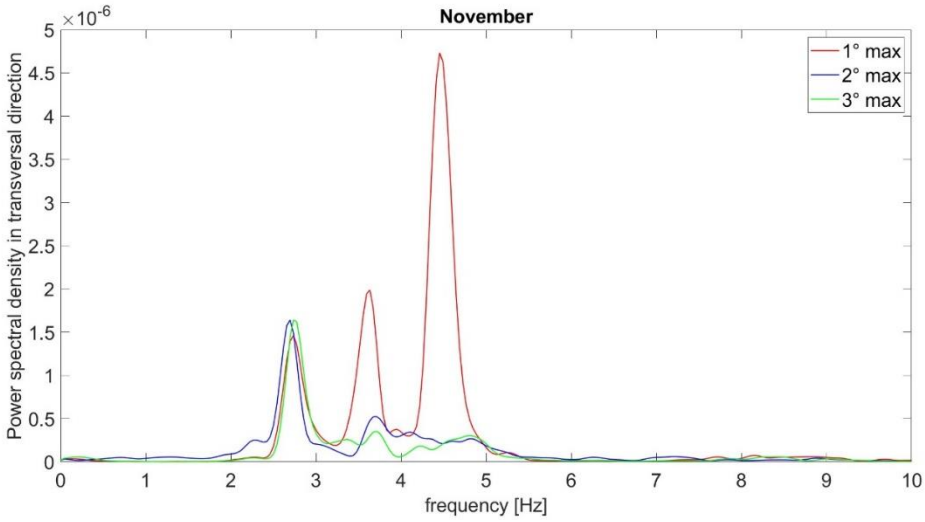


Figure 3-130: Results obtained from the 3 accelerograms with maximum SD in time domain

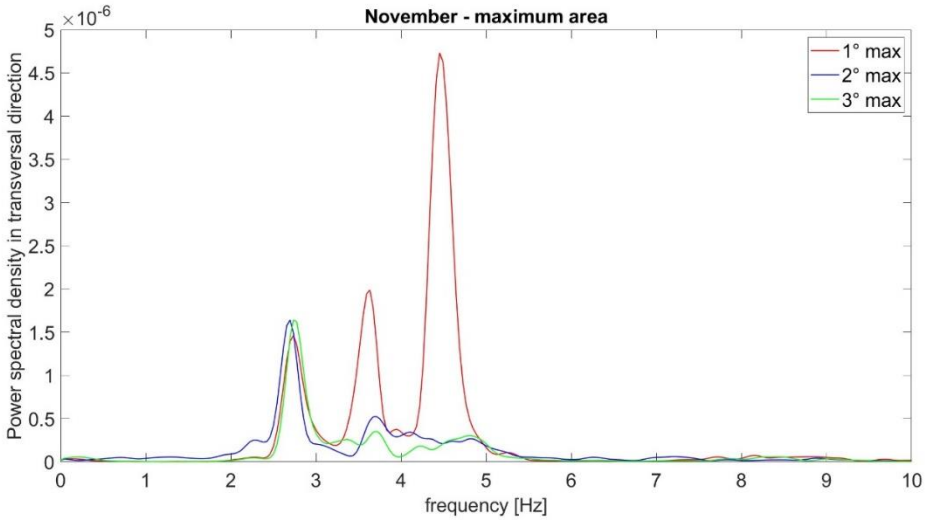


Figure 3-131: Results obtained from the 3 accelerograms with maximum area of PSD

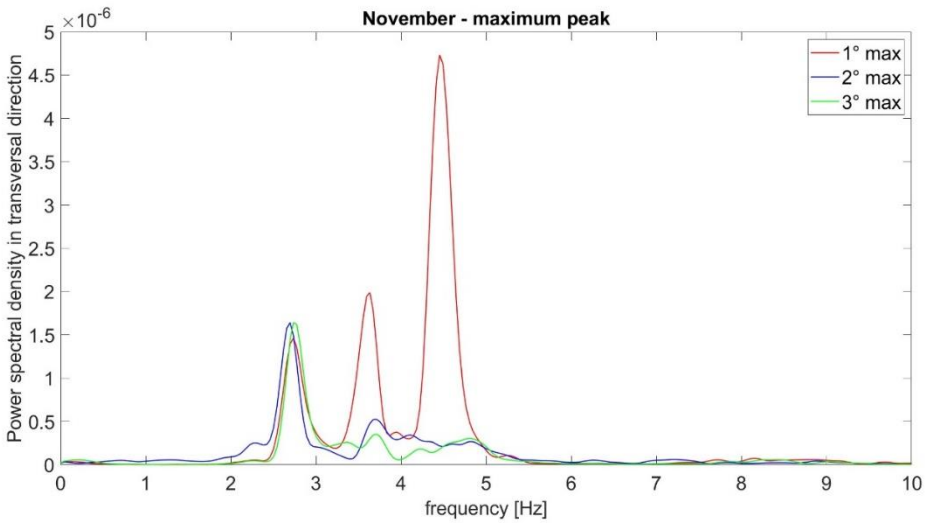


Figure 3-132: Results obtained from the 3 accelerograms with highest peak if PSD

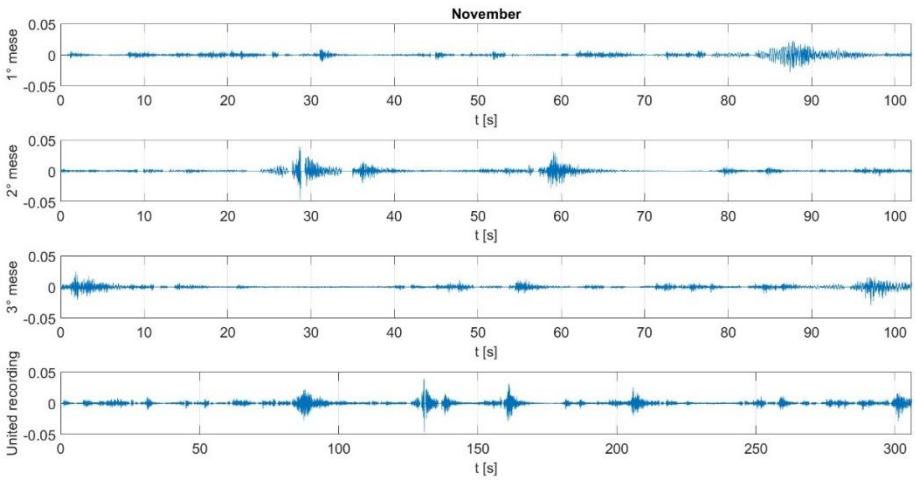


Figure 3-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

3.12 December

The results obtained for the December dataset are shown in the following tables.

Table 3-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31639_2023-12-06_10-00-20	2.01E-03
	2°	31639_2023-12-13_08-00-19	1.86E-03
	3°	31639_2023-12-22_09-00-21	1.60E-03
Longitudinal direction (y)	1°	31639_2023-12-06_10-00-20	1.58E-03
	2°	31639_2023-12-13_08-00-19	9.95E-04
	3°	31639_2023-12-07_14-00-19	8.36E-04
Transverse direction (z)	1°	31639_2023-12-06_10-00-20	1.29E-03
	2°	31639_2023-12-13_08-00-19	1.23E-03
	3°	31639_2023-12-12_15-00-19	1.01E-03

Table 3-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-12-06_10-00-20	9.07E-06	31639_2023-12-06_10-00-20	8.38E-07
2	31639_2023-12-22_16-00-19	5.18E-06	31639_2023-12-13_08-00-19	7.04E-07
3	31639_2023-12-13_08-00-19	4.65E-06	31639_2023-12-22_09-00-21	5.54E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-12-06_10-00-20	3.32E-06	31639_2023-12-06_10-00-20	5.15E-07
2	31639_2023-12-07_14-00-19	1.40E-06	31639_2023-12-13_08-00-19	2.04E-07
3	31639_2023-12-28_10-00-20	1.09E-06	31639_2023-12-07_14-00-19	1.44E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31639_2023-12-22_14-00-20	1.69E-06	31639_2023-12-06_10-00-20	3.60E-07
2	31639_2023-12-13_08-00-19	1.66E-06	31639_2023-12-13_08-00-19	3.14E-07
3	31639_2023-12-06_10-00-20	1.63E-06	31639_2023-12-12_15-00-19	2.57E-07

Table 3-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	-	A
2	B	-	B	B	D	B	-	B	B
3	C	B	C	D	-	D	E	A	E

3.12.1 Vertical direction (x)

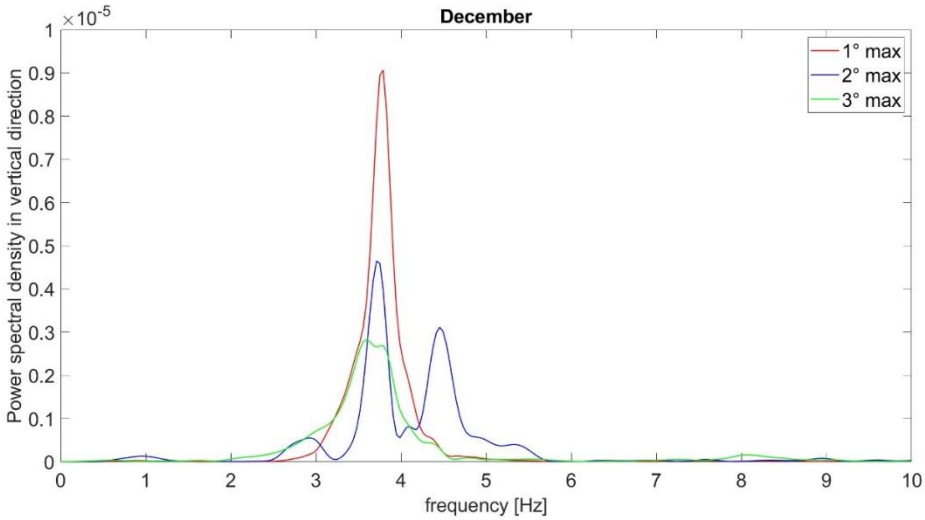


Figure 3-134: Results obtained from the 3 accelerograms with maximum SD in time domain

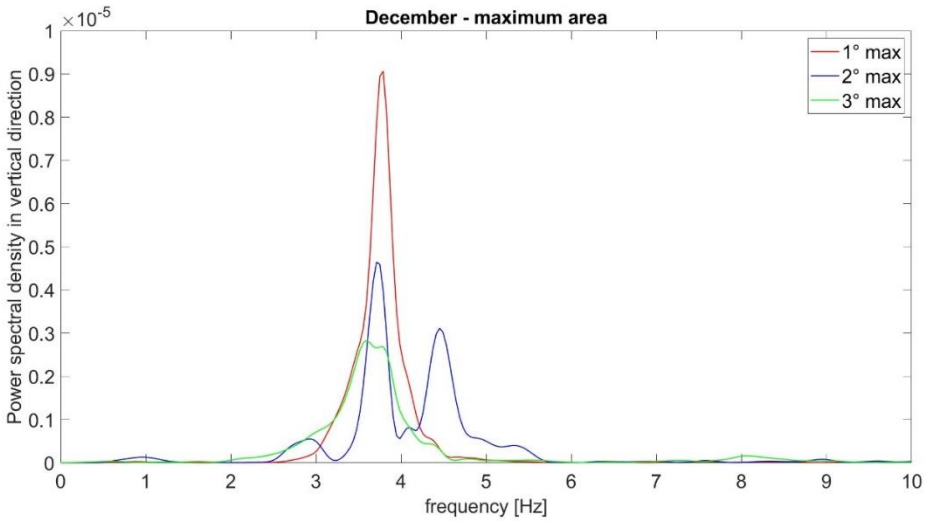


Figure 3-135: Results obtained from the 3 accelerograms with maximum area of PSD

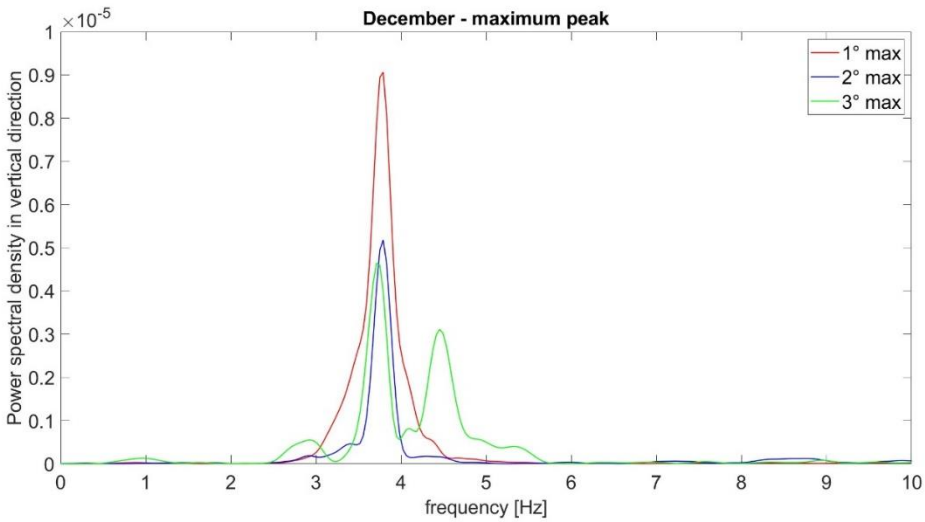


Figure 3-136: Results obtained from the 3 accelerograms with highest peak if PSD

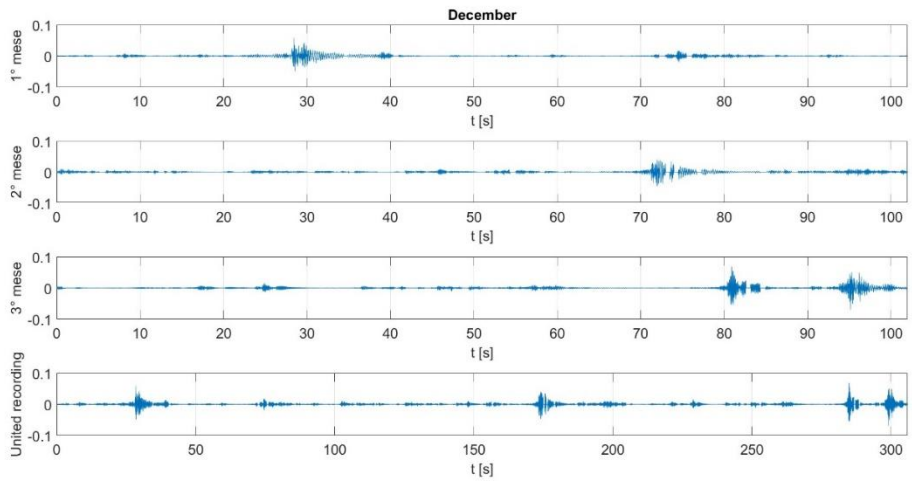


Figure 3-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

3.12.2 Longitudinal direction (y)

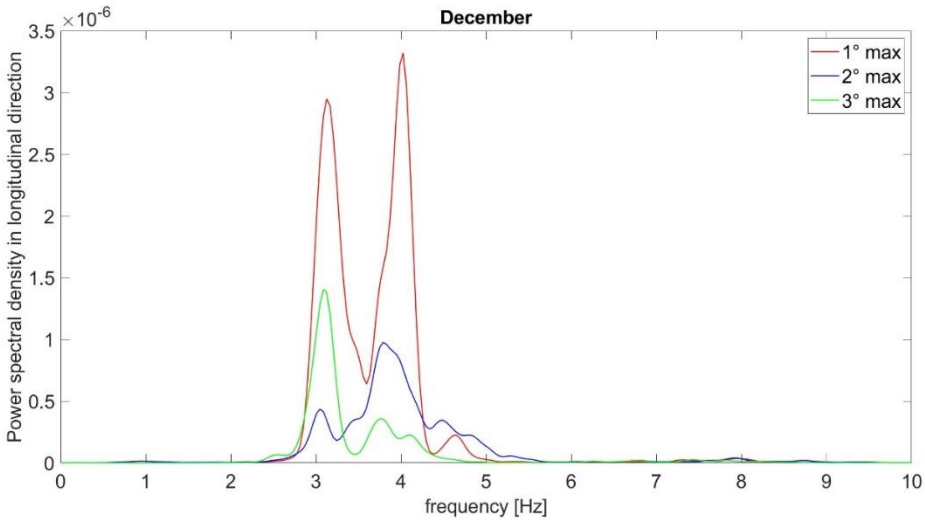


Figure 3-138: Results obtained from the 3 accelerograms with maximum SD in time domain

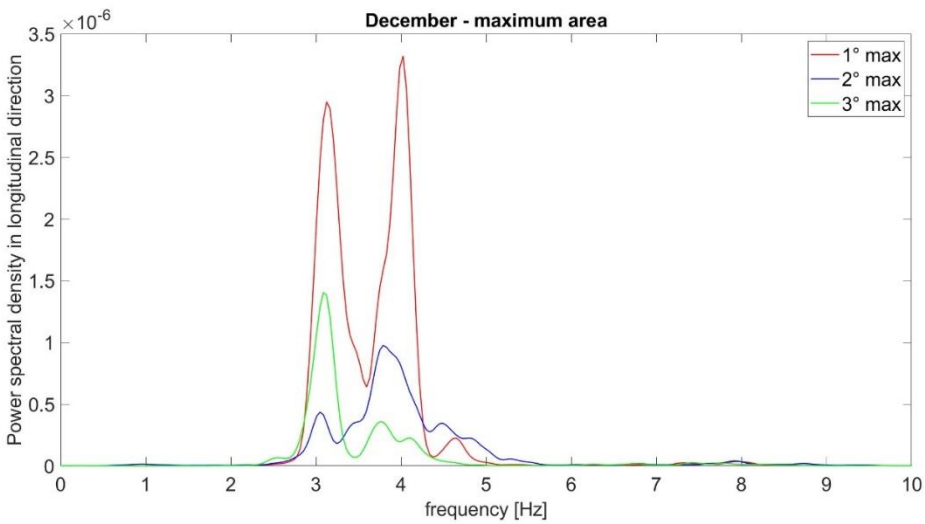


Figure 3-139: Results obtained from the 3 accelerograms with maximum area of PSD

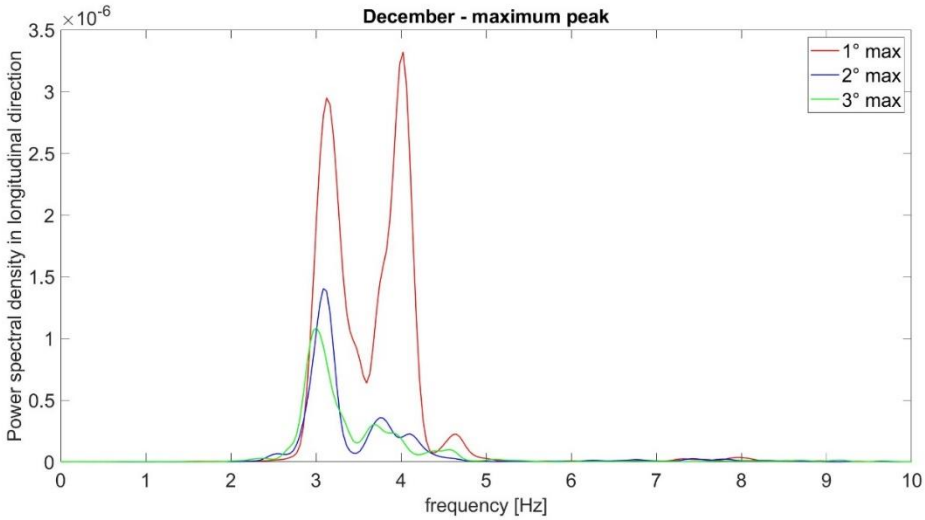


Figure 3-140: Results obtained from the 3 accelerograms with highest peak if PSD

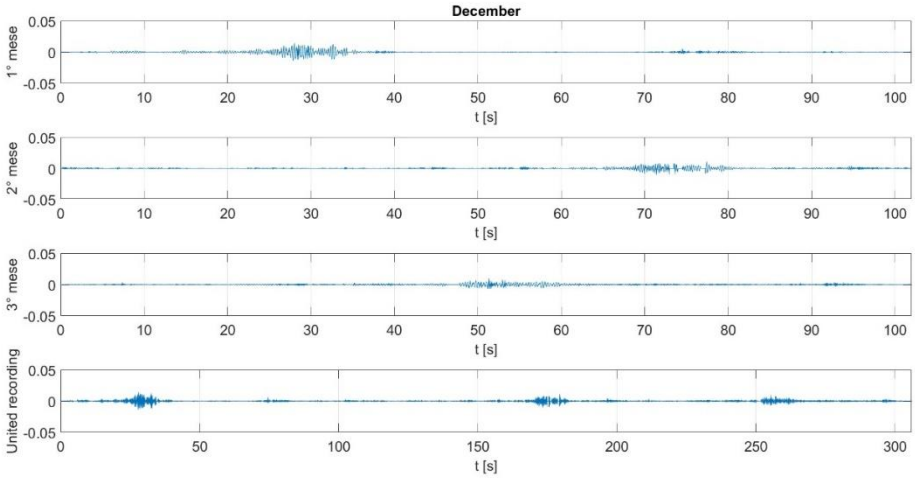


Figure 3-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

3.12.3 Transverse direction (z)

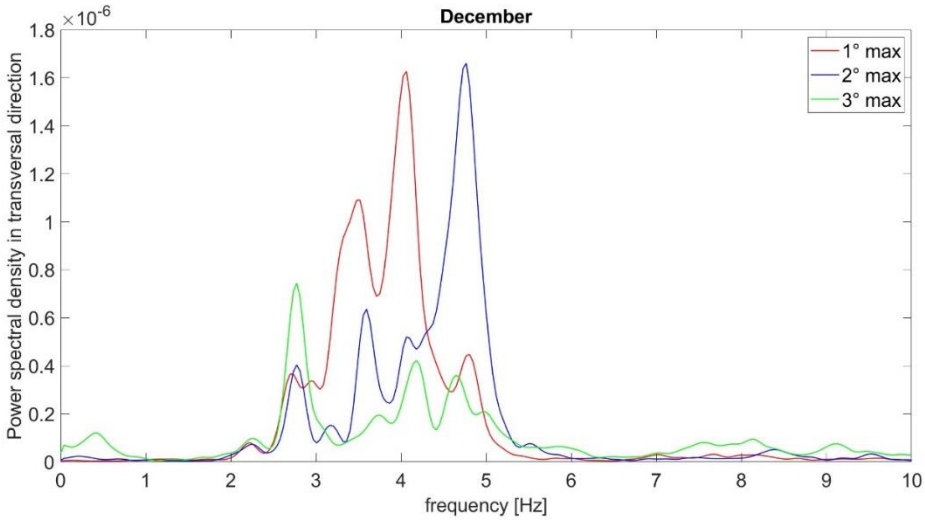


Figure 3-142: Results obtained from the 3 accelerograms with maximum SD in time domain

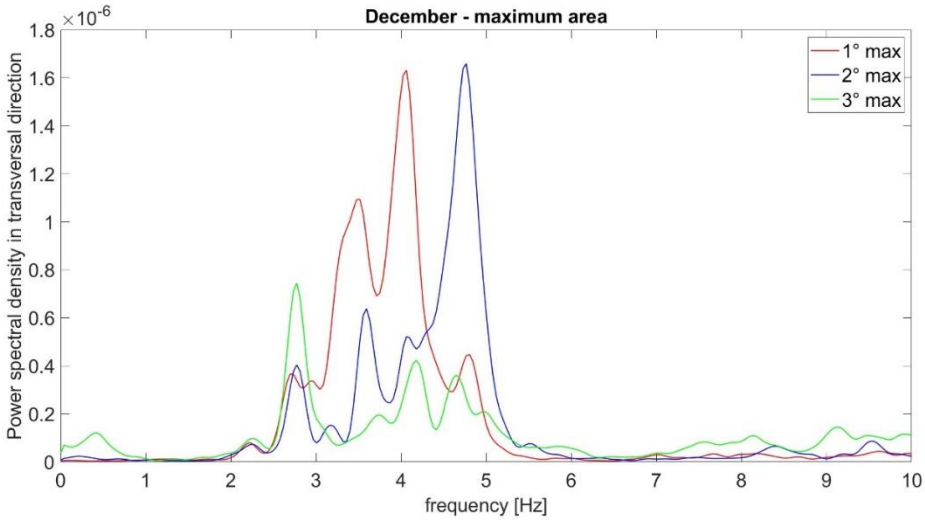


Figure 3-143: Results obtained from the 3 accelerograms with maximum area of PSD

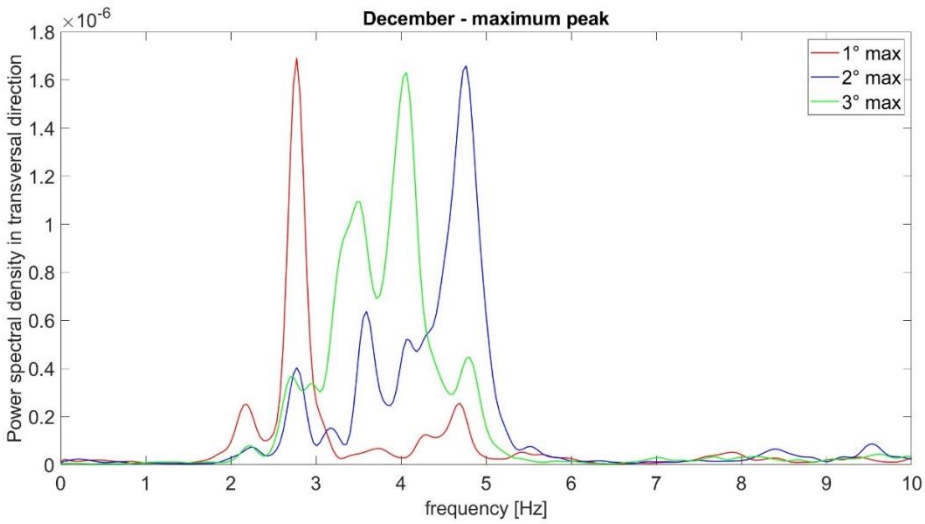


Figure 3-144: Results obtained from the 3 accelerograms with highest peak if PSD

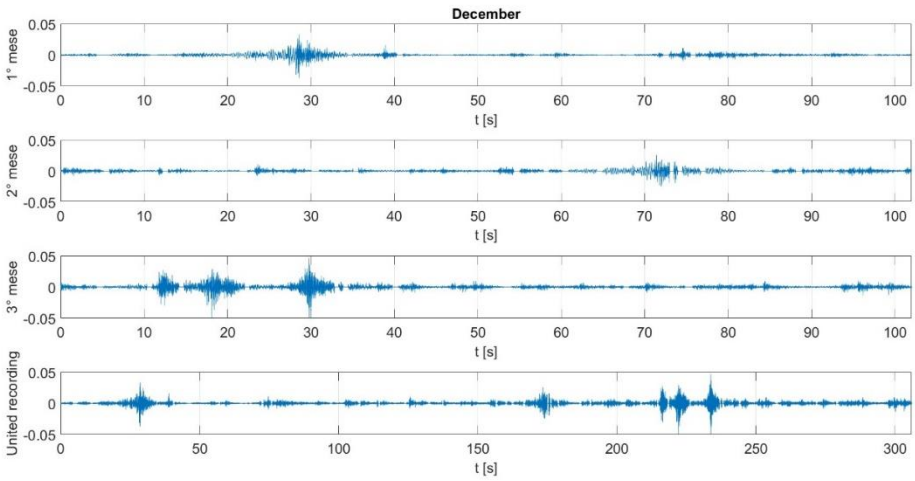


Figure 3-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

3.13 Analysis of the complete 2023 year

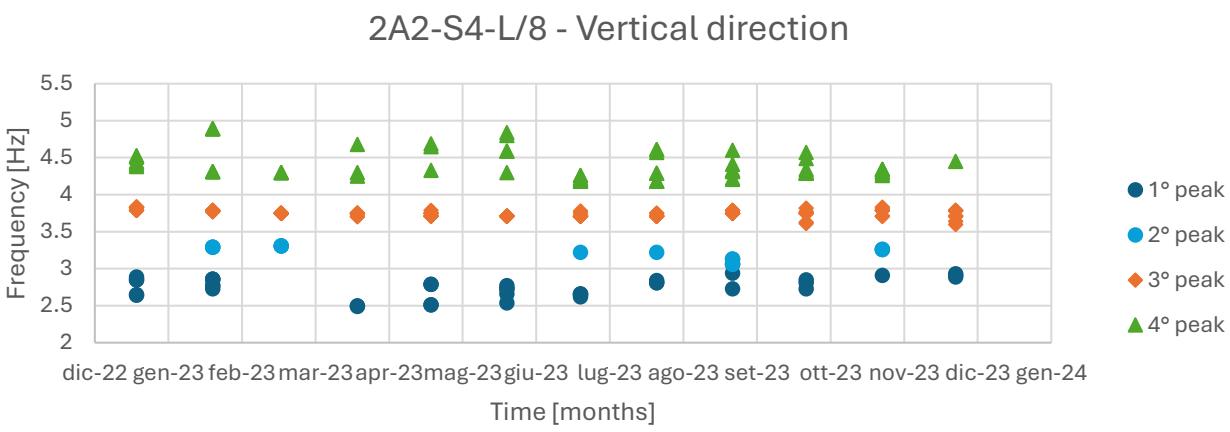
All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

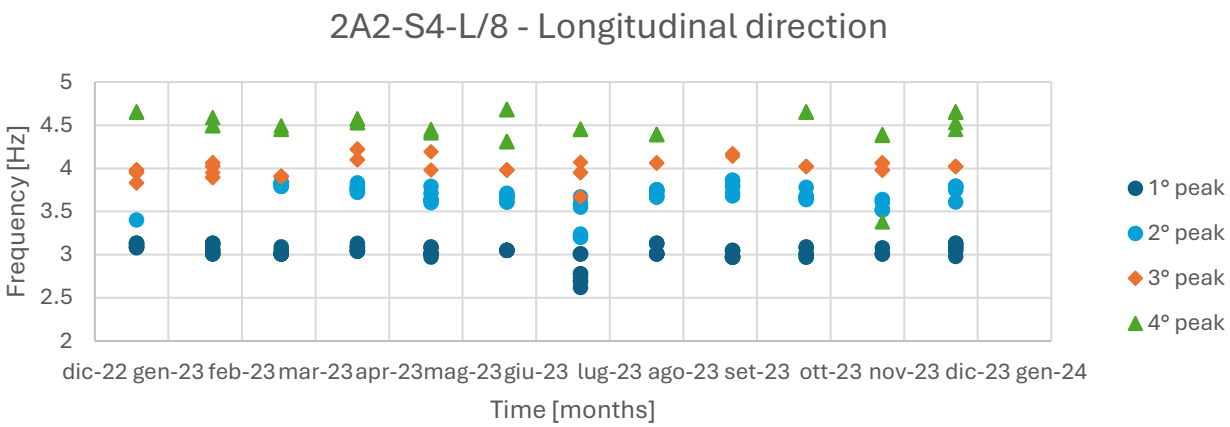
Table 3-37: Main identified frequencies for sensor 31639 – bridge 2A2 – Sp4 – L/8

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	38	16	108	63	89	65	64	40	33	69	45	43
	MEAN	**2.75**	**3.22**	**3.75**	**4.40**	**3.02**	**3.61**	**3.96**	**4.49**	**2.23**	**2.77**	**3.73**	**4.57**
	SD	0.13	0.09	0.04	0.19	0.17	0.21	0.14	0.21	0.06	0.08	0.17	0.14
	C.o.V.	4.6%	2.9%	1.2%	4.4%	5.8%	5.9%	3.5%	4.7%	2.6%	2.7%	4.5%	3.1%
	Rating	**27%**	**13%**	**100%**	**45%**	**59%**	**42%**	**49%**	**28%**	**27%**	**56%**	**32%**	**34%**
1	gen-23			3.83	4.44	3.09	3.4	3.95					
2	gen-23	2.85		3.79	4.53	3.09		3.98	4.65				
3	gen-23	2.64		3.83	4.44	3.13		3.98					
1	gen-23	2.85		3.83	4.51	3.08		3.95		2.27	2.62	3.91	
2	gen-23	2.65		3.79	4.51	3.09		3.98	4.65		2.8	3.99	4.63
3	gen-23			3.79	4.38	3.13		3.83			2.73	4.06	4.63
1	gen-23	2.89		3.83		3.13		3.83		2.27	2.62	3.86	
2	gen-23			3.83	4.41	3.09		3.98	4.65		2.73	3.99	4.63
3	gen-23			3.83		3.13		3.95			2.8		4.67
1	feb-23	2.77	3.29	3.78	4.89	3.13		4.02	4.5				
2	feb-23			3.78		3.01		4.06					
3	feb-23	2.86		3.77	4.31	3.05		3.9					
1	feb-23	2.77	3.29	3.79	4.89	2.34	3.13	4.02	4.49	2.21	2.73	3.51	
2	feb-23			3.79			3.01	4.06			2.66	3.81	4.63
3	feb-23	2.86		3.77	4.31		3.05	3.95			2.77		4.61
1	feb-23			3.78	4.31	2.34	3.13	4.02		2.23	2.73	3.51	
2	feb-23	2.86		3.79			3.09	3.89			2.77		4.65
3	feb-23	2.73	3.29	3.79	4.89		3.01	4.06	4.59		2.77		4.65
1	mar-23		3.31	3.75	4.3	3.01		3.79					
2	mar-23			3.75		3.01		3.91	4.45				
3	mar-23			3.75		3.09		3.83					
1	mar-23		3.31	3.75	4.3	3.01		3.79			2.77	3.63	4.57
2	mar-23			3.75		3.01		3.91	4.45	2.18	2.73		4.73
3	mar-23			3.75		3.05		3.83		2.18	2.81	3.55	
1	mar-23		3.31	3.75	4.3	3.01		3.79		2.19	2.73	3.71	4.73
2	mar-23			3.75		3.01		3.83		2.19	2.77	3.67	4.65
3	mar-23			3.75		3.01		3.9	4.49		2.77	3.67	
1	apr-23			3.75		3.09	3.76	4.1	4.57				
2	apr-23	2.49		3.75		3.05	3.76	4.22					
3	apr-23	2.5		3.71	4.68	3.05	3.72		4.53				
1	apr-23			3.75		3.09	3.79	4.1	4.57		2.77		4.29
2	apr-23			3.75	4.25	3.04	3.75	4.22	4.53	2.24	2.77	3.6	
3	apr-23			3.7		3.04	3.79			2.22	2.77	3.59	4.53

1	apr-23			3.75		3.09	3.75			2.24	2.77	3.6	4.65
2	apr-23			3.75		3.05	3.75	4.22			2.73	3.63	4.61
3	apr-23			3.75	4.3	3.13	3.83		4.57	2.22	2.77	3.59	4.53
1	mag-23			3.75		3.01							
2	mag-23	2.51		3.75		3.09	3.63		4.43				
3	mag-23	2.51		3.75	4.69		3.6	3.98					
1	mag-23	2.79		3.71		3.01	3.63		4.41	2.18	2.77		4.69
2	mag-23			3.75		3.01					2.77		
3	mag-23			3.71	4.33		3.63	4.19		2.3	2.94		4.53
1	mag-23	2.79		3.71		3.01	3.79			2.18	2.77		4.69
2	mag-23			3.71		2.97	3.71				2.73		
3	mag-23			3.79	4.65	3.08	3.63		4.45	2.3	2.77	3.75	
1	giu-23	2.66		3.71	4.59	3.05	3.61	3.98	4.68				
2	giu-23	2.73		3.71			3.61		4.31				
3	giu-23	2.54		3.71	4.8	3.05							
1	giu-23			3.71		3.05	3.67	3.98	4.68		2.81	3.91	4.61
2	giu-23	2.73		3.71	4.3		3.67		4.31	2.3	2.89		
3	giu-23			3.71	4.84	3.05	3.71				2.93	3.91	
1	giu-23			3.71		3.05	3.67	3.98	4.68		2.81	3.91	
2	giu-23			3.71	4.59		3.67		4.31	2.3	2.93		
3	giu-23	2.77		3.71			3.71			2.3	2.89		4.29
1	lug-23	2.66		3.71	4.19	2.69	3.67		4.45				
2	lug-23	2.62	3.22	3.71	4.26	2.78		3.95					
3	lug-23			3.75	4.22	3.01	3.55	4.07					
1	lug-23	2.66		3.71	4.18	2.78	3.2	3.95			2.85		4.69
2	lug-23			3.71	4.21	2.69			4.45		2.97	4.1	
3	lug-23			3.71		3.01					2.81		
1	lug-23	2.65		3.71	4.18	3.01		3.59			2.85		4.65
2	lug-23			3.71		2.73	3.24	3.67	4.45		2.73	3.63	
3	lug-23			3.78	4.26	2.62	3.2					4.1	
1	ago-23		3.22	3.71	4.18	3.13	3.67		4.39				
2	ago-23			3.71	4.29	3.01	3.71	4.06					
3	ago-23	2.84		3.75	4.61	3.01	3.75						
1	ago-23			3.71	4.18	3.13	3.67		4.39			3.79	
2	ago-23			3.75	4.29	3.01	3.75	4.06		2.3	2.73		
3	ago-23	2.81		3.71	4.61	3.01	3.75				2.85		4.49
1	ago-23			3.71	4.18	3.13	3.67		4.39	2.3	2.73	4.09	4.69
2	ago-23	2.81		3.71	4.57	3.01	3.75				2.73	3.79	4.67
3	ago-23			3.71			3.71			2.3	2.81		
1	set-23	2.94		3.79	4.31	2.97							
2	set-23	2.73		3.75	4.22	3.04	3.71						
3	set-23		3.06	3.75	4.6	2.97	3.68	4.17					
1	set-23		3.06	3.79	4.21	2.97	3.86				2.73	3.63	4.29
2	set-23			3.75		2.97	3.79				2.73	3.67	4.29
3	set-23		3.13	3.75	4.33	3.05		4.14			2.73		4.24
1	set-23		3.06	3.79	4.33	2.97					2.73	3.63	4.24
2	set-23		3.13	3.75	4.41	3.05	3.79			2.01	2.73	3.63	
3	set-23			3.75		2.97	3.86				2.73		
1	ott-23			3.75		3.09							

2	ott-23			3.61	4.57		3.64	4.02	4.65				
3	ott-23	2.81		3.77	4.31	2.97	3.64						
1	ott-23			3.63	4.49	3.08	3.67				2.73	3.67	4.69
2	ott-23			3.75	4.29		3.67	4.02	4.65		3.01		
3	ott-23	2.85		3.82	4.34	3.01	3.67			2.22	2.73	3.75	
1	ott-23			3.75	4.29	3.01	3.67				2.73	3.71	4.69
2	ott-23			3.75	4.29		3.67	4.02	4.65		3.01		
3	ott-23	2.73		3.75		2.97	3.78			2.22	2.77	3.79	4.65
1	nov-23		3.26	3.71	4.26		3.52	4.06	4.39				
2	nov-23	2.91		3.79	4.31	3.01	3.64						
3	nov-23			3.83	4.29			3.98					
1	nov-23		3.26	3.71	4.34		3.52	4.06	3.38		2.73	3.63	4.45
2	nov-23			3.82	4.34	3.01	3.63				2.71	3.67	
3	nov-23			3.79		3.08		3.98		2.26	2.73		4.63
1	nov-23		3.26	3.71	4.34		3.52	4.06	4.38		2.73	3.63	4.31
2	nov-23			3.79		3.01	3.61			2.26	2.73	3.67	
3	nov-23			3.79				3.98			2.73	3.67	4.54
1	dic-23			3.78		3.13		4.02	4.65				
2	dic-23	2.91		3.71	4.45	3.09		3.79	4.53				
3	dic-23			3.6		3.05		3.79					
1	dic-23			3.79		3.13		4.02	4.65	2.26	2.7	3.52	4.64
2	dic-23	2.89		3.71		3.09		3.79	4.45	2.24	2.77	3.6	4.59
3	dic-23			3.64		3.05		3.78		2.24	2.77		
1	dic-23			3.79		3.13		4.02	4.65	2.19	2.77		4.61
2	dic-23			3.79		3.09		3.75		2.22	2.77	3.59	4.59
3	dic-23	2.93		3.71		3.98		3.61		2.22		3.48	4.59





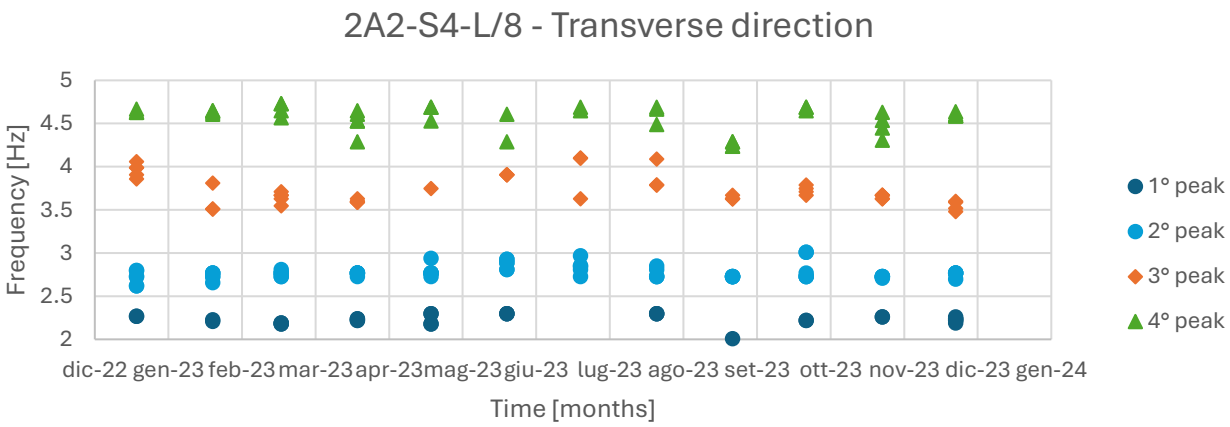


Figure 3-146: Main identified frequencies for sensor 31639 – bridge 2A2 – Sp4 – L/8

4. Annex 4 – Bridge 2A2 – Pile 5N - Sensor 30D41

The Bridge 2A2 counts 2 monitored decks: span 4 and span 5 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 4 are:

- 3099D – situated in the midspan;
- 30EB4 – situated at a distance of L/4;
- 31639 – situated at a distance of L/8;
- 30D41 – situated nearby the pilar.

The sensors present on deck number 5 are:

- 2B7E4 – situated in the midspan;
- 3187F – situated at a distance of L/4 of the deck;
- 2B988 – situated at a distance of L/8 of the deck;
- 2C1EA – situated by the pilar.

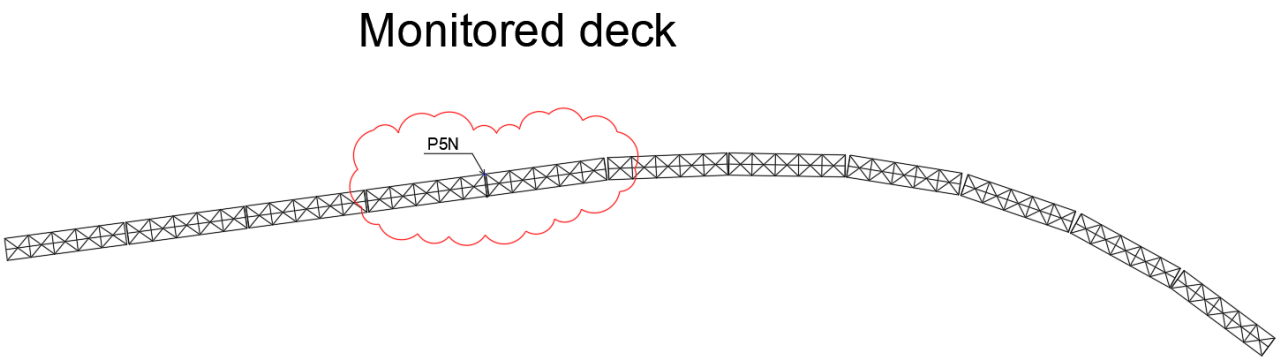


Figure 4-1 Monitored decks of 2A2 bridge

The accelerograms of the 30D41 sensor have been analyzed and the results are represented in the following paragraphs.

4.1 January

The results obtained for the January dataset are shown in the following tables.

Table 4-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-01-31_07-00-20	7.81E-05
	2°	30D41_2023-01-13_13-00-20	7.27E-05
	3°	30D41_2023-01-19_13-00-20	7.21E-05
Longitudinal direction (y)	1°	30D41_2023-01-17_07-00-21	4.45E-04
	2°	30D41_2023-01-26_07-00-19	3.80E-04
	3°	30D41_2023-01-31_07-00-20	3.77E-04
Transverse direction (z)	1°	30D41_2023-01-31_07-00-20	4.38E-04
	2°	30D41_2023-01-19_13-00-20	4.26E-04
	3°	30D41_2023-01-23_13-00-20	4.25E-04

Table 4-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-01-17_07-00-21	4.72E-09	30D41_2023-01-31_07-00-20	9.51E-10
2	30D41_2023-01-19_13-00-20	4.53E-09	30D41_2023-01-13_13-00-20	8.24E-10
3	30D41_2023-01-31_07-00-20	3.78E-09	30D41_2023-01-19_13-00-20	7.83E-10
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-01-17_07-00-21	3.05E-07	30D41_2023-01-17_07-00-21	4.20E-08
2	30D41_2023-01-31_07-00-20	2.54E-07	30D41_2023-01-26_07-00-19	2.92E-08
3	30D41_2023-01-26_07-00-19	2.53E-07	30D41_2023-01-31_07-00-20	2.85E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-01-31_07-00-20	1.63E-07	30D41_2023-01-31_07-00-20	4.09E-08
2	30D41_2023-01-19_13-00-20	1.62E-07	30D41_2023-01-19_13-00-20	3.66E-08
3	30D41_2023-01-14_13-00-20	1.18E-07	30D41_2023-01-26_07-00-19	3.60E-08

Table 4-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	D	D	D	A	A	A
2	B	C	B	E	A	E	F	F	F
3	C	A	C	A	E	A	-	-	-

4.1.1 Vertical direction (x)

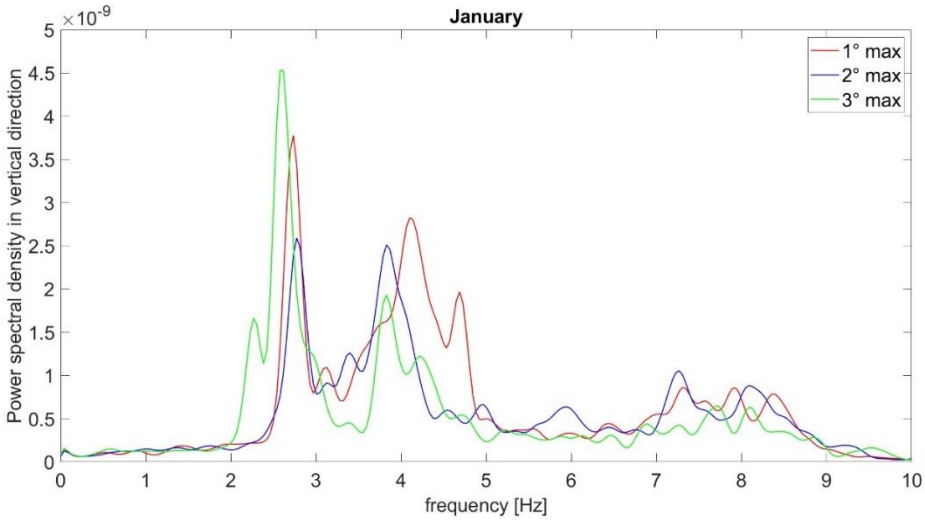


Figure 4-2: Results obtained from the 3 accelerograms with maximum SD in time domain

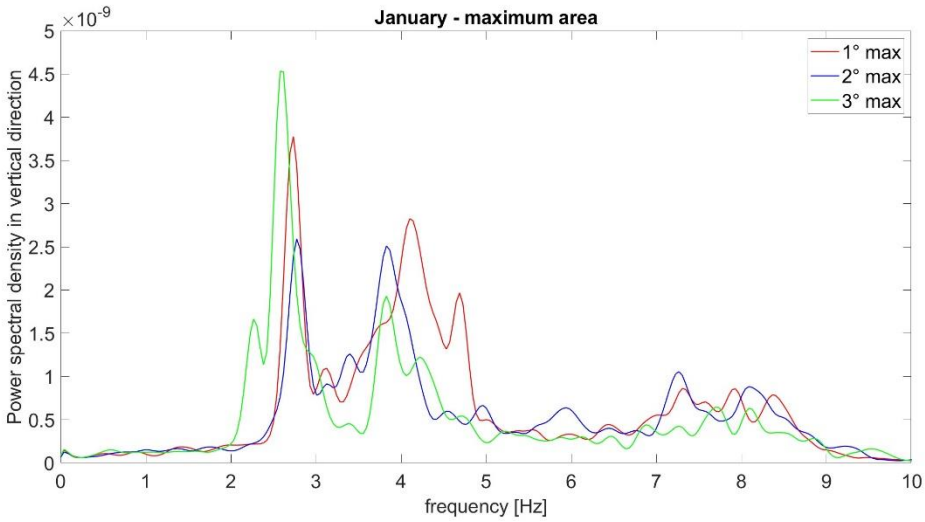


Figure 4-3: Results obtained from the 3 accelerograms with maximum area of PSD

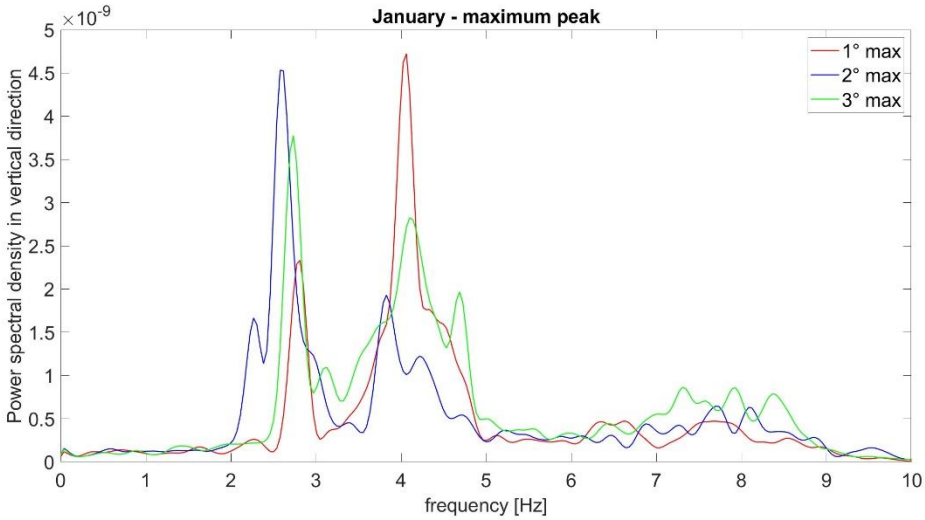


Figure 4-4: Results obtained from the 3 accelerograms with highest peak if PSD

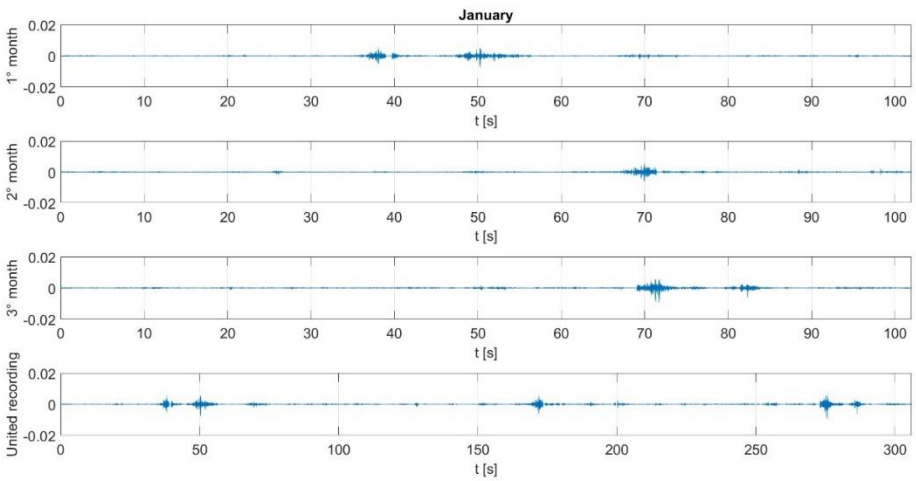


Figure 4-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.1.2 Longitudinal direction (y)

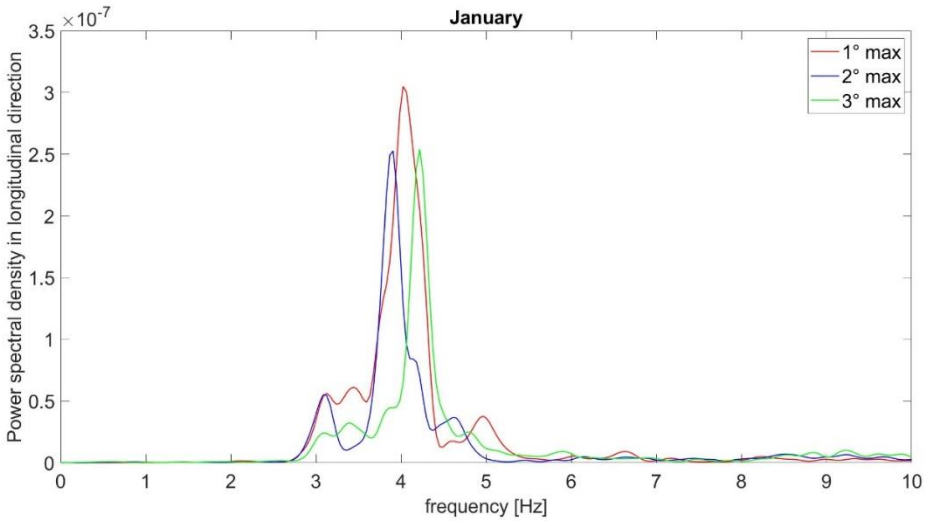


Figure 4-6: Results obtained from the 3 accelerograms with maximum SD in time domain

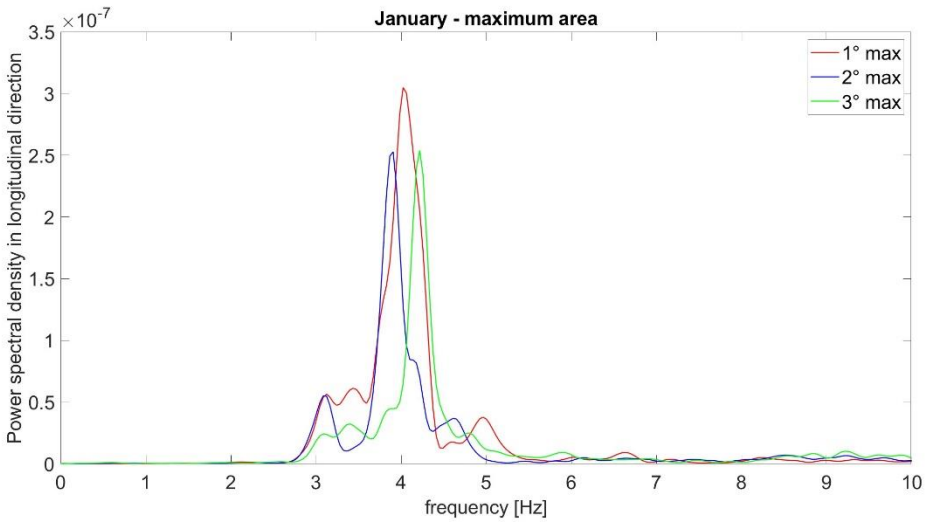


Figure 4-7: Results obtained from the 3 accelerograms with maximum area of PSD

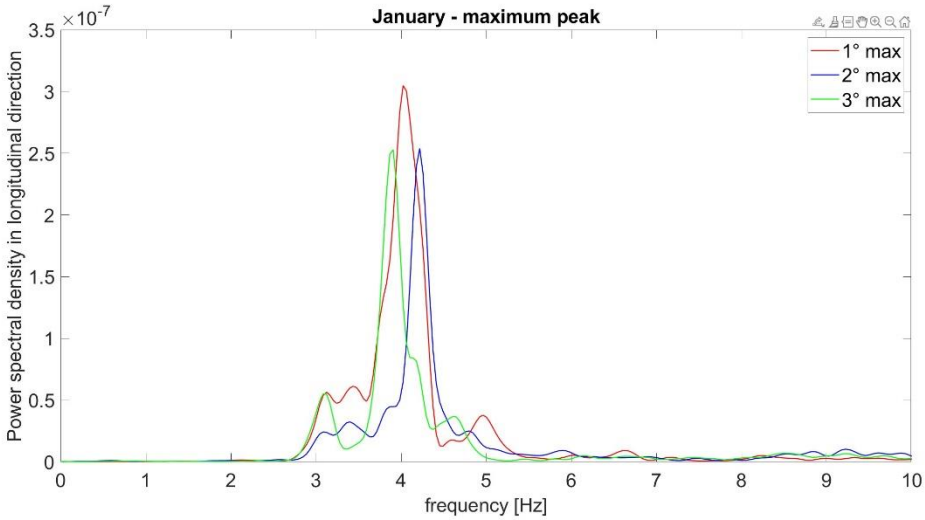


Figure 4-8: Results obtained from the 3 accelerograms with highest peak in PSD

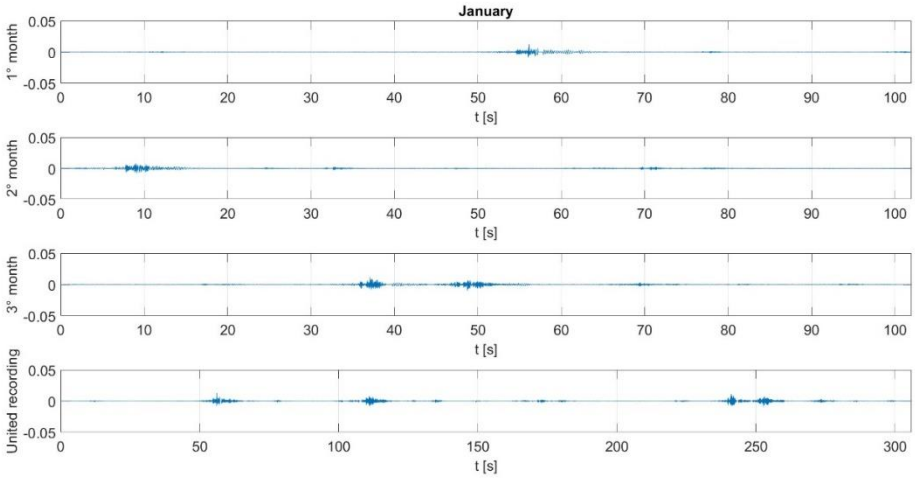


Figure 4-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

4.1.3 Transverse direction (z)

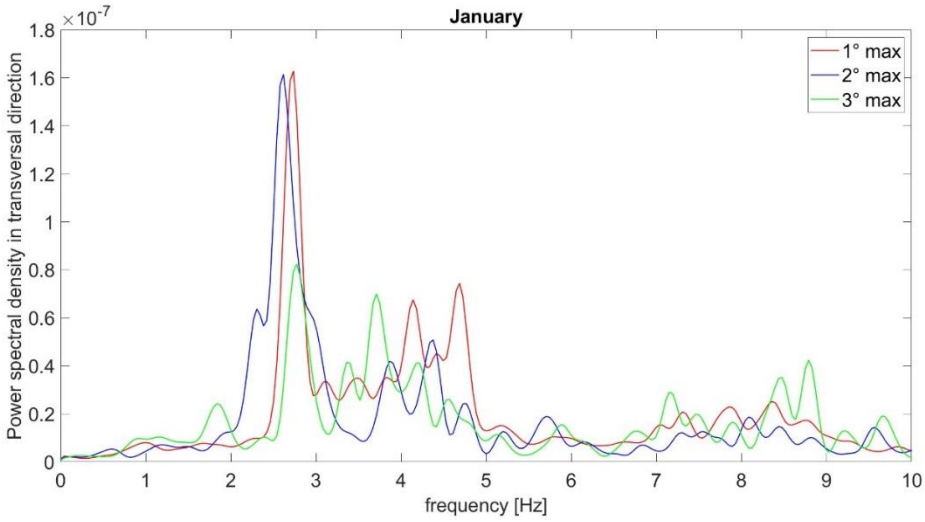


Figure 4-10: Results obtained from the 3 accelerograms with maximum SD in time domain

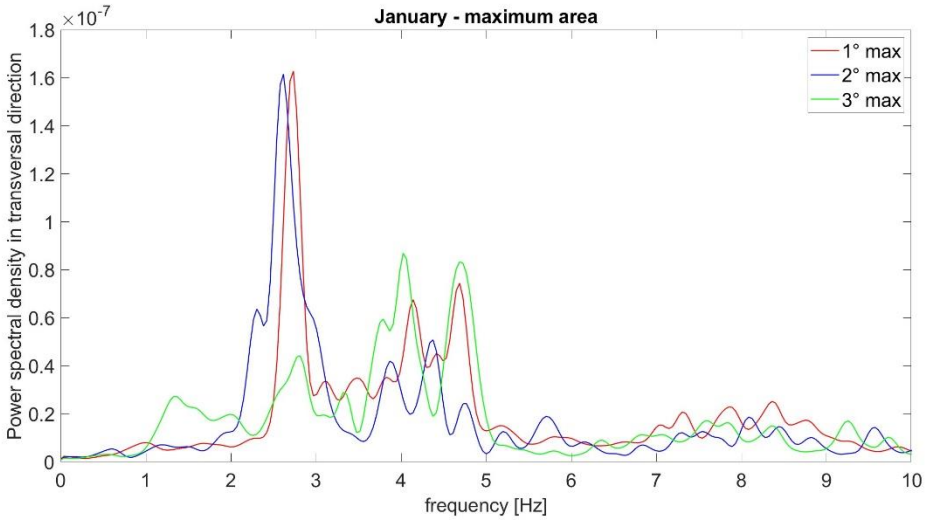


Figure 4-11: Results obtained from the 3 accelerograms with maximum area of PSD

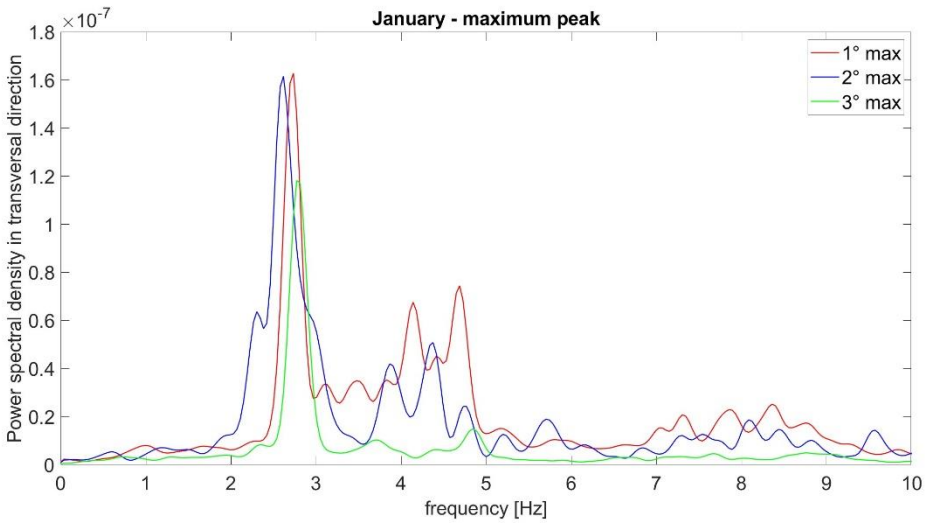


Figure 4-12: Results obtained from the 3 accelerograms with highest peak in PSD

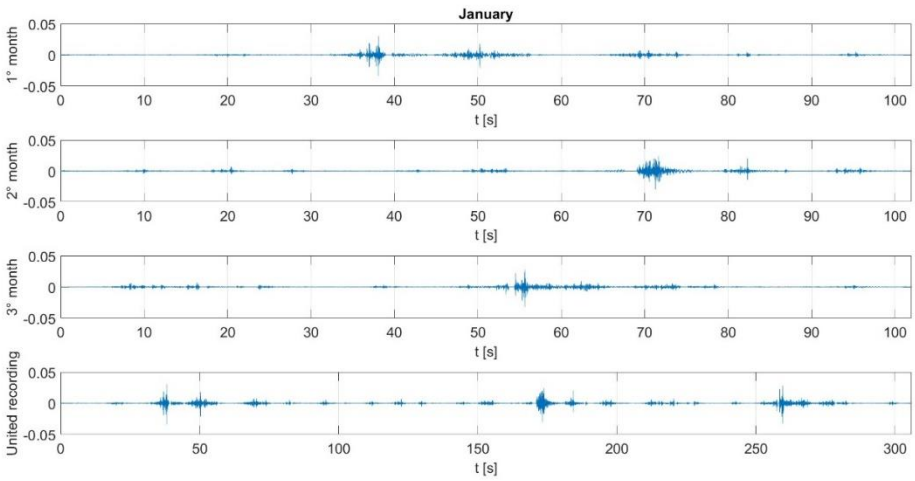


Figure 4-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

4.2 February

The results obtained for the February dataset are shown in the following tables.

Table 4-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-02-01_13-00-21	1.13E-04
	2°	30D41_2023-02-06_13-00-21	1.03E-04
	3°	30D41_2023-02-20_13-00-20	1.02E-04
Longitudinal direction (y)	1°	30D41_2023-02-01_13-00-21	7.47E-04
	2°	30D41_2023-02-06_13-00-21	5.63E-04
	3°	30D41_2023-02-01_07-00-20	3.98E-04
Transverse direction (z)	1°	30D41_2023-02-01_13-00-21	6.96E-04
	2°	30D41_2023-02-06_13-00-21	6.32E-04
	3°	30D41_2023-02-20_13-00-20	5.03E-04

Table 4-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-02-01_13-00-21	1.18E-08	30D41_2023-02-01_13-00-21	1.90E-09
2	30D41_2023-02-06_13-00-21	1.05E-08	30D41_2023-02-20_13-00-20	1.64E-09
3	30D41_2023-02-20_13-00-20	6.13E-09	30D41_2023-02-06_13-00-21	1.54E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-02-01_13-00-21	7.14E-07	30D41_2023-02-01_13-00-21	1.14E-07
2	30D41_2023-02-06_13-00-21	4.59E-07	30D41_2023-02-06_13-00-21	5.83E-08
3	30D41_2023-02-24_13-00-20	2.35E-07	30D41_2023-02-01_07-00-20	3.20E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-02-06_13-00-21	4.37E-07	30D41_2023-02-01_13-00-21	9.80E-08
2	30D41_2023-02-01_13-00-21	3.10E-07	30D41_2023-02-06_13-00-21	7.42E-08
3	30D41_2023-02-22_19-00-21	2.06E-07	30D41_2023-02-20_13-00-20	5.25E-08

Table 4-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	B	A
2	B	B	C	B	B	B	B	A	B
3	C	C	B	D	-	D	C	-	C

4.2.1 Vertical direction (x)

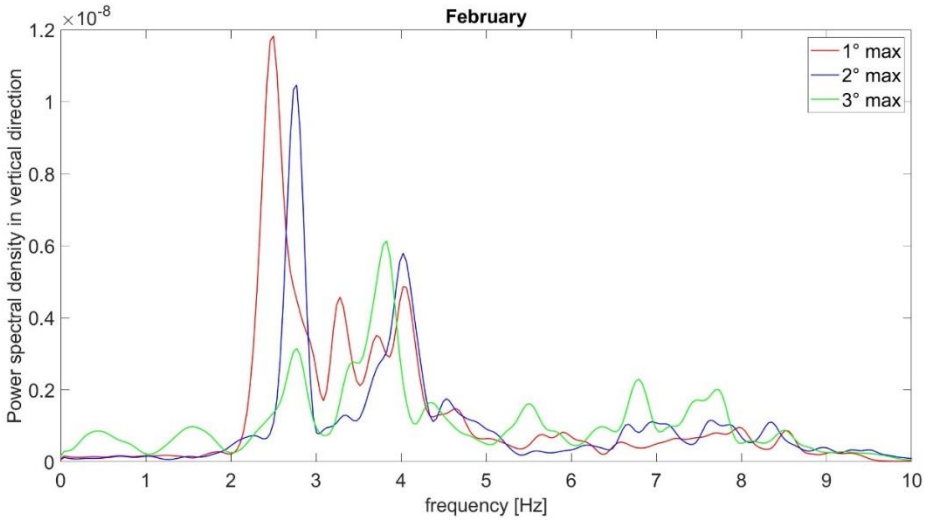


Figure 4-14: Results obtained from the 3 accelerograms with maximum SD in time domain

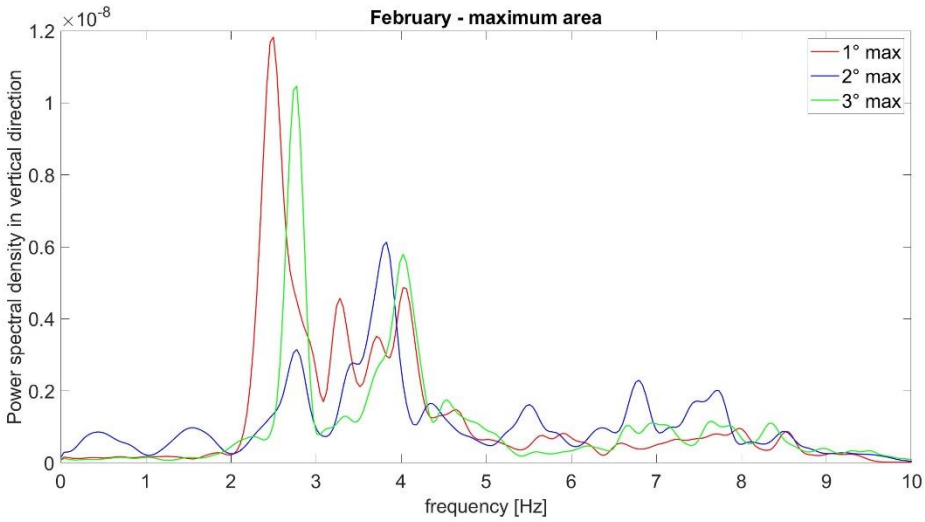


Figure 4-15: Results obtained from the 3 accelerograms with maximum area of PSD

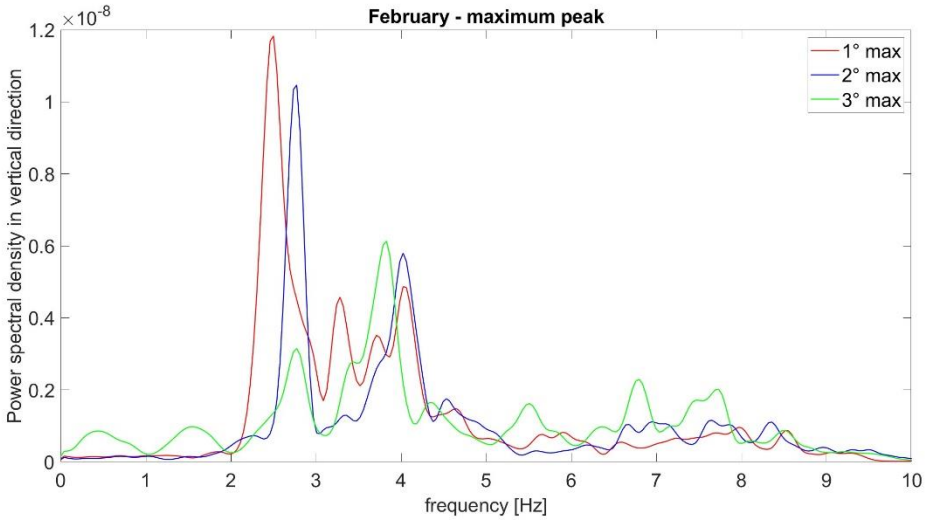


Figure 4-16: Results obtained from the 3 accelerograms with highest peak if PSD

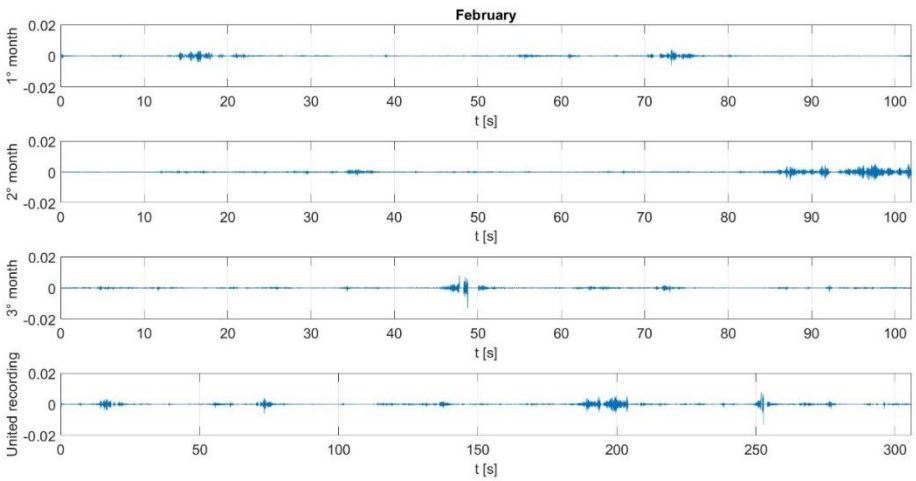


Figure 4-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.2.2 Longitudinal direction (y)

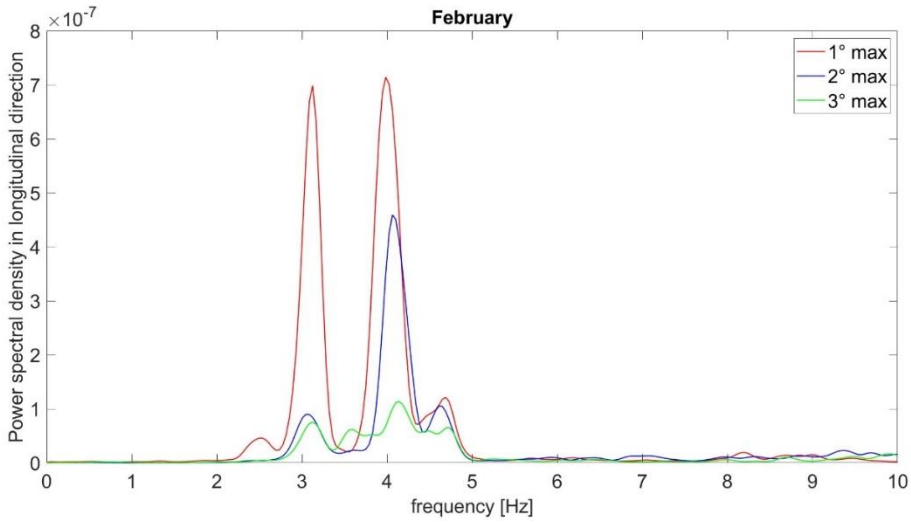


Figure 4-18: Results obtained from the 3 accelerograms with maximum SD in time domain

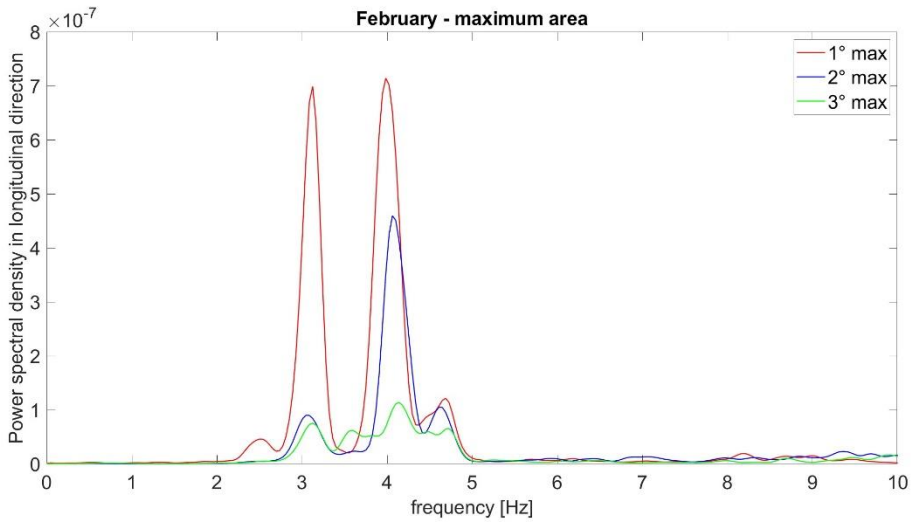


Figure 4-19: Results obtained from the 3 accelerograms with maximum area of PSD

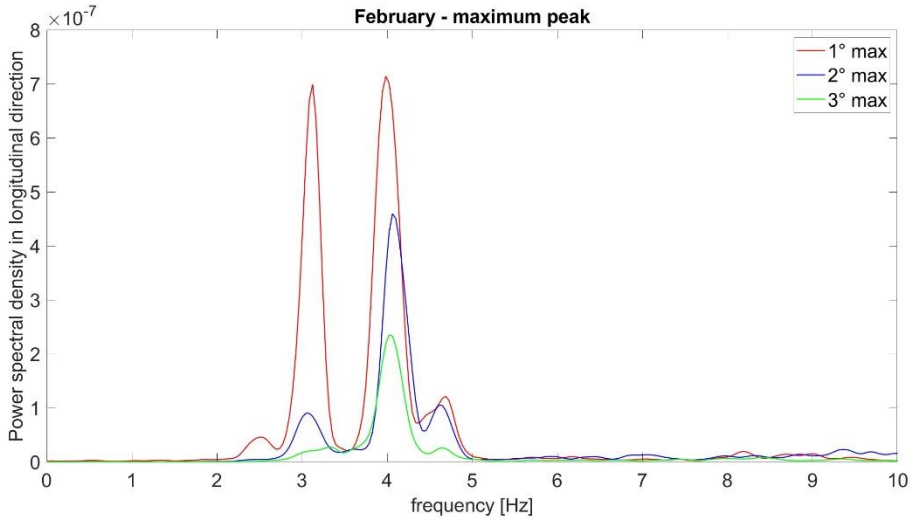


Figure 4-20: Results obtained from the 3 accelerograms with highest peak if PSD

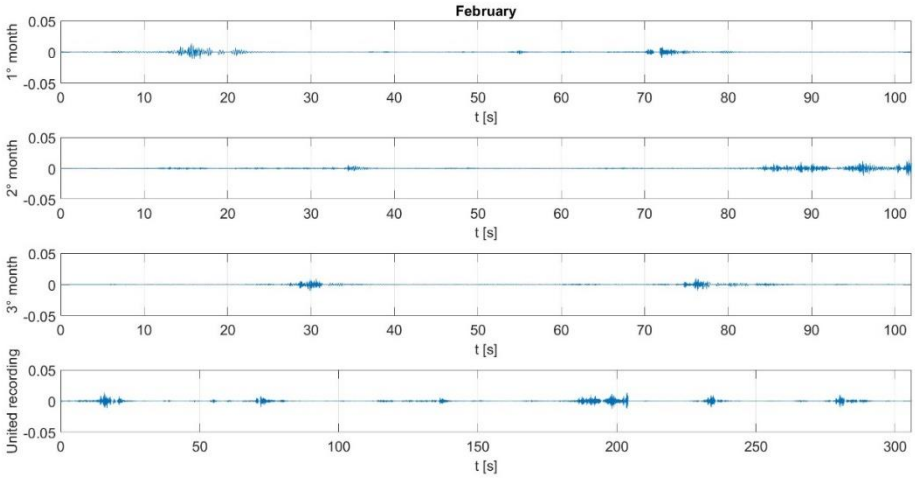


Figure 4-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

4.2.3 Transverse direction (z)

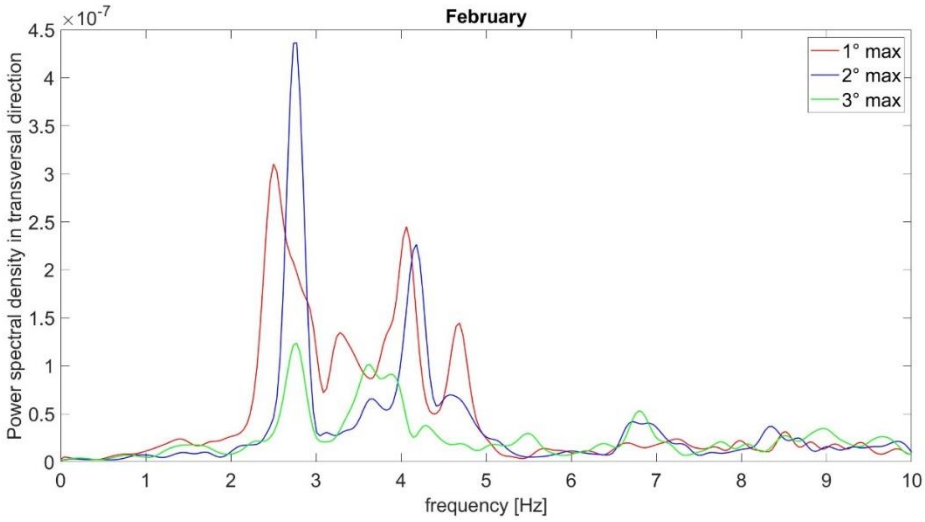


Figure 4-22: Results obtained from the 3 accelerograms with maximum SD in time domain

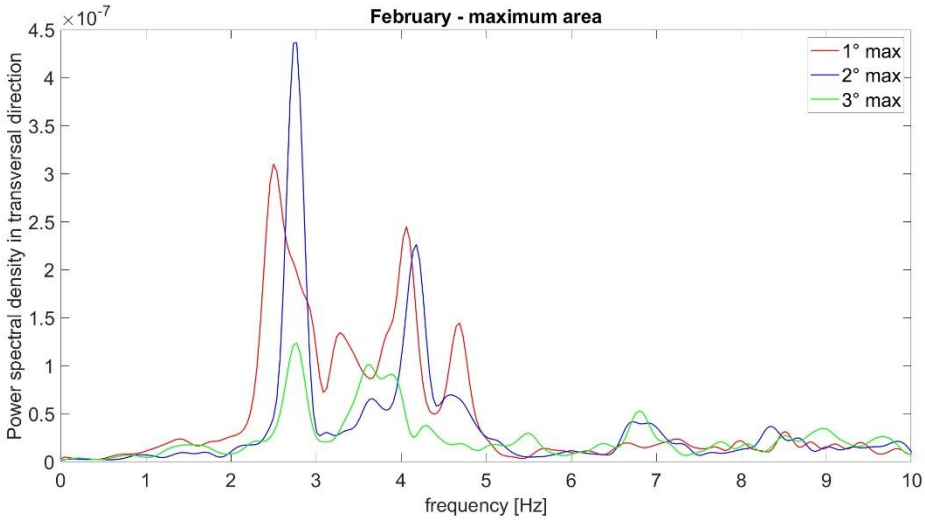


Figure 4-23: Results obtained from the 3 accelerograms with maximum area of PSD

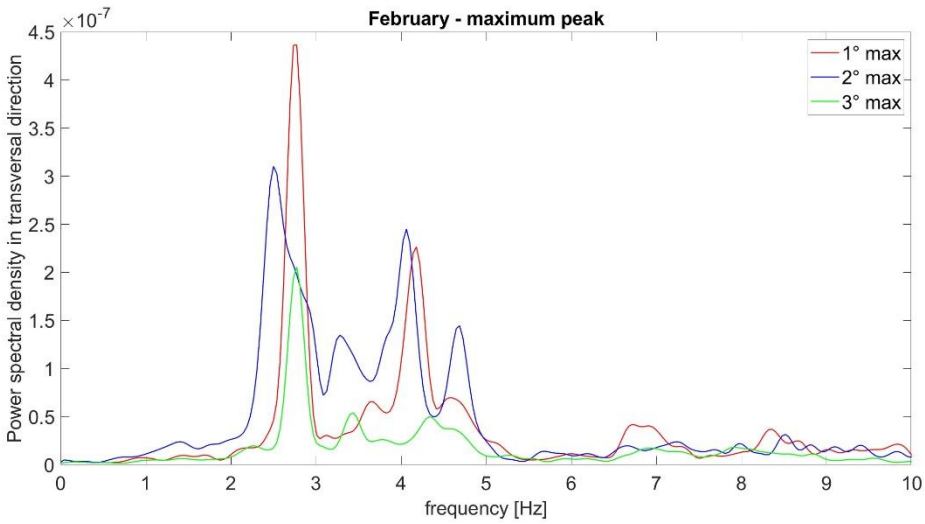


Figure 4-24: Results obtained from the 3 accelerograms with highest peak if PSD

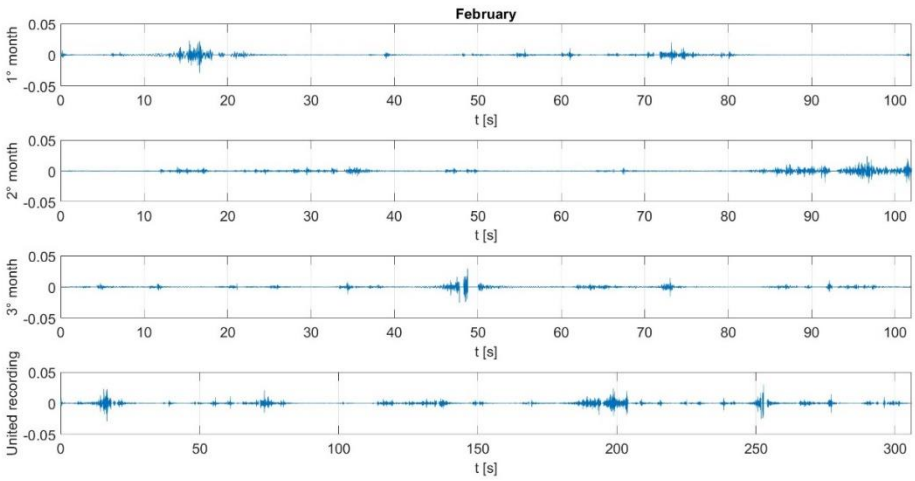


Figure 4-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

4.3 March

The results obtained for the March dataset are shown in the following tables.

Table 4-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-03-08_13-00-21	1.43E-04
	2°	30D41_2023-03-04_13-00-20	1.41E-04
	3°	30D41_2023-03-16_13-00-20	1.40E-04
Longitudinal direction (y)	1°	30D41_2023-03-04_13-00-20	1.25E-03
	2°	30D41_2023-03-16_13-00-20	9.69E-04
	3°	30D41_2023-03-08_13-00-21	9.00E-04
Transverse direction (z)	1°	30D41_2023-03-16_13-00-20	8.34E-04
	2°	30D41_2023-03-08_13-00-21	7.88E-04
	3°	30D41_2023-03-09_13-00-20	7.38E-04

Table 4-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-03-08_13-00-21	3.25E-08	30D41_2023-03-08_13-00-21	3.22E-09
2	30D41_2023-03-09_13-00-20	2.03E-08	30D41_2023-03-16_13-00-20	3.20E-09
3	30D41_2023-03-23_07-00-20	1.86E-08	30D41_2023-03-04_13-00-20	3.05E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-03-04_13-00-20	3.66E-06	30D41_2023-03-04_13-00-20	3.19E-07
2	30D41_2023-03-08_13-00-21	1.61E-06	30D41_2023-03-16_13-00-20	2.06E-07
3	30D41_2023-03-16_13-00-20	1.26E-06	30D41_2023-03-08_13-00-21	1.68E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-03-09_13-00-20	8.24E-07	30D41_2023-03-16_13-00-20	1.47E-07
2	30D41_2023-03-20_07-00-20	7.11E-07	30D41_2023-03-08_13-00-21	1.28E-07
3	30D41_2023-03-23_07-00-20	7.00E-07	30D41_2023-03-09_13-00-20	1.09E-07

Table 4-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	B	B	C	-	C
2	B	-	C	C	A	C	A	-	A
3	C	-	B	A	C	A	D	-	D

4.3.1 Vertical direction (x)

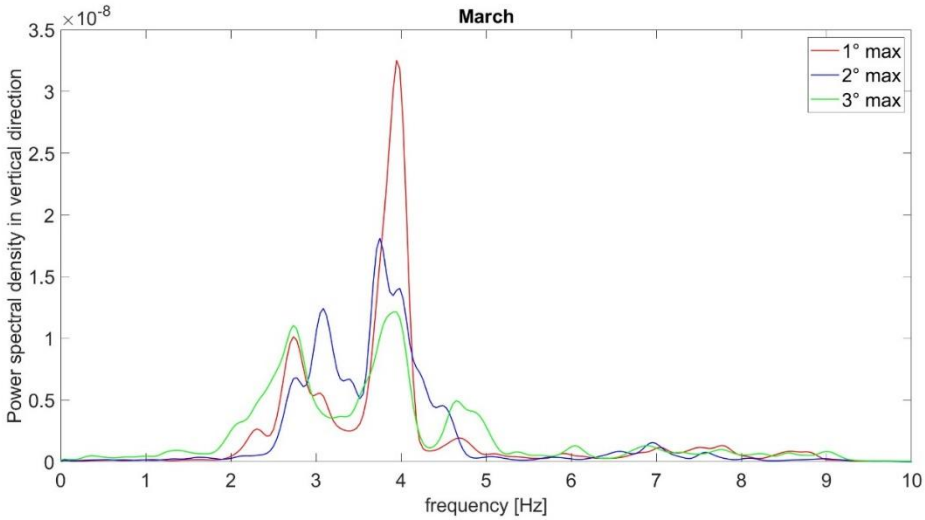


Figure 4-26: Results obtained from the 3 accelerograms with maximum SD in time domain

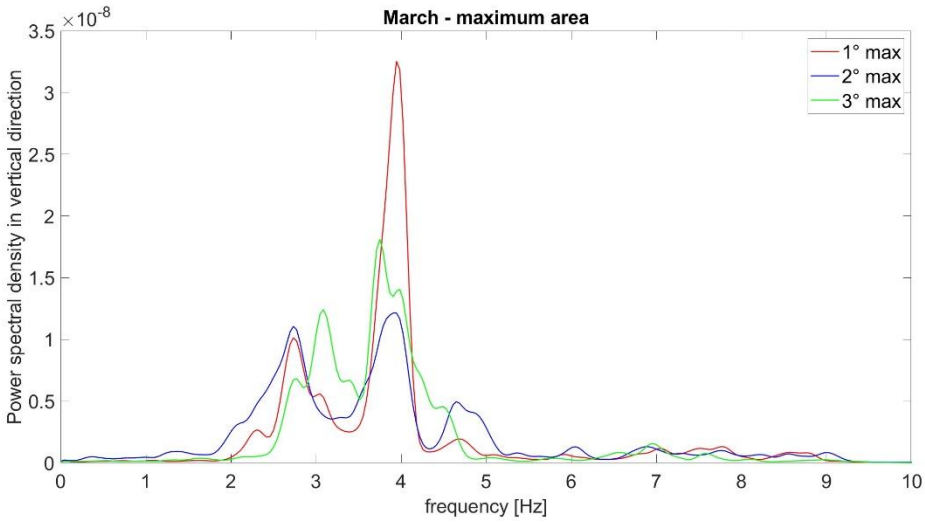


Figure 4-27: Results obtained from the 3 accelerograms with maximum area of PSD

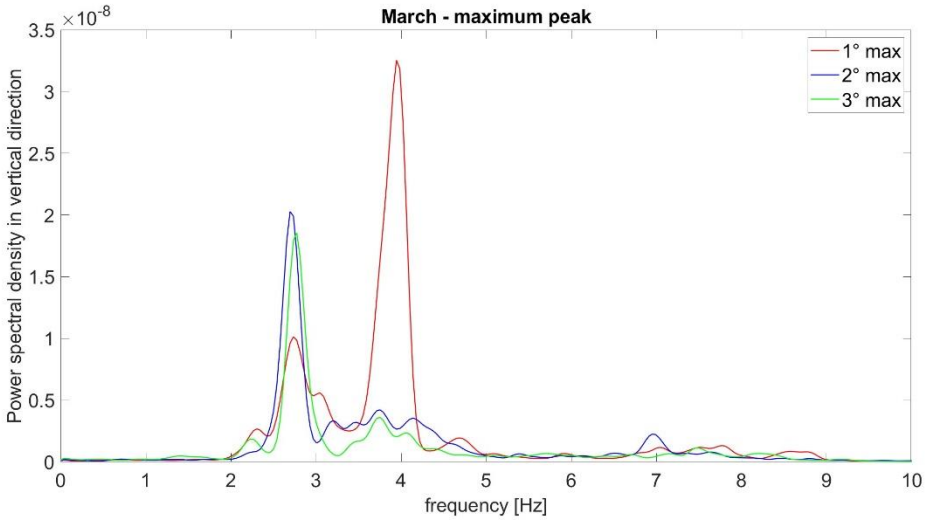


Figure 4-28: Results obtained from the 3 accelerograms with highest peak if PSD

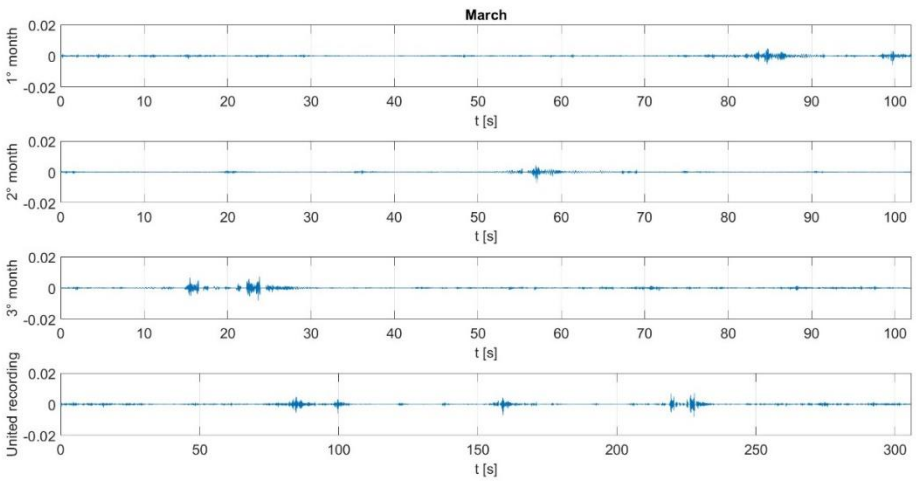


Figure 4-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.3.2 Longitudinal direction (y)

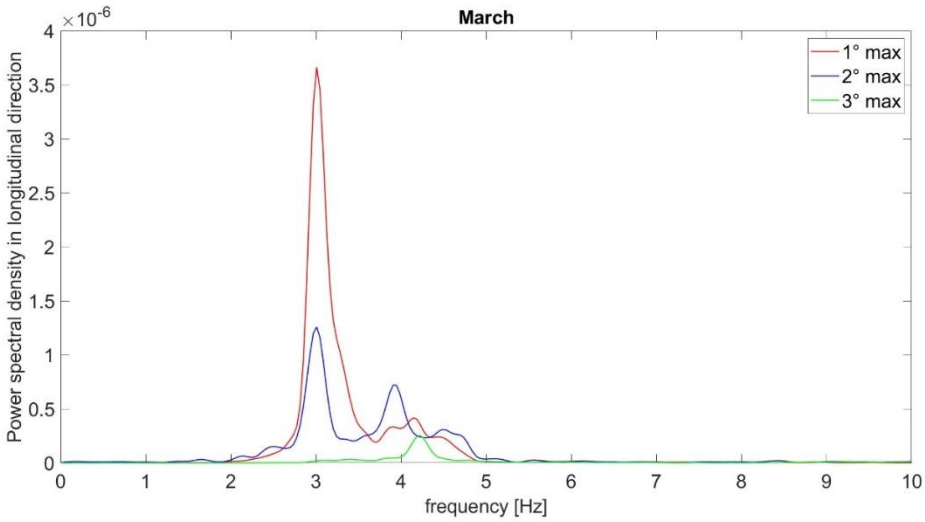


Figure 4-30: Results obtained from the 3 accelerograms with maximum SD in time domain

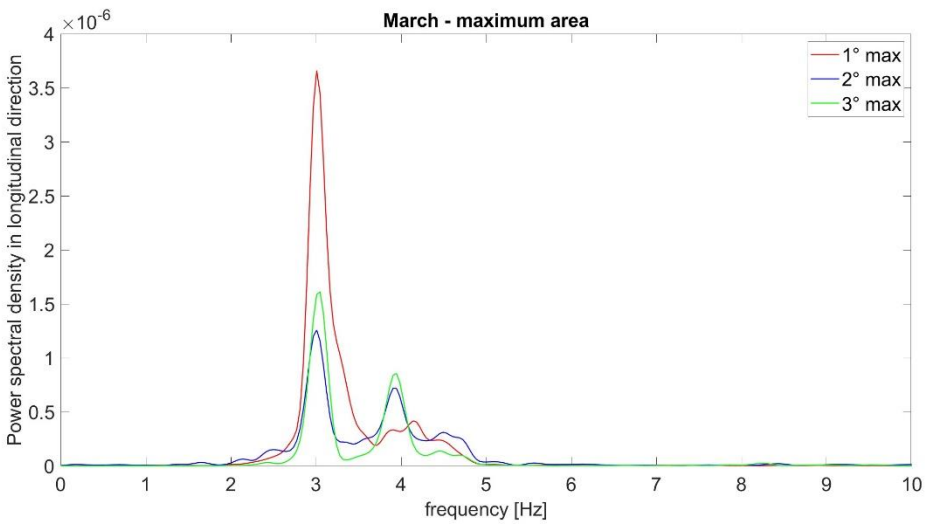


Figure 4-31: Results obtained from the 3 accelerograms with maximum area of PSD

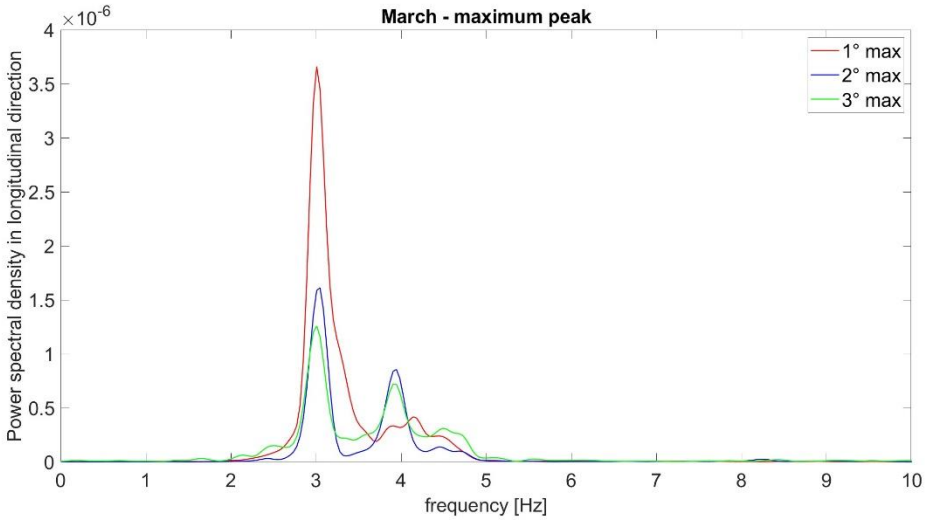


Figure 4-32: Results obtained from the 3 accelerograms with highest peak if PSD

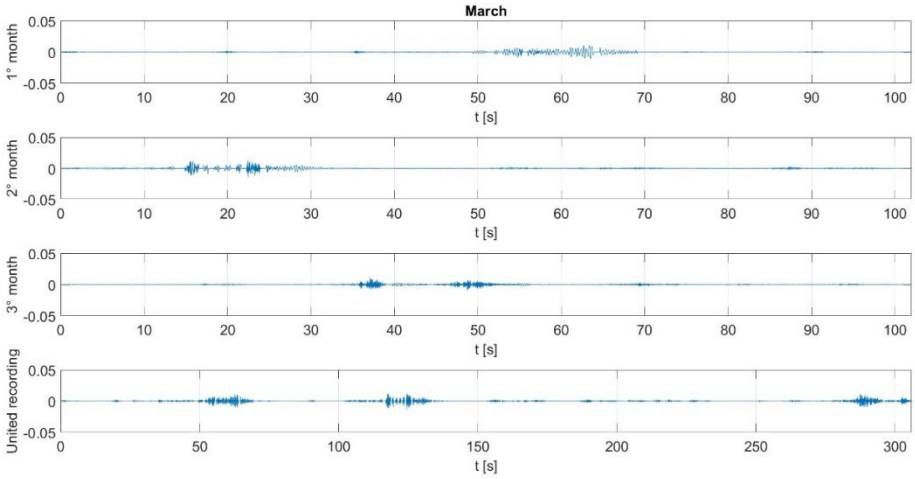


Figure 4-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

4.3.3 Transverse direction (z)

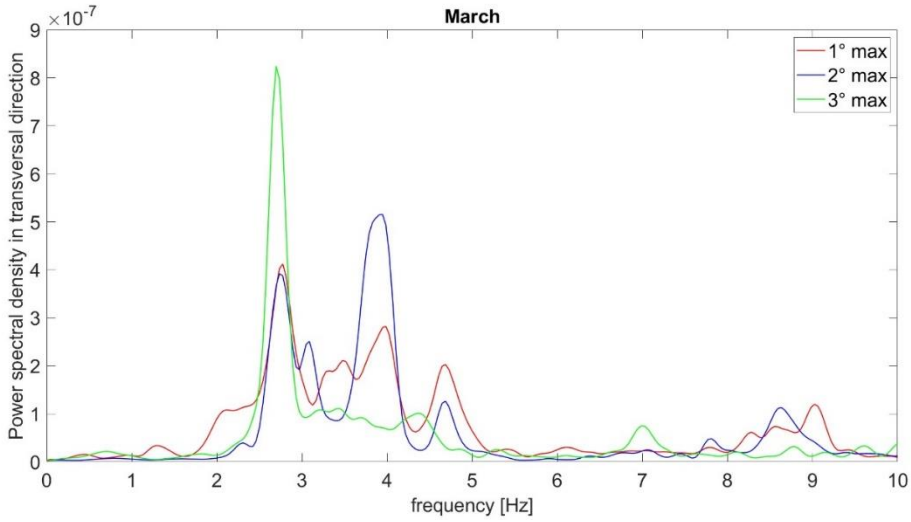


Figure 4-34: Results obtained from the 3 accelerograms with maximum SD in time domain

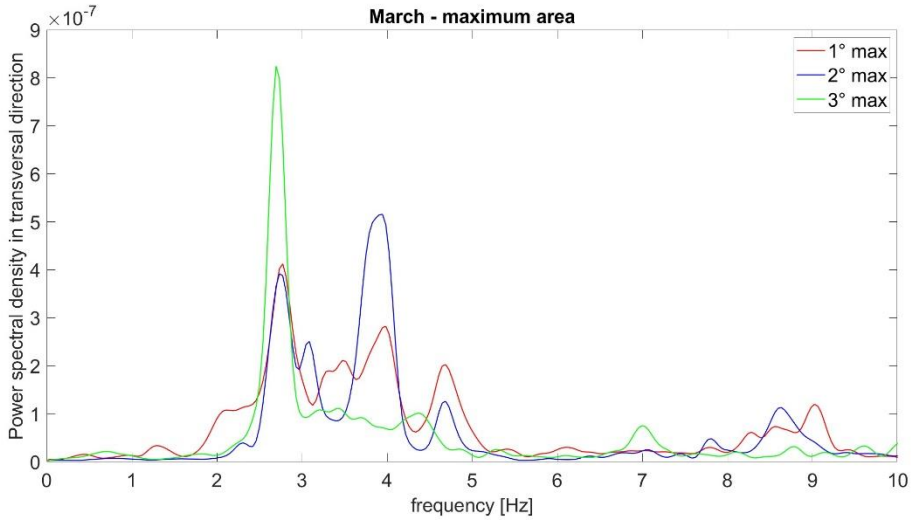


Figure 4-35: Results obtained from the 3 accelerograms with maximum area of PSD

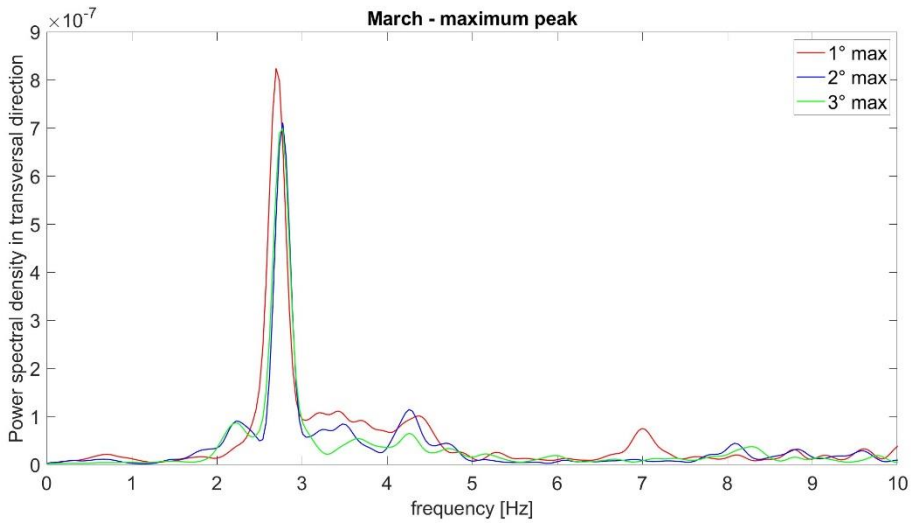


Figure 4-36: Results obtained from the 3 accelerograms with highest peak if PSD

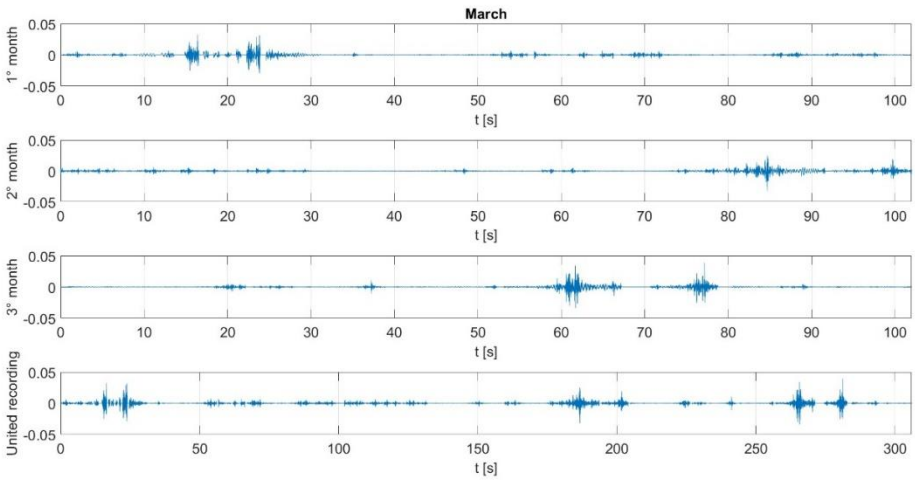


Figure 4-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

4.4 April

The results obtained for the April dataset are shown in the following tables.

Table 4-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-04-20_08-00-20	1.03E-04
	2°	30D41_2023-04-07_08-00-20	1.02E-04
	3°	30D41_2023-04-06_20-00-21	9.50E-05
Longitudinal direction (y)	1°	30D41_2023-04-18_14-00-19	4.99E-04
	2°	30D41_2023-04-07_08-00-20	4.60E-04
	3°	30D41_2023-04-20_08-00-20	4.55E-04
Transverse direction (z)	1°	30D41_2023-04-20_08-00-20	6.27E-04
	2°	30D41_2023-04-06_20-00-21	6.20E-04
	3°	30D41_2023-04-03_08-00-20	5.63E-04

Table 4-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-04-20_08-00-20	1.12E-08	30D41_2023-04-20_08-00-20	1.60E-09
2	30D41_2023-04-03_08-00-20	8.64E-09	30D41_2023-04-07_08-00-20	1.57E-09
3	30D41_2023-04-14_08-00-20	8.30E-09	30D41_2023-04-06_20-00-21	1.40E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-04-18_14-00-19	5.03E-07	30D41_2023-04-18_14-00-19	5.26E-08
2	30D41_2023-04-07_08-00-20	2.89E-07	30D41_2023-04-20_08-00-20	4.40E-08
3	30D41_2023-04-03_08-00-20	2.59E-07	30D41_2023-04-07_08-00-20	4.15E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-04-20_08-00-20	4.75E-07	30D41_2023-04-20_08-00-20	8.00E-08
2	30D41_2023-04-03_08-00-20	3.63E-07	30D41_2023-04-06_20-00-21	7.63E-08
3	30D41_2023-04-06_20-00-21	3.34E-07	30D41_2023-04-03_08-00-20	6.50E-08

Table 4-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	A	A	A
2	B	-	B	B	B	A	E	F	E
3	C	-	C	A	-	B	F	E	F

4.4.1 Vertical direction (x)

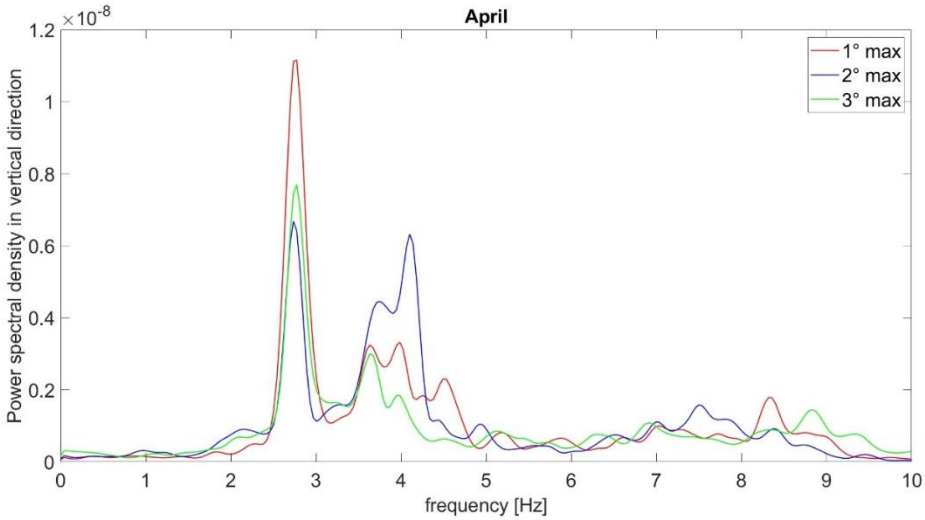


Figure 4-38: Results obtained from the 3 accelerograms with maximum SD in time domain

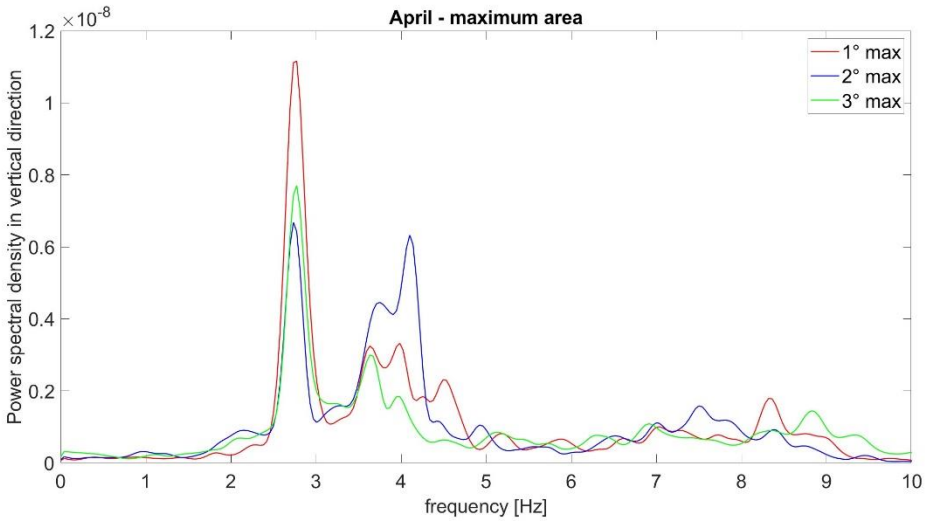


Figure 4-39: Results obtained from the 3 accelerograms with maximum area of PSD

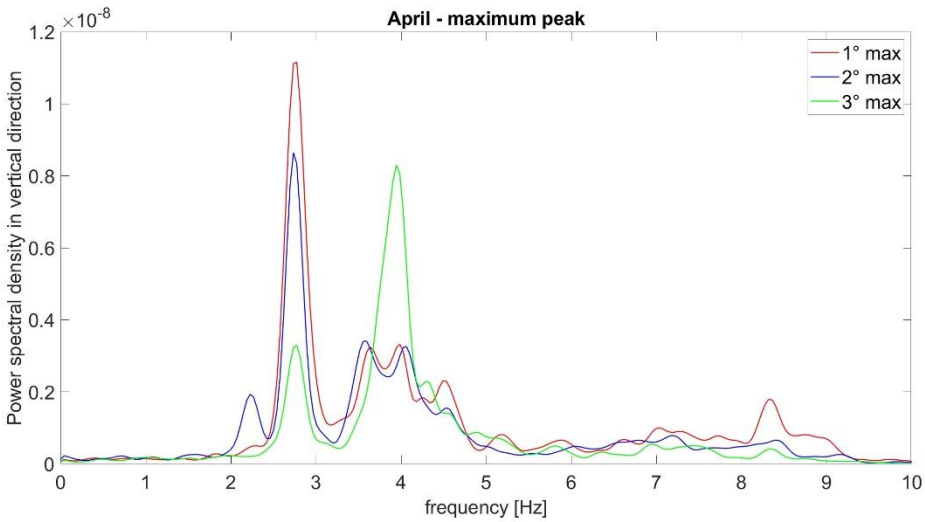


Figure 4-40: Results obtained from the 3 accelerograms with highest peak if PSD

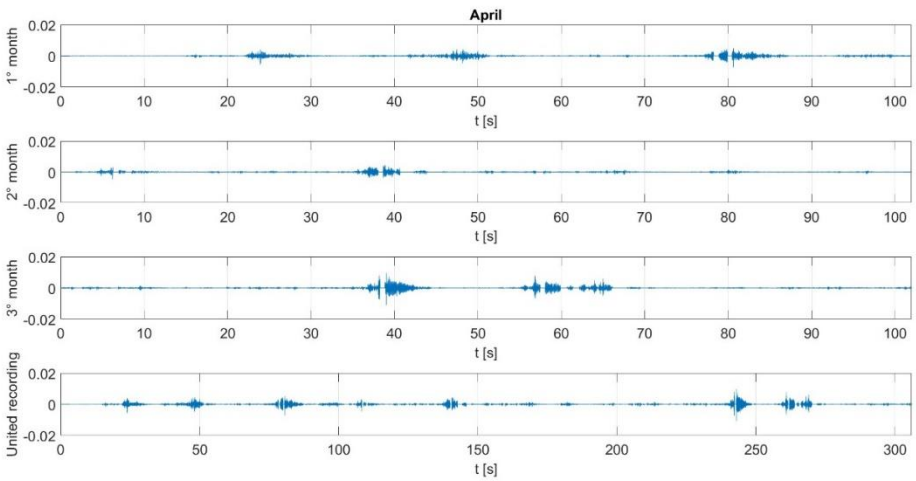


Figure 4-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.4.2 Longitudinal direction (y)

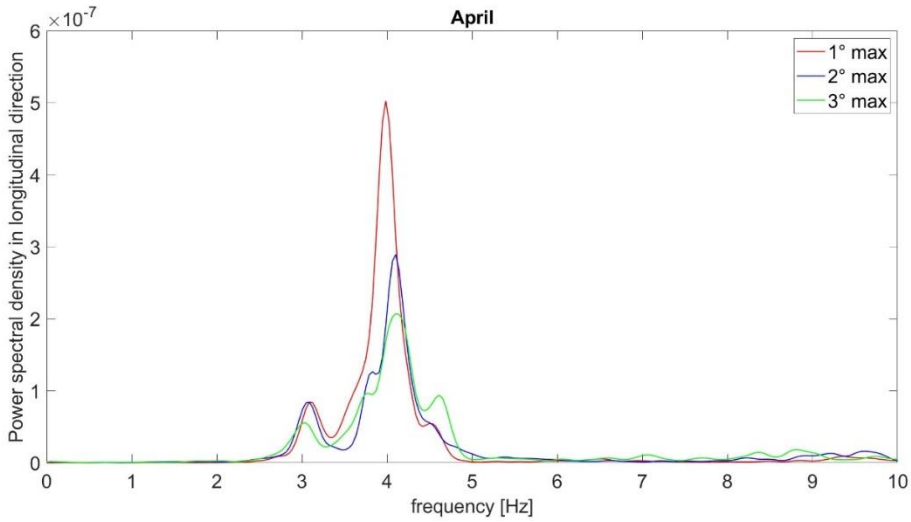


Figure 4-42: Results obtained from the 3 accelerograms with maximum SD in time domain

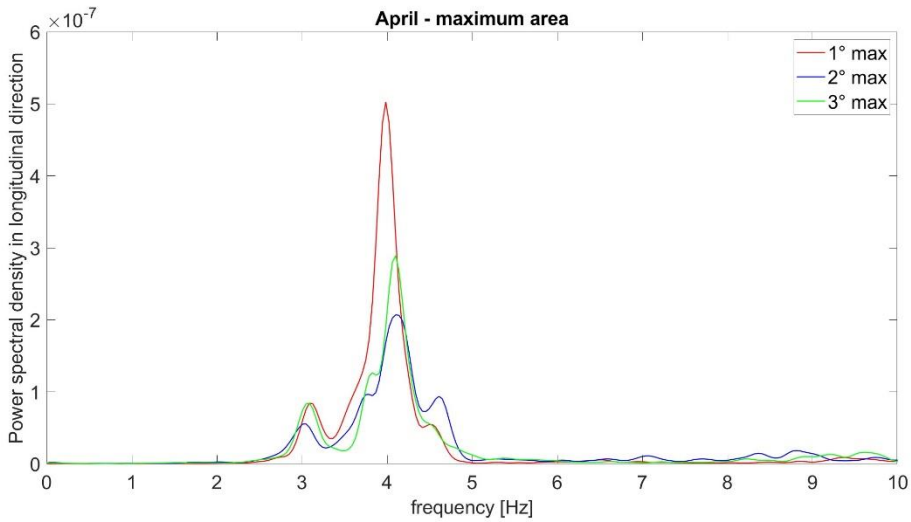


Figure 4-43: Results obtained from the 3 accelerograms with maximum area of PSD

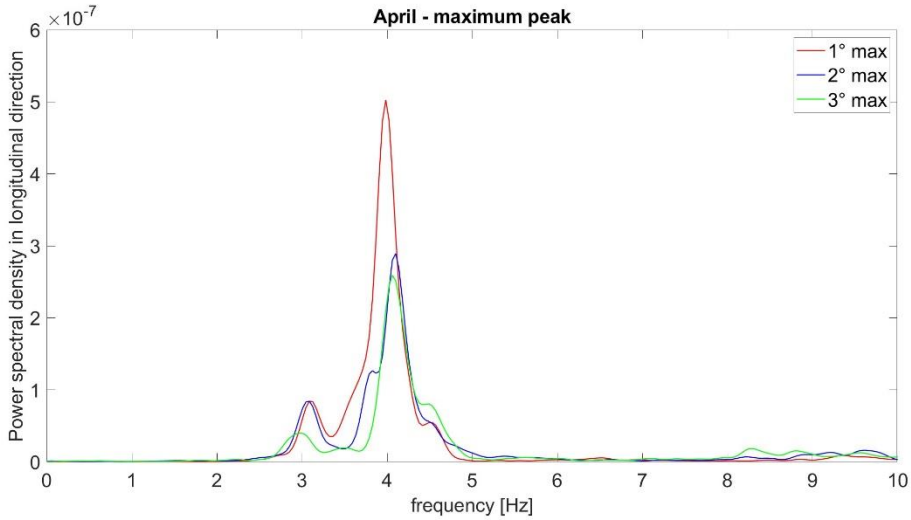


Figure 4-44: Results obtained from the 3 accelerograms with highest peak if PSD

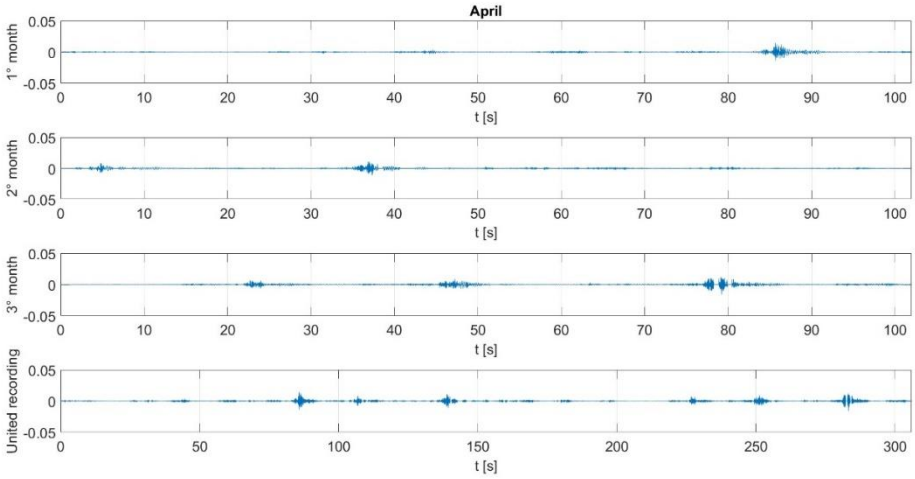


Figure 4-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

4.4.3 Transverse direction (z)

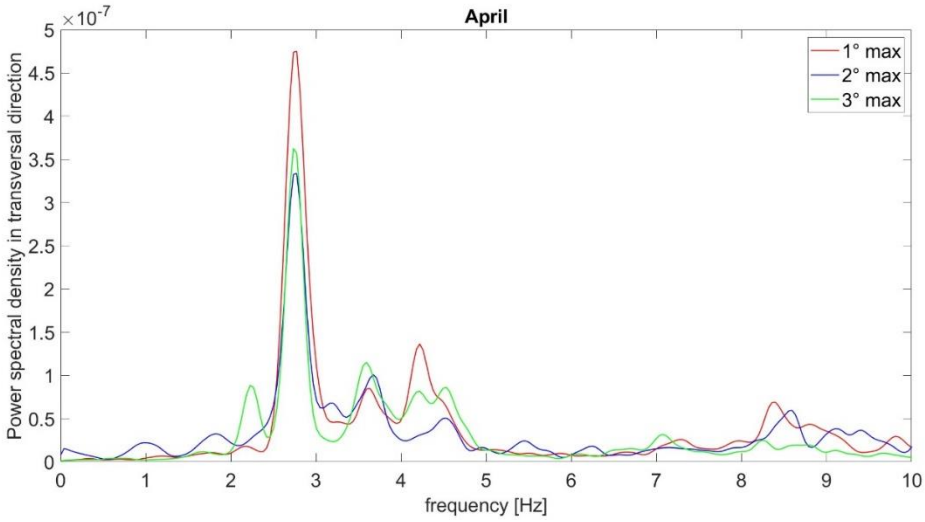


Figure 4-46: Results obtained from the 3 accelerograms with maximum SD in time domain

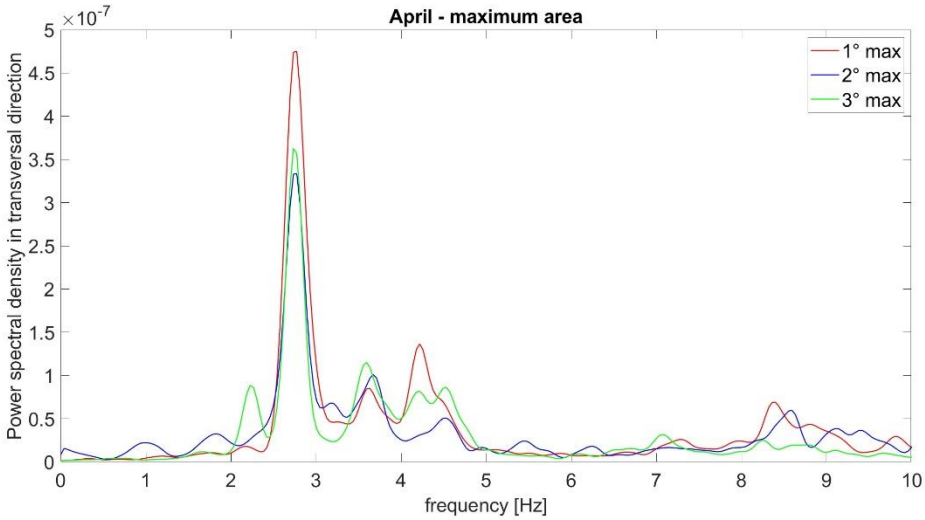


Figure 4-47: Results obtained from the 3 accelerograms with maximum area of PSD

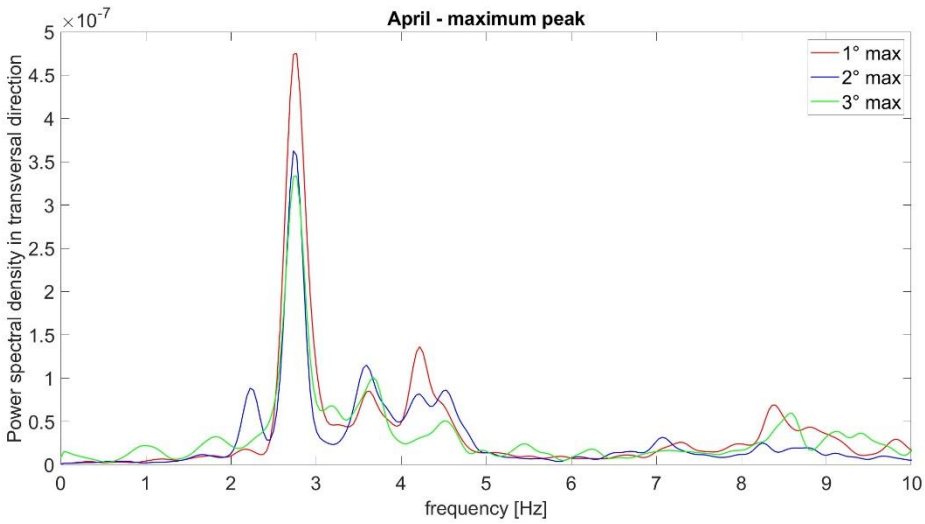


Figure 4-48: Results obtained from the 3 accelerograms with highest peak if PSD

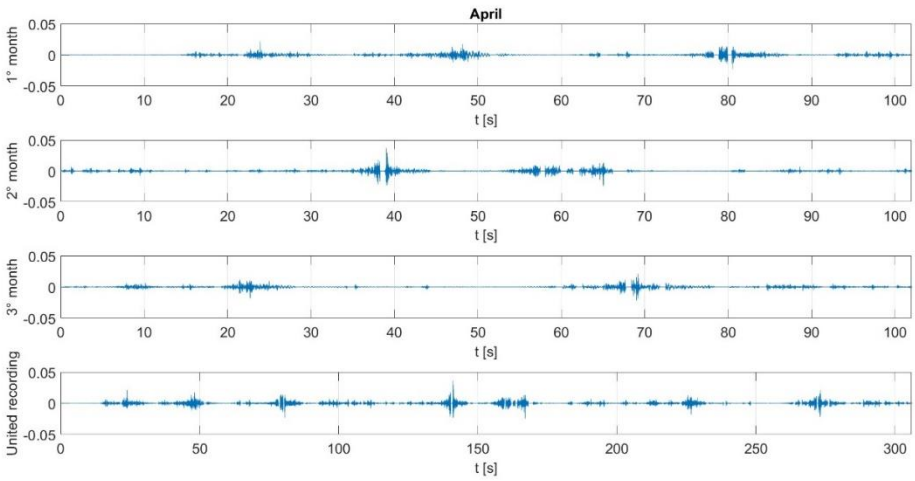


Figure 4-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

4.5 May

The results obtained for the May dataset are shown in the following tables.

Table 4-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-05-23_14-00-20	1.44E-04
	2°	30D41_2023-05-04_14-00-21	1.10E-04
	3°	30D41_2023-05-22_08-00-20	9.07E-05
Longitudinal direction (y)	1°	30D41_2023-05-19_14-00-21	9.93E-04
	2°	30D41_2023-05-23_14-00-20	8.68E-04
	3°	30D41_2023-05-04_14-00-21	6.37E-04
Transverse direction (z)	1°	30D41_2023-05-23_14-00-20	8.22E-04
	2°	30D41_2023-05-04_14-00-21	5.57E-04
	3°	30D41_2023-05-22_08-00-20	5.36E-04

Table 4-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-05-23_14-00-20	2.85E-08	30D41_2023-05-23_14-00-20	3.31E-09
2	30D41_2023-05-04_14-00-21	9.02E-09	30D41_2023-05-04_14-00-21	1.80E-09
3	30D41_2023-05-19_14-00-21	6.39E-09	30D41_2023-05-22_08-00-20	1.29E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-05-19_14-00-21	1.38E-06	30D41_2023-05-23_14-00-20	1.59E-07
2	30D41_2023-05-23_14-00-20	1.01E-06	30D41_2023-05-04_14-00-21	8.16E-08
3	30D41_2023-05-04_14-00-21	3.85E-07	30D41_2023-05-19_14-00-21	7.89E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-05-23_14-00-20	9.71E-07	30D41_2023-05-23_14-00-20	1.45E-07
2	30D41_2023-05-19_14-00-21	3.06E-07	30D41_2023-05-04_14-00-21	6.18E-08
3	30D41_2023-05-22_08-00-20	2.51E-07	30D41_2023-05-22_08-00-20	5.95E-08

Table 4-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	A	A	A	A
2	B	B	B	A	A	B	B	-	B
3	C	-	C	B	B	D	C	C	C

4.5.1 Vertical direction (x)

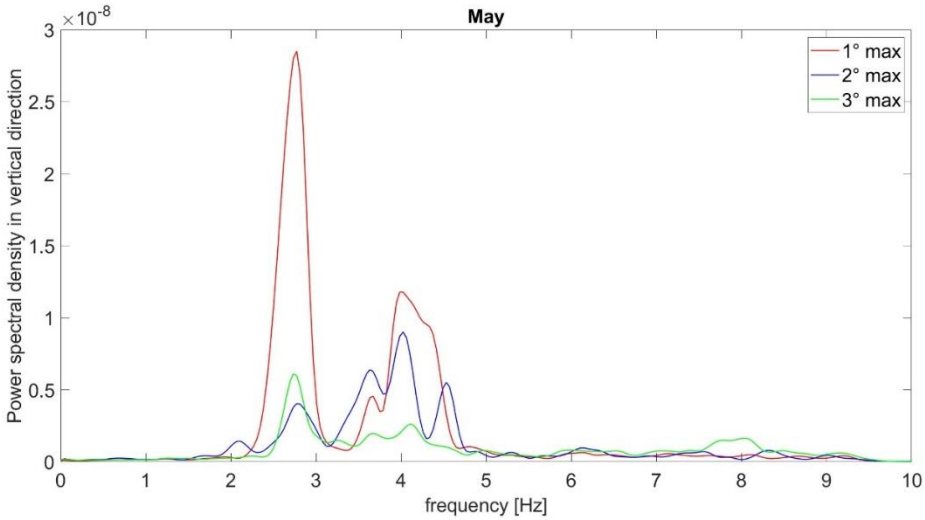


Figure 4-50: Results obtained from the 3 accelerograms with maximum SD in time domain

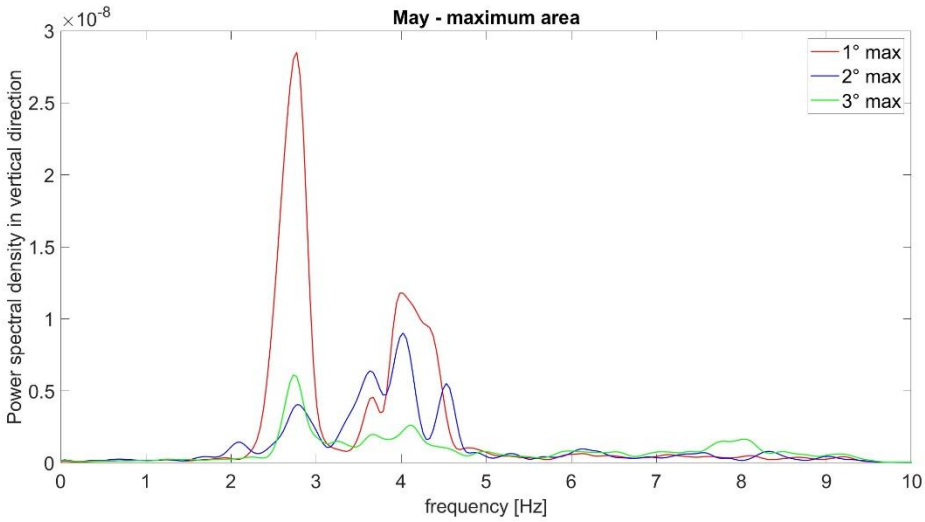


Figure 4-51: Results obtained from the 3 accelerograms with maximum area of PSD

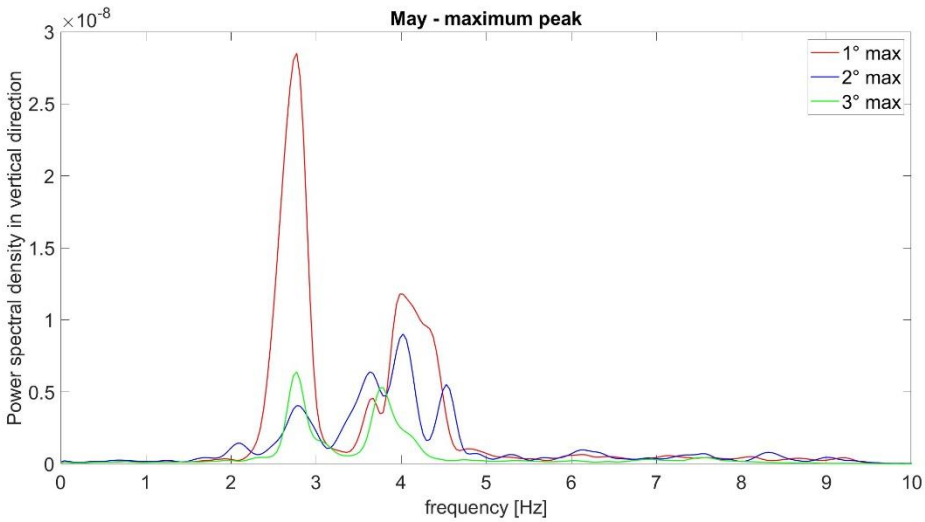


Figure 4-52: Results obtained from the 3 accelerograms with highest peak if PSD

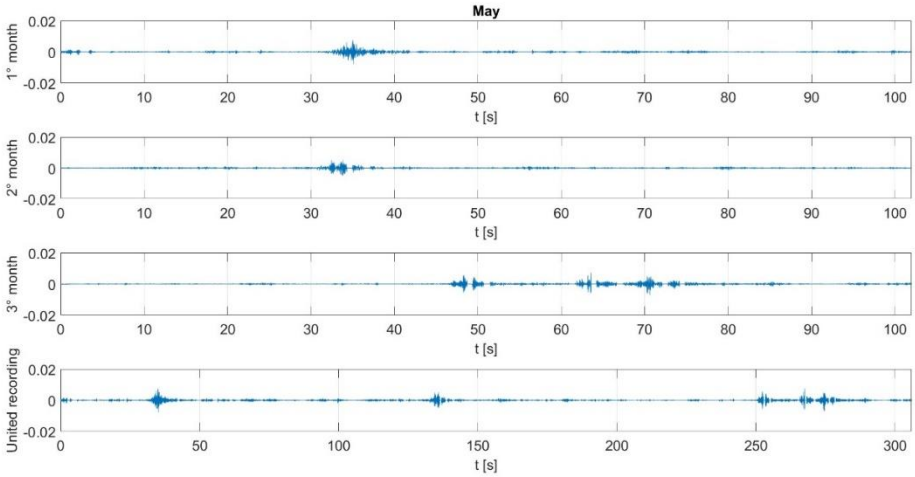


Figure 4-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.5.2 Longitudinal direction (y)

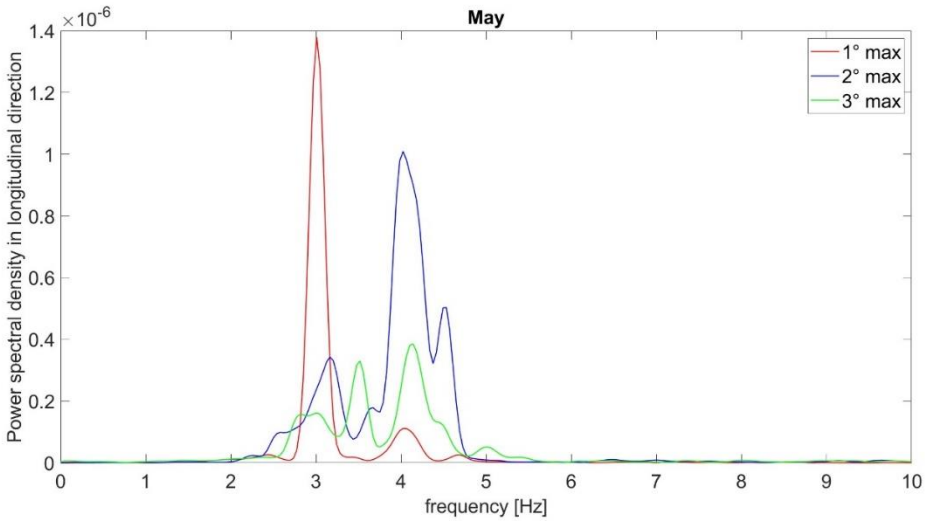


Figure 4-54: Results obtained from the 3 accelerograms with maximum SD in time domain

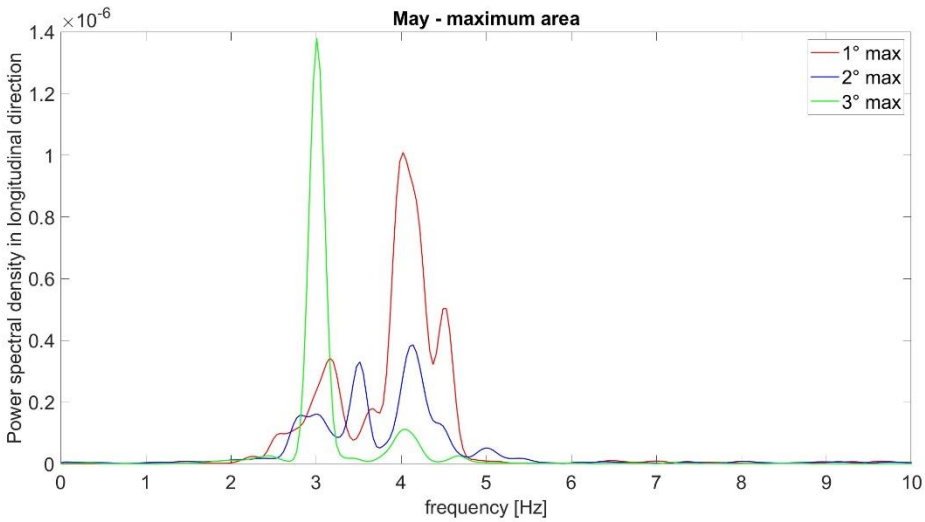


Figure 4-55: Results obtained from the 3 accelerograms with maximum area of PSD

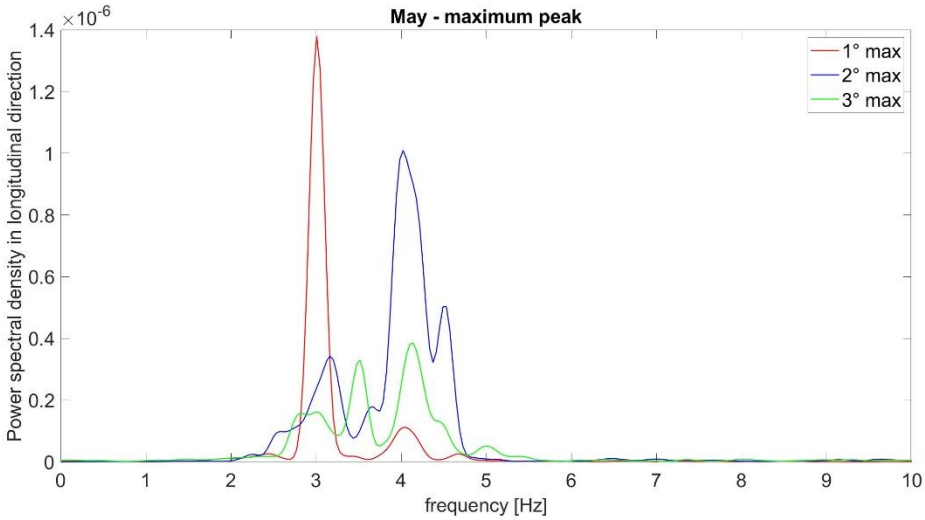


Figure 4-56: Results obtained from the 3 accelerograms with highest peak if PSD

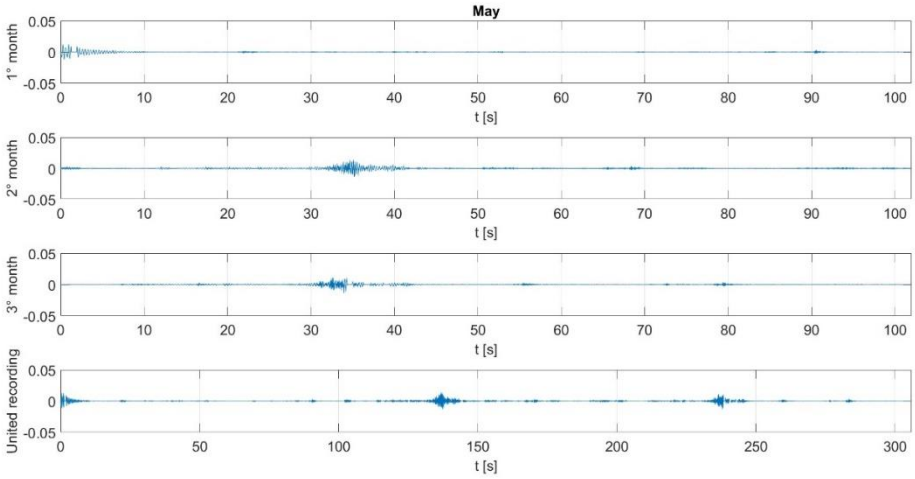


Figure 4-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

4.5.3 Transverse direction (z)

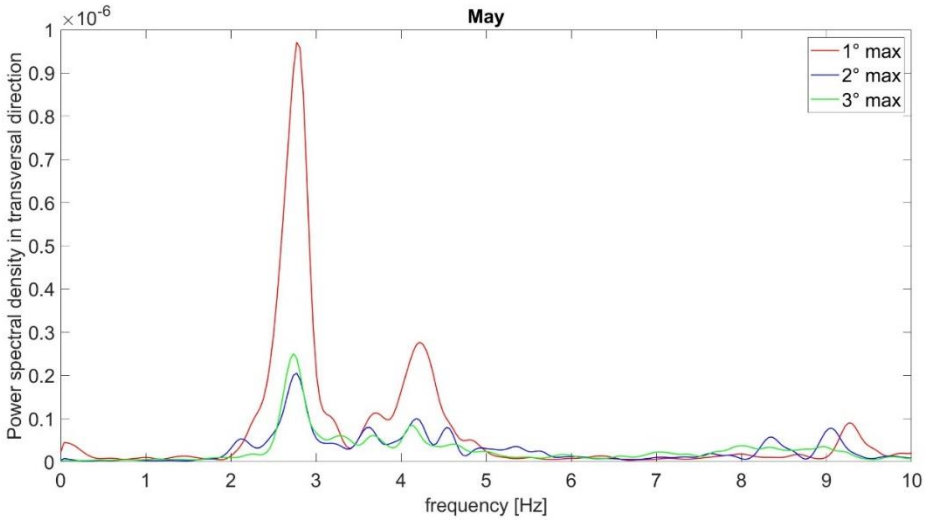


Figure 4-58: Results obtained from the 3 accelerograms with maximum SD in time domain

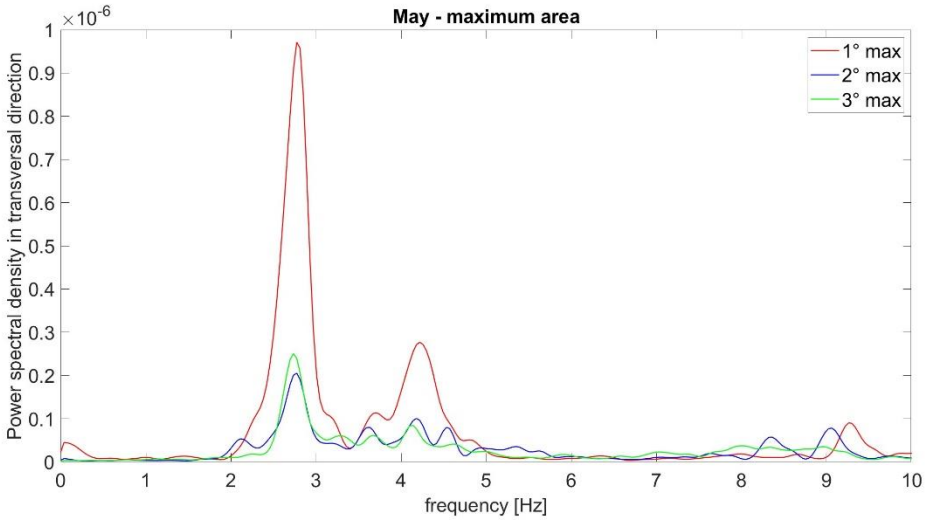


Figure 4-59: Results obtained from the 3 accelerograms with maximum area of PSD

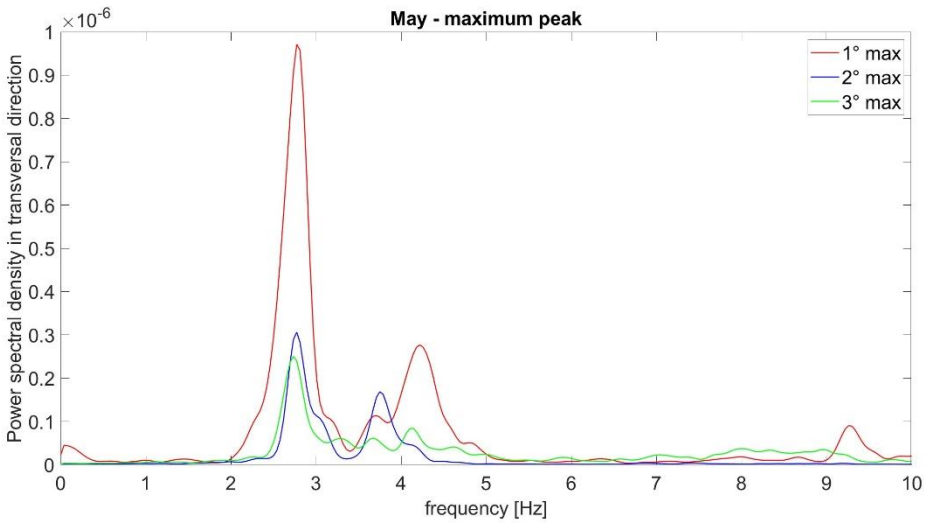


Figure 4-60: Results obtained from the 3 accelerograms with highest peak if PSD

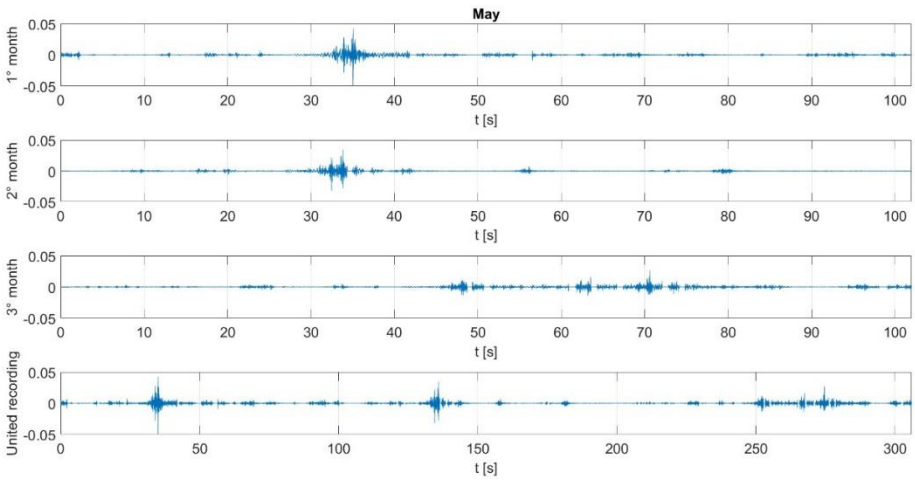


Figure 4-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

4.6 June

The results obtained for the June dataset are shown in the following tables.

Table 4-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-06-13_08-00-20	1.33E-04
	2°	30D41_2023-06-28_14-00-21	1.07E-04
	3°	30D41_2023-06-23_20-00-20	9.55E-05
Longitudinal direction (y)	1°	30D41_2023-06-13_08-00-20	1.03E-03
	2°	30D41_2023-06-27_14-00-21	5.60E-04
	3°	30D41_2023-06-28_14-00-21	4.58E-04
Transverse direction (z)	1°	30D41_2023-06-13_08-00-20	7.73E-04
	2°	30D41_2023-06-28_14-00-21	6.26E-04
	3°	30D41_2023-06-27_14-00-21	5.50E-04

Table 4-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-06-13_08-00-20	2.29E-08	30D41_2023-06-13_08-00-20	2.77E-09
2	30D41_2023-06-27_14-00-21	6.65E-09	30D41_2023-06-28_14-00-21	1.71E-09
3	30D41_2023-06-28_14-00-21	6.00E-09	30D41_2023-06-23_20-00-20	1.42E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-06-13_08-00-20	1.53E-06	30D41_2023-06-13_08-00-20	2.31E-07
2	30D41_2023-06-27_14-00-21	3.72E-07	30D41_2023-06-27_14-00-21	6.58E-08
3	30D41_2023-06-21_14-00-21	2.44E-07	30D41_2023-06-28_14-00-21	4.25E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-06-13_08-00-20	4.28E-07	30D41_2023-06-13_08-00-20	1.24E-07
2	30D41_2023-06-27_14-00-21	2.90E-07	30D41_2023-06-28_14-00-21	8.16E-08
3	30D41_2023-06-09_14-00-21	2.40E-07	30D41_2023-06-27_14-00-21	6.34E-08

Table 4-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	-	B	D	D	D	B	D	B
3	C	B	C	B	-	B	D	-	D

4.6.1 Vertical direction (x)

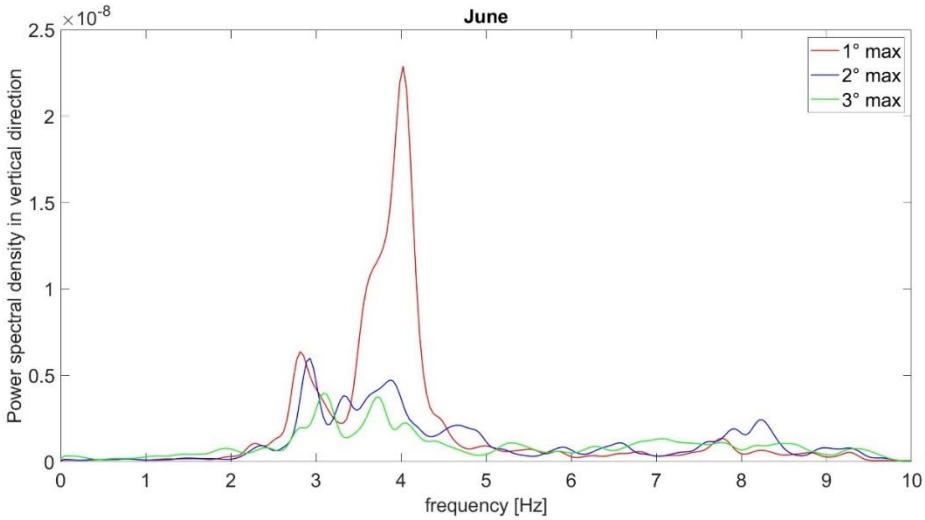


Figure 4-62: Results obtained from the 3 accelerograms with maximum SD in time domain

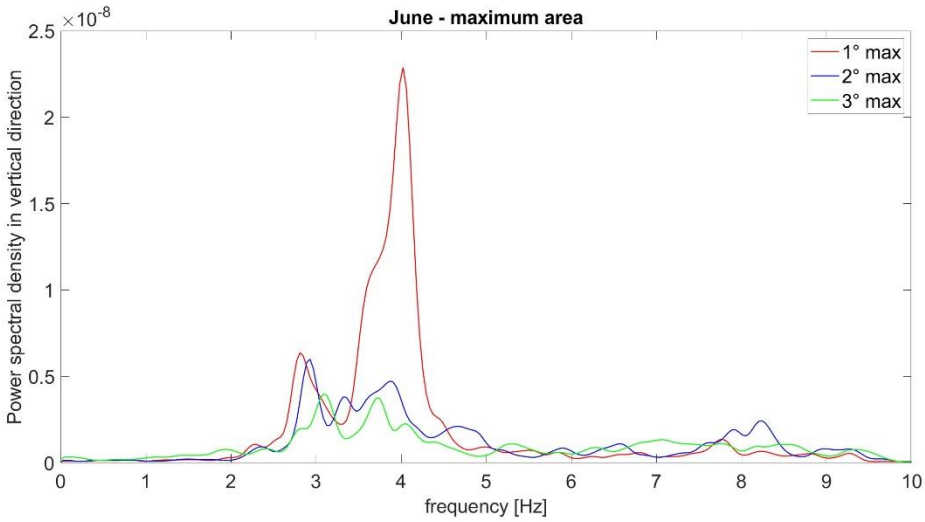


Figure 4-63: Results obtained from the 3 accelerograms with maximum area of PSD

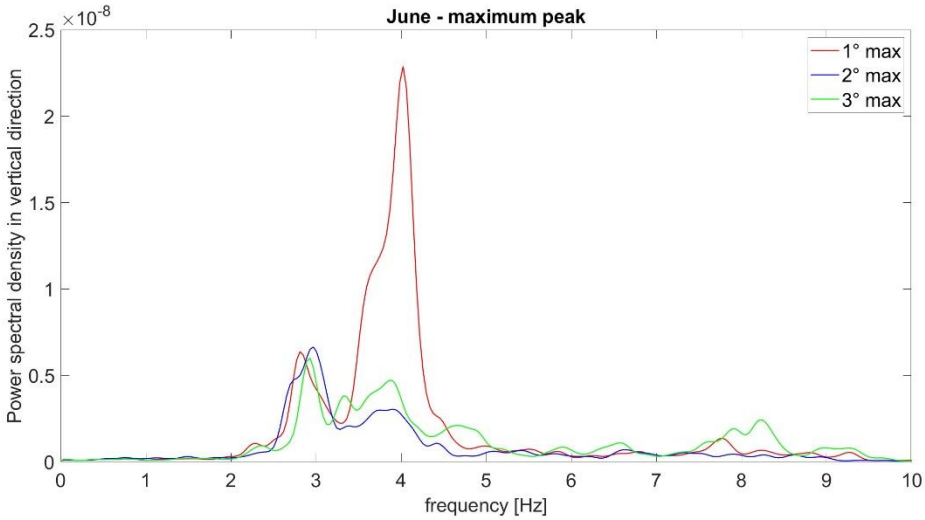


Figure 4-64: Results obtained from the 3 accelerograms with highest peak if PSD

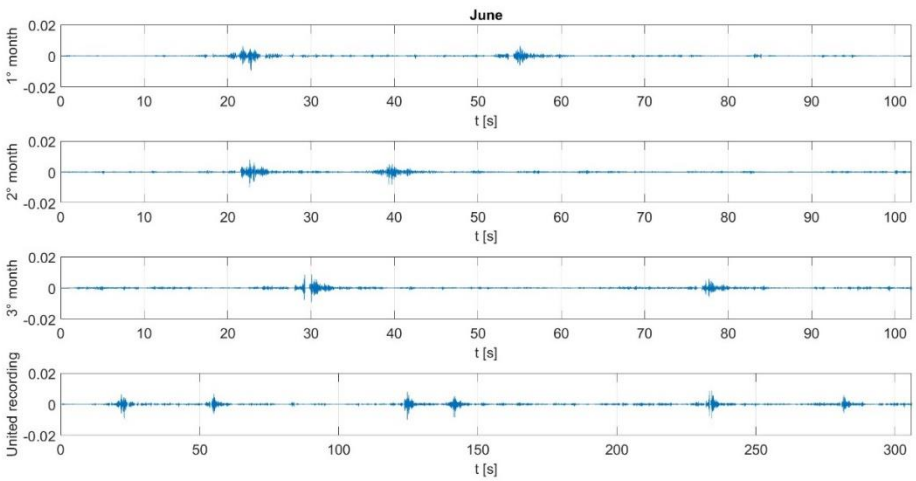


Figure 4-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.6.2 Longitudinal direction (y)

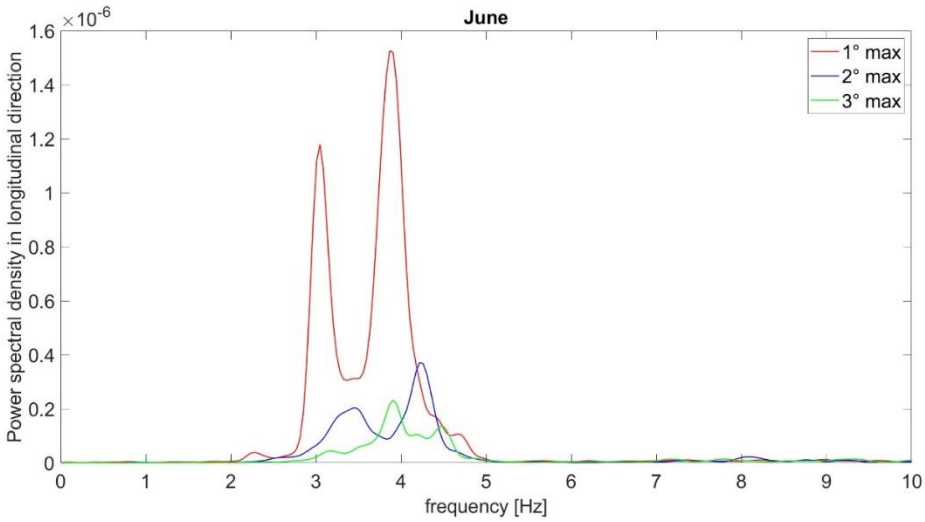


Figure 4-66: Results obtained from the 3 accelerograms with maximum SD in time domain

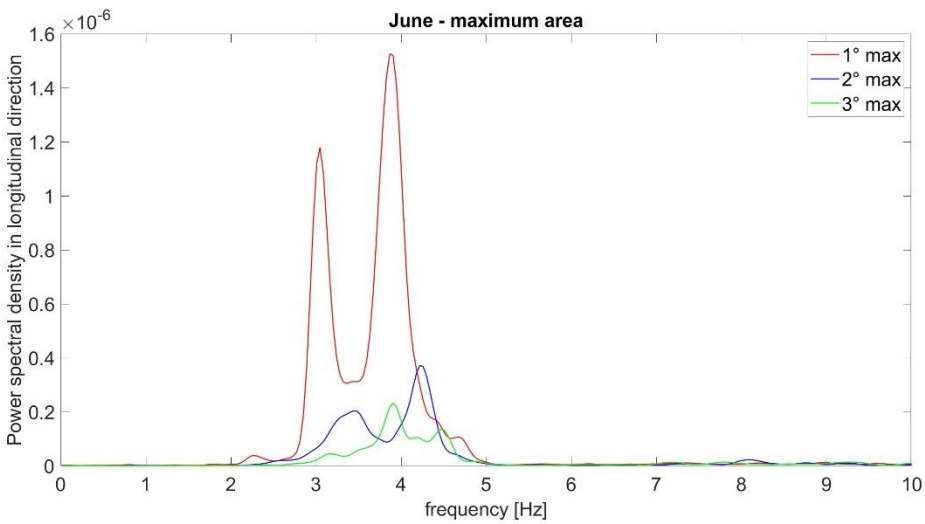


Figure 4-67: Results obtained from the 3 accelerograms with maximum area of PSD

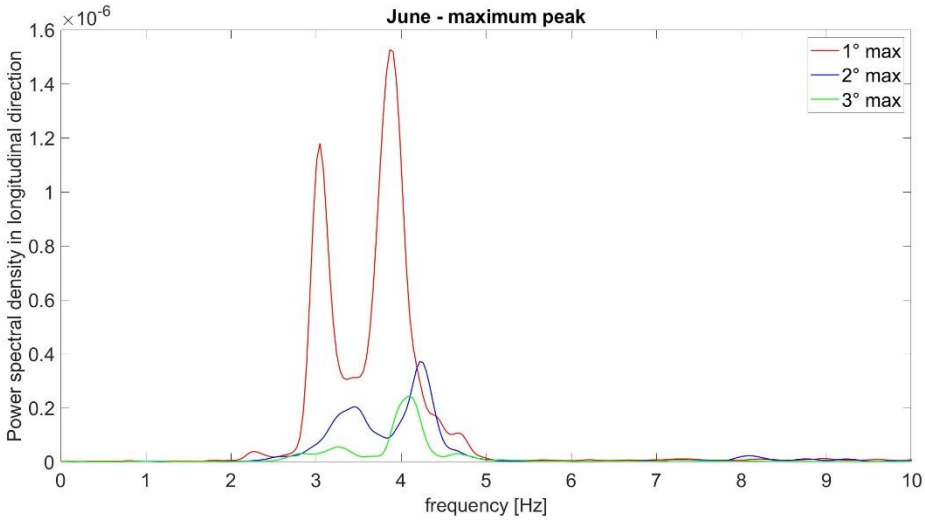


Figure 4-68: Results obtained from the 3 accelerograms with highest peak if PSD

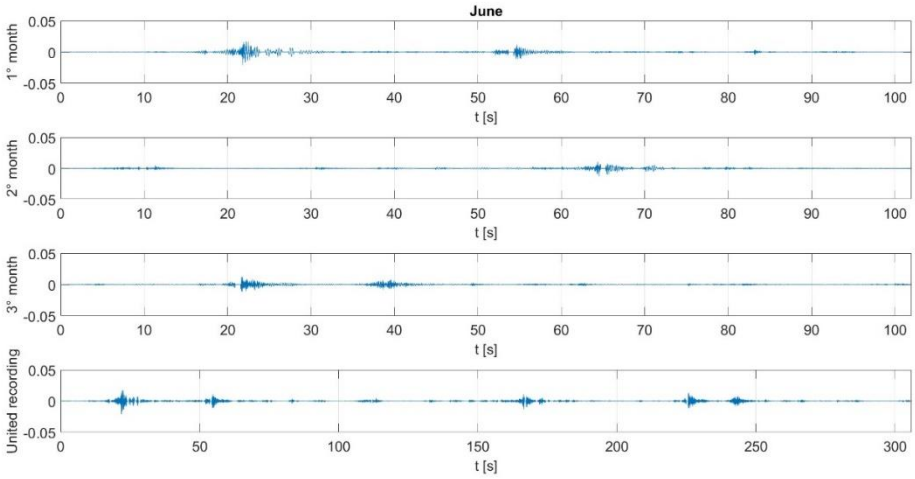


Figure 4-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

4.6.3 Transverse direction (z)

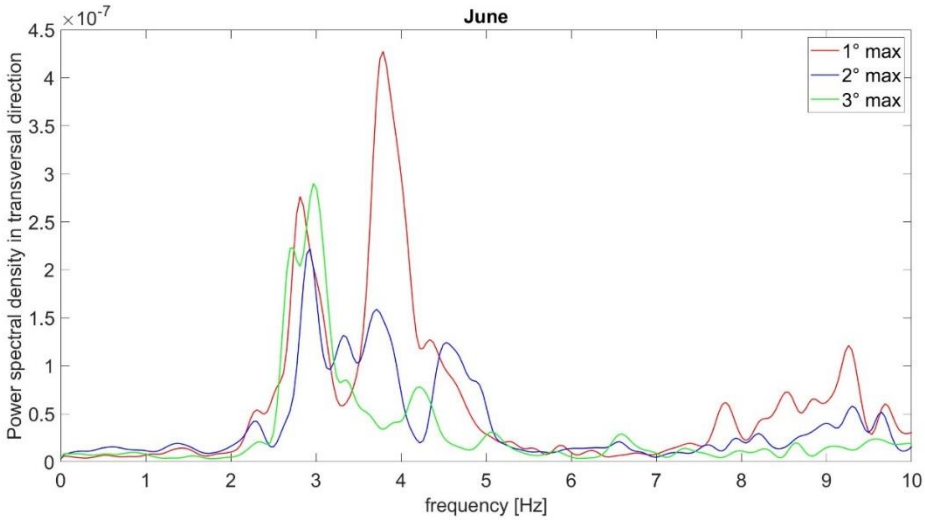


Figure 4-70: Results obtained from the 3 accelerograms with maximum SD in time domain

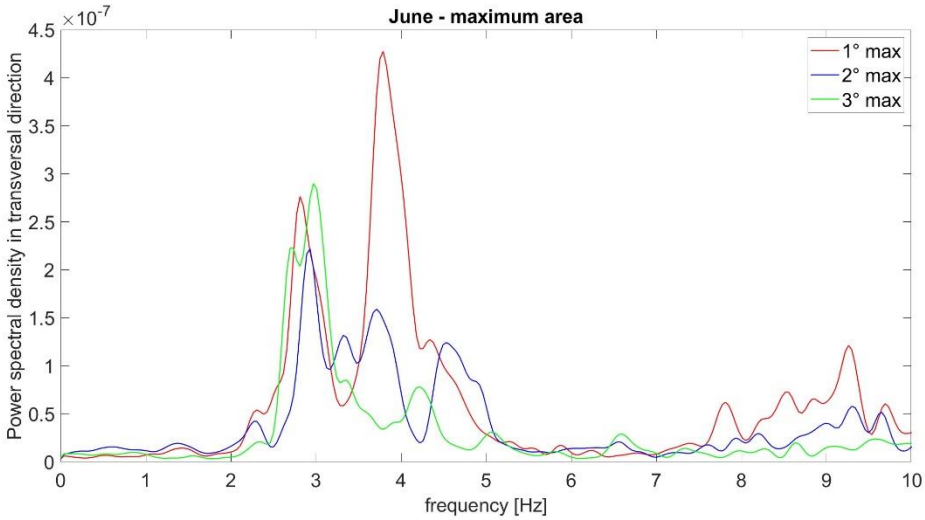


Figure 4-71: Results obtained from the 3 accelerograms with maximum area of PSD

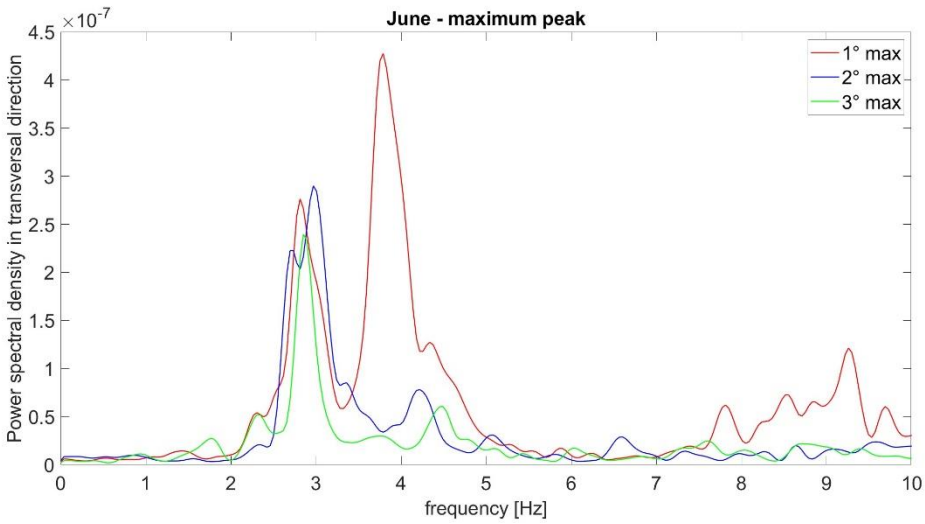


Figure 4-72: Results obtained from the 3 accelerograms with highest peak if PSD

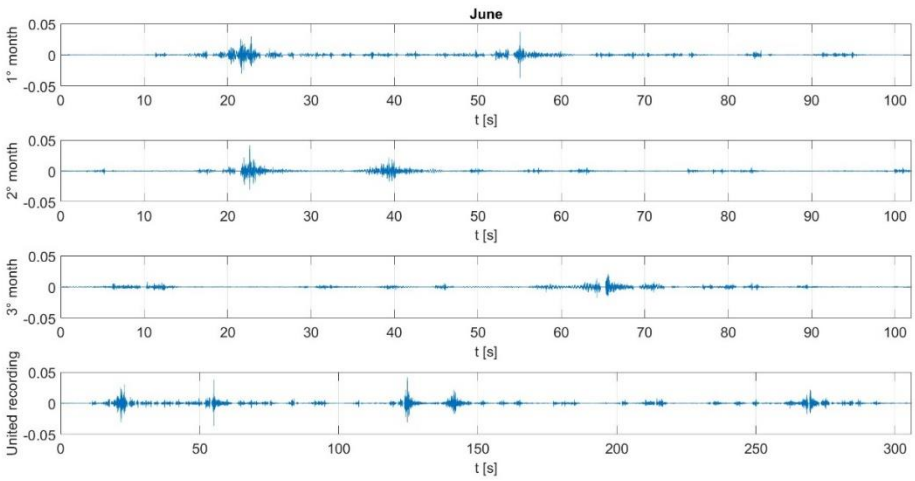


Figure 4-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

4.7 July

The results obtained for the July dataset are shown in the following tables.

Table 4-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-07-14_08-00-20	1.01E-04
	2°	30D41_2023-07-28_08-00-20	9.47E-05
	3°	30D41_2023-07-17_14-00-21	9.35E-05
Longitudinal direction (y)	1°	30D41_2023-07-20_14-00-22	5.30E-04
	2°	30D41_2023-07-17_14-00-21	5.30E-04
	3°	30D41_2023-07-07_14-00-21	4.95E-04
Transverse direction (z)	1°	30D41_2023-07-14_08-00-20	6.46E-04
	2°	30D41_2023-07-17_14-00-21	5.48E-04
	3°	30D41_2023-07-18_08-00-20	5.47E-04

Table 4-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-07-14_08-00-20	1.80E-08	30D41_2023-07-14_08-00-20	1.63E-09
2	30D41_2023-07-17_14-00-21	8.78E-09	30D41_2023-07-17_14-00-21	1.36E-09
3	30D41_2023-07-07_14-00-21	7.20E-09	30D41_2023-07-28_08-00-20	1.36E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-07-07_14-00-21	4.86E-07	30D41_2023-07-20_14-00-22	5.82E-08
2	30D41_2023-07-19_08-00-20	4.16E-07	30D41_2023-07-17_14-00-21	5.62E-08
3	30D41_2023-07-17_14-00-21	2.87E-07	30D41_2023-07-07_14-00-21	5.32E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-07-14_08-00-20	6.63E-07	30D41_2023-07-14_08-00-20	8.68E-08
2	30D41_2023-07-17_14-00-21	3.76E-07	30D41_2023-07-12_08-00-20	6.25E-08
3	30D41_2023-07-07_14-00-21	2.81E-07	30D41_2023-07-17_14-00-21	6.21E-08

Table 4-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	E	D	A	A	A
2	B	C	C	C	-	C	C	C	-
3	C	-	B	E	C	E	-	-	C

4.7.1 Vertical direction (x)

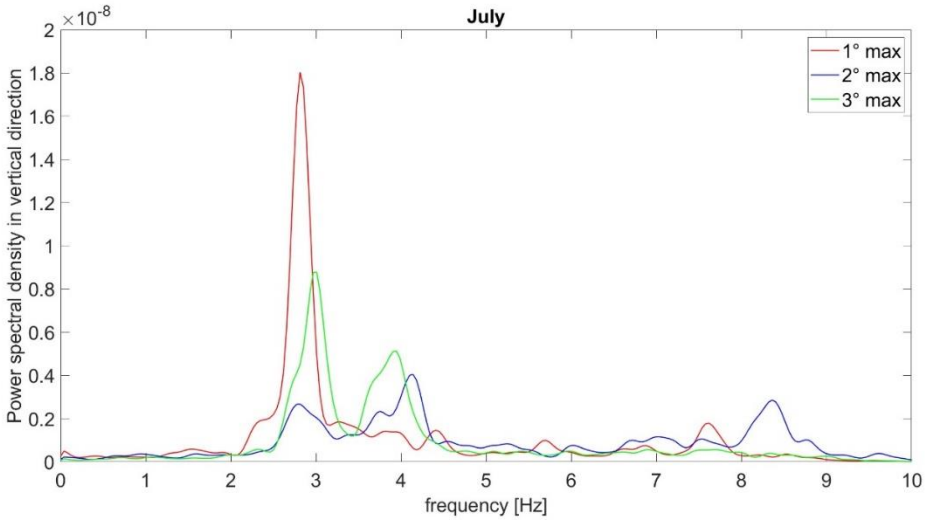


Figure 4-74: Results obtained from the 3 accelerograms with maximum SD in time domain

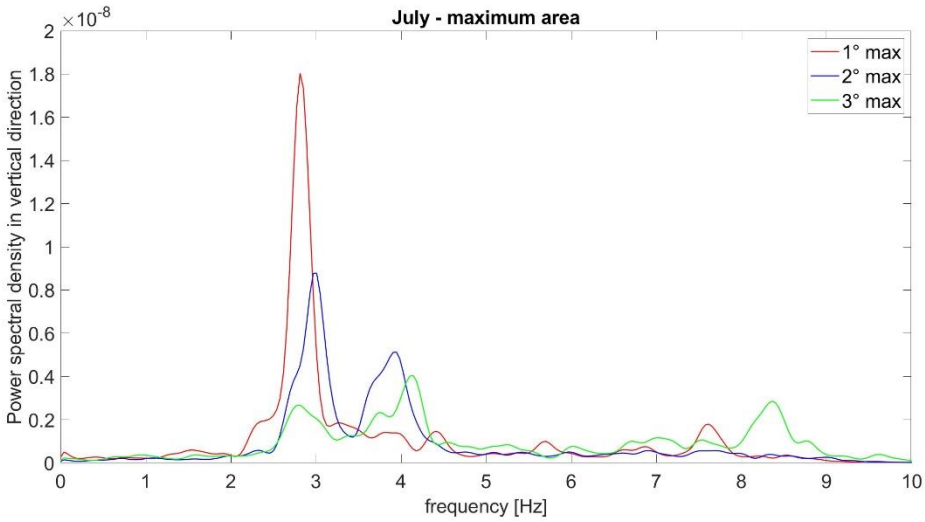


Figure 4-75: Results obtained from the 3 accelerograms with maximum area of PSD

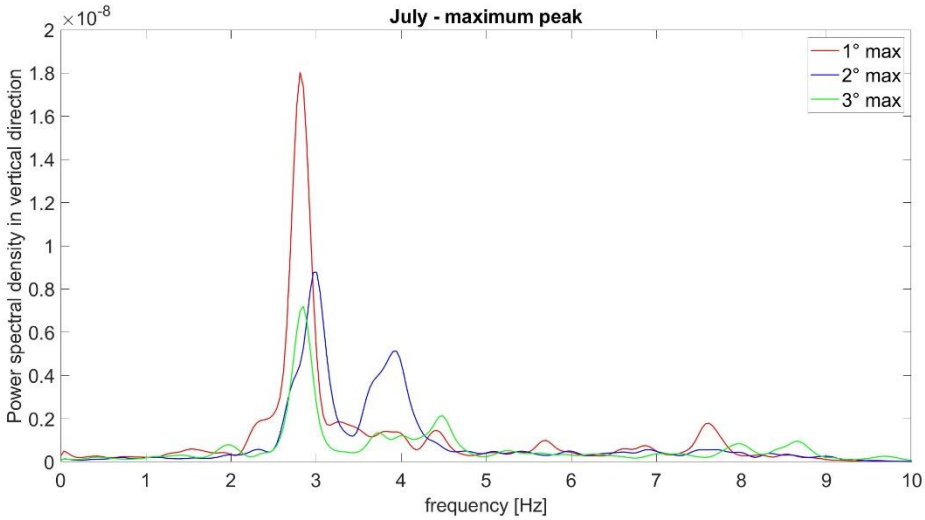


Figure 4-76: Results obtained from the 3 accelerograms with highest peak if PSD

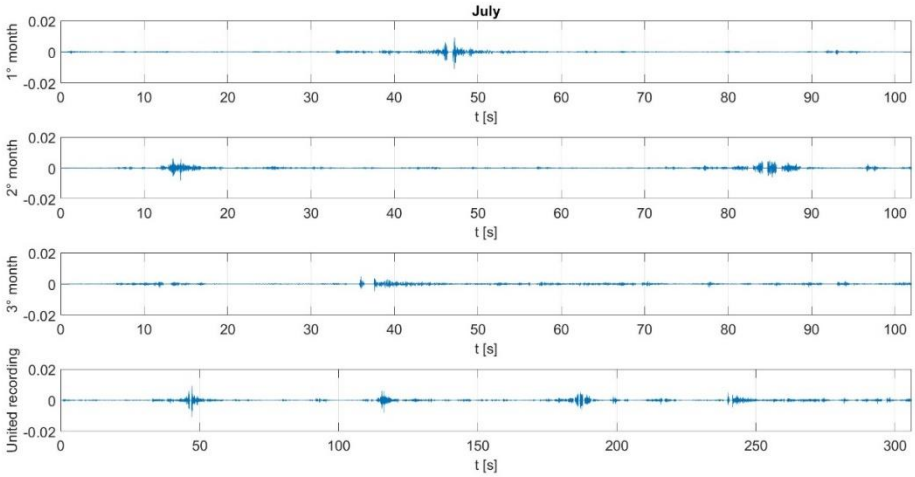


Figure 4-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.7.2 Longitudinal direction (y)

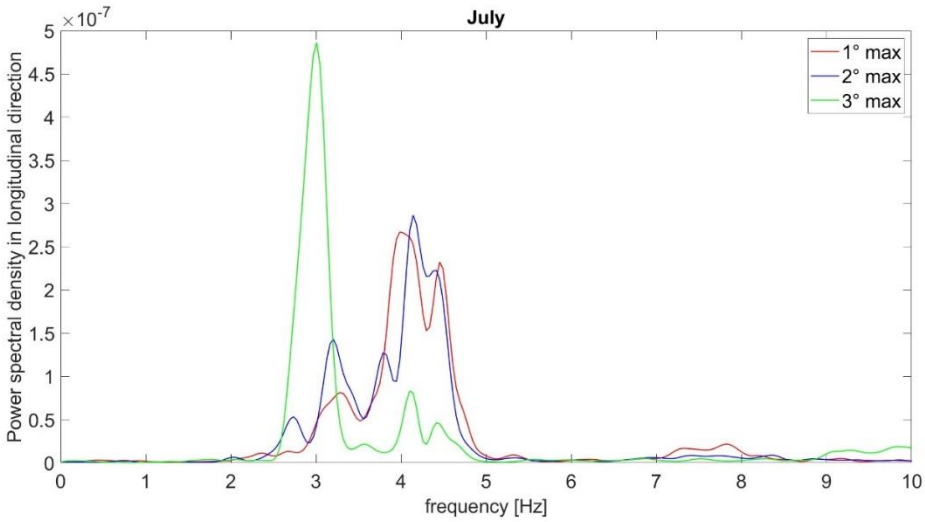


Figure 4-78: Results obtained from the 3 accelerograms with maximum SD in time domain

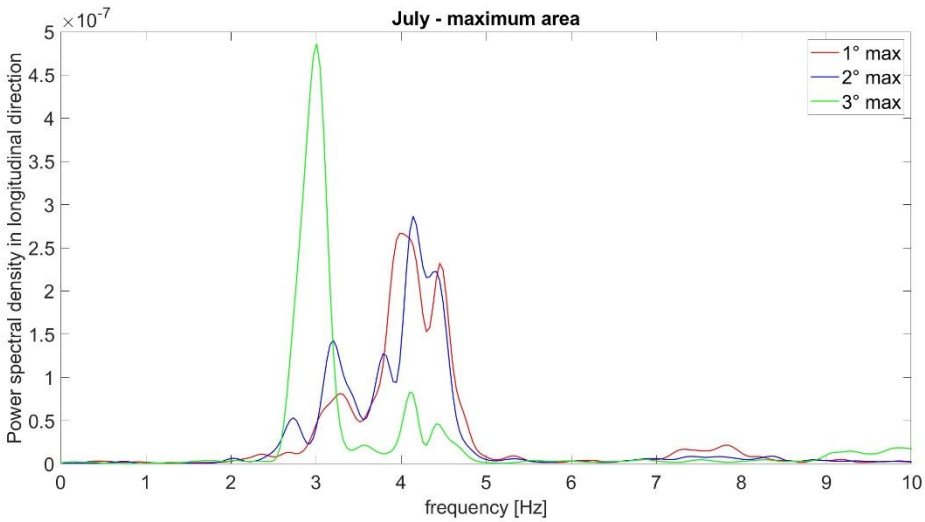


Figure 4-79: Results obtained from the 3 accelerograms with maximum area of PSD

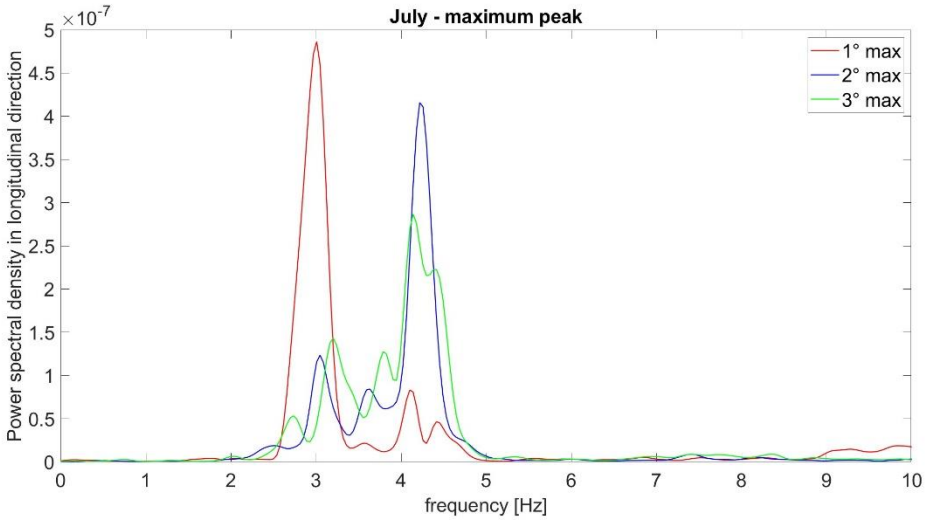


Figure 4-80: Results obtained from the 3 accelerograms with highest peak if PSD

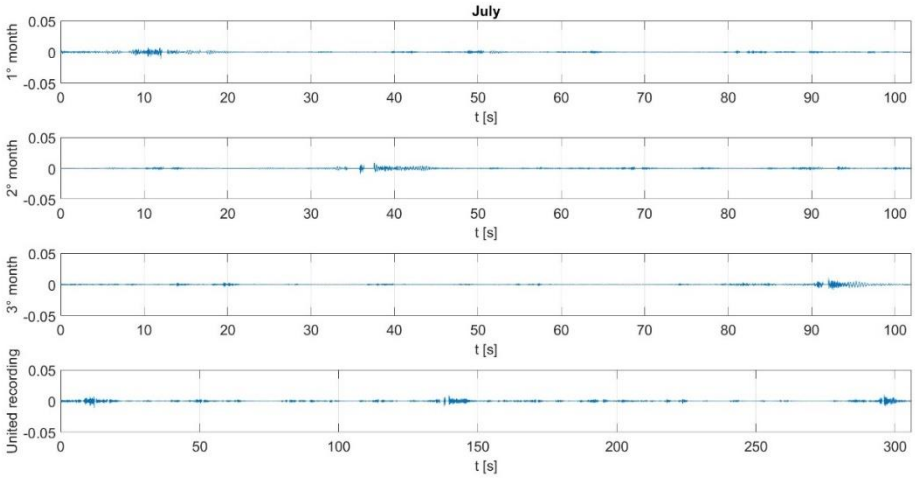


Figure 4-81: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.7.3 Transverse direction (z)

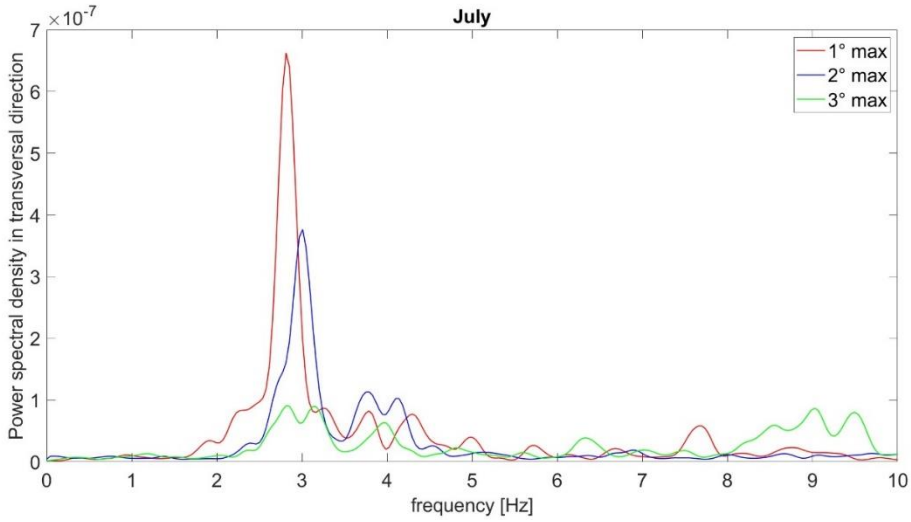


Figure 4-82: Results obtained from the 3 accelerograms with maximum SD in time domain

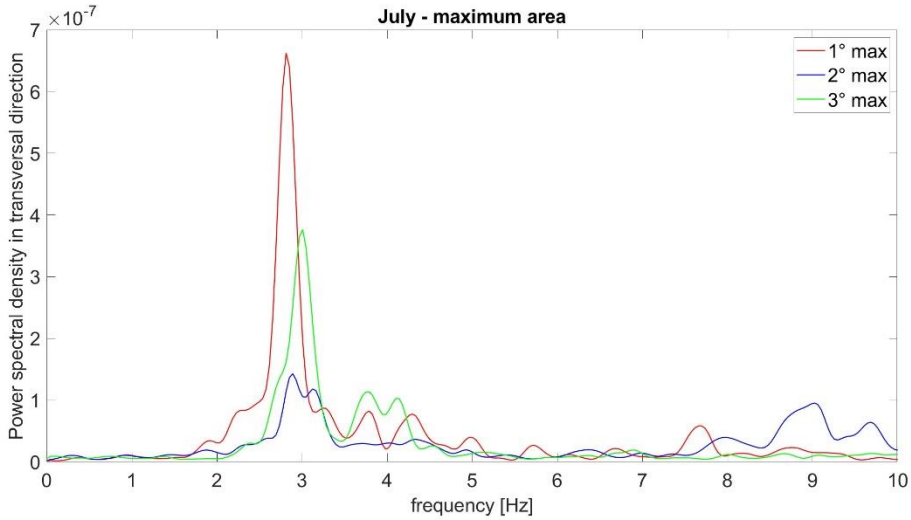


Figure 4-83: Results obtained from the 3 accelerograms with maximum area of PSD

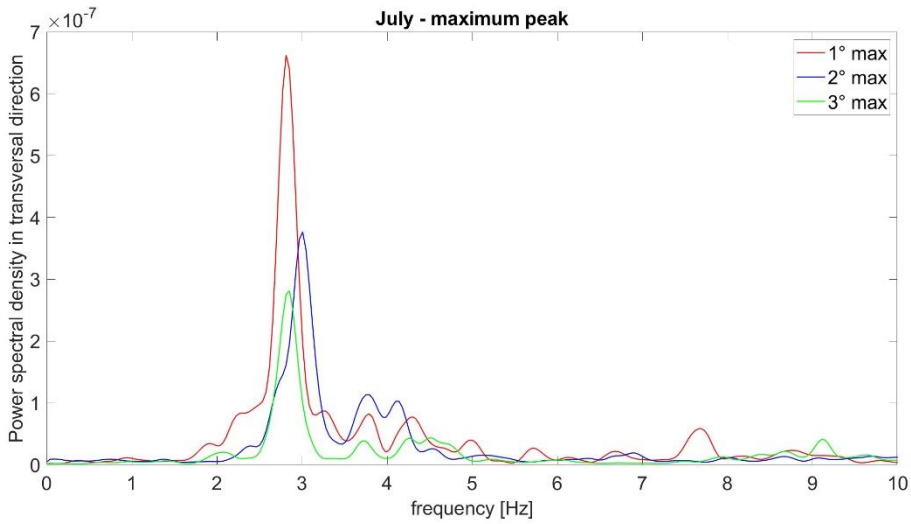


Figure 4-84: Results obtained from the 3 accelerograms with highest peak if PSD

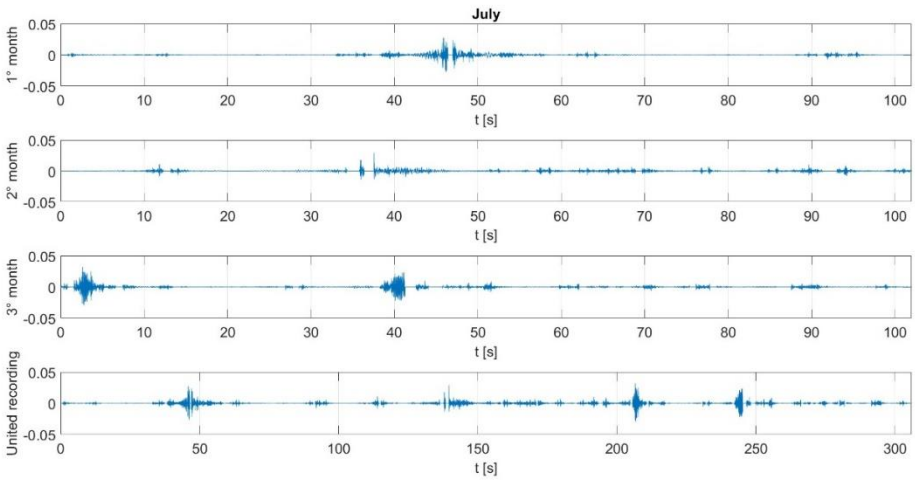


Figure 4-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

4.8 August

The results obtained for the August dataset are shown in the following tables.

Table 4-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-08-29_08-00-21	1.12E-04
	2°	30D41_2023-08-07_14-00-21	1.12E-04
	3°	30D41_2023-08-22_08-00-21	7.44E-05
Longitudinal direction (y)	1°	30D41_2023-08-07_14-00-21	6.96E-04
	2°	30D41_2023-08-29_08-00-21	4.98E-04
	3°	30D41_2023-08-02_08-00-20	3.74E-04
Transverse direction (z)	1°	30D41_2023-08-29_08-00-21	6.80E-04
	2°	30D41_2023-08-07_14-00-21	5.71E-04
	3°	30D41_2023-08-22_08-00-21	4.42E-04

Table 4-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-08-07_14-00-21	1.48E-08	30D41_2023-08-07_14-00-21	1.97E-09
2	30D41_2023-08-29_08-00-21	6.77E-09	30D41_2023-08-29_08-00-21	1.89E-09
3	30D41_2023-08-30_08-00-21	4.58E-09	30D41_2023-08-07_08-00-20	8.23E-10
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-08-07_14-00-21	6.00E-07	30D41_2023-08-07_14-00-21	1.06E-07
2	30D41_2023-08-29_08-00-21	4.78E-07	30D41_2023-08-29_08-00-21	5.13E-08
3	30D41_2023-08-02_08-00-20	1.82E-07	30D41_2023-08-02_08-00-20	2.86E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-08-29_08-00-21	3.44E-07	30D41_2023-08-29_08-00-21	9.34E-08
2	30D41_2023-08-07_14-00-21	2.22E-07	30D41_2023-08-07_14-00-21	6.83E-08
3	30D41_2023-08-30_08-00-21	1.94E-07	30D41_2023-08-02_08-00-20	3.91E-08

Table 4-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	B	B	B	B	A	A	A
2	B	A	A	A	A	A	B	B	B
3	-	-	-	C	C	C	-	-	-

4.8.1 Vertical direction (x)

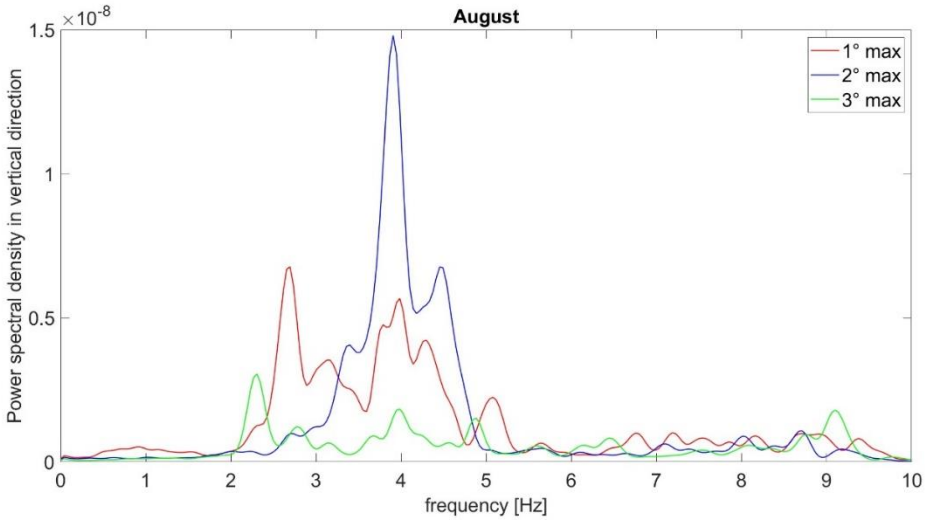


Figure 4-86: Results obtained from the 3 accelerograms with maximum SD in time domain

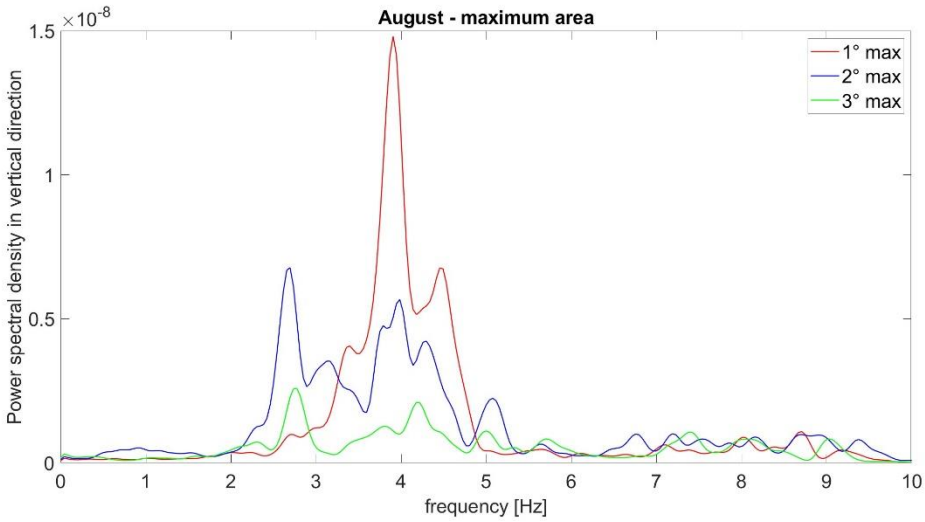


Figure 4-87: Results obtained from the 3 accelerograms with maximum area of PSD

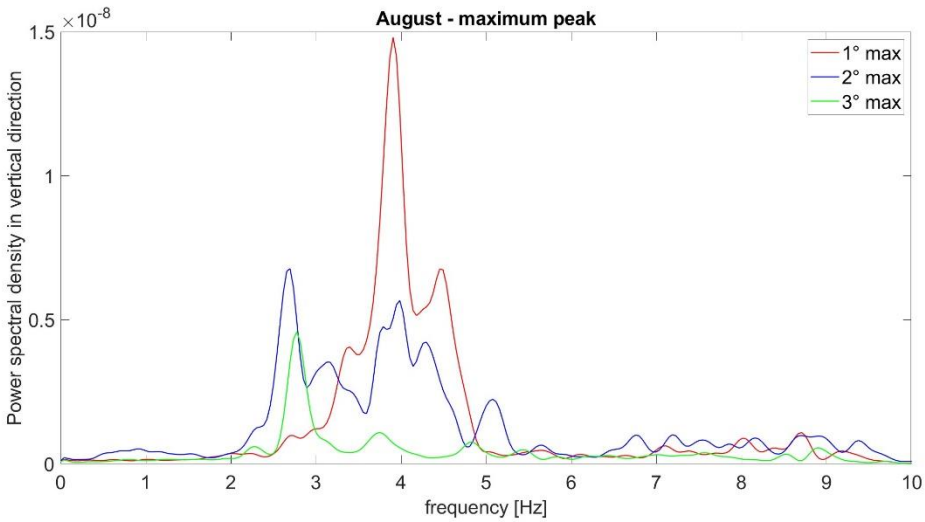


Figure 4-88: Results obtained from the 3 accelerograms with highest peak if PSD

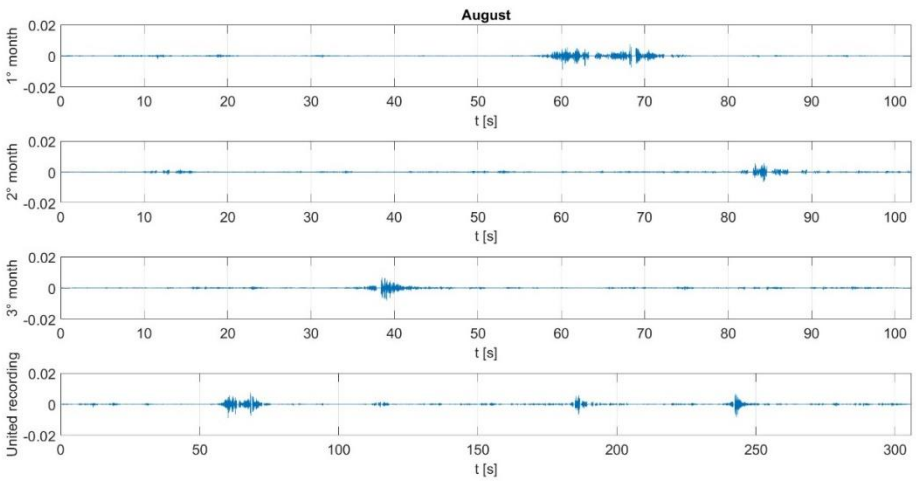


Figure 4-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.8.2 Longitudinal direction (y)

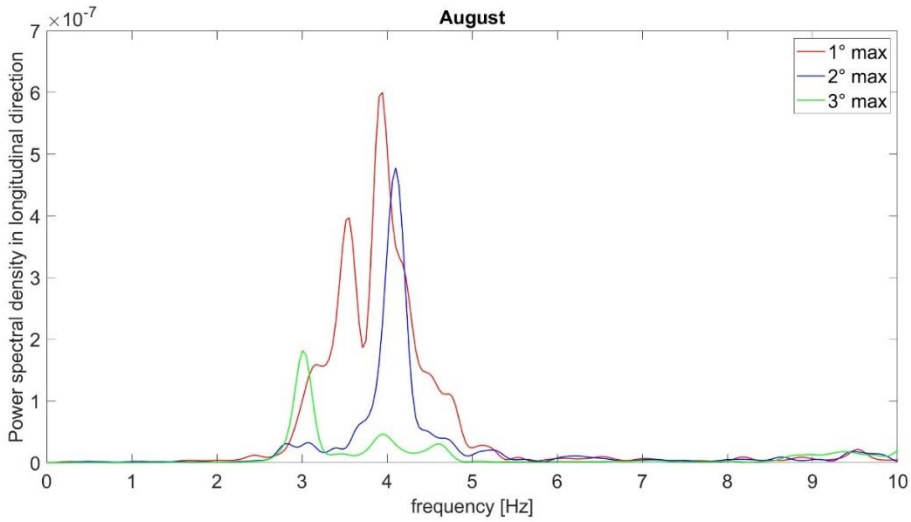


Figure 4-90: Results obtained from the 3 accelerograms with maximum SD in time domain

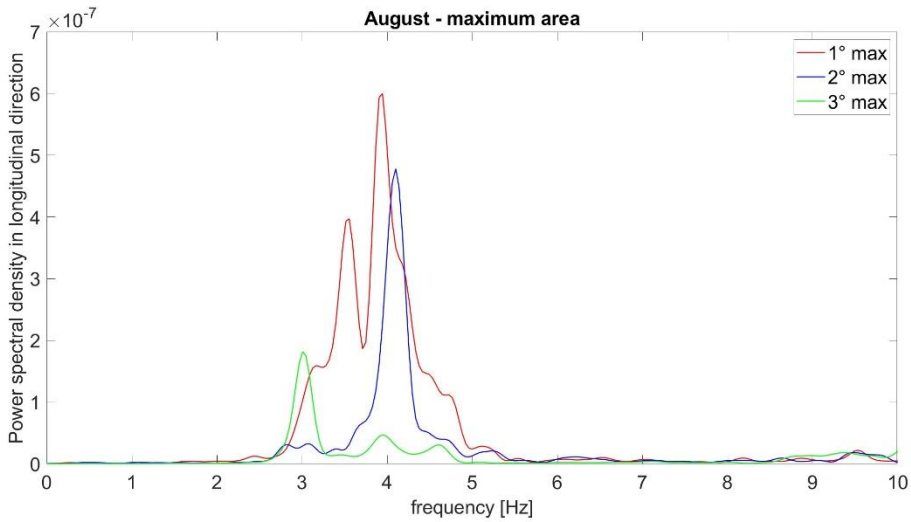


Figure 4-91: Results obtained from the 3 accelerograms with maximum area of PSD

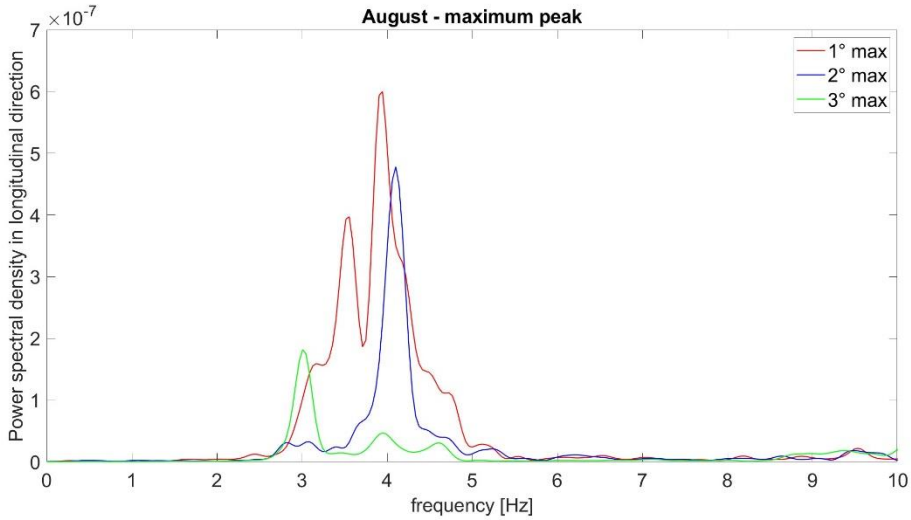


Figure 4-92: Results obtained from the 3 accelerograms with highest peak if PSD

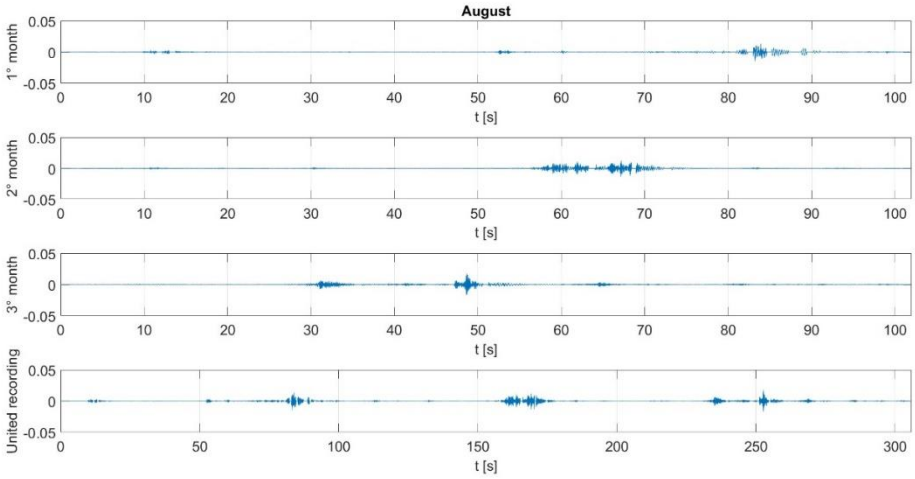


Figure 4-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

4.8.3 Transverse direction (z)

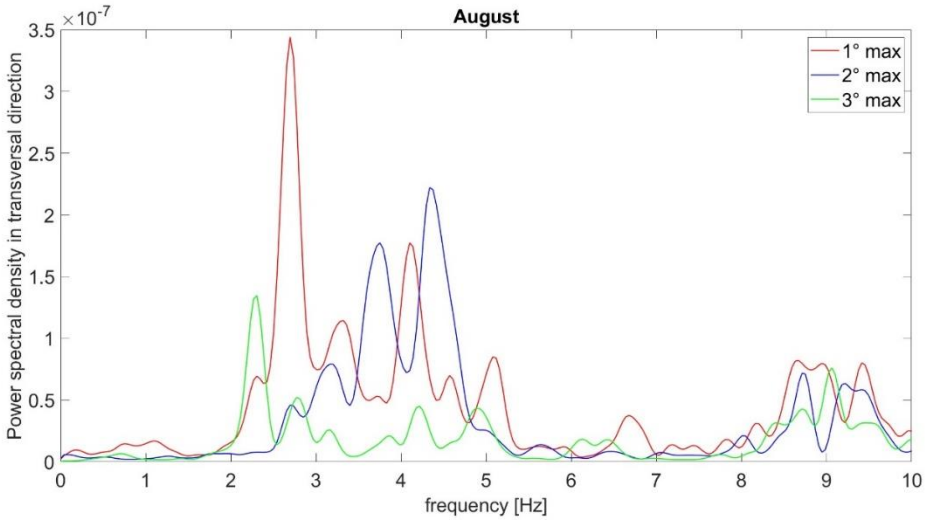


Figure 4-94: Results obtained from the 3 accelerograms with maximum SD in time domain

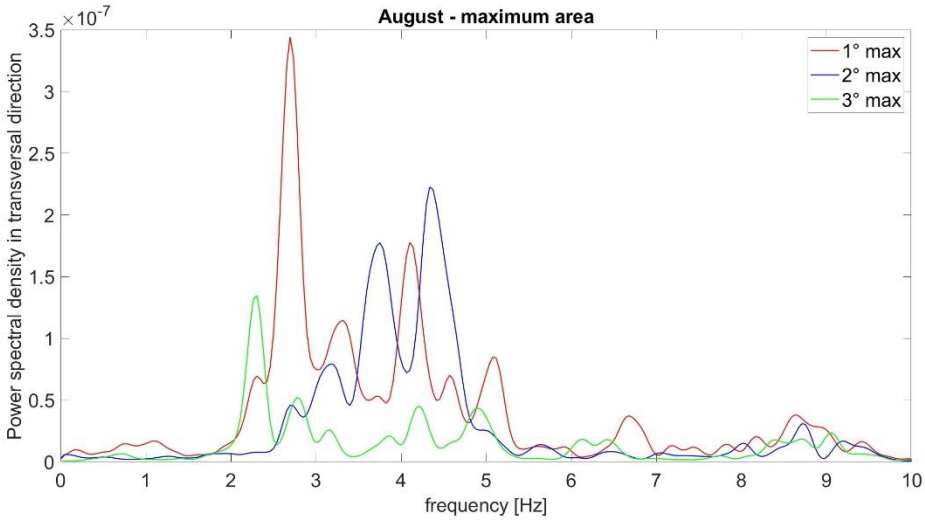


Figure 4-95: Results obtained from the 3 accelerograms with maximum area of PSD

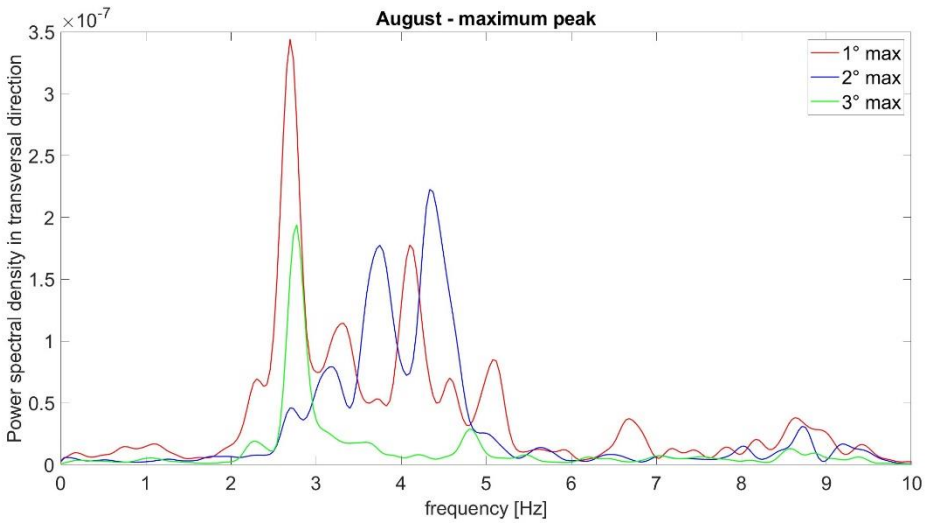


Figure 4-96: Results obtained from the 3 accelerograms with highest peak if PSD

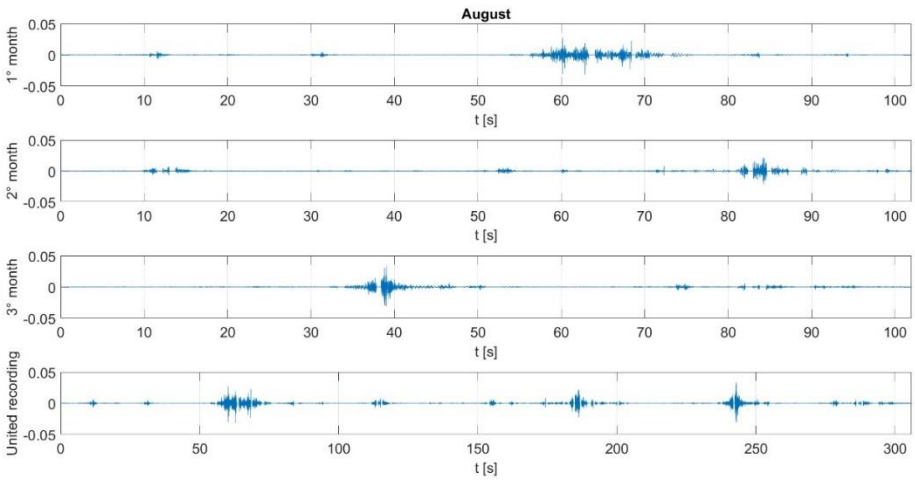


Figure 4-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

4.9 September

The results obtained for the September dataset are shown in the following tables.

Table 4-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-09-26_15-00-20	2.28E-04
	2°	30D41_2023-09-14_11-00-20	1.74E-04
	3°	30D41_2023-09-26_09-00-20	1.65E-04
Longitudinal direction (y)	1°	30D41_2023-09-26_09-00-20	1.67E-03
	2°	30D41_2023-09-14_11-00-20	1.30E-03
	3°	30D41_2023-09-26_15-00-20	1.27E-03
Transverse direction (z)	1°	30D41_2023-09-26_15-00-20	1.51E-03
	2°	30D41_2023-09-14_11-00-20	9.87E-04
	3°	30D41_2023-09-26_09-00-20	9.53E-04

Table 4-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-09-26_15-00-20	1.01E-07	30D41_2023-09-26_15-00-20	7.82E-09
2	30D41_2023-09-15_11-00-21	4.85E-08	30D41_2023-09-14_11-00-20	4.65E-09
3	30D41_2023-09-20_11-00-20	3.53E-08	30D41_2023-09-26_09-00-20	4.08E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-09-26_09-00-20	8.91E-06	30D41_2023-09-26_09-00-20	5.64E-07
2	30D41_2023-09-14_11-00-20	4.21E-06	30D41_2023-09-14_11-00-20	3.49E-07
3	30D41_2023-09-26_15-00-20	1.53E-06	30D41_2023-09-26_15-00-20	3.15E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-09-26_15-00-20	5.25E-06	30D41_2023-09-26_15-00-20	4.51E-07
2	30D41_2023-09-20_11-00-20	1.16E-06	30D41_2023-09-14_11-00-20	1.96E-07
3	30D41_2023-09-01_08-00-21	9.88E-07	30D41_2023-09-26_09-00-20	1.74E-07

Table 4-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	C	C	A	A	A
2	B	-	B	B	B	B	B	-	B
3	C	-	C	A	A	A	C	-	C

4.9.1 Vertical direction (x)

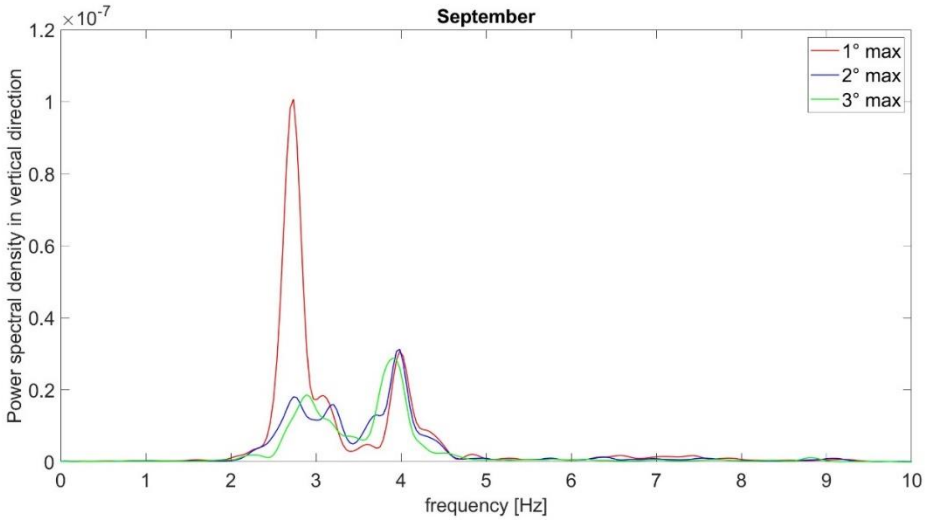


Figure 4-98: Results obtained from the 3 accelerograms with maximum SD in time domain

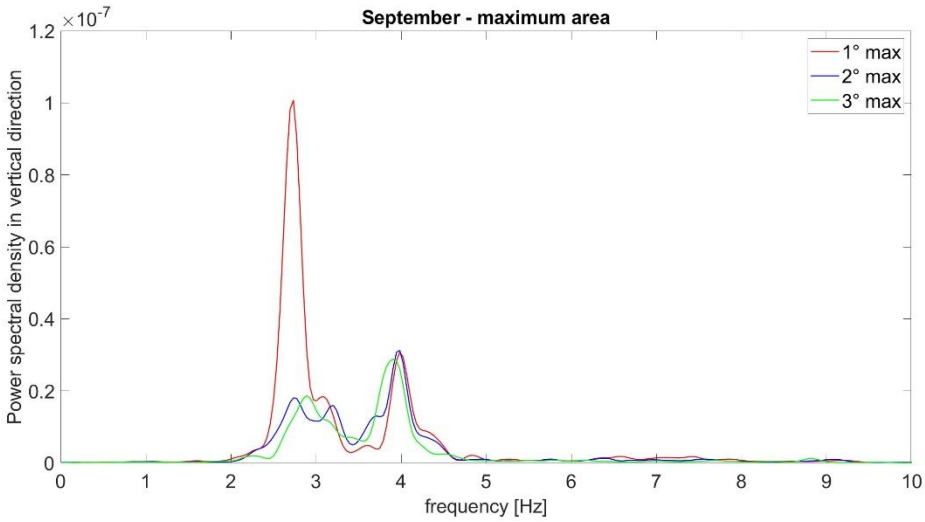


Figure 4-99: Results obtained from the 3 accelerograms with maximum area of PSD

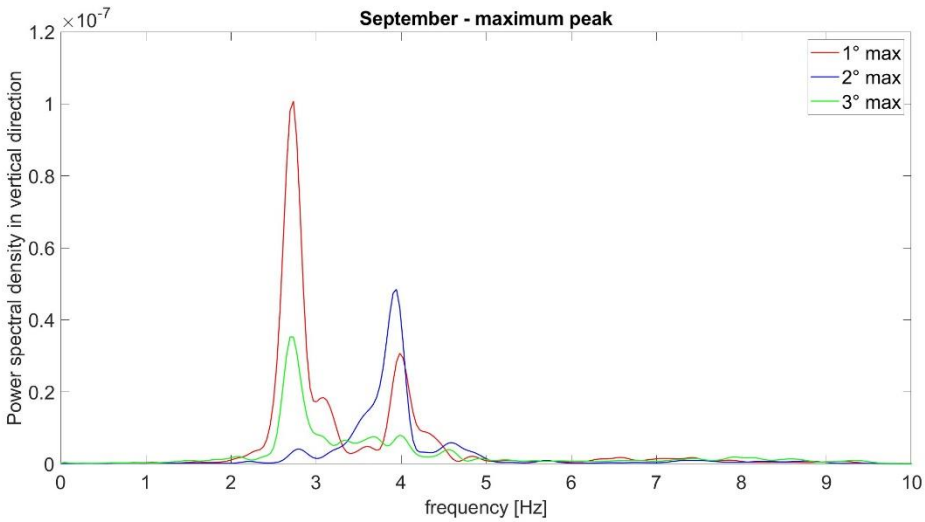


Figure 4-100: Results obtained from the 3 accelerograms with highest peak if PSD

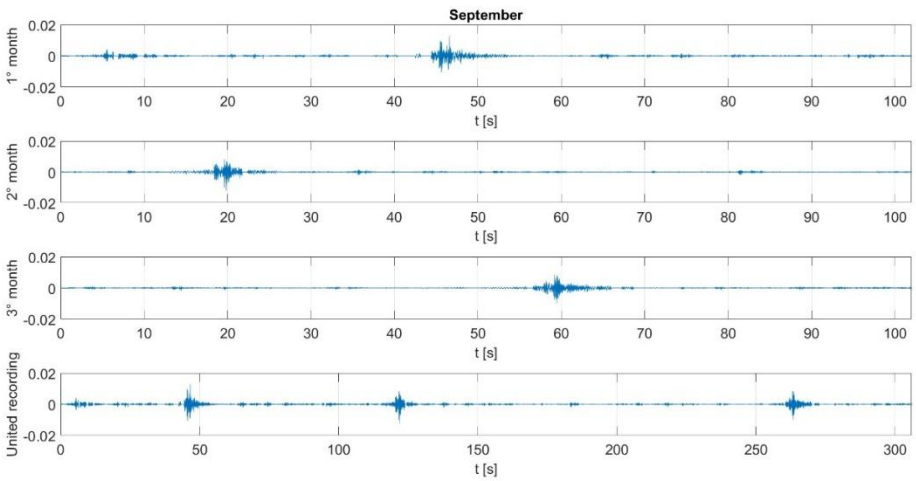


Figure 4-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.9.2 Longitudinal direction (y)

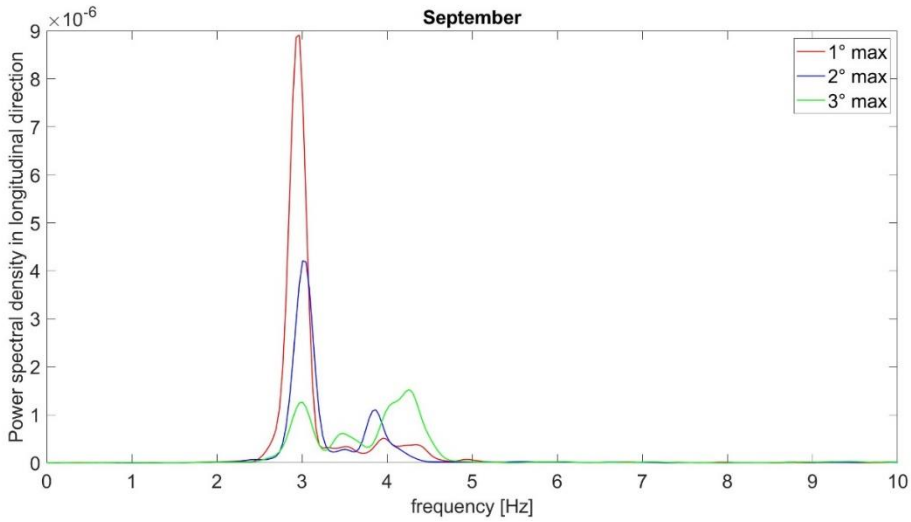


Figure 4-102: Results obtained from the 3 accelerograms with maximum SD in time domain

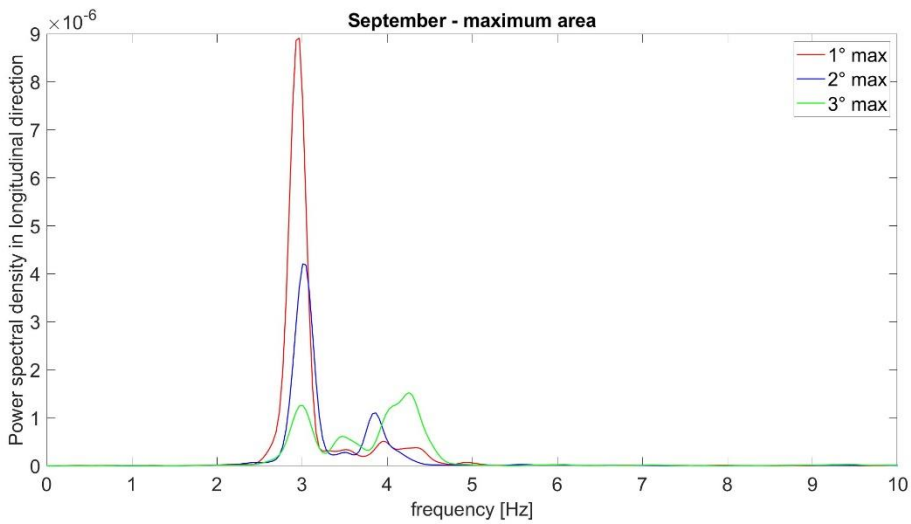


Figure 4-103: Results obtained from the 3 accelerograms with maximum area of PSD

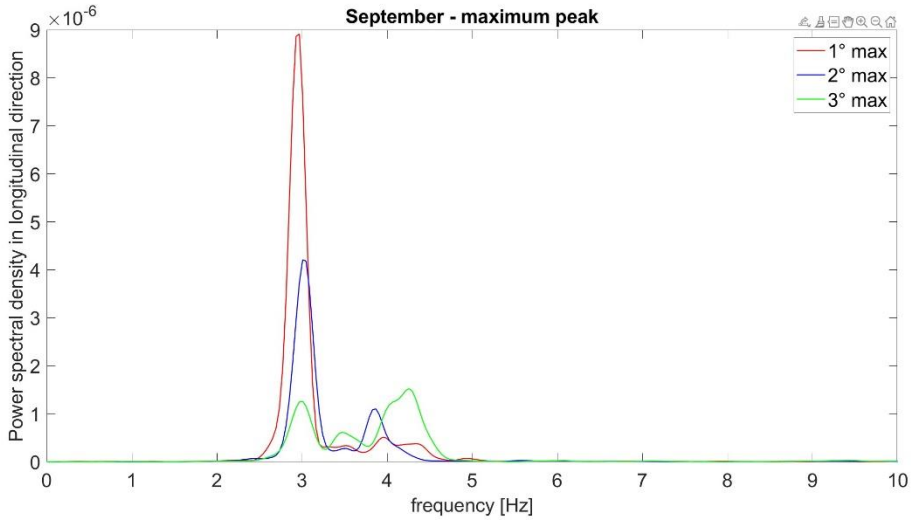


Figure 4-104: Results obtained from the 3 accelerograms with highest peak if PSD

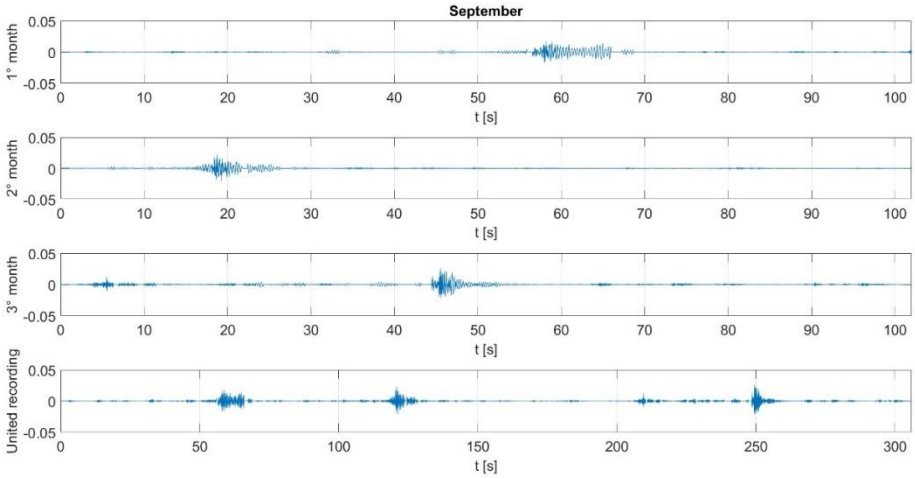


Figure 4-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

4.9.3 Transverse direction (z)

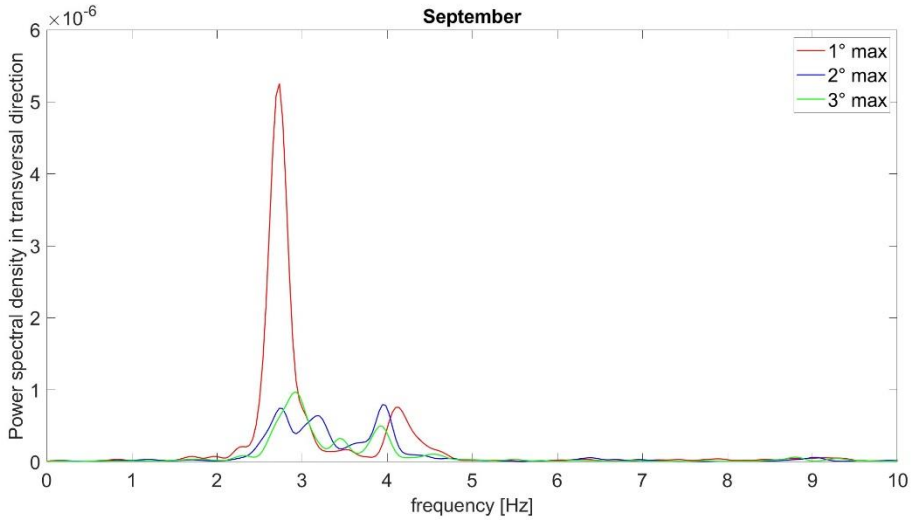


Figure 4-106: Results obtained from the 3 accelerograms with maximum SD in time domain

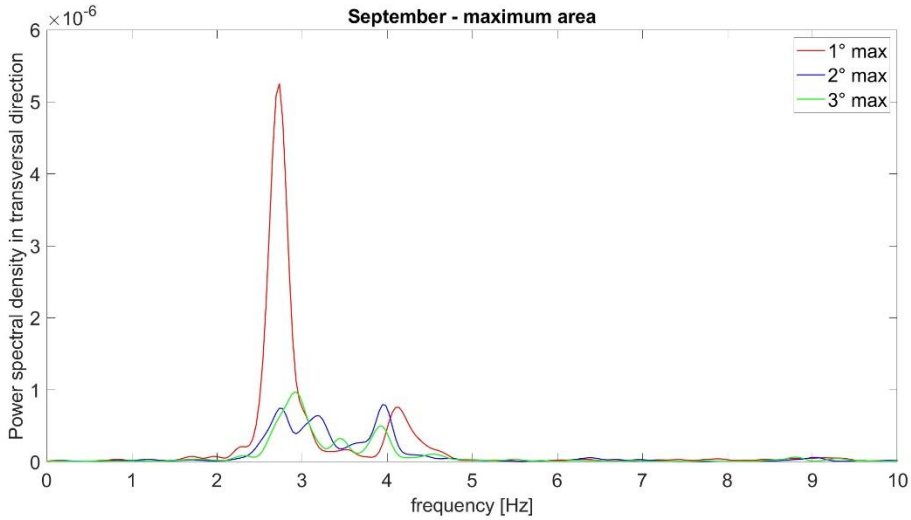


Figure 4-107: Results obtained from the 3 accelerograms with maximum area of PSD

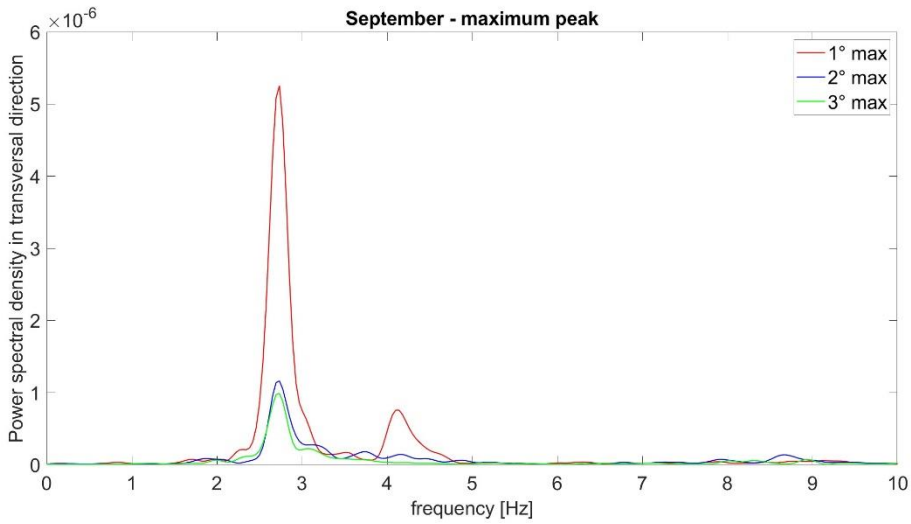


Figure 4-108: Results obtained from the 3 accelerograms with highest peak if PSD

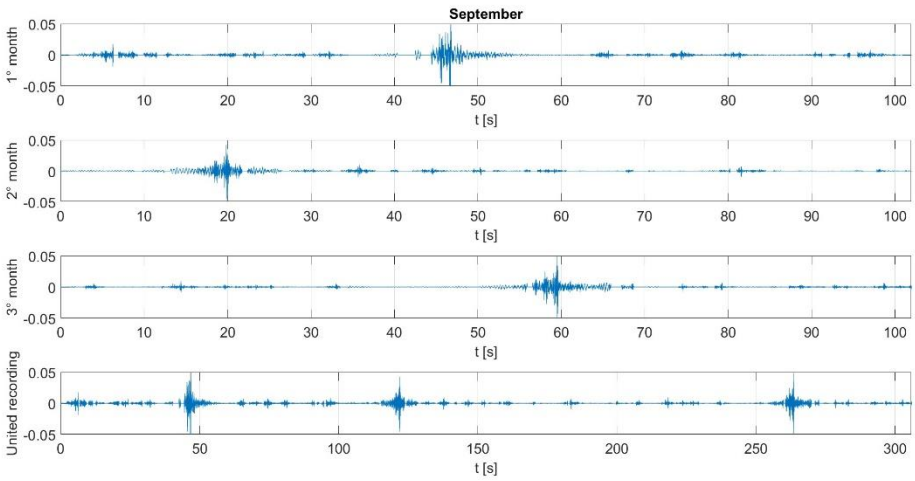


Figure 4-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

4.10 October

The results obtained for the October dataset are shown in the following tables.

Table 4-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-10-02_08-00-21	1.55E-04
	2°	30D41_2023-10-10_12-00-20	1.41E-04
	3°	30D41_2023-10-19_12-00-21	1.21E-04
Longitudinal direction (y)	1°	30D41_2023-10-19_12-00-21	1.30E-03
	2°	30D41_2023-10-02_08-00-21	1.08E-03
	3°	30D41_2023-10-10_12-00-20	8.10E-04
Transverse direction (z)	1°	30D41_2023-10-02_08-00-21	8.35E-04
	2°	30D41_2023-10-19_12-00-21	6.97E-04
	3°	30D41_2023-10-10_12-00-20	6.70E-04

Table 4-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-10-10_12-00-20	3.63E-08	30D41_2023-10-02_08-00-21	3.53E-09
2	30D41_2023-10-02_08-00-21	1.77E-08	30D41_2023-10-10_12-00-20	2.84E-09
3	30D41_2023-10-19_12-00-21	1.46E-08	30D41_2023-10-19_12-00-21	2.28E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-10-19_12-00-21	5.40E-06	30D41_2023-10-19_12-00-21	3.59E-07
2	30D41_2023-10-02_08-00-21	2.08E-06	30D41_2023-10-02_08-00-21	2.14E-07
3	30D41_2023-10-10_12-00-20	5.92E-07	30D41_2023-10-10_12-00-20	1.29E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-10-19_12-00-21	7.52E-07	30D41_2023-10-02_08-00-21	1.35E-07
2	30D41_2023-10-02_08-00-21	6.58E-07	30D41_2023-10-19_12-00-21	1.01E-07
3	30D41_2023-10-10_12-00-20	3.58E-07	30D41_2023-10-10_12-00-20	8.39E-08

Table 4-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	C	C	C	A	C	A
2	B	A	B	A	A	A	C	A	C
3	C	C	C	B	B	B	B	B	B

4.10.1 Vertical direction (x)

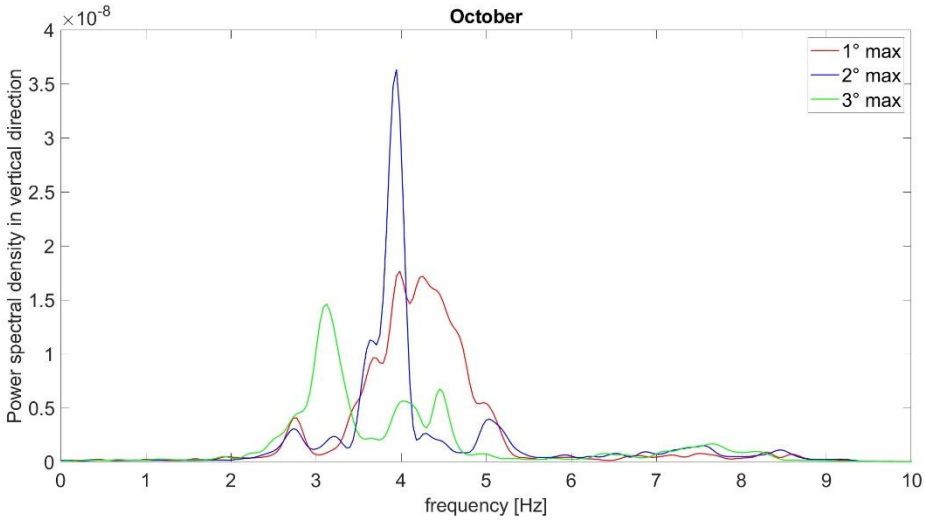


Figure 4-110: Results obtained from the 3 accelerograms with maximum SD in time domain

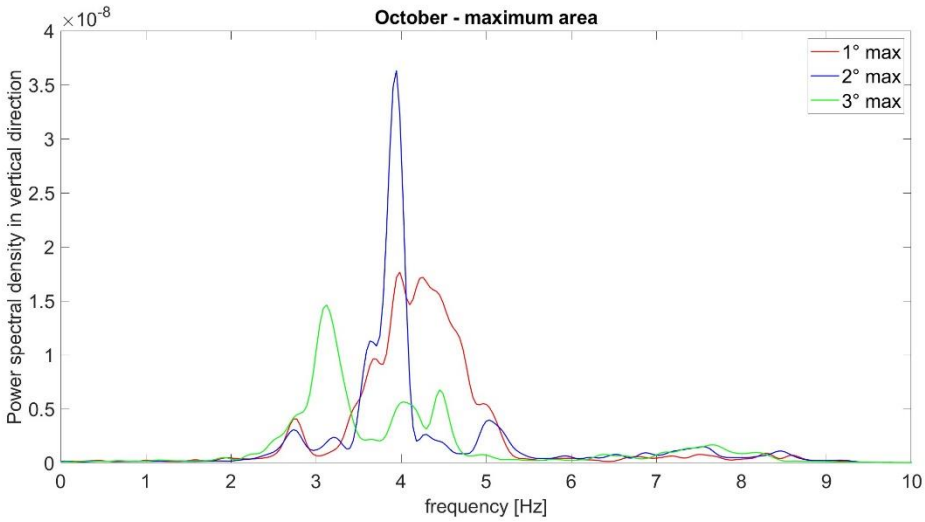


Figure 4-111: Results obtained from the 3 accelerograms with maximum area of PSD

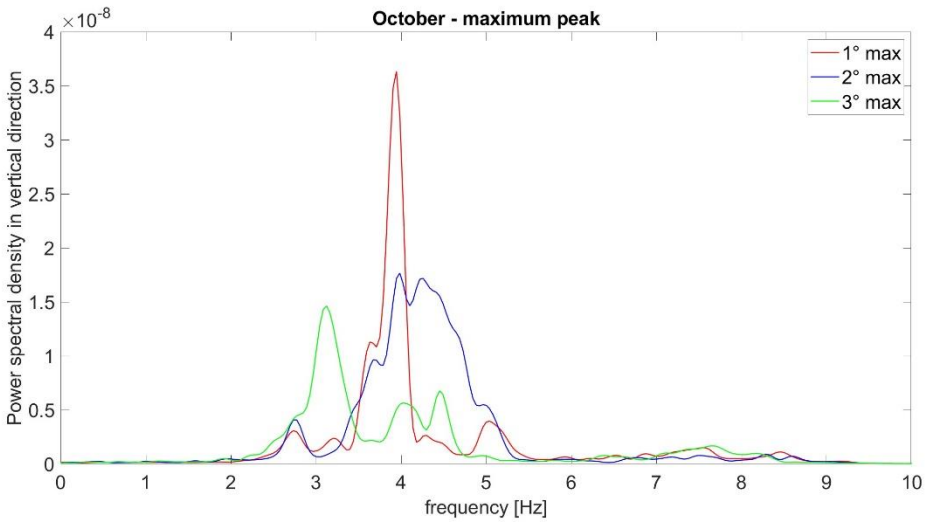


Figure 4-112: Results obtained from the 3 accelerograms with highest peak if PSD

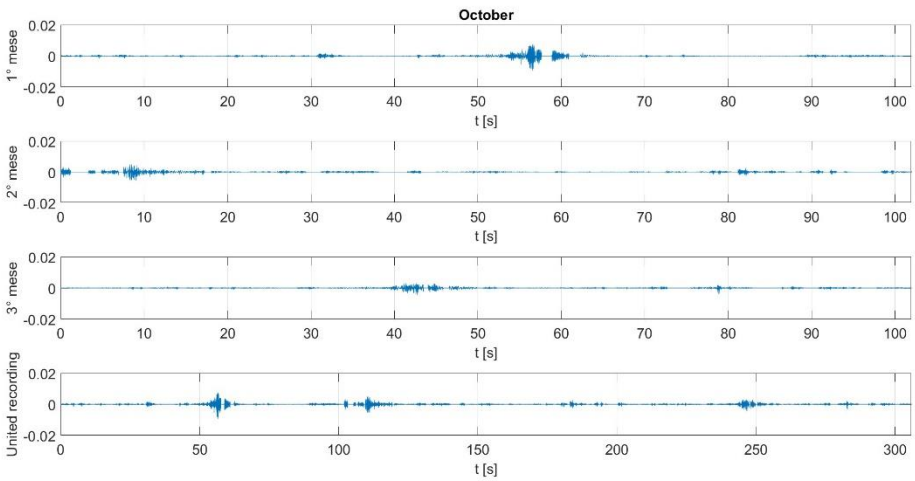


Figure 4-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.10.2 Longitudinal direction (y)

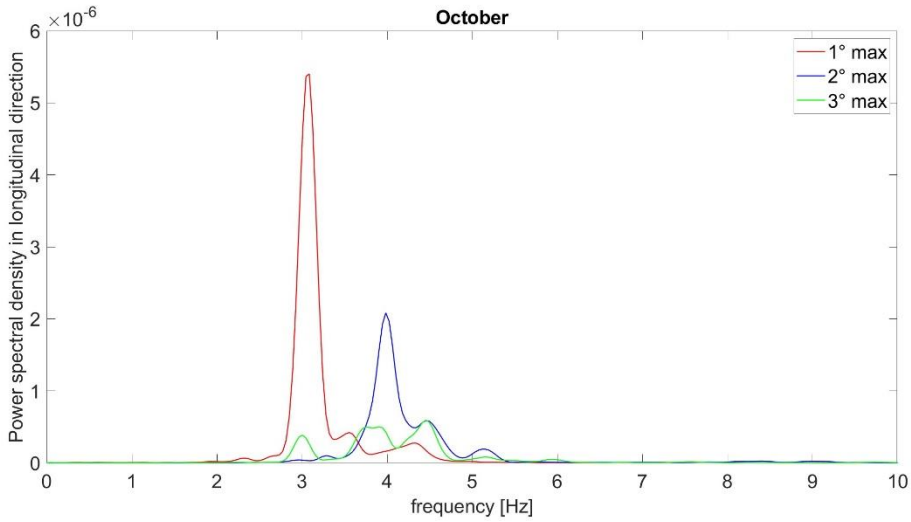


Figure 4-114: Results obtained from the 3 accelerograms with maximum SD in time domain

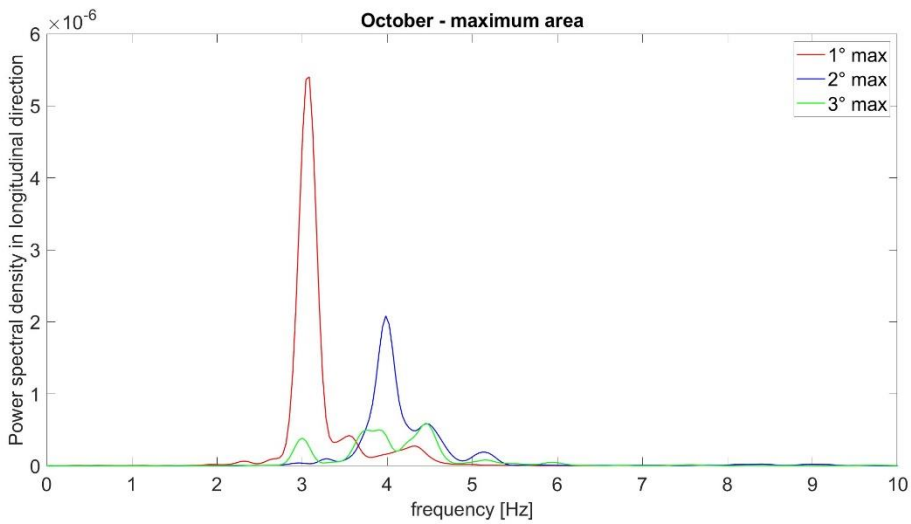


Figure 4-115: Results obtained from the 3 accelerograms with maximum area of PSD

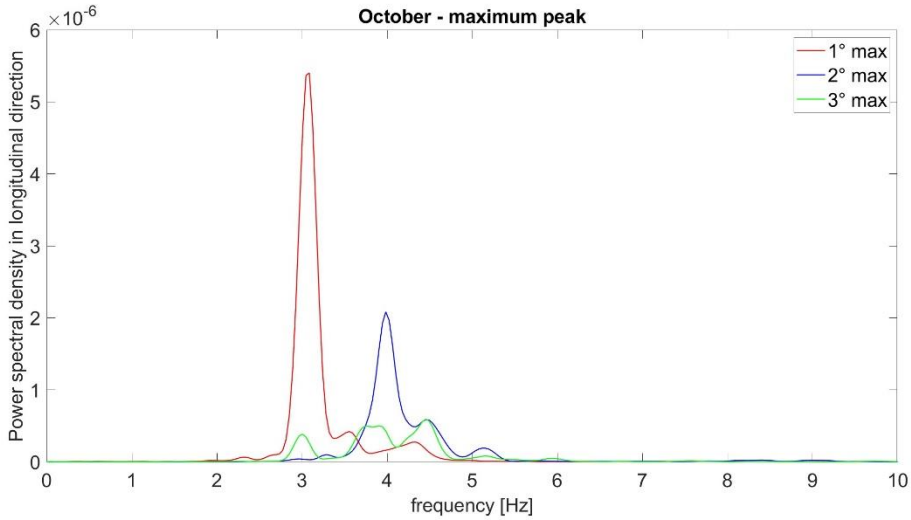


Figure 4-116: Results obtained from the 3 accelerograms with highest peak if PSD

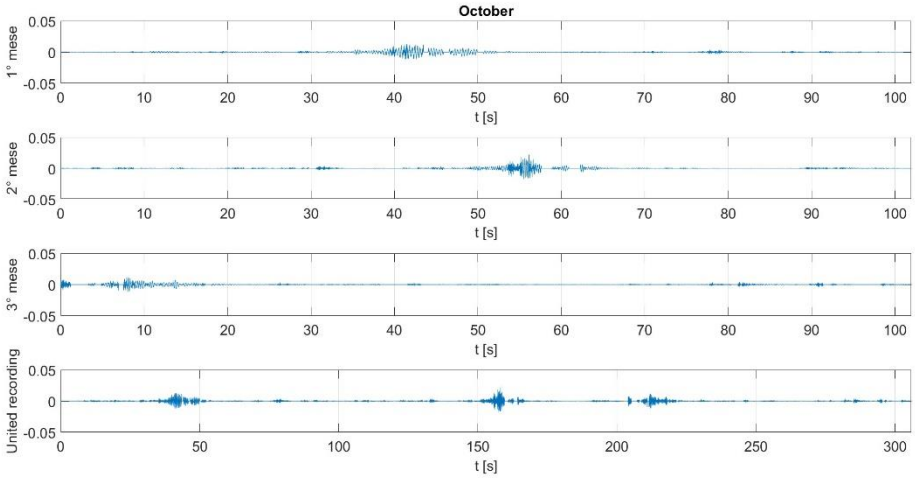


Figure 4-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

4.10.3 Transverse direction (z)

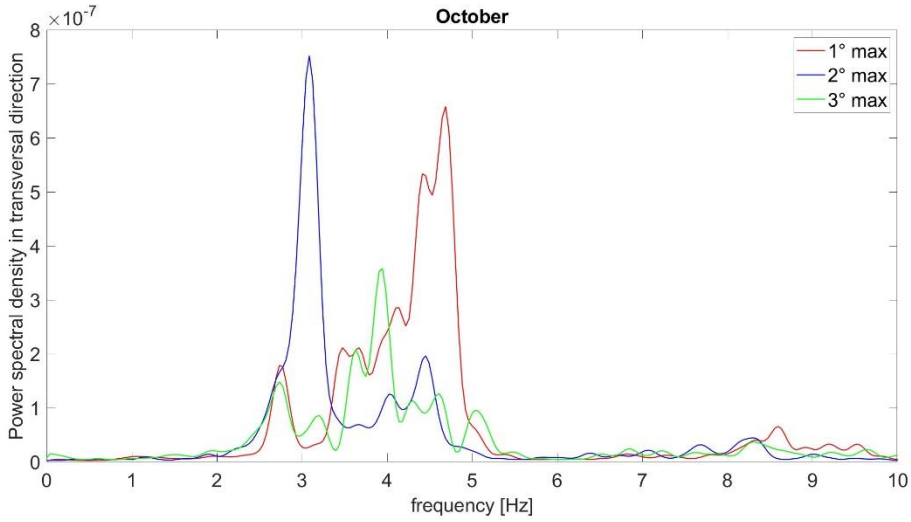


Figure 4-118: Results obtained from the 3 accelerograms with maximum SD in time domain

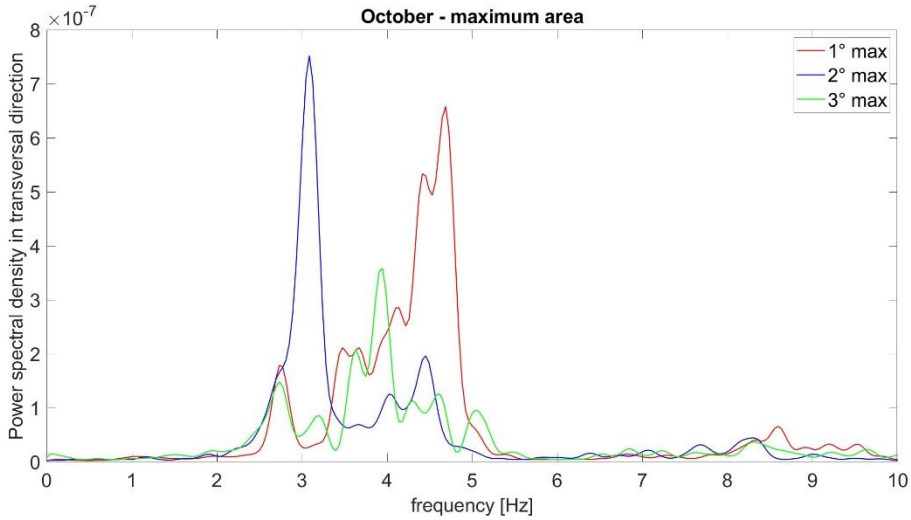


Figure 4-119: Results obtained from the 3 accelerograms with maximum area of PSD

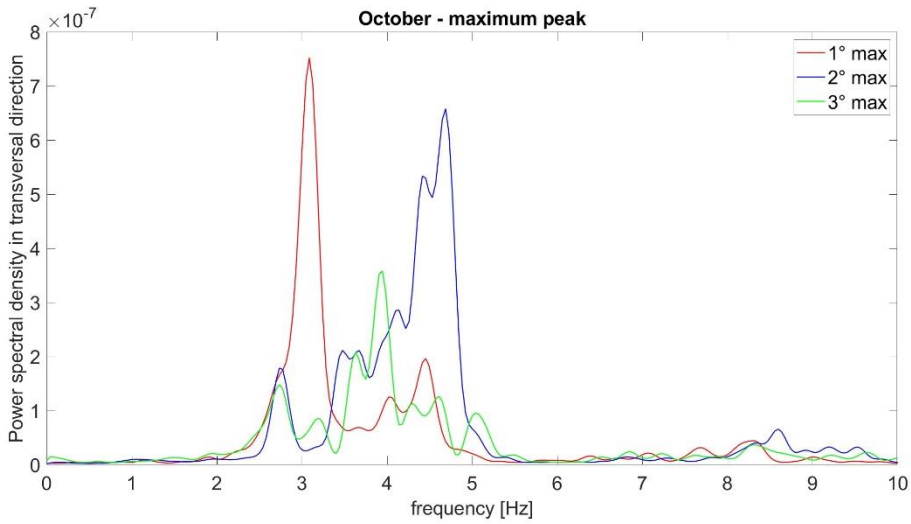


Figure 4-120: Results obtained from the 3 accelerograms with highest peak if PSD

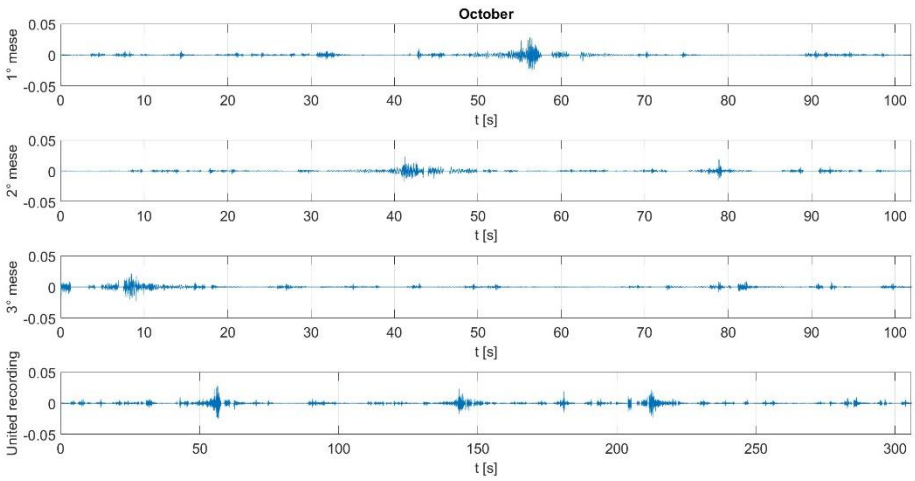


Figure 4-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

4.11 November

The results obtained for the November dataset are shown in the following tables.

Table 4-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-11-07_17-00-21	1.74E-04
	2°	30D41_2023-11-07_13-00-21	1.21E-04
	3°	30D41_2023-11-11_14-00-20	1.16E-04
Longitudinal direction (y)	1°	30D41_2023-11-07_17-00-21	1.24E-03
	2°	30D41_2023-11-29_02-00-21	6.23E-04
	3°	30D41_2023-11-06_17-00-20	5.84E-04
Transverse direction (z)	1°	30D41_2023-11-07_17-00-21	9.49E-04
	2°	30D41_2023-11-07_13-00-21	8.18E-04
	3°	30D41_2023-11-11_14-00-20	6.57E-04

Table 4-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-11-07_17-00-21	2.92E-08	30D41_2023-11-07_17-00-21	4.60E-09
2	30D41_2023-11-07_13-00-21	2.01E-08	30D41_2023-11-07_13-00-21	2.25E-09
3	30D41_2023-11-23_03-00-21	1.42E-08	30D41_2023-11-11_14-00-20	2.03E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-11-07_17-00-21	1.89E-06	30D41_2023-11-07_17-00-21	3.09E-07
2	30D41_2023-11-29_02-00-21	5.07E-07	30D41_2023-11-06_17-00-20	6.69E-08
3	30D41_2023-11-06_17-00-20	4.92E-07	30D41_2023-11-17_16-00-21	5.69E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-11-07_13-00-21	8.53E-07	30D41_2023-11-07_17-00-21	1.82E-07
2	30D41_2023-11-07_17-00-21	6.48E-07	30D41_2023-11-07_13-00-21	1.46E-07
3	30D41_2023-11-23_03-00-21	5.18E-07	30D41_2023-11-11_14-00-20	8.78E-08

Table 4-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	B	A
2	B	B	B	D	D	E	B	A	B
3	C	-	C	E	E	-	C	-	C

4.11.1 Vertical direction (x)

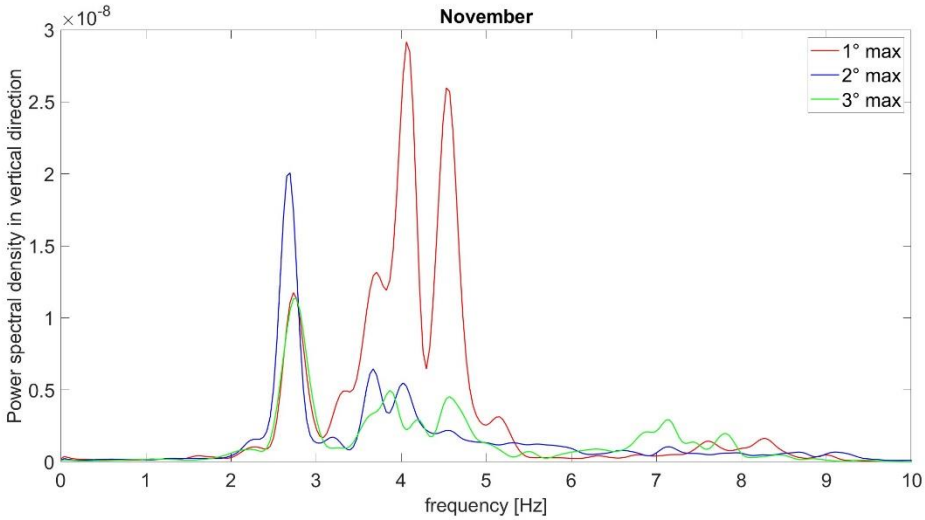


Figure 4-122: Results obtained from the 3 accelerograms with maximum SD in time domain

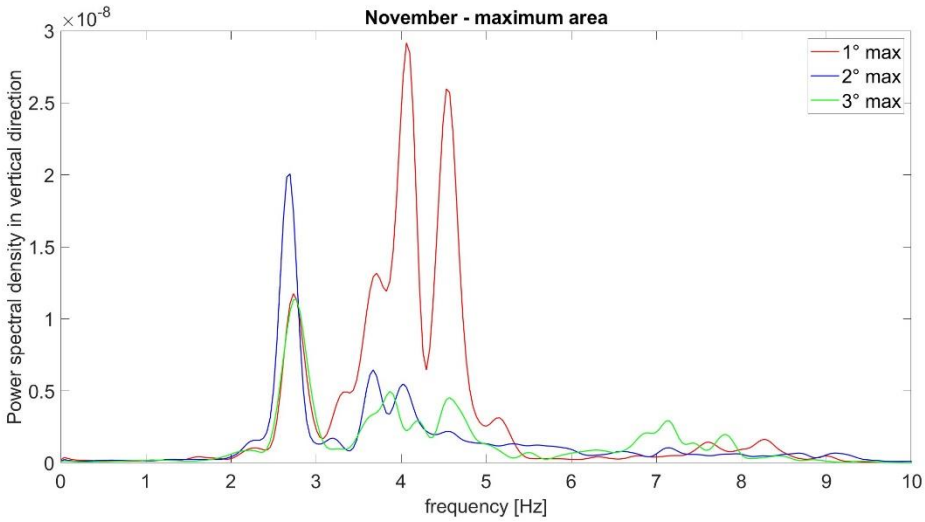


Figure 4-123: Results obtained from the 3 accelerograms with maximum area of PSD

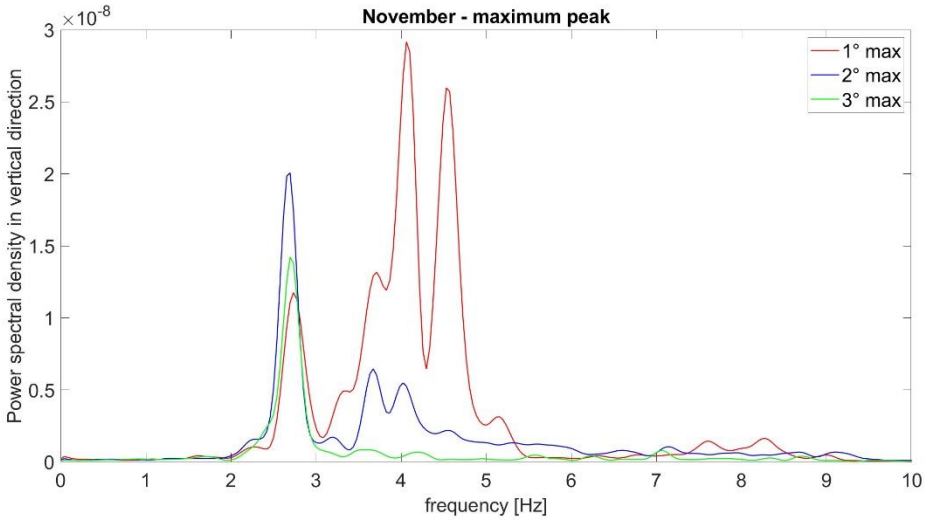


Figure 4-124: Results obtained from the 3 accelerograms with highest peak if PSD

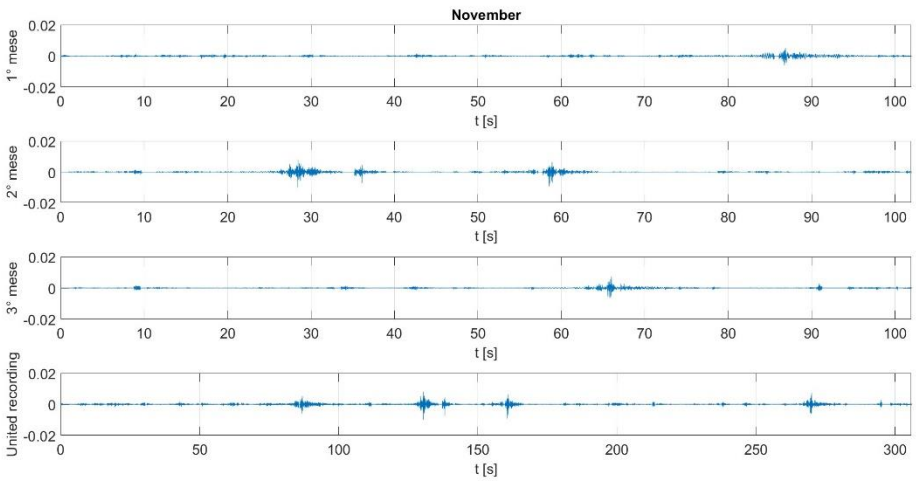


Figure 4-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.11.2 Longitudinal direction (y)

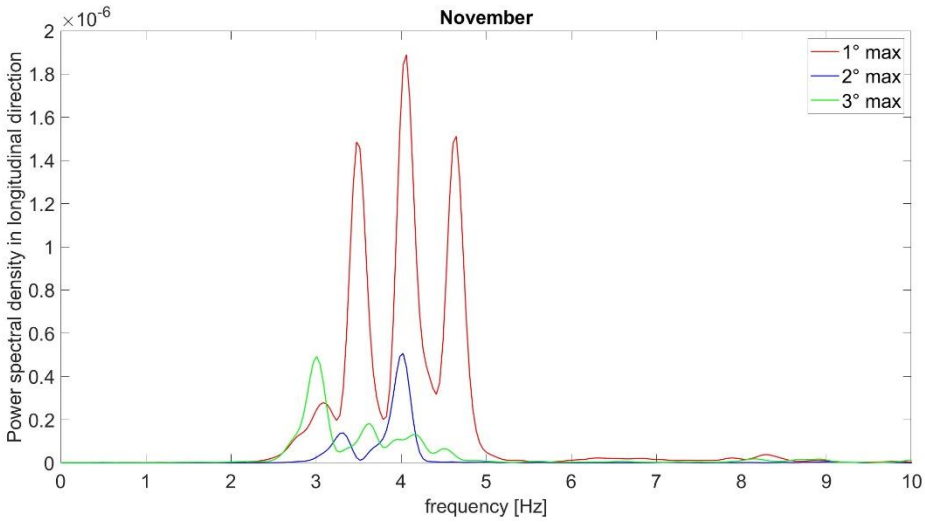


Figure 4-126: Results obtained from the 3 accelerograms with maximum SD in time domain

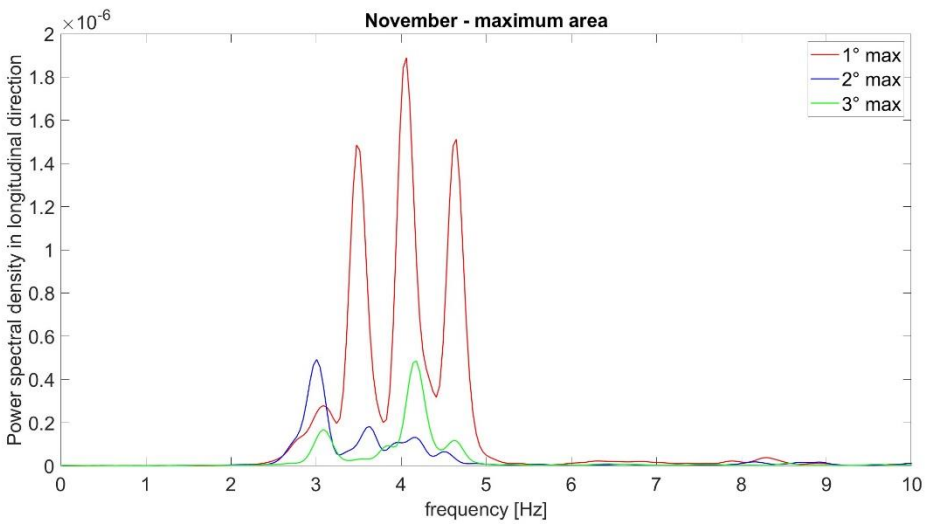


Figure 4-127: Results obtained from the 3 accelerograms with maximum area of PSD

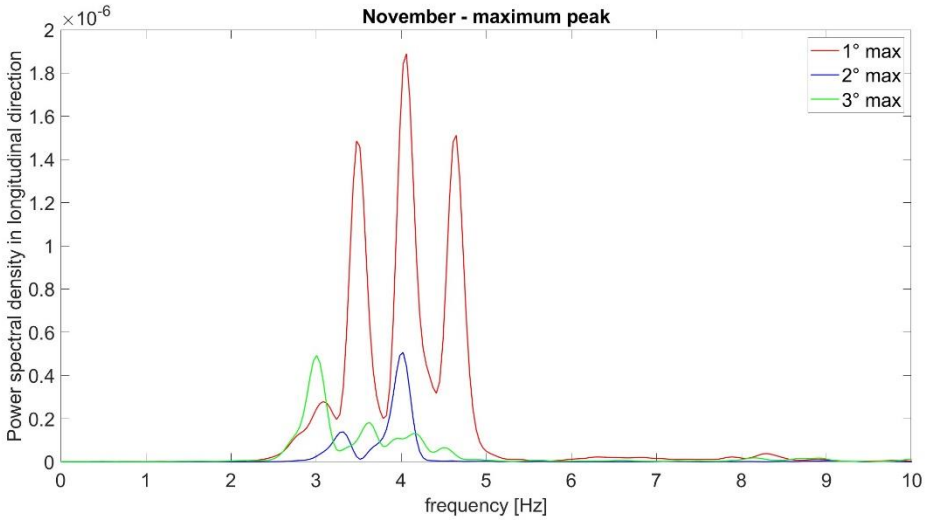


Figure 4-128: Results obtained from the 3 accelerograms with highest peak if PSD

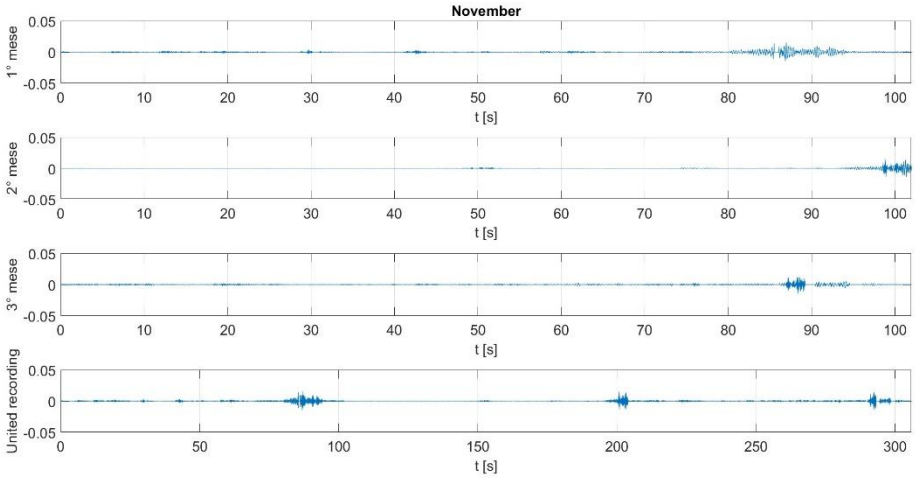


Figure 4-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

4.11.3 Transverse direction (z)

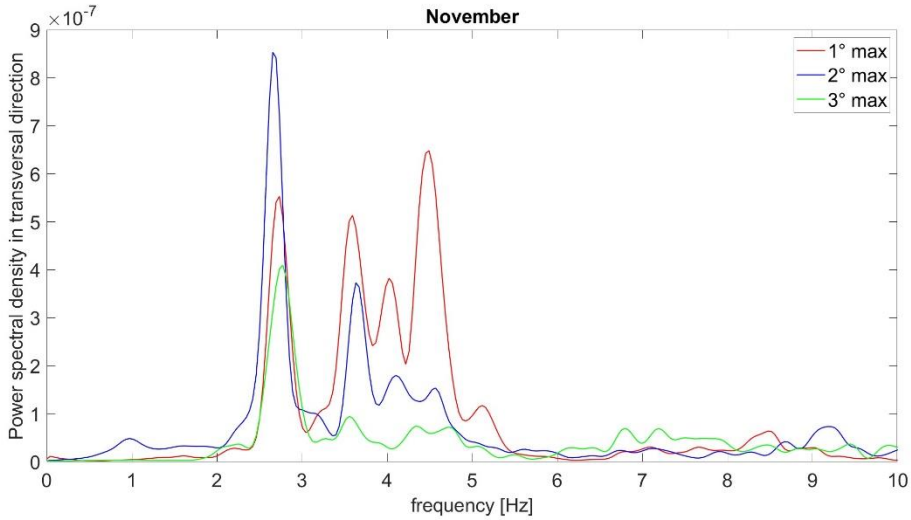


Figure 4-130: Results obtained from the 3 accelerograms with maximum SD in time domain

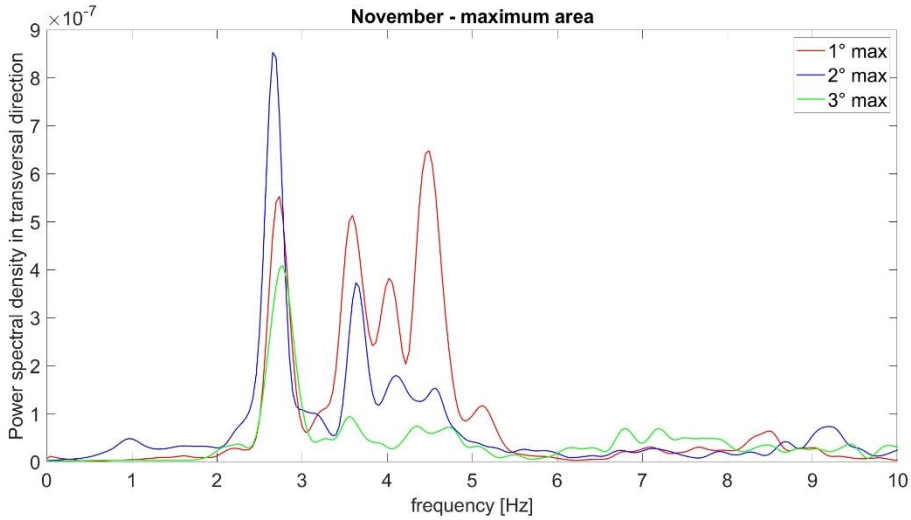


Figure 4-131: Results obtained from the 3 accelerograms with maximum area of PSD

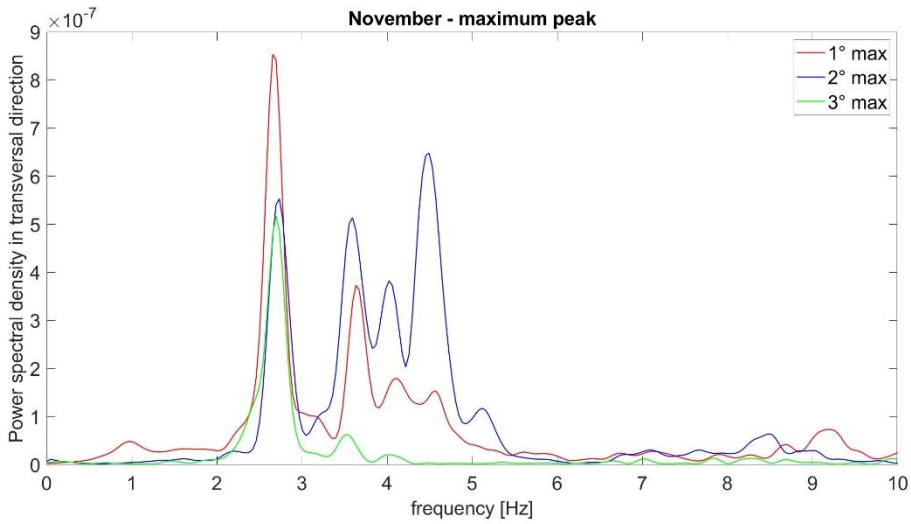


Figure 4-132: Results obtained from the 3 accelerograms with highest peak if PSD

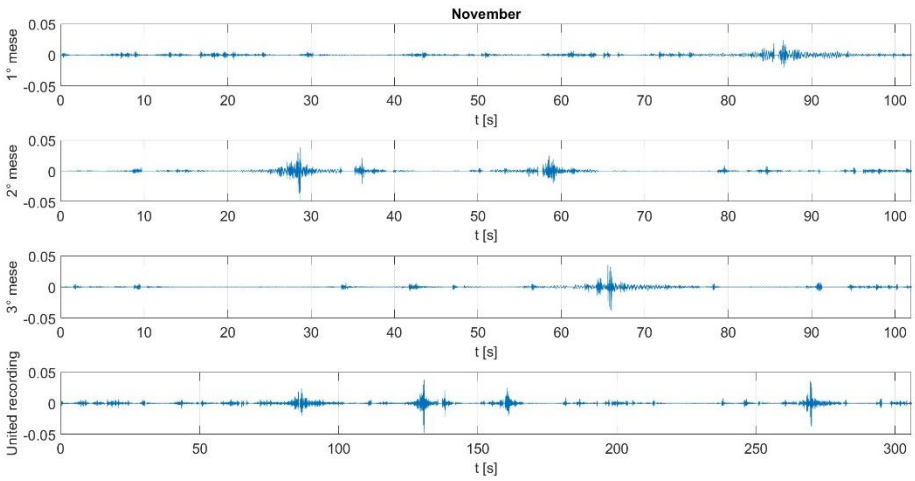


Figure 4-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

4.12 December

The results obtained for the December dataset are shown in the following tables.

Table 4-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	30D41_2023-12-13_08-00-21	1.35E-04
	2°	30D41_2023-12-06_10-00-19	1.31E-04
	3°	30D41_2023-12-12_15-00-20	1.26E-04
Longitudinal direction (y)	1°	30D41_2023-12-06_10-00-19	1.26E-03
	2°	30D41_2023-12-13_08-00-21	8.04E-04
	3°	30D41_2023-12-29_15-00-21	7.09E-04
Transverse direction (z)	1°	30D41_2023-12-06_10-00-19	8.70E-04
	2°	30D41_2023-12-13_08-00-21	7.30E-04
	3°	30D41_2023-12-12_15-00-20	6.46E-04

Table 4-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-12-13_08-00-21	1.76E-08	30D41_2023-12-13_08-00-21	2.84E-09
2	30D41_2023-12-06_10-00-19	1.48E-08	30D41_2023-12-06_10-00-19	2.61E-09
3	30D41_2023-12-28_08-00-20	1.18E-08	30D41_2023-12-12_15-00-20	2.54E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	30D41_2023-12-06_10-00-19	2.11E-06	30D41_2023-12-06_10-00-19	3.30E-07
2	30D41_2023-12-22_09-00-20	1.10E-06	30D41_2023-12-13_08-00-21	1.29E-07
3	30D41_2023-12-28_13-00-21	1.08E-06	30D41_2023-12-29_15-00-21	1.03E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-12-06_10-00-20	6.53E-07	2B7E4_2023-12-06_10-00-20	1.55E-07
2	2B7E4_2023-12-28_06-00-21	4.98E-07	2B7E4_2023-12-13_08-00-20	1.06E-07
3	2B7E4_2023-12-22_12-00-20	4.62E-07	2B7E4_2023-12-12_15-00-20	8.49E-08

Table 4-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	B	B	B	B	B
2	B	B	B	A	-	A	A	-	A
3	C	-	C	D	-	D	C	-	C

4.12.1 Vertical direction (x)

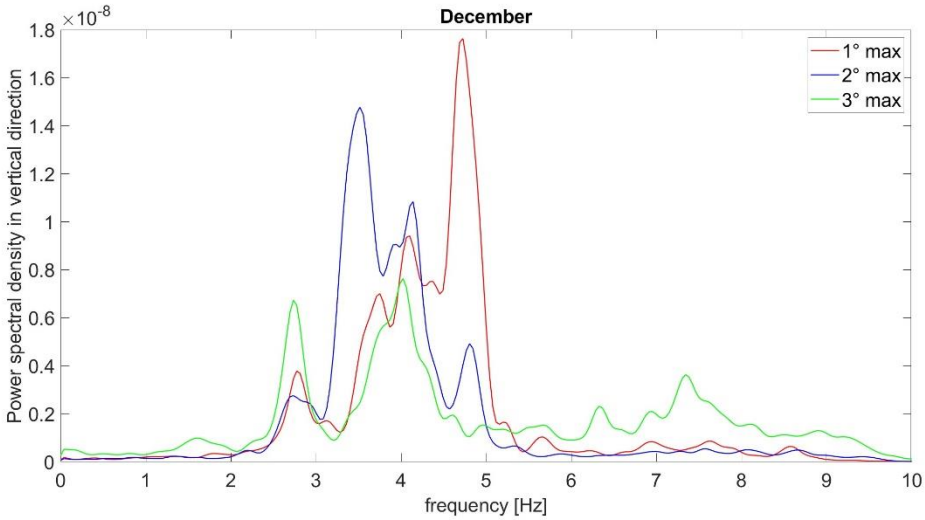


Figure 4-134: Results obtained from the 3 accelerograms with maximum SD in time domain

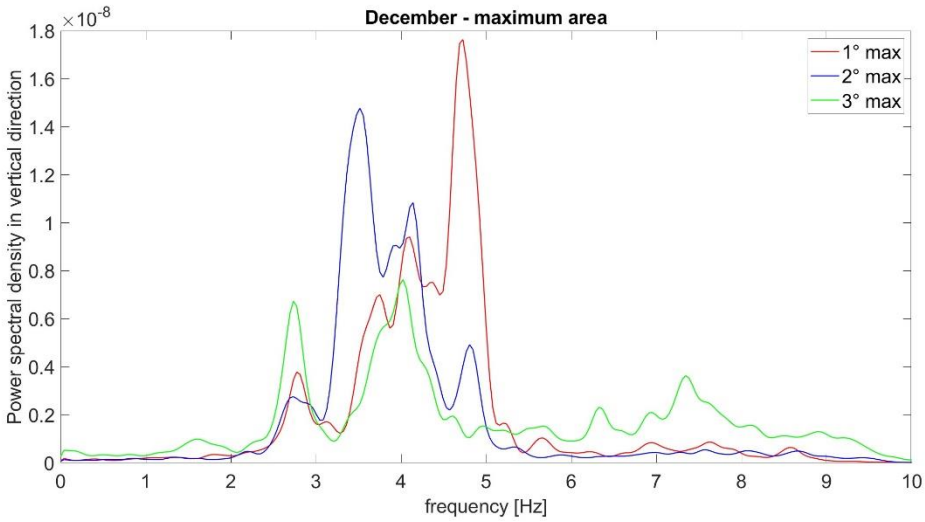


Figure 4-135: Results obtained from the 3 accelerograms with maximum area of PSD

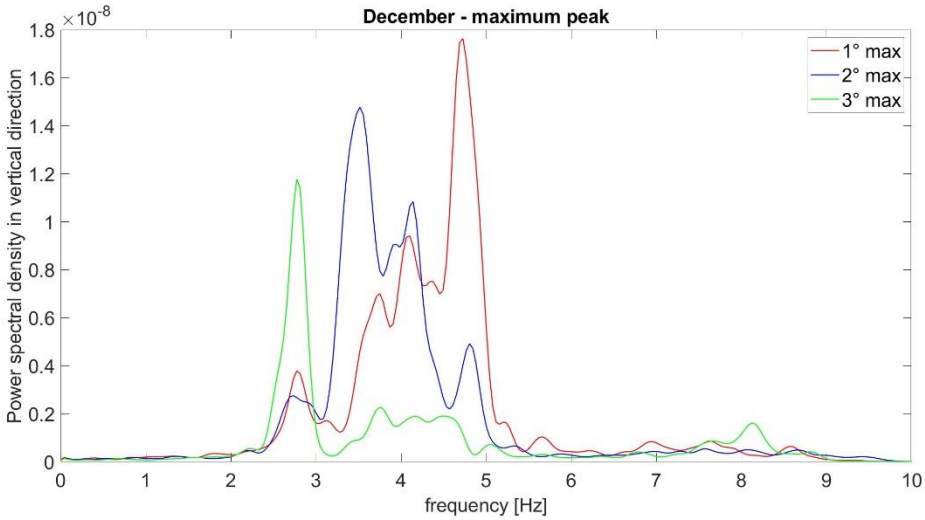


Figure 4-136: Results obtained from the 3 accelerograms with highest peak if PSD

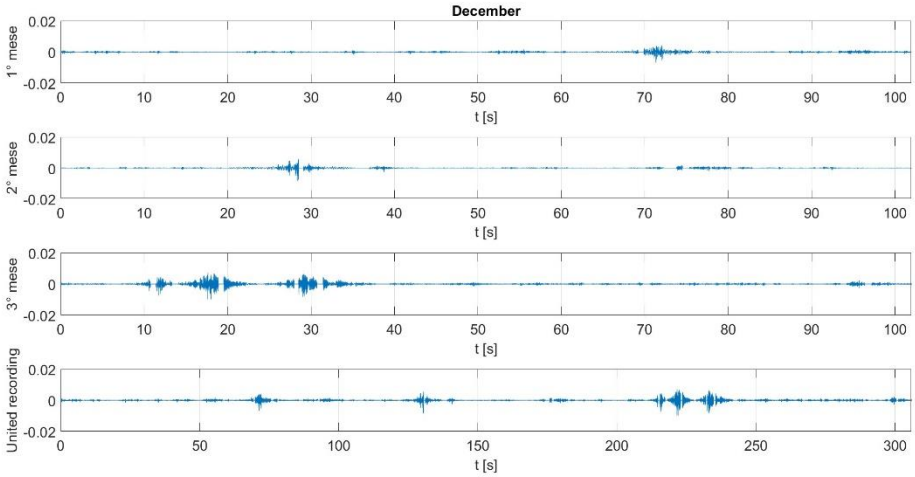


Figure 4-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

4.12.2 Longitudinal direction (y)

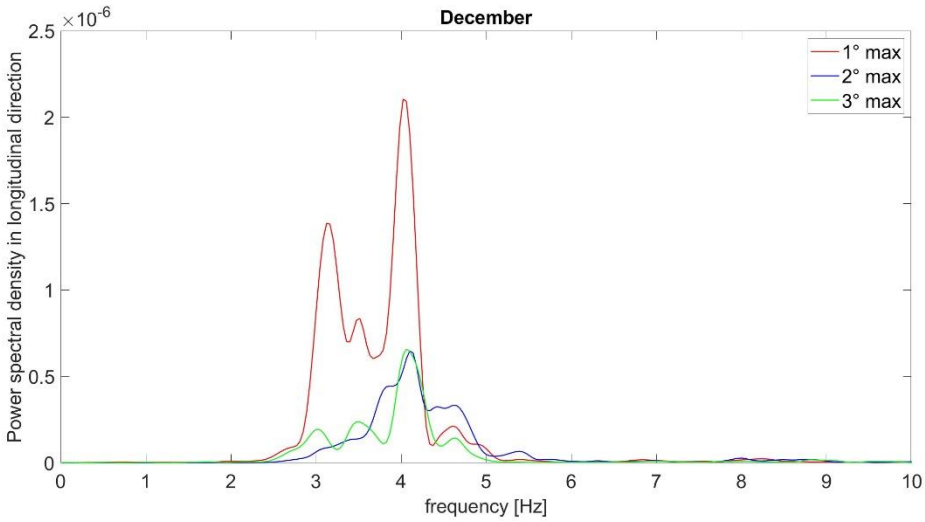


Figure 4-138: Results obtained from the 3 accelerograms with maximum SD in time domain

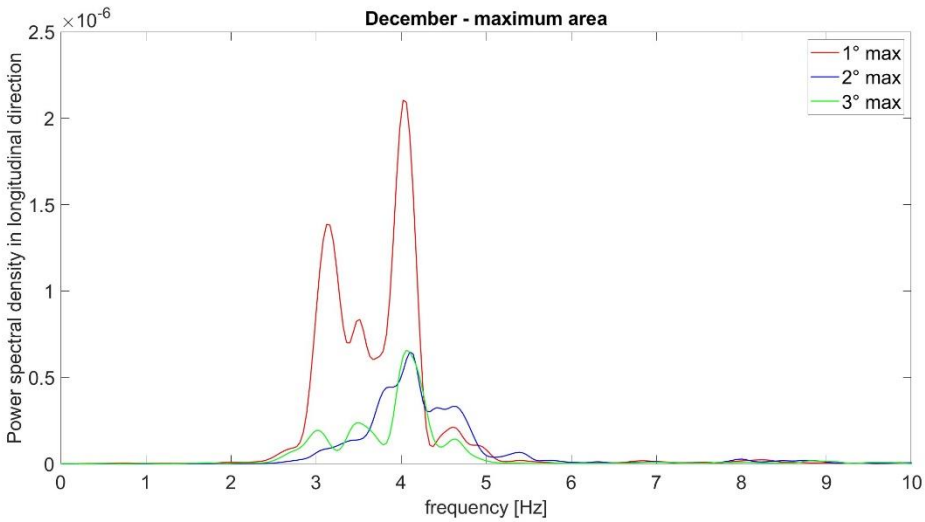


Figure 4-139: Results obtained from the 3 accelerograms with maximum area of PSD

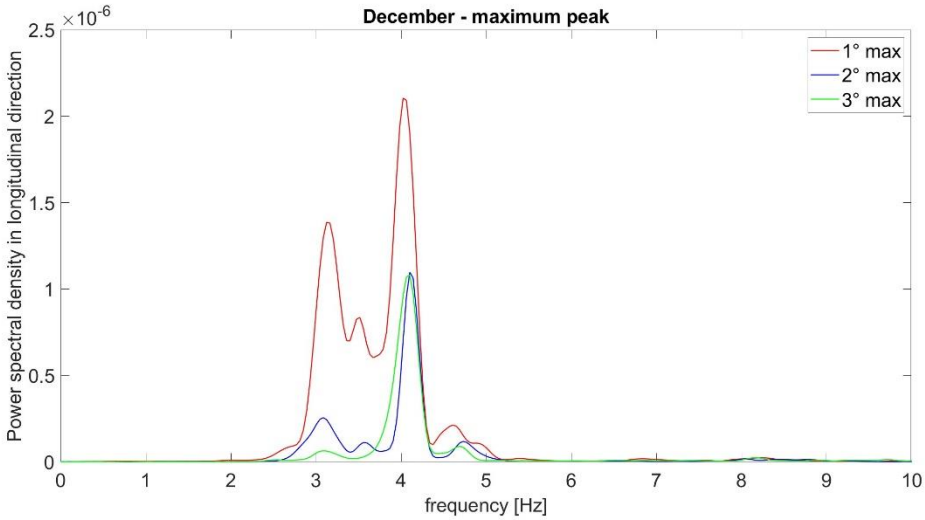


Figure 4-140: Results obtained from the 3 accelerograms with highest peak if PSD

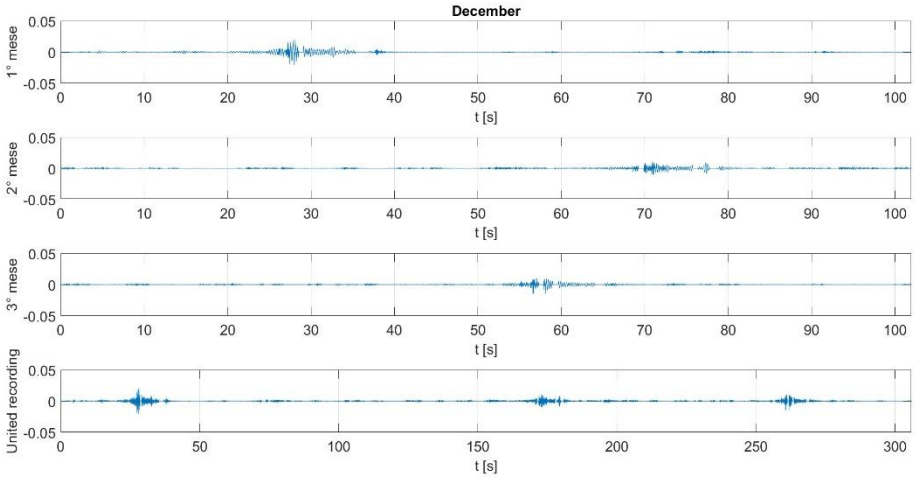


Figure 4-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

4.12.3 Transverse direction (z)

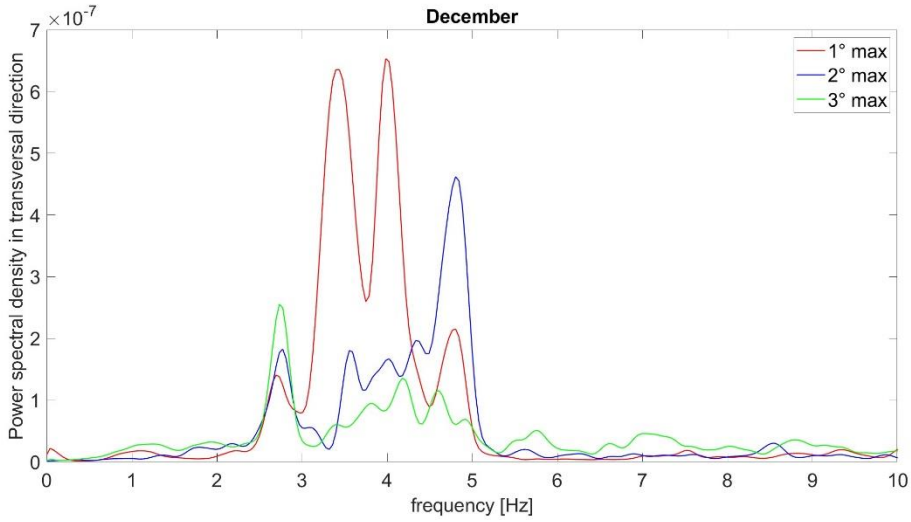


Figure 4-142: Results obtained from the 3 accelerograms with maximum SD in time domain

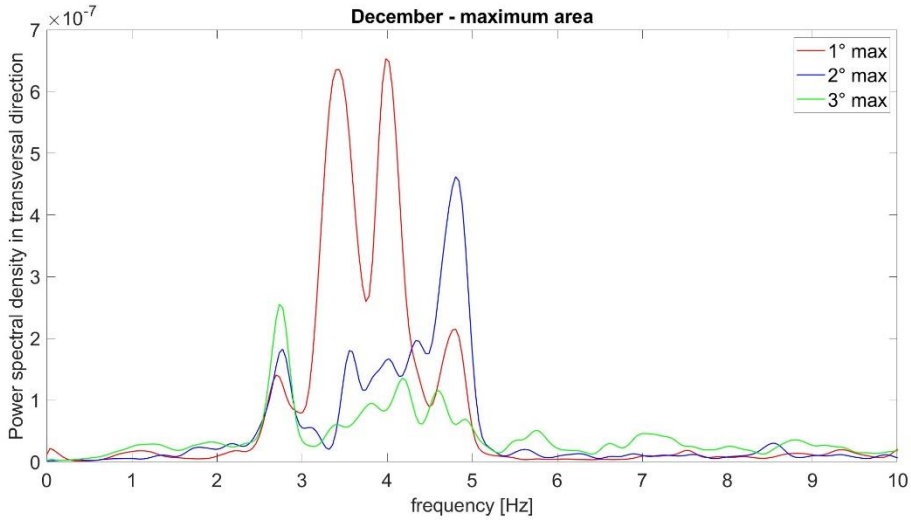


Figure 4-143: Results obtained from the 3 accelerograms with maximum area of PSD

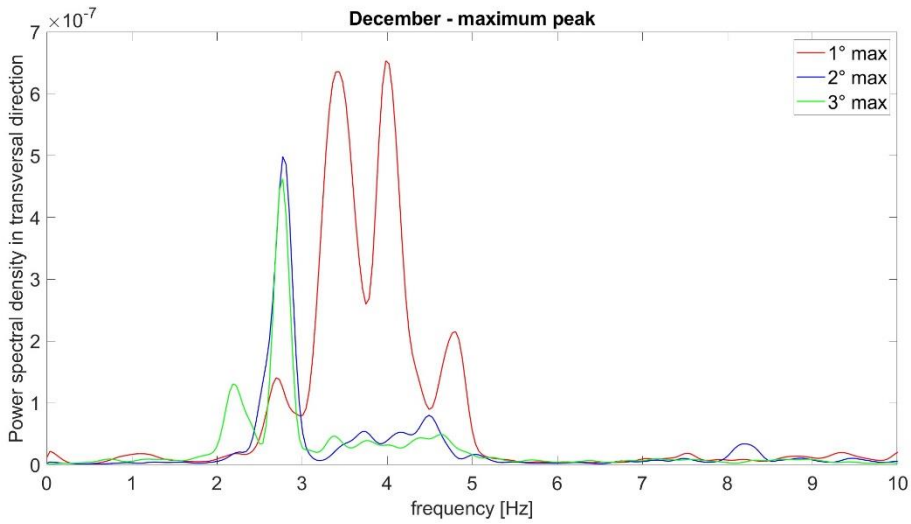


Figure 4-144: Results obtained from the 3 accelerograms with highest peak if PSD

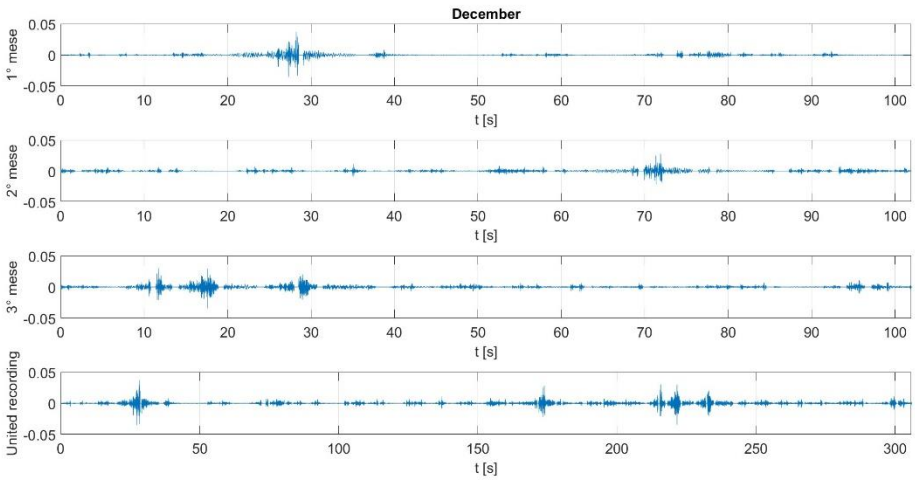


Figure 4-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

4.13 Analysis of the complete 2023 year

All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

Table 4-37: Main identified frequencies for sensor 30D41 – bridge 2A2 – P5N

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	106	108	107	108	108	108	108	108	108	108	108	108
	MEAN	**2.76**	**3.67**	**4.01**	**4.57**	**3.03**	**3.47**	**4.02**	**4.55**	**2.20**	**2.76**	**3.66**	**4.50**
	SD	0.10	0.09	0.07	0.15	0.06	0.09	0.08	0.15	0.10	0.08	0.12	0.19
	C.o.V.	3.5%	2.4%	1.7%	3.3%	2.0%	2.5%	2.0%	3.4%	4.4%	3.0%	3.2%	4.2%
	Rating	**86%**	**95%**	**100%**	**89%**	**98%**	**94%**	**98%**	**88%**	**82%**	**90%**	**89%**	**83%**
1	Jan-23	2.73		4.1	4.69	3.06	3.43	4.02	4.96		2.73	3.59	4.68
2	Jan-23	2.77	3.79			3.03		3.91	4.61	2.19	2.62	3.83	4.76
3	Jan-23	2.62	3.79	4.16			3.43	4.14		1.91	2.77	3.71	4.57
1	Jan-23	2.73		4.1	4.69	3.05	3.46	4.02	4.96		2.73	3.48	4.69
2	Jan-23	2.77	3.73			3.05		3.92	4.61		2.62	3.74	4.77
3	Jan-23	2.62	3.73		4.73	3.05	3.39	4.13		1.99	2.77	3.69	4.69
1	Jan-23	2.81		4.06	4.73	3.09	3.43	4.02	4.96		2.73	3.49	4.69
2	Jan-23	2.62				3.05	3.4	4.13			2.62	3.71	4.73
3	Jan-23	2.73		4.09	4.69	3.05		3.91		2.26	2.77	3.66	4.84
1	Feb-23	2.5	3.71	4.02	4.65	3.09		3.98	4.69		2.5		4.69
2	Feb-23	2.77		4.02	4.53	3.04		4.06	4.65		2.77	3.63	4.65
3	Feb-23	2.77		3.92	4.39	3.06		4.1	4.69		2.77	3.63	
1	Feb-23	2.5	3.51	4.02	4.65	3.13		3.98	4.69		2.5	3.49	4.69
2	Feb-23	2.77	3.79			3.08		4.06	4.69		2.77	3.64	
3	Feb-23	2.77	3.53	4.02	4.53	3.08	3.59	4.14			2.77	3.64	
1	Feb-23	2.5	3.51	4.02	4.65	3.13		3.98	4.69		2.77	3.79	4.69
2	Feb-23	2.77	3.79	4.02	4.53	3.05		4.06	4.65		2.5	3.77	4.69
3	Feb-23	2.77			4.42			4.02	4.65	2.26	2.77		
1	Mar-23	2.73		3.95	4.69	3.01		4.09			2.77	3.49	4.69
2	Mar-23	2.77		3.81	4.65	3.01		3.91	4.49	2.27	2.73	3.81	4.69
3	Mar-23	2.73		3.91				4.16			2.7		4.46
1	Mar-23	2.73		3.95	4.69	3.01		4.14			2.77	3.89	4.69
2	Mar-23	2.73		3.95	4.65	3.01		3.95	4.49	2.3	2.73	3.81	4.69
3	Mar-23	2.73		3.98		3.05		3.95			2.7		4.49
1	Mar-23	2.73		3.95	4.69	3.01		4.14			2.7	3.46	4.42
2	Mar-23	2.69	3.71			3.05		3.95		2.19	2.77	3.51	4.36
3	Mar-23	2.77	3.71			3.01		3.95	4.49	2.22	2.77	3.56	4.36
1	Apr-23	2.73		3.98	4.53	3.09		3.98		2.18	2.77	3.63	4.29

2	Apr-23	2.77	3.75	4.1		3.09		4.1			2.73	3.67	4.49
3	Apr-23	2.73	3.63			3.05		4.1	4.61	2.22	2.73	3.59	4.53
1	Apr-23	2.77	3.75	3.98	4.49	3.09		3.98	4.53	2.19	2.77	3.63	4.29
2	Apr-23	2.73	3.68	4.1		3.05		4.1	4.61	2.23	2.77	3.67	4.53
3	Apr-23	2.77	3.63	3.95		3.09		4.1			2.73	3.59	4.53
1	Apr-23	2.77	3.63	4.02	4.49	3.05		3.98	4.53	2.19	2.77	3.63	4.29
2	Apr-23	2.73	3.55	3.98		3.05		4.1		2.23	2.73	3.59	4.53
3	Apr-23	2.77		3.95		3.01		4.06			2.77	3.67	4.53
1	May-23	2.77	3.67	4.02		3.01		4.06			2.77	3.71	4.22
2	May-23	2.77	3.63	4.02	4.53	3.09		4.02	4.53	2.1	2.77	3.63	4.53
3	May-23	2.73		4.1		3.01	3.51	4.14			2.73	3.67	
1	May-23	2.77	3.63	4.02		3.09		4.02	4.53		2.77	3.67	4.22
2	May-23	2.77	3.63	4.02	4.53	3.01	3.51	4.14		2.1	2.77	3.63	4.57
3	May-23	2.73		4.1		3.01		4.06			2.73	3.63	
1	May-23	2.77	3.63	4.02		3.01		4.06			2.77	3.71	4.22
2	May-23	2.77	3.63	4.02	4.53	3.09		4.02	4.53		2.77	3.75	
3	May-23	2.77	3.74			3.01	3.51	4.09			2.73	3.67	4.19
1	Jun-23	2.81		4.02		3.05		3.94		2.3	2.79	3.79	4.39
2	Jun-23	2.93	3.69		4.68		3.49		4.29	2.3	2.83	3.71	4.53
3	Jun-23	3.01	3.71	4.06				3.91	4.5		2.83		4.27
1	Jun-23	2.81		4.02		3.05		3.89		2.3	2.81	3.79	4.34
2	Jun-23	2.92	3.49	3.96	4.65		3.48		4.29	2.3	2.84	3.71	4.53
3	Jun-23		3.67	4.06				3.91	4.49		2.71		4.31
1	Jun-23	2.81		4.02		3.05		3.89		2.3	2.81	3.79	
2	Jun-23	2.92		3.89			3.48	4.09	4.29	2.3	2.84		4.31
3	Jun-23	2.93		3.91	4.65						2.85		4.45
1	Jul-23	2.81			4.44		3.33	3.98	4.49		2.81	3.79	4.31
2	Jul-23	2.81		4.14		2.73	3.29	4.14			2.91	3.79	4.24
3	Jul-23	3.01		3.95		3.01		4.07	4.42		2.85		
1	Jul-23			3.81	4.42		3.32	3.98	4.45	1.91	2.81	3.79	4.31
2	Jul-23	3.01		3.95		2.79	3.26	3.84	4.41		2.89		4
3	Jul-23		3.81	4.09		3.01			4.41		2.91	3.79	4.21
1	Jul-23	2.81				3.01		4.06	4.45		2.81	3.79	4.34
2	Jul-23	3.01		3.95	4.42	3.05			4.34		3.01	3.75	4.24
3	Jul-23	2.85			4.45	2.84	3.26	3.84	4.41	2.1	2.85	3.71	4.26
1	Aug-23	2.71		3.98	4.34		3.55	3.95		2.21	2.69	3.53	4.57
2	Aug-23			3.91	4.46	3.05		4.1		2.21	2.71	3.69	4.42
3	Aug-23	2.77		3.98	4.81	3.01		3.95	4.65		2.77		4.29
1	Aug-23	2.7		3.94	4.45		3.51	3.95		2.21	2.7	3.51	4.57
2	Aug-23	2.7		3.98	4.31	3.05		4.1			2.7	3.61	4.39
3	Aug-23	2.77	3.74		4.29	3.01		3.95	4.61	2.21	2.77	3.51	
1	Aug-23	2.7	3.52	3.91	4.49		3.55	3.95		2.21	2.7	3.75	4.57

2	Aug-23	2.7		3.98	4.36	3.05		4.1			2.73		4.33
3	Aug-23	2.77	3.75		4.8	3.01		3.95	4.61	2.16	2.77		4.76
1	Sep-23	2.73		3.98		2.97		3.95			2.73		4.21
2	Sep-23	2.73		3.95		3.05					2.73	3.91	
3	Sep-23	2.81				3.01	3.49		4.29		2.84	3.86	
1	Sep-23	2.73		3.98		2.97		3.95			2.73		4.21
2	Sep-23	2.73		3.98		3.01		3.89			2.73	3.91	
3	Sep-23	2.81		3.91		3.01	3.48		4.29		2.84	3.86	
1	Sep-23	2.73		3.98		2.97		3.95			2.73		4.21
2	Sep-23	2.7		3.95	4.57	3.01		3.87			2.73		
3	Sep-23	2.77		3.98	4.57	2.97	3.51		4.29		2.73		
1	Oct-23	2.77		3.98	4.32	3.09	3.55		4.38		2.73	3.54	4.69
2	Oct-23	2.73		3.95				3.98			3.01	3.63	4.49
3	Oct-23	3.04		4.02	4.45	3.01		3.96	4.45		2.73	3.87	4.61
1	Oct-23	2.73		3.95	4.32	3.09	3.55		4.34		2.73	3.63	4.41
2	Oct-23	2.73		3.98				3.98	4.45		3.01		4.45
3	Oct-23	3.04		4.02	4.45	3.01		3.9	4.45		2.73	3.87	4.61
1	Oct-23	2.73	3.63	3.95		3.05	3.55	3.98	4.34		3.01	3.63	4.45
2	Oct-23	2.73	3.67	3.98	4.32				4.49		2.73	3.63	4.41
3	Oct-23	3.04		4.02	4.45	3.01		3.91	4.49		2.73		4.61
1	Nov-23	2.73	3.71	4.06	4.53	3.05	3.49	4.06	4.65	2.18	2.73	3.59	4.49
2	Nov-23	2.7	3.67	4.02			3.32	4.02			2.66	3.63	4.57
3	Nov-23	2.73		3.92	4.57	3.01	3.59				2.73	3.55	4.68
1	Nov-23	2.73	3.71	4.06	4.53	3.09	3.48	4.06	4.65	2.22	2.73	3.59	4.49
2	Nov-23	2.73	3.67	4.02		3.01	3.54	4.11			2.66	3.63	4.57
3	Nov-23	2.7			4.57	3.09		4.11	4.61		2.77	3.55	4.38
1	Nov-23	2.73	3.71	4.06	4.53	3.05	3.48	4.06	4.65		2.66	3.63	4.57
2	Nov-23	2.7	3.67	4.02				4.02		2.22	2.73	3.6	4.49
3	Nov-23	2.7				3.01	3.54		4.53		2.7	3.51	
1	Dec-23	2.77	3.75	4.09	4.73	3.09	3.52	4.02	4.61		2.73	3.44	4.8
2	Dec-23	2.73	3.52	4.13	4.8			4.06			2.77	3.51	4.8
3	Dec-23	2.73		4.02		3.01	3.52	4.1	4.61		2.73		4.61
1	Dec-23	2.77	3.75	4.1	4.73	3.09	3.52	4.02	4.61		2.7	3.44	4.8
2	Dec-23	2.73	3.52	4.14	4.81			4.06	4.65		2.77	3.55	4.81
3	Dec-23	2.73		4.06	4.96	3.01	3.48	4.06	4.61		2.73		4.61
1	Dec-23	2.77	3.75	4.1	4.73	3.09	3.52	4.02	4.61		2.7	3.4	4.81
2	Dec-23	2.73	3.52	4.14	4.8	3.06		4.1	4.73		2.77	3.61	
3	Dec-23	2.77			4.57	3.06		4.1	4.69	2.19	2.77		

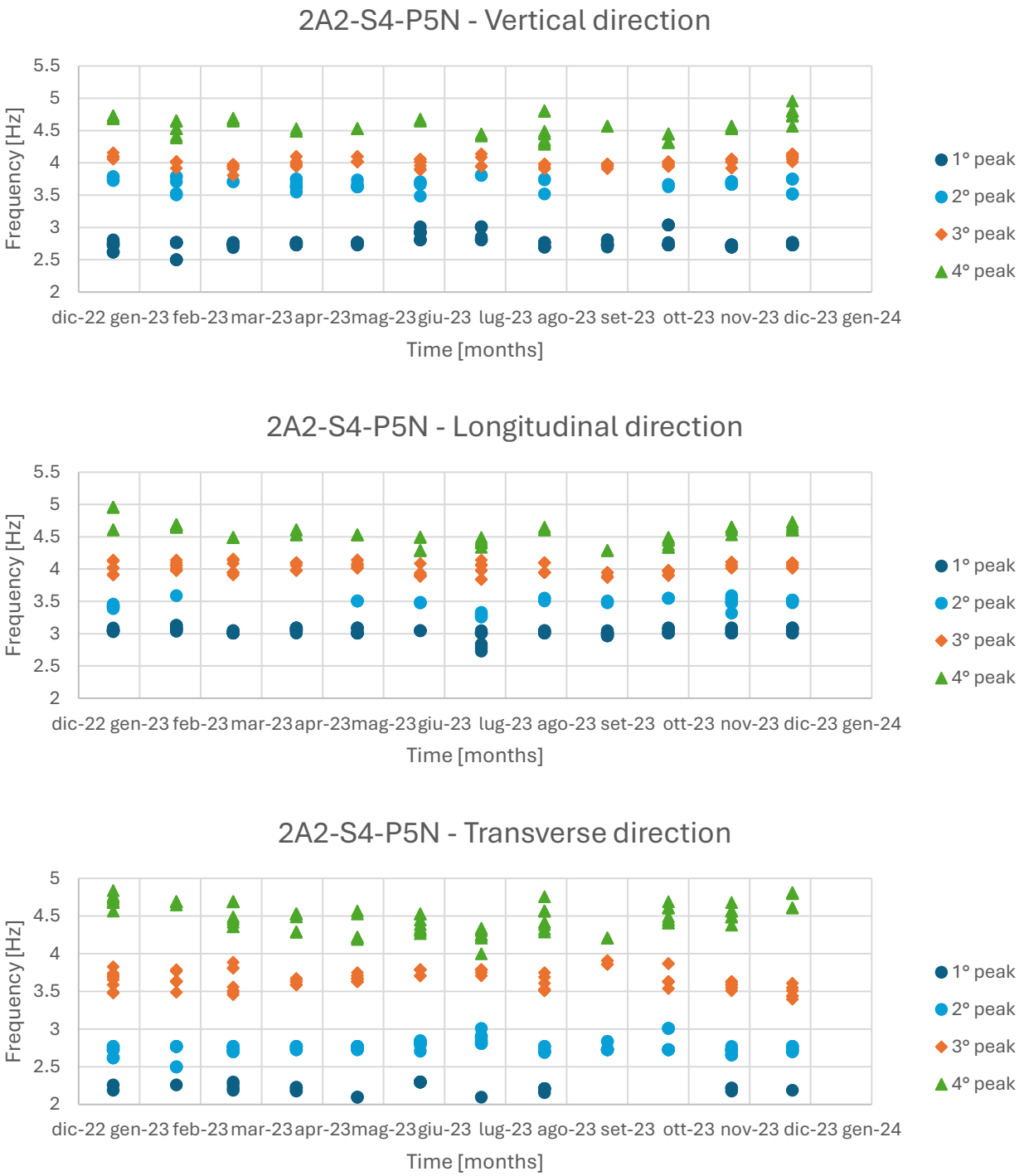


Figure 4-146: Main identified frequencies for sensor 30D41 – bridge 2A2 – P5N

5. Annex 5 – Bridge 2A2 – Pile 5S – Sensor 2C1EA

The Bridge 2A2 counts 2 monitored decks: span 4 and span 5 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 4 are:

- 3099D – situated in the midspan;
- 30EB4 – situated at a distance of L/4;
- 31639 – situated at a distance of L/8;
- 30D41 – situated nearby the pilar.

The sensors present on deck number 5 are:

- 2B7E4 – situated in the midspan;
- 3187F – situated at a distance of L/4 of the deck;
- 2B988 – situated at a distance of L/8 of the deck;
- 2C1EA – situated by the pilar.

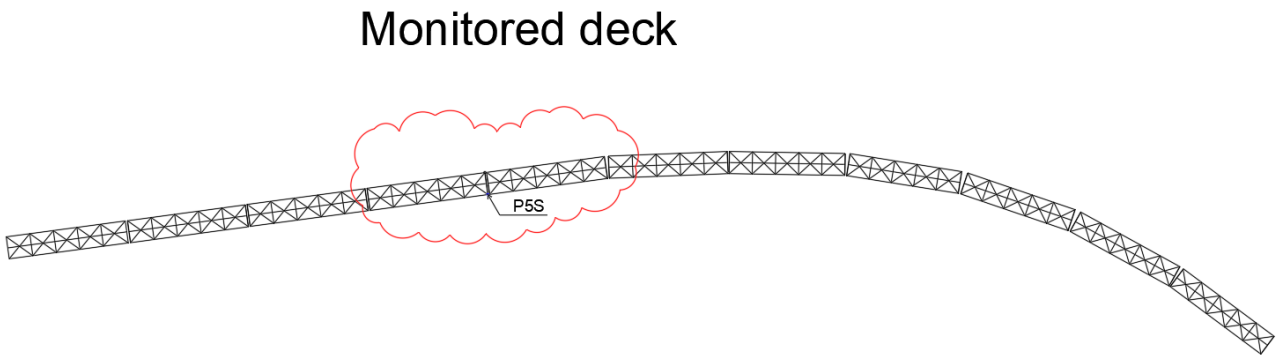


Figure 5-1 Monitored decks of 2A2 bridge

The accelerograms of the 2C1EA sensor have been analyzed and the results are represented in the following paragraphs.

5.1 January

The results obtained for the January dataset are shown in the following tables.

Table 5-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-01-17_07-00-20	9.33E-05
	2°	2C1EA_2023-01-02_07-00-20	8.47E-05
	3°	2C1EA_2023-01-20_13-00-20	8.46E-05
Longitudinal direction (y)	1°	2C1EA_2023-01-17_07-00-20	5.06E-04
	2°	2C1EA_2023-01-27_01-00-20	4.16E-04
	3°	2C1EA_2023-01-21_07-00-20	4.08E-04
Transverse direction (z)	1°	2C1EA_2023-01-19_13-00-20	4.39E-04
	2°	2C1EA_2023-01-31_07-00-20	4.19E-04
	3°	2C1EA_2023-01-06_01-00-21	4.14E-04

Table 5-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-01-17_07-00-20	1.07E-08	2C1EA_2023-01-17_07-00-20	1.43E-09
2	2C1EA_2023-01-26_07-00-20	8.06E-09	2C1EA_2023-01-20_13-00-20	1.14E-09
3	2C1EA_2023-01-19_13-00-20	5.66E-09	2C1EA_2023-01-31_07-00-20	1.07E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-01-17_07-00-20	4.02E-07	2C1EA_2023-01-17_07-00-20	5.55E-08
2	2C1EA_2023-01-26_07-00-20	2.68E-07	2C1EA_2023-01-27_01-00-20	3.54E-08
3	2C1EA_2023-01-31_07-00-20	2.05E-07	2C1EA_2023-01-26_07-00-20	3.27E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-01-19_13-00-20	1.93E-07	2C1EA_2023-01-19_13-00-20	3.80E-08
2	2C1EA_2023-01-31_07-00-20	1.30E-07	2C1EA_2023-01-31_07-00-20	3.60E-08
3	2C1EA_2023-01-27_01-00-20	1.19E-07	2C1EA_2023-01-27_01-00-20	3.37E-08

Table 5-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	B	B	B
2	-	-	C	D	E	D	F	F	F
3	C	-	-	-	-	E	-	D	D

5.1.1 Vertical direction (x)

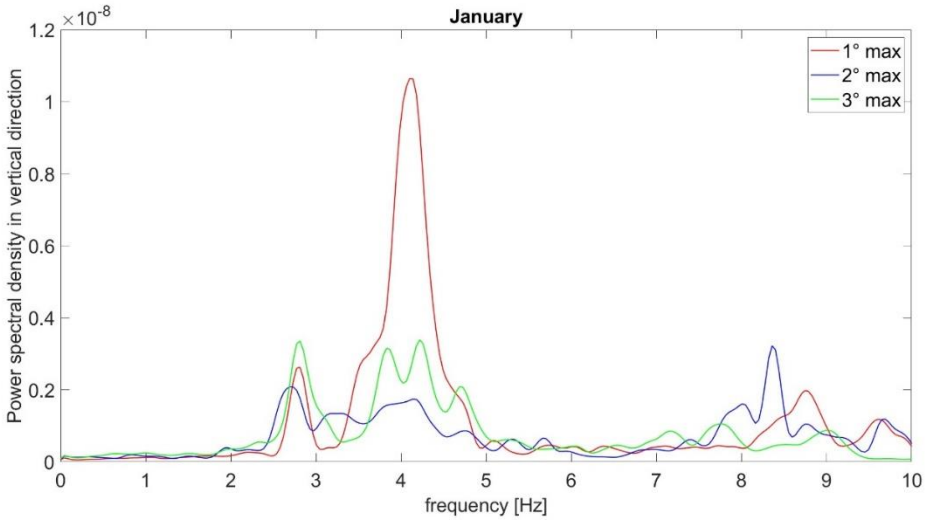


Figure 5-2: Results obtained from the 3 accelerograms with maximum SD in time domain

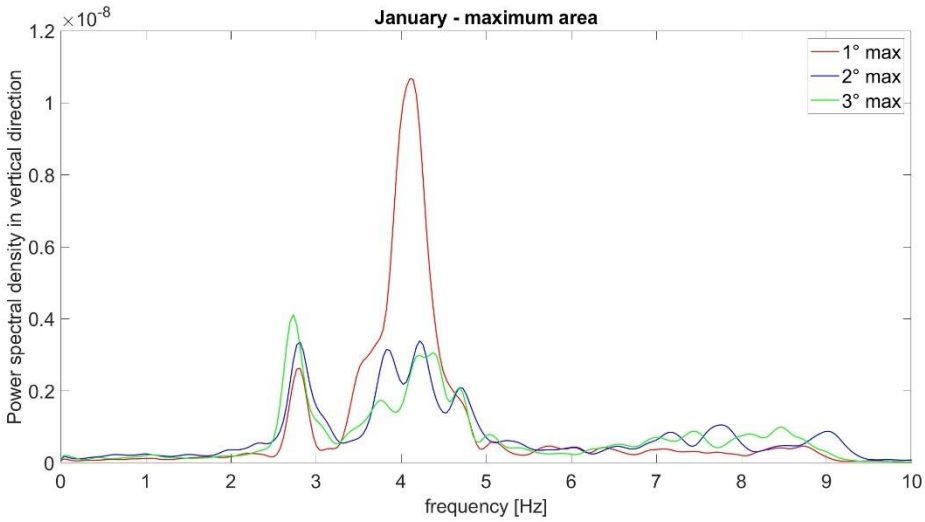


Figure 5-3: Results obtained from the 3 accelerograms with maximum area of PSD

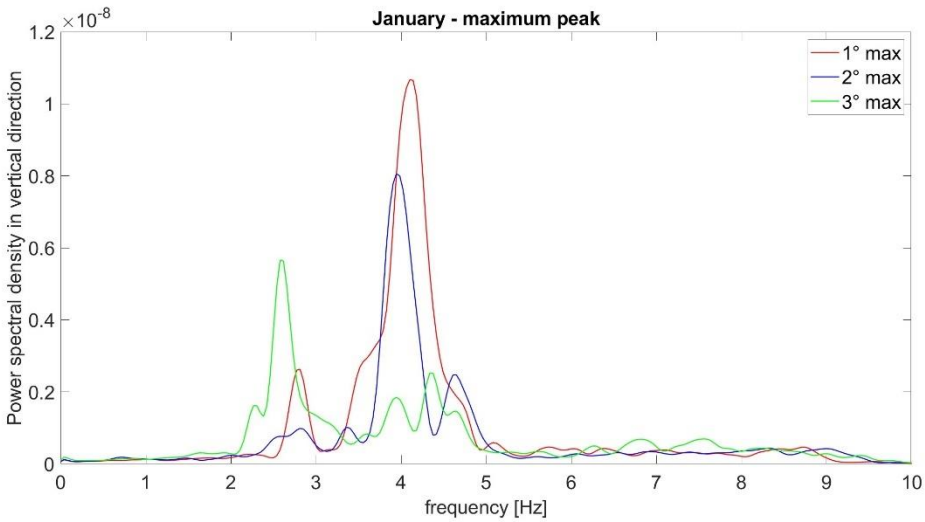


Figure 5-4: Results obtained from the 3 accelerograms with highest peak if PSD

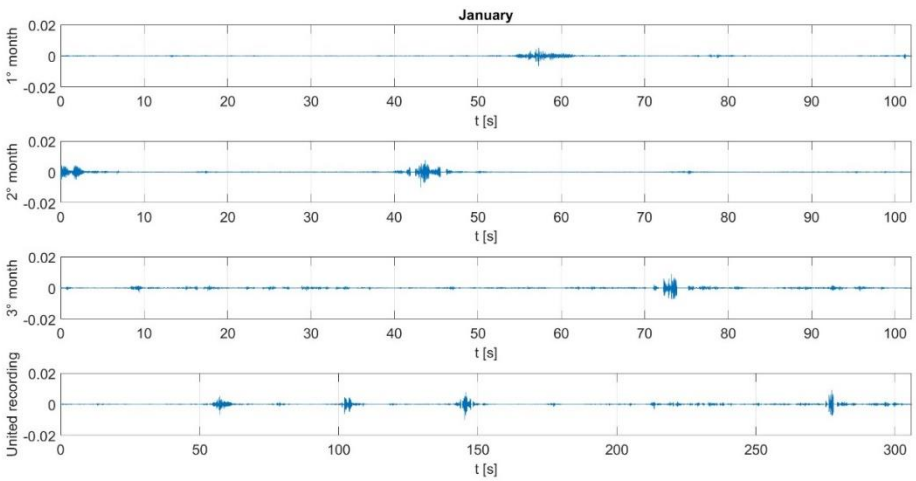


Figure 5-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.1.2 Longitudinal direction (y)

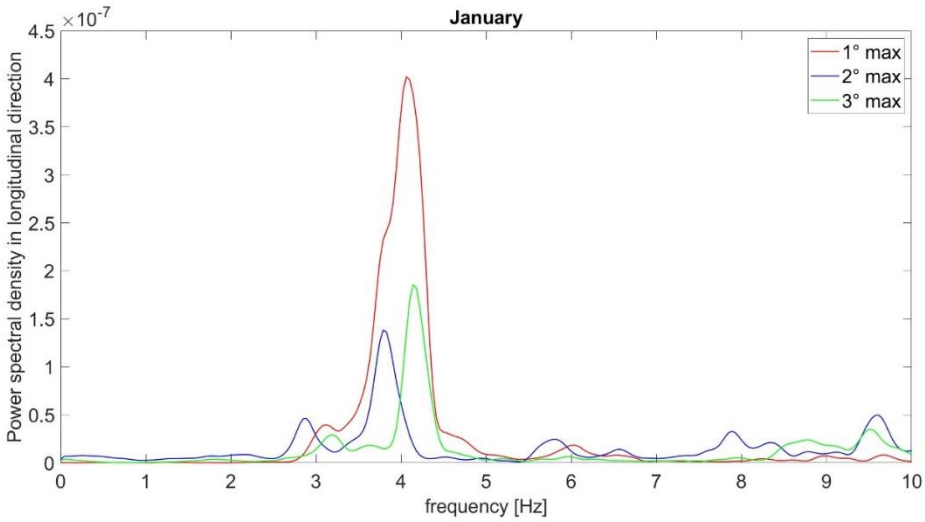


Figure 5-6: Results obtained from the 3 accelerograms with maximum SD in time domain

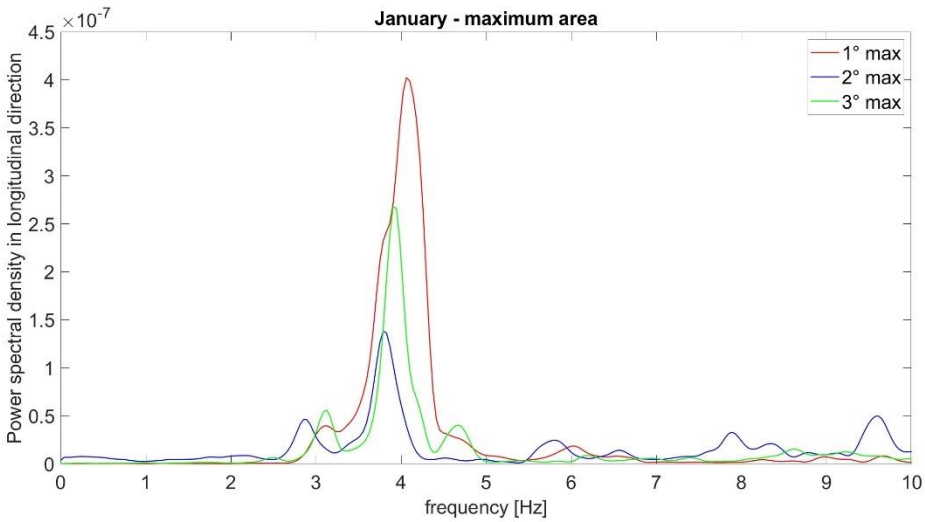


Figure 5-7: Results obtained from the 3 accelerograms with maximum area of PSD

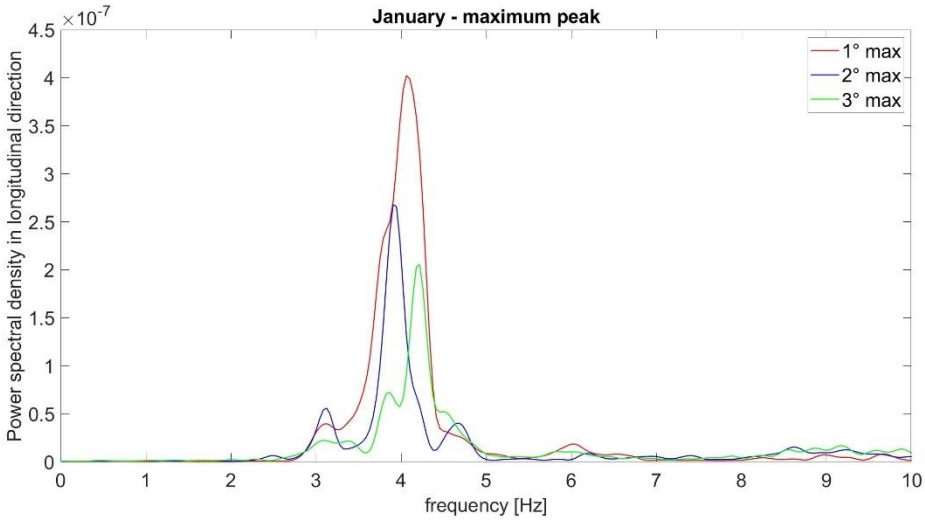


Figure 5-8: Results obtained from the 3 accelerograms with highest peak in PSD

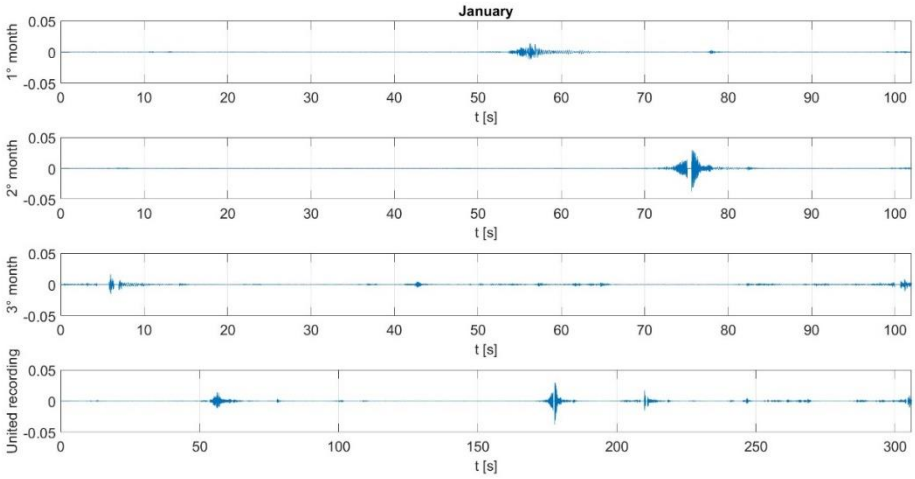


Figure 5-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

5.1.3 Transverse direction (z)

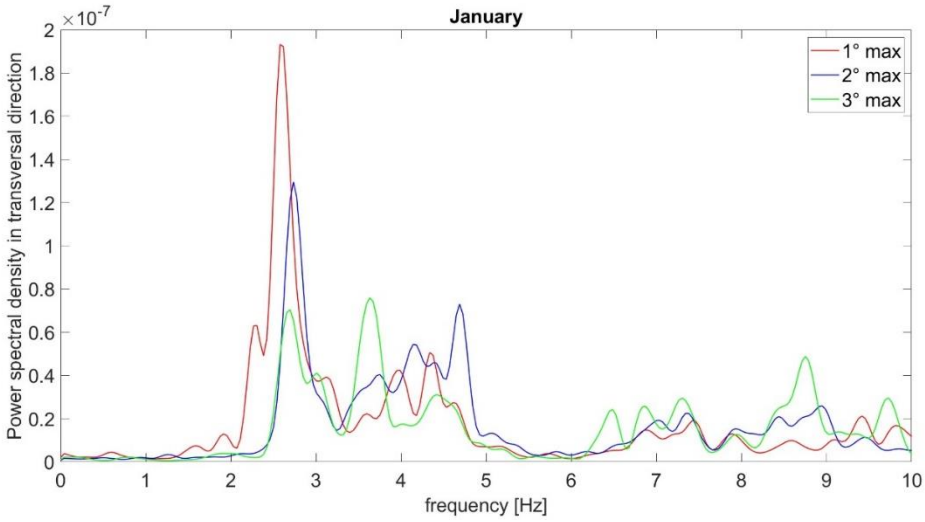


Figure 5-10: Results obtained from the 3 accelerograms with maximum SD in time domain

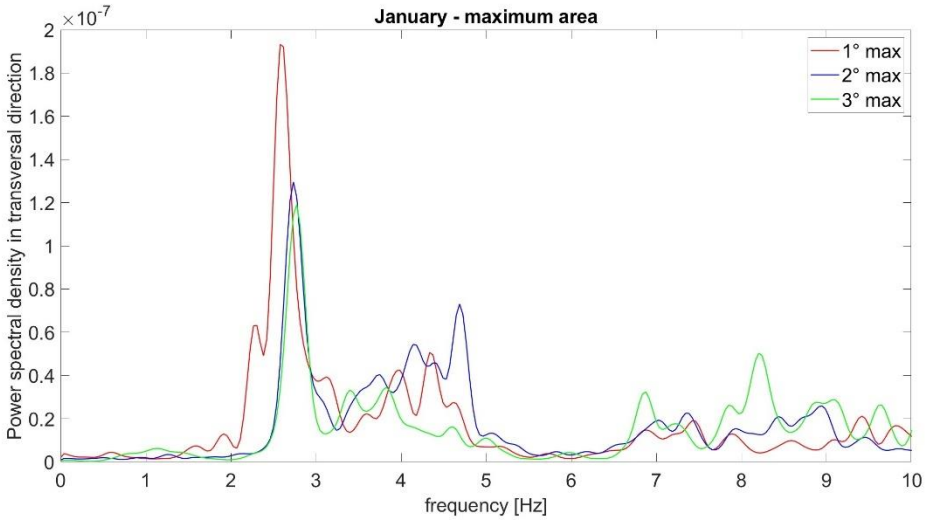


Figure 5-11: Results obtained from the 3 accelerograms with maximum area of PSD

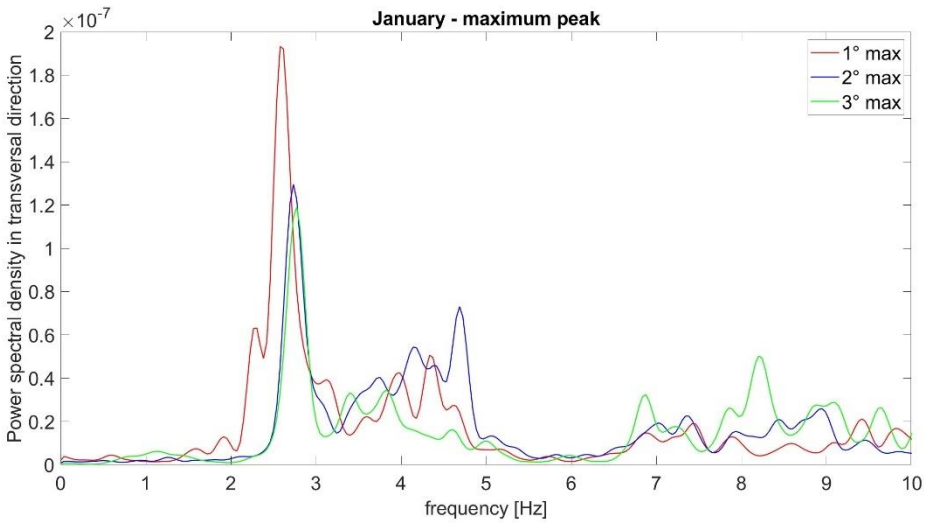


Figure 5-12: Results obtained from the 3 accelerograms with highest peak in PSD

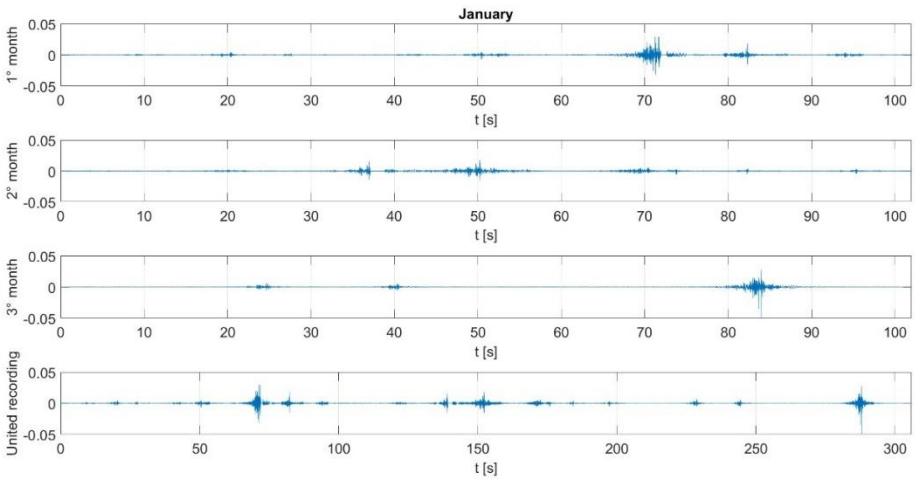


Figure 5-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

5.2 February

The results obtained for the February dataset are shown in the following tables.

Table 5-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-02-03_13-00-21	1.36E-04
	2°	2C1EA_2023-02-01_13-00-21	1.31E-04
	3°	2C1EA_2023-02-06_13-00-21	1.22E-04
Longitudinal direction (y)	1°	2C1EA_2023-02-01_13-00-21	8.81E-04
	2°	2C1EA_2023-02-06_13-00-21	5.92E-04
	3°	2C1EA_2023-02-03_13-00-21	4.91E-04
Transverse direction (z)	1°	2C1EA_2023-02-03_13-00-21	7.43E-04
	2°	2C1EA_2023-02-01_13-00-21	6.53E-04
	3°	2C1EA_2023-02-06_13-00-21	6.26E-04

Table 5-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-02-03_13-00-21	3.32E-08	2C1EA_2023-02-03_13-00-21	2.75E-09
2	2C1EA_2023-02-06_13-00-21	1.28E-08	2C1EA_2023-02-01_13-00-21	2.58E-09
3	2C1EA_2023-02-01_13-00-21	1.20E-08	2C1EA_2023-02-06_13-00-21	2.17E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-02-01_13-00-21	8.47E-07	2C1EA_2023-02-01_13-00-21	1.65E-07
2	2C1EA_2023-02-03_13-00-21	2.96E-07	2C1EA_2023-02-06_13-00-21	6.58E-08
3	2C1EA_2023-02-06_13-00-21	2.72E-07	2C1EA_2023-02-03_13-00-21	5.06E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-02-03_13-00-21	1.20E-06	2C1EA_2023-02-03_13-00-21	1.12E-07
2	2C1EA_2023-02-06_13-00-21	3.69E-07	2C1EA_2023-02-01_13-00-21	8.46E-08
3	2C1EA_2023-02-01_13-00-21	2.95E-07	2C1EA_2023-02-06_13-00-21	7.26E-08

Table 5-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	B	B	A	A	A
2	B	C	B	C	A	C	B	C	B
3	C	B	C	A	C	A	C	B	C

5.2.1 Vertical direction (x)

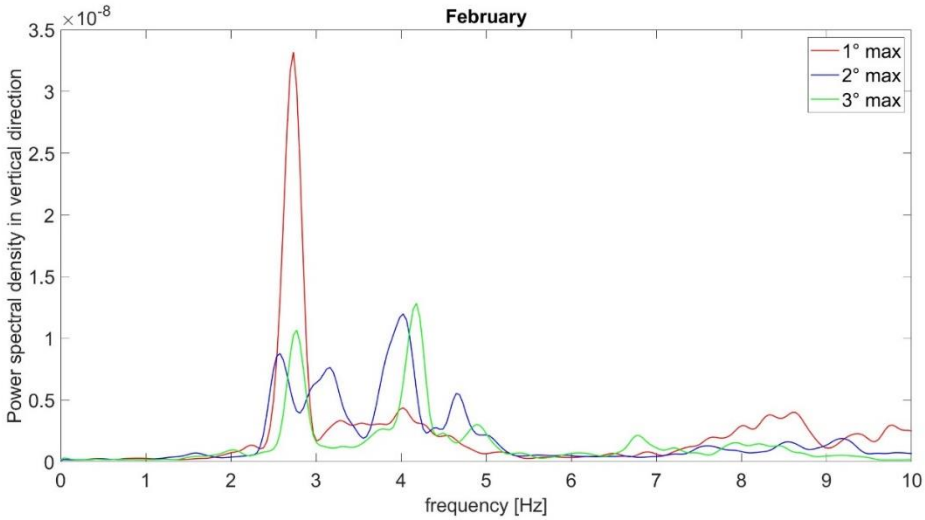


Figure 5-14: Results obtained from the 3 accelerograms with maximum SD in time domain

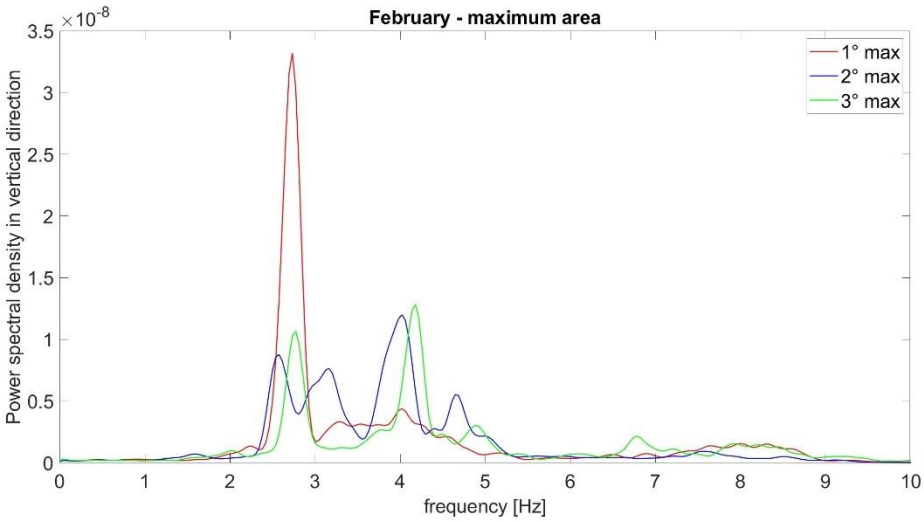


Figure 5-15: Results obtained from the 3 accelerograms with maximum area of PSD

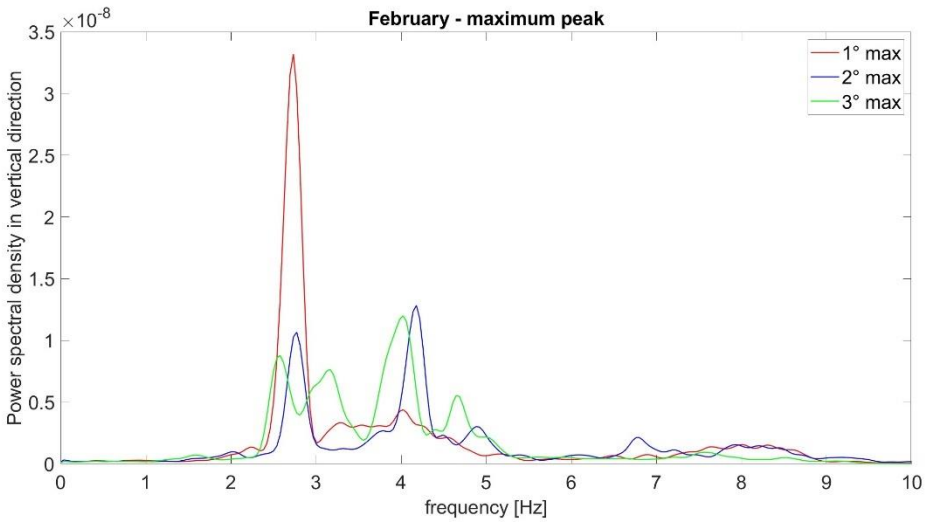


Figure 5-16: Results obtained from the 3 accelerograms with highest peak if PSD

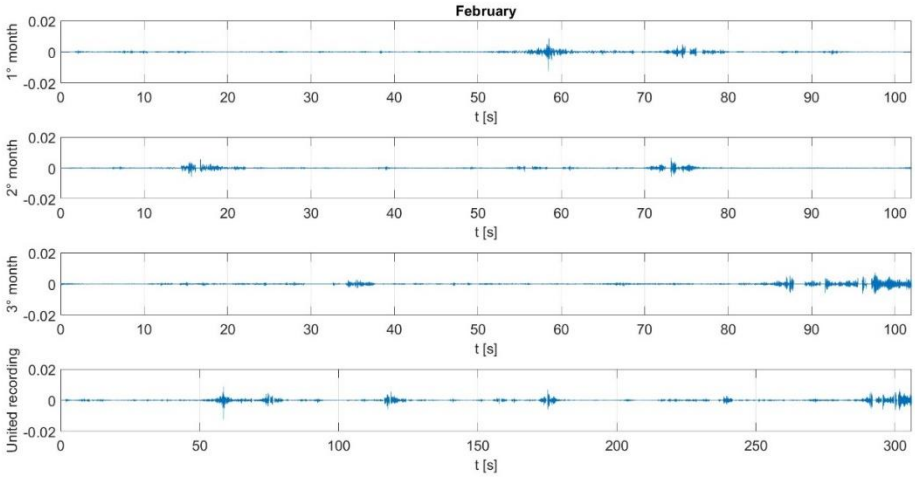


Figure 5-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.2.2 Longitudinal direction (y)

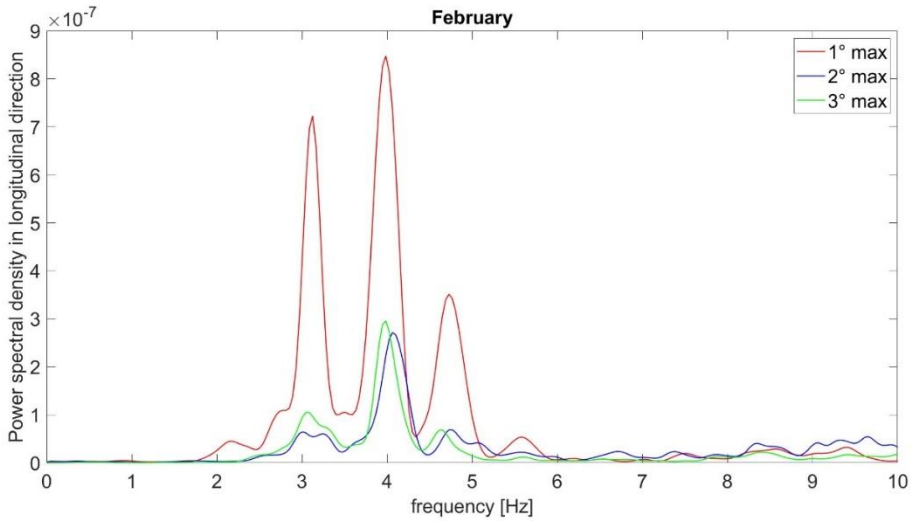


Figure 5-18: Results obtained from the 3 accelerograms with maximum SD in time domain

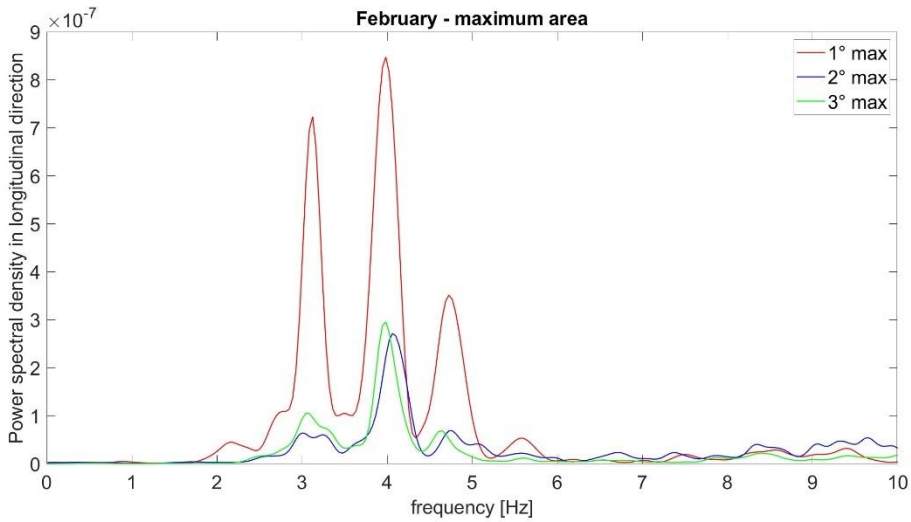


Figure 5-19: Results obtained from the 3 accelerograms with maximum area of PSD

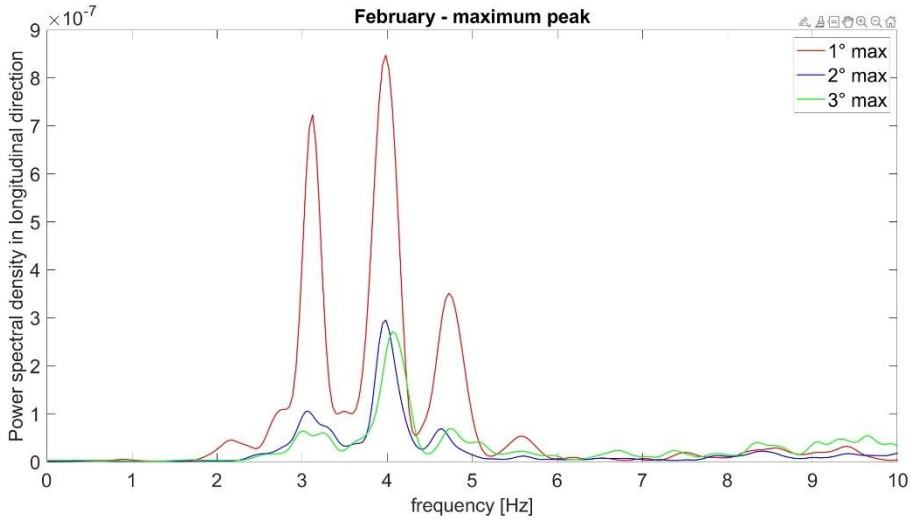


Figure 5-20: Results obtained from the 3 accelerograms with highest peak if PSD

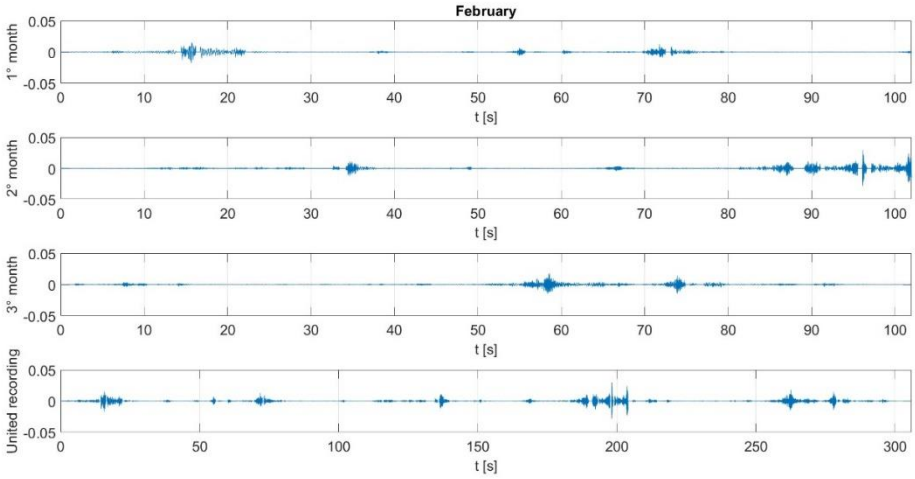


Figure 5-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

5.2.3 Transverse direction (z)

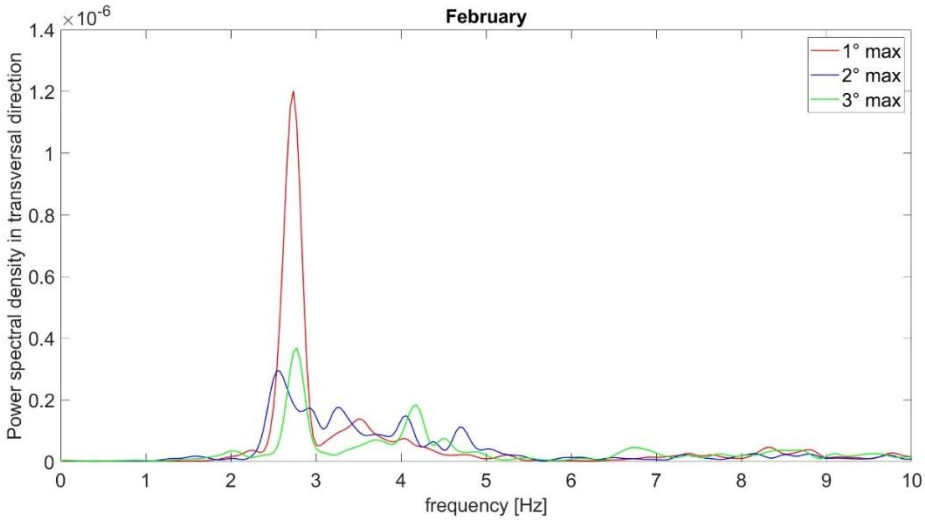


Figure 5-22: Results obtained from the 3 accelerograms with maximum SD in time domain

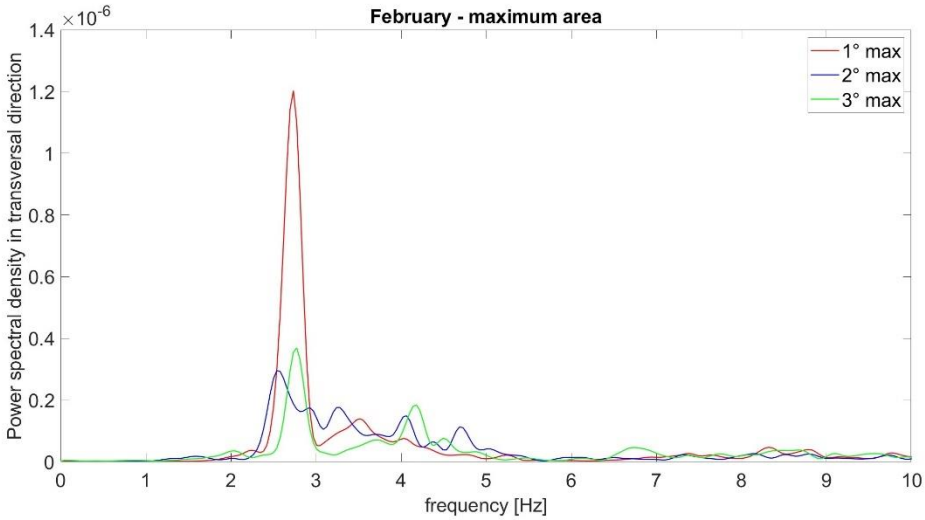


Figure 5-23: Results obtained from the 3 accelerograms with maximum area of PSD

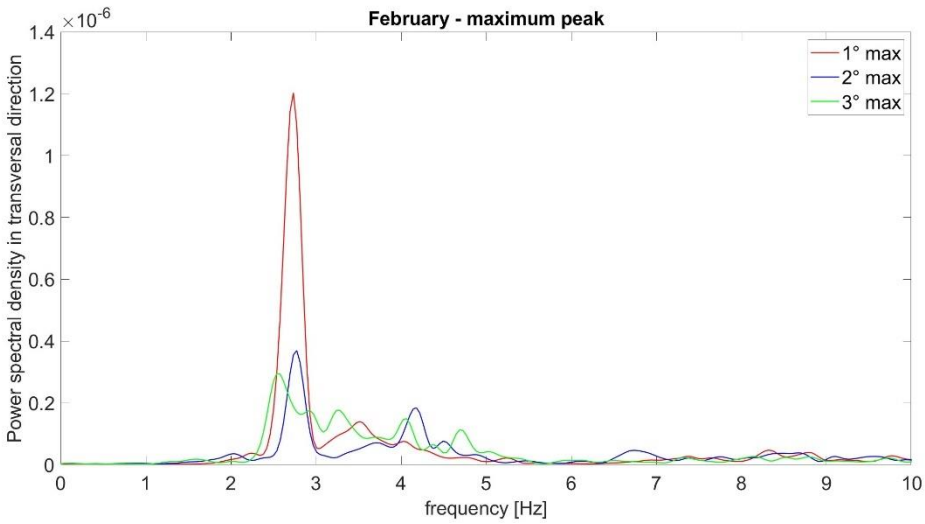


Figure 5-24: Results obtained from the 3 accelerograms with highest peak if PSD

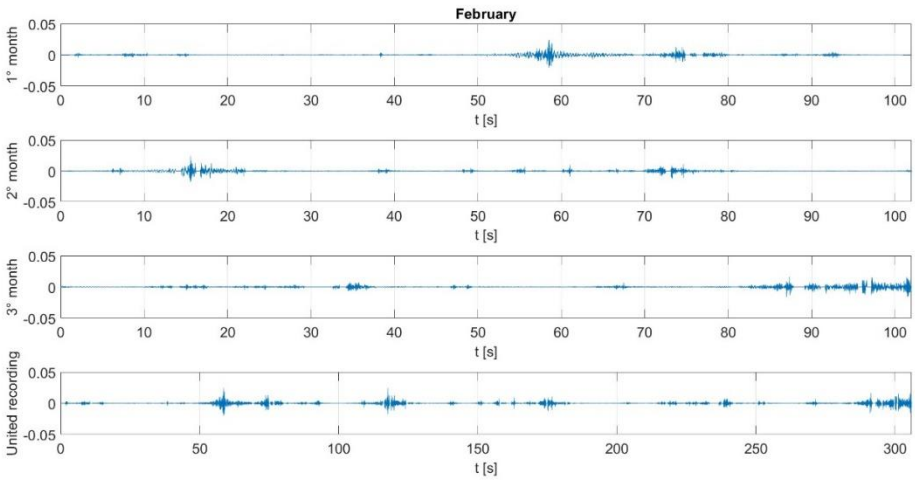


Figure 5-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

5.3 March

The results obtained for the March dataset are shown in the following tables.

Table 5-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-03-16_13-00-20	2.00E-04
	2°	2C1EA_2023-03-15_07-00-21	1.45E-04
	3°	2C1EA_2023-03-08_13-00-21	1.45E-04
Longitudinal direction (y)	1°	2C1EA_2023-03-04_13-00-20	1.32E-03
	2°	2C1EA_2023-03-16_13-00-20	1.29E-03
	3°	2C1EA_2023-03-08_13-00-21	9.99E-04
Transverse direction (z)	1°	2C1EA_2023-03-16_13-00-20	1.06E-03
	2°	2C1EA_2023-03-15_07-00-21	8.24E-04
	3°	2C1EA_2023-03-08_13-00-21	7.62E-04

Table 5-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-03-16_13-00-20	3.96E-08	2C1EA_2023-03-16_13-00-20	6.14E-09
2	2C1EA_2023-03-09_13-00-20	2.31E-08	2C1EA_2023-03-15_07-00-21	3.24E-09
3	2C1EA_2023-03-20_07-00-21	1.98E-08	2C1EA_2023-03-08_13-00-21	3.07E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-03-04_13-00-20	3.38E-06	2C1EA_2023-03-16_13-00-20	3.53E-07
2	2C1EA_2023-03-16_13-00-20	2.47E-06	2C1EA_2023-03-04_13-00-20	3.51E-07
3	2C1EA_2023-03-08_13-00-21	1.56E-06	2C1EA_2023-03-08_13-00-21	2.03E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-03-09_13-00-20	7.46E-07	2C1EA_2023-03-16_13-00-20	2.27E-07
2	2C1EA_2023-03-20_07-00-21	7.40E-07	2C1EA_2023-03-15_07-00-21	1.43E-07
3	2C1EA_2023-03-16_13-00-20	7.18E-07	2C1EA_2023-03-08_13-00-21	1.20E-07

Table 5-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	A	A	-	A
2	B	-	B	A	A	D	B	-	B
3	C	-	C	E	E	E	E	A	E

5.3.1 Vertical direction (x)

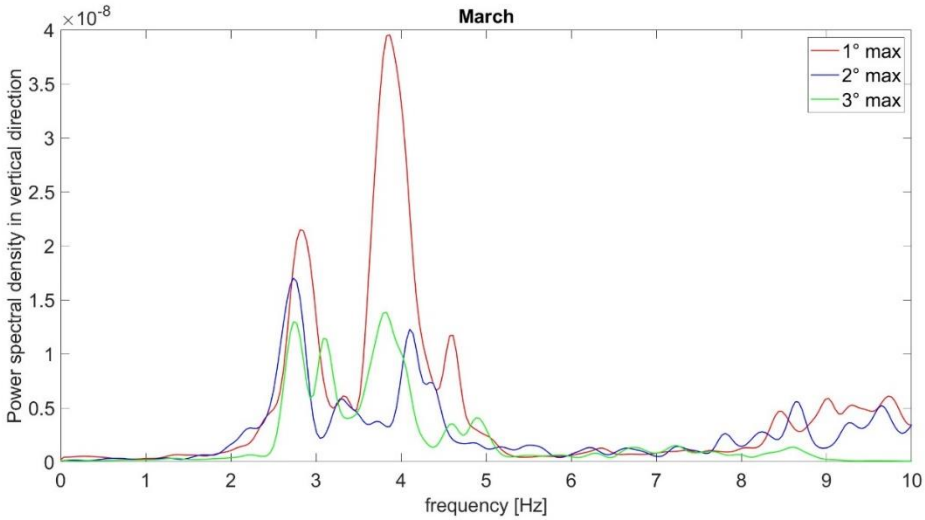


Figure 5-26: Results obtained from the 3 accelerograms with maximum SD in time domain

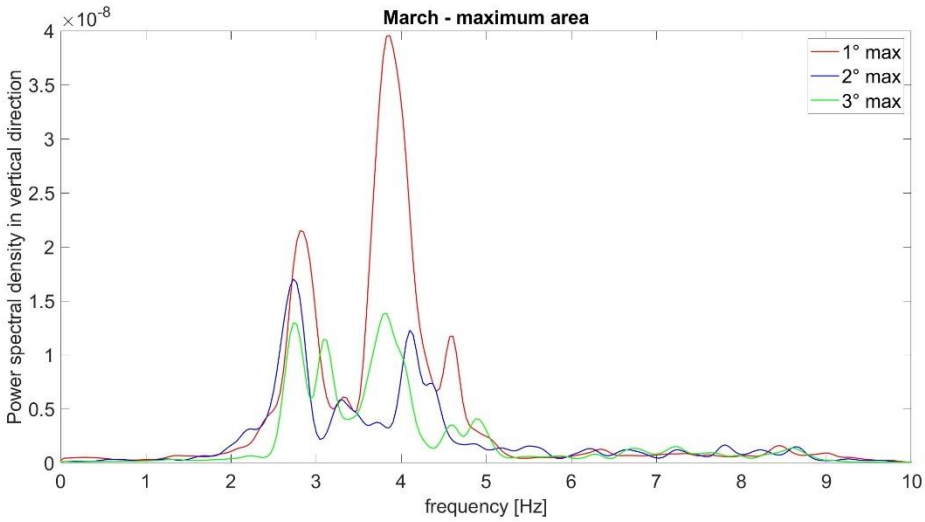


Figure 5-27: Results obtained from the 3 accelerograms with maximum area of PSD

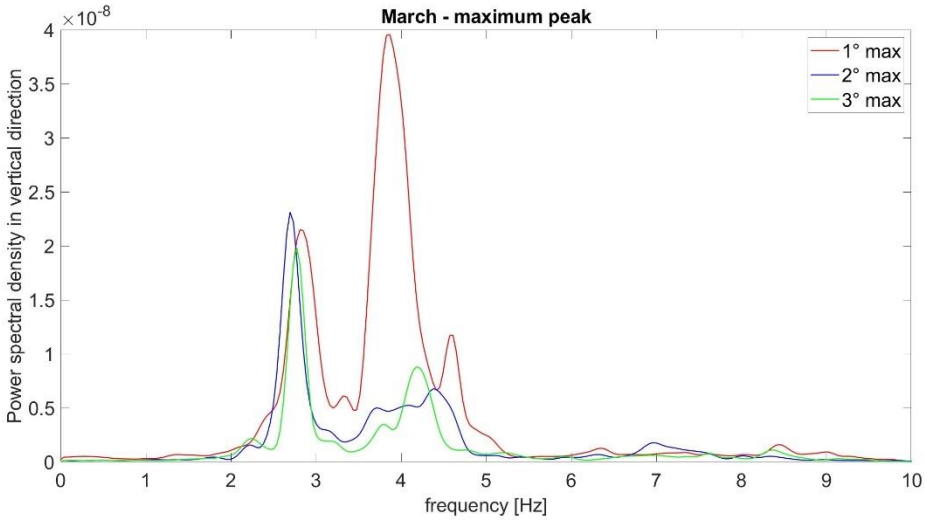


Figure 5-28: Results obtained from the 3 accelerograms with highest peak if PSD

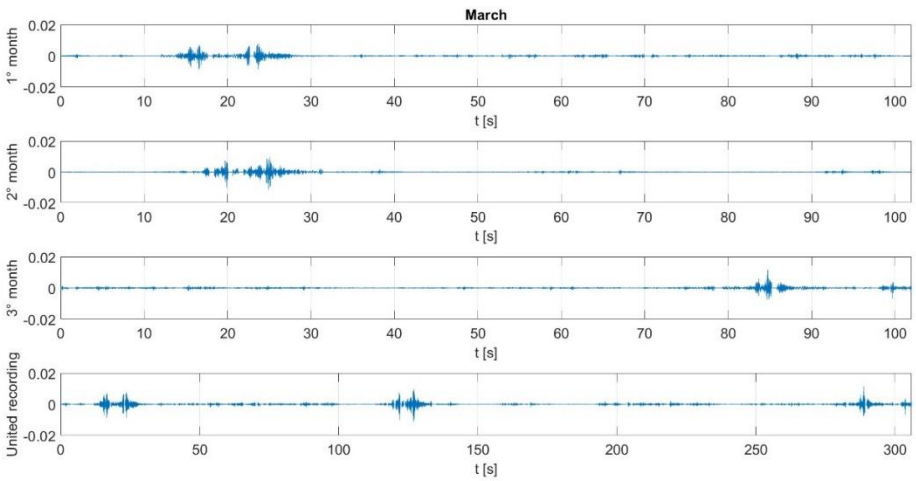


Figure 5-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.3.2 Longitudinal direction (y)

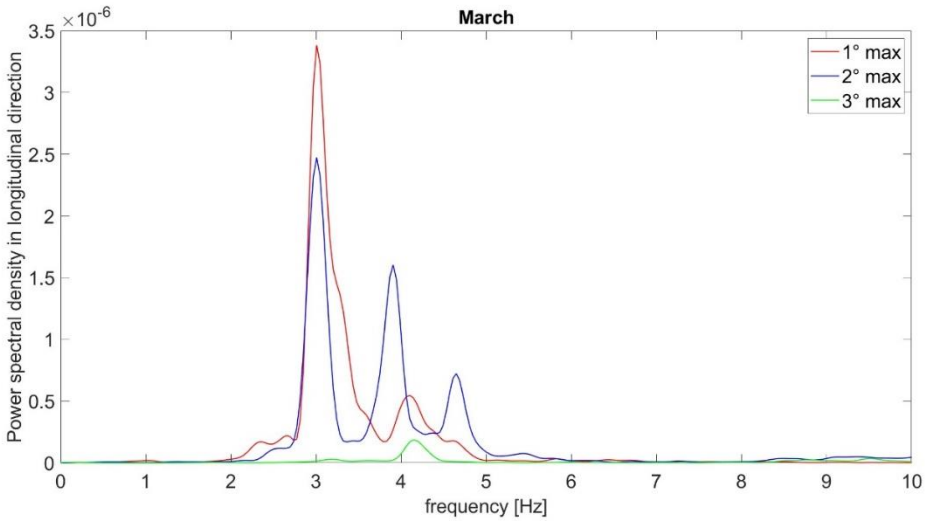


Figure 5-30: Results obtained from the 3 accelerograms with maximum SD in time domain

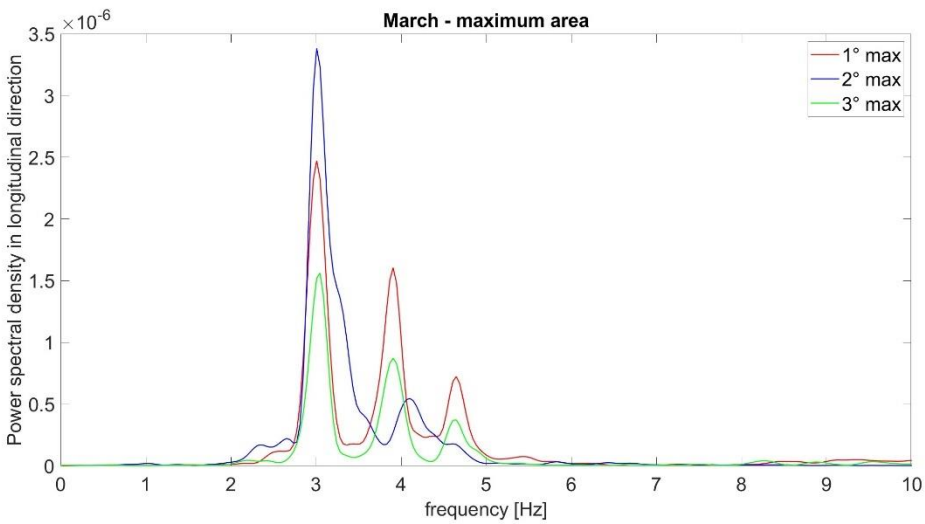


Figure 5-31: Results obtained from the 3 accelerograms with maximum area of PSD

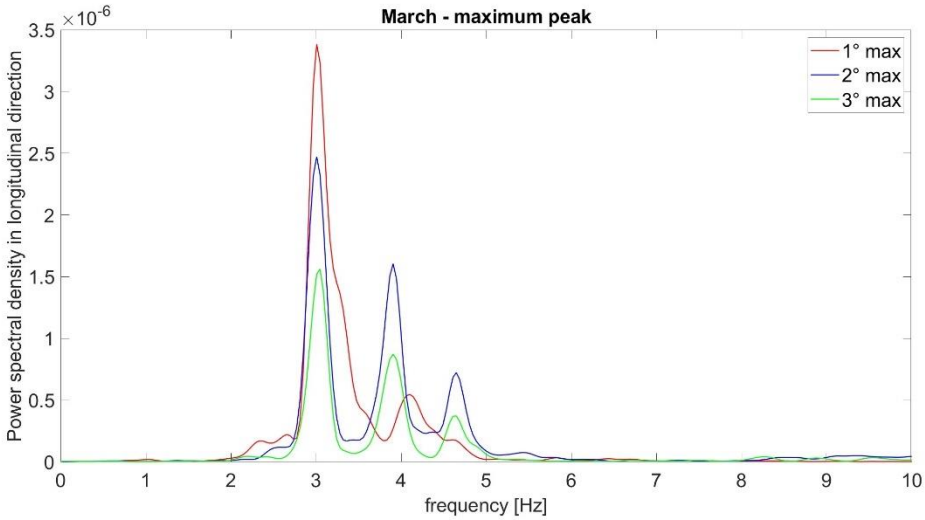


Figure 5-32: Results obtained from the 3 accelerograms with highest peak if PSD

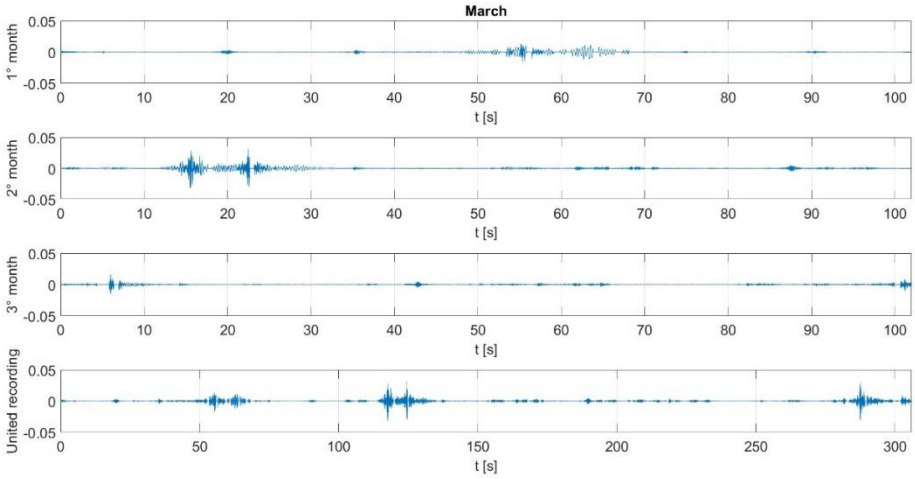


Figure 5-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

5.3.3 Transverse direction (z)

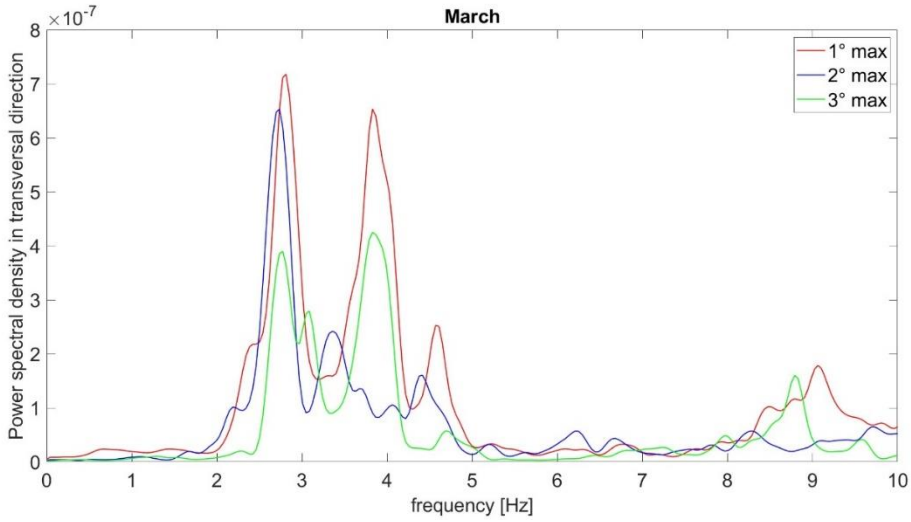


Figure 5-34: Results obtained from the 3 accelerograms with maximum SD in time domain

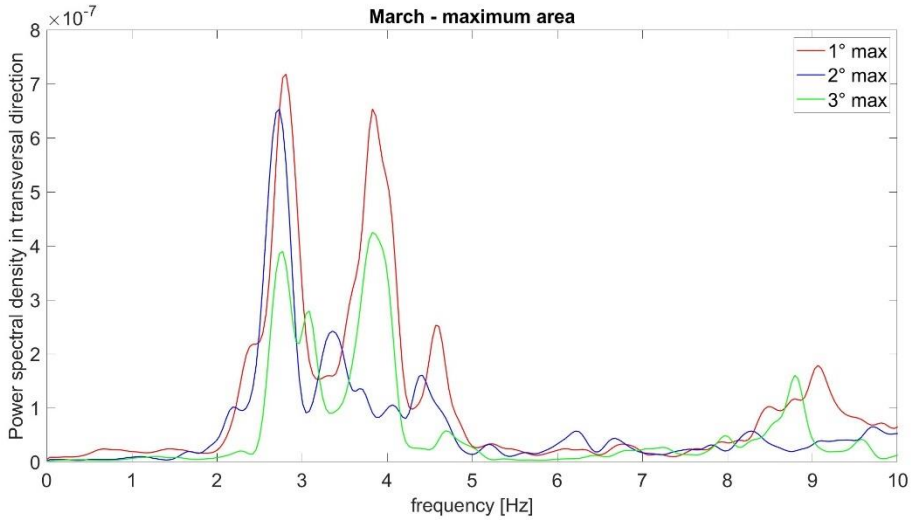


Figure 5-35: Results obtained from the 3 accelerograms with maximum area of PSD

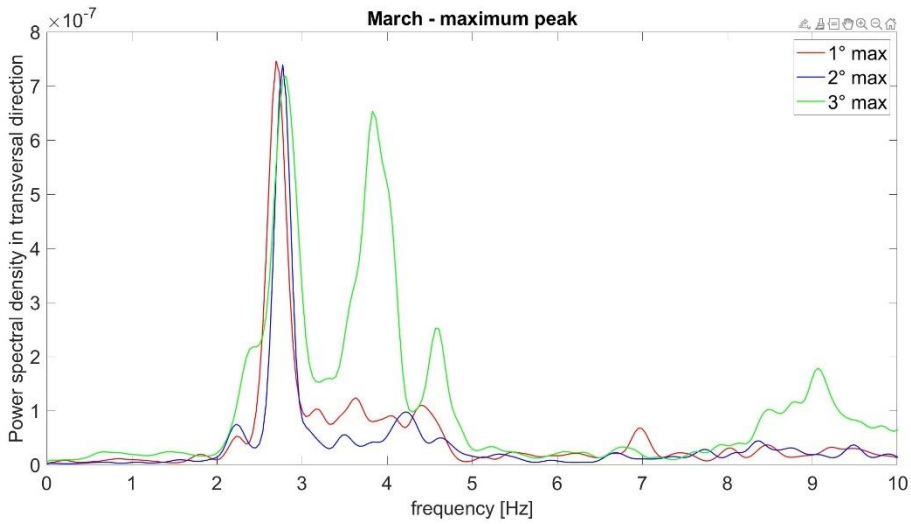


Figure 5-36: Results obtained from the 3 accelerograms with highest peak if PSD

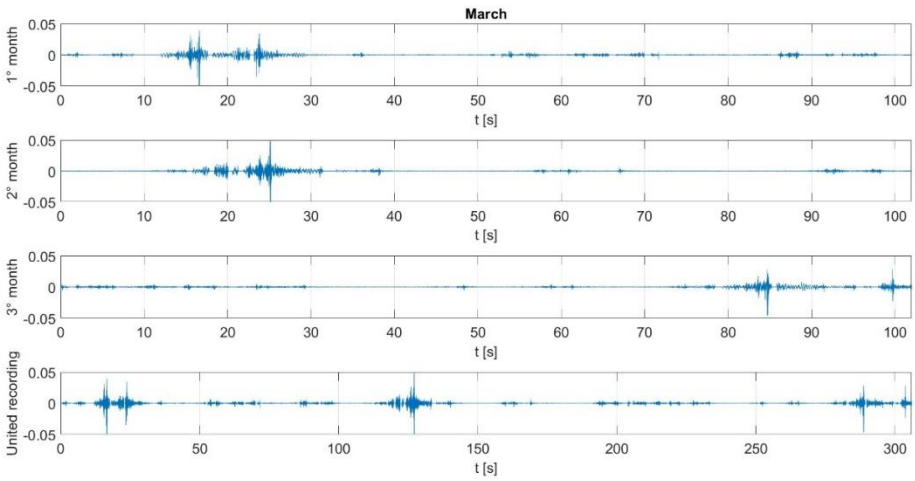


Figure 5-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

5.4 April

The results obtained for the April dataset are shown in the following tables.

Table 5-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-04-20_08-00-21	1.25E-04
	2°	2C1EA_2023-04-14_08-00-20	1.19E-04
	3°	2C1EA_2023-04-06_20-00-20	1.11E-04
Longitudinal direction (y)	1°	2C1EA_2023-04-11_08-00-20	6.55E-04
	2°	2C1EA_2023-04-06_20-00-20	6.51E-04
	3°	2C1EA_2023-04-20_08-00-21	5.96E-04
Transverse direction (z)	1°	2C1EA_2023-04-20_08-00-21	6.35E-04
	2°	2C1EA_2023-04-06_20-00-20	6.28E-04
	3°	2C1EA_2023-04-07_08-00-20	6.12E-04

Table 5-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-04-14_08-00-20	2.22E-08	2C1EA_2023-04-20_08-00-21	2.44E-09
2	2C1EA_2023-04-20_08-00-21	1.39E-08	2C1EA_2023-04-14_08-00-20	2.19E-09
3	2C1EA_2023-04-06_20-00-20	9.64E-09	2C1EA_2023-04-11_08-00-20	1.96E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-04-14_08-00-20	5.01E-07	2C1EA_2023-04-06_20-00-20	9.34E-08
2	2C1EA_2023-04-07_08-00-20	4.69E-07	2C1EA_2023-04-20_08-00-21	7.78E-08
3	2C1EA_2023-04-03_08-00-21	2.79E-07	2C1EA_2023-04-11_08-00-20	7.58E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-04-20_08-00-21	4.81E-07	2C1EA_2023-04-20_08-00-21	8.36E-08
2	2C1EA_2023-04-03_08-00-21	3.25E-07	2C1EA_2023-04-07_08-00-20	7.75E-08
3	2C1EA_2023-04-06_20-00-20	3.14E-07	2C1EA_2023-04-06_20-00-20	7.73E-08

Table 5-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	D	-	C	A	A	A
2	B	A	B	C	-	A	C	-	E
3	C	C	-	A	-	D	E	C	C

5.4.1 Vertical direction (x)

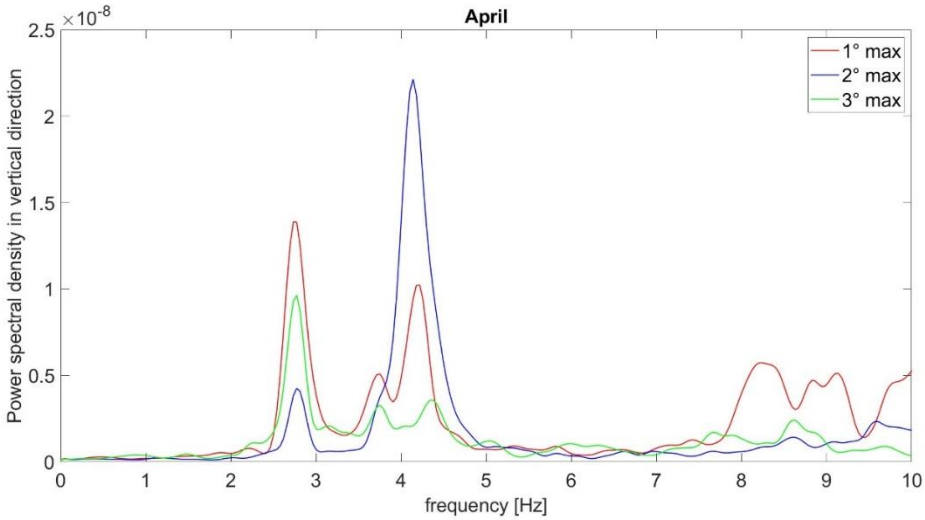


Figure 5-38: Results obtained from the 3 accelerograms with maximum SD in time domain

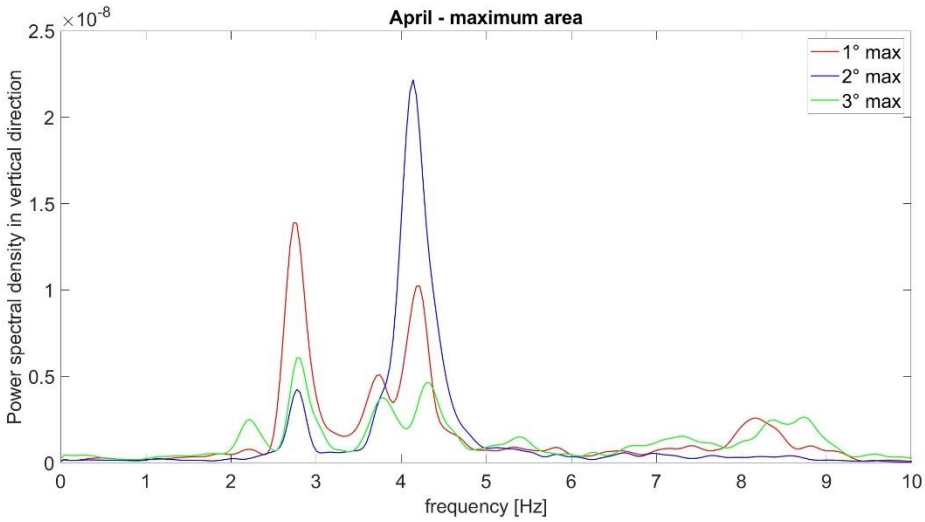


Figure 5-39: Results obtained from the 3 accelerograms with maximum area of PSD

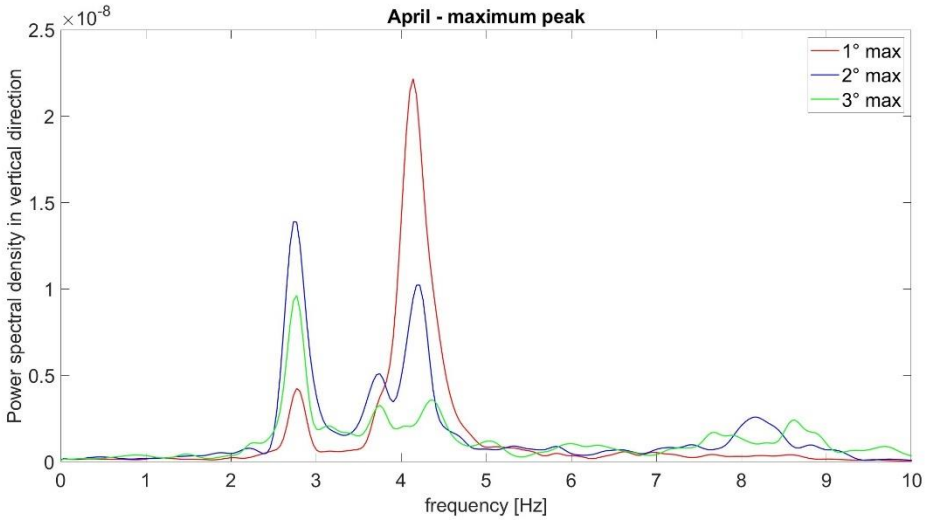


Figure 5-40: Results obtained from the 3 accelerograms with highest peak if PSD

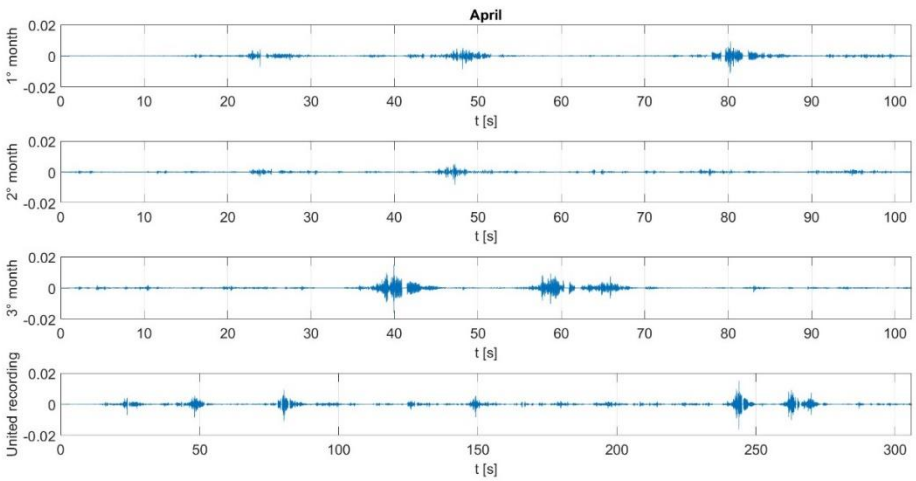


Figure 5-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.4.2 Longitudinal direction (y)

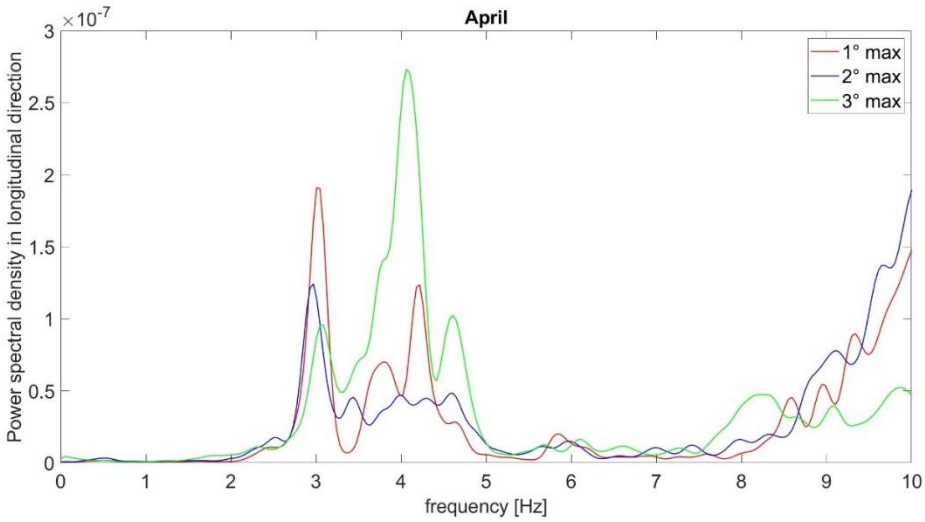


Figure 5-42: Results obtained from the 3 accelerograms with maximum SD in time domain

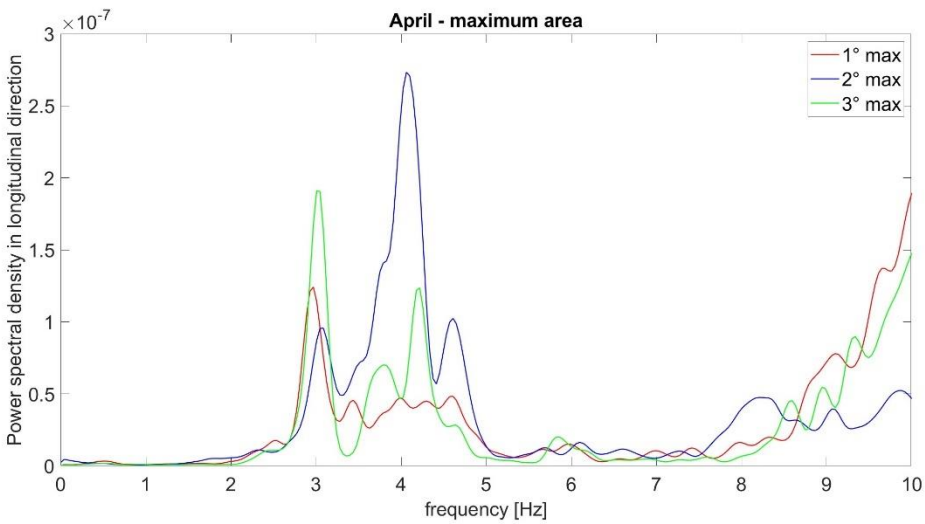


Figure 5-43: Results obtained from the 3 accelerograms with maximum area of PSD

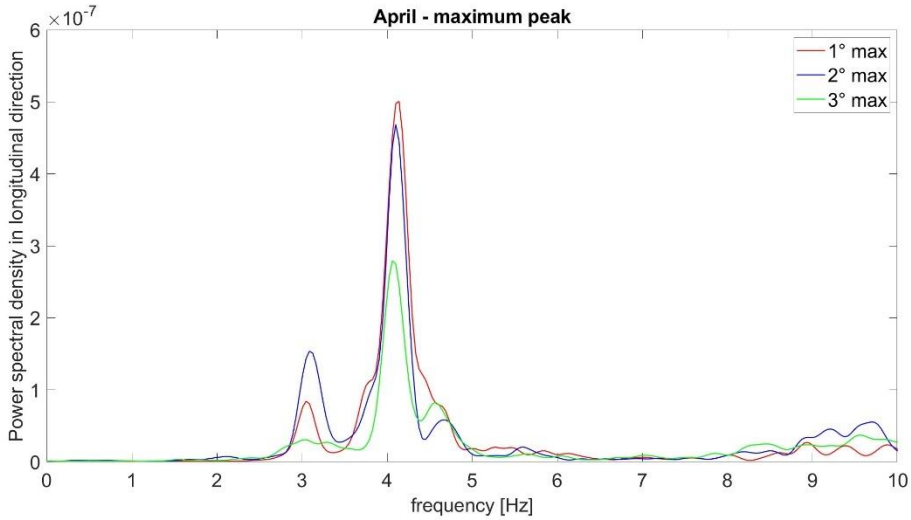


Figure 5-44: Results obtained from the 3 accelerograms with highest peak if PSD

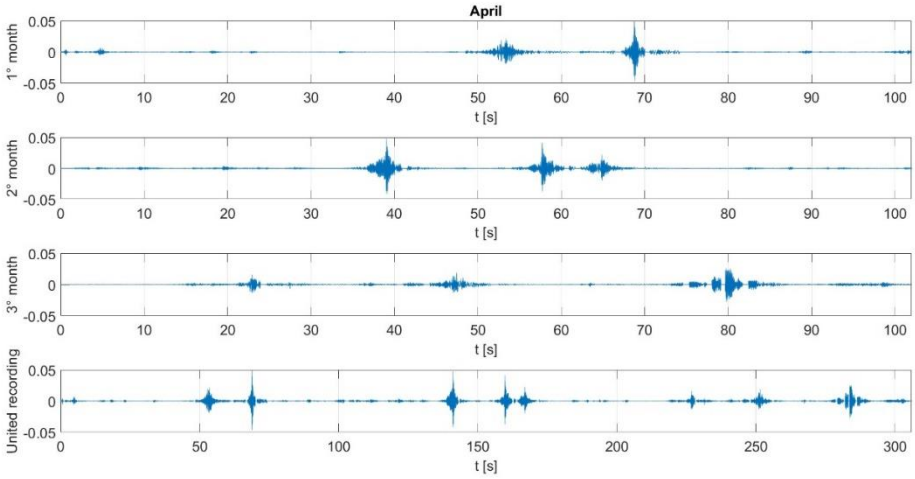


Figure 5-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

5.4.3 Transverse direction (z)

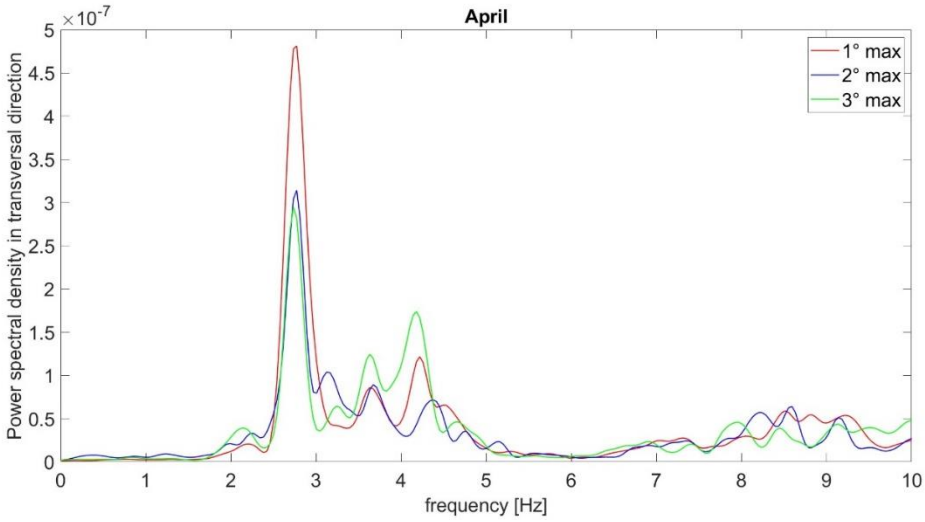


Figure 5-46: Results obtained from the 3 accelerograms with maximum SD in time domain

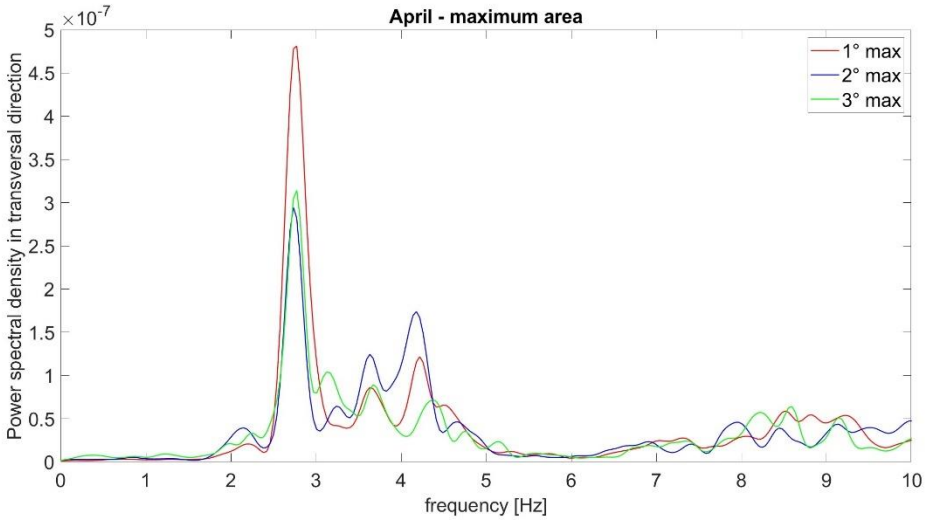


Figure 5-47: Results obtained from the 3 accelerograms with maximum area of PSD

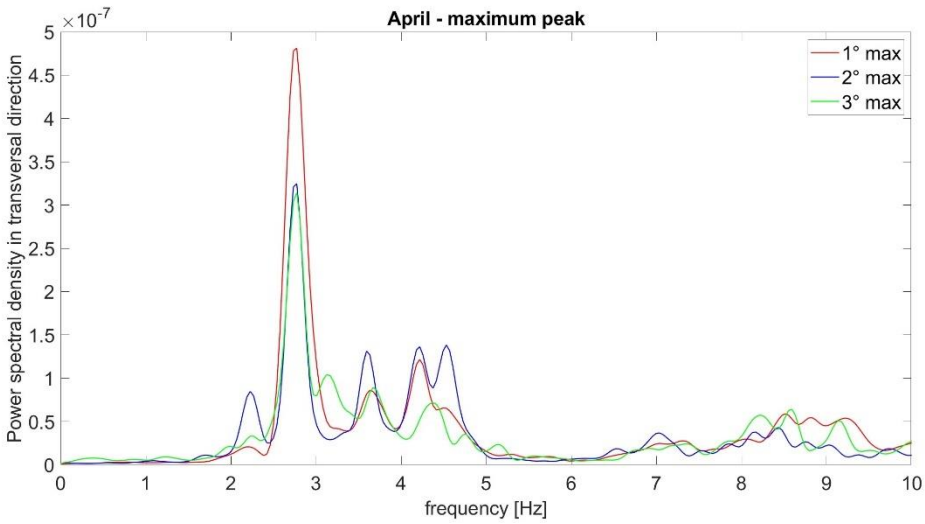


Figure 5-48: Results obtained from the 3 accelerograms with highest peak if PSD

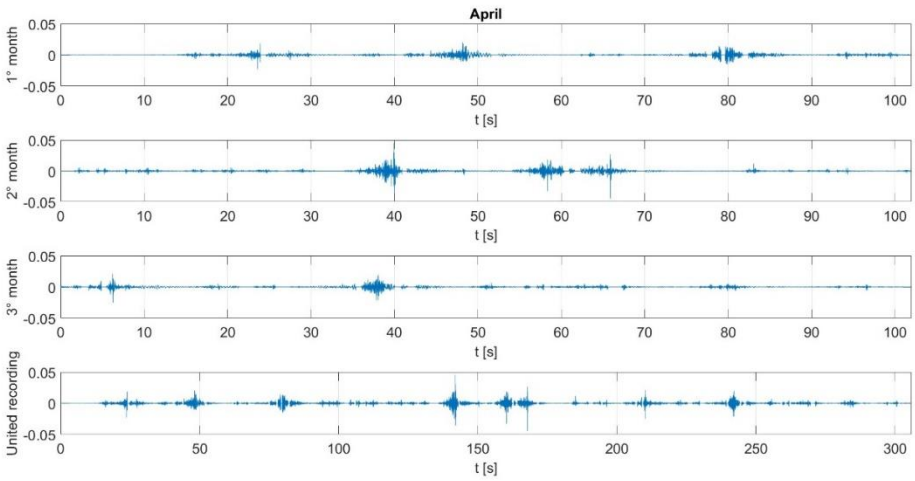


Figure 5-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

5.5 May

The results obtained for the May dataset are shown in the following tables.

Table 5-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-05-23_14-00-21	1.38E-04
	2°	2C1EA_2023-05-04_14-00-20	1.26E-04
	3°	2C1EA_2023-05-22_08-00-21	1.07E-04
Longitudinal direction (y)	1°	2C1EA_2023-05-19_14-00-21	9.06E-04
	2°	2C1EA_2023-05-23_14-00-21	7.90E-04
	3°	2C1EA_2023-05-04_14-00-20	7.57E-04
Transverse direction (z)	1°	2C1EA_2023-05-23_14-00-21	6.86E-04
	2°	2C1EA_2023-05-22_08-00-21	5.79E-04
	3°	2C1EA_2023-05-04_14-00-20	5.67E-04

Table 5-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-05-04_14-00-20	1.50E-08	2C1EA_2023-05-23_14-00-21	3.05E-09
2	2C1EA_2023-05-23_14-00-21	1.36E-08	2C1EA_2023-05-04_14-00-20	2.25E-09
3	2C1EA_2023-05-19_14-00-21	9.36E-09	2C1EA_2023-05-22_08-00-21	1.75E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-05-19_14-00-21	1.18E-06	2C1EA_2023-05-23_14-00-21	1.24E-07
2	2C1EA_2023-05-23_14-00-21	5.44E-07	2C1EA_2023-05-04_14-00-20	1.11E-07
3	2C1EA_2023-05-04_14-00-20	4.10E-07	2C1EA_2023-05-19_14-00-21	8.30E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-05-23_14-00-21	4.90E-07	2C1EA_2023-05-23_14-00-21	9.69E-08
2	2C1EA_2023-05-19_14-00-21	3.28E-07	2C1EA_2023-05-22_08-00-21	6.98E-08
3	2C1EA_2023-05-02_20-00-21	2.46E-07	2C1EA_2023-05-04_14-00-20	6.43E-08

Table 5-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	D	D	A	A	A	A
2	B	A	B	A	A	B	C	-	C
3	C	-	C	B	B	D	B	-	B

5.5.1 Vertical direction (x)

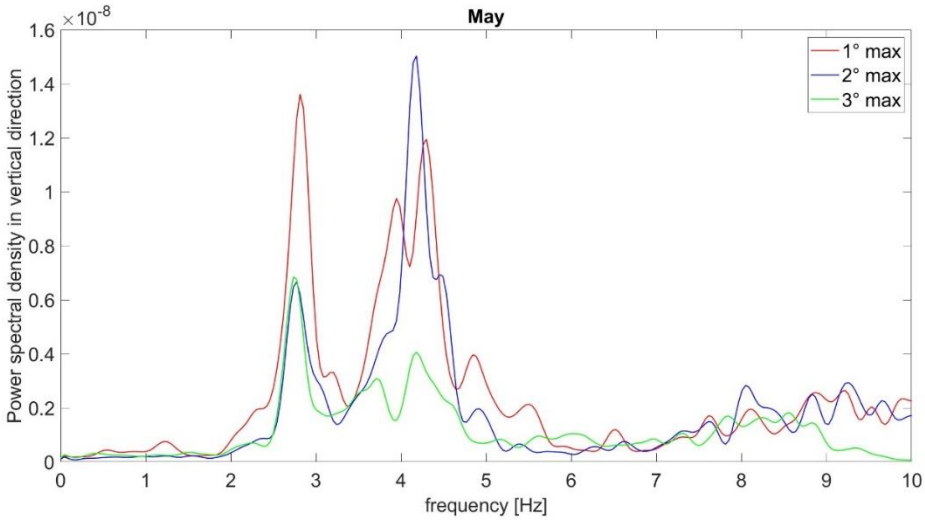


Figure 5-50: Results obtained from the 3 accelerograms with maximum SD in time domain

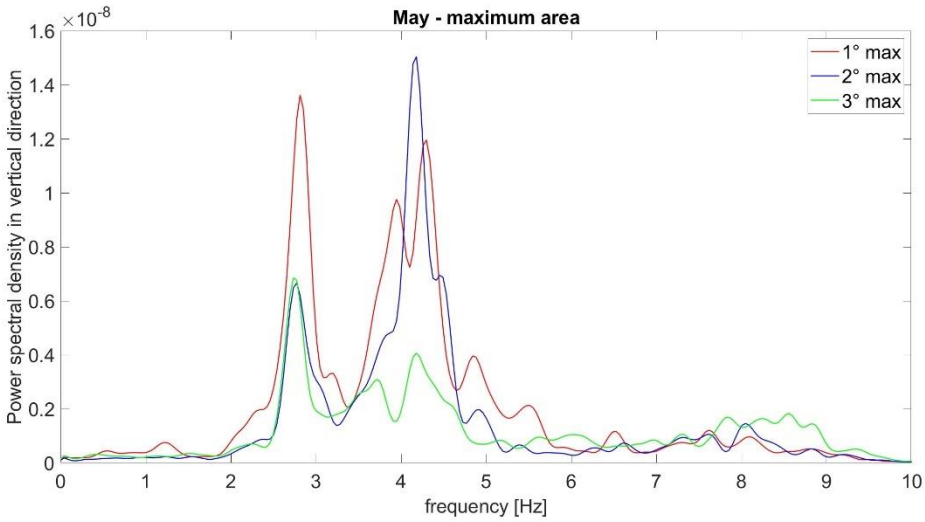


Figure 5-51: Results obtained from the 3 accelerograms with maximum area of PSD

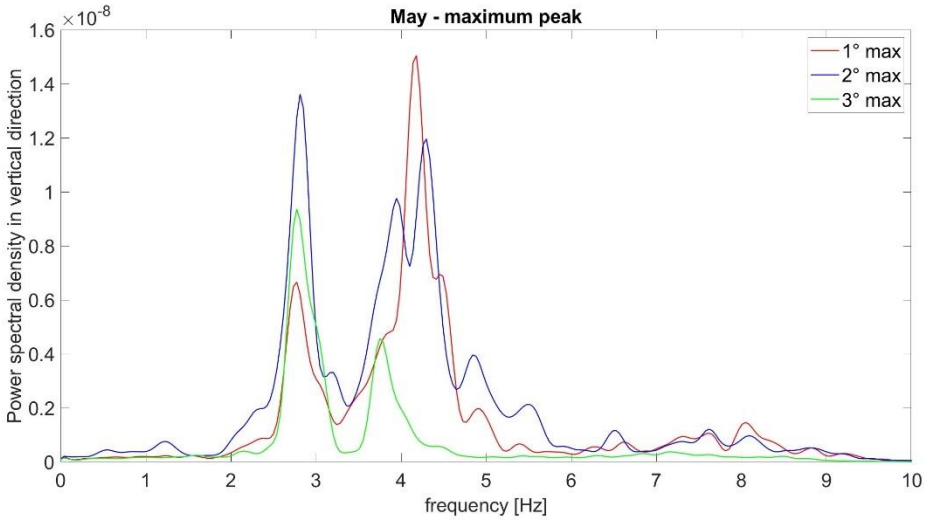


Figure 5-52: Results obtained from the 3 accelerograms with highest peak if PSD

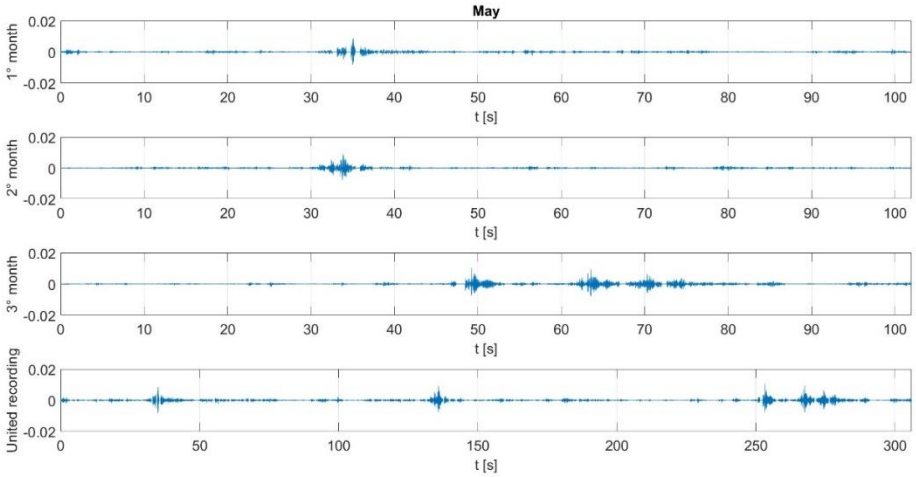


Figure 5-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.5.2 Longitudinal direction (y)

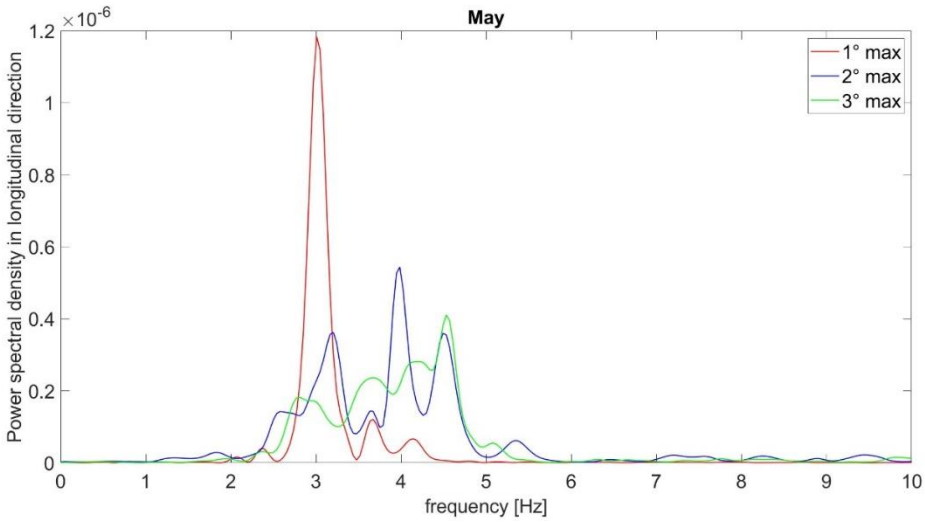


Figure 5-54: Results obtained from the 3 accelerograms with maximum SD in time domain

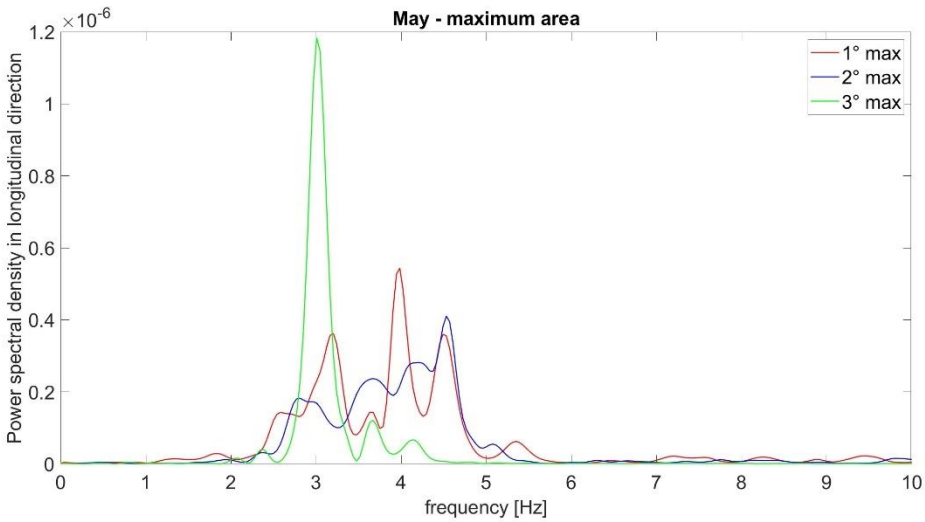


Figure 5-55: Results obtained from the 3 accelerograms with maximum area of PSD

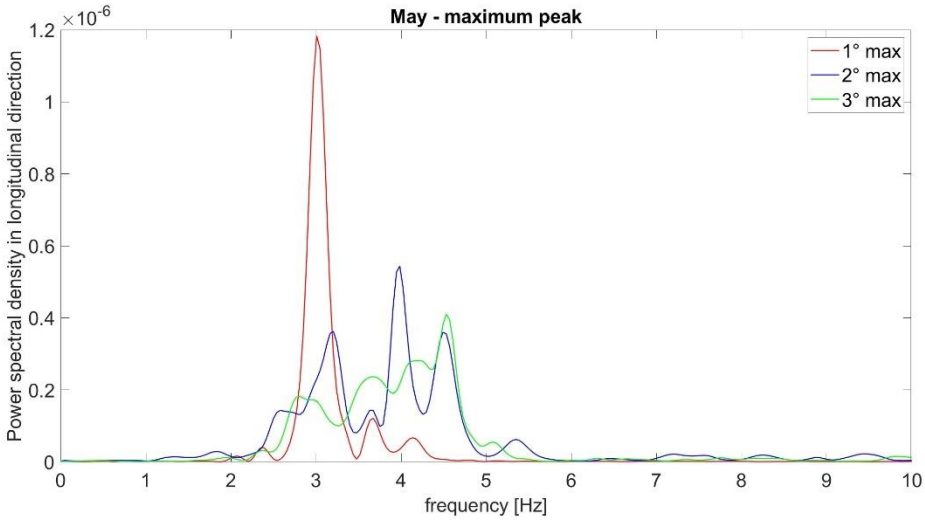


Figure 5-56: Results obtained from the 3 accelerograms with highest peak if PSD

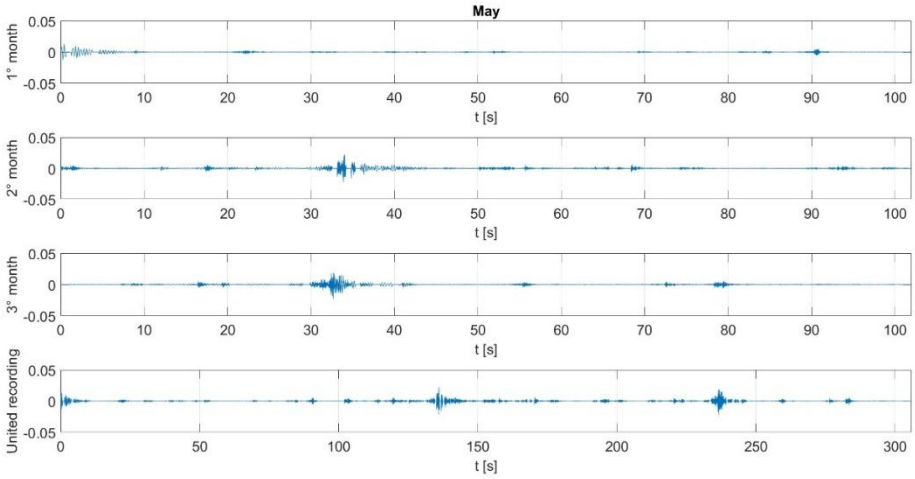


Figure 5-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

5.5.3 Transverse direction (z)

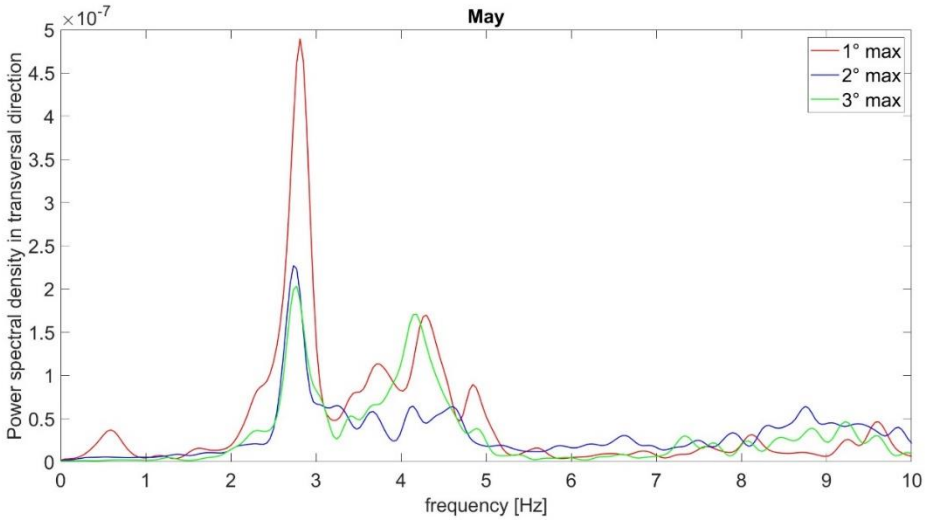


Figure 5-58: Results obtained from the 3 accelerograms with maximum SD in time domain

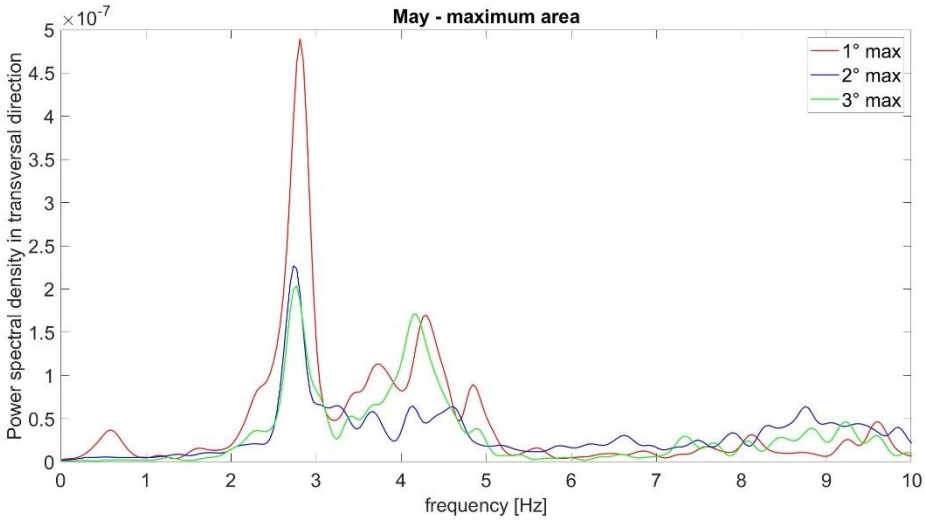


Figure 5-59: Results obtained from the 3 accelerograms with maximum area of PSD

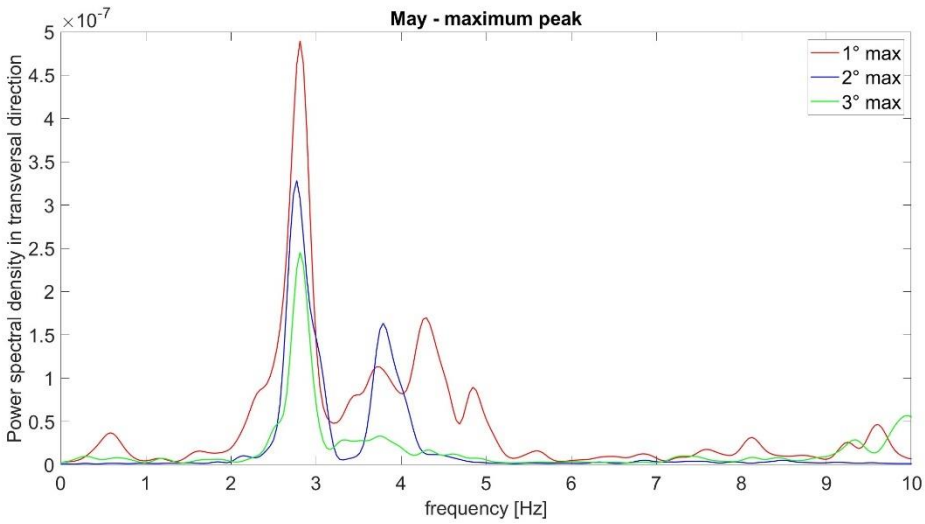


Figure 5-60: Results obtained from the 3 accelerograms with highest peak if PSD

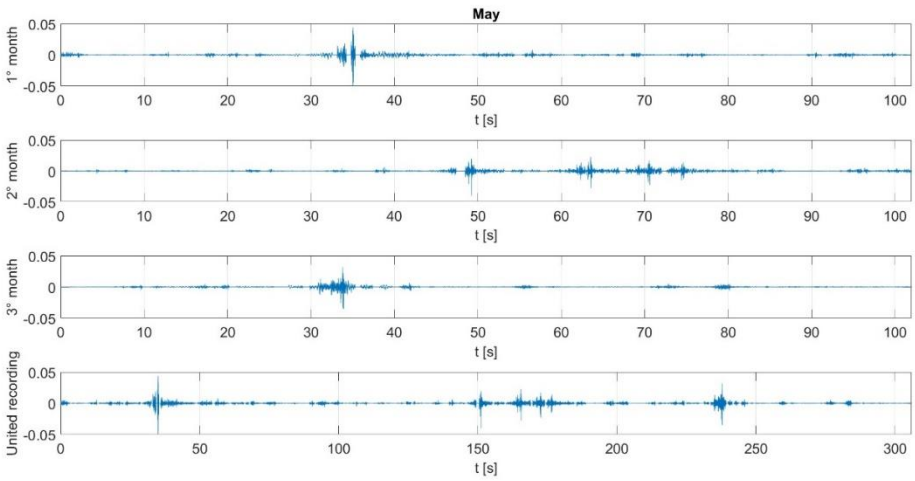


Figure 5-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

5.6 June

The results obtained for the June dataset are shown in the following tables.

Table 5-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-06-13_08-00-21	1.49E-04
	2°	2C1EA_2023-06-28_14-00-21	1.20E-04
	3°	2C1EA_2023-06-23_20-00-21	1.16E-04
Longitudinal direction (y)	1°	2C1EA_2023-06-13_08-00-21	9.18E-04
	2°	2C1EA_2023-06-23_20-00-21	5.74E-04
	3°	2C1EA_2023-06-28_14-00-21	5.49E-04
Transverse direction (z)	1°	2C1EA_2023-06-13_08-00-21	7.16E-04
	2°	2C1EA_2023-06-28_14-00-21	6.00E-04
	3°	2C1EA_2023-06-27_14-00-21	5.37E-04

Table 5-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-06-13_08-00-21	2.12E-08	2C1EA_2023-06-13_08-00-21	3.50E-09
2	2C1EA_2023-06-28_14-00-21	9.15E-09	2C1EA_2023-06-28_14-00-21	2.24E-09
3	2C1EA_2023-06-27_14-00-21	8.54E-09	2C1EA_2023-06-23_20-00-21	2.06E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-06-13_08-00-21	1.05E-06	2C1EA_2023-06-13_08-00-21	1.78E-07
2	2C1EA_2023-06-21_14-00-20	2.85E-07	2C1EA_2023-06-23_20-00-21	7.52E-08
3	2C1EA_2023-06-28_14-00-21	2.38E-07	2C1EA_2023-06-28_14-00-21	6.47E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-06-27_14-00-21	2.78E-07	2C1EA_2023-06-13_08-00-21	1.05E-07
2	2C1EA_2023-06-13_08-00-21	2.61E-07	2C1EA_2023-06-28_14-00-21	7.74E-08
3	2C1EA_2023-06-05_08-00-21	2.00E-07	2C1EA_2023-06-27_14-00-21	5.98E-08

Table 5-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	D	A
2	B	B	B	C	-	C	B	A	B
3	C	-	C	B	B	B	D	-	D

5.6.1 Vertical direction (x)

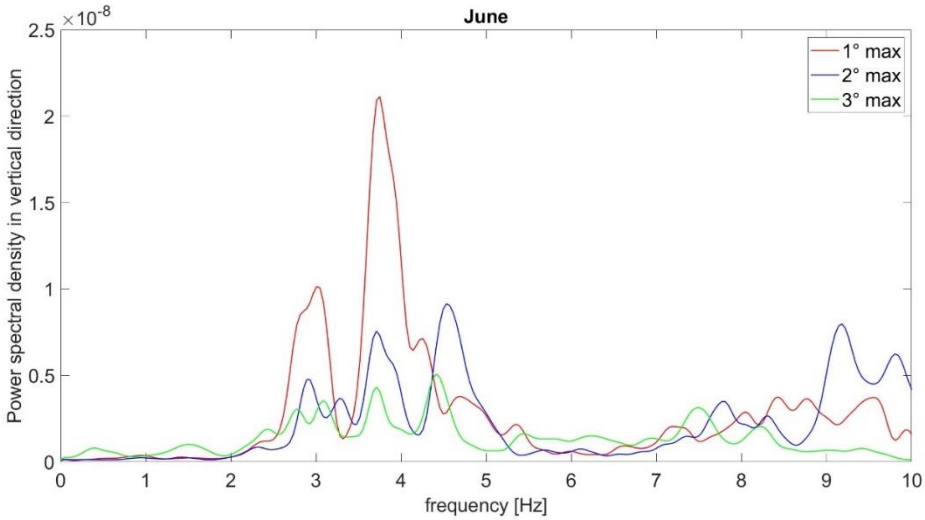


Figure 5-62: Results obtained from the 3 accelerograms with maximum SD in time domain

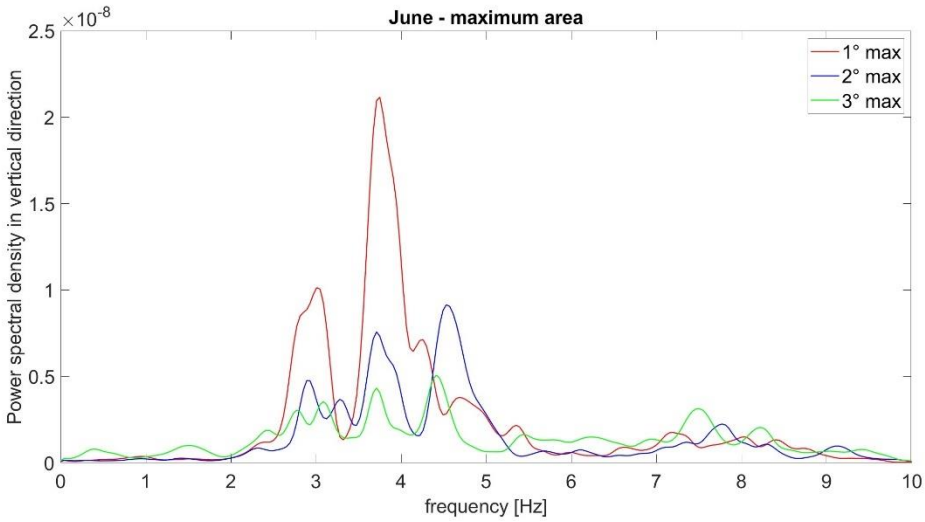


Figure 5-63: Results obtained from the 3 accelerograms with maximum area of PSD

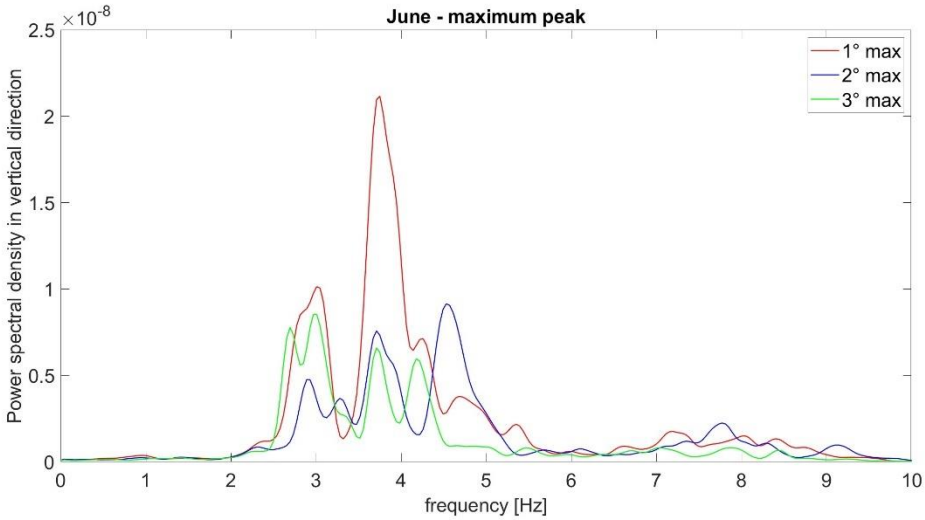


Figure 5-64: Results obtained from the 3 accelerograms with highest peak if PSD

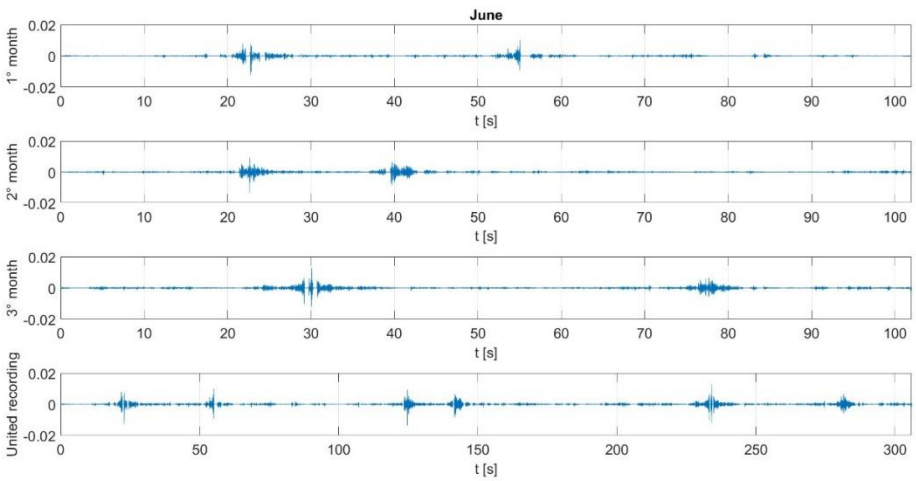


Figure 5-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.6.2 Longitudinal direction (y)

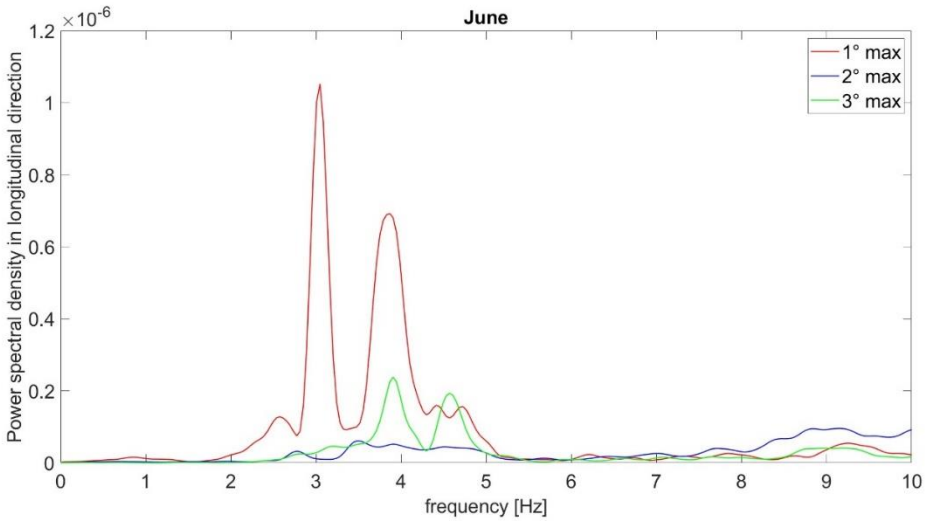


Figure 5-66: Results obtained from the 3 accelerograms with maximum SD in time domain

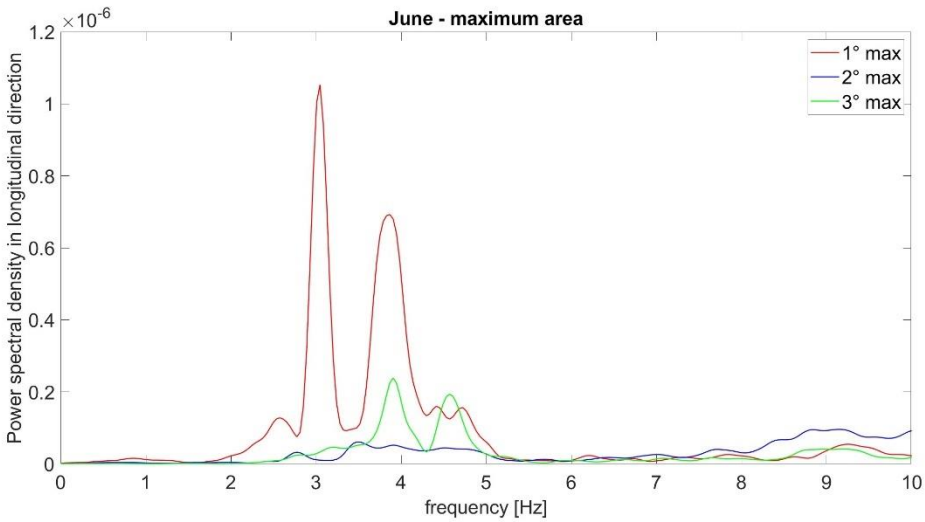


Figure 5-67: Results obtained from the 3 accelerograms with maximum area of PSD

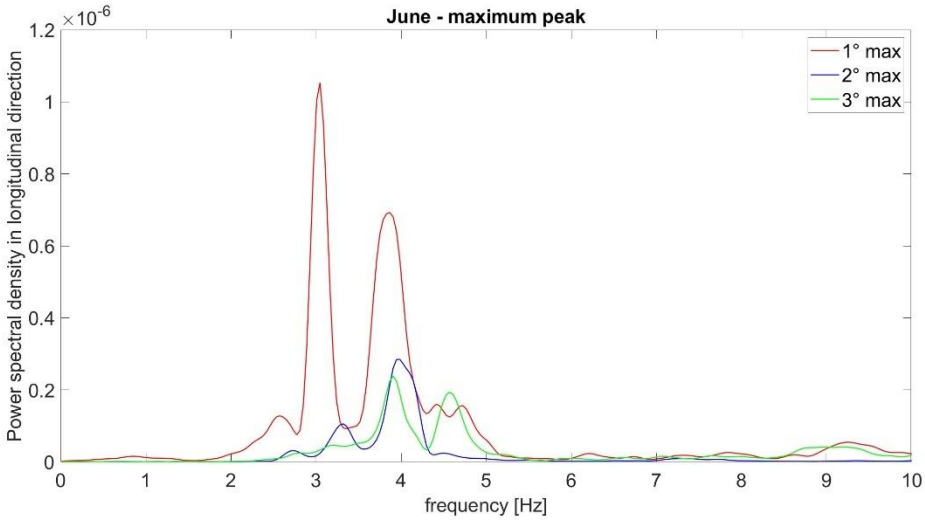


Figure 5-68: Results obtained from the 3 accelerograms with highest peak if PSD

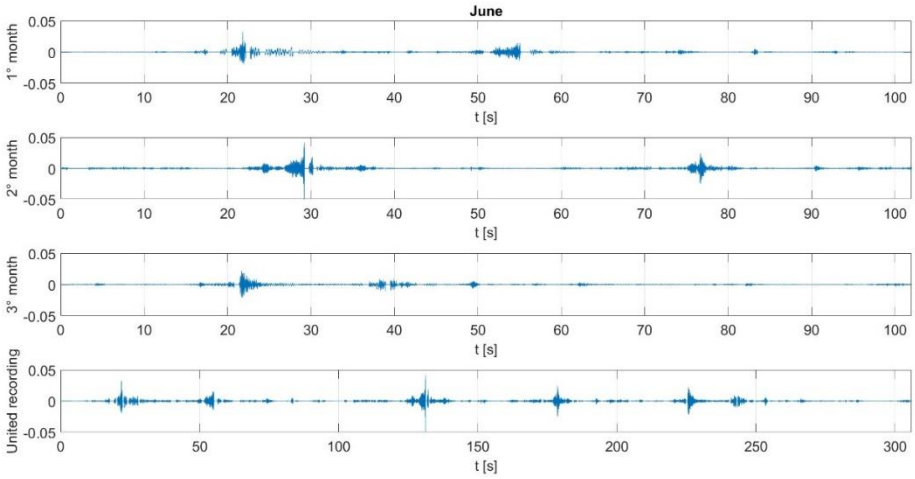


Figure 5-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

5.6.3 Transverse direction (z)

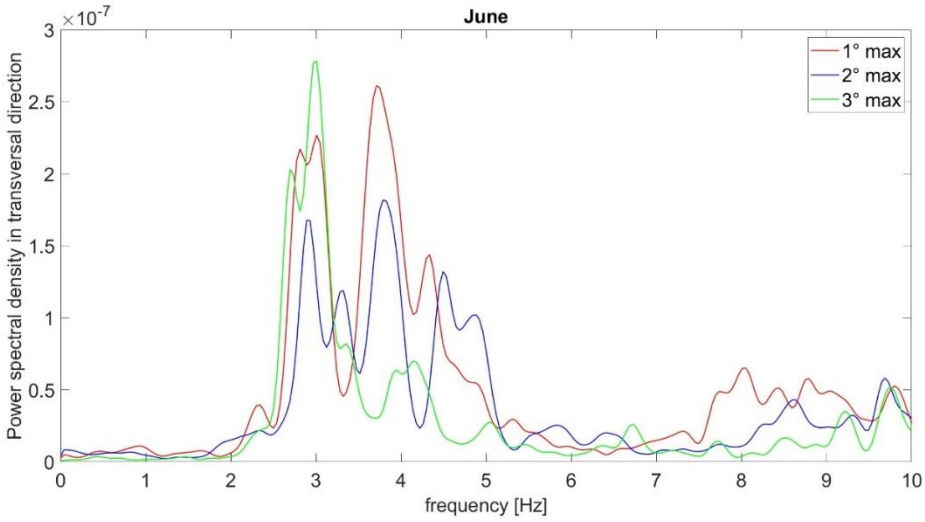


Figure 5-70: Results obtained from the 3 accelerograms with maximum SD in time domain

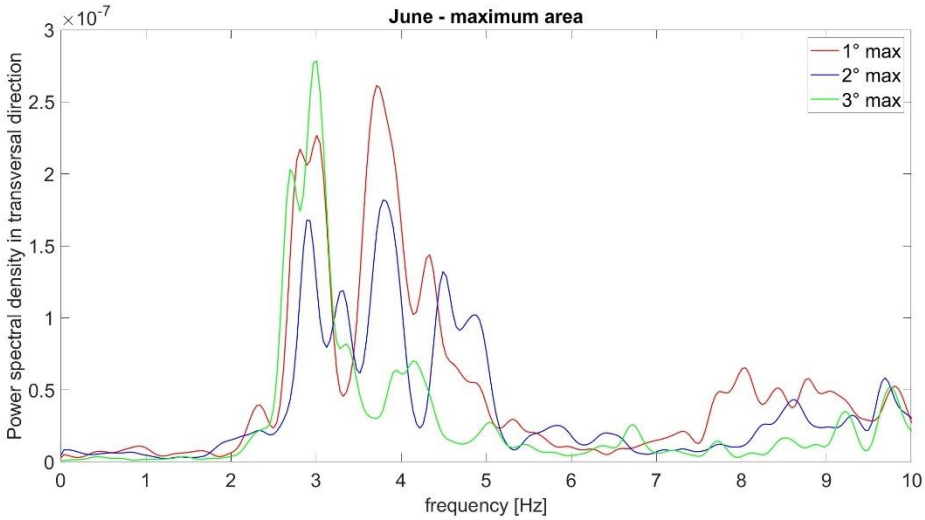


Figure 5-71: Results obtained from the 3 accelerograms with maximum area of PSD

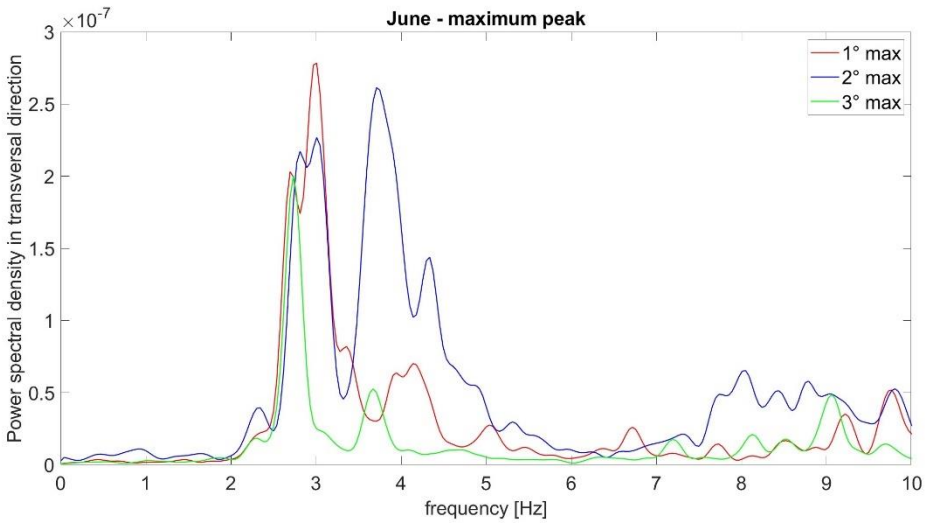


Figure 5-72: Results obtained from the 3 accelerograms with highest peak if PSD

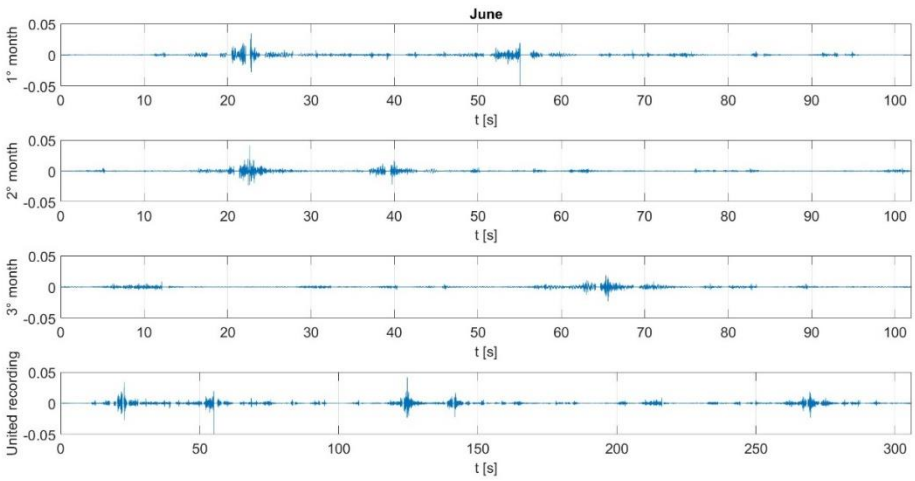


Figure 5-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

5.7 July

The results obtained for the July dataset are shown in the following tables.

Table 5-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-07-20_14-00-21	1.22E-04
	2°	2C1EA_2023-07-17_14-00-21	1.18E-04
	3°	2C1EA_2023-07-25_08-00-21	1.15E-04
Longitudinal direction (y)	1°	2C1EA_2023-07-25_08-00-21	6.43E-04
	2°	2C1EA_2023-07-07_14-00-21	6.34E-04
	3°	2C1EA_2023-07-28_08-00-21	6.16E-04
Transverse direction (z)	1°	2C1EA_2023-07-14_08-00-20	6.56E-04
	2°	2C1EA_2023-07-17_14-00-21	6.27E-04
	3°	2C1EA_2023-07-07_08-00-21	6.24E-04

Table 5-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-07-14_08-00-20	2.08E-08	2C1EA_2023-07-17_14-00-21	2.25E-09
2	2C1EA_2023-07-17_14-00-21	1.12E-08	2C1EA_2023-07-20_14-00-21	2.18E-09
3	2C1EA_2023-07-20_14-00-21	1.10E-08	2C1EA_2023-07-14_08-00-20	2.02E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-07-17_14-00-21	3.06E-07	2C1EA_2023-07-07_14-00-21	9.02E-08
2	2C1EA_2023-07-20_14-00-21	2.82E-07	2C1EA_2023-07-17_14-00-21	7.66E-08
3	2C1EA_2023-07-19_08-00-21	2.62E-07	2C1EA_2023-07-28_08-00-21	7.46E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-07-14_08-00-20	7.55E-07	2C1EA_2023-07-14_08-00-20	9.03E-08
2	2C1EA_2023-07-17_14-00-21	3.71E-07	2C1EA_2023-07-17_14-00-21	8.73E-08
3	2C1EA_2023-07-07_08-00-21	3.15E-07	2C1EA_2023-07-07_08-00-21	7.75E-08

Table 5-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	B	-	-	D	C	C	C
2	B	B	A	D	-	-	B	B	B
3	-	A	C	E	-	E	F	F	F

5.7.1 Vertical direction (x)

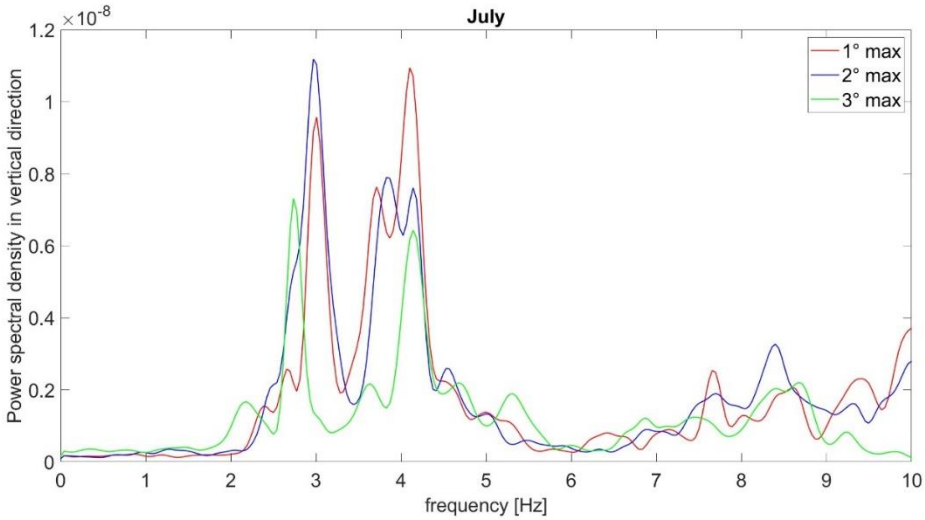


Figure 5-74: Results obtained from the 3 accelerograms with maximum SD in time domain

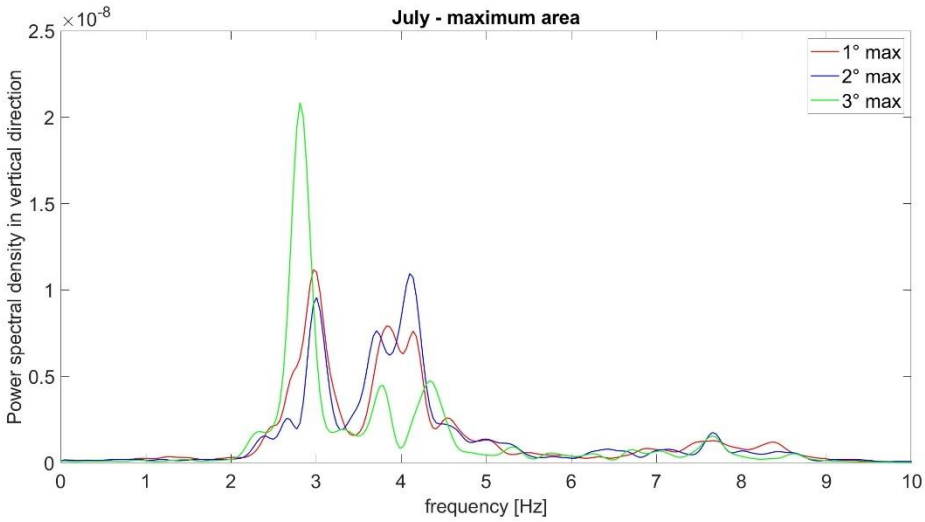


Figure 5-75: Results obtained from the 3 accelerograms with maximum area of PSD

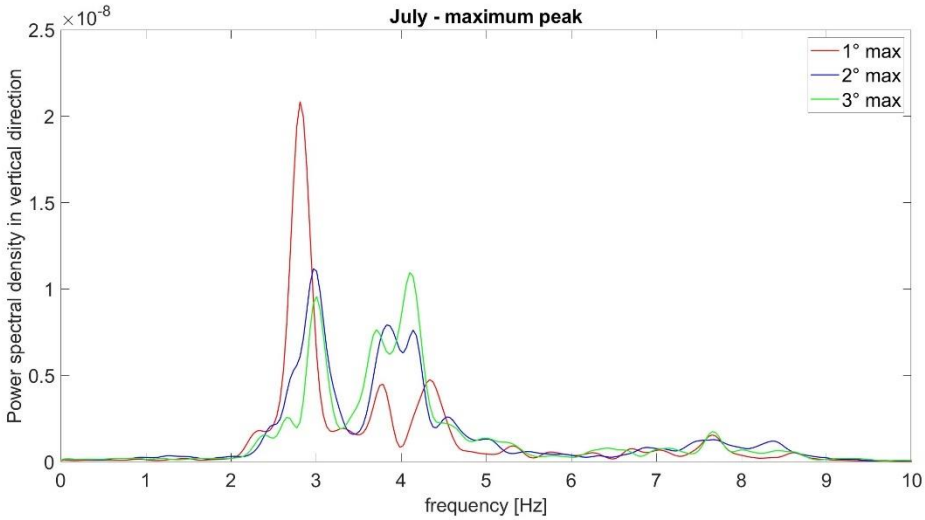


Figure 5-76: Results obtained from the 3 accelerograms with highest peak if PSD

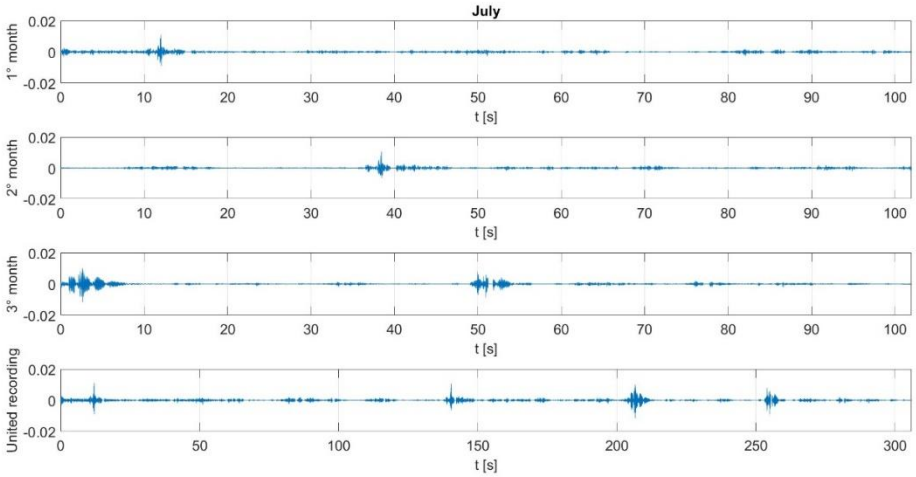


Figure 5-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.7.2 Longitudinal direction (y)

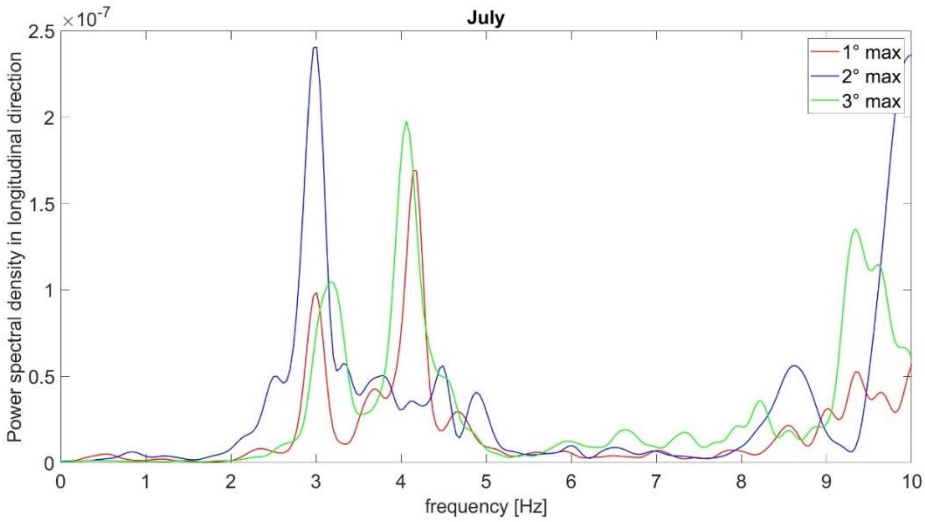


Figure 5-78: Results obtained from the 3 accelerograms with maximum SD in time domain

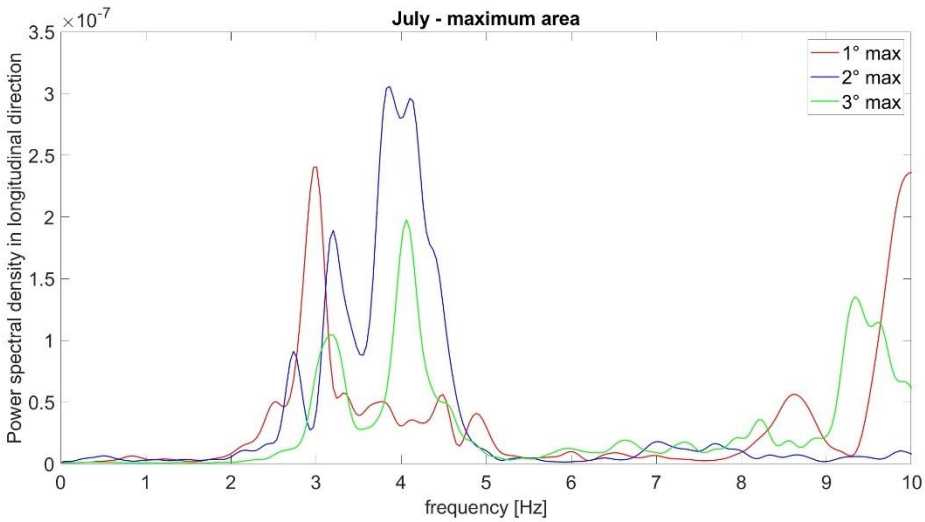


Figure 5-79: Results obtained from the 3 accelerograms with maximum area of PSD

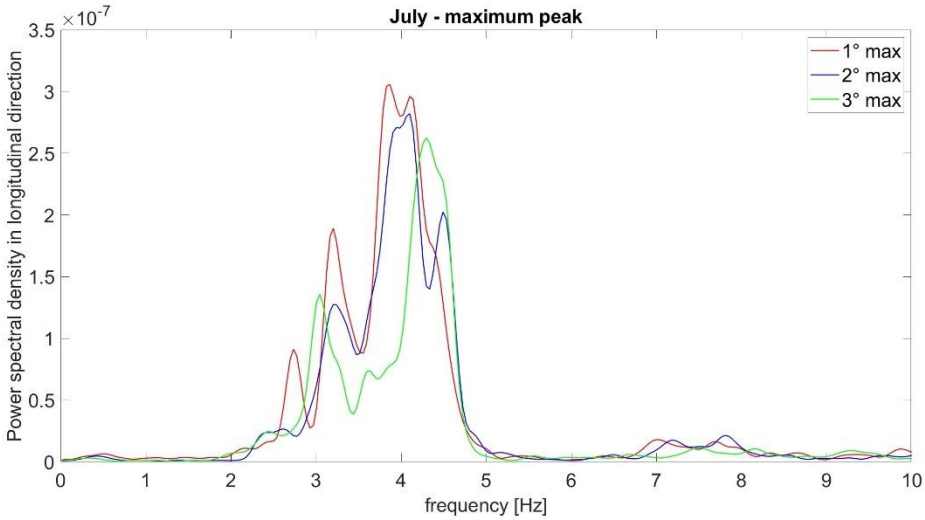


Figure 5-80: Results obtained from the 3 accelerograms with highest peak if PSD

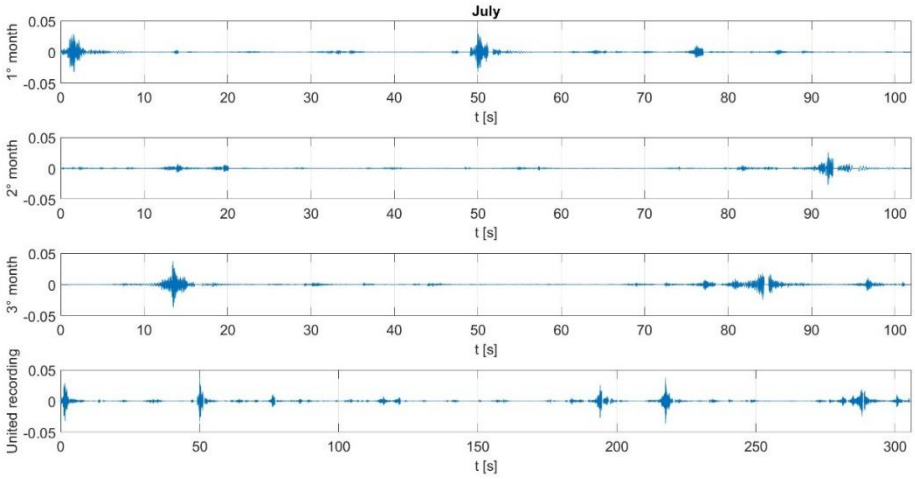


Figure 5-81: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.7.3 Transverse direction (z)

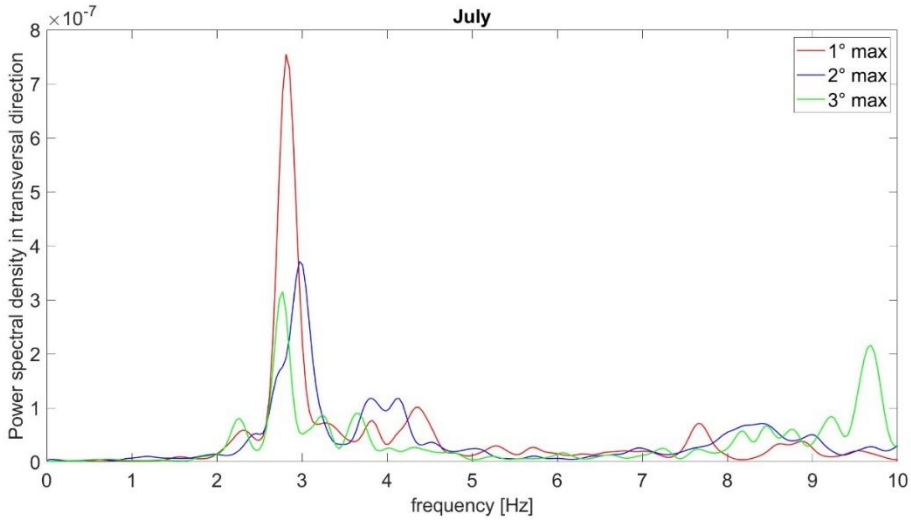


Figure 5-82: Results obtained from the 3 accelerograms with maximum SD in time domain

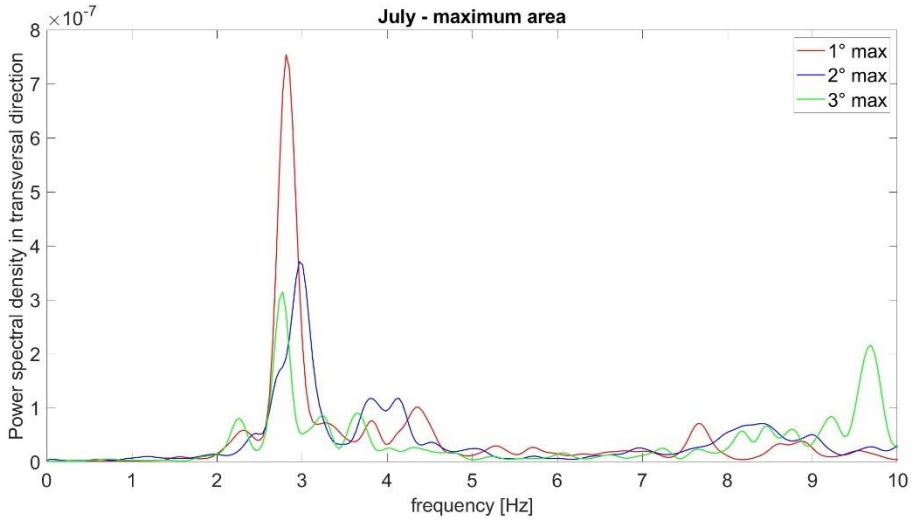


Figure 5-83: Results obtained from the 3 accelerograms with maximum area of PSD

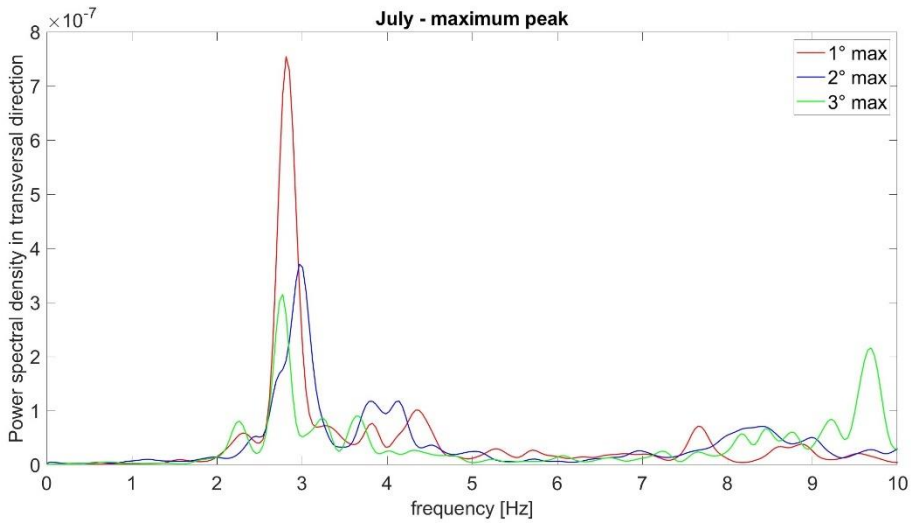


Figure 5-84: Results obtained from the 3 accelerograms with highest peak if PSD

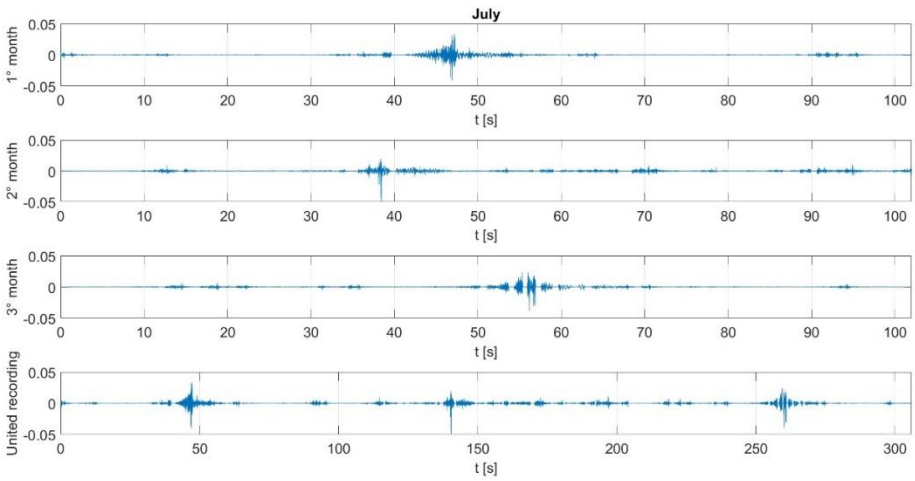


Figure 5-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

5.8 August

The results obtained for the August dataset are shown in the following tables.

Table 5-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-08-07_14-00-21	1.42E-04
	2°	2C1EA_2023-08-29_08-00-21	1.24E-04
	3°	2C1EA_2023-08-02_08-00-21	1.00E-04
Longitudinal direction (y)	1°	2C1EA_2023-08-07_14-00-21	8.14E-04
	2°	2C1EA_2023-08-02_08-00-21	7.11E-04
	3°	2C1EA_2023-08-17_08-00-21	6.10E-04
Transverse direction (z)	1°	2C1EA_2023-08-29_08-00-21	6.72E-04
	2°	2C1EA_2023-08-07_14-00-21	5.93E-04
	3°	2C1EA_2023-08-02_08-00-21	4.52E-04

Table 5-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-08-07_14-00-21	2.16E-08	2C1EA_2023-08-07_14-00-21	3.00E-09
2	2C1EA_2023-08-29_08-00-21	1.49E-08	2C1EA_2023-08-29_08-00-21	2.27E-09
3	2C1EA_2023-08-25_14-00-20	6.89E-09	2C1EA_2023-08-02_08-00-21	1.48E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-08-07_14-00-21	7.44E-07	2C1EA_2023-08-07_14-00-21	1.33E-07
2	2C1EA_2023-08-29_08-00-21	3.90E-07	2C1EA_2023-08-02_08-00-21	1.03E-07
3	2C1EA_2023-08-02_08-00-21	2.74E-07	2C1EA_2023-08-17_08-00-21	8.99E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-08-07_14-00-21	4.00E-07	2C1EA_2023-08-29_08-00-21	8.75E-08
2	2C1EA_2023-08-29_08-00-21	1.95E-07	2C1EA_2023-08-07_14-00-21	7.20E-08
3	2C1EA_2023-08-30_08-00-22	1.38E-07	2C1EA_2023-08-02_08-00-21	4.32E-08

Table 5-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	B	A	B
2	B	B	B	C	-	C	A	B	A
3	C	-	C	-	C	-	C	-	C

5.8.1 Vertical direction (x)

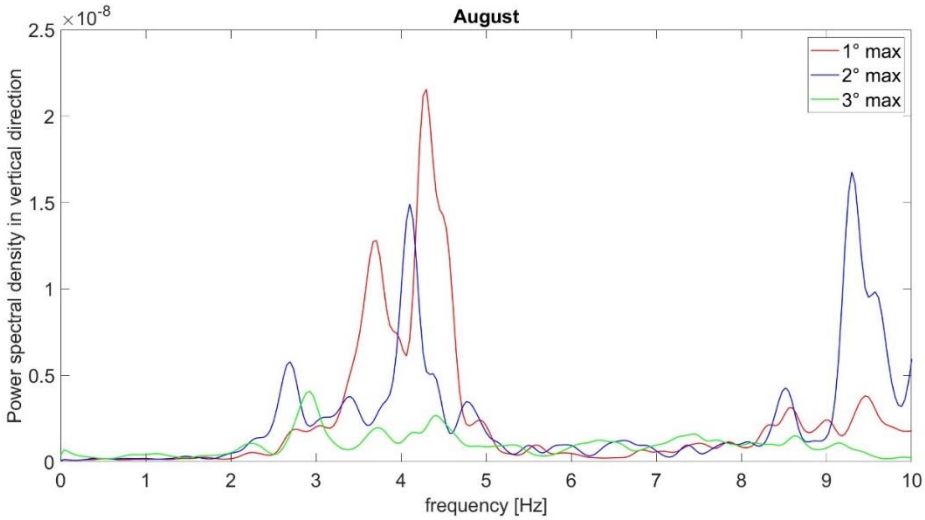


Figure 5-86: Results obtained from the 3 accelerograms with maximum SD in time domain

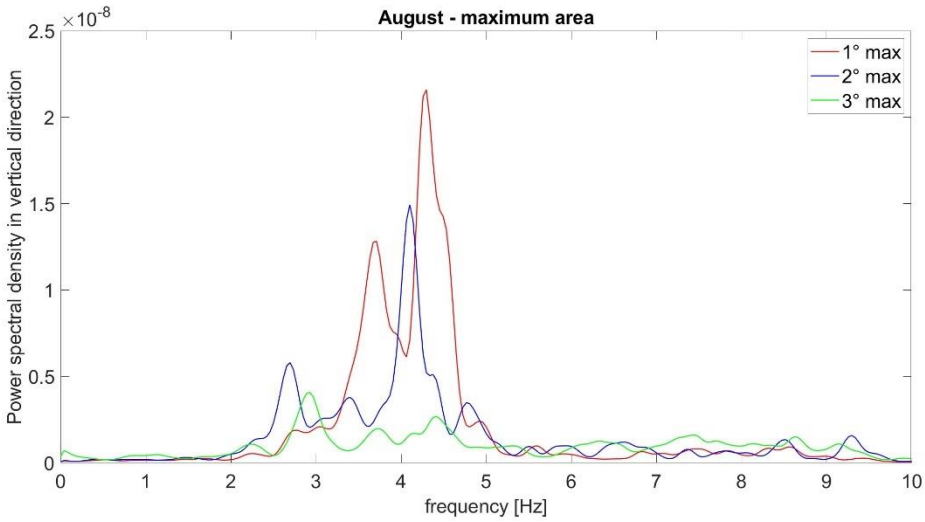


Figure 5-87: Results obtained from the 3 accelerograms with maximum area of PSD

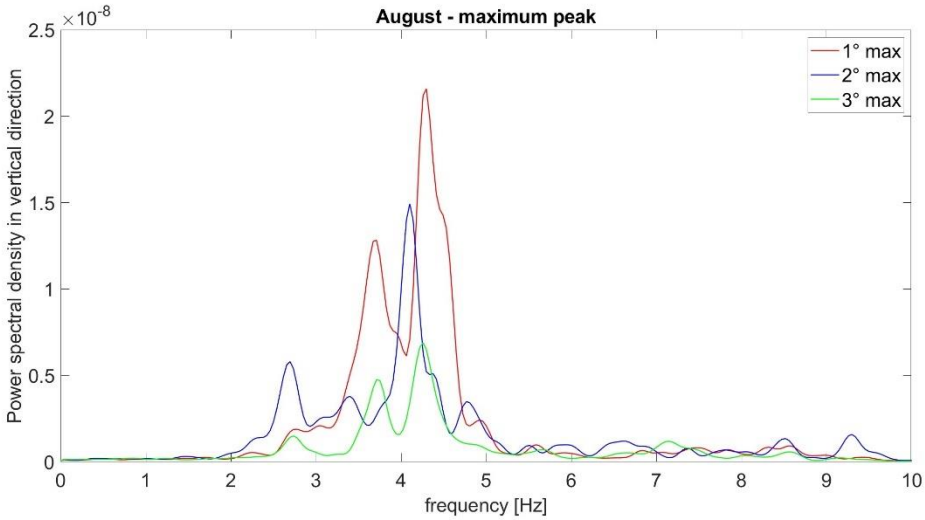


Figure 5-88: Results obtained from the 3 accelerograms with highest peak if PSD

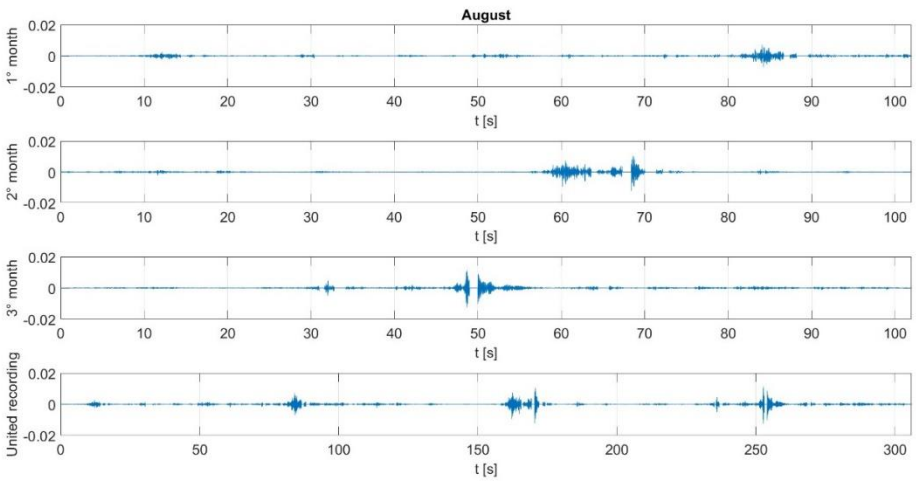


Figure 5-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.8.2 Longitudinal direction (y)

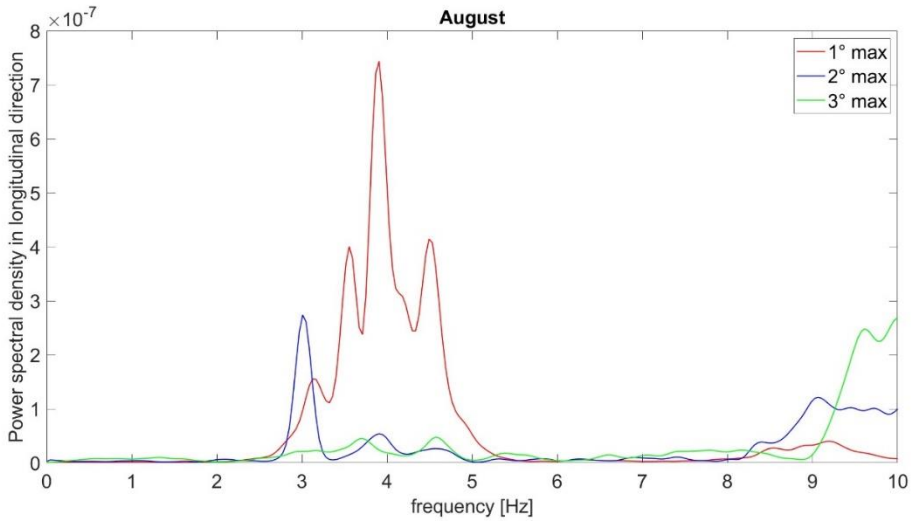


Figure 5-90: Results obtained from the 3 accelerograms with maximum SD in time domain

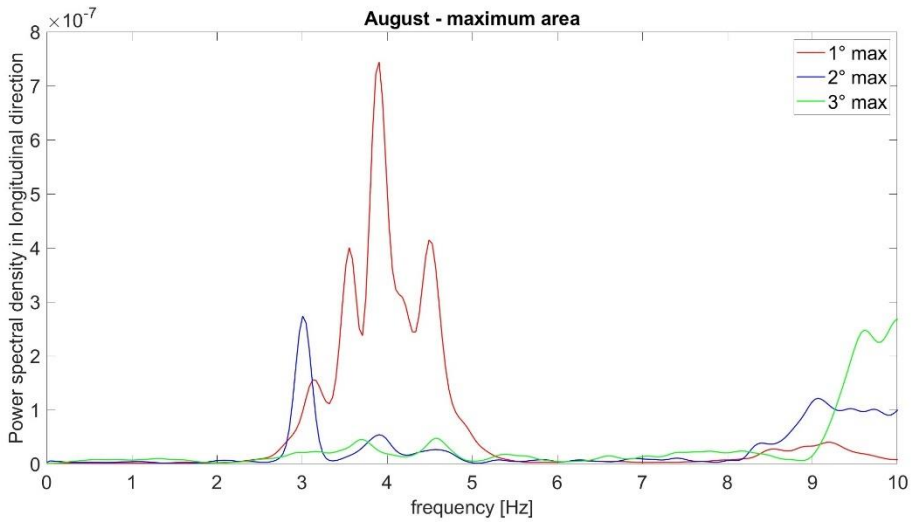


Figure 5-91: Results obtained from the 3 accelerograms with maximum area of PSD

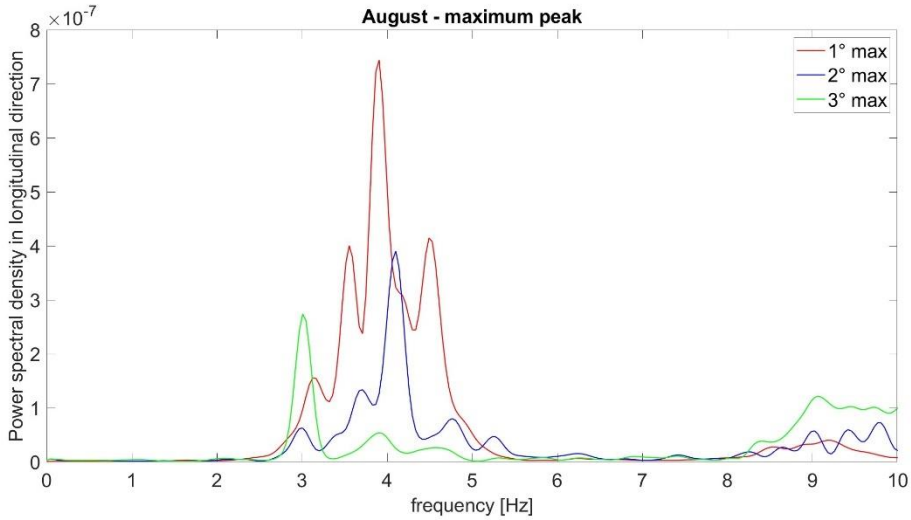


Figure 5-92: Results obtained from the 3 accelerograms with highest peak if PSD

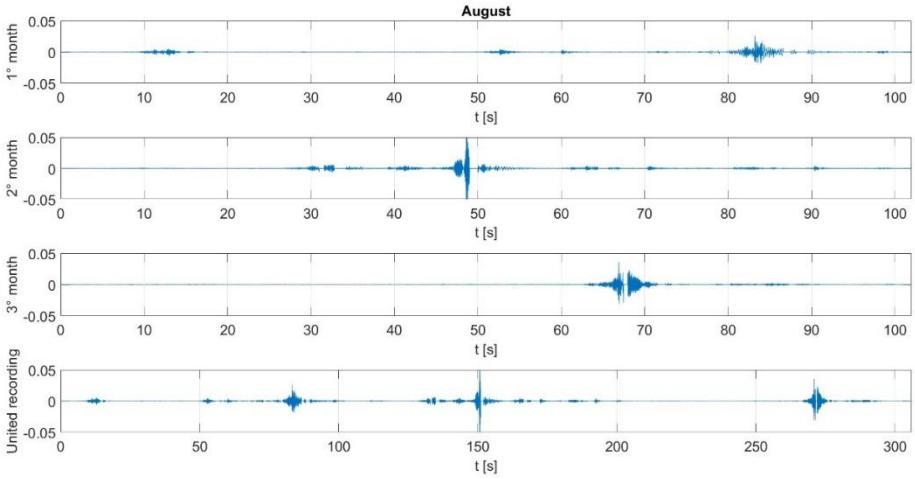


Figure 5-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

5.8.3 Transverse direction (z)

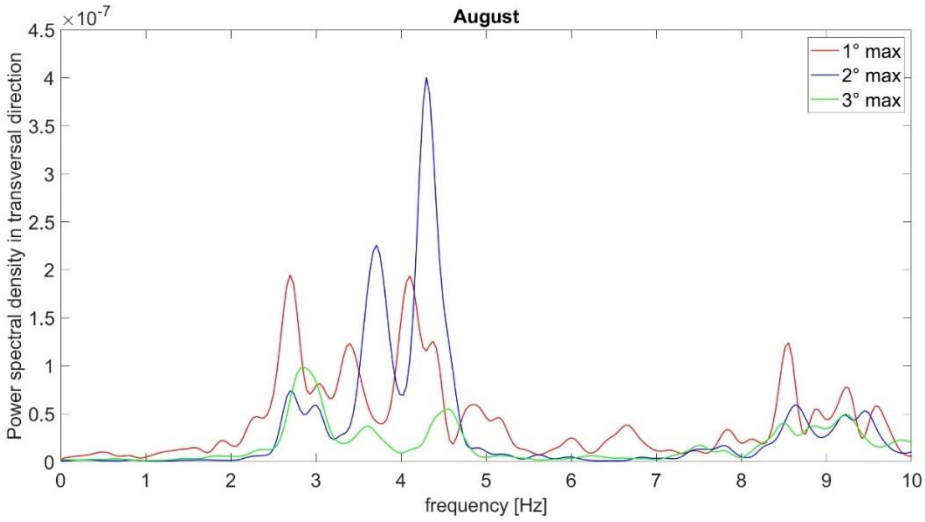


Figure 5-94: Results obtained from the 3 accelerograms with maximum SD in time domain

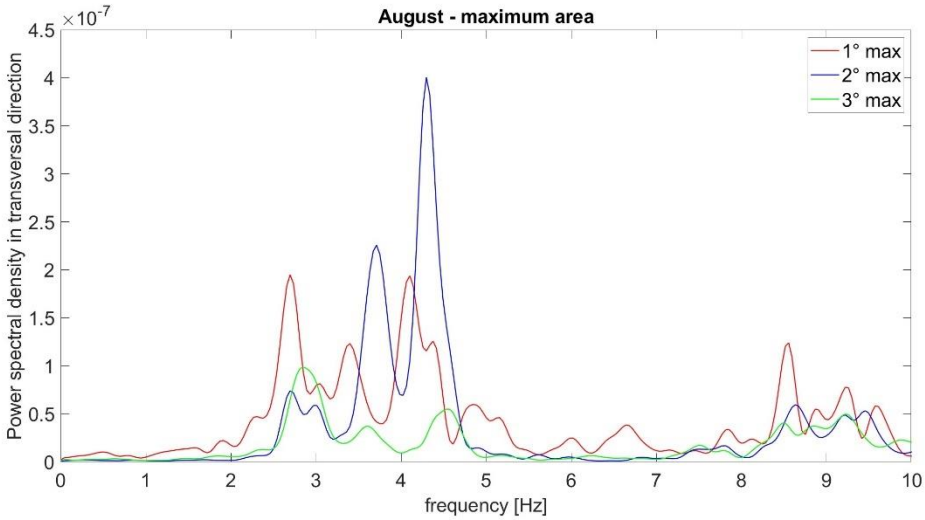


Figure 5-95: Results obtained from the 3 accelerograms with maximum area of PSD

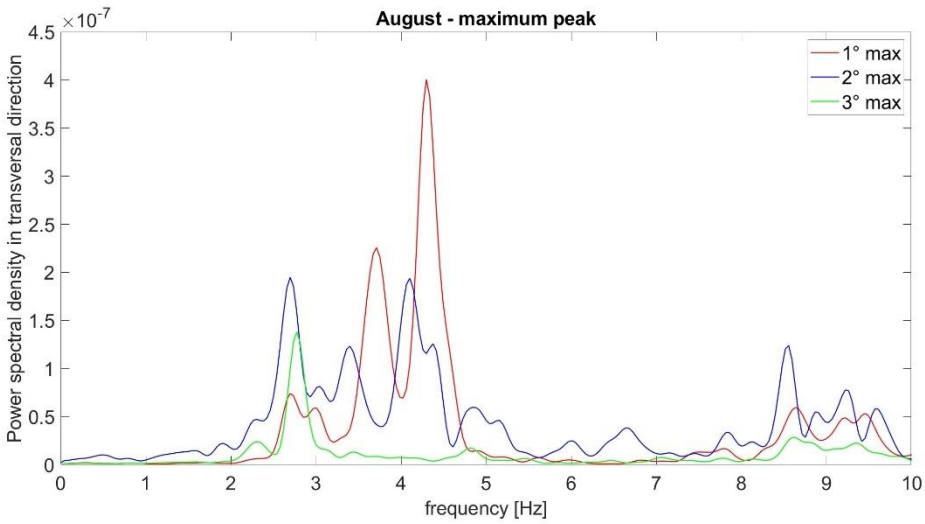


Figure 5-96: Results obtained from the 3 accelerograms with highest peak if PSD

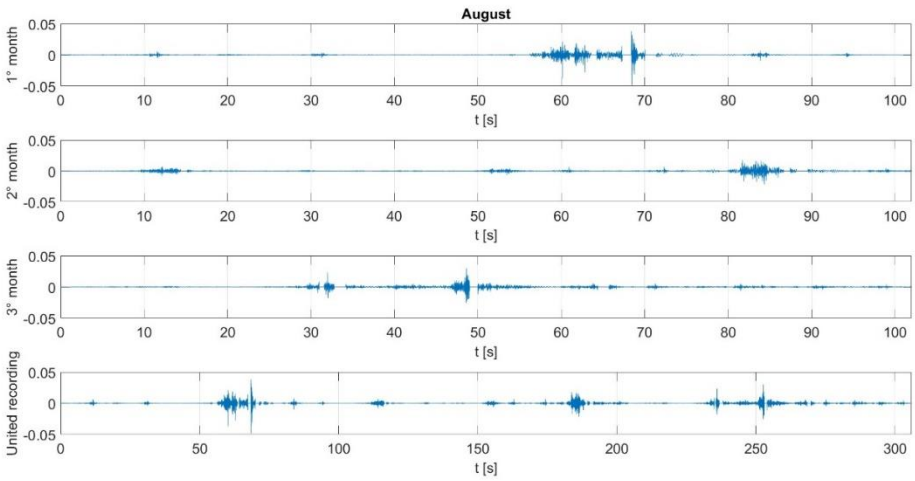


Figure 5-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

5.9 September

The results obtained for the September dataset are shown in the following tables.

Table 5-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-09-26_15-00-21	3.06E-04
	2°	2C1EA_2023-09-14_11-00-21	1.80E-04
	3°	2C1EA_2023-09-20_11-00-21	1.78E-04
Longitudinal direction (y)	1°	2C1EA_2023-09-26_09-00-20	1.84E-03
	2°	2C1EA_2023-09-14_11-00-21	1.50E-03
	3°	2C1EA_2023-09-26_15-00-21	1.29E-03
Transverse direction (z)	1°	2C1EA_2023-09-26_15-00-21	1.56E-03
	2°	2C1EA_2023-09-14_11-00-21	1.02E-03
	3°	2C1EA_2023-09-20_11-00-21	9.38E-04

Table 5-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-09-26_15-00-21	1.75E-07	2C1EA_2023-09-26_15-00-21	1.37E-08
2	2C1EA_2023-09-20_11-00-21	3.74E-08	2C1EA_2023-09-14_11-00-21	5.05E-09
3	2C1EA_2023-09-26_09-00-20	3.30E-08	2C1EA_2023-09-20_11-00-21	4.86E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-09-26_09-00-20	9.51E-06	2C1EA_2023-09-26_09-00-20	6.87E-07
2	2C1EA_2023-09-14_11-00-21	5.72E-06	2C1EA_2023-09-14_11-00-21	4.46E-07
3	2C1EA_2023-09-15_11-00-20	1.46E-06	2C1EA_2023-09-26_15-00-21	3.27E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-09-26_15-00-21	5.86E-06	2C1EA_2023-09-26_15-00-21	4.88E-07
2	2C1EA_2023-09-20_11-00-21	1.67E-06	2C1EA_2023-09-14_11-00-21	2.20E-07
3	2C1EA_2023-09-14_11-00-21	9.80E-07	2C1EA_2023-09-20_11-00-21	1.85E-07

Table 5-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	A	A	A
2	B	C	B	B	B	B	B	C	B
3	C	-	C	E	-	E	C	B	C

5.9.1 Vertical direction (x)

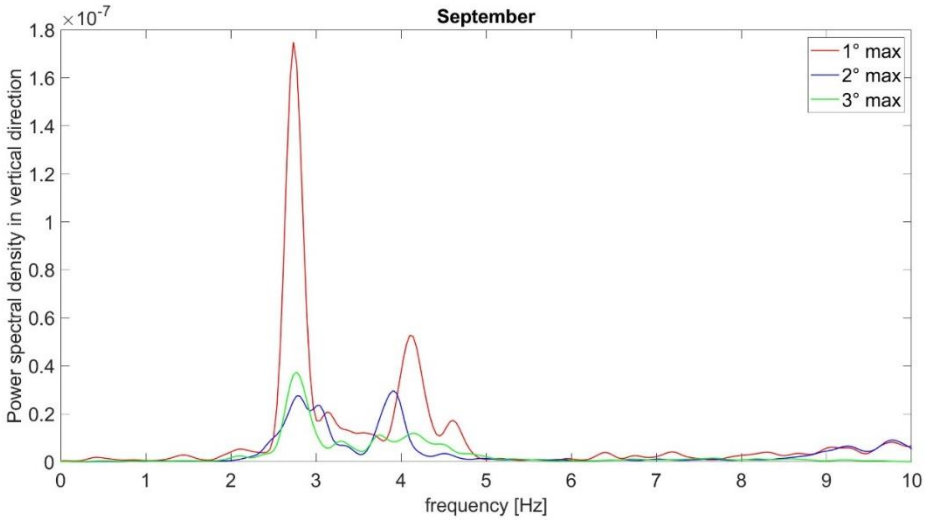


Figure 5-98: Results obtained from the 3 accelerograms with maximum SD in time domain

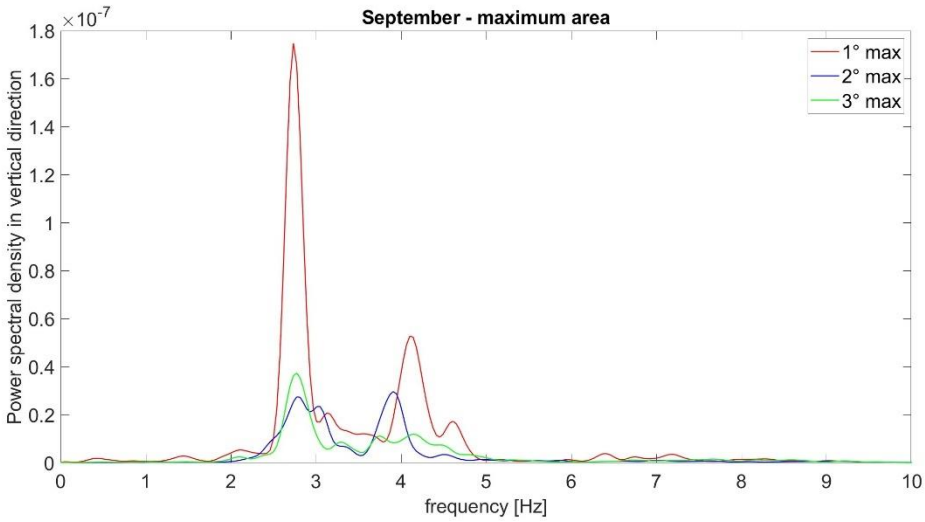


Figure 5-99: Results obtained from the 3 accelerograms with maximum area of PSD

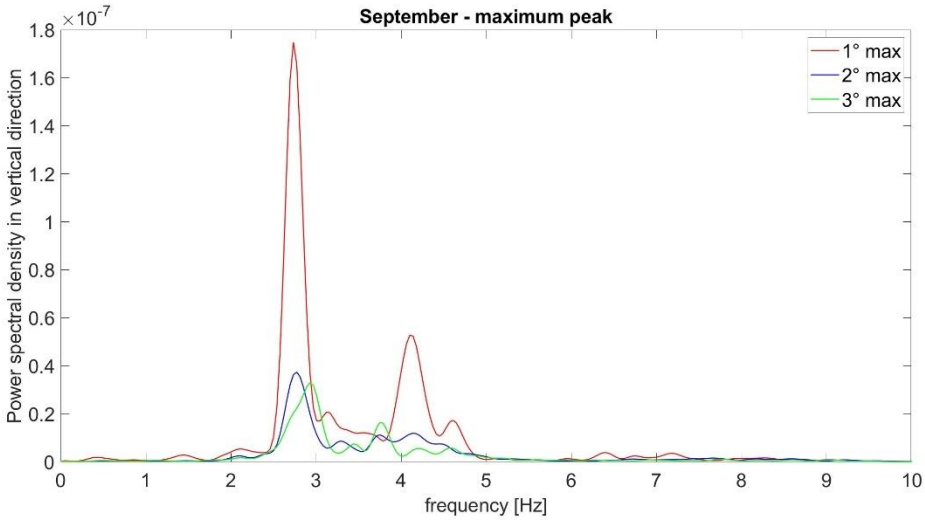


Figure 5-100: Results obtained from the 3 accelerograms with highest peak if PSD

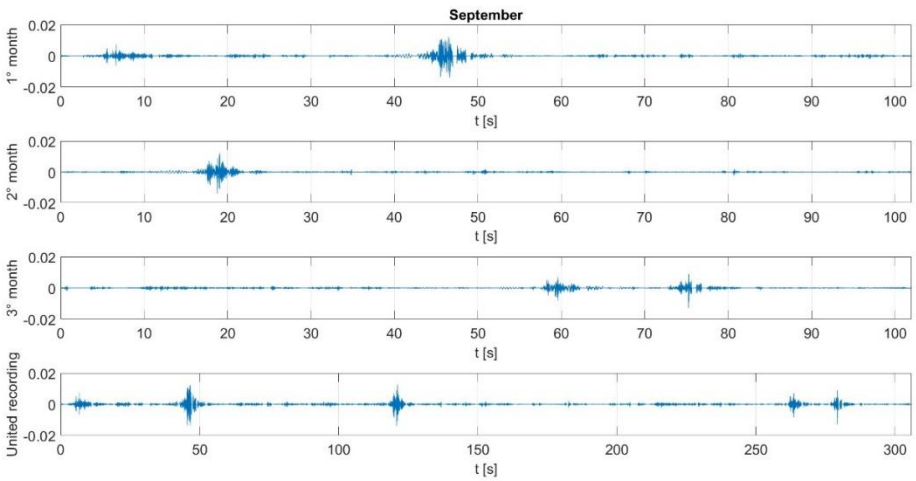


Figure 5-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.9.2 Longitudinal direction (y)

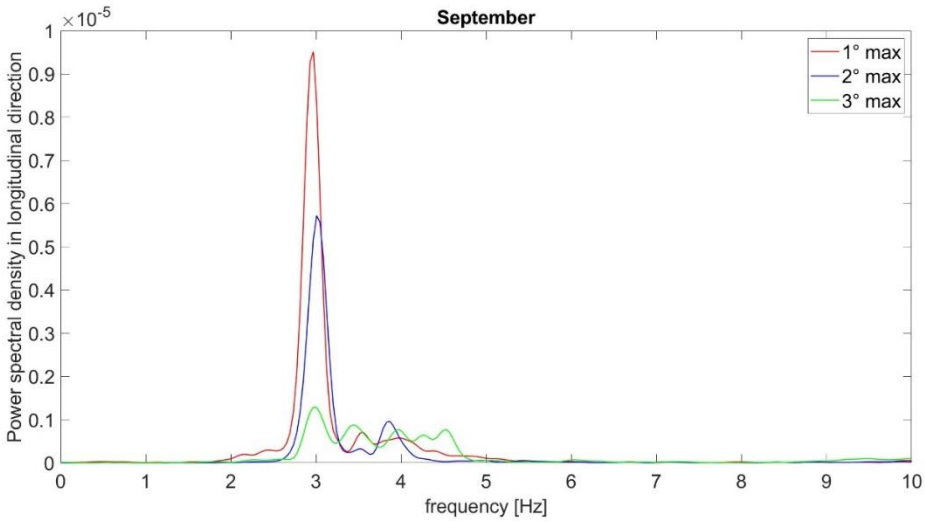


Figure 5-102: Results obtained from the 3 accelerograms with maximum SD in time domain

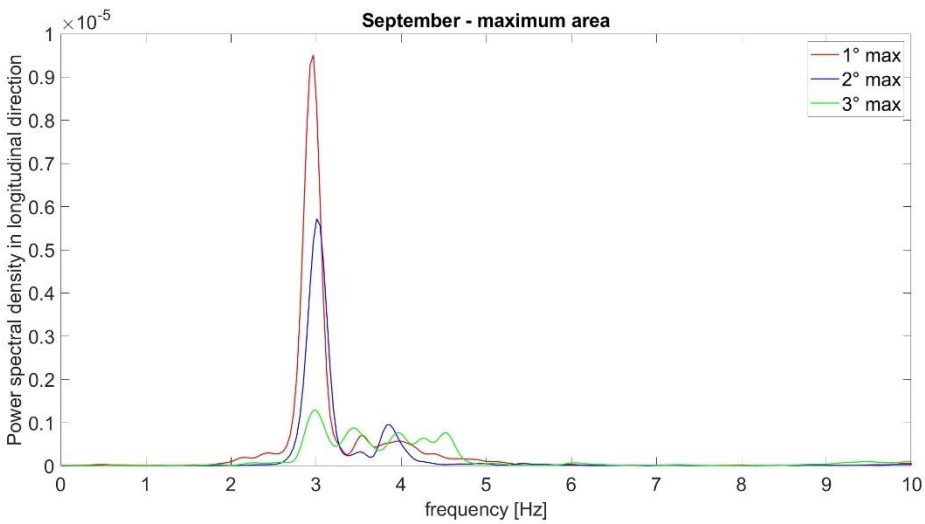


Figure 5-103: Results obtained from the 3 accelerograms with maximum area of PSD

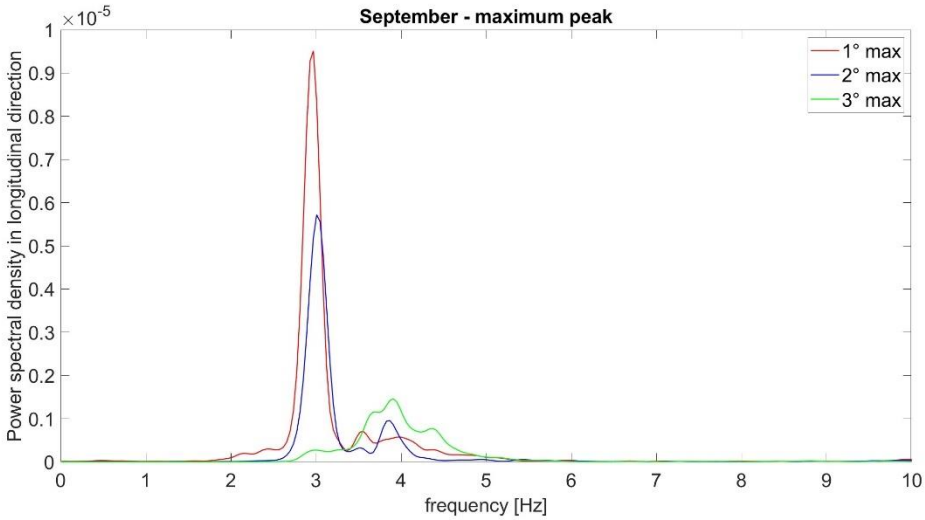


Figure 5-104: Results obtained from the 3 accelerograms with highest peak if PSD

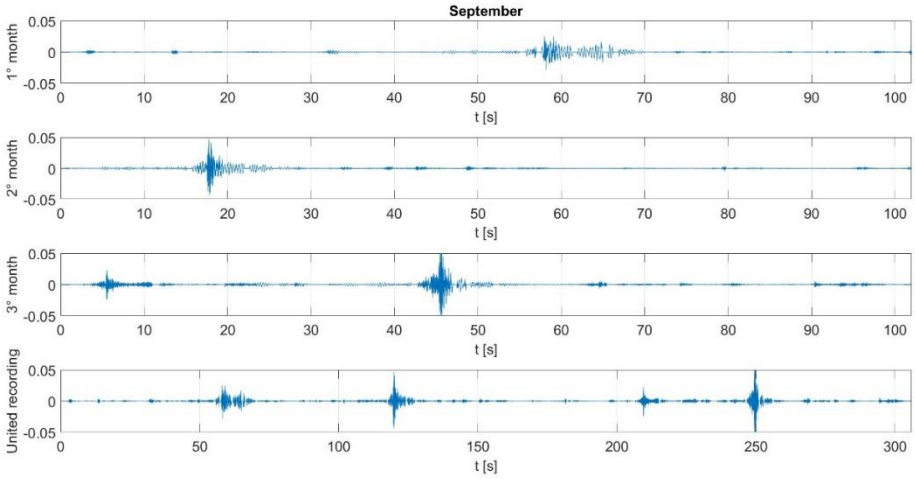


Figure 5-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

5.9.3 Transverse direction (z)

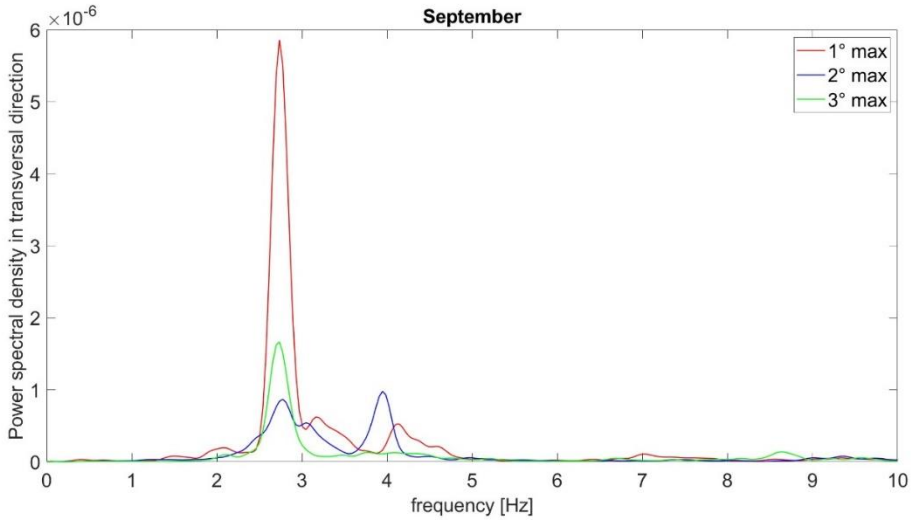


Figure 5-106: Results obtained from the 3 accelerograms with maximum SD in time domain

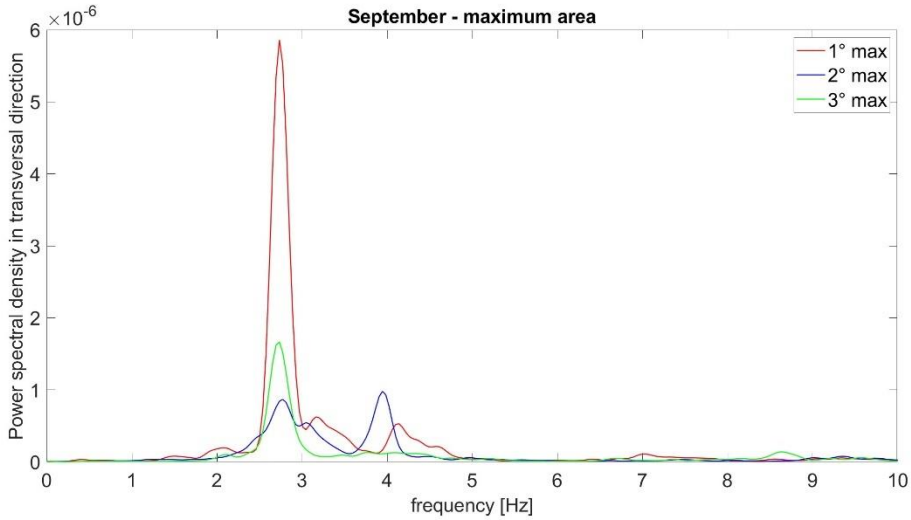


Figure 5-107: Results obtained from the 3 accelerograms with maximum area of PSD

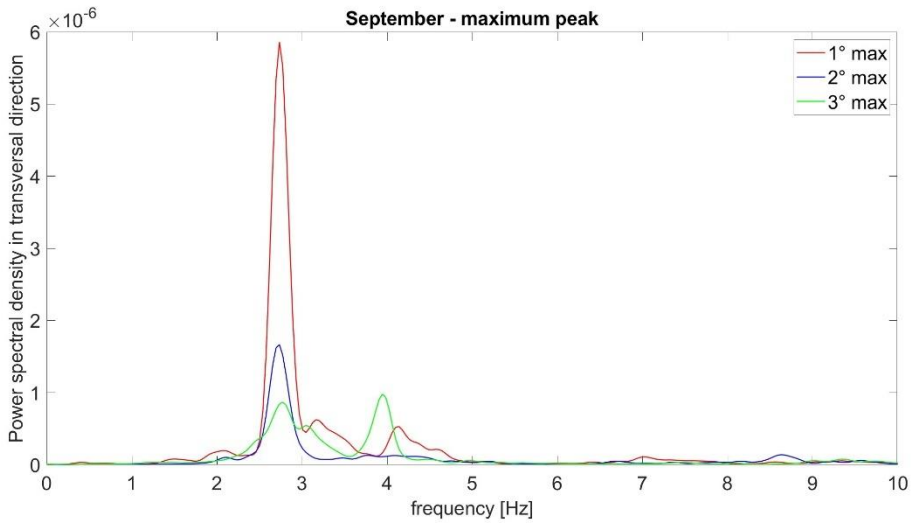


Figure 5-108: Results obtained from the 3 accelerograms with highest peak if PSD

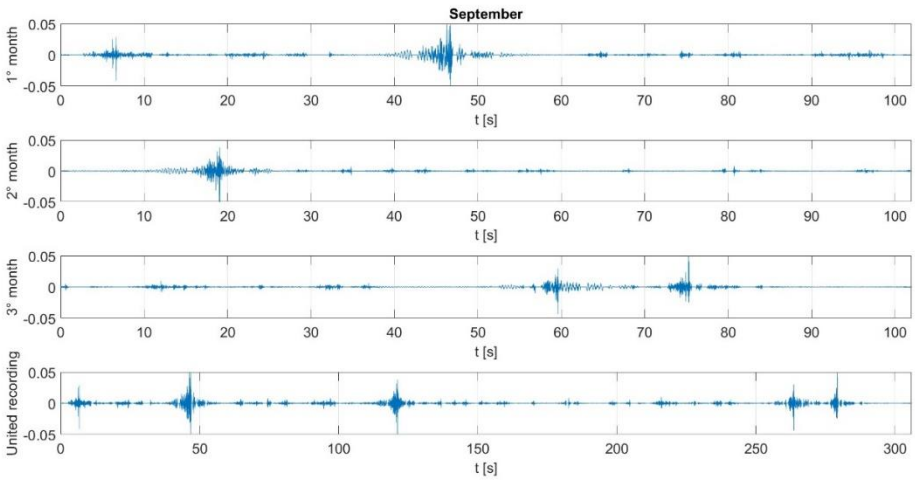


Figure 5-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

5.10 October

The results obtained for the October dataset are shown in the following tables.

Table 5-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-10-02_08-00-21	1.95E-04
	2°	2C1EA_2023-10-19_12-00-20	1.54E-04
	3°	2C1EA_2023-10-07_08-00-20	1.36E-04
Longitudinal direction (y)	1°	2C1EA_2023-10-19_12-00-20	1.47E-03
	2°	2C1EA_2023-10-02_08-00-21	1.22E-03
	3°	2C1EA_2023-10-10_12-00-21	8.65E-04
Transverse direction (z)	1°	2C1EA_2023-10-02_08-00-21	8.36E-04
	2°	2C1EA_2023-10-19_12-00-20	7.08E-04
	3°	2C1EA_2023-10-07_08-00-20	6.81E-04

Table 5-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-10-19_12-00-20	4.24E-08	2C1EA_2023-10-02_08-00-21	5.36E-09
2	2C1EA_2023-10-02_08-00-21	4.19E-08	2C1EA_2023-10-19_12-00-20	3.65E-09
3	2C1EA_2023-10-07_08-00-20	1.90E-08	2C1EA_2023-10-07_08-00-20	2.69E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-10-19_12-00-20	6.67E-06	2C1EA_2023-10-19_12-00-20	4.58E-07
2	2C1EA_2023-10-02_08-00-21	1.39E-06	2C1EA_2023-10-02_08-00-21	2.66E-07
3	2C1EA_2023-10-07_08-00-20	7.72E-07	2C1EA_2023-10-10_12-00-21	1.38E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-10-19_12-00-20	7.91E-07	2C1EA_2023-10-02_08-00-21	1.34E-07
2	2C1EA_2023-10-02_08-00-21	6.32E-07	2C1EA_2023-10-19_12-00-20	1.05E-07
3	2C1EA_2023-10-18_15-00-21	3.89E-07	2C1EA_2023-10-07_08-00-20	8.19E-08

Table 5-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	B	B	B	A	B	A
2	B	A	B	A	A	A	B	A	B
3	C	C	C	D	-	D	C	-	C

5.10.1 Vertical direction (x)

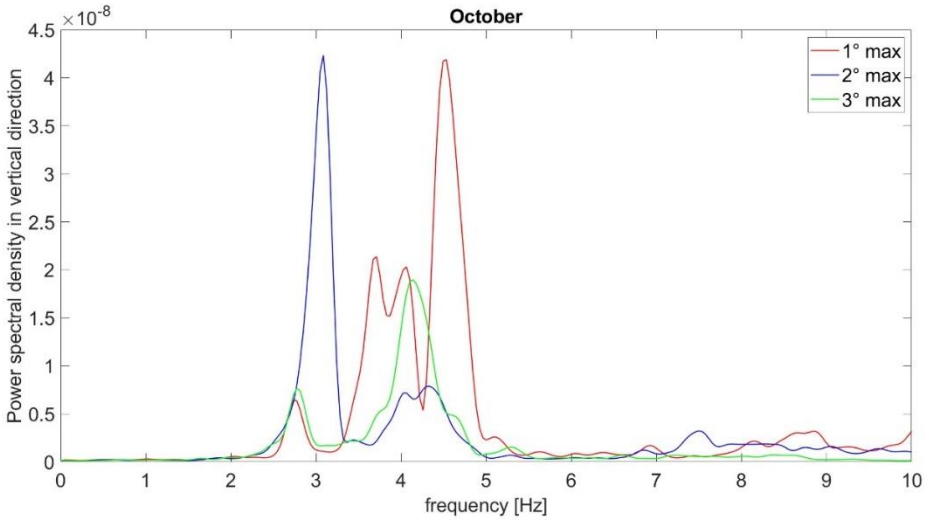


Figure 5-110: Results obtained from the 3 accelerograms with maximum SD in time domain

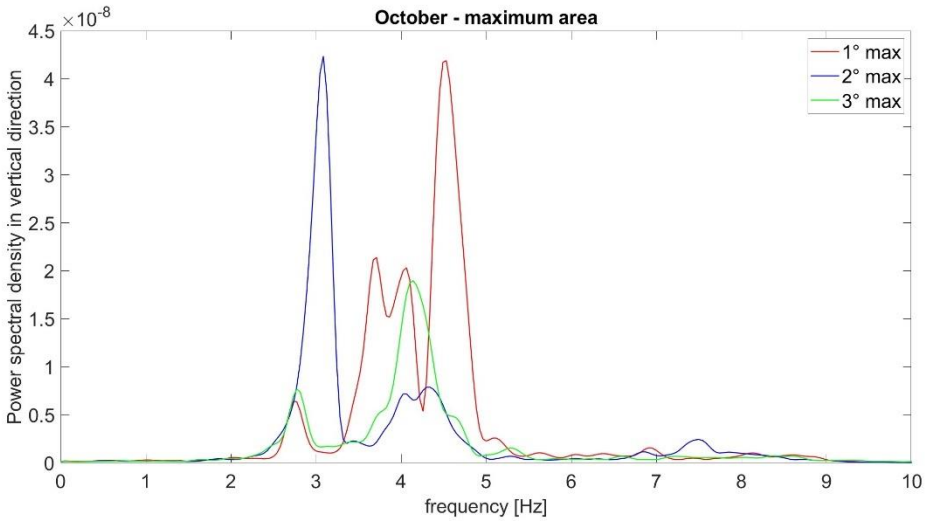


Figure 5-111: Results obtained from the 3 accelerograms with maximum area of PSD

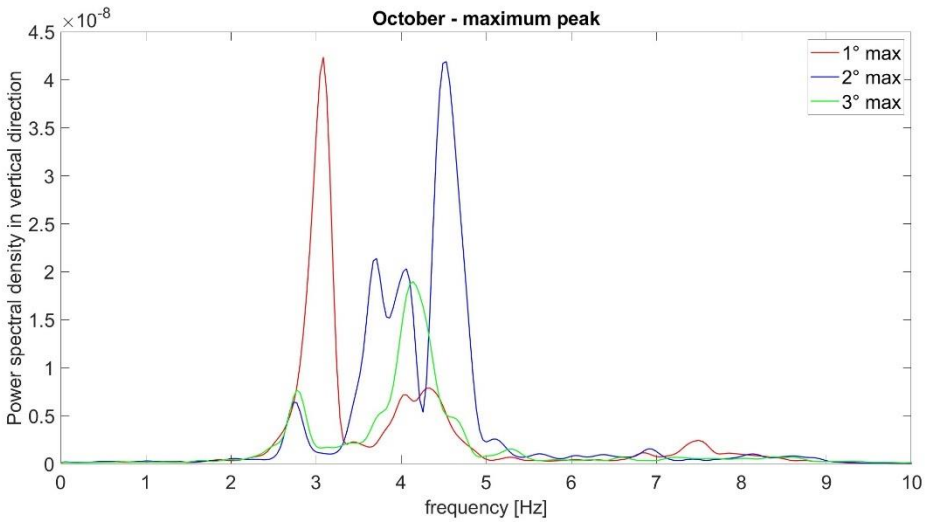


Figure 5-112: Results obtained from the 3 accelerograms with highest peak if PSD

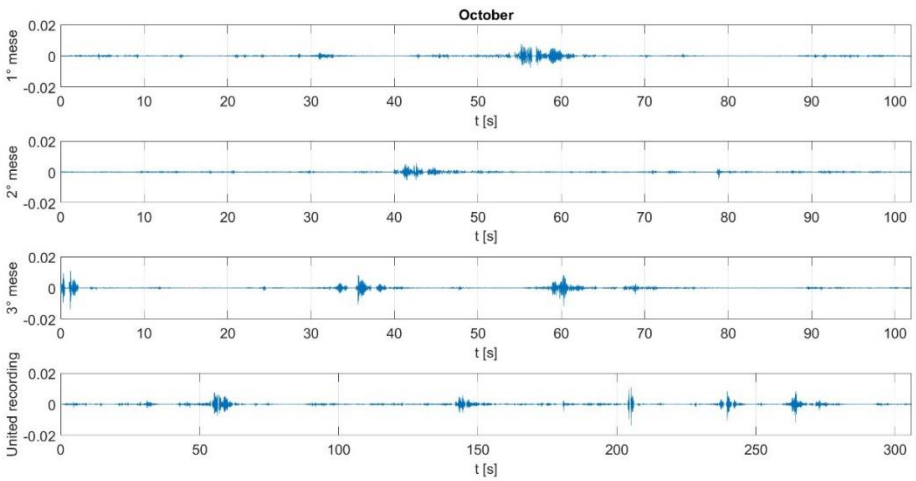


Figure 5-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.10.2 Longitudinal direction (y)

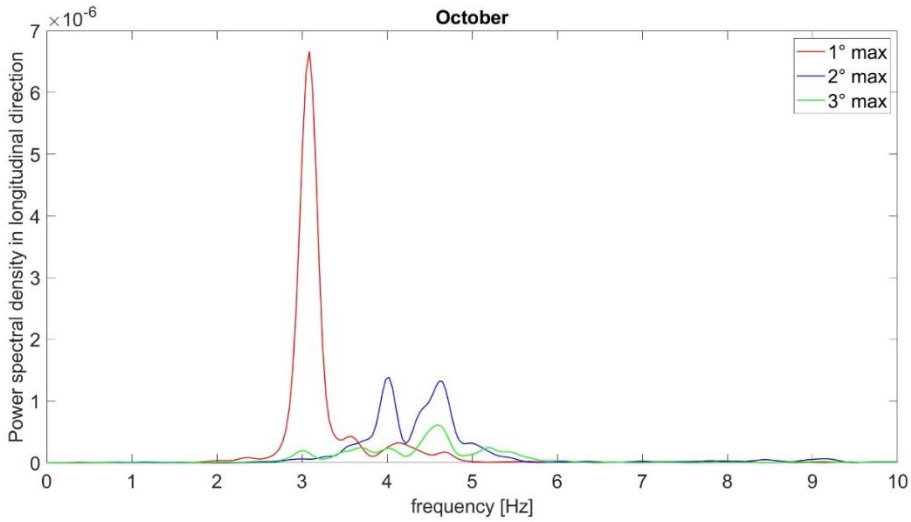


Figure 5-114: Results obtained from the 3 accelerograms with maximum SD in time domain

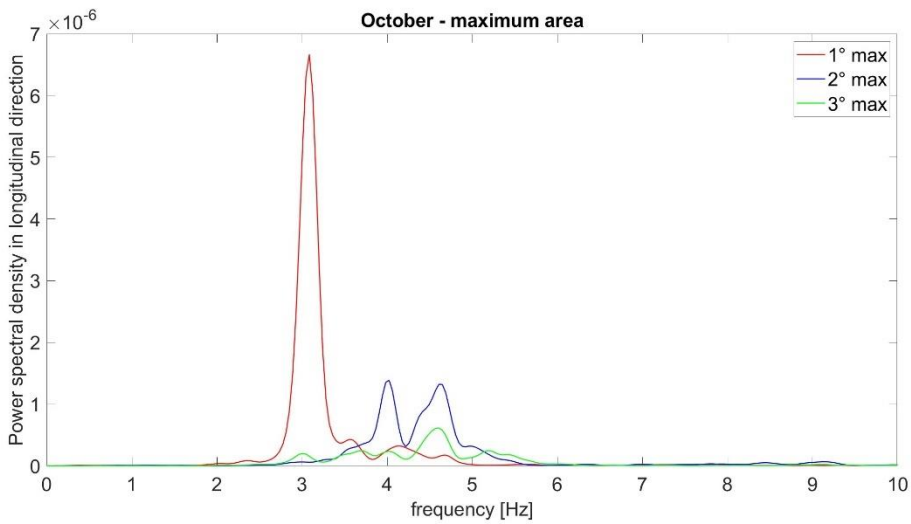


Figure 5-115: Results obtained from the 3 accelerograms with maximum area of PSD

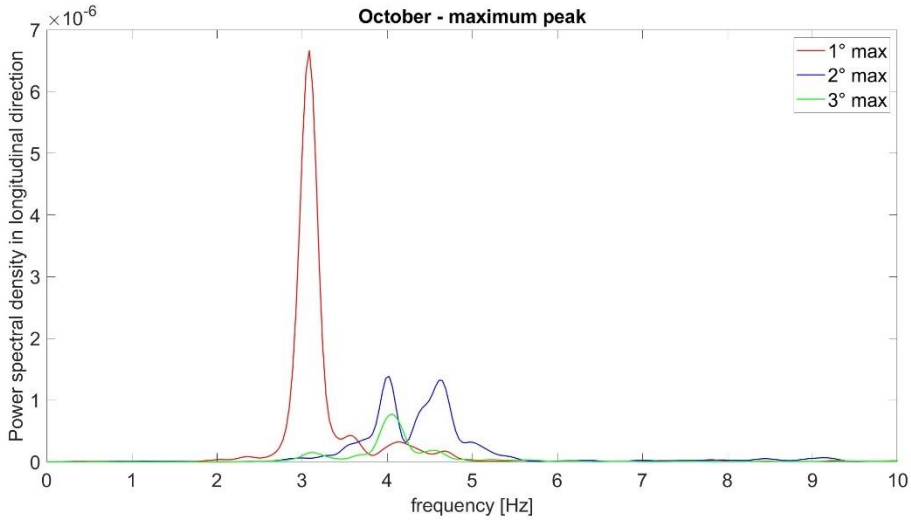


Figure 5-116: Results obtained from the 3 accelerograms with highest peak if PSD

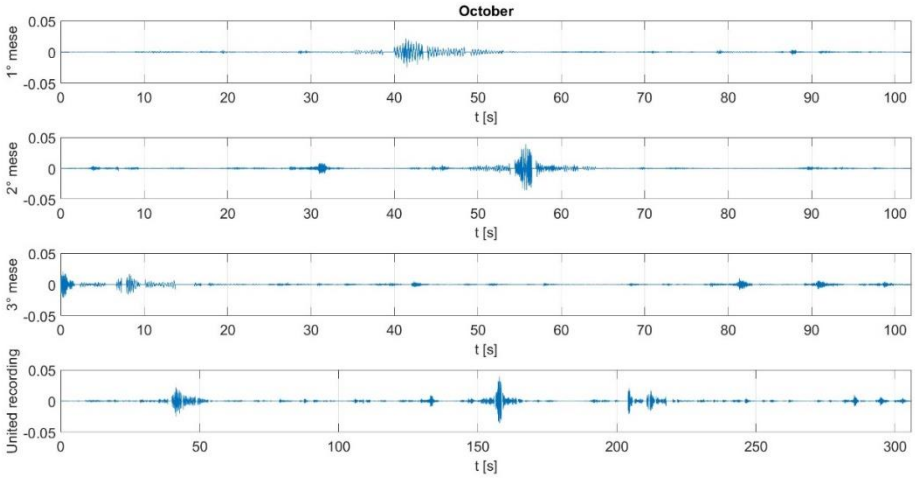


Figure 5-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

5.10.3 Transverse direction (z)

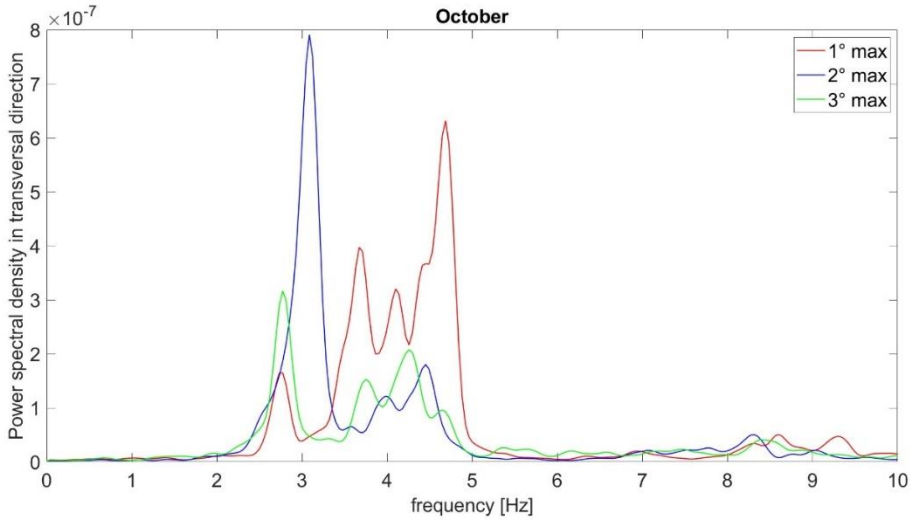


Figure 5-118: Results obtained from the 3 accelerograms with maximum SD in time domain

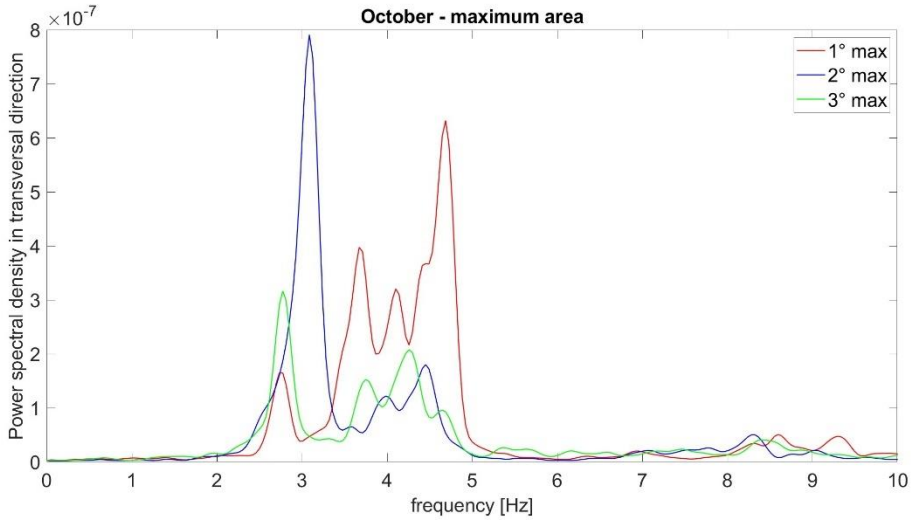


Figure 5-119: Results obtained from the 3 accelerograms with maximum area of PSD

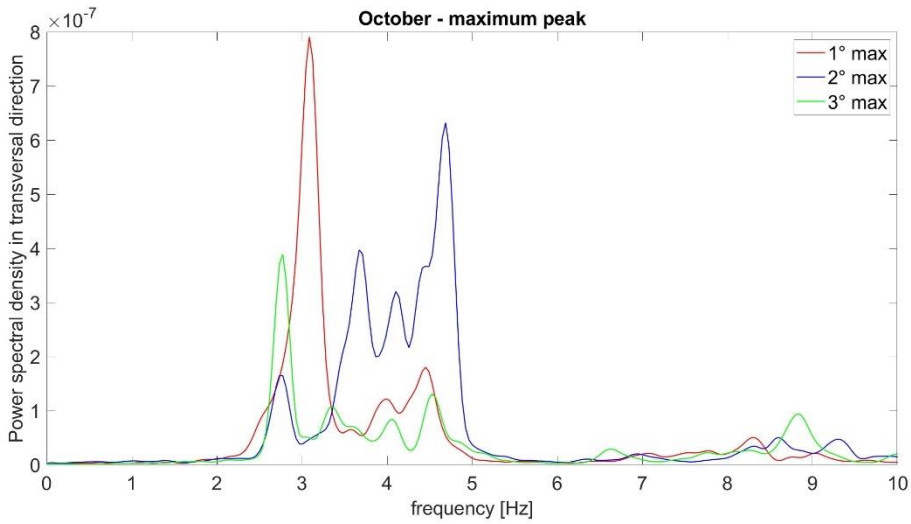


Figure 5-120: Results obtained from the 3 accelerograms with highest peak if PSD

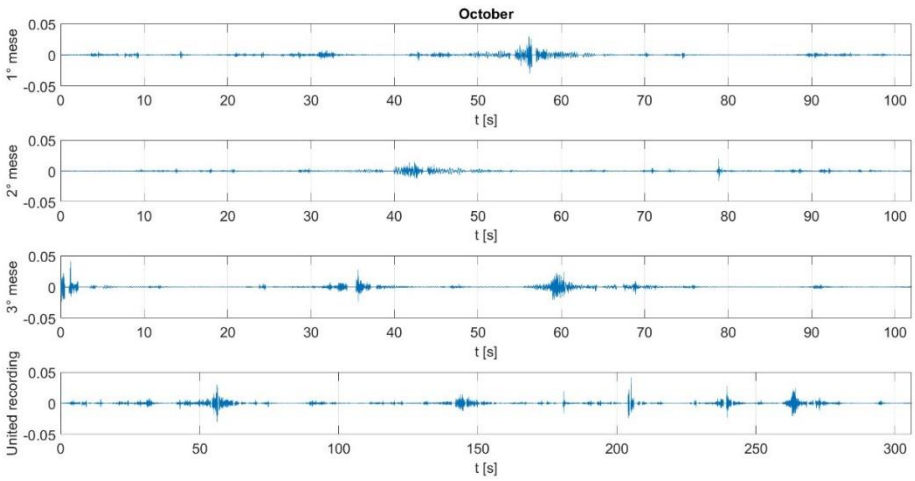


Figure 5-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

5.11 November

The results obtained for the November dataset are shown in the following tables.

Table 5-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-11-07_17-00-21	2.37E-04
	2°	2C1EA_2023-11-07_13-00-21	1.47E-04
	3°	2C1EA_2023-11-17_16-00-21	1.30E-04
Longitudinal direction (y)	1°	2C1EA_2023-11-07_17-00-21	1.30E-03
	2°	2C1EA_2023-11-06_17-00-20	7.21E-04
	3°	2C1EA_2023-11-07_16-00-20	7.05E-04
Transverse direction (z)	1°	2C1EA_2023-11-07_17-00-21	9.37E-04
	2°	2C1EA_2023-11-07_13-00-21	8.11E-04
	3°	2C1EA_2023-11-11_14-00-20	6.51E-04

Table 5-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-11-07_17-00-21	5.59E-08	2C1EA_2023-11-07_17-00-21	9.08E-09
2	2C1EA_2023-11-07_13-00-21	2.58E-08	2C1EA_2023-11-07_13-00-21	3.51E-09
3	2C1EA_2023-11-17_16-00-21	2.07E-08	2C1EA_2023-11-07_16-00-20	2.46E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-11-07_17-00-21	1.96E-06	2C1EA_2023-11-07_17-00-21	3.46E-07
2	2C1EA_2023-11-06_17-00-20	8.73E-07	2C1EA_2023-11-07_16-00-20	1.07E-07
3	2C1EA_2023-11-10_09-00-20	8.04E-07	2C1EA_2023-11-06_17-00-20	1.06E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-11-07_17-00-21	9.72E-07	2C1EA_2023-11-07_17-00-21	1.88E-07
2	2C1EA_2023-11-07_13-00-21	8.10E-07	2C1EA_2023-11-07_13-00-21	1.42E-07
3	2C1EA_2023-11-23_03-00-21	6.74E-07	2C1EA_2023-11-11_14-00-20	8.50E-08

Table 5-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	D	D	E	B	B	B
3	C	C	-	E	-	D	F	-	F

5.11.1 Vertical direction (x)

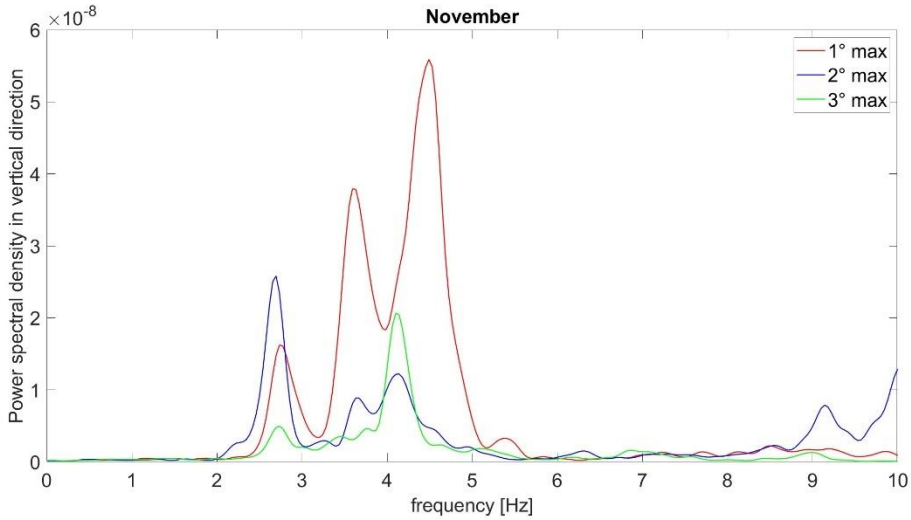


Figure 5-122: Results obtained from the 3 accelerograms with maximum SD in time domain

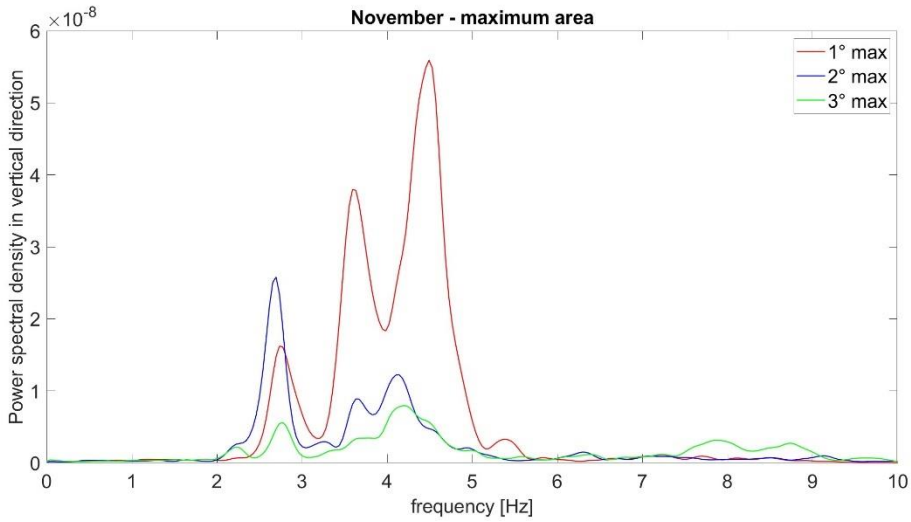


Figure 5-123: Results obtained from the 3 accelerograms with maximum area of PSD

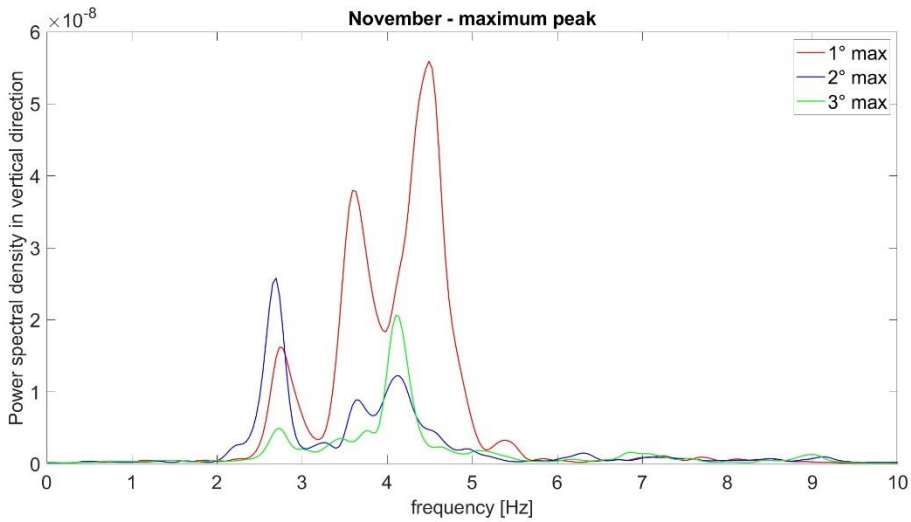


Figure 5-124: Results obtained from the 3 accelerograms with highest peak if PSD

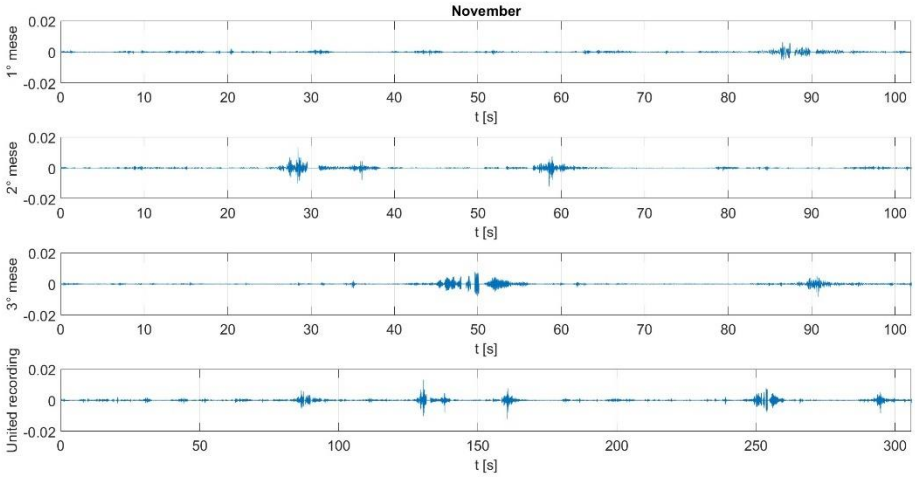


Figure 5-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.11.2 Longitudinal direction (y)

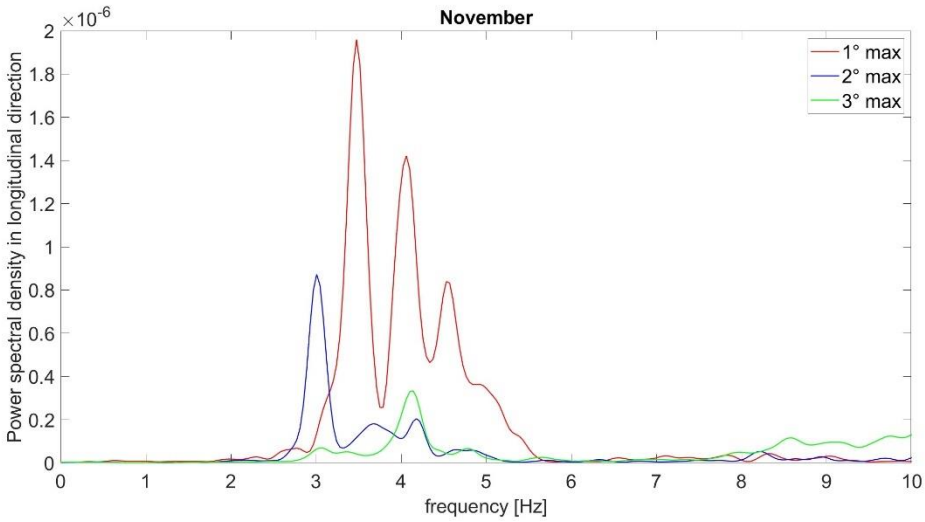


Figure 5-126: Results obtained from the 3 accelerograms with maximum SD in time domain

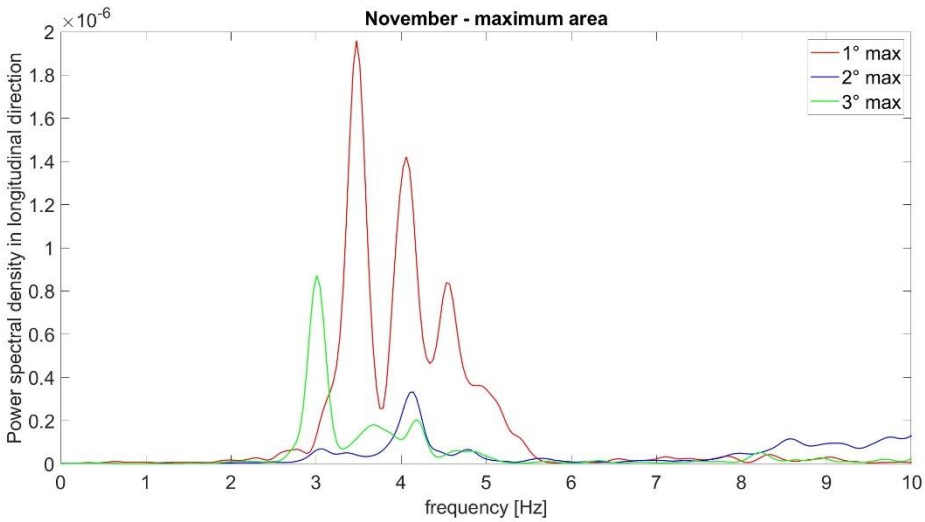


Figure 5-127: Results obtained from the 3 accelerograms with maximum area of PSD

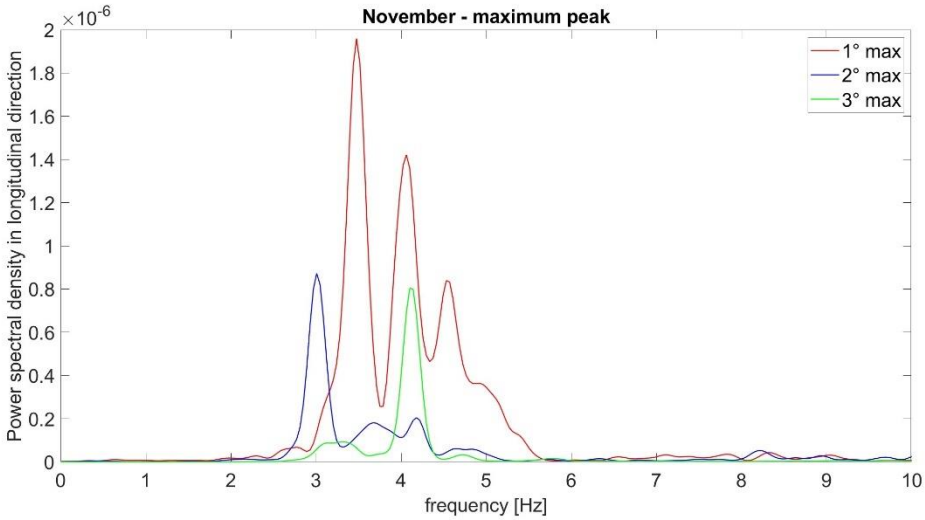


Figure 5-128: Results obtained from the 3 accelerograms with highest peak if PSD

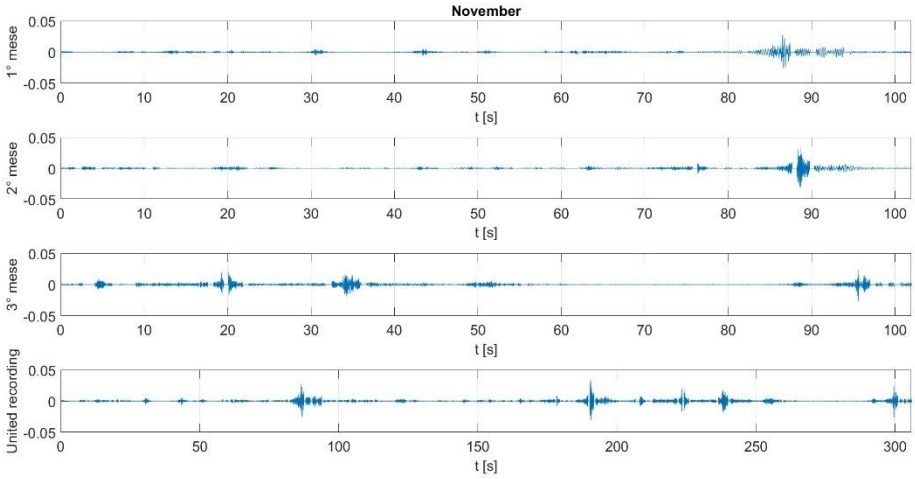


Figure 5-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

5.11.3 Transverse direction (z)

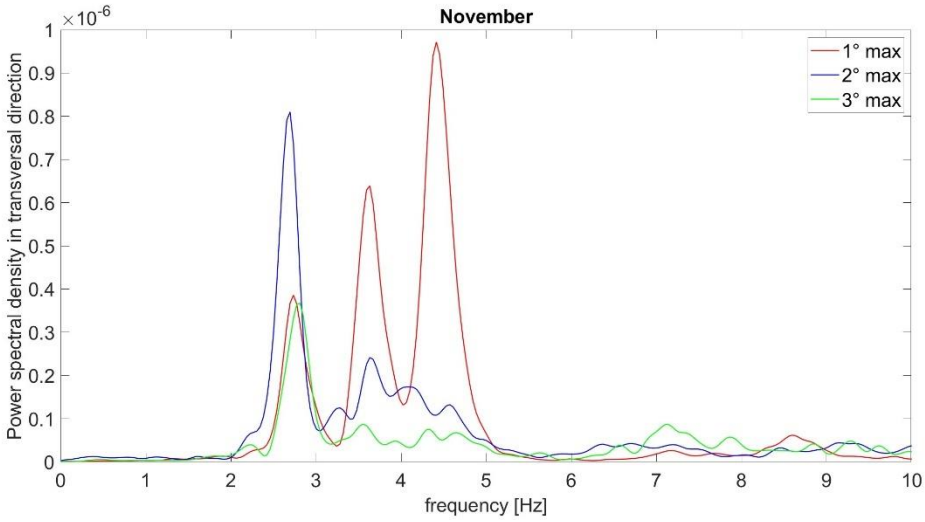


Figure 5-130: Results obtained from the 3 accelerograms with maximum SD in time domain

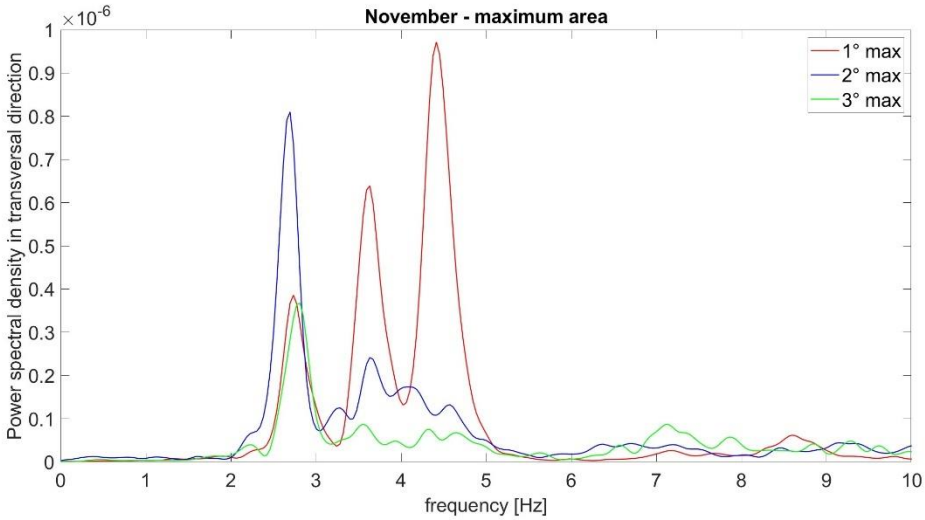


Figure 5-131: Results obtained from the 3 accelerograms with maximum area of PSD

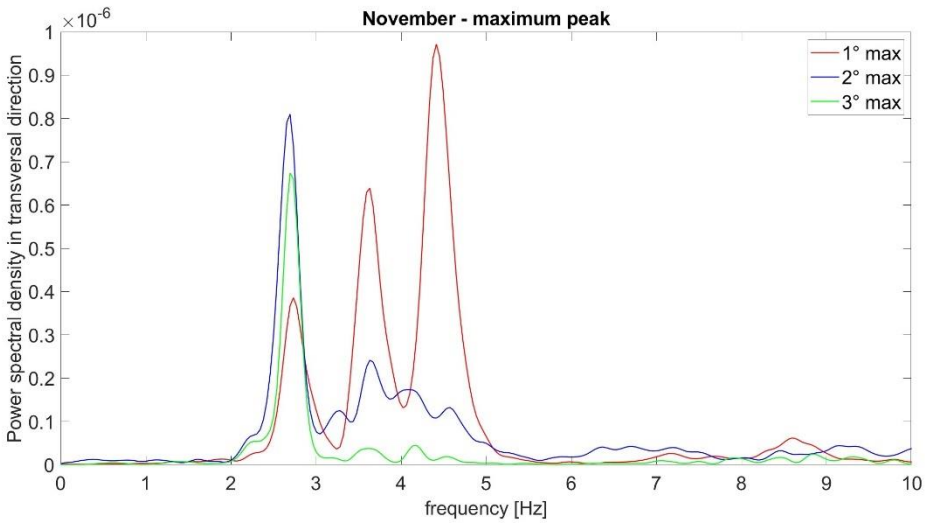


Figure 5-132: Results obtained from the 3 accelerograms with highest peak if PSD

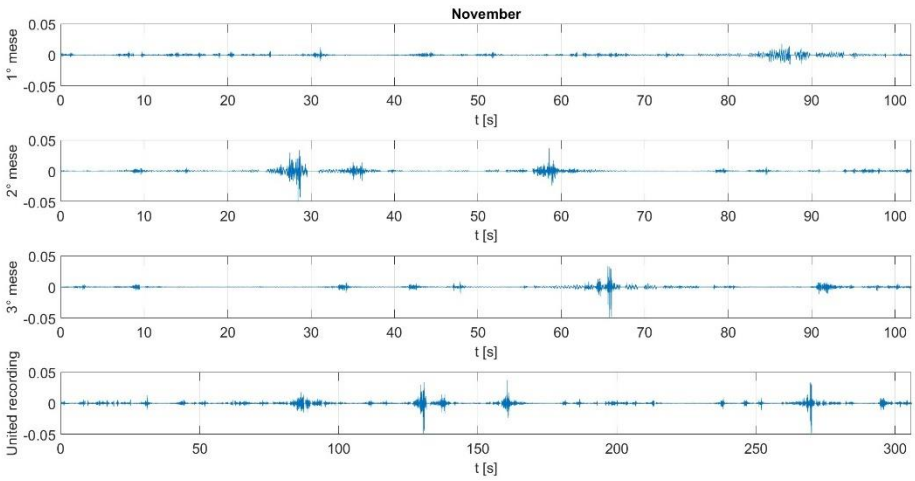


Figure 5-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

5.12 December

The results obtained for the December dataset are shown in the following tables.

Table 5-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2C1EA_2023-12-06_10-00-21	2.14E-04
	2°	2C1EA_2023-12-12_15-00-20	1.44E-04
	3°	2C1EA_2023-12-13_08-00-21	1.42E-04
Longitudinal direction (y)	1°	2C1EA_2023-12-06_10-00-21	1.33E-03
	2°	2C1EA_2023-12-04_12-00-20	8.78E-04
	3°	2C1EA_2023-12-13_08-00-21	8.56E-04
Transverse direction (z)	1°	2C1EA_2023-12-06_10-00-21	8.79E-04
	2°	2C1EA_2023-12-13_08-00-21	7.40E-04
	3°	2C1EA_2023-12-04_12-00-20	6.51E-04

Table 5-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-12-06_10-00-21	6.77E-08	2C1EA_2023-12-06_10-00-21	7.39E-09
2	2C1EA_2023-12-29_15-00-21	2.10E-08	2C1EA_2023-12-12_15-00-20	3.24E-09
3	2C1EA_2023-12-28_13-00-21	1.79E-08	2C1EA_2023-12-13_08-00-21	2.95E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-12-06_10-00-21	2.45E-06	2C1EA_2023-12-06_10-00-21	3.74E-07
2	2C1EA_2023-12-22_09-00-20	1.50E-06	2C1EA_2023-12-04_12-00-20	1.64E-07
3	2C1EA_2023-12-28_13-00-21	1.25E-06	2C1EA_2023-12-13_08-00-21	1.49E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2C1EA_2023-12-06_10-00-21	7.94E-07	2C1EA_2023-12-06_10-00-21	1.63E-07
2	2C1EA_2023-12-22_14-00-21	5.74E-07	2C1EA_2023-12-13_08-00-21	1.08E-07
3	2C1EA_2023-12-05_09-00-21	5.18E-07	2C1EA_2023-12-04_12-00-20	8.34E-08

Table 5-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	-	B	D	-	D	C	-	C
3	C	-	C	C	-	C	D	-	D

5.12.1 Vertical direction (x)

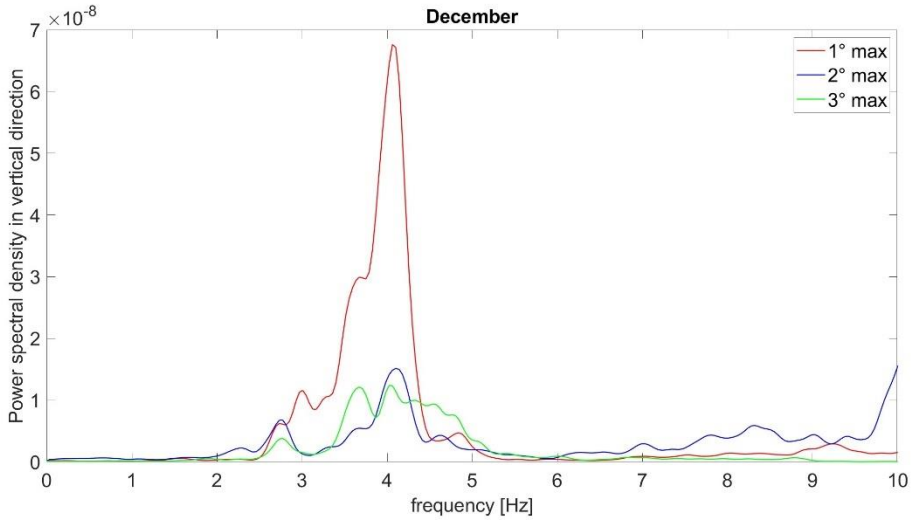


Figure 5-134: Results obtained from the 3 accelerograms with maximum SD in time domain

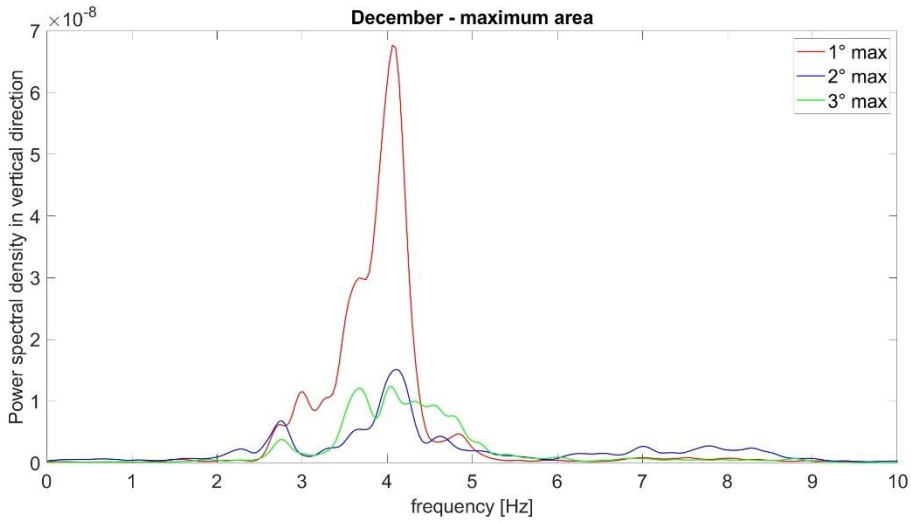


Figure 5-135: Results obtained from the 3 accelerograms with maximum area of PSD

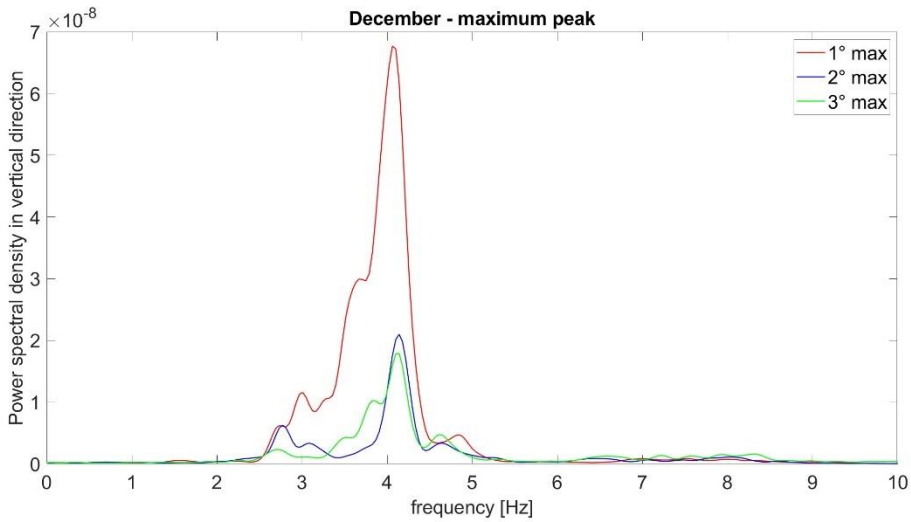


Figure 5-136: Results obtained from the 3 accelerograms with highest peak if PSD

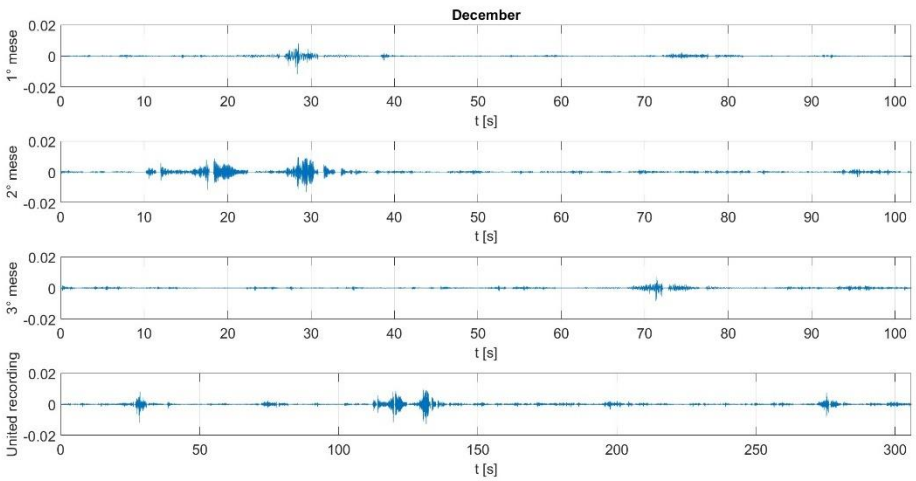


Figure 5-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

5.12.2 Longitudinal direction (y)

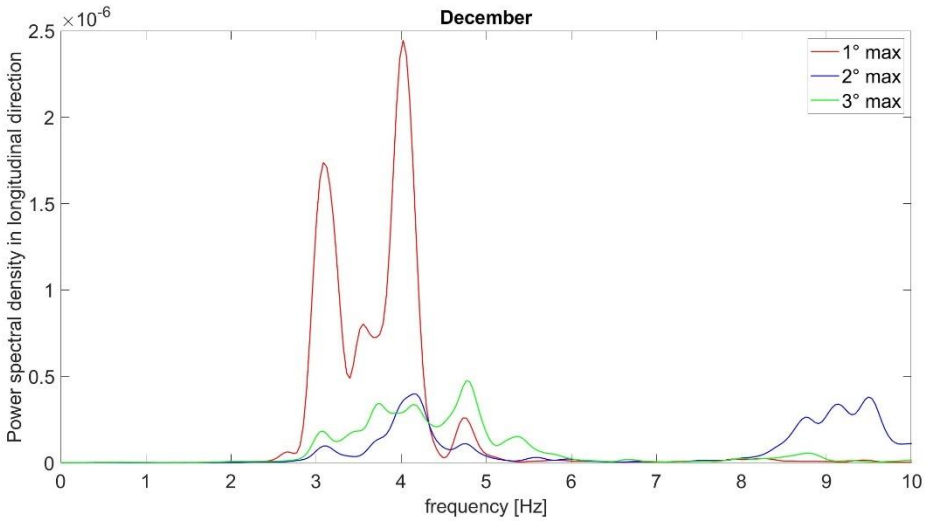


Figure 5-138: Results obtained from the 3 accelerograms with maximum SD in time domain

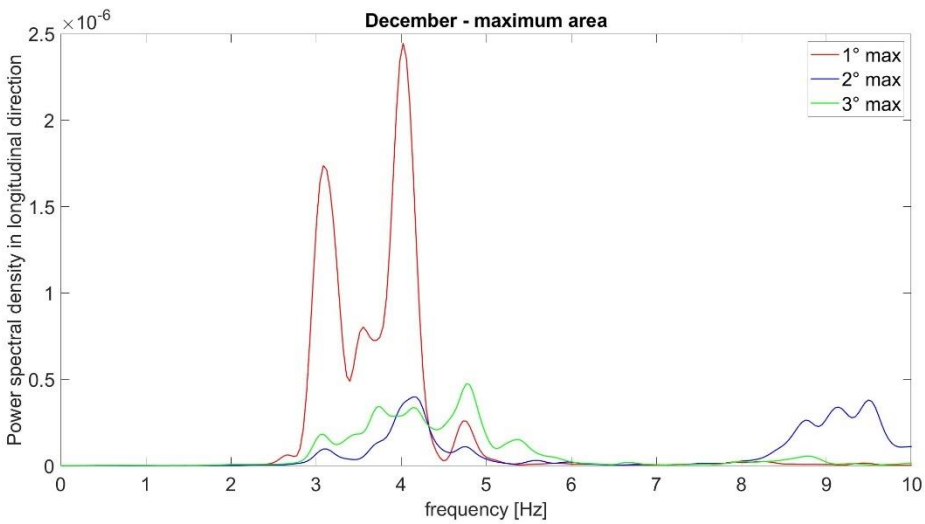


Figure 5-139: Results obtained from the 3 accelerograms with maximum area of PSD

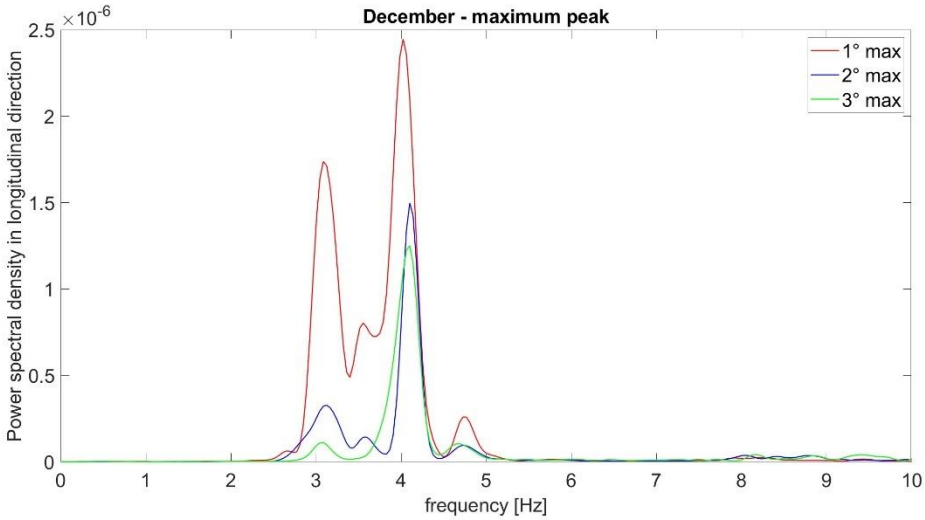


Figure 5-140: Results obtained from the 3 accelerograms with highest peak if PSD

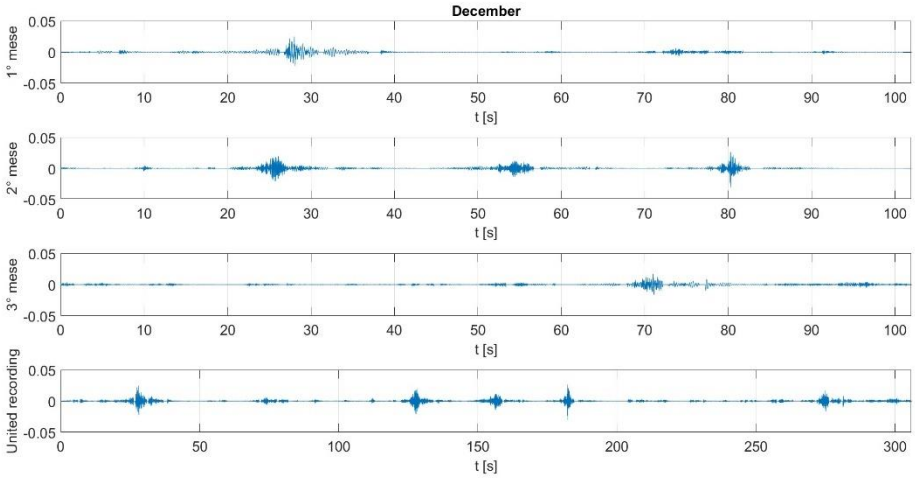


Figure 5-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

5.12.3 Transverse direction (z)

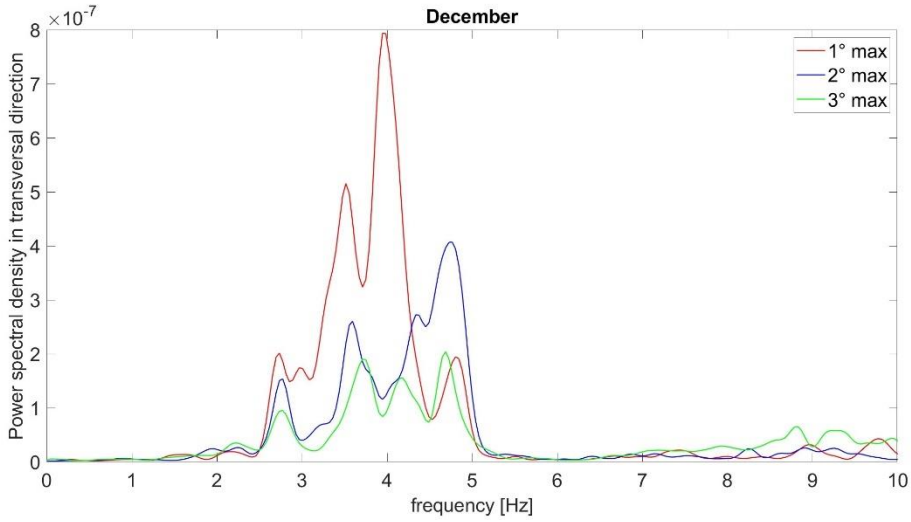


Figure 5-142: Results obtained from the 3 accelerograms with maximum SD in time domain

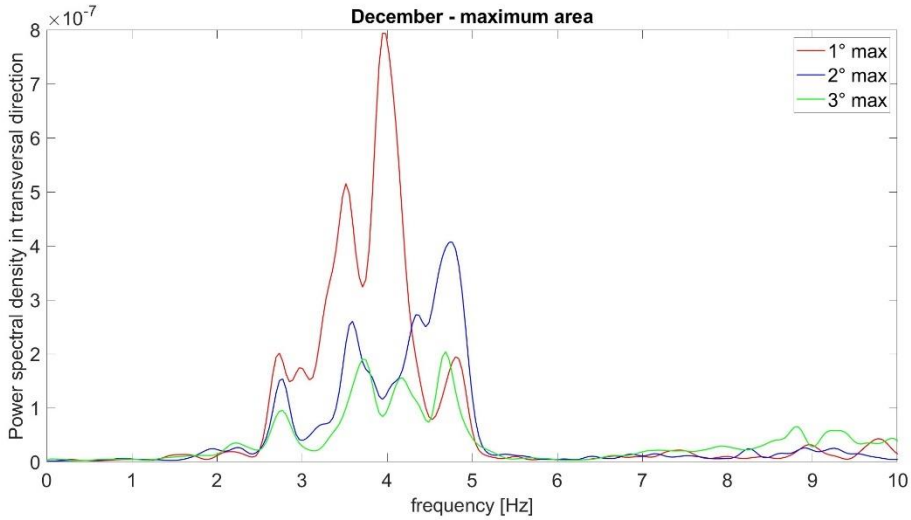


Figure 5-143: Results obtained from the 3 accelerograms with maximum area of PSD

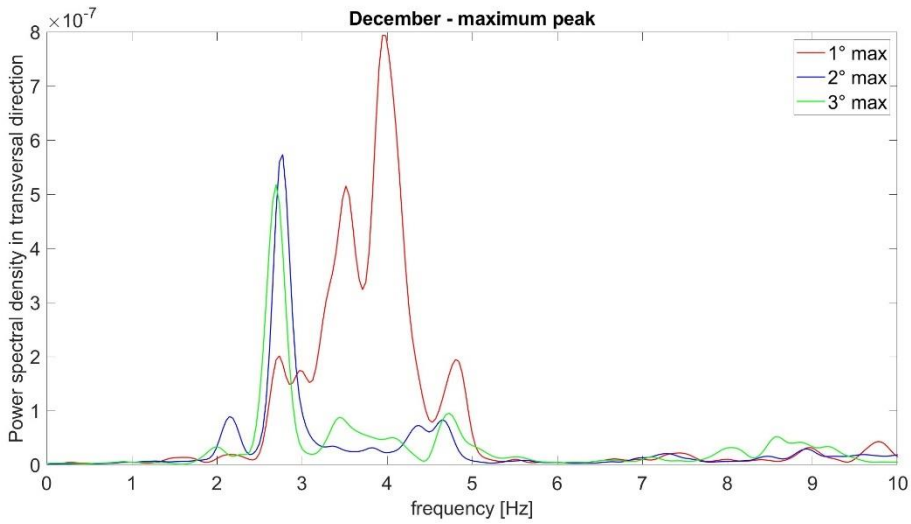


Figure 5-144: Results obtained from the 3 accelerograms with highest peak if PSD

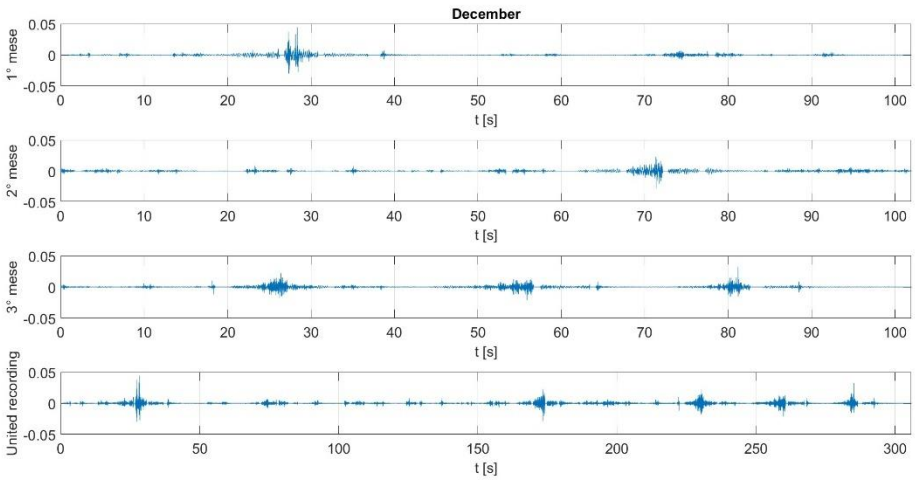


Figure 5-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

5.13 Analysis of the complete 2023 year

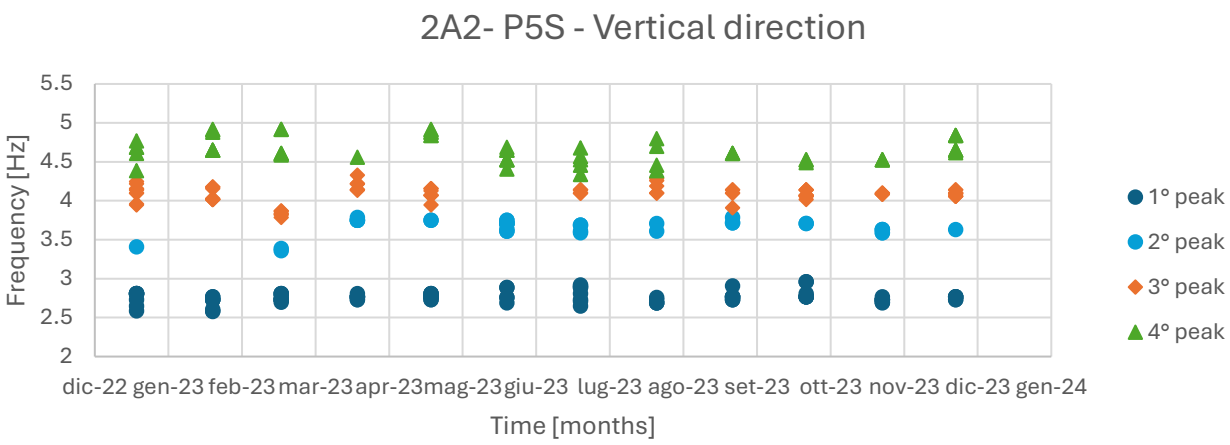
All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

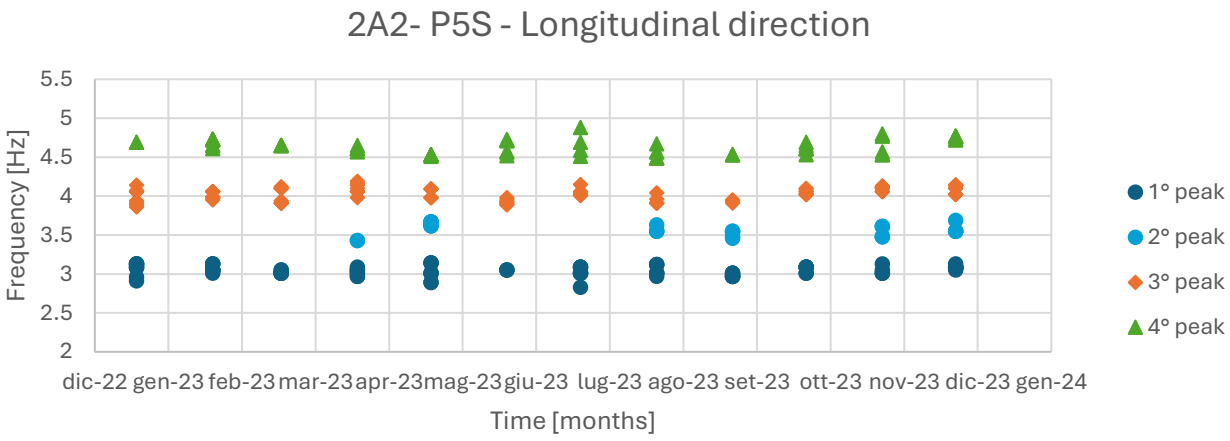
Table 5-37: Main identified frequencies for sensor 2C1EA – bridge 2A2 – P5S

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	95	36	78	56	88	31	90	66	29	107	79	67
	MEAN	**2.76**	**3.66**	**4.09**	**4.66**	**3.04**	**3.57**	**4.02**	**4.63**	**2.17**	**2.77**	**3.72**	**4.54**
	SD	0.07	0.10	0.10	0.16	0.06	0.07	0.08	0.09	0.11	0.09	0.11	0.17
	C.o.V.	2.5%	2.8%	2.5%	3.3%	2.0%	2.1%	2.0%	2.0%	5.0%	3.3%	2.9%	3.7%
	Rating	**94%**	**35%**	**77%**	**52%**	**91%**	**32%**	**93%**	**68%**	**24%**	**100%**	**76%**	**61%**
1	Jan-23	2.81		4.14		3.09		4.06		1.91	2.58		4.36
2	Jan-23	2.65		4.1	4.77	2.91		3.86		1.95	2.71	3.71	4.69
3	Jan-23	2.81		4.16	4.69	3.13		4.07			2.66	3.62	
1	Jan-23	2.81		4.14		3.13		4.06		1.95	2.58	3.89	
2	Jan-23	2.81		4.22	4.69	2.96		3.89			2.77	3.75	4.69
3	Jan-23	2.73		4.25		3.13		3.94	4.69		2.73	3.82	4.61
1	Jan-23	2.81		4.1	4.61	3.08		4.06			2.58	3.89	
2	Jan-23	2.81	3.41	3.95		3.13		3.91	4.69		2.73	3.75	4.69
3	Jan-23	2.59		3.96	4.39	3.09		4.14			2.77	3.82	
1	Feb-23	2.73				3.13		3.98	4.73		2.73	3.52	
2	Feb-23	2.77		4.02	4.65	3.01		4.06	4.61		2.61		4.66
3	Feb-23	2.59		4.18	4.88	3.04		3.98	4.72		2.74		4.29
1	Feb-23	2.73		4.02		3.13		3.98	4.73		2.73	3.52	
2	Feb-23	2.58		4.18	4.65	3.05		4.06	4.73		2.59		4.66
3	Feb-23	2.77		4.02	4.92	3.05		3.99	4.65		2.77		
1	Feb-23	2.73		4.02		3.13		3.98	4.73		2.73	3.52	
2	Feb-23	2.73		4.16	4.91	3.05		4.06	4.73		2.77		4.29
3	Feb-23	2.61		4.03	4.65	3.05		3.95	4.65		2.59		4.66
1	Mar-23	2.81	3.36	3.83	4.6	3.01		4.1			2.81	3.82	4.57
2	Mar-23	2.73				3.01		3.94	4.65		2.73		4.43
3	Mar-23	2.73		3.79	4.92			4.12			2.77	3.86	
1	Mar-23	2.81	3.39	3.87	4.61	3.01		3.91	4.65		2.81	3.83	4.61
2	Mar-23	2.73		3.84		3.01		3.91	4.65		2.73		4.38
3	Mar-23	2.73		3.82	4.92	3.05		4.1			2.77	3.83	4.66
1	Mar-23	2.81		3.87	4.61	3.01		4.1		2.22	2.7	3.63	4.41
2	Mar-23	2.7			4.59	3.01		3.91	4.65	2.22	2.77		
3	Mar-23	2.77				3.05		3.91	4.65		2.81	3.83	4.57
1	Apr-23	2.73	3.75	4.22		3.01		4.19		2.14	2.77	3.67	4.22

2	Apr-23	2.77		4.14		2.97	3.43		4.61		2.77	3.67	4.41
3	Apr-23	2.77			4.56	3.04		4.06	4.61	2.11	2.77	3.63	
1	Apr-23	2.77	3.75	4.22		2.97	3.43	3.98	4.61		2.77	3.67	4.22
2	Apr-23	2.77		4.14		3.06		4.06	4.61	2.15	2.77	3.63	4.18
3	Apr-23	2.81	3.79	4.14		3.01		4.16			2.77		4.41
1	Apr-23	2.77		4.14		3.05		4.14		2.19	2.77	3.63	
2	Apr-23	2.73	3.75	4.22		3.09		4.1	4.65	2.27	2.77	3.6	4.53
3	Apr-23	2.77	3.75	4.33				4.06	4.57		2.77		4.38
1	May-23	2.81		3.95	4.84	3.01	3.62	4.09			2.81	3.71	4.84
2	May-23	2.73		4.13	4.88	3.14	3.62	3.98	4.53		2.73	3.67	4.59
3	May-23	2.77					3.62		4.51		2.73		
1	May-23	2.81		4.16	4.84	3.14	3.63	3.98	4.53		2.81	3.71	4.84
2	May-23	2.73		4.07	4.91	2.89	3.67		4.53		2.73	3.67	
3	May-23	2.77	3.75	4.07		3.01	3.67	4.09		2.26	2.77		4.81
1	May-23	2.77		4.07	4.92	3.01	3.67	4.09			2.81	3.75	4.76
2	May-23	2.81		4.16	4.88	3.14	3.67	3.98	4.53	2.14	2.77	3.79	
3	May-23	2.77	3.75			2.89	3.67		4.53		2.81	3.75	
1	Jun-23		3.64		4.69	3.05		3.89	4.73	2.29	2.89	3.71	
2	Jun-23		3.61		4.53			3.93			2.91	3.79	4.49
3	Jun-23		3.61		4.41				4.52		2.92		
1	Jun-23	2.89	3.75		4.65	3.05		3.92	4.71	2.34	3.01	3.71	4.39
2	Jun-23	2.76	3.71		4.53						2.89	3.79	4.52
3	Jun-23		3.71					3.98	4.57		3.01		
1	Jun-23	2.89	3.75		4.65	3.05		3.89	4.71		3.01		4.29
2	Jun-23	2.76	3.71		4.53			3.95		2.34	3.01	3.71	4.41
3	Jun-23	2.69	3.71					3.91	4.57			3.68	
1	Jul-23	2.65		4.1		3.01		4.15	4.69	2.21	2.81	3.79	4.38
2	Jul-23			4.14	4.53	3.01			4.88	2.16	2.89	3.79	
3	Jul-23	2.73			4.68			4.01			2.77		
1	Jul-23	2.89	3.69	4.14		3.01			4.59		2.81	3.79	4.39
2	Jul-23	2.91	3.61	4.1		3.09		4.02			2.93	3.79	
3	Jul-23	2.71	3.59		4.46	2.83		4.06		2.26	2.82	3.71	
1	Jul-23	2.81	3.69		4.34	3.09		4.01			2.81	3.82	4.39
2	Jul-23	2.89		4.14	4.57	3.09		4.04	4.51		2.93	3.82	
3	Jul-23	2.92		4.1		3.01				2.26	2.82	3.69	
1	Aug-23		3.61		4.39	3.01	3.55	3.96	4.49		2.69	3.56	
2	Aug-23	2.69		4.1		3.12		3.91			2.69	3.71	4.41
3	Aug-23				4.46				4.57		2.76	3.62	4.53
1	Aug-23		3.71	4.19		3.12	3.55	3.91	4.49		2.7	3.56	
2	Aug-23	2.69		4.1	4.7	3.01		3.91			2.7	3.71	4.41
3	Aug-23	2.76							4.57		2.79	3.63	4.57
1	Aug-23			4.29		3.12	3.55	3.91	4.49		2.69	3.71	4.41

2	Aug-23	2.69		4.26	4.8	2.97	3.63	4.04	4.67		2.69	3.56	4.38
3	Aug-23	2.73				3.01				2.3	2.77		
1	Sep-23	2.73		4.14	4.61	2.97	3.55			2.07	2.73	4.04	
2	Sep-23	2.77		3.91		3.01					2.73	3.95	
3	Sep-23	2.77				2.97	3.48	3.95	4.53		2.77		
1	Sep-23	2.73		4.1	4.61	2.97	3.54			2.07	2.73	3.96	
2	Sep-23	2.77	3.79			3.01		3.94			2.77	3.79	
3	Sep-23	2.77	3.72	4.14		2.97	3.46		4.53		2.73		
1	Sep-23	2.73		4.1	4.61	2.97	3.55			2.07	2.73	3.96	
2	Sep-23	2.77				3.01		3.91			2.73		
3	Sep-23	2.91	3.72					3.94	4.53		2.77	3.79	
1	Oct-23	2.77		4.07	4.49	3.09		4.06	4.69		2.77	3.68	4.69
2	Oct-23	2.77		4.07				4.02	4.61		3.01		
3	Oct-23			4.14		3.01			4.61		2.77	3.75	4.65
1	Oct-23	2.77	3.71	4.07	4.53	3.09		4.09			2.73	3.67	4.69
2	Oct-23	2.96		4.02				4.02	4.65		3.01		4.45
3	Oct-23	2.77		4.14		3.01		4.06	4.61		2.77	3.75	
1	Oct-23	2.96		4.06		3.09		4.02			3.01		4.49
2	Oct-23	2.77	3.71	4.06	4.53			4.1	4.61		2.77	3.75	4.69
3	Oct-23	2.81		4.14		3.09		4.02	4.53		2.77		4.53
1	Nov-23	2.73	3.59		4.53		3.48	4.06	4.53		2.69	3.61	4.41
2	Nov-23	2.69		4.1		3.01	3.61	4.13	4.8		2.72	3.64	4.57
3	Nov-23	2.73		4.1				4.11		2.09	2.79		4.65
1	Nov-23	2.73	3.63				3.48	4.06	4.57		2.73	3.63	4.41
2	Nov-23	2.7	3.63	4.09	4.53	3.05		4.11	4.77		2.7	3.63	4.57
3	Nov-23	2.77		4.09		3.01	3.61	4.13		2.22	2.81		4.61
1	Nov-23	2.73	3.59		4.53		3.48	4.06	4.53		2.73	3.63	4.41
2	Nov-23	2.7	3.63	4.09		3.01	3.61	4.1			2.7	3.63	4.57
3	Nov-23	2.73		4.09		3.13		4.1			2.7	3.59	
1	Dec-23			4.06	4.84	3.09	3.55	4.02	4.77		2.73	3.84	4.8
2	Dec-23	2.73		4.1	4.65	3.09		4.14		2.18	2.73	3.63	4.76
3	Dec-23	2.77		4.1		3.09		4.14	4.77	2.22	2.73	3.71	4.68
1	Dec-23			4.06	4.84	3.08	3.55	4.02	4.72		2.73	3.89	4.8
2	Dec-23	2.77		4.1	4.62	3.08		4.14	4.76		2.73	3.64	4.77
3	Dec-23	2.77	3.63	4.09		3.08	3.69	4.14	4.76	2.14	2.77	3.75	4.69
1	Dec-23			4.06	4.84	3.08	3.55	4.02	4.73		2.73	3.89	4.8
2	Dec-23	2.77		4.14	4.65	3.13	3.55	4.1	4.77	2.14	2.77		4.69
3	Dec-23	2.73		4.14	4.65	3.05		4.1			2.7	3.64	4.73





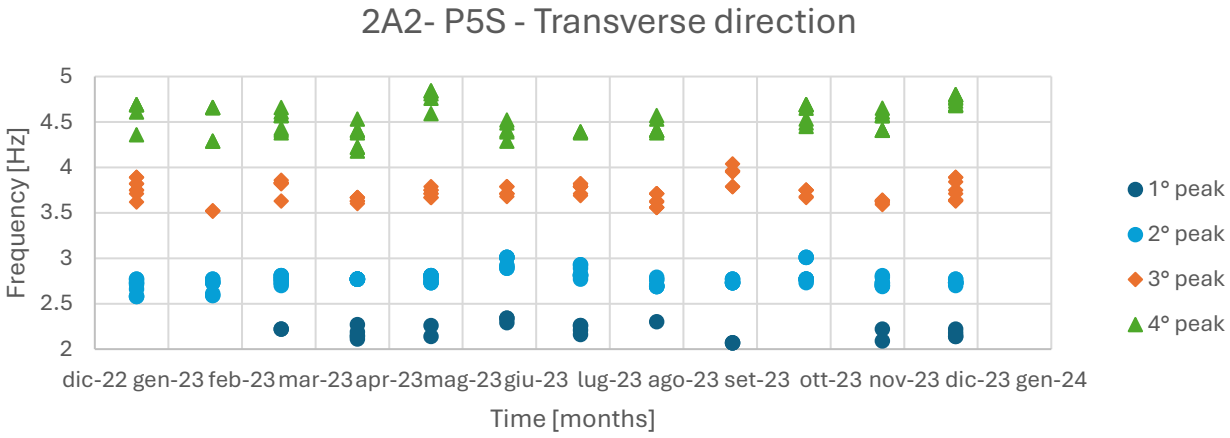


Figure 5-146: Main identified frequencies for sensor 2C1EA – bridge 2A2 – P5S

6. Annex 6 – Bridge 2A2 – Span 5 – L/2 - Sensor 2B7E4

The Bridge 2A2 counts 2 monitored decks: span 4 and span 5 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 4 are:

- 3099D – situated in the midspan;
- 30EB4 – situated at a distance of L/4;
- 31639 – situated at a distance of L/8;
- 30D41 – situated nearby the pilar.

The sensors present on deck number 5 are:

- 2B7E4 – situated in the midspan;
- 3187F – situated at a distance of L/4 of the deck;
- 2B988 – situated at a distance of L/8 of the deck;
- 2C1EA – situated by the pilar.

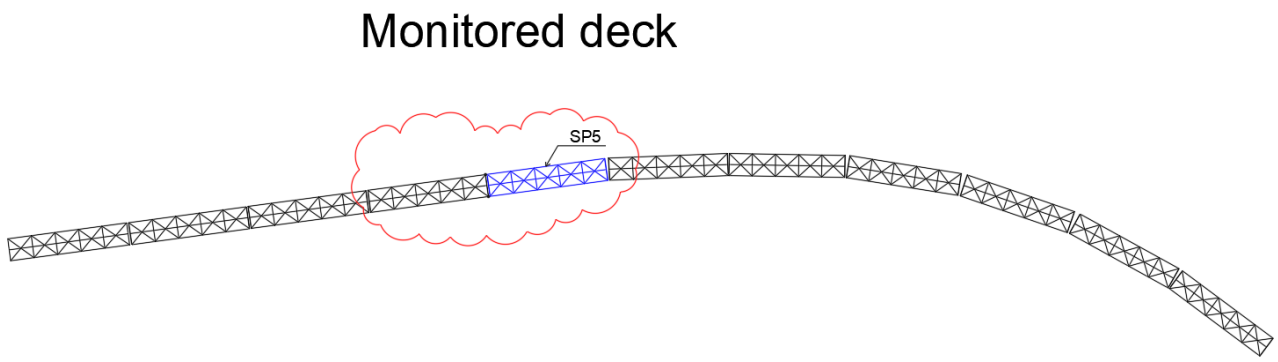


Figure 6-1 Monitored decks of 2A2 bridge

The accelerograms of the 2B7E4 sensor have been analyzed and the results are represented in the following paragraphs.

6.1 January

The results obtained for the January dataset are shown in the following tables.

Table 6-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-01-17_07-00-21	2.66E-03
	2°	2B7E4_2023-01-02_07-00-21	2.19E-03
	3°	2B7E4_2023-01-31_07-00-19	2.00E-03
Longitudinal direction (y)	1°	2B7E4_2023-01-26_07-00-21	4.47E-04
	2°	2B7E4_2023-01-31_07-00-19	4.03E-04
	3°	2B7E4_2023-01-17_07-00-21	4.00E-04
Transverse direction (z)	1°	2B7E4_2023-01-02_07-00-21	6.74E-04
	2°	2B7E4_2023-01-31_07-00-19	5.85E-04
	3°	2B7E4_2023-01-16_13-00-20	5.60E-04

Table 6-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-01-17_07-00-21	1.20E-05	2B7E4_2023-01-17_07-00-21	1.50E-06
2	2B7E4_2023-01-31_07-00-19	9.06E-06	2B7E4_2023-01-02_07-00-21	8.56E-07
3	2B7E4_2023-01-21_07-00-21	7.19E-06	2B7E4_2023-01-31_07-00-19	8.26E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-01-26_07-00-21	3.07E-07	2B7E4_2023-01-26_07-00-21	4.05E-08
2	2B7E4_2023-01-17_07-00-21	2.83E-07	2B7E4_2023-01-17_07-00-21	3.28E-08
3	2B7E4_2023-01-19_13-00-20	1.90E-07	2B7E4_2023-01-31_07-00-19	3.25E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-01-02_07-00-21	5.09E-07	2B7E4_2023-01-02_07-00-21	8.48E-08
2	2B7E4_2023-01-16_13-00-20	4.81E-07	2B7E4_2023-01-31_07-00-19	7.21E-08
3	2B7E4_2023-01-17_13-00-20	4.52E-07	2B7E4_2023-01-16_13-00-20	6.50E-08

Table 6-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	C	C	C
2	C	B	C	B	A	A	B	E	B
3	B	-	B	A	-	B	E	-	E

6.1.1 Vertical direction (x)

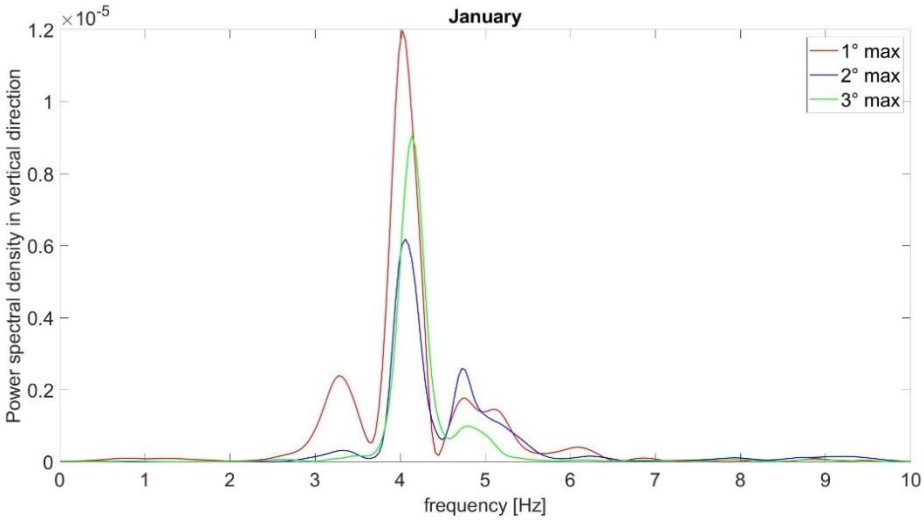


Figure 6-2: Results obtained from the 3 accelerograms with maximum SD in time domain

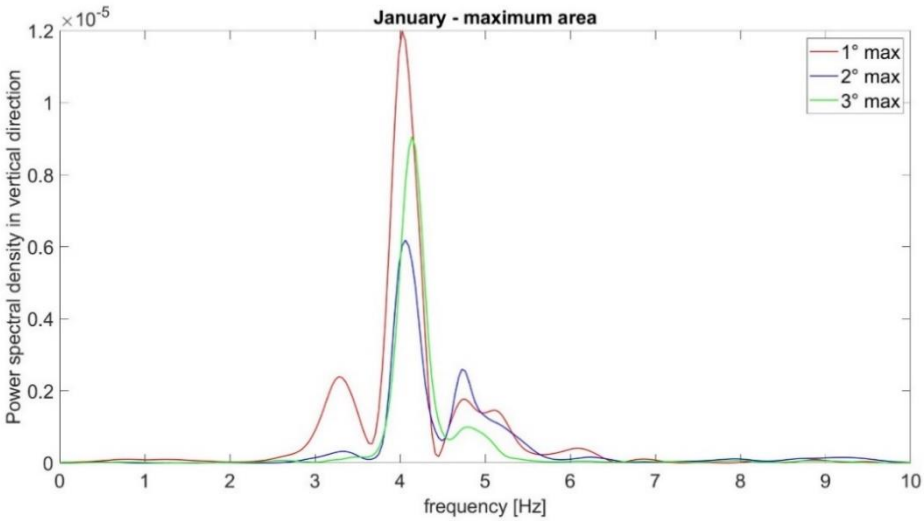


Figure 6-3: Results obtained from the 3 accelerograms with maximum area of PSD

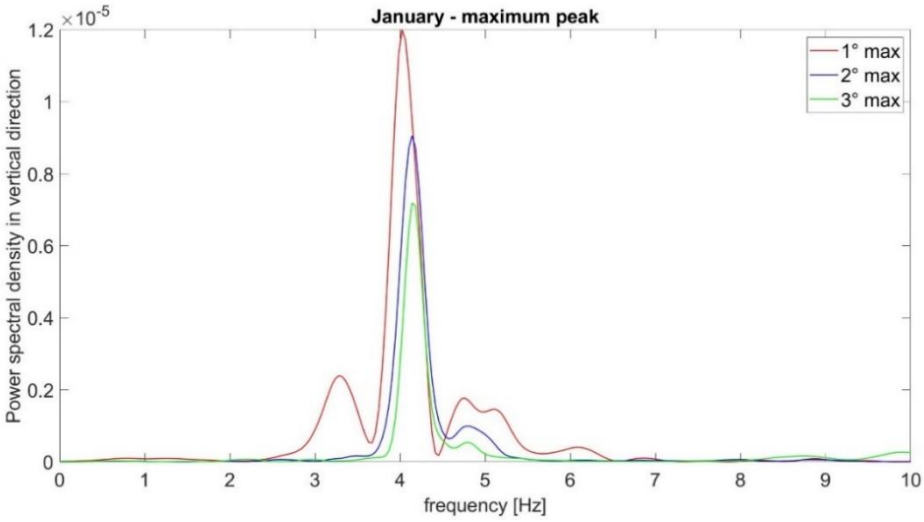


Figure 6-4: Results obtained from the 3 accelerograms with highest peak if PSD

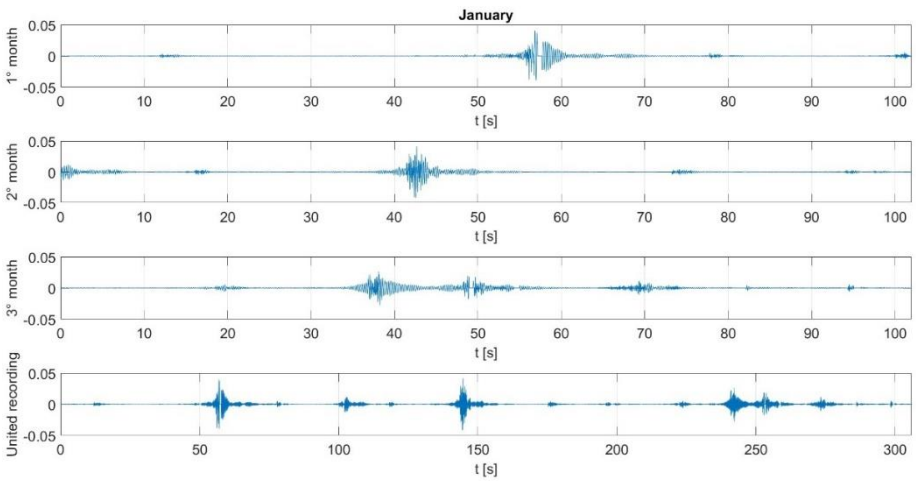


Figure 65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.1.2 Longitudinal direction (y)

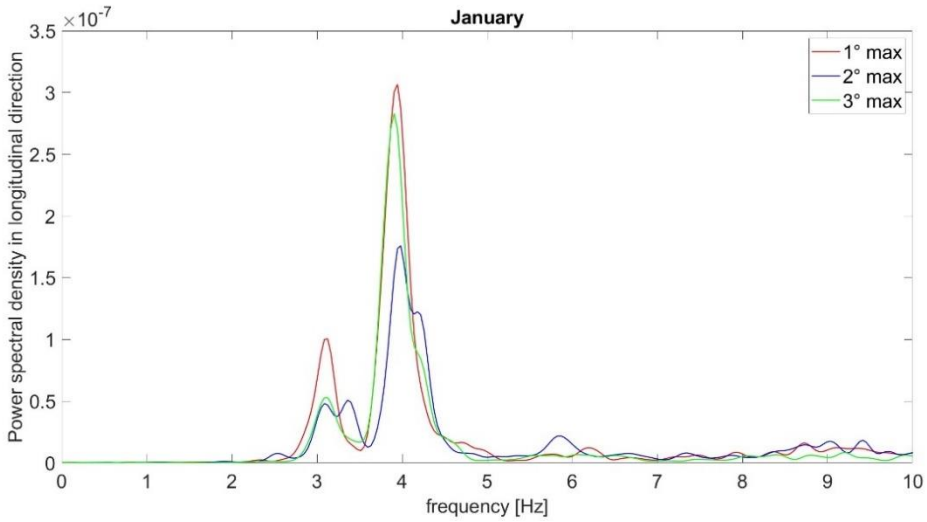


Figure 6-5: Results obtained from the 3 accelerograms with maximum SD in time domain

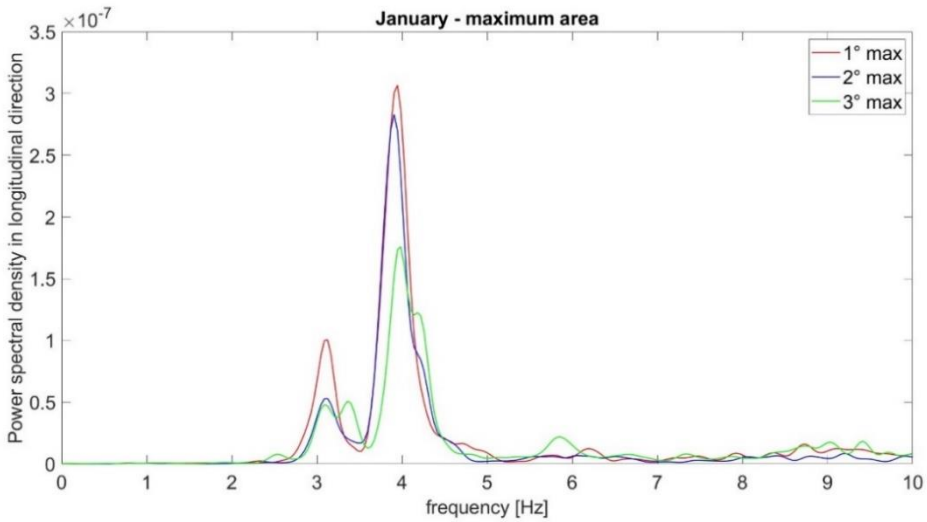


Figure 6-6: Results obtained from the 3 accelerograms with maximum area of PSD

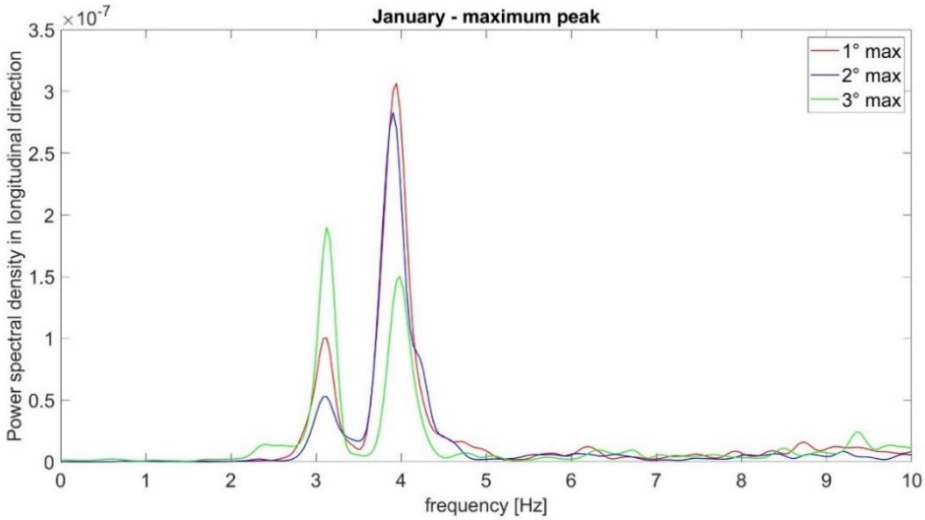


Figure 6-7: Results obtained from the 3 accelerograms with highest peak in PSD

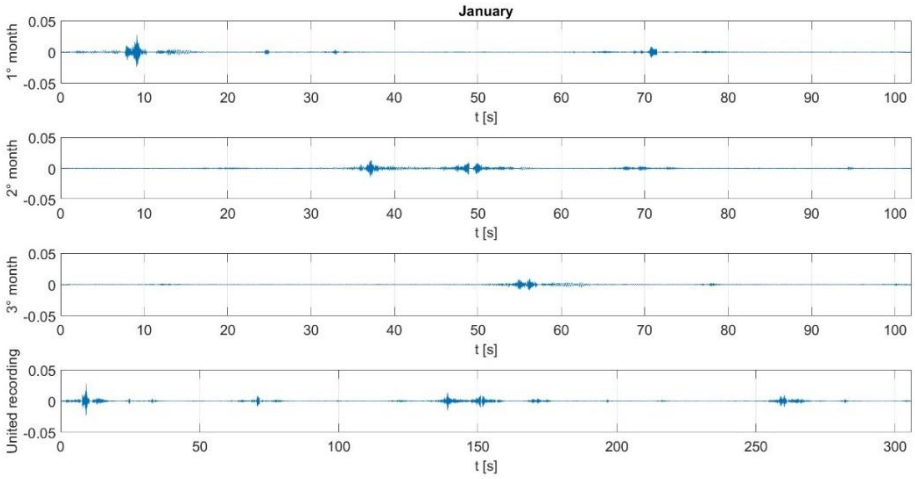


Figure 69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.1.3 Transverse direction (z)

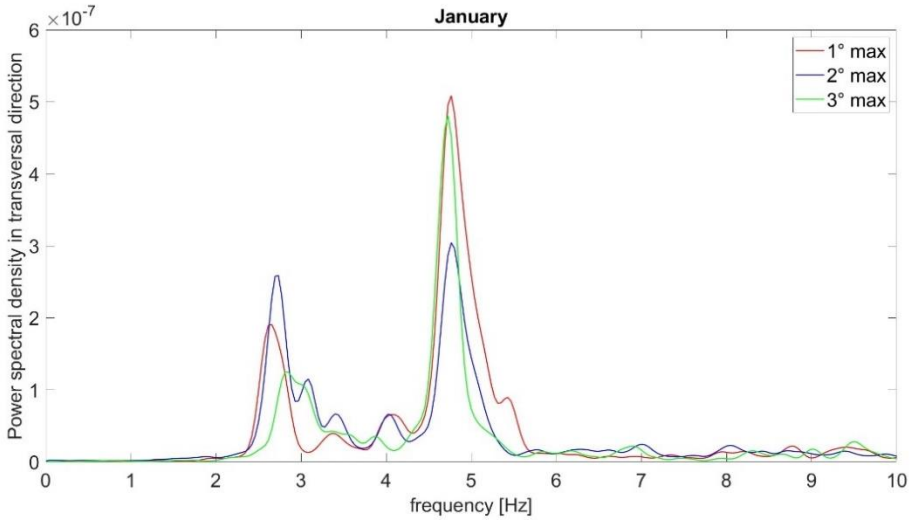


Figure 6-8: Results obtained from the 3 accelerograms with maximum SD in time domain

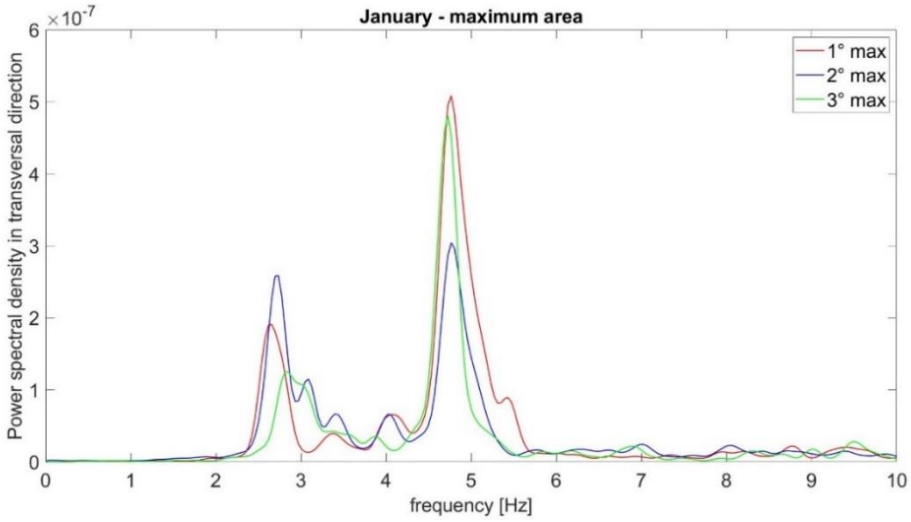


Figure 6-9: Results obtained from the 3 accelerograms with maximum area of PSD

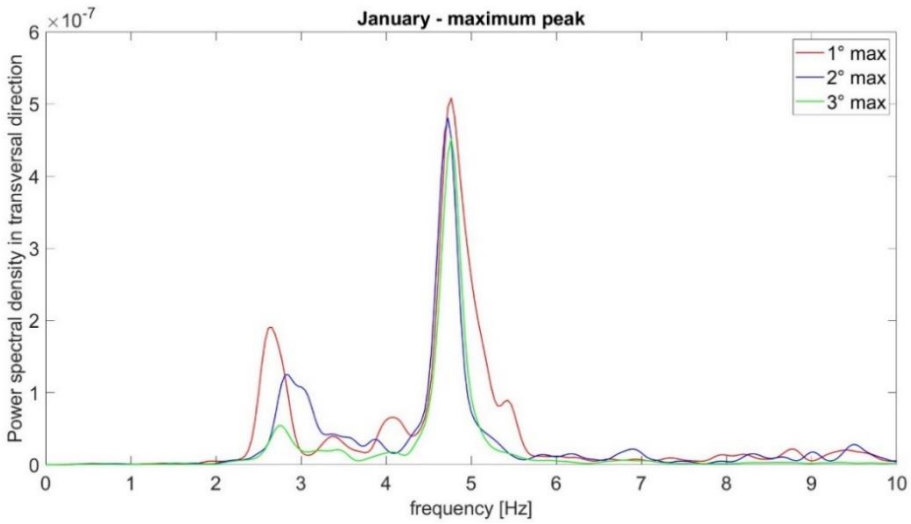


Figure 6-10: Results obtained from the 3 accelerograms with highest peak in PSD

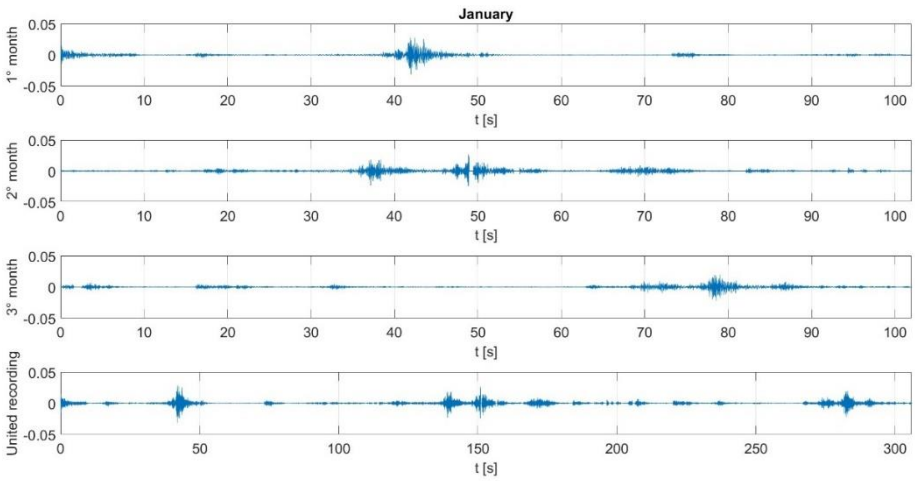


Figure 6-11: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

6.2 February

The results obtained for the February dataset are shown in the following tables.

Table 6-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-02-01_13-00-20	3.87E-03
	2°	2B7E4_2023-02-06_13-00-20	2.89E-03
	3°	2B7E4_2023-02-08_07-00-21	2.25E-03
Longitudinal direction (y)	1°	2B7E4_2023-02-01_13-00-20	8.90E-04
	2°	2B7E4_2023-02-06_13-00-20	5.31E-04
	3°	2B7E4_2023-02-03_13-00-20	5.13E-04
Transverse direction (z)	1°	2B7E4_2023-02-01_13-00-20	1.31E-03
	2°	2B7E4_2023-02-03_13-00-20	1.04E-03
	3°	2B7E4_2023-02-06_13-00-20	9.61E-04

Table 6-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-02-06_13-00-20	1.42E-05	2B7E4_2023-02-01_13-00-20	3.51E-06
2	2B7E4_2023-02-01_13-00-20	1.13E-05	2B7E4_2023-02-06_13-00-20	1.75E-06
3	2B7E4_2023-02-27_19-00-20	1.06E-05	2B7E4_2023-02-27_19-00-20	9.48E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-02-01_13-00-20	1.13E-06	2B7E4_2023-02-01_13-00-20	1.61E-07
2	2B7E4_2023-02-14_19-00-20	3.39E-07	2B7E4_2023-02-03_13-00-20	5.59E-08
3	2B7E4_2023-02-03_13-00-20	2.85E-07	2B7E4_2023-02-06_13-00-20	5.33E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-02-03_13-00-20	1.94E-06	2B7E4_2023-02-01_13-00-20	3.72E-07
2	2B7E4_2023-02-01_13-00-20	1.80E-06	2B7E4_2023-02-03_13-00-20	2.19E-07
3	2B7E4_2023-02-06_13-00-20	9.69E-07	2B7E4_2023-02-06_13-00-20	1.81E-07

Table 6-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	A	C	A
2	B	A	B	B	-	C	C	A	C
3	-	D	D	C	C	B	B	B	B

6.2.1 Vertical direction (x)

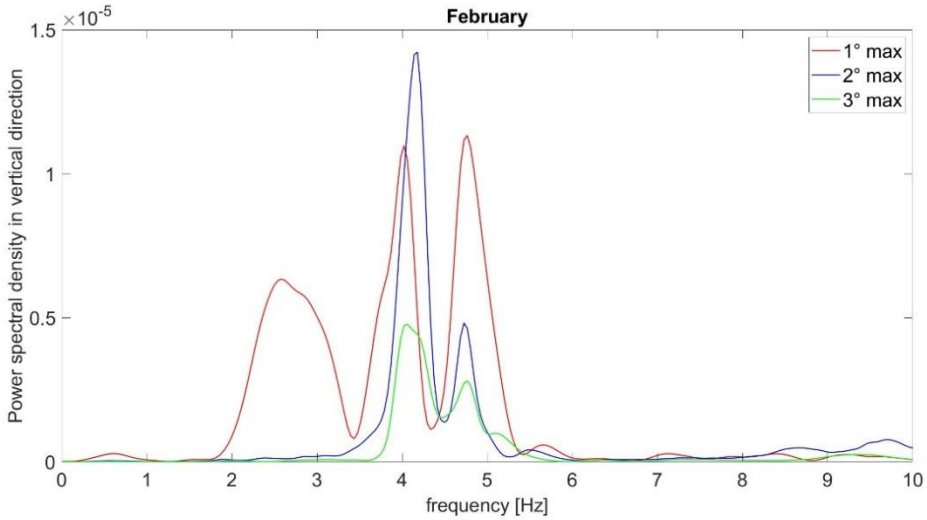


Figure 6-12: Results obtained from the 3 accelerograms with maximum SD in time domain

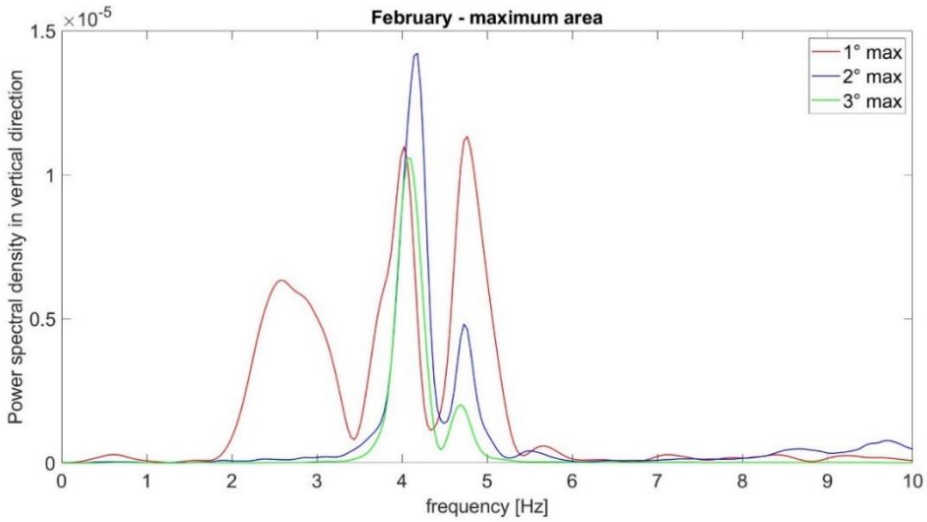


Figure 6-13: Results obtained from the 3 accelerograms with maximum area of PSD

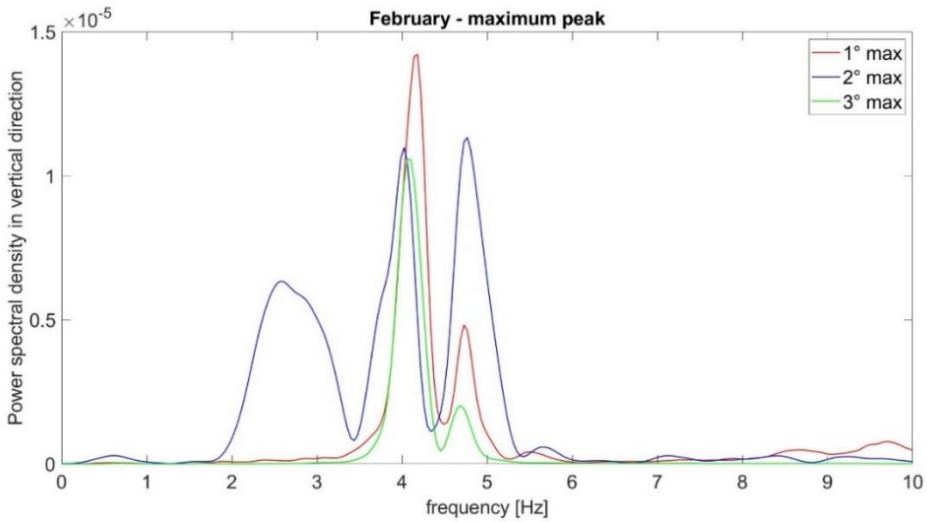


Figure 6-14: Results obtained from the 3 accelerograms with highest peak if PSD

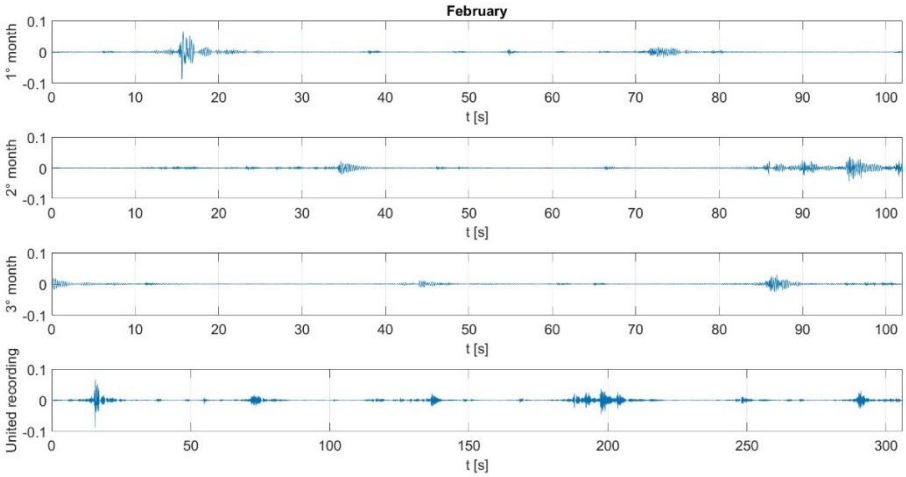


Figure 617: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.2.2 Longitudinal direction (y)

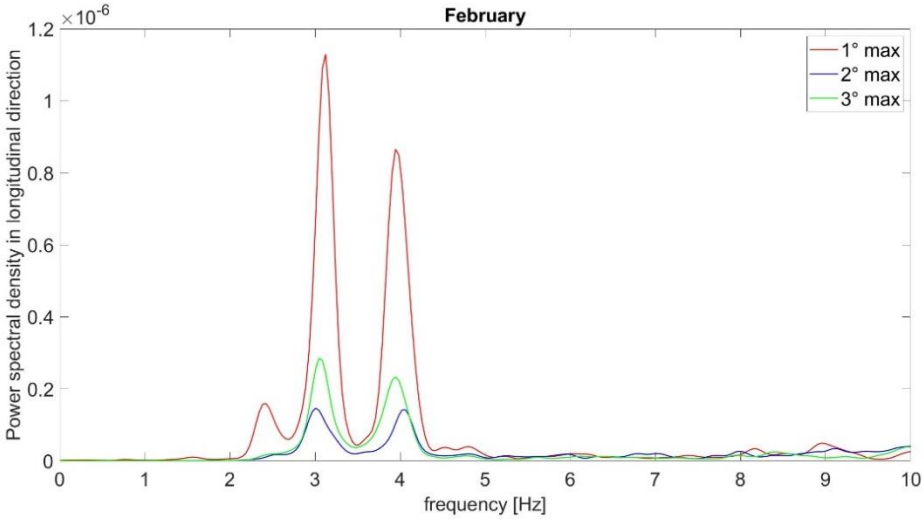


Figure 6-15: Results obtained from the 3 accelerograms with maximum SD in time domain

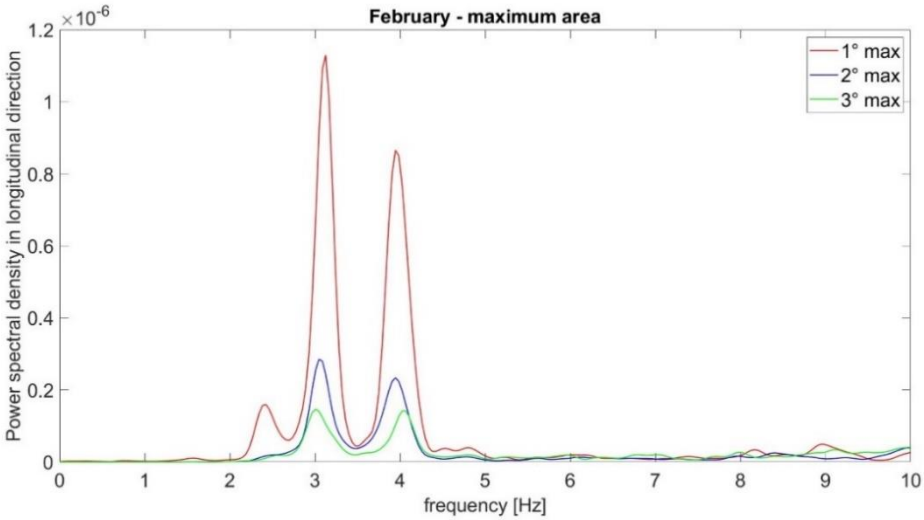


Figure 6-16: Results obtained from the 3 accelerograms with maximum area of PSD

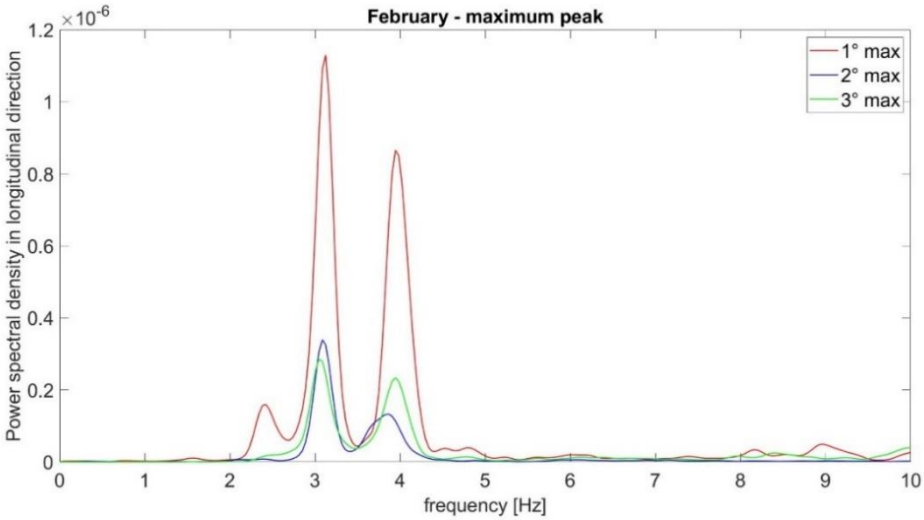


Figure 6-17: Results obtained from the 3 accelerograms with highest peak if PSD

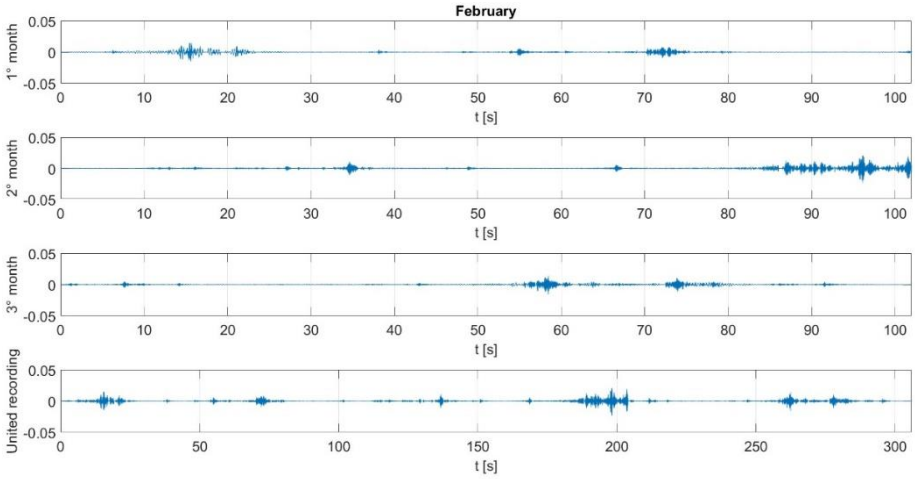


Figure 6-18: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.2.3 Transverse direction (z)

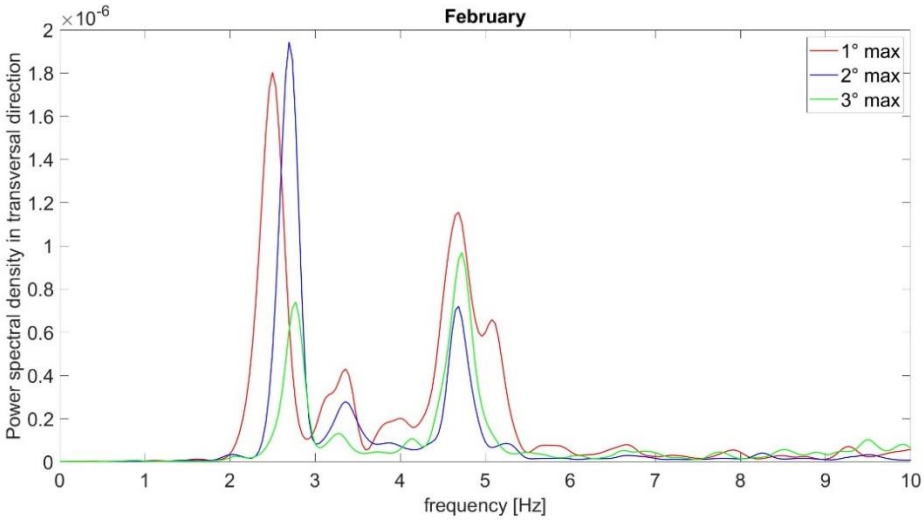


Figure 6-19: Results obtained from the 3 accelerograms with maximum SD in time domain

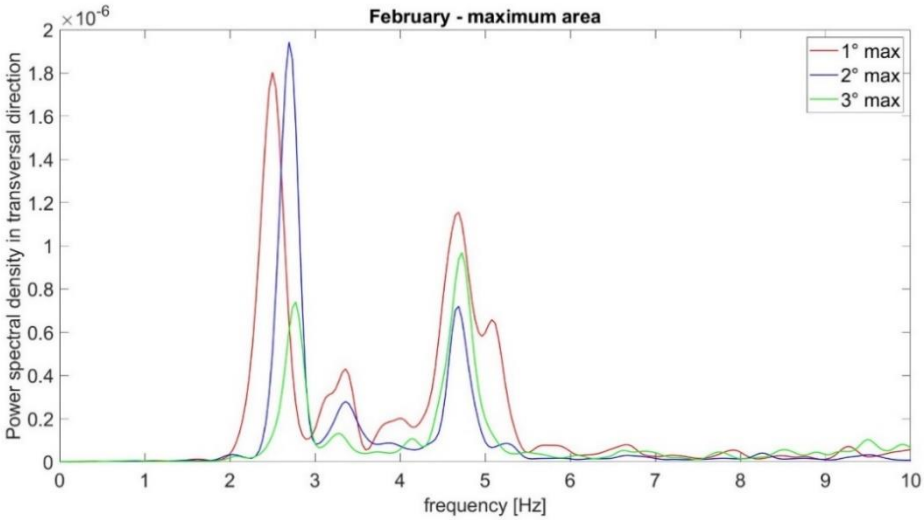


Figure 6-20: Results obtained from the 3 accelerograms with maximum area of PSD

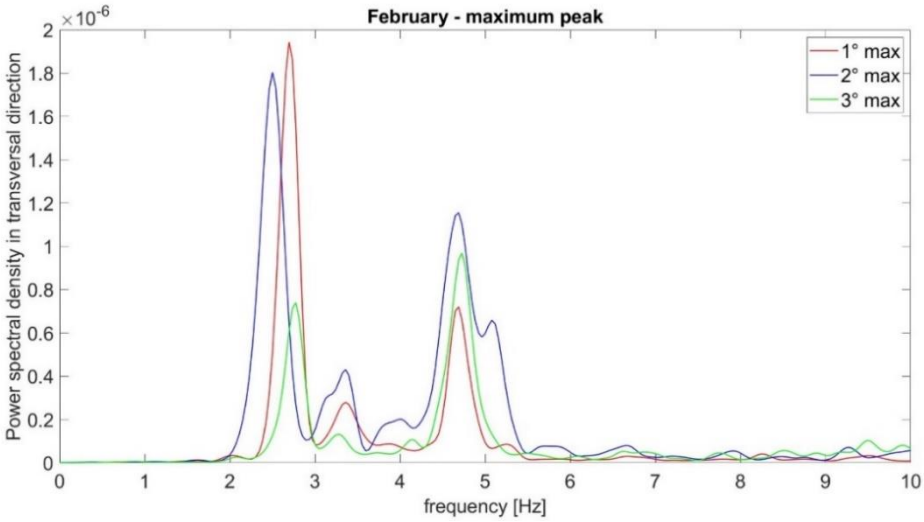


Figure 6-21: Results obtained from the 3 accelerograms with highest peak if PSD

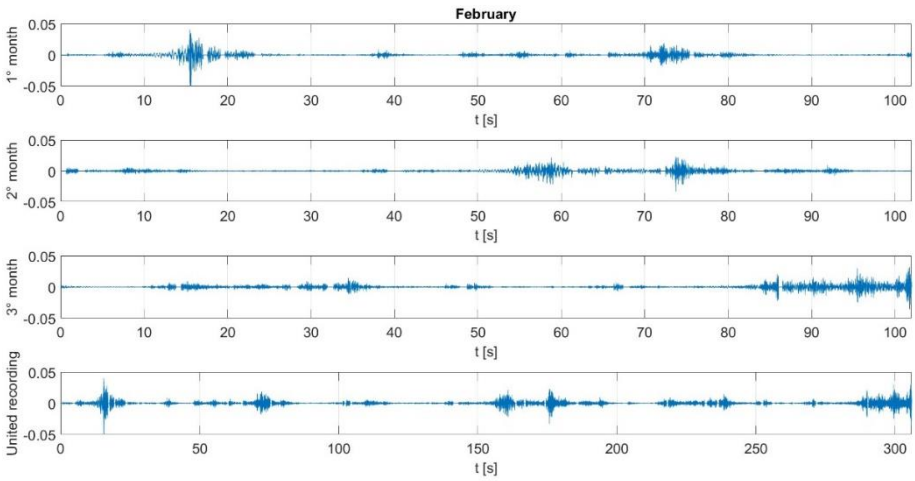


Figure 6-22: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

6.3 March

The results obtained for the March dataset are shown in the following tables.

Table 6-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-03-16_13-00-20	5.16E-03
	2°	2B7E4_2023-03-08_13-00-22	4.68E-03
	3°	2B7E4_2023-03-04_13-00-21	4.02E-03
Longitudinal direction (y)	1°	2B7E4_2023-03-04_13-00-21	1.65E-03
	2°	2B7E4_2023-03-16_13-00-20	1.21E-03
	3°	2B7E4_2023-03-08_13-00-22	1.06E-03
Transverse direction (z)	1°	2B7E4_2023-03-16_13-00-20	1.56E-03
	2°	2B7E4_2023-03-08_13-00-22	1.25E-03
	3°	2B7E4_2023-03-04_13-00-21	1.21E-03

Table 6-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-03-08_13-00-22	2.52E-05	2B7E4_2023-03-16_13-00-20	6.13E-06
2	2B7E4_2023-03-16_13-00-20	1.93E-05	2B7E4_2023-03-08_13-00-22	4.07E-06
3	2B7E4_2023-03-04_13-00-21	1.26E-05	2B7E4_2023-03-04_13-00-21	2.81E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-03-04_13-00-21	8.14E-06	2B7E4_2023-03-04_13-00-21	5.64E-07
2	2B7E4_2023-03-08_13-00-22	2.71E-06	2B7E4_2023-03-16_13-00-20	3.09E-07
3	2B7E4_2023-03-16_13-00-20	2.38E-06	2B7E4_2023-03-08_13-00-22	2.25E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-03-04_13-00-21	2.52E-06	2B7E4_2023-03-16_13-00-20	5.39E-07
2	2B7E4_2023-03-16_13-00-20	2.35E-06	2B7E4_2023-03-04_13-00-21	3.02E-07
3	2B7E4_2023-03-09_13-00-20	1.47E-06	2B7E4_2023-03-08_13-00-22	3.01E-07

Table 6-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	C	C	C	A	C	A
2	B	A	B	A	B	A	B	A	C
3	C	C	C	B	A	B	C	-	B

6.3.1 Vertical direction (x)

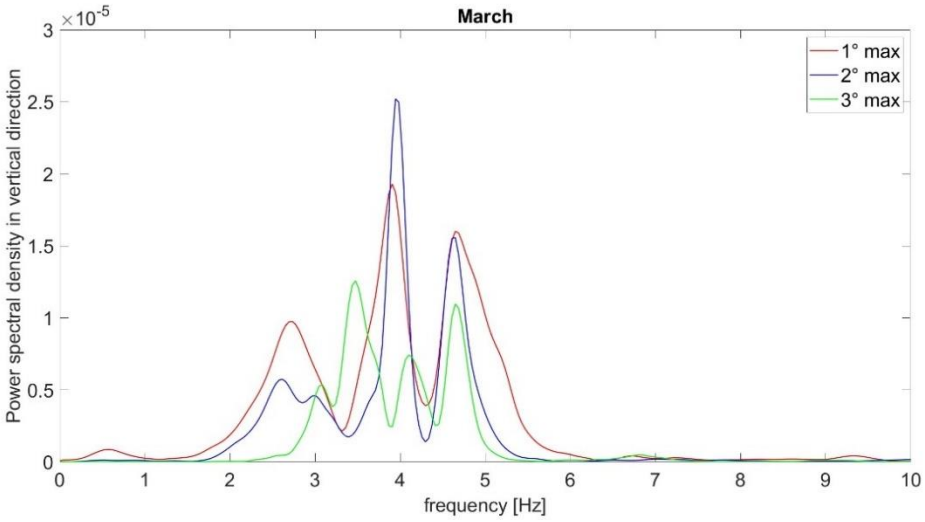


Figure 6-23: Results obtained from the 3 accelerograms with maximum SD in time domain

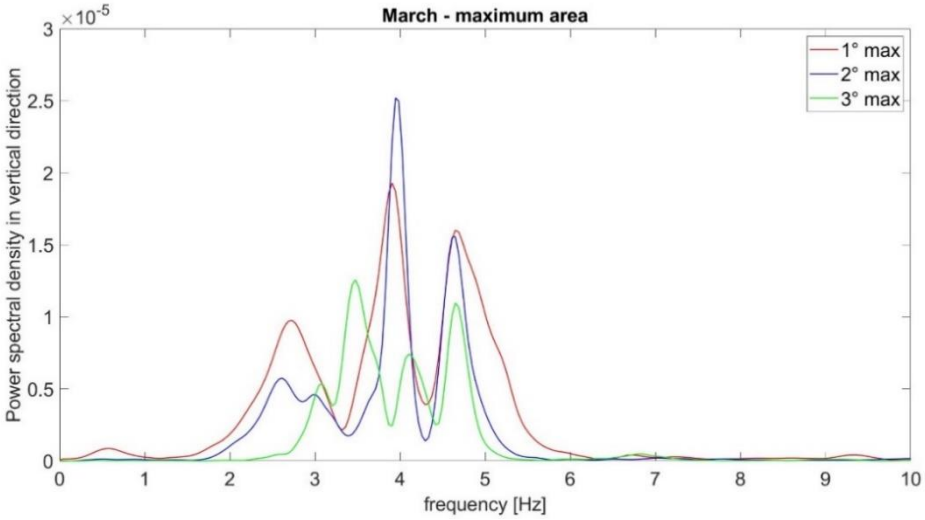


Figure 6-24: Results obtained from the 3 accelerograms with maximum area of PSD

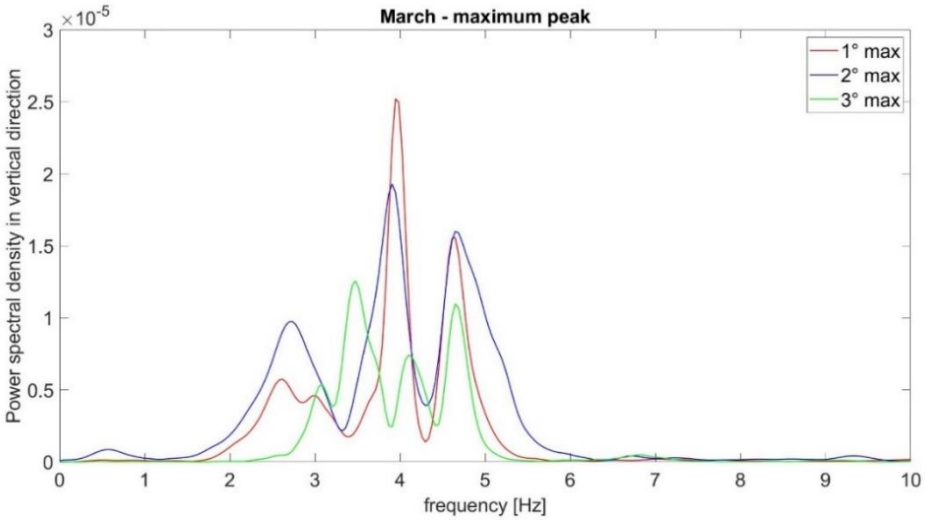


Figure 6-25: Results obtained from the 3 accelerograms with highest peak if PSD

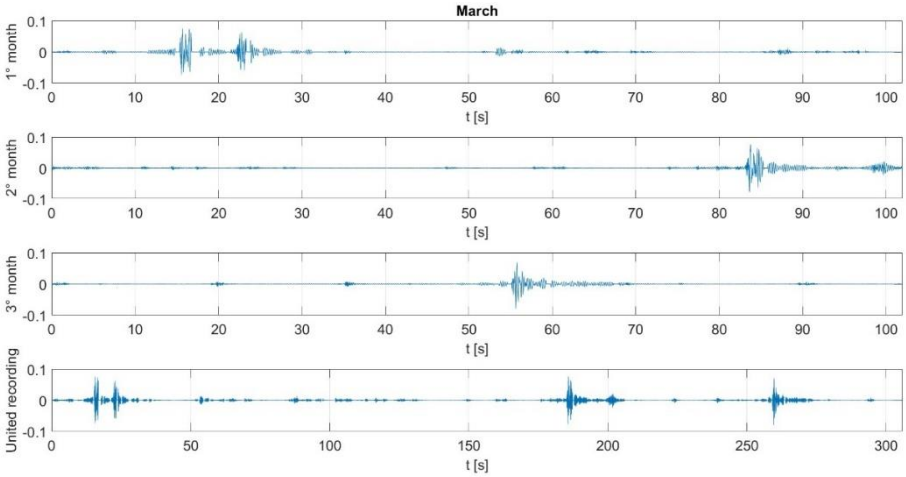


Figure 629: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.3.2 Longitudinal direction (y)

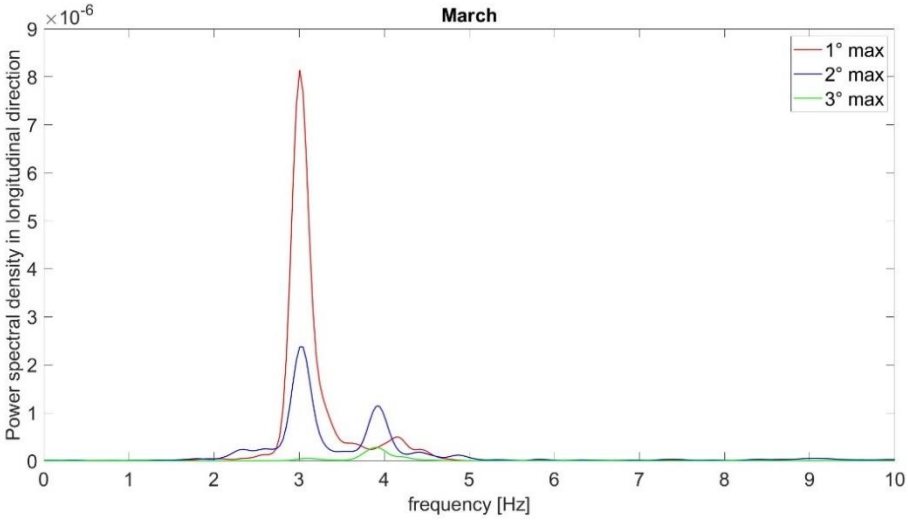


Figure 6-26: Results obtained from the 3 accelerograms with maximum SD in time domain

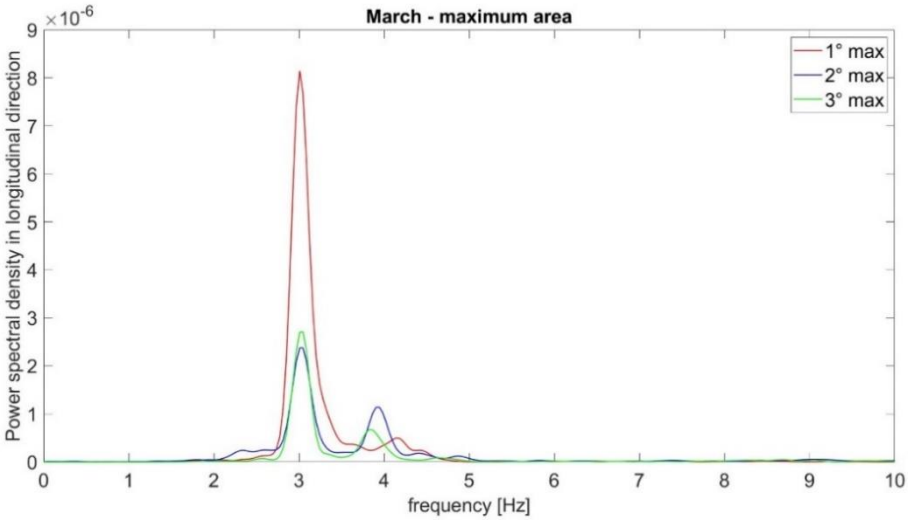


Figure 6-27: Results obtained from the 3 accelerograms with maximum area of PSD

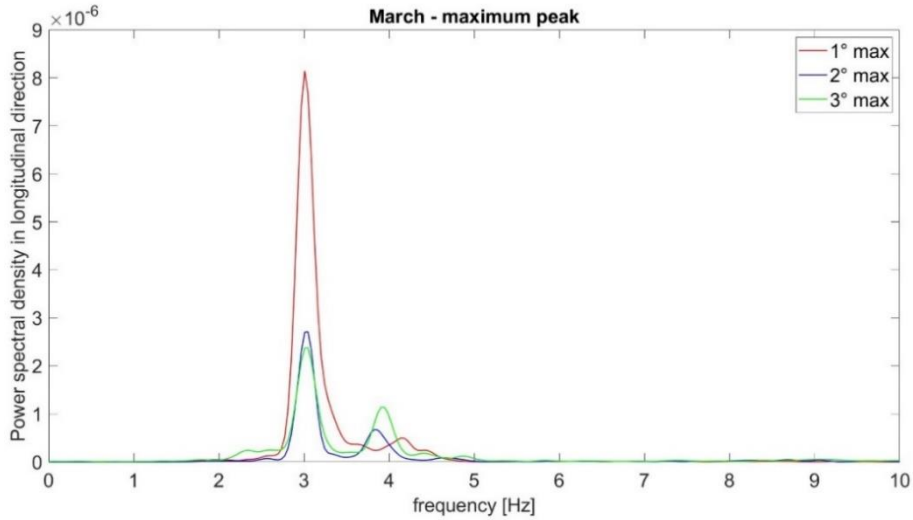


Figure 6-28: Results obtained from the 3 accelerograms with highest peak if PSD

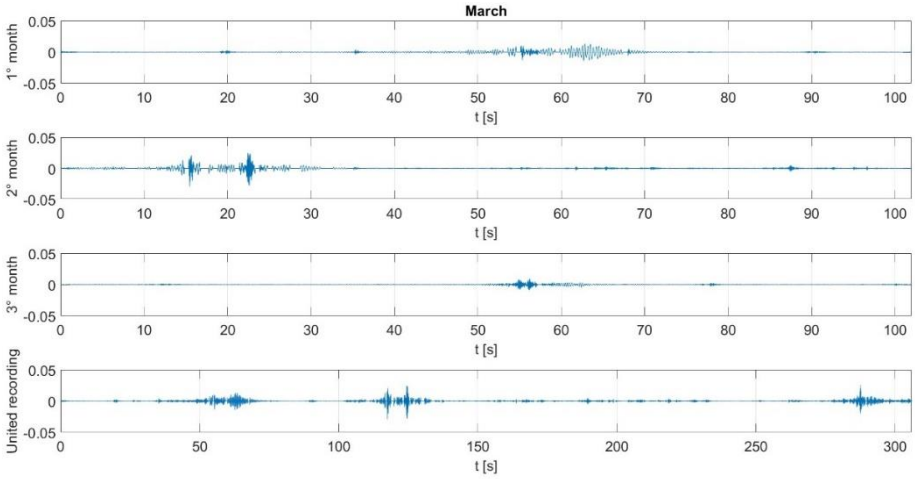


Figure 633: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.3.3 Transverse direction (z)

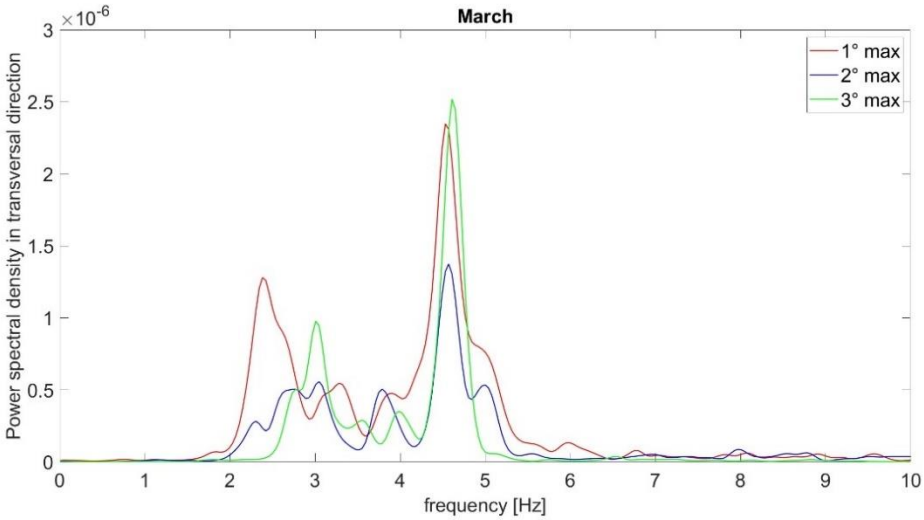


Figure 6-29: Results obtained from the 3 accelerograms with maximum SD in time domain

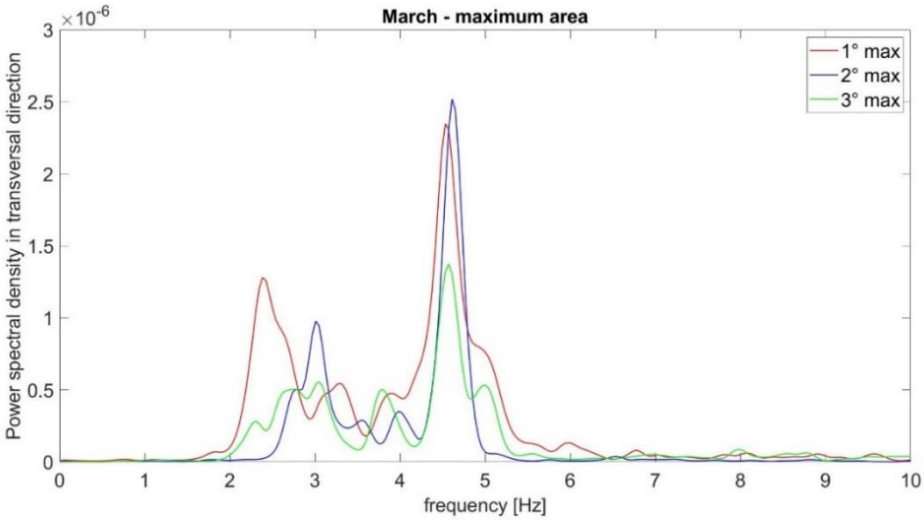


Figure 6-30: Results obtained from the 3 accelerograms with maximum area of PSD

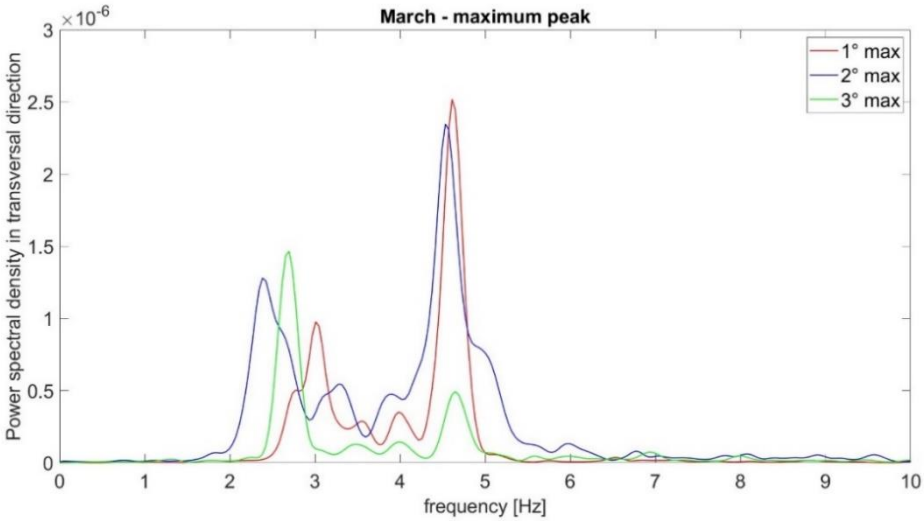


Figure 6-31: Results obtained from the 3 accelerograms with highest peak if PSD

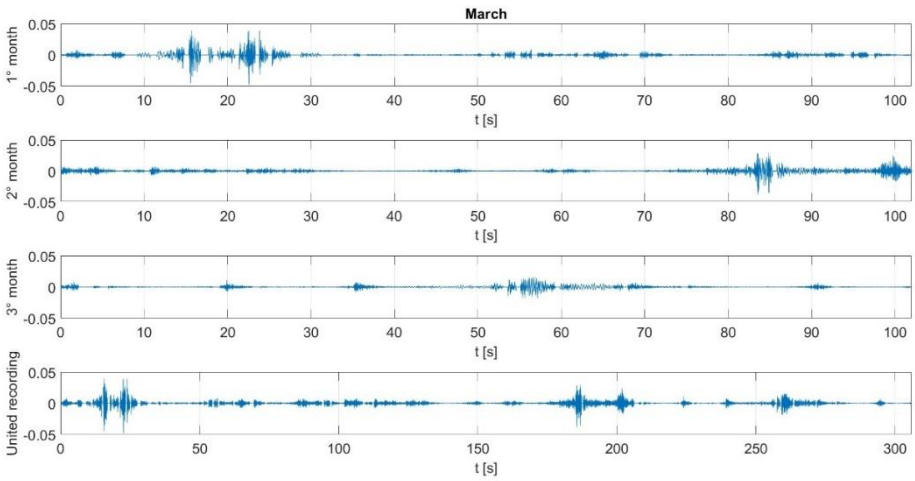


Figure 6-32: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

6.4 April

The results obtained for the April dataset are shown in the following tables.

Table 6-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-04-14_08-00-20	3.44E-03
	2°	2B7E4_2023-04-18_14-00-20	2.88E-03
	3°	2B7E4_2023-04-07_08-00-21	2.79E-03
Longitudinal direction (y)	1°	2B7E4_2023-04-06_20-00-20	5.87E-04
	2°	2B7E4_2023-04-11_08-00-20	5.83E-04
	3°	2B7E4_2023-04-20_08-00-21	5.29E-04
Transverse direction (z)	1°	2B7E4_2023-04-20_08-00-21	1.03E-03
	2°	2B7E4_2023-04-06_20-00-20	9.13E-04
	3°	2B7E4_2023-04-07_08-00-21	8.87E-04

Table 6-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-04-14_08-00-20	2.72E-05	2B7E4_2023-04-14_08-00-20	2.38E-06
2	2B7E4_2023-04-18_14-00-20	1.38E-05	2B7E4_2023-04-18_14-00-20	1.90E-06
3	2B7E4_2023-04-07_08-00-21	1.23E-05	2B7E4_2023-04-20_08-00-21	1.59E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-04-18_14-00-20	2.54E-07	2B7E4_2023-04-06_20-00-20	7.53E-08
2	2B7E4_2023-04-11_08-00-20	2.48E-07	2B7E4_2023-04-11_08-00-20	6.41E-08
3	2B7E4_2023-04-12_08-00-20	2.35E-07	2B7E4_2023-04-20_08-00-21	6.06E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-04-20_08-00-21	1.89E-06	2B7E4_2023-04-20_08-00-21	2.27E-07
2	2B7E4_2023-04-11_14-00-21	1.62E-06	2B7E4_2023-04-06_20-00-20	1.77E-07
3	2B7E4_2023-04-07_08-00-21	1.11E-06	2B7E4_2023-04-07_08-00-21	1.65E-07

Table 6-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	-	D	F	F	F
2	B	B	B	E	E	E	D	-	D
3	C	C	-	F	-	F	C	C	C

6.4.1 Vertical direction (x)

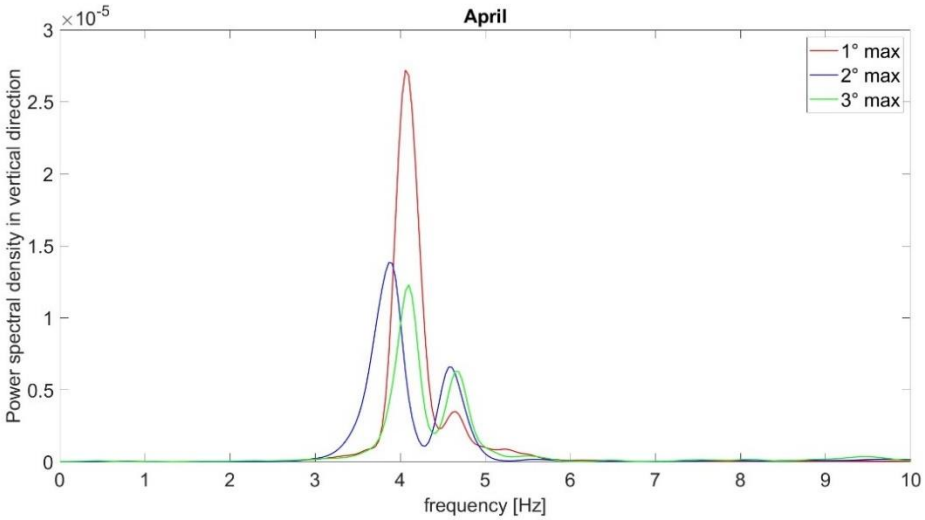


Figure 6-33: Results obtained from the 3 accelerograms with maximum SD in time domain

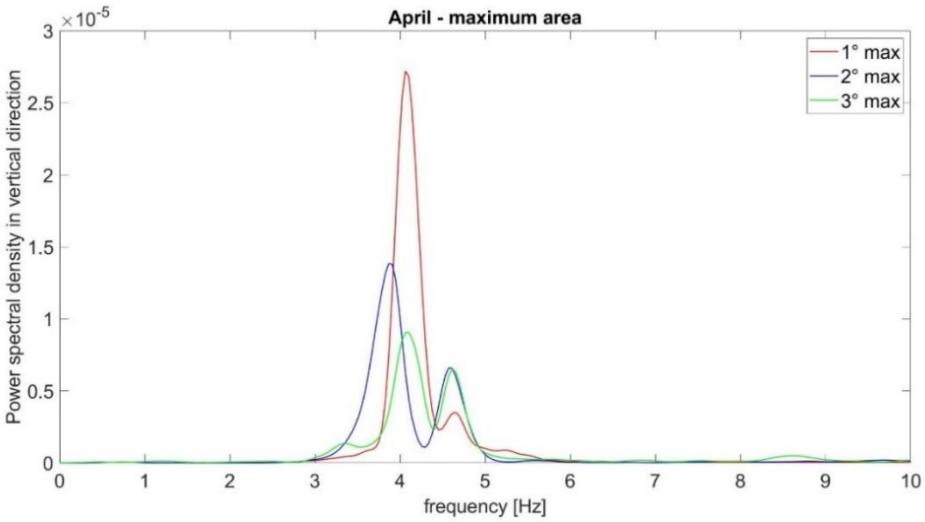


Figure 6-34: Results obtained from the 3 accelerograms with maximum area of PSD

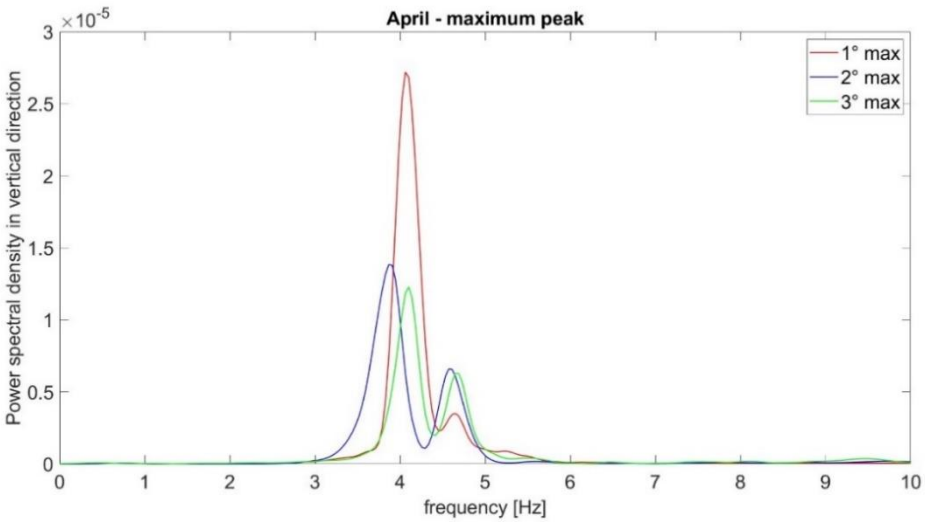


Figure 6-35: Results obtained from the 3 accelerograms with highest peak if PSD

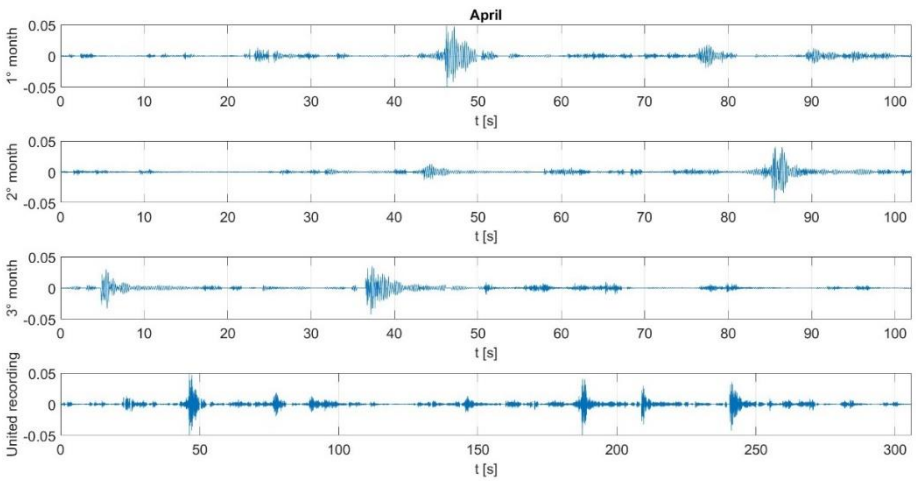


Figure 641: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.4.2 Longitudinal direction (y)

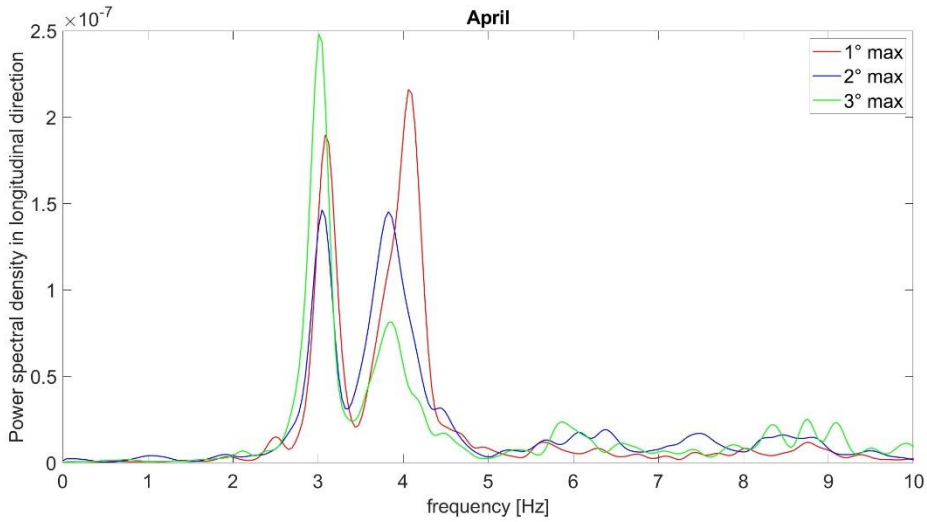


Figure 6-36: Results obtained from the 3 accelerograms with maximum SD in time domain

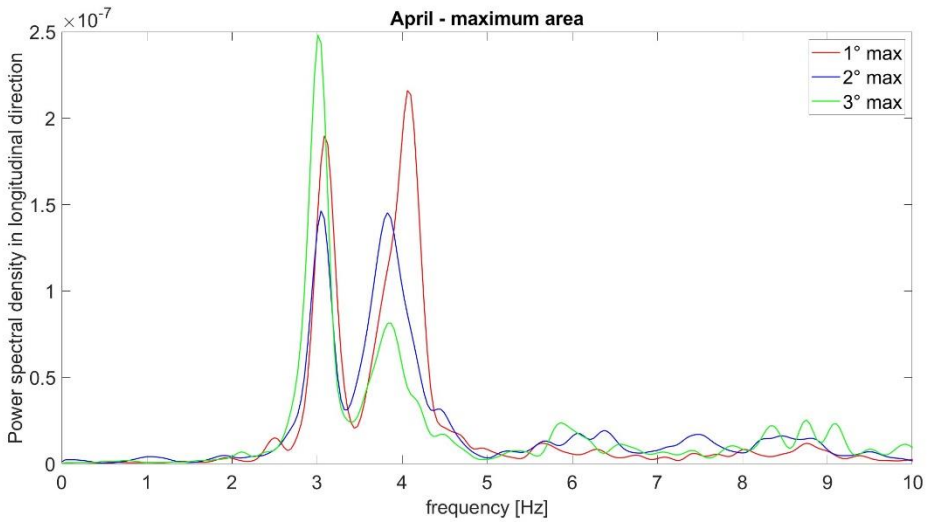


Figure 6-37: Results obtained from the 3 accelerograms with maximum area of PSD

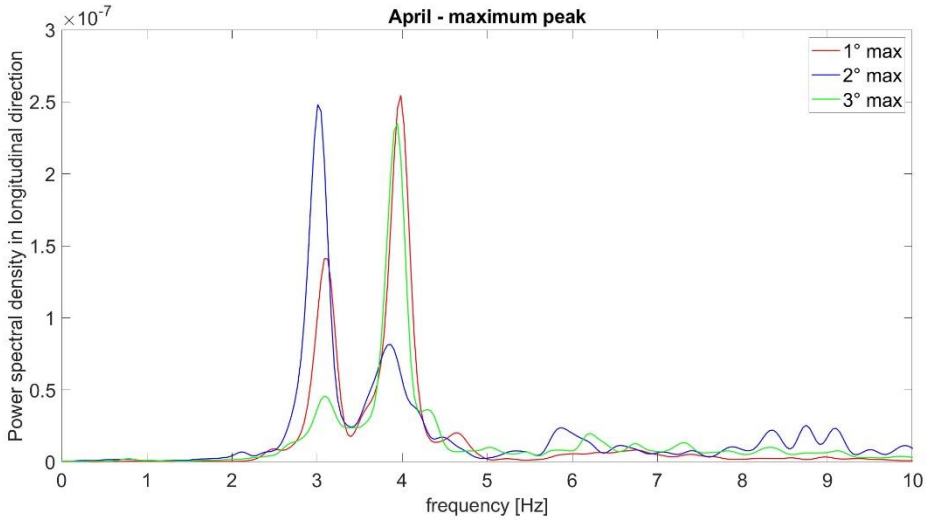


Figure 6-38: Results obtained from the 3 accelerograms with highest peak if PSD

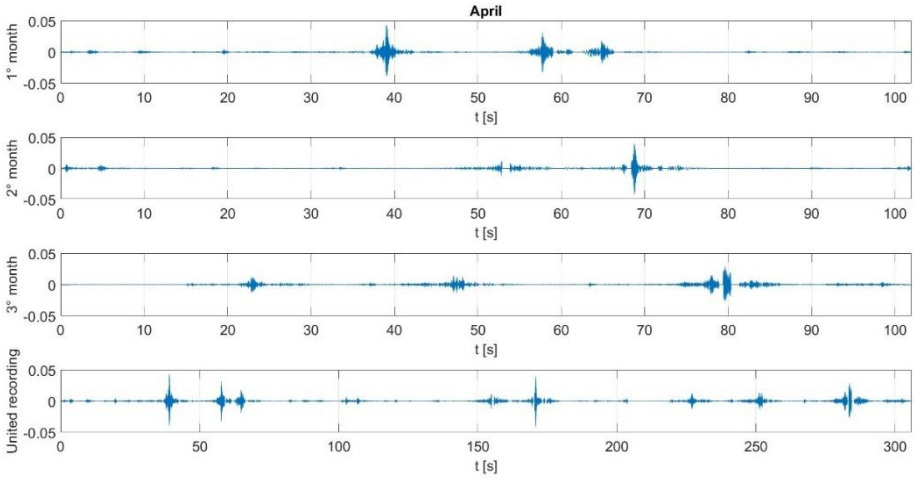


Figure 645: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.4.3 Transverse direction (z)

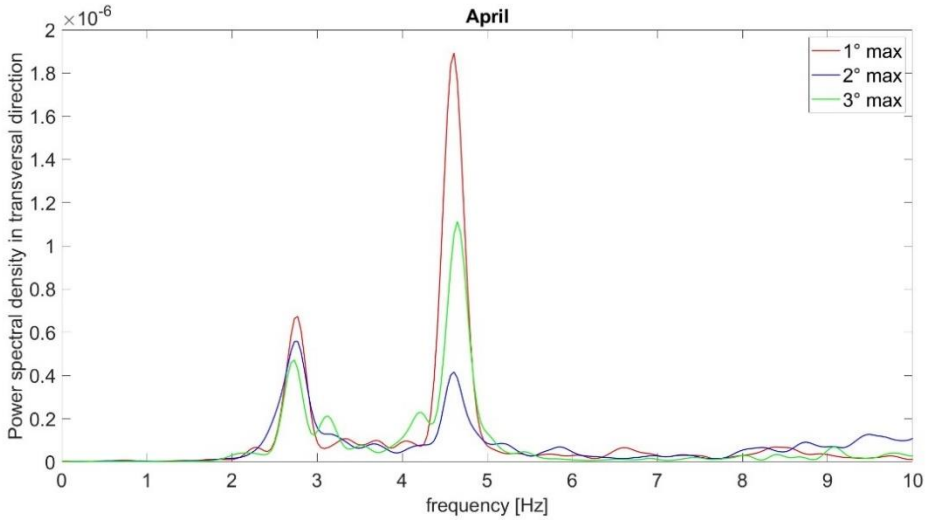


Figure 6-39: Results obtained from the 3 accelerograms with maximum SD in time domain

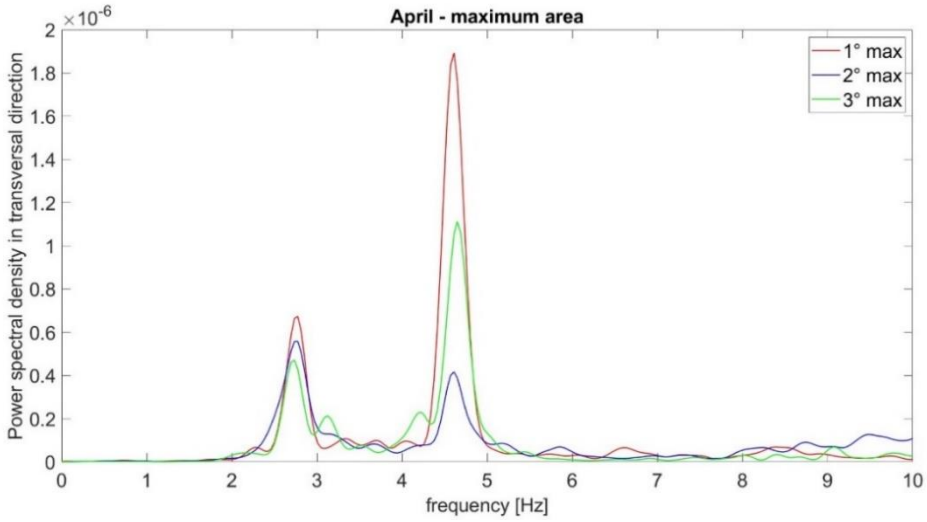


Figure 6-40: Results obtained from the 3 accelerograms with maximum area of PSD

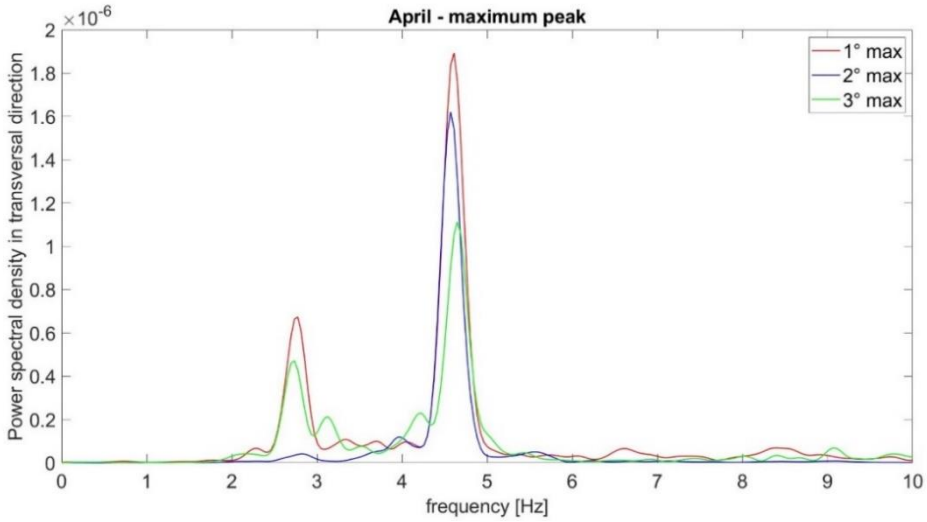


Figure 6-41: Results obtained from the 3 accelerograms with highest peak if PSD

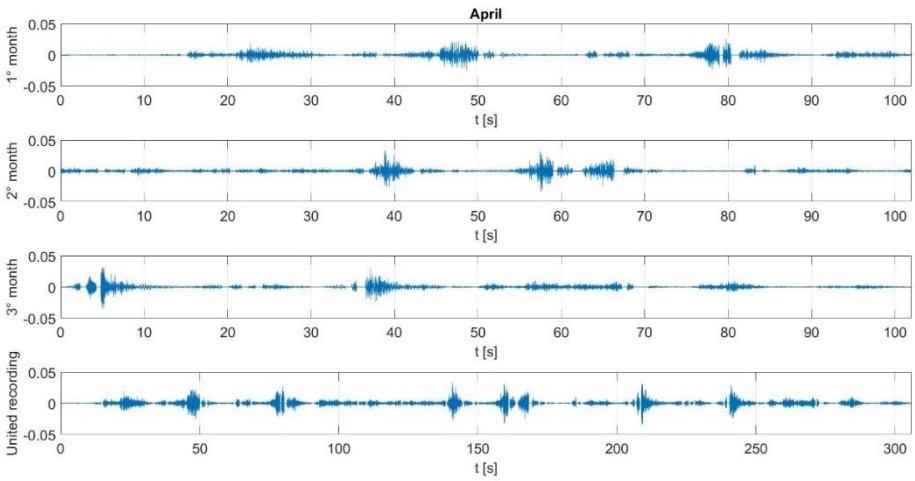


Figure 6-42: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

6.5 May

The results obtained for the May dataset are shown in the following tables.

Table 6-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-05-04_14-00-20	5.30E-03
	2°	2B7E4_2023-05-23_14-00-21	5.09E-03
	3°	2B7E4_2023-05-22_08-00-21	2.24E-03
Longitudinal direction (y)	1°	2B7E4_2023-05-19_14-00-21	1.25E-03
	2°	2B7E4_2023-05-23_14-00-21	7.21E-04
	3°	2B7E4_2023-05-04_14-00-20	5.77E-04
Transverse direction (z)	1°	2B7E4_2023-05-23_14-00-21	1.81E-03
	2°	2B7E4_2023-05-04_14-00-20	1.74E-03
	3°	2B7E4_2023-05-03_14-00-20	8.97E-04

Table 6-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-05-04_14-00-20	4.74E-05	2B7E4_2023-05-23_14-00-21	5.39E-06
2	2B7E4_2023-05-23_14-00-21	2.89E-05	2B7E4_2023-05-04_14-00-20	5.36E-06
3	2B7E4_2023-05-14_02-00-20	9.13E-06	2B7E4_2023-05-22_08-00-21	1.00E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-05-19_14-00-21	2.24E-06	2B7E4_2023-05-19_14-00-21	1.20E-07
2	2B7E4_2023-05-23_14-00-21	4.88E-07	2B7E4_2023-05-23_14-00-21	1.05E-07
3	2B7E4_2023-05-04_14-00-20	3.45E-07	2B7E4_2023-05-04_14-00-20	6.89E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-05-04_14-00-20	8.99E-06	2B7E4_2023-05-23_14-00-21	6.70E-07
2	2B7E4_2023-05-23_14-00-21	6.74E-06	2B7E4_2023-05-04_14-00-20	6.04E-07
3	2B7E4_2023-05-03_14-00-20	1.61E-06	2B7E4_2023-05-03_14-00-20	1.70E-07

Table 6-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	B	D	D	D	B	A	B
2	B	B	A	B	B	B	A	B	A
3	C	-	C	A	A	A	E	E	E

6.5.1 Vertical direction (x)

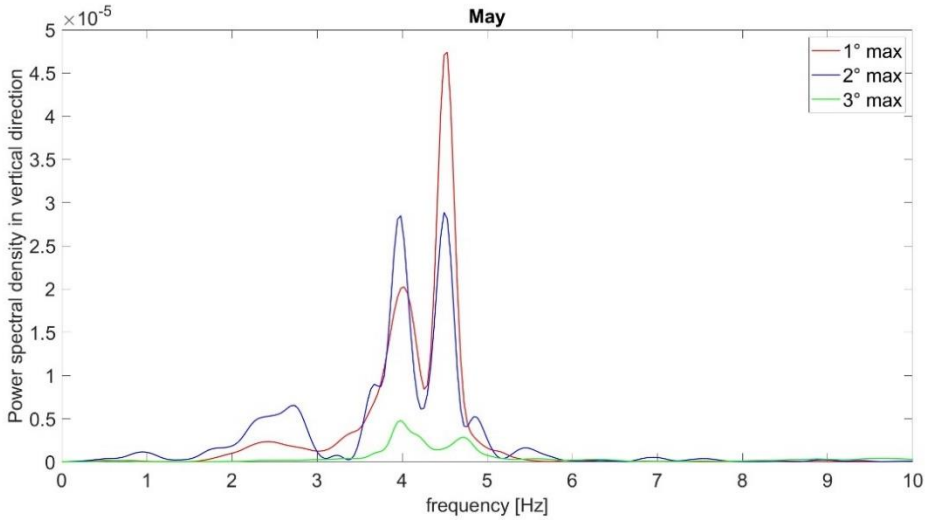


Figure 6-43: Results obtained from the 3 accelerograms with maximum SD in time domain

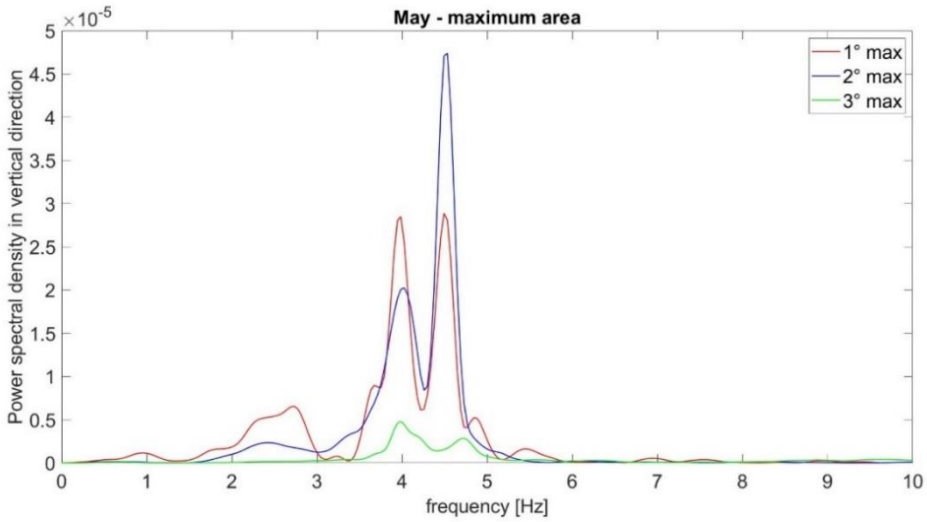


Figure 6-44: Results obtained from the 3 accelerograms with maximum area of PSD

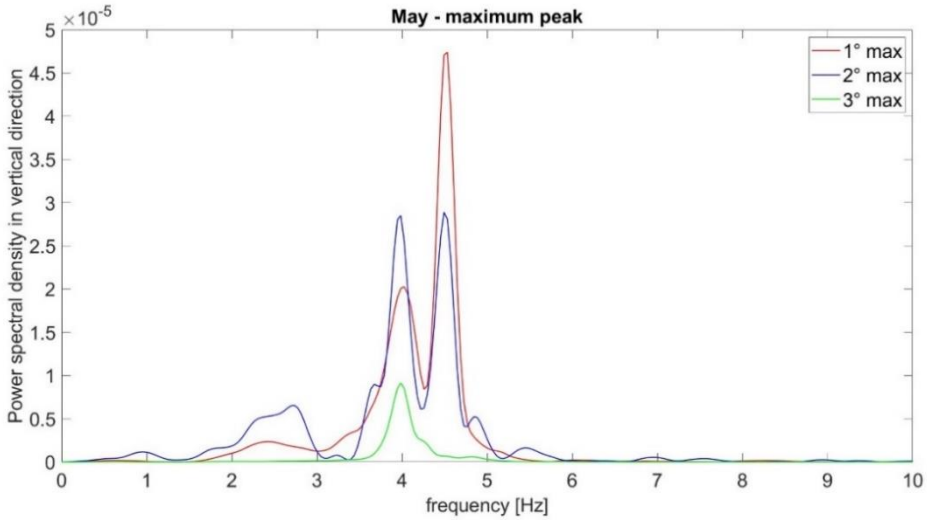


Figure 6-45: Results obtained from the 3 accelerograms with highest peak if PSD

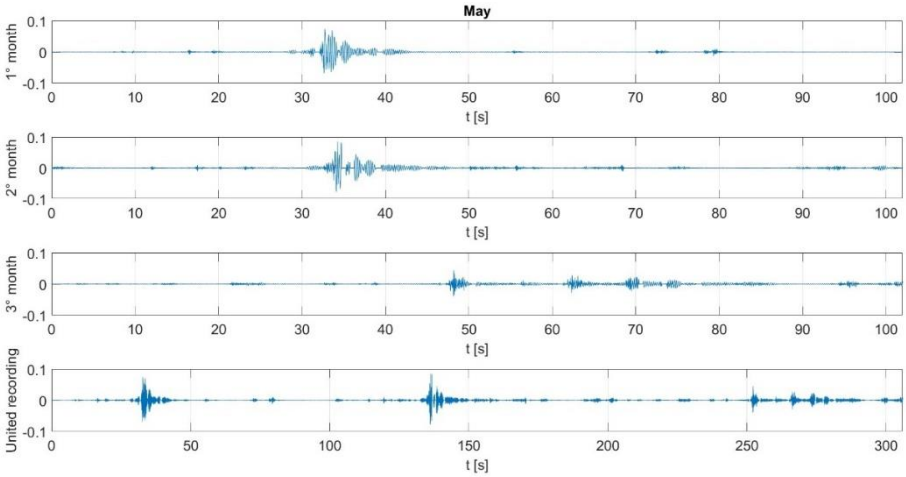


Figure 653: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.5.2 Longitudinal direction (y)

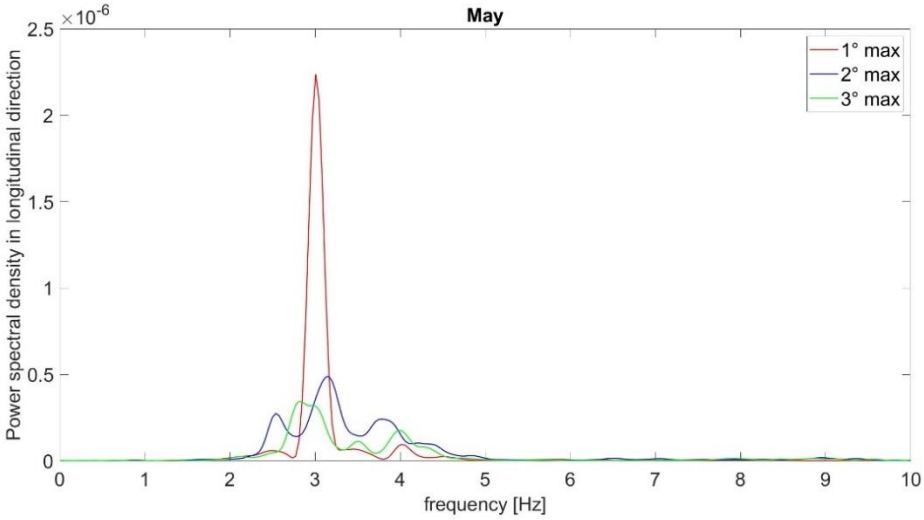


Figure 6-46: Results obtained from the 3 accelerograms with maximum SD in time domain

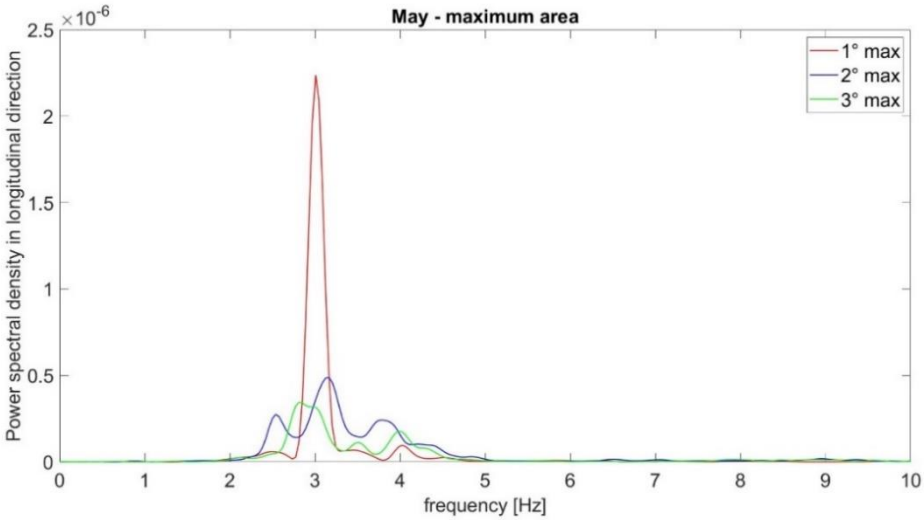


Figure 6-47: Results obtained from the 3 accelerograms with maximum area of PSD

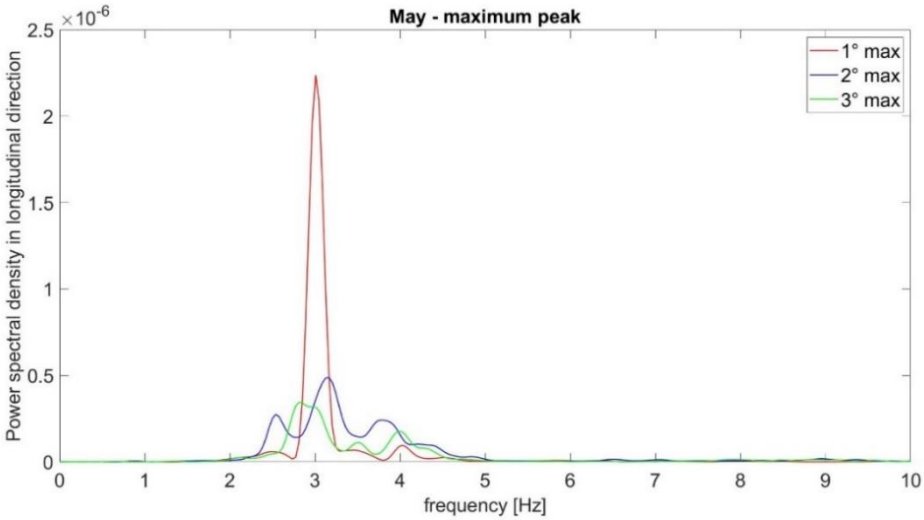


Figure 6-48: Results obtained from the 3 accelerograms with highest peak if PSD

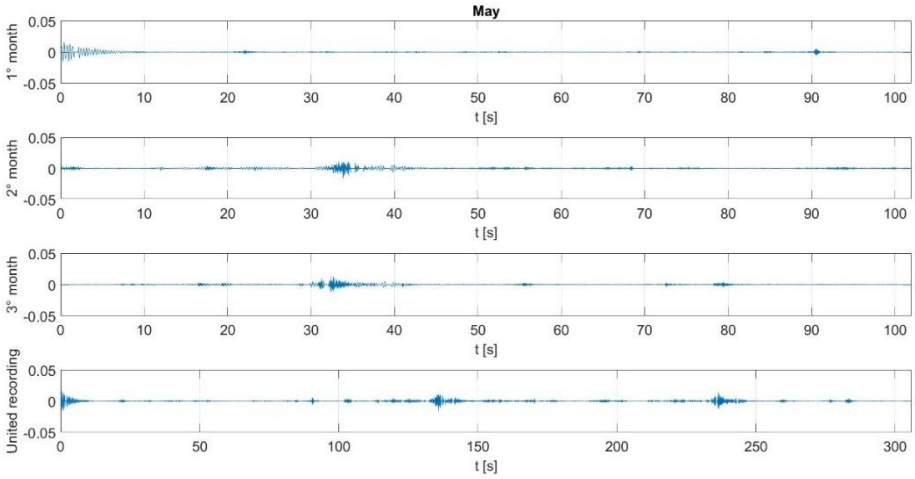


Figure 657: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.5.3 Transverse direction (z)

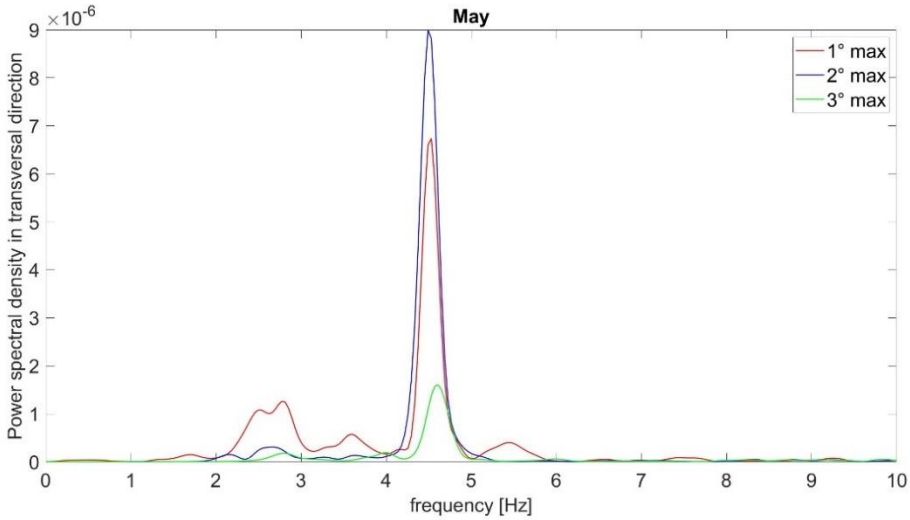


Figure 6-49: Results obtained from the 3 accelerograms with maximum SD in time domain

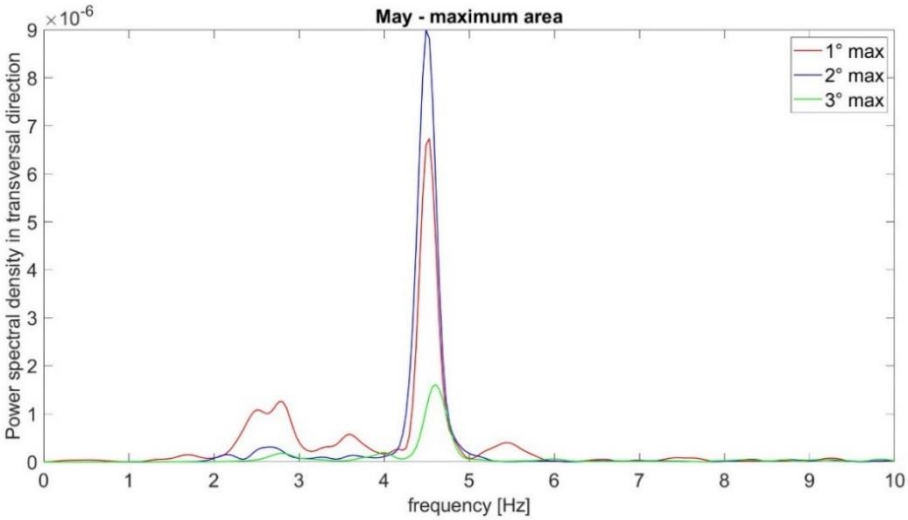


Figure 6-50: Results obtained from the 3 accelerograms with maximum area of PSD

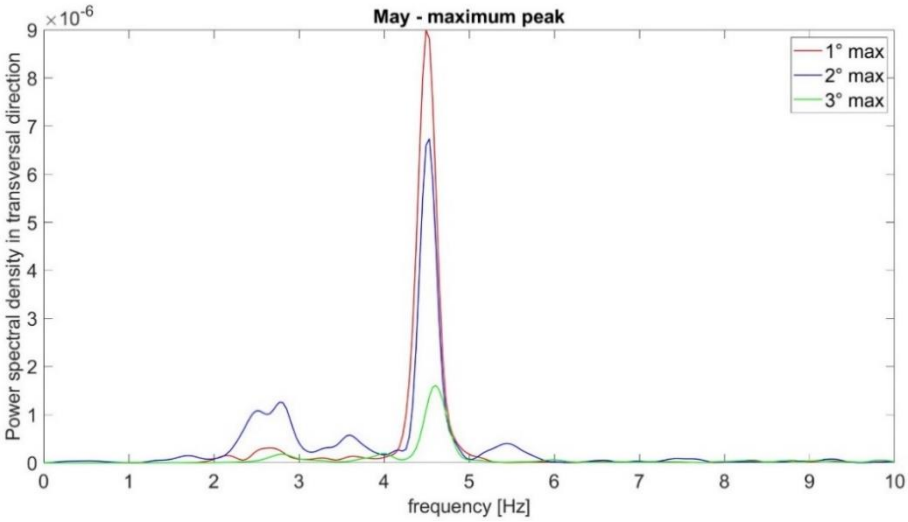


Figure 6-51: Results obtained from the 3 accelerograms with highest peak if PSD

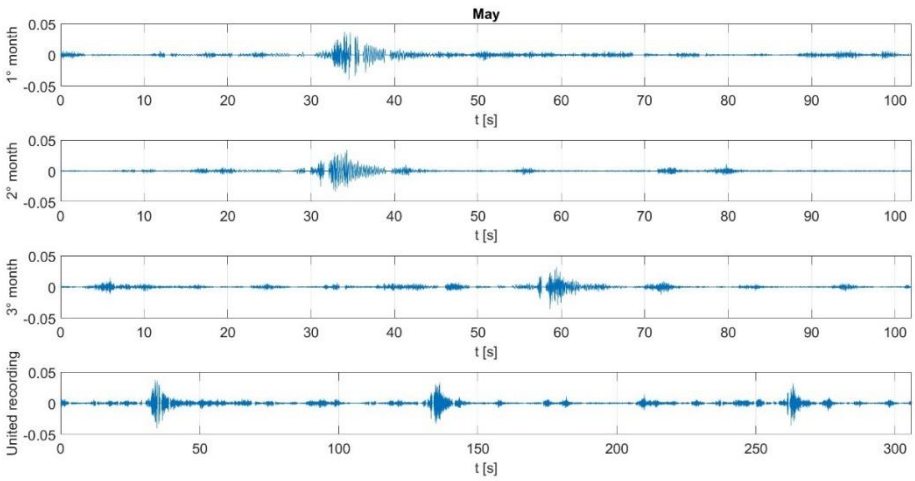


Figure 6-52: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

6.6 June

The results obtained for the June dataset are shown in the following tables.

Table 6-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-06-13_08-00-20	5.11E-03
	2°	2B7E4_2023-06-20_08-00-20	2.84E-03
	3°	2B7E4_2023-06-28_14-00-21	2.65E-03
Longitudinal direction (y)	1°	2B7E4_2023-06-13_08-00-20	1.13E-03
	2°	2B7E4_2023-06-27_14-00-21	5.46E-04
	3°	2B7E4_2023-06-20_08-00-20	4.88E-04
Transverse direction (z)	1°	2B7E4_2023-06-13_08-00-20	1.22E-03
	2°	2B7E4_2023-06-28_14-00-21	1.06E-03
	3°	2B7E4_2023-06-20_08-00-20	9.23E-04

Table 6-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-06-13_08-00-20	4.35E-05	2B7E4_2023-06-13_08-00-20	5.81E-06
2	2B7E4_2023-06-20_08-00-20	1.26E-05	2B7E4_2023-06-20_08-00-20	1.76E-06
3	2B7E4_2023-06-28_14-00-21	1.18E-05	2B7E4_2023-06-28_14-00-21	1.54E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-06-13_08-00-20	2.62E-06	2B7E4_2023-06-13_08-00-20	2.64E-07
2	2B7E4_2023-06-20_08-00-20	3.57E-07	2B7E4_2023-06-27_14-00-21	6.24E-08
3	2B7E4_2023-06-27_14-00-21	3.07E-07	2B7E4_2023-06-23_20-00-20	4.97E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-06-28_14-00-21	1.65E-06	2B7E4_2023-06-13_08-00-20	3.10E-07
2	2B7E4_2023-06-13_08-00-20	1.45E-06	2B7E4_2023-06-28_14-00-21	2.28E-07
3	2B7E4_2023-06-20_08-00-20	1.44E-06	2B7E4_2023-06-20_08-00-20	1.84E-07

Table 6-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	E	A
2	B	B	B	D	B	D	E	A	E
3	C	C	C	B	D	-	B	B	B

6.6.1 Vertical direction (x)

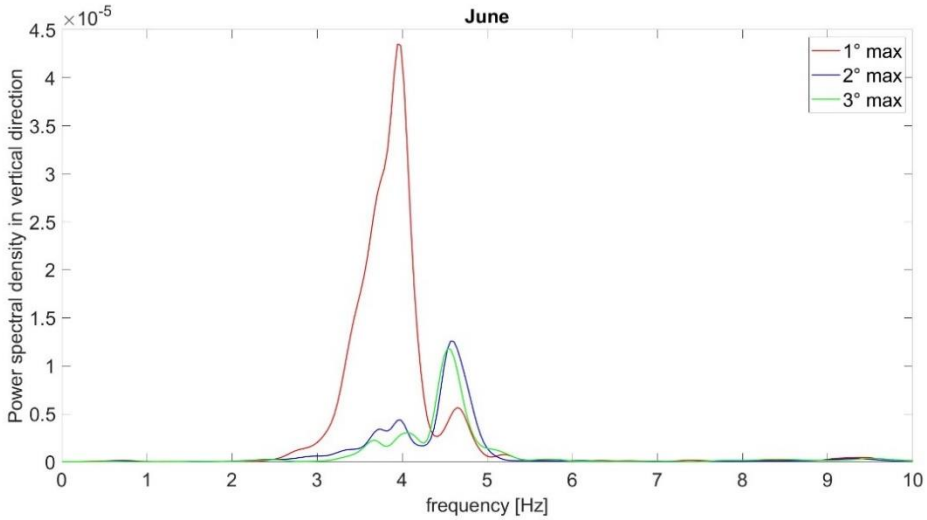


Figure 6-53: Results obtained from the 3 accelerograms with maximum SD in time domain

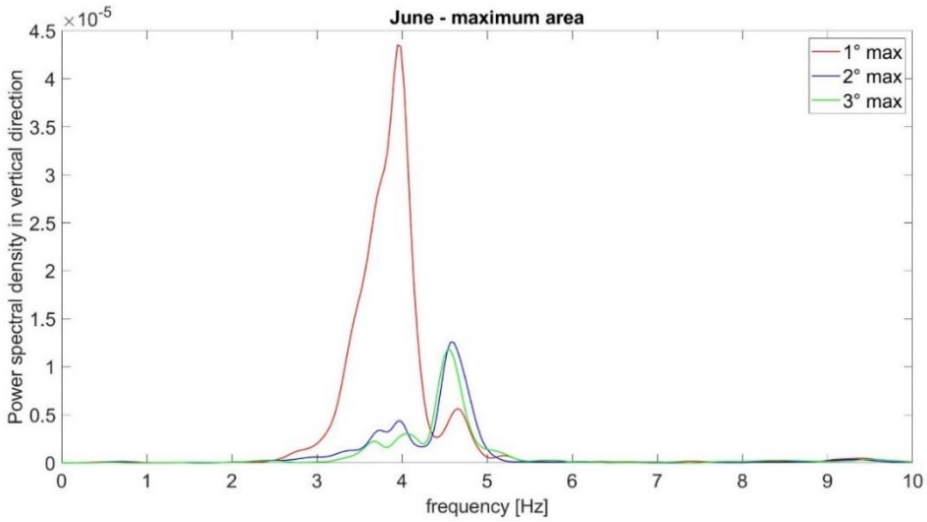


Figure 6-54: Results obtained from the 3 accelerograms with maximum area of PSD

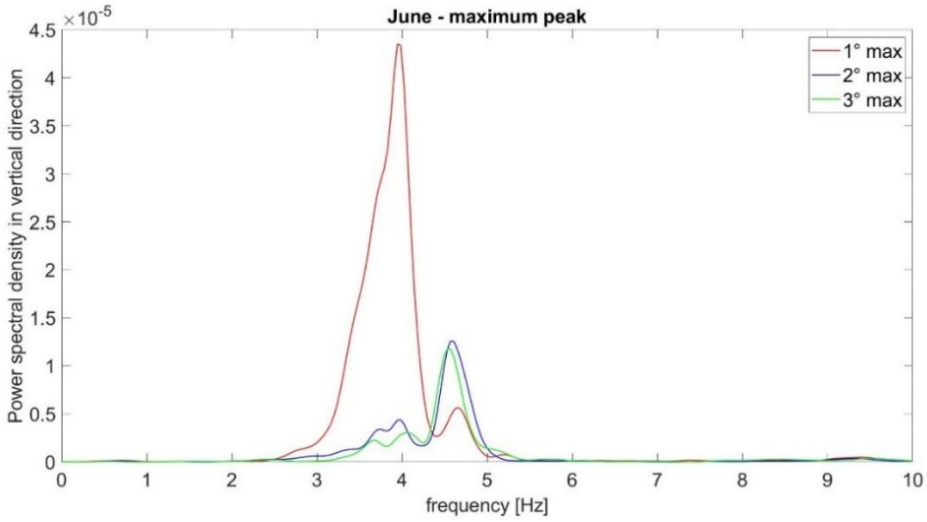


Figure 6-55: Results obtained from the 3 accelerograms with highest peak if PSD

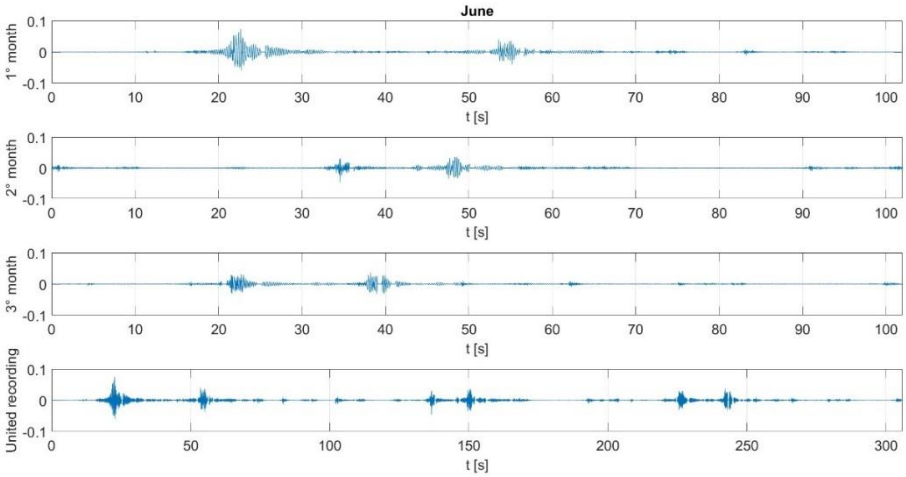


Figure 665: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.6.2 Longitudinal direction (y)

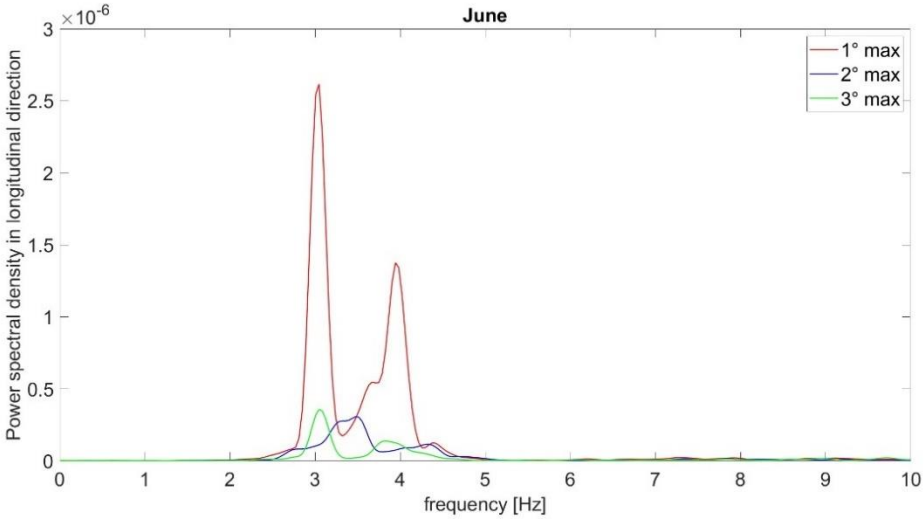


Figure 6-56: Results obtained from the 3 accelerograms with maximum SD in time domain

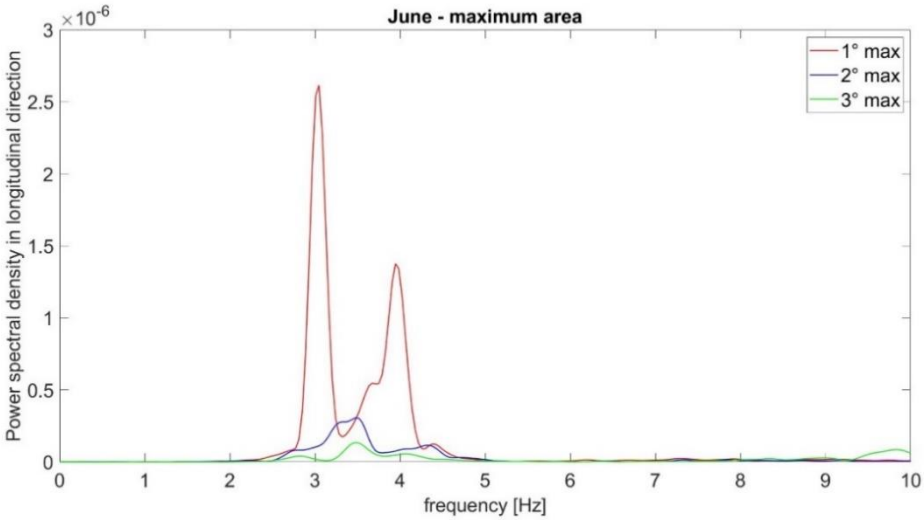


Figure 6-57: Results obtained from the 3 accelerograms with maximum area of PSD

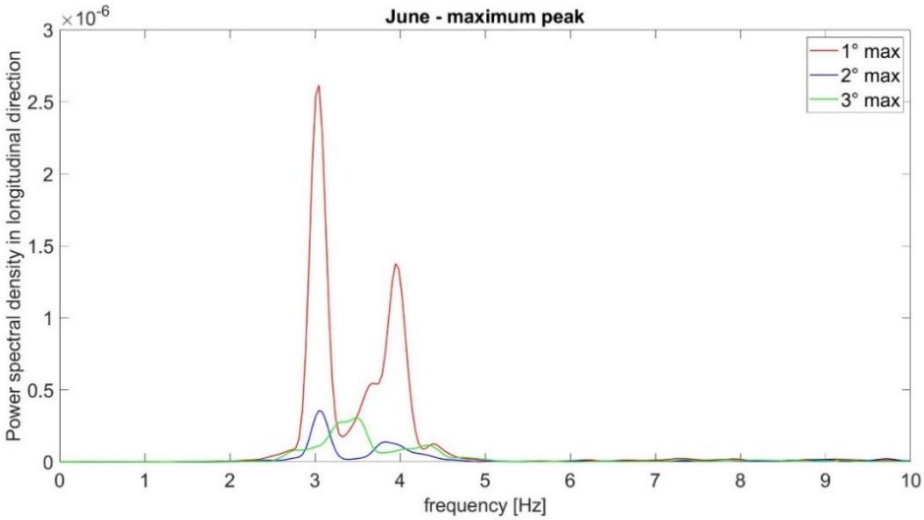


Figure 6-58: Results obtained from the 3 accelerograms with highest peak if PSD

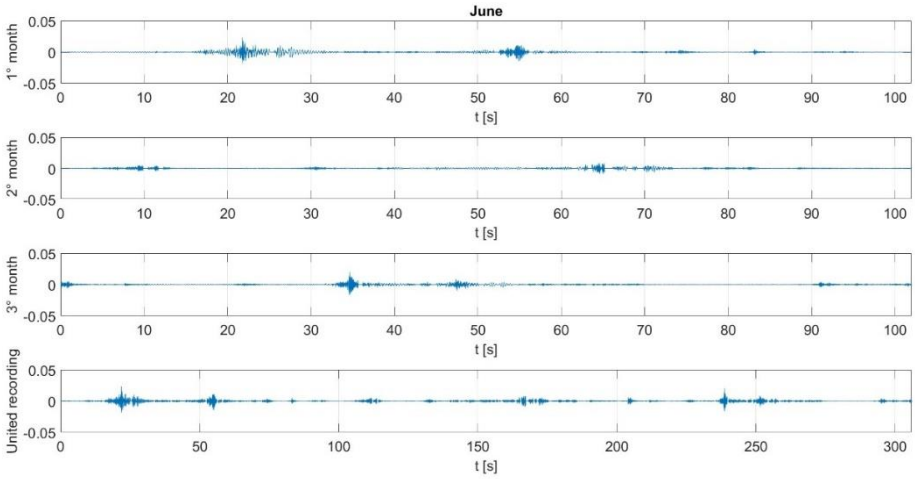


Figure 669: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.6.3 Transverse direction (z)

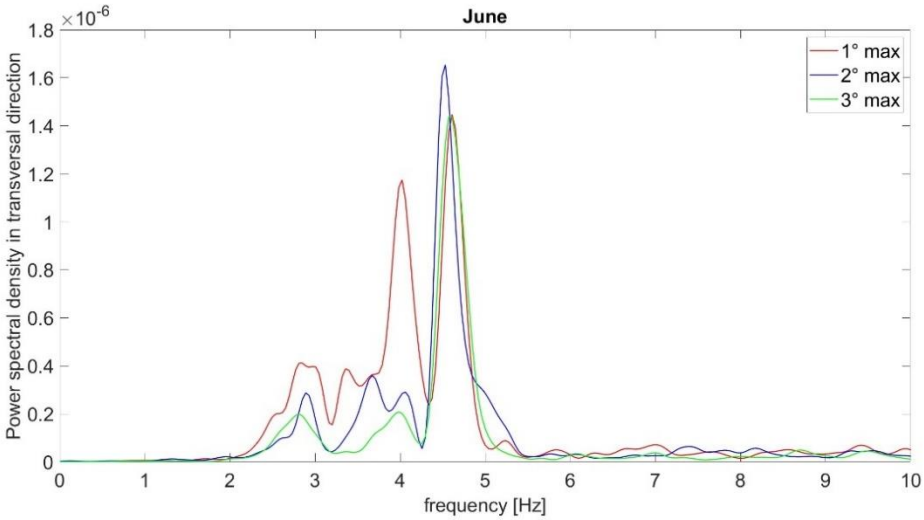


Figure 6-59: Results obtained from the 3 accelerograms with maximum SD in time domain

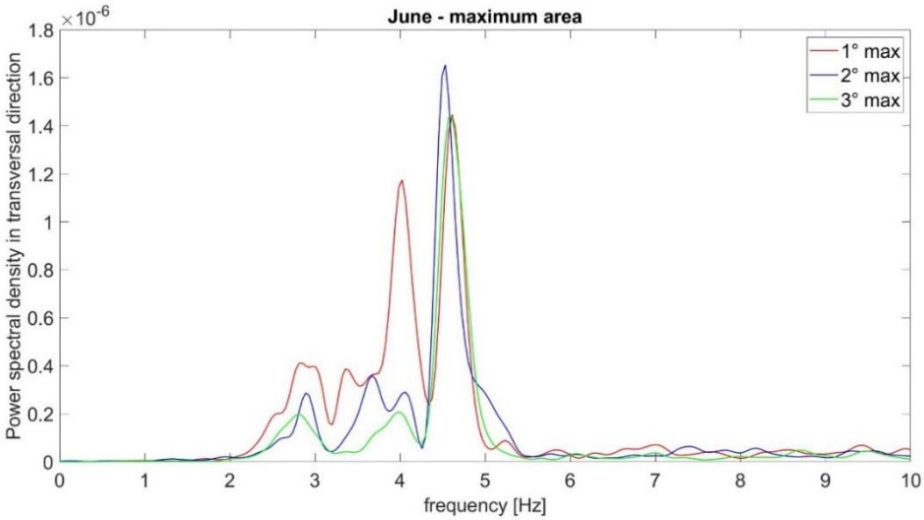


Figure 6-60: Results obtained from the 3 accelerograms with maximum area of PSD

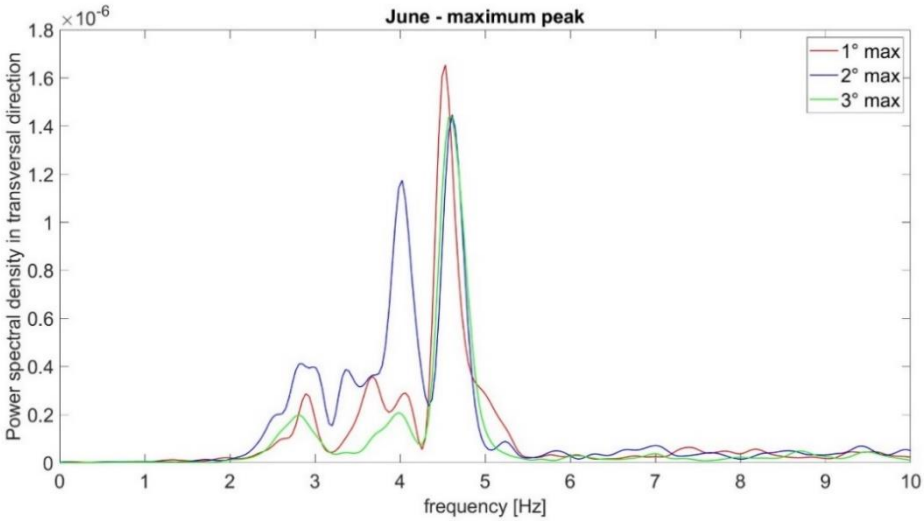


Figure 6-61: Results obtained from the 3 accelerograms with highest peak if PSD

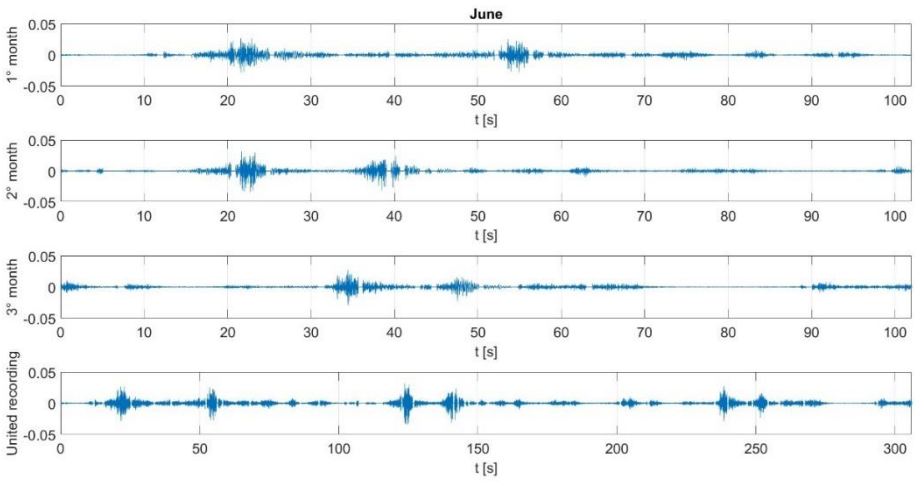


Figure 6-62: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

6.7 July

The results obtained for the July dataset are shown in the following tables.

Table 6-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-07-17_14-00-20	3.11E-03
	2°	2B7E4_2023-07-20_14-00-22	2.92E-03
	3°	2B7E4_2023-07-19_08-00-20	2.90E-03
Longitudinal direction (y)	1°	2B7E4_2023-07-07_14-00-21	6.70E-04
	2°	2B7E4_2023-07-17_14-00-20	6.23E-04
	3°	2B7E4_2023-07-25_08-00-21	5.79E-04
Transverse direction (z)	1°	2B7E4_2023-07-17_14-00-20	9.62E-04
	2°	2B7E4_2023-07-13_14-00-21	9.27E-04
	3°	2B7E4_2023-07-19_08-00-20	8.92E-04

Table 6-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-07-29_14-00-21	1.96E-05	2B7E4_2023-07-17_14-00-20	2.11E-06
2	2B7E4_2023-07-17_14-00-20	1.85E-05	2B7E4_2023-07-19_08-00-20	1.95E-06
3	2B7E4_2023-07-19_08-00-20	1.30E-05	2B7E4_2023-07-20_14-00-22	1.69E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-07-07_14-00-21	8.53E-07	2B7E4_2023-07-07_14-00-21	9.90E-08
2	2B7E4_2023-07-17_14-00-20	4.21E-07	2B7E4_2023-07-17_14-00-20	7.98E-08
3	2B7E4_2023-07-20_14-00-22	2.49E-07	2B7E4_2023-07-20_14-00-22	5.56E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-07-19_08-00-20	1.70E-06	2B7E4_2023-07-17_14-00-20	1.92E-07
2	2B7E4_2023-07-13_14-00-21	1.54E-06	2B7E4_2023-07-13_14-00-21	1.79E-07
3	2B7E4_2023-07-17_14-00-20	1.22E-06	2B7E4_2023-07-19_08-00-20	1.69E-07

Table 6-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	D	D	D	A	C	A
2	B	A	C	A	A	A	F	F	F
3	C	C	B	-	E	E	C	A	C

6.7.1 Vertical direction (x)

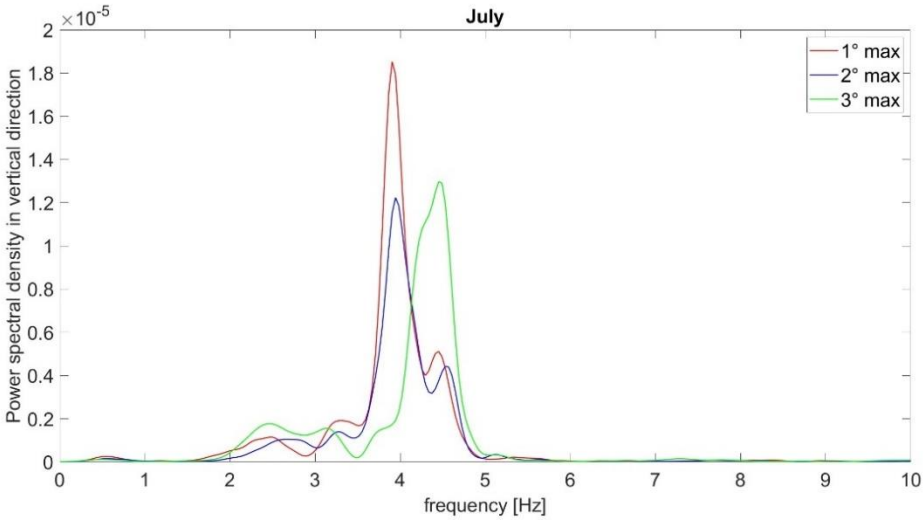


Figure 6-63: Results obtained from the 3 accelerograms with maximum SD in time domain

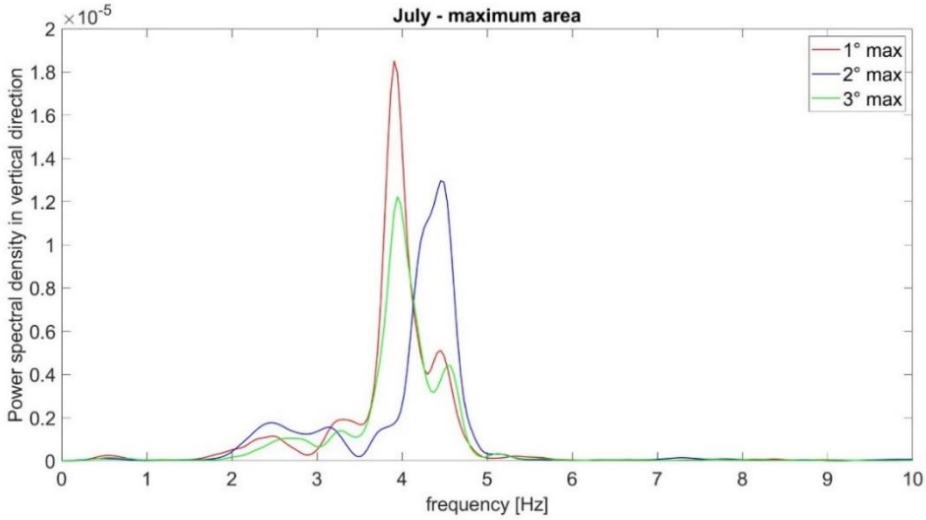


Figure 6-64: Results obtained from the 3 accelerograms with maximum area of PSD

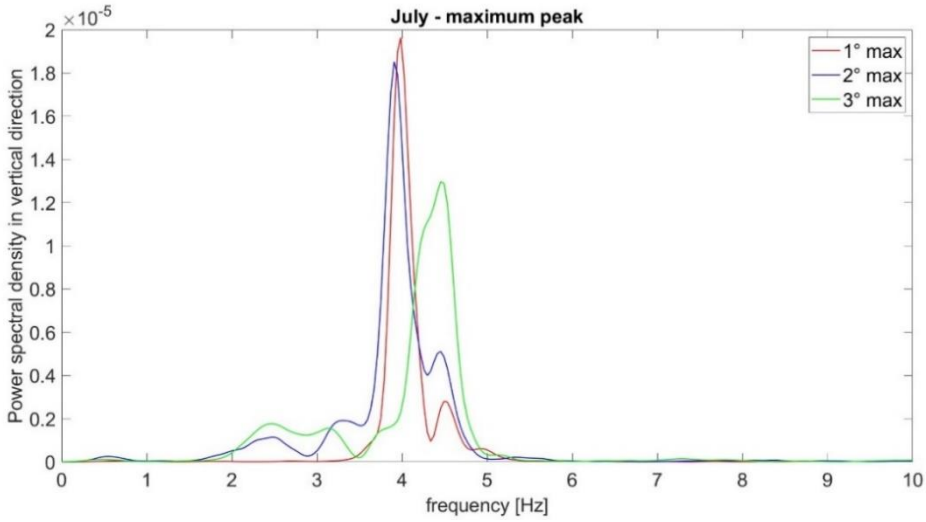


Figure 6-65: Results obtained from the 3 accelerograms with highest peak if PSD

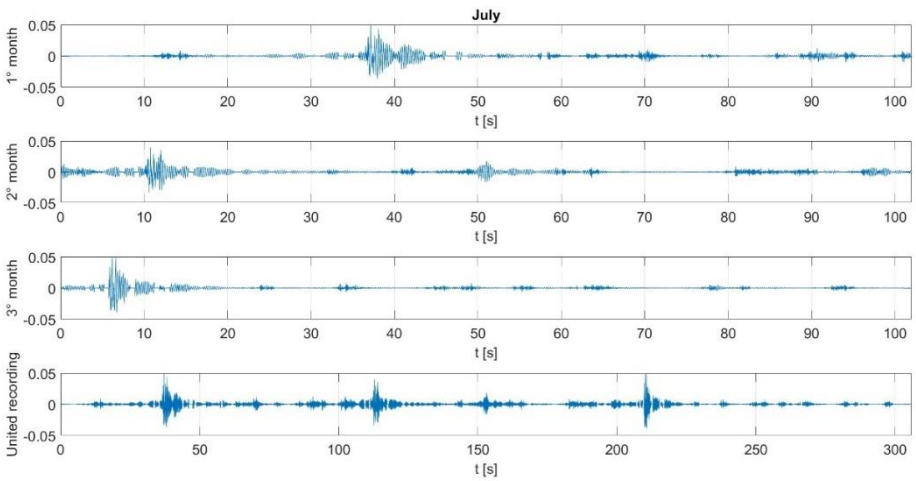


Figure 6-66: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.7.2 Longitudinal direction (y)

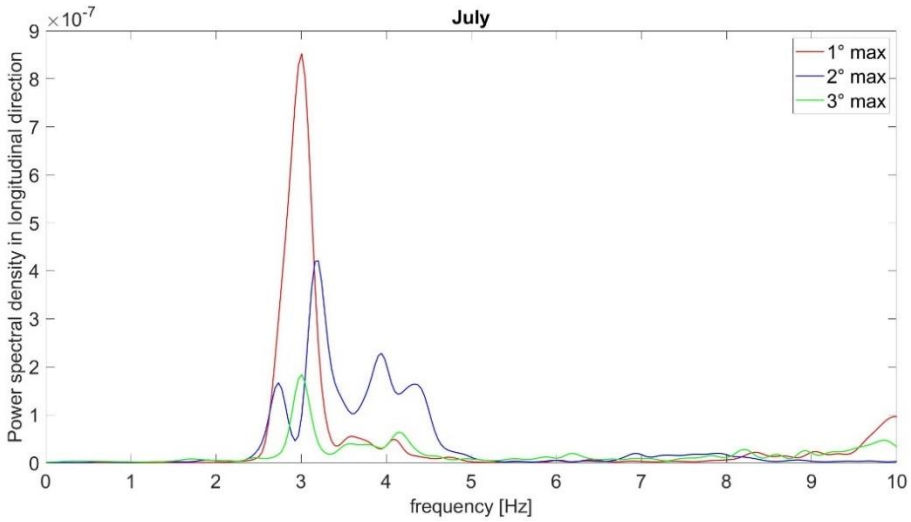


Figure 6-67: Results obtained from the 3 accelerograms with maximum SD in time domain

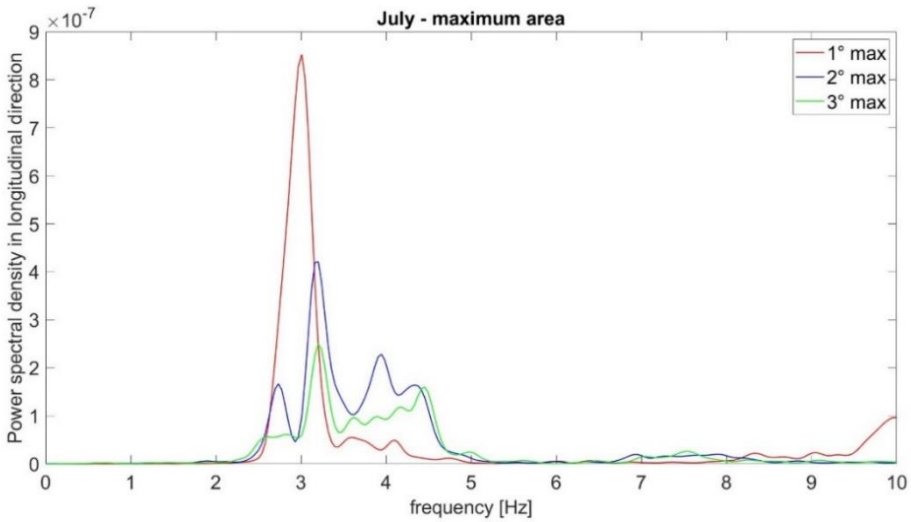


Figure 6-68: Results obtained from the 3 accelerograms with maximum area of PSD

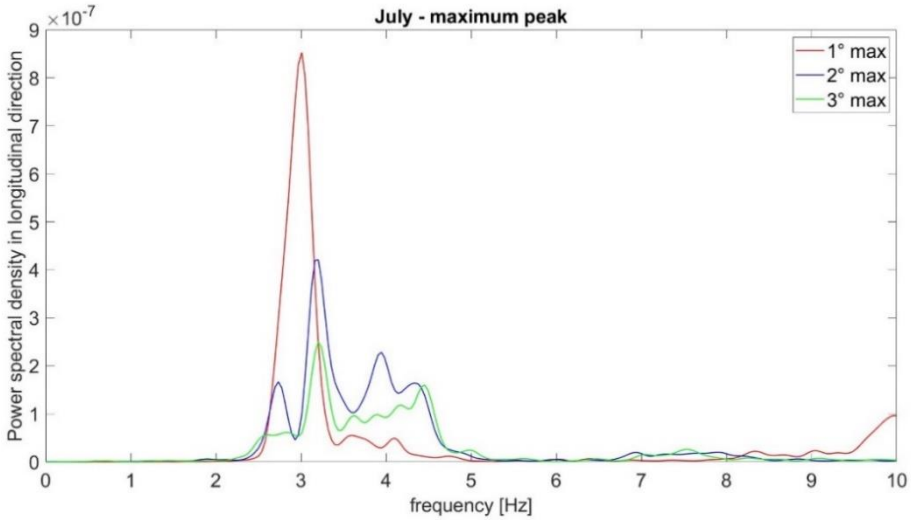


Figure 6-69: Results obtained from the 3 accelerograms with highest peak if PSD

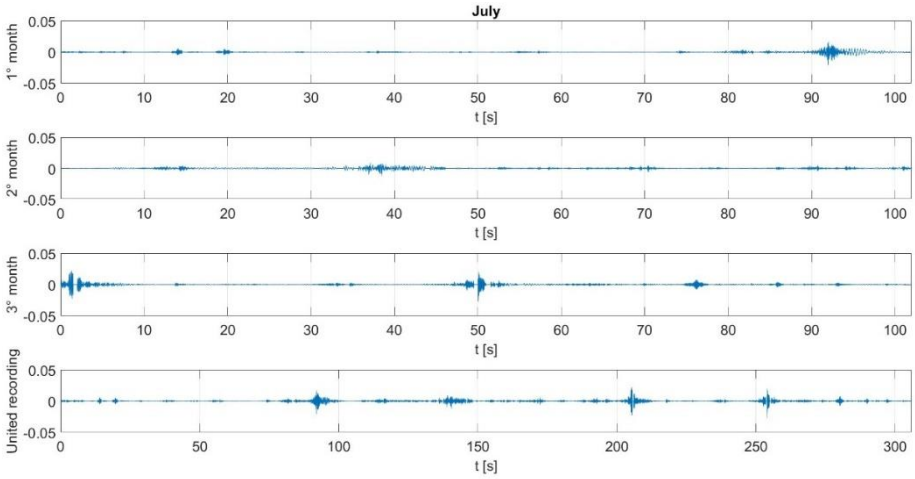


Figure 6-70: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.7.3 Transverse direction (z)

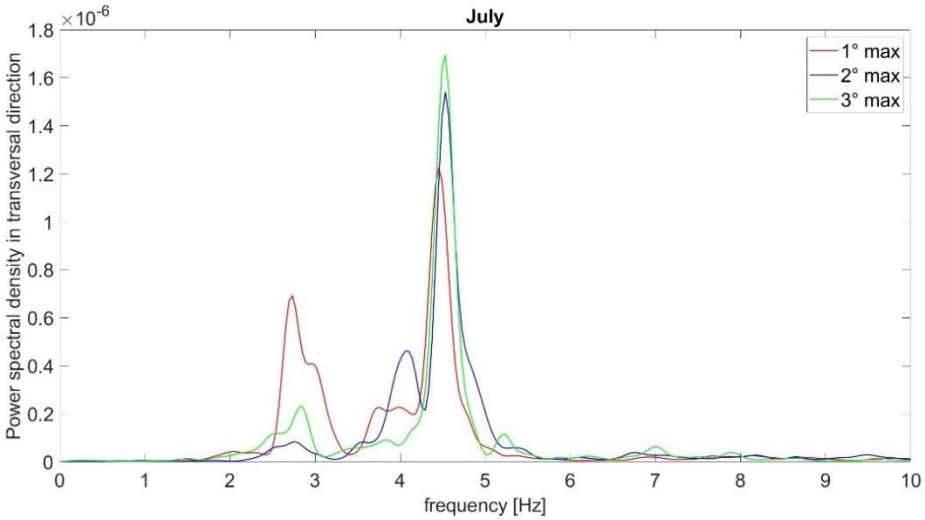


Figure 6-71: Results obtained from the 3 accelerograms with maximum SD in time domain

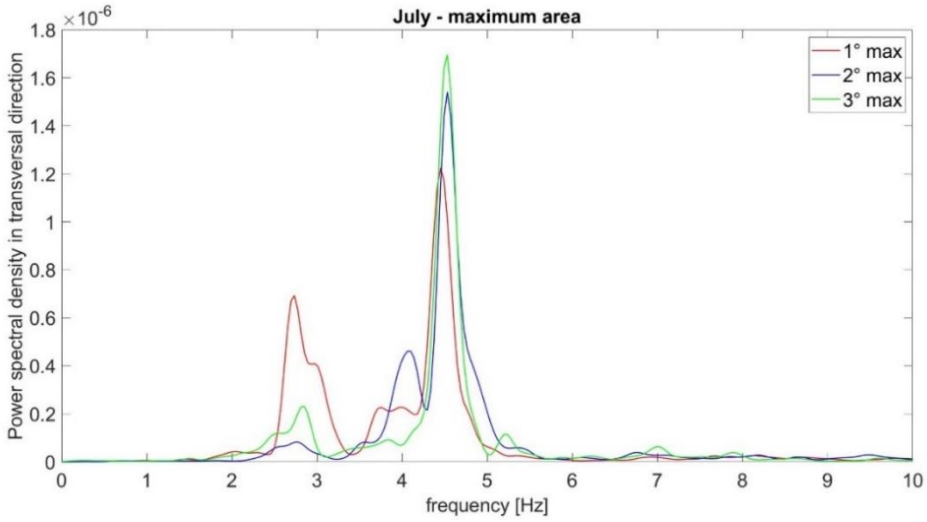


Figure 6-72: Results obtained from the 3 accelerograms with maximum area of PSD

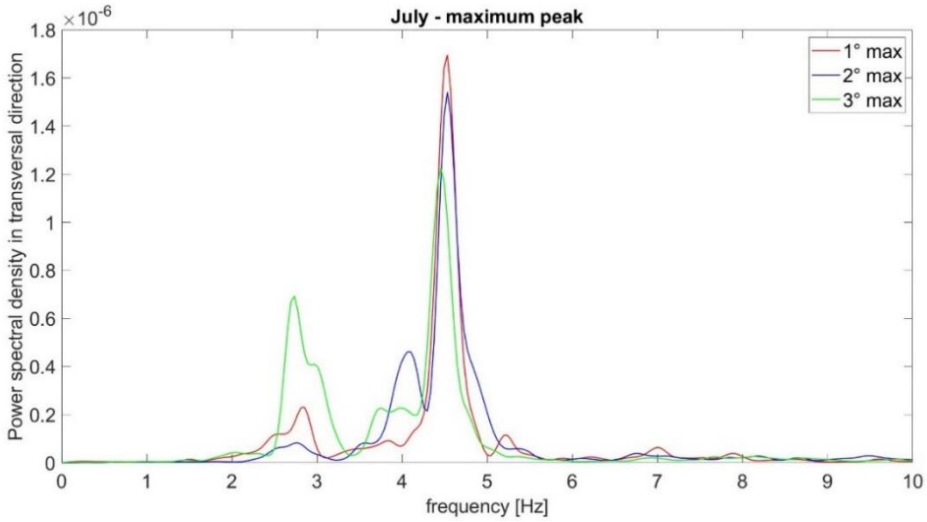


Figure 6-73: Results obtained from the 3 accelerograms with highest peak if PSD

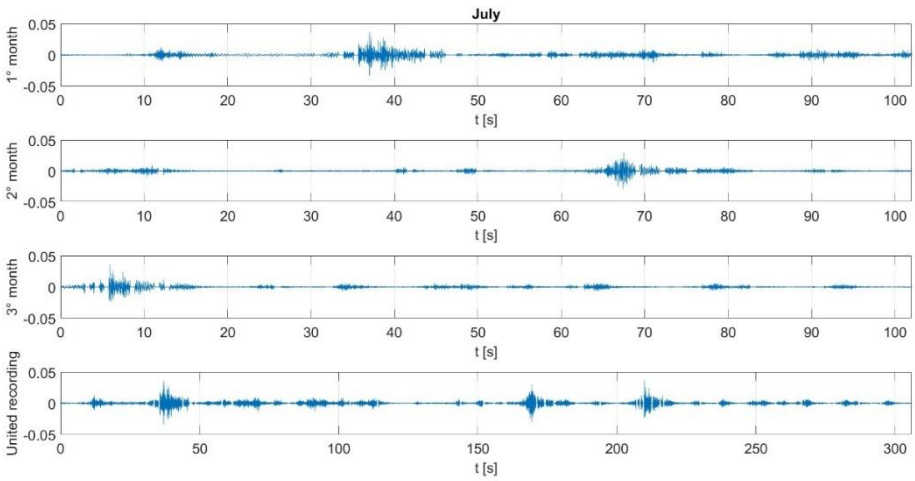


Figure 6-74: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

6.8 August

The results obtained for the August dataset are shown in the following tables.

Table 6-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-08-07_14-00-21	5.00E-03
	2°	2B7E4_2023-08-29_08-00-21	3.26E-03
	3°	2B7E4_2023-08-17_08-00-21	2.37E-03
Longitudinal direction (y)	1°	2B7E4_2023-08-07_14-00-21	6.26E-04
	2°	2B7E4_2023-08-02_08-00-21	5.36E-04
	3°	2B7E4_2023-08-29_08-00-21	5.23E-04
Transverse direction (z)	1°	2B7E4_2023-08-07_14-00-21	1.36E-03
	2°	2B7E4_2023-08-29_08-00-21	1.01E-03
	3°	2B7E4_2023-08-17_08-00-21	7.34E-04

Table 6-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-08-07_14-00-21	2.78E-05	2B7E4_2023-08-07_14-00-21	5.25E-06
2	2B7E4_2023-08-29_08-00-21	2.50E-05	2B7E4_2023-08-29_08-00-21	2.18E-06
3	2B7E4_2023-08-31_14-00-21	8.17E-06	2B7E4_2023-08-17_08-00-21	1.20E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-08-07_14-00-21	4.54E-07	2B7E4_2023-08-07_14-00-21	8.04E-08
2	2B7E4_2023-08-02_08-00-21	3.78E-07	2B7E4_2023-08-02_08-00-21	5.89E-08
3	2B7E4_2023-08-29_08-00-21	2.13E-07	2B7E4_2023-08-29_08-00-21	5.44E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-08-07_14-00-21	4.13E-06	2B7E4_2023-08-07_14-00-21	3.82E-07
2	2B7E4_2023-08-29_08-00-21	1.03E-06	2B7E4_2023-08-29_08-00-21	2.14E-07
3	2B7E4_2023-08-17_08-00-21	5.30E-07	2B7E4_2023-08-17_08-00-21	1.18E-07

Table 6-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	D	D	D	B	B	B
3	C	-	C	B	B	B	C	C	C

6.8.1 Vertical direction (x)

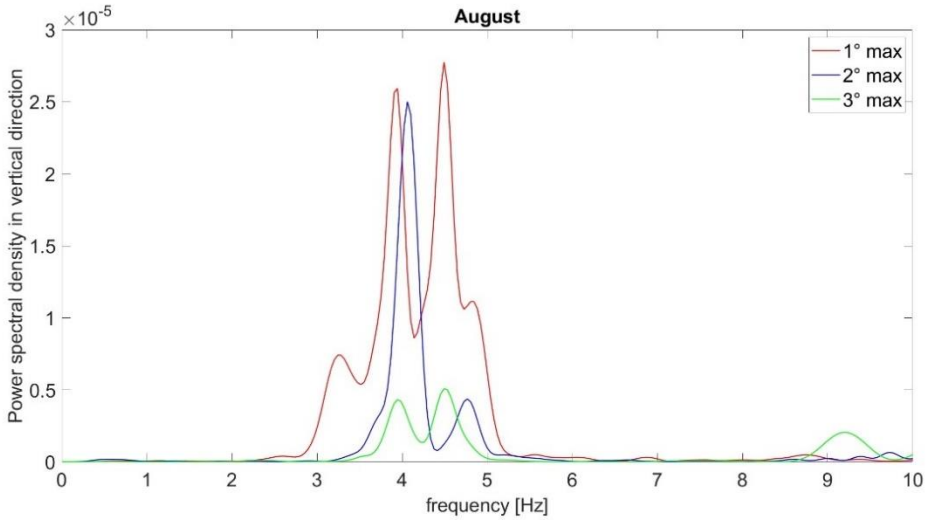


Figure 6-75: Results obtained from the 3 accelerograms with maximum SD in time domain

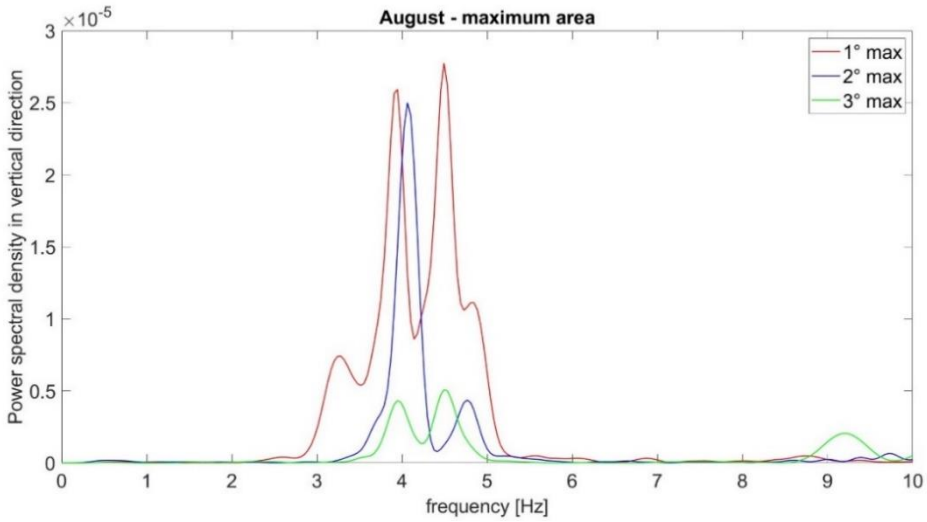


Figure 6-76: Results obtained from the 3 accelerograms with maximum area of PSD

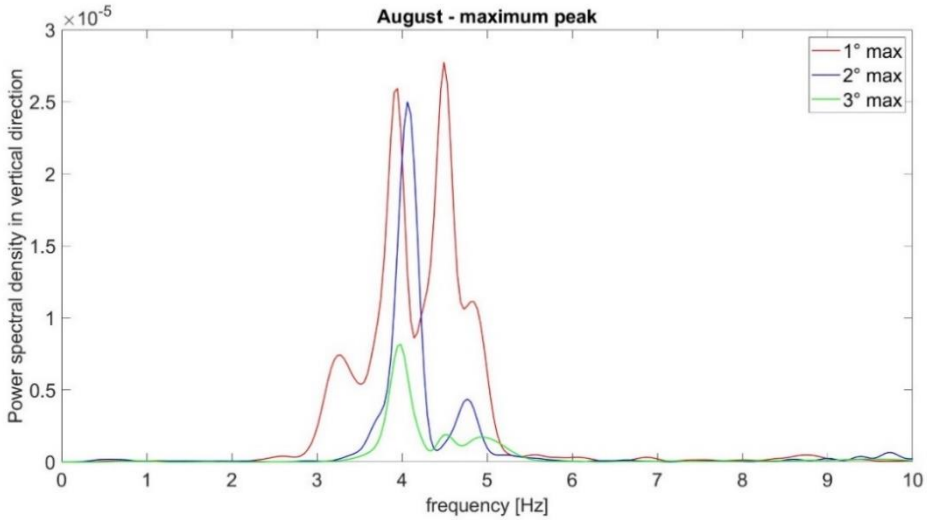


Figure 6-77: Results obtained from the 3 accelerograms with highest peak if PSD

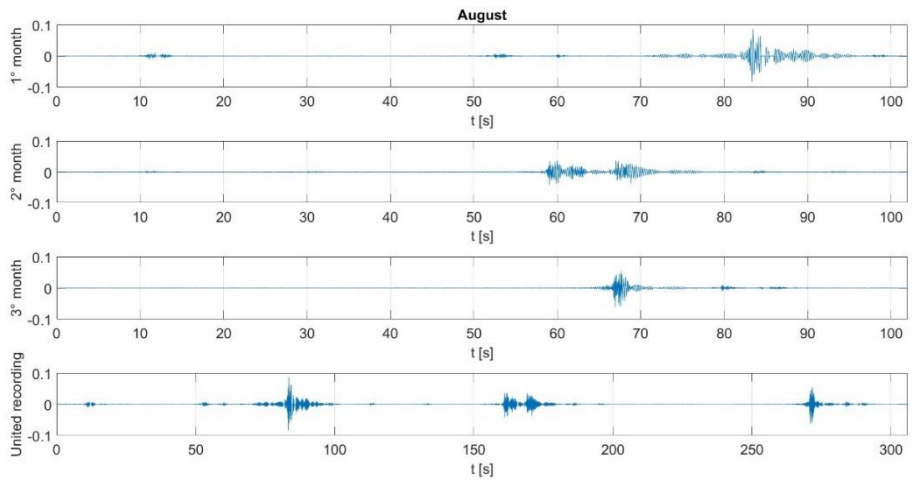


Figure 6-78: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.8.2 Longitudinal direction (y)

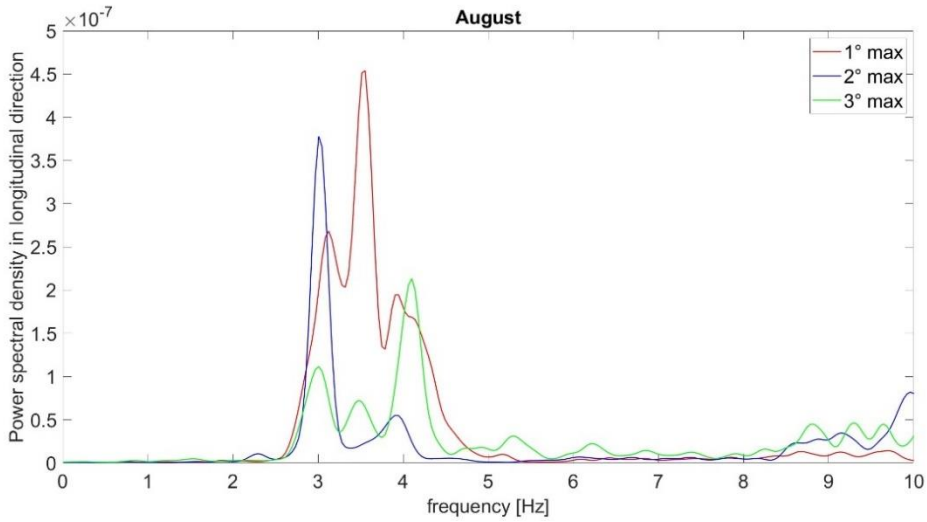


Figure 6-79: Results obtained from the 3 accelerograms with maximum SD in time domain

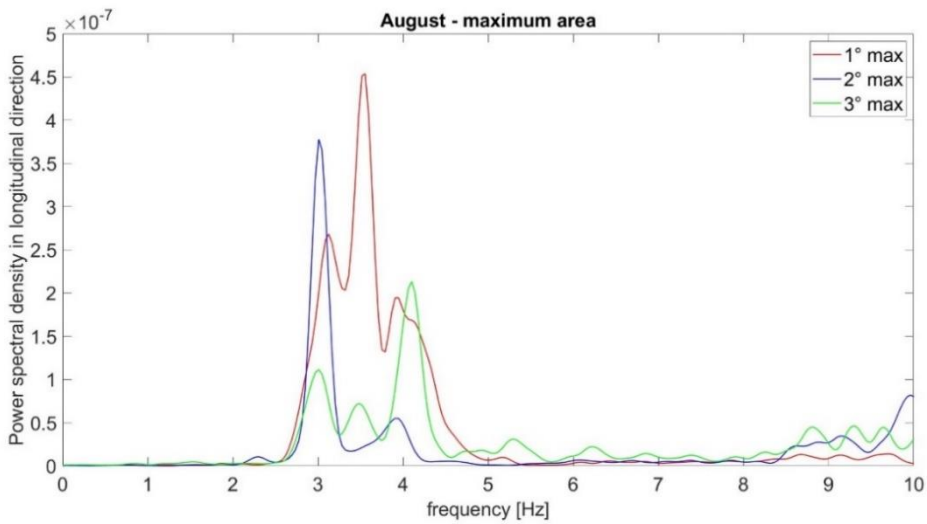


Figure 6-80: Results obtained from the 3 accelerograms with maximum area of PSD

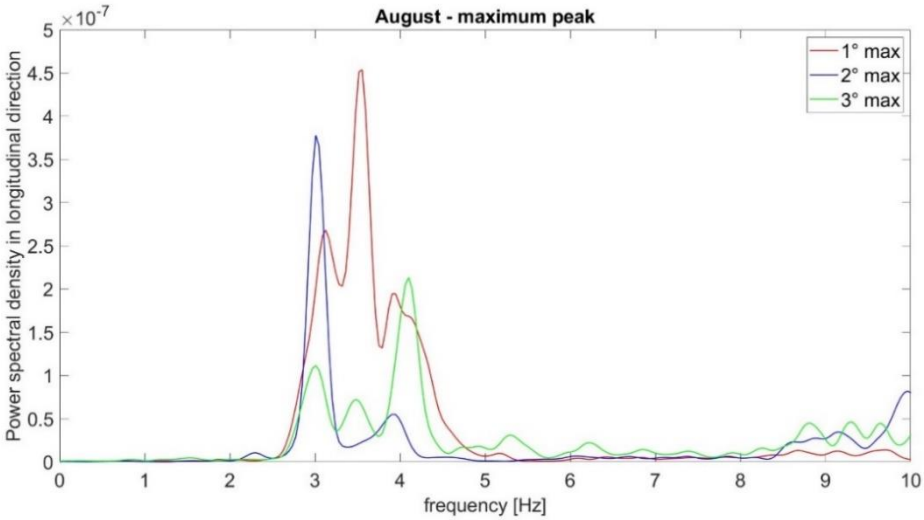


Figure 6-81: Results obtained from the 3 accelerograms with highest peak if PSD

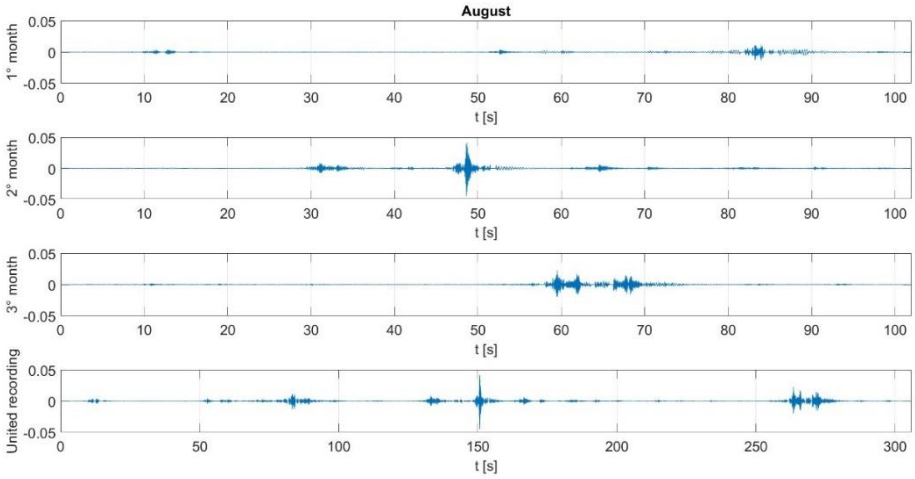


Figure 693: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.8.3 Transverse direction (z)

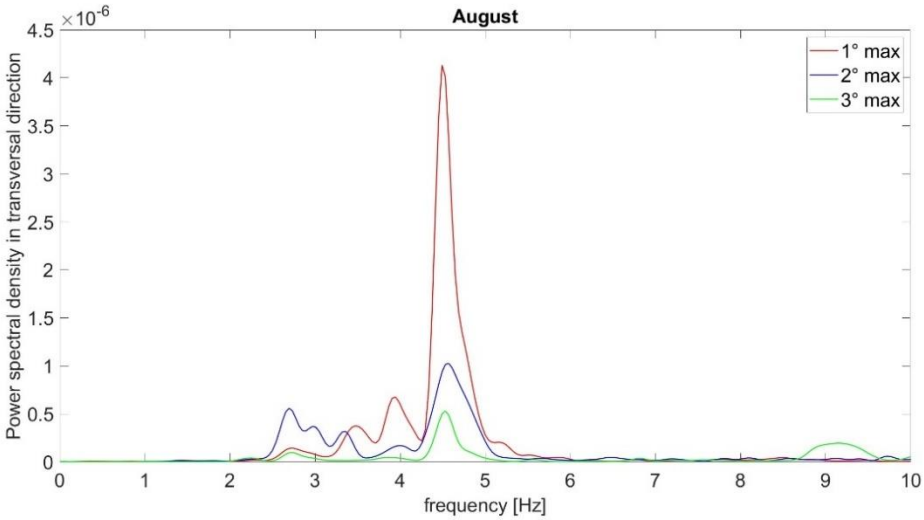


Figure 6-82: Results obtained from the 3 accelerograms with maximum SD in time domain

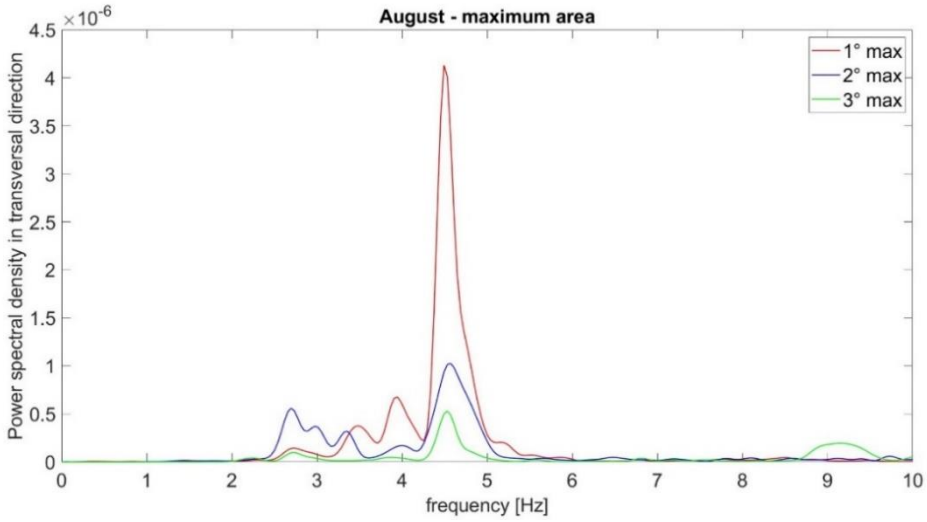


Figure 6-83: Results obtained from the 3 accelerograms with maximum area of PSD

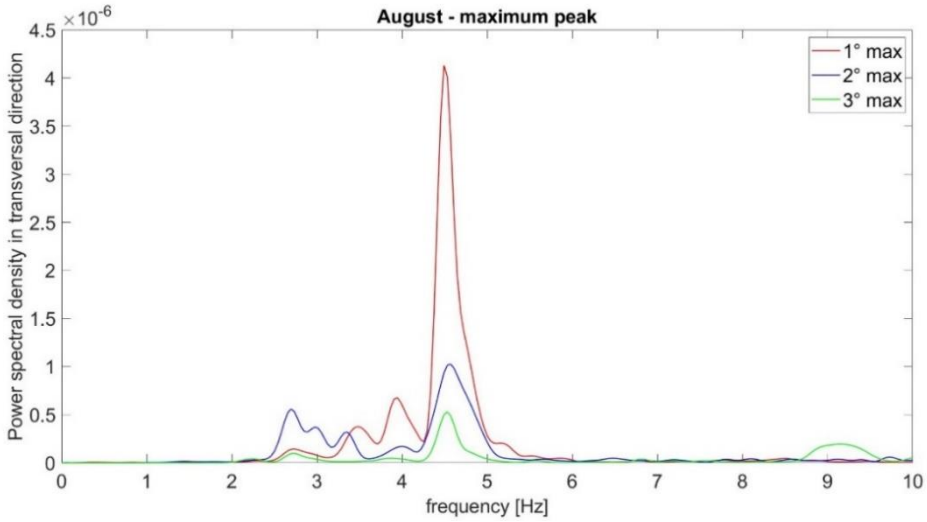


Figure 6-84: Results obtained from the 3 accelerograms with highest peak if PSD

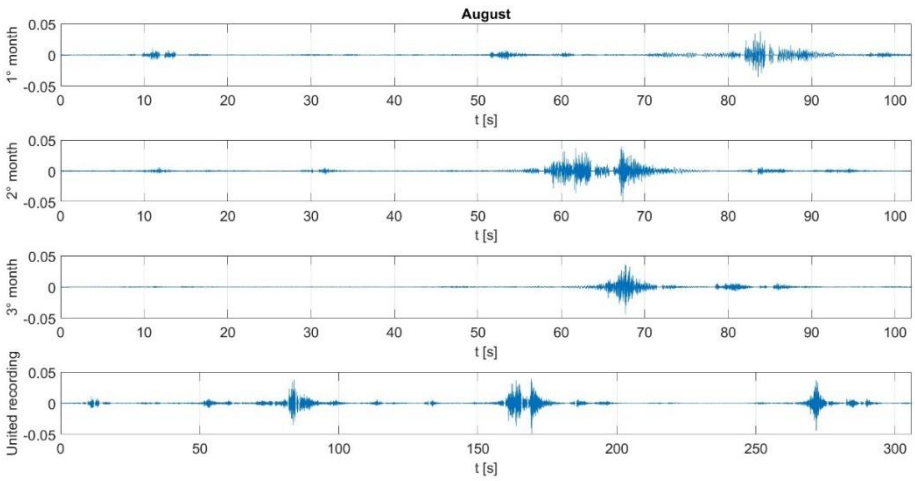


Figure 6-85: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

6.9 September

The results obtained for the September dataset are shown in the following tables.

Table 6-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-09-26_15-00-20	7.58E-03
	2°	2B7E4_2023-09-15_11-00-21	6.18E-03
	3°	2B7E4_2023-09-20_11-00-21	5.37E-03
Longitudinal direction (y)	1°	2B7E4_2023-09-26_09-00-20	2.06E-03
	2°	2B7E4_2023-09-14_11-00-21	1.69E-03
	3°	2B7E4_2023-09-20_11-00-21	1.34E-03
Transverse direction (z)	1°	2B7E4_2023-09-26_15-00-20	2.46E-03
	2°	2B7E4_2023-09-04_14-00-21	1.74E-03
	3°	2B7E4_2023-09-20_11-00-21	1.50E-03

Table 6-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-09-15_11-00-21	6.52E-05	2B7E4_2023-09-26_15-00-20	1.04E-05
2	2B7E4_2023-09-26_15-00-20	6.47E-05	2B7E4_2023-09-15_11-00-21	8.13E-06
3	2B7E4_2023-09-04_14-00-21	3.87E-05	2B7E4_2023-09-20_11-00-21	5.68E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-09-26_09-00-20	1.25E-05	2B7E4_2023-09-26_09-00-20	8.98E-07
2	2B7E4_2023-09-14_11-00-21	8.35E-06	2B7E4_2023-09-14_11-00-21	5.87E-07
3	2B7E4_2023-09-20_11-00-21	2.83E-06	2B7E4_2023-09-20_11-00-21	3.84E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-09-26_15-00-20	8.71E-06	2B7E4_2023-09-26_15-00-20	1.18E-06
2	2B7E4_2023-09-04_14-00-21	6.31E-06	2B7E4_2023-09-04_14-00-21	6.39E-07
3	2B7E4_2023-09-20_11-00-21	2.76E-06	2B7E4_2023-09-20_11-00-21	4.74E-07

Table 6-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	D	D	D	A	A	A
2	B	A	B	E	E	E	F	F	F
3	C	-	C	C	C	C	C	C	C

6.9.1 Vertical direction (x)

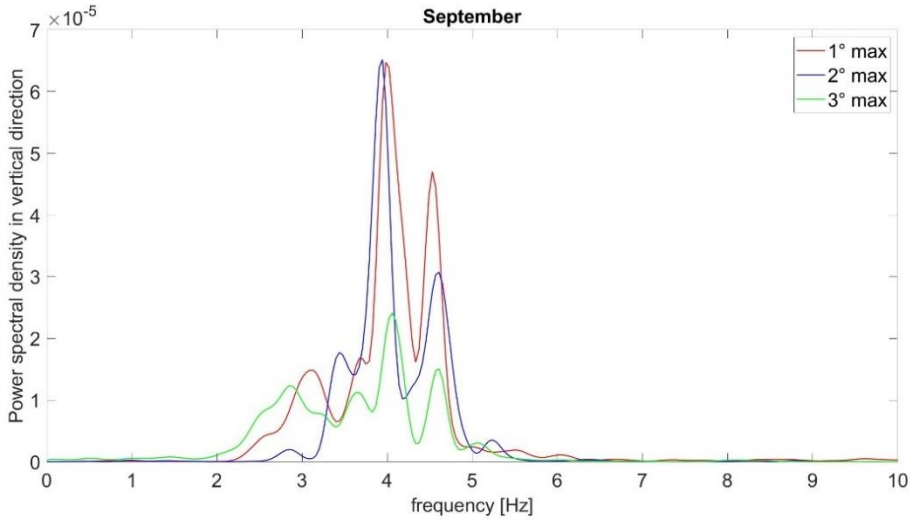


Figure 6-86: Results obtained from the 3 accelerograms with maximum SD in time domain

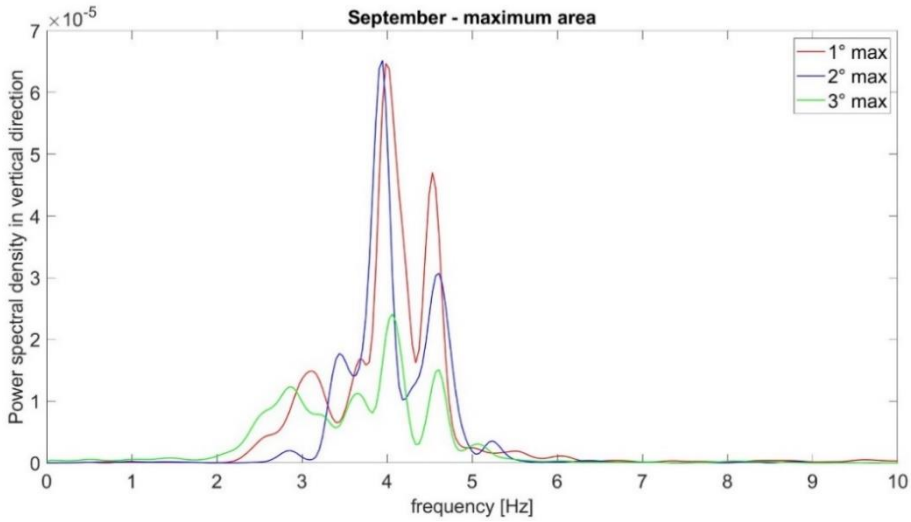


Figure 6-87: Results obtained from the 3 accelerograms with maximum area of PSD

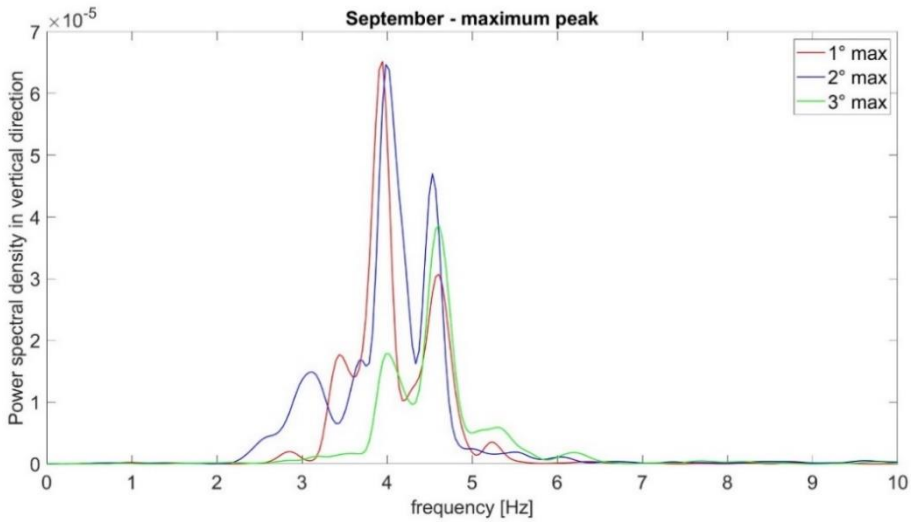


Figure 6-88: Results obtained from the 3 accelerograms with highest peak if PSD

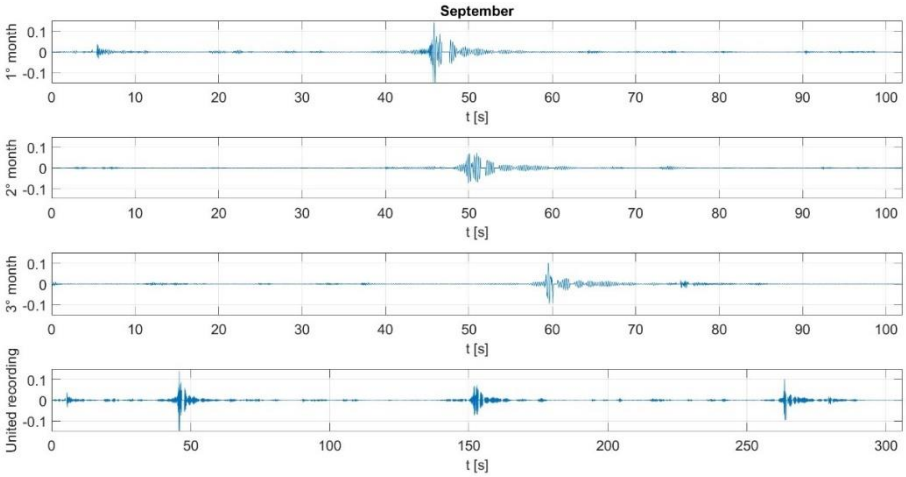


Figure 6101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.9.2 Longitudinal direction (y)

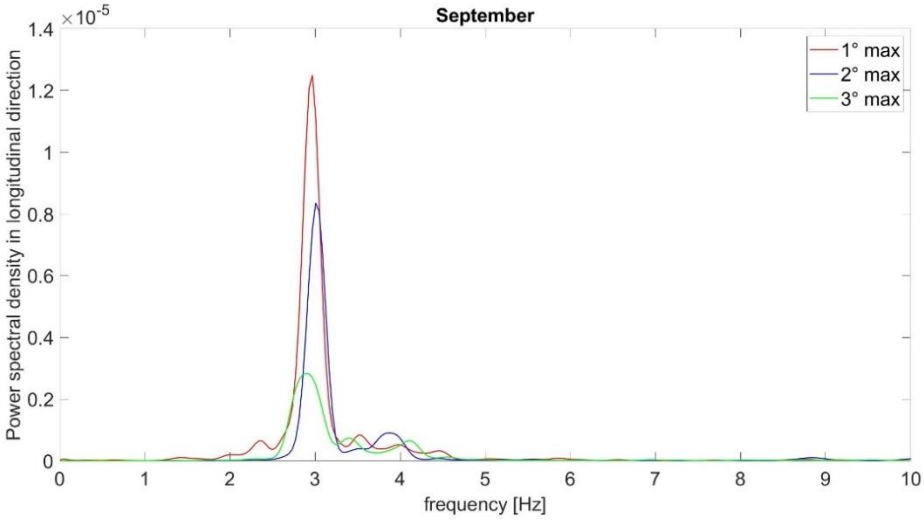


Figure 6-89: Results obtained from the 3 accelerograms with maximum SD in time domain

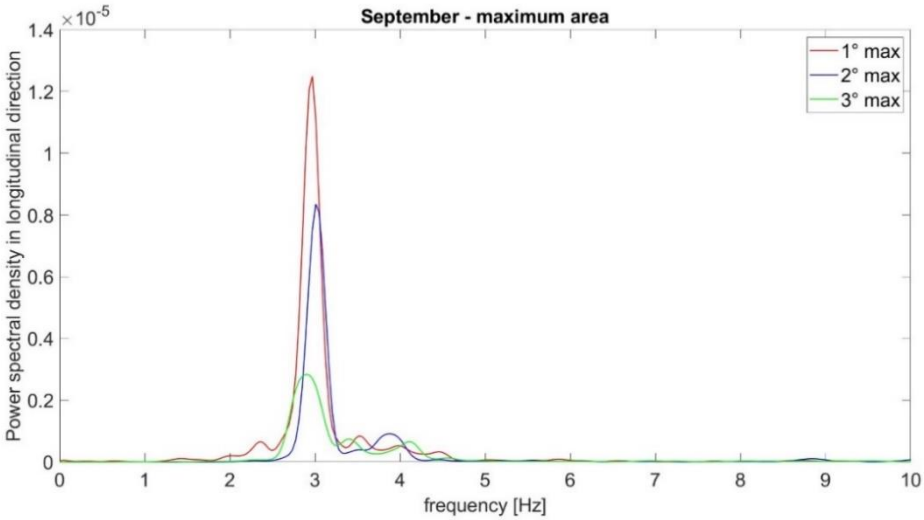


Figure 6-90: Results obtained from the 3 accelerograms with maximum area of PSD

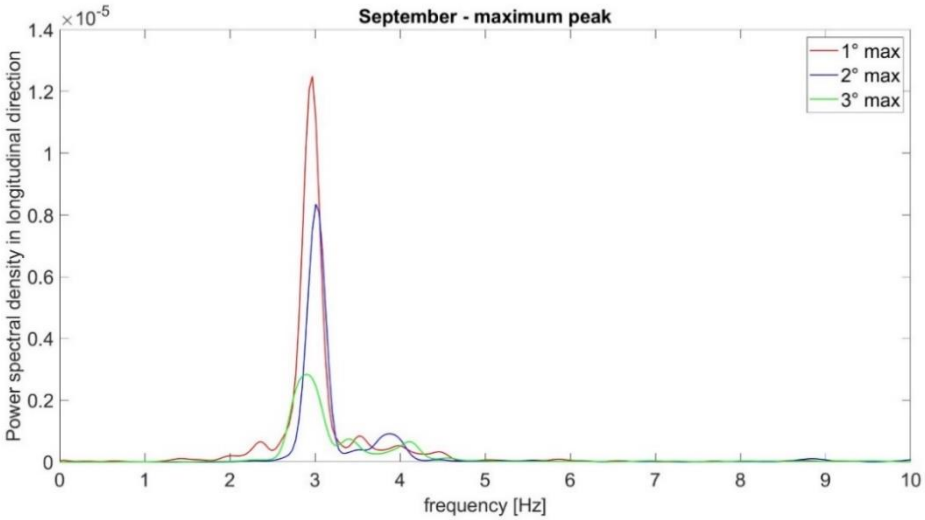


Figure 6-91: Results obtained from the 3 accelerograms with highest peak if PSD

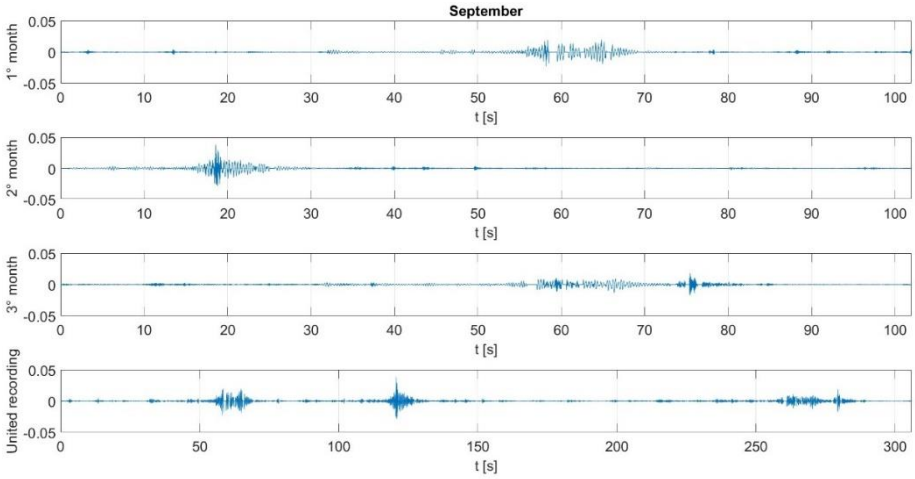


Figure 6-92: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.9.3 Transverse direction (z)

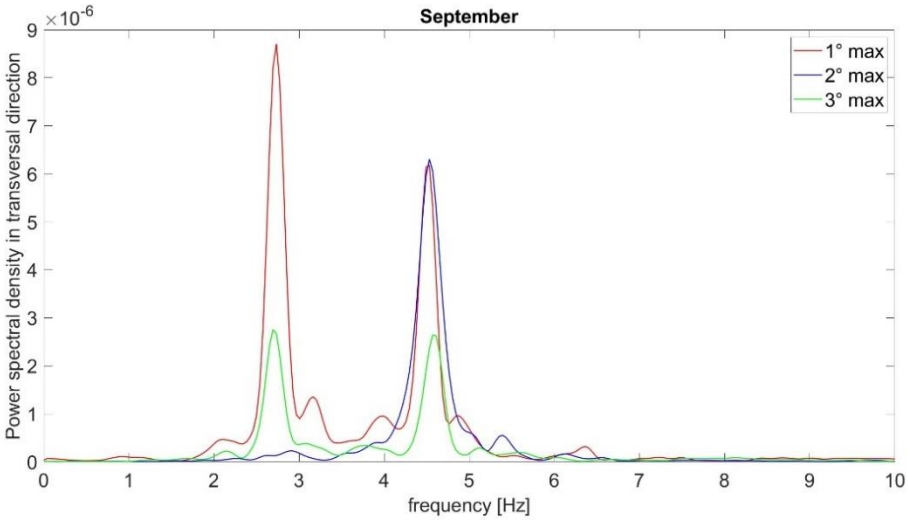


Figure 6-93: Results obtained from the 3 accelerograms with maximum SD in time domain

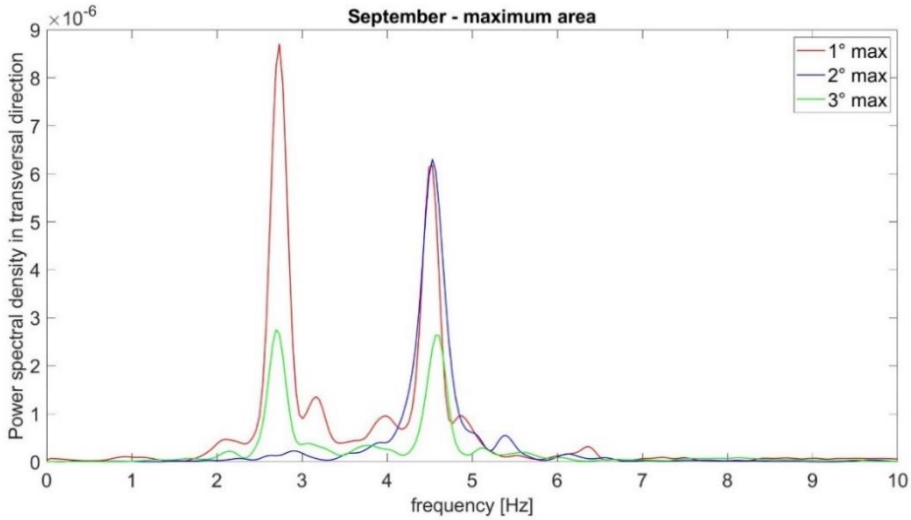


Figure 6-94: Results obtained from the 3 accelerograms with maximum area of PSD

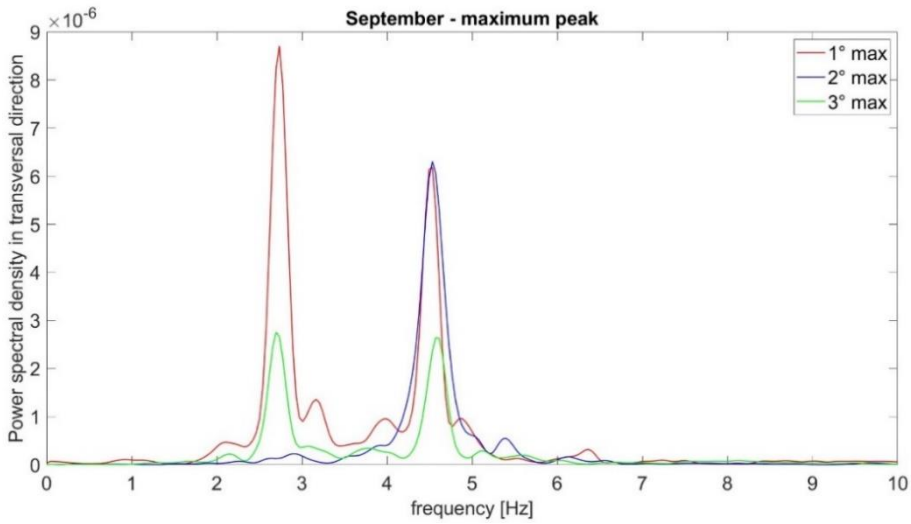


Figure 6-95: Results obtained from the 3 accelerograms with highest peak if PSD

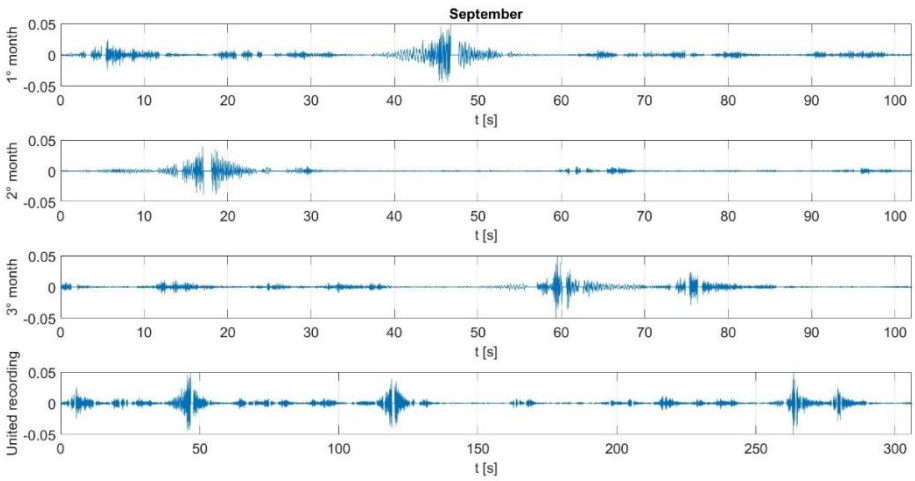


Figure 6-96: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

6.10 October

The results obtained for the October dataset are shown in the following tables.

Table 6-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-10-02_08-00-21	6.70E-03
	2°	2B7E4_2023-10-10_12-00-20	4.54E-03
	3°	2B7E4_2023-10-19_12-00-21	4.47E-03
Longitudinal direction (y)	1°	2B7E4_2023-10-19_12-00-21	1.79E-03
	2°	2B7E4_2023-10-02_08-00-21	1.01E-03
	3°	2B7E4_2023-10-10_12-00-20	8.74E-04
Transverse direction (z)	1°	2B7E4_2023-10-19_12-00-21	1.32E-03
	2°	2B7E4_2023-10-02_08-00-21	1.29E-03
	3°	2B7E4_2023-10-10_12-00-20	1.18E-03

Table 6-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-10-02_08-00-21	4.25E-05	2B7E4_2023-10-02_08-00-21	7.62E-06
2	2B7E4_2023-10-07_08-00-21	3.85E-05	2B7E4_2023-10-19_12-00-21	4.51E-06
3	2B7E4_2023-10-05_13-00-20	2.71E-05	2B7E4_2023-10-07_08-00-21	3.92E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-10-19_12-00-21	1.20E-05	2B7E4_2023-10-19_12-00-21	6.59E-07
2	2B7E4_2023-10-02_08-00-21	1.28E-06	2B7E4_2023-10-02_08-00-21	2.00E-07
3	2B7E4_2023-10-10_12-00-20	8.24E-07	2B7E4_2023-10-10_12-00-20	1.49E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-10-19_12-00-21	3.58E-06	2B7E4_2023-10-19_12-00-21	3.63E-07
2	2B7E4_2023-10-02_08-00-21	2.38E-06	2B7E4_2023-10-02_08-00-21	3.47E-07
3	2B7E4_2023-10-07_08-00-21	2.07E-06	2B7E4_2023-10-10_12-00-20	2.78E-07

Table 6-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	D	D	D
2	-	C	D	A	A	A	A	A	A
3	D	-	C	B	B	B	B	-	B

6.10.1 Vertical direction (x)

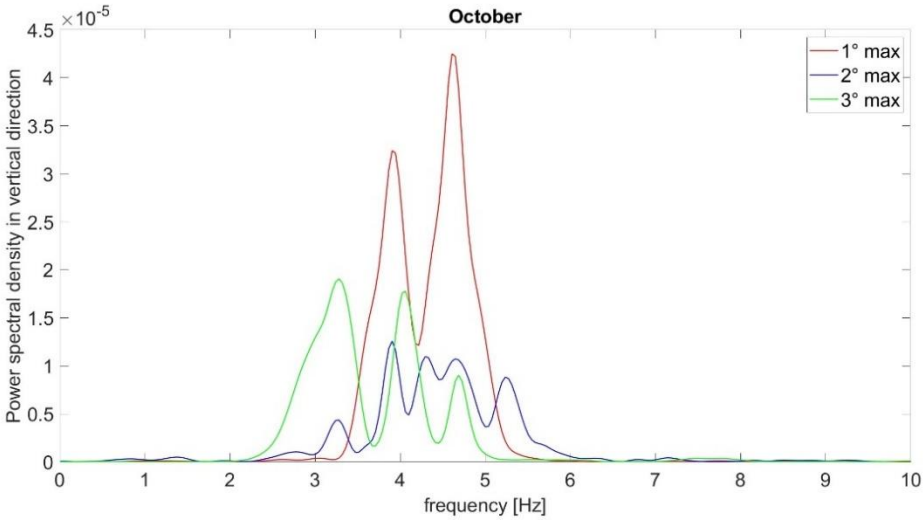


Figure 6-97: Results obtained from the 3 accelerograms with maximum SD in time domain

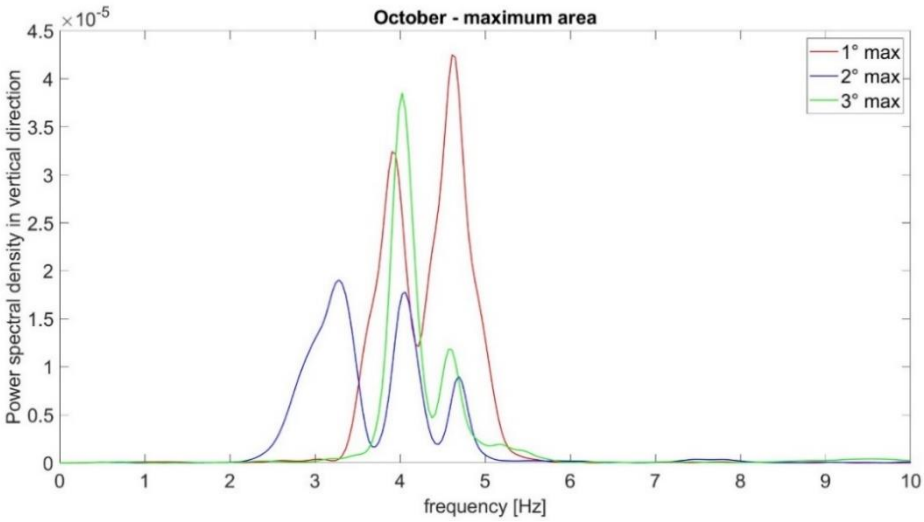


Figure 6-98: Results obtained from the 3 accelerograms with maximum area of PSD

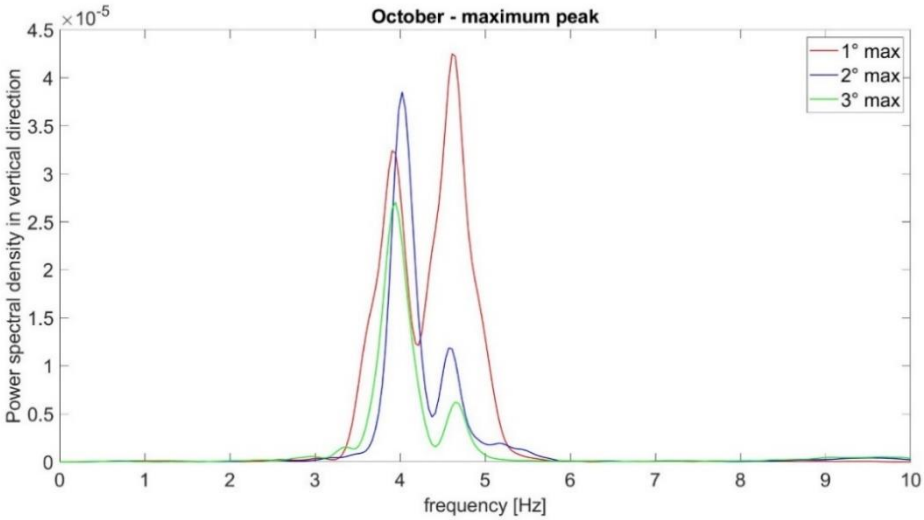


Figure 6-99: Results obtained from the 3 accelerograms with highest peak if PSD

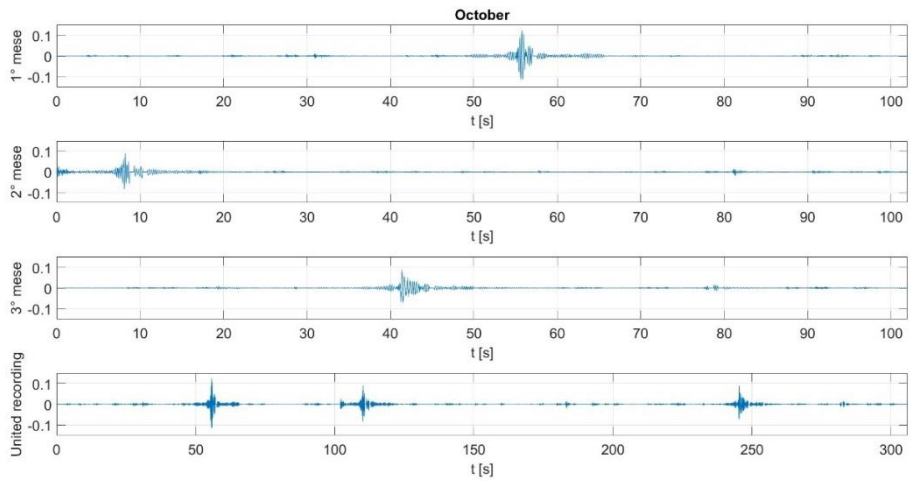


Figure 6113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.10.2 Longitudinal direction (y)

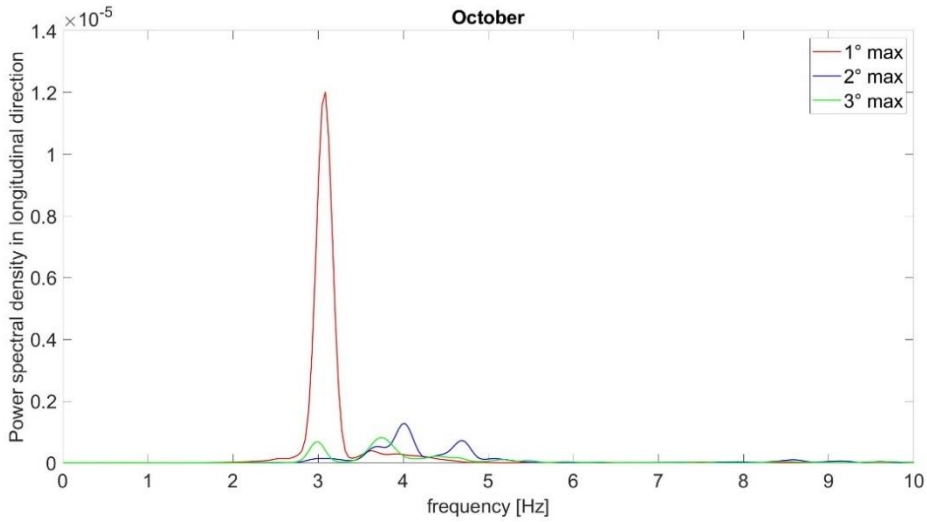


Figure 6-100: Results obtained from the 3 accelerograms with maximum SD in time domain

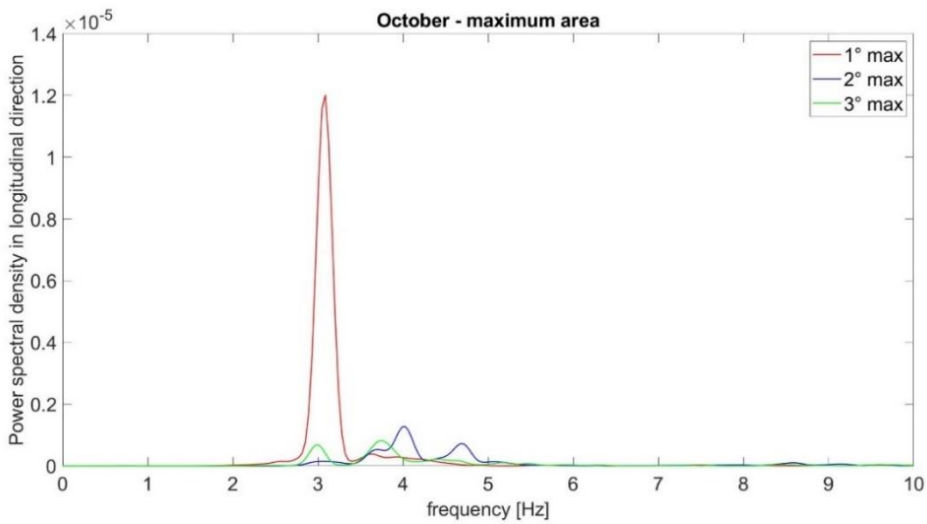


Figure 6-101: Results obtained from the 3 accelerograms with maximum area of PSD

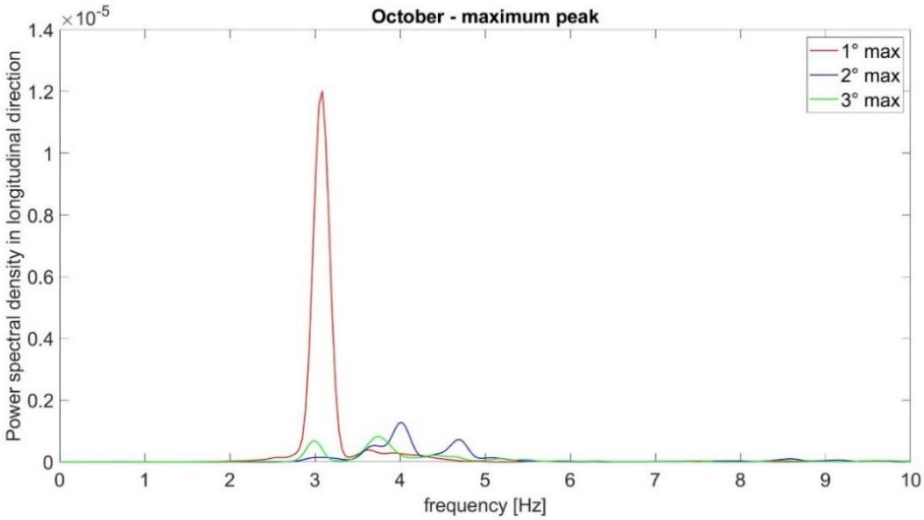


Figure 6-102: Results obtained from the 3 accelerograms with highest peak if PSD

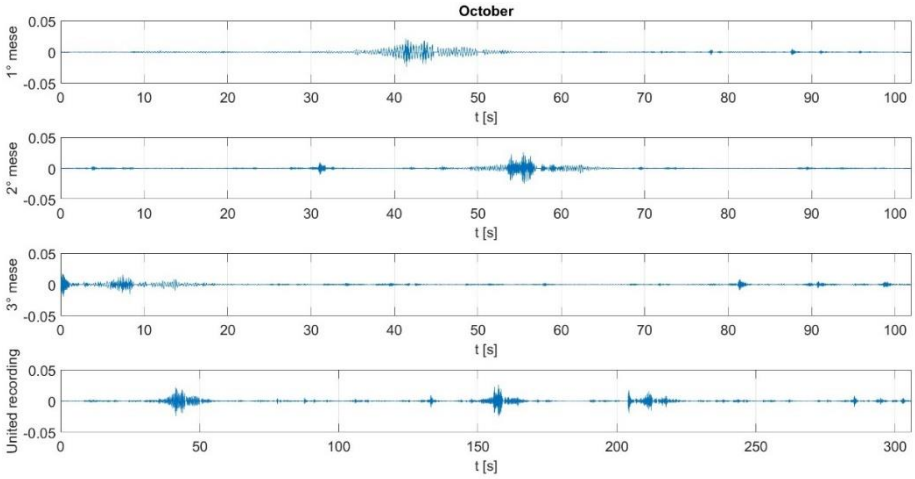


Figure 6117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.10.3 Transverse direction (z)

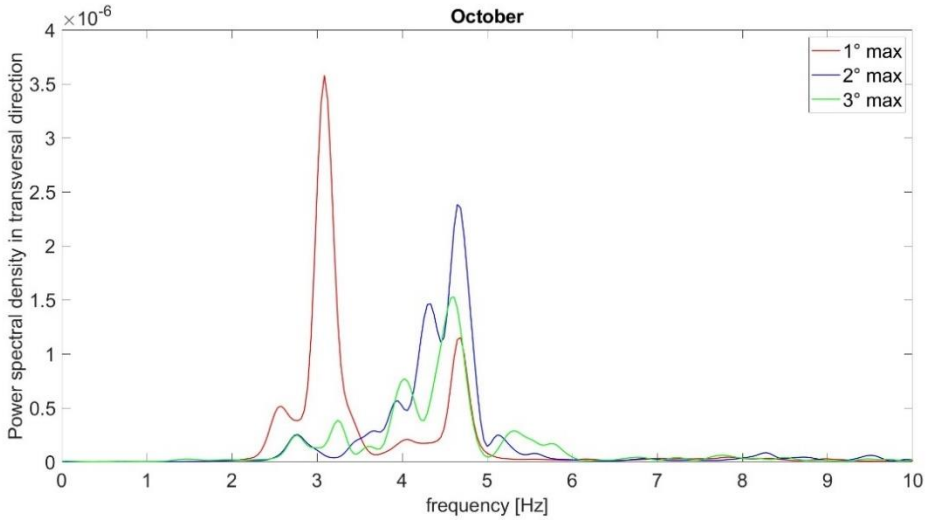


Figure 6-103: Results obtained from the 3 accelerograms with maximum SD in time domain

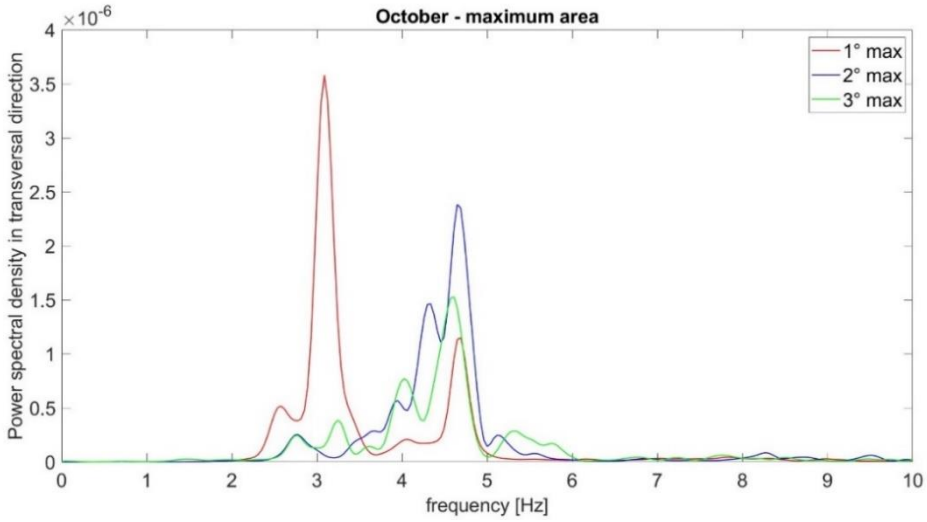


Figure 6-104: Results obtained from the 3 accelerograms with maximum area of PSD

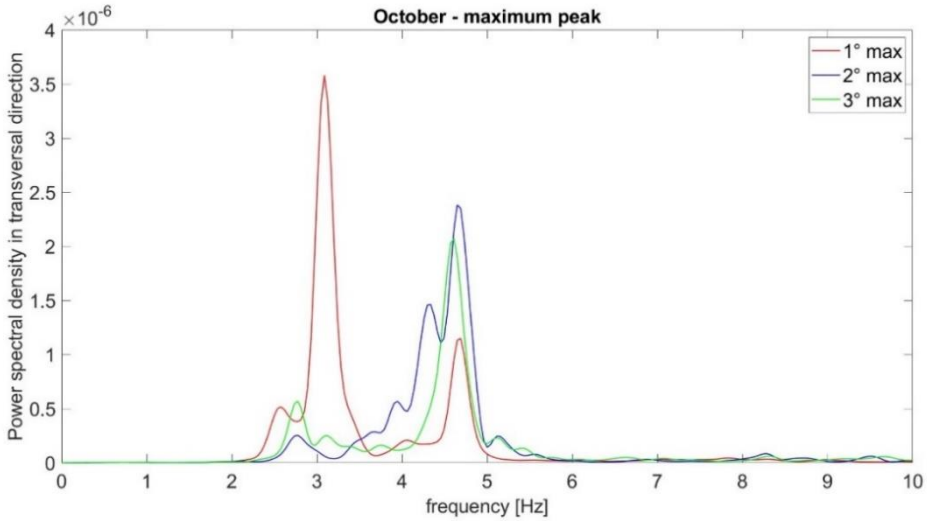


Figure 6-105: Results obtained from the 3 accelerograms with highest peak if PSD

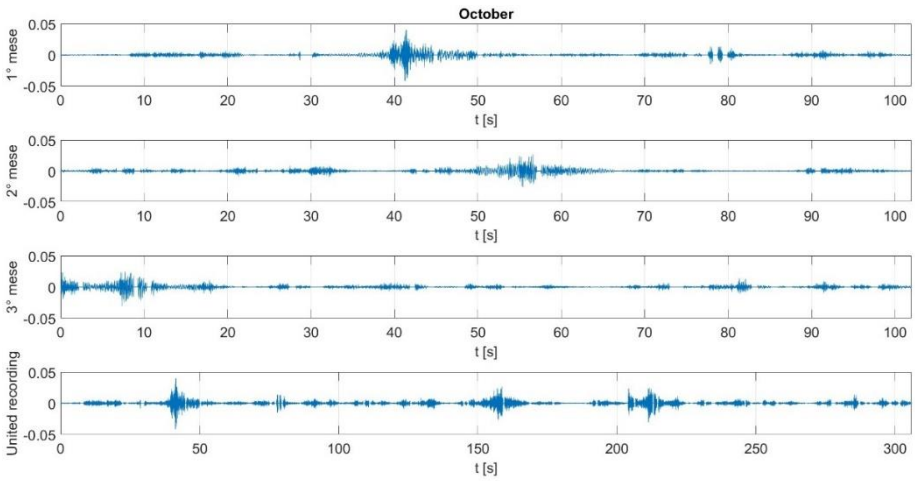


Figure 6-106: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

6.11 November

The results obtained for the November dataset are shown in the following tables.

Table 6-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-11-07_17-00-22	9.43E-03
	2°	2B7E4_2023-11-11_14-00-21	3.72E-03
	3°	2B7E4_2023-11-29_02-00-21	3.71E-03
Longitudinal direction (y)	1°	2B7E4_2023-11-07_17-00-22	1.07E-03
	2°	2B7E4_2023-11-06_17-00-21	8.72E-04
	3°	2B7E4_2023-11-17_08-00-20	6.38E-04
Transverse direction (z)	1°	2B7E4_2023-11-07_17-00-22	3.17E-03
	2°	2B7E4_2023-11-11_14-00-21	1.35E-03
	3°	2B7E4_2023-11-14_09-00-20	1.05E-03

Table 6-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-11-07_17-00-22	1.28E-04	2B7E4_2023-11-07_17-00-22	1.79E-05
2	2B7E4_2023-11-11_14-00-21	2.18E-05	2B7E4_2023-11-11_14-00-21	2.49E-06
3	2B7E4_2023-11-10_09-00-20	2.09E-05	2B7E4_2023-11-06_17-00-21	1.90E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-11-06_17-00-21	1.83E-06	2B7E4_2023-11-07_17-00-22	2.36E-07
2	2B7E4_2023-11-07_17-00-22	1.59E-06	2B7E4_2023-11-06_17-00-21	1.57E-07
3	2B7E4_2023-11-29_02-00-21	8.79E-07	2B7E4_2023-11-17_08-00-20	8.53E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-11-07_17-00-22	3.03E-05	2B7E4_2023-11-07_17-00-22	1.94E-06
2	2B7E4_2023-11-11_14-00-21	3.90E-06	2B7E4_2023-11-11_14-00-21	3.47E-07
3	2B7E4_2023-11-18_09-00-20	1.62E-06	2B7E4_2023-11-07_13-00-21	2.23E-07

Table 6-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	C	A	A	A	A
2	B	B	B	C	A	C	B	B	B
3	-	-	-	D	-	D	-	-	-

6.11.1 Vertical direction (x)

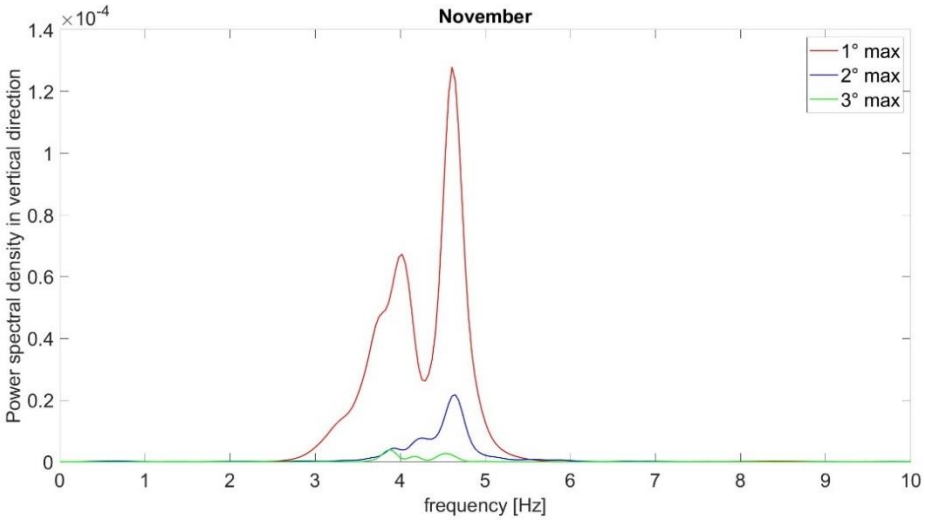


Figure 6-107: Results obtained from the 3 accelerograms with maximum SD in time domain

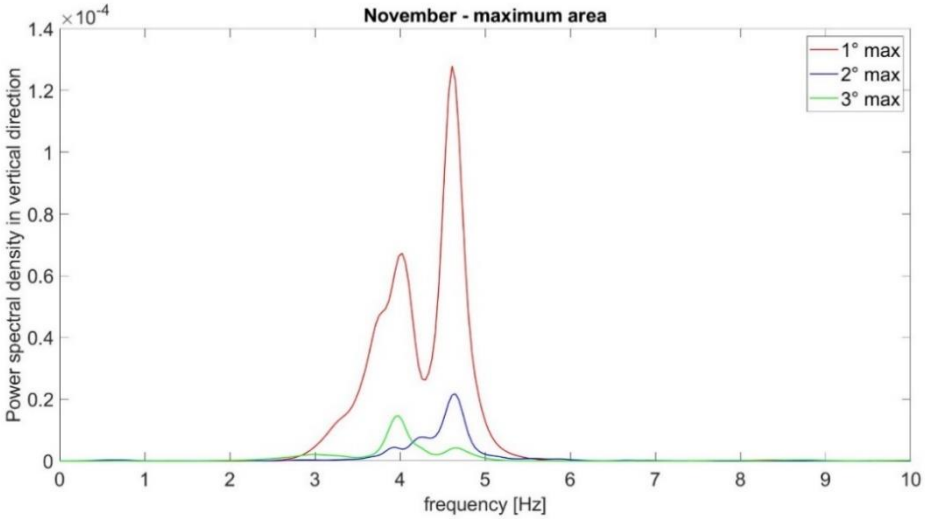


Figure 6-108: Results obtained from the 3 accelerograms with maximum area of PSD

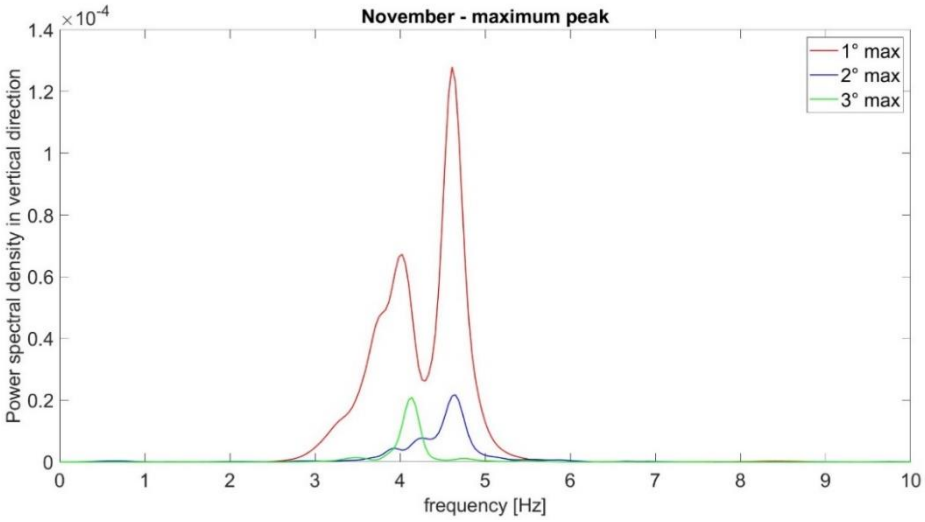


Figure 6-109: Results obtained from the 3 accelerograms with highest peak if PSD

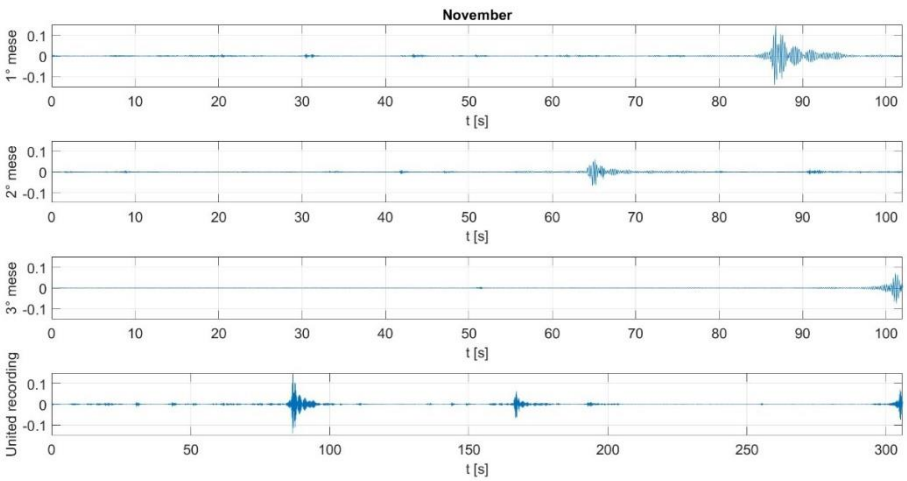


Figure 6125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.11.2 Longitudinal direction (y)

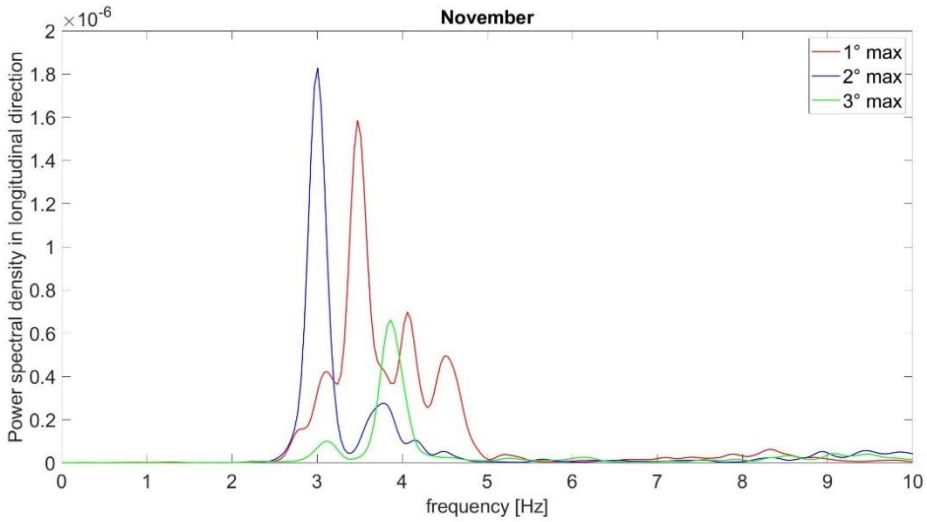


Figure 6-110: Results obtained from the 3 accelerograms with maximum SD in time domain

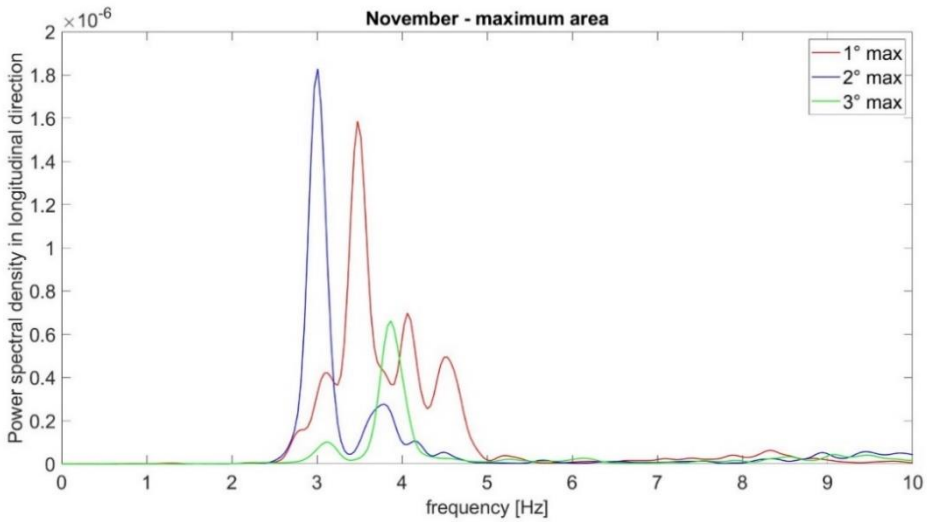


Figure 6-111: Results obtained from the 3 accelerograms with maximum area of PSD

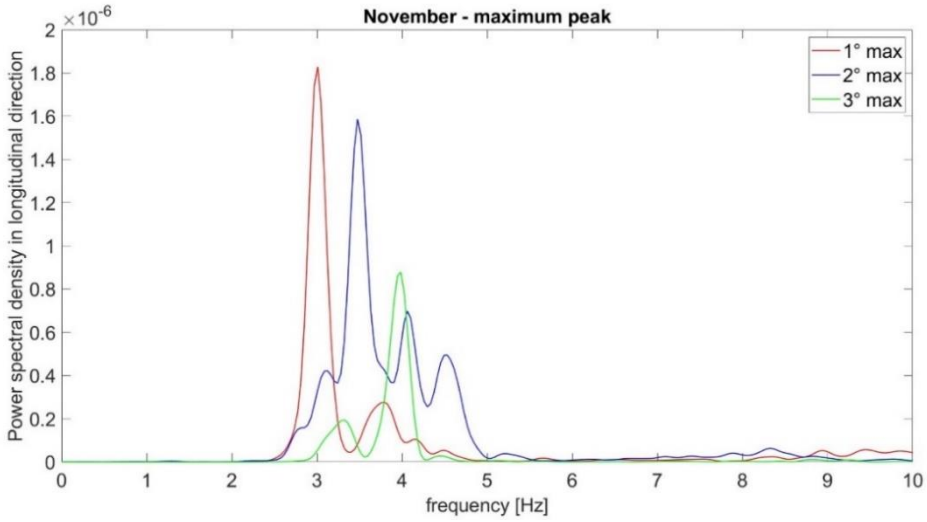


Figure 6-112: Results obtained from the 3 accelerograms with highest peak if PSD

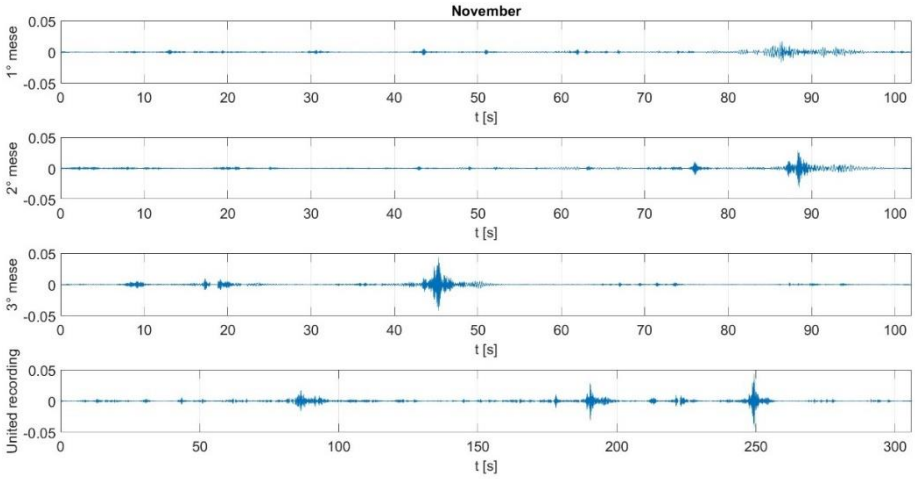


Figure 6129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.11.3 Transverse direction (z)

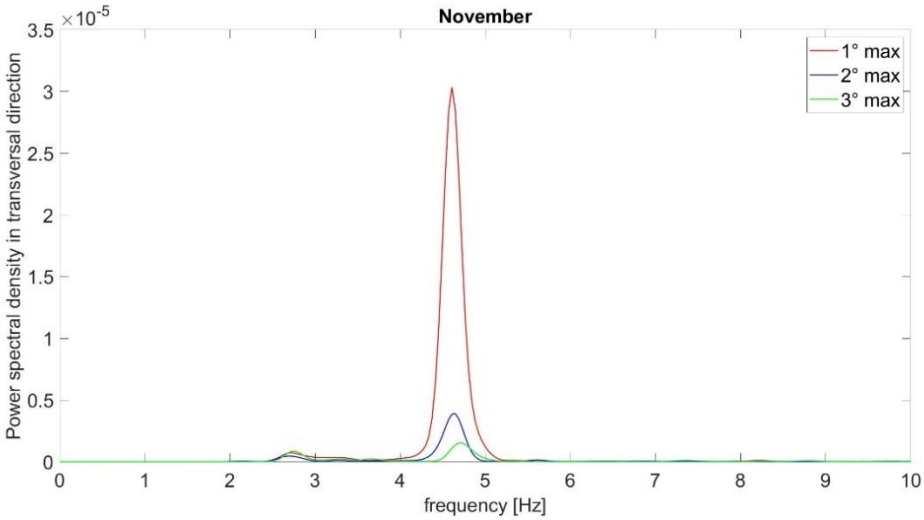


Figure 6-113: Results obtained from the 3 accelerograms with maximum SD in time domain

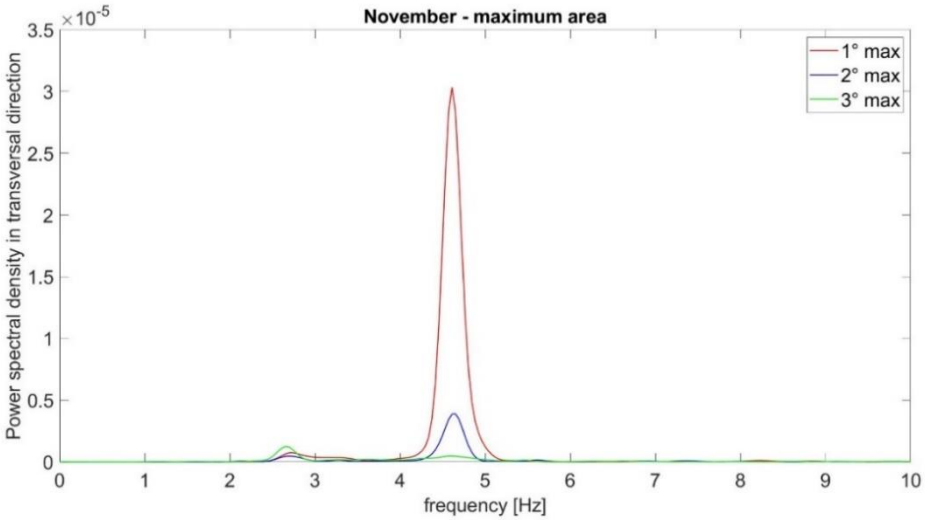


Figure 6-114: Results obtained from the 3 accelerograms with maximum area of PSD

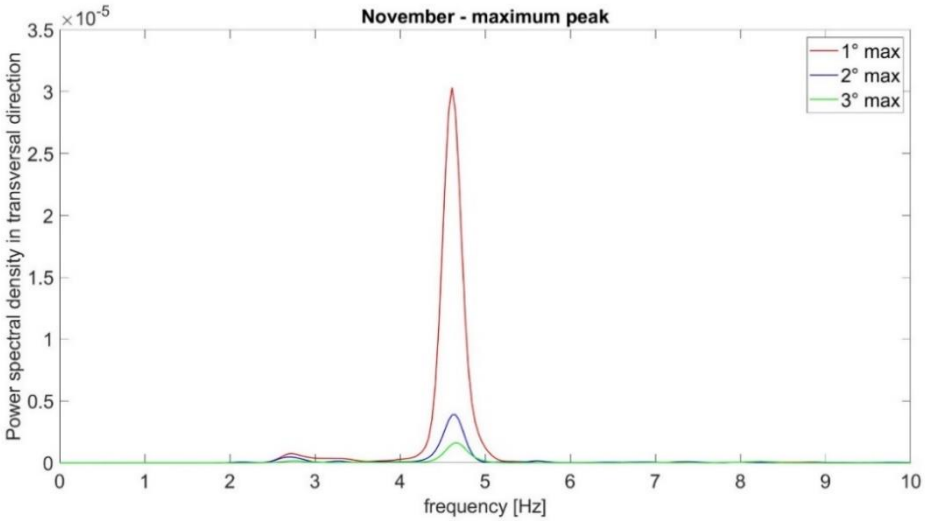


Figure 6-115: Results obtained from the 3 accelerograms with highest peak if PSD

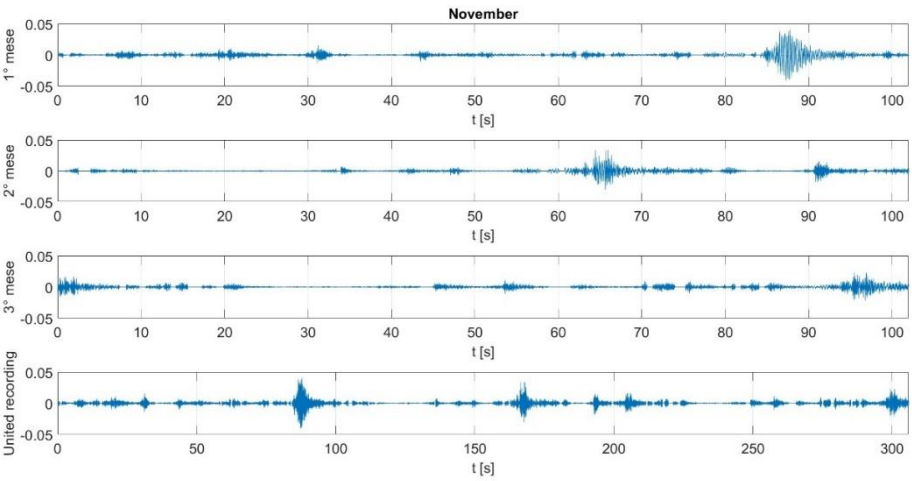


Figure 6-116: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

6.12 December

The results obtained for the December dataset are shown in the following tables.

Table 6-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B7E4_2023-12-06_10-00-20	5.77E-03
	2°	2B7E4_2023-12-13_08-00-20	4.53E-03
	3°	2B7E4_2023-12-29_15-00-21	3.67E-03
Longitudinal direction (y)	1°	2B7E4_2023-12-06_10-00-20	1.23E-03
	2°	2B7E4_2023-12-12_15-00-20	8.55E-04
	3°	2B7E4_2023-12-13_08-00-20	8.15E-04
Transverse direction (z)	1°	2B7E4_2023-12-13_08-00-20	1.18E-03
	2°	2B7E4_2023-12-01_08-00-20	1.13E-03
	3°	2B7E4_2023-12-04_12-00-21	1.12E-03

Table 6-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-12-06_10-00-20	4.55E-05	2B7E4_2023-12-06_10-00-20	7.19E-06
2	2B7E4_2023-12-13_08-00-20	3.05E-05	2B7E4_2023-12-13_08-00-20	4.08E-06
3	2B7E4_2023-12-01_08-00-20	2.45E-05	2B7E4_2023-12-29_15-00-21	3.06E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-12-06_10-00-20	2.17E-06	2B7E4_2023-12-06_10-00-20	3.07E-07
2	2B7E4_2023-12-07_14-00-21	1.05E-06	2B7E4_2023-12-12_15-00-20	1.62E-07
3	2B7E4_2023-12-22_09-00-20	8.28E-07	2B7E4_2023-12-13_08-00-20	1.40E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B7E4_2023-12-01_08-00-20	2.47E-06	2B7E4_2023-12-13_08-00-20	2.88E-07
2	2B7E4_2023-12-14_08-00-21	2.38E-06	2B7E4_2023-12-01_08-00-20	2.67E-07
3	2B7E4_2023-12-13_08-00-20	2.15E-06	2B7E4_2023-12-04_12-00-21	2.62E-07

Table 6-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	B	E	B
2	B	B	B	D	-	D	E	-	E
3	C	-	C	B	-	B	F	B	F

6.12.1 Vertical direction (x)

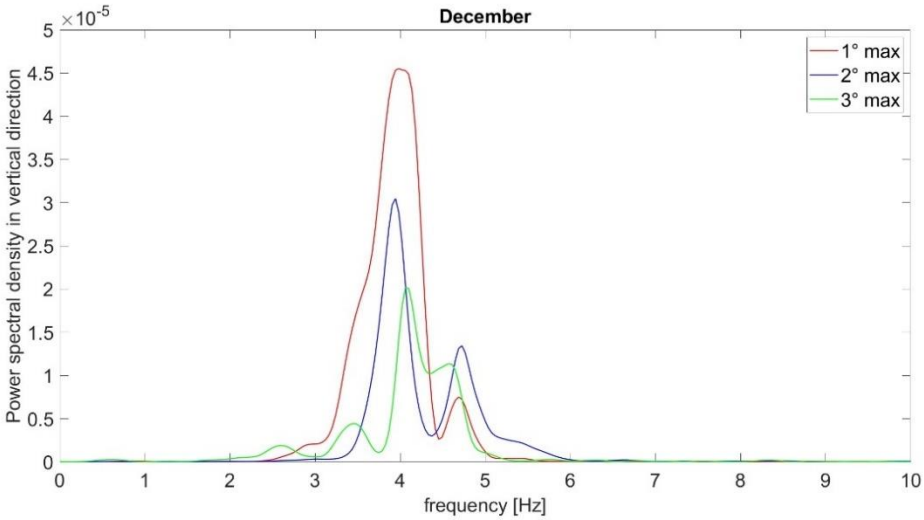


Figure 6-117: Results obtained from the 3 accelerograms with maximum SD in time domain

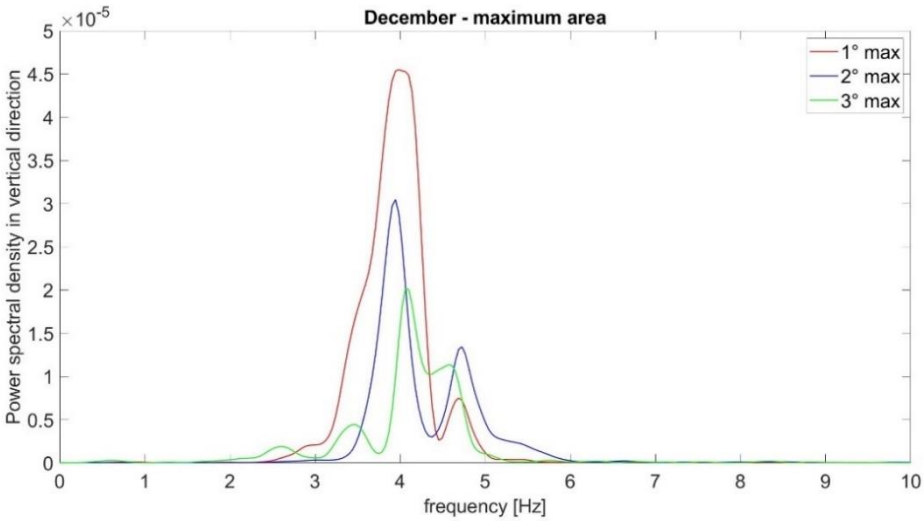


Figure 6-118: Results obtained from the 3 accelerograms with maximum area of PSD

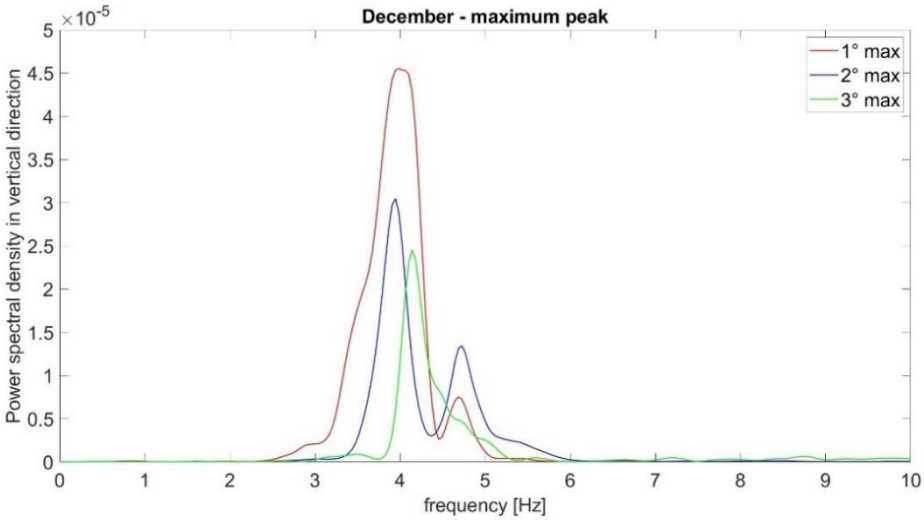


Figure 6-119: Results obtained from the 3 accelerograms with highest peak if PSD

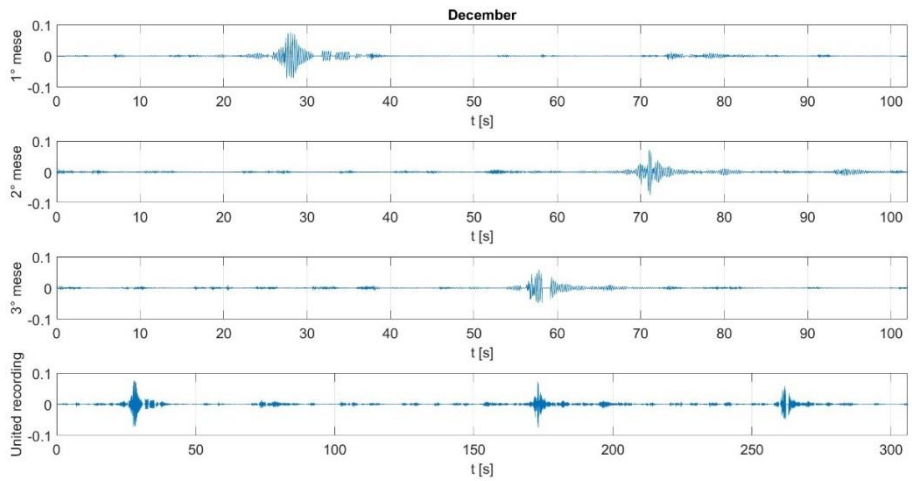


Figure 6137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

6.12.2 Longitudinal direction (y)

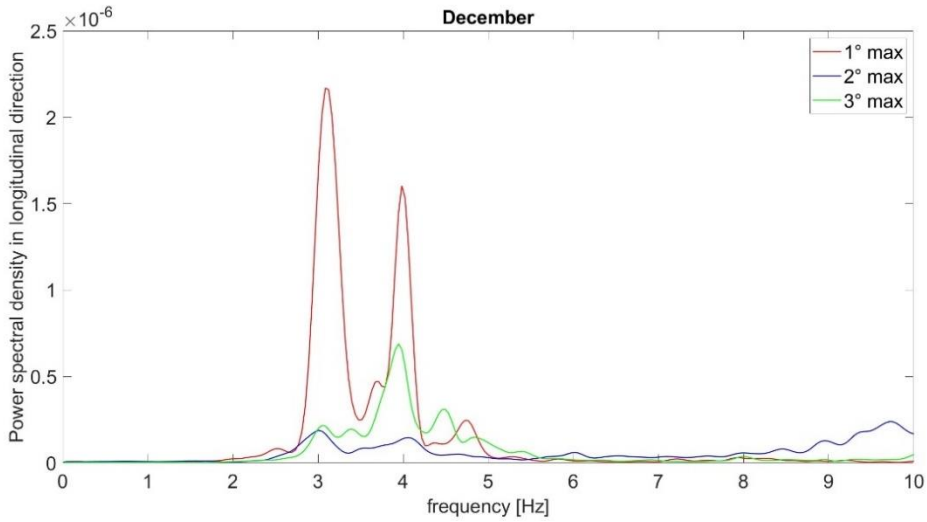


Figure 6-120: Results obtained from the 3 accelerograms with maximum SD in time domain

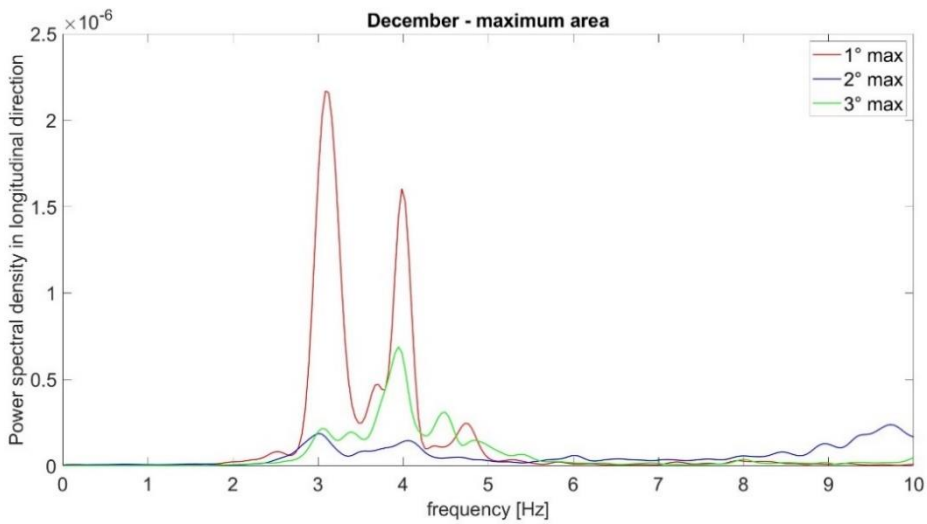


Figure 6-121: Results obtained from the 3 accelerograms with maximum area of PSD

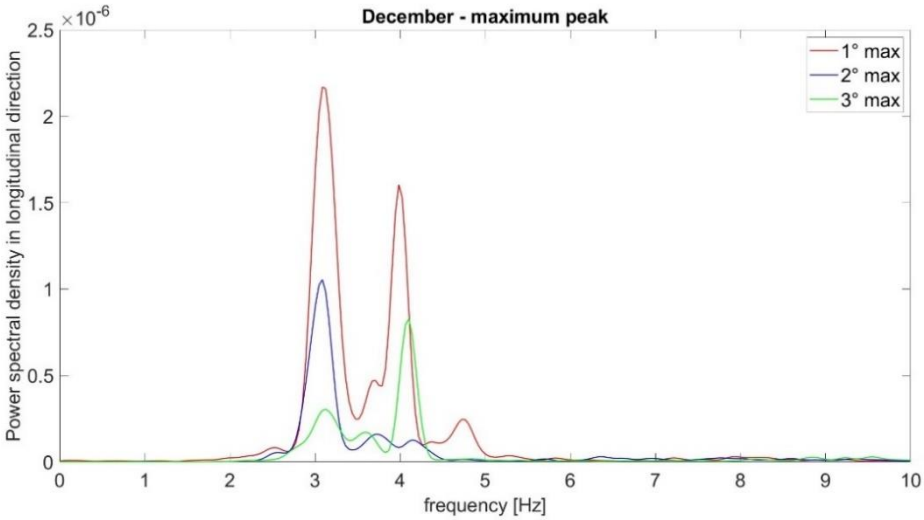


Figure 6-122: Results obtained from the 3 accelerograms with highest peak if PSD

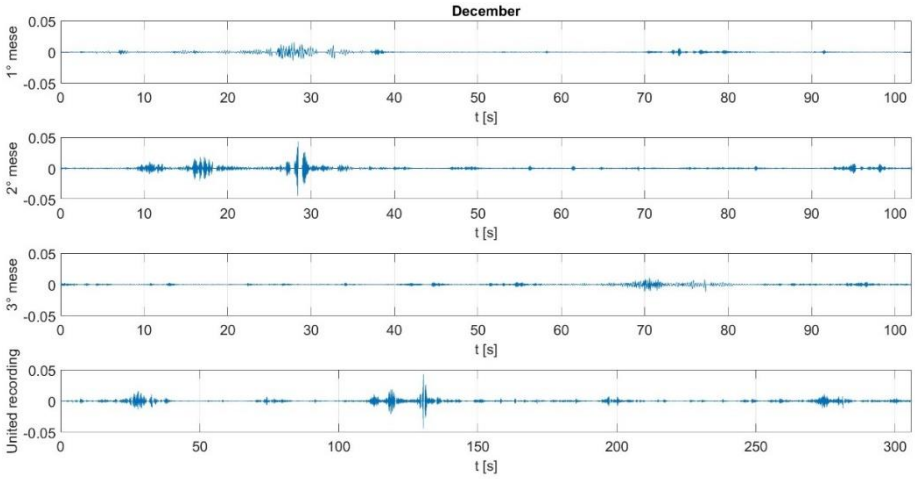


Figure 6141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

6.12.3 Transverse direction (z)

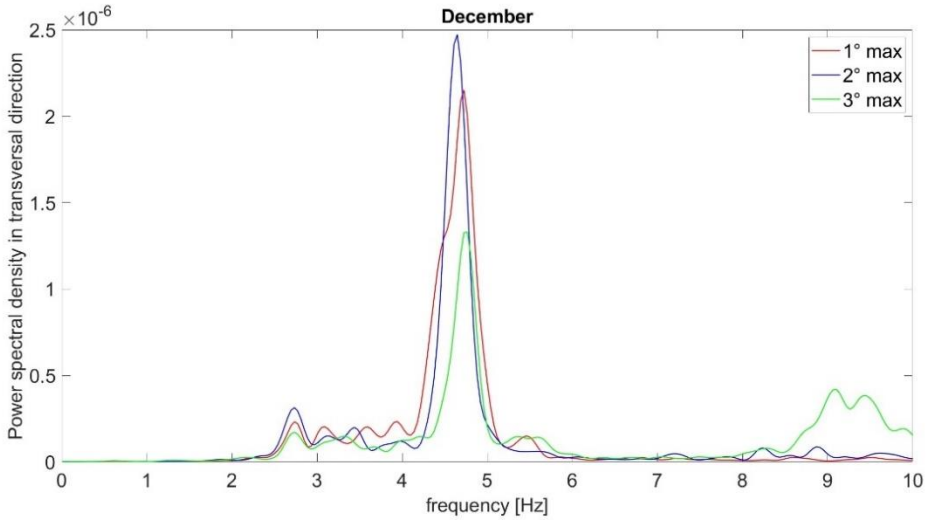


Figure 6-123: Results obtained from the 3 accelerograms with maximum SD in time domain

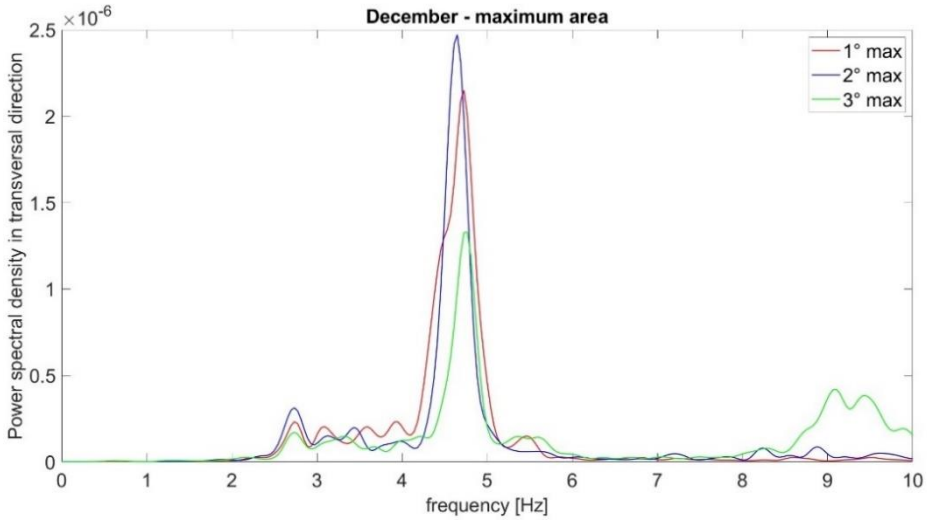


Figure 6-124: Results obtained from the 3 accelerograms with maximum area of PSD

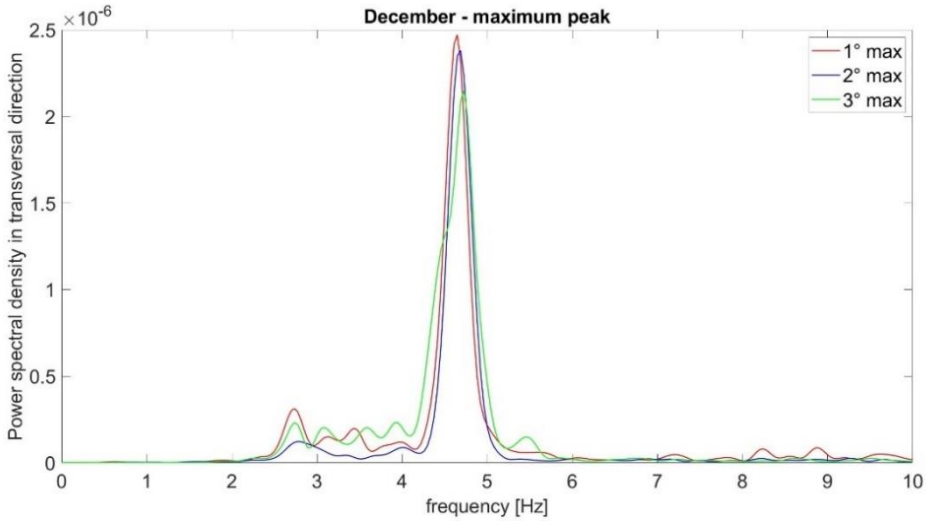


Figure 6-125: Results obtained from the 3 accelerograms with highest peak if PSD

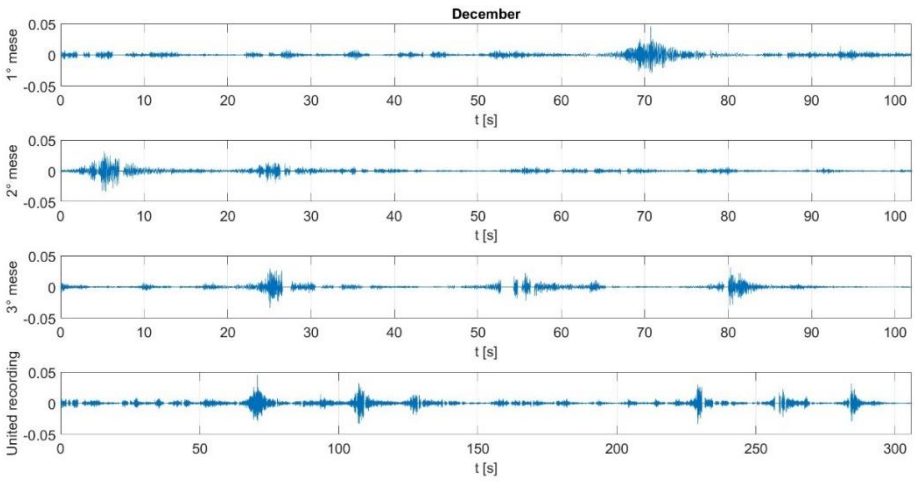


Figure 6-126: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

6.13 Analysis of the complete 2023 year

All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the different peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

Table 6-37: Main identified frequencies for sensor 2B7E4 – bridge 2A2 – Sp5 – L/2

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	21	22	104	104	100	25	100	12	3	99	52	108
	MEAN	**2.65**	**3.34**	**4.01**	**4.63**	**3.05**	**3.53**	**3.99**	**4.54**	**2.33**	**2.77**	**3.79**	**4.60**
	SD	0.14	0.11	0.07	0.10	0.08	0.13	0.14	0.15	0.00	0.11	0.27	0.09
	C.o.V.	5.3%	3.4%	1.9%	2.1%	2.5%	3.6%	3.4%	3.4%	0.0%	4.0%	7.2%	1.9%
	Rating	**15%**	**18%**	**97%**	**95%**	**88%**	**20%**	**82%**	**10%**	**3%**	**78%**	**33%**	**100%**
1	gen-23		3.27	4.02	4.73	3.13		3.95			2.66	4.01	4.77
2	gen-23			4.14	4.73	3.09	3.41	3.99			2.73	3.98	4.77
3	gen-23			4.06	4.77	3.13		3.91			2.81		4.73
1	gen-23		3.27	4.02	4.73	3.13		3.95			2.66	4.01	4.77
2	gen-23			4.14	4.73	3.09		3.91			2.73	3.98	4.77
3	gen-23			4.06	4.8	3.13	3.41	3.98			2.81		4.73
1	gen-23		3.27	4.02	4.77	3.13		3.95			2.66	4.01	4.77
2	gen-23			4.14	4.8	3.13		3.91			2.85		4.73
3	gen-23			4.14	4.77	3.13		3.98			2.77		4.77
1	feb-23	2.69		4.02	4.77	3.13		3.95			2.5	3.43	4.69
2	feb-23			4.18	4.73	3.01		4.02			2.7	3.43	4.73
3	feb-23			4.06	4.77	3.05		3.95			2.77	3.36	4.69
1	feb-23	2.89		4.02	4.77	3.13		3.95			2.5	3.43	4.69
2	feb-23			4.18	4.73	3.01		3.95			2.7	3.43	4.69
3	feb-23			4.1	4.69	3.05		4.06			2.77	3.46	4.73
1	feb-23			4.18	4.73	3.13		3.95			2.69	3.43	4.69
2	feb-23	2.89		4.02	4.77	3.09		3.87			2.5	3.43	4.69
3	feb-23			4.1	4.69	3.05		3.95			2.77	3.36	4.73
1	mar-23	2.67		3.91	4.65	3.01		4.14		2.33			4.53
2	mar-23	2.54		3.95	4.65	3.01		3.95			3.05	3.69	4.57
3	mar-23		3.52	4.1	4.65	3.09		3.91			3.01		4.61
1	mar-23	2.67		3.91	4.65	3.01		4.14		2.33			4.53
2	mar-23	2.54		3.95	4.65	3.05		3.91			3.01		4.49
3	mar-23		3.52	4.1	4.65	3.01		3.83			3.05		4.57
1	mar-23	2.54		3.95	4.65	3.01		4.18			3.01		4.61
2	mar-23	2.67		3.91	4.65	3.05		3.83		2.33			4.53
3	mar-23		3.52	4.1	4.65	3.01		3.91			2.7		4.65
1	apr-23			4.06	4.65	2.97		4.06			2.77		4.61
2	apr-23			3.87	4.57	3.01		3.87			2.73		4.61
3	apr-23			4.1	4.69	3.05		3.83			2.73	3.22	4.65
1	apr-23			4.06	4.65	2.97		4.06			2.77		4.61
2	apr-23			3.87	4.57	3.01		3.87			2.77		4.61

3	apr-23			4.06	4.61	3.05		3.83		2.73	3.22	4.65
1	apr-23			4.06	4.65	3.09		4.06		2.77		4.61
2	apr-23			3.87	4.61	3.01		3.87		2.81		4.57
3	apr-23			4.1	4.69	3.09		3.95		2.73	3.22	4.65
1	mag-23			4.02	4.53	3.01		4.02		2.77	3.56	4.53
2	mag-23	2.72		3.98	4.49	3.13		3.79		2.66		4.49
3	mag-23			3.98	4.69	2.85	3.52	4.02		2.81		4.61
1	mag-23	2.72		3.98	4.49	3.01		4.02		2.77	3.56	4.53
2	mag-23			4.02	4.53	3.13		4.02		2.66		4.49
3	mag-23			3.98	4.73	2.81	3.53	3.79		2.81		4.61
1	mag-23			4.02	4.53	3.01		4.02		2.62		4.49
2	mag-23	2.72		3.98	4.49	3.13		3.79		2.77	3.56	4.53
3	mag-23			3.98		2.81	3.53	4.02		2.77		4.61
1	giu-23			3.95	4.65	3.05		3.95		2.81	4.02	4.52
2	giu-23			3.95	4.57		3.54	4.29		2.89	4.06	4.48
3	giu-23			4.06	4.57			3.87		2.77	3.98	4.52
1	giu-23			3.95	4.65	3.05		3.95		2.81	4.02	4.5
2	giu-23			3.98	4.57		3.54	4.3		2.89	4.06	4.48
3	giu-23			4.06	4.57			4.1		2.77	3.98	4.52
1	giu-23			3.95	4.65	3.05		3.95		2.93	4.06	4.48
2	giu-23			3.95	4.57	3.05		3.83		2.81	4.02	4.52
3	giu-23			4.02	4.57		3.54	4.3		2.77	3.98	4.52
1	lug-23	2.51	3.27	3.91	4.45	3.01		4.1	4.34	2.73		4.45
2	lug-23		3.27	3.95	4.53	3.2		3.95		2.73	4.01	4.53
3	lug-23	2.46			4.45	3.01		4.14	4.45	2.85		4.53
1	lug-23	2.51	3.27	3.91	4.45	3.01		4.1	4.34	2.73		4.45
2	lug-23	2.46		4.05	4.57	3.2		3.95		2.77	4.01	4.53
3	lug-23		3.27	3.95		3.2		4.45		2.85		4.53
1	lug-23			3.98	4.45	3.01		4.1	4.34	2.85		4.53
2	lug-23	2.51	3.27	3.91	4.49	3.2		4.34		2.73	4.01	4.53
3	lug-23	2.46			4.45	3.2		4.45		2.77		4.45
1	ago-23		3.26	3.95	4.49	3.13	3.55	3.95		2.7	3.95	4.49
2	ago-23			4.06	4.75	3.01		3.86		2.69	3.95	4.57
3	ago-23			3.95	4.49	3.01	3.48	4.1		2.7	3.87	4.53
1	ago-23		3.26	3.95	4.49	3.13	3.55	3.95		2.7	3.95	4.49
2	ago-23			4.06	4.77	3.01		3.95		2.7	3.98	4.57
3	ago-23			3.95	4.49	3.01	3.48	4.1		2.7	3.91	4.53
1	ago-23		3.26	3.95	4.49	3.13	3.55	3.95		2.73	3.95	4.49
2	ago-23			4.06	4.77	3.01		3.91		2.7	3.98	4.57
3	ago-23			3.98	4.92	3.01	3.48	4.1		2.73	3.91	4.53
1	set-23			3.98	4.53	2.97	3.52			2.73	3.56	4.53
2	set-23		3.48	3.95	4.61	3.01		3.87		2.89		4.53
3	set-23	2.81		4.06	4.61	2.89	3.4			2.7		4.57
1	set-23			3.98	4.53	2.97		3.95		2.73	3.56	4.5
2	set-23		3.48	3.95	4.61	3.01		3.87		2.7		4.53
3	set-23	2.81		4.06	4.61	2.89		4.1		2.89		4.57
1	set-23		3.48	3.95	4.61	2.97		3.95		2.73	3.56	4.49

2	set-23	2.81		3.98	4.53	3.01		3.87		2.7		4.53
3	set-23			4.02	4.61	2.89		4.14		2.93		4.57
1	ott-23			3.91	4.61	3.09	3.63			3.09		4.65
2	ott-23		3.2	3.91	4.65	3.01		4.02				4.65
3	ott-23		3.2	4.06	4.69	3.01		3.75			4.02	4.61
1	ott-23			3.91	4.61	3.09	3.59			3.09		4.69
2	ott-23		3.2	4.02	4.57	3.01	3.71					4.65
3	ott-23			4.06	4.69	3.01	4.02				4.02	4.61
1	ott-23			3.91	4.61	3.09	3.59			3.09		4.69
2	ott-23			4.02	4.61	2.97		4.02			4.02	4.61
3	ott-23			3.95	4.65	3.01		3.75				4.65
1	nov-23			4.02	4.61	3.13	3.48		4.57	2.7		4.61
2	nov-23			3.91	4.65	3.01		3.79		2.7		4.65
3	nov-23			3.87	4.57	3.13		3.87		2.73		4.73
1	nov-23			4.02	4.61		3.48	4.05	4.57	2.7		4.61
2	nov-23				4.65	3.01		3.79		2.7		4.61
3	nov-23			3.98	4.65	3.13		3.87		2.66		4.65
1	nov-23			4.02	4.61	3.01		3.79		2.7		4.61
2	nov-23				4.65		3.48	4.06	4.57	2.7		4.65
3	nov-23			4.14			3.32	3.98		2.7		4.65
1	dic-23			3.98	4.69	3.09		3.98	4.76	2.73	3.92	4.73
2	dic-23			3.95	4.73	3.01		4.06		2.73		4.65
3	dic-23		3.42	4.06	4.61	3.05		3.95	4.5	2.73	3.94	4.73
1	dic-23			3.98	4.69	3.09		3.98	4.76	2.73	3.94	4.73
2	dic-23			3.95	4.73	3.05		3.95	4.5	2.73		4.65
3	dic-23		3.42	4.1	4.57	3.05		4.06		2.73		4.77
1	dic-23			3.98	4.69	3.09		3.98	4.76	2.73		4.65
2	dic-23			3.95	4.73	3.09		4.14		2.77		4.69
3	dic-23			4.14		3.13		4.1		2.73	3.92	4.73

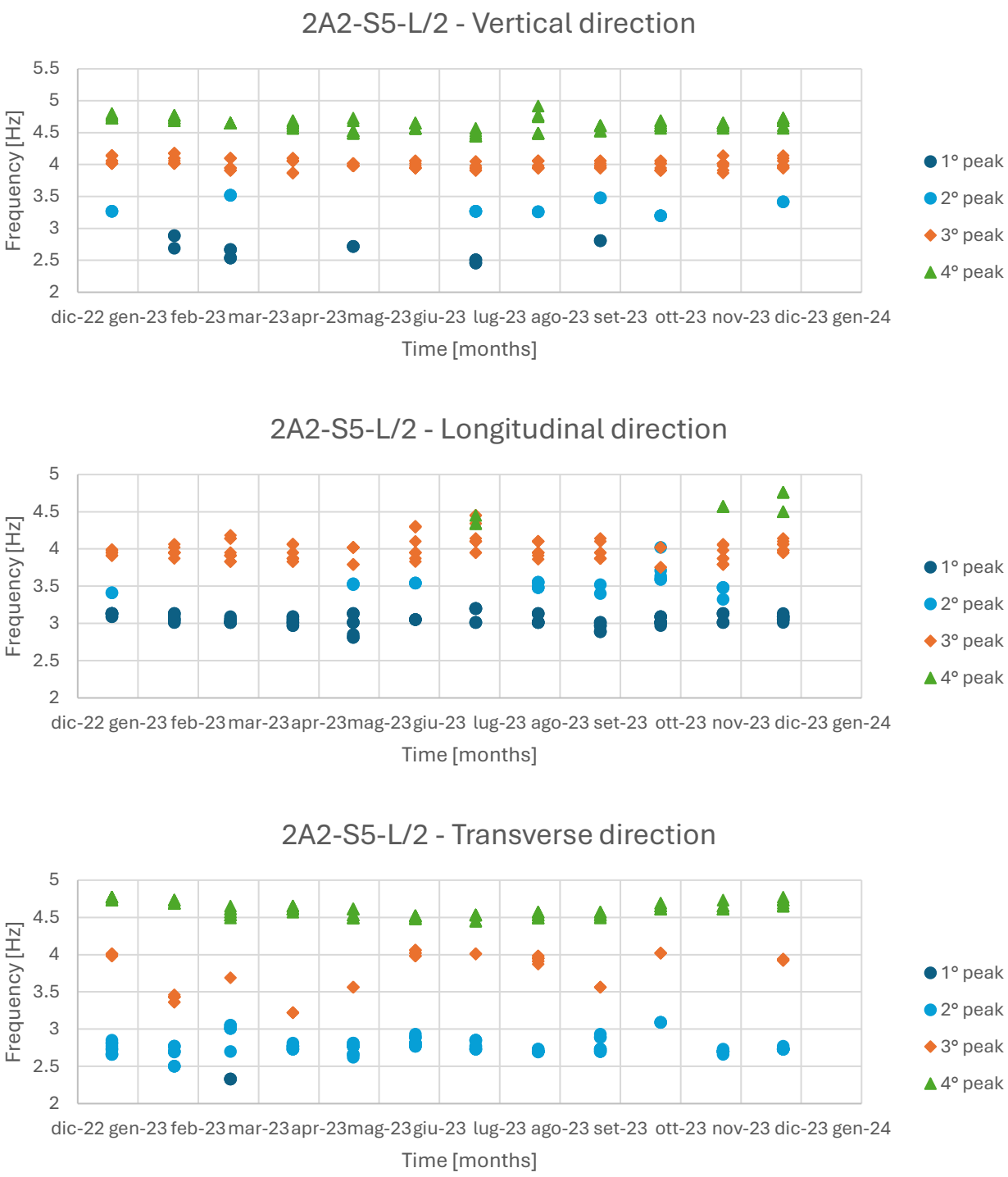


Figure 6-127: Main identified frequencies for sensor 2B7E4 – bridge 2A2 – Sp5 – L/2

7. Annex 7 – Bridge 2A2 – Span 5 – L/4 - Sensor 3187F

The Bridge 2A2 counts 2 monitored decks: span 4 and span 5 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 4 are:

- 3099D – situated in the midspan;
- 30EB4 – situated at a distance of L/4;
- 31639 – situated at a distance of L/8;
- 30D41 – situated nearby the pilar.

The sensors present on deck number 5 are:

- 2B7E4 – situated in the midspan;
- 3187F – situated at a distance of L/4 of the deck;
- 2B988 – situated at a distance of L/8 of the deck;
- 2C1EA – situated by the pilar.

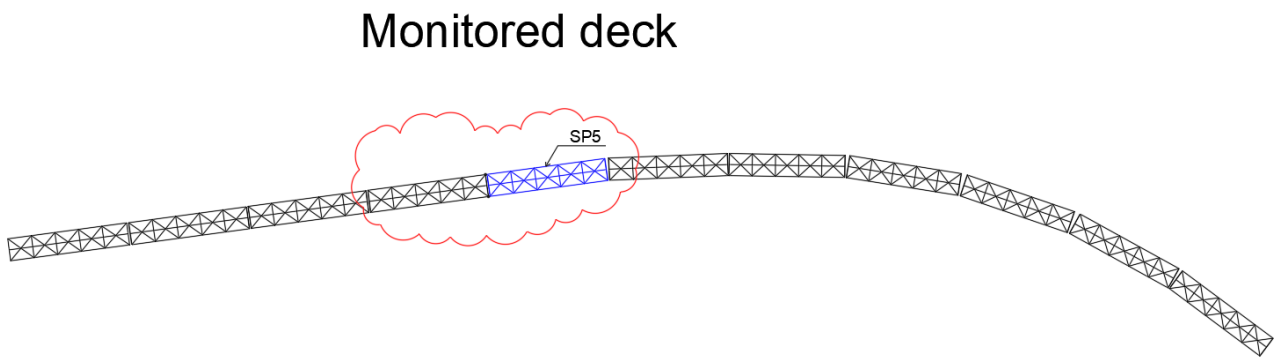


Figure 7-1 Monitored decks of 2A2 bridge

The accelerograms of the 3187F sensor have been analyzed and the results are represented in the following paragraphs.

7.1 January

The results obtained for the January dataset are shown in the following tables.

Table 7-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-01-17_07-00-21	2.04E-03
	2°	3187F_2023-01-21_07-00-20	1.59E-03
	3°	3187F_2023-01-30_07-00-20	1.56E-03
Longitudinal direction (y)	1°	3187F_2023-01-26_07-00-20	4.46E-04
	2°	3187F_2023-01-17_07-00-21	4.25E-04
	3°	3187F_2023-01-31_07-00-20	4.22E-04
Transverse direction (z)	1°	3187F_2023-01-31_07-00-20	5.36E-04
	2°	3187F_2023-01-19_13-00-19	5.24E-04
	3°	3187F_2023-01-02_07-00-20	5.23E-04

Table 7-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-01-17_07-00-21	6.91E-06	3187F_2023-01-17_07-00-21	9.01E-07
2	3187F_2023-01-31_07-00-20	4.81E-06	3187F_2023-01-30_07-00-20	5.31E-07
3	3187F_2023-01-21_07-00-20	3.28E-06	3187F_2023-01-31_07-00-20	4.88E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-01-26_07-00-20	3.43E-07	3187F_2023-01-26_07-00-20	4.01E-08
2	3187F_2023-01-31_07-00-20	2.58E-07	3187F_2023-01-17_07-00-21	3.70E-08
3	3187F_2023-01-19_13-00-19	2.06E-07	3187F_2023-01-31_07-00-20	3.56E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-01-19_13-00-19	3.68E-07	3187F_2023-01-31_07-00-20	6.08E-08
2	3187F_2023-01-31_07-00-20	2.75E-07	3187F_2023-01-19_13-00-19	5.46E-08
3	3187F_2023-01-17_13-00-20	2.57E-07	3187F_2023-01-13_13-00-20	5.40E-08

Table 7-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	E	E	E	D	F	D
2	B	D	C	A	D	A	F	D	F
3	C	B	D	D	-	D	-	-	-

7.1.1 Vertical direction (x)

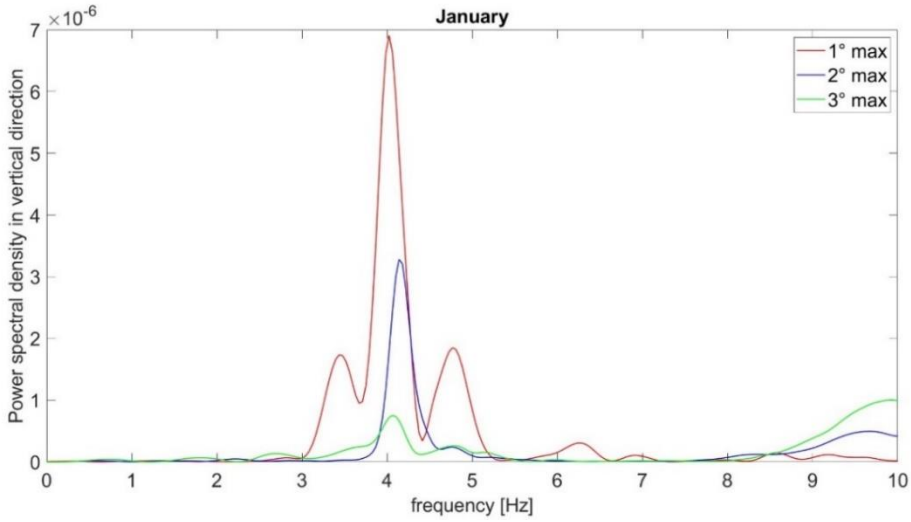


Figure 7-2: Results obtained from the 3 accelerograms with maximum SD in time domain

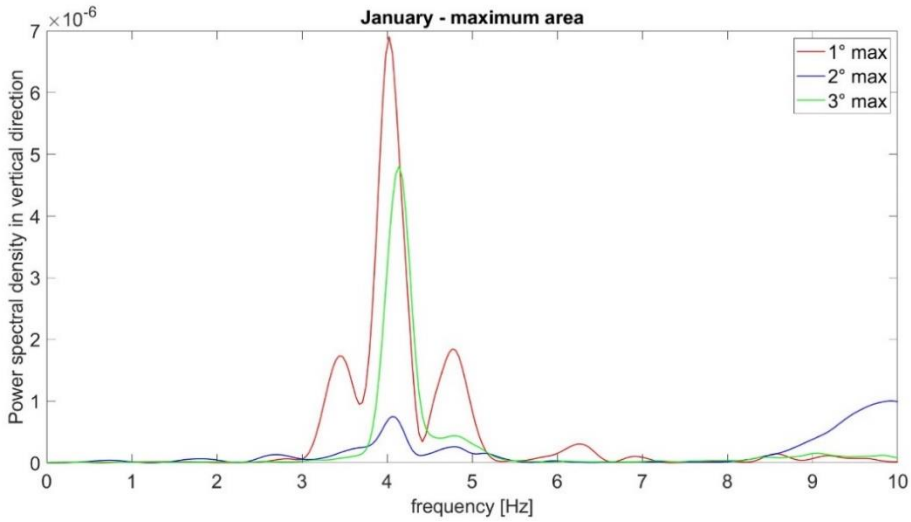


Figure 7-3: Results obtained from the 3 accelerograms with maximum area of PSD

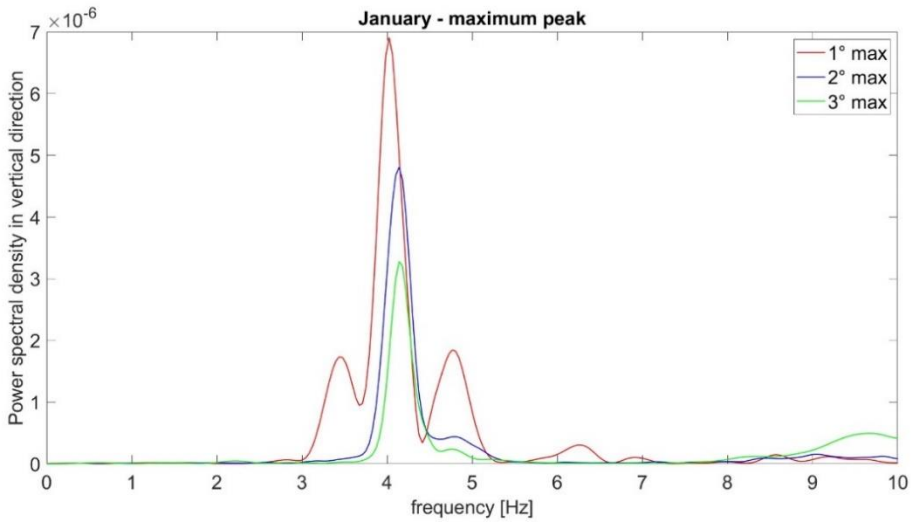


Figure 7-4: Results obtained from the 3 accelerograms with highest peak if PSD

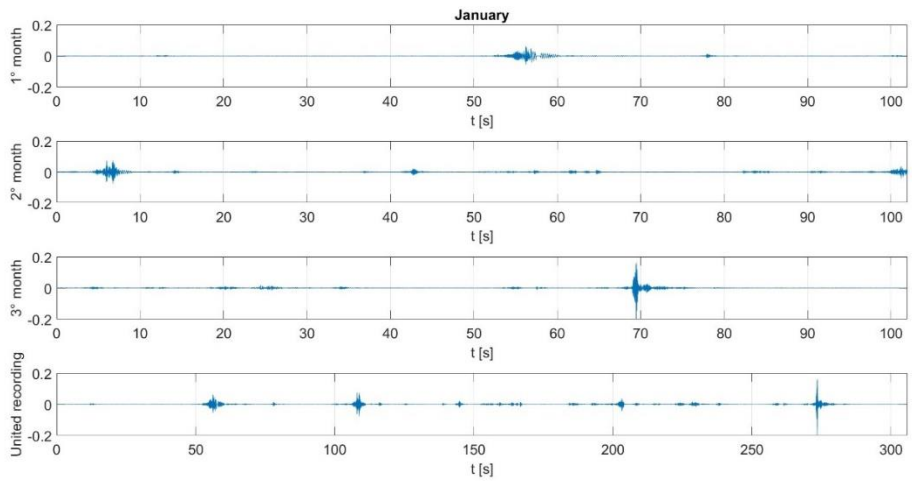


Figure 7-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.1.2 Longitudinal direction (y)

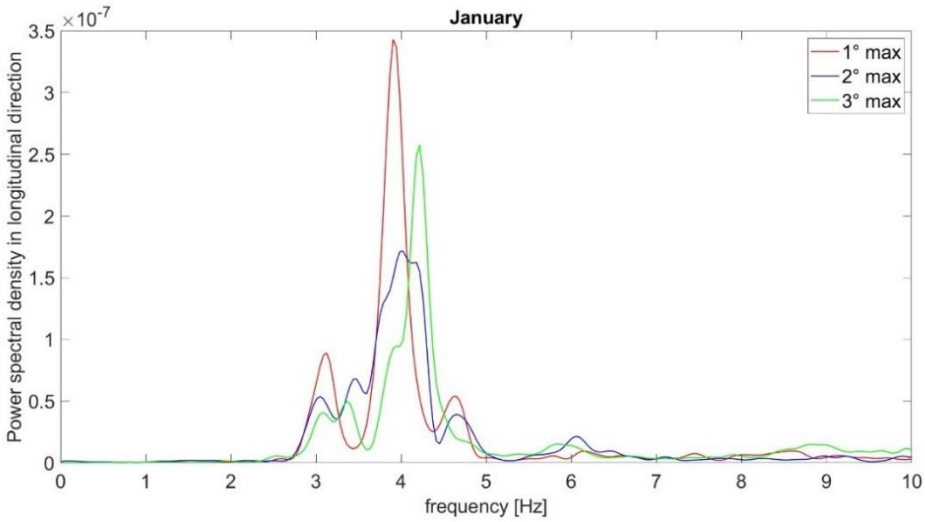


Figure 7-6: Results obtained from the 3 accelerograms with maximum SD in time domain

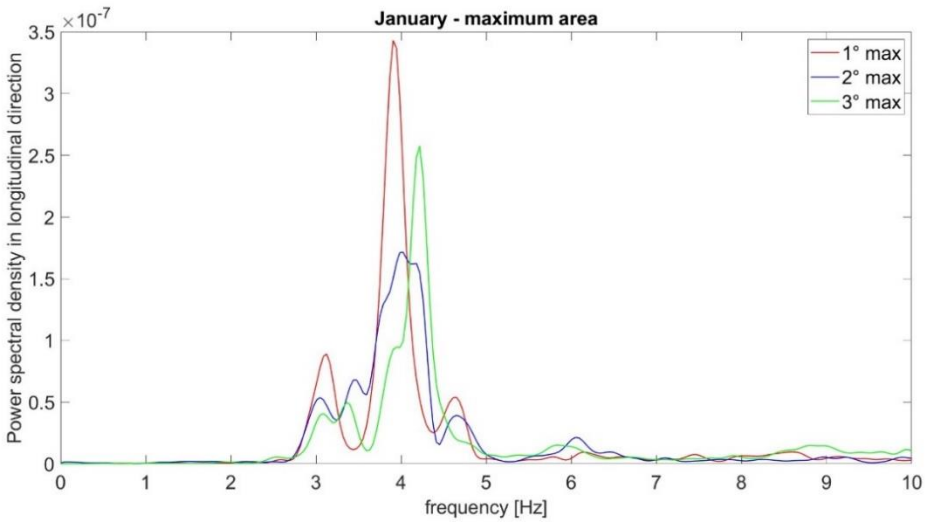


Figure 7-7: Results obtained from the 3 accelerograms with maximum area of PSD

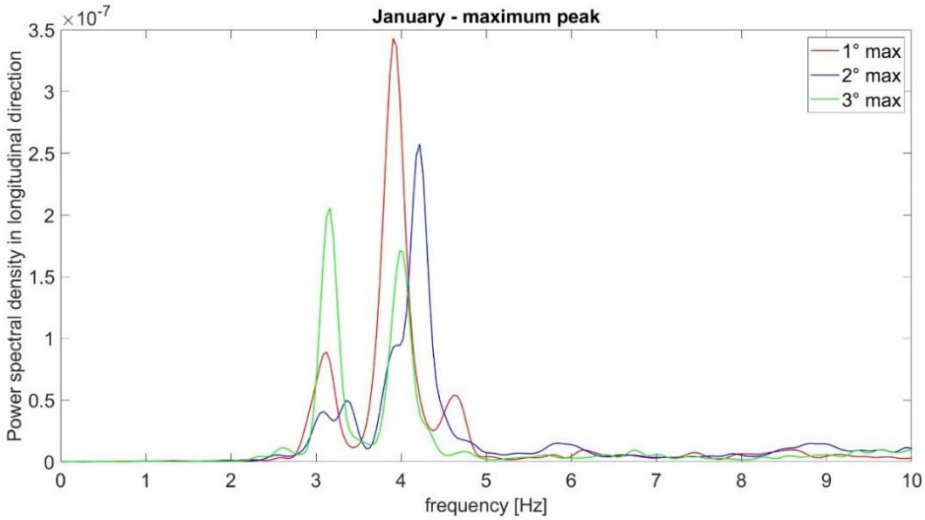


Figure 7-8: Results obtained from the 3 accelerograms with highest peak in PSD

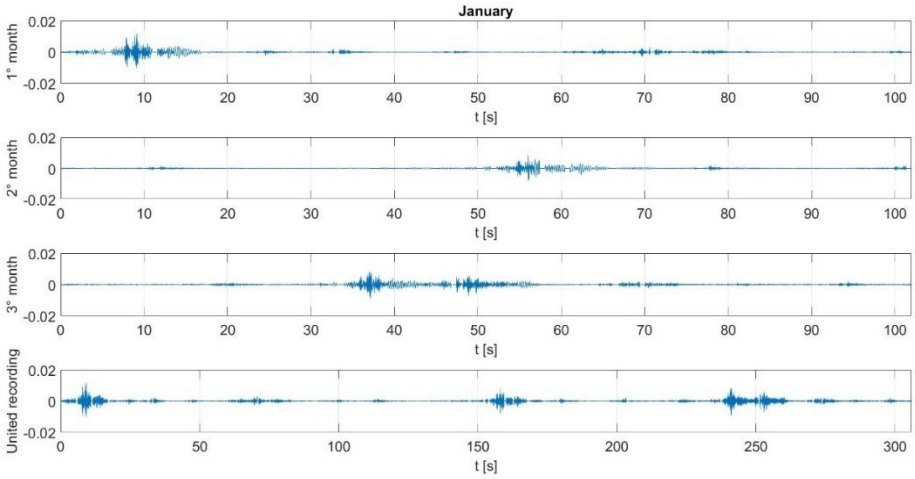


Figure 7-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.1.3 Transverse direction (z)

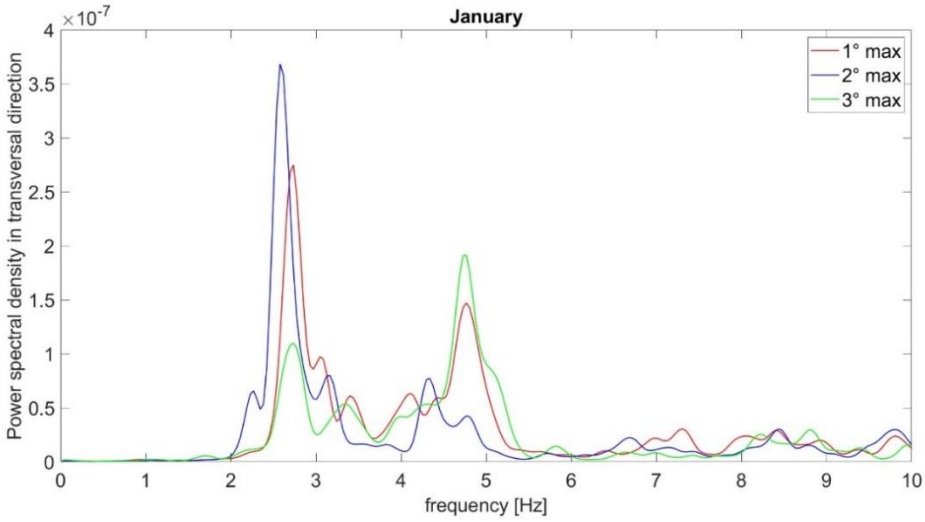


Figure 7-10: Results obtained from the 3 accelerograms with maximum SD in time domain

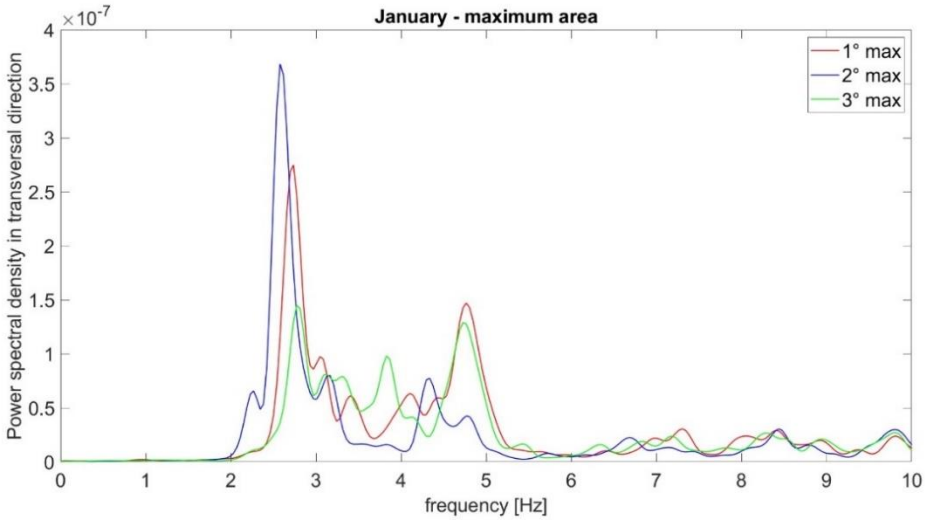


Figure 7-11: Results obtained from the 3 accelerograms with maximum area of PSD

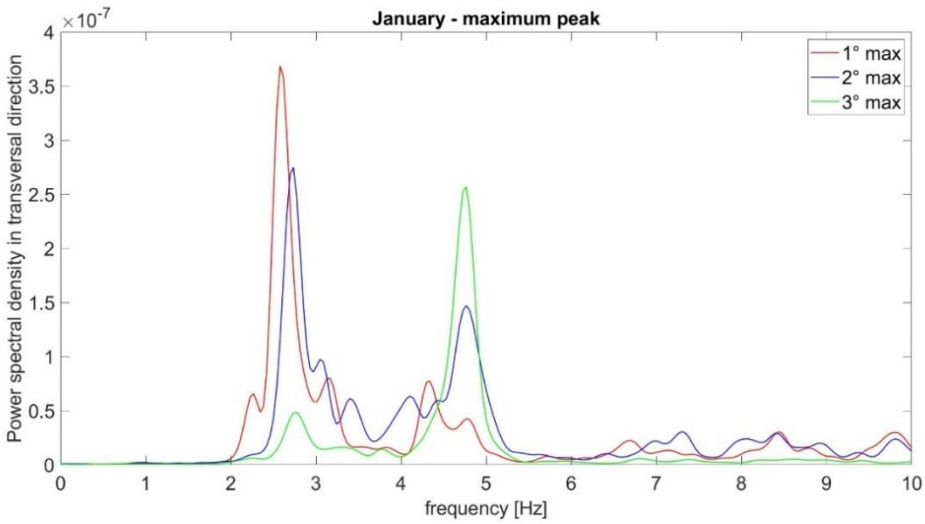


Figure 7-12: Results obtained from the 3 accelerograms with highest peak in PSD

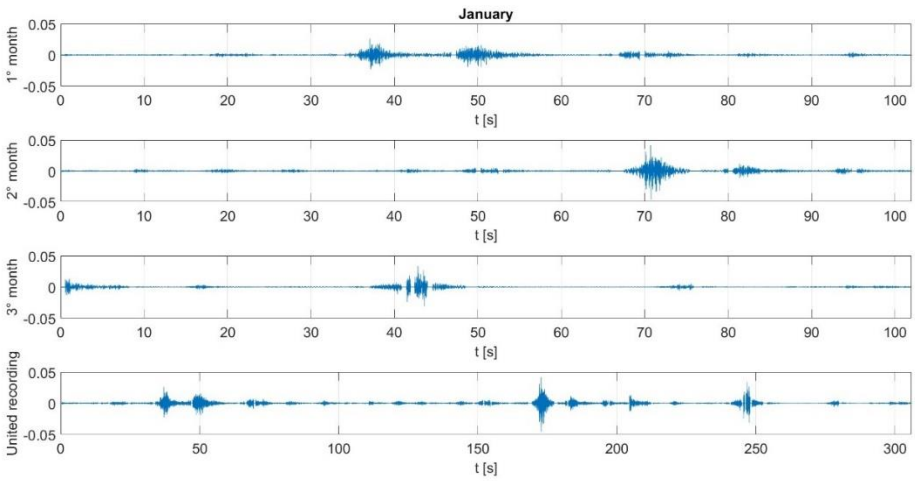


Figure 7-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

7.2 February

The results obtained for the February dataset are shown in the following tables.

Table 7-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-02-01_13-00-20	2.97E-03
	2°	3187F_2023-02-06_13-00-19	2.67E-03
	3°	3187F_2023-02-01_07-00-20	1.86E-03
Longitudinal direction (y)	1°	3187F_2023-02-01_13-00-20	9.62E-04
	2°	3187F_2023-02-06_13-00-19	5.42E-04
	3°	3187F_2023-02-03_13-00-19	5.24E-04
Transverse direction (z)	1°	3187F_2023-02-01_13-00-20	1.15E-03
	2°	3187F_2023-02-03_13-00-19	9.64E-04
	3°	3187F_2023-02-06_13-00-19	9.41E-04

Table 7-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-02-01_13-00-20	7.66E-06	3187F_2023-02-01_13-00-20	2.04E-06
2	3187F_2023-02-06_13-00-19	7.04E-06	3187F_2023-02-06_13-00-19	1.49E-06
3	3187F_2023-02-27_19-00-21	5.55E-06	3187F_2023-02-01_07-00-20	7.15E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-02-01_13-00-20	1.36E-06	3187F_2023-02-01_13-00-20	1.90E-07
2	3187F_2023-02-14_19-00-20	3.60E-07	3187F_2023-02-03_13-00-19	5.75E-08
3	3187F_2023-02-03_13-00-19	3.32E-07	3187F_2023-02-06_13-00-19	5.51E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-02-03_13-00-19	1.76E-06	3187F_2023-02-01_13-00-20	2.71E-07
2	3187F_2023-02-01_13-00-20	1.36E-06	3187F_2023-02-03_13-00-19	1.86E-07
3	3187F_2023-02-06_13-00-19	8.03E-07	3187F_2023-02-06_13-00-19	1.73E-07

Table 7-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	D	A
2	B	B	B	B	-	D	D	A	D
3	C	-	C	D	D	B	B	B	B

7.2.1 Vertical direction (x)

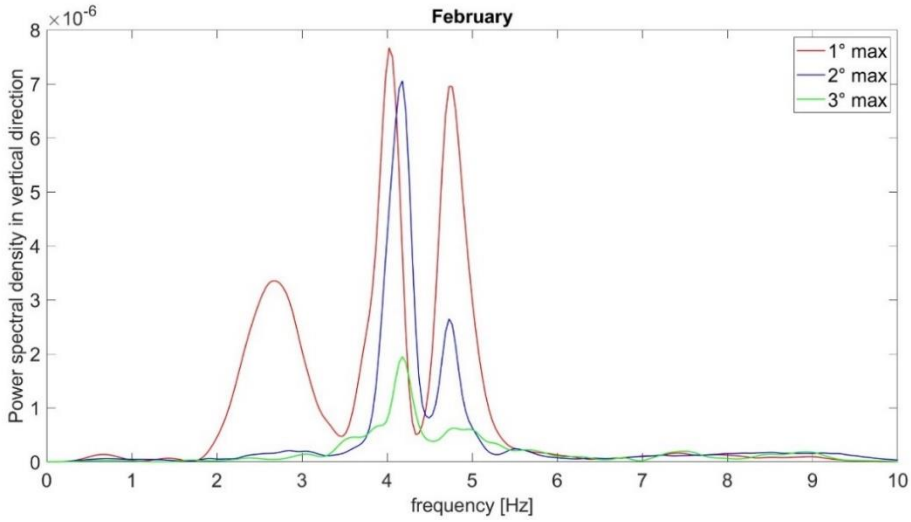


Figure 7-14: Results obtained from the 3 accelerograms with maximum SD in time domain

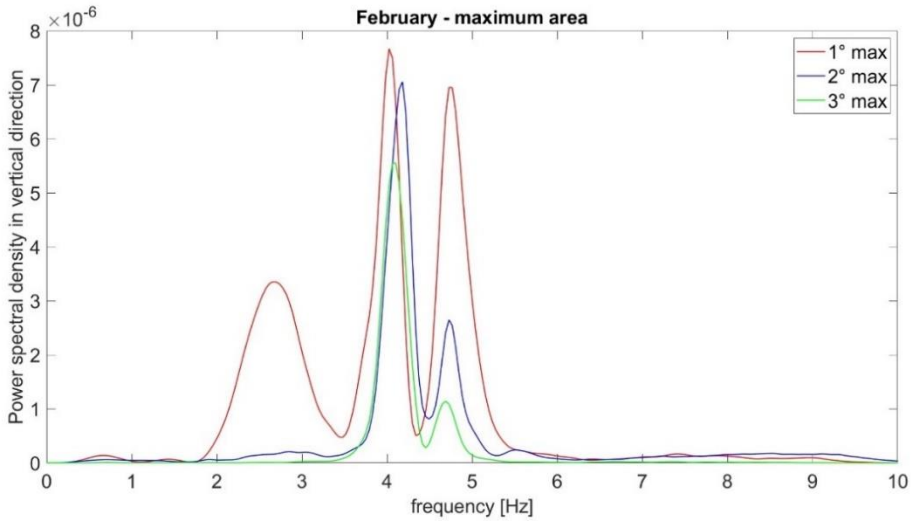


Figure 7-15: Results obtained from the 3 accelerograms with maximum area of PSD

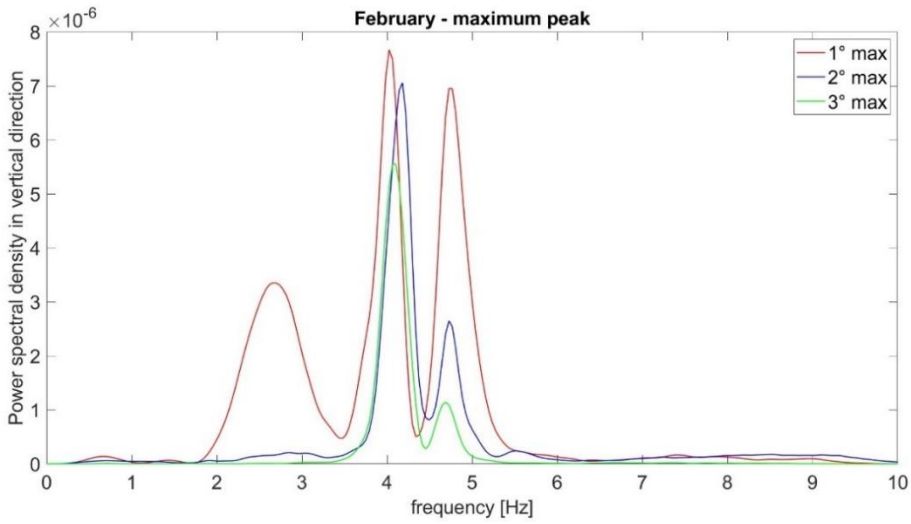


Figure 7-16: Results obtained from the 3 accelerograms with highest peak if PSD

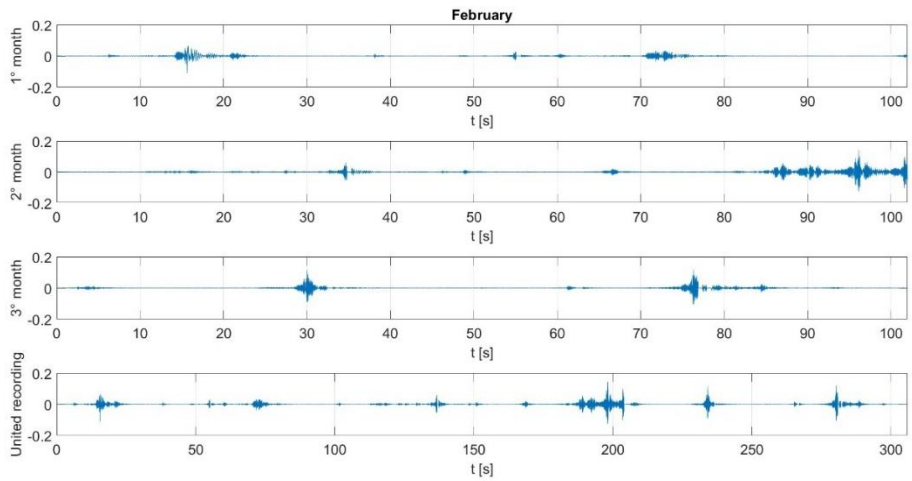


Figure 7-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.2.2 Longitudinal direction (y)

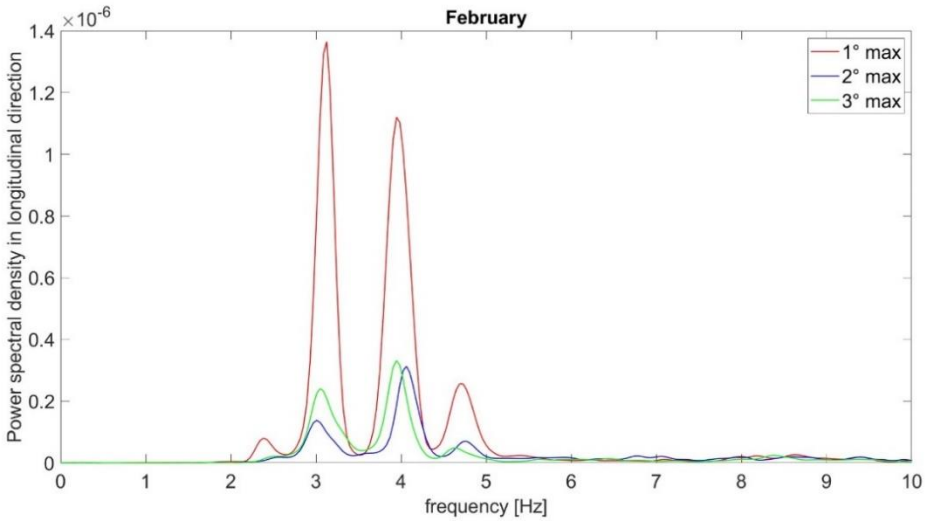


Figure 7-18: Results obtained from the 3 accelerograms with maximum SD in time domain

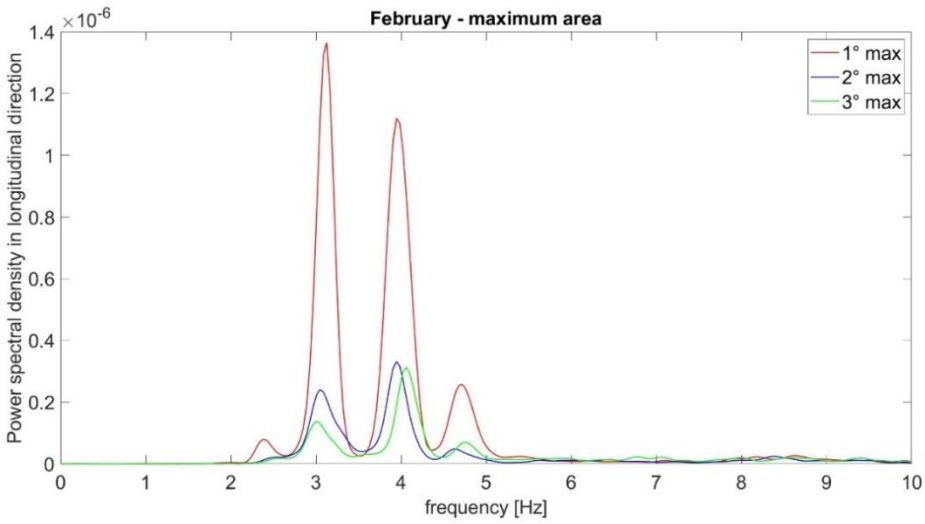


Figure 7-19: Results obtained from the 3 accelerograms with maximum area of PSD

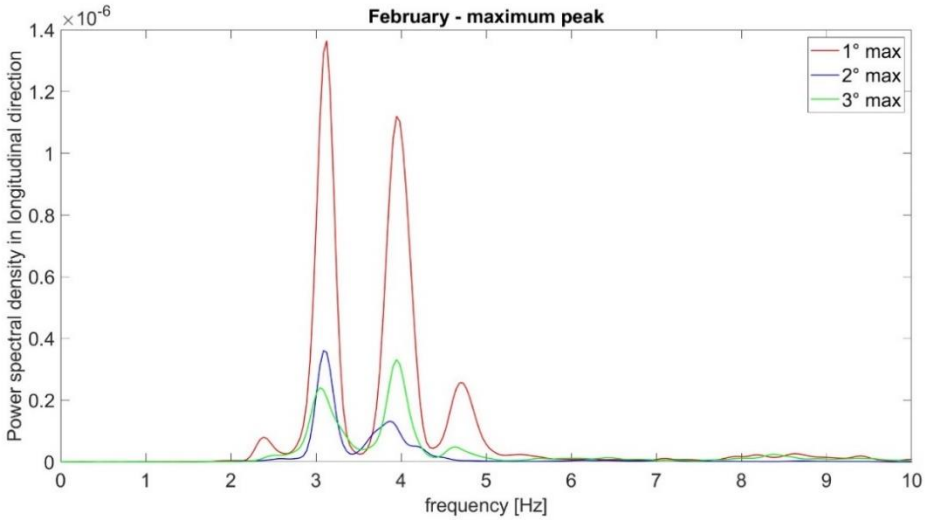


Figure 7-20: Results obtained from the 3 accelerograms with highest peak if PSD

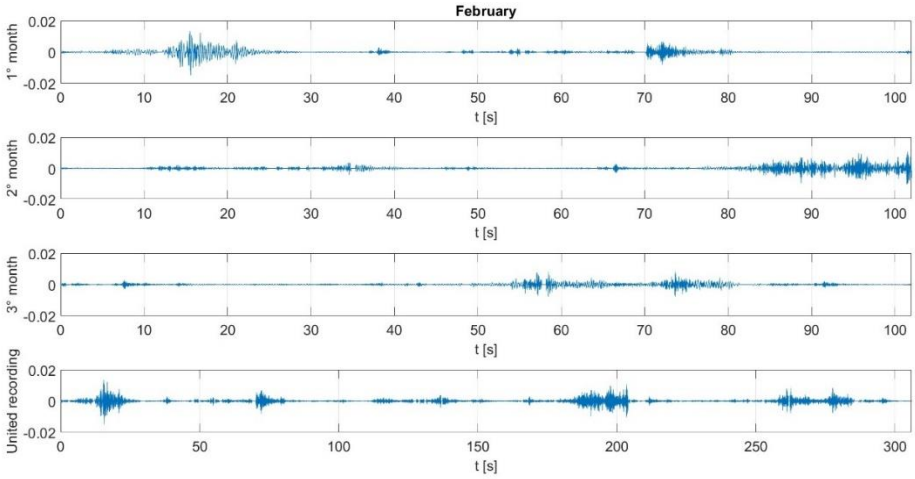


Figure 7-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.2.3 Transverse direction (z)

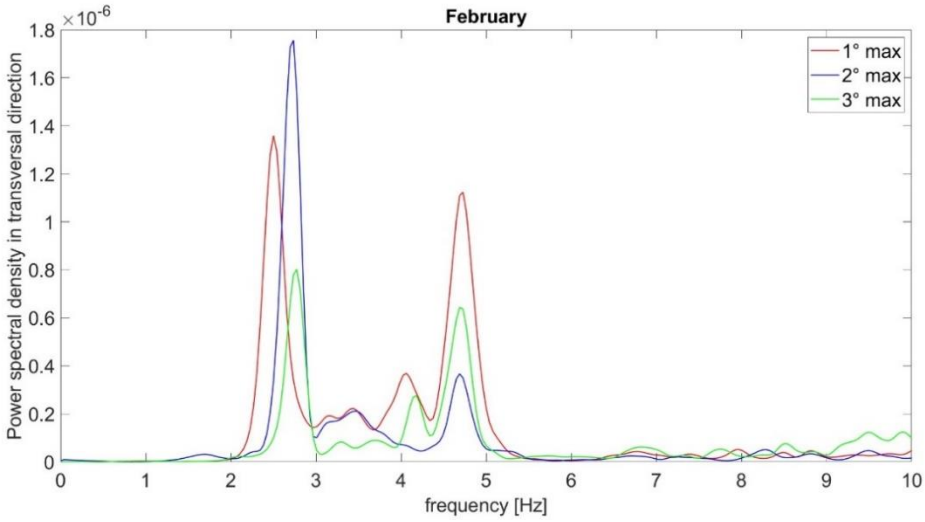


Figure 7-22: Results obtained from the 3 accelerograms with maximum SD in time domain

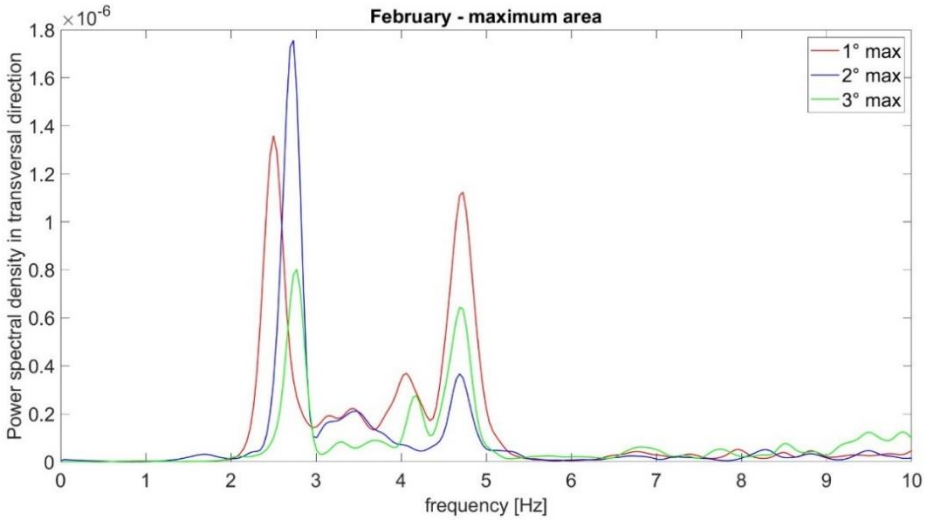


Figure 7-23: Results obtained from the 3 accelerograms with maximum area of PSD

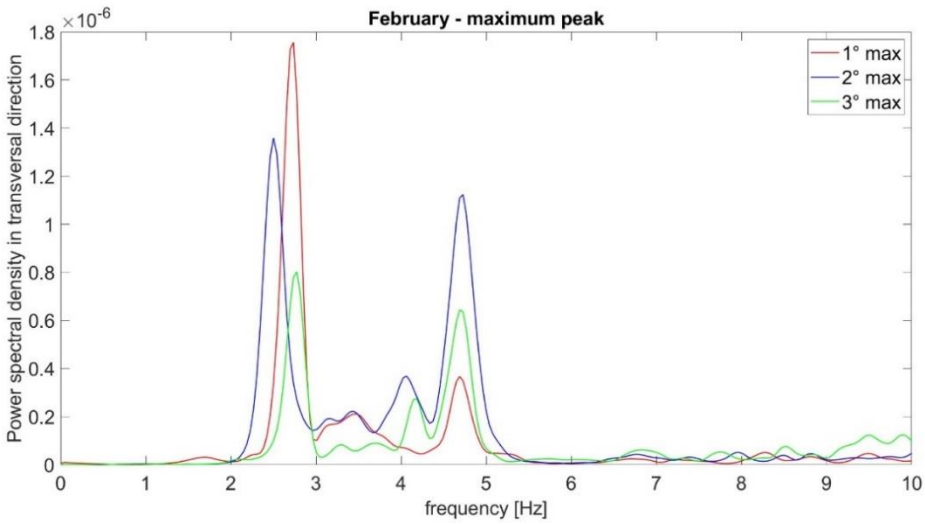


Figure 7-24: Results obtained from the 3 accelerograms with highest peak if PSD

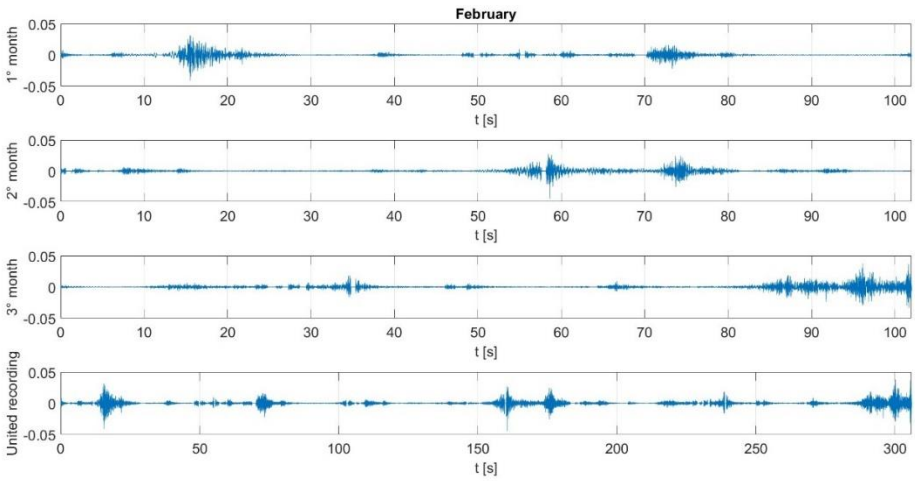


Figure 7-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

7.3 March

The results obtained for the March dataset are shown in the following tables.

Table 7-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-03-16_13-00-20	3.85E-03
	2°	3187F_2023-03-08_13-00-21	3.58E-03
	3°	3187F_2023-03-04_13-00-20	2.98E-03
Longitudinal direction (y)	1°	3187F_2023-03-04_13-00-20	1.71E-03
	2°	3187F_2023-03-16_13-00-20	1.29E-03
	3°	3187F_2023-03-08_13-00-21	1.09E-03
Transverse direction (z)	1°	3187F_2023-03-16_13-00-20	1.26E-03
	2°	3187F_2023-03-08_13-00-21	1.13E-03
	3°	3187F_2023-03-15_07-00-20	1.05E-03

Table 7-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-03-08_13-00-21	1.52E-05	3187F_2023-03-16_13-00-20	3.21E-06
2	3187F_2023-03-16_13-00-20	1.42E-05	3187F_2023-03-08_13-00-21	2.43E-06
3	3187F_2023-03-04_13-00-20	6.05E-06	3187F_2023-03-04_13-00-20	1.55E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-03-04_13-00-20	8.20E-06	3187F_2023-03-04_13-00-20	5.99E-07
2	3187F_2023-03-16_13-00-20	3.01E-06	3187F_2023-03-16_13-00-20	3.44E-07
3	3187F_2023-03-08_13-00-21	2.90E-06	3187F_2023-03-08_13-00-21	2.45E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-03-09_13-00-20	1.35E-06	3187F_2023-03-16_13-00-20	3.19E-07
2	3187F_2023-03-20_07-00-21	1.27E-06	3187F_2023-03-08_13-00-21	2.62E-07
3	3187F_2023-03-04_13-00-20	1.15E-06	3187F_2023-03-15_07-00-20	2.25E-07

Table 7-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	C	C	C	A	-	A
2	B	A	B	A	A	A	B	-	B
3	C	C	C	B	B	B	D	-	D

7.3.1 Vertical direction (x)

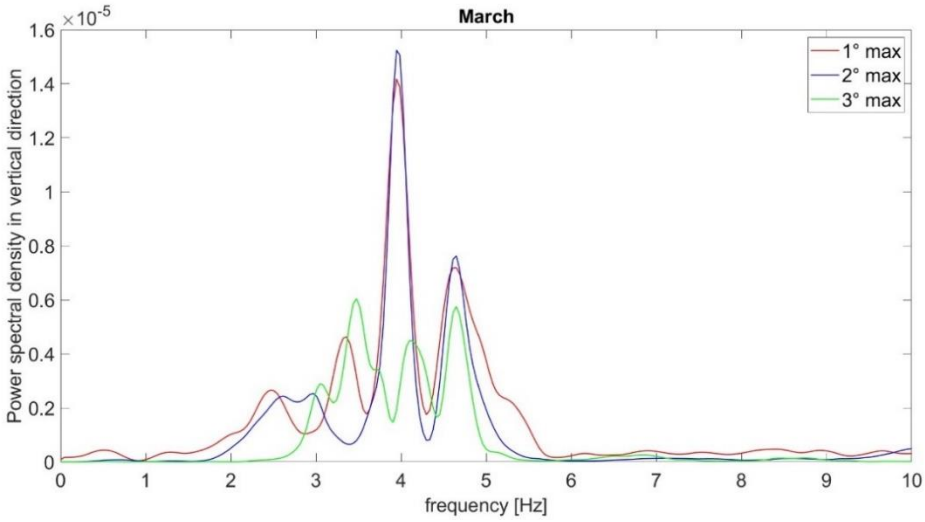


Figure 7-26: Results obtained from the 3 accelerograms with maximum SD in time domain

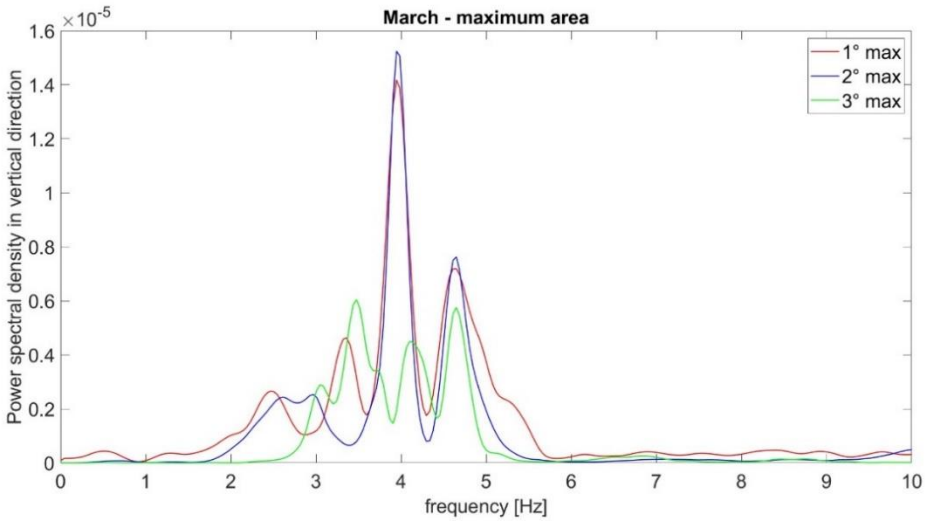


Figure 7-27: Results obtained from the 3 accelerograms with maximum area of PSD

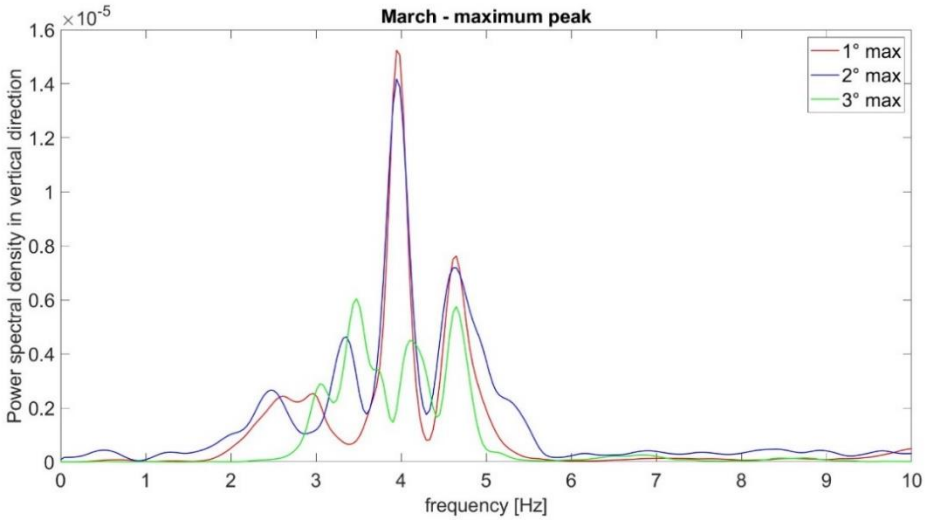


Figure 7-28: Results obtained from the 3 accelerograms with highest peak if PSD

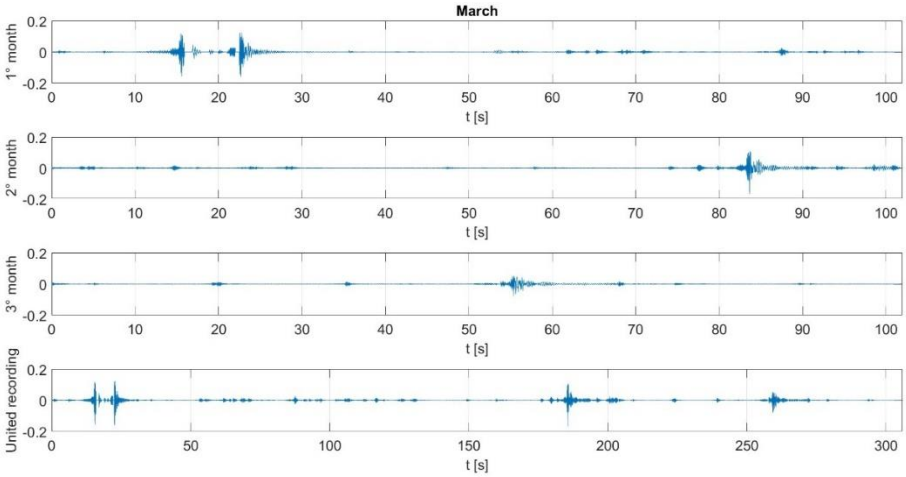


Figure 7-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.3.2 Longitudinal direction (y)

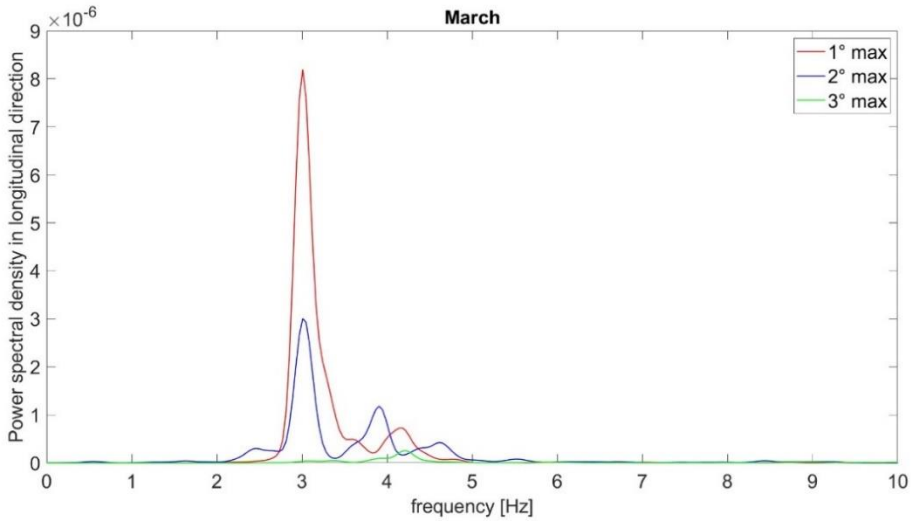


Figure 7-30: Results obtained from the 3 accelerograms with maximum SD in time domain

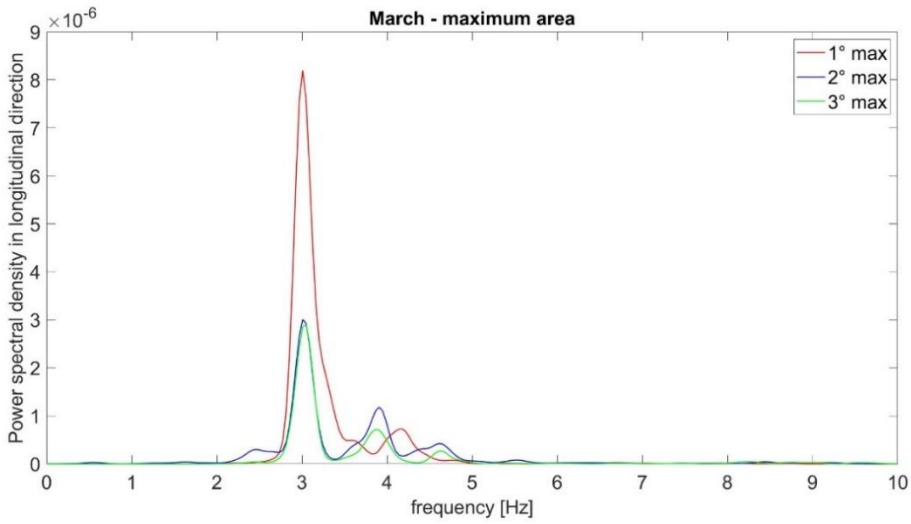


Figure 7-31: Results obtained from the 3 accelerograms with maximum area of PSD

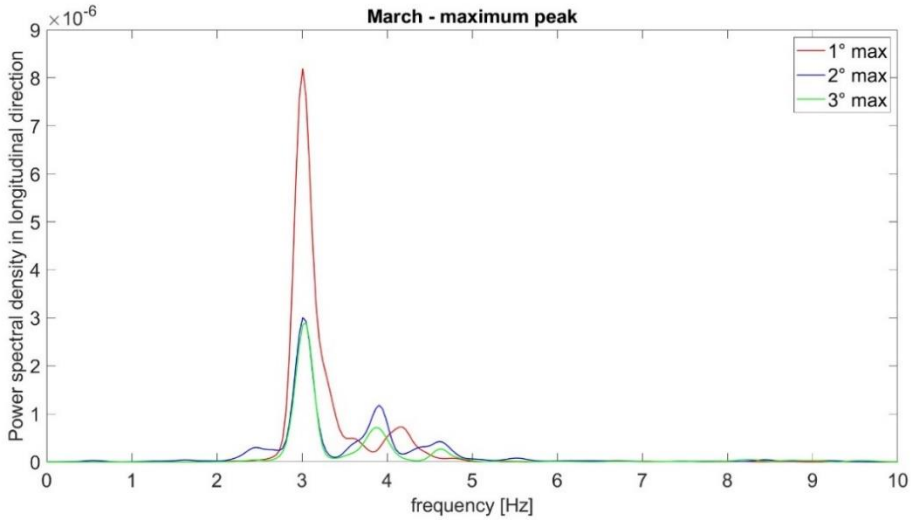


Figure 7-32: Results obtained from the 3 accelerograms with highest peak if PSD

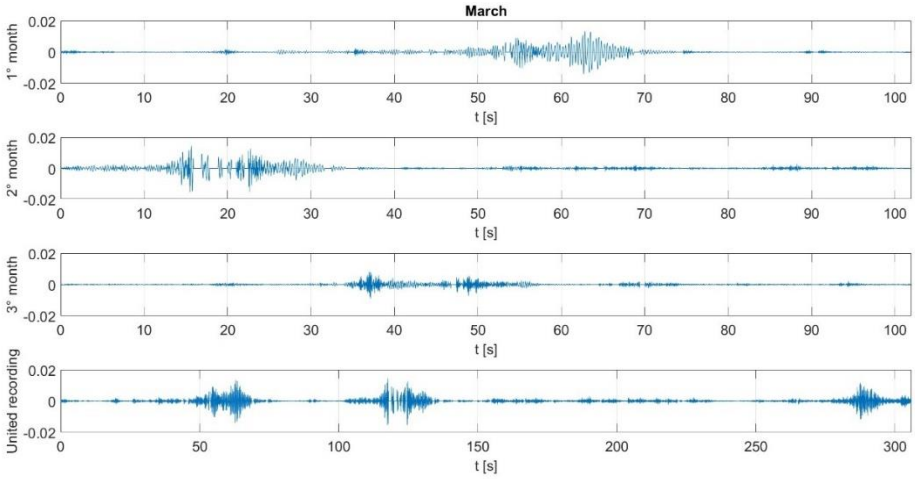


Figure 7-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.3.3 Transverse direction (z)

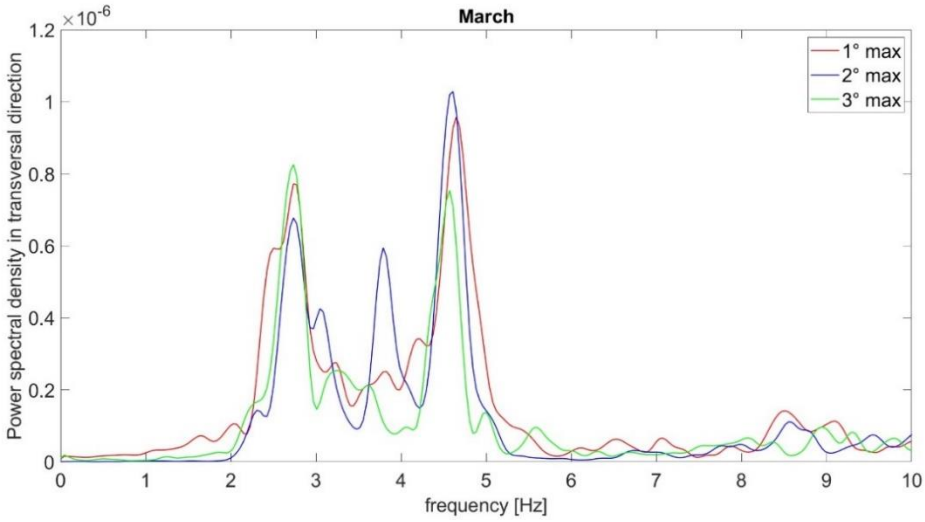


Figure 7-34: Results obtained from the 3 accelerograms with maximum SD in time domain

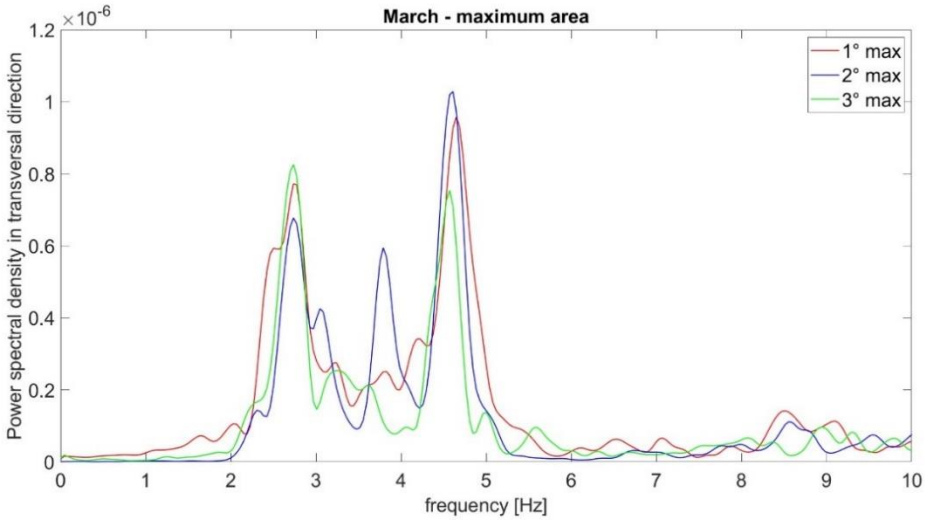


Figure 7-35: Results obtained from the 3 accelerograms with maximum area of PSD

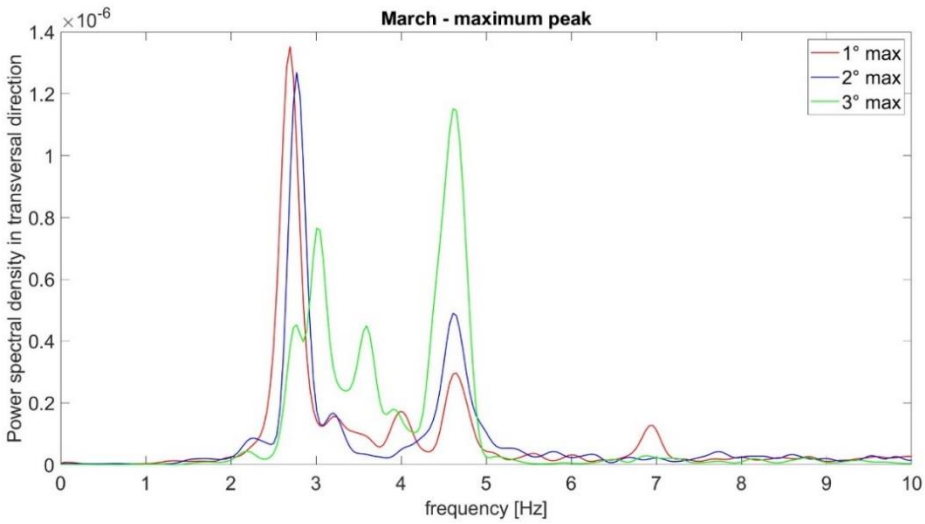


Figure 7-36: Results obtained from the 3 accelerograms with highest peak if PSD

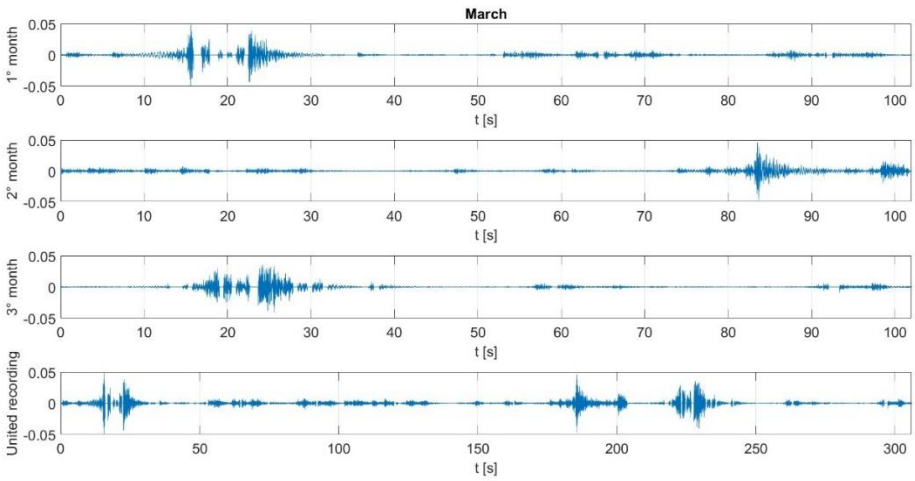


Figure 7-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

7.4 April

The results obtained for the April dataset are shown in the following tables.

Table 7-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-04-06_20-00-20	3.10E-03
	2°	3187F_2023-04-11_08-00-21	2.93E-03
	3°	3187F_2023-04-20_08-00-20	2.57E-03
Longitudinal direction (y)	1°	3187F_2023-04-07_08-00-21	5.33E-04
	2°	3187F_2023-04-20_08-00-20	4.88E-04
	3°	3187F_2023-04-18_14-00-21	4.72E-04
Transverse direction (z)	1°	3187F_2023-04-06_20-00-20	9.41E-04
	2°	3187F_2023-04-20_08-00-20	9.05E-04
	3°	3187F_2023-04-03_08-00-21	8.21E-04

Table 7-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-04-14_08-00-20	8.69E-06	3187F_2023-04-06_20-00-20	2.14E-06
2	3187F_2023-04-18_14-00-21	7.30E-06	3187F_2023-04-20_08-00-20	1.47E-06
3	3187F_2023-04-20_08-00-20	5.47E-06	3187F_2023-04-11_08-00-21	1.42E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-04-18_14-00-21	4.02E-07	3187F_2023-04-07_08-00-21	5.60E-08
2	3187F_2023-04-07_08-00-21	3.55E-07	3187F_2023-04-20_08-00-20	4.95E-08
3	3187F_2023-04-21_08-00-20	3.33E-07	3187F_2023-04-18_14-00-21	4.72E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-04-20_08-00-20	9.06E-07	3187F_2023-04-06_20-00-20	1.87E-07
2	3187F_2023-04-11_14-00-20	8.16E-07	3187F_2023-04-20_08-00-20	1.74E-07
3	3187F_2023-04-06_20-00-20	6.48E-07	3187F_2023-04-03_08-00-21	1.40E-07

Table 7-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	D	E	D	A	C	A
2	B	-	C	C	D	C	C	-	C
3	C	C	B	E	-	E	F	A	F

7.4.1 Vertical direction (x)

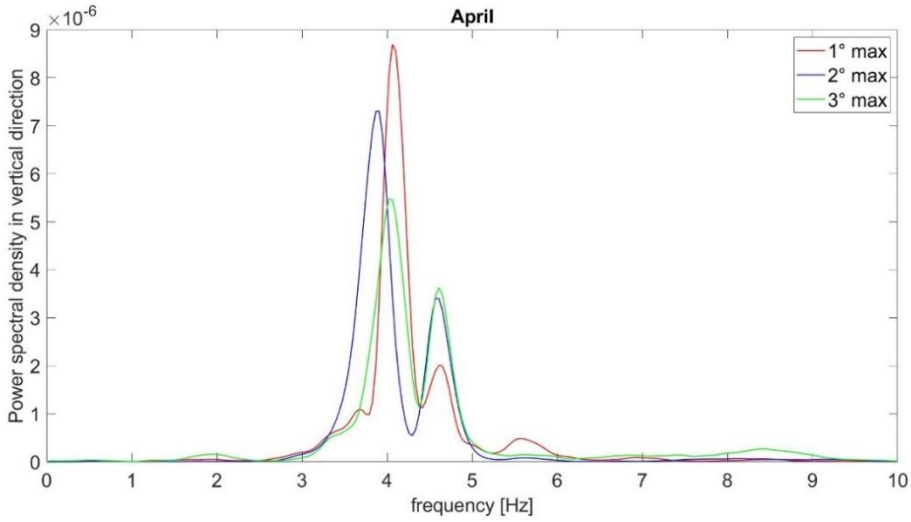


Figure 7-38: Results obtained from the 3 accelerograms with maximum SD in time domain

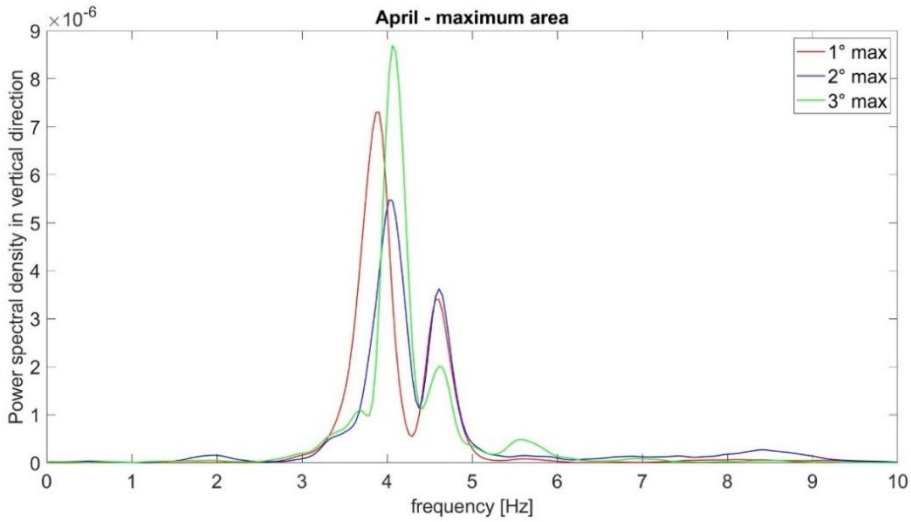


Figure 7-39: Results obtained from the 3 accelerograms with maximum area of PSD

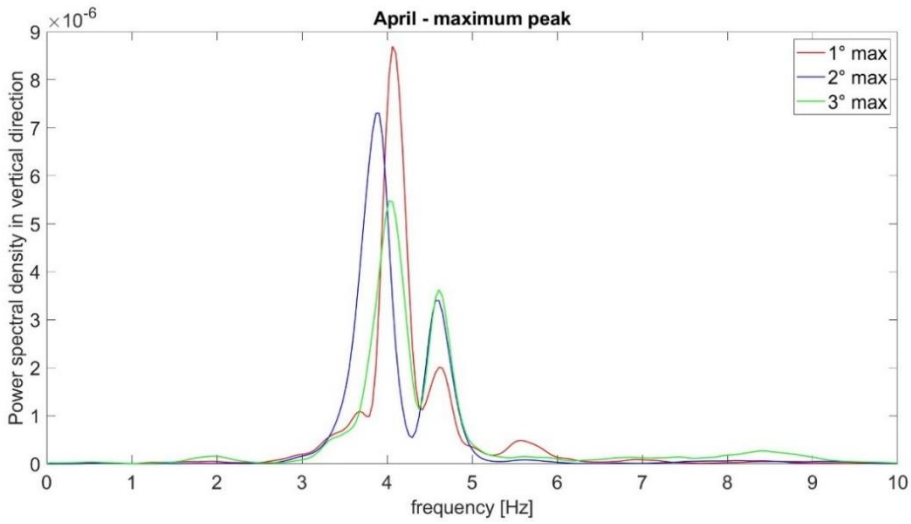


Figure 7-40: Results obtained from the 3 accelerograms with highest peak if PSD

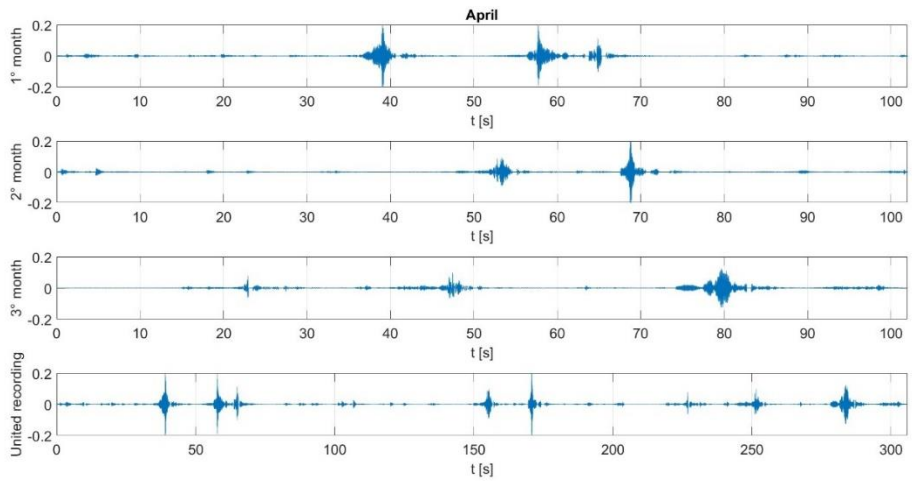


Figure 7-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.4.2 Longitudinal direction (y)

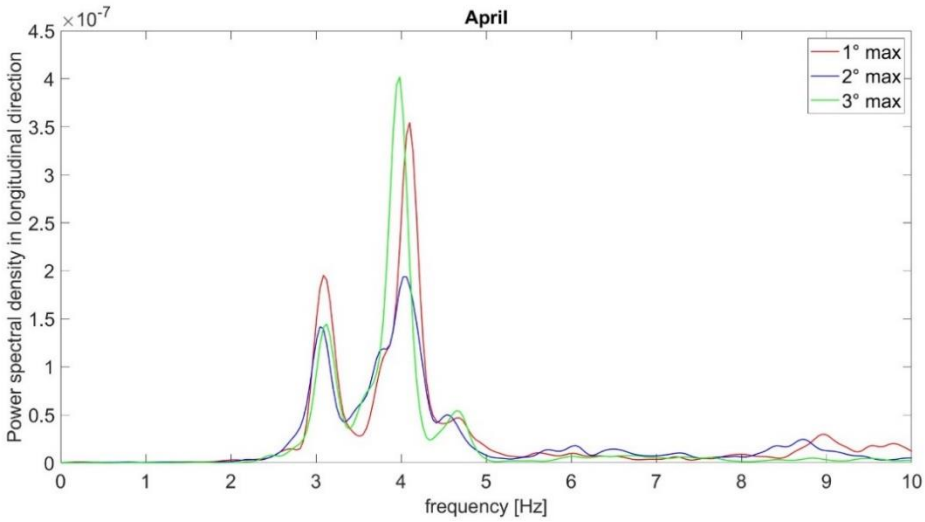


Figure 7-42: Results obtained from the 3 accelerograms with maximum SD in time domain

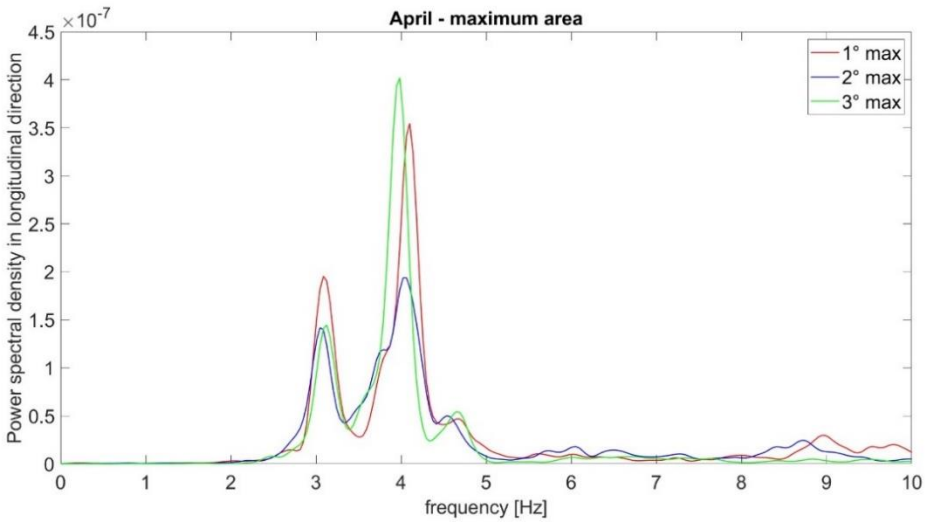


Figure 7-43: Results obtained from the 3 accelerograms with maximum area of PSD

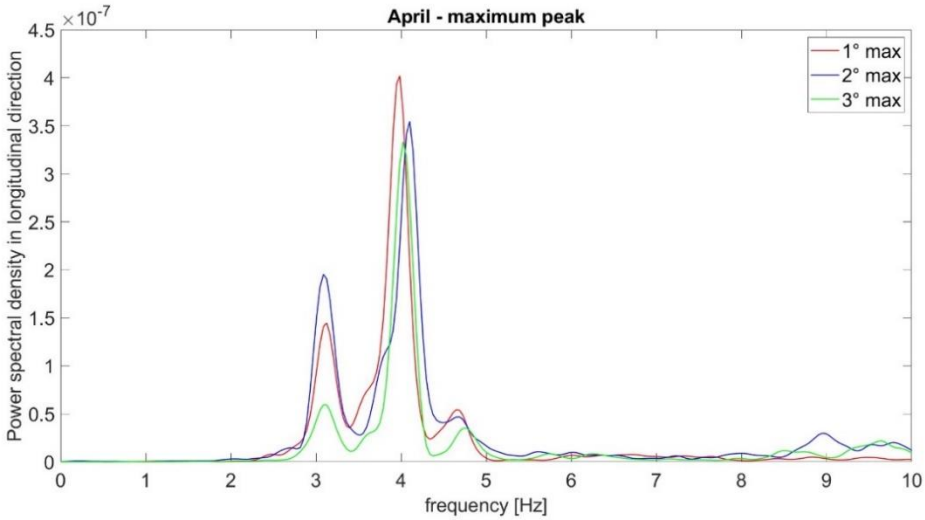


Figure 7-44: Results obtained from the 3 accelerograms with highest peak if PSD

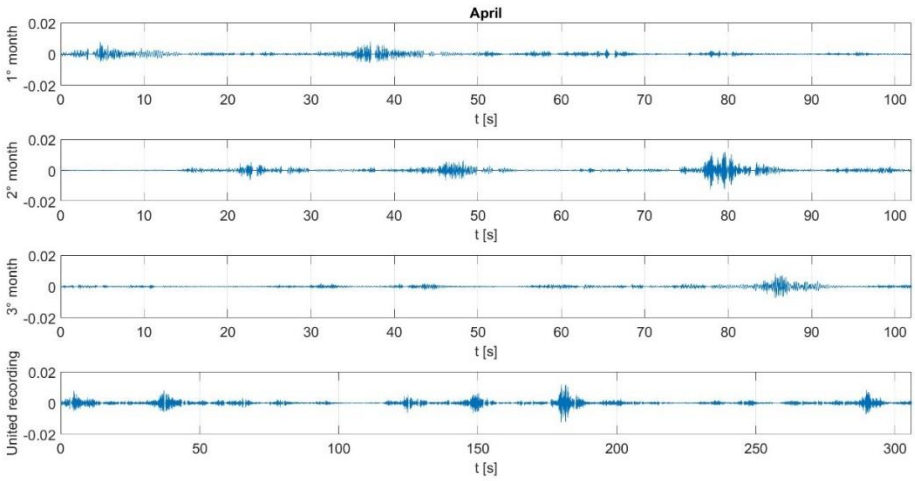


Figure 7-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.4.3 Transverse direction (z)

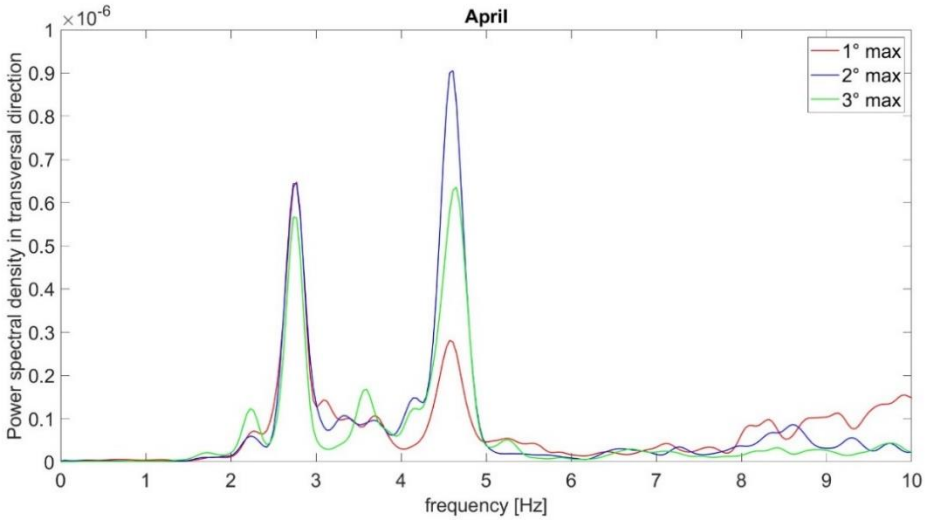


Figure 7-46: Results obtained from the 3 accelerograms with maximum SD in time domain

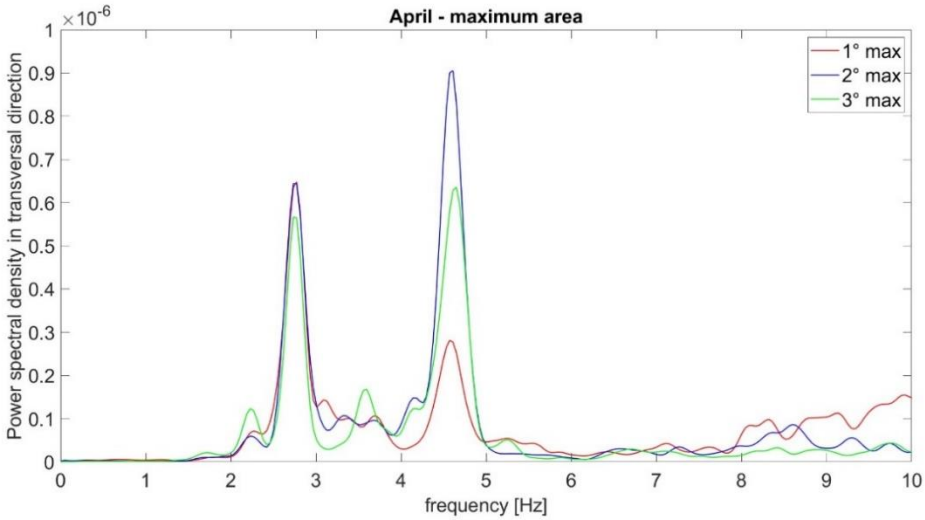


Figure 7-47: Results obtained from the 3 accelerograms with maximum area of PSD

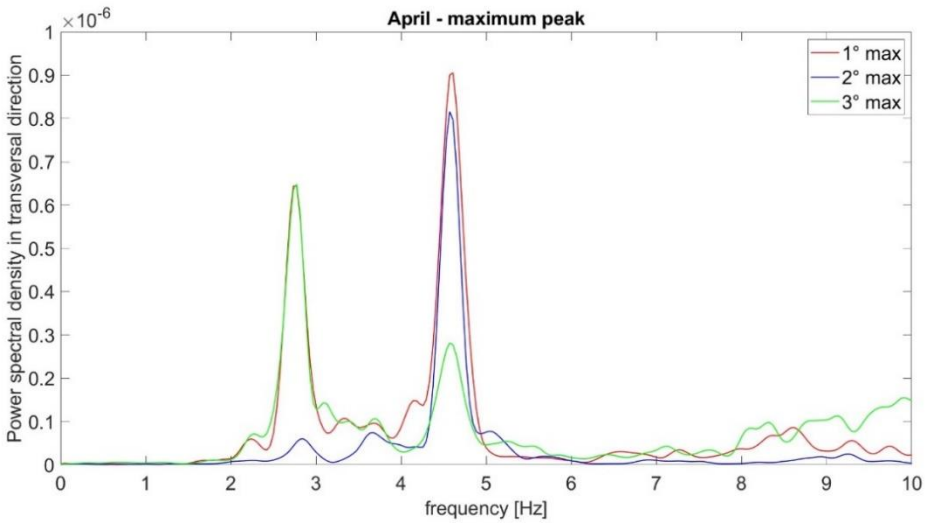


Figure 7-48: Results obtained from the 3 accelerograms with highest peak if PSD

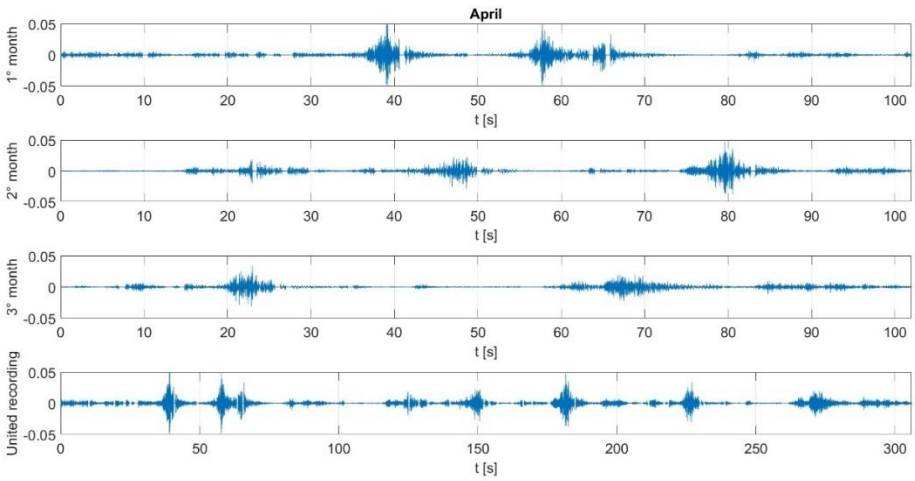


Figure 7-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

7.5 May

The results obtained for the May dataset are shown in the following tables.

Table 7-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-05-23_14-00-21	4.26E-03
	2°	3187F_2023-05-04_14-00-21	3.94E-03
	3°	3187F_2023-05-24_08-00-21	2.65E-03
Longitudinal direction (y)	1°	3187F_2023-05-19_14-00-20	1.32E-03
	2°	3187F_2023-05-23_14-00-21	7.75E-04
	3°	3187F_2023-05-04_14-00-21	6.46E-04
Transverse direction (z)	1°	3187F_2023-05-23_14-00-21	1.58E-03
	2°	3187F_2023-05-04_14-00-21	1.26E-03
	3°	3187F_2023-05-09_14-00-20	8.60E-04

Table 7-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-05-23_14-00-21	2.48E-05	3187F_2023-05-23_14-00-21	3.82E-06
2	3187F_2023-05-04_14-00-21	2.31E-05	3187F_2023-05-04_14-00-21	2.96E-06
3	3187F_2023-05-08_14-00-21	5.15E-06	3187F_2023-05-22_08-00-21	1.26E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-05-19_14-00-20	2.84E-06	3187F_2023-05-19_14-00-20	1.43E-07
2	3187F_2023-05-23_14-00-21	4.53E-07	3187F_2023-05-23_14-00-21	1.19E-07
3	3187F_2023-05-17_08-00-21	3.81E-07	3187F_2023-05-04_14-00-21	8.34E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-05-23_14-00-21	5.15E-06	3187F_2023-05-23_14-00-21	5.14E-07
2	3187F_2023-05-04_14-00-21	3.87E-06	3187F_2023-05-04_14-00-21	3.31E-07
3	3187F_2023-05-09_14-00-20	9.97E-07	3187F_2023-05-09_14-00-20	1.50E-07

Table 7-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	C	C	A	A	A
2	B	B	B	A	A	A	B	B	B
3	-	-	-	B	-	B	D	D	D

7.5.1 Vertical direction (x)

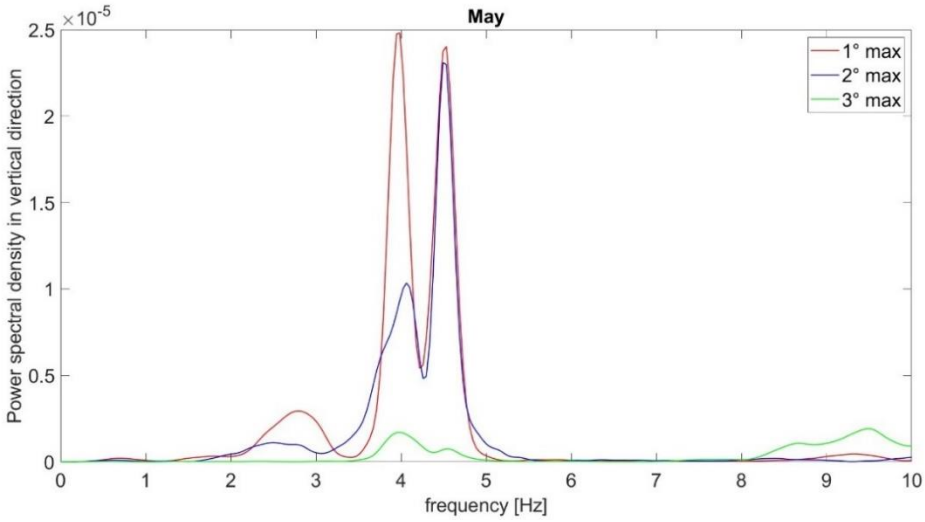


Figure 7-50: Results obtained from the 3 accelerograms with maximum SD in time domain

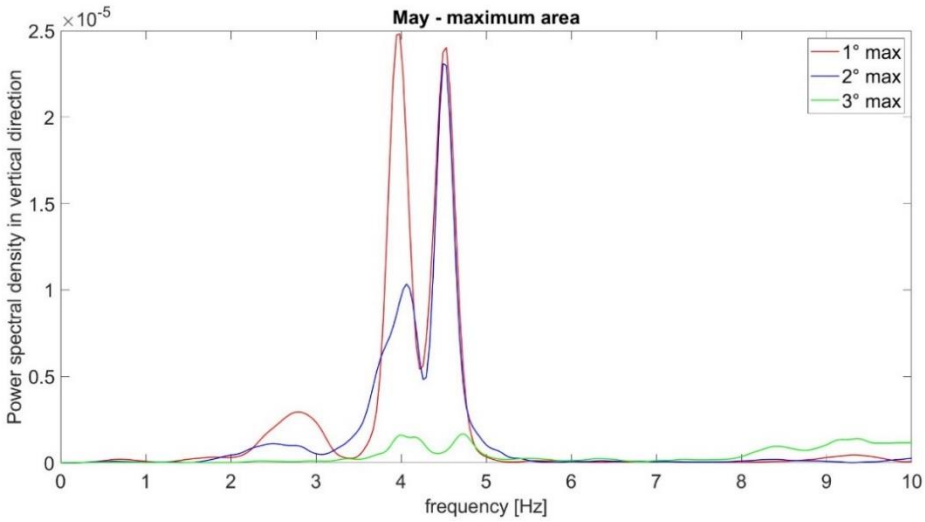


Figure 7-51: Results obtained from the 3 accelerograms with maximum area of PSD

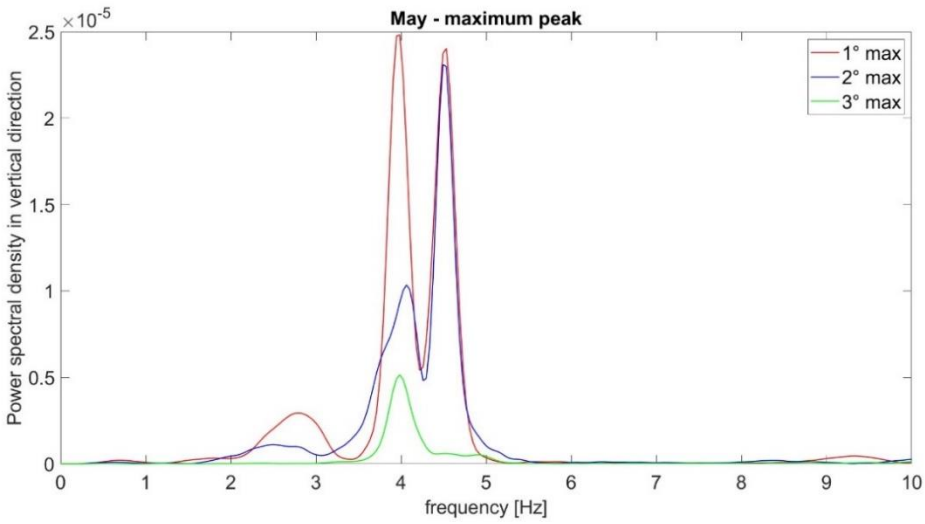


Figure 7-52: Results obtained from the 3 accelerograms with highest peak if PSD

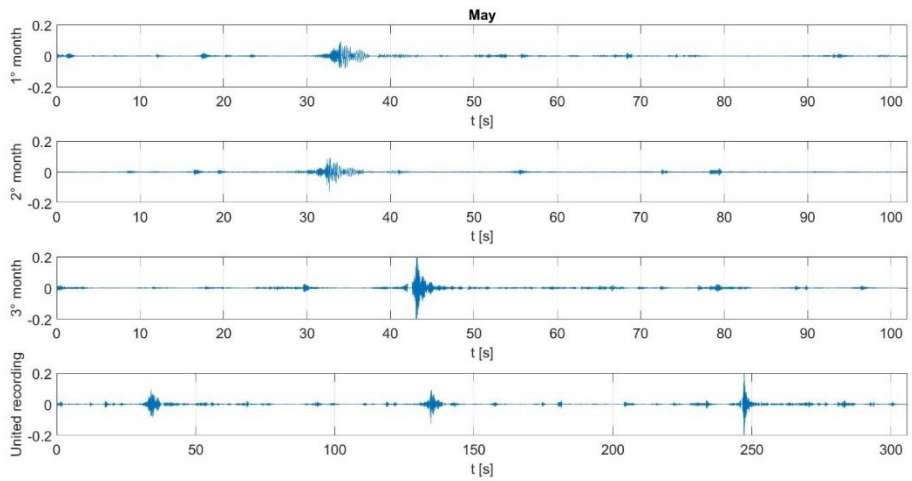


Figure 7-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.5.2 Longitudinal direction (y)

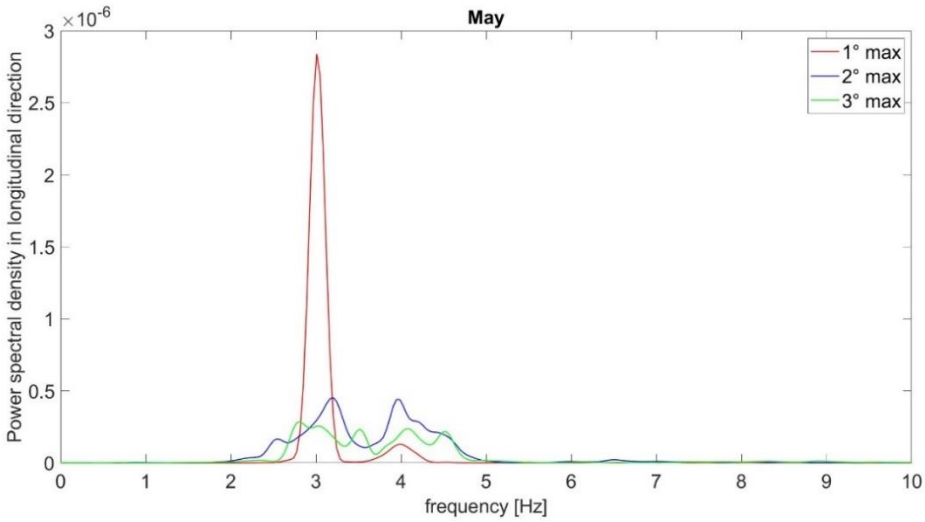


Figure 7-54: Results obtained from the 3 accelerograms with maximum SD in time domain

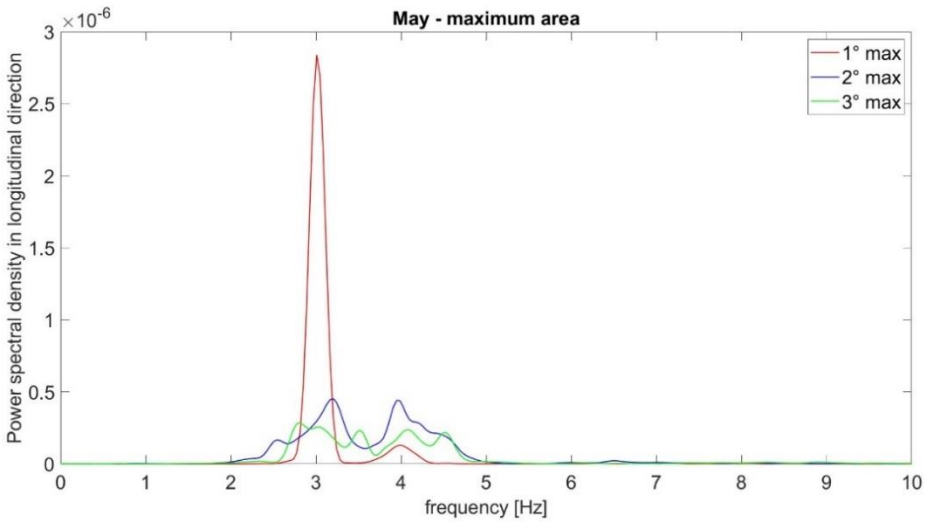


Figure 7-55: Results obtained from the 3 accelerograms with maximum area of PSD

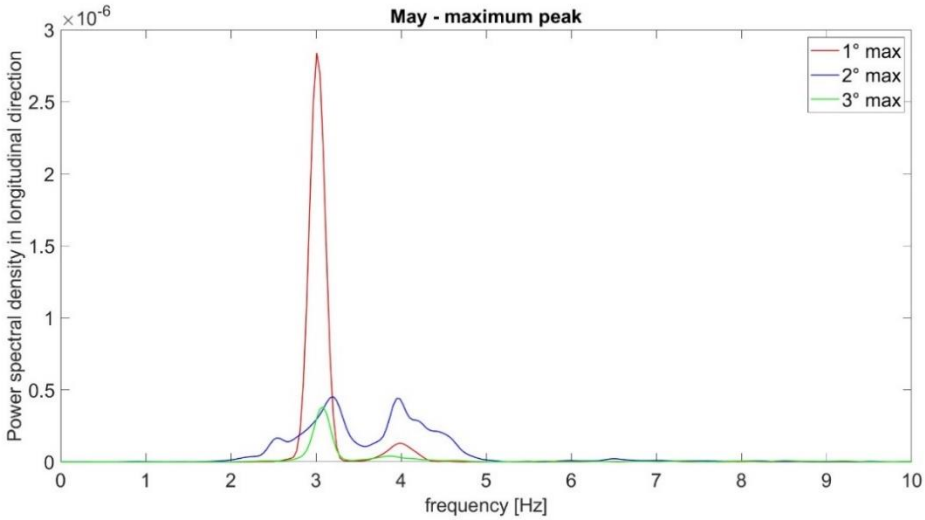


Figure 7-56: Results obtained from the 3 accelerograms with highest peak if PSD

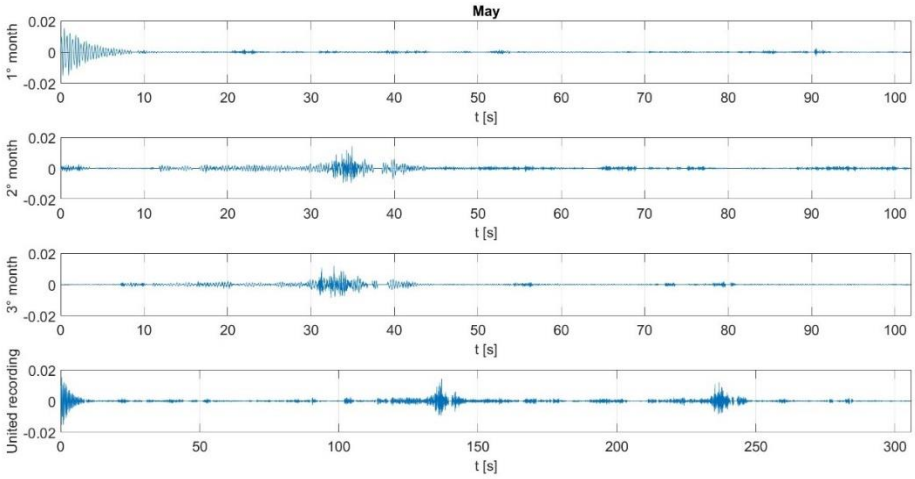


Figure 7-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.5.3 Transverse direction (z)

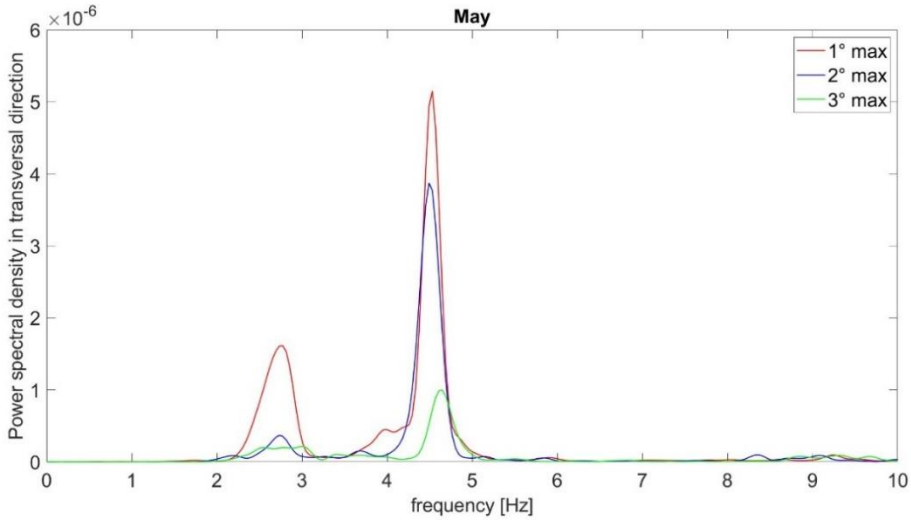


Figure 7-58: Results obtained from the 3 accelerograms with maximum SD in time domain

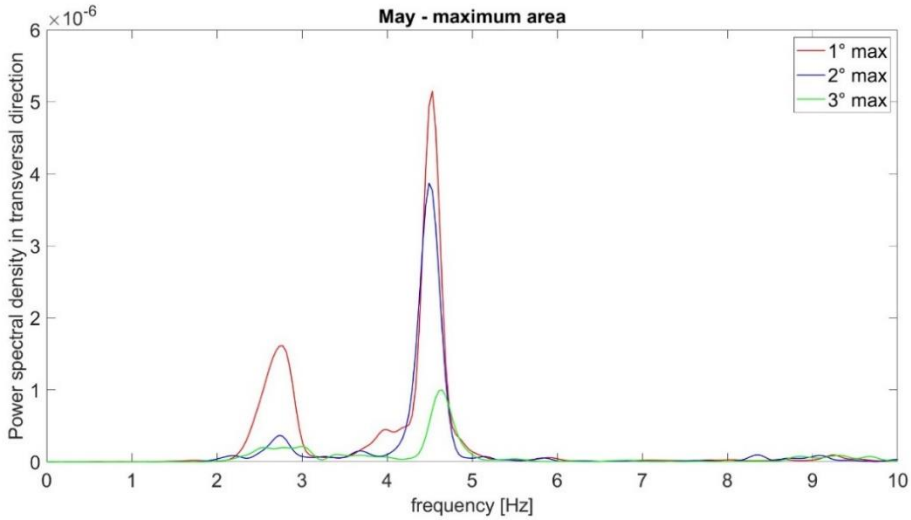


Figure 7-59: Results obtained from the 3 accelerograms with maximum area of PSD

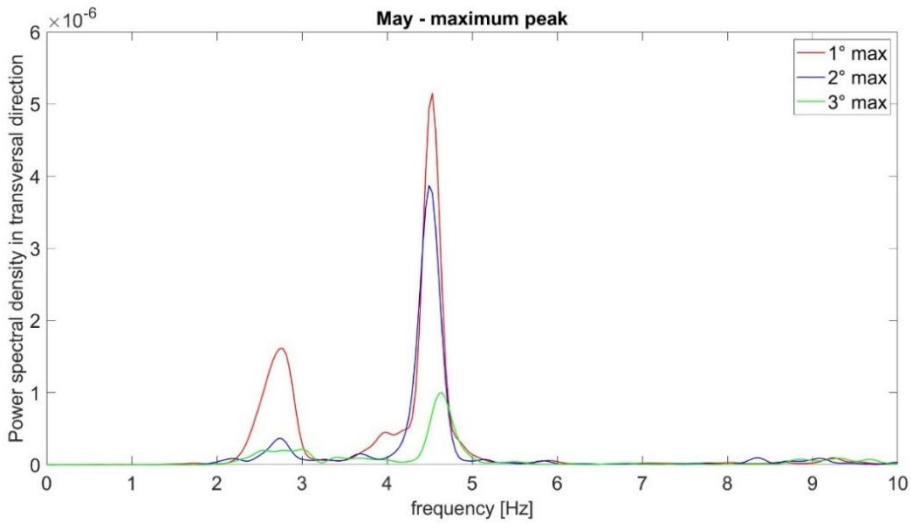


Figure 7-60: Results obtained from the 3 accelerograms with highest peak if PSD

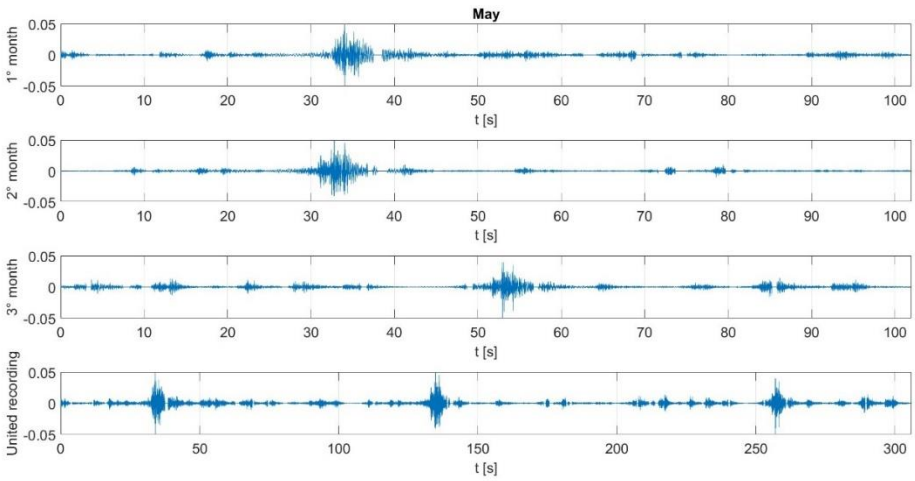


Figure 7-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

7.6 June

The results obtained for the June dataset are shown in the following tables.

Table 7-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-06-13_08-00-20	3.85E-03
	2°	3187F_2023-06-20_08-00-20	2.42E-03
	3°	3187F_2023-06-28_14-00-20	2.37E-03
Longitudinal direction (y)	1°	3187F_2023-06-13_08-00-20	1.09E-03
	2°	3187F_2023-06-27_14-00-20	5.92E-04
	3°	3187F_2023-06-20_08-00-20	4.97E-04
Transverse direction (z)	1°	3187F_2023-06-13_08-00-20	1.03E-03
	2°	3187F_2023-06-28_14-00-20	9.63E-04
	3°	3187F_2023-06-27_14-00-20	7.70E-04

Table 7-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-06-13_08-00-20	2.28E-05	3187F_2023-06-13_08-00-20	3.34E-06
2	3187F_2023-06-20_08-00-20	7.34E-06	3187F_2023-06-20_08-00-20	1.30E-06
3	3187F_2023-06-28_14-00-20	5.87E-06	3187F_2023-06-23_20-00-21	1.26E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-06-13_08-00-20	2.16E-06	3187F_2023-06-13_08-00-20	2.56E-07
2	3187F_2023-06-20_08-00-20	3.91E-07	3187F_2023-06-27_14-00-20	7.11E-08
3	3187F_2023-06-27_14-00-20	3.42E-07	3187F_2023-06-20_08-00-20	5.11E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-06-28_14-00-20	1.03E-06	3187F_2023-06-13_08-00-20	2.12E-07
2	3187F_2023-06-13_08-00-20	7.68E-07	3187F_2023-06-28_14-00-20	1.88E-07
3	3187F_2023-06-20_08-00-20	6.17E-07	3187F_2023-06-27_14-00-20	1.24E-07

Table 7-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	C	A
2	B	B	B	D	B	D	C	A	C
3	C	C	-	B	D	B	D	-	D

7.6.1 Vertical direction (x)

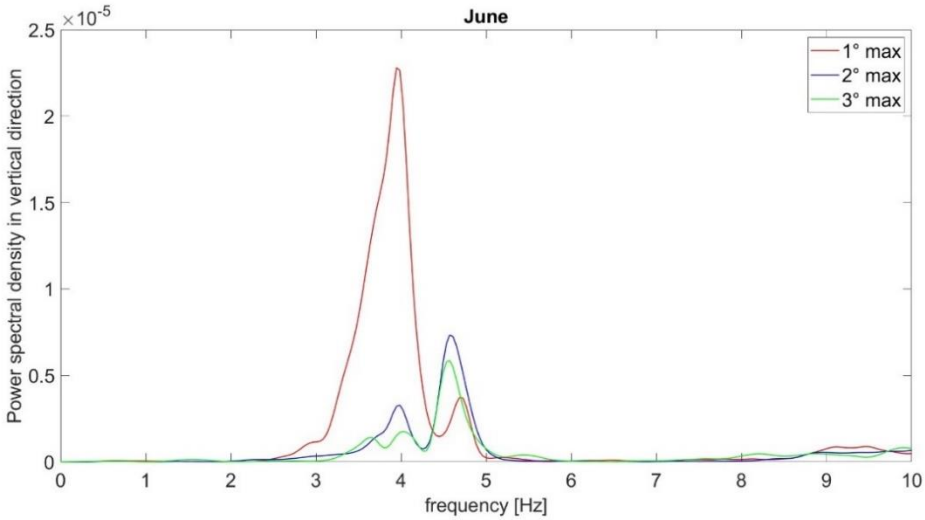


Figure 7-62: Results obtained from the 3 accelerograms with maximum SD in time domain

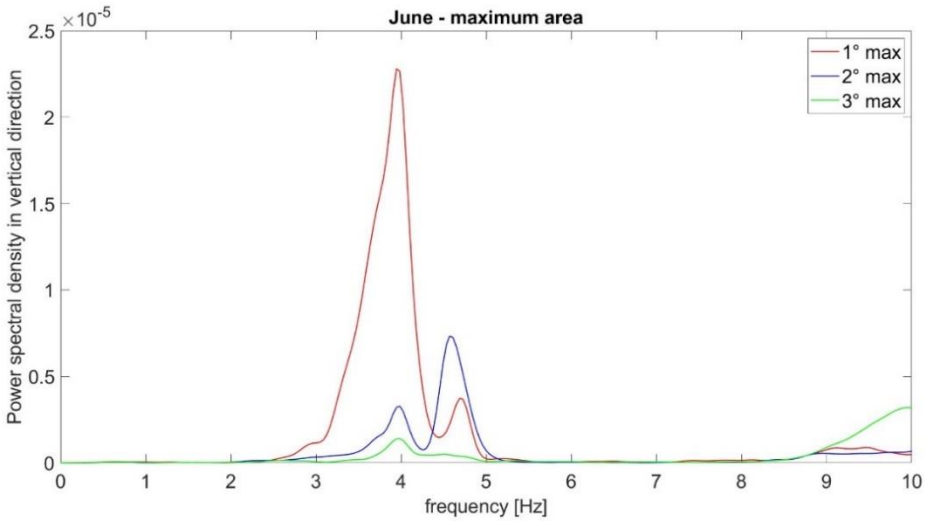


Figure 7-63: Results obtained from the 3 accelerograms with maximum area of PSD

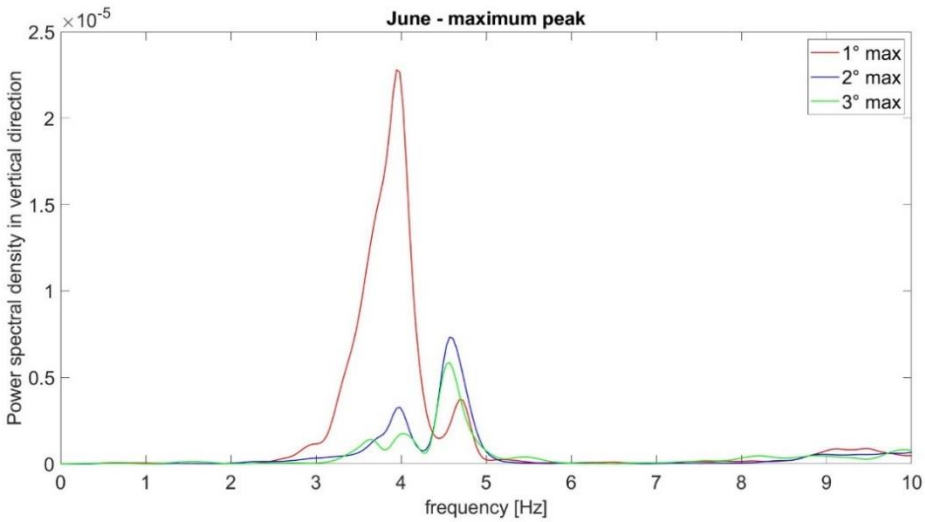


Figure 7-64: Results obtained from the 3 accelerograms with highest peak if PSD

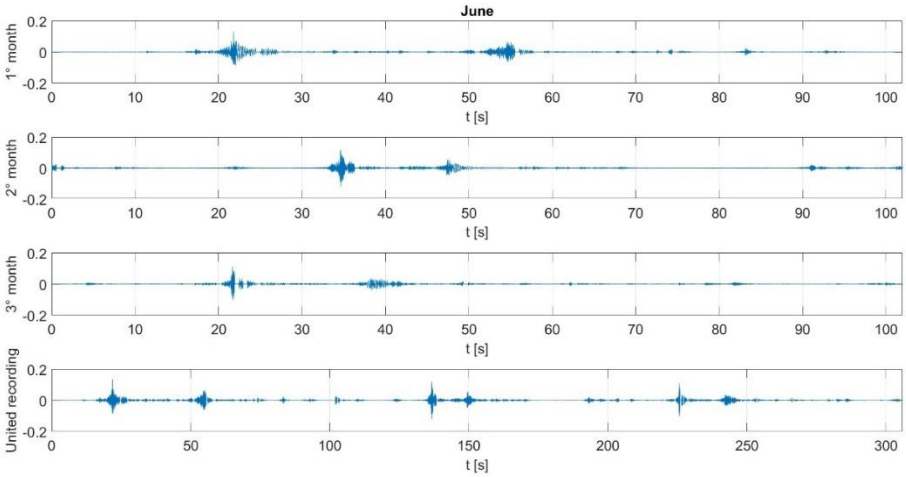


Figure 7-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.6.2 Longitudinal direction (y)

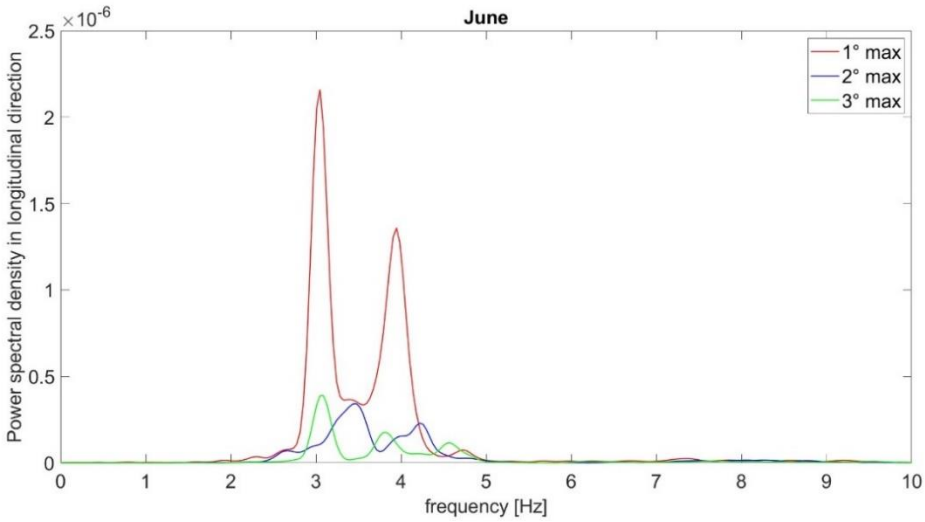


Figure 7-66: Results obtained from the 3 accelerograms with maximum SD in time domain

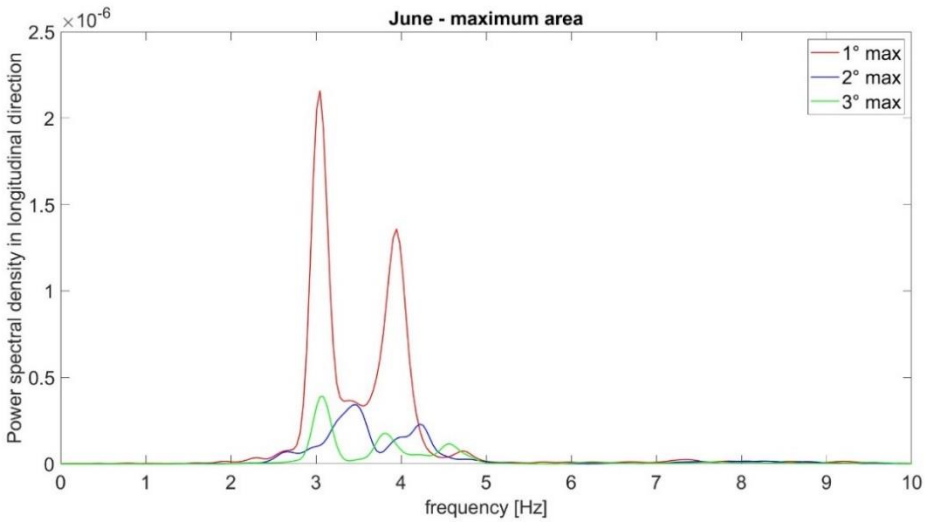


Figure 7-67: Results obtained from the 3 accelerograms with maximum area of PSD

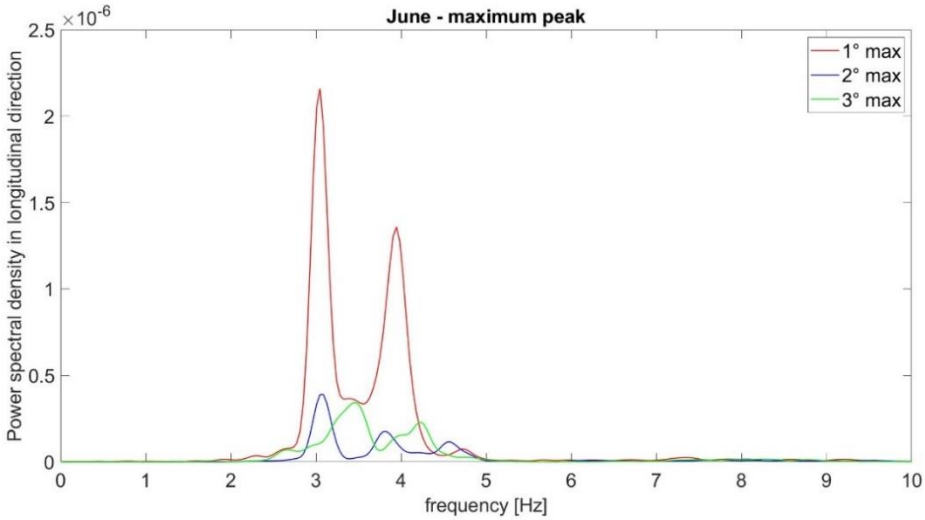


Figure 7-68: Results obtained from the 3 accelerograms with highest peak if PSD

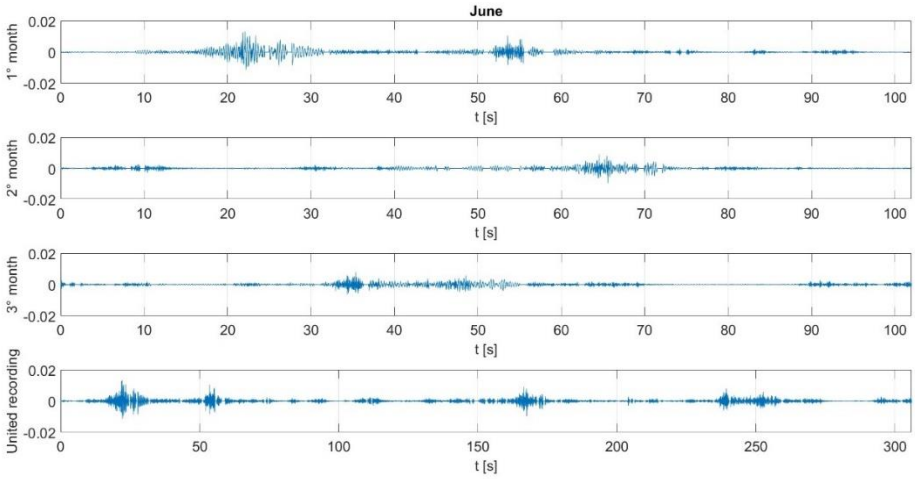


Figure 7-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.6.3 Transverse direction (z)

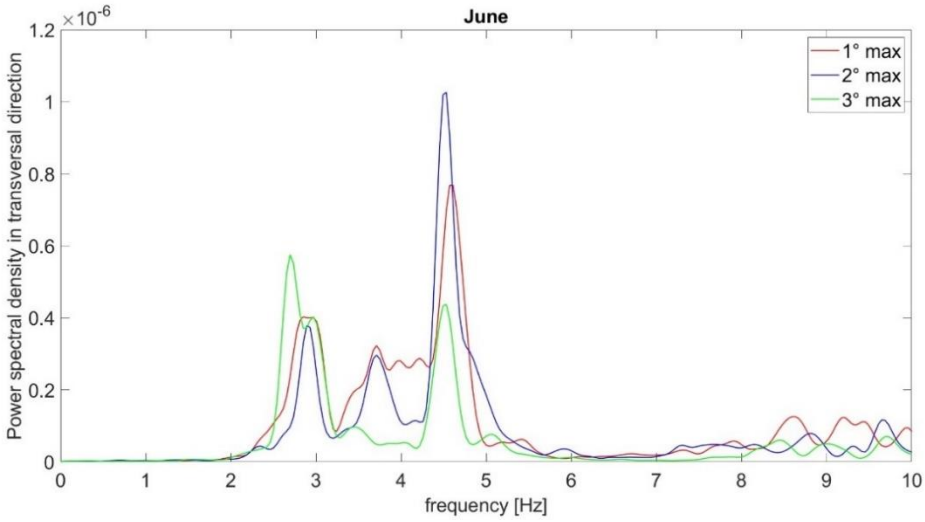


Figure 7-70: Results obtained from the 3 accelerograms with maximum SD in time domain

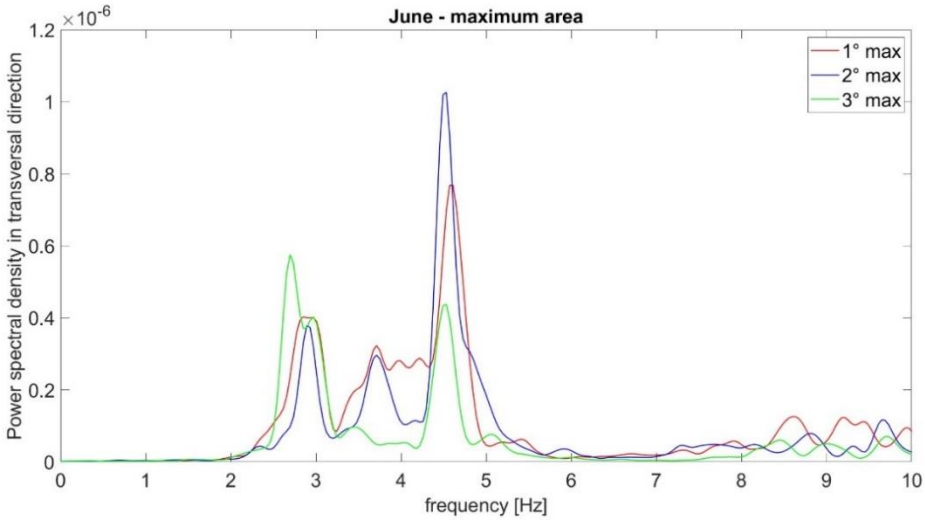


Figure 7-71: Results obtained from the 3 accelerograms with maximum area of PSD

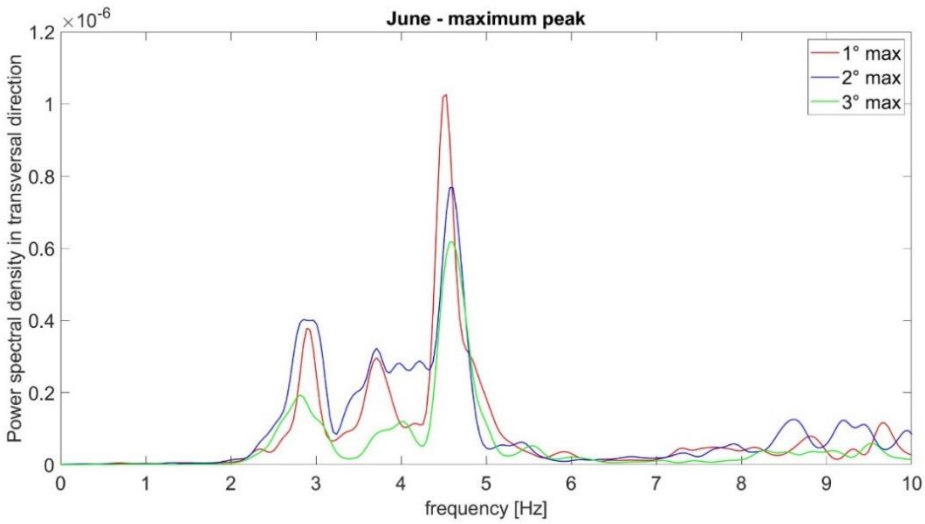


Figure 7-72: Results obtained from the 3 accelerograms with highest peak if PSD

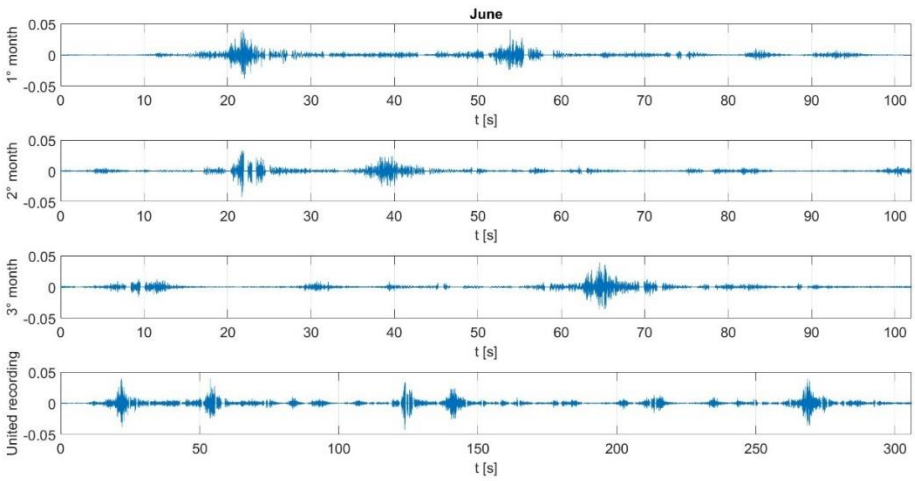


Figure 7-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

7.7 July

The results obtained for the July dataset are shown in the following tables.

Table 7-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-07-25_08-00-20	3.03E-03
	2°	3187F_2023-07-27_08-00-20	2.99E-03
	3°	3187F_2023-07-07_14-00-21	2.60E-03
Longitudinal direction (y)	1°	3187F_2023-07-17_14-00-20	6.43E-04
	2°	3187F_2023-07-20_14-00-21	5.95E-04
	3°	3187F_2023-07-07_14-00-21	5.70E-04
Transverse direction (z)	1°	3187F_2023-07-17_14-00-20	8.66E-04
	2°	3187F_2023-07-18_08-00-21	8.29E-04
	3°	3187F_2023-07-28_08-00-20	8.29E-04

Table 7-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-07-17_14-00-20	1.01E-05	3187F_2023-07-07_14-00-21	1.57E-06
2	3187F_2023-07-29_14-00-21	7.48E-06	3187F_2023-07-27_08-00-20	1.43E-06
3	3187F_2023-07-19_08-00-21	7.20E-06	3187F_2023-07-08_08-00-20	1.32E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-07-07_14-00-21	7.45E-07	3187F_2023-07-17_14-00-20	8.77E-08
2	3187F_2023-07-17_14-00-20	3.77E-07	3187F_2023-07-20_14-00-21	7.19E-08
3	3187F_2023-07-19_08-00-21	2.66E-07	3187F_2023-07-07_14-00-21	7.08E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-07-14_08-00-21	1.22E-06	3187F_2023-07-17_14-00-20	1.57E-07
2	3187F_2023-07-19_08-00-21	9.99E-07	3187F_2023-07-28_08-00-20	1.41E-07
3	3187F_2023-07-17_14-00-20	7.27E-07	3187F_2023-07-14_08-00-21	1.30E-07

Table 7-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	-	-	B	C	B	C	C	F	C
2	A	-	A	D	C	D	-	-	E
3	B	-	-	B	-	B	E	C	F

7.7.1 Vertical direction (x)

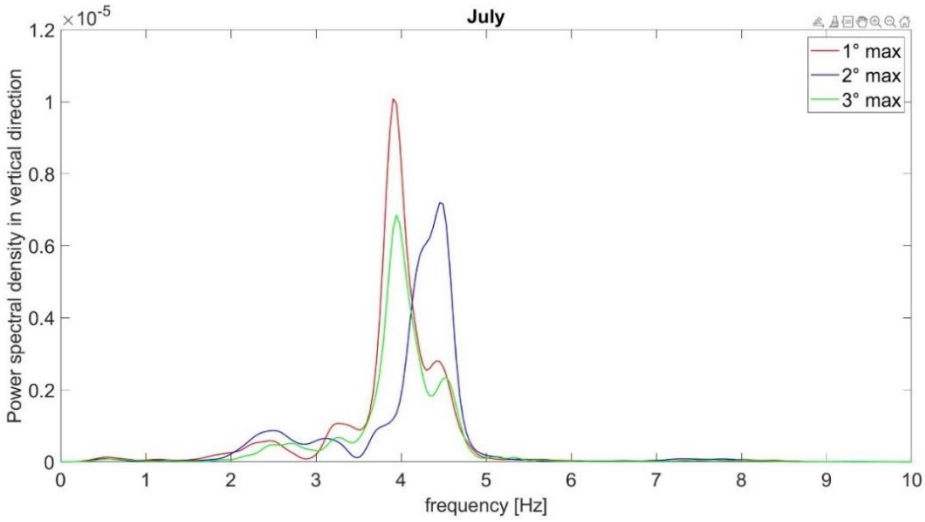


Figure 7-74: Results obtained from the 3 accelerograms with maximum SD in time domain

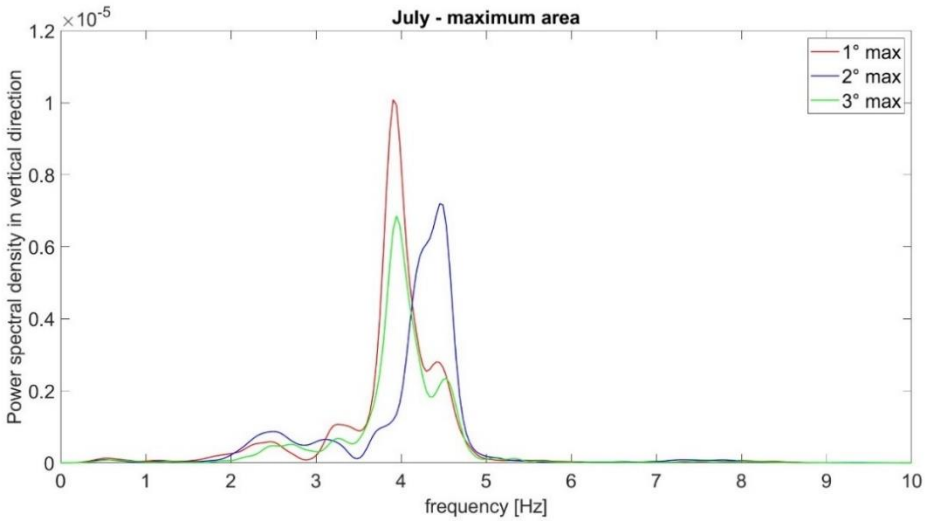


Figure 7-75: Results obtained from the 3 accelerograms with maximum area of PSD

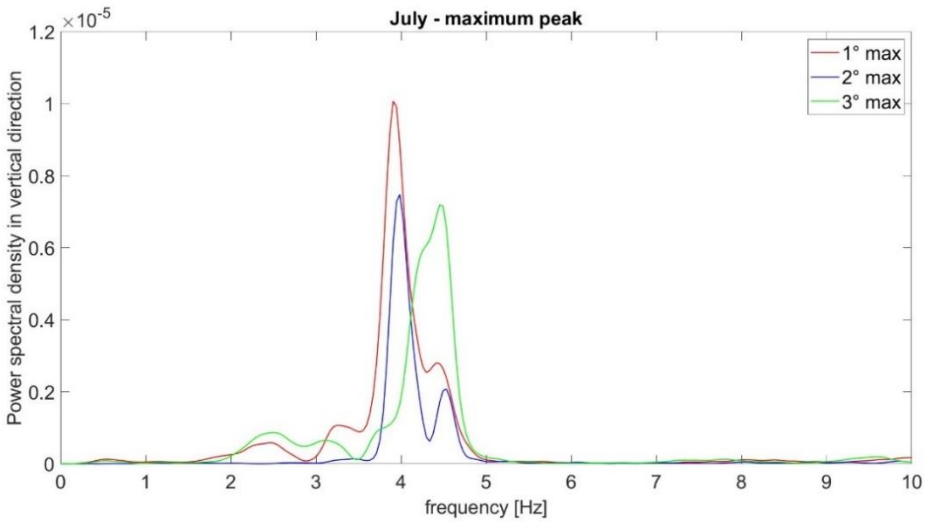


Figure 7-76: Results obtained from the 3 accelerograms with highest peak if PSD

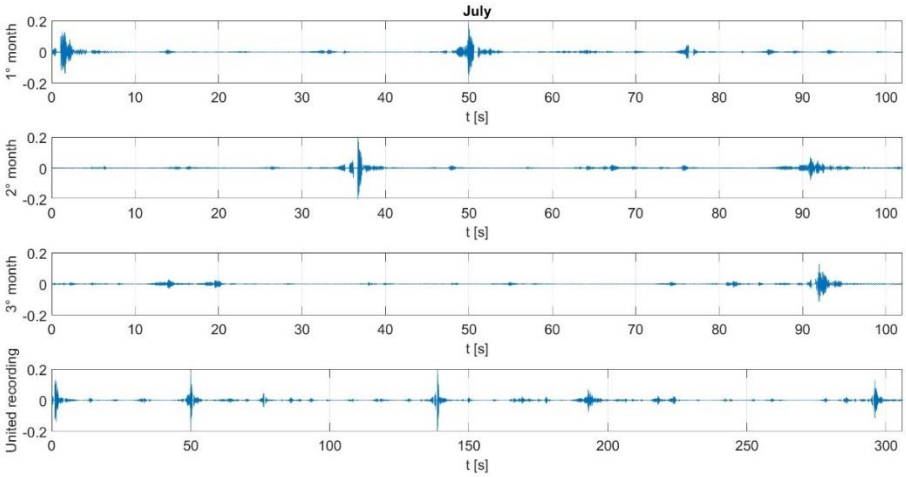


Figure 7-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.7.2 Longitudinal direction (y)

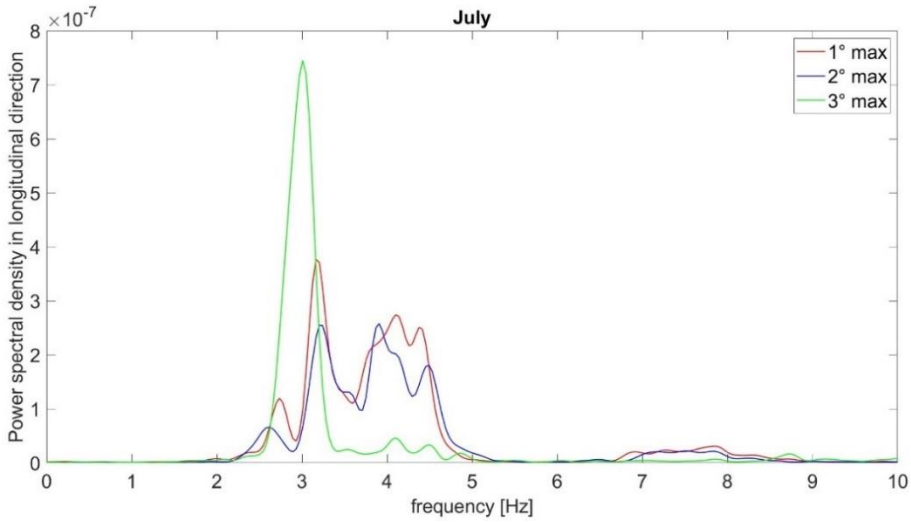


Figure 7-78: Results obtained from the 3 accelerograms with maximum SD in time domain

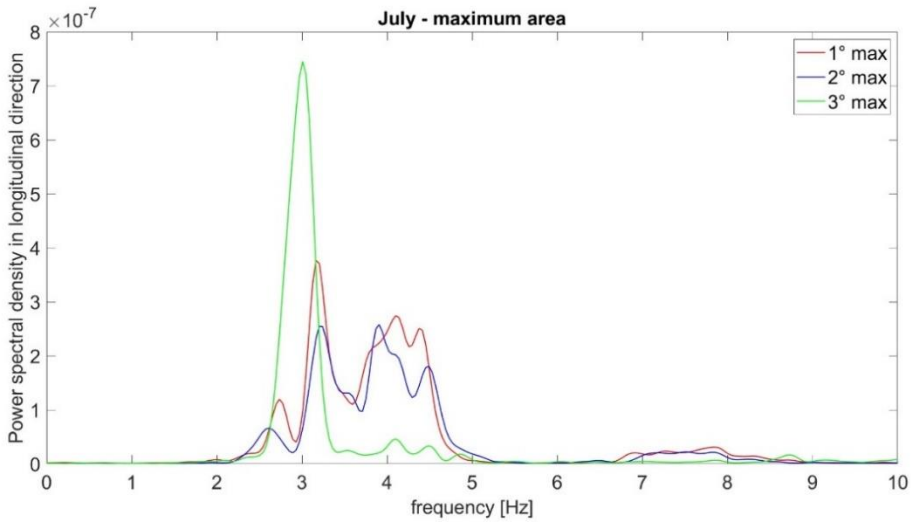


Figure 7-79: Results obtained from the 3 accelerograms with maximum area of PSD

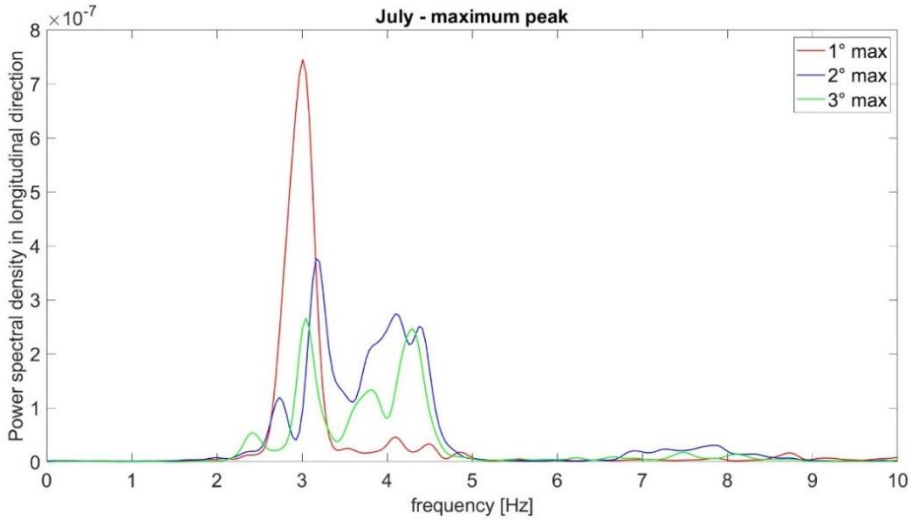


Figure 7-80: Results obtained from the 3 accelerograms with highest peak if PSD

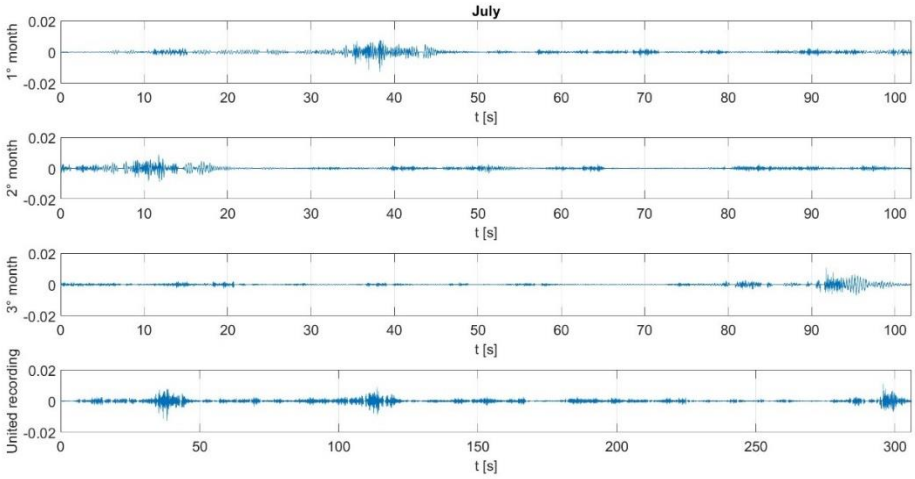


Figure 7-81: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.7.3 Transverse direction (z)

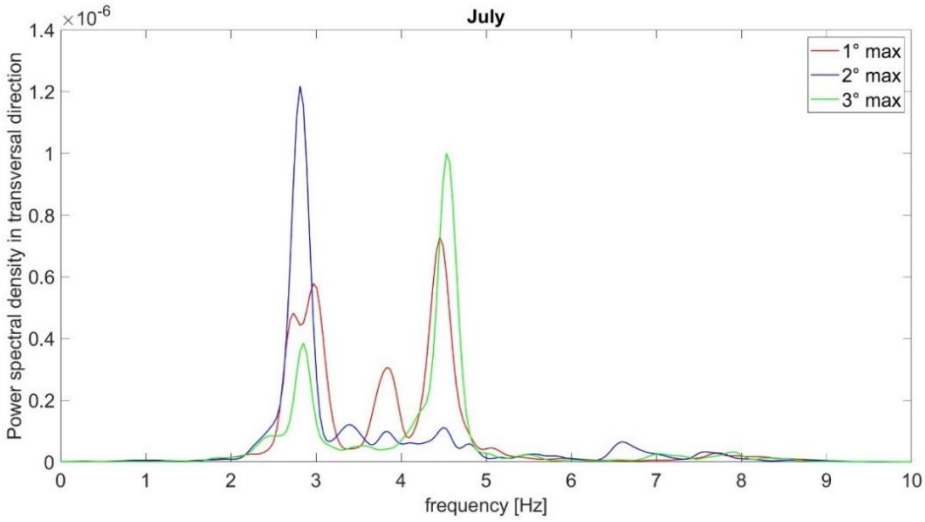


Figure 7-82: Results obtained from the 3 accelerograms with maximum SD in time domain

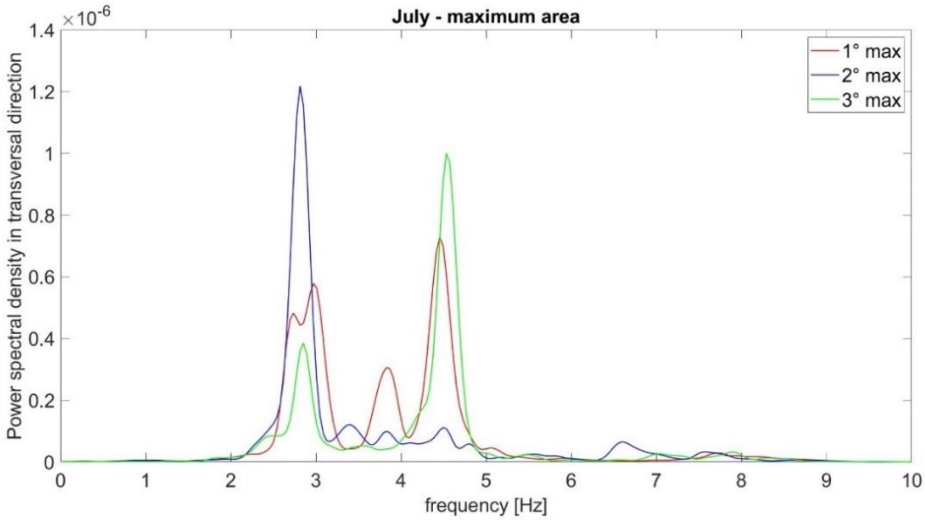


Figure 7-83: Results obtained from the 3 accelerograms with maximum area of PSD

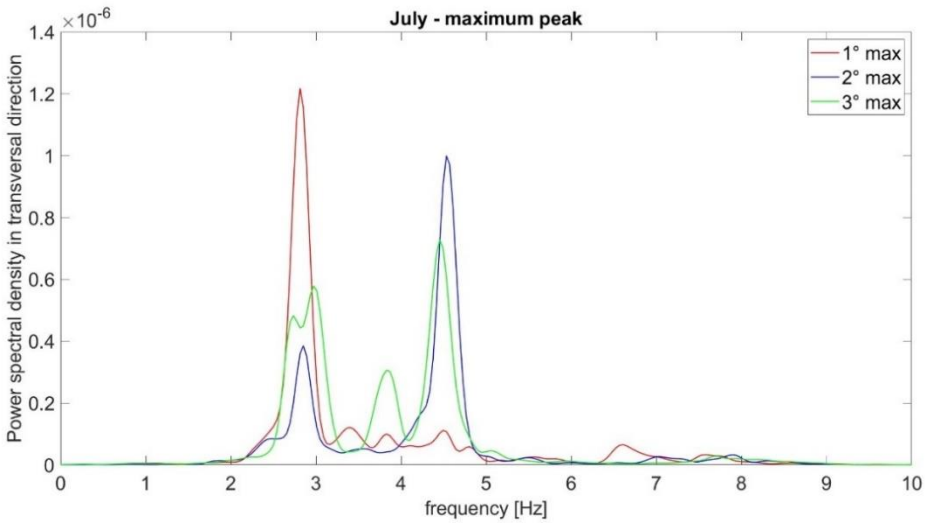


Figure 7-84: Results obtained from the 3 accelerograms with highest peak if PSD

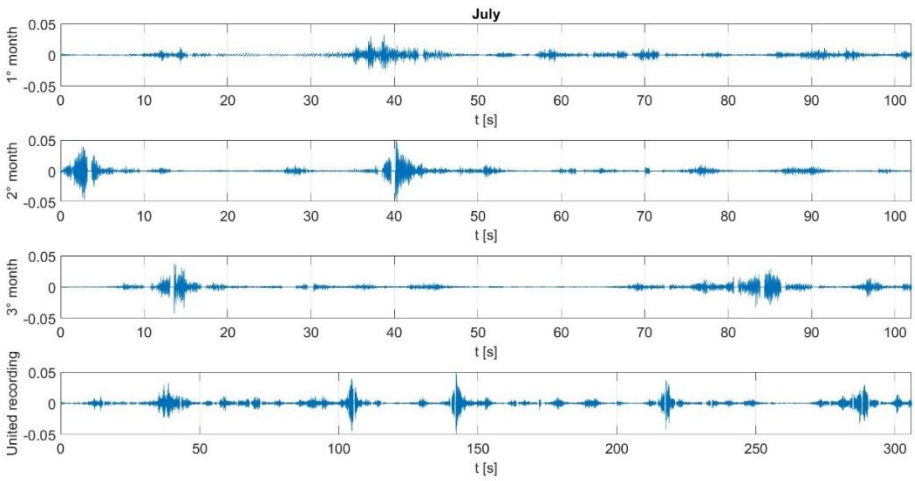


Figure 7-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

7.8 August

The results obtained for the August dataset are shown in the following tables.

Table 7-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-08-07_14-00-21	3.87E-03
	2°	3187F_2023-08-02_08-00-21	3.11E-03
	3°	3187F_2023-08-17_08-00-20	2.97E-03
Longitudinal direction (y)	1°	3187F_2023-08-07_14-00-21	7.41E-04
	2°	3187F_2023-08-29_08-00-21	5.69E-04
	3°	3187F_2023-08-02_08-00-21	3.75E-04
Transverse direction (z)	1°	3187F_2023-08-07_14-00-21	9.83E-04
	2°	3187F_2023-08-29_08-00-21	9.48E-04
	3°	3187F_2023-08-02_08-00-21	8.46E-04

Table 7-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-08-07_14-00-21	1.56E-05	3187F_2023-08-07_14-00-21	3.13E-06
2	3187F_2023-08-29_08-00-21	1.19E-05	3187F_2023-08-17_08-00-20	2.10E-06
3	3187F_2023-08-17_08-00-20	7.10E-06	3187F_2023-08-02_08-00-21	1.97E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-08-07_14-00-21	6.19E-07	3187F_2023-08-07_14-00-21	1.13E-07
2	3187F_2023-08-29_08-00-21	5.32E-07	3187F_2023-08-29_08-00-21	6.65E-08
3	3187F_2023-08-02_08-00-21	2.35E-07	3187F_2023-08-02_08-00-21	2.88E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-08-07_14-00-21	1.97E-06	3187F_2023-08-07_14-00-21	2.03E-07
2	3187F_2023-08-29_08-00-21	6.49E-07	3187F_2023-08-29_08-00-21	1.88E-07
3	3187F_2023-08-17_08-00-20	4.59E-07	3187F_2023-08-02_08-00-21	1.47E-07

Table 7-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	-	C	D	D	D	D	D	D
3	C	C	B	E	E	E	E	-	E

7.8.1 Vertical direction (x)

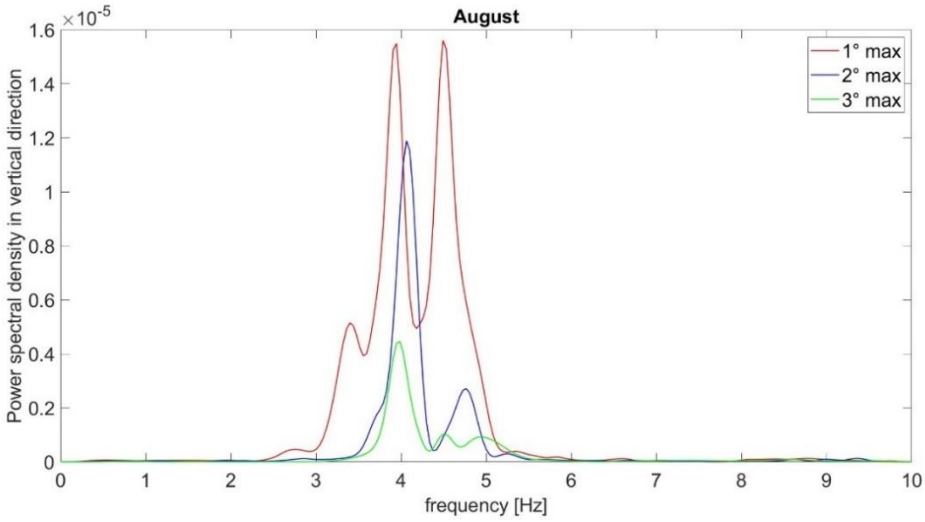


Figure 7-86: Results obtained from the 3 accelerograms with maximum SD in time domain

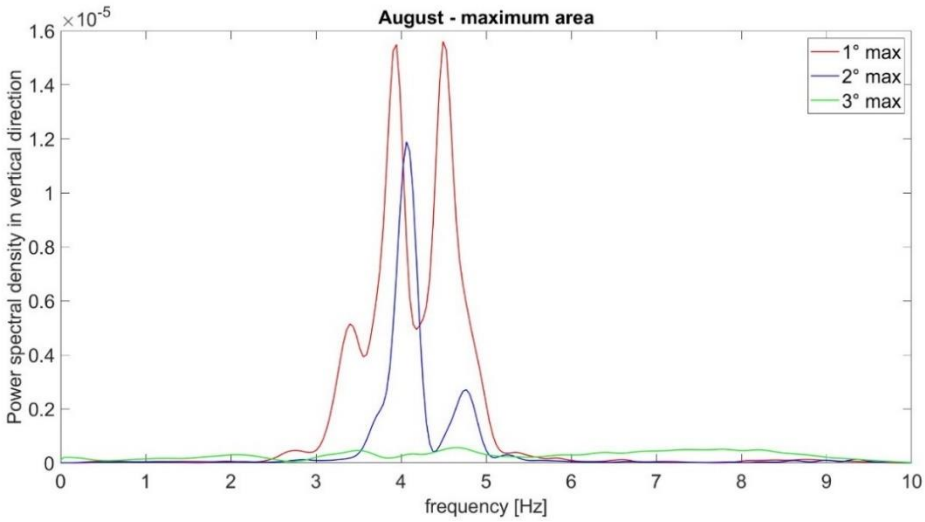


Figure 7-87: Results obtained from the 3 accelerograms with maximum area of PSD

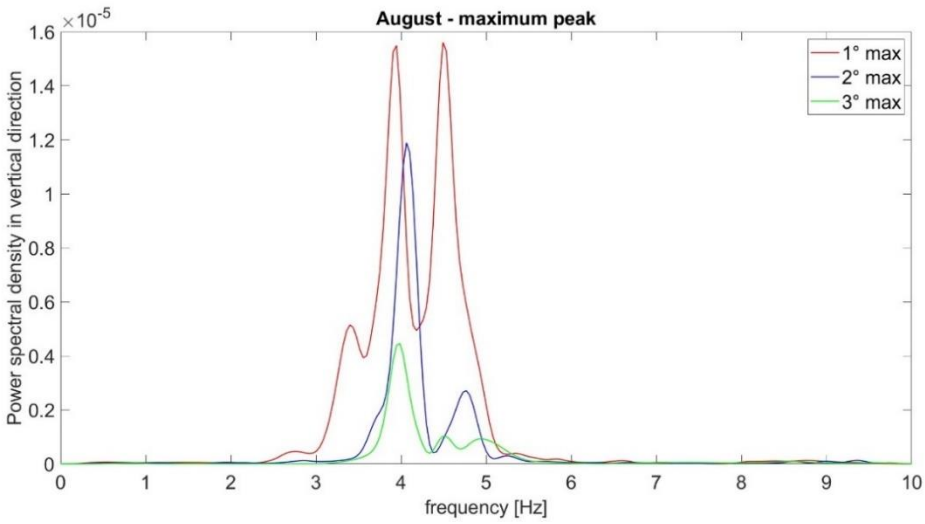


Figure 7-88: Results obtained from the 3 accelerograms with highest peak if PSD

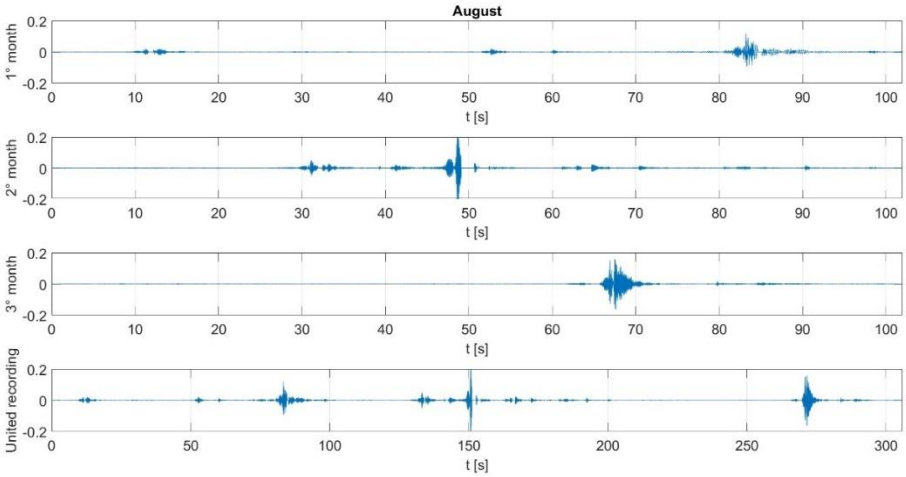


Figure 7-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.8.2 Longitudinal direction (y)

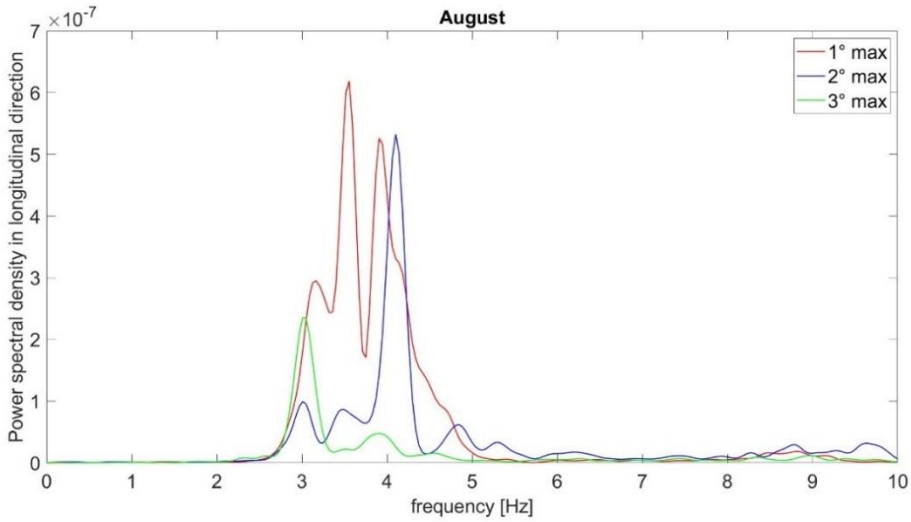


Figure 7-90: Results obtained from the 3 accelerograms with maximum SD in time domain

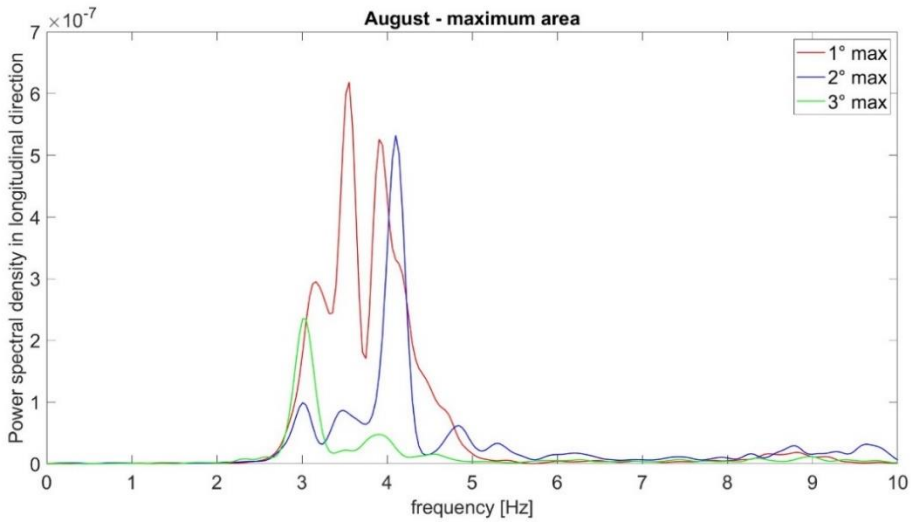


Figure 7-91: Results obtained from the 3 accelerograms with maximum area of PSD

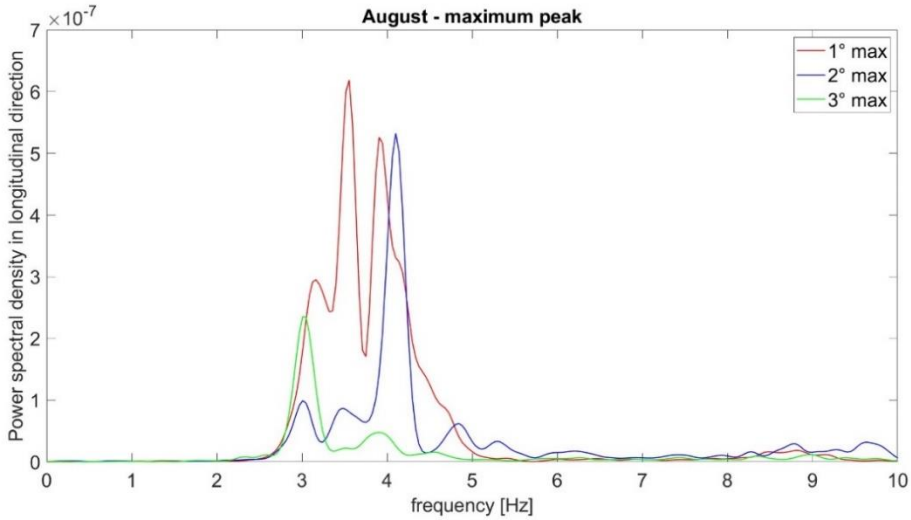


Figure 7-92: Results obtained from the 3 accelerograms with highest peak if PSD

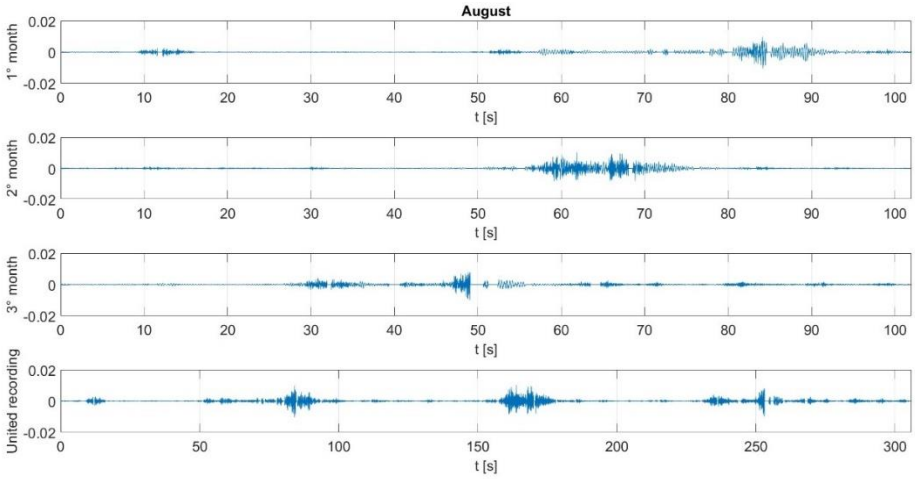


Figure 7-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.8.3 Transverse direction (z)

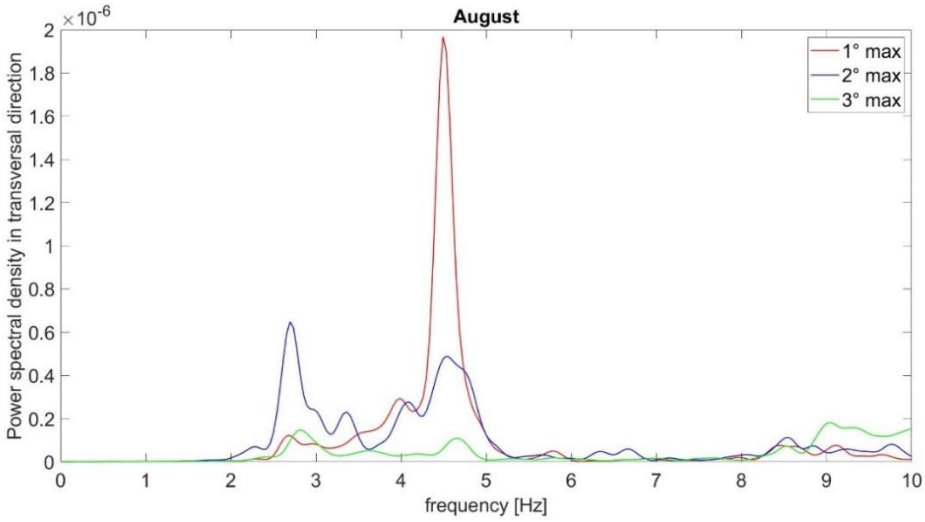


Figure 7-94: Results obtained from the 3 accelerograms with maximum SD in time domain

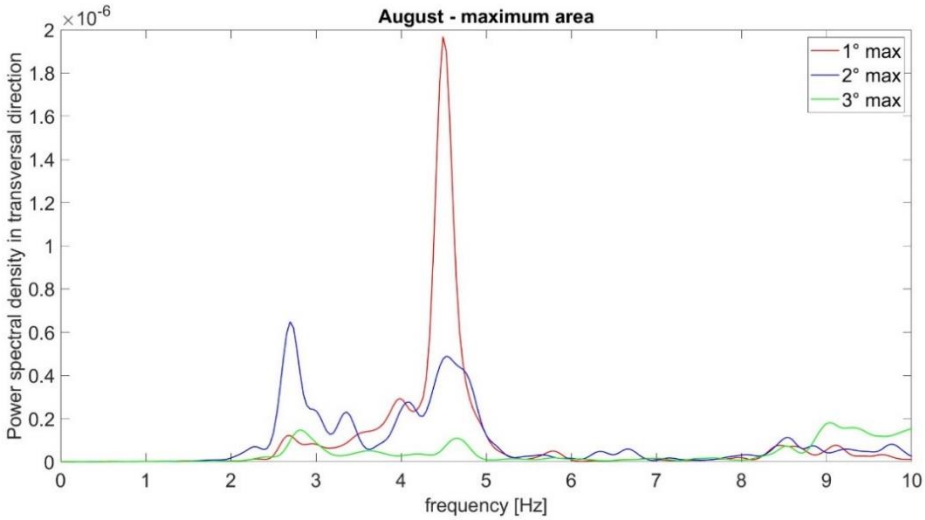


Figure 7-95: Results obtained from the 3 accelerograms with maximum area of PSD

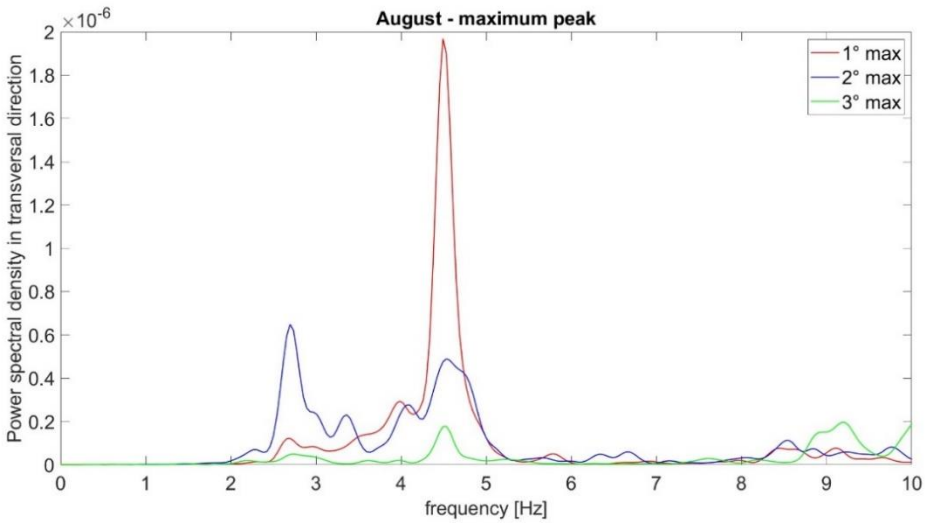


Figure 7-96: Results obtained from the 3 accelerograms with highest peak if PSD

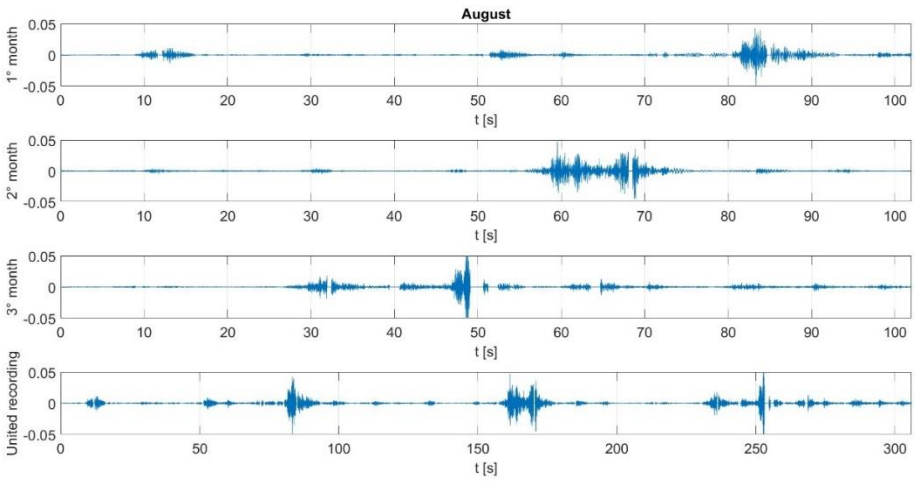


Figure 7-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

7.9 September

The results obtained for the September dataset are shown in the following tables.

Table 7-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-09-26_15-00-21	5.86E-03
	2°	3187F_2023-09-15_11-00-21	4.33E-03
	3°	3187F_2023-09-20_11-00-20	4.30E-03
Longitudinal direction (y)	1°	3187F_2023-09-26_09-00-20	2.11E-03
	2°	3187F_2023-09-14_11-00-20	1.64E-03
	3°	3187F_2023-09-20_11-00-20	1.35E-03
Transverse direction (z)	1°	3187F_2023-09-26_15-00-21	2.46E-03
	2°	3187F_2023-09-04_14-00-20	1.41E-03
	3°	3187F_2023-09-20_11-00-20	1.33E-03

Table 7-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-09-26_15-00-21	3.54E-05	3187F_2023-09-26_15-00-21	6.27E-06
2	3187F_2023-09-15_11-00-21	3.47E-05	3187F_2023-09-20_11-00-20	3.83E-06
3	3187F_2023-09-04_14-00-20	2.41E-05	3187F_2023-09-15_11-00-21	3.78E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-09-26_09-00-20	1.34E-05	3187F_2023-09-26_09-00-20	8.97E-07
2	3187F_2023-09-14_11-00-20	7.10E-06	3187F_2023-09-14_11-00-20	5.71E-07
3	3187F_2023-09-20_11-00-20	2.52E-06	3187F_2023-09-20_11-00-20	3.94E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-09-26_15-00-21	1.14E-05	3187F_2023-09-26_15-00-21	1.20E-06
2	3187F_2023-09-04_14-00-20	4.26E-06	3187F_2023-09-04_14-00-20	4.00E-07
3	3187F_2023-09-20_11-00-20	2.43E-06	3187F_2023-09-20_11-00-20	3.78E-07

Table 7-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	A	A	A
2	B	B	C	E	E	E	G	G	G
3	C	-	B	F	F	F	F	F	F

7.9.1 Vertical direction (x)

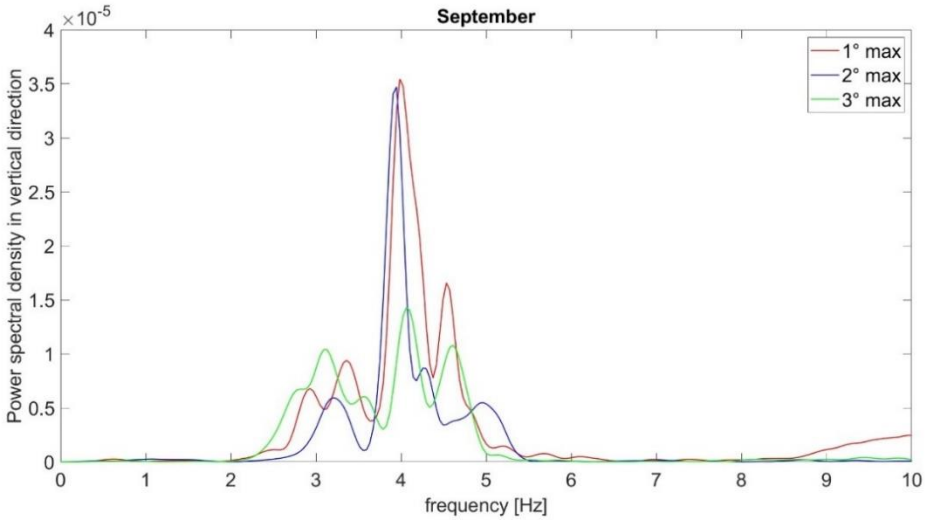


Figure 7-98: Results obtained from the 3 accelerograms with maximum SD in time domain

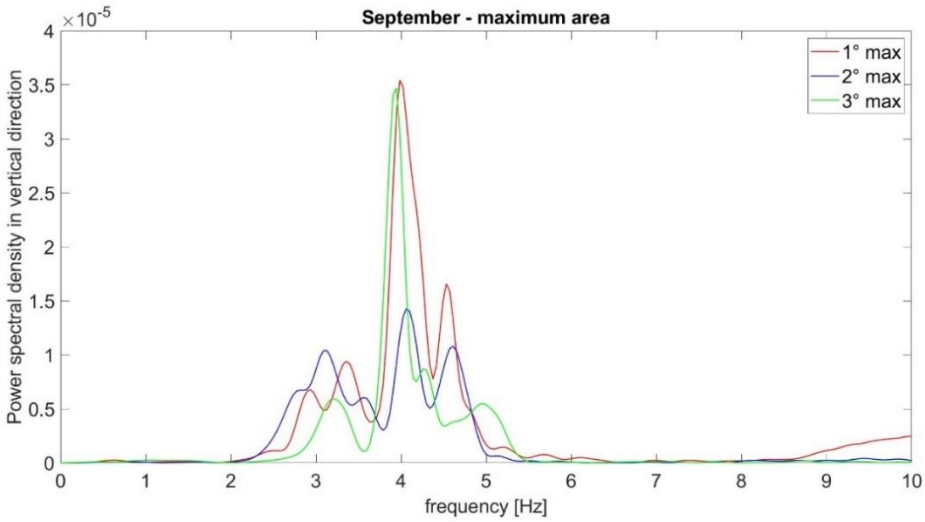


Figure 7-99: Results obtained from the 3 accelerograms with maximum area of PSD

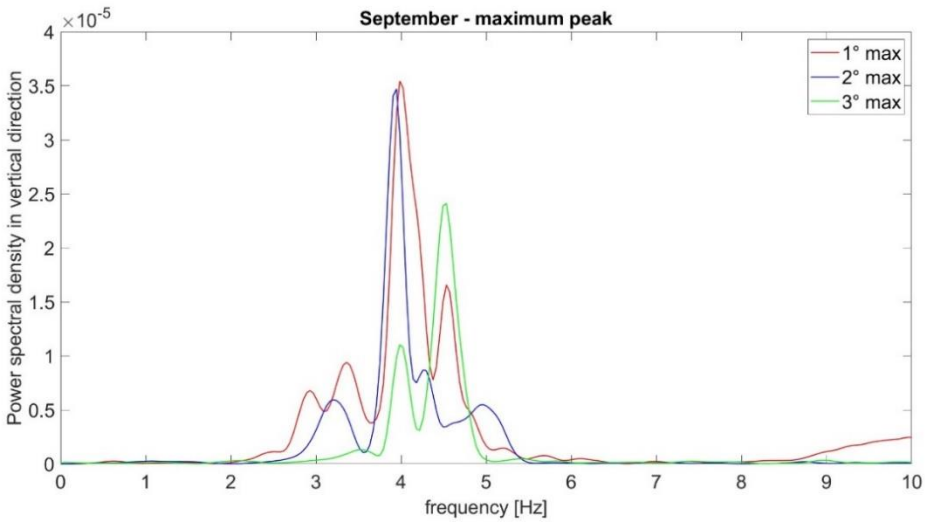


Figure 7-100: Results obtained from the 3 accelerograms with highest peak if PSD

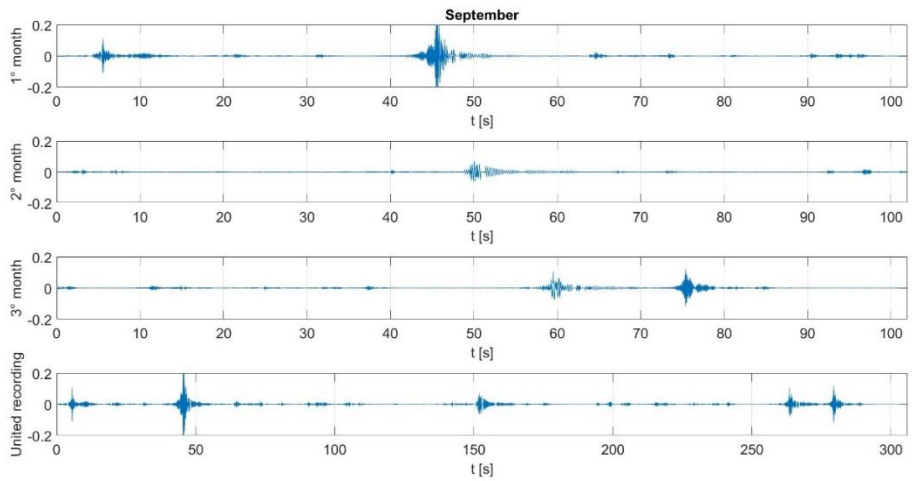


Figure 7-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.9.2 Longitudinal direction (y)

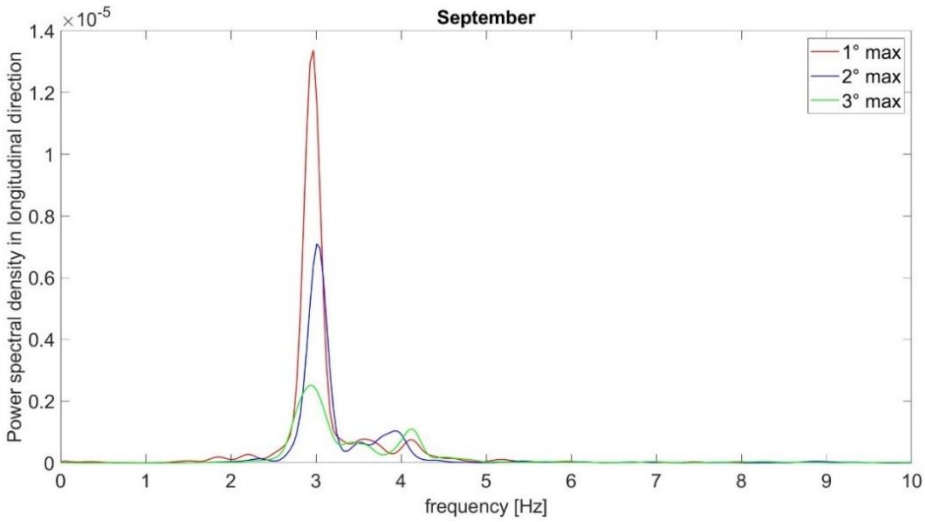


Figure 7-102: Results obtained from the 3 accelerograms with maximum SD in time domain

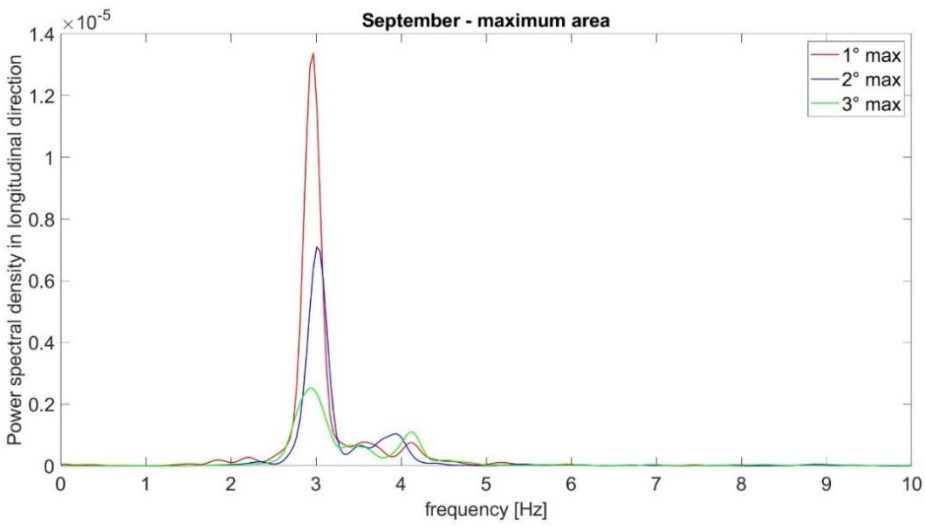


Figure 7-103: Results obtained from the 3 accelerograms with maximum area of PSD

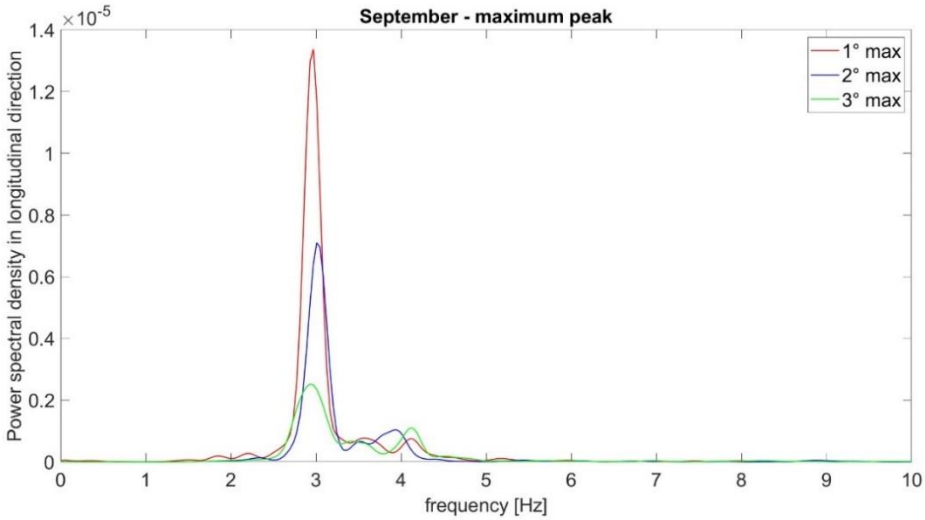


Figure 7-104: Results obtained from the 3 accelerograms with highest peak if PSD

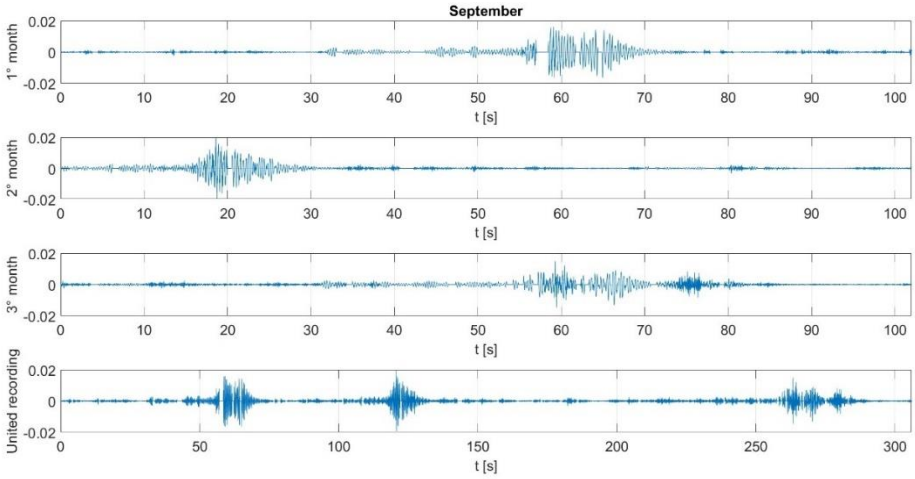


Figure 7-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.9.3 Transverse direction (z)

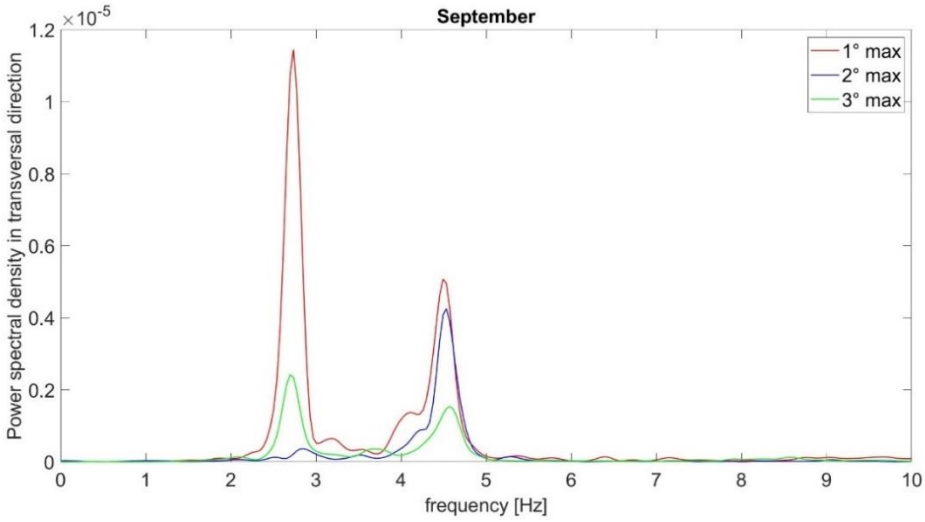


Figure 7-106: Results obtained from the 3 accelerograms with maximum SD in time domain

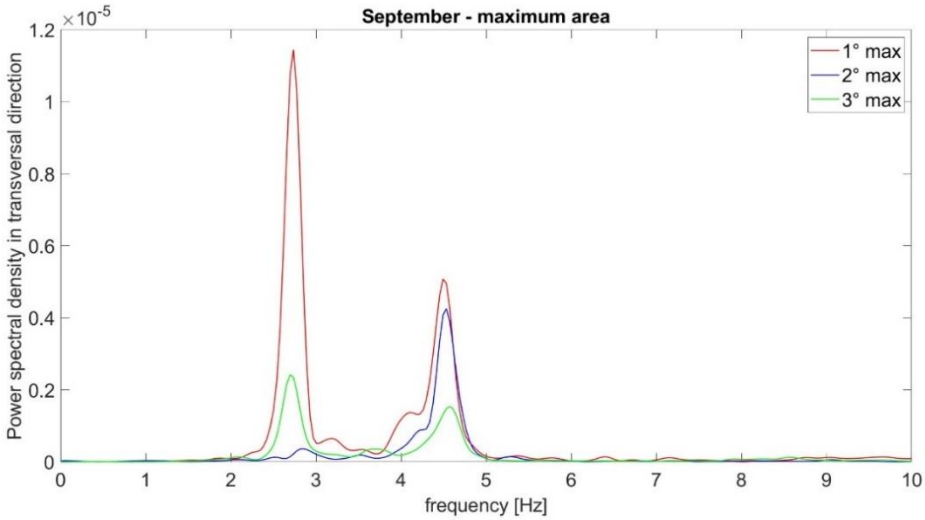


Figure 7-107: Results obtained from the 3 accelerograms with maximum area of PSD

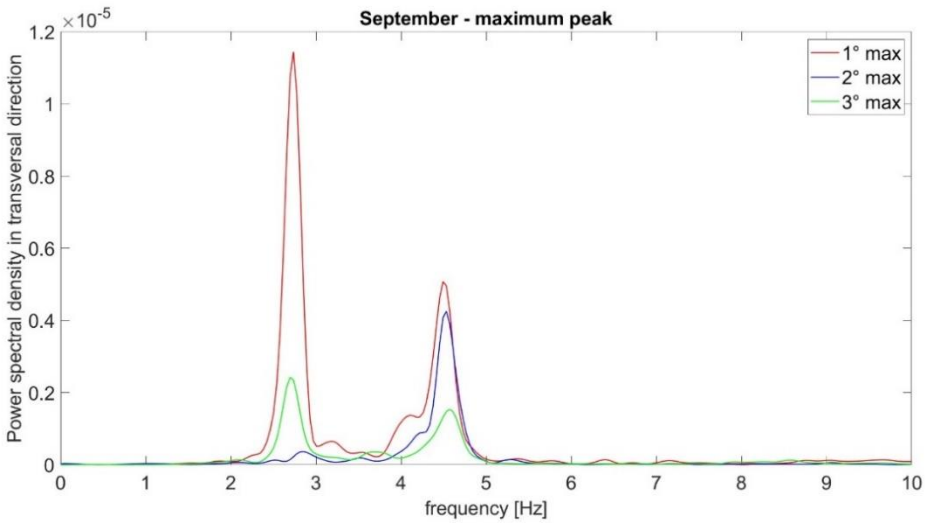


Figure 7-108: Results obtained from the 3 accelerograms with highest peak if PSD

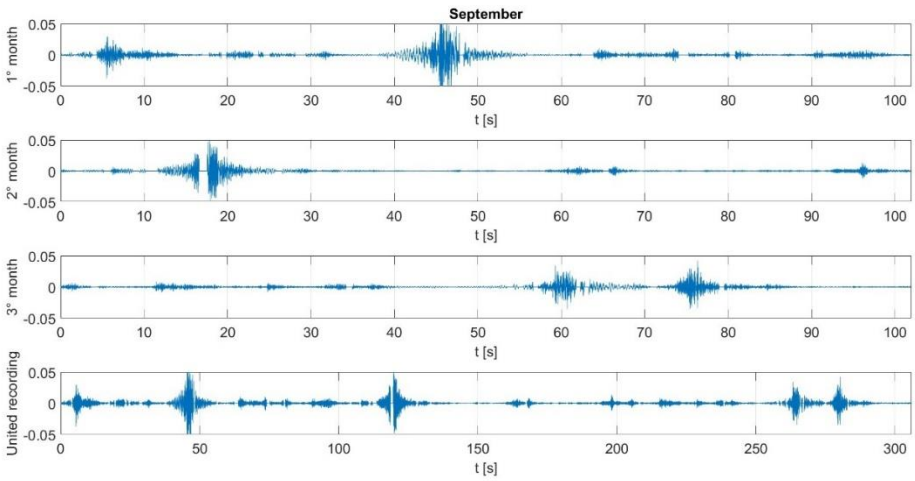


Figure 7-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

7.10 October

The results obtained for the October dataset are shown in the following tables.

Table 7-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-10-02_08-00-21	4.42E-03
	2°	3187F_2023-10-10_12-00-20	3.79E-03
	3°	3187F_2023-10-19_12-00-21	3.29E-03
Longitudinal direction (y)	1°	3187F_2023-10-19_12-00-21	1.78E-03
	2°	3187F_2023-10-02_08-00-21	1.10E-03
	3°	3187F_2023-10-10_12-00-20	7.88E-04
Transverse direction (z)	1°	3187F_2023-10-02_08-00-21	1.17E-03
	2°	3187F_2023-10-19_12-00-21	1.12E-03
	3°	3187F_2023-10-07_08-00-21	1.04E-03

Table 7-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-10-02_08-00-21	1.58E-05	3187F_2023-10-02_08-00-21	3.44E-06
2	3187F_2023-10-10_12-00-20	1.30E-05	3187F_2023-10-10_12-00-20	2.52E-06
3	3187F_2023-10-05_13-00-20	1.18E-05	3187F_2023-10-19_12-00-21	2.42E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-10-19_12-00-21	1.19E-05	3187F_2023-10-19_12-00-21	6.50E-07
2	3187F_2023-10-02_08-00-21	1.42E-06	3187F_2023-10-02_08-00-21	2.33E-07
3	3187F_2023-10-01_11-00-21	9.26E-07	3187F_2023-10-10_12-00-20	1.19E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-10-19_12-00-21	2.45E-06	3187F_2023-10-02_08-00-21	2.69E-07
2	3187F_2023-10-02_08-00-21	1.42E-06	3187F_2023-10-19_12-00-21	2.59E-07
3	3187F_2023-10-10_12-00-20	1.27E-06	3187F_2023-10-07_08-00-21	2.12E-07

Table 7-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	C	C	A	C	A
2	B	B	B	A	A	A	C	A	C
3	C	-	C	B	-	B	D	-	D

7.10.1 Vertical direction (x)

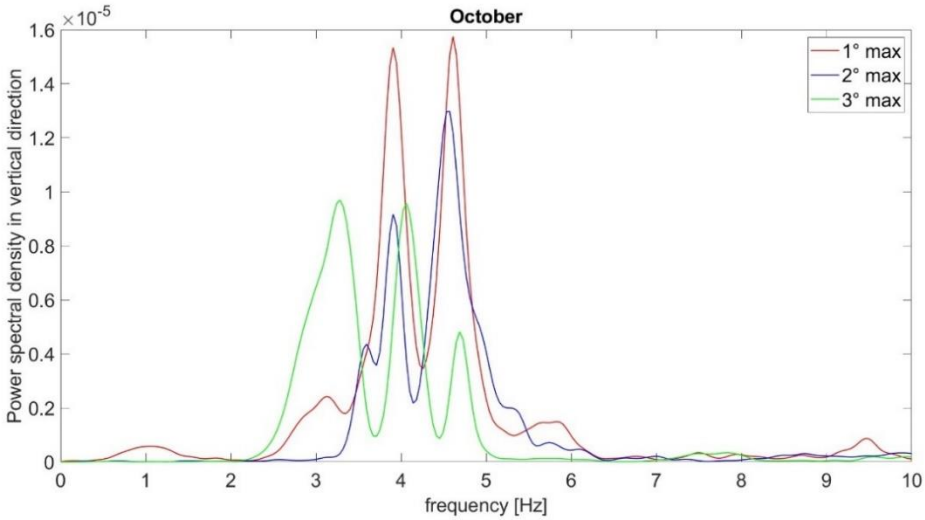


Figure 7-110: Results obtained from the 3 accelerograms with maximum SD in time domain

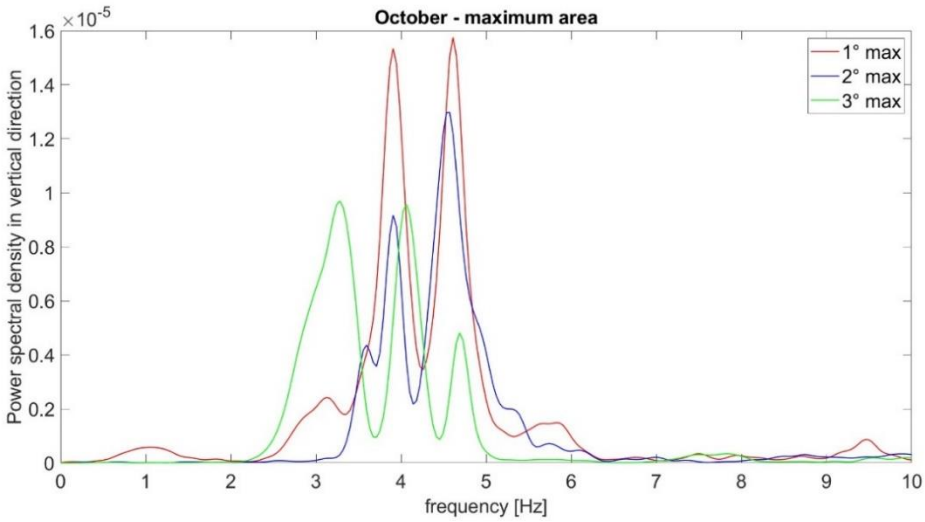


Figure 7-111: Results obtained from the 3 accelerograms with maximum area of PSD

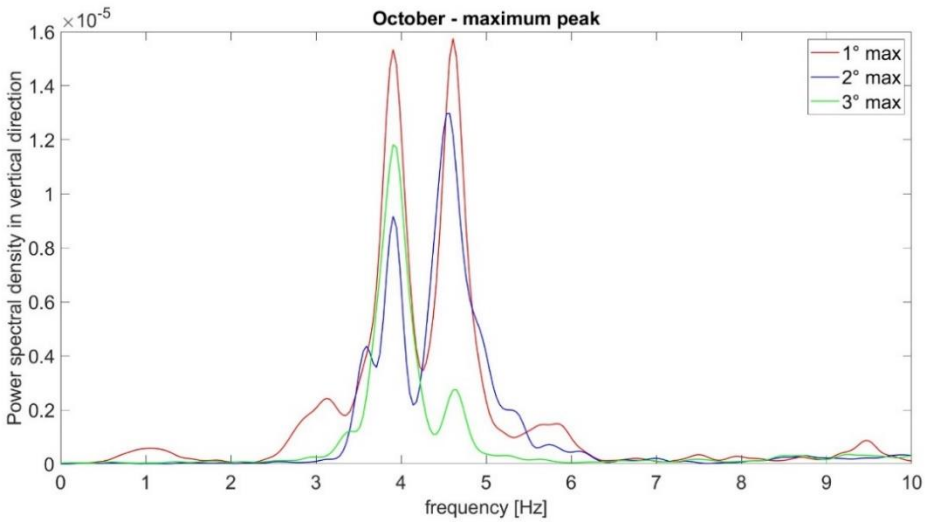


Figure 7-112: Results obtained from the 3 accelerograms with highest peak if PSD

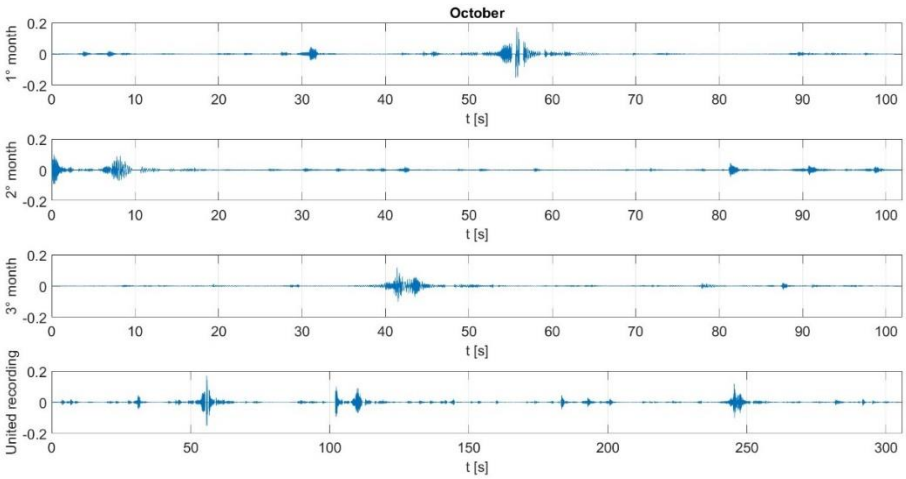


Figure 7-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.10.2 Longitudinal direction (y)

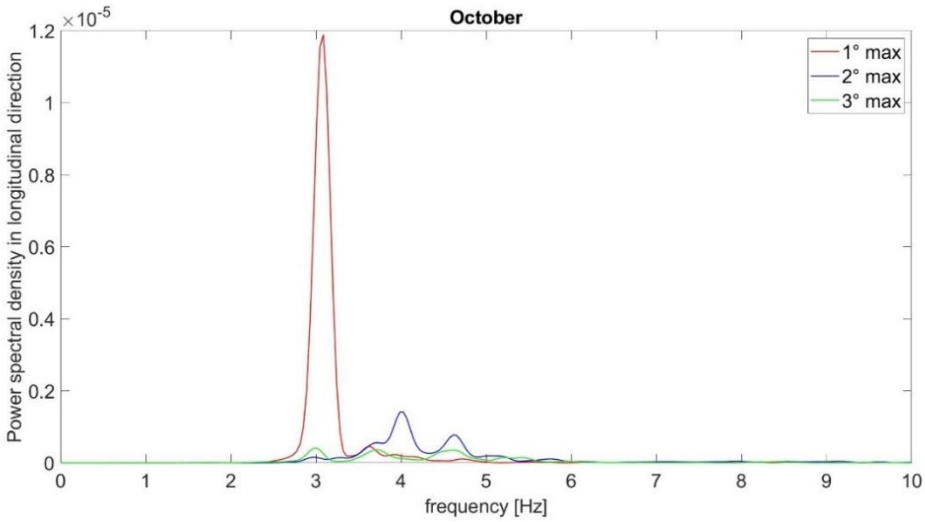


Figure 7-114: Results obtained from the 3 accelerograms with maximum SD in time domain

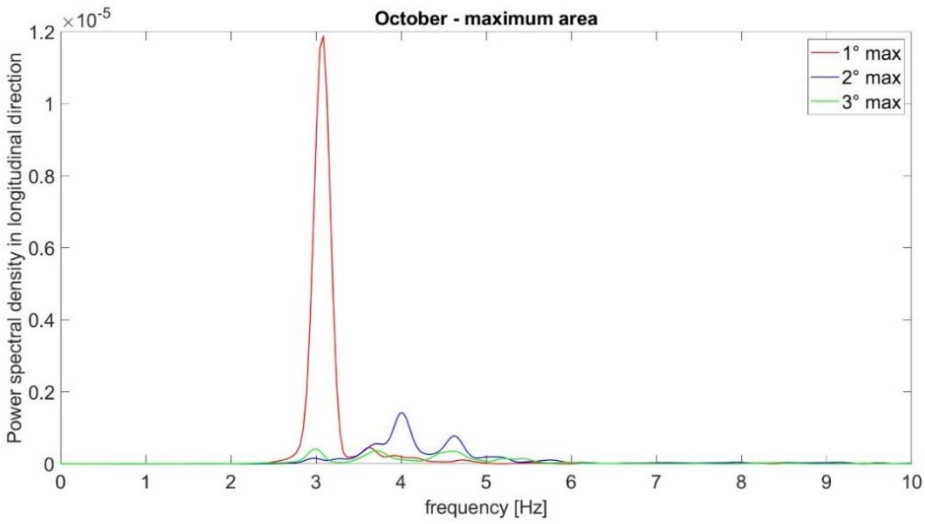


Figure 7-115: Results obtained from the 3 accelerograms with maximum area of PSD

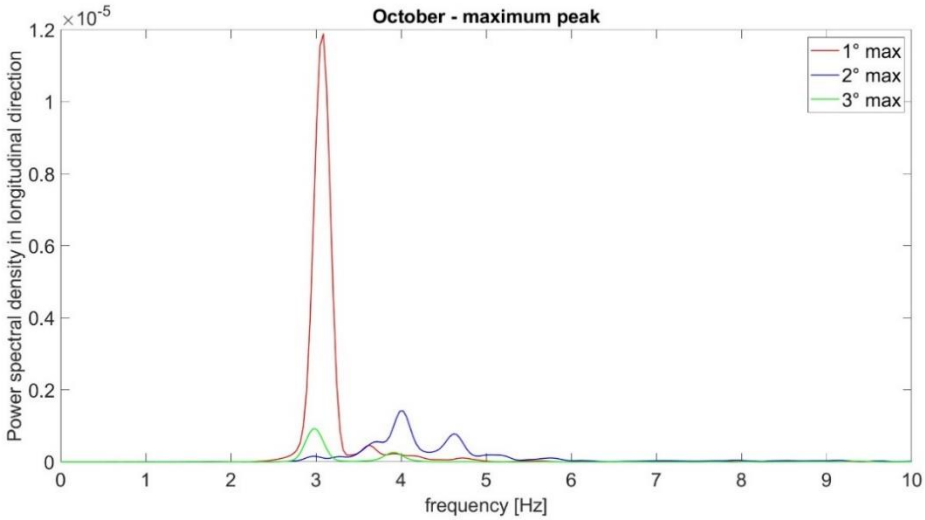


Figure 7-116: Results obtained from the 3 accelerograms with highest peak if PSD

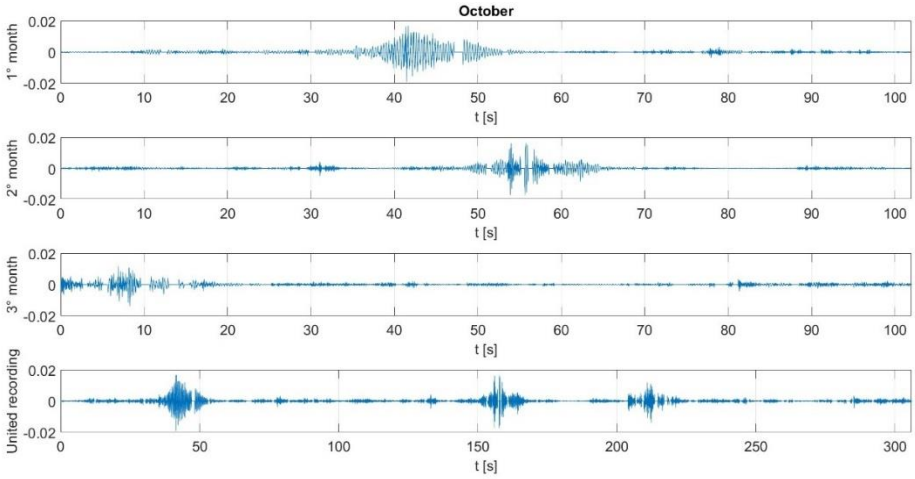


Figure 7-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.10.3 Transverse direction (z)

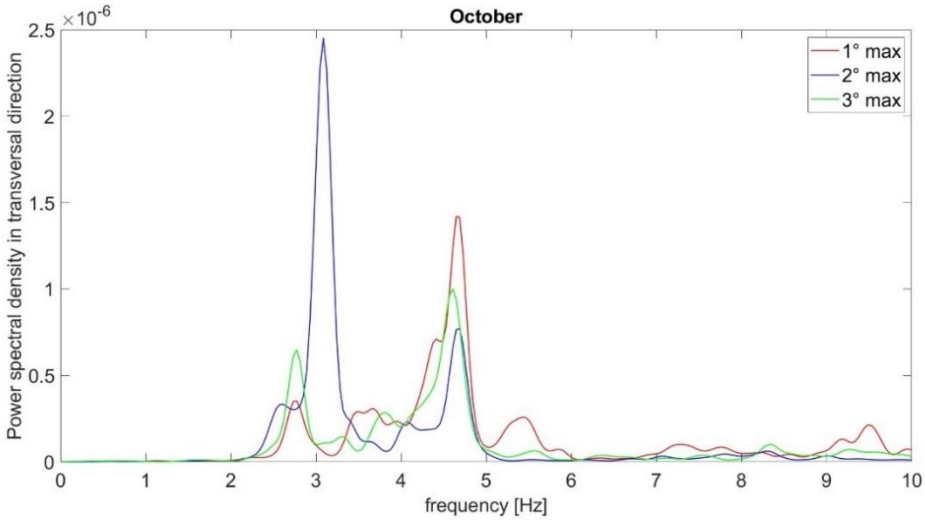


Figure 7-118: Results obtained from the 3 accelerograms with maximum SD in time domain

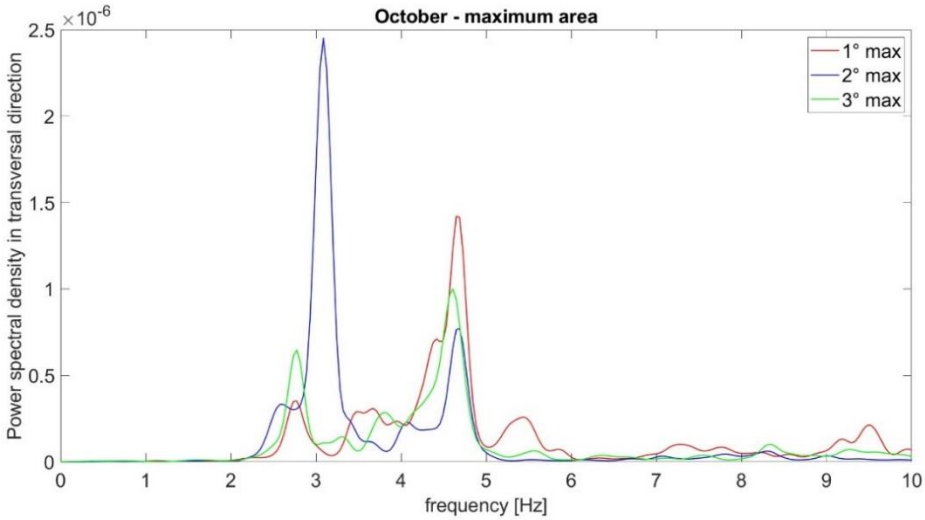


Figure 7-119: Results obtained from the 3 accelerograms with maximum area of PSD

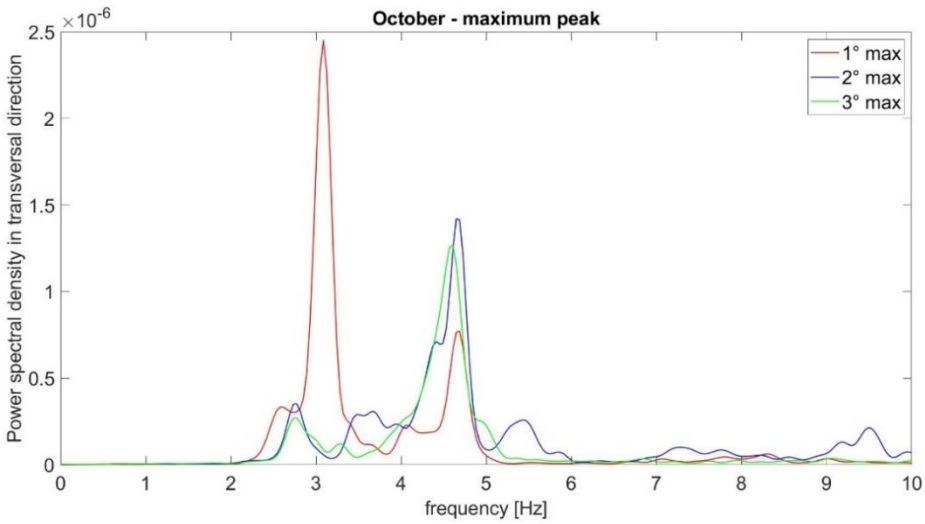


Figure 7-120: Results obtained from the 3 accelerograms with highest peak if PSD

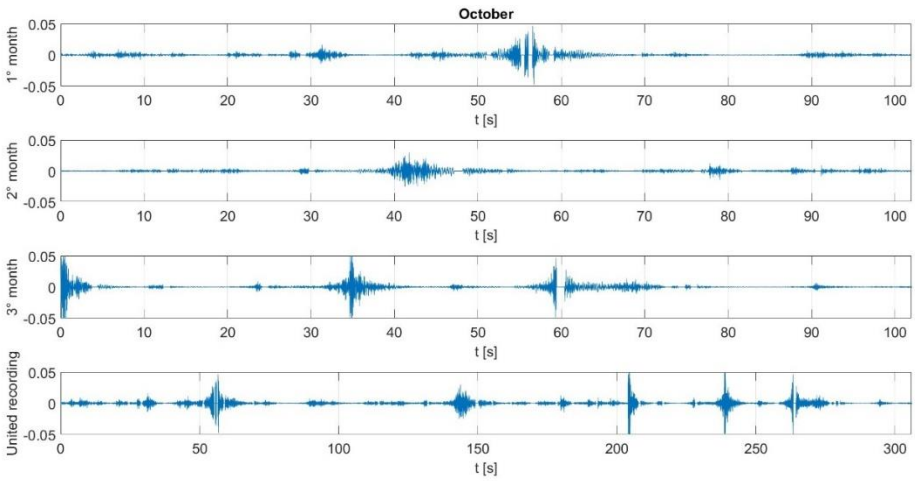


Figure 7-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

7.11 November

The results obtained for the November dataset are shown in the following tables.

Table 7-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-11-07_17-00-21	6.60E-03
	2°	3187F_2023-11-07_16-00-21	3.24E-03
	3°	3187F_2023-11-09_06-00-20	2.88E-03
Longitudinal direction (y)	1°	3187F_2023-11-07_17-00-21	1.20E-03
	2°	3187F_2023-11-06_17-00-21	8.20E-04
	3°	3187F_2023-11-29_02-00-20	6.52E-04
Transverse direction (z)	1°	3187F_2023-11-07_17-00-21	1.92E-03
	2°	3187F_2023-11-07_13-00-20	1.00E-03
	3°	3187F_2023-11-11_14-00-21	9.42E-04

Table 7-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-11-07_17-00-21	5.43E-05	3187F_2023-11-07_17-00-21	8.93E-06
2	3187F_2023-11-13_12-00-21	1.29E-05	3187F_2023-11-07_16-00-21	2.41E-06
3	3187F_2023-11-10_09-00-20	1.01E-05	3187F_2023-11-09_06-00-20	1.95E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-11-07_17-00-21	2.03E-06	3187F_2023-11-07_17-00-21	2.94E-07
2	3187F_2023-11-06_17-00-21	1.53E-06	3187F_2023-11-06_17-00-21	1.38E-07
3	3187F_2023-11-29_02-00-20	7.38E-07	3187F_2023-11-17_08-00-19	7.40E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-11-07_17-00-21	8.57E-06	3187F_2023-11-07_17-00-21	7.41E-07
2	3187F_2023-11-07_13-00-20	1.27E-06	3187F_2023-11-07_13-00-20	2.07E-07
3	3187F_2023-11-11_14-00-21	1.09E-06	3187F_2023-11-11_14-00-21	1.79E-07

Table 7-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	-	B	D	D	D	F	F	F
3	C	-	C	E	E	-	G	G	G

7.11.1 Vertical direction (x)

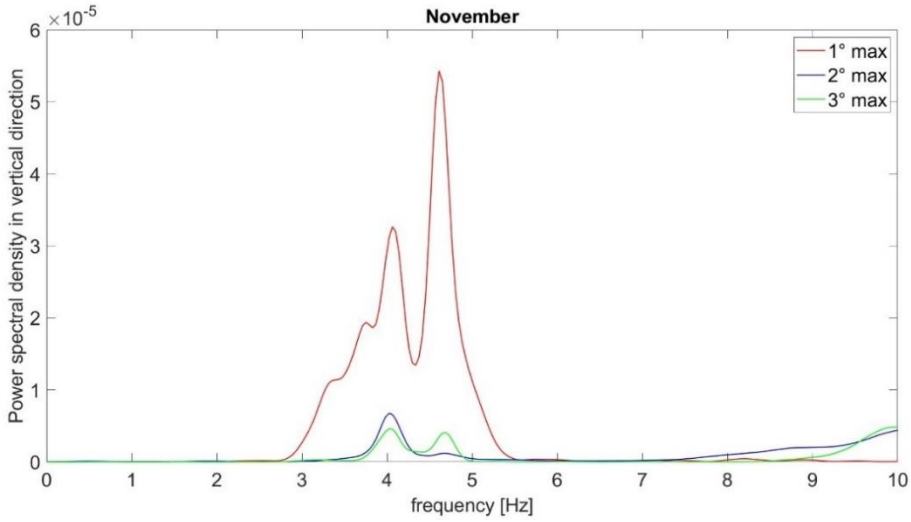


Figure 7-122: Results obtained from the 3 accelerograms with maximum SD in time domain

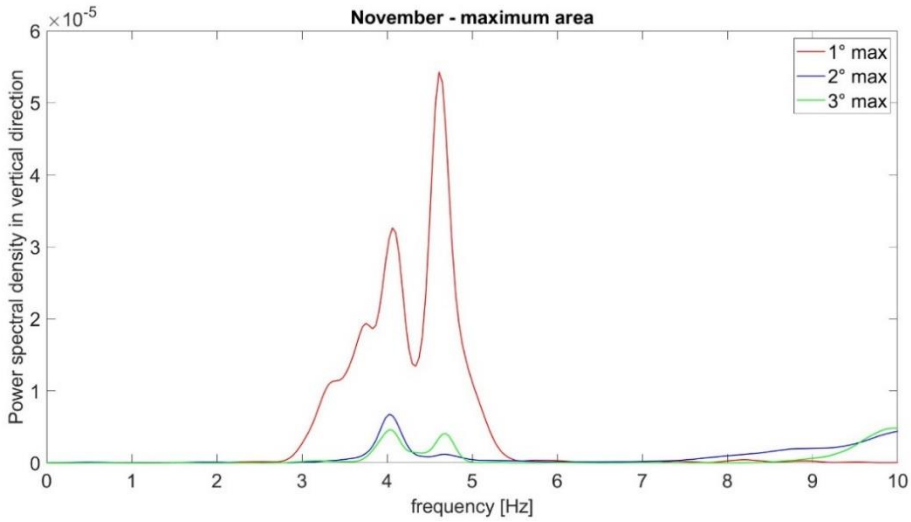


Figure 7-123: Results obtained from the 3 accelerograms with maximum area of PSD

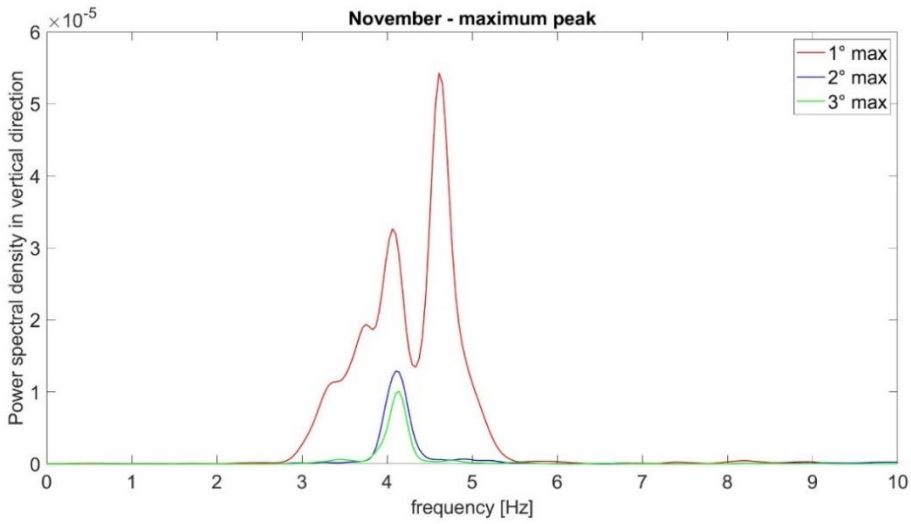


Figure 7-124: Results obtained from the 3 accelerograms with highest peak if PSD

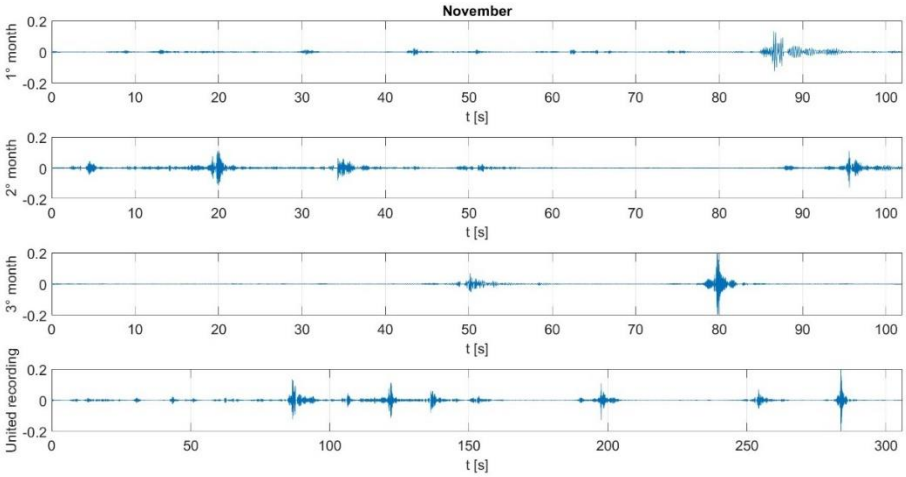


Figure 7-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.11.2 Longitudinal direction (y)

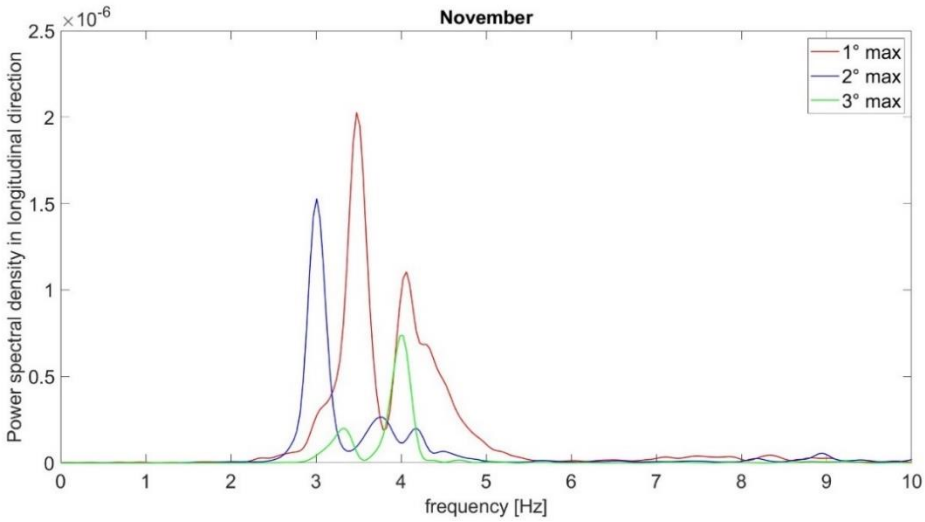


Figure 7-126: Results obtained from the 3 accelerograms with maximum SD in time domain

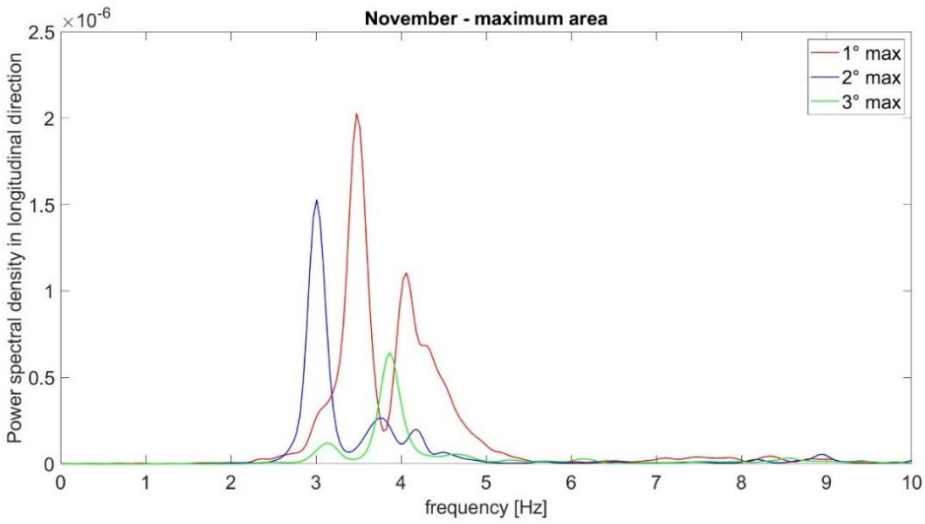


Figure 7-127: Results obtained from the 3 accelerograms with maximum area of PSD

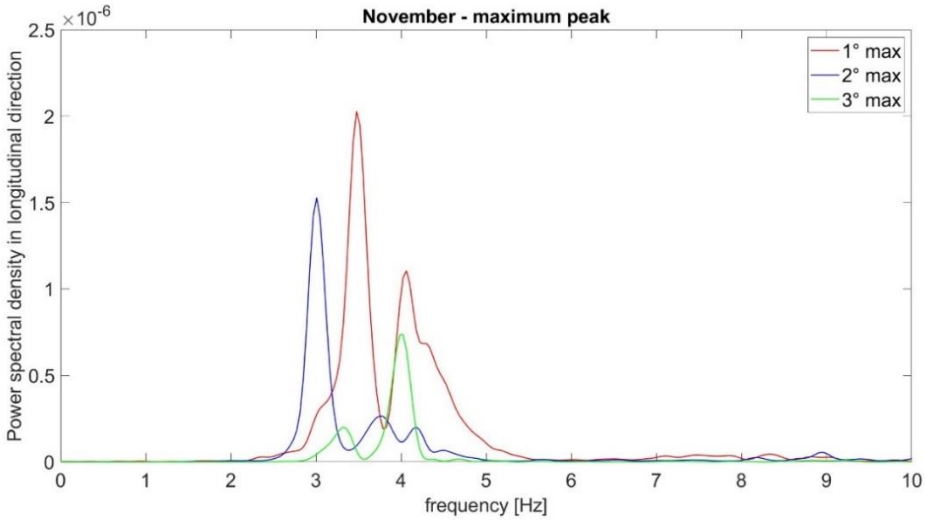


Figure 7-128: Results obtained from the 3 accelerograms with highest peak if PSD

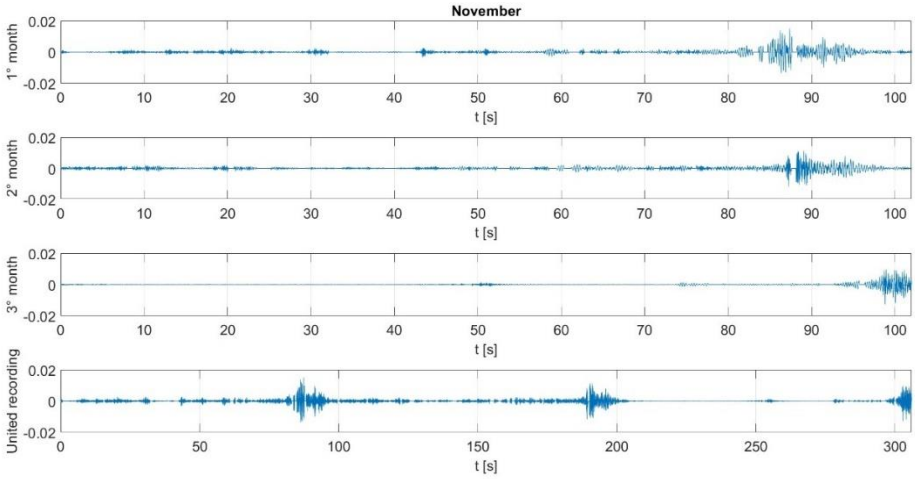


Figure 7-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.11.3 Transverse direction (z)

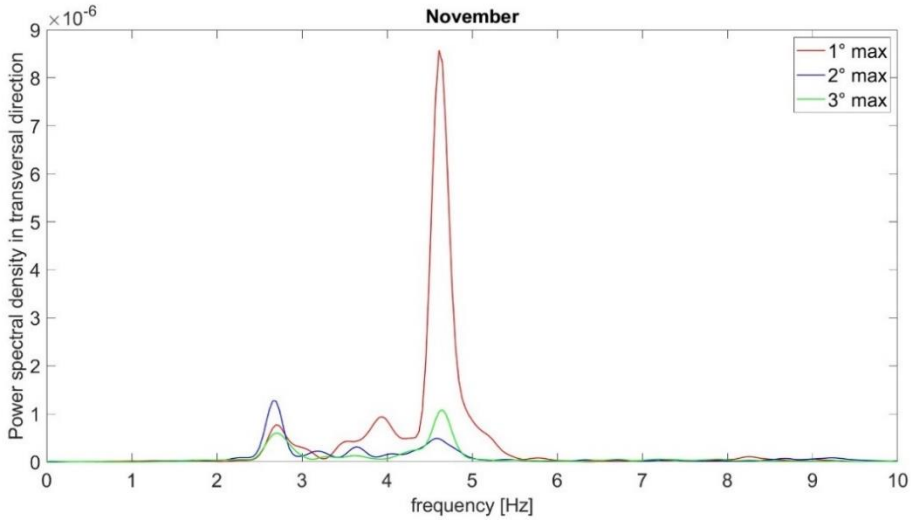


Figure 7-130: Results obtained from the 3 accelerograms with maximum SD in time domain

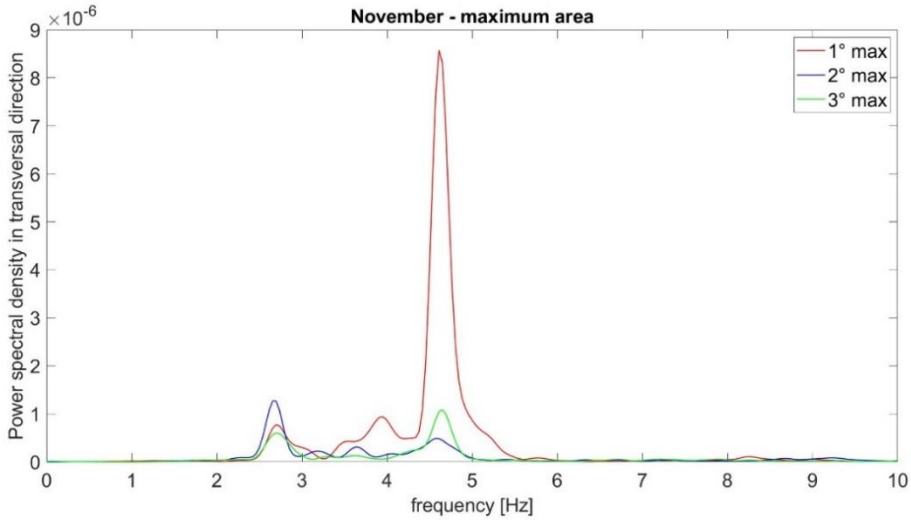


Figure 7-131: Results obtained from the 3 accelerograms with maximum area of PSD

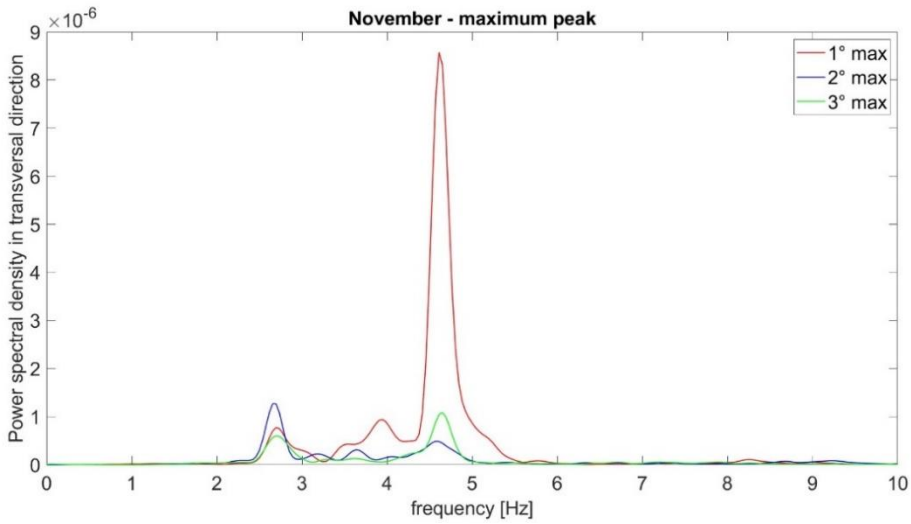


Figure 7-132: Results obtained from the 3 accelerograms with highest peak if PSD

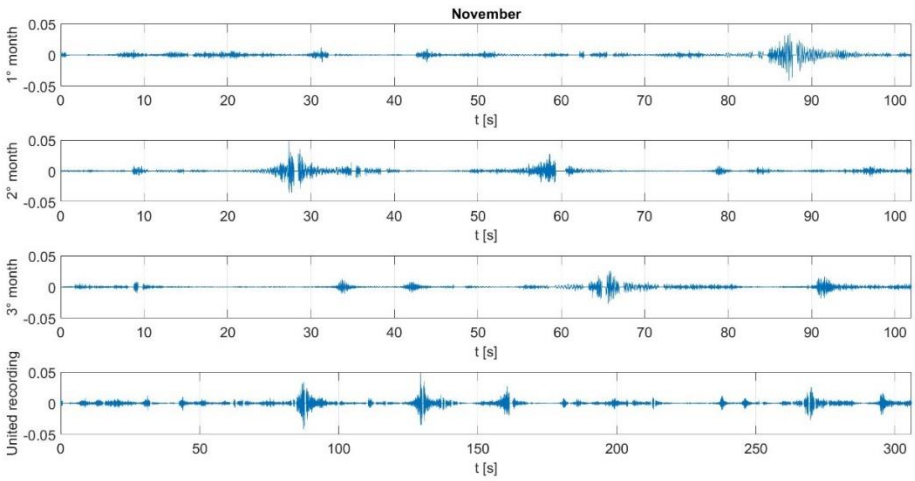


Figure 7-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

7.12 December

The results obtained for the December dataset are shown in the following tables.

Table 7-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	3187F_2023-12-06_10-00-19	4.25E-03
	2°	3187F_2023-12-12_15-00-20	3.82E-03
	3°	3187F_2023-12-04_12-00-21	3.67E-03
Longitudinal direction (y)	1°	3187F_2023-12-06_10-00-19	1.41E-03
	2°	3187F_2023-12-13_08-00-20	8.55E-04
	3°	3187F_2023-12-22_09-00-21	8.02E-04
Transverse direction (z)	1°	3187F_2023-12-06_10-00-19	1.10E-03
	2°	3187F_2023-12-01_08-00-20	1.00E-03
	3°	3187F_2023-12-04_12-00-21	9.68E-04

Table 7-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-12-06_10-00-19	2.72E-05	3187F_2023-12-06_10-00-19	3.92E-06
2	3187F_2023-12-01_08-00-20	1.68E-05	3187F_2023-12-12_15-00-20	3.13E-06
3	3187F_2023-12-29_15-00-21	1.42E-05	3187F_2023-12-04_12-00-21	2.95E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-12-06_10-00-19	2.60E-06	3187F_2023-12-06_10-00-19	4.21E-07
2	3187F_2023-12-22_09-00-21	1.43E-06	3187F_2023-12-13_08-00-20	1.49E-07
3	3187F_2023-12-28_13-00-20	1.15E-06	3187F_2023-12-22_09-00-21	1.30E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	3187F_2023-12-01_08-00-20	1.60E-06	3187F_2023-12-06_10-00-19	2.50E-07
2	3187F_2023-12-14_08-00-21	1.59E-06	3187F_2023-12-01_08-00-20	2.12E-07
3	3187F_2023-12-06_10-00-19	1.11E-06	3187F_2023-12-04_12-00-21	1.94E-07

Table 7-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	F	A
2	B	-	B	D	E	D	F	-	F
3	C	-	C	E	-	E	C	A	C

7.12.1 Vertical direction (x)

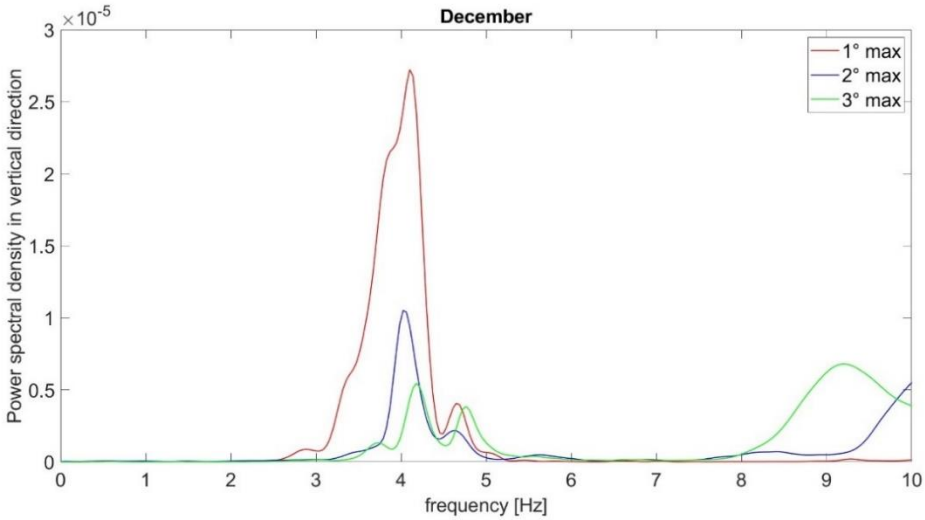


Figure 7-134: Results obtained from the 3 accelerograms with maximum SD in time domain

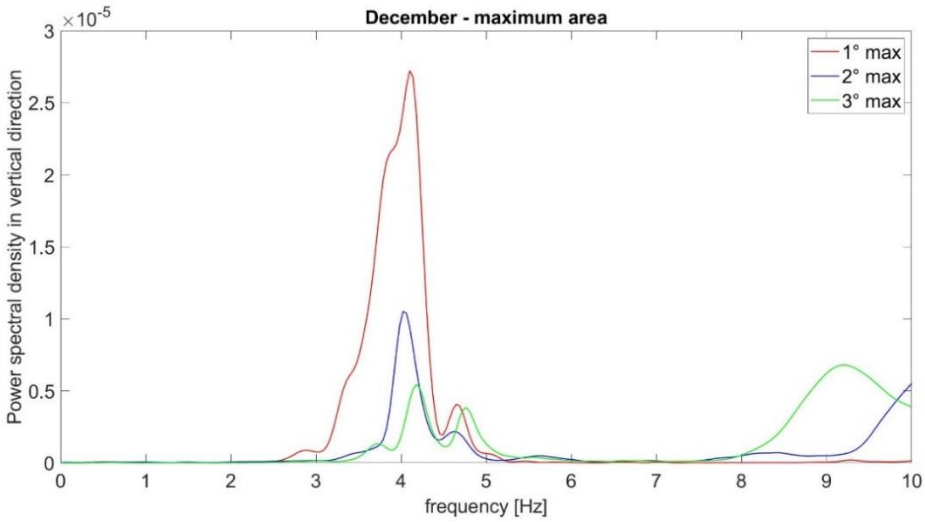


Figure 7-135: Results obtained from the 3 accelerograms with maximum area of PSD

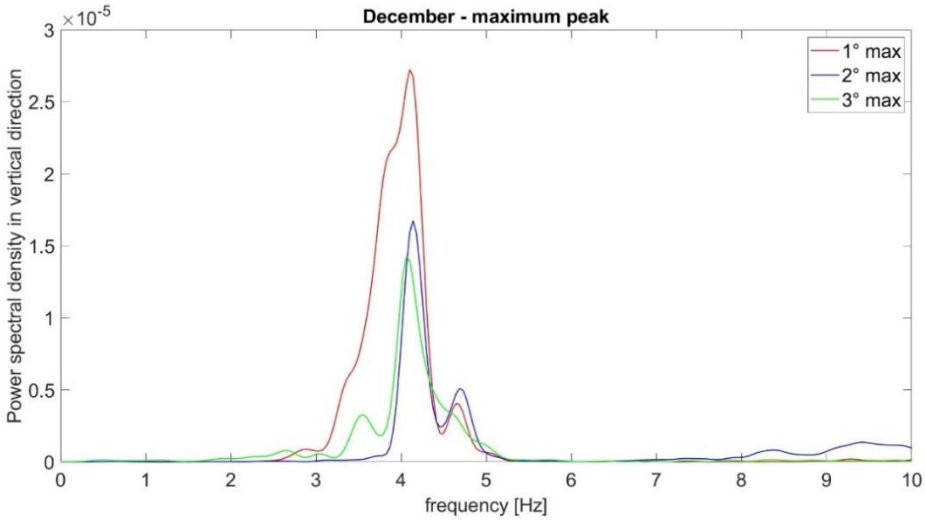


Figure 7-136: Results obtained from the 3 accelerograms with highest peak if PSD

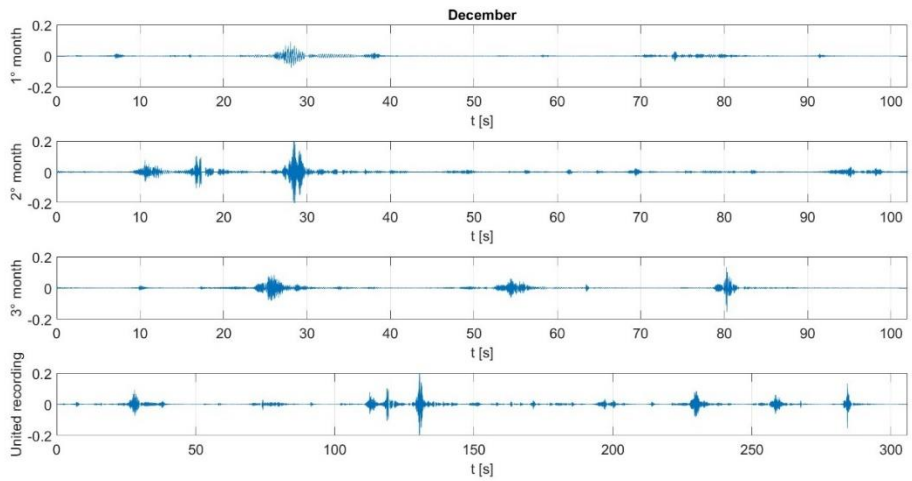


Figure 7-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

7.12.2 Longitudinal direction (y)

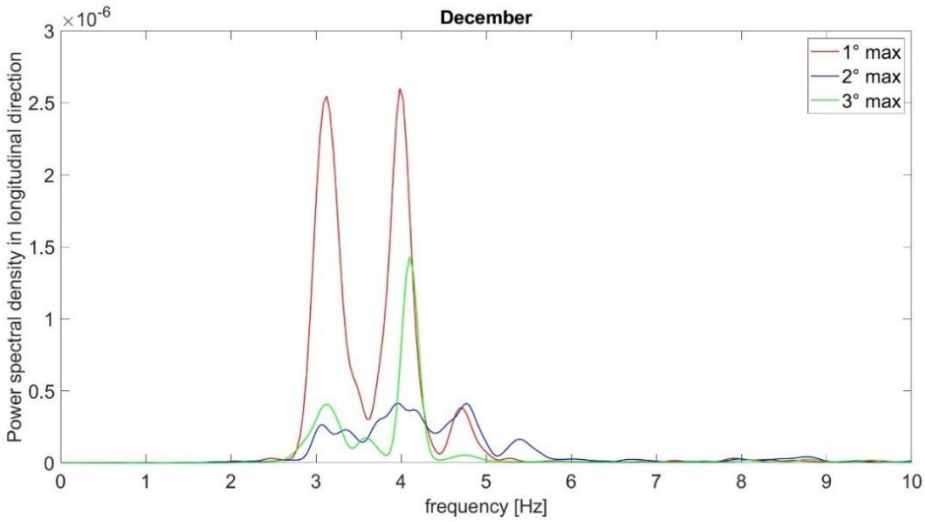


Figure 7-138: Results obtained from the 3 accelerograms with maximum SD in time domain

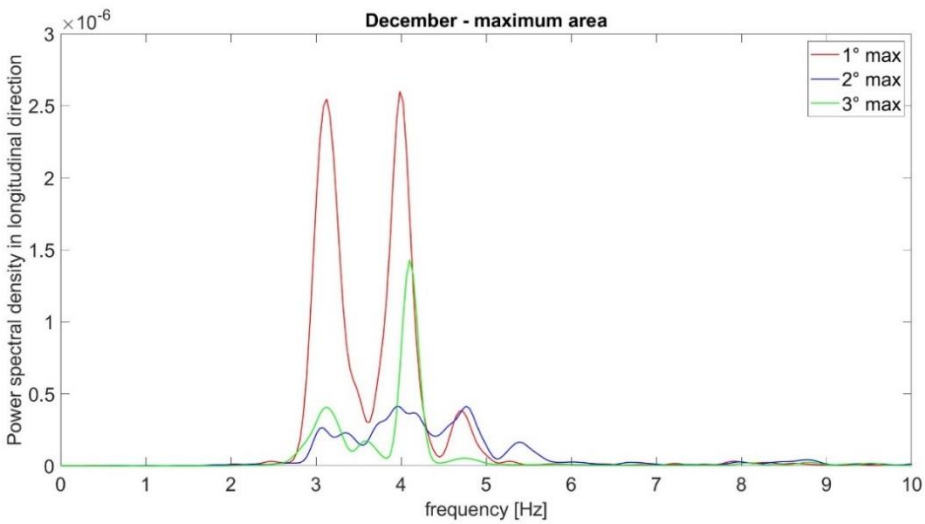


Figure 7-139: Results obtained from the 3 accelerograms with maximum area of PSD

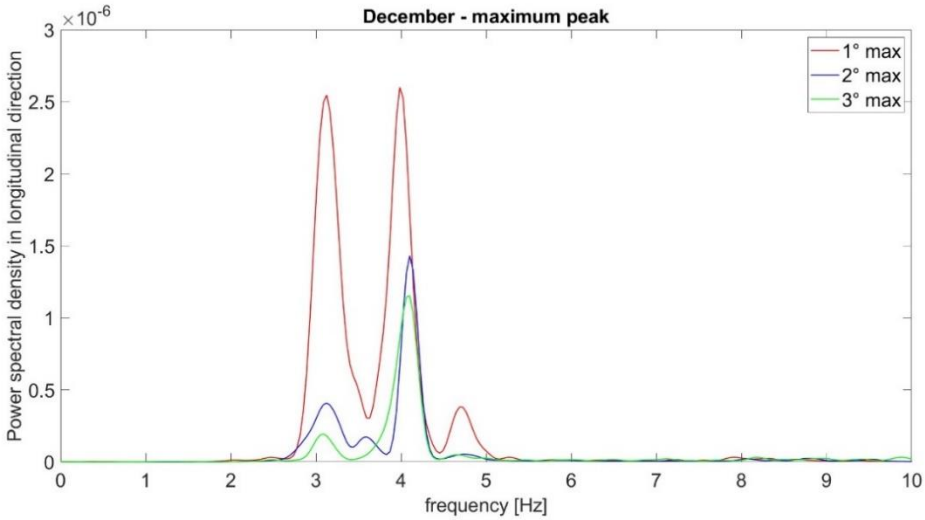


Figure 7-140: Results obtained from the 3 accelerograms with highest peak if PSD

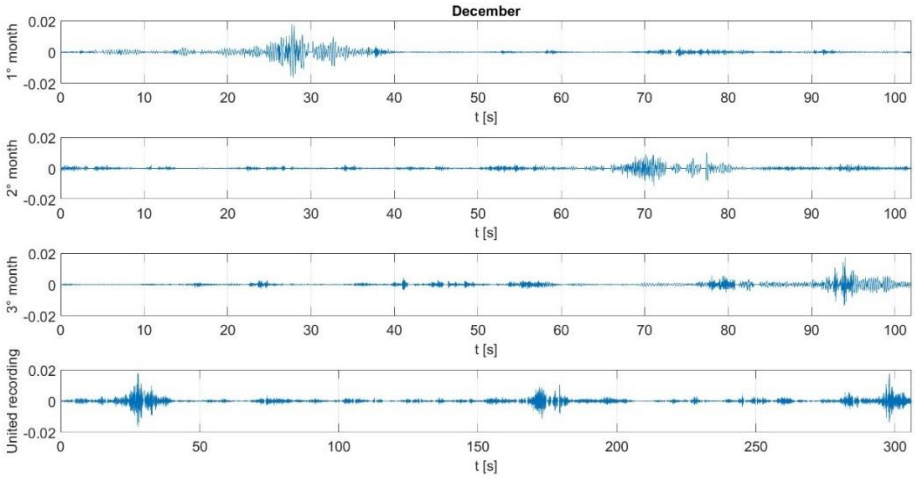


Figure 7-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

7.12.3 Transverse direction (z)

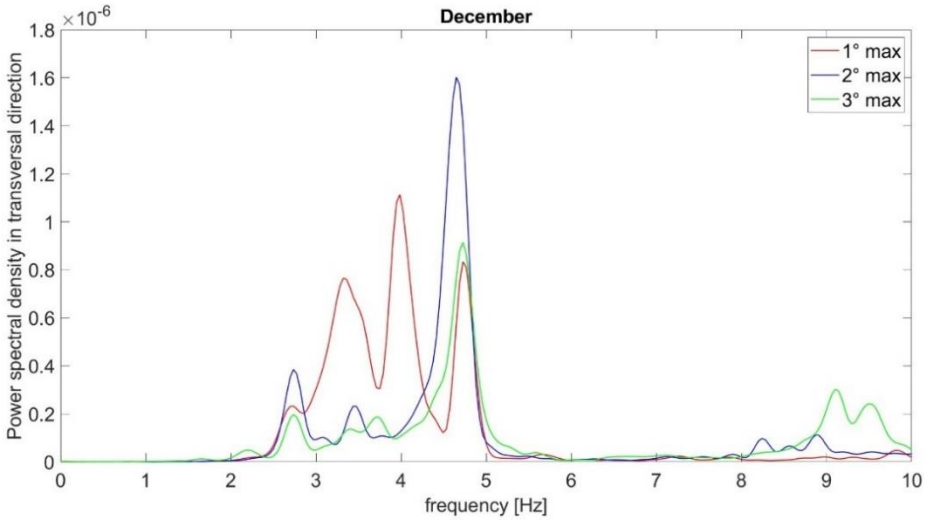


Figure 7-142: Results obtained from the 3 accelerograms with maximum SD in time domain

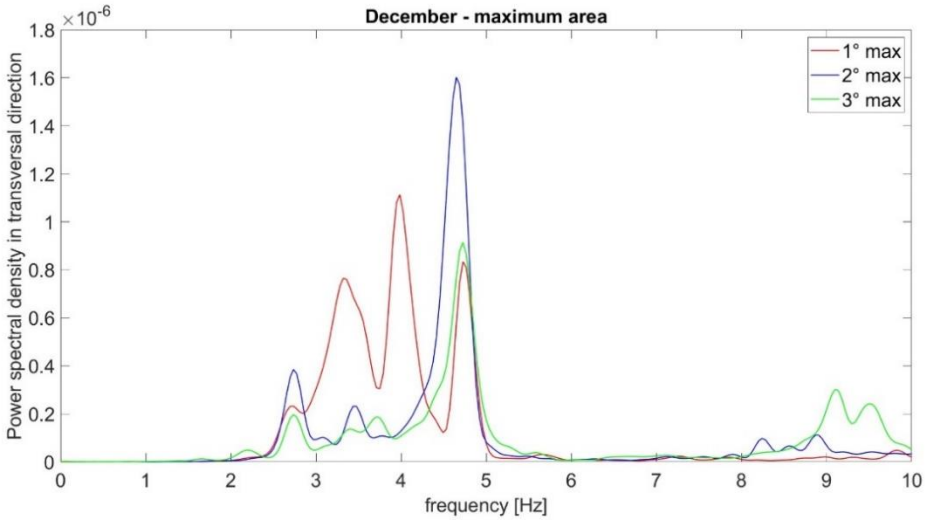


Figure 7-143: Results obtained from the 3 accelerograms with maximum area of PSD

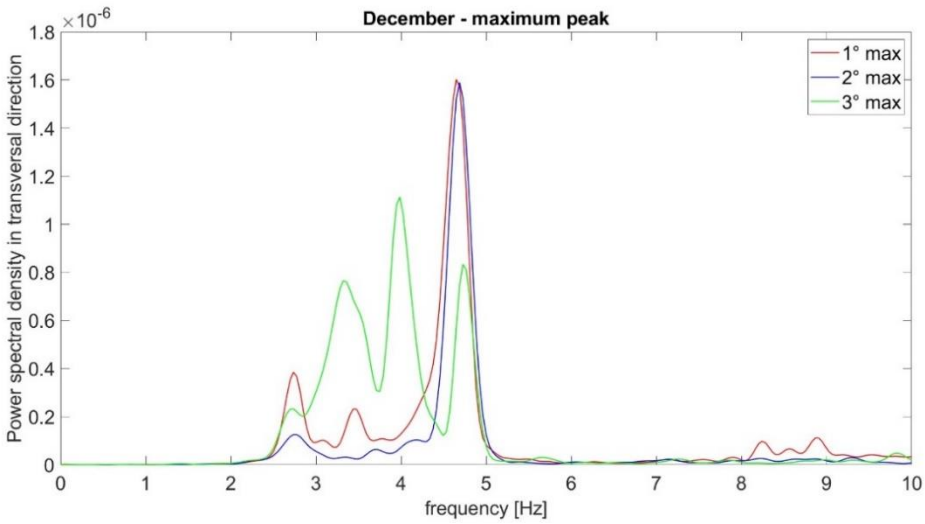


Figure 7-144: Results obtained from the 3 accelerograms with highest peak if PSD

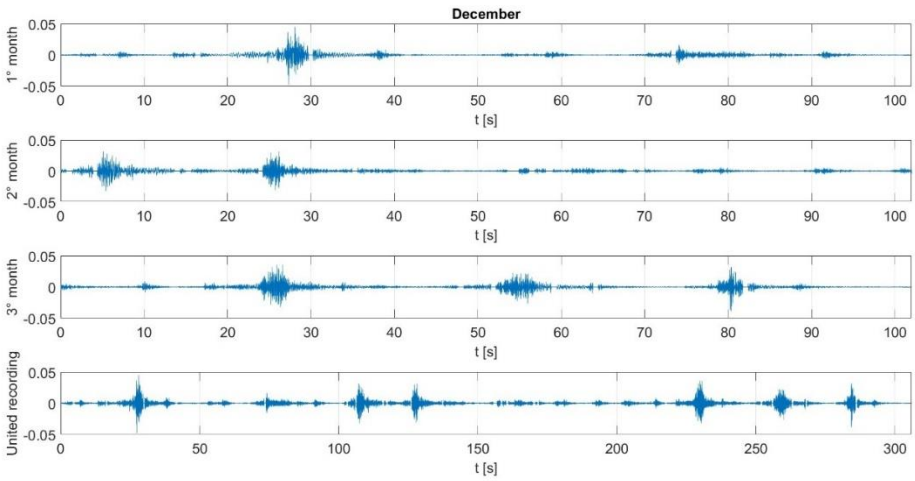


Figure 7-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

7.13 Overall representation

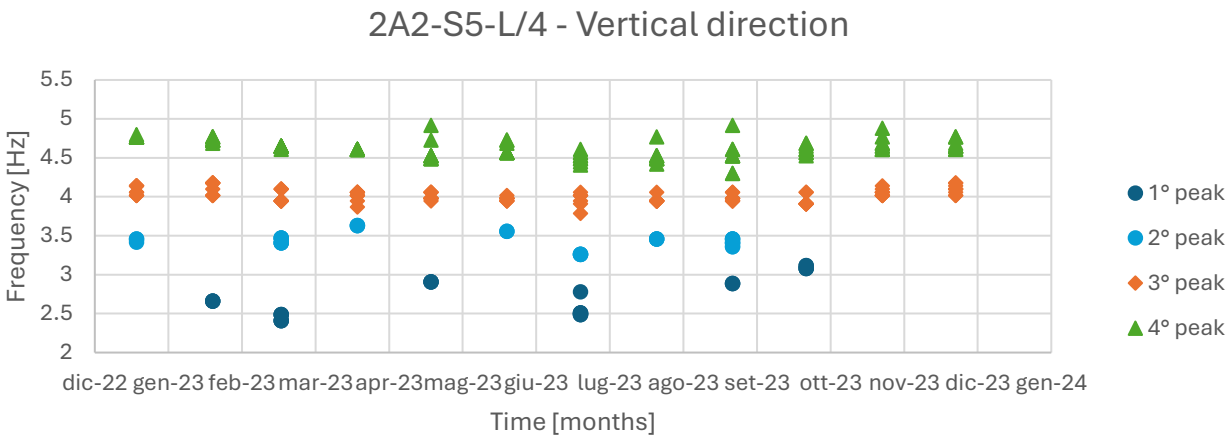
All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the different peaks value has been separated and the representation for the vertical, longitudinal, and transverse direction have been obtained.

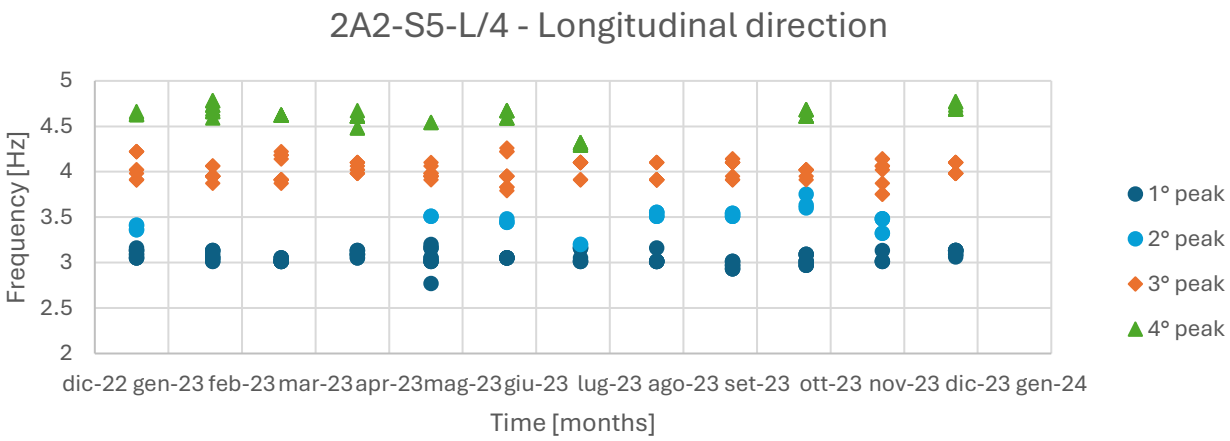
Table 1-37: Main identified frequencies for sensor 3187F – bridge 2A2 – Sp5 – L/4

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	27	29	106	106	96	31	104	56	9	108	65	107
	MEAN	**2.72**	**3.44**	**4.02**	**4.62**	**3.05**	**3.47**	**4.01**	**4.61**	**2.24**	**2.76**	**3.71**	**4.61**
	SD	0.25	0.10	0.08	0.11	0.07	0.11	0.11	0.12	0.03	0.11	0.21	0.09
	C.o.V.	9.1%	2.9%	2.0%	2.4%	2.2%	3.2%	2.7%	2.6%	1.5%	3.9%	5.7%	2.0%
	Rating	**16%**	**25%**	**99%**	**95%**	**88%**	**26%**	**92%**	**50%**	**9%**	**87%**	**46%**	**100%**
1	gen-23		3.42	4.02	4.77	3.13		3.91	4.63		2.73	3.41	4.77
2	gen-23			4.14	4.8	3.05	3.41	4.02	4.63	2.29	2.58	3.28	
3	gen-23			4.06	4.77	3.09	3.36	4.22			2.83	3.36	4.77
1	gen-23		3.46	4.02	4.77	3.13		3.91	4.63		2.73	3.41	4.77
2	gen-23			4.06	4.77	3.05	3.41	4.02	4.63	2.29	2.58	3.28	4.77
3	gen-23			4.14	4.77	3.05	3.36	4.22			2.77		4.73
1	gen-23		3.46	4.02	4.77	3.13		3.91	4.66	2.29	2.58	3.28	4.77
2	gen-23			4.14		3.09		4.22			2.73	3.41	4.77
3	gen-23			4.14		3.16		3.98			2.77		4.77
1	feb-23	2.66		4.02	4.73	3.13		3.95	4.73		2.5	4.01	4.73
2	feb-23			4.18	4.73	3.01		4.06	4.78		2.73		4.69
3	feb-23			4.18	4.77	3.05		3.95	4.66		2.77	4.03	4.69
1	feb-23	2.66		4.02	4.77	3.13		3.95	4.73		2.5	4.01	4.73
2	feb-23			4.18	4.73	3.05		3.95	4.66		2.73		4.69
3	feb-23			4.18	4.77	3.01		4.06	4.78		2.77	4.03	4.69
1	feb-23	2.66		4.02	4.73	3.13		3.95	4.69		2.73		4.69
2	feb-23			4.18	4.73	3.09		3.87			2.5	4.01	4.73
3	feb-23			4.1	4.69	3.05		3.95	4.59		2.77	4.03	4.69
1	mar-23	2.41	3.41	3.95	4.65	3.01		4.18			2.73	3.83	4.65
2	mar-23	2.49		3.95	4.65	3.01		3.91	4.62		2.73	3.81	4.61
3	mar-23		3.47	4.1	4.65	3.05		4.22			2.73	3.74	4.57
1	mar-23	2.41	3.41	3.95	4.65	3.01		4.18			2.73	3.83	4.65
2	mar-23	2.49		3.95	4.65	3.01		3.91	4.62		2.73	3.81	4.61
3	mar-23		3.47	4.1	4.65	3.05		3.91	4.62		2.73	3.74	4.57
1	mar-23	2.49		3.95	4.65	3.01		4.14			2.7	4.02	4.65
2	mar-23	2.41	3.41	3.95	4.61	3.01		3.91	4.62		2.77		4.61
3	mar-23		3.47	4.1	4.65	3.05		3.87	4.62		3.01	3.68	4.61
1	apr-23		3.63	4.06	4.61	3.09		4.1	4.61		2.77	3.61	4.57
2	apr-23			3.95	4.61	3.13		4.06	4.48	2.21	2.73	3.61	4.61
3	apr-23			4.02	4.61	3.05		3.98	4.61	2.23	2.73	3.54	4.65
1	apr-23			4.02	4.61	3.09		4.1	4.61		2.73	3.61	4.57
2	apr-23			4.02	4.61	3.05		4.02	4.48	2.23	2.77	3.61	4.61

3	apr-23		3.63	4.06	4.61	3.13		3.98	4.61	2.21	2.73	3.54	4.65
1	apr-23		3.63	4.06	4.61	3.13		3.98	4.61	2.21	2.77		4.61
2	apr-23			3.87	4.61	3.09		4.1	4.61		2.73	3.54	4.57
3	apr-23			4.06	4.61	3.09		4.02	4.67	2.23	2.81	3.61	4.57
1	mag-23	2.91		3.98	4.53	3.01		3.98			2.73		4.53
2	mag-23			4.06	4.49	3.16		3.95			2.73	3.64	4.49
3	mag-23			3.95	4.53	3.05	3.51	4.1	4.54		2.54		4.65
1	mag-23	2.91		3.98	4.53	3.01		3.95			2.77		4.53
2	mag-23			4.06	4.49	3.16		3.95			2.73	3.64	4.49
3	mag-23			3.98	4.73	2.77	3.51	4.06	4.54		3.01		4.65
1	mag-23	2.91		3.98	4.53	3.01		3.98			2.77		4.53
2	mag-23			4.06	4.49	3.2		3.95			2.73	3.64	4.49
3	mag-23			3.98	4.92	3.05		3.91			3.01		4.61
1	giu-23			3.95	4.73	3.05		3.95	4.67		2.85	3.74	4.57
2	giu-23			3.98	4.57		3.44	4.26			2.7	3.74	4.53
3	giu-23		3.56	4.02	4.57	3.05		3.83	4.59		2.9		4.53
1	giu-23			3.95	4.69	3.05		3.95	4.67		2.85	3.74	4.57
2	giu-23			3.98	4.57		3.44	4.22			2.7	3.74	4.53
3	giu-23			3.98	4.57	3.05		3.83	4.59		2.89		4.53
1	giu-23			3.95	4.73	3.05		3.95	4.67		2.89	3.74	4.53
2	giu-23			3.98	4.57	3.05		3.79	4.59		2.89	3.74	4.57
3	giu-23		3.56	3.98	4.57		3.48	4.22			2.81		4.57
1	lug-23	2.49	3.26	4.06	4.61	3.16		4.1	4.29		2.97	3.83	4.41
2	lug-23	2.51		4.02	4.57		3.2	3.91	4.32		2.85	3.83	4.53
3	lug-23	2.78	3.26		4.49	3.01		4.1			2.81		4.53
1	lug-23	2.49	3.26		4.49	3.16		4.1	4.29		2.97	3.83	4.45
2	lug-23	2.51		4.02	4.57		3.2	3.91	4.32		2.77	3.83	4.57
3	lug-23			4.02	4.53	3.01		4.1			2.81		4.49
1	lug-23	2.49	3.26	3.91	4.41	3.01		4.1			2.81	3.83	4.49
2	lug-23			3.95	4.53	3.16		4.1	4.32		2.85		4.53
3	lug-23	2.51		3.79	4.45	3.05			4.3		2.97	3.83	4.45
1	ago-23		3.46	3.95	4.49	3.16	3.55	3.91			2.66	3.91	4.49
2	ago-23			3.95	4.42	3.01		4.1			2.7	3.94	4.53
3	ago-23			3.95	4.53	3.01	3.51	3.91			2.81		4.65
1	ago-23		3.46	3.95	4.49		3.55	3.91			2.66	3.91	4.49
2	ago-23			3.95	4.53	3.01		4.1			2.7	3.94	4.53
3	ago-23			3.95	4.49	3.01	3.51	3.91			2.81		4.65
1	ago-23		3.46	3.95	4.49		3.55	3.91			2.7	3.91	4.49
2	ago-23			4.06	4.77	3.01		4.1			2.7	3.94	4.53
3	ago-23			3.95	4.53	3.01	3.51	3.91			2.73		4.49
1	set-23	2.89	3.46	3.98	4.53	2.97	3.54	4.14			2.73		4.49
2	set-23		3.41	3.95	4.92	3.01		3.95			2.81		4.53
3	set-23		3.36	4.06	4.61	2.93	3.51	4.1			2.7		4.57
1	set-23	2.89	3.46	3.98	4.53	2.97	3.54	4.1			2.73		4.49
2	set-23		3.36	4.06	4.61	3.01		3.91			2.81		4.53
3	set-23		3.41	3.95	4.3	2.93	3.51	4.1			2.7		4.57
1	set-23	2.89	3.46	3.98	4.53	2.97	3.54	4.1			2.73		4.49

2	set-23		3.41	3.95	4.3	3.01		3.91		2.81		4.53
3	set-23			3.98	4.53	2.93	3.51	4.14		2.7		4.57
1	ott-23	3.08		3.91	4.61	3.09		3.95	4.68	2.73		4.65
2	ott-23			3.91	4.57	3.01		4.02	4.61	3.09		4.65
3	ott-23	3.12		4.06	4.69	3.01	3.75		4.61	2.77	3.73	4.61
1	ott-23	3.08		3.91	4.61	3.09	3.6		4.68	2.77		4.65
2	ott-23			3.91	4.57	2.97		4.02	4.61	3.09		4.65
3	ott-23	3.12		4.06	4.69	3.01		4.02	4.61	2.77	3.73	4.61
1	ott-23	3.08		3.91	4.61	3.09	3.63		4.68	3.09		4.65
2	ott-23			3.91	4.53	2.97		4.02	4.61	2.77		4.65
3	ott-23			3.91	4.65	2.97		3.91		2.73		4.61
1	nov-23			4.06	4.61		3.48	4.06		2.7	3.95	4.61
2	nov-23			4.02	4.69	3.01		3.75		2.66	3.63	4.57
3	nov-23			4.02	4.69		3.32	3.75		2.7		4.65
1	nov-23			4.06	4.61		3.48	4.06		2.66	3.95	4.61
2	nov-23			4.02	4.65	3.01		4.14		2.7	3.63	4.57
3	nov-23			4.02	4.65	3.13		3.87		2.7		4.65
1	nov-23			4.06	4.61		3.48	4.06		2.7	3.95	4.61
2	nov-23			4.1	4.88	3.01		4.14		2.66	3.63	4.66
3	nov-23			4.14	4.77		3.32	4.02		2.7		4.65
1	dic-23			4.1	4.65	3.13		3.98	4.69	2.73	3.36	4.93
2	dic-23			4.02	4.61	3.06		3.98	4.77	2.73	3.44	4.73
3	dic-23			4.18	4.77	3.13		4.1	4.73	2.73	3.71	4.65
1	dic-23			4.1	4.65	3.13		3.98	4.69	2.7	3.36	4.73
2	dic-23			4.02	4.61	3.09		3.98	4.77	2.73	3.49	4.65
3	dic-23			4.18	4.77	3.13		4.1	4.69	2.73		4.73
1	dic-23			4.1	4.65	3.13		3.98	4.69	2.73	3.49	4.65
2	dic-23			4.14	4.69	3.13		4.1		2.7		4.73
3	dic-23			4.06	4.65	3.09		4.1		2.73	3.36	4.69





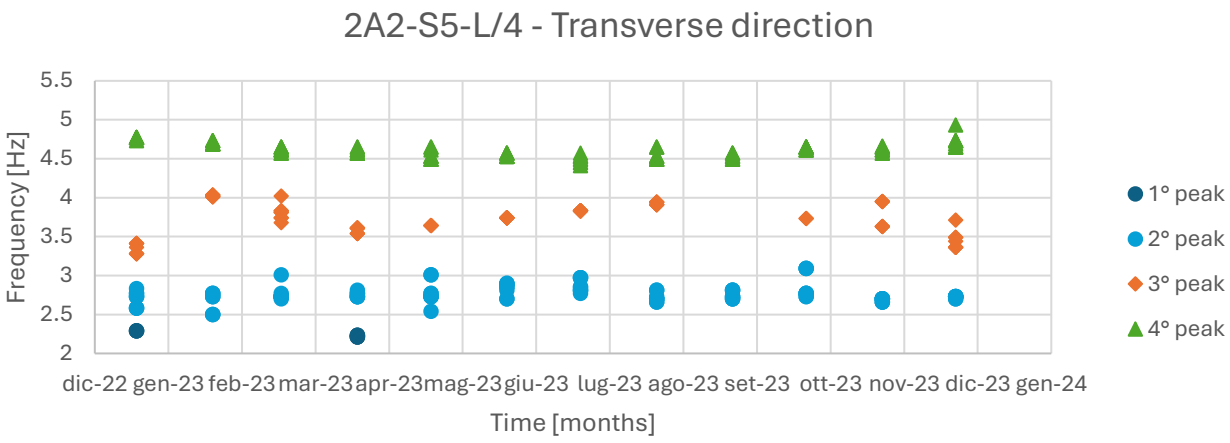


Figure 7-146: Main identified frequencies for sensor 3187F – bridge 2A2 – Sp5 – L/4

8. Annex 8 – Bridge 2A2 – Span 5 – L/8 - Sensor 2B988

The Bridge 2A2 counts 2 monitored decks: span 4 and span 5 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 4 are:

- 3099D – situated in the midspan;
- 30EB4 – situated at a distance of L/4;
- 31639 – situated at a distance of L/8;
- 30D41 – situated nearby the pilar.

The sensors present on deck number 5 are:

- 2B7E4 – situated in the midspan;
- 3187F – situated at a distance of L/4 of the deck;
- 2B988 – situated at a distance of L/8 of the deck;
- 2C1EA – situated by the pilar.

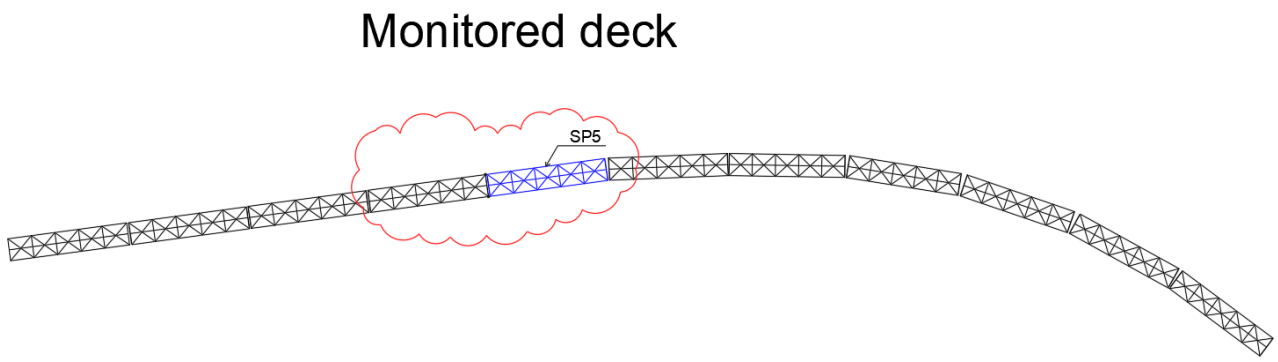


Figure 8-1 Monitored decks of 2A2 bridge

The accelerograms of the 2B988 sensor have been analyzed and the results are represented in the following paragraphs.

8.1 January

The results obtained for the January dataset are shown in the following tables.

Table 8-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-01-17_07-00-20	1.26E-03
	2°	2B988_2023-01-31_07-00-20	8.62E-04
	3°	2B988_2023-01-02_07-00-21	8.53E-04
Longitudinal direction (y)	1°	2B988_2023-01-17_07-00-20	4.87E-04
	2°	2B988_2023-01-31_07-00-20	4.19E-04
	3°	2B988_2023-01-19_13-00-20	4.04E-04
Transverse direction (z)	1°	2B988_2023-01-19_13-00-20	5.86E-04
	2°	2B988_2023-01-31_07-00-20	5.42E-04
	3°	2B988_2023-01-06_01-00-21	5.35E-04

Table -2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-01-17_07-00-20	3.44E-06	2B988_2023-01-17_07-00-20	3.54E-07
2	2B988_2023-01-31_07-00-20	1.61E-06	2B988_2023-01-31_07-00-20	1.52E-07
3	2B988_2023-01-21_07-00-20	1.25E-06	2B988_2023-01-02_07-00-21	1.32E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-01-31_07-00-20	3.30E-07	2B988_2023-01-17_07-00-20	5.07E-08
2	2B988_2023-01-17_07-00-20	2.92E-07	2B988_2023-01-31_07-00-20	3.53E-08
3	2B988_2023-01-26_07-00-20	2.51E-07	2B988_2023-01-19_13-00-20	3.32E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-01-19_13-00-20	3.95E-07	2B988_2023-01-19_13-00-20	6.60E-08
2	2B988_2023-01-16_13-00-20	2.75E-07	2B988_2023-01-31_07-00-20	6.15E-08
3	2B988_2023-01-31_07-00-20	2.31E-07	2B988_2023-01-16_13-00-20	5.79E-08

Table -2: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	B	A	D	D	D
2	B	B	B	B	A	B	B	E	B
3	C	-	C	D	-	D	-	B	E

8.1.1 Vertical direction (x)

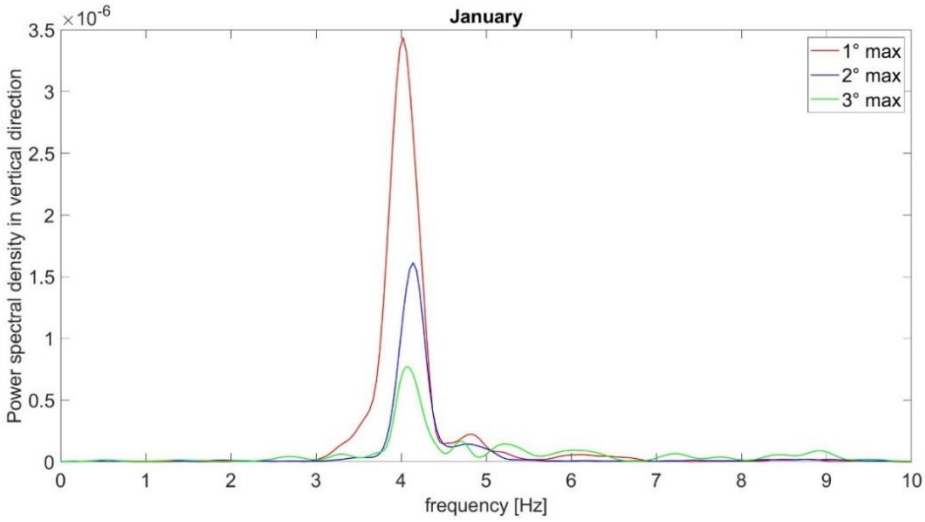


Figure 8-2: Results obtained from the 3 accelerograms with maximum SD in time domain

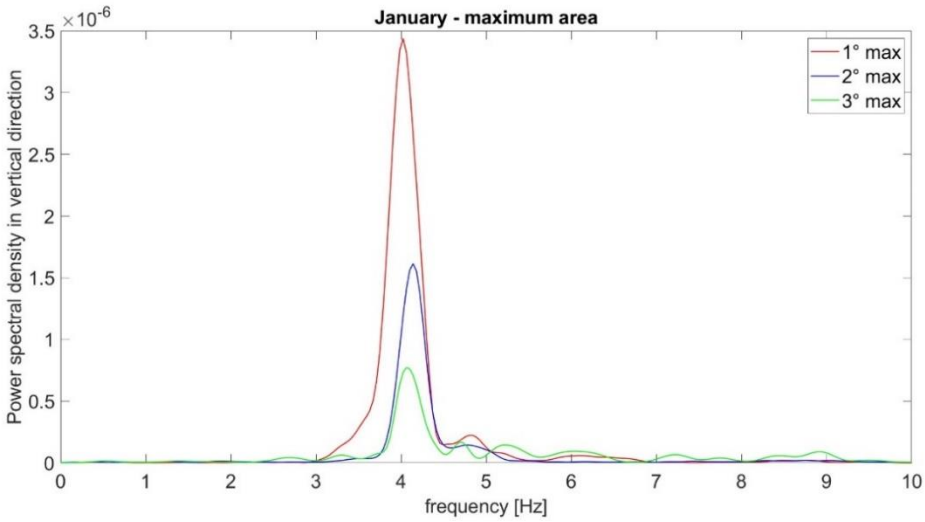


Figure 1-3: Results obtained from the 3 accelerograms with maximum area of PSD

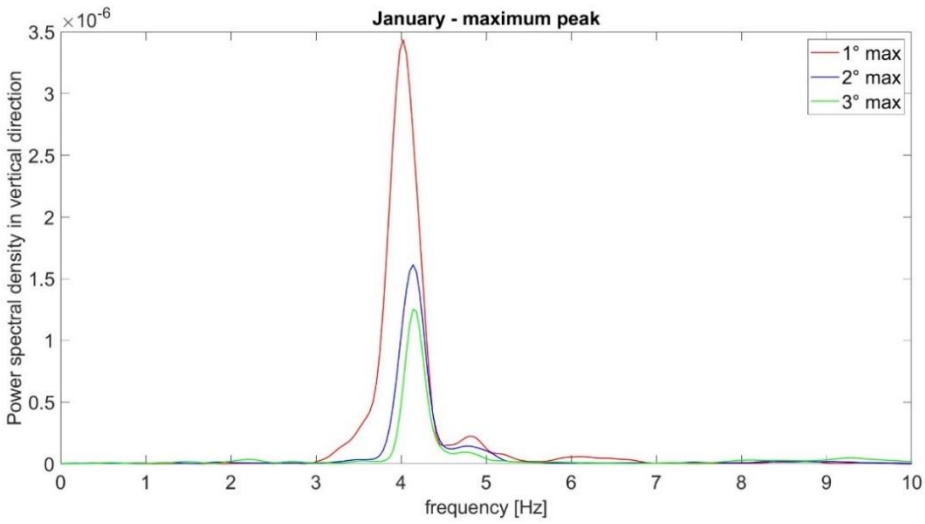


Figure 1-4: Results obtained from the 3 accelerograms with highest peak if PSD

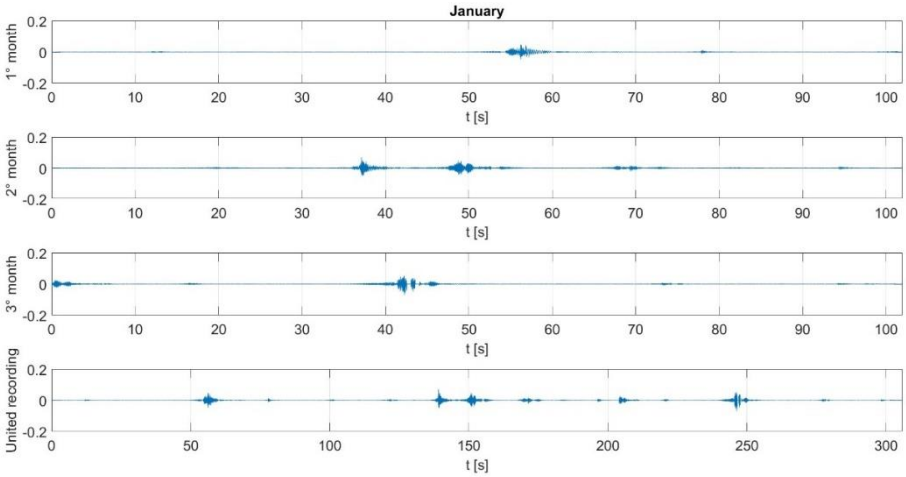


Figure 8-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.1.2 Longitudinal direction (y)

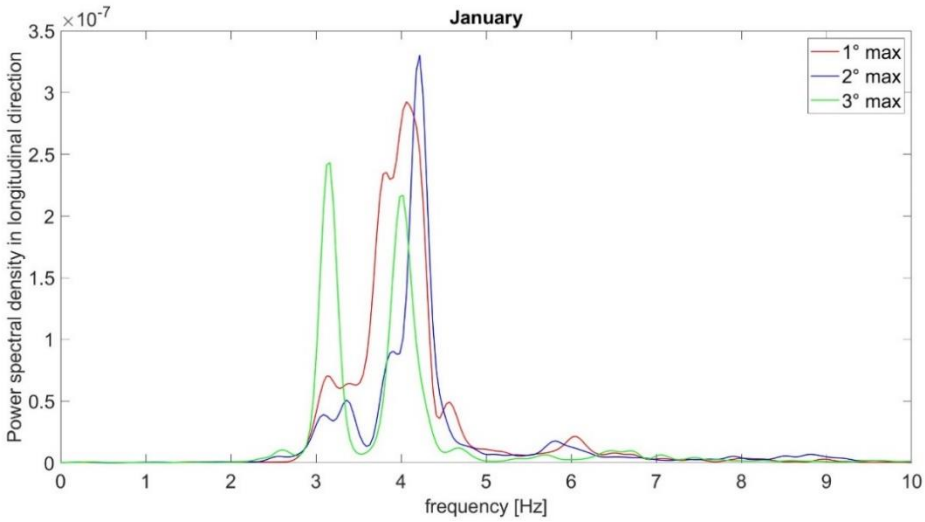


Figure 8-6: Results obtained from the 3 accelerograms with maximum SD in time domain

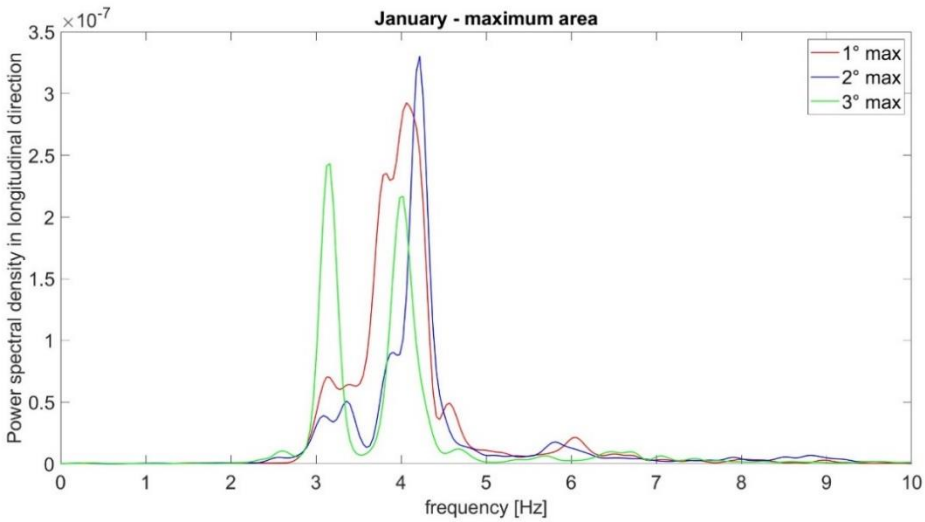


Figure 8-7: Results obtained from the 3 accelerograms with maximum area of PSD

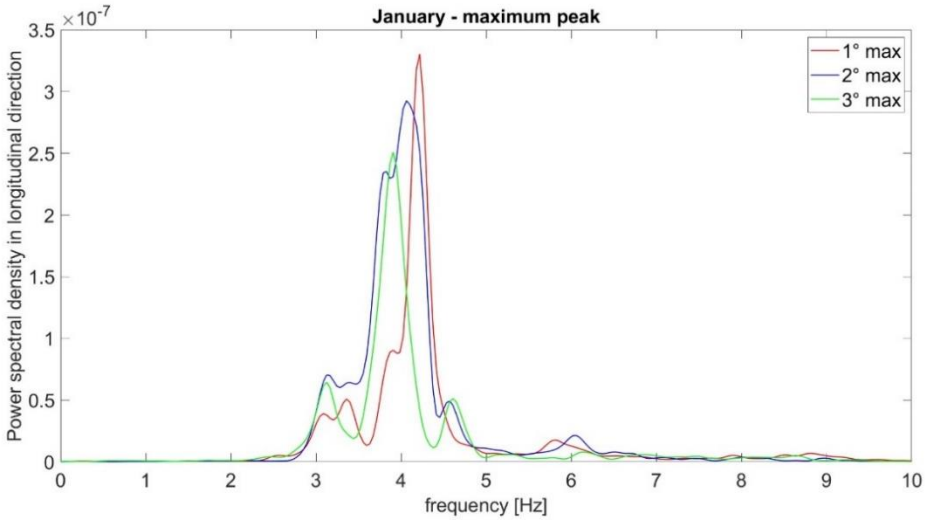


Figure 1-8: Results obtained from the 3 accelerograms with highest peak in PSD

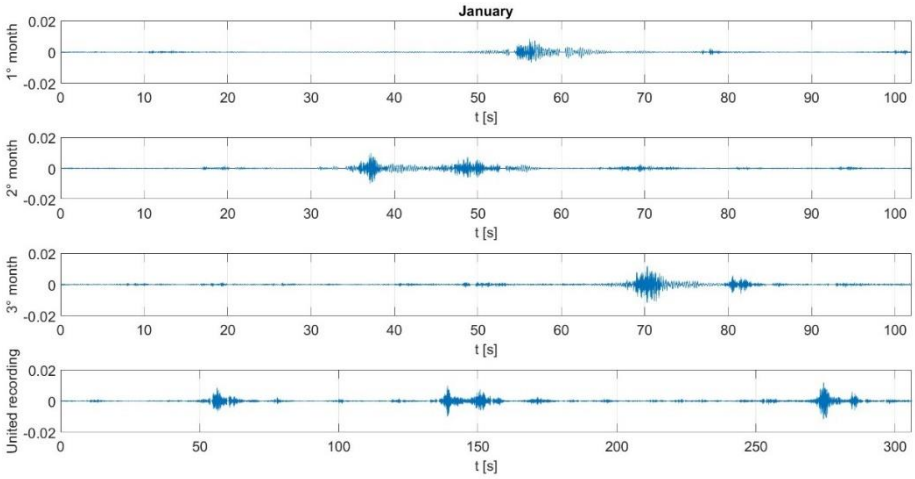


Figure 8-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.1.3 Transverse direction (z)

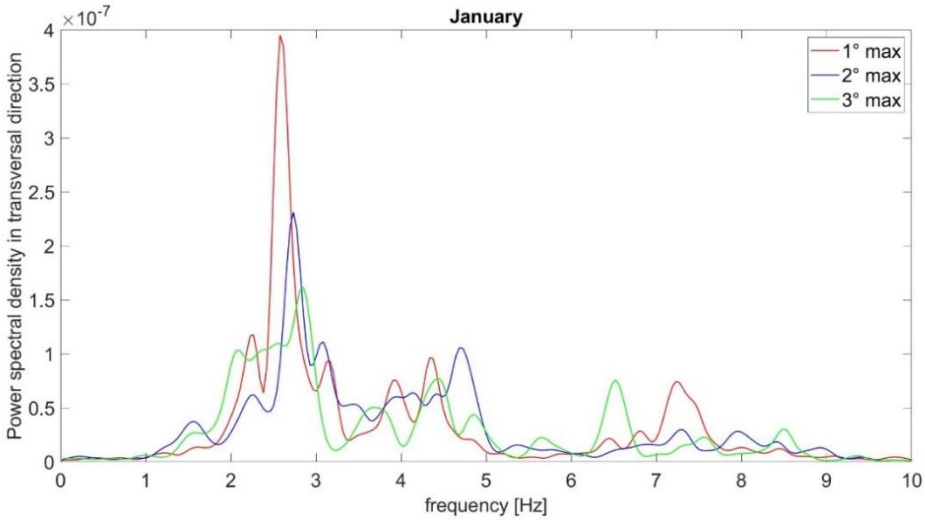


Figure 8-10: Results obtained from the 3 accelerograms with maximum SD in time domain

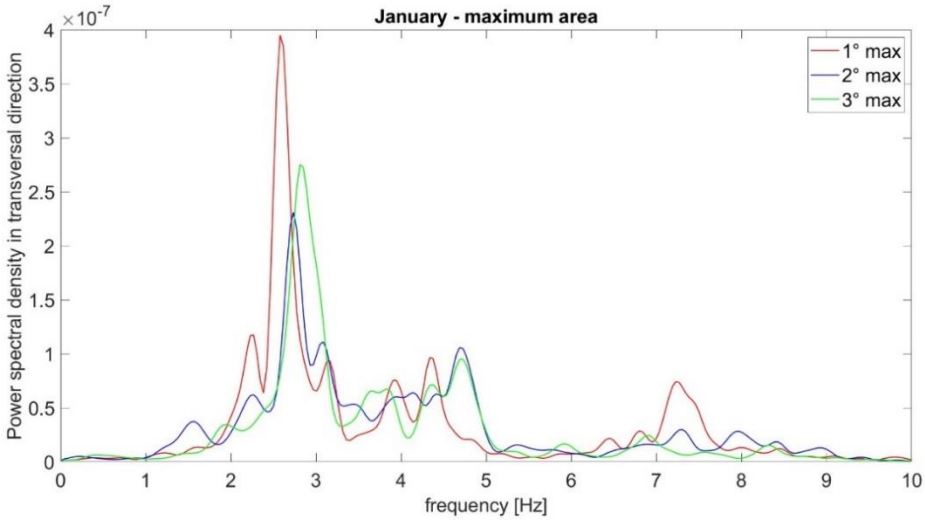


Figure 8-11: Results obtained from the 3 accelerograms with maximum area of PSD

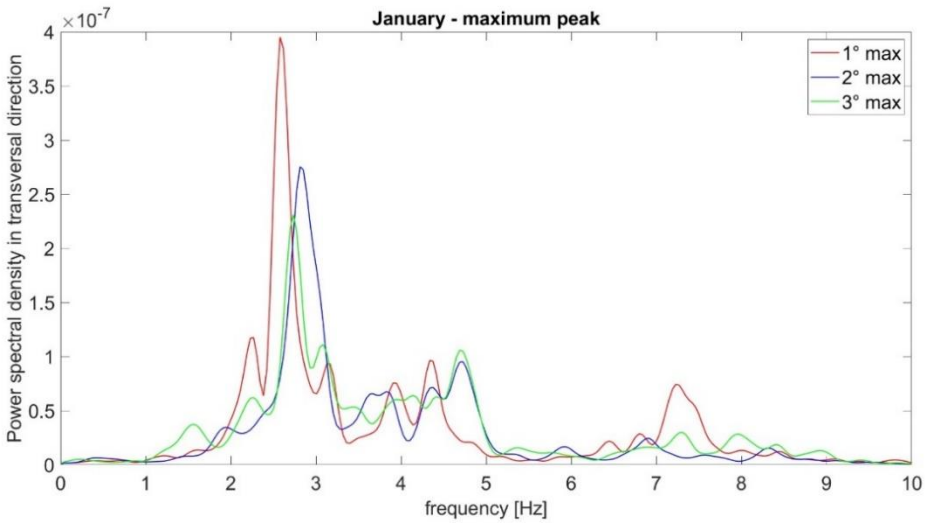


Figure 1-12: Results obtained from the 3 accelerograms with highest peak in PSD

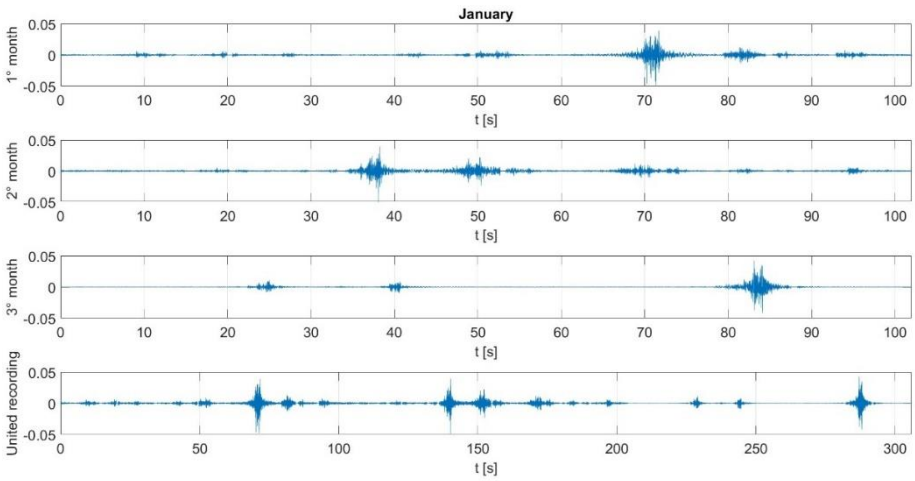


Figure 1-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

8.2 February

The results obtained for the February dataset are shown in the following tables.

Table 8-3: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-02-01_13-00-20	1.65E-03
	2°	2B988_2023-02-06_13-00-21	1.26E-03
	3°	2B988_2023-02-08_07-00-20	9.62E-04
Longitudinal direction (y)	1°	2B988_2023-02-01_13-00-20	9.55E-04
	2°	2B988_2023-02-06_13-00-21	5.50E-04
	3°	2B988_2023-02-03_13-00-20	5.18E-04
Transverse direction (z)	1°	2B988_2023-02-01_13-00-20	9.36E-04
	2°	2B988_2023-02-03_13-00-20	8.93E-04
	3°	2B988_2023-02-06_13-00-21	8.04E-04

Table 4: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-02-06_13-00-21	2.41E-06	2B988_2023-02-01_13-00-20	6.27E-07
2	2B988_2023-02-01_13-00-20	2.25E-06	2B988_2023-02-06_13-00-21	3.29E-07
3	2B988_2023-02-27_19-00-21	1.67E-06	2B988_2023-02-01_07-00-20	1.82E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-02-01_13-00-20	1.26E-06	2B988_2023-02-01_13-00-20	1.87E-07
2	2B988_2023-02-06_13-00-21	4.19E-07	2B988_2023-02-06_13-00-21	5.80E-08
3	2B988_2023-02-03_13-00-20	3.53E-07	2B988_2023-02-03_13-00-20	5.66E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-02-03_13-00-20	1.57E-06	2B988_2023-02-01_13-00-20	1.76E-07
2	2B988_2023-02-01_13-00-20	9.24E-07	2B988_2023-02-03_13-00-20	1.63E-07
3	2B988_2023-02-06_13-00-21	7.35E-07	2B988_2023-02-06_13-00-21	1.19E-07

Table 8-5: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	A	C	A
2	B	A	B	B	B	B	-	A	C
3	-	-	-	C	C	C	B	B	B

8.2.1 Vertical direction (x)

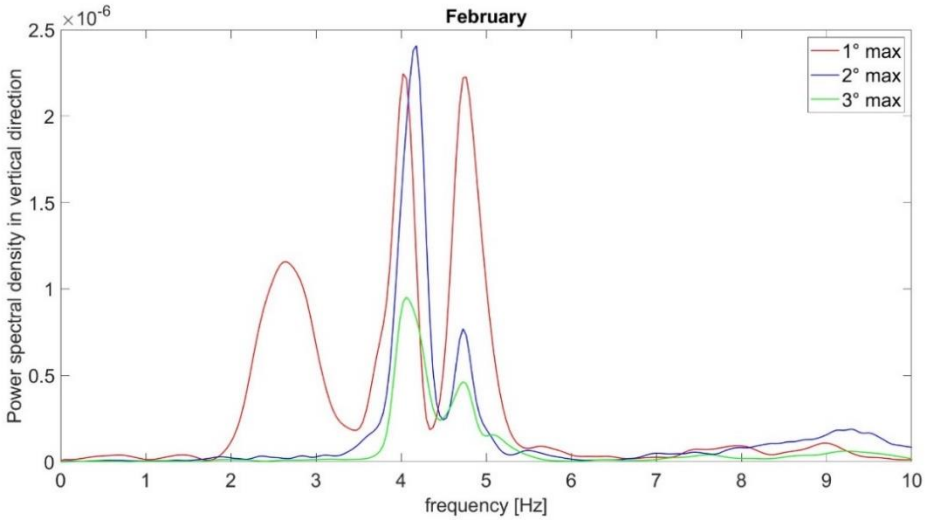


Figure 8-14: Results obtained from the 3 accelerograms with maximum SD in time domain

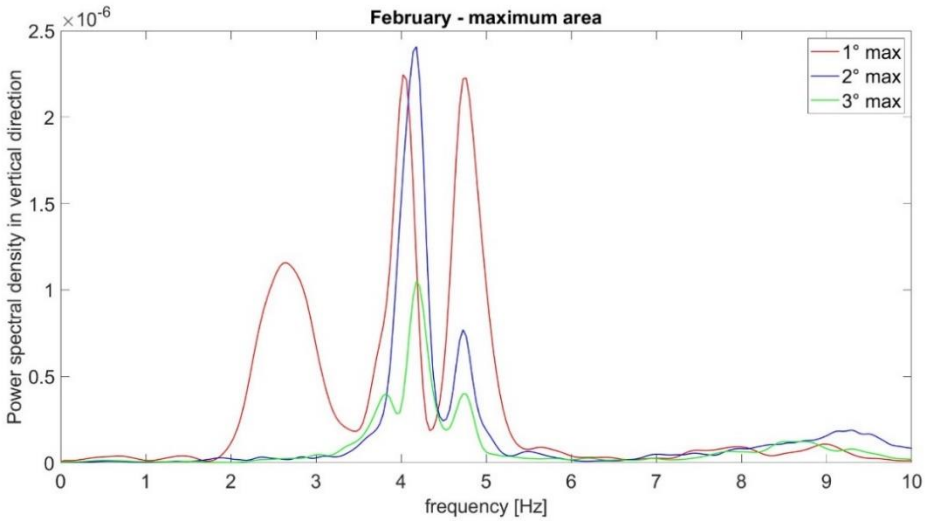


Figure 8-15: Results obtained from the 3 accelerograms with maximum area of PSD

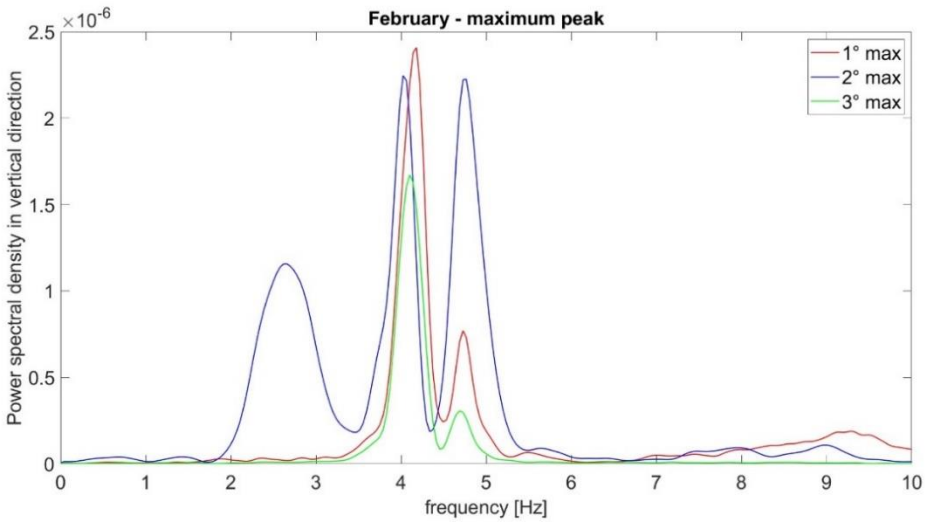


Figure 8-16: Results obtained from the 3 accelerograms with highest peak if PSD

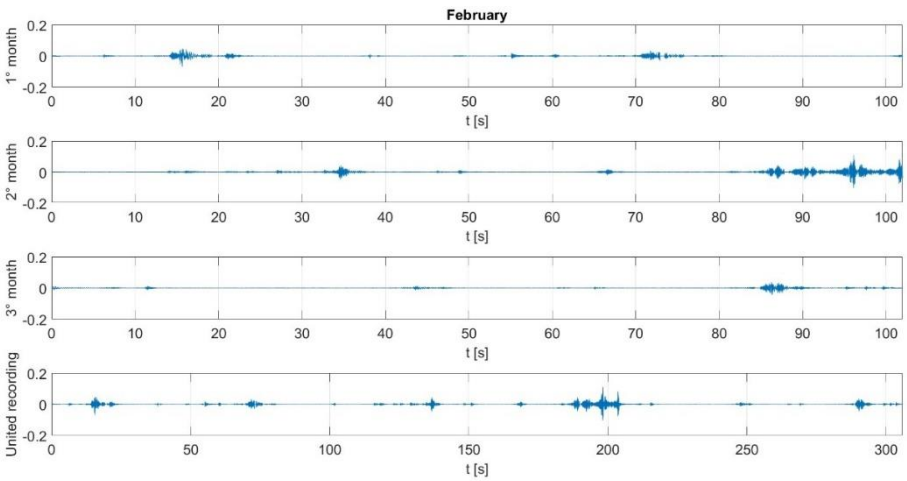


Figure 8-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.2.2 Longitudinal direction (y)

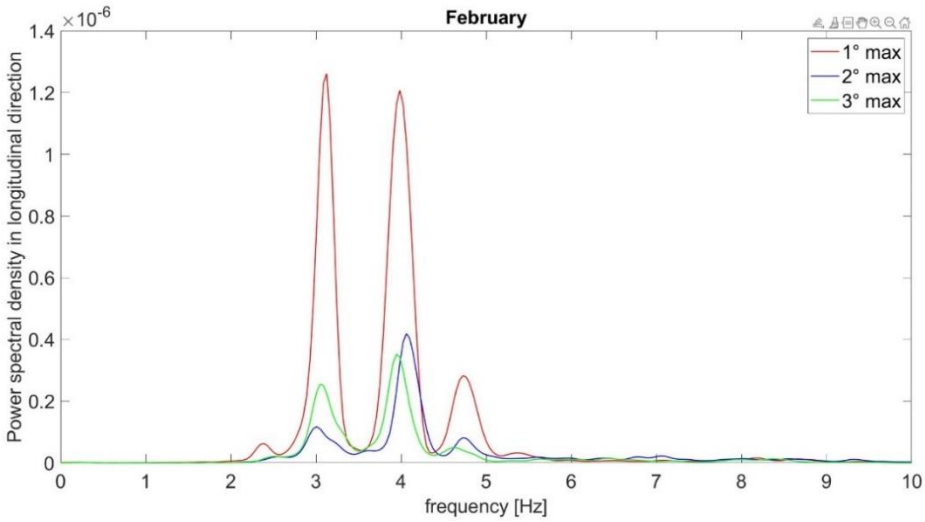


Figure 8-18: Results obtained from the 3 accelerograms with maximum SD in time domain

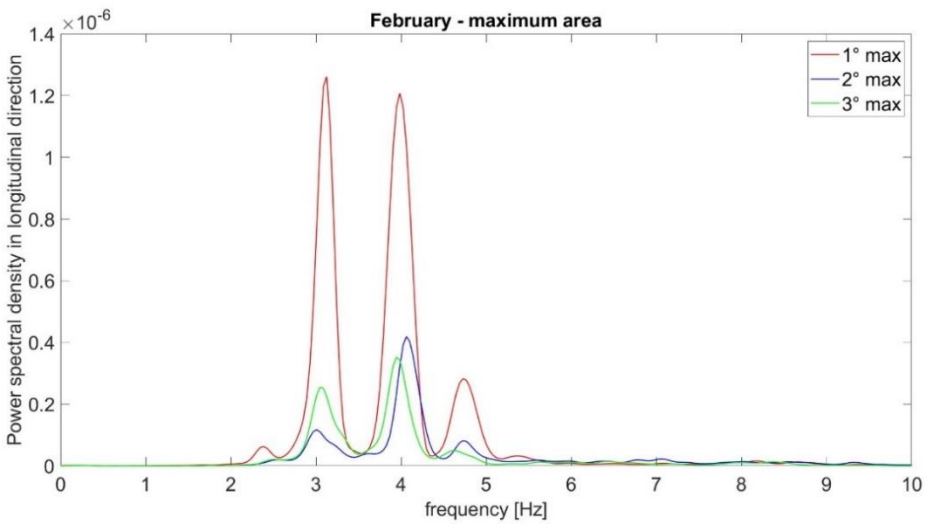


Figure 1-19: Results obtained from the 3 accelerograms with maximum area of PSD

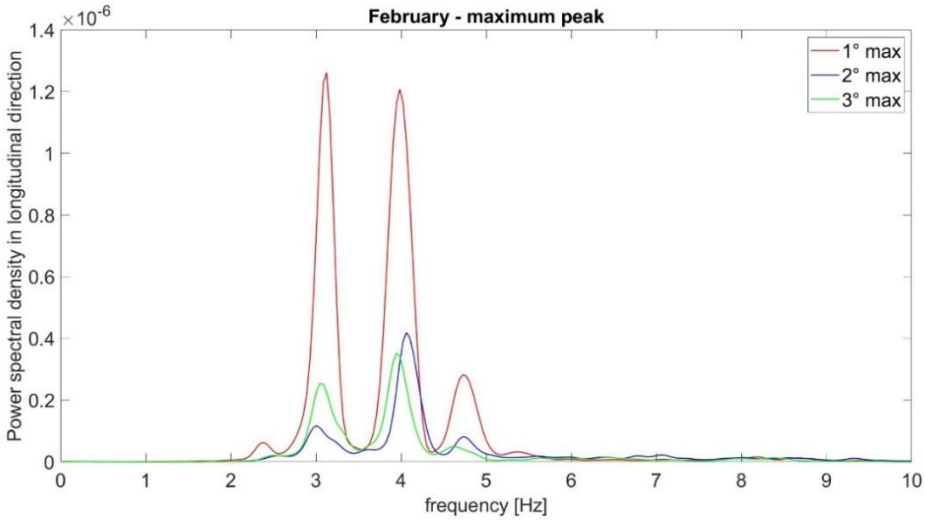


Figure 8-20: Results obtained from the 3 accelerograms with highest peak if PSD

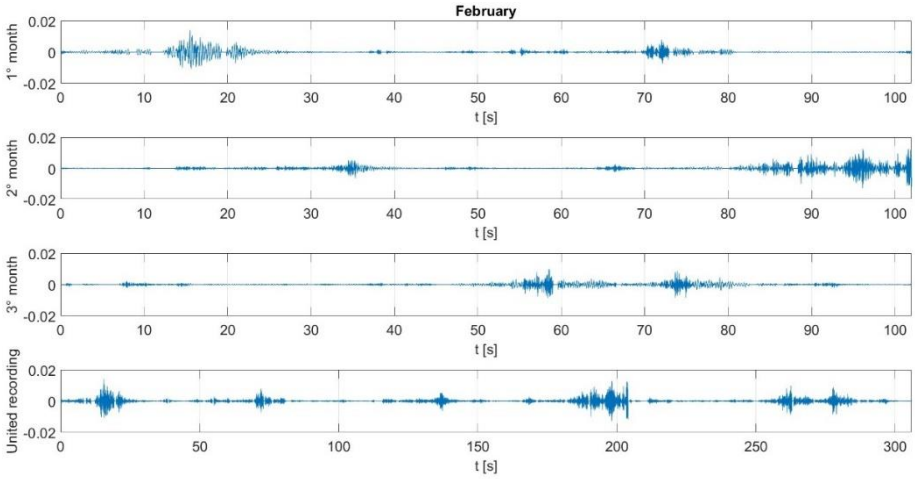


Figure 1-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.2.3 Transverse direction (z)

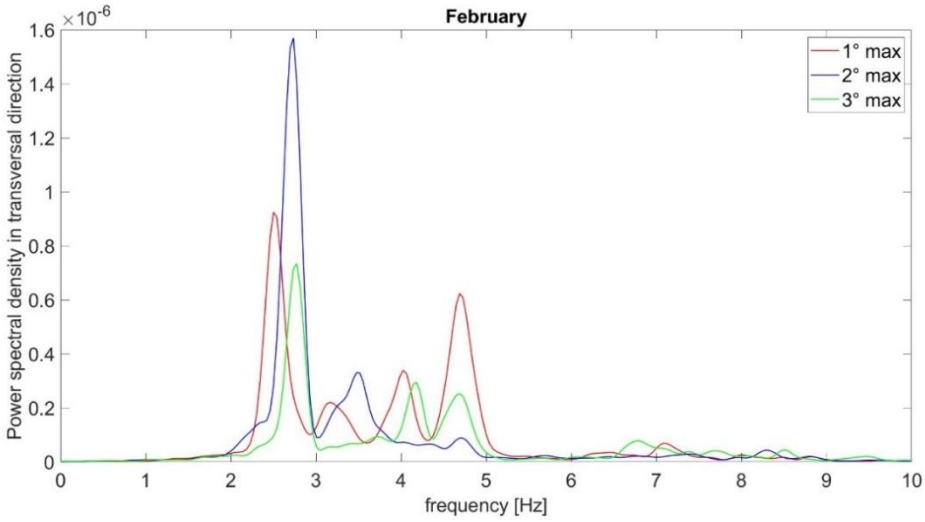


Figure 1-22: Results obtained from the 3 accelerograms with maximum SD in time domain

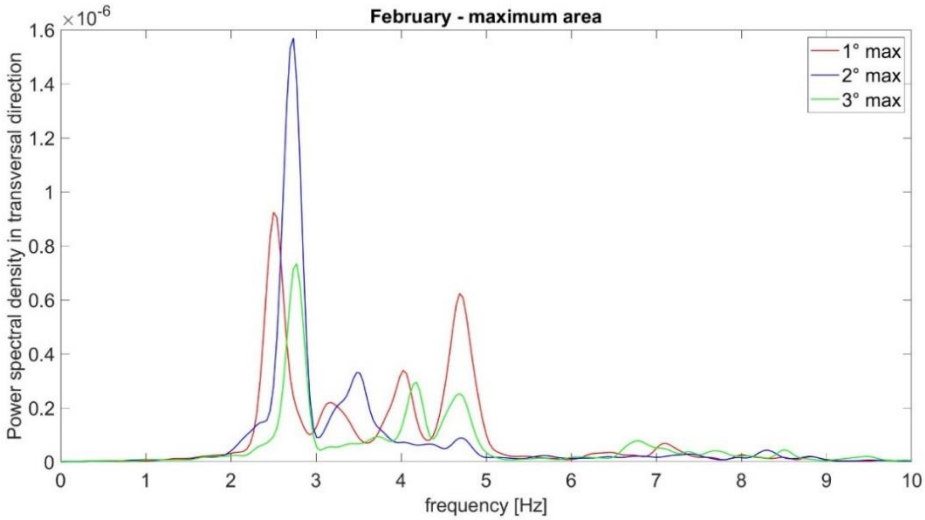


Figure 1-23: Results obtained from the 3 accelerograms with maximum area of PSD

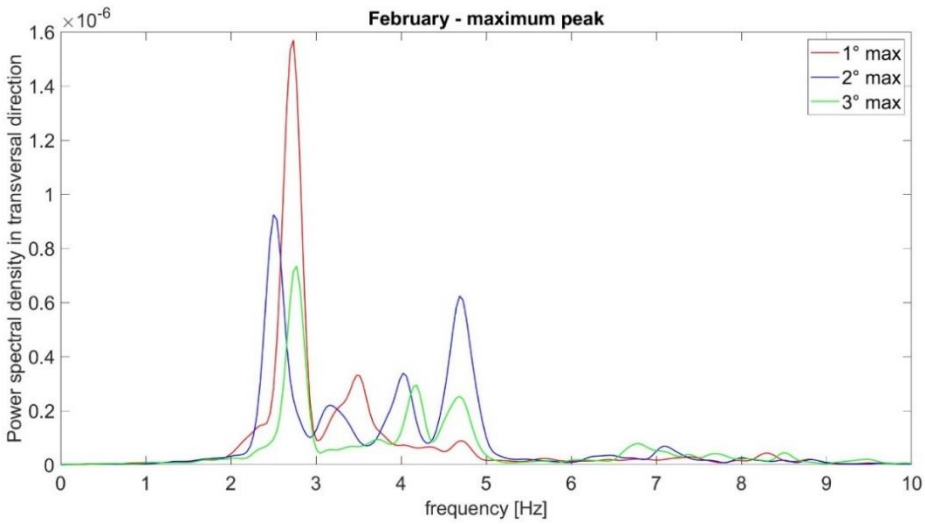


Figure 8-24: Results obtained from the 3 accelerograms with highest peak if PSD

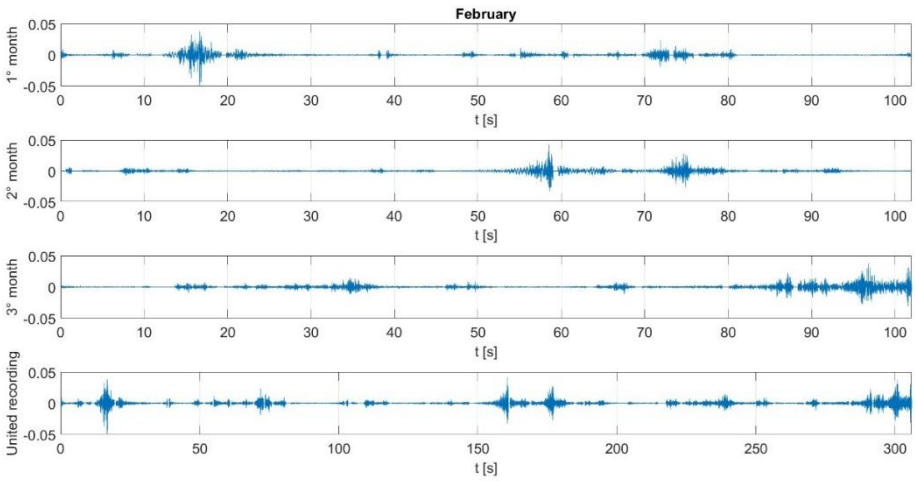


Figure 1-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

8.3 March

The results obtained for the March dataset are shown in the following tables.

Table 8-6: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-03-16_13-00-20	2.13E-03
	2°	2B988_2023-03-04_13-00-20	1.69E-03
	3°	2B988_2023-03-08_13-00-22	1.59E-03
Longitudinal direction (y)	1°	2B988_2023-03-04_13-00-20	1.73E-03
	2°	2B988_2023-03-16_13-00-20	1.23E-03
	3°	2B988_2023-03-08_13-00-22	1.02E-03
Transverse direction (z)	1°	2B988_2023-03-16_13-00-20	1.19E-03
	2°	2B988_2023-03-08_13-00-22	9.43E-04
	3°	2B988_2023-03-15_07-00-21	9.03E-04

Table-7: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-03-08_13-00-22	3.95E-06	2B988_2023-03-16_13-00-20	9.79E-07
2	2B988_2023-03-16_13-00-20	3.85E-06	2B988_2023-03-04_13-00-20	4.96E-07
3	2B988_2023-03-15_07-00-21	2.59E-06	2B988_2023-03-08_13-00-22	4.53E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-03-04_13-00-20	8.14E-06	2B988_2023-03-04_13-00-20	6.11E-07
2	2B988_2023-03-16_13-00-20	2.31E-06	2B988_2023-03-16_13-00-20	3.12E-07
3	2B988_2023-03-08_13-00-22	2.29E-06	2B988_2023-03-08_13-00-22	2.13E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-03-20_07-00-21	1.09E-06	2B988_2023-03-16_13-00-20	2.93E-07
2	2B988_2023-03-15_07-00-21	1.01E-06	2B988_2023-03-08_13-00-22	1.81E-07
3	2B988_2023-03-23_07-00-21	9.37E-07	2B988_2023-03-15_07-00-21	1.64E-07

Table -8: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	B	B	B	A	-	A
2	B	A	B	A	A	A	C	D	C
3	C	-	C	C	C	C	D	-	D

8.3.1 Vertical direction (x)

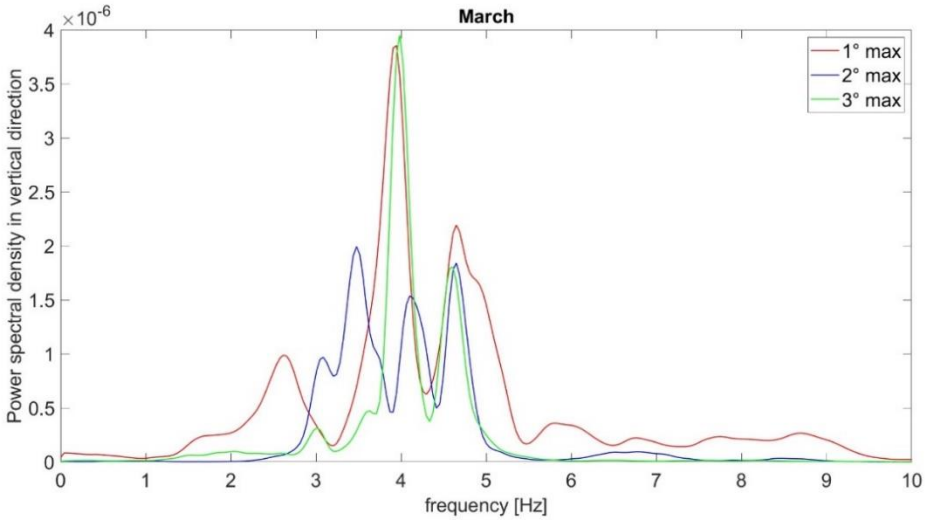


Figure 1-26: Results obtained from the 3 accelerograms with maximum SD in time domain

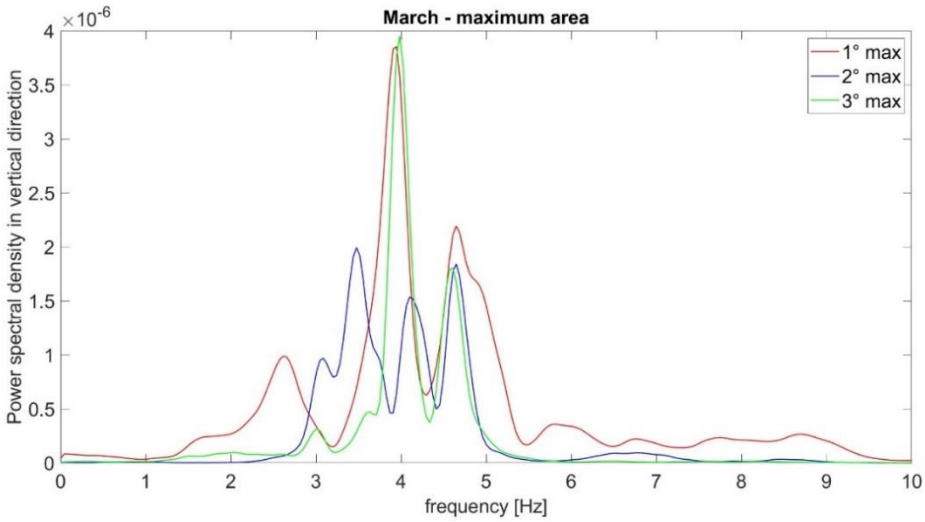


Figure 8-27: Results obtained from the 3 accelerograms with maximum area of PSD

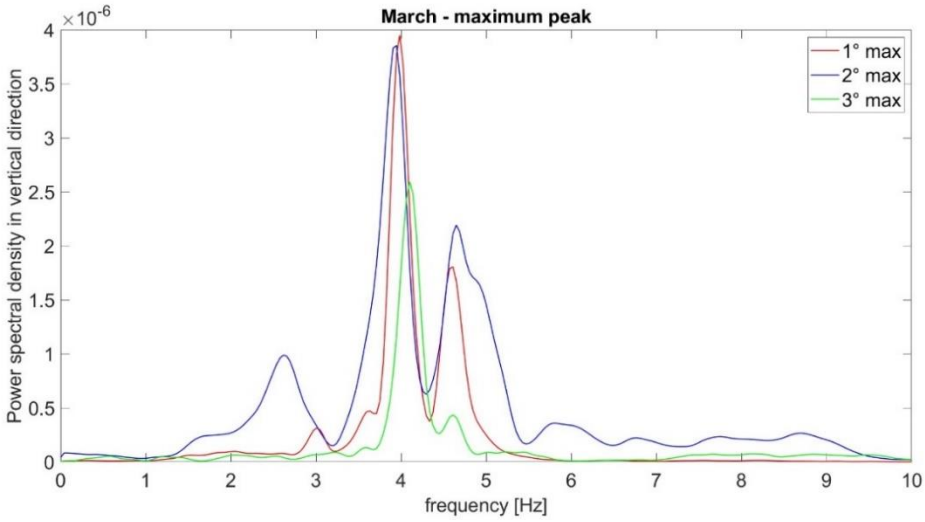


Figure 1-28: Results obtained from the 3 accelerograms with highest peak if PSD

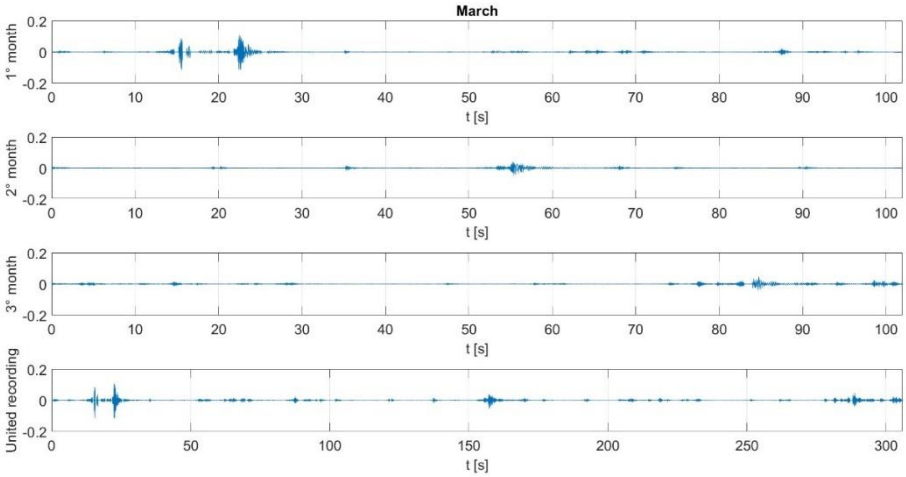


Figure 8-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.3.2 Longitudinal direction (y)

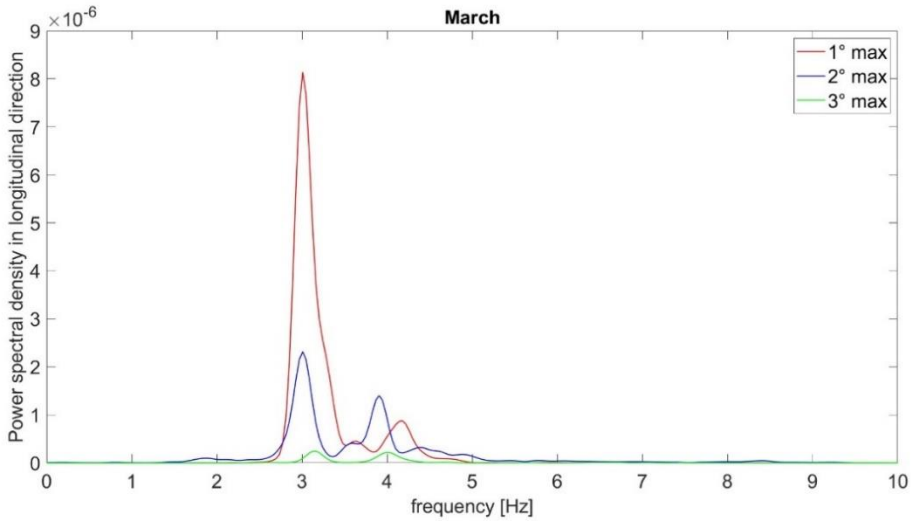


Figure 1-30: Results obtained from the 3 accelerograms with maximum SD in time domain

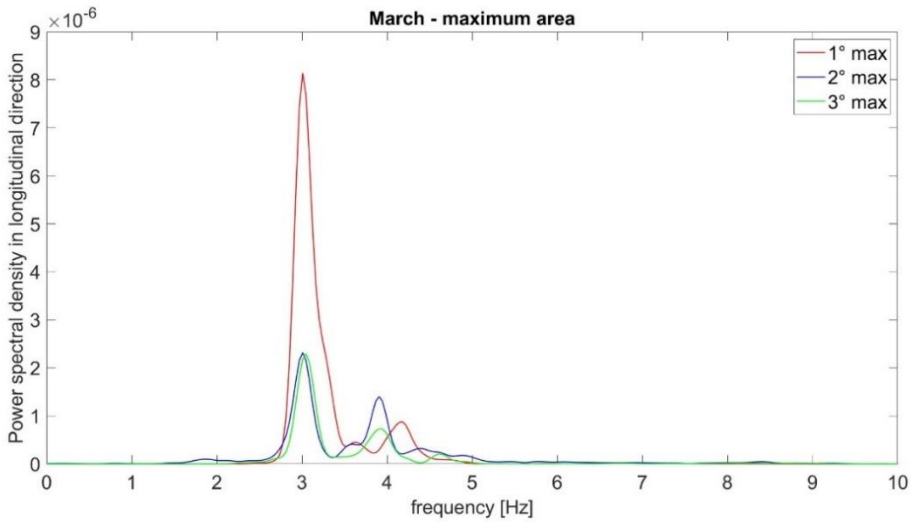


Figure 1-31: Results obtained from the 3 accelerograms with maximum area of PSD

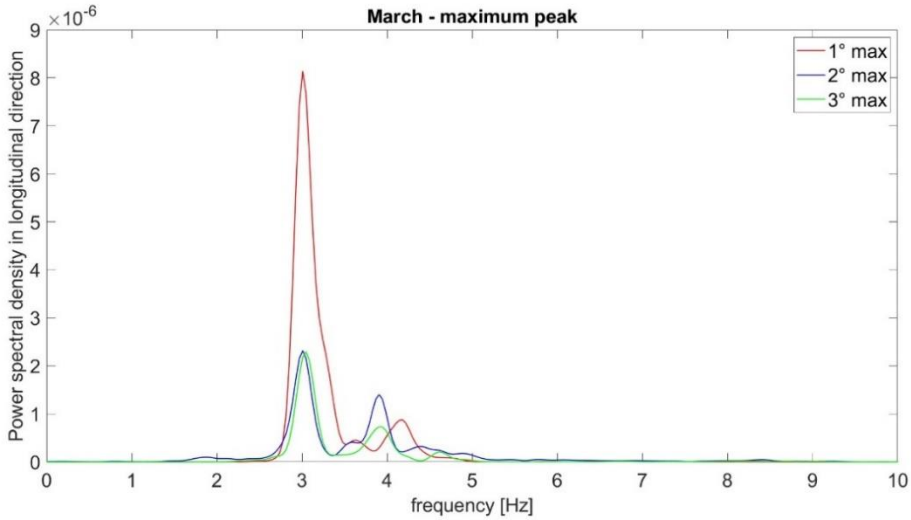


Figure 1-32: Results obtained from the 3 accelerograms with highest peak if PSD

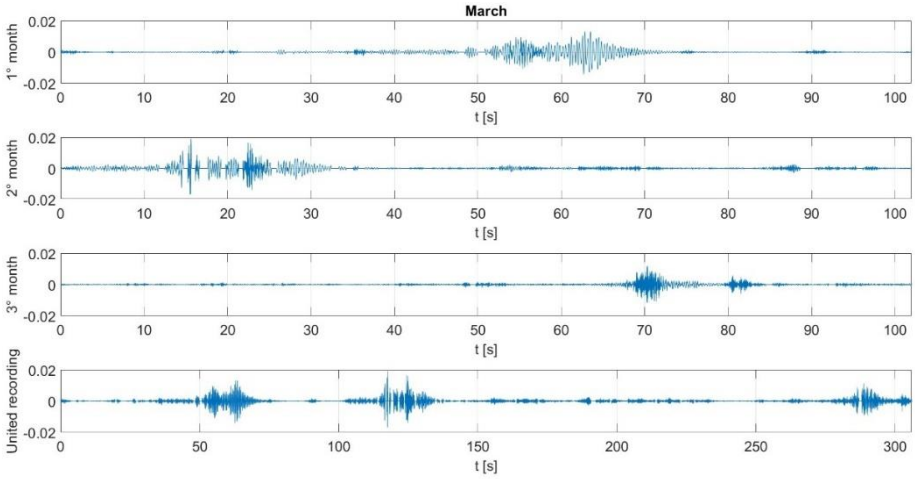


Figure 8-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.3.3 Transverse direction (z)

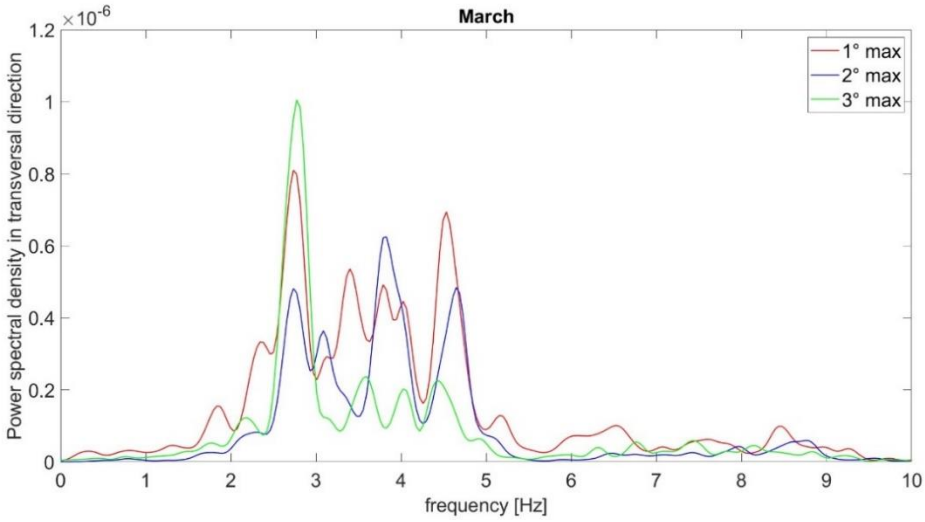


Figure 1-34: Results obtained from the 3 accelerograms with maximum SD in time domain

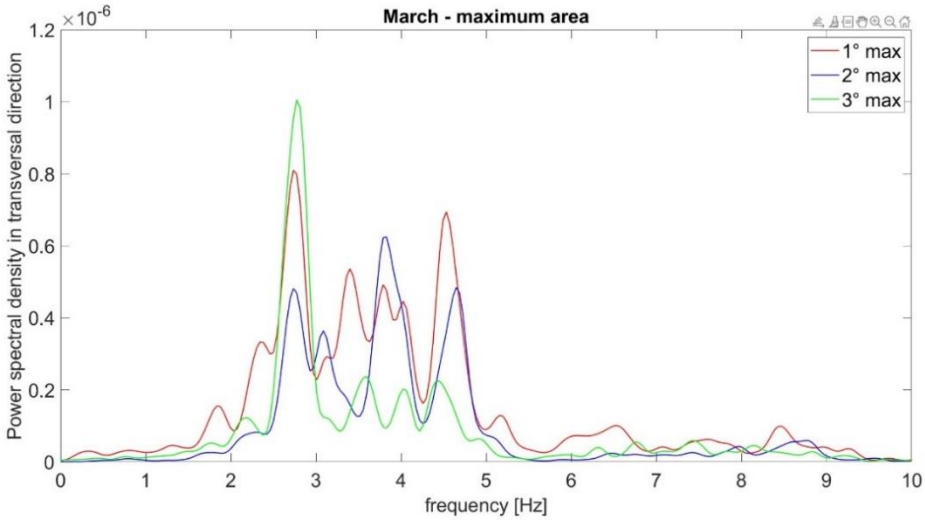


Figure 1-35: Results obtained from the 3 accelerograms with maximum area of PSD

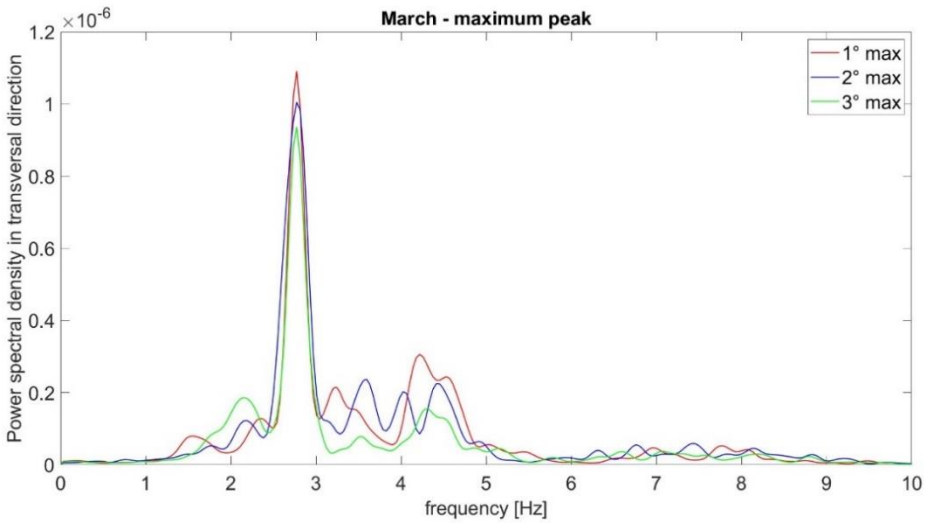


Figure 8-36: Results obtained from the 3 accelerograms with highest peak if PSD

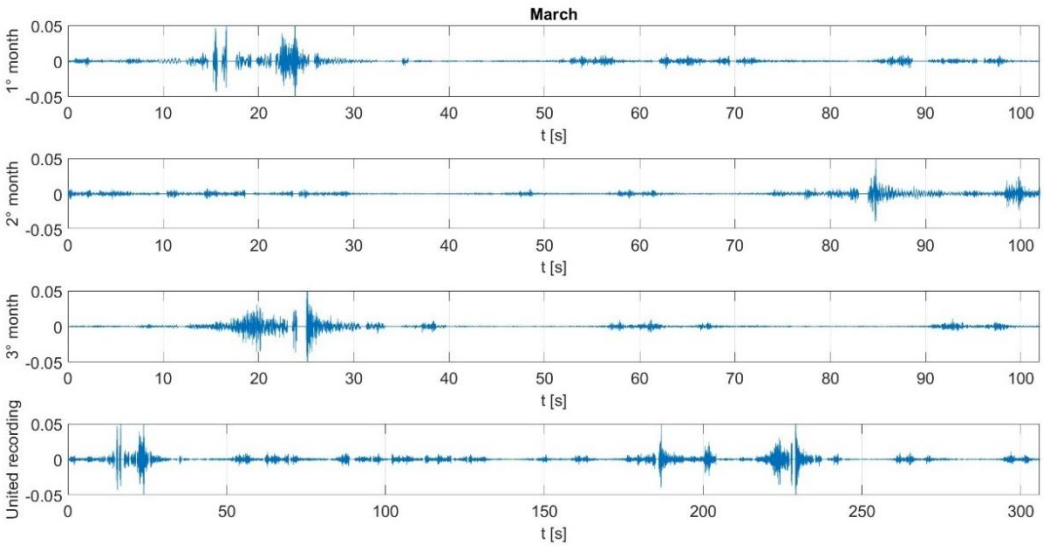


Figure 8-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

8.4 April

The results obtained for the April dataset are shown in the following tables.

Table 9: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-04-14_08-00-20	1.40E-03
	2°	2B988_2023-04-11_08-00-21	1.31E-03
	3°	2B988_2023-04-20_08-00-20	1.24E-03
Longitudinal direction (y)	1°	2B988_2023-04-07_08-00-21	5.46E-04
	2°	2B988_2023-04-14_08-00-20	5.25E-04
	3°	2B988_2023-04-18_14-00-21	5.01E-04
Transverse direction (z)	1°	2B988_2023-04-06_20-00-20	8.30E-04
	2°	2B988_2023-04-12_08-00-21	8.03E-04
	3°	2B988_2023-04-20_08-00-20	7.89E-04

Table 10: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-04-14_08-00-20	3.62E-06	2B988_2023-04-14_08-00-20	3.81E-07
2	2B988_2023-04-18_14-00-21	2.31E-06	2B988_2023-04-20_08-00-20	3.35E-07
3	2B988_2023-04-07_08-00-21	1.93E-06	2B988_2023-04-18_14-00-21	3.27E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-04-07_08-00-21	4.92E-07	2B988_2023-04-07_08-00-21	6.04E-08
2	2B988_2023-04-18_14-00-21	4.67E-07	2B988_2023-04-14_08-00-20	5.40E-08
3	2B988_2023-04-21_08-00-20	3.84E-07	2B988_2023-04-18_14-00-21	5.39E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-04-20_08-00-20	8.32E-07	2B988_2023-04-06_20-00-20	1.35E-07
2	2B988_2023-04-06_20-00-20	7.53E-07	2B988_2023-04-07_08-00-21	1.32E-07
3	2B988_2023-04-07_08-00-21	7.07E-07	2B988_2023-04-20_08-00-20	1.27E-07

Table -11: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	E	B	E
2	-	C	B	A	C	A	-	E	D
3	B	-	C	C	-	C	B	D	B

8.4.1 Vertical direction (x)

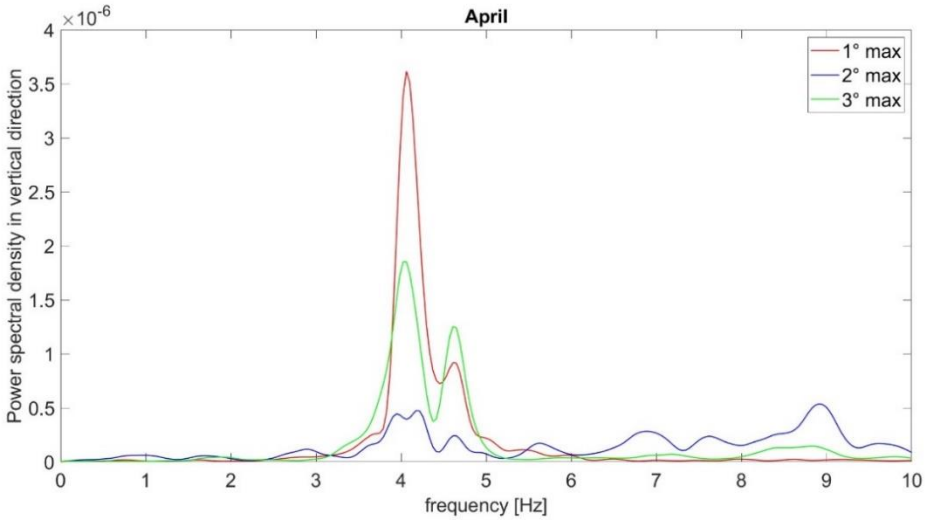


Figure 1-38: Results obtained from the 3 accelerograms with maximum SD in time domain

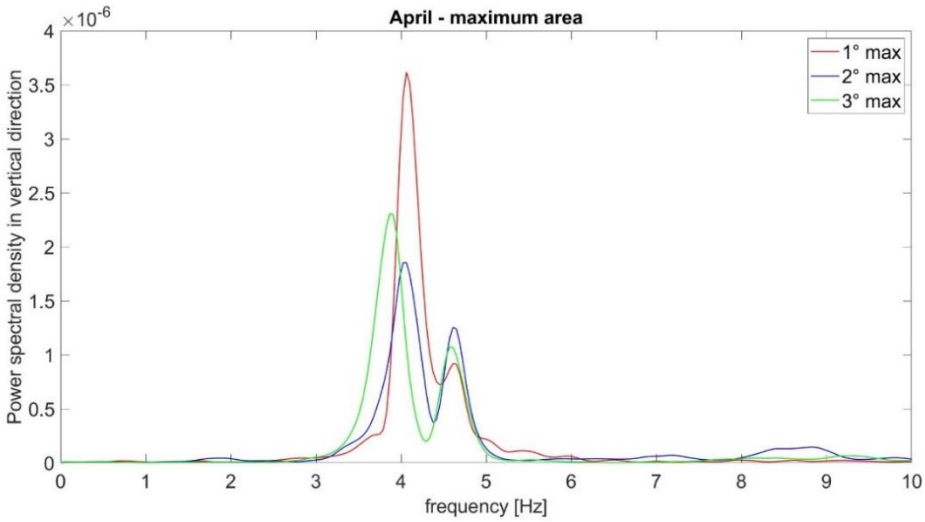


Figure1-39: Results obtained from the 3 accelerograms with maximum area of PSD

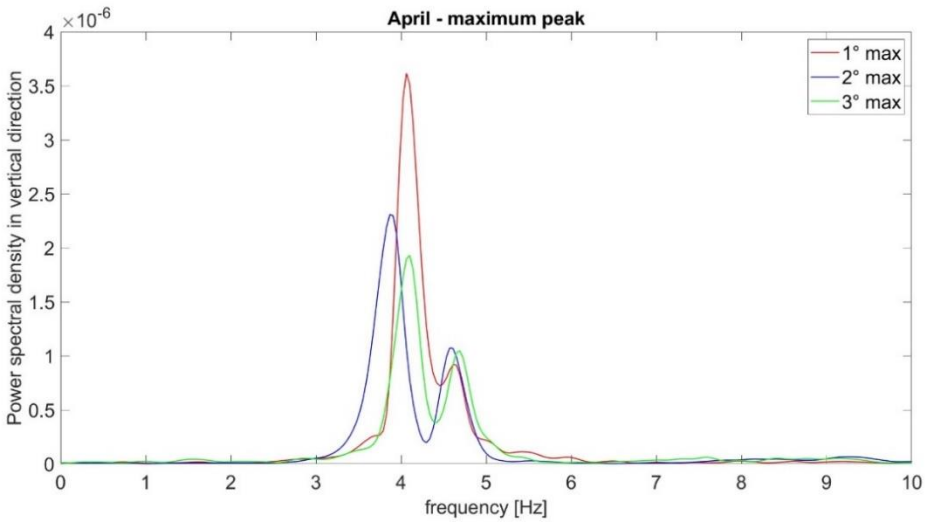


Figure 1-40: Results obtained from the 3 accelerograms with highest peak if PSD

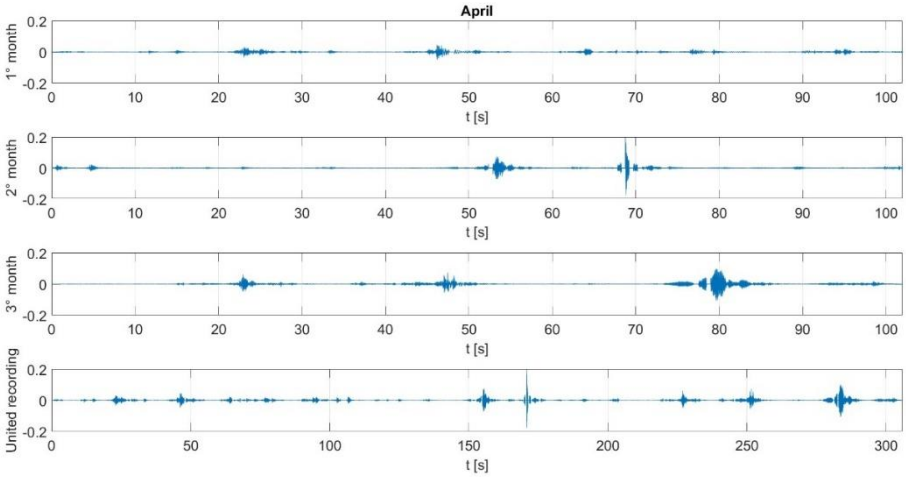


Figure 8-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.4.2 Longitudinal direction (y)

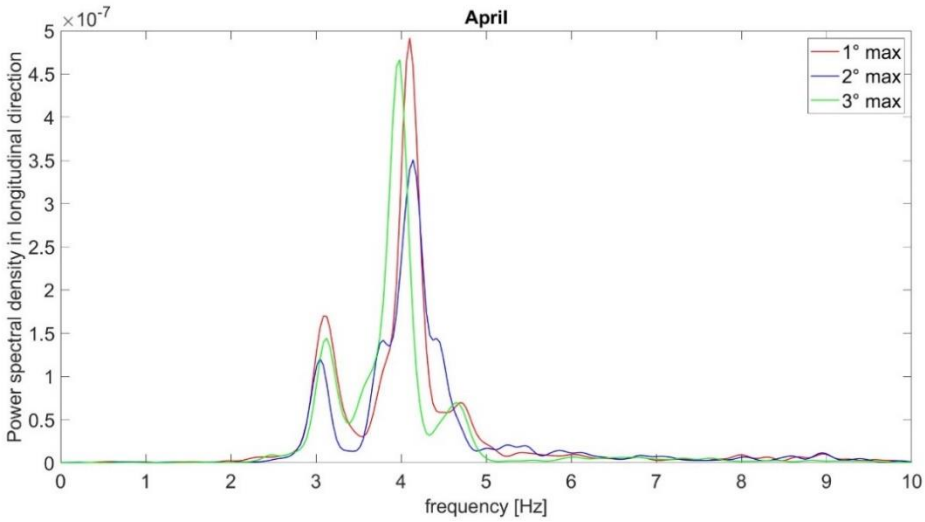


Figure 1-42: Results obtained from the 3 accelerograms with maximum SD in time domain

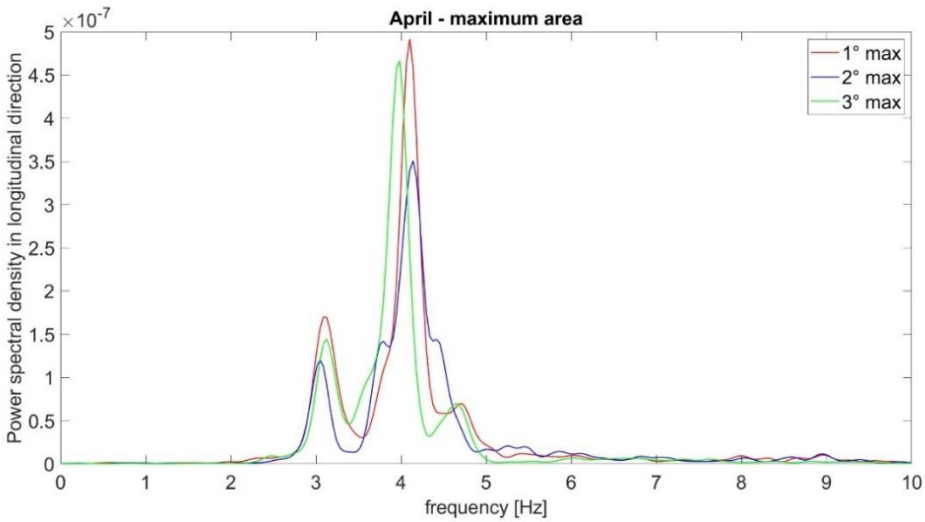


Figure 1-43: Results obtained from the 3 accelerograms with maximum area of PSD

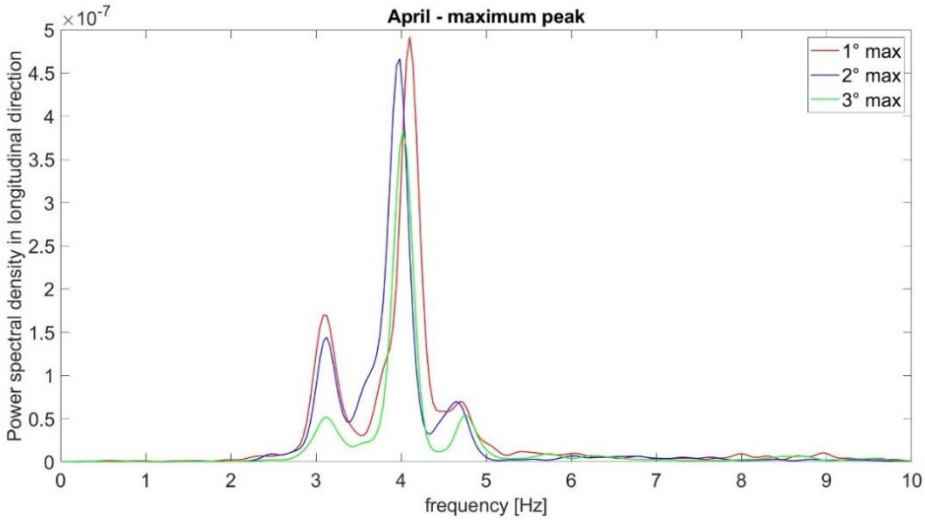


Figure 1-44: Results obtained from the 3 accelerograms with highest peak if PSD

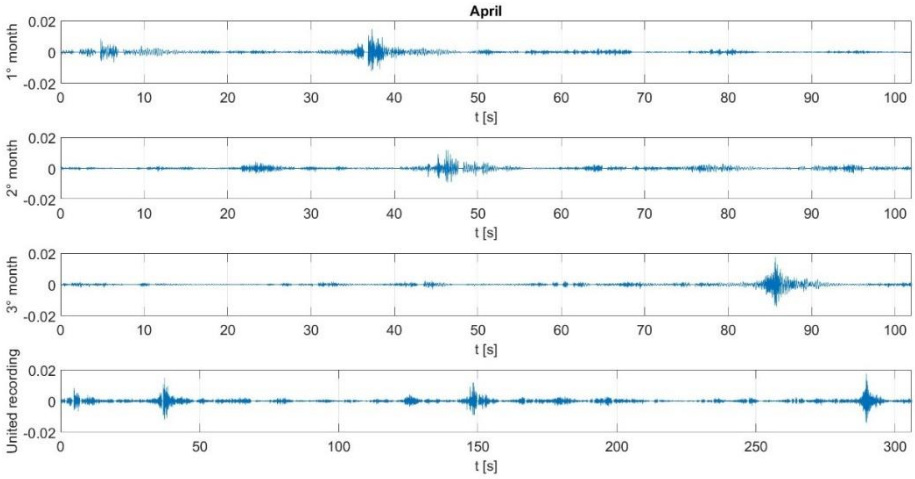


Figure 1-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.4.3 Transverse direction (z)

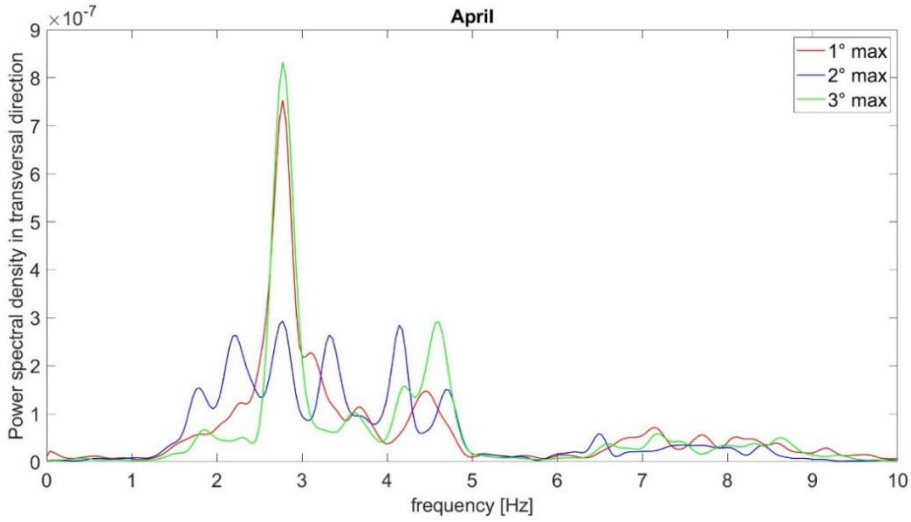


Figure 1-46: Results obtained from the 3 accelerograms with maximum SD in time domain

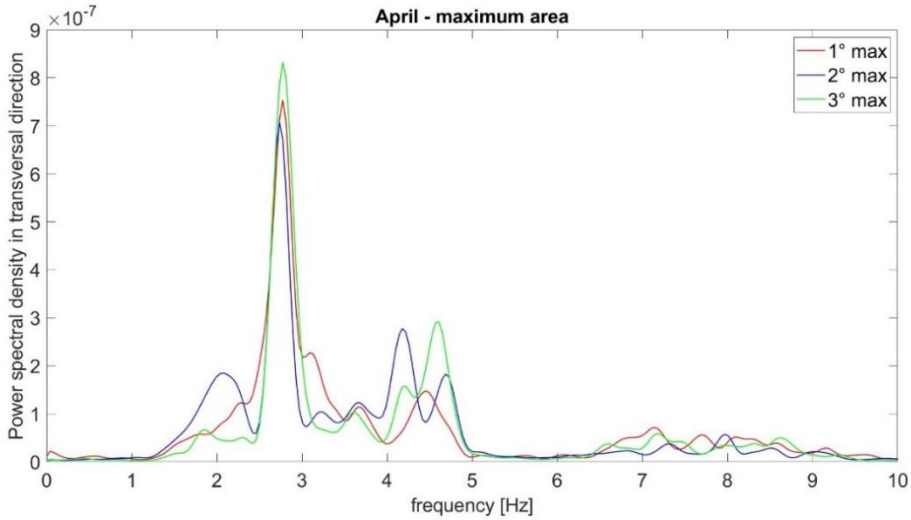


Figure 1-47: Results obtained from the 3 accelerograms with maximum area of PSD

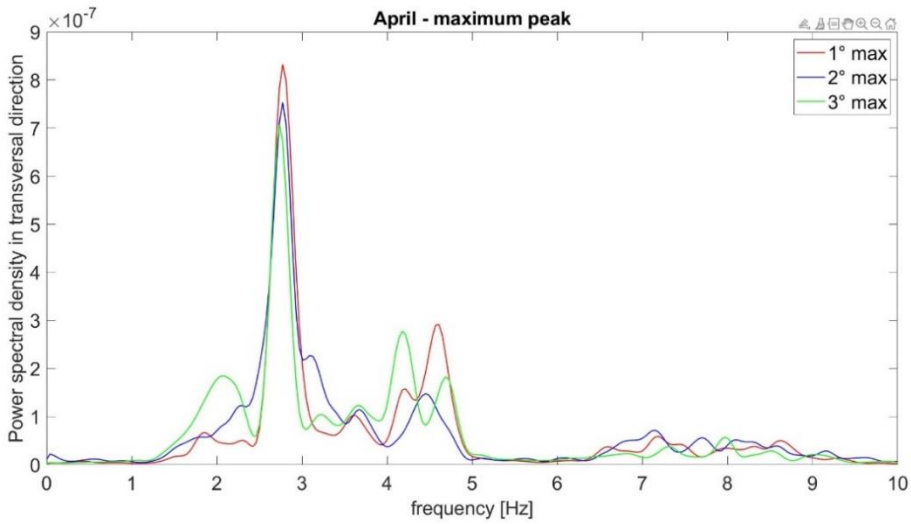


Figure 1-48: Results obtained from the 3 accelerograms with highest peak if PSD

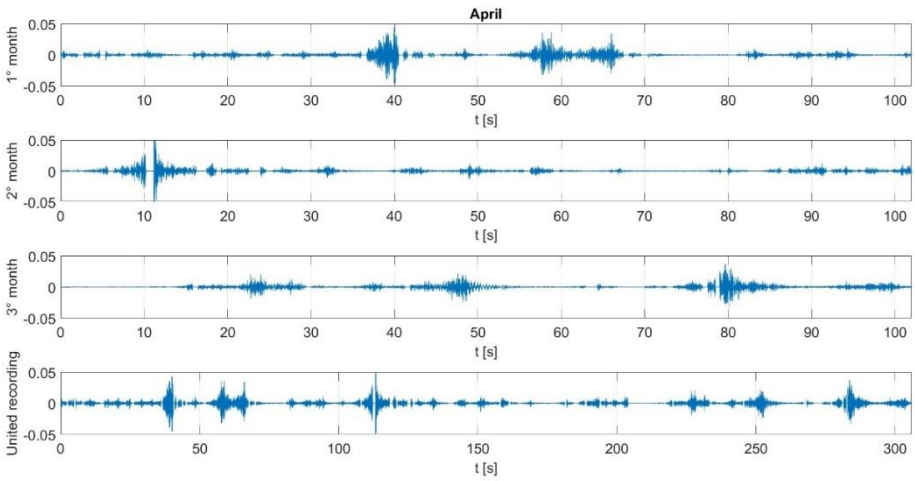


Figure 1-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

8.5 May

The results obtained for the May dataset are shown in the following tables.

Table 12: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-05-23_14-00-21	2.18E-03
	2°	2B988_2023-05-04_14-00-20	1.89E-03
	3°	2B988_2023-05-15_14-00-21	1.13E-03
Longitudinal direction (y)	1°	2B988_2023-05-19_14-00-21	1.31E-03
	2°	2B988_2023-05-23_14-00-21	8.23E-04
	3°	2B988_2023-05-04_14-00-20	6.78E-04
Transverse direction (z)	1°	2B988_2023-05-23_14-00-21	1.25E-03
	2°	2B988_2023-05-04_14-00-20	8.31E-04
	3°	2B988_2023-05-09_14-00-21	6.91E-04

Table -13: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-05-23_14-00-21	6.90E-06	2B988_2023-05-23_14-00-21	1.01E-06
2	2B988_2023-05-04_14-00-20	4.92E-06	2B988_2023-05-04_14-00-20	7.25E-07
3	2B988_2023-05-08_14-00-21	1.65E-06	2B988_2023-05-09_14-00-21	2.61E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-05-19_14-00-21	2.79E-06	2B988_2023-05-19_14-00-21	1.41E-07
2	2B988_2023-05-23_14-00-21	5.13E-07	2B988_2023-05-23_14-00-21	1.37E-07
3	2B988_2023-05-04_14-00-20	3.80E-07	2B988_2023-05-04_14-00-20	9.44E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-05-23_14-00-21	1.69E-06	2B988_2023-05-23_14-00-21	3.36E-07
2	2B988_2023-05-04_14-00-20	1.03E-06	2B988_2023-05-04_14-00-20	1.50E-07
3	2B988_2023-05-19_14-00-21	7.00E-07	2B988_2023-05-09_14-00-21	9.79E-08

Table -14: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	C	C	A	A	A
2	B	B	B	A	A	A	-	B	B
3	-	-	-	B	B	B	D	-	D

8.5.1 Vertical direction (x)

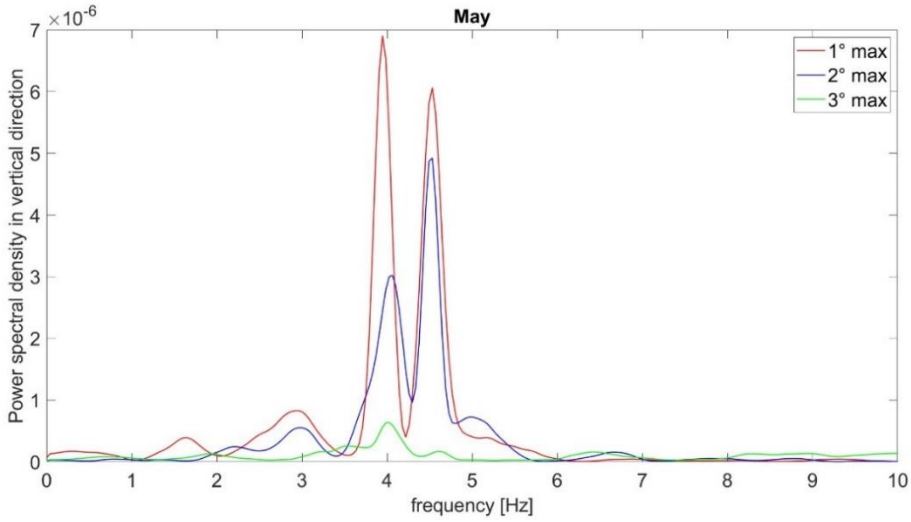


Figure 1-50: Results obtained from the 3 accelerograms with maximum SD in time domain

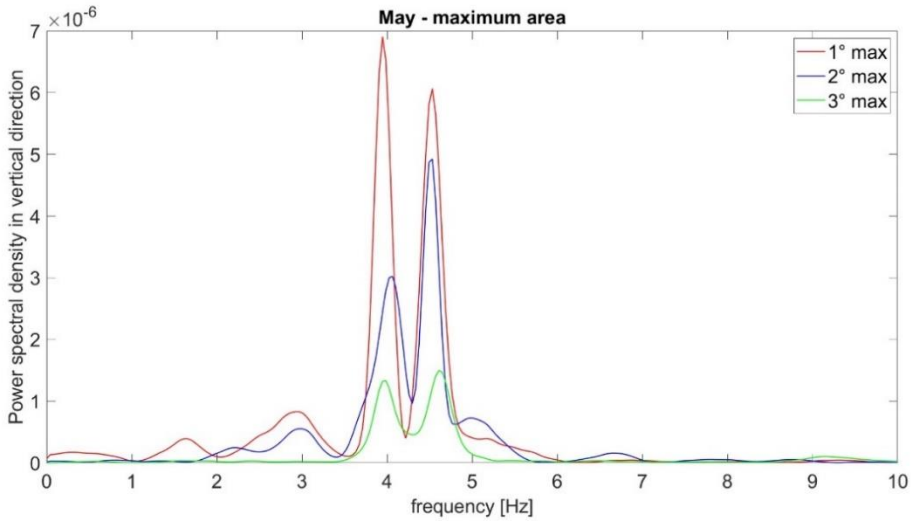


Figure 1-51: Results obtained from the 3 accelerograms with maximum area of PSD

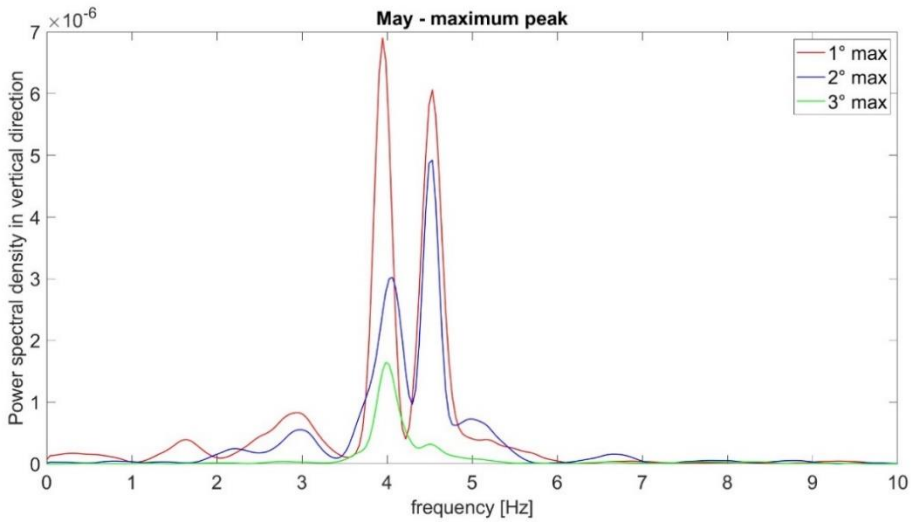


Figure 8-52: Results obtained from the 3 accelerograms with highest peak if PSD

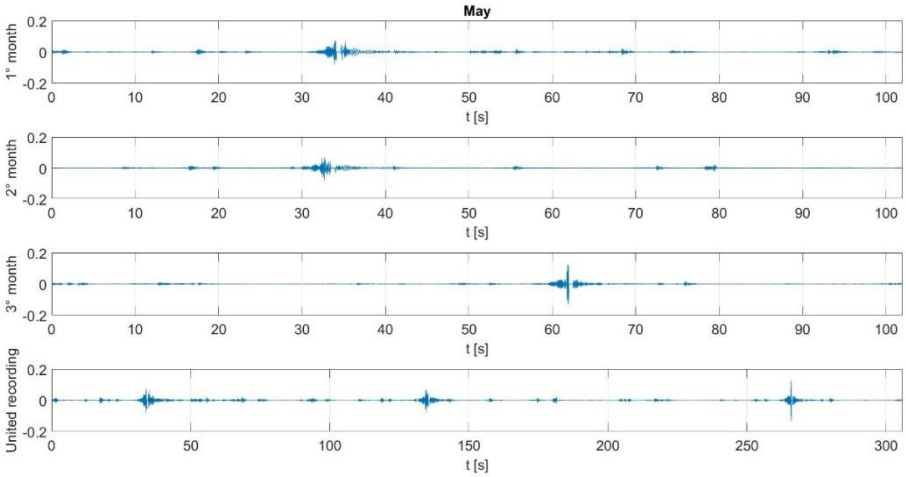


Figure 8-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.5.2 Longitudinal direction (y)

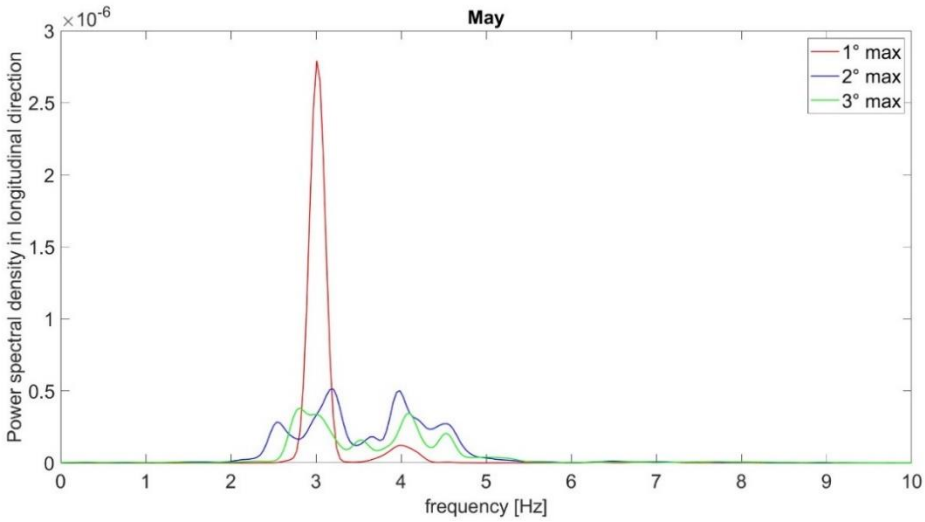


Figure 8-54: Results obtained from the 3 accelerograms with maximum SD in time domain

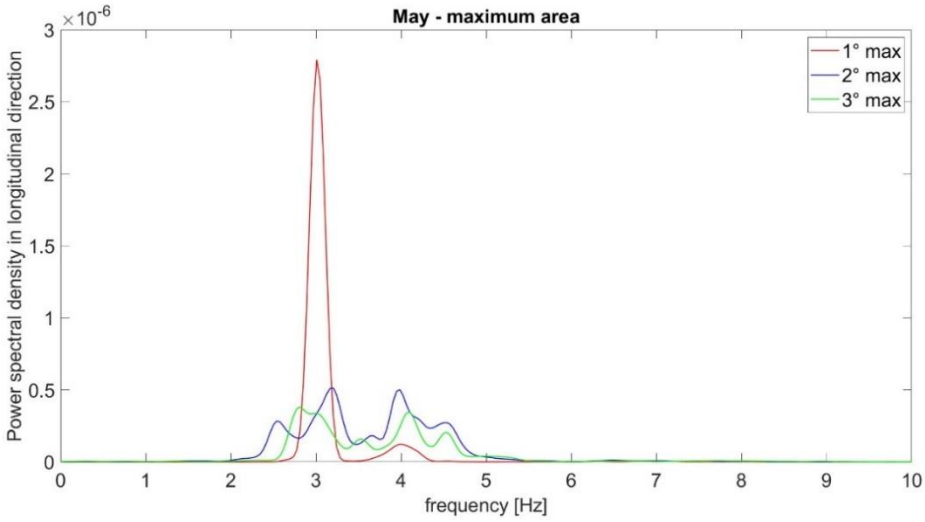


Figure -55: Results obtained from the 3 accelerograms with maximum area of PSD

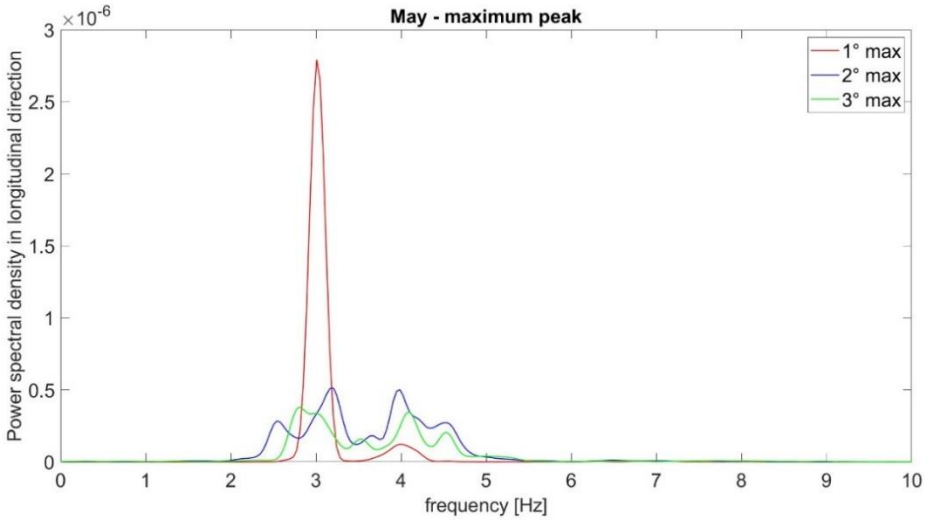


Figure 8-56: Results obtained from the 3 accelerograms with highest peak if PSD

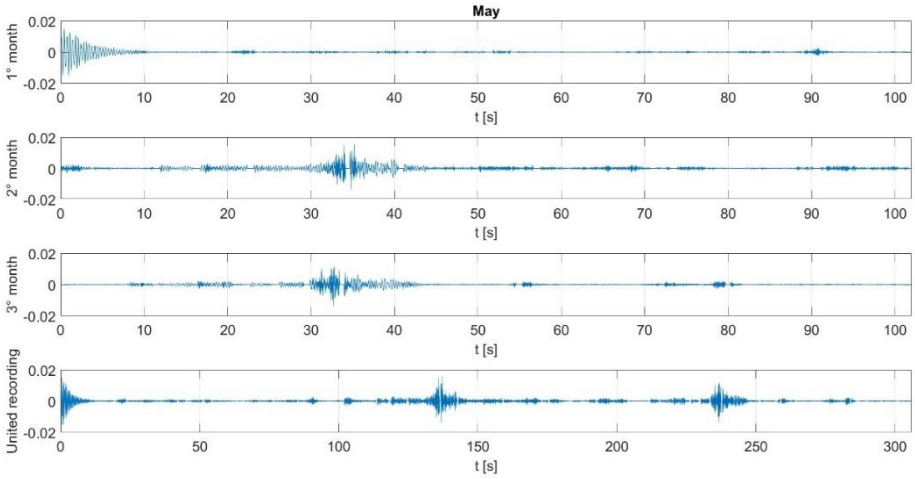


Figure 1-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.5.3 Transverse direction (z)

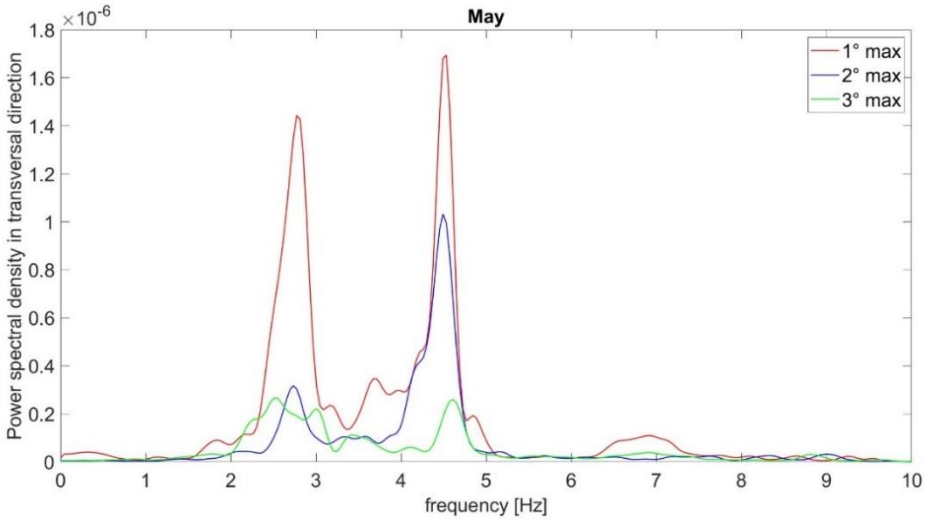


Figure 1-58: Results obtained from the 3 accelerograms with maximum SD in time domain

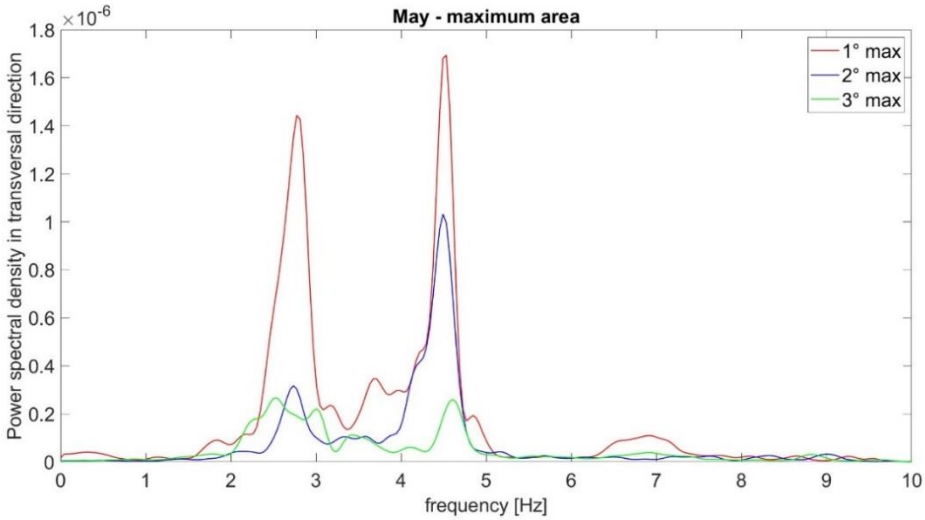


Figure 1-59: Results obtained from the 3 accelerograms with maximum area of PSD

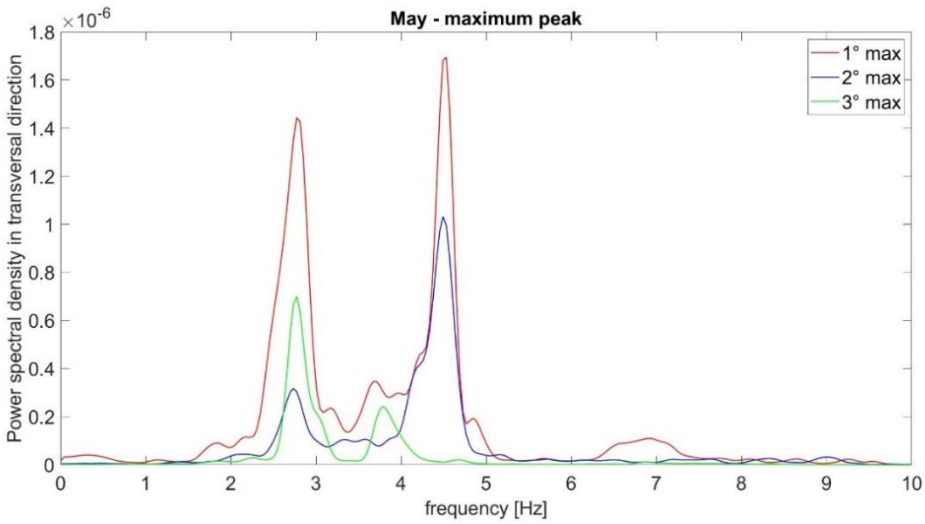


Figure 8-60: Results obtained from the 3 accelerograms with highest peak if PSD

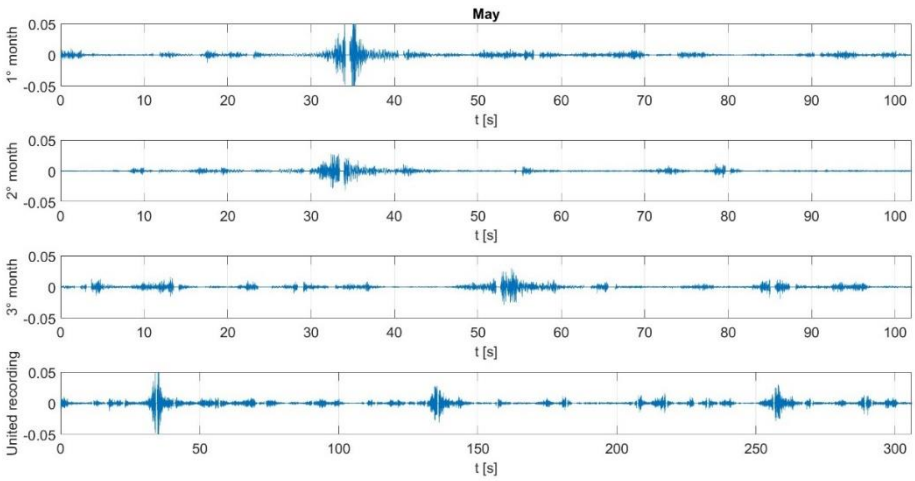


Figure 1-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

8.6 June

The results obtained for the June dataset are shown in the following tables.

Table 8-15: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-06-13_08-00-21	2.11E-03
	2°	2B988_2023-06-20_08-00-21	1.22E-03
	3°	2B988_2023-06-28_14-00-21	1.21E-03
Longitudinal direction (y)	1°	2B988_2023-06-13_08-00-21	1.16E-03
	2°	2B988_2023-06-27_14-00-21	6.18E-04
	3°	2B988_2023-06-28_14-00-21	4.85E-04
Transverse direction (z)	1°	2B988_2023-06-13_08-00-21	9.45E-04
	2°	2B988_2023-06-28_14-00-21	7.35E-04
	3°	2B988_2023-06-27_14-00-21	6.78E-04

Table 16: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-06-13_08-00-21	7.83E-06	2B988_2023-06-13_08-00-21	9.98E-07
2	2B988_2023-06-28_14-00-21	2.38E-06	2B988_2023-06-20_08-00-21	3.26E-07
3	2B988_2023-06-20_08-00-21	2.30E-06	2B988_2023-06-28_14-00-21	3.20E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-06-13_08-00-21	2.36E-06	2B988_2023-06-13_08-00-21	2.87E-07
2	2B988_2023-06-27_14-00-21	3.79E-07	2B988_2023-06-27_14-00-21	7.79E-08
3	2B988_2023-06-20_08-00-21	3.36E-07	2B988_2023-06-28_14-00-21	4.90E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-06-13_08-00-21	5.32E-07	2B988_2023-06-13_08-00-21	1.77E-07
2	2B988_2023-06-09_14-00-21	4.33E-07	2B988_2023-06-28_14-00-21	1.09E-07
3	2B988_2023-06-21_08-00-21	4.32E-07	2B988_2023-06-27_14-00-21	9.63E-08

Table -17: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	C	B	D	D	D	C	-	C
3	C	B	C	C	-	C	D	-	D

8.6.1 Vertical direction (x)

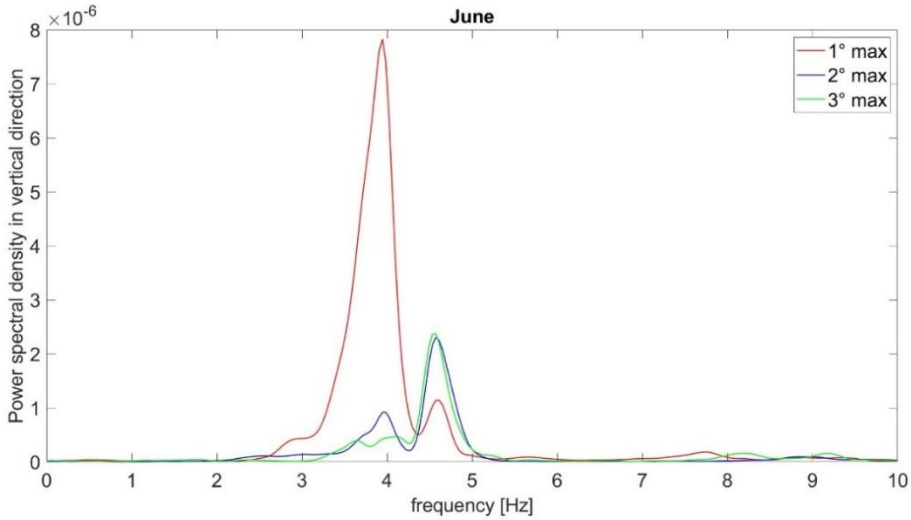


Figure 8-62: Results obtained from the 3 accelerograms with maximum SD in time domain

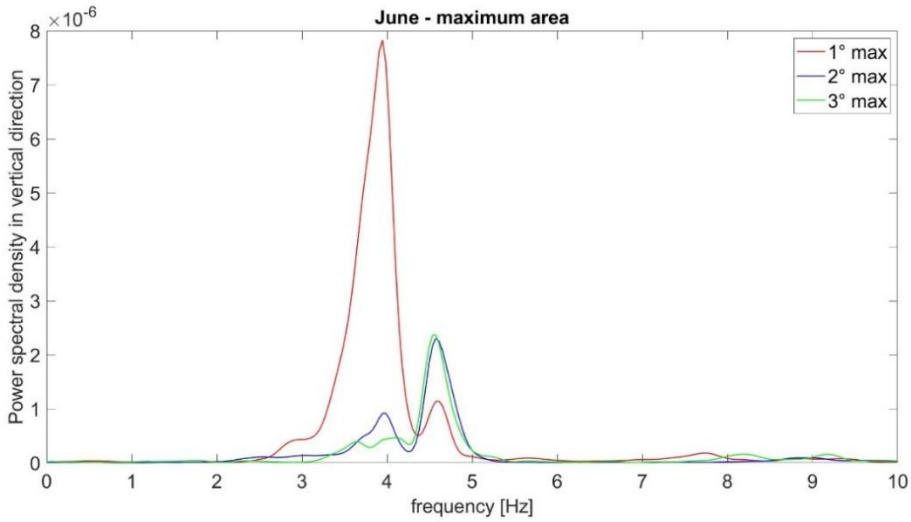


Figure 1-63: Results obtained from the 3 accelerograms with maximum area of PSD

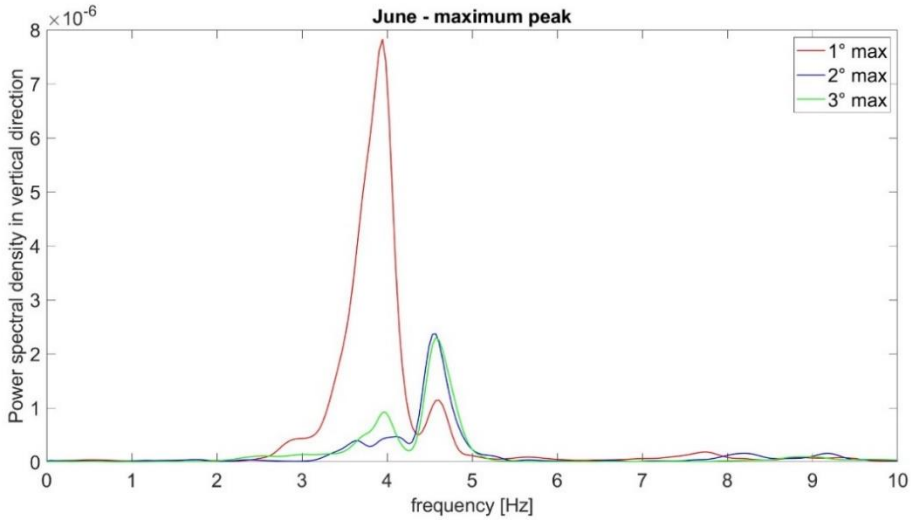


Figure 1-64: Results obtained from the 3 accelerograms with highest peak if PSD

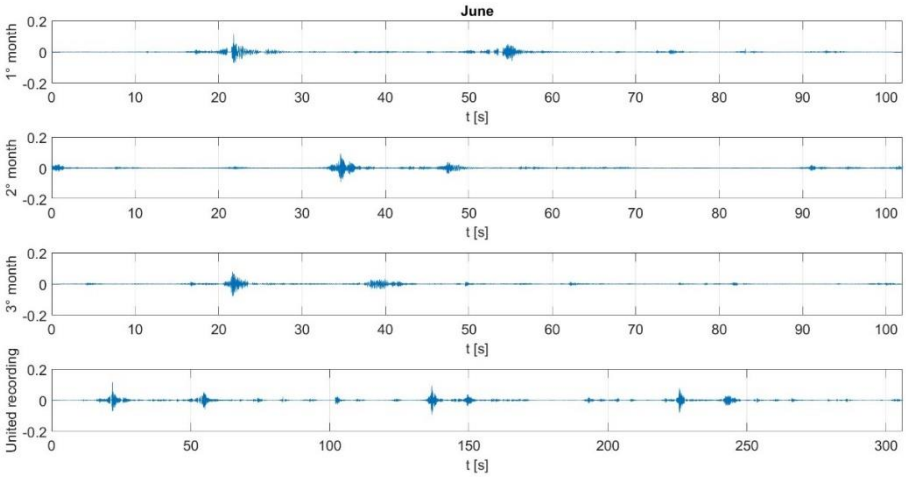


Figure 1-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.6.2 Longitudinal direction (y)

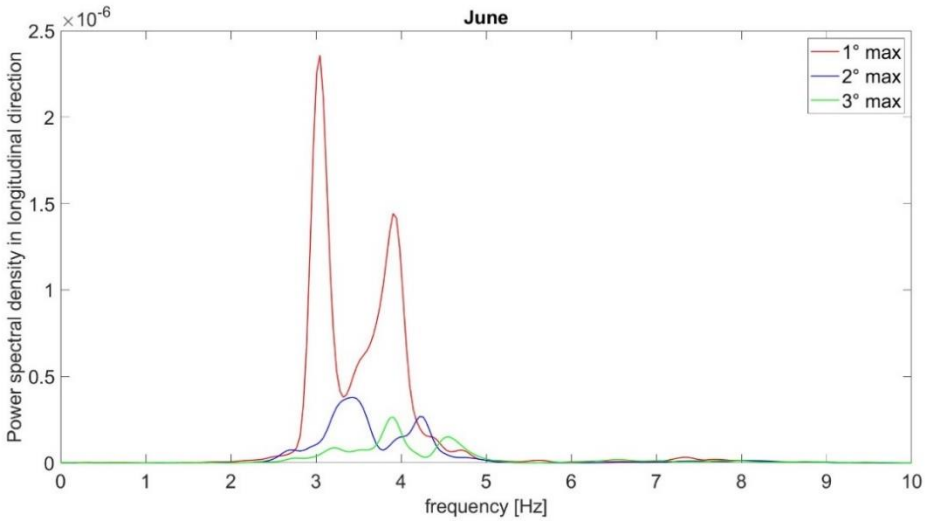


Figure 8-66: Results obtained from the 3 accelerograms with maximum SD in time domain

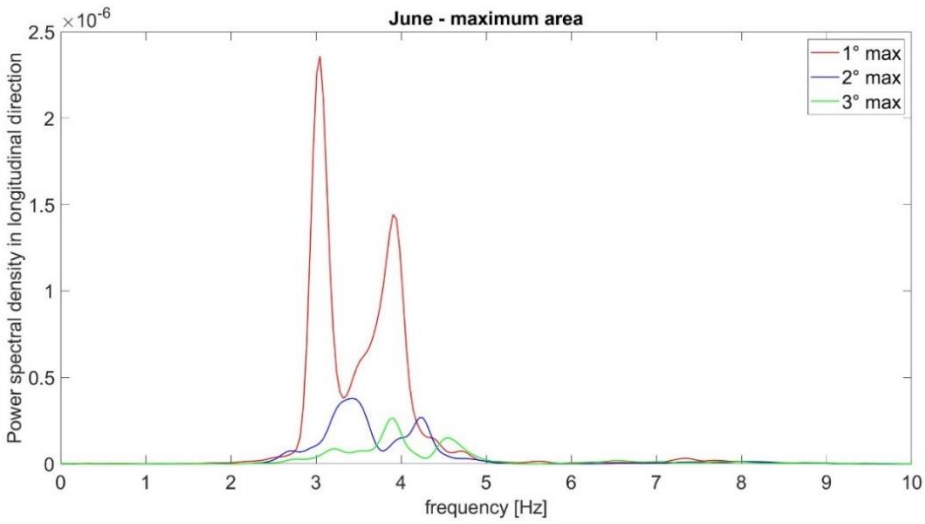


Figure 1-67: Results obtained from the 3 accelerograms with maximum area of PSD

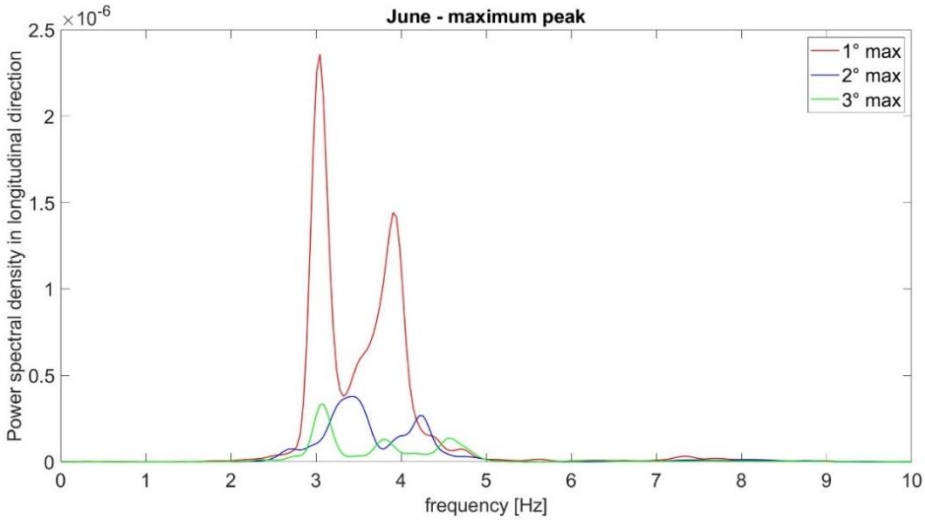


Figure 8-68: Results obtained from the 3 accelerograms with highest peak if PSD

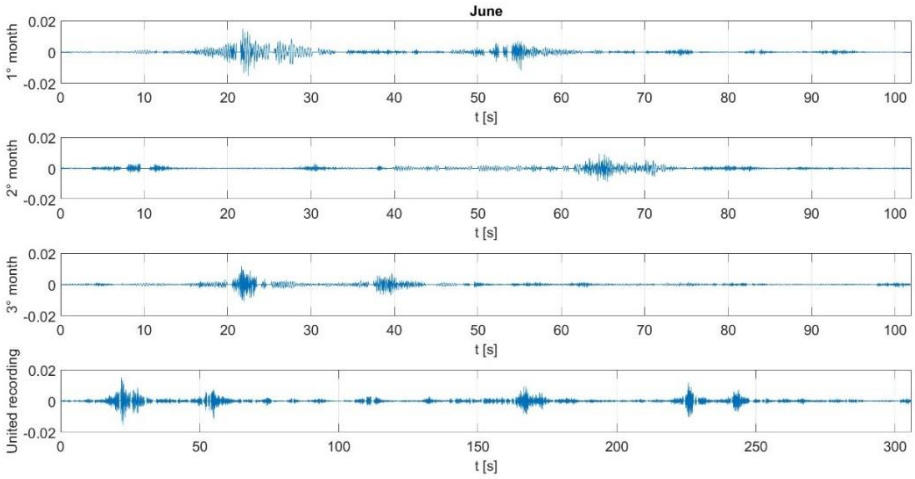


Figure 1-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.6.3 Transverse direction (z)

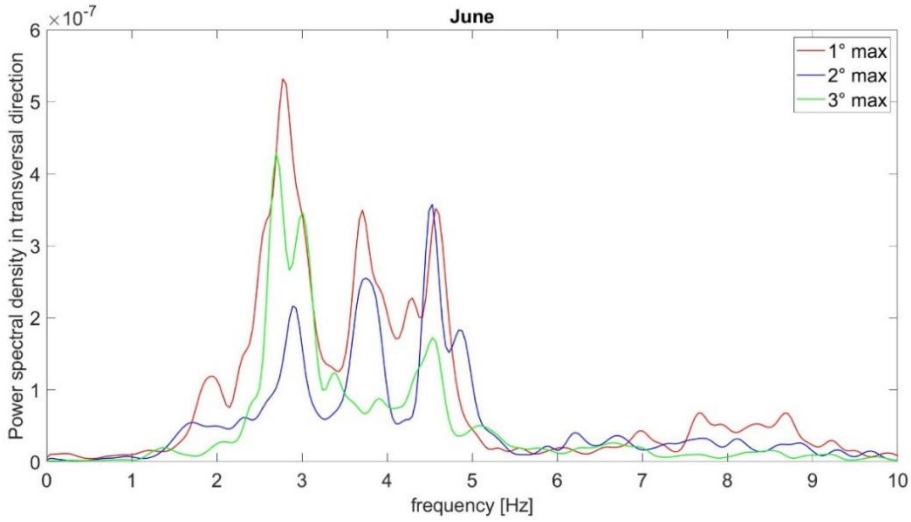


Figure 8-70: Results obtained from the 3 accelerograms with maximum SD in time domain

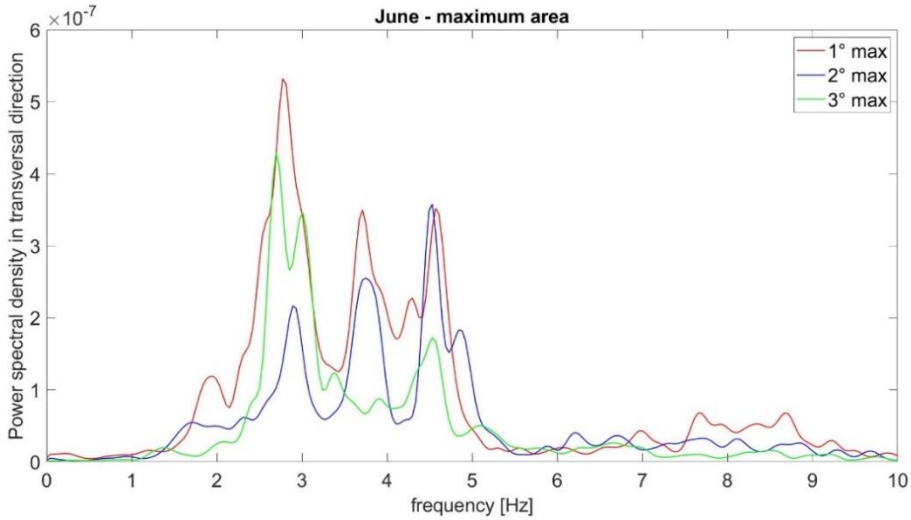


Figure 8-71: Results obtained from the 3 accelerograms with maximum area of PSD

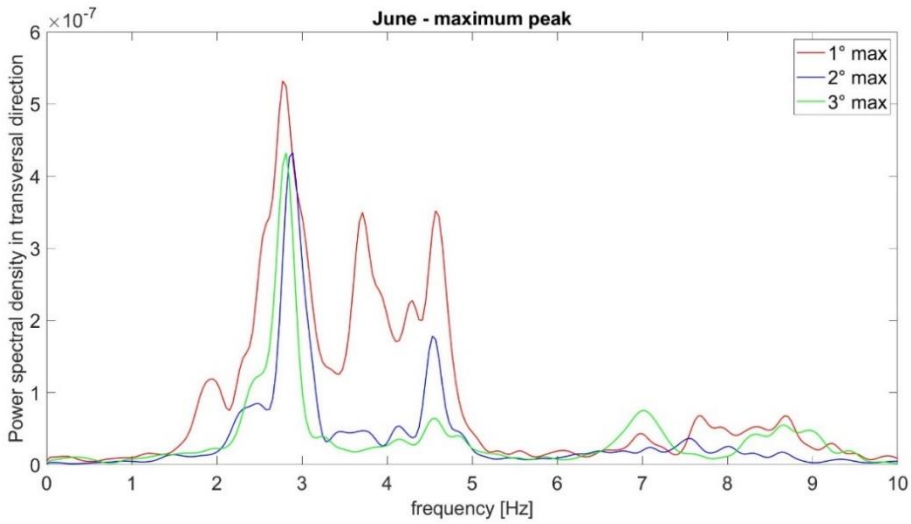


Figure 8-72: Results obtained from the 3 accelerograms with highest peak if PSD

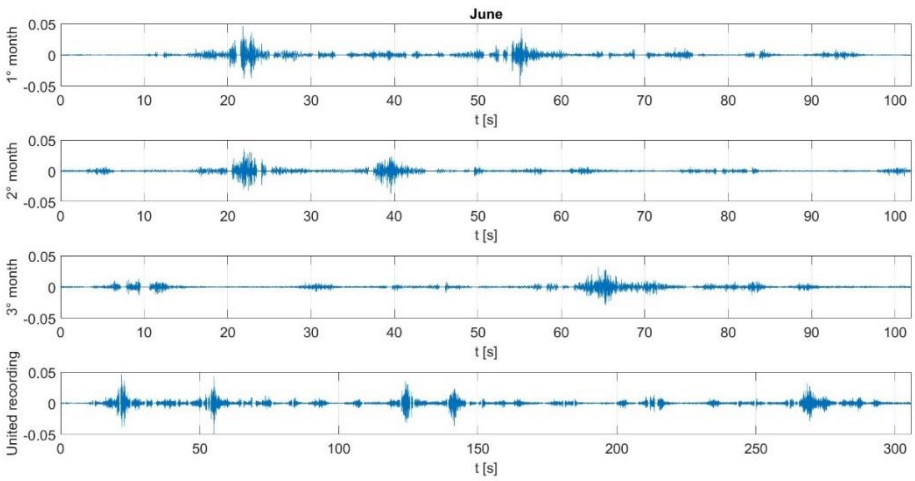


Figure-1-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

8.7 July

The results obtained for the July dataset are shown in the following tables.

Table -18: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-07-17_14-00-20	1.32E-03
	2°	2B988_2023-07-19_08-00-21	1.22E-03
	3°	2B988_2023-07-20_14-00-21	1.21E-03
Longitudinal direction (y)	1°	2B988_2023-07-17_14-00-20	6.24E-04
	2°	2B988_2023-07-20_14-00-21	6.18E-04
	3°	2B988_2023-07-07_14-00-21	5.88E-04
Transverse direction (z)	1°	2B988_2023-07-14_08-00-21	8.45E-04
	2°	2B988_2023-07-17_14-00-20	7.62E-04
	3°	2B988_2023-07-25_08-00-21	7.10E-04

Table-19: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-07-29_14-00-21	3.38E-06	2B988_2023-07-17_14-00-20	3.77E-07
2	2B988_2023-07-17_14-00-20	3.08E-06	2B988_2023-07-19_08-00-21	3.43E-07
3	2B988_2023-07-19_08-00-21	2.50E-06	2B988_2023-07-20_14-00-21	2.88E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-07-07_14-00-21	7.54E-07	2B988_2023-07-17_14-00-20	8.27E-08
2	2B988_2023-07-20_14-00-21	3.11E-07	2B988_2023-07-20_14-00-21	7.68E-08
3	2B988_2023-07-17_14-00-20	2.87E-07	2B988_2023-07-07_14-00-21	7.49E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-07-14_08-00-21	1.06E-06	2B988_2023-07-14_08-00-21	1.46E-07
2	2B988_2023-07-17_14-00-20	5.79E-07	2B988_2023-07-17_14-00-20	1.20E-07
3	2B988_2023-07-25_08-00-21	4.60E-07	2B988_2023-07-28_08-00-21	9.79E-08

Table -20: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	A	D	A	E	E	E
2	B	A	B	C	C	C	A	A	A
3	C	B	C	D	A	D	F	F	-

8.7.1 Vertical direction (x)

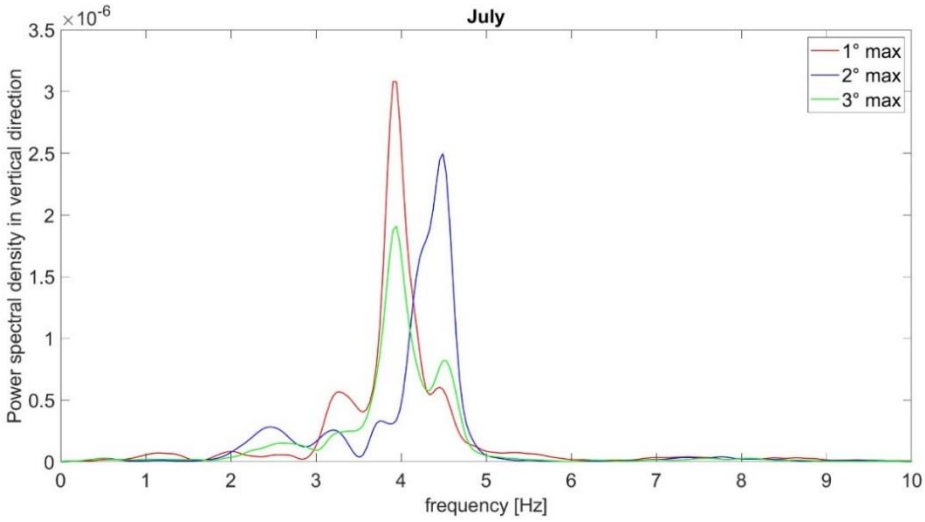


Figure 1-74: Results obtained from the 3 accelerograms with maximum SD in time domain

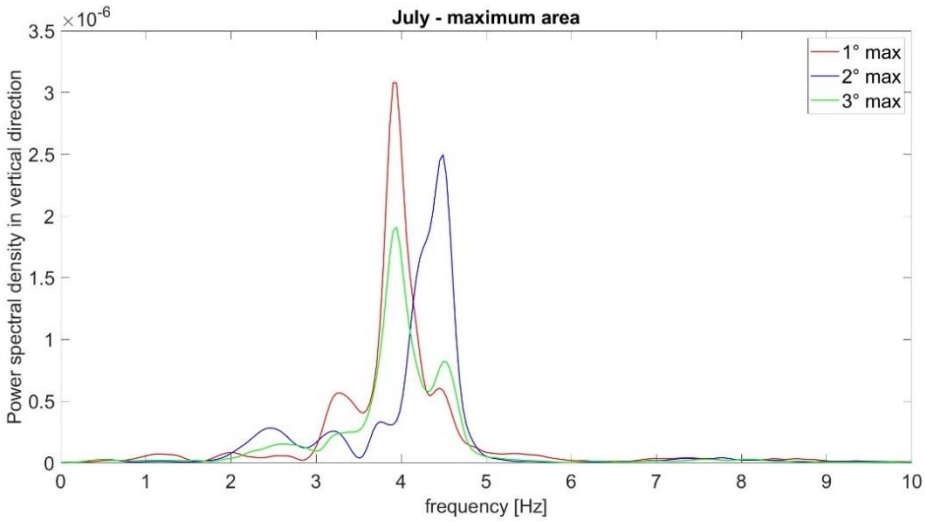


Figure 1-75: Results obtained from the 3 accelerograms with maximum area of PSD

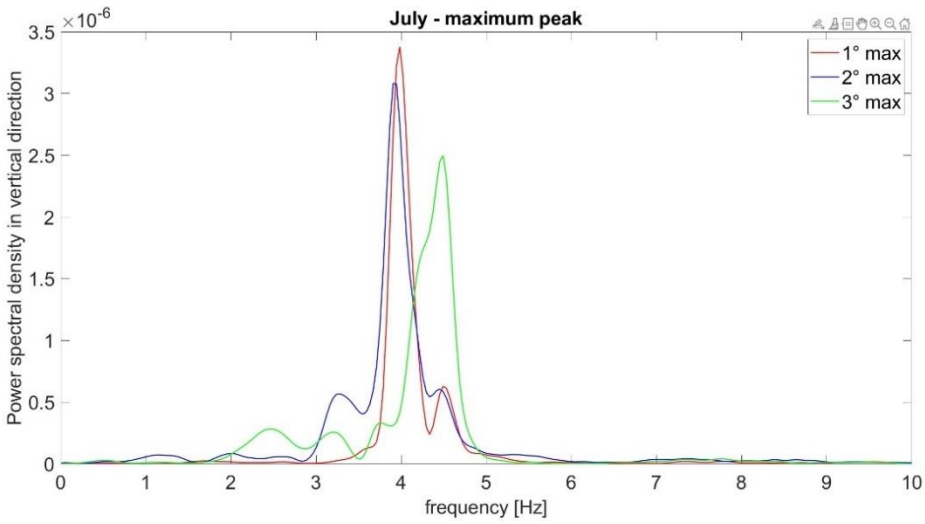


Figure 8-76: Results obtained from the 3 accelerograms with highest peak if PSD

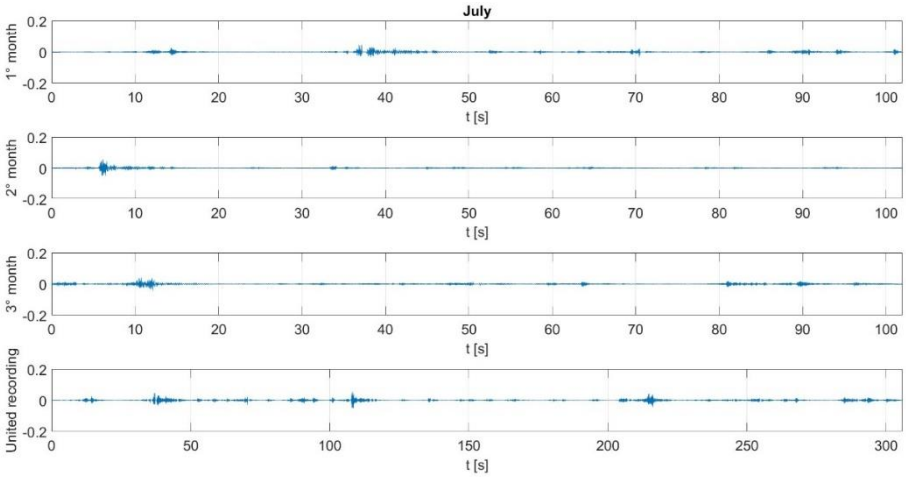


Figure 1-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.7.2 Longitudinal direction (y)

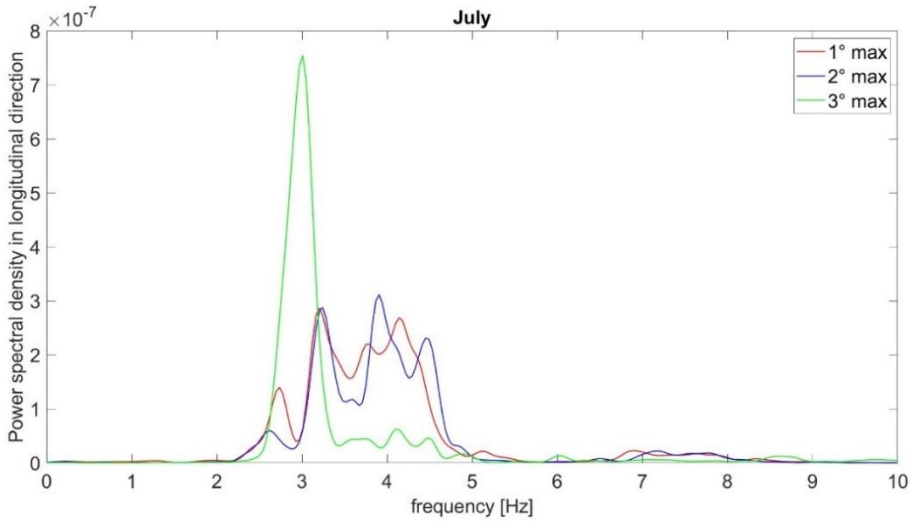


Figure 1-78: Results obtained from the 3 accelerograms with maximum SD in time domain

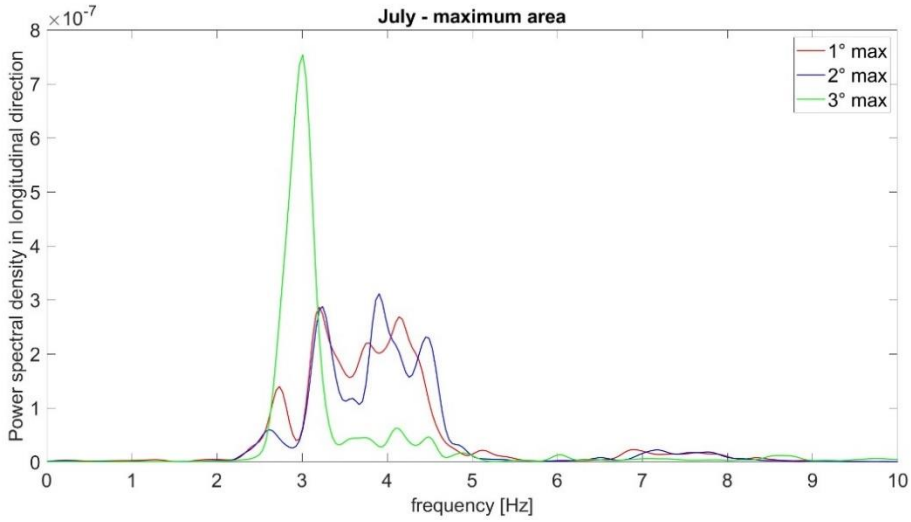


Figure 8-79: Results obtained from the 3 accelerograms with maximum area of PSD

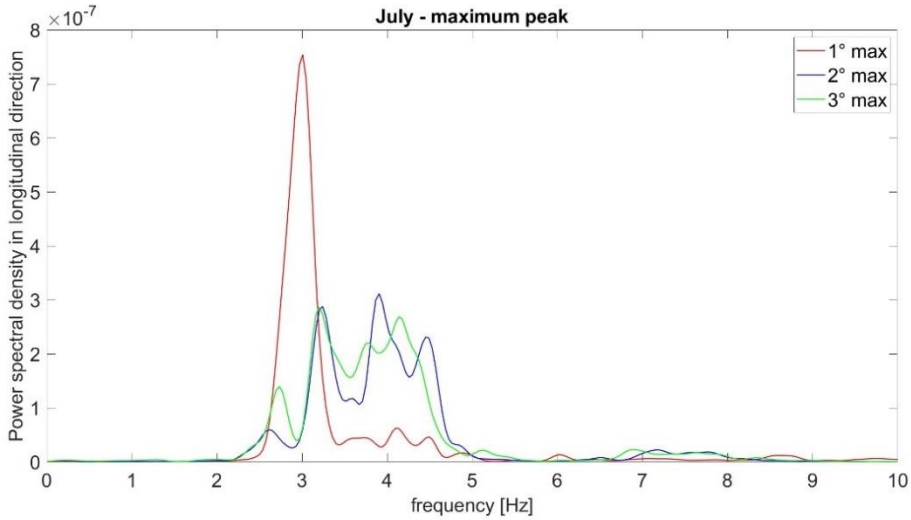


Figure 1-80: Results obtained from the 3 accelerograms with highest peak if PSD

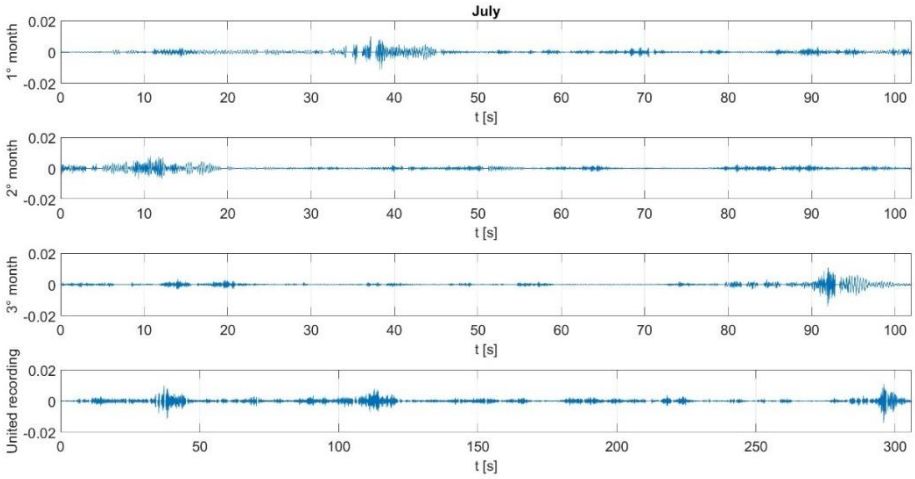


Figure 8-81: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.7.3 Transverse direction (z)

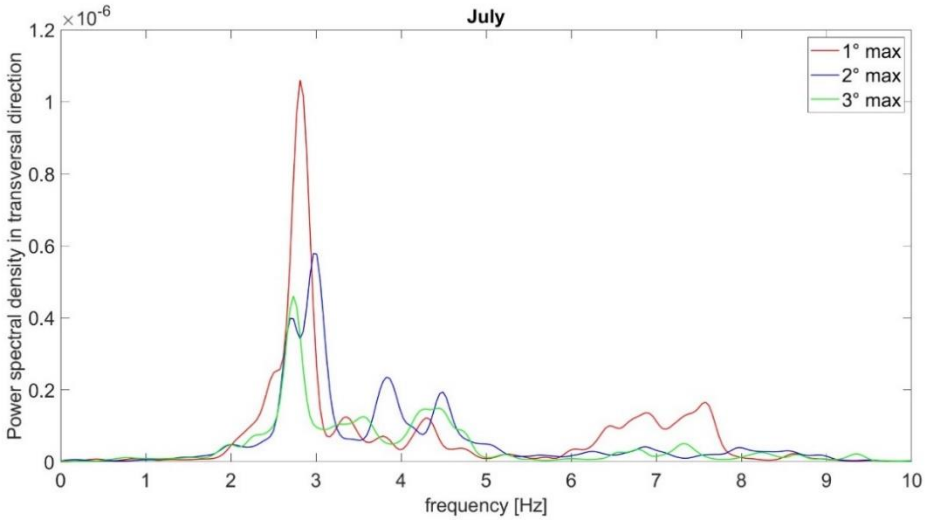


Figure 1-82: Results obtained from the 3 accelerograms with maximum SD in time domain

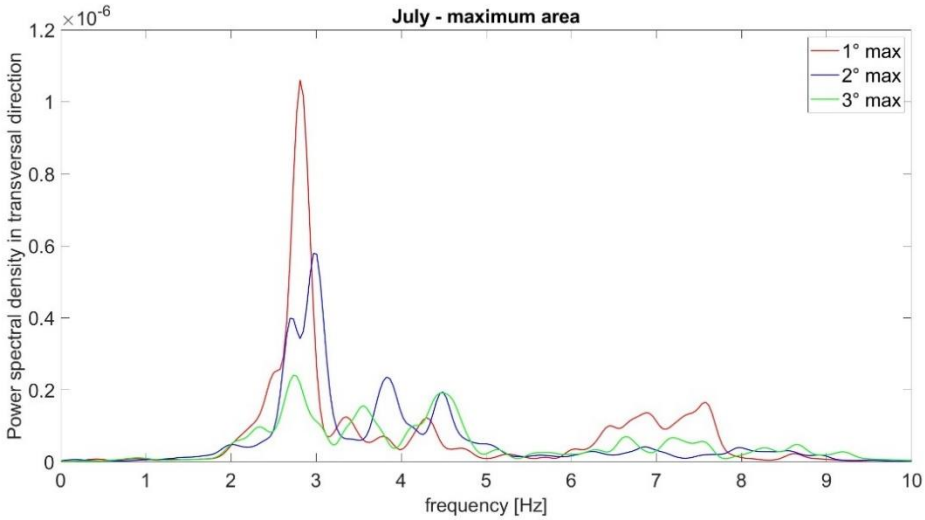


Figure 1-83: Results obtained from the 3 accelerograms with maximum area of PSD

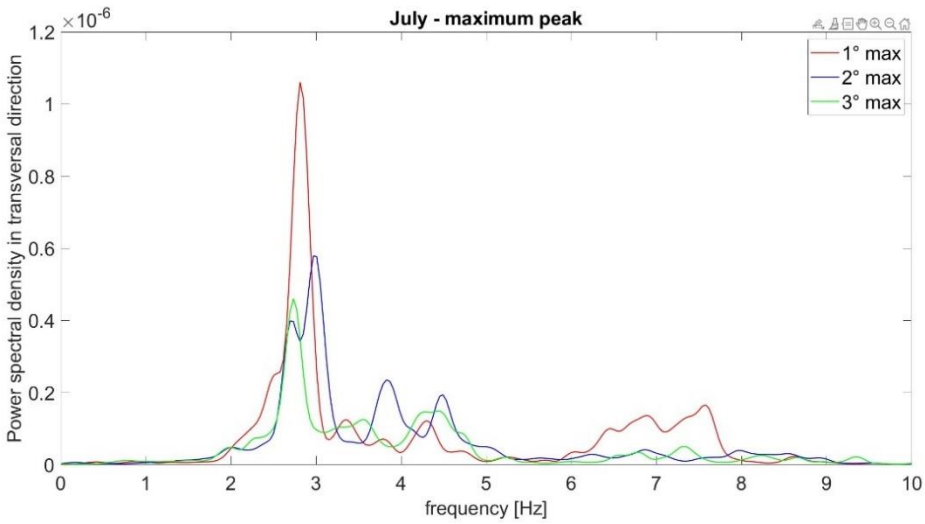


Figure 1-84: Results obtained from the 3 accelerograms with highest peak if PSD

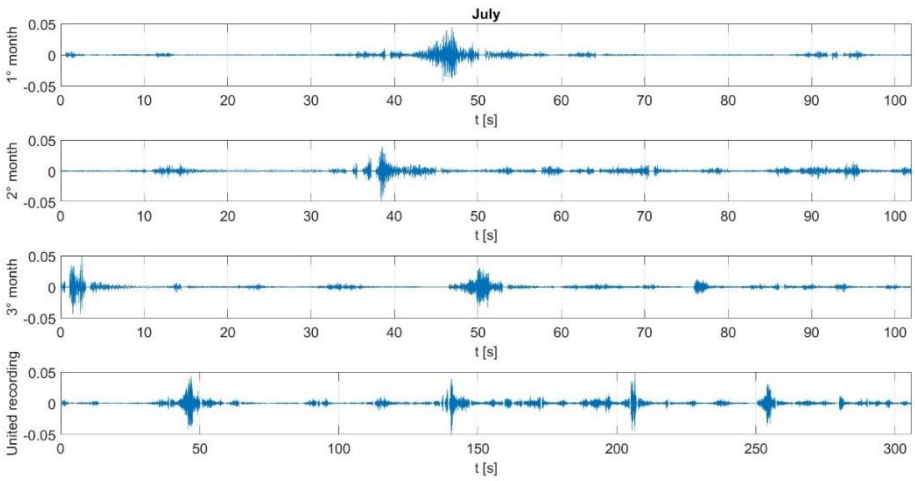


Figure 8-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

8.8 August

The results obtained for the August dataset are shown in the following tables.

Table-21: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-08-07_14-00-21	2.31E-03
	2°	2B988_2023-08-29_08-00-21	1.51E-03
	3°	2B988_2023-08-17_08-00-21	1.03E-03
Longitudinal direction (y)	1°	2B988_2023-08-07_14-00-21	8.26E-04
	2°	2B988_2023-08-29_08-00-21	5.72E-04
	3°	2B988_2023-08-02_08-00-21	3.77E-04
Transverse direction (z)	1°	2B988_2023-08-29_08-00-21	8.29E-04
	2°	2B988_2023-08-07_14-00-21	7.43E-04
	3°	2B988_2023-08-02_08-00-21	5.47E-04

Table -22: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-08-07_14-00-21	7.21E-06	2B988_2023-08-07_14-00-21	1.08E-06
2	2B988_2023-08-29_08-00-21	3.65E-06	2B988_2023-08-29_08-00-21	4.57E-07
3	2B988_2023-08-31_14-00-21	1.43E-06	2B988_2023-08-17_08-00-21	2.31E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-08-07_14-00-21	8.51E-07	2B988_2023-08-07_14-00-21	1.40E-07
2	2B988_2023-08-29_08-00-21	6.32E-07	2B988_2023-08-29_08-00-21	6.80E-08
3	2B988_2023-08-02_08-00-21	2.97E-07	2B988_2023-08-02_08-00-21	2.95E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-08-29_08-00-21	6.15E-07	2B988_2023-08-29_08-00-21	1.39E-07
2	2B988_2023-08-07_14-00-21	6.10E-07	2B988_2023-08-07_14-00-21	1.17E-07
3	2B988_2023-08-28_08-00-20	2.62E-07	2B988_2023-08-02_08-00-21	6.13E-08

Table 8-23: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	B	B	B
2	B	B	B	B	B	B	A	A	A
3	C	-	C	D	D	D	D	-	D

8.8.1 Vertical direction (x)

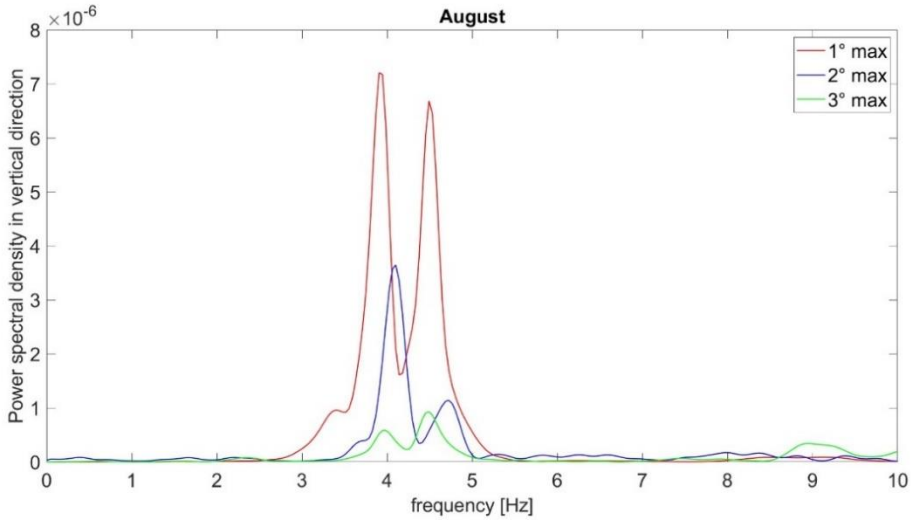


Figure 1-86: Results obtained from the 3 accelerograms with maximum SD in time domain

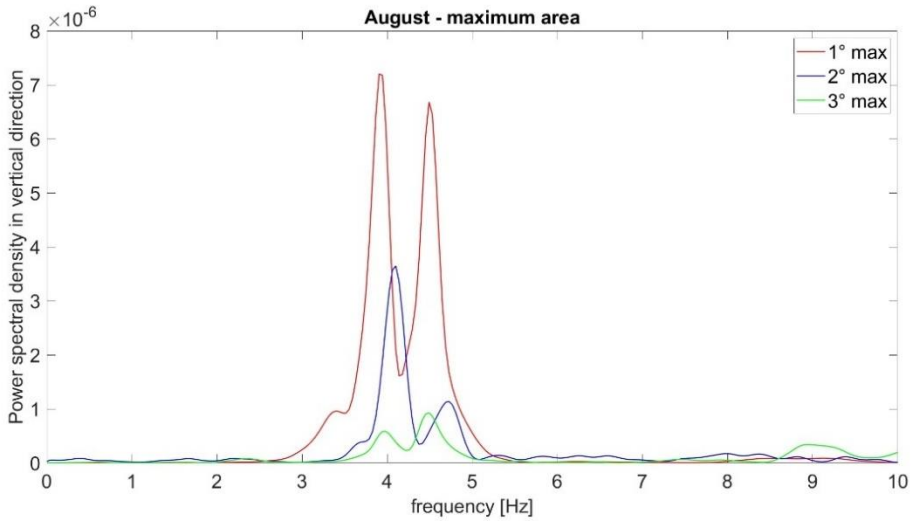


Figure 1-87: Results obtained from the 3 accelerograms with maximum area of PSD

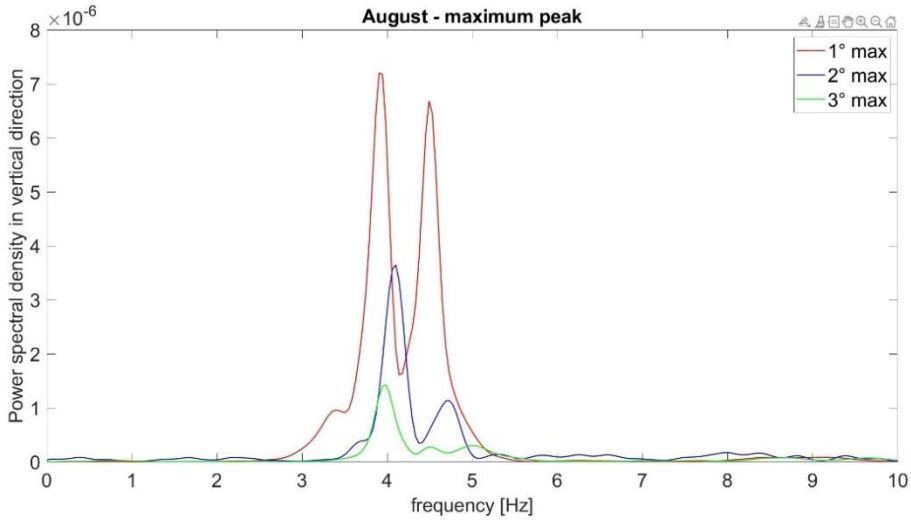


Figure 1-88: Results obtained from the 3 accelerograms with highest peak if PSD

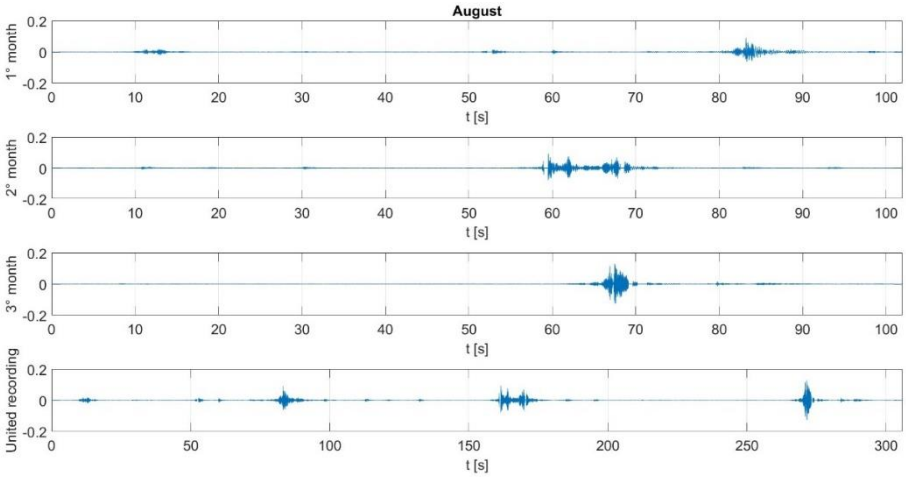


Figure 1-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.8.2 Longitudinal direction (y)

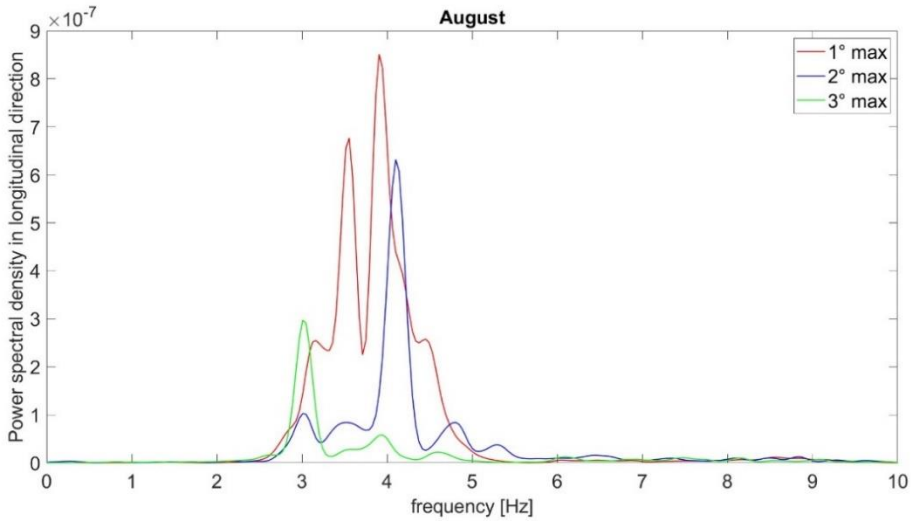


Figure 1-90: Results obtained from the 3 accelerograms with maximum SD in time domain

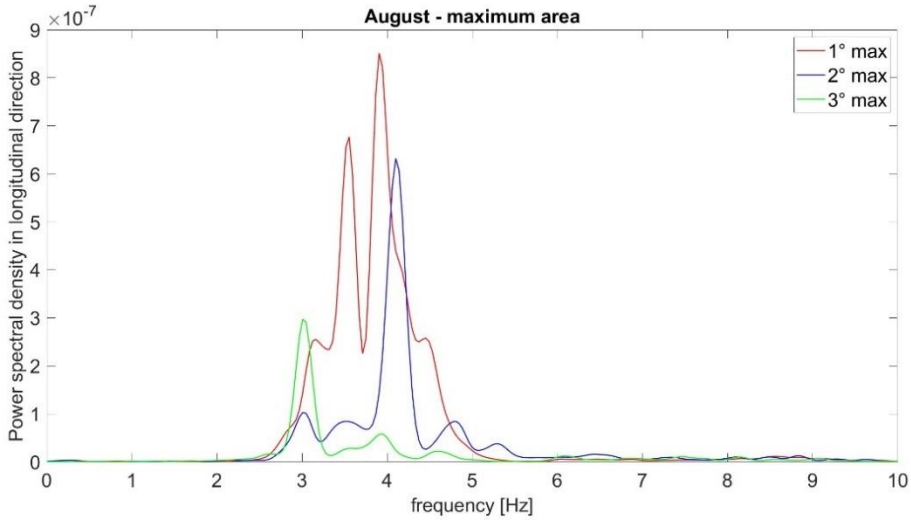


Figure 1-91: Results obtained from the 3 accelerograms with maximum area of PSD

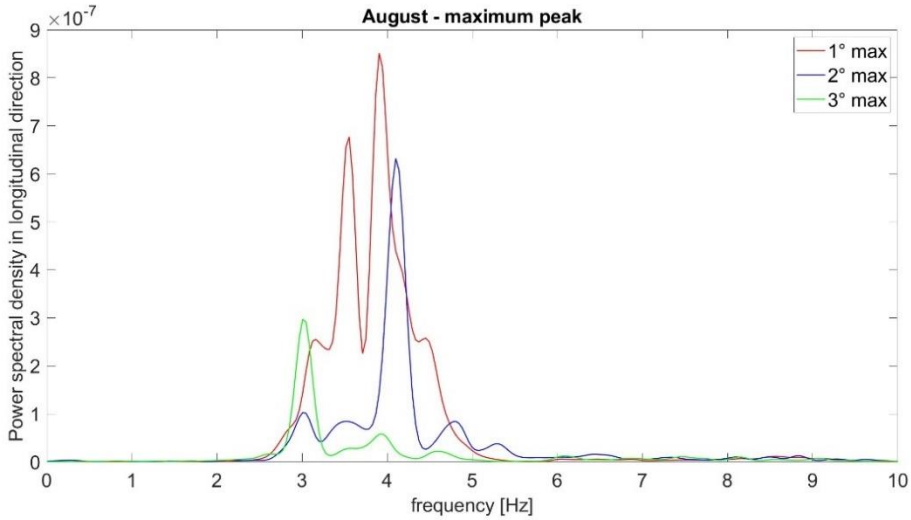


Figure 1-92: Results obtained from the 3 accelerograms with highest peak if PSD

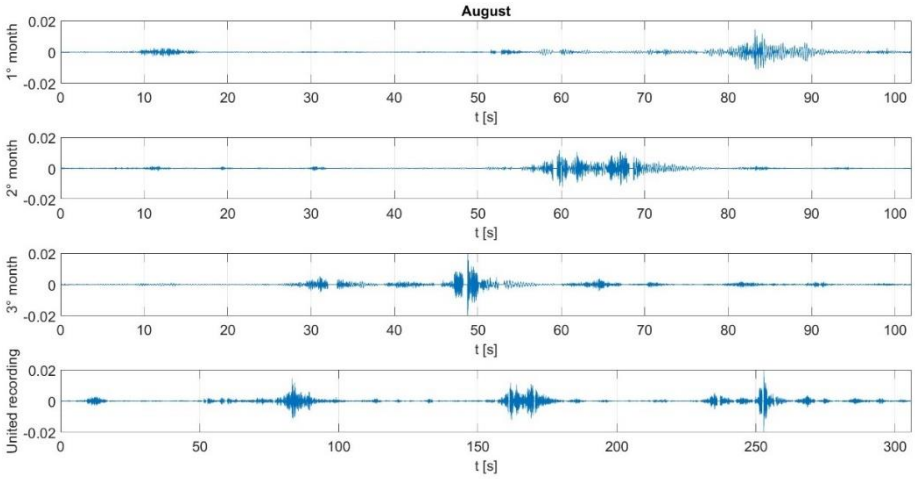


Figure 1-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.8.3 Transverse direction (z)

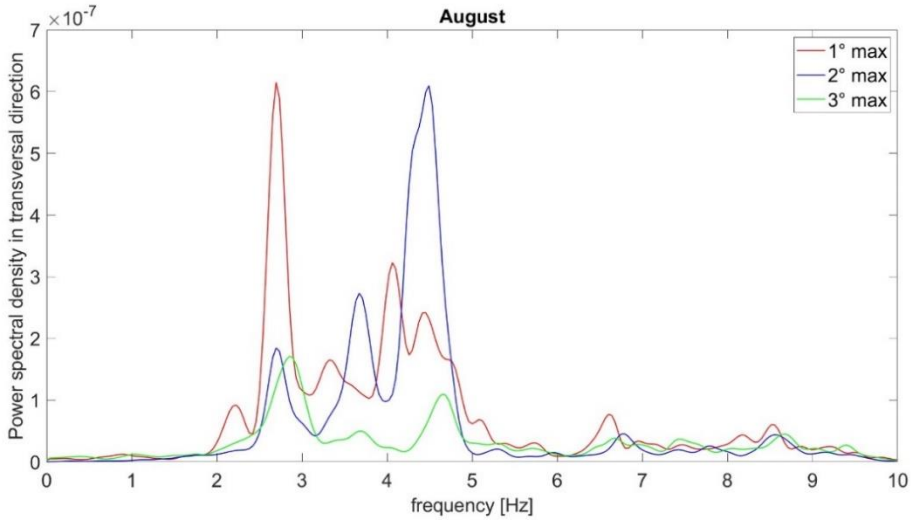


Figure 1-94: Results obtained from the 3 accelerograms with maximum SD in time domain

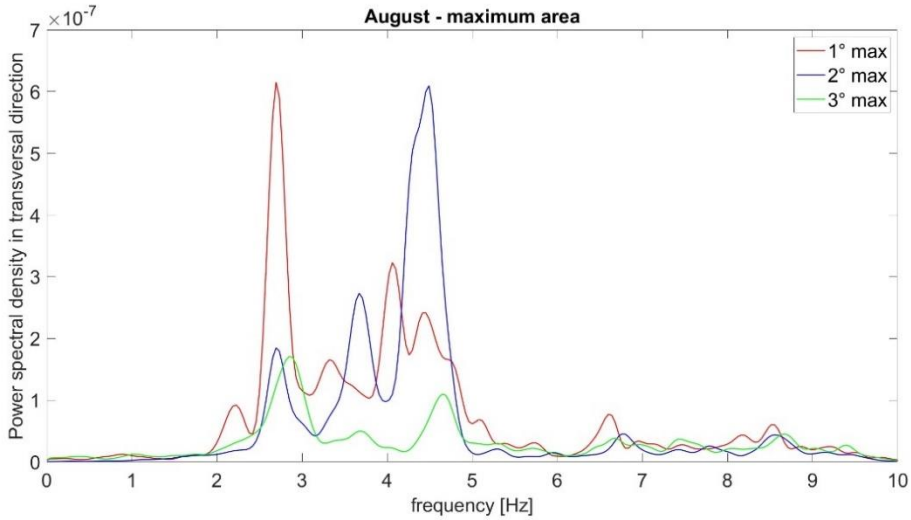


Figure 8-95: Results obtained from the 3 accelerograms with maximum area of PSD

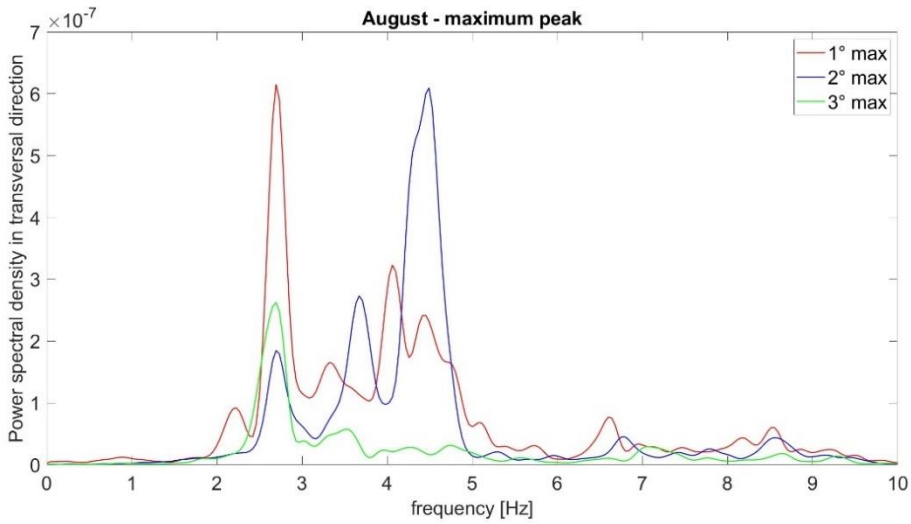


Figure 8-96: Results obtained from the 3 accelerograms with highest peak if PSD

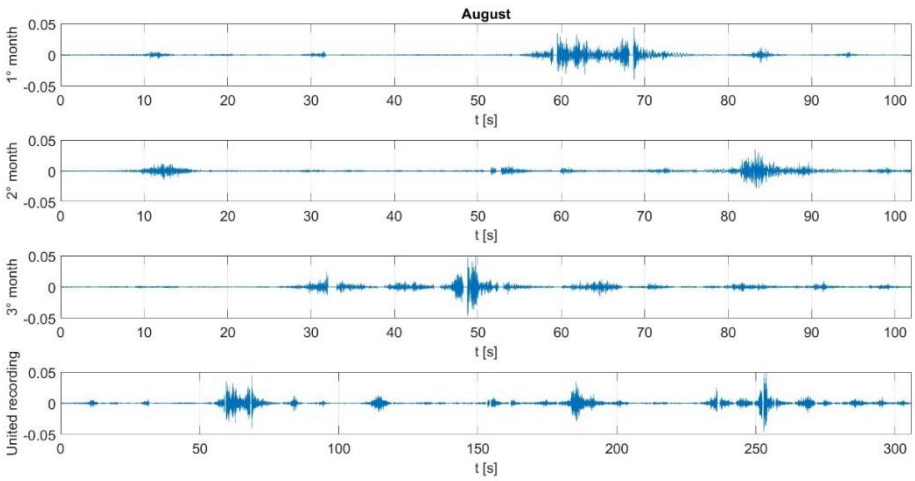


Figure 1-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

8.9 September

The results obtained for the September dataset are shown in the following tables.

Table 8-24: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-09-26_15-00-21	3.49E-03
	2°	2B988_2023-09-15_11-00-20	2.64E-03
	3°	2B988_2023-09-04_14-00-21	2.51E-03
Longitudinal direction (y)	1°	2B988_2023-09-26_09-00-21	1.97E-03
	2°	2B988_2023-09-14_11-00-20	1.63E-03
	3°	2B988_2023-09-20_11-00-20	1.40E-03
Transverse direction (z)	1°	2B988_2023-09-26_15-00-21	2.13E-03
	2°	2B988_2023-09-20_11-00-20	1.22E-03
	3°	2B988_2023-09-14_11-00-20	1.19E-03

Table 8-25: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-09-26_15-00-21	1.58E-05	2B988_2023-09-26_15-00-21	2.28E-06
2	2B988_2023-09-15_11-00-20	1.31E-05	2B988_2023-09-15_11-00-20	1.48E-06
3	2B988_2023-09-04_14-00-21	7.56E-06	2B988_2023-09-20_11-00-20	1.23E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-09-26_09-00-21	1.13E-05	2B988_2023-09-26_09-00-21	8.19E-07
2	2B988_2023-09-14_11-00-20	7.04E-06	2B988_2023-09-14_11-00-20	5.66E-07
3	2B988_2023-09-20_11-00-20	2.47E-06	2B988_2023-09-20_11-00-20	4.16E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-09-26_15-00-21	9.82E-06	2B988_2023-09-26_15-00-21	8.92E-07
2	2B988_2023-09-20_11-00-20	2.81E-06	2B988_2023-09-20_11-00-20	3.11E-07
3	2B988_2023-09-04_14-00-21	2.07E-06	2B988_2023-09-14_11-00-20	2.87E-07

Table 26: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	A	A	A
2	B	B	B	E	E	E	F	F	F
3	C	C	-	F	F	F	E	E	E

8.9.1 Vertical direction (x)

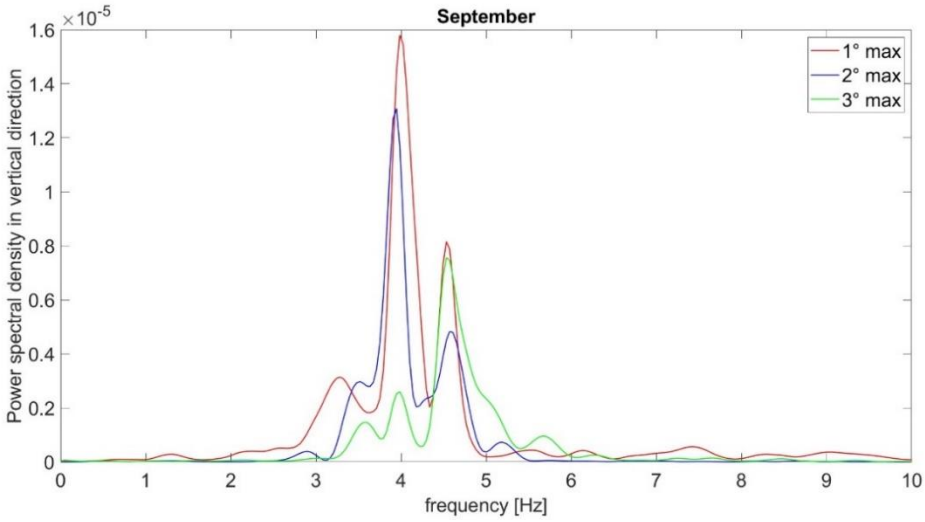


Figure 1-98: Results obtained from the 3 accelerograms with maximum SD in time domain

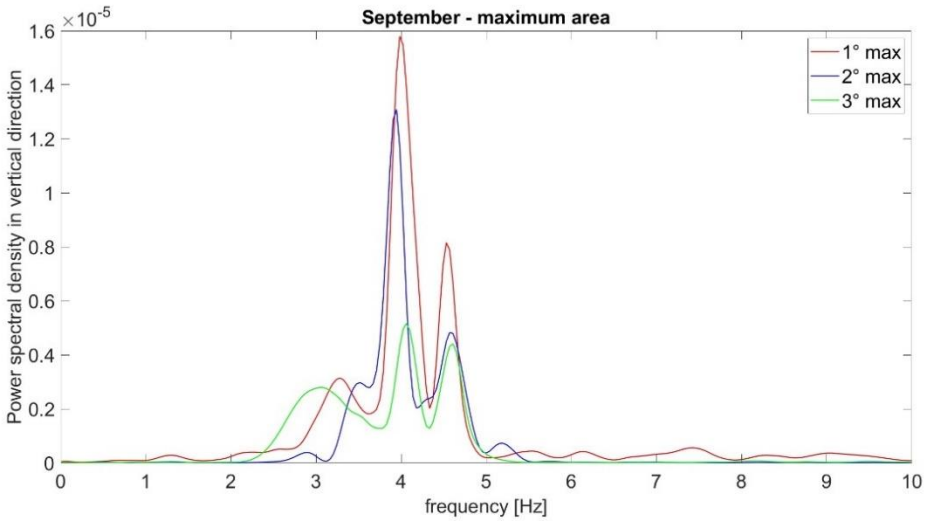


Figure 1-99: Results obtained from the 3 accelerograms with maximum area of PSD

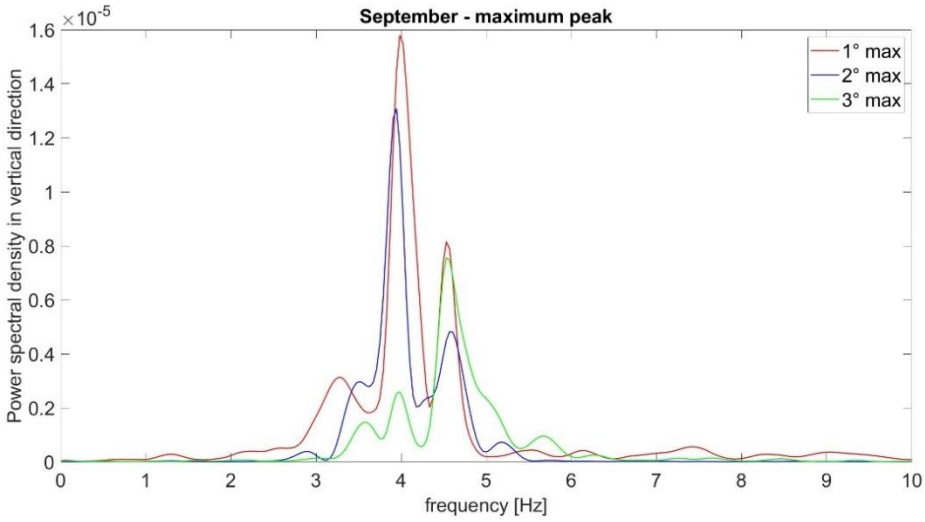


Figure 1-100: Results obtained from the 3 accelerograms with highest peak if PSD

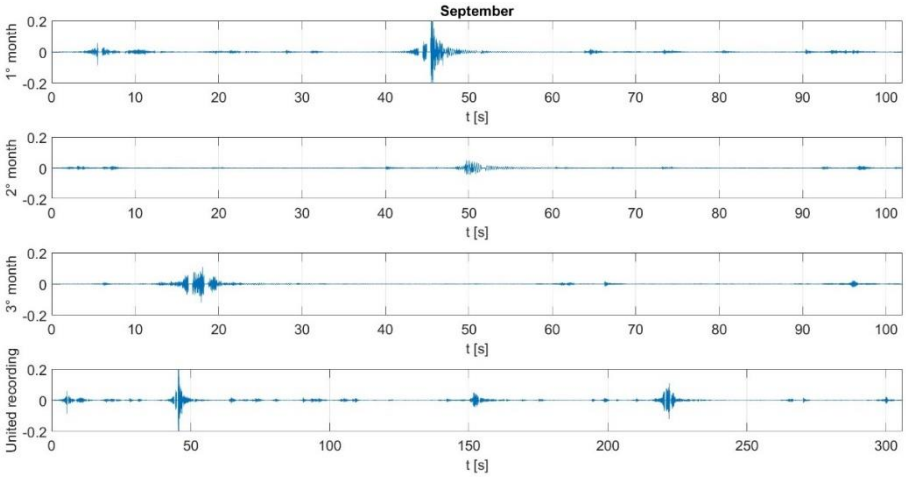


Figure 8-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.9.2 Longitudinal direction (y)

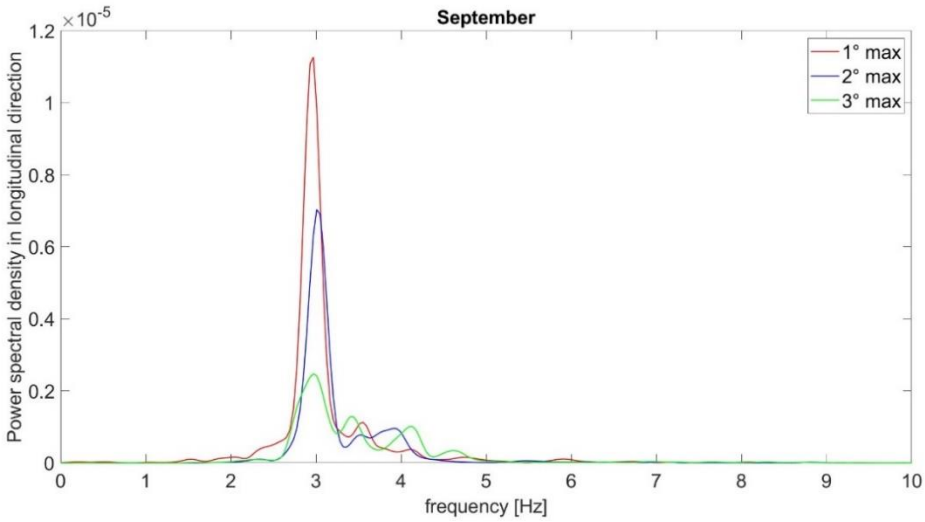


Figure 1-102: Results obtained from the 3 accelerograms with maximum SD in time domain

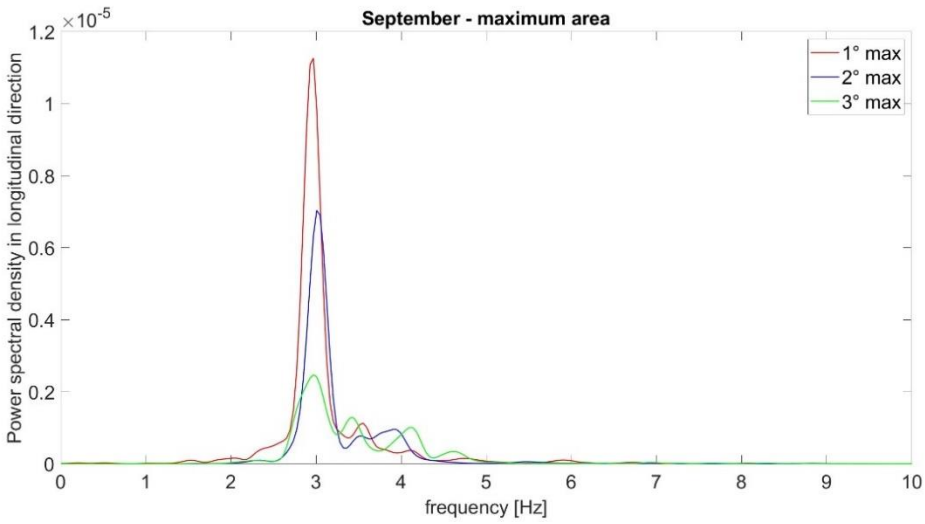


Figure 1-103: Results obtained from the 3 accelerograms with maximum area of PSD

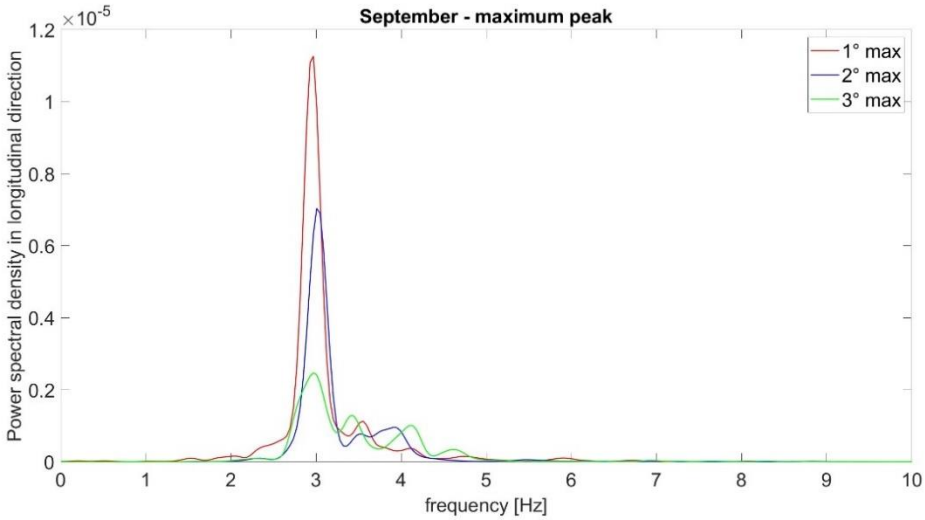


Figure 8-104: Results obtained from the 3 accelerograms with highest peak if PSD

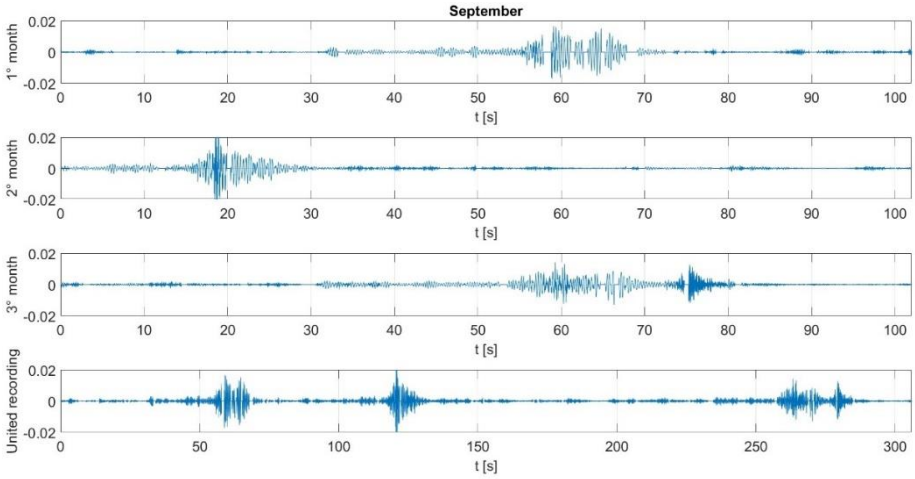


Figure 1-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.9.3 Transverse direction (z)

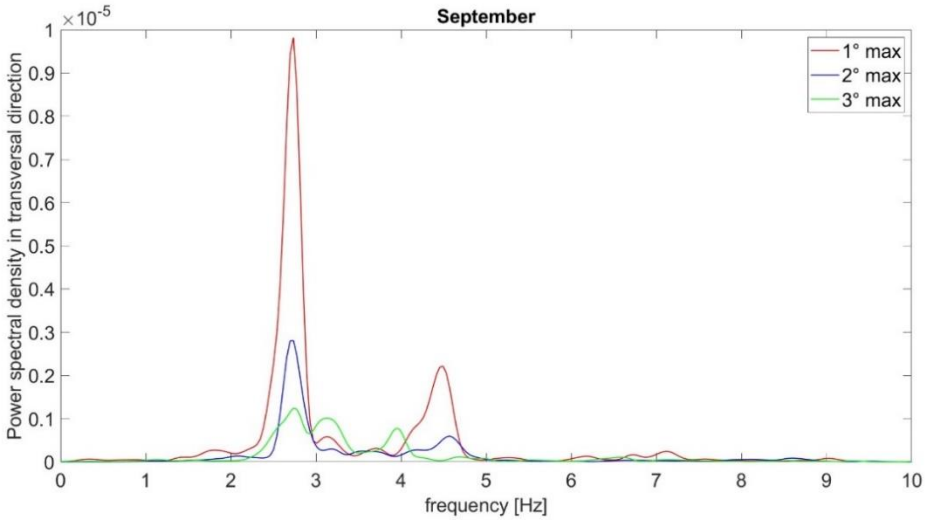


Figure 1-106: Results obtained from the 3 accelerograms with maximum SD in time domain

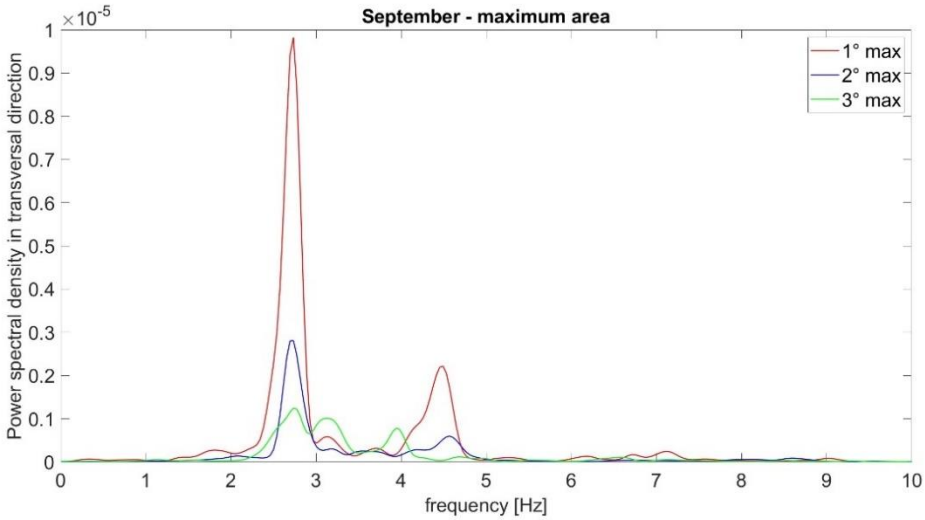


Figure 8-107: Results obtained from the 3 accelerograms with maximum area of PSD

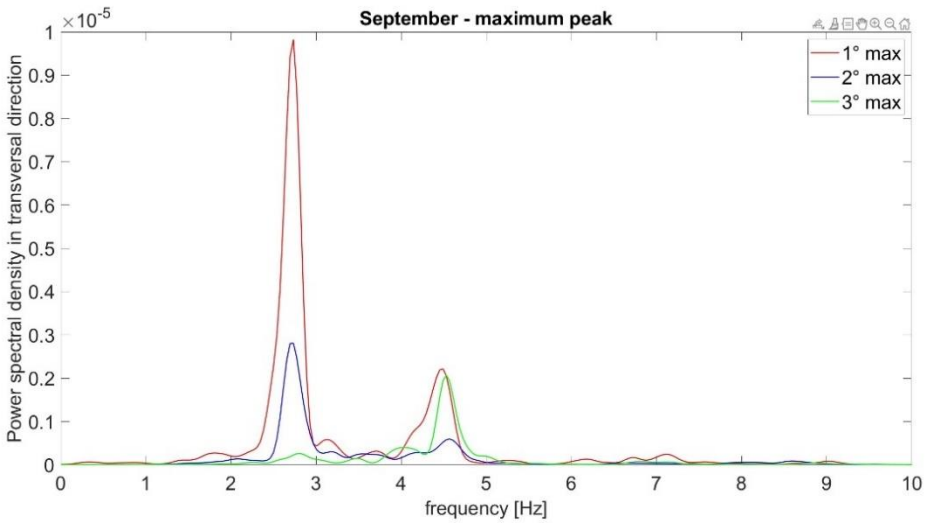


Figure 8-108: Results obtained from the 3 accelerograms with highest peak if PSD

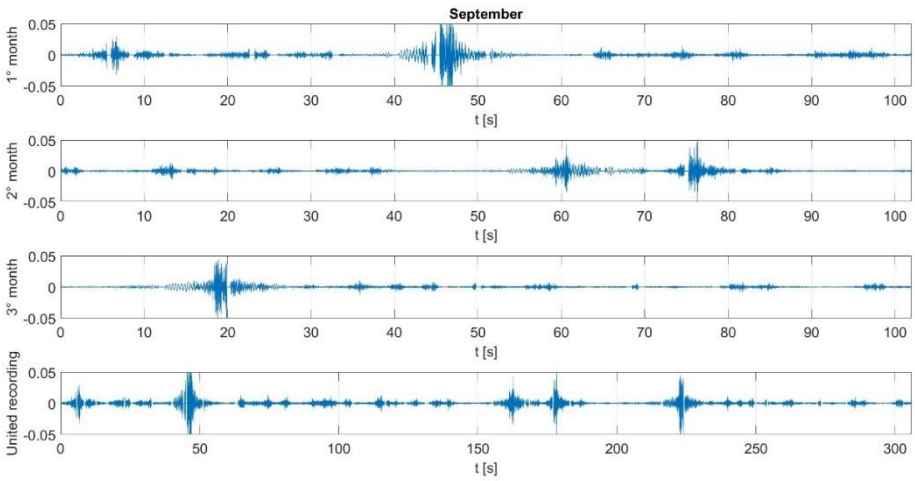


Figure 8-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

8.10 October

The results obtained for the October dataset are shown in the following tables.

Table 8-27: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-10-02_08-00-21	2.86E-03
	2°	2B988_2023-10-10_12-00-20	1.92E-03
	3°	2B988_2023-10-19_12-00-21	1.90E-03
Longitudinal direction (y)	1°	2B988_2023-10-19_12-00-21	1.76E-03
	2°	2B988_2023-10-02_08-00-21	1.29E-03
	3°	2B988_2023-10-10_12-00-20	8.62E-04
Transverse direction (z)	1°	2B988_2023-10-02_08-00-21	1.08E-03
	2°	2B988_2023-10-07_08-00-21	9.33E-04
	3°	2B988_2023-10-19_12-00-21	8.96E-04

Table 8-28: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-10-02_08-00-21	8.20E-06	2B988_2023-10-02_08-00-21	1.41E-06
2	2B988_2023-10-07_08-00-21	6.68E-06	2B988_2023-10-19_12-00-21	8.00E-07
3	2B988_2023-10-10_12-00-20	6.02E-06	2B988_2023-10-07_08-00-21	7.01E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-10-19_12-00-21	1.10E-05	2B988_2023-10-19_12-00-21	6.46E-07
2	2B988_2023-10-02_08-00-21	1.93E-06	2B988_2023-10-02_08-00-21	3.08E-07
3	2B988_2023-10-10_12-00-20	8.74E-07	2B988_2023-10-10_12-00-20	1.51E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-10-02_08-00-21	1.51E-06	2B988_2023-10-02_08-00-21	2.25E-07
2	2B988_2023-10-19_12-00-21	1.38E-06	2B988_2023-10-07_08-00-21	1.67E-07
3	2B988_2023-10-18_15-00-21	7.78E-07	2B988_2023-10-19_12-00-21	1.66E-07

Table -29: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	B	B	A	A	A
2	C	D	B	A	A	A	D	B	D
3	B	C	D	C	C	C	B	-	B

8.10.1 Vertical direction (x)

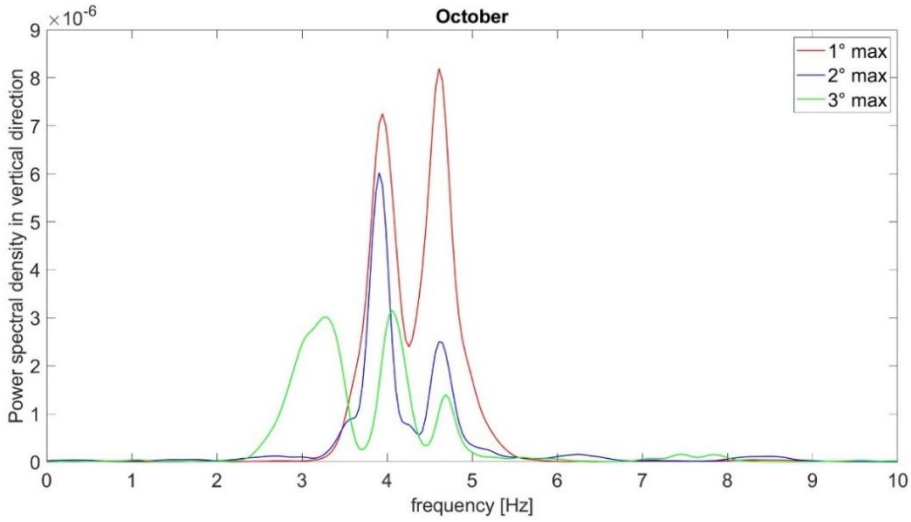


Figure 1-110: Results obtained from the 3 accelerograms with maximum SD in time domain

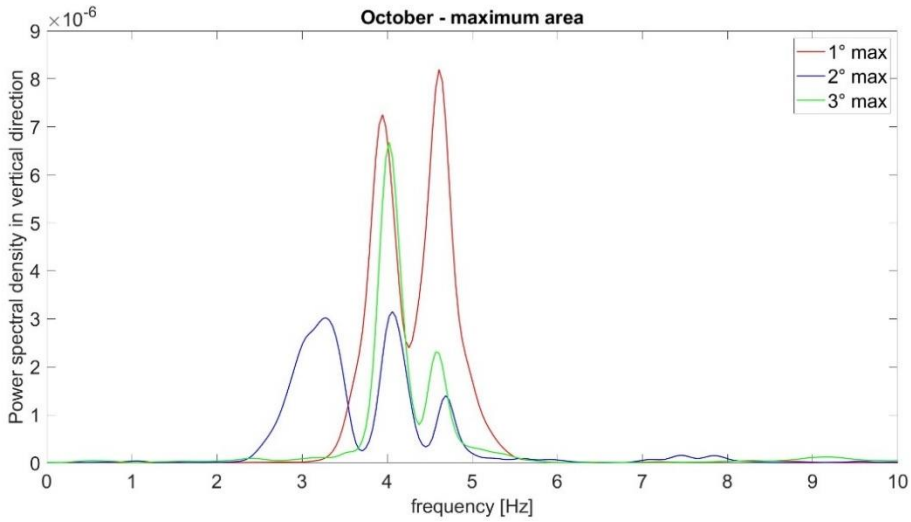


Figure 1-111: Results obtained from the 3 accelerograms with maximum area of PSD

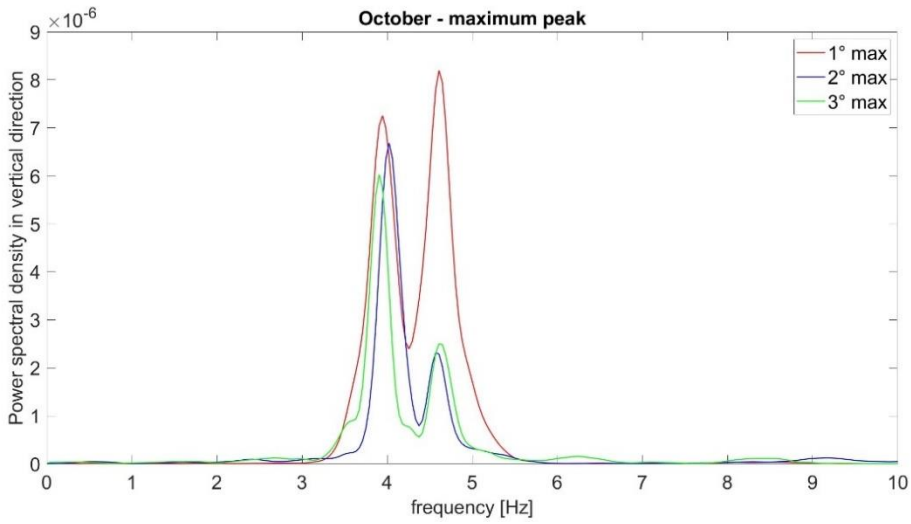


Figure 8-112: Results obtained from the 3 accelerograms with highest peak if PSD

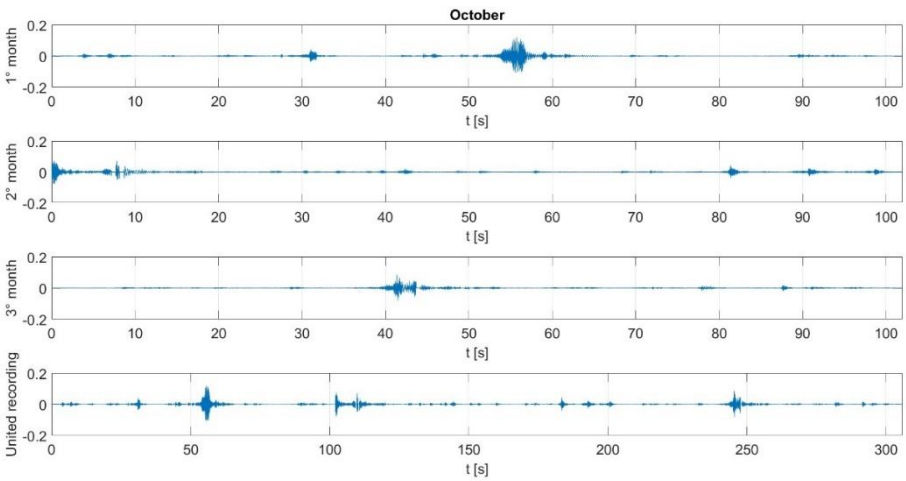


Figure 8-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.10.2 Longitudinal direction (y)

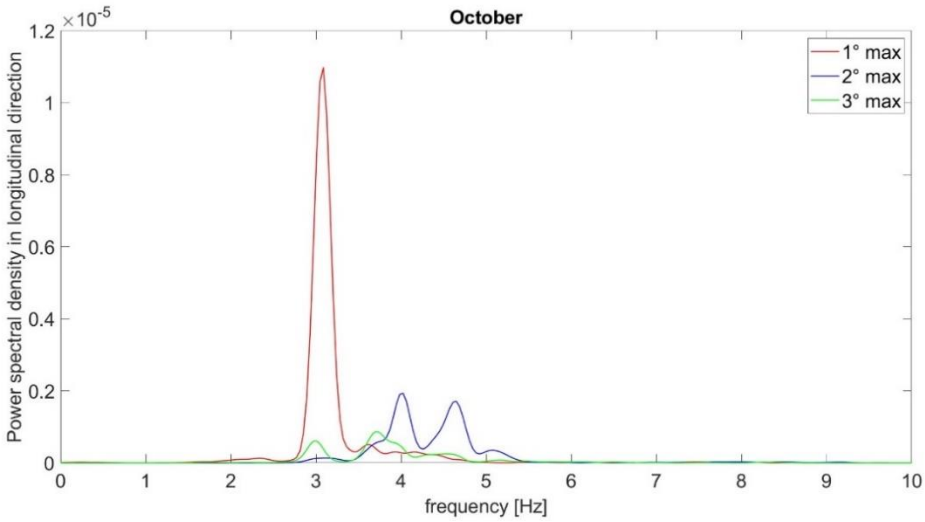


Figure 1-114: Results obtained from the 3 accelerograms with maximum SD in time domain

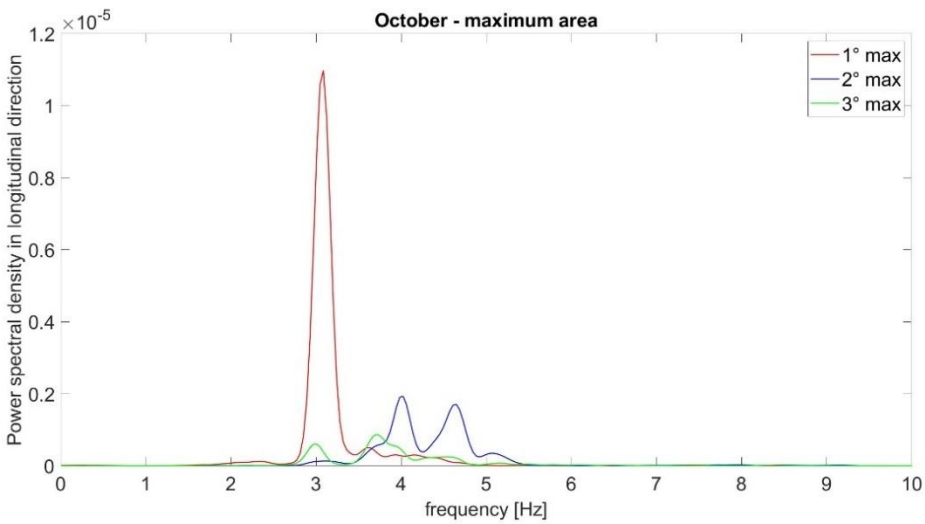


Figure 1-115: Results obtained from the 3 accelerograms with maximum area of PSD

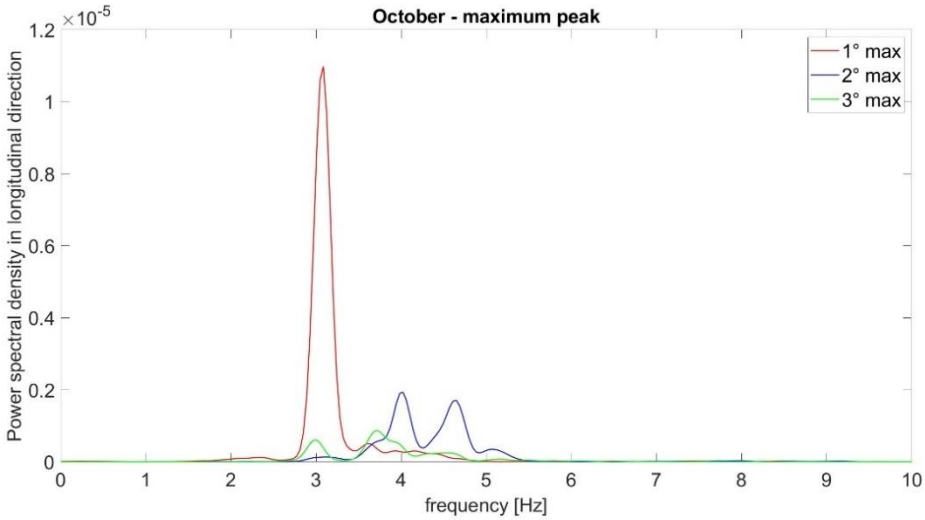


Figure 8-116: Results obtained from the 3 accelerograms with highest peak if PSD

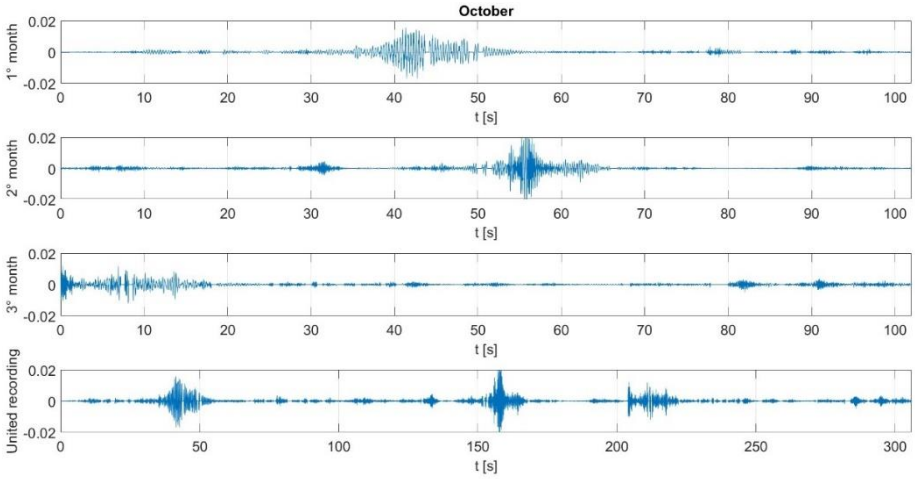


Figure 8-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.10.3 Transverse direction (z)

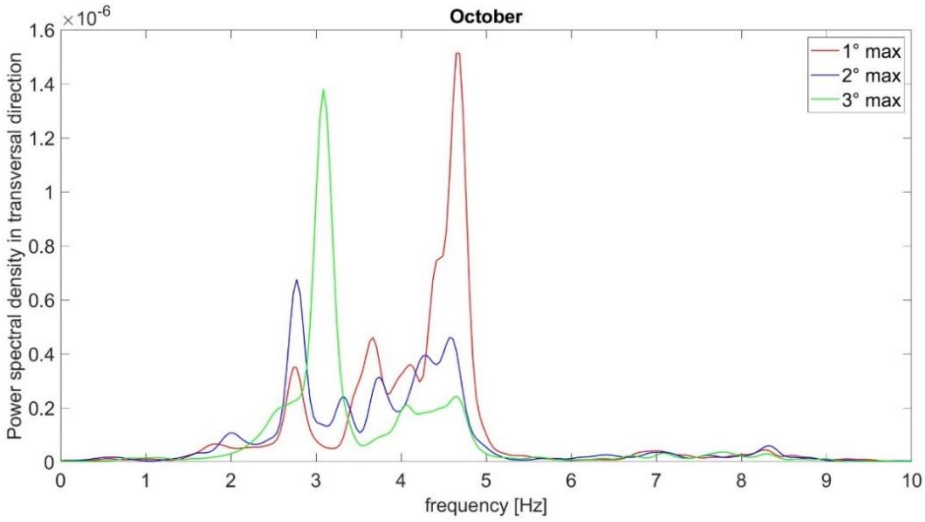


Figure 1-118: Results obtained from the 3 accelerograms with maximum SD in time domain

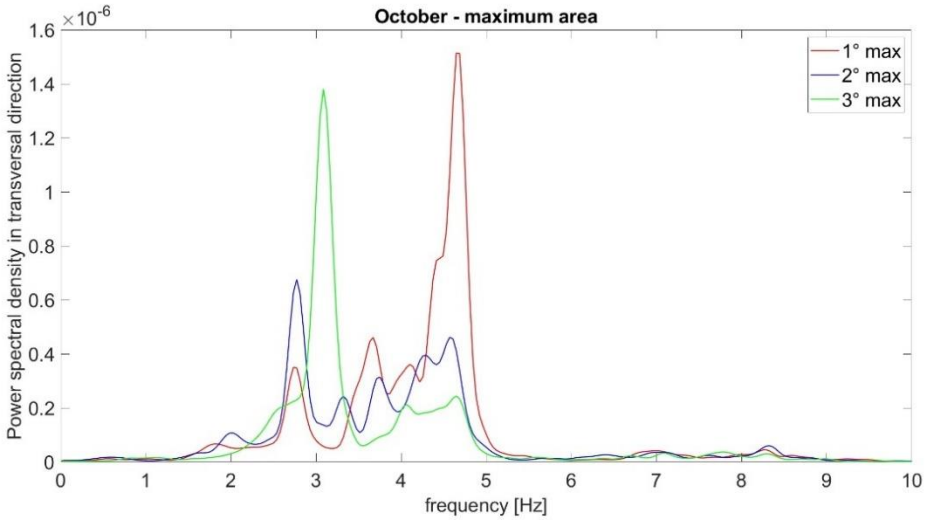


Figure 1-119: Results obtained from the 3 accelerograms with maximum area of PSD

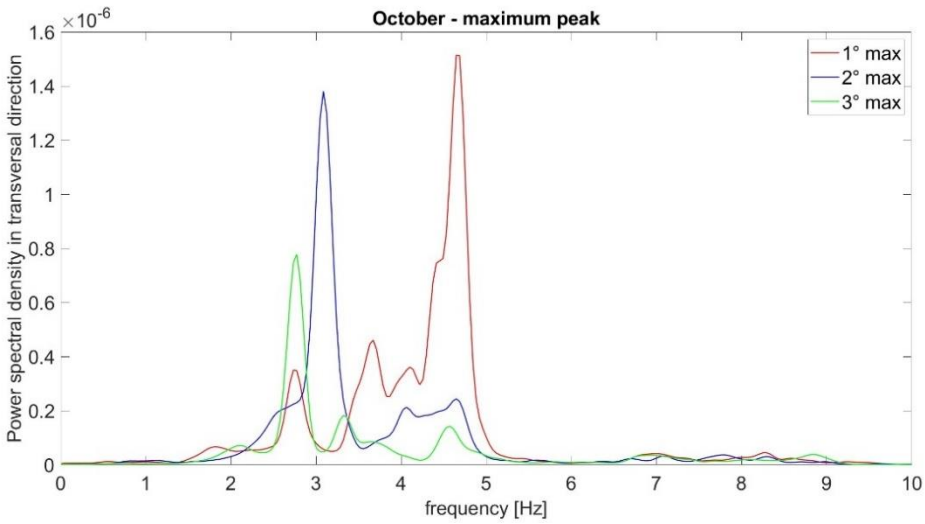


Figure 1-120: Results obtained from the 3 accelerograms with highest peak if PSD

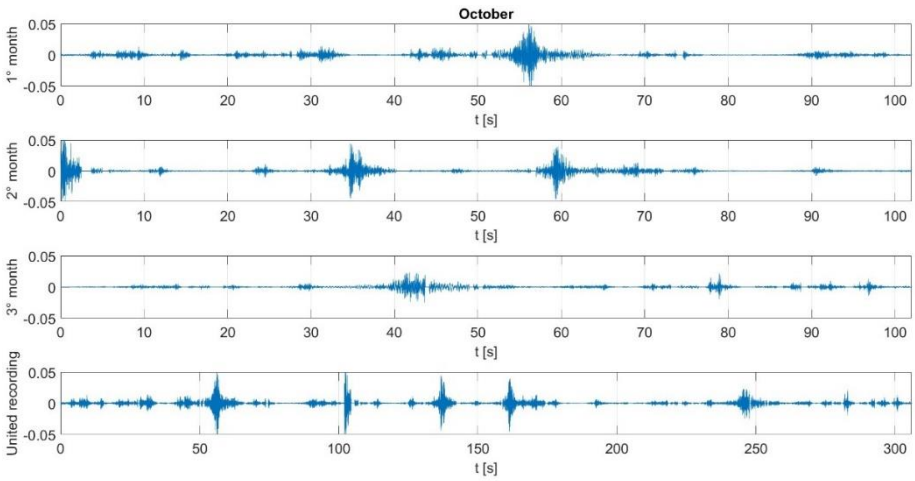


Figure 8-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

8.11 November

The results obtained for the November dataset are shown in the following tables.

Table -30: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-11-07_17-00-21	3.94E-03
	2°	2B988_2023-11-11_14-00-21	1.56E-03
	3°	2B988_2023-11-29_02-00-21	1.54E-03
Longitudinal direction (y)	1°	2B988_2023-11-07_17-00-21	1.33E-03
	2°	2B988_2023-11-06_17-00-21	8.20E-04
	3°	2B988_2023-11-29_02-00-21	6.73E-04
Transverse direction (z)	1°	2B988_2023-11-07_17-00-21	1.34E-03
	2°	2B988_2023-11-07_13-00-20	9.70E-04
	3°	2B988_2023-11-14_09-00-21	8.27E-04

Table 8-31: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-11-07_17-00-21	2.24E-05	2B988_2023-11-07_17-00-21	3.11E-06
2	2B988_2023-11-17_17-00-20	4.13E-06	2B988_2023-11-11_14-00-21	4.34E-07
3	2B988_2023-11-11_14-00-21	3.39E-06	2B988_2023-11-07_16-00-21	4.16E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-11-07_17-00-21	3.15E-06	2B988_2023-11-07_17-00-21	3.49E-07
2	2B988_2023-11-06_17-00-21	1.57E-06	2B988_2023-11-06_17-00-21	1.37E-07
3	2B988_2023-11-29_02-00-21	6.46E-07	2B988_2023-11-17_17-00-20	7.97E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-11-07_17-00-21	2.64E-06	2B988_2023-11-07_17-00-21	3.57E-07
2	2B988_2023-11-07_13-00-20	1.41E-06	2B988_2023-11-07_13-00-20	2.03E-07
3	2B988_2023-11-14_09-00-21	9.78E-07	2B988_2023-11-11_14-00-21	1.31E-07

Table 8-32: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	-	B	C	C	C	E	E	E
3	-	B	-	D	D	-	F	F	-

8.11.1 Vertical direction (x)

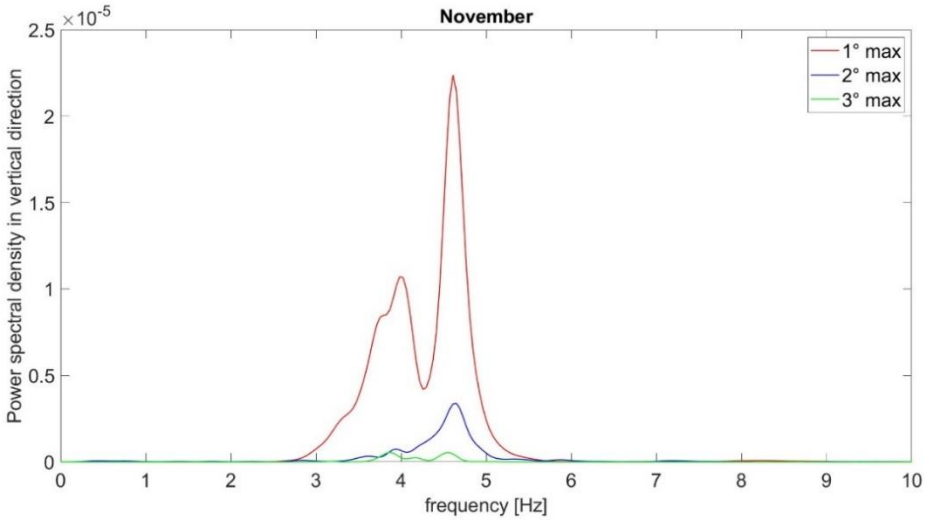


Figure 1-122: Results obtained from the 3 accelerograms with maximum SD in time domain

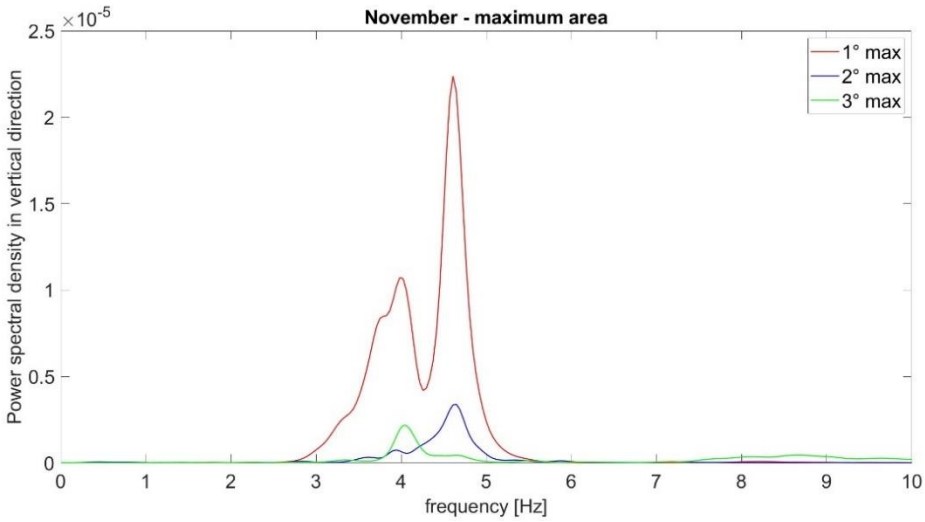


Figure 8-123: Results obtained from the 3 accelerograms with maximum area of PSD

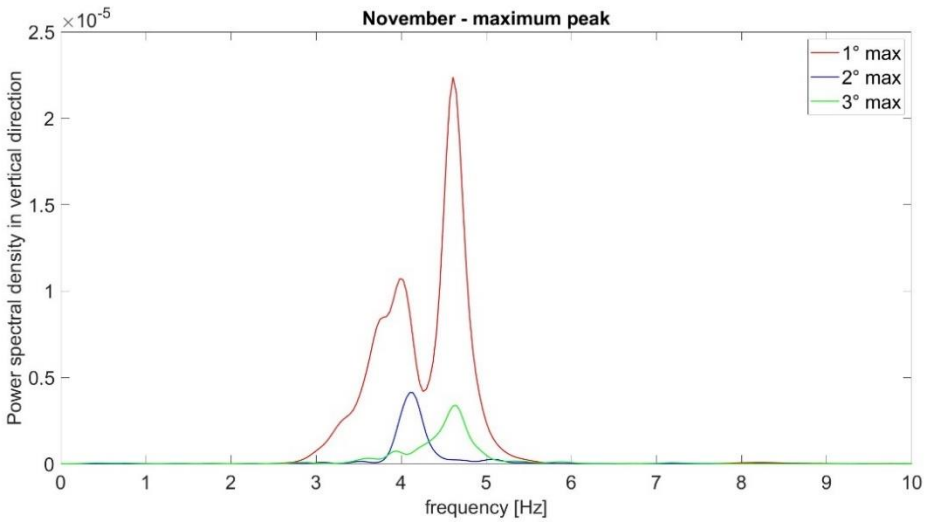


Figure 1-124: Results obtained from the 3 accelerograms with highest peak if PSD

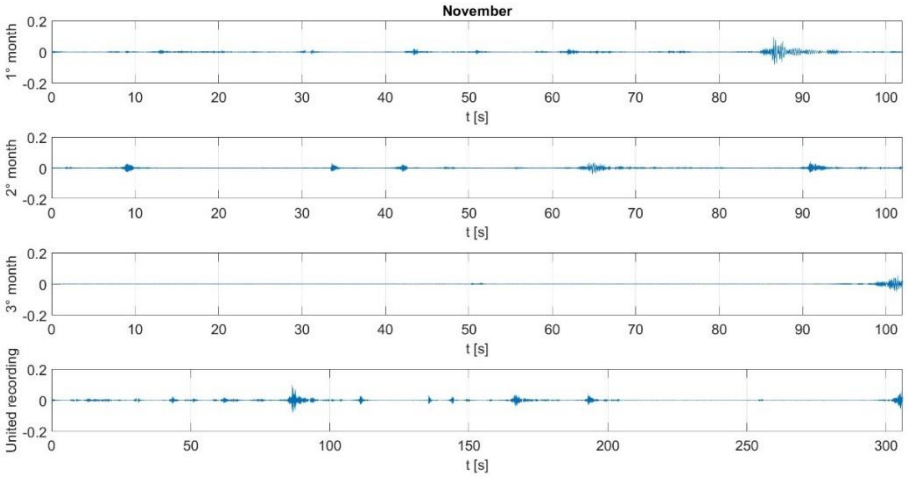


Figure 8-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.11.2 Longitudinal direction (y)

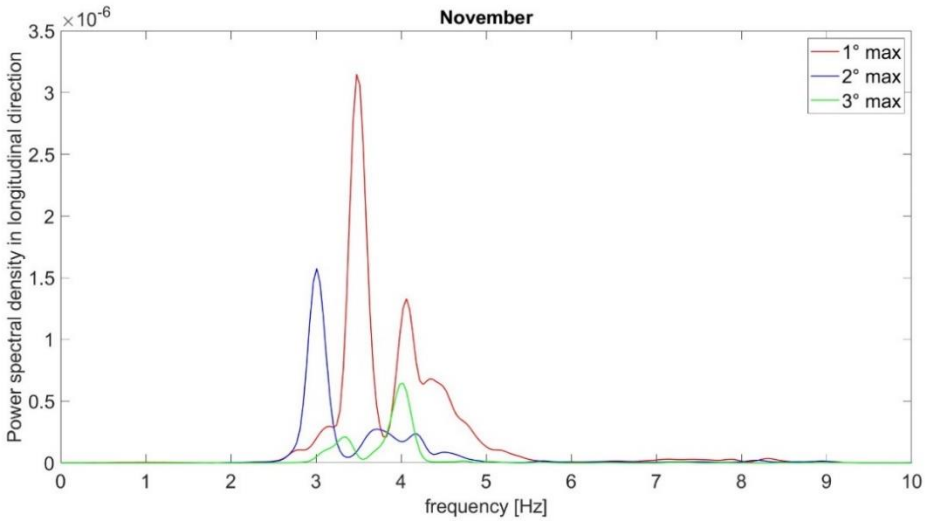


Figure 8-126: Results obtained from the 3 accelerograms with maximum SD in time domain

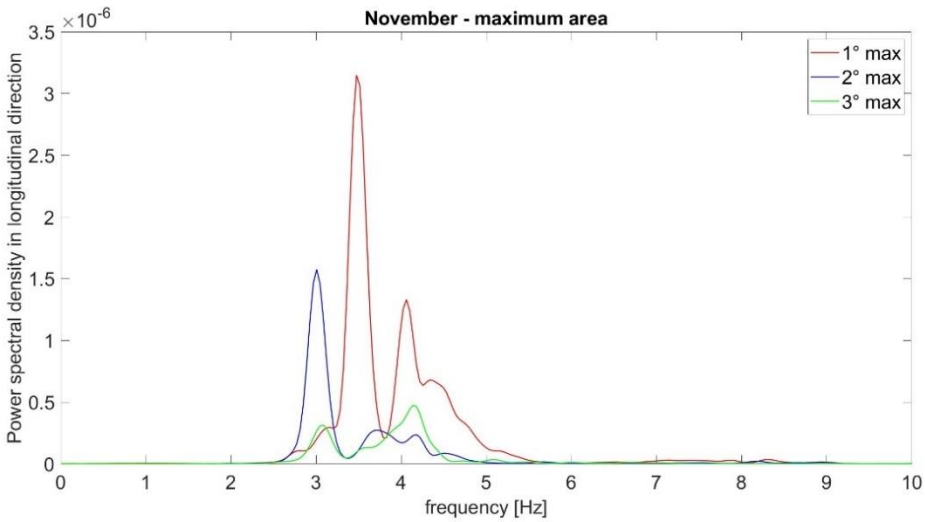


Figure 8-127: Results obtained from the 3 accelerograms with maximum area of PSD

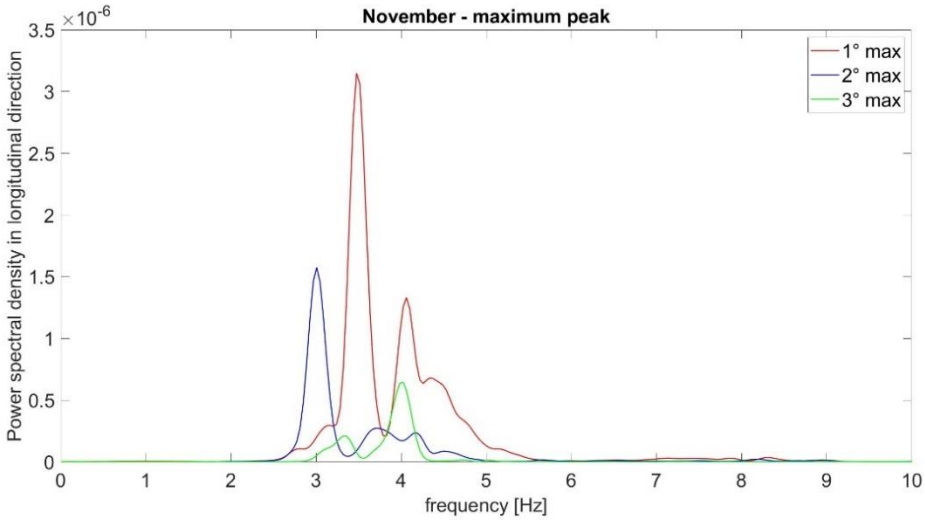


Figure 8-128: Results obtained from the 3 accelerograms with highest peak if PSD

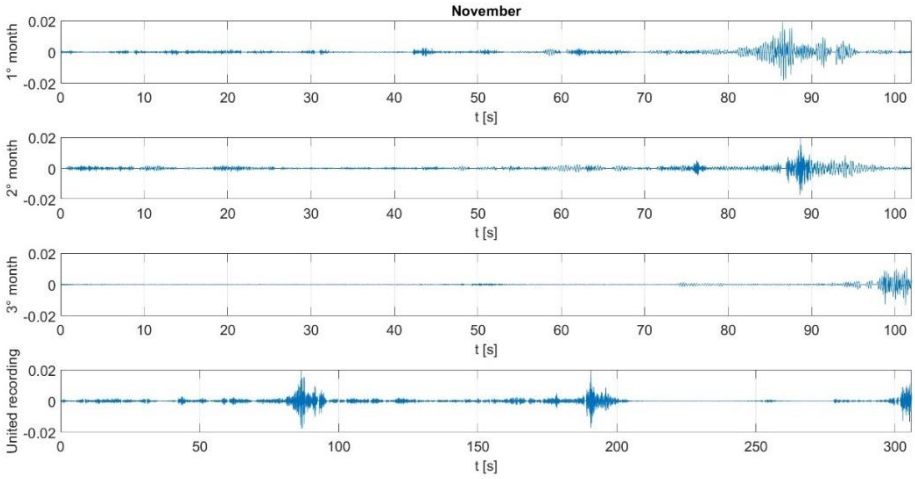


Figure 8-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.11.3 Transverse direction (z)

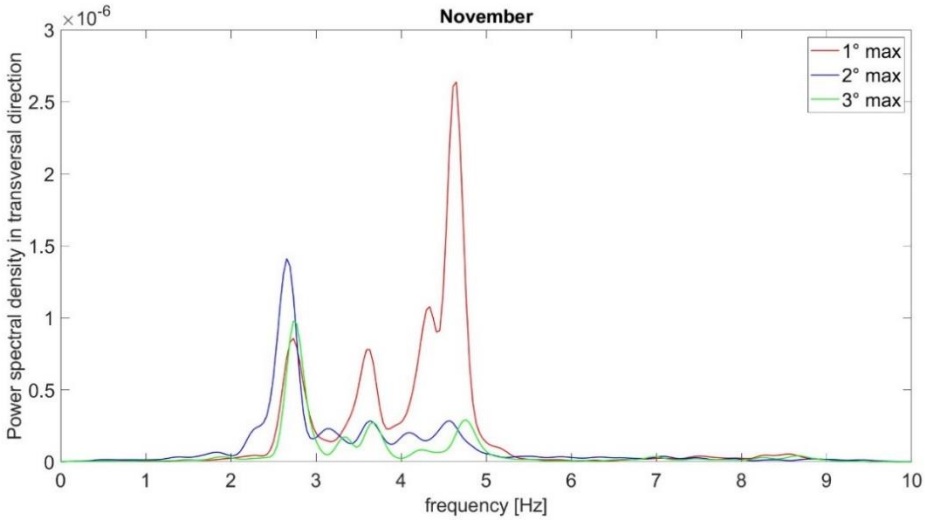


Figure 8-130: Results obtained from the 3 accelerograms with maximum SD in time domain

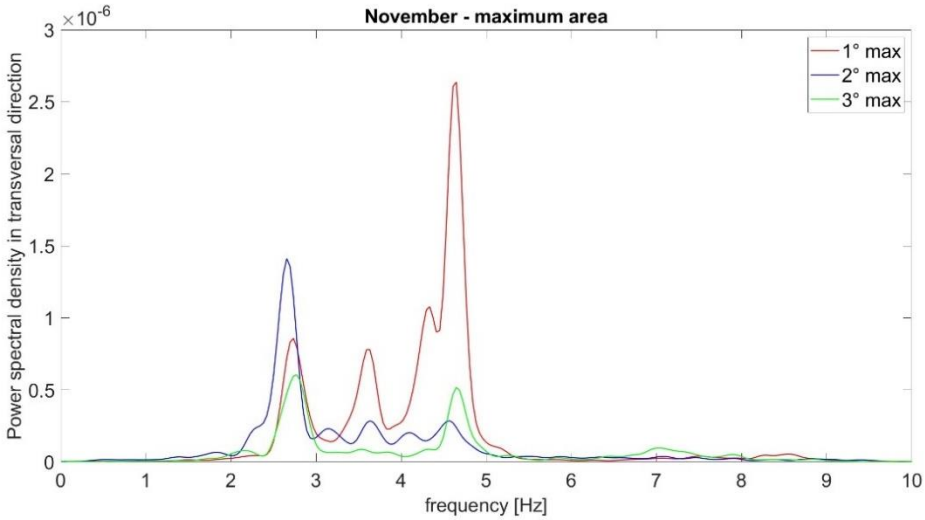


Figure 8-131: Results obtained from the 3 accelerograms with maximum area of PSD

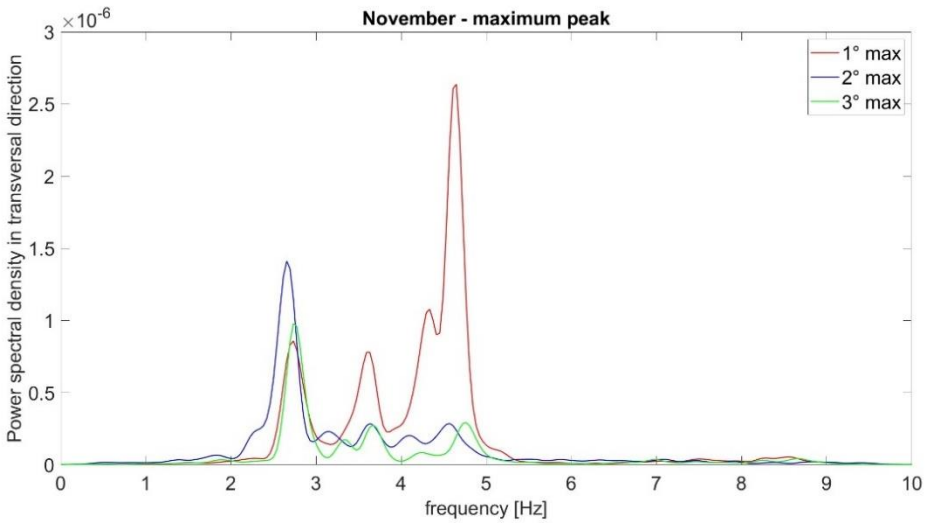


Figure 1-132: Results obtained from the 3 accelerograms with highest peak if PSD

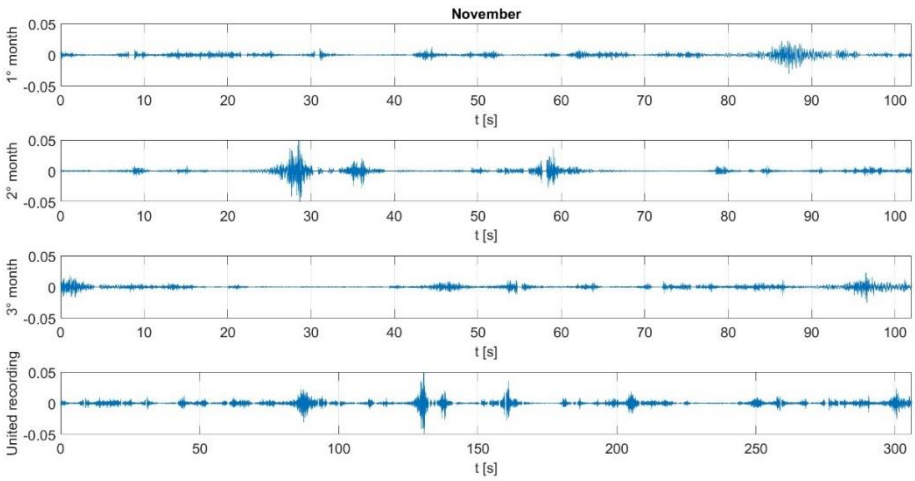


Figure 1-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

8.12 December

The results obtained for the December dataset are shown in the following tables.

Table -33: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B988_2023-12-06_10-00-21	2.19E-03
	2°	2B988_2023-12-13_08-00-21	1.89E-03
	3°	2B988_2023-12-29_15-00-21	1.69E-03
Longitudinal direction (y)	1°	2B988_2023-12-06_10-00-21	1.47E-03
	2°	2B988_2023-12-13_08-00-21	9.37E-04
	3°	2B988_2023-12-22_09-00-20	8.26E-04
Transverse direction (z)	1°	2B988_2023-12-06_10-00-21	9.99E-04
	2°	2B988_2023-12-13_08-00-21	9.11E-04
	3°	2B988_2023-12-05_09-00-21	8.01E-04

Table -34: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-12-06_10-00-21	6.45E-06	2B988_2023-12-06_10-00-21	1.01E-06
2	2B988_2023-12-13_08-00-21	5.06E-06	2B988_2023-12-13_08-00-21	7.15E-07
3	2B988_2023-12-29_15-00-21	4.77E-06	2B988_2023-12-29_15-00-21	6.17E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-12-06_10-00-21	3.01E-06	2B988_2023-12-06_10-00-21	4.50E-07
2	2B988_2023-12-22_09-00-20	1.64E-06	2B988_2023-12-13_08-00-21	1.80E-07
3	2B988_2023-12-07_14-00-20	1.31E-06	2B988_2023-12-22_09-00-20	1.36E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B988_2023-12-05_09-00-21	1.35E-06	2B988_2023-12-06_10-00-21	2.02E-07
2	2B988_2023-12-06_10-00-21	8.65E-07	2B988_2023-12-13_08-00-21	1.63E-07
3	2B988_2023-12-22_14-00-21	8.54E-07	2B988_2023-12-05_09-00-21	1.35E-07

Table-35: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	E	A
2	B	B	B	B	D	B	B	A	B
3	C	C	C	D	-	D	E	-	E

8.12.1 Vertical direction (x)

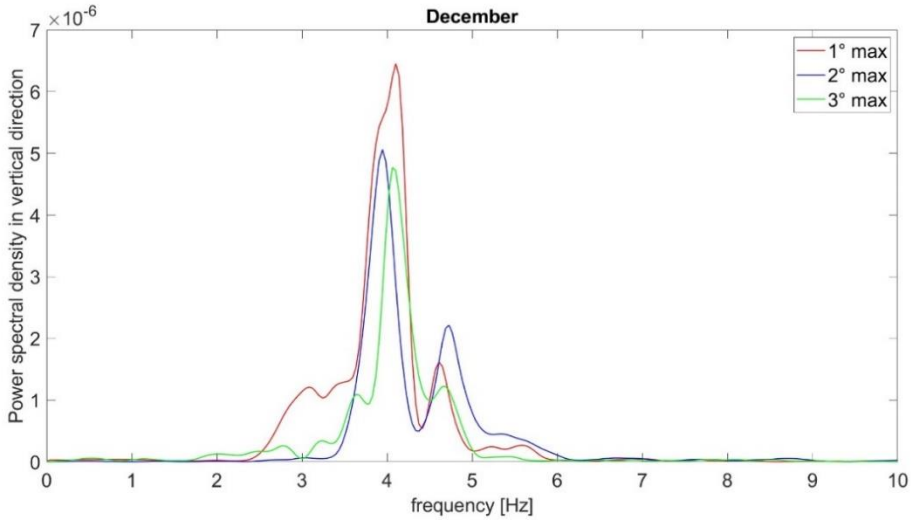


Figure 8-134: Results obtained from the 3 accelerograms with maximum SD in time domain

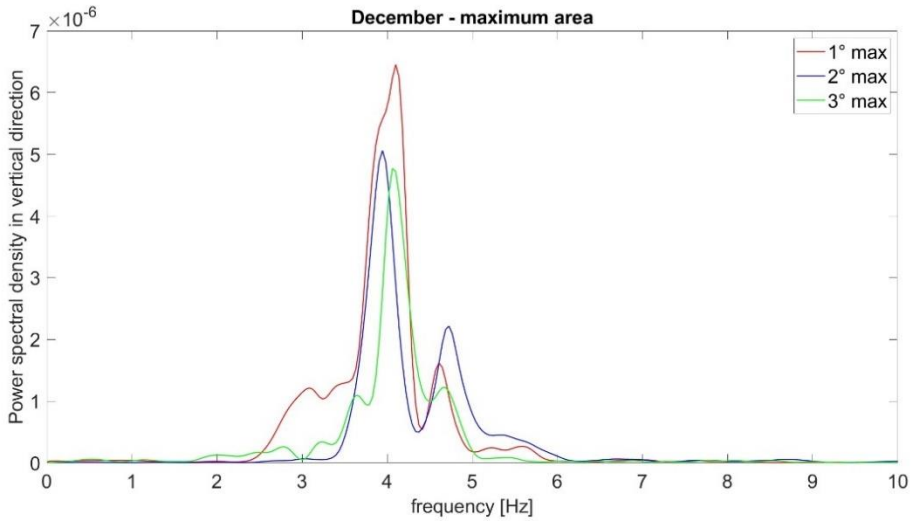


Figure 1-135: Results obtained from the 3 accelerograms with maximum area of PSD

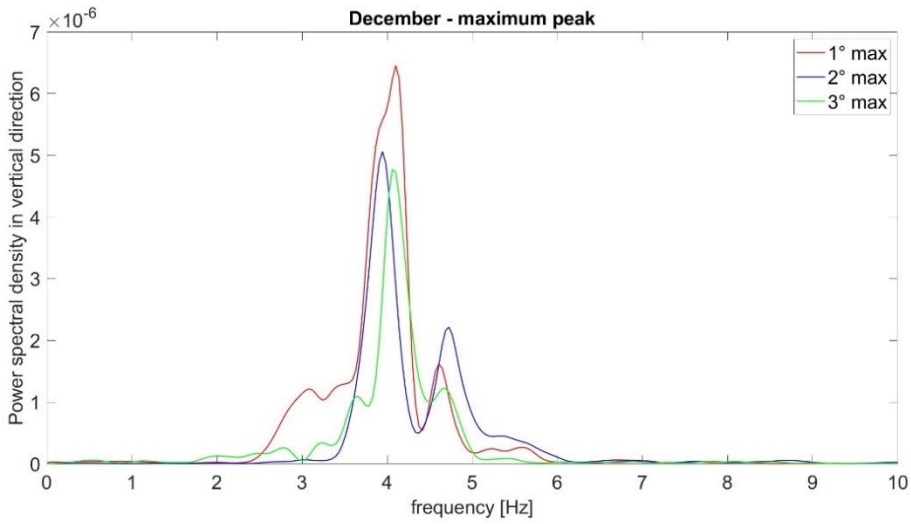


Figure 8-136: Results obtained from the 3 accelerograms with highest peak if PSD

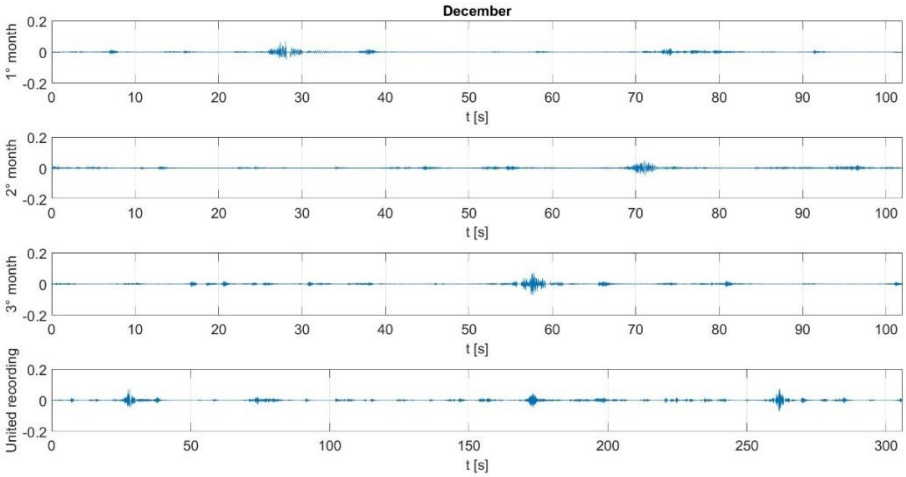


Figure 8-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

8.12.2 Longitudinal direction (y)

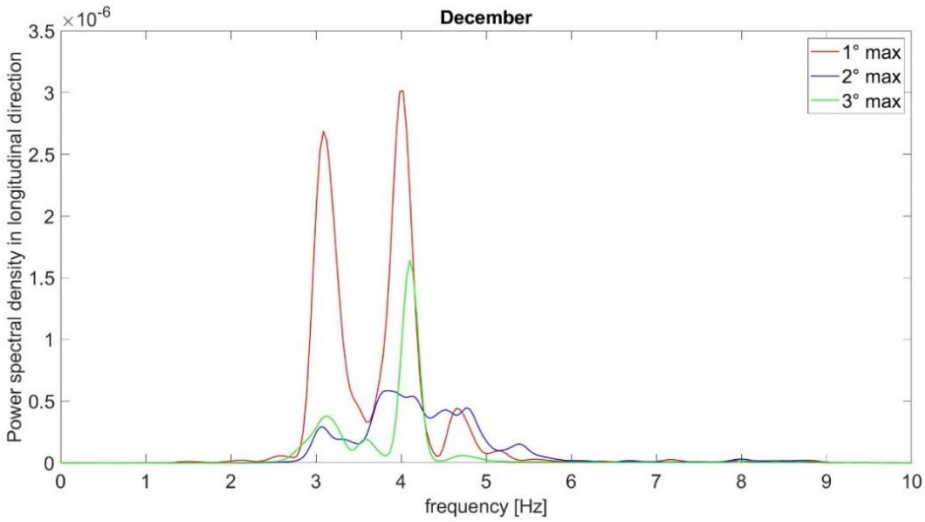


Figure 1-138: Results obtained from the 3 accelerograms with maximum SD in time domain

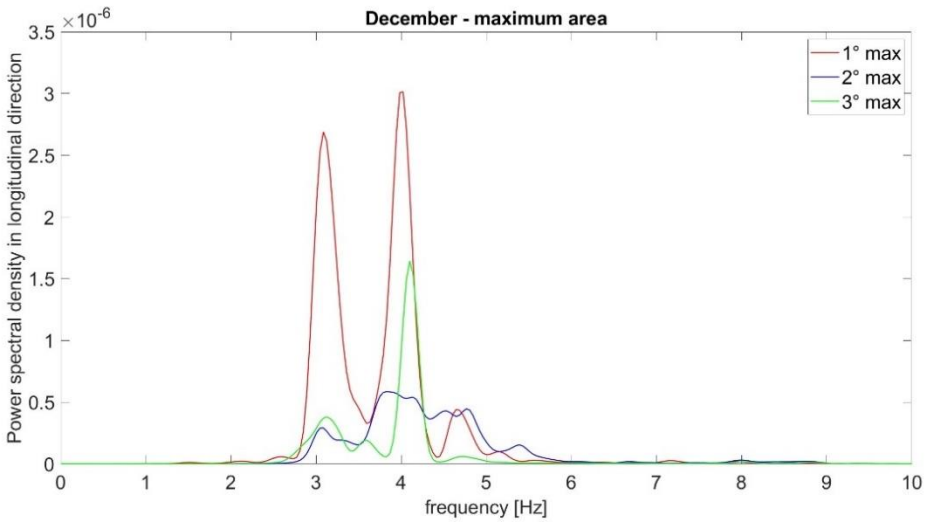


Figure 8-139: Results obtained from the 3 accelerograms with maximum area of PSD

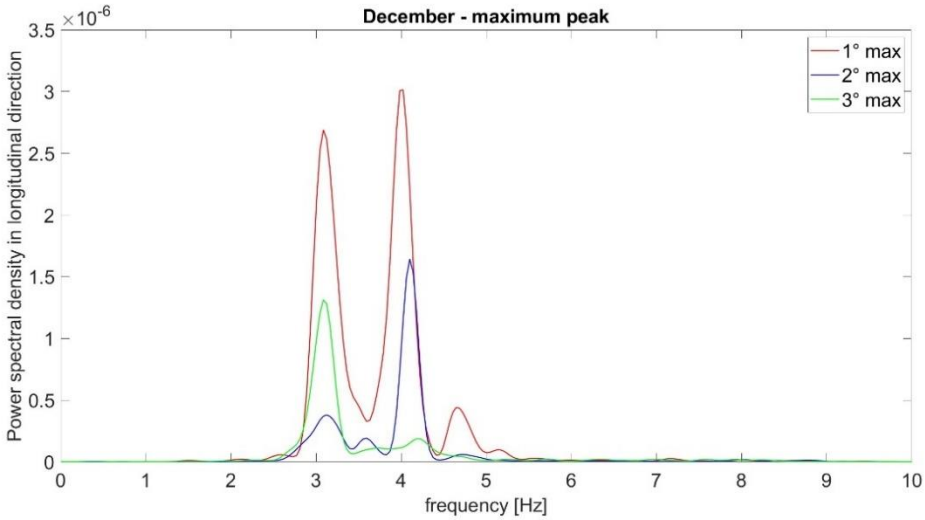


Figure 1-140: Results obtained from the 3 accelerograms with highest peak if PSD

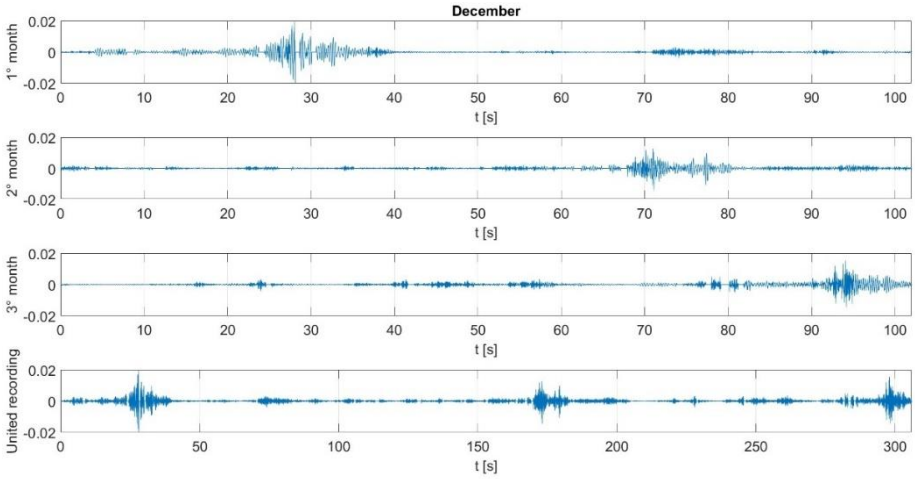


Figure 8-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

8.12.3 Transverse direction (z)

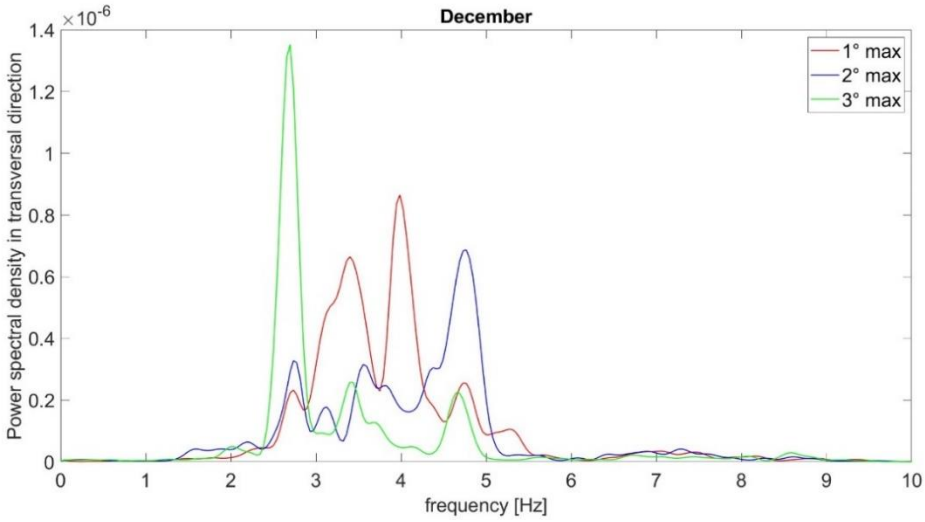


Figure 1-142: Results obtained from the 3 accelerograms with maximum SD in time domain

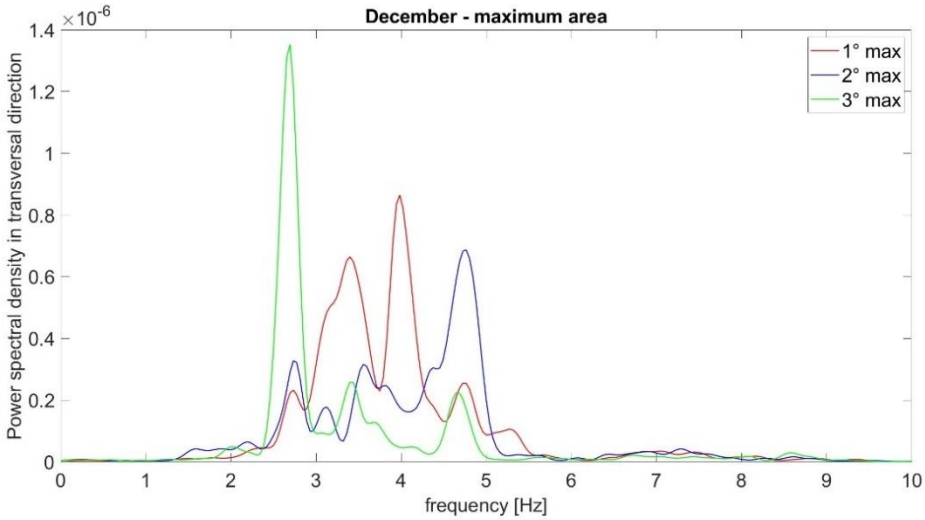


Figure 8-143: Results obtained from the 3 accelerograms with maximum area of PSD

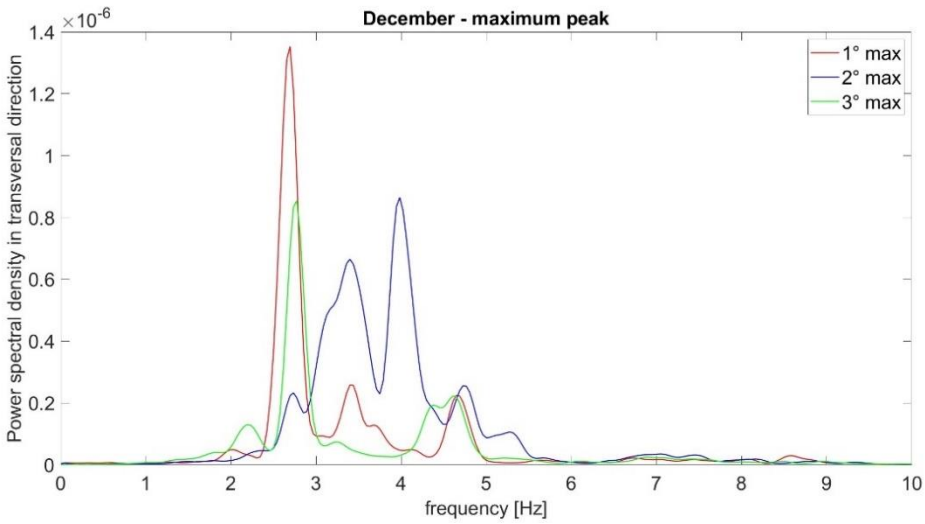


Figure 8-144: Results obtained from the 3 accelerograms with highest peak if PSD

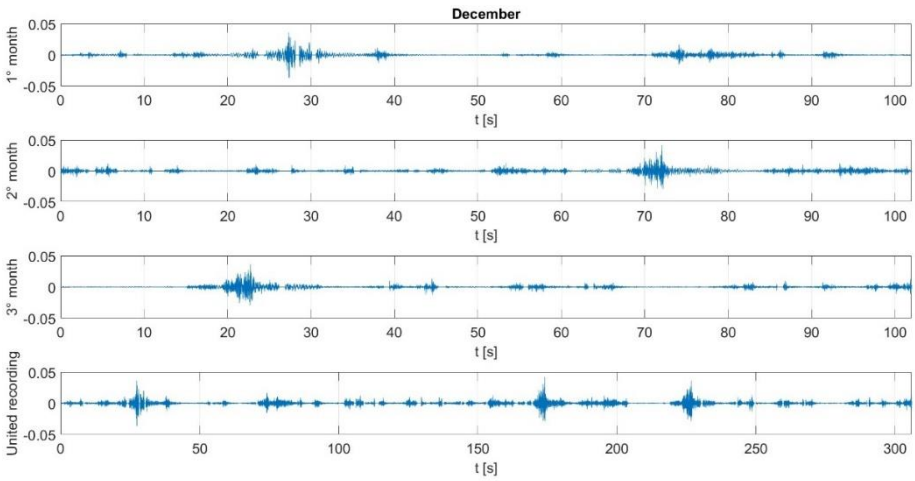


Figure 1-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

8.13 Overall representation

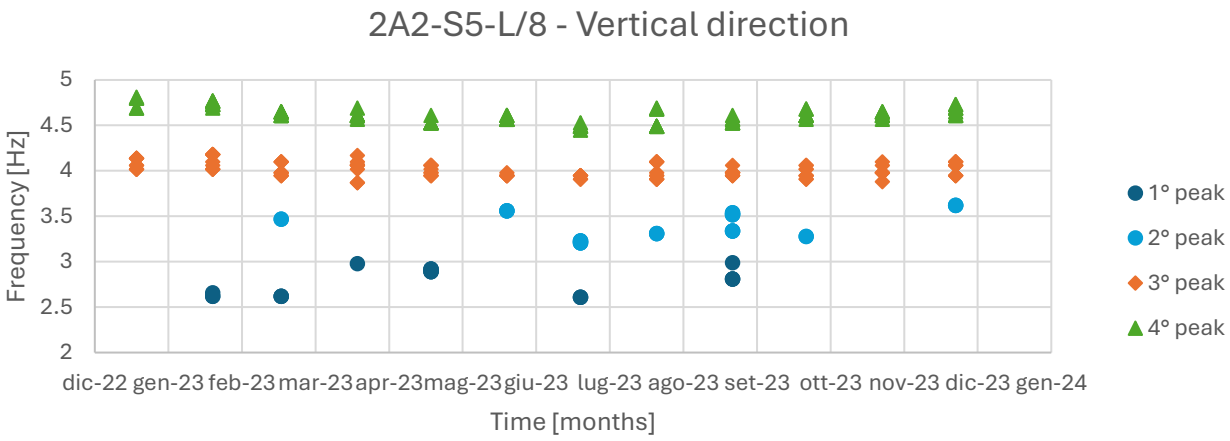
All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the different peaks value has been separated and the representation for the vertical, longitudinal, and transverse direction have been obtained.

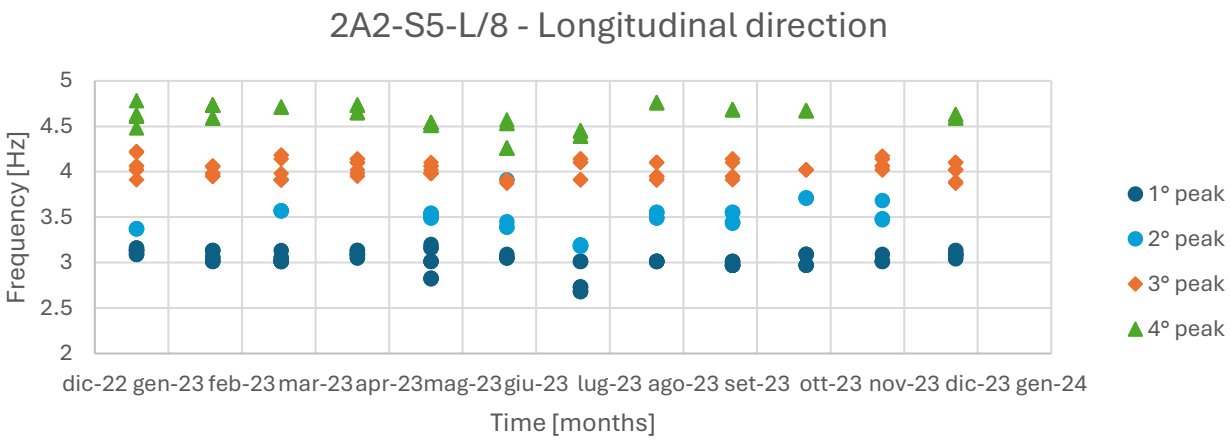
Table 1-37: Main identified frequencies for sensor 2B988 – bridge 2A2 – Sp5 – L/8

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	20	27	99	97	92	41	91	56	20	107	68	101
	MEAN	**2.77**	**3.41**	**4.01**	**4.61**	**3.03**	**3.48**	**4.03**	**4.60**	**2.09**	**2.75**	**3.76**	**4.57**
	SD	0.14	0.15	0.08	0.08	0.11	0.16	0.09	0.13	0.11	0.10	0.20	0.11
	C.o.V.	5.2%	4.3%	1.9%	1.8%	3.6%	4.6%	2.3%	2.8%	5.5%	3.6%	5.2%	2.5%
	Rating	**16%**	**23%**	**100%**	**99%**	**81%**	**34%**	**89%**	**52%**	**16%**	**95%**	**54%**	**97%**
1	gen-23			4.02	4.8	3.13		4.06	4.61	2.21	2.58	3.91	4.34
2	gen-23			4.14		3.09	3.37	4.22		2.21	2.73		4.69
3	gen-23			4.06	4.69	3.16		4.02	4.78	2.09	2.85	3.69	4.45
1	gen-23			4.02	4.8	3.16		4.06	4.61		2.58	3.91	4.38
2	gen-23			4.14		3.13	3.37	4.22			2.73		4.68
3	gen-23			4.06	4.69	3.09		4.02	4.48		2.81	3.89	4.68
1	gen-23			4.02	4.81	3.13	3.37	4.21			2.58	3.91	4.33
2	gen-23			4.14		3.13		4.06	4.61		2.81	3.89	4.68
3	gen-23			4.14		3.09		3.91	4.63		2.73		4.72
1	feb-23	2.66		4.02	4.77	3.13		3.98	4.73		2.5	4.02	4.69
2	feb-23			4.18	4.73	3.01		4.06	4.73		2.73	3.48	4.69
3	feb-23			4.06	4.73	3.05		3.95	4.59		2.77	4.08	4.69
1	feb-23	2.62		4.02	4.77	3.13		3.98	4.73		2.5	4.02	4.69
2	feb-23			4.18	4.73	3.01		4.05	4.73		2.73	3.48	
3	feb-23			4.18	4.76	3.06		3.95	4.59		2.77	4.08	4.69
1	feb-23	2.62		4.18	4.73	3.13		3.98	4.73		2.73	3.48	4.69
2	feb-23			4.1	4.77	3.05		4.06	4.73		2.5	4.02	4.69
3	feb-23			4.02	4.69	3.01		3.95	4.59		2.77	4.08	4.69
1	mar-23	2.62		3.95	4.65	3.01		4.18		1.96	2.73	3.79	4.53
2	mar-23		3.47	4.1	4.65	3.01	3.57	3.91			2.77	3.83	4.65
3	mar-23			3.98	4.61	3.13		3.98		2.18	2.73	3.6	4.45
1	mar-23	2.62		3.95	4.65	3.01		4.14		1.96	2.73	3.79	4.53
2	mar-23		3.47	3.98	4.65	3.01	3.57	3.91		2.18	2.77	3.83	4.65
3	mar-23			4.1	4.61	3.05		3.91	4.71	2.18	2.73	3.6	4.45
1	mar-23			3.98	4.61	3.01	3.57	4.18		2.18	2.77		
2	mar-23	2.62		3.95	4.65	3.01		3.91		2.18	2.77		4.41
3	mar-23			4.1	4.61	3.05		3.91	4.71	2.31	2.77		4.3
1	apr-23			4.06	4.61	3.09		4.1	4.73		2.77		4.45
2	apr-23			4.06	4.61	3.05		4.14			2.77	4.09	4.68
3	apr-23	2.98		4.17	4.61	3.09		3.98	4.65	2.21	2.77	4.09	4.61
1	apr-23			4.07	4.61	3.09		4.1	4.73		2.77		4.45
2	apr-23			3.87	4.61	3.13		4.14		2.04	2.77	4.09	4.61

3	apr-23			4.02	4.61	3.05		3.95	4.65		2.73	4.09	4.69
1	apr-23			4.06	4.61	3.09		4.1	4.73		2.77	4.09	4.61
2	apr-23			3.87	4.69	3.13		3.98	4.65		2.77		4.45
3	apr-23			4.1	4.57	3.13		4.02	4.73	2.04	2.73	4.09	4.68
1	mag-23	2.89		3.95	4.53	3.01		3.98			2.77	3.76	4.53
2	mag-23	2.92		4.06	4.53	3.2	3.54	3.98	4.51		2.73		4.49
3	mag-23			4.02		2.82	3.49	4.06	4.54		2.54		4.61
1	mag-23	2.89		3.95	4.53	3.01		3.98			2.77	3.76	4.53
2	mag-23	2.92		4.06	4.53	3.16	3.54	4.1	4.51		2.73		4.49
3	mag-23			3.98	4.61	2.83	3.49	3.98	4.54		2.54		4.61
1	mag-23	2.89		3.95	4.53	3.01		4.02			2.77	3.76	4.53
2	mag-23	2.92		4.06	4.53	3.16	3.54	3.98	4.51		2.77		4.49
3	mag-23			3.98		2.82	3.49	4.06	4.54		2.73	3.79	
1	giu-23			3.95	4.61	3.05		3.91		1.93	2.77	3.71	4.56
2	giu-23			3.98	4.57		3.39		4.26		2.89	3.75	4.57
3	giu-23		3.56		4.57		3.91		4.53		2.7		4.53
1	giu-23			3.95	4.61	3.05		3.91		1.93	2.77	3.71	4.53
2	giu-23			3.95	4.57		3.39		4.26		2.89	3.75	4.57
3	giu-23		3.56		4.57			3.87	4.53		2.7		4.53
1	giu-23			3.95	4.61	3.05		3.91		1.93	2.77	3.71	4.57
2	giu-23		3.56		4.57		3.45		4.26		2.81		4.53
3	giu-23			3.95	4.57	3.09			4.57		2.89		4.53
1	lug-23		3.23	3.91	4.45	2.73	3.18	4.14			2.81	3.78	4.3
2	lug-23	2.61	3.21	3.95	4.49	2.68	3.19	3.91	4.39		2.97	3.6	4.49
3	lug-23				4.49	3.01			4.45		2.73	3.82	
1	lug-23		3.23	3.95		2.73	3.18	4.14			2.81		4.3
2	lug-23	2.61	3.21		4.49	2.68	3.19	3.91	4.39		2.97		4.49
3	lug-23			3.95	4.53	3.01		4.1	4.45		2.73	3.55	4.49
1	lug-23			3.95	4.49	3.01		4.1			2.81		4.29
2	lug-23		3.23	3.91		2.73	3.19	3.91	4.39		2.97	3.83	4.49
3	lug-23	2.61	3.21		4.49	2.68	3.18	4.14	4.45		2.73		4.45
1	ago-23		3.31	3.91	4.49		3.55	3.91			2.7		4.45
2	ago-23			4.1	4.68	3.01	3.49	4.1	4.76		2.7	3.69	4.49
3	ago-23			3.95	4.49	3.01		3.95			2.85	3.69	4.65
1	ago-23		3.31	3.91	4.49		3.55	3.91			2.7		4.45
2	ago-23			4.1	4.69	3.01	3.49	4.1	4.76		2.7	3.69	4.49
3	ago-23			3.95	4.49	3.01		3.95			2.85	3.69	4.65
1	ago-23		3.31	3.91	4.49		3.55	3.91			2.7		
2	ago-23			3.98	4.68	3.01	3.49	4.1	4.76		2.69	3.69	4.49
3	ago-23			4.1		3.01		3.95			2.69	3.61	4.45
1	set-23		3.34	3.98	4.53	2.97	3.55				2.73		4.49
2	set-23	2.81	3.52	3.95	4.57	3.01		3.91			2.7		4.57
3	set-23		3.54	3.98	4.53	2.97	3.44	4.14	4.68		2.73	3.95	
1	set-23		3.34	3.98	4.53	2.97	3.55				2.73		4.49
2	set-23	2.81	3.52	3.95	4.53	3.01		3.94			2.7		4.57
3	set-23	2.99		3.98	4.57	2.97	3.44	4.14	4.68		2.73	3.95	
1	set-23		3.34	3.98	4.53	2.97	3.55				2.73		4.49

2	set-23	2.81	3.52	3.95	4.57	3.01		3.95			2.7		4.53
3	set-23		3.54	4.06	4.61	2.97	3.43	4.1	4.68				4.57
1	ott-23			3.95	4.61	3.09					2.73	3.67	4.65
2	ott-23			3.91	4.61			4.02	4.67	2.01	2.77	3.75	4.57
3	ott-23		3.28	4.06	4.68	2.97	3.71				3.05		4.65
1	ott-23			3.95	4.61	3.09					2.73	3.67	4.65
2	ott-23		3.28	4.02	4.68			4.02	4.67	2.01	2.77	3.75	4.57
3	ott-23			4.06	4.57	2.97	3.71				3.09		4.65
1	ott-23			3.95	4.61	3.09					2.77	3.67	4.65
2	ott-23			4.02	4.61			4.02	4.67		3.09		4.65
3	ott-23			3.91	4.61	2.97	3.71			2.09	2.77		4.57
1	nov-23			3.98	4.61		3.47	4.06			2.73	3.63	4.65
2	nov-23				4.65	3.01					2.66	3.63	4.76
3	nov-23			3.88	4.57		3.68	4.02			2.73	3.67	4.57
1	nov-23			3.98	4.61		3.48	4.06			2.73	3.59	4.65
2	nov-23				4.65	3.01		4.14			2.66	3.53	4.57
3	nov-23			4.06		3.09		4.14			2.77		4.65
1	nov-23			3.98	4.61		3.48	4.06			2.73	3.63	4.65
2	nov-23			4.1	4.65	3.01		4.17			2.73	3.63	4.57
3	nov-23							4.02			2.66		4.6
1	dic-23			4.1	4.61	3.09		4.02	4.59		2.73	3.4	4.77
2	dic-23			3.95	4.69	3.05		3.89	4.63		2.73	3.55	4.77
3	dic-23		3.62	4.06	4.69	3.13		4.1			2.7	3.4	4.65
1	dic-23			4.1	4.61	3.09		4.02	4.59		2.73	3.39	4.77
2	dic-23			3.95	4.73	3.04		3.87	4.63		2.7	3.55	4.77
3	dic-23		3.62	4.06	4.69	3.09		4.1			2.73		4.69
1	dic-23			4.1	4.73	3.08		4.02	4.59		2.7	3.4	4.61
2	dic-23			3.95	4.61	3.13		4.1			2.73	3.98	4.73
3	dic-23		3.62	4.06	4.65	3.09					2.77		4.63





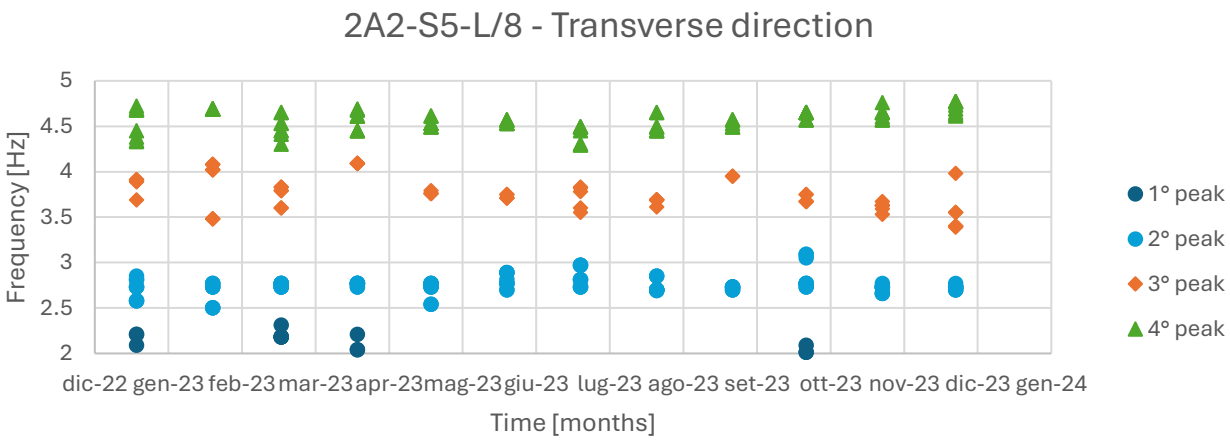


Figure 8-146: Main identified frequencies for sensor 2B988 – bridge 2A2 – Sp5 – L/8

9. Annex 9 – Bridge 223 – Span 2 – L/2 - Sensor 2BE0F

The Bridge 223 counts 2 monitored decks: span 2 and span 6 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 2 are:

- 2BE0F – situated in the midspan;
- 2BA63 – situated at a distance of L/4;
- 31205 – situated at a distance of L/8;
- 319BC – situated nearby the west pilar;
- 319E3 – situated nearby the east pilar.

The sensors present on deck number 6 are:

- 2B5E7 – situated in the midspan;
- 2BCF9 – situated at a distance of L/4 of the deck;
- 2BCAD – situated at a distance of L/8 of the deck;

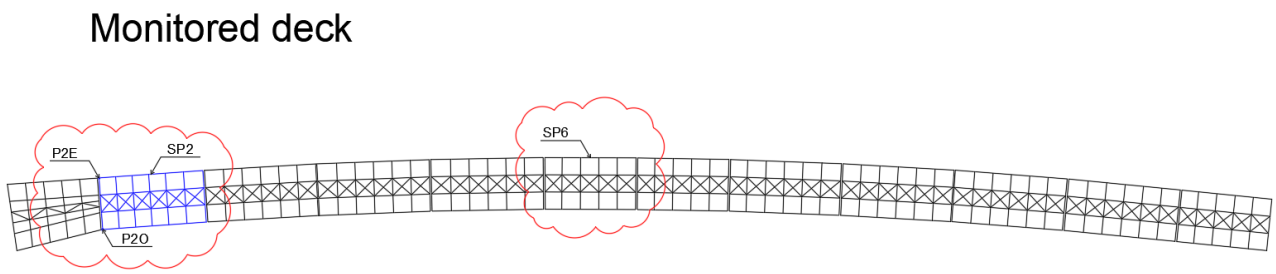


Figure 9-1 Monitored decks of 223 bridge

The accelerograms of the 2BE0F sensor have been analyzed and the results are represented in the following paragraphs.

9.1 January

The results obtained for the January dataset are shown in the following tables.

Table 9-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-01-30_07-00-20	3.95E-03
	2°	2BE0F_2023-01-31_07-00-20	3.11E-03
	3°	2BE0F_2023-01-26_13-00-21	2.96E-03
Longitudinal direction (y)	1°	2BE0F_2023-01-26_13-00-21	2.51E-04
	2°	2BE0F_2023-01-27_01-00-21	2.35E-04
	3°	2BE0F_2023-01-16_13-00-19	2.19E-04
Transverse direction (z)	1°	2BE0F_2023-01-30_07-00-20	1.08E-03
	2°	2BE0F_2023-01-31_07-00-20	7.75E-04
	3°	2BE0F_2023-01-26_13-00-21	7.57E-04

Table 9-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-01-30_07-00-20	3.08E-05	2BE0F_2023-01-30_07-00-20	3.28E-06
2	2BE0F_2023-01-31_07-00-20	1.15E-05	2BE0F_2023-01-31_07-00-20	1.96E-06
3	2BE0F_2023-01-26_13-00-21	1.09E-05	2BE0F_2023-01-26_13-00-21	1.87E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-01-26_13-00-21	3.53E-08	2BE0F_2023-01-26_13-00-21	1.29E-08
2	2BE0F_2023-01-27_01-00-21	3.34E-08	2BE0F_2023-01-27_01-00-21	1.13E-08
3	2BE0F_2023-01-23_13-00-19	3.06E-08	2BE0F_2023-01-16_13-00-19	9.84E-09
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-01-30_07-00-20	2.63E-06	2BE0F_2023-01-30_07-00-20	2.55E-07
2	2BE0F_2023-01-01_01-00-21	5.52E-07	2BE0F_2023-01-31_07-00-20	1.20E-07
3	2BE0F_2023-01-26_13-00-21	4.63E-07	2BE0F_2023-01-26_13-00-21	1.20E-07

Table 9-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	C	C	A	A	A
2	B	B	B	D	D	D	B	-	B
3	C	C	C	E	-	E	C	C	C

9.1.1 Vertical direction (x)

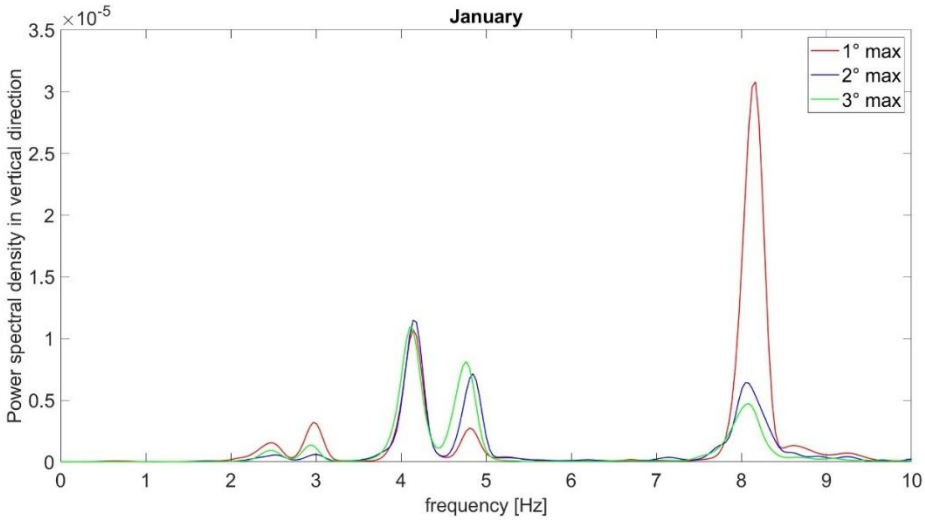


Figure 9-2: Results obtained from the 3 accelerograms with maximum SD in time domain

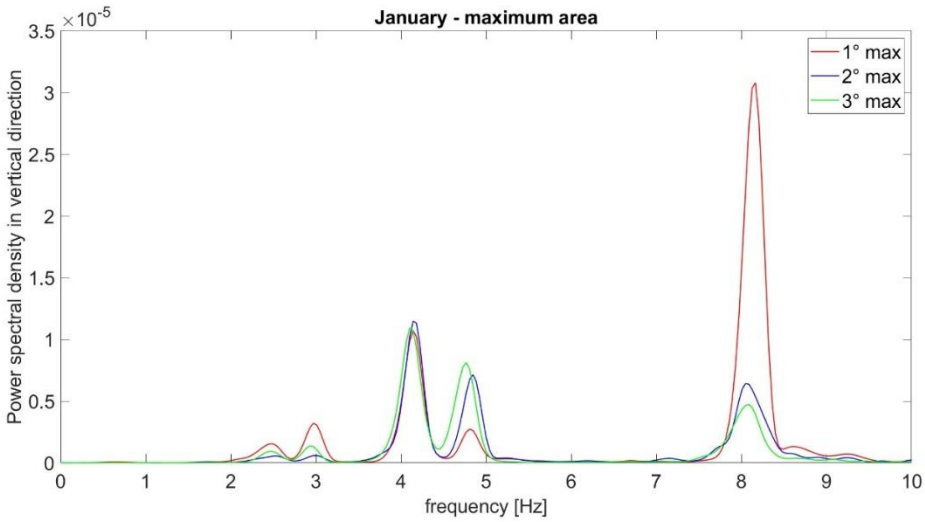


Figure 9-3: Results obtained from the 3 accelerograms with maximum area of PSD

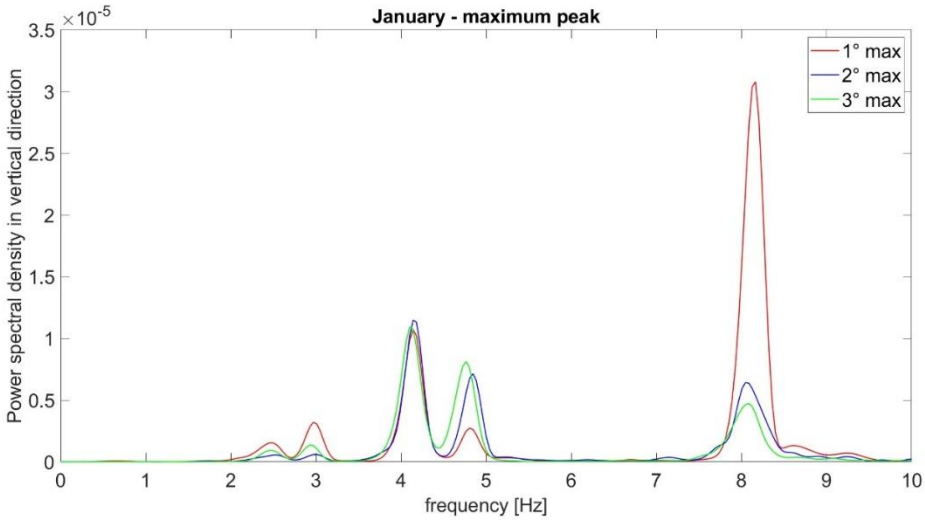


Figure 9-4: Results obtained from the 3 accelerograms with highest peak if PSD

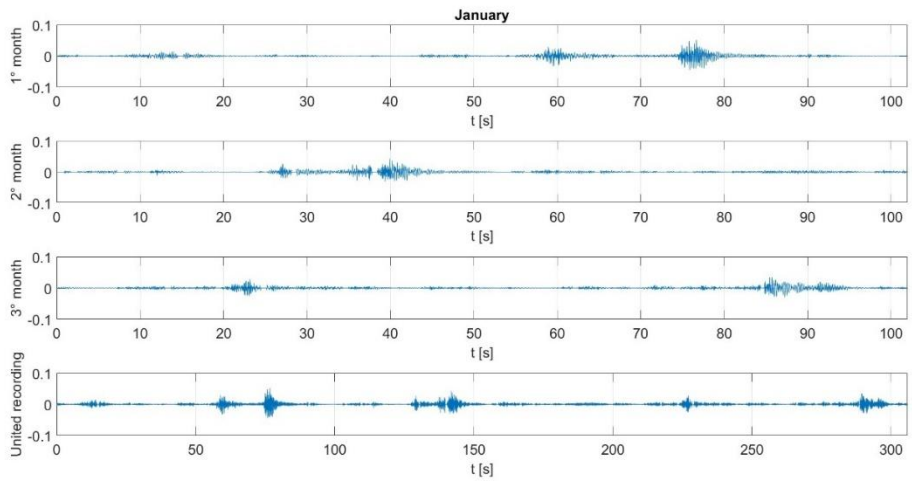


Figure 9-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.1.2 Longitudinal direction (y)

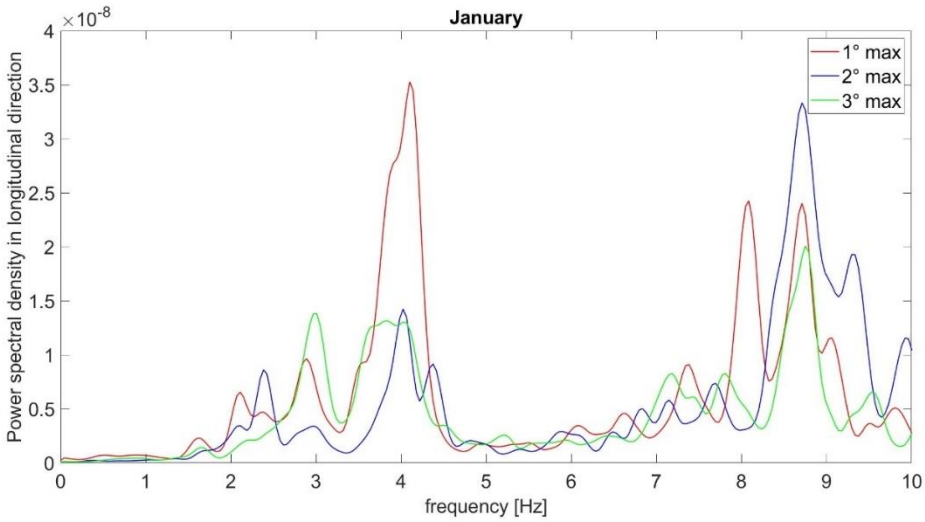


Figure 9-6: Results obtained from the 3 accelerograms with maximum SD in time domain

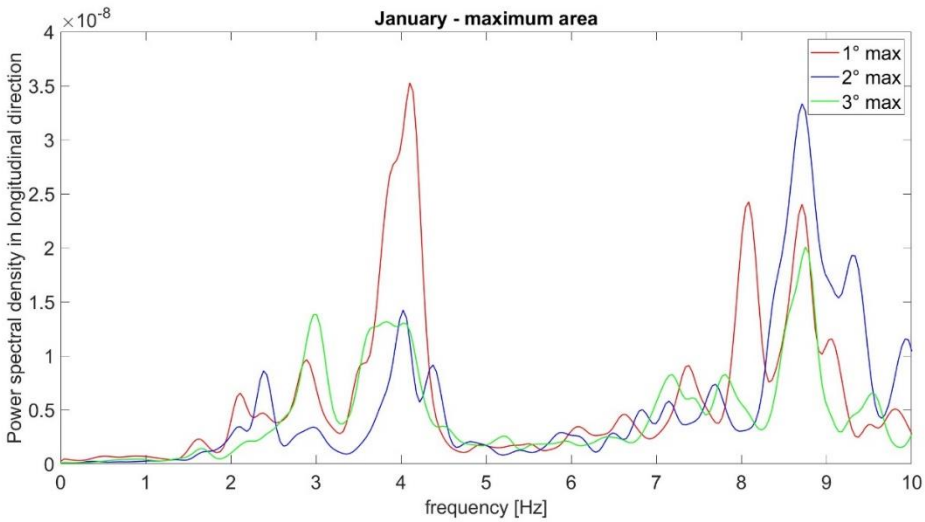


Figure 9-7: Results obtained from the 3 accelerograms with maximum area of PSD

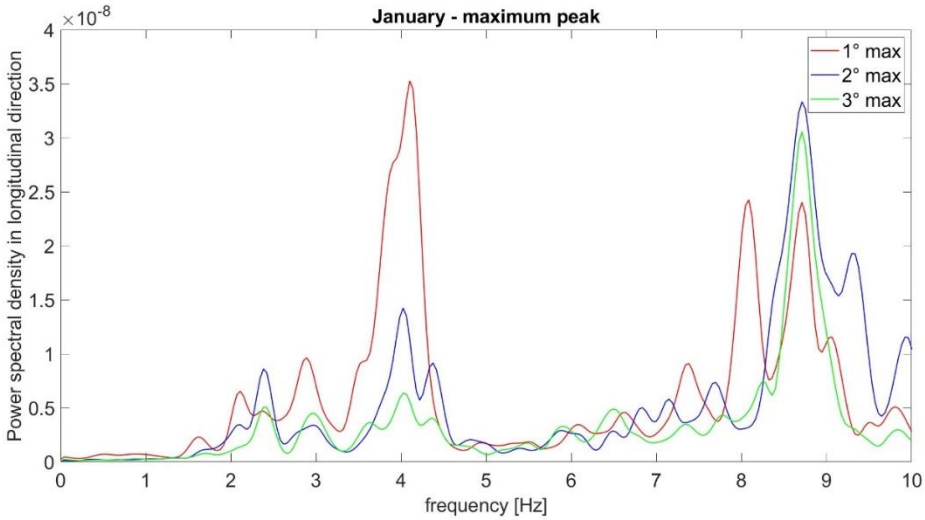


Figure 9-8: Results obtained from the 3 accelerograms with highest peak in PSD

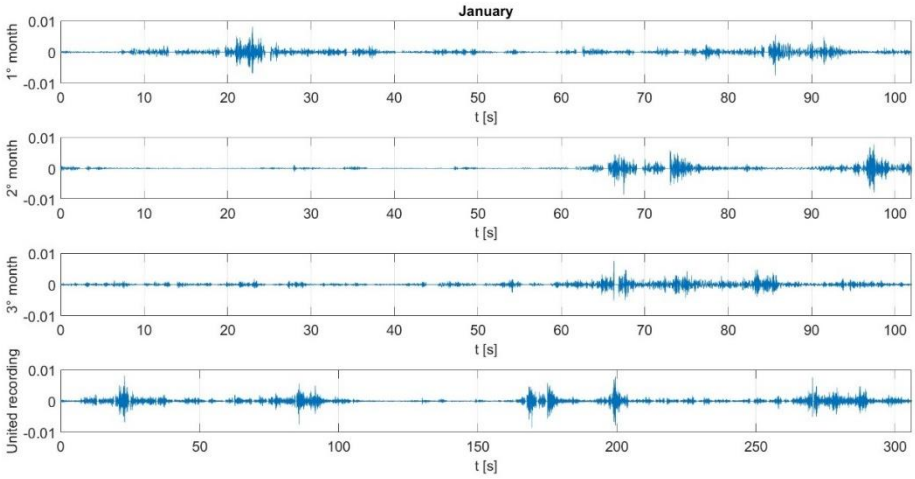


Figure 9-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

9.1.3 Transverse direction (z)

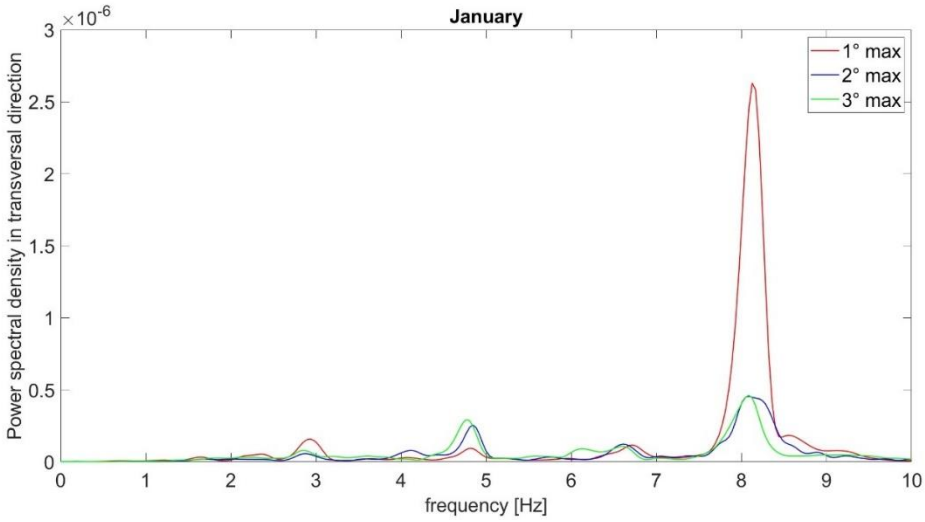


Figure 9-10: Results obtained from the 3 accelerograms with maximum SD in time domain

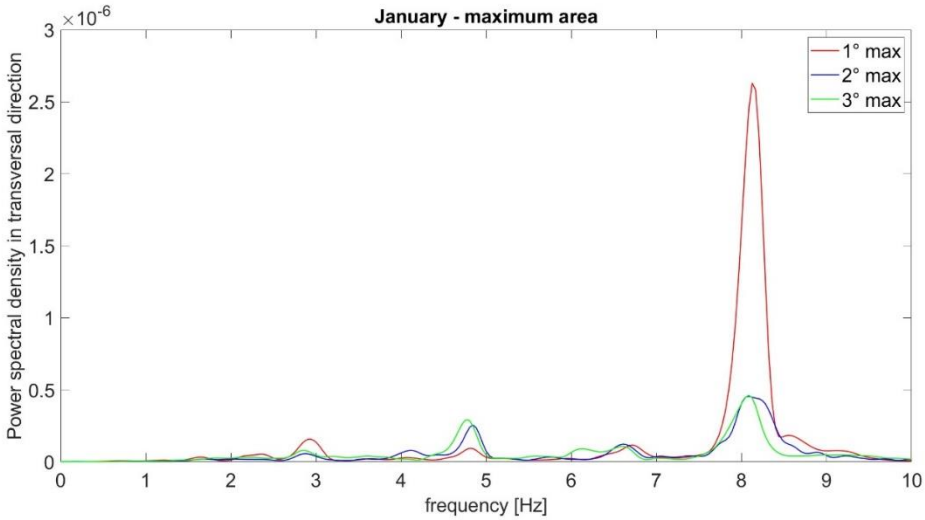


Figure 9-11: Results obtained from the 3 accelerograms with maximum area of PSD

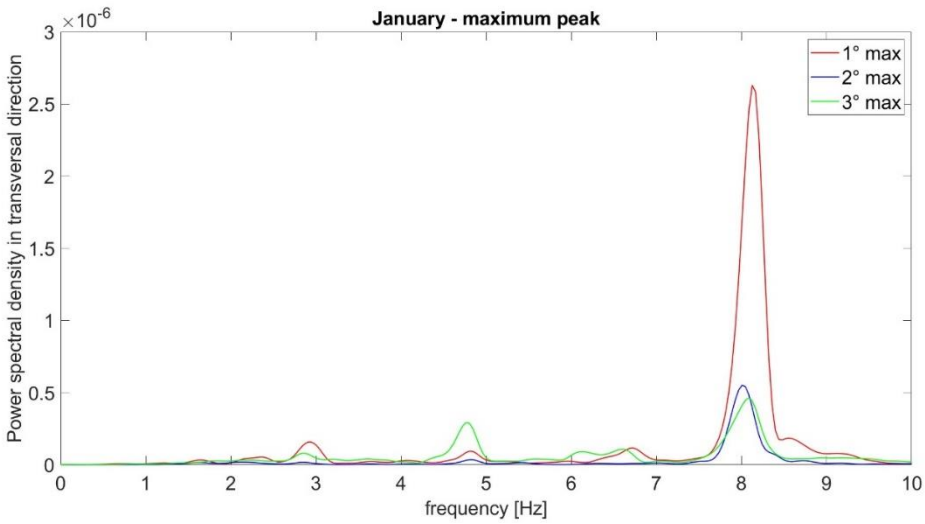


Figure 9-12: Results obtained from the 3 accelerograms with highest peak in PSD

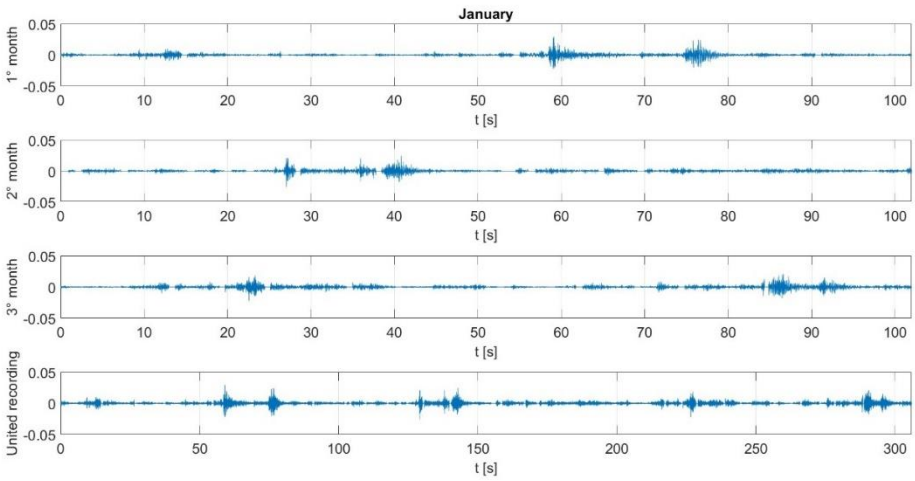


Figure 9-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

9.2 February

The results obtained for the February dataset are shown in the following tables.

Table 9-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-02-01_13-00-19	4.59E-03
	2°	2BE0F_2023-02-06_13-00-19	4.21E-03
	3°	2BE0F_2023-02-17_13-00-19	3.95E-03
Longitudinal direction (y)	1°	2BE0F_2023-02-06_13-00-19	3.91E-04
	2°	2BE0F_2023-02-01_13-00-19	3.74E-04
	3°	2BE0F_2023-02-23_13-00-20	3.34E-04
Transverse direction (z)	1°	2BE0F_2023-02-06_13-00-19	1.05E-03
	2°	2BE0F_2023-02-17_13-00-19	9.64E-04
	3°	2BE0F_2023-02-01_13-00-19	9.54E-04

Table 9-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-02-17_13-00-19	3.17E-05	2BE0F_2023-02-01_13-00-19	4.25E-06
2	2BE0F_2023-02-06_13-00-19	2.62E-05	2BE0F_2023-02-06_13-00-19	3.65E-06
3	2BE0F_2023-02-01_01-00-19	2.00E-05	2BE0F_2023-02-17_13-00-19	3.13E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-02-01_13-00-19	9.17E-08	2BE0F_2023-02-06_13-00-19	3.15E-08
2	2BE0F_2023-02-23_13-00-20	9.17E-08	2BE0F_2023-02-01_13-00-19	2.70E-08
3	2BE0F_2023-02-06_13-00-19	5.86E-08	2BE0F_2023-02-23_13-00-20	2.35E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-02-04_07-00-20	1.02E-06	2BE0F_2023-02-06_13-00-19	2.22E-07
2	2BE0F_2023-02-17_13-00-19	1.01E-06	2BE0F_2023-02-17_13-00-19	1.87E-07
3	2BE0F_2023-02-07_13-00-19	7.78E-07	2BE0F_2023-02-01_13-00-19	1.86E-07

Table 9-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	B	A	B	B	-	B
2	B	B	B	A	D	A	C	C	C
3	C	-	C	D	B	D	A	-	A

9.2.1 Vertical direction (x)

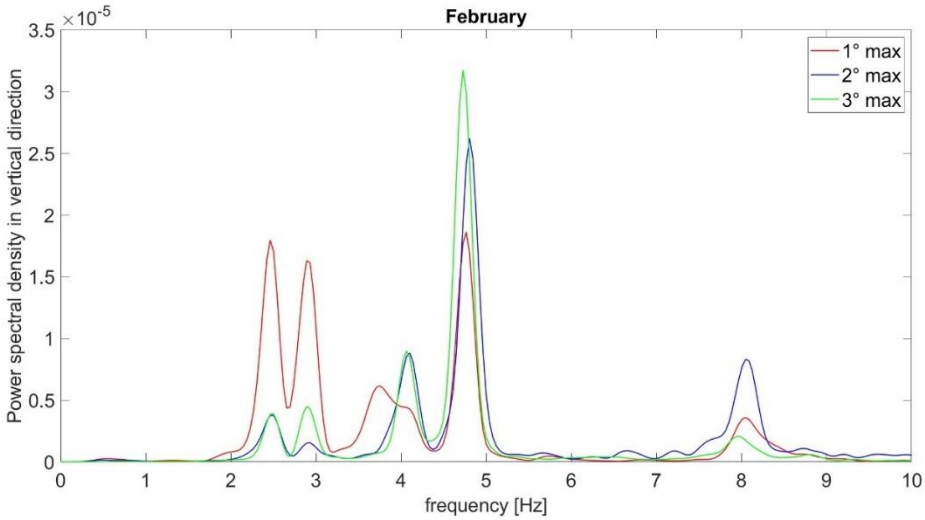


Figure 9-14: Results obtained from the 3 accelerograms with maximum SD in time domain

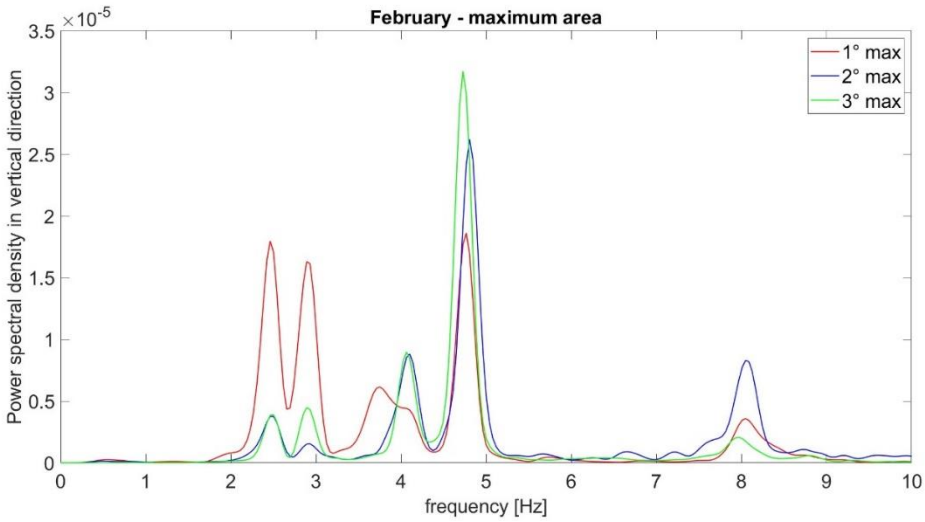


Figure 9-15: Results obtained from the 3 accelerograms with maximum area of PSD

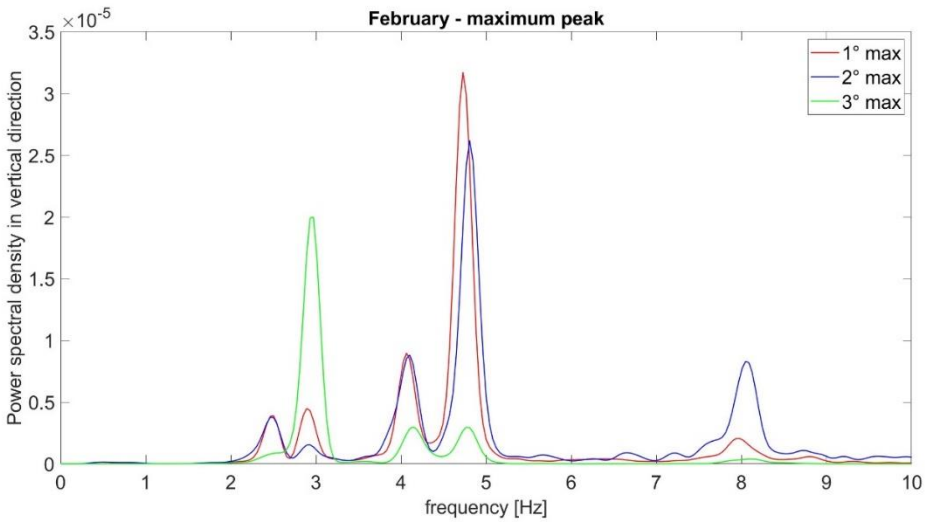


Figure 9-16: Results obtained from the 3 accelerograms with highest peak if PSD

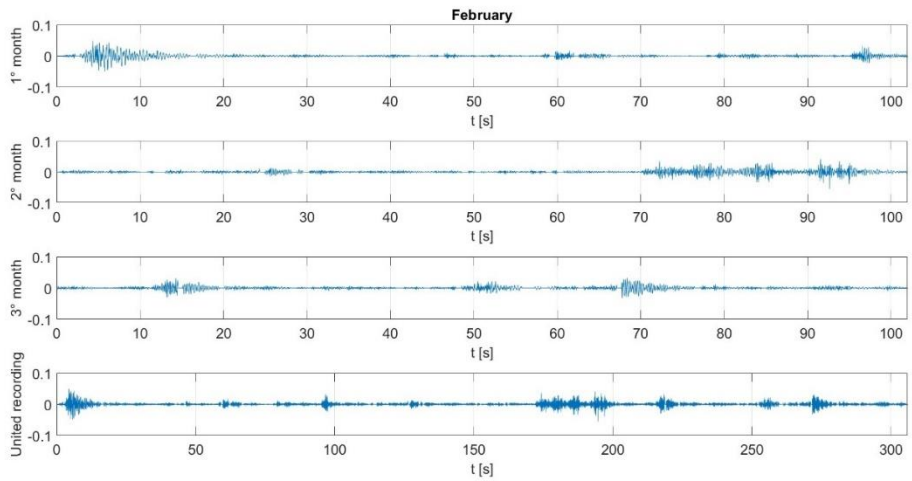


Figure 9-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.2.2 Longitudinal direction (y)

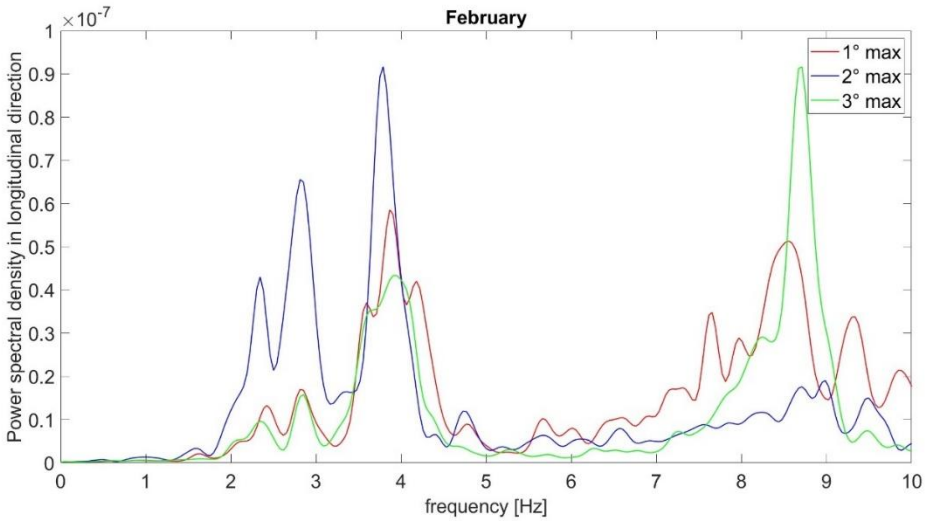


Figure 9-18: Results obtained from the 3 accelerograms with maximum SD in time domain

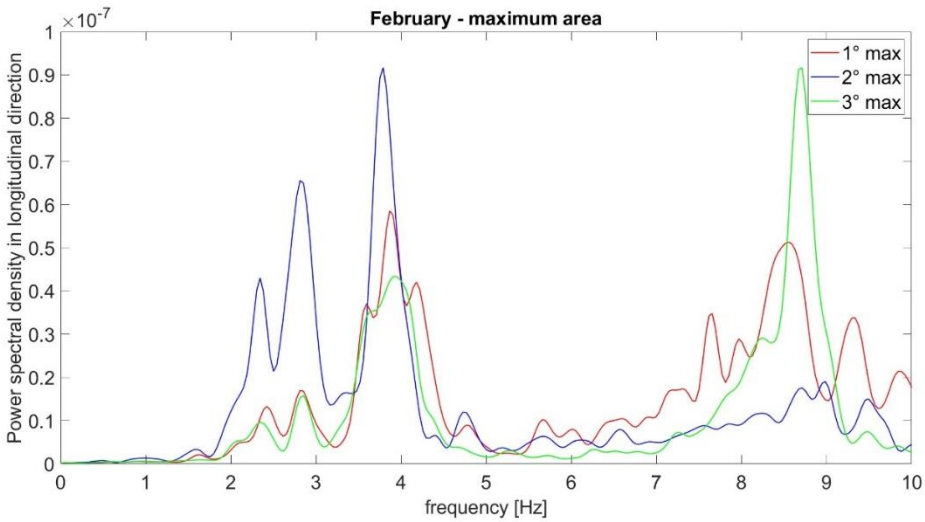


Figure 9-19: Results obtained from the 3 accelerograms with maximum area of PSD

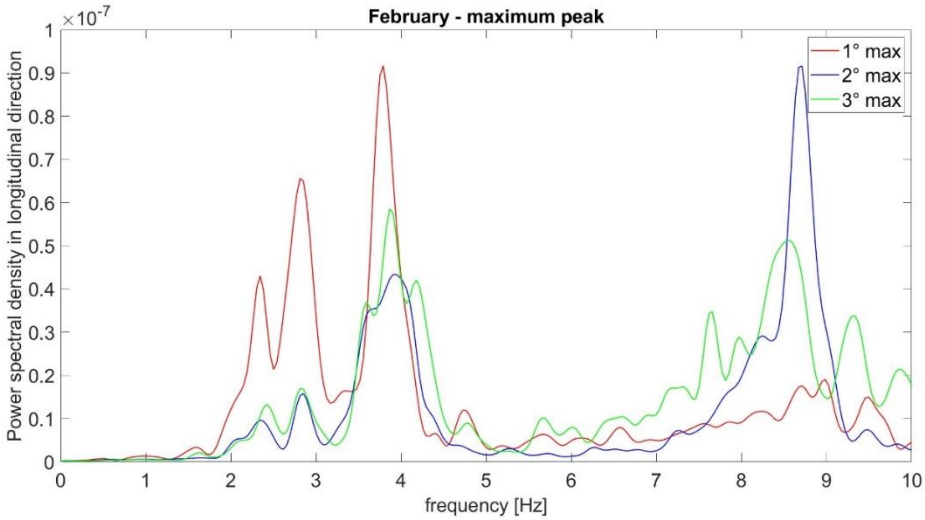


Figure 9-20: Results obtained from the 3 accelerograms with highest peak if PSD

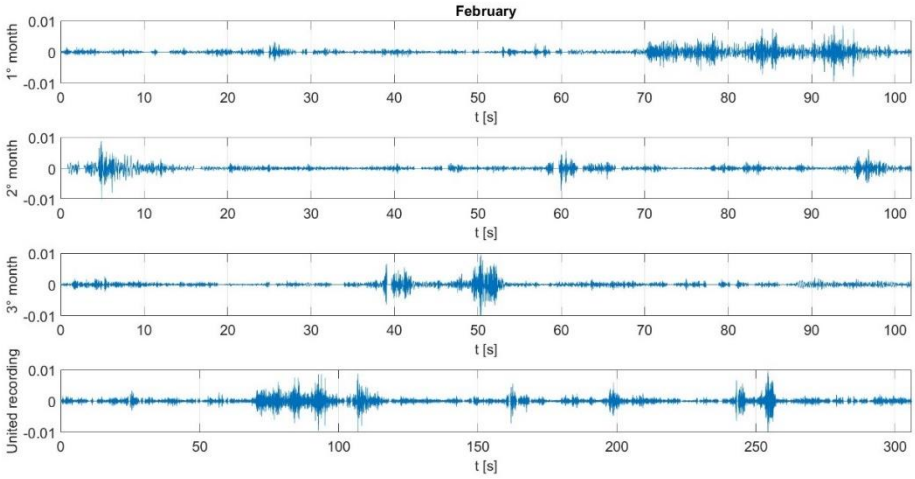


Figure 9-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

9.2.3 Transverse direction (z)

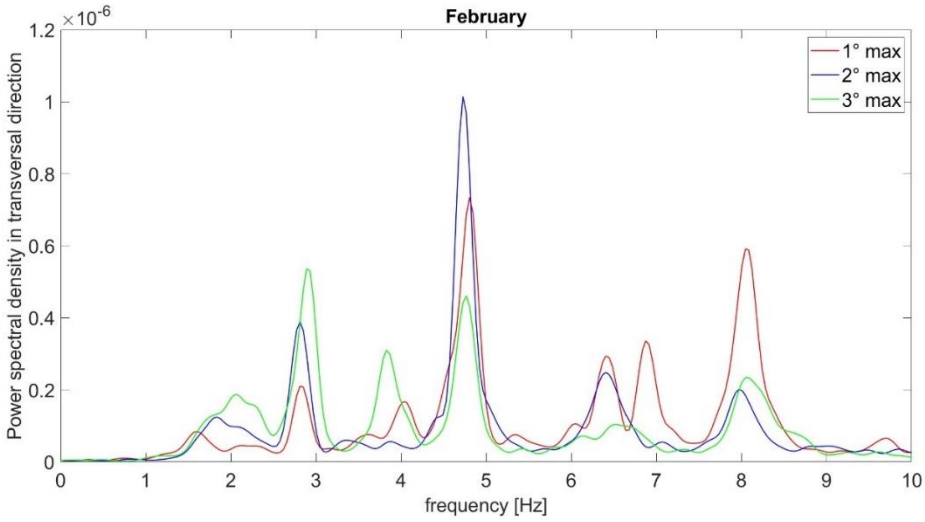


Figure 9-22: Results obtained from the 3 accelerograms with maximum SD in time domain

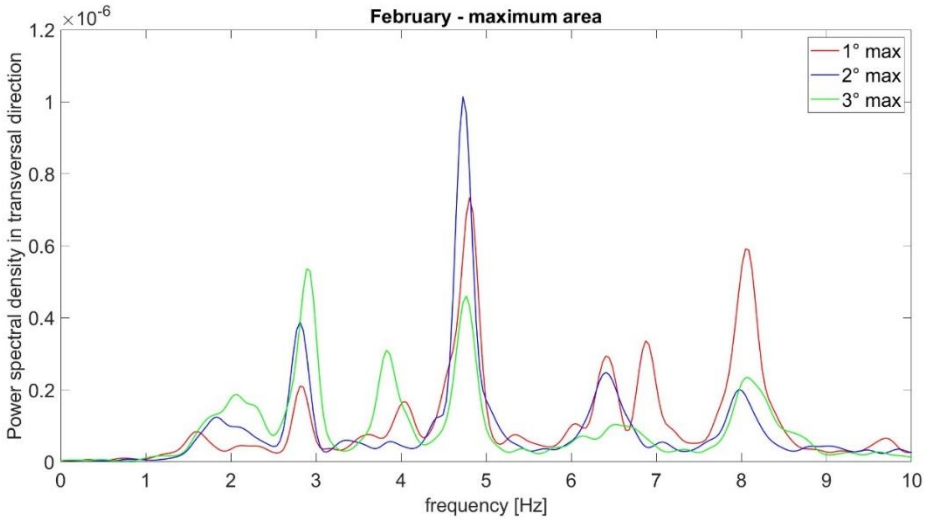


Figure 9-23: Results obtained from the 3 accelerograms with maximum area of PSD

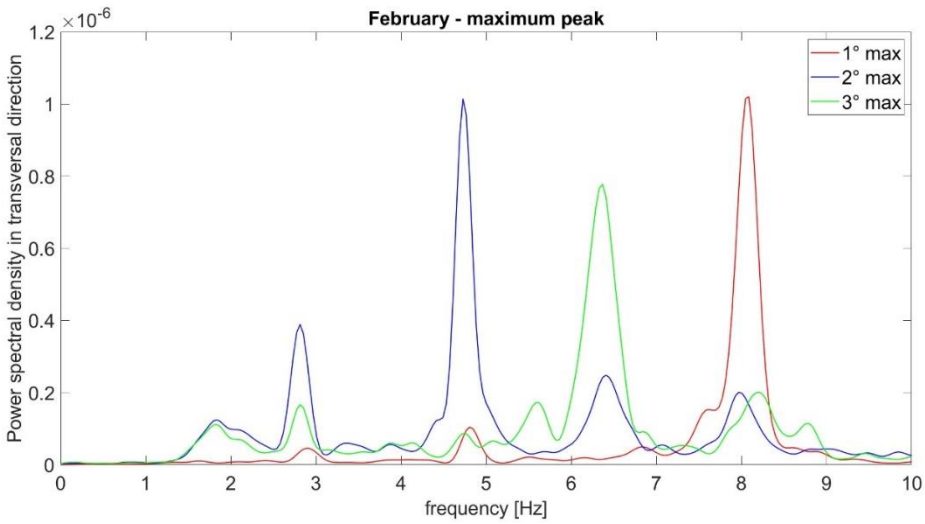


Figure 9-24: Results obtained from the 3 accelerograms with highest peak if PSD

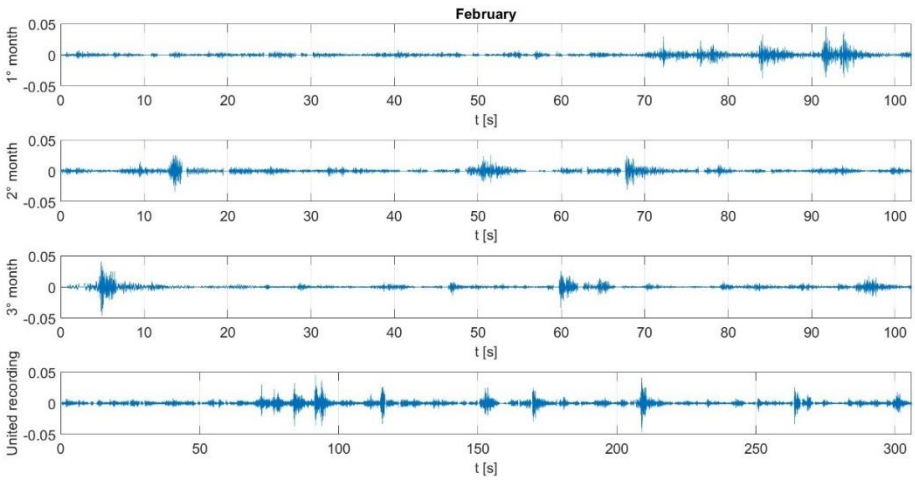


Figure 9-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

9.3 March

The results obtained for the March dataset are shown in the following tables.

Table 9-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-03-16_13-00-19	8.40E-03
	2°	2BE0F_2023-03-04_13-00-20	4.72E-03
	3°	2BE0F_2023-03-08_13-00-21	4.65E-03
Longitudinal direction (y)	1°	2BE0F_2023-03-16_13-00-19	4.34E-04
	2°	2BE0F_2023-03-08_13-00-21	3.98E-04
	3°	2BE0F_2023-03-04_13-00-20	3.96E-04
Transverse direction (z)	1°	2BE0F_2023-03-16_13-00-19	1.67E-03
	2°	2BE0F_2023-03-21_13-00-19	1.16E-03
	3°	2BE0F_2023-03-09_13-00-20	1.09E-03

Table 9-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-03-16_13-00-19	6.78E-05	2BE0F_2023-03-16_13-00-19	1.53E-05
2	2BE0F_2023-03-29_14-00-19	3.11E-05	2BE0F_2023-03-08_13-00-21	4.35E-06
3	2BE0F_2023-03-09_13-00-20	2.73E-05	2BE0F_2023-03-04_13-00-20	4.24E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-03-04_13-00-20	1.26E-07	2BE0F_2023-03-16_13-00-19	3.86E-08
2	2BE0F_2023-03-08_13-00-21	1.23E-07	2BE0F_2023-03-04_13-00-20	3.24E-08
3	2BE0F_2023-03-16_13-00-19	1.01E-07	2BE0F_2023-03-08_13-00-21	3.20E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-03-16_13-00-19	2.13E-06	2BE0F_2023-03-16_13-00-19	5.95E-07
2	2BE0F_2023-03-21_13-00-19	1.15E-06	2BE0F_2023-03-21_13-00-19	2.69E-07
3	2BE0F_2023-03-09_13-00-20	1.02E-06	2BE0F_2023-03-09_13-00-20	2.48E-07

Table 9-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	B	A	A	A	A
2	B	-	C	C	C	B	D	D	D
3	C	-	B	B	A	C	E	E	E

9.3.1 Vertical direction (x)

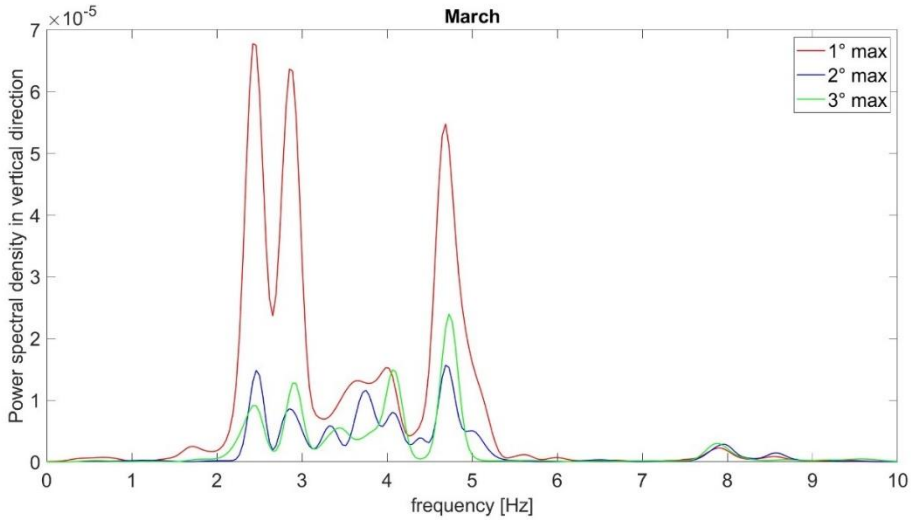


Figure 9-26: Results obtained from the 3 accelerograms with maximum SD in time domain

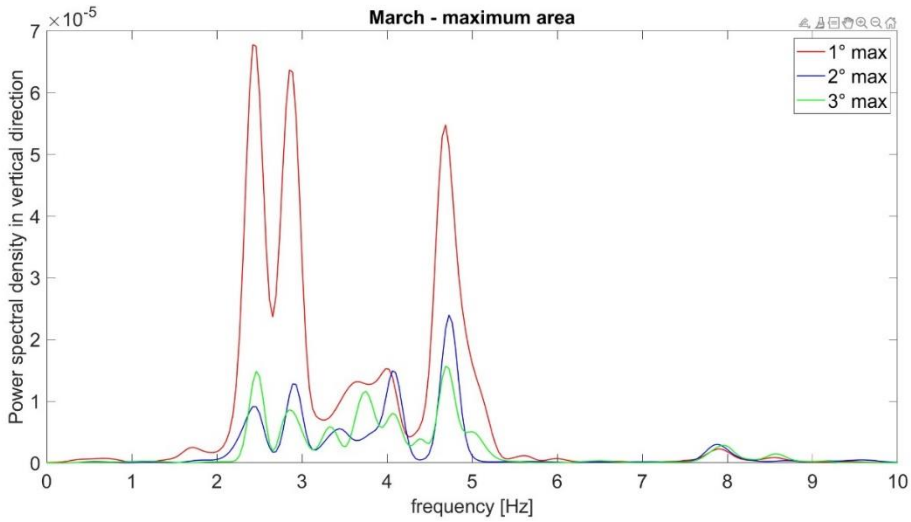


Figure 9-27: Results obtained from the 3 accelerograms with maximum area of PSD

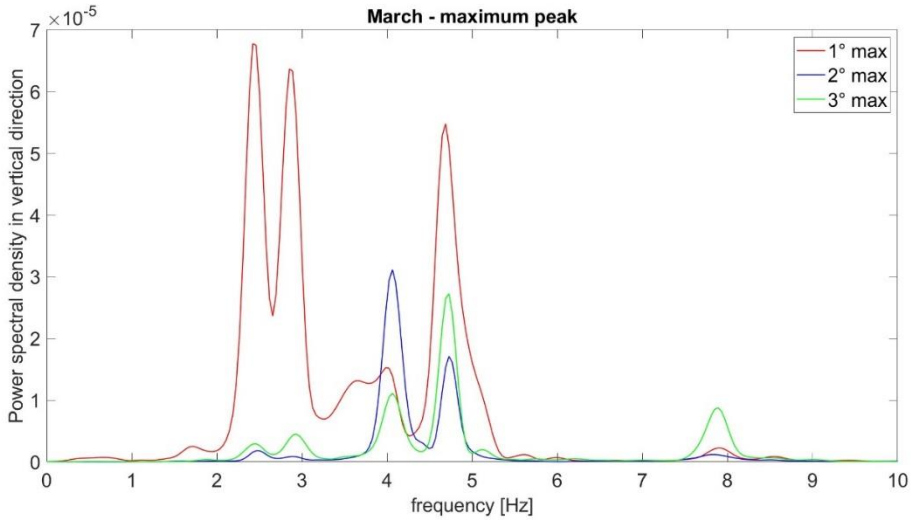


Figure 9-28: Results obtained from the 3 accelerograms with highest peak if PSD

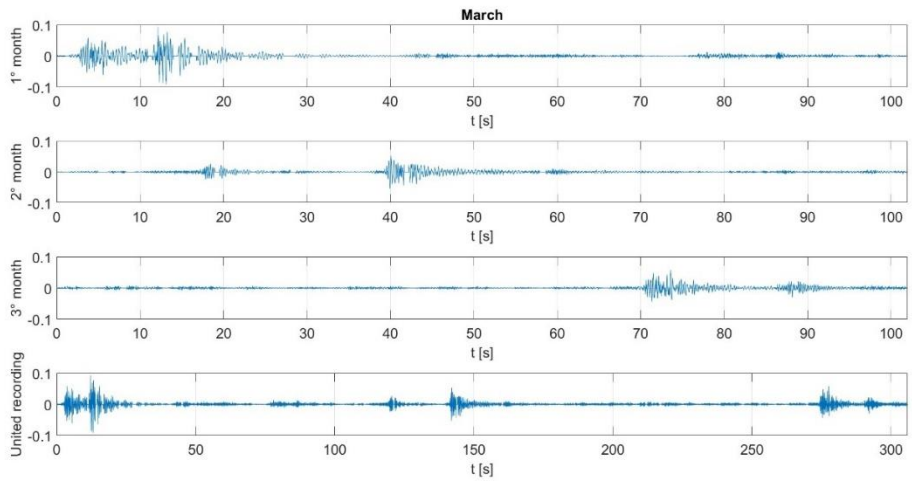


Figure 9-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.3.2 Longitudinal direction (y)

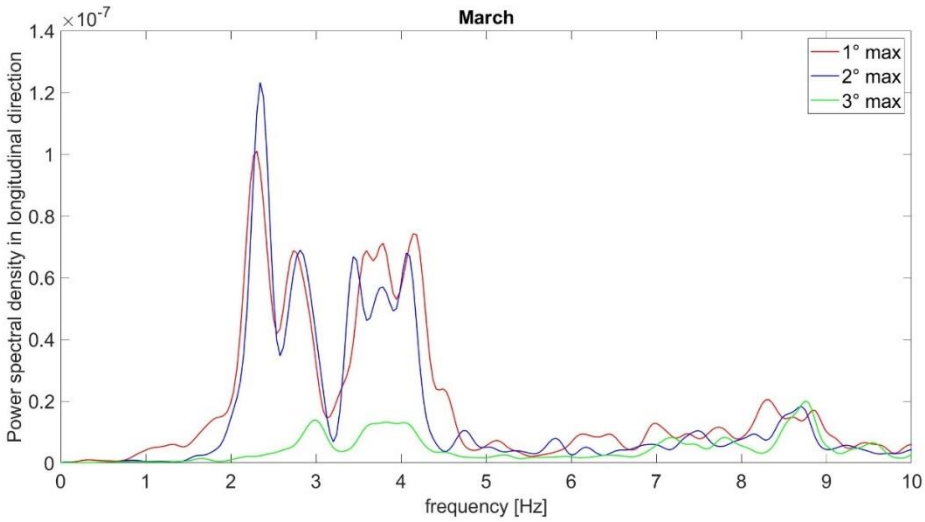


Figure 9-30: Results obtained from the 3 accelerograms with maximum SD in time domain

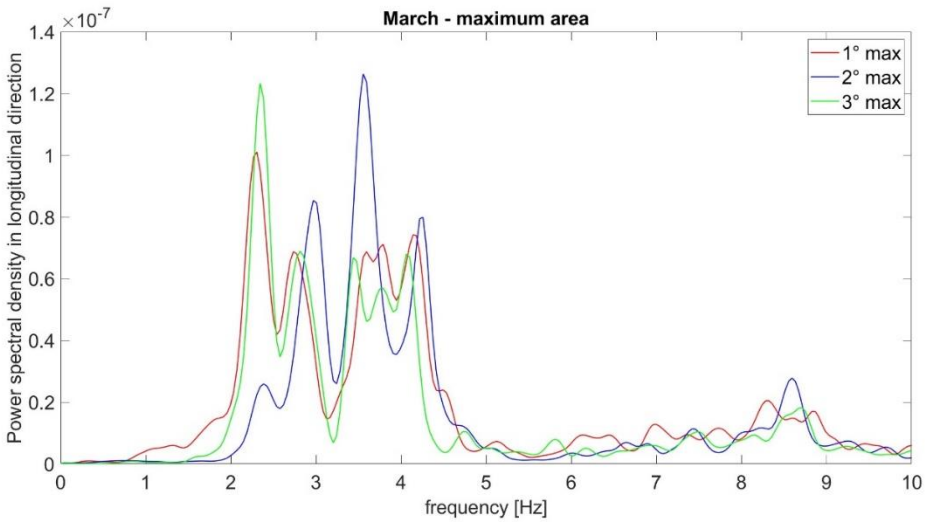


Figure 9-31: Results obtained from the 3 accelerograms with maximum area of PSD

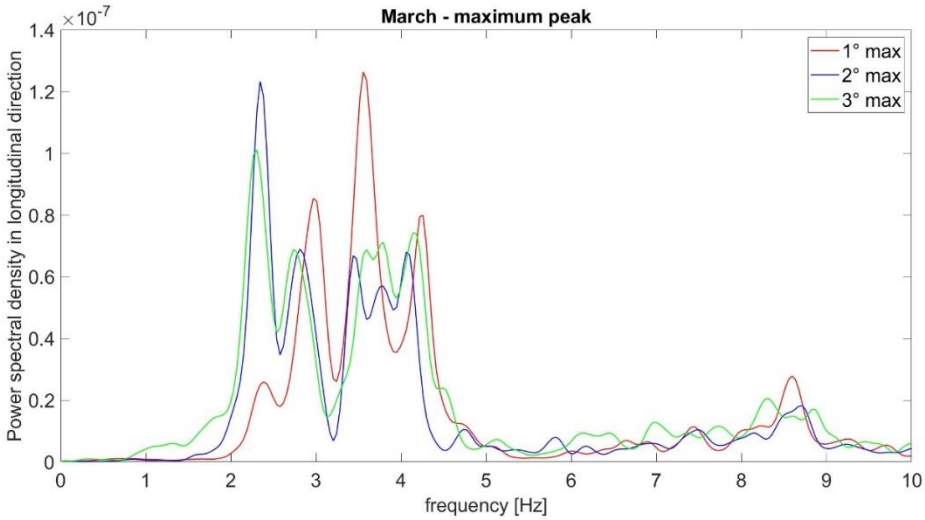


Figure 9-32: Results obtained from the 3 accelerograms with highest peak if PSD

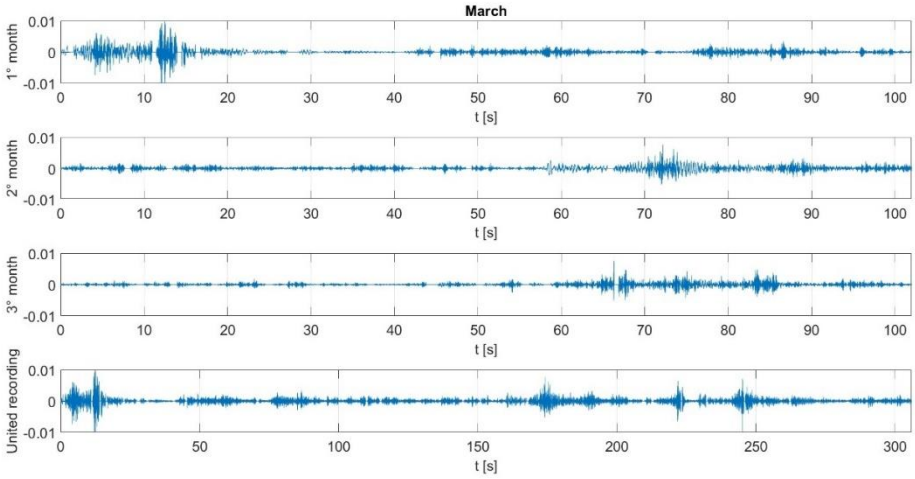


Figure 9-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

9.3.3 Transverse direction (z)

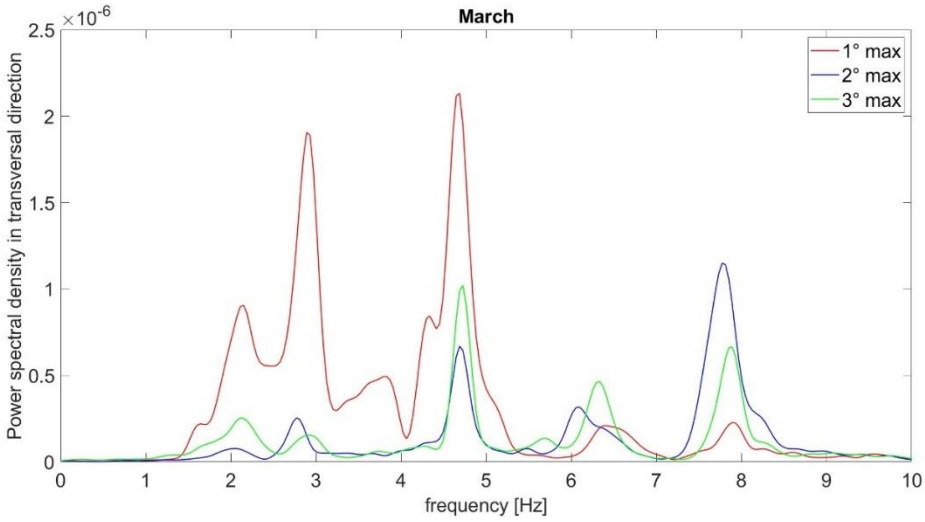


Figure 9-34: Results obtained from the 3 accelerograms with maximum SD in time domain

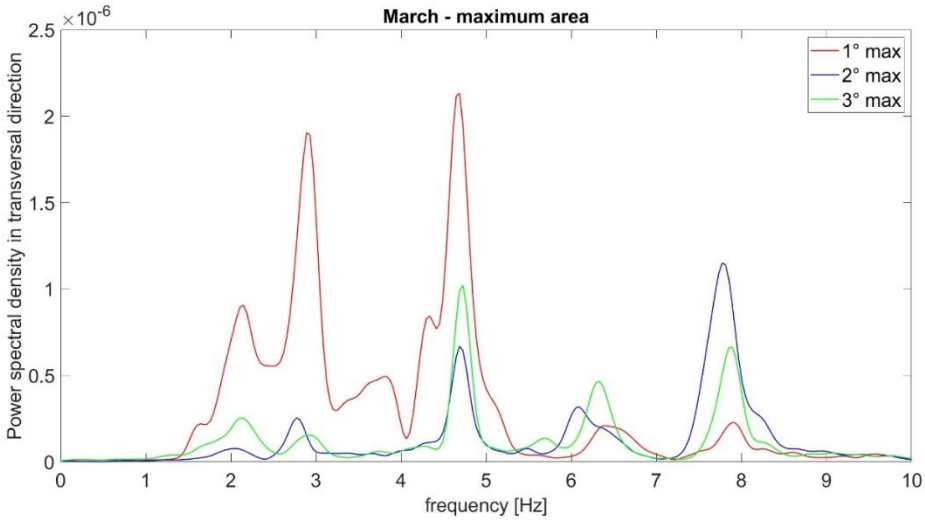


Figure 9-35: Results obtained from the 3 accelerograms with maximum area of PSD

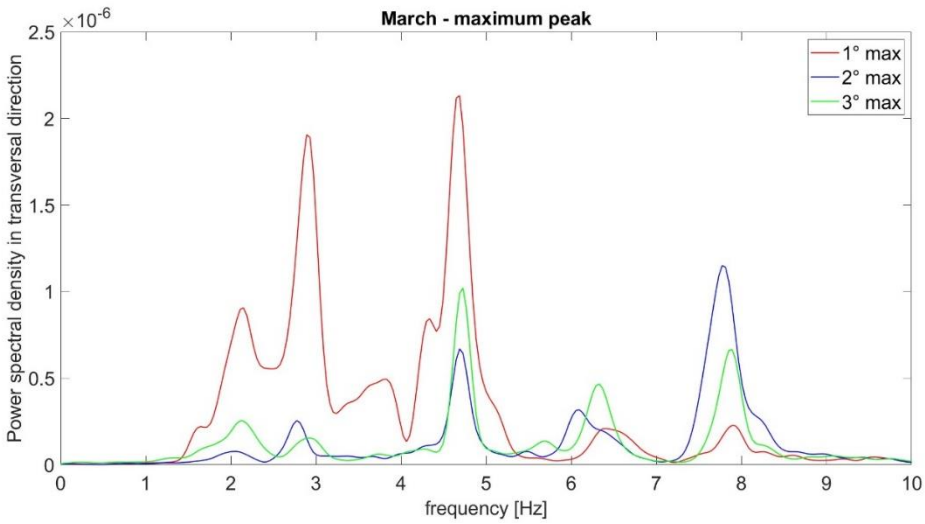


Figure 9-36: Results obtained from the 3 accelerograms with highest peak if PSD

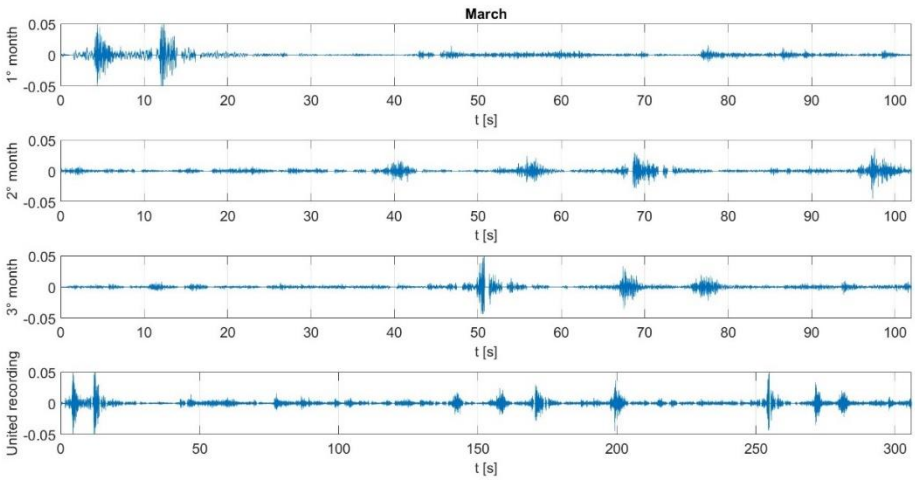


Figure 9-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

9.4 April

The results obtained for the April dataset are shown in the following tables.

Table 9-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-04-13_08-00-20	8.13E-03
	2°	2BE0F_2023-04-04_14-00-19	4.63E-03
	3°	2BE0F_2023-04-24_14-00-22	4.57E-03
Longitudinal direction (y)	1°	2BE0F_2023-04-13_08-00-20	4.27E-04
	2°	2BE0F_2023-04-14_08-00-20	3.25E-04
	3°	2BE0F_2023-04-24_14-00-22	3.16E-04
Transverse direction (z)	1°	2BE0F_2023-04-13_08-00-20	1.45E-03
	2°	2BE0F_2023-04-24_14-00-22	1.08E-03
	3°	2BE0F_2023-04-18_14-00-20	1.07E-03

Table 9-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-04-13_08-00-20	1.63E-04	2BE0F_2023-04-13_08-00-20	1.28E-05
2	2BE0F_2023-04-04_14-00-19	4.71E-05	2BE0F_2023-04-04_14-00-19	4.32E-06
3	2BE0F_2023-04-24_14-00-22	3.70E-05	2BE0F_2023-04-24_14-00-22	4.13E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-04-13_08-00-20	1.15E-07	2BE0F_2023-04-13_08-00-20	3.50E-08
2	2BE0F_2023-04-04_14-00-19	9.55E-08	2BE0F_2023-04-24_14-00-22	2.08E-08
3	2BE0F_2023-04-24_14-00-22	8.57E-08	2BE0F_2023-04-14_08-00-20	2.06E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-04-13_08-00-20	4.03E-06	2BE0F_2023-04-13_08-00-20	4.20E-07
2	2BE0F_2023-04-04_14-00-19	1.83E-06	2BE0F_2023-04-24_14-00-22	2.41E-07
3	2BE0F_2023-04-24_14-00-22	1.35E-06	2BE0F_2023-04-18_14-00-20	2.36E-07

Table 9-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	D	-	C	C	-	C
3	C	C	C	C	C	D	E	C	E

9.4.1 Vertical direction (x)

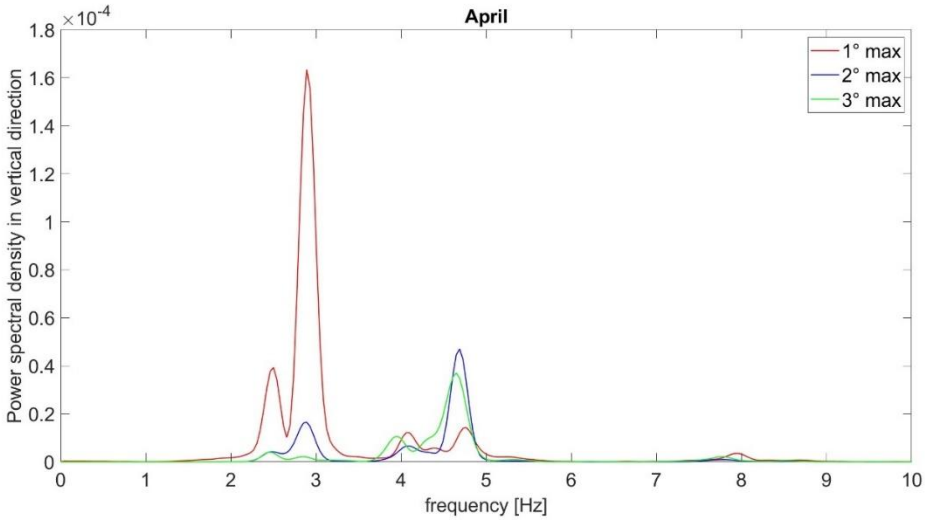


Figure 9-38: Results obtained from the 3 accelerograms with maximum SD in time domain

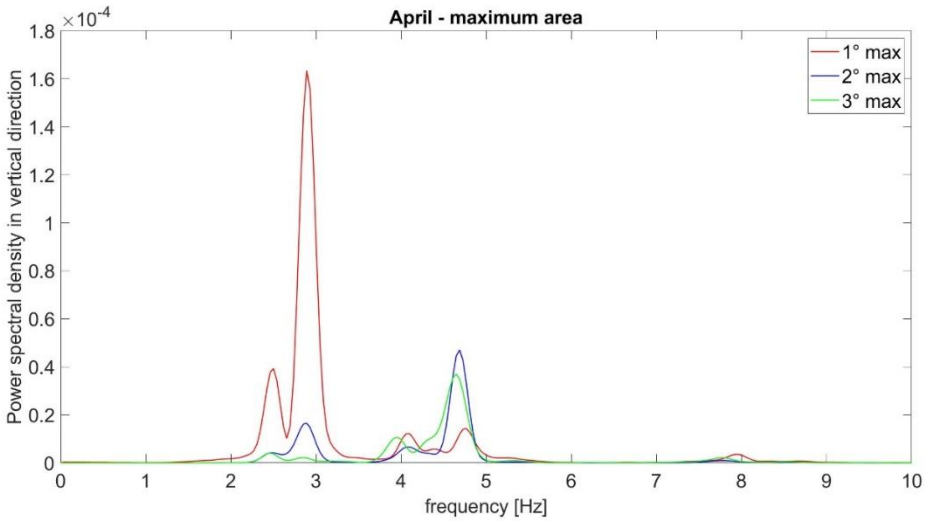


Figure 9-39: Results obtained from the 3 accelerograms with maximum area of PSD

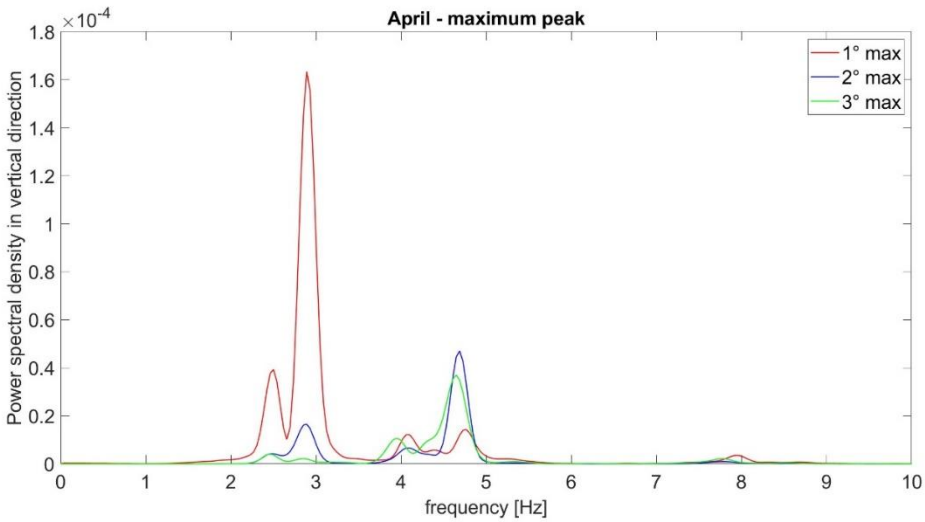


Figure 9-40: Results obtained from the 3 accelerograms with highest peak if PSD

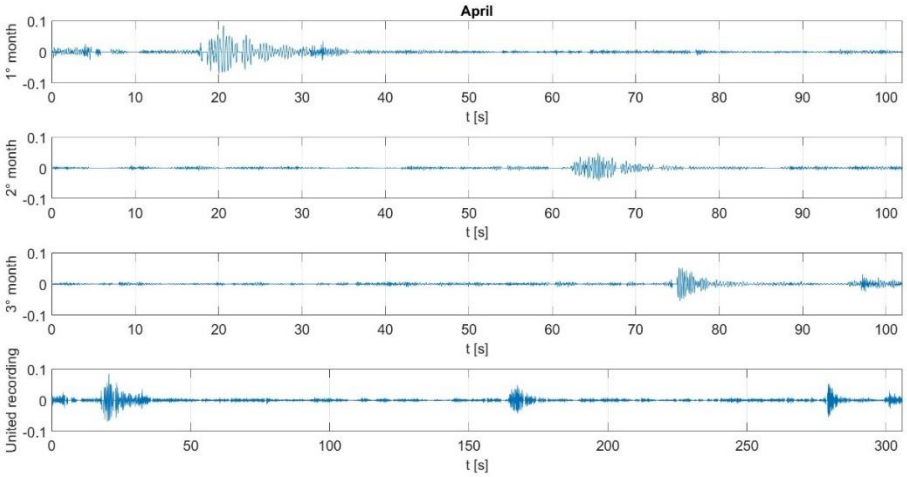


Figure 9-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.4.2 Longitudinal direction (y)

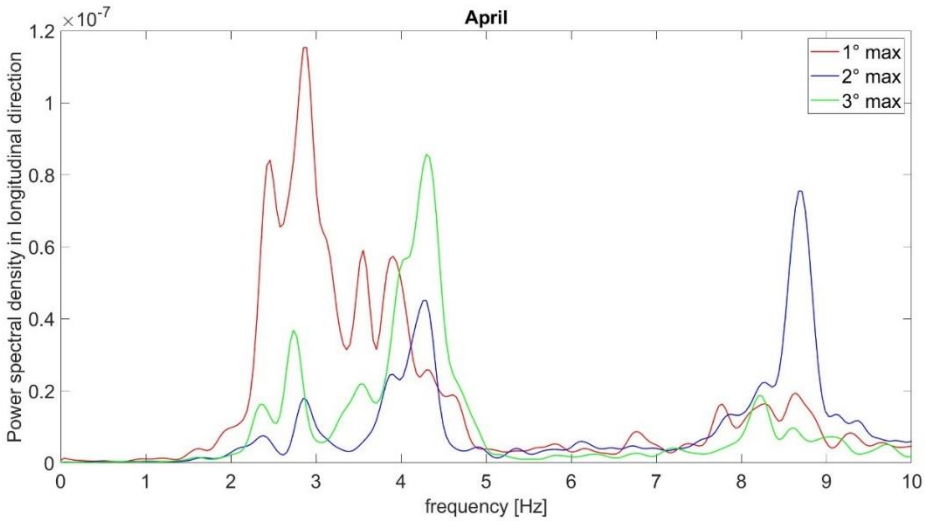


Figure 9-42: Results obtained from the 3 accelerograms with maximum SD in time domain

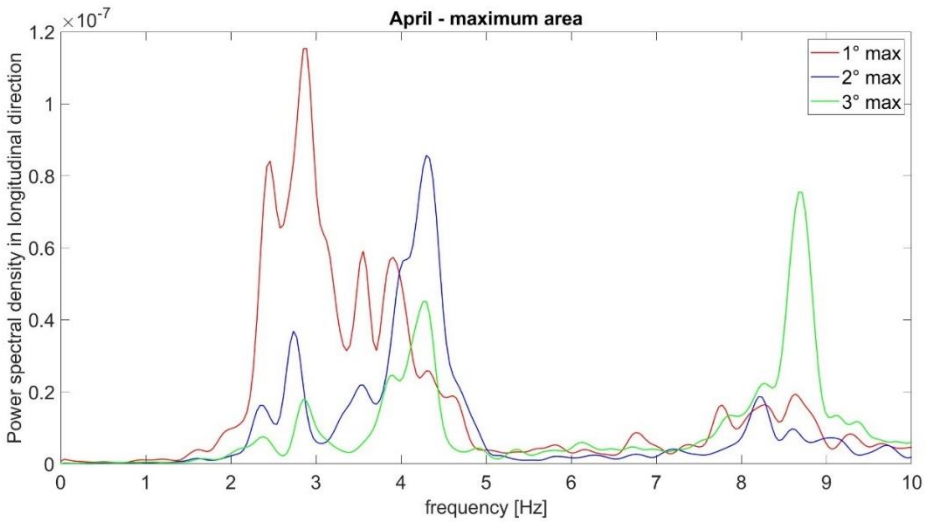


Figure 9-43: Results obtained from the 3 accelerograms with maximum area of PSD

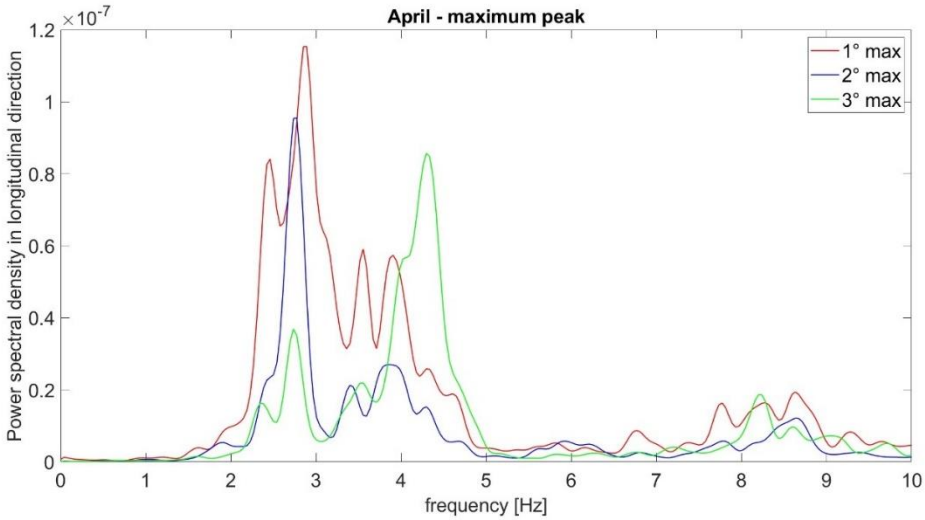


Figure 9-44: Results obtained from the 3 accelerograms with highest peak if PSD

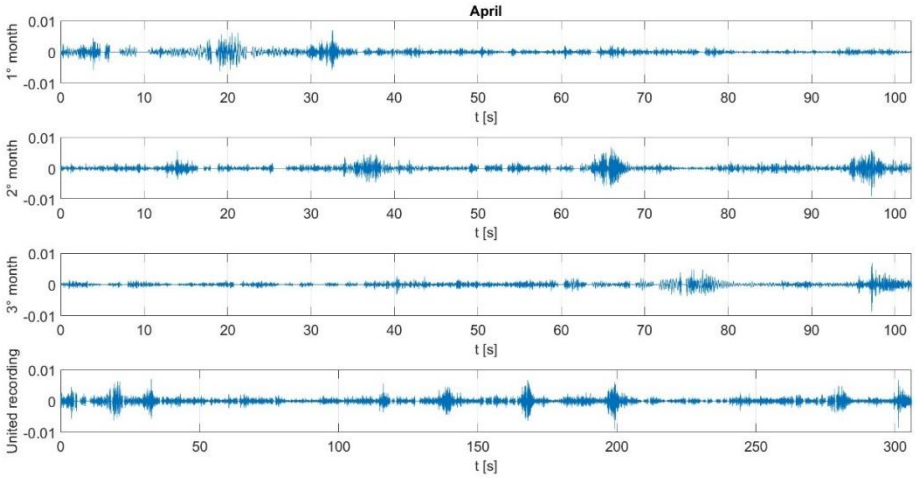


Figure 9-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

9.4.3 Transverse direction (z)

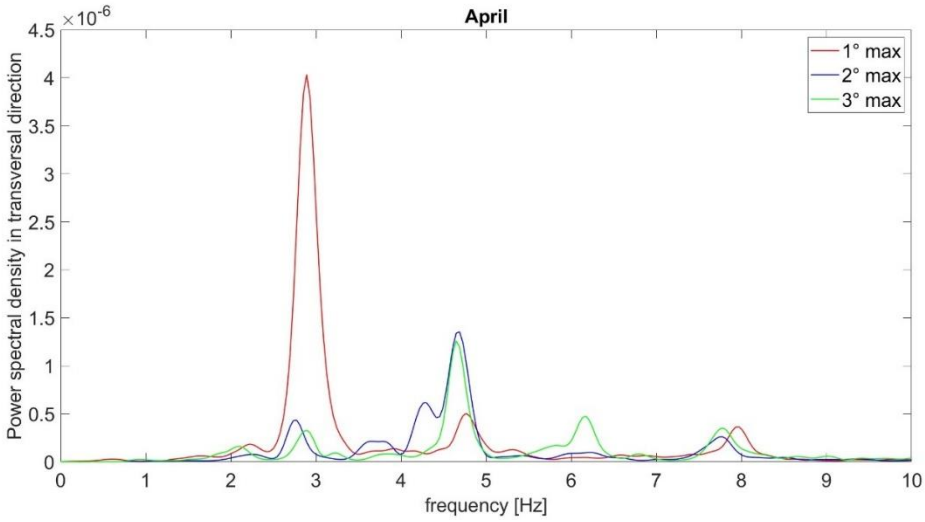


Figure 9-46: Results obtained from the 3 accelerograms with maximum SD in time domain

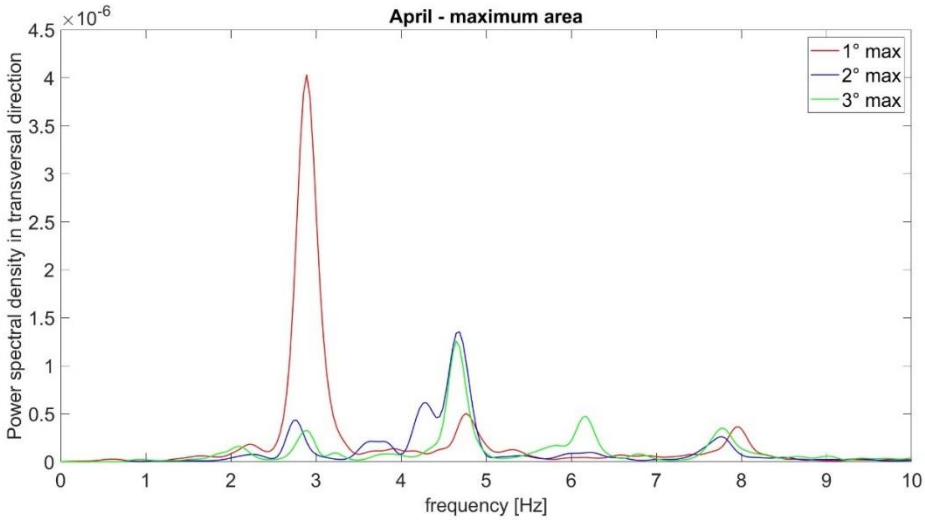


Figure 9-47: Results obtained from the 3 accelerograms with maximum area of PSD

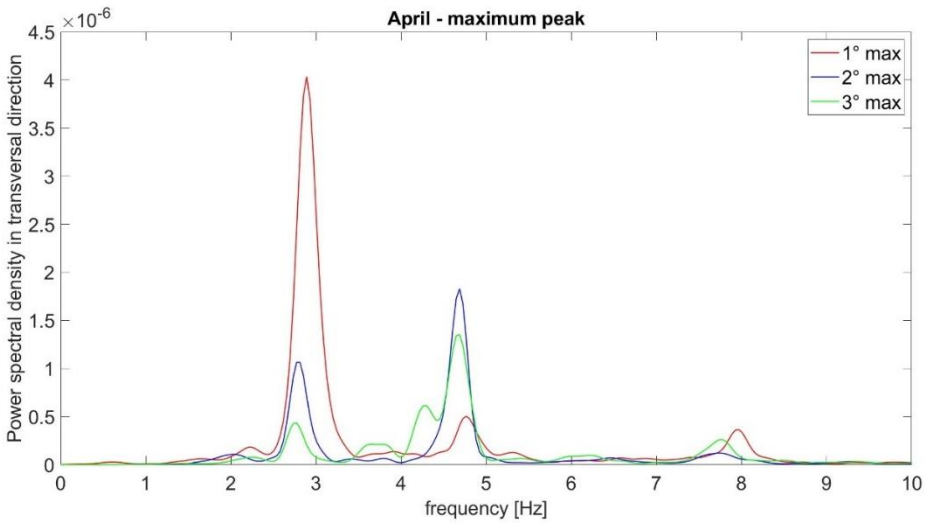


Figure 9-48: Results obtained from the 3 accelerograms with highest peak if PSD

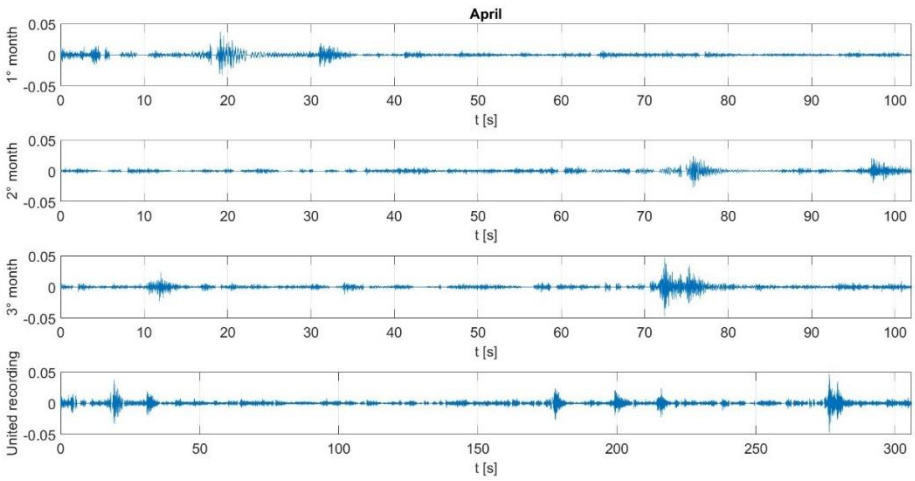


Figure 9-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

9.5 May

The results obtained for the May dataset are shown in the following tables.

Table 9-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-05-23_14-00-21	8.71E-03
	2°	2BE0F_2023-05-04_14-00-20	6.46E-03
	3°	2BE0F_2023-05-22_08-00-20	4.45E-03
Longitudinal direction (y)	1°	2BE0F_2023-05-23_14-00-21	5.02E-04
	2°	2BE0F_2023-05-04_14-00-20	3.48E-04
	3°	2BE0F_2023-05-02_08-00-20	3.02E-04
Transverse direction (z)	1°	2BE0F_2023-05-23_14-00-21	1.56E-03
	2°	2BE0F_2023-05-04_14-00-20	1.40E-03
	3°	2BE0F_2023-05-22_08-00-20	1.02E-03

Table 9-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-05-23_14-00-21	1.19E-04	2BE0F_2023-05-23_14-00-21	1.53E-05
2	2BE0F_2023-05-04_14-00-20	5.21E-05	2BE0F_2023-05-04_14-00-20	8.89E-06
3	2BE0F_2023-05-22_08-00-20	3.29E-05	2BE0F_2023-05-22_08-00-20	4.04E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-05-23_14-00-21	1.82E-07	2BE0F_2023-05-23_14-00-21	4.76E-08
2	2BE0F_2023-05-04_14-00-20	1.33E-07	2BE0F_2023-05-04_14-00-20	2.50E-08
3	2BE0F_2023-05-26_14-00-20	8.40E-08	2BE0F_2023-05-22_08-00-20	1.87E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-05-23_14-00-21	4.31E-06	2BE0F_2023-05-23_14-00-21	4.86E-07
2	2BE0F_2023-05-04_14-00-20	1.85E-06	2BE0F_2023-05-04_14-00-20	4.12E-07
3	2BE0F_2023-05-22_08-00-20	1.18E-06	2BE0F_2023-05-22_08-00-20	2.16E-07

Table 9-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	B	B	B	B	B	B
3	C	C	C	-	-	-	C	C	C

9.5.1 Vertical direction (x)

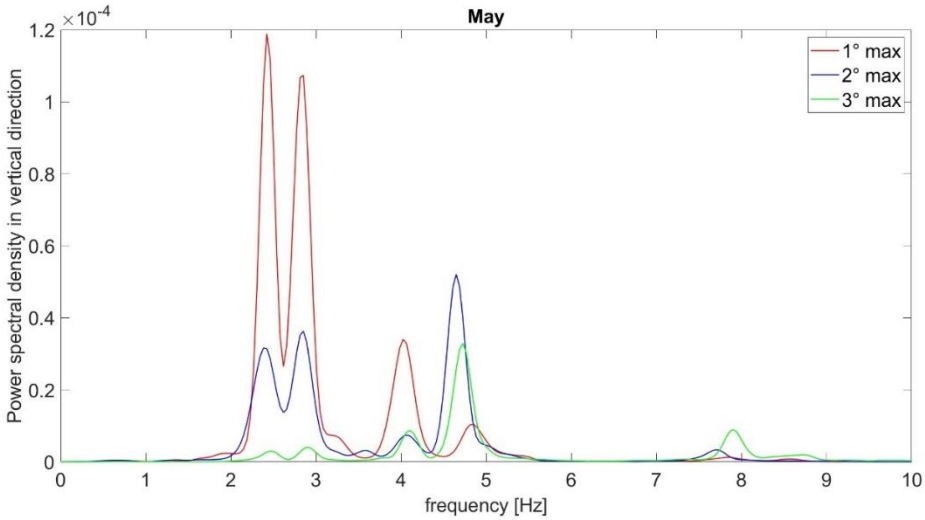


Figure 9-50: Results obtained from the 3 accelerograms with maximum SD in time domain

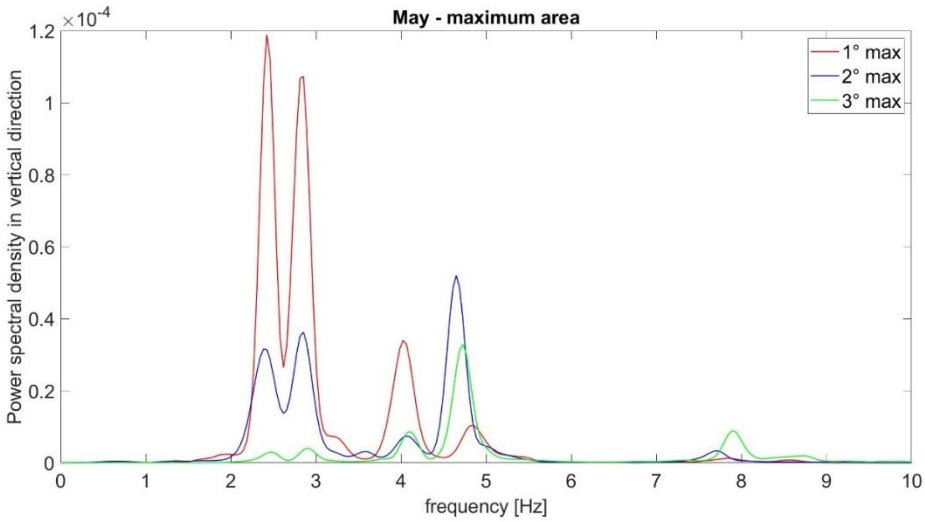


Figure 9-51: Results obtained from the 3 accelerograms with maximum area of PSD

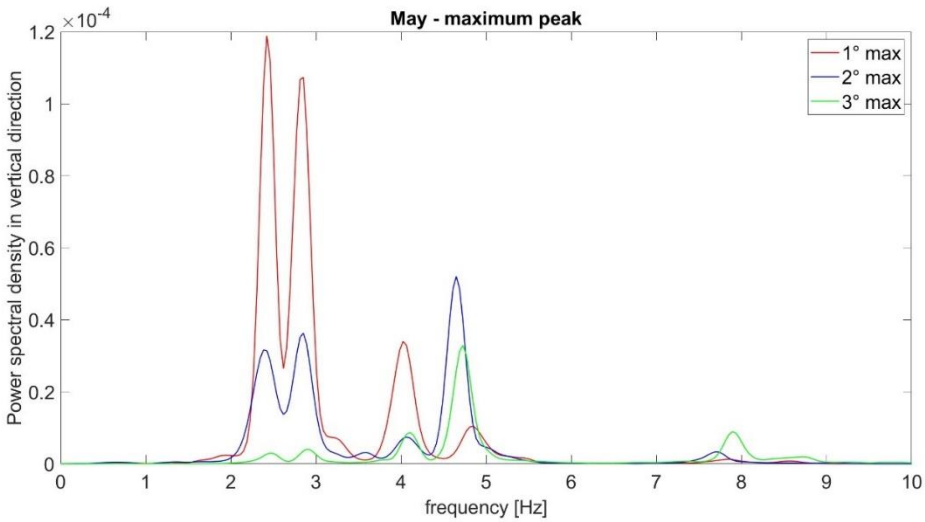


Figure 9-52: Results obtained from the 3 accelerograms with highest peak if PSD

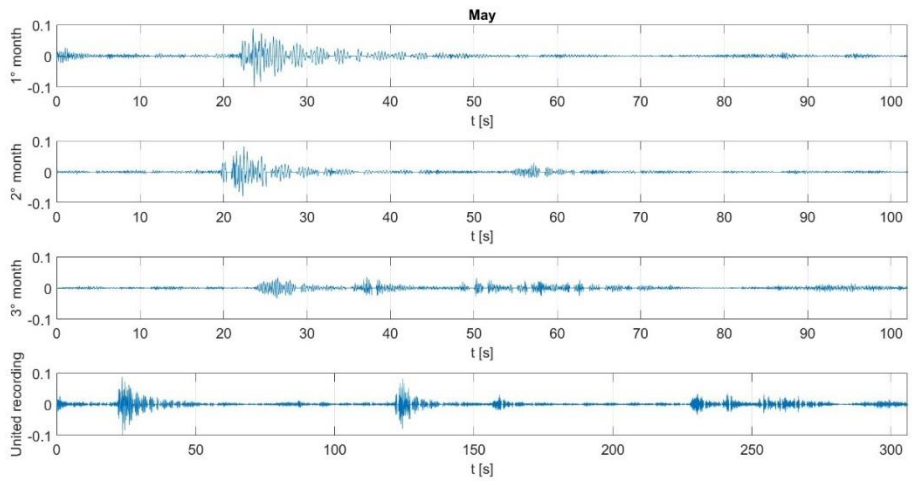


Figure 9-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.5.2 Longitudinal direction (y)

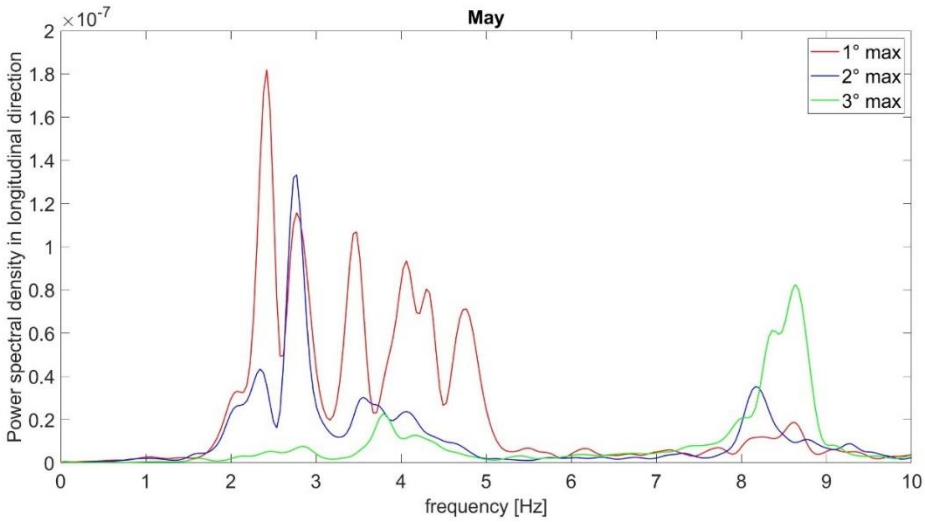


Figure 9-54: Results obtained from the 3 accelerograms with maximum SD in time domain

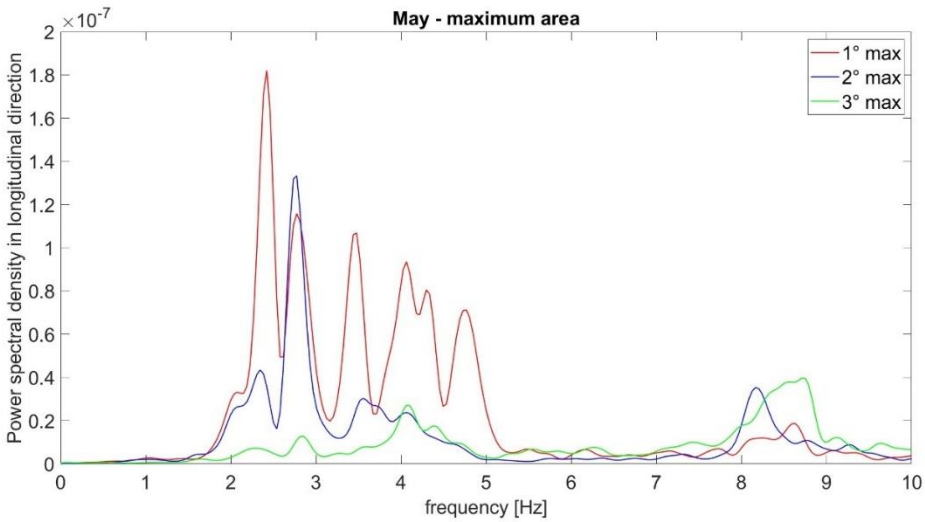


Figure 9-55: Results obtained from the 3 accelerograms with maximum area of PSD

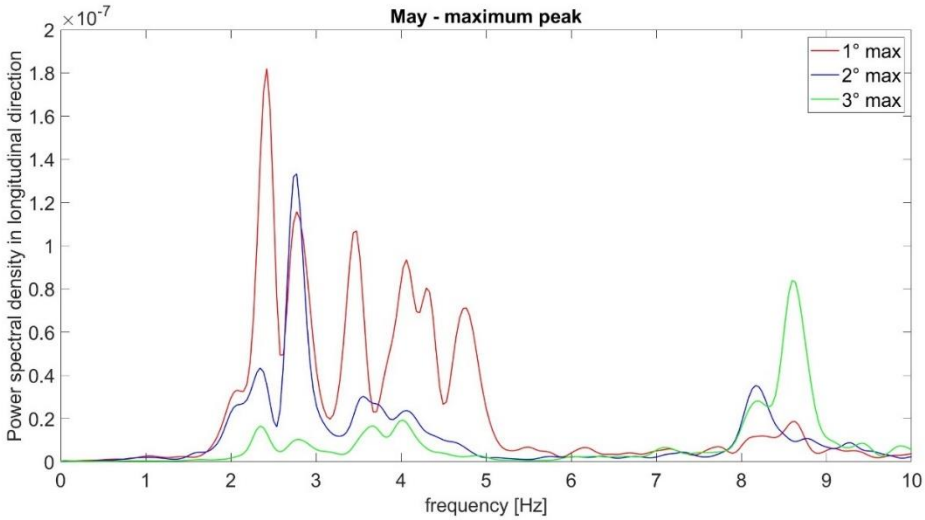


Figure 9-56: Results obtained from the 3 accelerograms with highest peak if PSD

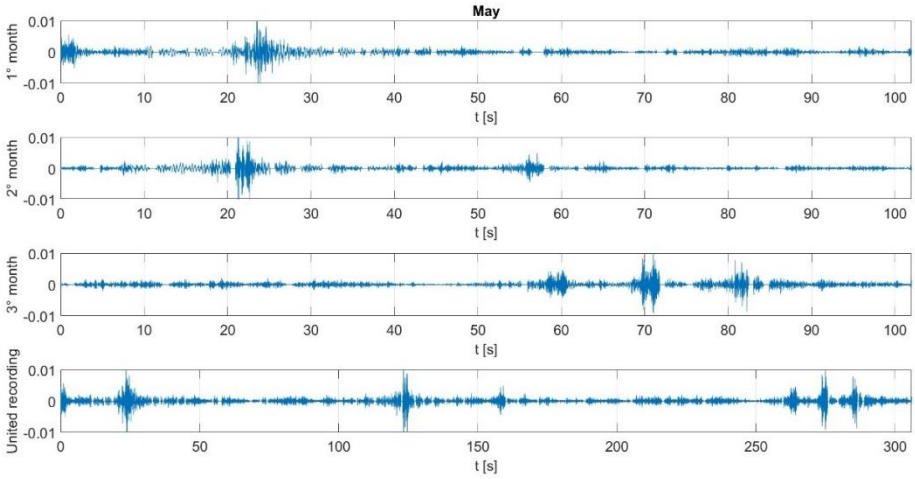


Figure 9-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

9.5.3 Transverse direction (z)

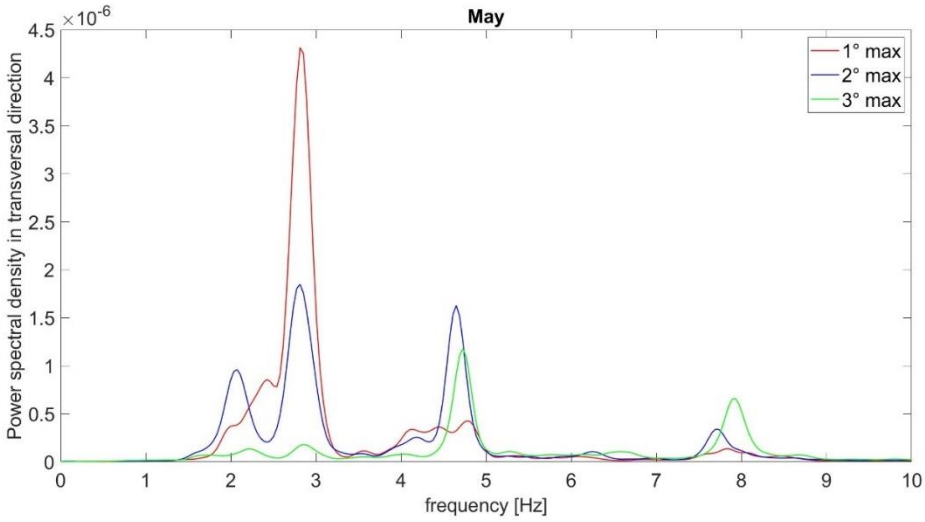


Figure 9-58: Results obtained from the 3 accelerograms with maximum SD in time domain

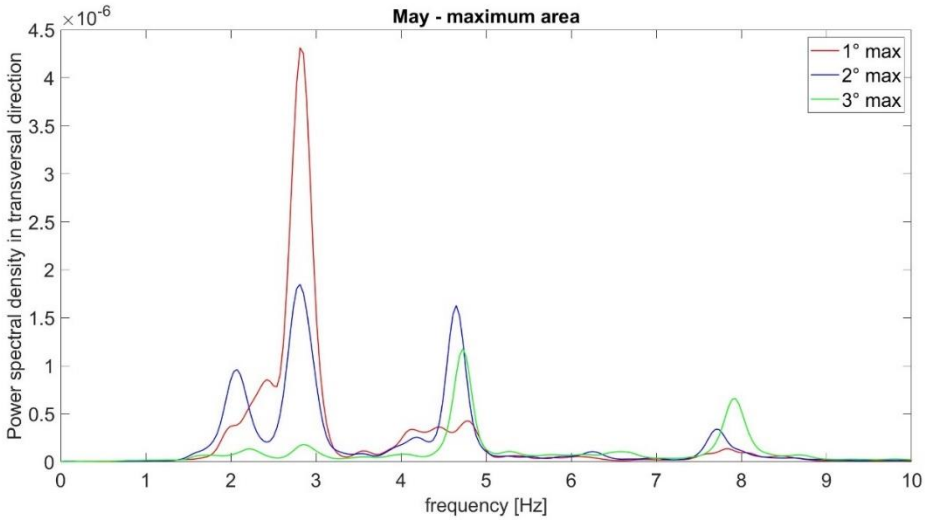


Figure 9-59: Results obtained from the 3 accelerograms with maximum area of PSD

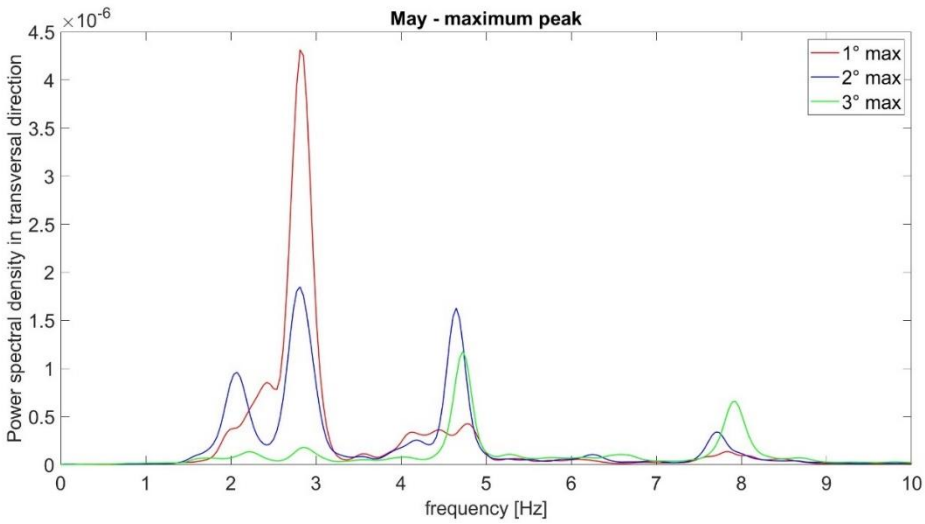


Figure 9-60: Results obtained from the 3 accelerograms with highest peak if PSD

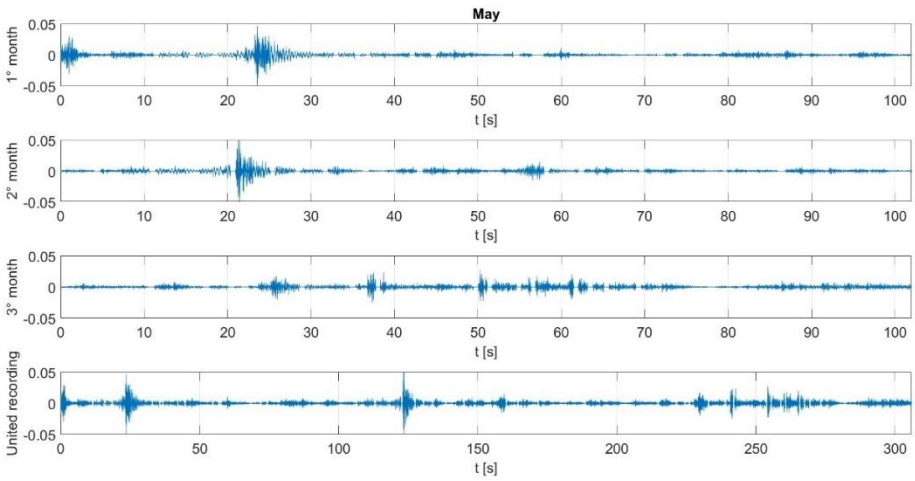


Figure 9-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

9.6 June

The results obtained for the June dataset are shown in the following tables.

Table 9-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-06-10_08-00-20	4.42E-03
	2°	2BE0F_2023-06-21_08-00-21	4.40E-03
	3°	2BE0F_2023-06-13_08-00-20	4.18E-03
Longitudinal direction (y)	1°	2BE0F_2023-06-10_08-00-20	4.33E-04
	2°	2BE0F_2023-06-27_14-00-20	3.59E-04
	3°	2BE0F_2023-06-13_08-00-20	3.30E-04
Transverse direction (z)	1°	2BE0F_2023-06-10_08-00-20	1.28E-03
	2°	2BE0F_2023-06-21_08-00-21	1.04E-03
	3°	2BE0F_2023-06-13_08-00-20	1.02E-03

Table 9-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-06-21_08-00-21	3.58E-05	2BE0F_2023-06-21_08-00-21	3.82E-06
2	2BE0F_2023-06-10_08-00-20	2.65E-05	2BE0F_2023-06-10_08-00-20	3.79E-06
3	2BE0F_2023-06-15_08-00-20	2.03E-05	2BE0F_2023-06-13_08-00-20	3.60E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-06-27_14-00-20	2.39E-07	2BE0F_2023-06-10_08-00-20	3.63E-08
2	2BE0F_2023-06-10_08-00-20	2.20E-07	2BE0F_2023-06-27_14-00-20	2.59E-08
3	2BE0F_2023-06-28_14-00-20	5.58E-08	2BE0F_2023-06-13_08-00-20	2.24E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-06-10_08-00-20	2.64E-06	2BE0F_2023-06-10_08-00-20	3.24E-07
2	2BE0F_2023-06-21_08-00-21	1.60E-06	2BE0F_2023-06-21_08-00-21	2.23E-07
3	2BE0F_2023-06-27_14-00-20	8.07E-07	2BE0F_2023-06-13_08-00-20	2.06E-07

Table 9-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	B	A	D	A	A	A	A
2	B	A	A	D	A	D	B	B	B
3	C	-	C	C	-	C	C	-	C

9.6.1 Vertical direction (x)

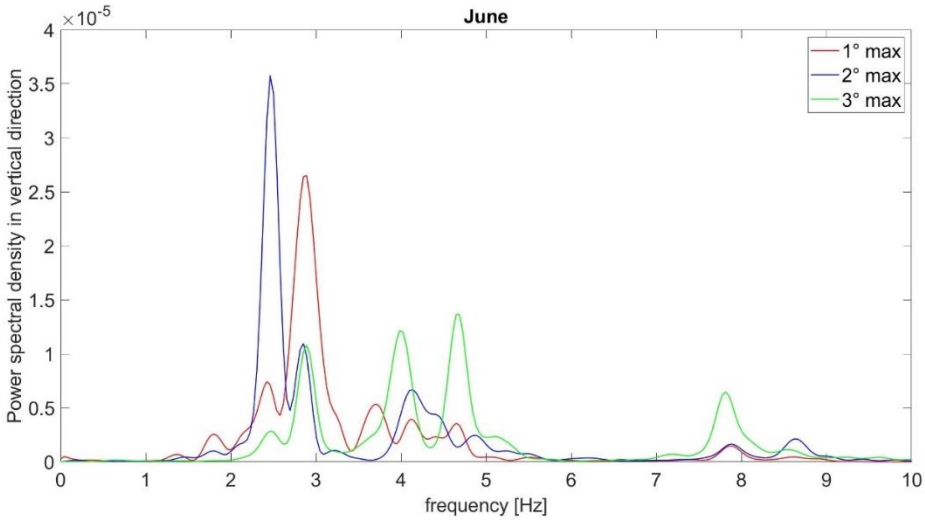


Figure 9-62: Results obtained from the 3 accelerograms with maximum SD in time domain

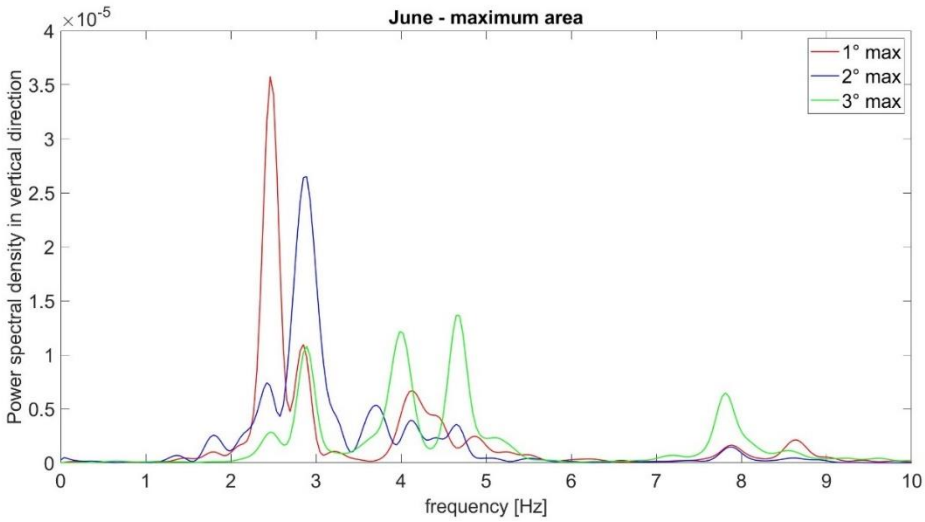


Figure 9-63: Results obtained from the 3 accelerograms with maximum area of PSD

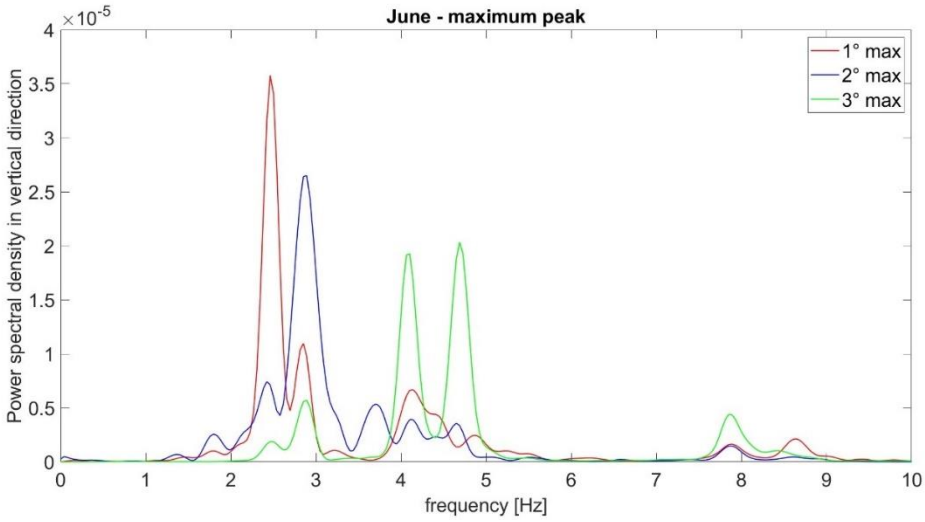


Figure 9-64: Results obtained from the 3 accelerograms with highest peak if PSD

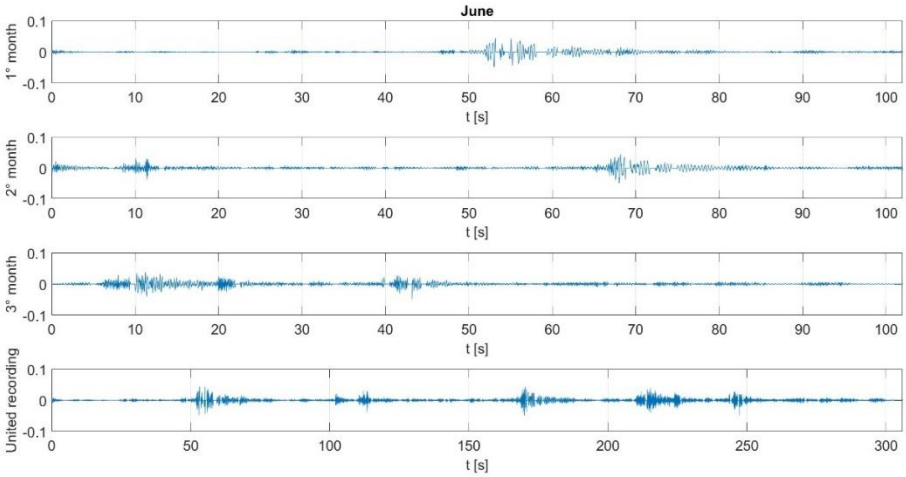


Figure 9-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.6.2 Longitudinal direction (y)

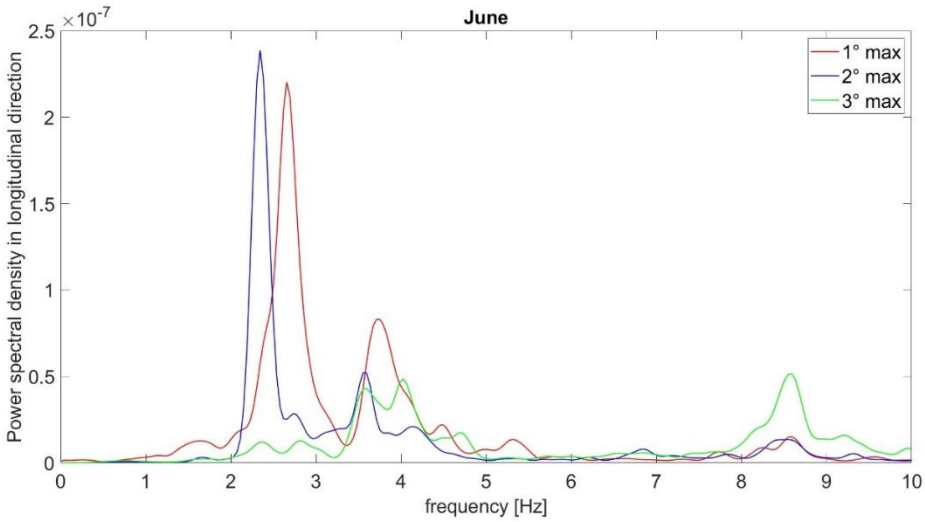


Figure 9-66: Results obtained from the 3 accelerograms with maximum SD in time domain

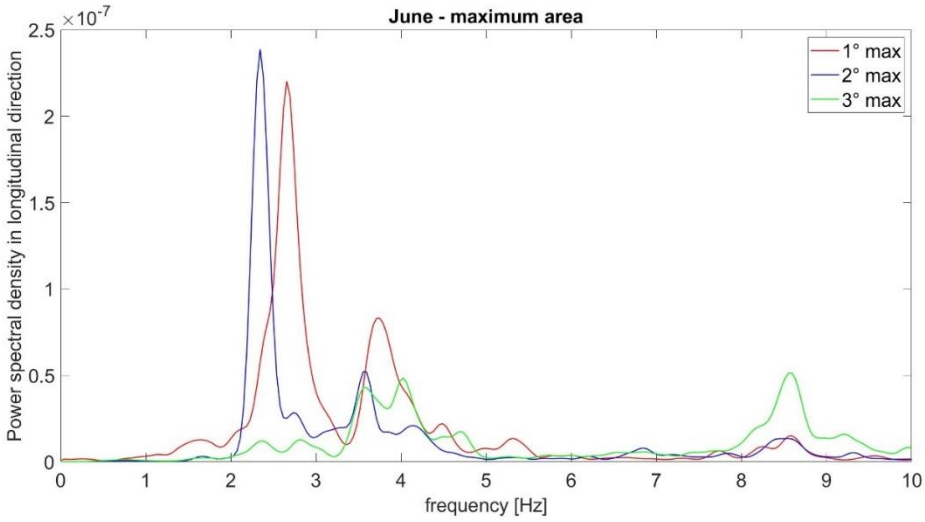


Figure 9-67: Results obtained from the 3 accelerograms with maximum area of PSD

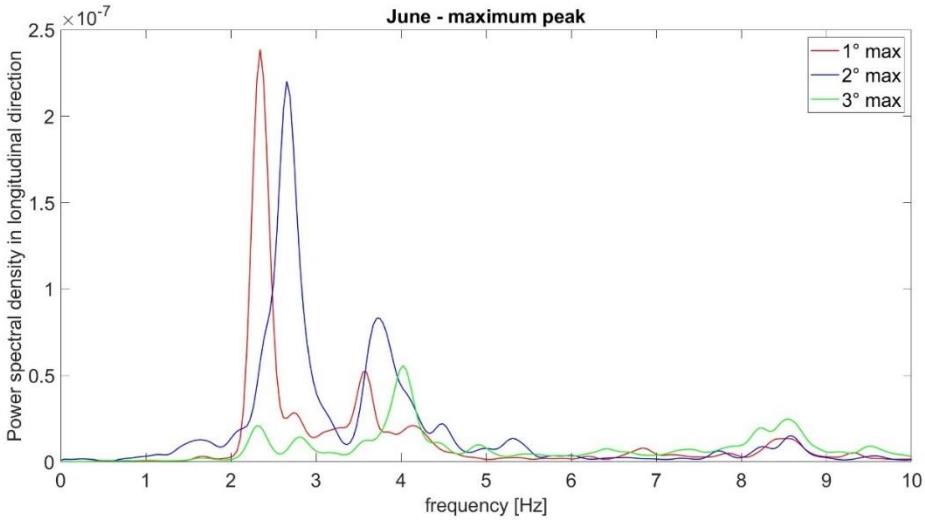


Figure 9-68: Results obtained from the 3 accelerograms with highest peak if PSD

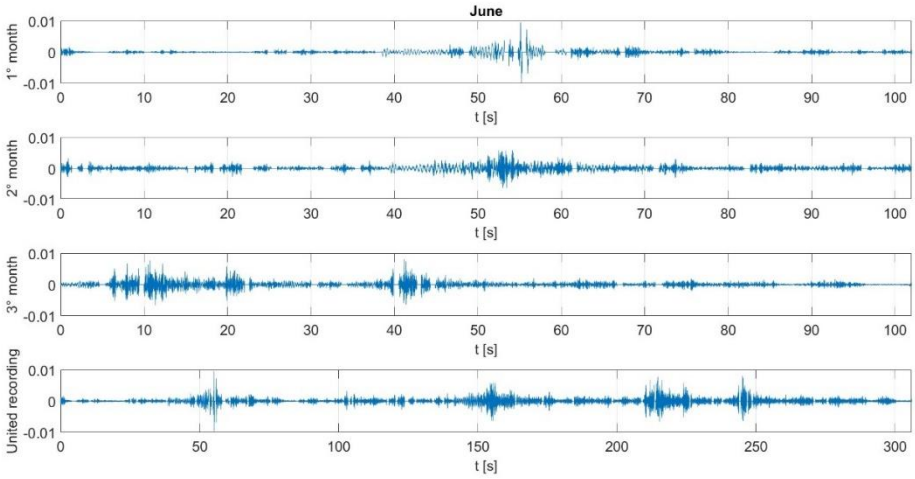


Figure 9-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

9.6.3 Transverse direction (z)

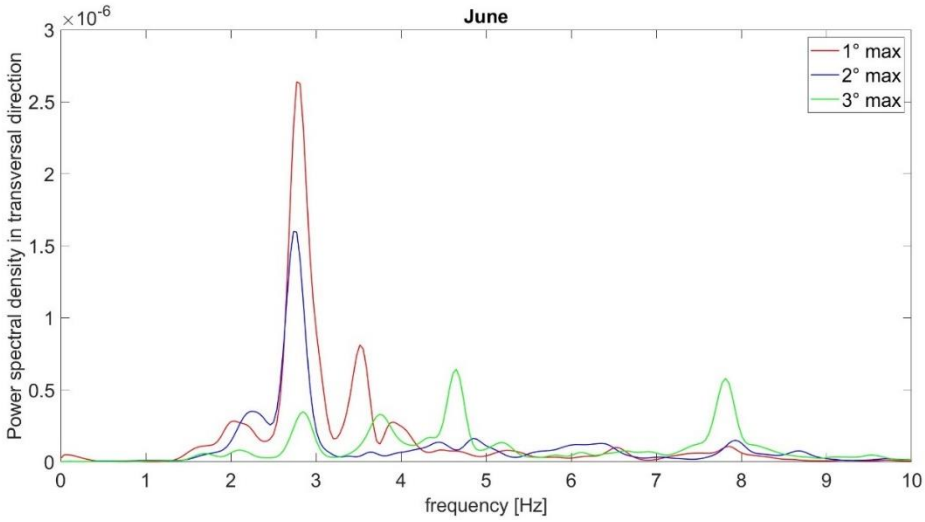


Figure 9-70: Results obtained from the 3 accelerograms with maximum SD in time domain

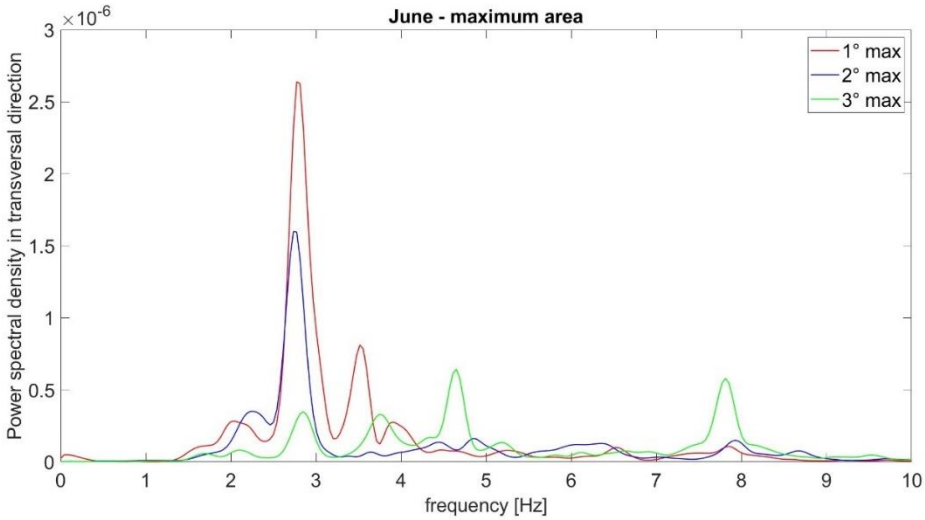


Figure 9-71: Results obtained from the 3 accelerograms with maximum area of PSD

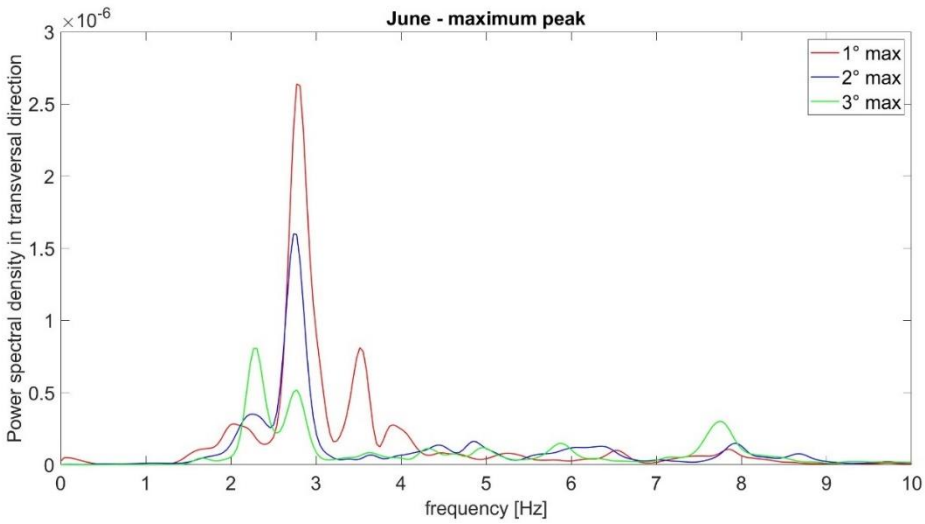


Figure 9-72: Results obtained from the 3 accelerograms with highest peak if PSD

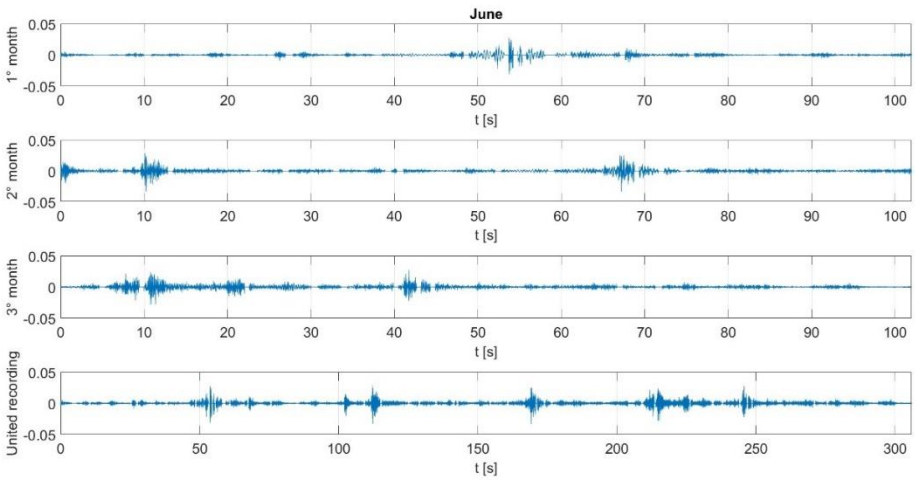


Figure 9-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

9.7 July

The results obtained for the July dataset are shown in the following tables.

Table 9-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-07-06_14-00-21	6.61E-03
	2°	2BE0F_2023-07-07_14-00-20	5.14E-03
	3°	2BE0F_2023-07-20_14-00-21	4.51E-03
Longitudinal direction (y)	1°	2BE0F_2023-07-07_14-00-20	5.39E-04
	2°	2BE0F_2023-07-06_14-00-21	3.92E-04
	3°	2BE0F_2023-07-17_14-00-20	3.82E-04
Transverse direction (z)	1°	2BE0F_2023-07-06_14-00-21	1.62E-03
	2°	2BE0F_2023-07-07_14-00-20	1.29E-03
	3°	2BE0F_2023-07-17_14-00-20	1.11E-03

Table 9-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-07-06_14-00-21	7.78E-05	2BE0F_2023-07-06_14-00-21	7.10E-06
2	2BE0F_2023-07-07_14-00-20	6.35E-05	2BE0F_2023-07-07_14-00-20	5.20E-06
3	2BE0F_2023-07-20_14-00-21	1.67E-05	2BE0F_2023-07-20_14-00-21	4.21E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-07-07_14-00-20	4.28E-07	2BE0F_2023-07-07_14-00-20	6.10E-08
2	2BE0F_2023-07-06_14-00-21	1.40E-07	2BE0F_2023-07-17_14-00-20	2.87E-08
3	2BE0F_2023-07-17_14-00-20	8.70E-08	2BE0F_2023-07-06_14-00-21	2.82E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-07-06_14-00-21	3.27E-06	2BE0F_2023-07-06_14-00-21	4.22E-07
2	2BE0F_2023-07-07_14-00-20	2.29E-06	2BE0F_2023-07-07_14-00-20	3.21E-07
3	2BE0F_2023-07-17_14-00-20	1.29E-06	2BE0F_2023-07-17_14-00-20	2.44E-07

Table 9-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	B	B	A	A	A
2	B	B	B	A	A	D	B	B	B
3	C	C	C	D	D	A	D	D	D

9.7.1 Vertical direction (x)

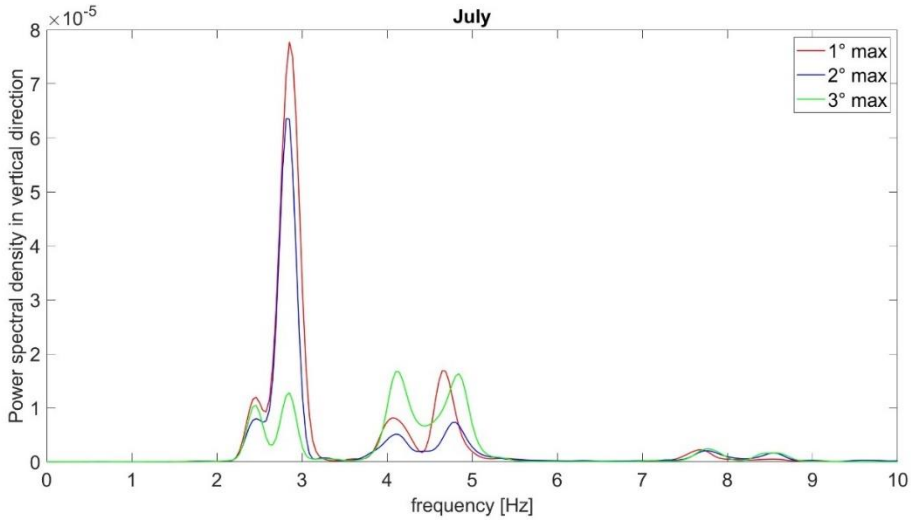


Figure 9-74: Results obtained from the 3 accelerograms with maximum SD in time domain

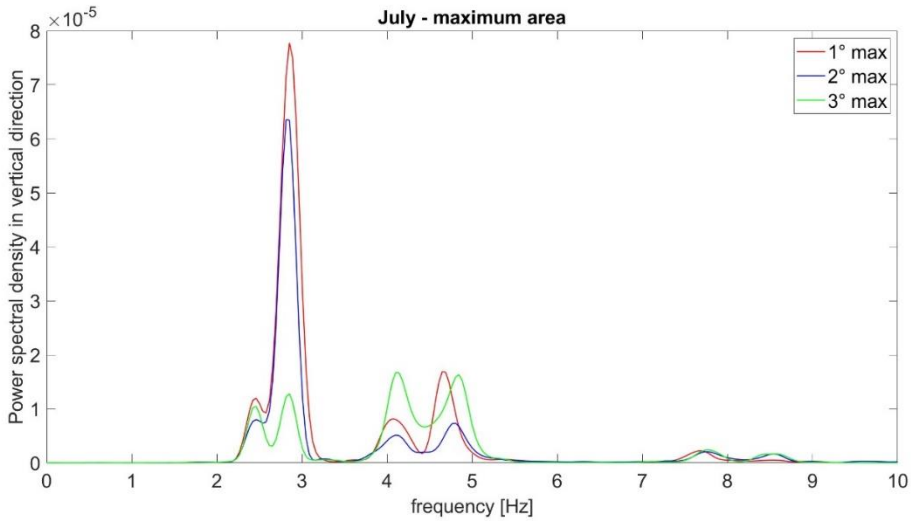


Figure 9-75: Results obtained from the 3 accelerograms with maximum area of PSD

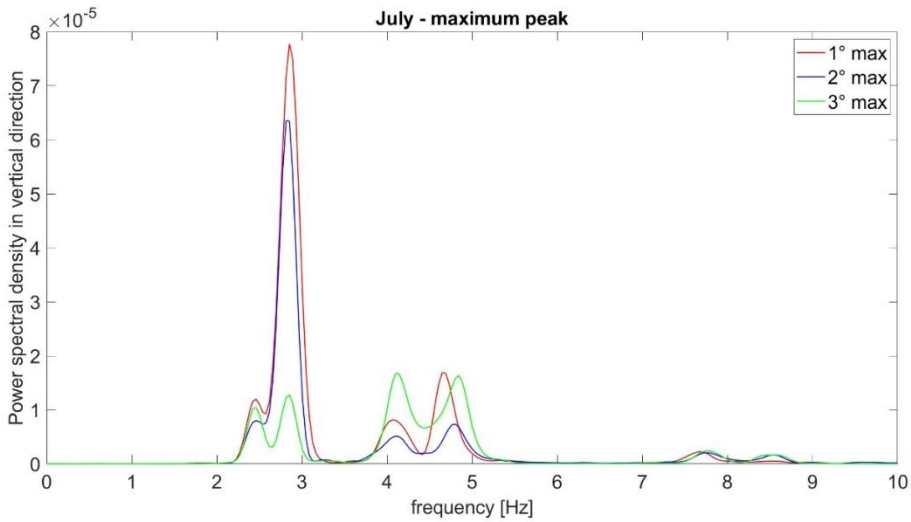


Figure 9-76: Results obtained from the 3 accelerograms with highest peak if PSD

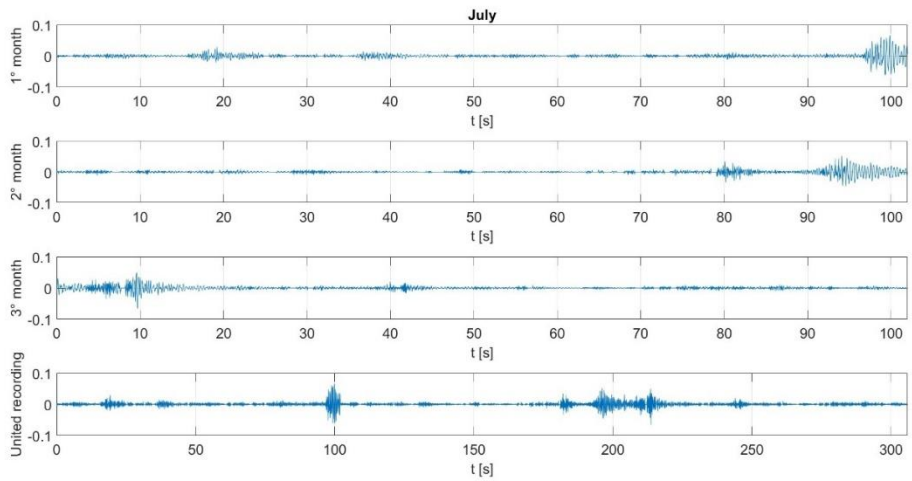


Figure 9-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.7.2 Longitudinal direction (y)

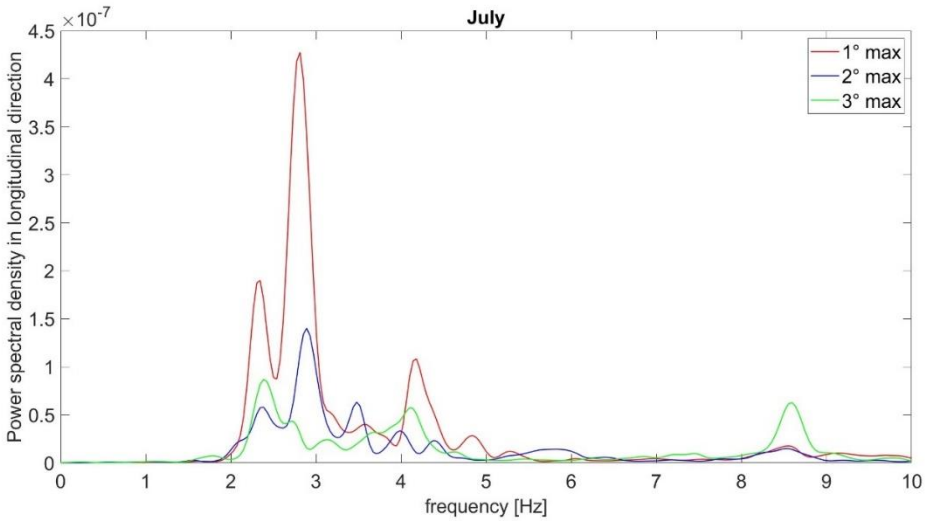


Figure 9-78: Results obtained from the 3 accelerograms with maximum SD in time domain

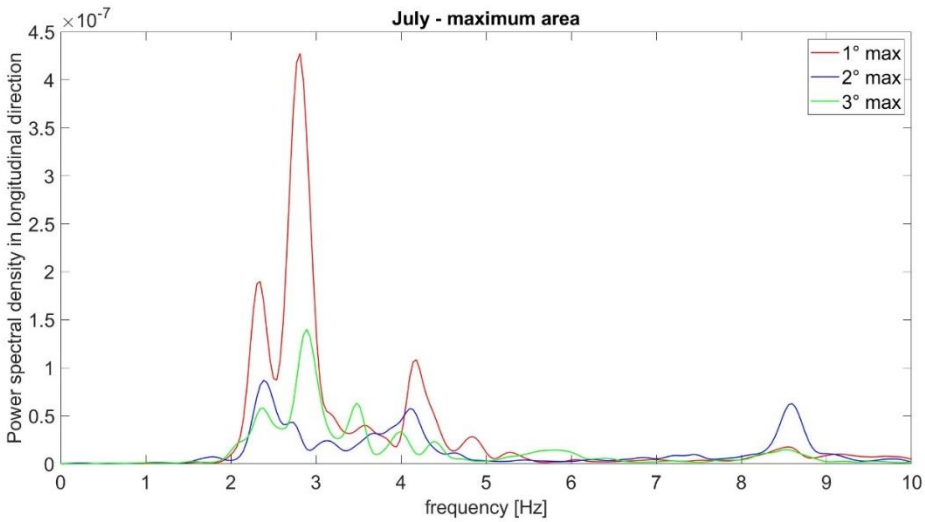


Figure 9-79: Results obtained from the 3 accelerograms with maximum area of PSD

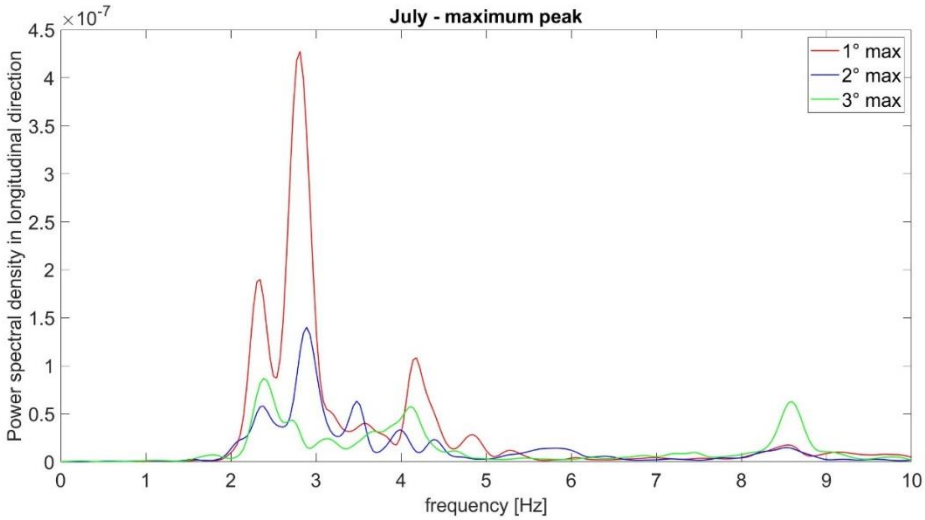


Figure 9-80: Results obtained from the 3 accelerograms with highest peak if PSD

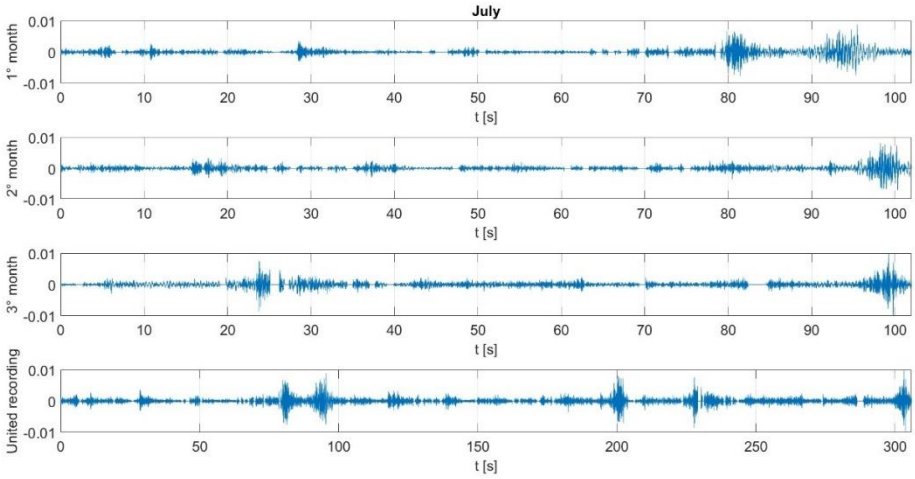


Figure 9-81: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.7.3 Transverse direction (z)

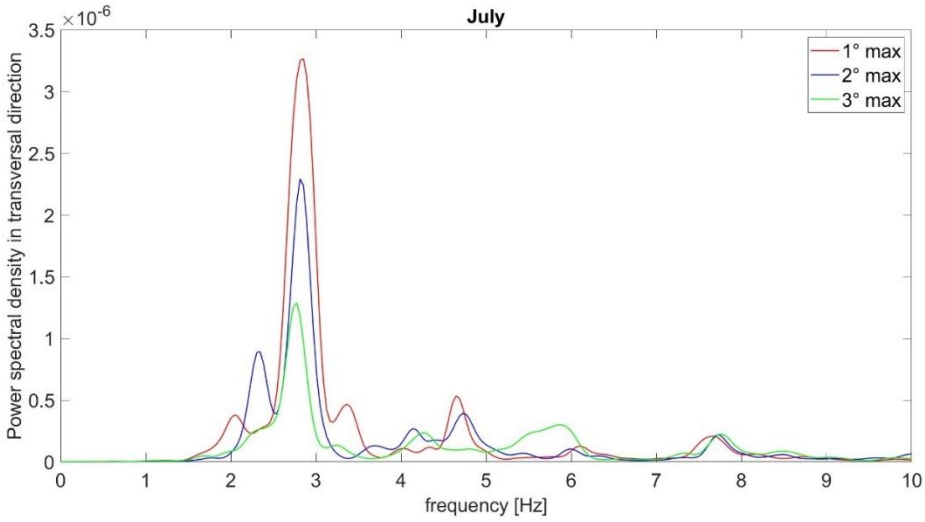


Figure 9-82: Results obtained from the 3 accelerograms with maximum SD in time domain

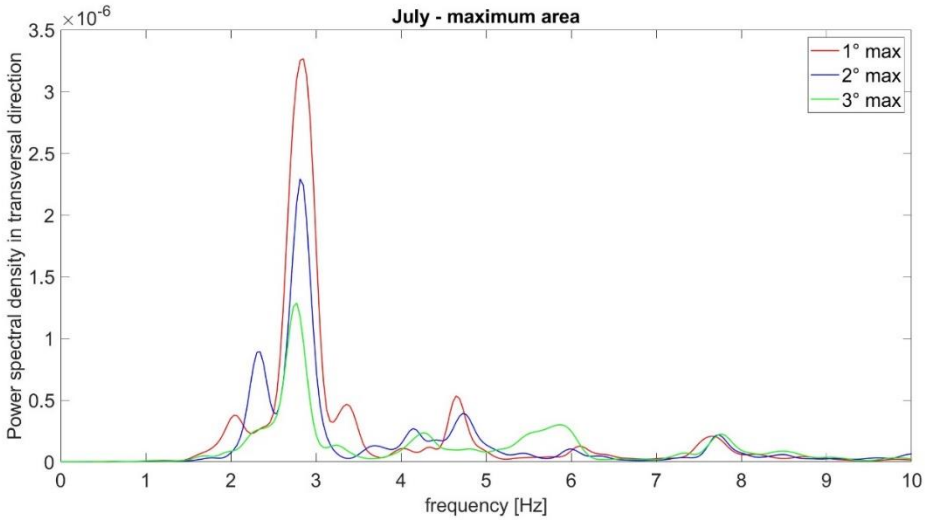


Figure 9-83: Results obtained from the 3 accelerograms with maximum area of PSD

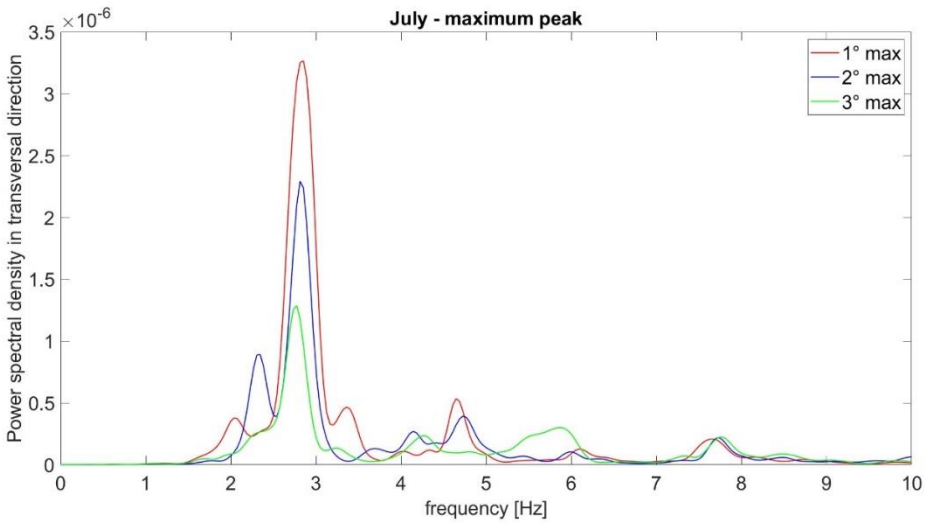


Figure 9-84: Results obtained from the 3 accelerograms with highest peak if PSD

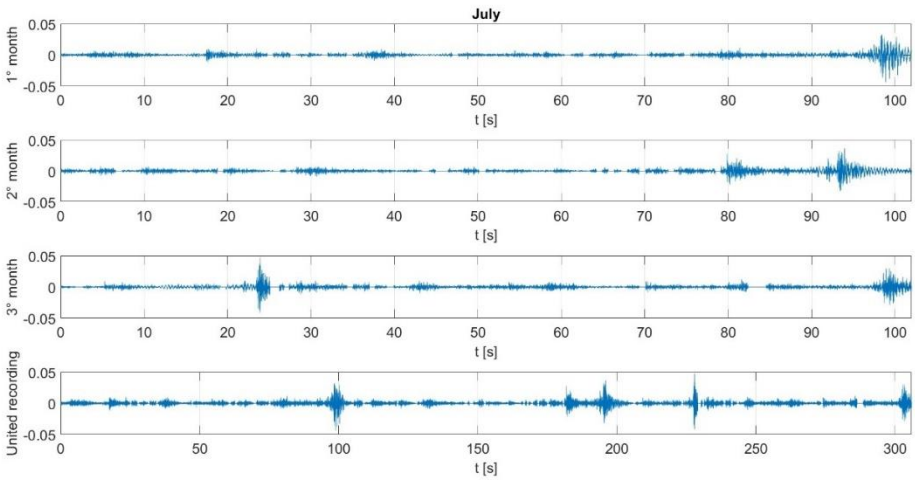


Figure 9-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

9.8 August

The results obtained for the August dataset are shown in the following tables.

Table 9-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-08-02_08-00-20	3.92E-03
	2°	2BE0F_2023-08-07_14-00-21	3.53E-03
	3°	2BE0F_2023-08-30_08-00-21	3.23E-03
Longitudinal direction (y)	1°	2BE0F_2023-08-07_14-00-21	3.60E-04
	2°	2BE0F_2023-08-02_08-00-20	3.29E-04
	3°	2BE0F_2023-08-29_08-00-21	3.06E-04
Transverse direction (z)	1°	2BE0F_2023-08-02_08-00-20	1.09E-03
	2°	2BE0F_2023-08-30_08-00-21	8.85E-04
	3°	2BE0F_2023-08-07_14-00-21	8.70E-04

Table 9-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-08-07_08-00-20	1.92E-05	2BE0F_2023-08-02_08-00-20	3.20E-06
2	2BE0F_2023-08-07_14-00-21	1.85E-05	2BE0F_2023-08-07_14-00-21	2.48E-06
3	2BE0F_2023-08-02_08-00-20	1.63E-05	2BE0F_2023-08-30_08-00-21	2.24E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-08-07_14-00-21	1.27E-07	2BE0F_2023-08-07_14-00-21	2.62E-08
2	2BE0F_2023-08-03_08-00-21	6.34E-08	2BE0F_2023-08-02_08-00-20	2.24E-08
3	2BE0F_2023-08-02_08-00-20	6.10E-08	2BE0F_2023-08-29_08-00-21	1.89E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-08-07_20-00-20	9.27E-07	2BE0F_2023-08-02_08-00-20	2.41E-07
2	2BE0F_2023-08-07_14-00-21	7.69E-07	2BE0F_2023-08-30_08-00-21	1.65E-07
3	2BE0F_2023-08-28_08-00-20	7.18E-07	2BE0F_2023-08-07_14-00-21	1.49E-07

Table 9-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	B	B	B	A	-	A
2	B	B	B	A	-	A	C	B	C
3	C	A	C	D	A	D	B	-	B

9.8.1 Vertical direction (x)

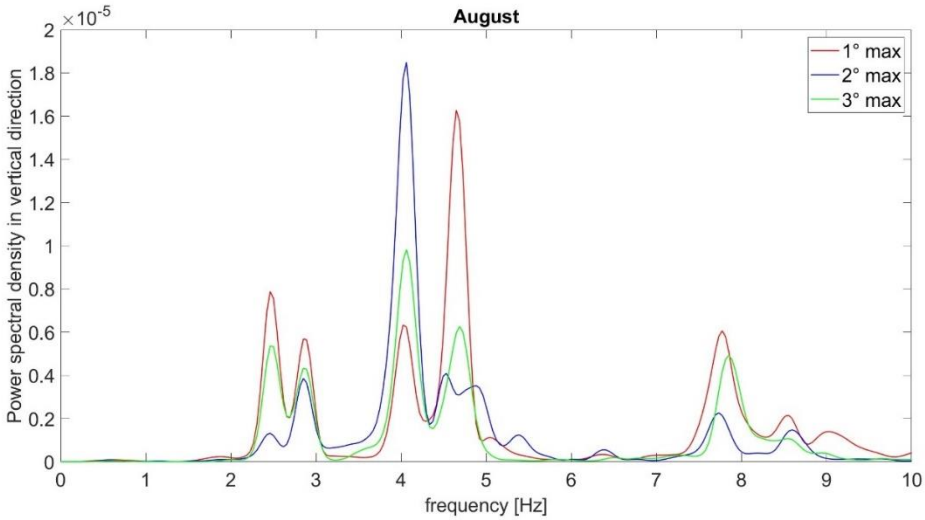


Figure 9-86: Results obtained from the 3 accelerograms with maximum SD in time domain

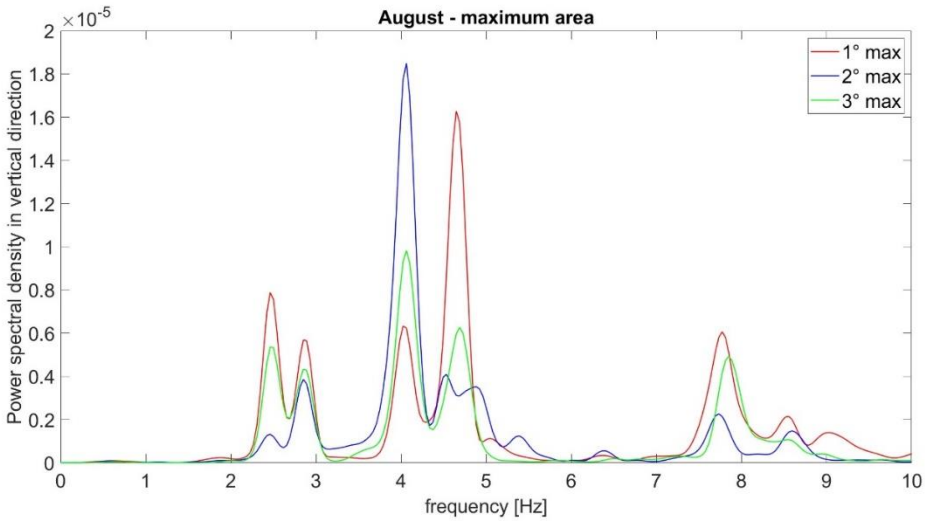


Figure 9-87: Results obtained from the 3 accelerograms with maximum area of PSD

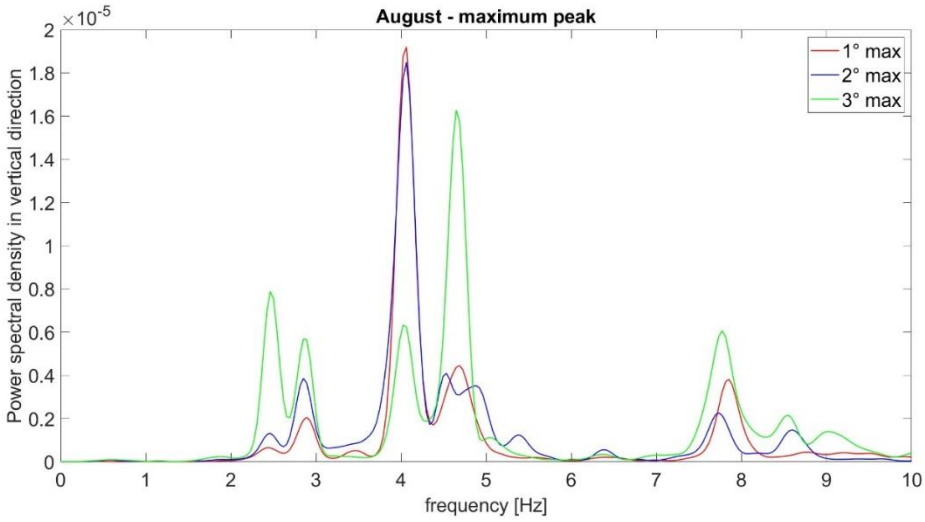


Figure 9-88: Results obtained from the 3 accelerograms with highest peak if PSD

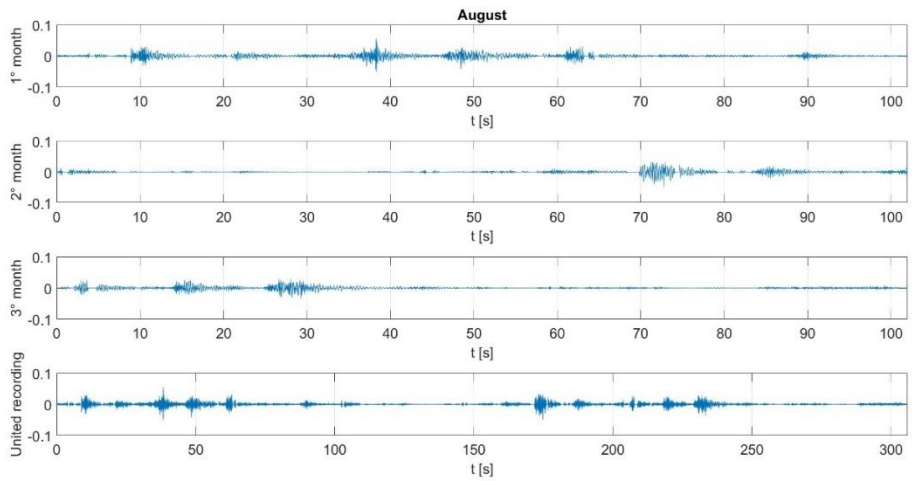


Figure 9-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.8.2 Longitudinal direction (y)

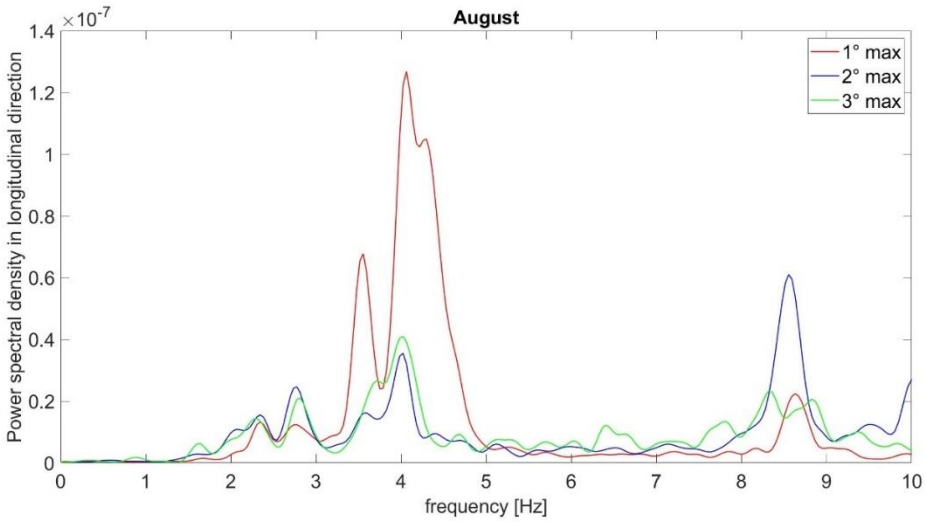


Figure 9-90: Results obtained from the 3 accelerograms with maximum SD in time domain

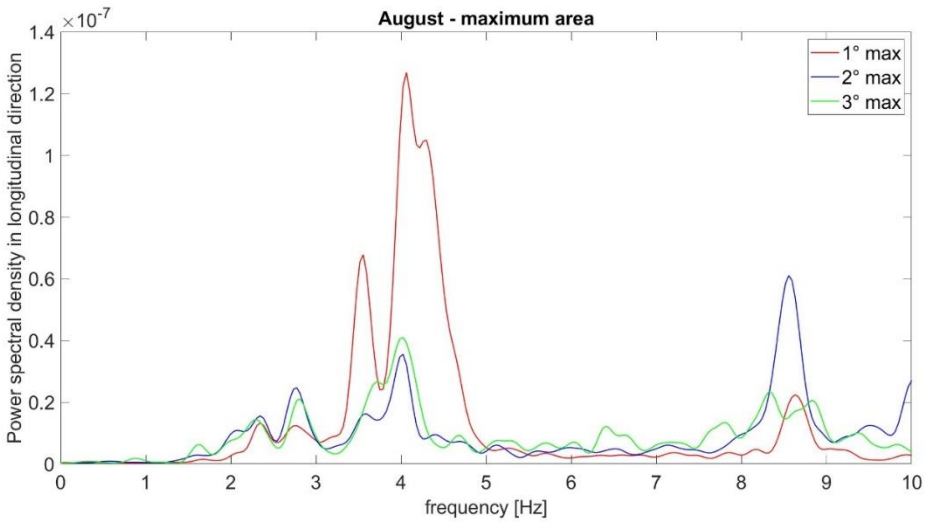


Figure 9-91: Results obtained from the 3 accelerograms with maximum area of PSD

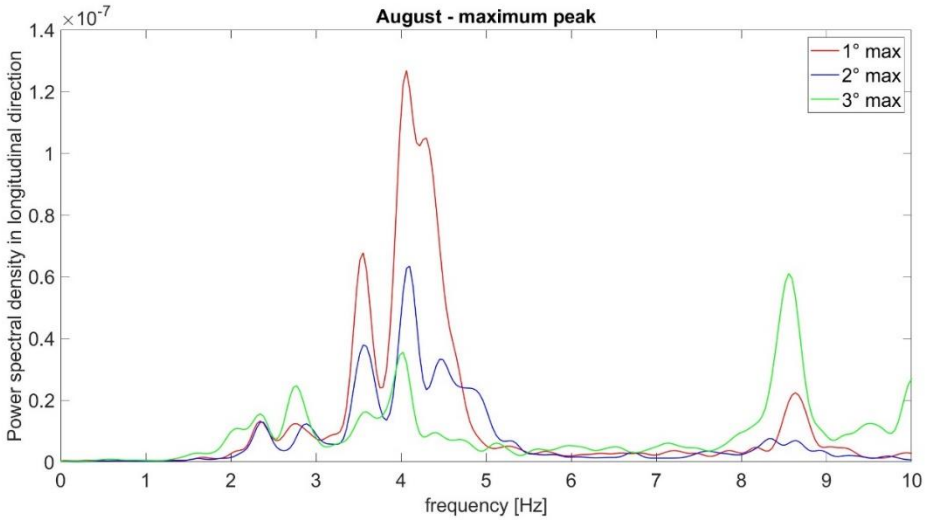


Figure 9-92: Results obtained from the 3 accelerograms with highest peak if PSD

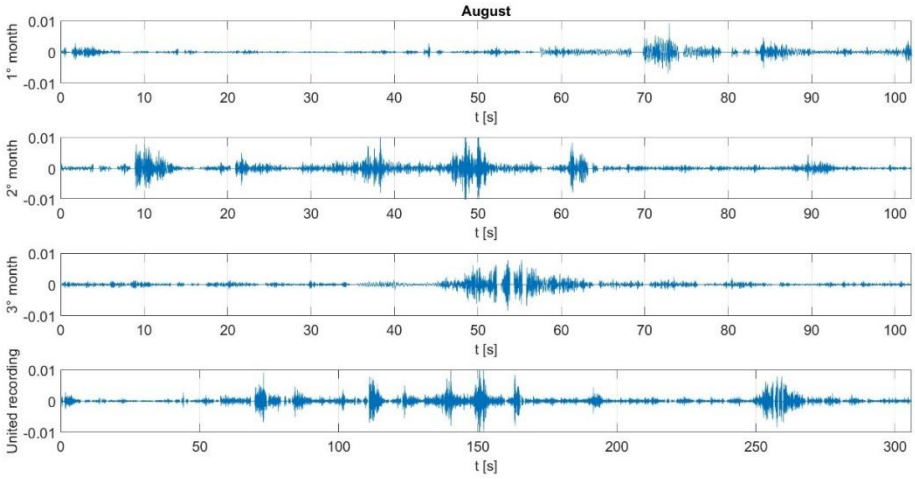


Figure 9-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

9.8.3 Transverse direction (z)

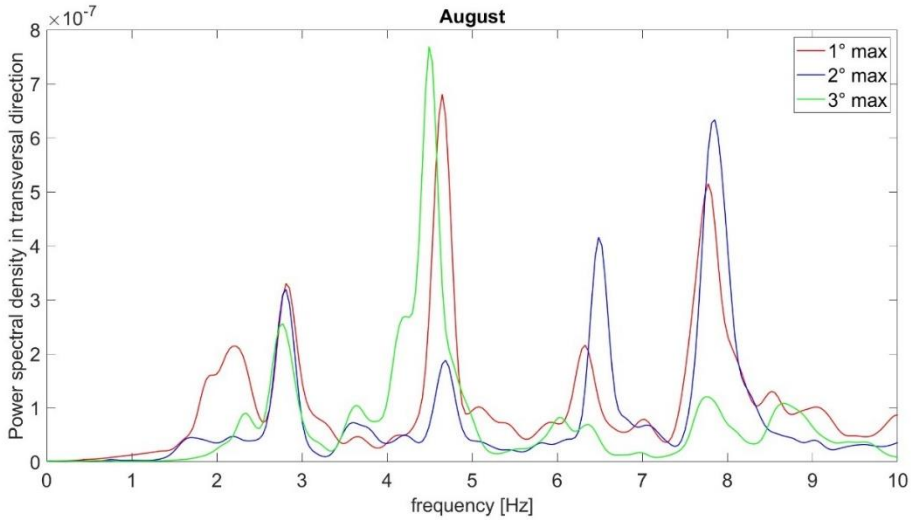


Figure 9-94: Results obtained from the 3 accelerograms with maximum SD in time domain

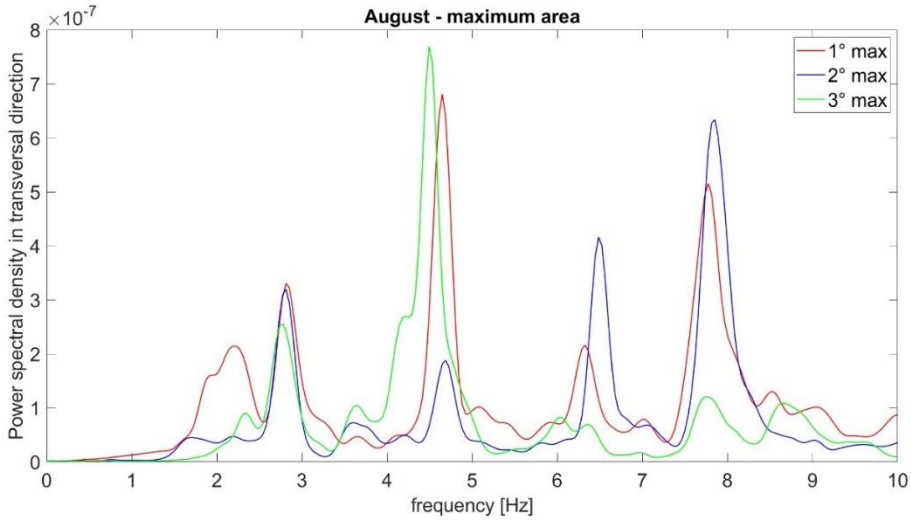


Figure 9-95: Results obtained from the 3 accelerograms with maximum area of PSD

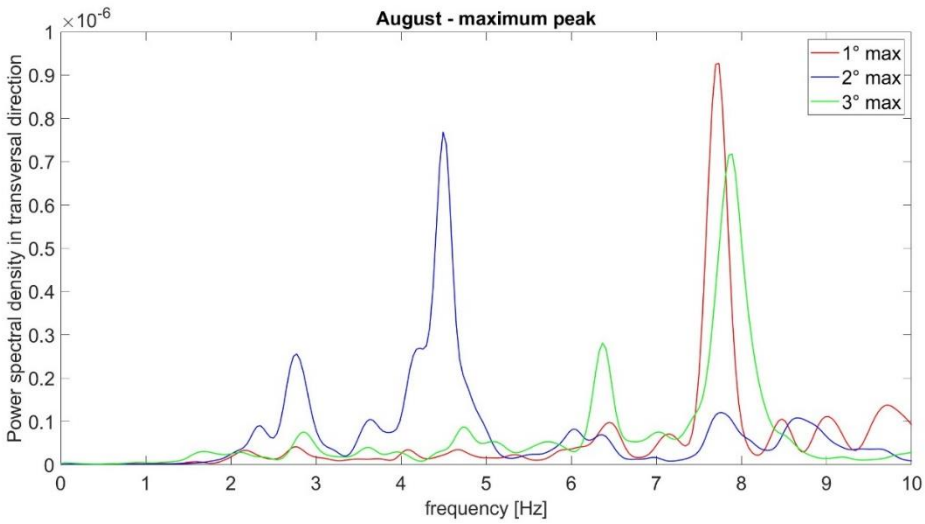


Figure 9-96: Results obtained from the 3 accelerograms with highest peak if PSD

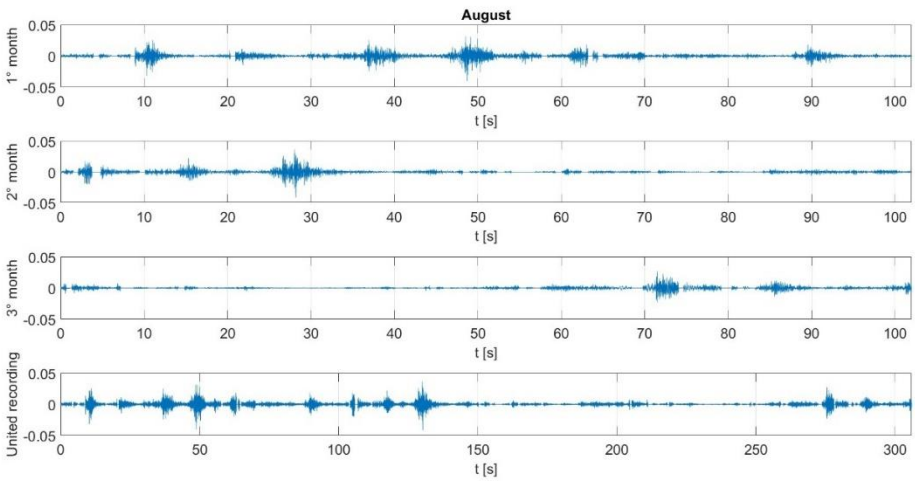


Figure 9-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

9.9 September

The results obtained for the September dataset are shown in the following tables.

Table 9-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-09-26_15-00-20	7.03E-03
	2°	2BE0F_2023-09-27_03-00-20	6.57E-03
	3°	2BE0F_2023-09-15_11-00-20	6.37E-03
Longitudinal direction (y)	1°	2BE0F_2023-09-26_15-00-20	6.21E-04
	2°	2BE0F_2023-09-26_09-00-21	5.47E-04
	3°	2BE0F_2023-09-14_11-00-20	5.43E-04
Transverse direction (z)	1°	2BE0F_2023-09-26_15-00-20	1.49E-03
	2°	2BE0F_2023-09-28_16-00-20	1.48E-03
	3°	2BE0F_2023-09-15_11-00-20	1.36E-03

Table 9-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-09-27_03-00-20	1.53E-04	2BE0F_2023-09-26_15-00-20	9.85E-06
2	2BE0F_2023-09-28_16-00-20	6.48E-05	2BE0F_2023-09-27_03-00-20	9.16E-06
3	2BE0F_2023-09-26_15-00-20	6.21E-05	2BE0F_2023-09-15_11-00-20	8.40E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-09-26_15-00-20	4.40E-07	2BE0F_2023-09-26_15-00-20	7.76E-08
2	2BE0F_2023-09-26_09-00-21	3.07E-07	2BE0F_2023-09-26_09-00-21	6.32E-08
3	2BE0F_2023-09-14_11-00-20	2.90E-07	2BE0F_2023-09-14_11-00-20	5.96E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-09-27_03-00-20	5.32E-06	2BE0F_2023-09-26_15-00-20	4.66E-07
2	2BE0F_2023-09-15_11-00-20	2.62E-06	2BE0F_2023-09-28_16-00-20	4.47E-07
3	2BE0F_2023-09-28_16-00-20	2.29E-06	2BE0F_2023-09-15_11-00-20	3.83E-07

Table 9-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	A	-	A
2	B	-	B	D	D	D	F	C	F
3	C	A	C	E	E	E	C	F	C

9.9.1 Vertical direction (x)

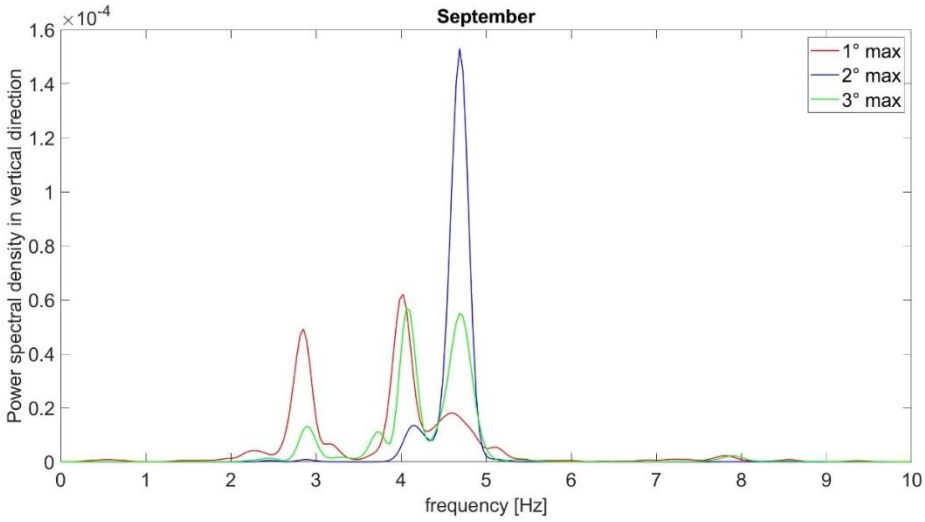


Figure 9-98: Results obtained from the 3 accelerograms with maximum SD in time domain

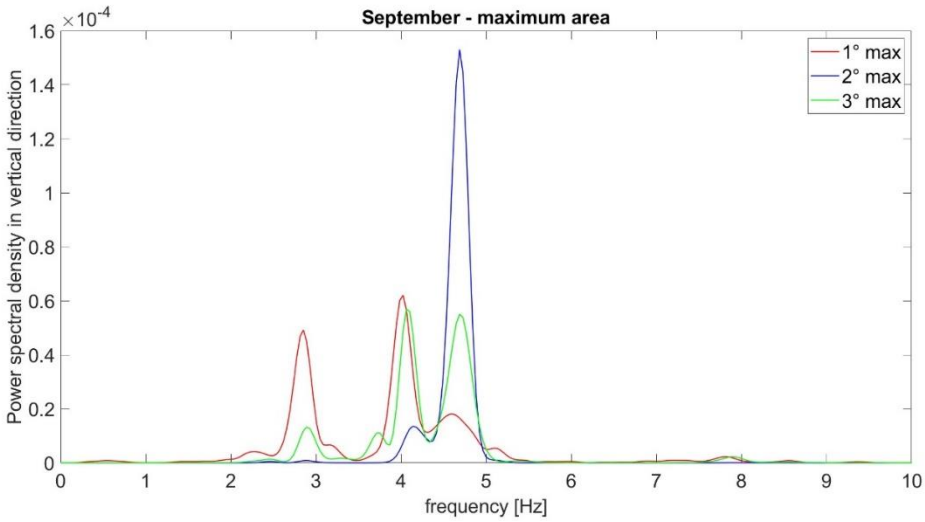


Figure 9-99: Results obtained from the 3 accelerograms with maximum area of PSD

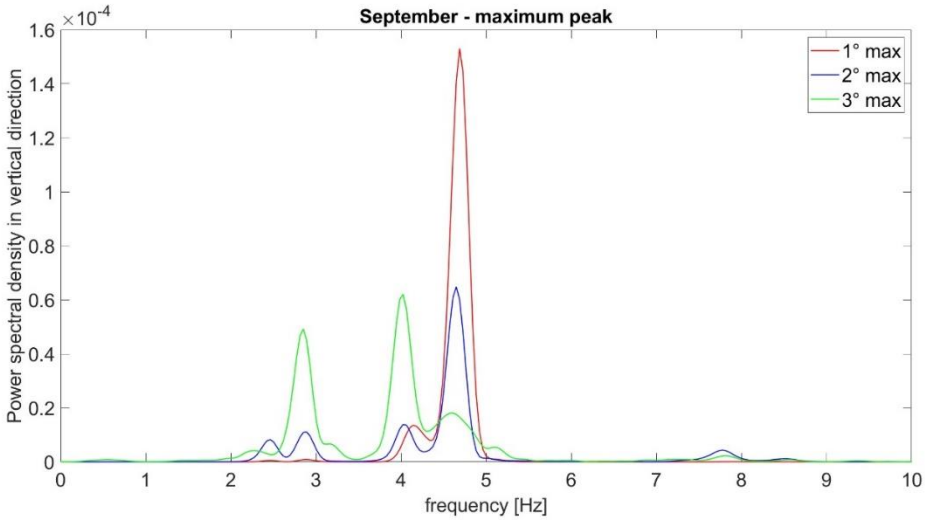


Figure 9-100: Results obtained from the 3 accelerograms with highest peak if PSD

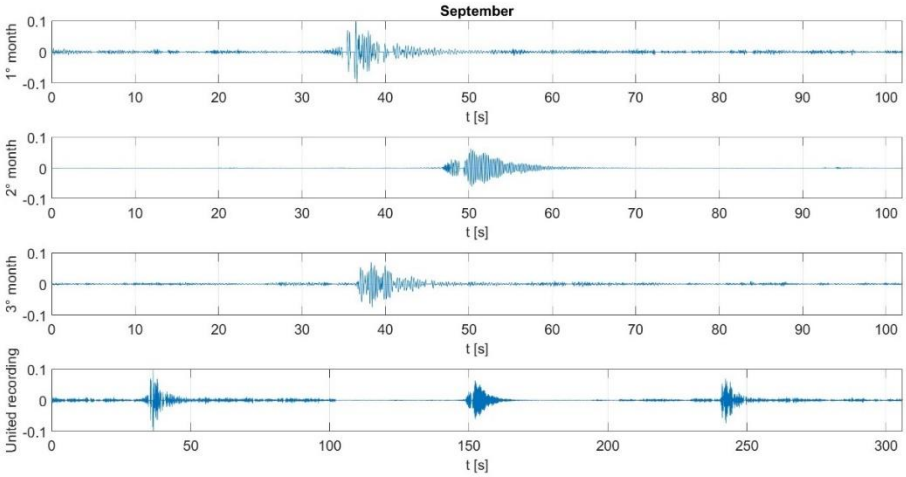


Figure 9-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.9.2 Longitudinal direction (y)

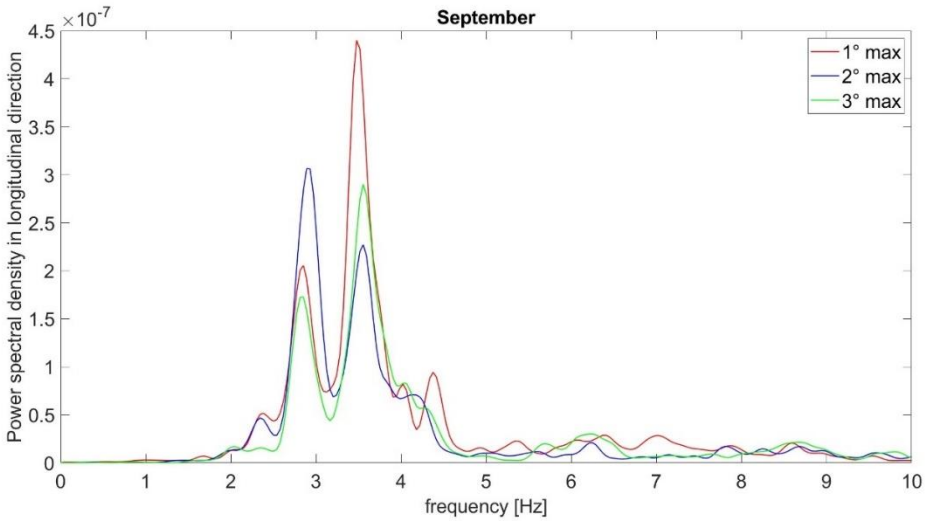


Figure 9-102: Results obtained from the 3 accelerograms with maximum SD in time domain

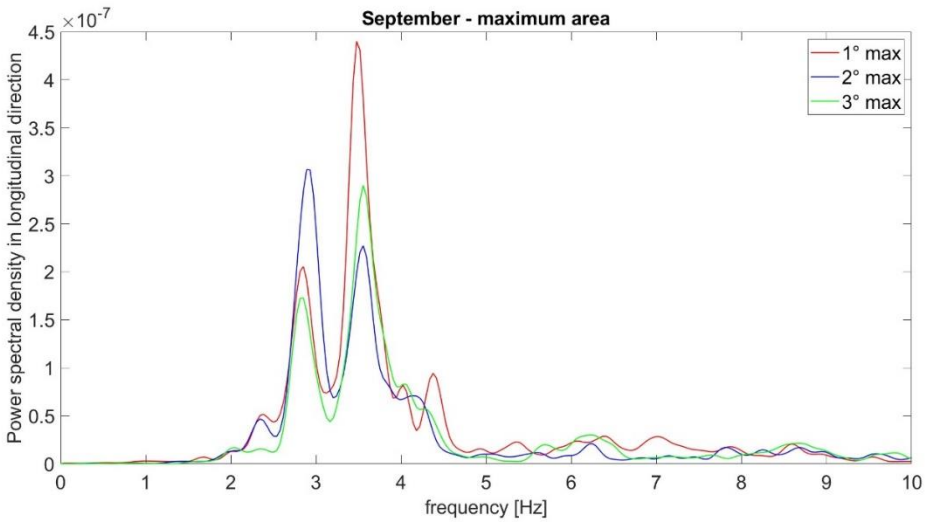


Figure 9-103: Results obtained from the 3 accelerograms with maximum area of PSD

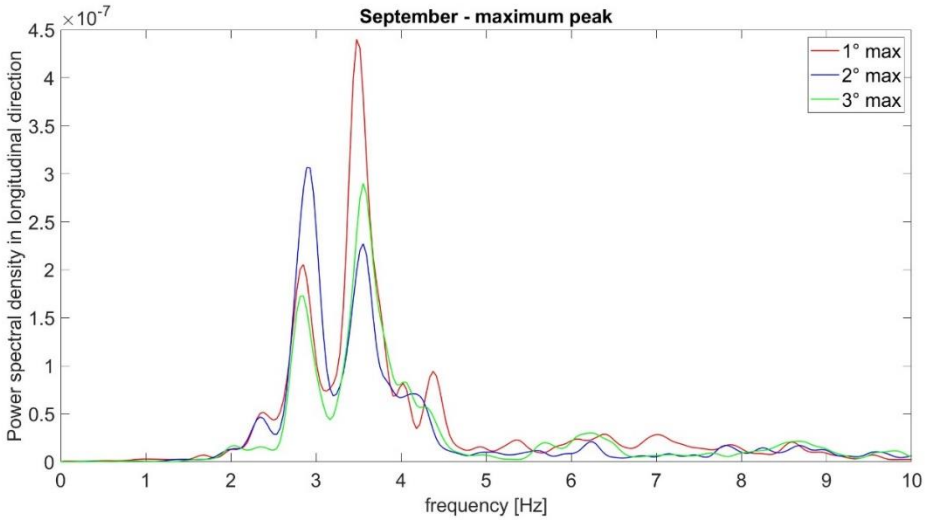


Figure 9-104: Results obtained from the 3 accelerograms with highest peak if PSD

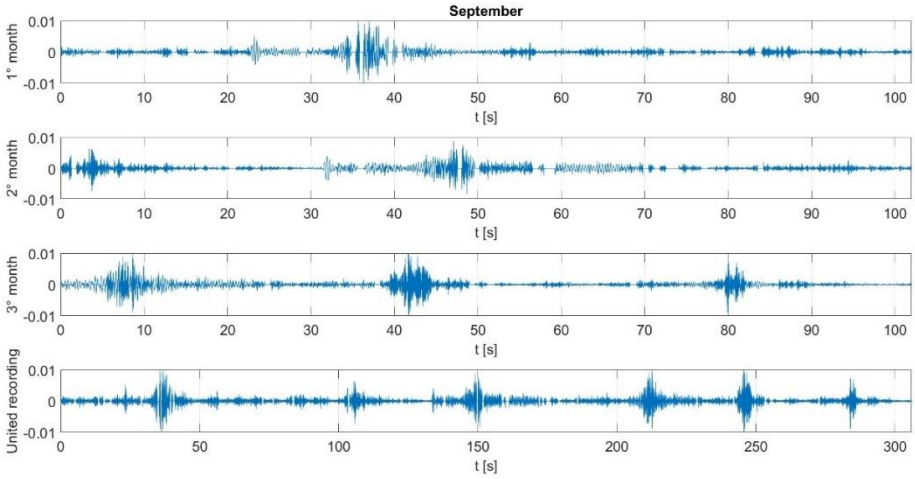


Figure 9-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

9.9.3 Transverse direction (z)

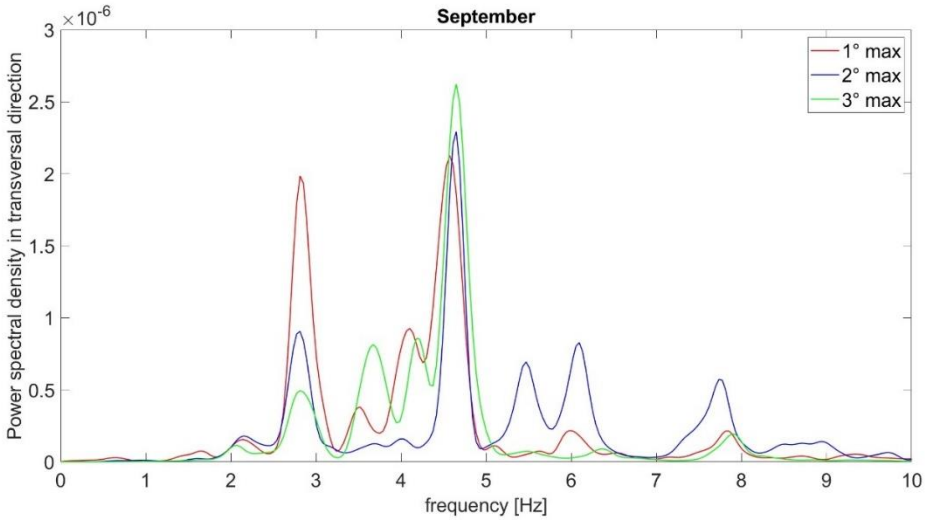


Figure 9-106: Results obtained from the 3 accelerograms with maximum SD in time domain

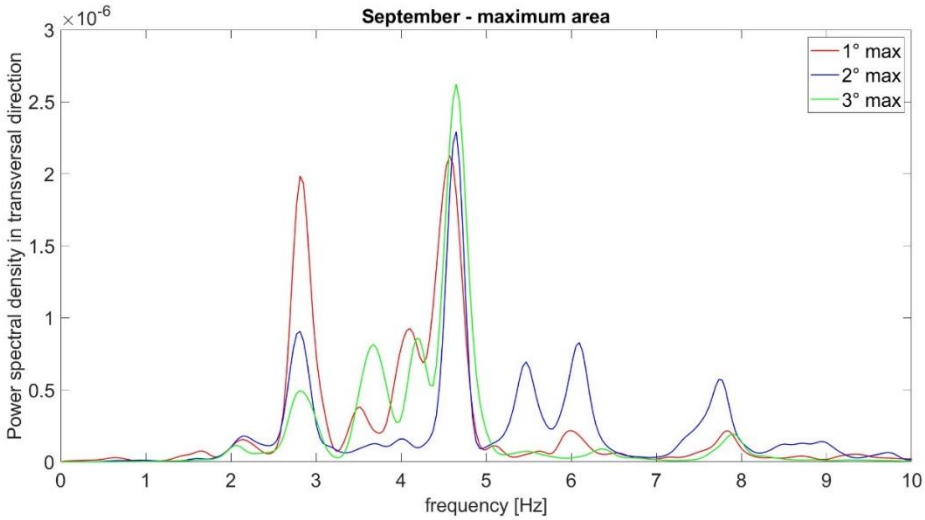


Figure 9-107: Results obtained from the 3 accelerograms with maximum area of PSD

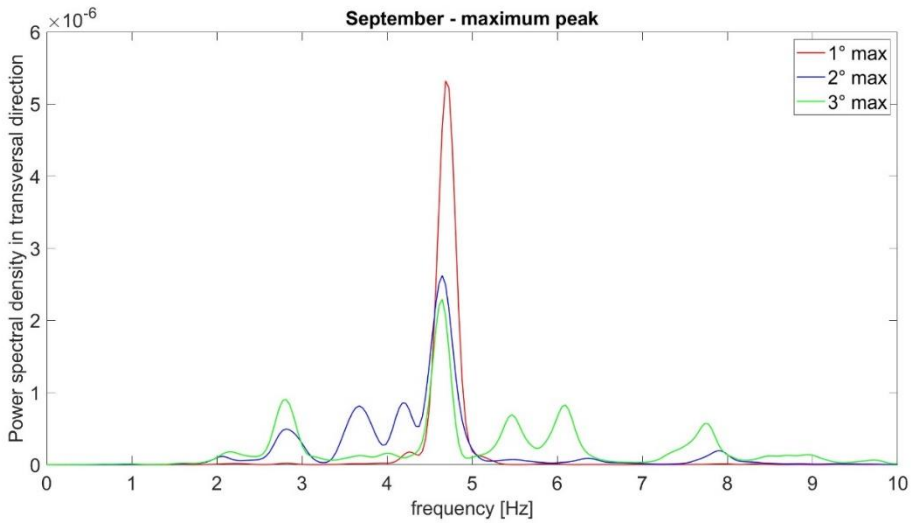


Figure 9-108: Results obtained from the 3 accelerograms with highest peak if PSD

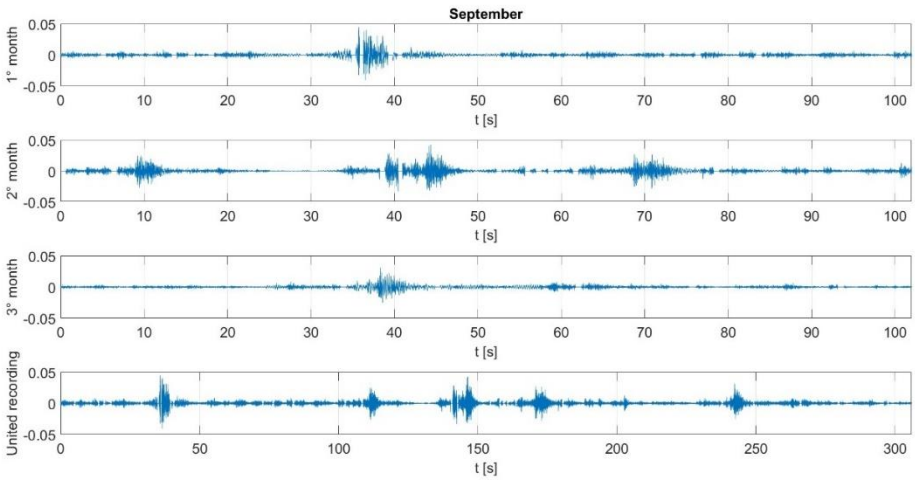


Figure 9-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

9.10 October

The results obtained for the October dataset are shown in the following tables.

Table 9-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-10-26_12-00-21	6.75E-03
	2°	2BE0F_2023-10-12_09-00-20	6.18E-03
	3°	2BE0F_2023-10-02_08-00-21	5.74E-03
Longitudinal direction (y)	1°	2BE0F_2023-10-25_10-00-20	5.28E-04
	2°	2BE0F_2023-10-18_15-00-21	4.20E-04
	3°	2BE0F_2023-10-12_09-00-20	4.19E-04
Transverse direction (z)	1°	2BE0F_2023-10-25_10-00-20	1.33E-03
	2°	2BE0F_2023-10-12_09-00-20	1.26E-03
	3°	2BE0F_2023-10-26_12-00-21	1.26E-03

Table 9-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-10-26_12-00-21	1.16E-04	2BE0F_2023-10-26_12-00-21	9.22E-06
2	2BE0F_2023-10-12_09-00-20	9.54E-05	2BE0F_2023-10-12_09-00-20	7.55E-06
3	2BE0F_2023-10-02_08-00-21	6.23E-05	2BE0F_2023-10-02_08-00-21	6.37E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-10-12_09-00-20	1.71E-07	2BE0F_2023-10-25_10-00-20	5.27E-08
2	2BE0F_2023-10-12_16-00-21	1.59E-07	2BE0F_2023-10-12_09-00-20	3.58E-08
3	2BE0F_2023-10-25_10-00-20	1.52E-07	2BE0F_2023-10-18_15-00-21	3.37E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-10-12_09-00-20	2.99E-06	2BE0F_2023-10-25_10-00-20	3.51E-07
2	2BE0F_2023-10-26_12-00-21	2.63E-06	2BE0F_2023-10-12_09-00-20	3.22E-07
3	2BE0F_2023-10-02_08-00-21	1.64E-06	2BE0F_2023-10-26_12-00-21	3.15E-07

Table 9-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	B	D	D	B	D
2	B	B	B	E	-	B	B	A	B
3	C	C	C	B	D	E	A	-	A

9.10.1 Vertical direction (x)

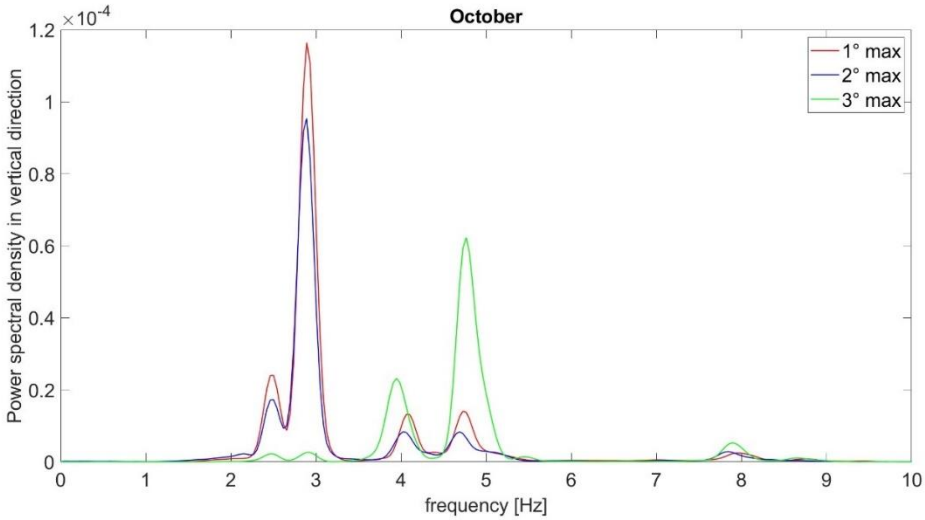


Figure 9-110: Results obtained from the 3 accelerograms with maximum SD in time domain

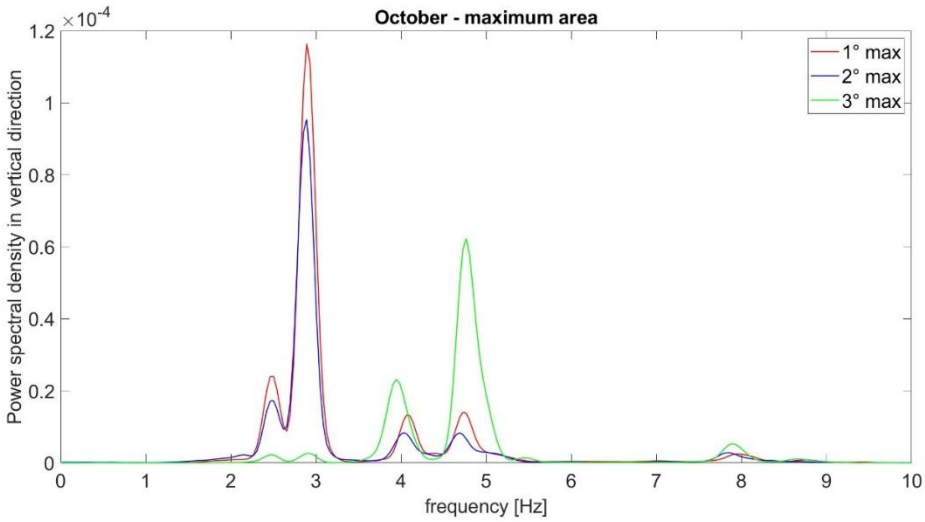


Figure 9-111: Results obtained from the 3 accelerograms with maximum area of PSD

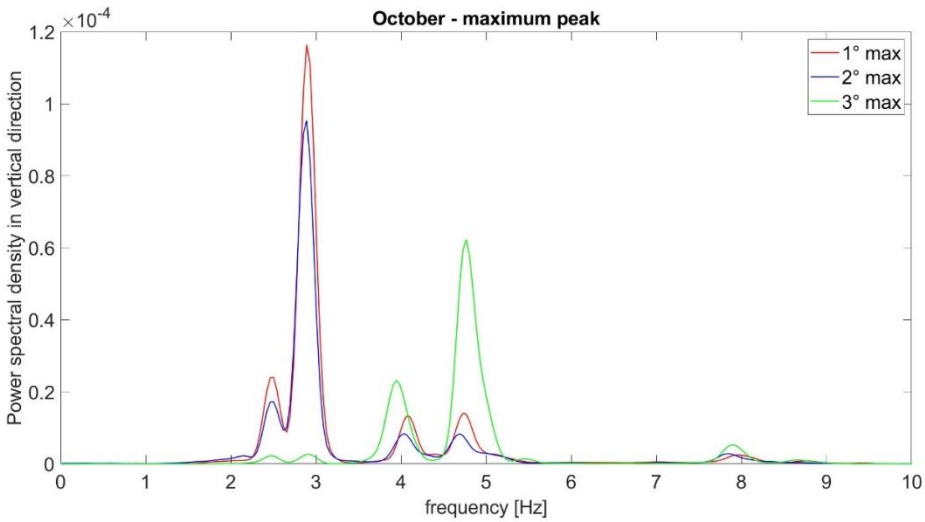


Figure 9-112: Results obtained from the 3 accelerograms with highest peak if PSD

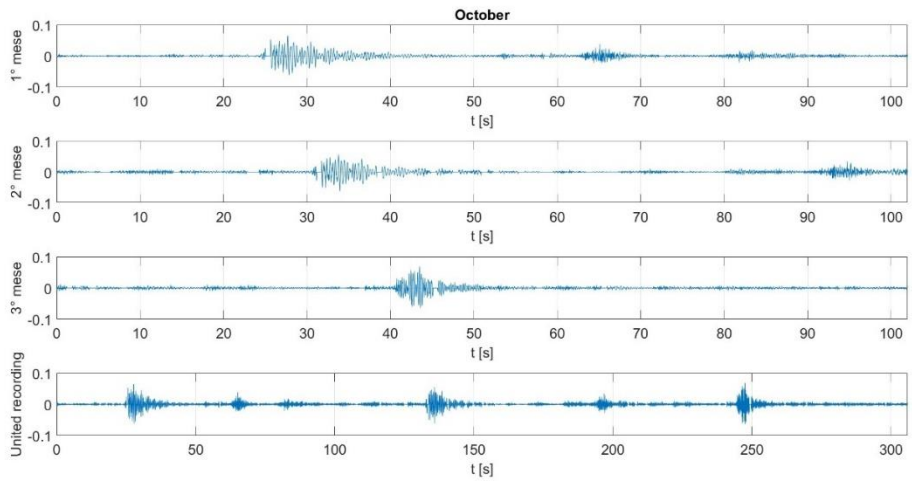


Figure 9-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.10.2 Longitudinal direction (y)

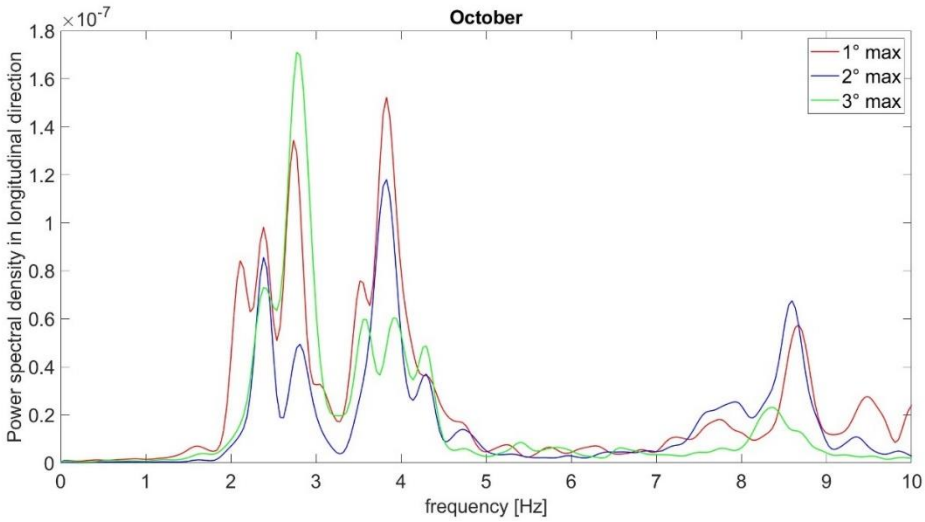


Figure 9-114: Results obtained from the 3 accelerograms with maximum SD in time domain

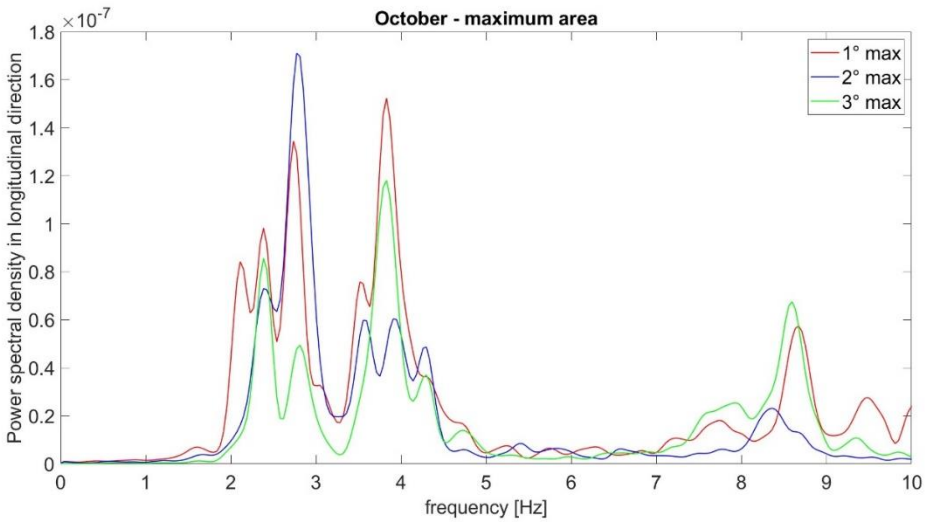


Figure 9-115: Results obtained from the 3 accelerograms with maximum area of PSD

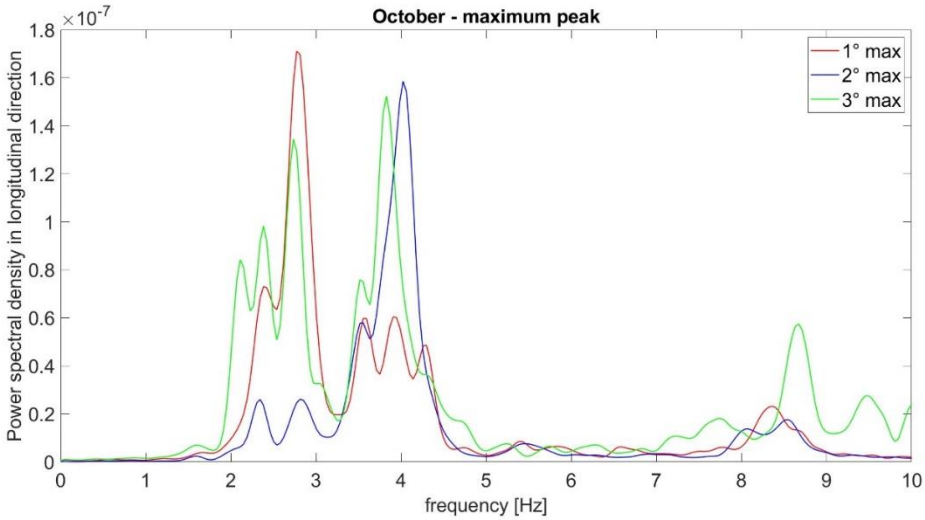


Figure 9-116: Results obtained from the 3 accelerograms with highest peak if PSD

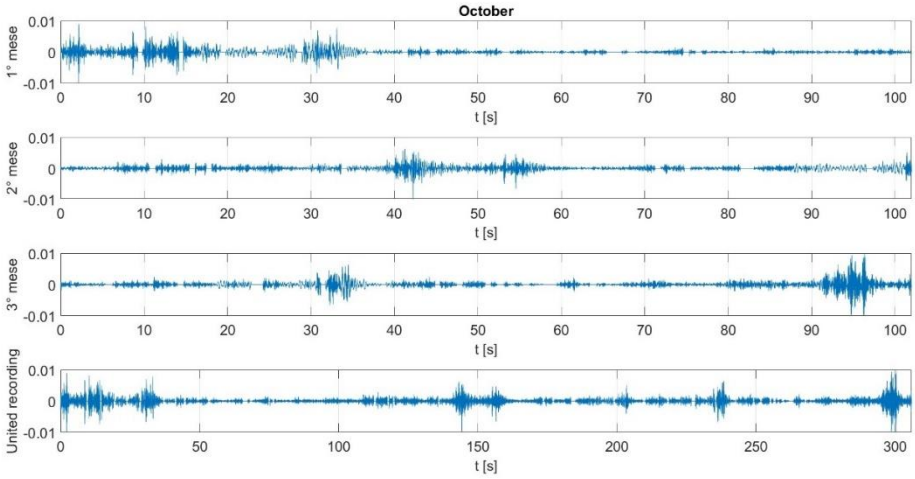


Figure 9-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

9.10.3 Transverse direction (z)

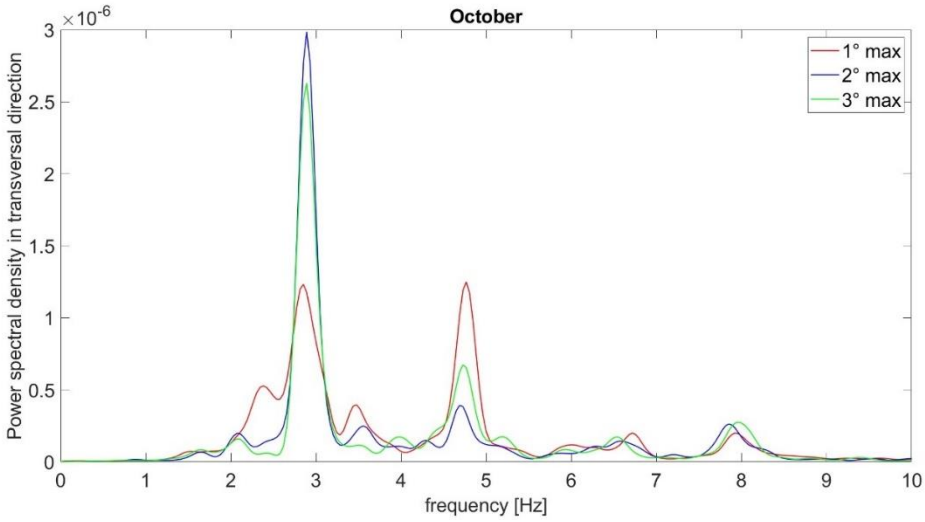


Figure 9-118: Results obtained from the 3 accelerograms with maximum SD in time domain

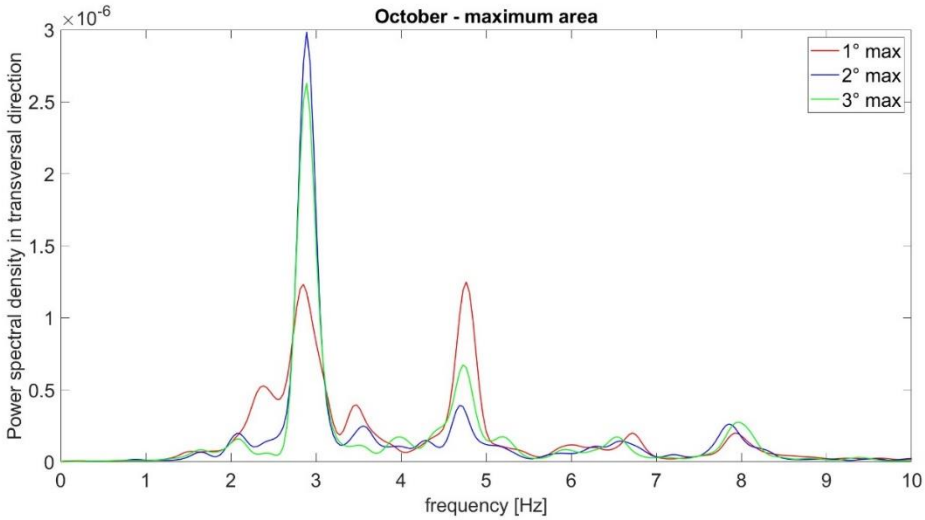


Figure 9-119: Results obtained from the 3 accelerograms with maximum area of PSD

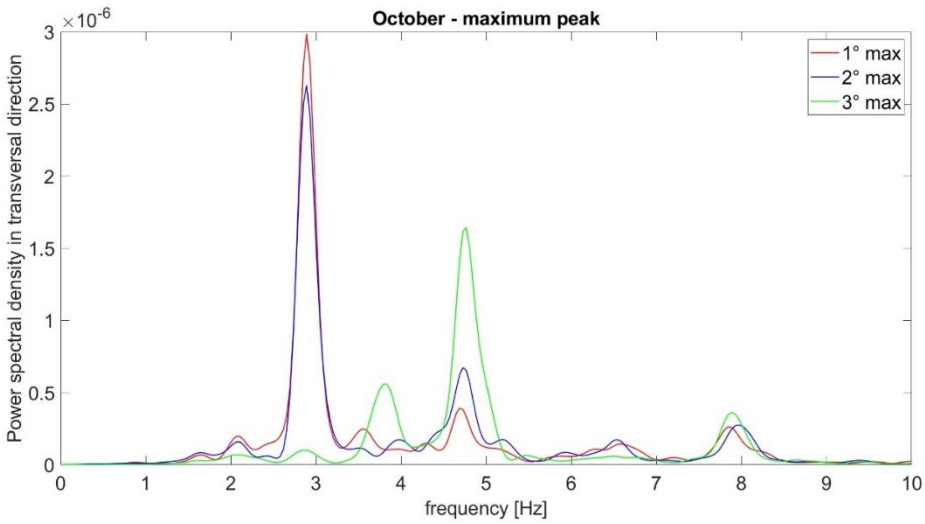


Figure 9-120: Results obtained from the 3 accelerograms with highest peak if PSD

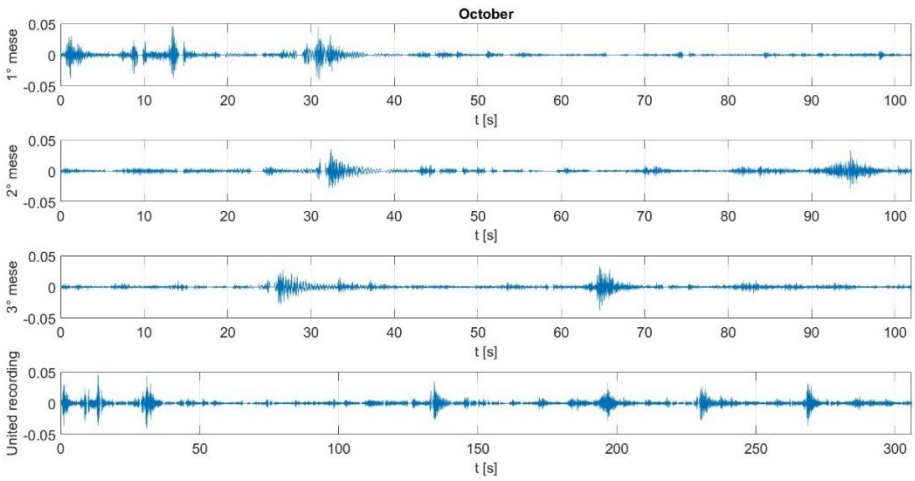


Figure 9-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

9.11 November

The results obtained for the November dataset are shown in the following tables.

Table 9-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-11-28_11-00-19	7.57E-03
	2°	2BE0F_2023-11-14_10-00-20	7.29E-03
	3°	2BE0F_2023-11-06_17-00-21	7.10E-03
Longitudinal direction (y)	1°	2BE0F_2023-11-20_19-00-21	4.72E-04
	2°	2BE0F_2023-11-06_17-00-21	4.52E-04
	3°	2BE0F_2023-11-28_11-00-19	4.51E-04
Transverse direction (z)	1°	2BE0F_2023-11-14_10-00-20	1.50E-03
	2°	2BE0F_2023-11-06_17-00-21	1.44E-03
	3°	2BE0F_2023-11-28_11-00-19	1.37E-03

Table 9-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-11-14_10-00-20	1.57E-04	2BE0F_2023-11-14_10-00-20	1.14E-05
2	2BE0F_2023-11-28_11-00-19	1.13E-04	2BE0F_2023-11-28_11-00-19	1.12E-05
3	2BE0F_2023-11-06_17-00-21	6.78E-05	2BE0F_2023-11-06_17-00-21	1.11E-05
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-11-28_11-00-19	2.48E-07	2BE0F_2023-11-20_19-00-21	4.69E-08
2	2BE0F_2023-11-20_19-00-21	2.26E-07	2BE0F_2023-11-28_11-00-19	4.30E-08
3	2BE0F_2023-11-10_08-00-20	1.59E-07	2BE0F_2023-11-06_17-00-21	4.26E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-11-14_10-00-20	6.32E-06	2BE0F_2023-11-14_10-00-20	4.74E-07
2	2BE0F_2023-11-28_11-00-19	4.22E-06	2BE0F_2023-11-06_17-00-21	4.43E-07
3	2BE0F_2023-11-06_17-00-21	3.68E-06	2BE0F_2023-11-28_11-00-19	3.84E-07

Table 9-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	B	D	A	D	B	B	B
2	B	A	A	C	D	A	C	A	C
3	C	C	C	A	-	C	A	C	A

9.11.1 Vertical direction (x)

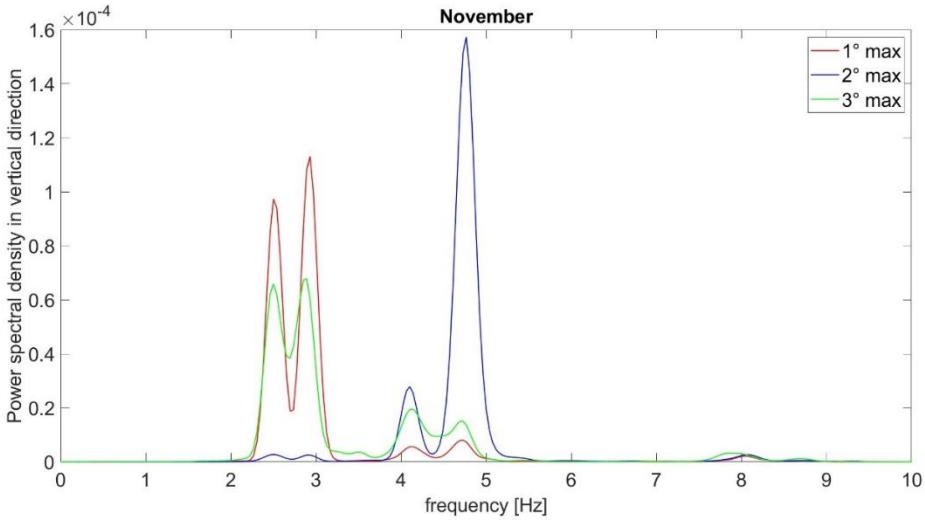


Figure 9-122: Results obtained from the 3 accelerograms with maximum SD in time domain

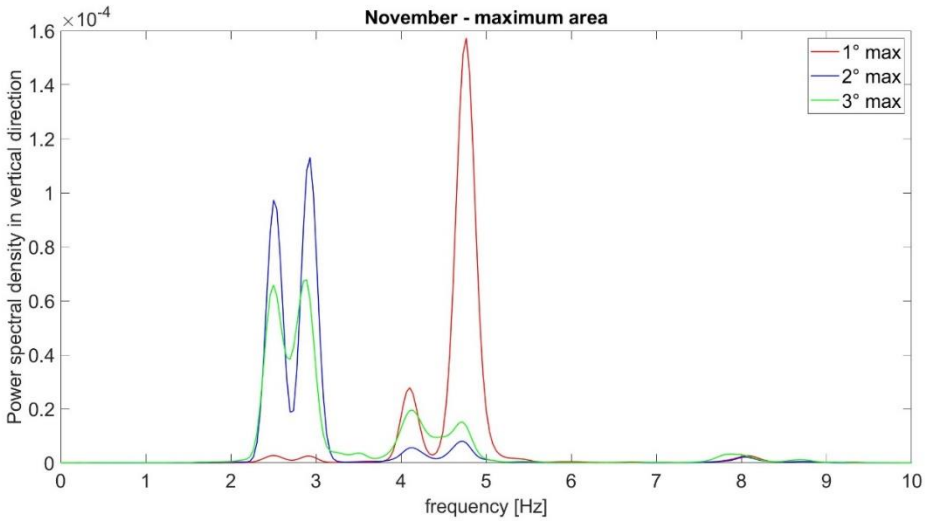


Figure 9-123: Results obtained from the 3 accelerograms with maximum area of PSD

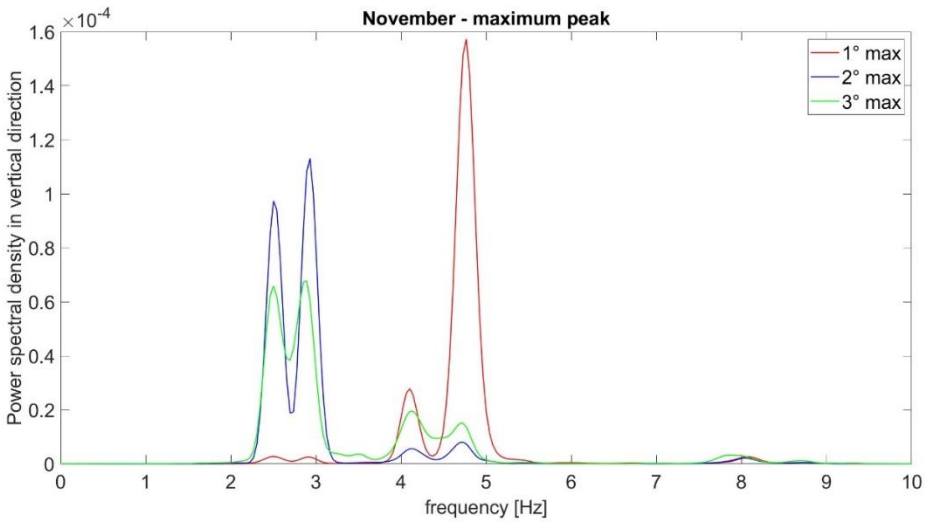


Figure 9-124: Results obtained from the 3 accelerograms with highest peak if PSD

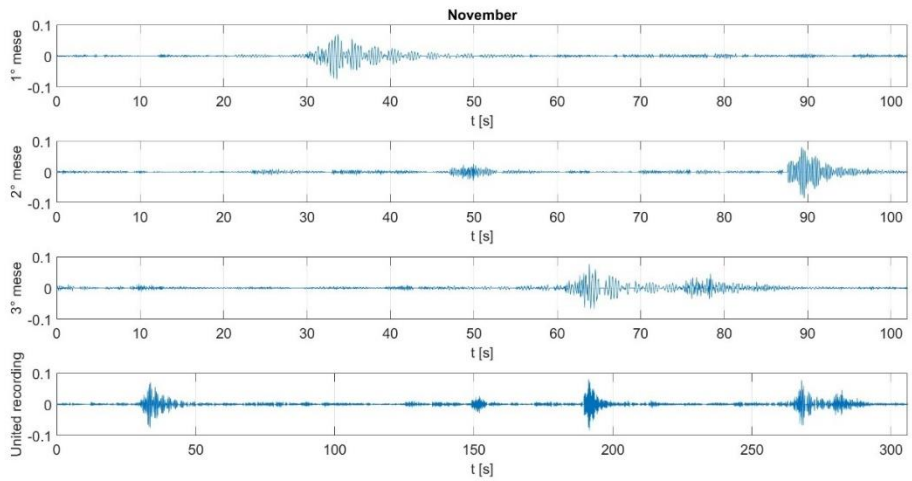


Figure 9-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.11.2 Longitudinal direction (y)

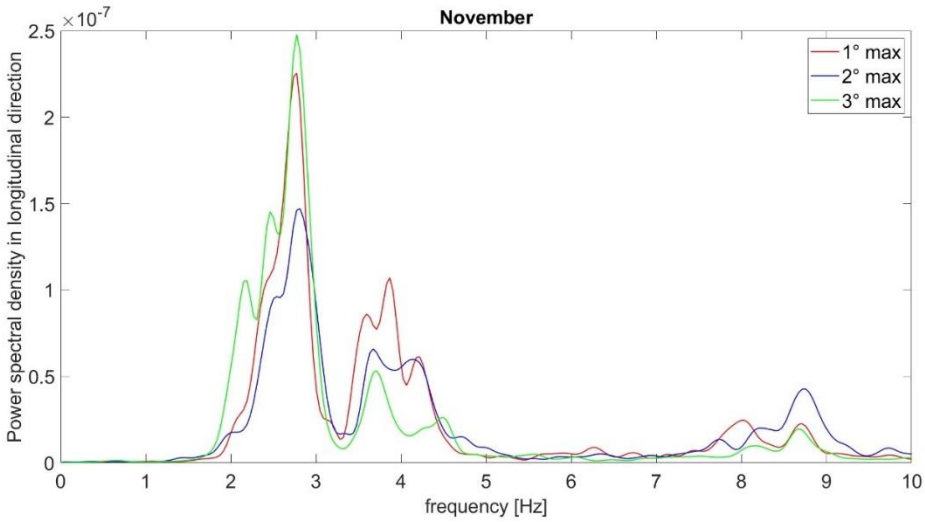


Figure 9-126: Results obtained from the 3 accelerograms with maximum SD in time domain

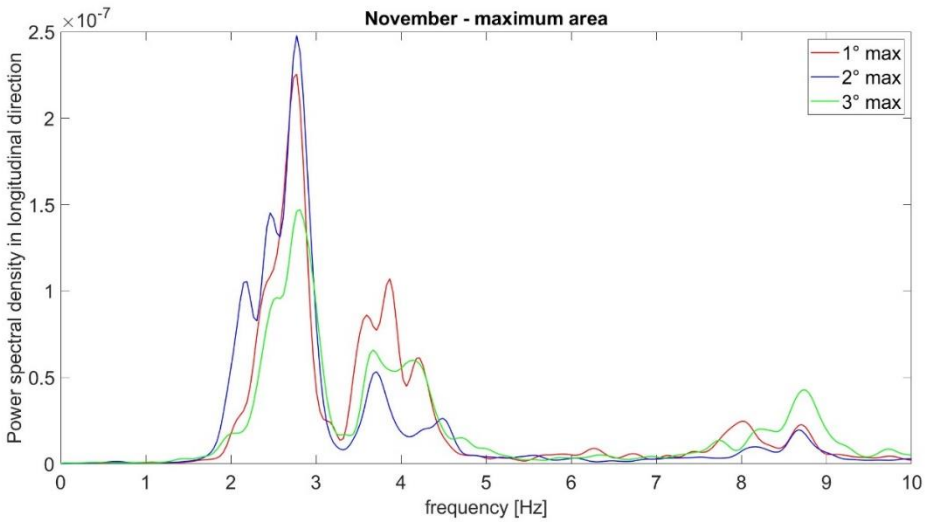


Figure 9-127: Results obtained from the 3 accelerograms with maximum area of PSD

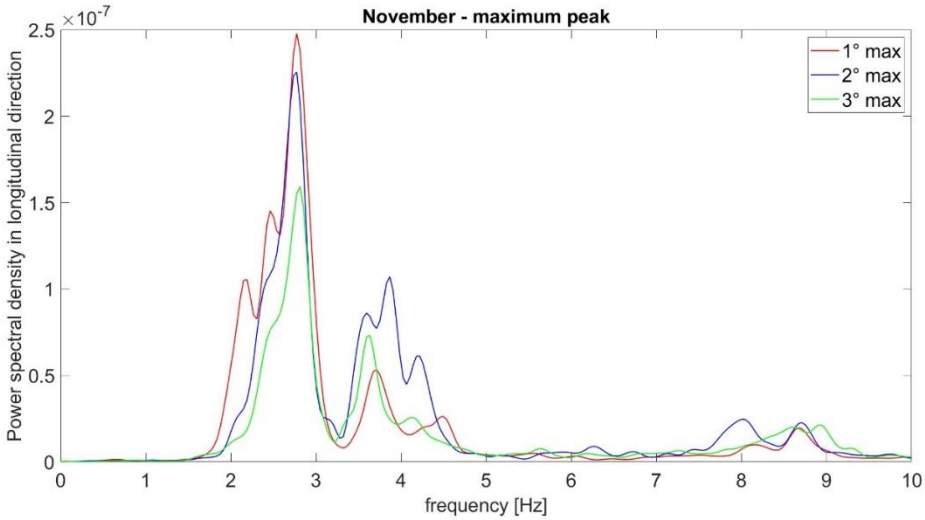


Figure 9-128: Results obtained from the 3 accelerograms with highest peak if PSD

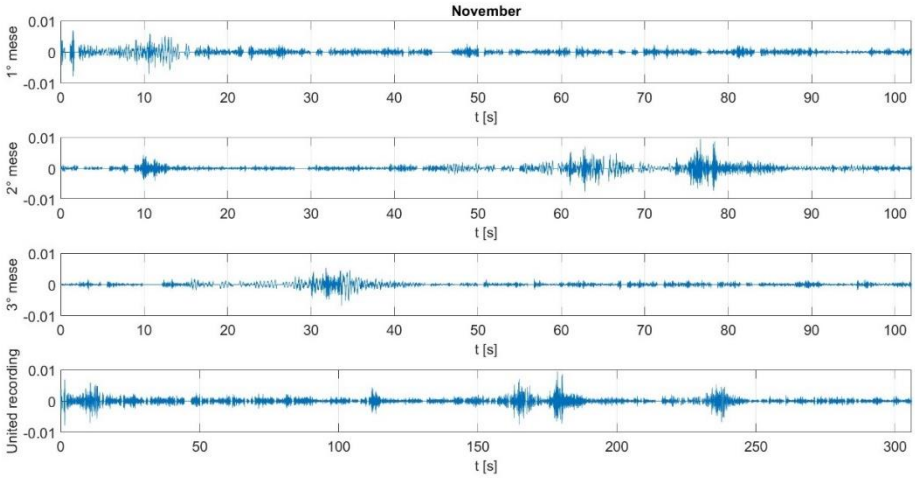


Figure 9-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

9.11.3 Transverse direction (z)

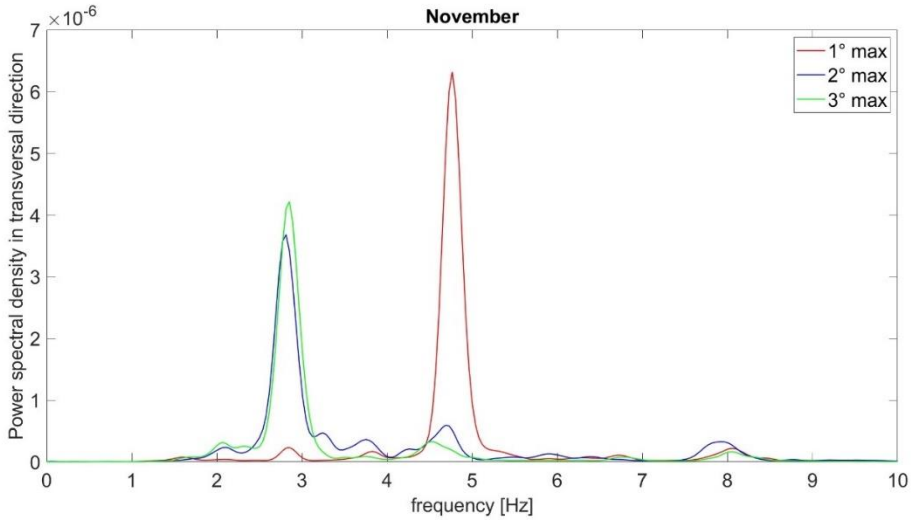


Figure 9-130: Results obtained from the 3 accelerograms with maximum SD in time domain

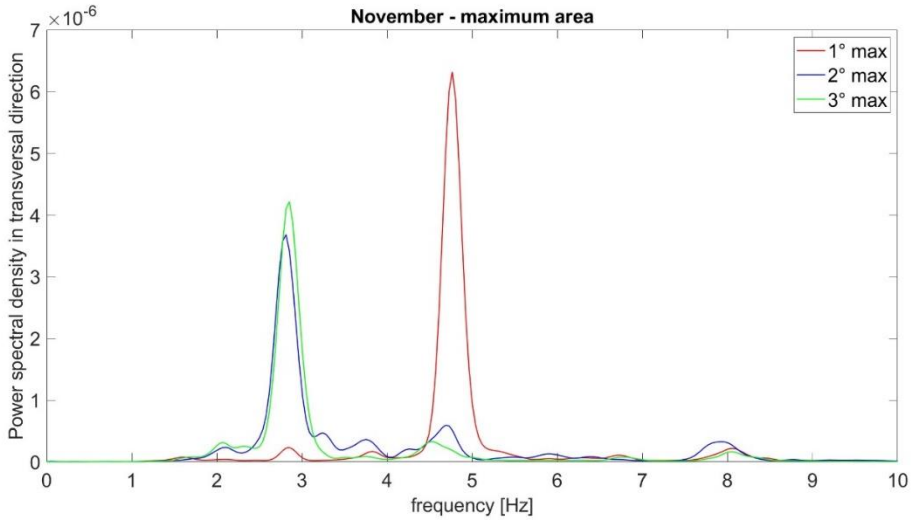


Figure 9-131: Results obtained from the 3 accelerograms with maximum area of PSD

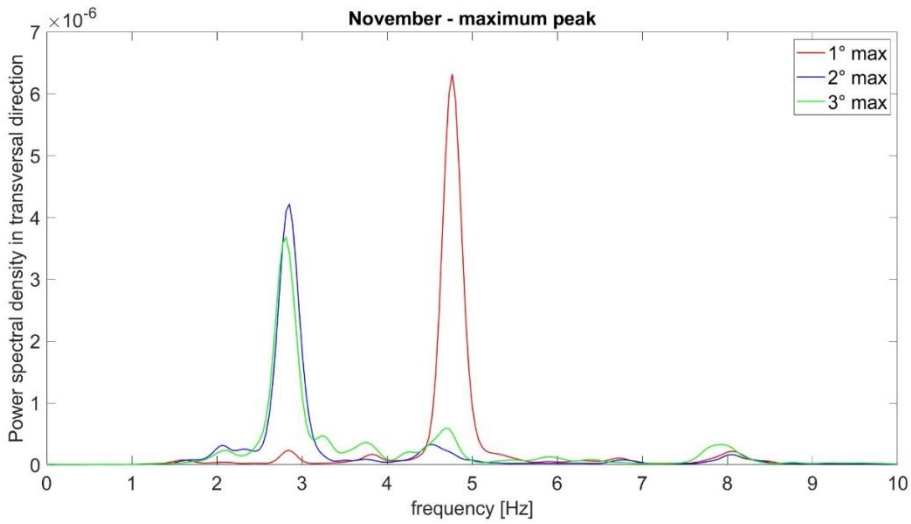


Figure 9-132: Results obtained from the 3 accelerograms with highest peak if PSD

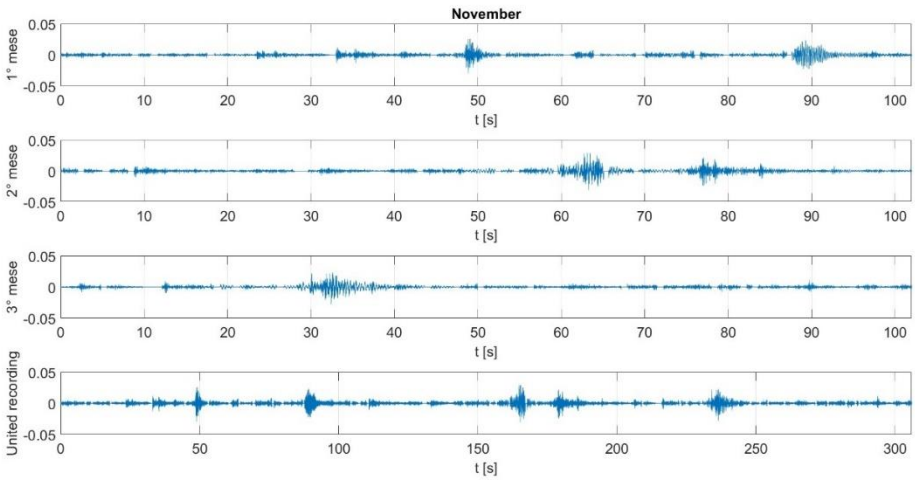


Figure 9-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

9.12 December

The results obtained for the December dataset are shown in the following tables.

Table 9-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BE0F_2023-12-18_08-00-21	9.57E-03
	2°	2BE0F_2023-12-06_10-00-21	8.80E-03
	3°	2BE0F_2023-12-11_14-00-20	8.55E-03
Longitudinal direction (y)	1°	2BE0F_2023-12-28_09-00-21	4.68E-04
	2°	2BE0F_2023-12-06_10-00-21	4.65E-04
	3°	2BE0F_2023-12-06_15-00-20	4.41E-04
Transverse direction (z)	1°	2BE0F_2023-12-18_08-00-21	1.82E-03
	2°	2BE0F_2023-12-06_10-00-21	1.50E-03
	3°	2BE0F_2023-12-11_14-00-20	1.46E-03

Table 9-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-12-18_08-00-21	2.19E-04	2BE0F_2023-12-18_08-00-21	1.99E-05
2	2BE0F_2023-12-11_14-00-20	1.67E-04	2BE0F_2023-12-11_14-00-20	1.58E-05
3	2BE0F_2023-12-06_10-00-21	8.61E-05	2BE0F_2023-12-06_10-00-21	1.53E-05
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-12-18_08-00-21	2.86E-07	2BE0F_2023-12-28_09-00-21	4.57E-08
2	2BE0F_2023-12-06_15-00-20	2.27E-07	2BE0F_2023-12-06_10-00-21	4.38E-08
3	2BE0F_2023-12-28_09-00-21	2.00E-07	2BE0F_2023-12-06_15-00-20	4.05E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BE0F_2023-12-18_08-00-21	5.86E-06	2BE0F_2023-12-18_08-00-21	6.96E-07
2	2BE0F_2023-12-11_14-00-20	3.59E-06	2BE0F_2023-12-11_14-00-20	4.42E-07
3	2BE0F_2023-12-06_10-00-21	2.44E-06	2BE0F_2023-12-06_10-00-21	4.14E-07

Table 9-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	-	D	A	A	A
2	B	C	C	B	E	B	B	C	C
3	C	B	B	E	D	E	C	B	B

9.12.1 Vertical direction (x)

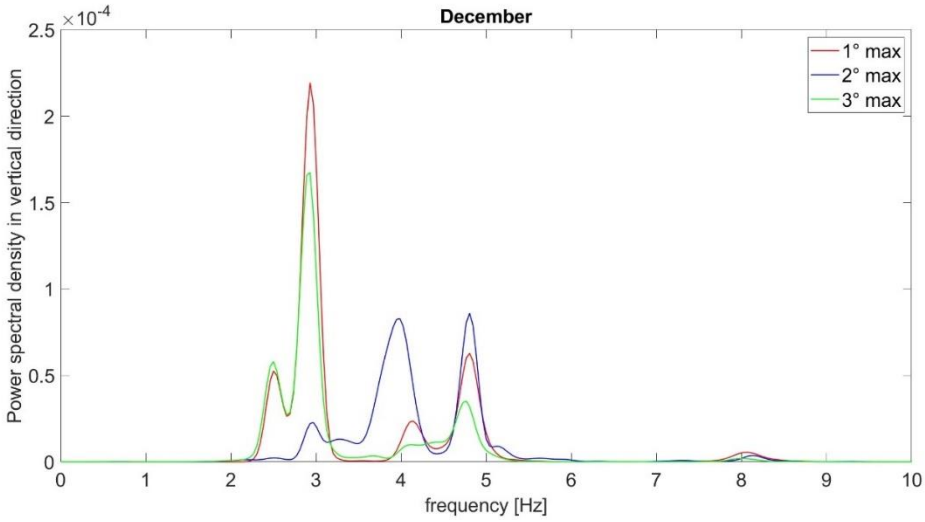


Figure 9-134: Results obtained from the 3 accelerograms with maximum SD in time domain

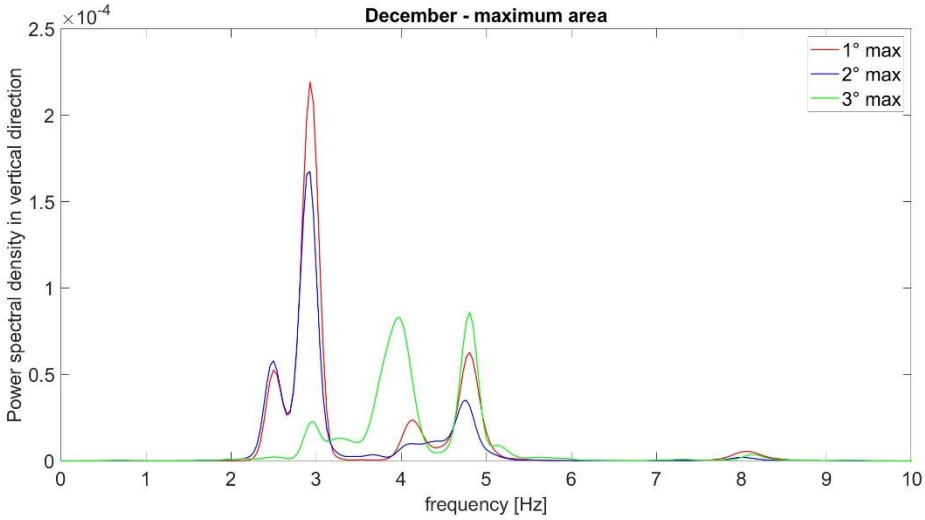


Figure 9-135: Results obtained from the 3 accelerograms with maximum area of PSD

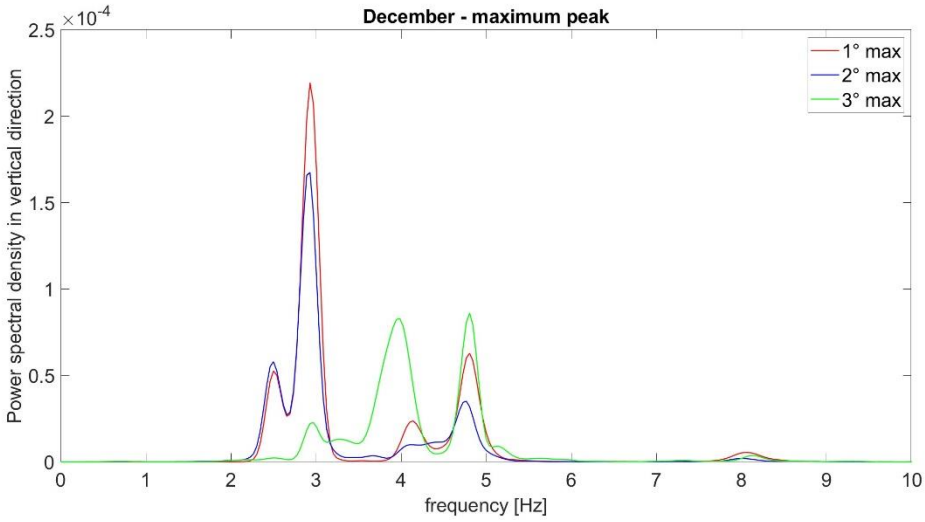


Figure 9-136: Results obtained from the 3 accelerograms with highest peak if PSD

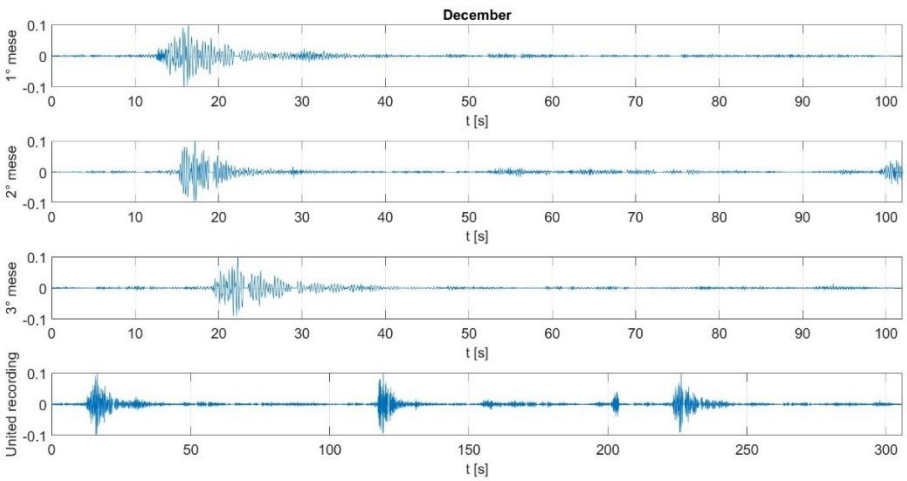


Figure 9-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

9.12.2 Longitudinal direction (y)

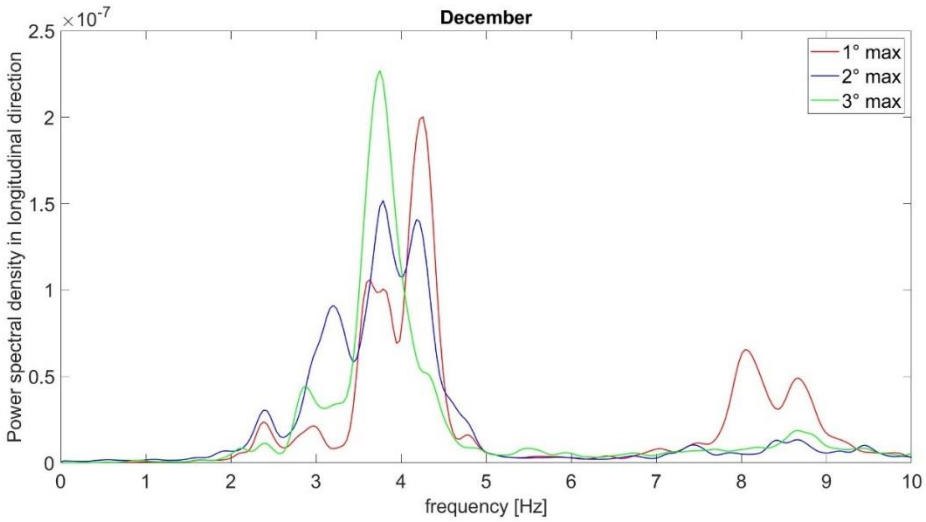


Figure 9-138: Results obtained from the 3 accelerograms with maximum SD in time domain

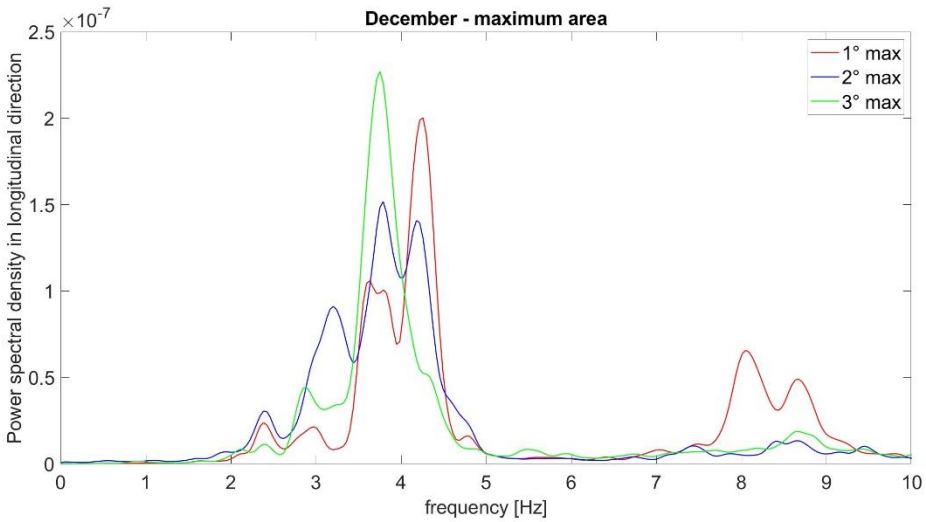


Figure 9-139: Results obtained from the 3 accelerograms with maximum area of PSD

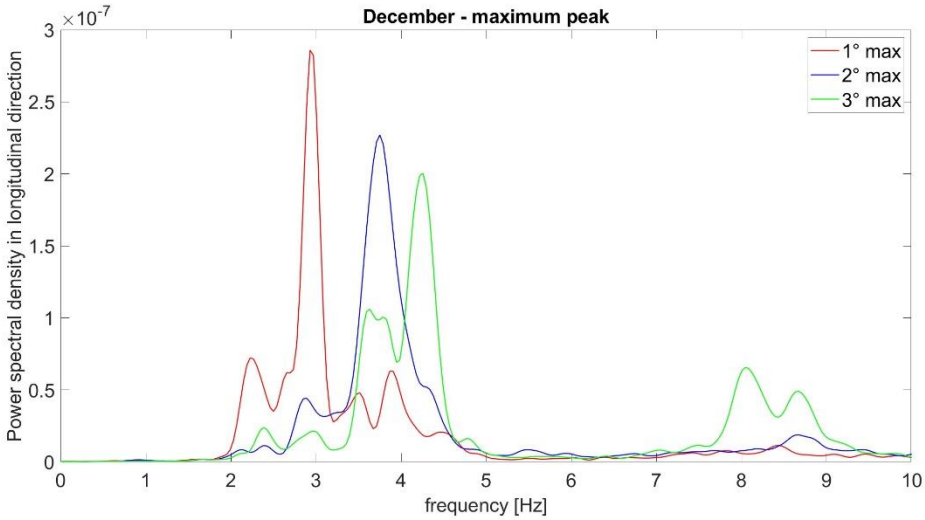


Figure 9-140: Results obtained from the 3 accelerograms with highest peak if PSD

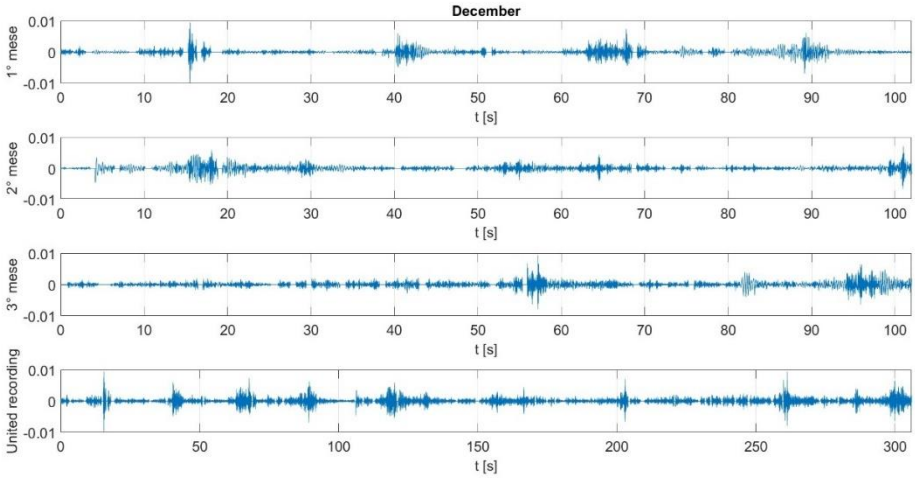


Figure 9-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

9.12.3 Transverse direction (z)

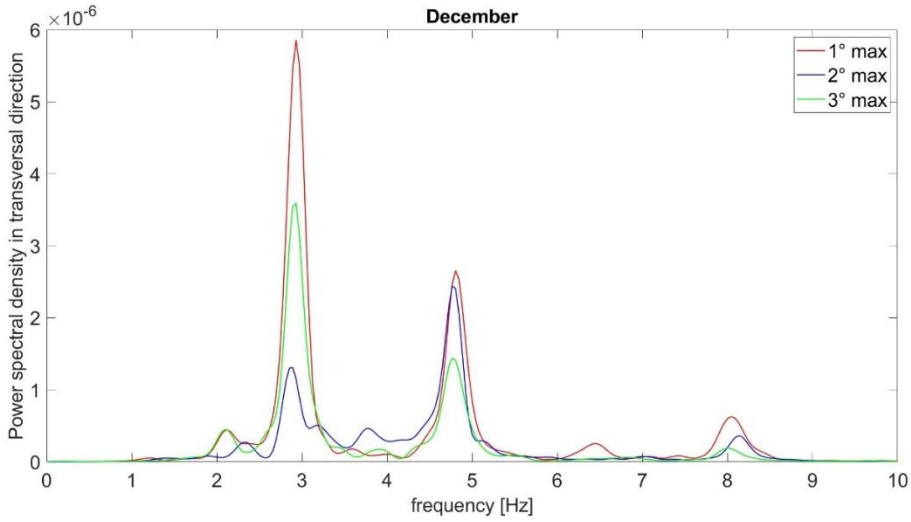


Figure 9-142: Results obtained from the 3 accelerograms with maximum SD in time domain

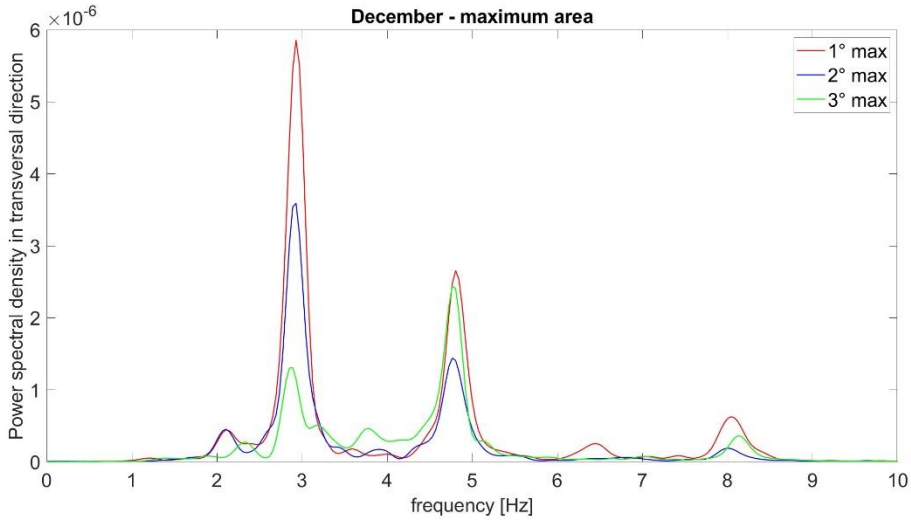


Figure 9-143: Results obtained from the 3 accelerograms with maximum area of PSD

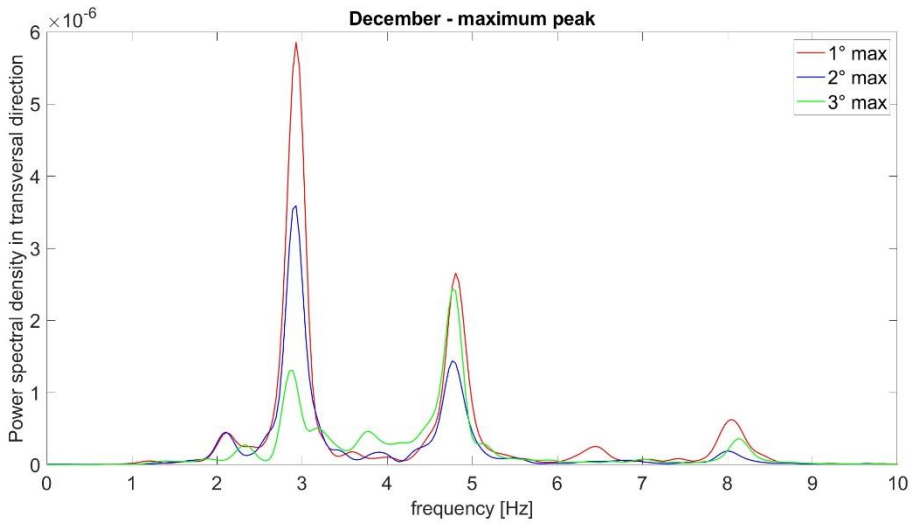


Figure 9-144: Results obtained from the 3 accelerograms with highest peak if PSD

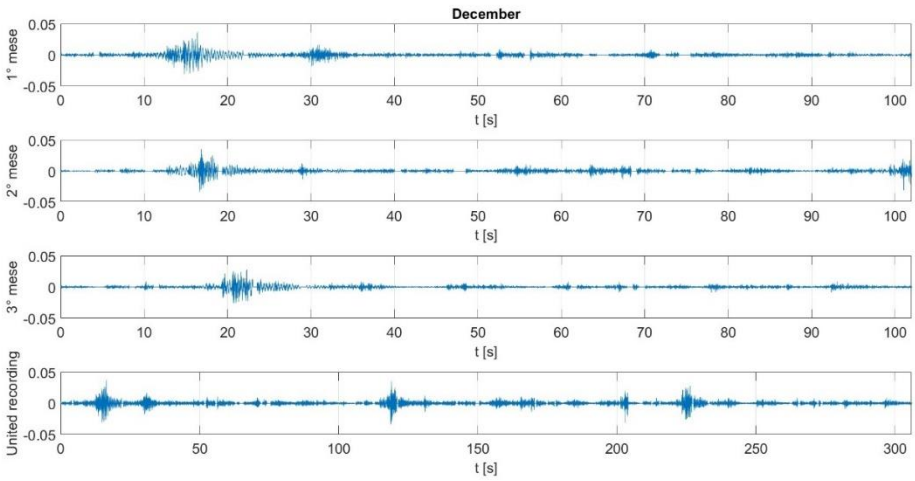


Figure 9-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

9.13 Analysis of the complete 2023 year

All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

Table 9-37: Main identified frequencies for sensor 2BE0F – bridge 223 – Sp2 – L/2

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	94	101	104	106	90	104	102	60	73	106	45	98
	MEAN	**2.46**	**2.89**	**4.06**	**4.73**	**2.35**	**2.83**	**3.82**	**4.45**	**2.11**	**2.84**	**3.66**	**4.72**
	SD	0.04	0.04	0.07	0.07	0.06	0.07	0.17	0.19	0.13	0.05	0.14	0.08
	C.o.V.	1.5%	1.3%	1.7%	1.5%	2.7%	2.6%	4.4%	4.2%	6.3%	1.8%	3.7%	1.6%
	Rating	**89%**	**97%**	**96%**	**100%**	**77%**	**89%**	**77%**	**46%**	**49%**	**97%**	**36%**	**91%**
1	gen-23	2.5	2.97	4.14	4.8	2.11	2.89	4.1			2.93		4.81
2	gen-23	2.5	2.97	4.14	4.84	2.38	2.97	4.02	4.38		2.89		4.81
3	gen-23	2.5	2.93	4.14	4.77		3.01	4.02			2.89		4.77
1	gen-23	2.46	2.97	4.1	4.84	2.11	2.89	4.1			2.93		4.8
2	gen-23	2.46	2.97	4.14	4.84	2.34	2.97	4.02	4.38		2.89		4.84
3	gen-23	2.5	2.97	4.14	4.77	2.07	3.01	4.02			2.89		4.77
1	gen-23	2.46	2.97	4.1	4.8	2.1	2.89	4.1			2.93		4.8
2	gen-23	2.5	2.97	4.14	4.84	2.34	2.97	4.02	4.38		2.89		4.84
3	gen-23	2.46	2.97	4.1	4.77	2.34	2.97	4.02	4.38		2.85		4.77
1	feb-23	2.46	2.89	3.79	4.77	2.42	2.81	3.87	4.77	1.79	2.81	3.79	4.81
2	feb-23	2.5	2.89	4.06	4.8	2.34	2.81	3.79	4.73	1.86	2.81	3.64	4.73
3	feb-23	2.5	2.89	4.06	4.73	2.38	2.81	3.91		2.01	2.89		4.77
1	feb-23	2.46	2.89	3.79	4.77	2.42	2.85	3.87	4.77	1.6	2.81	4.02	4.8
2	feb-23	2.46	2.89	4.1	4.8	2.34	2.81	3.79	4.73	1.84	2.81		4.73
3	feb-23	2.46	2.89	4.1	4.73	2.34	2.81	3.91		2.07	2.89	3.92	4.77
1	feb-23		2.89	4.06	4.73	2.34	2.81	3.79	4.73		2.89		4.8
2	feb-23	2.46	2.89	4.1	4.81	2.38	2.81	3.91		1.83	2.81		4.73
3	feb-23		2.97	4.1	4.77	2.38	2.81	3.87	4.77	1.8	2.81		4.73
1	mar-23	2.42	2.85	3.98	4.69	2.3	2.73	3.78	4.36	2.15	2.89	3.79	4.69
2	mar-23	2.46	2.85	4.06	4.69	2.34	2.81	3.75	4.29	2.07	2.77		4.69
3	mar-23	2.42	2.89	4.06	4.73		3.01			2.15	2.92		4.72
1	mar-23	2.42	2.85	4.02	4.69	2.3	2.73	3.6	4.29	2.14	2.89	3.83	4.69
2	mar-23	2.46	2.89	4.1	4.73	2.34	2.81	3.55	4.37		2.77		4.69
3	mar-23	2.46	2.85	3.86	4.69	2.38	2.89	3.49	4.19	2.11	2.91		4.73
1	mar-23	2.42	2.85	4.02	4.69	2.38	2.97	3.55	4.37	2.14	2.89	3.82	4.69
2	mar-23	2.42		4.06	4.72	2.34	2.81	3.49	4.29	2.11	2.77		4.69
3	mar-23	2.42	2.93	4.02	4.73	2.3	2.73	3.59	4.19	2.03			4.69
1	apr-23	2.5	2.89	4.06	4.77	2.46	2.89	3.85	4.39	2.22	2.89		4.77
2	apr-23	2.46	2.89	4.1	4.69	2.38	2.85		4.39		2.77		4.69
3	apr-23	2.46		3.91	4.65	2.38	2.81	3.69	4.39	2.09	2.89		4.65
1	apr-23	2.5	2.89	4.06	4.73	2.42	2.89	3.9	4.34	2.23	2.89		4.77
2	apr-23	2.46	2.89		4.69	2.34	2.85	3.69	4.3		2.77		4.69

3	apr-23	2.46		3.95	4.65	2.38	2.87		4.3	2.07	2.89		4.65
1	apr-23	2.5	2.89	4.1	4.77	2.42	2.89	3.85	4.57	2.22	2.89		4.77
2	apr-23	2.46	2.89	4.1	4.69	2.38	2.85	3.87	4.3		2.81		4.69
3	apr-23	2.46		3.95	4.65		2.87		4.3		2.77		4.69
1	mag-23	2.42	2.85	4.02	4.8	2.42	2.77	3.69	4.77		2.81	3.55	4.77
2	mag-23	2.38	2.85	4.06	4.65	2.34	2.77	3.74		2.07	2.81		4.65
3	mag-23	2.46	2.89	4.1	4.73		2.85	3.84		2.23	2.89		4.73
1	mag-23	2.42	2.85	4.02	4.84	2.42	2.77	3.65	4.69	2.23	2.81	3.55	4.77
2	mag-23	2.42	2.85	4.1	4.65	2.34	2.77	3.69		2.07	2.81		4.65
3	mag-23	2.46	2.89	4.1	4.73		2.85				2.85		4.73
1	mag-23	2.42	2.85	4.02	4.84	2.42	2.77	3.84	4.77	2.23	2.81		4.8
2	mag-23	2.38	2.85	4.1	4.65	2.3	2.77	3.59		2.07	2.81		4.65
3	mag-23	2.46	2.89	4.1	4.73	2.34	2.77	3.63		2.18	2.85		4.73
1	giu-23	2.42	2.89	4.1	4.65		2.76	3.75	4.45	2.03	2.77	3.56	
2	giu-23	2.46	2.85	4.14	4.88	2.34	2.76	3.69		2.22	2.73		
3	giu-23	2.5	2.89	3.98	4.69	2.34	2.77	3.96	4.65		2.85	3.69	4.65
1	giu-23	2.46	2.85	4.1			2.76	3.75	4.49	2.03	2.77	3.52	
2	giu-23	2.42	2.89	4.1	4.65	2.34	2.79	3.69		2.22	2.77		
3	giu-23	2.46	2.85	3.98	4.65	2.34	2.81	3.69	4.72		2.81	3.75	4.65
1	giu-23	2.46	2.85	4.1		2.34		3.59		1.99	2.77	3.51	
2	giu-23	2.42	2.89	4.14	4.65		2.76	3.71	4.49	2.22	2.77		4.84
3	giu-23	2.46	2.89	4.06	4.69	2.3	2.81	4.02		2.24	2.73		
1	lug-23	2.46	2.85	4.06	4.69	2.34	2.81	4.01	4.8	2.07	2.85	3.39	4.65
2	lug-23	2.46	2.85	4.06	4.8	2.38	2.89	4.04	4.41	2.29	2.81		4.73
3	lug-23	2.42	2.85	4.1	4.84	2.38		3.98			2.77		
1	lug-23	2.46	2.85	4.06	4.69	2.34	2.81	4.04	4.8	2.03	2.85	3.39	4.65
2	lug-23		2.81	4.1	4.8	2.38		4.01		2.29	2.81		4.77
3	lug-23	2.46	2.85	4.1	4.84	2.38	2.89	3.98			2.77		
1	lug-23	2.46	2.85	4.06	4.69	2.34	2.81	4.04	4.84	2.03	2.85		4.65
2	lug-23		2.85	4.1	4.77	2.38	2.89	4.01		2.29	2.81		4.73
3	lug-23	2.46	2.85	4.14	4.84	2.38		3.98			2.77		
1	ago-23	2.46	2.85	4.02	4.65	2.34	2.73	4.02		2.18	2.81	3.63	4.65
2	ago-23	2.46	2.85	4.06	4.53	2.34	2.77	4.02		2.22	2.81	3.59	4.69
3	ago-23	2.46	2.85	4.06	4.69	2.34	2.81	4.02	4.69	2.3	2.77	3.63	4.49
1	ago-23	2.46	2.89	4.02	4.65	2.34	2.77	4.06		2.22	2.81	3.63	4.65
2	ago-23	2.42	2.85	4.06	4.53	2.34	2.77	4.02			2.81	3.63	4.69
3	ago-23	2.46	2.85	4.06	4.69	2.34	2.81	4.02		2.3	2.77	3.63	4.49
1	ago-23	2.46	2.89	4.06	4.69	2.34	2.77	4.06		2.18	2.77		4.69
2	ago-23	2.46	2.85	4.06	4.53	2.34	2.89	4.02		2.34	2.77	3.63	4.49
3	ago-23	2.46	2.85	4.02	4.65	2.34	2.77	4.02			2.81	3.63	4.73
1	set-23		2.85	4.02	4.61	2.38	2.85	3.71	4.38	2.14	2.81	3.51	4.53
2	set-23			4.14	4.69	2.38	2.89	3.76		2.14	2.81	3.67	4.65
3	set-23		2.89	4.06	4.69		2.85	3.76			2.81		4.65
1	set-23	2.26	2.85	4.02	4.61	2.38	2.85	3.48	4.38	2.14	2.81	3.51	4.57
2	set-23			4.14	4.69	2.36	2.89	3.55		2.14	2.81		4.65
3	set-23		2.89	4.1	4.69		2.81	3.55			2.81	3.67	4.65
1	set-23			4.14	4.69	2.34	2.85	3.48	4.38				4.69

2	set-23	2.46	2.85	4.02	4.65	2.34	2.89	3.55			2.77	3.67	4.65
3	set-23		2.85	4.02	4.61		2.85	3.55		2.14	2.81		4.65
1	ott-23	2.46	2.89	4.06	4.77	2.38	2.73	3.83		2.32	2.85	3.49	4.77
2	ott-23	2.5	2.89	4.02	4.73	2.38	2.81		4.39	2.08	2.89	3.55	4.73
3	ott-23	2.46	2.89	3.95	4.77	2.38	2.77	3.91	4.39	2.08	2.89		4.73
1	ott-23	2.5	2.89	4.06	4.73	2.38	2.73	3.83		2.38	2.85	3.48	4.77
2	ott-23	2.5	2.89	4.06	4.73	2.38	2.77	3.91	4.39	2.07	2.89	3.55	4.69
3	ott-23	2.46	2.93	3.95	4.77	2.38	2.81	3.83	4.39	2.07	2.89		4.73
1	ott-23	2.46	2.89	4.06	4.73	2.38	2.77	3.91	4.39	2.07	2.89	3.55	4.73
2	ott-23	2.5	2.89	4.06	4.69	2.34	2.81	4.01		2.07	2.89	3.79	4.73
3	ott-23	2.46	2.89	3.95	4.73	2.38	2.73	3.86			2.85		4.77
1	nov-23	2.5	2.93	4.1	4.73		2.77	3.86	4.29		2.85	3.74	4.77
2	nov-23	2.5	2.89	4.1	4.77		2.77	3.67		2.1	2.85	3.69	4.69
3	nov-23	2.5	2.89	4.1	4.73	2.41	2.81	3.71	4.49	2.1	2.85		4.54
1	nov-23	2.5	2.89	4.1	4.77		2.77	3.86	4.29		2.85	3.83	4.77
2	nov-23	2.5	2.93	4.1	4.69	2.39	2.77	3.67	4.29	2.07	2.81	3.75	4.73
3	nov-23	2.5	2.89	4.1	4.73		2.77	3.71	4.32	2.07	2.85		
1	nov-23	2.5	2.89	4.1	4.77	2.34	2.77	3.71	4.49		2.85	3.83	4.77
2	nov-23	2.5	2.93	4.1	4.73		2.77	3.59	4.31	2.07	2.85		4.53
3	nov-23	2.5	2.89	4.1	4.73		2.81	3.63		2.07	2.85	3.75	4.73
1	dic-23	2.5	2.93	4.14	4.8	2.38	2.94	3.69	4.29	2.1	2.93		4.8
2	dic-23		2.93	3.98	4.8	2.38	3.01	3.79	4.23		2.89	3.78	4.79
3	dic-23	2.5	2.89		4.77	2.38	2.89	3.75		2.1	2.93	3.81	4.79
1	dic-23	2.5	2.93	4.14	4.8	2.38	2.94	3.75	4.29	2.1	2.93		4.81
2	dic-23	2.5	2.93		4.77	2.38	3.03	3.79	4.26	2.1	2.93		4.8
3	dic-23		2.97	3.98	4.8	2.38	2.89	3.75			2.89	3.78	4.8
1	dic-23	2.5	2.93	4.14	4.8	2.27	2.93	3.87		2.1	2.93		4.8
2	dic-23	2.5	2.93		4.77	2.34	2.85	3.75		2.1	2.89		4.77
3	dic-23		2.97	3.95	4.8		2.97	3.69	4.29		2.89	3.79	4.77

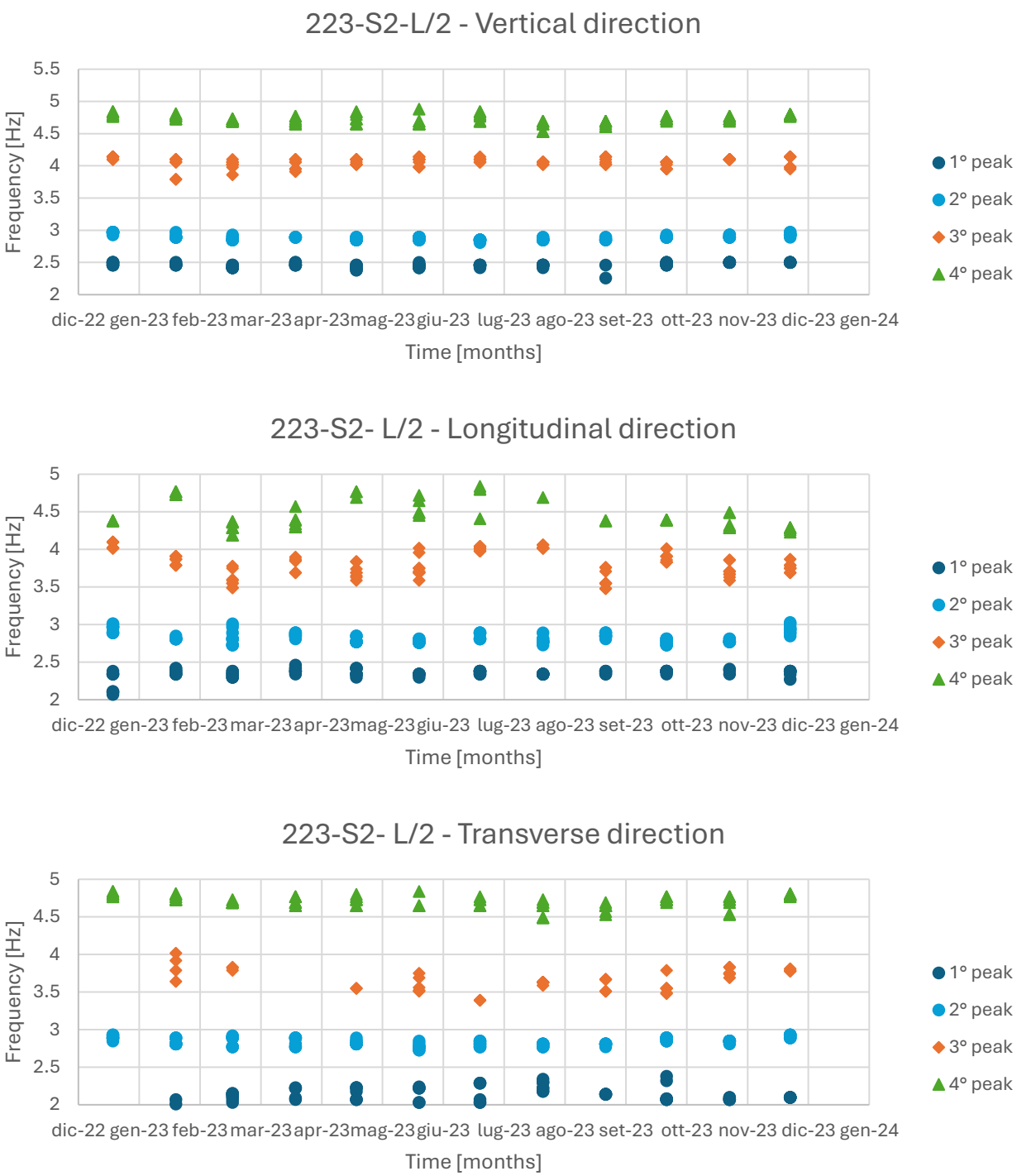


Figure 9-146: Main identified frequencies for sensor 2BE0F – bridge 223 – Sp2 – L/2

10. Annex 10 – Bridge 223 – Span 2 – L/4 - Sensor 2BA63

The Bridge 223 counts 2 monitored decks: span 2 and span 6 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 2 are:

- 2BE0F – situated in the midspan;
- 2BA63 – situated at a distance of L/4;
- 31205 – situated at a distance of L/8;
- 319BC – situated nearby the west pilar;
- 319E3 – situated nearby the east pilar.

The sensors present on deck number 6 are:

- 2B5E7 – situated in the midspan;
- 2BCF9 – situated at a distance of L/4 of the deck;
- 2BCAD – situated at a distance of L/8 of the deck;

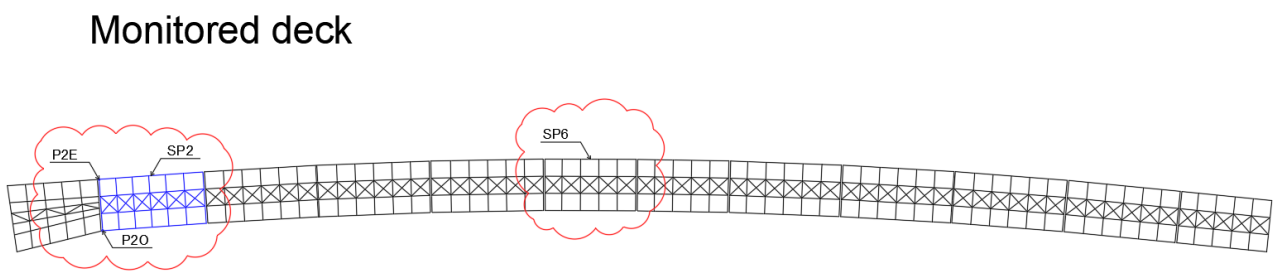


Figure 10-1 Monitored decks of 223 bridge

The accelerograms of the 2BA63 sensor have been analyzed and the results are represented in the following paragraphs.

10.1 January

The results obtained for the January dataset are shown in the following tables.

Table 10-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-01-30_07-00-21	3.26E-03
	2°	2BA63_2023-01-31_07-00-19	2.57E-03
	3°	2BA63_2023-01-26_13-00-20	2.30E-03
Longitudinal direction (y)	1°	2BA63_2023-01-30_07-00-21	4.17E-04
	2°	2BA63_2023-01-31_07-00-19	3.72E-04
	3°	2BA63_2023-01-26_13-00-20	3.65E-04
Transverse direction (z)	1°	2BA63_2023-01-30_07-00-21	8.99E-04
	2°	2BA63_2023-01-31_07-00-19	6.68E-04
	3°	2BA63_2023-01-16_13-00-20	6.05E-04

Table 10-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-01-30_07-00-21	2.25E-05	2BA63_2023-01-30_07-00-21	2.22E-06
2	2BA63_2023-01-31_07-00-19	6.44E-06	2BA63_2023-01-31_07-00-19	1.33E-06
3	2BA63_2023-01-24_01-00-20	5.92E-06	2BA63_2023-01-26_13-00-20	1.10E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-01-30_07-00-21	2.23E-07	2BA63_2023-01-30_07-00-21	3.58E-08
2	2BA63_2023-01-31_07-00-19	2.00E-07	2BA63_2023-01-31_07-00-19	2.82E-08
3	2BA63_2023-01-26_13-00-20	1.83E-07	2BA63_2023-01-26_13-00-20	2.78E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-01-30_07-00-21	1.76E-06	2BA63_2023-01-30_07-00-21	1.75E-07
2	2BA63_2023-01-31_07-00-19	4.35E-07	2BA63_2023-01-31_07-00-19	9.07E-08
3	2BA63_2023-01-01_01-00-20	3.69E-07	2BA63_2023-01-16_13-00-20	7.56E-08

Table 10-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	B	B	B	B	B	B
3	C	-	C	C	C	C	D	-	D

10.1.1 Vertical direction (x)

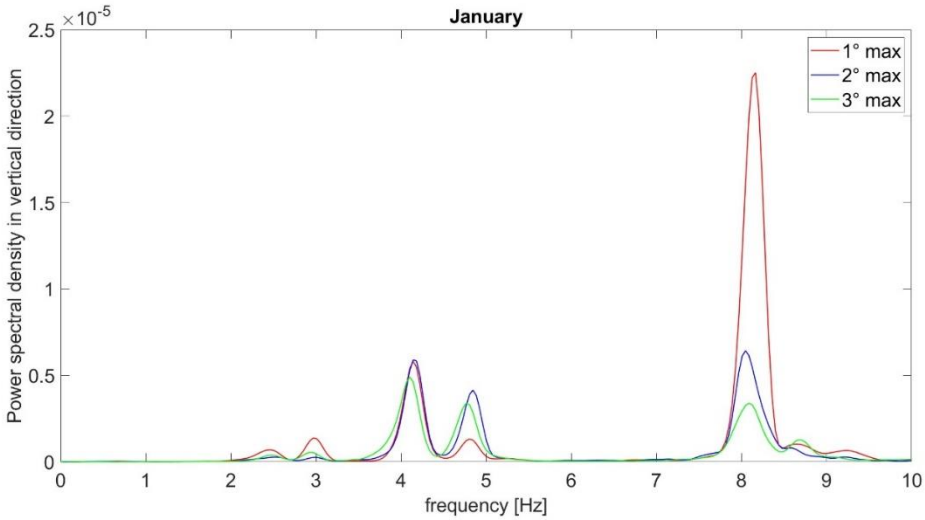


Figure 10-2: Results obtained from the 3 accelerograms with maximum SD in time domain

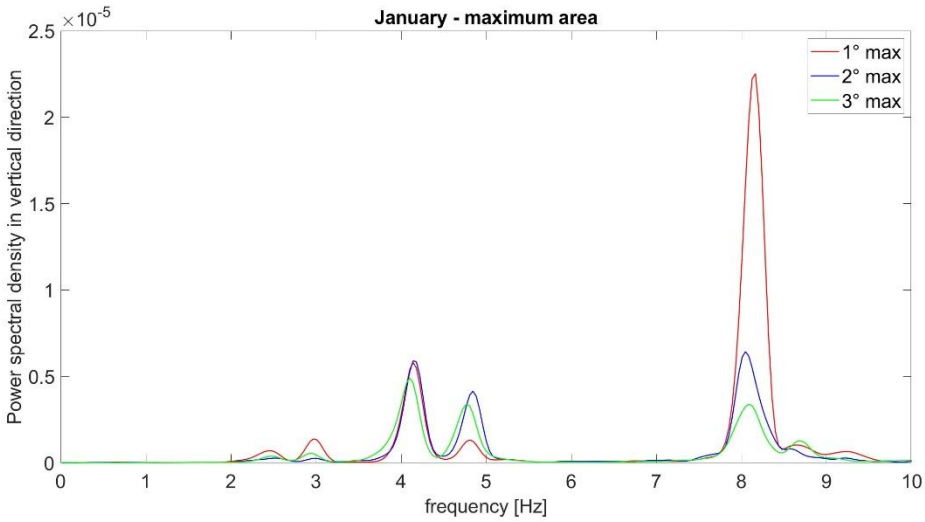


Figure 10-3: Results obtained from the 3 accelerograms with maximum area of PSD

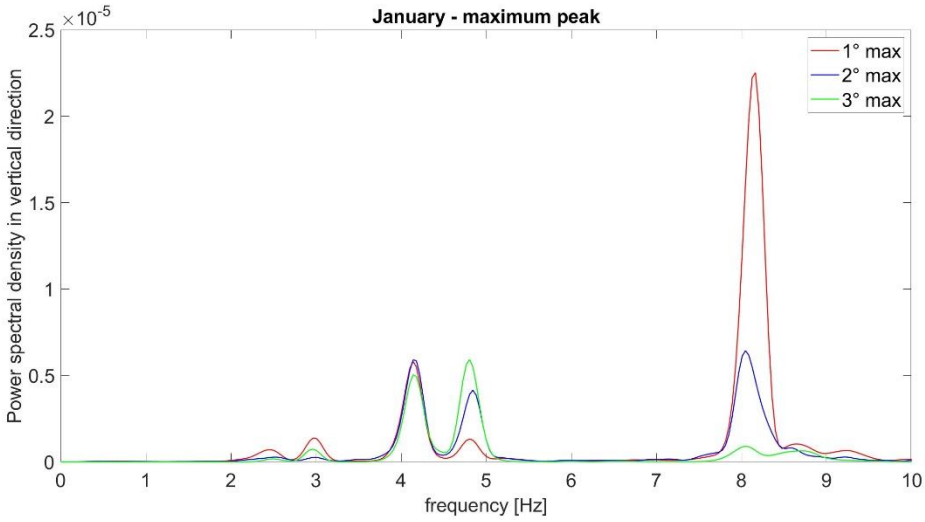


Figure 10-4: Results obtained from the 3 accelerograms with highest peak if PSD

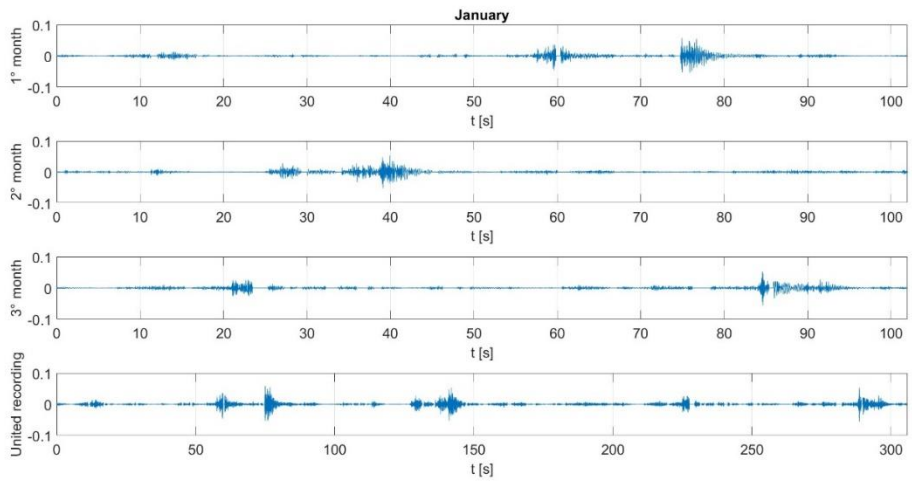


Figure 10-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.1.2 Longitudinal direction (y)

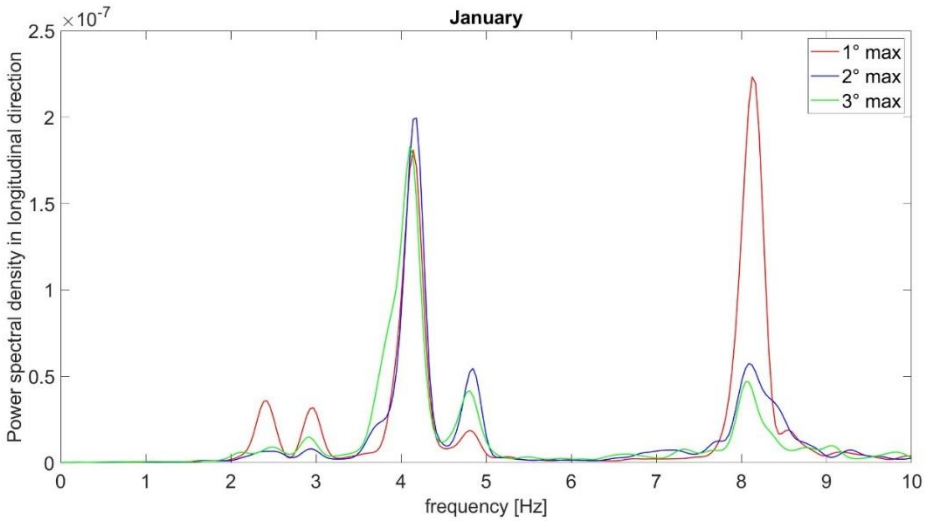


Figure 10-6: Results obtained from the 3 accelerograms with maximum SD in time domain

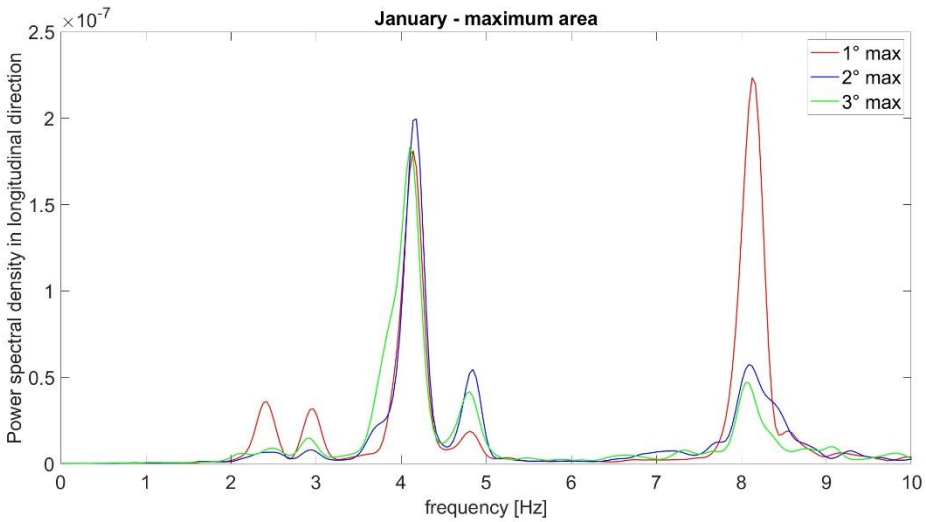


Figure 10-7: Results obtained from the 3 accelerograms with maximum area of PSD

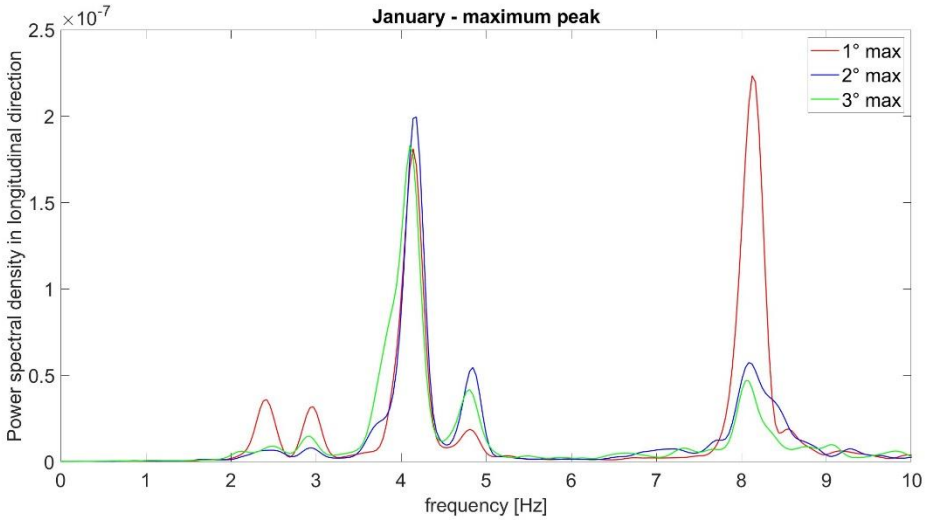


Figure 10-8: Results obtained from the 3 accelerograms with highest peak in PSD

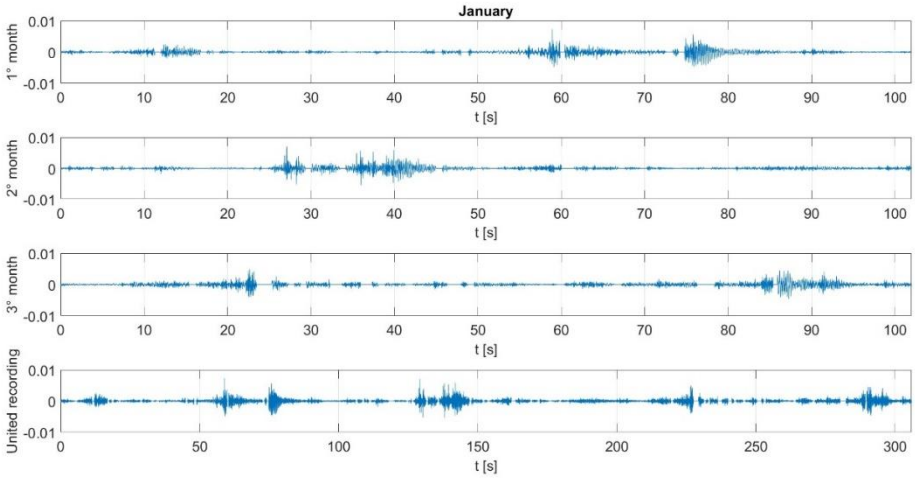


Figure 10-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

10.1.3 Transverse direction (z)

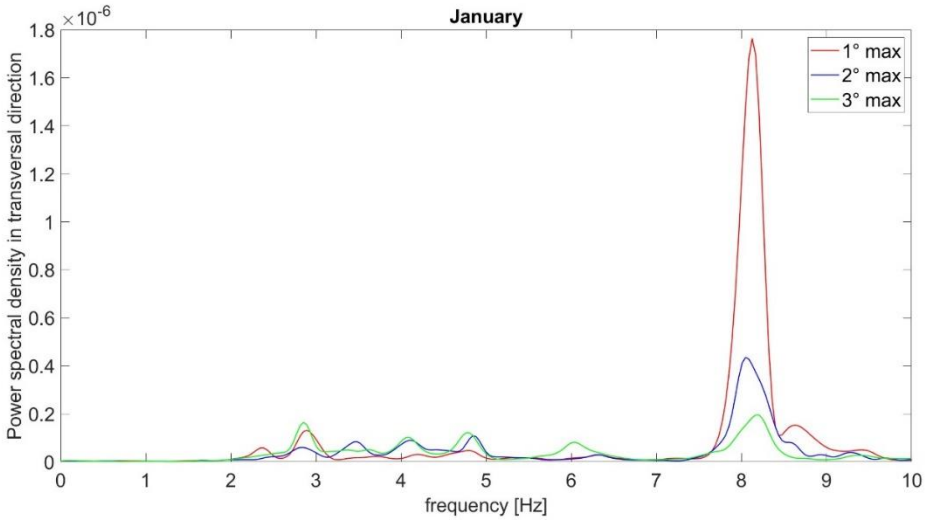


Figure 10-10: Results obtained from the 3 accelerograms with maximum SD in time domain

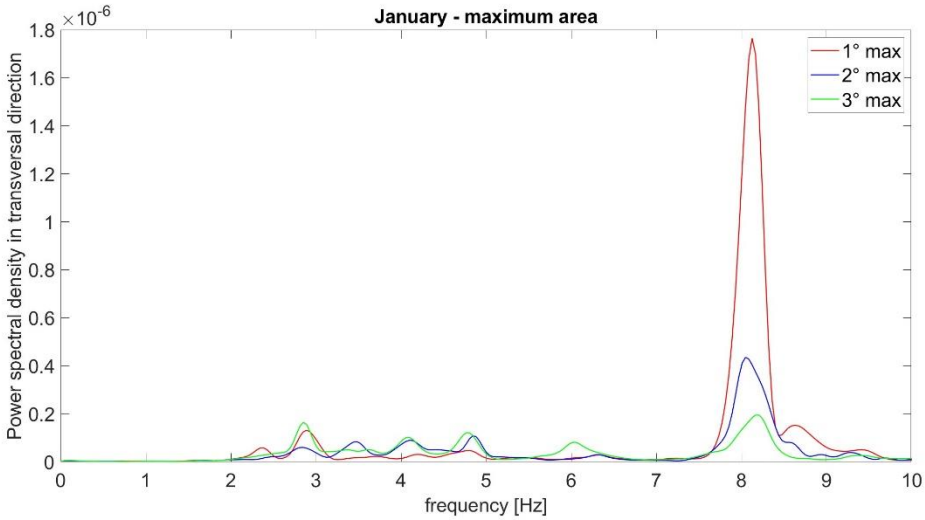


Figure 10-11: Results obtained from the 3 accelerograms with maximum area of PSD

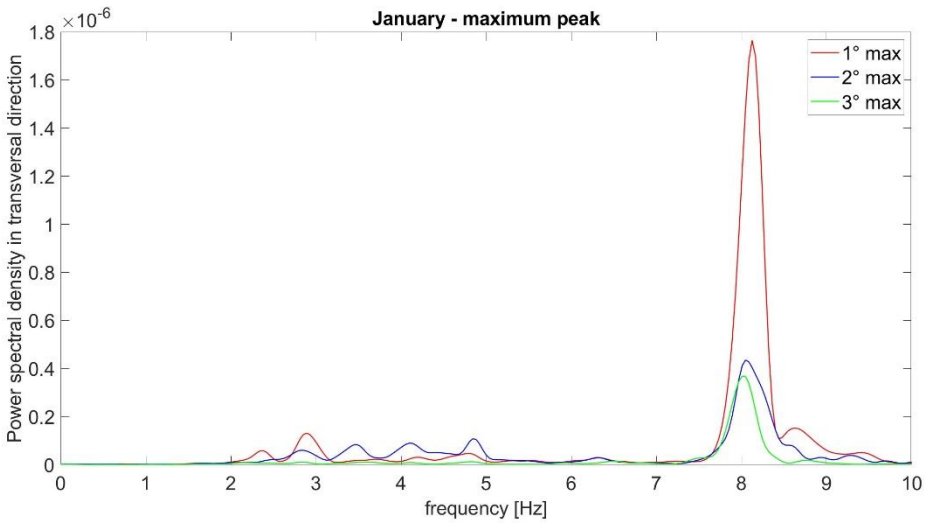


Figure 10-12: Results obtained from the 3 accelerograms with highest peak in PSD

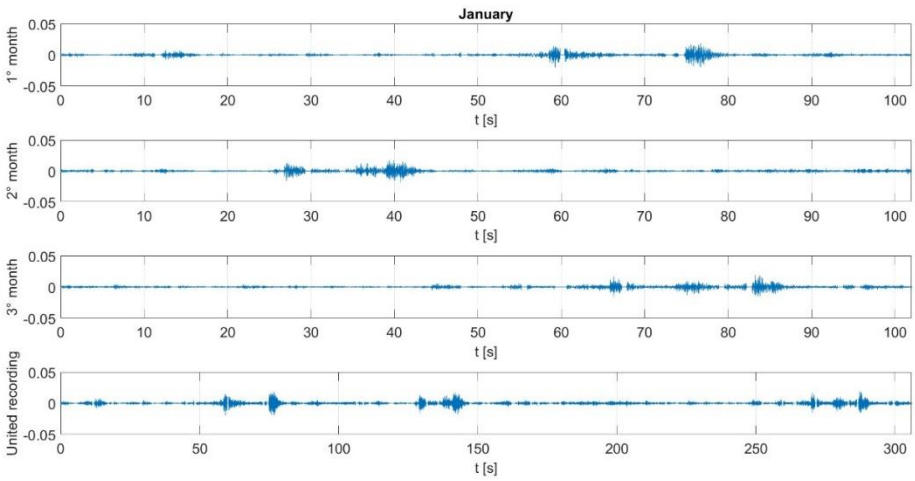


Figure 10-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

10.2 February

The results obtained for the February dataset are shown in the following tables.

Table 10-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-02-01_13-00-20	3.49E-03
	2°	2BA63_2023-02-06_13-00-20	3.40E-03
	3°	2BA63_2023-02-17_13-00-20	3.00E-03
Longitudinal direction (y)	1°	2BA63_2023-02-01_13-00-20	5.56E-04
	2°	2BA63_2023-02-06_13-00-20	5.42E-04
	3°	2BA63_2023-02-17_13-00-20	4.40E-04
Transverse direction (z)	1°	2BA63_2023-02-01_13-00-20	9.32E-04
	2°	2BA63_2023-02-06_13-00-20	8.71E-04
	3°	2BA63_2023-02-17_13-00-20	7.78E-04

Table 10-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-02-17_13-00-20	1.59E-05	2BA63_2023-02-01_13-00-20	2.45E-06
2	2BA63_2023-02-06_13-00-20	1.31E-05	2BA63_2023-02-06_13-00-20	2.39E-06
3	2BA63_2023-02-01_13-00-20	1.08E-05	2BA63_2023-02-17_13-00-20	1.83E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-02-01_13-00-20	2.47E-07	2BA63_2023-02-01_13-00-20	6.10E-08
2	2BA63_2023-02-17_13-00-20	2.02E-07	2BA63_2023-02-06_13-00-20	6.04E-08
3	2BA63_2023-02-02_13-00-21	1.87E-07	2BA63_2023-02-17_13-00-20	3.86E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-02-04_07-00-21	1.01E-06	2BA63_2023-02-01_13-00-20	1.74E-07
2	2BA63_2023-02-01_13-00-20	5.69E-07	2BA63_2023-02-06_13-00-20	1.55E-07
3	2BA63_2023-02-17_13-00-20	4.45E-07	2BA63_2023-02-17_13-00-20	1.23E-07

Table 10-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	A	A	A	A	-	A
2	B	B	B	B	C	B	B	A	B
3	C	A	C	C	-	C	C	C	C

10.2.1 Vertical direction (x)

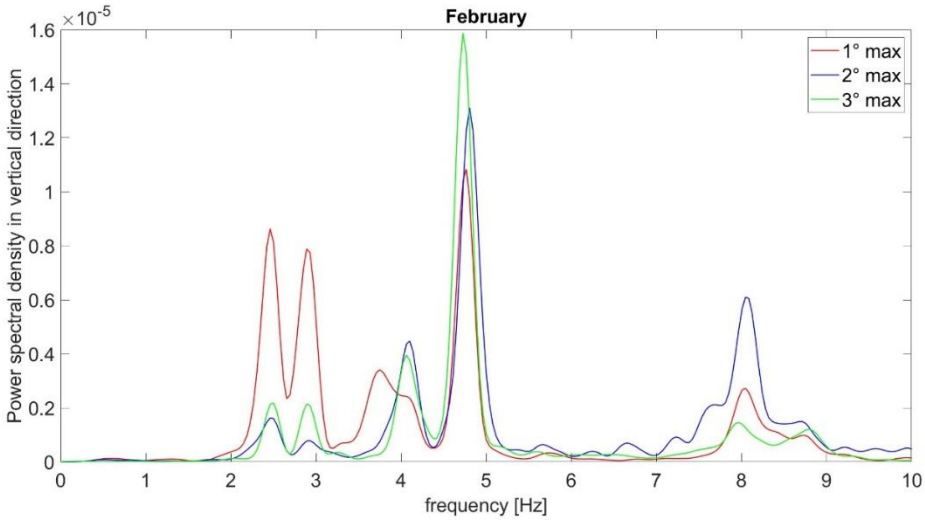


Figure 10-14: Results obtained from the 3 accelerograms with maximum SD in time domain

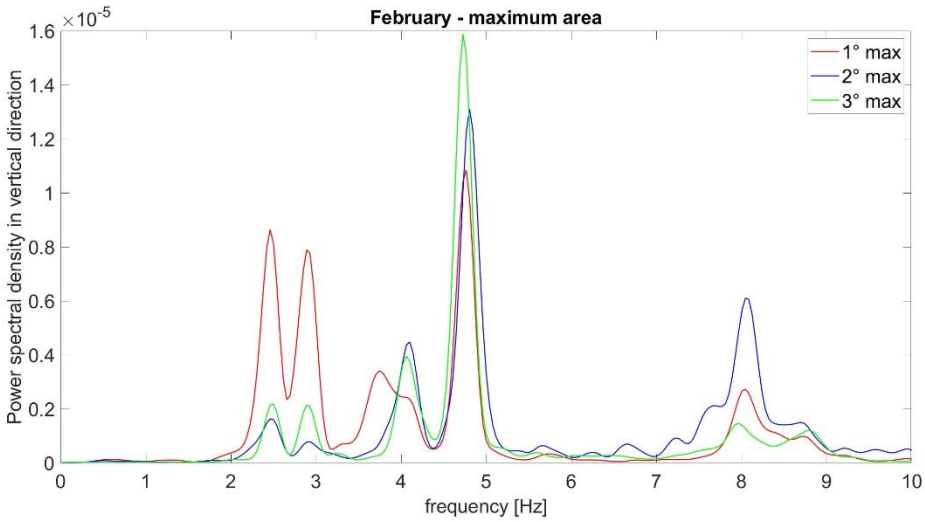


Figure 10-15: Results obtained from the 3 accelerograms with maximum area of PSD

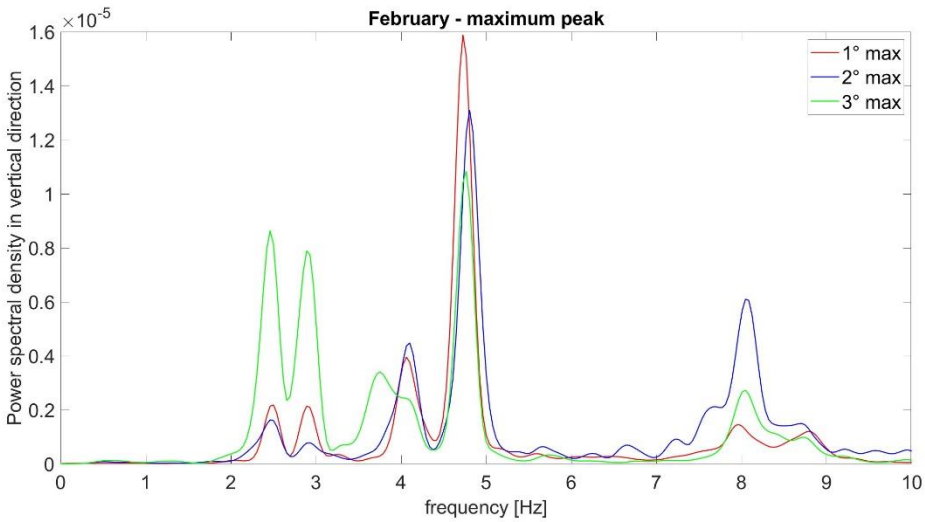


Figure 10-16: Results obtained from the 3 accelerograms with highest peak if PSD

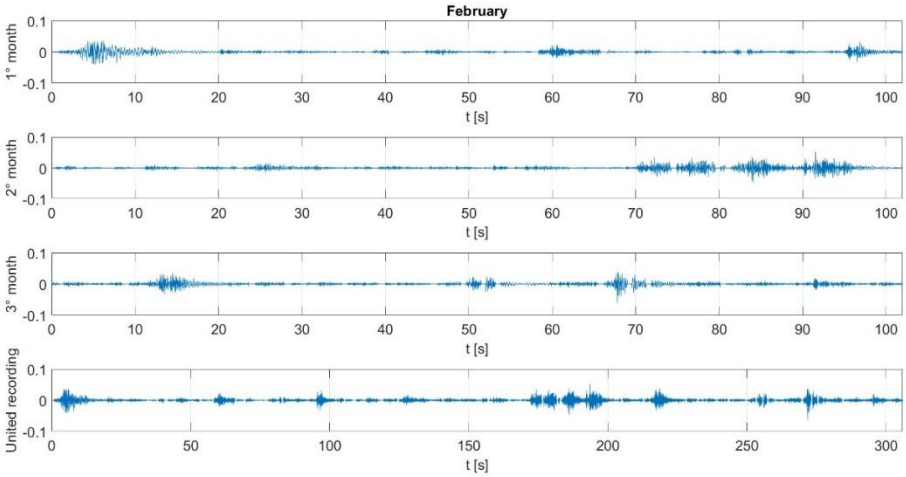


Figure 10-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.2.2 Longitudinal direction (y)

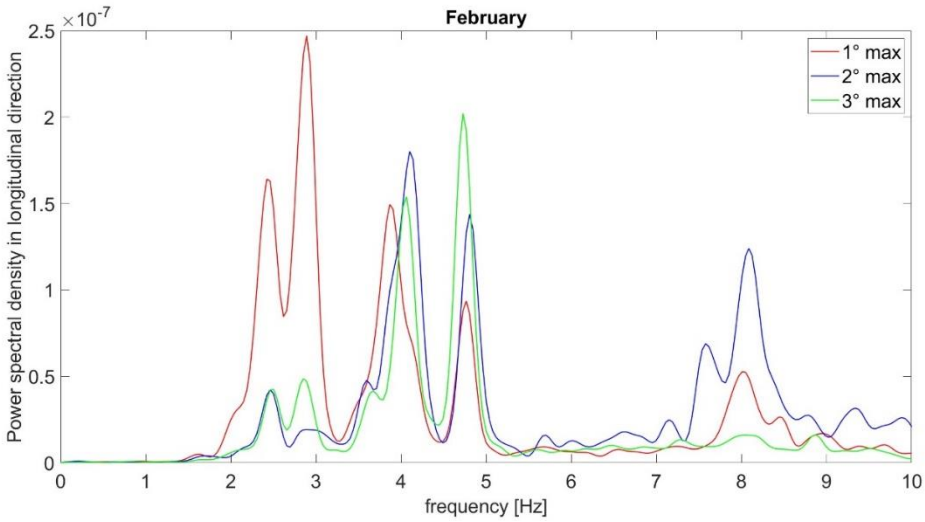


Figure 10-18: Results obtained from the 3 accelerograms with maximum SD in time domain

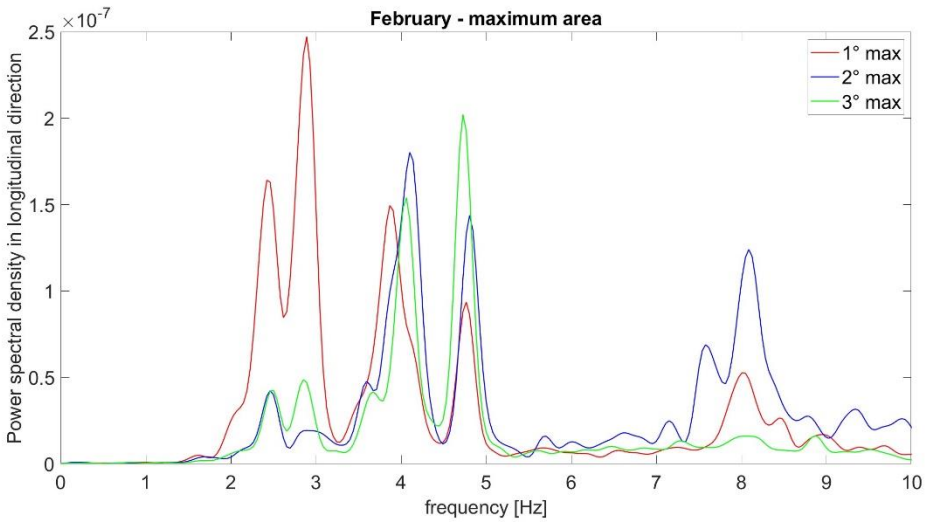


Figure 10-19: Results obtained from the 3 accelerograms with maximum area of PSD

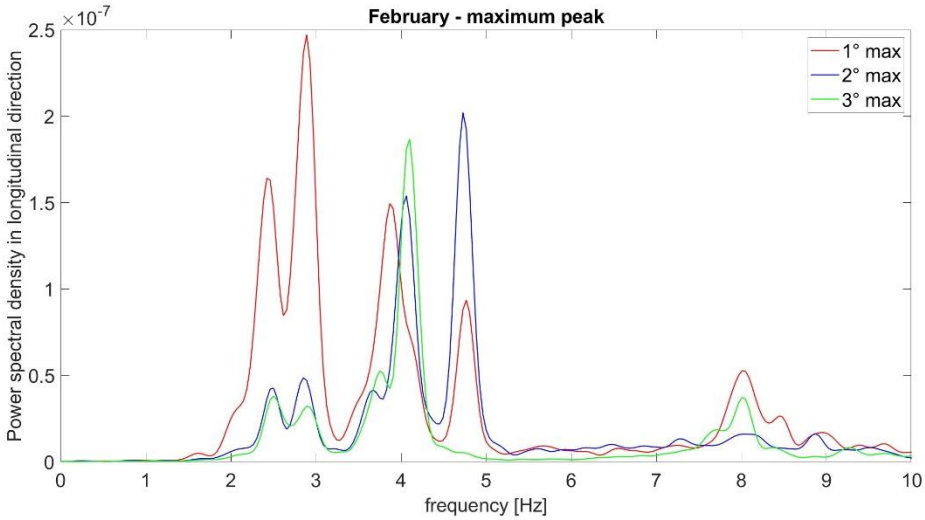


Figure 10-20: Results obtained from the 3 accelerograms with highest peak if PSD

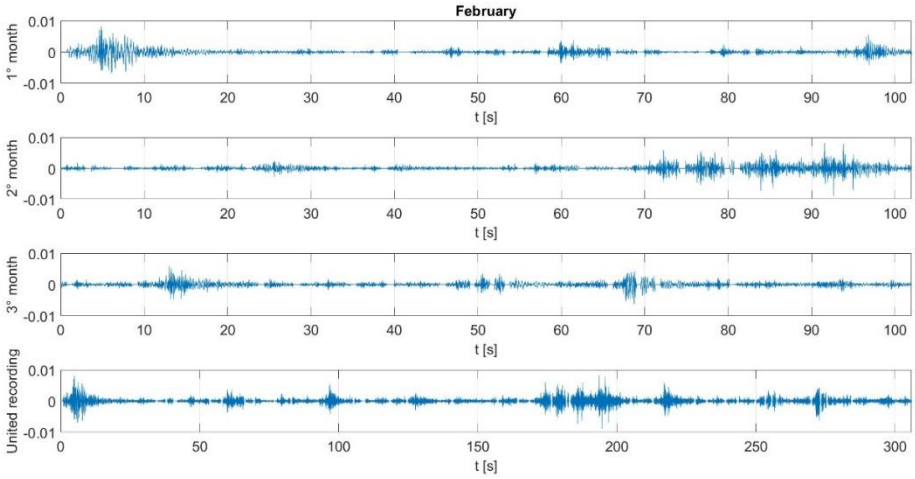


Figure 10-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

10.2.3 Transverse direction (z)

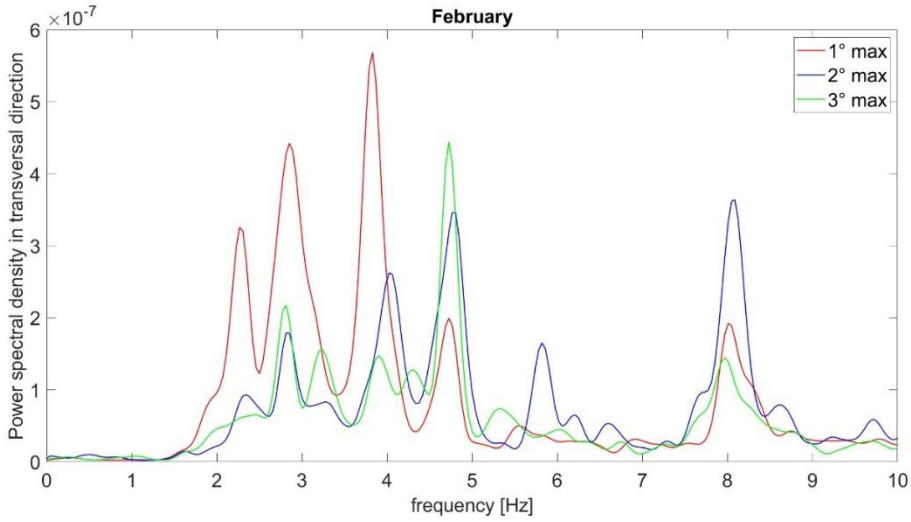


Figure 10-22: Results obtained from the 3 accelerograms with maximum SD in time domain

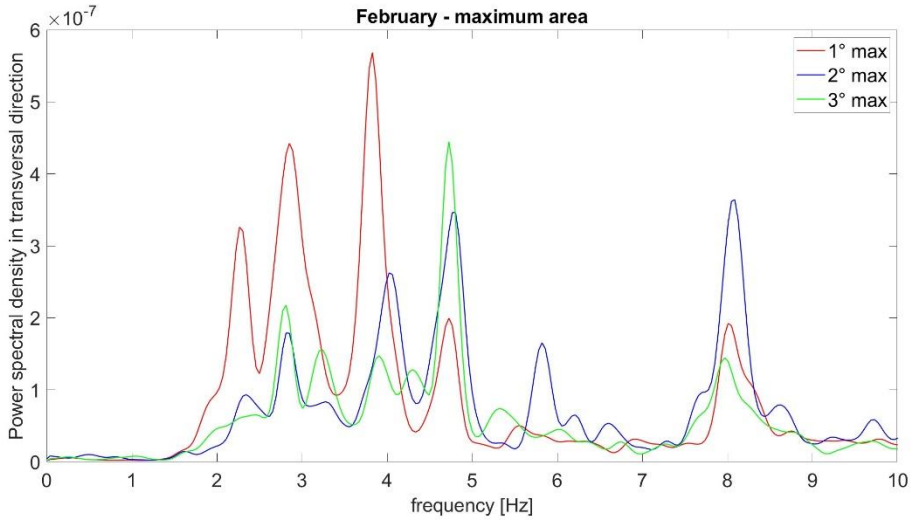


Figure 10-23: Results obtained from the 3 accelerograms with maximum area of PSD

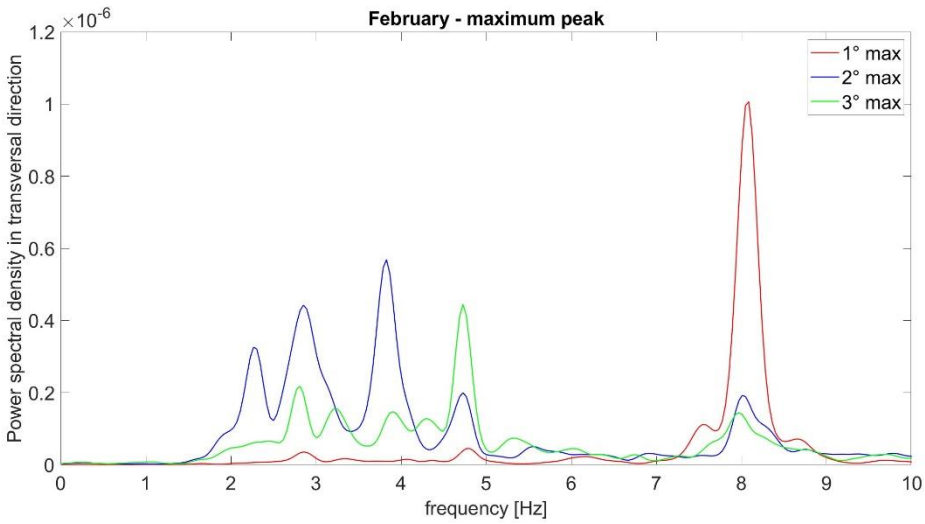


Figure 10-24: Results obtained from the 3 accelerograms with highest peak if PSD

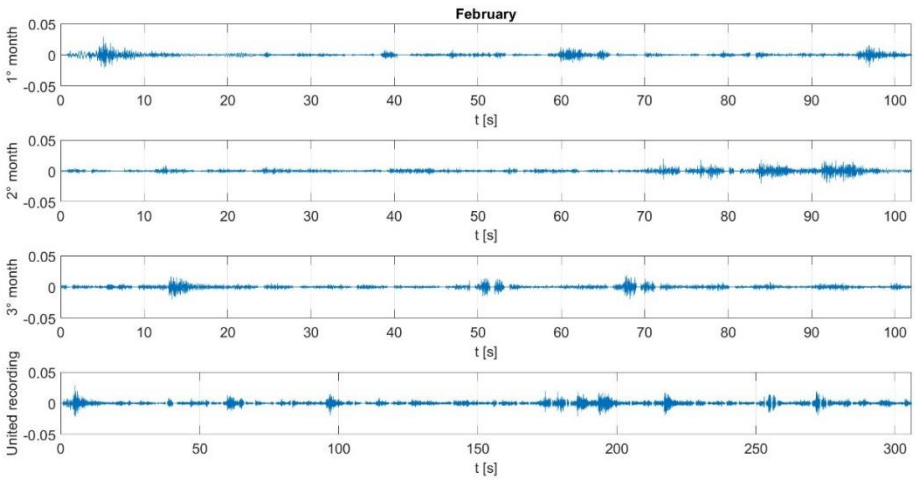


Figure 10-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

10.3 March

The results obtained for the March dataset are shown in the following tables.

Table 10-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-03-16_13-00-21	5.70E-03
	2°	2BA63_2023-03-21_13-00-20	3.52E-03
	3°	2BA63_2023-03-09_13-00-22	3.47E-03
Longitudinal direction (y)	1°	2BA63_2023-03-16_13-00-21	8.69E-04
	2°	2BA63_2023-03-08_13-00-22	5.94E-04
	3°	2BA63_2023-03-31_08-00-21	5.62E-04
Transverse direction (z)	1°	2BA63_2023-03-16_13-00-21	1.26E-03
	2°	2BA63_2023-03-21_13-00-20	9.49E-04
	3°	2BA63_2023-03-09_13-00-22	8.77E-04

Table 10-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-03-16_13-00-21	2.73E-05	2BA63_2023-03-16_13-00-21	6.99E-06
2	2BA63_2023-03-29_14-00-20	1.98E-05	2BA63_2023-03-09_13-00-22	2.53E-06
3	2BA63_2023-03-09_13-00-22	1.73E-05	2BA63_2023-03-21_13-00-20	2.51E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-03-29_14-00-20	6.73E-07	2BA63_2023-03-16_13-00-21	1.58E-07
2	2BA63_2023-03-16_13-00-21	6.12E-07	2BA63_2023-03-08_13-00-22	7.15E-08
3	2BA63_2023-03-31_08-00-21	3.72E-07	2BA63_2023-03-31_08-00-21	6.25E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-03-16_13-00-21	1.32E-06	2BA63_2023-03-16_13-00-21	3.30E-07
2	2BA63_2023-03-21_13-00-20	7.58E-07	2BA63_2023-03-21_13-00-20	1.85E-07
3	2BA63_2023-03-09_13-00-22	7.16E-07	2BA63_2023-03-09_13-00-22	1.62E-07

Table 10-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	-	A	A	A	A
2	B	-	C	D	A	D	B	B	B
3	C	C	B	E	E	E	C	C	C

10.3.1 Vertical direction (x)

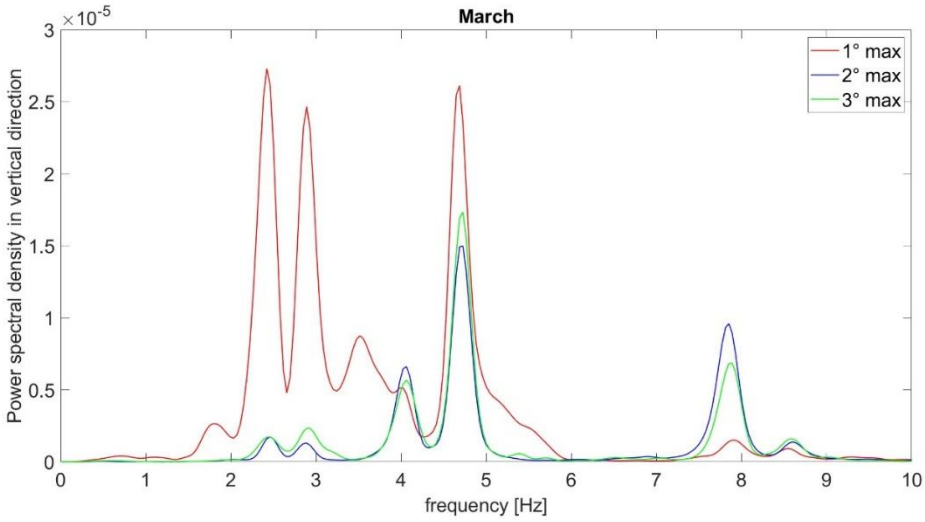


Figure 10-26: Results obtained from the 3 accelerograms with maximum SD in time domain

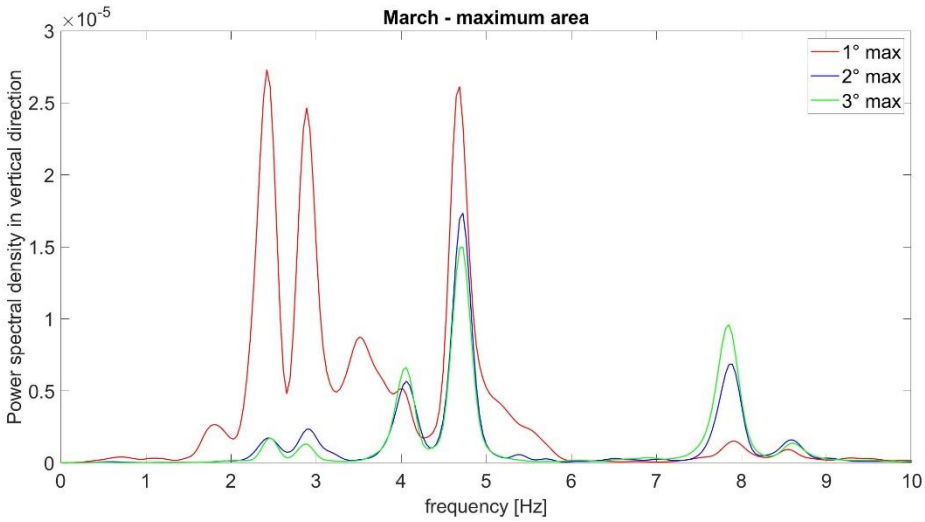


Figure 10-27: Results obtained from the 3 accelerograms with maximum area of PSD

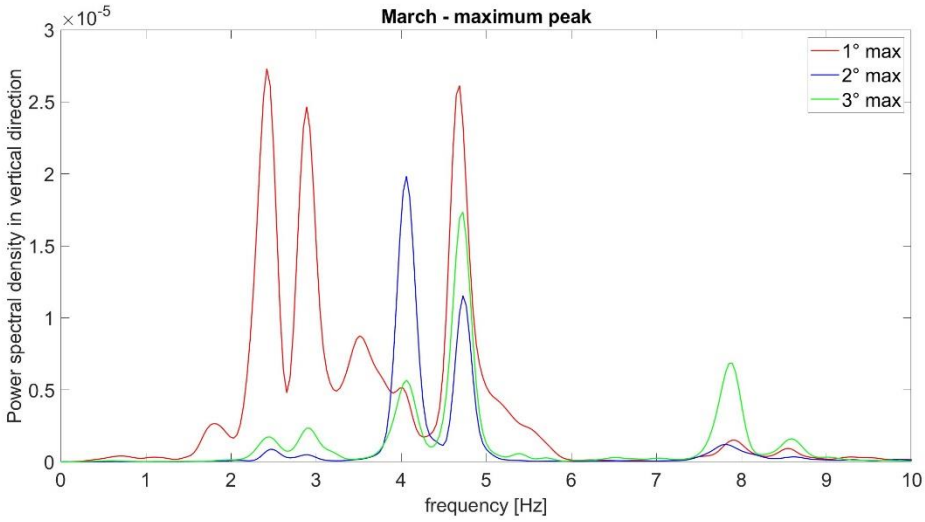


Figure 10-28: Results obtained from the 3 accelerograms with highest peak if PSD

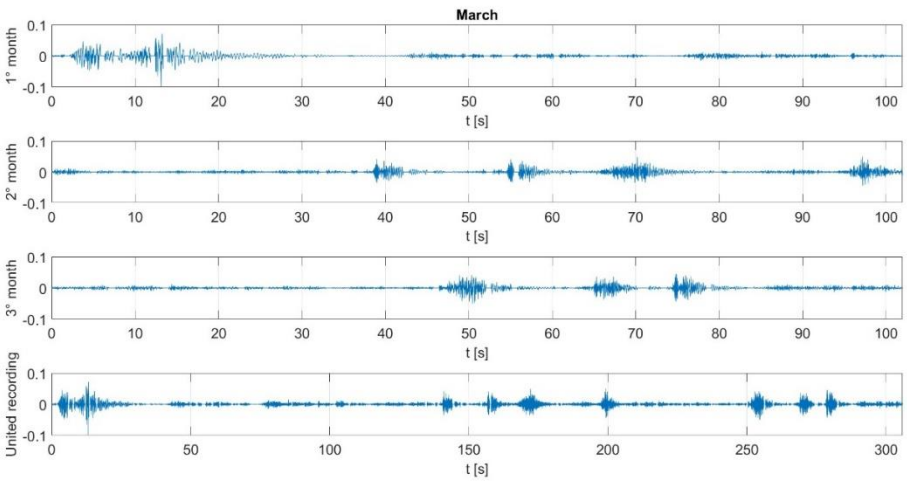


Figure 10-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.3.2 Longitudinal direction (y)

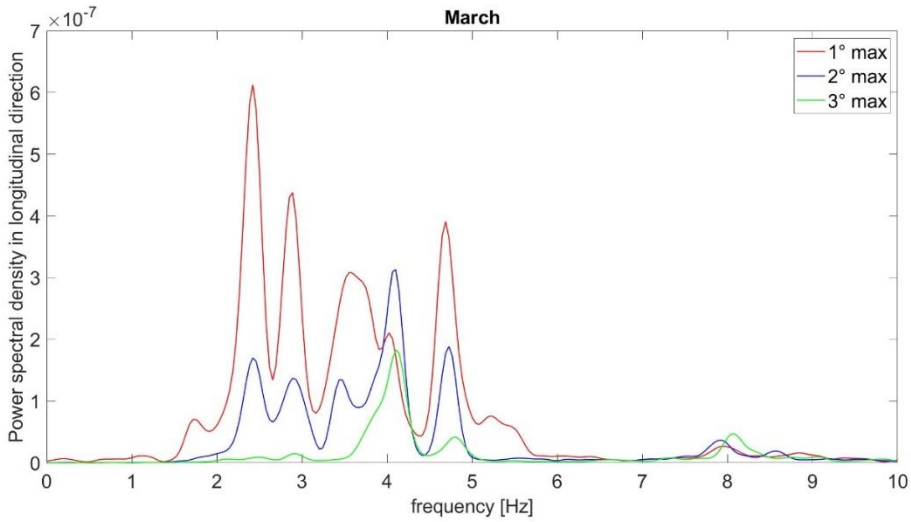


Figure 10-30: Results obtained from the 3 accelerograms with maximum SD in time domain

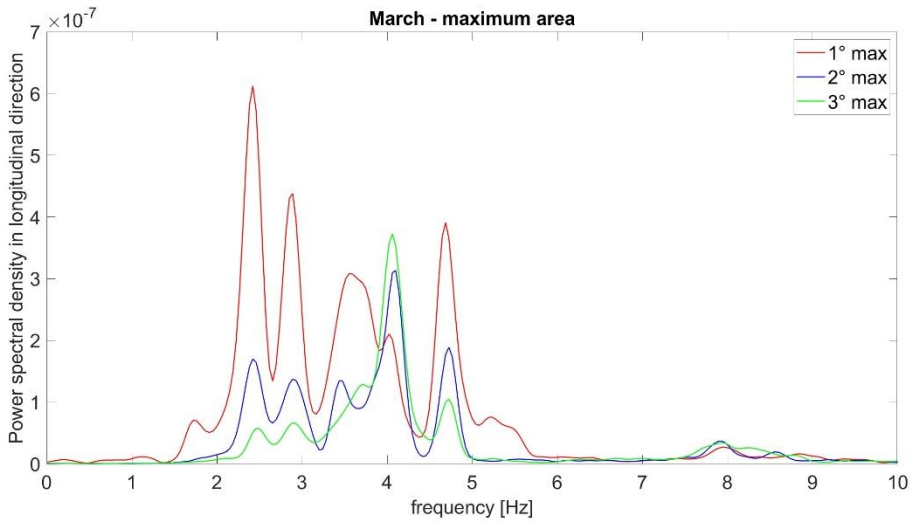


Figure 10-31: Results obtained from the 3 accelerograms with maximum area of PSD

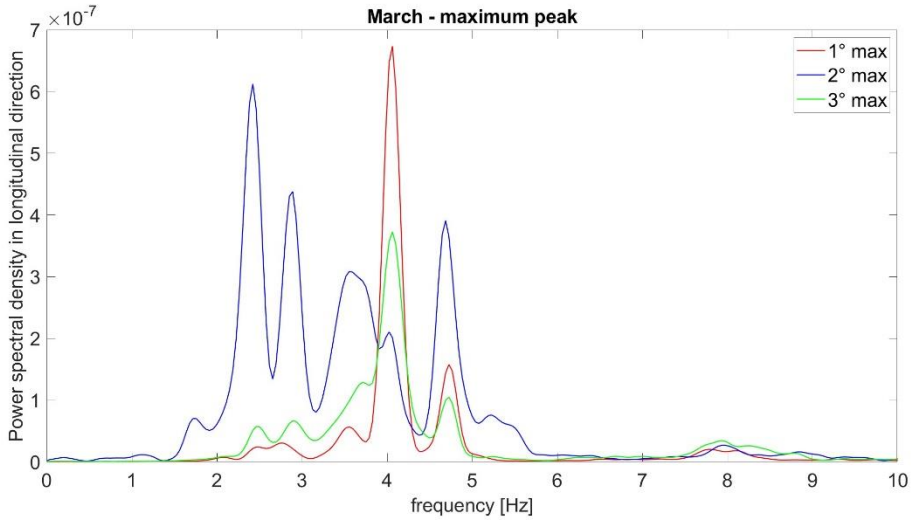


Figure 10-32: Results obtained from the 3 accelerograms with highest peak if PSD

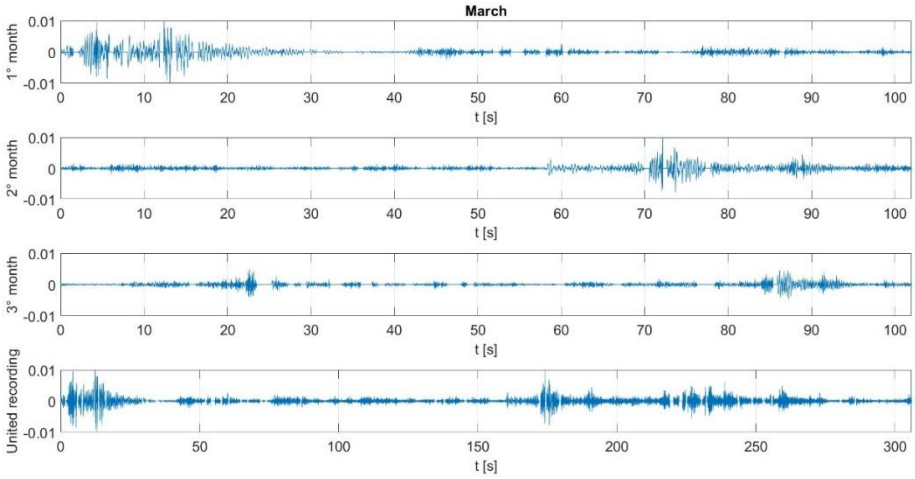


Figure 10-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

10.3.3 Transverse direction (z)

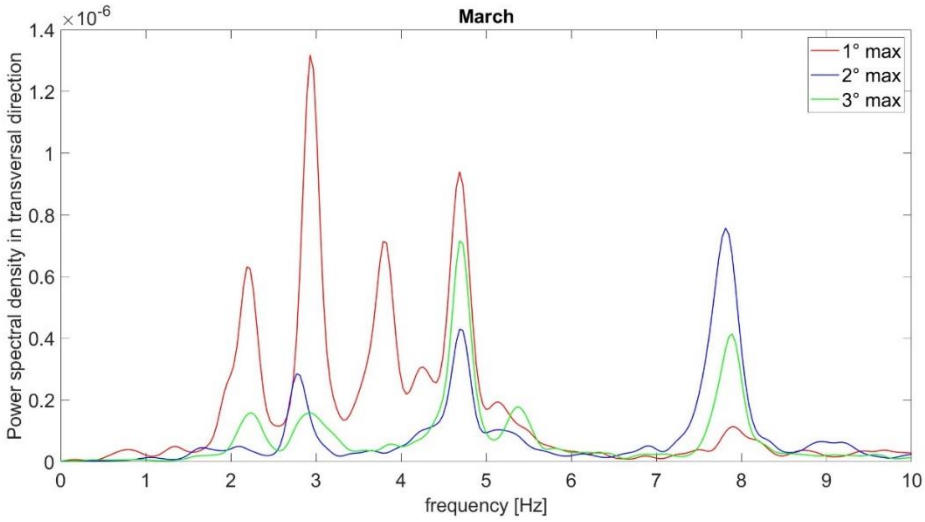


Figure 10-34: Results obtained from the 3 accelerograms with maximum SD in time domain

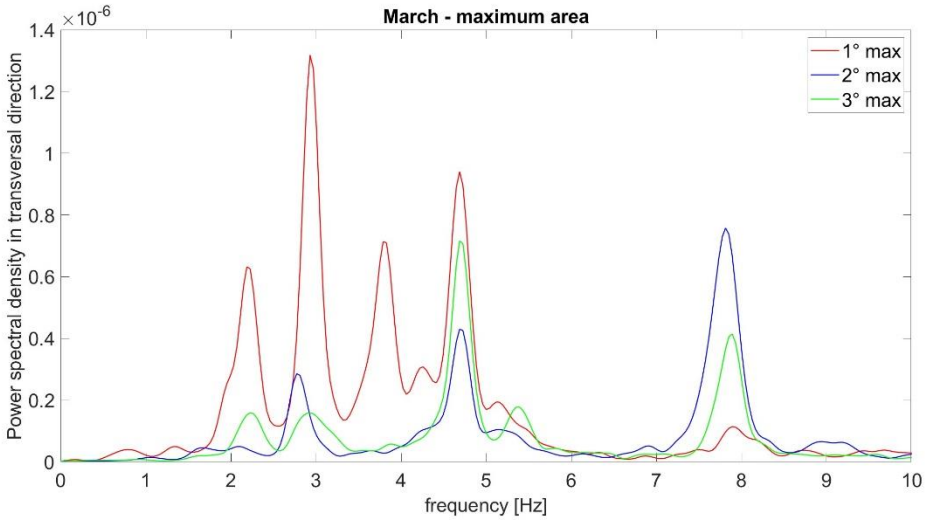


Figure 10-35: Results obtained from the 3 accelerograms with maximum area of PSD

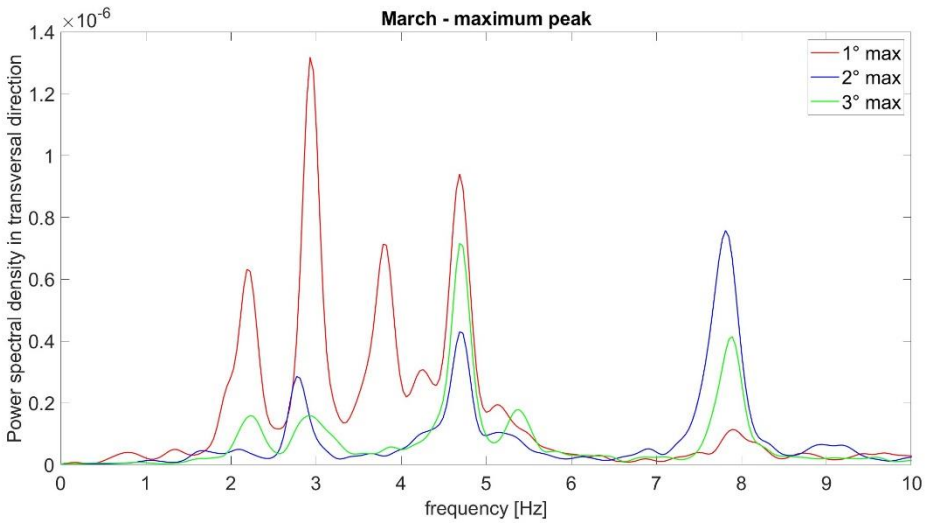


Figure 10-36: Results obtained from the 3 accelerograms with highest peak if PSD

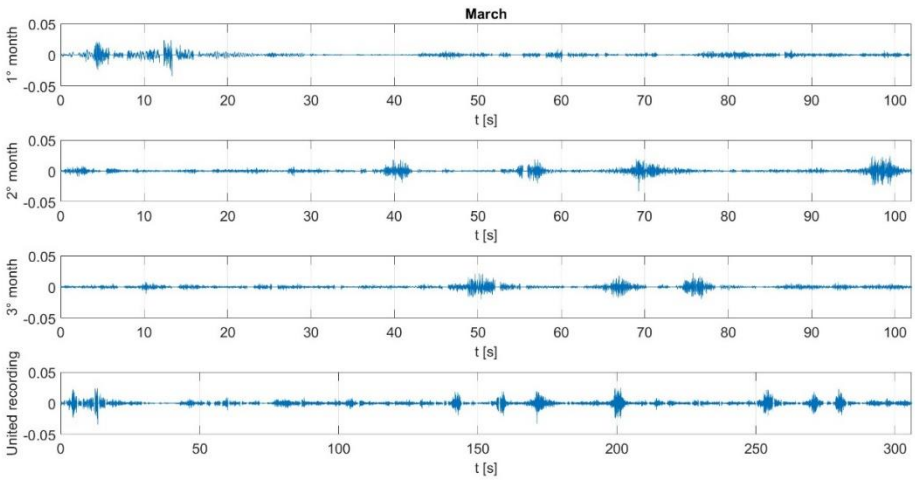


Figure 10-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

10.4 April

The results obtained for the April dataset are shown in the following tables.

Table 10-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-04-13_08-00-21	5.48E-03
	2°	2BA63_2023-04-24_14-00-20	3.42E-03
	3°	2BA63_2023-04-18_14-00-20	3.42E-03
Longitudinal direction (y)	1°	2BA63_2023-04-13_08-00-21	8.49E-04
	2°	2BA63_2023-04-24_14-00-20	5.42E-04
	3°	2BA63_2023-04-18_14-00-20	5.17E-04
Transverse direction (z)	1°	2BA63_2023-04-13_08-00-21	1.14E-03
	2°	2BA63_2023-04-24_14-00-20	1.02E-03
	3°	2BA63_2023-04-14_08-00-21	8.45E-04

Table 10-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-04-13_08-00-21	5.95E-05	2BA63_2023-04-13_08-00-21	5.73E-06
2	2BA63_2023-04-24_14-00-20	1.66E-05	2BA63_2023-04-24_14-00-20	2.53E-06
3	2BA63_2023-04-18_14-00-20	1.64E-05	2BA63_2023-04-18_14-00-20	2.39E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-04-13_08-00-21	1.31E-06	2BA63_2023-04-13_08-00-21	1.40E-07
2	2BA63_2023-04-24_14-00-20	3.23E-07	2BA63_2023-04-24_14-00-20	6.24E-08
3	2BA63_2023-04-18_14-00-20	2.74E-07	2BA63_2023-04-18_14-00-20	5.45E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-04-13_08-00-21	1.57E-06	2BA63_2023-04-13_08-00-21	2.54E-07
2	2BA63_2023-04-24_14-00-20	1.10E-06	2BA63_2023-04-24_14-00-20	2.16E-07
3	2BA63_2023-04-18_14-00-20	6.97E-07	2BA63_2023-04-18_14-00-20	1.41E-07

Table 10-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	B	B	B	B	B	B
3	C	C	C	C	C	C	-	C	C

10.4.1 Vertical direction (x)

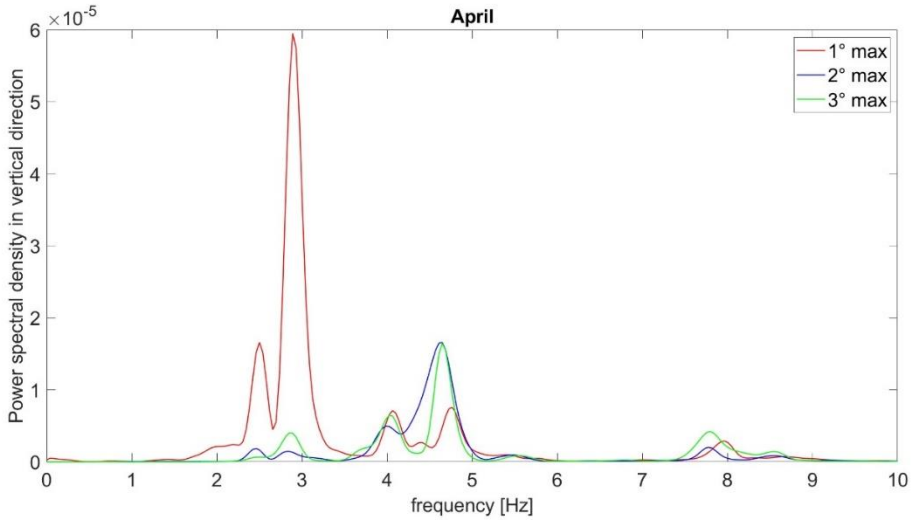


Figure 10-38: Results obtained from the 3 accelerograms with maximum SD in time domain

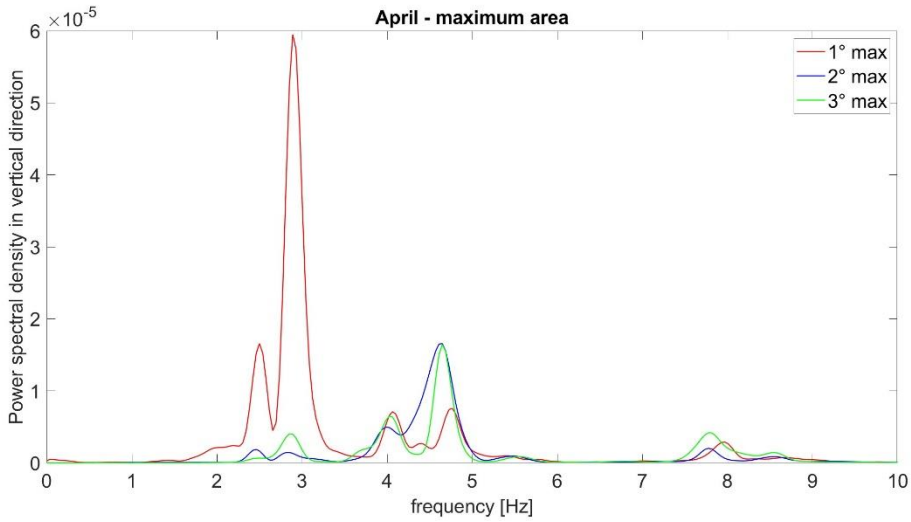


Figure 10-39: Results obtained from the 3 accelerograms with maximum area of PSD

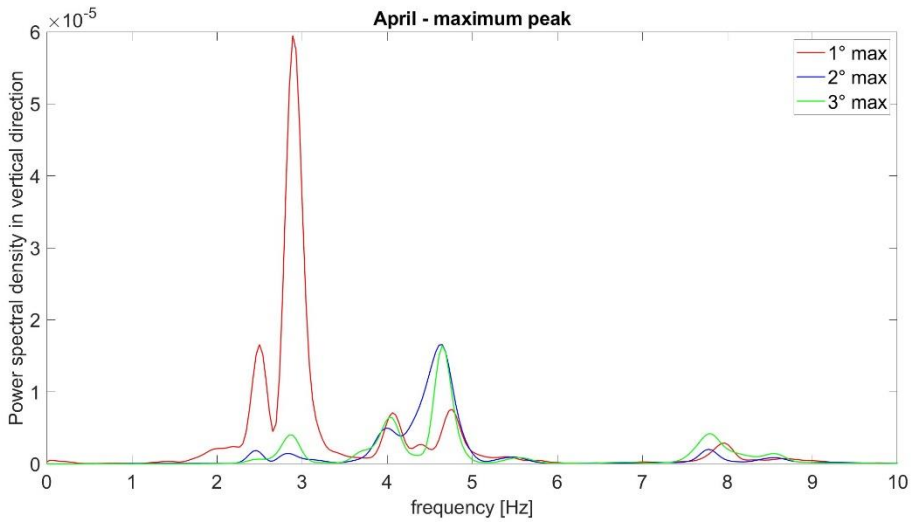


Figure 10-40: Results obtained from the 3 accelerograms with highest peak if PSD

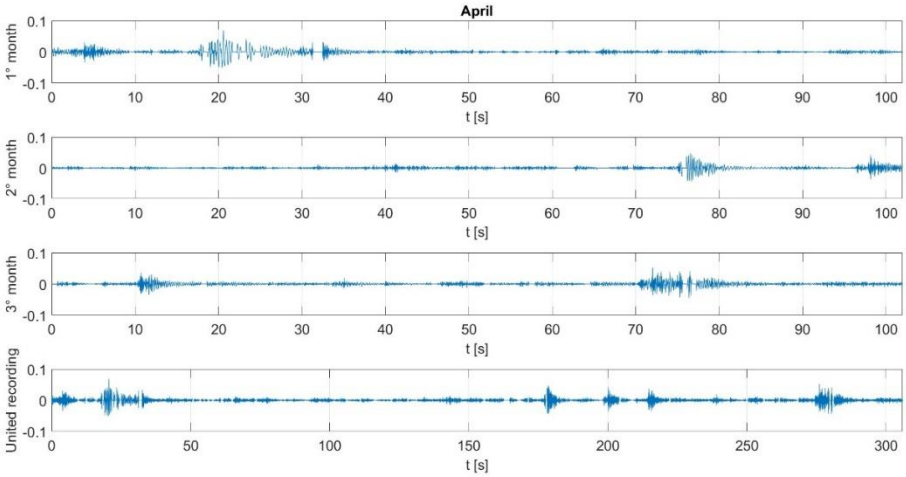


Figure 10-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.4.2 Longitudinal direction (y)

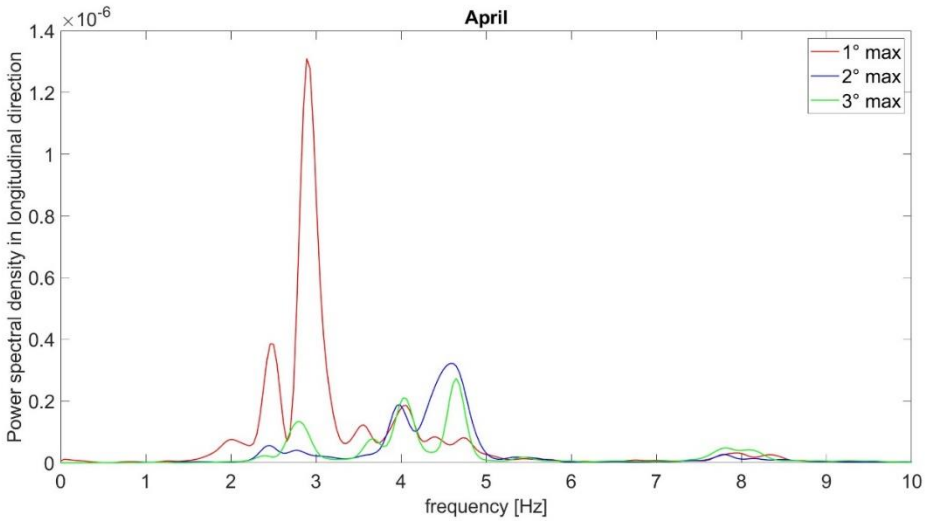


Figure 10-42: Results obtained from the 3 accelerograms with maximum SD in time domain

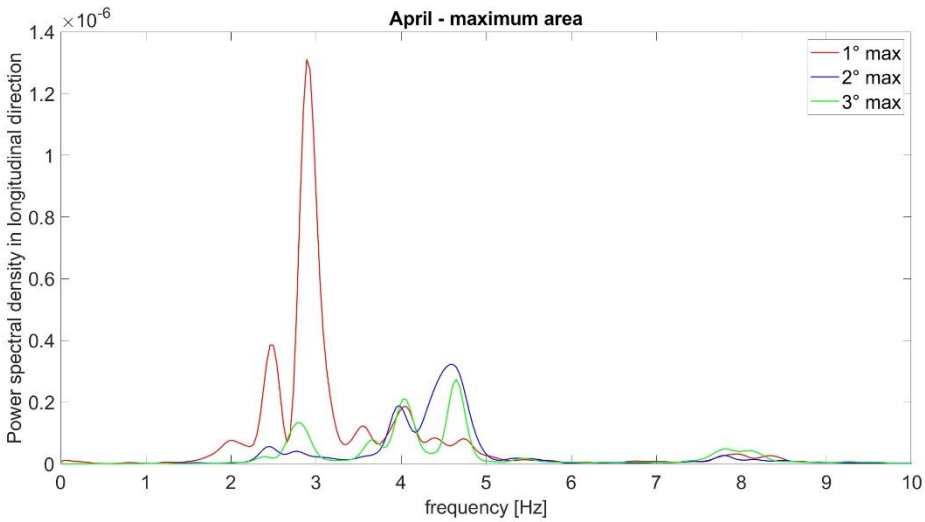


Figure 10-43: Results obtained from the 3 accelerograms with maximum area of PSD

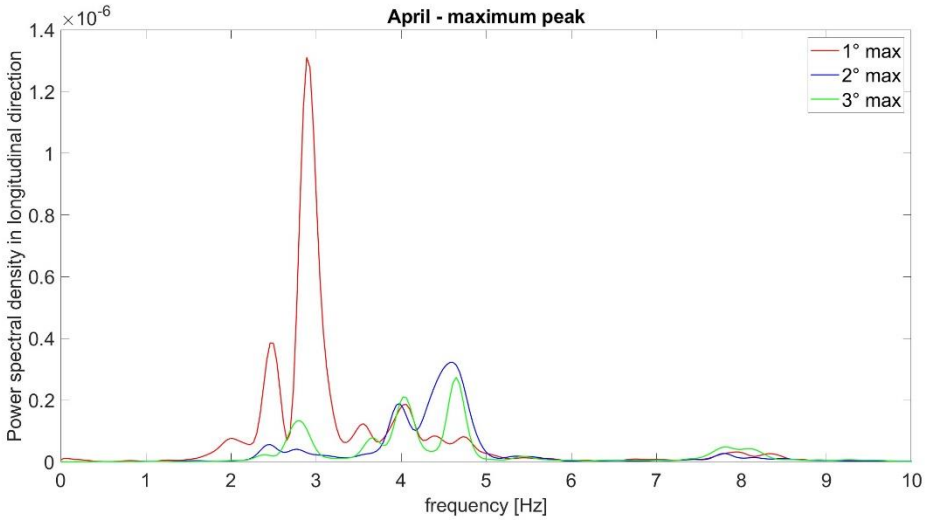


Figure 10-44: Results obtained from the 3 accelerograms with highest peak if PSD

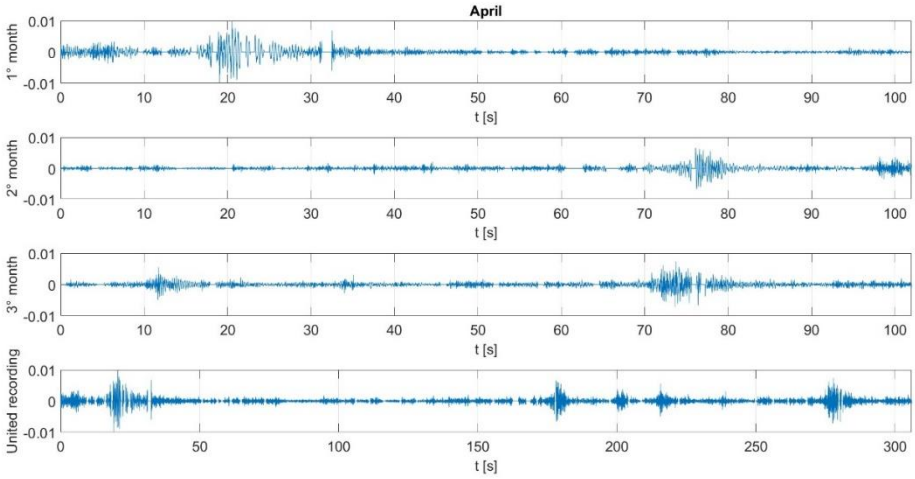


Figure 10-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

10.4.3 Transverse direction (z)

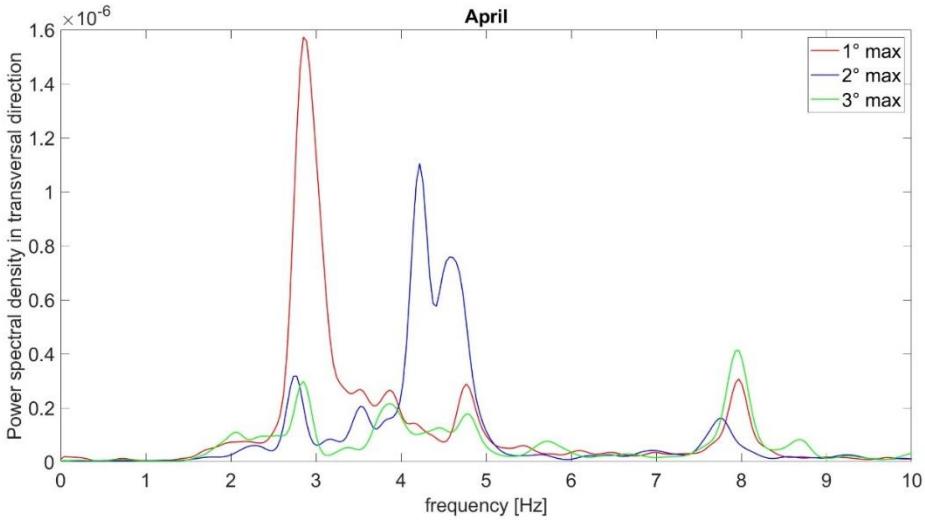


Figure 10-46: Results obtained from the 3 accelerograms with maximum SD in time domain

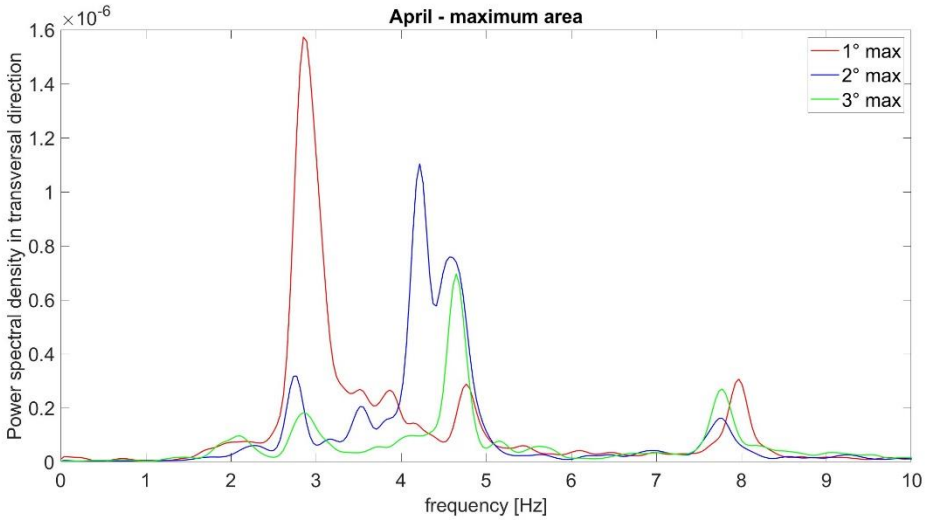


Figure 10-47: Results obtained from the 3 accelerograms with maximum area of PSD

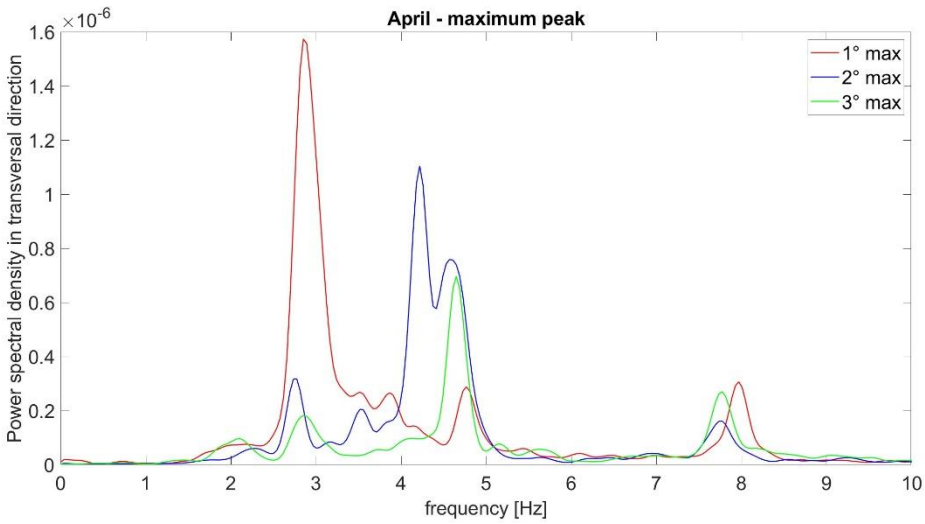


Figure 10-48: Results obtained from the 3 accelerograms with highest peak if PSD

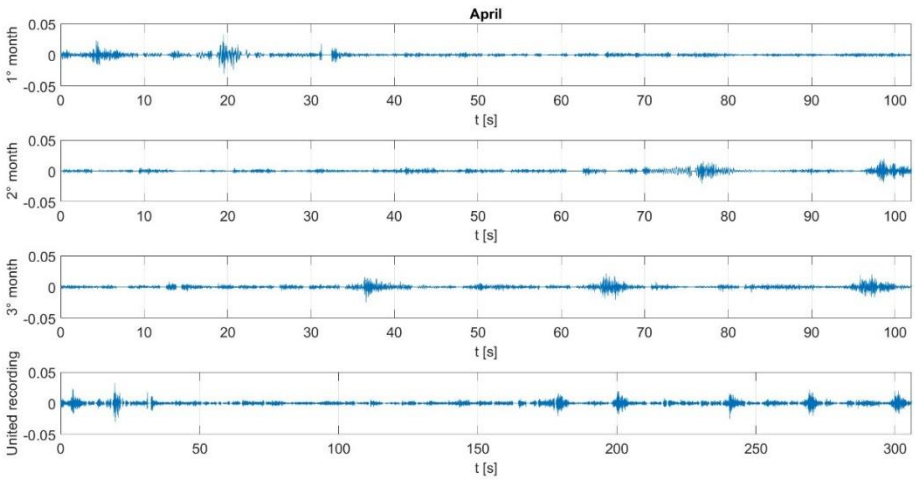


Figure 10-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

10.5 May

The results obtained for the May dataset are shown in the following tables.

Table 10-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-05-23_14-00-21	6.07E-03
	2°	2BA63_2023-05-04_14-00-20	4.92E-03
	3°	2BA63_2023-05-22_08-00-20	3.52E-03
Longitudinal direction (y)	1°	2BA63_2023-05-23_14-00-21	9.85E-04
	2°	2BA63_2023-05-04_14-00-20	7.19E-04
	3°	2BA63_2023-05-22_08-00-20	4.94E-04
Transverse direction (z)	1°	2BA63_2023-05-23_14-00-21	1.35E-03
	2°	2BA63_2023-05-04_14-00-20	1.15E-03
	3°	2BA63_2023-05-22_08-00-20	8.06E-04

Table 10-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-05-23_14-00-21	4.91E-05	2BA63_2023-05-23_14-00-21	7.21E-06
2	2BA63_2023-05-04_14-00-20	3.36E-05	2BA63_2023-05-04_14-00-20	5.17E-06
3	2BA63_2023-05-22_08-00-20	1.47E-05	2BA63_2023-05-22_08-00-20	2.56E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-05-23_14-00-21	1.32E-06	2BA63_2023-05-23_14-00-21	1.87E-07
2	2BA63_2023-05-04_14-00-20	5.22E-07	2BA63_2023-05-04_14-00-20	1.08E-07
3	2BA63_2023-05-22_08-00-20	2.20E-07	2BA63_2023-05-22_08-00-20	5.03E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-05-23_14-00-21	2.82E-06	2BA63_2023-05-23_14-00-21	3.73E-07
2	2BA63_2023-05-04_14-00-20	1.54E-06	2BA63_2023-05-04_14-00-20	2.81E-07
3	2BA63_2023-05-22_08-00-20	4.97E-07	2BA63_2023-05-22_08-00-20	1.35E-07

Table 10-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	B	B	B	B	B	B
3	C	C	C	C	C	C	C	C	C

10.5.1 Vertical direction (x)

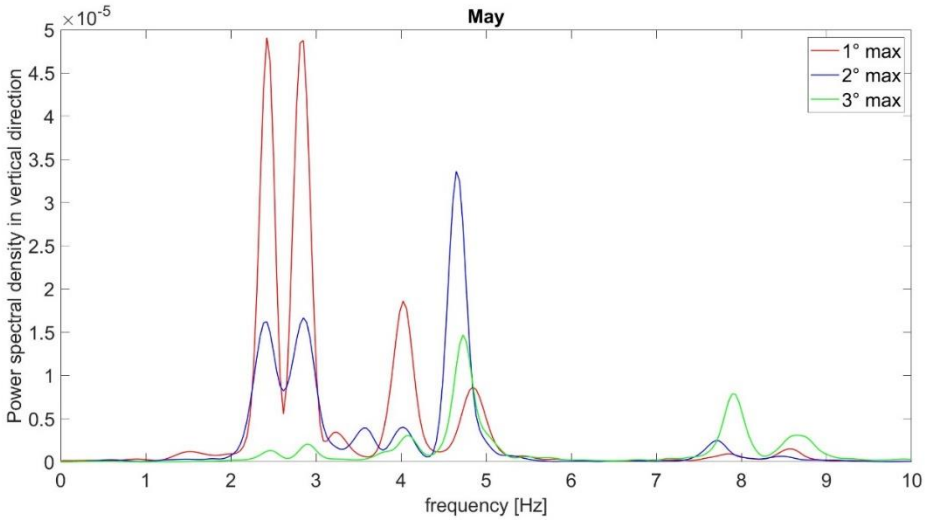


Figure 10-50: Results obtained from the 3 accelerograms with maximum SD in time domain

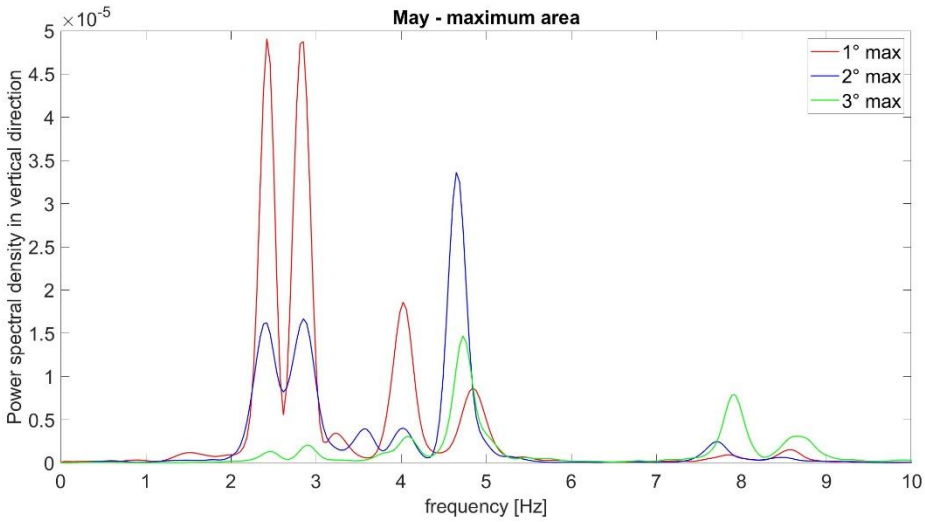


Figure 10-51: Results obtained from the 3 accelerograms with maximum area of PSD

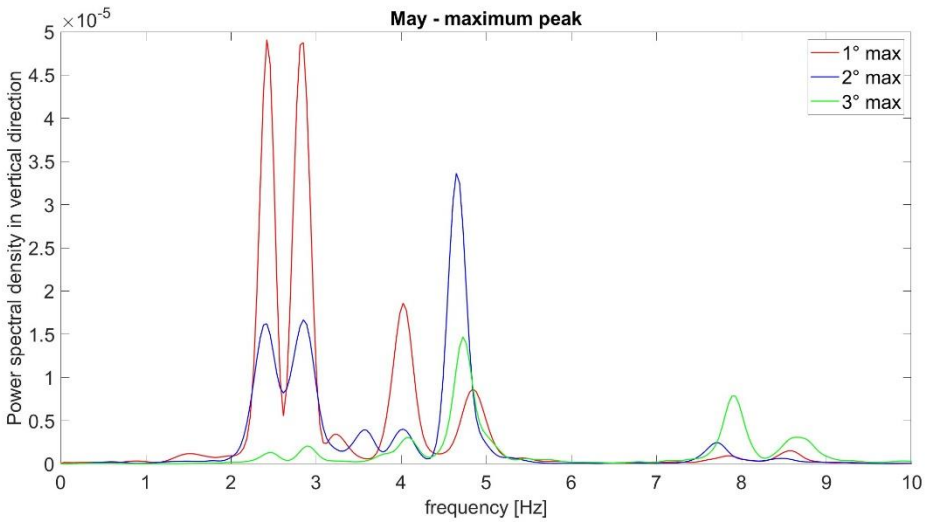


Figure 10-52: Results obtained from the 3 accelerograms with highest peak if PSD

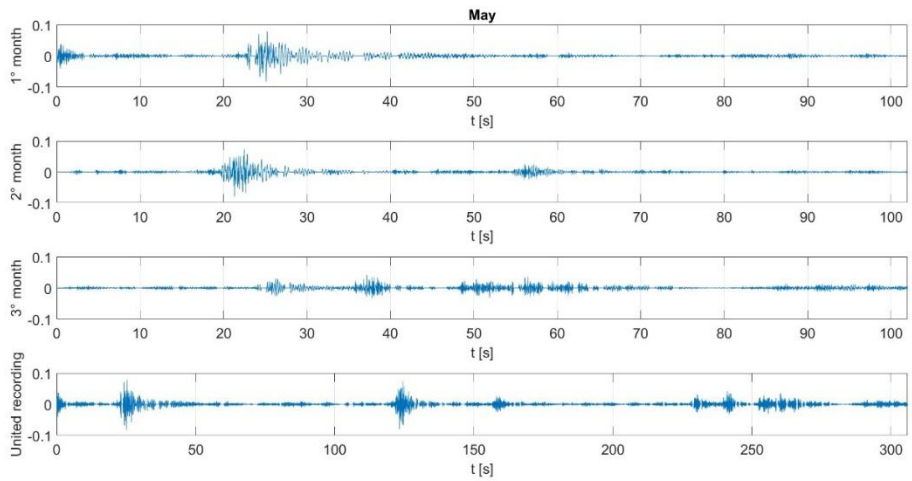


Figure 10-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.5.2 Longitudinal direction (y)

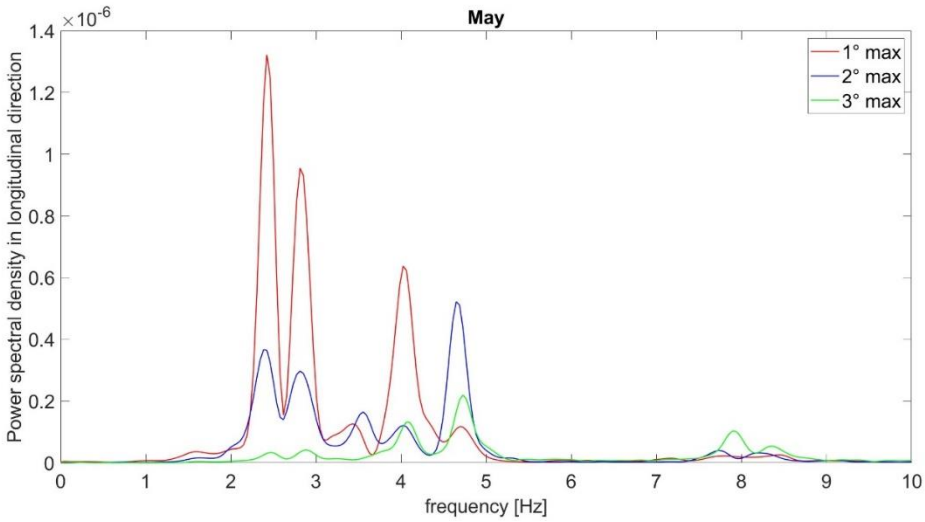


Figure 10-54: Results obtained from the 3 accelerograms with maximum SD in time domain

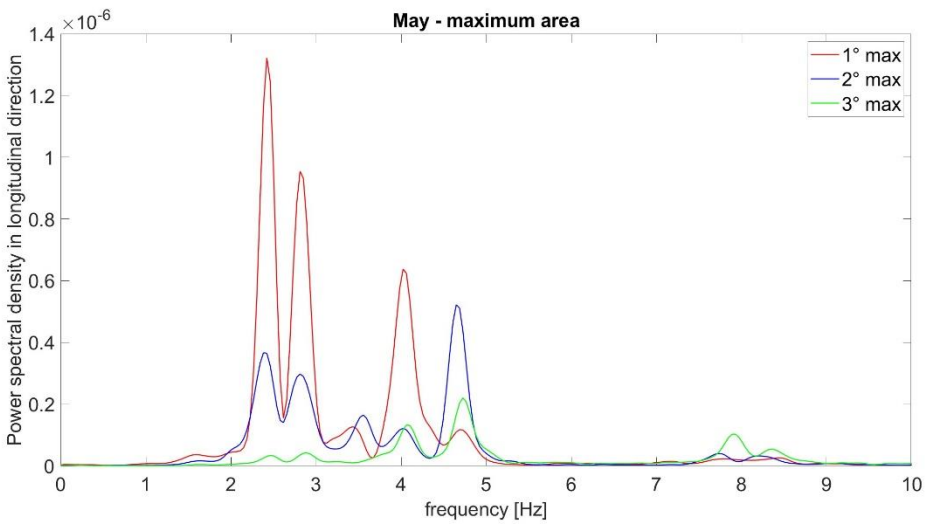


Figure 10-55: Results obtained from the 3 accelerograms with maximum area of PSD

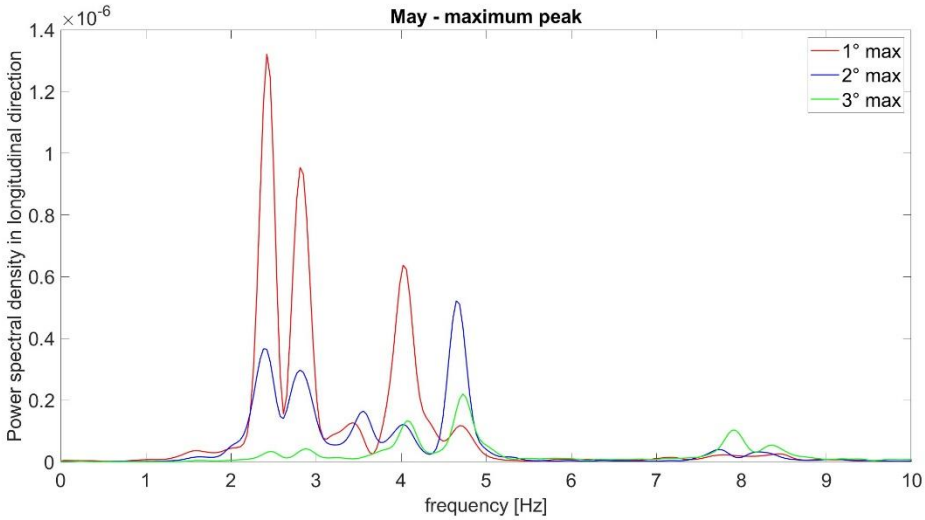


Figure 10-56: Results obtained from the 3 accelerograms with highest peak if PSD

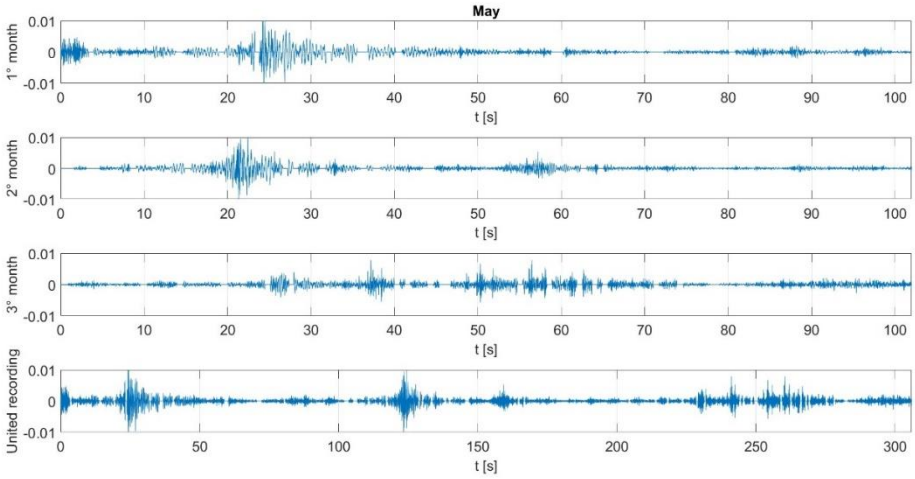


Figure 10-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

10.5.3 Transverse direction (z)

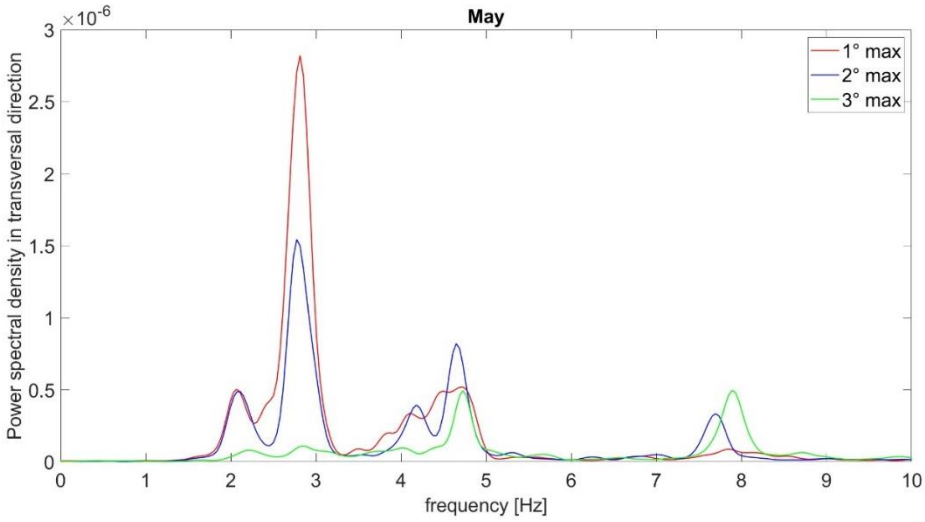


Figure 10-58: Results obtained from the 3 accelerograms with maximum SD in time domain

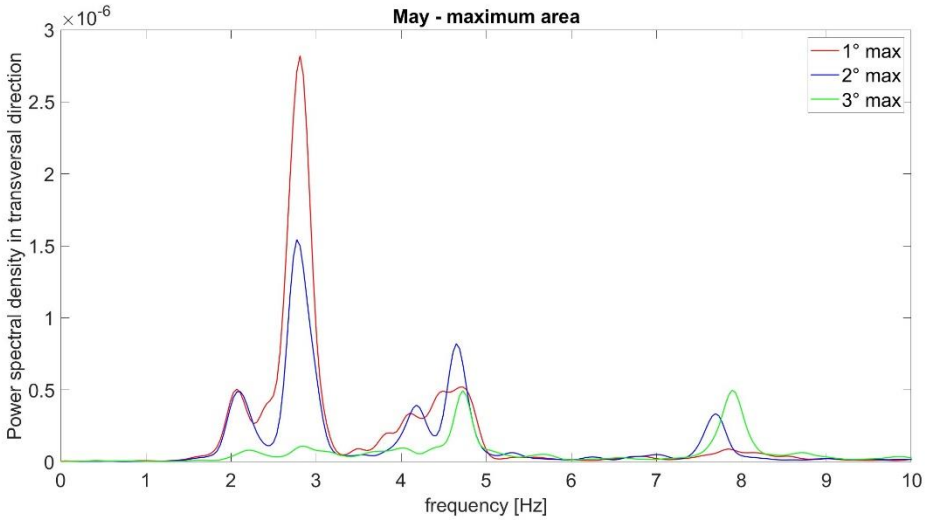


Figure 10-59: Results obtained from the 3 accelerograms with maximum area of PSD

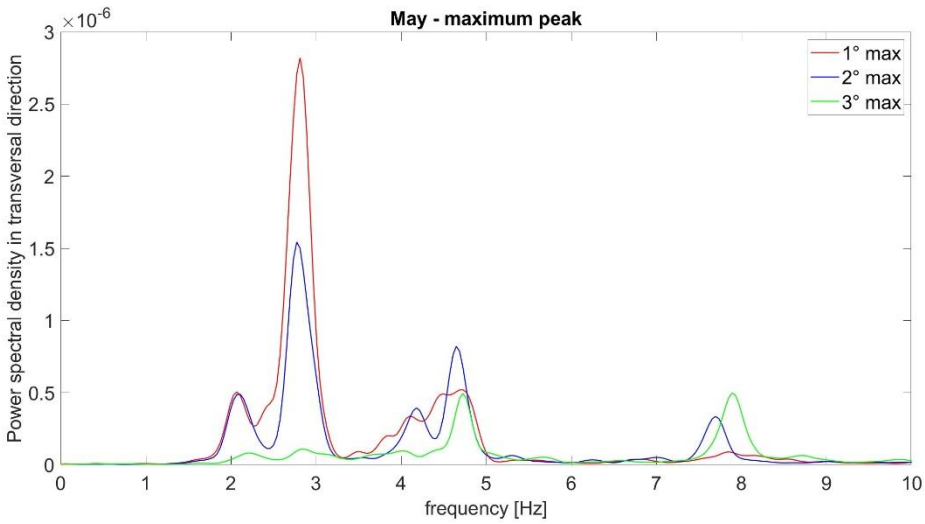


Figure 10-60: Results obtained from the 3 accelerograms with highest peak if PSD

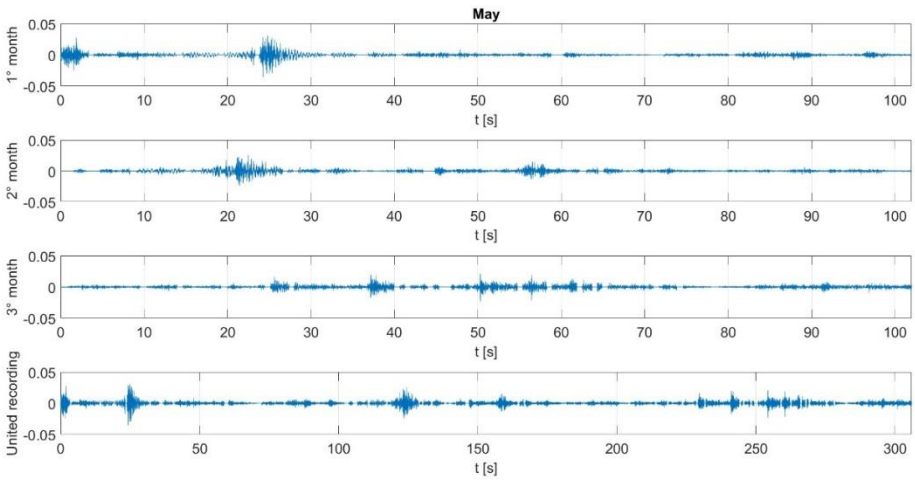


Figure 10-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

10.6 June

The results obtained for the June dataset are shown in the following tables.

Table 10-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-06-10_08-00-20	3.81E-03
	2°	2BA63_2023-06-21_08-00-20	3.48E-03
	3°	2BA63_2023-06-13_08-00-20	3.35E-03
Longitudinal direction (y)	1°	2BA63_2023-06-10_08-00-20	7.26E-04
	2°	2BA63_2023-06-21_08-00-20	5.40E-04
	3°	2BA63_2023-06-13_08-00-20	5.28E-04
Transverse direction (z)	1°	2BA63_2023-06-10_08-00-20	1.23E-03
	2°	2BA63_2023-06-21_08-00-20	9.39E-04
	3°	2BA63_2023-06-13_08-00-20	9.08E-04

Table 10-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-06-10_08-00-20	2.40E-05	2BA63_2023-06-10_08-00-20	2.80E-06
2	2BA63_2023-06-21_08-00-20	2.12E-05	2BA63_2023-06-21_08-00-20	2.35E-06
3	2BA63_2023-06-30_08-00-20	1.36E-05	2BA63_2023-06-13_08-00-20	2.32E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-06-10_08-00-20	5.42E-07	2BA63_2023-06-10_08-00-20	9.80E-08
2	2BA63_2023-06-21_08-00-20	4.82E-07	2BA63_2023-06-13_08-00-20	5.85E-08
3	2BA63_2023-06-15_08-00-20	3.57E-07	2BA63_2023-06-21_08-00-20	5.78E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-06-10_08-00-20	2.83E-06	2BA63_2023-06-10_08-00-20	3.01E-07
2	2BA63_2023-06-21_08-00-20	1.30E-06	2BA63_2023-06-21_08-00-20	1.79E-07
3	2BA63_2023-06-27_14-00-21	6.11E-07	2BA63_2023-06-13_08-00-20	1.62E-07

Table 10-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	B	B	C	B	B	B
3	C	-	C	C	-	B	C	-	C

10.6.1 Vertical direction (x)

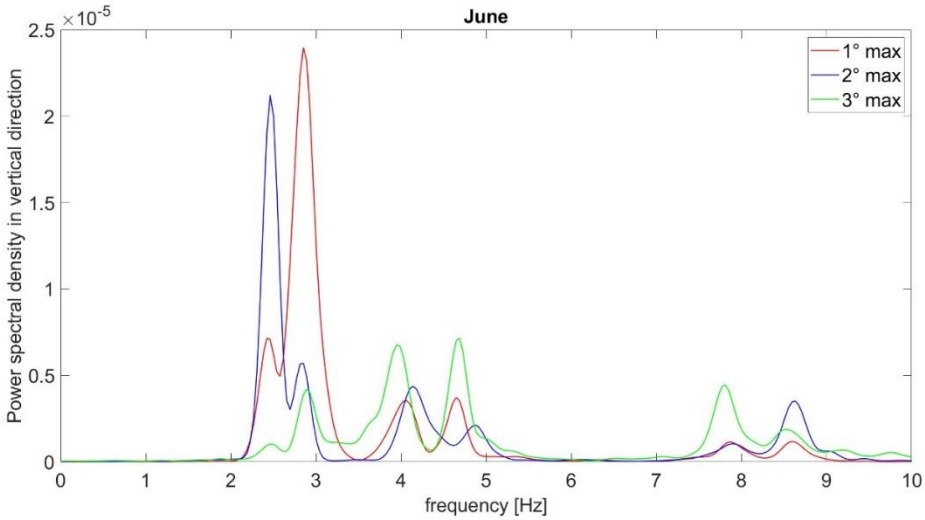


Figure 10-62: Results obtained from the 3 accelerograms with maximum SD in time domain

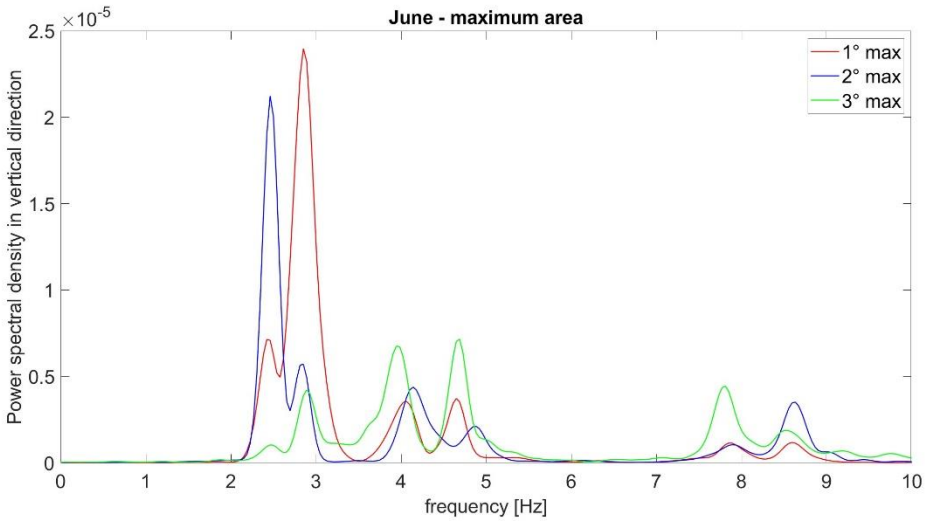


Figure 10-63: Results obtained from the 3 accelerograms with maximum area of PSD

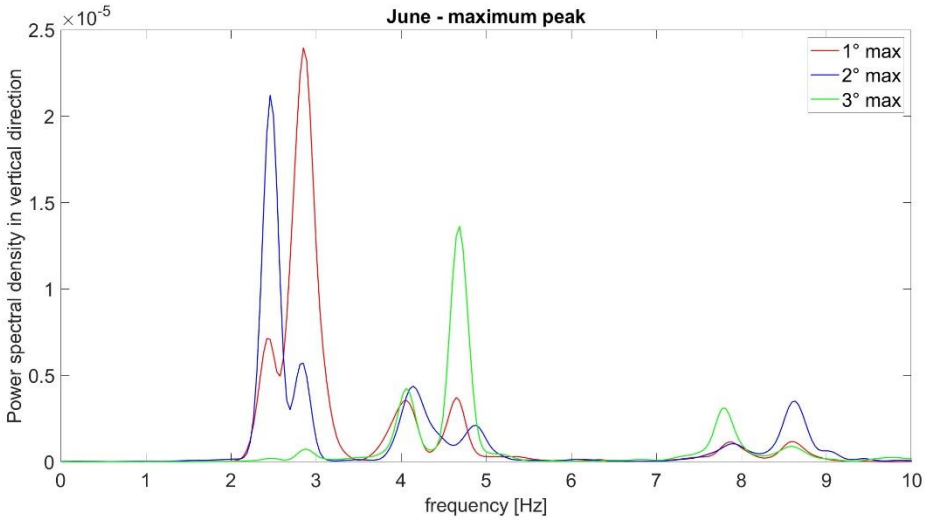


Figure 10-64: Results obtained from the 3 accelerograms with highest peak if PSD

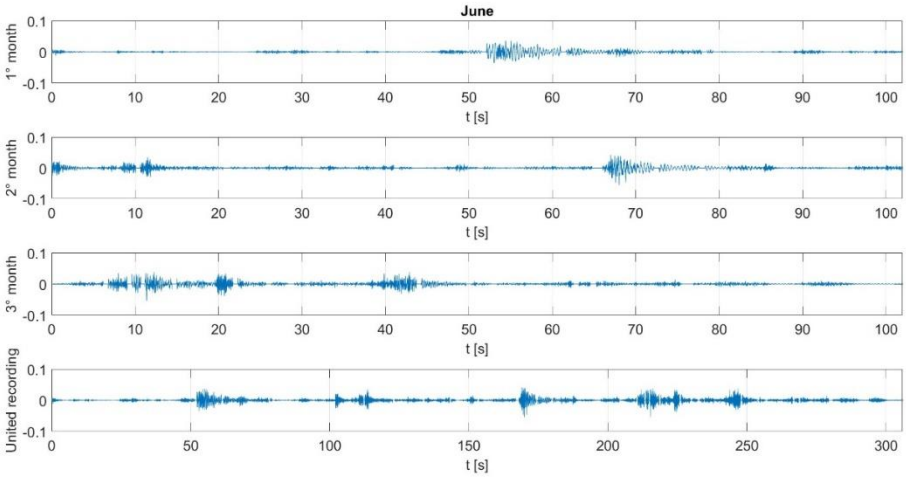


Figure 10-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.6.2 Longitudinal direction (y)

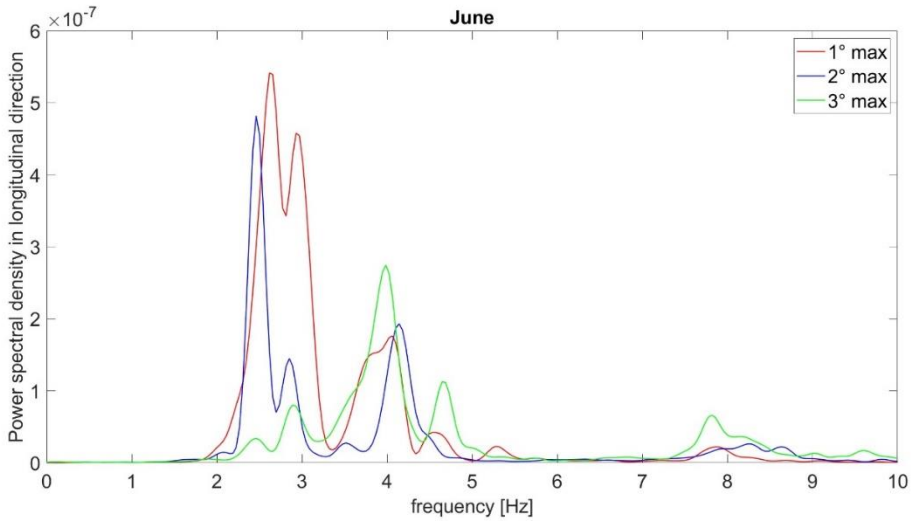


Figure 10-66: Results obtained from the 3 accelerograms with maximum SD in time domain

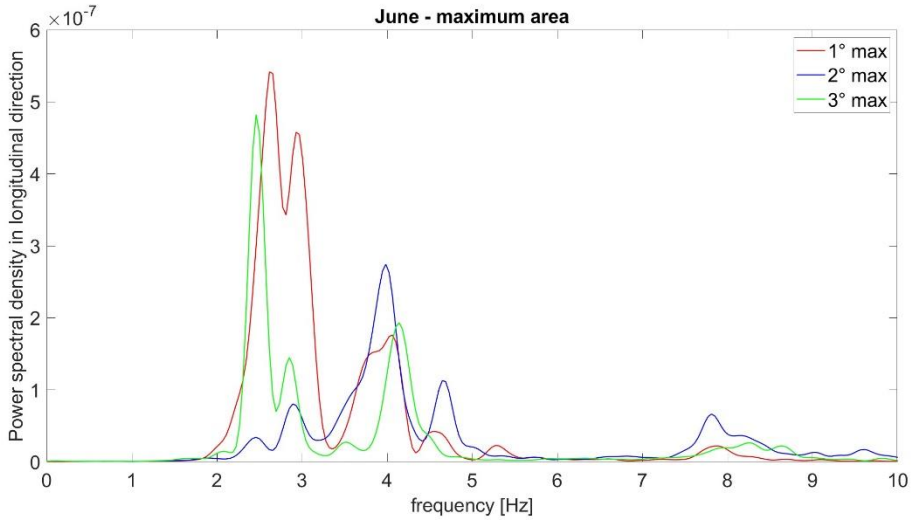


Figure 10-67: Results obtained from the 3 accelerograms with maximum area of PSD

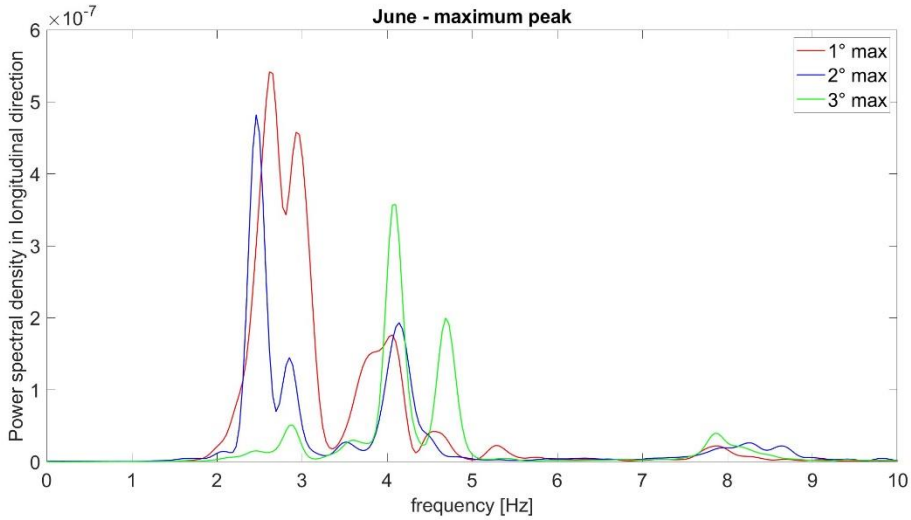


Figure 10-68: Results obtained from the 3 accelerograms with highest peak if PSD

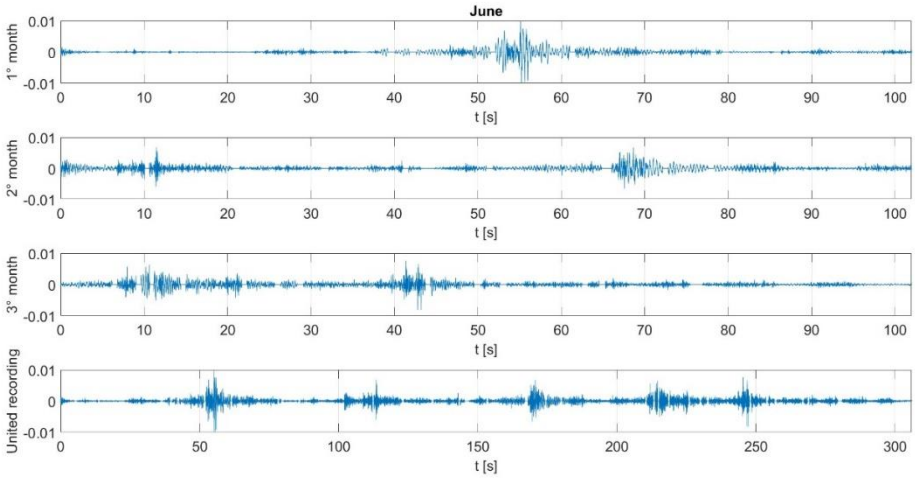


Figure 10-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

10.6.3 Transverse direction (z)

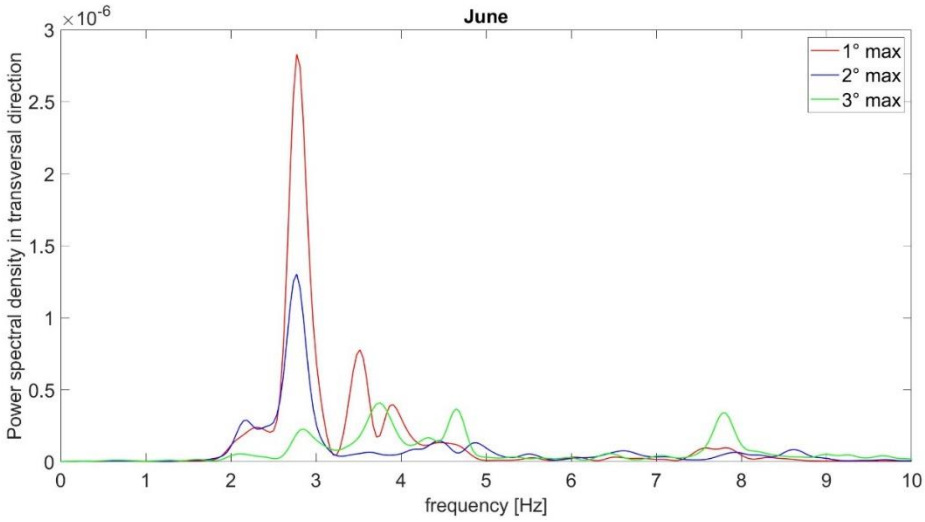


Figure 10-70: Results obtained from the 3 accelerograms with maximum SD in time domain

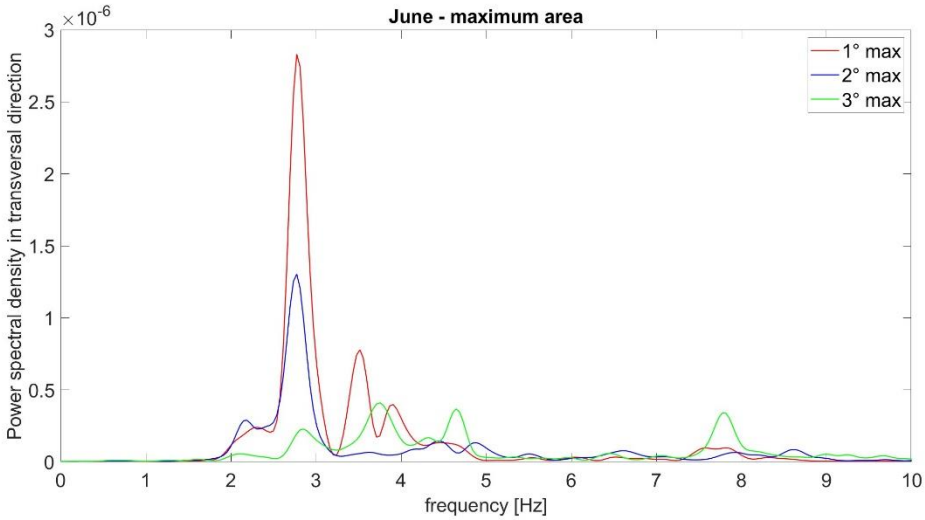


Figure 10-71: Results obtained from the 3 accelerograms with maximum area of PSD

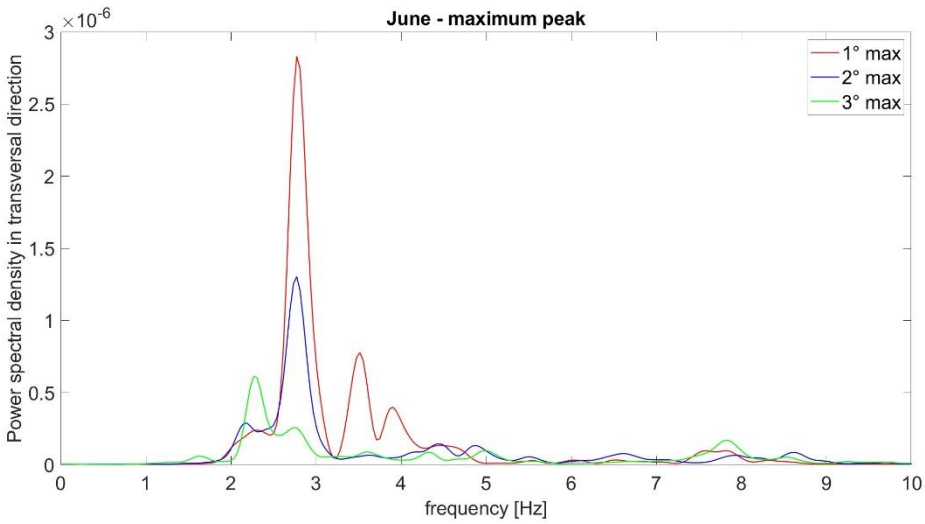


Figure 10-72: Results obtained from the 3 accelerograms with highest peak if PSD

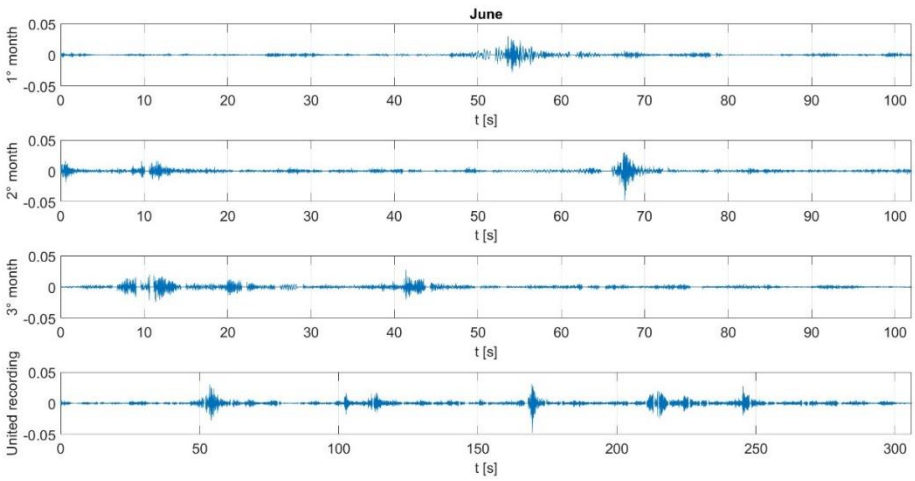


Figure 10-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

10.7 July

The results obtained for the July dataset are shown in the following tables.

Table 10-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-07-06_14-00-22	4.63E-03
	2°	2BA63_2023-07-07_14-00-21	3.75E-03
	3°	2BA63_2023-07-17_14-00-21	3.54E-03
Longitudinal direction (y)	1°	2BA63_2023-07-07_14-00-21	7.96E-04
	2°	2BA63_2023-07-06_14-00-22	7.46E-04
	3°	2BA63_2023-07-17_14-00-21	6.19E-04
Transverse direction (z)	1°	2BA63_2023-07-06_14-00-22	1.23E-03
	2°	2BA63_2023-07-07_14-00-21	1.13E-03
	3°	2BA63_2023-07-17_14-00-21	9.17E-04

Table 10-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-07-06_14-00-22	3.47E-05	2BA63_2023-07-06_14-00-22	3.55E-06
2	2BA63_2023-07-07_14-00-21	2.93E-05	2BA63_2023-07-07_14-00-21	2.79E-06
3	2BA63_2023-07-17_14-00-21	1.09E-05	2BA63_2023-07-17_14-00-21	2.46E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-07-07_14-00-21	1.35E-06	2BA63_2023-07-07_14-00-21	1.32E-07
2	2BA63_2023-07-06_14-00-22	9.24E-07	2BA63_2023-07-06_14-00-22	9.25E-08
3	2BA63_2023-07-17_14-00-21	5.50E-07	2BA63_2023-07-17_14-00-21	7.74E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-07-06_14-00-22	1.71E-06	2BA63_2023-07-07_14-00-21	2.48E-07
2	2BA63_2023-07-07_14-00-21	1.58E-06	2BA63_2023-07-06_14-00-22	2.42E-07
3	2BA63_2023-07-17_14-00-21	8.36E-07	2BA63_2023-07-17_14-00-21	1.66E-07

Table 10-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	B	B	A	A	B
2	B	B	B	A	A	A	B	B	A
3	C	C	C	C	C	C	C	C	C

10.7.1 Vertical direction (x)

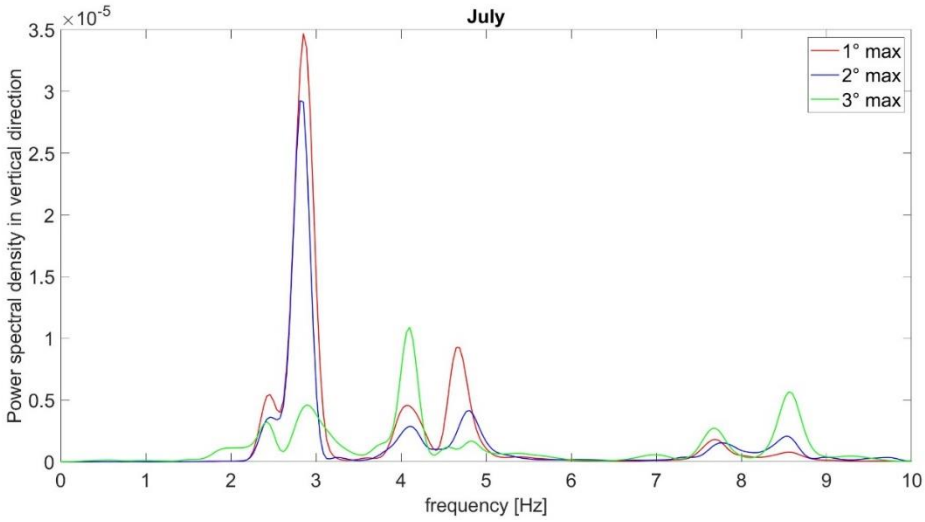


Figure 10-74: Results obtained from the 3 accelerograms with maximum SD in time domain

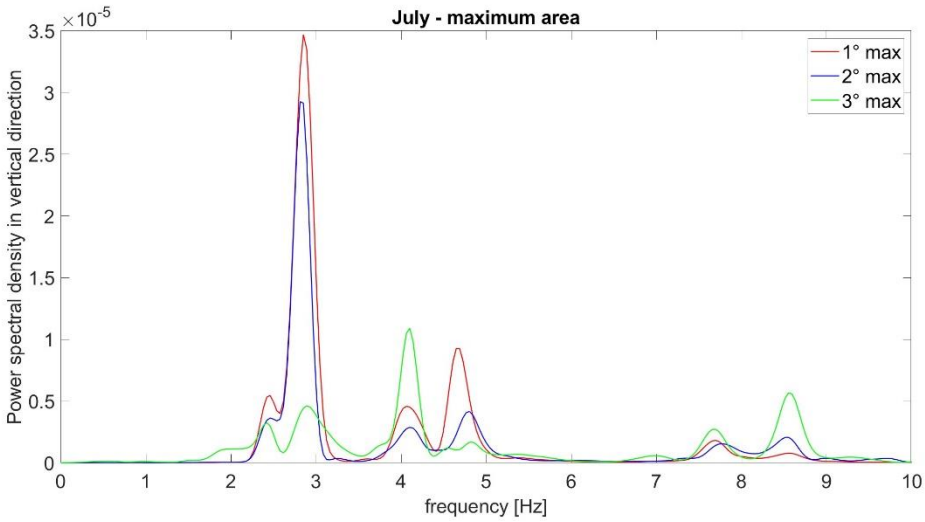


Figure 10-75: Results obtained from the 3 accelerograms with maximum area of PSD

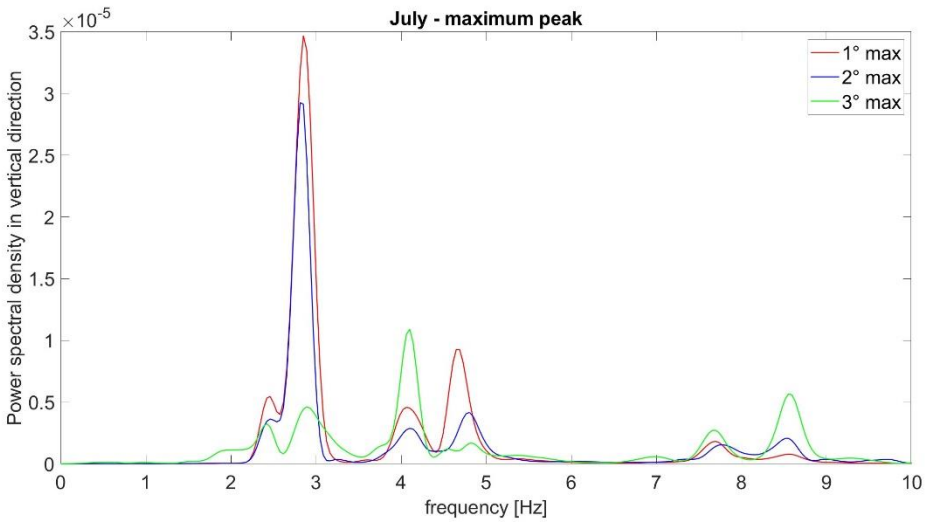


Figure 10-76: Results obtained from the 3 accelerograms with highest peak if PSD

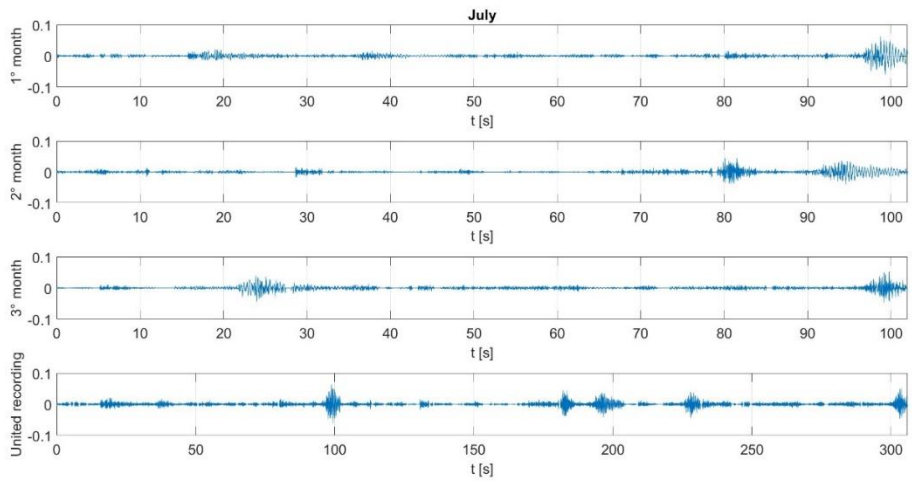


Figure 10-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.7.2 Longitudinal direction (y)

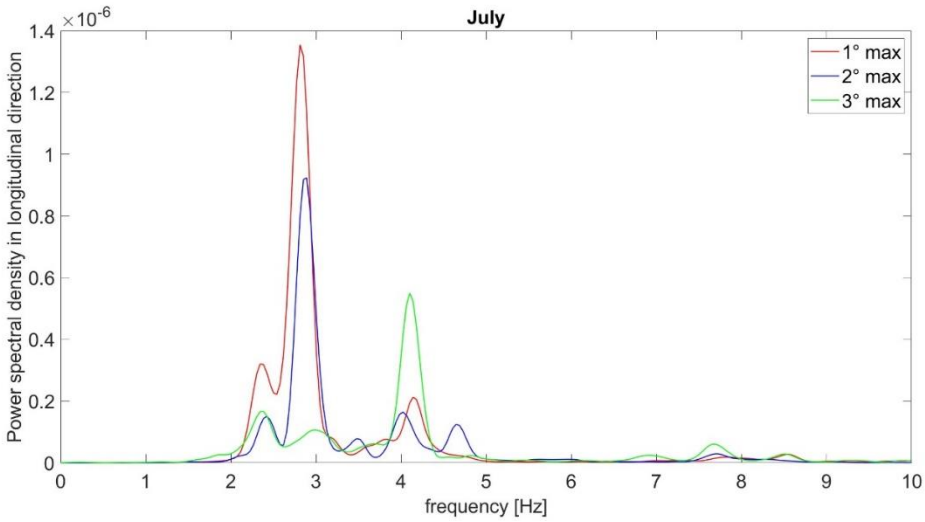


Figure 10-78: Results obtained from the 3 accelerograms with maximum SD in time domain

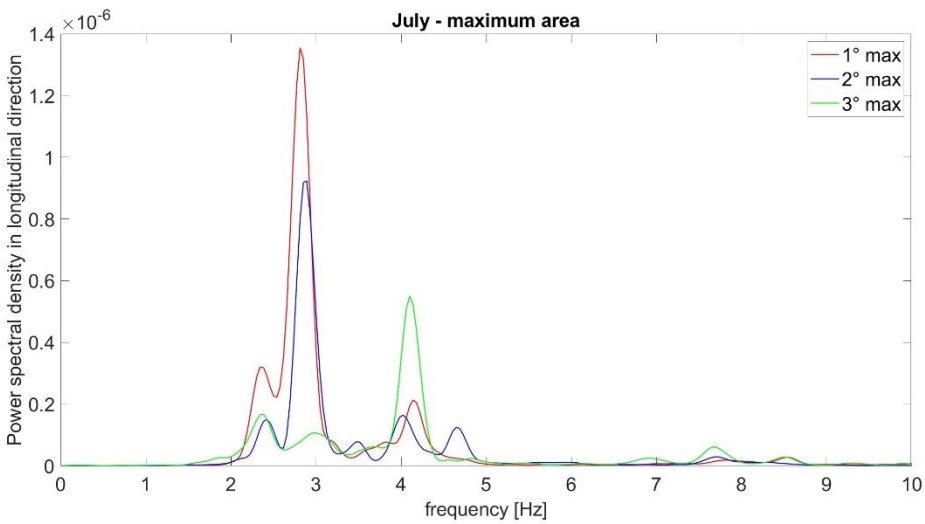


Figure 10-79: Results obtained from the 3 accelerograms with maximum area of PSD

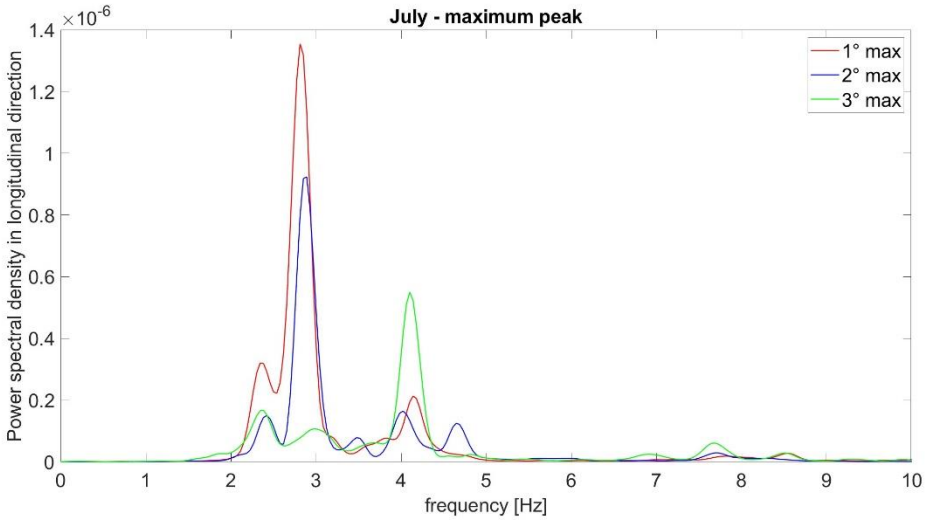


Figure 10-80: Results obtained from the 3 accelerograms with highest peak if PSD

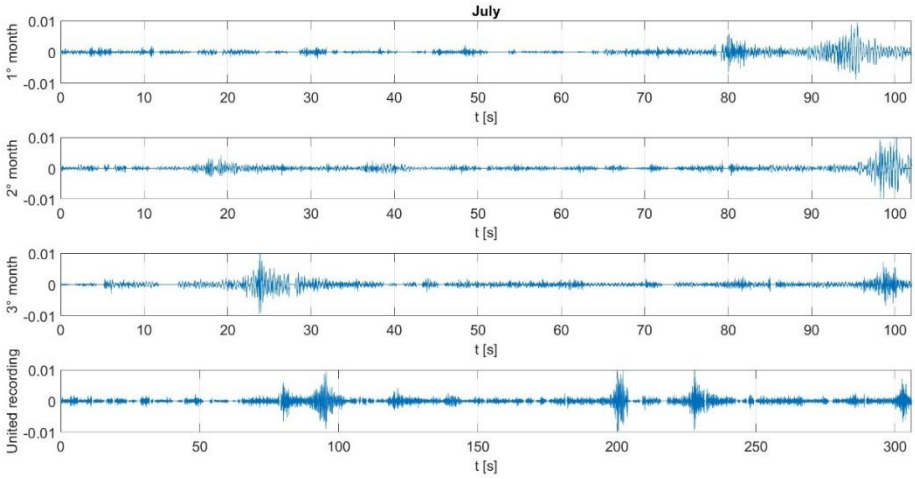


Figure 10-81: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.7.3 Transverse direction (z)

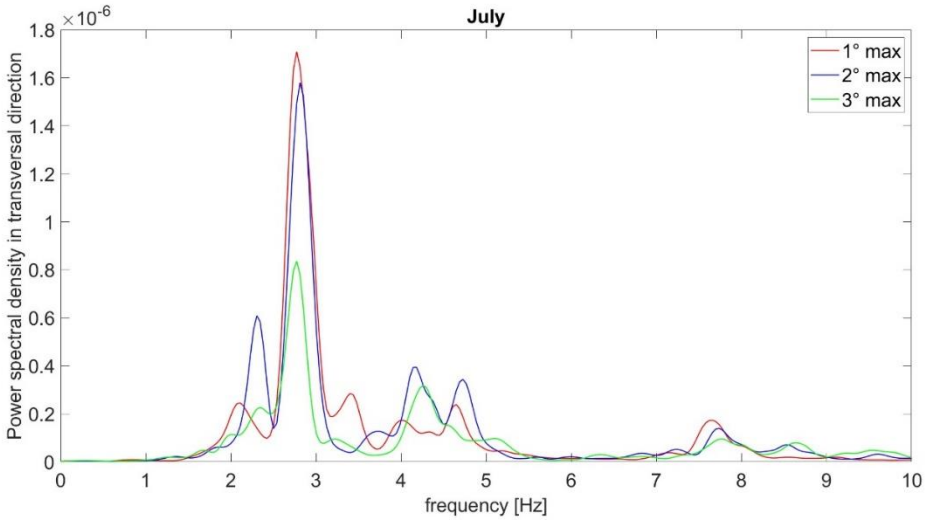


Figure 10-82: Results obtained from the 3 accelerograms with maximum SD in time domain

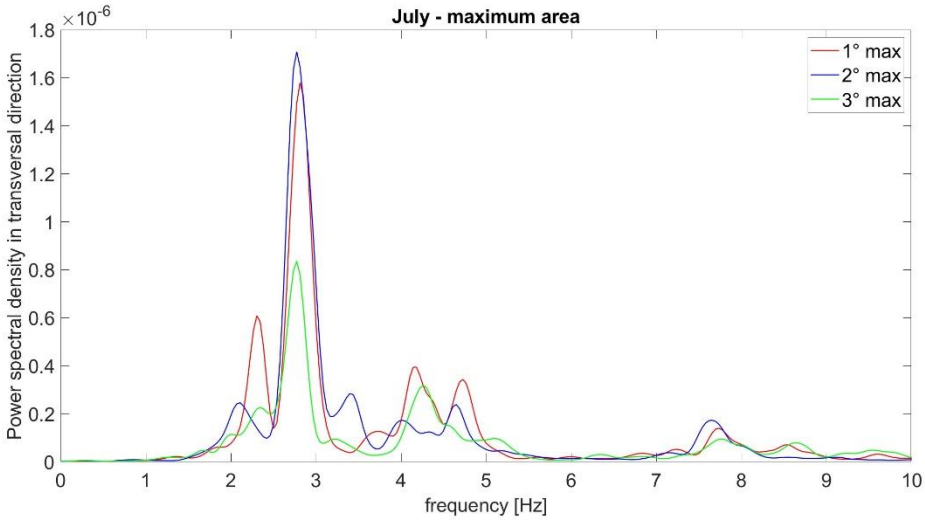


Figure 10-83: Results obtained from the 3 accelerograms with maximum area of PSD

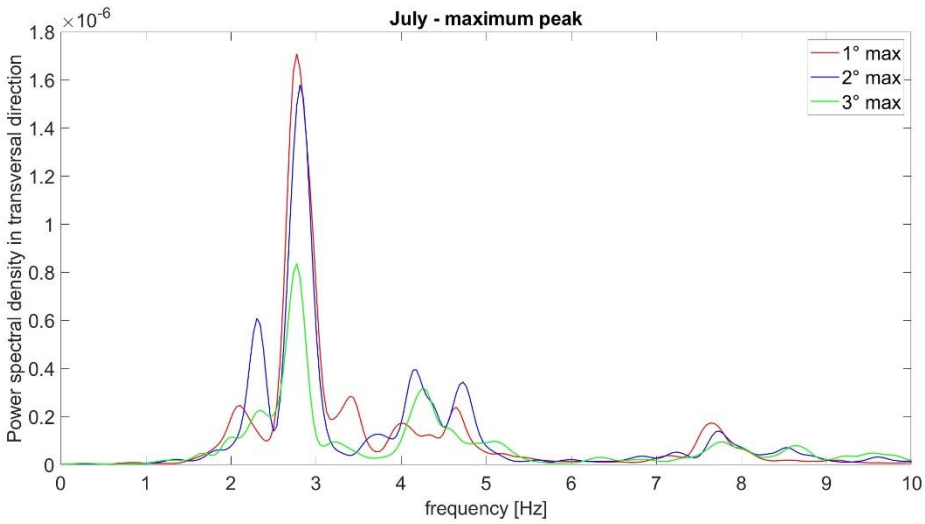


Figure 10-84: Results obtained from the 3 accelerograms with highest peak if PSD

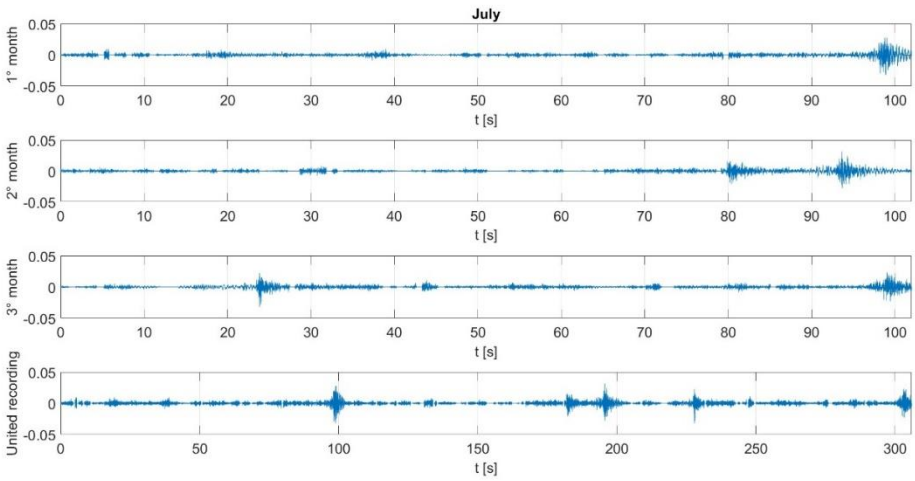


Figure 10-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

10.8 August

The results obtained for the August dataset are shown in the following tables.

Table 10-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-08-02_08-00-21	3.31E-03
	2°	2BA63_2023-08-07_20-00-21	3.02E-03
	3°	2BA63_2023-08-07_14-00-21	2.81E-03
Longitudinal direction (y)	1°	2BA63_2023-08-07_14-00-21	5.63E-04
	2°	2BA63_2023-08-02_08-00-21	4.85E-04
	3°	2BA63_2023-08-07_08-00-21	4.11E-04
Transverse direction (z)	1°	2BA63_2023-08-02_08-00-21	9.13E-04
	2°	2BA63_2023-08-07_14-00-21	8.88E-04
	3°	2BA63_2023-08-07_20-00-21	8.61E-04

Table 10-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-08-07_14-00-21	1.12E-05	2BA63_2023-08-02_08-00-21	2.27E-06
2	2BA63_2023-08-07_08-00-21	8.95E-06	2BA63_2023-08-07_20-00-21	1.78E-06
3	2BA63_2023-08-02_08-00-21	8.45E-06	2BA63_2023-08-07_14-00-21	1.57E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-08-07_14-00-21	5.70E-07	2BA63_2023-08-07_14-00-21	6.43E-08
2	2BA63_2023-08-07_08-00-21	3.31E-07	2BA63_2023-08-02_08-00-21	4.89E-08
3	2BA63_2023-08-02_20-00-21	1.93E-07	2BA63_2023-08-07_08-00-21	3.32E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-08-07_14-00-21	1.07E-06	2BA63_2023-08-02_08-00-21	1.72E-07
2	2BA63_2023-08-07_20-00-21	6.63E-07	2BA63_2023-08-07_14-00-21	1.58E-07
3	2BA63_2023-08-02_08-00-21	5.44E-07	2BA63_2023-08-07_20-00-21	1.42E-07

Table 10-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	C	C	C	A	C	A
2	B	-	B	A	D	A	C	B	C
3	C	A	C	D	A	D	B	A	B

10.8.1 Vertical direction (x)

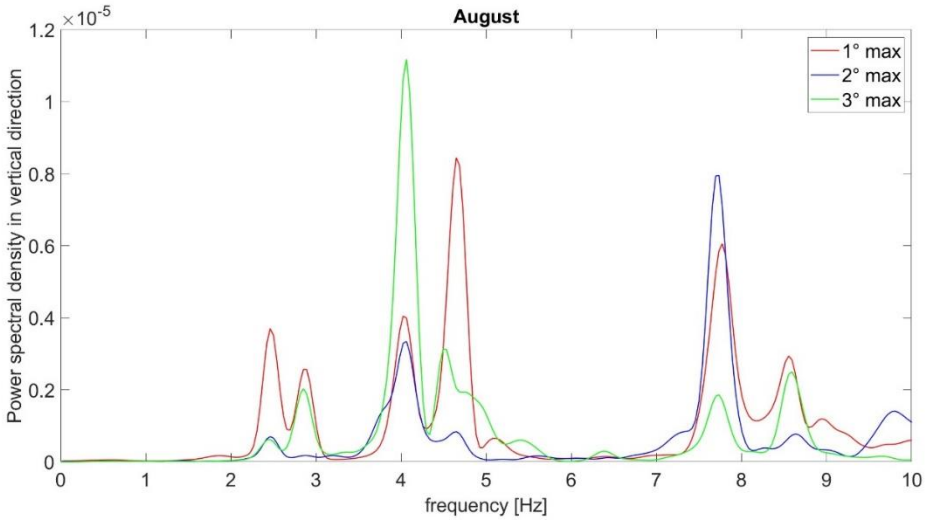


Figure 10-86: Results obtained from the 3 accelerograms with maximum SD in time domain

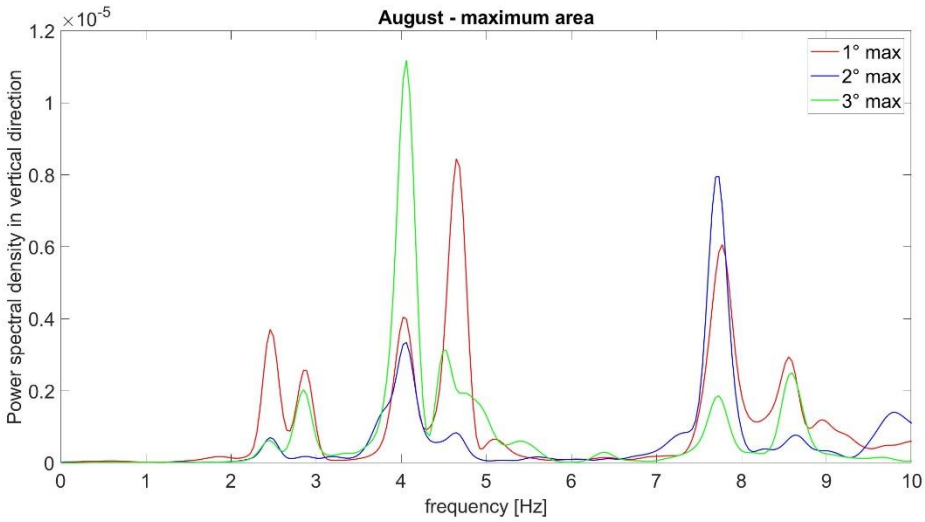


Figure 10-87: Results obtained from the 3 accelerograms with maximum area of PSD

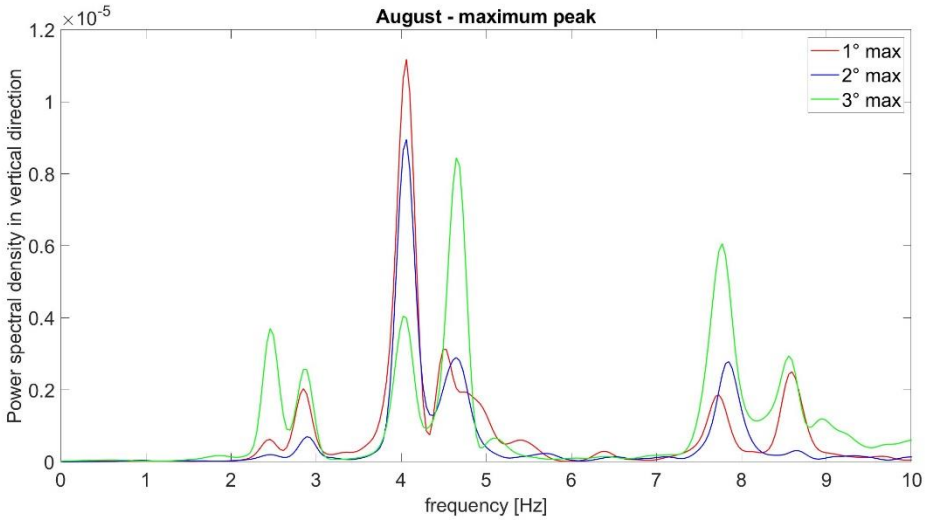


Figure 10-88: Results obtained from the 3 accelerograms with highest peak if PSD

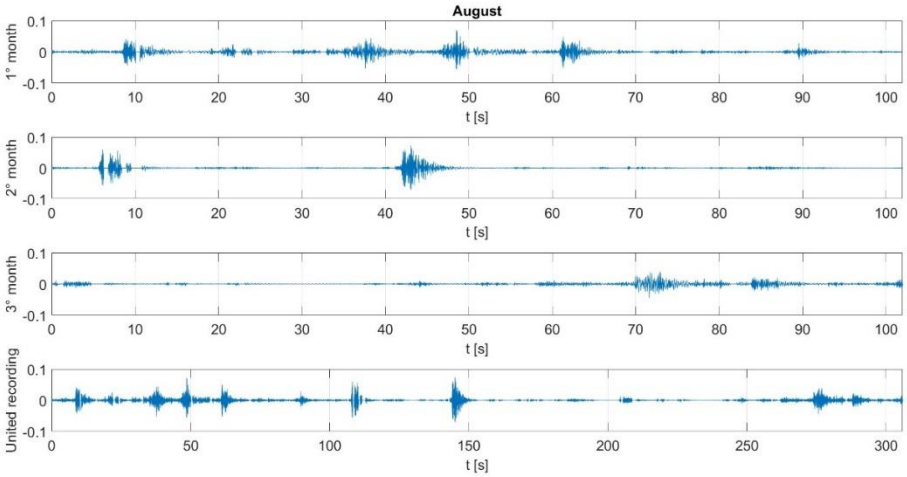


Figure 10-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.8.2 Longitudinal direction (y)

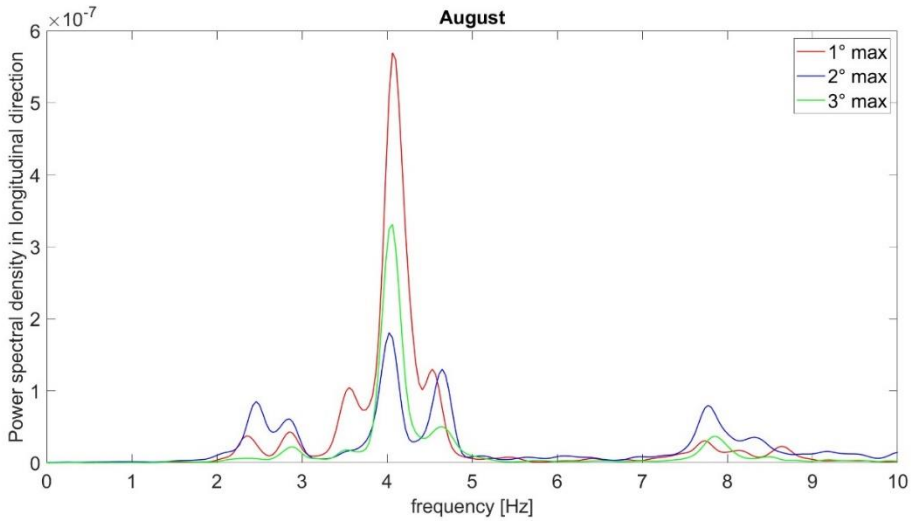


Figure 10-90: Results obtained from the 3 accelerograms with maximum SD in time domain

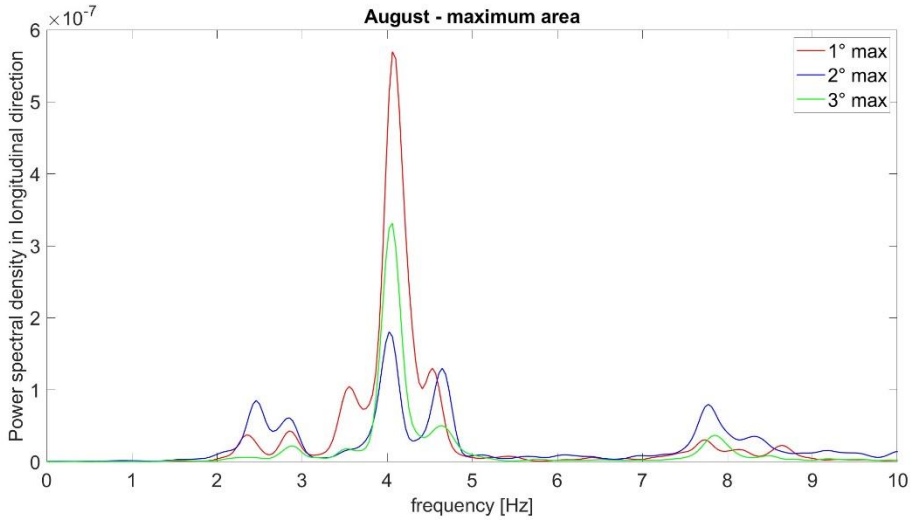


Figure 10-91: Results obtained from the 3 accelerograms with maximum area of PSD

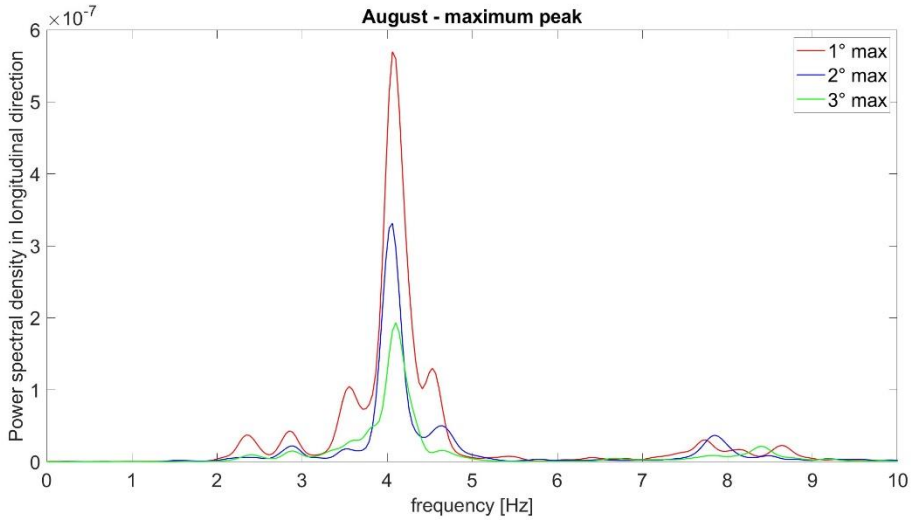


Figure 10-92: Results obtained from the 3 accelerograms with highest peak if PSD

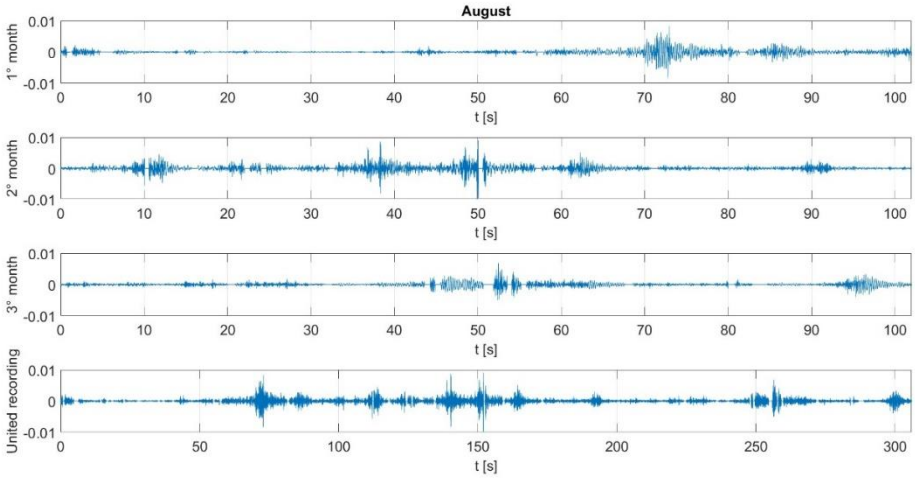


Figure 10-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

10.8.3 Transverse direction (z)

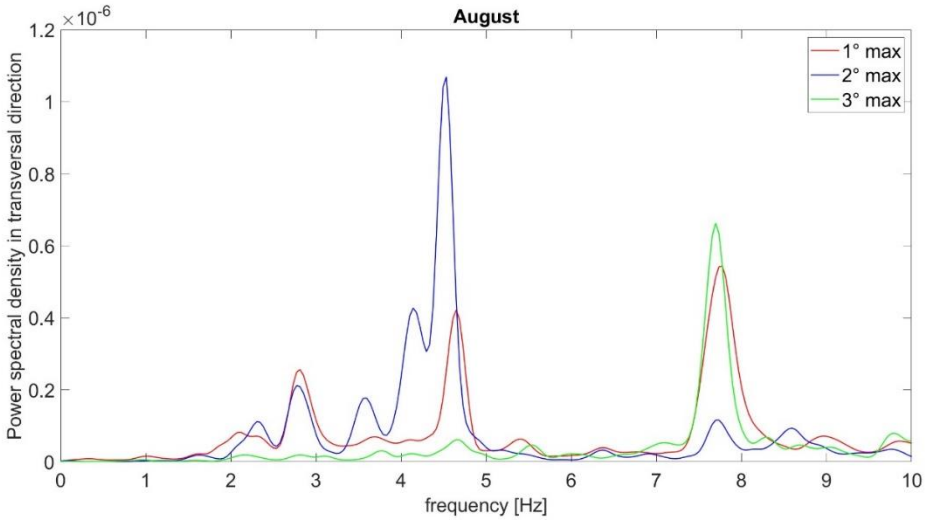


Figure 10-94: Results obtained from the 3 accelerograms with maximum SD in time domain

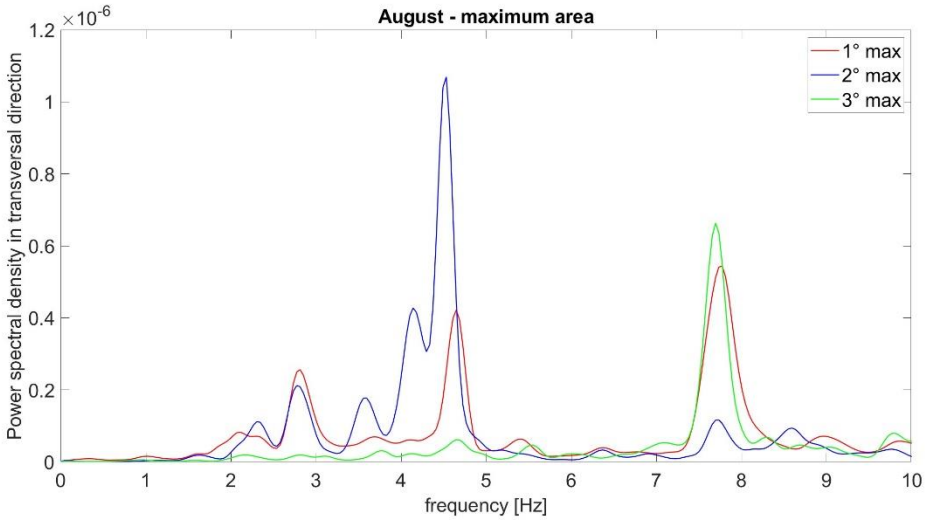


Figure 10-95: Results obtained from the 3 accelerograms with maximum area of PSD

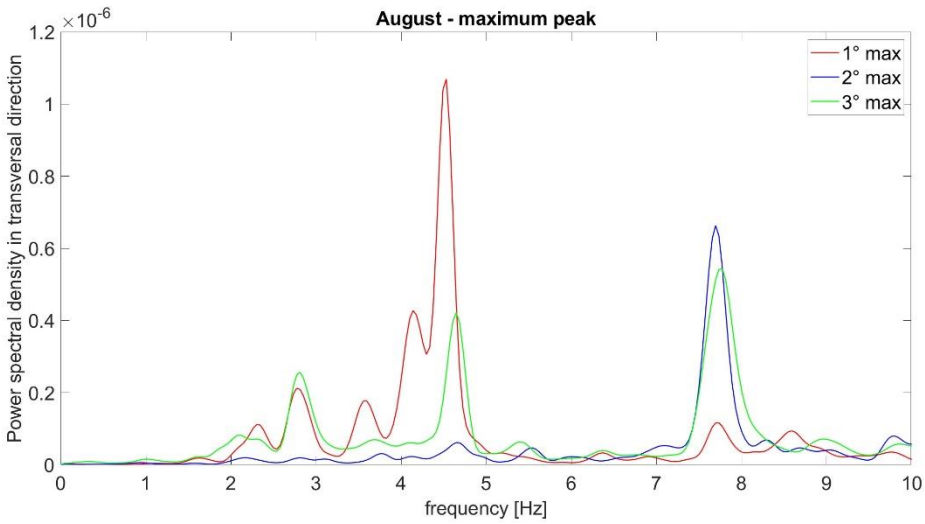


Figure 10-96: Results obtained from the 3 accelerograms with highest peak if PSD

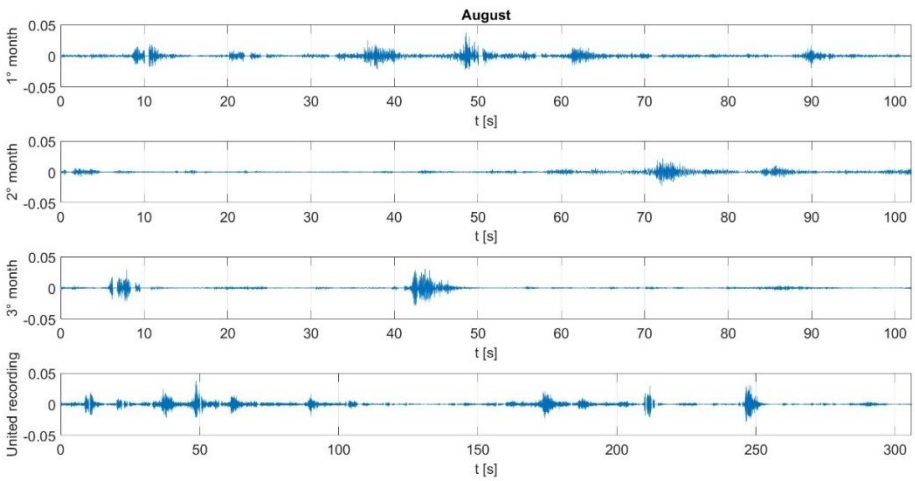


Figure 10-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

10.9 September

The results obtained for the September dataset are shown in the following tables.

Table 10-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-09-26_15-00-20	5.48E-03
	2°	2BA63_2023-09-27_03-00-20	4.79E-03
	3°	2BA63_2023-09-15_11-00-21	4.68E-03
Longitudinal direction (y)	1°	2BA63_2023-09-26_15-00-20	1.00E-03
	2°	2BA63_2023-09-15_11-00-21	7.80E-04
	3°	2BA63_2023-09-20_11-00-20	7.16E-04
Transverse direction (z)	1°	2BA63_2023-09-26_15-00-20	1.32E-03
	2°	2BA63_2023-09-26_09-00-21	1.27E-03
	3°	2BA63_2023-09-15_11-00-21	1.23E-03

Table 10-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-09-27_03-00-20	7.44E-05	2BA63_2023-09-26_15-00-20	5.91E-06
2	2BA63_2023-09-26_15-00-20	4.61E-05	2BA63_2023-09-27_03-00-20	4.94E-06
3	2BA63_2023-09-28_16-00-20	3.48E-05	2BA63_2023-09-15_11-00-21	4.59E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-09-26_15-00-20	1.36E-06	2BA63_2023-09-26_15-00-20	1.88E-07
2	2BA63_2023-09-27_03-00-20	1.07E-06	2BA63_2023-09-15_11-00-21	1.24E-07
3	2BA63_2023-09-15_11-00-21	1.05E-06	2BA63_2023-09-20_11-00-20	1.06E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-09-27_03-00-20	2.28E-06	2BA63_2023-09-26_15-00-20	3.64E-07
2	2BA63_2023-09-26_09-00-21	2.09E-06	2BA63_2023-09-26_09-00-21	3.29E-07
3	2BA63_2023-09-15_11-00-21	1.58E-06	2BA63_2023-09-15_11-00-21	3.11E-07

Table 10-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	A	-	A
2	B	A	B	C	-	C	E	E	E
3	C	-	C	D	C	D	C	C	C

10.9.1 Vertical direction (x)

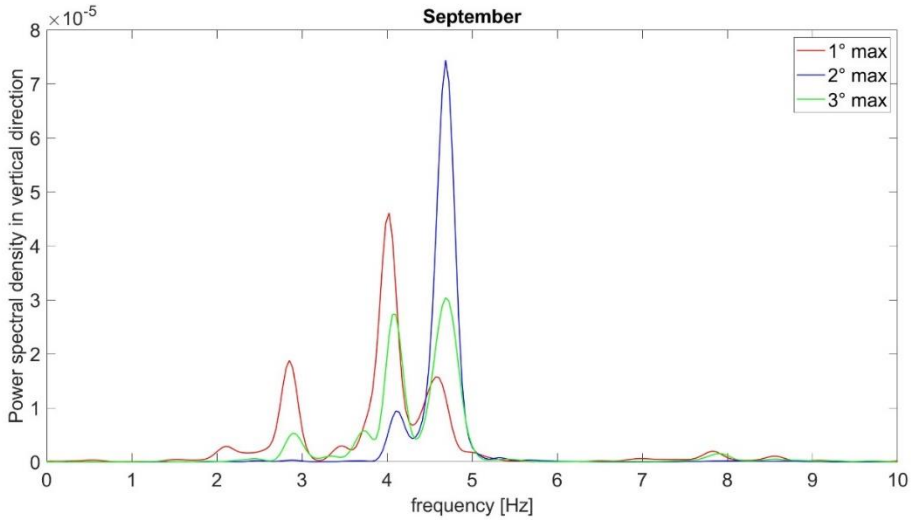


Figure 10-98: Results obtained from the 3 accelerograms with maximum SD in time domain

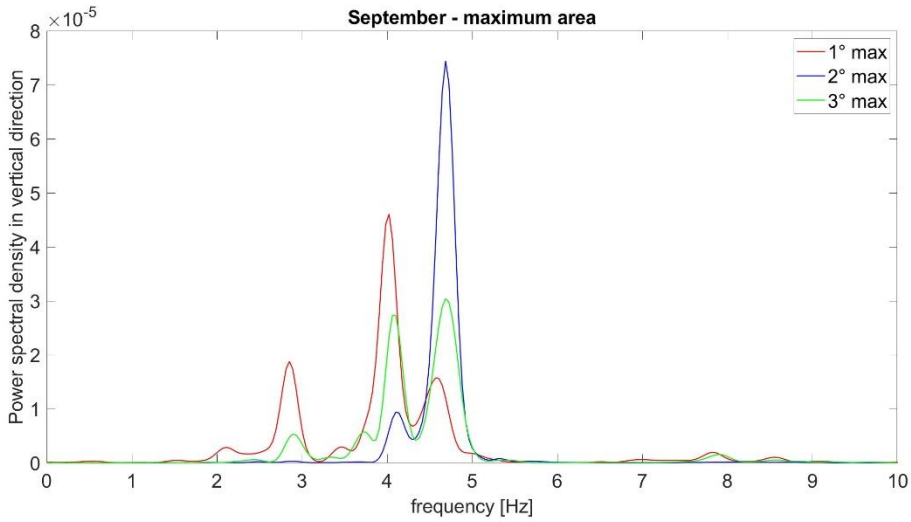


Figure 10-99: Results obtained from the 3 accelerograms with maximum area of PSD

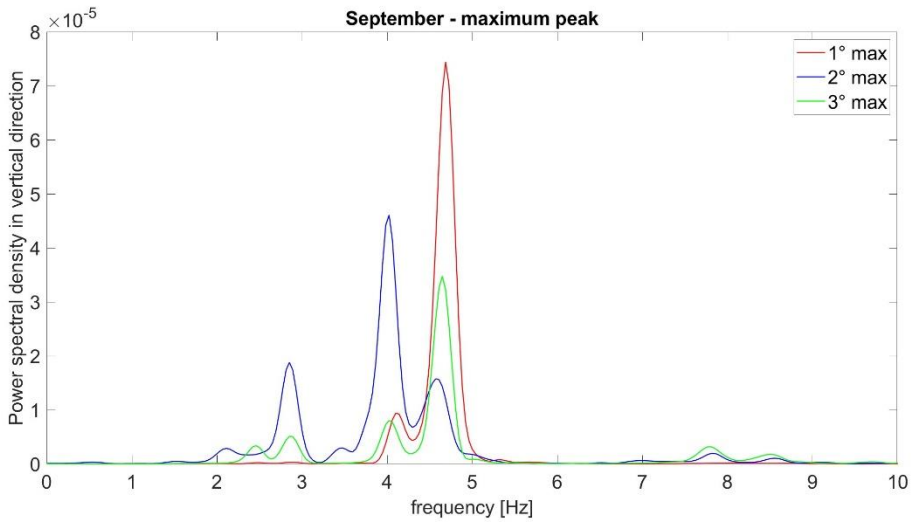


Figure 10-100: Results obtained from the 3 accelerograms with highest peak if PSD

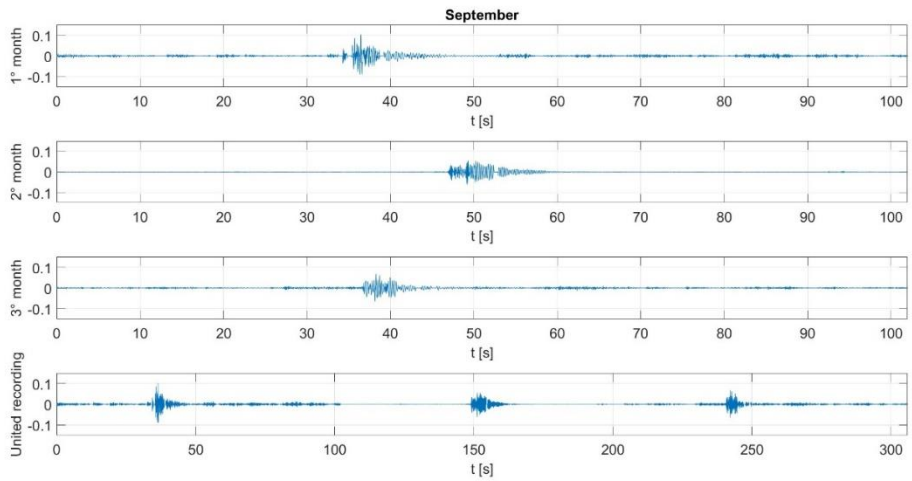


Figure 10-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.9.2 Longitudinal direction (y)

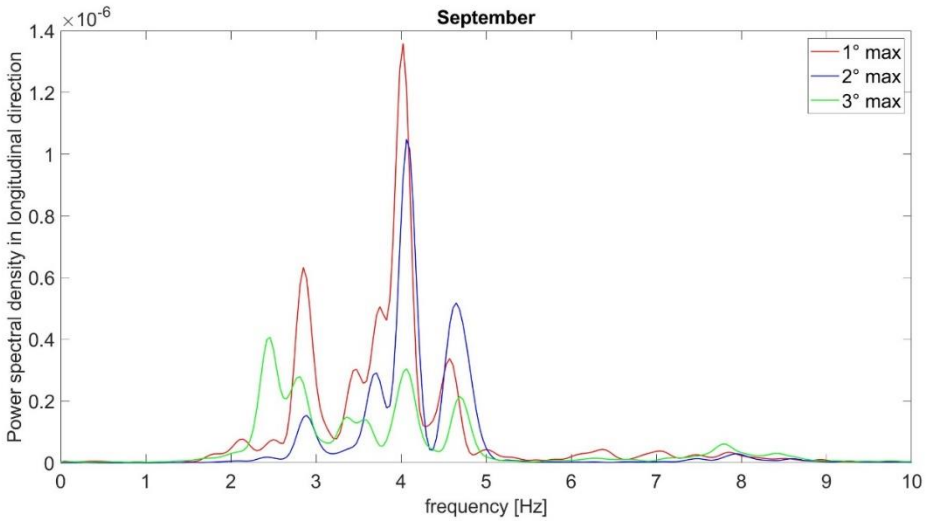


Figure 10-102: Results obtained from the 3 accelerograms with maximum SD in time domain

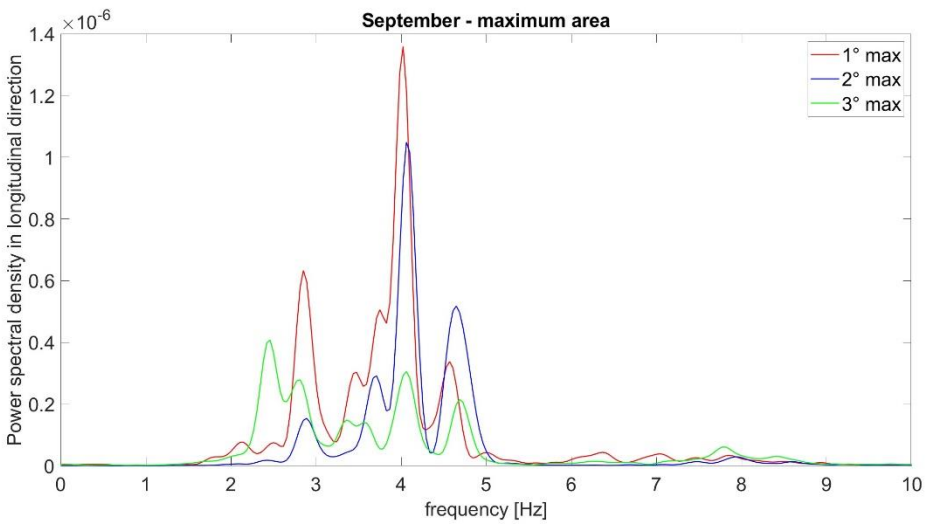


Figure 10-103: Results obtained from the 3 accelerograms with maximum area of PSD

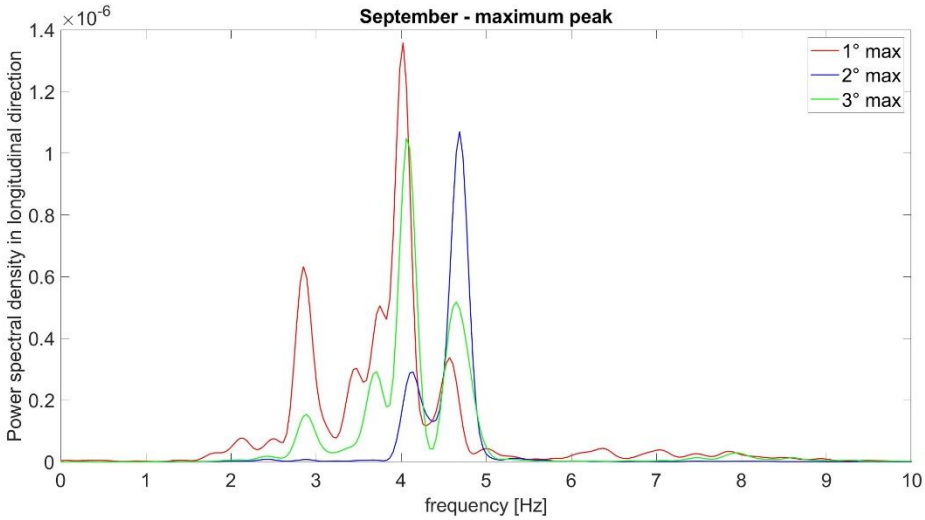


Figure 10-104: Results obtained from the 3 accelerograms with highest peak if PSD

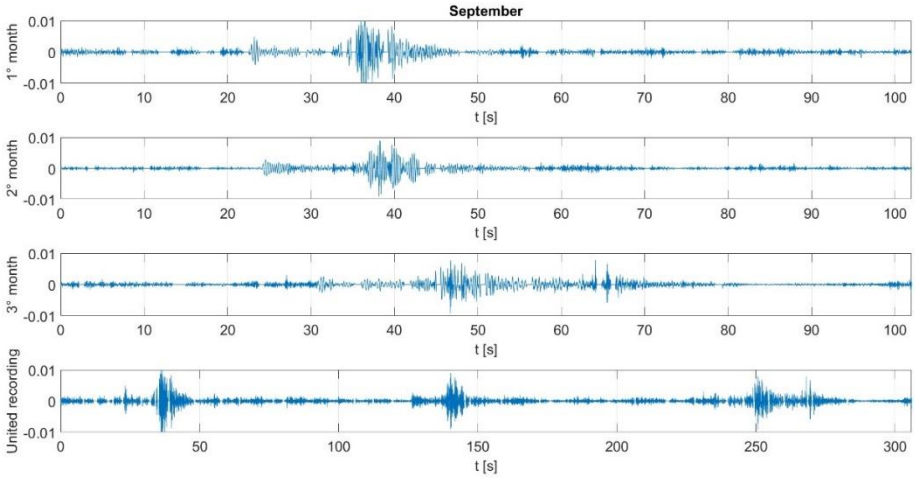


Figure 10-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

10.9.3 Transverse direction (z)

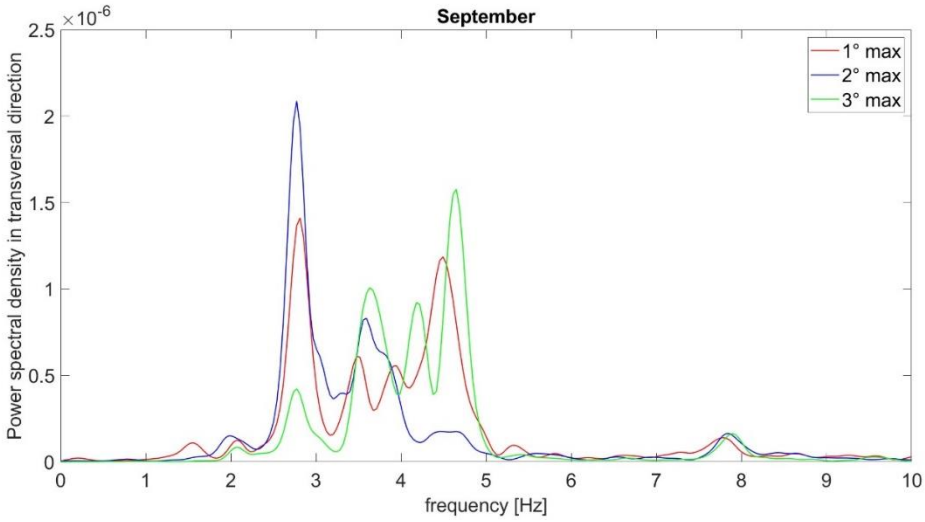


Figure 10-106: Results obtained from the 3 accelerograms with maximum SD in time domain

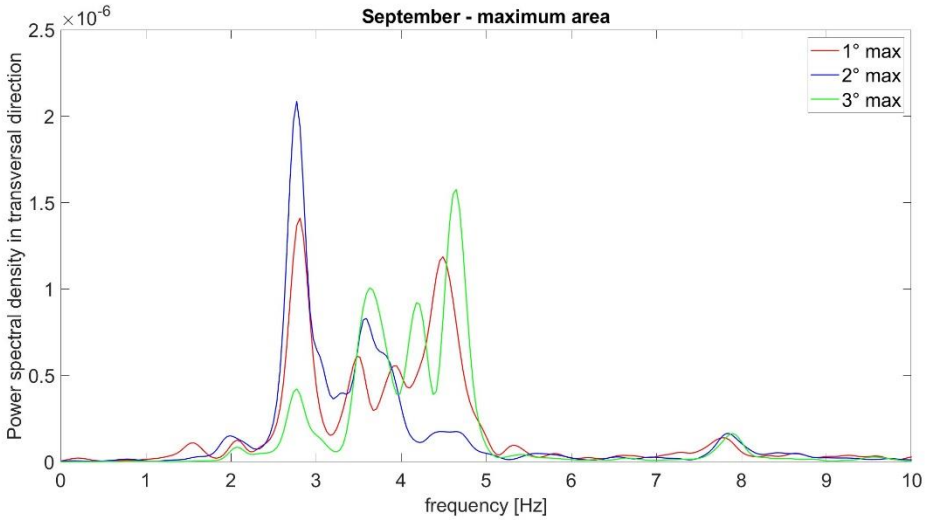


Figure 10-107: Results obtained from the 3 accelerograms with maximum area of PSD

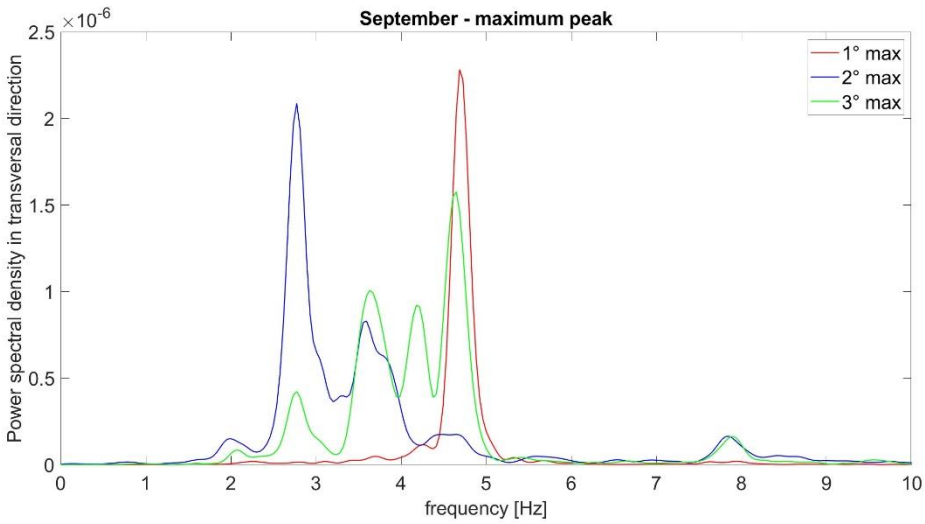


Figure 10-108: Results obtained from the 3 accelerograms with highest peak if PSD

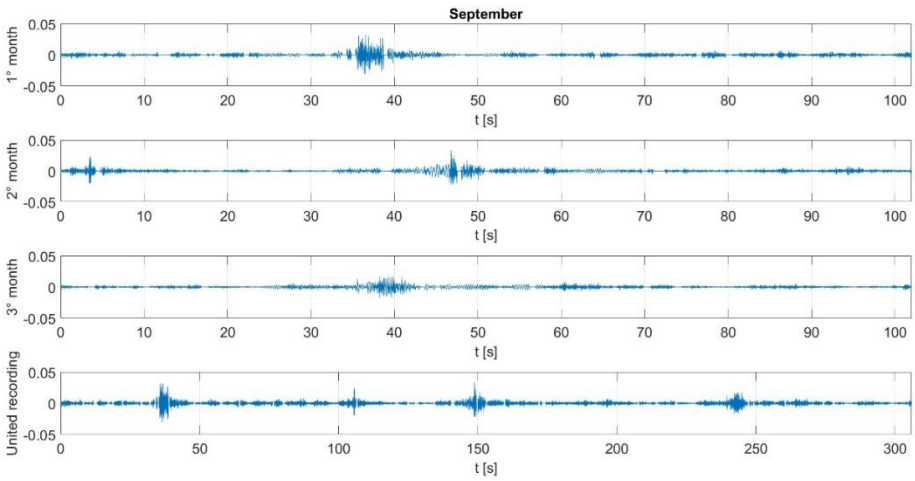


Figure 10-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

10.10 October

The results obtained for the October dataset are shown in the following tables.

Table 10-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-10-26_12-00-21	4.83E-03
	2°	2BA63_2023-10-02_08-00-20	4.35E-03
	3°	2BA63_2023-10-12_09-00-20	4.17E-03
Longitudinal direction (y)	1°	2BA63_2023-10-26_12-00-21	7.44E-04
	2°	2BA63_2023-10-25_10-00-20	7.28E-04
	3°	2BA63_2023-10-12_09-00-20	6.96E-04
Transverse direction (z)	1°	2BA63_2023-10-25_10-00-20	1.07E-03
	2°	2BA63_2023-10-24_10-00-21	1.01E-03
	3°	2BA63_2023-10-09_13-00-20	1.00E-03

Table 10-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-10-26_12-00-21	5.12E-05	2BA63_2023-10-26_12-00-21	4.76E-06
2	2BA63_2023-10-02_08-00-20	3.63E-05	2BA63_2023-10-02_08-00-20	3.63E-06
3	2BA63_2023-10-12_09-00-20	3.49E-05	2BA63_2023-10-12_09-00-20	3.52E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-10-26_12-00-21	1.15E-06	2BA63_2023-10-26_12-00-21	1.13E-07
2	2BA63_2023-10-12_16-00-20	8.07E-07	2BA63_2023-10-25_10-00-20	1.03E-07
3	2BA63_2023-10-05_18-00-20	8.01E-07	2BA63_2023-10-12_09-00-20	1.00E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-10-24_10-00-21	1.38E-06	2BA63_2023-10-25_10-00-20	2.28E-07
2	2BA63_2023-10-12_09-00-20	1.24E-06	2BA63_2023-10-24_10-00-21	2.08E-07
3	2BA63_2023-10-16_06-00-21	8.91E-07	2BA63_2023-10-26_12-00-21	2.06E-07

Table 10-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	D	E	D
2	B	B	B	D	-	D	E	-	E
3	C	C	C	C	-	C		-	-

10.10.1 Vertical direction (x)

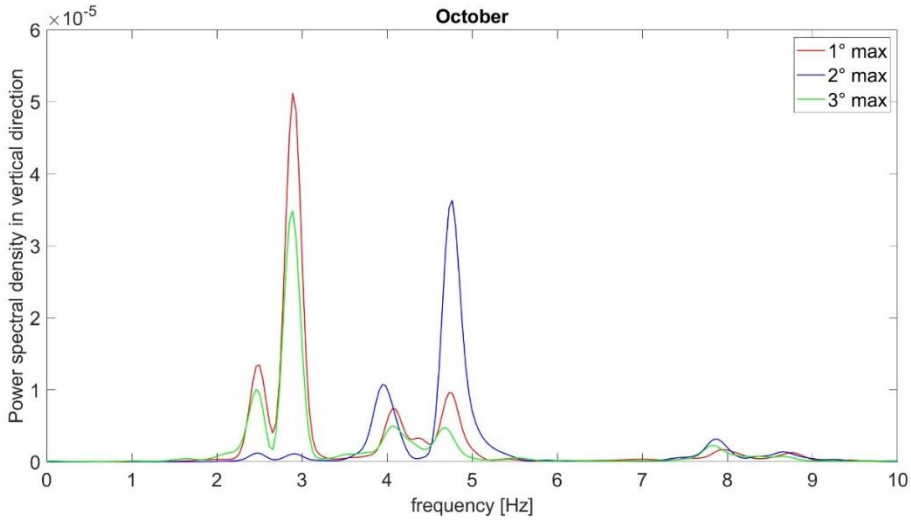


Figure 10-110: Results obtained from the 3 accelerograms with maximum SD in time domain

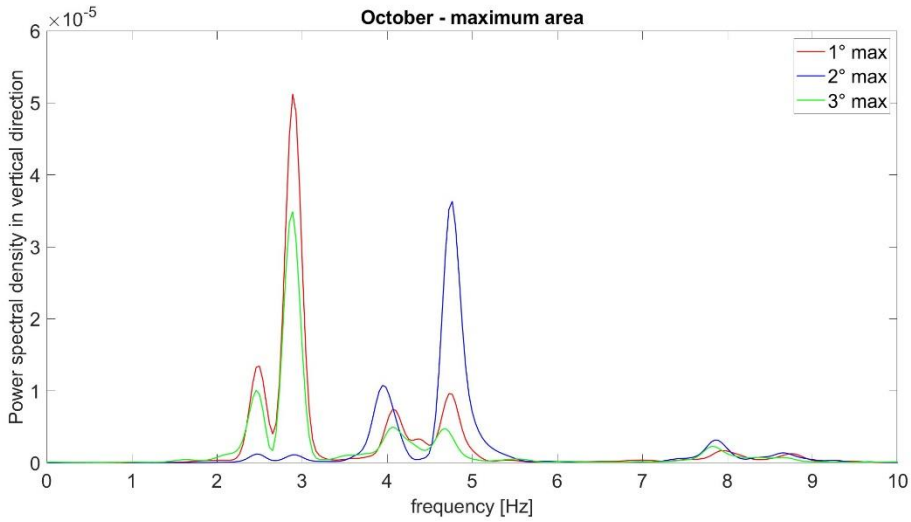


Figure 10-111: Results obtained from the 3 accelerograms with maximum area of PSD

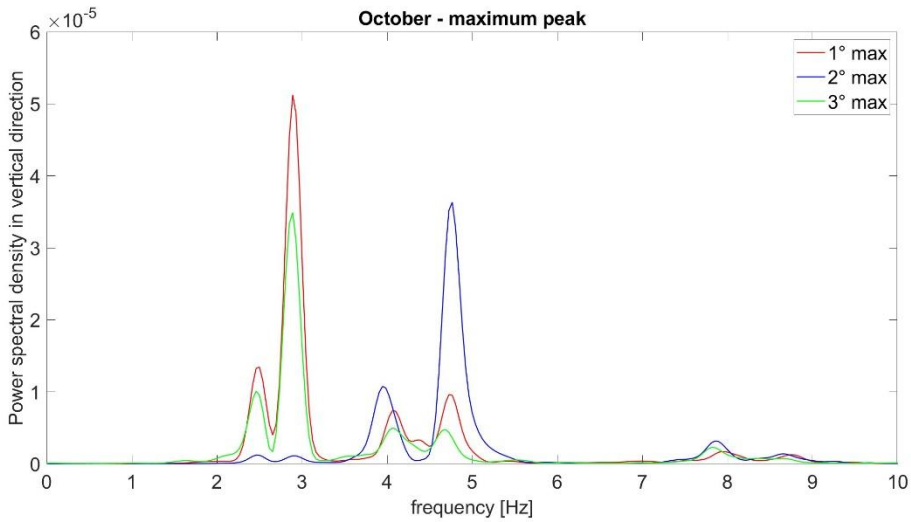


Figure 10-112: Results obtained from the 3 accelerograms with highest peak if PSD

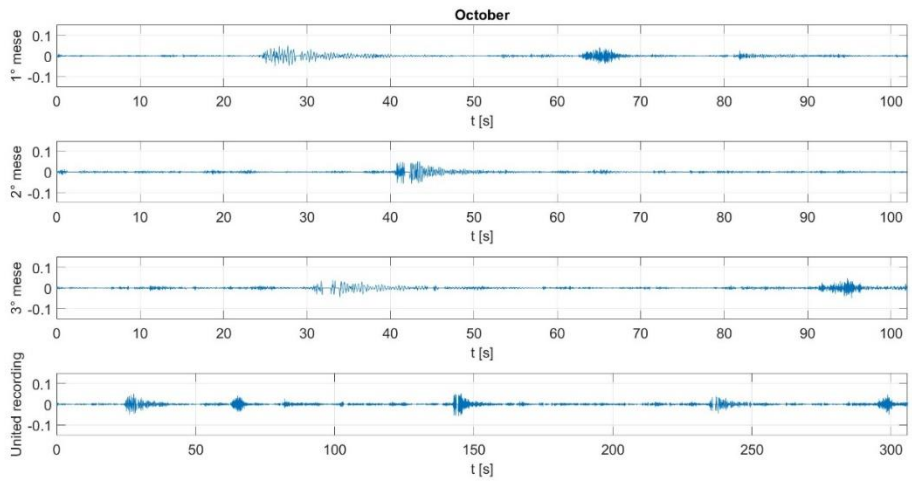


Figure 10-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.10.2 Longitudinal direction (y)

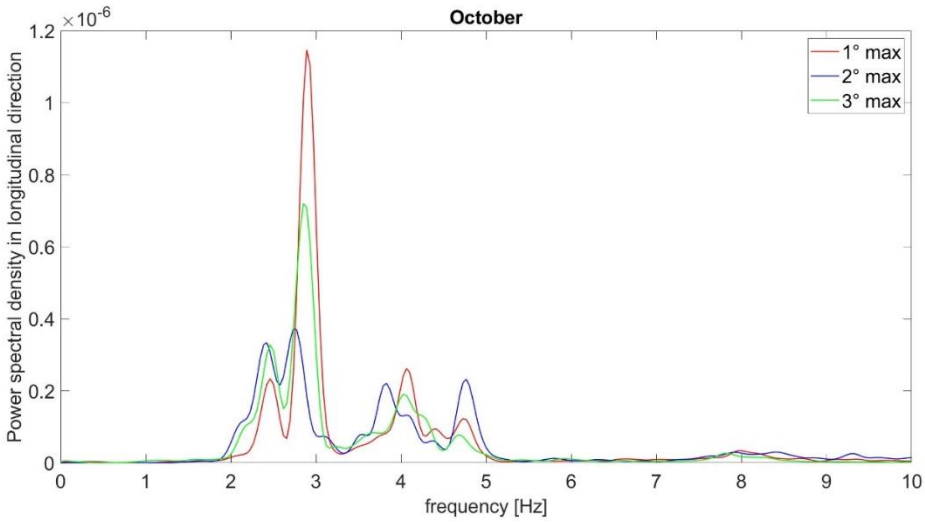


Figure 10-114: Results obtained from the 3 accelerograms with maximum SD in time domain

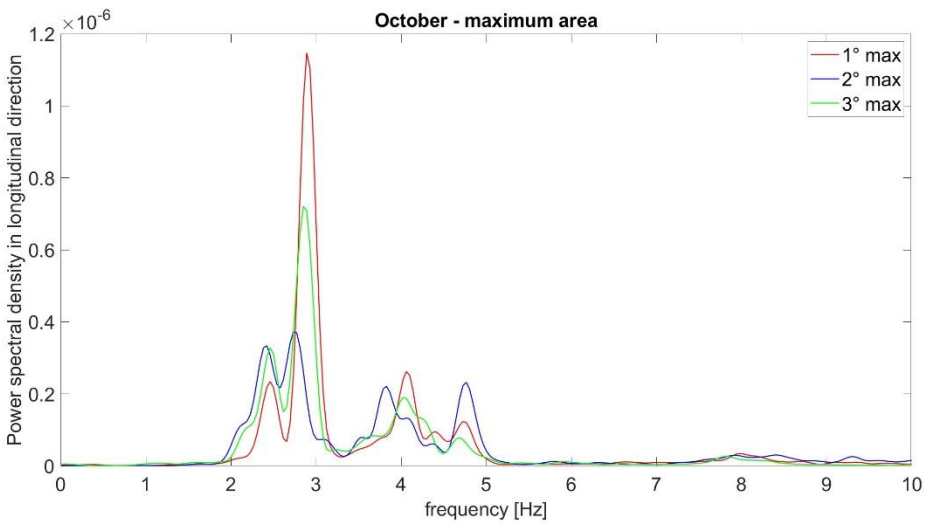


Figure 10-115: Results obtained from the 3 accelerograms with maximum area of PSD

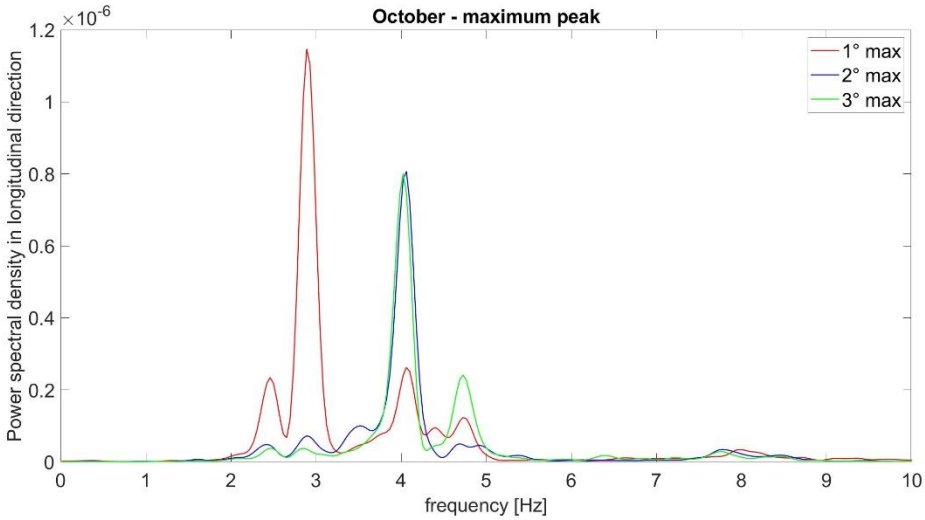


Figure 10-116: Results obtained from the 3 accelerograms with highest peak if PSD

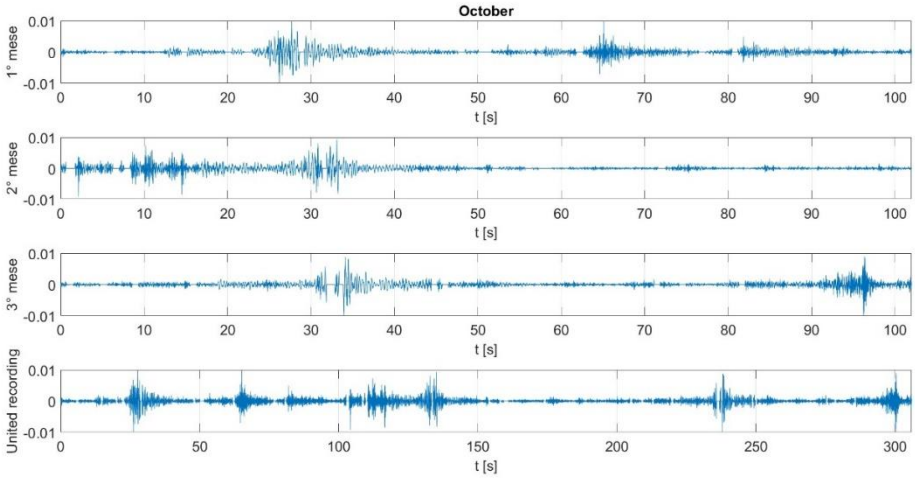


Figure 10-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

10.10.3 Transverse direction (z)

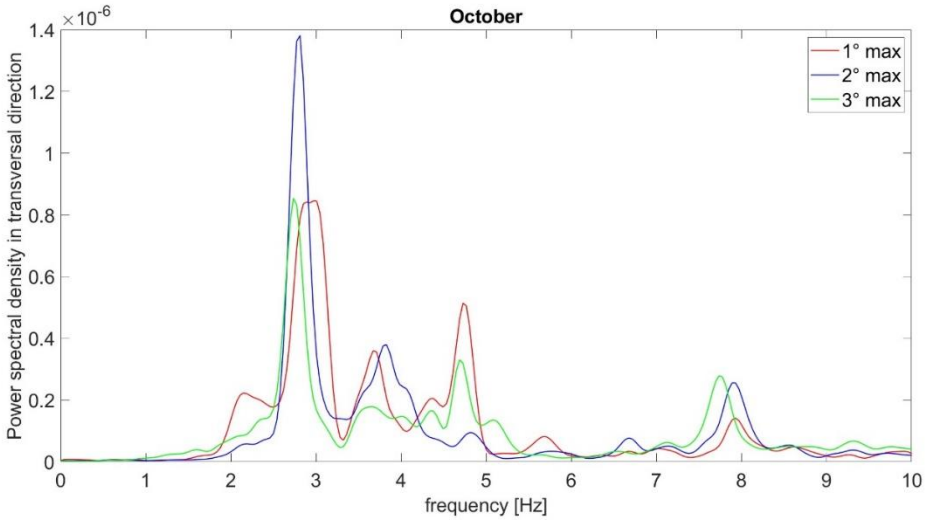


Figure 10-118: Results obtained from the 3 accelerograms with maximum SD in time domain

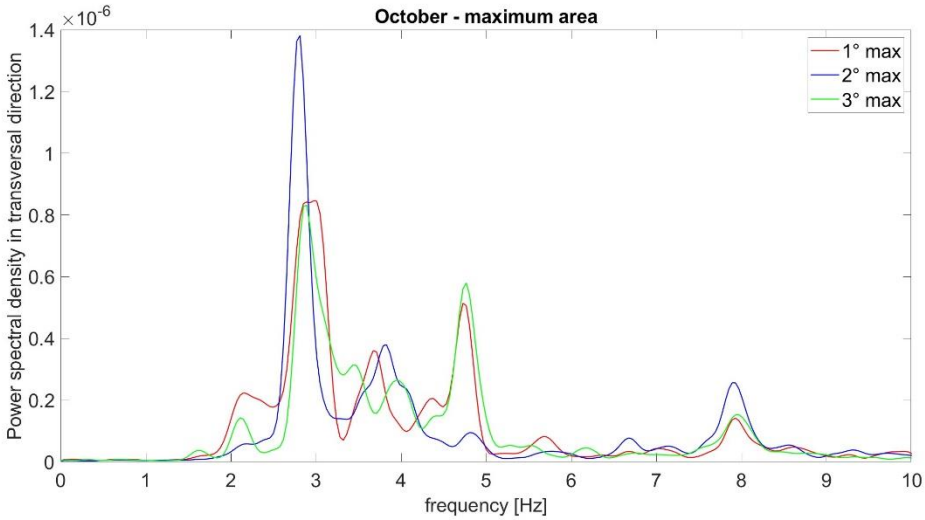


Figure 10-119: Results obtained from the 3 accelerograms with maximum area of PSD

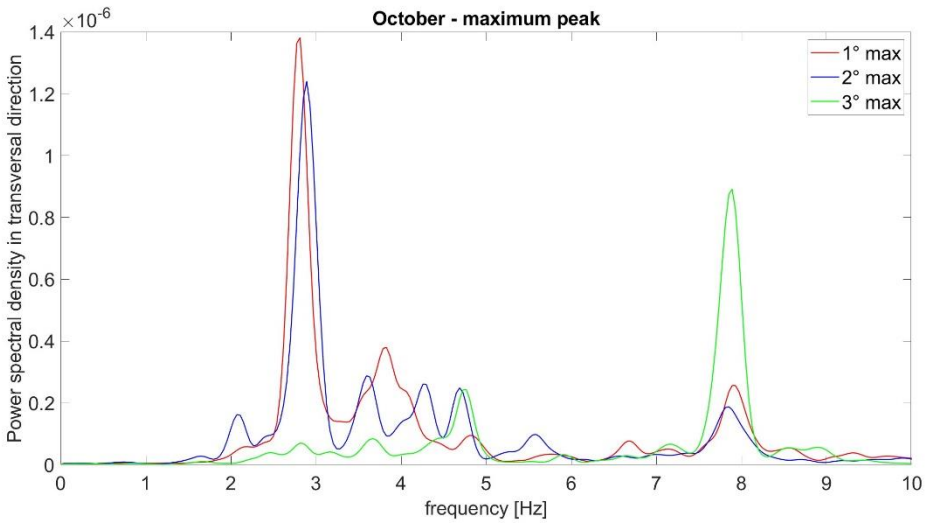


Figure 10-120: Results obtained from the 3 accelerograms with highest peak if PSD

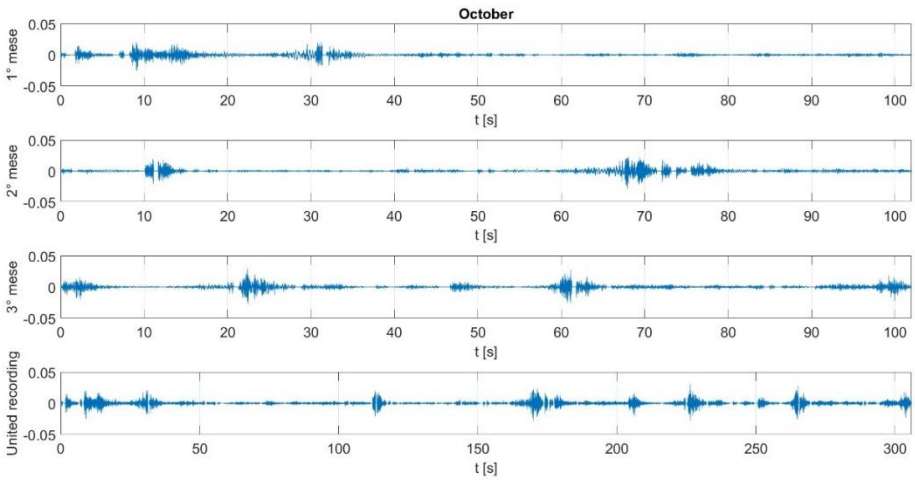


Figure 10-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

10.11 November

The results obtained for the November dataset are shown in the following tables.

Table 10-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-11-14_10-00-21	5.57E-03
	2°	2BA63_2023-11-28_11-00-20	4.98E-03
	3°	2BA63_2023-11-06_17-00-21	4.77E-03
Longitudinal direction (y)	1°	2BA63_2023-11-06_17-00-21	7.49E-04
	2°	2BA63_2023-11-14_10-00-21	7.48E-04
	3°	2BA63_2023-11-28_11-00-20	6.82E-04
Transverse direction (z)	1°	2BA63_2023-11-06_17-00-21	1.20E-03
	2°	2BA63_2023-11-10_08-00-20	1.18E-03
	3°	2BA63_2023-11-14_10-00-21	1.18E-03

Table 10-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-11-14_10-00-21	9.15E-05	2BA63_2023-11-14_10-00-21	6.62E-06
2	2BA63_2023-11-27_17-00-21	4.08E-05	2BA63_2023-11-06_17-00-21	5.00E-06
3	2BA63_2023-11-28_11-00-20	4.02E-05	2BA63_2023-11-28_11-00-20	4.71E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-11-14_10-00-21	1.30E-06	2BA63_2023-11-06_17-00-21	1.21E-07
2	2BA63_2023-11-28_11-00-20	7.15E-07	2BA63_2023-11-14_10-00-21	1.17E-07
3	2BA63_2023-11-07_17-00-21	6.74E-07	2BA63_2023-11-28_11-00-20	9.43E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-11-14_10-00-21	3.50E-06	2BA63_2023-11-06_17-00-21	2.93E-07
2	2BA63_2023-11-10_08-00-20	2.37E-06	2BA63_2023-11-14_10-00-21	2.90E-07
3	2BA63_2023-11-28_11-00-20	2.36E-06	2BA63_2023-11-10_08-00-20	2.86E-07

Table 10-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	A	C	C	A	C
2	B	-	C	A	B	A	D	D	A
3	C	B	B	B	-	B	A	-	D

10.11.1 Vertical direction (x)

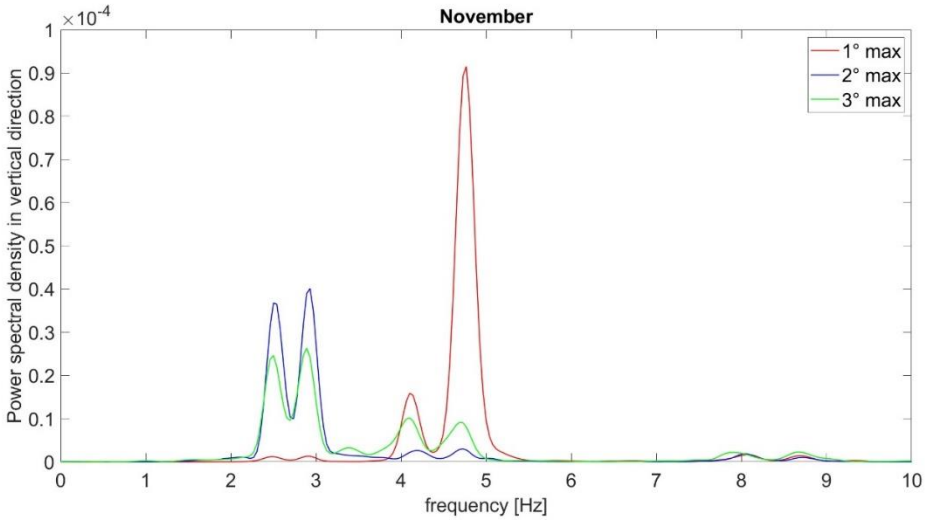


Figure 10-122: Results obtained from the 3 accelerograms with maximum SD in time domain

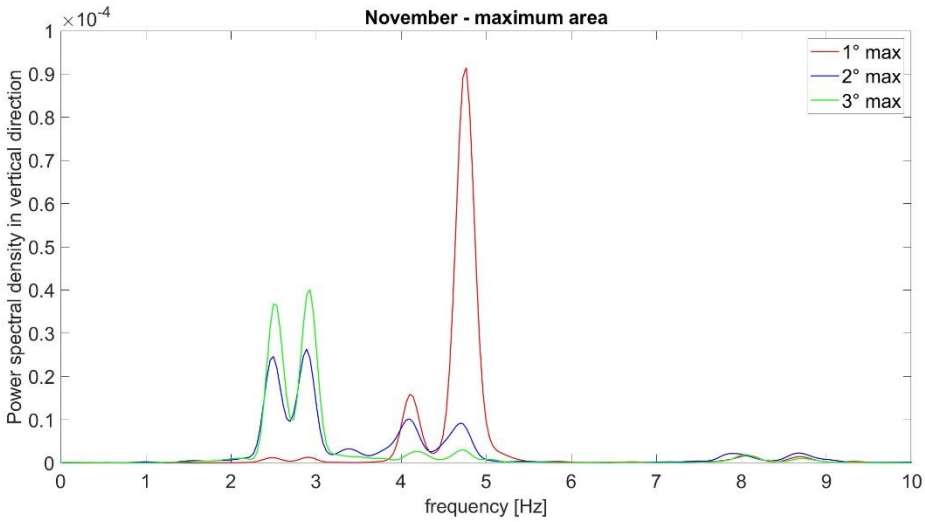


Figure 10-123: Results obtained from the 3 accelerograms with maximum area of PSD

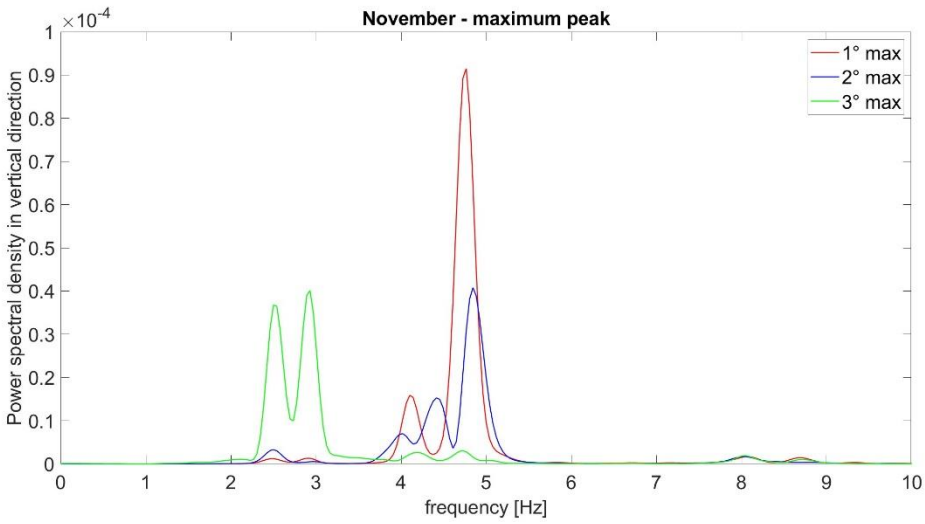


Figure 10-124: Results obtained from the 3 accelerograms with highest peak if PSD

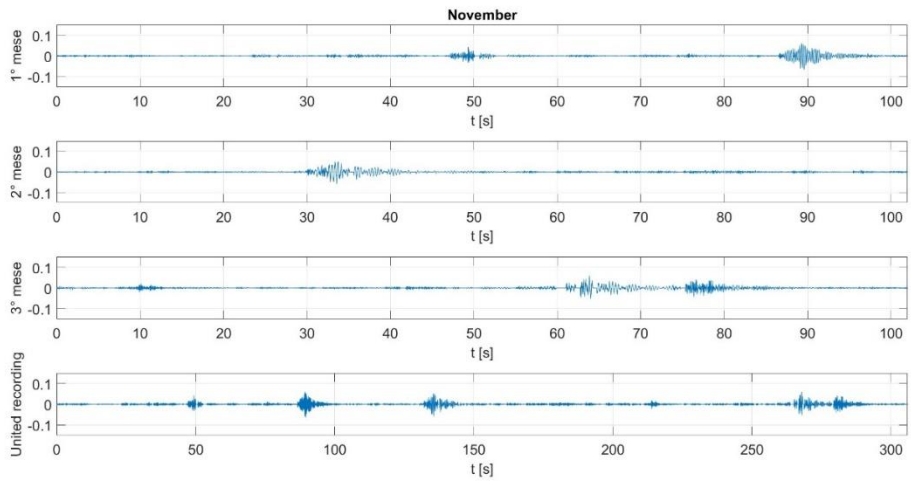


Figure 10-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.11.2 Longitudinal direction (y)

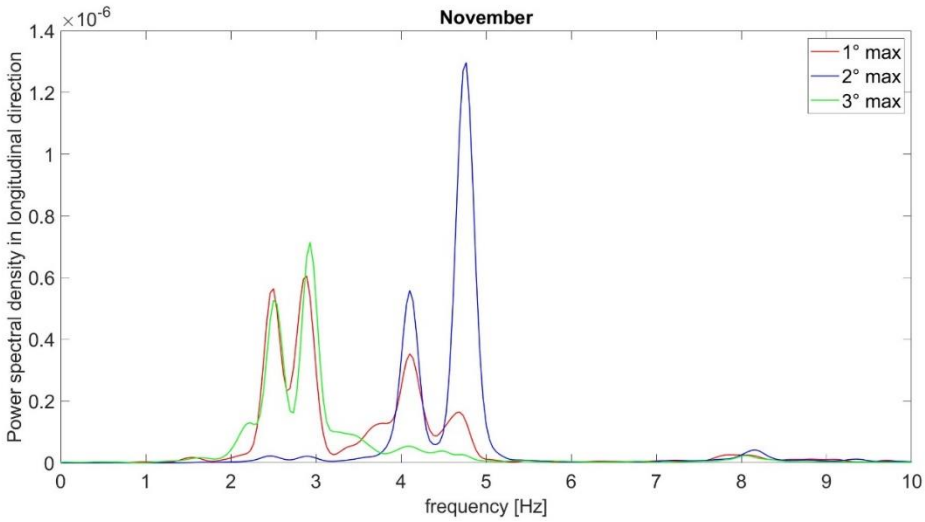


Figure 10-126: Results obtained from the 3 accelerograms with maximum SD in time domain

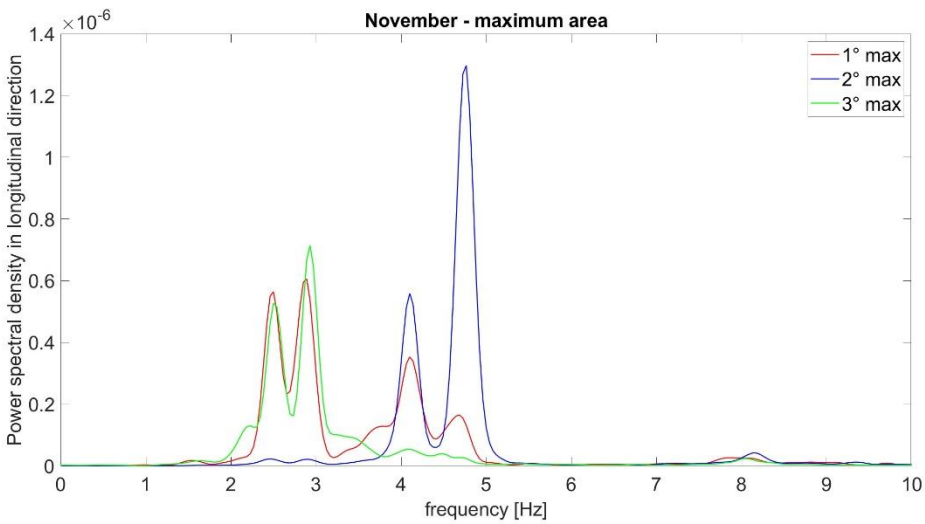


Figure 10-127: Results obtained from the 3 accelerograms with maximum area of PSD

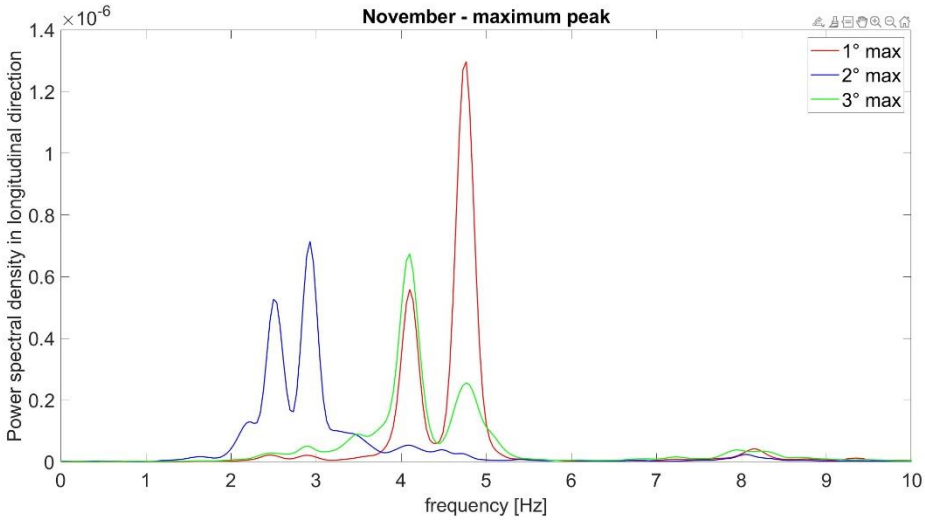


Figure 10-128: Results obtained from the 3 accelerograms with highest peak if PSD

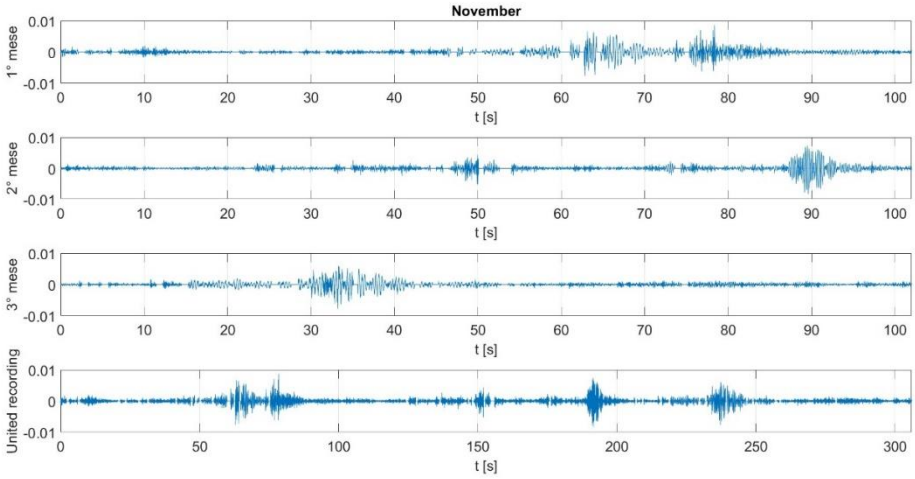


Figure 10-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

10.11.3 Transverse direction (z)

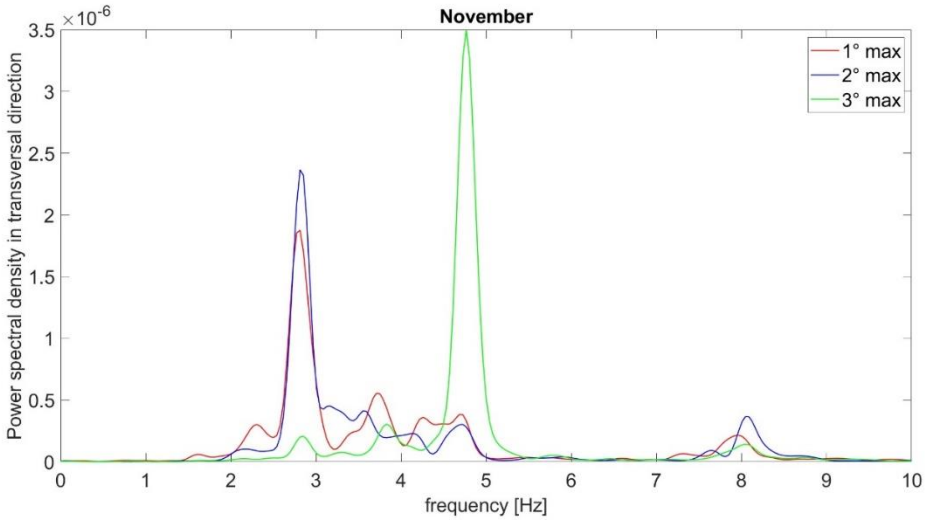


Figure 10-130: Results obtained from the 3 accelerograms with maximum SD in time domain

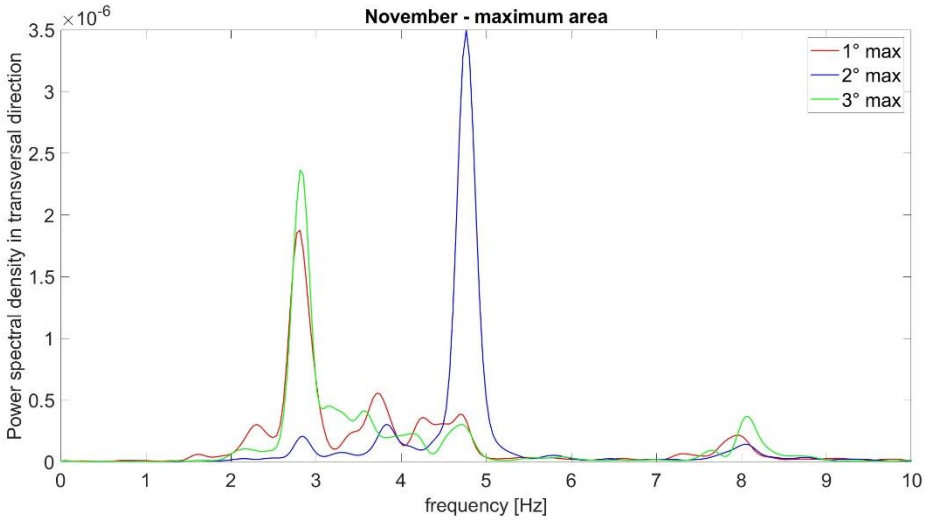


Figure 10-131: Results obtained from the 3 accelerograms with maximum area of PSD

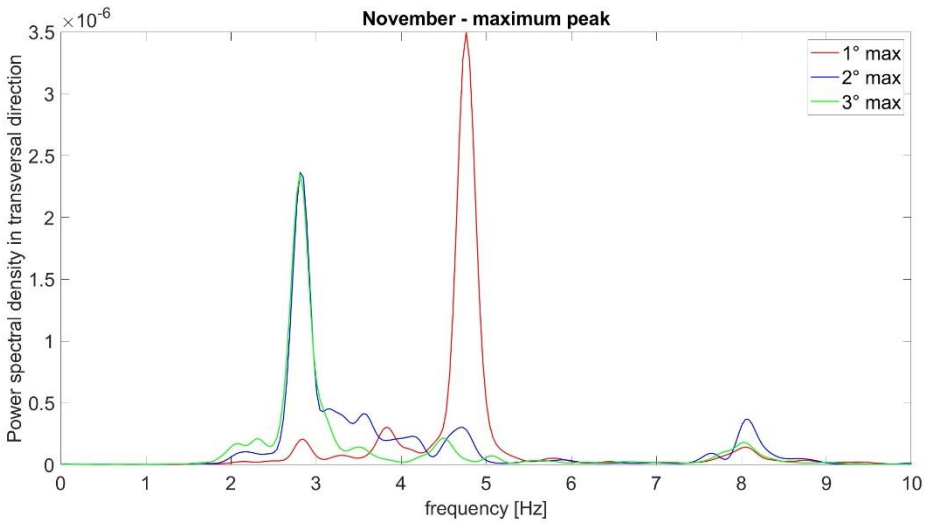


Figure 10-132: Results obtained from the 3 accelerograms with highest peak if PSD

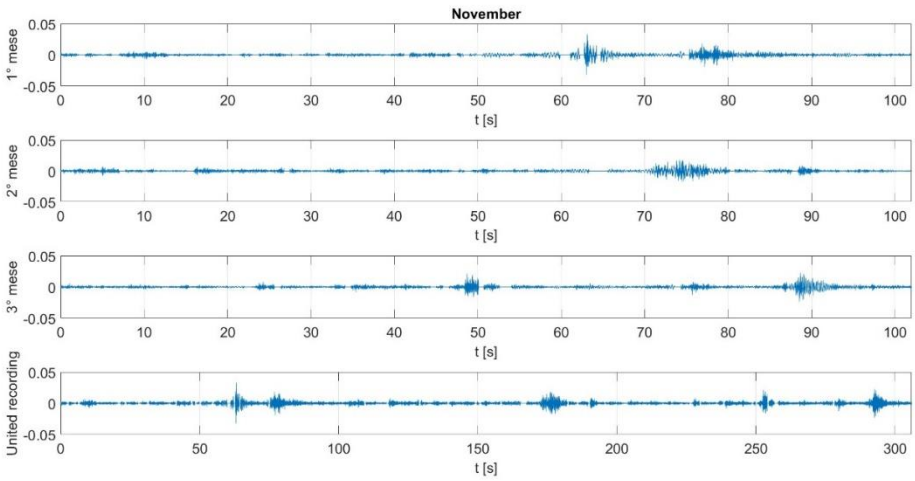


Figure 10-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

10.12 December

The results obtained for the December dataset are shown in the following tables.

Table 10-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BA63_2023-12-18_08-00-19	6.58E-03
	2°	2BA63_2023-12-06_10-00-20	5.83E-03
	3°	2BA63_2023-12-28_09-00-20	5.64E-03
Longitudinal direction (y)	1°	2BA63_2023-12-18_08-00-19	9.92E-04
	2°	2BA63_2023-12-28_09-00-20	8.72E-04
	3°	2BA63_2023-12-06_10-00-20	8.54E-04
Transverse direction (z)	1°	2BA63_2023-12-18_08-00-19	1.30E-03
	2°	2BA63_2023-12-28_09-00-20	1.24E-03
	3°	2BA63_2023-12-06_10-00-20	1.11E-03

Table 10-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-12-18_08-00-19	9.29E-05	2BA63_2023-12-18_08-00-19	9.55E-06
2	2BA63_2023-12-06_10-00-20	6.00E-05	2BA63_2023-12-11_14-00-21	6.42E-06
3	2BA63_2023-12-11_14-00-21	5.61E-05	2BA63_2023-12-28_09-00-20	6.32E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-12-18_08-00-19	2.29E-06	2BA63_2023-12-18_08-00-19	2.08E-07
2	2BA63_2023-12-28_09-00-20	1.28E-06	2BA63_2023-12-28_09-00-20	1.53E-07
3	2BA63_2023-12-11_14-00-21	1.15E-06	2BA63_2023-12-11_14-00-21	1.44E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BA63_2023-12-18_08-00-19	2.43E-06	2BA63_2023-12-18_08-00-19	3.53E-07
2	2BA63_2023-12-28_09-00-20	1.31E-06	2BA63_2023-12-28_09-00-20	3.05E-07
3	2BA63_2023-12-06_10-00-20	1.12E-06	2BA63_2023-12-06_10-00-20	2.30E-07

Table 10-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	D	C	C	C	C	C	C
3	C	D	C	-	D	D	B	B	B

10.12.1 Vertical direction (x)

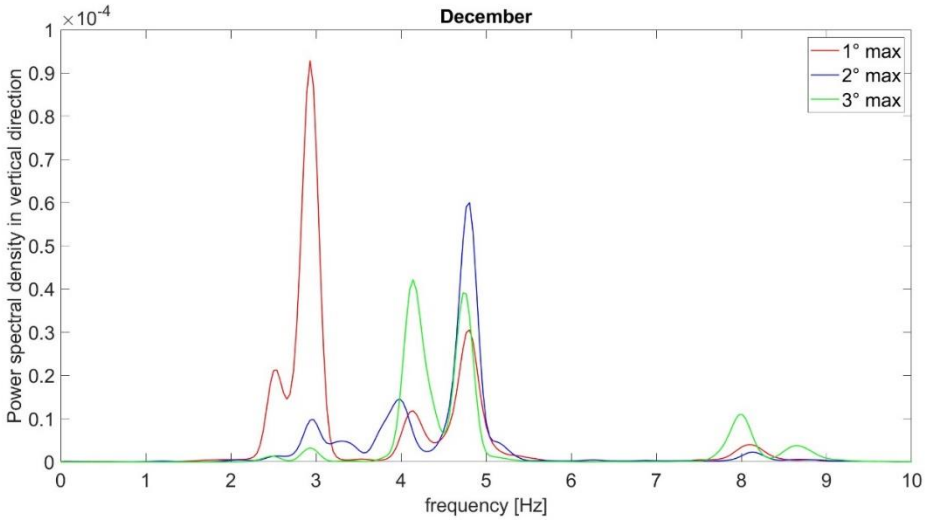


Figure 10-134: Results obtained from the 3 accelerograms with maximum SD in time domain

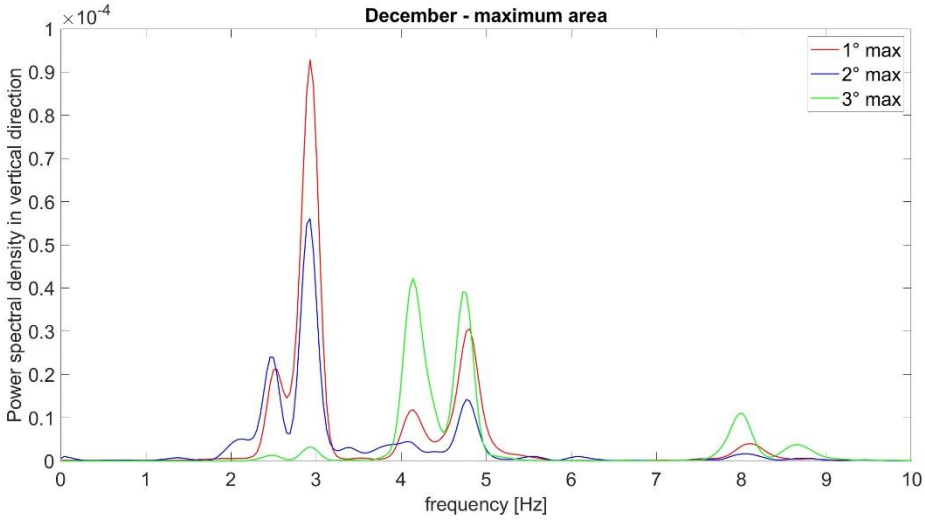


Figure 10-135: Results obtained from the 3 accelerograms with maximum area of PSD

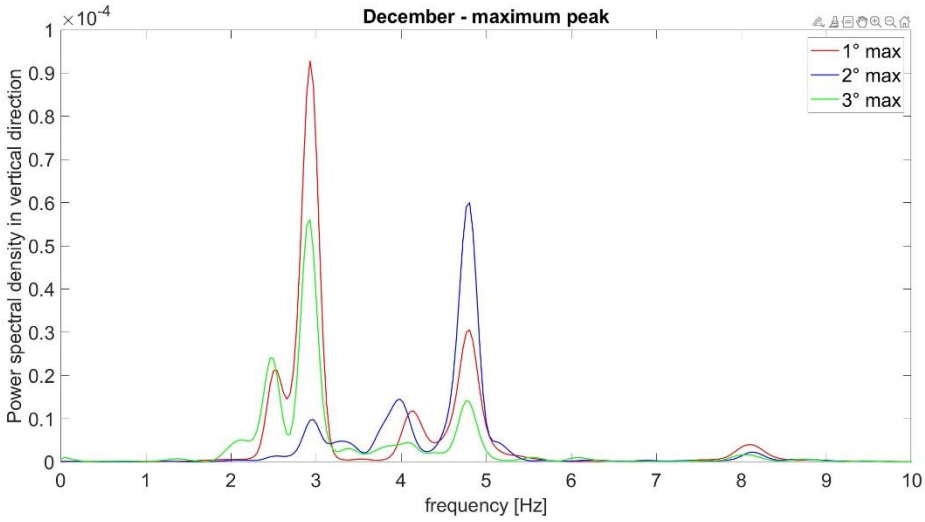


Figure 10-136: Results obtained from the 3 accelerograms with highest peak if PSD

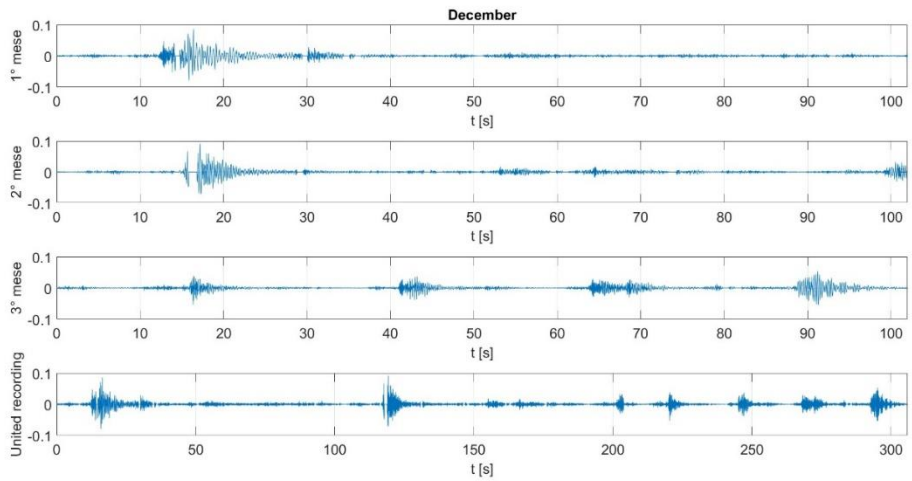


Figure 10-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

10.12.2 Longitudinal direction (y)

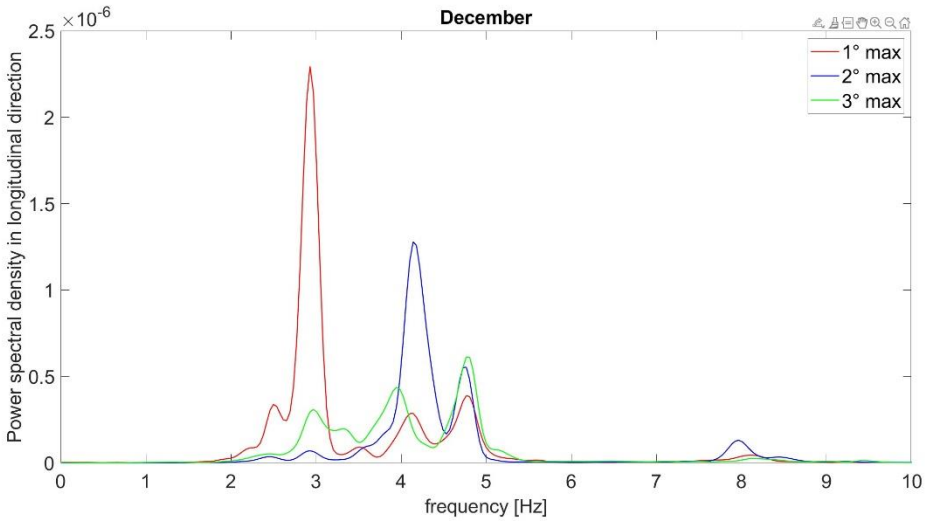


Figure 10-138: Results obtained from the 3 accelerograms with maximum SD in time domain

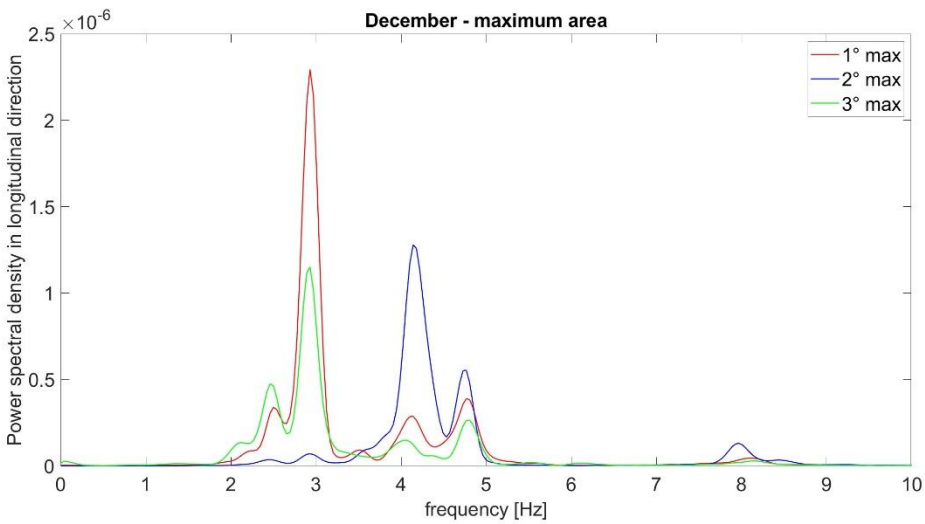


Figure 10-139: Results obtained from the 3 accelerograms with maximum area of PSD

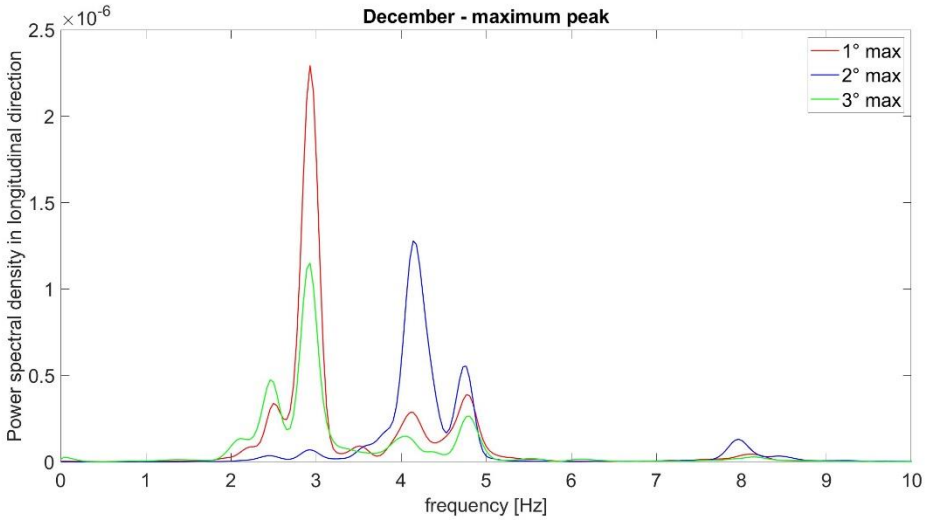


Figure 10-140: Results obtained from the 3 accelerograms with highest peak if PSD

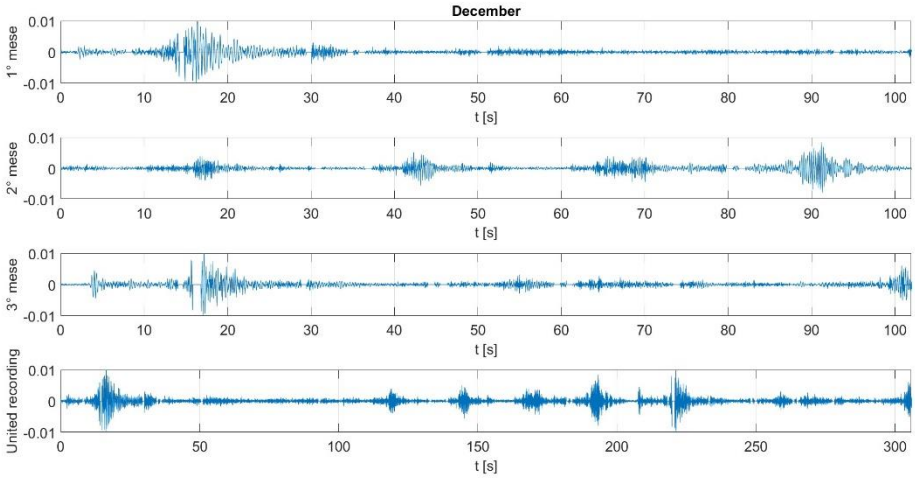


Figure 10-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

10.12.3 Transverse direction (z)

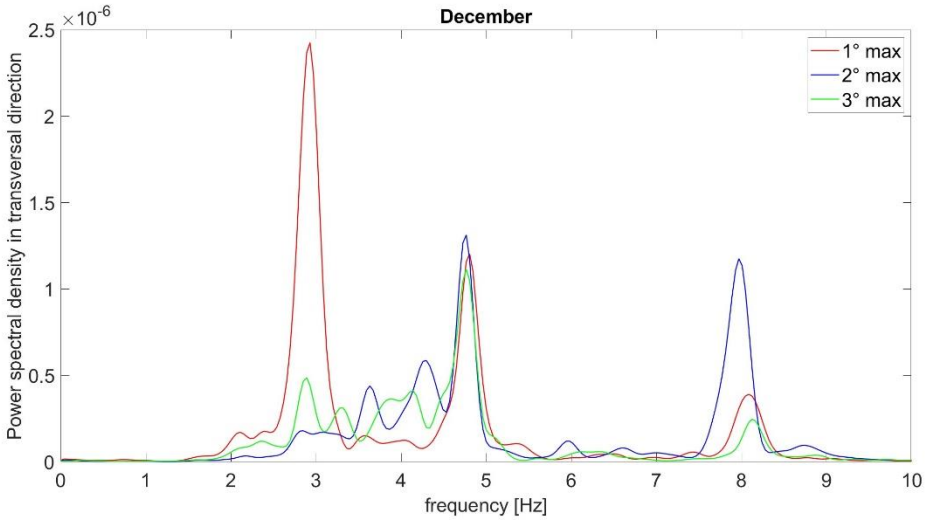


Figure 10-142: Results obtained from the 3 accelerograms with maximum SD in time domain

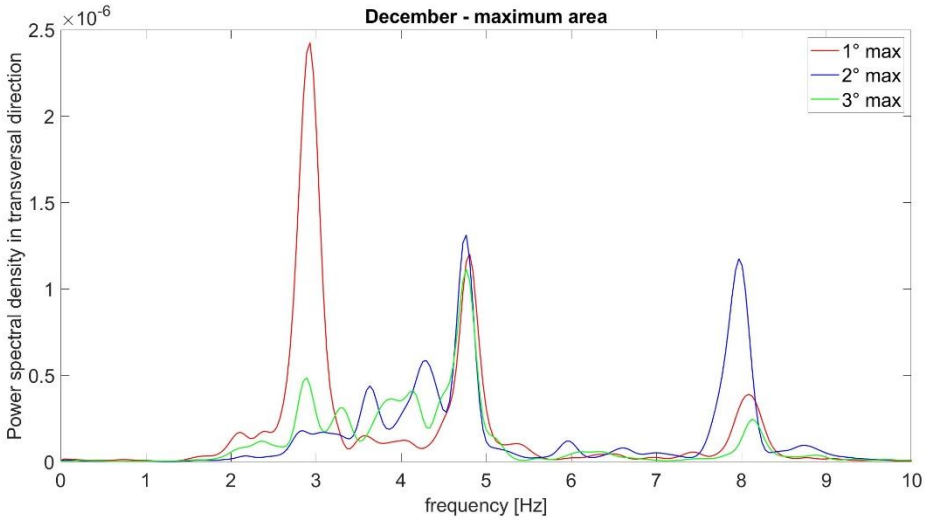


Figure 10-143: Results obtained from the 3 accelerograms with maximum area of PSD

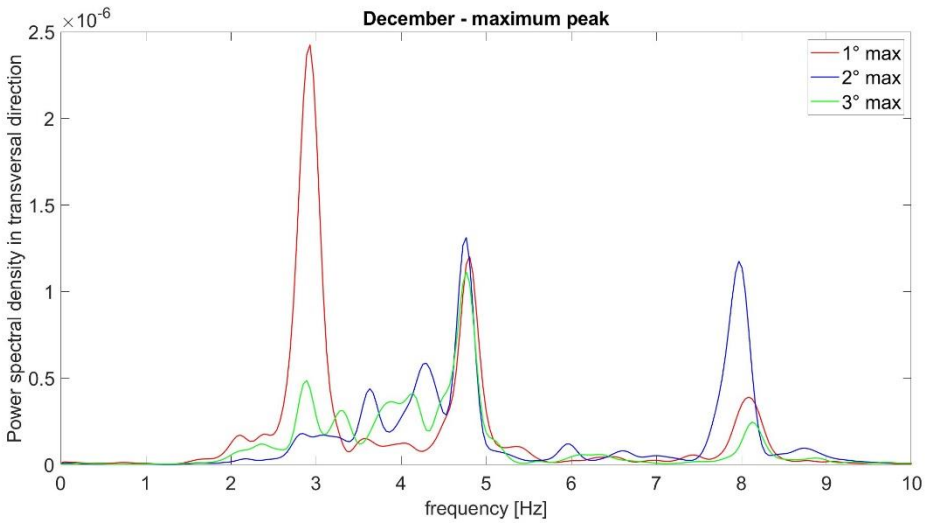


Figure 10-144: Results obtained from the 3 accelerograms with highest peak if PSD

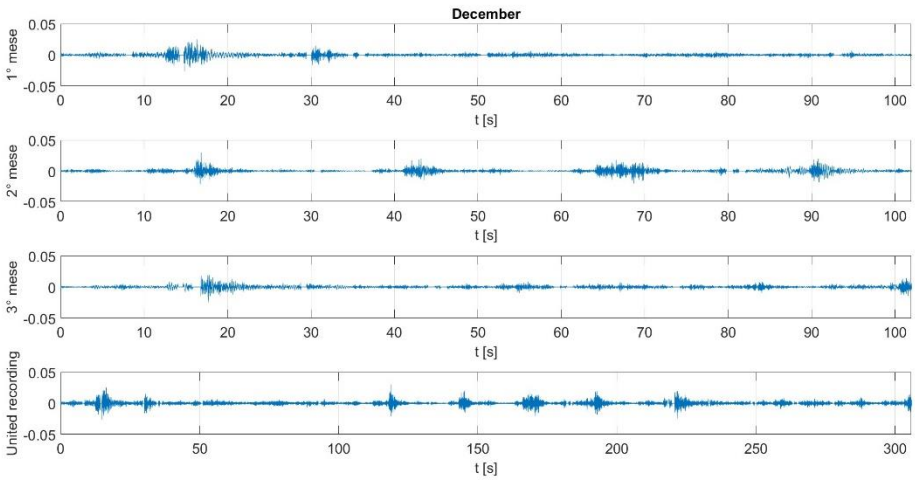


Figure 10-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

10.13 Analysis of the complete 2023 year

All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

Table 10-37: Main identified frequencies for sensor 2BA63 – bridge 223 – Sp2 – L/4

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	83	97	105	108	78	95	105	93	61	101	69	94
	MEAN	**2.46**	**2.89**	**4.05**	**4.73**	**2.44**	**2.88**	**4.05**	**4.71**	**2.17**	**2.82**	**3.78**	**4.69**
	SD	0.03	0.04	0.09	0.08	0.05	0.05	0.09	0.08	0.10	0.05	0.19	0.12
	C.o.V.	1.1%	1.3%	2.2%	1.6%	2.0%	1.7%	2.1%	1.6%	4.8%	1.8%	4.9%	2.5%
	Rating	**80%**	**92%**	**93%**	**100%**	**70%**	**87%**	**93%**	**86%**	**44%**	**92%**	**50%**	**81%**
1	gen-23	2.46	2.97	4.14	4.8	2.42	2.97	4.14	4.8	2.34	2.89		
2	gen-23		2.97	4.14	4.84	2.46	2.93	4.18	4.84		2.85	3.48	4.1
3	gen-23	2.46	2.97	4.1	4.8	2.46	2.89	4.14	4.8		2.85		4.1
1	gen-23	2.46	3.01	4.14	4.8	2.42	2.97	4.14	4.84	2.34	2.85		
2	gen-23			4.14	4.84		2.93	4.18	4.84		2.81	3.48	4.84
3	gen-23		2.93	4.1	4.8		2.93	4.1	4.8		2.85		4.77
1	gen-23	2.46	2.97	4.14	4.8	2.42	2.97	4.14	4.8	2.34	2.89		
2	gen-23			4.14	4.84		2.93	4.18	4.84			3.43	4.84
3	gen-23		2.97	4.14	4.8		2.97	4.1	4.8				
1	feb-23	2.46	2.89	3.86	4.77	2.42	2.89	3.91	4.77	2.26	2.85	3.82	4.73
2	feb-23	2.46	2.89	4.1	4.8	2.46		4.1	4.8	2.34	2.81	3.96	4.77
3	feb-23	2.5	2.89	4.06	4.73	2.46	2.85	4.06	4.73		2.81	3.89	4.73
1	feb-23	2.46	2.89	3.89	4.77	2.42	2.89	3.87	4.77	2.27	2.85	3.83	4.73
2	feb-23	2.46	2.93	4.1	4.8	2.46		4.1	4.8	2.3	2.81	4.02	4.77
3	feb-23	2.5	2.89	4.06	4.73	2.46	2.85	4.06	4.73		2.81	3.91	4.73
1	feb-23	2.5	2.89	4.06	4.73	2.42	2.89	3.87	4.77		2.85		4.8
2	feb-23	2.46	2.93	4.1	4.8	2.46	2.85	4.06	4.73	2.27	2.85	3.83	4.73
3	feb-23	2.46	2.93	3.89	4.77	2.5	2.89	4.1			2.81	3.9	4.73
1	mar-23	2.42	2.89	3.75	4.69	2.42	2.89	4.02	4.69	2.19	2.93	3.79	4.69
2	mar-23	2.46	2.89	4.06	4.73	2.42	2.89	4.1	4.73		2.77		4.69
3	mar-23	2.46	2.89	4.06	4.73			4.1	4.8	2.22	2.93		4.69
1	mar-23	2.42	2.89	3.64	4.69	2.42	2.89	3.64	4.69	2.18	2.92	3.78	4.69
2	mar-23	2.46	2.93	4.06	4.72	2.42	2.89	4.1	4.73		2.77		4.69
3	mar-23	2.46	2.89	4.06	4.72	2.46	2.89	4.06	4.73	2.22	2.92		4.69
1	mar-23	2.42	2.89	3.64	4.69	2.46		4.06	4.73	2.18	2.93	3.78	4.69
2	mar-23	2.42		4.06	4.73	2.42	2.89	3.64	4.69		2.77		4.69
3	mar-23	2.42	2.89	4.06	4.73	2.5	2.89	4.06	4.73	2.18	2.93		4.69
1	apr-23	2.5	2.89	4.06	4.73	2.5	2.89	3.98	4.73		2.85	3.84	4.77
2	apr-23	2.46	2.85	4.06	4.65	2.46		3.98	4.57	2.26	2.73	3.59	4.57
3	apr-23		2.85	3.98	4.65		2.81	4.02	4.61	2.02	2.85	3.84	4.77
1	apr-23	2.5	2.89	4.06	4.77	2.5	2.89	3.98			2.89	3.81	4.73
2	apr-23	2.46			4.65	2.46		4.02	4.61		2.77	3.55	4.57

3	apr-23		2.89	4.02	4.65		2.81	4.02	4.65	2.1	2.85		4.65
1	apr-23	2.5	2.89	4.06	4.73	2.46	2.89	3.98	4.73		2.85	3.84	4.77
2	apr-23	2.46	2.85	4.04	4.65	2.46		4.06	4.61		2.73	3.55	4.57
3	apr-23			4.02	4.65		2.81	4.02	4.65	2.1	2.89		4.65
1	mag-23	2.42	2.85	4.02	4.84	2.42	2.81	4.02	4.73	2.07	2.81	4.01	4.69
2	mag-23	2.42	2.85	4.02	4.65	2.38	2.81	4.06	4.65	2.07	2.77	4.09	4.65
3	mag-23	2.46	2.89	4.06	4.73	2.46	2.85	4.02	4.73	2.15	2.85		4.73
1	mag-23	2.42	2.85	4.02	4.84	2.42	2.81	4.02	4.73	2.07	2.81		4.69
2	mag-23	2.42	2.85	4.02	4.65	2.38	2.81	4.1	4.65	2.07	2.77	4.18	4.65
3	mag-23	2.46	2.89	4.06	4.73	2.46	2.89	4.02	4.73	2.18	2.85		4.73
1	mag-23	2.42	2.85	4.02	4.84	2.42	2.81	4.02	4.69	2.07	2.81		4.73
2	mag-23	2.42	2.85	4.02	4.65	2.38	2.81	4.1	4.65	2.07	2.77	4.18	4.65
3	mag-23	2.46	2.89	4.06	4.73	2.5	2.85	4.02	4.73	2.18	2.81		4.73
1	giu-23	2.42	2.85	4.1	4.65	2.59	2.97	4.02	4.57		2.77	3.59	
2	giu-23	2.46	2.85	4.14	4.88	2.46	2.85	4.14		2.18	2.77		
3	giu-23	2.46	2.89	3.95	4.69	2.46	2.89	3.98	4.69		2.81	3.75	4.65
1	giu-23	2.42	2.85	4.06	4.65		2.93	4.02	4.57		2.77	3.9	
2	giu-23	2.46	2.85	4.14	4.88	2.46	2.89	3.98	4.65	2.14	2.77		4.45
3	giu-23	2.46	2.89	3.95	4.69	2.46	2.85	4.14			2.81	3.75	4.65
1	giu-23	2.42	2.85	4.06	4.65		2.93	4.06	4.57		2.77	3.87	
2	giu-23	2.46	2.85	4.06	4.84	2.46	2.85	4.14			2.77		4.88
3	giu-23		2.89	4.14	4.69		2.89	4.1	4.69	2.26	2.73		
1	lug-23	2.46	2.85	4.06	4.69	2.38	2.81	4.09		2.11	2.77	3.92	4.65
2	lug-23		2.85	4.06	4.77	2.42	2.89	4.02	4.65	2.24	2.81	4.09	4.73
3	lug-23	2.42	2.89	4.1	4.84	2.34	2.96	4.09		2.29	2.77	4.09	
1	lug-23	2.42	2.85	4.06	4.65	2.34	2.81	4.14		2.3	2.81	4.09	4.73
2	lug-23		2.85	4.1	4.8	2.34	2.85	4.02	4.65	2.1	2.77		4.65
3	lug-23	2.42	2.89	4.1	4.8	2.42	2.97	4.1		2.31	2.77	4.14	
1	lug-23	2.46	2.85	4.06	4.65	2.34	2.81	4.14		2.11	2.77		4.65
2	lug-23		2.81	4.1	4.77	2.42	2.85	4.02	4.69	2.3	2.81	4.14	4.73
3	lug-23	2.46	2.89	4.1	4.8	2.34	2.97	4.1		2.34	2.77	4.21	
1	ago-23	2.46	2.85	4.02	4.65	2.38	2.85	4.06	4.53	2.07	2.81	3.67	4.65
2	ago-23	2.46		4.06	4.65	2.46	2.85	4.02	4.65	2.24	2.77	3.61	4.53
3	ago-23		2.85	4.06	4.53		2.89	4.06	4.65			3.75	4.65
1	ago-23	2.46	2.89	4.02	4.65	2.38	2.85	4.06	4.53	2.07	2.81		4.65
2	ago-23	2.46		4.06	4.65	2.46	2.82	4.02	4.65	2.24	2.81	3.67	4.53
3	ago-23	2.46	2.85	4.06	4.49		2.85	4.06	4.61				4.69
1	ago-23	2.42	2.85	4.06	4.53	2.34	2.85	4.06	4.53	2.24	2.77	3.67	4.53
2	ago-23		2.89	4.06	4.65		2.89	4.06	4.61				4.69
3	ago-23	2.46	2.85	4.02	4.65			4.1		2.07	2.81		4.65
1	set-23		2.85	4.02	4.57	2.5	2.85		4.57	2.07	2.81	3.59	4.49
2	set-23			4.1	4.69		2.89	4.06	4.65		2.77	3.64	4.65
3	set-23		2.89	4.06	4.73	2.46	2.81	4.06	4.69	2.07	2.77	3.71	4.65
1	set-23		2.85	4.02	4.69		2.85	4.02	4.57	2.1	2.81	3.59	4.49
2	set-23			4.1	4.61		2.85	4.06	4.65	1.95	2.77	3.59	
3	set-23		2.89	4.1	4.69	2.46	2.81	4.06	4.69	2.07	2.77	3.63	4.65
1	set-23			4.1	4.69		2.85	4.02	4.57				4.69

2	set-23		2.85	4.02	4.61			4.06	4.69	1.95	2.77	3.6	
3	set-23	2.42	2.85	4.02	4.65		2.89	4.14	4.65	2.07	2.77	3.63	4.65
1	ott-23	2.46	2.89	4.1	4.73	2.46	2.89	4.06	4.73	2.15	2.86	3.67	4.73
2	ott-23	2.46	2.93	3.95	4.77	2.38	2.77	3.83	4.77		2.81	3.83	4.8
3	ott-23	2.46	2.89	4.06	4.69	2.46	2.85	4.02	4.73		2.73	3.64	4.69
1	ott-23	2.46	2.89	4.06	4.73	2.46	2.89	4.06	4.73	2.14	2.89	3.69	4.73
2	ott-23	2.46	2.89	3.95	4.76	2.42	2.77	3.89	4.77		2.81	3.83	4.8
3	ott-23	2.46	2.89	4.02	4.69	2.42	2.85	4.06	4.69	2.11	2.89	3.94	4.77
1	ott-23	2.46	2.89	4.1	4.77	2.46	2.89	4.06	4.73		2.81	3.83	4.8
2	ott-23	2.46	2.89	3.95	4.77	2.42	2.89	4.06	4.69	2.07	2.89	3.64	4.77
3	ott-23	2.46	2.89	4.06	4.65			4.06	4.73		2.81	3.69	4.69
1	nov-23	2.46	2.89	4.1	4.77	2.5	2.89	4.1	4.69	2.3	2.81	3.71	4.69
2	nov-23	2.5	2.93	4.14	4.73			4.1	4.77		2.81	3.55	4.69
3	nov-23	2.5	2.89	4.06	4.69	2.5	2.93				2.81	3.82	4.77
1	nov-23	2.46	2.89	4.1	4.77	2.5	2.89	4.1	4.65	2.3	2.81	3.71	4.69
2	nov-23	2.5	2.89	4.1	4.77			4.1	4.77		2.81	3.79	4.77
3	nov-23	2.5	2.93	4.18	4.73	2.5	2.93	4.06			2.81		4.73
1	nov-23	2.46	2.93	4.1	4.77			4.1	4.77		2.85	3.83	4.77
2	nov-23	2.5		4.02	4.84	2.5	2.93		4.77		2.81	3.59	4.69
3	nov-23	2.5	2.93	4.18	4.73		2.89	4.1		2.3	2.81		4.49
1	dic-23	2.54	2.93	4.14	4.77	2.5	2.93	4.1	4.8		2.93		4.8
2	dic-23		2.93	3.98	4.8		2.93	4.14	4.73		2.85	3.69	4.77
3	dic-23	2.46	2.93	4.14	4.73		2.97	3.95	4.8		2.89		4.77
1	dic-23	2.5	2.93	4.14	4.77	2.5	2.93	4.1	4.77	2.07	2.93		4.8
2	dic-23	2.46	2.93		4.77		2.97	4.14	4.77		2.85	3.69	4.77
3	dic-23		2.93	4.14	4.73	2.46	2.93	4.06	4.77		2.89		4.77
1	dic-23	2.5	2.93	4.14	4.8	2.5	2.93	4.1	4.77	2.1	2.93		4.8
2	dic-23		2.97	3.98	4.8		2.93	4.14	4.77		2.89	3.69	4.77
3	dic-23	2.46	2.93		4.8	2.46	2.93	4.06	4.77				4.77

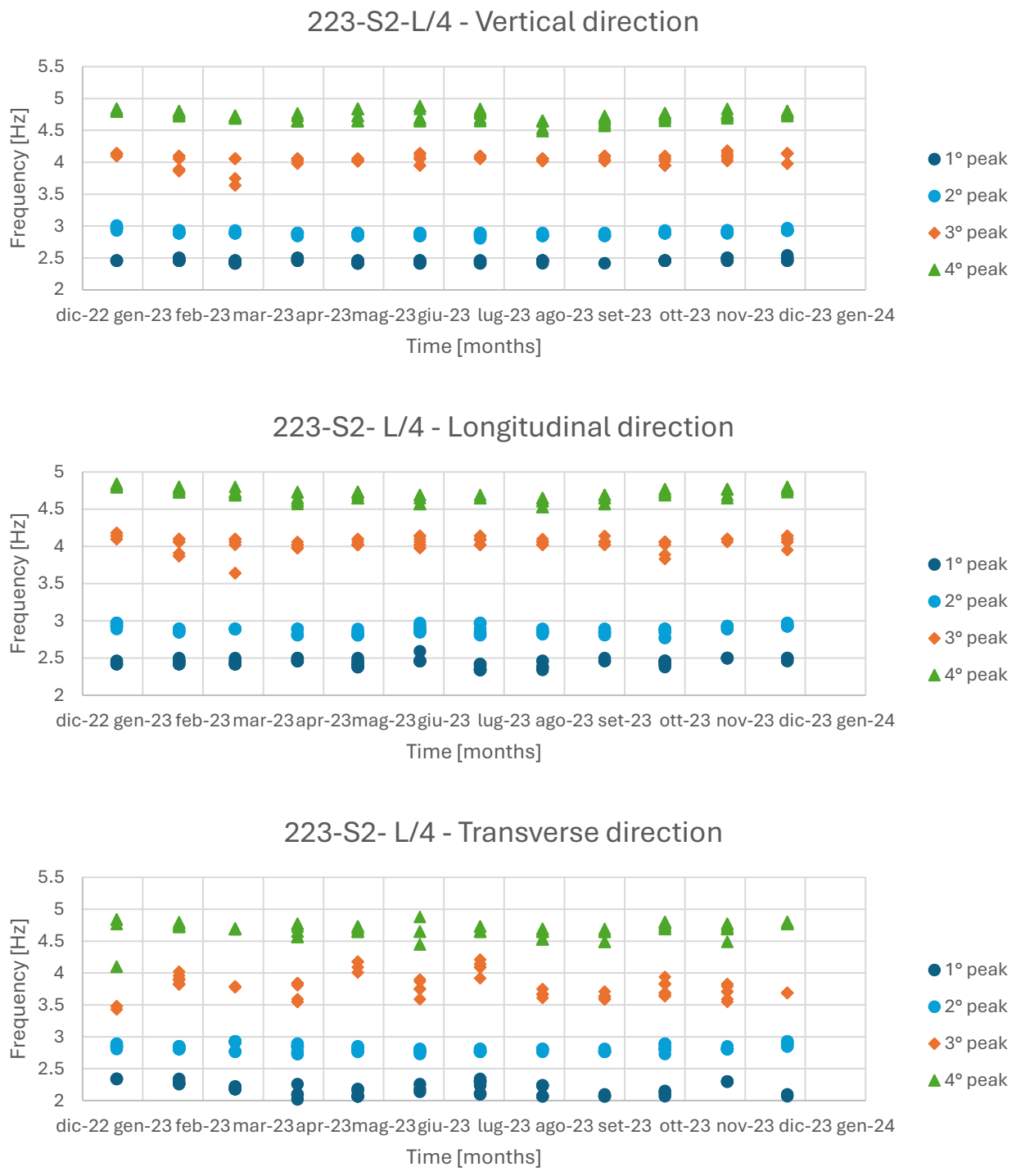


Figure 10-146: Main identified frequencies for sensor 2BA63 – bridge 223 – Sp2 – L/4

11. Annex 11 – Bridge 223 – Span 2 – L/8 - Sensor 31205

The Bridge 223 counts 2 monitored decks: span 2 and span 6 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 2 are:

- 2BE0F – situated in the midspan;
- 2BA63 – situated at a distance of L/4;
- 31205 – situated at a distance of L/8;
- 319BC – situated nearby the west pilar;
- 319E3 – situated nearby the east pilar.

The sensors present on deck number 6 are:

- 2B5E7 – situated in the midspan;
- 2BCF9 – situated at a distance of L/4 of the deck;
- 2BCAD – situated at a distance of L/8 of the deck;

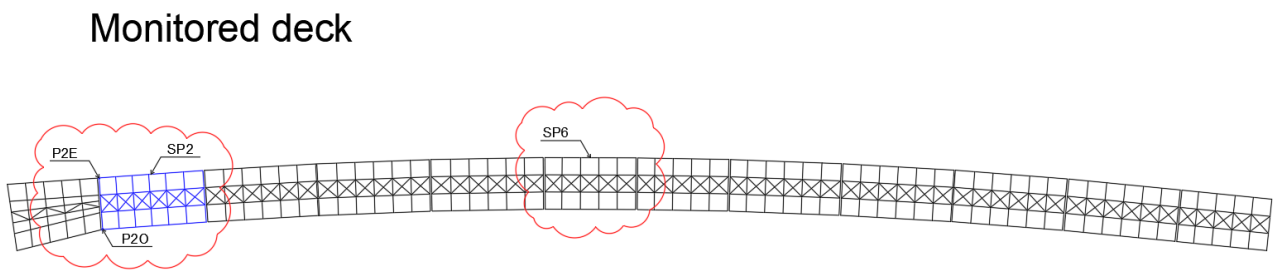


Figure 11-1 Monitored decks of 223 bridge

The accelerograms of the 31205 sensor have been analyzed and the results are represented in the following paragraphs.

11.1 January

The results obtained for the January dataset are shown in the following tables.

Table 11-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-01-30_07-00-20	1.91E-03
	2°	31205_2023-01-31_07-00-20	1.44E-03
	3°	31205_2023-01-26_13-00-20	1.34E-03
Longitudinal direction (y)	1°	31205_2023-01-30_07-00-20	5.80E-04
	2°	31205_2023-01-31_07-00-20	4.67E-04
	3°	31205_2023-01-26_13-00-20	4.62E-04
Transverse direction (z)	1°	31205_2023-01-30_07-00-20	5.76E-04
	2°	31205_2023-01-27_01-00-20	4.59E-04
	3°	31205_2023-01-31_07-00-20	4.46E-04

Table 11-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-01-30_07-00-20	8.13E-06	31205_2023-01-30_07-00-20	7.58E-07
2	31205_2023-01-01_01-00-21	1.94E-06	31205_2023-01-31_07-00-20	4.15E-07
3	31205_2023-01-20_13-00-19	1.81E-06	31205_2023-01-26_13-00-20	3.74E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-01-30_07-00-20	5.81E-07	31205_2023-01-30_07-00-20	6.92E-08
2	31205_2023-01-26_13-00-20	2.65E-07	31205_2023-01-26_13-00-20	4.45E-08
3	31205_2023-01-31_07-00-20	2.47E-07	31205_2023-01-31_07-00-20	4.36E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-01-30_07-00-20	5.97E-07	31205_2023-01-30_07-00-20	7.02E-08
2	31205_2023-01-26_07-00-20	2.15E-07	31205_2023-01-27_01-00-20	4.36E-08
3	31205_2023-01-06_01-00-21	1.59E-07	31205_2023-01-16_13-00-21	4.03E-08

Table 11-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	-	B	B	C	C	D	-	D
3	C	-	C	C	B	B	-	-	-

11.1.1 Vertical direction (x)

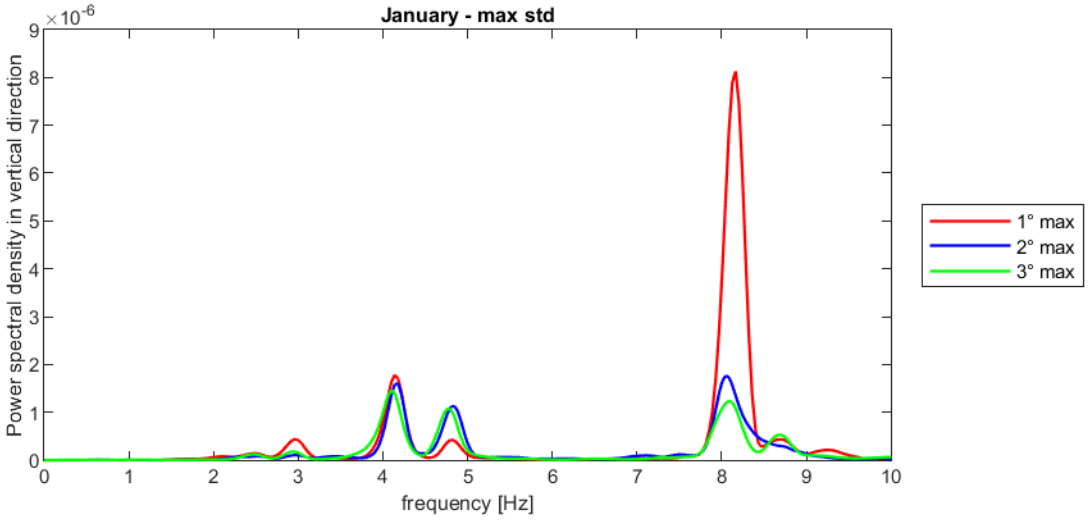


Figure 11-2: Results obtained from the 3 accelerograms with maximum SD in time domain

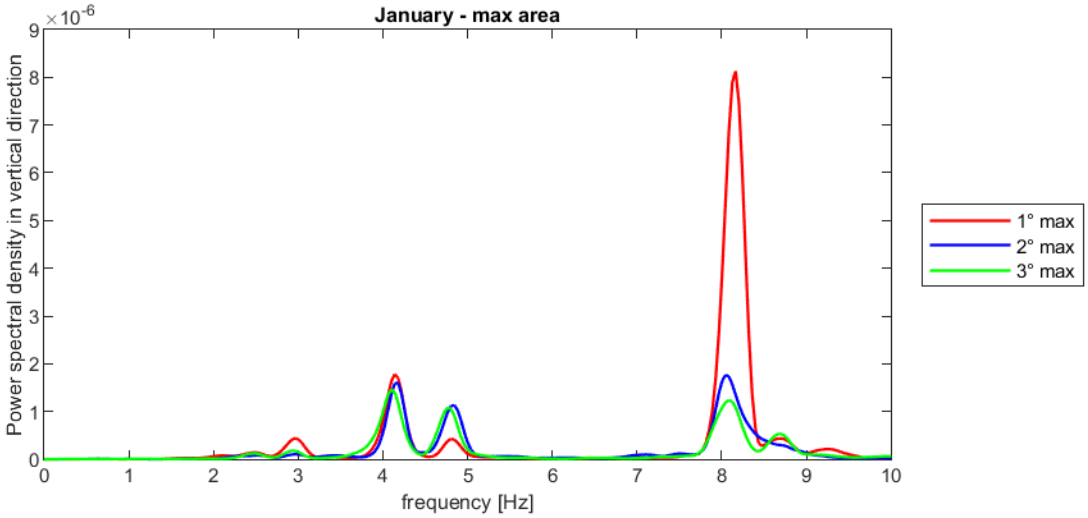


Figure 11-3: Results obtained from the 3 accelerograms with maximum area of PSD

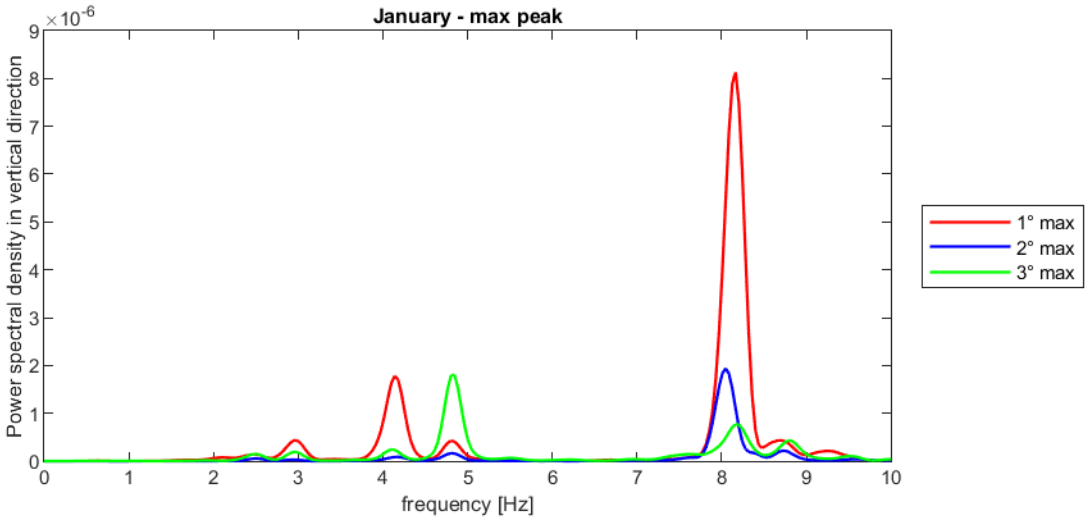


Figure 11-4: Results obtained from the 3 accelerograms with highest peak if PSD

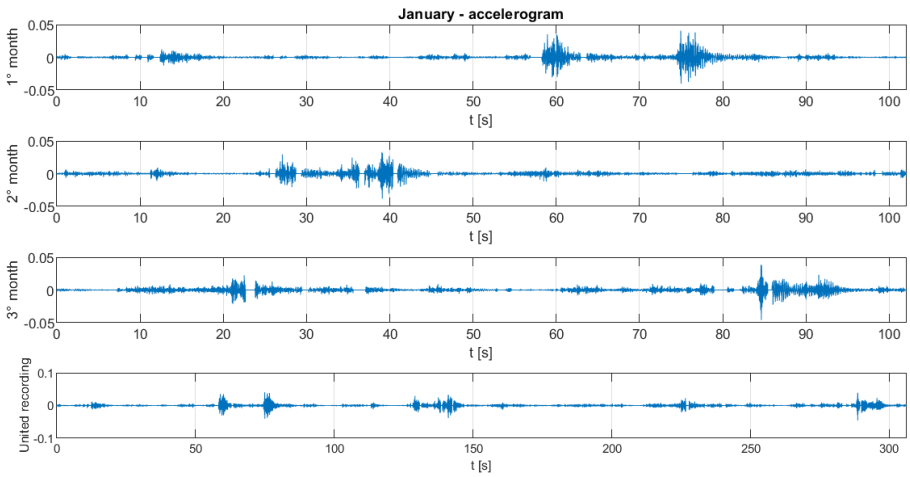


Figure 11-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.1.2 Longitudinal direction (y)

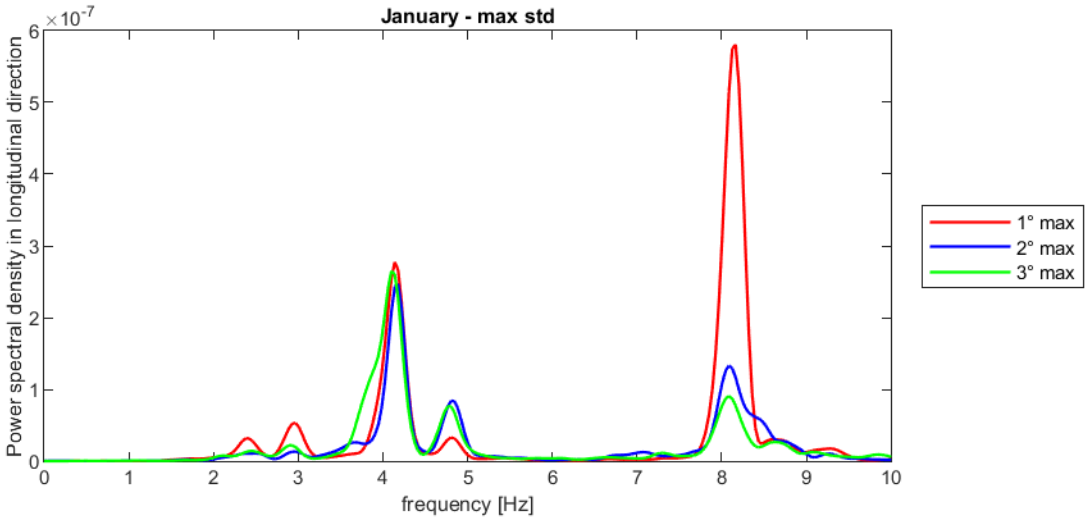


Figure 11-6: Results obtained from the 3 accelerograms with maximum SD in time domain

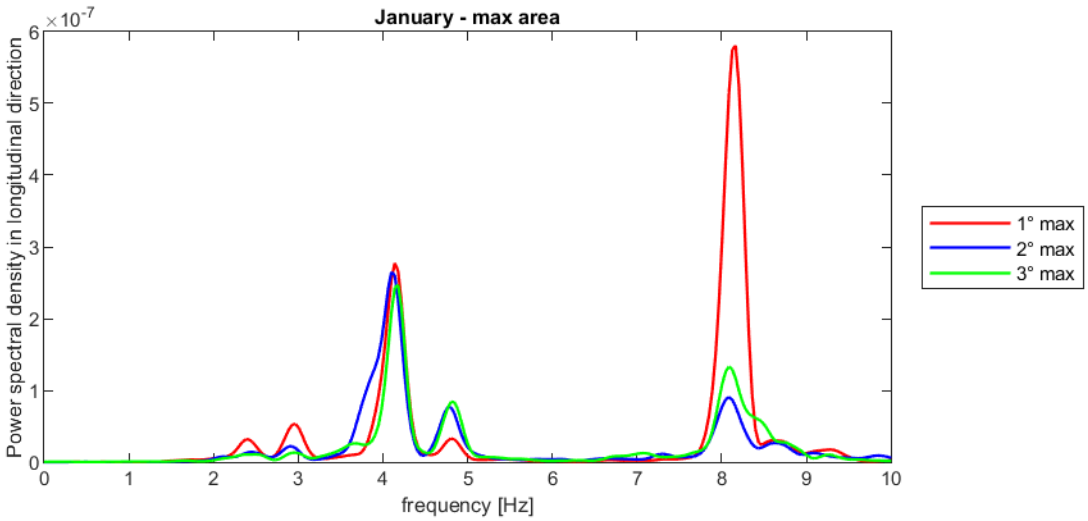


Figure 11-7: Results obtained from the 3 accelerograms with maximum area of PSD

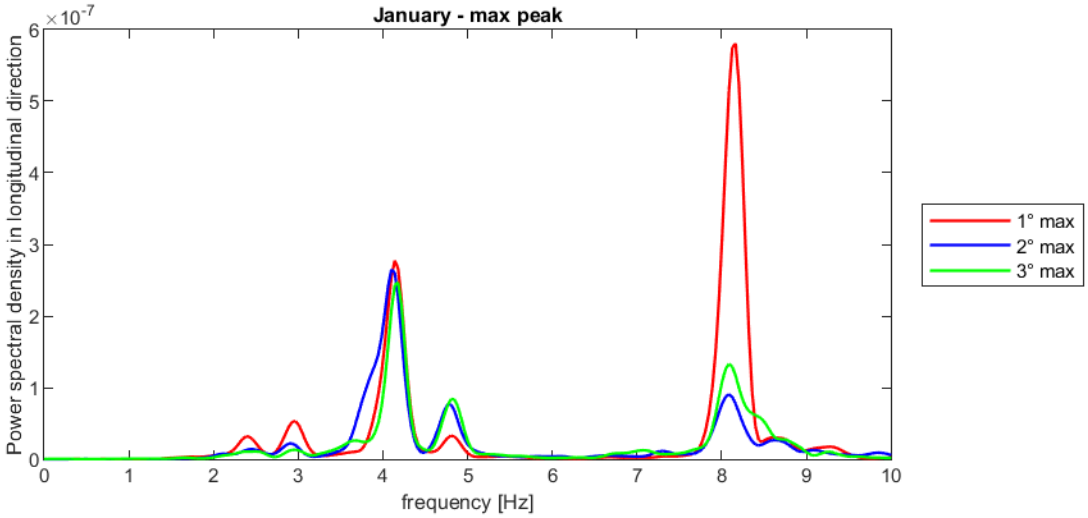


Figure 11-8: Results obtained from the 3 accelerograms with highest peak in PSD

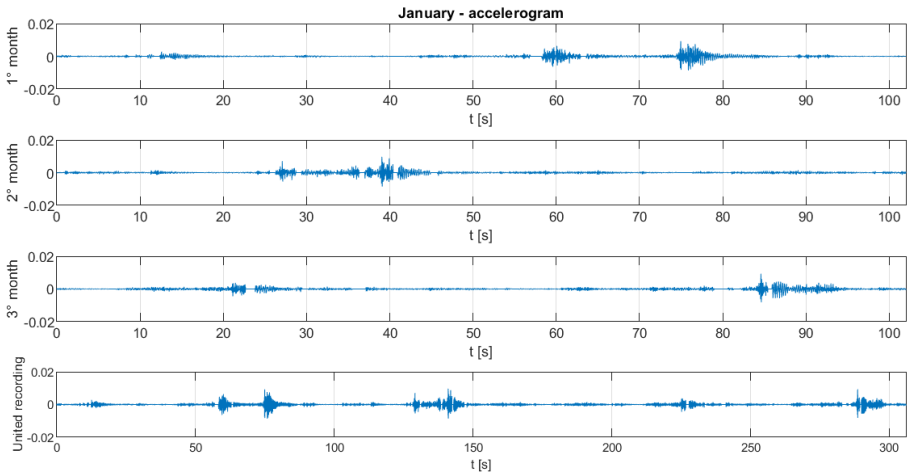


Figure 11-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

11.1.3 Transverse direction (z)

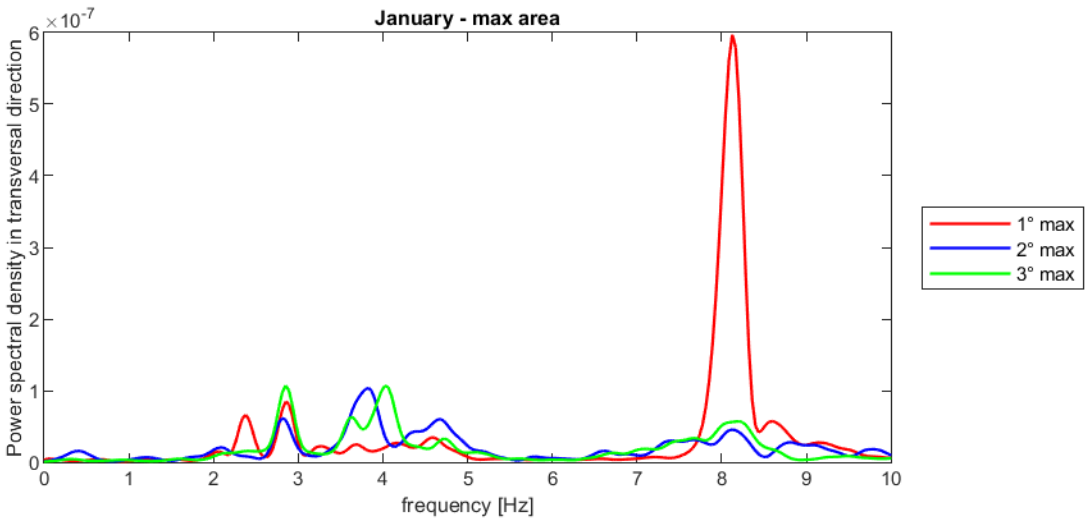


Figure 11-10: Results obtained from the 3 accelerograms with maximum SD in time domain

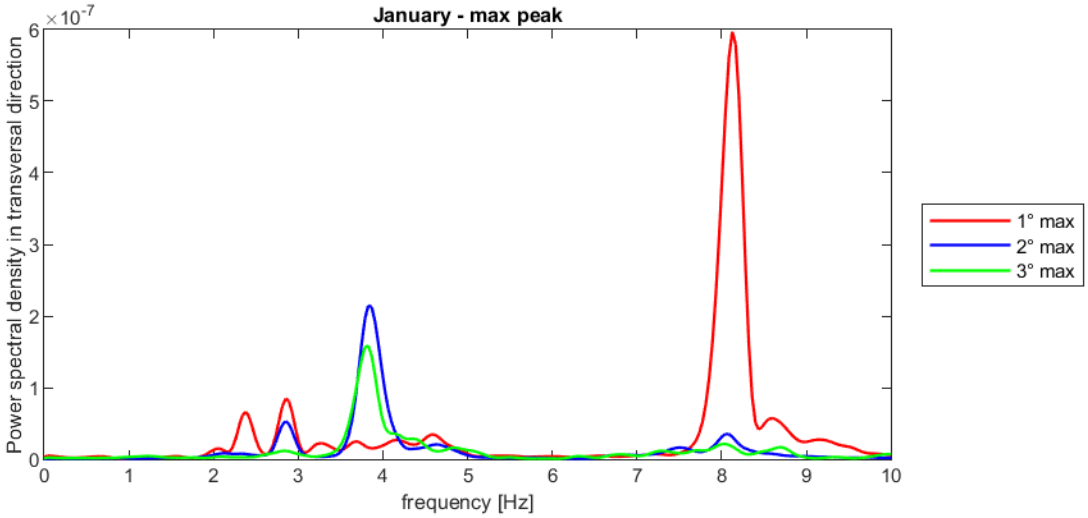


Figure 11-11: Results obtained from the 3 accelerograms with maximum area of PSD

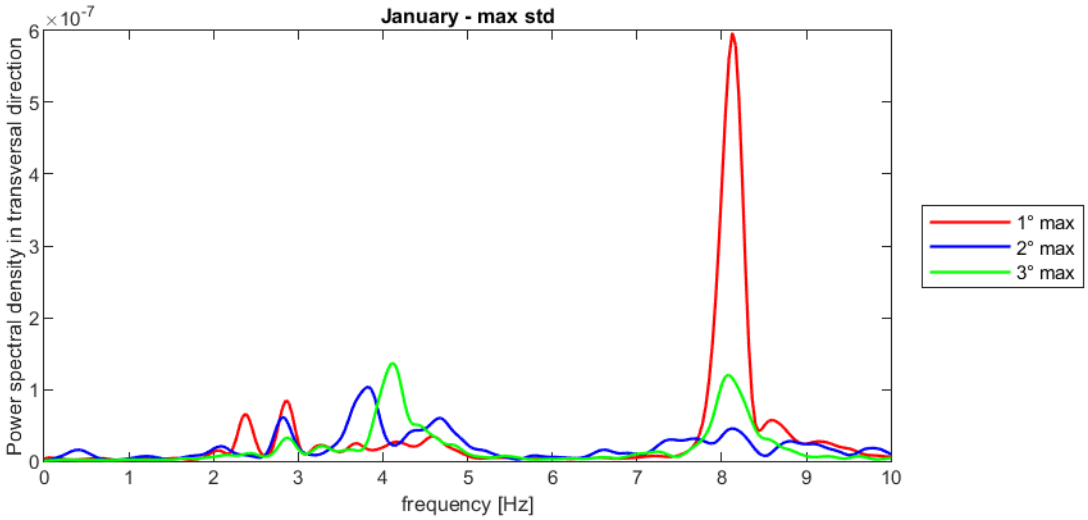


Figure 11-12: Results obtained from the 3 accelerograms with highest peak in PSD

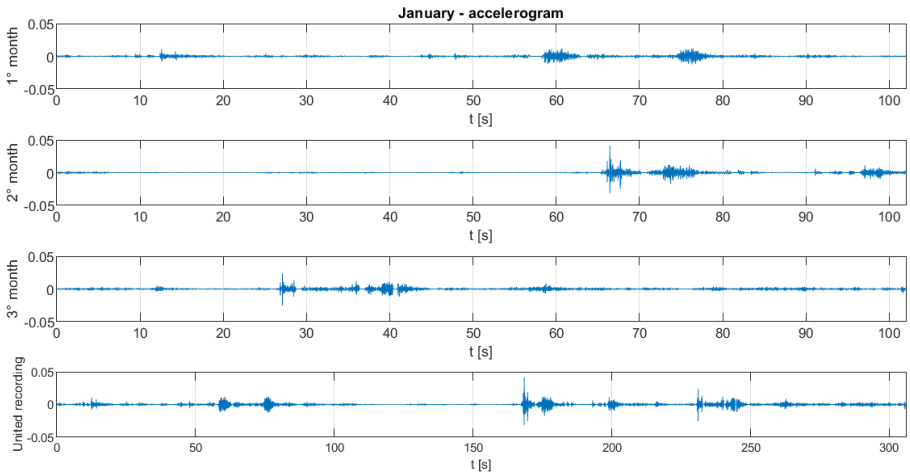


Figure 11-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

11.2 February

The results obtained for the February dataset are shown in the following tables.

Table 11-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-02-06_13-00-21	2.01E-03
	2°	31205_2023-02-01_13-00-21	1.93E-03
	3°	31205_2023-02-17_13-00-20	1.73E-03
Longitudinal direction (y)	1°	31205_2023-02-06_13-00-21	6.64E-04
	2°	31205_2023-02-01_13-00-21	6.50E-04
	3°	31205_2023-02-17_13-00-20	5.49E-04
Transverse direction (z)	1°	31205_2023-02-01_13-00-21	7.69E-04
	2°	31205_2023-02-06_13-00-21	6.81E-04
	3°	31205_2023-02-17_13-00-20	5.91E-04

Table 11-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-02-17_13-00-20	5.06E-06	31205_2023-02-06_13-00-21	8.41E-07
2	31205_2023-02-06_13-00-21	4.36E-06	31205_2023-02-01_13-00-21	7.60E-07
3	31205_2023-02-04_07-00-20	3.34E-06	31205_2023-02-17_13-00-20	6.09E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-02-17_13-00-20	4.02E-07	31205_2023-02-06_13-00-21	9.15E-08
2	31205_2023-02-01_01-00-20	3.41E-07	31205_2023-02-01_13-00-21	8.38E-08
3	31205_2023-02-01_13-00-21	3.01E-07	31205_2023-02-17_13-00-20	6.00E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-02-01_13-00-21	6.65E-07	31205_2023-02-01_13-00-21	1.19E-07
2	31205_2023-02-04_07-00-20	3.37E-07	31205_2023-02-06_13-00-21	9.44E-08
3	31205_2023-02-06_13-00-21	2.76E-07	31205_2023-02-17_13-00-20	7.05E-08

Table 11-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	A	C	A	B	B	B
2	B	A	B	B	-	B	A	-	A
3	C	-	C	C	B	C	C	A	C

11.2.1 Vertical direction (x)

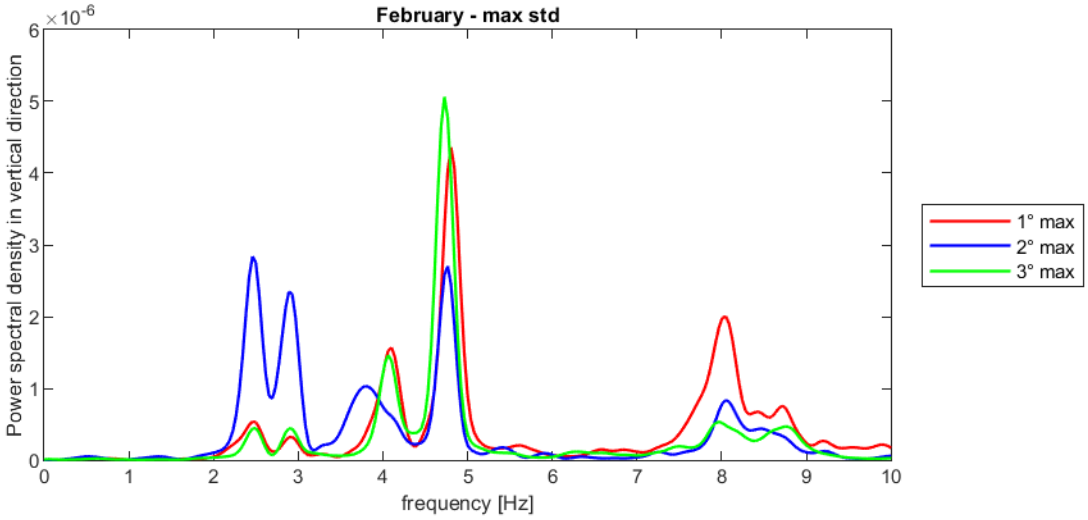


Figure 11-14: Results obtained from the 3 accelerograms with maximum SD in time domain

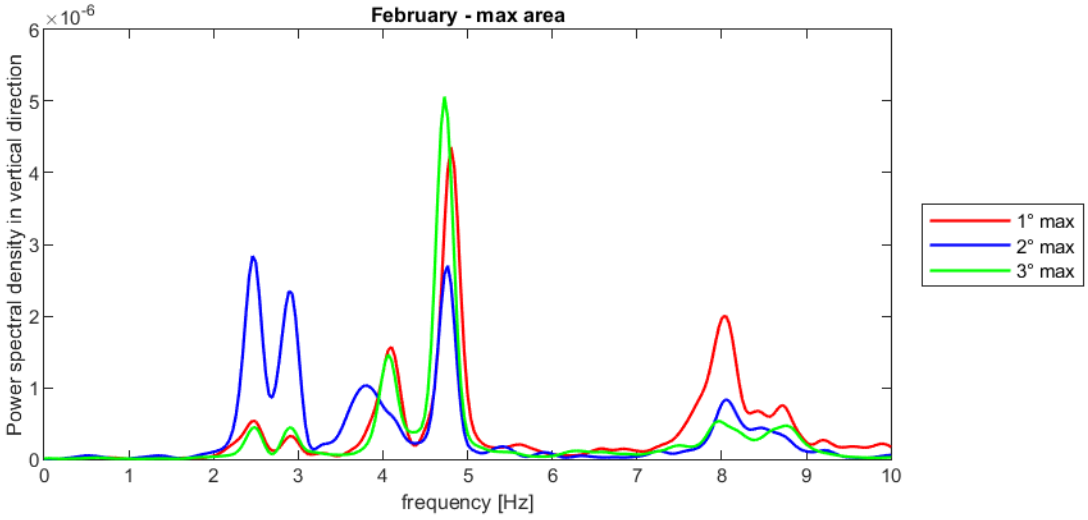


Figure 11-15: Results obtained from the 3 accelerograms with maximum area of PSD

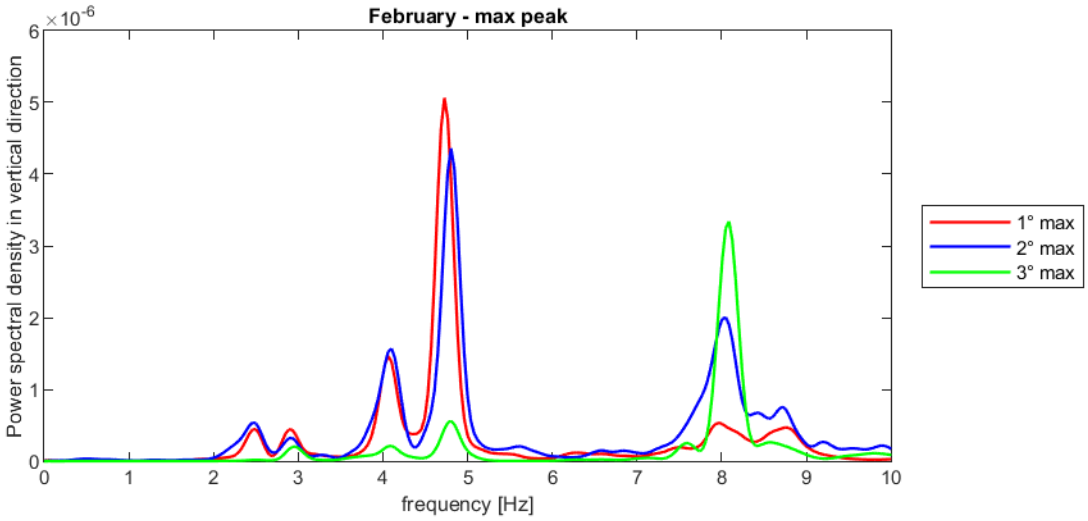


Figure 11-16: Results obtained from the 3 accelerograms with highest peak if PSD

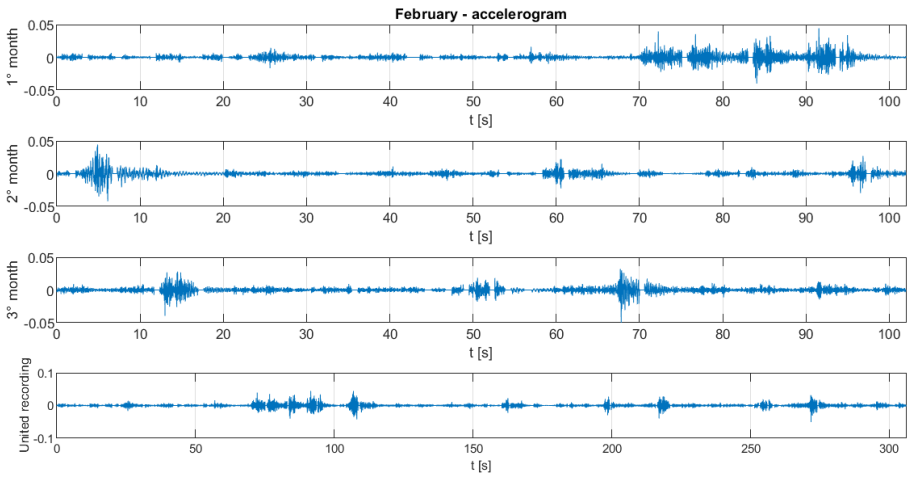


Figure 11-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.2.2 Longitudinal direction (y)

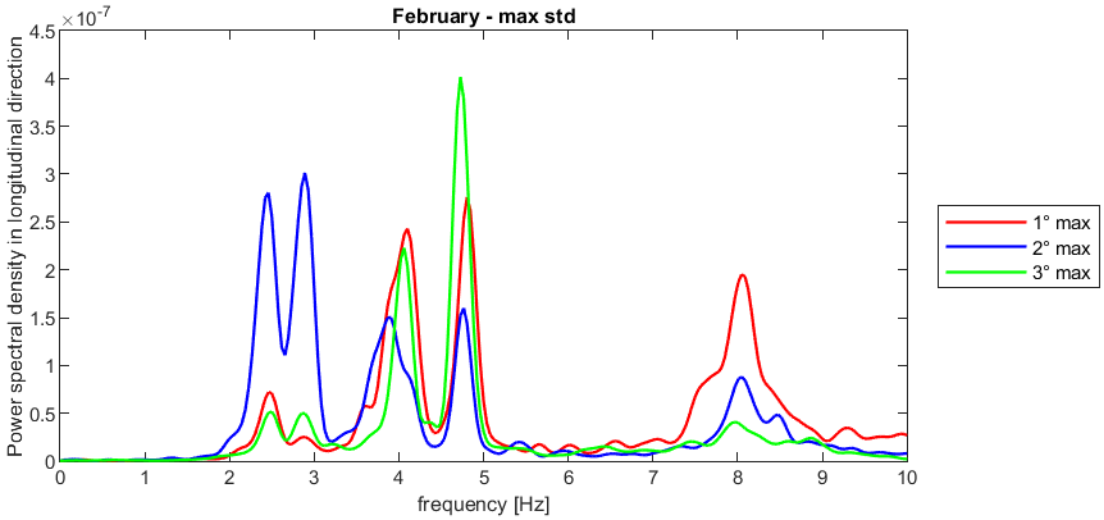


Figure 11-18: Results obtained from the 3 accelerograms with maximum SD in time domain

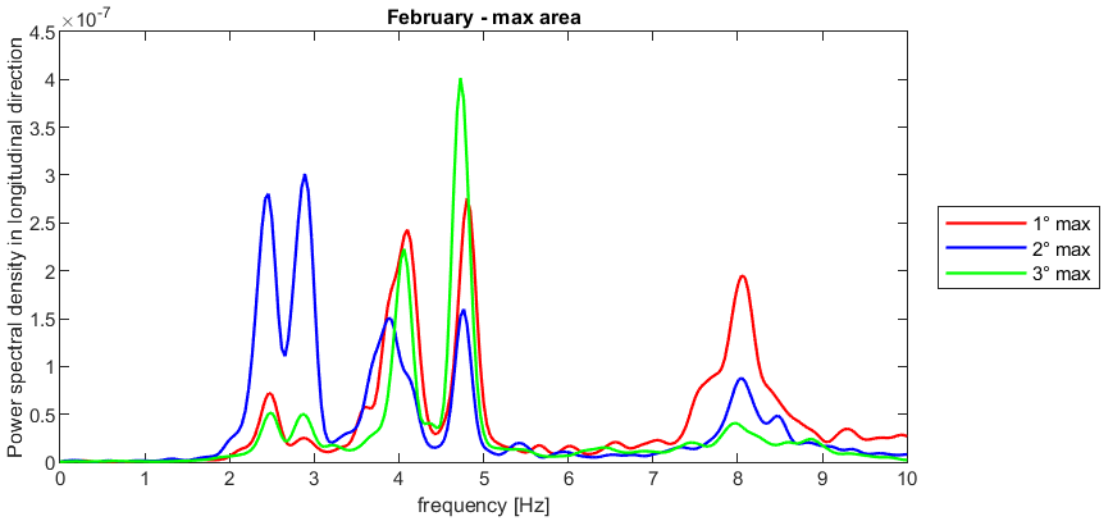


Figure 11-19: Results obtained from the 3 accelerograms with maximum area of PSD

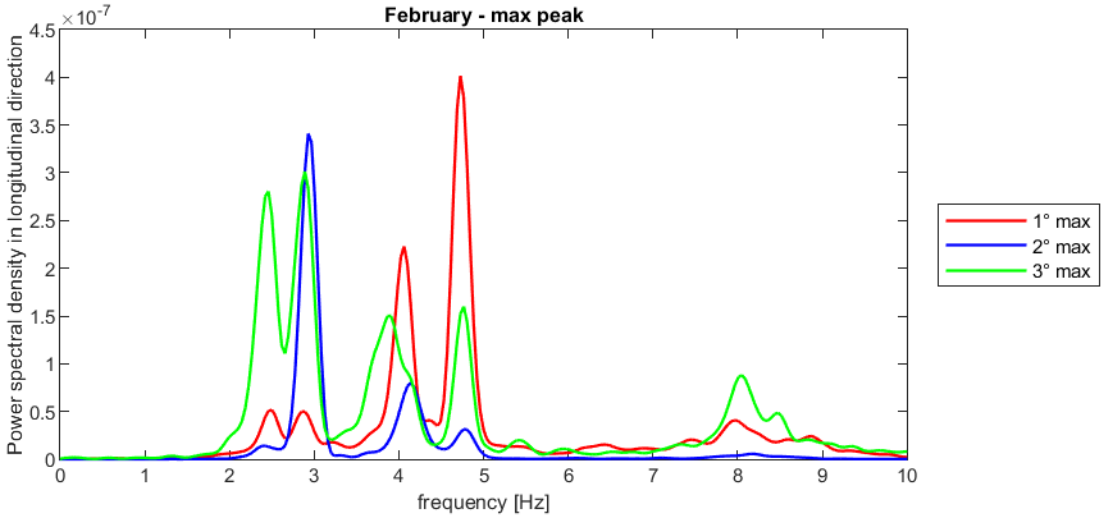


Figure 11-20: Results obtained from the 3 accelerograms with highest peak if PSD

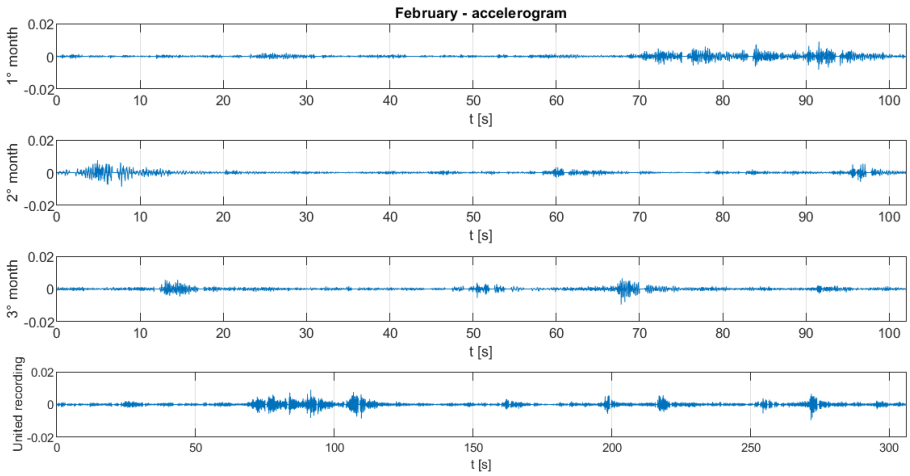


Figure 11-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

11.2.3 Transverse direction (z)

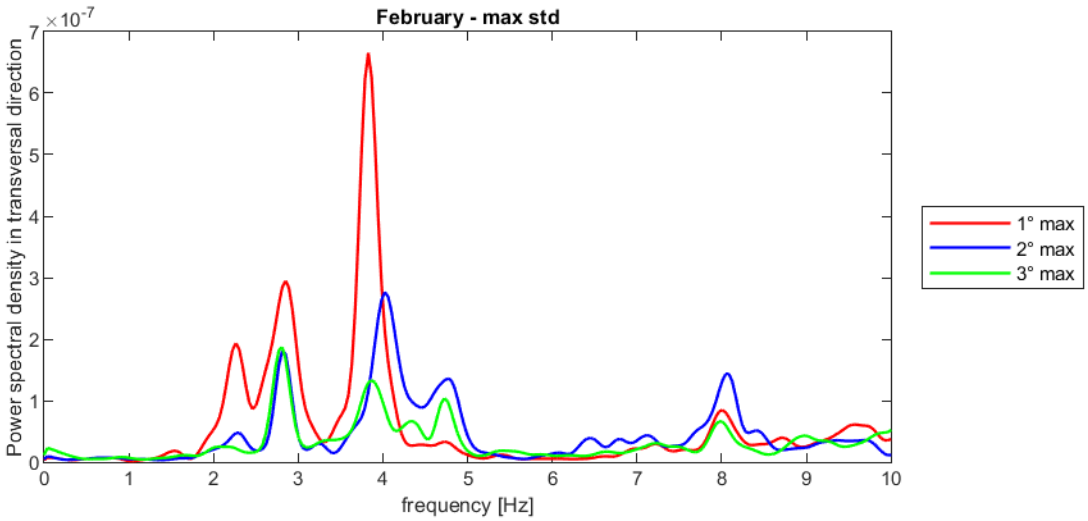


Figure 11-22: Results obtained from the 3 accelerograms with maximum SD in time domain

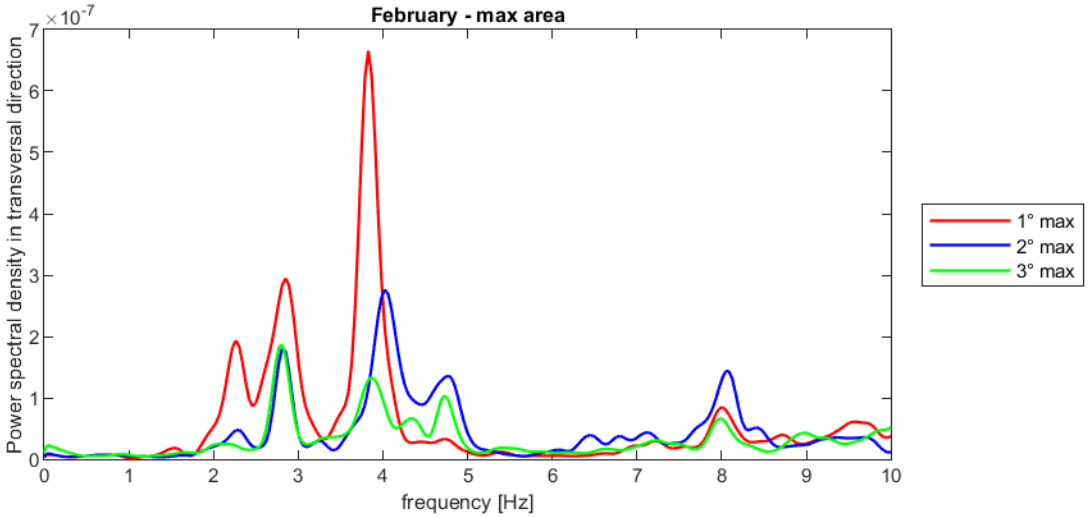


Figure 11-23: Results obtained from the 3 accelerograms with maximum area of PSD

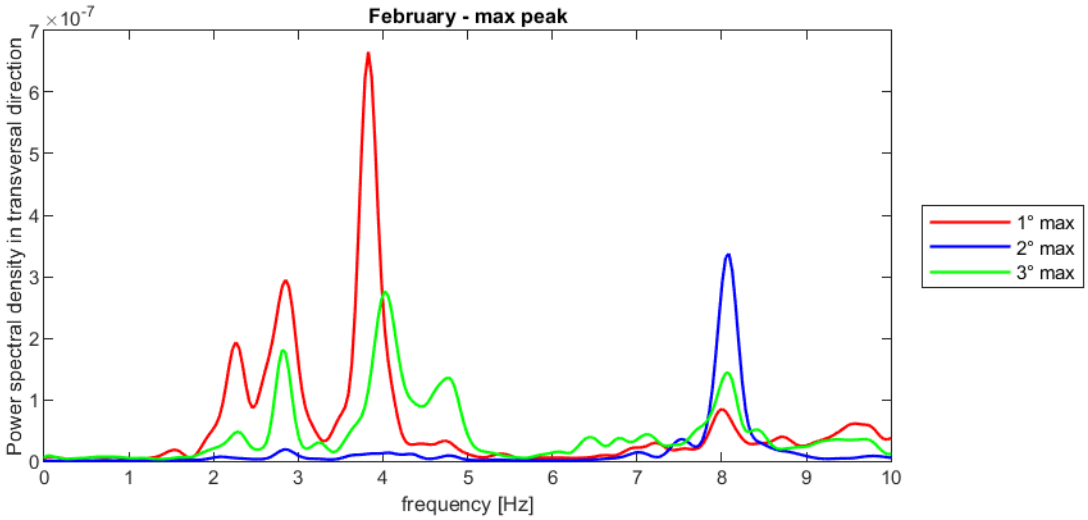


Figure 11-24: Results obtained from the 3 accelerograms with highest peak if PSD

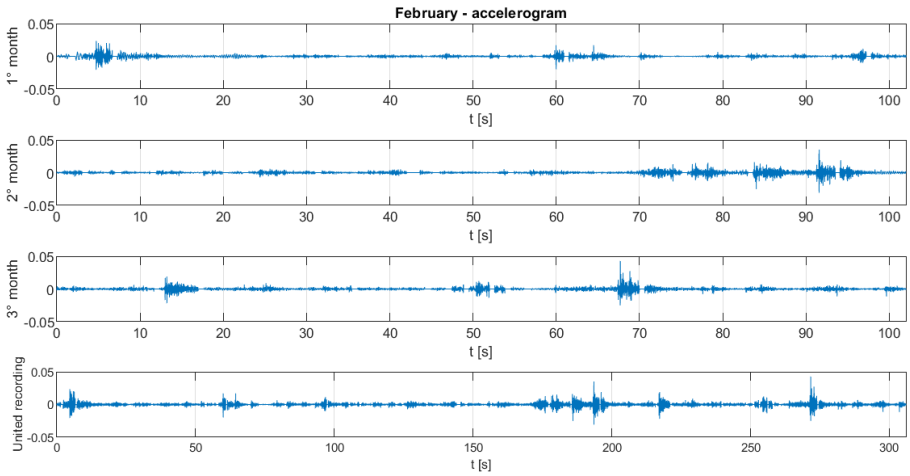


Figure 11-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

11.3 March

The results obtained for the March dataset are shown in the following tables.

Table 11-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-03-16_13-00-20	3.34E-03
	2°	31205_2023-03-04_13-00-21	2.11E-03
	3°	31205_2023-03-21_13-00-20	2.00E-03
Longitudinal direction (y)	1°	31205_2023-03-16_13-00-20	1.13E-03
	2°	31205_2023-03-04_13-00-21	7.87E-04
	3°	31205_2023-03-08_13-00-21	7.31E-04
Transverse direction (z)	1°	31205_2023-03-16_13-00-20	1.04E-03
	2°	31205_2023-03-04_13-00-21	7.59E-04
	3°	31205_2023-03-31_08-00-21	6.75E-04

Table 11-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-03-16_13-00-20	9.59E-06	31205_2023-03-16_13-00-20	2.42E-06
2	31205_2023-03-29_14-00-20	5.27E-06	31205_2023-03-04_13-00-21	8.75E-07
3	31205_2023-03-09_13-00-20	4.77E-06	31205_2023-03-09_13-00-20	8.13E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-03-16_13-00-20	1.01E-06	31205_2023-03-16_13-00-20	2.74E-07
2	31205_2023-03-29_14-00-20	8.35E-07	31205_2023-03-04_13-00-21	1.25E-07
3	31205_2023-03-04_13-00-21	6.45E-07	31205_2023-03-08_13-00-21	1.08E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-03-16_13-00-20	7.05E-07	31205_2023-03-16_13-00-20	2.28E-07
2	31205_2023-03-28_14-00-22	4.49E-07	31205_2023-03-04_13-00-21	1.19E-07
3	31205_2023-03-04_13-00-21	4.34E-07	31205_2023-03-31_08-00-21	9.49E-08

Table 11-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	-	B	B	-	B	B	-	B
3	-	C	C	D	B	D	E	B	E

11.3.1 Vertical direction (x)

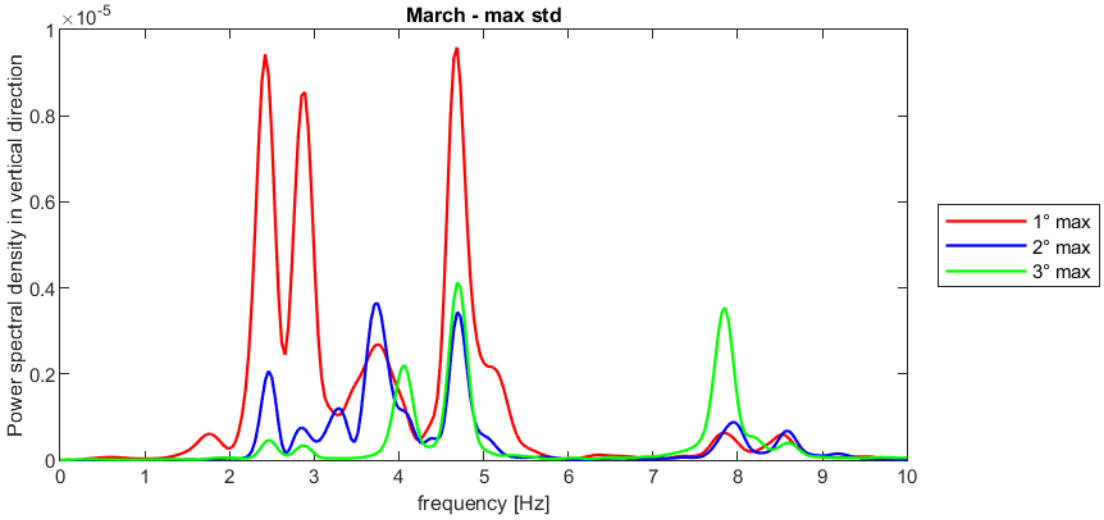


Figure 11-26: Results obtained from the 3 accelerograms with maximum SD in time domain

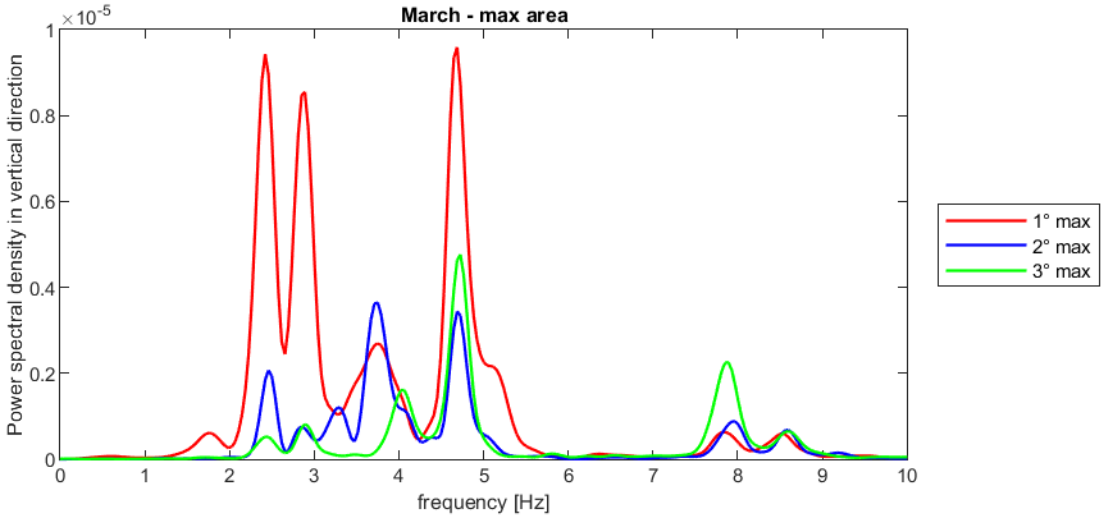


Figure 11-27: Results obtained from the 3 accelerograms with maximum area of PSD

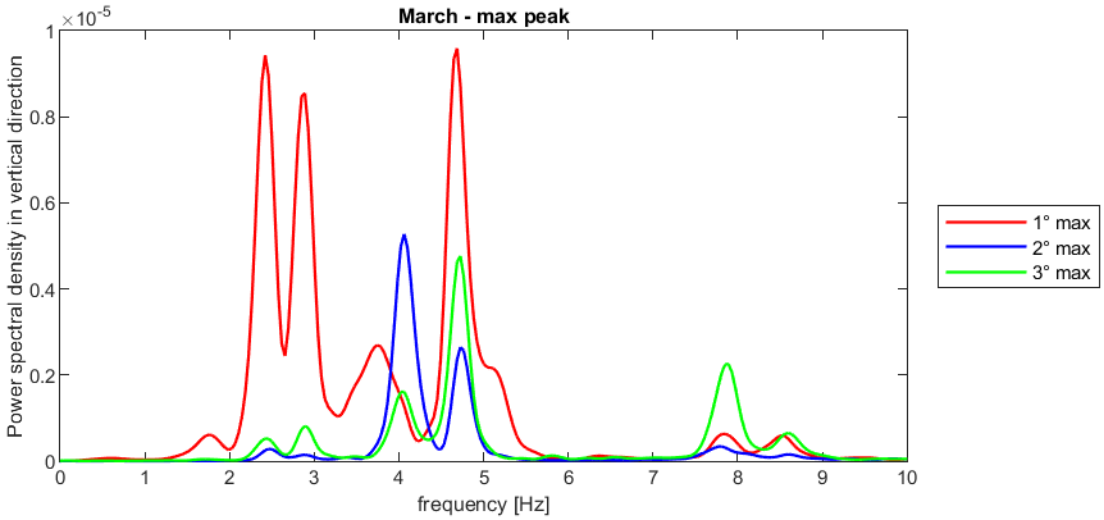


Figure 11-28: Results obtained from the 3 accelerograms with highest peak if PSD

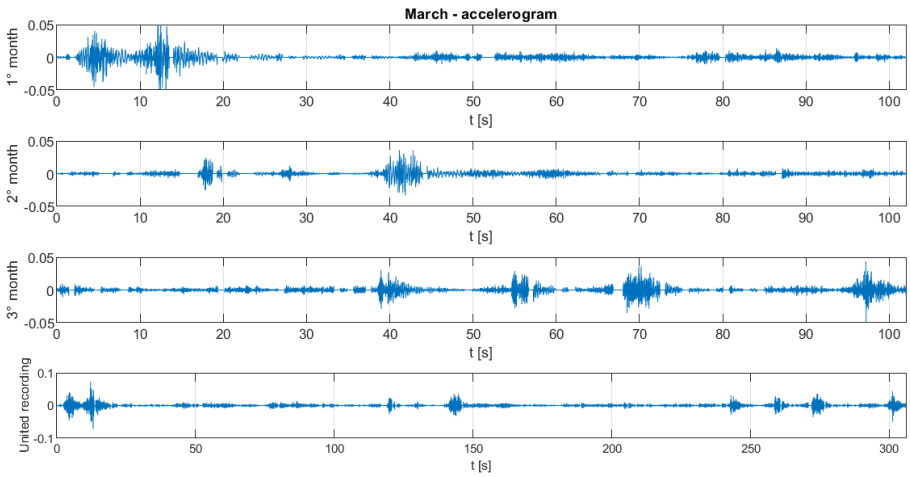


Figure 11-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.3.2 Longitudinal direction (y)

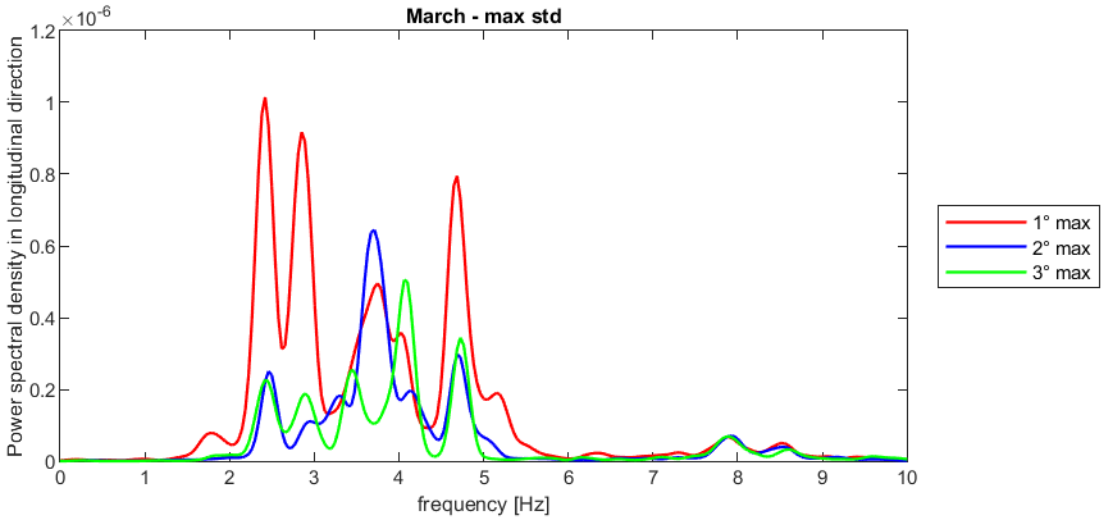


Figure 11-30: Results obtained from the 3 accelerograms with maximum SD in time domain

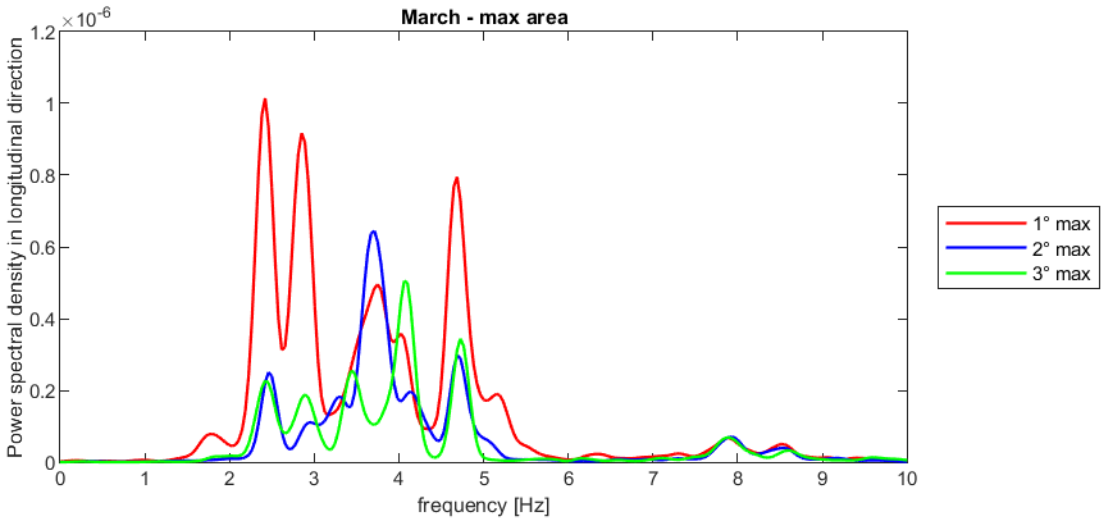


Figure 11-31: Results obtained from the 3 accelerograms with maximum area of PSD

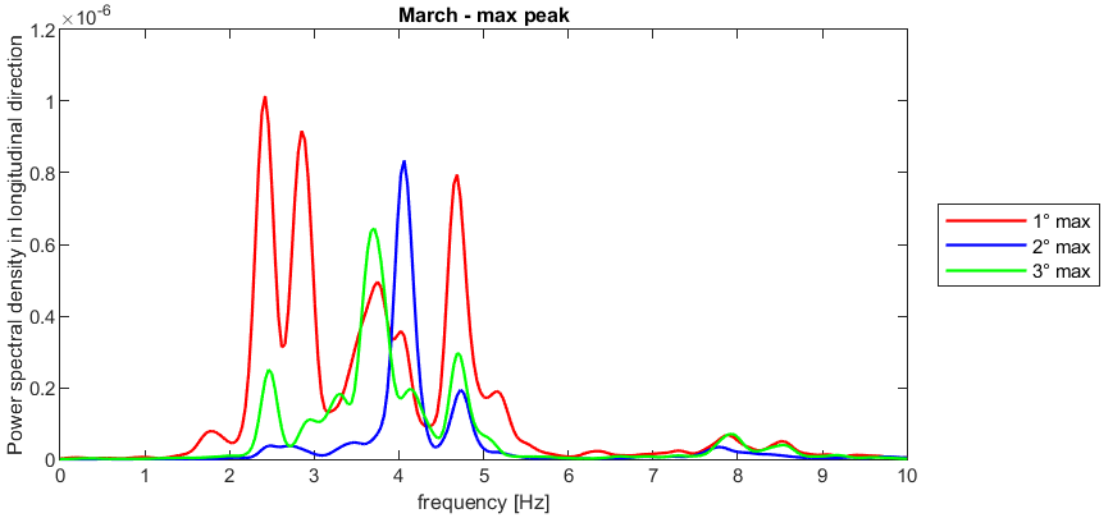


Figure 11-32: Results obtained from the 3 accelerograms with highest peak if PSD

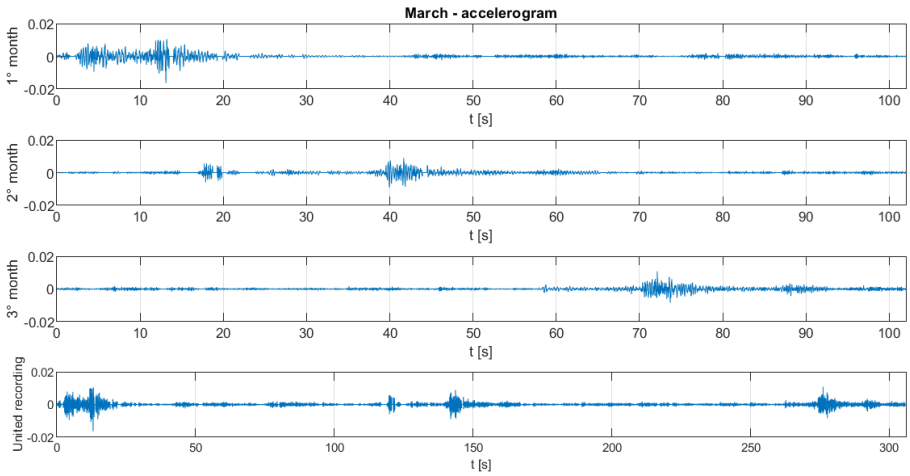


Figure 11-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

11.3.3 Transverse direction (z)

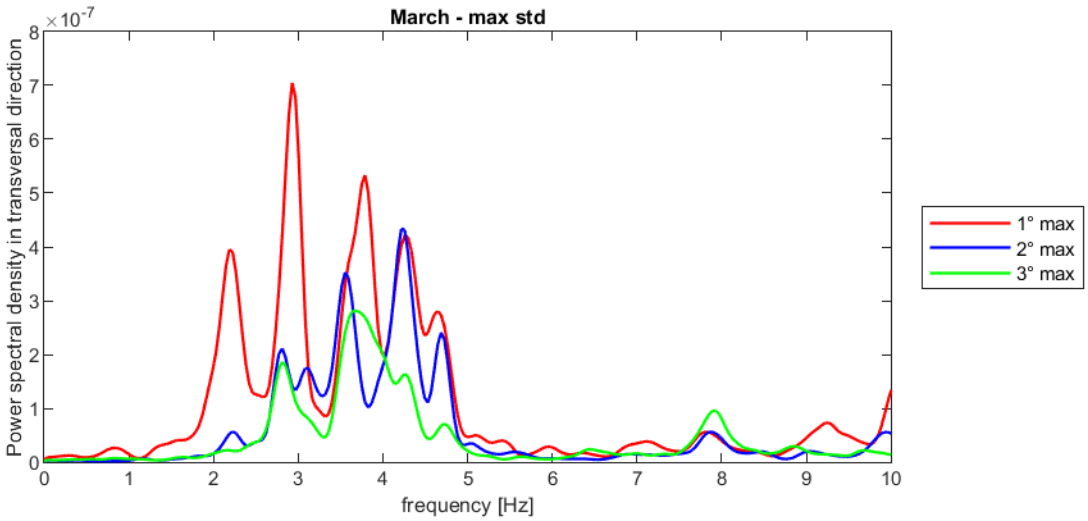


Figure 11-34: Results obtained from the 3 accelerograms with maximum SD in time domain

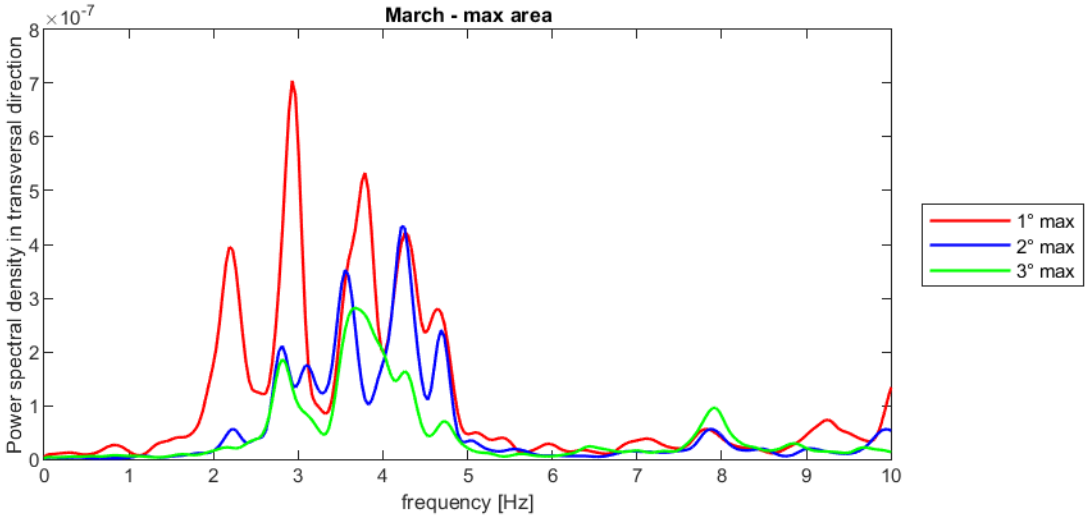


Figure 11-35: Results obtained from the 3 accelerograms with maximum area of PSD

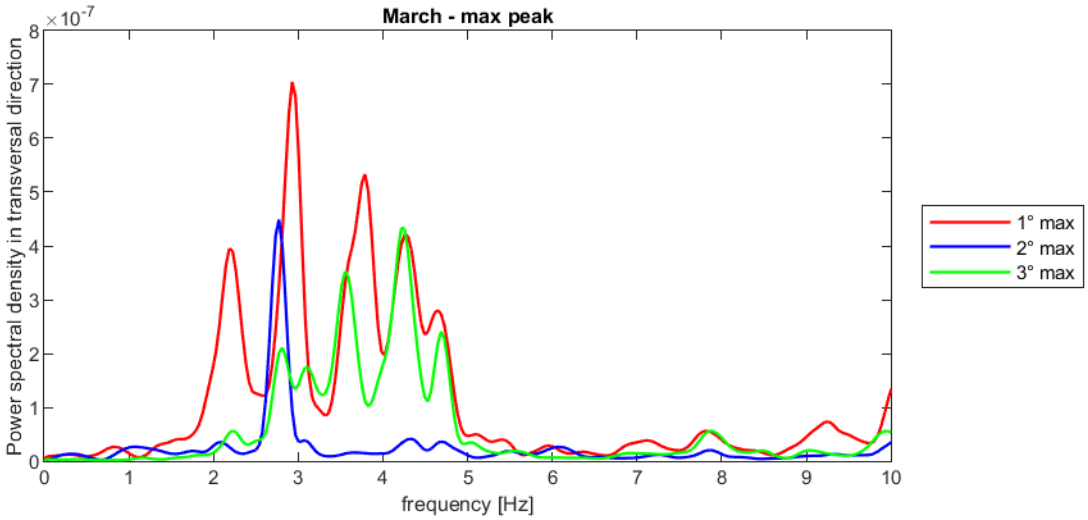


Figure 11-36: Results obtained from the 3 accelerograms with highest peak if PSD

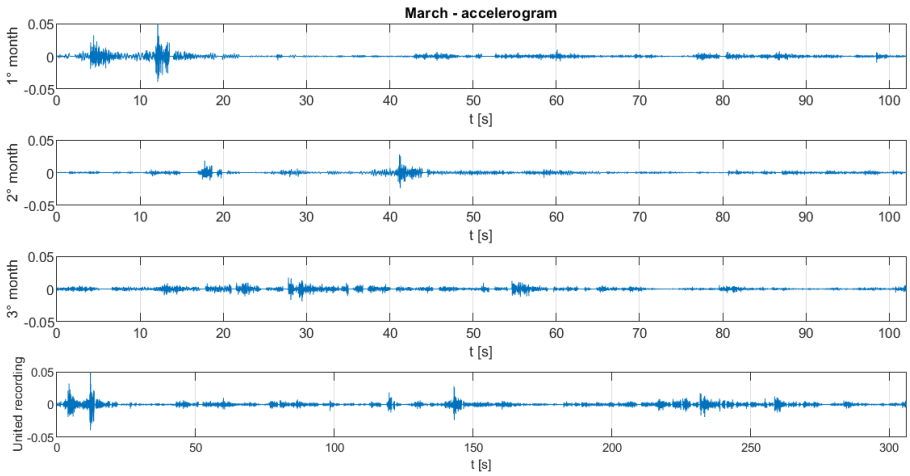


Figure 11-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

11.4 April

The results obtained for the April dataset are shown in the following tables.

Table 11-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-04-13_08-00-21	3.18E-03
	2°	31205_2023-04-24_14-00-21	2.08E-03
	3°	31205_2023-04-14_08-00-20	2.02E-03
Longitudinal direction (y)	1°	31205_2023-04-13_08-00-21	1.07E-03
	2°	31205_2023-04-24_14-00-21	7.27E-04
	3°	31205_2023-04-18_14-00-20	6.52E-04
Transverse direction (z)	1°	31205_2023-04-24_14-00-21	8.98E-04
	2°	31205_2023-04-13_08-00-21	8.95E-04
	3°	31205_2023-04-14_08-00-20	6.75E-04

Table 11-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-04-13_08-00-21	2.32E-05	31205_2023-04-13_08-00-21	2.00E-06
2	31205_2023-04-24_14-00-21	6.98E-06	31205_2023-04-24_14-00-21	9.37E-07
3	31205_2023-04-04_14-00-20	5.82E-06	31205_2023-04-14_08-00-20	8.04E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-04-13_08-00-21	2.55E-06	31205_2023-04-13_08-00-21	2.29E-07
2	31205_2023-04-24_14-00-21	7.71E-07	31205_2023-04-24_14-00-21	1.14E-07
3	31205_2023-04-04_14-00-20	5.25E-07	31205_2023-04-18_14-00-20	8.68E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-04-24_14-00-21	1.49E-06	31205_2023-04-24_14-00-21	1.67E-07
2	31205_2023-04-13_08-00-21	9.89E-07	31205_2023-04-13_08-00-21	1.64E-07
3	31205_2023-04-04_14-00-20	4.76E-07	31205_2023-04-14_08-00-20	9.00E-08

Table 11-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	B	B	B
2	B	B	B	B	B	B	A	A	A
3	C	-	C	D	-	D	C	-	C

11.4.1 Vertical direction (x)

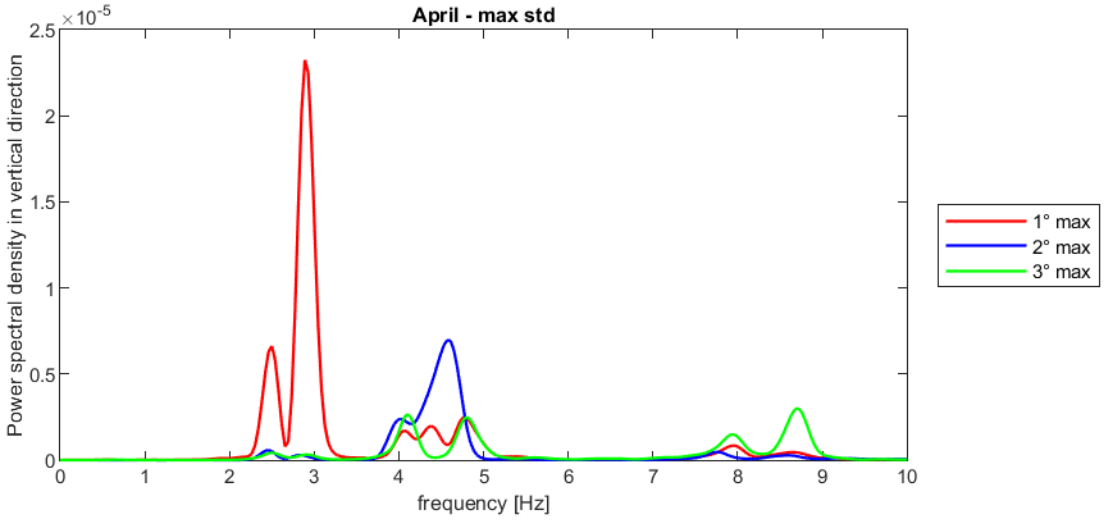


Figure 11-38: Results obtained from the 3 accelerograms with maximum SD in time domain

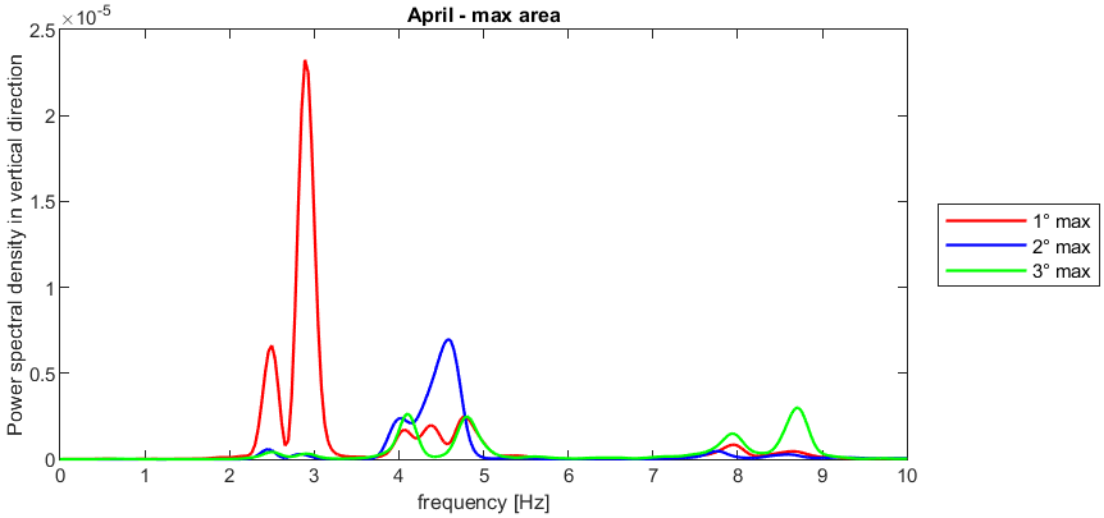


Figure 11-39: Results obtained from the 3 accelerograms with maximum area of PSD

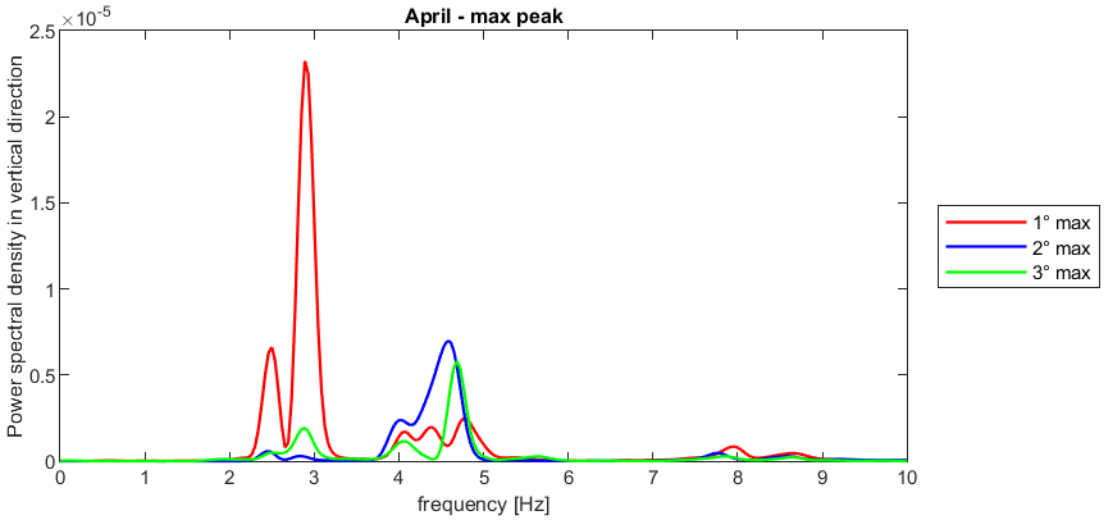


Figure 11-40: Results obtained from the 3 accelerograms with highest peak if PSD

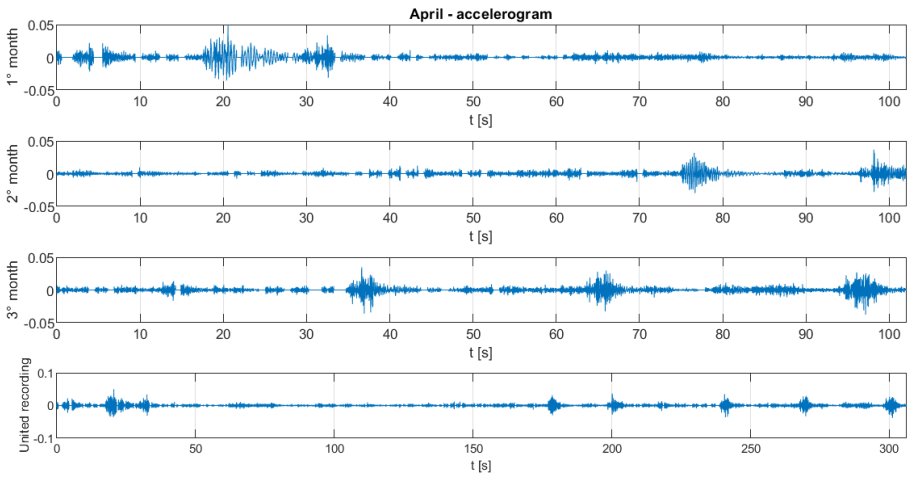


Figure 11-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.4.2 Longitudinal direction (y)

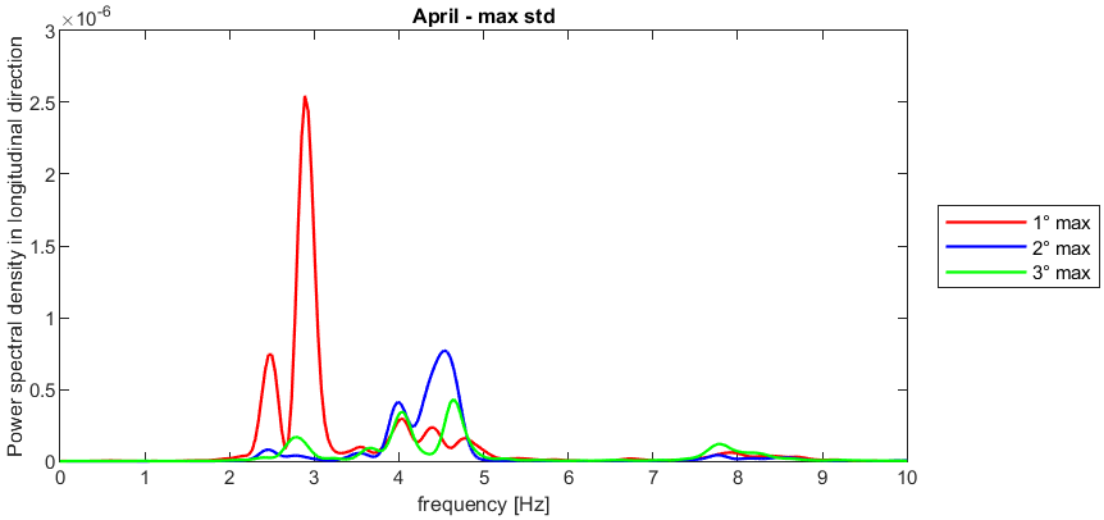


Figure 11-42: Results obtained from the 3 accelerograms with maximum SD in time domain

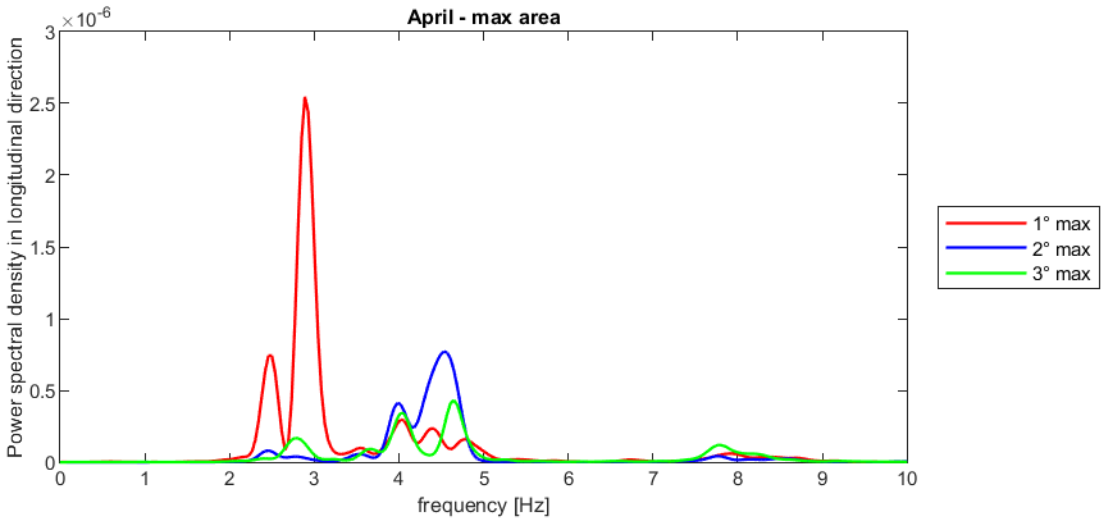


Figure 11-43: Results obtained from the 3 accelerograms with maximum area of PSD

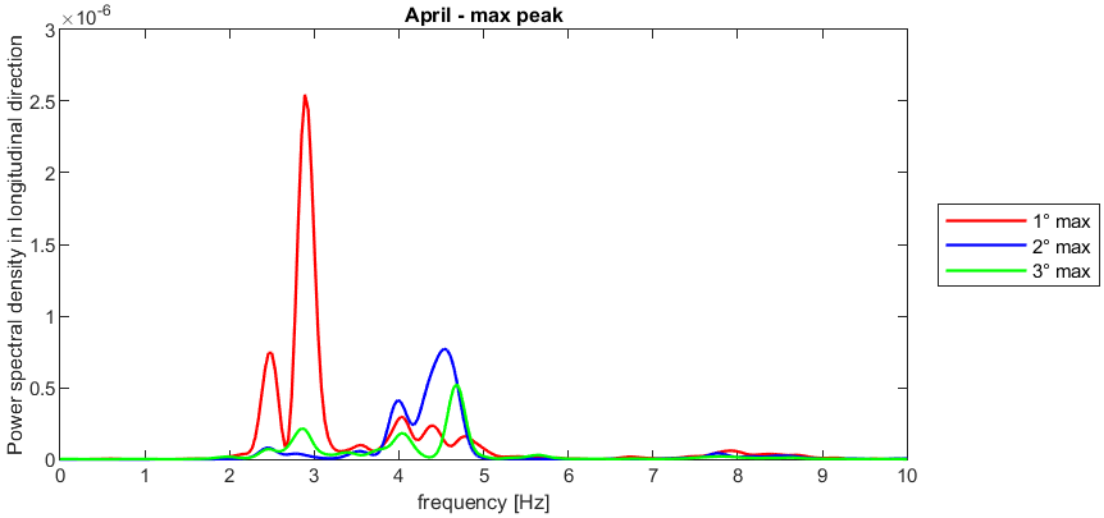


Figure 11-44: Results obtained from the 3 accelerograms with highest peak if PSD

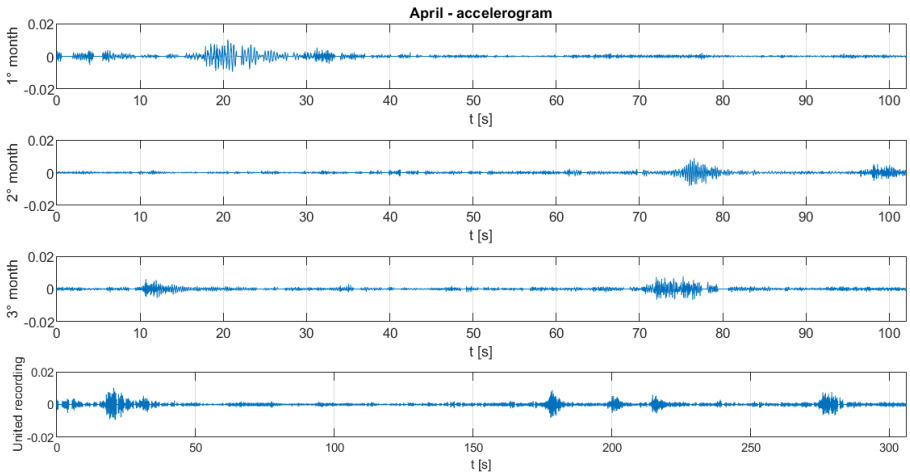


Figure 11-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

11.4.3 Transverse direction (z)

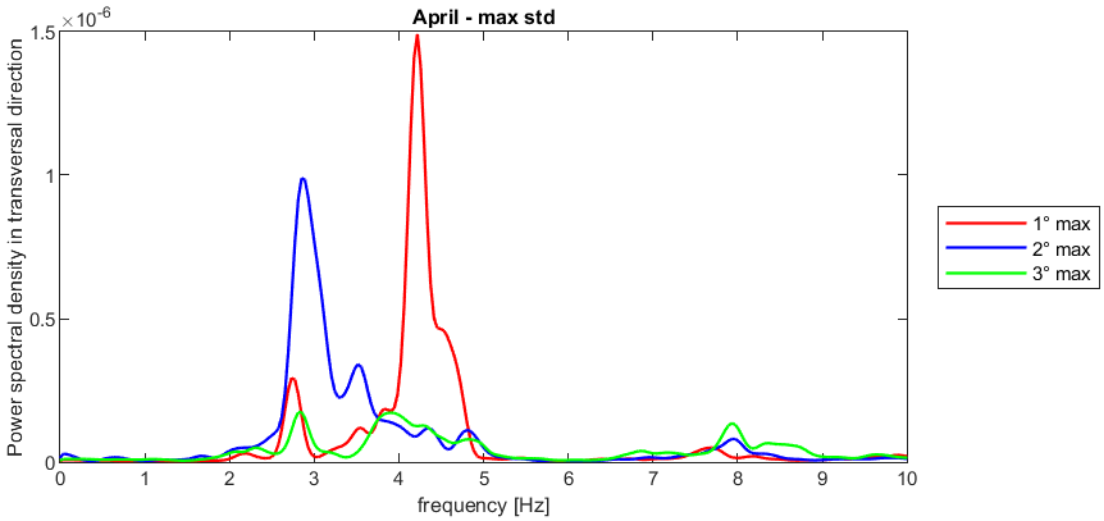


Figure 11-46: Results obtained from the 3 accelerograms with maximum SD in time domain

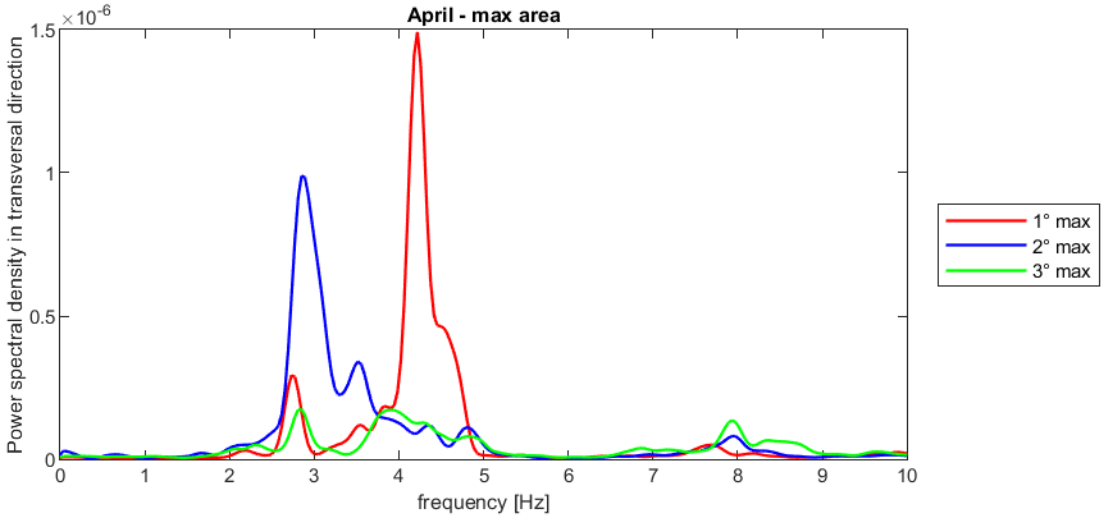


Figure 11-47: Results obtained from the 3 accelerograms with maximum area of PSD

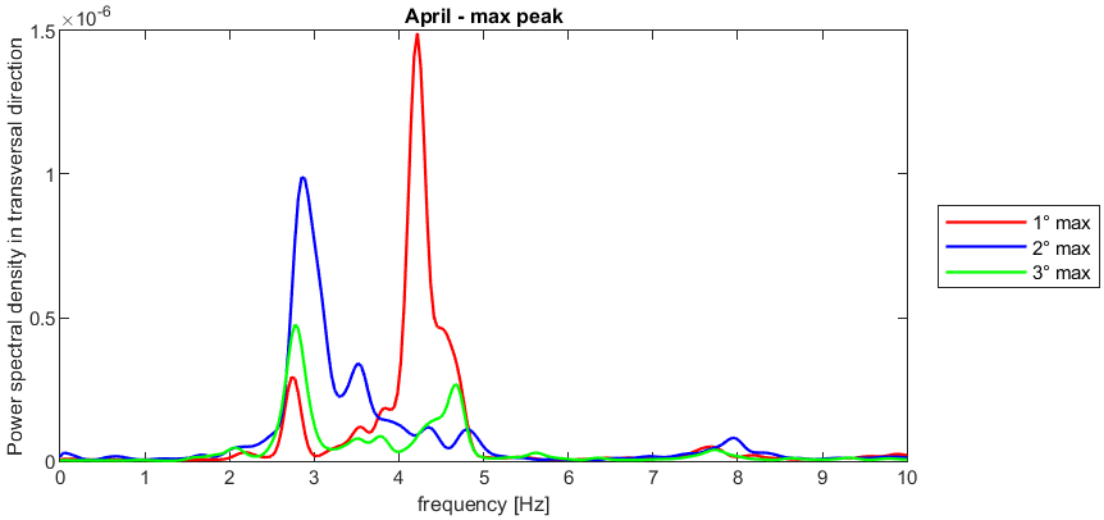


Figure 11-48: Results obtained from the 3 accelerograms with highest peak if PSD

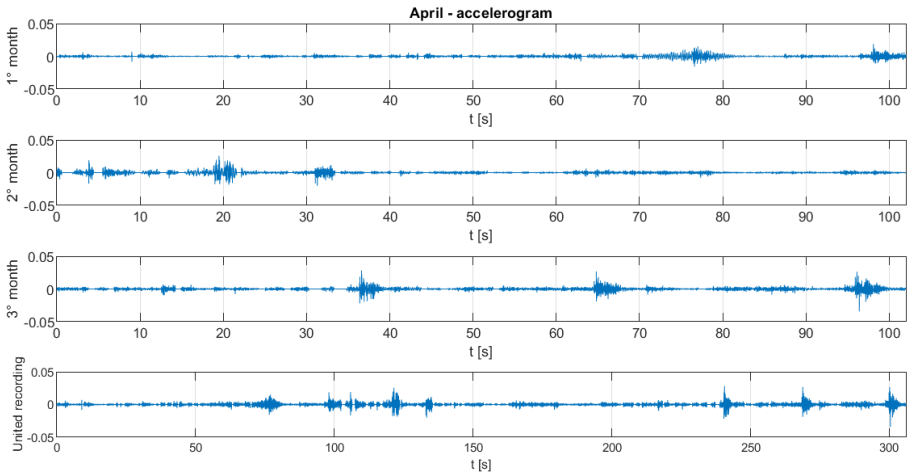


Figure 11-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

11.5 May

The results obtained for the May dataset are shown in the following tables.

Table 11-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-05-23_14-00-21	3.33E-03
	2°	31205_2023-05-04_14-00-21	2.39E-03
	3°	31205_2023-05-22_08-00-21	2.04E-03
Longitudinal direction (y)	1°	31205_2023-05-23_14-00-21	1.17E-03
	2°	31205_2023-05-04_14-00-21	7.87E-04
	3°	31205_2023-05-22_08-00-21	6.36E-04
Transverse direction (z)	1°	31205_2023-05-23_14-00-21	1.05E-03
	2°	31205_2023-05-04_14-00-21	8.16E-04
	3°	31205_2023-05-22_08-00-21	5.99E-04

Table 11-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-05-23_14-00-21	1.37E-05	31205_2023-05-23_14-00-21	2.21E-06
2	31205_2023-05-04_14-00-21	6.30E-06	31205_2023-05-04_14-00-21	1.15E-06
3	31205_2023-05-22_08-00-21	5.04E-06	31205_2023-05-22_08-00-21	8.58E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-05-23_14-00-21	1.75E-06	31205_2023-05-23_14-00-21	2.68E-07
2	31205_2023-05-04_14-00-21	5.32E-07	31205_2023-05-04_14-00-21	1.23E-07
3	31205_2023-05-22_08-00-21	4.28E-07	31205_2023-05-22_08-00-21	8.31E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-05-23_14-00-21	1.20E-06	31205_2023-05-23_14-00-21	2.23E-07
2	31205_2023-05-04_14-00-21	8.06E-07	31205_2023-05-04_14-00-21	1.37E-07
3	31205_2023-05-31_14-00-20	2.70E-07	31205_2023-05-22_08-00-21	7.48E-08

Table 11-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	B	B	B	B	B	B
3	C	C	C	C	C	C	C	-	C

11.5.1 Vertical direction (x)

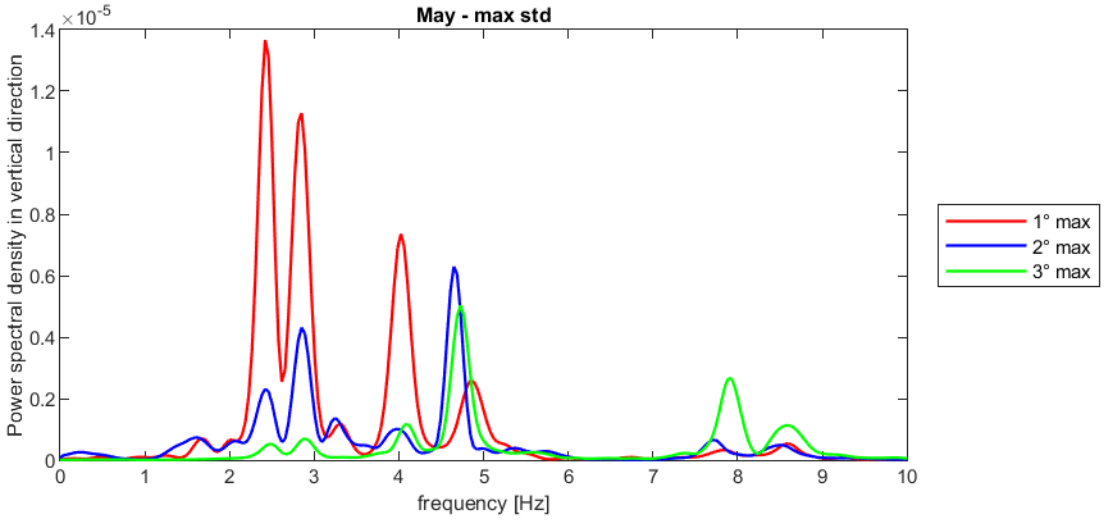


Figure 11-50: Results obtained from the 3 accelerograms with maximum SD in time domain

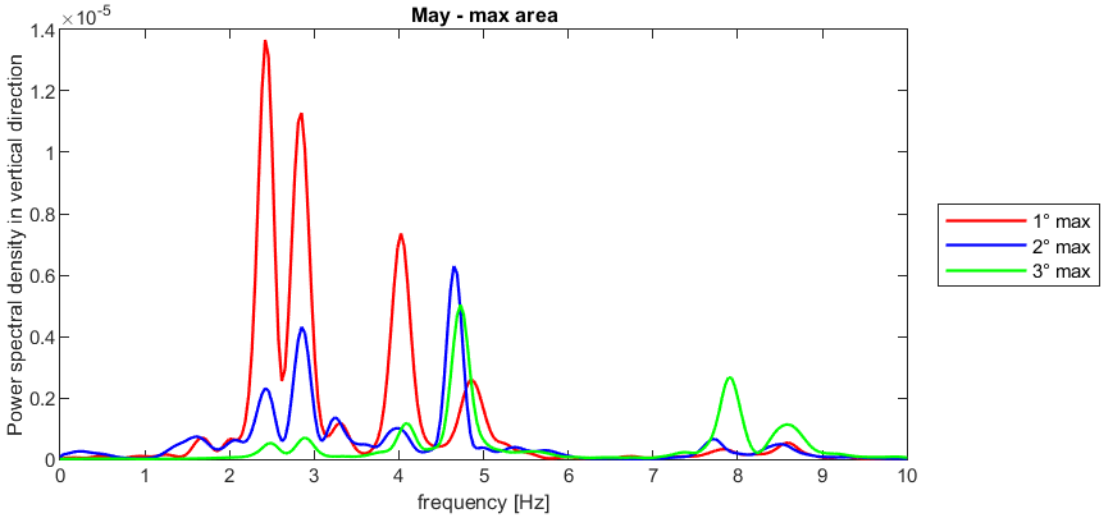


Figure 11-51: Results obtained from the 3 accelerograms with maximum area of PSD

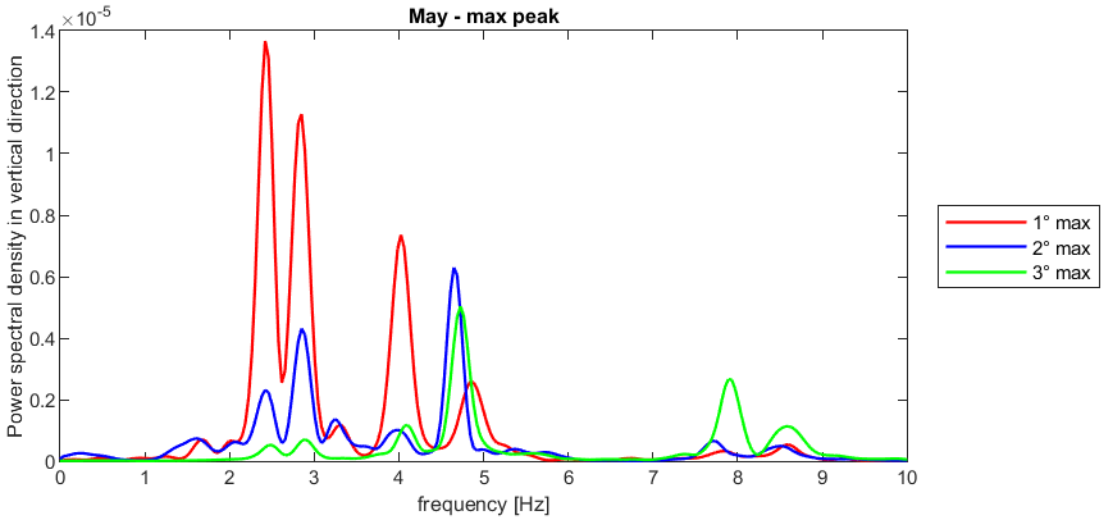


Figure 11-52: Results obtained from the 3 accelerograms with highest peak if PSD

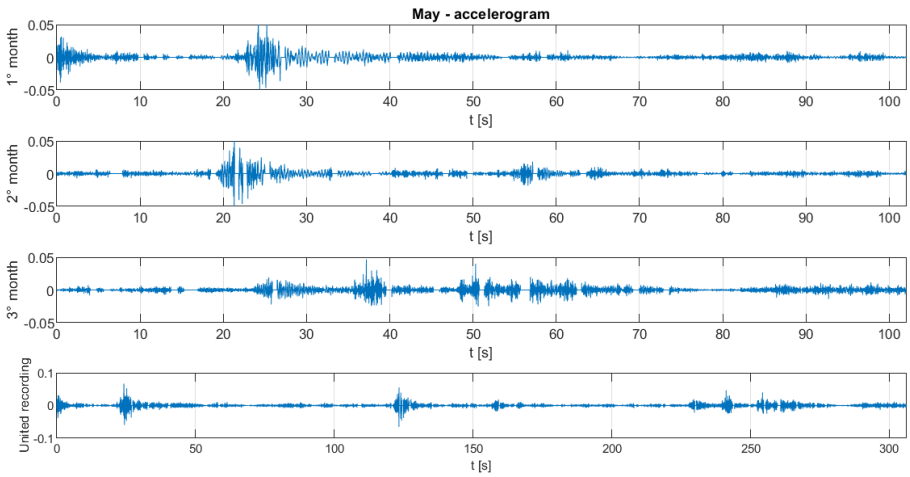


Figure 11-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.5.2 Longitudinal direction (y)

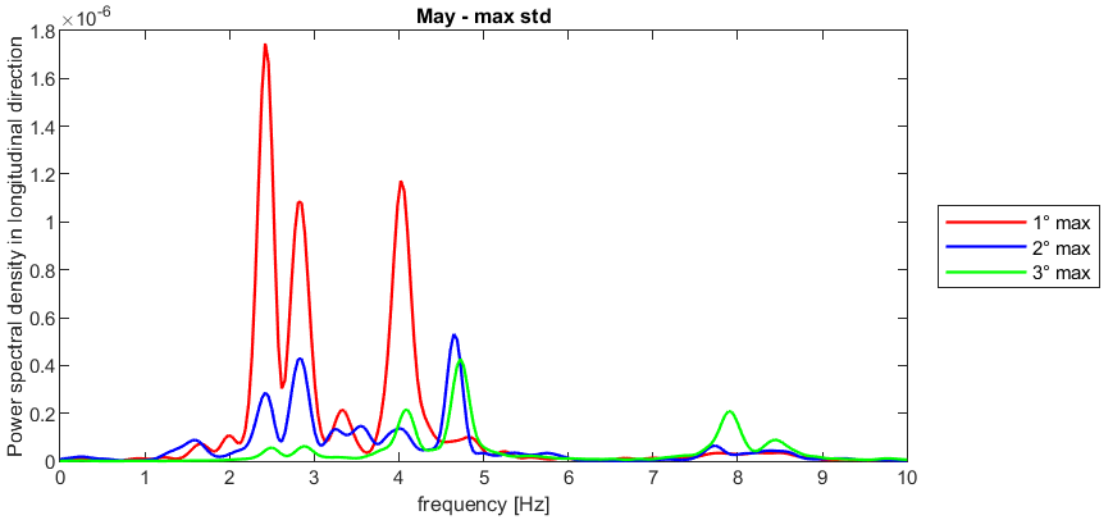


Figure 11-54: Results obtained from the 3 accelerograms with maximum SD in time domain

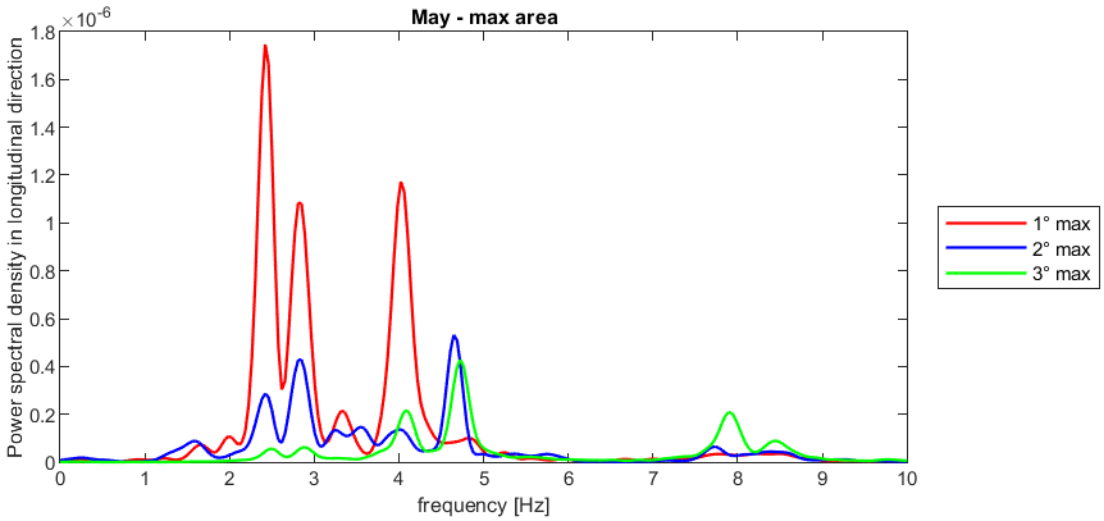


Figure 11-55: Results obtained from the 3 accelerograms with maximum area of PSD

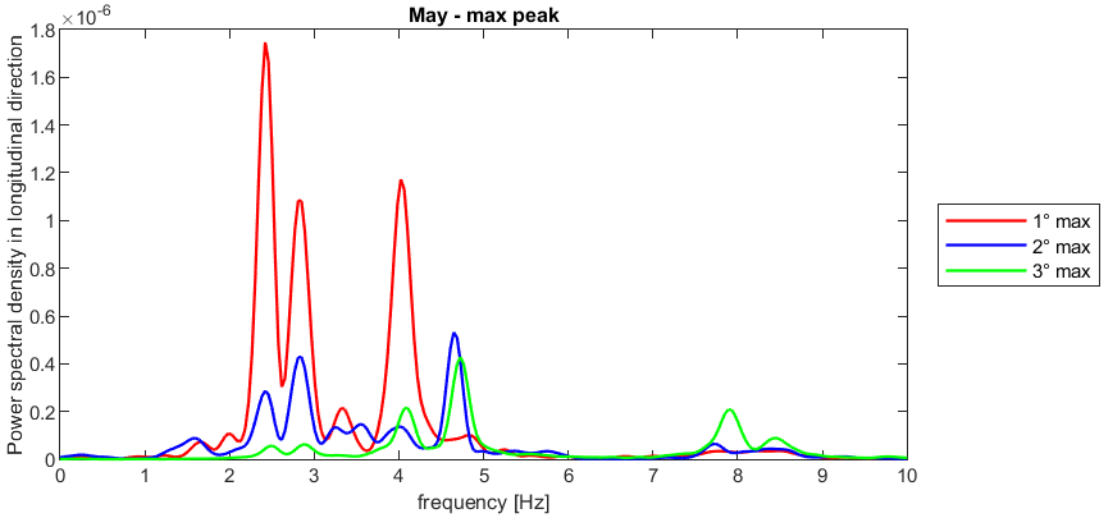


Figure 11-56: Results obtained from the 3 accelerograms with highest peak if PSD

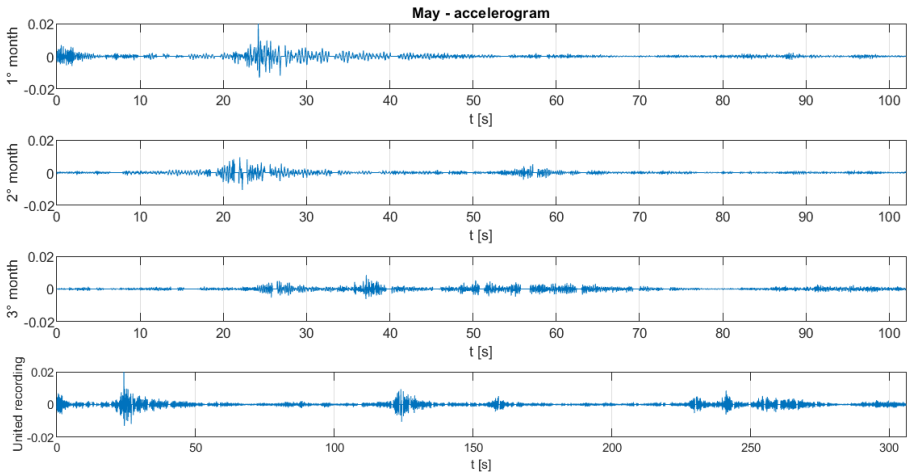


Figure 11-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

11.5.3 Transverse direction (z)

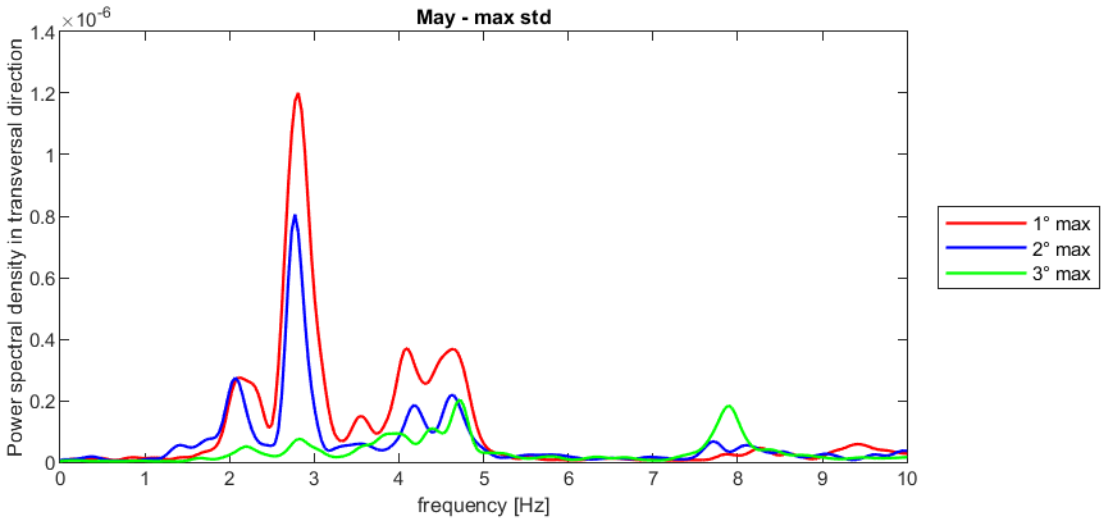


Figure 11-58: Results obtained from the 3 accelerograms with maximum SD in time domain

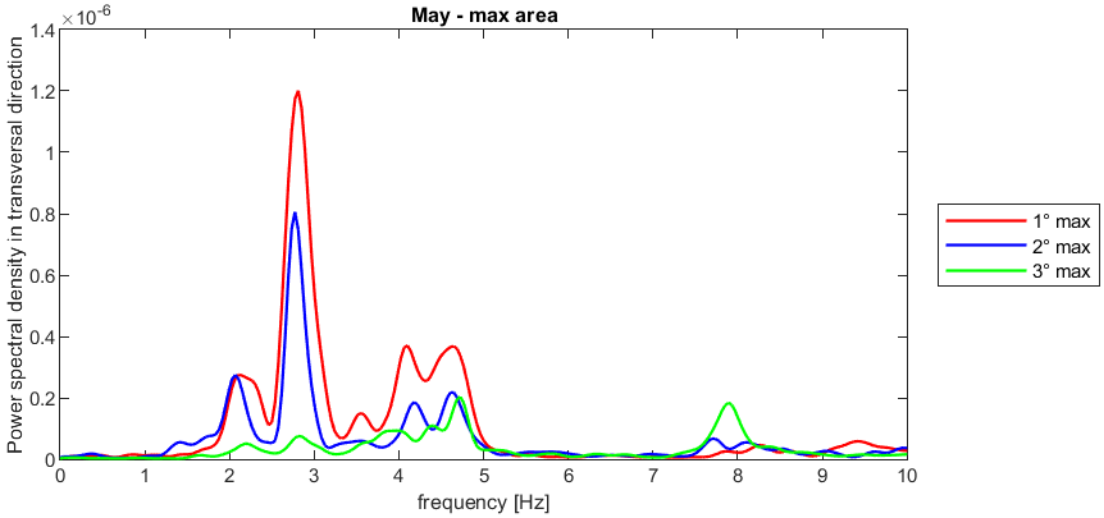


Figure 11-59: Results obtained from the 3 accelerograms with maximum area of PSD

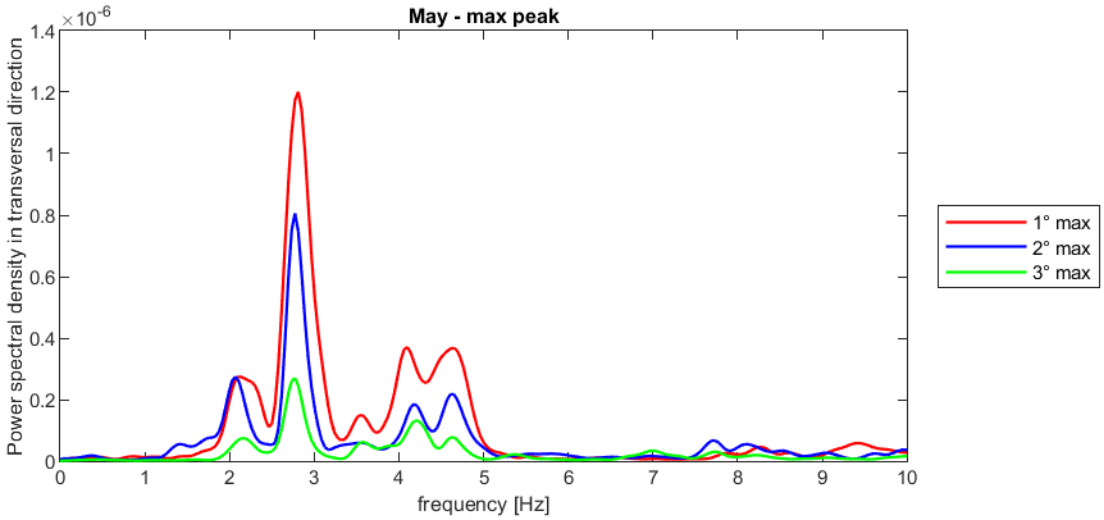


Figure 11-60: Results obtained from the 3 accelerograms with highest peak if PSD

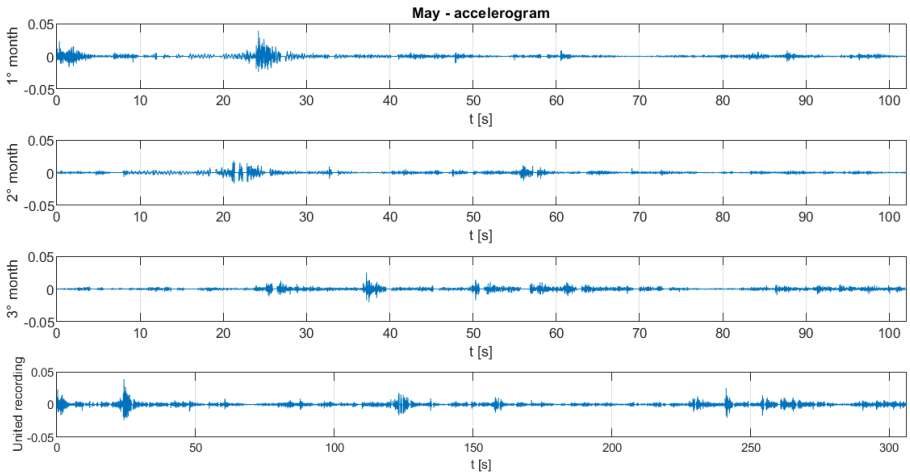


Figure 11-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

11.6 June

The results obtained for the June dataset are shown in the following tables.

Table 11-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-06-13_08-00-20	1.91E-03
	2°	31205_2023-06-10_08-00-21	1.89E-03
	3°	31205_2023-06-21_08-00-21	1.88E-03
Longitudinal direction (y)	1°	31205_2023-06-10_08-00-21	7.17E-04
	2°	31205_2023-06-13_08-00-20	6.41E-04
	3°	31205_2023-06-21_08-00-21	6.10E-04
Transverse direction (z)	1°	31205_2023-06-10_08-00-21	9.24E-04
	2°	31205_2023-06-13_08-00-20	7.30E-04
	3°	31205_2023-06-21_08-00-21	6.97E-04

Table 11-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-06-21_08-00-21	5.09E-06	31205_2023-06-13_08-00-20	7.51E-07
2	31205_2023-06-10_08-00-21	4.88E-06	31205_2023-06-21_08-00-21	6.85E-07
3	31205_2023-06-30_08-00-21	3.59E-06	31205_2023-06-10_08-00-21	6.73E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-06-21_08-00-21	6.19E-07	31205_2023-06-10_08-00-21	9.54E-08
2	31205_2023-06-10_08-00-21	4.34E-07	31205_2023-06-13_08-00-20	8.53E-08
3	31205_2023-06-15_08-00-21	4.13E-07	31205_2023-06-21_08-00-21	7.27E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-06-10_08-00-21	1.31E-06	31205_2023-06-10_08-00-21	1.73E-07
2	31205_2023-06-21_08-00-21	6.71E-07	31205_2023-06-13_08-00-20	1.06E-07
3	31205_2023-06-13_08-00-20	5.09E-07	31205_2023-06-21_08-00-21	9.69E-08

Table 11-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	B	C	B	B	B	B
2	B	B	C	A	B	A	A	C	A
3	C	-	B	C	-	C	C	A	C

11.6.1 Vertical direction (x)

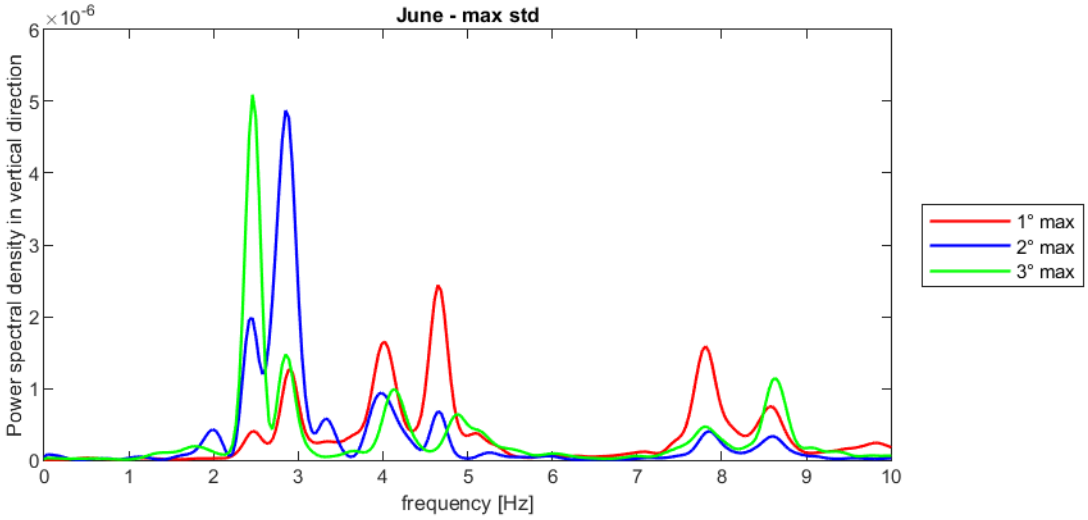


Figure 11-62: Results obtained from the 3 accelerograms with maximum SD in time domain

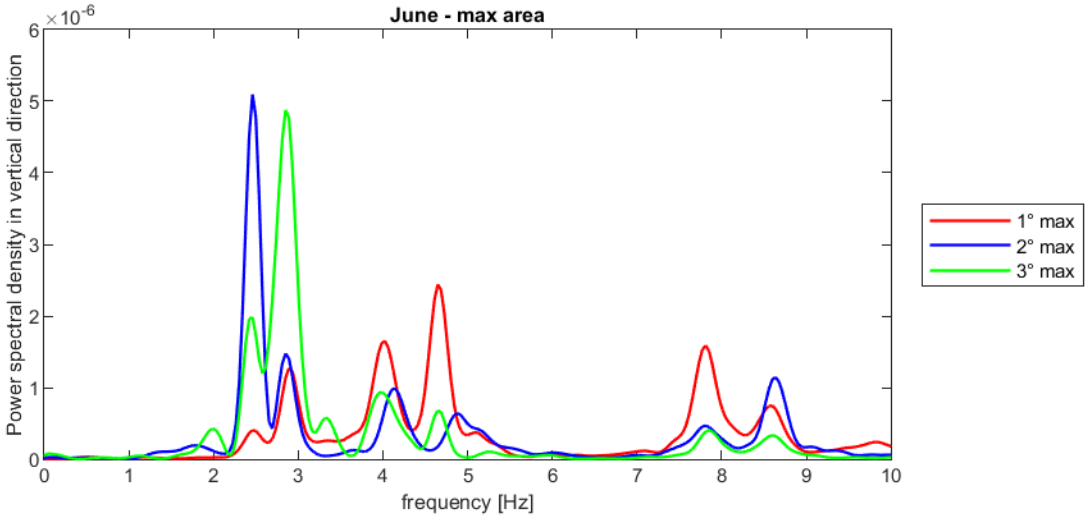


Figure 11-63: Results obtained from the 3 accelerograms with maximum area of PSD

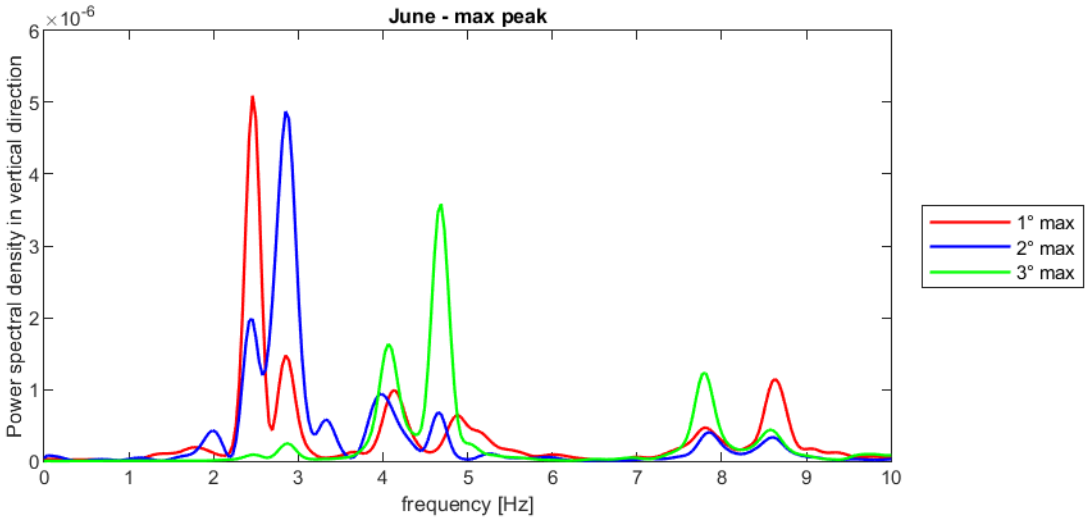


Figure 11-64: Results obtained from the 3 accelerograms with highest peak if PSD

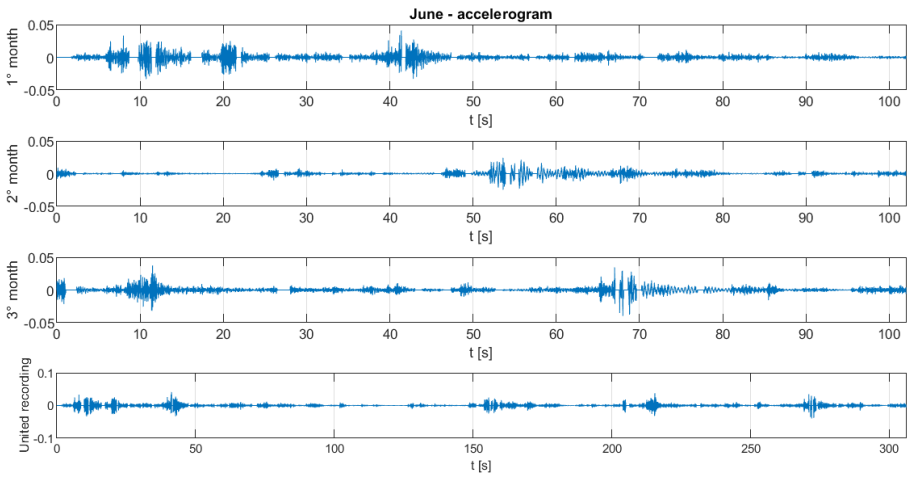


Figure 11-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.6.2 Longitudinal direction (y)

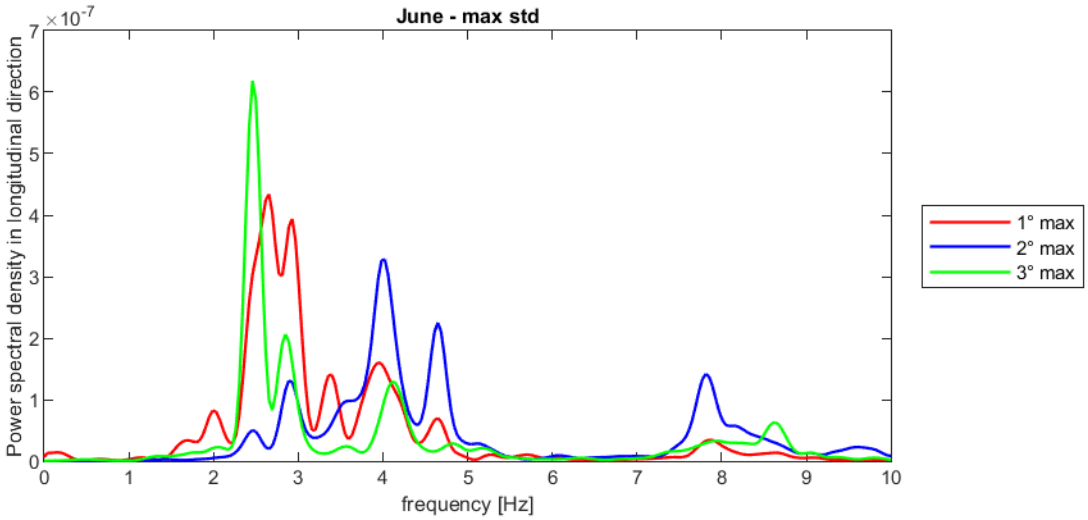


Figure 11-66: Results obtained from the 3 accelerograms with maximum SD in time domain

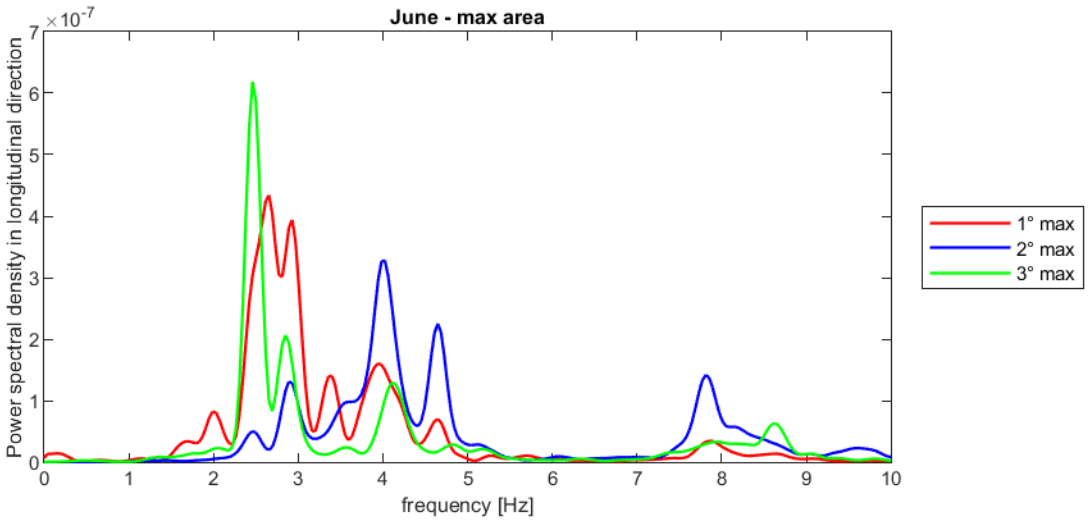


Figure 11-67: Results obtained from the 3 accelerograms with maximum area of PSD

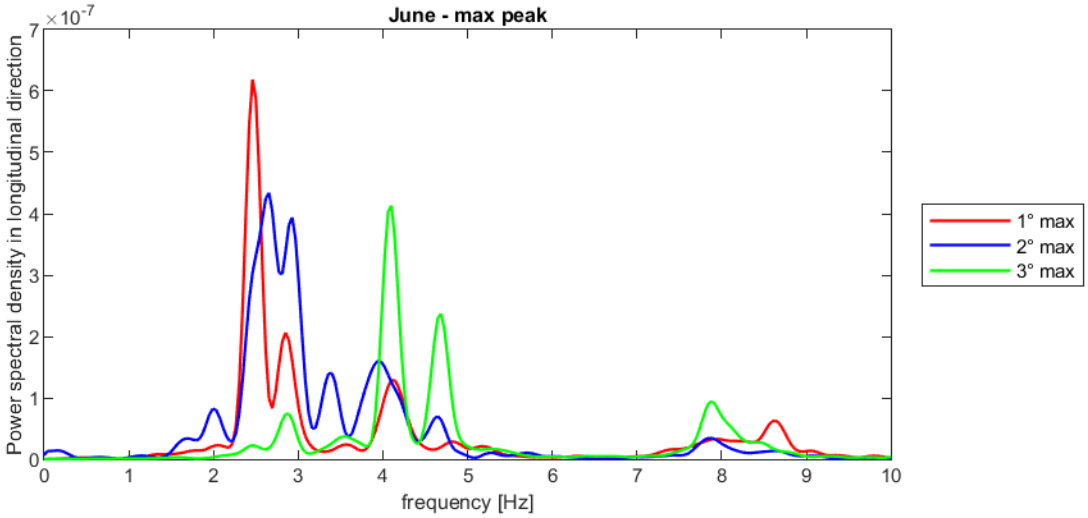


Figure 11-68: Results obtained from the 3 accelerograms with highest peak if PSD

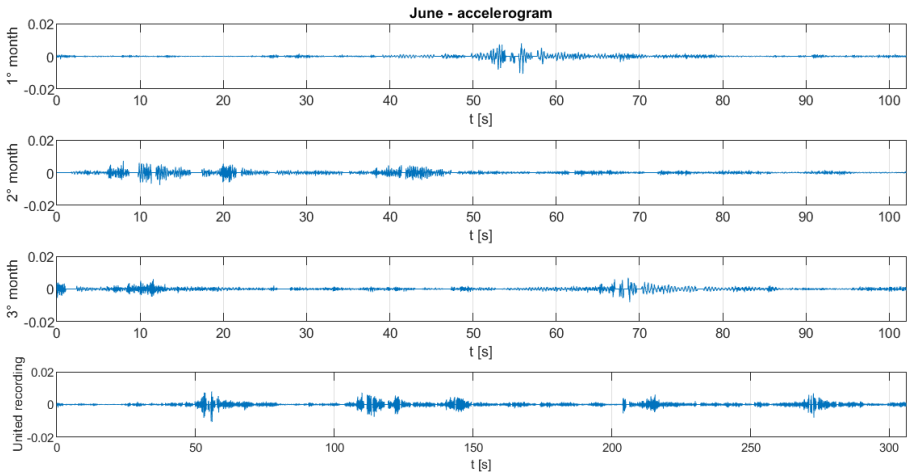


Figure 11-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

11.6.3 Transverse direction (z)

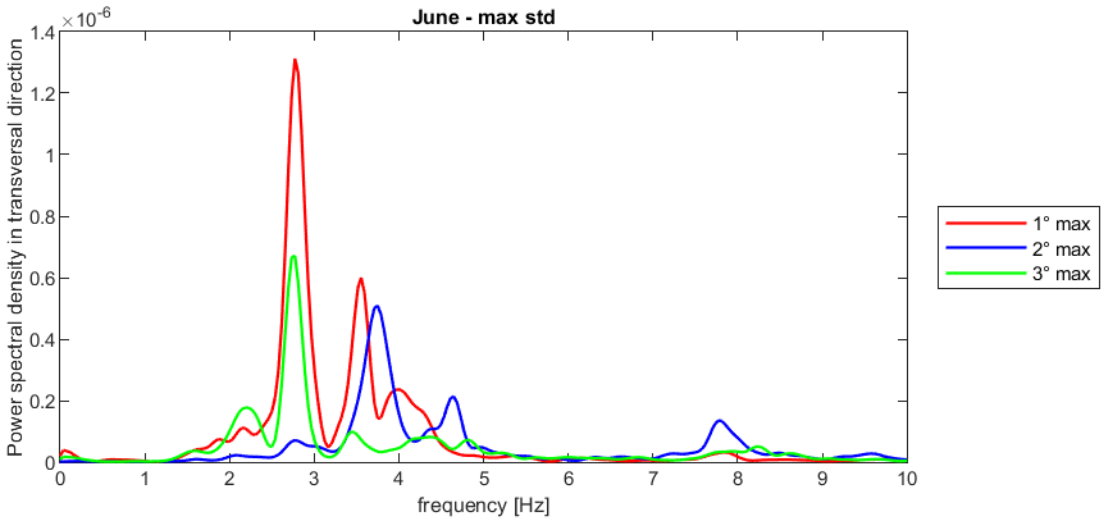


Figure 11-70: Results obtained from the 3 accelerograms with maximum SD in time domain

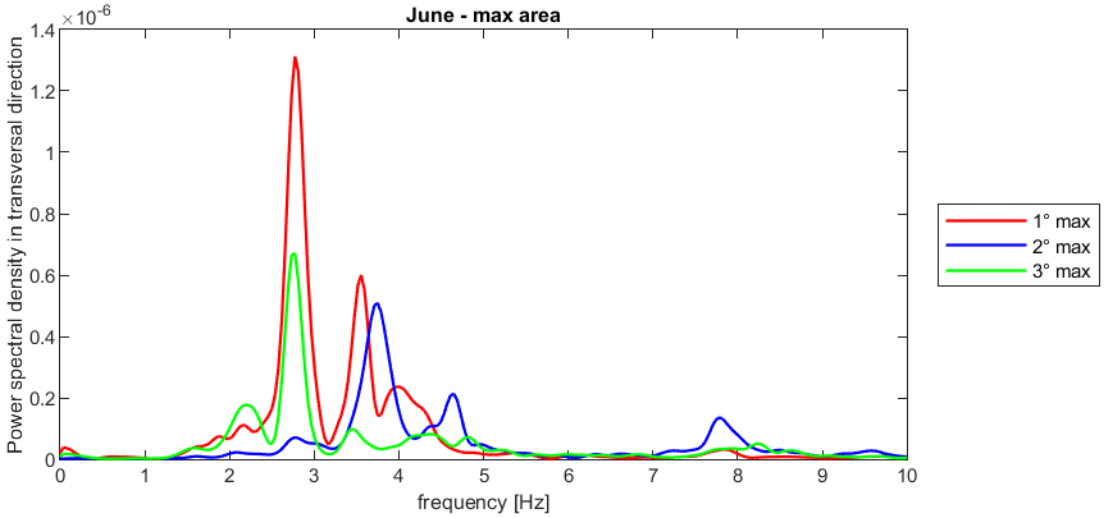


Figure 11-71: Results obtained from the 3 accelerograms with maximum area of PSD

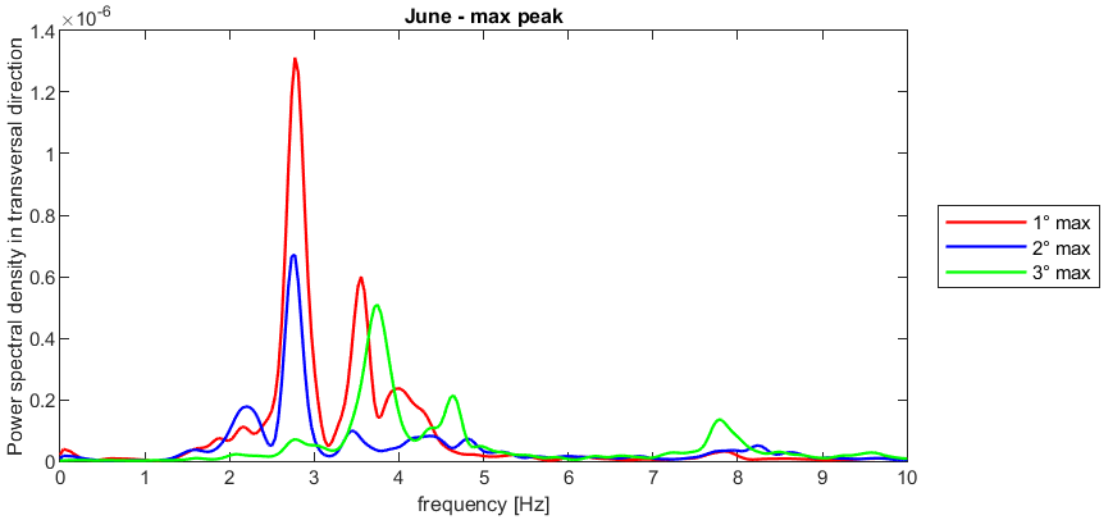


Figure 11-72: Results obtained from the 3 accelerograms with highest peak if PSD

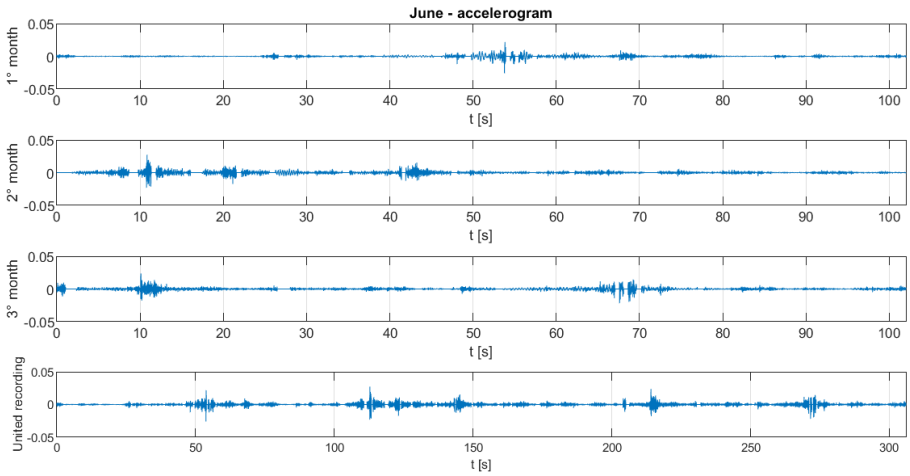


Figure 11-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

11.7 July

The results obtained for the July dataset are shown in the following tables.

Table 11-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-07-06_14-00-21	2.56E-03
	2°	31205_2023-07-07_14-00-21	2.06E-03
	3°	31205_2023-07-20_14-00-22	2.02E-03
Longitudinal direction (y)	1°	31205_2023-07-06_14-00-21	8.98E-04
	2°	31205_2023-07-07_14-00-21	8.93E-04
	3°	31205_2023-07-17_14-00-21	7.37E-04
Transverse direction (z)	1°	31205_2023-07-06_14-00-21	1.01E-03
	2°	31205_2023-07-07_14-00-21	9.24E-04
	3°	31205_2023-07-17_14-00-21	7.75E-04

Table 11-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-07-06_14-00-21	1.01E-05	31205_2023-07-06_14-00-21	1.10E-06
2	31205_2023-07-07_14-00-21	8.40E-06	31205_2023-07-20_14-00-22	8.49E-07
3	31205_2023-07-20_14-00-22	3.18E-06	31205_2023-07-07_14-00-21	8.39E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-07-07_14-00-21	1.73E-06	31205_2023-07-07_14-00-21	1.65E-07
2	31205_2023-07-06_14-00-21	1.30E-06	31205_2023-07-06_14-00-21	1.35E-07
3	31205_2023-07-17_14-00-21	6.83E-07	31205_2023-07-17_14-00-21	1.09E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-07-06_14-00-21	1.52E-06	31205_2023-07-06_14-00-21	1.83E-07
2	31205_2023-07-07_14-00-21	9.79E-07	31205_2023-07-07_14-00-21	1.70E-07
3	31205_2023-07-17_14-00-21	5.71E-07	31205_2023-07-17_14-00-21	1.19E-07

Table 11-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	B	B	A	A	A
2	B	B	C	B	A	A	B	B	B
3	C	C	B	D	D	D	D	D	D

11.7.1 Vertical direction (x)

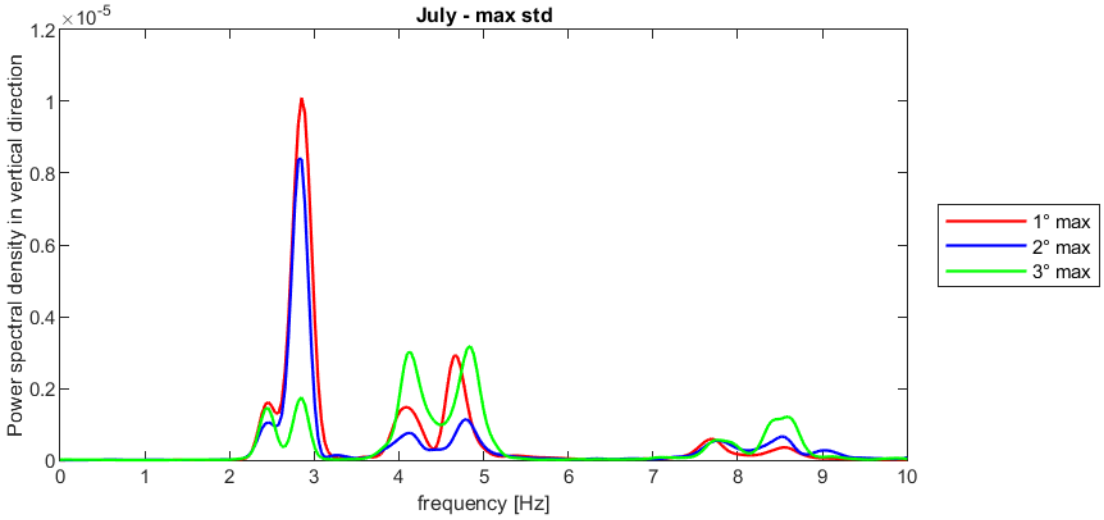


Figure 11-74: Results obtained from the 3 accelerograms with maximum SD in time domain

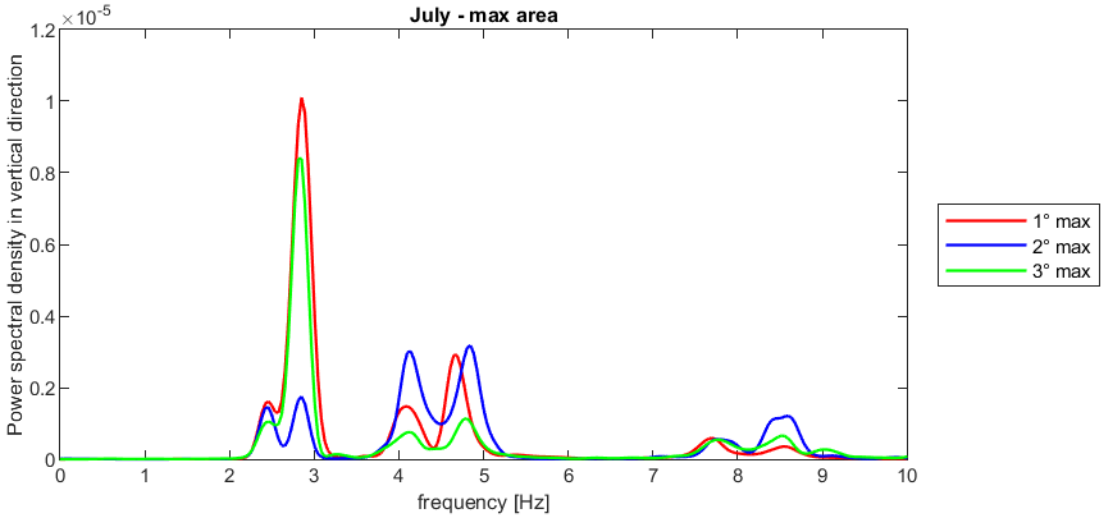


Figure 11-75: Results obtained from the 3 accelerograms with maximum area of PSD

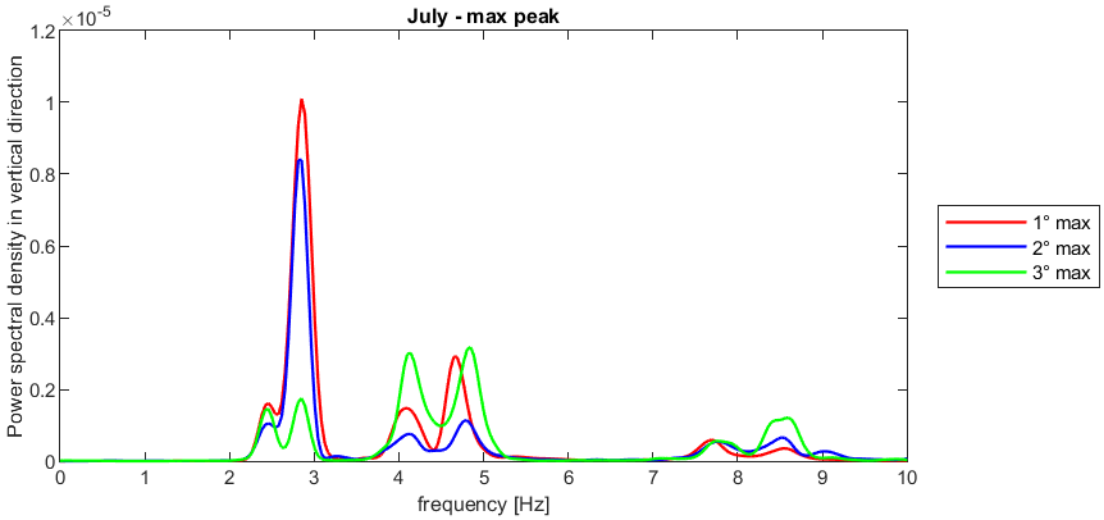


Figure 11-76: Results obtained from the 3 accelerograms with highest peak if PSD

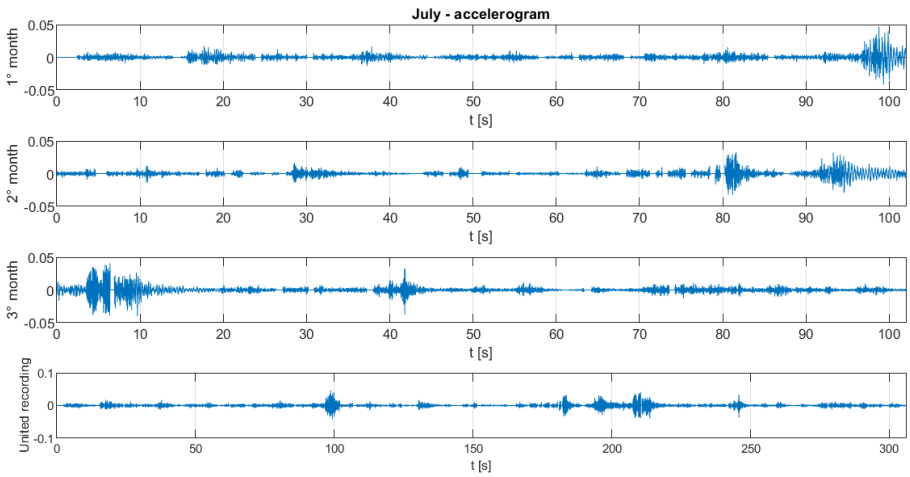


Figure 11-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.7.2 Longitudinal direction (y)

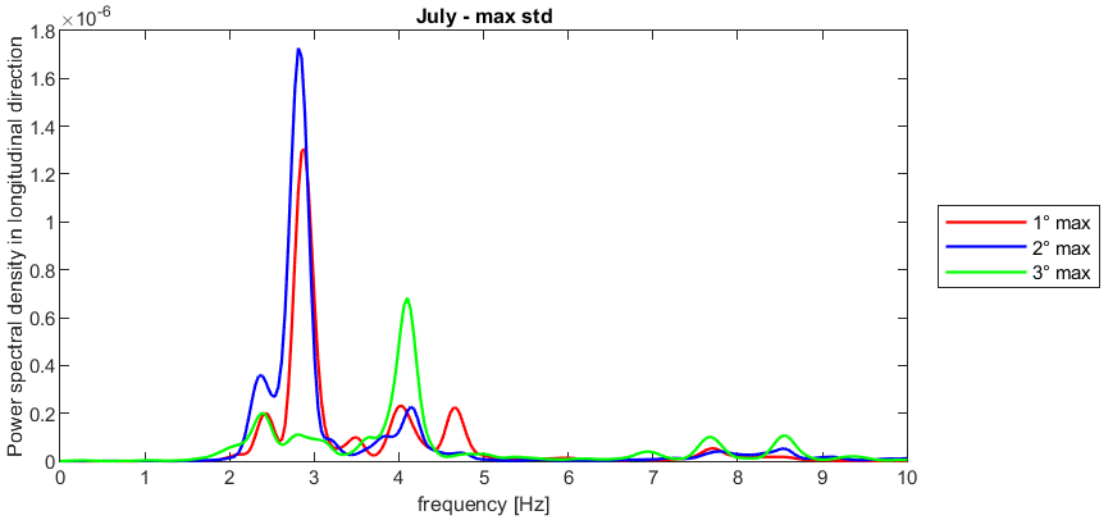


Figure 11-78: Results obtained from the 3 accelerograms with maximum SD in time domain

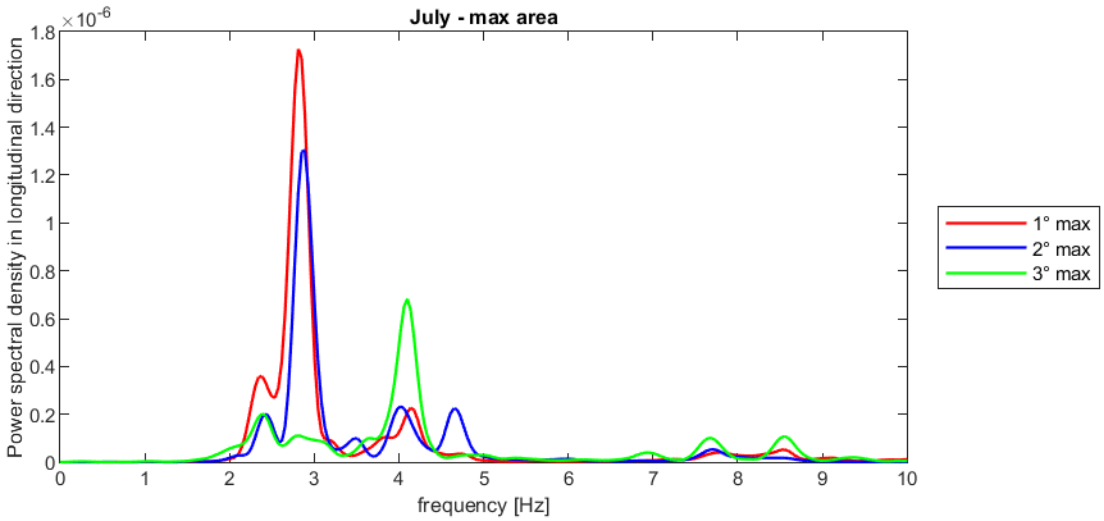


Figure 11-79: Results obtained from the 3 accelerograms with maximum area of PSD

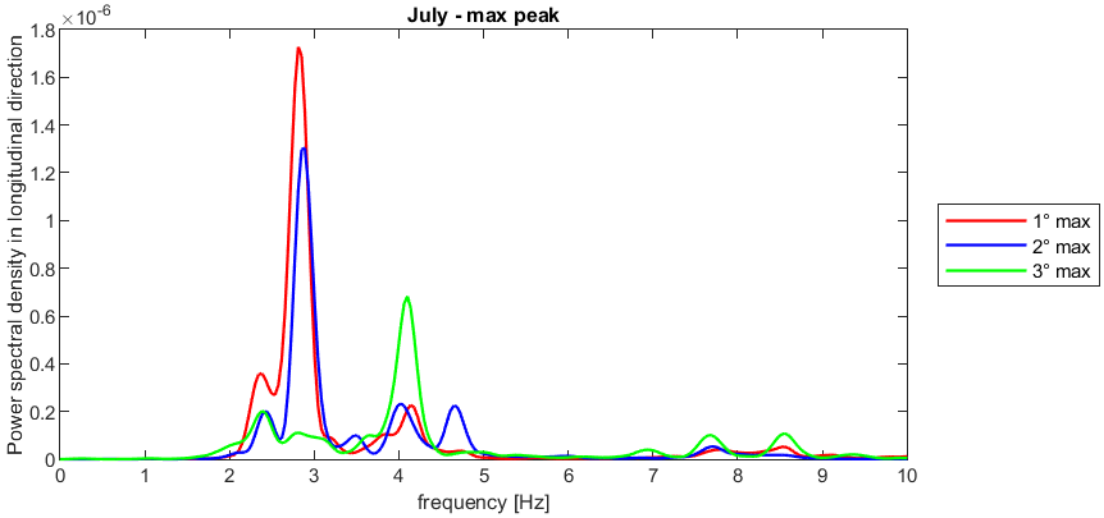


Figure 11-80: Results obtained from the 3 accelerograms with highest peak if PSD

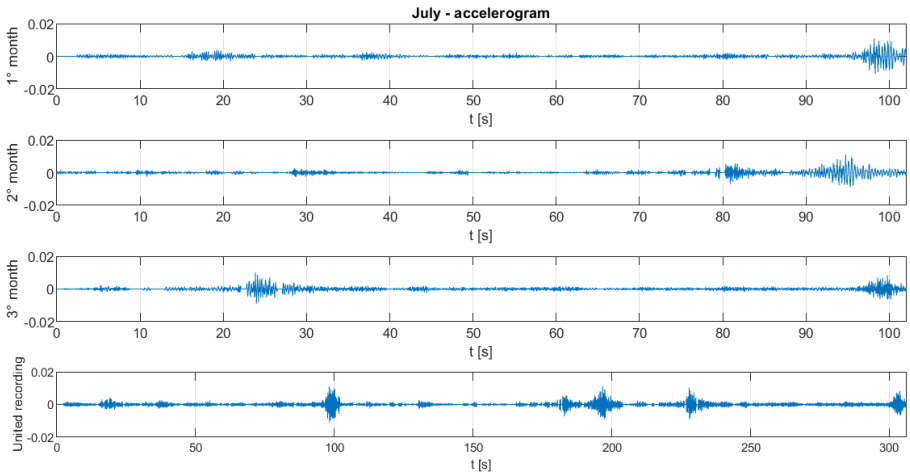


Figure 11-81: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.7.3 Transverse direction (z)

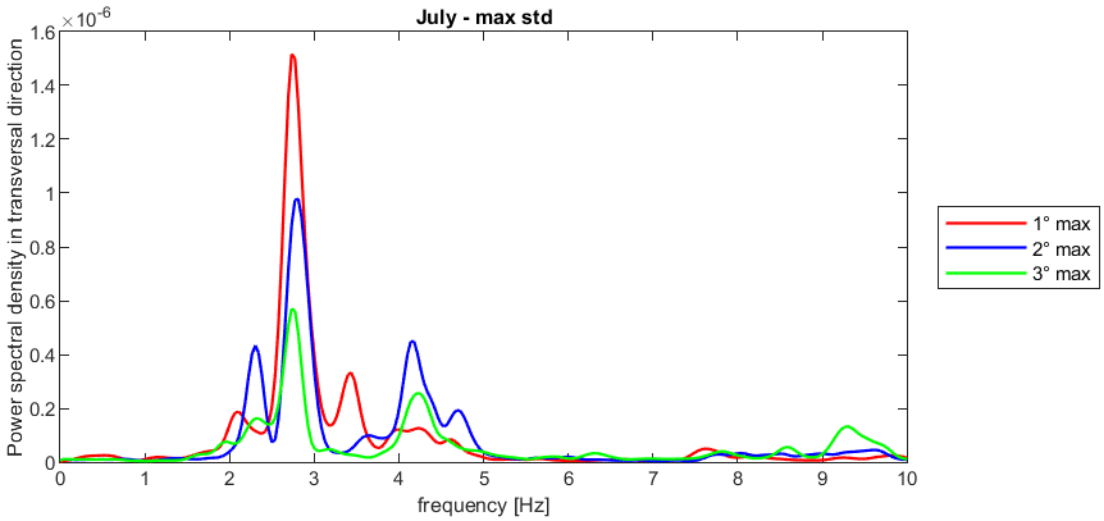


Figure 11-82: Results obtained from the 3 accelerograms with maximum SD in time domain

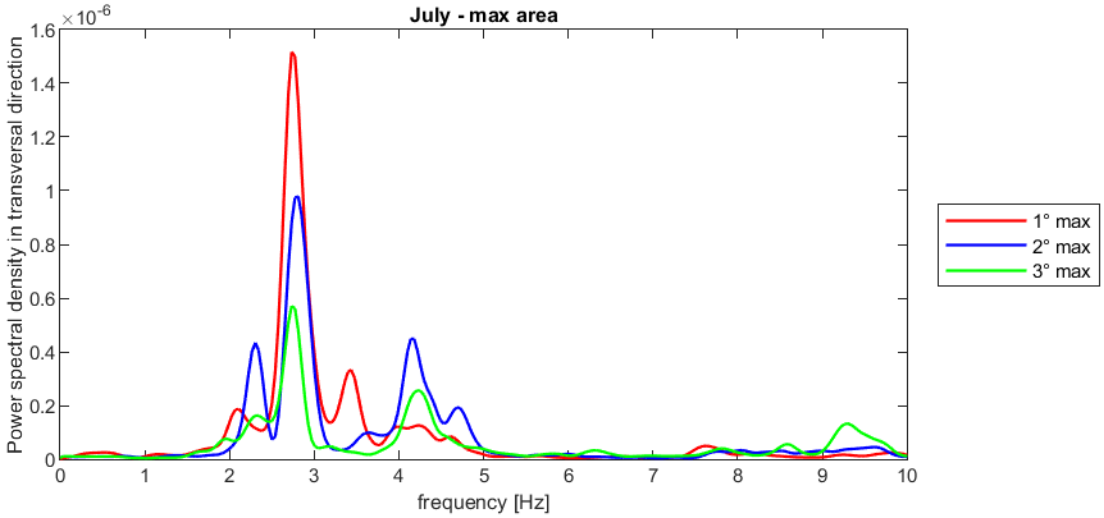


Figure 11-83: Results obtained from the 3 accelerograms with maximum area of PSD

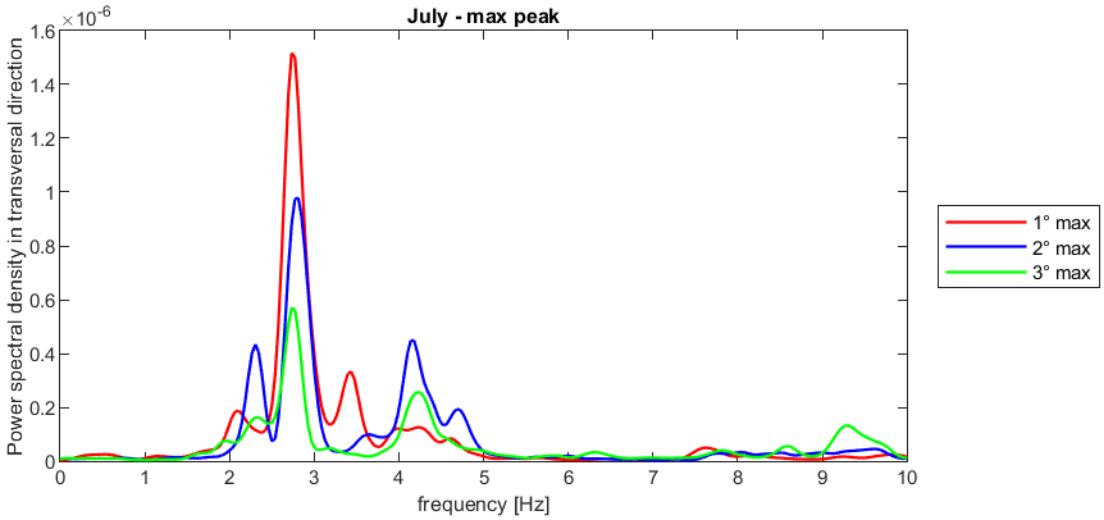


Figure 11-84: Results obtained from the 3 accelerograms with highest peak if PSD

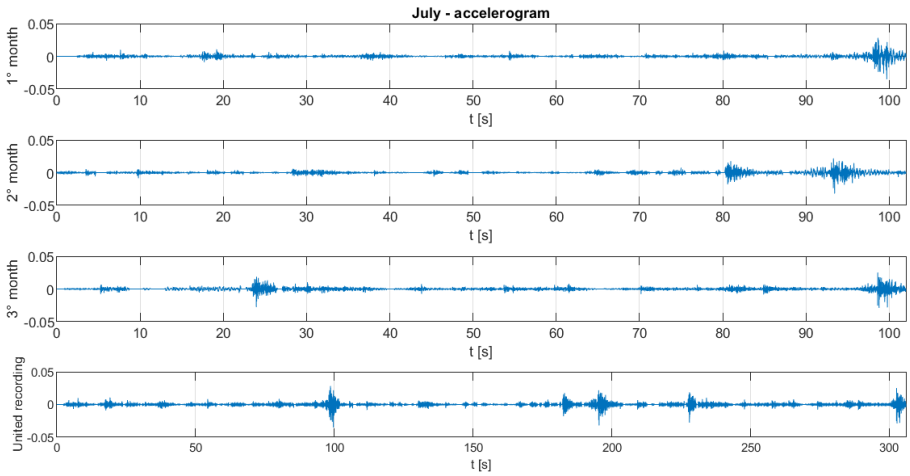


Figure 11-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

11.8 August

The results obtained for the August dataset are shown in the following tables.

Table 11-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-08-02_08-00-21	1.98E-03
	2°	31205_2023-08-07_20-00-21	1.89E-03
	3°	31205_2023-08-07_14-00-21	1.64E-03
Longitudinal direction (y)	1°	31205_2023-08-07_14-00-21	6.60E-04
	2°	31205_2023-08-02_08-00-21	6.05E-04
	3°	31205_2023-08-07_20-00-21	5.40E-04
Transverse direction (z)	1°	31205_2023-08-07_14-00-21	7.86E-04
	2°	31205_2023-08-02_08-00-21	6.53E-04
	3°	31205_2023-08-29_08-00-21	5.82E-04

Table 11-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-08-07_20-00-21	3.75E-06	31205_2023-08-02_08-00-21	8.09E-07
2	31205_2023-08-07_14-00-21	3.55E-06	31205_2023-08-07_20-00-21	7.05E-07
3	31205_2023-08-02_08-00-21	2.62E-06	31205_2023-08-28_08-00-21	5.28E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-08-07_14-00-21	7.68E-07	31205_2023-08-07_14-00-21	8.86E-08
2	31205_2023-08-03_08-00-21	4.34E-07	31205_2023-08-02_08-00-21	7.56E-08
3	31205_2023-08-07_08-00-21	4.05E-07	31205_2023-08-07_20-00-21	5.76E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-08-07_14-00-21	8.55E-07	31205_2023-08-07_14-00-21	1.25E-07
2	31205_2023-08-10_08-00-21	2.88E-07	31205_2023-08-02_08-00-21	8.78E-08
3	31205_2023-08-07_20-00-21	2.77E-07	31205_2023-08-29_08-00-21	6.80E-08

Table 11-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	C	C	C	C	C	C
2	B	C	B	A	-	A	A	-	A
3	C	A	-	B	-	B	D	-	D

11.8.1 Vertical direction (x)

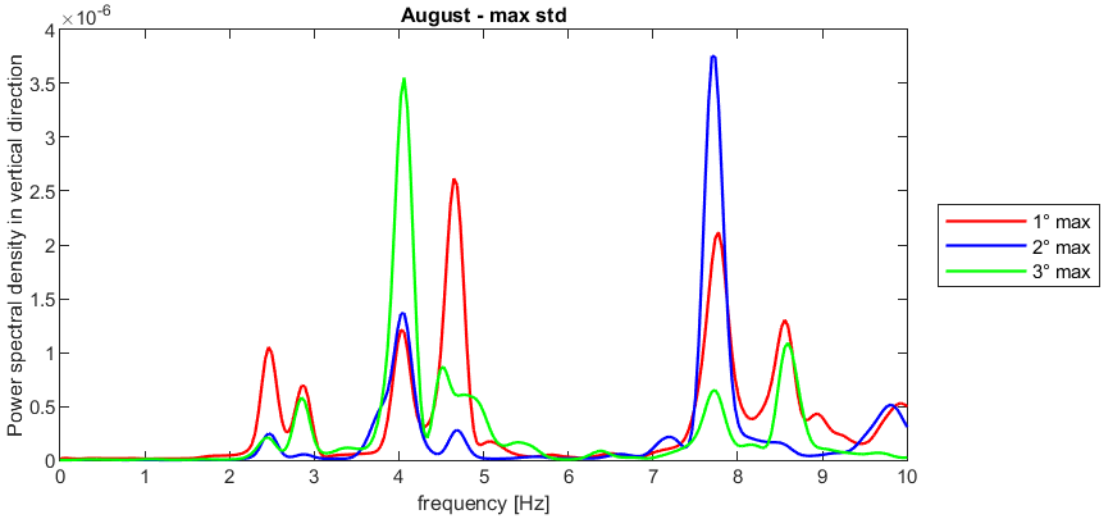


Figure 11-86: Results obtained from the 3 accelerograms with maximum SD in time domain

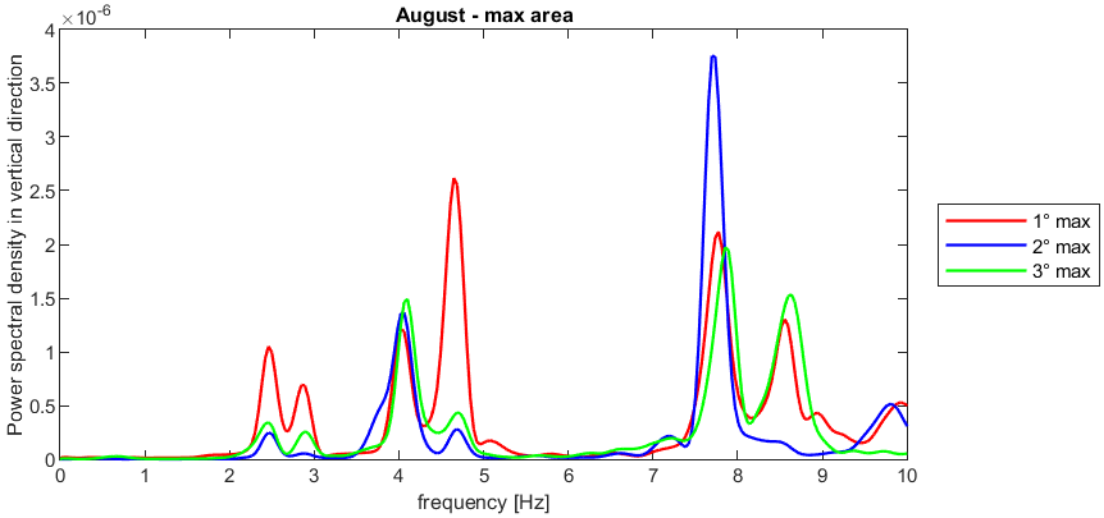


Figure 11-87: Results obtained from the 3 accelerograms with maximum area of PSD

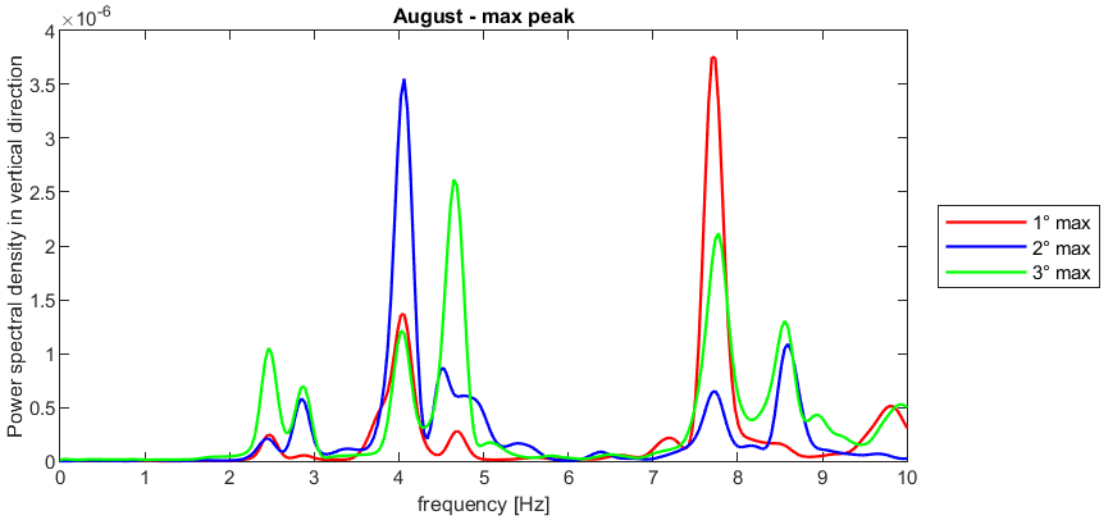


Figure 11-88: Results obtained from the 3 accelerograms with highest peak if PSD

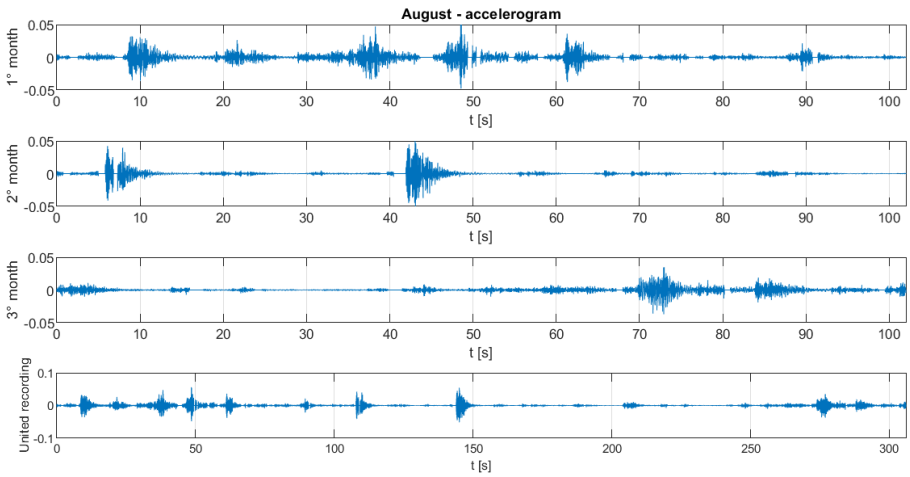


Figure 11-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.8.2 Longitudinal direction (y)

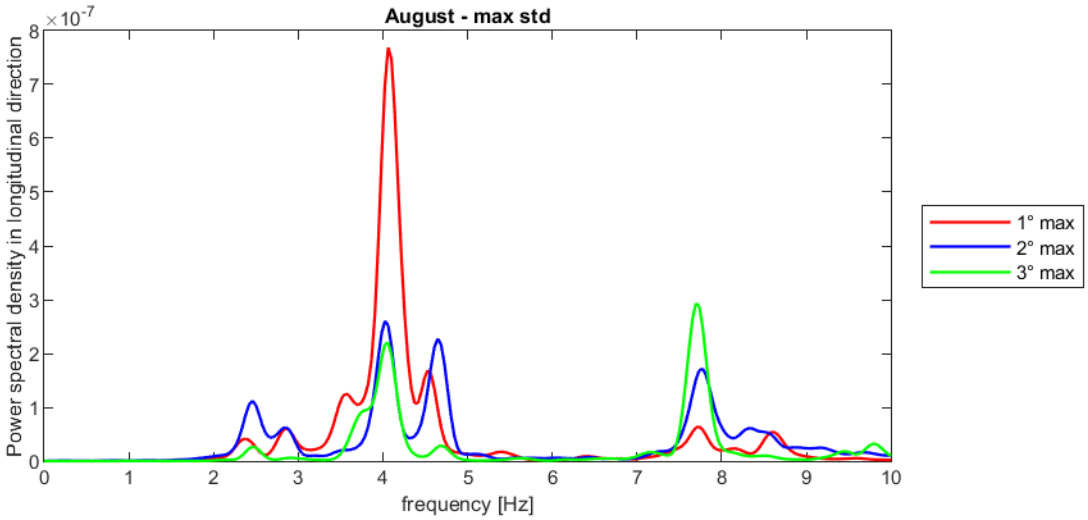


Figure 11-90: Results obtained from the 3 accelerograms with maximum SD in time domain

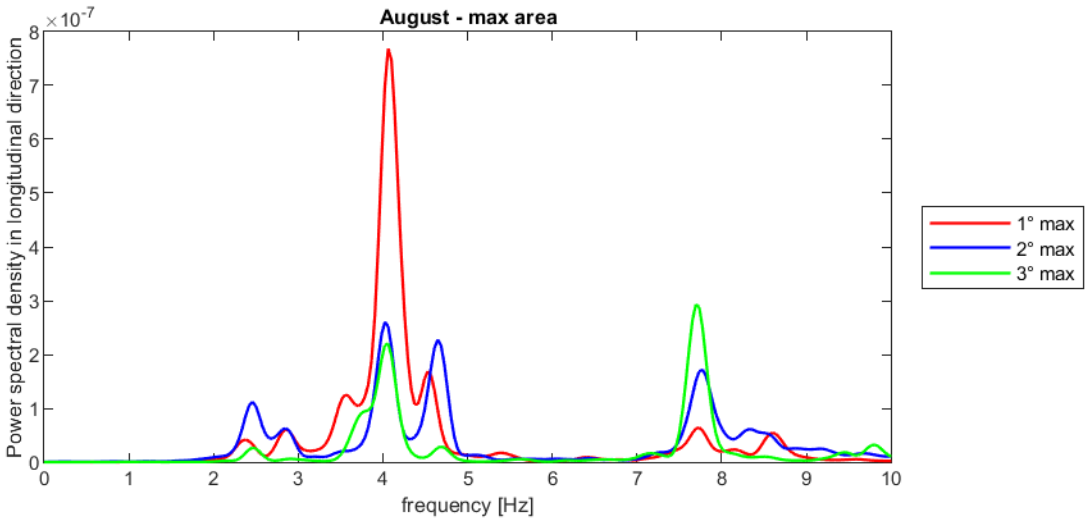


Figure 11-91: Results obtained from the 3 accelerograms with maximum area of PSD

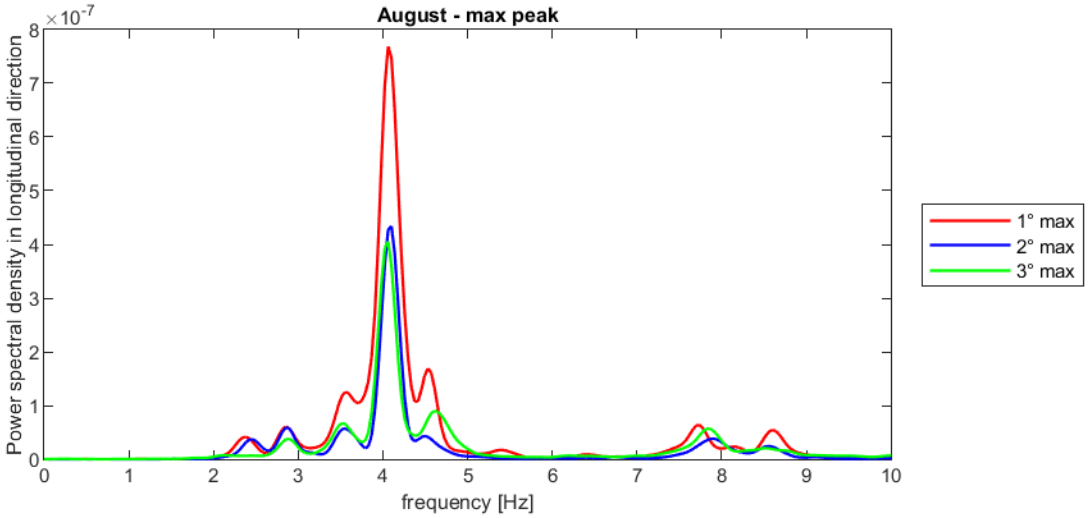


Figure 11-92: Results obtained from the 3 accelerograms with highest peak if PSD

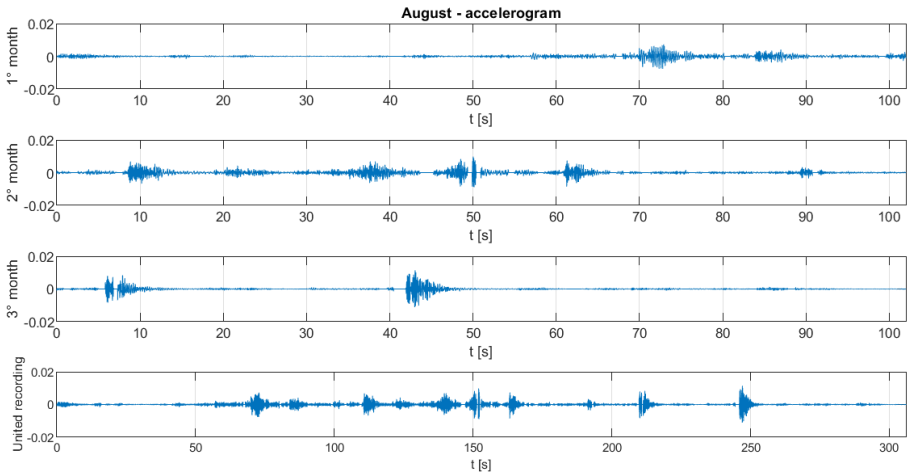


Figure 11-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

11.8.3 Transverse direction (z)

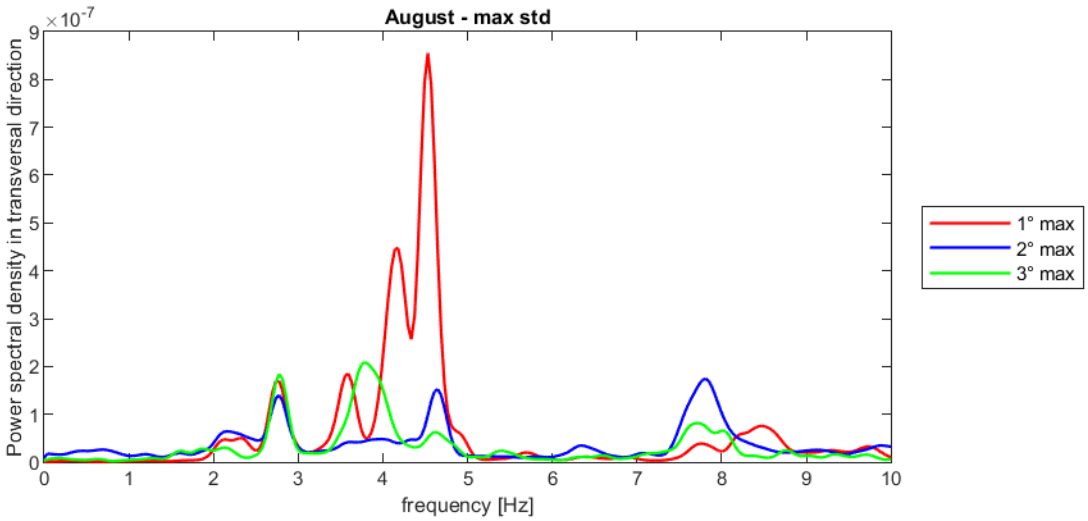


Figure 11-94: Results obtained from the 3 accelerograms with maximum SD in time domain

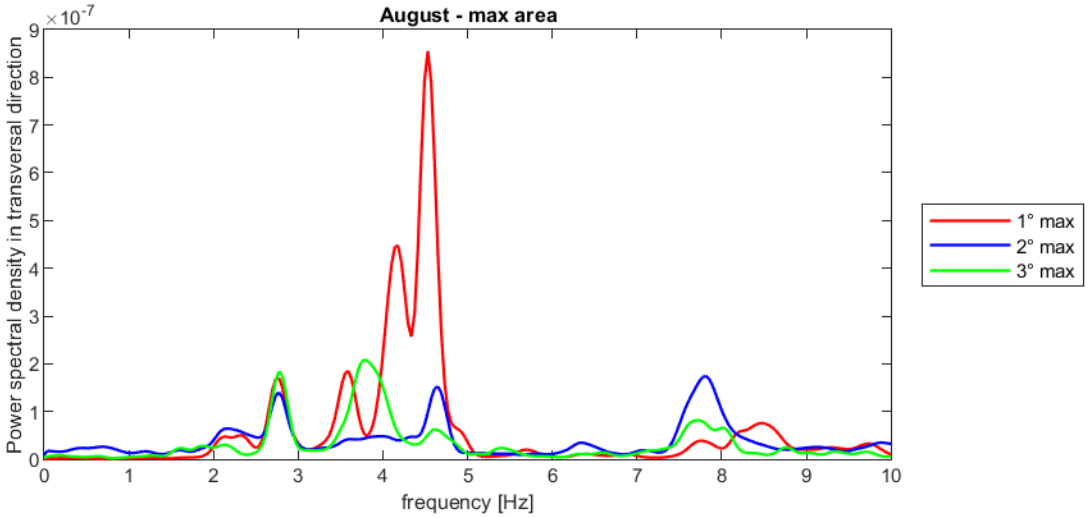


Figure 11-95: Results obtained from the 3 accelerograms with maximum area of PSD

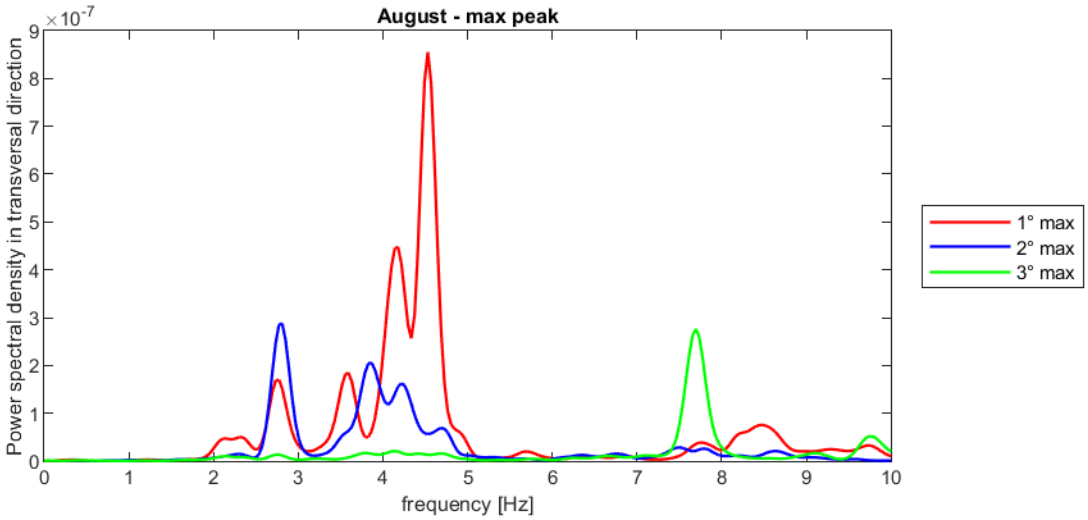


Figure 11-96: Results obtained from the 3 accelerograms with highest peak if PSD

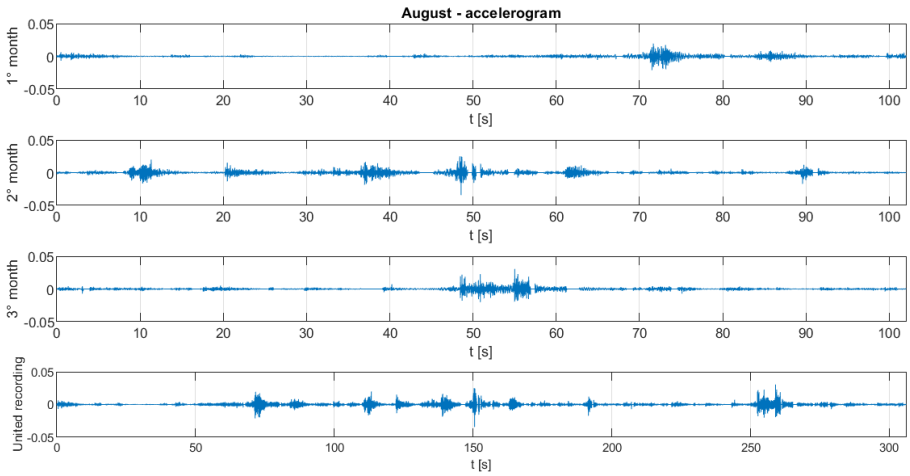


Figure 11-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

11.9 September

The results obtained for the September dataset are shown in the following tables.

Table 11-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-09-26_15-00-21	3.07E-03
	2°	31205_2023-09-27_03-00-21	2.71E-03
	3°	31205_2023-09-15_11-00-21	2.62E-03
Longitudinal direction (y)	1°	31205_2023-09-26_15-00-21	1.22E-03
	2°	31205_2023-09-15_11-00-21	9.40E-04
	3°	31205_2023-09-14_11-00-21	9.13E-04
Transverse direction (z)	1°	31205_2023-09-26_15-00-21	1.21E-03
	2°	31205_2023-09-26_09-00-21	1.08E-03
	3°	31205_2023-09-14_11-00-21	1.05E-03

Table 11-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-09-27_03-00-21	2.51E-05	31205_2023-09-26_15-00-21	1.83E-06
2	31205_2023-09-26_15-00-21	1.52E-05	31205_2023-09-27_03-00-21	1.57E-06
3	31205_2023-09-28_16-00-20	1.13E-05	31205_2023-09-15_11-00-21	1.44E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-09-26_15-00-21	2.27E-06	31205_2023-09-26_15-00-21	2.82E-07
2	31205_2023-09-27_03-00-21	2.10E-06	31205_2023-09-15_11-00-21	1.82E-07
3	31205_2023-09-15_11-00-21	1.36E-06	31205_2023-09-14_11-00-21	1.73E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-09-15_11-00-21	1.36E-06	31205_2023-09-26_15-00-21	3.08E-07
2	31205_2023-09-26_09-00-21	1.24E-06	31205_2023-09-26_09-00-21	2.40E-07
3	31205_2023-09-26_15-00-21	1.19E-06	31205_2023-09-15_11-00-21	2.18E-07

Table 11-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	A	F	A
2	B	A	B	C	-	C	E	E	E
3	C	-	C	D	C	D	-	A	F

11.9.1 Vertical direction (x)

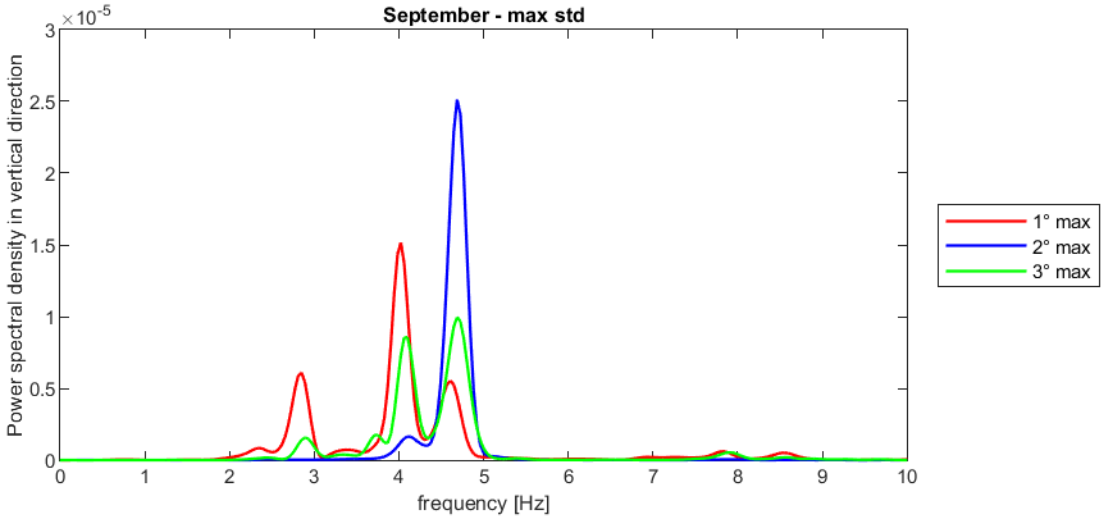


Figure 11-98: Results obtained from the 3 accelerograms with maximum SD in time domain

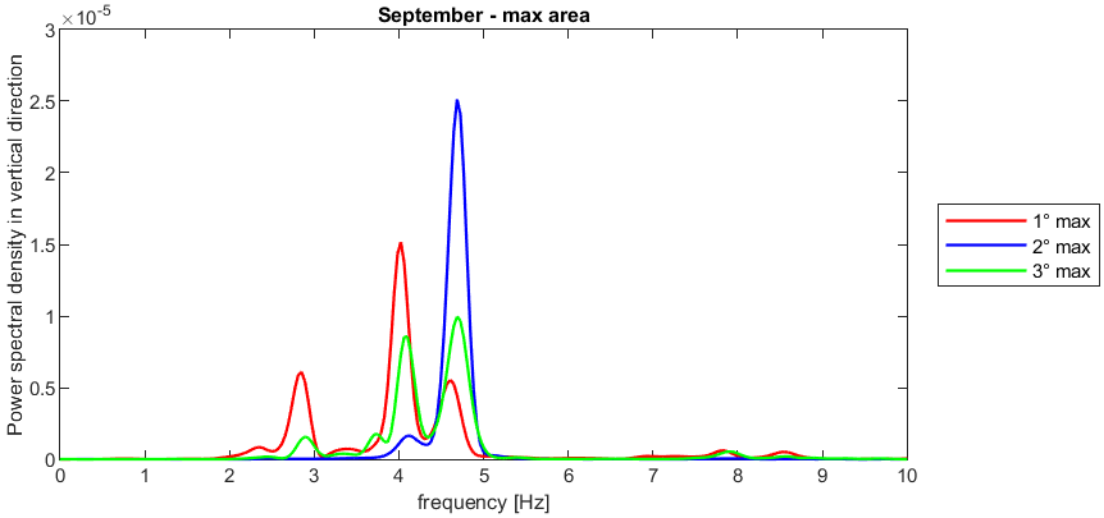


Figure 11-99: Results obtained from the 3 accelerograms with maximum area of PSD

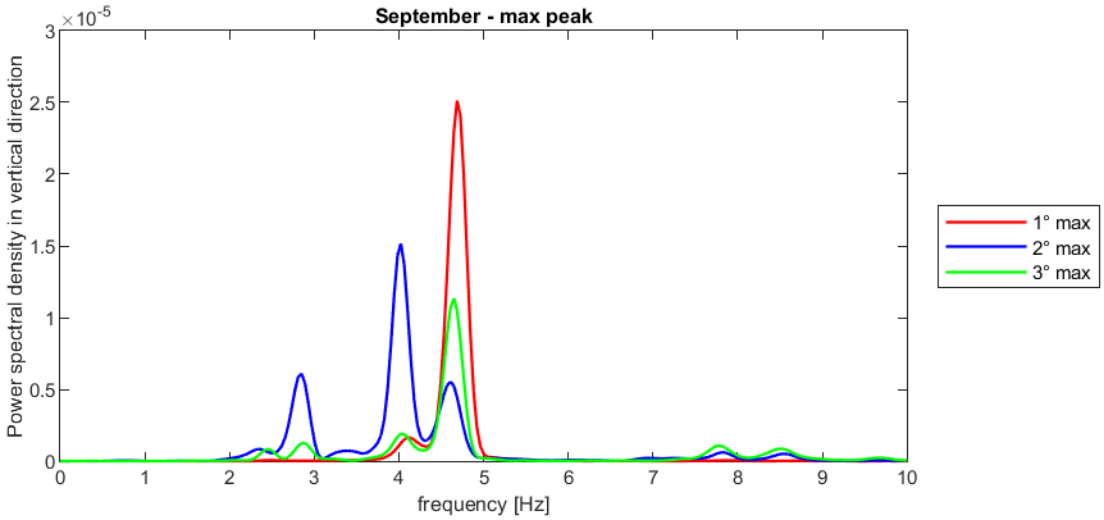


Figure 11-100: Results obtained from the 3 accelerograms with highest peak if PSD

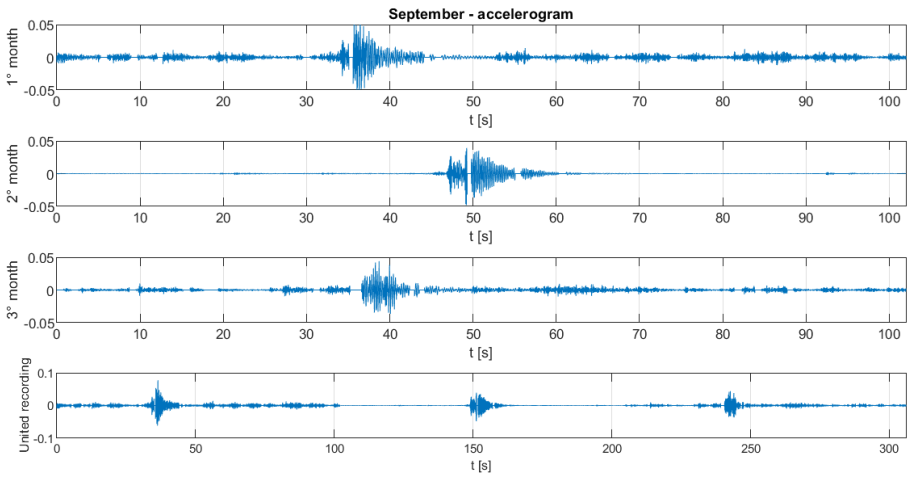


Figure 11-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.9.2 Longitudinal direction (y)

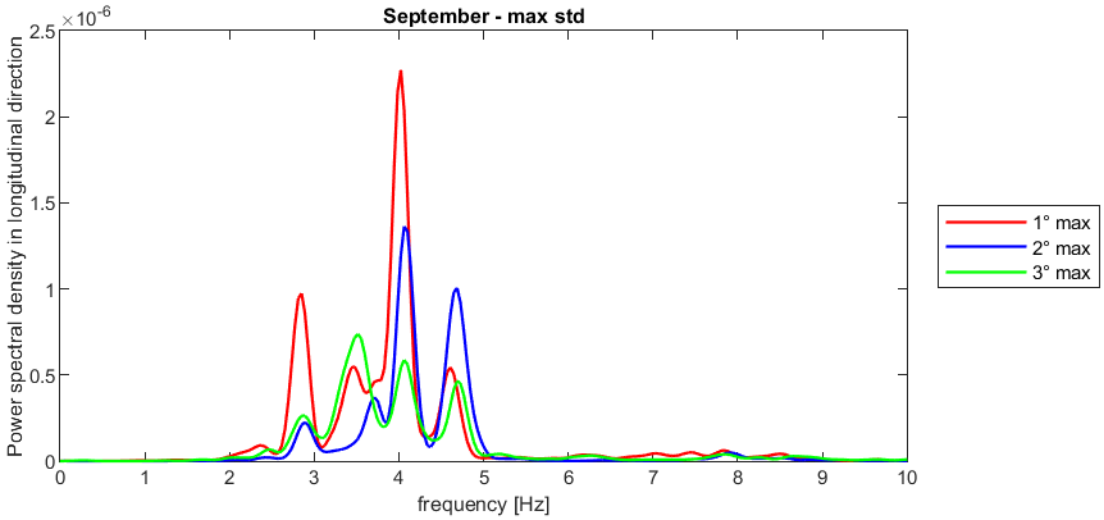


Figure 11-102: Results obtained from the 3 accelerograms with maximum SD in time domain

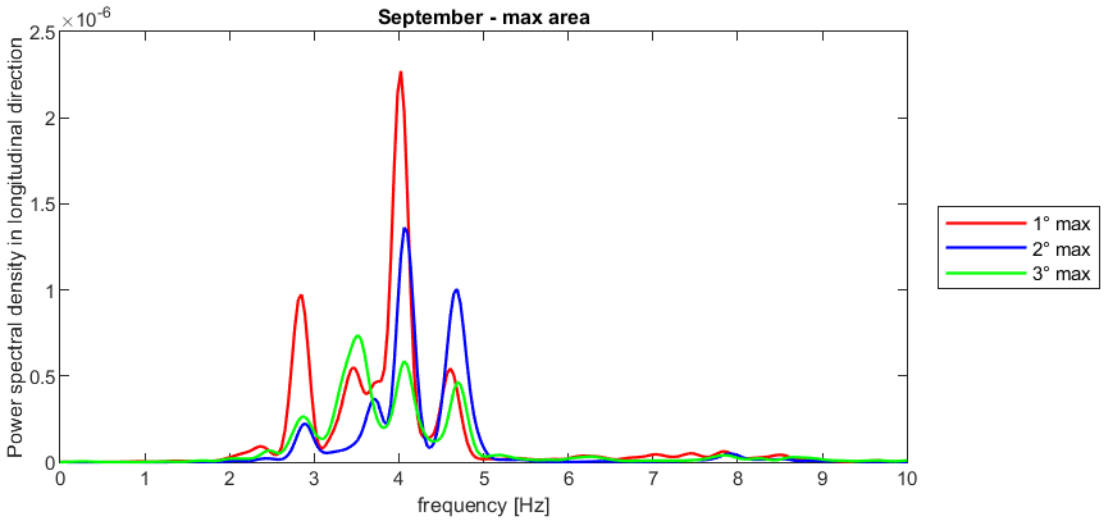


Figure 11-103: Results obtained from the 3 accelerograms with maximum area of PSD

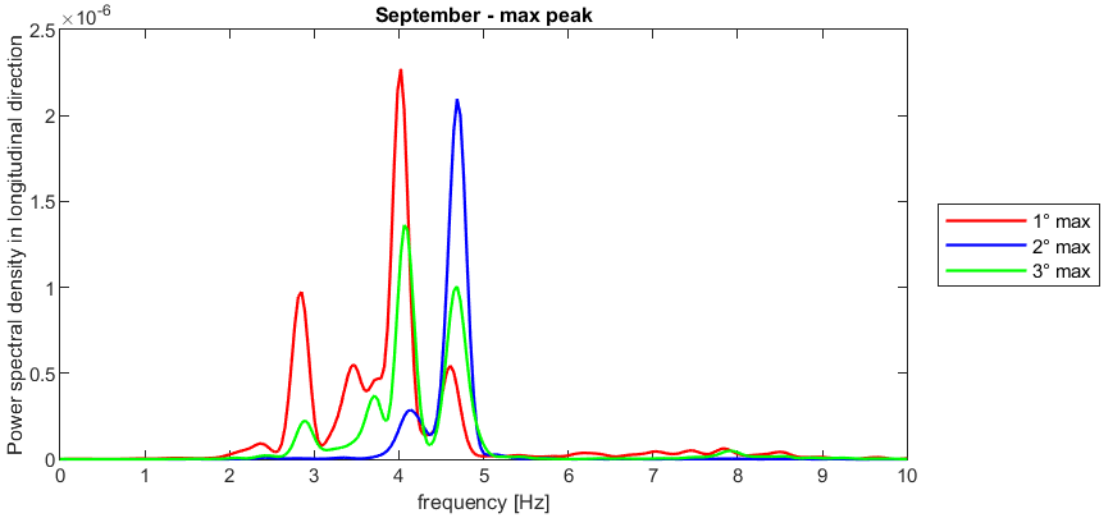


Figure 11-104: Results obtained from the 3 accelerograms with highest peak if PSD

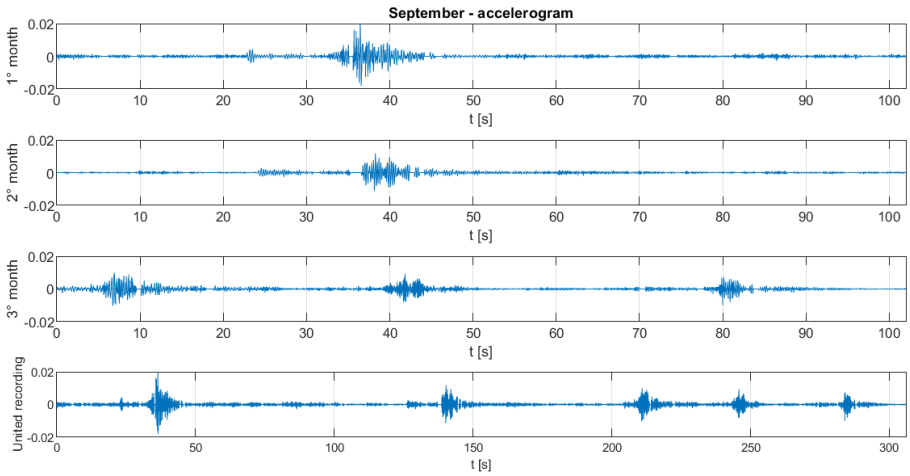


Figure 11-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

11.9.3 Transverse direction (z)

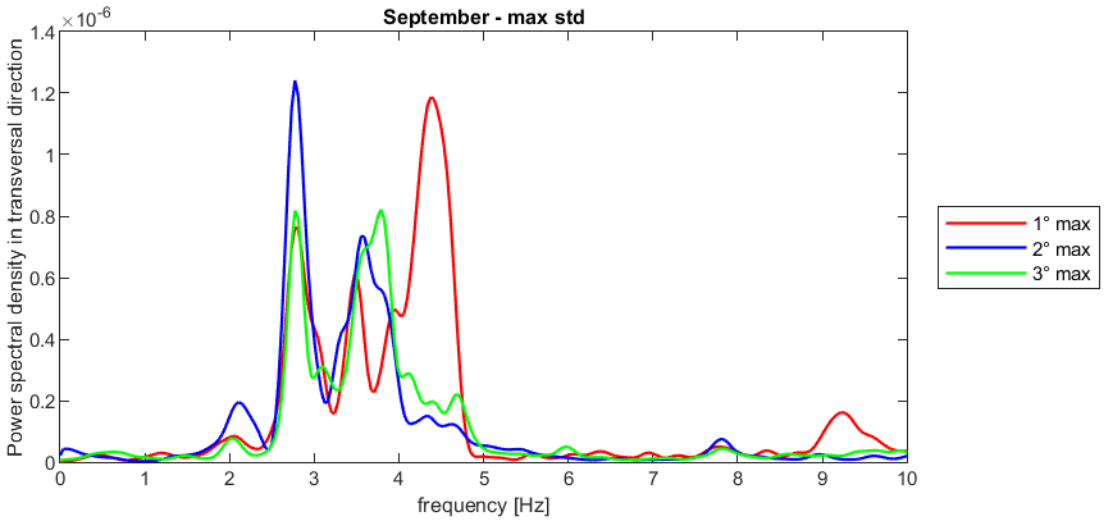


Figure 11-106: Results obtained from the 3 accelerograms with maximum SD in time domain

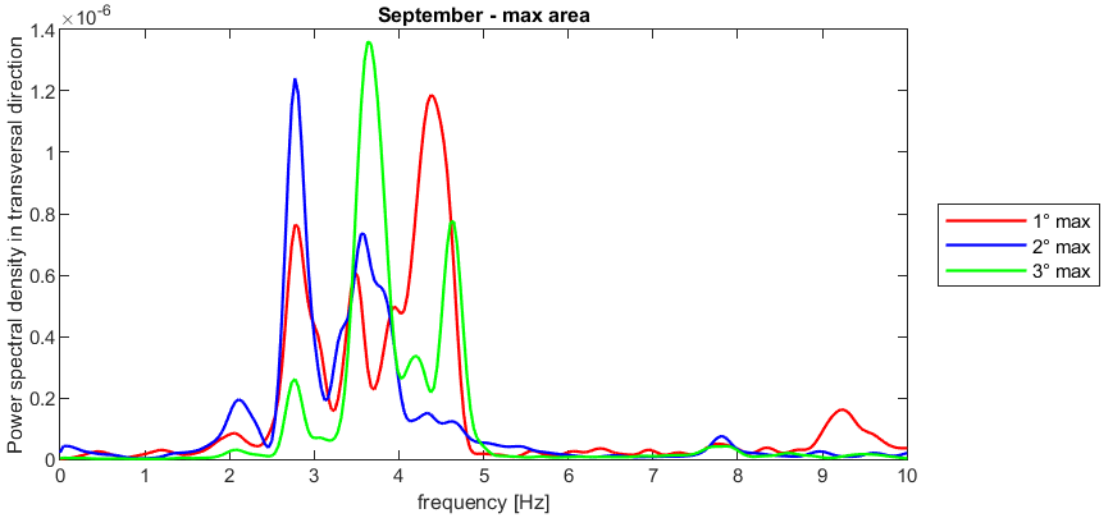


Figure 11-107: Results obtained from the 3 accelerograms with maximum area of PSD

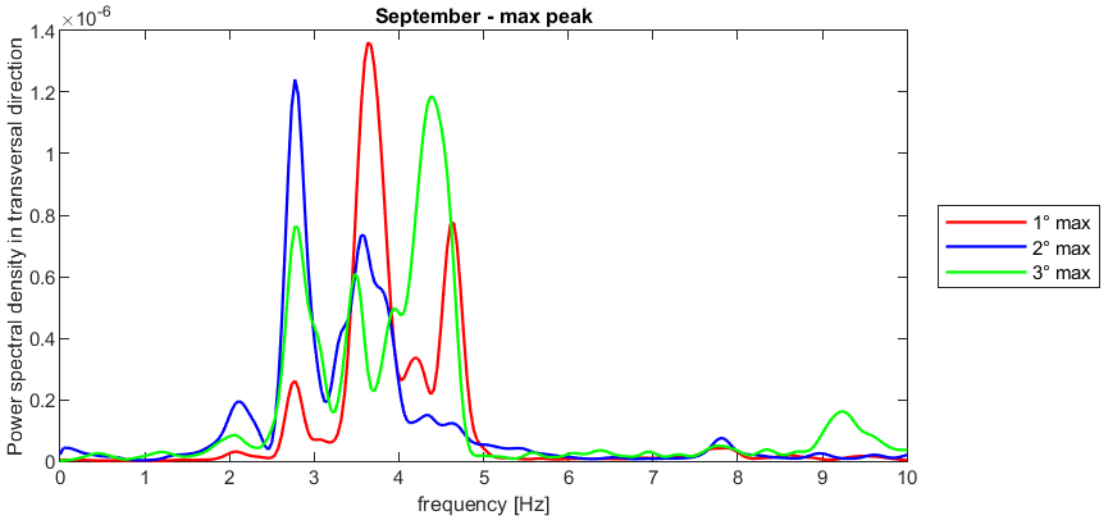


Figure 11-108: Results obtained from the 3 accelerograms with highest peak if PSD

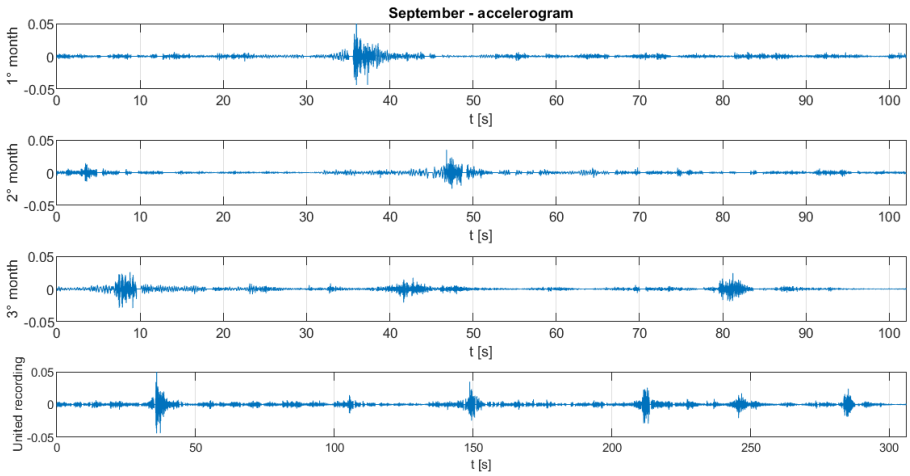


Figure 11-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

11.10 October

The results obtained for the October dataset are shown in the following tables.

Table 11-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-10-26_12-00-20	2.62E-03
	2°	31205_2023-10-02_08-00-21	2.50E-03
	3°	31205_2023-10-12_09-00-21	2.46E-03
Longitudinal direction (y)	1°	31205_2023-10-12_09-00-21	8.88E-04
	2°	31205_2023-10-26_12-00-20	8.86E-04
	3°	31205_2023-10-25_10-00-20	8.34E-04
Transverse direction (z)	1°	31205_2023-10-25_10-00-20	8.76E-04
	2°	31205_2023-10-24_10-00-21	8.13E-04
	3°	31205_2023-10-12_09-00-21	8.03E-04

Table 11-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-10-26_12-00-20	1.45E-05	31205_2023-10-26_12-00-20	1.43E-06
2	31205_2023-10-12_09-00-21	1.24E-05	31205_2023-10-02_08-00-21	1.21E-06
3	31205_2023-10-02_08-00-21	1.07E-05	31205_2023-10-12_09-00-21	1.19E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-10-26_12-00-20	1.55E-06	31205_2023-10-26_12-00-20	1.64E-07
2	31205_2023-10-12_09-00-21	1.42E-06	31205_2023-10-12_09-00-21	1.57E-07
3	31205_2023-10-05_18-00-21	1.41E-06	31205_2023-10-25_10-00-20	1.34E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-10-24_10-00-21	9.45E-07	31205_2023-10-25_10-00-20	1.52E-07
2	31205_2023-10-02_08-00-21	8.55E-07	31205_2023-10-24_10-00-21	1.34E-07
3	31205_2023-10-12_09-00-21	6.63E-07	31205_2023-10-12_09-00-21	1.31E-07

Table 11-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	A	A	D	E	D
2	B	C	B	A	C	C	E	-	E
3	C	B	C	D	-	D	C	C	C

11.10.1 Vertical direction (x)

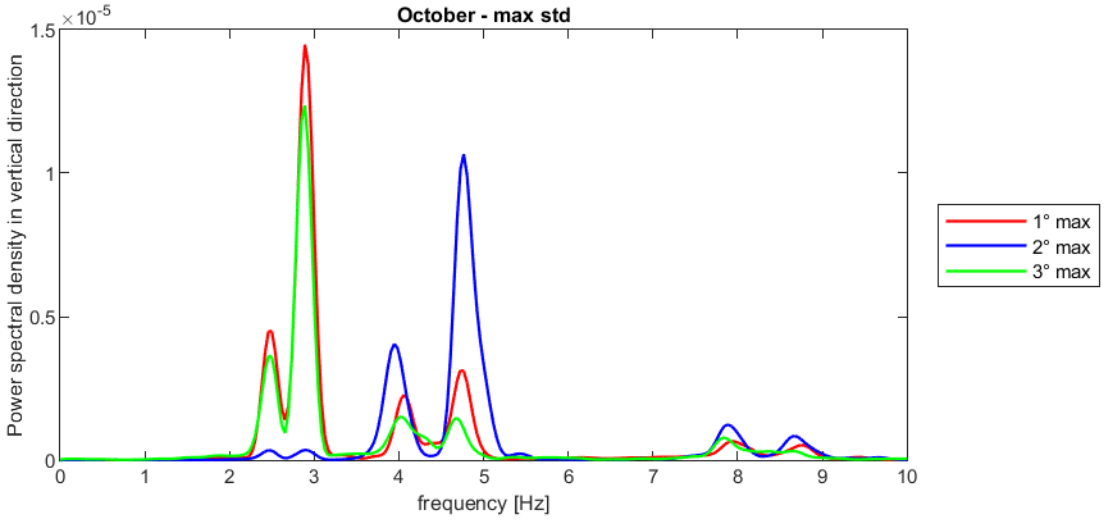


Figure 11-110: Results obtained from the 3 accelerograms with maximum SD in time domain

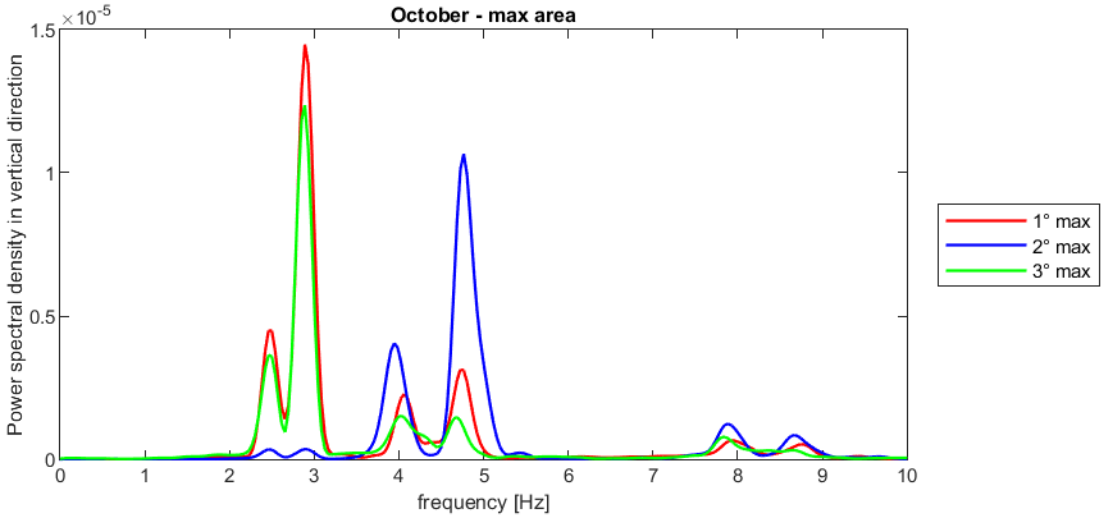


Figure 11-111: Results obtained from the 3 accelerograms with maximum area of PSD

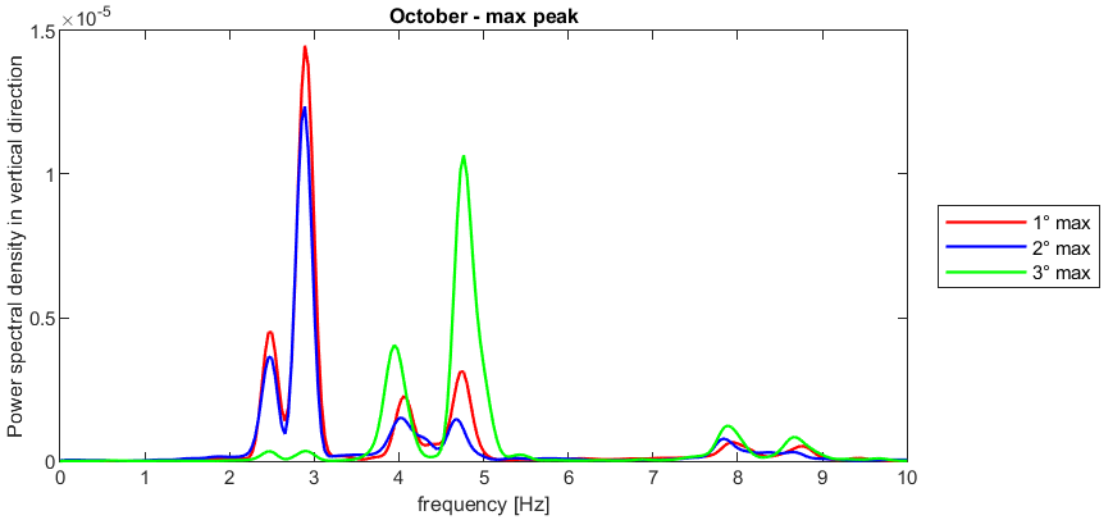


Figure 11-112: Results obtained from the 3 accelerograms with highest peak if PSD

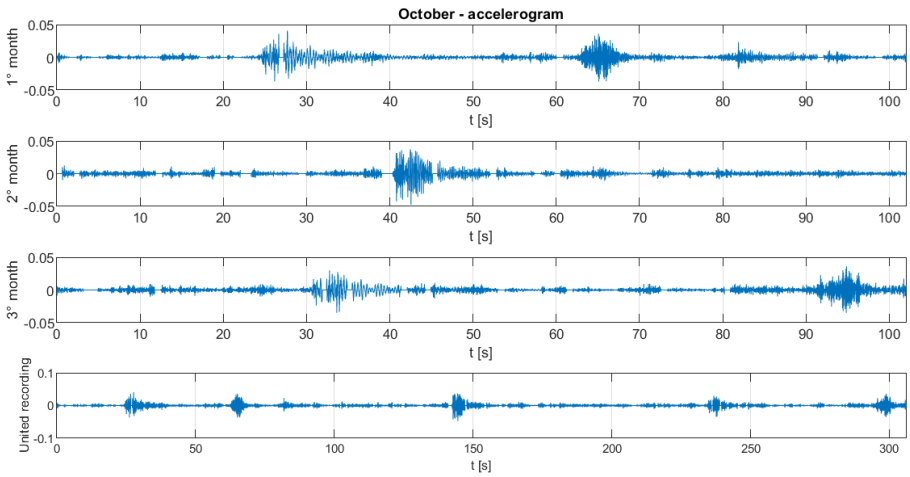


Figure 11-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.10.2 Longitudinal direction (y)

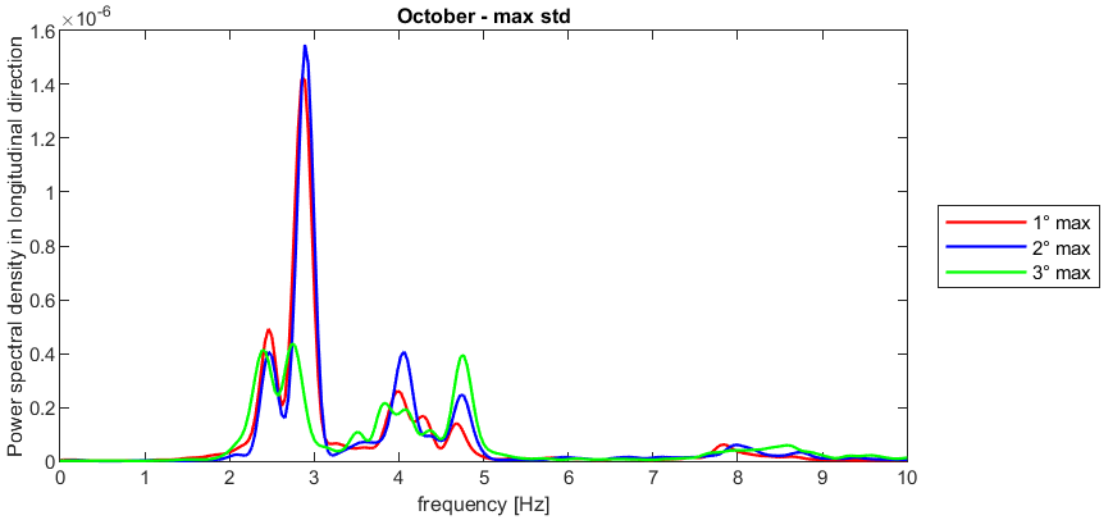


Figure 11-114: Results obtained from the 3 accelerograms with maximum SD in time domain

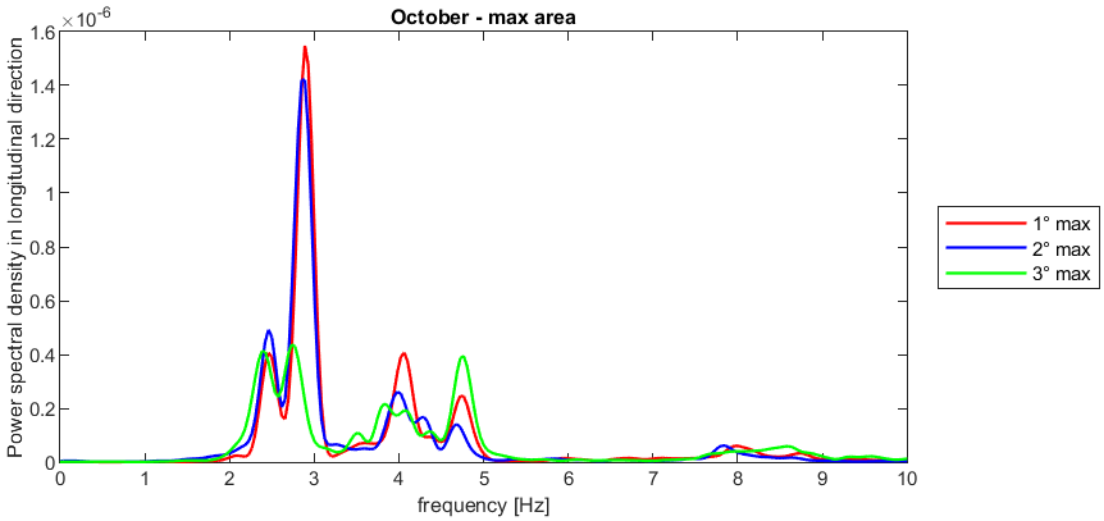


Figure 11-115: Results obtained from the 3 accelerograms with maximum area of PSD

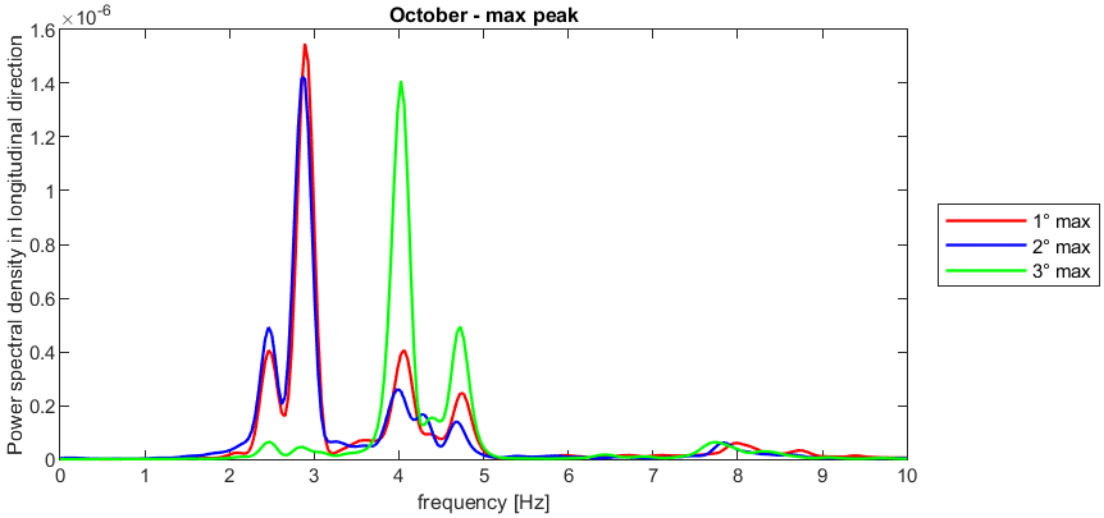


Figure 11-116: Results obtained from the 3 accelerograms with highest peak if PSD

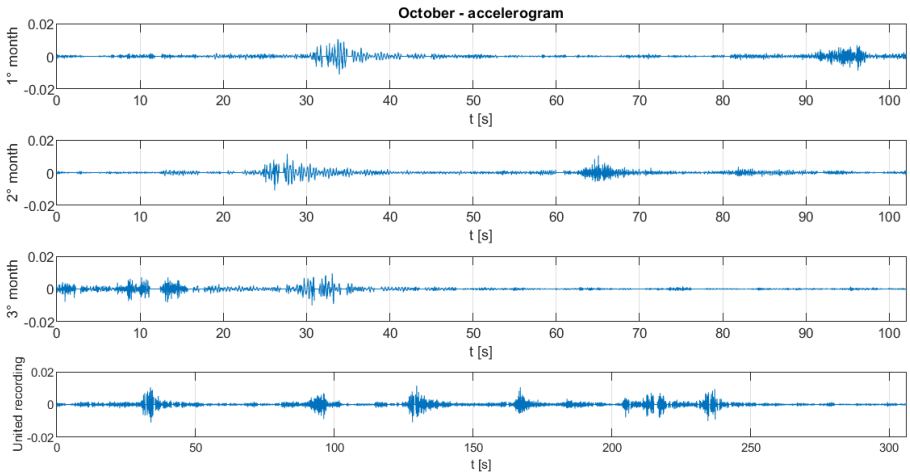


Figure 11-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

11.10.3 Transverse direction (z)

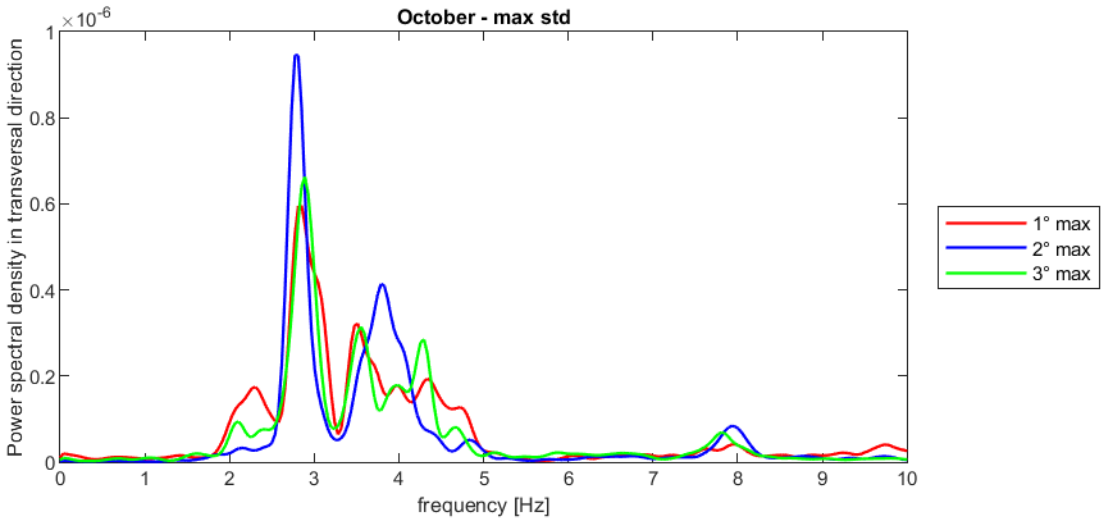


Figure 11-118: Results obtained from the 3 accelerograms with maximum SD in time domain

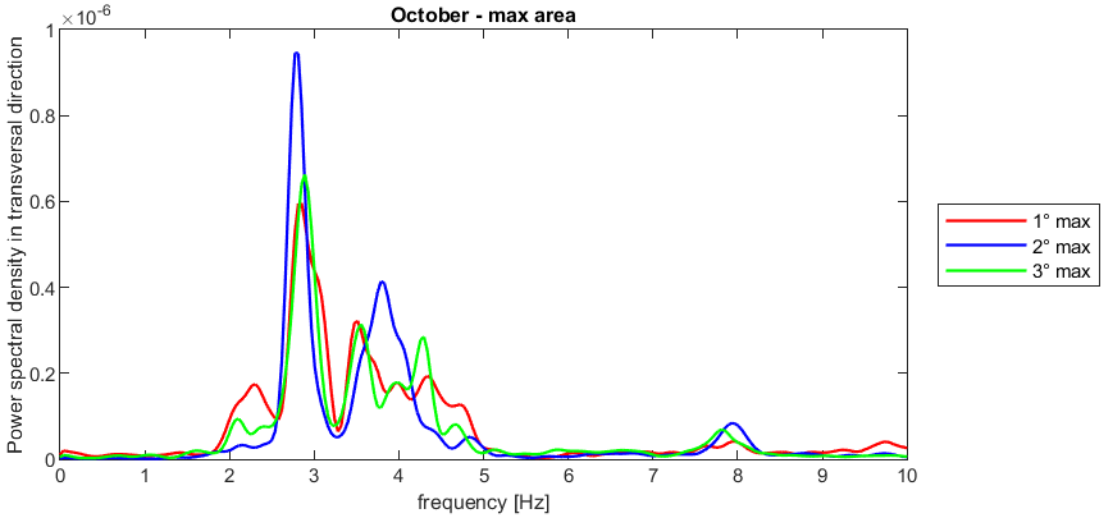


Figure 11-119: Results obtained from the 3 accelerograms with maximum area of PSD

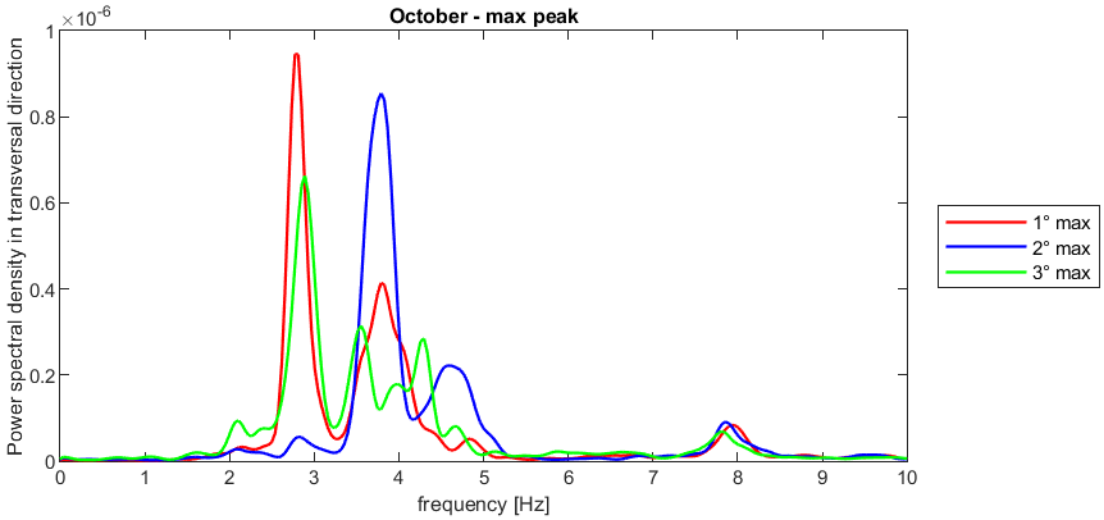


Figure 11-120: Results obtained from the 3 accelerograms with highest peak if PSD

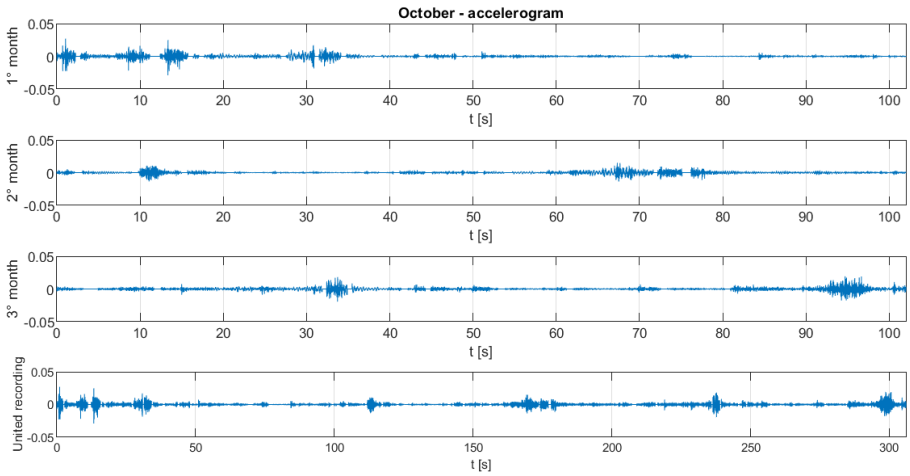


Figure 11-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

11.11 November

The results obtained for the November dataset are shown in the following tables.

Table 11-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-11-14_10-00-21	3.00E-03
	2°	31205_2023-11-28_11-00-20	2.84E-03
	3°	31205_2023-11-06_17-00-21	2.75E-03
Longitudinal direction (y)	1°	31205_2023-11-06_17-00-21	9.13E-04
	2°	31205_2023-11-14_10-00-21	9.00E-04
	3°	31205_2023-11-28_11-00-20	8.71E-04
Transverse direction (z)	1°	31205_2023-11-06_17-00-21	1.04E-03
	2°	31205_2023-11-10_08-00-21	9.34E-04
	3°	31205_2023-11-28_11-00-20	8.44E-04

Table 11-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-11-14_10-00-21	2.38E-05	31205_2023-11-14_10-00-21	1.98E-06
2	31205_2023-11-28_11-00-20	1.41E-05	31205_2023-11-06_17-00-21	1.66E-06
3	31205_2023-11-27_17-00-20	1.27E-05	31205_2023-11-28_11-00-20	1.55E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-11-14_10-00-21	1.84E-06	31205_2023-11-06_17-00-21	1.80E-07
2	31205_2023-11-28_11-00-20	1.38E-06	31205_2023-11-14_10-00-21	1.76E-07
3	31205_2023-11-23_09-00-20	1.03E-06	31205_2023-11-28_11-00-20	1.55E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-11-06_17-00-21	1.82E-06	31205_2023-11-06_17-00-21	2.22E-07
2	31205_2023-11-28_11-00-20	1.75E-06	31205_2023-11-10_08-00-21	1.78E-07
3	31205_2023-11-10_08-00-21	1.53E-06	31205_2023-11-28_11-00-20	1.48E-07

Table 11-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	A	C	C	C	C
2	B	B	C	A	B	A	D	B	D
3	C	-	B	B	-	B	B	D	B

11.11.1 Vertical direction (x)

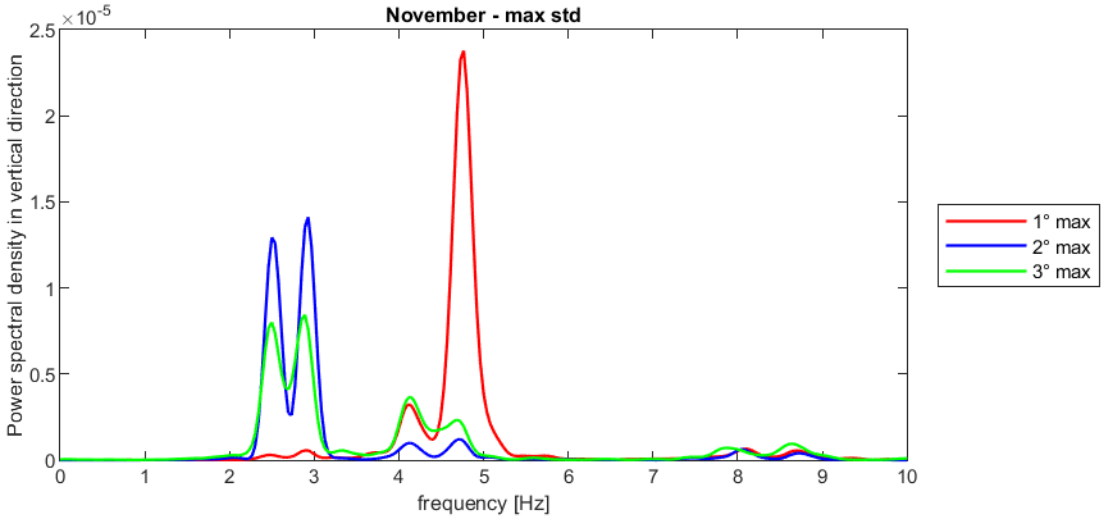


Figure 11-122: Results obtained from the 3 accelerograms with maximum SD in time domain

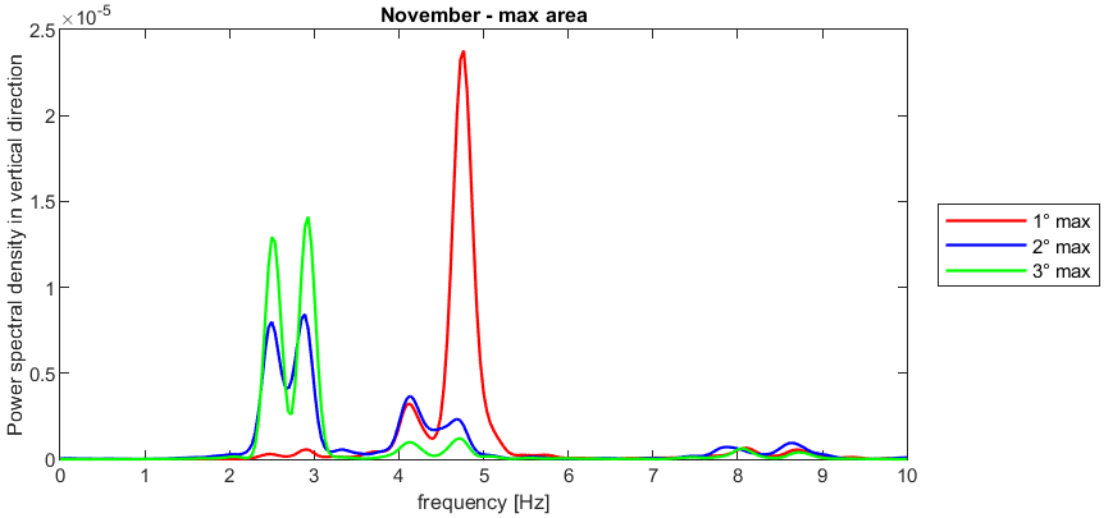


Figure 11-123: Results obtained from the 3 accelerograms with maximum area of PSD

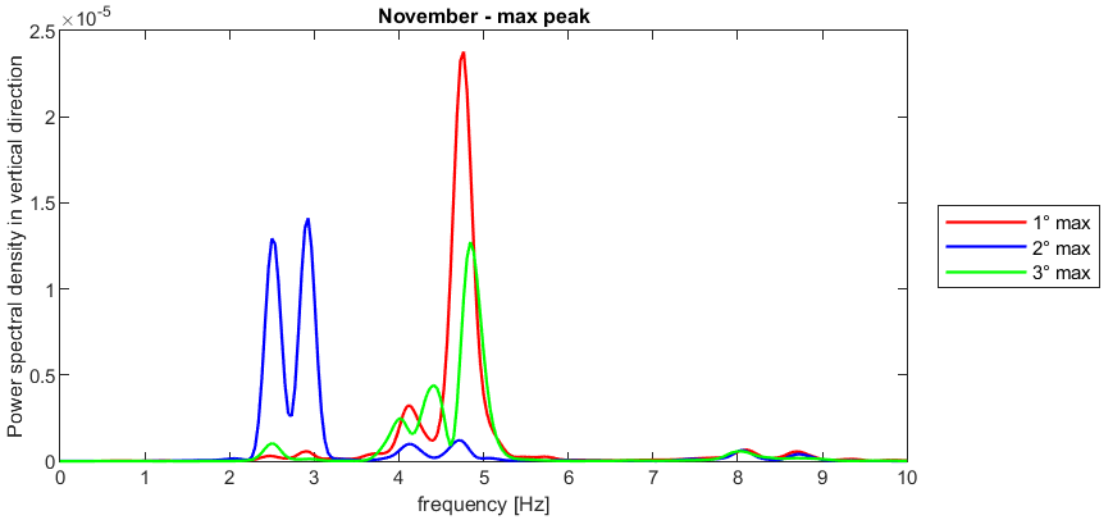


Figure 11-124: Results obtained from the 3 accelerograms with highest peak if PSD

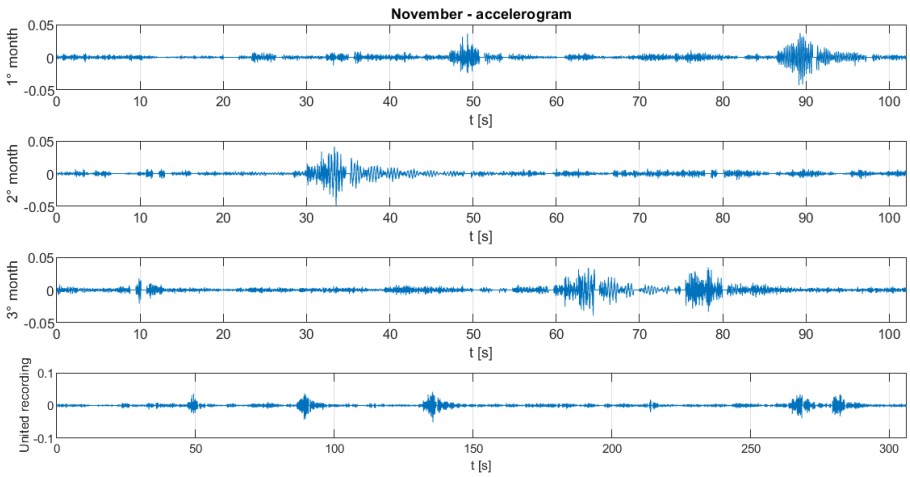


Figure 11-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.11.2 Longitudinal direction (y)

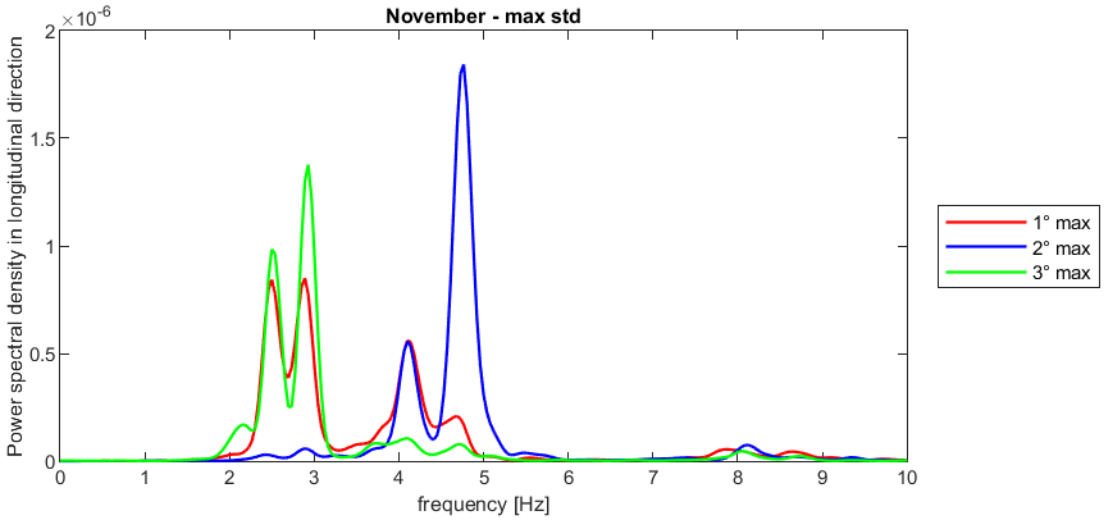


Figure 11-126: Results obtained from the 3 accelerograms with maximum SD in time domain

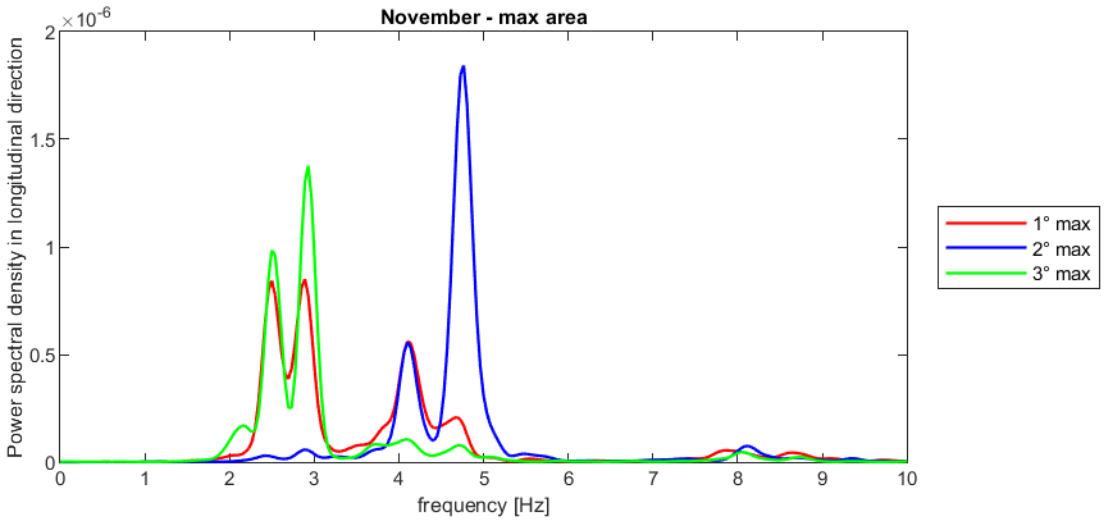


Figure 11-127: Results obtained from the 3 accelerograms with maximum area of PSD

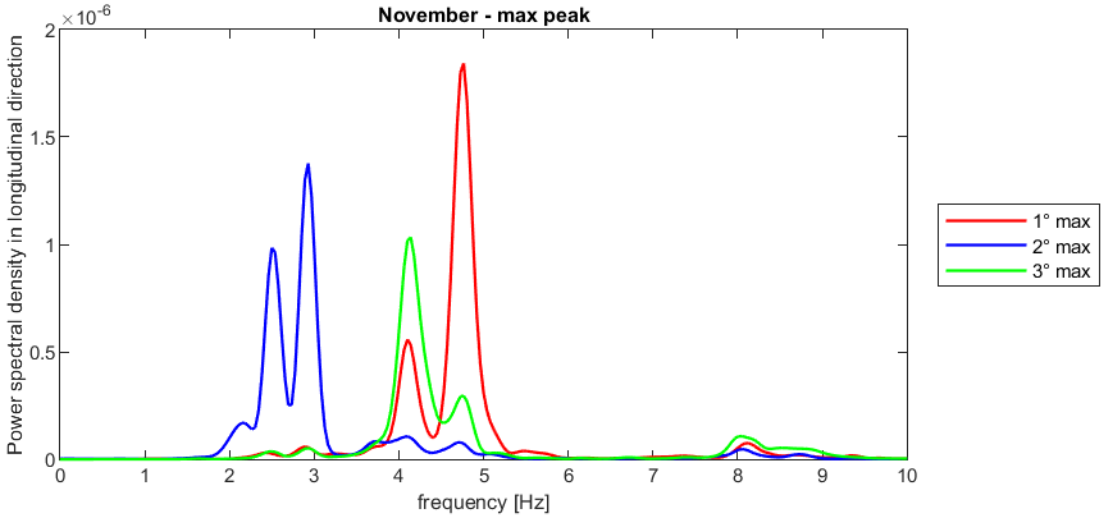


Figure 11-128: Results obtained from the 3 accelerograms with highest peak if PSD

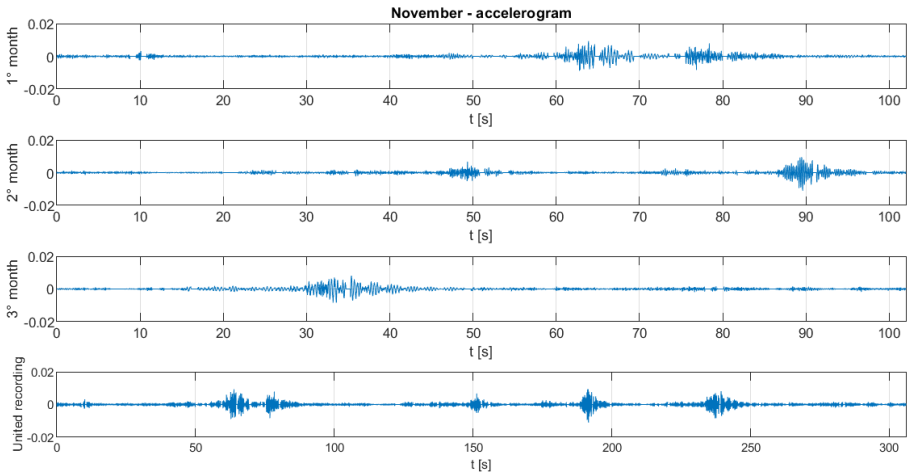


Figure 11-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

11.11.3 Transverse direction (z)

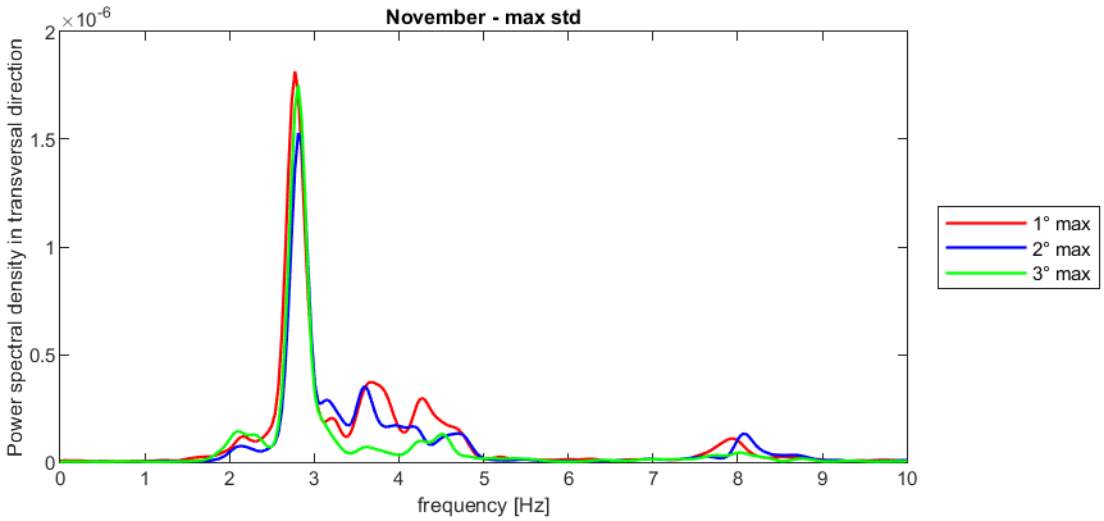


Figure 11-130: Results obtained from the 3 accelerograms with maximum SD in time domain

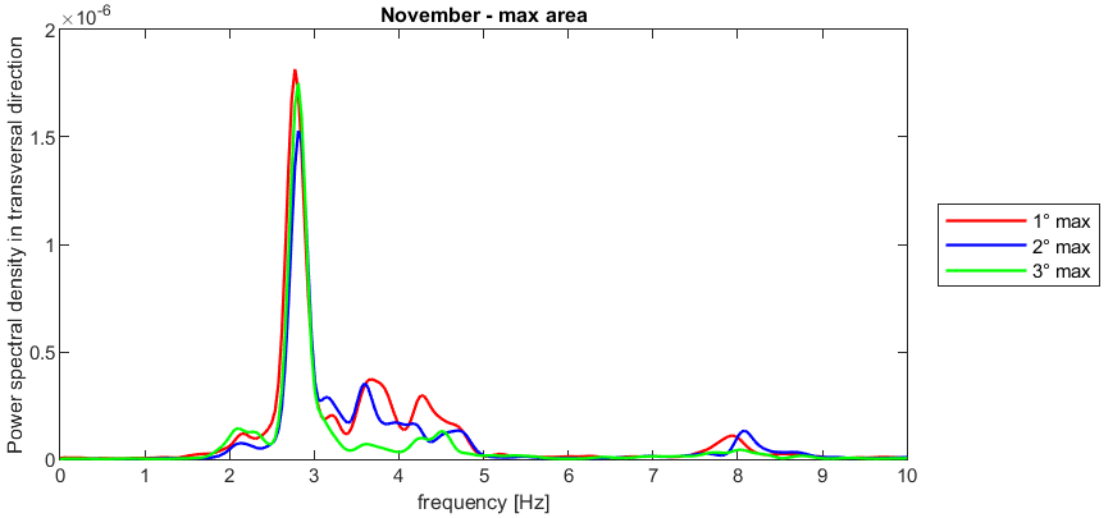


Figure 11-131: Results obtained from the 3 accelerograms with maximum area of PSD

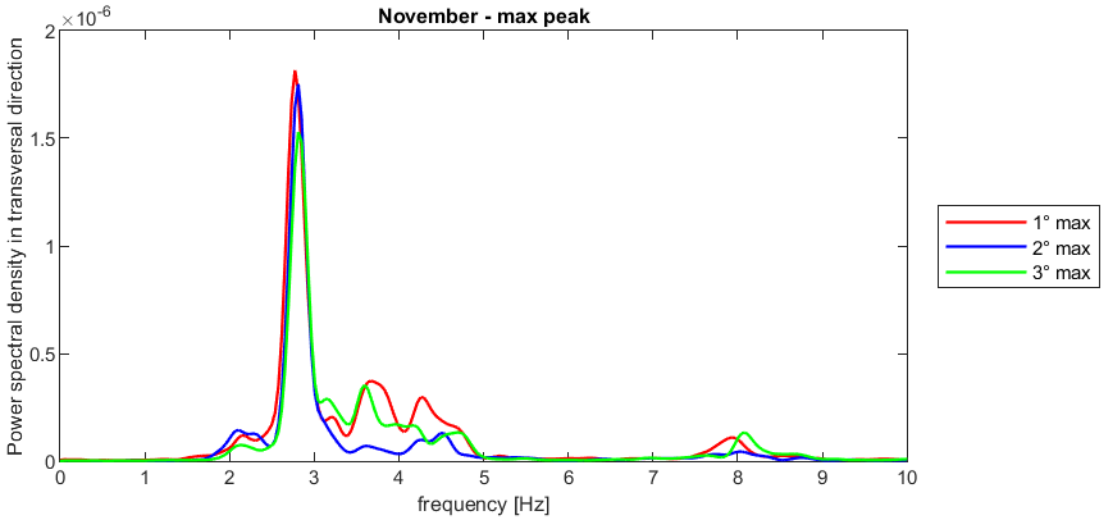


Figure 11-132: Results obtained from the 3 accelerograms with highest peak if PSD

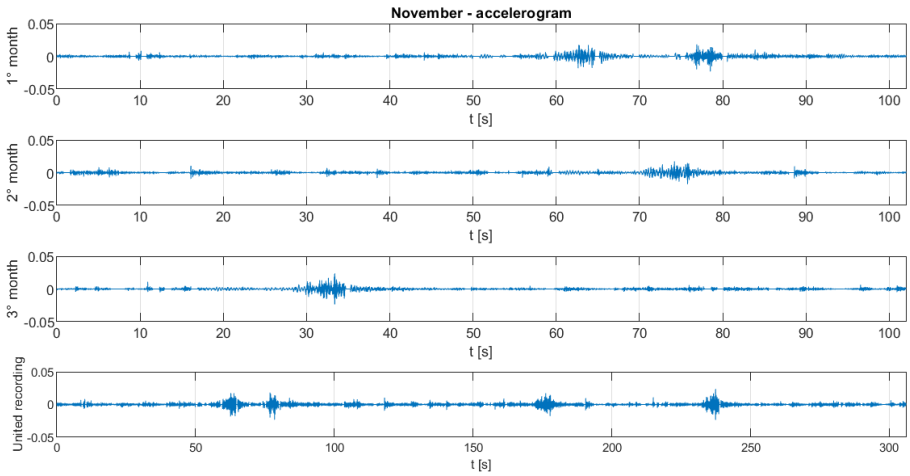


Figure 11-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

11.12 December

The results obtained for the December dataset are shown in the following tables.

Table 11-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	31205_2023-12-18_08-00-21	3.68E-03
	2°	31205_2023-12-28_09-00-20	3.17E-03
	3°	31205_2023-12-11_14-00-20	3.13E-03
Longitudinal direction (y)	1°	31205_2023-12-18_08-00-21	1.23E-03
	2°	31205_2023-12-11_14-00-20	1.09E-03
	3°	31205_2023-12-28_09-00-20	1.07E-03
Transverse direction (z)	1°	31205_2023-12-06_10-00-21	8.97E-04
	2°	31205_2023-12-28_09-00-20	8.73E-04
	3°	31205_2023-12-18_08-00-21	8.60E-04

Table 11-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-12-18_08-00-21	2.81E-05	31205_2023-12-18_08-00-21	2.95E-06
2	31205_2023-12-11_14-00-20	2.18E-05	31205_2023-12-11_14-00-20	2.08E-06
3	31205_2023-12-28_09-00-20	1.27E-05	31205_2023-12-28_09-00-20	2.00E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-12-18_08-00-21	3.44E-06	31205_2023-12-18_08-00-21	3.21E-07
2	31205_2023-12-11_14-00-20	2.60E-06	31205_2023-12-11_14-00-20	2.51E-07
3	31205_2023-12-28_09-00-20	1.74E-06	31205_2023-12-28_09-00-20	2.28E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	31205_2023-12-18_08-00-21	9.77E-07	31205_2023-12-18_08-00-21	1.54E-07
2	31205_2023-12-28_09-00-20	6.16E-07	31205_2023-12-28_09-00-20	1.51E-07
3	31205_2023-12-28_10-00-20	5.64E-07	31205_2023-12-06_10-00-21	1.49E-07

Table 11-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	D	A	A
2	B	C	C	C	C	C	B	B	B
3	C	B	B	B	B	B	A	-	D

11.12.1 Vertical direction (x)

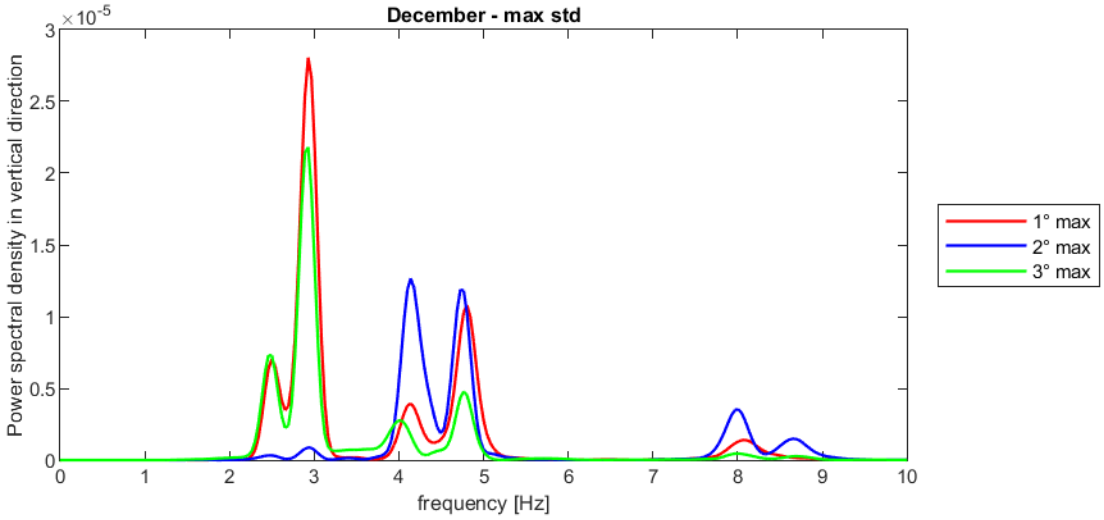


Figure 11-134: Results obtained from the 3 accelerograms with maximum SD in time domain

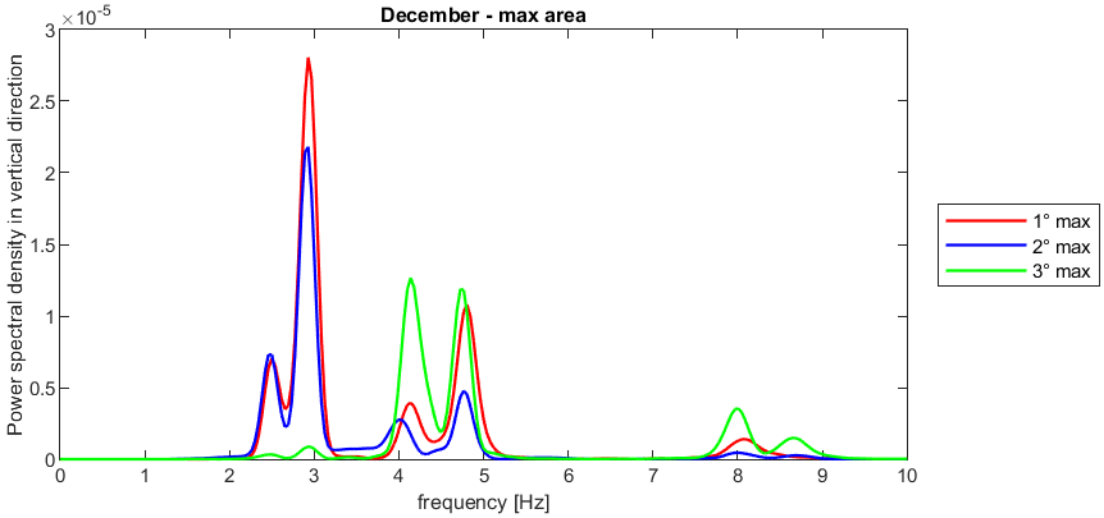


Figure 11-135: Results obtained from the 3 accelerograms with maximum area of PSD

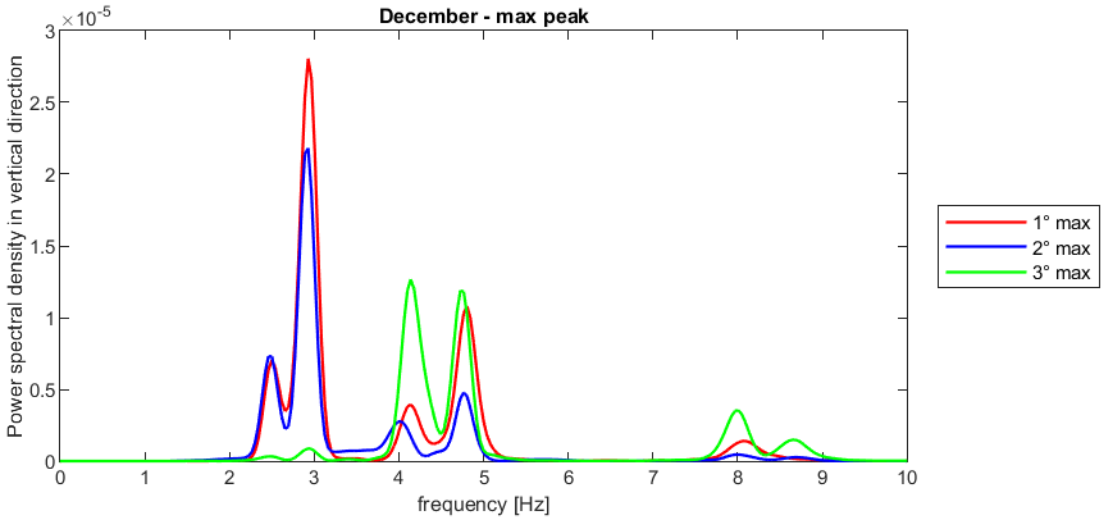


Figure 11-136: Results obtained from the 3 accelerograms with highest peak if PSD

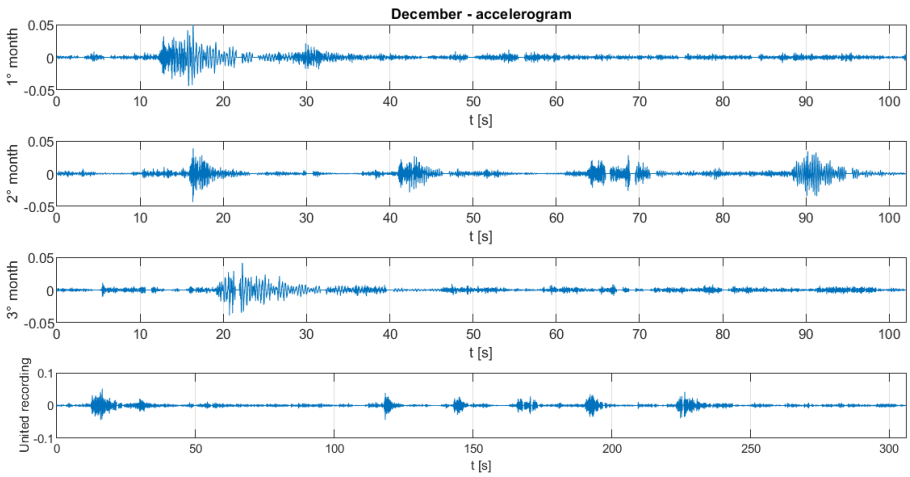


Figure 11-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

11.12.2 Longitudinal direction (y)

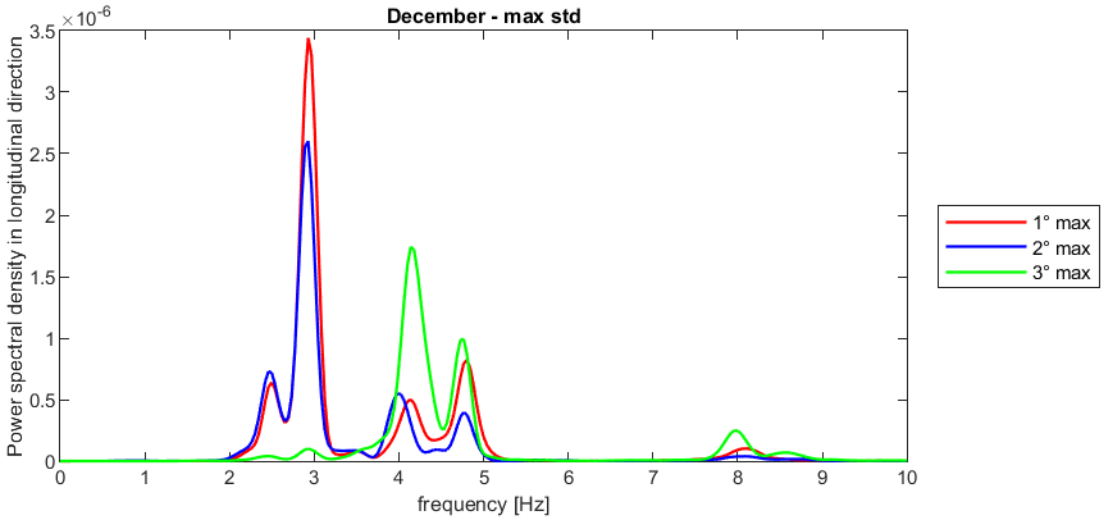


Figure 11-138: Results obtained from the 3 accelerograms with maximum SD in time domain

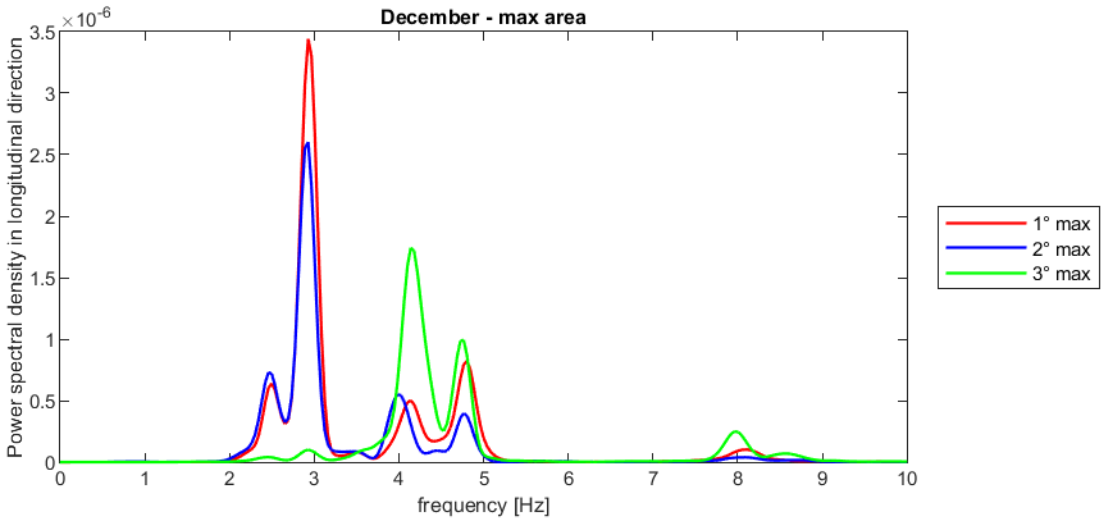


Figure 11-139: Results obtained from the 3 accelerograms with maximum area of PSD

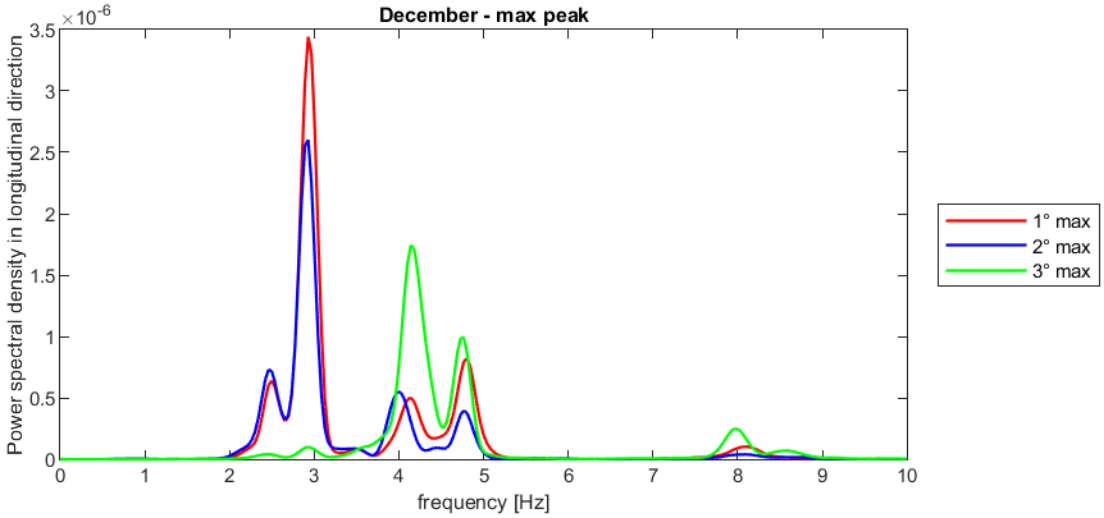


Figure 11-140: Results obtained from the 3 accelerograms with highest peak if PSD

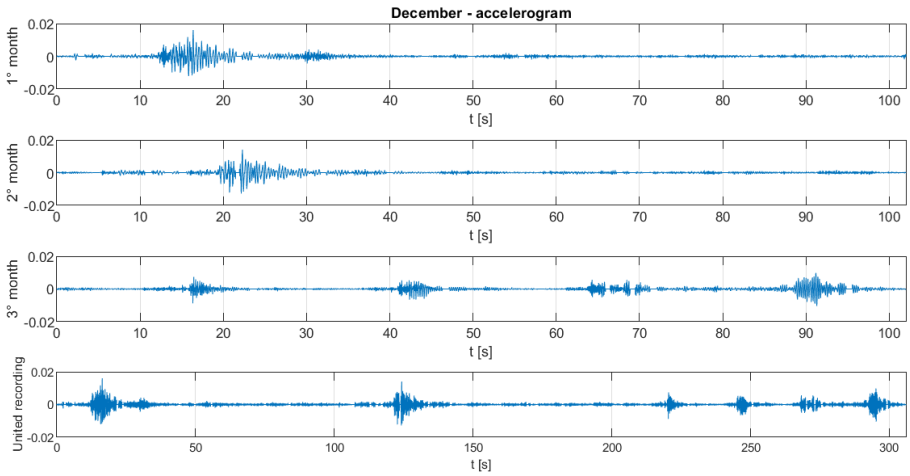


Figure 11-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

11.12.3 Transverse direction (z)

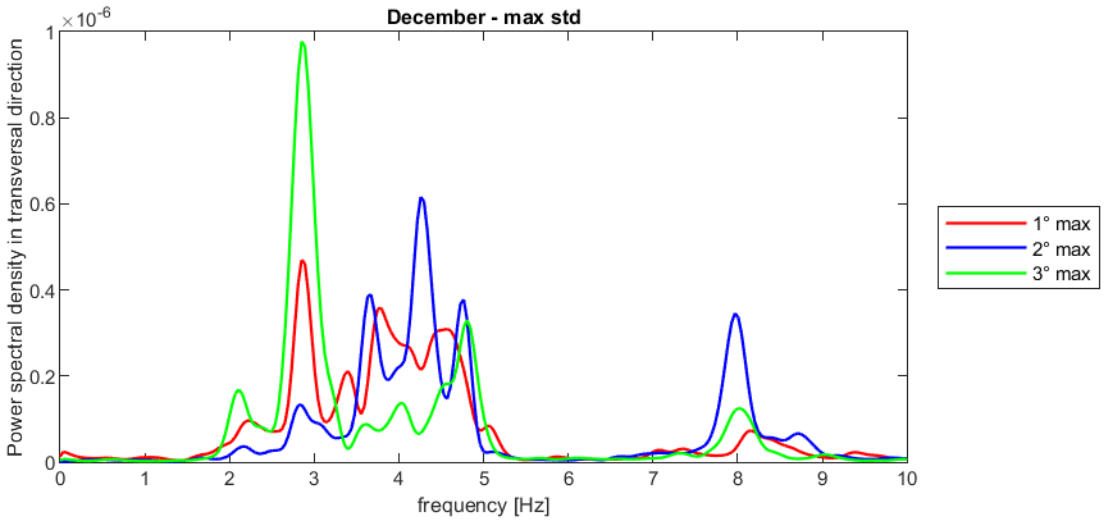


Figure 11-142: Results obtained from the 3 accelerograms with maximum SD in time domain

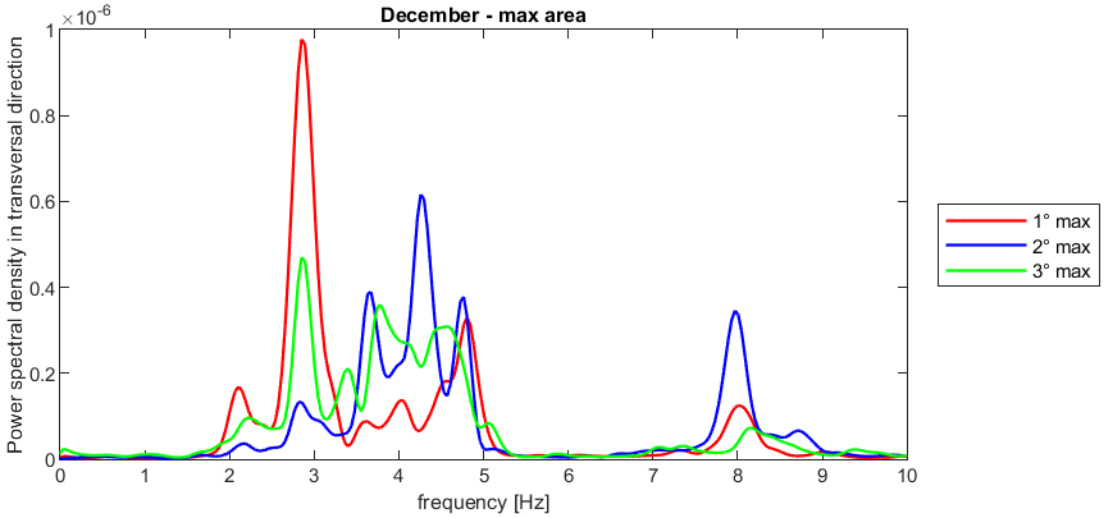


Figure 11-143: Results obtained from the 3 accelerograms with maximum area of PSD

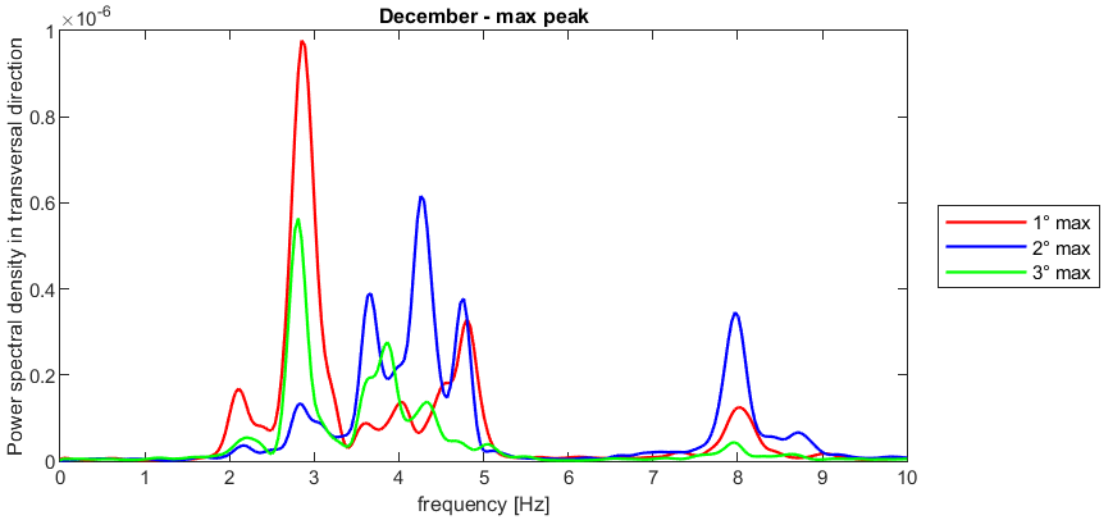


Figure 11-144: Results obtained from the 3 accelerograms with highest peak if PSD

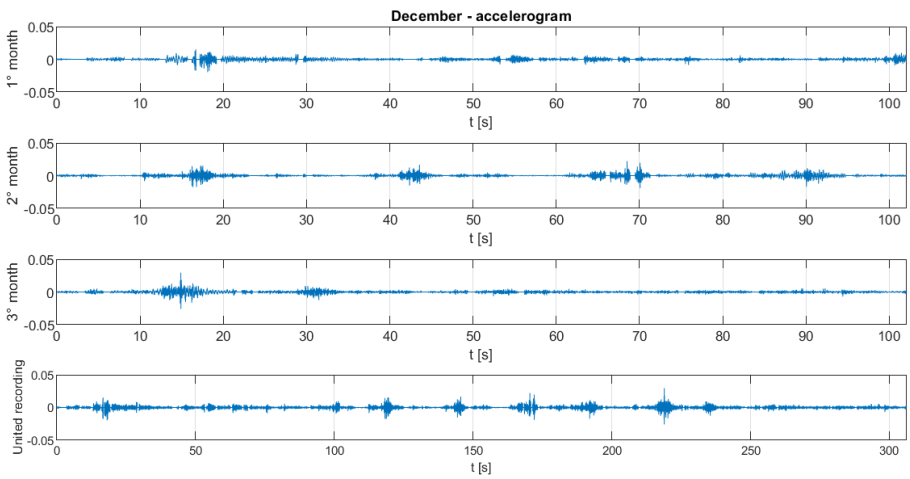


Figure 11-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

11.13 Analysis of the complete 2023 year

All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

Table 11-37: Main identified frequencies for sensor 31205 – bridge 223 – Sp2 – L/8

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	78	91	103	108	82	89	107	92	71	102	83	88
	MEAN	**2.46**	**2.88**	**4.05**	**4.73**	**2.45**	**2.87**	**4.04**	**4.69**	**2.16**	**2.80**	**3.73**	**4.61**
	SD	0.03	0.04	0.09	0.08	0.05	0.04	0.10	0.09	0.08	0.05	0.19	0.17
	C.o.V.	1.4%	1.2%	2.3%	1.6%	2.1%	1.5%	2.4%	1.9%	3.8%	1.8%	5.2%	3.6%
	Rating	**74%**	**87%**	**90%**	**100%**	**73%**	**83%**	**93%**	**83%**	**55%**	**93%**	**59%**	**69%**
1	gen-23		2.97	4.14	4.8	2.38	2.97	4.14	4.84	2.07	2.85		4.6
2	gen-23		2.97	4.1	4.8		2.93	4.14	4.8	2.07	2.85	3.83	4.69
3	gen-23	2.5	2.97	4.06	4.8	2.5		4.06	4.8		2.85	4.02	4.73
1	gen-23		2.93	4.14	4.8	2.38	2.85		4.61	2.38	2.97	4.14	4.8
2	gen-23			4.14	4.8		2.81	3.79	4.65		2.93	4.14	4.77
3	gen-23			4.14	4.8		2.85	4.02				4.14	4.8
1	gen-23		2.97	4.14	4.8	2.38	2.97	4.14	4.8	2.38	2.85		4.61
2	gen-23				4.8		2.89	4.14	4.77		2.85	3.83	
3	gen-23	2.46	2.97	4.1	4.8			4.14	4.81			3.83	
1	feb-23	2.46	2.89	4.1	4.8	2.46	2.85	4.1	4.8	2.26	2.85	3.83	
2	feb-23	2.46	2.89	3.82	4.77	2.46	2.89	3.91	4.77	2.26	2.81	4.02	4.8
3	feb-23	2.46	2.89	4.06	4.73	2.5	2.85	4.06	4.73		2.81	3.87	4.77
1	feb-23	2.46	2.89	4.1	4.8	2.46		4.1	4.8	2.26	2.85	3.83	
2	feb-23	2.46	2.89	3.81	4.77	2.46	2.89	3.91	4.77	2.26	2.77	4.02	4.73
3	feb-23	2.46	2.89	4.06	4.73	2.46	2.85	4.06	4.73		2.77	3.87	4.73
1	feb-23	2.46	2.89	4.06	4.73	2.5	2.89	4.06	4.73	2.26	2.85	3.83	
2	feb-23	2.46	2.89	4.1	4.8		2.93	4.14	4.77	2.26	2.85		
3	feb-23		2.93		4.8	2.46	2.89	3.87	4.77		2.81	4.02	4.77
1	mar-23	2.42	2.89	3.75	4.69	2.42	2.85	3.81	4.69	2.18	2.93	3.79	4.65
2	mar-23	2.46	2.85	3.75	4.69	2.46		3.75	4.69	2.22	2.81	3.59	4.69
3	mar-23	2.46	2.89	4.01	4.69	2.5		4.06	4.8		2.81		4.69
1	mar-23	2.42	2.89	3.75	4.69	2.42	2.85	3.75	4.69	2.19	2.93	3.79	4.65
2	mar-23	2.46	2.85	3.75	4.69	2.46		3.71	4.69	2.22	2.81	3.55	4.68
3	mar-23	2.38	2.85	4.01	4.73	2.46	2.89	4.06	4.73		2.81	3.63	4.73
1	mar-23	2.42	2.89	3.75	4.69	2.42	2.85	3.75	4.69	2.18	2.93	3.78	4.65
2	mar-23	2.46		4.06	4.73			4.06	4.73	2.07	2.77		4.69
3	mar-23	2.42	2.89	4.06	4.73	2.46		3.74	4.69	2.23	2.81	3.55	4.69
1	apr-23	2.5	2.89		4.8	2.46	2.89	4.01	4.38	2.14	2.73		4.29
2	apr-23	2.42			4.61	2.46		3.98	4.53		2.85	3.59	4.8
3	apr-23			4.1	4.8		2.81	4.02	4.65		2.81	3.94	4.8
1	apr-23	2.5	2.89	4.06	4.77	2.46	2.89	4.02	4.38	2.18	2.73		4.29
2	apr-23	2.42			4.57	2.46		3.98	4.53		2.85	3.51	4.8
3	apr-23	2.42		4.1	4.77		2.77	4.02	4.65		2.85		

1	apr-23	2.5	2.89	4.06	4.73	2.46	2.89	4.02	4.41		2.73		4.29
2	apr-23			4.02	4.61	2.46		3.98	4.53		2.85	3.51	4.77
3	apr-23		2.89	3.98	4.69		2.85	4.02	4.69	2.03	2.77		4.69
1	mag-23	2.42	2.85	4.02	4.84	2.42	2.81	4.02		2.07	2.81	3.98	4.65
2	mag-23	2.42	2.85	4.02	4.65	2.42	2.85	4.02	4.65	2.07	2.77	4.04	4.61
3	mag-23	2.46	2.89	4.1	4.73	2.5	2.89	4.1	4.73	2.07	2.81		4.69
1	mag-23	2.42	2.85	4.02	4.84	2.42	2.81	4.02		2.07	2.81	3.98	4.65
2	mag-23	2.42	2.85	4.06	4.65	2.42	2.85	3.98	4.65	2.07	2.77	4.04	4.61
3	mag-23		2.85	3.98	4.73	2.46	2.89	4.1	4.73	2.15	2.81		4.73
1	mag-23	2.42	2.85	4.02	4.84	2.42	2.81	4.02		2.1	2.81	3.98	4.65
2	mag-23	2.42	2.85	3.98	4.65	2.42	2.81	4.02	4.65	2.11	2.77	4.08	4.61
3	mag-23	2.46	2.89	4.1	4.73	2.5	2.89	4.06	4.73	2.15	2.73	4.08	4.61
1	giu-23	2.46	2.89	4.02	4.65	2.61	2.93	3.95	4.65	2.15	2.77	3.55	
2	giu-23	2.46	2.85	3.98	4.65	2.46	2.89	4.02	4.65			3.75	4.65
3	giu-23	2.46	2.85	4.1	4.88	2.46	2.85	4.14		2.19	2.77		
1	giu-23	2.46	2.89	4.02	4.65	2.61	2.93	3.95	4.65		2.77	3.55	
2	giu-23	2.46	2.85	4.14	4.88	2.46	2.89	3.98	4.65			3.75	4.65
3	giu-23	2.46	2.85	3.98	4.65	2.46	2.85	4.14		2.19	2.77	3.48	4.8
1	giu-23	2.46	2.85	4.1	4.92	2.46	2.85	4.14		2.15	2.77	3.55	
2	giu-23	2.46	2.85	3.98	4.65	2.61	2.93	3.95	4.65	2.19	2.77	3.44	4.65
3	giu-23		2.85	4.06	4.69		2.85	4.1	4.69			3.75	4.8
1	lug-23	2.46	2.85	4.1	4.69	2.42	2.89	4.02	4.65	2.1	2.73	3.43	
2	lug-23		2.81	4.1	4.8	2.42	2.81	4.14		2.3	2.77		4.73
3	lug-23	2.46	2.85	4.14	4.84	2.38		4.1		2.34	2.73		4.29
1	lug-23		2.85	4.1	4.65	2.34	2.81	4.14		2.07	2.73	3.44	
2	lug-23	2.46	2.85	4.14	4.84	2.42	2.89	3.98	4.65	2.3	2.77		4.69
3	lug-23		2.85	4.1	4.77	2.42		4.1		2.3	2.73		4.22
1	lug-23		2.85	4.1	4.65	2.38	2.81	4.14		2.11	2.73	3.4	
2	lug-23		2.81	4.1	4.77	2.42	2.85	4.02	4.65	2.3	2.81		4.29
3	lug-23	2.46	2.85	4.14	4.84	2.42		4.1			2.73		4.34
1	ago-23	2.46	2.85	3.98	4.65	2.38	2.85	4.06	4.53		2.77		4.53
2	ago-23	2.46		4.06	4.69	2.46	2.85	4.02	4.65	2.14	2.77	3.59	4.65
3	ago-23	2.46	2.85	4.06	4.53	2.42		4.06	4.69	2.14	2.77	3.78	4.65
1	ago-23	2.46	2.89	4.02	4.65	2.38	2.85	4.06	4.53		2.73	3.59	4.53
2	ago-23	2.46		4.02	4.65	2.46	2.85	4.02	4.65	2.14	2.77		4.65
3	ago-23	2.46	2.89	4.1	4.69	2.46		4.06	4.69		2.77	3.79	4.65
1	ago-23	2.46		4.06	4.65	2.34	2.85	4.06	4.53	2.11	2.77	3.59	4.53
2	ago-23	2.46	2.85	4.06	4.53	2.46	2.85	4.1			2.81	3.87	4.69
3	ago-23	2.46	2.85	4.02	4.65		2.85	4.06	4.57				
1	set-23		2.85	4.02	4.61		2.85	4.02	4.61	2.03	2.77	3.48	4.42
2	set-23		2.89	4.1	4.69		2.89	4.06	4.69	2.1	2.77	3.55	
3	set-23			4.06	4.69		2.85	4.06	4.69	2.03	2.77	3.78	4.69
1	set-23	2.3	2.85	4.02	4.57	2.38	2.85	4.02	4.61		2.77	3.48	4.34
2	set-23			4.1	4.69		2.89	4.06	4.69	2.11	2.77	3.55	
3	set-23		2.89	4.06	4.69		2.85	4.06	4.73		2.77	3.63	4.38
1	set-23			4.14	4.69	2.34	2.85	4.02	4.61		2.77	3.63	4.65
2	set-23	2.34	2.85	4.02	4.61			4.1	4.69	2.11	2.77	3.55	4.34
3	set-23	2.42	2.89	4.02	4.65		2.89	4.06	4.69	2.07	2.77	3.48	4.38
1	ott-23	2.46	2.89	4.06	4.73	2.46	2.89	3.98	4.69	2.21	2.81	3.51	4.42

2	ott-23	2.46	2.89	3.94	4.77	2.38	2.89	4.06	4.77		2.81	3.76	
3	ott-23	2.46	2.89	4.02	4.69	2.46	2.77	4.06	4.77	2.1	2.89	3.55	4.34
1	ott-23	2.46	2.89	4.06	4.73	2.46	2.89	4.02	4.77	2.26	2.81	3.55	4.34
2	ott-23	2.46	2.89	3.95	4.77	2.46	2.85	3.98	4.77		2.77	3.78	
3	ott-23	2.46	2.89	4.02	4.69	2.38	2.73	4.1	4.73	2.11	2.89	3.51	4.65
1	ott-23	2.5	2.89	4.06	4.73	2.46	2.89	4.06	4.77		2.77	3.78	4.88
2	ott-23	2.46	2.89	4.02	4.65	2.46	2.85	3.98	4.69		2.77	3.78	4.57
3	ott-23	2.46		3.95	4.77	2.46		4.02	4.73	2.11	2.89	3.55	4.69
1	nov-23		2.89	4.14	4.77	2.5	2.89	4.1	4.69	2.14	2.77	3.67	4.36
2	nov-23	2.5	2.93	4.1	4.69		2.89	4.1	4.77		2.81	3.59	4.73
3	nov-23	2.5	2.89	4.14	4.73	2.5	2.93	4.1			2.81		4.49
1	nov-23		2.89	4.14	4.77	2.5	2.89	4.1	4.69	2.15	2.77	3.63	4.3
2	nov-23	2.5	2.89	4.14	4.69		2.93	4.1	4.77	2.11	2.81	3.59	4.69
3	nov-23	2.5	2.93	4.14	4.69	2.5	2.89	4.1		2.11	2.81	3.59	4.49
1	nov-23		2.89	4.1	4.77		2.89	4.1	4.77	2.15	2.77	3.67	4.29
2	nov-23	2.5	2.93	4.14	4.77	2.5	2.93	4.1	4.73	2.07	2.81		4.59
3	nov-23	2.5		4.02	4.84		2.89	4.14	4.77		2.81	3.59	4.69
1	dic-23	2.5	2.93	4.14	4.8	2.46	2.93	4.14	4.77	2.14	2.85	3.78	
2	dic-23		2.93	4.02	4.73	2.5	2.93	3.98	4.77	2.14	2.85	3.67	4.77
3	dic-23	2.46	2.93	4.14	4.77			4.14	4.77	2.1	2.85		4.8
1	dic-23	2.5	2.93	4.14	4.8	2.5	2.93	4.14	4.77	2.11	2.85	3.84	4.8
2	dic-23	2.46	2.93	3.98	4.77	2.46	2.93	3.98	4.77	2.15	2.81	3.67	4.77
3	dic-23		2.93	4.14	4.73		2.93	4.14	4.77		2.85	3.75	4.53
1	dic-23	2.5	2.93	4.1	4.8	2.5	2.93	4.14	4.8	2.11	2.85	3.84	4.8
2	dic-23	2.46	2.93	3.98	4.77	2.46	2.93	4.02	4.77	2.18	2.85	3.67	4.77
3	dic-23		2.89	4.14	4.73		2.89	4.14	4.77	2.14	2.81	3.87	4.34

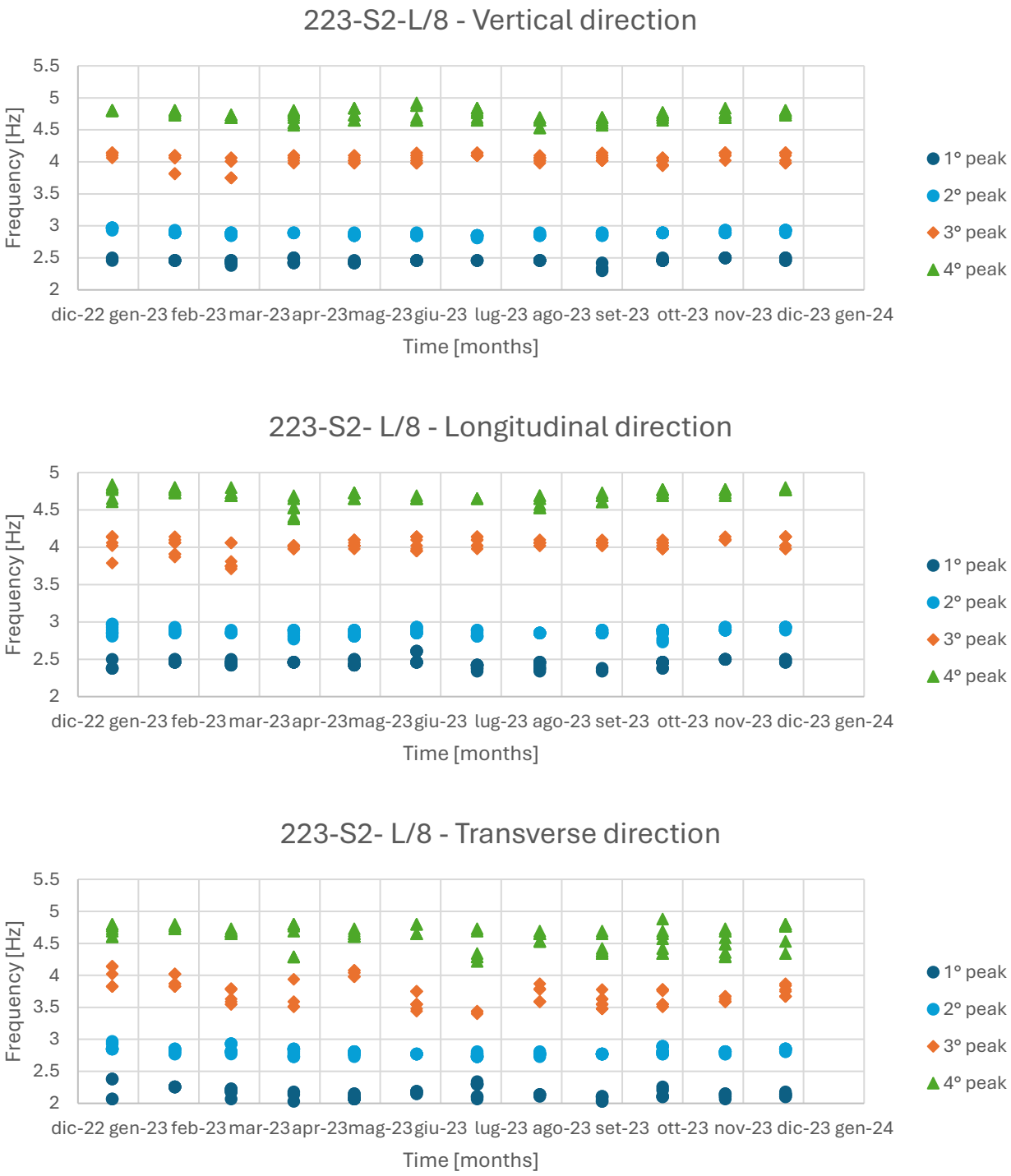


Figure 11-146: Main identified frequencies for sensor 31205 – bridge 223 – Sp2 – L/8

12. Annex 12 – Bridge 223 – Pile 2W - Sensor 319BC

The Bridge 223 counts 2 monitored decks: span 2 and span 6 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 2 are:

- 2BE0F – situated in the midspan;
- 2BA63 – situated at a distance of L/4;
- 31205 – situated at a distance of L/8;
- 319BC – situated nearby the west pilar;
- 319E3 – situated nearby the east pilar.

The sensors present on deck number 6 are:

- 2B5E7 – situated in the midspan;
- 2BCF9 – situated at a distance of L/4 of the deck;
- 2BCAD – situated at a distance of L/8 of the deck;

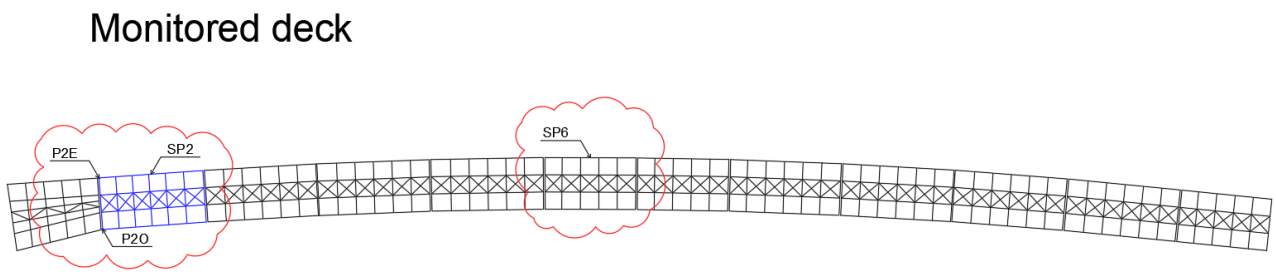


Figure 12-1 Monitored decks of 223 bridge

The accelerograms of the 319BC sensor have been analyzed and the results are represented in the following paragraphs.

12.1 January

The results obtained for the January dataset are shown in the following tables.

Table 12-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-01-31_07-00-20	9.56E-05
	2°	319BC_2023-01-30_07-00-20	9.47E-05
	3°	319BC_2023-01-16_13-00-21	9.37E-05
Longitudinal direction (y)	1°	319BC_2023-01-30_07-00-20	6.14E-04
	2°	319BC_2023-01-31_07-00-20	5.10E-04
	3°	319BC_2023-01-26_13-00-19	4.83E-04
Transverse direction (z)	1°	319BC_2023-01-27_01-00-21	3.53E-04
	2°	319BC_2023-01-30_07-00-20	3.40E-04
	3°	319BC_2023-01-31_07-00-20	3.35E-04

Table 12-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-01-24_01-00-21	8.00E-09	319BC_2023-01-31_07-00-20	1.45E-09
2	319BC_2023-01-30_07-00-20	7.63E-09	319BC_2023-01-30_07-00-20	1.40E-09
3	319BC_2023-01-16_13-00-21	6.50E-09	319BC_2023-01-16_13-00-21	1.35E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-01-30_07-00-20	5.68E-07	319BC_2023-01-30_07-00-20	8.04E-08
2	319BC_2023-01-26_13-00-19	3.00E-07	319BC_2023-01-31_07-00-20	5.16E-08
3	319BC_2023-01-31_07-00-20	2.92E-07	319BC_2023-01-26_13-00-19	4.96E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-01-26_07-00-20	1.54E-07	319BC_2023-01-27_01-00-21	2.51E-08
2	319BC_2023-01-17_07-00-20	1.21E-07	319BC_2023-01-30_07-00-20	2.37E-08
3	319BC_2023-01-31_07-00-20	1.02E-07	319BC_2023-01-31_07-00-20	2.25E-08

Table 12-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	B	B	B	E	-	E
2	B	B	B	A	D	A	B	-	B
3	C	C	C	D	A	D	A	A	A

12.1.1 Vertical direction (x)

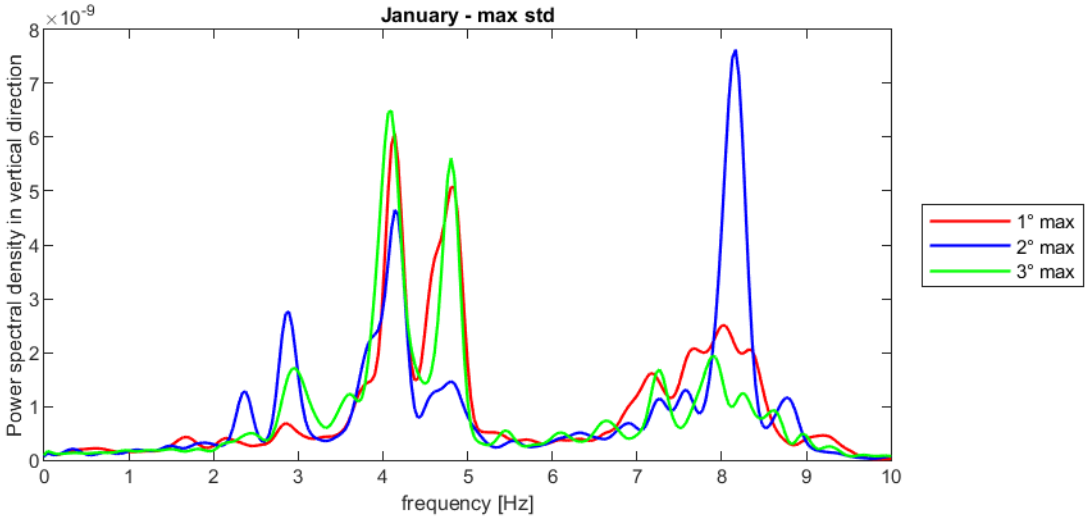


Figure 12-2: Results obtained from the 3 accelerograms with maximum SD in time domain

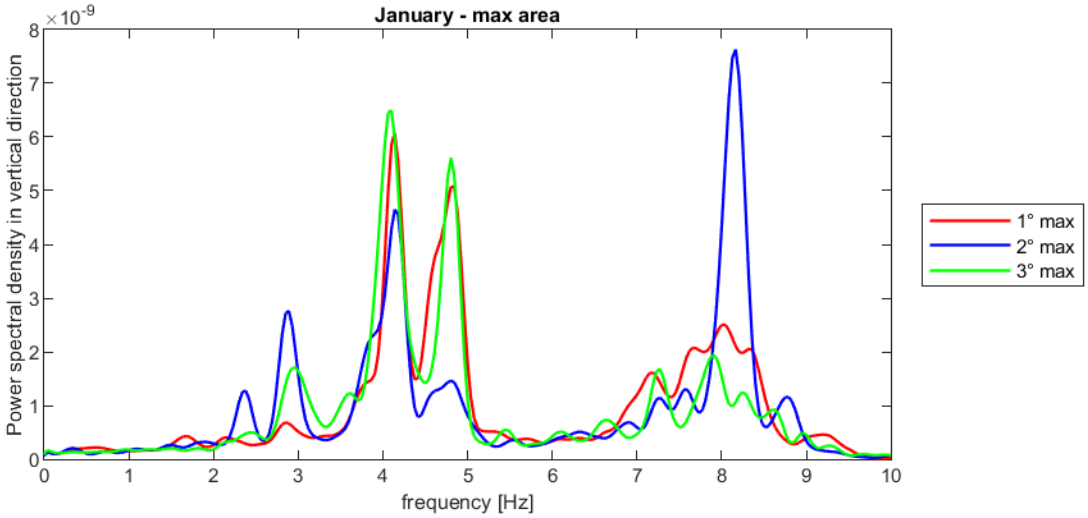


Figure 12-3: Results obtained from the 3 accelerograms with maximum area of PSD

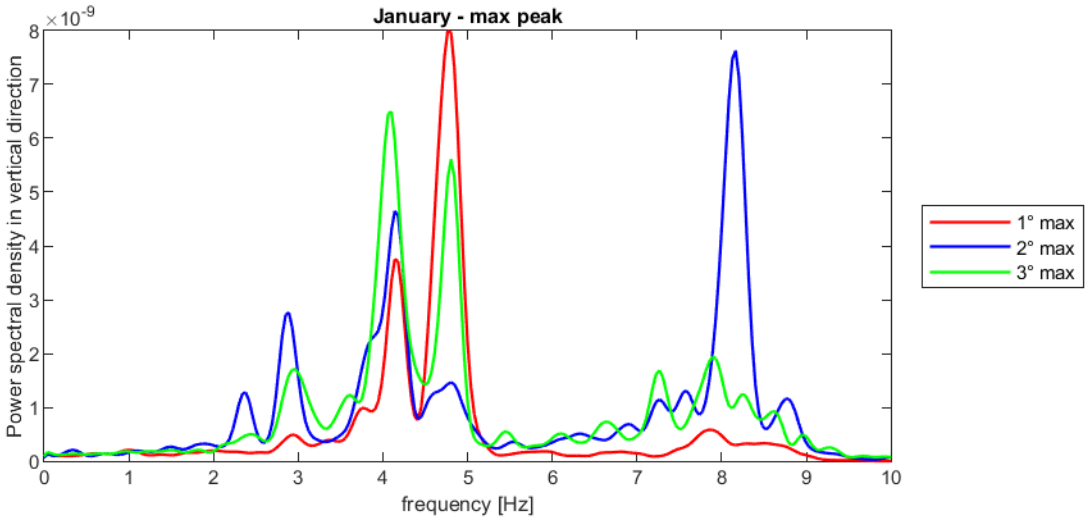


Figure 12-4: Results obtained from the 3 accelerograms with highest peak if PSD

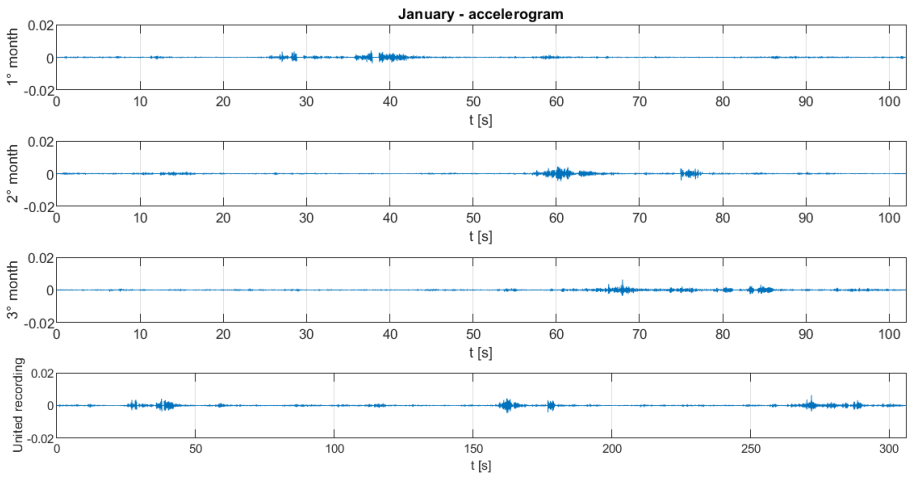


Figure 12-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.1.2 Longitudinal direction (y)

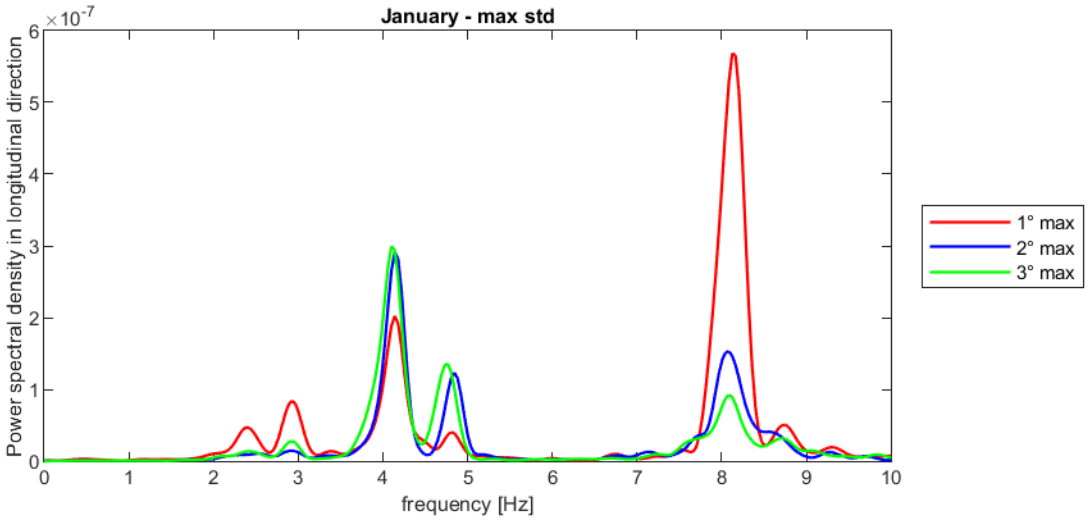


Figure 12-6: Results obtained from the 3 accelerograms with maximum SD in time domain

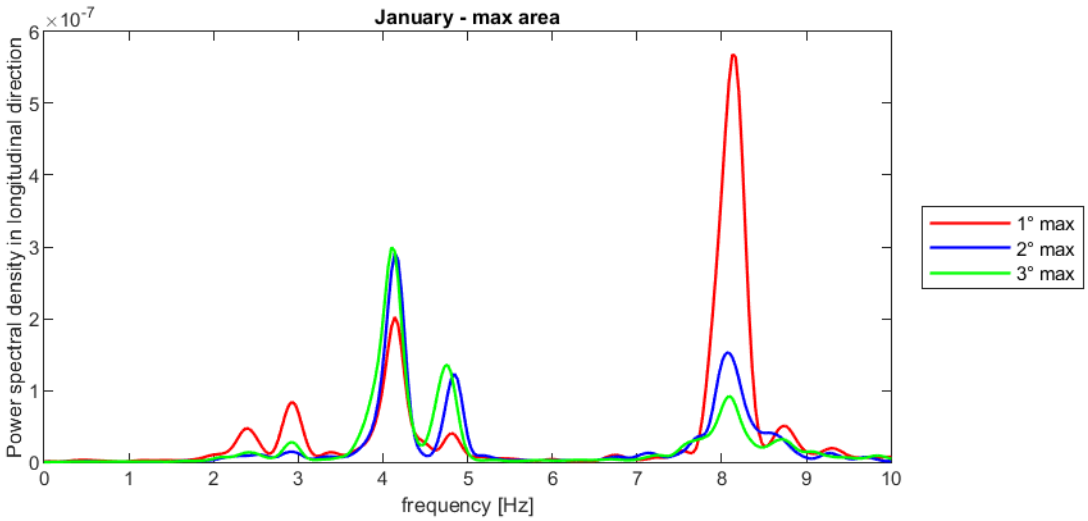


Figure 12-7: Results obtained from the 3 accelerograms with maximum area of PSD

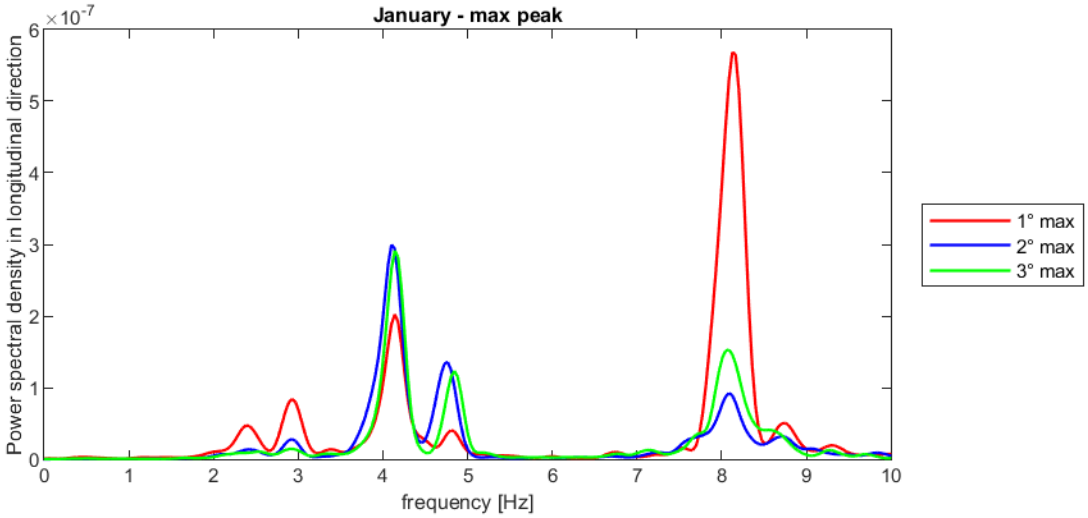


Figure 12-8: Results obtained from the 3 accelerograms with highest peak in PSD

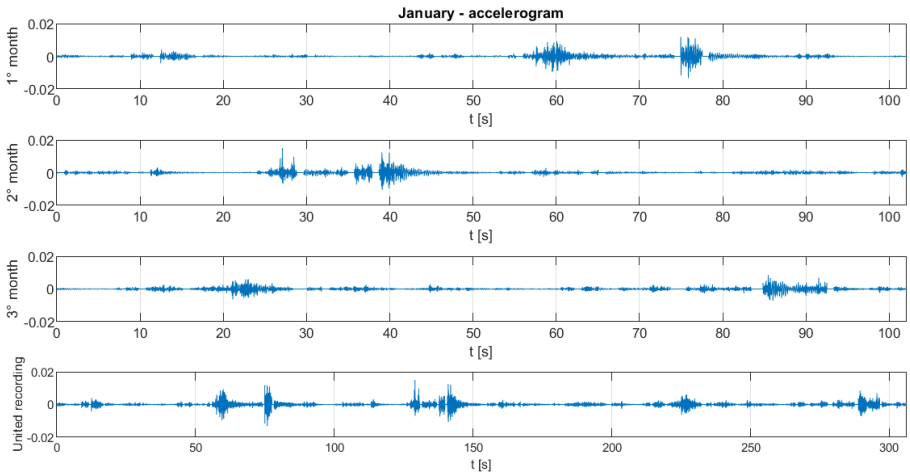


Figure 12-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

12.1.3 Transverse direction (z)

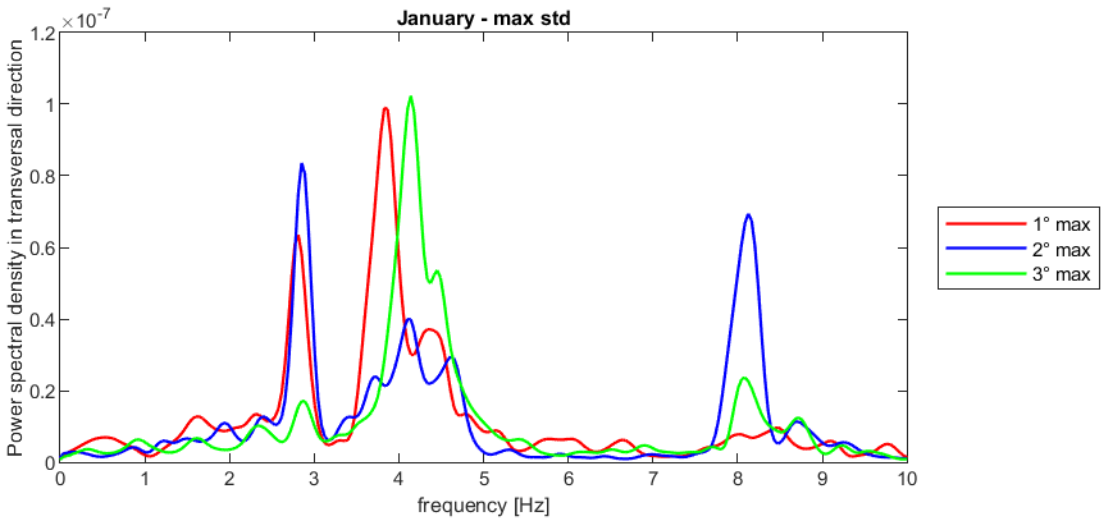


Figure 12-10: Results obtained from the 3 accelerograms with maximum SD in time domain

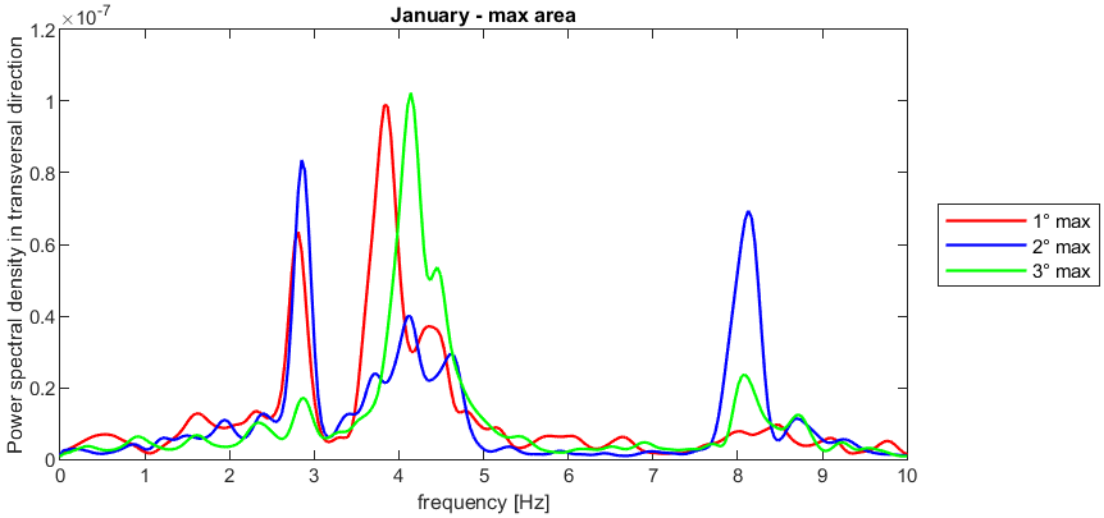


Figure 12-11: Results obtained from the 3 accelerograms with maximum area of PSD

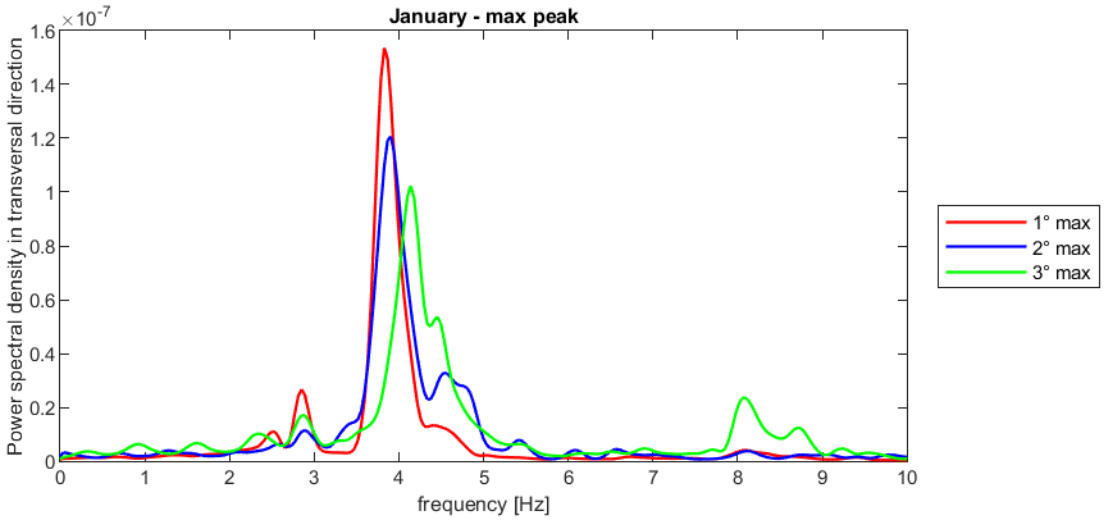


Figure 12-12: Results obtained from the 3 accelerograms with highest peak in PSD

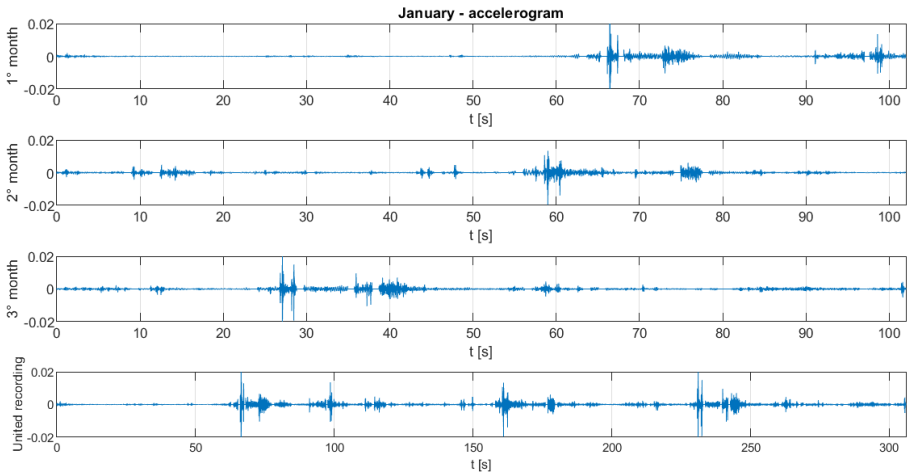


Figure 12-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

12.2 February

The results obtained for the February dataset are shown in the following tables.

Table 12-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-02-01_13-00-19	1.45E-04
	2°	319BC_2023-02-06_13-00-21	1.40E-04
	3°	319BC_2023-02-17_13-00-20	1.14E-04
Longitudinal direction (y)	1°	319BC_2023-02-06_13-00-21	7.21E-04
	2°	319BC_2023-02-01_13-00-19	7.12E-04
	3°	319BC_2023-02-03_13-00-19	5.79E-04
Transverse direction (z)	1°	319BC_2023-02-01_13-00-19	6.44E-04
	2°	319BC_2023-02-06_13-00-21	5.32E-04
	3°	319BC_2023-02-17_13-00-20	4.25E-04

Table 12-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-02-06_13-00-21	1.59E-08	319BC_2023-02-01_13-00-19	3.29E-09
2	319BC_2023-02-01_13-00-19	1.50E-08	319BC_2023-02-06_13-00-21	3.04E-09
3	319BC_2023-02-17_13-00-20	1.48E-08	319BC_2023-02-17_13-00-20	1.99E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-02-17_13-00-20	5.43E-07	319BC_2023-02-06_13-00-21	1.07E-07
2	319BC_2023-02-01_13-00-19	3.65E-07	319BC_2023-02-01_13-00-19	1.00E-07
3	319BC_2023-02-06_13-00-21	3.50E-07	319BC_2023-02-03_13-00-19	6.75E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-02-01_13-00-19	5.27E-07	319BC_2023-02-01_13-00-19	8.21E-08
2	319BC_2023-02-06_13-00-21	2.10E-07	319BC_2023-02-06_13-00-21	5.68E-08
3	319BC_2023-02-17_13-00-20	1.11E-07	319BC_2023-02-17_13-00-20	3.56E-08

Table 12-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	B	-	B	A	A	A
2	B	A	B	A	A	A	B	B	B
3	C	C	C	D	B	D	C	C	C

12.2.1 Vertical direction (x)

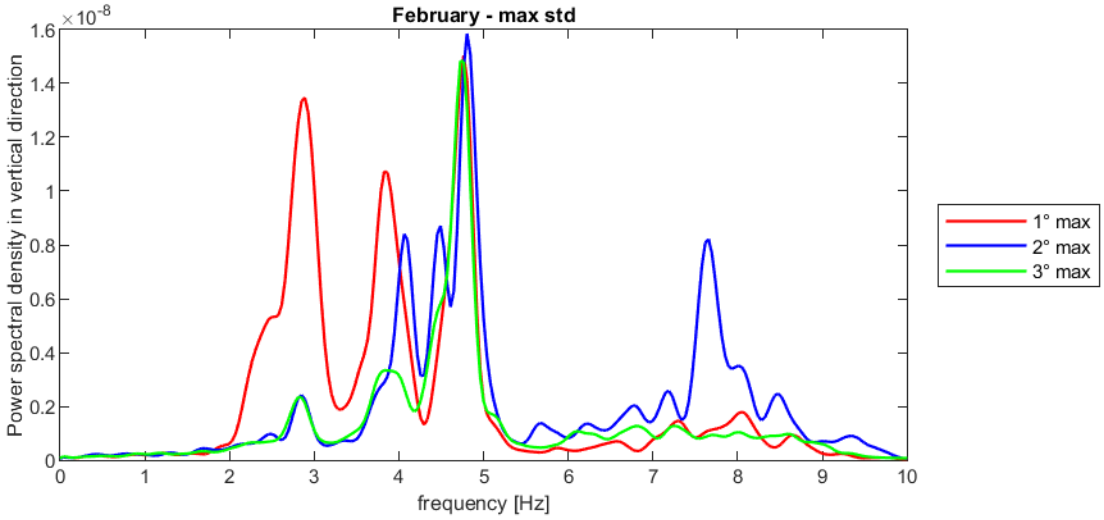


Figure 12-14: Results obtained from the 3 accelerograms with maximum SD in time domain

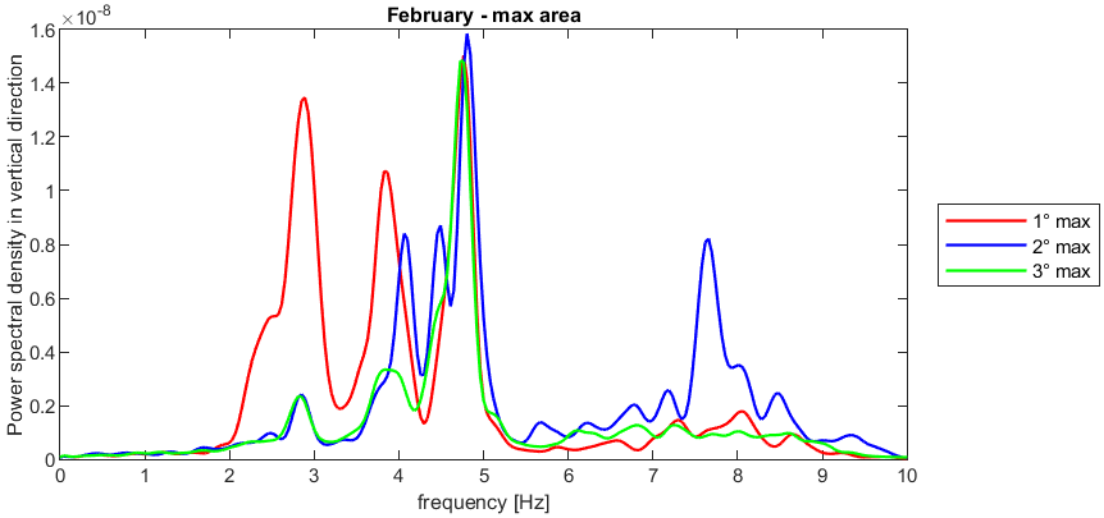


Figure 12-15: Results obtained from the 3 accelerograms with maximum area of PSD

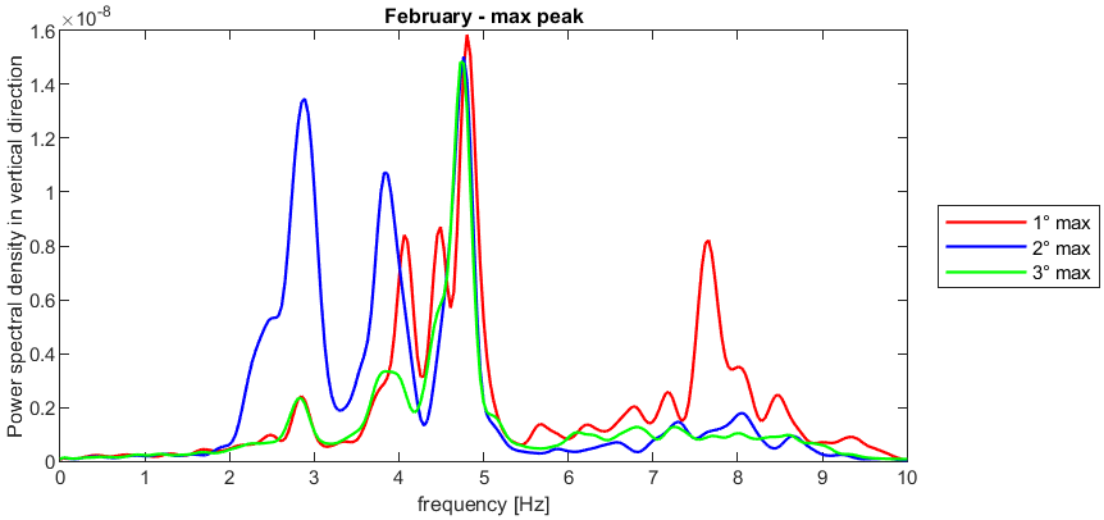


Figure 12-16: Results obtained from the 3 accelerograms with highest peak if PSD

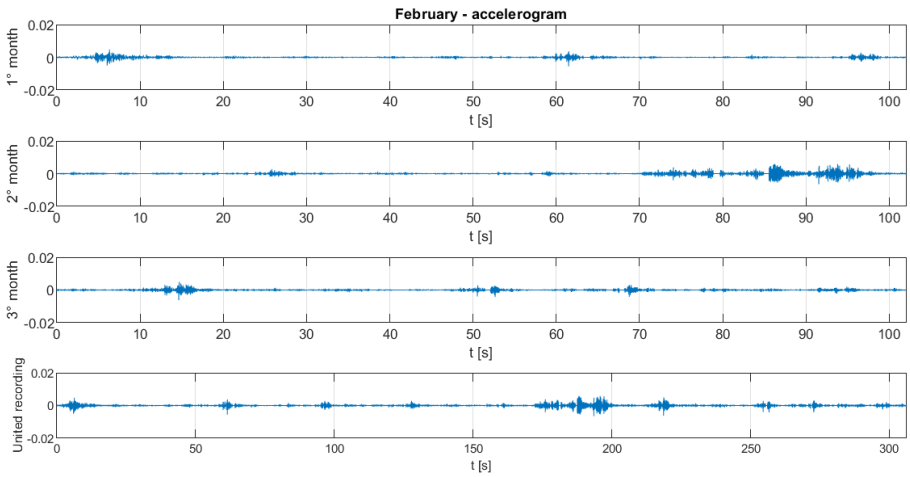


Figure 12-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.2.2 Longitudinal direction (y)

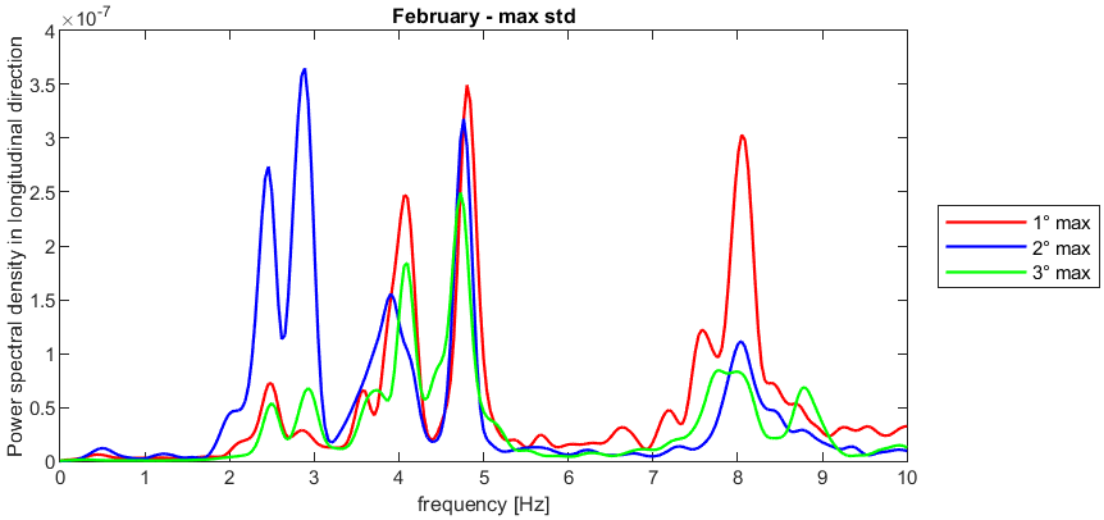


Figure 12-18: Results obtained from the 3 accelerograms with maximum SD in time domain

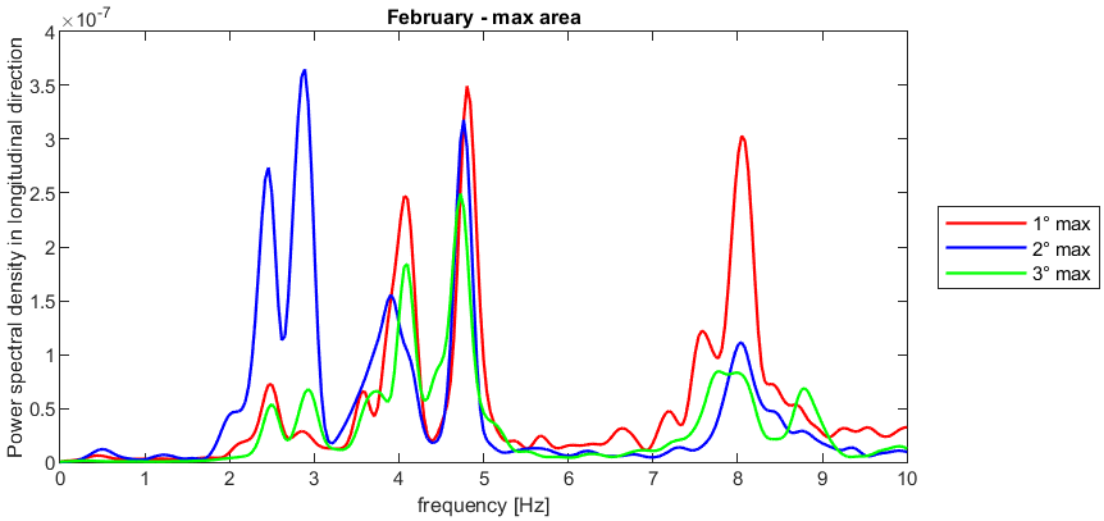


Figure 12-19: Results obtained from the 3 accelerograms with maximum area of PSD

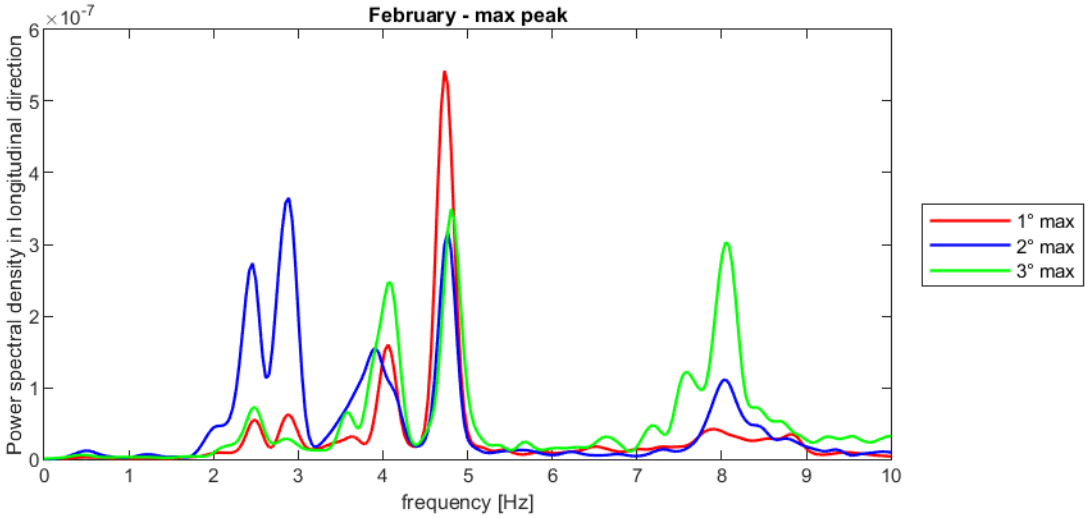


Figure 12-20: Results obtained from the 3 accelerograms with highest peak if PSD

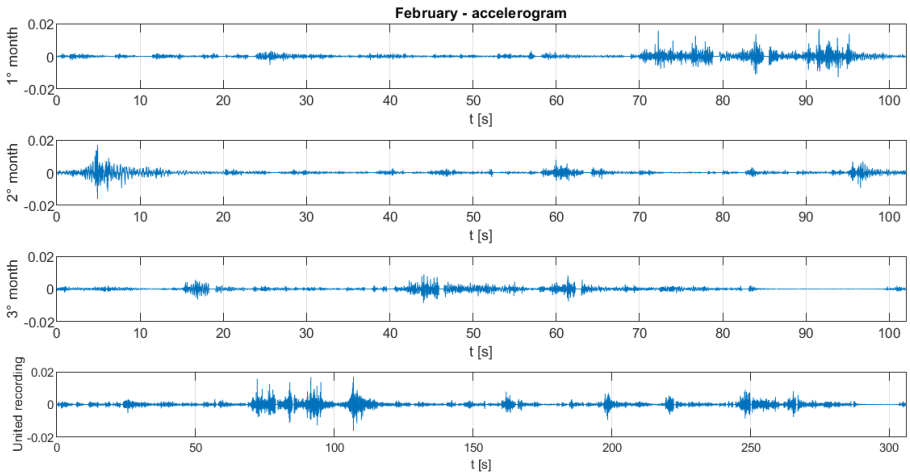


Figure 12-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

12.2.3 Transverse direction (z)

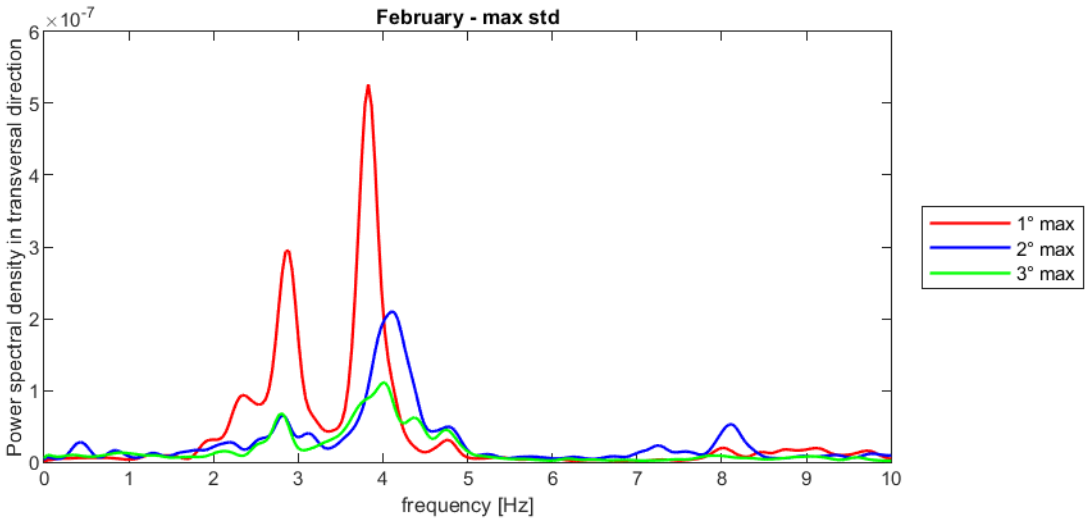


Figure 12-22: Results obtained from the 3 accelerograms with maximum SD in time domain

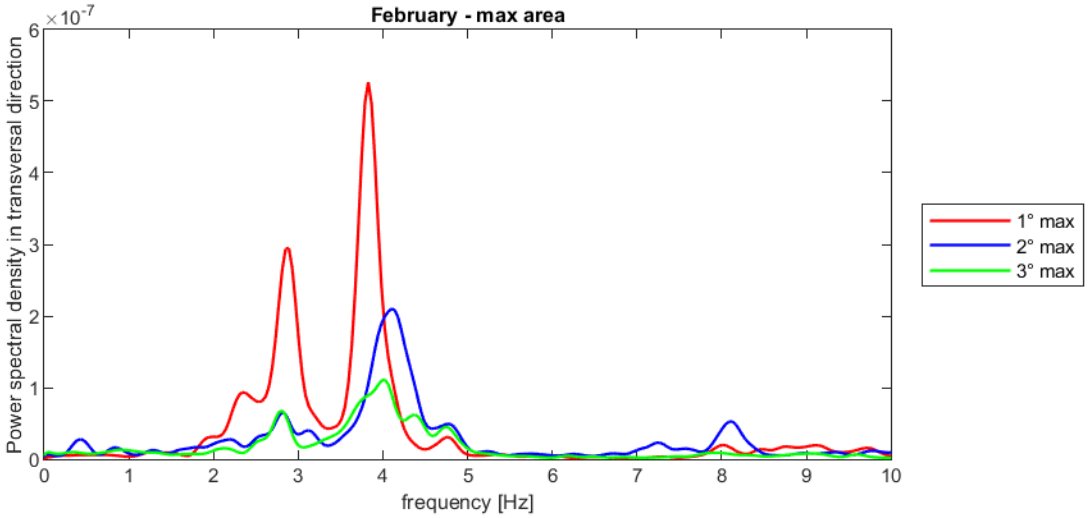


Figure 12-23: Results obtained from the 3 accelerograms with maximum area of PSD

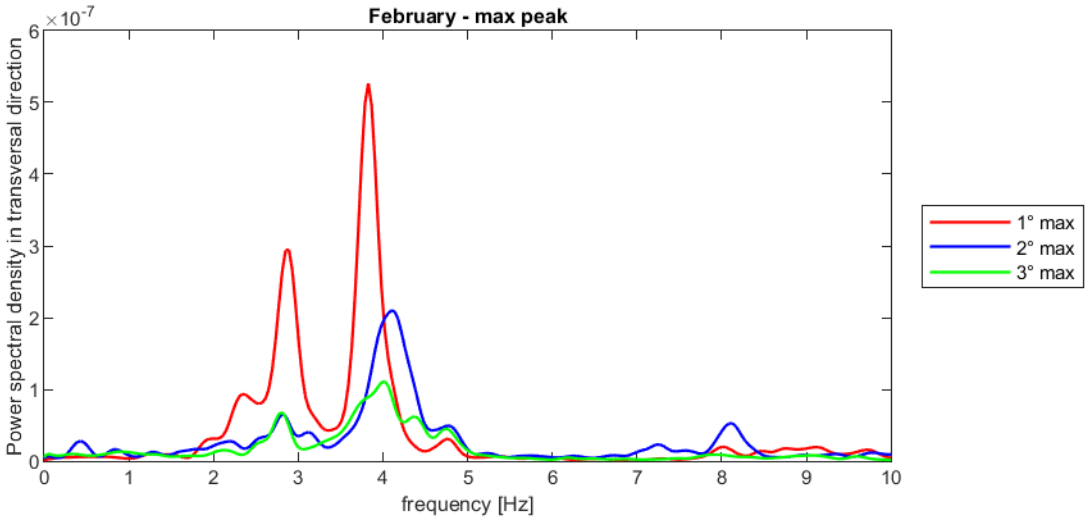


Figure 12-24: Results obtained from the 3 accelerograms with highest peak if PSD

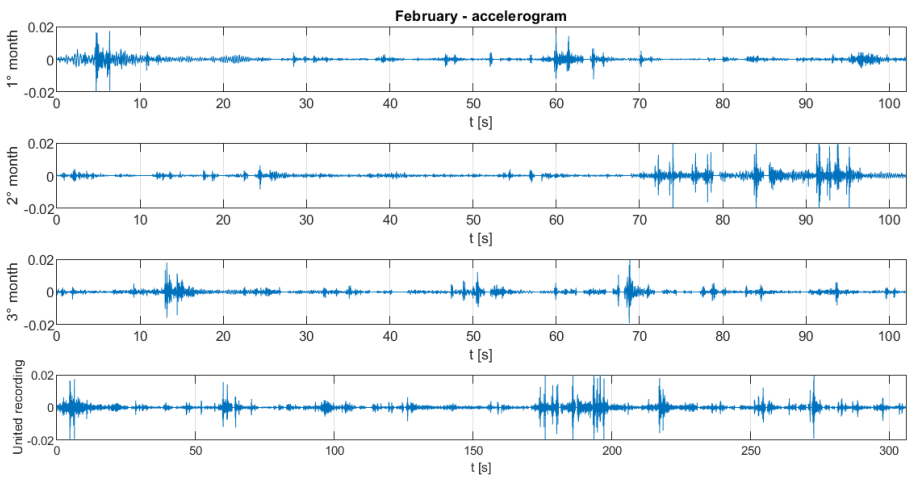


Figure 12-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

12.3 March

The results obtained for the March dataset are shown in the following tables.

Table 12-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-03-16_13-00-21	1.92E-04
	2°	319BC_2023-03-04_13-00-20	1.29E-04
	3°	319BC_2023-03-08_13-00-20	1.25E-04
Longitudinal direction (y)	1°	319BC_2023-03-16_13-00-21	1.15E-03
	2°	319BC_2023-03-04_13-00-20	8.25E-04
	3°	319BC_2023-03-08_13-00-20	7.45E-04
Transverse direction (z)	1°	319BC_2023-03-16_13-00-21	8.85E-04
	2°	319BC_2023-03-04_13-00-20	6.16E-04
	3°	319BC_2023-03-31_08-00-21	5.36E-04

Table 12-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-03-16_13-00-21	2.64E-08	319BC_2023-03-16_13-00-21	5.60E-09
2	319BC_2023-03-29_14-00-20	1.43E-08	319BC_2023-03-04_13-00-20	2.56E-09
3	319BC_2023-03-04_13-00-20	1.23E-08	319BC_2023-03-08_13-00-20	2.37E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-03-16_13-00-21	1.02E-06	319BC_2023-03-16_13-00-21	2.78E-07
2	319BC_2023-03-04_13-00-20	6.64E-07	319BC_2023-03-04_13-00-20	1.37E-07
3	319BC_2023-03-09_13-00-19	6.15E-07	319BC_2023-03-08_13-00-20	1.12E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-03-16_13-00-21	4.75E-07	319BC_2023-03-16_13-00-21	1.64E-07
2	319BC_2023-03-04_13-00-20	4.54E-07	319BC_2023-03-04_13-00-20	7.91E-08
3	319BC_2023-03-28_14-00-21	3.14E-07	319BC_2023-03-31_08-00-21	5.97E-08

Table 12-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	-	B	B	B	B	B	B	B
3	C	B	C	C	-	C	D	-	D

12.3.1 Vertical direction (x)

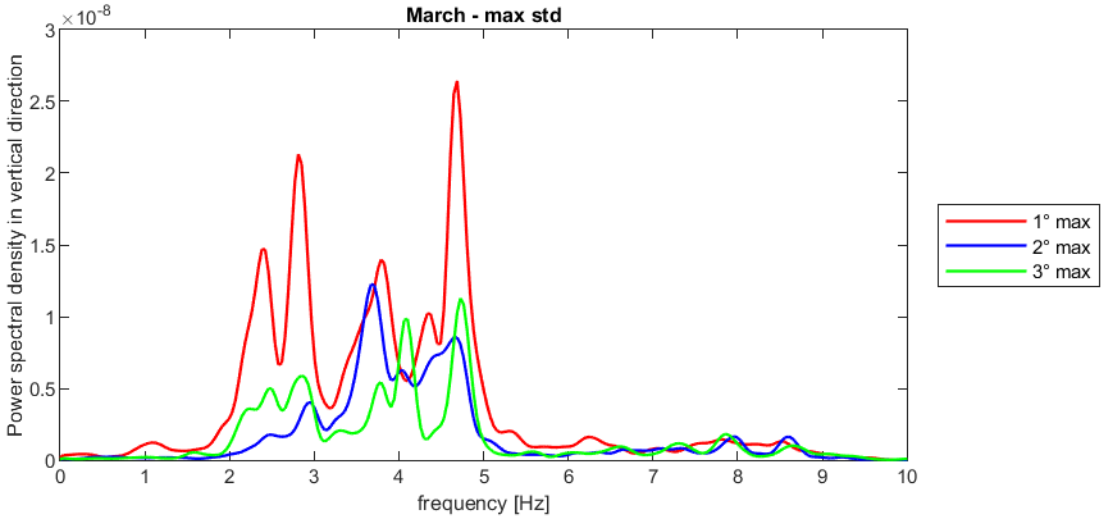


Figure 12-26: Results obtained from the 3 accelerograms with maximum SD in time domain

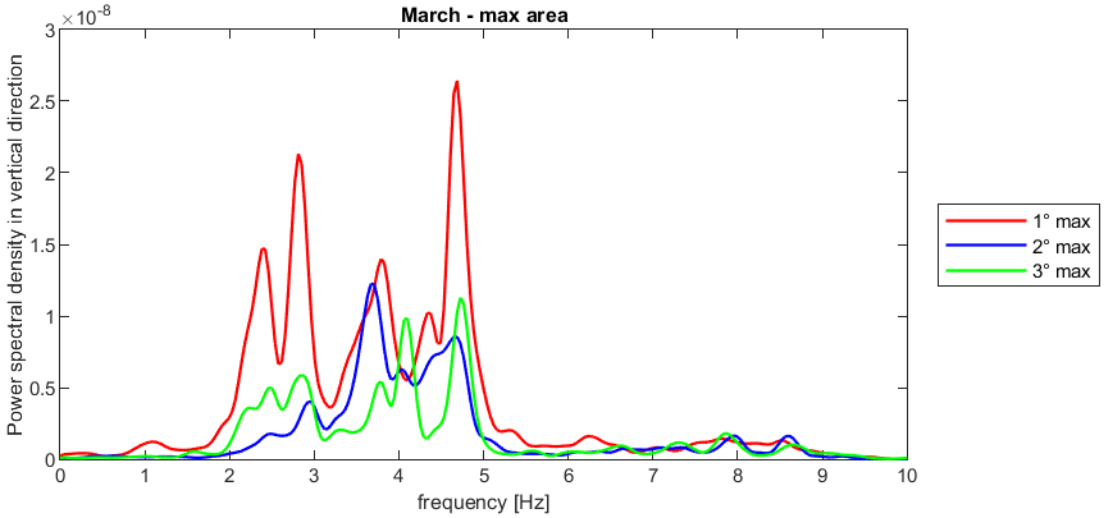


Figure 12-27: Results obtained from the 3 accelerograms with maximum area of PSD

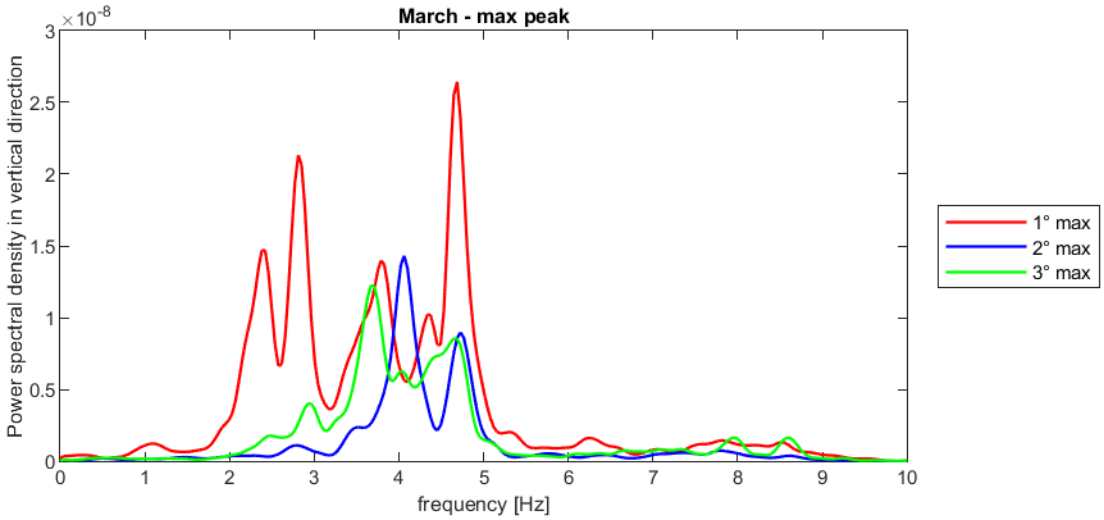


Figure 12-28: Results obtained from the 3 accelerograms with highest peak if PSD

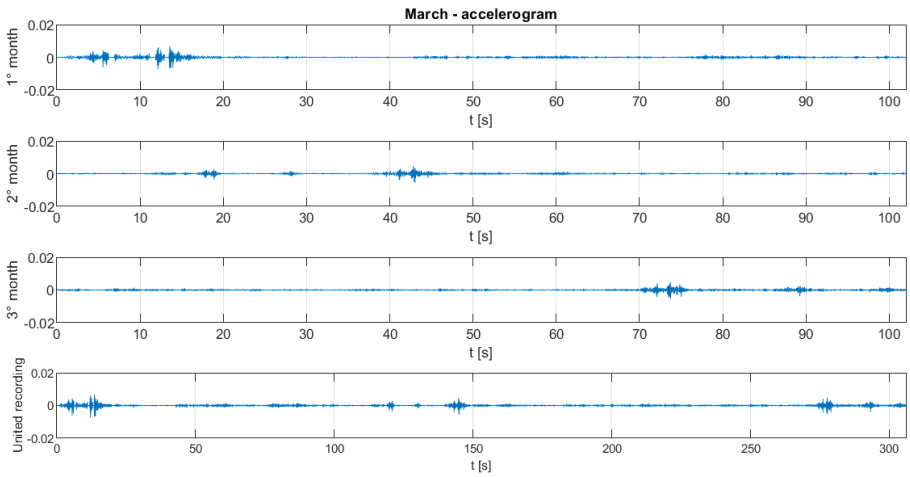


Figure 12-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.3.2 Longitudinal direction (y)

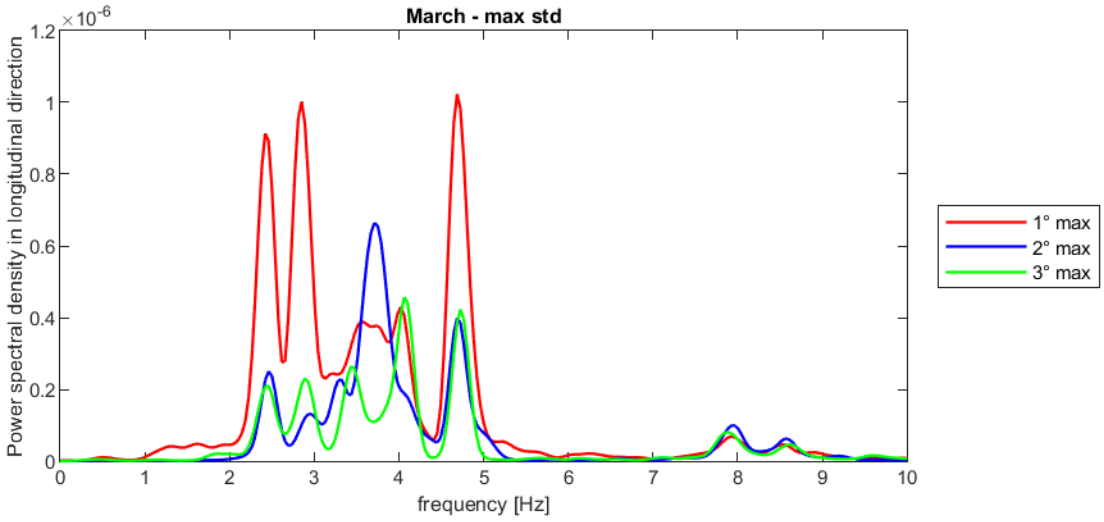


Figure 12-30: Results obtained from the 3 accelerograms with maximum SD in time domain

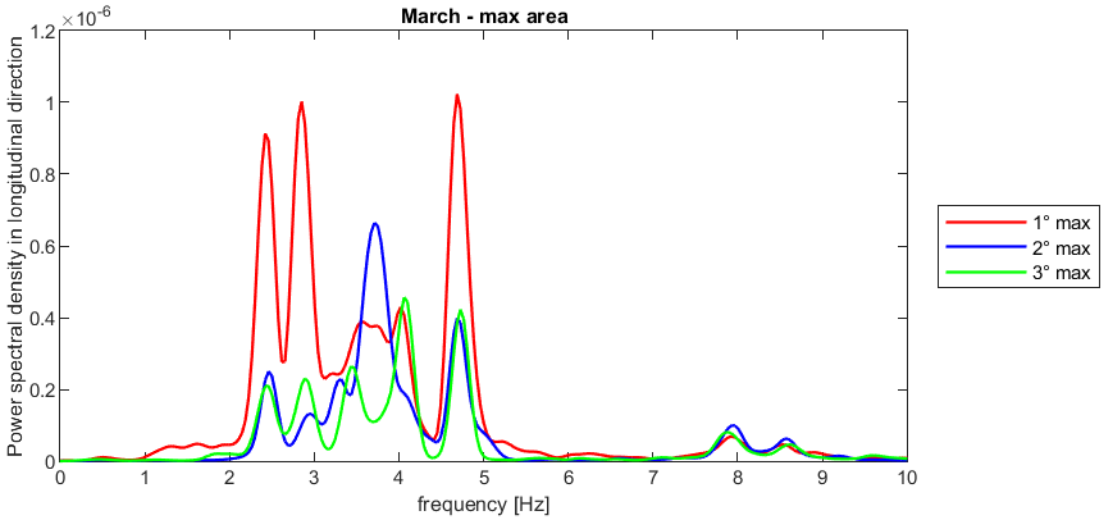


Figure 12-31: Results obtained from the 3 accelerograms with maximum area of PSD

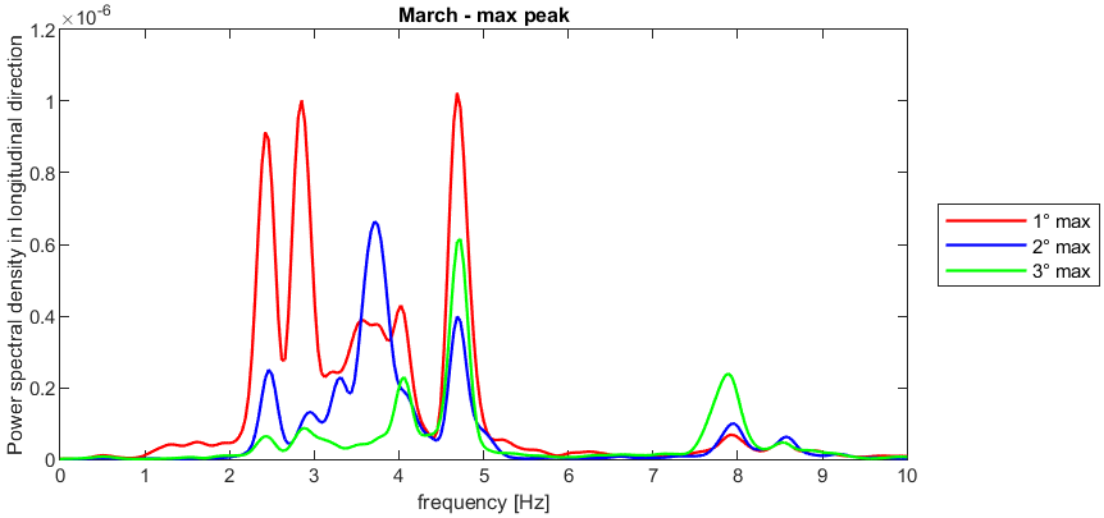


Figure 12-32: Results obtained from the 3 accelerograms with highest peak if PSD

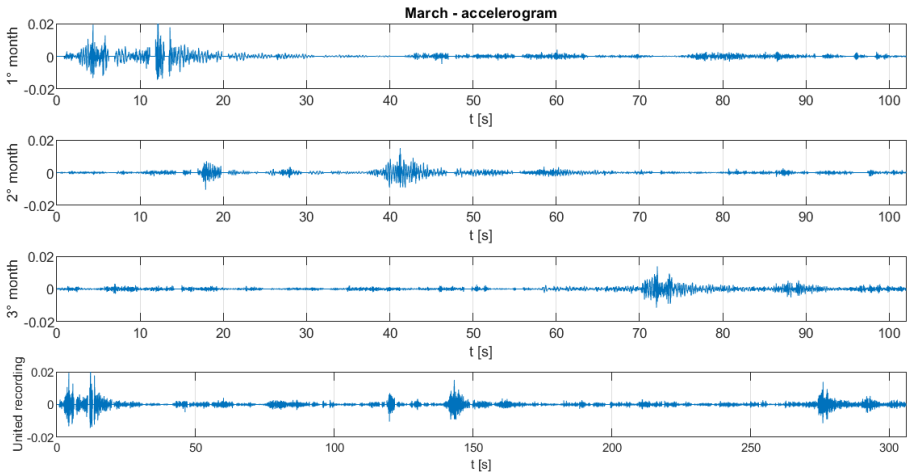


Figure 12-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

12.3.3 Transverse direction (z)

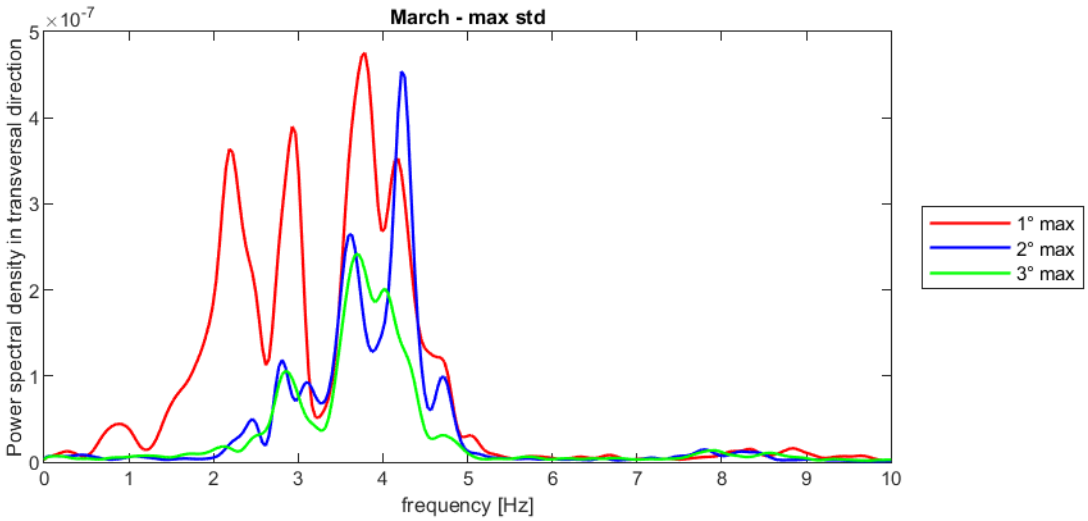


Figure 12-34: Results obtained from the 3 accelerograms with maximum SD in time domain

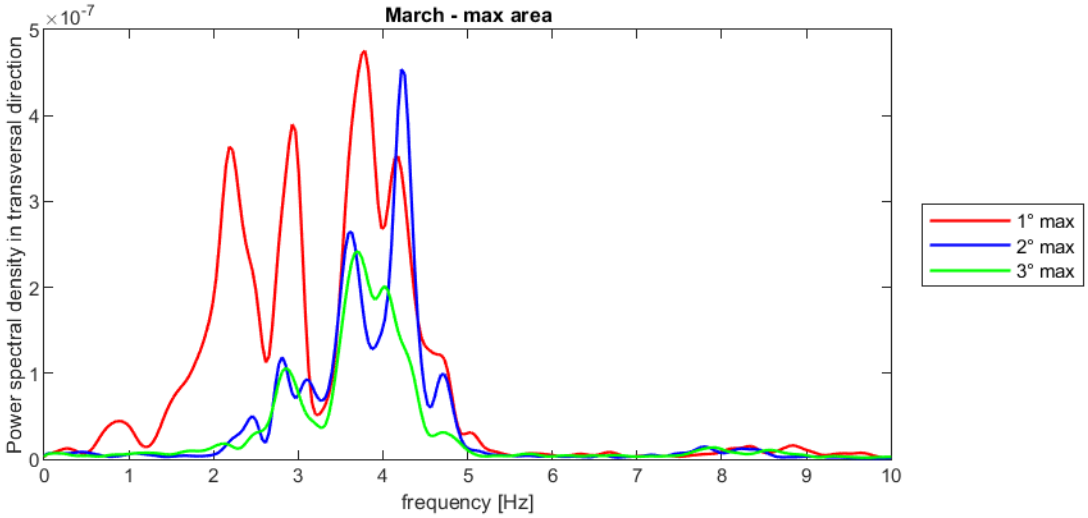


Figure 12-35: Results obtained from the 3 accelerograms with maximum area of PSD

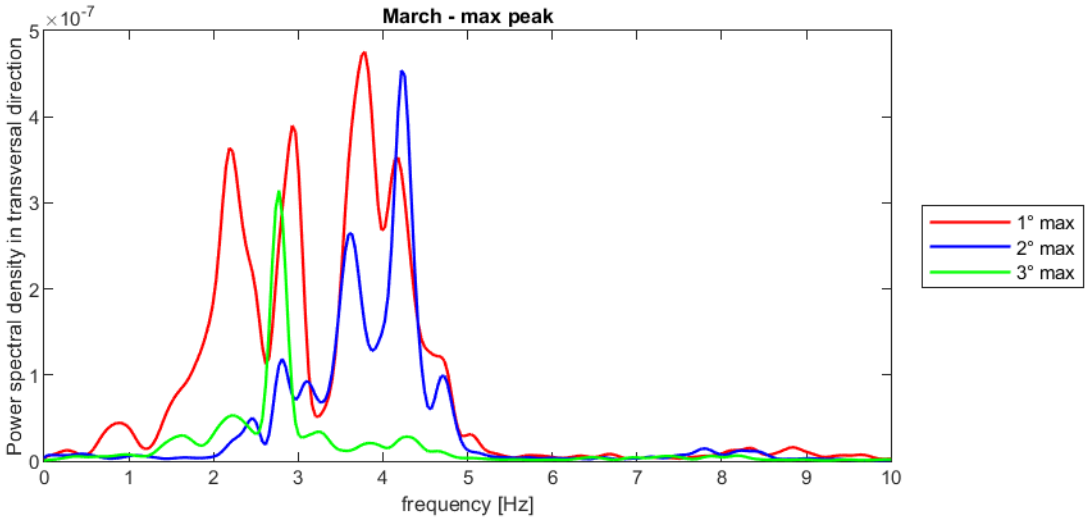


Figure 12-36: Results obtained from the 3 accelerograms with highest peak if PSD

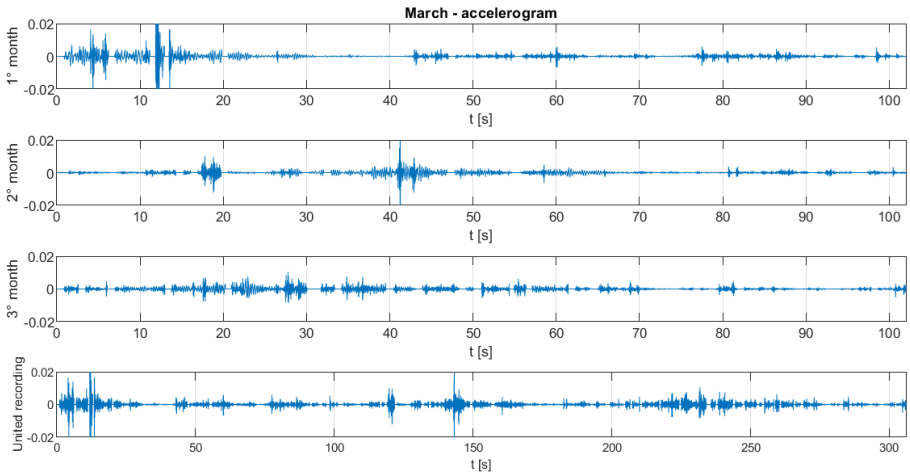


Figure 12-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

12.4 April

The results obtained for the April dataset are shown in the following tables.

Table 12-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-04-13_08-00-20	1.71E-04
	2°	319BC_2023-04-14_08-00-19	1.24E-04
	3°	319BC_2023-04-18_14-00-19	1.24E-04
Longitudinal direction (y)	1°	319BC_2023-04-13_08-00-20	1.11E-03
	2°	319BC_2023-04-14_08-00-19	6.71E-04
	3°	319BC_2023-04-18_14-00-19	6.52E-04
Transverse direction (z)	1°	319BC_2023-04-13_08-00-20	7.18E-04
	2°	319BC_2023-04-24_14-00-21	6.47E-04
	3°	319BC_2023-04-14_08-00-19	5.24E-04

Table 12-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-04-13_08-00-20	4.20E-08	319BC_2023-04-13_08-00-20	4.37E-09
2	319BC_2023-04-04_14-00-19	1.66E-08	319BC_2023-04-18_14-00-19	2.38E-09
3	319BC_2023-04-24_14-00-21	1.51E-08	319BC_2023-04-14_08-00-19	2.36E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-04-13_08-00-20	2.57E-06	319BC_2023-04-13_08-00-20	2.44E-07
2	319BC_2023-04-04_14-00-19	7.22E-07	319BC_2023-04-24_14-00-21	9.22E-08
3	319BC_2023-04-18_14-00-19	4.62E-07	319BC_2023-04-14_08-00-19	8.77E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-04-24_14-00-21	8.01E-07	319BC_2023-04-13_08-00-20	1.01E-07
2	319BC_2023-04-13_08-00-20	6.70E-07	319BC_2023-04-24_14-00-21	8.50E-08
3	319BC_2023-04-04_14-00-19	2.89E-07	319BC_2023-04-14_08-00-19	5.54E-08

Table 12-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	D	A
2	B	-	C	B	-	-	D	A	D
3	C	-	B	C	C	B	B	-	B

12.4.1 Vertical direction (x)

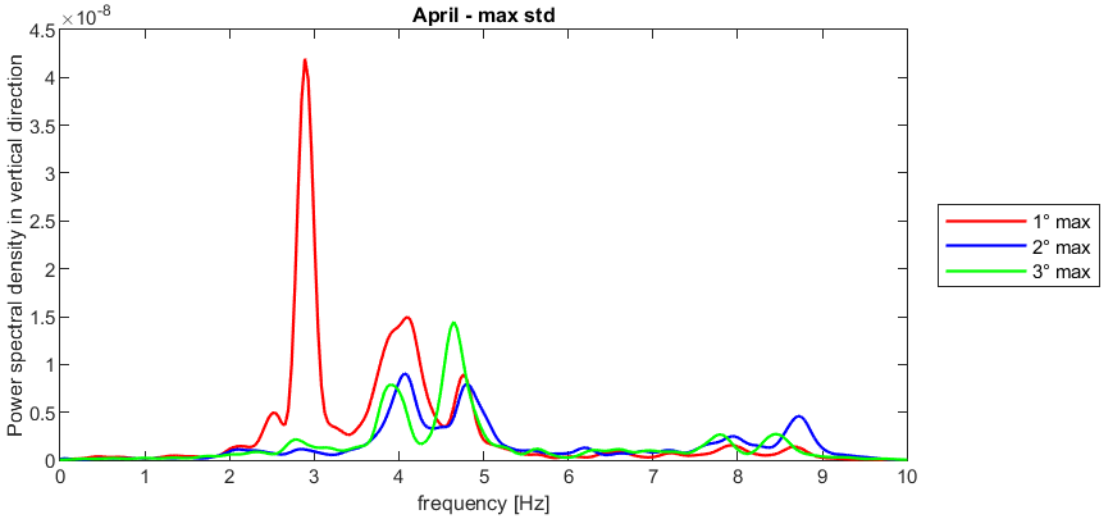


Figure 12-38: Results obtained from the 3 accelerograms with maximum SD in time domain

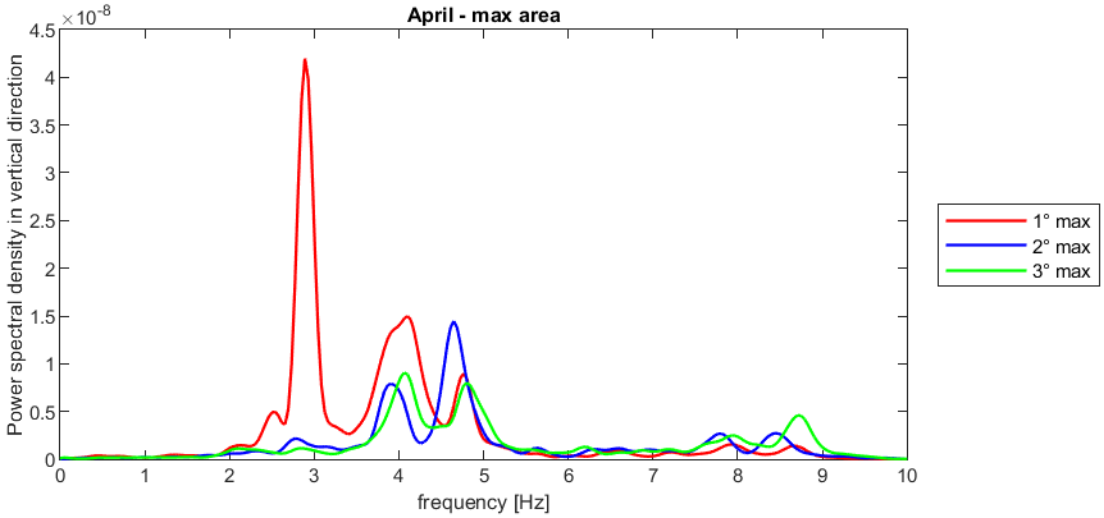


Figure 12-39: Results obtained from the 3 accelerograms with maximum area of PSD

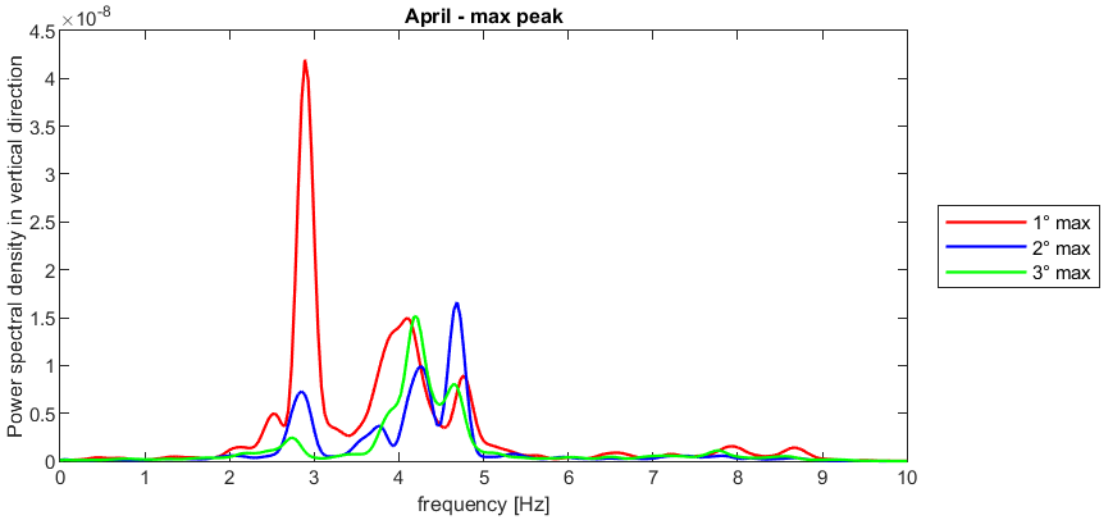


Figure 12-40: Results obtained from the 3 accelerograms with highest peak if PSD

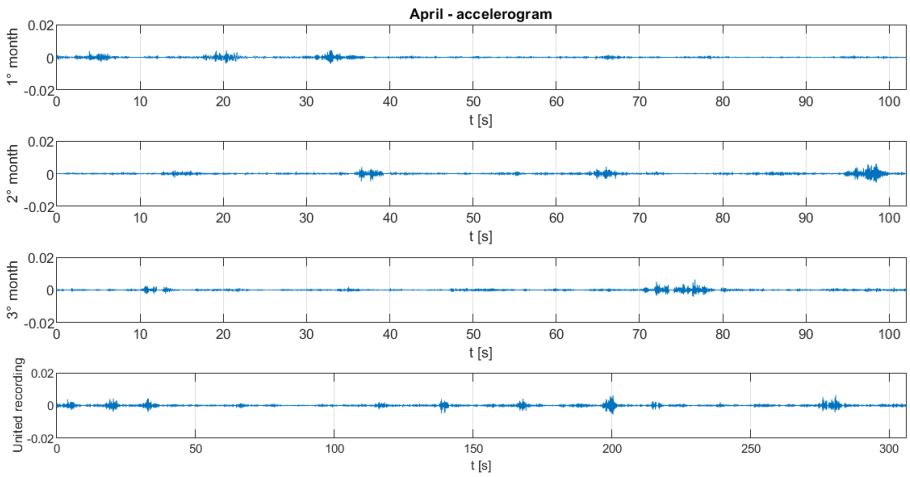


Figure 12-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.4.2 Longitudinal direction (y)

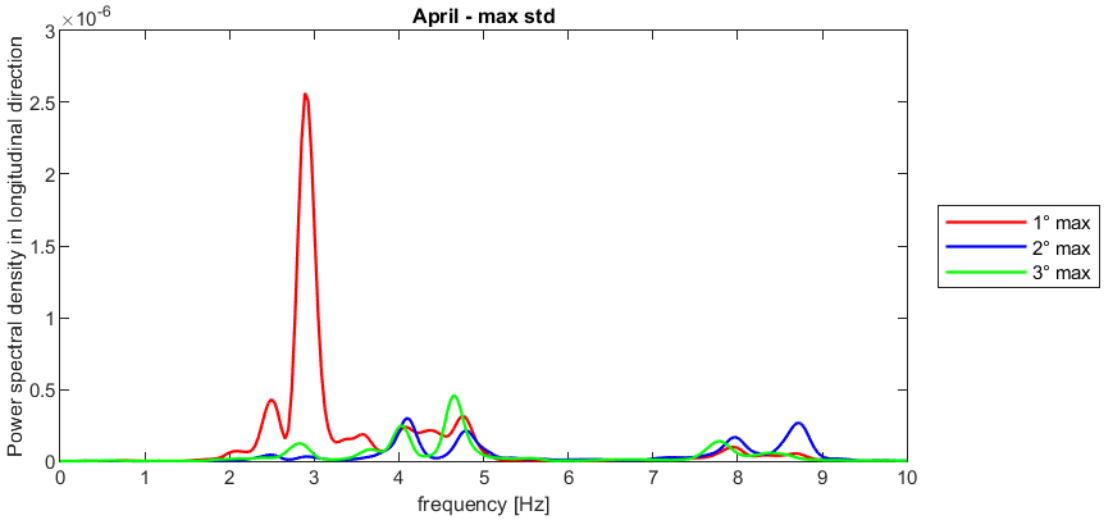


Figure 12-42: Results obtained from the 3 accelerograms with maximum SD in time domain

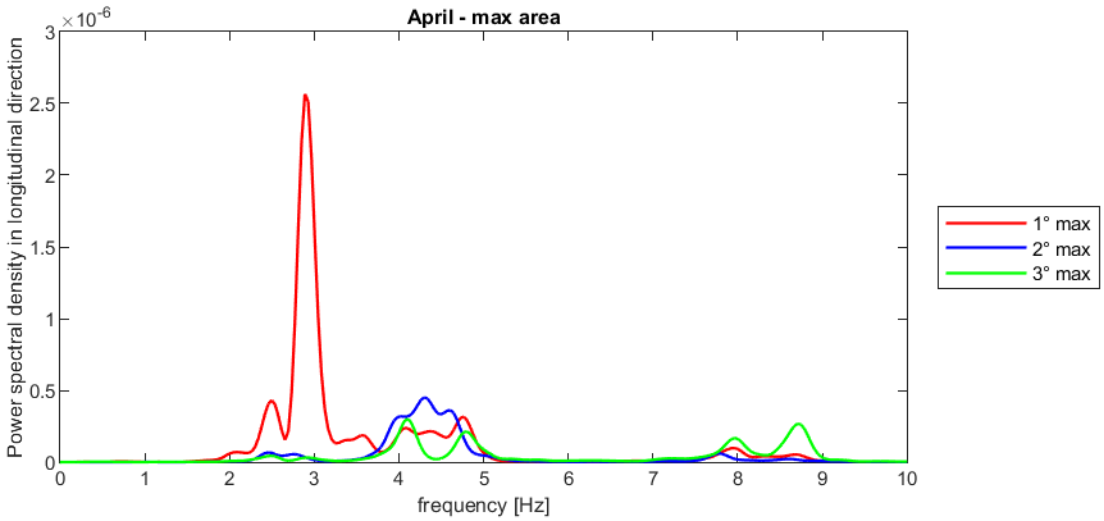


Figure 12-43: Results obtained from the 3 accelerograms with maximum area of PSD

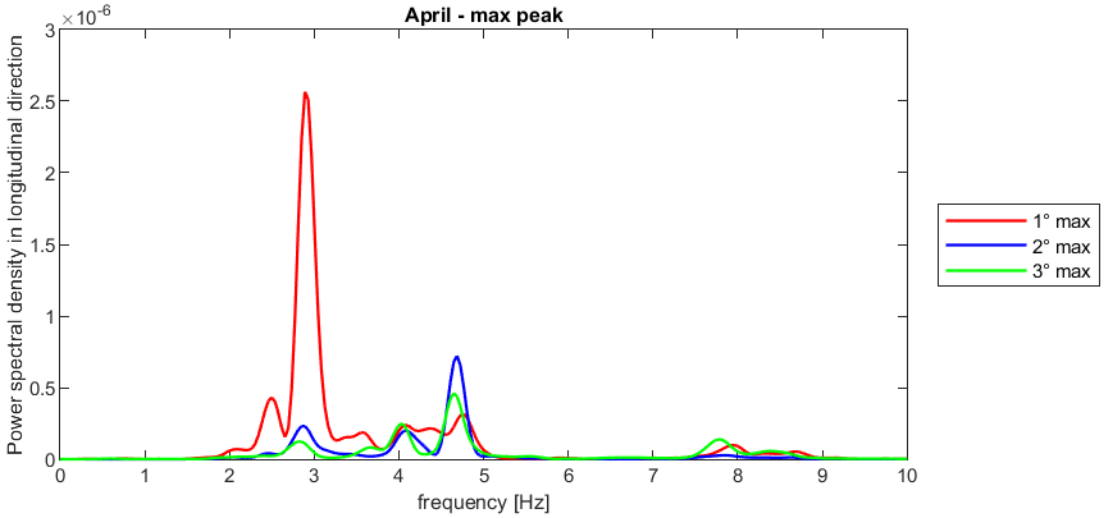


Figure 12-44: Results obtained from the 3 accelerograms with highest peak if PSD

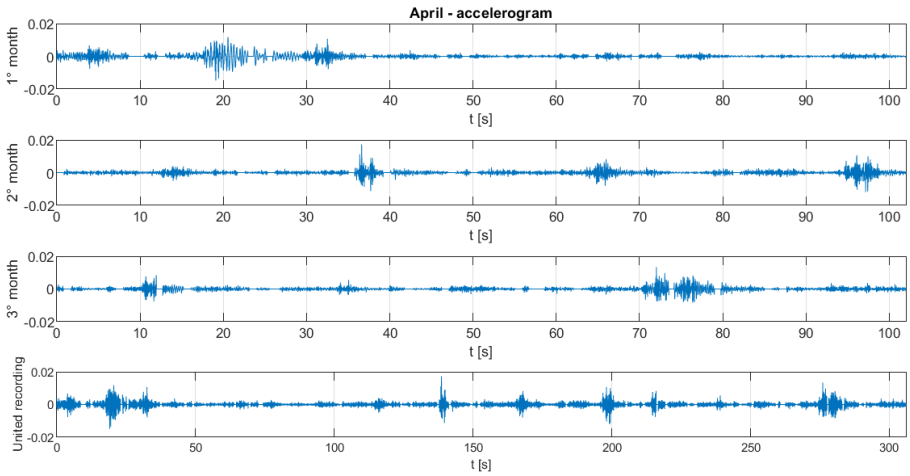


Figure 12-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

12.4.3 Transverse direction (z)

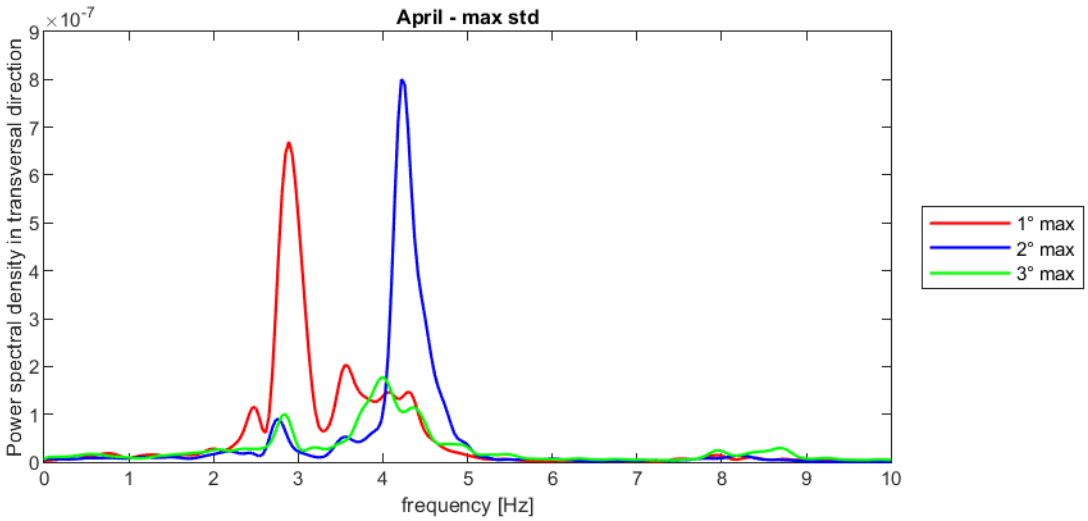


Figure 12-46: Results obtained from the 3 accelerograms with maximum SD in time domain

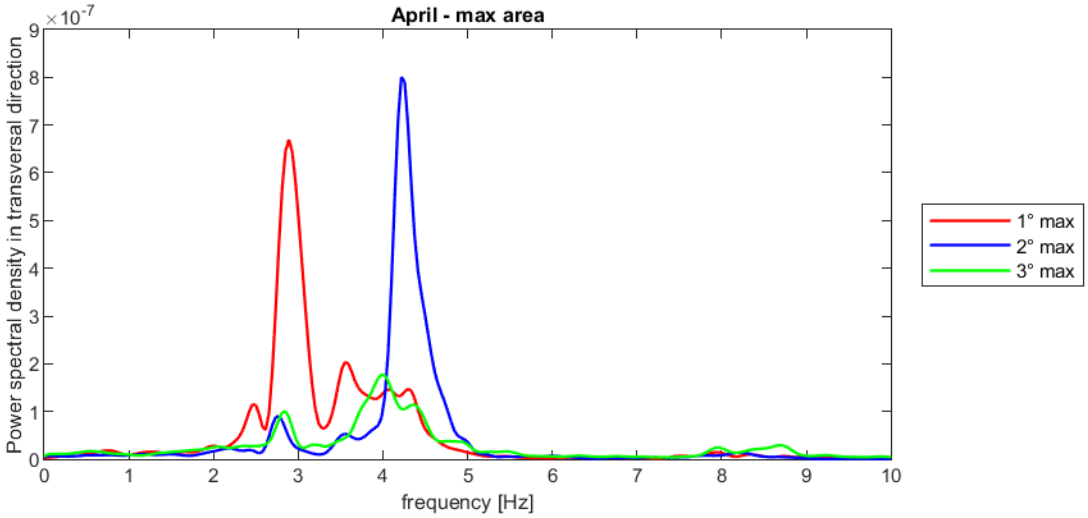


Figure 12-47: Results obtained from the 3 accelerograms with maximum area of PSD

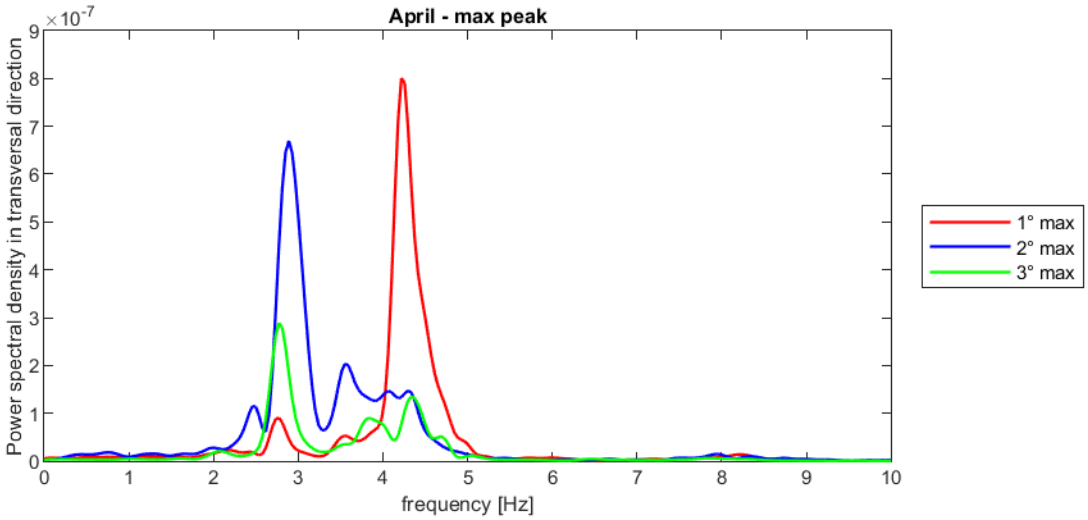


Figure 12-48: Results obtained from the 3 accelerograms with highest peak if PSD

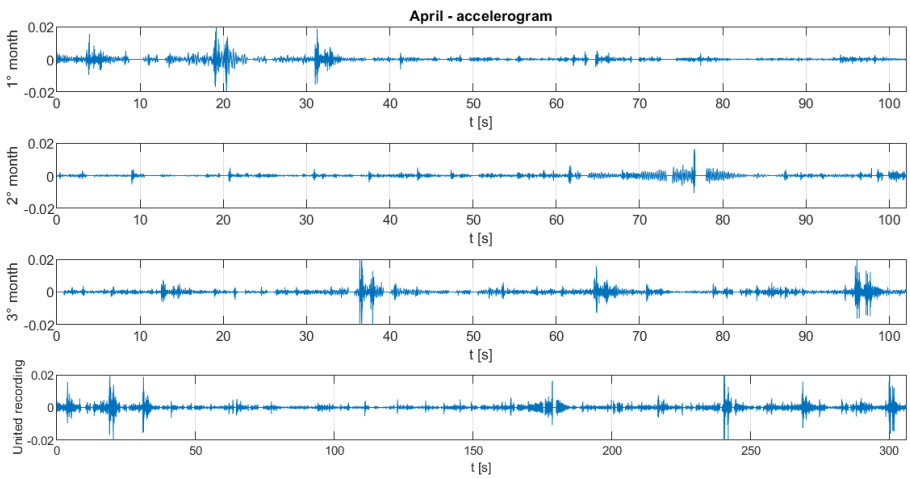


Figure 12-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

12.5 May

The results obtained for the May dataset are shown in the following tables.

Table 12-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-05-23_14-00-20	1.76E-04
	2°	319BC_2023-05-04_14-00-20	1.34E-04
	3°	319BC_2023-05-22_08-00-20	1.21E-04
Longitudinal direction (y)	1°	319BC_2023-05-23_14-00-20	1.27E-03
	2°	319BC_2023-05-04_14-00-20	9.13E-04
	3°	319BC_2023-05-22_08-00-20	6.87E-04
Transverse direction (z)	1°	319BC_2023-05-23_14-00-20	8.06E-04
	2°	319BC_2023-05-04_14-00-20	6.12E-04
	3°	319BC_2023-05-31_14-00-20	4.42E-04

Table 12-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-05-23_14-00-20	3.19E-08	319BC_2023-05-23_14-00-20	4.57E-09
2	319BC_2023-05-04_14-00-20	1.87E-08	319BC_2023-05-04_14-00-20	2.89E-09
3	319BC_2023-05-22_08-00-20	1.34E-08	319BC_2023-05-22_08-00-20	2.23E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-05-23_14-00-20	2.08E-06	319BC_2023-05-23_14-00-20	3.10E-07
2	319BC_2023-05-04_14-00-20	9.99E-07	319BC_2023-05-04_14-00-20	1.79E-07
3	319BC_2023-05-22_08-00-20	4.67E-07	319BC_2023-05-22_08-00-20	9.60E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-05-23_14-00-20	5.57E-07	319BC_2023-05-23_14-00-20	1.29E-07
2	319BC_2023-05-04_14-00-20	4.80E-07	319BC_2023-05-04_14-00-20	8.02E-08
3	319BC_2023-05-31_14-00-20	2.00E-07	319BC_2023-05-19_08-00-20	3.56E-08

Table 12-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	B	B	B	B	B	B
3	C	C	C	C	C	C	D	D	-

12.5.1 Vertical direction (x)

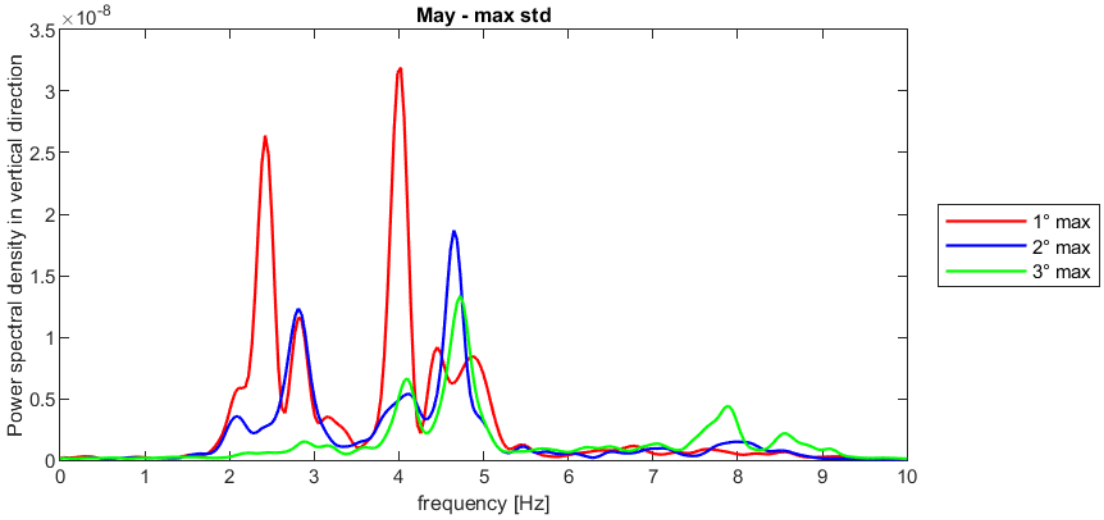


Figure 12-50: Results obtained from the 3 accelerograms with maximum SD in time domain

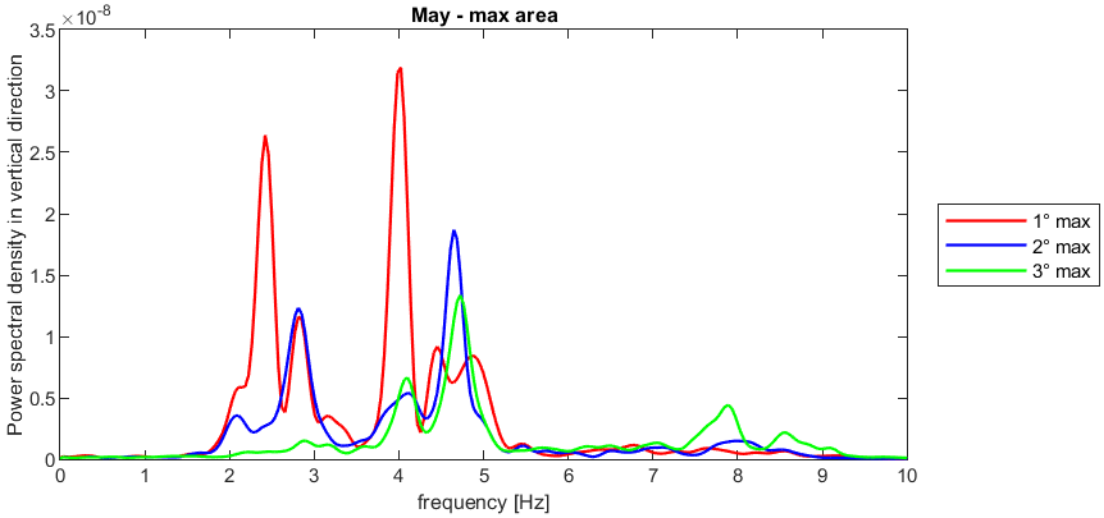


Figure 12-51: Results obtained from the 3 accelerograms with maximum area of PSD

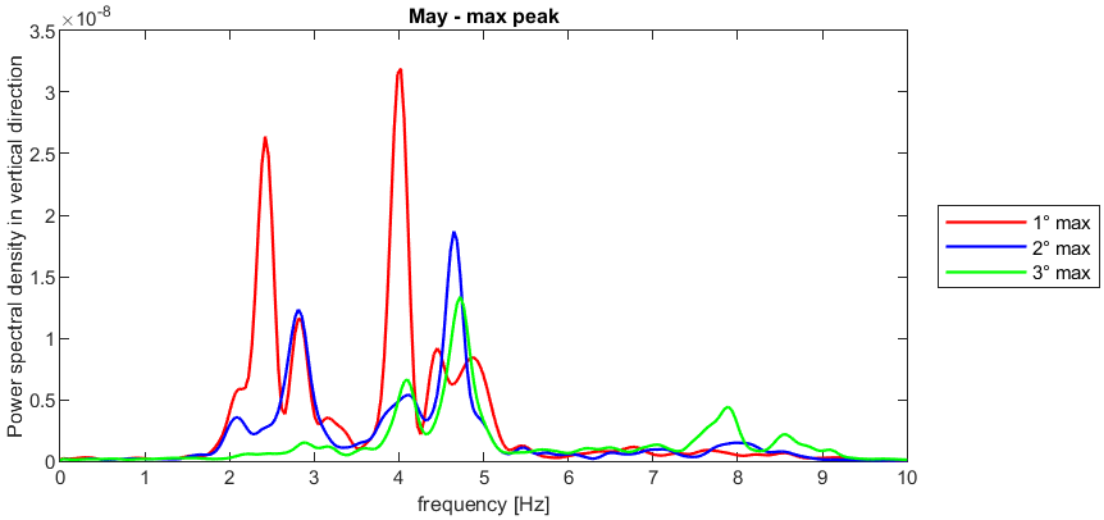


Figure 12-52: Results obtained from the 3 accelerograms with highest peak if PSD

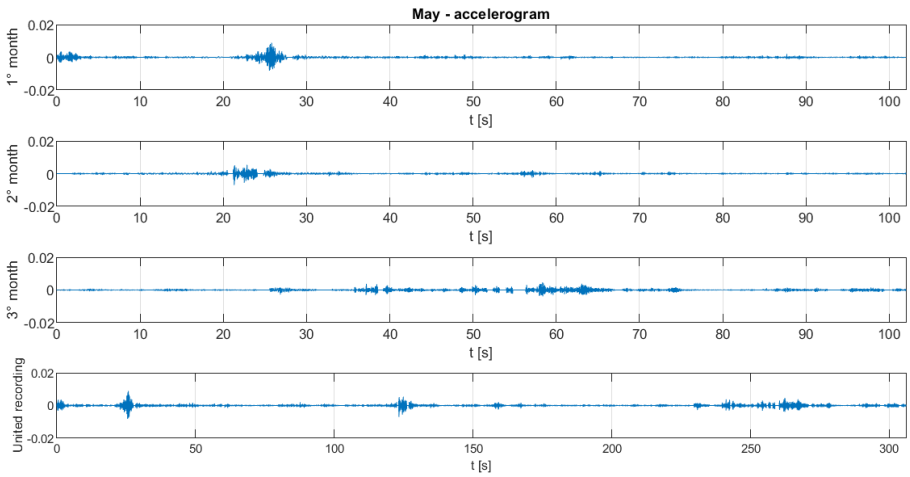


Figure 12-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.5.2 Longitudinal direction (y)

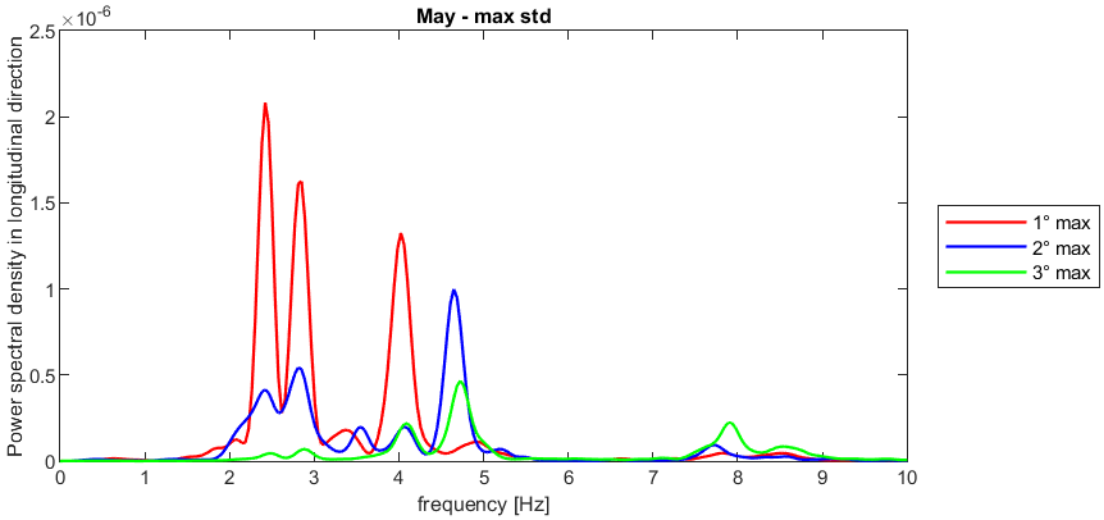


Figure 12-54: Results obtained from the 3 accelerograms with maximum SD in time domain

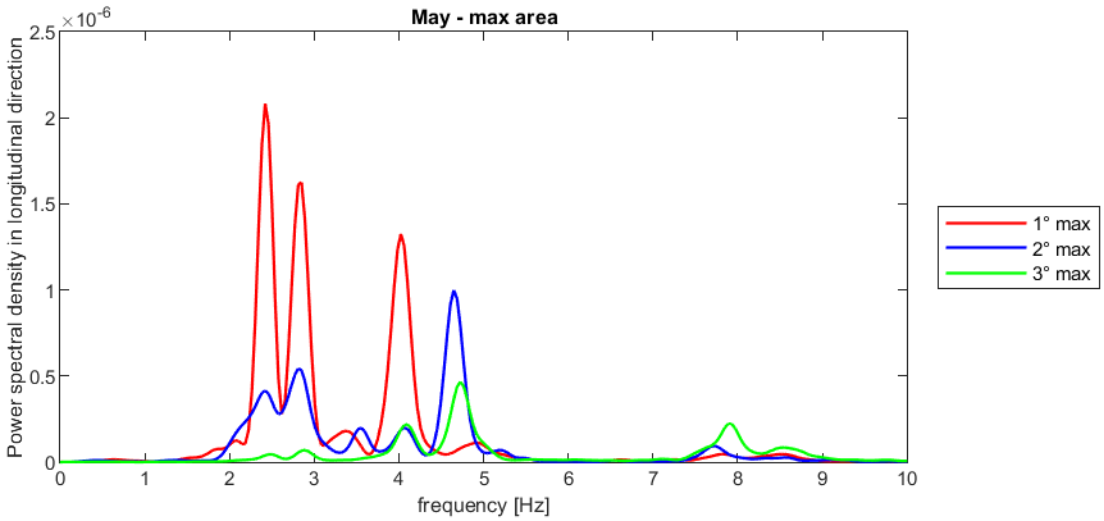


Figure 12-55: Results obtained from the 3 accelerograms with maximum area of PSD

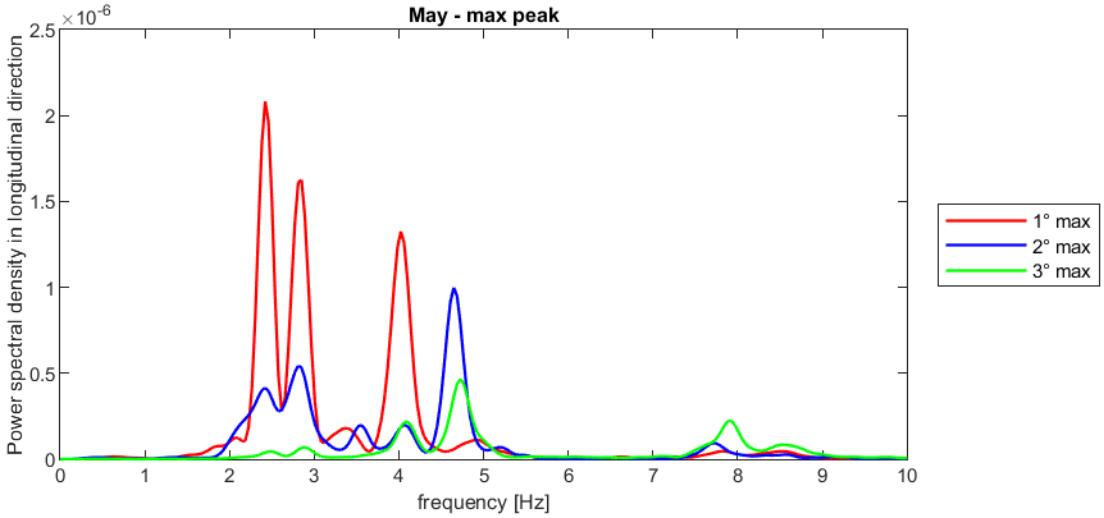


Figure 12-56: Results obtained from the 3 accelerograms with highest peak if PSD

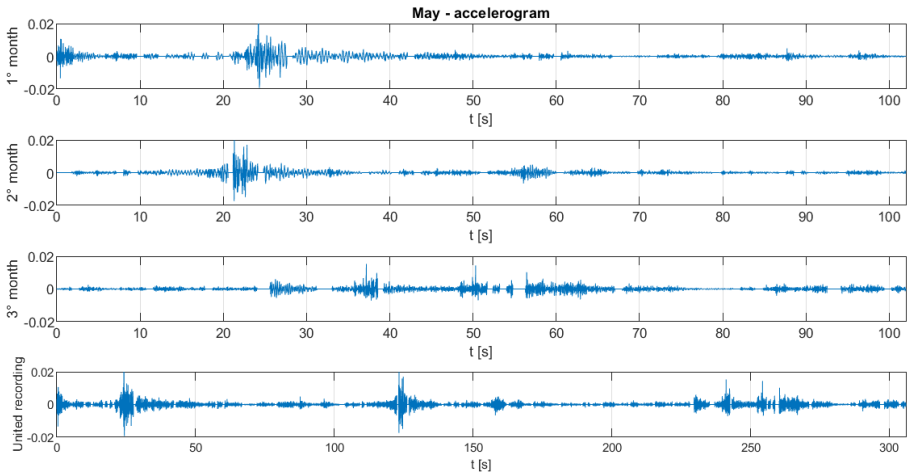


Figure 12-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

12.5.3 Transverse direction (z)

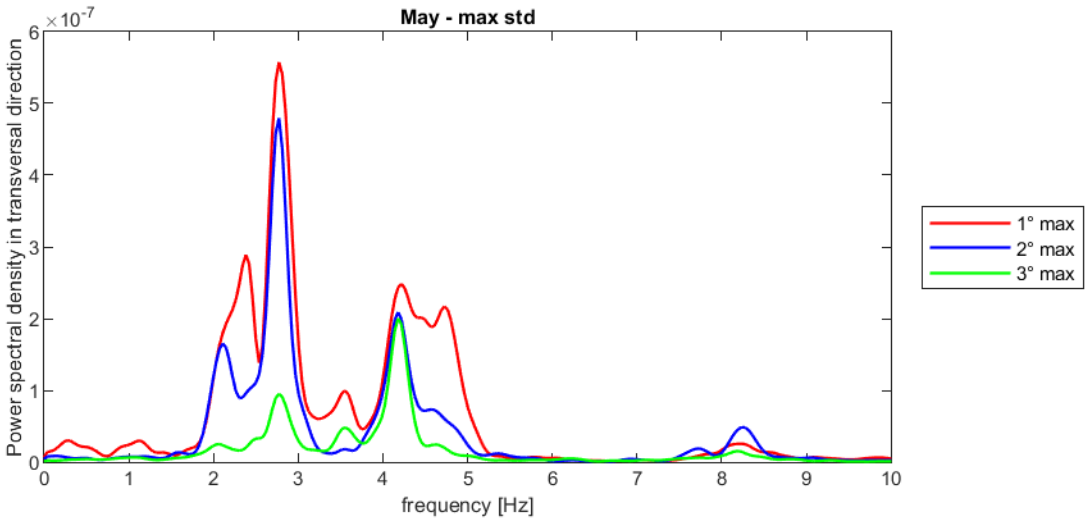


Figure 12-58: Results obtained from the 3 accelerograms with maximum SD in time domain

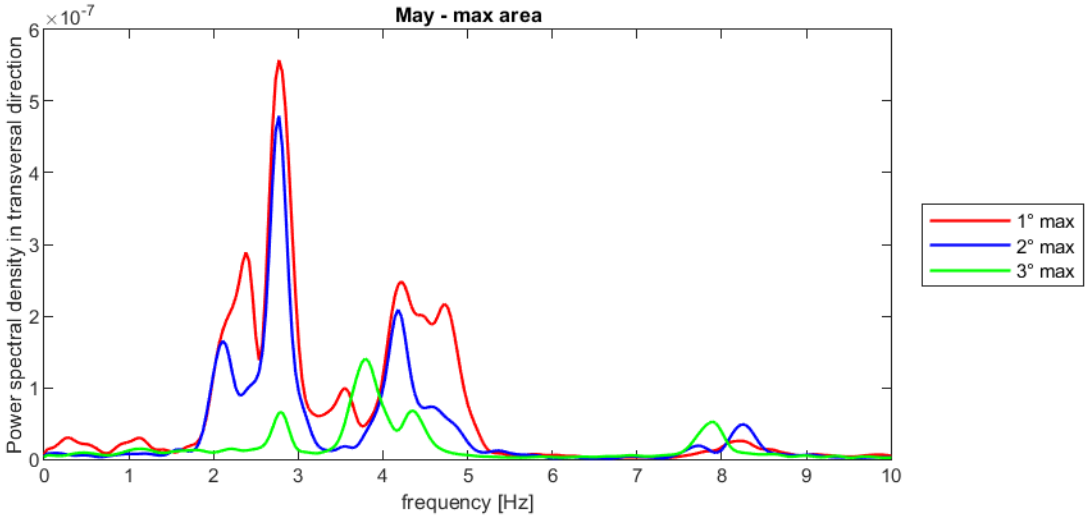


Figure 12-59: Results obtained from the 3 accelerograms with maximum area of PSD

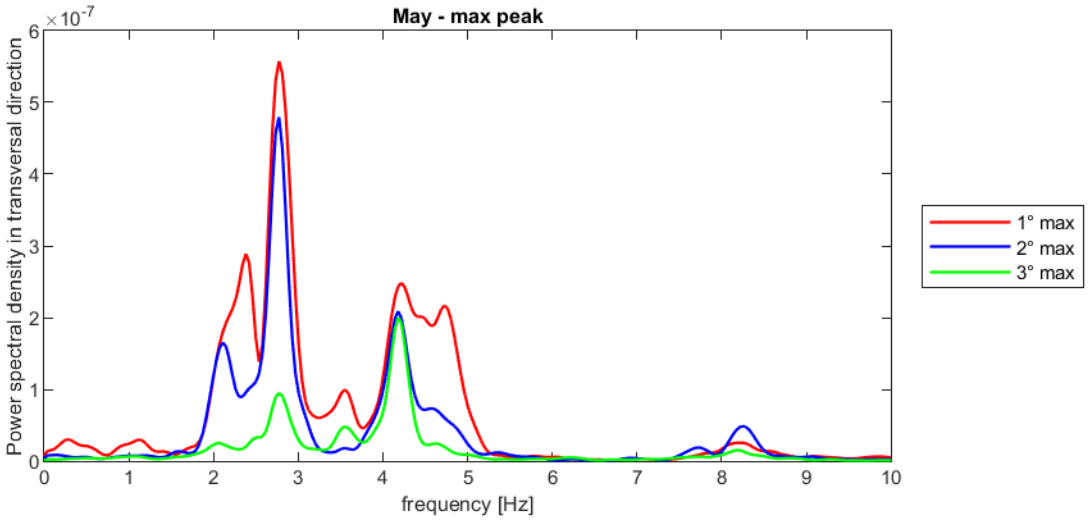


Figure 12-60: Results obtained from the 3 accelerograms with highest peak if PSD

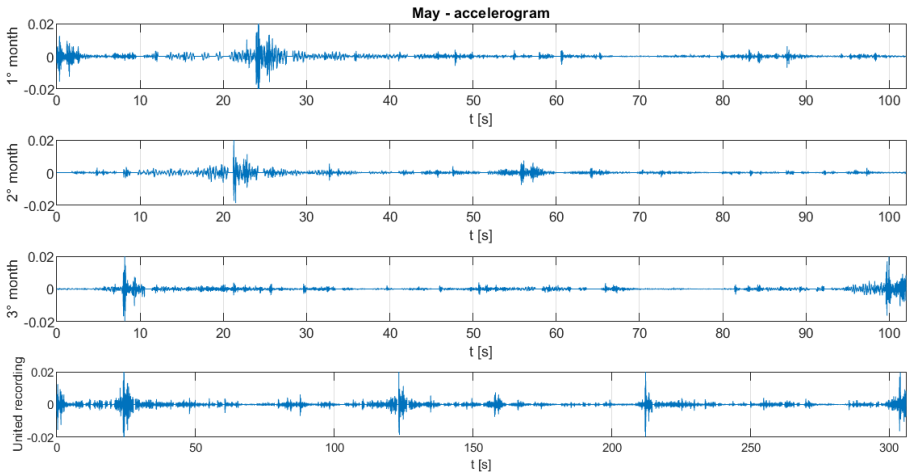


Figure 12-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

12.6 June

The results obtained for the June dataset are shown in the following tables.

Table 12-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-06-10_08-00-20	1.30E-04
	2°	319BC_2023-06-13_08-00-20	1.28E-04
	3°	319BC_2023-06-16_08-00-21	1.13E-04
Longitudinal direction (y)	1°	319BC_2023-06-10_08-00-20	8.03E-04
	2°	319BC_2023-06-13_08-00-20	7.06E-04
	3°	319BC_2023-06-15_08-00-20	6.23E-04
Transverse direction (z)	1°	319BC_2023-06-10_08-00-20	6.96E-04
	2°	319BC_2023-06-13_08-00-20	5.54E-04
	3°	319BC_2023-06-21_08-00-21	5.16E-04

Table 12-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-06-10_08-00-20	1.52E-08	319BC_2023-06-10_08-00-20	2.55E-09
2	319BC_2023-06-13_08-00-20	1.17E-08	319BC_2023-06-13_08-00-20	2.51E-09
3	319BC_2023-06-15_08-00-20	1.15E-08	319BC_2023-06-21_08-00-21	1.87E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-06-10_08-00-20	6.61E-07	319BC_2023-06-10_08-00-20	1.25E-07
2	319BC_2023-06-21_08-00-21	4.80E-07	319BC_2023-06-13_08-00-20	1.02E-07
3	319BC_2023-06-15_08-00-20	4.51E-07	319BC_2023-06-15_08-00-20	7.86E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-06-10_08-00-20	8.32E-07	319BC_2023-06-10_08-00-20	9.74E-08
2	319BC_2023-06-21_08-00-21	3.89E-07	319BC_2023-06-13_08-00-20	6.17E-08
3	319BC_2023-06-13_08-00-20	3.54E-07	319BC_2023-06-21_08-00-21	5.57E-08

Table 12-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	A	A
2	B	B	B	B	-	B	B	D	B
3	-	-	-	C	C	C	D	B	D

12.6.1 Vertical direction (x)

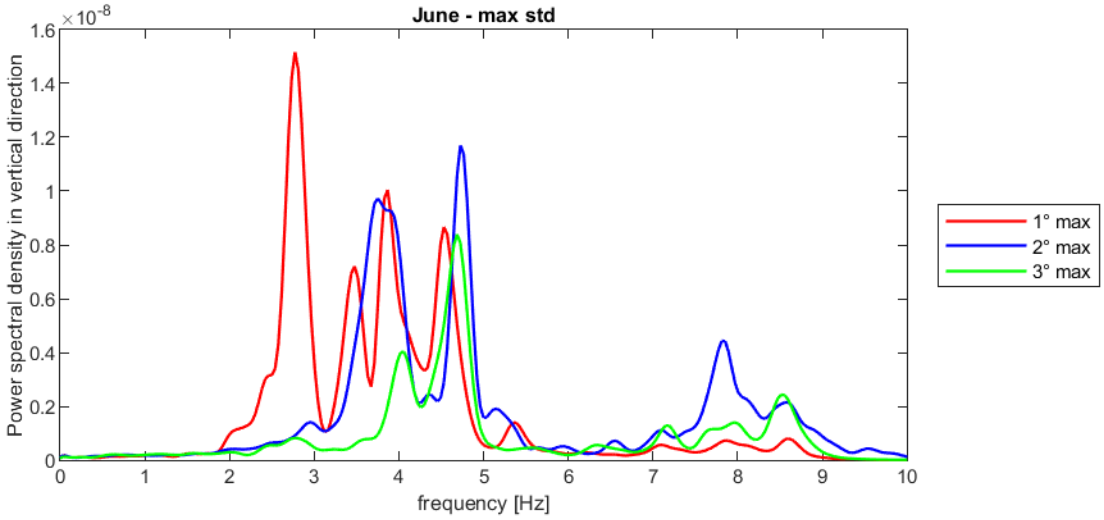


Figure 12-62: Results obtained from the 3 accelerograms with maximum SD in time domain

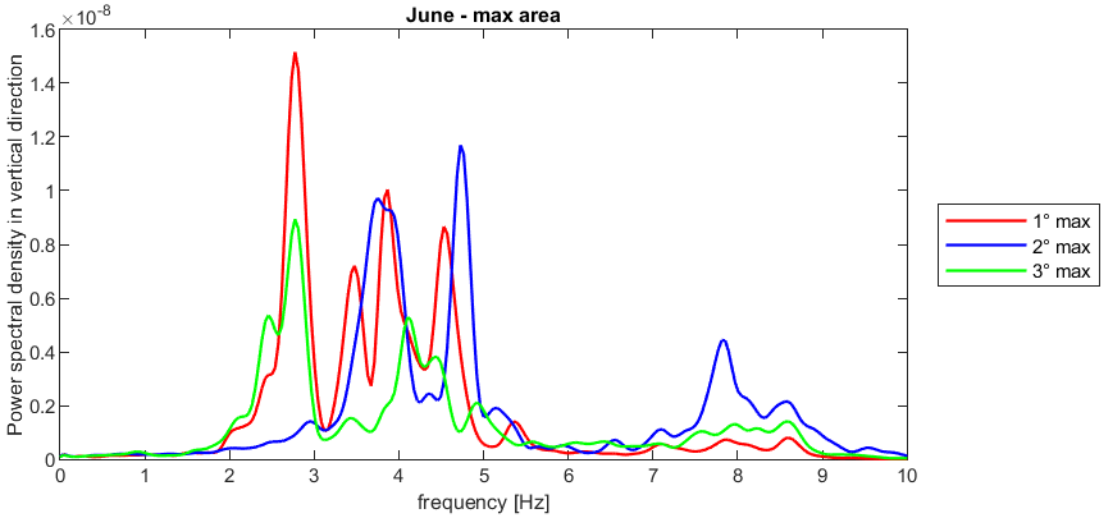


Figure 12-63: Results obtained from the 3 accelerograms with maximum area of PSD

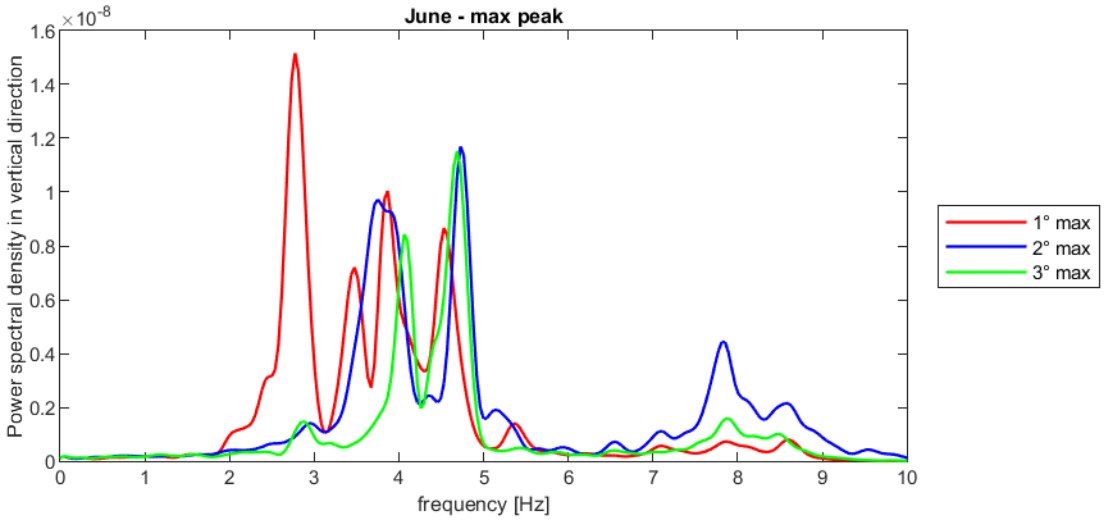


Figure 12-64: Results obtained from the 3 accelerograms with highest peak if PSD

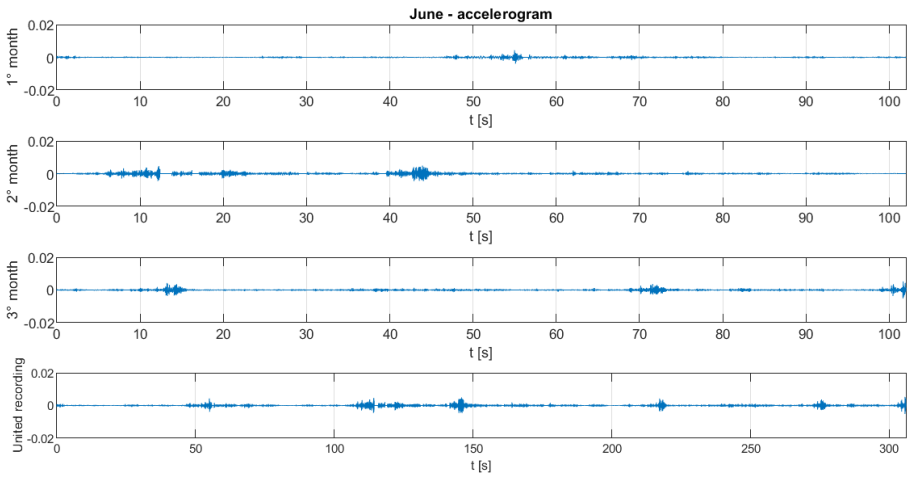


Figure 12-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.6.2 Longitudinal direction (y)

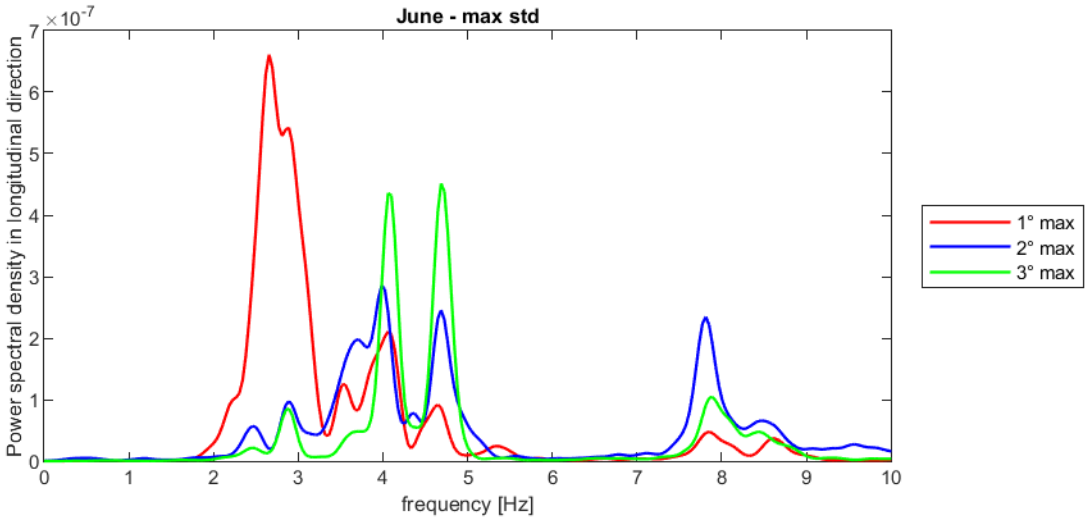


Figure 12-66: Results obtained from the 3 accelerograms with maximum SD in time domain

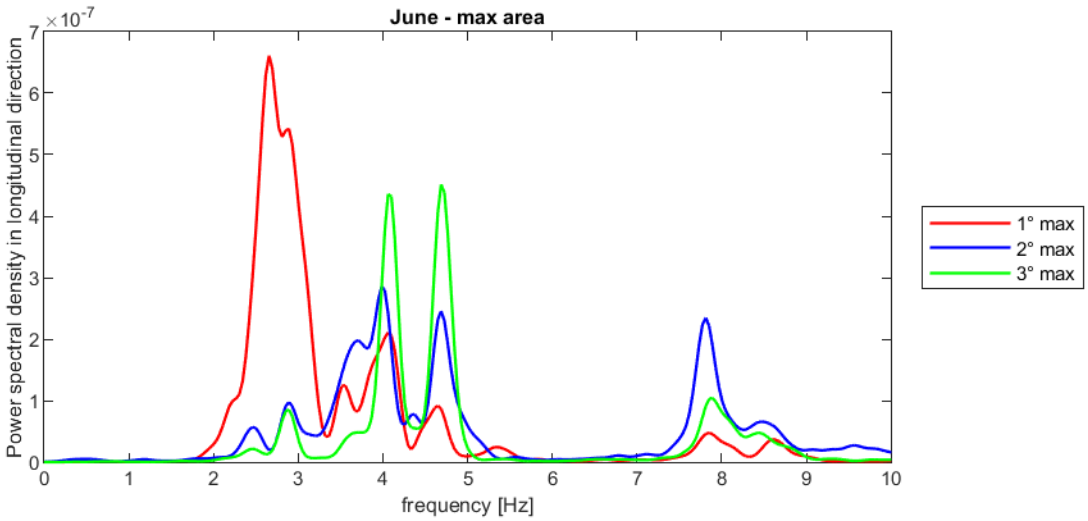


Figure 12-67: Results obtained from the 3 accelerograms with maximum area of PSD

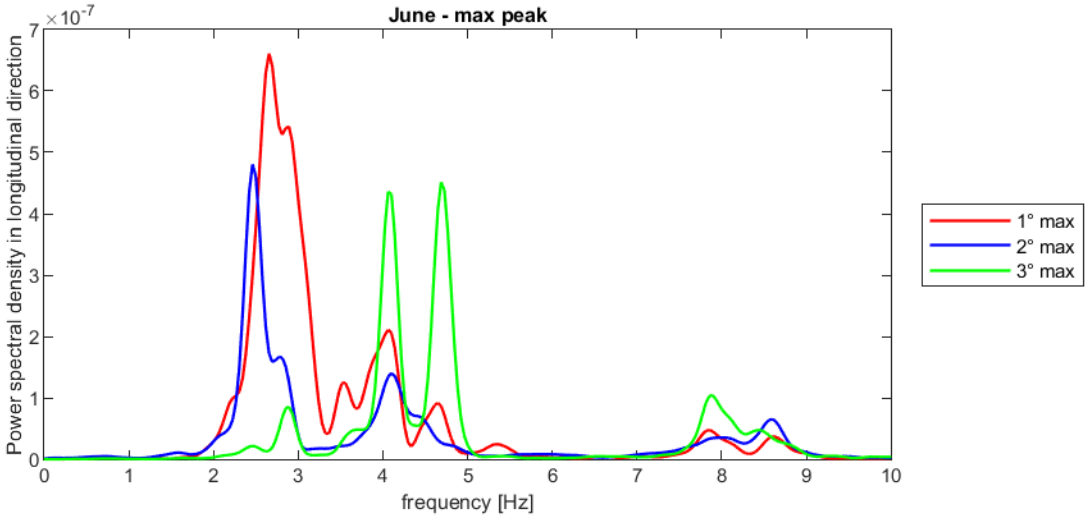


Figure 12-68: Results obtained from the 3 accelerograms with highest peak if PSD

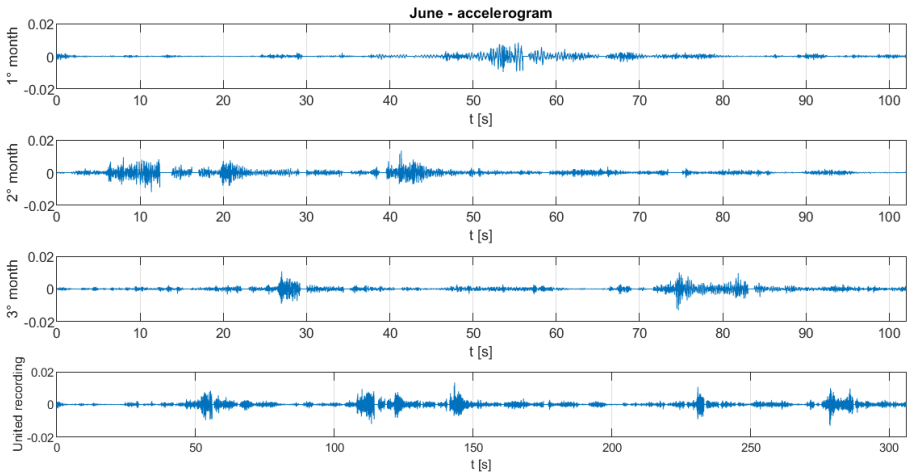


Figure 12-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

12.6.3 Transverse direction (z)

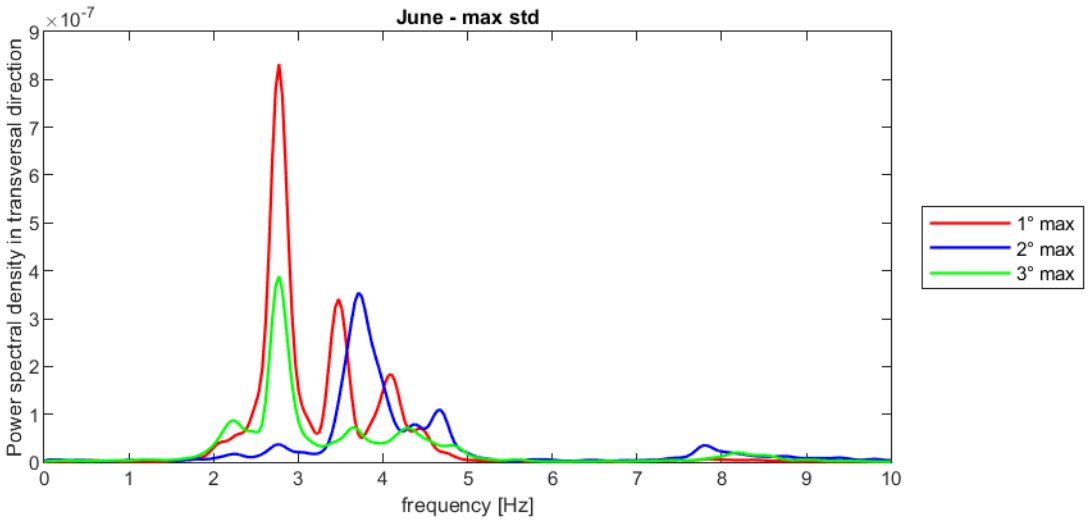


Figure 12-70: Results obtained from the 3 accelerograms with maximum SD in time domain

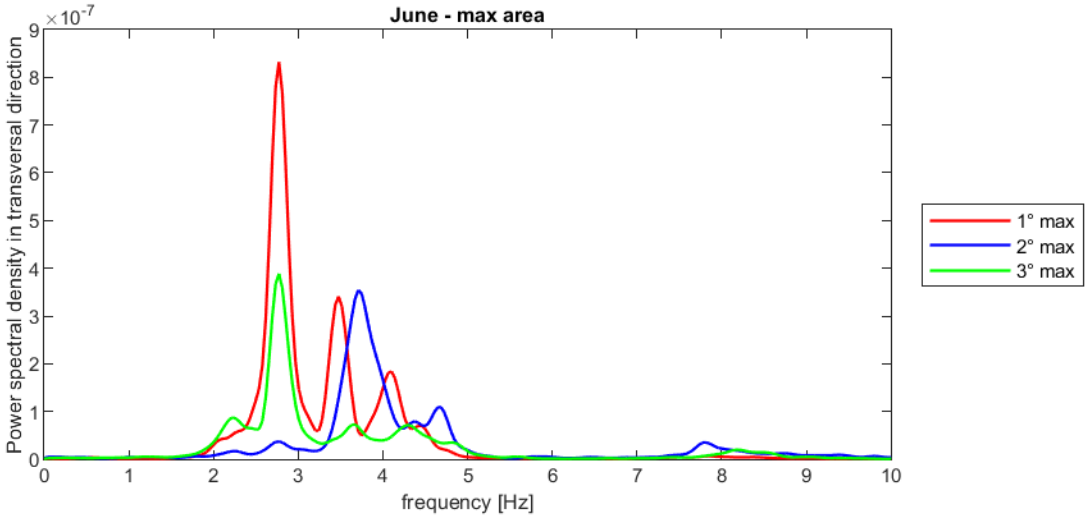


Figure 12-71: Results obtained from the 3 accelerograms with maximum area of PSD

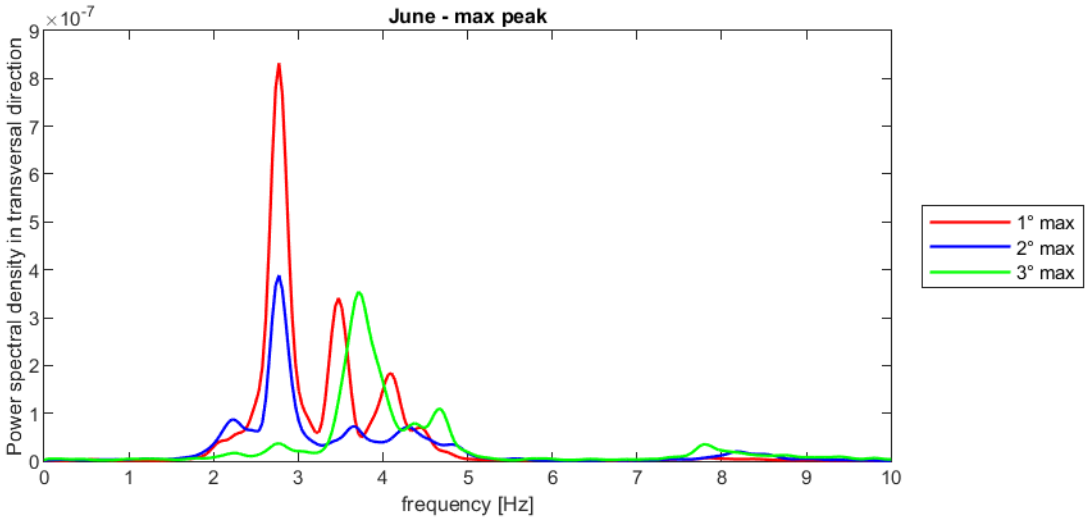


Figure 12-72: Results obtained from the 3 accelerograms with highest peak if PSD

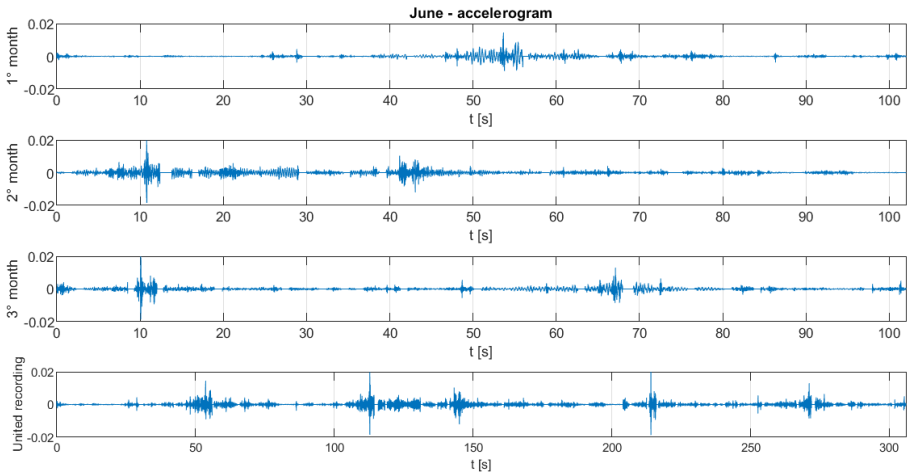


Figure 12-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

12.7 July

The results obtained for the July dataset are shown in the following tables.

Table 12-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-07-06_14-00-22	1.46E-04
	2°	319BC_2023-07-17_14-00-20	1.37E-04
	3°	319BC_2023-07-07_14-00-21	1.28E-04
Longitudinal direction (y)	1°	319BC_2023-07-06_14-00-22	9.37E-04
	2°	319BC_2023-07-07_14-00-21	8.34E-04
	3°	319BC_2023-07-17_14-00-20	8.10E-04
Transverse direction (z)	1°	319BC_2023-07-06_14-00-22	7.02E-04
	2°	319BC_2023-07-07_14-00-21	6.50E-04
	3°	319BC_2023-07-17_14-00-20	5.39E-04

Table 12-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-07-06_14-00-22	2.18E-08	319BC_2023-07-17_14-00-20	2.80E-09
2	319BC_2023-07-17_14-00-20	1.95E-08	319BC_2023-07-06_14-00-22	2.66E-09
3	319BC_2023-07-07_14-00-21	1.41E-08	319BC_2023-07-07_14-00-21	2.50E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-07-06_14-00-22	1.48E-06	319BC_2023-07-06_14-00-22	1.50E-07
2	319BC_2023-07-07_14-00-21	1.08E-06	319BC_2023-07-07_14-00-21	1.37E-07
3	319BC_2023-07-17_14-00-20	8.46E-07	319BC_2023-07-17_14-00-20	1.32E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-07-06_14-00-22	6.95E-07	319BC_2023-07-06_14-00-22	9.01E-08
2	319BC_2023-07-07_14-00-21	3.67E-07	319BC_2023-07-07_14-00-21	8.33E-08
3	319BC_2023-07-17_14-00-20	3.13E-07	319BC_2023-07-17_14-00-20	5.79E-08

Table 12-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	B	A	A	A	A	A	A
2	B	B	A	C	C	C	C	C	C
3	C	C	C	B	B	B	B	B	B

12.7.1 Vertical direction (x)

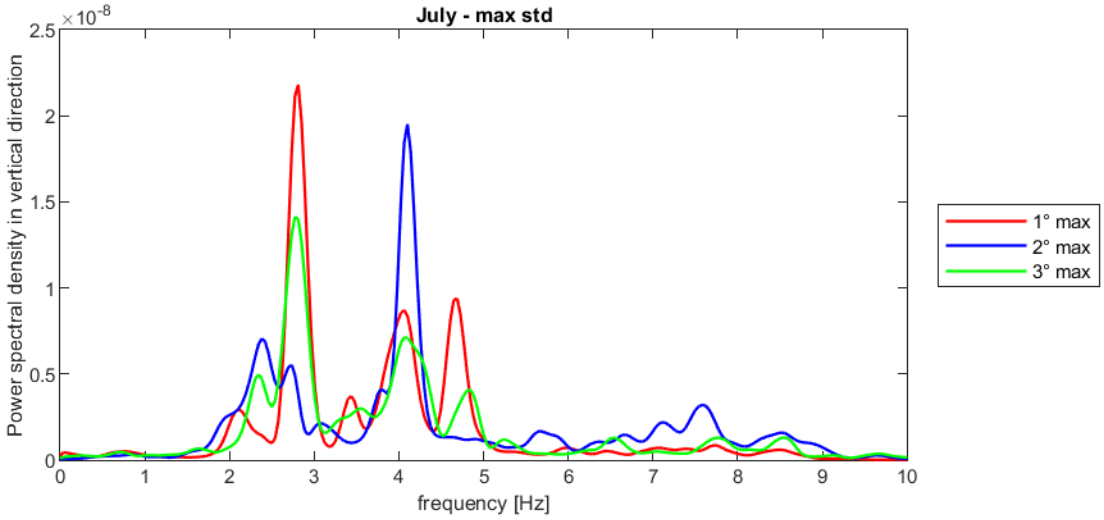


Figure 12-74: Results obtained from the 3 accelerograms with maximum SD in time domain

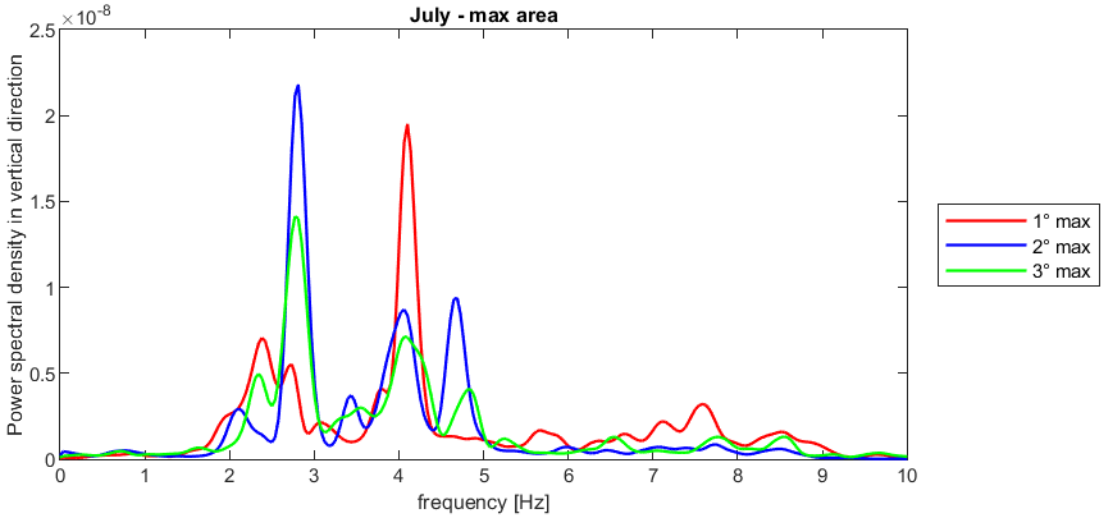


Figure 12-75: Results obtained from the 3 accelerograms with maximum area of PSD

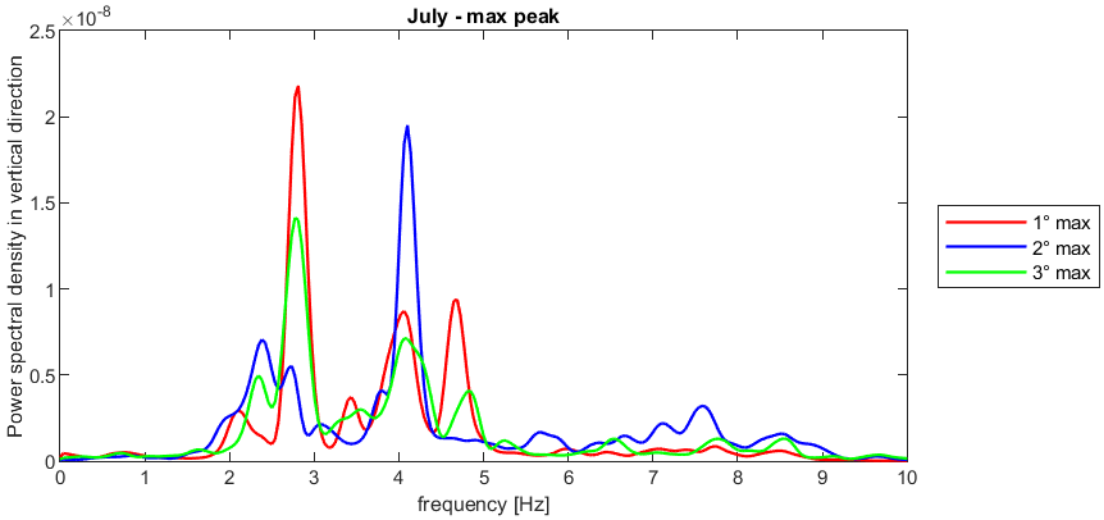


Figure 12-76: Results obtained from the 3 accelerograms with highest peak if PSD

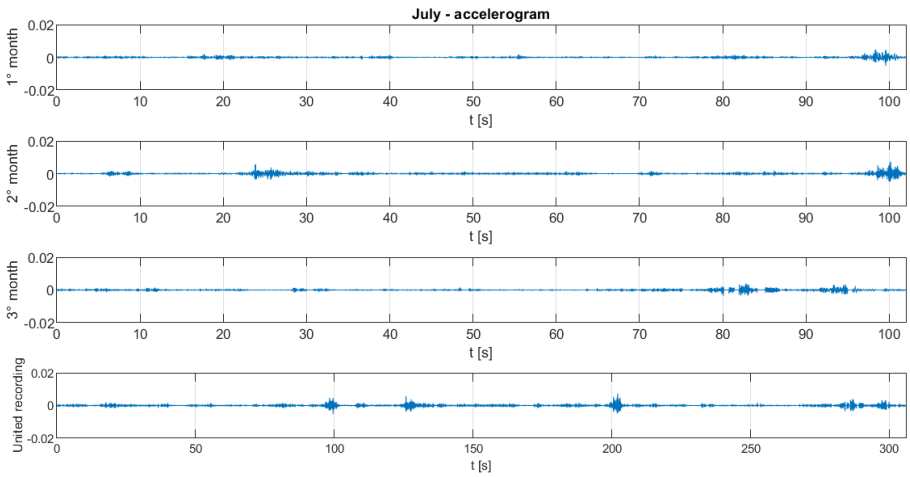


Figure 12-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.7.2 Longitudinal direction (y)

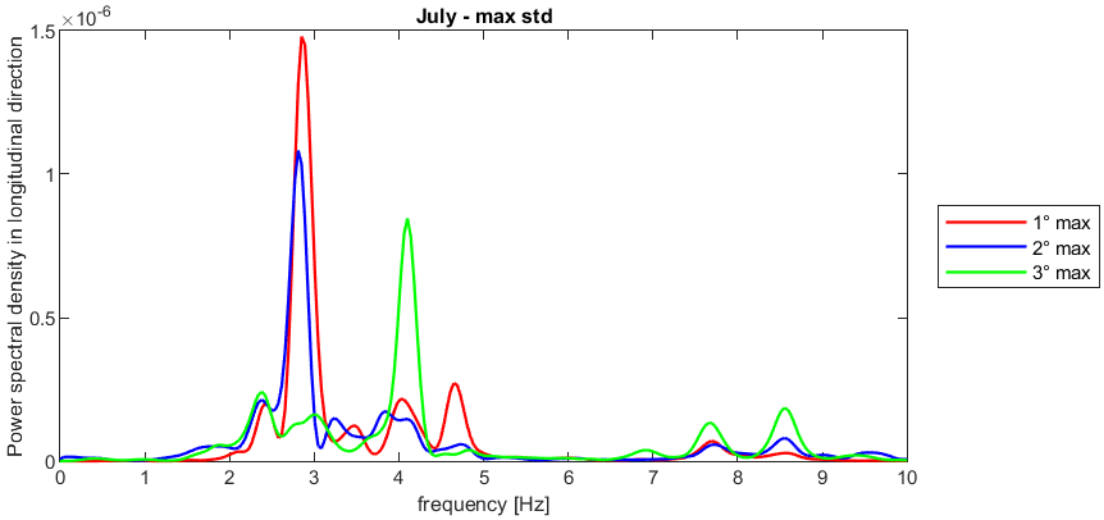


Figure 12-78: Results obtained from the 3 accelerograms with maximum SD in time domain

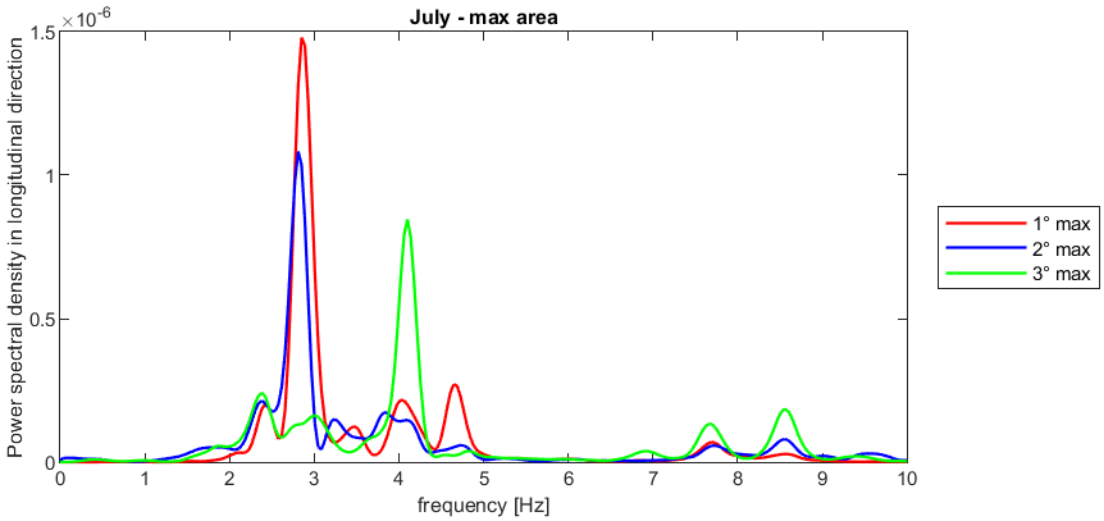


Figure 12-79: Results obtained from the 3 accelerograms with maximum area of PSD

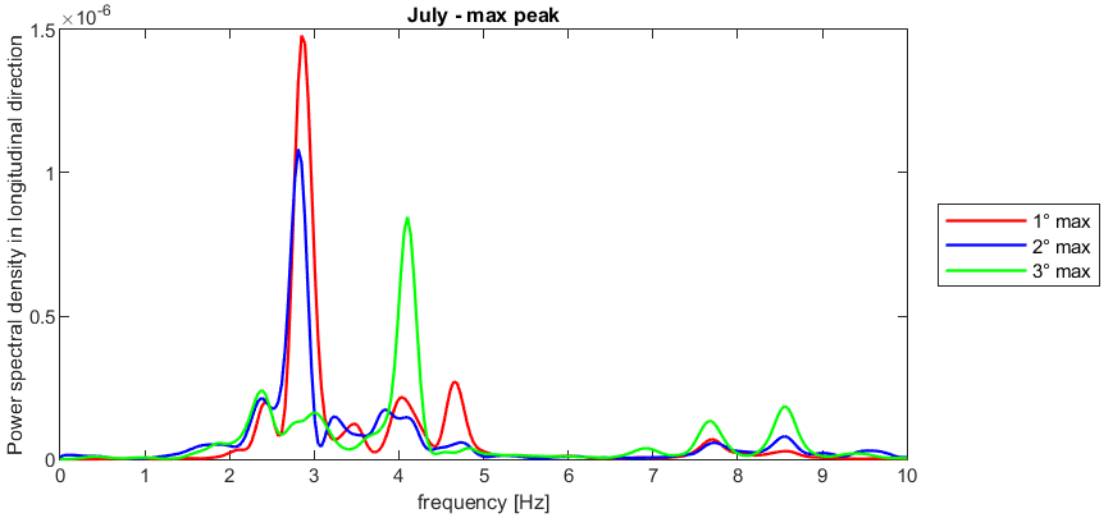


Figure 12-80: Results obtained from the 3 accelerograms with highest peak if PSD

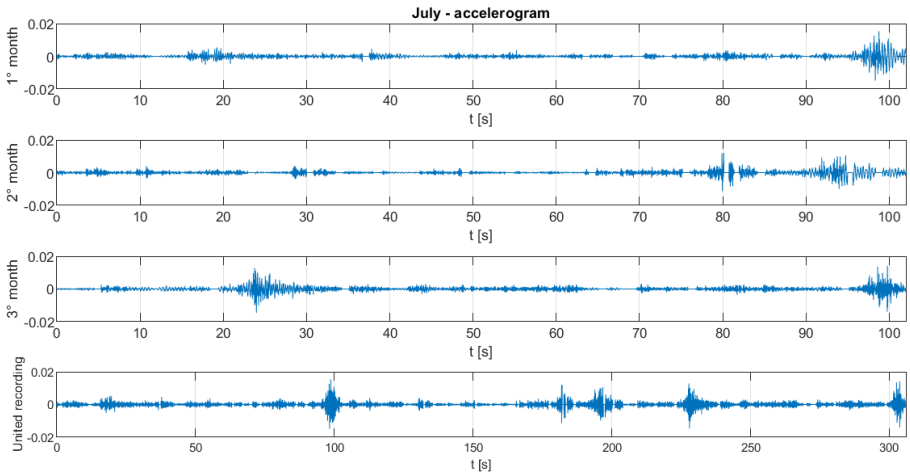


Figure 12-81: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.7.3 Transverse direction (z)

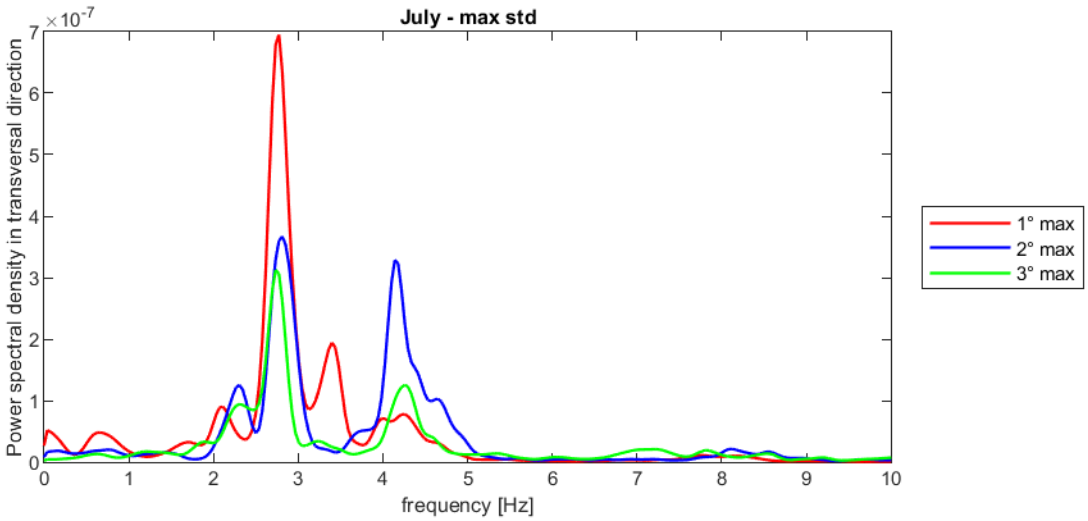


Figure 12-82: Results obtained from the 3 accelerograms with maximum SD in time domain

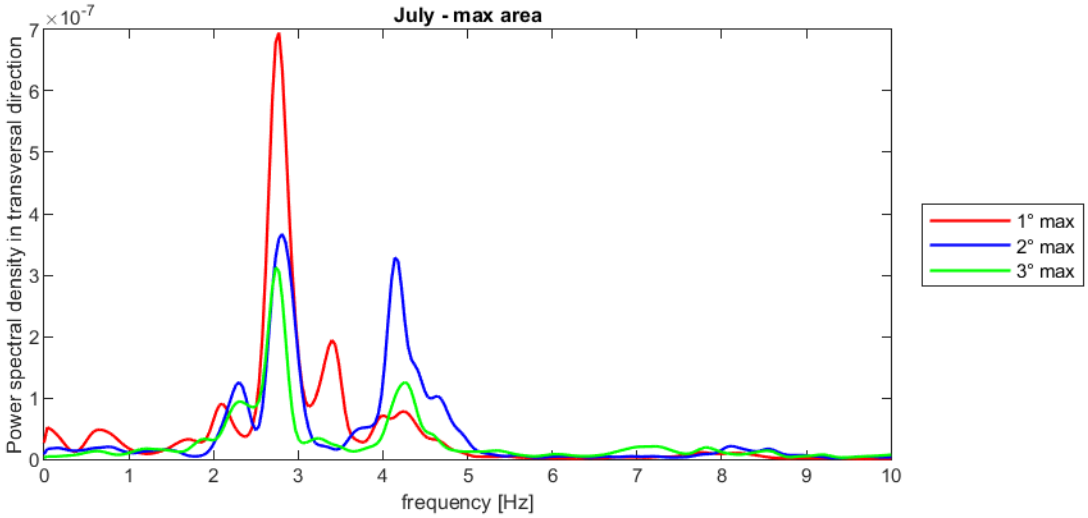


Figure 12-83: Results obtained from the 3 accelerograms with maximum area of PSD

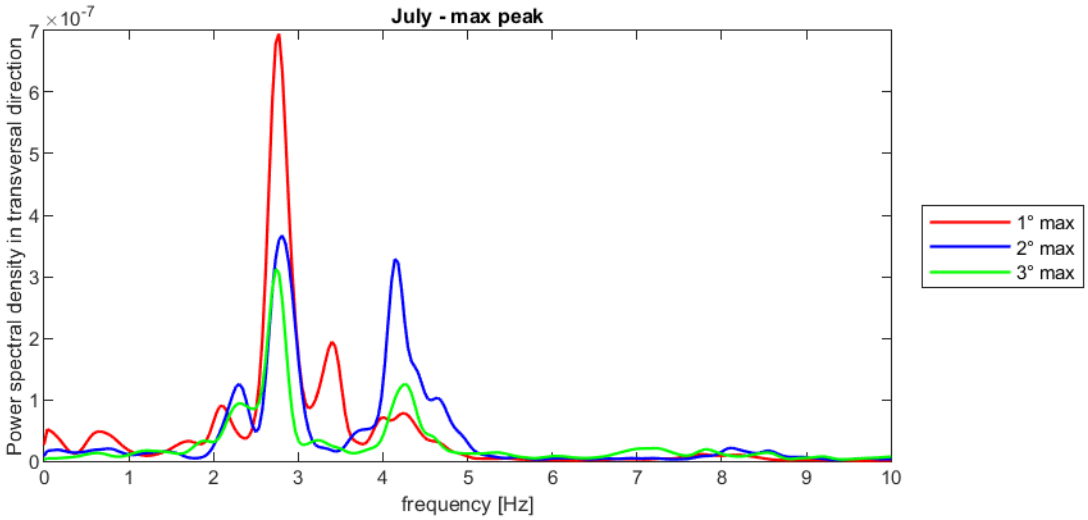


Figure 12-84: Results obtained from the 3 accelerograms with highest peak if PSD

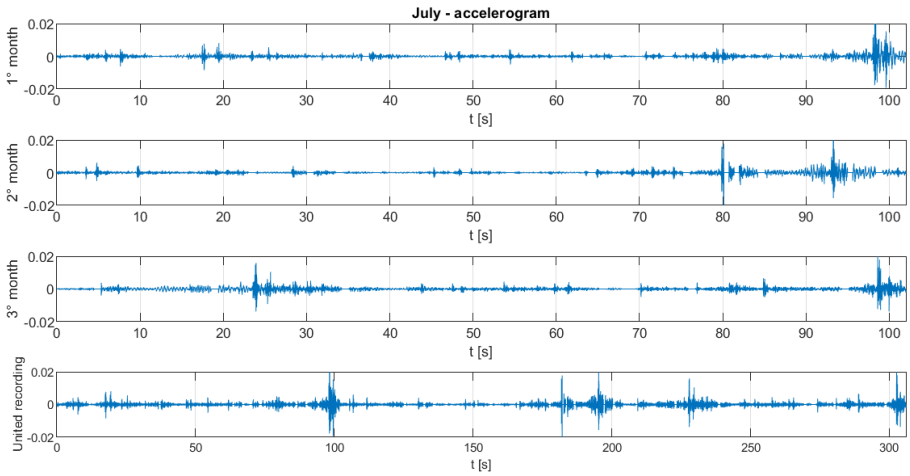


Figure 12-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

12.8 August

The results obtained for the August dataset are shown in the following tables.

Table 12-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-08-07_14-00-21	1.21E-04
	2°	319BC_2023-08-02_08-00-21	1.08E-04
	3°	319BC_2023-08-29_08-00-21	1.06E-04
Longitudinal direction (y)	1°	319BC_2023-08-02_08-00-21	6.48E-04
	2°	319BC_2023-08-07_14-00-21	6.37E-04
	3°	319BC_2023-08-07_20-00-21	5.65E-04
Transverse direction (z)	1°	319BC_2023-08-07_14-00-21	6.09E-04
	2°	319BC_2023-08-02_08-00-21	4.40E-04
	3°	319BC_2023-08-29_08-00-21	4.32E-04

Table 12-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-08-07_14-00-21	1.44E-08	319BC_2023-08-07_14-00-21	2.21E-09
2	319BC_2023-08-02_20-00-21	1.21E-08	319BC_2023-08-02_08-00-21	1.80E-09
3	319BC_2023-08-10_08-00-21	9.90E-09	319BC_2023-08-29_08-00-21	1.73E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-08-07_14-00-21	5.95E-07	319BC_2023-08-02_08-00-21	8.77E-08
2	319BC_2023-08-03_08-00-21	3.57E-07	319BC_2023-08-07_14-00-21	8.12E-08
3	319BC_2023-08-07_08-00-21	3.57E-07	319BC_2023-08-07_20-00-21	6.51E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-08-07_14-00-21	5.85E-07	319BC_2023-08-07_14-00-21	7.40E-08
2	319BC_2023-08-10_08-00-21	1.56E-07	319BC_2023-08-02_08-00-21	4.06E-08
3	319BC_2023-08-29_08-00-21	1.36E-07	319BC_2023-08-29_08-00-21	3.84E-08

Table 12-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	A	B	A	A	A
2	B	-	B	A	-	A	B	-	B
3	C	-	C	D	-	D	C	C	C

12.8.1 Vertical direction (x)

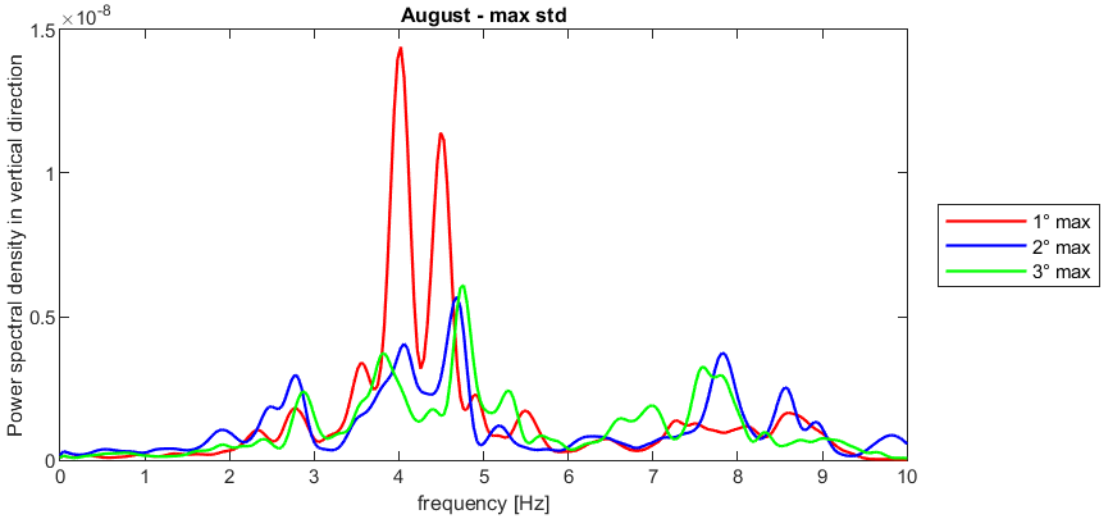


Figure 12-86: Results obtained from the 3 accelerograms with maximum SD in time domain

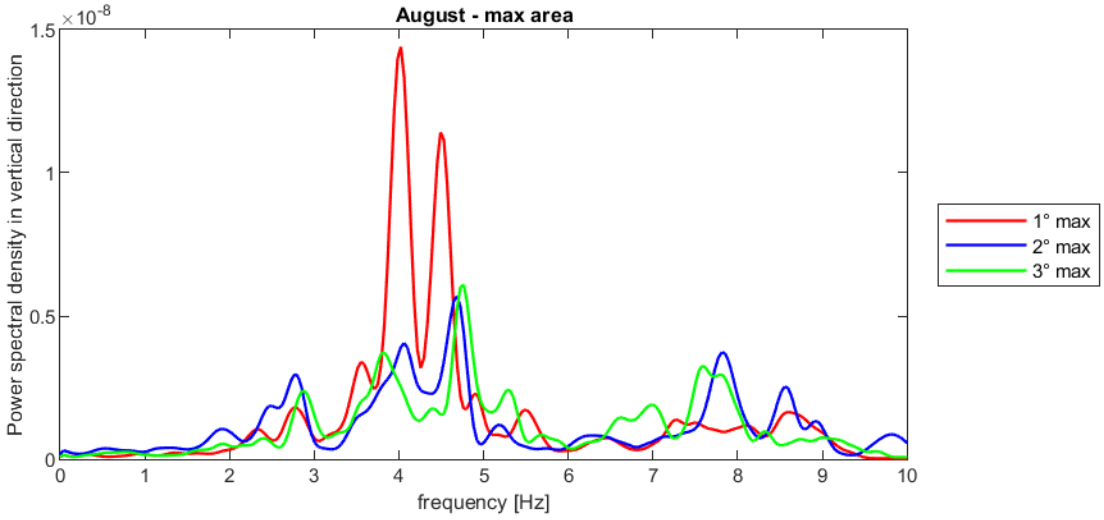


Figure 12-87: Results obtained from the 3 accelerograms with maximum area of PSD

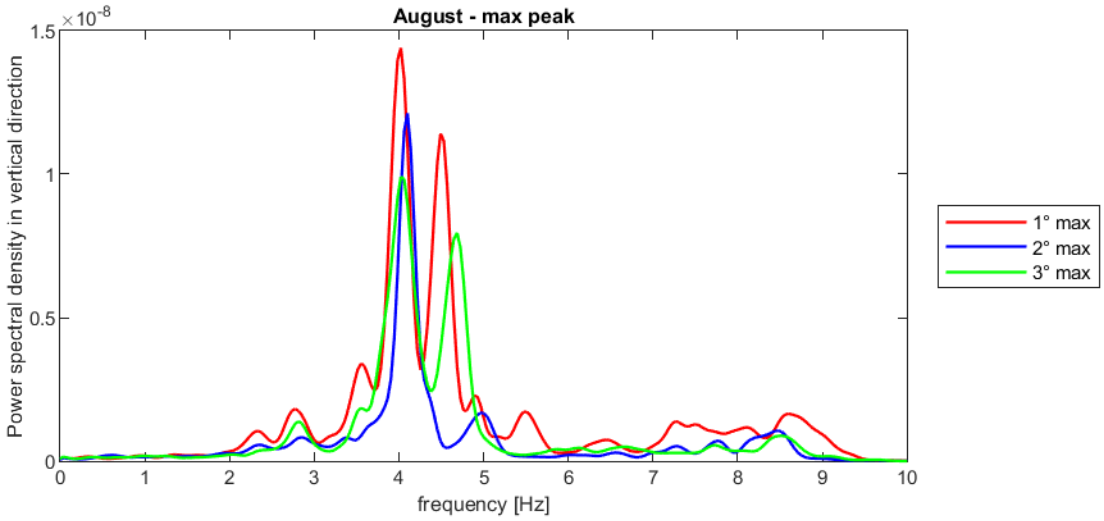


Figure 12-88: Results obtained from the 3 accelerograms with highest peak if PSD

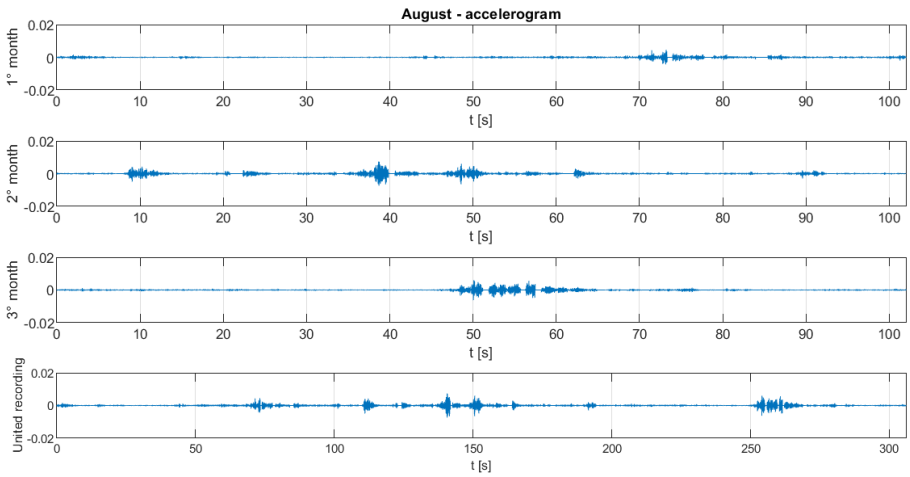


Figure 12-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.8.2 Longitudinal direction (y)

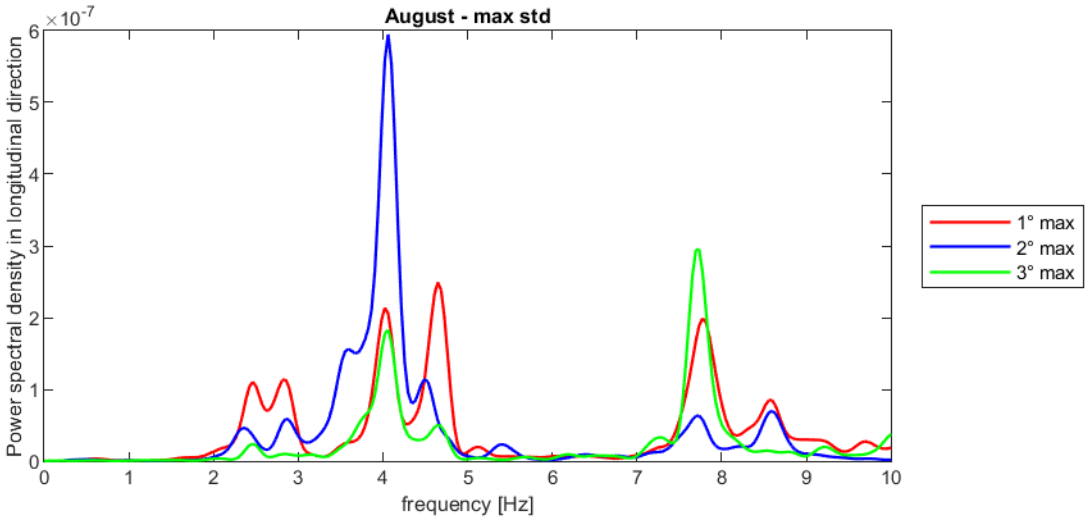


Figure 12-90: Results obtained from the 3 accelerograms with maximum SD in time domain

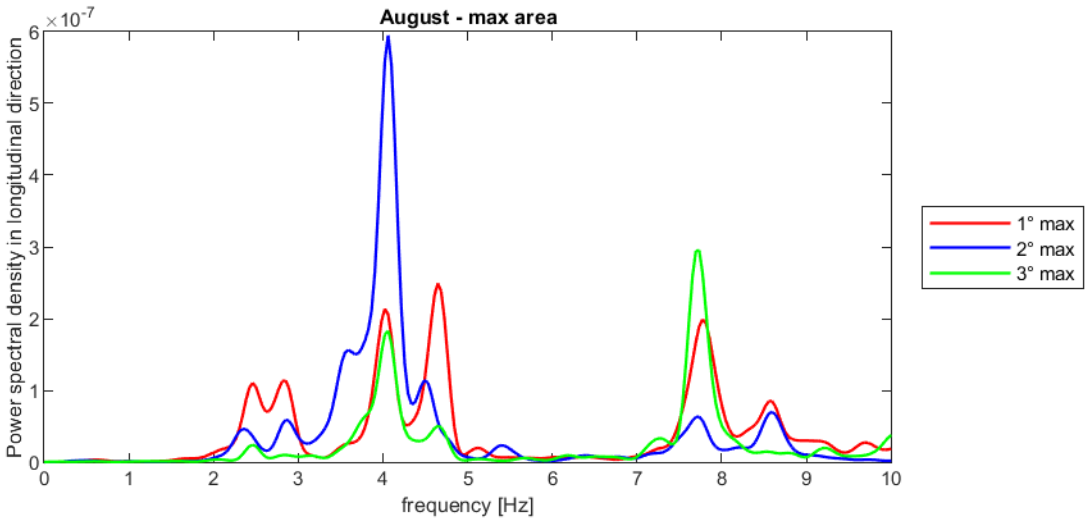


Figure 12-91: Results obtained from the 3 accelerograms with maximum area of PSD

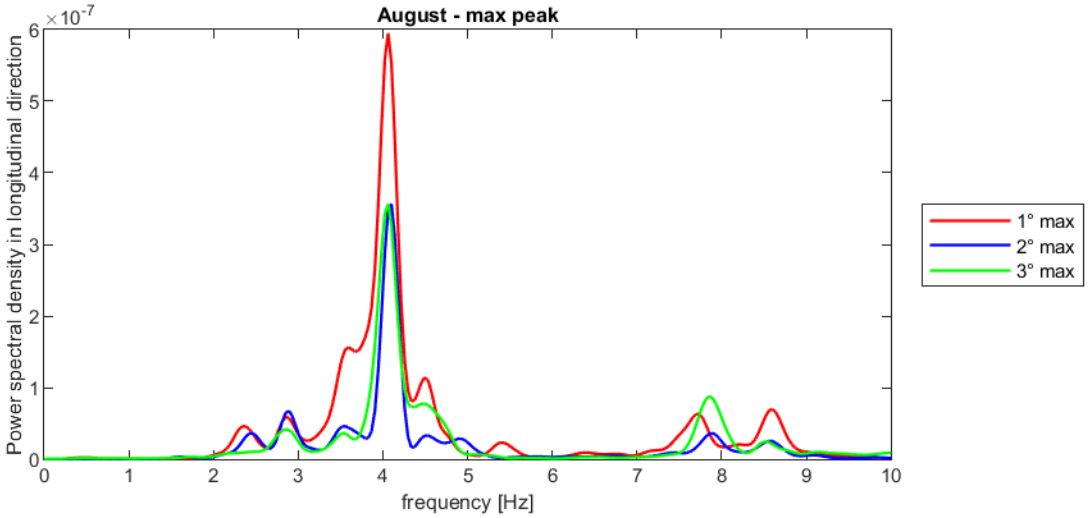


Figure 12-92: Results obtained from the 3 accelerograms with highest peak if PSD

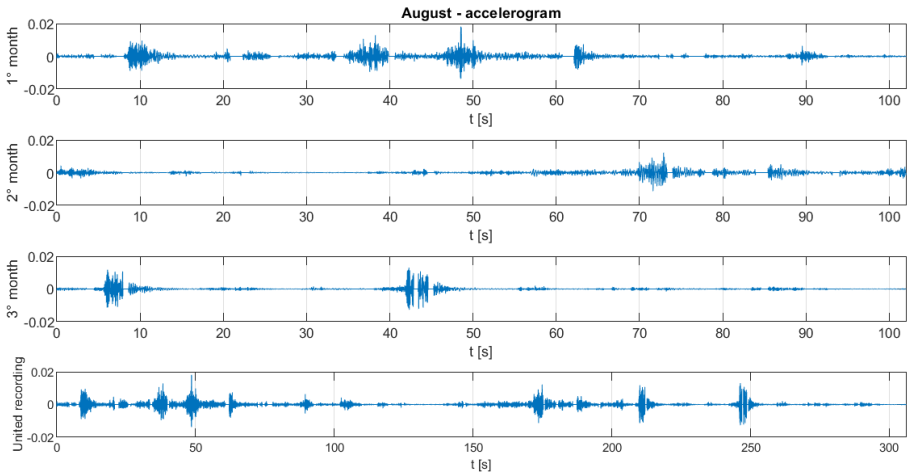


Figure 12-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

12.8.3 Transverse direction (z)

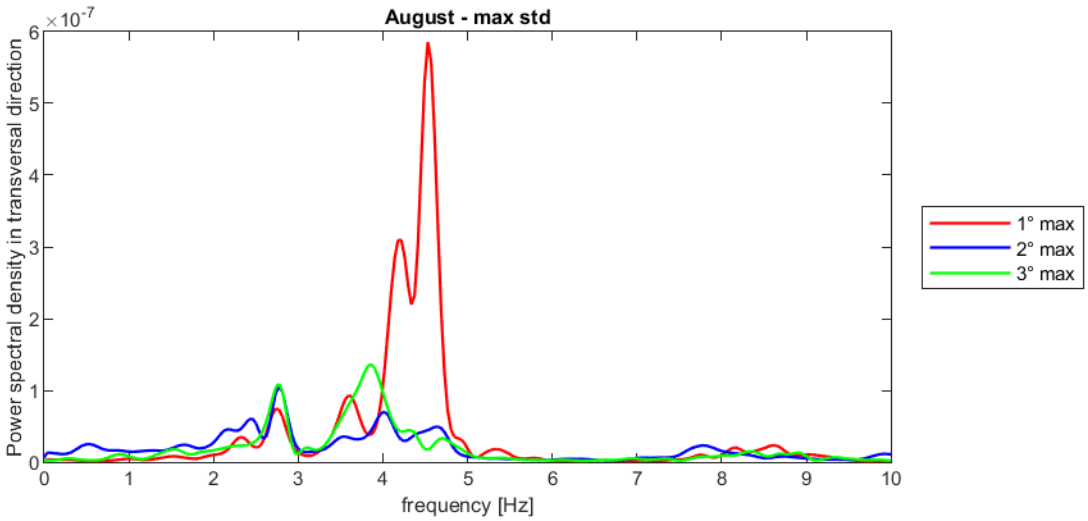


Figure 12-94: Results obtained from the 3 accelerograms with maximum SD in time domain

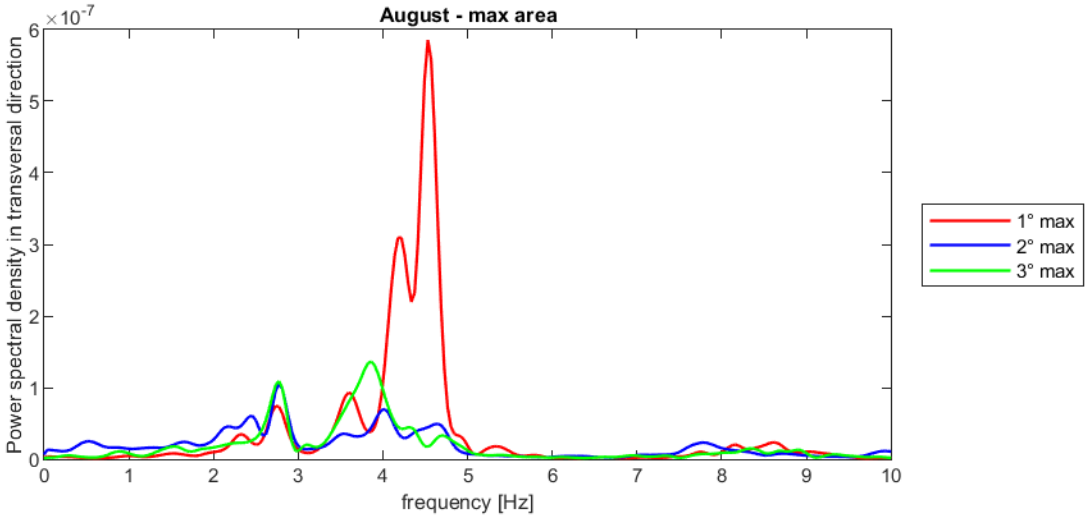


Figure 12-95: Results obtained from the 3 accelerograms with maximum area of PSD

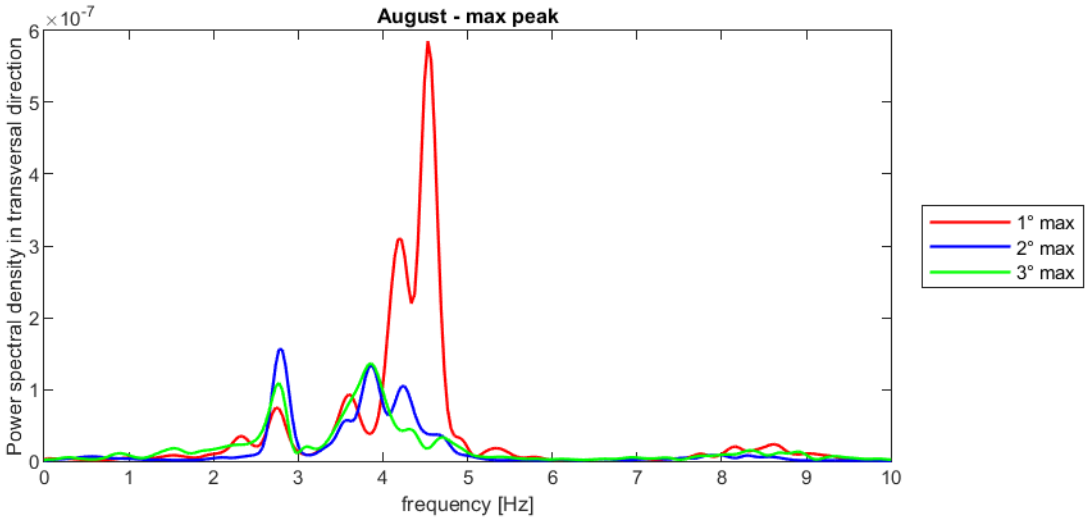


Figure 12-96: Results obtained from the 3 accelerograms with highest peak if PSD

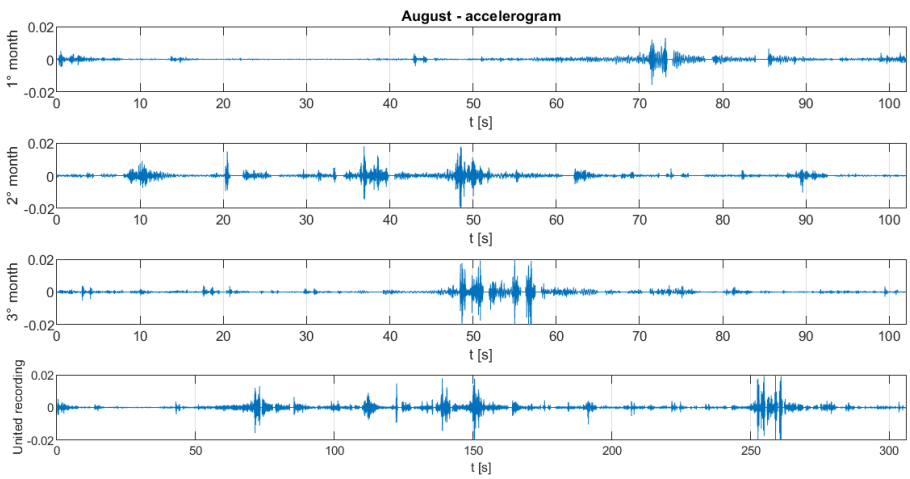


Figure 12-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

12.9 September

The results obtained for the September dataset are shown in the following tables.

Table 12-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-09-26_15-00-21	2.30E-04
	2°	319BC_2023-09-14_11-00-20	1.94E-04
	3°	319BC_2023-09-15_11-00-20	1.92E-04
Longitudinal direction (y)	1°	319BC_2023-09-26_15-00-21	1.25E-03
	2°	319BC_2023-09-20_11-00-20	9.99E-04
	3°	319BC_2023-09-15_11-00-20	9.93E-04
Transverse direction (z)	1°	319BC_2023-09-26_15-00-21	9.31E-04
	2°	319BC_2023-09-15_11-00-20	8.84E-04
	3°	319BC_2023-09-26_09-00-20	8.51E-04

Table 12-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-09-26_15-00-21	6.27E-08	319BC_2023-09-26_15-00-21	8.47E-09
2	319BC_2023-09-15_11-00-20	3.79E-08	319BC_2023-09-15_11-00-20	6.06E-09
3	319BC_2023-09-14_11-00-20	3.78E-08	319BC_2023-09-14_11-00-20	6.00E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-09-26_15-00-21	2.60E-06	319BC_2023-09-26_15-00-21	2.95E-07
2	319BC_2023-09-15_11-00-20	1.56E-06	319BC_2023-09-20_11-00-20	2.11E-07
3	319BC_2023-09-27_03-00-21	1.35E-06	319BC_2023-09-15_11-00-20	2.04E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-09-15_11-00-20	8.82E-07	319BC_2023-09-26_15-00-21	1.82E-07
2	319BC_2023-09-26_15-00-21	8.48E-07	319BC_2023-09-15_11-00-20	1.60E-07
3	319BC_2023-09-14_11-00-20	6.84E-07	319BC_2023-09-26_09-00-20	1.48E-07

Table 12-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	C	A
2	B	C	C	D	C	D	-	A	C
3	C	B	B	C	-	C	E	-	E

12.9.1 Vertical direction (x)

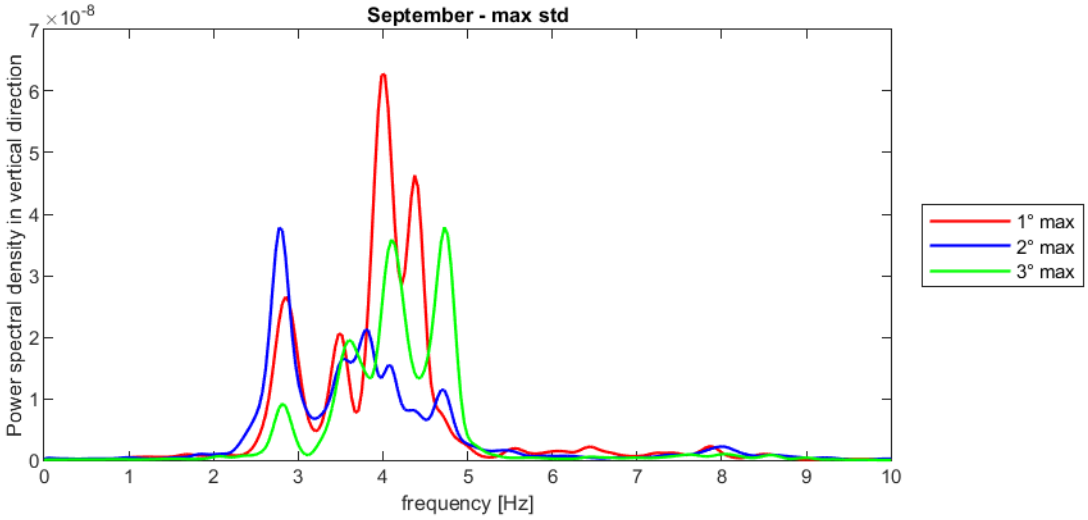


Figure 12-98: Results obtained from the 3 accelerograms with maximum SD in time domain

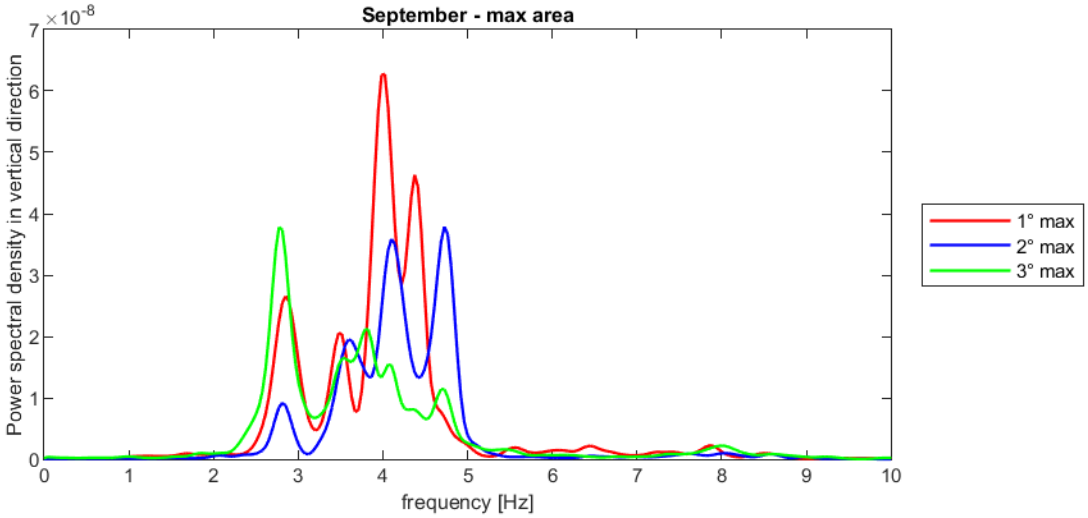


Figure 12-99: Results obtained from the 3 accelerograms with maximum area of PSD

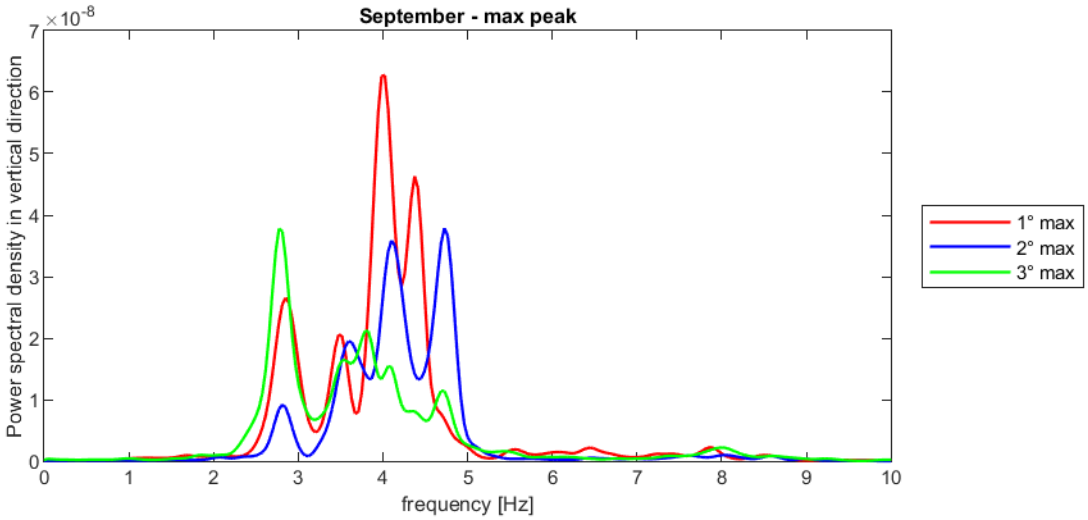


Figure 12-100: Results obtained from the 3 accelerograms with highest peak if PSD

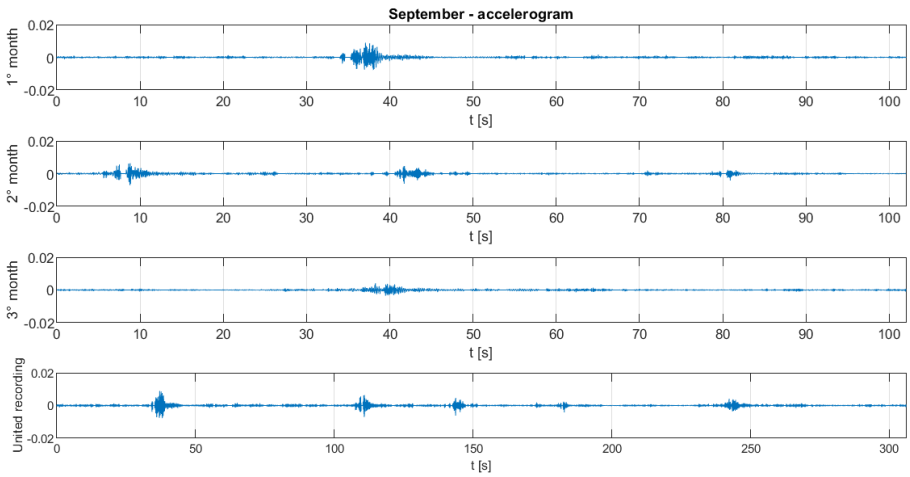


Figure 12-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.9.2 Longitudinal direction (y)

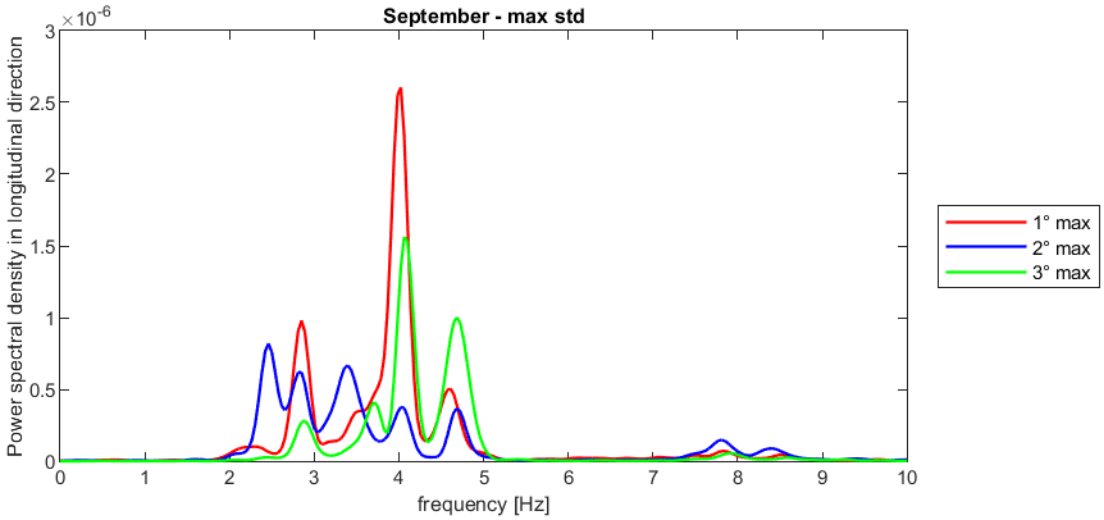


Figure 12-102: Results obtained from the 3 accelerograms with maximum SD in time domain

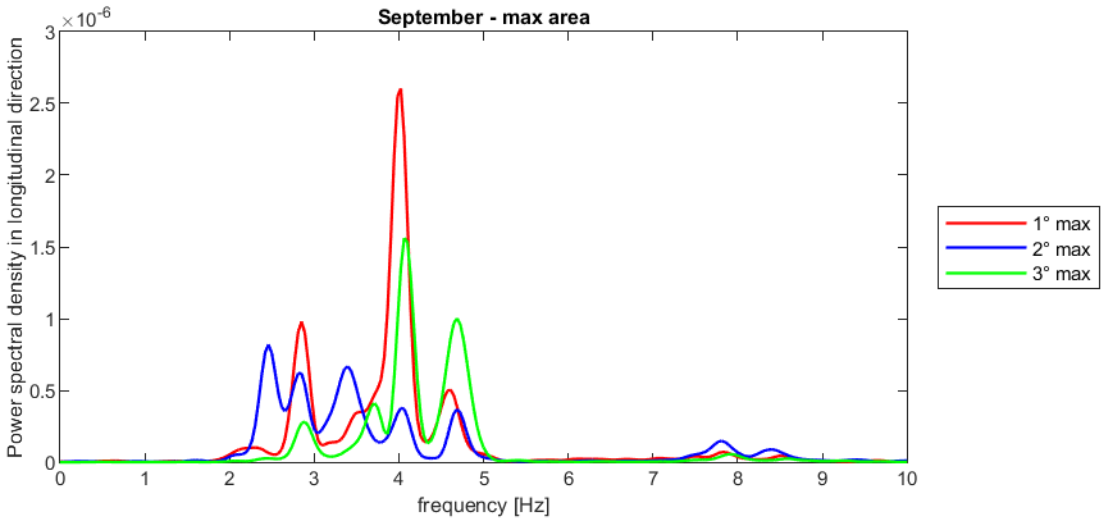


Figure 12-103: Results obtained from the 3 accelerograms with maximum area of PSD

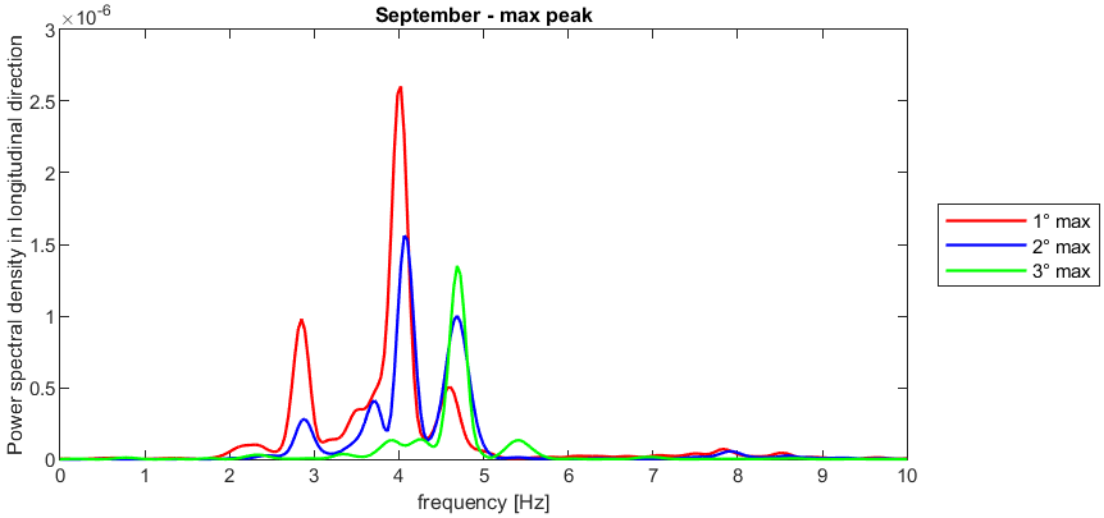


Figure 12-104: Results obtained from the 3 accelerograms with highest peak if PSD

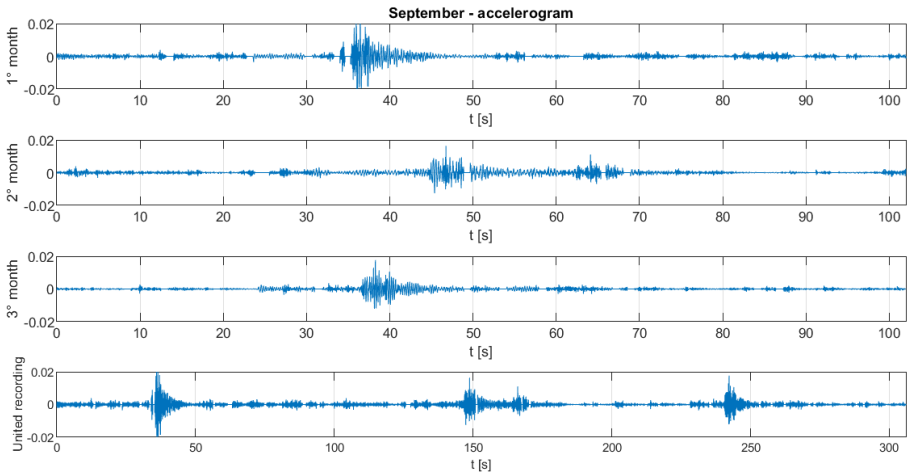


Figure 12-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

12.9.3 Transverse direction (z)

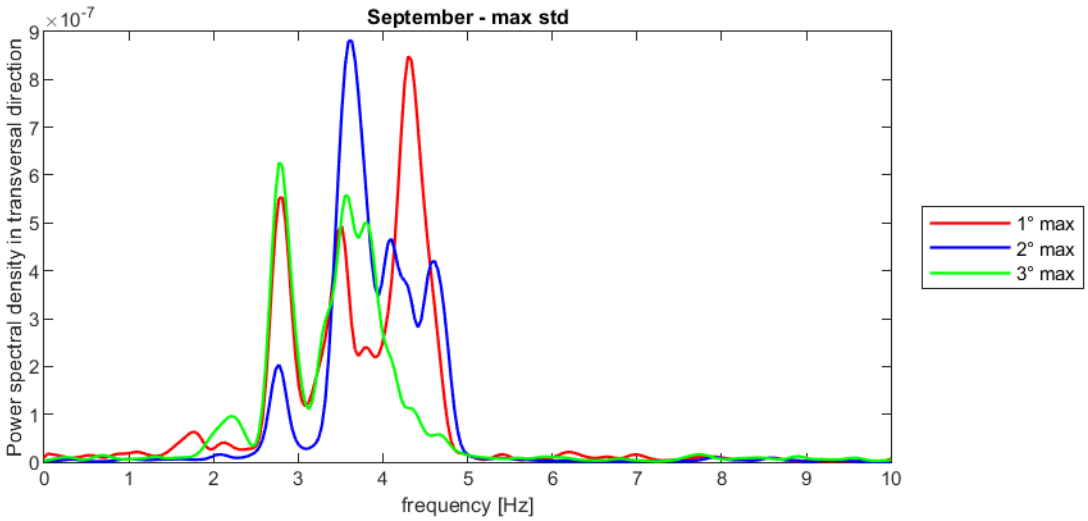


Figure 12-106: Results obtained from the 3 accelerograms with maximum SD in time domain

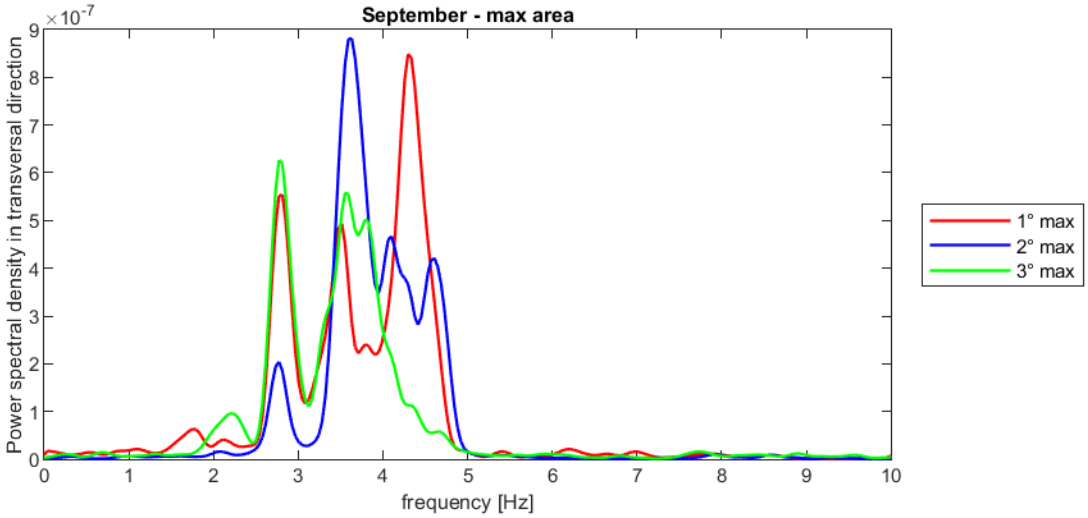


Figure 12-107: Results obtained from the 3 accelerograms with maximum area of PSD

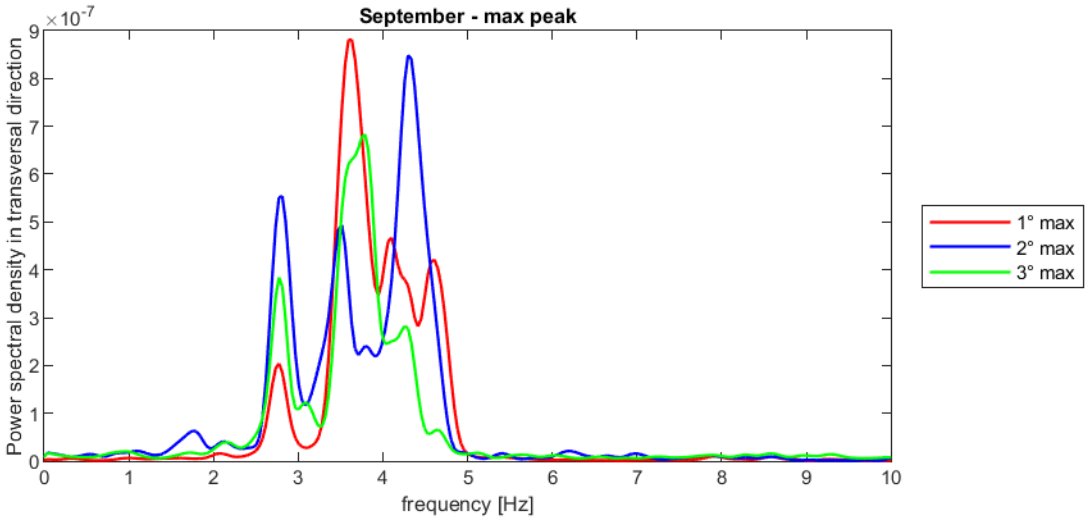


Figure 12-108: Results obtained from the 3 accelerograms with highest peak if PSD

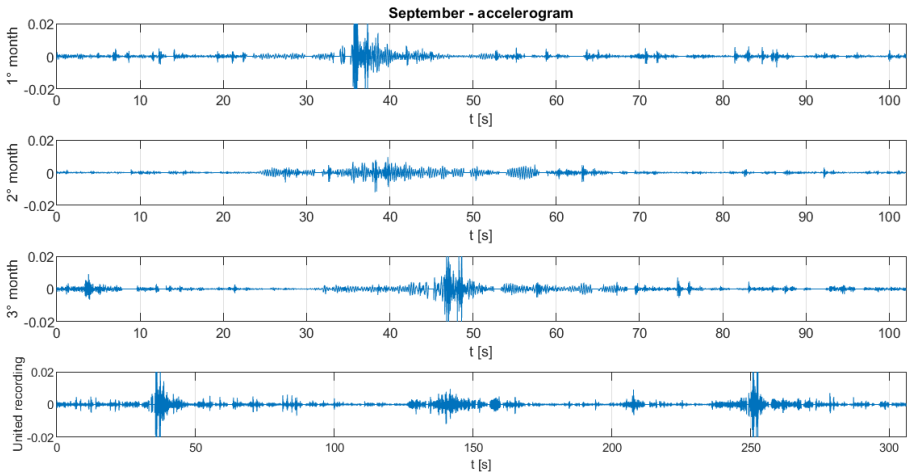


Figure 12-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

12.10 October

The results obtained for the October dataset are shown in the following tables.

Table 12-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-10-26_12-00-21	1.56E-04
	2°	319BC_2023-10-25_10-00-21	1.52E-04
	3°	319BC_2023-10-05_18-00-20	1.47E-04
Longitudinal direction (y)	1°	319BC_2023-10-26_12-00-21	9.72E-04
	2°	319BC_2023-10-12_09-00-21	8.50E-04
	3°	319BC_2023-10-05_18-00-20	8.31E-04
Transverse direction (z)	1°	319BC_2023-10-25_10-00-21	6.86E-04
	2°	319BC_2023-10-02_08-00-21	6.60E-04
	3°	319BC_2023-10-24_10-00-21	6.34E-04

Table 12-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-10-05_18-00-20	4.14E-08	319BC_2023-10-26_12-00-21	3.95E-09
2	319BC_2023-10-26_12-00-21	3.46E-08	319BC_2023-10-25_10-00-21	3.36E-09
3	319BC_2023-10-02_10-00-21	2.61E-08	319BC_2023-10-02_08-00-21	3.31E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-10-26_12-00-21	2.27E-06	319BC_2023-10-26_12-00-21	1.95E-07
2	319BC_2023-10-12_16-00-20	1.19E-06	319BC_2023-10-12_09-00-21	1.46E-07
3	319BC_2023-10-05_18-00-20	1.15E-06	319BC_2023-10-02_10-00-21	1.34E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-10-02_08-00-21	7.10E-07	319BC_2023-10-02_08-00-21	8.90E-08
2	319BC_2023-10-24_10-00-21	4.11E-07	319BC_2023-10-25_10-00-21	8.82E-08
3	319BC_2023-10-19_12-00-21	3.46E-07	319BC_2023-10-12_09-00-21	8.35E-08

Table 12-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	A	A	A	B	E	E
2	B	A	B	D	-	D	E	F	B
3	C	-	-	C	C	-	F	-	-

12.10.1 Vertical direction (x)

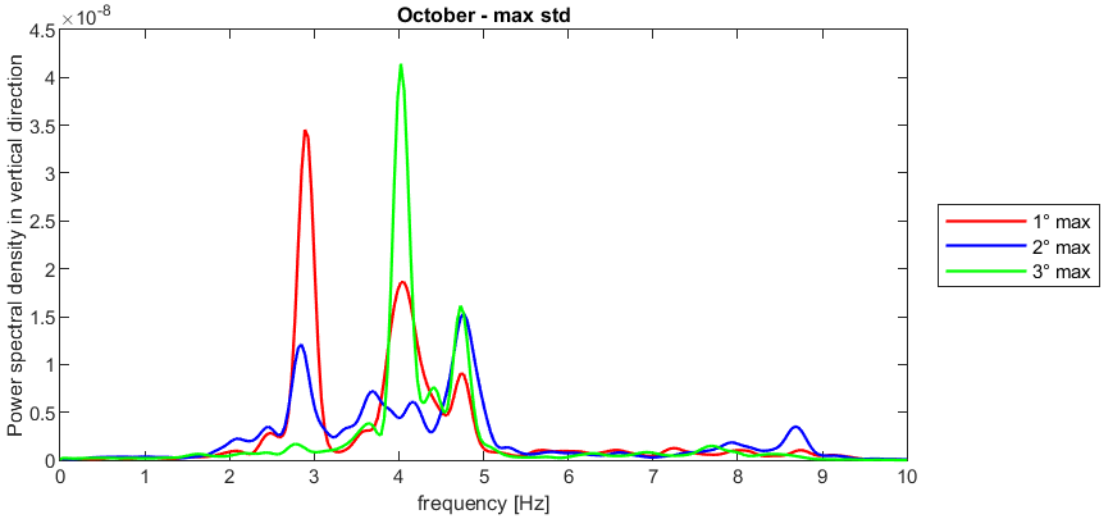


Figure 12-110: Results obtained from the 3 accelerograms with maximum SD in time domain

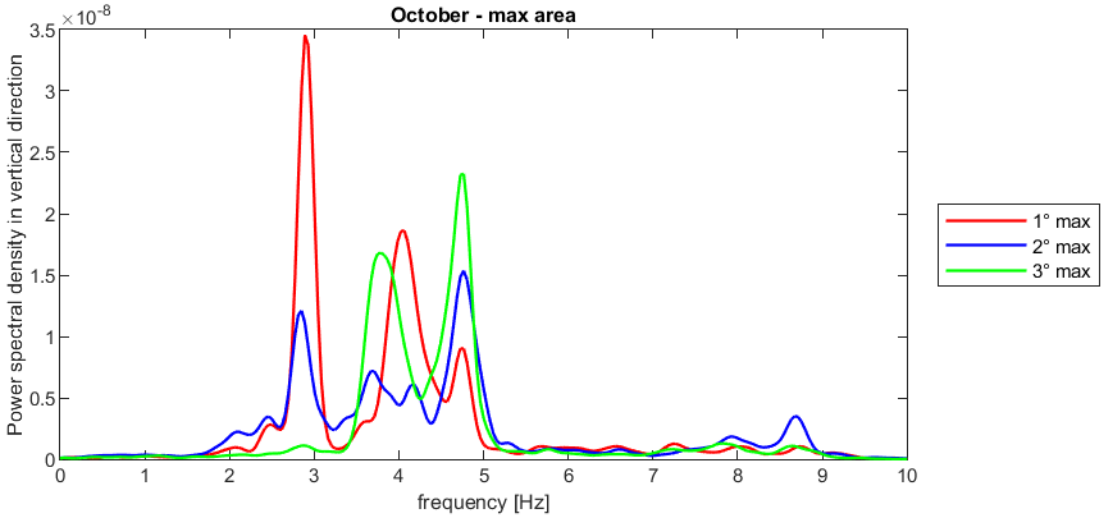


Figure 12-111: Results obtained from the 3 accelerograms with maximum area of PSD

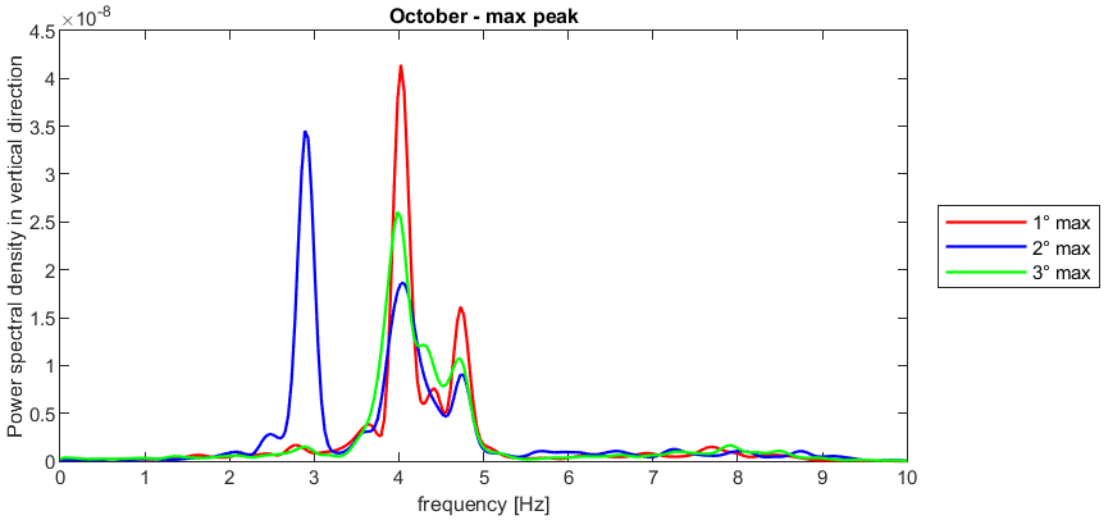


Figure 12-112: Results obtained from the 3 accelerograms with highest peak if PSD

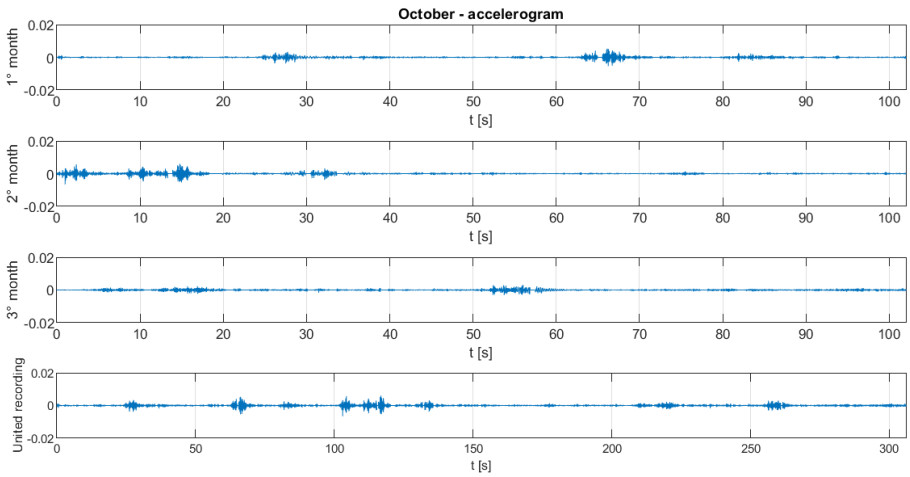


Figure 12-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.10.2 Longitudinal direction (y)

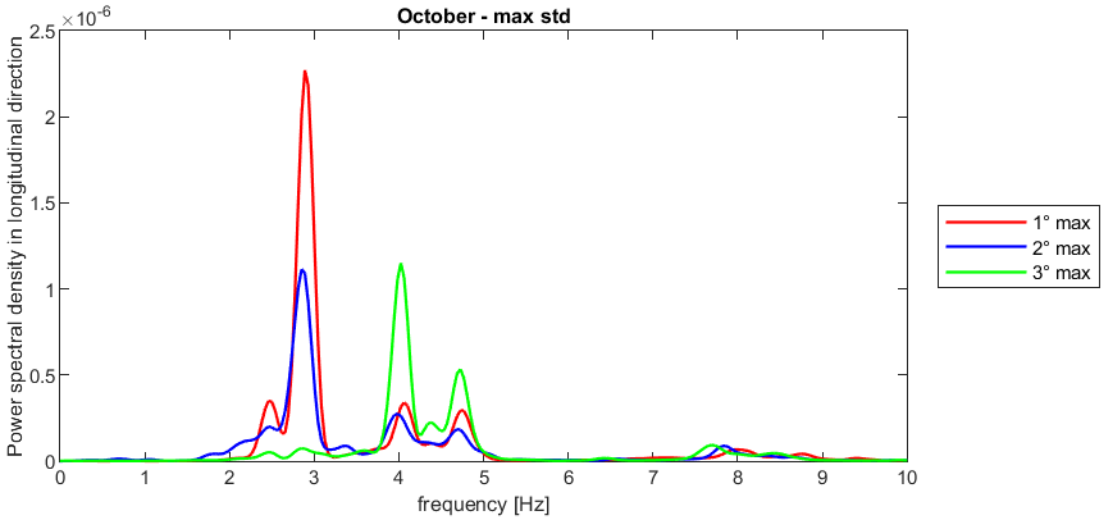


Figure 12-114: Results obtained from the 3 accelerograms with maximum SD in time domain

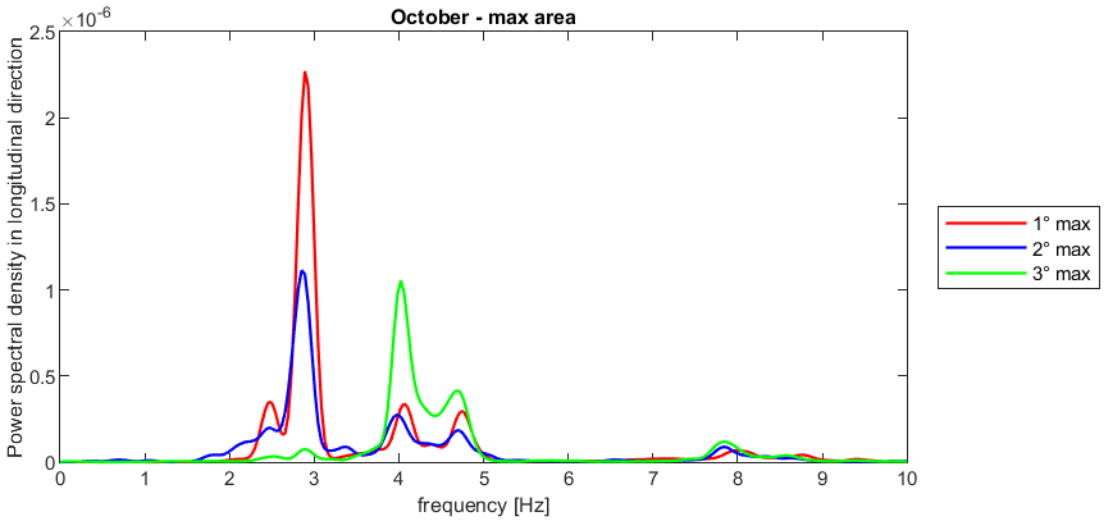


Figure 12-115: Results obtained from the 3 accelerograms with maximum area of PSD

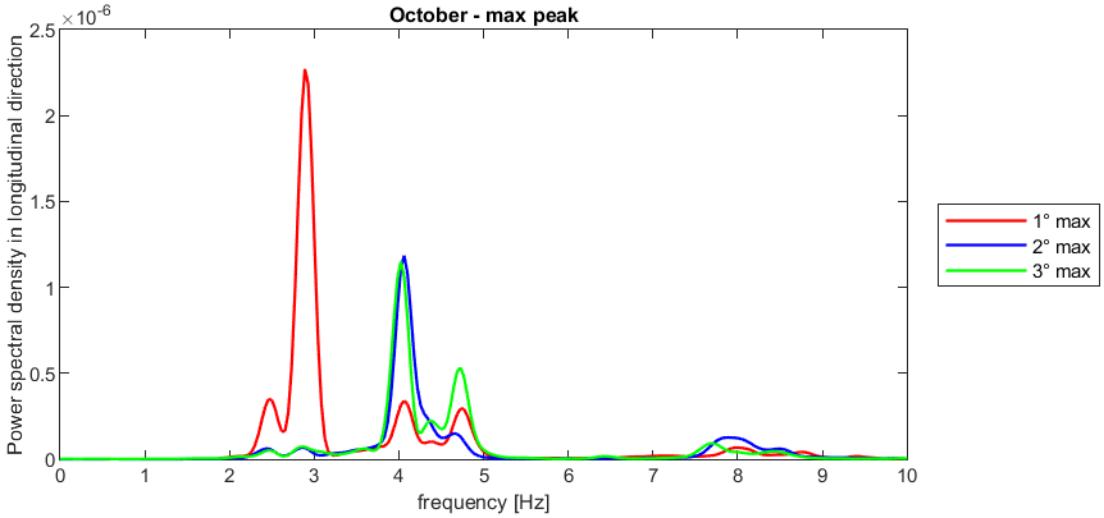


Figure 12-116: Results obtained from the 3 accelerograms with highest peak if PSD

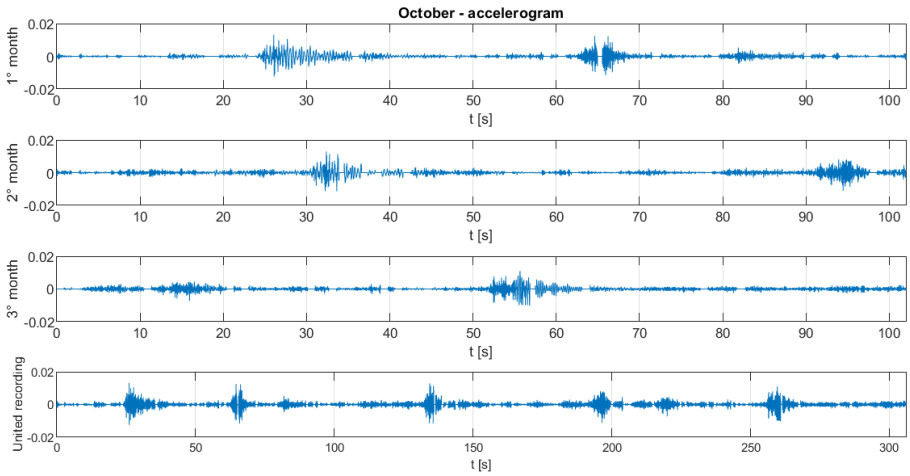


Figure 12-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

12.10.3 Transverse direction (z)

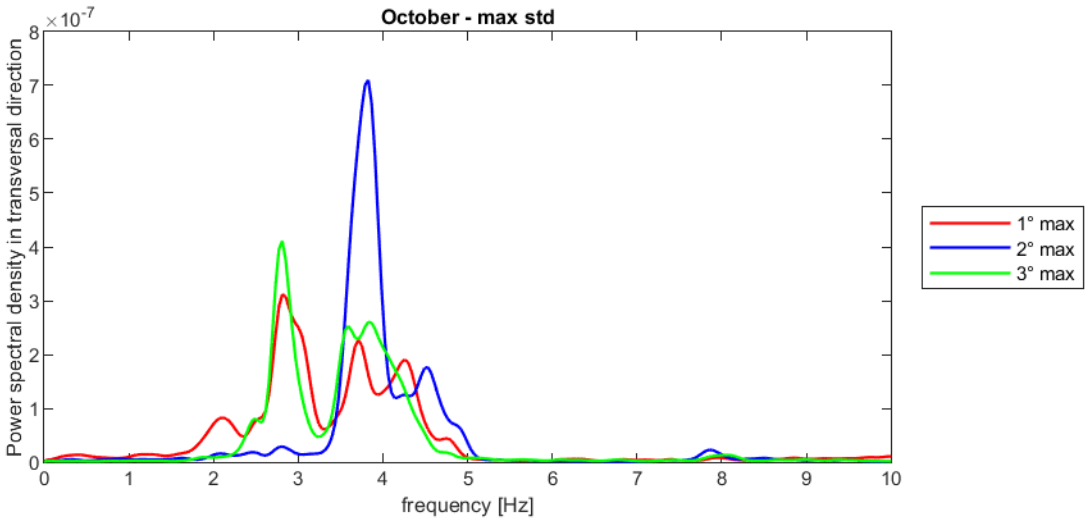


Figure 12-118: Results obtained from the 3 accelerograms with maximum SD in time domain

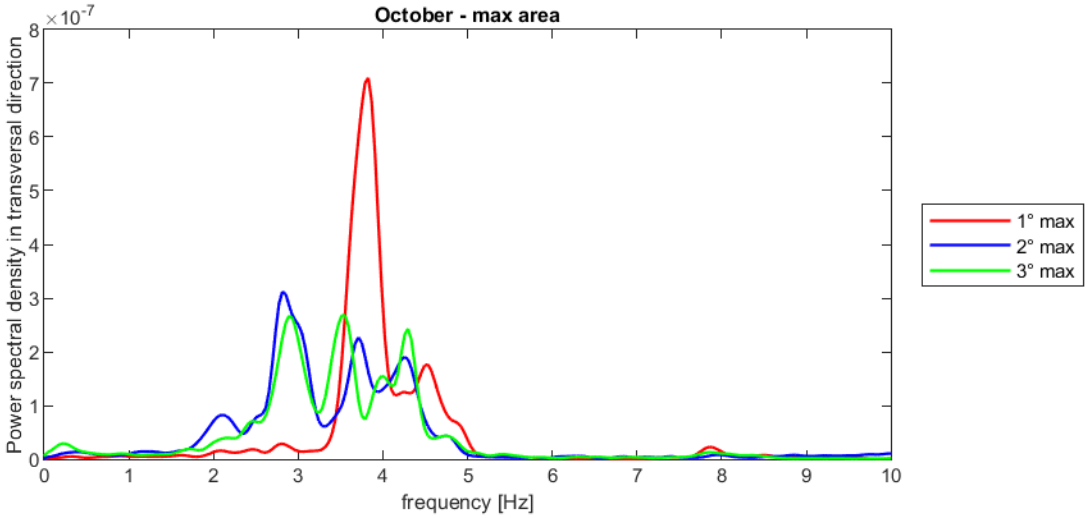


Figure 12-119: Results obtained from the 3 accelerograms with maximum area of PSD

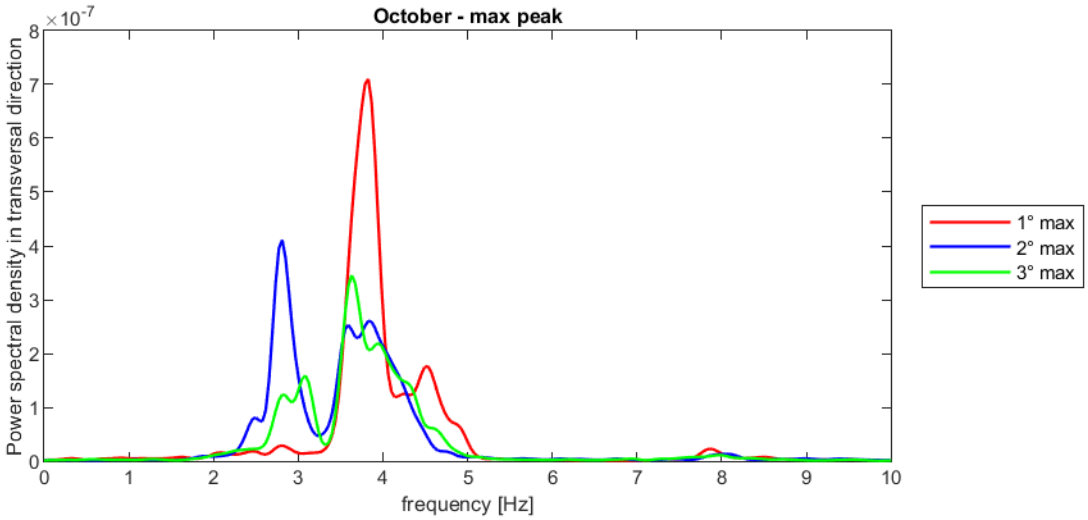


Figure 12-120: Results obtained from the 3 accelerograms with highest peak if PSD

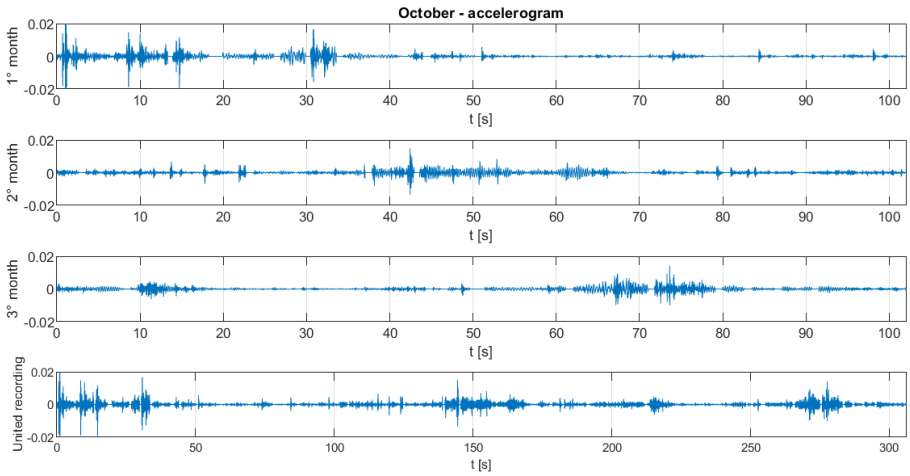


Figure 12-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

12.11 November

The results obtained for the November dataset are shown in the following tables.

Table 12-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-11-06_17-00-21	1.71E-04
	2°	319BC_2023-11-14_10-00-20	1.63E-04
	3°	319BC_2023-11-28_11-00-20	1.62E-04
Longitudinal direction (y)	1°	319BC_2023-11-06_17-00-21	9.85E-04
	2°	319BC_2023-11-14_10-00-20	9.59E-04
	3°	319BC_2023-11-07_15-00-21	9.46E-04
Transverse direction (z)	1°	319BC_2023-11-06_17-00-21	8.06E-04
	2°	319BC_2023-11-07_17-00-21	6.71E-04
	3°	319BC_2023-11-10_08-00-20	6.42E-04

Table 12-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-11-14_10-00-20	5.09E-08	319BC_2023-11-06_17-00-21	4.48E-09
2	319BC_2023-11-28_11-00-20	3.19E-08	319BC_2023-11-14_10-00-20	4.46E-09
3	319BC_2023-11-23_09-00-20	2.60E-08	319BC_2023-11-28_11-00-20	4.06E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-11-14_10-00-20	2.17E-06	319BC_2023-11-06_17-00-21	2.10E-07
2	319BC_2023-11-28_11-00-20	1.62E-06	319BC_2023-11-14_10-00-20	2.04E-07
3	319BC_2023-11-06_17-00-21	1.21E-06	319BC_2023-11-28_11-00-20	1.77E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-11-06_17-00-21	8.41E-07	319BC_2023-11-06_17-00-21	1.33E-07
2	319BC_2023-11-28_11-00-20	6.91E-07	319BC_2023-11-07_17-00-21	9.46E-08
3	319BC_2023-11-23_09-00-20	5.82E-07	319BC_2023-11-28_11-00-20	8.53E-08

Table 12-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	B	A	A	A	A
2	B	C	B	B	C	B	D	C	D
3	C	-	C	-	A	C	-	-	C

12.11.1 Vertical direction (x)

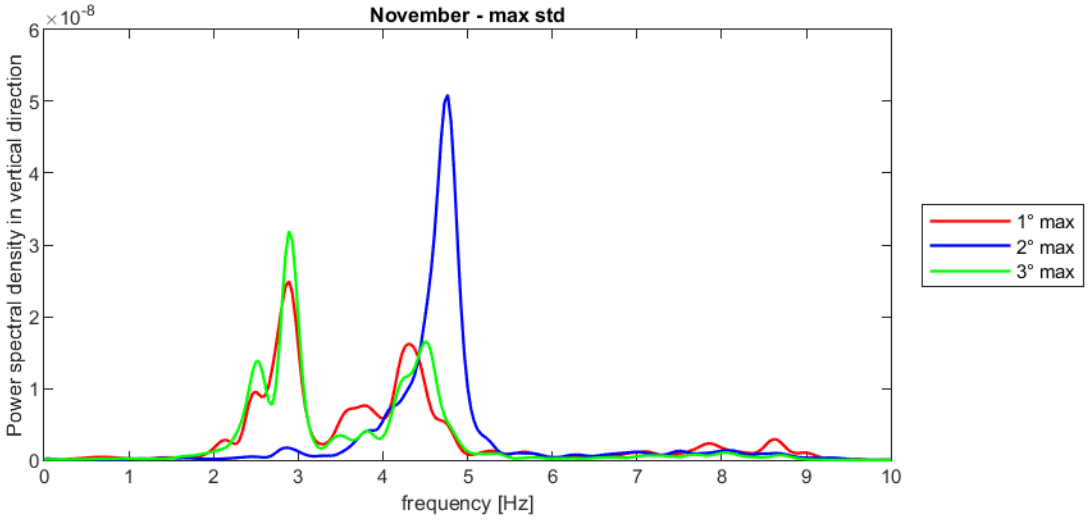


Figure 12-122: Results obtained from the 3 accelerograms with maximum SD in time domain

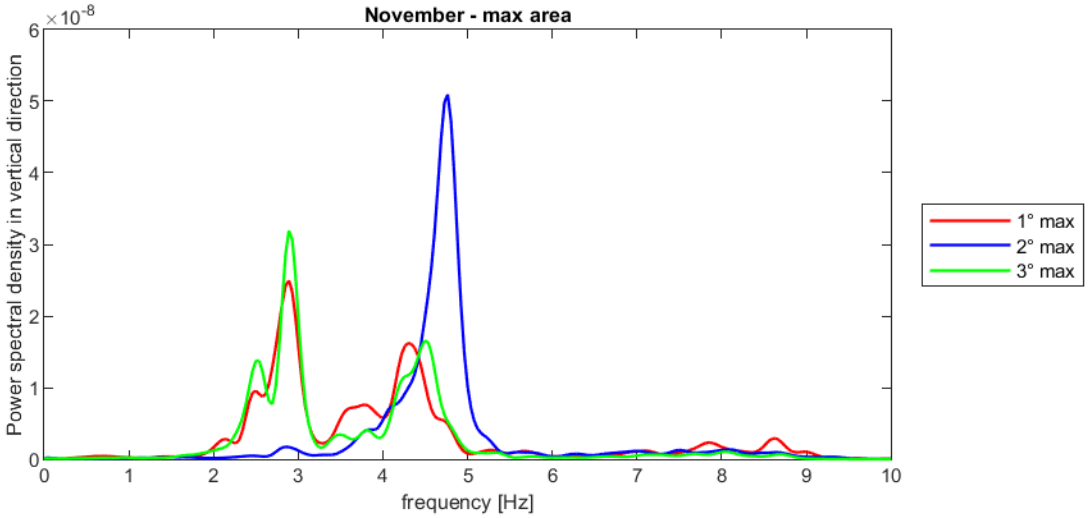


Figure 12-123: Results obtained from the 3 accelerograms with maximum area of PSD

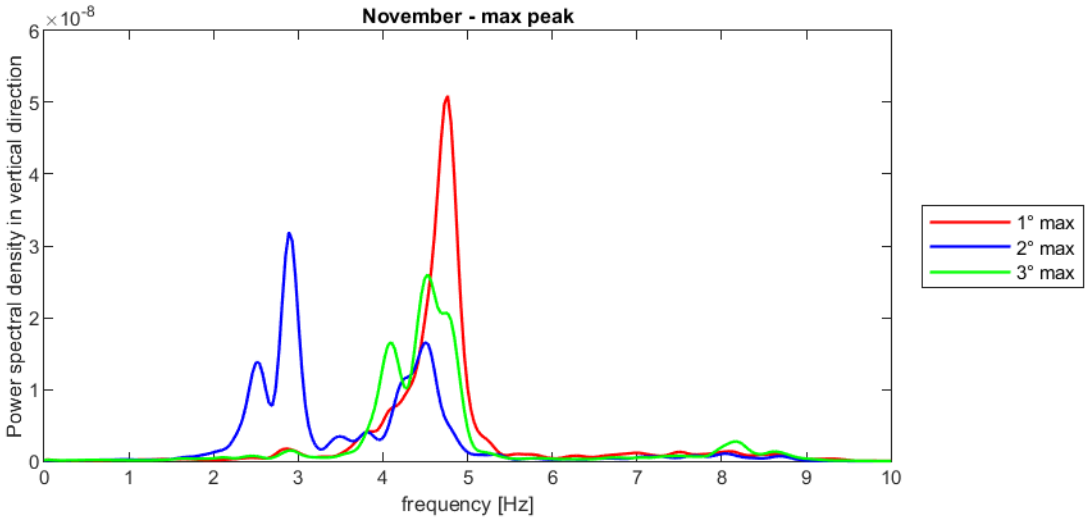


Figure 12-124: Results obtained from the 3 accelerograms with highest peak if PSD

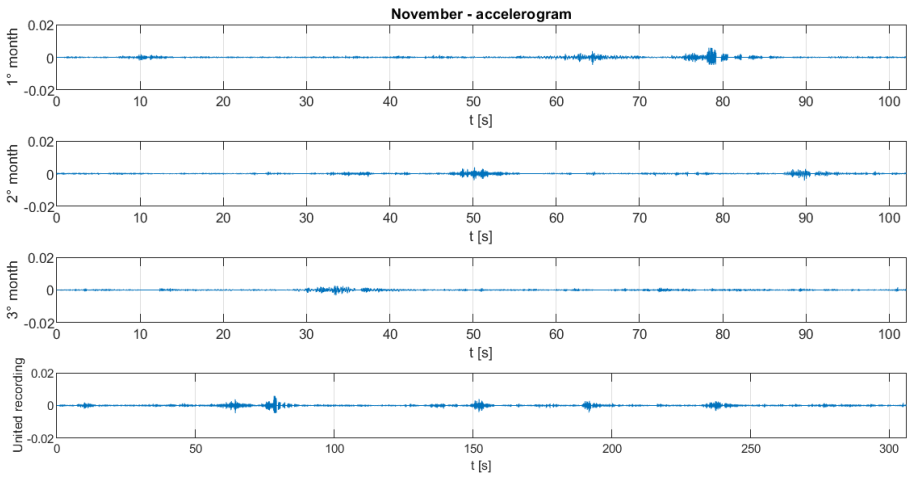


Figure 12-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.11.2 Longitudinal direction (y)

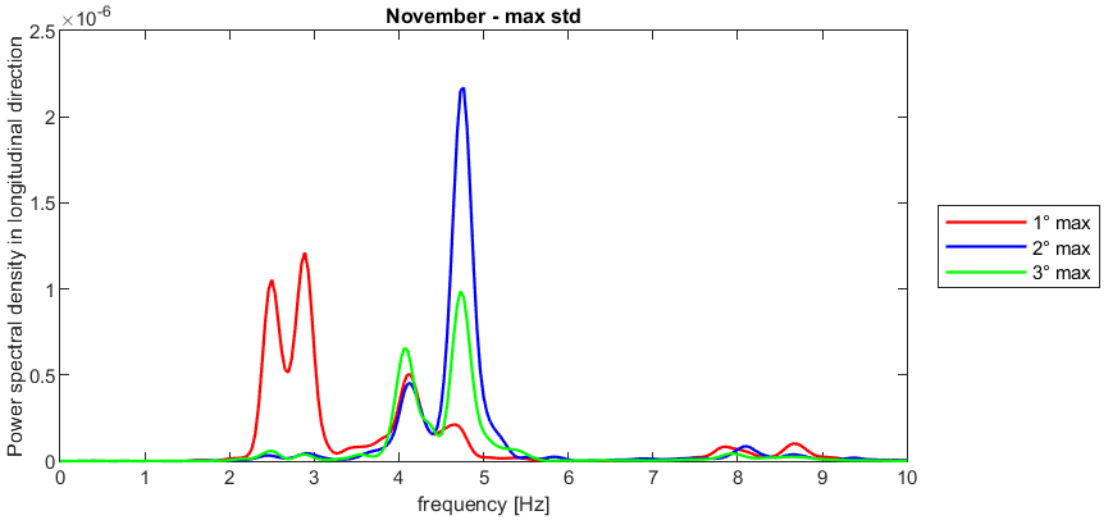


Figure 12-126: Results obtained from the 3 accelerograms with maximum SD in time domain

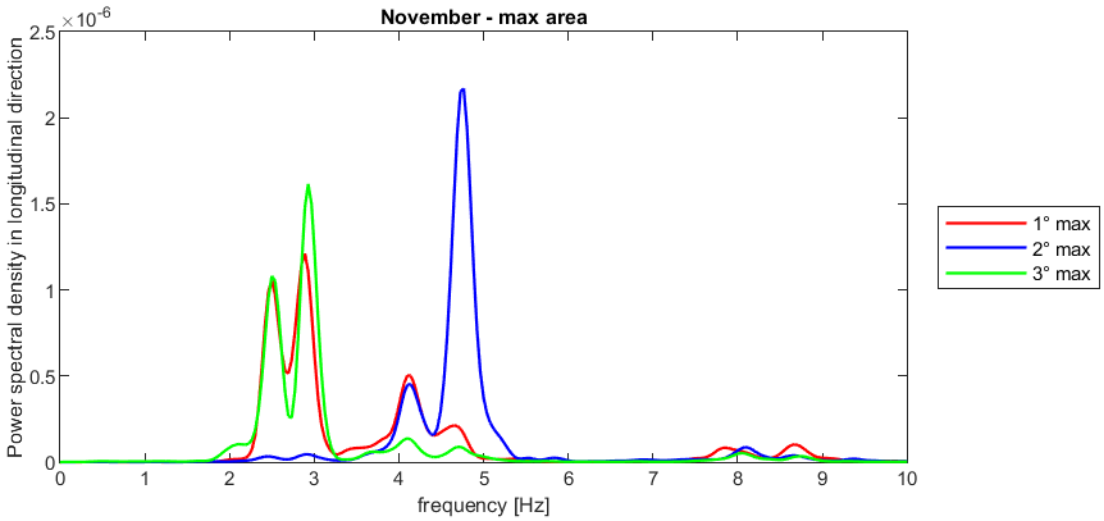


Figure 12-127: Results obtained from the 3 accelerograms with maximum area of PSD

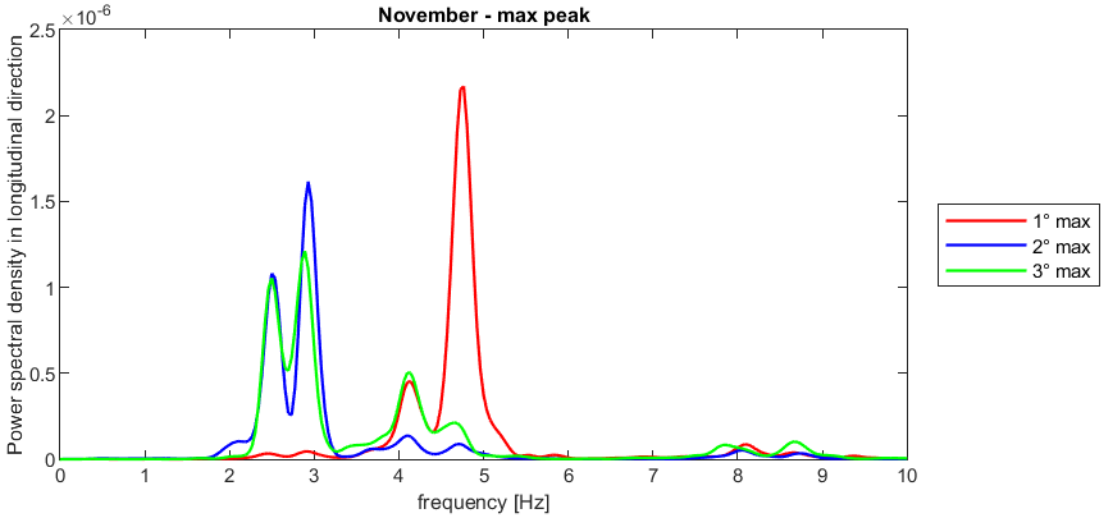


Figure 12-128: Results obtained from the 3 accelerograms with highest peak if PSD

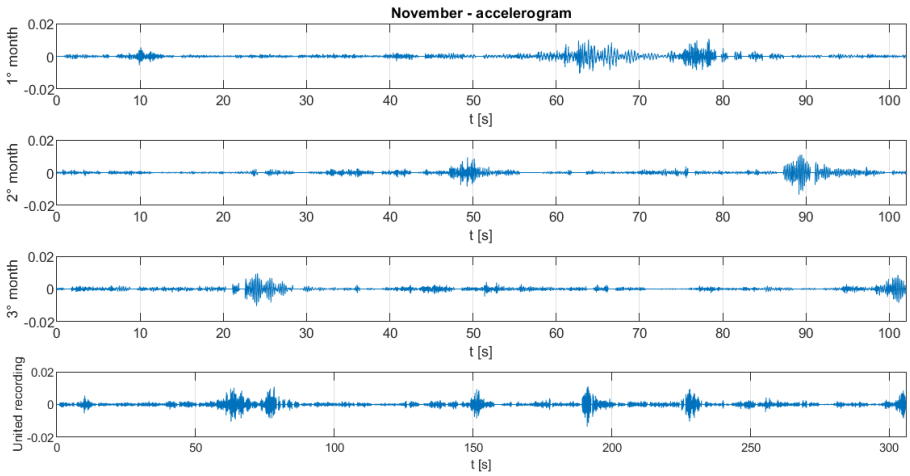


Figure 12-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

12.11.3 Transverse direction (z)

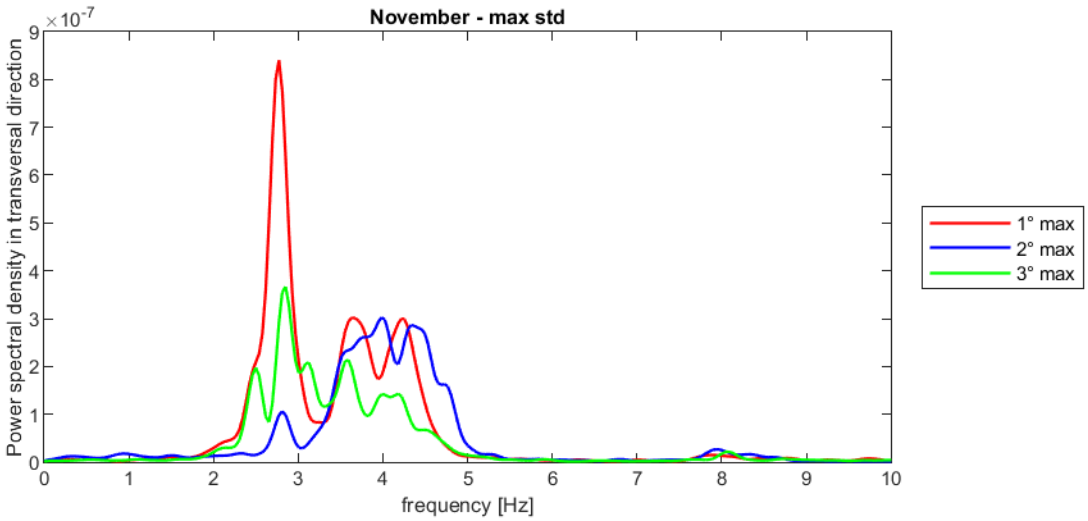


Figure 12-130: Results obtained from the 3 accelerograms with maximum SD in time domain

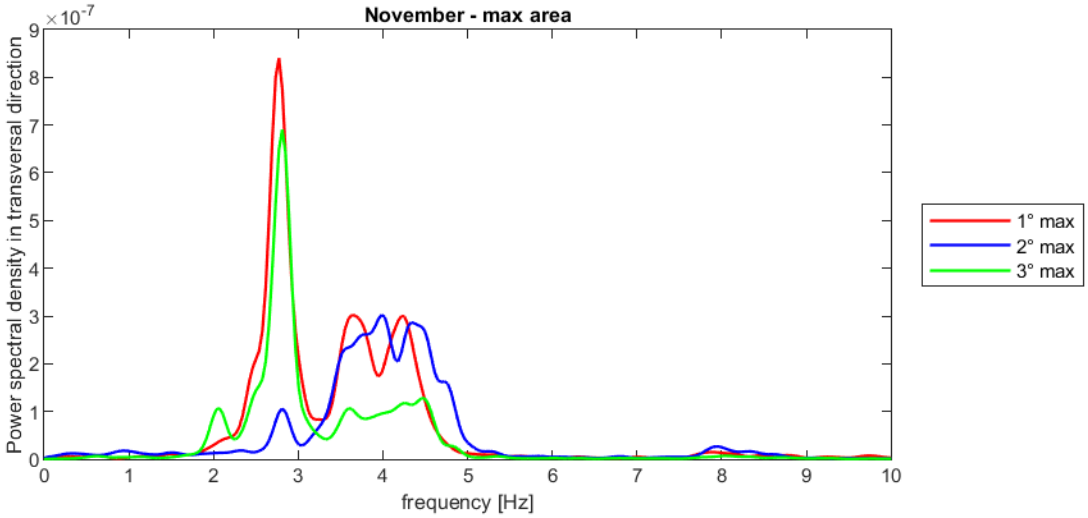


Figure 12-131: Results obtained from the 3 accelerograms with maximum area of PSD

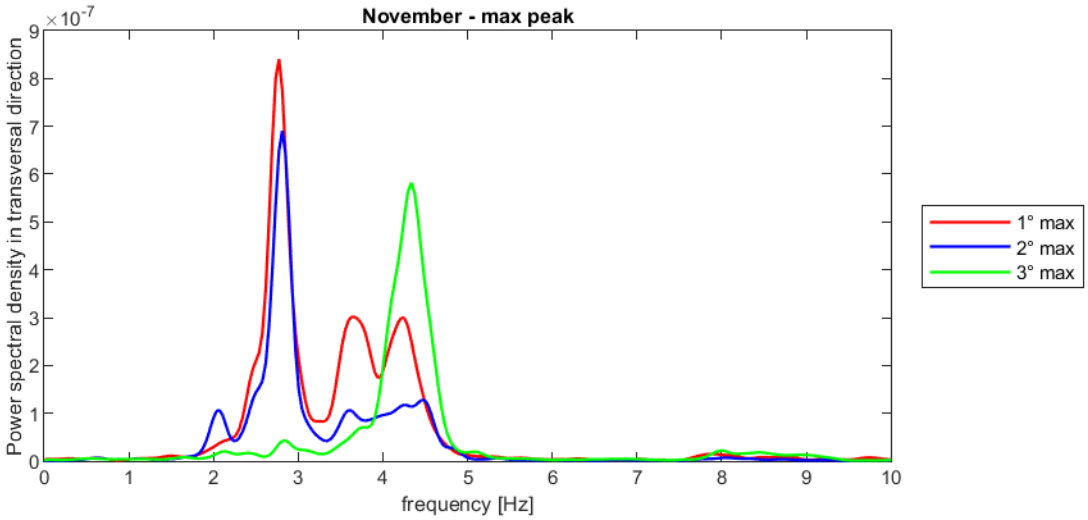


Figure 12-132: Results obtained from the 3 accelerograms with highest peak if PSD

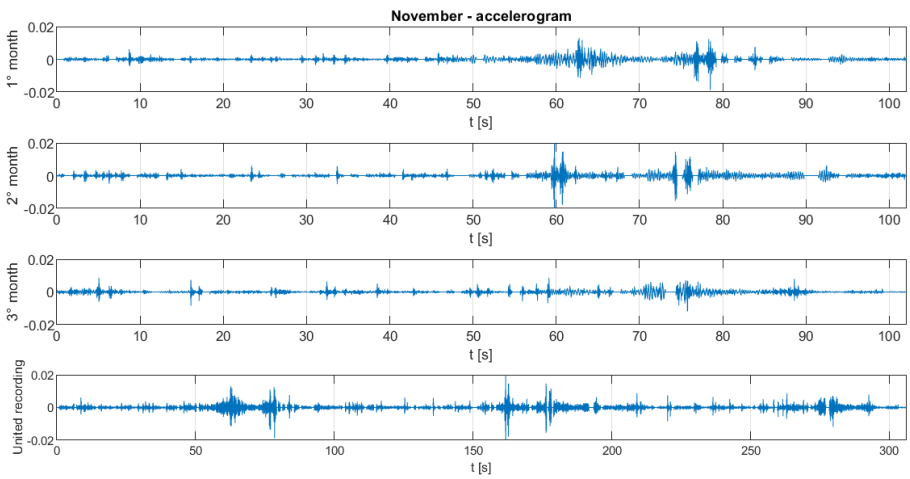


Figure 12-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

12.12 December

The results obtained for the December dataset are shown in the following tables.

Table 12-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319BC_2023-12-06_10-00-19	2.36E-04
	2°	319BC_2023-12-18_08-00-20	1.81E-04
	3°	319BC_2023-12-11_14-00-20	1.73E-04
Longitudinal direction (y)	1°	319BC_2023-12-18_08-00-20	1.33E-03
	2°	319BC_2023-12-06_10-00-19	1.31E-03
	3°	319BC_2023-12-11_14-00-20	1.25E-03
Transverse direction (z)	1°	319BC_2023-12-06_10-00-19	7.97E-04
	2°	319BC_2023-12-13_08-00-21	7.02E-04
	3°	319BC_2023-12-28_09-00-19	6.59E-04

Table 12-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-12-06_10-00-19	8.21E-08	319BC_2023-12-06_10-00-19	8.68E-09
2	319BC_2023-12-11_14-00-20	5.32E-08	319BC_2023-12-18_08-00-20	5.22E-09
3	319BC_2023-12-09_11-00-22	4.56E-08	319BC_2023-12-11_14-00-20	4.86E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-12-18_08-00-20	4.01E-06	319BC_2023-12-18_08-00-20	3.74E-07
2	319BC_2023-12-11_14-00-20	3.93E-06	319BC_2023-12-06_10-00-19	3.48E-07
3	319BC_2023-12-06_10-00-19	1.87E-06	319BC_2023-12-11_14-00-20	3.36E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319BC_2023-12-28_09-00-19	6.13E-07	319BC_2023-12-06_10-00-19	1.24E-07
2	319BC_2023-12-18_08-00-20	4.93E-07	319BC_2023-12-13_08-00-21	1.03E-07
3	319BC_2023-12-13_08-00-21	4.52E-07	319BC_2023-12-28_09-00-19	8.72E-08

Table 12-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	B	B	A	E	A
2	B	C	B	A	C	A	D	-	D
3	C	-	C	C	A	C	E	D	E

12.12.1 Vertical direction (x)

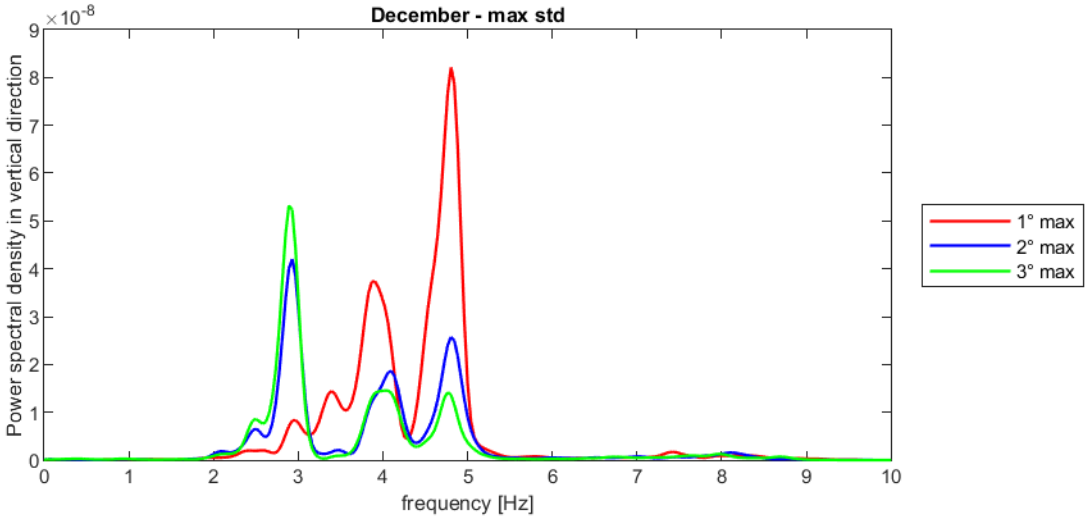


Figure 12-134: Results obtained from the 3 accelerograms with maximum SD in time domain

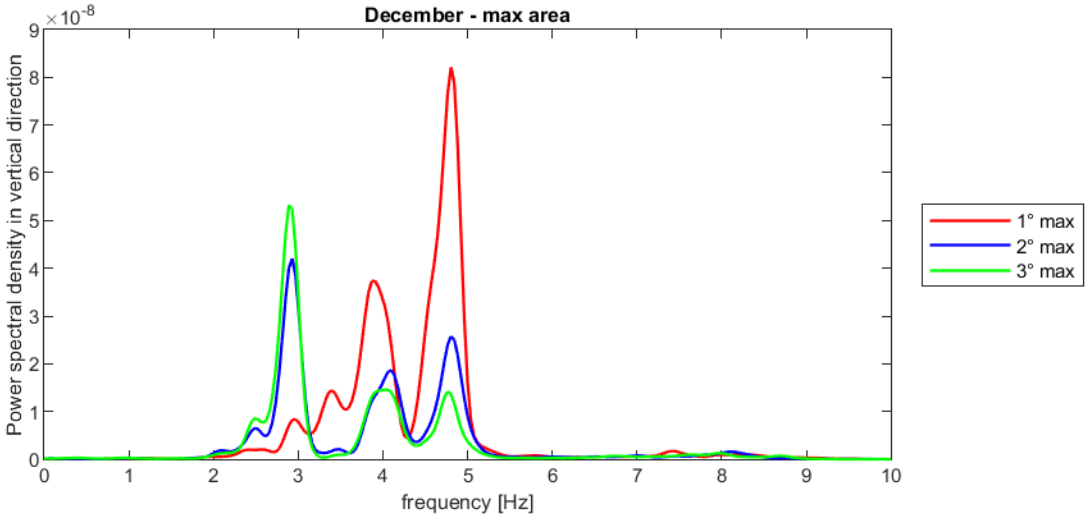


Figure 12-135: Results obtained from the 3 accelerograms with maximum area of PSD

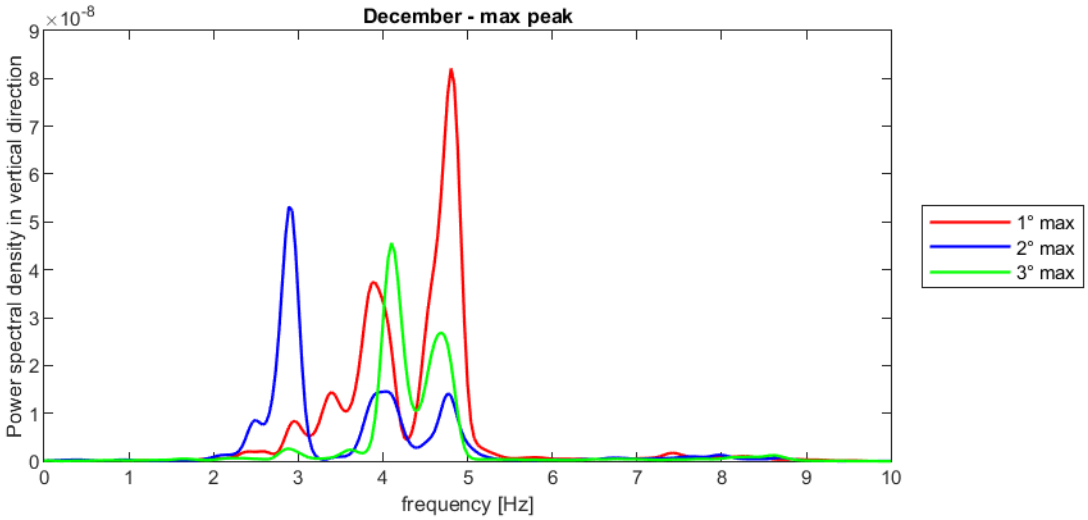


Figure 12-136: Results obtained from the 3 accelerograms with highest peak if PSD

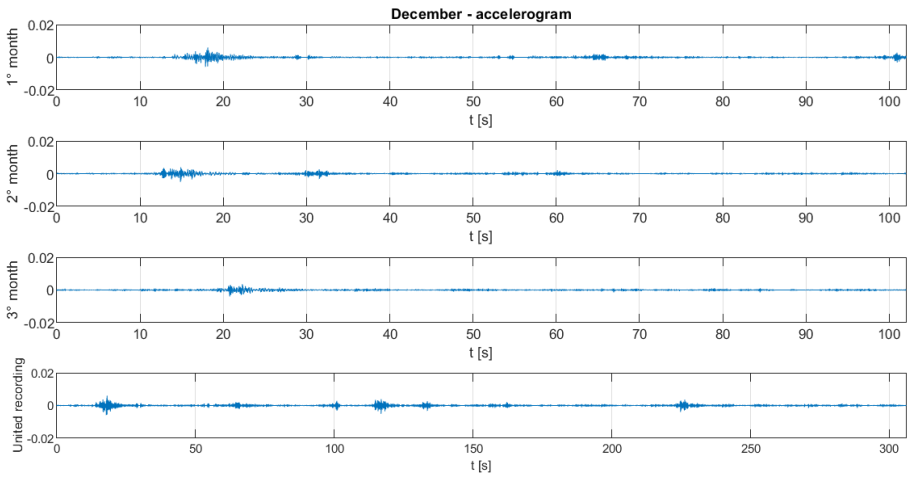


Figure 12-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

12.12.2 Longitudinal direction (y)

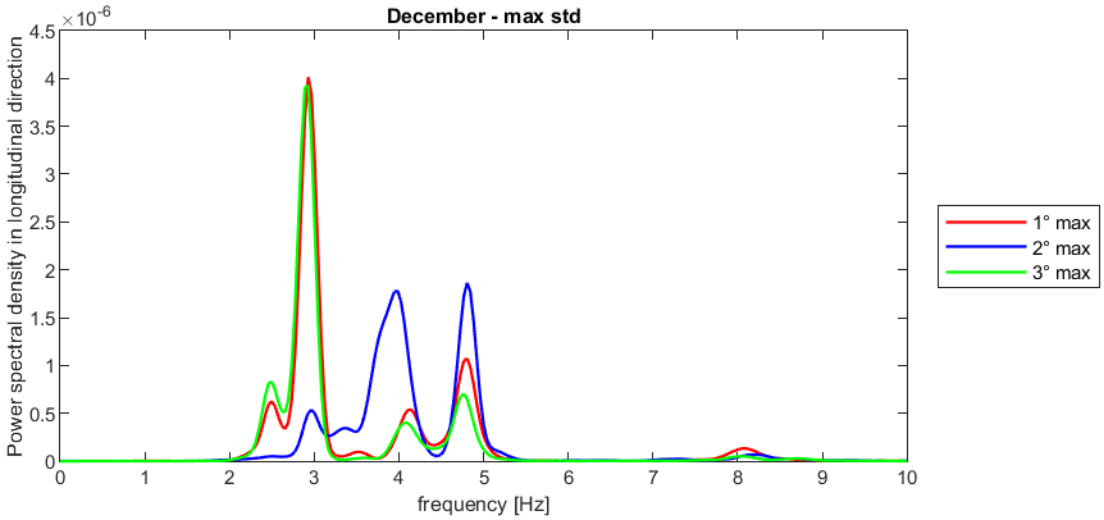


Figure 12-138: Results obtained from the 3 accelerograms with maximum SD in time domain

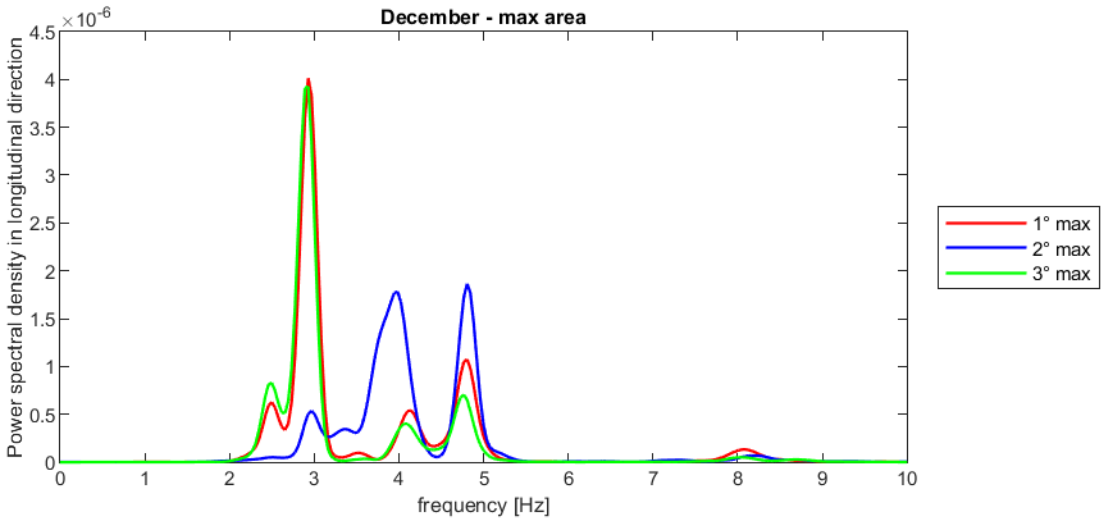


Figure 12-139: Results obtained from the 3 accelerograms with maximum area of PSD

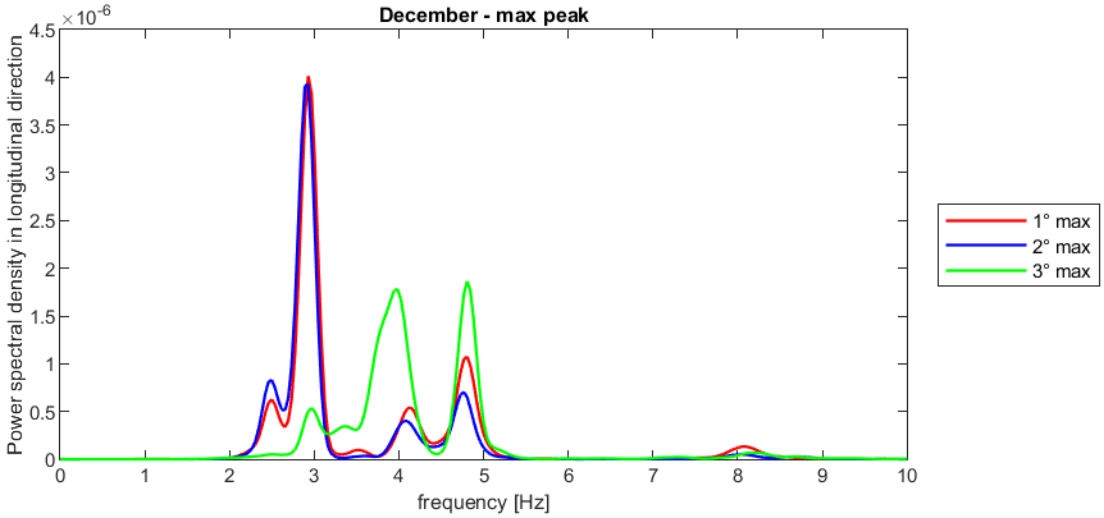


Figure 12-140: Results obtained from the 3 accelerograms with highest peak if PSD

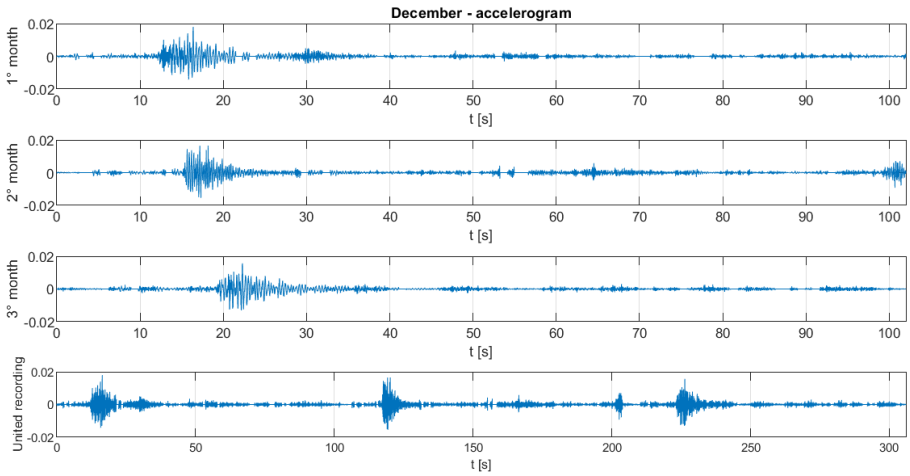


Figure 12-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

12.12.3 Transverse direction (z)

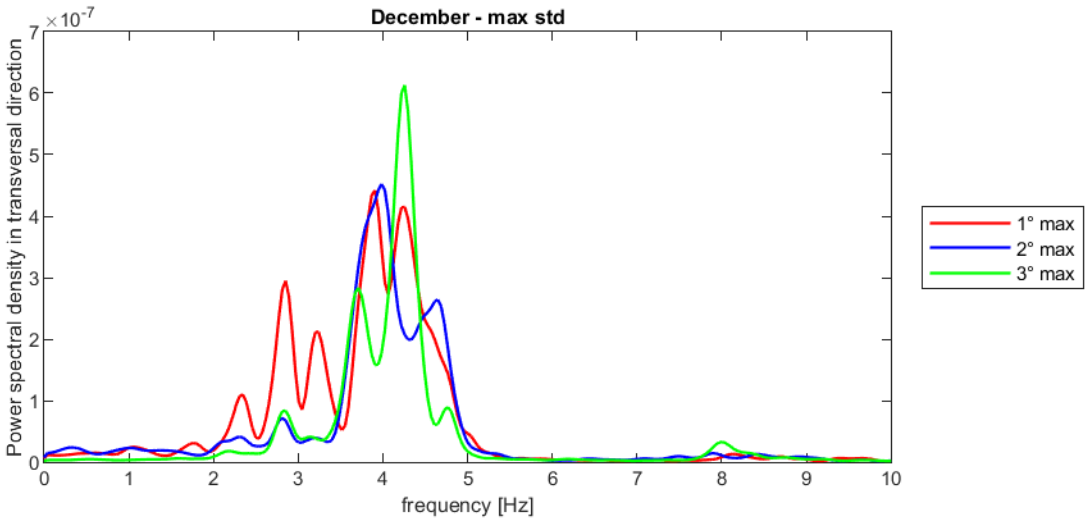


Figure 12-142: Results obtained from the 3 accelerograms with maximum SD in time domain

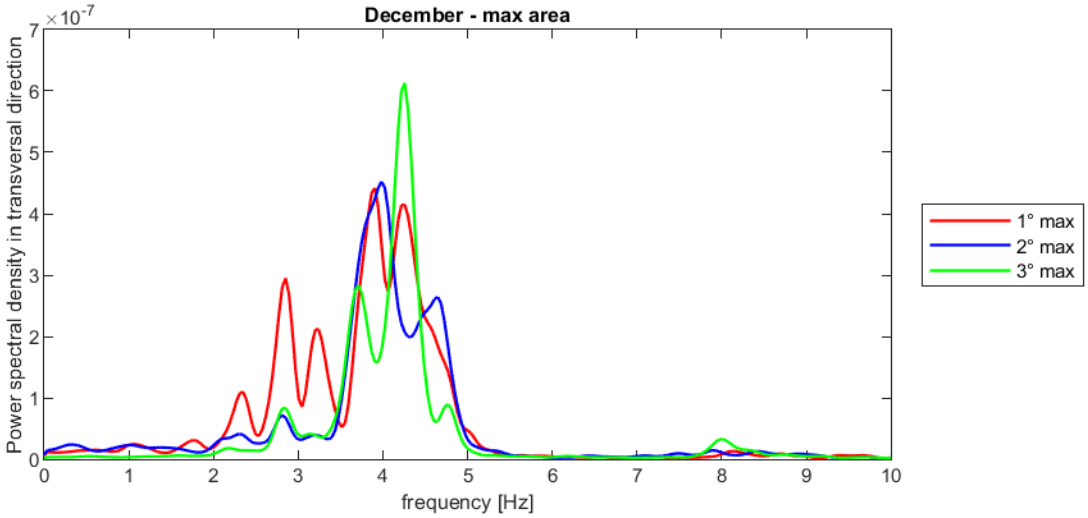


Figure 12-143: Results obtained from the 3 accelerograms with maximum area of PSD

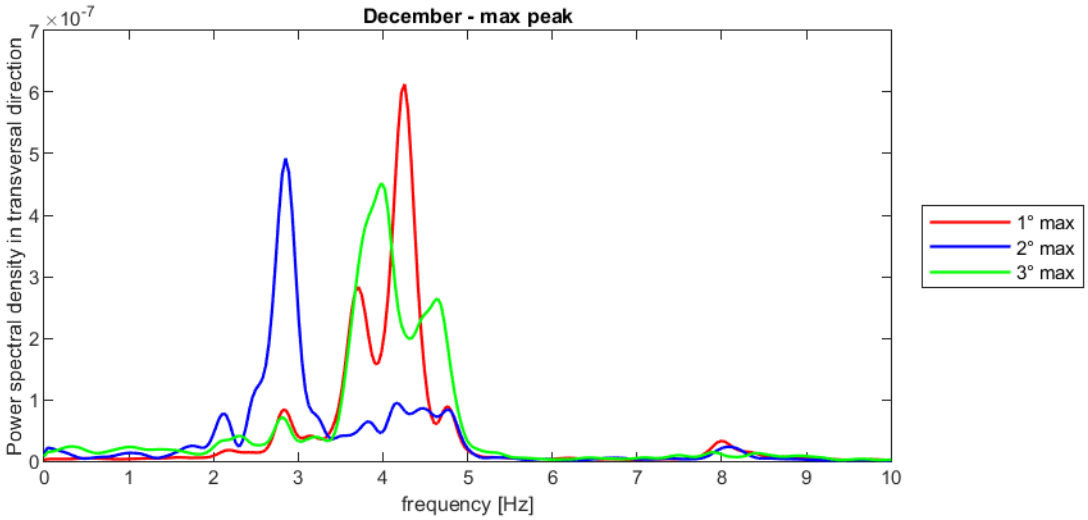


Figure 12-144: Results obtained from the 3 accelerograms with highest peak if PSD

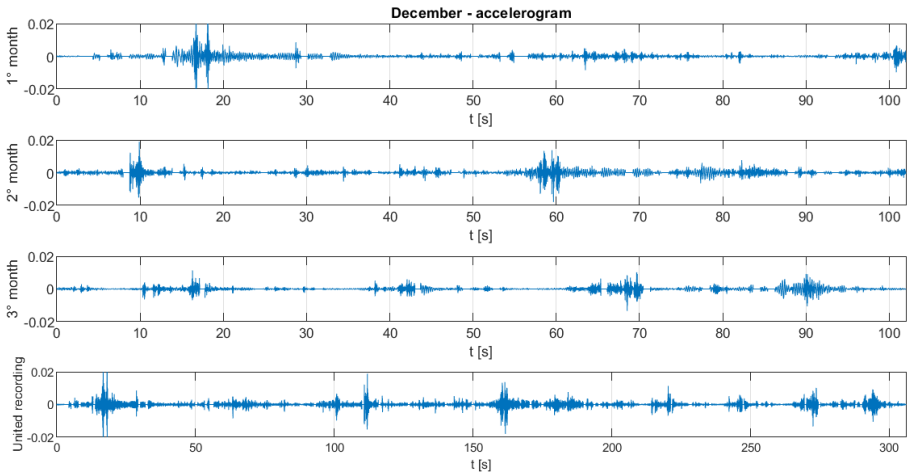


Figure 12-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

12.13 Analysis of the complete 2023 year

All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

Table 12-37: Main identified frequencies for sensor 319BC – bridge 223 – Sp2

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	39	90	101	105	62	83	100	90	49	105	93	82
	MEAN	**2.33**	**2.84**	**3.98**	**4.71**	**2.45**	**2.87**	**4.05**	**4.72**	**2.25**	**2.81**	**3.74**	**4.41**
	SD	0.17	0.06	0.14	0.12	0.04	0.06	0.08	0.07	0.14	0.05	0.18	0.19
	C.o.V.	7.1%	2.1%	3.6%	2.5%	1.8%	2.1%	1.9%	1.5%	6.1%	1.9%	4.7%	4.2%
	Rating	**26%**	**84%**	**84%**	**95%**	**59%**	**78%**	**95%**	**89%**	**34%**	**100%**	**71%**	**65%**
1	gen-23	2.14	2.85	4.14	4.8	2.38	2.93	4.14	4.8	2.3	2.81	3.83	4.35
2	gen-23	2.38	2.89	4.14	4.8			4.1	4.84	1.95	2.85	4.01	4.65
3	gen-23		2.93	4.1	4.8		2.93	4.1	4.77	2.34	2.89	3.98	
1	gen-23		2.85	4.14	4.8	2.38	2.93	4.14	4.8		2.81	3.83	4.39
2	gen-23	2.34	2.89	4.14	4.8			4.14	4.84		2.85	3.98	4.65
3	gen-23		2.93	4.1	4.8		2.93	4.1	4.77	2.34	2.85	3.98	4.45
1	gen-23		2.93	4.14	4.77	2.38	2.93	4.14	4.8	2.5	2.85	3.83	
2	gen-23	2.38	2.89	4.14	4.8		2.93	4.14	4.77		2.85	3.9	4.53
3	gen-23		2.93	4.1	4.8			4.1	4.84	2.3	2.89	3.98	
1	feb-23		2.89	3.83	4.73	2.46		4.06	4.8	2.34	2.89	3.83	4.77
2	feb-23		2.81	4.06	4.8	2.46	2.89	3.91	4.77		2.77	3.98	
3	feb-23		2.81	3.83	4.73	2.5	2.93	4.06	4.73		2.77	3.98	
1	feb-23		2.89	3.83	4.8	2.46		4.06	4.8	2.34	2.85	3.83	4.77
2	feb-23		2.85	4.06	4.8	2.46	2.89	3.91	4.77		2.81	3.98	
3	feb-23		2.85	3.79	4.8	2.5	2.93	4.1	4.73		2.81	4.02	
1	feb-23		2.85	4.06	4.8	2.46	2.89	4.06	4.73	2.34	2.85	3.83	4.76
2	feb-23		2.89	3.83	4.77	2.46	2.89	3.91	4.77		2.81	4.01	
3	feb-23		2.85	3.83	4.8	2.46		4.06	4.8		2.81	4.02	4.72
1	mar-23	2.38	2.81	3.79	4.69	2.42	2.85	4.02	4.69	2.19	2.93	3.79	4.29
2	mar-23		2.93	3.67	4.65	2.46		3.71	4.69	2.46	2.81	3.63	4.34
3	mar-23	2.46	2.85	4.1	4.73	2.46	2.89	4.06	4.73		2.85	3.67	
1	mar-23	2.38	2.81	3.79	4.69	2.42	2.85	4.02	4.69	2.18	2.93	3.79	4.29
2	mar-23		2.93	3.67	4.69	2.46		3.71	4.69	2.39	2.81	3.63	4.34
3	mar-23	2.46	2.85	4.06	4.73	2.46	2.89	4.06	4.73		2.85	3.67	
1	mar-23	2.42	2.81	3.79	4.69	2.42	2.85	4.02	4.69	2.18	2.93	3.79	4.29
2	mar-23			4.06	4.73	2.46		3.71	4.69		2.81	3.63	4.34
3	mar-23		2.93	3.67	4.65	2.38		4.06	4.69	2.18	2.77		
1	apr-23	2.51	2.89	4.1	4.8	2.5	2.89		4.77	2.46	2.89	3.55	
2	apr-23			4.06	4.8			4.1	4.8		2.81		4.29
3	apr-23		2.81	3.9	4.65		2.85	4.02	4.65		2.81	3.98	
1	apr-23	2.54	2.89	4.1	4.77	2.5	2.89		4.77	2.46	2.89	3.55	4.29
2	apr-23		2.77	3.87	4.65				4.8		2.85		4.29
3	apr-23			4.06	4.8		2.85	4.02			2.77	3.82	

1	apr-23	2.5	2.89	4.1	4.77	2.5	2.89		4.77	2.46	2.77	3.52	4.29
2	apr-23		2.85		4.69		2.85	4.1	4.69		2.89	3.55	4.29
3	apr-23		2.73	4.17	4.65		2.81	4.02	4.65		2.77	3.82	4.34
1	mag-23	2.42	2.85	4.02	4.88	2.42	2.85	4.02		2.38	2.77	3.55	4.73
2	mag-23	2.1	2.85	4.06	4.65	2.38	2.85	4.02	4.65	2.1	2.77		
3	mag-23			4.1	4.69		2.85	4.02	4.73		2.77	3.55	
1	mag-23	2.42	2.82	4.02	4.88	2.42	2.81	4.02		2.38	2.77	3.55	4.73
2	mag-23	2.07	2.82	4.02	4.65	2.38	2.81	4.06	4.65	2.11	2.77	4.01	
3	mag-23			4.1	4.73		2.85	4.06	4.73		2.77	3.78	4.34
1	mag-23	2.42	2.81	4.02	4.84	2.42	2.81	4.02		2.38	2.77	3.55	4.73
2	mag-23	2.07	2.81	4.1	4.65	2.42	2.81	4.06	4.65	2.11	2.77	4.01	4.34
3	mag-23			4.1	4.73			4.06	4.73		2.77	3.51	4.34
1	giu-23		2.77	3.87	4.53		2.66	4.02	4.65		2.77	3.48	4.1
2	giu-23			3.75	4.73	2.46	2.89	3.98	4.69		2.77	3.71	4.69
3	giu-23			3.48	4.69		2.89	4.06	4.69	2.23	2.77	3.67	4.3
1	giu-23		2.77	3.87	4.53		2.66	4.1	4.65		2.77	3.48	4.1
2	giu-23		2.93	3.74	4.73	2.42	2.85	3.98	4.69		2.77	3.71	4.65
3	giu-23	2.46	2.77	4.1	4.96		2.85	4.1	4.69	2.18	2.73	3.63	4.3
1	giu-23		2.77	3.87	4.53		2.66	4.06	4.65		2.77	3.48	4.1
2	giu-23			3.75	4.73	2.42		4.1		2.18	2.77	3.63	4.29
3	giu-23		2.85	4.06	4.73		2.85	4.06	4.69		2.73	3.71	4.68
1	lug-23	2.07	2.81	4.06	4.69		2.85	4.02	4.65	2.11	2.77	3.4	4.26
2	lug-23	2.38	2.73	4.1			2.81			2.3	2.81		4.14
3	lug-23	2.34	2.77	4.06	4.8	2.38		4.1			2.73		4.26
1	lug-23	2.34	2.73	4.1			2.85	4.02	4.65	2.1	2.77	3.4	4.26
2	lug-23	2.07	2.81	4.02	4.69		2.81			2.3	2.81		4.26
3	lug-23	2.3	2.77	4.02	4.84	2.38	3.01	4.1			2.73		4.14
1	lug-23	2.07	2.81	4.06	4.69		2.85	4.02	4.65	2.07	2.77	3.4	4.26
2	lug-23	2.38	2.73	4.1			2.81			2.3	2.81		4.14
3	lug-23	2.34	2.77	4.06	4.84	2.38		4.1			2.73		4.26
1	ago-23	2.34	2.73	4.02	4.49	2.46	2.85	4.02	4.65	2.34	2.73	3.59	4.53
2	ago-23	1.95	2.77	4.06	4.69	2.38	2.89	4.06	4.49		2.77		4.61
3	ago-23		2.85	3.83	4.77	2.46		4.06	4.69		2.77	3.87	
1	ago-23	2.34	2.77	4.02	4.49	2.46	2.85	4.02	4.65	2.3	2.77	3.59	4.53
2	ago-23	1.95	2.89	4.06	4.69	2.34	2.85	4.06	4.53		2.77	3.98	4.61
3	ago-23	2.38	2.81	3.83	4.77	2.46		4.06	4.65		2.77	3.86	
1	ago-23	2.3	2.77	4.02	4.49	2.34	2.85	4.06	4.49	2.3	2.77	3.59	4.53
2	ago-23			4.1	5	2.42	2.89	4.1			2.77	3.83	4.22
3	ago-23		2.81	4.02	4.69		2.85	4.1			2.73	3.83	
1	set-23		2.85	3.98	4.38		2.85	4.02	4.61	2.1	2.81	3.52	4.3
2	set-23		2.77	3.83	4.73	2.46	2.81	4.02	4.69		2.77	3.63	4.61
3	set-23		2.81	4.1	4.73		2.89	4.06	4.69	2.18	2.77	3.55	
1	set-23		2.85	4.02	4.68		2.85	4.02	4.61		2.77	3.52	4.3
2	set-23		2.81	4.1	4.73	2.46	2.81	4.02	4.69		2.77	3.59	4.61
3	set-23		2.77	3.83	4.69		2.85	4.06	4.69	2.23	2.77	3.55	
1	set-23		2.85	4.02	4.38		2.85	4.02	4.61		2.77	3.59	4.61
2	set-23		2.81	4.1	4.73		2.89	4.06	4.69	2.1	2.77	3.52	4.3
3	set-23		2.77	3.83	4.69				4.69	2.1	2.77	3.79	4.26
1	ott-23		2.89	4.02	4.77	2.46	2.89	4.06	4.77	2.07	2.81	3.71	4.26

2	ott-23		2.85	3.79	4.73		2.85	3.95	4.69			3.83	
3	ott-23			4.02	4.73			4.02	4.73		2.81	3.83	4.53
1	ott-23		2.89	4.06	4.77	2.46	2.89	4.06	4.73			3.83	4.53
2	ott-23		2.85	3.71	4.77		2.85	3.98	4.69	2.07	2.81	3.71	4.26
3	ott-23			3.79	4.77			4.02	4.69		2.89	3.52	4.3
1	ott-23			4.02	4.73	2.46	2.89	4.06	4.77			3.83	4.53
2	ott-23		2.89	4.02	4.77	2.46	2.85	4.06			2.81	3.83	
3	ott-23			3.98	4.73	2.46	2.85	4.06	4.73		3.08	3.63	
1	nov-23		2.89		4.3	2.5	2.89	4.1			2.77	3.63	4.26
2	nov-23				4.77			4.14	4.77		2.81	3.98	4.34
3	nov-23	2.5	2.89		4.53			4.06	4.73	2.5	2.85	3.59	
1	nov-23		2.89	3.75	4.3	2.5	2.89	4.1	4.65		2.77	3.63	4.26
2	nov-23				4.77			4.1	4.77		2.81	3.98	4.38
3	nov-23	2.53	2.89	3.83	4.53	2.5	2.93	4.1		2.07	2.81		4.45
1	nov-23				4.77			4.14	4.77		2.77	3.63	4.26
2	nov-23	2.5	2.89		4.53	2.5	2.93	4.06		2.07	2.81		4.45
3	nov-23			4.1	4.53	2.5	2.89	4.1			2.85		4.34
1	dic-23		2.93	3.87	4.8	2.5	2.93	4.1	4.8	2.34	2.85	3.87	4.26
2	dic-23	2.5	2.93	4.06	4.8		2.97	3.98	4.8		2.81	3.98	4.65
3	dic-23		2.89	4.06	4.77	2.5	2.93	4.1	4.77		2.81	3.71	4.26
1	dic-23		2.97	3.91	4.8	2.5	2.93	4.1	4.8	2.34	2.85	3.9	4.26
2	dic-23	2.5	2.93	4.1	4.8		2.97	3.98	4.8		2.81	3.98	4.65
3	dic-23		2.89	4.02	4.77	2.46	2.93	4.1	4.77		2.81	3.71	4.26
1	dic-23		2.97	3.91	4.8	2.5	2.93	4.14	4.8		2.85	3.71	4.29
2	dic-23		2.89	3.98	4.77	2.5	2.93	4.1	4.73	2.1	2.85		4.71
3	dic-23		2.85	4.1	4.69		2.97	3.95	4.8		2.81	3.98	4.65

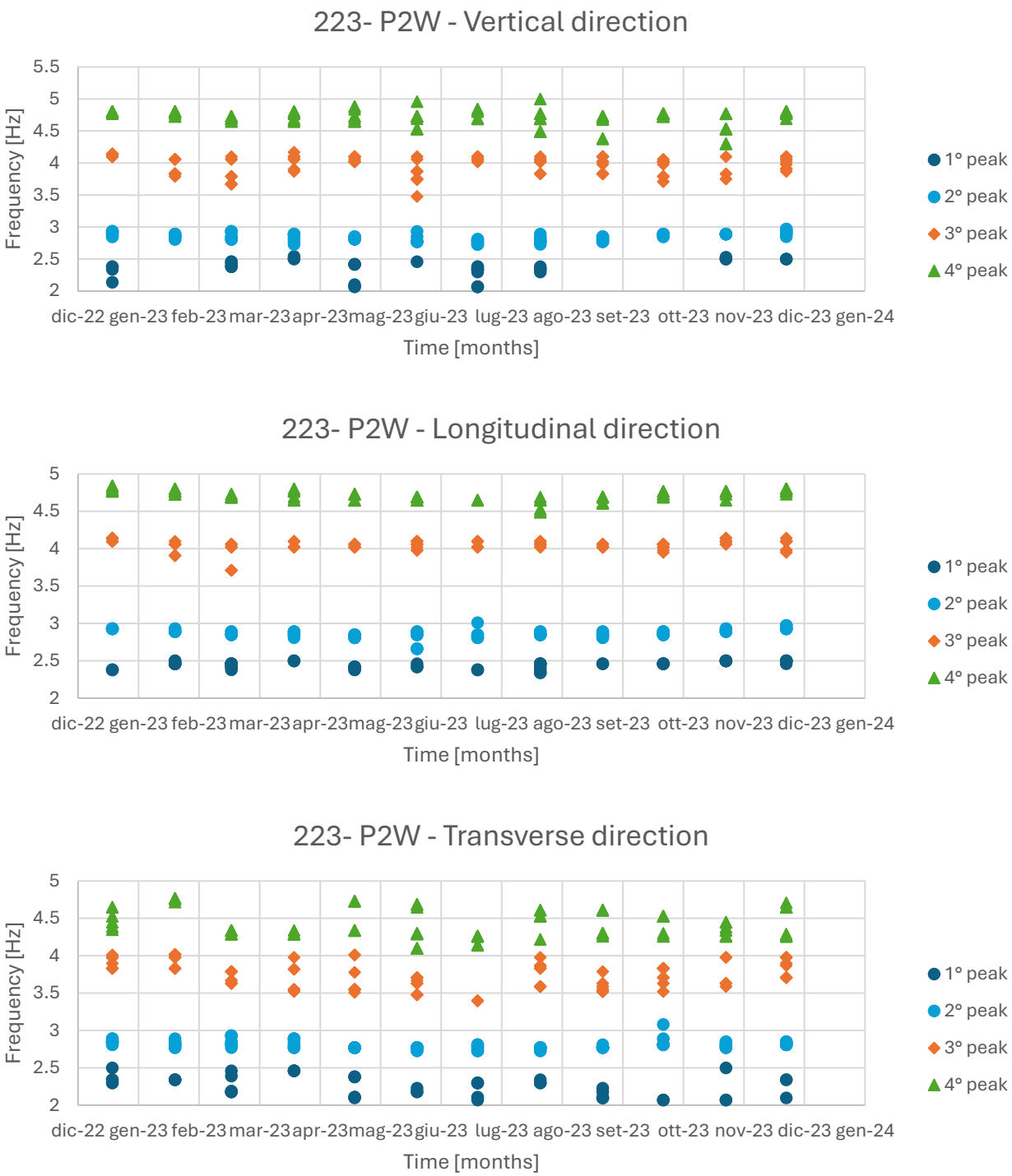


Figure 12-146: Main identified frequencies for sensor 319BC – bridge 223 – Sp2

13. Annex 13 – Bridge 223 – Pile 2E - Sensor 319E3

The Bridge 223 counts 2 monitored decks: span 2 and span 6 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 2 are:

- 2BE0F – situated in the midspan;
- 2BA63 – situated at a distance of L/4;
- 31205 – situated at a distance of L/8;
- 319BC – situated nearby the vest pilar;
- 319E3 – situated nearby the east pilar.

The sensors present on deck number 6 are:

- 2B5E7 – situated in the midspan;
- 2BCF9 – situated at a distance of L/4 of the deck;
- 2BCAD – situated at a distance of L/8 of the deck;

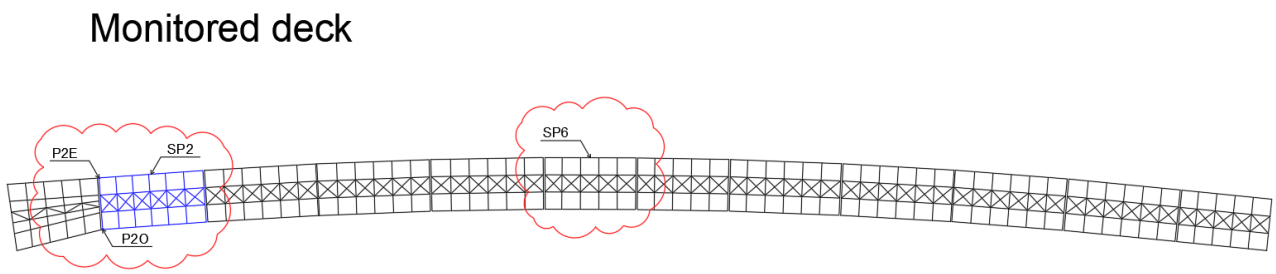


Figure 13-1 Monitored decks of 223 bridge

The accelerograms of the 319E3 sensor have been analyzed and the results are represented in the following paragraphs.

13.1 January

The results obtained for the January dataset are shown in the following tables.

Table 13-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-01-24_01-00-20	8.76E-05
	2°	319E3_2023-01-27_01-00-20	8.52E-05
	3°	319E3_2023-01-26_13-00-20	7.85E-05
Longitudinal direction (y)	1°	319E3_2023-01-30_07-00-21	5.86E-04
	2°	319E3_2023-01-26_13-00-20	5.59E-04
	3°	319E3_2023-01-31_07-00-21	5.41E-04
Transverse direction (z)	1°	319E3_2023-01-24_01-00-20	5.67E-04
	2°	319E3_2023-01-27_01-00-20	4.34E-04
	3°	319E3_2023-01-16_13-00-20	4.12E-04

Table 13-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-01-31_07-00-21	5.58E-09	319E3_2023-01-24_01-00-20	1.73E-09
2	319E3_2023-01-24_01-00-20	5.29E-09	319E3_2023-01-26_13-00-20	1.30E-09
3	319E3_2023-01-26_13-00-20	5.16E-09	319E3_2023-01-27_01-00-20	1.29E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-01-30_07-00-21	4.18E-07	319E3_2023-01-30_07-00-21	6.92E-08
2	319E3_2023-01-31_07-00-21	3.30E-07	319E3_2023-01-26_13-00-20	6.60E-08
3	319E3_2023-01-26_13-00-20	3.29E-07	319E3_2023-01-27_01-00-20	6.01E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-01-24_01-00-20	2.57E-07	319E3_2023-01-24_01-00-20	7.30E-08
2	319E3_2023-01-27_01-00-20	1.61E-07	319E3_2023-01-25_07-00-21	3.81E-08
3	319E3_2023-01-26_07-00-21	1.58E-07	319E3_2023-01-27_01-00-20	3.67E-08

Table 13-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	D	D	D	A	A	A
2	B	A	C	C	E	C	B	B	-
3	C	C	B	E	C	-	-	-	B

13.1.1 Vertical direction (x)

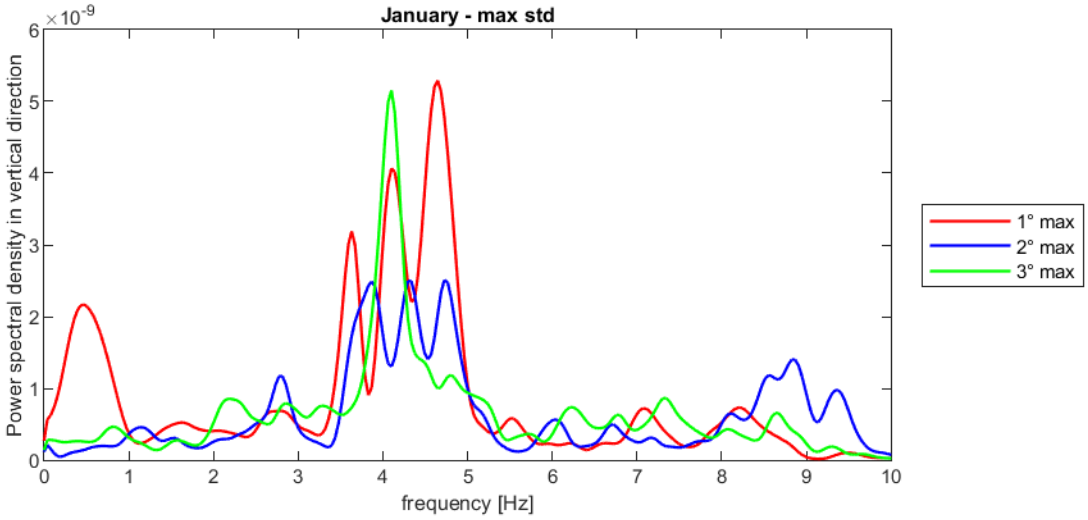


Figure 13-2: Results obtained from the 3 accelerograms with maximum SD in time domain

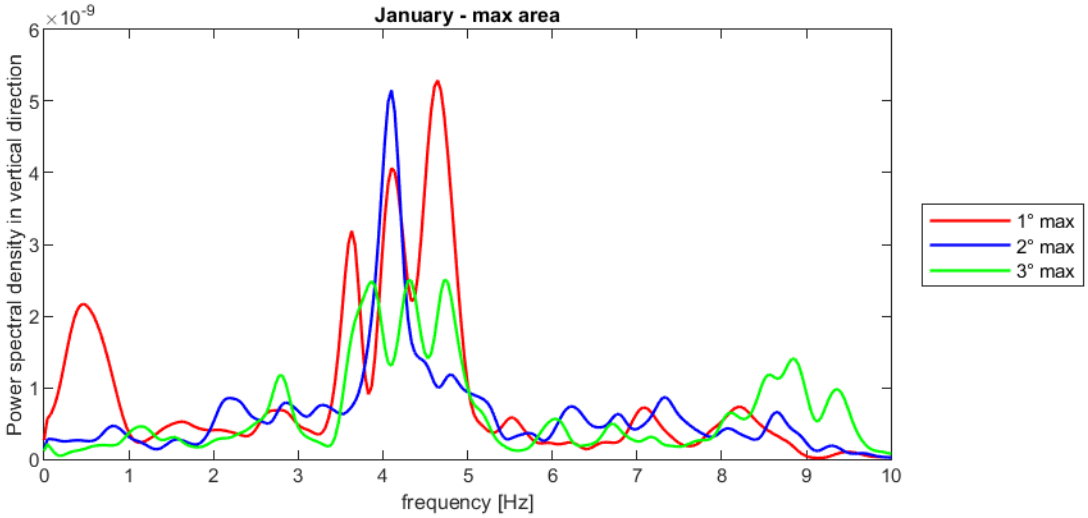


Figure 13-3: Results obtained from the 3 accelerograms with maximum area of PSD

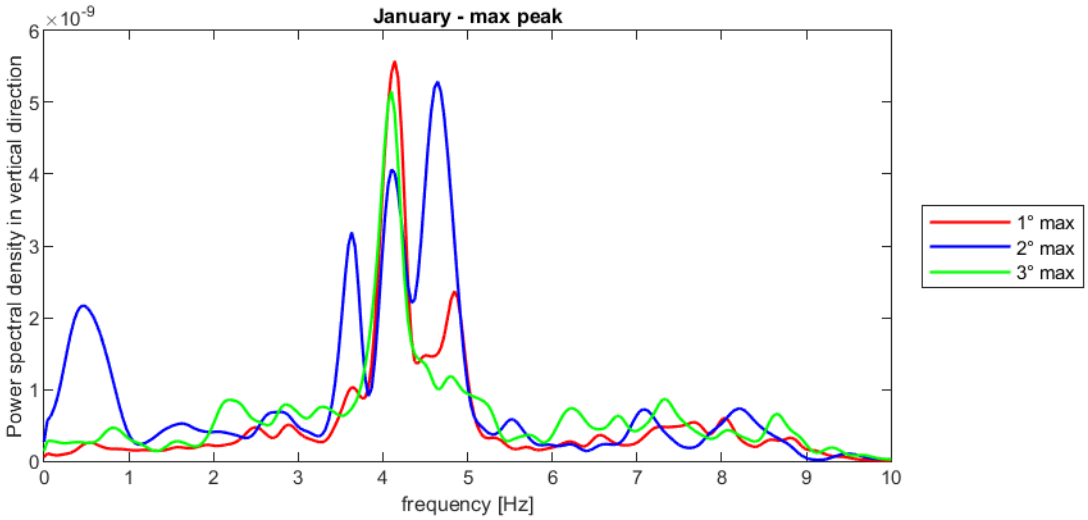


Figure 13-4: Results obtained from the 3 accelerograms with highest peak if PSD

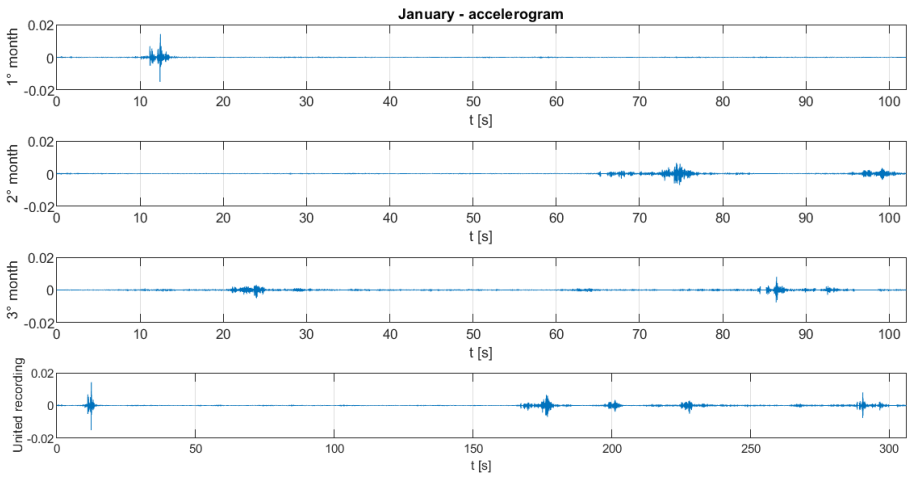


Figure 13-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.1.2 Longitudinal direction (y)

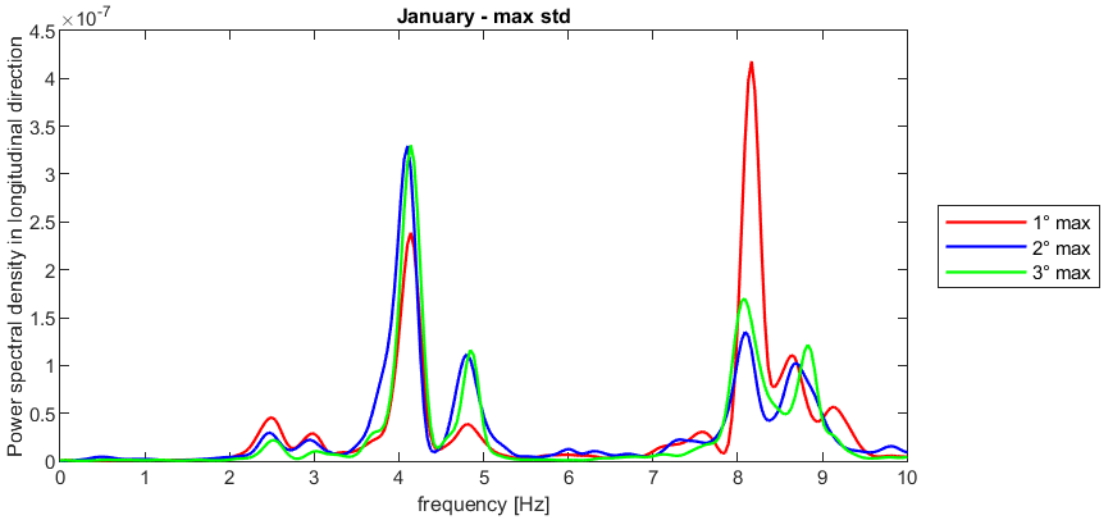


Figure 13-6: Results obtained from the 3 accelerograms with maximum SD in time domain

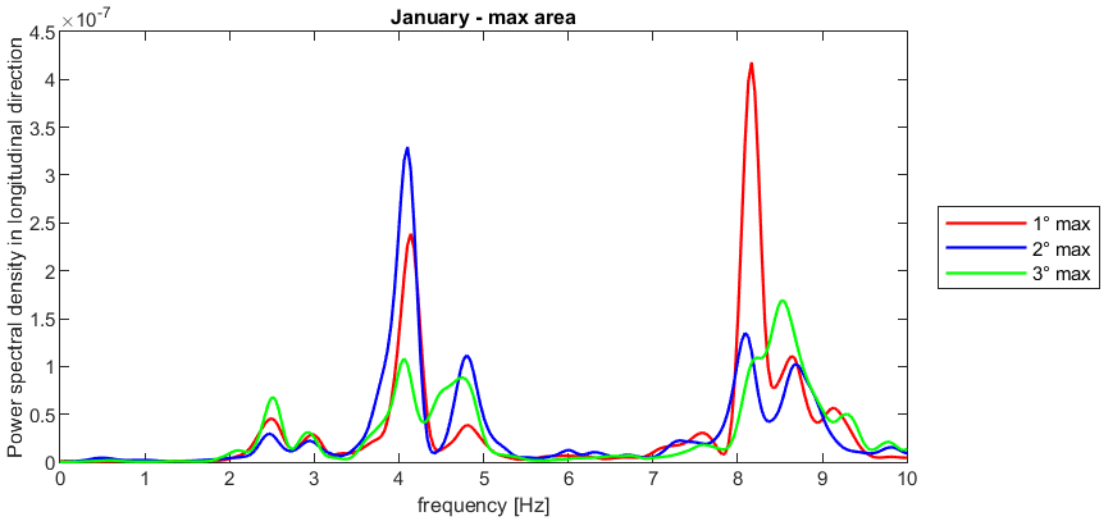


Figure 13-7: Results obtained from the 3 accelerograms with maximum area of PSD

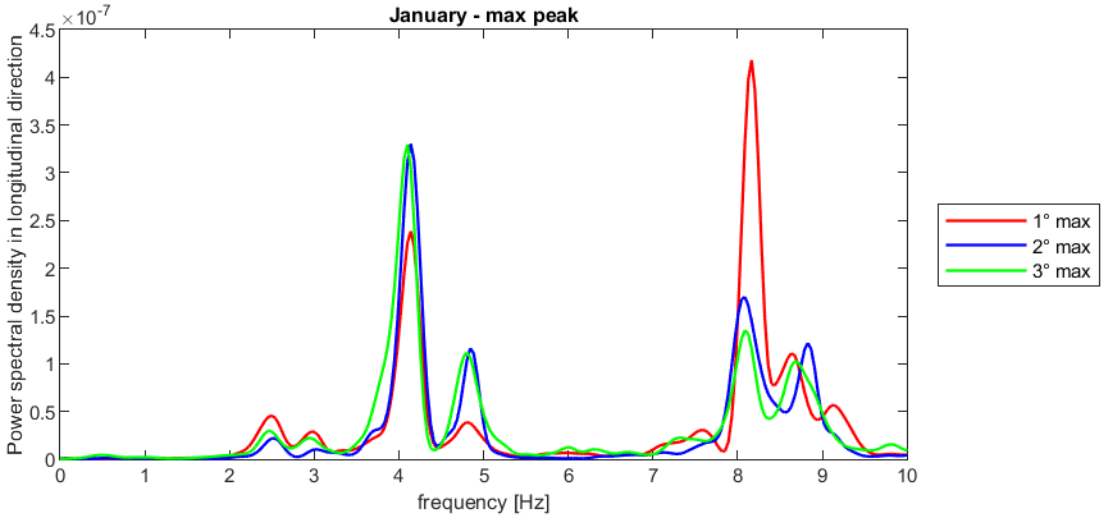


Figure 13-8: Results obtained from the 3 accelerograms with highest peak in PSD

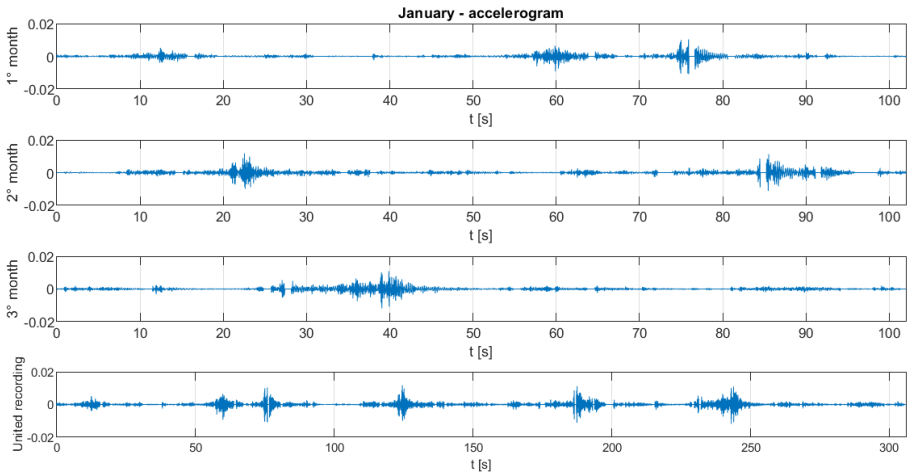


Figure 13-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

13.1.3 Transverse direction (z)

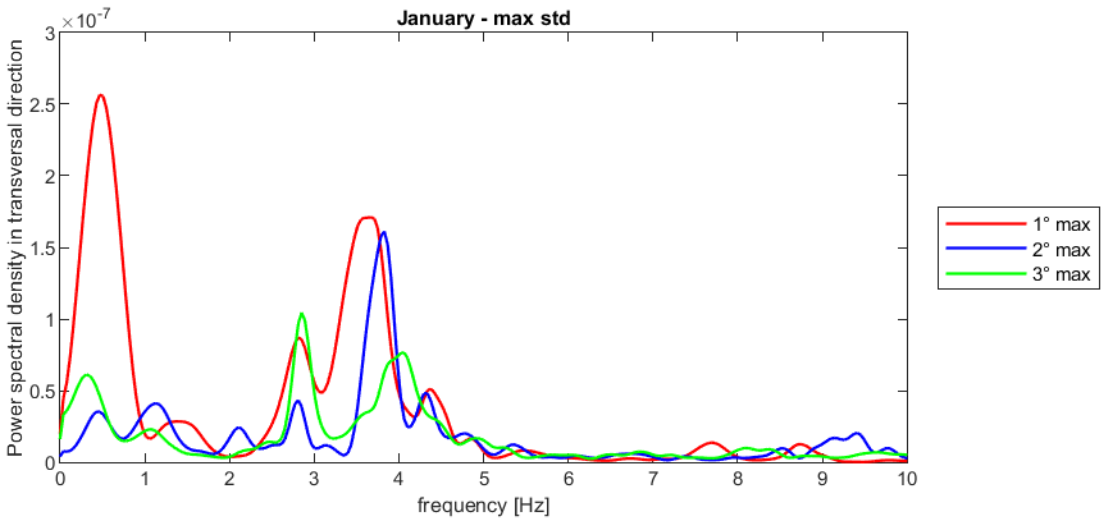


Figure 13-10: Results obtained from the 3 accelerograms with maximum SD in time domain

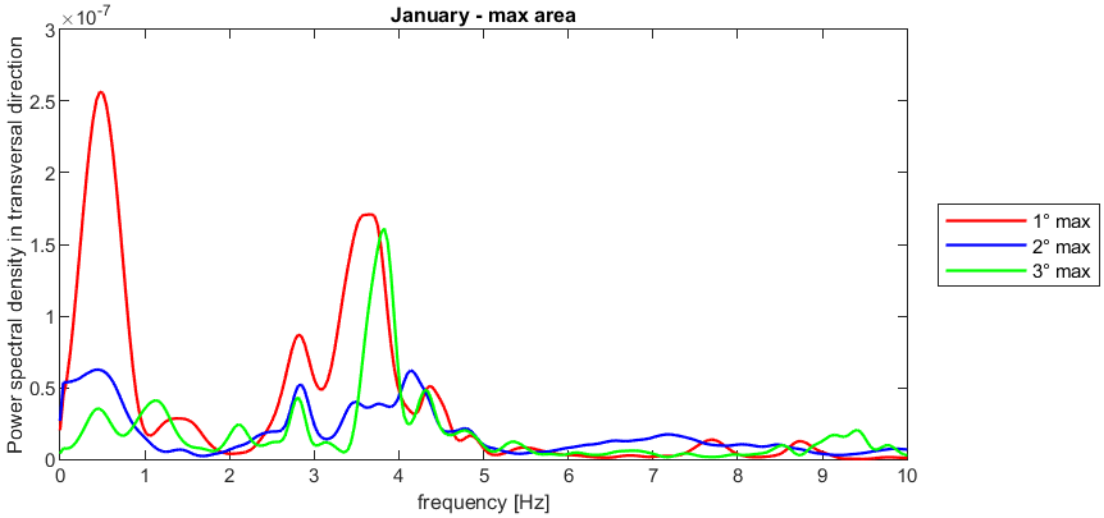


Figure 13-11: Results obtained from the 3 accelerograms with maximum area of PSD

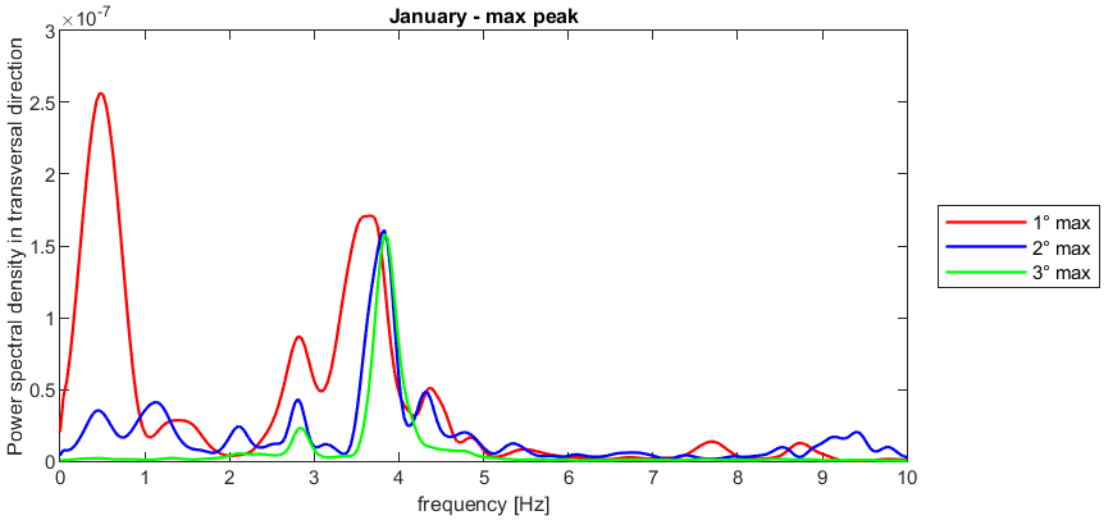


Figure 13-12: Results obtained from the 3 accelerograms with highest peak in PSD

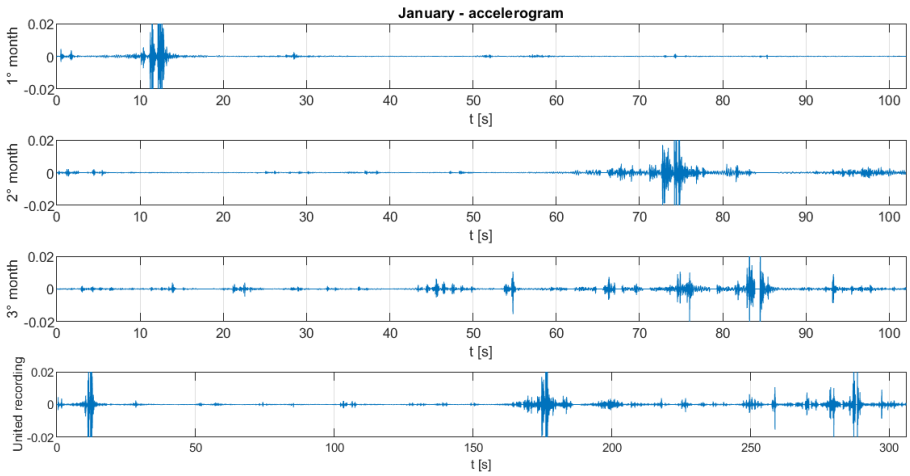


Figure 13-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

13.2 February

The results obtained for the February dataset are shown in the following tables.

Table 13-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-02-01_13-00-20	1.03E-04
	2°	319E3_2023-02-17_13-00-20	1.01E-04
	3°	319E3_2023-02-08_13-00-20	1.00E-04
Longitudinal direction (y)	1°	319E3_2023-02-06_13-00-20	7.48E-04
	2°	319E3_2023-02-23_13-00-20	7.04E-04
	3°	319E3_2023-02-01_13-00-20	6.96E-04
Transverse direction (z)	1°	319E3_2023-02-07_13-00-20	6.32E-04
	2°	319E3_2023-02-17_13-00-20	6.12E-04
	3°	319E3_2023-02-01_13-00-20	5.34E-04

Table 13-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-02-01_13-00-20	1.03E-08	319E3_2023-02-08_13-00-20	2.09E-09
2	319E3_2023-02-06_13-00-20	7.29E-09	319E3_2023-02-01_13-00-20	2.07E-09
3	319E3_2023-02-08_13-00-20	4.39E-09	319E3_2023-02-06_13-00-20	1.99E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-02-17_13-00-20	5.43E-07	319E3_2023-02-06_13-00-20	1.12E-07
2	319E3_2023-02-01_13-00-20	5.25E-07	319E3_2023-02-23_13-00-20	1.08E-07
3	319E3_2023-02-23_13-00-20	4.62E-07	319E3_2023-02-01_13-00-20	1.01E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-02-01_13-00-20	4.22E-07	319E3_2023-02-07_13-00-20	7.76E-08
2	319E3_2023-02-06_13-00-20	2.10E-07	319E3_2023-02-17_13-00-20	6.67E-08
3	319E3_2023-02-17_13-00-20	1.82E-07	319E3_2023-02-08_13-00-20	5.51E-08

Table 13-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	C	D	-	D	F	A	F
2	-	D	A	E	A	E	B	-	B
3	C	C	D	A	E	A	A	B	-

13.2.1 Vertical direction (x)

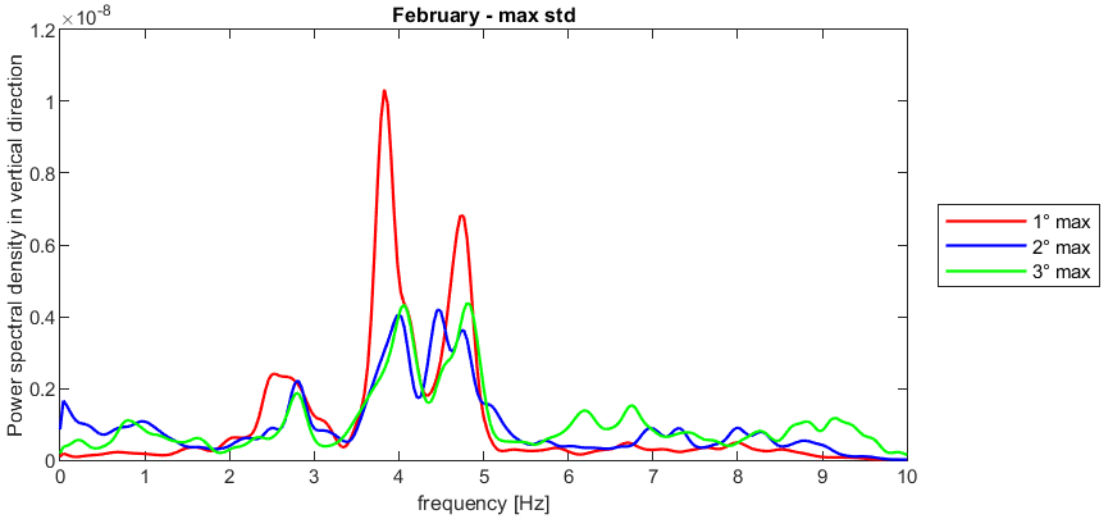


Figure 13-14: Results obtained from the 3 accelerograms with maximum SD in time domain

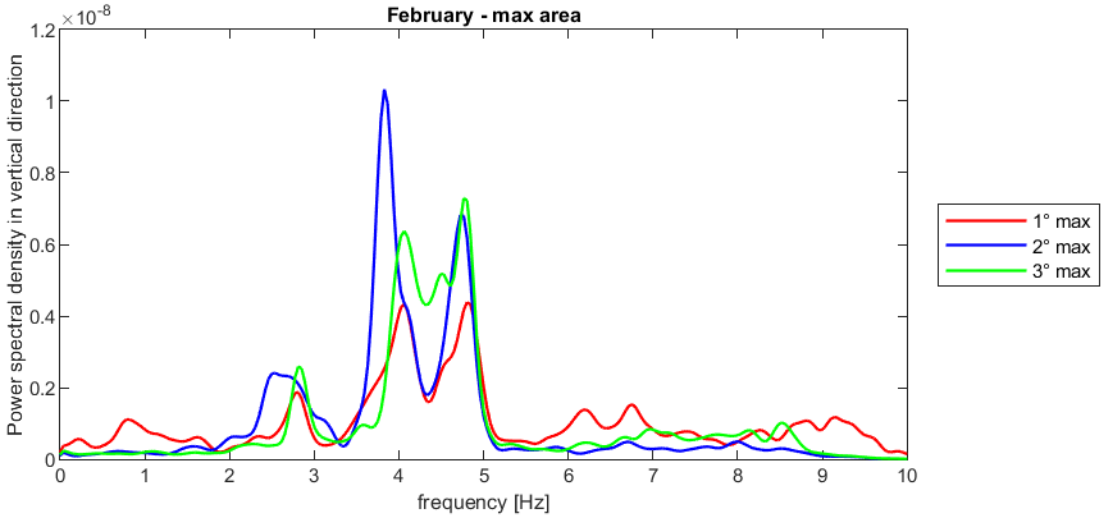


Figure 13-15: Results obtained from the 3 accelerograms with maximum area of PSD

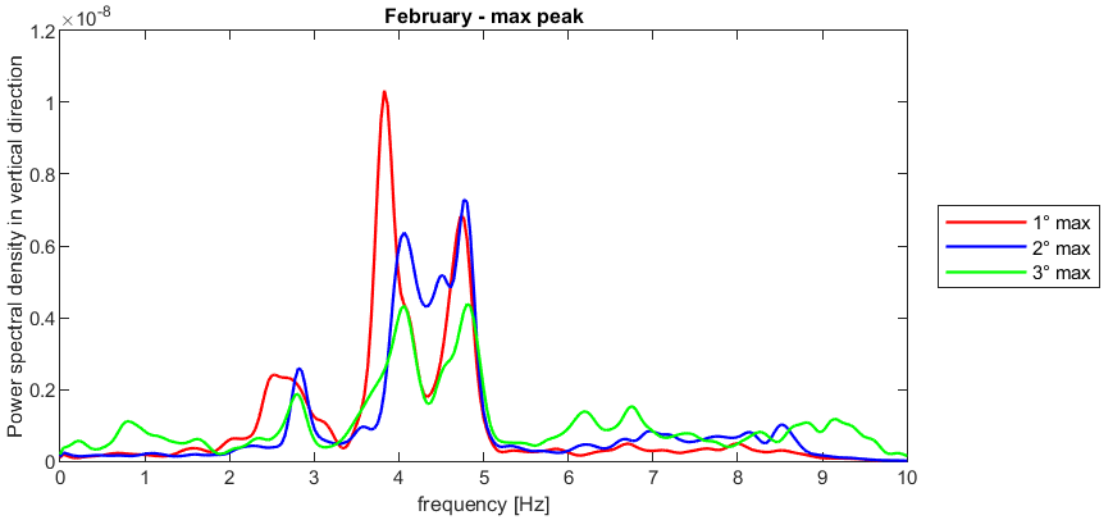


Figure 13-16: Results obtained from the 3 accelerograms with highest peak if PSD

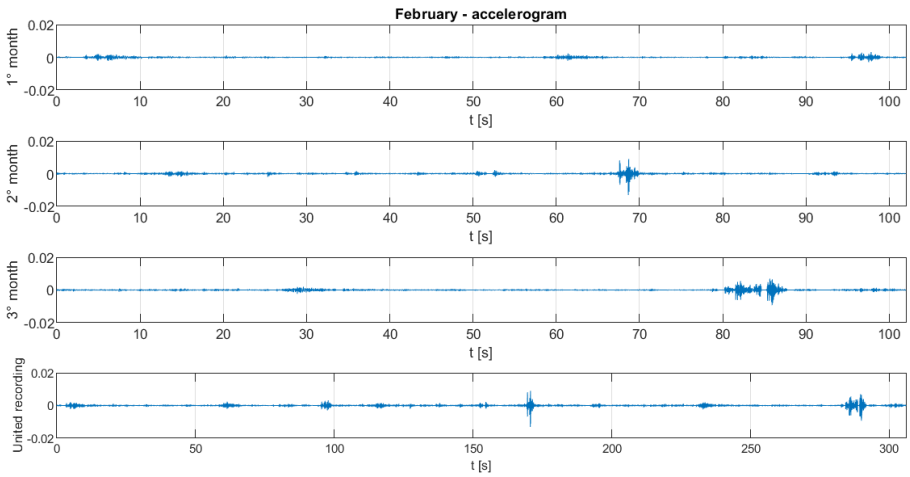


Figure 13-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.2.2 Longitudinal direction (y)

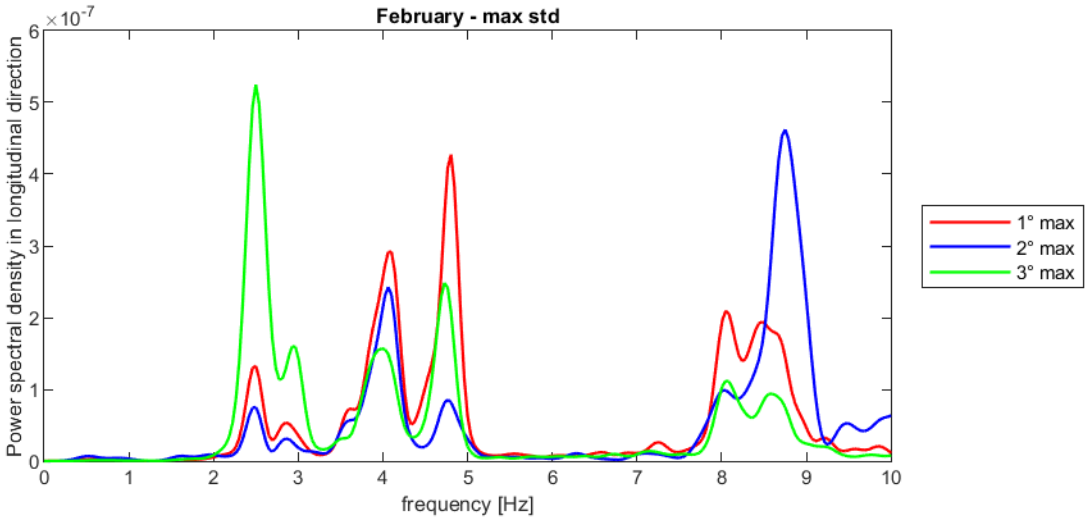


Figure 13-18: Results obtained from the 3 accelerograms with maximum SD in time domain

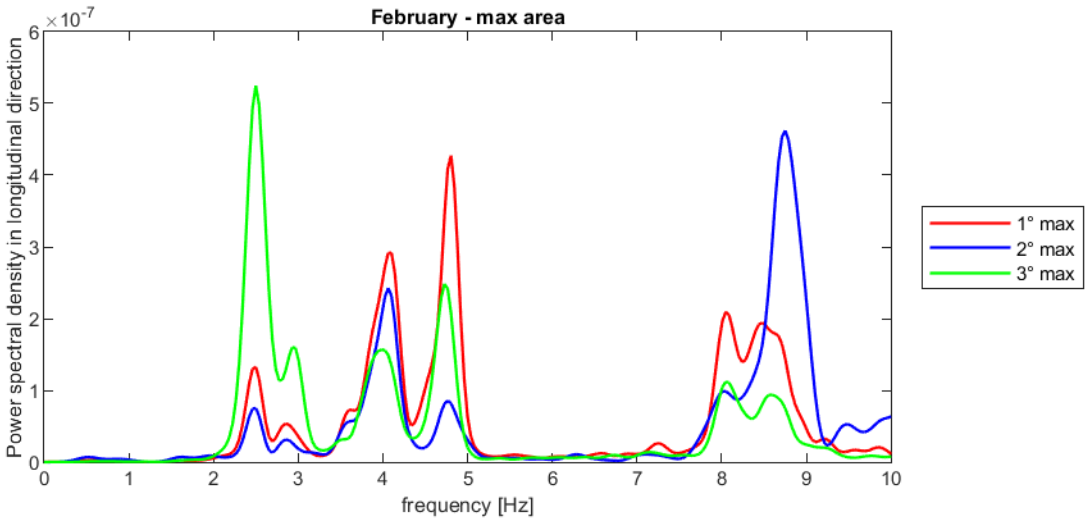


Figure 13-19: Results obtained from the 3 accelerograms with maximum area of PSD

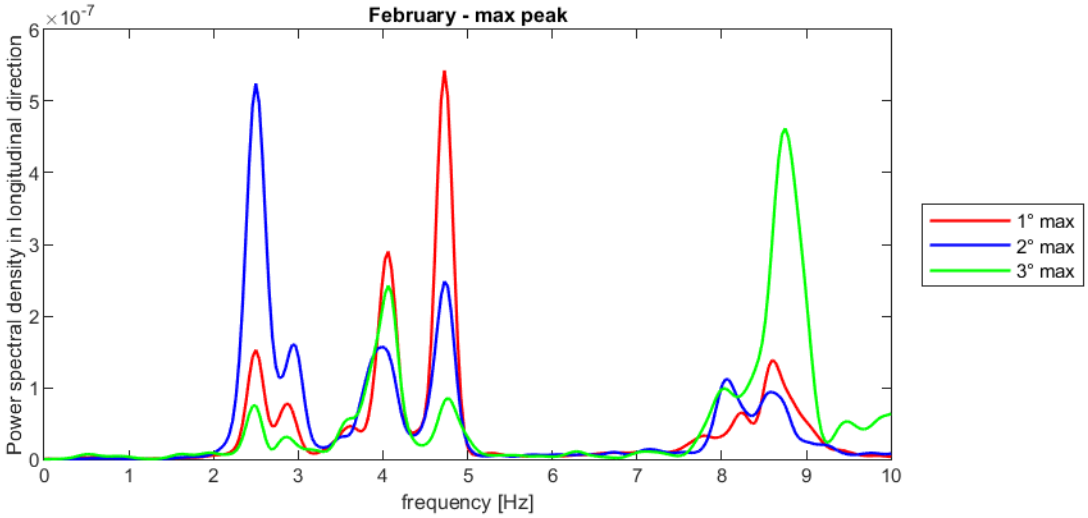


Figure 13-20: Results obtained from the 3 accelerograms with highest peak if PSD

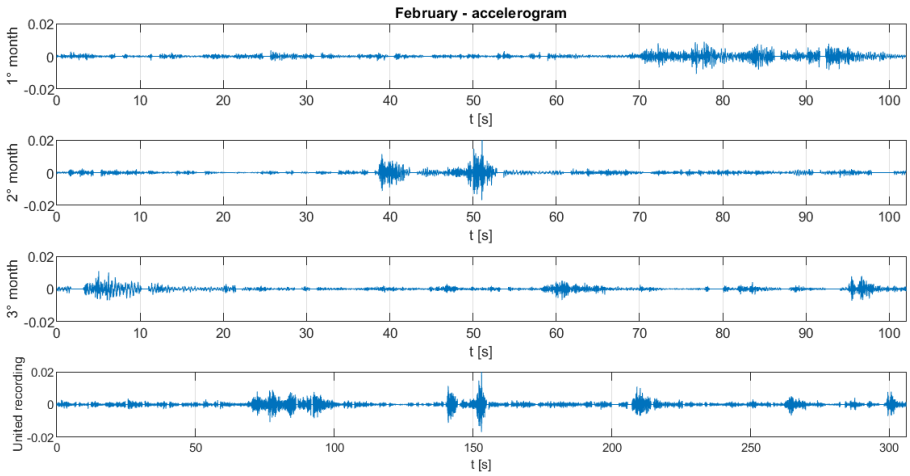


Figure 13-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

13.2.3 Transverse direction (z)

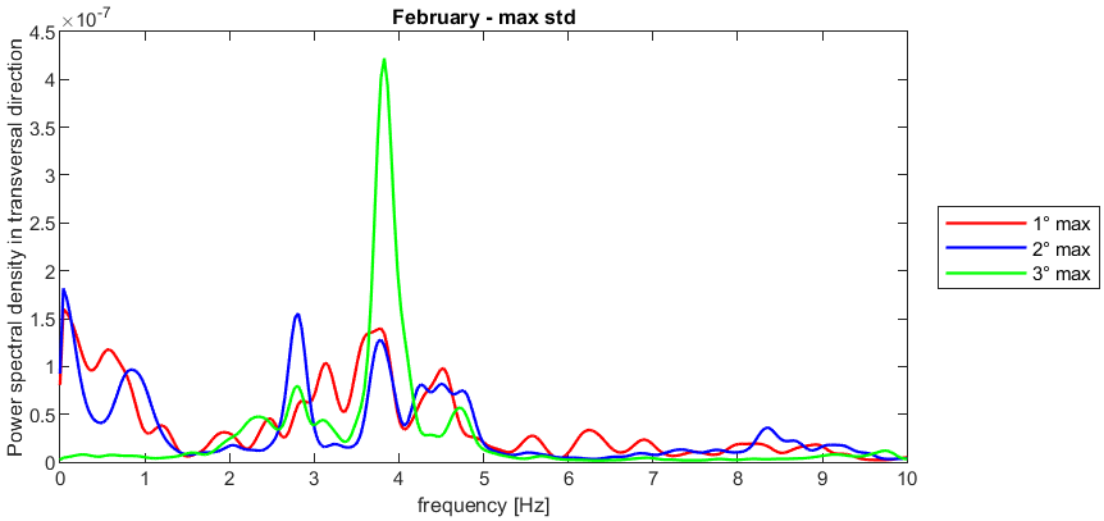


Figure 13-22: Results obtained from the 3 accelerograms with maximum SD in time domain

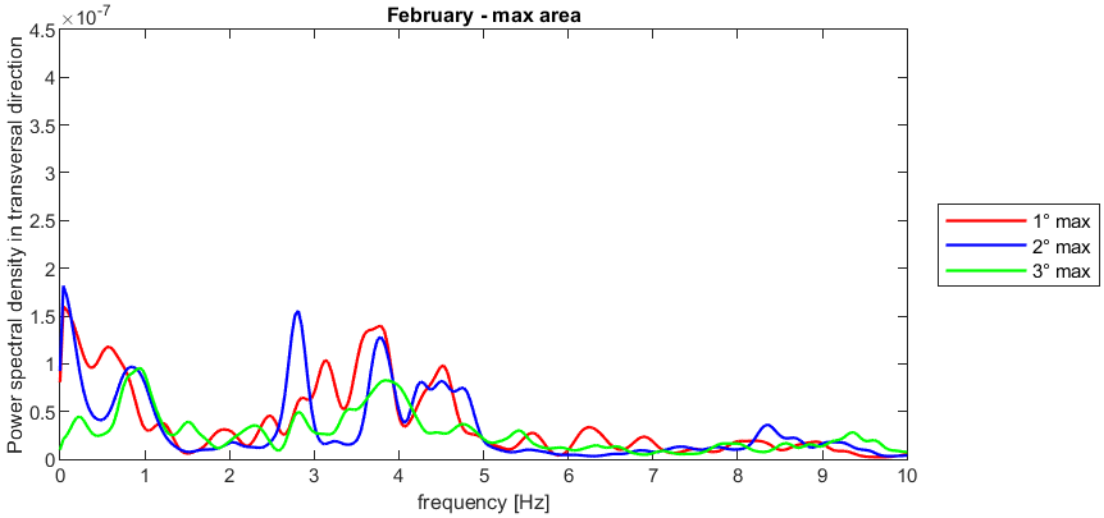


Figure 13-23: Results obtained from the 3 accelerograms with maximum area of PSD

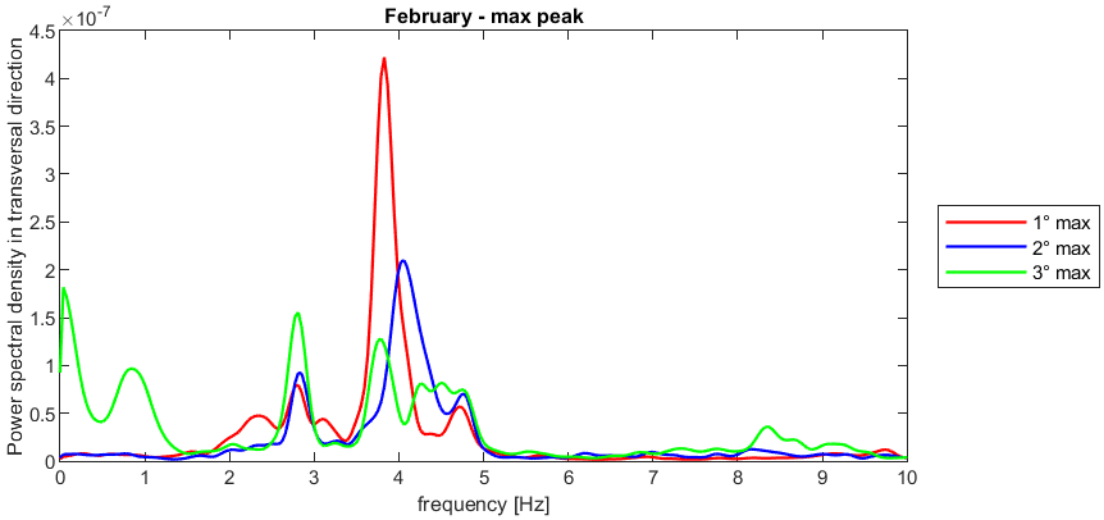


Figure 13-24: Results obtained from the 3 accelerograms with highest peak if PSD

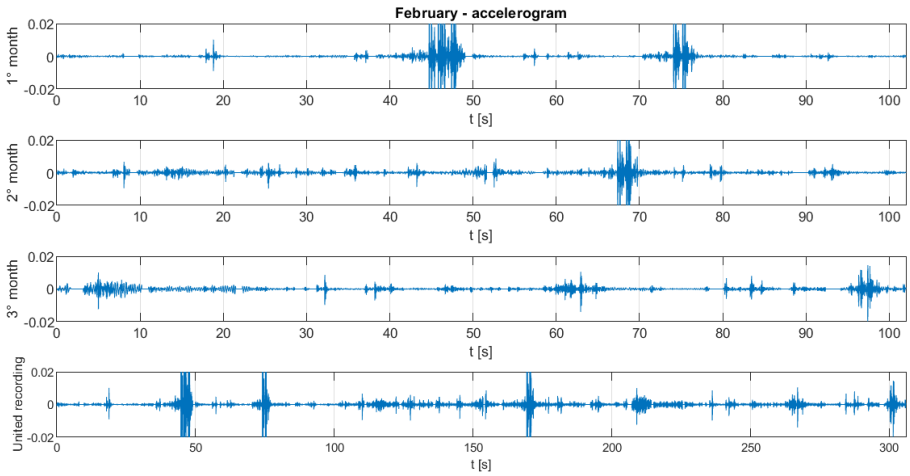


Figure 13-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

13.3 March

The results obtained for the March dataset are shown in the following tables.

Table 13-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-03-16_13-00-20	1.49E-04
	2°	319E3_2023-03-04_13-00-20	1.30E-04
	3°	319E3_2023-03-31_08-00-20	1.02E-04
Longitudinal direction (y)	1°	319E3_2023-03-16_13-00-20	1.13E-03
	2°	319E3_2023-03-04_13-00-20	8.94E-04
	3°	319E3_2023-03-08_13-00-21	7.80E-04
Transverse direction (z)	1°	319E3_2023-03-16_13-00-20	7.51E-04
	2°	319E3_2023-03-04_13-00-20	6.84E-04
	3°	319E3_2023-03-18_07-00-20	6.17E-04

Table 13-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-03-04_13-00-20	1.56E-08	319E3_2023-03-16_13-00-20	4.57E-09
2	319E3_2023-03-16_13-00-20	1.45E-08	319E3_2023-03-04_13-00-20	3.52E-09
3	319E3_2023-03-18_07-00-20	7.32E-09	319E3_2023-03-31_08-00-20	2.16E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-03-16_13-00-20	1.41E-06	319E3_2023-03-16_13-00-20	2.68E-07
2	319E3_2023-03-29_14-00-21	7.27E-07	319E3_2023-03-04_13-00-20	1.66E-07
3	319E3_2023-03-08_13-00-21	6.85E-07	319E3_2023-03-08_13-00-21	1.25E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-03-16_13-00-20	4.61E-07	319E3_2023-03-16_13-00-20	1.16E-07
2	319E3_2023-03-04_13-00-20	4.31E-07	319E3_2023-03-04_13-00-20	9.77E-08
3	319E3_2023-03-14_13-00-20	2.72E-07	319E3_2023-03-14_13-00-20	7.84E-08

Table 13-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	A	A	A
2	B	A	B	B	-	B	B	B	B
3	C	-	C	D	D	D	-	E	E

13.3.1 Vertical direction (x)

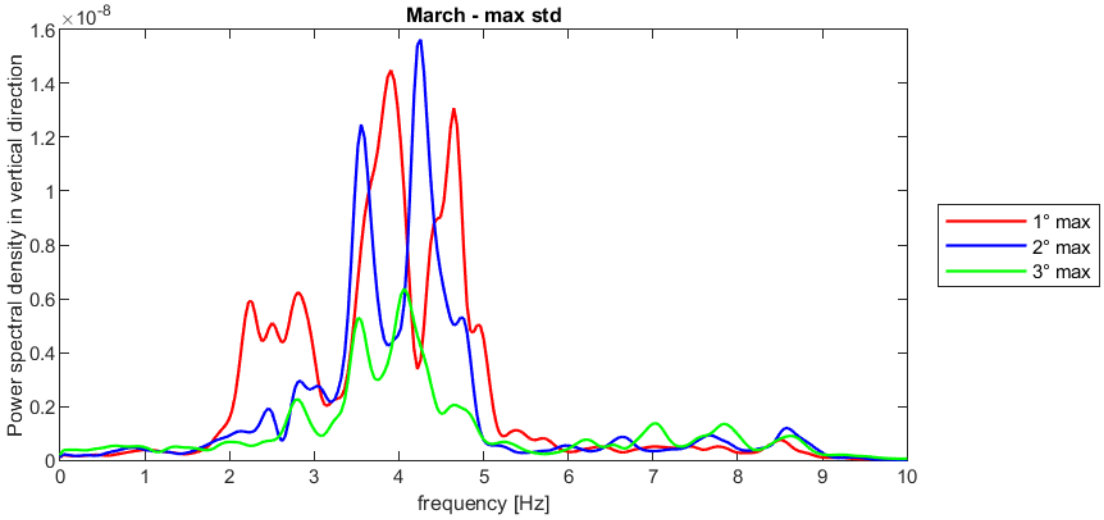


Figure 13-26: Results obtained from the 3 accelerograms with maximum SD in time domain

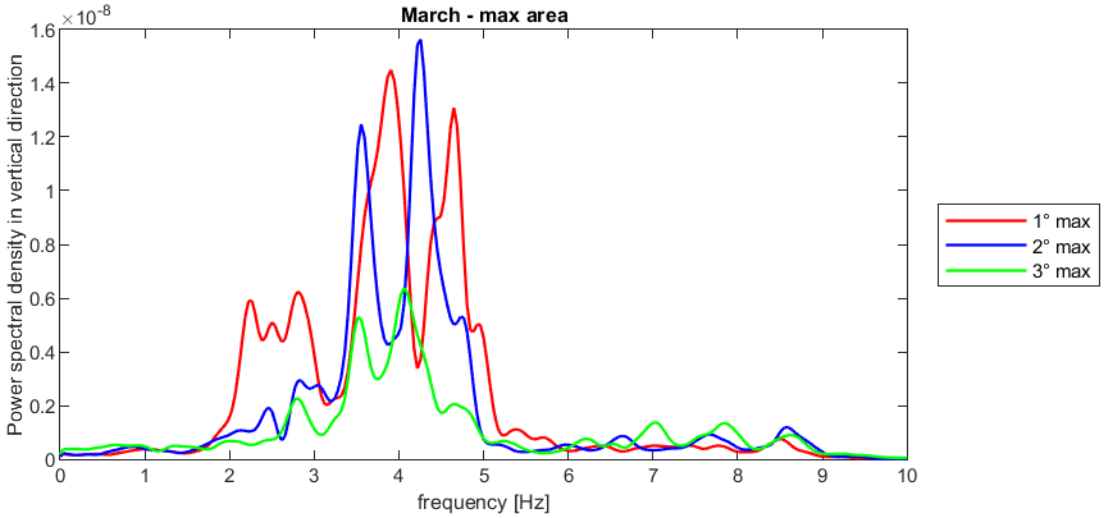


Figure 13-27: Results obtained from the 3 accelerograms with maximum area of PSD

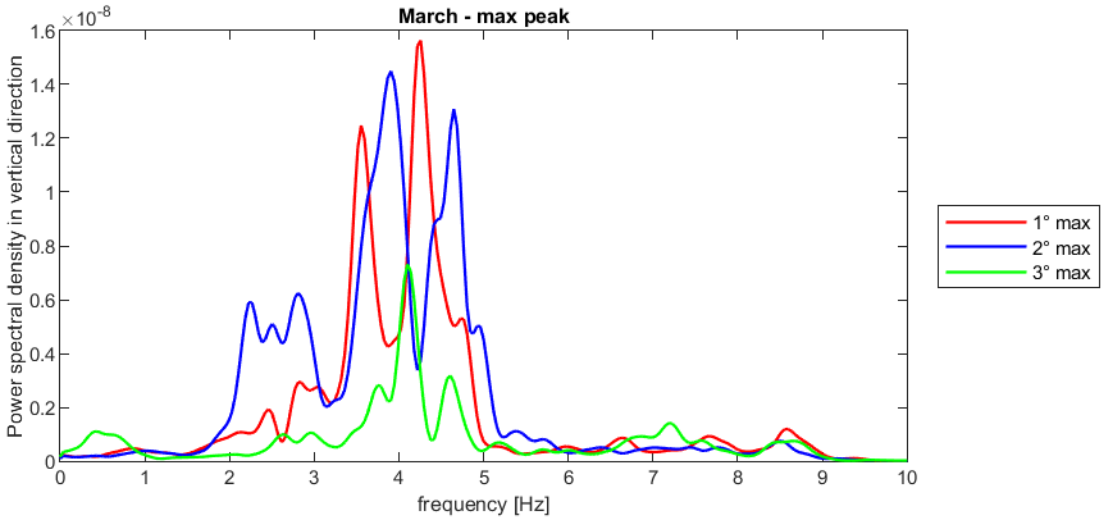


Figure 13-28: Results obtained from the 3 accelerograms with highest peak if PSD

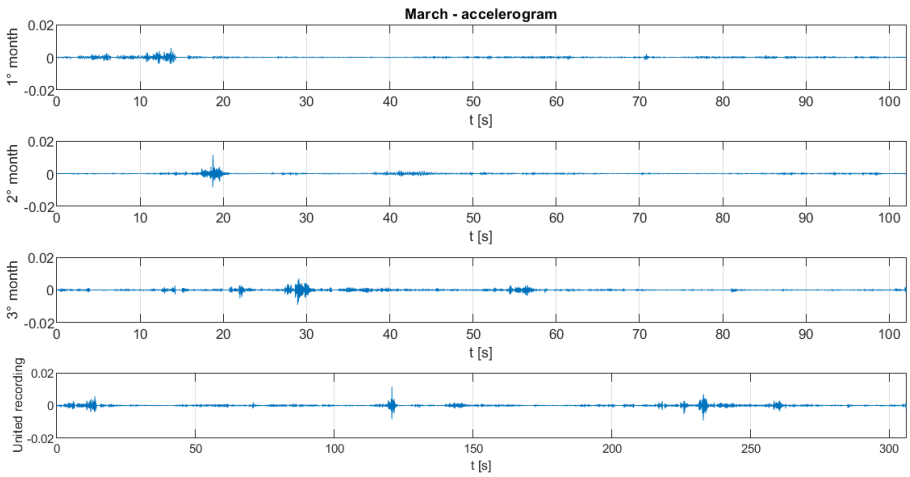


Figure 13-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.3.2 Longitudinal direction (y)

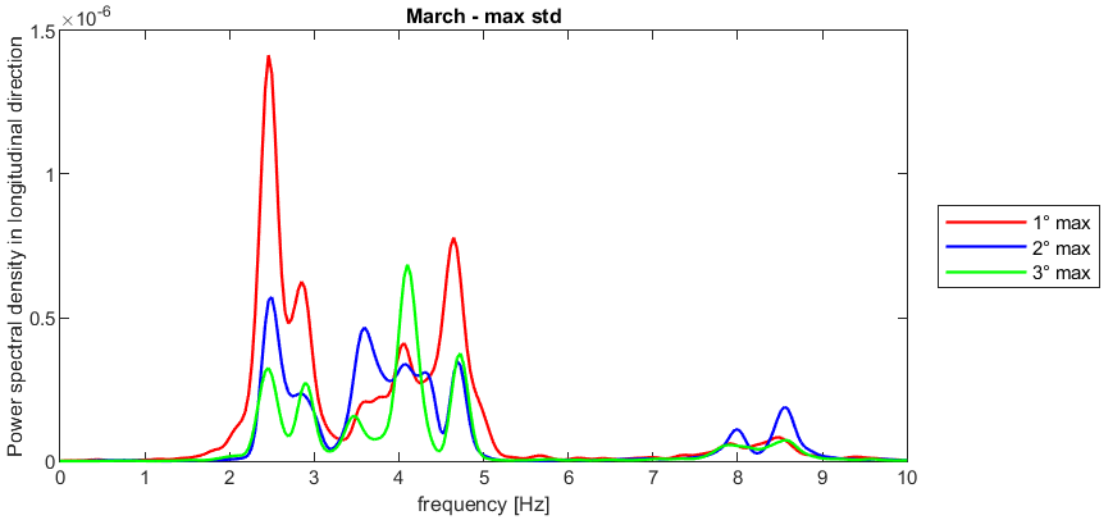


Figure 13-30: Results obtained from the 3 accelerograms with maximum SD in time domain

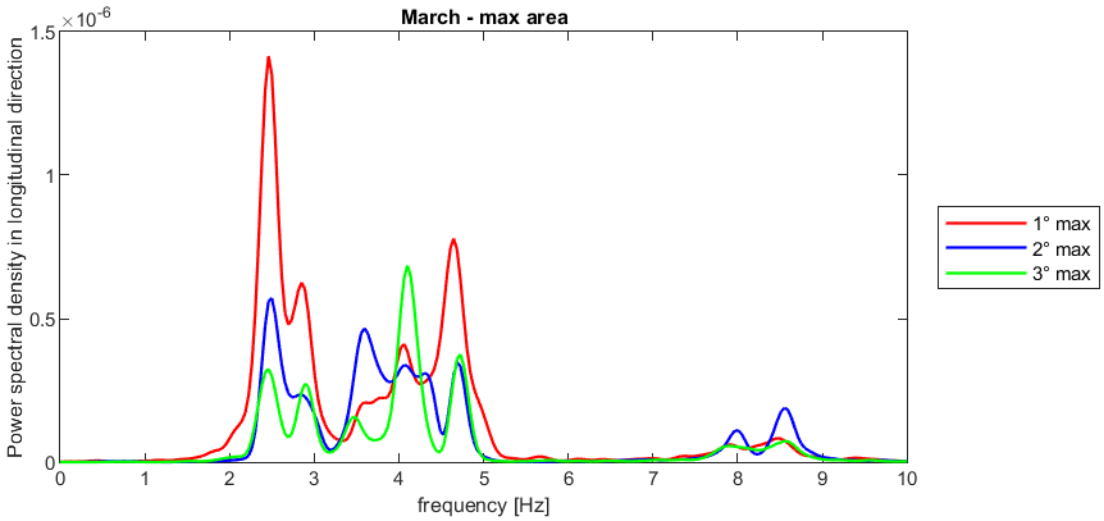


Figure 13-31: Results obtained from the 3 accelerograms with maximum area of PSD

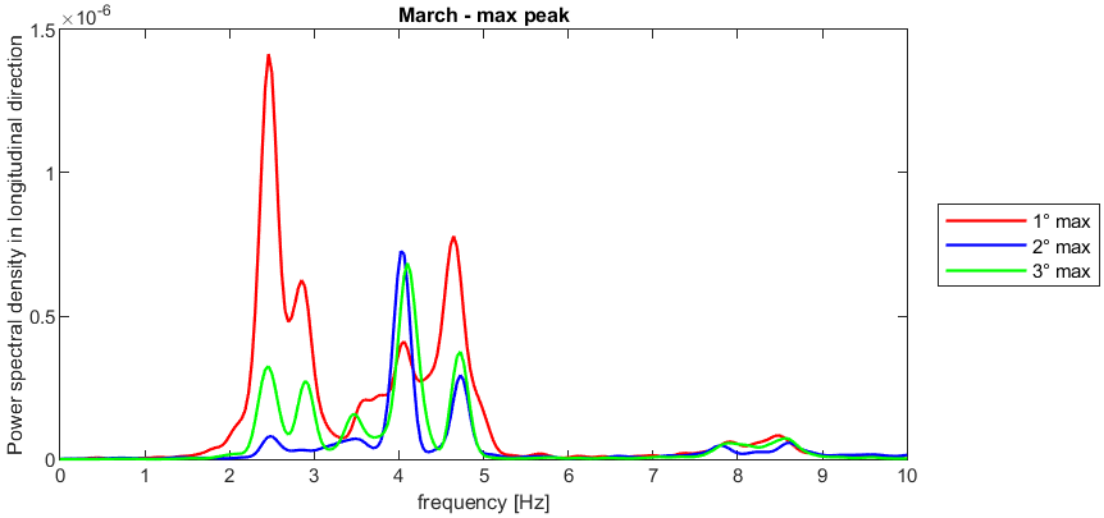


Figure 13-32: Results obtained from the 3 accelerograms with highest peak if PSD

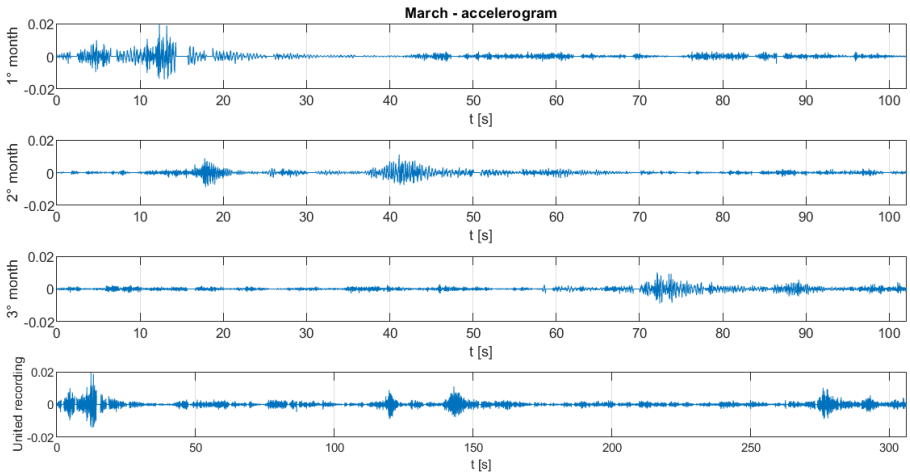


Figure 13-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

13.3.3 Transverse direction (z)

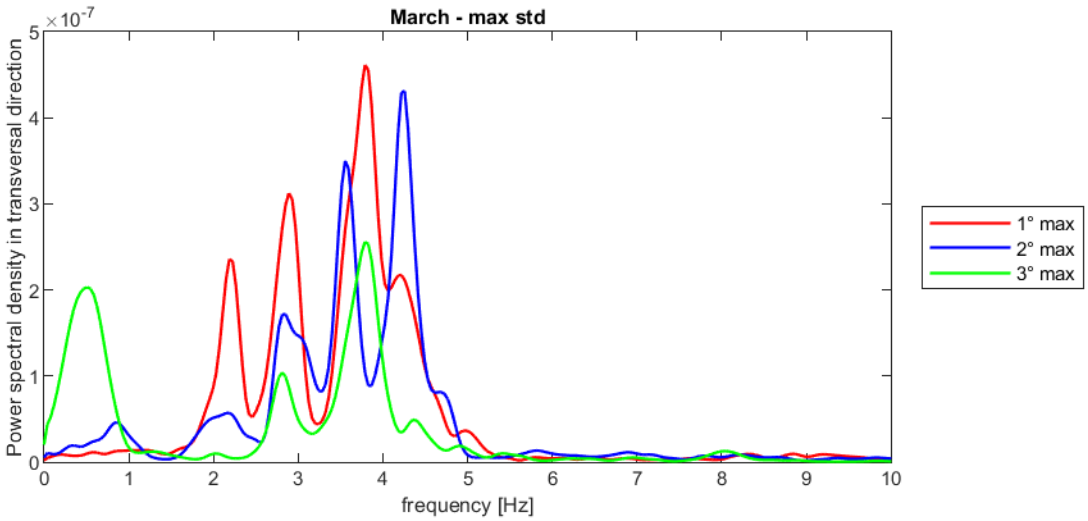


Figure 13-34: Results obtained from the 3 accelerograms with maximum SD in time domain

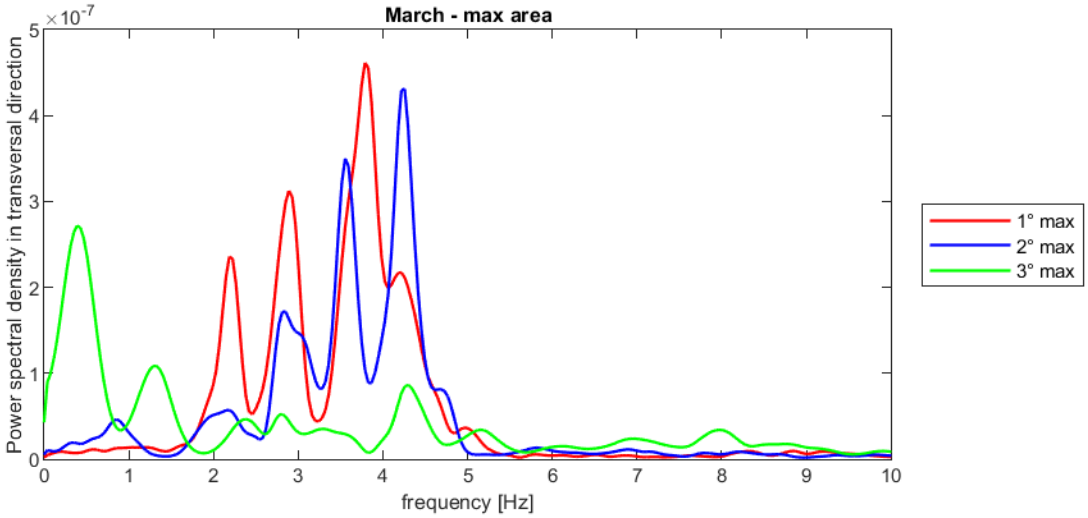


Figure 13-35: Results obtained from the 3 accelerograms with maximum area of PSD

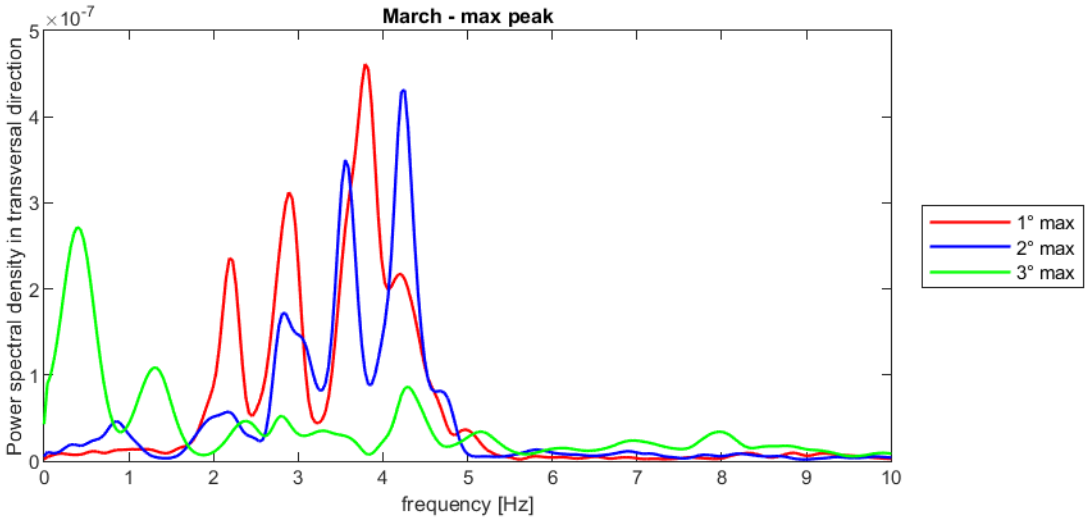


Figure 13-36: Results obtained from the 3 accelerograms with highest peak if PSD

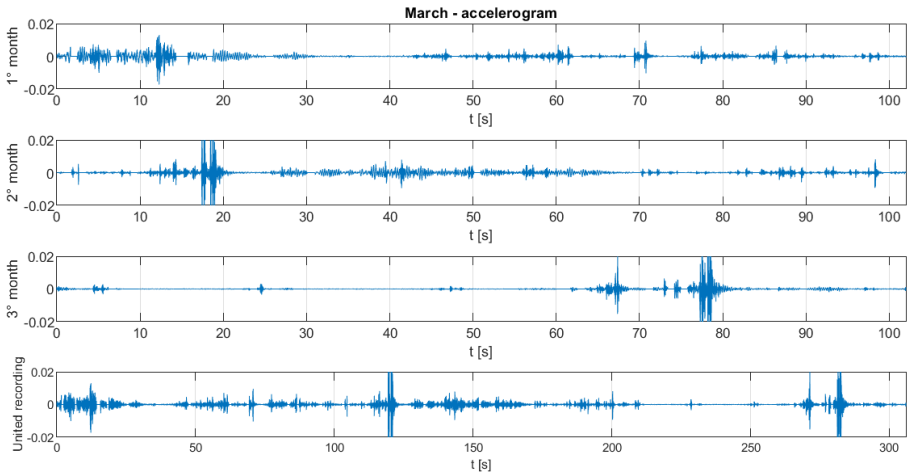


Figure 13-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

13.4 April

The results obtained for the April dataset are shown in the following tables.

Table 13-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-04-13_08-00-21	1.33E-04
	2°	319E3_2023-04-18_14-00-20	1.13E-04
	3°	319E3_2023-04-24_14-00-21	1.10E-04
Longitudinal direction (y)	1°	319E3_2023-04-13_08-00-21	1.12E-03
	2°	319E3_2023-04-18_14-00-20	7.42E-04
	3°	319E3_2023-04-24_14-00-21	7.19E-04
Transverse direction (z)	1°	319E3_2023-04-13_08-00-21	1.01E-03
	2°	319E3_2023-04-24_14-00-21	7.35E-04
	3°	319E3_2023-04-18_14-00-20	6.90E-04

Table 13-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-04-24_14-00-21	1.08E-08	319E3_2023-04-13_08-00-21	3.53E-09
2	319E3_2023-04-13_08-00-21	1.04E-08	319E3_2023-04-18_14-00-20	2.69E-09
3	319E3_2023-04-18_14-00-20	9.32E-09	319E3_2023-04-24_14-00-21	2.45E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-04-13_08-00-21	1.48E-06	319E3_2023-04-13_08-00-21	2.59E-07
2	319E3_2023-04-18_14-00-20	5.54E-07	319E3_2023-04-18_14-00-20	1.11E-07
3	319E3_2023-04-04_14-00-20	5.15E-07	319E3_2023-04-24_14-00-21	1.04E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-04-13_08-00-21	8.78E-07	319E3_2023-04-13_08-00-21	2.03E-07
2	319E3_2023-04-24_14-00-21	8.07E-07	319E3_2023-04-24_14-00-21	1.15E-07
3	319E3_2023-04-18_14-00-20	5.16E-07	319E3_2023-04-18_14-00-20	9.62E-08

Table 13-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	A	A	A	A	A	A
2	B	A	B	B	B	B	C	C	C
3	C	B	C	C	-	C	B	B	B

13.4.1 Vertical direction (x)

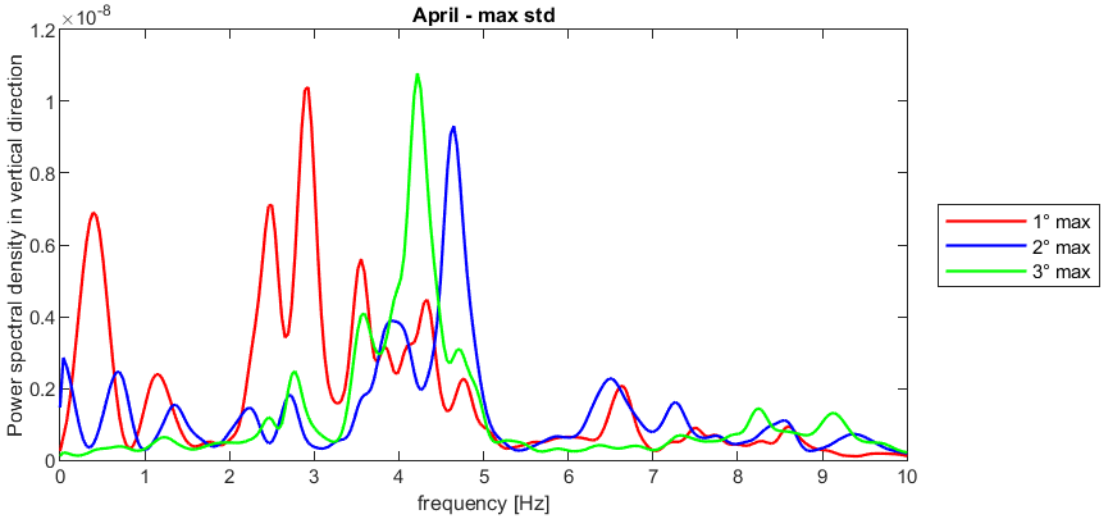


Figure 13-38: Results obtained from the 3 accelerograms with maximum SD in time domain

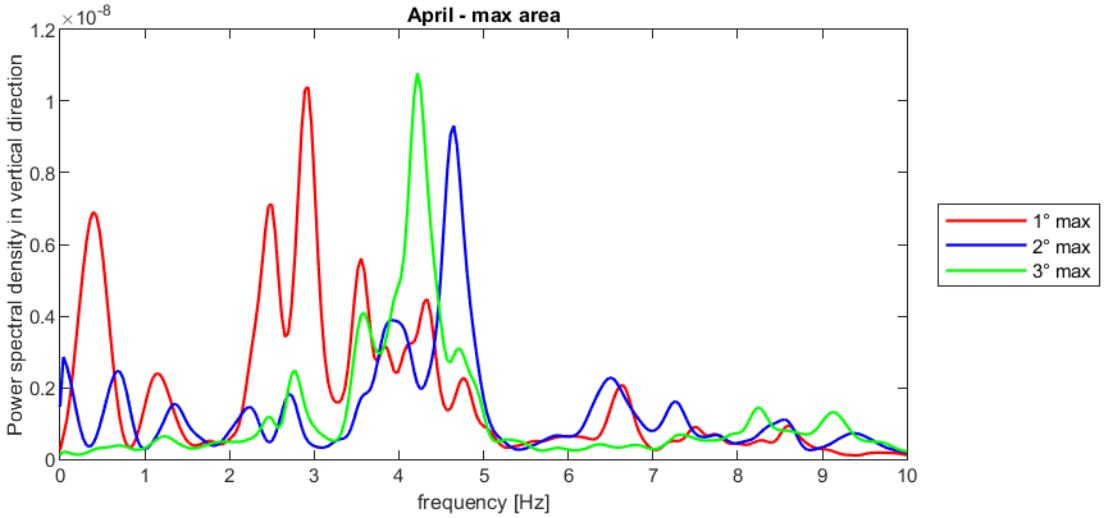


Figure 13-39: Results obtained from the 3 accelerograms with maximum area of PSD

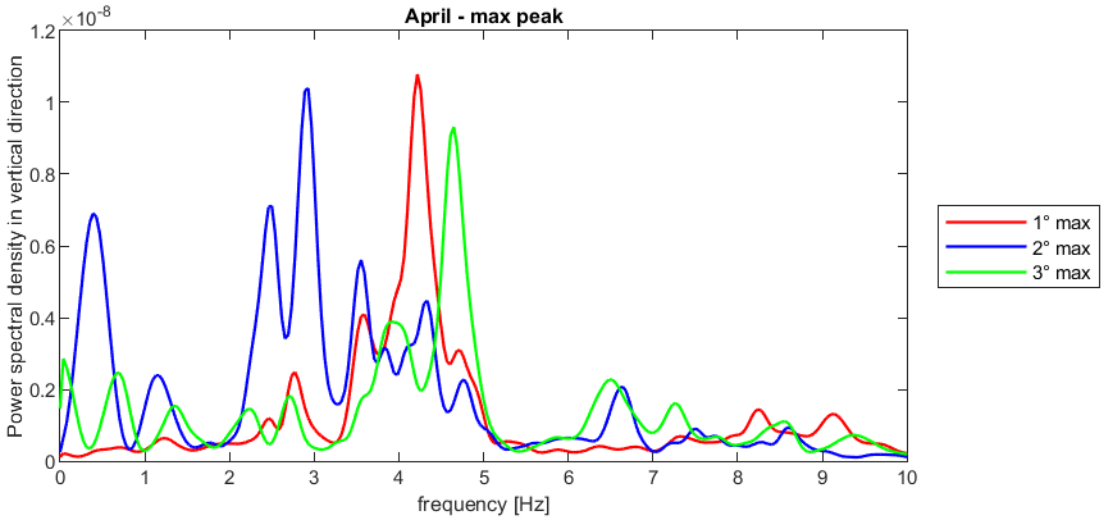


Figure 13-40: Results obtained from the 3 accelerograms with highest peak if PSD

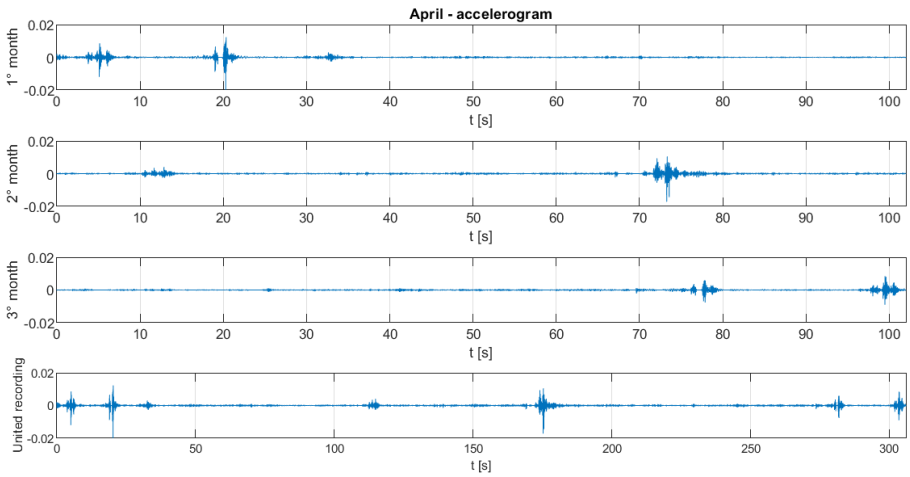


Figure 13-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.4.2 Longitudinal direction (y)

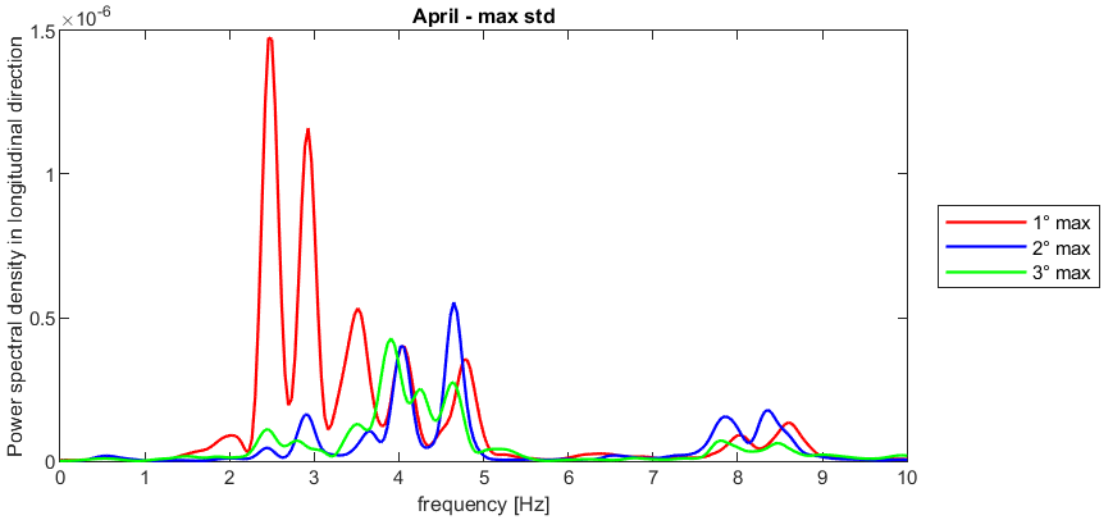


Figure 13-42: Results obtained from the 3 accelerograms with maximum SD in time domain

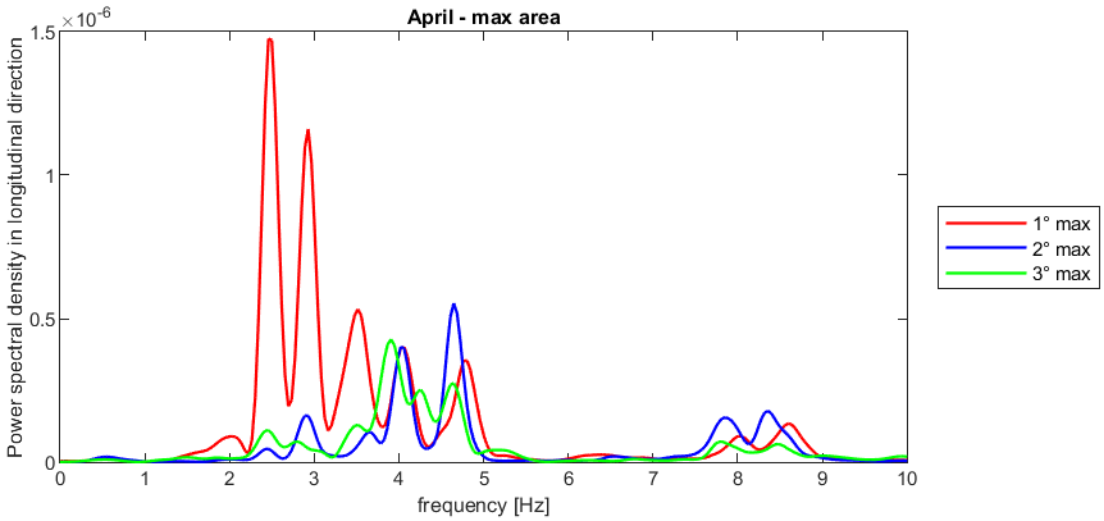


Figure 13-43: Results obtained from the 3 accelerograms with maximum area of PSD

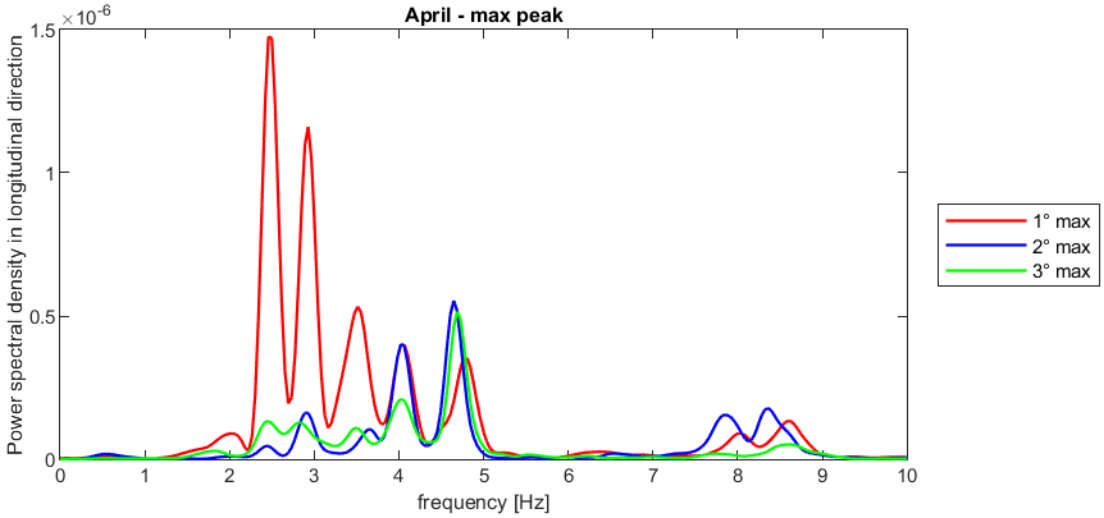


Figure 13-44: Results obtained from the 3 accelerograms with highest peak if PSD

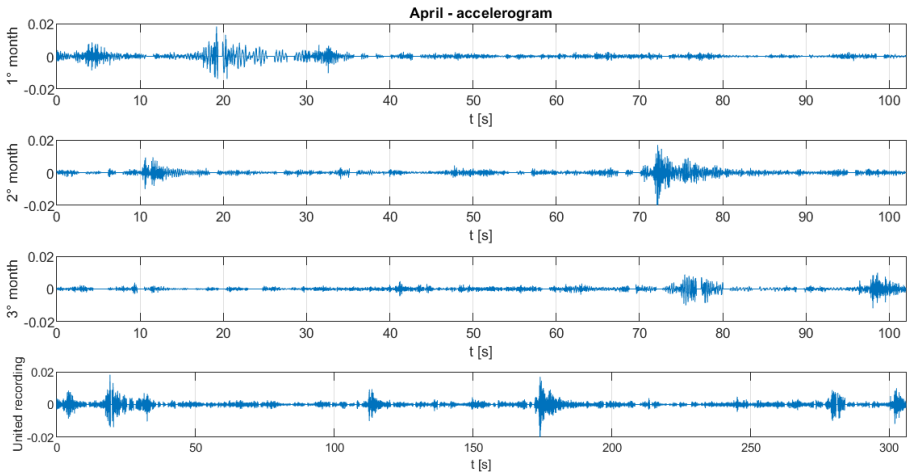


Figure 13-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

13.4.3 Transverse direction (z)

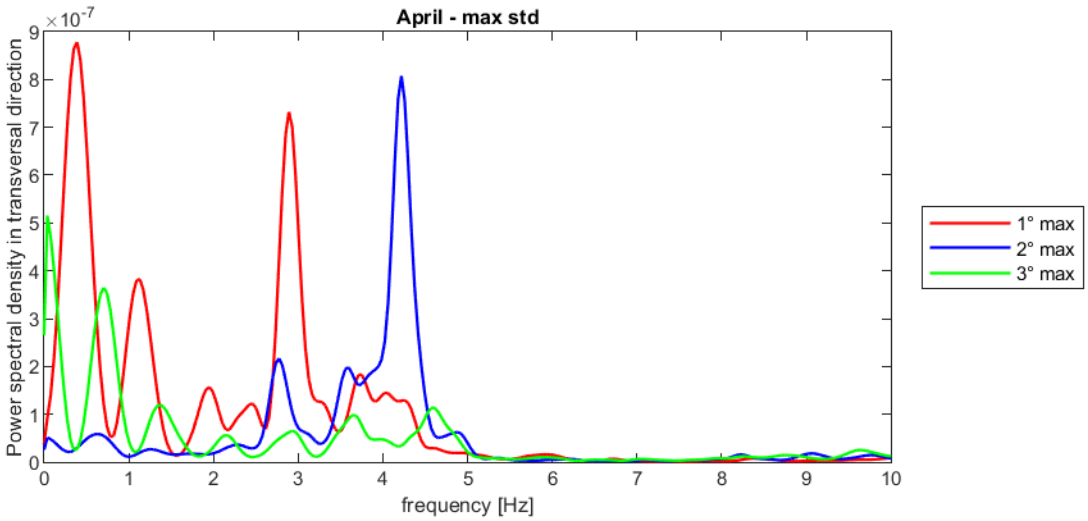


Figure 13-46: Results obtained from the 3 accelerograms with maximum SD in time domain

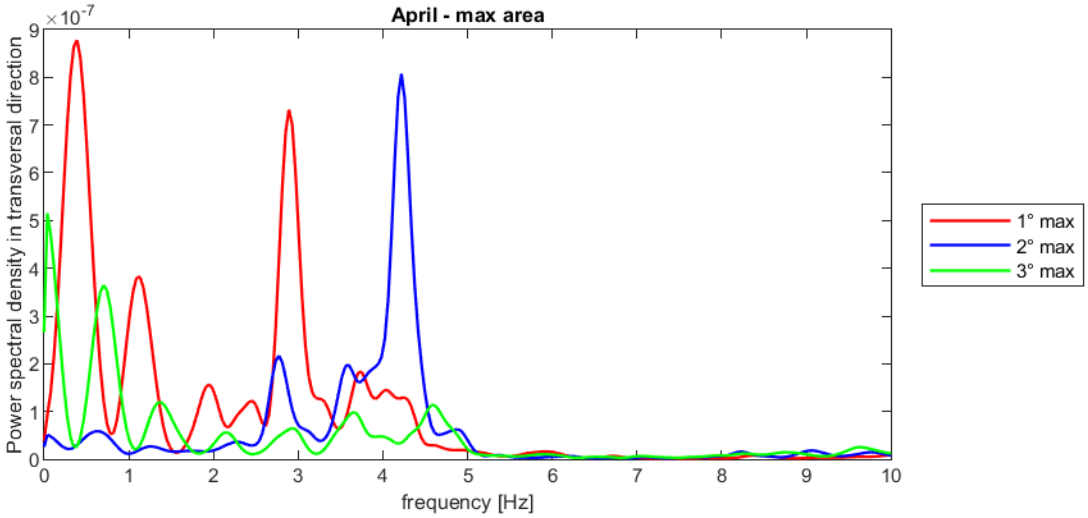


Figure 13-47: Results obtained from the 3 accelerograms with maximum area of PSD

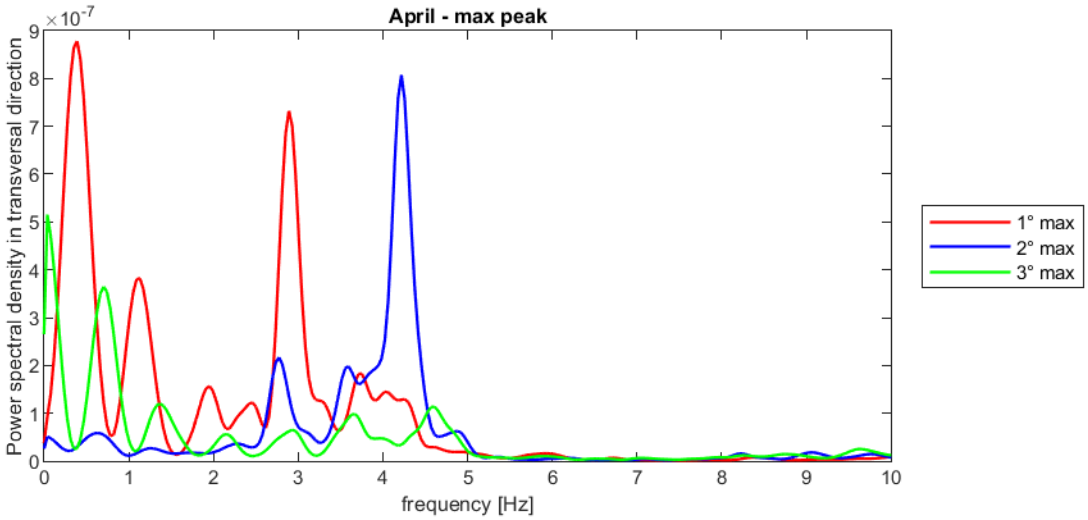


Figure 13-48: Results obtained from the 3 accelerograms with highest peak if PSD

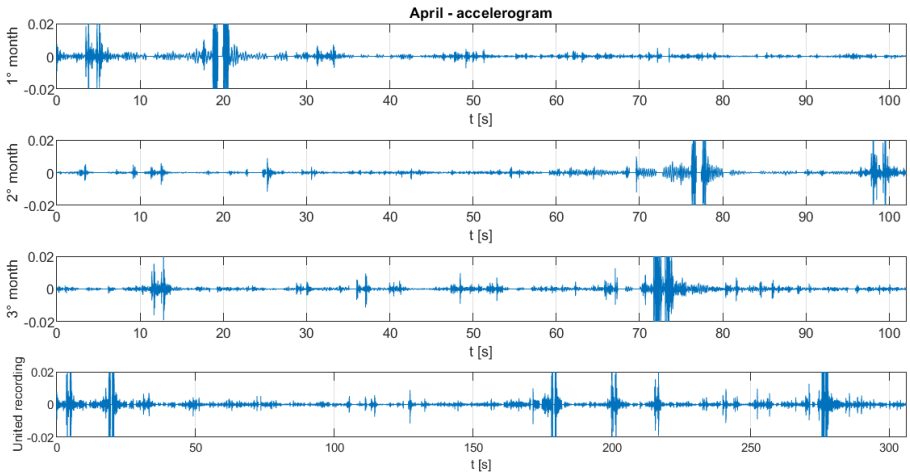


Figure 13-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

13.5 May

The results obtained for the May dataset are shown in the following tables.

Table 13-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-05-23_14-00-20	1.46E-04
	2°	319E3_2023-05-04_14-00-20	1.12E-04
	3°	319E3_2023-05-15_08-00-20	9.22E-05
Longitudinal direction (y)	1°	319E3_2023-05-23_14-00-20	1.34E-03
	2°	319E3_2023-05-04_14-00-20	8.25E-04
	3°	319E3_2023-05-22_08-00-21	7.71E-04
Transverse direction (z)	1°	319E3_2023-05-23_14-00-20	8.57E-04
	2°	319E3_2023-05-04_14-00-20	6.10E-04
	3°	319E3_2023-05-15_08-00-20	5.63E-04

Table 13-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-05-23_14-00-20	1.48E-08	319E3_2023-05-23_14-00-20	3.89E-09
2	319E3_2023-05-04_14-00-20	1.10E-08	319E3_2023-05-04_14-00-20	2.79E-09
3	319E3_2023-05-22_08-00-21	6.88E-09	319E3_2023-05-22_08-00-21	1.70E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-05-23_14-00-20	3.28E-06	319E3_2023-05-23_14-00-20	3.65E-07
2	319E3_2023-05-04_14-00-20	5.74E-07	319E3_2023-05-04_14-00-20	1.46E-07
3	319E3_2023-05-22_08-00-21	5.69E-07	319E3_2023-05-22_08-00-21	1.24E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-05-04_14-00-20	5.14E-07	319E3_2023-05-23_14-00-20	1.09E-07
2	319E3_2023-05-23_14-00-20	4.94E-07	319E3_2023-05-04_14-00-20	7.91E-08
3	319E3_2023-05-15_08-00-20	1.97E-07	319E3_2023-05-02_08-00-21	6.62E-08

Table 13-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	A	B	A
2	B	B	B	B	B	B	B	A	B
3	-	D	D	D	D	D	C	C	-

13.5.1 Vertical direction (x)

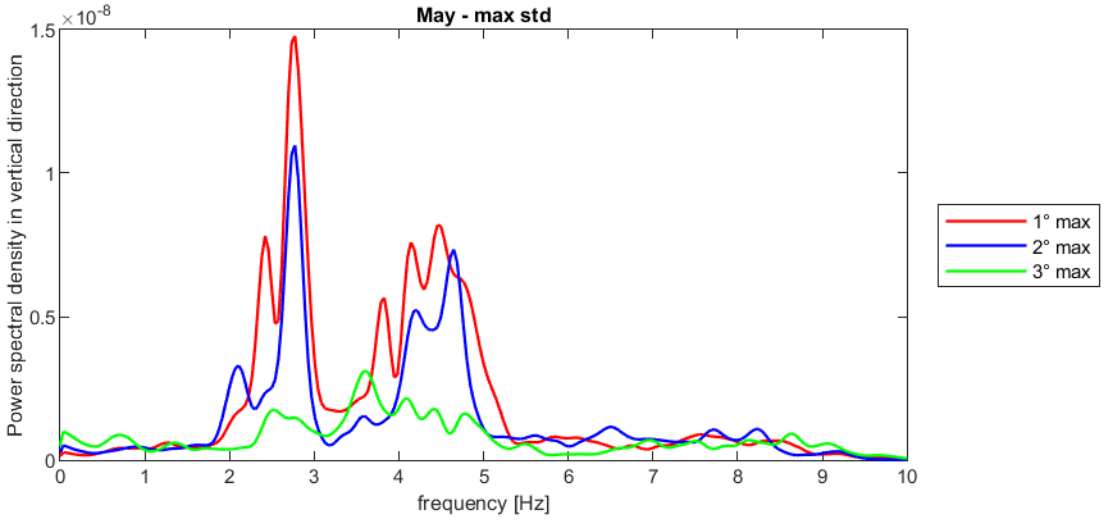


Figure 13-50: Results obtained from the 3 accelerograms with maximum SD in time domain

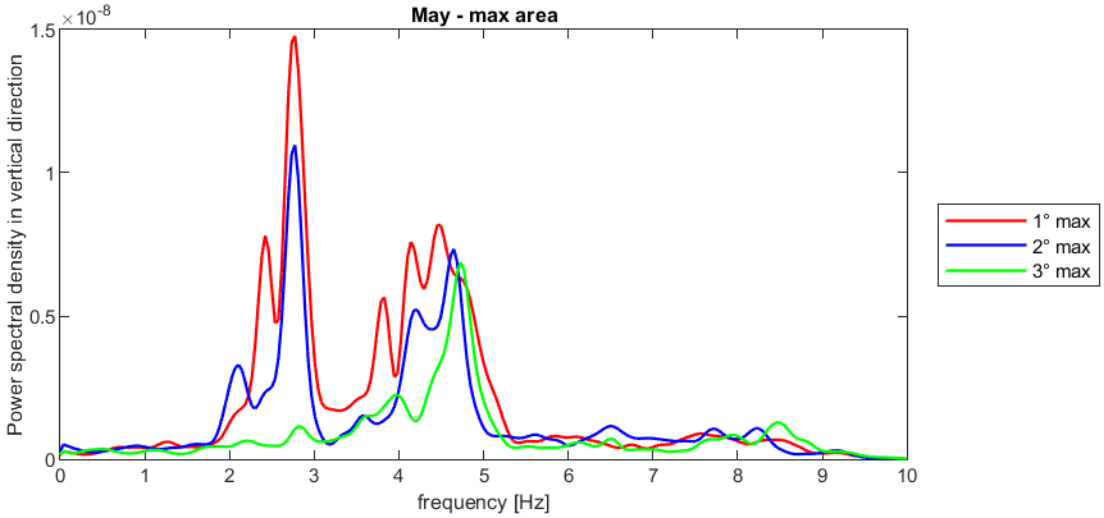


Figure 13-51: Results obtained from the 3 accelerograms with maximum area of PSD

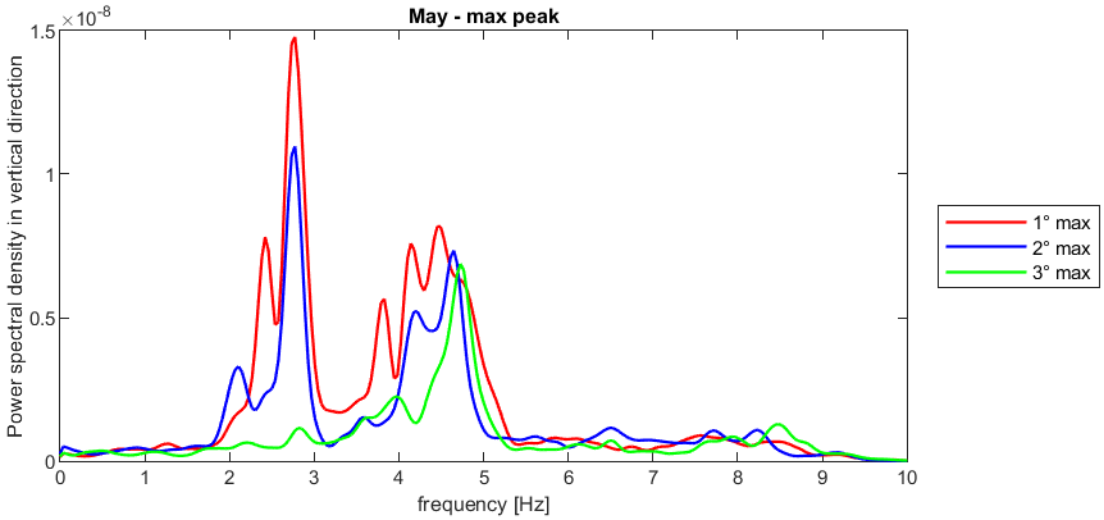


Figure 13-52: Results obtained from the 3 accelerograms with highest peak if PSD

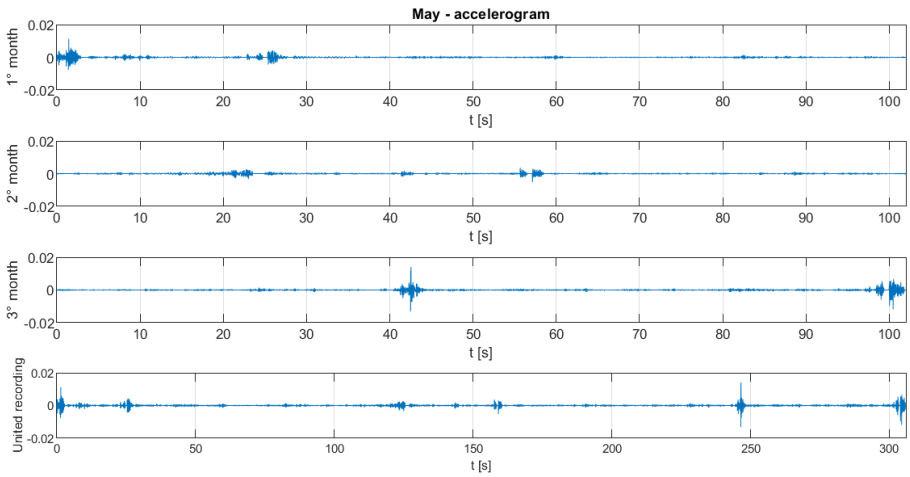


Figure 13-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.5.2 Longitudinal direction (y)

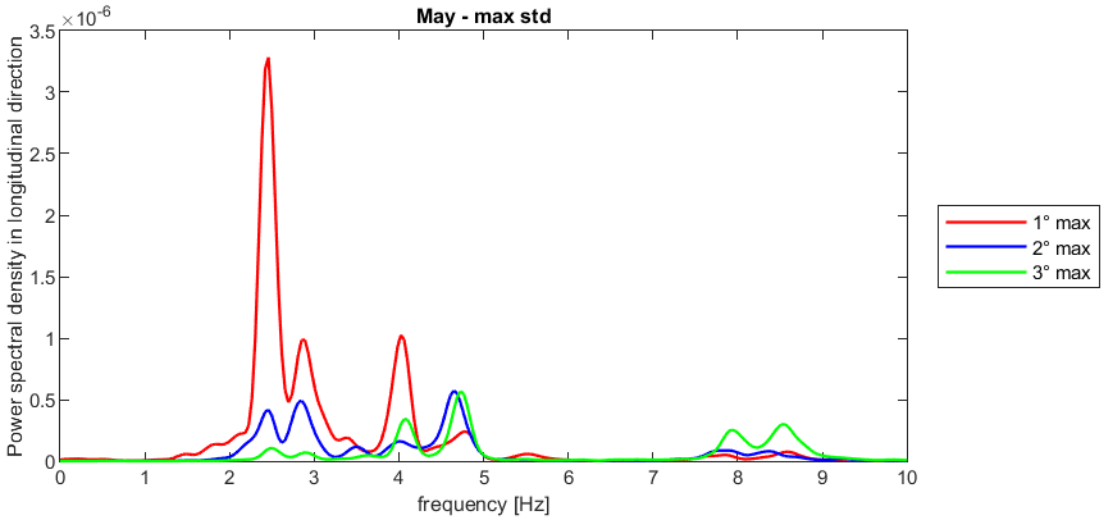


Figure 13-54: Results obtained from the 3 accelerograms with maximum SD in time domain

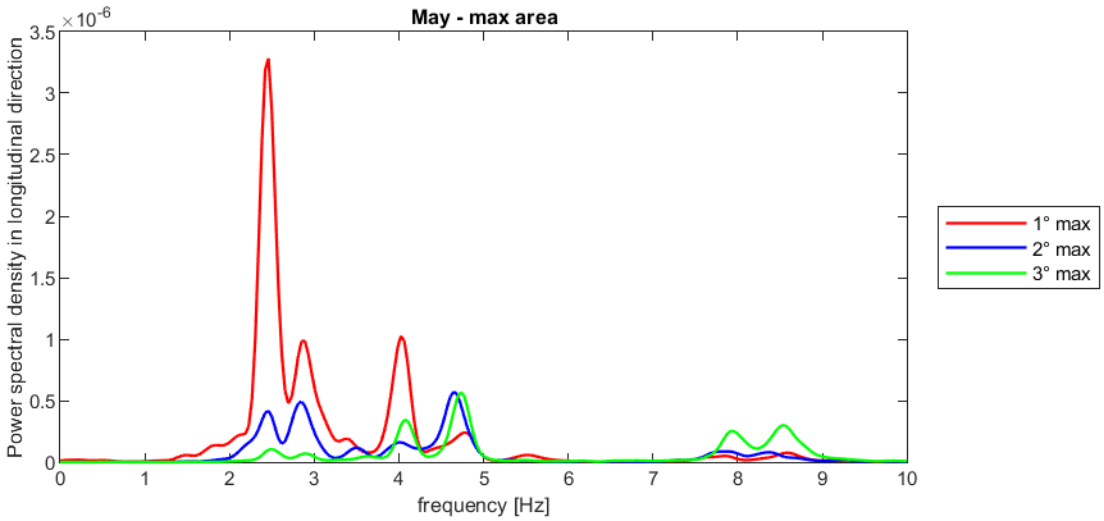


Figure 13-55: Results obtained from the 3 accelerograms with maximum area of PSD

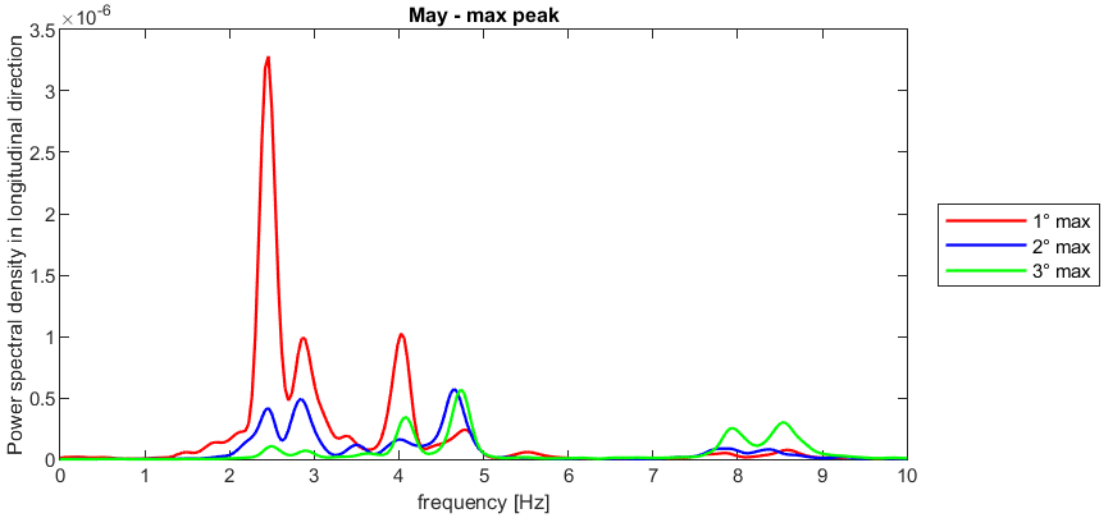


Figure 13-56: Results obtained from the 3 accelerograms with highest peak if PSD

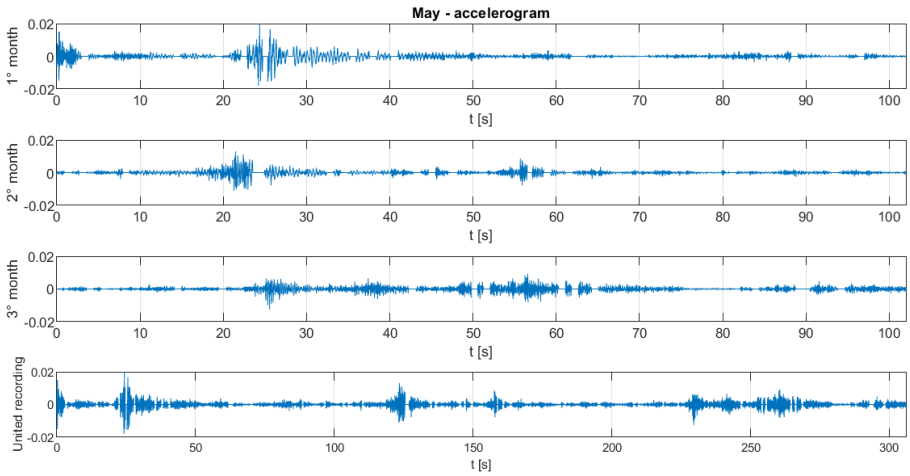


Figure 13-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

13.5.3 Transverse direction (z)

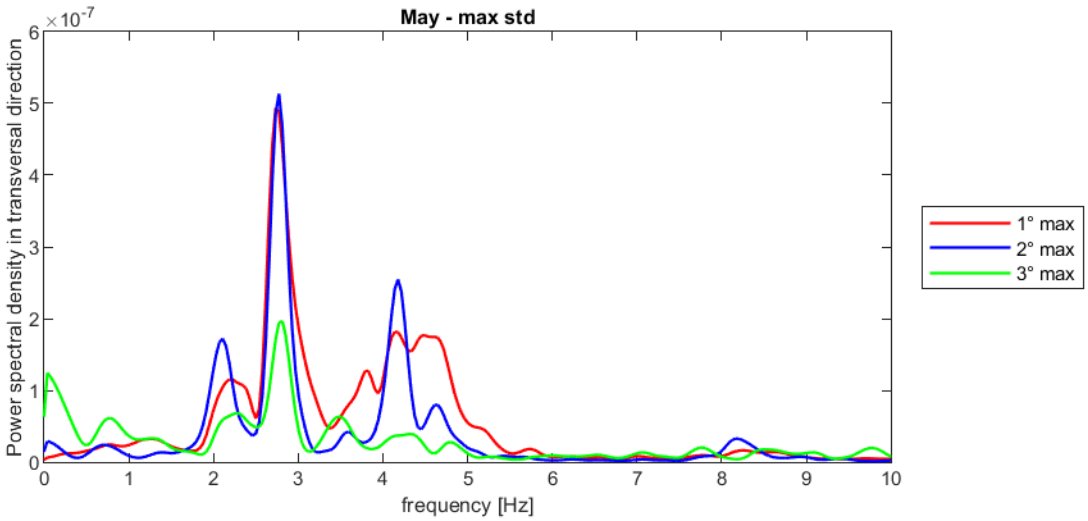


Figure 13-58: Results obtained from the 3 accelerograms with maximum SD in time domain

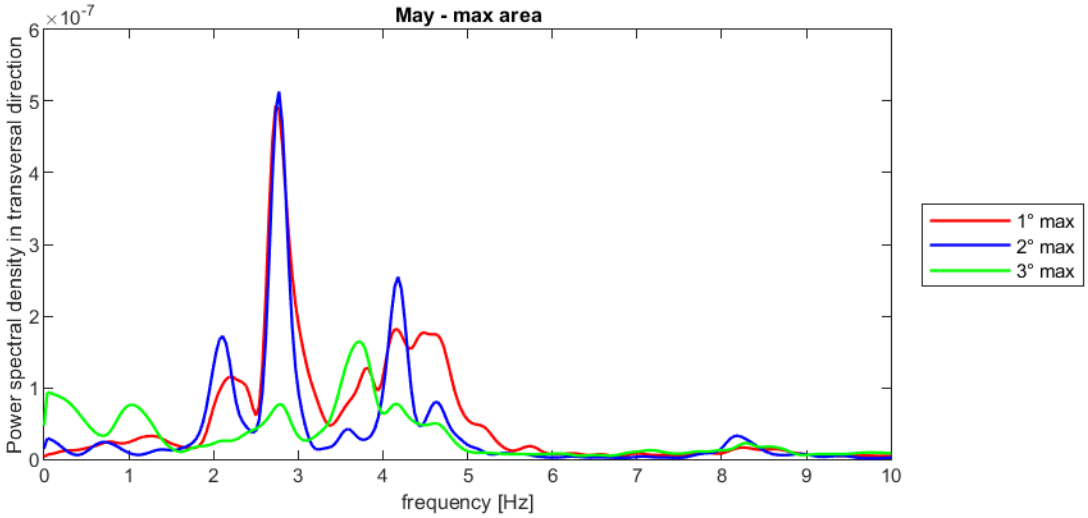


Figure 13-59: Results obtained from the 3 accelerograms with maximum area of PSD

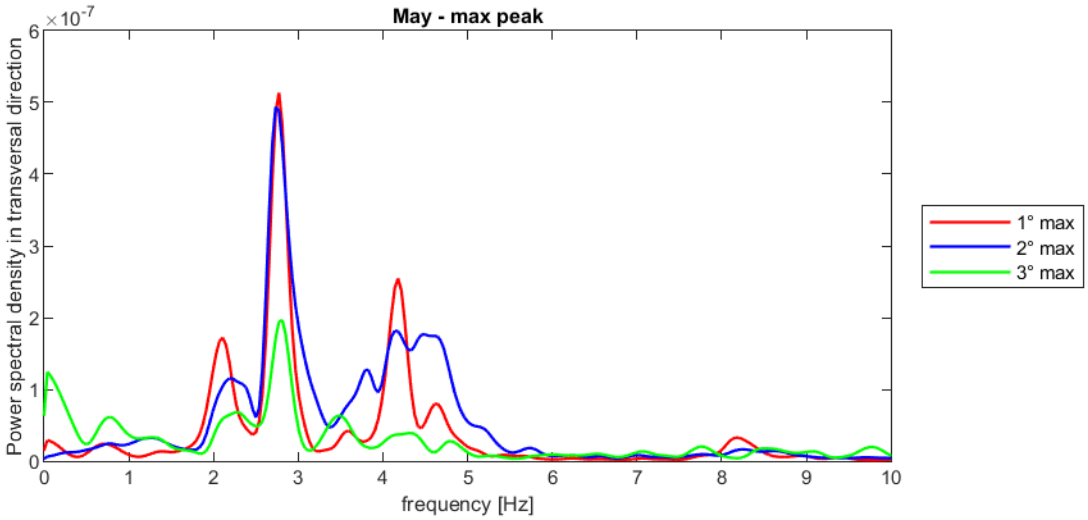


Figure 13-60: Results obtained from the 3 accelerograms with highest peak if PSD

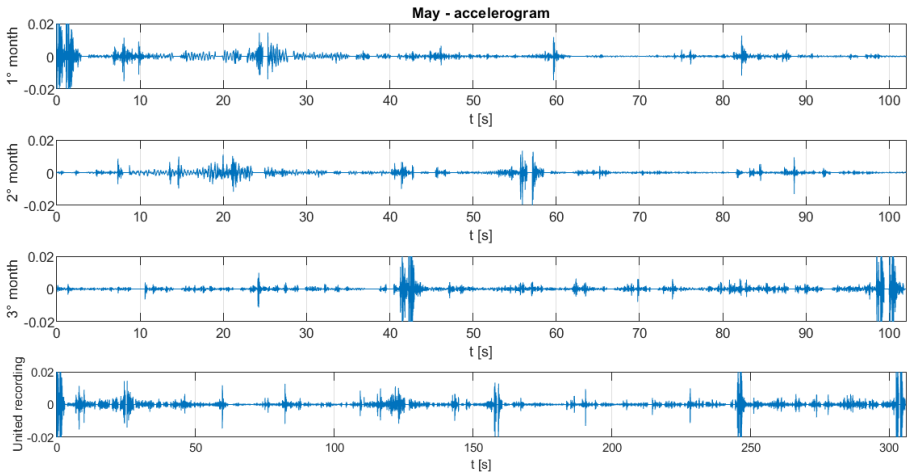


Figure 13-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

13.6 June

The results obtained for the June dataset are shown in the following tables.

Table 13-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-06-10_08-00-21	1.27E-04
	2°	319E3_2023-06-08_08-00-21	1.12E-04
	3°	319E3_2023-06-13_08-00-20	1.08E-04
Longitudinal direction (y)	1°	319E3_2023-06-10_08-00-21	1.07E-03
	2°	319E3_2023-06-21_08-00-21	8.65E-04
	3°	319E3_2023-06-13_08-00-20	7.68E-04
Transverse direction (z)	1°	319E3_2023-06-10_08-00-21	7.69E-04
	2°	319E3_2023-06-21_08-00-21	5.68E-04
	3°	319E3_2023-06-13_08-00-20	5.46E-04

Table 13-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-06-10_08-00-21	1.33E-08	319E3_2023-06-10_08-00-21	3.50E-09
2	319E3_2023-06-13_08-00-20	1.04E-08	319E3_2023-06-08_08-00-21	2.55E-09
3	319E3_2023-06-21_08-00-21	9.50E-09	319E3_2023-06-13_08-00-20	2.36E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-06-21_08-00-21	1.45E-06	319E3_2023-06-10_08-00-21	2.29E-07
2	319E3_2023-06-10_08-00-21	1.24E-06	319E3_2023-06-21_08-00-21	1.60E-07
3	319E3_2023-06-15_08-00-20	5.15E-07	319E3_2023-06-13_08-00-20	1.21E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-06-10_08-00-21	8.30E-07	319E3_2023-06-10_08-00-21	1.21E-07
2	319E3_2023-06-13_08-00-20	4.21E-07	319E3_2023-06-21_08-00-21	6.85E-08
3	319E3_2023-06-21_08-00-21	3.86E-07	319E3_2023-06-13_08-00-20	5.97E-08

Table 13-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	D	A	A	A	A
2	B	C	B	D	A	D	D	C	D
3	C	-	C	C	-	C	C	D	C

13.6.1 Vertical direction (x)

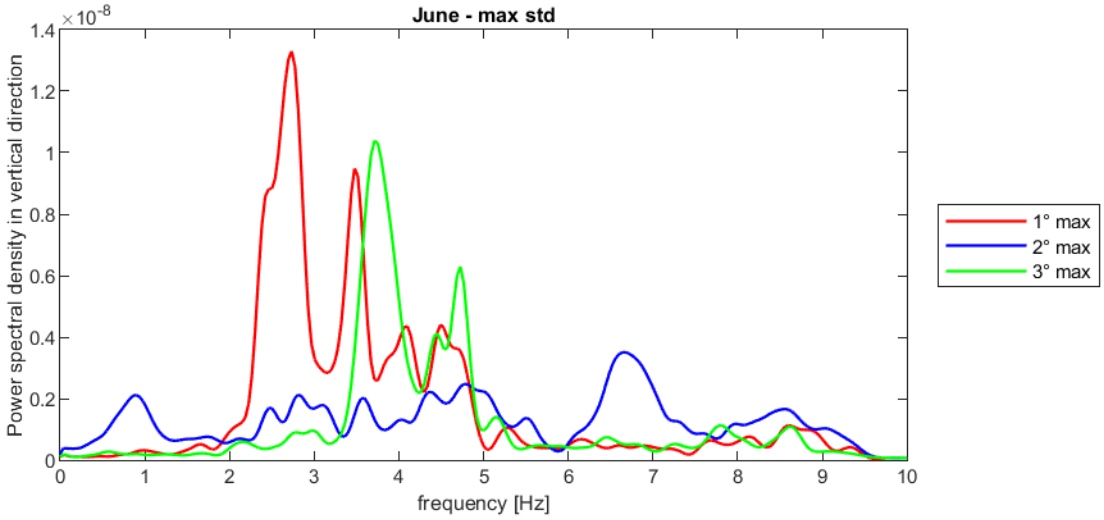


Figure 13-62: Results obtained from the 3 accelerograms with maximum SD in time domain

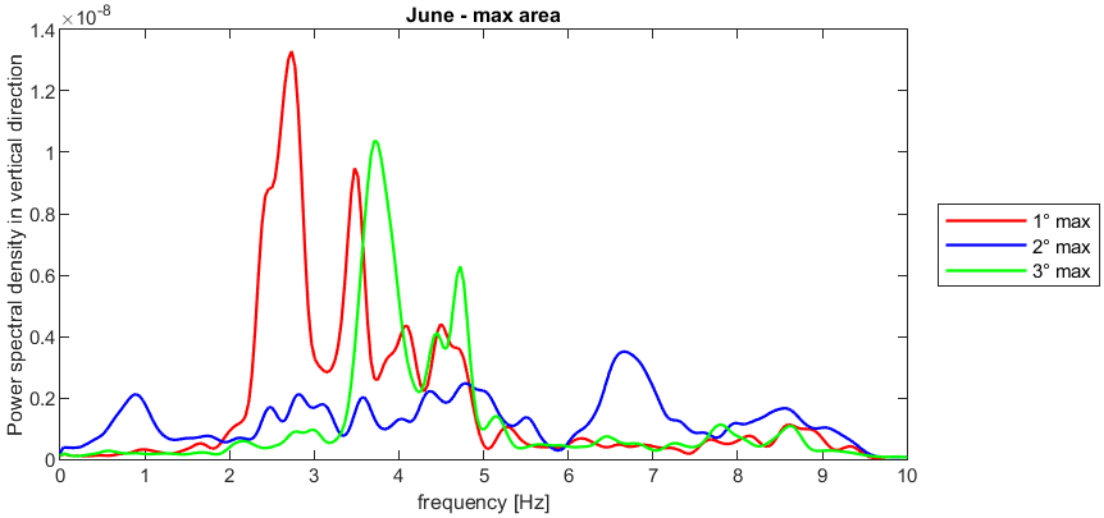


Figure 13-63: Results obtained from the 3 accelerograms with maximum area of PSD

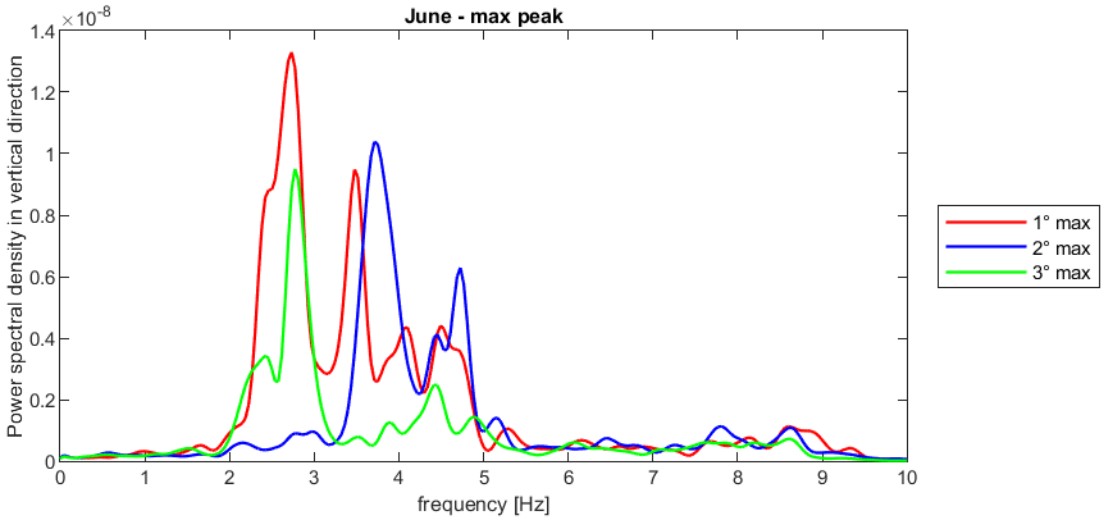


Figure 13-64: Results obtained from the 3 accelerograms with highest peak if PSD

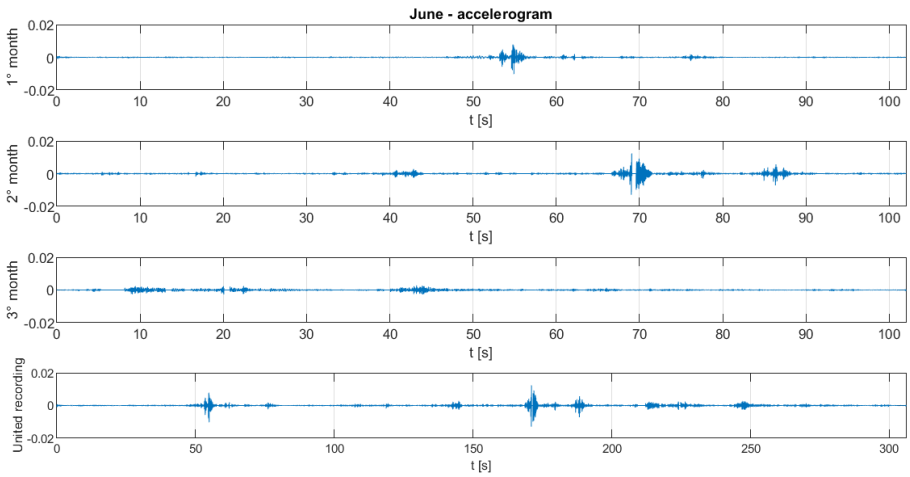


Figure 13-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.6.2 Longitudinal direction (y)

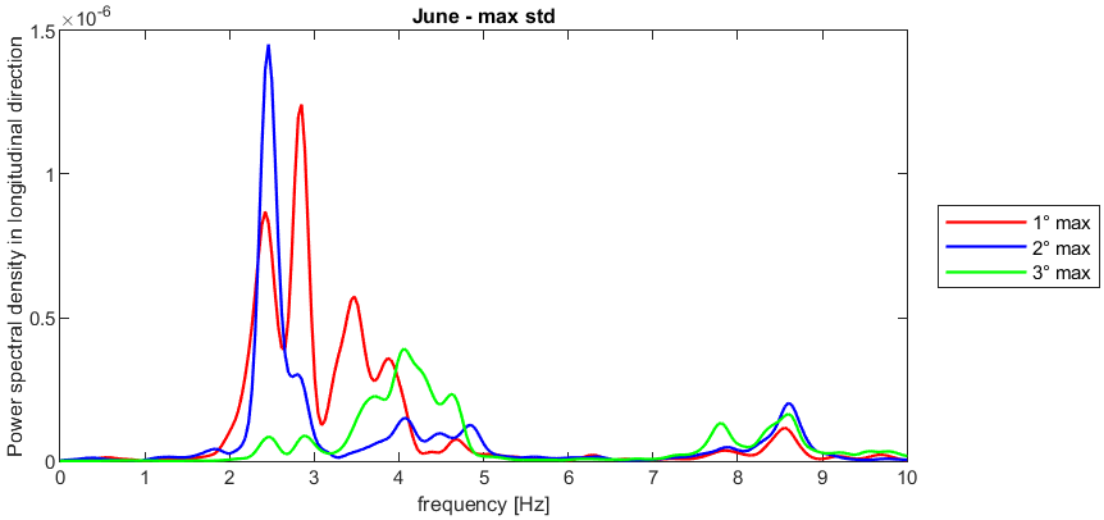


Figure 13-66: Results obtained from the 3 accelerograms with maximum SD in time domain

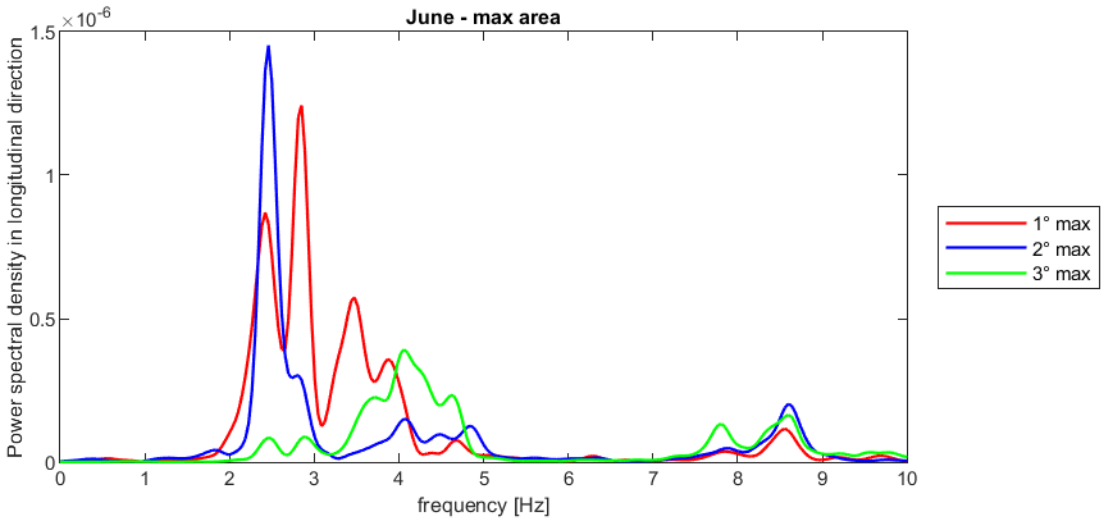


Figure 13-67: Results obtained from the 3 accelerograms with maximum area of PSD

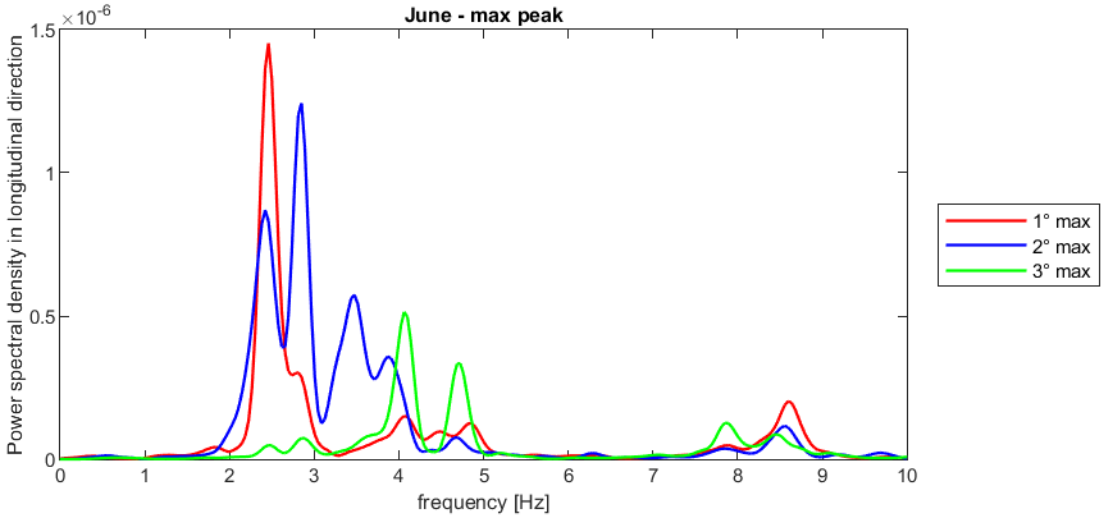


Figure 13-68: Results obtained from the 3 accelerograms with highest peak if PSD

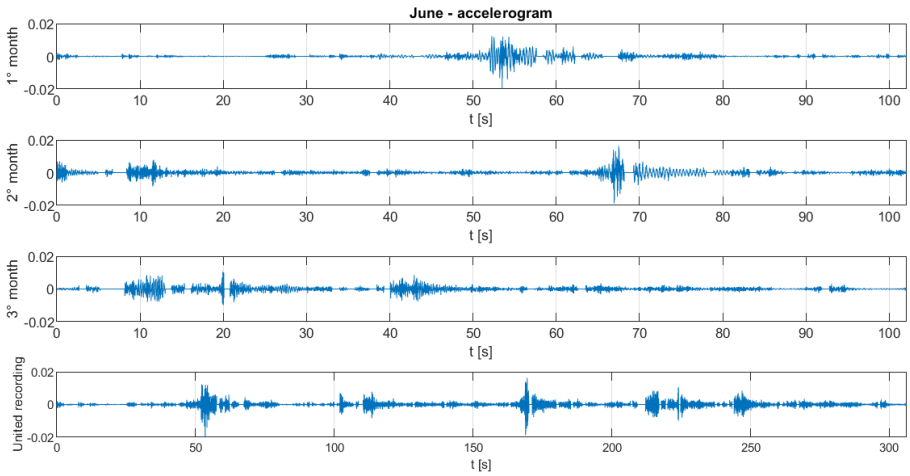


Figure 13-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

13.6.3 Transverse direction (z)

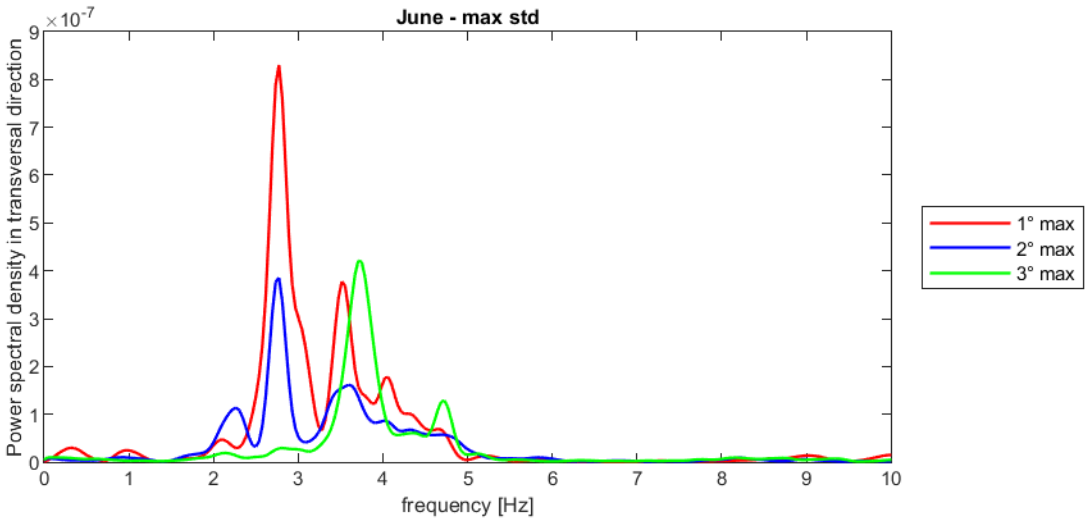


Figure 13-70: Results obtained from the 3 accelerograms with maximum SD in time domain

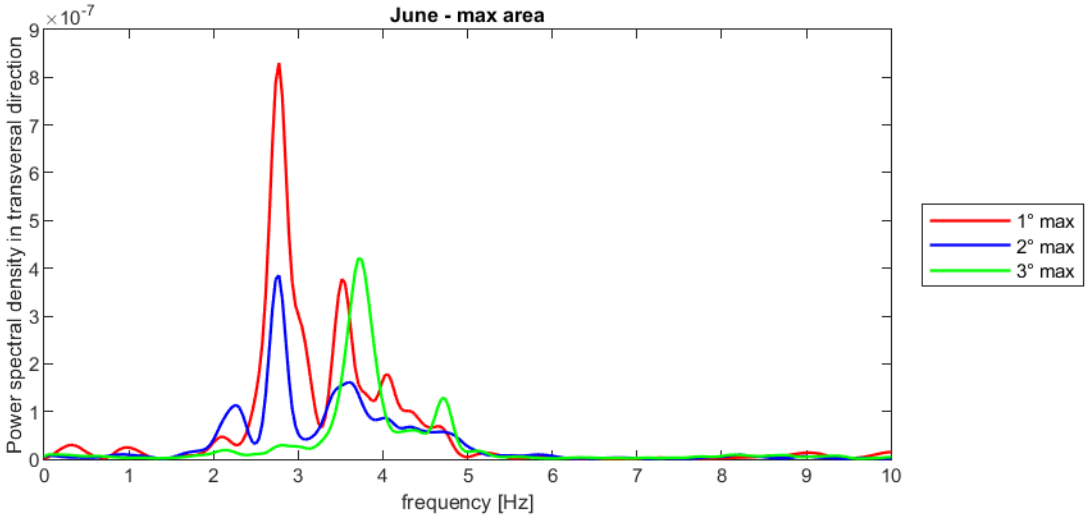


Figure 13-71: Results obtained from the 3 accelerograms with maximum area of PSD

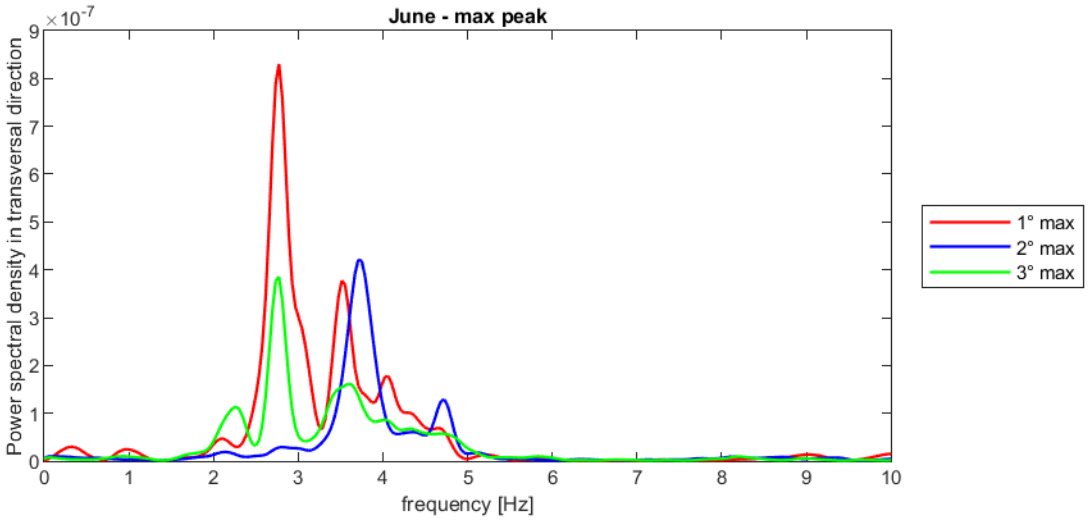


Figure 13-72: Results obtained from the 3 accelerograms with highest peak if PSD

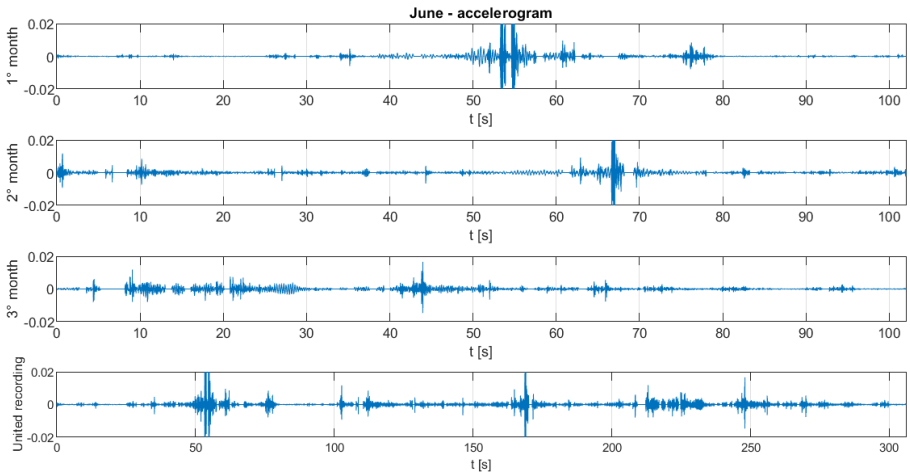


Figure 13-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

13.7 July

The results obtained for the July dataset are shown in the following tables.

Table 13-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-07-06_14-00-21	1.22E-04
	2°	319E3_2023-07-07_14-00-21	1.15E-04
	3°	319E3_2023-07-22_14-00-21	9.75E-05
Longitudinal direction (y)	1°	319E3_2023-07-06_14-00-21	9.84E-04
	2°	319E3_2023-07-07_14-00-21	8.56E-04
	3°	319E3_2023-07-20_14-00-21	8.19E-04
Transverse direction (z)	1°	319E3_2023-07-06_14-00-21	8.44E-04
	2°	319E3_2023-07-07_14-00-21	7.07E-04
	3°	319E3_2023-07-22_14-00-21	6.42E-04

Table 13-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-07-07_14-00-21	1.52E-08	319E3_2023-07-06_14-00-21	3.05E-09
2	319E3_2023-07-06_14-00-21	1.15E-08	319E3_2023-07-07_14-00-21	2.68E-09
3	319E3_2023-07-17_14-00-20	4.78E-09	319E3_2023-07-22_14-00-21	1.87E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-07-17_14-00-20	8.24E-07	319E3_2023-07-06_14-00-21	1.75E-07
2	319E3_2023-07-06_14-00-21	7.92E-07	319E3_2023-07-07_14-00-21	1.40E-07
3	319E3_2023-07-20_14-00-21	7.37E-07	319E3_2023-07-20_14-00-21	1.32E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-07-06_14-00-21	8.51E-07	319E3_2023-07-06_14-00-21	1.46E-07
2	319E3_2023-07-07_14-00-21	5.46E-07	319E3_2023-07-07_14-00-21	1.01E-07
3	319E3_2023-07-19_08-00-20	3.21E-07	319E3_2023-07-22_14-00-21	8.20E-08

Table 13-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	-	A	A	A	A
2	B	A	B	B	A	B	B	B	B
3	C	-	C	D	D	D	C	-	C

13.7.1 Vertical direction (x)

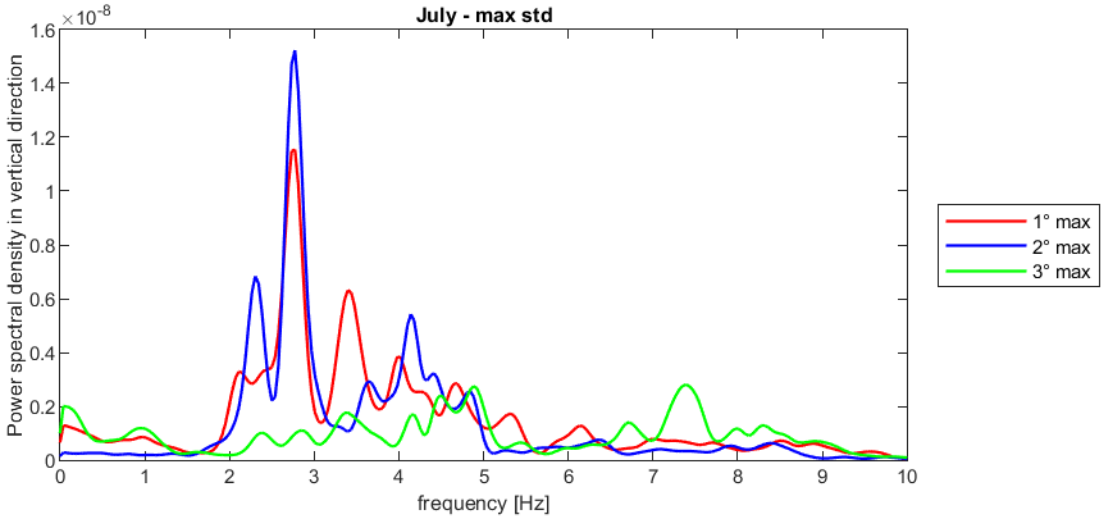


Figure 13-74: Results obtained from the 3 accelerograms with maximum SD in time domain

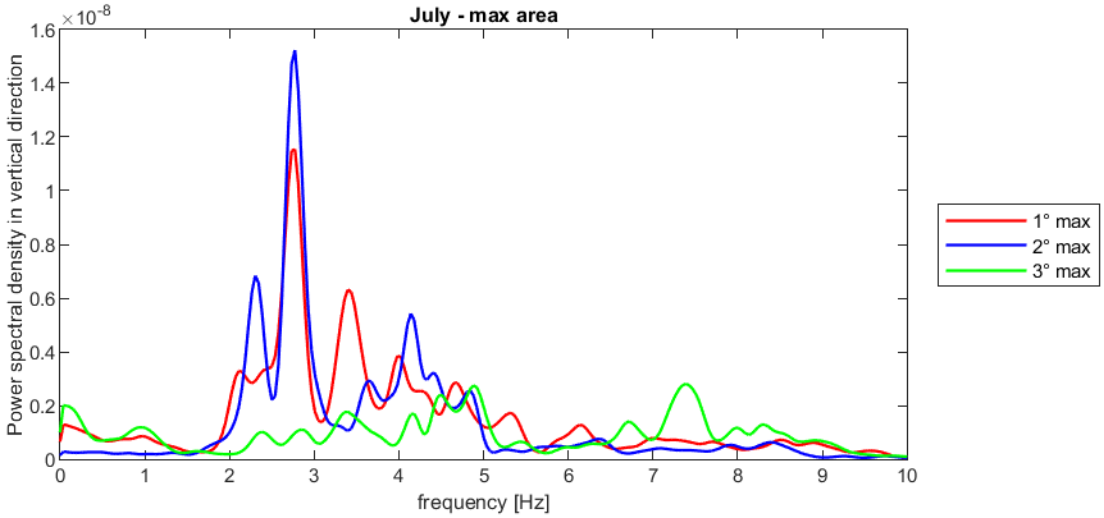


Figure 13-75: Results obtained from the 3 accelerograms with maximum area of PSD

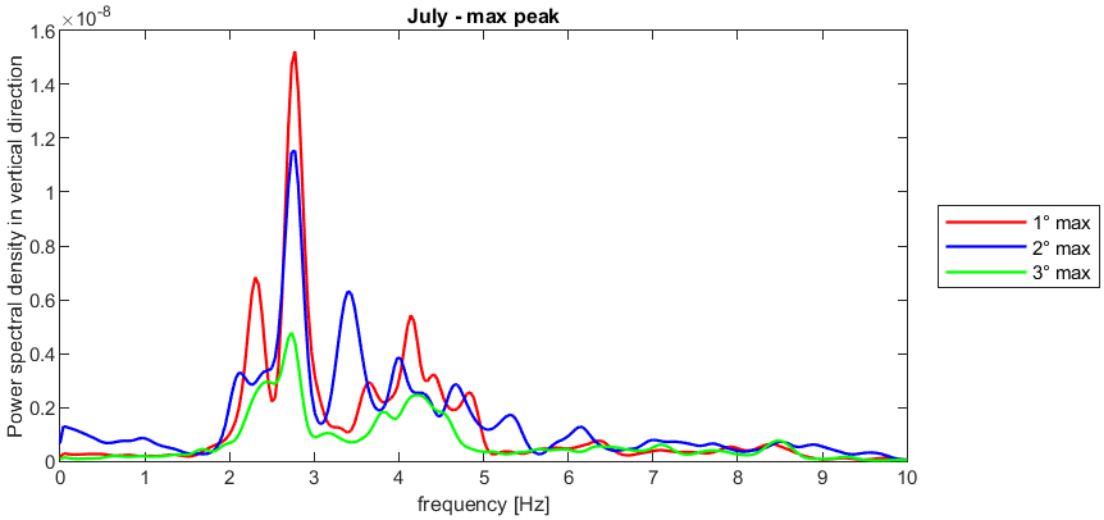


Figure 13-76: Results obtained from the 3 accelerograms with highest peak if PSD

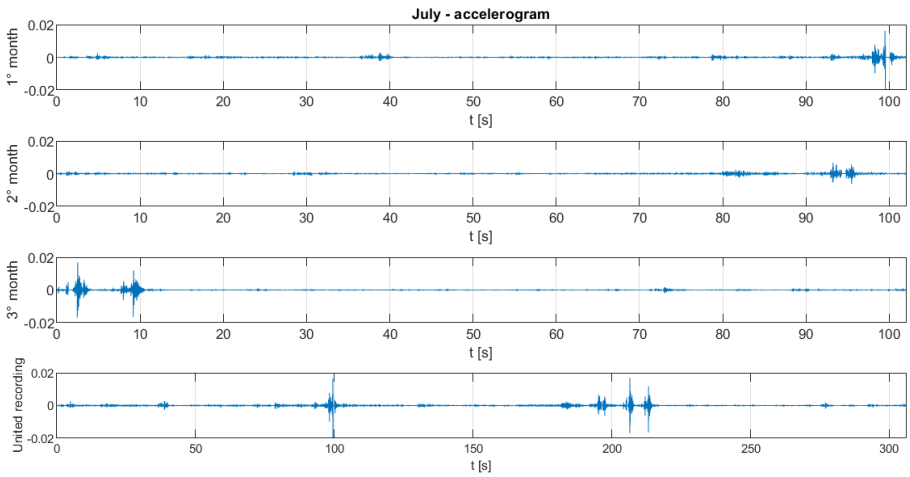


Figure 13-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.7.2 Longitudinal direction (y)

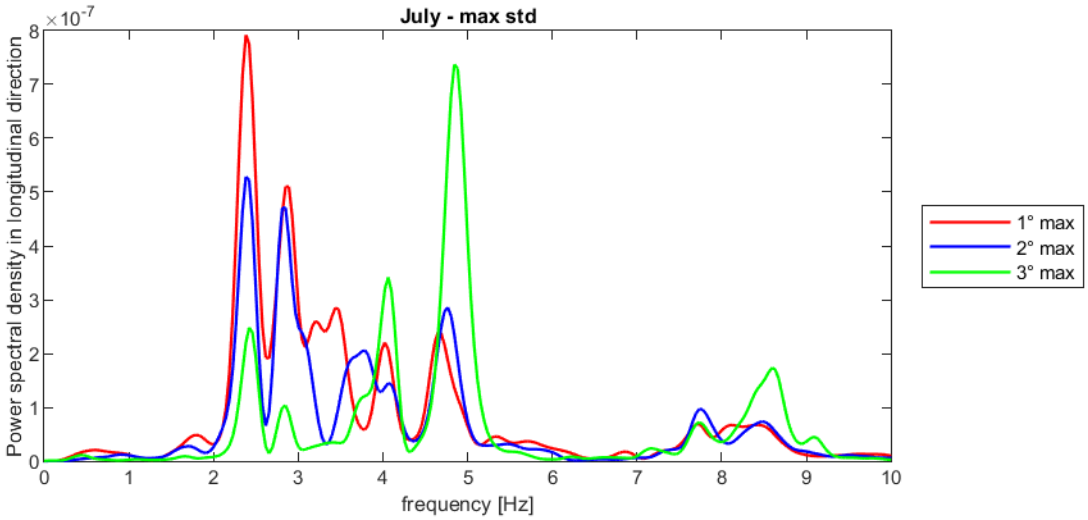


Figure 13-78: Results obtained from the 3 accelerograms with maximum SD in time domain

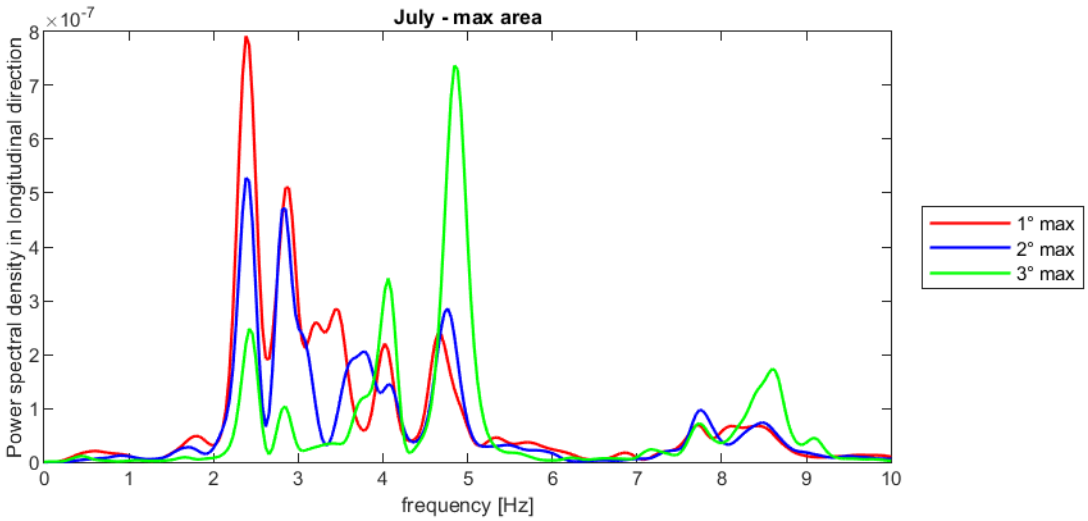


Figure 13-79: Results obtained from the 3 accelerograms with maximum area of PSD

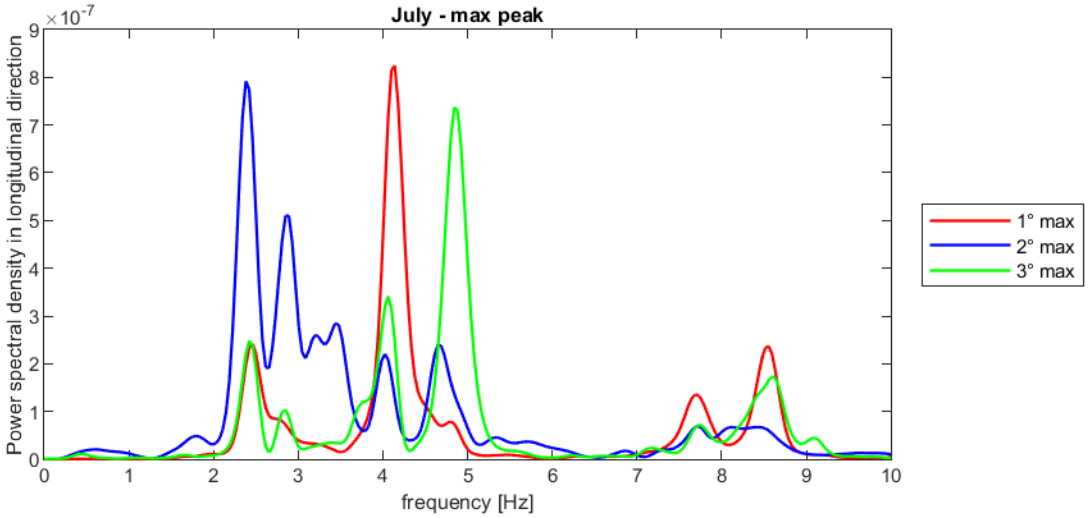


Figure 13-80: Results obtained from the 3 accelerograms with highest peak if PSD

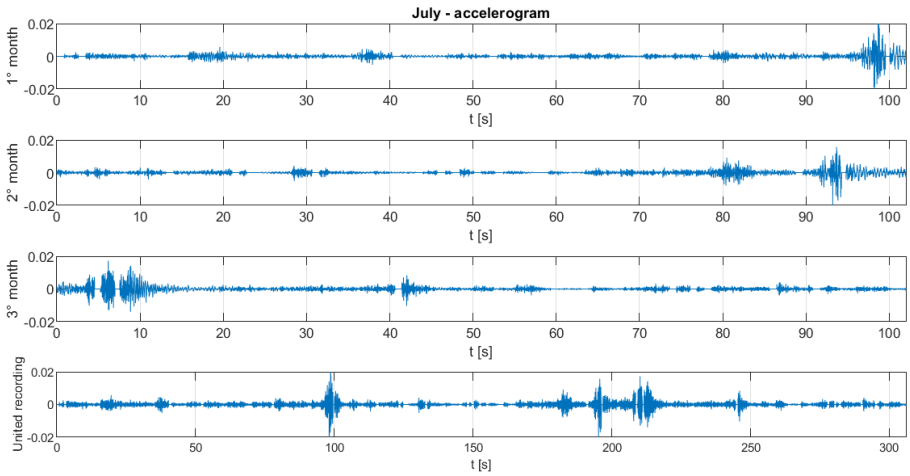


Figure 13-81: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.7.3 Transverse direction (z)

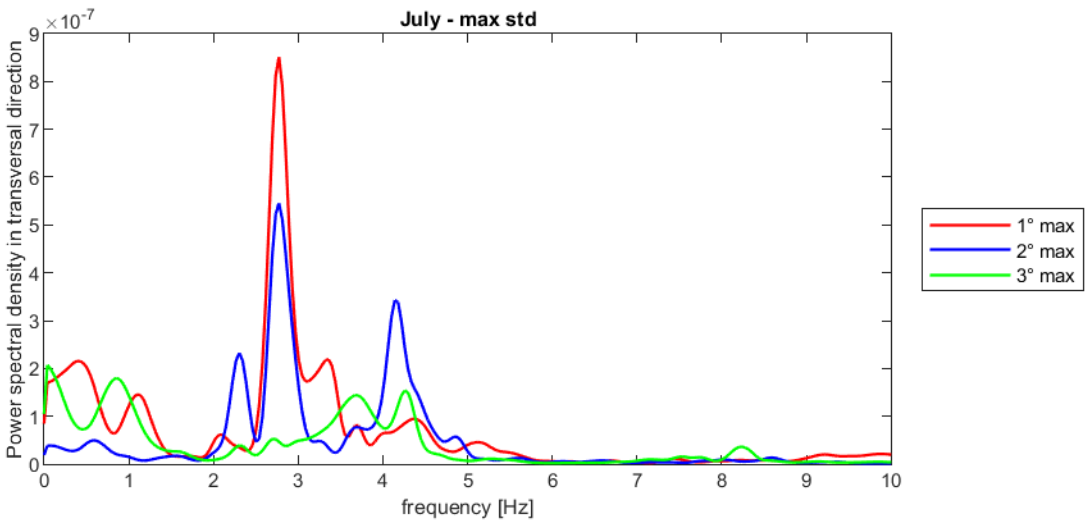


Figure 13-82: Results obtained from the 3 accelerograms with maximum SD in time domain

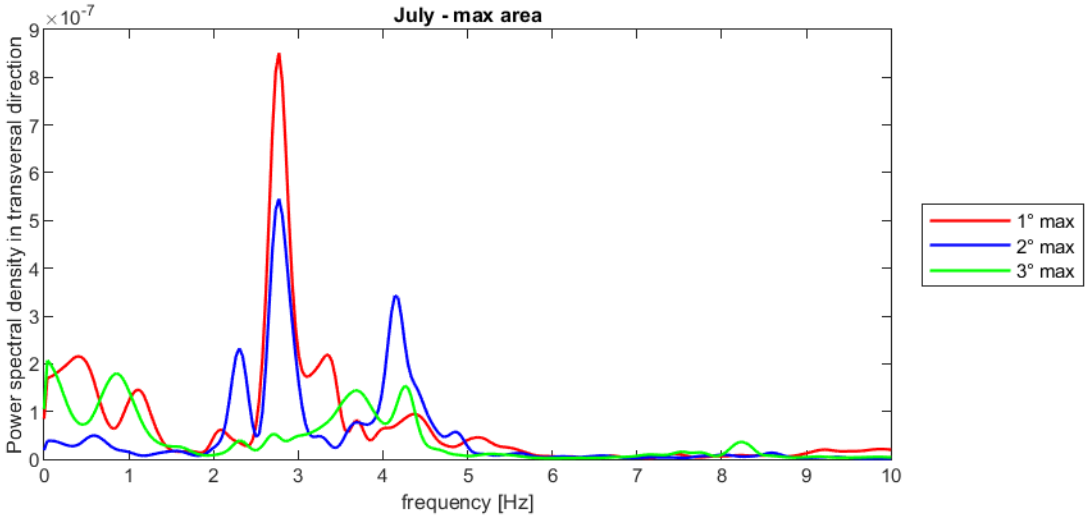


Figure 13-83: Results obtained from the 3 accelerograms with maximum area of PSD

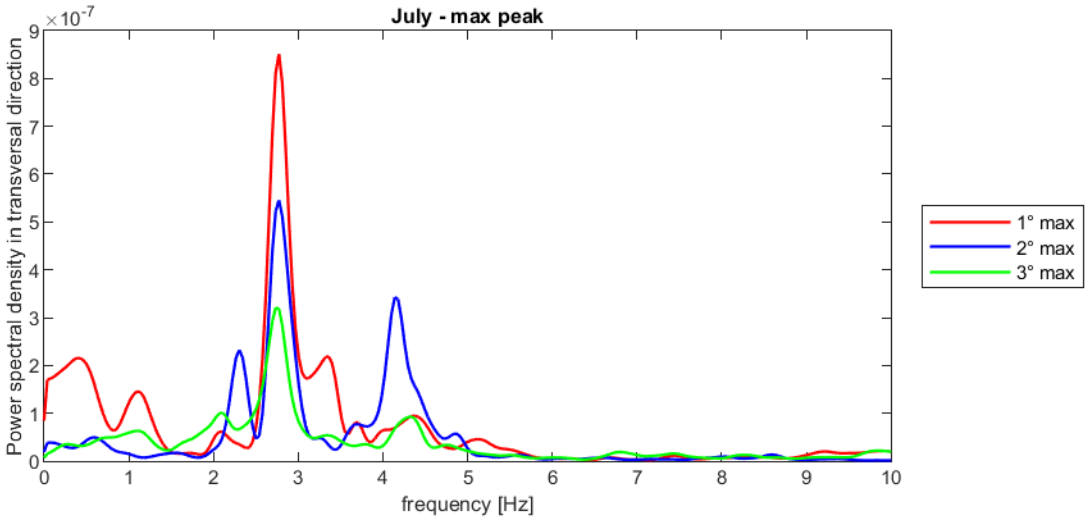


Figure 13-84: Results obtained from the 3 accelerograms with highest peak if PSD

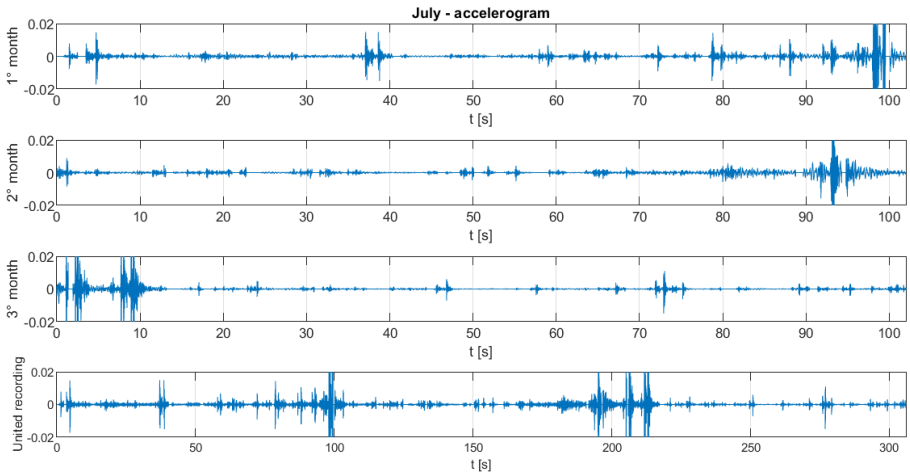


Figure 13-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

13.8 August

The results obtained for the August dataset are shown in the following tables.

Table 13-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-08-02_08-00-20	1.13E-04
	2°	319E3_2023-08-07_14-00-20	1.10E-04
	3°	319E3_2023-08-02_20-00-20	1.01E-04
Longitudinal direction (y)	1°	319E3_2023-08-07_14-00-20	8.03E-04
	2°	319E3_2023-08-02_08-00-20	6.97E-04
	3°	319E3_2023-08-30_08-00-21	6.43E-04
Transverse direction (z)	1°	319E3_2023-08-02_20-00-20	6.18E-04
	2°	319E3_2023-08-07_14-00-20	6.13E-04
	3°	319E3_2023-08-10_08-00-20	5.28E-04

Table 13-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-08-07_14-00-20	1.72E-08	319E3_2023-08-07_14-00-20	2.48E-09
2	319E3_2023-08-10_08-00-20	5.74E-09	319E3_2023-08-02_20-00-20	2.43E-09
3	319E3_2023-08-30_08-00-21	5.24E-09	319E3_2023-08-02_08-00-20	2.33E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-08-07_14-00-20	7.81E-07	319E3_2023-08-07_14-00-20	1.32E-07
2	319E3_2023-08-10_08-00-20	6.28E-07	319E3_2023-08-02_08-00-20	9.95E-08
3	319E3_2023-08-07_08-00-21	5.68E-07	319E3_2023-08-30_08-00-21	8.77E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-08-07_14-00-20	4.95E-07	319E3_2023-08-02_20-00-20	9.20E-08
2	319E3_2023-08-10_08-00-20	2.65E-07	319E3_2023-08-07_14-00-20	7.55E-08
3	319E3_2023-08-03_08-00-21	1.82E-07	319E3_2023-08-03_08-00-21	5.66E-08

Table 13-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	B	B	B	B	C	B	C
2	B	-	C	A	-	A	B	E	B
3	C	-	A	D	-	D	E	F	F

13.8.1 Vertical direction (x)

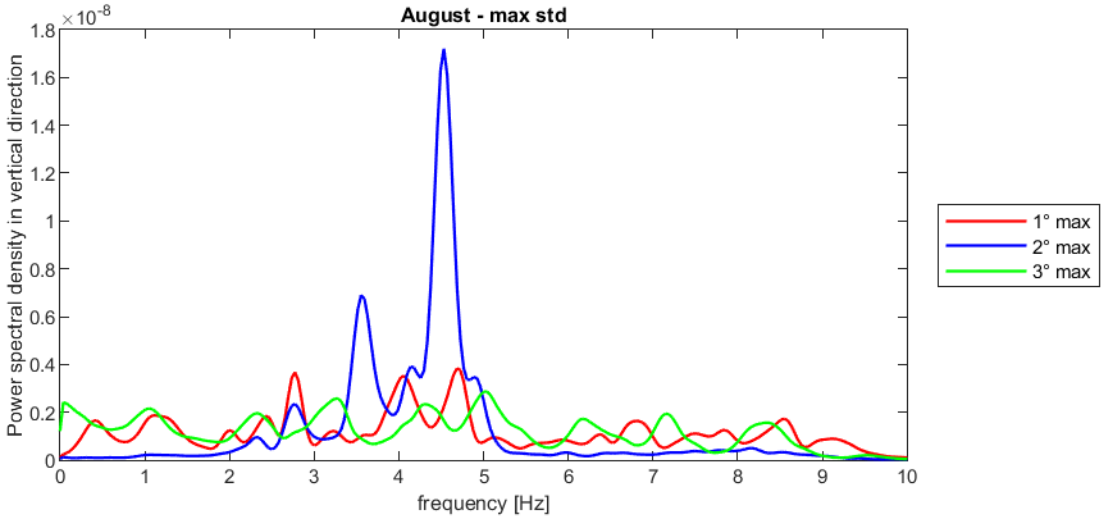


Figure 13-86: Results obtained from the 3 accelerograms with maximum SD in time domain

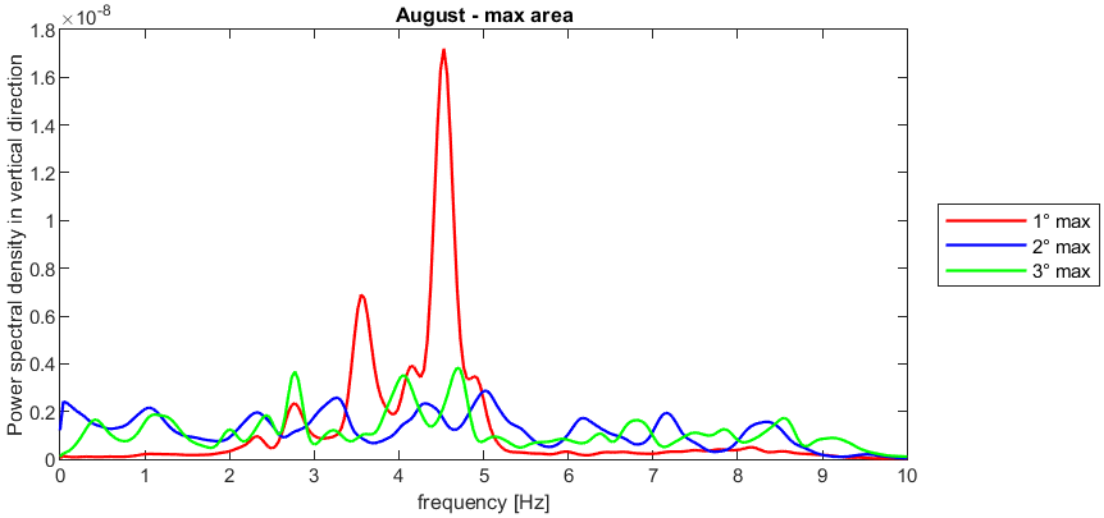


Figure 13-87: Results obtained from the 3 accelerograms with maximum area of PSD

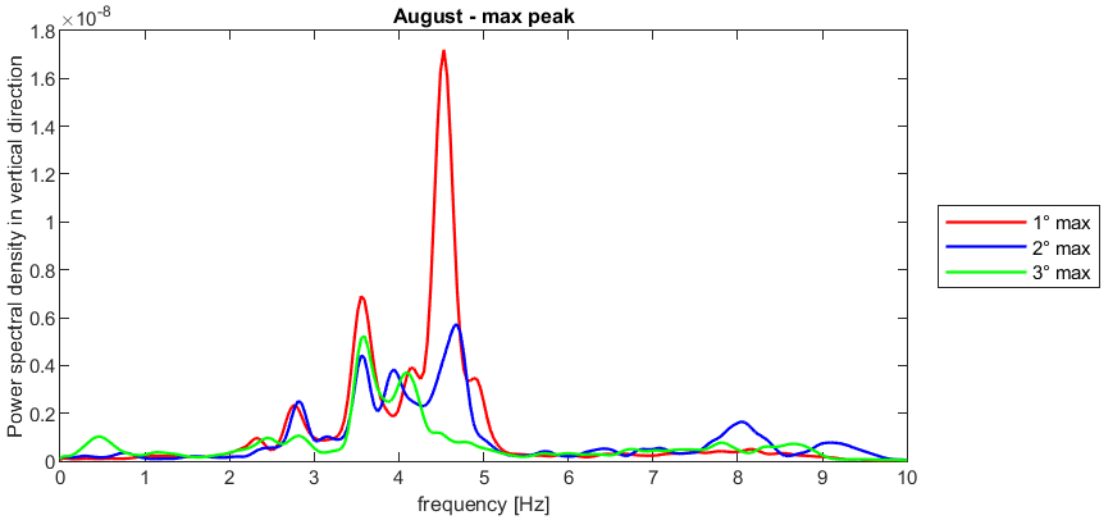


Figure 13-88: Results obtained from the 3 accelerograms with highest peak if PSD

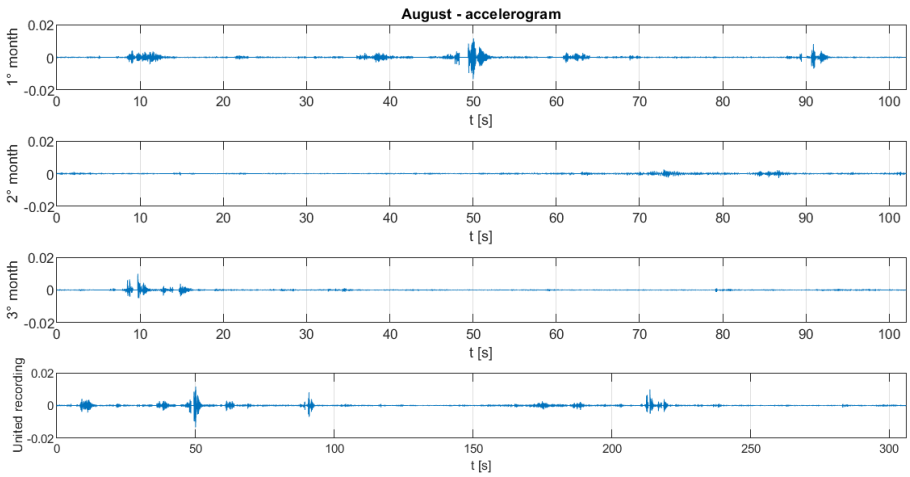


Figure 13-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.8.2 Longitudinal direction (y)

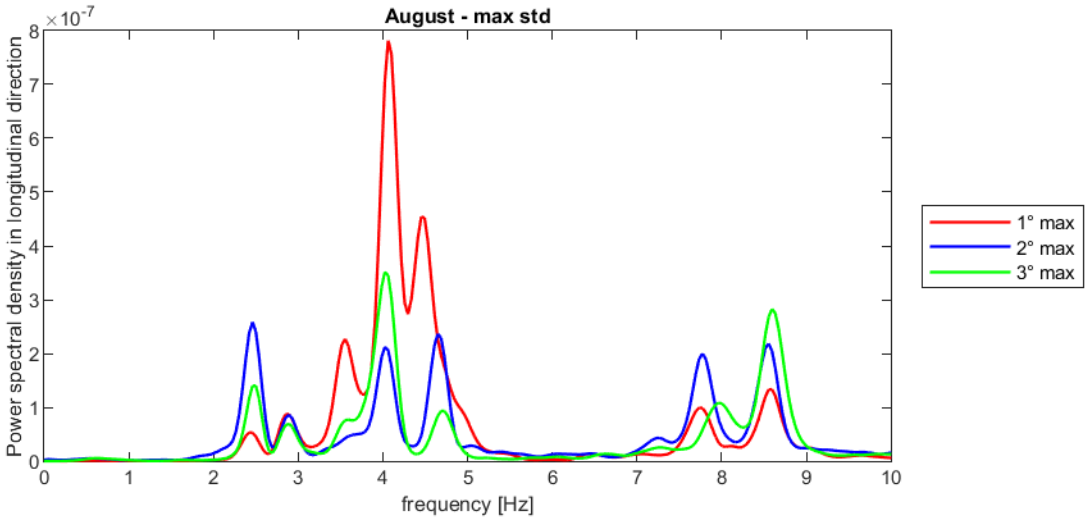


Figure 13-90: Results obtained from the 3 accelerograms with maximum SD in time domain

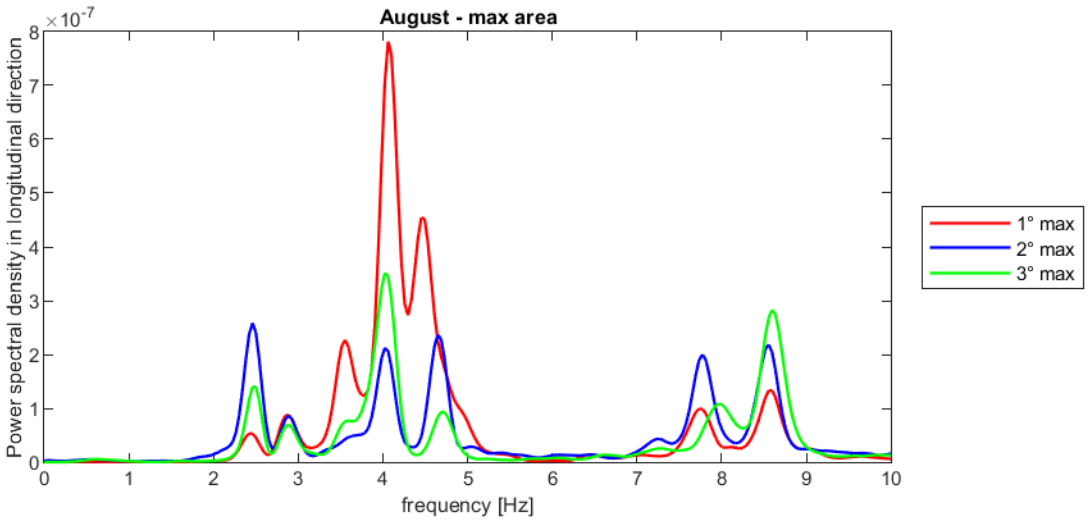


Figure 13-91: Results obtained from the 3 accelerograms with maximum area of PSD

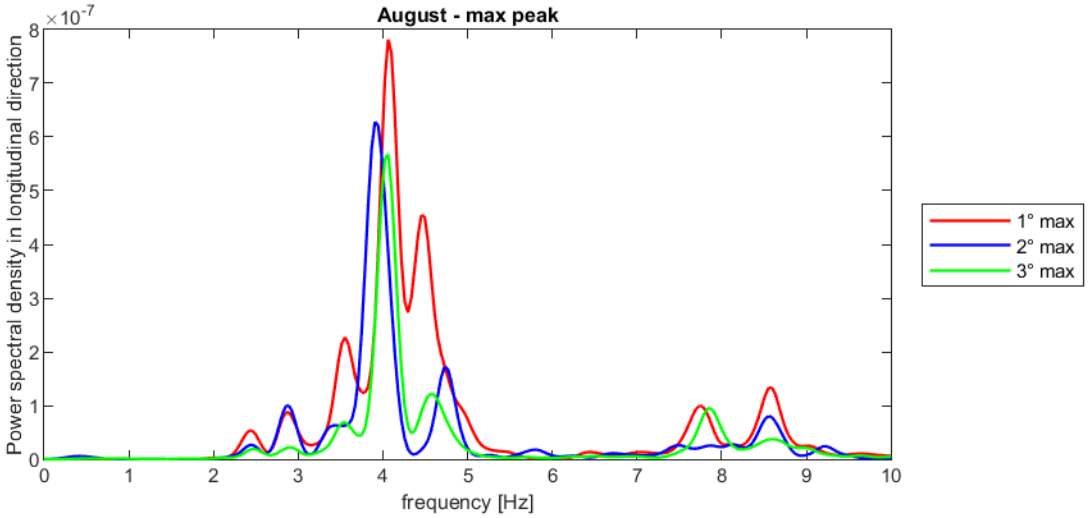


Figure 13-92: Results obtained from the 3 accelerograms with highest peak if PSD

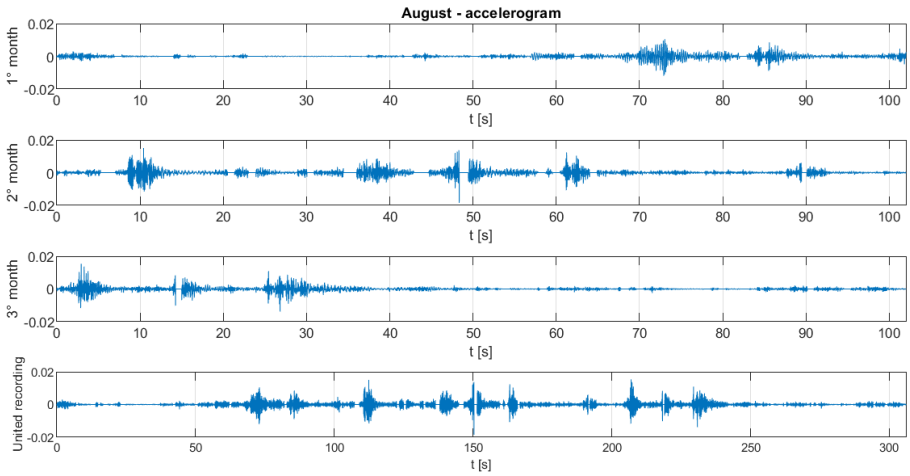


Figure 13-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

13.8.3 Transverse direction (z)

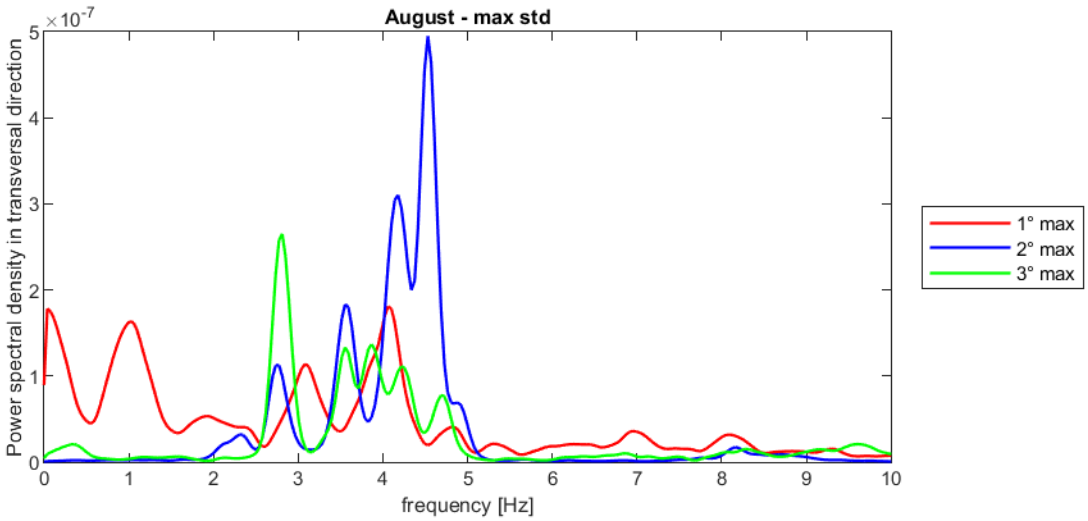


Figure 13-94: Results obtained from the 3 accelerograms with maximum SD in time domain

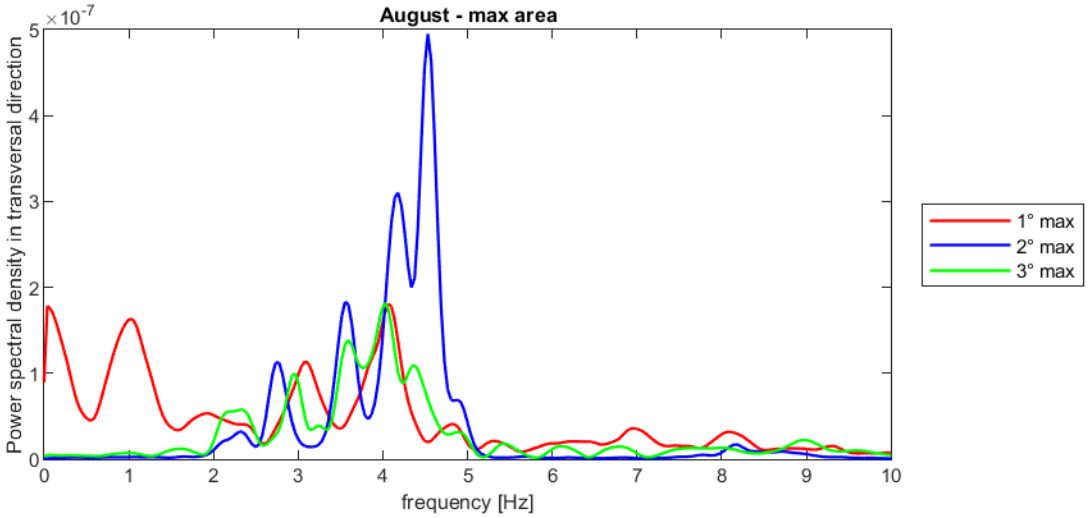


Figure 13-95: Results obtained from the 3 accelerograms with maximum area of PSD

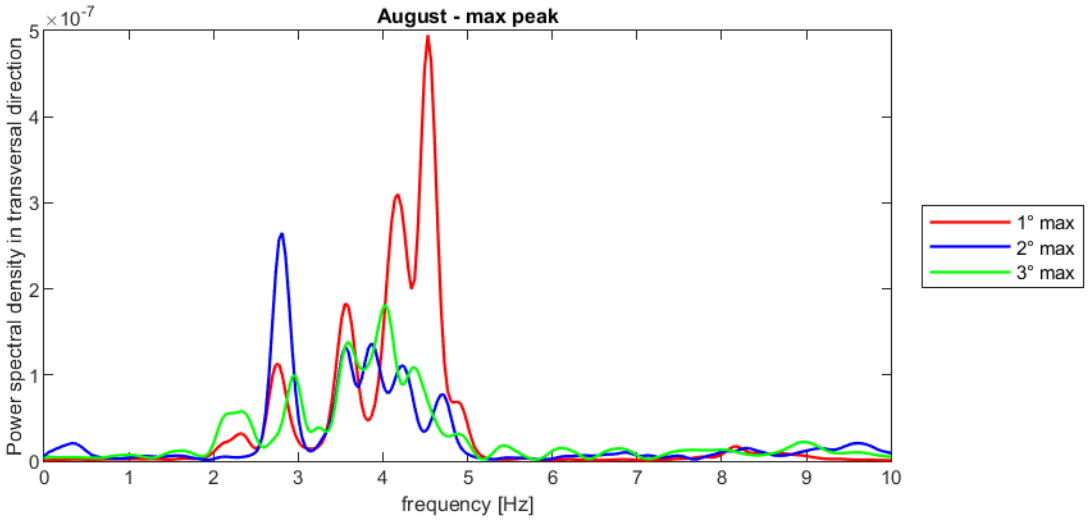


Figure 13-96: Results obtained from the 3 accelerograms with highest peak if PSD

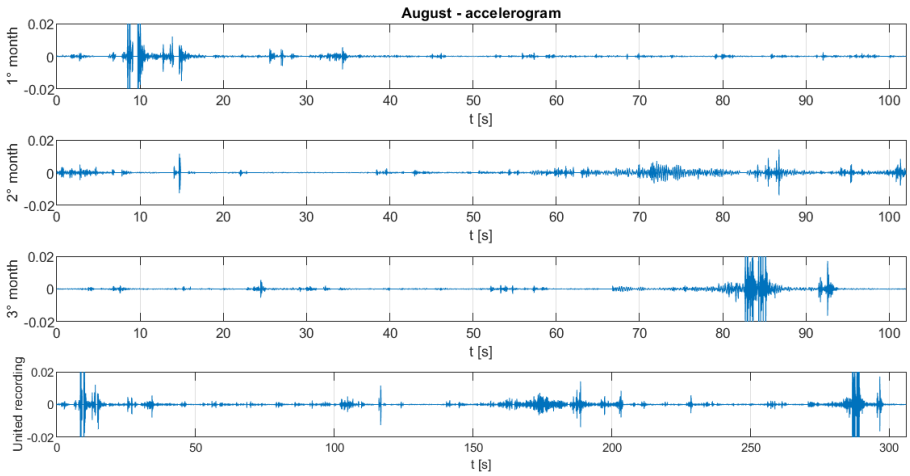


Figure 13-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

13.9 September

The results obtained for the September dataset are shown in the following tables.

Table 13-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-09-26_15-00-20	1.95E-04
	2°	319E3_2023-09-15_11-00-20	1.72E-04
	3°	319E3_2023-09-28_16-00-20	1.59E-04
Longitudinal direction (y)	1°	319E3_2023-09-26_15-00-20	1.24E-03
	2°	319E3_2023-09-15_11-00-20	1.23E-03
	3°	319E3_2023-09-20_11-00-20	1.02E-03
Transverse direction (z)	1°	319E3_2023-09-14_11-00-20	9.59E-04
	2°	319E3_2023-09-28_16-00-20	9.30E-04
	3°	319E3_2023-09-15_11-00-20	8.87E-04

Table 13-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-09-26_15-00-20	6.26E-08	319E3_2023-09-26_15-00-20	8.07E-09
2	319E3_2023-09-15_11-00-20	2.58E-08	319E3_2023-09-15_11-00-20	6.19E-09
3	319E3_2023-09-26_09-00-19	2.20E-08	319E3_2023-09-28_16-00-20	5.21E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-09-15_11-00-20	3.01E-06	319E3_2023-09-26_15-00-20	3.17E-07
2	319E3_2023-09-27_03-00-20	2.22E-06	319E3_2023-09-15_11-00-20	3.04E-07
3	319E3_2023-09-26_15-00-20	2.21E-06	319E3_2023-09-20_11-00-20	2.14E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-09-15_11-00-20	1.01E-06	319E3_2023-09-14_11-00-20	1.84E-07
2	319E3_2023-09-26_15-00-20	9.21E-07	319E3_2023-09-28_16-00-20	1.77E-07
3	319E3_2023-09-26_09-00-19	6.98E-07	319E3_2023-09-15_11-00-20	1.62E-07

Table 13-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	B	A	E	B	E
2	B	B	B	B	-	B	C	-	C
3	C	-	C	D	A	D	B	-	B

13.9.1 Vertical direction (x)

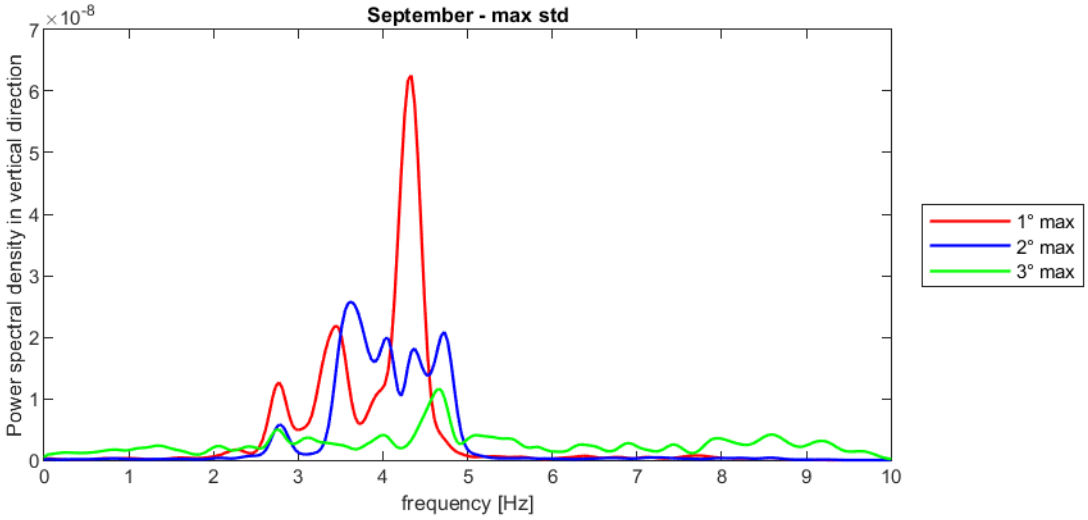


Figure 13-98: Results obtained from the 3 accelerograms with maximum SD in time domain

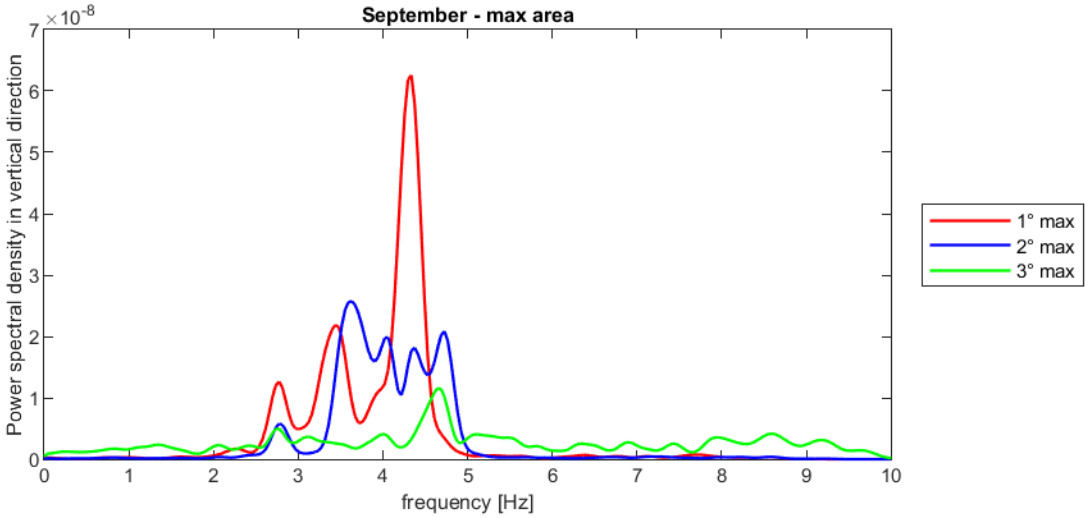


Figure 13-99: Results obtained from the 3 accelerograms with maximum area of PSD

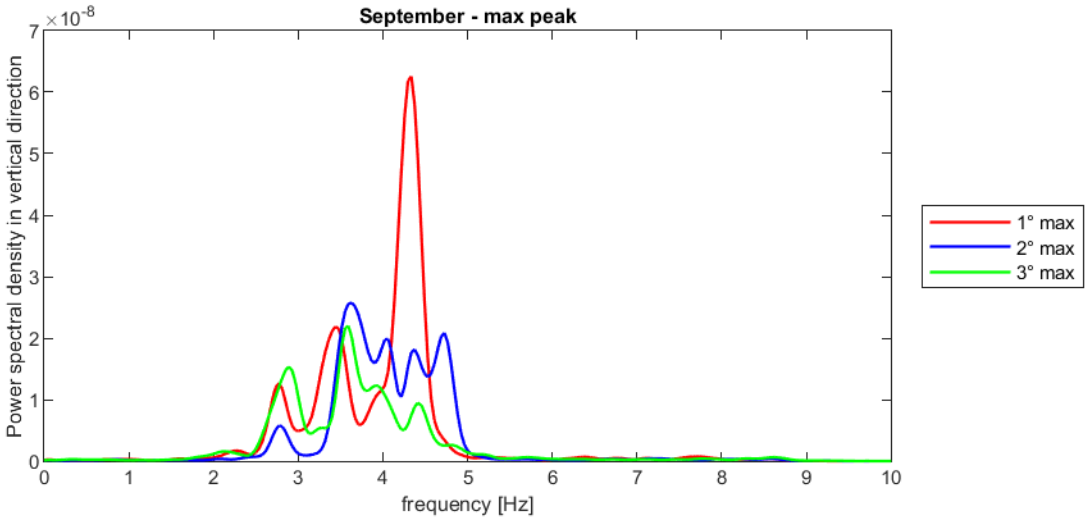


Figure 13-100: Results obtained from the 3 accelerograms with highest peak if PSD

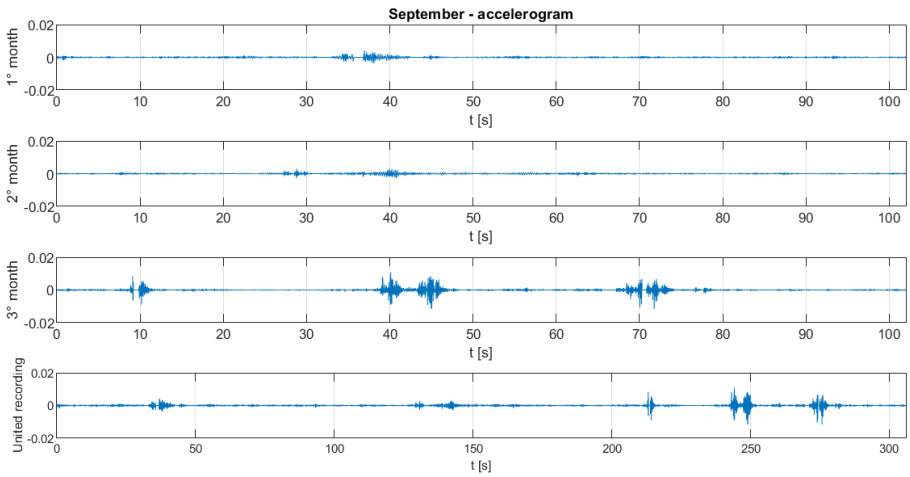


Figure 13-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.9.2 Longitudinal direction (y)

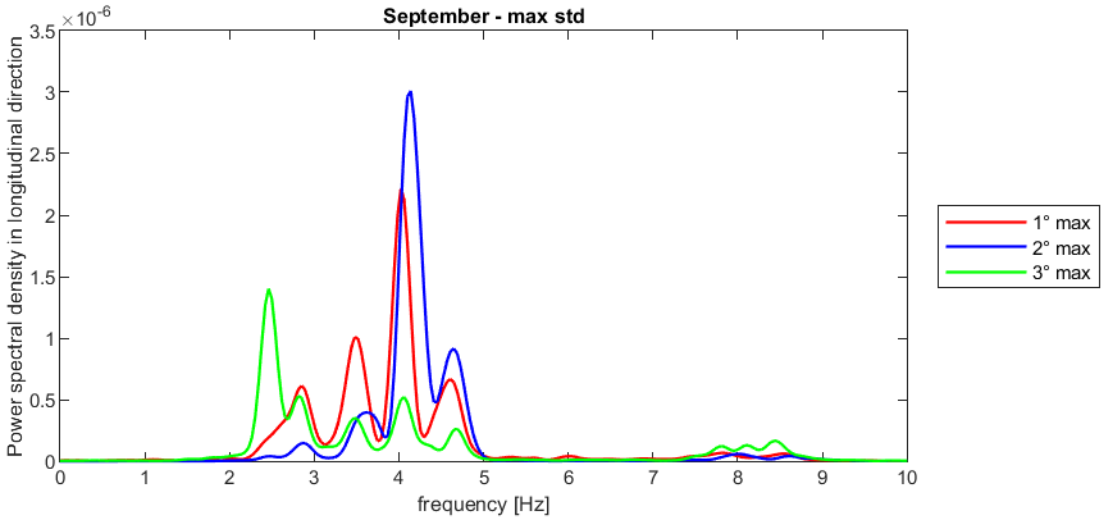


Figure 13-102: Results obtained from the 3 accelerograms with maximum SD in time domain

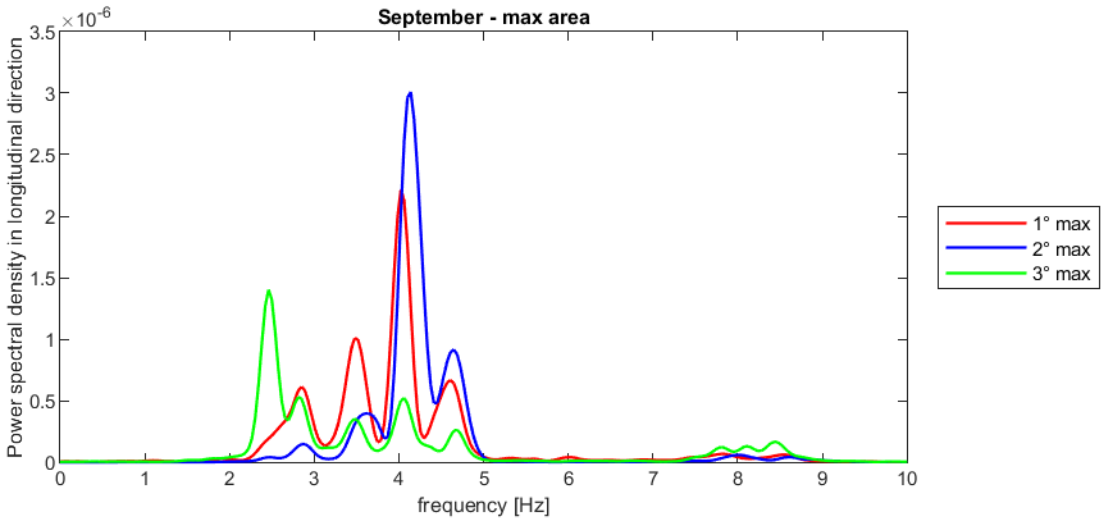


Figure 13-103: Results obtained from the 3 accelerograms with maximum area of PSD

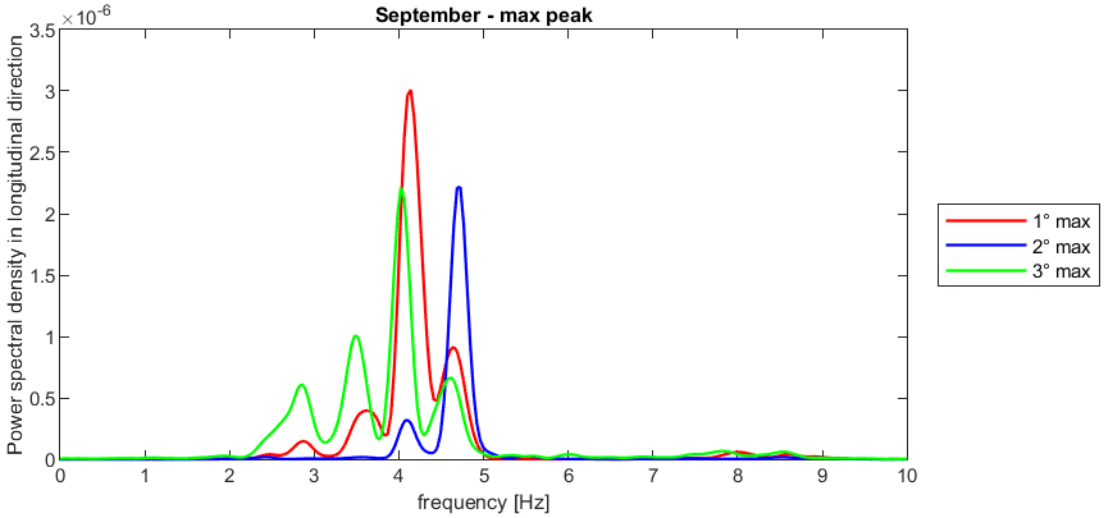


Figure 13-104: Results obtained from the 3 accelerograms with highest peak if PSD

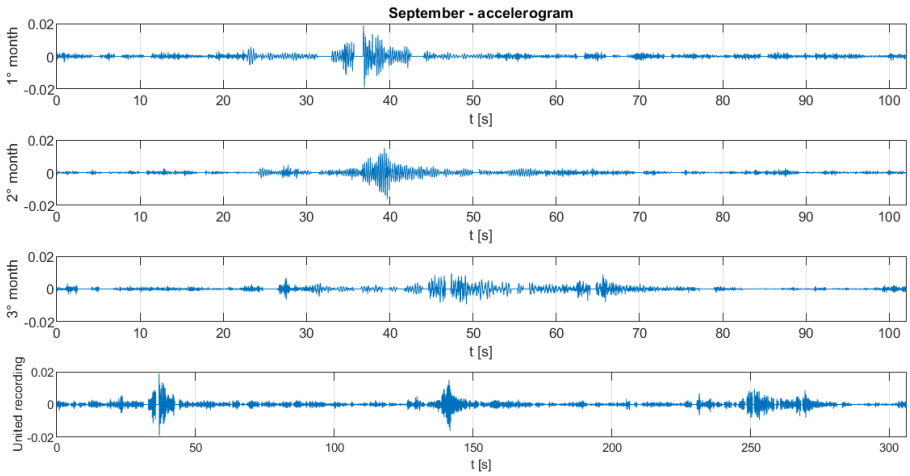


Figure 13-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

13.9.3 Transverse direction (z)

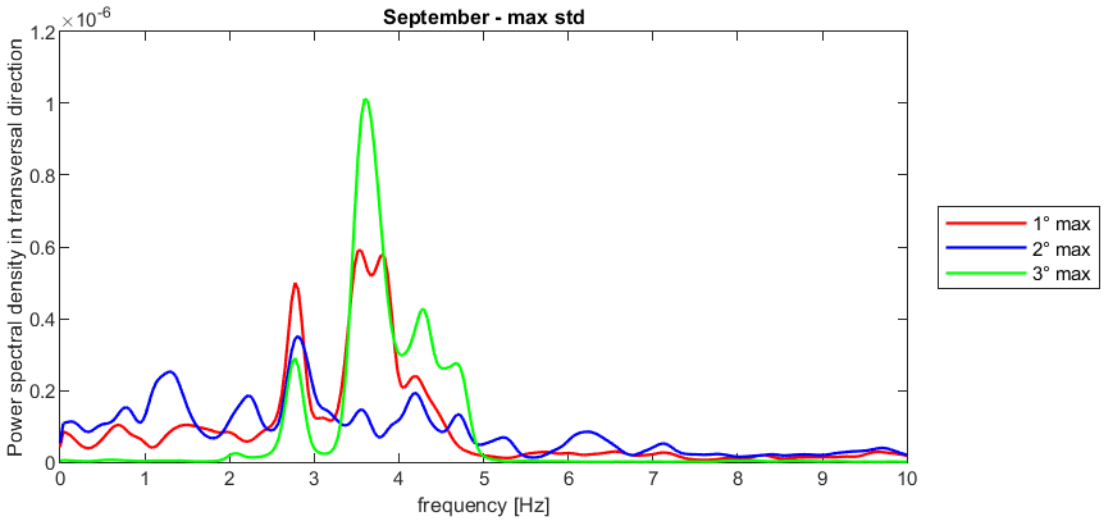


Figure 13-106: Results obtained from the 3 accelerograms with maximum SD in time domain

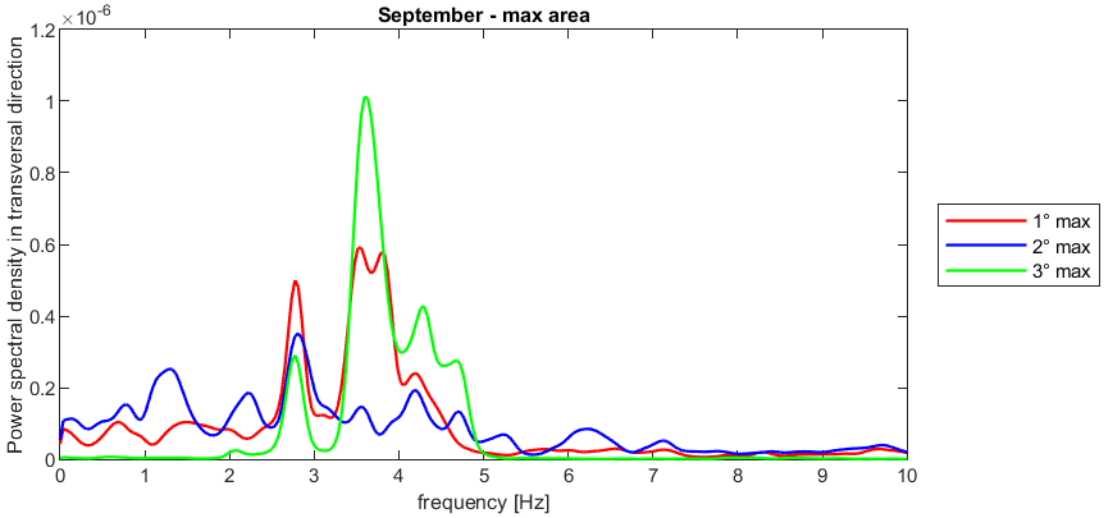


Figure 13-107: Results obtained from the 3 accelerograms with maximum area of PSD

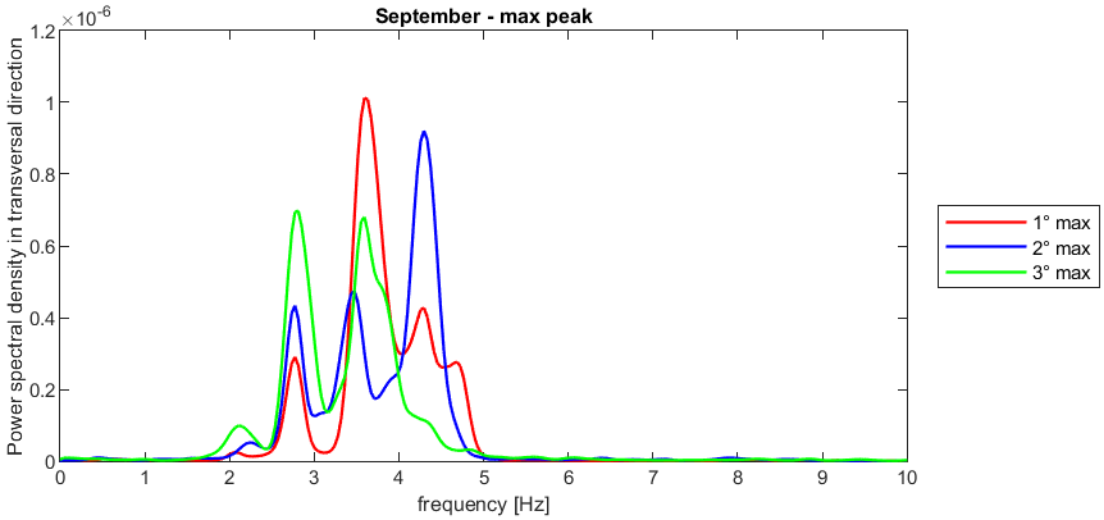


Figure 13-108: Results obtained from the 3 accelerograms with highest peak if PSD

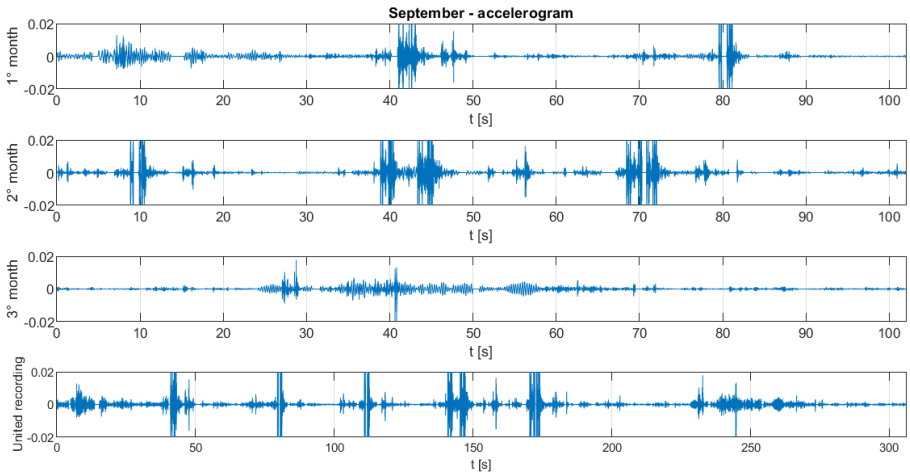


Figure 13-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

13.10 October

The results obtained for the October dataset are shown in the following tables.

Table 13-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-10-25_10-00-20	1.32E-04
	2°	319E3_2023-10-12_09-00-20	1.30E-04
	3°	319E3_2023-10-02_08-00-21	1.28E-04
Longitudinal direction (y)	1°	319E3_2023-10-25_10-00-20	1.09E-03
	2°	319E3_2023-10-05_18-00-21	9.85E-04
	3°	319E3_2023-10-12_09-00-20	9.85E-04
Transverse direction (z)	1°	319E3_2023-10-12_09-00-20	7.97E-04
	2°	319E3_2023-10-25_10-00-20	7.96E-04
	3°	319E3_2023-10-16_08-00-20	7.27E-04

Table 13-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-10-02_08-00-21	1.65E-08	319E3_2023-10-12_09-00-20	3.59E-09
2	319E3_2023-10-12_09-00-20	1.53E-08	319E3_2023-10-25_10-00-20	3.56E-09
3	319E3_2023-10-26_12-00-20	1.37E-08	319E3_2023-10-02_08-00-21	3.37E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-10-05_18-00-21	1.91E-06	319E3_2023-10-25_10-00-20	2.37E-07
2	319E3_2023-10-12_16-00-20	1.54E-06	319E3_2023-10-12_09-00-20	2.04E-07
3	319E3_2023-10-09_13-00-20	1.28E-06	319E3_2023-10-05_18-00-21	2.00E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-10-02_08-00-21	5.23E-07	319E3_2023-10-12_09-00-20	1.35E-07
2	319E3_2023-10-12_09-00-20	4.98E-07	319E3_2023-10-25_10-00-20	1.32E-07
3	319E3_2023-10-25_10-00-20	4.98E-07	319E3_2023-10-26_12-00-20	9.82E-08

Table 13-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	B	A	D	A	B	-	B
2	B	B	A	D	-	B	A	B	A
3	C	-	C	B	-	D	-	A	-

13.10.1 Vertical direction (x)

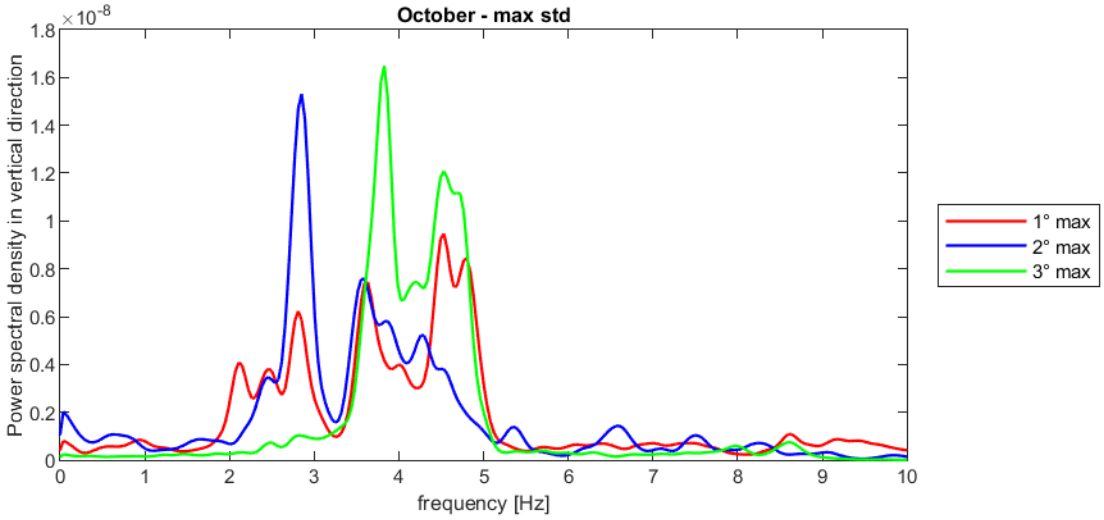


Figure 13-110: Results obtained from the 3 accelerograms with maximum SD in time domain

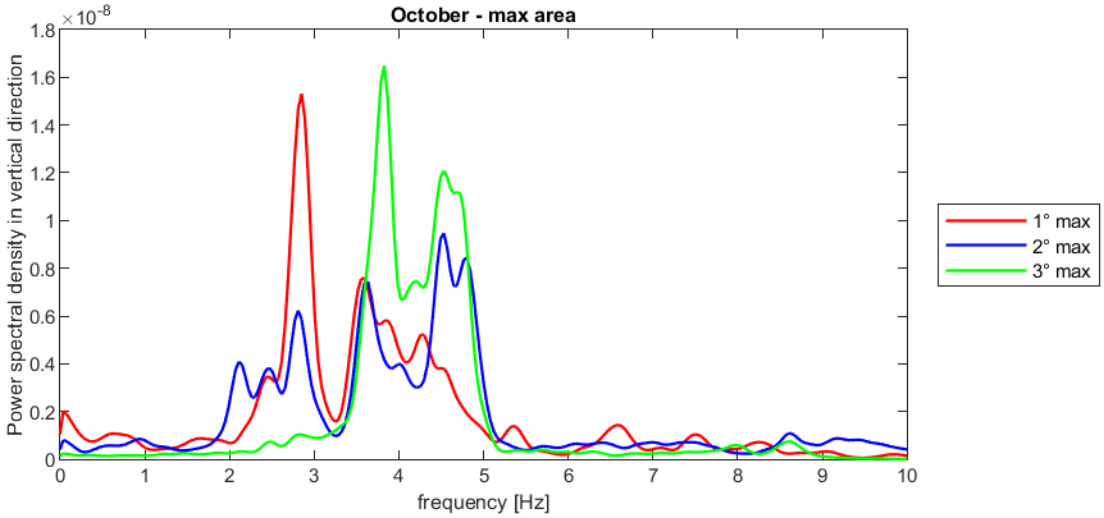


Figure 13-111: Results obtained from the 3 accelerograms with maximum area of PSD

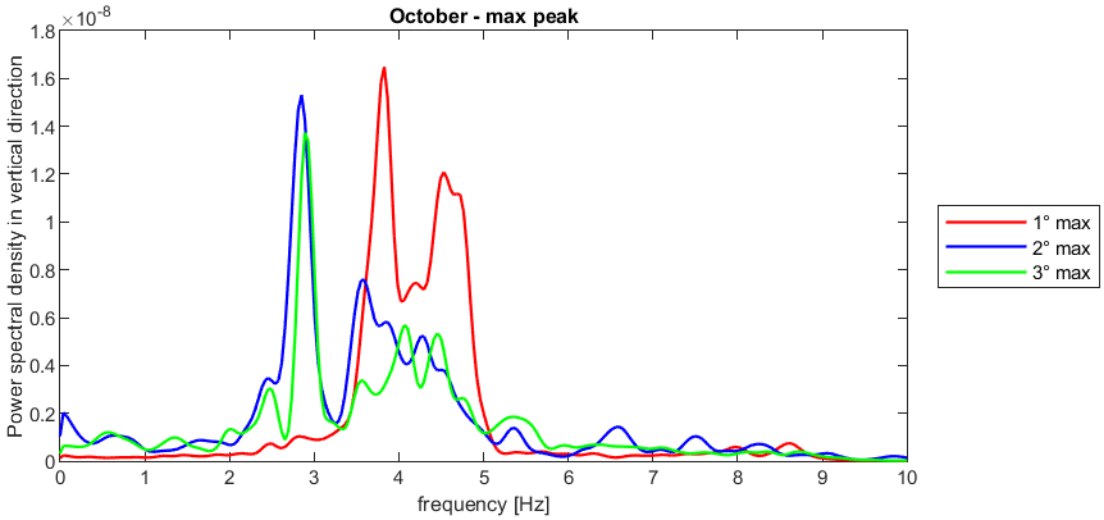


Figure 13-112: Results obtained from the 3 accelerograms with highest peak if PSD

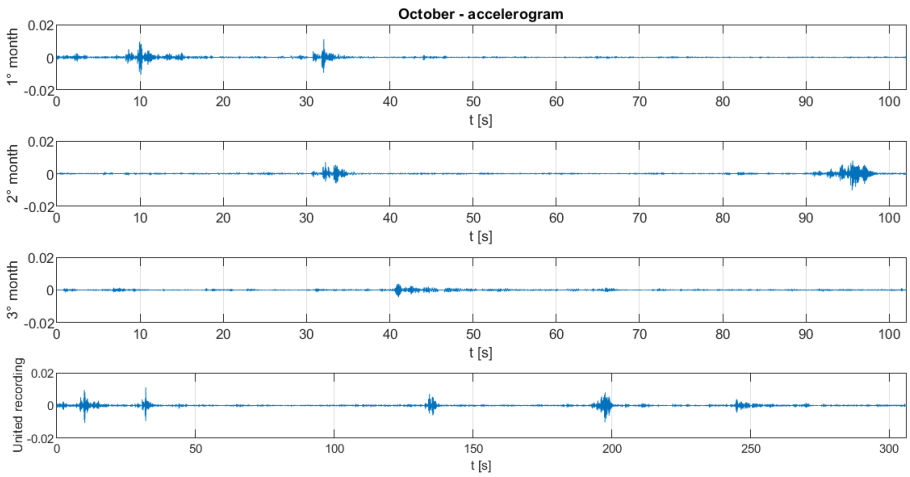


Figure 13-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.10.2 Longitudinal direction (y)

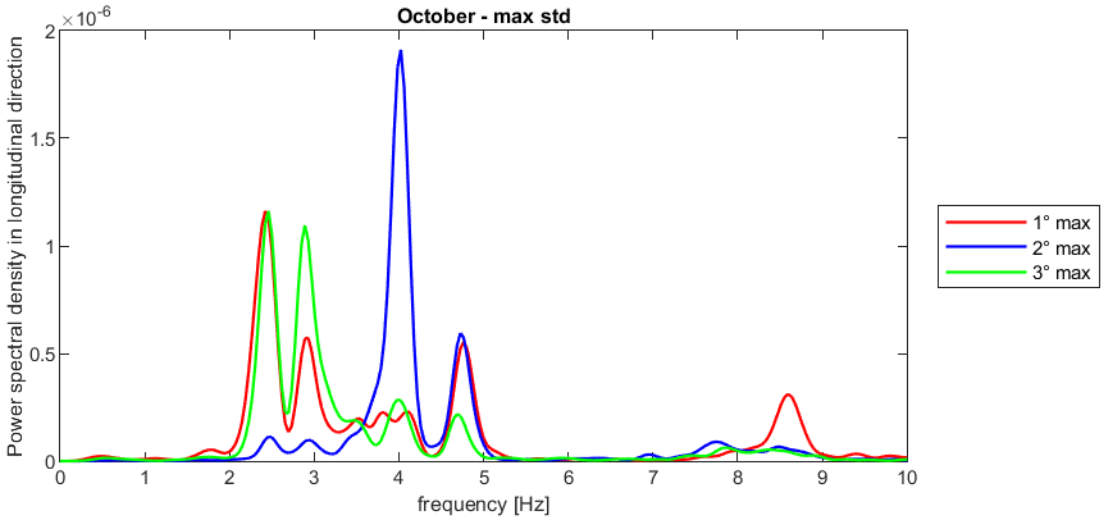


Figure 13-114: Results obtained from the 3 accelerograms with maximum SD in time domain

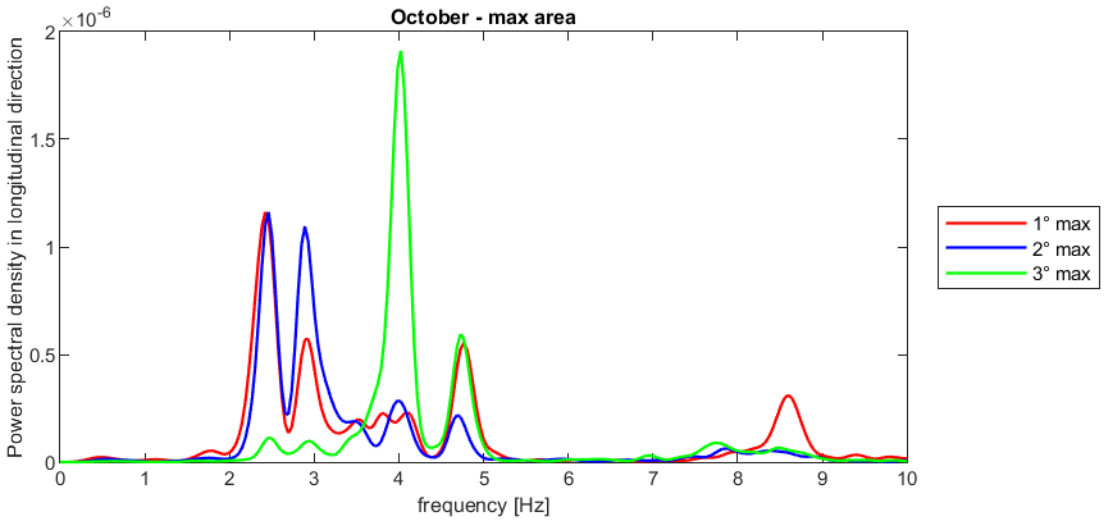


Figure 13-115: Results obtained from the 3 accelerograms with maximum area of PSD

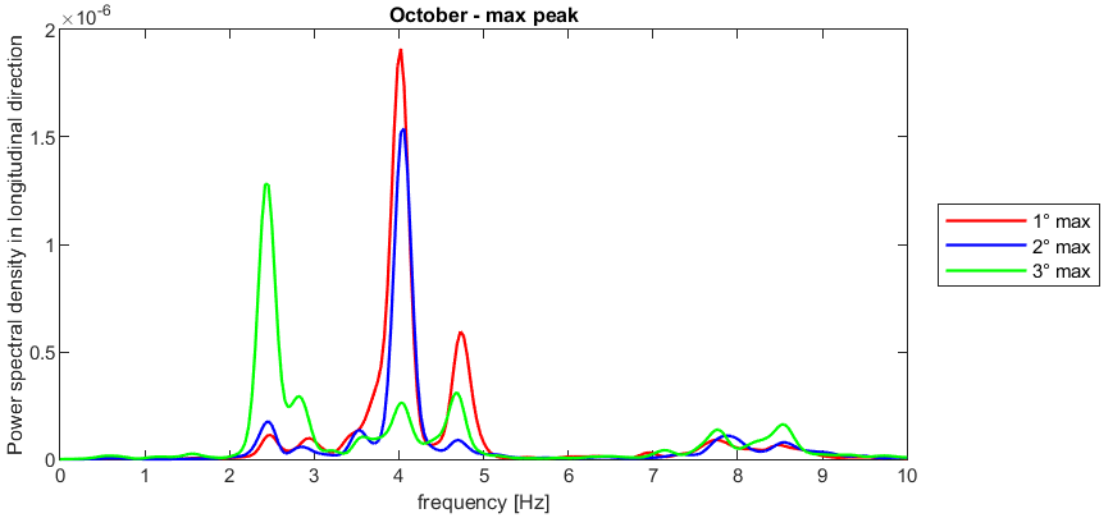


Figure 13-116: Results obtained from the 3 accelerograms with highest peak if PSD

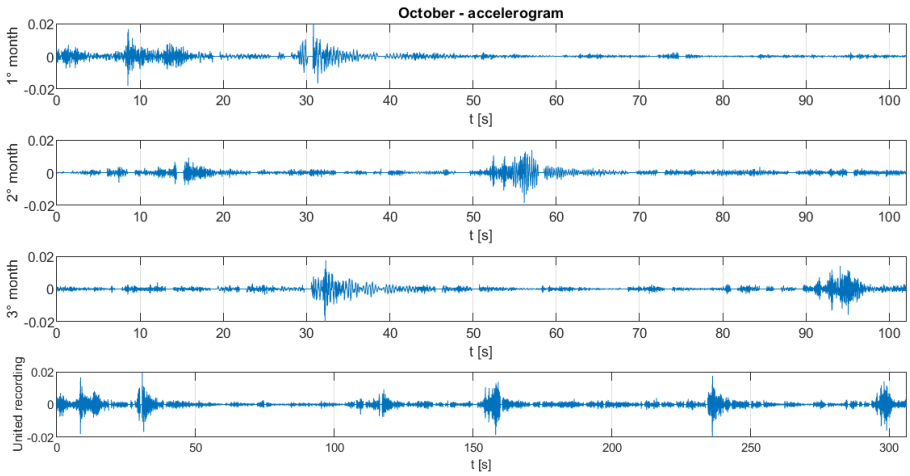


Figure 13-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

13.10.3 Transverse direction (z)

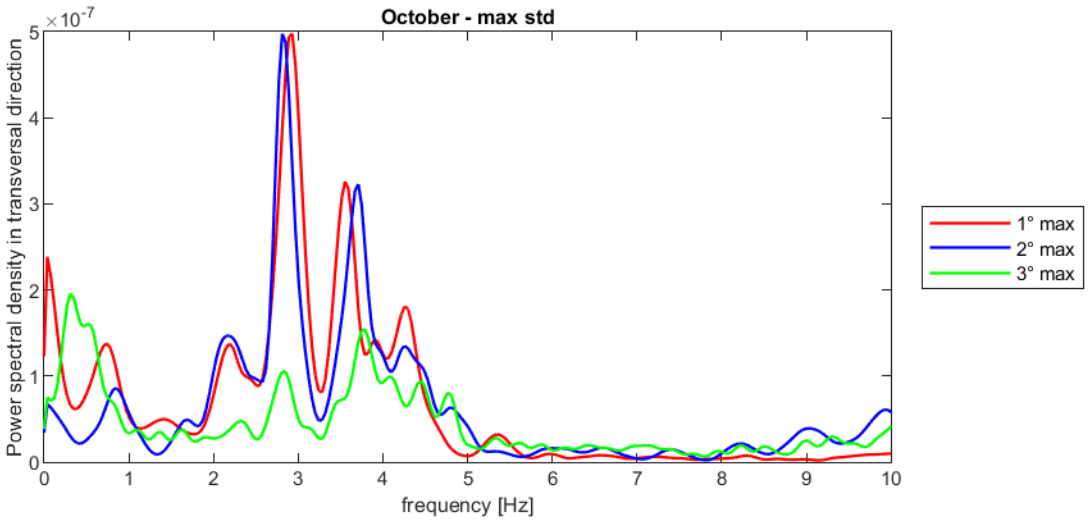


Figure 13-118: Results obtained from the 3 accelerograms with maximum SD in time domain

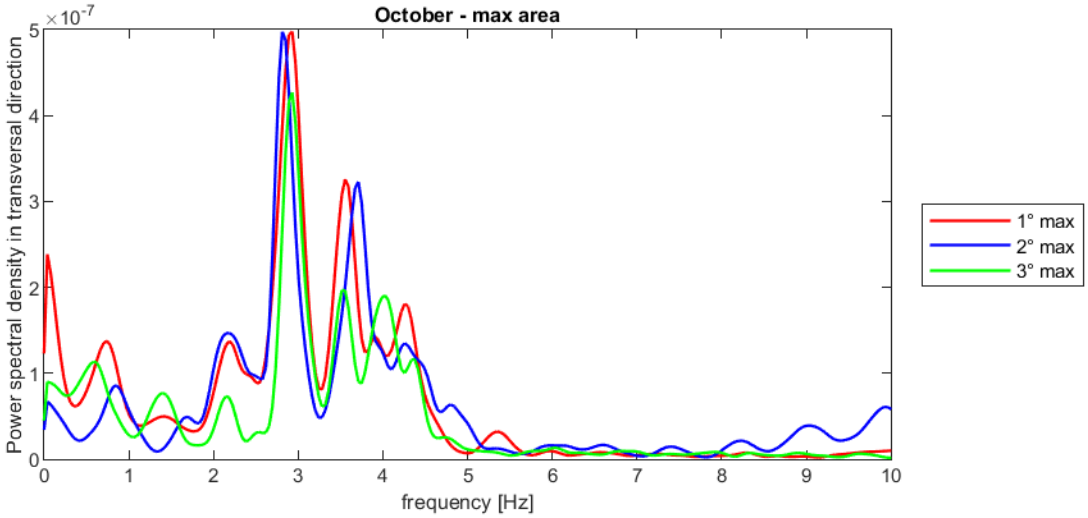


Figure 13-119: Results obtained from the 3 accelerograms with maximum area of PSD

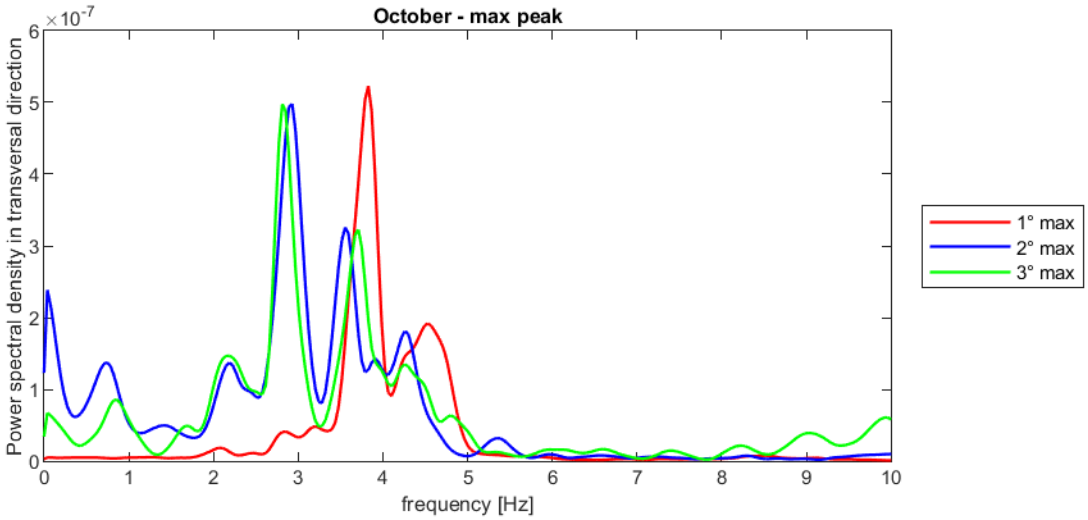


Figure 13-120: Results obtained from the 3 accelerograms with highest peak if PSD

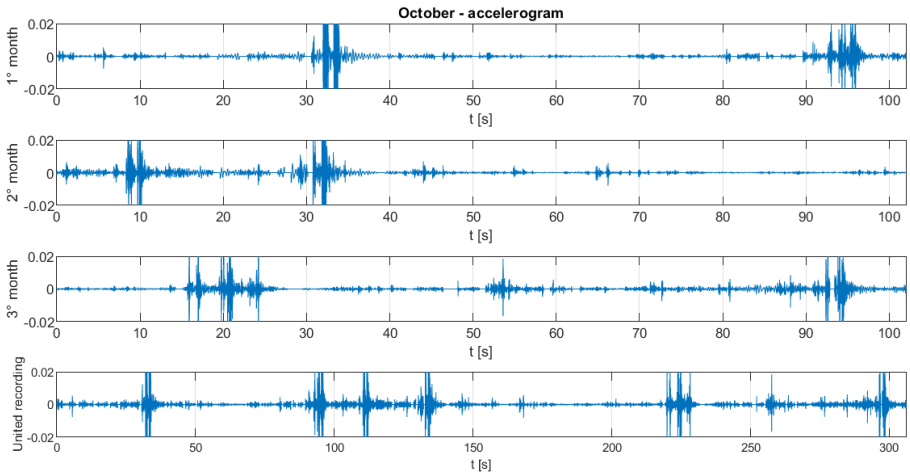


Figure 13-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

13.11 November

The results obtained for the November dataset are shown in the following tables.

Table 13-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-11-07_17-00-21	1.58E-04
	2°	319E3_2023-11-06_17-00-20	1.47E-04
	3°	319E3_2023-11-23_09-00-20	1.46E-04
Longitudinal direction (y)	1°	319E3_2023-11-06_17-00-20	1.22E-03
	2°	319E3_2023-11-10_08-00-19	1.16E-03
	3°	319E3_2023-11-28_11-00-21	1.07E-03
Transverse direction (z)	1°	319E3_2023-11-06_17-00-20	8.53E-04
	2°	319E3_2023-11-07_17-00-21	7.87E-04
	3°	319E3_2023-11-15_13-00-20	7.82E-04

Table 13-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-11-23_09-00-20	2.29E-08	319E3_2023-11-07_17-00-21	5.32E-09
2	319E3_2023-11-07_17-00-21	2.23E-08	319E3_2023-11-06_17-00-20	4.43E-09
3	319E3_2023-11-29_02-00-20	2.14E-08	319E3_2023-11-23_09-00-20	4.32E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-11-14_10-00-21	2.85E-06	319E3_2023-11-06_17-00-20	3.01E-07
2	319E3_2023-11-06_17-00-20	1.84E-06	319E3_2023-11-10_08-00-19	2.82E-07
3	319E3_2023-11-28_11-00-21	1.78E-06	319E3_2023-11-28_11-00-21	2.45E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-11-06_17-00-20	8.38E-07	319E3_2023-11-06_17-00-20	1.48E-07
2	319E3_2023-11-28_11-00-21	7.22E-07	319E3_2023-11-15_13-00-20	1.34E-07
3	319E3_2023-11-15_13-00-20	6.74E-07	319E3_2023-11-07_17-00-21	1.34E-07

Table 13-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	B	-	B	B	B	B
2	B	A	B	D	B	D	A	-	F
3	C	-	C	E	E	E	F	F	A

13.11.1 Vertical direction (x)

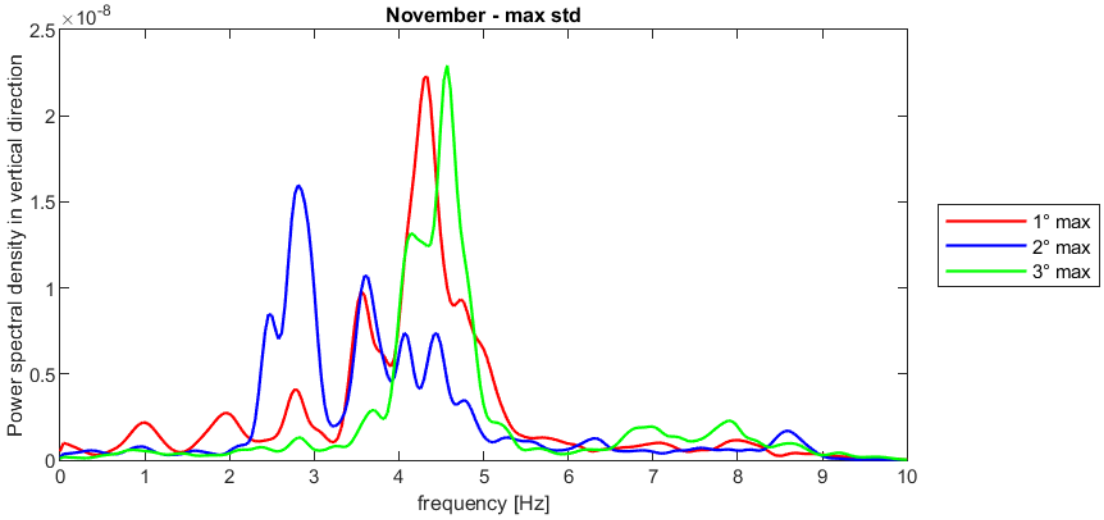


Figure 13-122: Results obtained from the 3 accelerograms with maximum SD in time domain

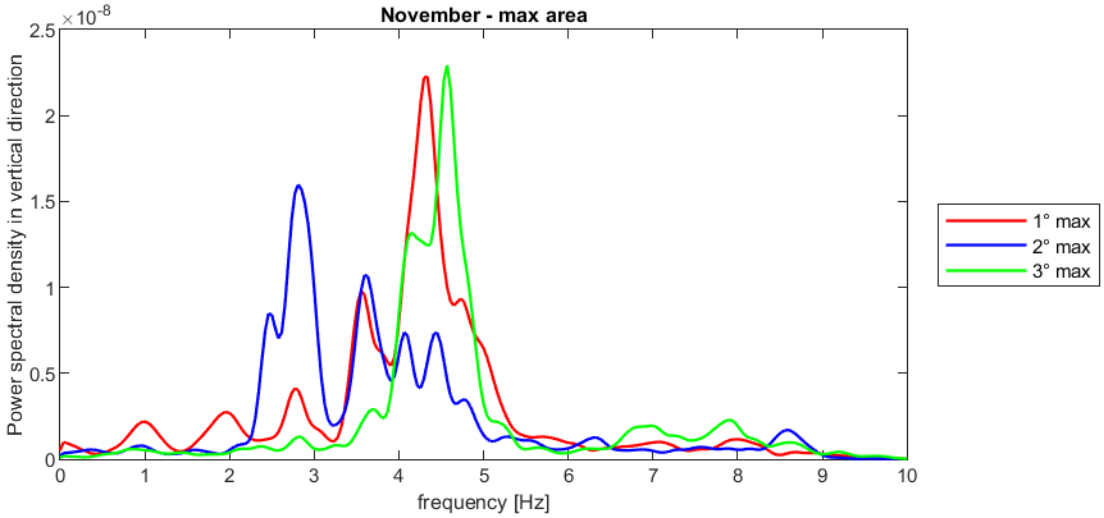


Figure 13-123: Results obtained from the 3 accelerograms with maximum area of PSD

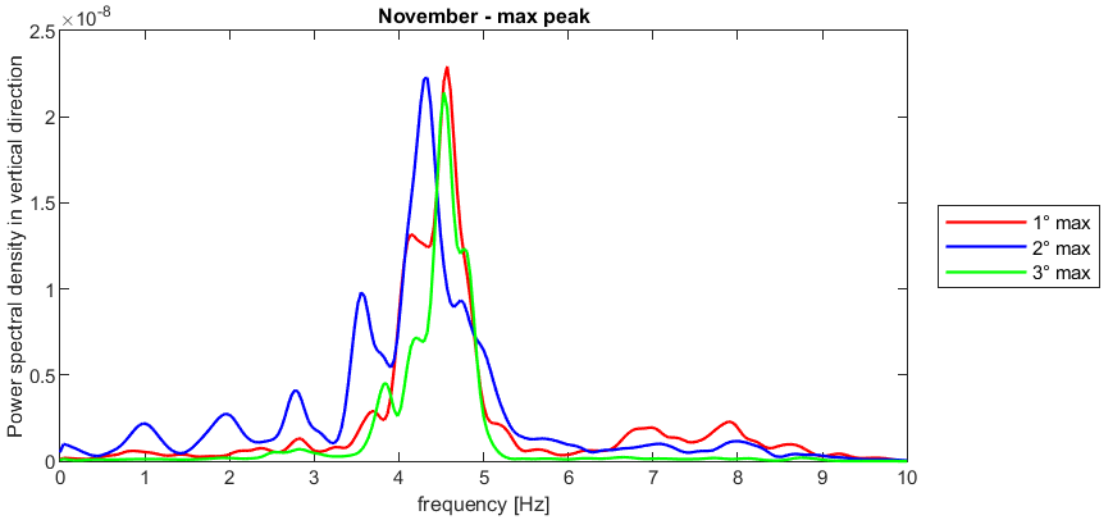


Figure 13-124: Results obtained from the 3 accelerograms with highest peak if PSD

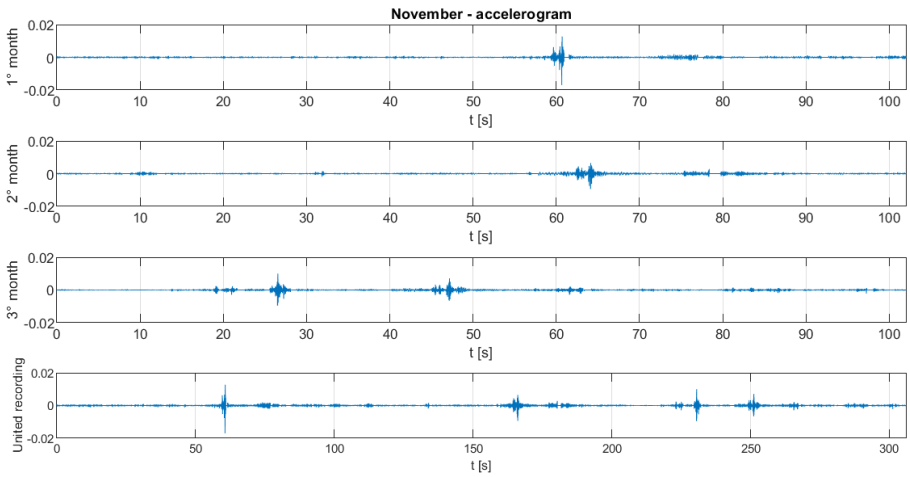


Figure 13-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.11.2 Longitudinal direction (y)

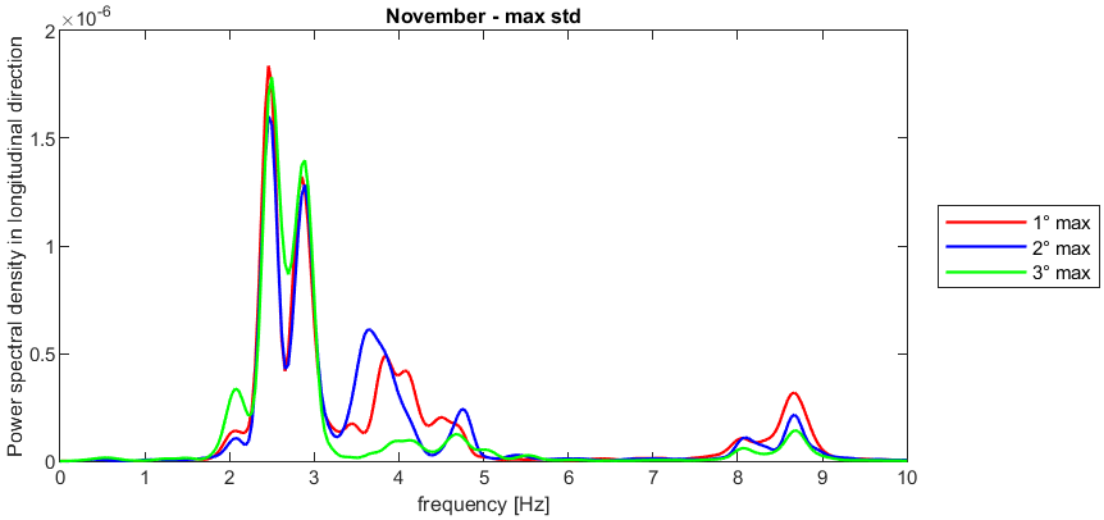


Figure 13-126: Results obtained from the 3 accelerograms with maximum SD in time domain

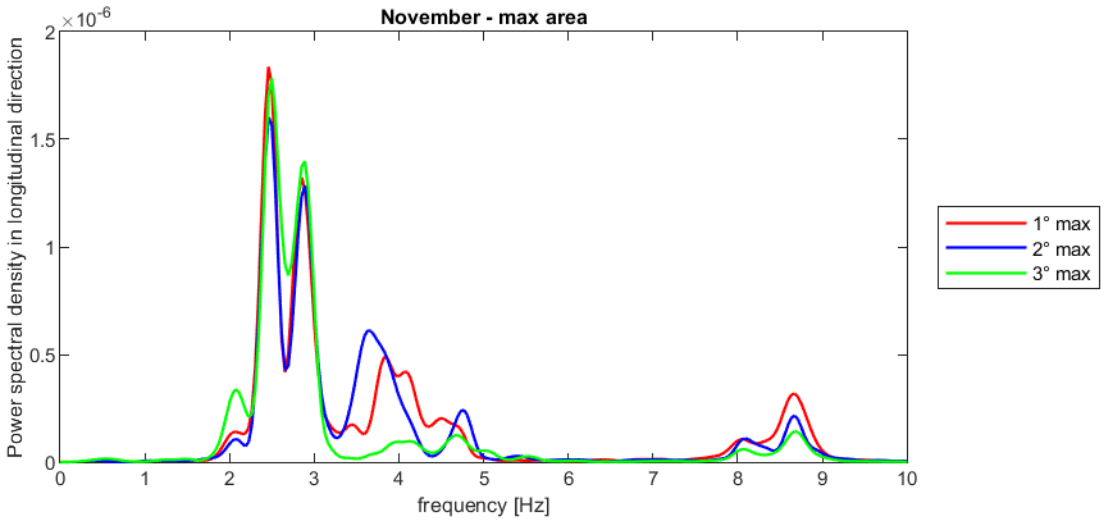


Figure 13-127: Results obtained from the 3 accelerograms with maximum area of PSD

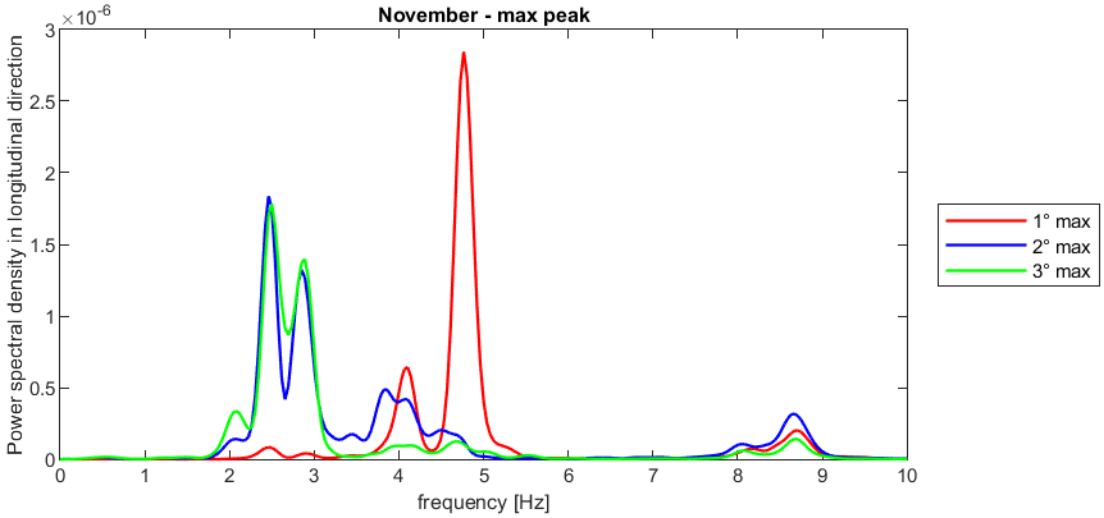


Figure 13-128: Results obtained from the 3 accelerograms with highest peak if PSD

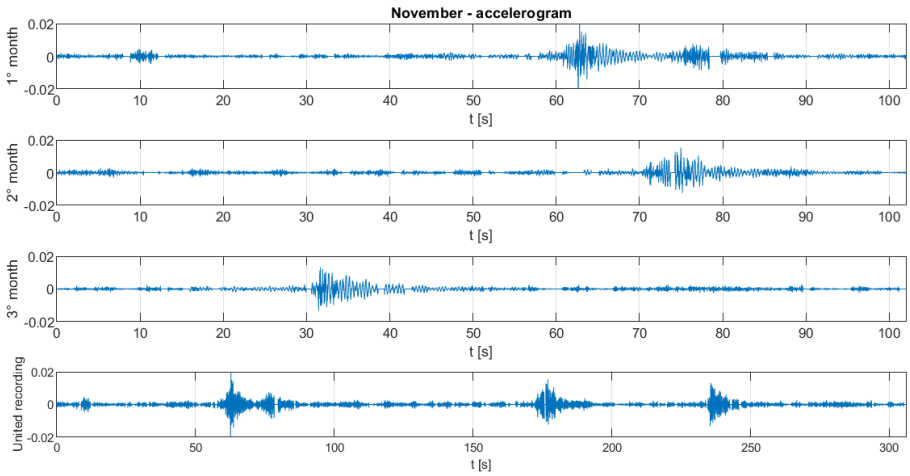


Figure 13-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

13.11.3 Transverse direction (z)

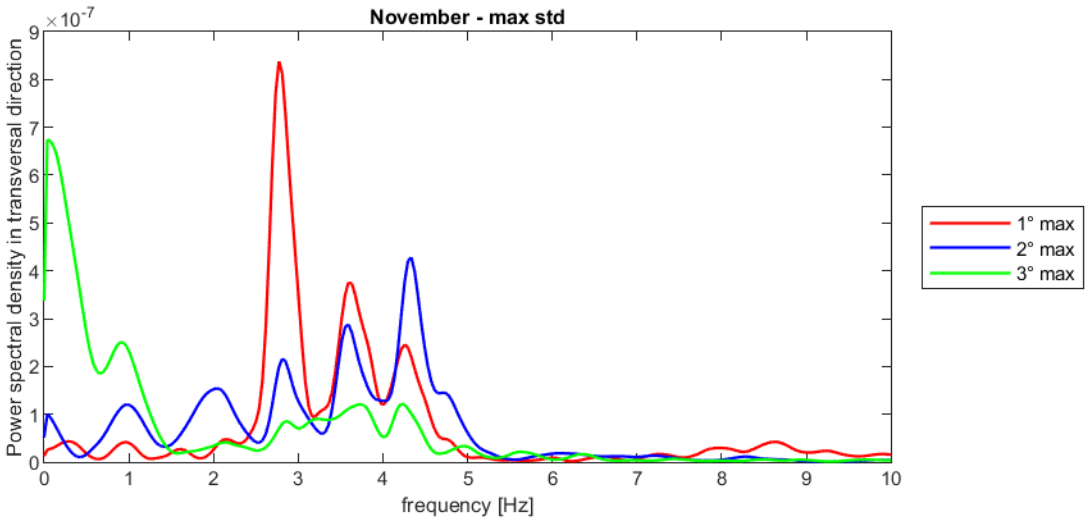


Figure 13-130: Results obtained from the 3 accelerograms with maximum SD in time domain

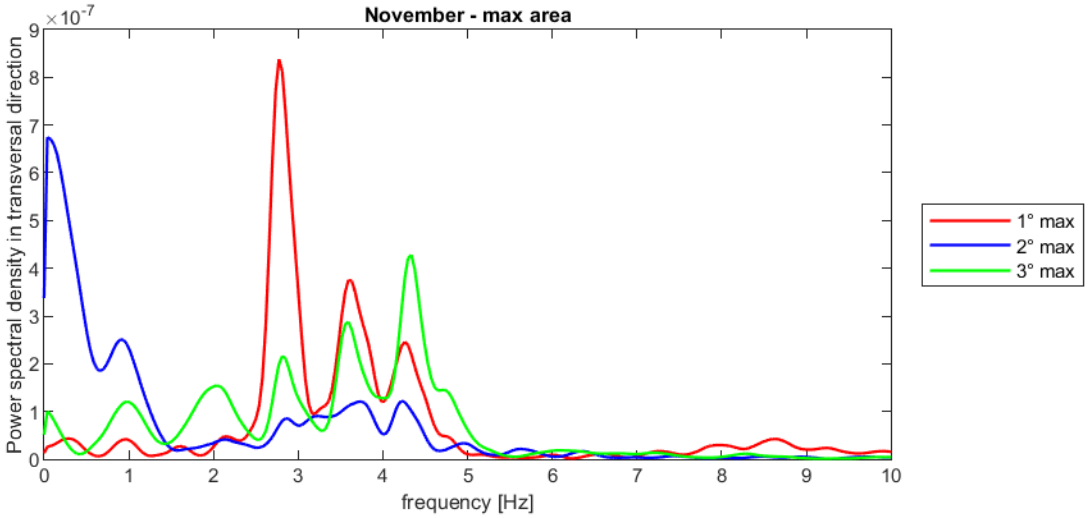


Figure 13-131: Results obtained from the 3 accelerograms with maximum area of PSD

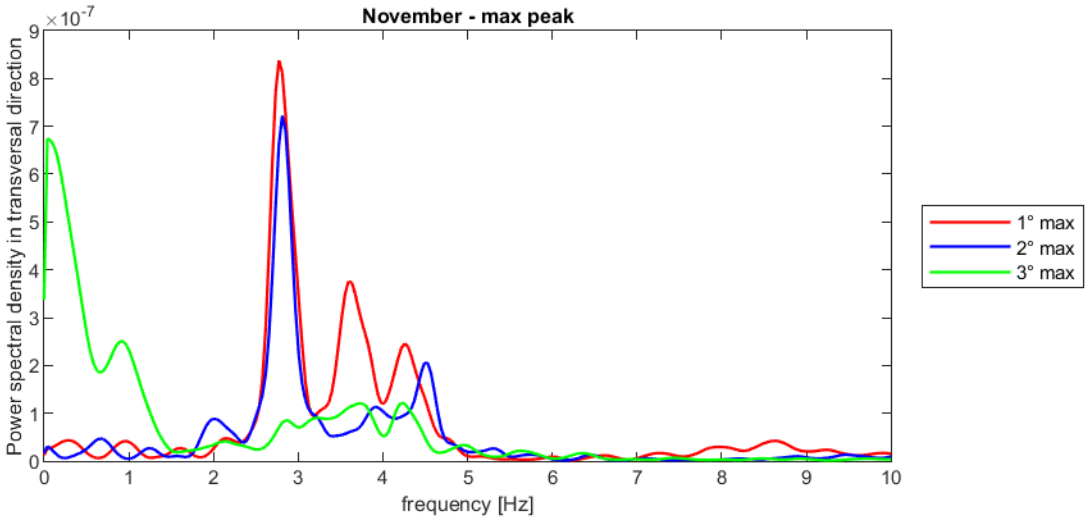


Figure 13-132: Results obtained from the 3 accelerograms with highest peak if PSD

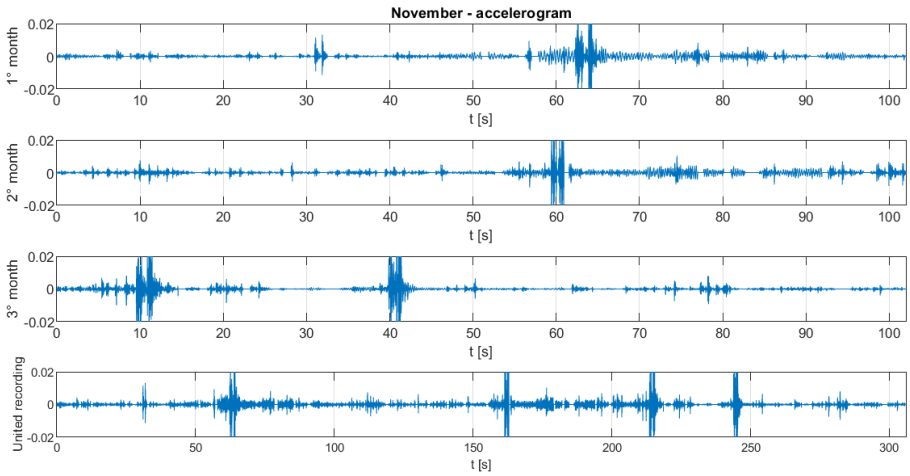


Figure 13-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

13.12 December

The results obtained for the December dataset are shown in the following tables.

Table 13-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	319E3_2023-12-06_10-00-20	1.79E-04
	2°	319E3_2023-12-13_08-00-20	1.46E-04
	3°	319E3_2023-12-28_09-00-20	1.43E-04
Longitudinal direction (y)	1°	319E3_2023-12-18_08-00-19	1.23E-03
	2°	319E3_2023-12-11_14-00-19	1.15E-03
	3°	319E3_2023-12-28_09-00-20	1.06E-03
Transverse direction (z)	1°	319E3_2023-12-06_10-00-20	7.79E-04
	2°	319E3_2023-12-18_08-00-19	7.76E-04
	3°	319E3_2023-12-13_08-00-20	7.71E-04

Table 13-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-12-06_10-00-20	2.86E-08	319E3_2023-12-06_10-00-20	6.77E-09
2	319E3_2023-12-13_08-00-20	1.66E-08	319E3_2023-12-18_08-00-19	4.49E-09
3	319E3_2023-12-28_09-00-20	1.60E-08	319E3_2023-12-13_08-00-20	4.46E-09
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-12-11_14-00-19	1.75E-06	319E3_2023-12-18_08-00-19	3.17E-07
2	319E3_2023-12-18_08-00-19	1.59E-06	319E3_2023-12-11_14-00-19	2.75E-07
3	319E3_2023-12-28_09-00-20	1.48E-06	319E3_2023-12-28_09-00-20	2.40E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	319E3_2023-12-11_14-00-19	5.34E-07	319E3_2023-12-13_08-00-20	1.29E-07
2	319E3_2023-12-13_08-00-20	4.68E-07	319E3_2023-12-18_08-00-19	1.27E-07
3	319E3_2023-12-18_08-00-19	4.65E-07	319E3_2023-12-11_14-00-19	1.20E-07

Table 13-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	E	D	-	E	B
2	B	B	-	E	D	E	D	B	D
3	C	C	B	C	C	C	B	D	E

13.12.1 Vertical direction (x)

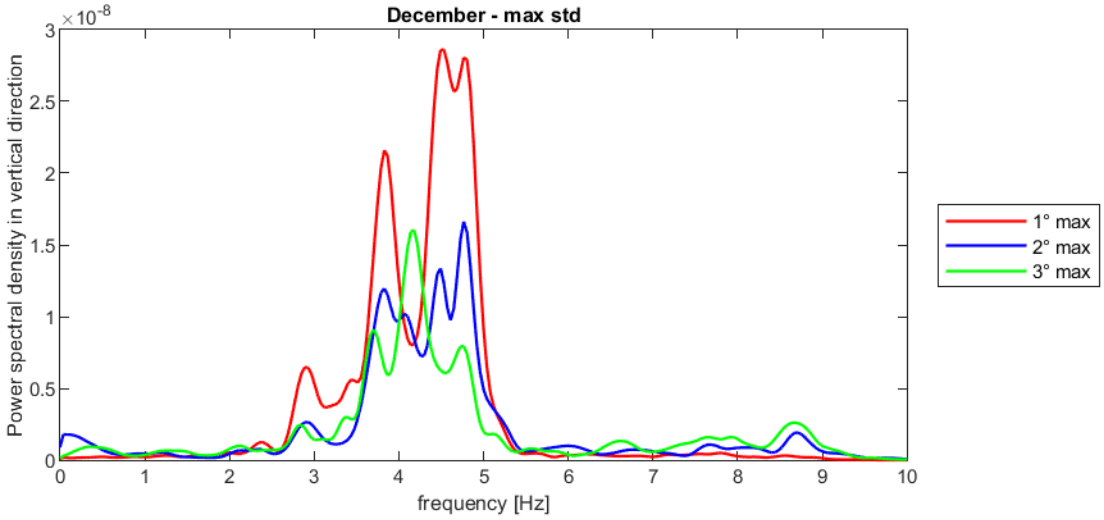


Figure 13-134: Results obtained from the 3 accelerograms with maximum SD in time domain

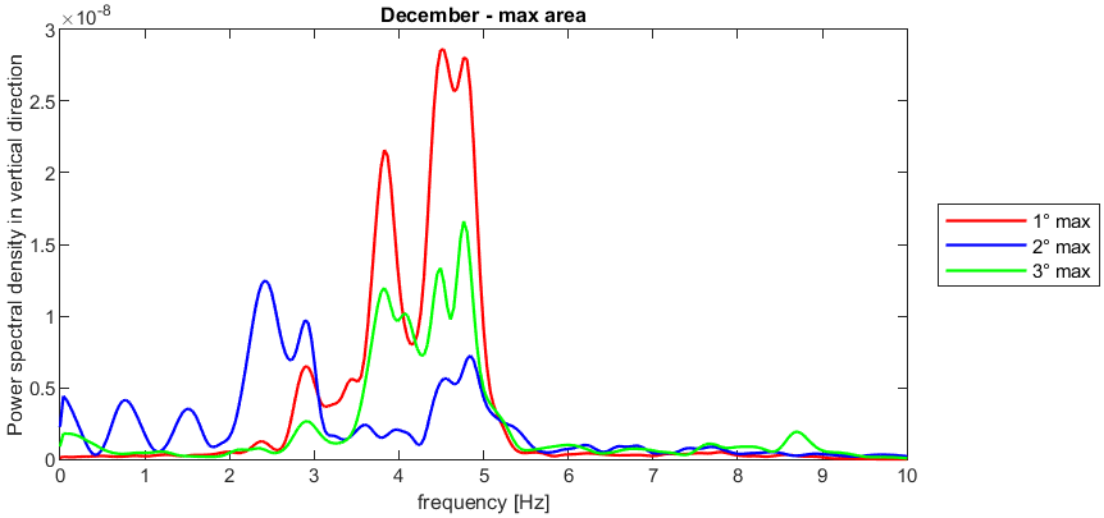


Figure 13-135: Results obtained from the 3 accelerograms with maximum area of PSD

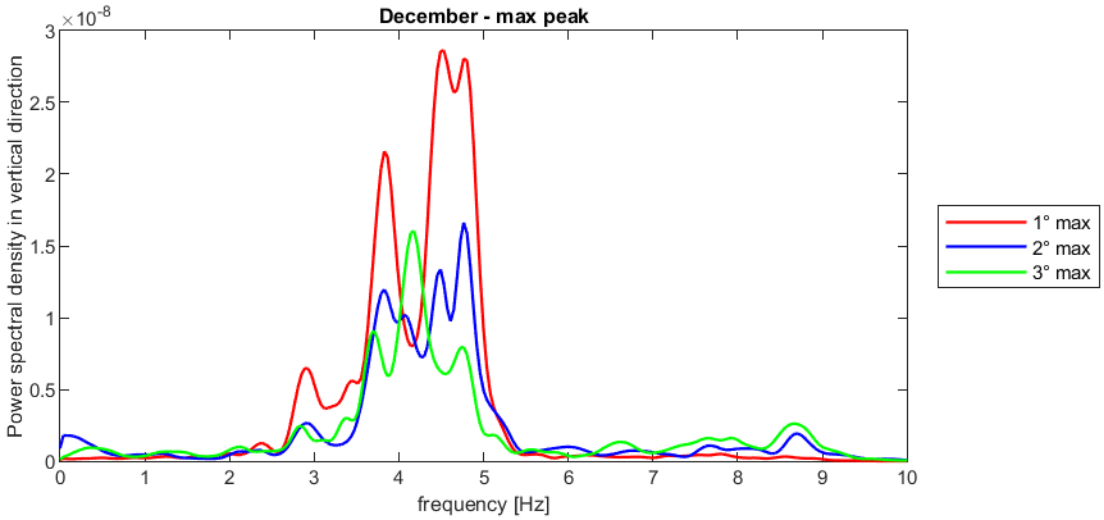


Figure 13-136: Results obtained from the 3 accelerograms with highest peak if PSD

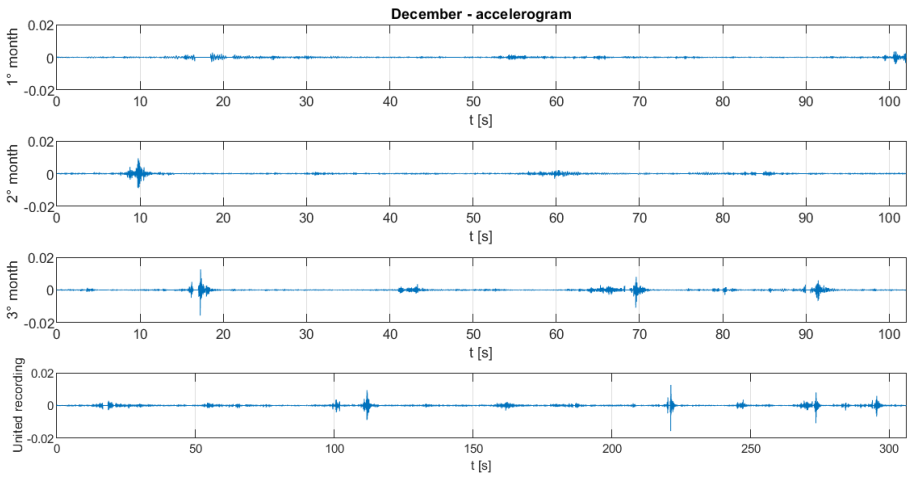


Figure 13-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

13.12.2 Longitudinal direction (y)

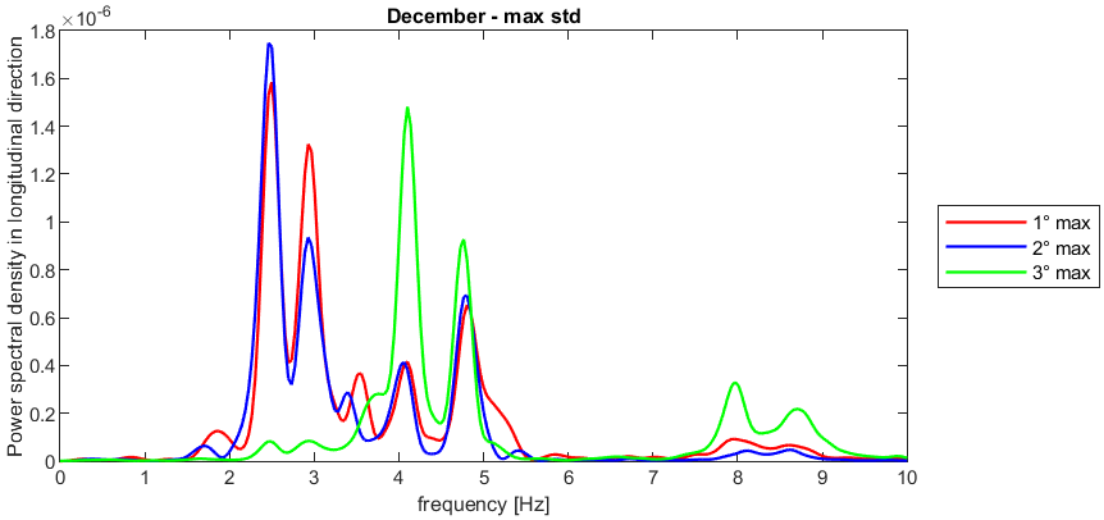


Figure 13-138: Results obtained from the 3 accelerograms with maximum SD in time domain

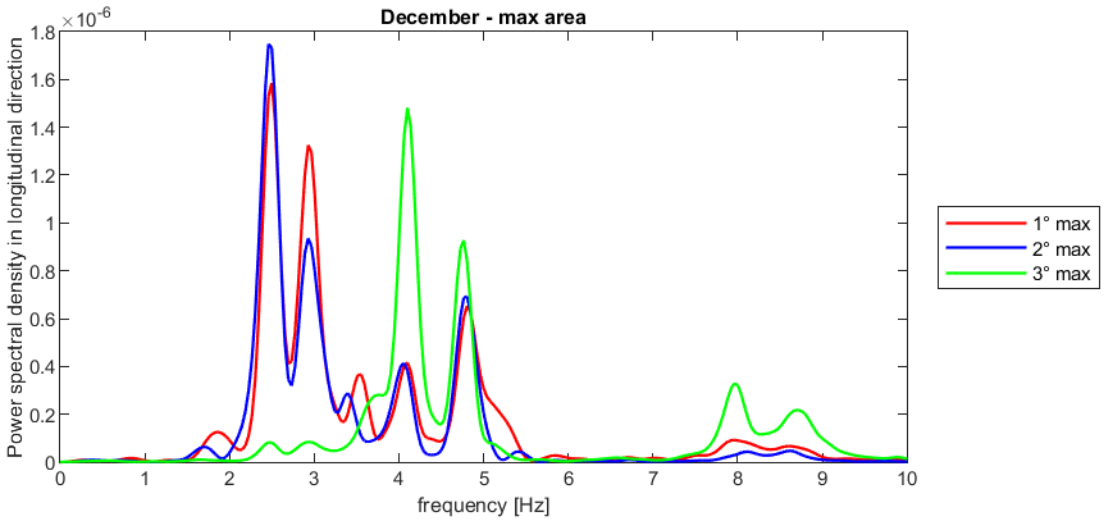


Figure 13-139: Results obtained from the 3 accelerograms with maximum area of PSD

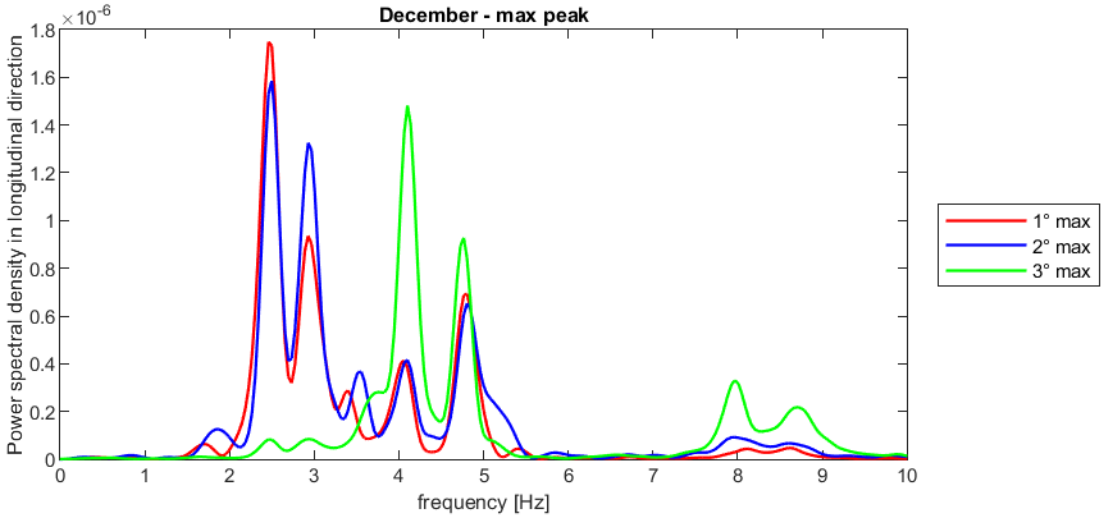


Figure 13-140: Results obtained from the 3 accelerograms with highest peak if PSD

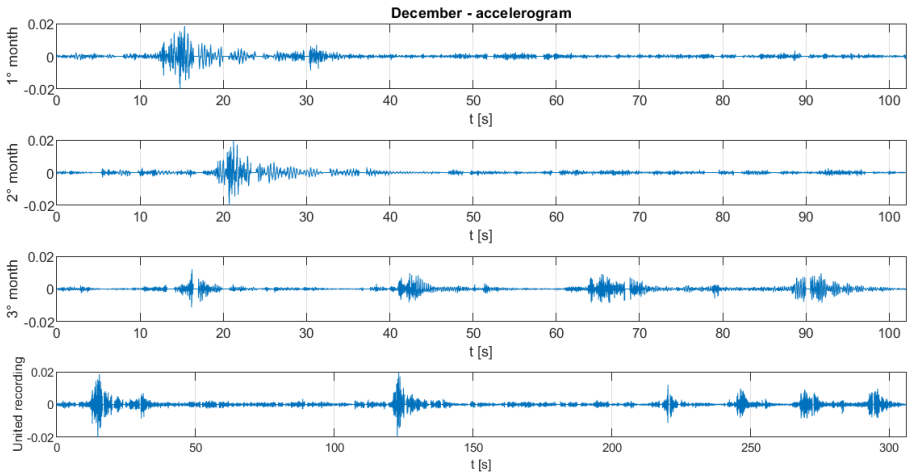


Figure 13-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

13.12.3 Transverse direction (z)

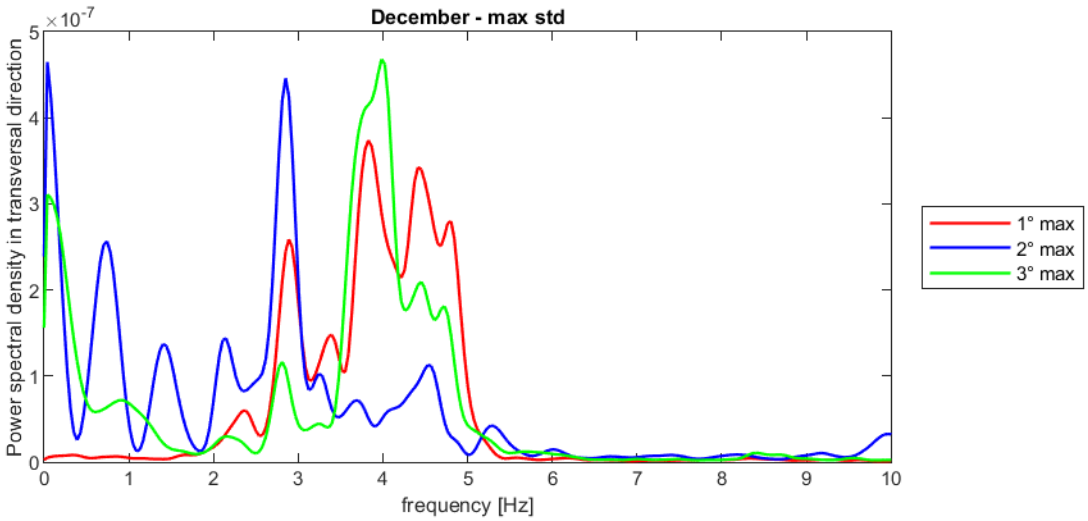


Figure 13-142: Results obtained from the 3 accelerograms with maximum SD in time domain

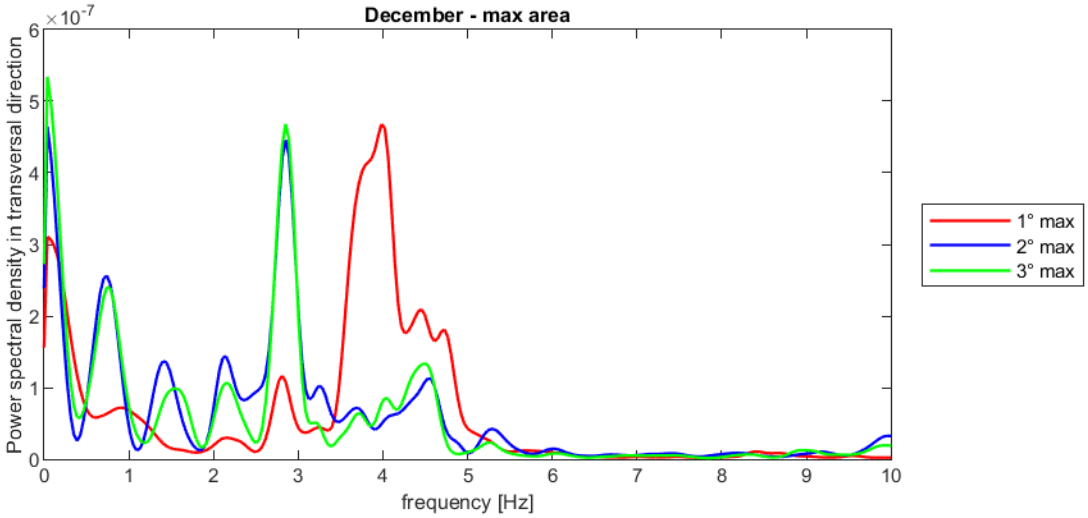


Figure 13-143: Results obtained from the 3 accelerograms with maximum area of PSD

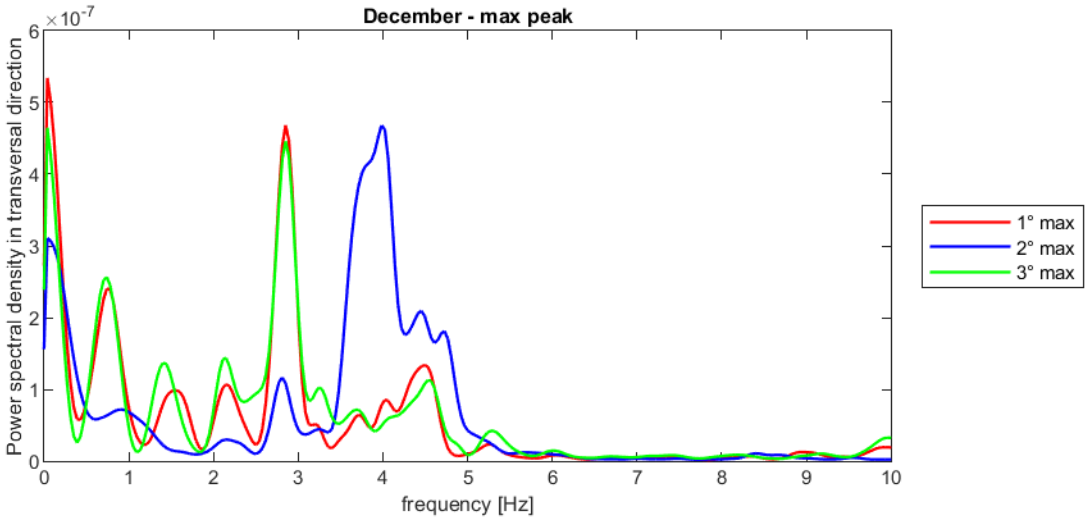


Figure 13-144: Results obtained from the 3 accelerograms with highest peak if PSD

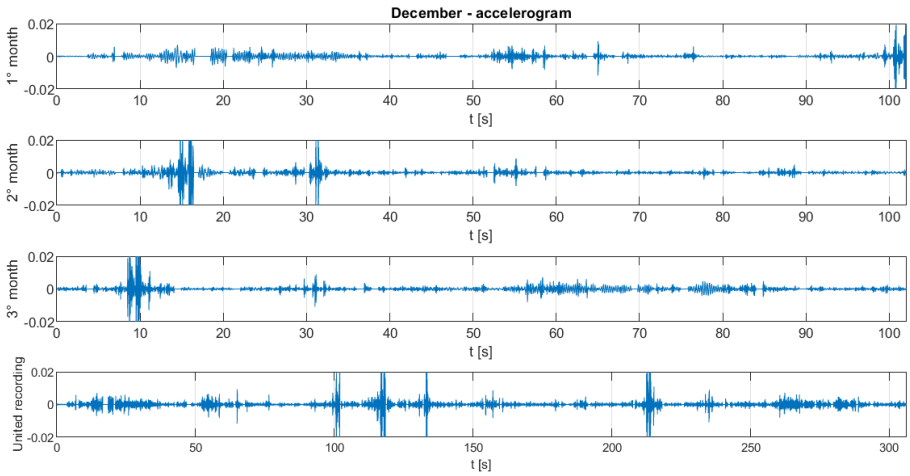


Figure 13-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

13.13 Analysis of the complete 2023 year

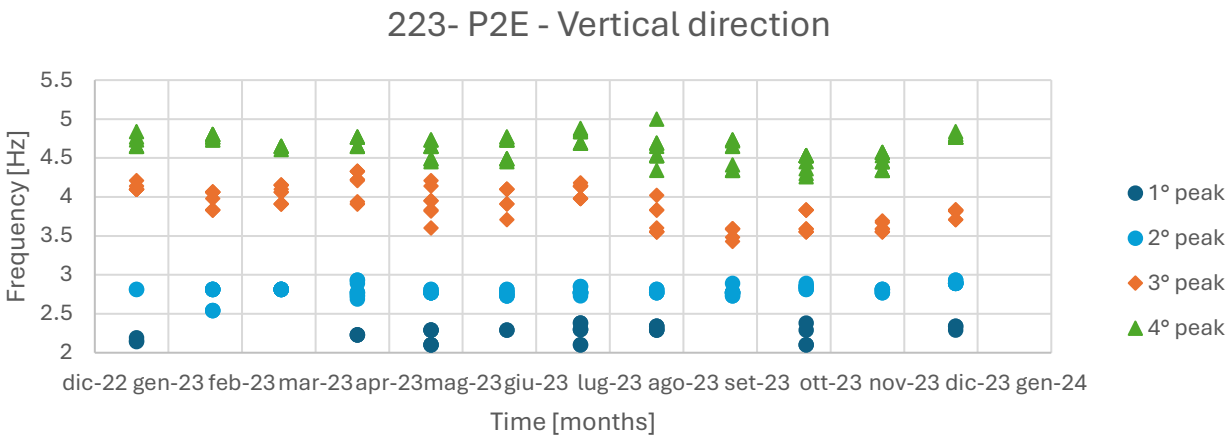
All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

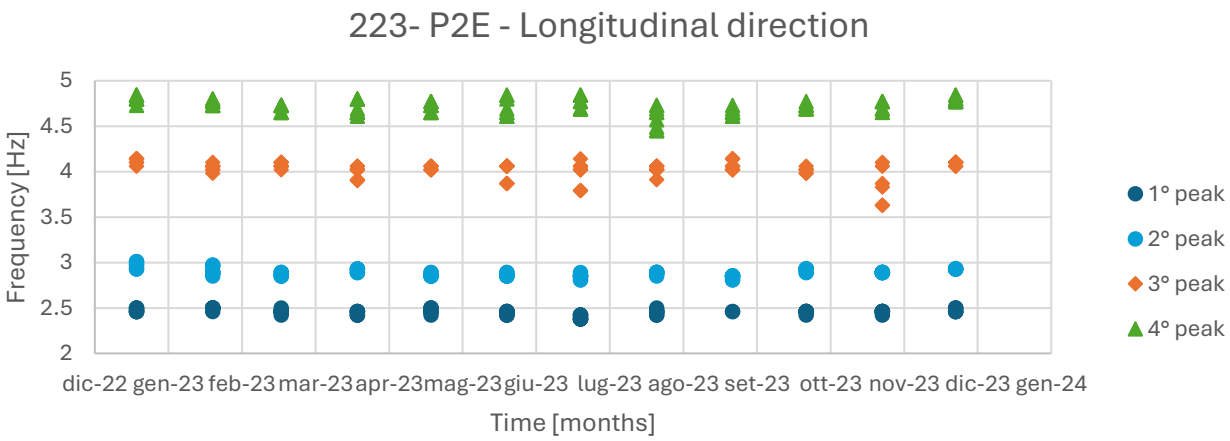
Table 13-37: Main identified frequencies for sensor 319E3 – bridge 223 – Sp2 – P2E

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	38	92	94	93	97	85	100	103	69	102	88	94
	MEAN	**2.23**	**2.80**	**3.90**	**4.64**	**2.46**	**2.89**	**4.03**	**4.72**	**2.16**	**2.82**	**3.68**	**4.40**
	SD	0.12	0.07	0.24	0.16	0.03	0.04	0.09	0.08	0.10	0.08	0.13	0.18
	C.o.V.	5.4%	2.5%	6.0%	3.4%	1.2%	1.5%	2.3%	1.7%	4.8%	2.8%	3.7%	4.2%
	Rating	**28%**	**84%**	**67%**	**79%**	**98%**	**84%**	**93%**	**100%**	**53%**	**91%**	**73%**	**76%**
1	gen-23			4.1	4.65	2.5	2.97	4.14	4.8		2.85	3.71	4.38
2	gen-23		2.81	4.21	4.77	2.46	2.97	4.1	4.84	2.1	2.81	3.83	
3	gen-23	2.15		4.1		2.5		4.1	4.84		2.85	4.02	
1	gen-23			4.1	4.65	2.46	2.93	4.14	4.8		2.81	3.67	4.38
2	gen-23	2.14		4.1		2.46	2.93	4.1	4.8		2.85		4.38
3	gen-23		2.81		4.73	2.5		4.06	4.73	2.1	2.81	3.83	4.3
1	gen-23			4.14	4.84	2.46	3.01	4.14	4.8		2.81	3.67	4.34
2	gen-23			4.1	4.65	2.48		4.14	4.84	2.07	2.81	3.83	4.34
3	gen-23	2.19		4.1		2.46	3.01	4.14	4.84		2.85	3.83	
1	feb-23		2.54	3.83	4.73	2.5	2.85	4.1	4.8	1.91	3.12	3.79	4.53
2	feb-23		2.81	3.98	4.77	2.5	2.89	4.06	4.77		2.81	3.79	4.73
3	feb-23		2.81	4.06	4.8	2.5	2.97	4.02	4.73	2.27	2.77	3.83	4.73
1	feb-23		2.81	4.06	4.8	2.5	2.89	4.06	4.8		3.12	3.79	4.53
2	feb-23		2.54	3.83	4.73	2.46	2.89	4.06	4.77	2.03	2.81	3.79	4.49
3	feb-23		2.81	4.06	4.77	2.5	2.96	4.02	4.73	2.26	2.81	3.83	4.77
1	feb-23		2.54	3.83	4.77	2.5	2.89	4.06	4.73	2.34	2.81	3.83	4.73
2	feb-23		2.81	4.06	4.8	2.5	2.97	3.98	4.73		2.81	4.01	4.77
3	feb-23		2.81	4.06	4.8	2.5	2.89	4.06	4.77		2.81	3.79	
1	mar-23		2.81	3.91	4.65	2.46	2.85	4.06	4.65	2.19	2.89	3.79	
2	mar-23		2.81	4.15		2.5		4.06	4.73	2.19	2.81	3.55	4.26
3	mar-23		2.81	4.06		2.46	2.89	4.1	4.73		2.81	3.78	4.38
1	mar-23		2.81	3.91	4.65	2.46	2.85	4.06	4.65	2.19	2.89	3.79	
2	mar-23		2.81	4.15		2.46		4.06	4.73	2.15	2.85	3.55	4.26
3	mar-23		2.81	4.06		2.42	2.89	4.1	4.73		2.81		4.3
1	mar-23		2.81	4.15		2.46	2.85	4.06	4.65	2.18	2.89	3.79	4.22
2	mar-23		2.81	3.91	4.65	2.46		4.02	4.73	2.15	2.81	3.55	4.26
3	mar-23			4.1	4.61	2.46	2.89	4.1	4.73		2.81		4.3
1	apr-23		2.93	4.33	4.77	2.46	2.93	4.06	4.8	1.95	2.89	3.71	4.22
2	apr-23	2.23	2.69	3.94	4.65		2.89	4.06	4.65		2.77	3.59	4.22
3	apr-23		2.77	4.22		2.42		3.9	4.61	2.14	2.93	3.63	4.57
1	apr-23		2.89	4.33	4.77	2.46	2.93	4.02	4.8	1.95	2.89	3.71	
2	apr-23	2.23	2.73	3.91	4.65	2.42	2.89	4.02	4.65		2.77	3.59	4.22
3	apr-23		2.77	4.22		2.42		3.91	4.65	2.14	2.93	3.63	4.57

1	apr-23		2.77	4.21		2.46	2.93	4.02	4.8	1.95	2.89	3.71	
2	apr-23		2.93	4.33	4.77	2.46	2.89	4.02	4.65		2.77	3.59	4.22
3	apr-23	2.23	2.73	3.91	4.65	2.46		4.02	4.69	2.15	2.93		4.61
1	mag-23	2.29	2.77	3.83	4.45	2.46	2.85	4.02	4.77	2.18	2.73	3.79	4.65
2	mag-23	2.1	2.77		4.65	2.42	2.85		4.73	2.1	2.77	3.55	4.65
3	mag-23		2.77	3.6		2.5		4.06	4.65	2.3	2.77	3.48	4.77
1	mag-23	2.29	2.77	4.14	4.49	2.46	2.89	4.02	4.77	2.15	2.73	3.79	4.49
2	mag-23	2.1	2.77	4.21	4.65	2.46	2.85		4.65	2.1	2.77		4.61
3	mag-23		2.81	3.95	4.73	2.5		4.06	4.73		2.77	3.71	
1	mag-23	2.29	2.77	3.82	4.49	2.46	2.89	4.02	4.77	2.07	2.77		4.18
2	mag-23	2.1	2.77		4.65	2.46	2.85		4.65	2.23	2.73		4.18
3	mag-23		2.81	3.95	4.73	2.5		4.06	4.73	2.23	2.81		4.34
1	giu-23		2.73	4.1	4.49	2.42	2.85	3.87	4.65	2.07	2.77	3.52	4.09
2	giu-23	2.29	2.81		4.77	2.46		4.06	4.84	2.26	2.77	3.63	
3	giu-23			3.91	4.73	2.46	2.89	4.06	4.61			3.71	4.73
1	giu-23		2.73	4.1	4.49	2.42	2.85	3.87	4.65	2.07	2.77	3.52	4.09
2	giu-23		2.81		4.77	2.46		4.06	4.84	2.23	2.77	3.55	
3	giu-23		2.77	3.71	4.73	2.46	2.85	4.06	4.61			3.71	4.73
1	giu-23		2.73	4.1	4.49	2.46		4.06	4.8	2.1	2.77	3.52	4.09
2	giu-23		2.77		4.73	2.42	2.85	3.87				3.71	4.73
3	giu-23	2.29	2.77	3.91	4.45	2.46	2.89	4.06	4.69	2.26	2.77	3.63	
1	lug-23	2.1	2.77	3.98	4.69	2.38	2.85	4.02	4.69	2.07	2.77	3.67	4.38
2	lug-23	2.3	2.77	4.14		2.38	2.81	3.79	4.77	2.3	2.77		4.14
3	lug-23	2.38	2.85	4.18	4.88	2.42	2.81	4.06	4.84		2.73	3.67	4.26
1	lug-23	2.1	2.77	3.98	4.69	2.38	2.89	4.02	4.69	2.07	2.77	3.71	4.38
2	lug-23	2.3	2.77	4.14	4.84	2.38	2.85	3.79	4.77	2.3	2.77		4.14
3	lug-23	2.38	2.85	4.14	4.86	2.42	2.85	4.06	4.84	2.34	2.7	3.67	4.26
1	lug-23	2.3	2.77	4.14	4.84	2.42		4.14		2.3	2.77	3.36	4.34
2	lug-23		2.77	3.98	4.69	2.38	2.85	4.02	4.69	2.07	2.77		4.14
3	lug-23		2.73	4.14		2.42	2.85	4.06	4.84	2.07	2.73		4.34
1	ago-23	2.29	2.77	4.02	4.69	2.42	2.89	4.06	4.45		3.08		4.84
2	ago-23	2.34	2.77	3.55	4.53	2.46	2.89	4.02	4.65	2.3	2.73	3.55	4.53
3	ago-23	2.34		3.83	5	2.46	2.89	4.02	4.69		2.81	3.55	4.69
1	ago-23	2.34	2.77	3.55	4.53	2.42	2.89	4.06	4.49		3.08		
2	ago-23	2.3			4.34	2.46	2.89	4.02	4.65	2.3	2.73	3.55	4.53
3	ago-23	2.29	2.77	3.83	4.69	2.5	2.89	4.02	4.73	2.3	2.92	3.59	4.38
1	ago-23	2.3	2.81	3.55	4.53	2.46	2.85	4.06	4.45	2.34	2.73	3.55	4.53
2	ago-23		2.81	3.6	4.65		2.89	3.91	4.73		2.81	3.55	4.69
3	ago-23		2.81	3.55		2.46		4.06	4.57	2.34	2.93	3.55	4.38
1	set-23		2.77	3.48	4.34		2.85	4.02	4.61		2.77	3.52	4.29
2	set-23		2.77	3.59	4.73	2.46	2.85	4.14	4.65	2.23	2.81	3.55	4.29
3	set-23		2.77		4.65		2.81	4.06	4.69		2.77	3.59	4.38
1	set-23		2.77	3.43	4.34		2.85	4.02	4.65		2.77	3.52	4.29
2	set-23		2.73	3.59	4.72		2.81	4.14	4.65	2.23	2.81	3.55	4.29
3	set-23		2.73		4.65	2.46	2.85	4.06	4.65	2.07	2.77	3.59	4.38
1	set-23		2.77		4.34		2.85	4.14	4.65		2.77	3.59	4.3
2	set-23		2.77	3.59	4.73			4.06	4.73		2.77	3.48	4.3
3	set-23		2.89	3.59	4.41		2.85	4.02	4.61	2.11	2.77	3.59	
1	ott-23	2.1	2.81	3.55	4.53	2.46	2.93		4.73	2.18	2.93	3.55	4.26

2	ott-23		2.85	3.55	4.26	2.46	2.93	4.02	4.73	2.15	2.81	3.71	4.26
3	ott-23			3.83	4.53	2.46	2.89	3.98	4.69	2.34	2.85	3.79	4.45
1	ott-23	2.38	2.85	3.59	4.3	2.46	2.93		4.77	2.18	2.93	3.55	4.26
2	ott-23	2.1	2.81	3.59	4.53	2.46	2.89	3.98	4.69	2.14	2.81	3.71	4.26
3	ott-23			3.83	4.53	2.46	2.93	4.02	4.73	2.14	2.93	3.55	4.29
1	ott-23			3.83	4.53	2.46	2.93	4.02	4.73			3.83	4.53
2	ott-23		2.85	3.55	4.36	2.46		4.06	4.73	2.19	2.93	3.55	4.3
3	ott-23	2.29	2.89		4.45	2.42		4.02	4.69	2.19	2.93	3.71	4.26
1	nov-23	1.95	2.77	3.55	4.34	2.46	2.89	3.83			2.77	3.59	4.25
2	nov-23		2.81	3.59	4.45	2.46	2.89	3.63	4.77	2.07	2.81	3.59	4.34
3	nov-23		2.81		4.57	2.46	2.89		4.69			3.75	4.22
1	nov-23	1.95	2.77	3.55	4.34	2.46	2.89	3.87			2.77	3.59	4.25
2	nov-23		2.81	3.59	4.45	2.46	2.89	3.63	4.77				4.22
3	nov-23				4.57	2.46	2.89		4.69	2.07	2.81	3.59	4.34
1	nov-23		2.81	3.67	4.57	2.42		4.1	4.77		2.77	3.59	4.26
2	nov-23	1.95	2.77	3.55	4.34	2.46	2.89	4.06		1.99	2.81		4.49
3	nov-23			3.69	4.53	2.46	2.89		4.65		2.85	3.75	4.26
1	dic-23	2.34	2.89	3.83	4.8	2.5	2.93	4.1	4.84	2.34	2.89	3.83	4.41
2	dic-23		2.89	3.83	4.77	2.46	2.93	4.1	4.84	2.15	2.85		4.53
3	dic-23		2.89	3.71	4.77			4.1	4.77	2.15	2.81	3.98	4.45
1	dic-23		2.89	3.82	4.77	2.5	2.93	4.06	4.8		2.85	3.75	4.45
2	dic-23	2.29	2.89		4.84	2.46	2.93	4.06	4.8	2.15	2.85		4.53
3	dic-23		2.93	3.82	4.77			4.1	4.77	2.15	2.85		4.49
1	dic-23	2.34	2.89	3.83	4.8	2.46	2.93	4.1	4.77	2.15	2.85	4.02	4.49
2	dic-23		2.93	3.83	4.77	2.5	2.93	4.1	4.8		2.81	3.98	4.45
3	dic-23		2.89	3.71	4.77	2.46	2.93	4.1	4.77	2.15	2.85		4.53





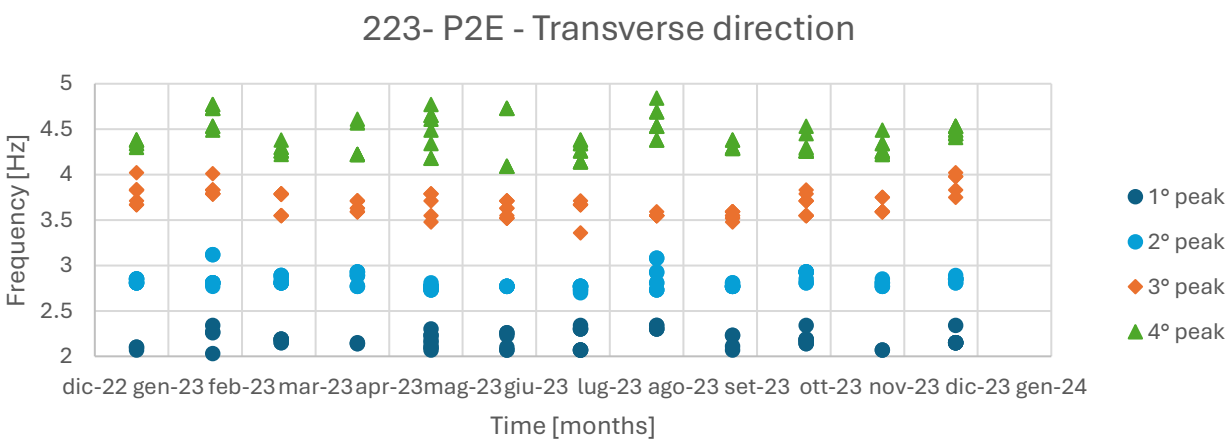


Figure 13-146: Main identified frequencies for sensor 319E3 – bridge 223 – Sp2 – P2E

13.14 Anomalies detection

Sensor 319E3 shows evident frequency anomalies along all the 2023 year.

Beside the frequencies shown in Table 13-37, that are regular and belong to the standard behavior of these decks, lower frequencies are found only for this sensor. These lower frequencies are found in vertical and transverse directions and are presented in Table 13-38.

The anomaly frequencies may suggest the presence of a damage on the pier, being the frequencies lower than the natural ones of the sound element.

Table 13-38: Frequency anomalies for sensor 319E3 – bridge 223 – Sp2 – P2E

		Frequency anomalies		
		Vertical	**Transverse**	
Numerosity		22	53	57
MEAN		**0.56**	**0.27**	**0.95**
SD		0.38	0.24	0.27
C.o.V.		67.0%	91.4%	28.3%
Rating		**3%**	**6%**	**17%**
1	gen-23	0.47	0.48	1.4
2	gen-23		0.43	1.13
3	gen-23		0.31	
1	gen-23	0.47	0.47	1.44
2	gen-23		0.42	
3	gen-23		0.47	1.13
1	gen-23		0.47	1.33
2	gen-23	0.47	0.43	1.17
3	gen-23			
1	feb-23		0.04	0.59
2	feb-23		0.04	0.86
3	feb-23	0.78		
1	feb-23	0.78		0.59
2	feb-23		0.04	0.86
3	feb-23		0.23	0.93
1	feb-23			
2	feb-23			
3	feb-23	0.78	0.04	0.86
1	mar-23			
2	mar-23			0.82
3	mar-23			0.51
1	mar-23			
2	mar-23			0.85
3	mar-23			0.39
1	mar-23			
2	mar-23			0.85
3	mar-23		0.39	1.29

1	apr-23		0.39	1.13
2	apr-23		0.63	
3	apr-23		0.7	1.37
1	apr-23	0.39	0.39	1.09
2	apr-23	0.66		
3	apr-23		0.7	1.33
1	apr-23		0.39	1.09
2	apr-23			
3	apr-23		0.7	1.41
1	mag-23			
2	mag-23			0.78
3	mag-23		0.04	0.66
1	mag-23			
2	mag-23		0.04	0.66
3	mag-23		0.04	1.01
1	mag-23			0.7
2	mag-23			
3	mag-23		0.08	0.78
1	giu-23		0.31	0.98
2	giu-23	0.9		
3	giu-23			
1	giu-23		0.31	0.98
2	giu-23	0.86		
3	giu-23		0.31	0.98
1	giu-23			
2	giu-23			
3	giu-23			
1	lug-23		0.39	1.09
2	lug-23			
3	lug-23			0.86
1	lug-23			0.39
2	lug-23			
3	lug-23	0.04	0.04	0.86
1	lug-23		0.39	1.13
2	lug-23	0.04		
3	lug-23			
1	ago-23	1.05	0.04	1.02
2	ago-23			
3	ago-23	1.01		
1	ago-23		0.04	1.02
2	ago-23	1.05		
3	ago-23	1.05		
1	ago-23			
2	ago-23		0.31	
3	ago-23	0.47		
1	set-23			
2	set-23			

3	set-23			
1	set-23		0.66	
2	set-23		0.78	1.33
3	set-23			
1	set-23			
2	set-23			
3	set-23			
1	ott-23		0.04	0.74
2	ott-23		0.04	0.82
3	ott-23			
1	ott-23	0.04	0.04	0.74
2	ott-23	0.04	0.04	0.86
3	ott-23		0.04	0.59
1	ott-23			
2	ott-23		0.04	0.74
3	ott-23		0.04	0.86
1	nov-23			
2	nov-23			
3	nov-23		0.04	0.9
1	nov-23	0.98		0.98
2	nov-23		0.12	0.9
3	nov-23		0.12	0.94
1	nov-23			
2	nov-23			
3	nov-23			
1	dic-23			
2	dic-23		0.04	0.74
3	dic-23		0.04	
1	dic-23			
2	dic-23	0.04	0.74	1.4
3	dic-23	0.04	0.74	1.56
1	dic-23		0.04	0.74
2	dic-23		0.04	
3	dic-23		0.04	0.74

14. Annex 14 – Bridge 223 – Span 6 – L/2 - Sensor 2B5E7

The Bridge 223 counts 2 monitored decks: span 2 and span 6 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 2 are:

- 2BE0F – situated in the midspan;
- 2BA63 – situated at a distance of L/4;
- 31205 – situated at a distance of L/8;
- 319BC – situated nearby the vest pilar;
- 319E3 – situated nearby the east pilar.

The sensors present on deck number 6 are:

- 2B5E7 – situated in the midspan;
- 2BCF9 – situated at a distance of L/4 of the deck;
- 2BCAD – situated at a distance of L/8 of the deck;

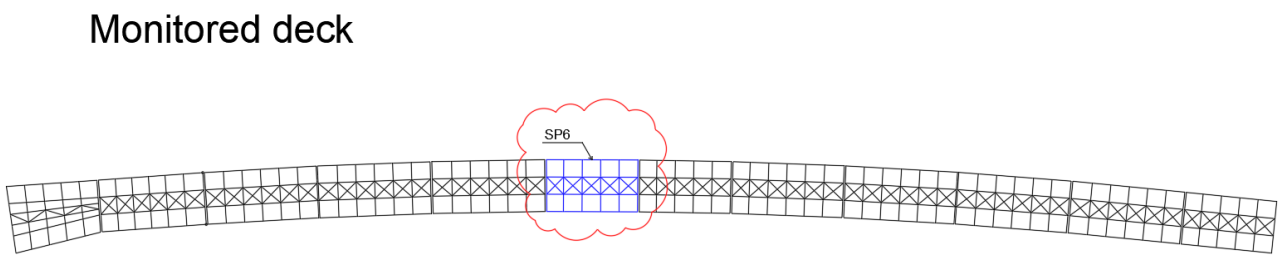


Figure 14-1 Monitored decks of 223 bridge

The accelerograms of the 2B5E7 sensor have been analyzed and the results are represented in the following paragraphs.

14.1 January

The results obtained for the January dataset are shown in the following tables.

Table 14-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-01-16_13-00-20	3.64E-03
	2°	2B5E7_2023-01-03_13-00-20	3.47E-03
	3°	2B5E7_2023-01-30_19-00-20	3.44E-03
Longitudinal direction (y)	1°	2B5E7_2023-01-26_13-00-21	2.93E-04
	2°	2B5E7_2023-01-16_13-00-20	2.60E-04
	3°	2B5E7_2023-01-27_13-00-21	2.46E-04
Transverse direction (z)	1°	2B5E7_2023-01-03_13-00-20	1.18E-03
	2°	2B5E7_2023-01-30_19-00-20	1.16E-03
	3°	2B5E7_2023-01-30_07-00-20	1.07E-03

Table 14-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-01-24_01-00-19	3.88E-05	2B5E7_2023-01-16_13-00-20	2.66E-06
2	2B5E7_2023-01-30_19-00-20	2.60E-05	2B5E7_2023-01-30_19-00-20	2.39E-06
3	2B5E7_2023-01-22_19-00-21	1.98E-05	2B5E7_2023-01-22_19-00-21	2.29E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-01-27_13-00-21	8.44E-08	2B5E7_2023-01-26_13-00-21	1.71E-08
2	2B5E7_2023-01-30_07-00-20	8.21E-08	2B5E7_2023-01-16_13-00-20	1.39E-08
3	2B5E7_2023-01-11_13-00-20	6.45E-08	2B5E7_2023-01-27_13-00-21	1.19E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-01-30_19-00-20	3.02E-06	2B5E7_2023-01-30_19-00-20	2.76E-07
2	2B5E7_2023-01-22_19-00-21	2.48E-06	2B5E7_2023-01-30_07-00-20	2.37E-07
3	2B5E7_2023-01-03_13-00-20	2.09E-06	2B5E7_2023-01-22_19-00-21	2.22E-07

Table 14-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	C	D	C	E	B	B
2	-	B	B	A	-	A	B	G	F
3	B	H	H	D	-	D	F	E	G

14.1.1 Vertical direction (x)

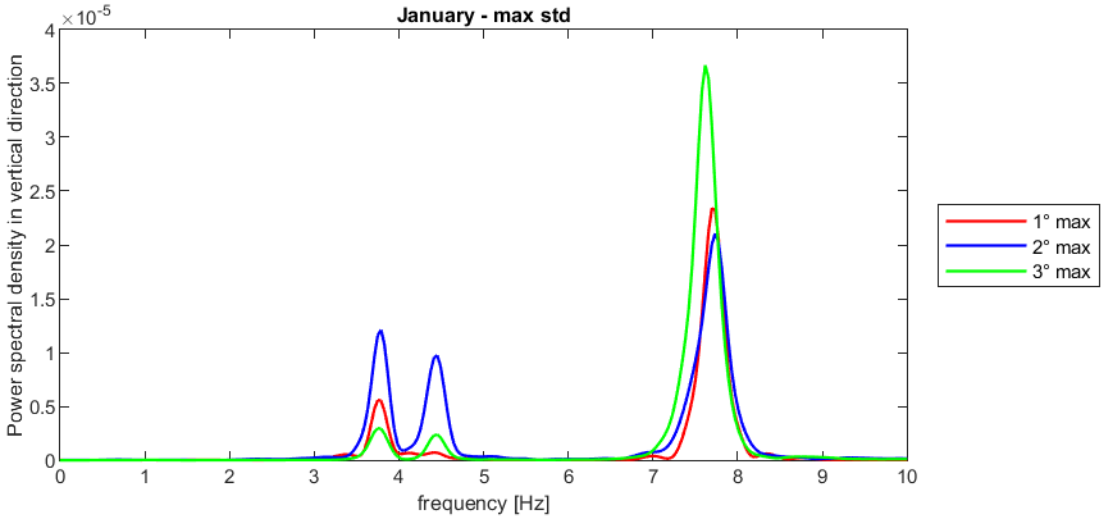


Figure 14-2: Results obtained from the 3 accelerograms with maximum SD in time domain

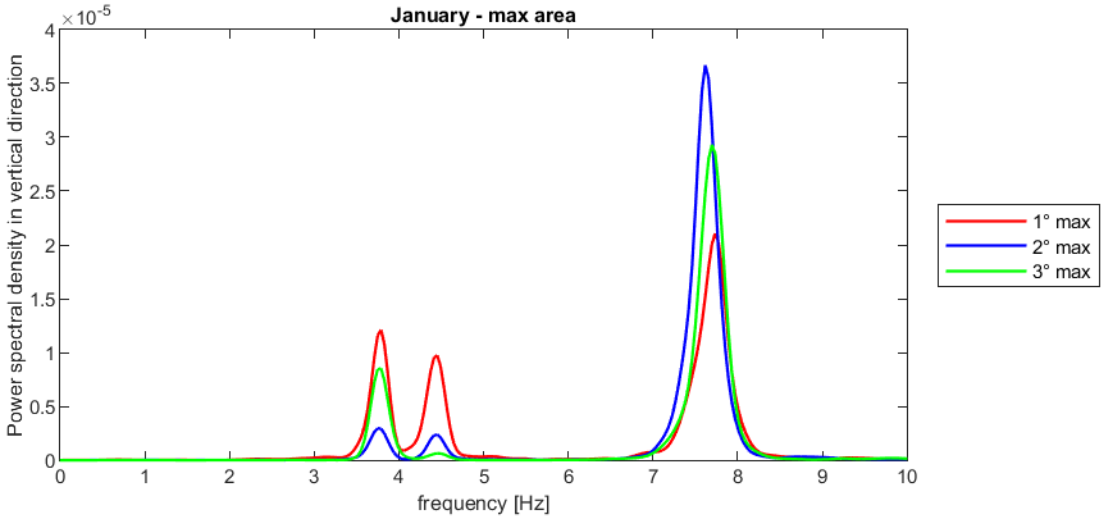


Figure 14-3: Results obtained from the 3 accelerograms with maximum area of PSD

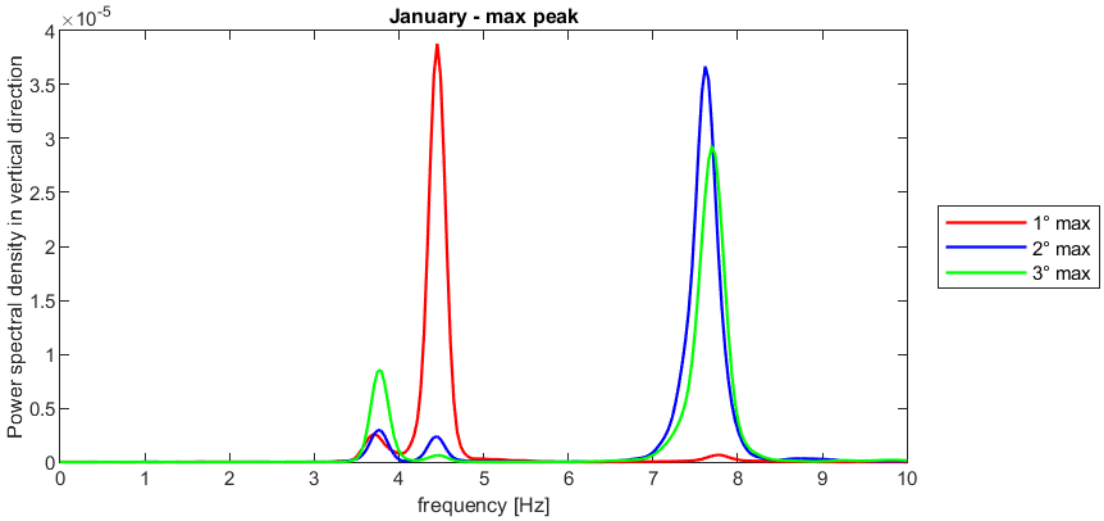


Figure 14-4: Results obtained from the 3 accelerograms with highest peak if PSD

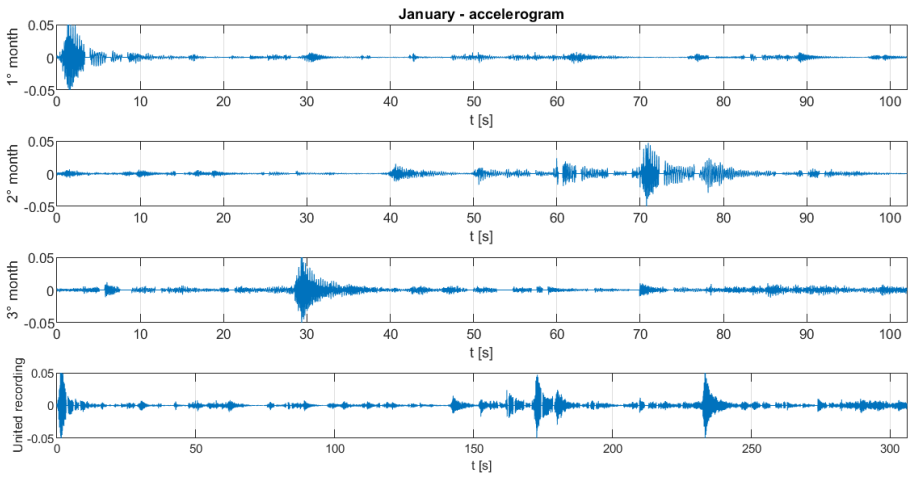


Figure 14-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.1.2 Longitudinal direction (y)

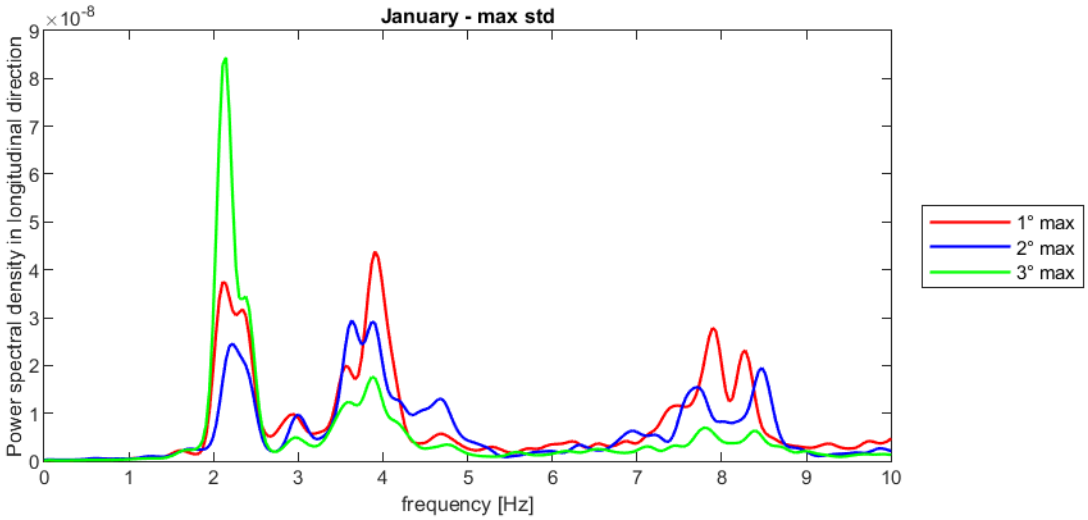


Figure 14-6: Results obtained from the 3 accelerograms with maximum SD in time domain

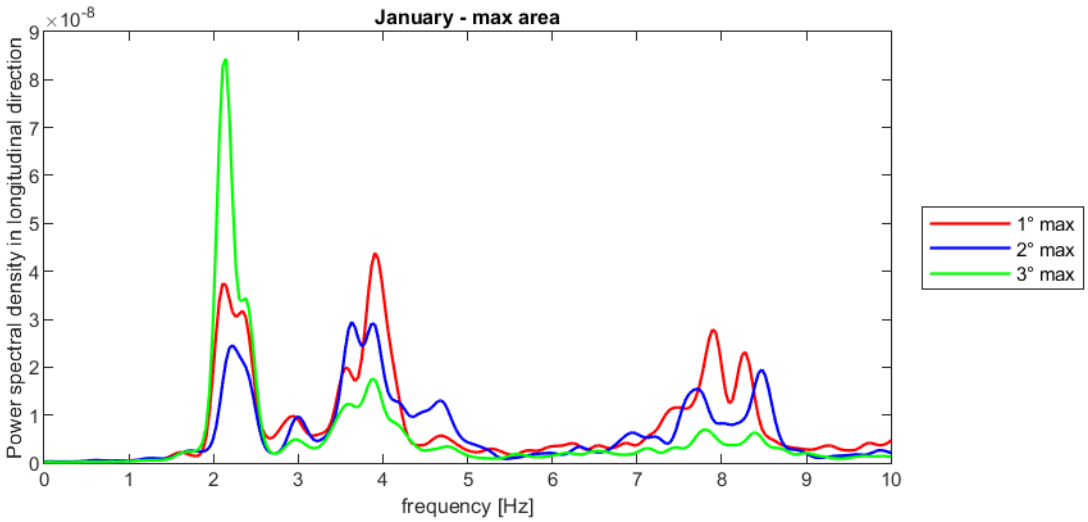


Figure 14-7: Results obtained from the 3 accelerograms with maximum area of PSD

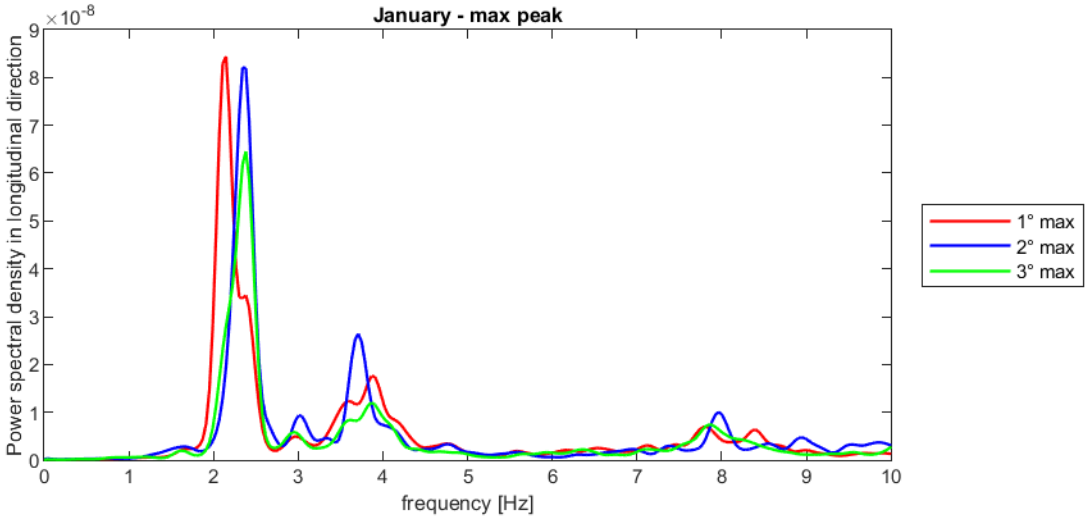


Figure 14-8: Results obtained from the 3 accelerograms with highest peak in PSD

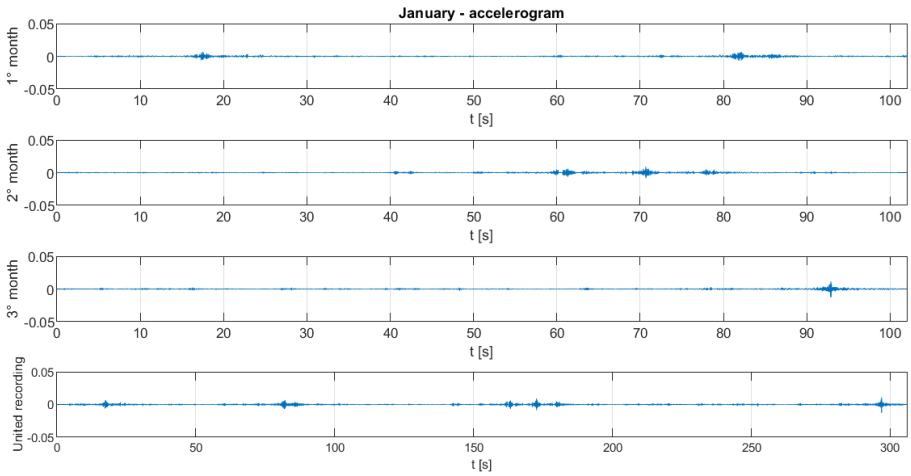


Figure 14-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

14.1.3 Transverse direction (z)

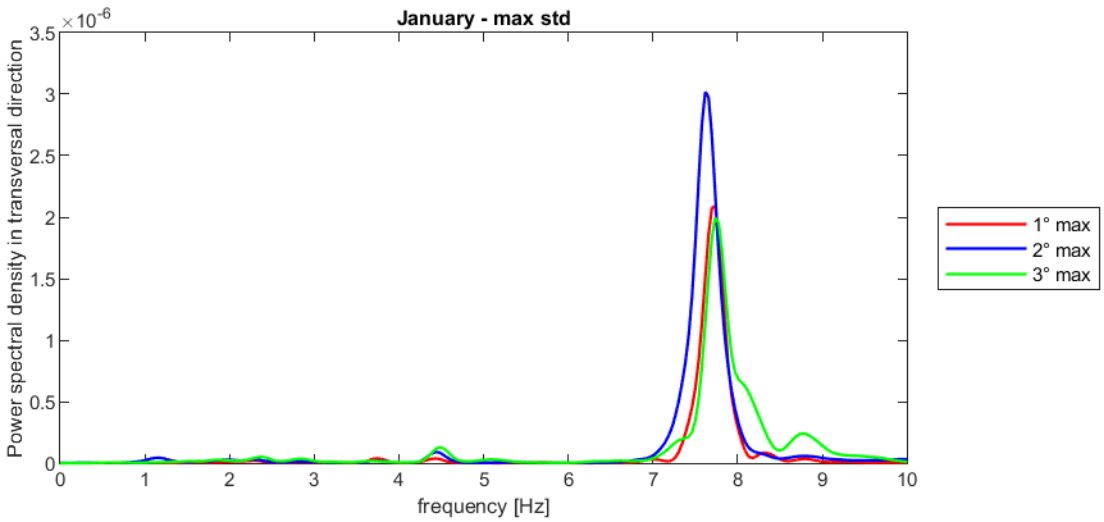


Figure 14-10: Results obtained from the 3 accelerograms with maximum SD in time domain

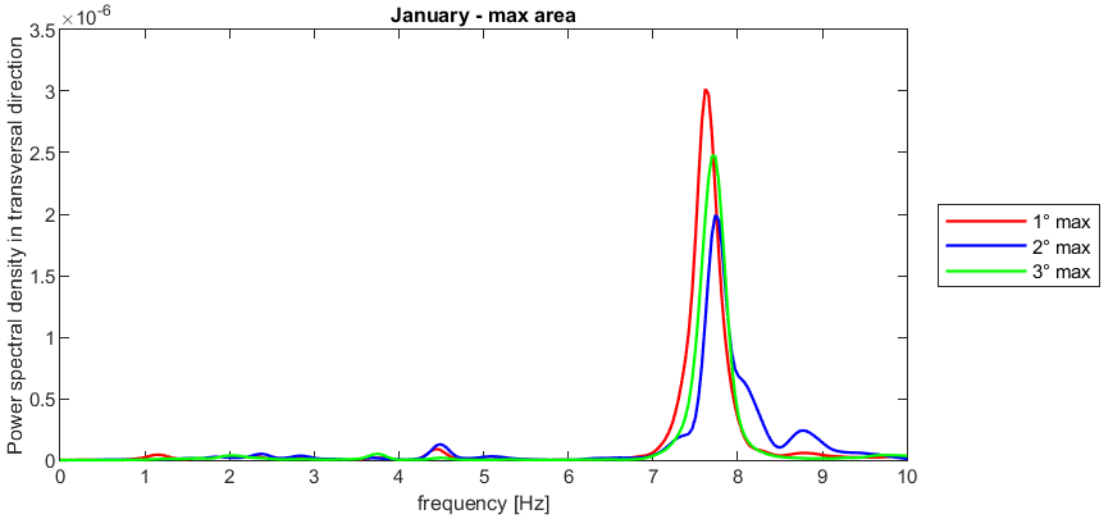


Figure 14-11: Results obtained from the 3 accelerograms with maximum area of PSD

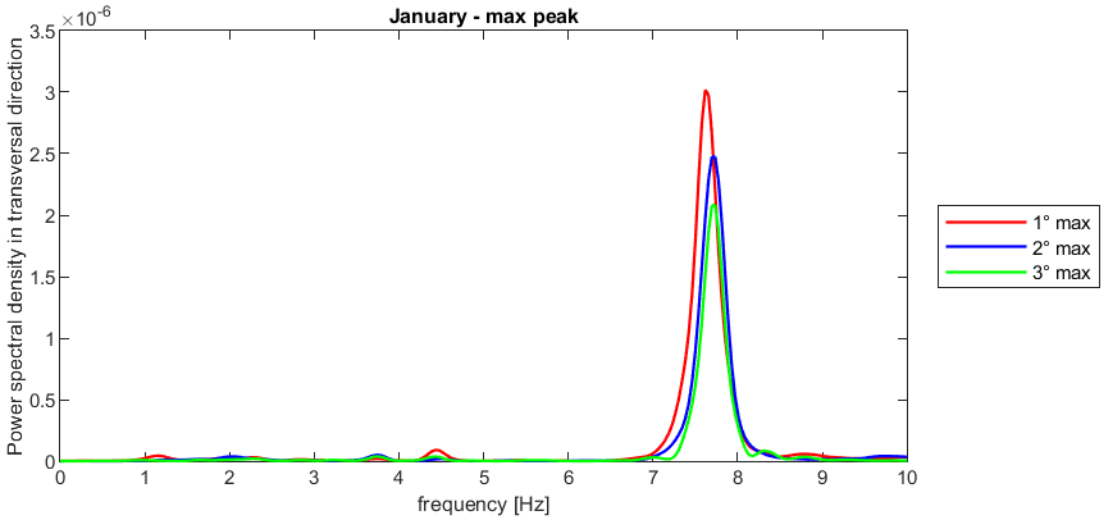


Figure 14-12: Results obtained from the 3 accelerograms with highest peak in PSD

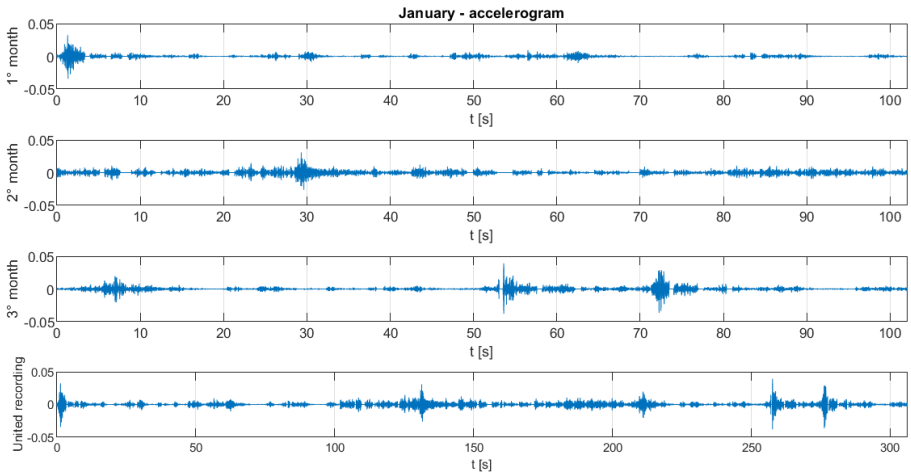


Figure 14-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

14.2 February

The results obtained for the February dataset are shown in the following tables.

Table 14-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-02-01_13-00-21	4.22E-03
	2°	2B5E7_2023-02-11_13-00-19	3.85E-03
	3°	2B5E7_2023-02-02_13-00-21	3.83E-03
Longitudinal direction (y)	1°	2B5E7_2023-02-23_13-00-20	4.58E-04
	2°	2B5E7_2023-02-06_13-00-21	4.38E-04
	3°	2B5E7_2023-02-01_13-00-21	4.07E-04
Transverse direction (z)	1°	2B5E7_2023-02-11_13-00-19	1.23E-03
	2°	2B5E7_2023-02-01_13-00-21	1.20E-03
	3°	2B5E7_2023-02-05_13-00-22	1.19E-03

Table 14-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-02-11_13-00-19	3.04E-05	2B5E7_2023-02-05_13-00-22	3.11E-06
2	2B5E7_2023-02-05_13-00-22	2.46E-05	2B5E7_2023-02-02_13-00-21	2.87E-06
3	2B5E7_2023-02-02_13-00-21	2.27E-05	2B5E7_2023-02-11_13-00-19	2.83E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-02-23_13-00-20	4.28E-08	2B5E7_2023-02-01_13-00-21	1.27E-07
2	2B5E7_2023-02-06_13-00-21	3.85E-08	2B5E7_2023-02-23_13-00-20	1.08E-07
3	2B5E7_2023-02-01_13-00-21	3.01E-08	2B5E7_2023-02-06_13-00-21	1.07E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-02-11_13-00-19	3.56E-06	2B5E7_2023-02-11_13-00-19	2.93E-07
2	2B5E7_2023-02-02_13-00-21	2.98E-06	2B5E7_2023-02-05_13-00-22	2.86E-07
3	2B5E7_2023-02-05_13-00-22	2.95E-06	2B5E7_2023-02-01_13-00-21	2.68E-07

Table 14-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	-	E	G	C	C	D	E	E	E
2	E	G	B	A	A	C	D	-	F
3	B	B	E	D	D	A	F	F	D

14.2.1 Vertical direction (x)

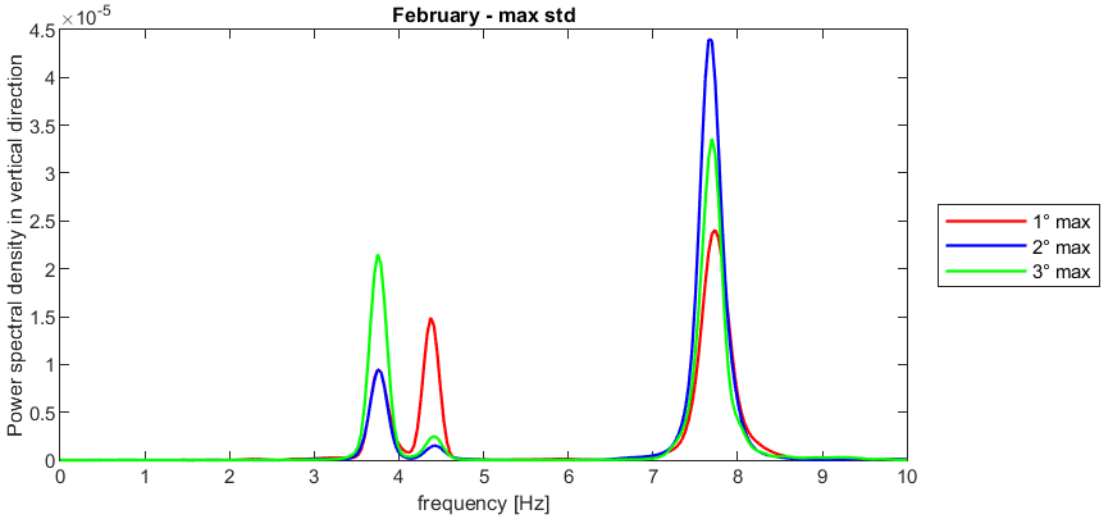


Figure 14-14: Results obtained from the 3 accelerograms with maximum SD in time domain

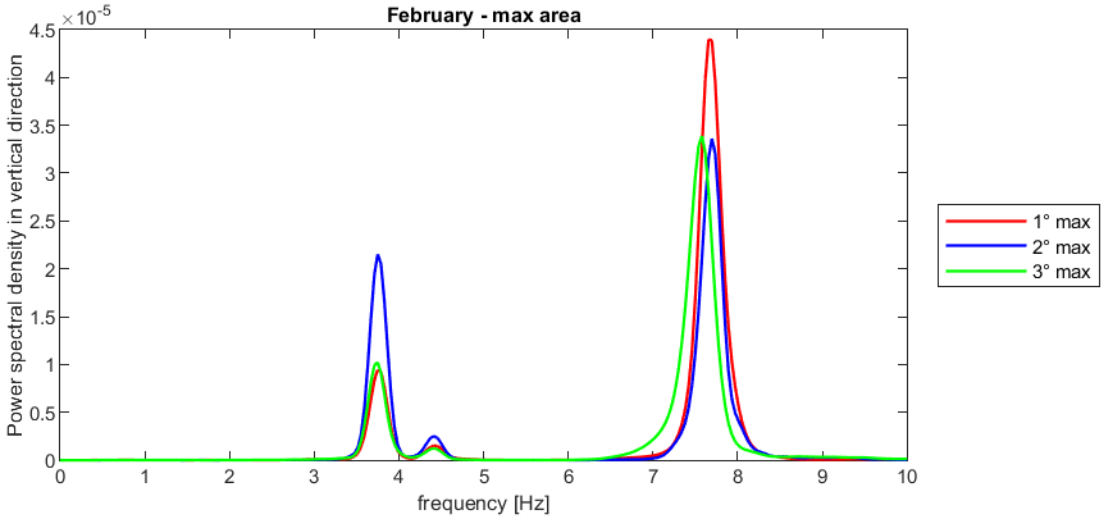


Figure 14-15: Results obtained from the 3 accelerograms with maximum area of PSD

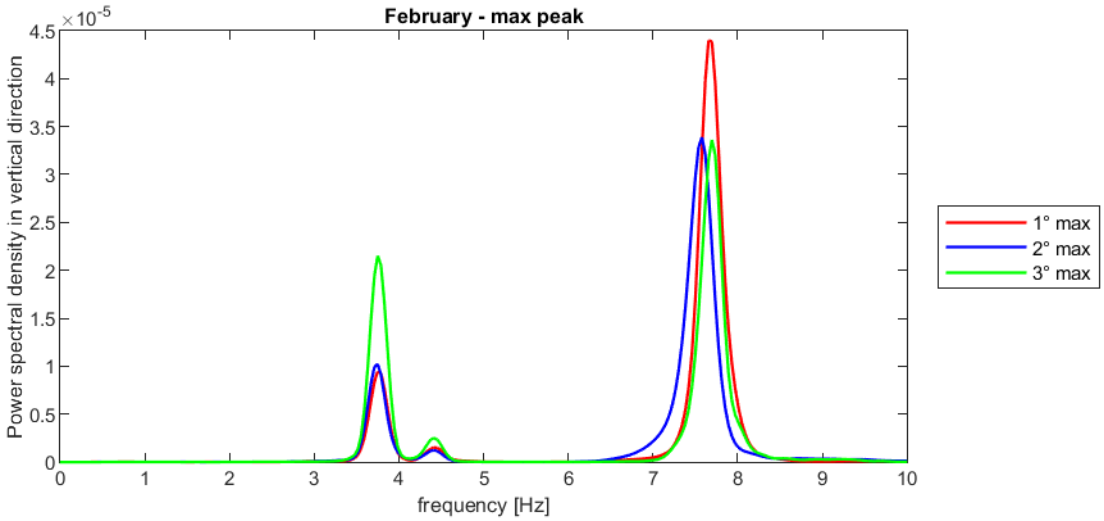


Figure 14-16: Results obtained from the 3 accelerograms with highest peak if PSD

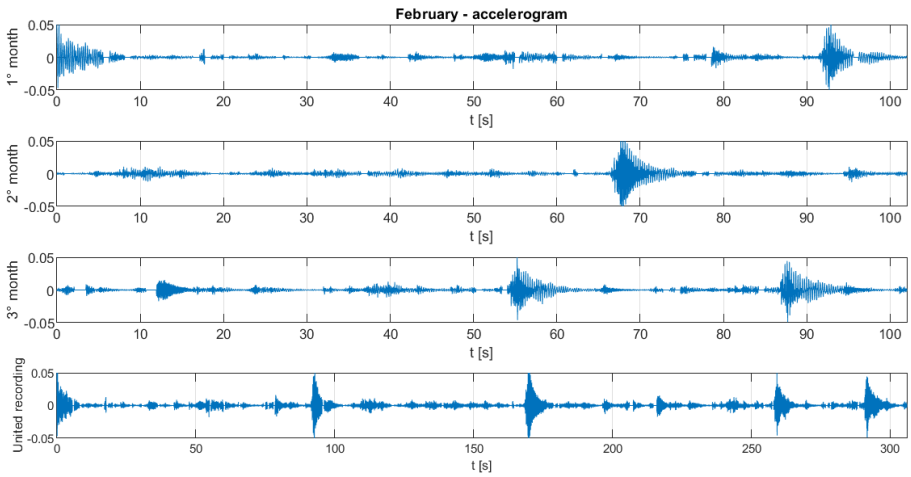


Figure 14-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.2.2 Longitudinal direction (y)

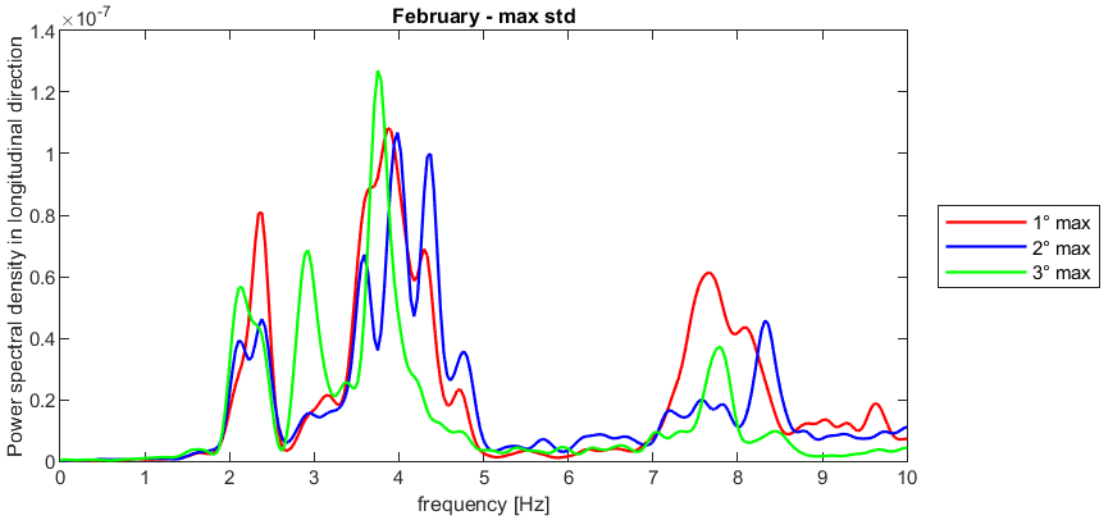


Figure 14-18: Results obtained from the 3 accelerograms with maximum SD in time domain

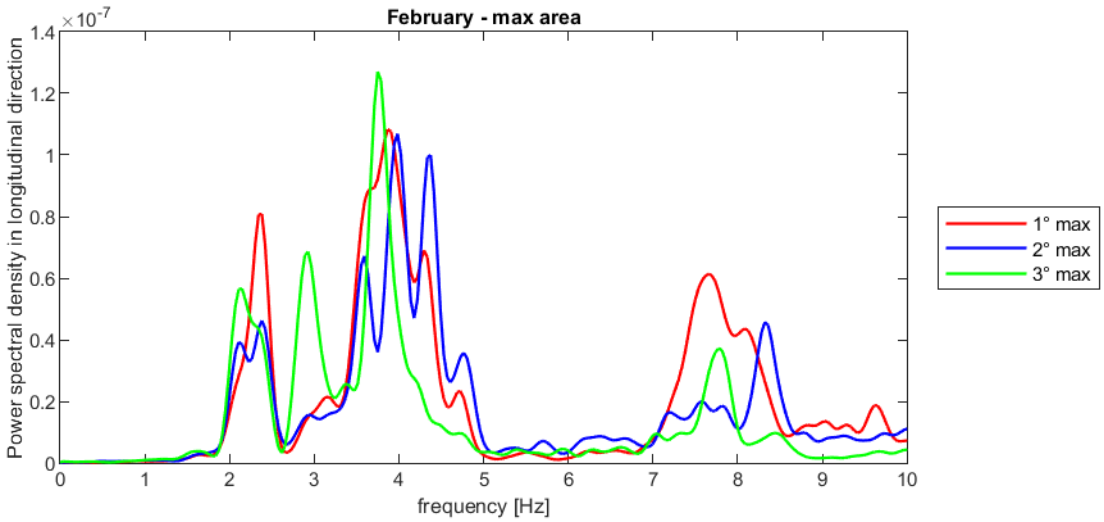


Figure 14-19: Results obtained from the 3 accelerograms with maximum area of PSD

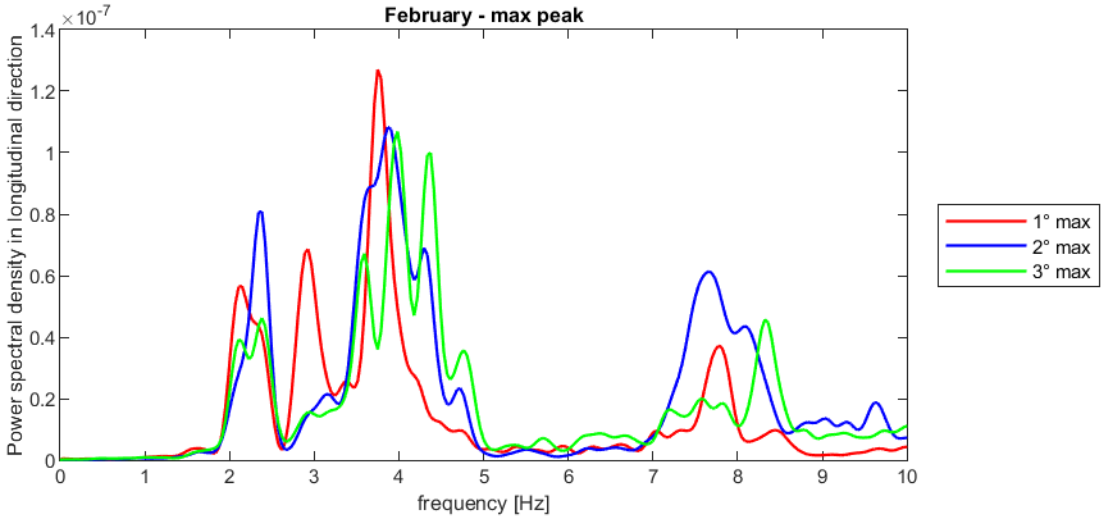


Figure 14-20: Results obtained from the 3 accelerograms with highest peak if PSD

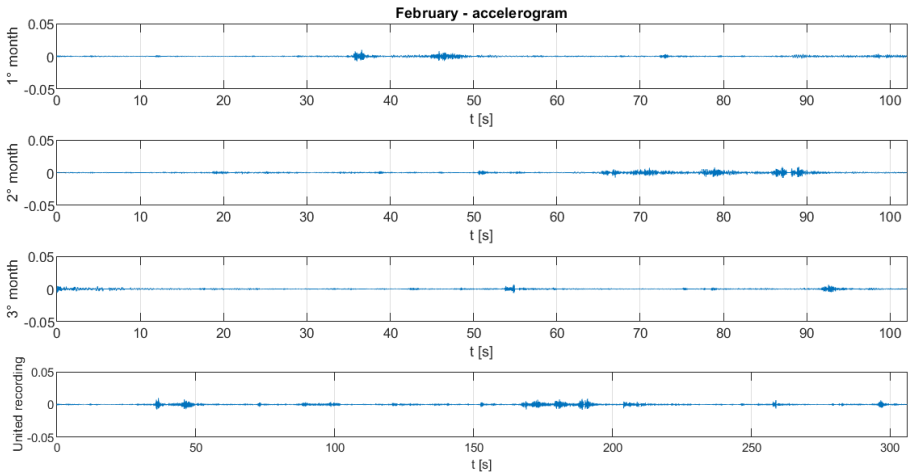


Figure 14-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

14.2.3 Transverse direction (z)

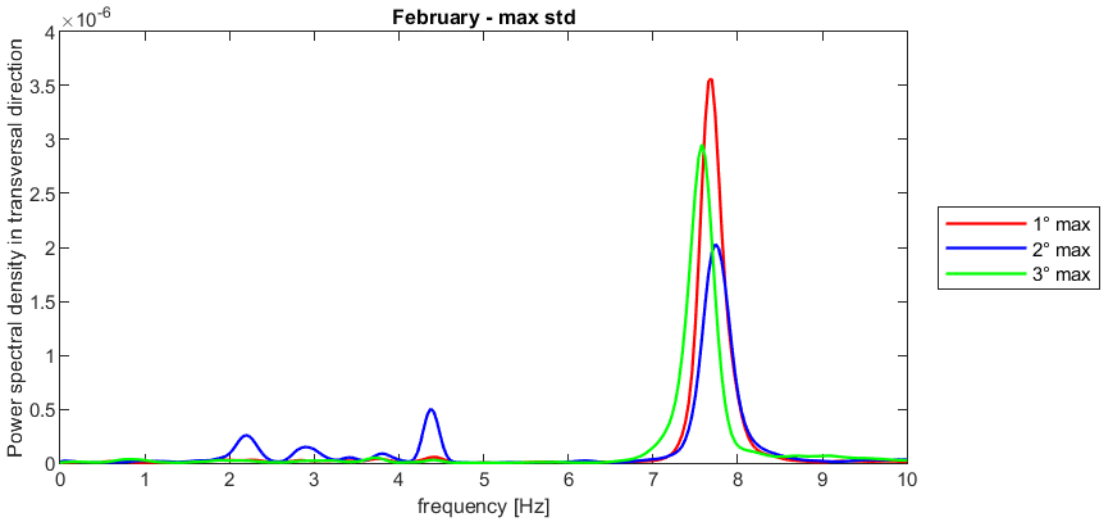


Figure 14-22: Results obtained from the 3 accelerograms with maximum SD in time domain

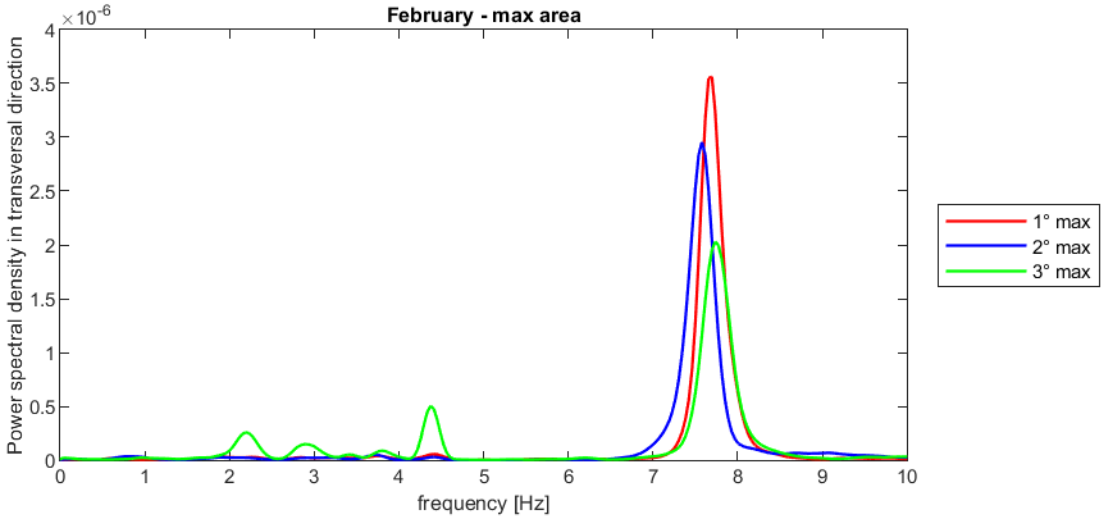


Figure 14-23: Results obtained from the 3 accelerograms with maximum area of PSD

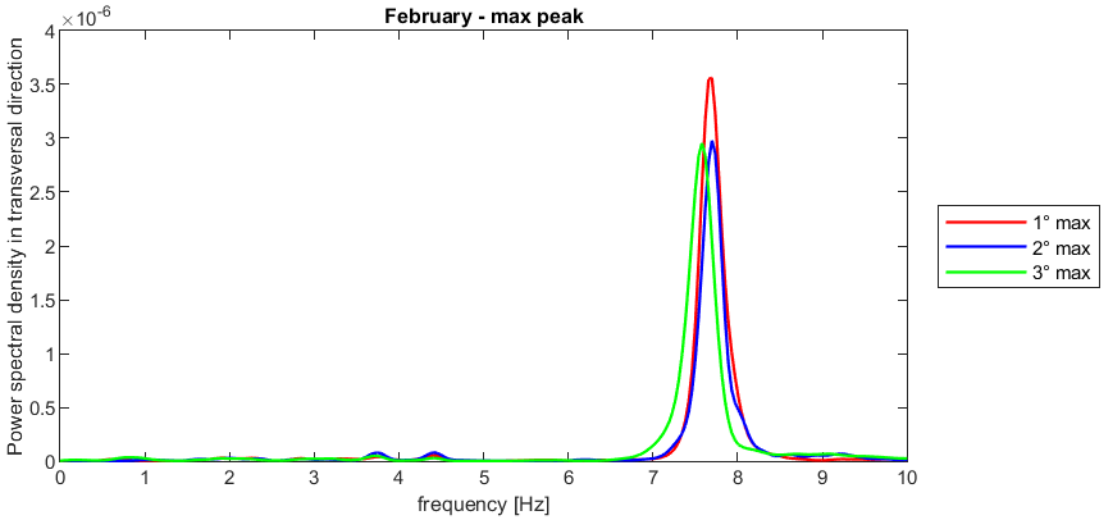


Figure 14-24: Results obtained from the 3 accelerograms with highest peak if PSD

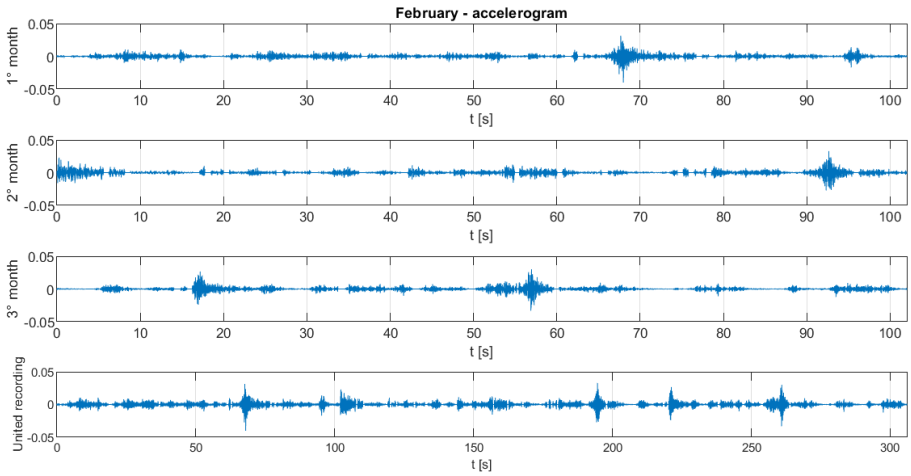


Figure 14-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

14.3 March

The results obtained for the March dataset are shown in the following tables.

Table 14-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-03-04_13-00-20	4.83E-03
	2°	2B5E7_2023-03-31_08-00-20	4.73E-03
	3°	2B5E7_2023-03-30_08-00-20	4.55E-03
Longitudinal direction (y)	1°	2B5E7_2023-03-16_13-00-21	7.50E-04
	2°	2B5E7_2023-03-04_13-00-20	6.87E-04
	3°	2B5E7_2023-03-08_13-00-21	6.25E-04
Transverse direction (z)	1°	2B5E7_2023-03-16_13-00-21	1.63E-03
	2°	2B5E7_2023-03-30_08-00-20	1.30E-03
	3°	2B5E7_2023-03-31_08-00-20	1.27E-03

Table 14-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-03-16_13-00-21	3.41E-05	2B5E7_2023-03-04_13-00-20	5.01E-06
2	2B5E7_2023-03-19_19-00-20	2.73E-05	2B5E7_2023-03-31_08-00-20	4.61E-06
3	2B5E7_2023-03-30_08-00-20	2.72E-05	2B5E7_2023-03-29_14-00-21	4.20E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-03-16_13-00-21	4.49E-07	2B5E7_2023-03-16_13-00-21	1.05E-07
2	2B5E7_2023-03-04_13-00-20	4.15E-07	2B5E7_2023-03-04_13-00-20	1.00E-07
3	2B5E7_2023-03-30_02-00-21	3.12E-07	2B5E7_2023-03-08_13-00-21	7.88E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-03-16_13-00-21	4.65E-06	2B5E7_2023-03-16_13-00-21	5.09E-07
2	2B5E7_2023-03-19_19-00-20	2.99E-06	2B5E7_2023-03-30_08-00-20	3.29E-07
3	2B5E7_2023-03-30_08-00-20	2.89E-06	2B5E7_2023-03-31_08-00-20	3.27E-07

Table 14-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	D	D	D	D	D	D
2	B	-	B	A	A	A	E	-	E
3	C	C	-	F	-	F	B	E	B

14.3.1 Vertical direction (x)

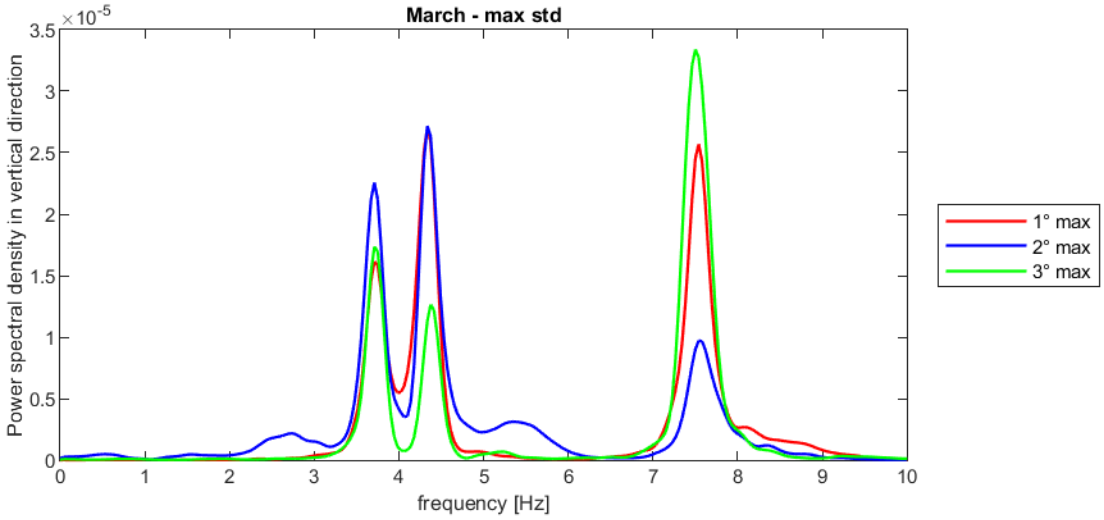


Figure 14-26: Results obtained from the 3 accelerograms with maximum SD in time domain

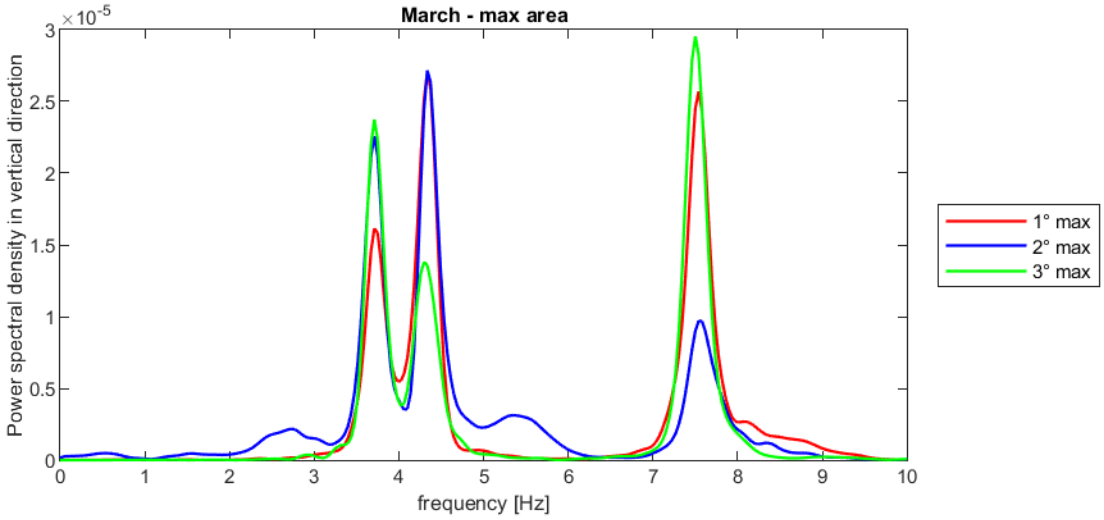


Figure 14-27: Results obtained from the 3 accelerograms with maximum area of PSD

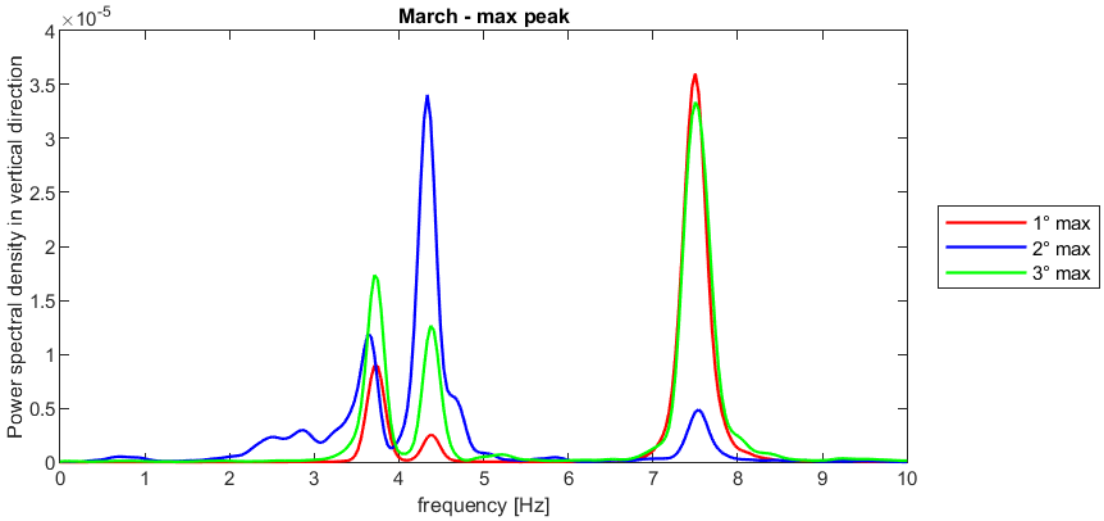


Figure 14-28: Results obtained from the 3 accelerograms with highest peak if PSD

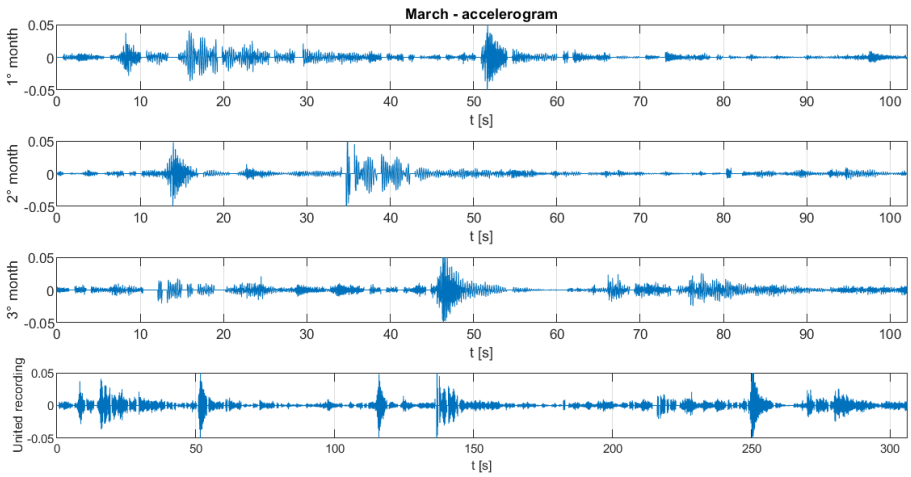


Figure 14-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.3.2 Longitudinal direction (y)

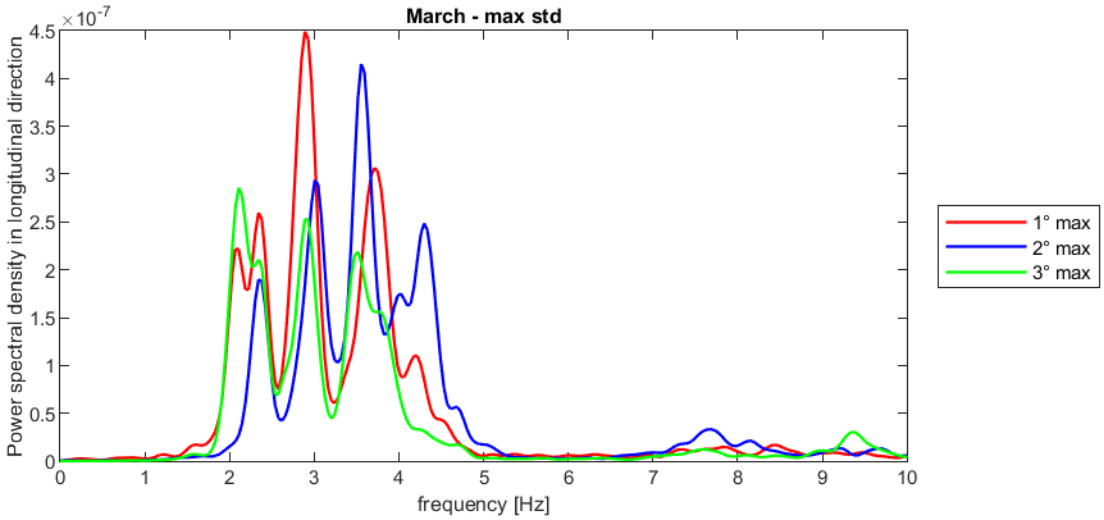


Figure 14-30: Results obtained from the 3 accelerograms with maximum SD in time domain

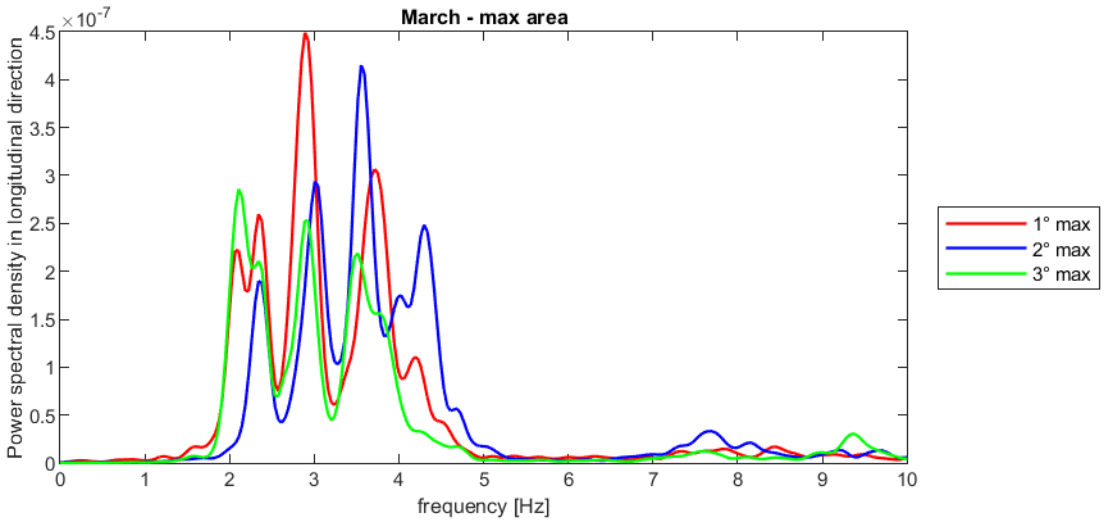


Figure 14-31: Results obtained from the 3 accelerograms with maximum area of PSD

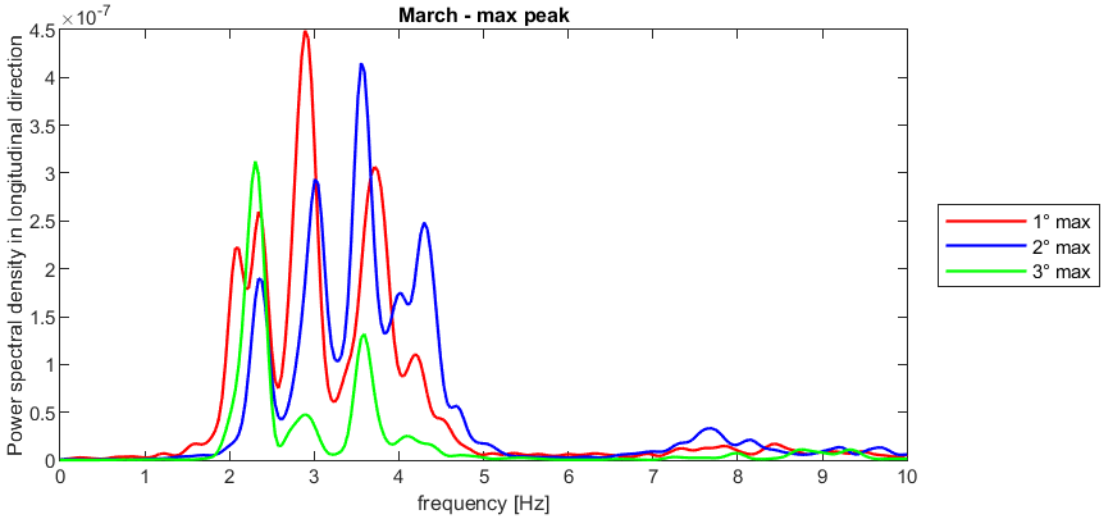


Figure 14-32: Results obtained from the 3 accelerograms with highest peak if PSD

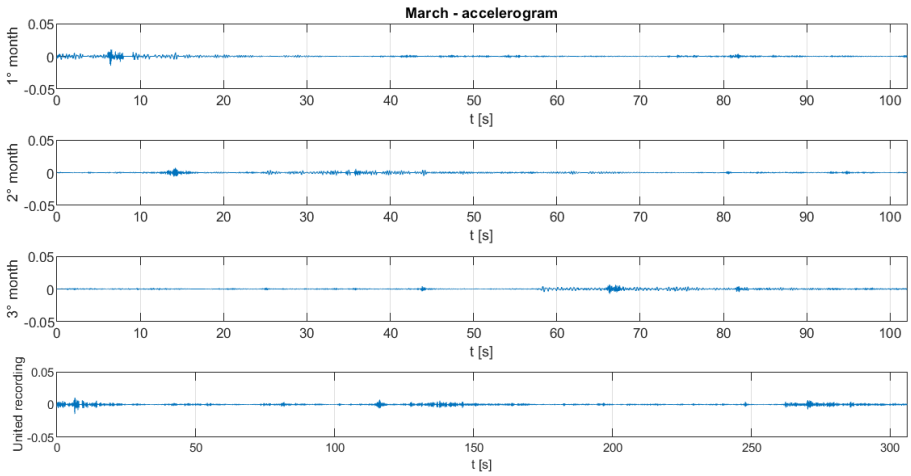


Figure 14-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

14.3.3 Transverse direction (z)

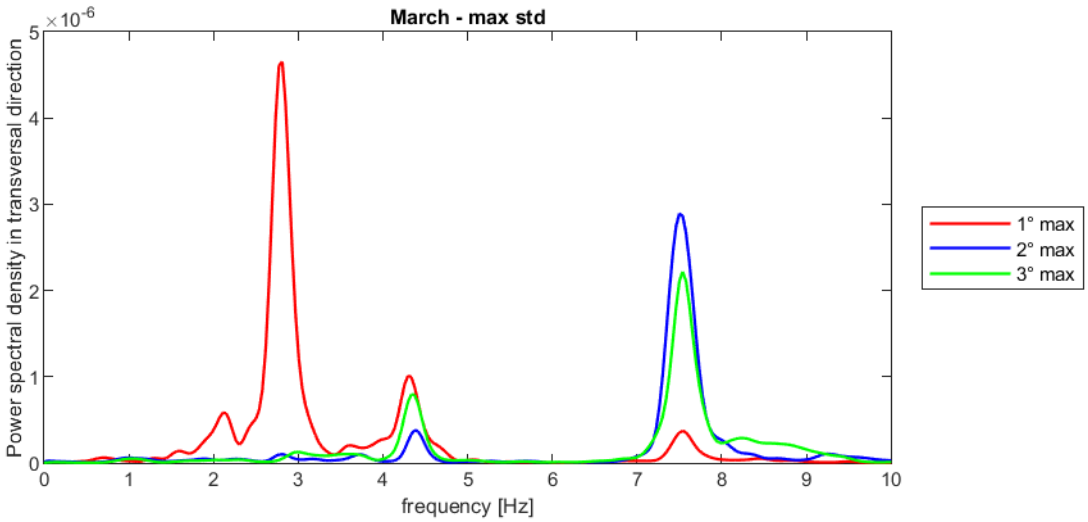


Figure 14-34: Results obtained from the 3 accelerograms with maximum SD in time domain

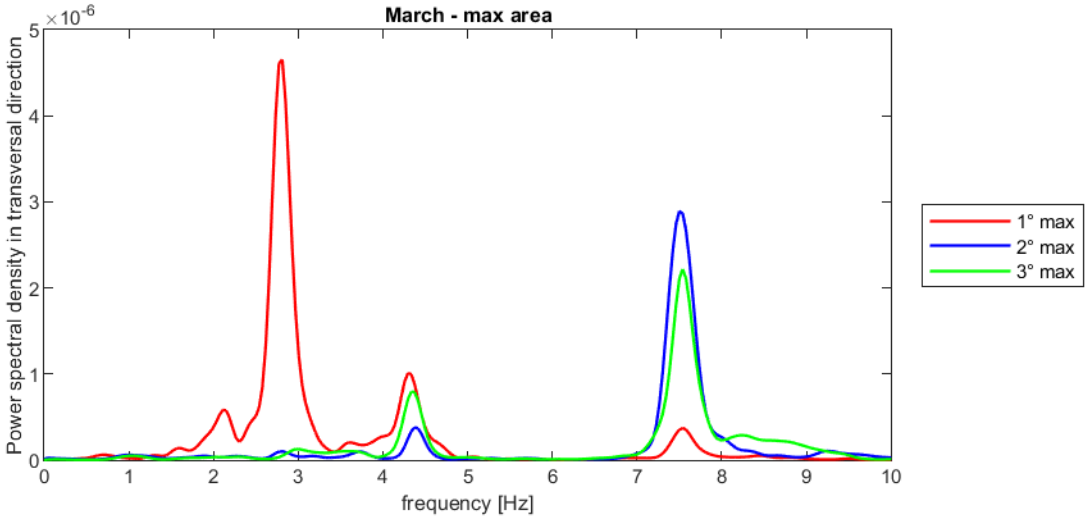


Figure 14-35: Results obtained from the 3 accelerograms with maximum area of PSD

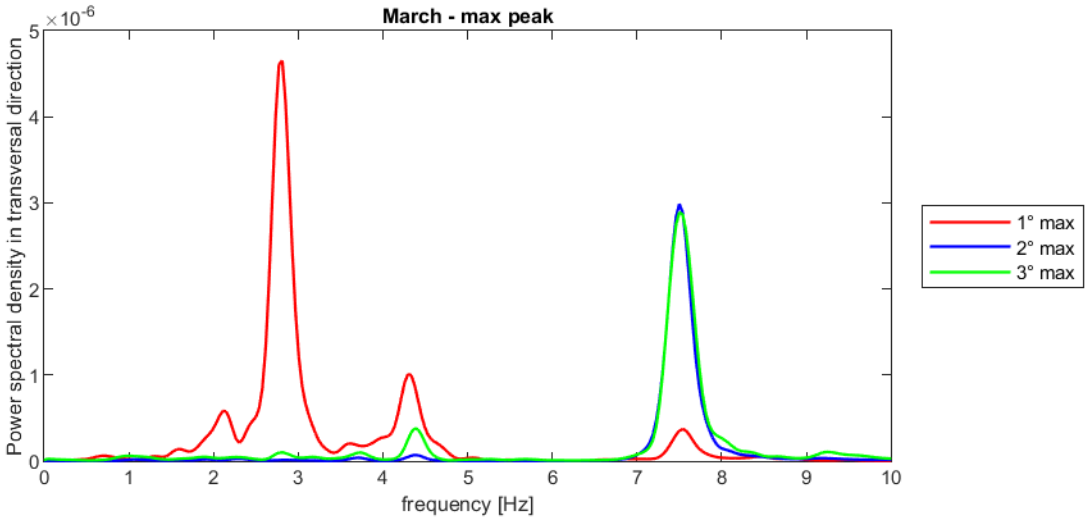


Figure 14-36: Results obtained from the 3 accelerograms with highest peak if PSD

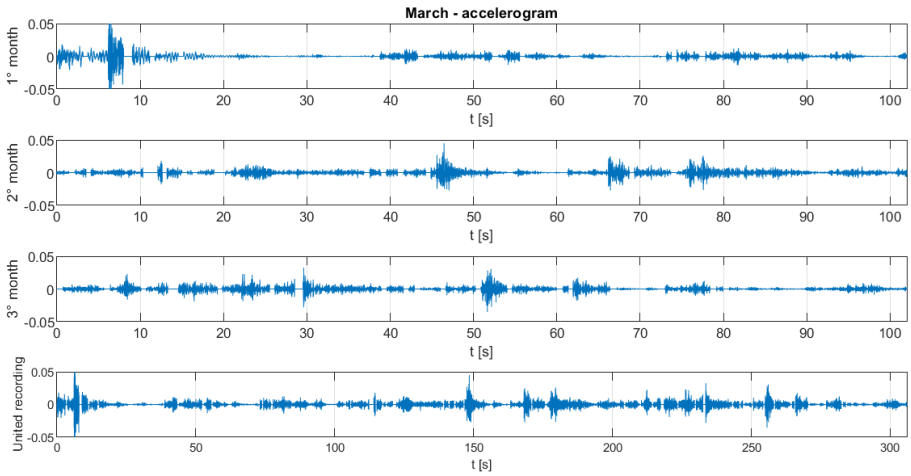


Figure 14-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

14.4 April

The results obtained for the April dataset are shown in the following tables.

Table 14-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-04-13_08-00-21	4.63E-03
	2°	2B5E7_2023-04-24_14-00-20	4.28E-03
	3°	2B5E7_2023-04-19_08-00-21	3.89E-03
Longitudinal direction (y)	1°	2B5E7_2023-04-24_14-00-20	5.97E-04
	2°	2B5E7_2023-04-13_08-00-21	5.94E-04
	3°	2B5E7_2023-04-20_08-00-21	5.16E-04
Transverse direction (z)	1°	2B5E7_2023-04-13_08-00-21	1.25E-03
	2°	2B5E7_2023-04-05_08-00-20	1.17E-03
	3°	2B5E7_2023-04-19_08-00-21	1.17E-03

Table 14-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-04-13_08-00-21	4.83E-05	2B5E7_2023-04-13_08-00-21	4.06E-06
2	2B5E7_2023-04-24_14-00-20	3.64E-05	2B5E7_2023-04-24_14-00-20	3.75E-06
3	2B5E7_2023-04-19_08-00-21	3.64E-05	2B5E7_2023-04-19_08-00-21	3.20E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-04-24_14-00-20	6.01E-07	2B5E7_2023-04-24_14-00-20	7.29E-08
2	2B5E7_2023-04-13_08-00-21	3.94E-07	2B5E7_2023-04-13_08-00-21	7.02E-08
3	2B5E7_2023-04-19_14-00-20	2.11E-07	2B5E7_2023-04-20_08-00-21	4.97E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-04-19_08-00-21	3.13E-06	2B5E7_2023-04-13_08-00-21	3.15E-07
2	2B5E7_2023-04-05_08-00-20	2.44E-06	2B5E7_2023-04-05_08-00-20	3.06E-07
3	2B5E7_2023-04-11_20-00-21	2.19E-06	2B5E7_2023-04-11_20-00-21	2.93E-07

Table 14-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	B	B	A	F	A
2	B	B	B	A	A	A	E	E	E
3	C	C	C	D	-	D	F	G	G

14.4.1 Vertical direction (x)

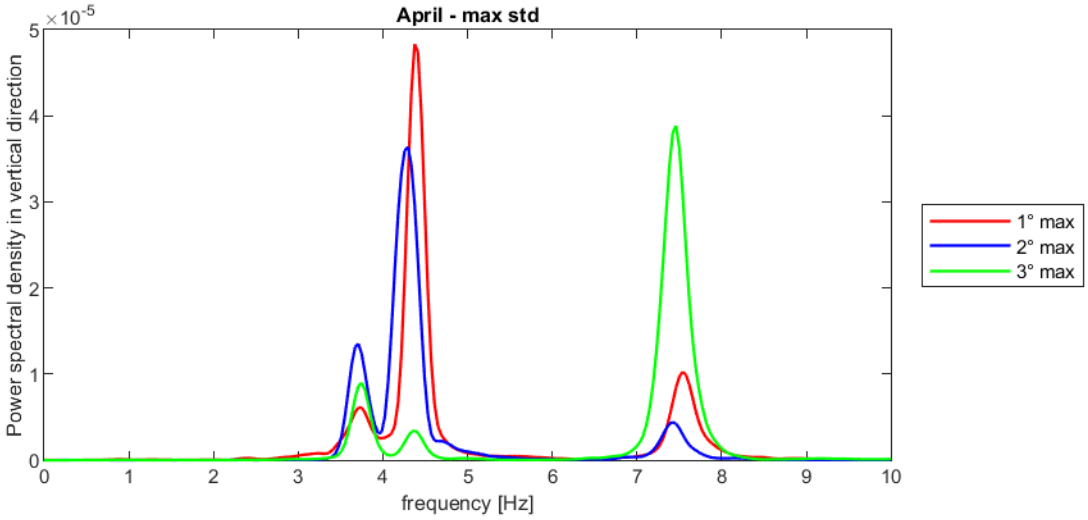


Figure 14-38: Results obtained from the 3 accelerograms with maximum SD in time domain

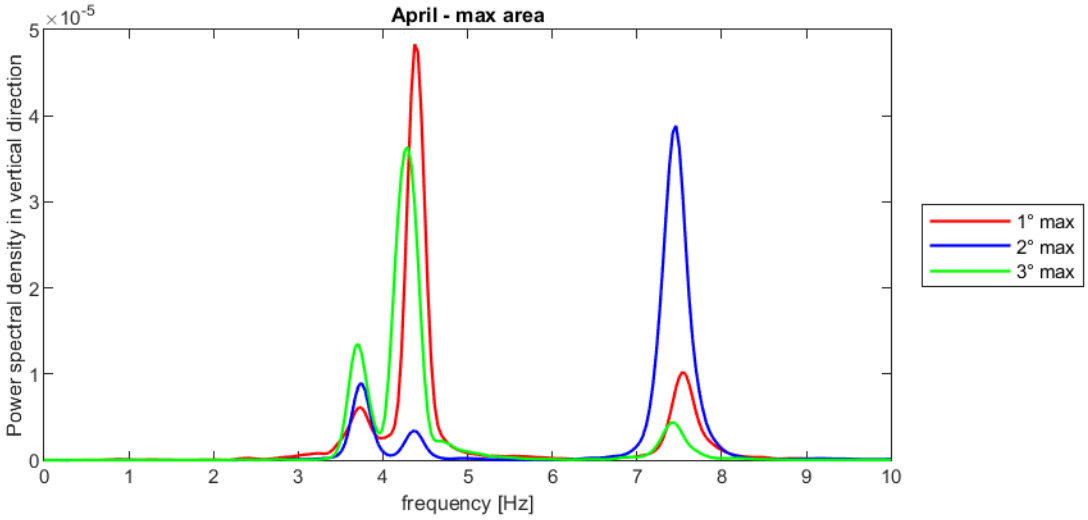


Figure 14-39: Results obtained from the 3 accelerograms with maximum area of PSD

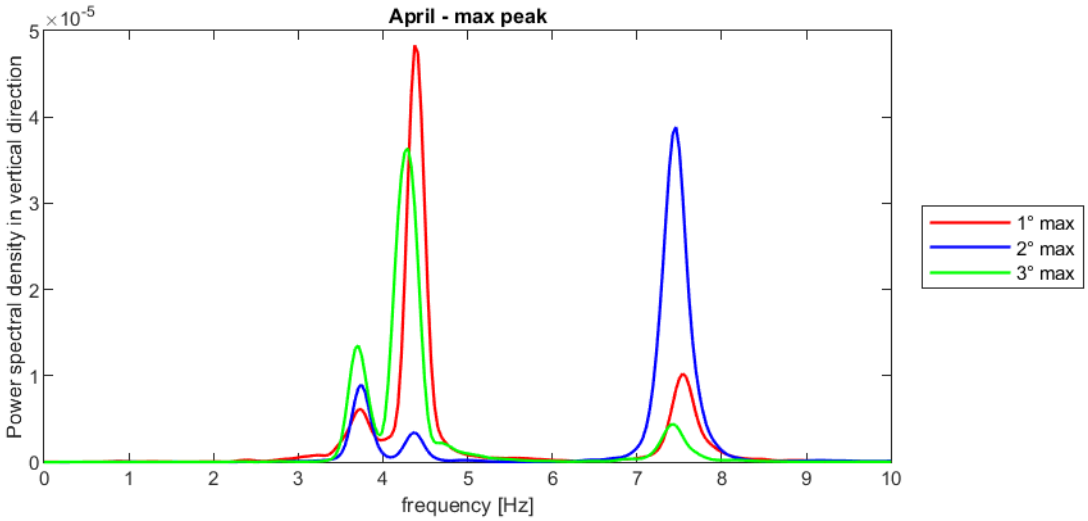


Figure 14-40: Results obtained from the 3 accelerograms with highest peak if PSD

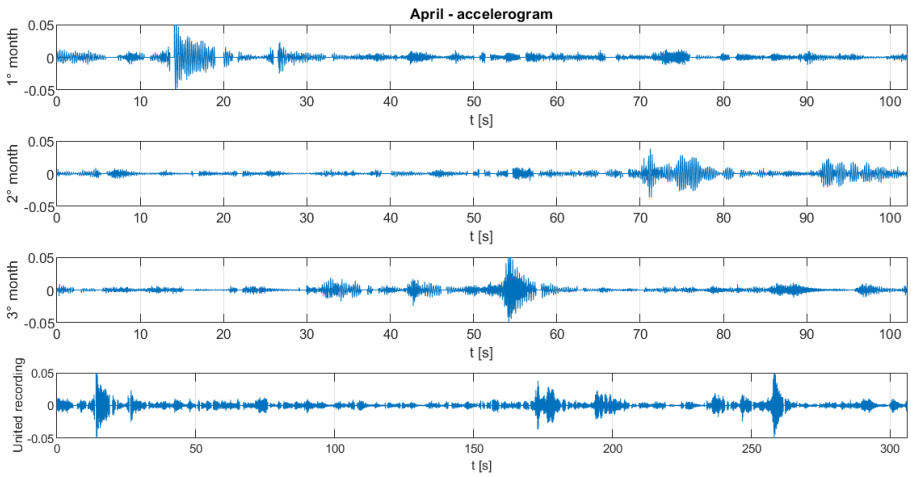


Figure 14-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.4.2 Longitudinal direction (y)

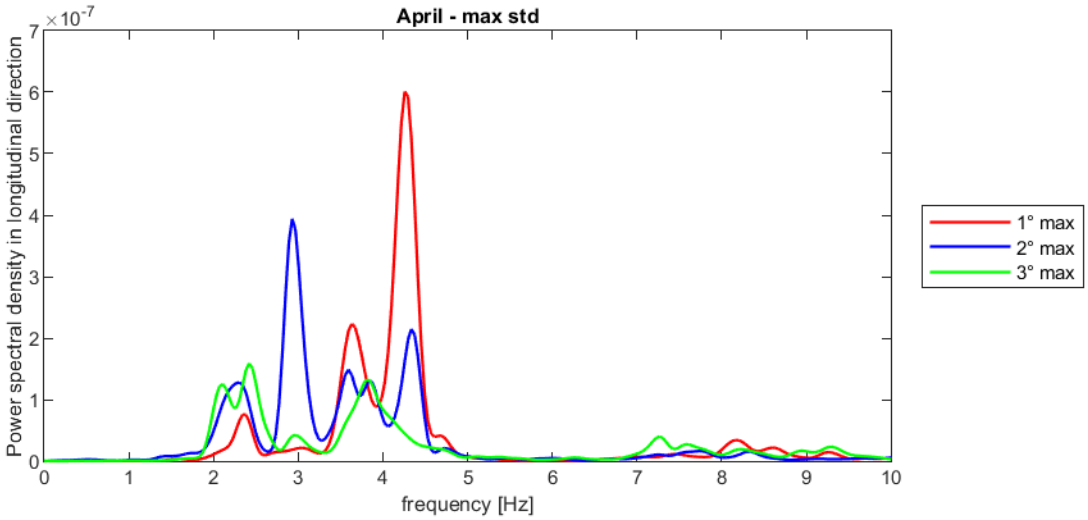


Figure 14-42: Results obtained from the 3 accelerograms with maximum SD in time domain

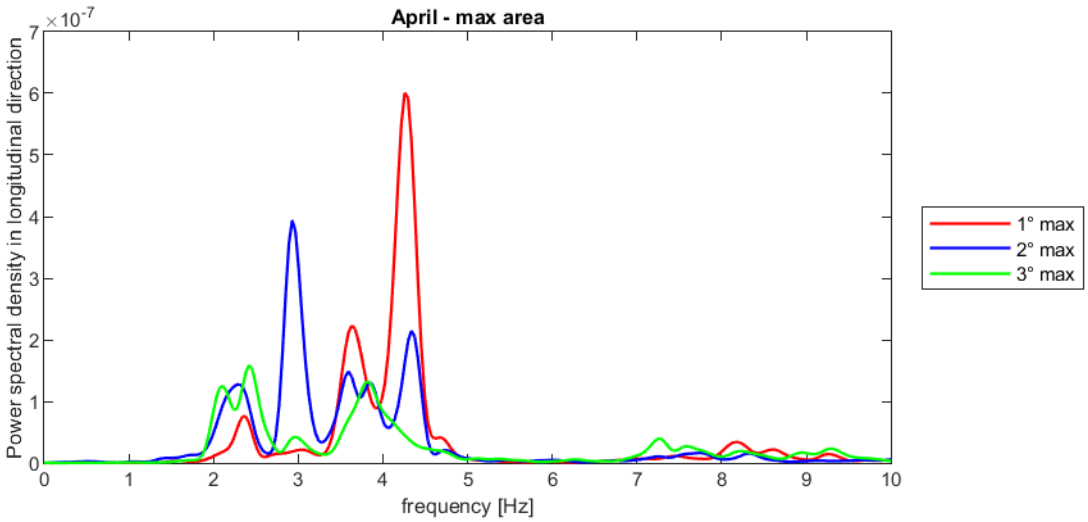


Figure 14-43: Results obtained from the 3 accelerograms with maximum area of PSD

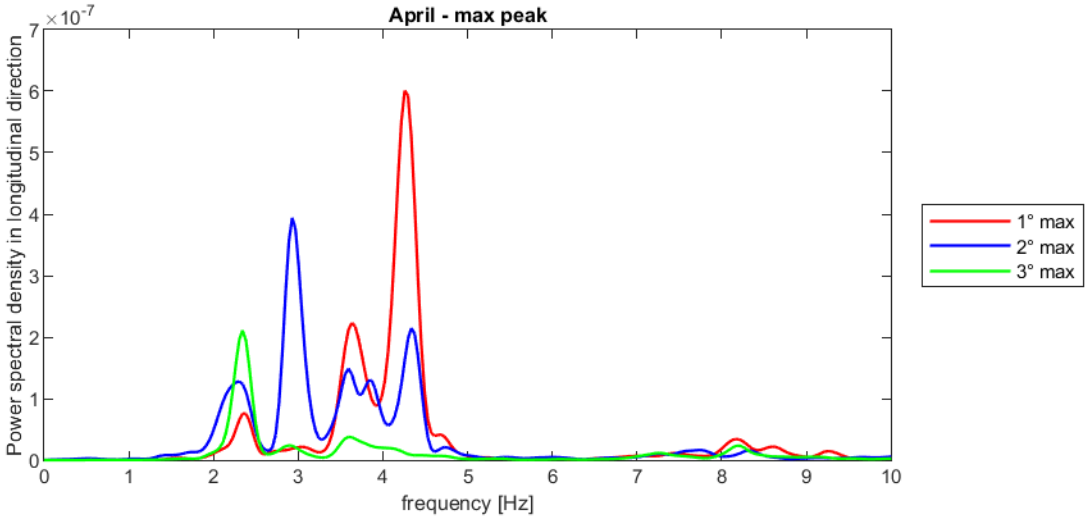


Figure 14-44: Results obtained from the 3 accelerograms with highest peak if PSD

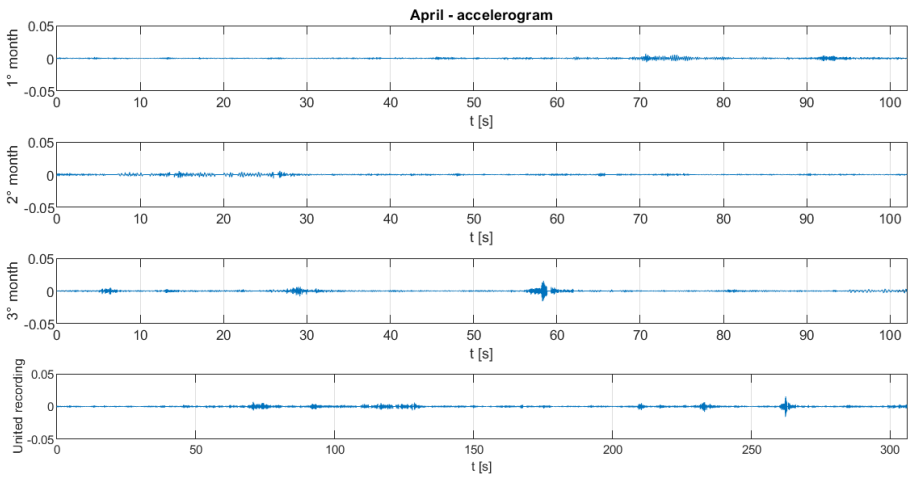


Figure 14-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

14.4.3 Transverse direction (z)

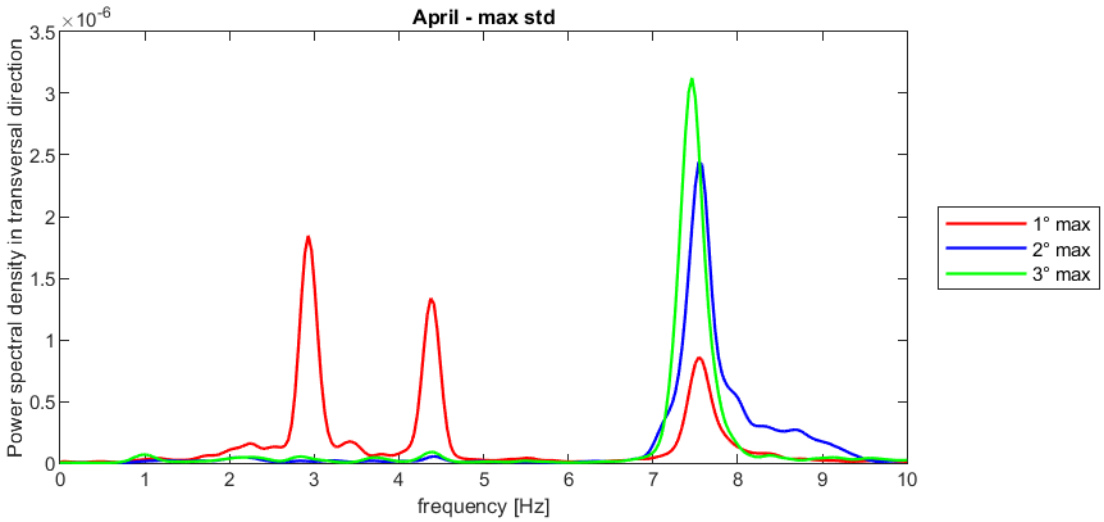


Figure 14-46: Results obtained from the 3 accelerograms with maximum SD in time domain

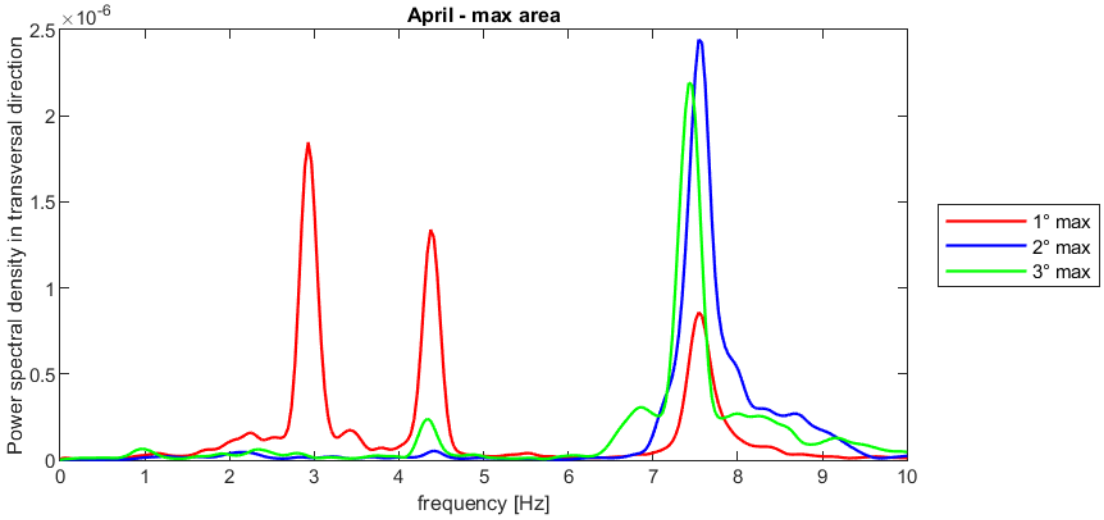


Figure 14-47: Results obtained from the 3 accelerograms with maximum area of PSD

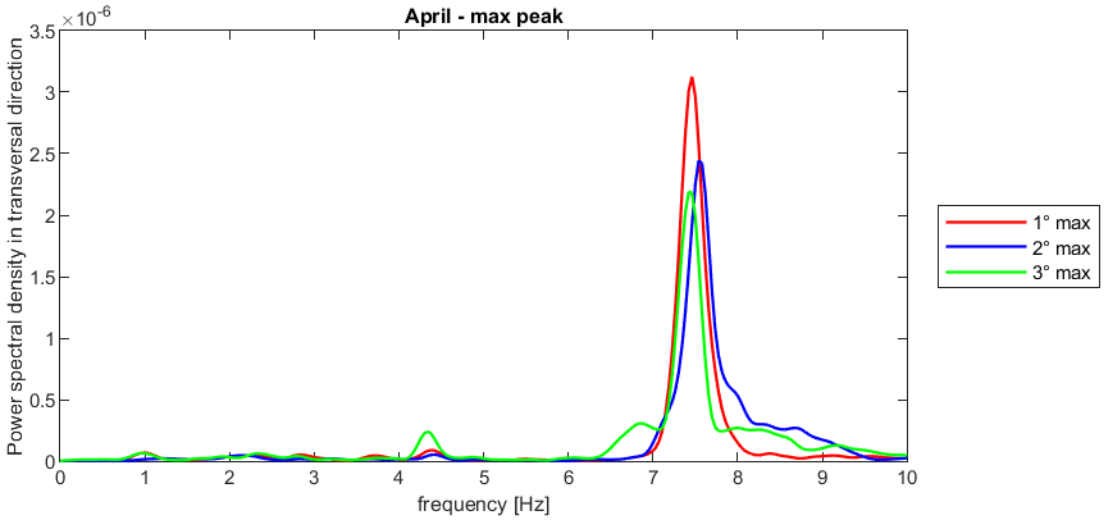


Figure 14-48: Results obtained from the 3 accelerograms with highest peak if PSD

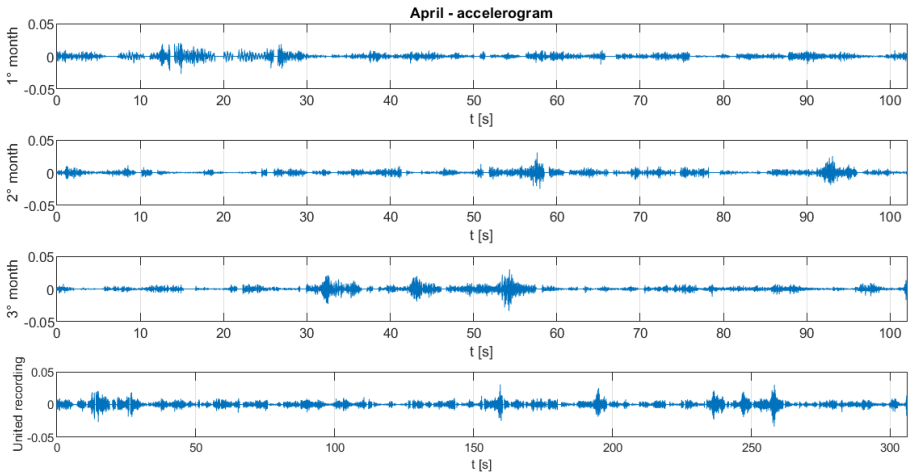


Figure 14-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

14.5 May

The results obtained for the May dataset are shown in the following tables.

Table 14-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-05-23_14-00-21	5.03E-03
	2°	2B5E7_2023-05-04_14-00-20	4.96E-03
	3°	2B5E7_2023-05-31_14-00-20	4.51E-03
Longitudinal direction (y)	1°	2B5E7_2023-05-23_14-00-21	8.99E-04
	2°	2B5E7_2023-05-04_14-00-20	6.87E-04
	3°	2B5E7_2023-05-31_14-00-20	5.85E-04
Transverse direction (z)	1°	2B5E7_2023-05-23_14-00-21	1.82E-03
	2°	2B5E7_2023-05-04_14-00-20	1.41E-03
	3°	2B5E7_2023-05-31_14-00-20	1.25E-03

Table 14-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-05-04_14-00-20	5.61E-05	2B5E7_2023-05-23_14-00-21	5.53E-06
2	2B5E7_2023-05-23_14-00-21	5.13E-05	2B5E7_2023-05-04_14-00-20	5.34E-06
3	2B5E7_2023-05-11_20-00-21	3.07E-05	2B5E7_2023-05-31_14-00-20	3.93E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-05-23_14-00-21	7.90E-07	2B5E7_2023-05-23_14-00-21	1.63E-07
2	2B5E7_2023-05-04_14-00-20	5.32E-07	2B5E7_2023-05-04_14-00-20	9.96E-08
3	2B5E7_2023-05-31_14-00-20	2.90E-07	2B5E7_2023-05-31_14-00-20	6.65E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-05-23_14-00-21	7.48E-06	2B5E7_2023-05-23_14-00-21	6.81E-07
2	2B5E7_2023-05-04_14-00-20	3.48E-06	2B5E7_2023-05-04_14-00-20	4.21E-07
3	2B5E7_2023-05-11_20-00-21	3.05E-06	2B5E7_2023-05-31_14-00-20	2.97E-07

Table 14-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	A	A	A
2	B	A	B	B	B	B	B	B	B
3	C	-	C	-	C	C	C	-	C

14.5.1 Vertical direction (x)

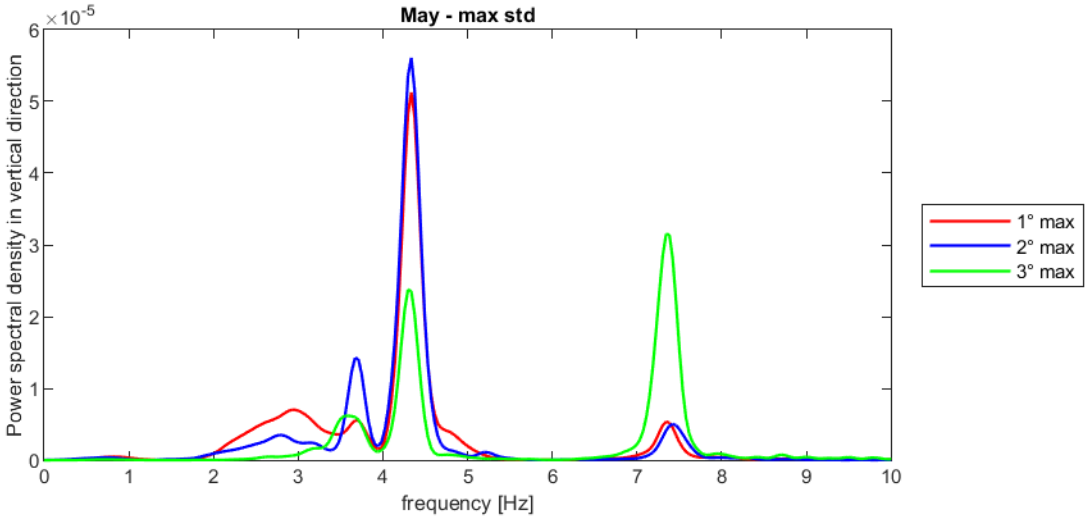


Figure 14-50: Results obtained from the 3 accelerograms with maximum SD in time domain

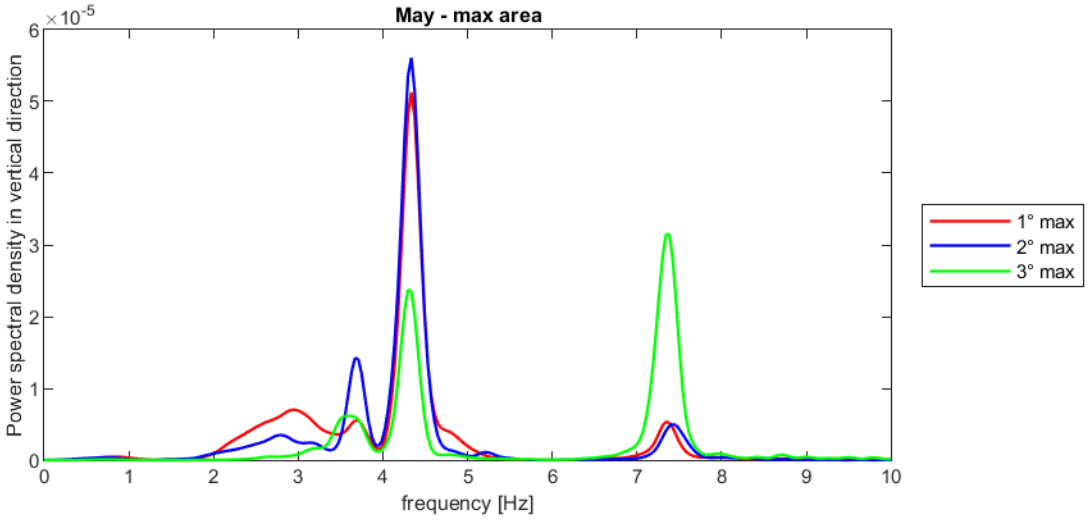


Figure 14-51: Results obtained from the 3 accelerograms with maximum area of PSD

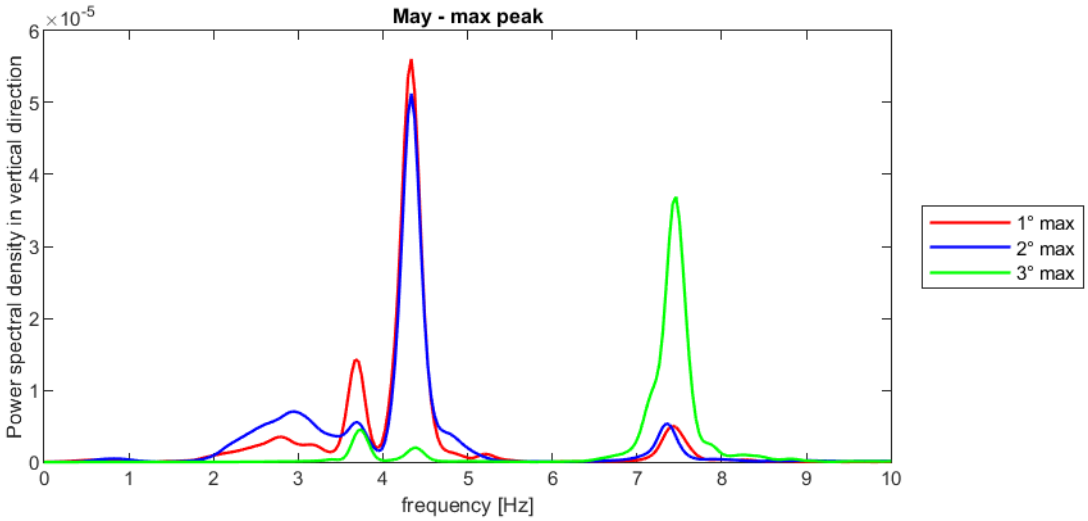


Figure 14-52: Results obtained from the 3 accelerograms with highest peak if PSD

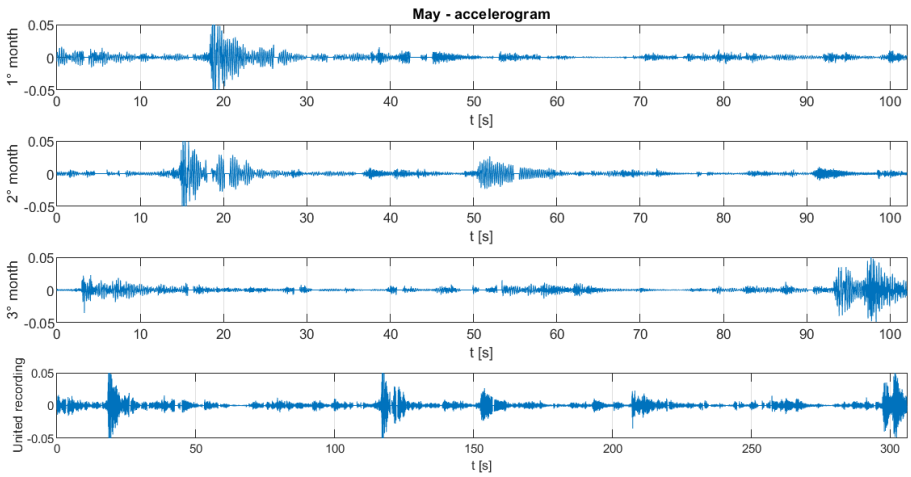


Figure 14-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.5.2 Longitudinal direction (y)

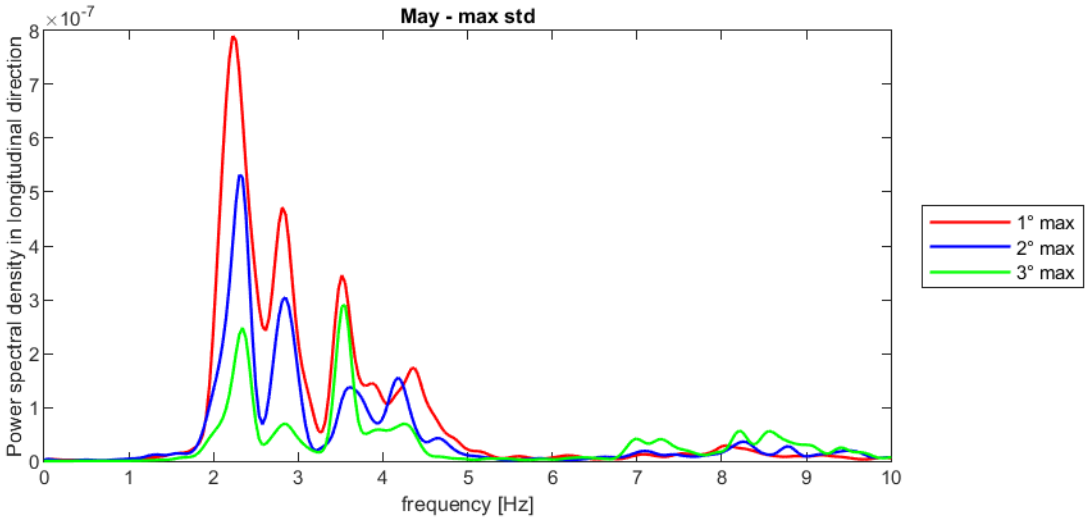


Figure 14-54: Results obtained from the 3 accelerograms with maximum SD in time domain

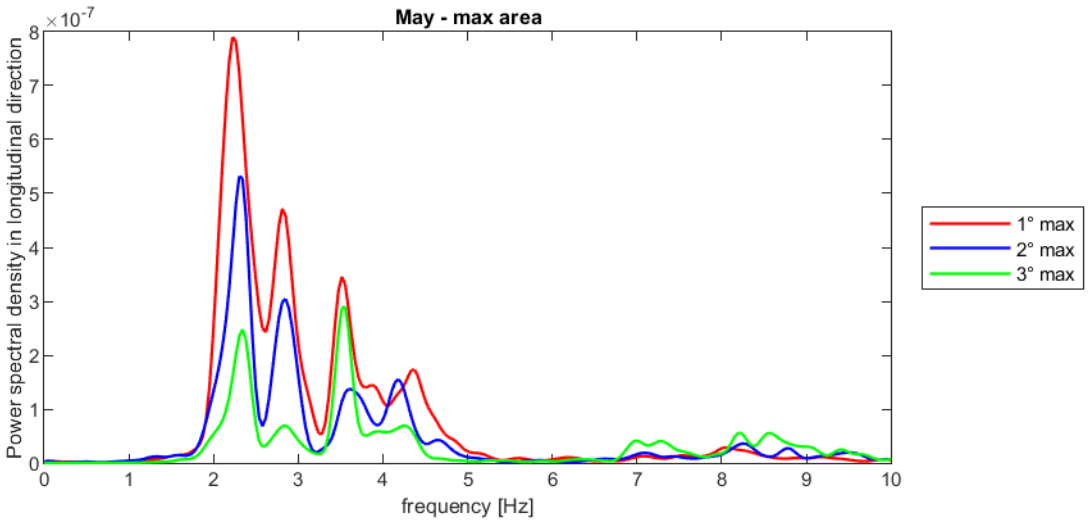


Figure 14-55: Results obtained from the 3 accelerograms with maximum area of PSD

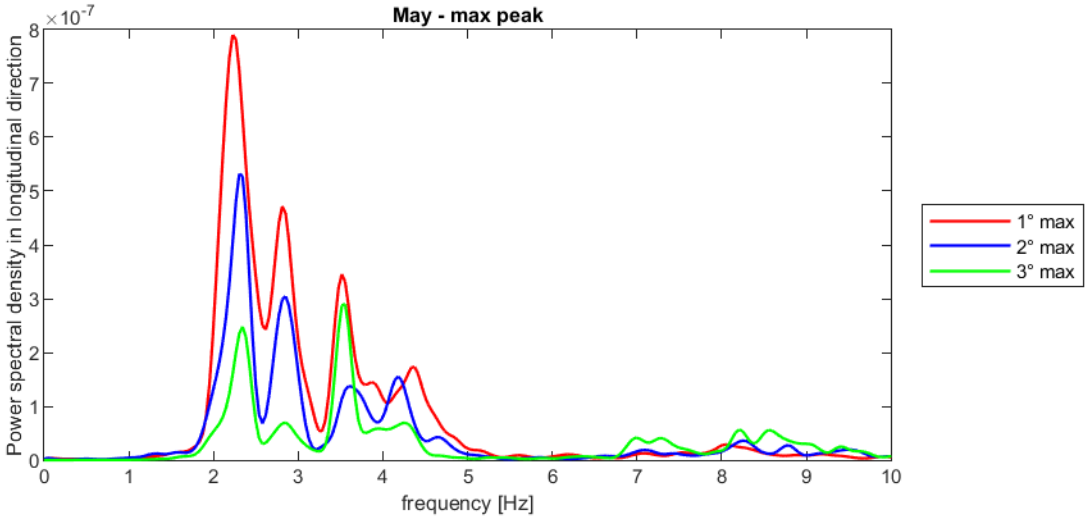


Figure 14-56: Results obtained from the 3 accelerograms with highest peak if PSD

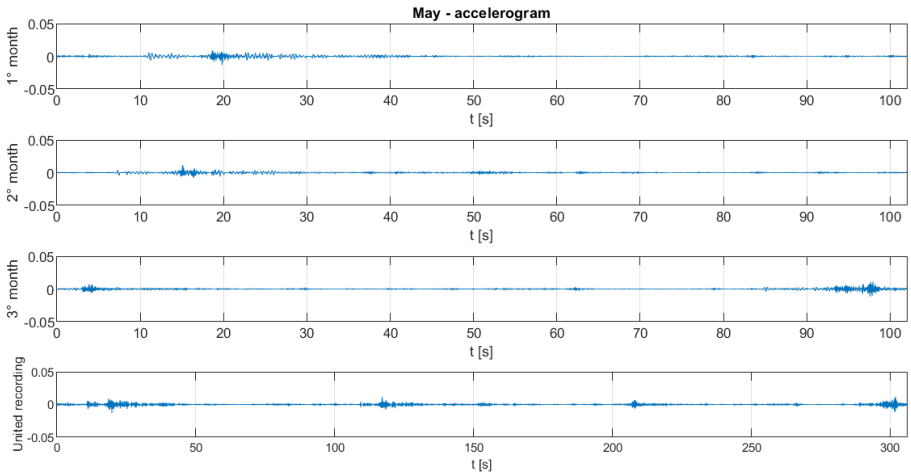


Figure 14-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

14.5.3 Transverse direction (z)

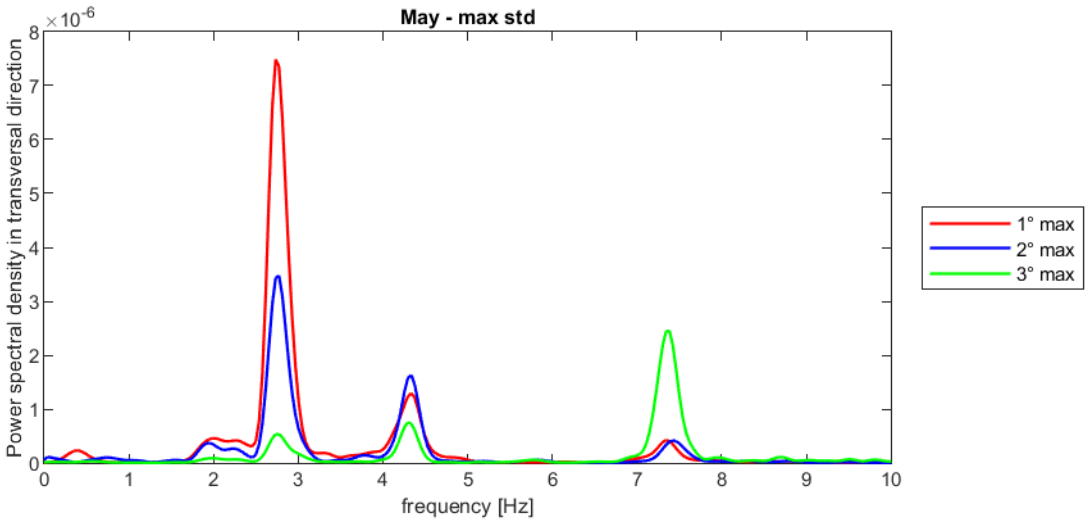


Figure 14-58: Results obtained from the 3 accelerograms with maximum SD in time domain

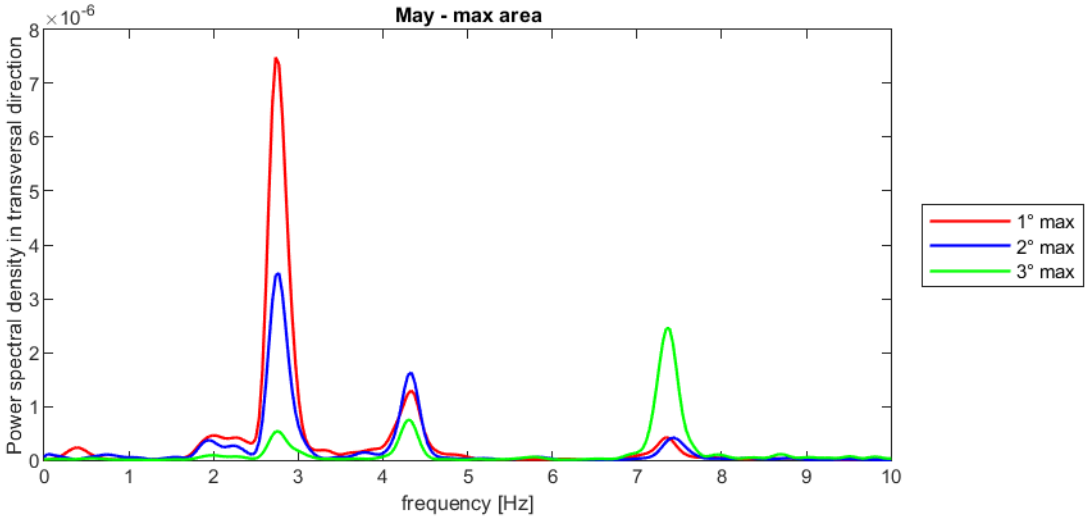


Figure 14-59: Results obtained from the 3 accelerograms with maximum area of PSD

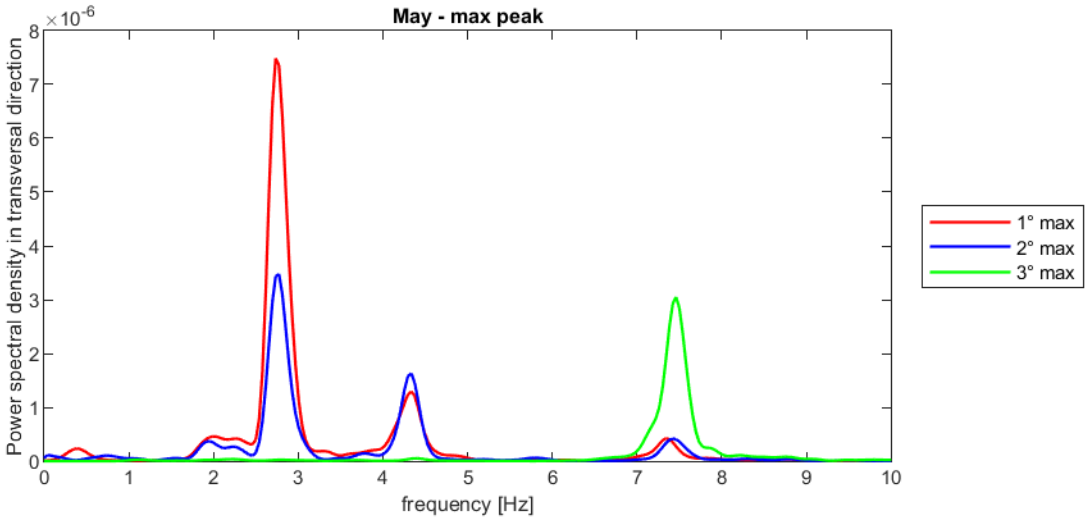


Figure 14-60: Results obtained from the 3 accelerograms with highest peak if PSD

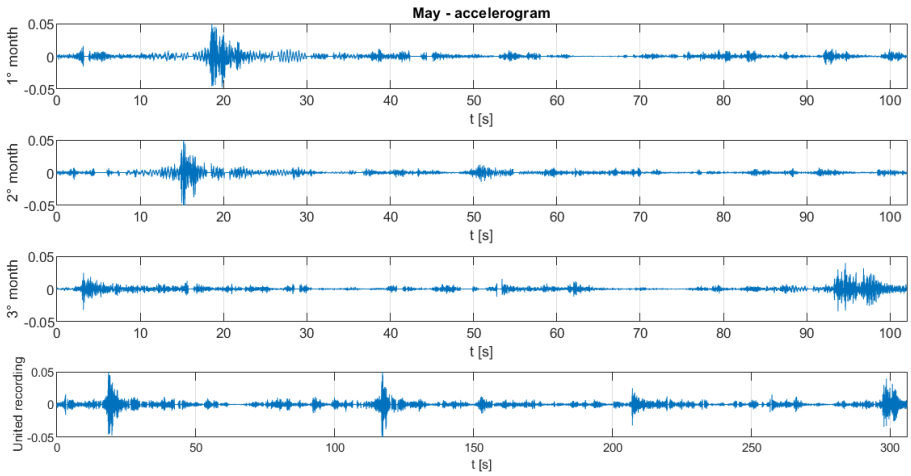


Figure 14-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

14.6 June

The results obtained for the June dataset are shown in the following tables.

Table 14-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-06-13_08-00-21	4.31E-03
	2°	2B5E7_2023-06-20_14-00-21	4.23E-03
	3°	2B5E7_2023-06-19_14-00-21	4.21E-03
Longitudinal direction (y)	1°	2B5E7_2023-06-27_14-00-21	9.08E-04
	2°	2B5E7_2023-06-10_08-00-21	6.89E-04
	3°	2B5E7_2023-06-13_08-00-21	6.53E-04
Transverse direction (z)	1°	2B5E7_2023-06-19_14-00-21	1.28E-03
	2°	2B5E7_2023-06-20_14-00-21	1.26E-03
	3°	2B5E7_2023-06-14_20-00-21	1.23E-03

Table 14-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-06-14_20-00-21	3.88E-05	2B5E7_2023-06-13_08-00-21	4.00E-06
2	2B5E7_2023-06-20_14-00-21	3.71E-05	2B5E7_2023-06-20_14-00-21	3.84E-06
3	2B5E7_2023-06-23_20-00-20	3.14E-05	2B5E7_2023-06-19_08-00-20	3.68E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-06-27_14-00-21	2.59E-06	2B5E7_2023-06-27_14-00-21	1.69E-07
2	2B5E7_2023-06-10_08-00-21	4.66E-07	2B5E7_2023-06-10_08-00-21	9.54E-08
3	2B5E7_2023-06-28_14-00-21	4.15E-07	2B5E7_2023-06-13_08-00-21	8.30E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-06-14_20-00-21	3.87E-06	2B5E7_2023-06-20_14-00-21	3.53E-07
2	2B5E7_2023-06-20_14-00-21	3.58E-06	2B5E7_2023-06-14_20-00-21	3.06E-07
3	2B5E7_2023-06-23_20-00-20	2.55E-06	2B5E7_2023-06-19_08-00-20	2.96E-07

Table 14-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	D	D	D	F	H	G
2	B	B	B	E	E	E	G	G	H
3	F	-	F	A	-	A	H	-	F

14.6.1 Vertical direction (x)

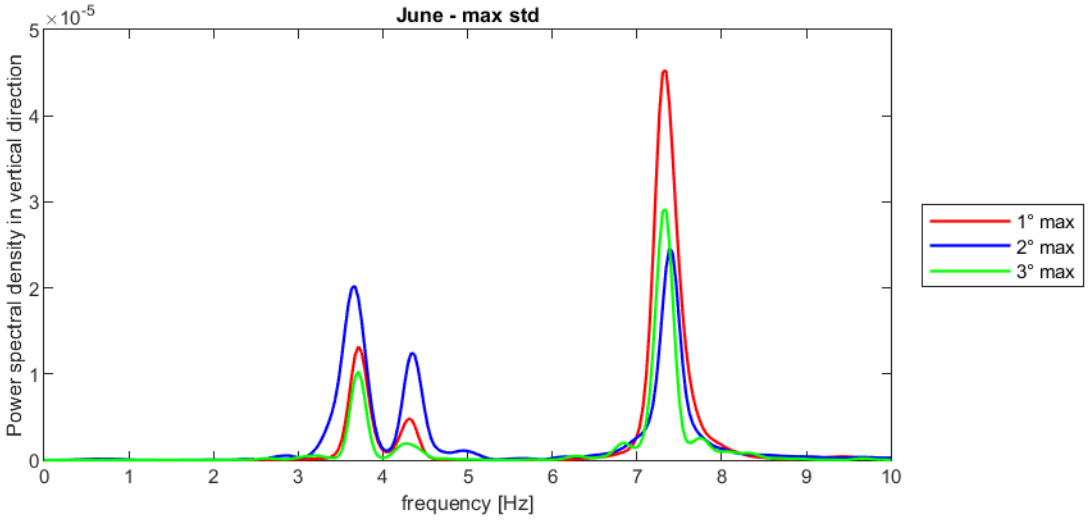


Figure 14-62: Results obtained from the 3 accelerograms with maximum SD in time domain

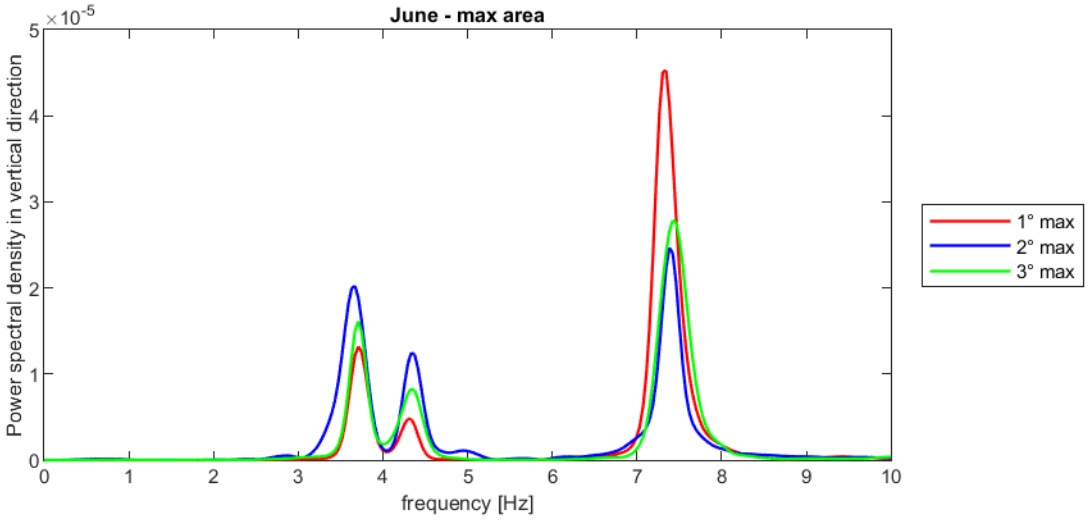


Figure 14-63: Results obtained from the 3 accelerograms with maximum area of PSD

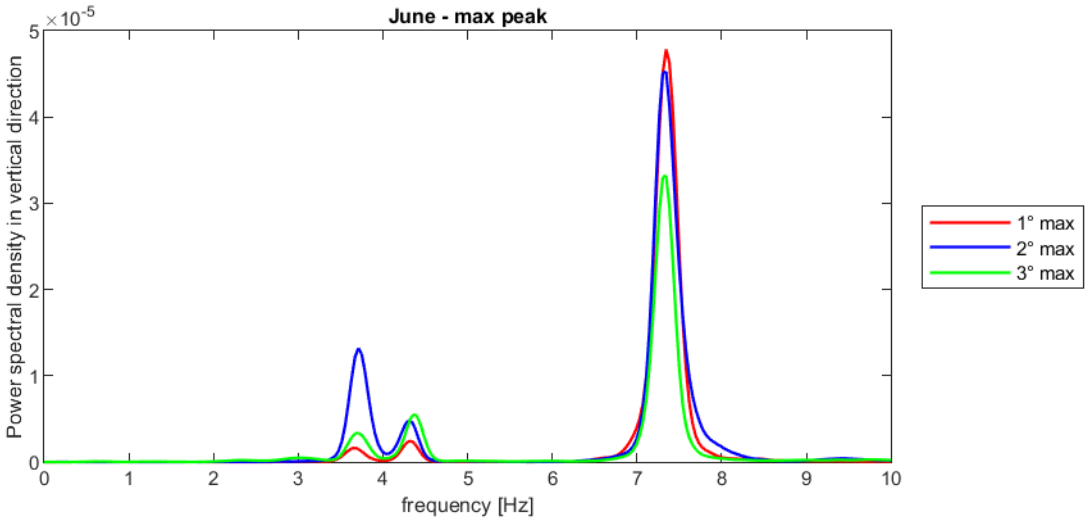


Figure 14-64: Results obtained from the 3 accelerograms with highest peak if PSD

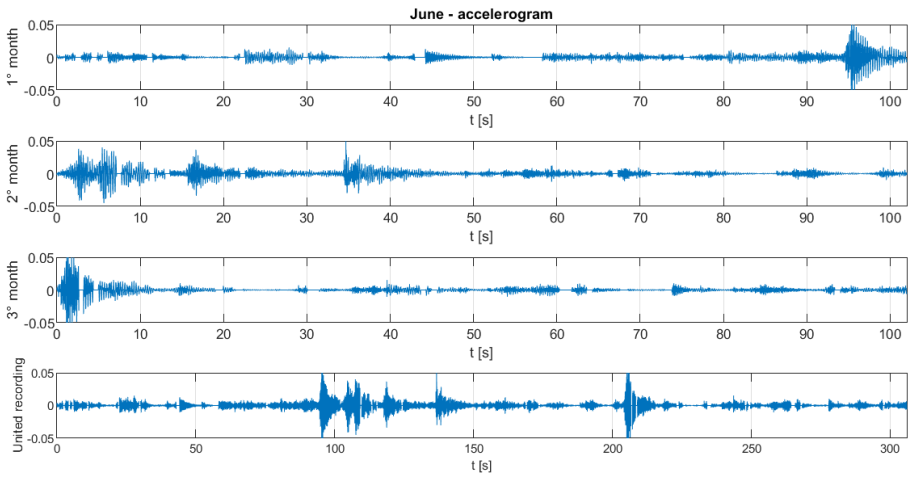


Figure 14-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.6.2 Longitudinal direction (y)

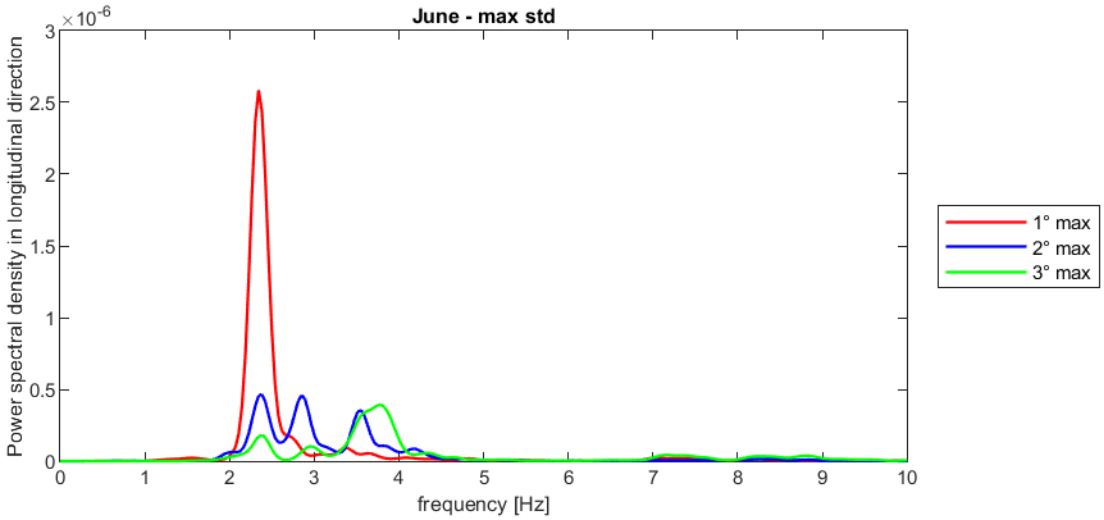


Figure 14-66: Results obtained from the 3 accelerograms with maximum SD in time domain

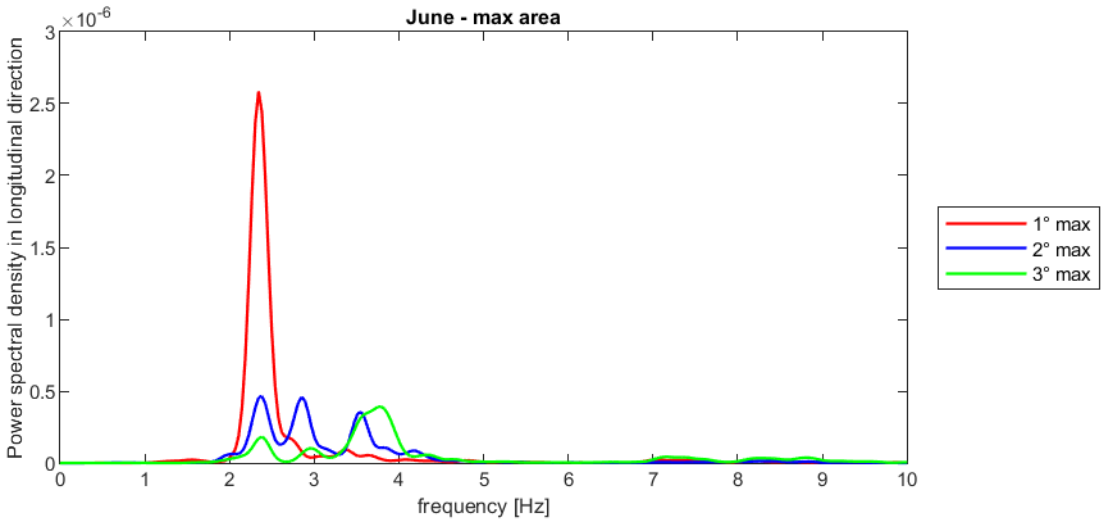


Figure 14-67: Results obtained from the 3 accelerograms with maximum area of PSD

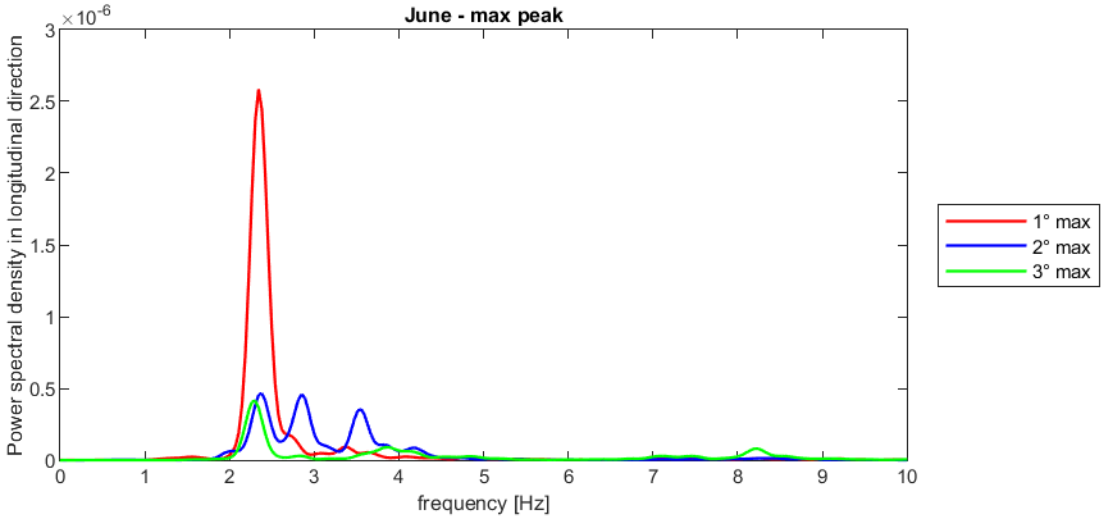


Figure 14-68: Results obtained from the 3 accelerograms with highest peak if PSD

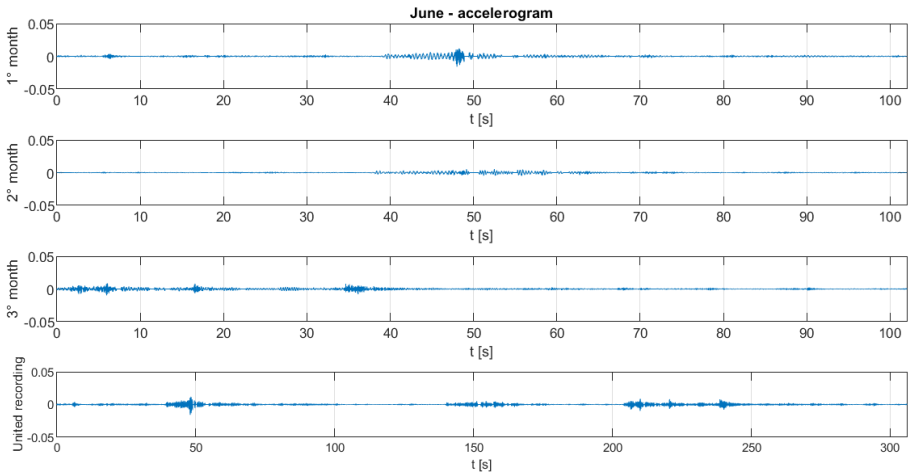


Figure 14-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

14.6.3 Transverse direction (z)

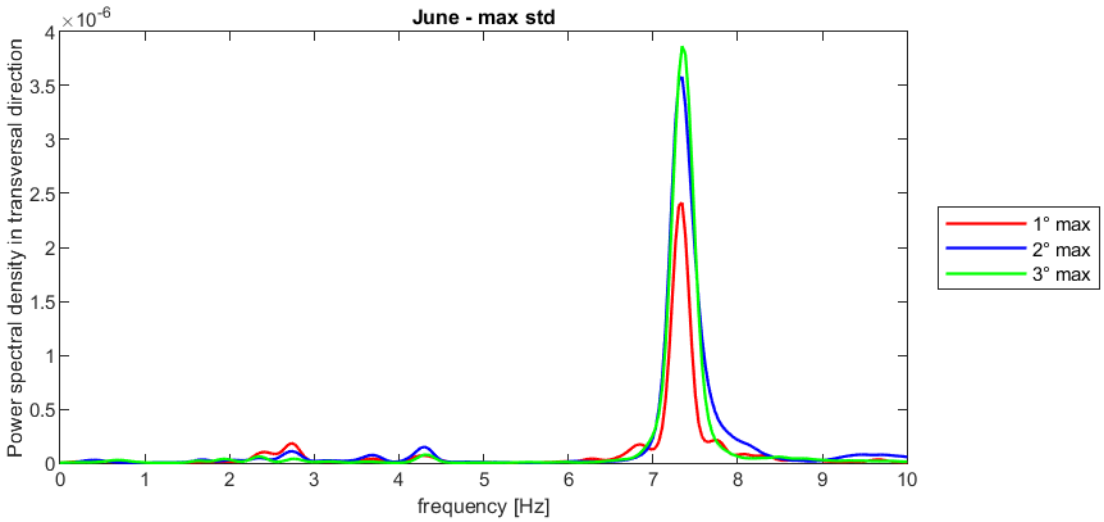


Figure 14-70: Results obtained from the 3 accelerograms with maximum SD in time domain

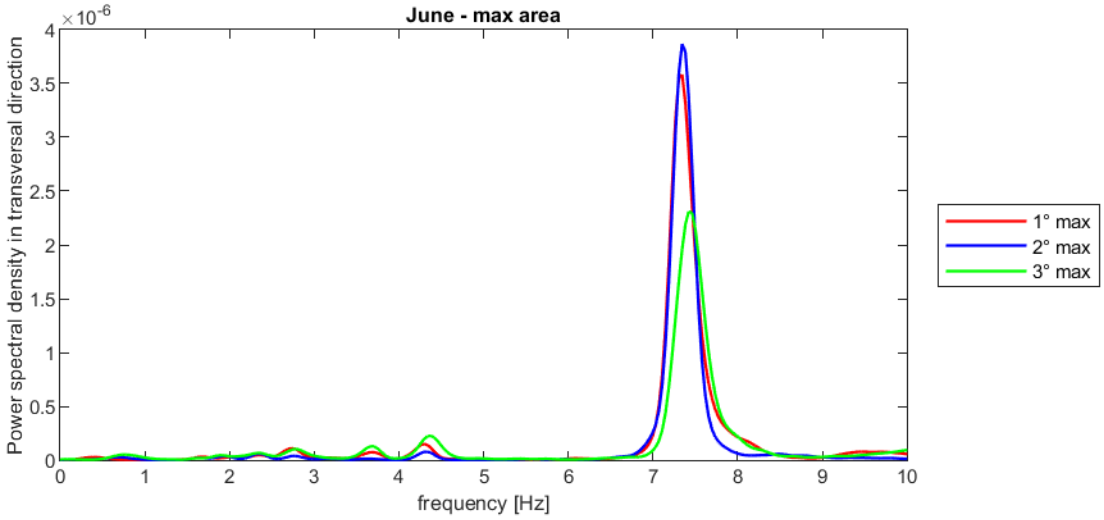


Figure 14-71: Results obtained from the 3 accelerograms with maximum area of PSD

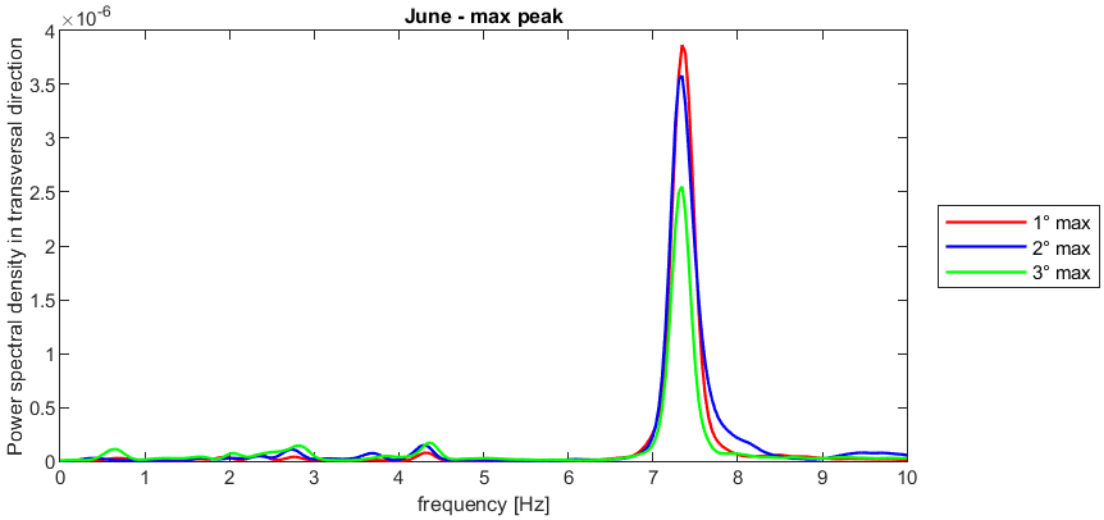


Figure 14-72: Results obtained from the 3 accelerograms with highest peak if PSD

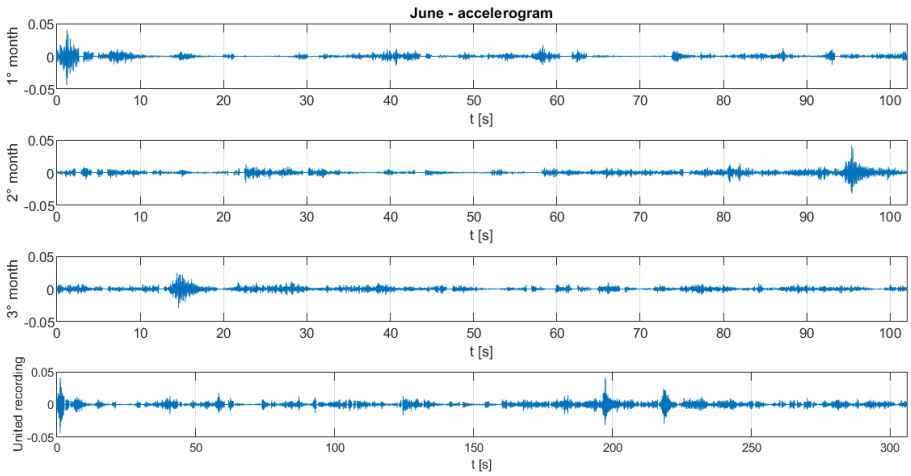


Figure 14-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

14.7 July

The results obtained for the July dataset are shown in the following tables.

Table 14-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-07-06_14-00-22	5.23E-03
	2°	2B5E7_2023-07-07_14-00-21	4.78E-03
	3°	2B5E7_2023-07-05_20-00-20	4.28E-03
Longitudinal direction (y)	1°	2B5E7_2023-07-17_14-00-21	8.28E-04
	2°	2B5E7_2023-07-07_14-00-21	7.32E-04
	3°	2B5E7_2023-07-20_14-00-22	6.81E-04
Transverse direction (z)	1°	2B5E7_2023-07-06_14-00-22	1.42E-03
	2°	2B5E7_2023-07-07_14-00-21	1.28E-03
	3°	2B5E7_2023-07-05_20-00-20	1.23E-03

Table 14-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-07-06_14-00-22	6.40E-05	2B5E7_2023-07-06_14-00-22	5.54E-06
2	2B5E7_2023-07-07_14-00-21	6.20E-05	2B5E7_2023-07-07_14-00-21	4.63E-06
3	2B5E7_2023-07-05_20-00-20	2.97E-05	2B5E7_2023-07-05_20-00-20	3.42E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-07-17_14-00-21	1.30E-06	2B5E7_2023-07-17_14-00-21	1.40E-07
2	2B5E7_2023-07-27_14-00-21	9.17E-07	2B5E7_2023-07-07_14-00-21	1.08E-07
3	2B5E7_2023-07-20_14-00-22	6.32E-07	2B5E7_2023-07-20_14-00-22	9.22E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-07-05_20-00-20	2.86E-06	2B5E7_2023-07-06_14-00-22	3.66E-07
2	2B5E7_2023-07-22_20-00-21	2.68E-06	2B5E7_2023-07-07_14-00-21	3.18E-07
3	2B5E7_2023-07-06_14-00-22	2.33E-06	2B5E7_2023-07-05_20-00-20	2.81E-07

Table 14-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	A	C	A
2	B	B	B	B	-	B	B	-	B
3	C	C	C	E	E	E	C	A	C

14.7.1 Vertical direction (x)

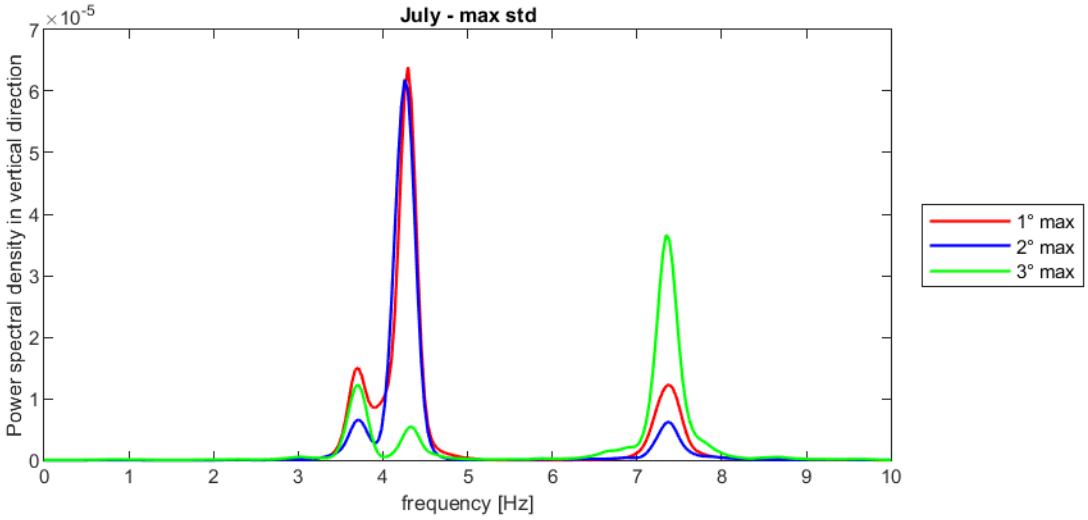


Figure 14-74: Results obtained from the 3 accelerograms with maximum SD in time domain

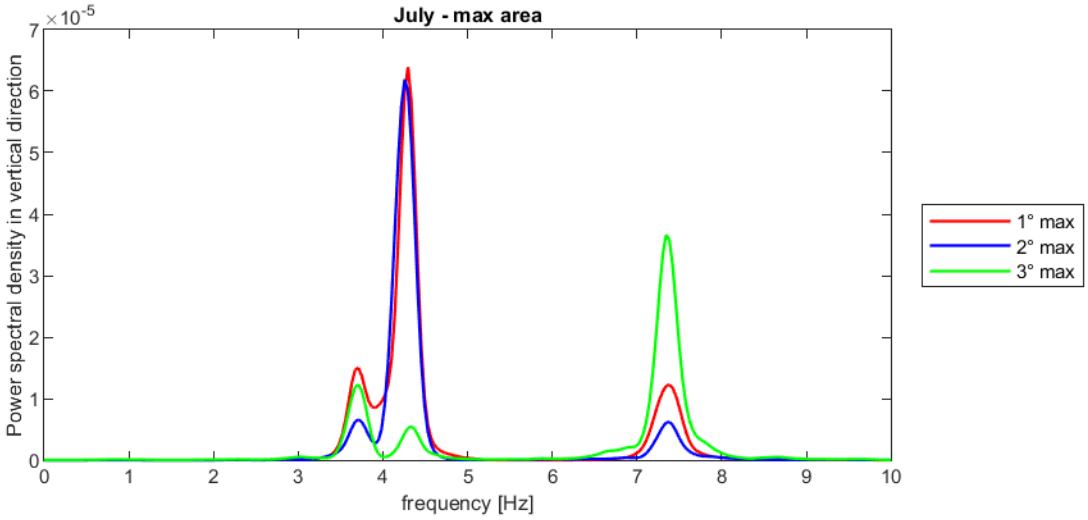


Figure 14-75: Results obtained from the 3 accelerograms with maximum area of PSD

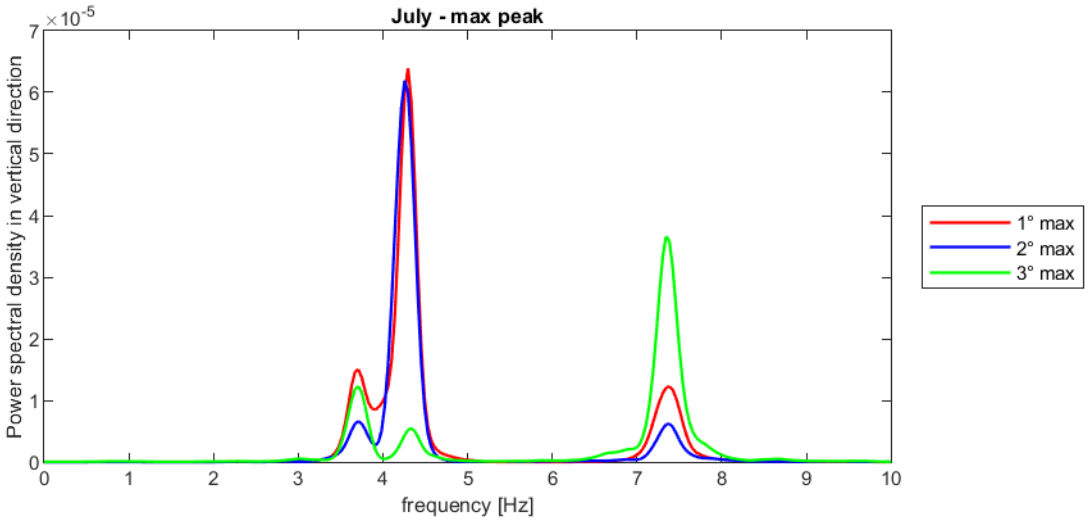


Figure 14-76: Results obtained from the 3 accelerograms with highest peak if PSD

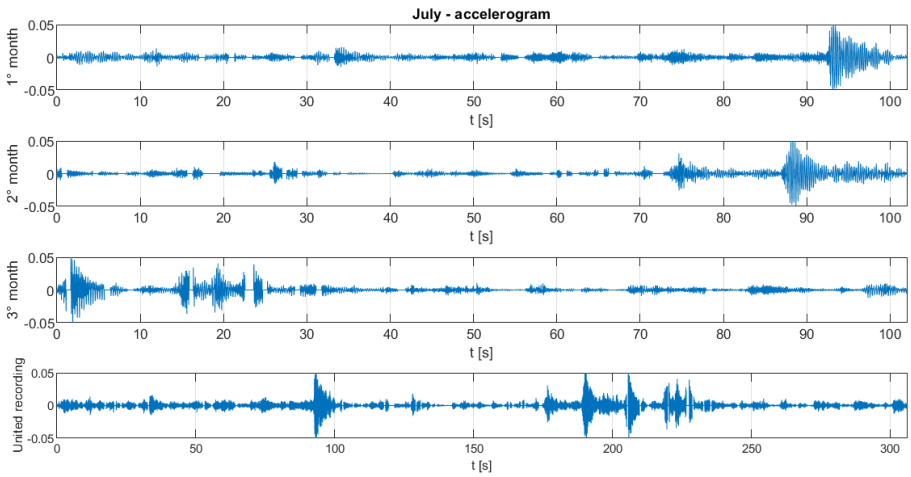


Figure 14-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.7.2 Longitudinal direction (y)

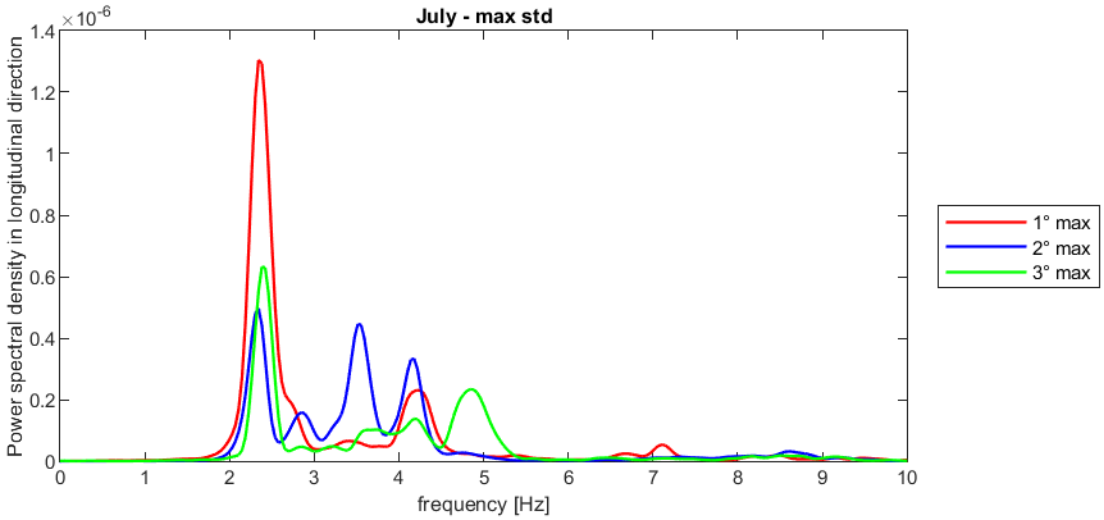


Figure 14-78: Results obtained from the 3 accelerograms with maximum SD in time domain

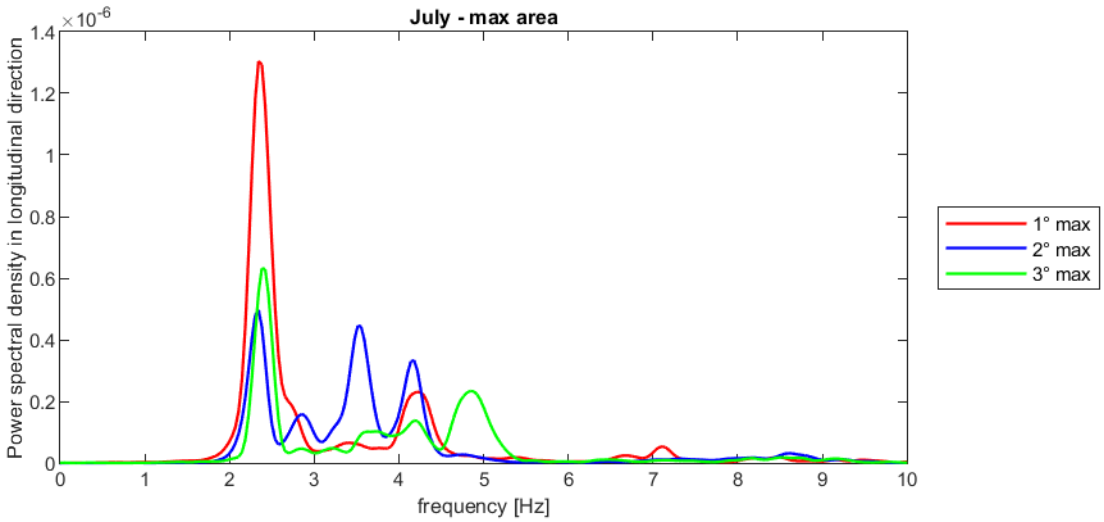


Figure 14-79: Results obtained from the 3 accelerograms with maximum area of PSD

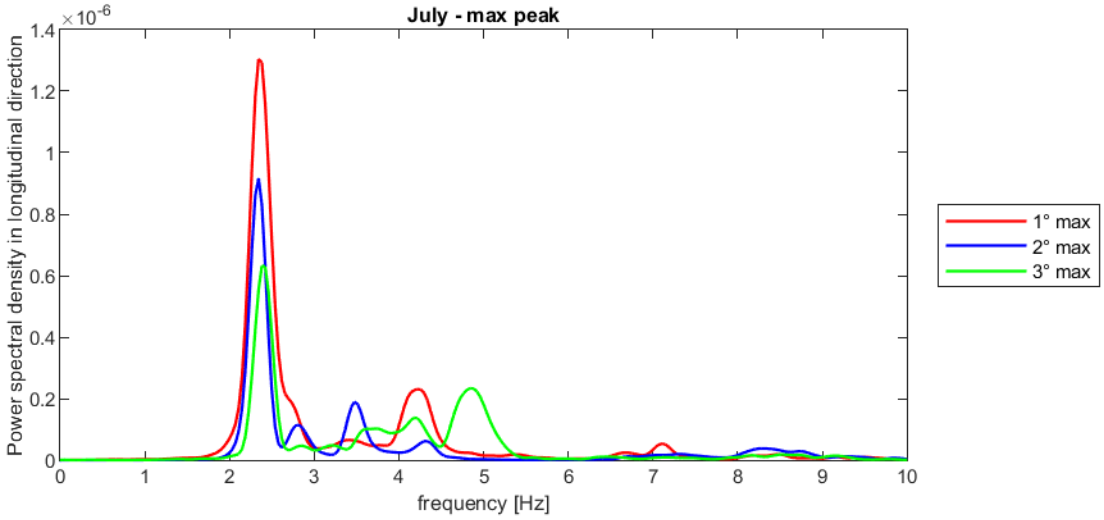


Figure 14-80: Results obtained from the 3 accelerograms with highest peak if PSD

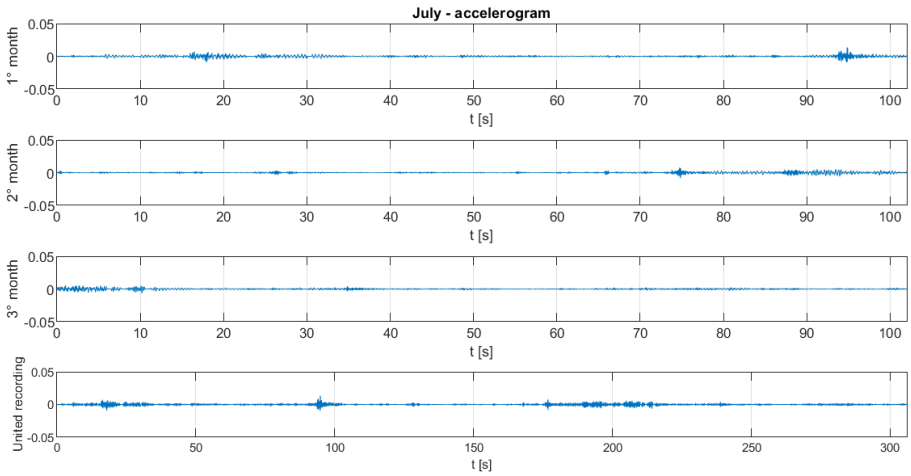


Figure 14-81: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.7.3 Transverse direction (z)

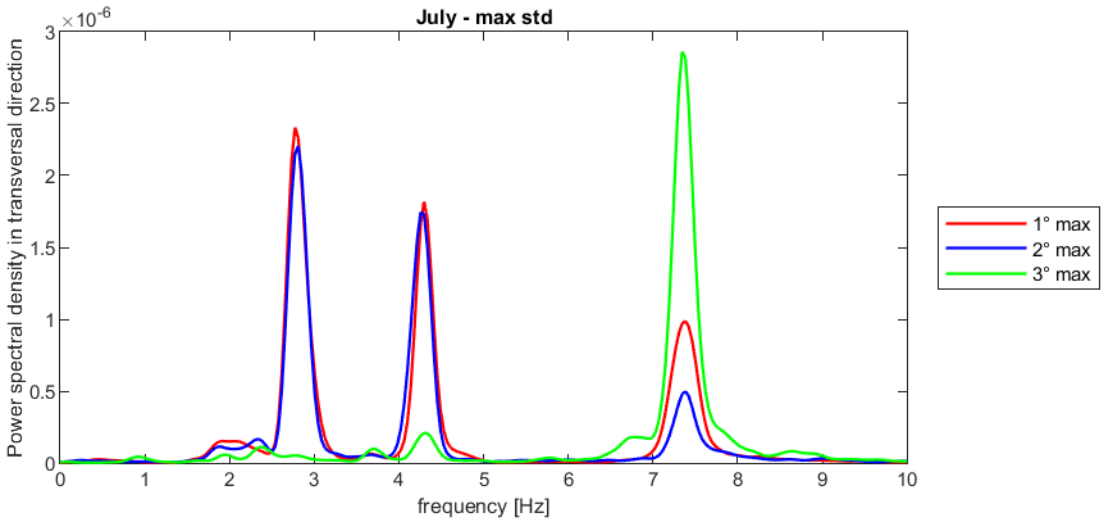


Figure 14-82: Results obtained from the 3 accelerograms with maximum SD in time domain

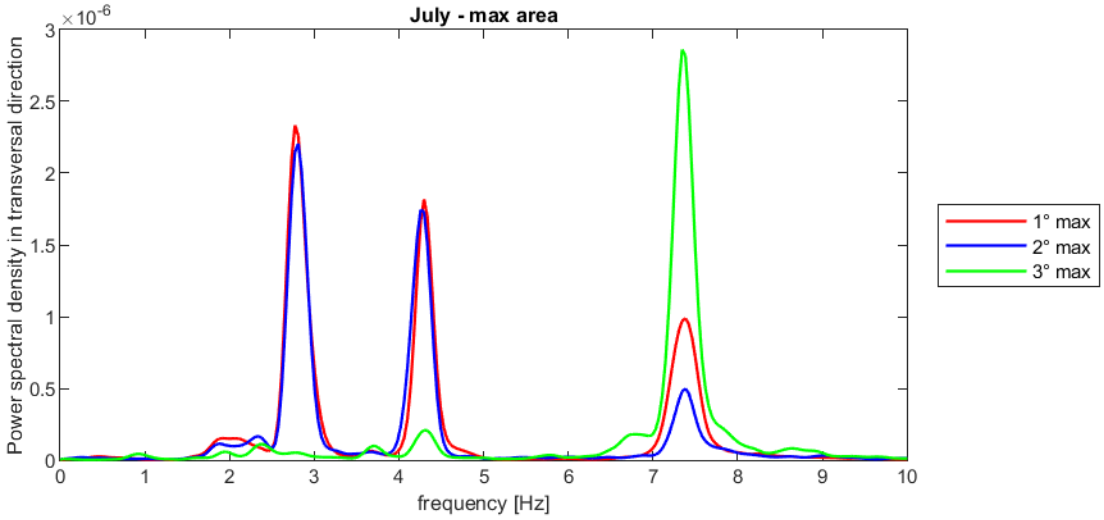


Figure 14-83: Results obtained from the 3 accelerograms with maximum area of PSD

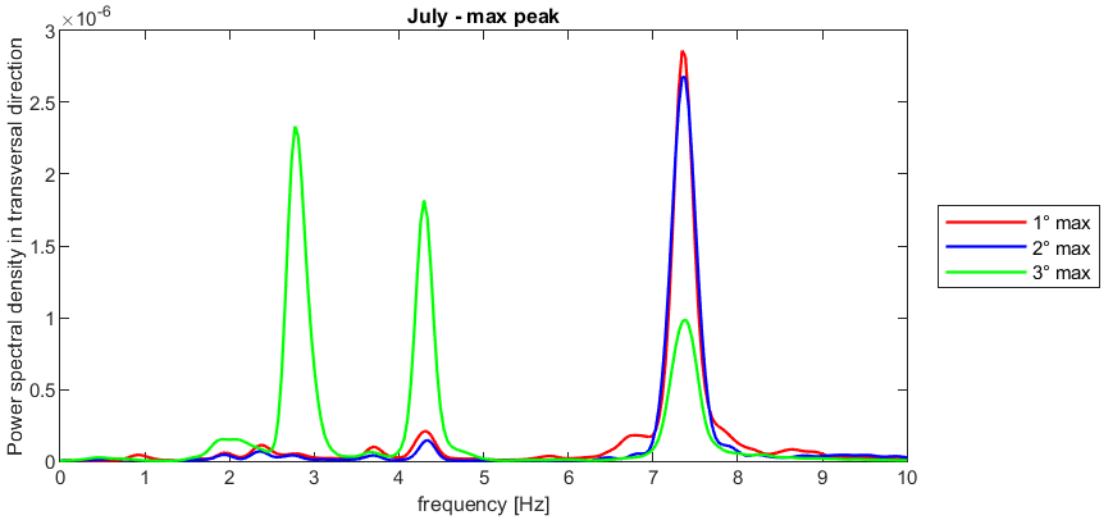


Figure 14-84: Results obtained from the 3 accelerograms with highest peak if PSD

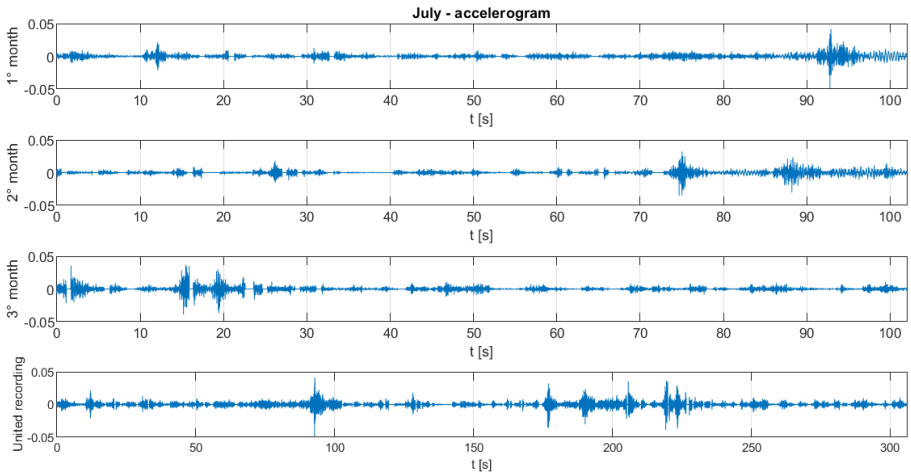


Figure 14-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

14.8 August

The results obtained for the August dataset are shown in the following tables.

Table 14-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-08-07_14-00-21	3.83E-03
	2°	2B5E7_2023-08-07_20-00-20	3.53E-03
	3°	2B5E7_2023-08-08_14-00-21	3.48E-03
Longitudinal direction (y)	1°	2B5E7_2023-08-07_14-00-21	6.91E-04
	2°	2B5E7_2023-08-02_08-00-20	5.28E-04
	3°	2B5E7_2023-08-03_08-00-20	5.08E-04
Transverse direction (z)	1°	2B5E7_2023-08-07_20-00-20	1.04E-03
	2°	2B5E7_2023-08-02_08-00-20	1.01E-03
	3°	2B5E7_2023-08-08_14-00-21	9.73E-04

Table 14-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-08-03_08-00-20	2.94E-05	2B5E7_2023-08-07_14-00-21	2.82E-06
2	2B5E7_2023-08-08_14-00-21	2.68E-05	2B5E7_2023-08-07_20-00-20	2.67E-06
3	2B5E7_2023-08-15_20-00-21	2.18E-05	2B5E7_2023-08-03_08-00-20	2.65E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-08-07_14-00-21	6.01E-07	2B5E7_2023-08-07_14-00-21	9.81E-08
2	2B5E7_2023-08-03_08-00-20	3.04E-07	2B5E7_2023-08-02_08-00-20	5.63E-08
3	2B5E7_2023-08-10_08-00-20	2.69E-07	2B5E7_2023-08-03_08-00-20	5.45E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-08-08_14-00-21	2.51E-06	2B5E7_2023-08-07_20-00-20	2.32E-07
2	2B5E7_2023-08-15_20-00-21	1.97E-06	2B5E7_2023-08-15_20-00-21	2.15E-07
3	2B5E7_2023-08-07_20-00-20	1.71E-06	2B5E7_2023-08-02_08-00-20	2.01E-07

Table 14-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	A	A	A	B	F	B
2	B	F	B	D	C	D	E	G	G
3	F	-	C	C	-	C	F	B	E

14.8.1 Vertical direction (x)

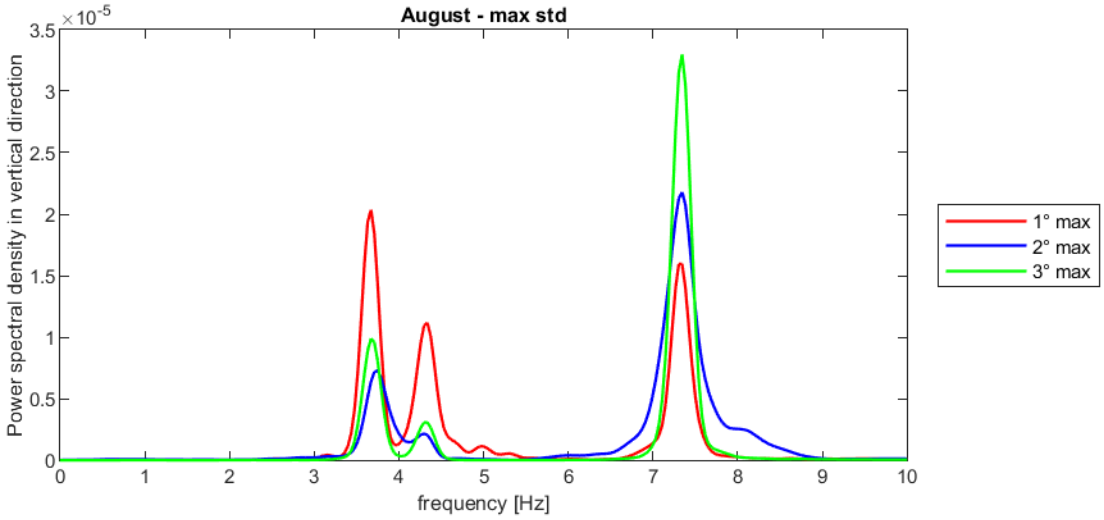


Figure 14-86: Results obtained from the 3 accelerograms with maximum SD in time domain

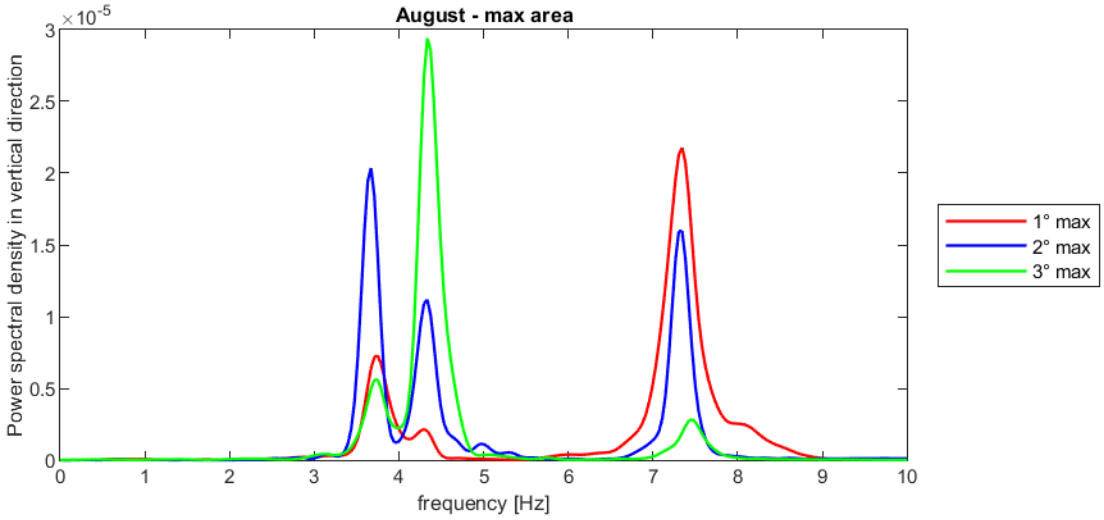


Figure 14-87: Results obtained from the 3 accelerograms with maximum area of PSD

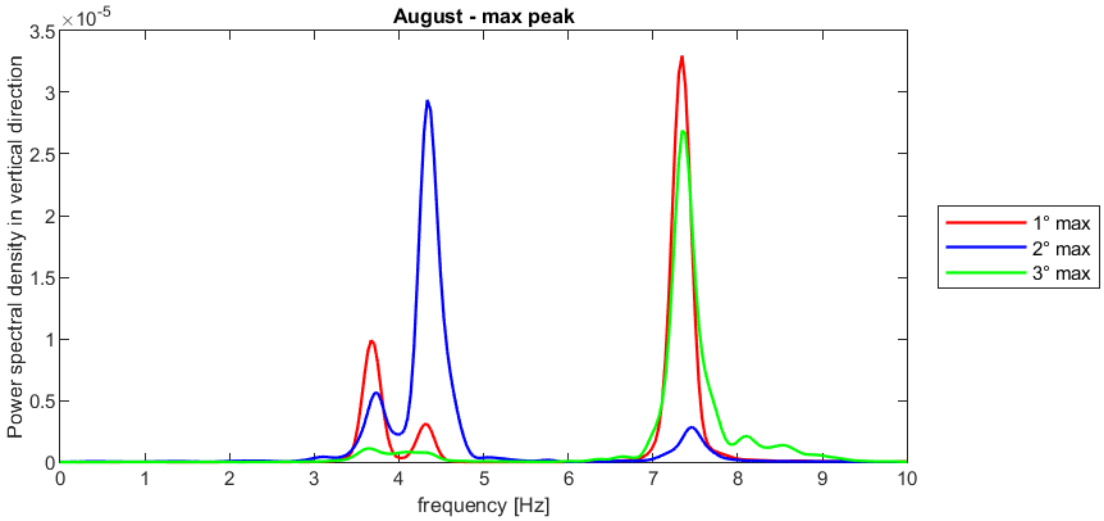


Figure 14-88: Results obtained from the 3 accelerograms with highest peak if PSD

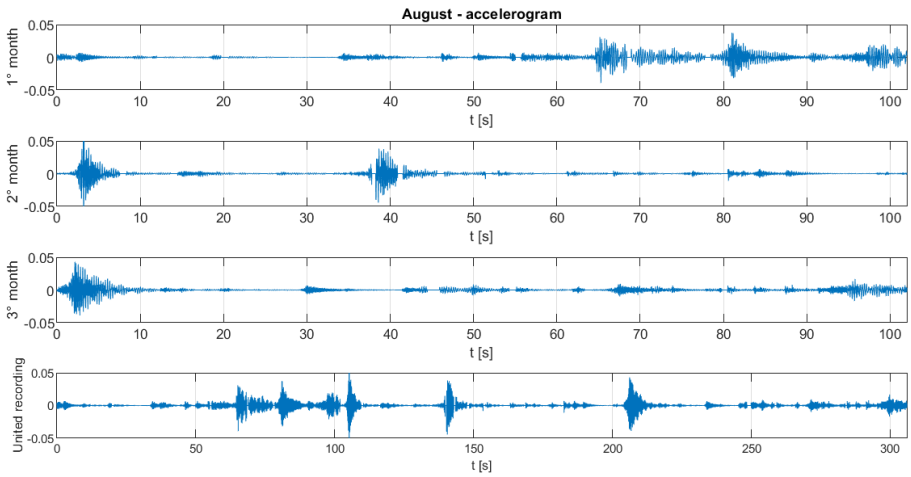


Figure 14-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.8.2 Longitudinal direction (y)

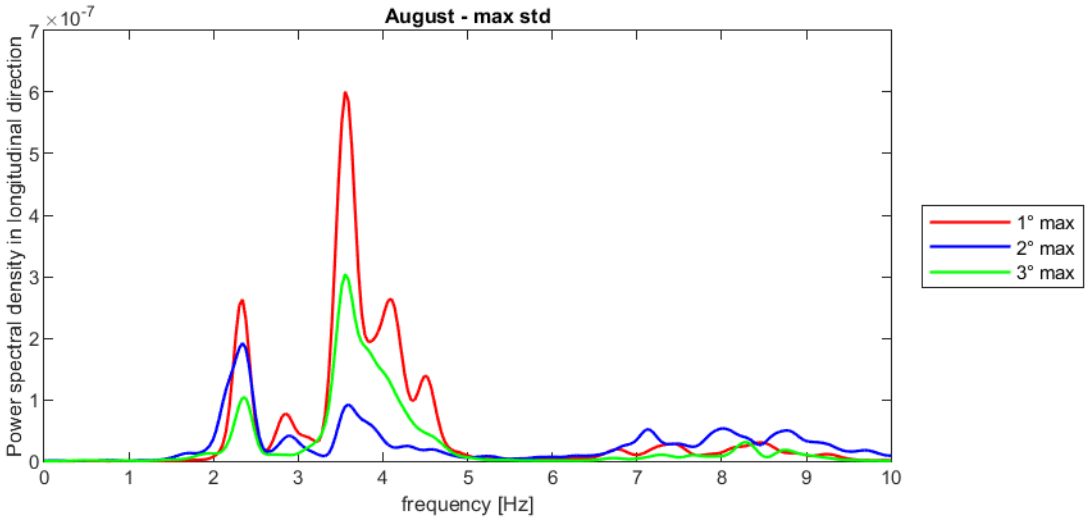


Figure 14-90: Results obtained from the 3 accelerograms with maximum SD in time domain

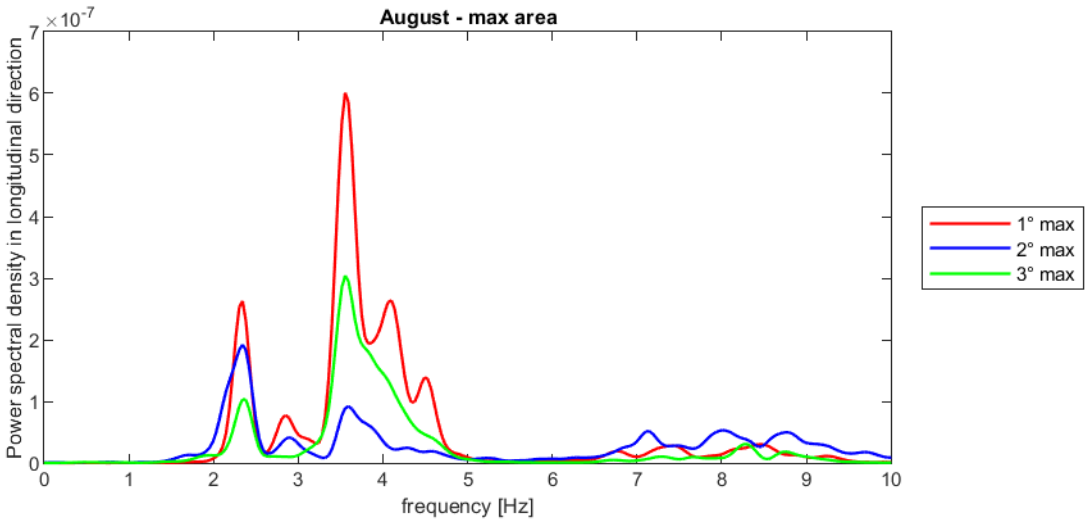


Figure 14-91: Results obtained from the 3 accelerograms with maximum area of PSD

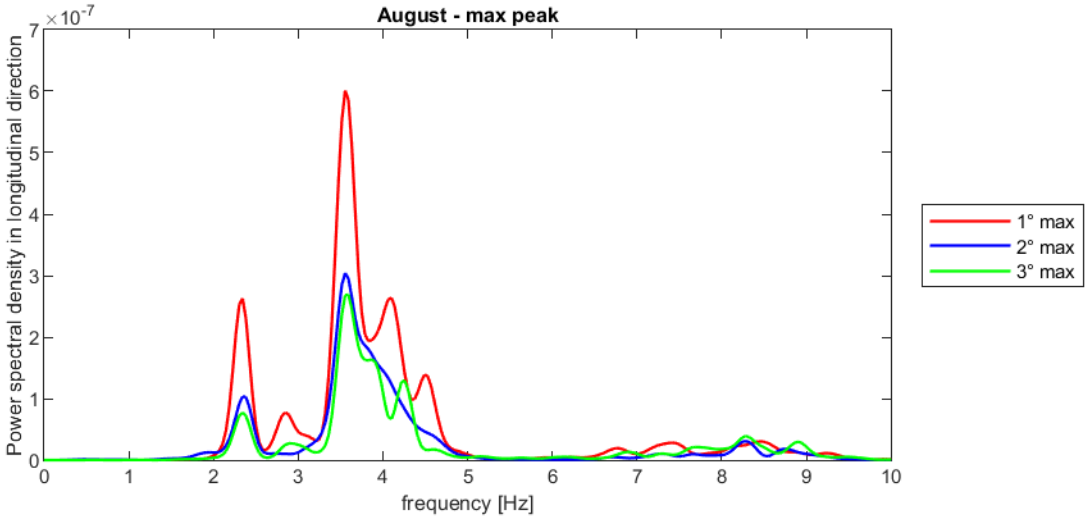


Figure 14-92: Results obtained from the 3 accelerograms with highest peak if PSD

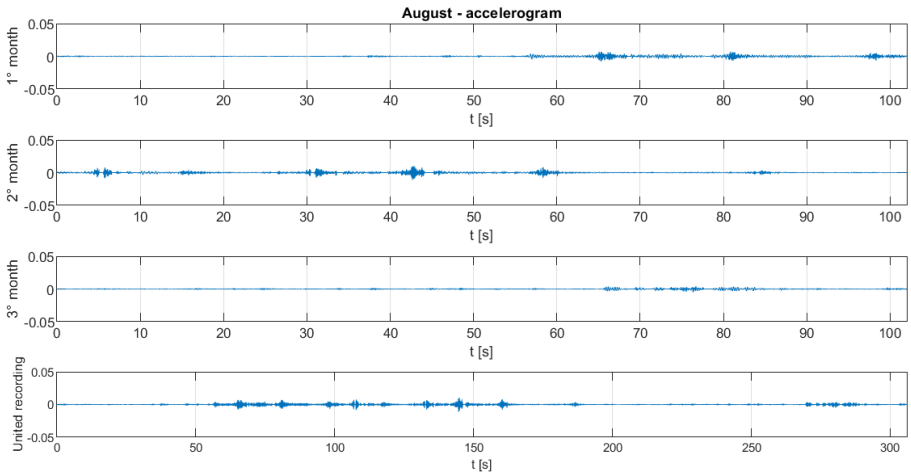


Figure 14-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

14.8.3 Transverse direction (z)

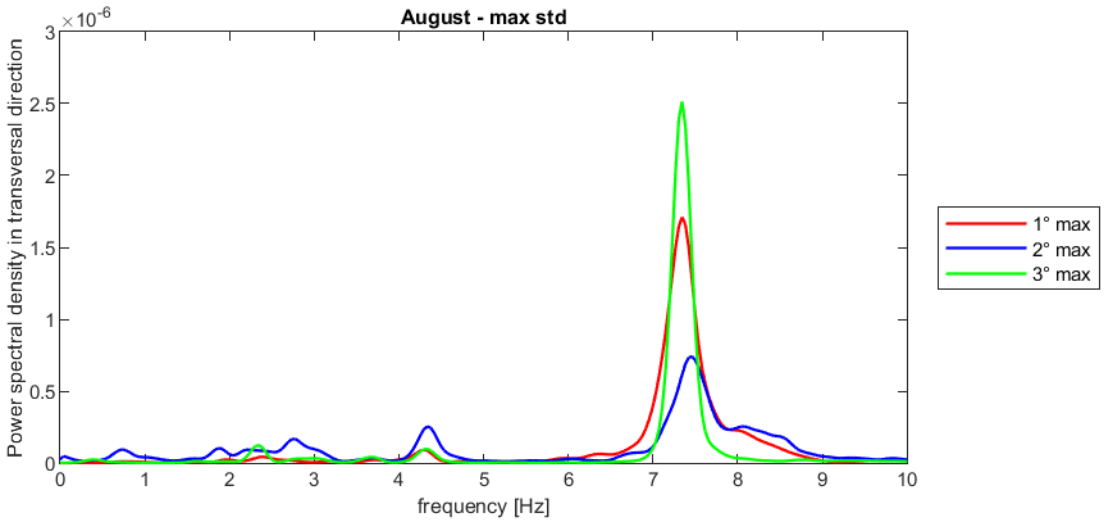


Figure 14-94: Results obtained from the 3 accelerograms with maximum SD in time domain

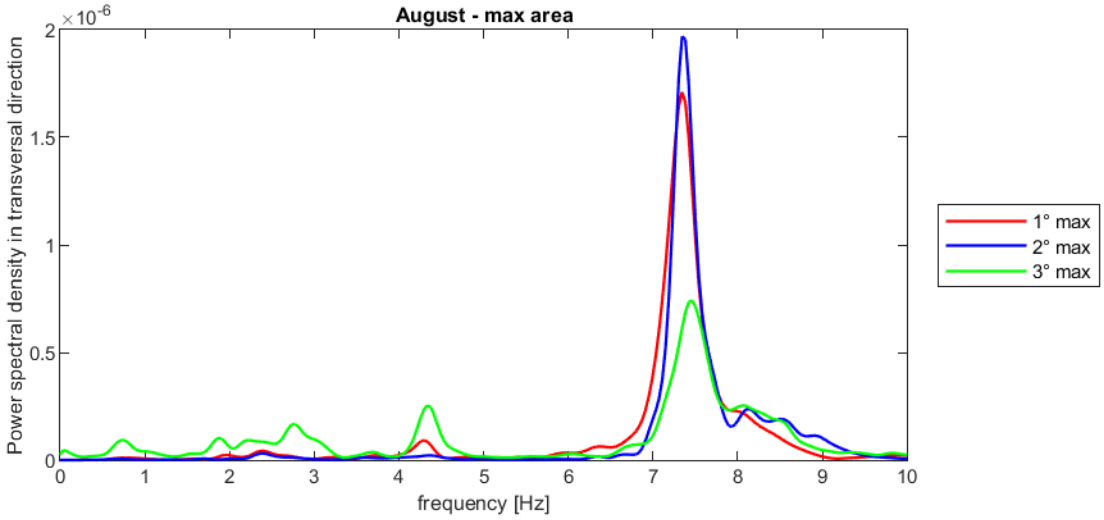


Figure 14-95: Results obtained from the 3 accelerograms with maximum area of PSD

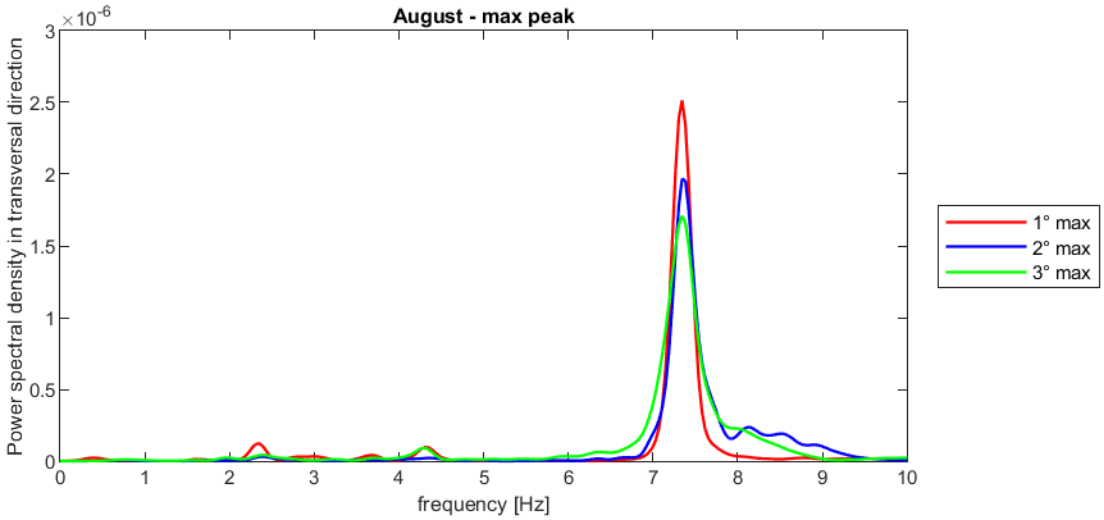


Figure 14-96: Results obtained from the 3 accelerograms with highest peak if PSD

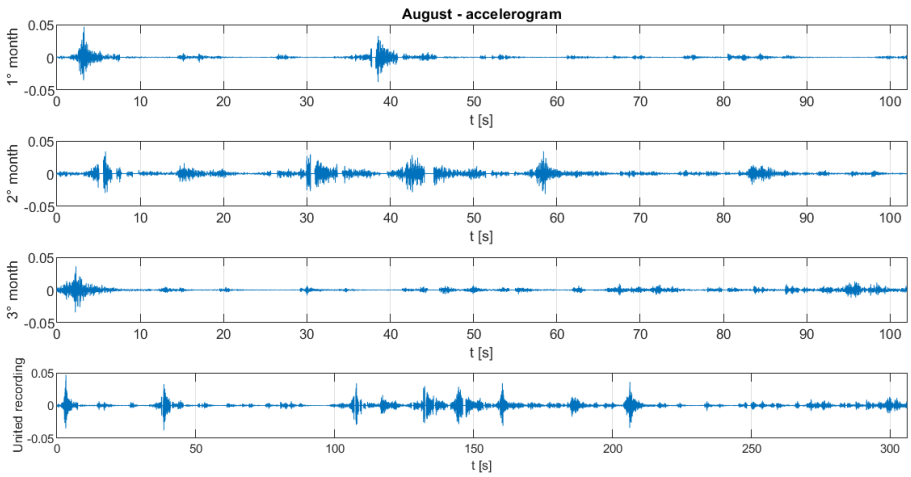


Figure 14-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

14.9 September

The results obtained for the September dataset are shown in the following tables.

Table 14-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-09-14_11-00-20	5.88E-03
	2°	2B5E7_2023-09-19_10-00-20	5.44E-03
	3°	2B5E7_2023-09-26_09-00-21	5.11E-03
Longitudinal direction (y)	1°	2B5E7_2023-09-26_15-00-20	1.11E-03
	2°	2B5E7_2023-09-20_11-00-20	9.11E-04
	3°	2B5E7_2023-09-26_09-00-21	8.16E-04
Transverse direction (z)	1°	2B5E7_2023-09-21_14-00-21	1.38E-03
	2°	2B5E7_2023-09-25_22-00-21	1.25E-03
	3°	2B5E7_2023-09-25_09-00-21	1.24E-03

Table 14-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-09-19_10-00-20	8.38E-05	2B5E7_2023-09-14_11-00-20	6.78E-06
2	2B5E7_2023-09-14_11-00-20	7.25E-05	2B5E7_2023-09-19_10-00-20	6.06E-06
3	2B5E7_2023-09-21_10-00-20	5.55E-05	2B5E7_2023-09-26_09-00-21	6.05E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-09-26_15-00-20	2.36E-06	2B5E7_2023-09-26_15-00-20	2.65E-07
2	2B5E7_2023-09-20_00-00-20	8.57E-07	2B5E7_2023-09-20_11-00-20	1.69E-07
3	2B5E7_2023-09-20_11-00-20	8.24E-07	2B5E7_2023-09-26_09-00-21	1.35E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-09-21_14-00-21	4.55E-06	2B5E7_2023-09-21_14-00-21	3.70E-07
2	2B5E7_2023-09-25_18-00-20	3.75E-06	2B5E7_2023-09-25_22-00-21	3.49E-07
3	2B5E7_2023-09-25_22-00-21	3.27E-06	2B5E7_2023-09-25_09-00-21	3.35E-07

Table 14-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	D	D	D	F	F	F
2	B	A	B	E	-	E	G	-	G
3	C	-	C	C	E	C	H	G	H

14.9.1 Vertical direction (x)

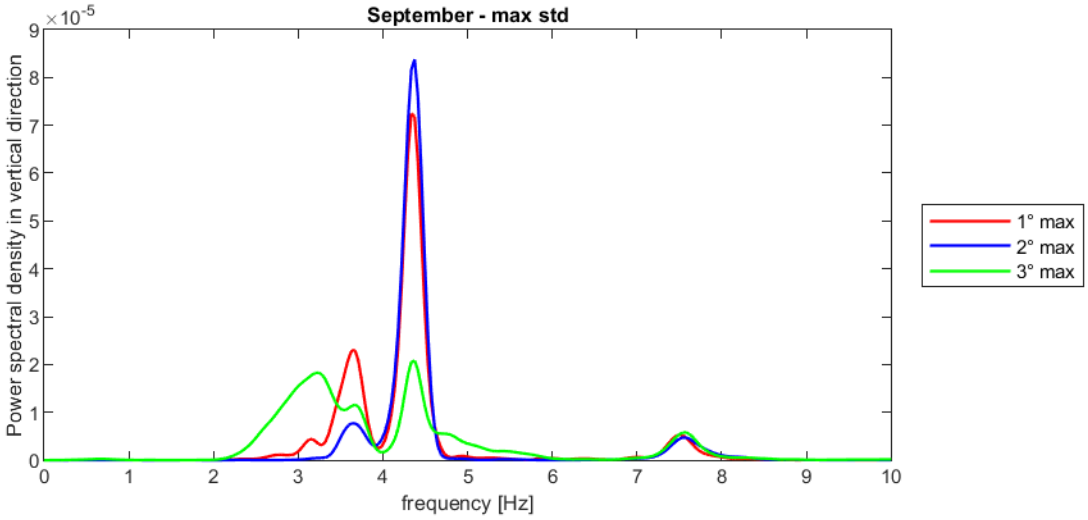


Figure 14-98: Results obtained from the 3 accelerograms with maximum SD in time domain

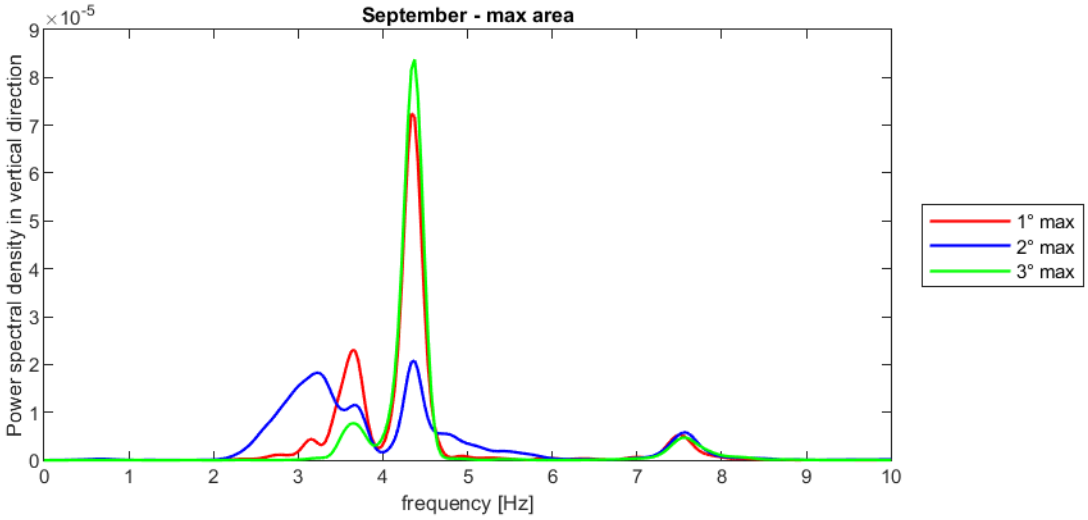


Figure 14-99: Results obtained from the 3 accelerograms with maximum area of PSD

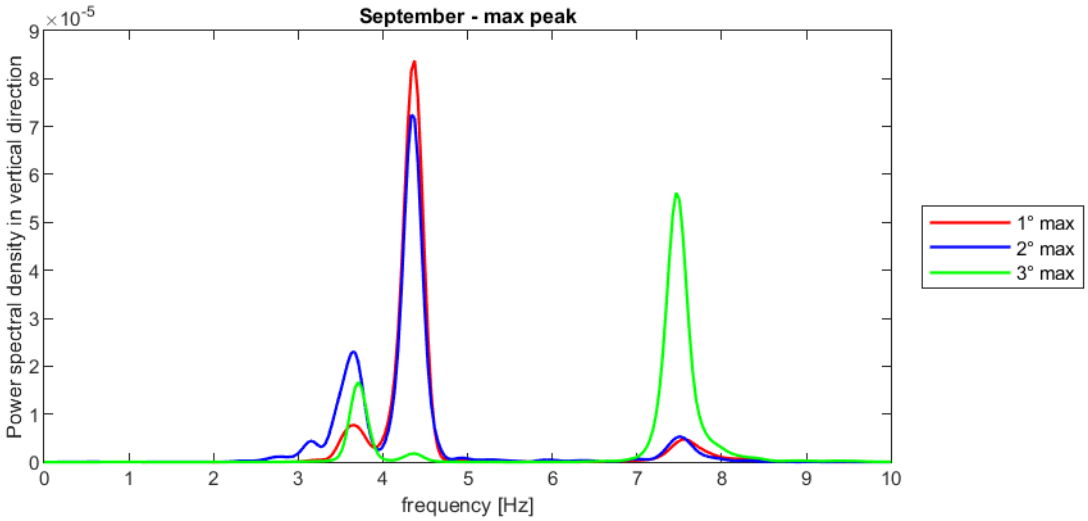


Figure 14-100: Results obtained from the 3 accelerograms with highest peak if PSD

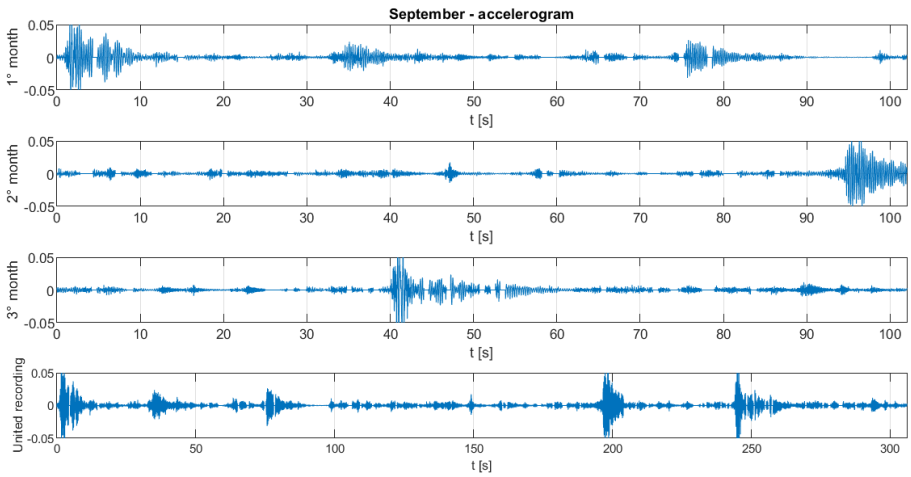


Figure 14-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.9.2 Longitudinal direction (y)

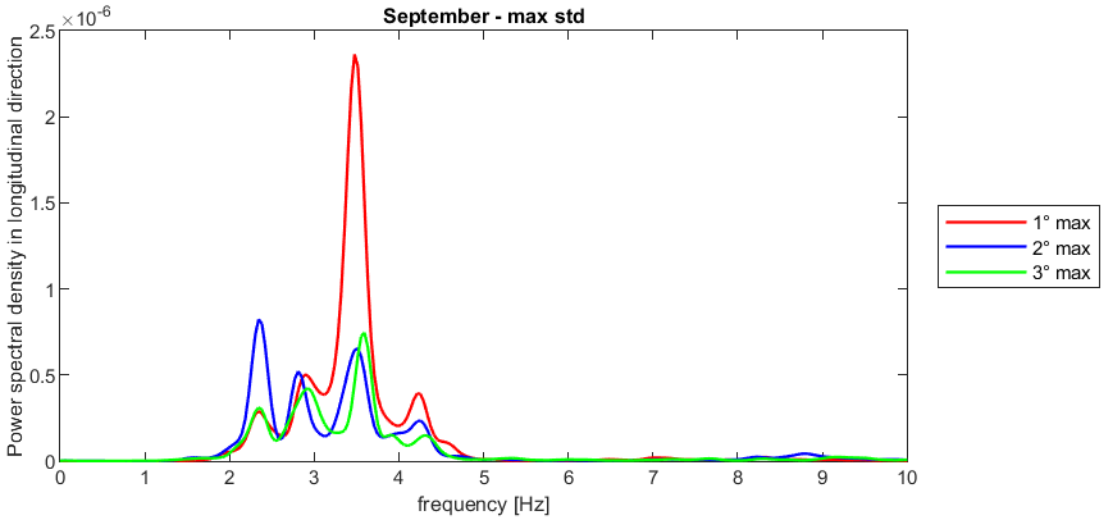


Figure 14-102: Results obtained from the 3 accelerograms with maximum SD in time domain

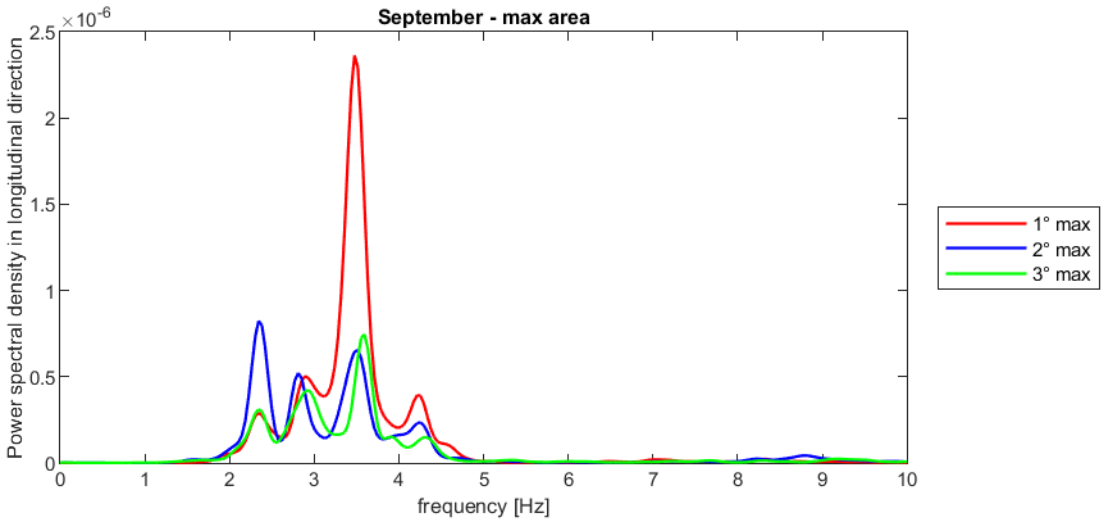


Figure 14-103: Results obtained from the 3 accelerograms with maximum area of PSD

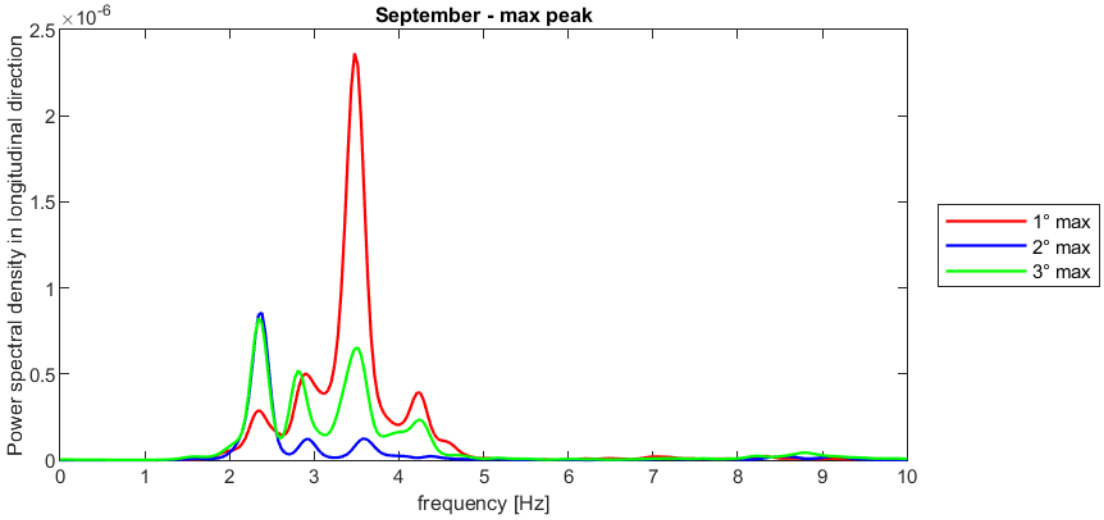


Figure 14-104: Results obtained from the 3 accelerograms with highest peak if PSD

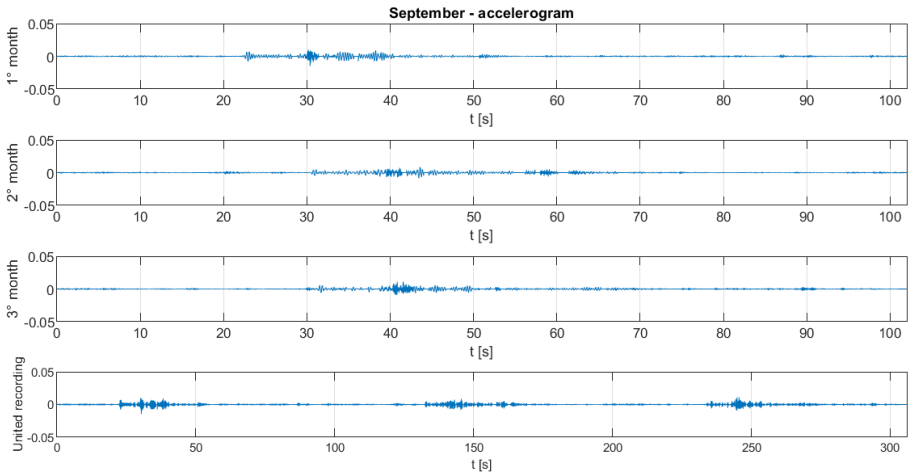


Figure 14-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

14.9.3 Transverse direction (z)

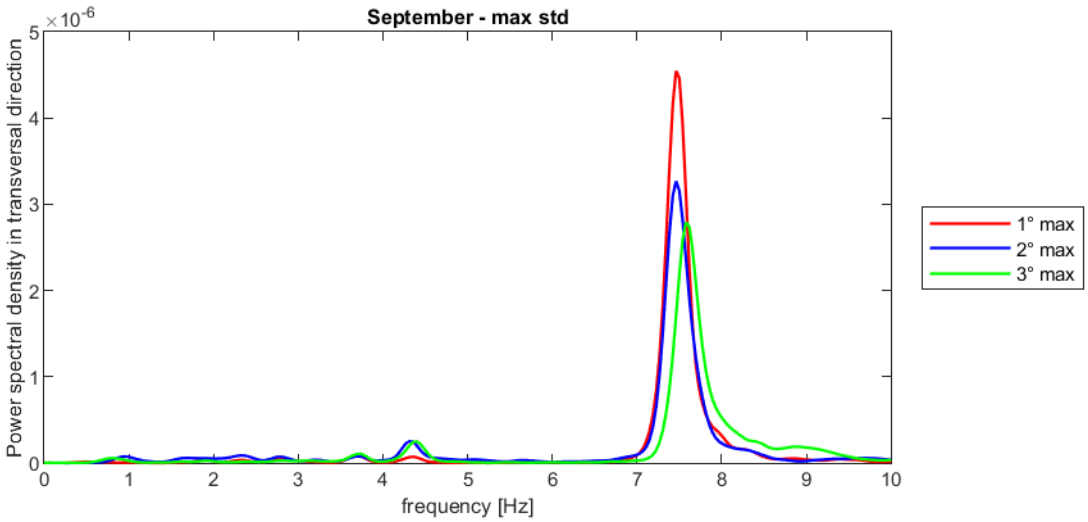


Figure 14-106: Results obtained from the 3 accelerograms with maximum SD in time domain

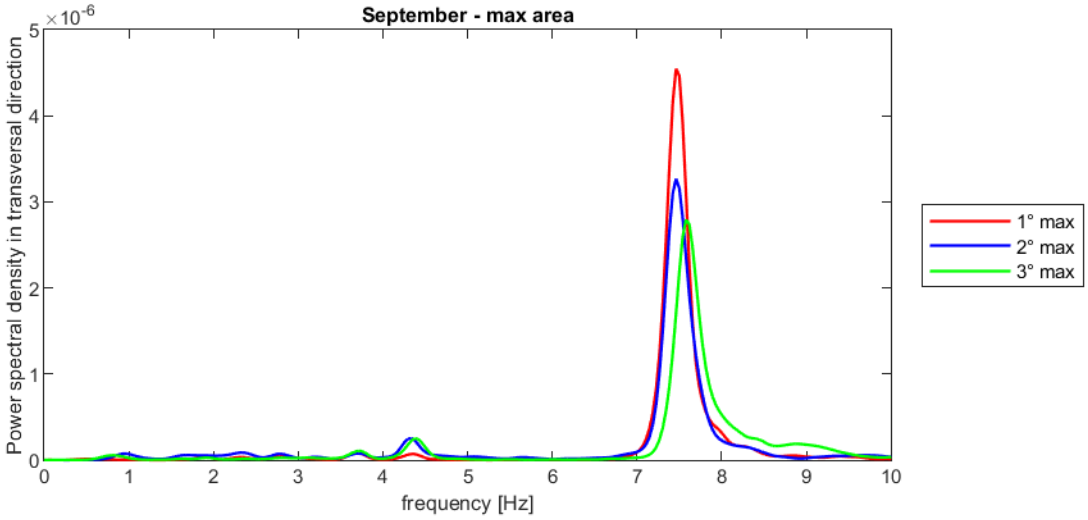


Figure 14-107: Results obtained from the 3 accelerograms with maximum area of PSD

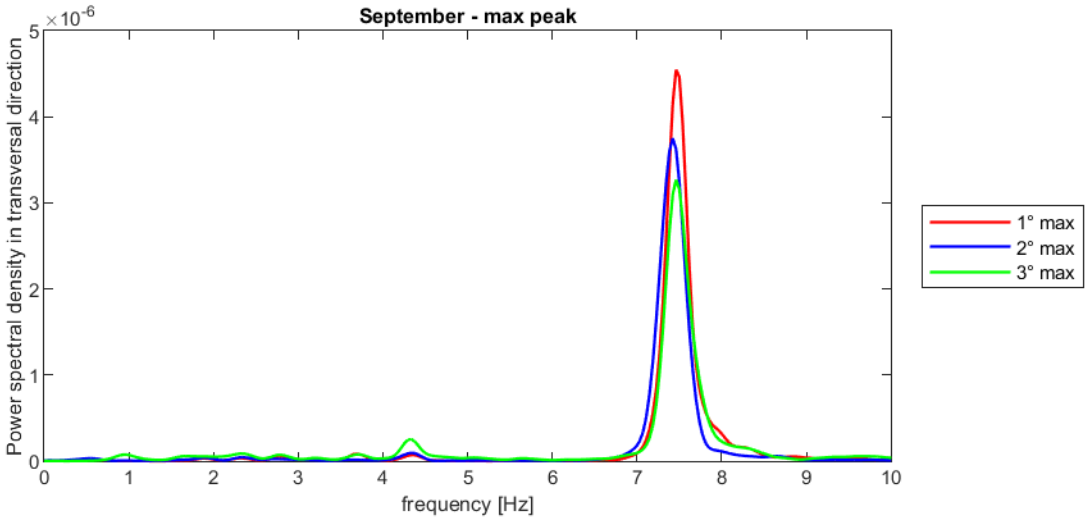


Figure 14-108: Results obtained from the 3 accelerograms with highest peak if PSD

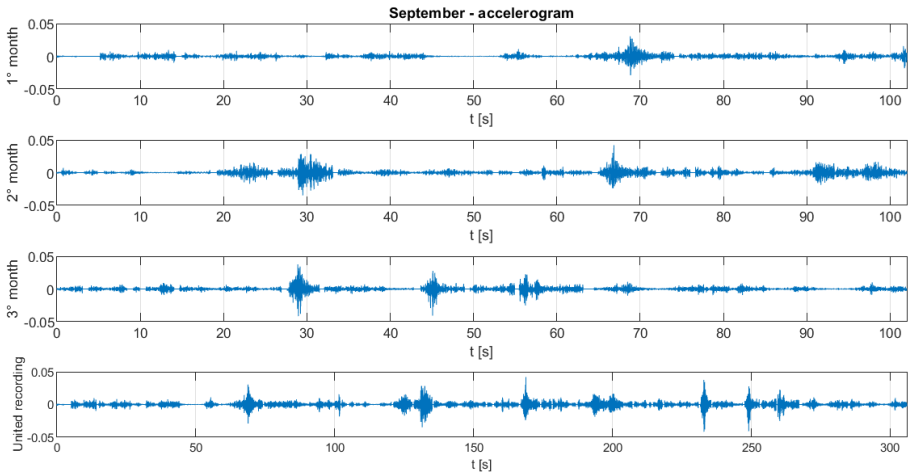


Figure 14-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

14.10 October

The results obtained for the October dataset are shown in the following tables.

Table 14-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-10-25_10-00-21	5.87E-03
	2°	2B5E7_2023-10-12_09-00-20	5.49E-03
	3°	2B5E7_2023-10-24_10-00-21	5.32E-03
Longitudinal direction (y)	1°	2B5E7_2023-10-12_09-00-20	6.40E-04
	2°	2B5E7_2023-10-25_10-00-21	6.38E-04
	3°	2B5E7_2023-10-09_13-00-20	6.25E-04
Transverse direction (z)	1°	2B5E7_2023-10-24_10-00-21	1.53E-03
	2°	2B5E7_2023-10-09_09-00-21	1.39E-03
	3°	2B5E7_2023-10-03_15-00-20	1.38E-03

Table 14-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-10-25_10-00-21	7.31E-05	2B5E7_2023-10-25_10-00-21	7.38E-06
2	2B5E7_2023-10-12_09-00-20	7.09E-05	2B5E7_2023-10-12_09-00-20	5.86E-06
3	2B5E7_2023-10-19_12-00-20	5.54E-05	2B5E7_2023-10-24_10-00-21	5.66E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-10-02_08-00-21	4.26E-07	2B5E7_2023-10-12_09-00-20	8.37E-08
2	2B5E7_2023-10-25_10-00-21	3.97E-07	2B5E7_2023-10-25_10-00-21	7.83E-08
3	2B5E7_2023-10-12_09-00-20	3.77E-07	2B5E7_2023-10-09_13-00-20	7.62E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-10-24_19-00-21	3.87E-06	2B5E7_2023-10-24_10-00-21	4.64E-07
2	2B5E7_2023-10-24_10-00-21	3.78E-06	2B5E7_2023-10-09_13-00-20	3.93E-07
3	2B5E7_2023-10-09_09-00-21	3.63E-06	2B5E7_2023-10-09_09-00-21	3.84E-07

Table 14-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	-	B	C	-	C
2	B	B	B	A	A	A	E	C	-
3	C	-	C	D	B	D	-	E	E

14.10.1 Vertical direction (x)

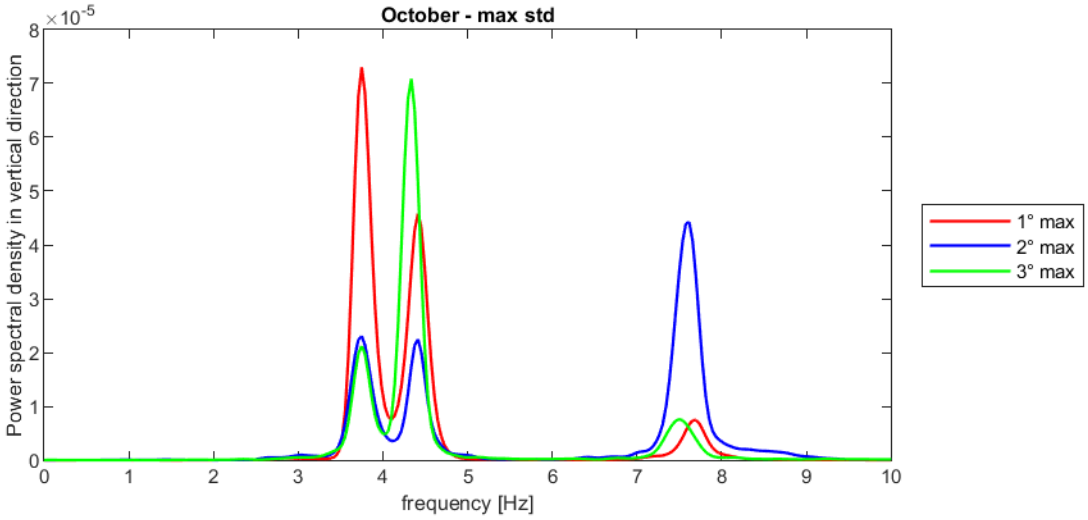


Figure 14-110: Results obtained from the 3 accelerograms with maximum SD in time domain

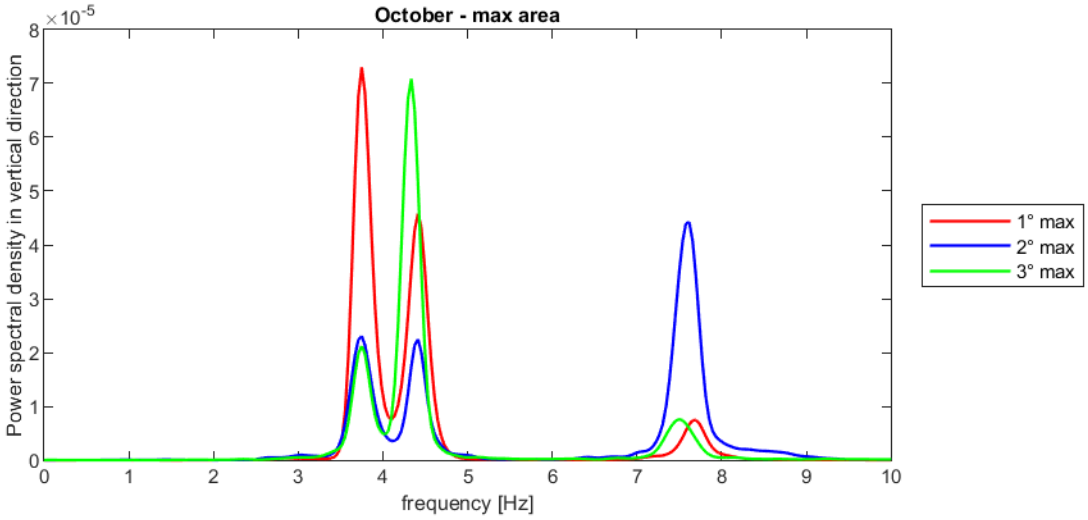


Figure 14-111: Results obtained from the 3 accelerograms with maximum area of PSD

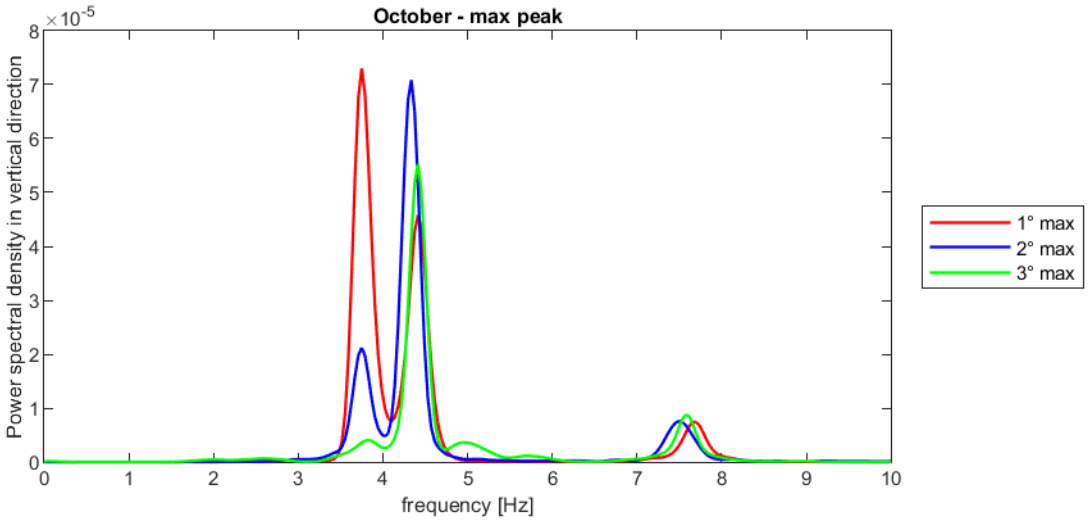


Figure 14-112: Results obtained from the 3 accelerograms with highest peak if PSD

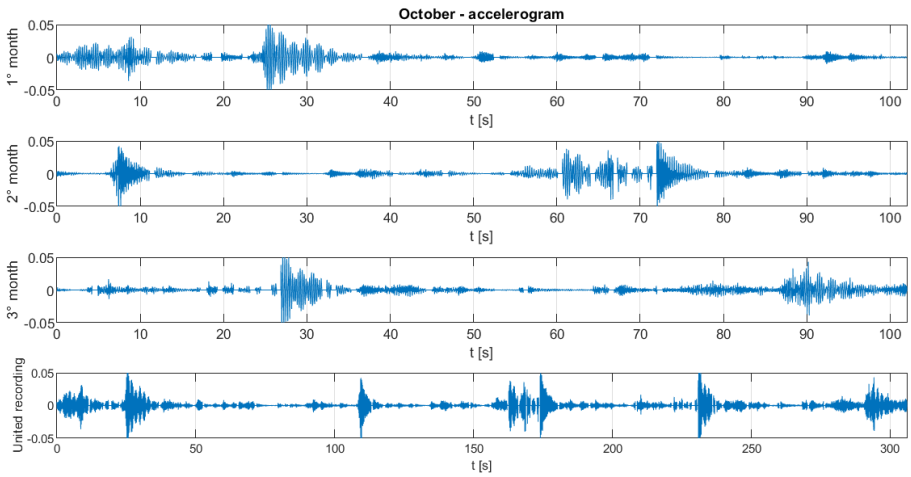


Figure 14-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.10.2 Longitudinal direction (y)

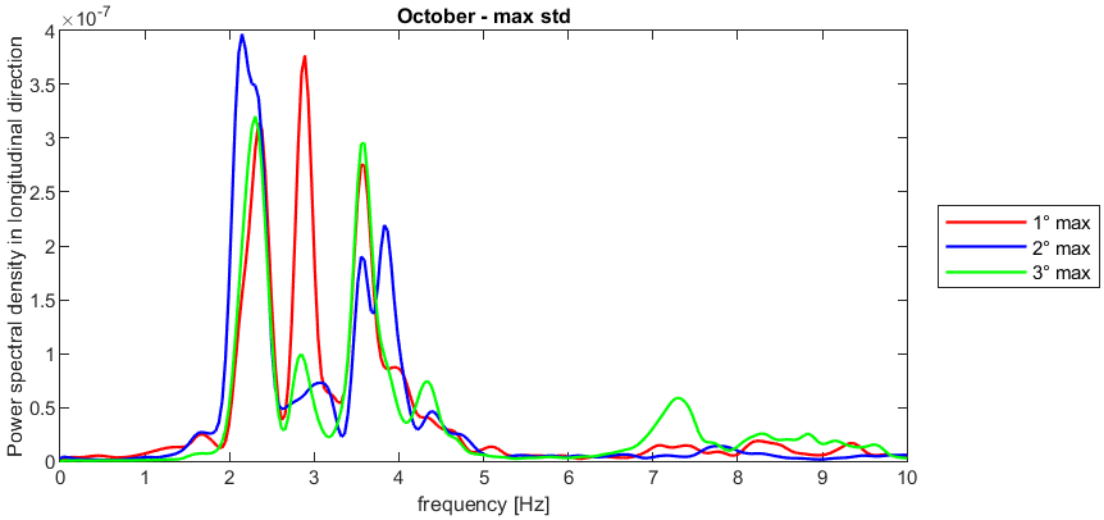


Figure 14-114: Results obtained from the 3 accelerograms with maximum SD in time domain

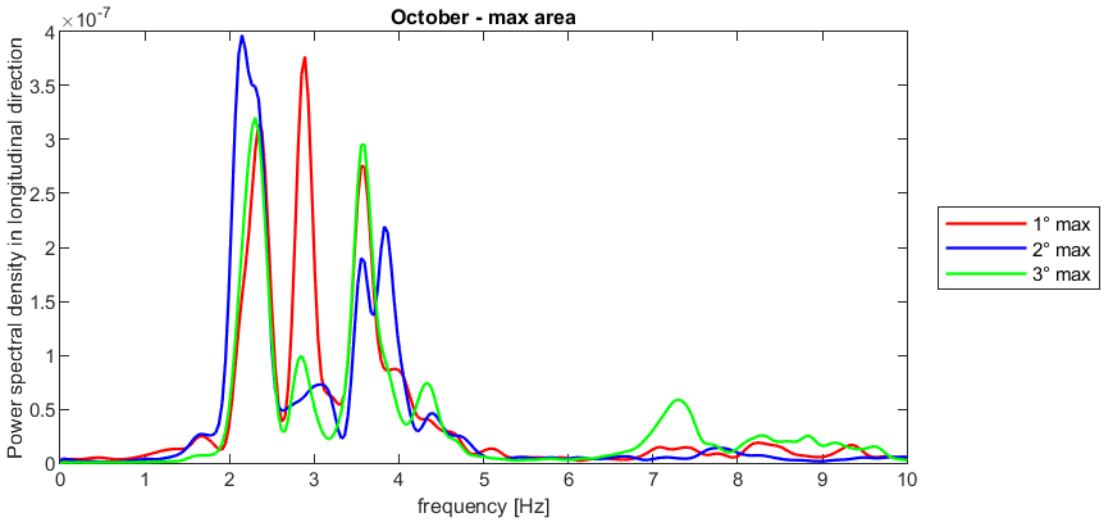


Figure 14-115: Results obtained from the 3 accelerograms with maximum area of PSD

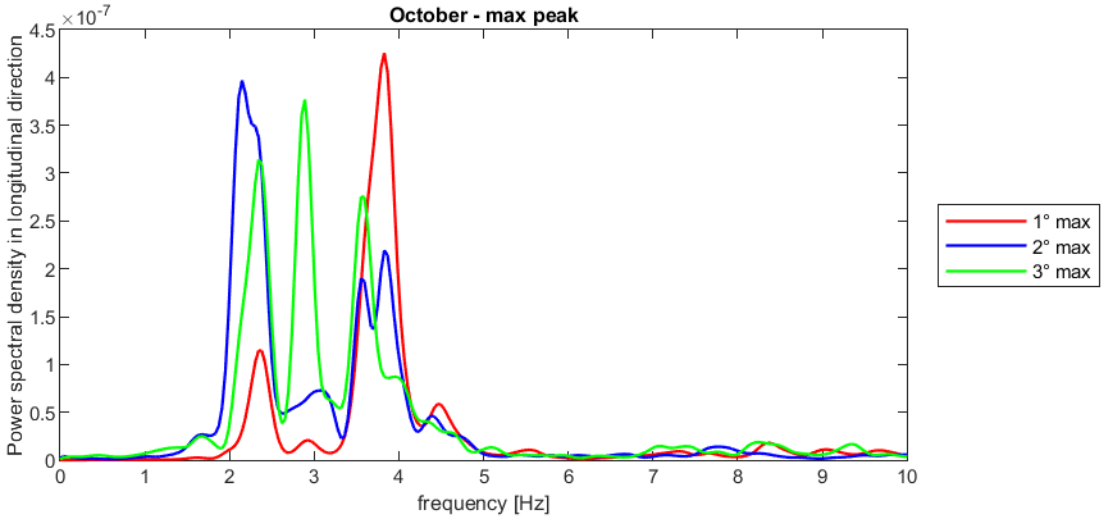


Figure 14-116: Results obtained from the 3 accelerograms with highest peak if PSD

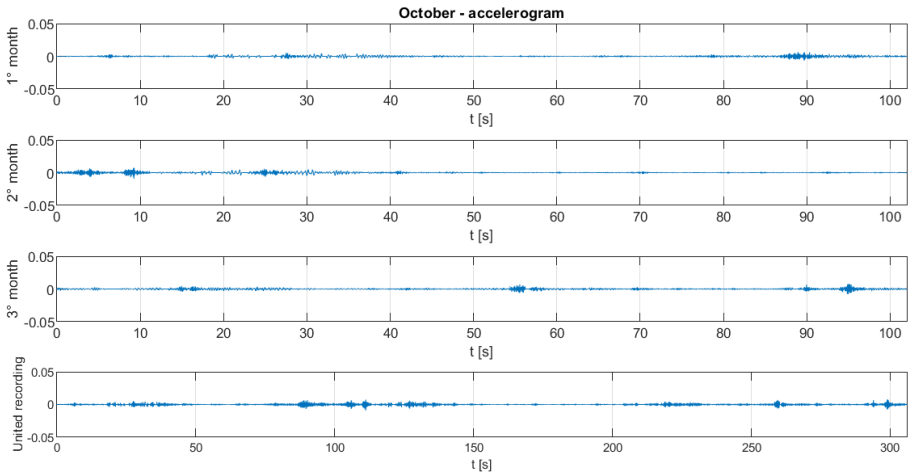


Figure 14-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

14.10.3 Transverse direction (z)

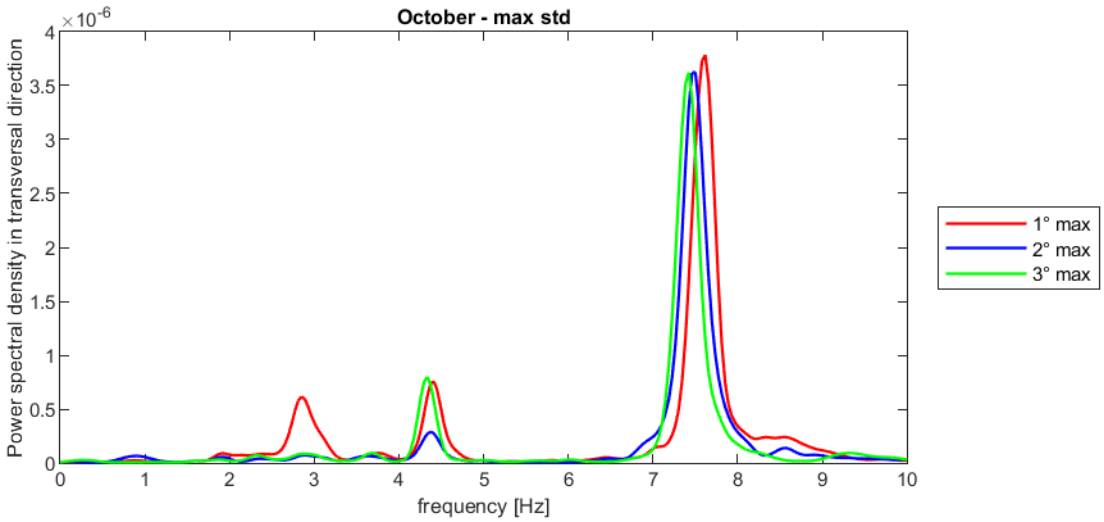


Figure 14-118: Results obtained from the 3 accelerograms with maximum SD in time domain

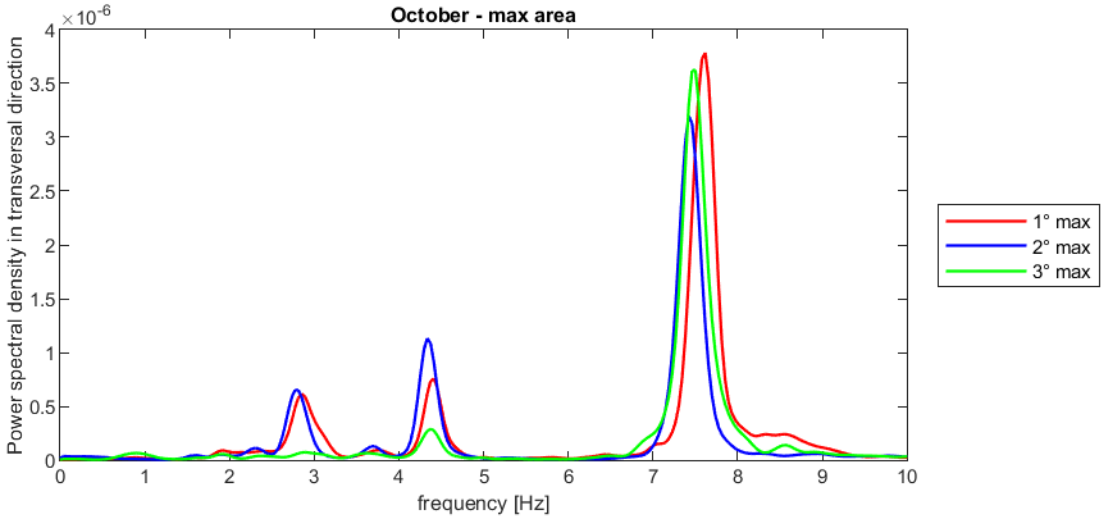


Figure 14-119: Results obtained from the 3 accelerograms with maximum area of PSD

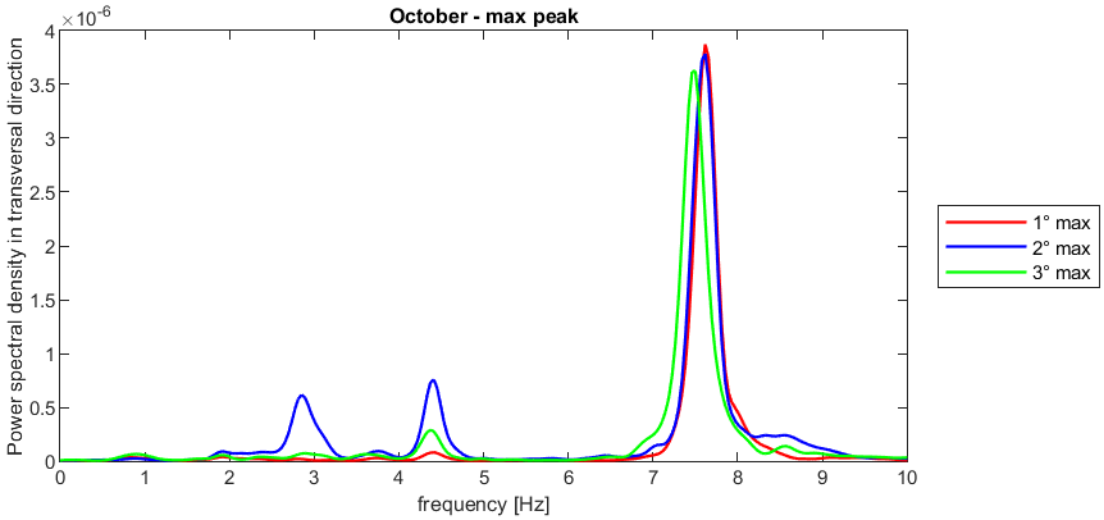


Figure 14-120: Results obtained from the 3 accelerograms with highest peak if PSD

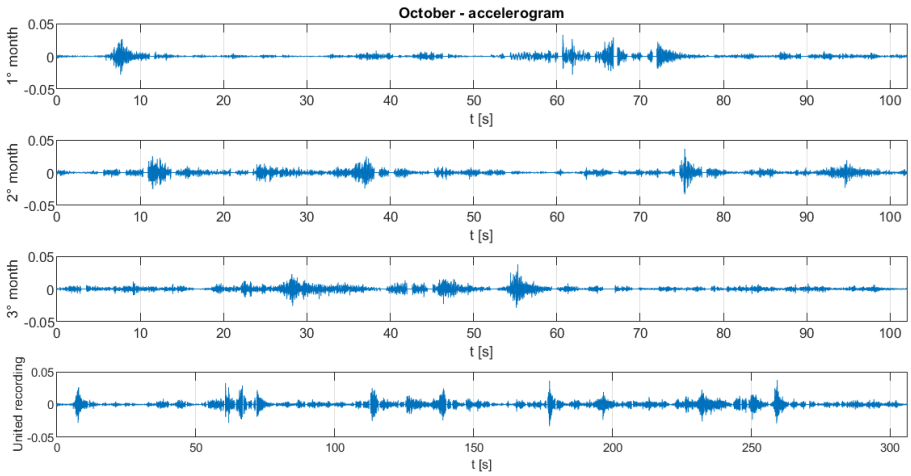


Figure 14-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

14.11 November

The results obtained for the November dataset are shown in the following tables.

Table 14-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-11-07_17-00-21	6.25E-03
	2°	2B5E7_2023-11-06_17-00-21	5.44E-03
	3°	2B5E7_2023-11-27_17-00-20	5.43E-03
Longitudinal direction (y)	1°	2B5E7_2023-11-06_17-00-21	6.56E-04
	2°	2B5E7_2023-11-28_11-00-21	6.41E-04
	3°	2B5E7_2023-11-07_15-00-21	6.01E-04
Transverse direction (z)	1°	2B5E7_2023-11-06_17-00-21	1.31E-03
	2°	2B5E7_2023-11-21_14-00-20	1.31E-03
	3°	2B5E7_2023-11-02_08-00-21	1.28E-03

Table 14-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-11-07_17-00-21	7.00E-05	2B5E7_2023-11-07_17-00-21	7.74E-06
2	2B5E7_2023-11-29_16-00-21	6.24E-05	2B5E7_2023-11-06_17-00-21	6.19E-06
3	2B5E7_2023-11-07_13-00-20	6.24E-05	2B5E7_2023-11-29_16-00-21	6.06E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-11-28_11-00-21	6.69E-07	2B5E7_2023-11-28_11-00-21	8.71E-08
2	2B5E7_2023-11-07_15-00-21	4.45E-07	2B5E7_2023-11-06_17-00-21	8.63E-08
3	2B5E7_2023-11-06_17-00-21	3.72E-07	2B5E7_2023-11-07_15-00-21	7.42E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-11-21_14-00-20	3.34E-06	2B5E7_2023-11-06_17-00-21	3.62E-07
2	2B5E7_2023-11-02_08-00-21	3.16E-06	2B5E7_2023-11-21_14-00-20	3.34E-07
3	2B5E7_2023-11-22_12-00-20	2.89E-06	2B5E7_2023-11-09_09-00-20	3.18E-07

Table 14-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	D	D	B	F	B
2	B	C	B	D	E	B	F	G	F
3	-	-	C	E	B	E	G	-	-

14.11.1 Vertical direction (x)

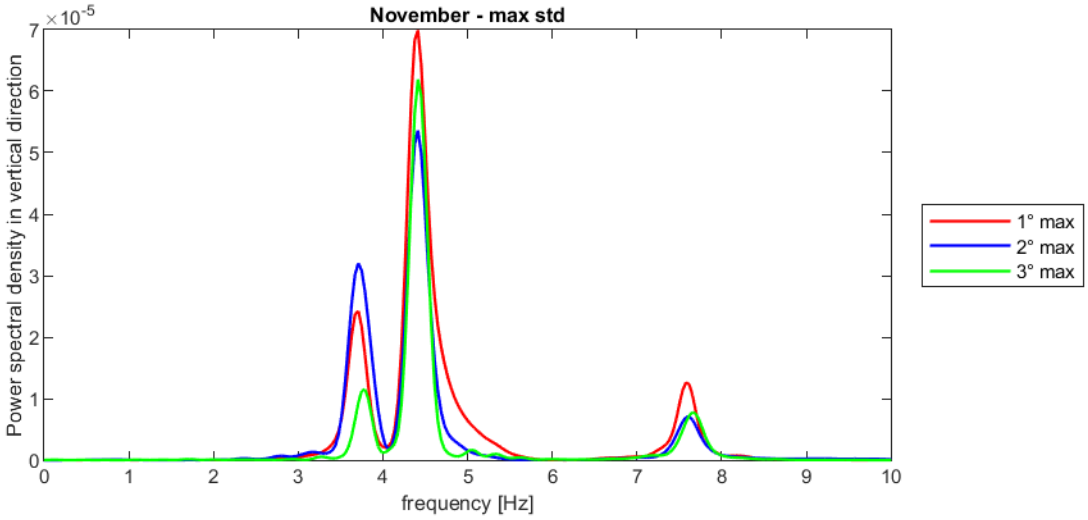


Figure 14-122: Results obtained from the 3 accelerograms with maximum SD in time domain

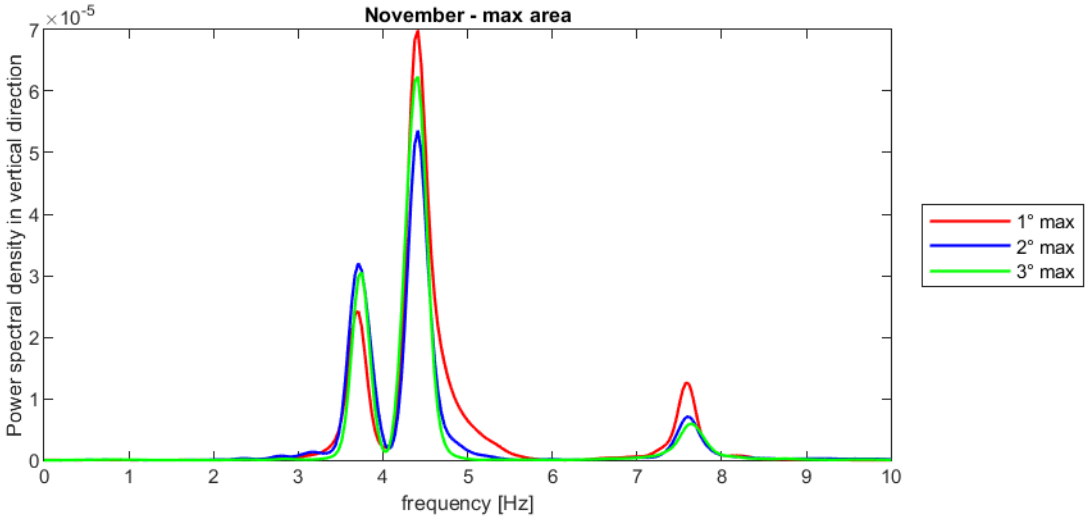


Figure 14-123: Results obtained from the 3 accelerograms with maximum area of PSD

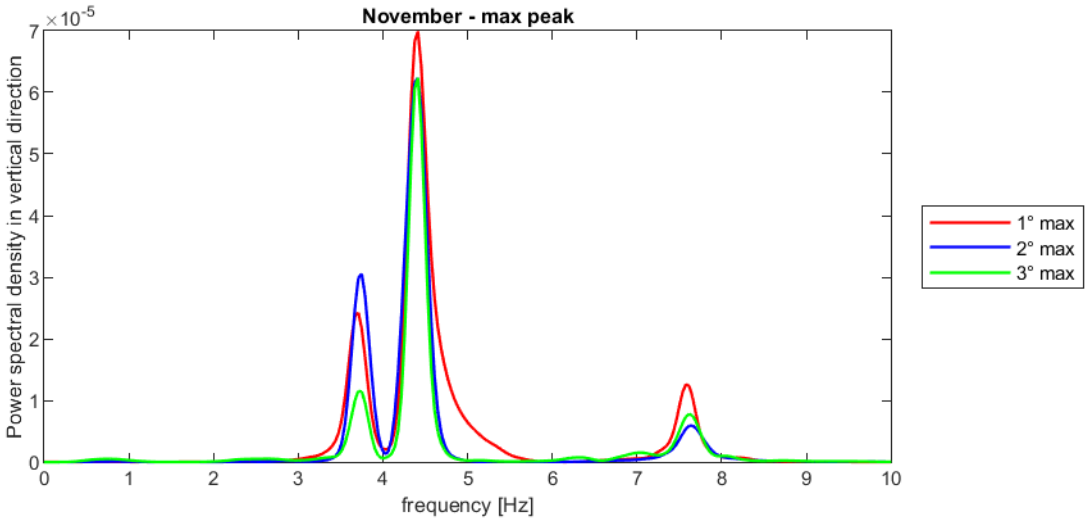


Figure 14-124: Results obtained from the 3 accelerograms with highest peak if PSD

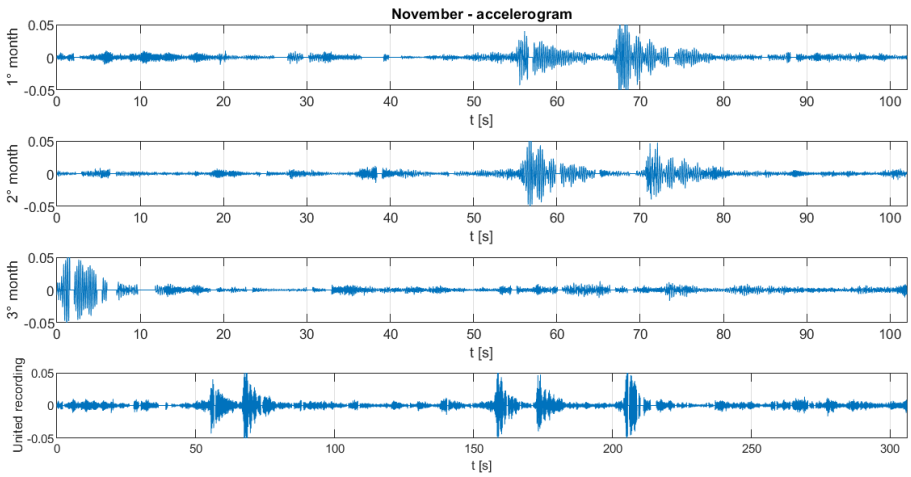


Figure 14-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.11.2 Longitudinal direction (y)

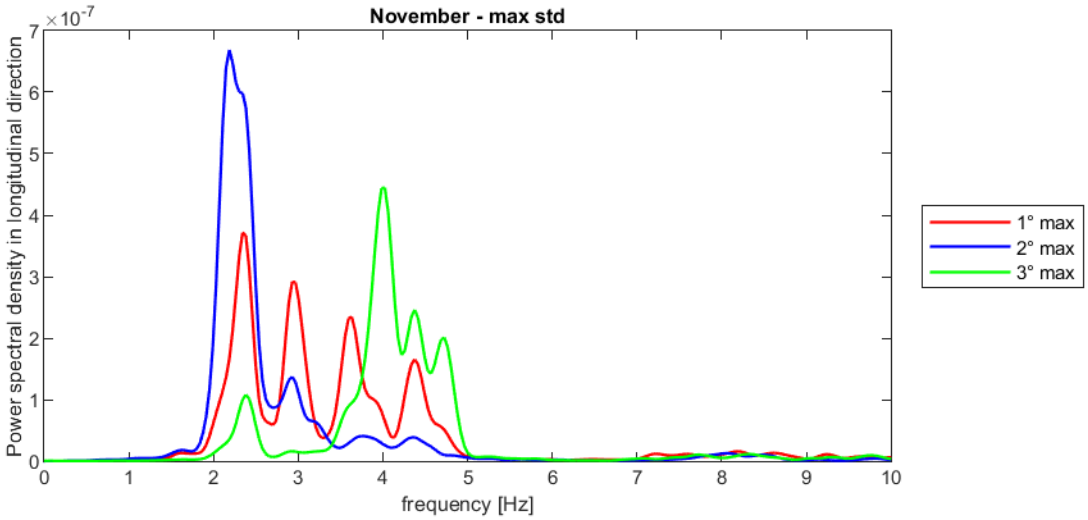


Figure 14-126: Results obtained from the 3 accelerograms with maximum SD in time domain

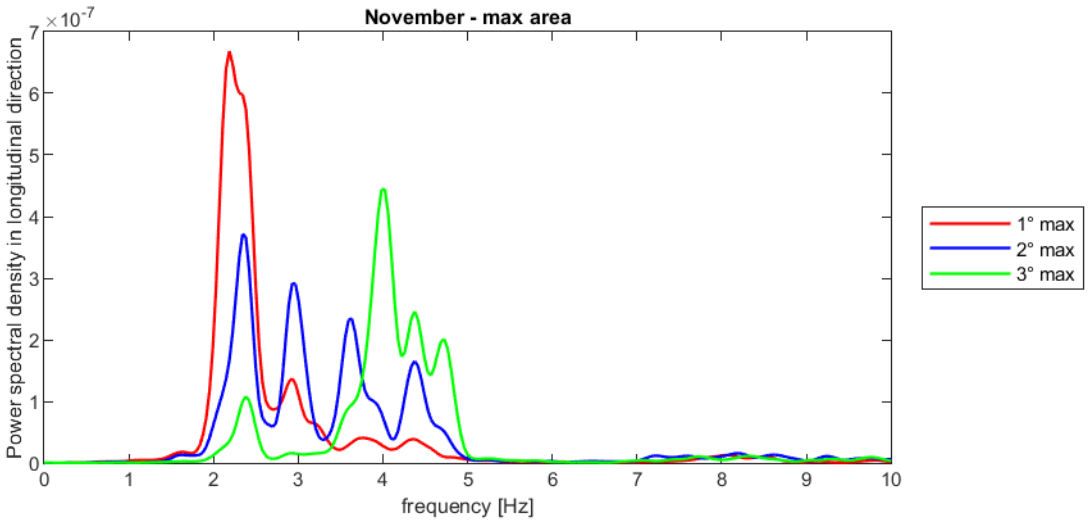


Figure 14-127: Results obtained from the 3 accelerograms with maximum area of PSD

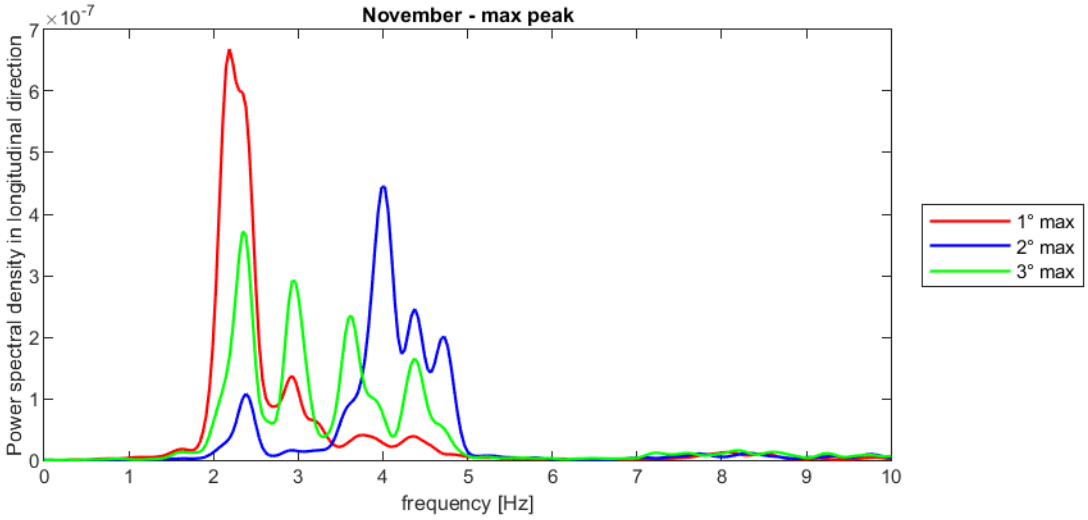


Figure 14-128: Results obtained from the 3 accelerograms with highest peak if PSD

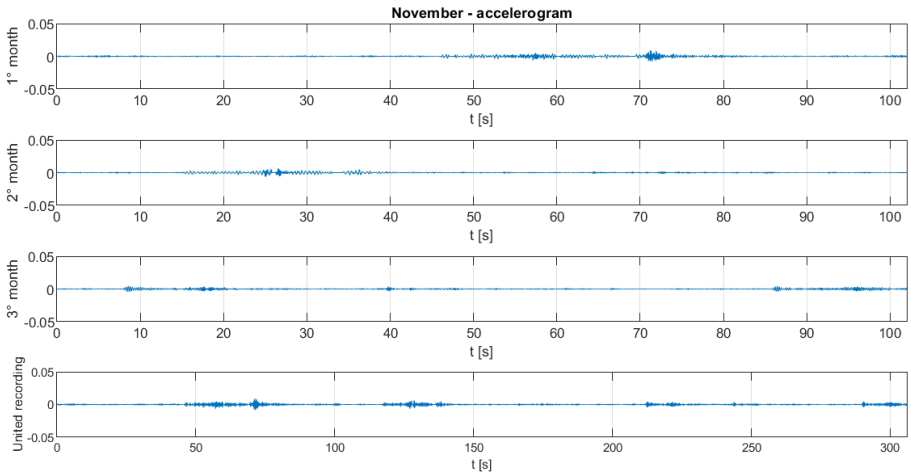


Figure 14-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

14.11.3 Transverse direction (z)

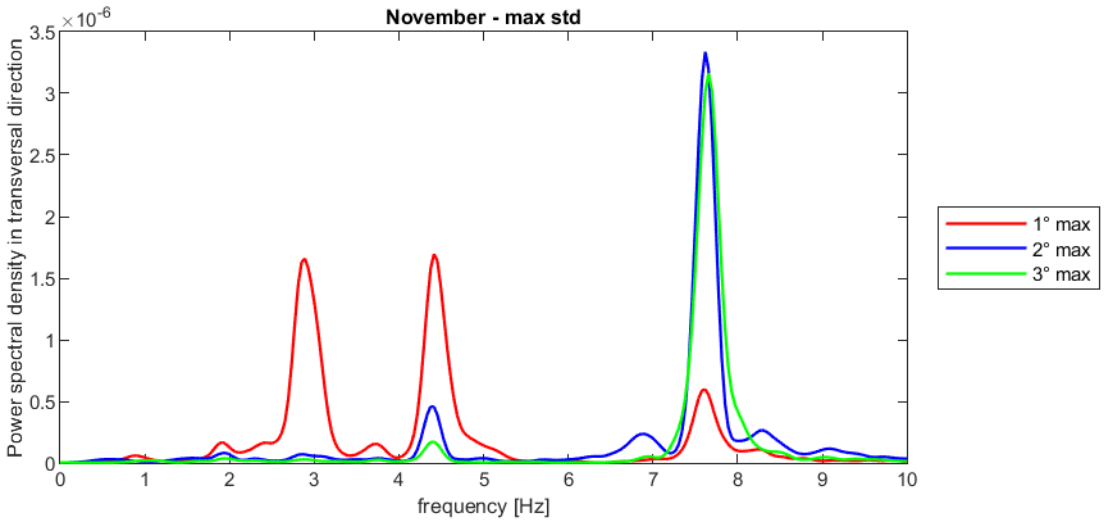


Figure 14-130: Results obtained from the 3 accelerograms with maximum SD in time domain

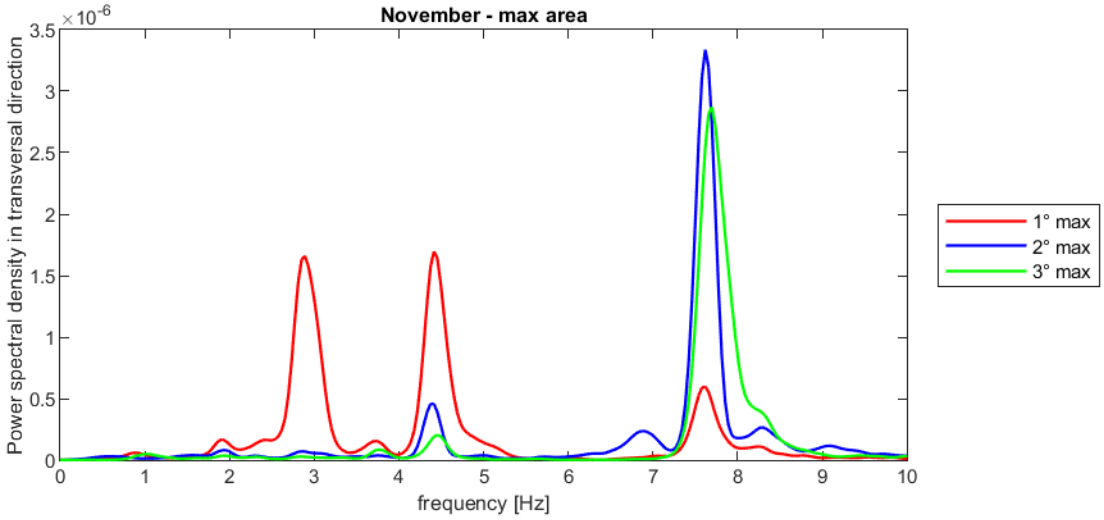


Figure 14-131: Results obtained from the 3 accelerograms with maximum area of PSD

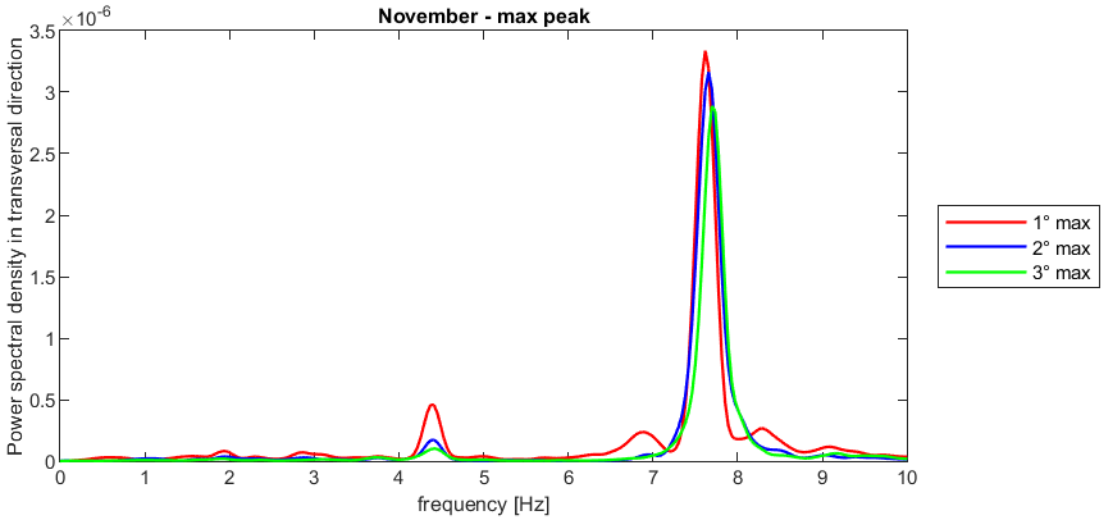


Figure 14-132: Results obtained from the 3 accelerograms with highest peak if PSD

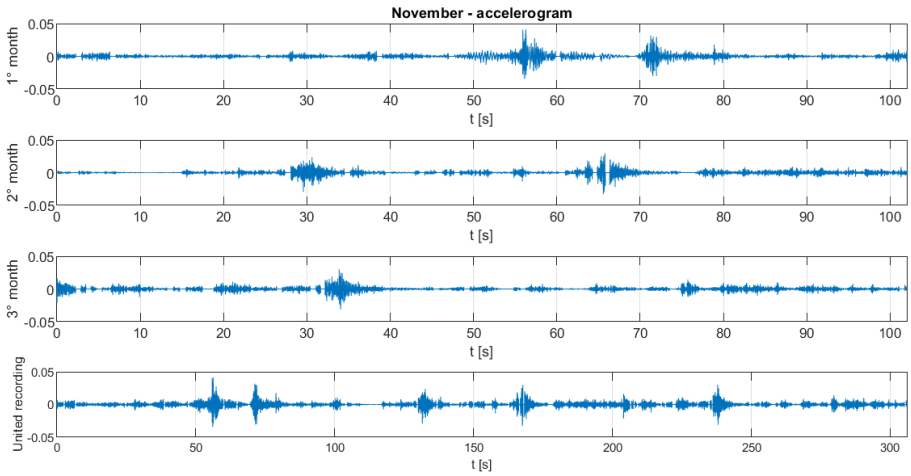


Figure 14-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

14.12 December

The results obtained for the December dataset are shown in the following tables.

Table 14-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2B5E7_2023-12-28_09-00-21	6.39E-03
	2°	2B5E7_2023-12-09_11-00-20	6.02E-03
	3°	2B5E7_2023-12-14_16-00-21	5.65E-03
Longitudinal direction (y)	1°	2B5E7_2023-12-18_08-00-20	6.10E-04
	2°	2B5E7_2023-12-11_14-00-21	5.61E-04
	3°	2B5E7_2023-12-28_09-00-21	5.46E-04
Transverse direction (z)	1°	2B5E7_2023-12-14_16-00-21	1.64E-03
	2°	2B5E7_2023-12-28_09-00-21	1.49E-03
	3°	2B5E7_2023-12-18_08-00-20	1.41E-03

Table 14-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-12-09_11-00-20	1.13E-04	2B5E7_2023-12-28_09-00-21	8.20E-06
2	2B5E7_2023-12-28_09-00-21	7.01E-05	2B5E7_2023-12-09_11-00-20	7.17E-06
3	2B5E7_2023-12-14_16-00-21	5.32E-05	2B5E7_2023-12-14_16-00-21	5.94E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-12-18_08-00-20	4.47E-07	2B5E7_2023-12-18_08-00-20	7.47E-08
2	2B5E7_2023-12-11_14-00-21	3.92E-07	2B5E7_2023-12-11_14-00-21	6.37E-08
3	2B5E7_2023-12-29_15-00-20	3.61E-07	2B5E7_2023-12-28_09-00-21	6.00E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2B5E7_2023-12-14_16-00-21	5.48E-06	2B5E7_2023-12-14_16-00-21	4.70E-07
2	2B5E7_2023-12-04_11-00-20	4.49E-06	2B5E7_2023-12-28_09-00-21	4.48E-07
3	2B5E7_2023-12-07_19-00-20	4.29E-06	2B5E7_2023-12-18_08-00-20	4.10E-07

Table 14-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	D	D	D	F	F	F
2	B	A	B	E	E	E	A	-	A
3	C	C	C	A	-	A	D	-	D

14.12.1 Vertical direction (x)

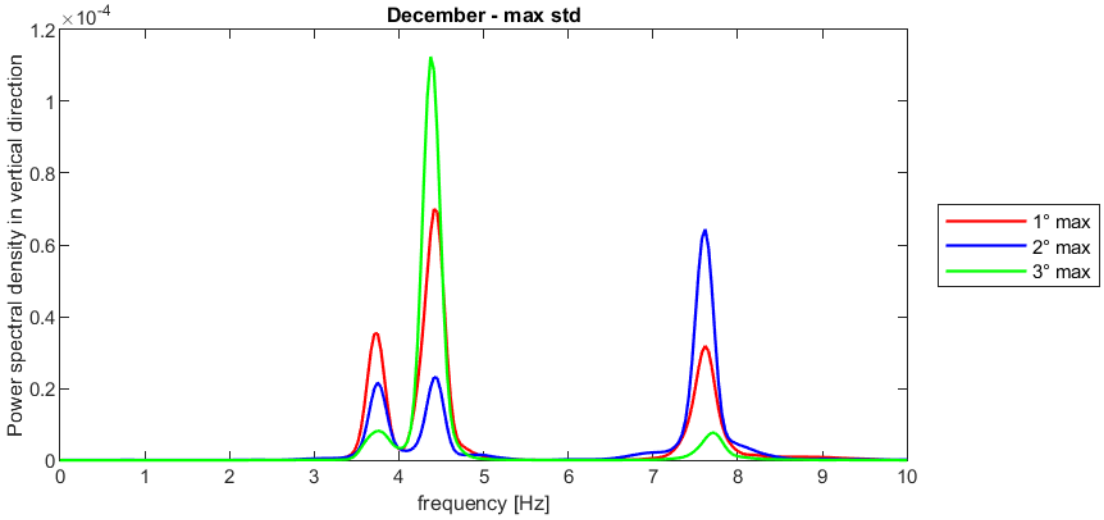


Figure 14-134: Results obtained from the 3 accelerograms with maximum SD in time domain

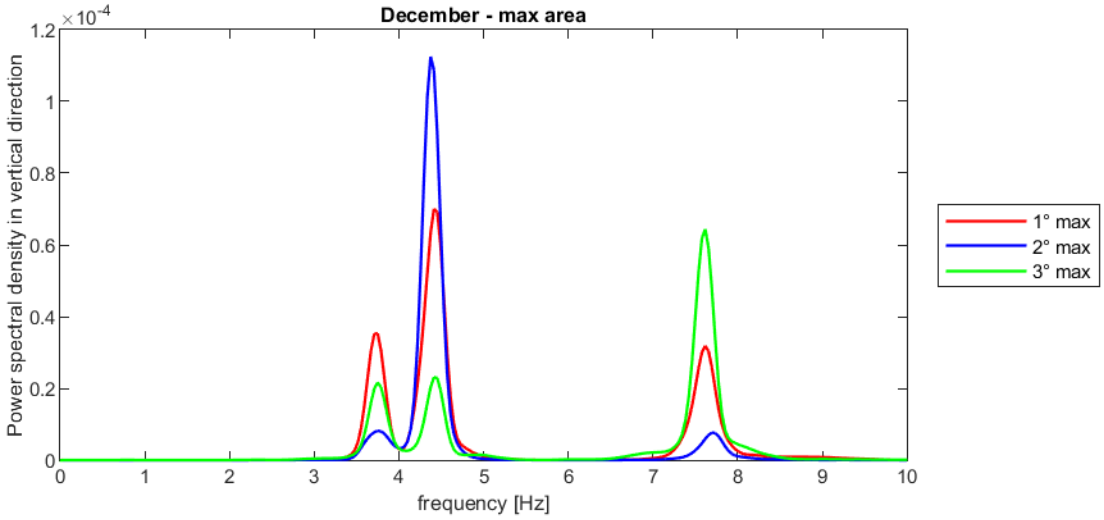


Figure 14-135: Results obtained from the 3 accelerograms with maximum area of PSD

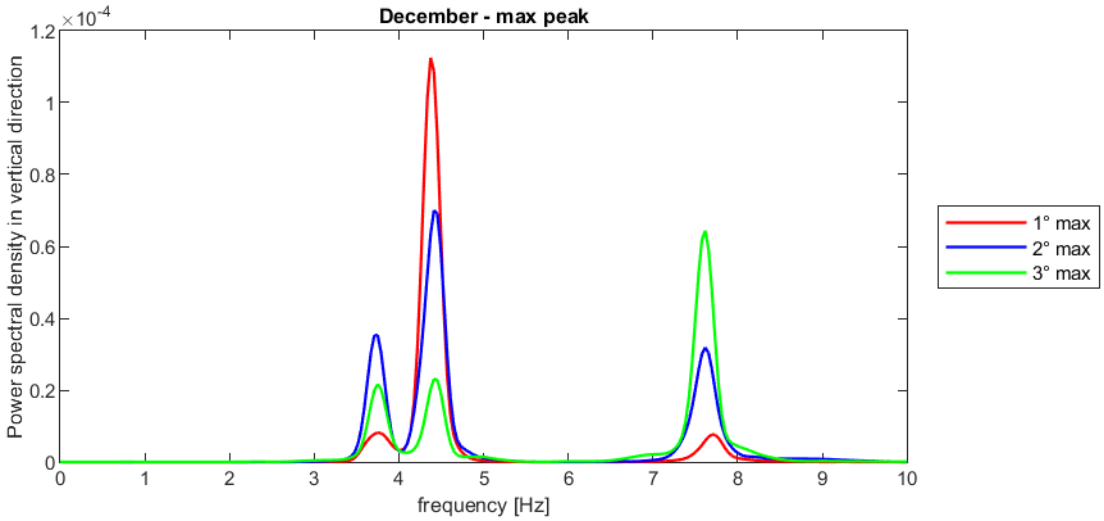


Figure 14-136: Results obtained from the 3 accelerograms with highest peak if PSD

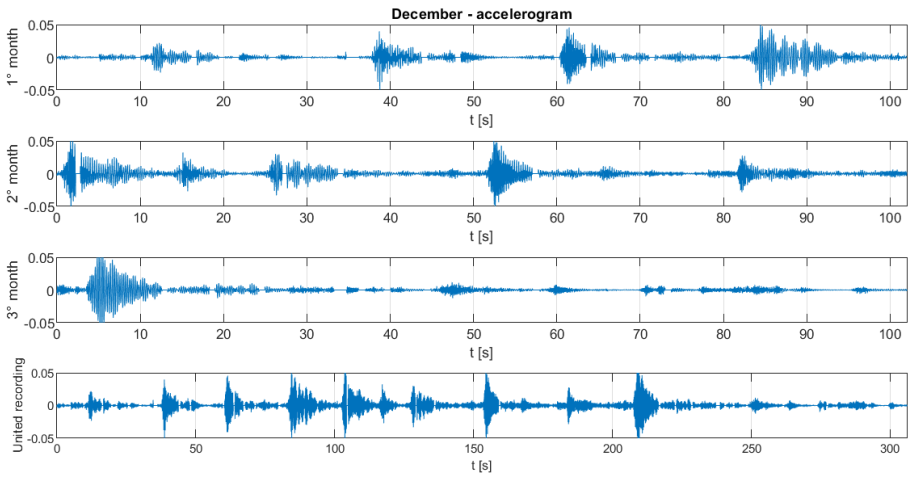


Figure 14-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

14.12.2 Longitudinal direction (y)

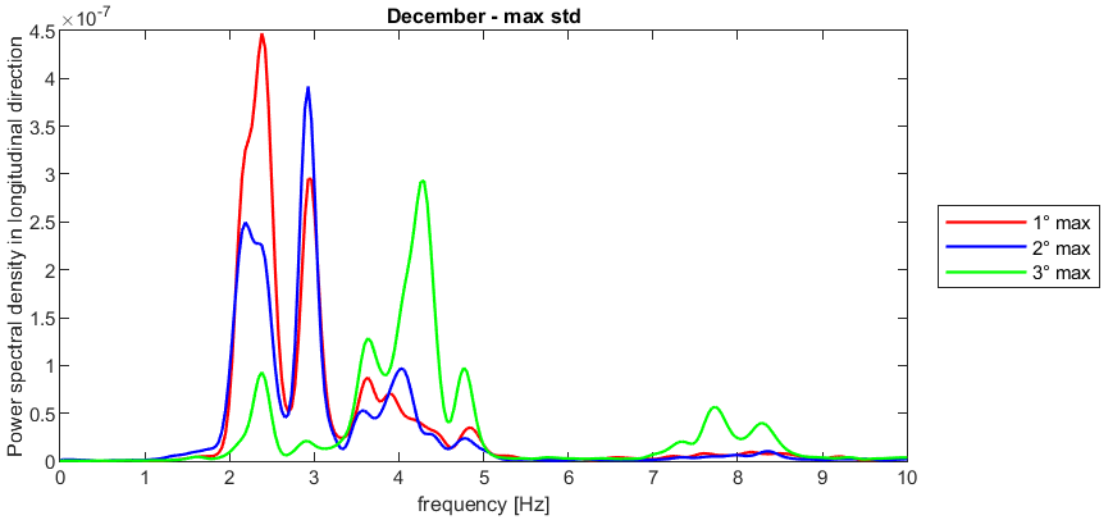


Figure 14-138: Results obtained from the 3 accelerograms with maximum SD in time domain

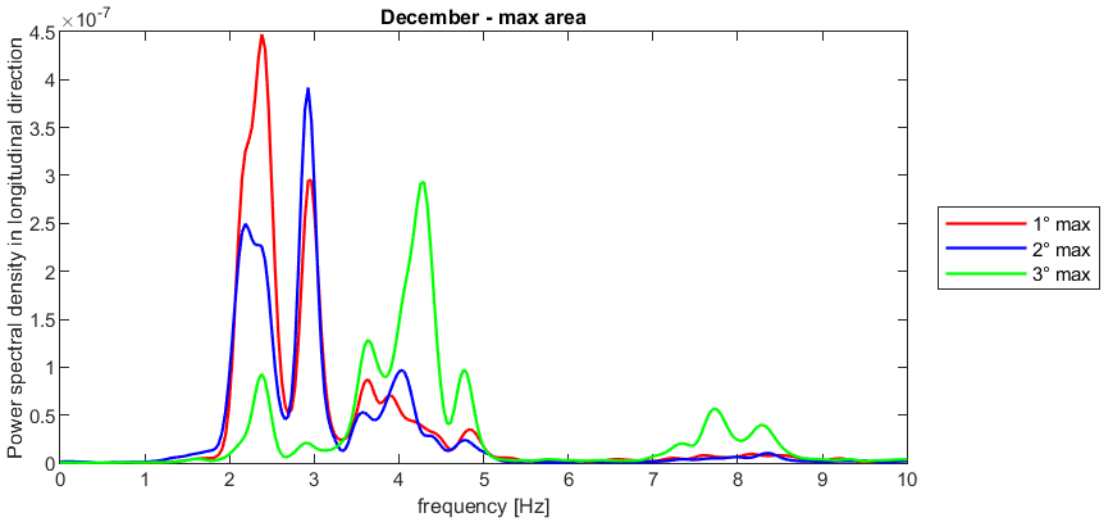


Figure 14-139: Results obtained from the 3 accelerograms with maximum area of PSD

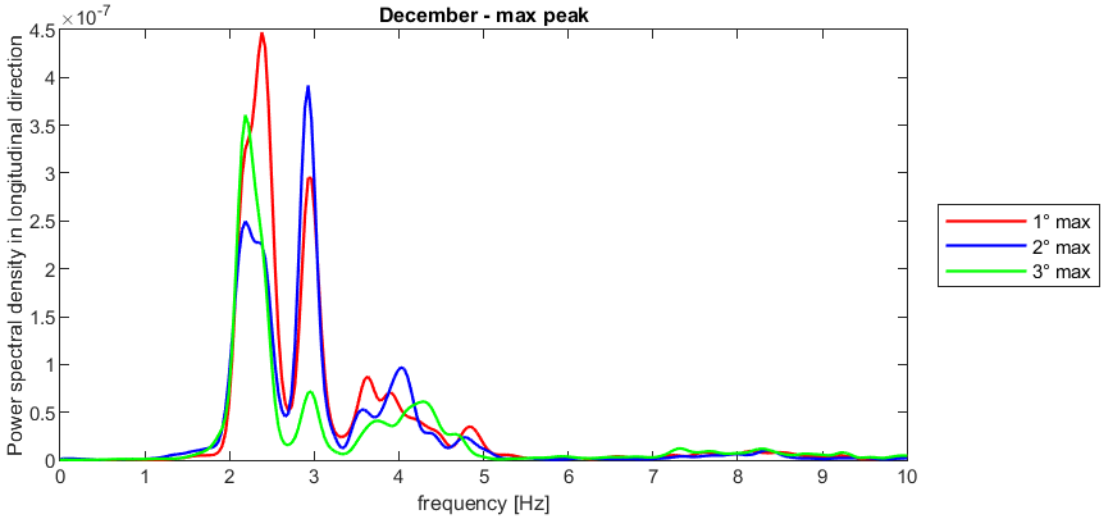


Figure 14-140: Results obtained from the 3 accelerograms with highest peak if PSD

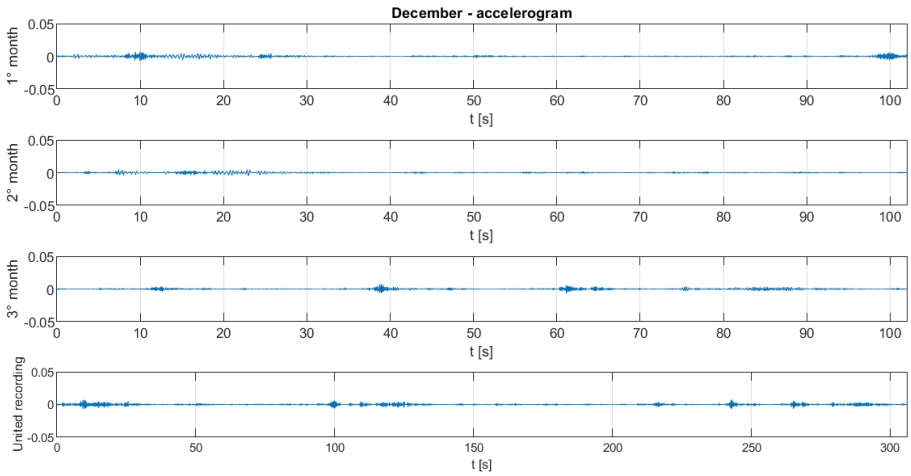


Figure 14-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

14.12.3 Transverse direction (z)

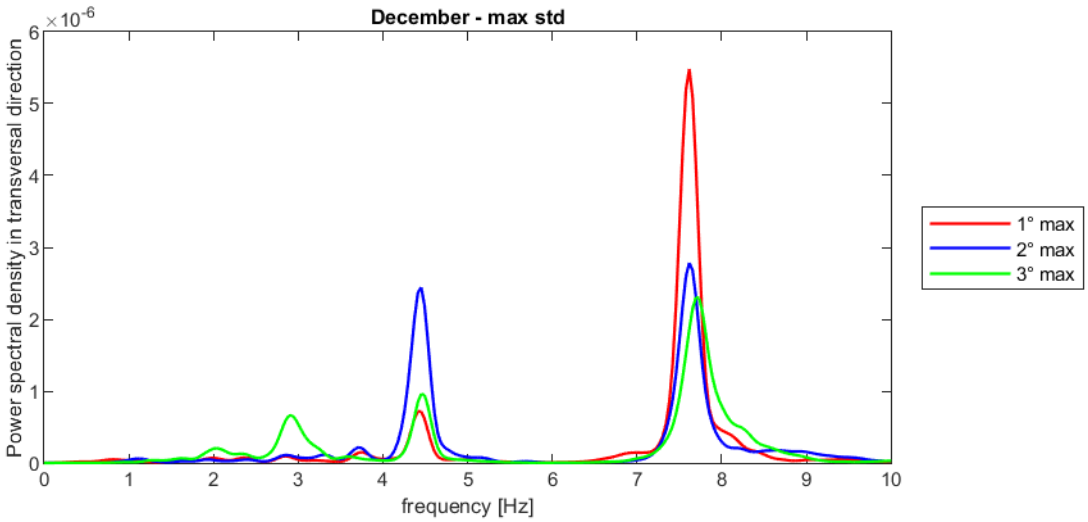


Figure 14-142: Results obtained from the 3 accelerograms with maximum SD in time domain

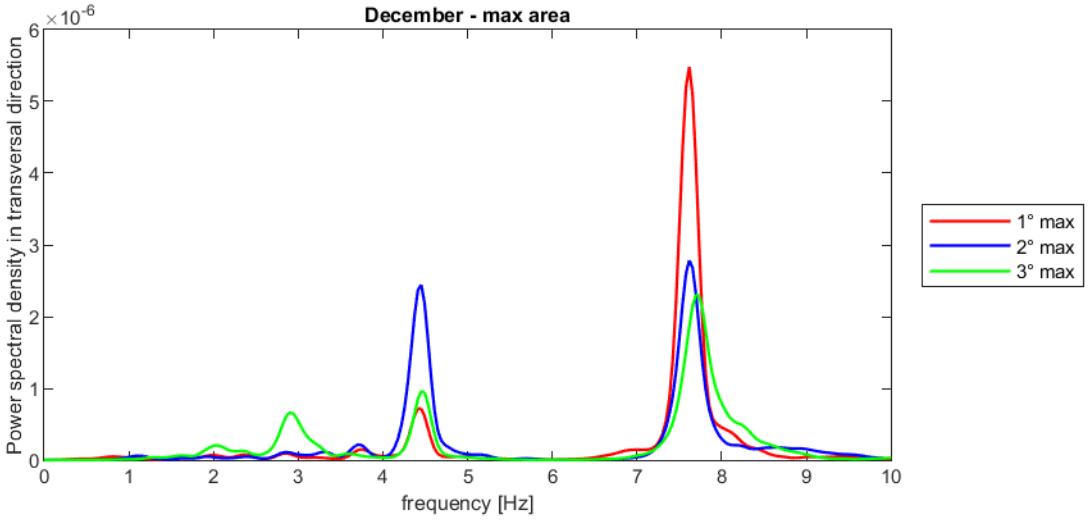


Figure 14-143: Results obtained from the 3 accelerograms with maximum area of PSD

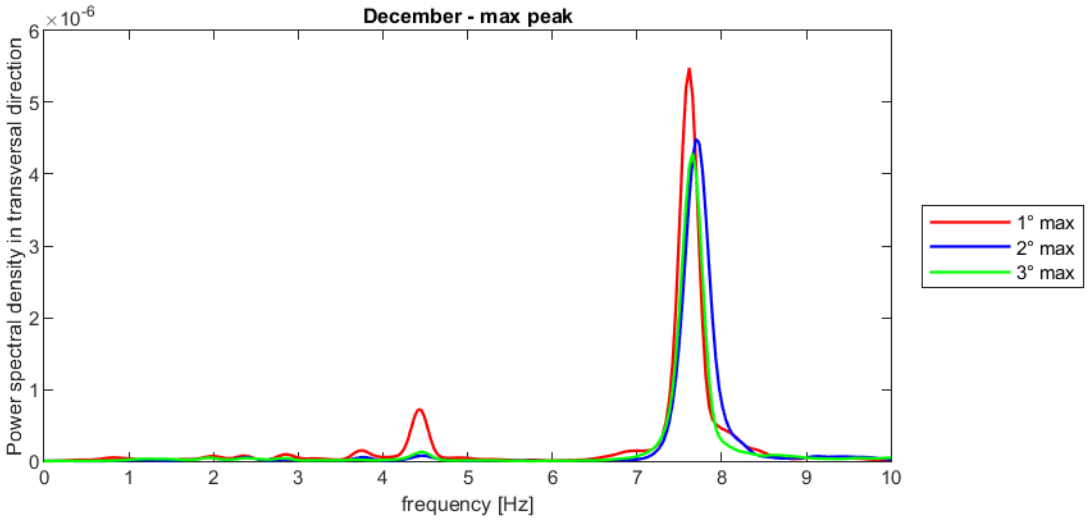


Figure 14-144: Results obtained from the 3 accelerograms with highest peak if PSD

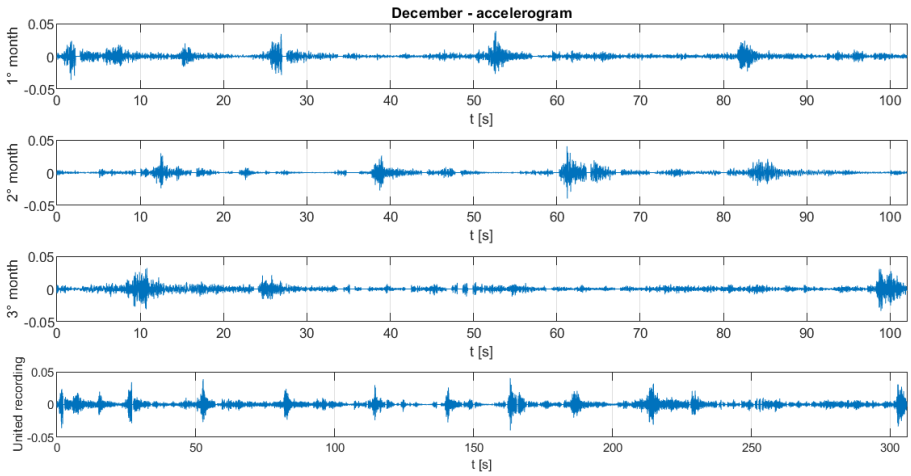


Figure 14-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

14.13 Analysis of the complete 2023 year

All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

Table 14-37: Main identified frequencies for sensor 2B5E7 – bridge 223 – Sp6 – L/2

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
Numerosity			14	105	104	108	73	96	64	25	41	30	94
MEAN			**2.89**	**3.71**	**4.37**	**2.30**	**2.90**	**3.67**	**4.42**	**2.00**	**2.80**	**3.72**	**4.37**
SD			0.13	0.04	0.05	0.08	0.06	0.16	0.21	0.12	0.06	0.03	0.05
C.o.V.			4.5%	1.0%	1.1%	3.6%	2.0%	4.5%	4.7%	6.1%	2.3%	0.9%	1.2%
Rating			**10%**	**100%**	**98%**	**84%**	**64%**	**70%**	**46%**	**16%**	**35%**	**29%**	**88%**
1	gen-23			3.78	4.45	2.11	2.93	3.91	4.65				4.41
2	gen-23			3.75		2.23	3.01	3.87	4.69				4.45
3	gen-23			3.75	4.45	2.15	2.97	3.87					4.49
1	gen-23			3.71	4.45	2.15		3.9					4.45
2	gen-23			3.75	4.45	2.38	3.04	3.71	4.72			3.75	
3	gen-23			3.79		2.37	2.93	3.91				3.75	
1	gen-23			3.79	4.45	2.11	2.97	3.91	4.69				4.45
2	gen-23			3.75	4.41	2.23	2.97	3.87	4.65				4.45
3	gen-23			3.75	4.45	2.15		3.91					
1	feb-23			3.75	4.38	2.34		3.87	4.34				4.38
2	feb-23			3.75	4.38	2.34		3.98	4.38	2.22	2.89	3.78	4.38
3	feb-23			3.75	4.38	2.11	2.93	3.75				3.74	4.38
1	feb-23			3.75	4.41	2.1	2.92	3.75					
2	feb-23			3.75	4.41	2.34		3.87	4.3			3.75	
3	feb-23			3.75	4.41	2.38		3.98	4.38			3.75	
1	feb-23			3.75	4.41	2.34		3.83	4.3				4.41
2	feb-23			3.75	4.41	2.38		3.98	4.38				4.41
3	feb-23			3.75	4.41	2.11	2.89	3.75		2.23	2.93	3.79	4.38
1	mar-23		2.73	3.71	4.34	2.34	2.89	3.71	4.21	2.14	2.81		4.3
2	mar-23			3.71	4.34	2.34	3.01	3.55	4.3		2.77		4.38
3	mar-23			3.71	4.3	2.11	2.89	3.52					4.34
1	mar-23		2.73	3.71	4.34	2.34	2.89	3.71	4.22	2.14	2.81		4.3
2	mar-23			3.71	4.34	2.34	3.01	3.55	4.3				4.38
3	mar-23			3.71	4.34	2.11	2.89	3.52					4.34
1	mar-23		2.81	3.67	4.34	2.34	2.89	3.75	4.22	2.11	2.81		4.3
2	mar-23			3.75	4.41	2.34	3.01	3.55	4.3				4.38
3	mar-23		2.77	3.71	4.34	2.3	2.93	3.59			2.81	3.75	4.38
1	apr-23			3.71	4.38	2.34		3.63	4.26		2.93		4.38
2	apr-23			3.67	4.3	2.34	2.93	3.59	4.34				
3	apr-23			3.71	4.34	2.42	3.01	3.83			2.85		4.38
1	apr-23			3.71	4.38	2.34		3.63	4.26		2.92		4.38
2	apr-23			3.71	4.34	2.3	2.93	3.59	4.34				
3	apr-23			3.67	4.34	2.34		3.59					4.34

1	apr-23		3.71	4.38	2.34		3.63	4.26				4.34
2	apr-23		3.71	4.26	2.3	2.93	3.59	4.34				
3	apr-23		3.71	4.34	2.42	2.96	3.83					4.34
1	mag-23	2.93	3.71	4.34	2.23	2.81	3.52	4.38		2.73		4.34
2	mag-23	2.81	3.67	4.34	2.3	2.81	3.59	4.19	1.91	2.77		4.34
3	mag-23		3.6	4.3	2.34	2.85	3.52			2.77		4.34
1	mag-23	2.93	3.71	4.34	2.23	2.81	3.51	4.34	1.95	2.73		4.34
2	mag-23	2.77	3.67	4.34	2.3	2.81	3.59	4.19	1.95	2.77		4.34
3	mag-23		3.67	4.3	2.34	2.85	3.52			2.73		4.3
1	mag-23	2.81	3.67	4.34	2.23	2.81	3.52	4.38	1.91	2.73		4.34
2	mag-23	2.93	3.67	4.34	2.3	2.85	3.59	4.19	1.91	2.77		4.34
3	mag-23		3.71	4.38	2.34	2.85	3.55					
1	giu-23		3.67	4.34	2.34					2.73		4.3
2	giu-23		3.71	4.3	2.34	2.85	3.51			2.73		4.3
3	giu-23		3.71	4.38	2.38		3.71					4.3
1	giu-23		3.67	4.34	2.34					2.73	3.67	4.3
2	giu-23		3.71	4.34	2.34	2.85	3.51					4.3
3	giu-23		3.71	4.38	2.38	2.97	3.71			2.73	3.67	4.38
1	giu-23		3.63	4.3	2.34		3.4					4.3
2	giu-23		3.71	4.3	2.38	2.85	3.55			2.73	3.71	4.3
3	giu-23		3.71	4.38	2.27		3.79			2.85		4.38
1	lug-23		3.67	4.3	2.34			4.22	1.91	2.77		4.3
2	lug-23		3.71	4.26	2.34	2.85	3.52	4.18		2.77		4.25
3	lug-23		3.67	4.34	2.38			4.84	1.95		3.71	4.34
1	lug-23		3.71	4.3	2.34		3.52	4.22		2.77		4.3
2	lug-23		3.71	4.25	2.34	2.85		4.19	1.89	2.81		4.28
3	lug-23		3.71	4.34	2.38			4.84	1.95		3.67	4.3
1	lug-23		3.71	4.3	2.34			4.22	1.95		3.67	4.34
2	lug-23		3.71	4.26	2.34	2.81	3.48	4.34	1.88			4.3
3	lug-23		3.71	4.34	2.38			4.84	1.95	2.77		4.3
1	ago-23		3.67	4.34	2.34	2.85	3.55	4.49				4.3
2	ago-23		3.75		2.34	2.89	3.59			2.77		4.34
3	ago-23		3.71	4.34	2.34		3.55		2.24			4.3
1	ago-23		3.67	4.34	2.34	2.85	3.55	4.49				4.3
2	ago-23		3.75	4.34	2.34	2.85	3.59					
3	ago-23		3.71	4.34	2.34		3.55		1.88	2.77		4.38
1	ago-23		3.71	4.34	2.34	2.85	3.55	4.49	2.24		3.67	4.3
2	ago-23		3.67	4.34	2.34		3.55					
3	ago-23				2.34		3.55	4.22				4.3
1	set-23		3.63	4.34	2.34	2.89	3.48	4.22			3.71	4.34
2	set-23		3.63	4.38	2.34	2.81	3.48	4.22			3.71	4.3
3	set-23	3.09		4.38	2.34	2.93	3.59				3.71	4.41
1	set-23	3.06	3.64	4.34	2.34	2.89	3.48	4.22			3.71	
2	set-23		3.64	4.38	2.34	2.81	3.48				3.71	4.3
3	set-23	3.09		4.38	2.34	2.93	3.59				3.71	4.41
1	set-23		3.67	4.38	2.34	2.89	3.48	4.22			3.67	4.38
2	set-23	3.03	3.63	4.33	2.38	2.93	3.59					4.38
3	set-23		3.67	4.34	2.38	2.81	3.51	4.26			3.67	4.34
1	ott-23		3.75	4.41	2.34	2.89	3.55			2.85		4.41

2	ott-23	3.75	4.34	2.15		3.55					4.38
3	ott-23	3.75	4.41	2.3	2.85	3.55	4.34				4.34
1	ott-23	3.75	4.41	2.34	2.89	3.55			2.85		4.41
2	ott-23	3.75	4.34	2.15		3.55	4.43		2.77	3.71	4.34
3	ott-23	3.75	4.41	2.3	2.85	3.59	4.39				4.38
1	ott-23	3.75	4.41	2.34	2.93	3.83	4.49				4.41
2	ott-23	3.75	4.34	2.15		3.83			2.85		4.41
3	ott-23	3.83	4.41	2.34	2.89	3.55					4.38
1	nov-23	3.67	4.41	2.34	2.93	3.63	4.39	1.91	2.89	3.71	4.41
2	nov-23	3.71	4.41	2.19	2.93			1.95			4.41
3	nov-23	3.71	4.41	2.38		3.98	4.73				4.41
1	nov-23	3.71	4.41	2.19	2.93		4.39	1.91	2.89	3.71	4.41
2	nov-23	3.71	4.41	2.34	2.93	3.63	4.39			3.75	4.41
3	nov-23	3.71	4.41	2.38		4.01	4.73				4.45
1	nov-23	3.71	4.41	2.18	2.93			1.95	2.81		4.38
2	nov-23	3.75	4.41	2.38		4.01	4.73				4.41
3	nov-23	3.71	4.41	2.34	2.93	3.63	4.38				4.41
1	dic-23	3.71	4.41	2.38	2.93	3.63	4.84				4.45
2	dic-23	3.75	4.38	2.19	2.93	4.01				3.71	4.45
3	dic-23	3.75	4.41	2.38		3.63	4.77	2.03	2.89		4.45
1	dic-23	3.71	4.41	2.38	2.93	3.63	4.84				4.45
2	dic-23	3.75	4.38	2.19	2.93	4.01				3.71	4.45
3	dic-23	3.75	4.53	2.38		3.63	4.39		2.93		4.45
1	dic-23	3.75	4.38	2.38	2.93	3.63	4.84		2.81	3.75	4.41
2	dic-23	3.71	4.41	2.19	2.93	4.02					
3	dic-23	3.71	4.45	2.19	2.93		4.39				4.45

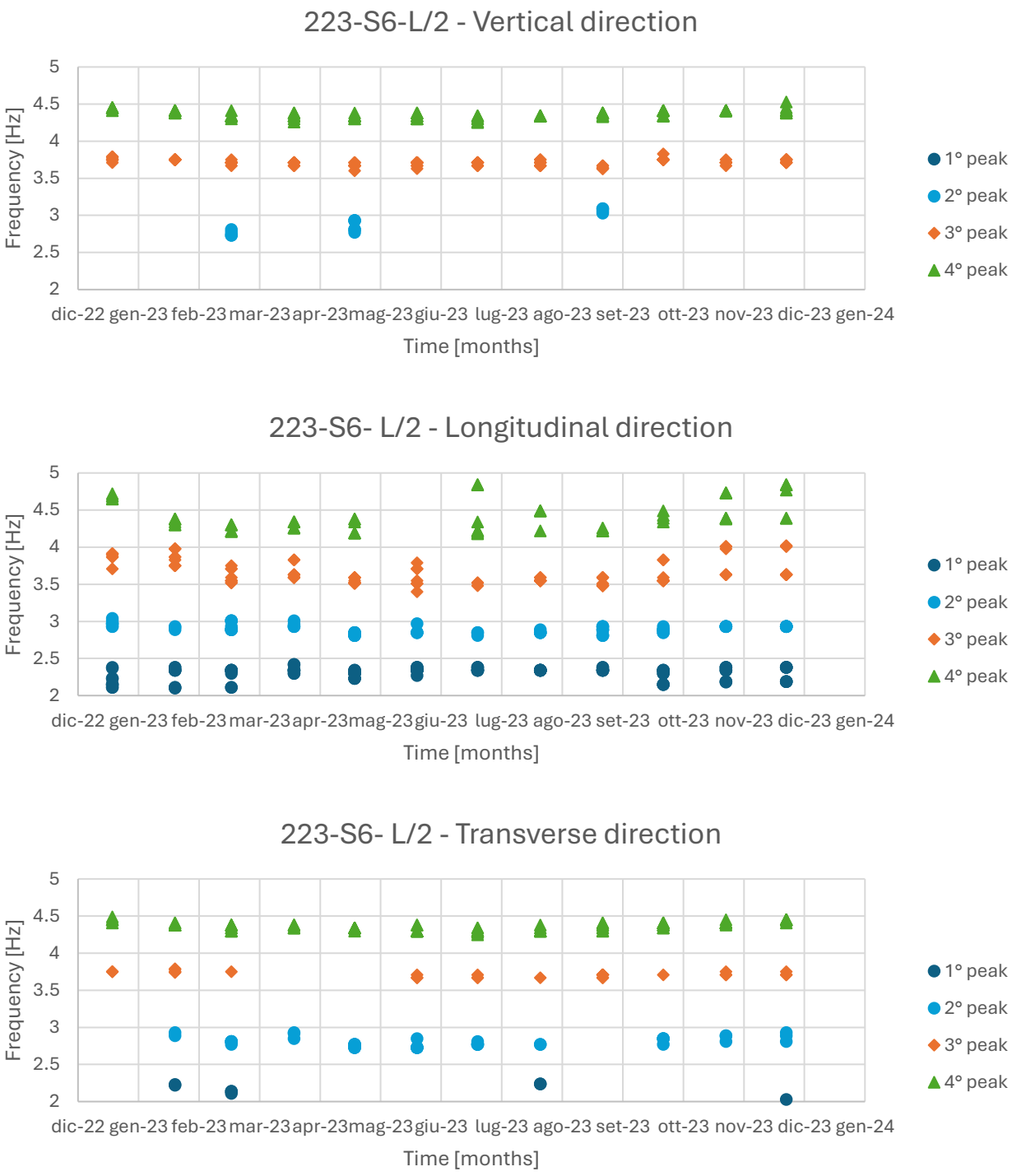


Figure 14-146: Main identified frequencies for sensor 2B5E7 – bridge 223 – Sp6 – L/2

15. Annex 15 – Bridge 223 – Span 6 – L/4 - Sensor 2BCF9

The Bridge 223 counts 2 monitored decks: span 2 and span 6 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 2 are:

- 2BE0F – situated in the midspan;
- 2BA63 – situated at a distance of L/4;
- 31205 – situated at a distance of L/8;
- 319BC – situated nearby the vest pilar;
- 319E3 – situated nearby the east pilar.

The sensors present on deck number 6 are:

- 2B5E7 – situated in the midspan;
- 2BCF9 – situated at a distance of L/4 of the deck;
- 2BCAD – situated at a distance of L/8 of the deck;

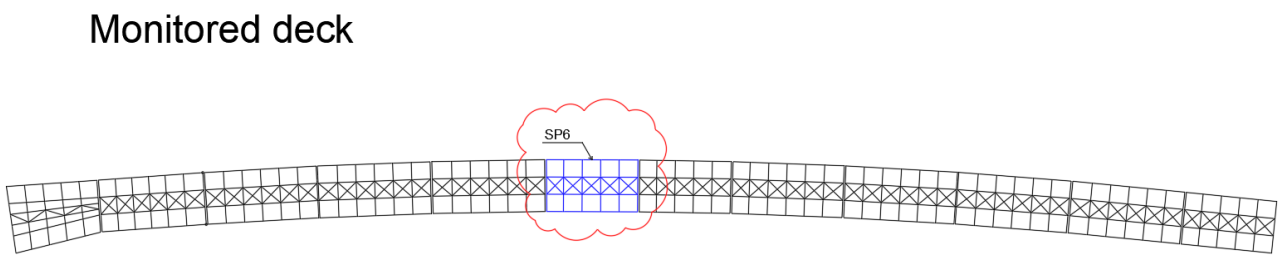


Figure 15-1 Monitored decks of 223 bridge

The accelerograms of the 2BCF9 sensor have been analyzed and the results are represented in the following paragraphs.

15.1 January

The results obtained for the January dataset are shown in the following tables.

Table 15-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-01-30_19-00-21	2.92E-03
	2°	2BCF9_2023-01-30_07-00-20	2.88E-03
	3°	2BCF9_2023-01-26_13-00-20	2.44E-03
Longitudinal direction (y)	1°	2BCF9_2023-01-30_07-00-20	3.93E-04
	2°	2BCF9_2023-01-26_13-00-20	3.68E-04
	3°	2BCF9_2023-01-30_19-00-21	3.37E-04
Transverse direction (z)	1°	2BCF9_2023-01-30_19-00-21	8.63E-04
	2°	2BCF9_2023-01-30_07-00-20	8.15E-04
	3°	2BCF9_2023-01-25_07-00-21	6.70E-04

Table 15-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-01-30_07-00-20	1.77E-05	2BCF9_2023-01-30_19-00-21	1.76E-06
2	2BCF9_2023-01-30_19-00-21	1.70E-05	2BCF9_2023-01-30_07-00-20	1.74E-06
3	2BCF9_2023-01-27_01-00-20	1.19E-05	2BCF9_2023-01-26_13-00-20	1.19E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-01-30_07-00-20	2.16E-07	2BCF9_2023-01-30_07-00-20	3.21E-08
2	2BCF9_2023-01-30_19-00-21	1.60E-07	2BCF9_2023-01-26_13-00-20	2.69E-08
3	2BCF9_2023-01-26_13-00-20	1.04E-07	2BCF9_2023-01-30_19-00-21	2.38E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-01-30_19-00-21	1.42E-06	2BCF9_2023-01-30_19-00-21	1.54E-07
2	2BCF9_2023-01-30_07-00-20	1.42E-06	2BCF9_2023-01-30_07-00-20	1.39E-07
3	2BCF9_2023-01-25_07-00-21	8.31E-07	2BCF9_2023-01-26_13-00-20	8.74E-08

Table 15-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	B	B	B	A	A	A
2	B	A	B	C	A	C	B	B	B
3	C	-	C	A	C	A	D	D	-

15.1.1 Vertical direction (x)

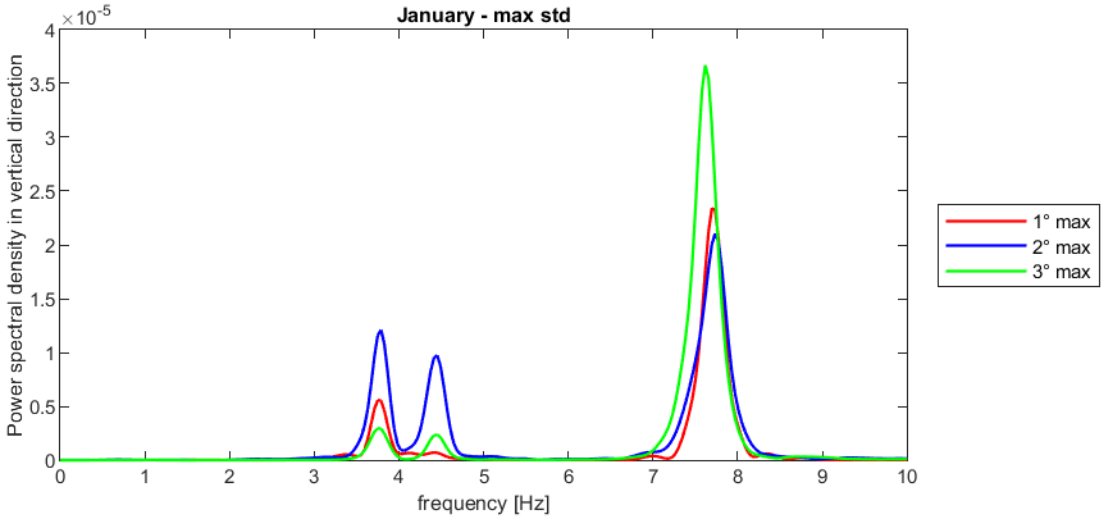


Figure 15-2: Results obtained from the 3 accelerograms with maximum SD in time domain

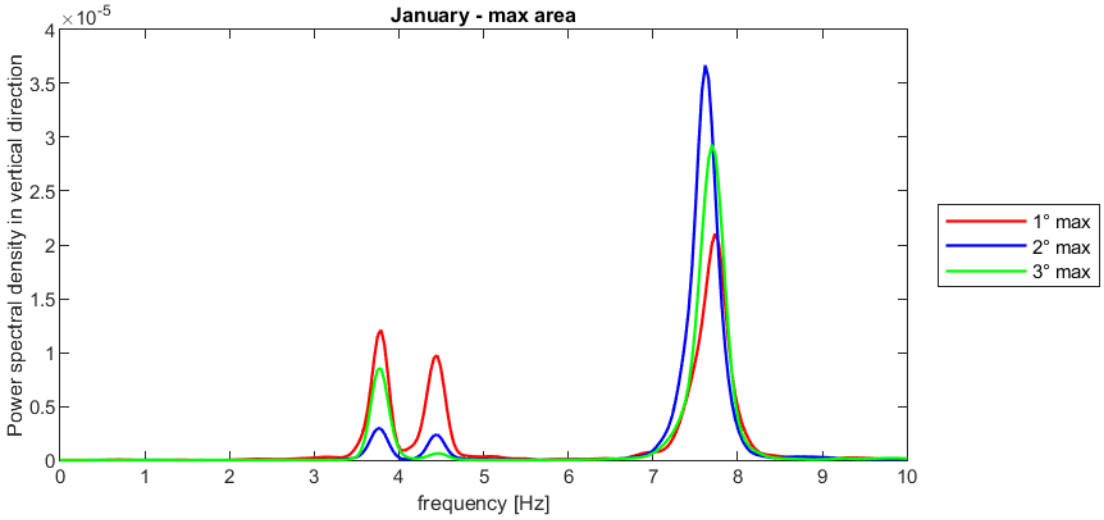


Figure 15-3: Results obtained from the 3 accelerograms with maximum area of PSD

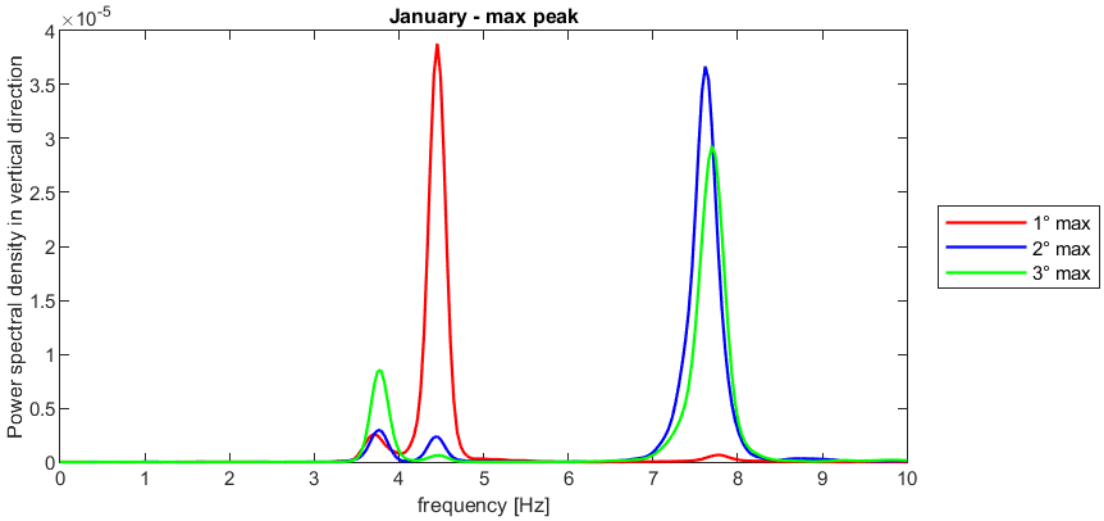


Figure 15-4: Results obtained from the 3 accelerograms with highest peak if PSD

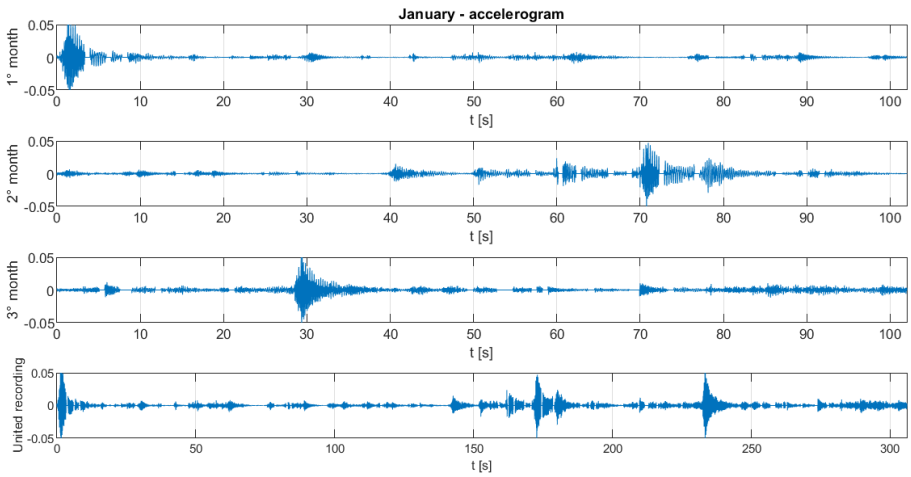


Figure 15-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.1.2 Longitudinal direction (y)

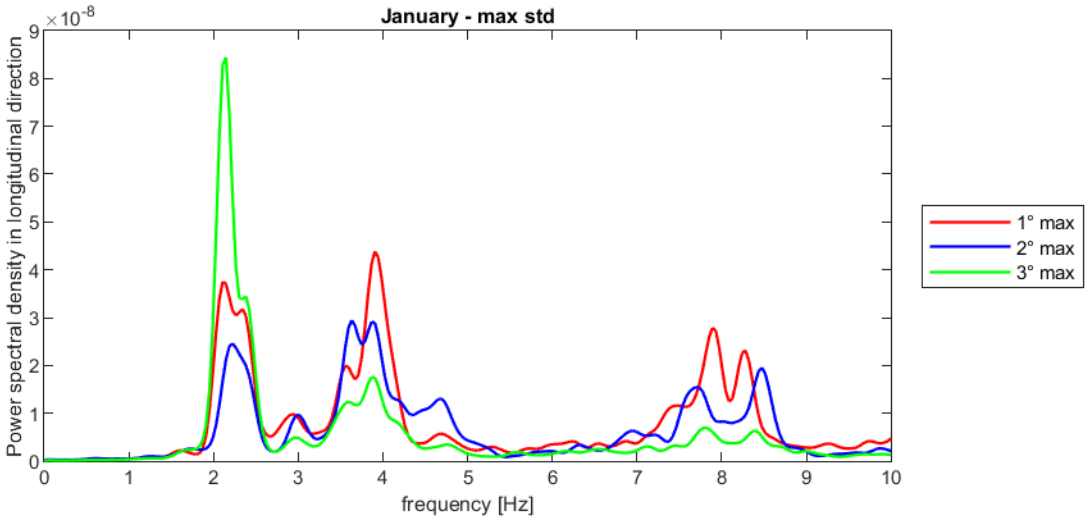


Figure 15-6: Results obtained from the 3 accelerograms with maximum SD in time domain

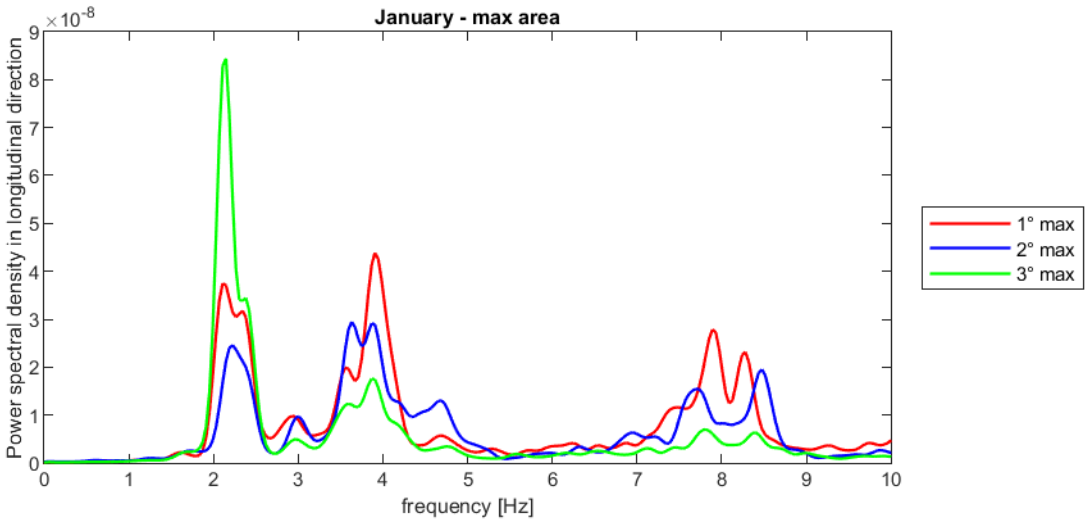


Figure 15-7: Results obtained from the 3 accelerograms with maximum area of PSD

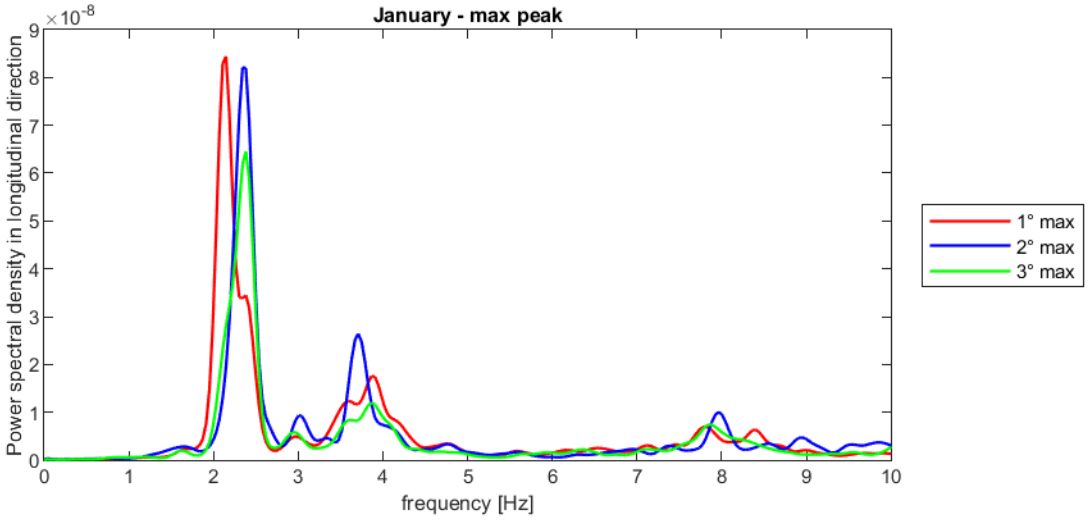


Figure 15-8: Results obtained from the 3 accelerograms with highest peak in PSD

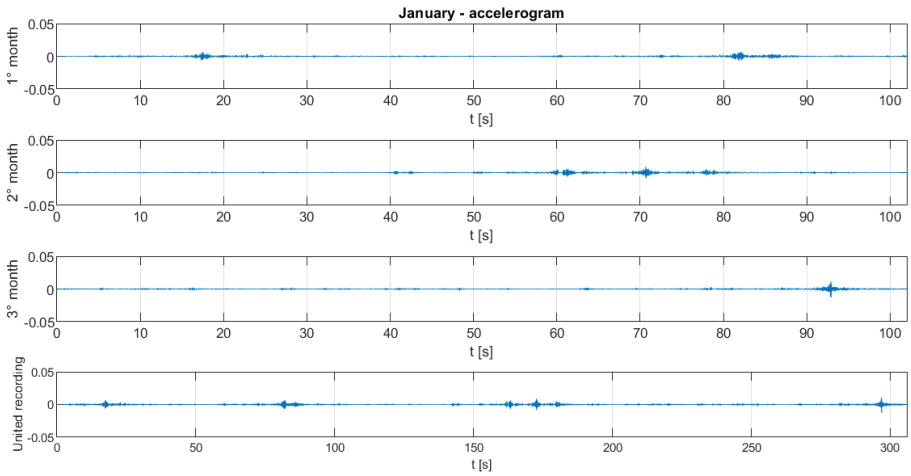


Figure 15-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

15.1.3 Transverse direction (z)

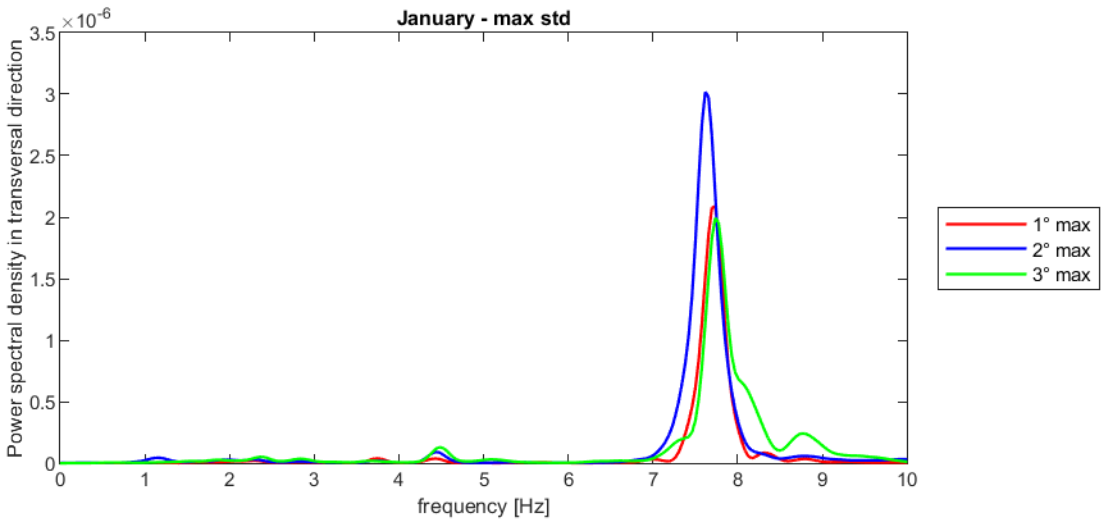


Figure 15-10: Results obtained from the 3 accelerograms with maximum SD in time domain

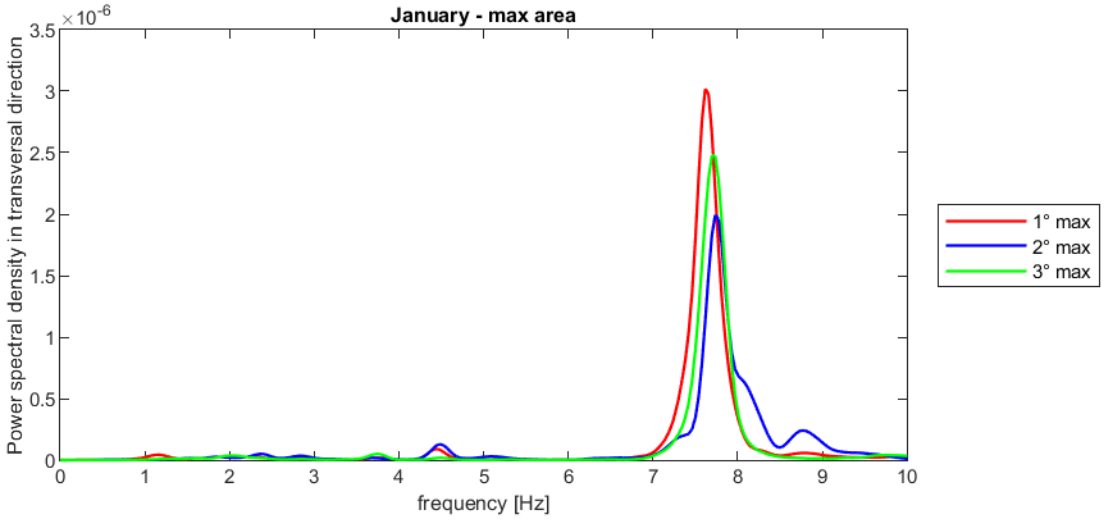


Figure 15-11: Results obtained from the 3 accelerograms with maximum area of PSD

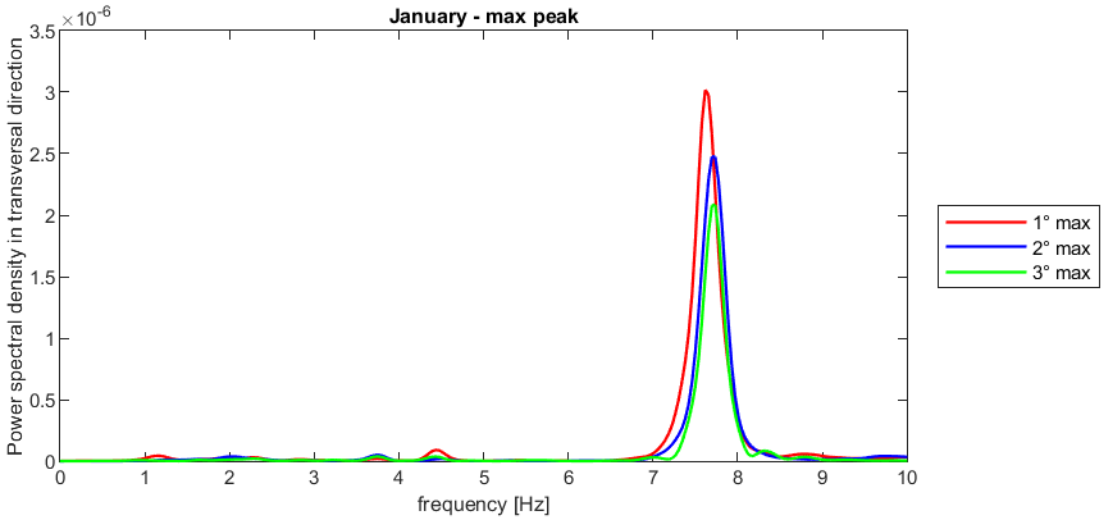


Figure 15-12: Results obtained from the 3 accelerograms with highest peak in PSD

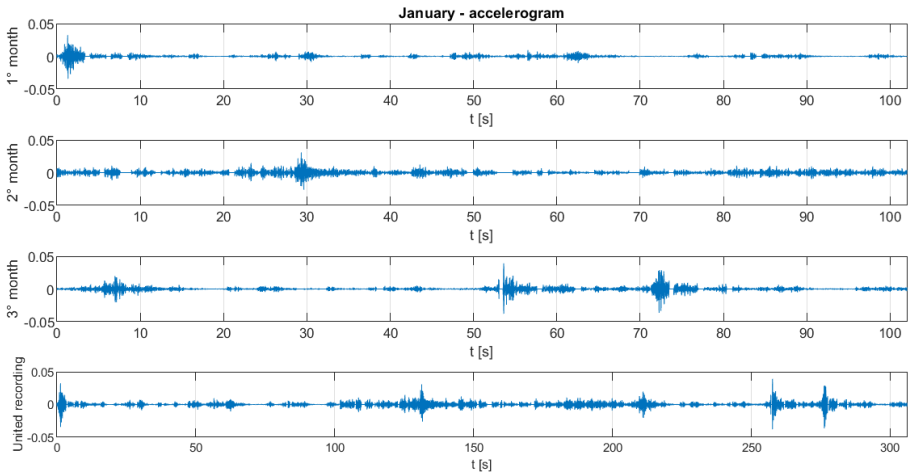


Figure 15-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

15.2 February

The results obtained for the February dataset are shown in the following tables.

Table 15-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-02-11_13-00-19	3.35E-03
	2°	2BCF9_2023-02-02_13-00-19	3.22E-03
	3°	2BCF9_2023-02-01_13-00-20	3.16E-03
Longitudinal direction (y)	1°	2BCF9_2023-02-06_13-00-20	5.25E-04
	2°	2BCF9_2023-02-23_13-00-20	5.01E-04
	3°	2BCF9_2023-02-01_13-00-20	4.99E-04
Transverse direction (z)	1°	2BCF9_2023-02-01_13-00-20	9.74E-04
	2°	2BCF9_2023-02-11_13-00-19	9.64E-04
	3°	2BCF9_2023-02-05_13-00-21	9.00E-04

Table 15-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-02-11_13-00-19	2.47E-05	2BCF9_2023-02-11_13-00-19	2.17E-06
2	2BCF9_2023-02-17_19-00-20	1.88E-05	2BCF9_2023-02-02_13-00-19	1.99E-06
3	2BCF9_2023-02-02_13-00-19	1.83E-05	2BCF9_2023-02-01_13-00-20	1.98E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-02-06_13-00-20	2.54E-07	2BCF9_2023-02-06_13-00-20	5.62E-08
2	2BCF9_2023-02-07_13-00-20	2.49E-07	2BCF9_2023-02-23_13-00-20	5.14E-08
3	2BCF9_2023-02-02_13-00-19	2.27E-07	2BCF9_2023-02-01_13-00-20	4.82E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-02-11_13-00-19	2.08E-06	2BCF9_2023-02-01_13-00-20	1.93E-07
2	2BCF9_2023-02-17_19-00-20	1.65E-06	2BCF9_2023-02-11_13-00-19	1.82E-07
3	2BCF9_2023-02-02_13-00-19	1.53E-06	2BCF9_2023-02-05_13-00-21	1.64E-07

Table 15-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	C	A	C
2	B	-	B	E	-	E	A	-	A
3	C	B	C	C	-	C	F	-	F

15.2.1 Vertical direction (x)

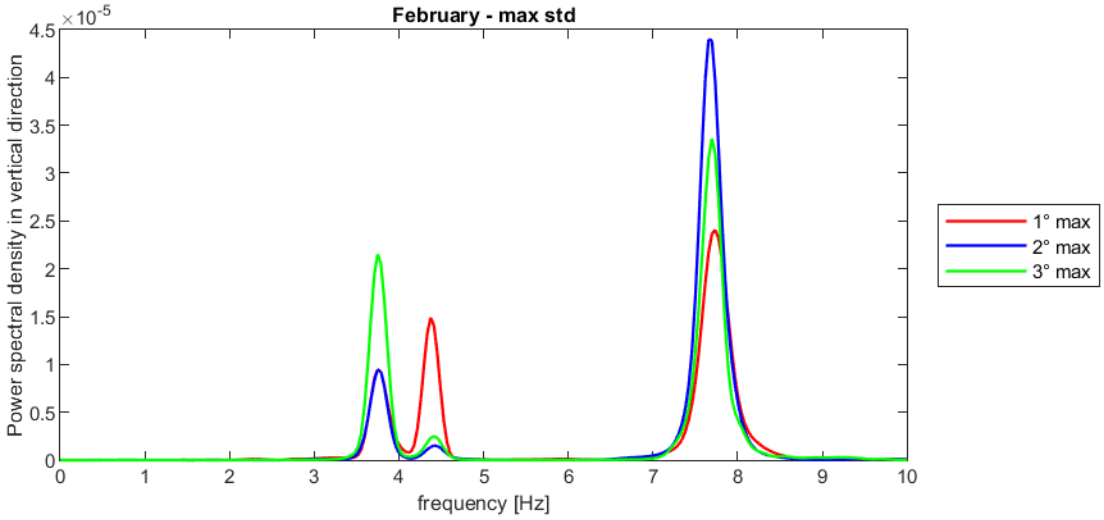


Figure 15-14: Results obtained from the 3 accelerograms with maximum SD in time domain

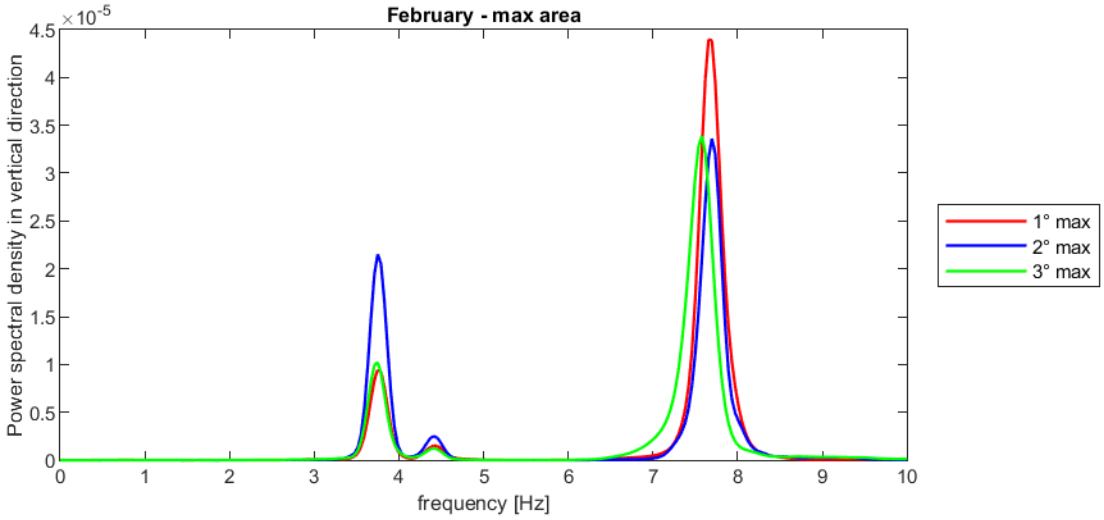


Figure 15-15: Results obtained from the 3 accelerograms with maximum area of PSD

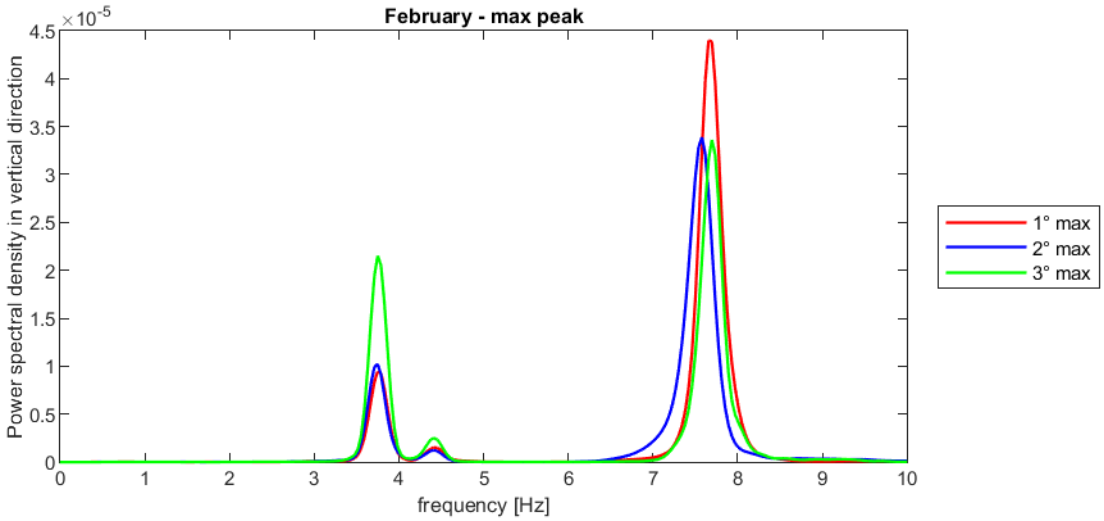


Figure 15-16: Results obtained from the 3 accelerograms with highest peak if PSD

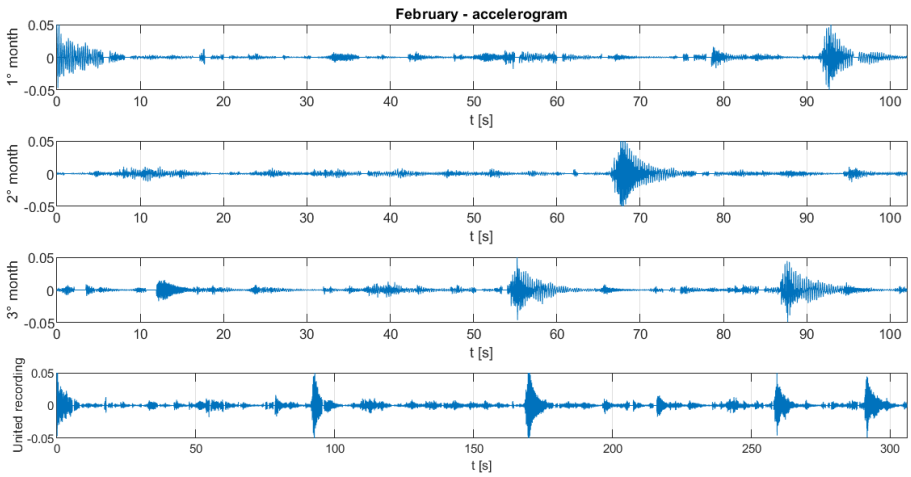


Figure 15-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.2.2 Longitudinal direction (y)

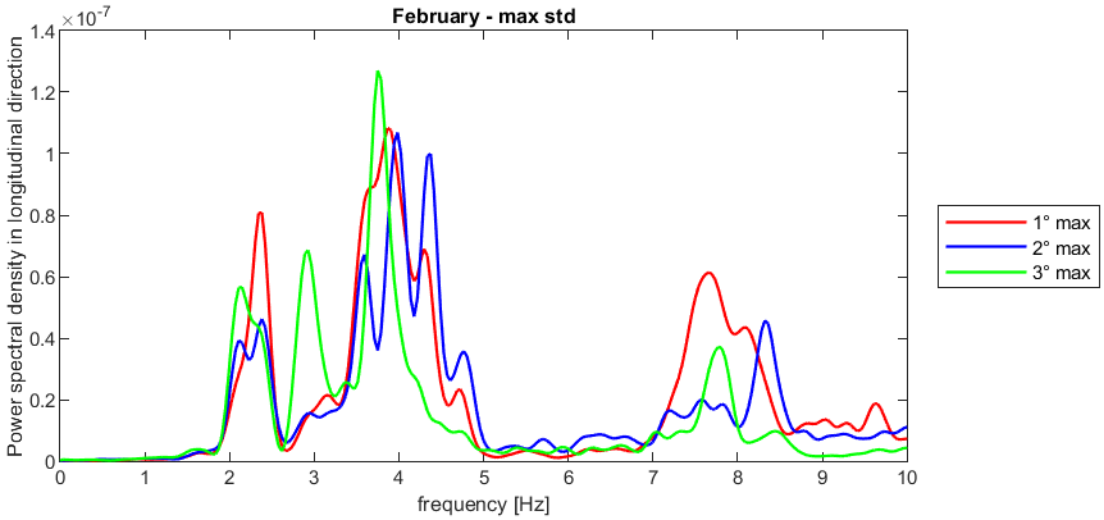


Figure 15-18: Results obtained from the 3 accelerograms with maximum SD in time domain

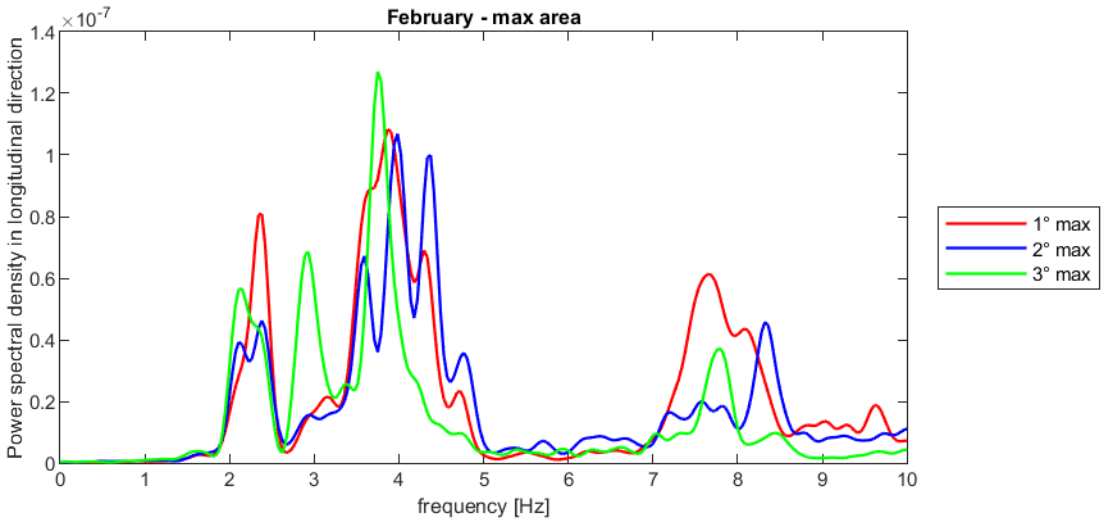


Figure 15-19: Results obtained from the 3 accelerograms with maximum area of PSD

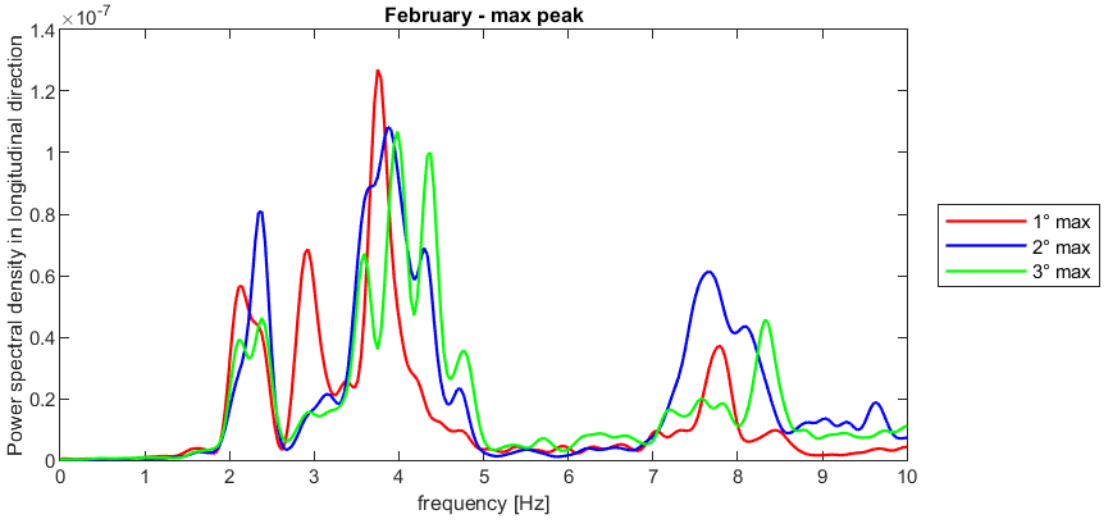


Figure 15-20: Results obtained from the 3 accelerograms with highest peak if PSD

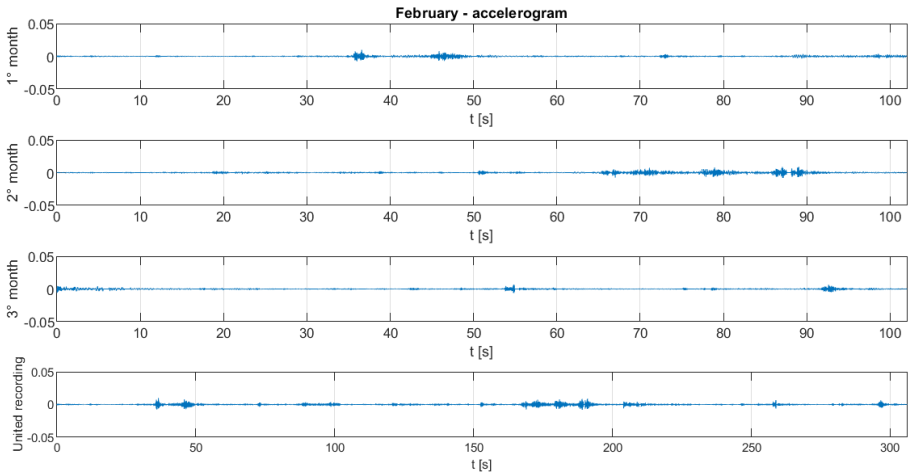


Figure 15-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

15.2.3 Transverse direction (z)

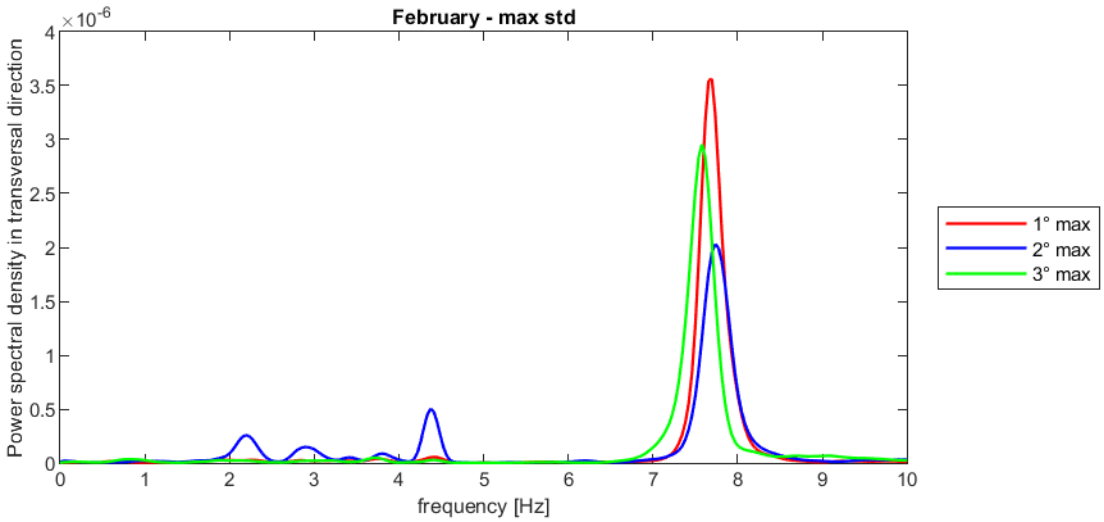


Figure 15-22: Results obtained from the 3 accelerograms with maximum SD in time domain

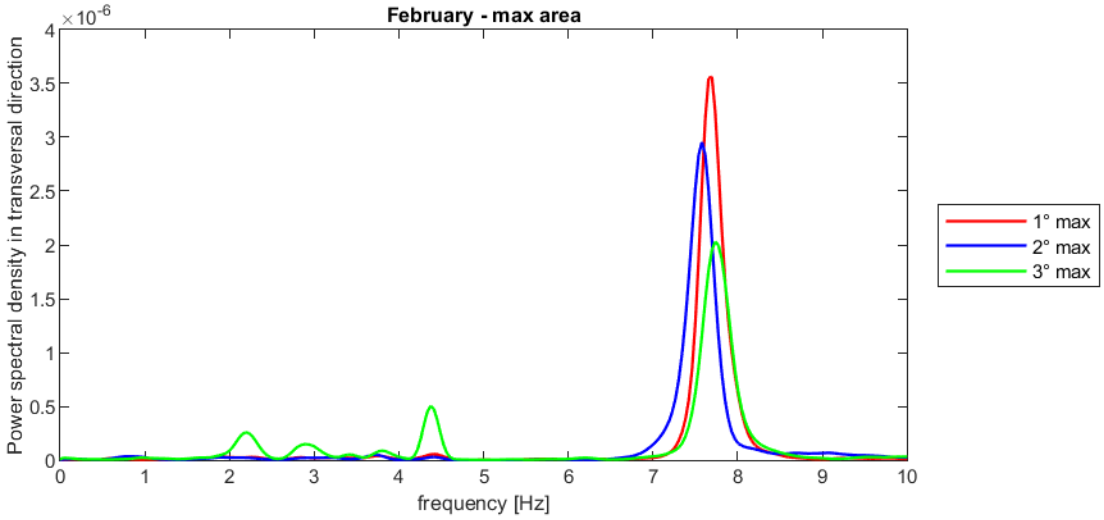


Figure 15-23: Results obtained from the 3 accelerograms with maximum area of PSD

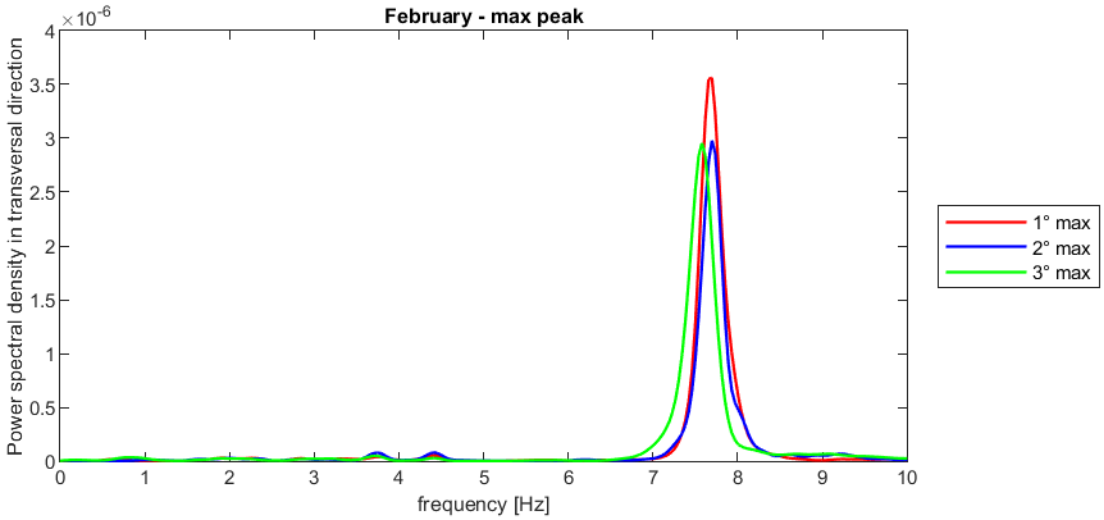


Figure 15-24: Results obtained from the 3 accelerograms with highest peak if PSD

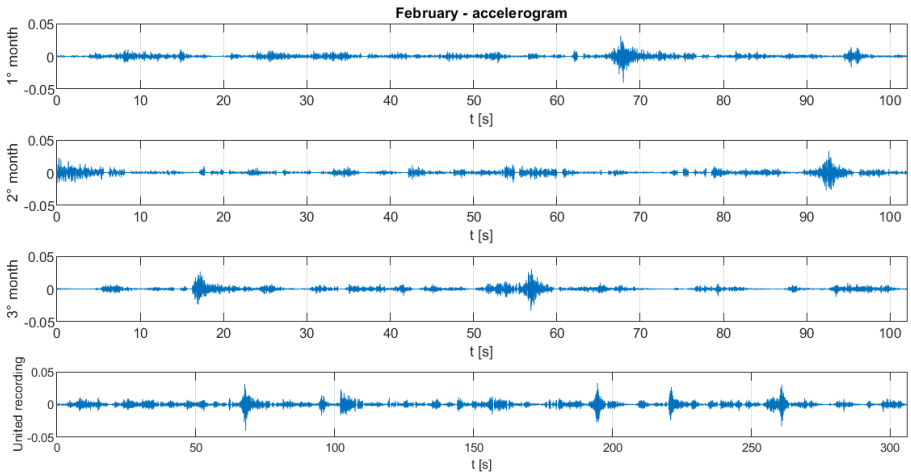


Figure 15-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

15.3 March

The results obtained for the March dataset are shown in the following tables.

Table 15-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-03-04_13-00-20	4.31E-03
	2°	2BCF9_2023-03-23_19-00-21	3.85E-03
	3°	2BCF9_2023-03-31_08-00-21	3.78E-03
Longitudinal direction (y)	1°	2BCF9_2023-03-04_13-00-20	8.82E-04
	2°	2BCF9_2023-03-16_13-00-20	7.93E-04
	3°	2BCF9_2023-03-08_13-00-21	6.52E-04
Transverse direction (z)	1°	2BCF9_2023-03-16_13-00-20	1.85E-03
	2°	2BCF9_2023-03-07_19-00-20	1.16E-03
	3°	2BCF9_2023-03-04_13-00-20	1.09E-03

Table 15-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-03-23_19-00-21	2.32E-05	2BCF9_2023-03-04_13-00-20	4.07E-06
2	2BCF9_2023-03-04_13-00-20	2.29E-05	2BCF9_2023-03-23_19-00-21	3.05E-06
3	2BCF9_2023-03-19_19-00-21	2.01E-05	2BCF9_2023-03-31_08-00-21	2.97E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-03-04_13-00-20	9.16E-07	2BCF9_2023-03-04_13-00-20	1.68E-07
2	2BCF9_2023-03-16_13-00-20	4.70E-07	2BCF9_2023-03-16_13-00-20	1.13E-07
3	2BCF9_2023-03-07_19-00-20	2.86E-07	2BCF9_2023-03-08_13-00-21	8.73E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-03-16_13-00-20	7.57E-06	2BCF9_2023-03-16_13-00-20	6.74E-07
2	2BCF9_2023-03-07_19-00-20	2.73E-06	2BCF9_2023-03-07_19-00-20	2.46E-07
3	2BCF9_2023-03-23_19-00-21	2.02E-06	2BCF9_2023-03-04_13-00-20	2.43E-07

Table 15-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	A	A	D	D	D
2	B	A	B	D	D	D	F	F	F
3	C	-	C	E	-	E	A	-	A

15.3.1 Vertical direction (x)

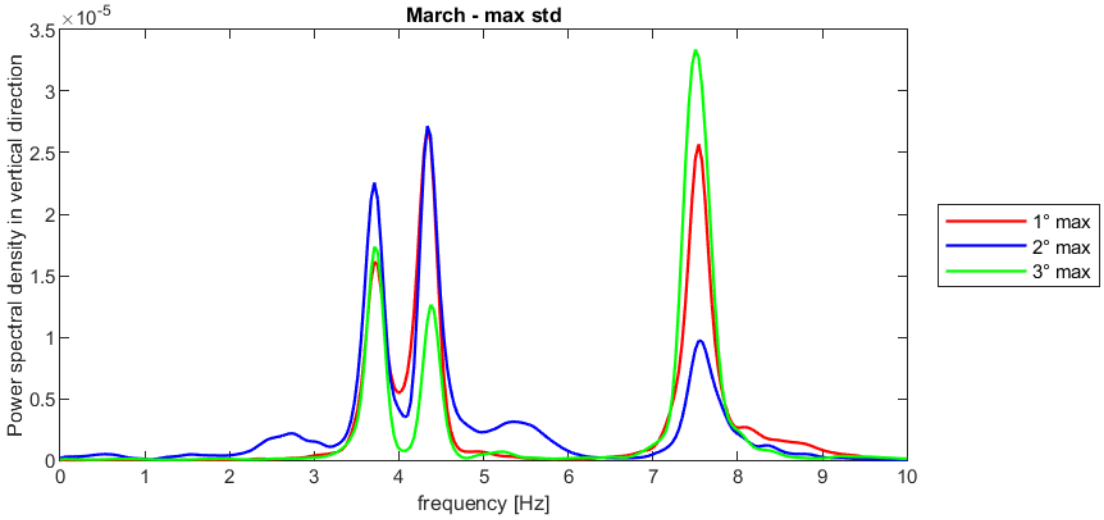


Figure 15-26: Results obtained from the 3 accelerograms with maximum SD in time domain

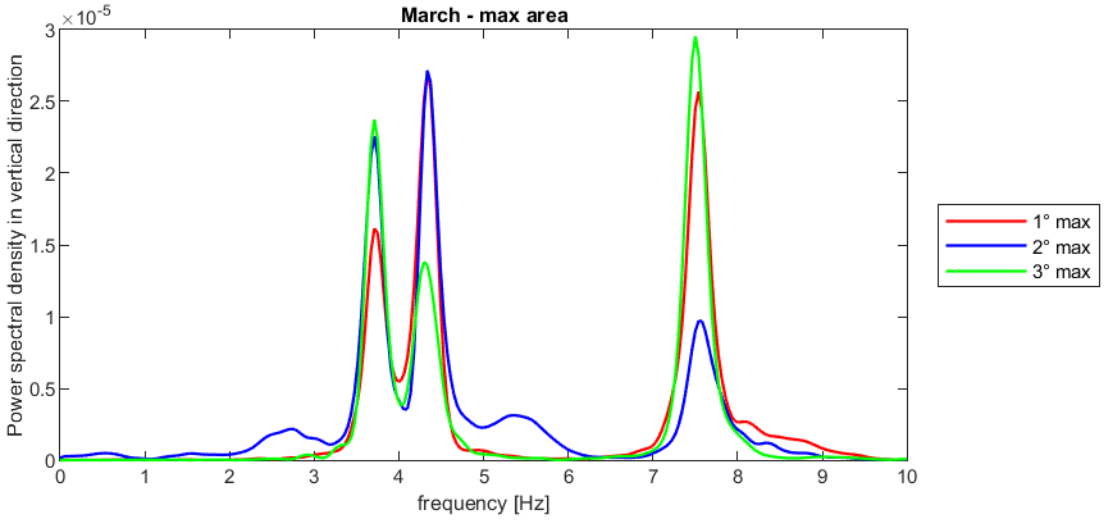


Figure 15-27: Results obtained from the 3 accelerograms with maximum area of PSD

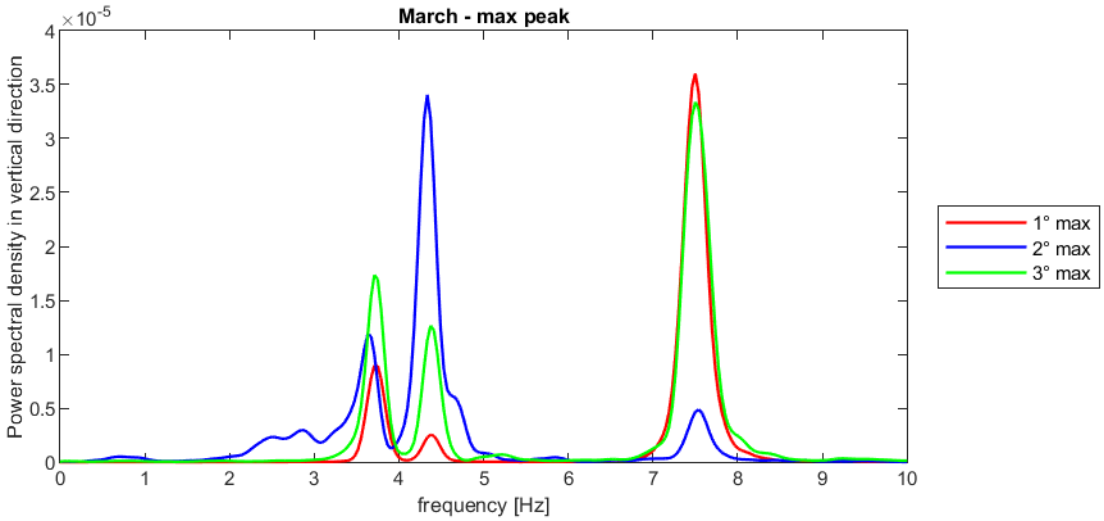


Figure 15-28: Results obtained from the 3 accelerograms with highest peak if PSD

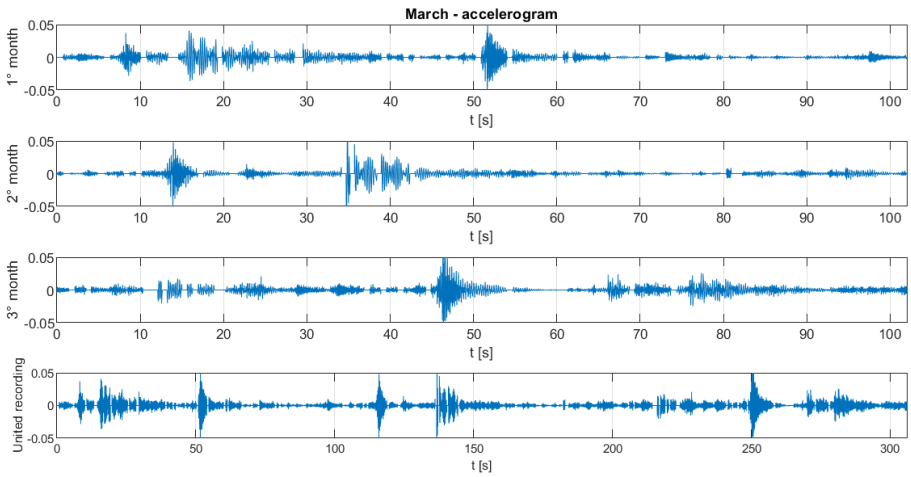


Figure 15-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.3.2 Longitudinal direction (y)

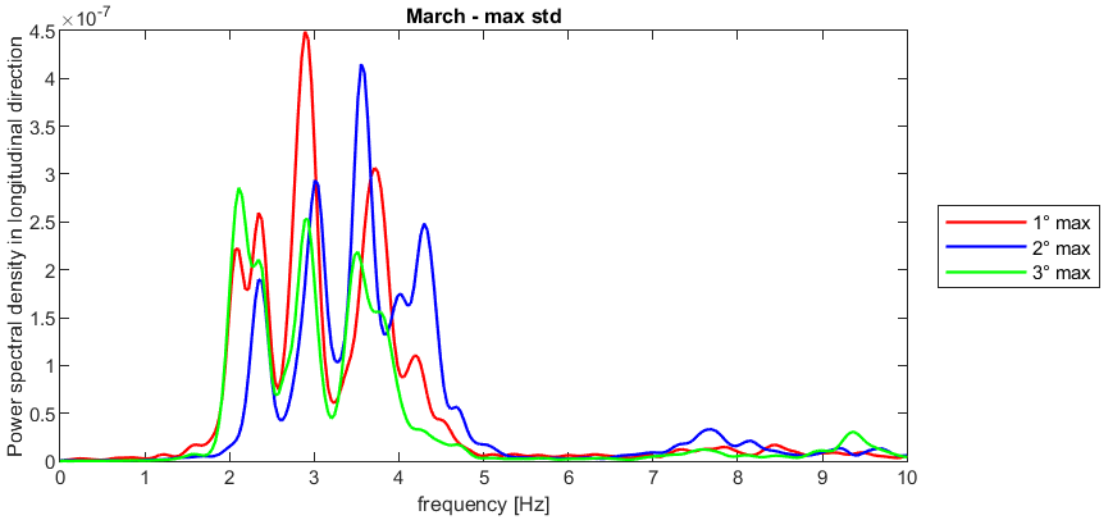


Figure 15-30: Results obtained from the 3 accelerograms with maximum SD in time domain

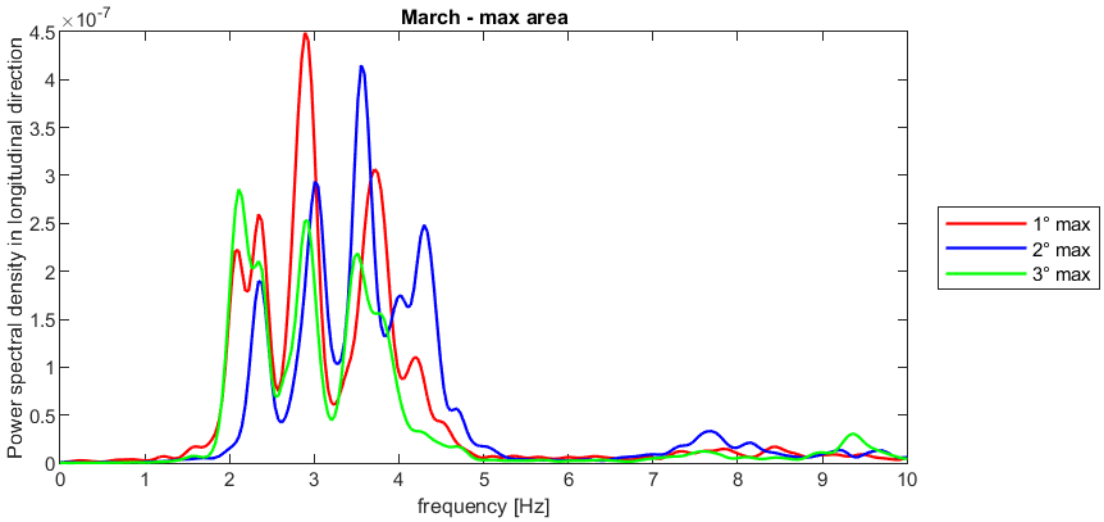


Figure 15-31: Results obtained from the 3 accelerograms with maximum area of PSD

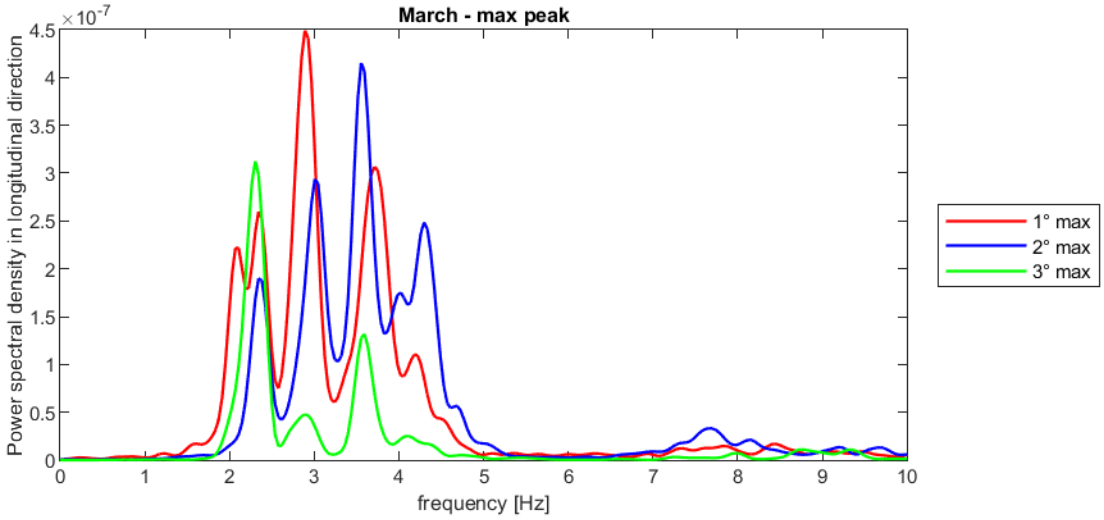


Figure 15-32: Results obtained from the 3 accelerograms with highest peak if PSD

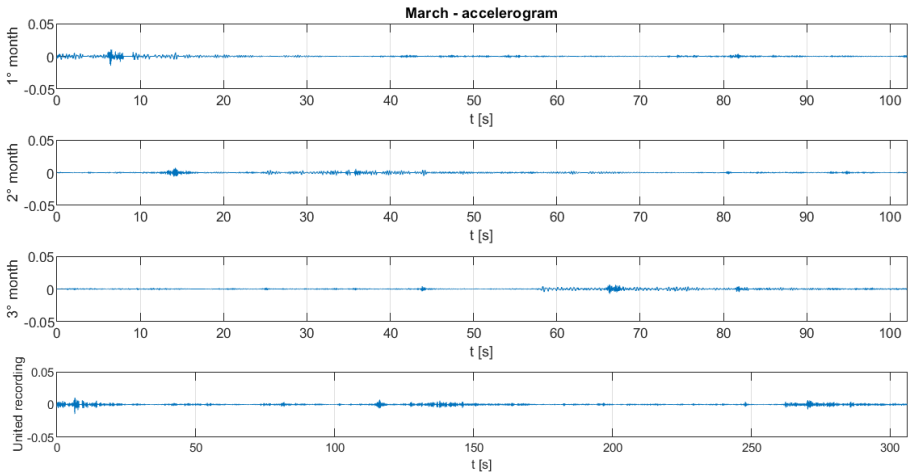


Figure 15-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

15.3.3 Transverse direction (z)

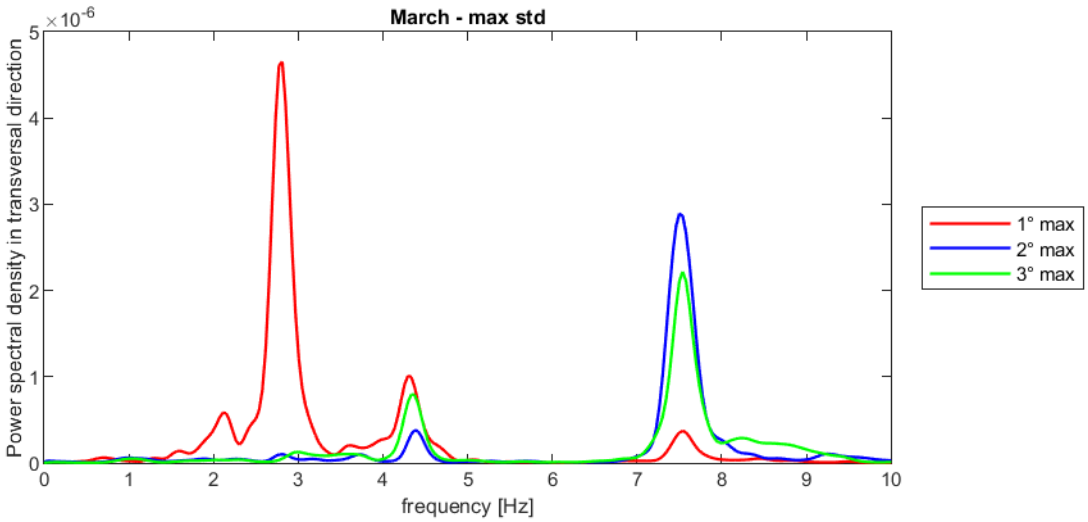


Figure 15-34: Results obtained from the 3 accelerograms with maximum SD in time domain

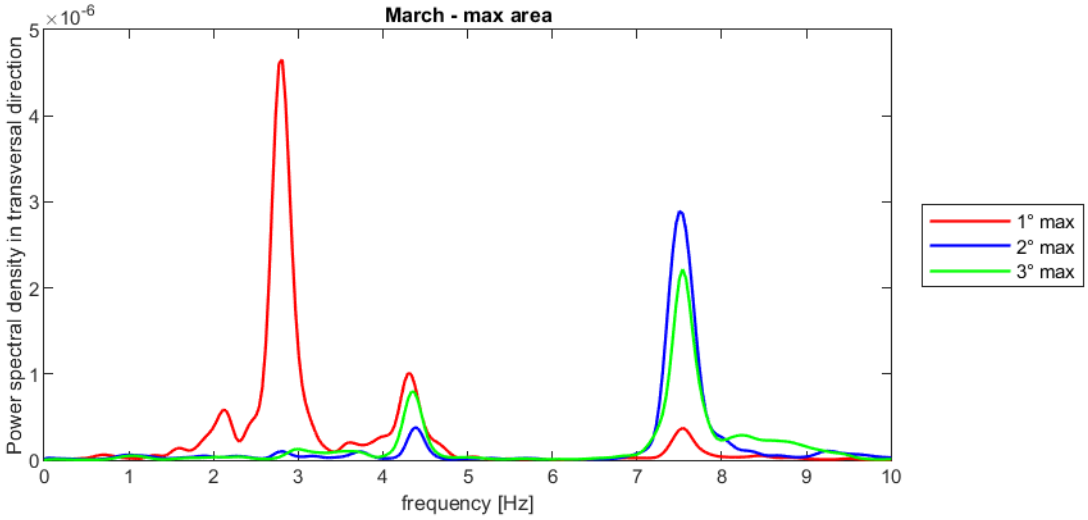


Figure 15-35: Results obtained from the 3 accelerograms with maximum area of PSD

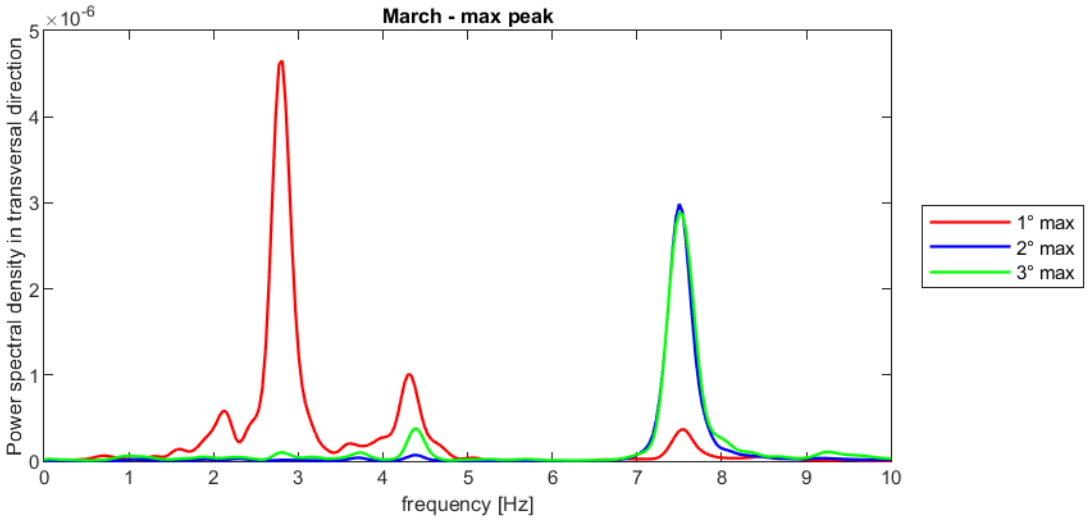


Figure 15-36: Results obtained from the 3 accelerograms with highest peak if PSD

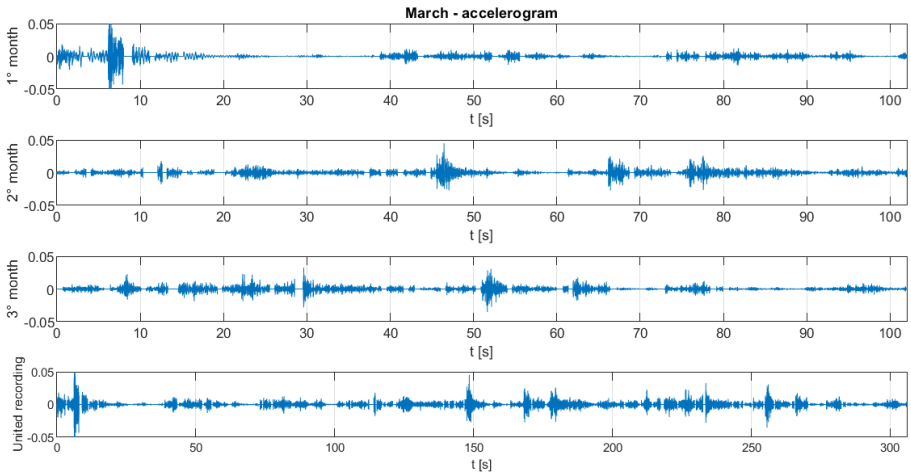


Figure 15-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

15.4 April

The results obtained for the April dataset are shown in the following tables.

Table 15-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-04-13_08-00-21	3.70E-03
	2°	2BCF9_2023-04-11_20-00-21	3.20E-03
	3°	2BCF9_2023-04-24_14-00-20	3.10E-03
Longitudinal direction (y)	1°	2BCF9_2023-04-24_14-00-20	7.05E-04
	2°	2BCF9_2023-04-13_08-00-21	6.91E-04
	3°	2BCF9_2023-04-20_08-00-20	5.53E-04
Transverse direction (z)	1°	2BCF9_2023-04-13_08-00-21	1.46E-03
	2°	2BCF9_2023-04-11_20-00-21	9.46E-04
	3°	2BCF9_2023-04-20_08-00-20	8.53E-04

Table 15-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-04-13_08-00-21	2.54E-05	2BCF9_2023-04-13_08-00-21	2.54E-06
2	2BCF9_2023-04-11_20-00-21	1.89E-05	2BCF9_2023-04-11_20-00-21	2.26E-06
3	2BCF9_2023-04-24_14-00-20	1.70E-05	2BCF9_2023-04-24_14-00-20	1.96E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-04-24_14-00-20	9.38E-07	2BCF9_2023-04-24_14-00-20	9.95E-08
2	2BCF9_2023-04-13_08-00-21	6.20E-07	2BCF9_2023-04-13_08-00-21	9.54E-08
3	2BCF9_2023-04-19_14-00-21	2.17E-07	2BCF9_2023-04-18_14-00-20	6.12E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-04-13_08-00-21	6.15E-06	2BCF9_2023-04-13_08-00-21	4.36E-07
2	2BCF9_2023-04-11_20-00-21	1.59E-06	2BCF9_2023-04-11_20-00-21	1.97E-07
3	2BCF9_2023-04-24_14-00-20	1.23E-06	2BCF9_2023-04-05_08-00-21	1.55E-07

Table 15-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	C	C	A	A	A
2	B	B	B	A	A	A	B	B	B
3	C	C	C	-	-	-	-	-	-

15.4.1 Vertical direction (x)

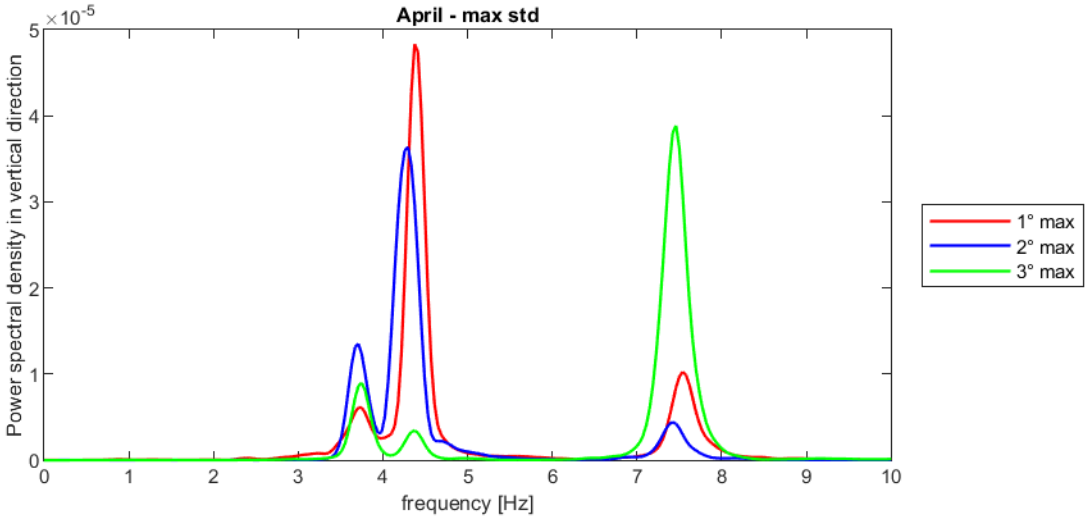


Figure 15-38: Results obtained from the 3 accelerograms with maximum SD in time domain

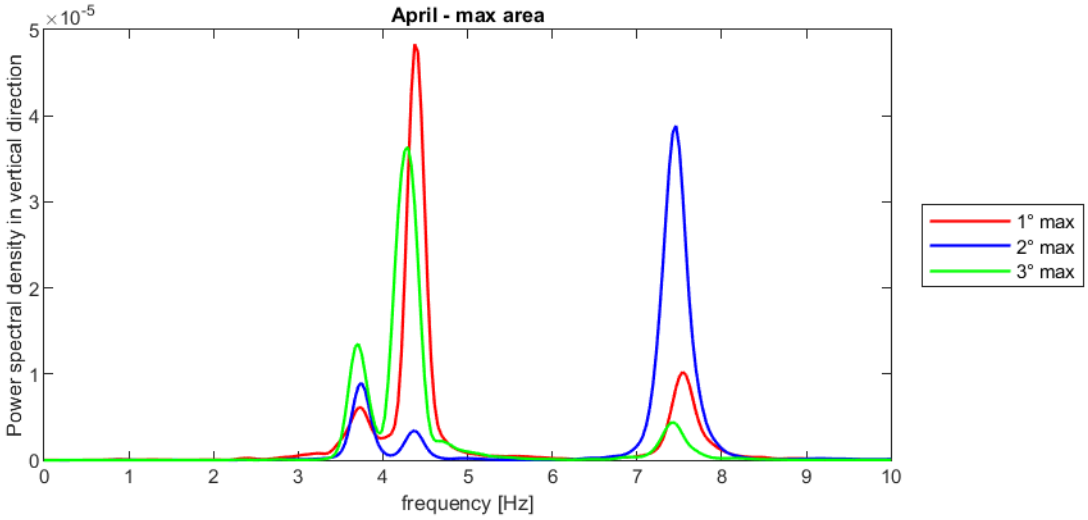


Figure 15-39: Results obtained from the 3 accelerograms with maximum area of PSD

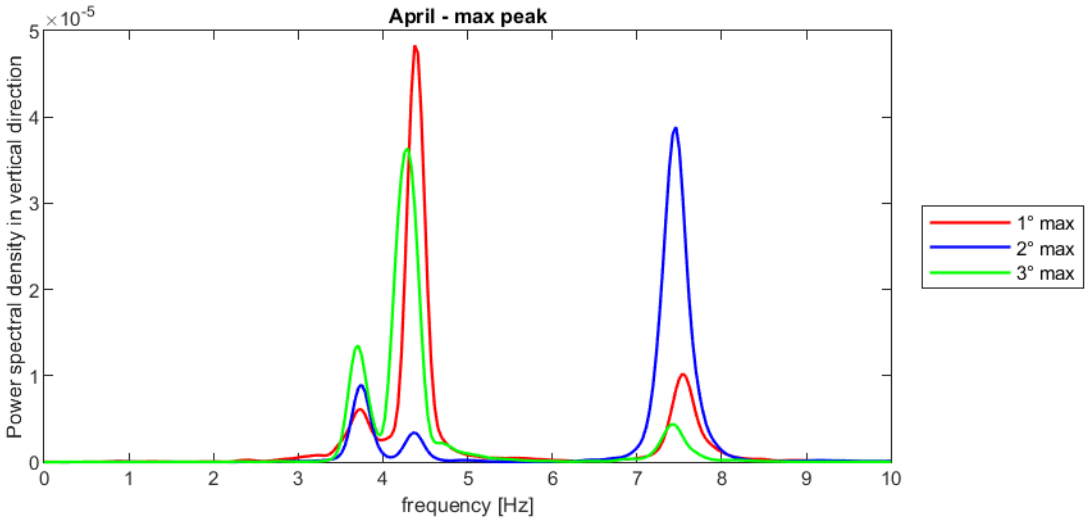


Figure 15-40: Results obtained from the 3 accelerograms with highest peak if PSD

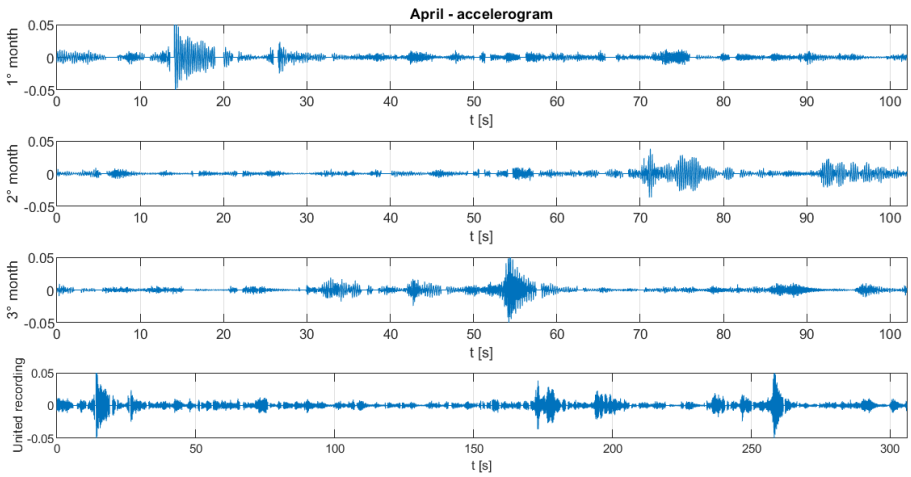


Figure 15-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.4.2 Longitudinal direction (y)

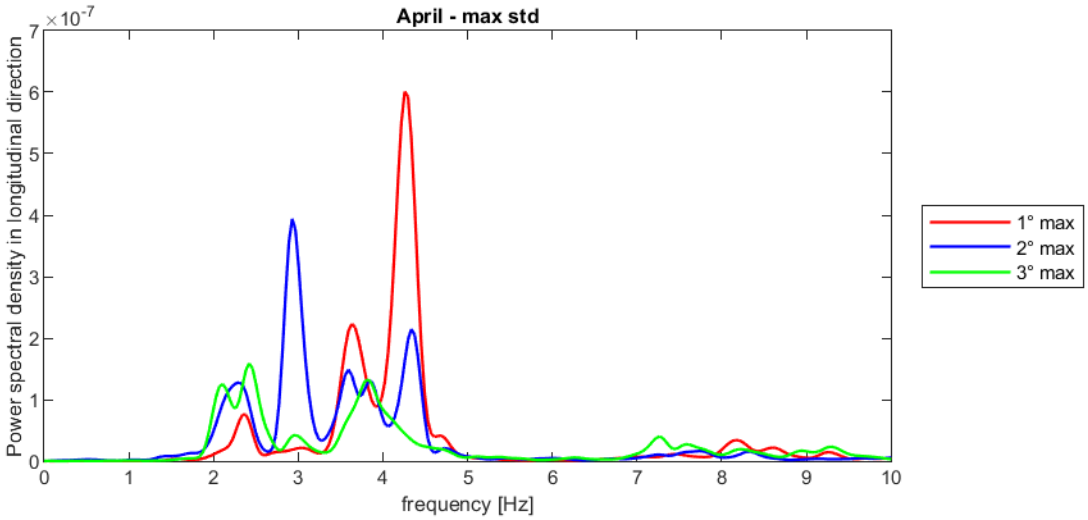


Figure 15-42: Results obtained from the 3 accelerograms with maximum SD in time domain

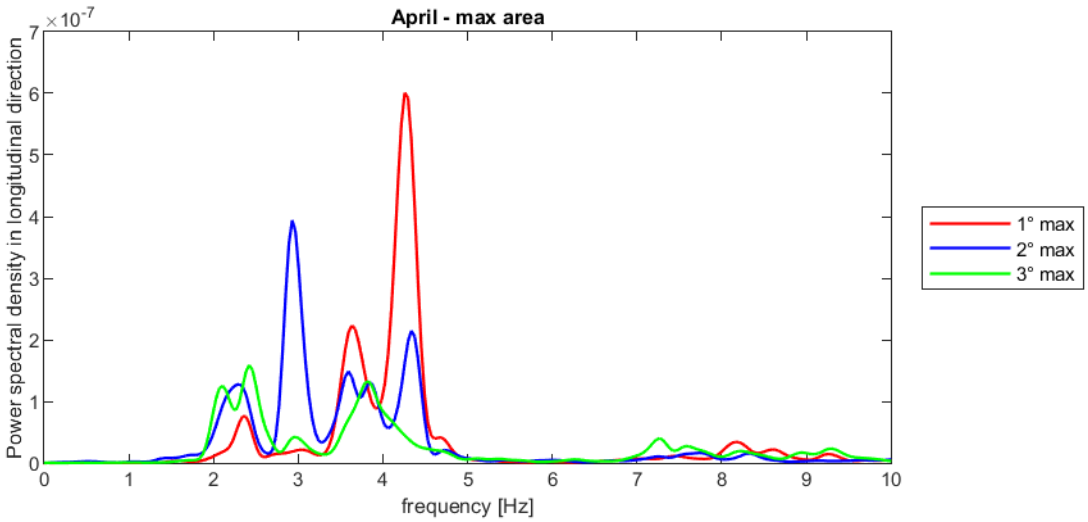


Figure 15-43: Results obtained from the 3 accelerograms with maximum area of PSD

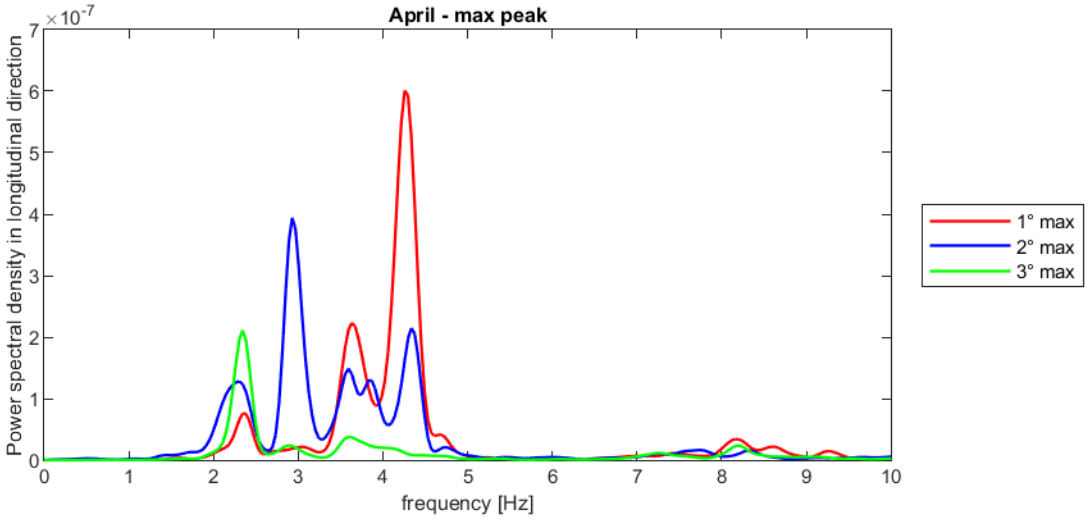


Figure 15-44: Results obtained from the 3 accelerograms with highest peak if PSD

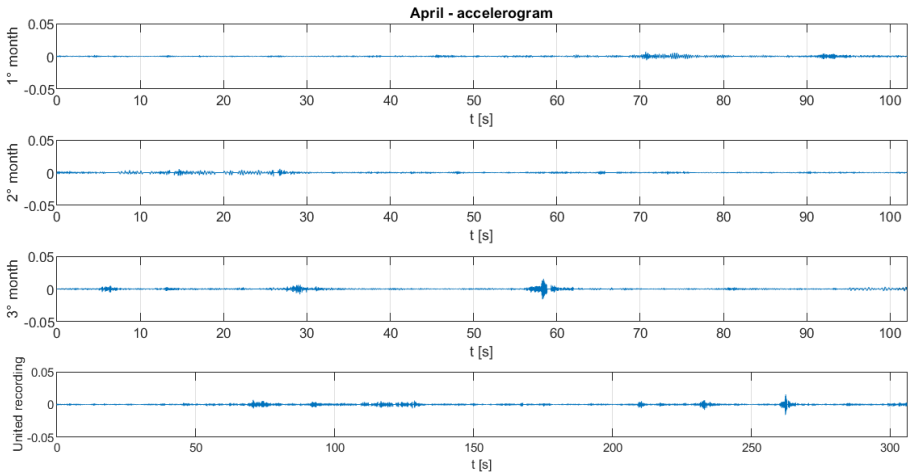


Figure 15-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

15.4.3 Transverse direction (z)

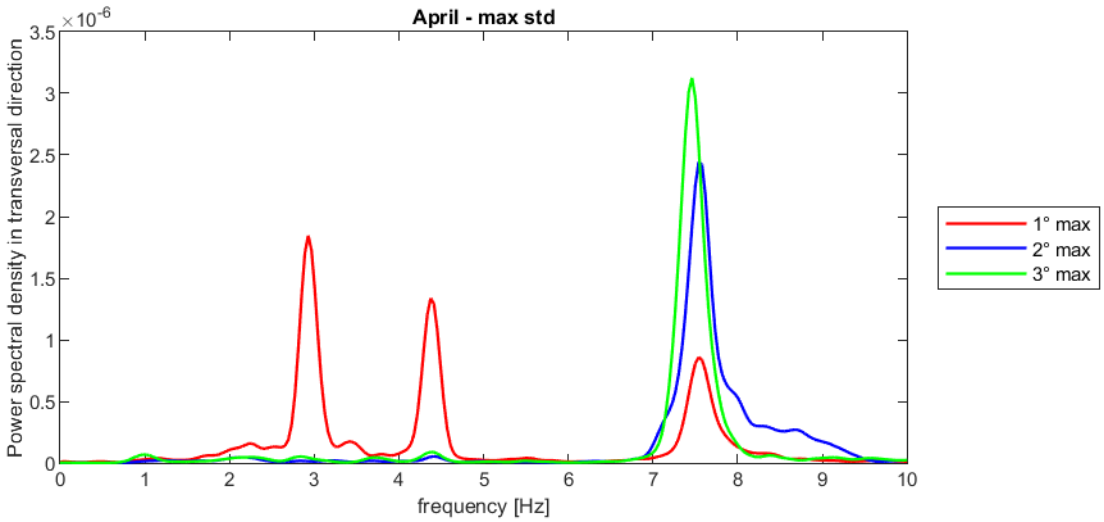


Figure 15-46: Results obtained from the 3 accelerograms with maximum SD in time domain

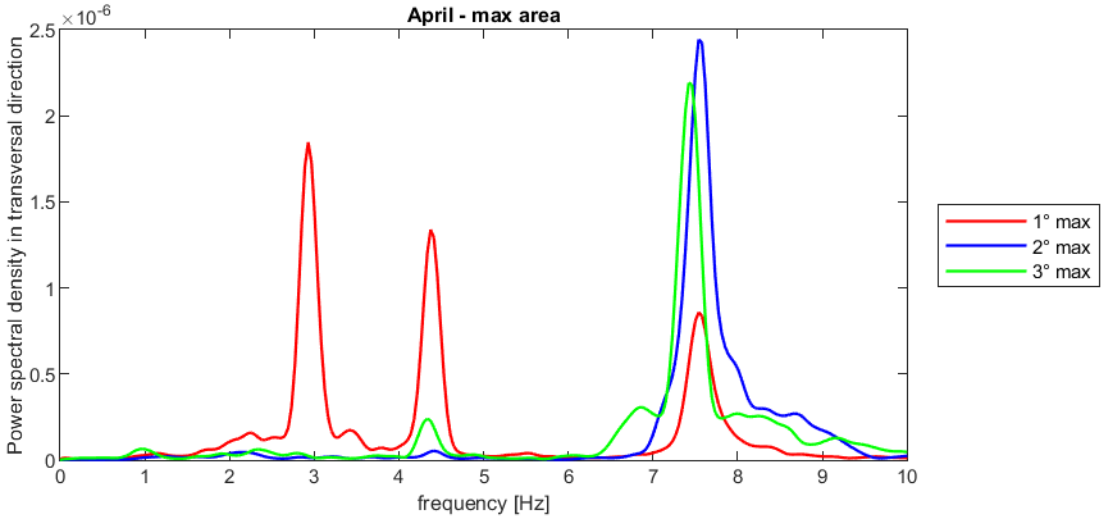


Figure 15-47: Results obtained from the 3 accelerograms with maximum area of PSD

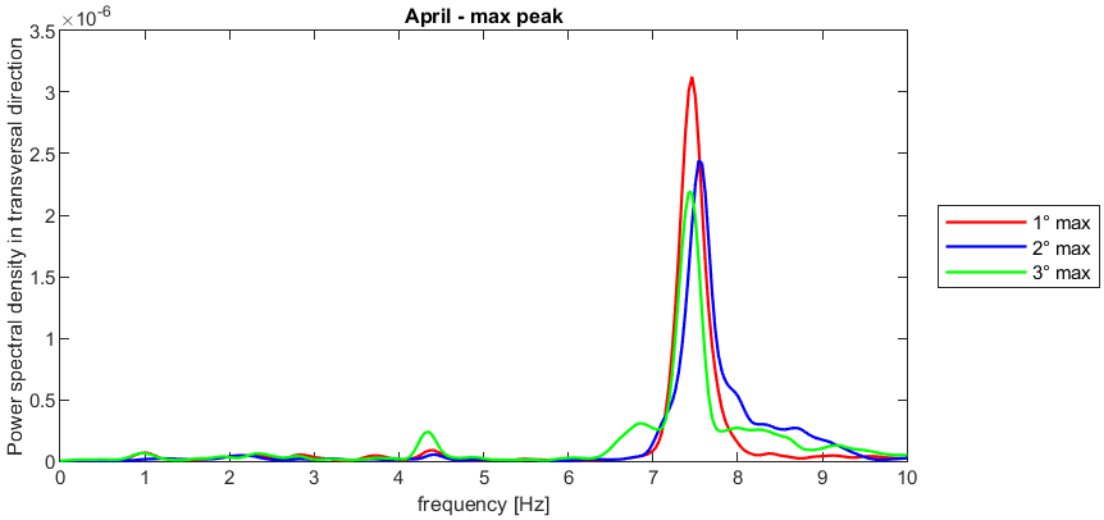


Figure 15-48: Results obtained from the 3 accelerograms with highest peak if PSD

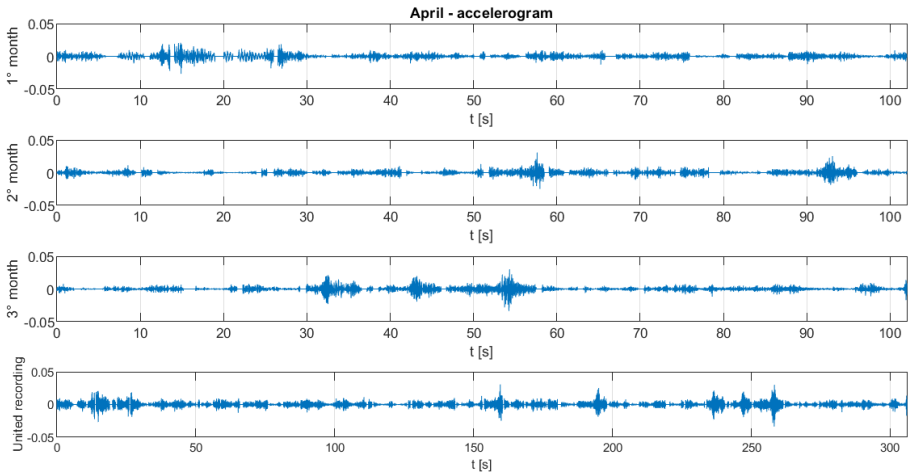


Figure 15-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

15.5 May

The results obtained for the May dataset are shown in the following tables.

Table 15-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-05-04_14-00-20	3.80E-03
	2°	2BCF9_2023-05-23_14-00-21	3.74E-03
	3°	2BCF9_2023-05-31_14-00-20	3.61E-03
Longitudinal direction (y)	1°	2BCF9_2023-05-23_14-00-21	1.00E-03
	2°	2BCF9_2023-05-04_14-00-20	8.10E-04
	3°	2BCF9_2023-05-31_14-00-20	6.81E-04
Transverse direction (z)	1°	2BCF9_2023-05-23_14-00-21	2.05E-03
	2°	2BCF9_2023-05-04_14-00-20	1.49E-03
	3°	2BCF9_2023-05-31_14-00-20	1.09E-03

Table 15-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-05-04_14-00-20	3.51E-05	2BCF9_2023-05-04_14-00-20	3.11E-06
2	2BCF9_2023-05-23_14-00-21	2.58E-05	2BCF9_2023-05-23_14-00-21	3.06E-06
3	2BCF9_2023-05-11_20-00-21	2.44E-05	2BCF9_2023-05-31_14-00-20	2.50E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-05-23_14-00-21	7.58E-07	2BCF9_2023-05-23_14-00-21	2.06E-07
2	2BCF9_2023-05-04_14-00-20	4.89E-07	2BCF9_2023-05-04_14-00-20	1.37E-07
3	2BCF9_2023-05-31_14-00-20	2.90E-07	2BCF9_2023-05-31_14-00-20	8.96E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-05-23_14-00-21	1.03E-05	2BCF9_2023-05-23_14-00-21	8.81E-07
2	2BCF9_2023-05-04_14-00-20	4.74E-06	2BCF9_2023-05-04_14-00-20	4.59E-07
3	2BCF9_2023-05-11_20-00-21	2.08E-06	2BCF9_2023-05-31_14-00-20	2.30E-07

Table 15-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	B	B	B	B	B
2	B	B	B	A	A	A	A	A	A
3	C	-	C	C	C	C	C	-	C

15.5.1 Vertical direction (x)

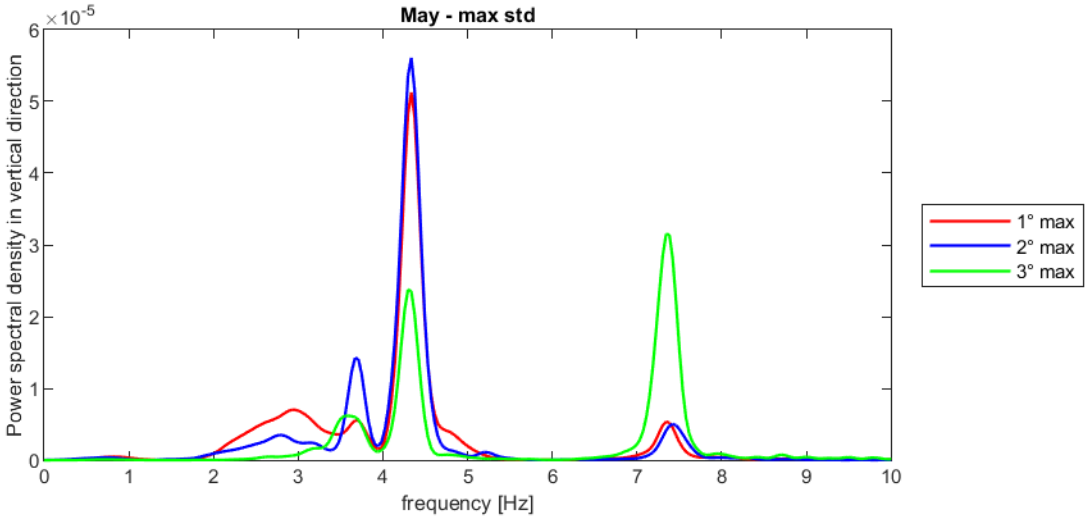


Figure 15-50: Results obtained from the 3 accelerograms with maximum SD in time domain

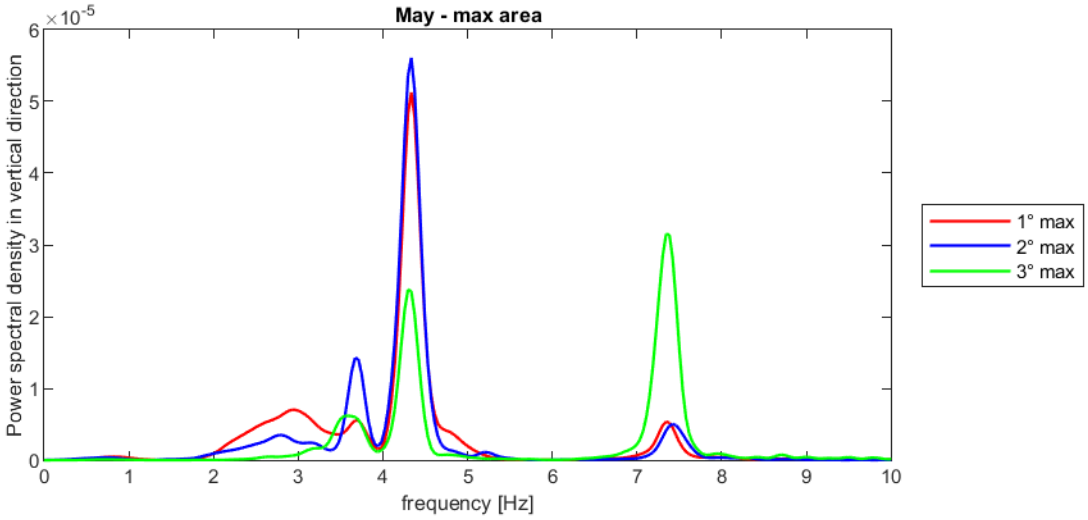


Figure 15-51: Results obtained from the 3 accelerograms with maximum area of PSD

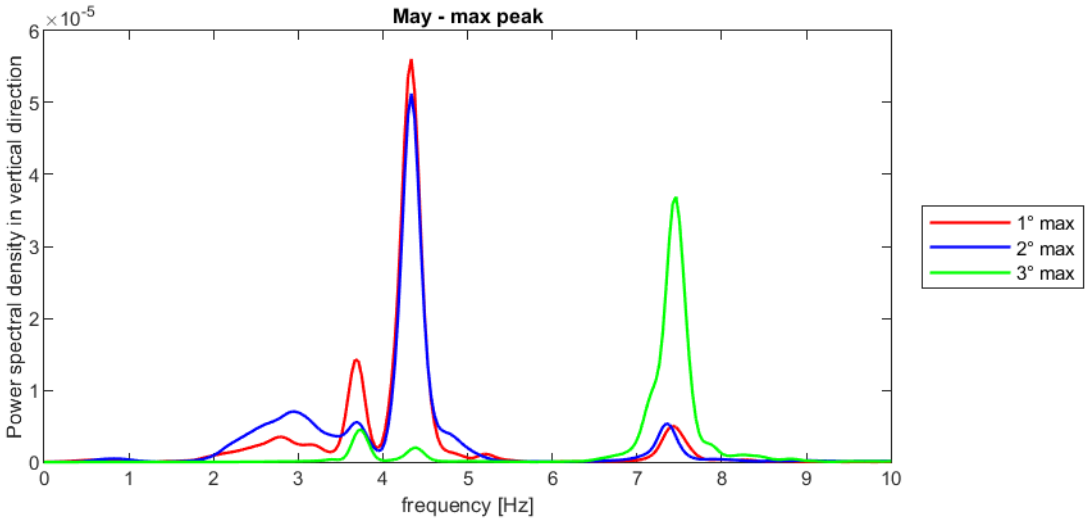


Figure 15-52: Results obtained from the 3 accelerograms with highest peak if PSD

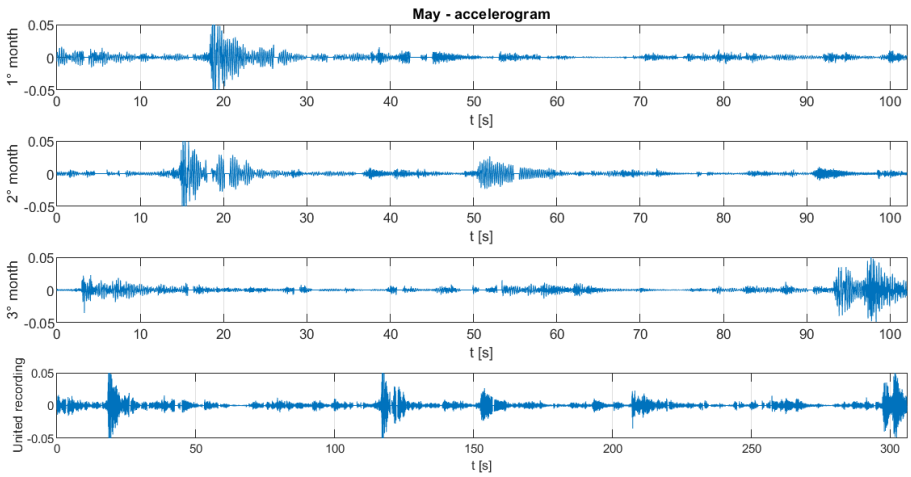


Figure 15-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.5.2 Longitudinal direction (y)

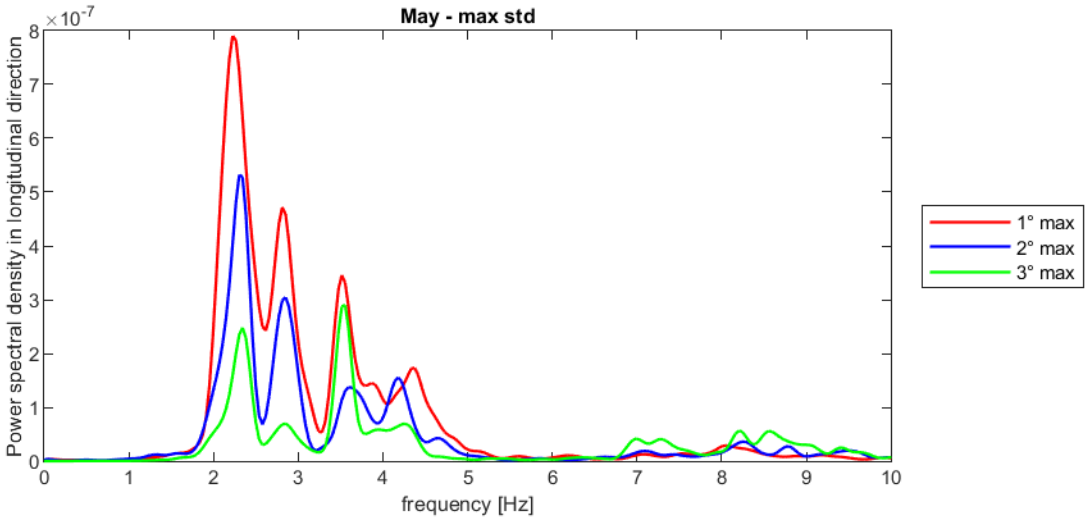


Figure 15-54: Results obtained from the 3 accelerograms with maximum SD in time domain

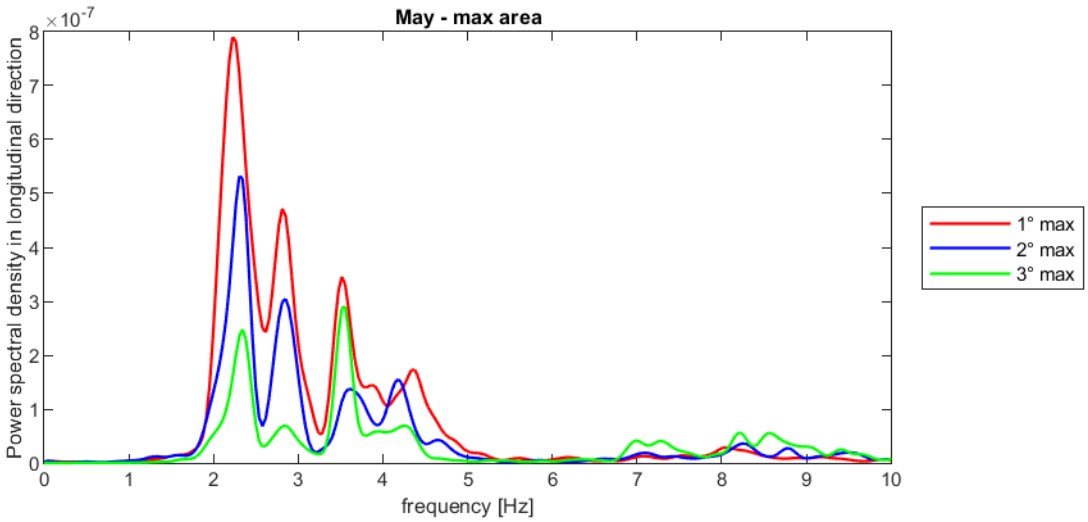


Figure 15-55: Results obtained from the 3 accelerograms with maximum area of PSD

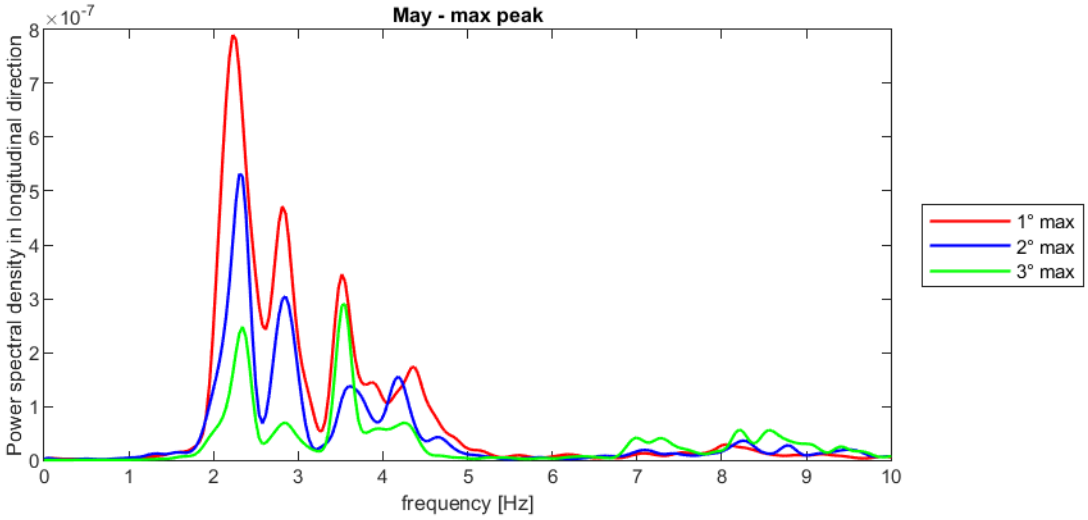


Figure 15-56: Results obtained from the 3 accelerograms with highest peak if PSD

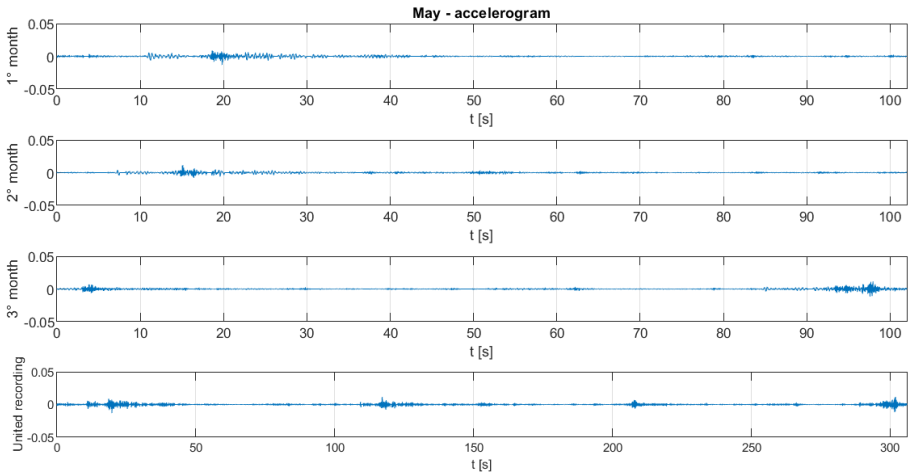


Figure 15-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

15.5.3 Transverse direction (z)

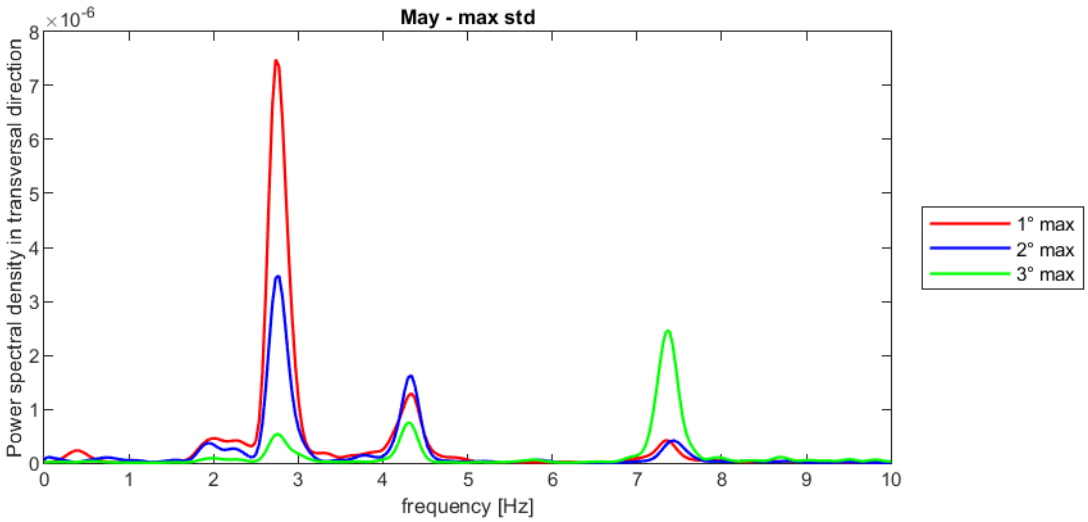


Figure 15-58: Results obtained from the 3 accelerograms with maximum SD in time domain

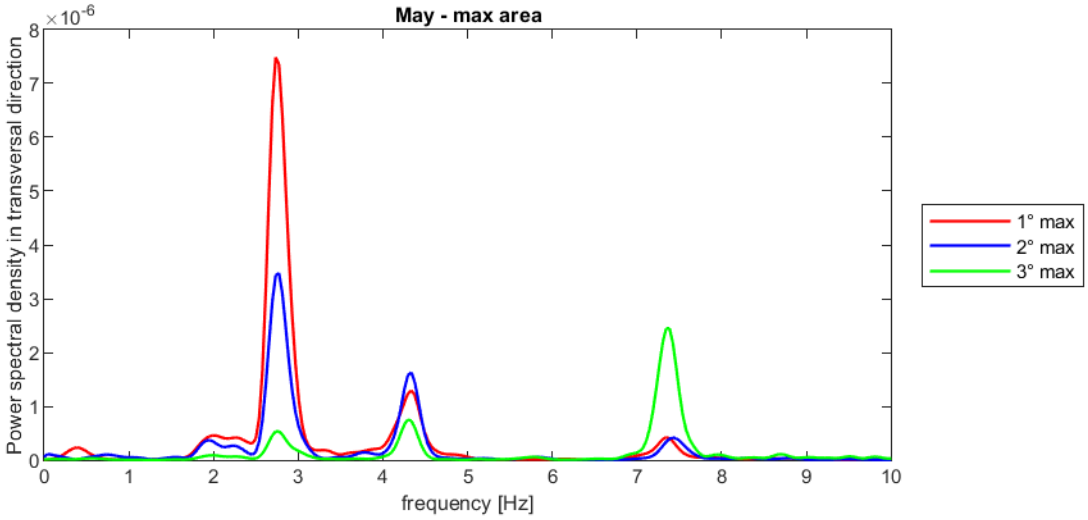


Figure 15-59: Results obtained from the 3 accelerograms with maximum area of PSD

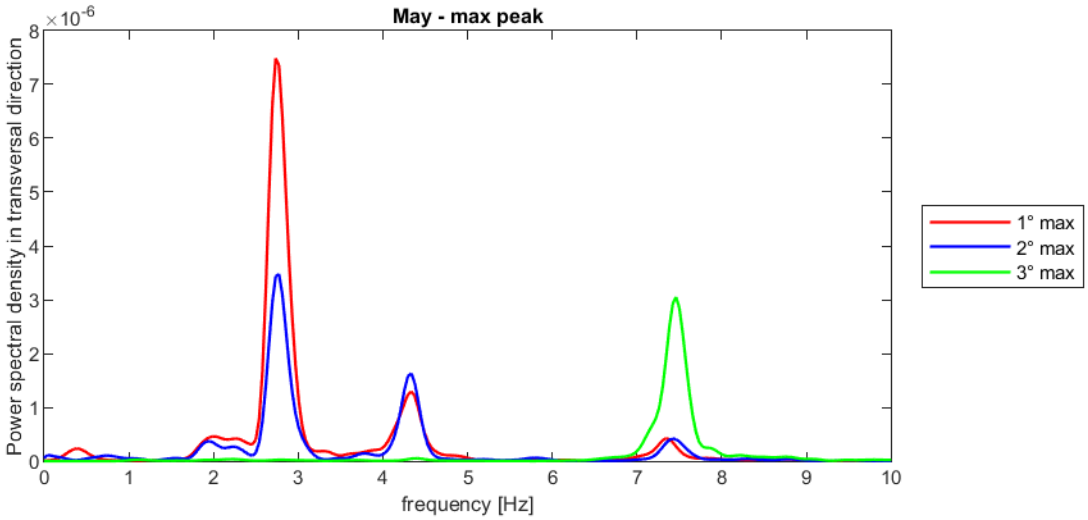


Figure 15-60: Results obtained from the 3 accelerograms with highest peak if PSD

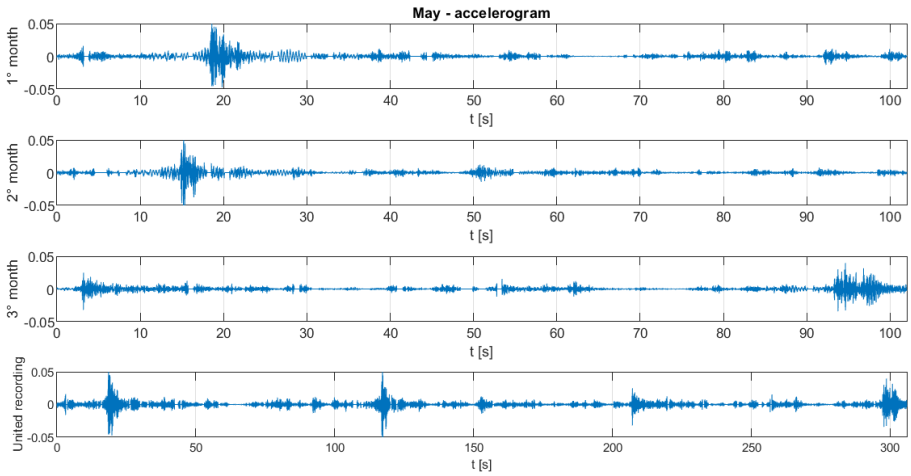


Figure 15-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

15.6 June

The results obtained for the June dataset are shown in the following tables.

Table 15-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-06-15_08-00-21	3.46E-03
	2°	2BCF9_2023-06-20_14-00-20	3.44E-03
	3°	2BCF9_2023-06-19_08-00-21	3.42E-03
Longitudinal direction (y)	1°	2BCF9_2023-06-27_14-00-21	9.11E-04
	2°	2BCF9_2023-06-10_08-00-21	7.45E-04
	3°	2BCF9_2023-06-13_08-00-20	7.15E-04
Transverse direction (z)	1°	2BCF9_2023-06-10_08-00-21	1.09E-03
	2°	2BCF9_2023-06-21_08-00-21	1.09E-03
	3°	2BCF9_2023-06-19_14-00-20	1.00E-03

Table 15-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-06-20_14-00-20	2.45E-05	2BCF9_2023-06-20_14-00-20	2.56E-06
2	2BCF9_2023-06-14_20-00-21	2.44E-05	2BCF9_2023-06-19_08-00-21	2.47E-06
3	2BCF9_2023-06-22_20-00-21	2.12E-05	2BCF9_2023-06-15_08-00-21	2.47E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-06-27_14-00-21	2.42E-06	2BCF9_2023-06-27_14-00-21	1.66E-07
2	2BCF9_2023-06-10_08-00-21	5.79E-07	2BCF9_2023-06-10_08-00-21	1.13E-07
3	2BCF9_2023-06-13_08-00-20	4.40E-07	2BCF9_2023-06-13_08-00-20	1.03E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-06-10_08-00-21	2.60E-06	2BCF9_2023-06-10_08-00-21	2.51E-07
2	2BCF9_2023-06-21_08-00-21	2.50E-06	2BCF9_2023-06-21_08-00-21	2.43E-07
3	2BCF9_2023-06-14_20-00-21	2.10E-06	2BCF9_2023-06-20_14-00-20	2.10E-07

Table 15-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	B	D	D	D	E	E	E
2	B	-	C	E	E	E	G	G	G
3	C	-	A	F	F	F			

15.6.1 Vertical direction (x)

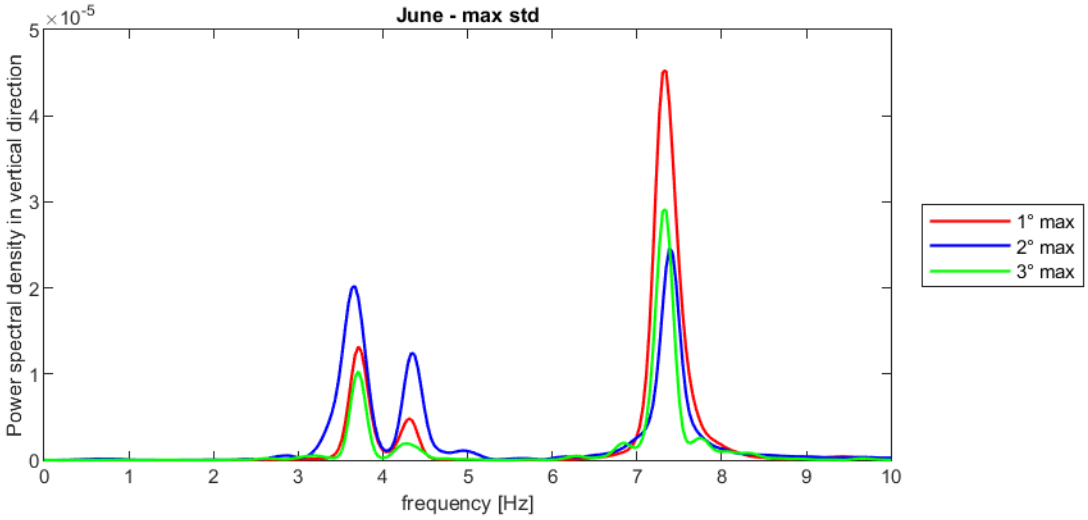


Figure 15-62: Results obtained from the 3 accelerograms with maximum SD in time domain

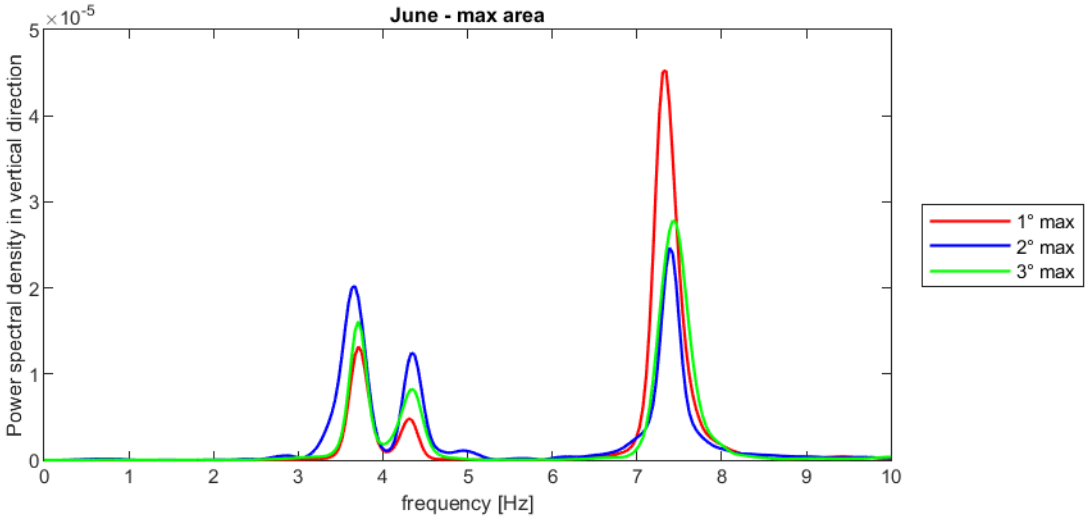


Figure 15-63: Results obtained from the 3 accelerograms with maximum area of PSD

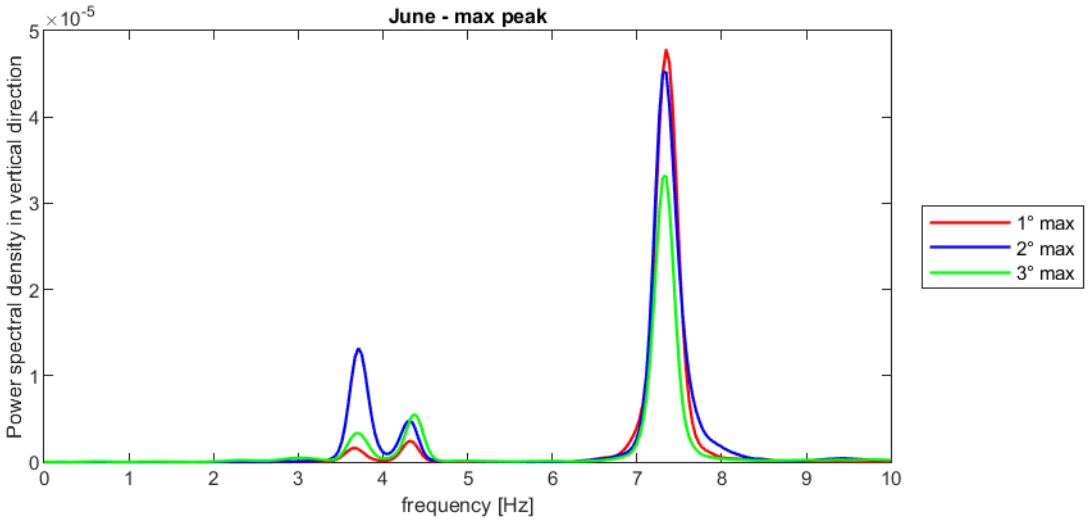


Figure 15-64: Results obtained from the 3 accelerograms with highest peak if PSD

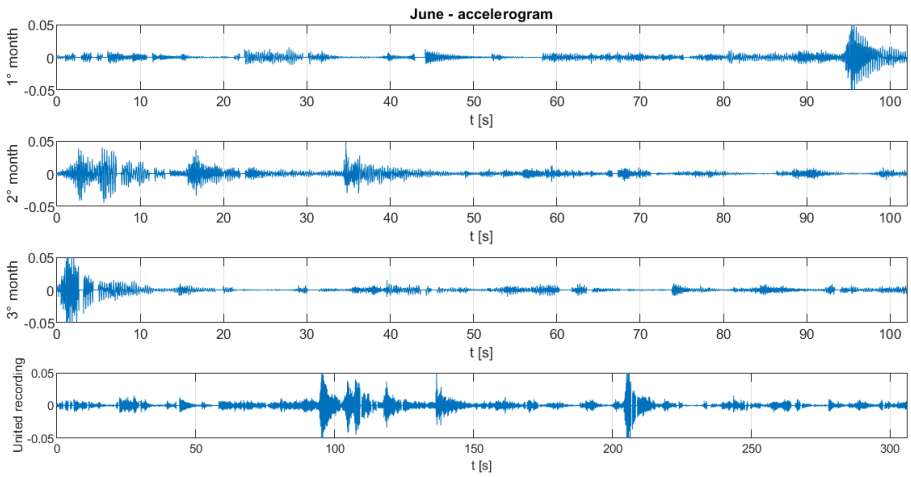


Figure 15-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.6.2 Longitudinal direction (y)

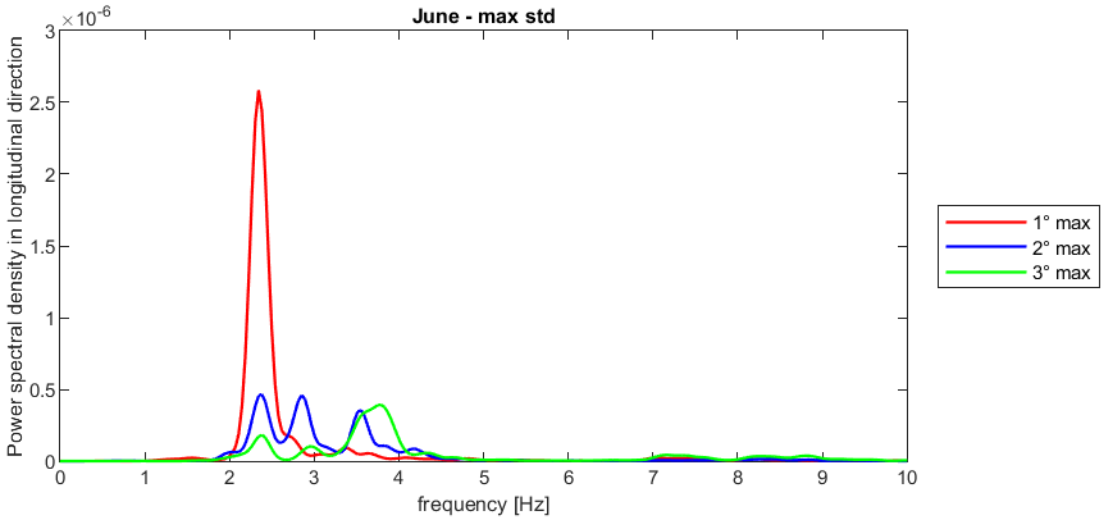


Figure 15-66: Results obtained from the 3 accelerograms with maximum SD in time domain

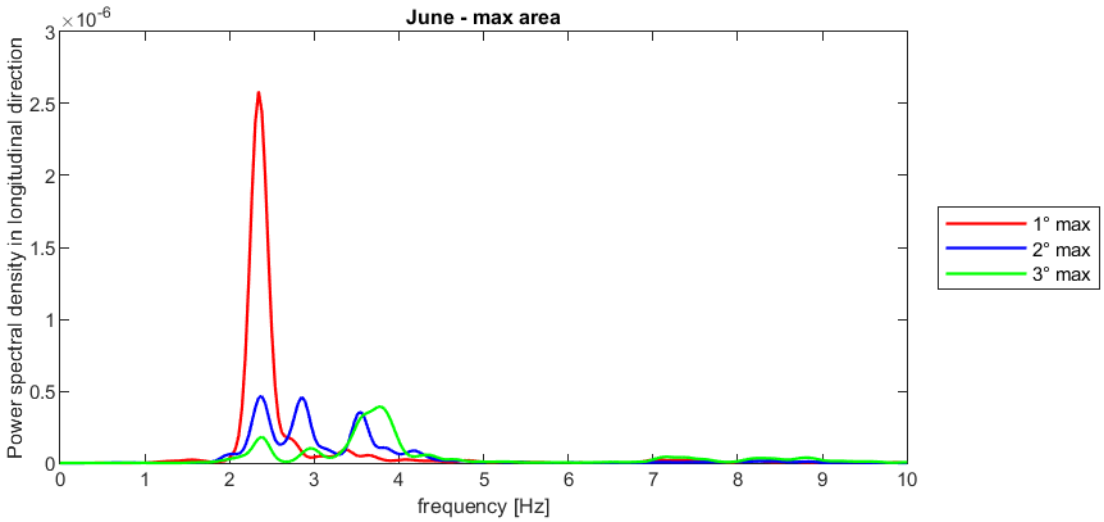


Figure 15-67: Results obtained from the 3 accelerograms with maximum area of PSD

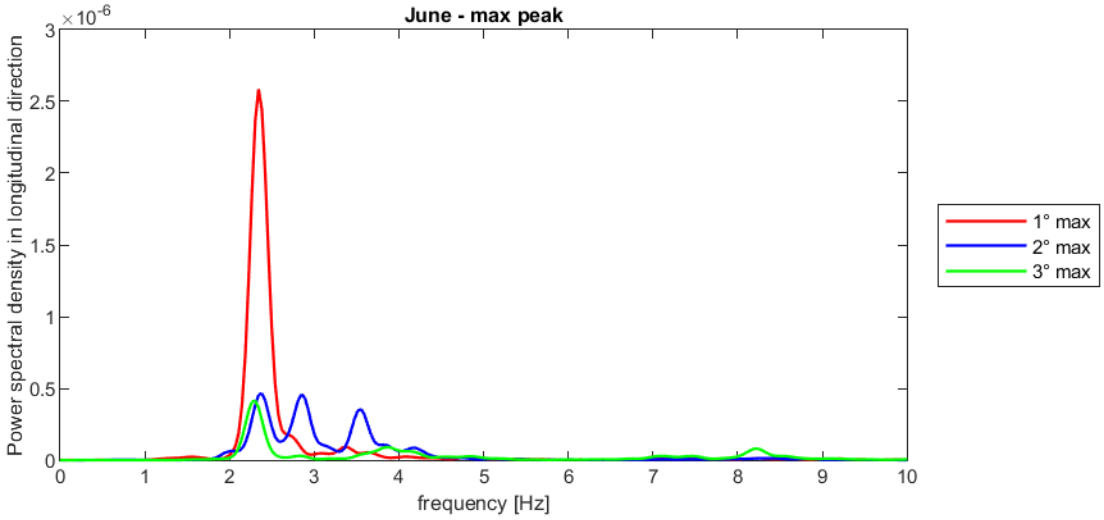


Figure 15-68: Results obtained from the 3 accelerograms with highest peak if PSD

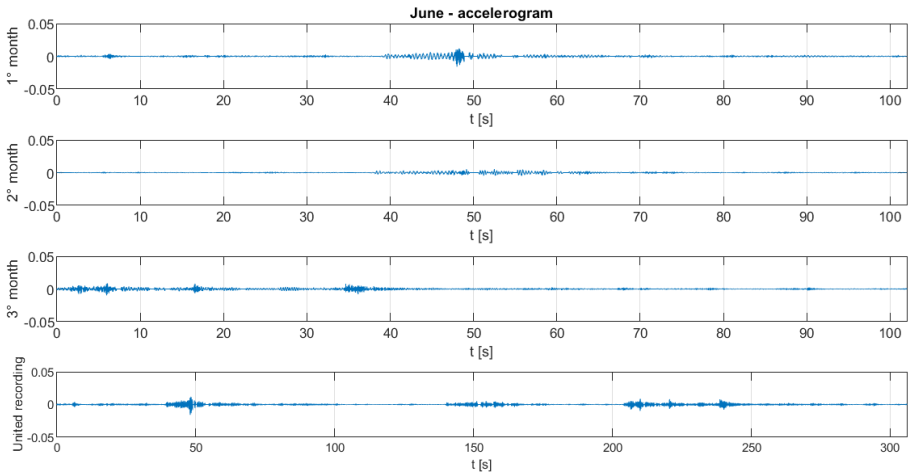


Figure 15-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

15.6.3 Transverse direction (z)

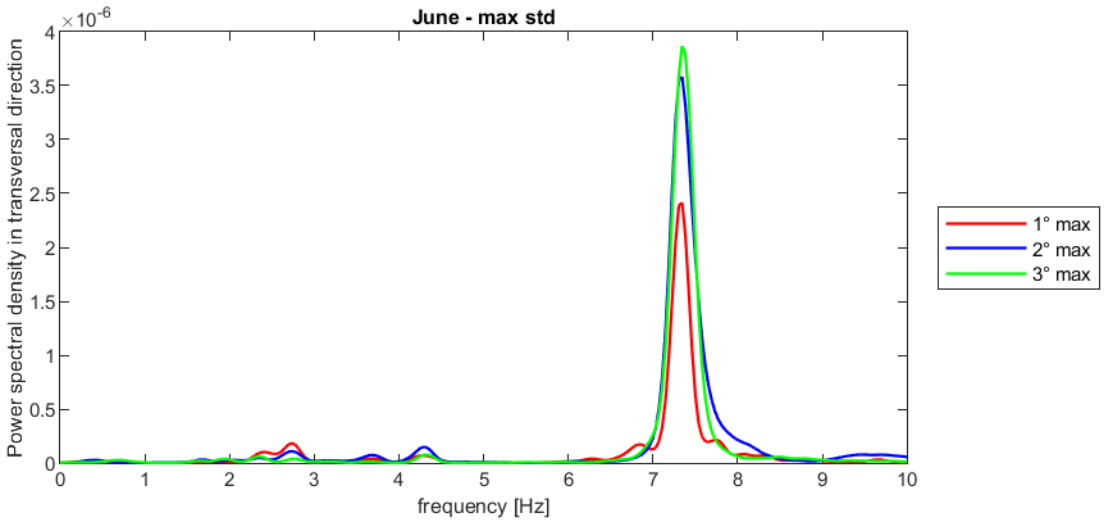


Figure 15-70: Results obtained from the 3 accelerograms with maximum SD in time domain

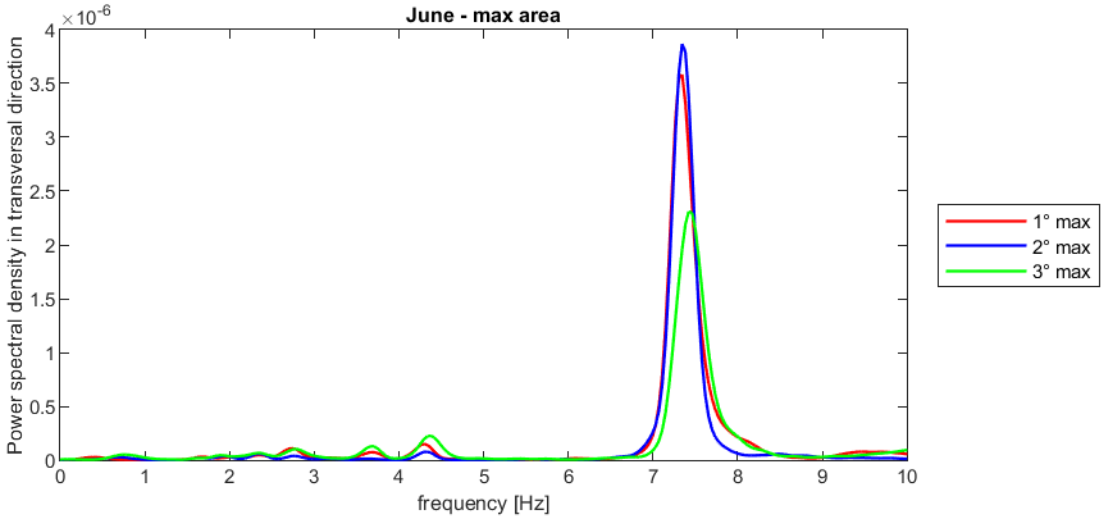


Figure 15-71: Results obtained from the 3 accelerograms with maximum area of PSD

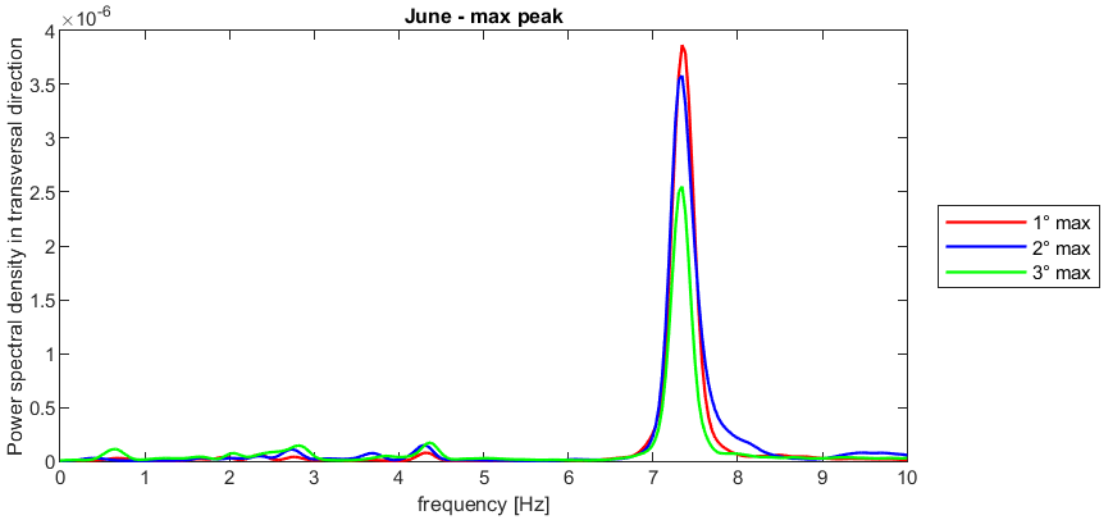


Figure 15-72: Results obtained from the 3 accelerograms with highest peak if PSD

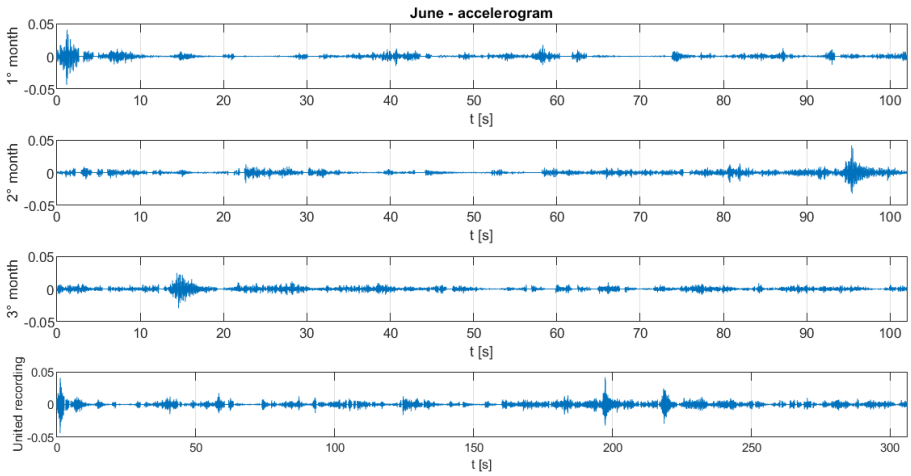


Figure 15-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

15.7 July

The results obtained for the July dataset are shown in the following tables.

Table 15-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-07-06_14-00-21	3.92E-03
	2°	2BCF9_2023-07-05_20-00-21	3.57E-03
	3°	2BCF9_2023-07-07_14-00-21	3.57E-03
Longitudinal direction (y)	1°	2BCF9_2023-07-17_14-00-20	8.57E-04
	2°	2BCF9_2023-07-07_14-00-21	8.16E-04
	3°	2BCF9_2023-07-20_14-00-21	7.84E-04
Transverse direction (z)	1°	2BCF9_2023-07-06_14-00-21	1.48E-03
	2°	2BCF9_2023-07-07_14-00-21	1.37E-03
	3°	2BCF9_2023-07-05_20-00-21	1.07E-03

Table 15-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-07-06_14-00-21	3.45E-05	2BCF9_2023-07-06_14-00-21	3.10E-06
2	2BCF9_2023-07-07_14-00-21	3.29E-05	2BCF9_2023-07-07_14-00-21	2.57E-06
3	2BCF9_2023-07-19_08-00-21	2.29E-05	2BCF9_2023-07-05_20-00-21	2.40E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-07-17_14-00-20	1.30E-06	2BCF9_2023-07-17_14-00-20	1.48E-07
2	2BCF9_2023-07-07_14-00-21	8.17E-07	2BCF9_2023-07-07_14-00-21	1.34E-07
3	2BCF9_2023-07-27_14-00-21	7.90E-07	2BCF9_2023-07-20_14-00-21	1.19E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-07-06_14-00-21	3.99E-06	2BCF9_2023-07-06_14-00-21	3.70E-07
2	2BCF9_2023-07-07_14-00-21	3.81E-06	2BCF9_2023-07-07_14-00-21	3.59E-07
3	2BCF9_2023-07-05_20-00-21	1.90E-06	2BCF9_2023-07-05_20-00-21	2.09E-07

Table 15-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	A	A	A
2	B	C	C	C	C	C	C	C	C
3	C		B	E	-	E	B	B	B

15.7.1 Vertical direction (x)

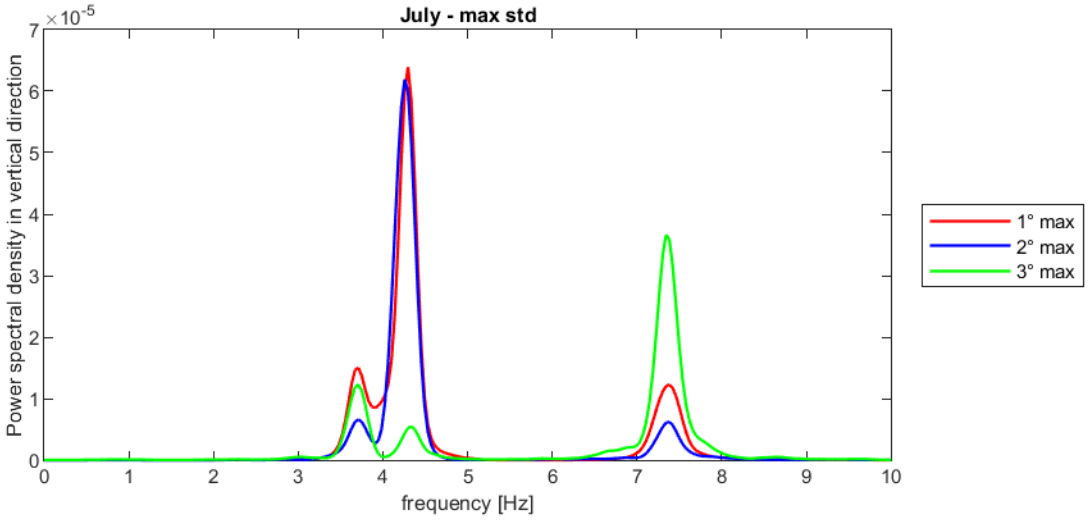


Figure 15-74: Results obtained from the 3 accelerograms with maximum SD in time domain

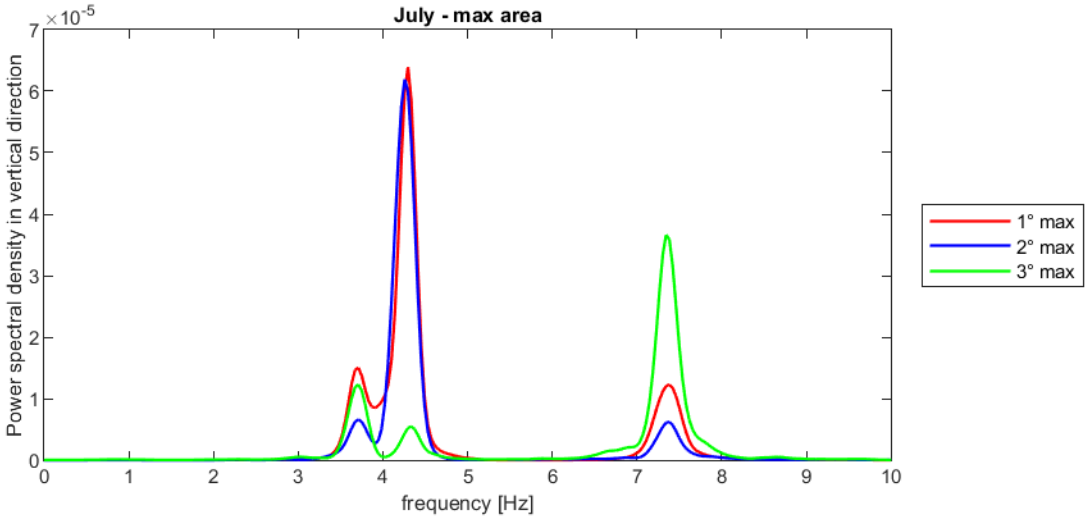


Figure 15-75: Results obtained from the 3 accelerograms with maximum area of PSD

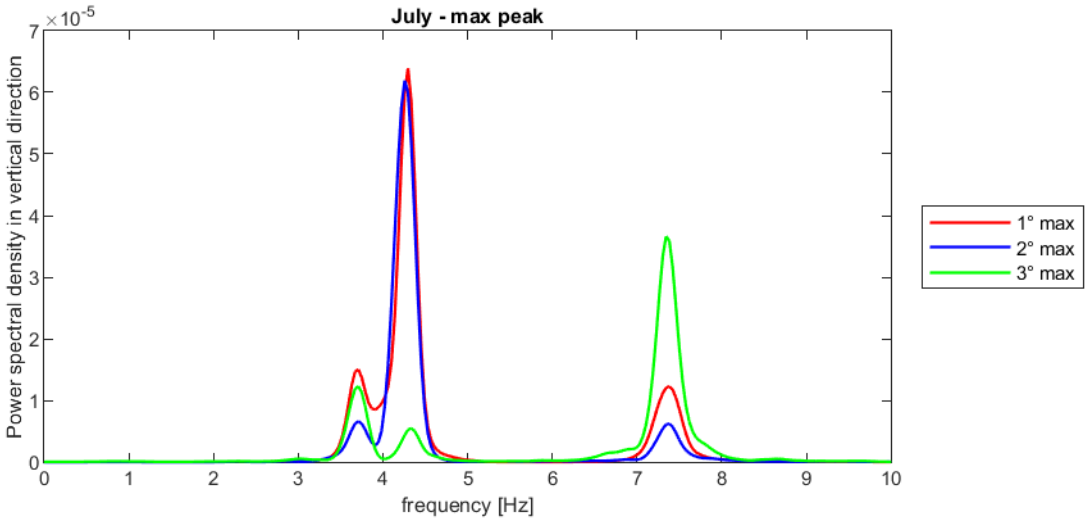


Figure 15-76: Results obtained from the 3 accelerograms with highest peak if PSD

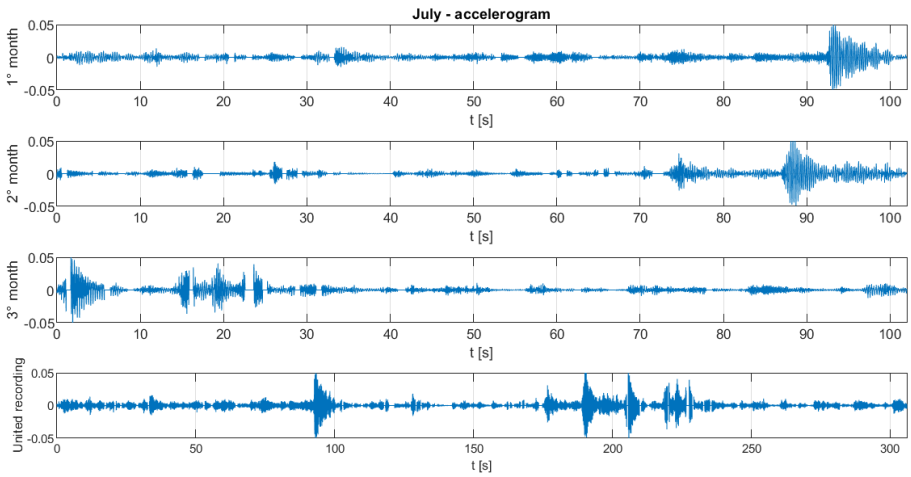


Figure 15-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.7.2 Longitudinal direction (y)

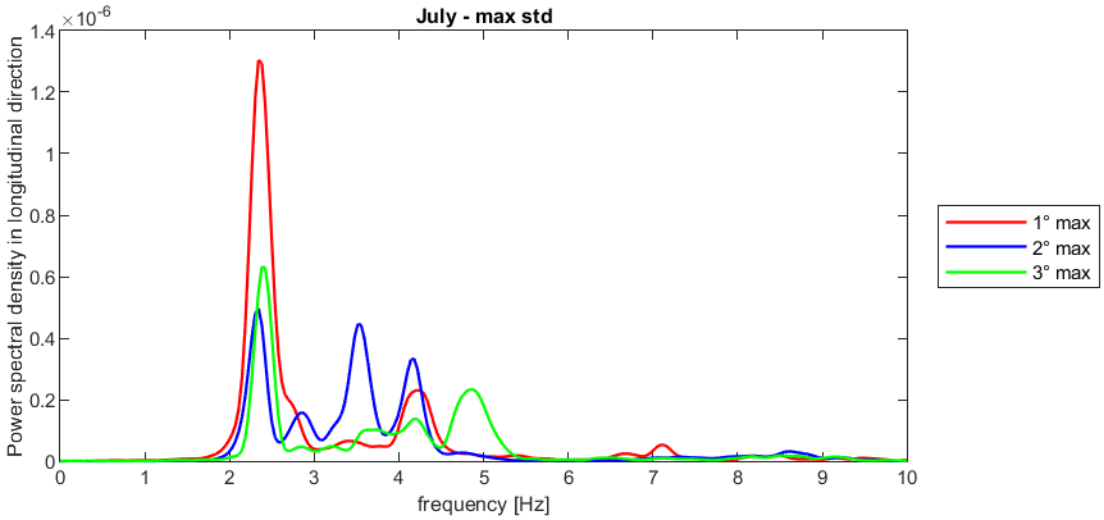


Figure 15-78: Results obtained from the 3 accelerograms with maximum SD in time domain

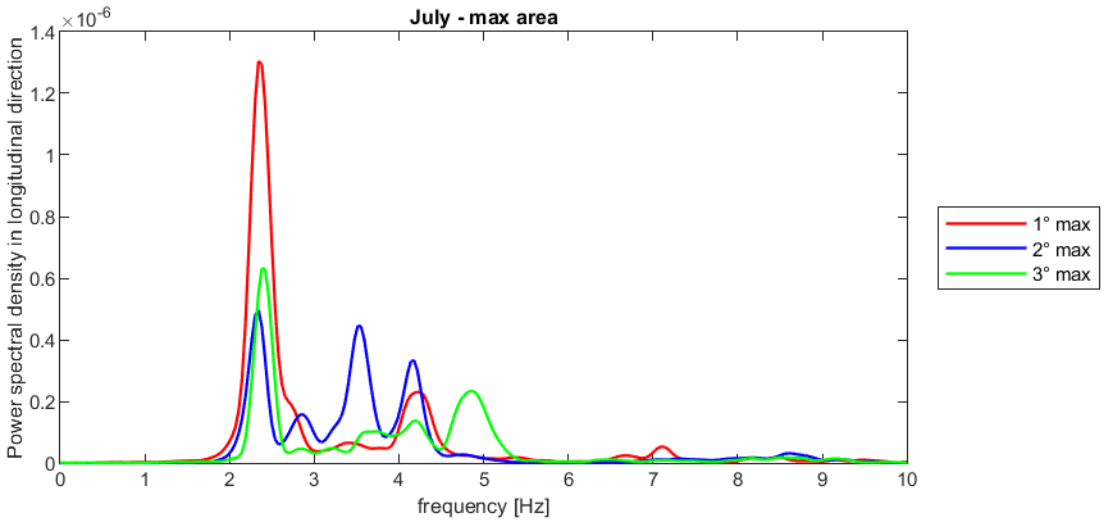


Figure 15-79: Results obtained from the 3 accelerograms with maximum area of PSD

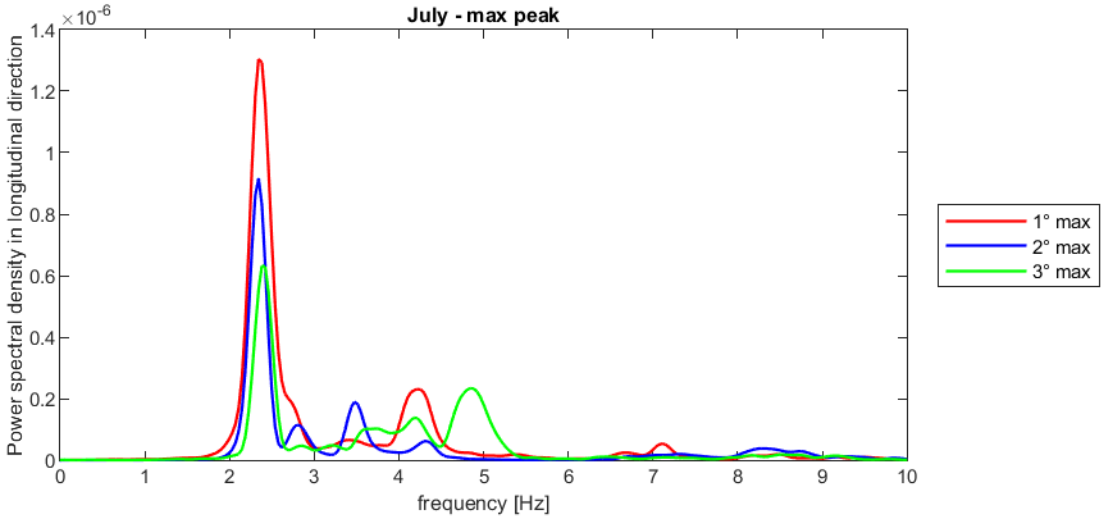


Figure 15-80: Results obtained from the 3 accelerograms with highest peak if PSD

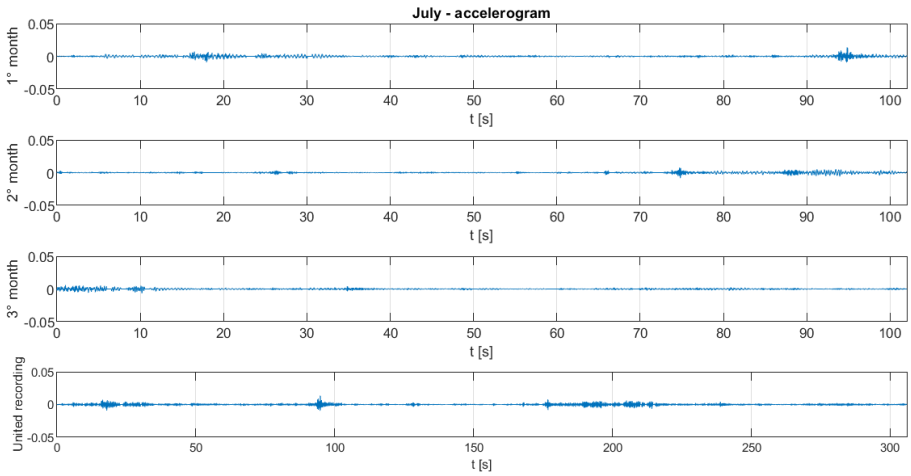


Figure 15-81: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.7.3 Transverse direction (z)

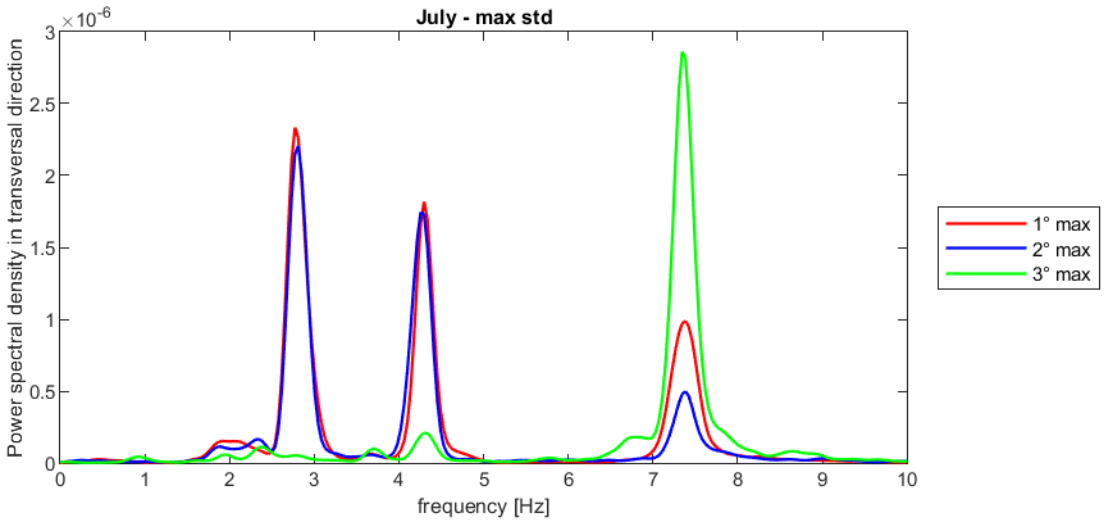


Figure 15-82: Results obtained from the 3 accelerograms with maximum SD in time domain

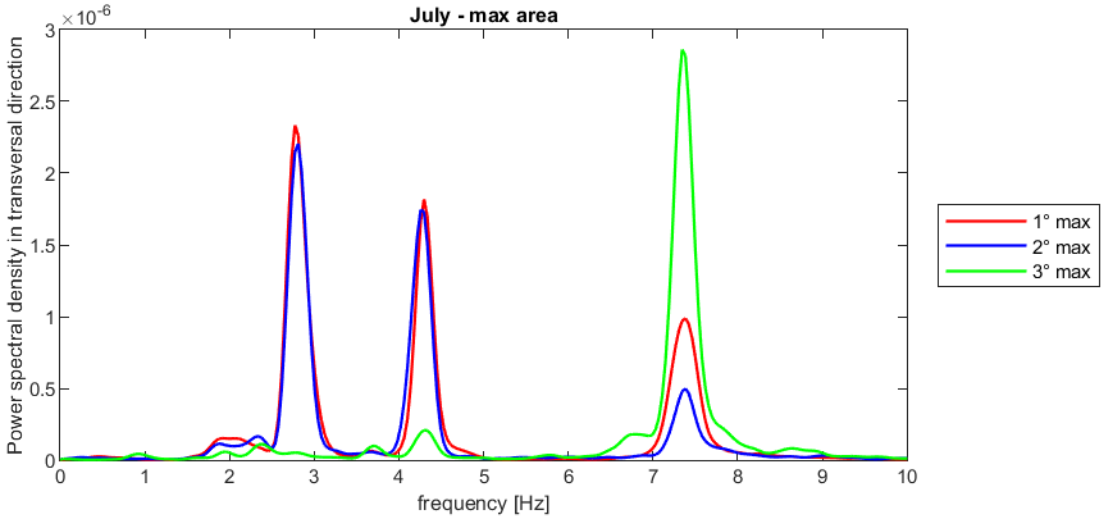


Figure 15-83: Results obtained from the 3 accelerograms with maximum area of PSD

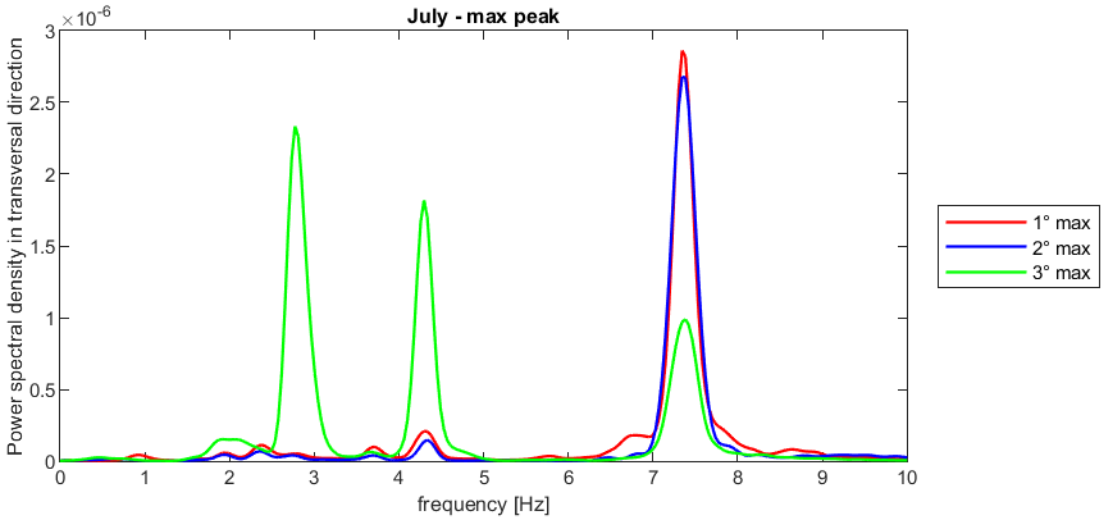


Figure 15-84: Results obtained from the 3 accelerograms with highest peak if PSD

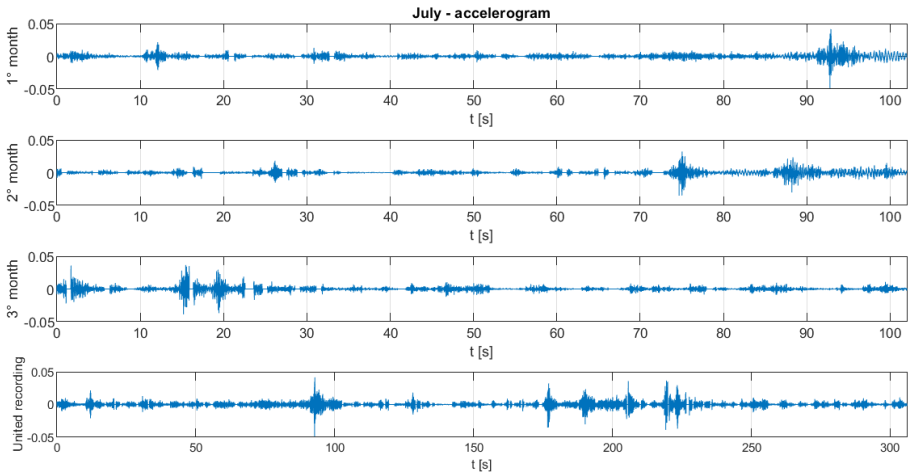


Figure 15-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

15.8 August

The results obtained for the August dataset are shown in the following tables.

Table 15-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-08-07_14-00-21	2.85E-03
	2°	2BCF9_2023-08-02_20-00-20	2.77E-03
	3°	2BCF9_2023-08-02_08-00-20	2.67E-03
Longitudinal direction (y)	1°	2BCF9_2023-08-07_14-00-21	7.56E-04
	2°	2BCF9_2023-08-02_08-00-20	5.65E-04
	3°	2BCF9_2023-08-03_08-00-20	5.49E-04
Transverse direction (z)	1°	2BCF9_2023-08-02_08-00-20	8.12E-04
	2°	2BCF9_2023-08-07_20-00-20	8.12E-04
	3°	2BCF9_2023-08-07_14-00-21	7.86E-04

Table 15-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-08-08_14-00-21	1.35E-05	2BCF9_2023-08-02_20-00-20	1.65E-06
2	2BCF9_2023-08-02_20-00-20	1.33E-05	2BCF9_2023-08-07_14-00-21	1.54E-06
3	2BCF9_2023-08-18_08-00-20	1.26E-05	2BCF9_2023-08-02_08-00-20	1.38E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-08-07_14-00-21	7.45E-07	2BCF9_2023-08-07_14-00-21	1.15E-07
2	2BCF9_2023-08-10_08-00-20	2.64E-07	2BCF9_2023-08-02_08-00-20	6.51E-08
3	2BCF9_2023-08-17_08-00-20	2.59E-07	2BCF9_2023-08-03_08-00-20	6.31E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-08-08_14-00-21	1.08E-06	2BCF9_2023-08-07_20-00-20	1.40E-07
2	2BCF9_2023-08-18_08-00-20	9.79E-07	2BCF9_2023-08-02_08-00-20	1.34E-07
3	2BCF9_2023-08-15_20-00-20	7.47E-07	2BCF9_2023-08-07_14-00-21	1.21E-07

Table 15-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	B	A	A	A	C	-	E
2	B	C	A	C	-	C	E	-	C
3	C	-	C	D	-	D	A	-	A

15.8.1 Vertical direction (x)

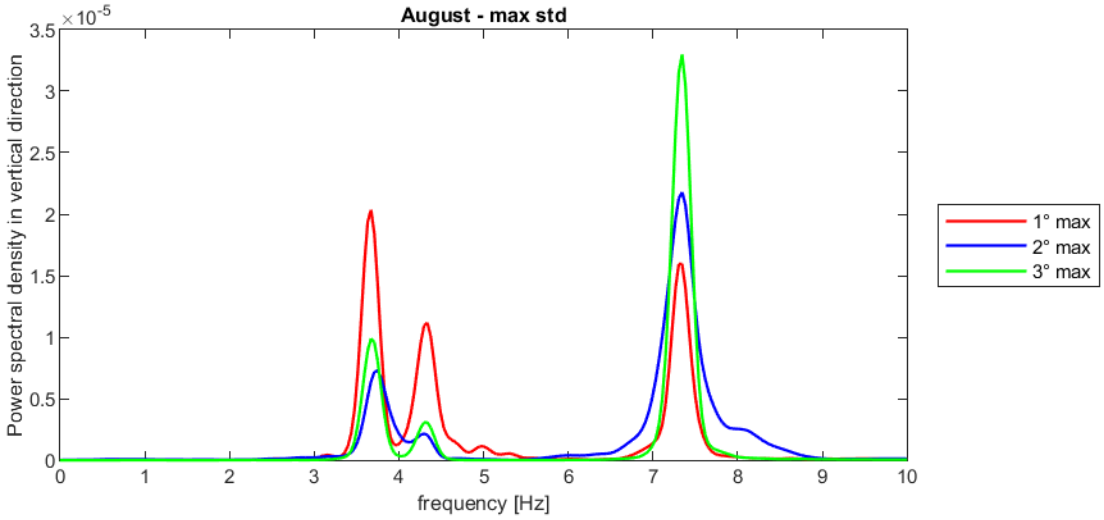


Figure 15-86: Results obtained from the 3 accelerograms with maximum SD in time domain

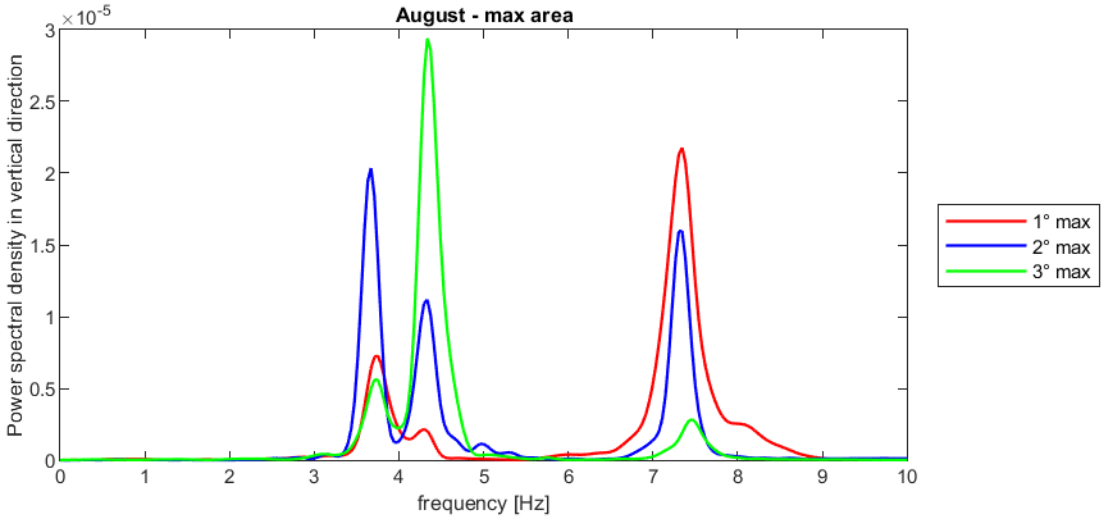


Figure 15-87: Results obtained from the 3 accelerograms with maximum area of PSD

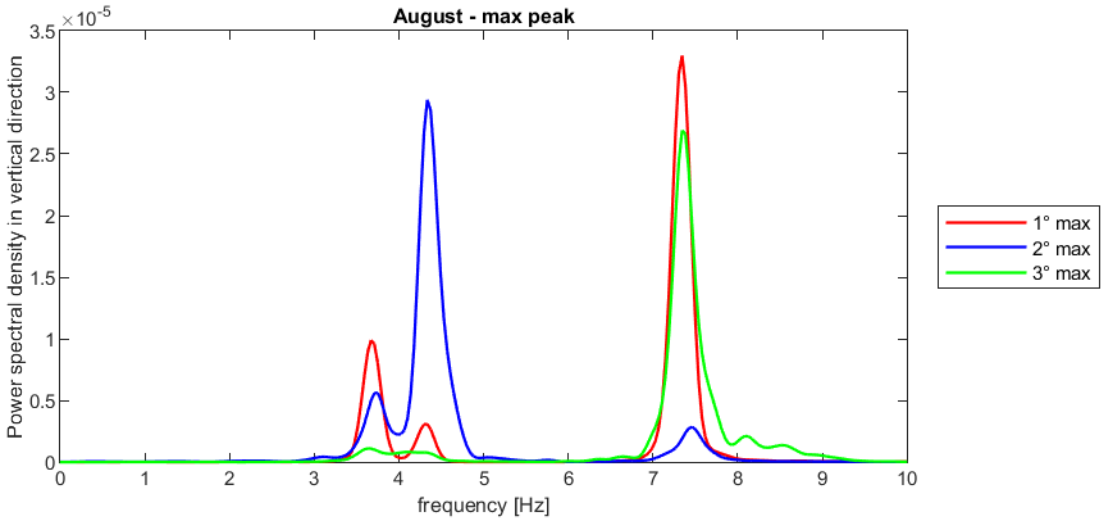


Figure 15-88: Results obtained from the 3 accelerograms with highest peak if PSD

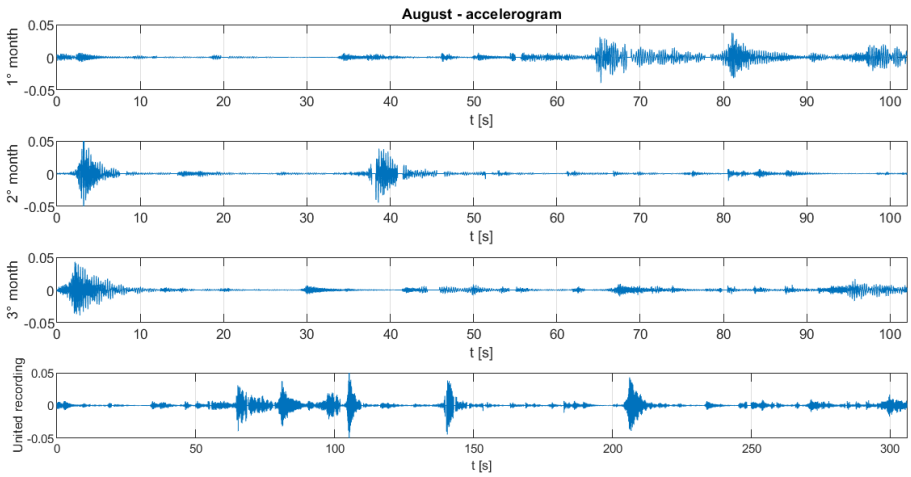


Figure 15-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.8.2 Longitudinal direction (y)

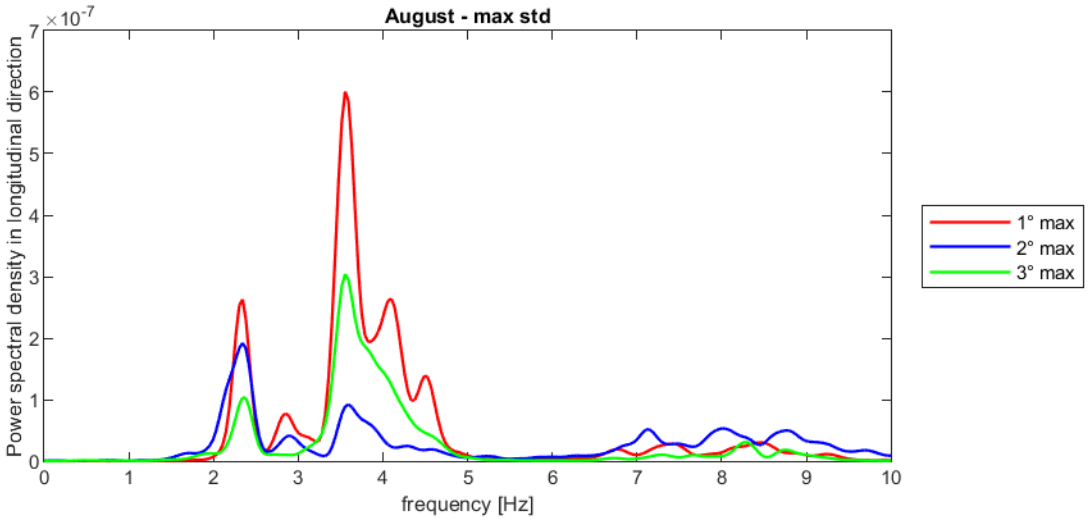


Figure 15-90: Results obtained from the 3 accelerograms with maximum SD in time domain

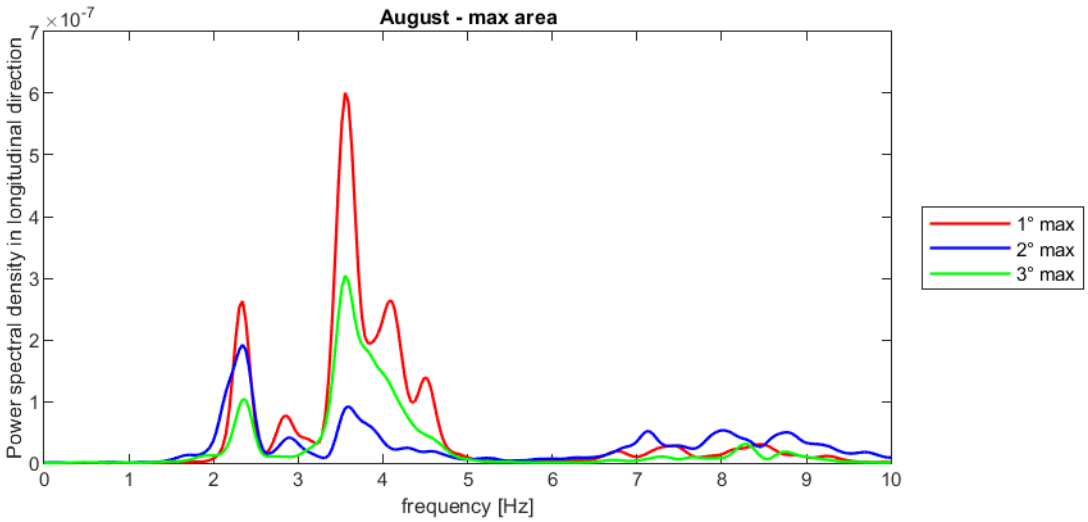


Figure 15-91: Results obtained from the 3 accelerograms with maximum area of PSD

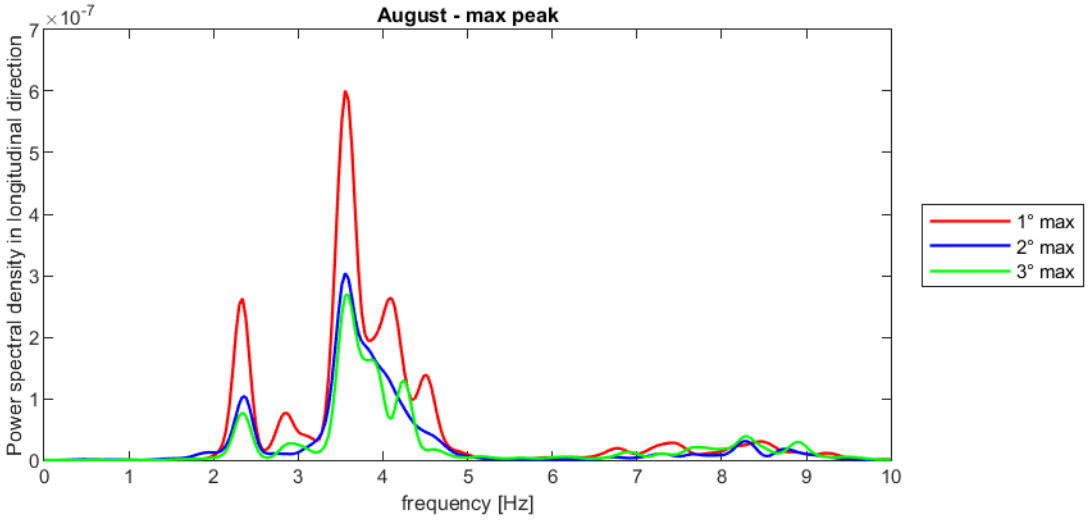


Figure 15-92: Results obtained from the 3 accelerograms with highest peak if PSD

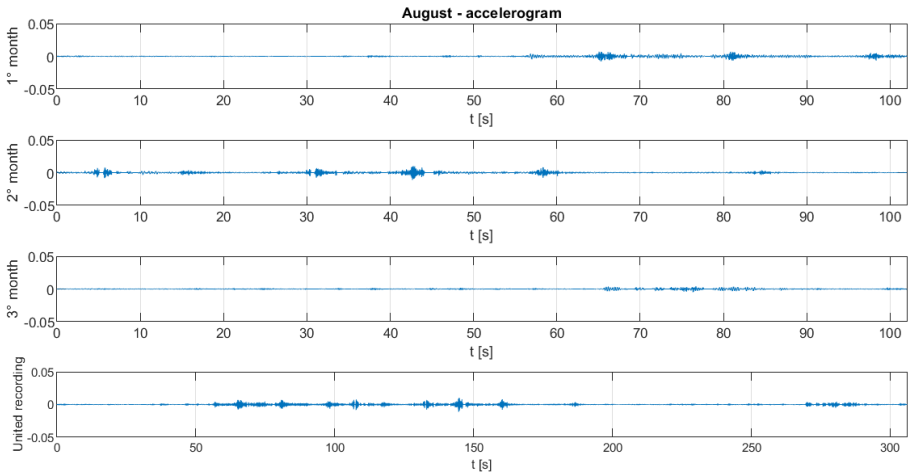


Figure 15-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

15.8.3 Transverse direction (z)

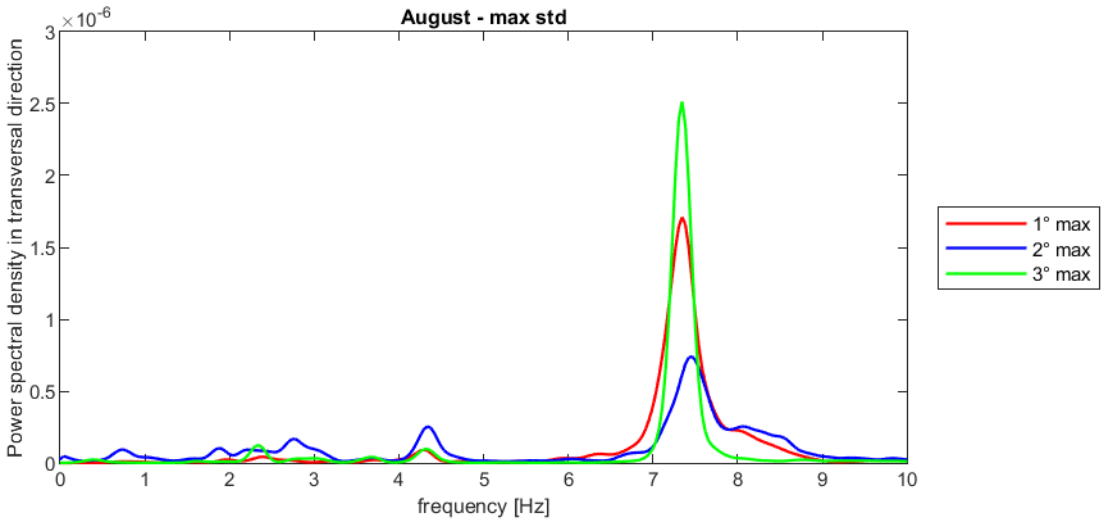


Figure 15-94: Results obtained from the 3 accelerograms with maximum SD in time domain

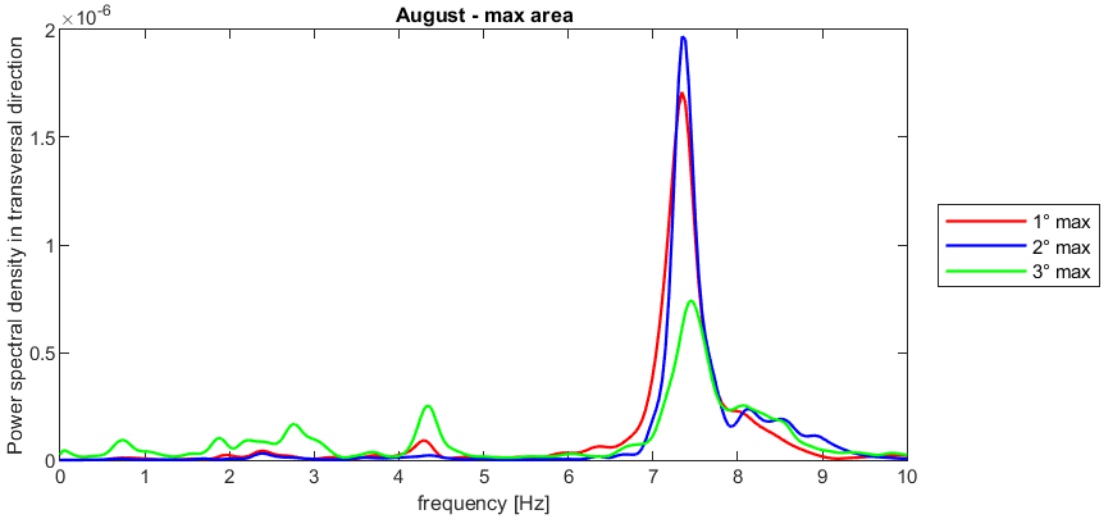


Figure 15-95: Results obtained from the 3 accelerograms with maximum area of PSD

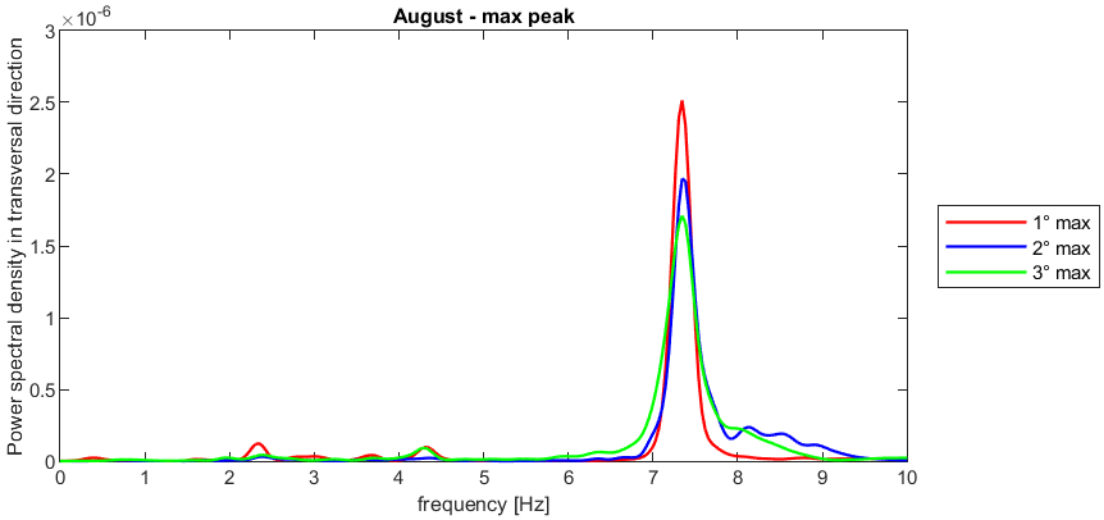


Figure 15-96: Results obtained from the 3 accelerograms with highest peak if PSD

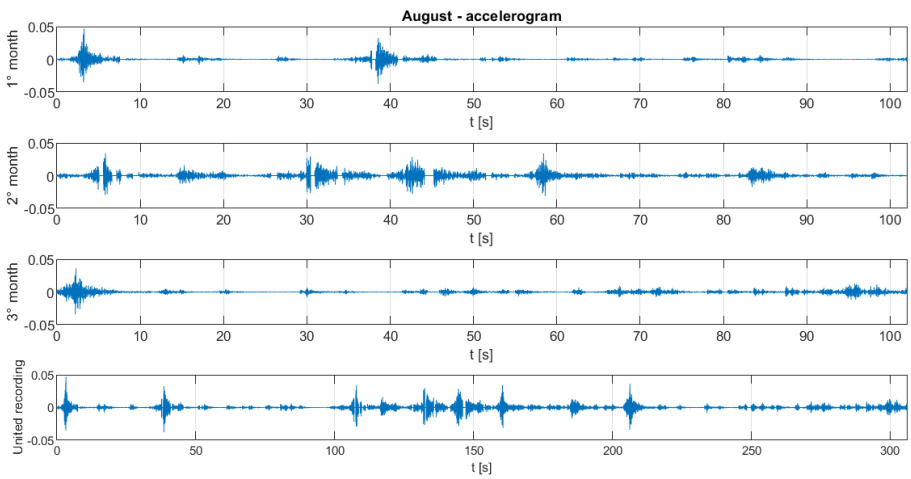


Figure 15-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

15.9 September

The results obtained for the September dataset are shown in the following tables.

Table 15-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-09-14_11-00-20	4.46E-03
	2°	2BCF9_2023-09-19_10-00-21	4.06E-03
	3°	2BCF9_2023-09-21_14-00-21	3.54E-03
Longitudinal direction (y)	1°	2BCF9_2023-09-26_15-00-21	1.19E-03
	2°	2BCF9_2023-09-26_09-00-20	9.40E-04
	3°	2BCF9_2023-09-14_11-00-20	9.07E-04
Transverse direction (z)	1°	2BCF9_2023-09-20_11-00-21	1.23E-03
	2°	2BCF9_2023-09-14_11-00-20	1.07E-03
	3°	2BCF9_2023-09-26_15-00-21	1.04E-03

Table 15-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-09-14_11-00-20	4.56E-05	2BCF9_2023-09-14_11-00-20	3.85E-06
2	2BCF9_2023-09-19_10-00-21	4.47E-05	2BCF9_2023-09-19_10-00-21	3.37E-06
3	2BCF9_2023-09-21_10-00-20	2.42E-05	2BCF9_2023-09-21_10-00-20	2.57E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-09-26_15-00-21	2.42E-06	2BCF9_2023-09-26_15-00-21	2.99E-07
2	2BCF9_2023-09-26_09-00-20	9.70E-07	2BCF9_2023-09-26_09-00-20	1.86E-07
3	2BCF9_2023-09-19_10-00-21	8.37E-07	2BCF9_2023-09-20_11-00-21	1.66E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-09-20_11-00-21	3.11E-06	2BCF9_2023-09-20_11-00-21	3.07E-07
2	2BCF9_2023-09-25_18-00-20	1.98E-06	2BCF9_2023-09-26_09-00-20	2.27E-07
3	2BCF9_2023-09-21_14-00-21	1.82E-06	2BCF9_2023-09-25_13-00-21	2.24E-07

Table 15-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	D	D	D	F	F	F
2	B	B	B	E	E	E	-	-	-
3	-	C	C	-	-	-	-	-	-

15.9.1 Vertical direction (x)

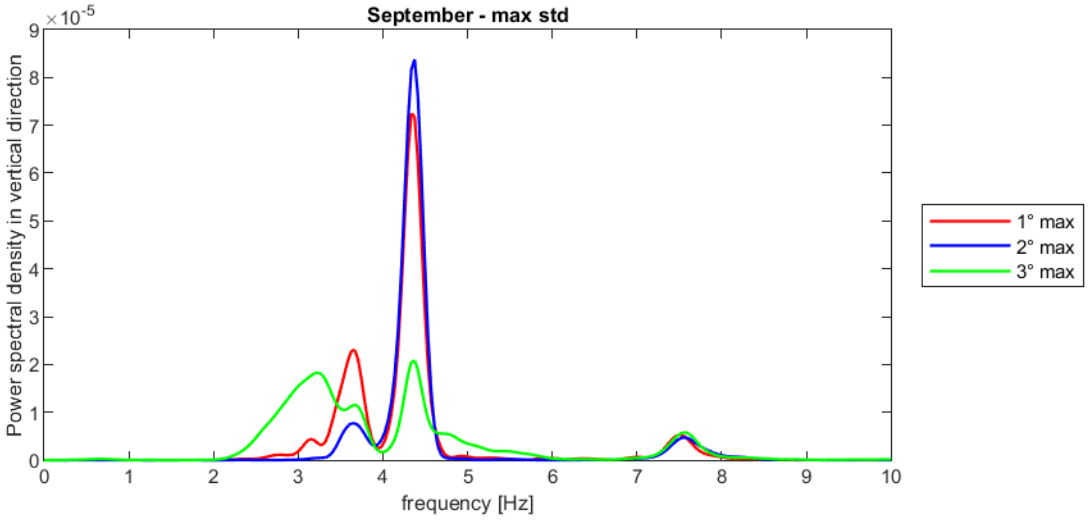


Figure 15-98: Results obtained from the 3 accelerograms with maximum SD in time domain

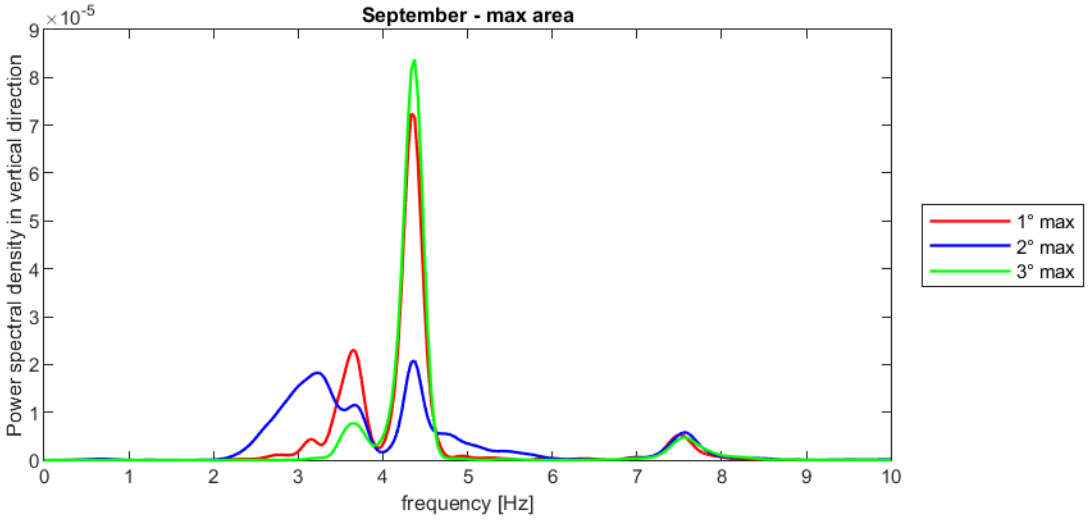


Figure 15-99: Results obtained from the 3 accelerograms with maximum area of PSD

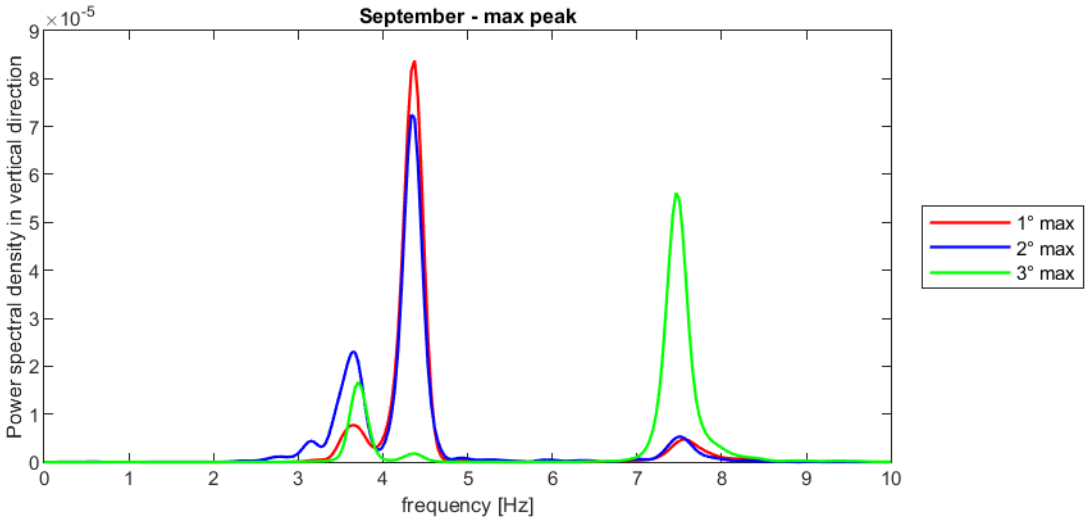


Figure 15-100: Results obtained from the 3 accelerograms with highest peak if PSD

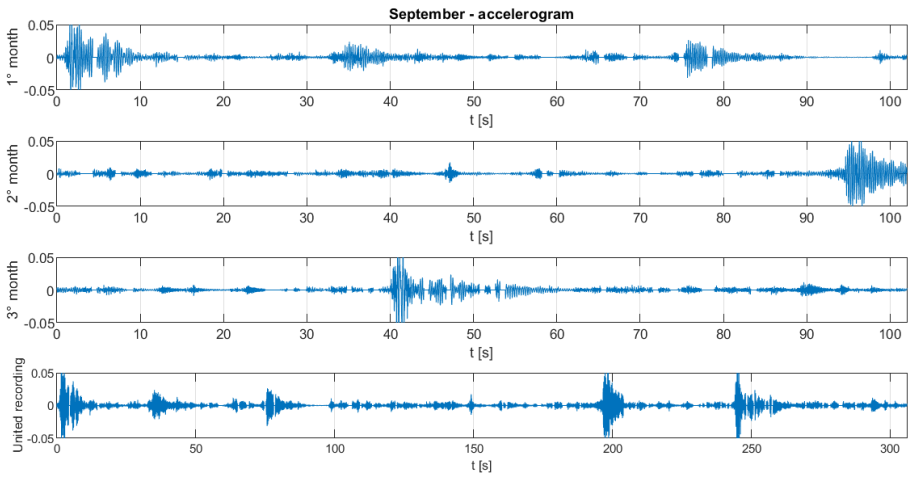


Figure 15-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.9.2 Longitudinal direction (y)

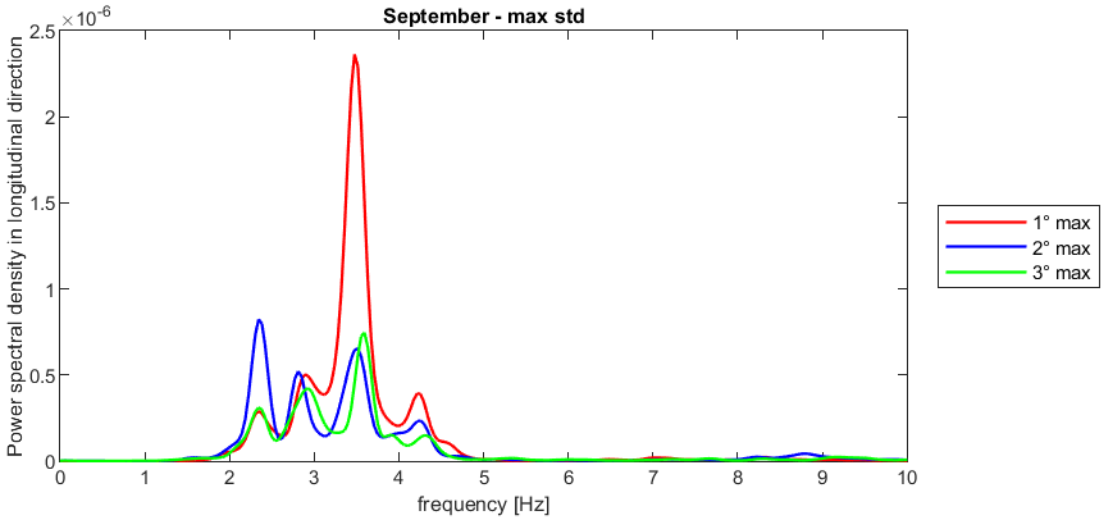


Figure 15-102: Results obtained from the 3 accelerograms with maximum SD in time domain

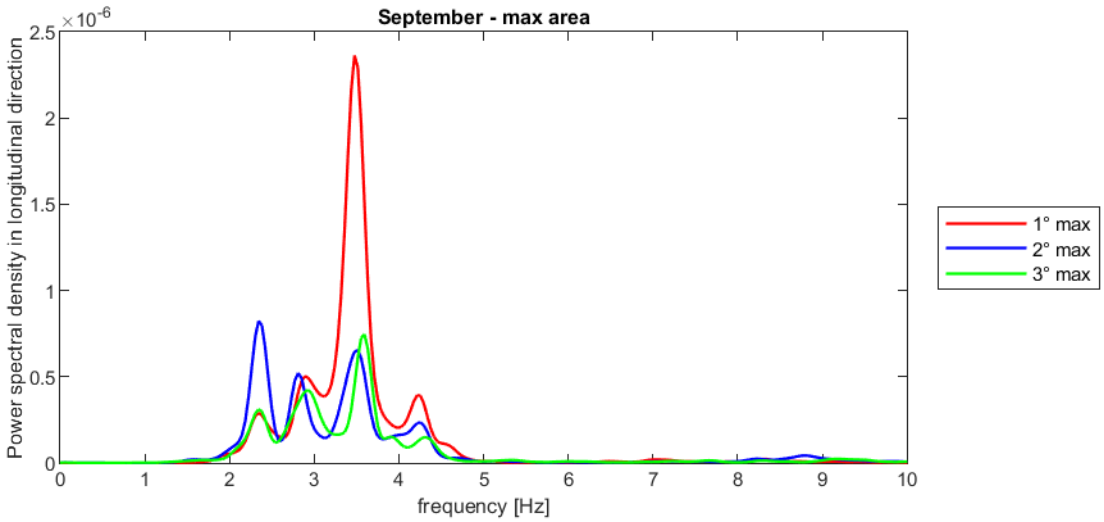


Figure 15-103: Results obtained from the 3 accelerograms with maximum area of PSD

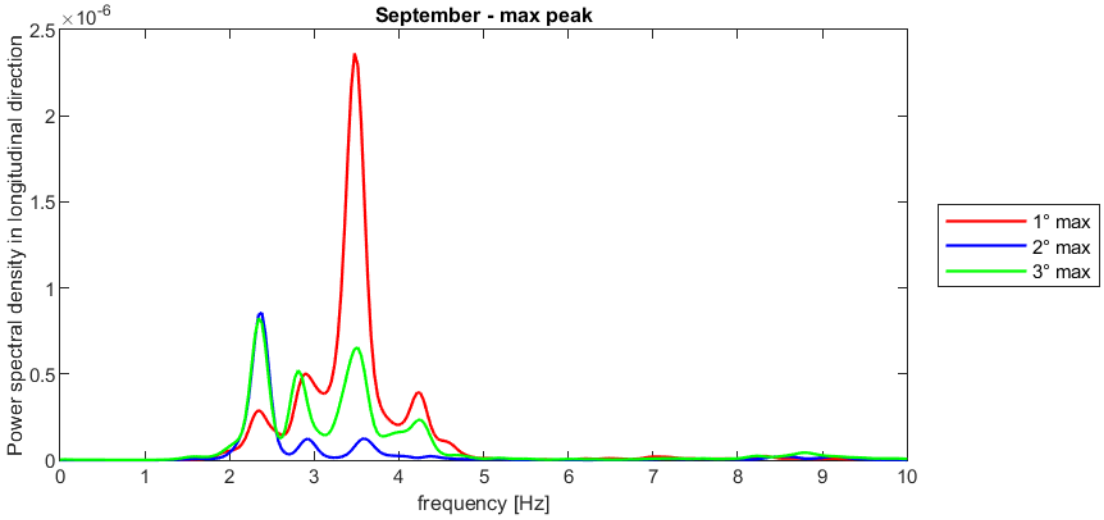


Figure 15-104: Results obtained from the 3 accelerograms with highest peak if PSD

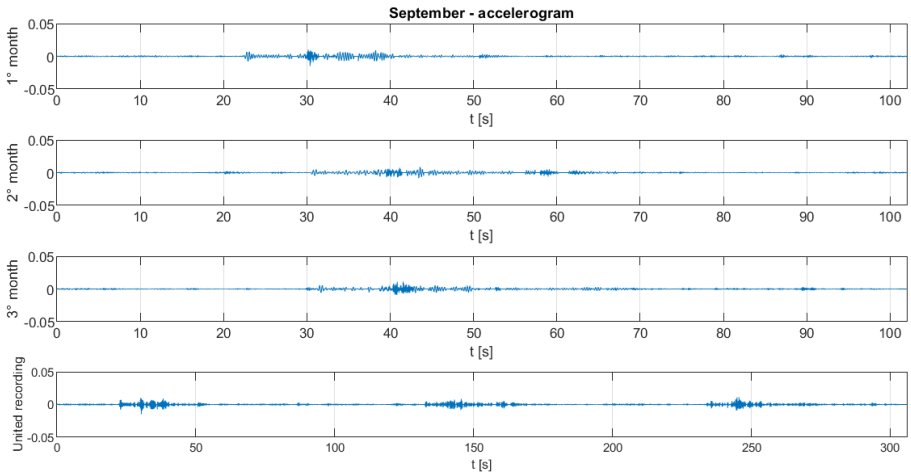


Figure 15-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

15.9.3 Transverse direction (z)

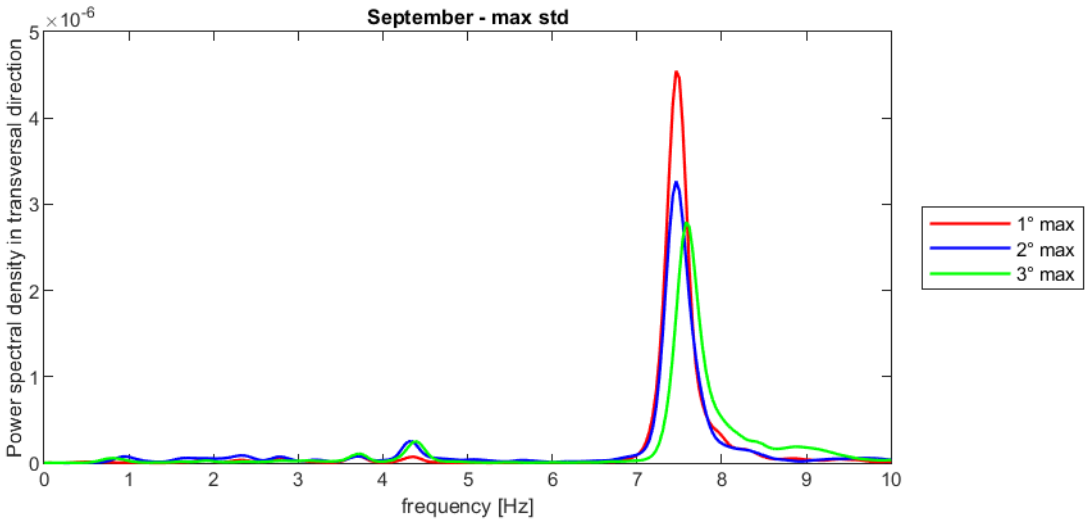


Figure 15-106: Results obtained from the 3 accelerograms with maximum SD in time domain

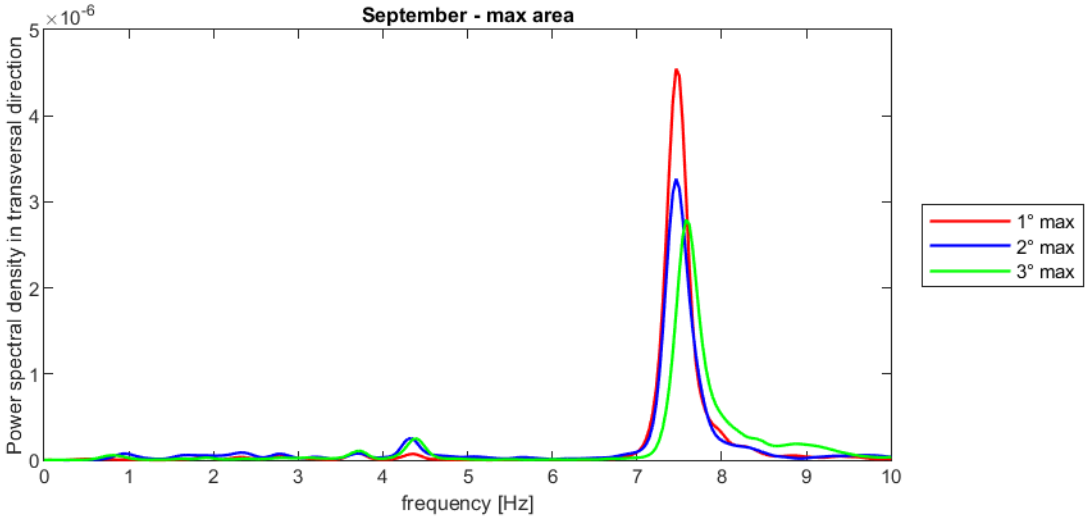


Figure 15-107: Results obtained from the 3 accelerograms with maximum area of PSD

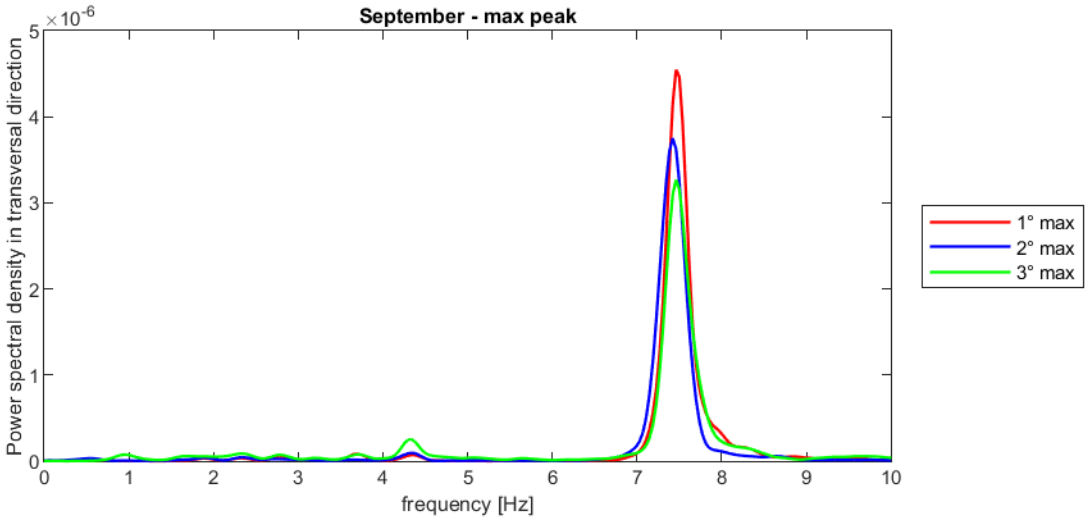


Figure 15-108: Results obtained from the 3 accelerograms with highest peak if PSD

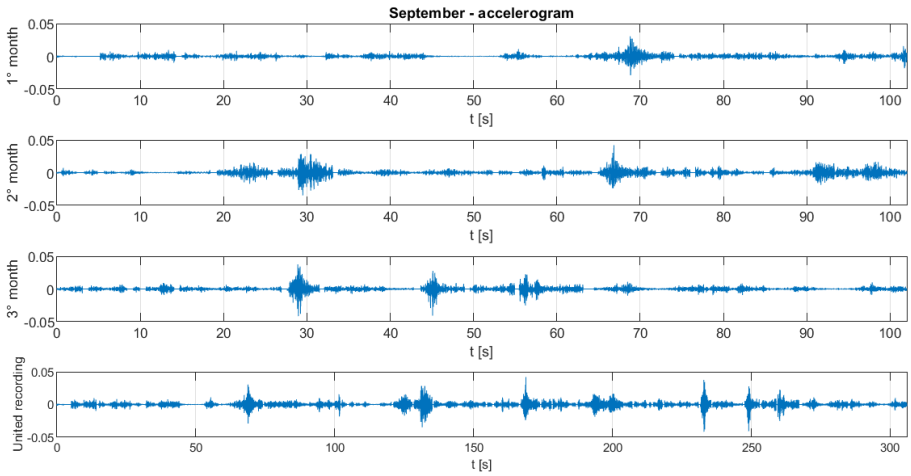


Figure 15-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

15.10 October

The results obtained for the October dataset are shown in the following tables.

Table 15-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-10-24_10-00-21	4.44E-03
	2°	2BCF9_2023-10-12_09-00-20	4.10E-03
	3°	2BCF9_2023-10-25_10-00-20	4.09E-03
Longitudinal direction (y)	1°	2BCF9_2023-10-25_10-00-20	8.01E-04
	2°	2BCF9_2023-10-12_09-00-20	7.77E-04
	3°	2BCF9_2023-10-18_15-00-21	6.80E-04
Transverse direction (z)	1°	2BCF9_2023-10-12_09-00-20	1.36E-03
	2°	2BCF9_2023-10-24_10-00-21	1.27E-03
	3°	2BCF9_2023-10-26_12-00-21	1.15E-03

Table 15-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-10-12_09-00-20	3.69E-05	2BCF9_2023-10-24_10-00-21	3.88E-06
2	2BCF9_2023-10-25_10-00-20	3.16E-05	2BCF9_2023-10-25_10-00-20	3.52E-06
3	2BCF9_2023-10-24_10-00-21	2.80E-05	2BCF9_2023-10-12_09-00-20	3.26E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-10-25_10-00-20	5.63E-07	2BCF9_2023-10-25_10-00-20	1.31E-07
2	2BCF9_2023-10-02_10-00-21	5.21E-07	2BCF9_2023-10-12_09-00-20	1.23E-07
3	2BCF9_2023-10-12_16-00-21	5.07E-07	2BCF9_2023-10-09_13-00-20	9.22E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-10-12_09-00-20	4.23E-06	2BCF9_2023-10-12_09-00-20	3.76E-07
2	2BCF9_2023-10-26_12-00-21	3.08E-06	2BCF9_2023-10-24_10-00-21	3.15E-07
3	2BCF9_2023-10-24_10-00-21	2.35E-06	2BCF9_2023-10-25_10-00-20	2.76E-07

Table 15-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	C	C	C	B	B	B
2	B	C	C	B	-	B	A	D	A
3	C	A	B	-	-	-	D	A	-

15.10.1 Vertical direction (x)

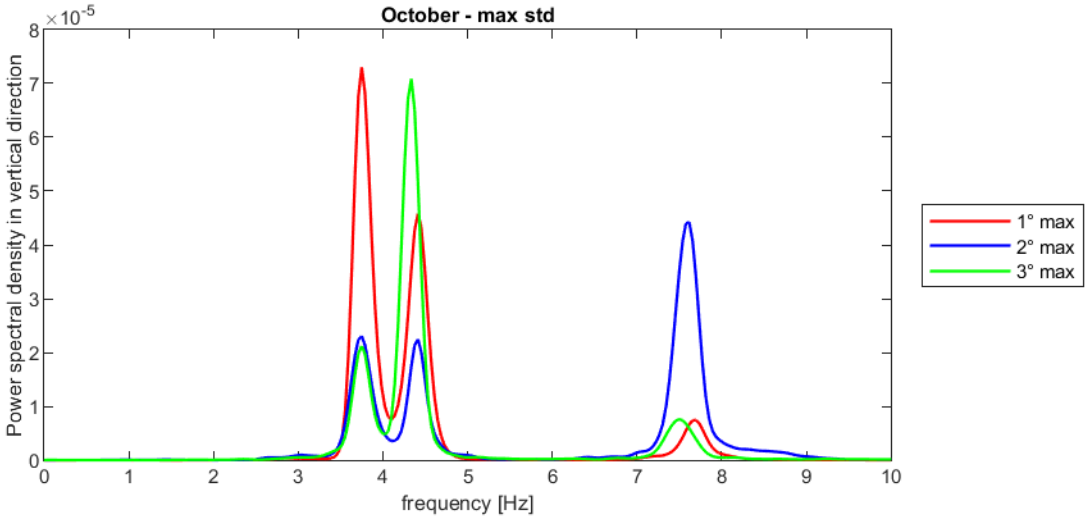


Figure 15-110: Results obtained from the 3 accelerograms with maximum SD in time domain

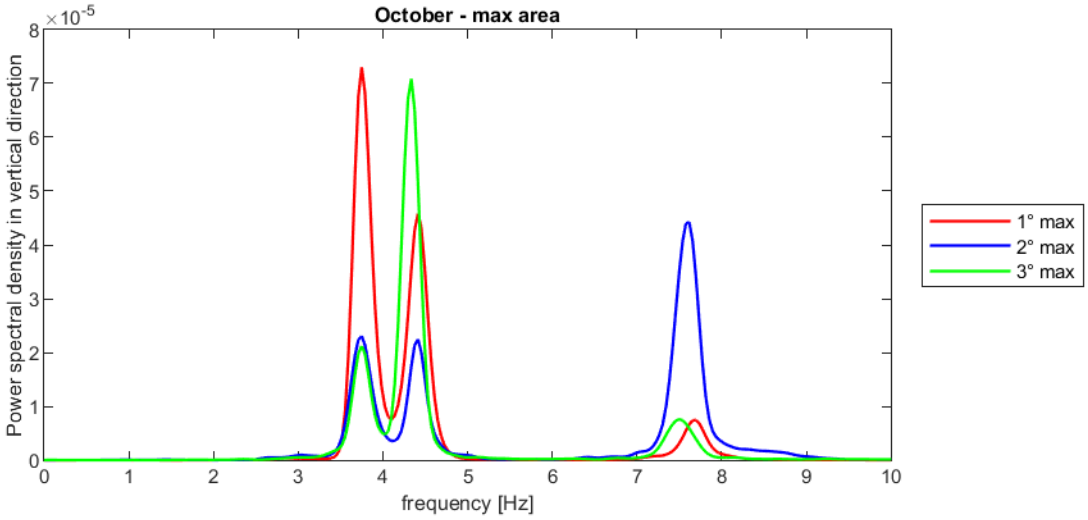


Figure 15-111: Results obtained from the 3 accelerograms with maximum area of PSD

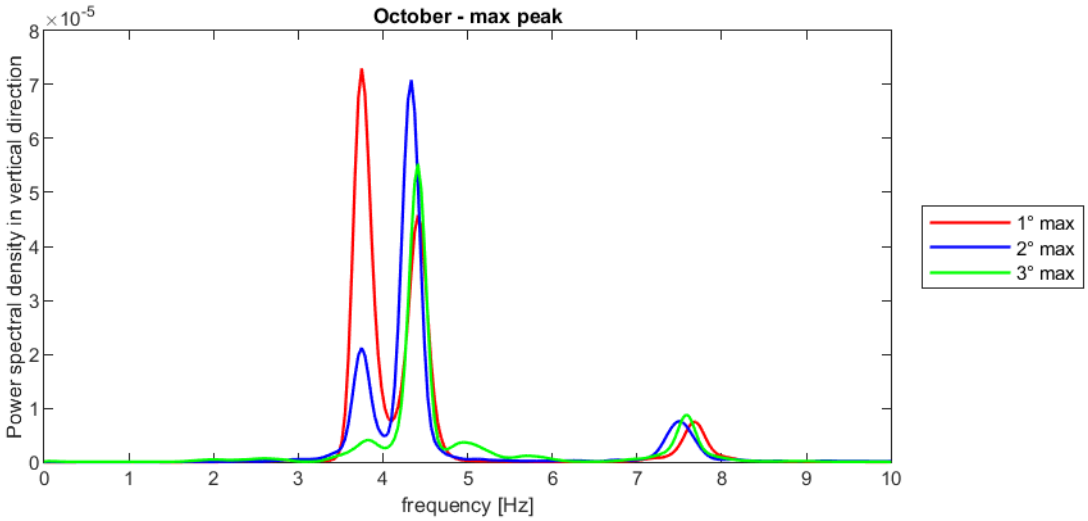


Figure 15-112: Results obtained from the 3 accelerograms with highest peak if PSD

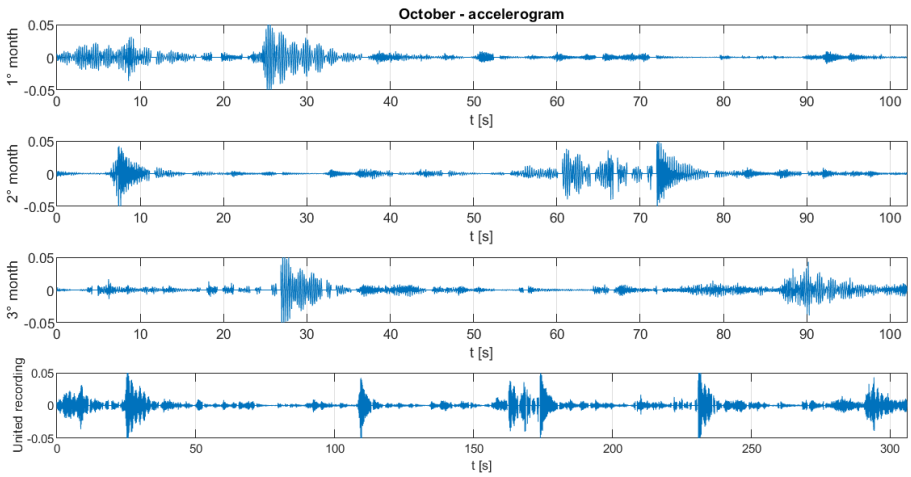


Figure 15-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.10.2 Longitudinal direction (y)

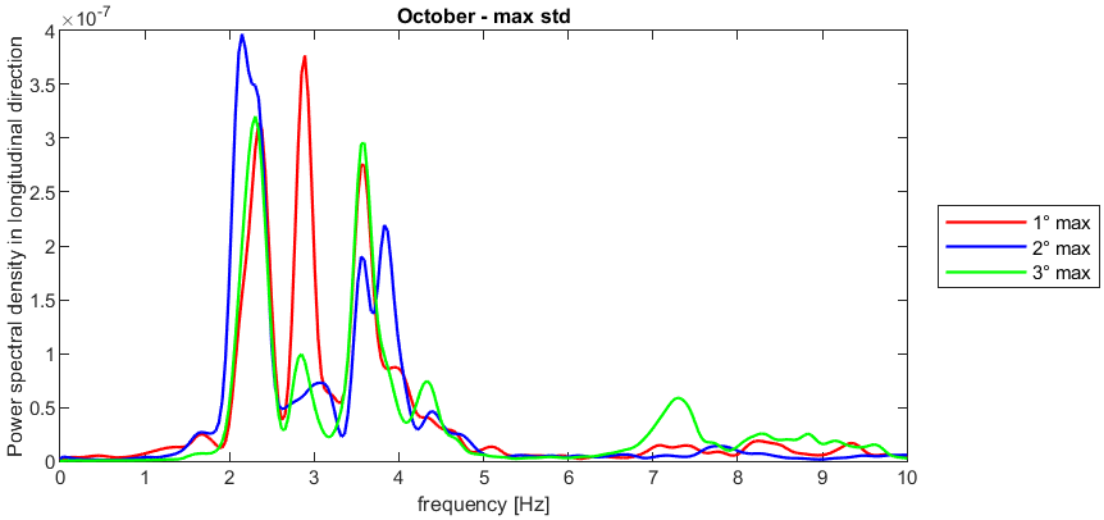


Figure 15-114: Results obtained from the 3 accelerograms with maximum SD in time domain

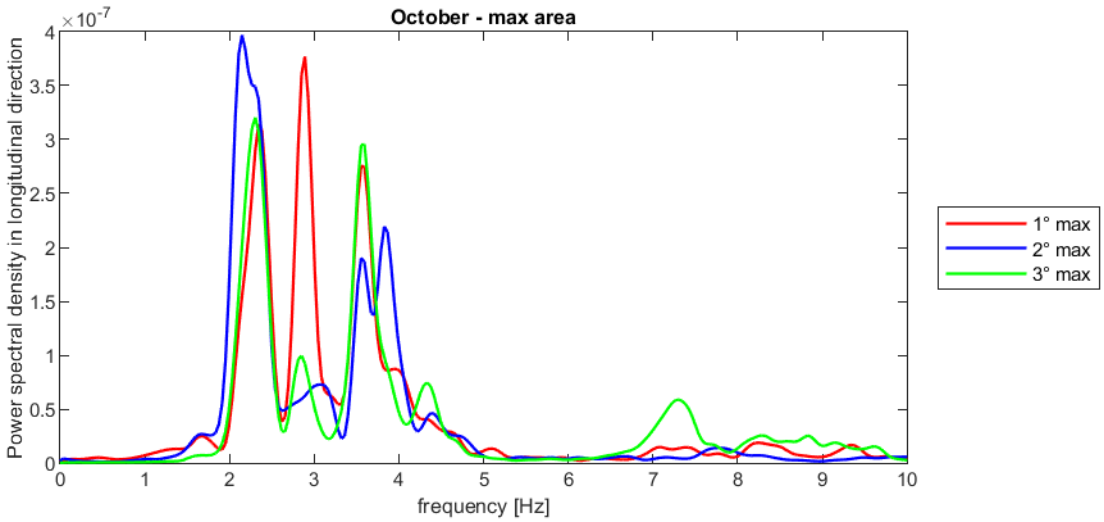


Figure 15-115: Results obtained from the 3 accelerograms with maximum area of PSD

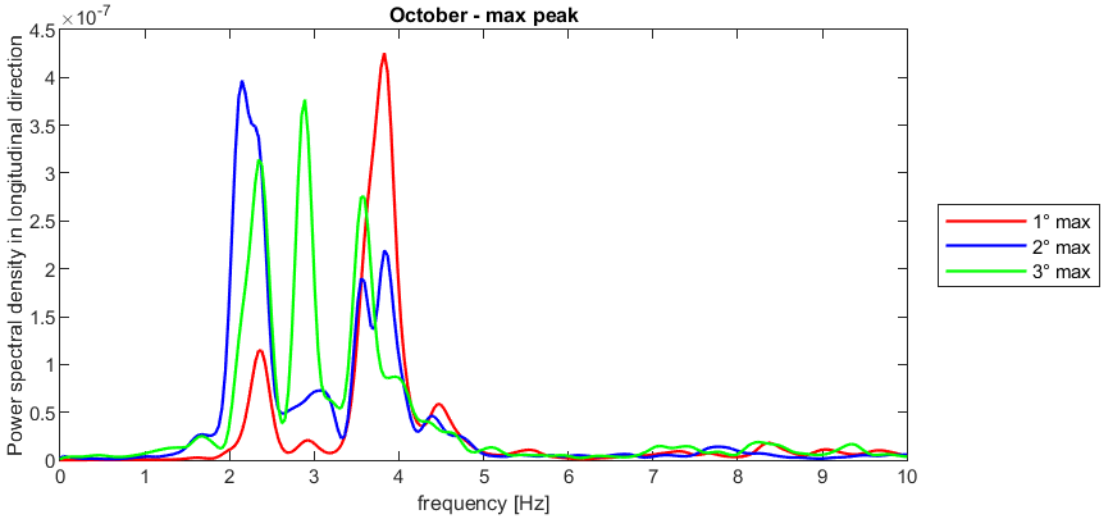


Figure 15-116: Results obtained from the 3 accelerograms with highest peak if PSD

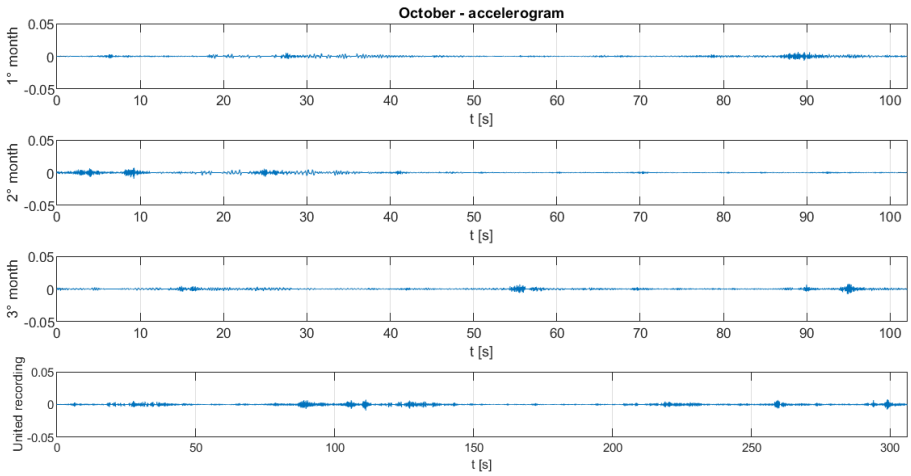


Figure 15-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

15.10.3 Transverse direction (z)

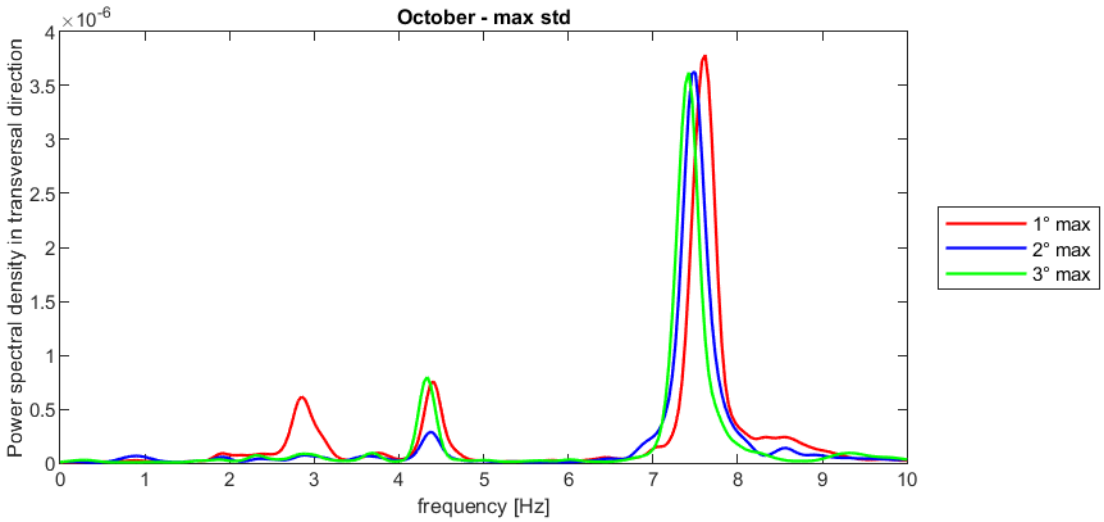


Figure 15-118: Results obtained from the 3 accelerograms with maximum SD in time domain

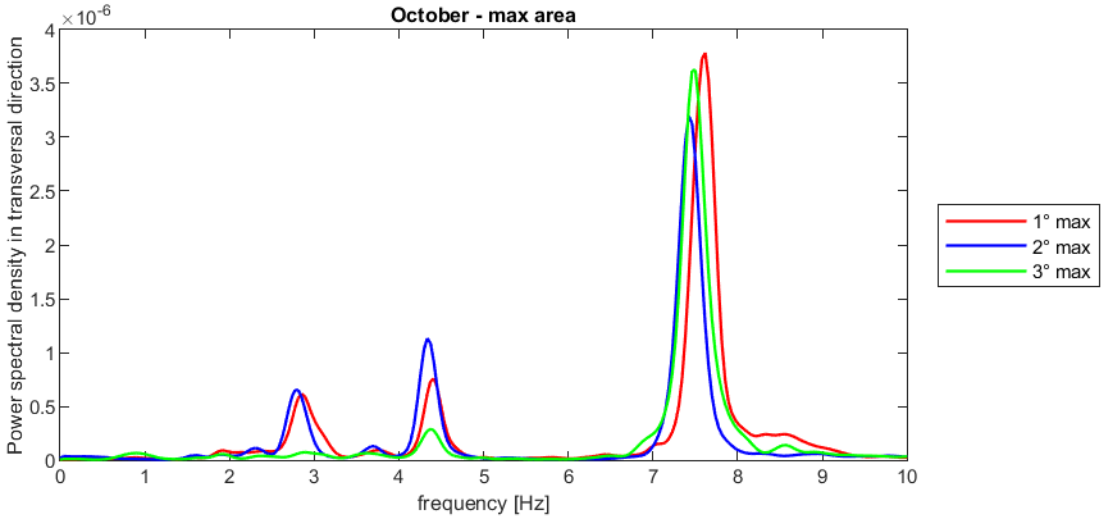


Figure 15-119: Results obtained from the 3 accelerograms with maximum area of PSD

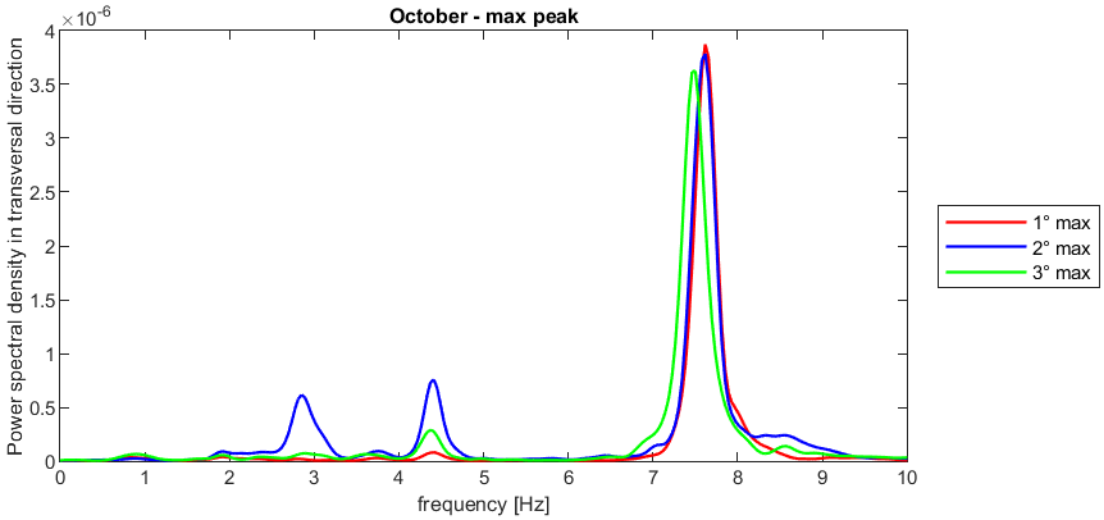


Figure 15-120: Results obtained from the 3 accelerograms with highest peak if PSD

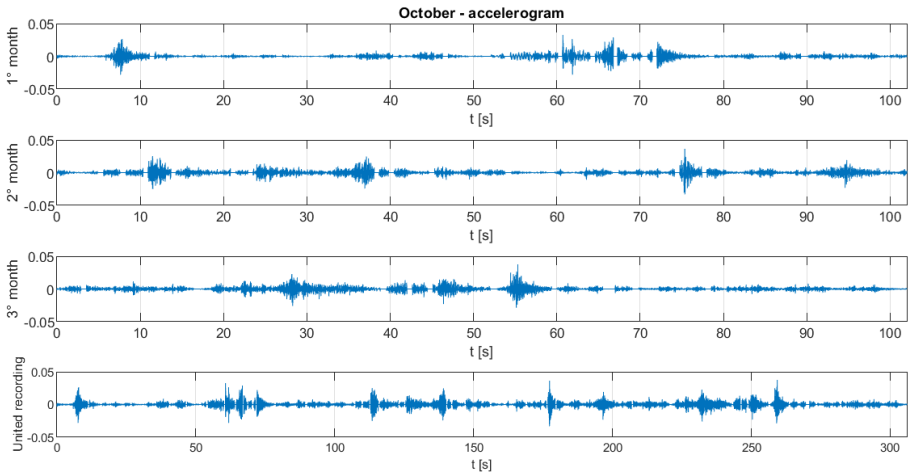


Figure 15-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

15.11 November

The results obtained for the November dataset are shown in the following tables.

Table 15-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-11-27_17-00-21	4.38E-03
	2°	2BCF9_2023-11-07_17-00-21	4.15E-03
	3°	2BCF9_2023-11-29_16-00-21	4.07E-03
Longitudinal direction (y)	1°	2BCF9_2023-11-07_17-00-21	7.19E-04
	2°	2BCF9_2023-11-28_11-00-20	7.17E-04
	3°	2BCF9_2023-11-06_17-00-20	6.84E-04
Transverse direction (z)	1°	2BCF9_2023-11-28_11-00-20	1.26E-03
	2°	2BCF9_2023-11-06_17-00-20	1.21E-03
	3°	2BCF9_2023-11-29_16-00-21	1.13E-03

Table 15-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-11-27_17-00-21	4.87E-05	2BCF9_2023-11-07_17-00-21	3.47E-06
2	2BCF9_2023-11-29_16-00-21	3.34E-05	2BCF9_2023-11-29_16-00-21	3.39E-06
3	2BCF9_2023-11-07_13-00-21	3.24E-05	2BCF9_2023-11-27_17-00-21	2.96E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-11-28_11-00-20	7.89E-07	2BCF9_2023-11-28_11-00-20	1.08E-07
2	2BCF9_2023-11-28_15-00-21	5.90E-07	2BCF9_2023-11-07_17-00-21	1.05E-07
3	2BCF9_2023-11-07_17-00-21	5.05E-07	2BCF9_2023-11-06_17-00-20	9.57E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-11-28_11-00-20	3.96E-06	2BCF9_2023-11-28_11-00-20	3.29E-07
2	2BCF9_2023-11-06_17-00-20	2.27E-06	2BCF9_2023-11-06_17-00-20	3.03E-07
3	2BCF9_2023-11-10_08-00-21	2.05E-06	2BCF9_2023-11-10_08-00-21	2.48E-07

Table 15-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	B	B	D	D	D	D	D
2	B	C	C	D	-	B	E	E	E
3	C	-	A	E	B	E	-	F	F

15.11.1 Vertical direction (x)

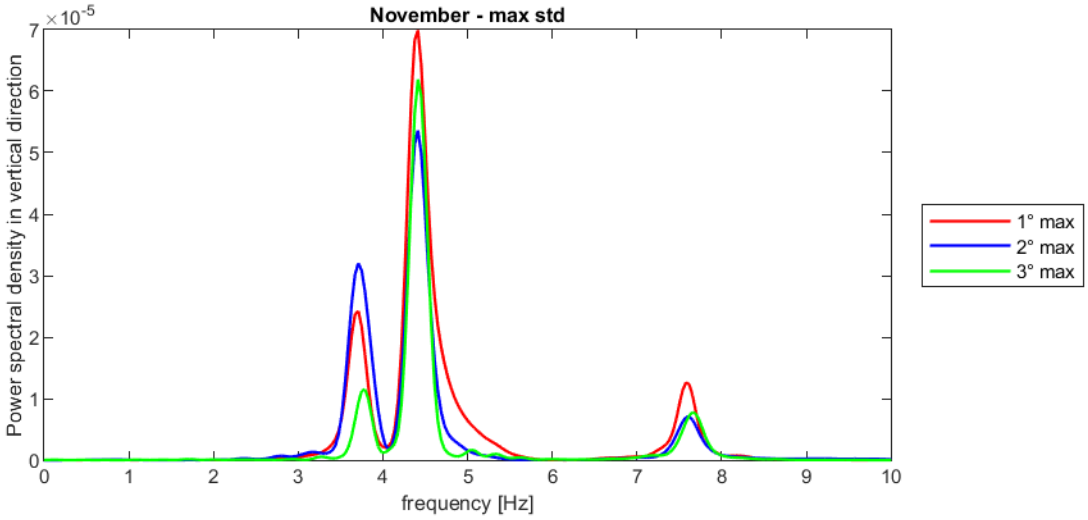


Figure 15-122: Results obtained from the 3 accelerograms with maximum SD in time domain

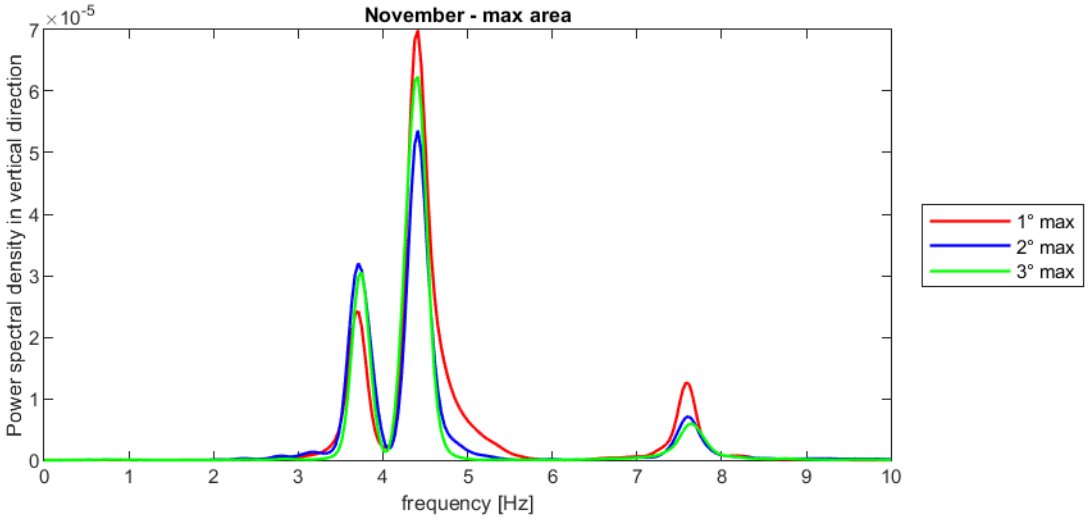


Figure 15-123: Results obtained from the 3 accelerograms with maximum area of PSD

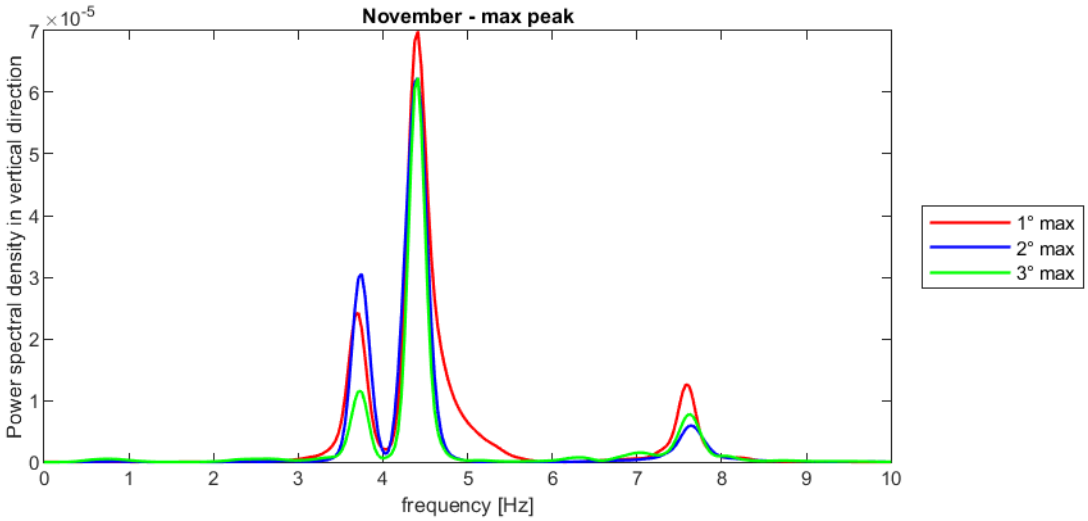


Figure 15-124: Results obtained from the 3 accelerograms with highest peak if PSD

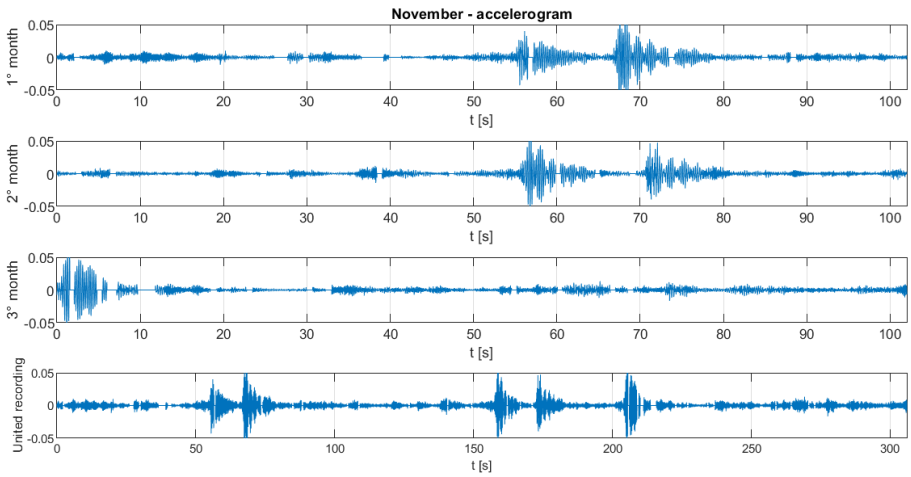


Figure 15-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.11.2 Longitudinal direction (y)

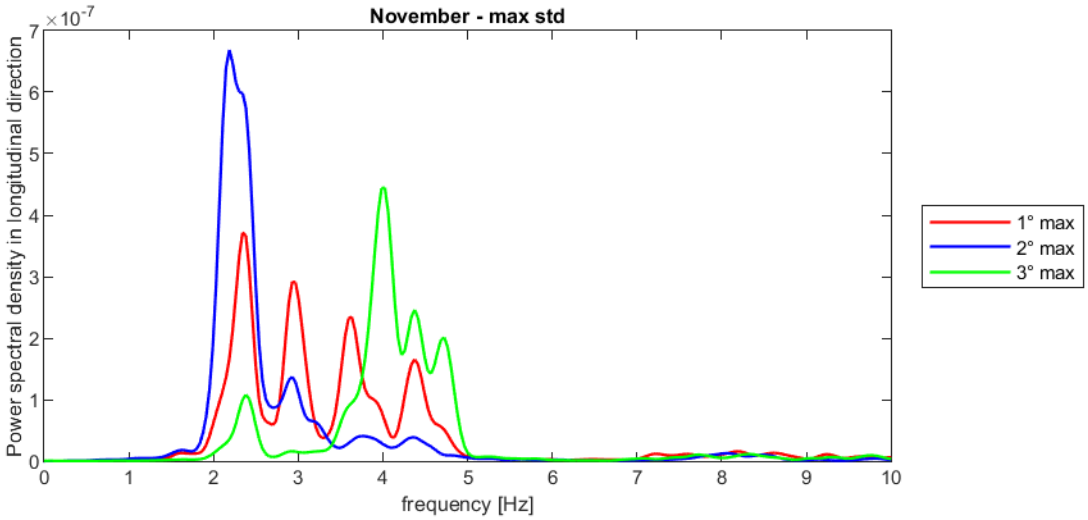


Figure 15-126: Results obtained from the 3 accelerograms with maximum SD in time domain

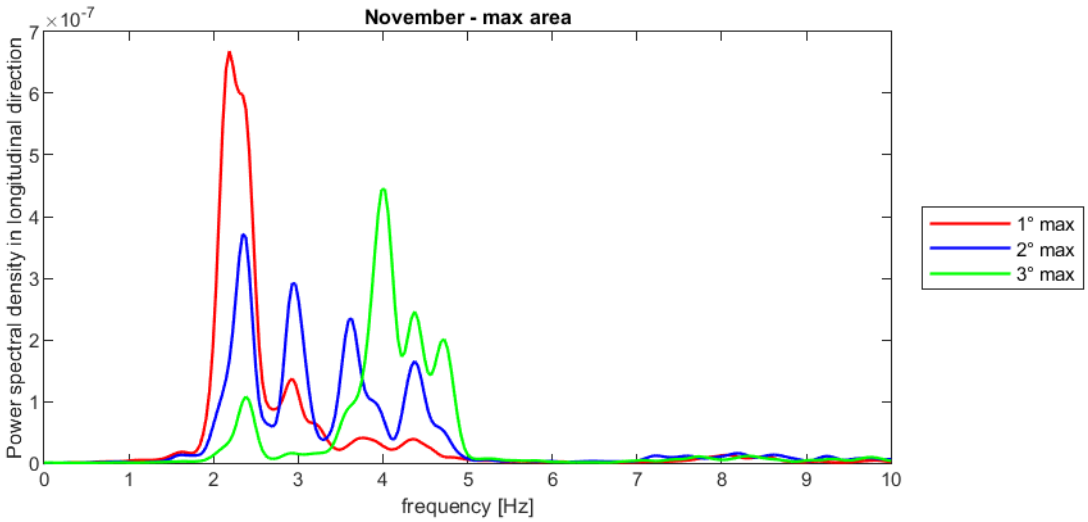


Figure 15-127: Results obtained from the 3 accelerograms with maximum area of PSD

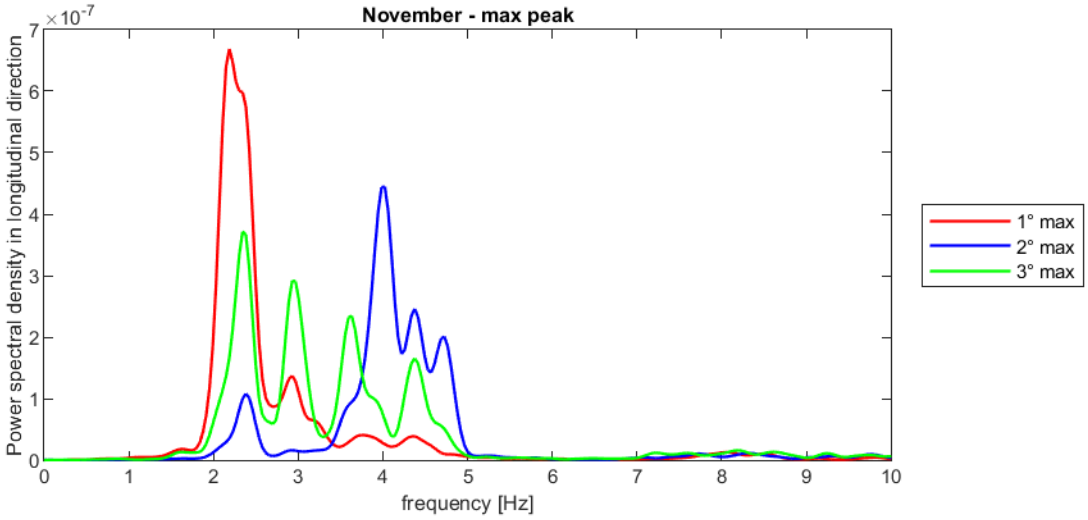


Figure 15-128: Results obtained from the 3 accelerograms with highest peak if PSD

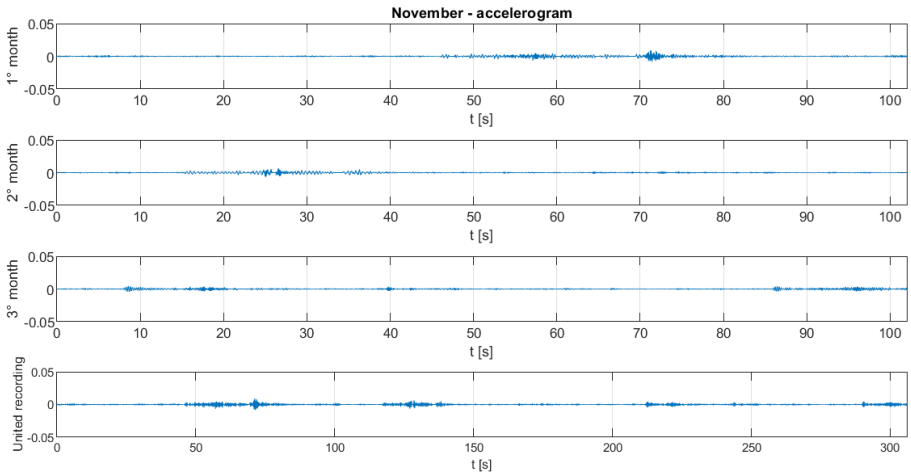


Figure 15-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

15.11.3 Transverse direction (z)

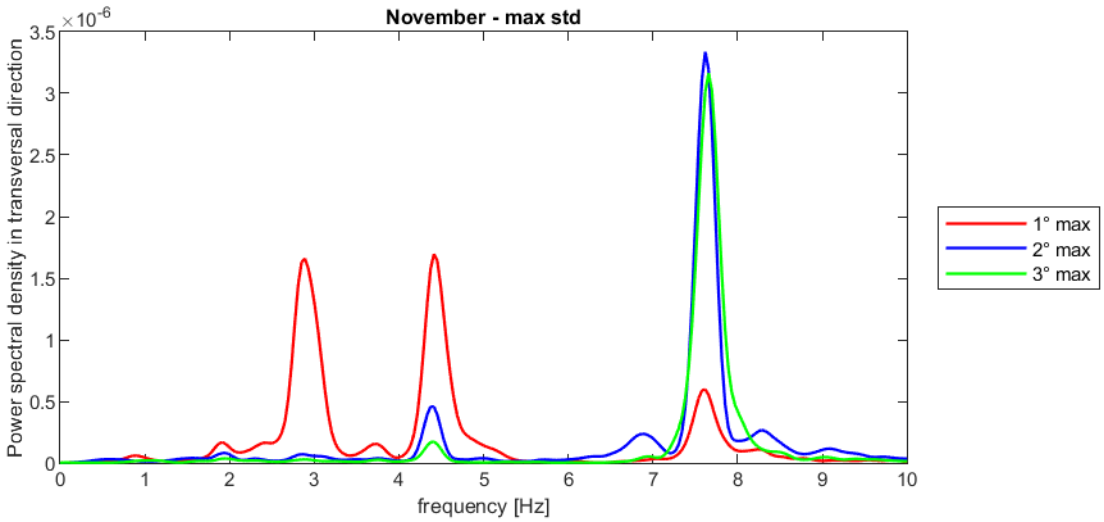


Figure 15-130: Results obtained from the 3 accelerograms with maximum SD in time domain

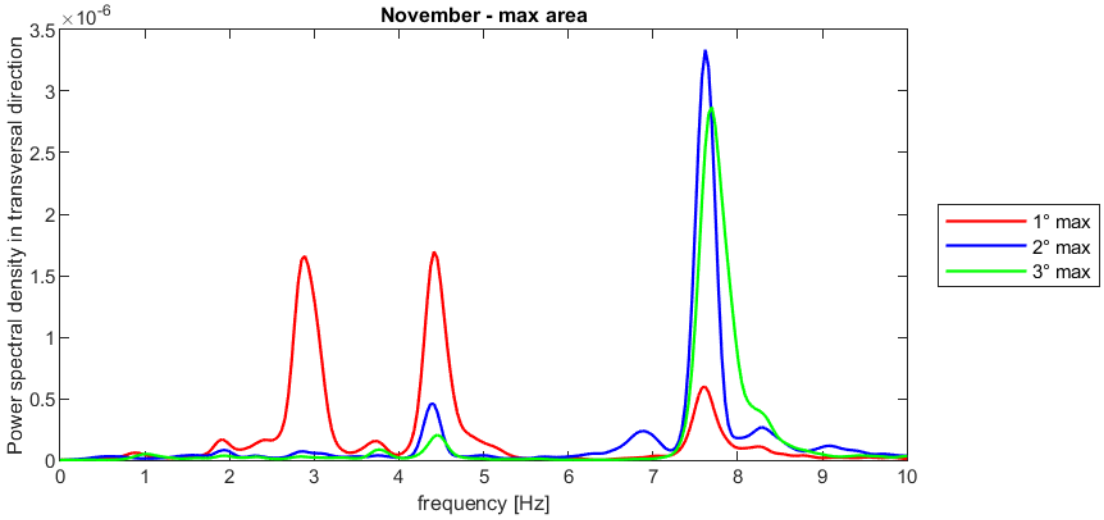


Figure 15-131: Results obtained from the 3 accelerograms with maximum area of PSD

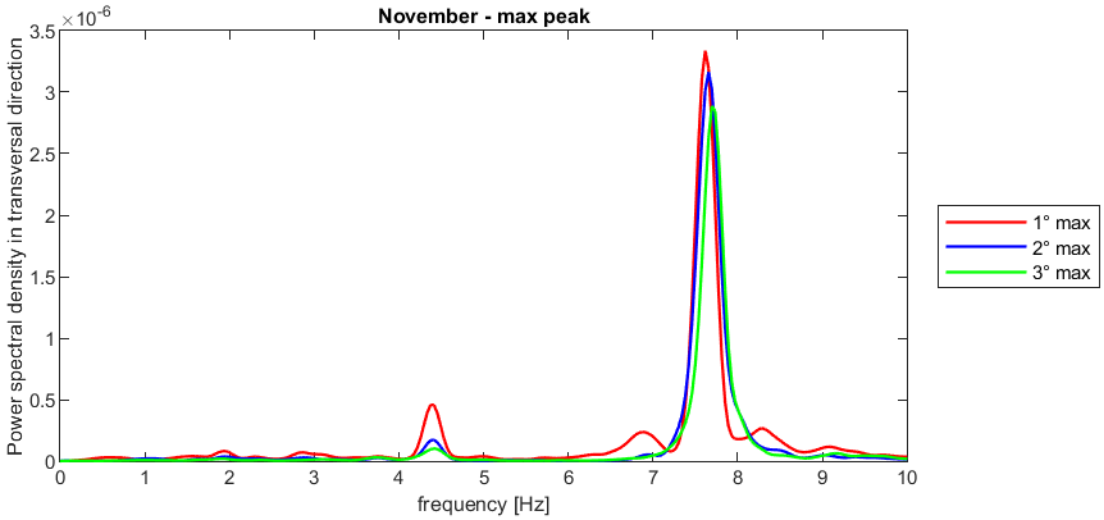


Figure 15-132: Results obtained from the 3 accelerograms with highest peak if PSD

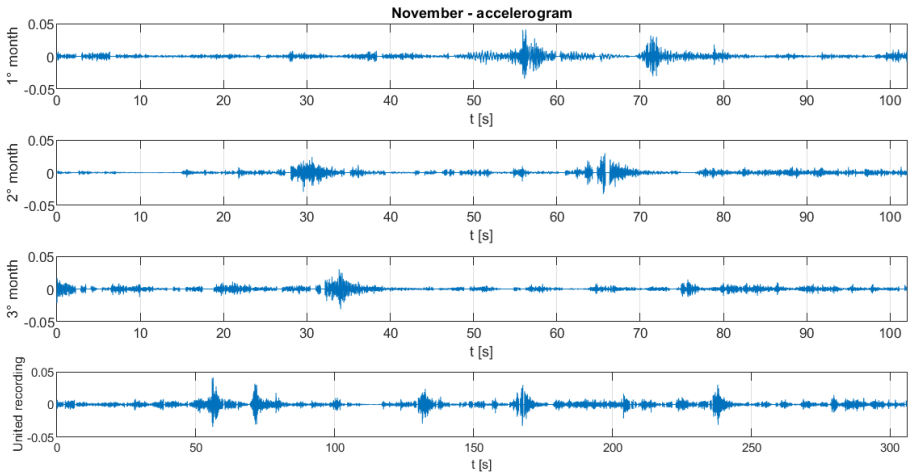


Figure 15-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

15.12 December

The results obtained for the December dataset are shown in the following tables.

Table 15-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCF9_2023-12-28_09-00-20	4.97E-03
	2°	2BCF9_2023-12-14_16-00-20	4.61E-03
	3°	2BCF9_2023-12-09_11-00-20	4.46E-03
Longitudinal direction (y)	1°	2BCF9_2023-12-28_09-00-20	7.64E-04
	2°	2BCF9_2023-12-18_08-00-20	7.13E-04
	3°	2BCF9_2023-12-06_10-00-21	7.07E-04
Transverse direction (z)	1°	2BCF9_2023-12-14_16-00-20	1.26E-03
	2°	2BCF9_2023-12-18_08-00-20	1.21E-03
	3°	2BCF9_2023-12-28_09-00-20	1.16E-03

Table 15-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-12-09_11-00-20	5.68E-05	2BCF9_2023-12-28_09-00-20	5.00E-06
2	2BCF9_2023-12-28_09-00-20	3.86E-05	2BCF9_2023-12-09_11-00-20	3.90E-06
3	2BCF9_2023-12-14_16-00-20	3.19E-05	2BCF9_2023-12-14_16-00-20	3.77E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-12-09_11-00-20	7.72E-07	2BCF9_2023-12-28_09-00-20	1.19E-07
2	2BCF9_2023-12-28_09-00-20	6.22E-07	2BCF9_2023-12-18_08-00-20	1.03E-07
3	2BCF9_2023-12-18_08-00-20	5.38E-07	2BCF9_2023-12-11_14-00-20	1.02E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCF9_2023-12-14_16-00-20	2.86E-06	2BCF9_2023-12-18_08-00-20	3.06E-07
2	2BCF9_2023-12-04_11-00-21	2.61E-06	2BCF9_2023-12-14_16-00-20	2.73E-07
3	2BCF9_2023-12-07_19-00-21	2.53E-06	2BCF9_2023-12-28_09-00-20	2.72E-07

Table 15-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	A	-	A	B	B	D
2	B	A	C	D	A	D	D	-	B
3	C	B	B	-	D	-	A	-	A

15.12.1 Vertical direction (x)

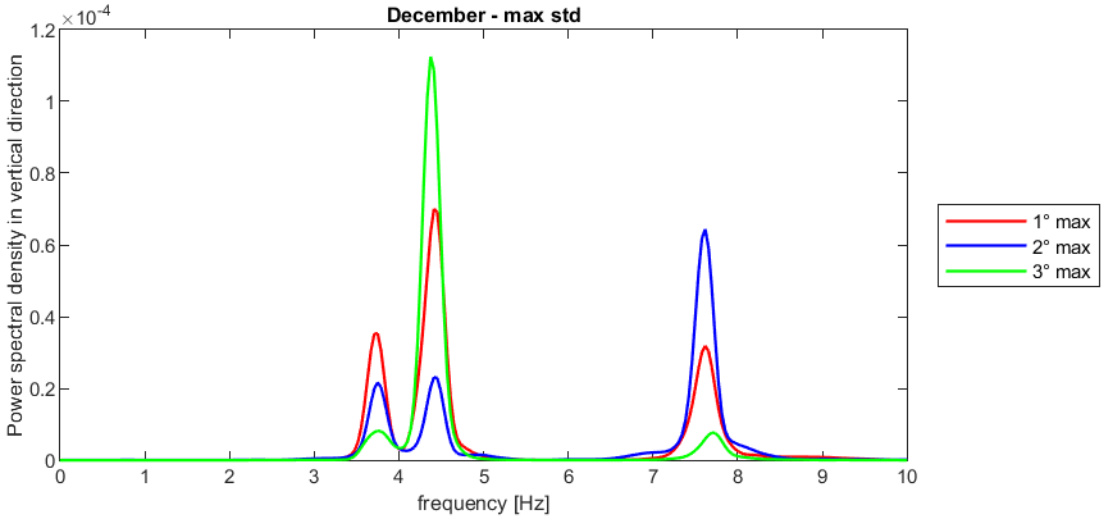


Figure 15-134: Results obtained from the 3 accelerograms with maximum SD in time domain

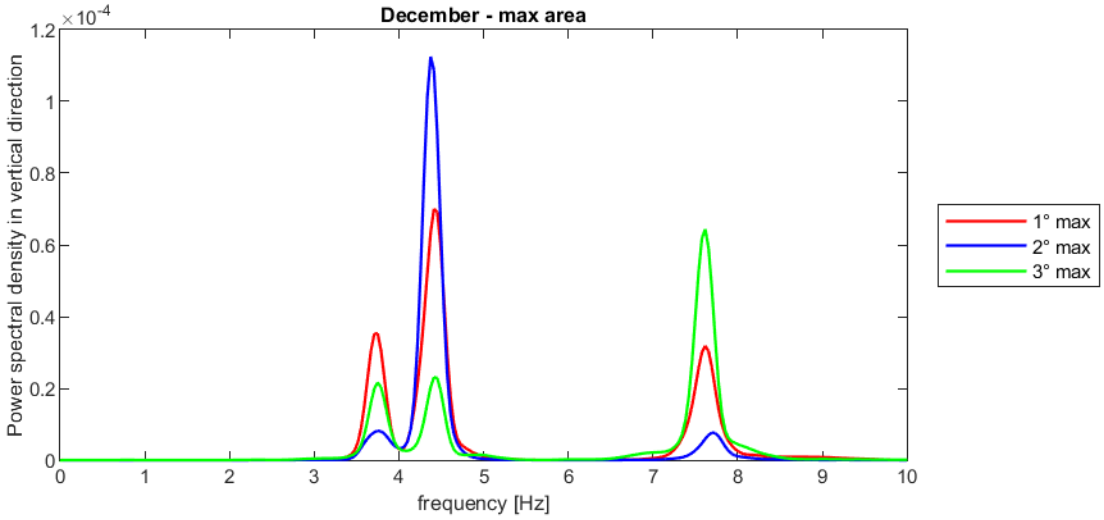


Figure 15-135: Results obtained from the 3 accelerograms with maximum area of PSD

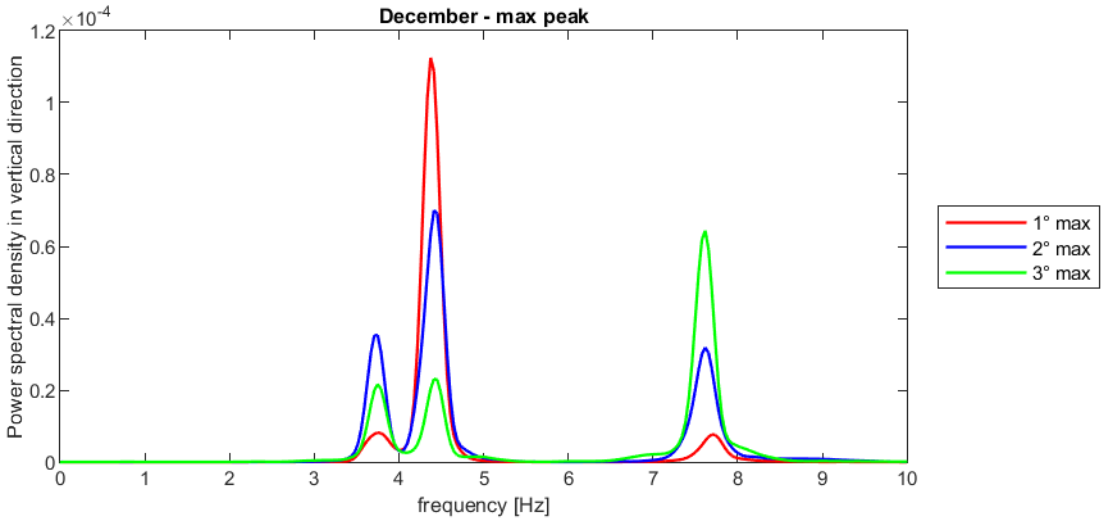


Figure 15-136: Results obtained from the 3 accelerograms with highest peak if PSD

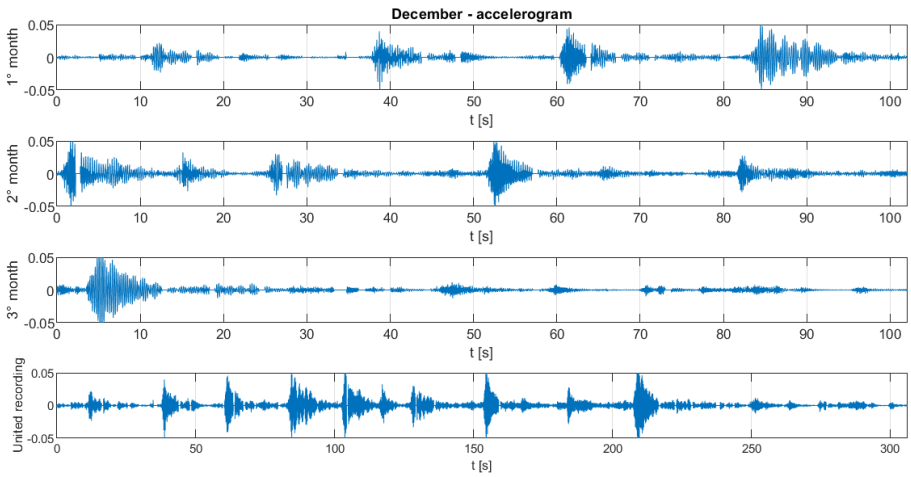


Figure 15-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

15.12.2 Longitudinal direction (y)

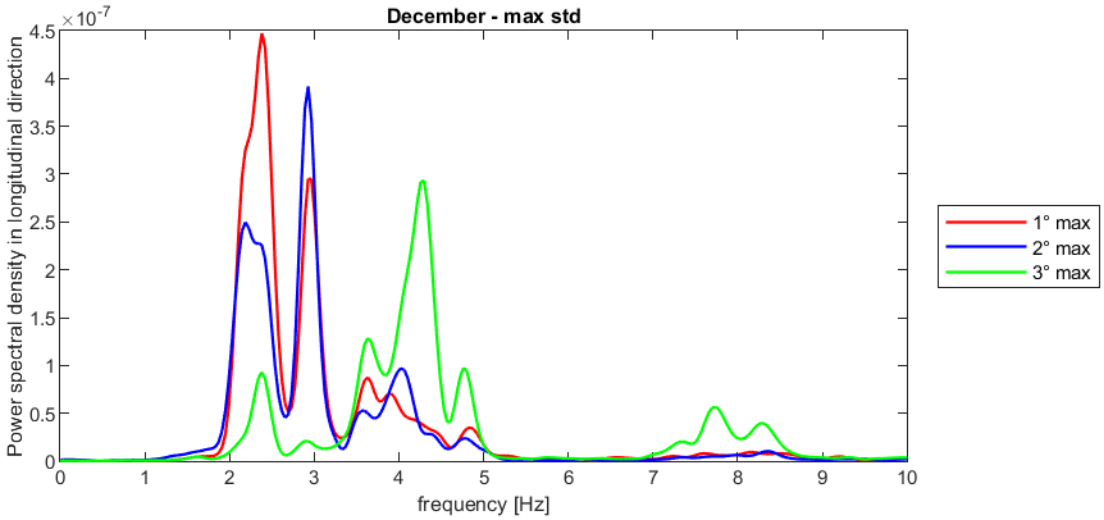


Figure 15-138: Results obtained from the 3 accelerograms with maximum SD in time domain

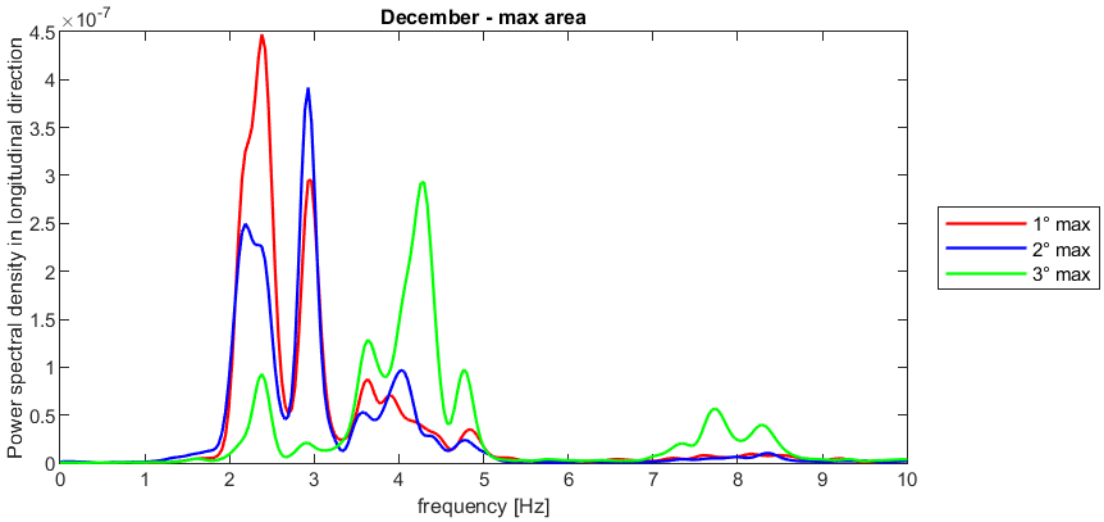


Figure 15-139: Results obtained from the 3 accelerograms with maximum area of PSD

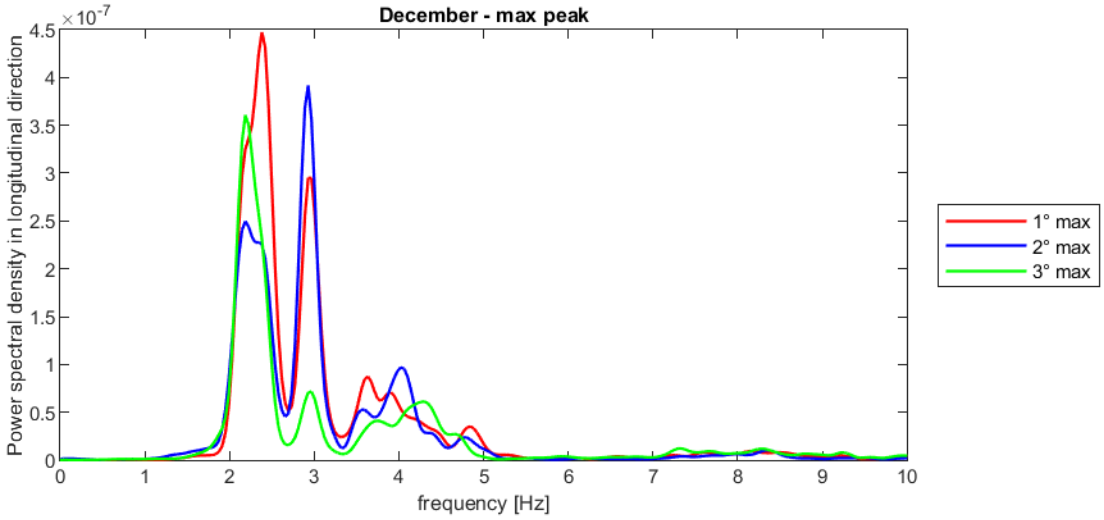


Figure 15-140: Results obtained from the 3 accelerograms with highest peak if PSD

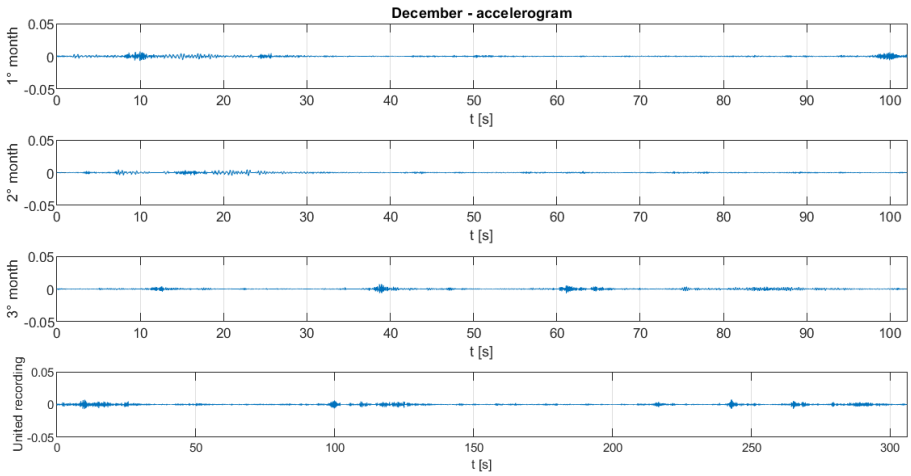


Figure 15-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

15.12.3 Transverse direction (z)

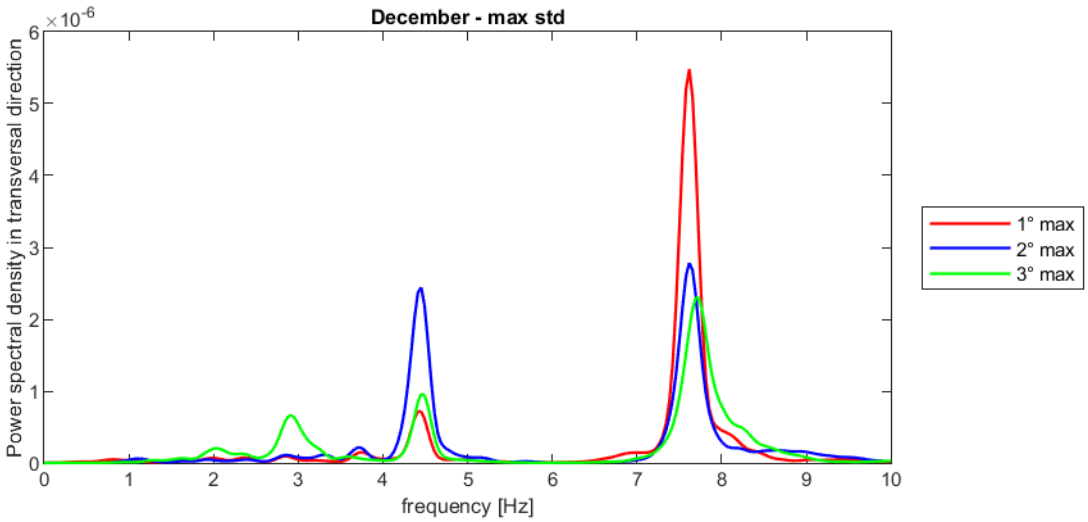


Figure 15-142: Results obtained from the 3 accelerograms with maximum SD in time domain

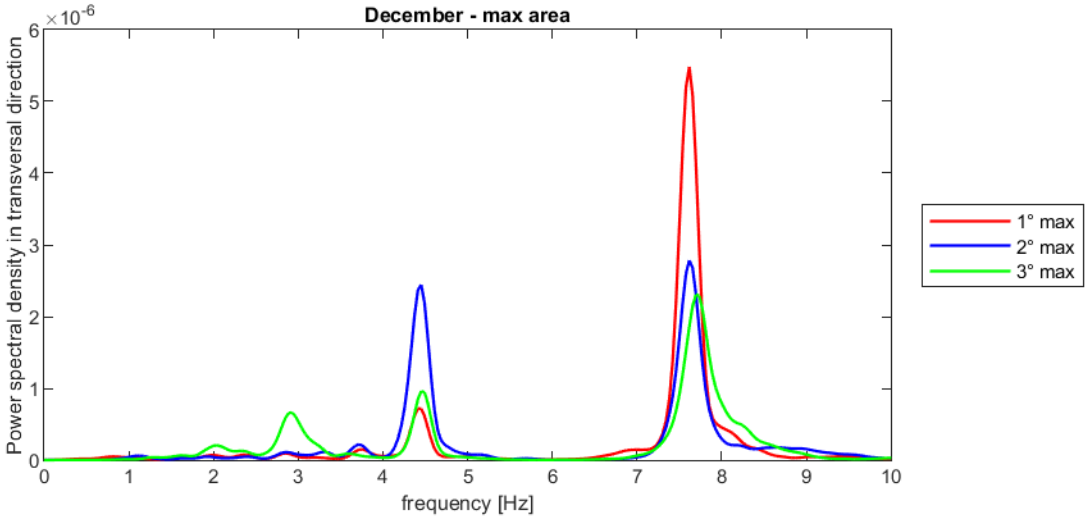


Figure 15-143: Results obtained from the 3 accelerograms with maximum area of PSD

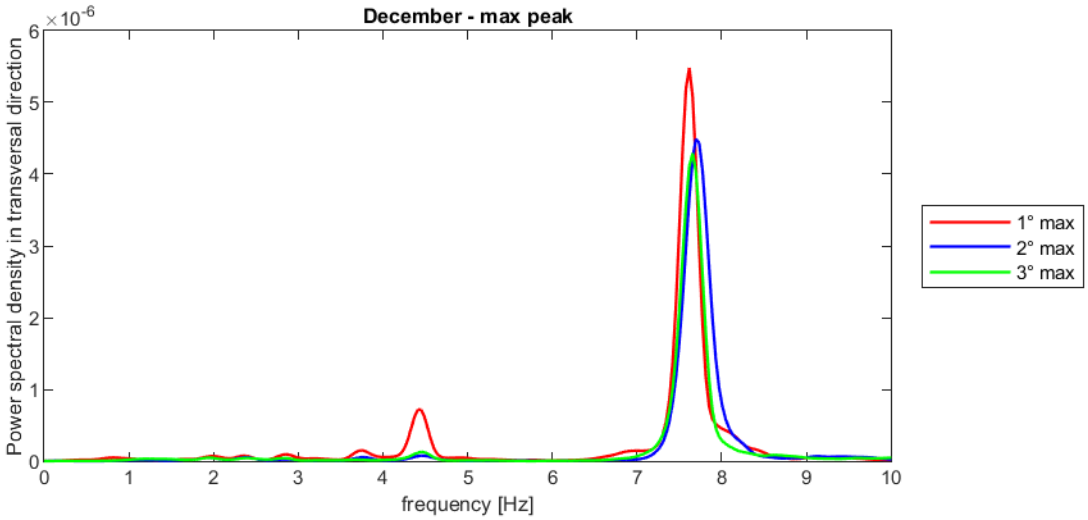


Figure 15-144: Results obtained from the 3 accelerograms with highest peak if PSD

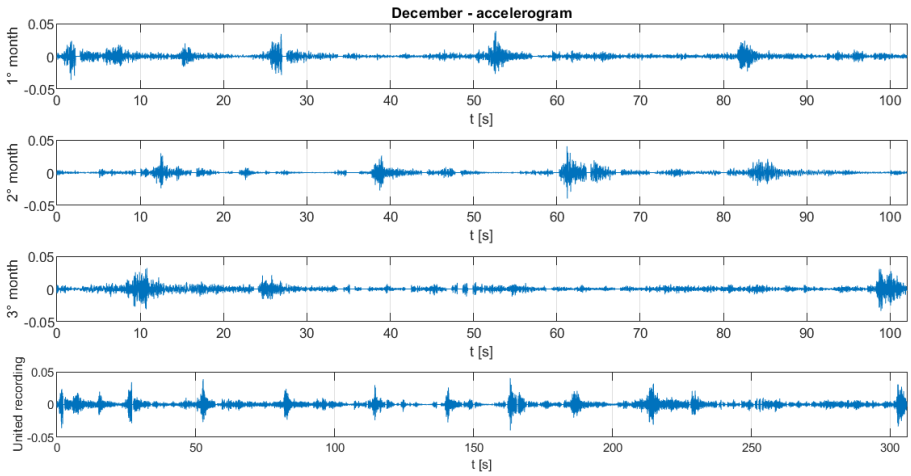


Figure 15-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

15.13 Analysis of the complete 2023 year

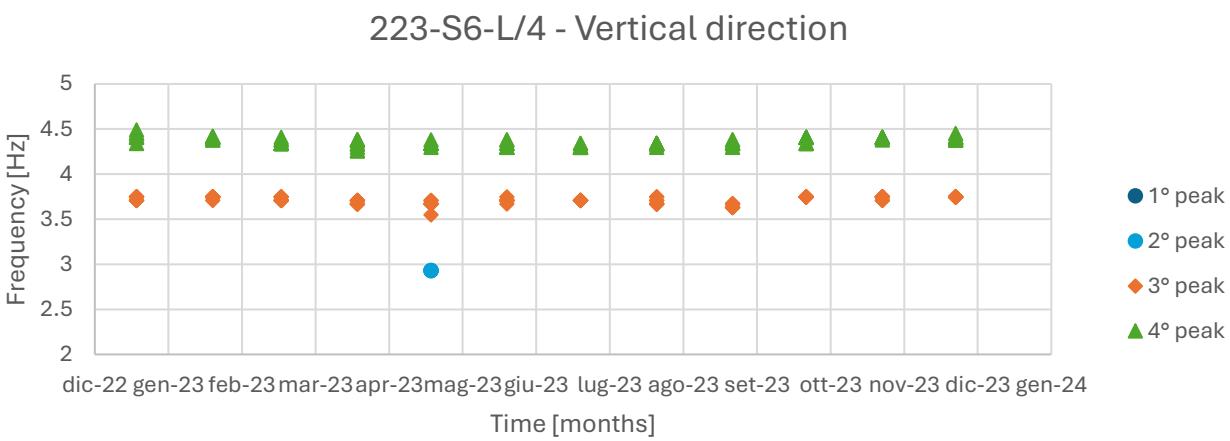
All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

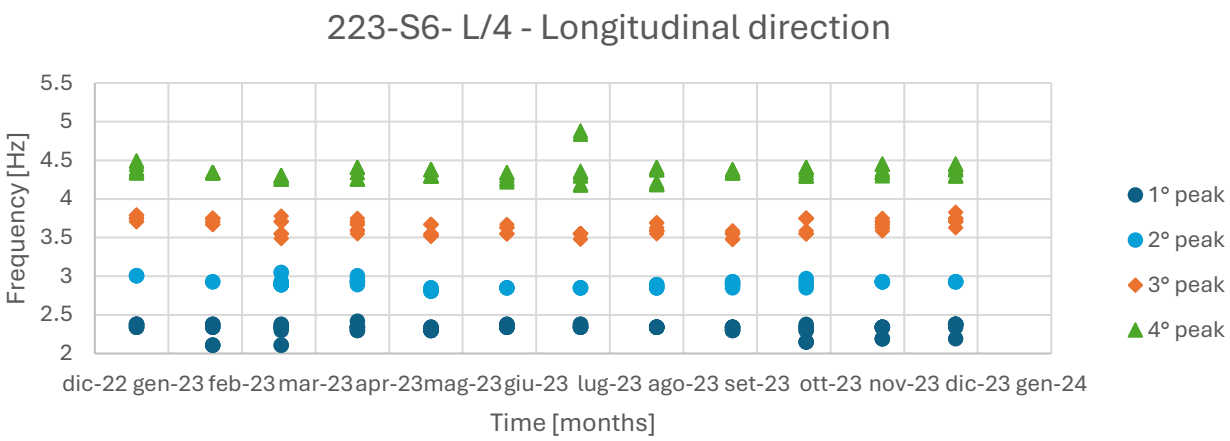
Table 15-37: Main identified frequencies for sensor 2BCF9 – bridge 223 – Sp6 – L/4

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	0	3	108	108	107	59	101	99	50	79	26	82
	MEAN		**2.93**	**3.71**	**4.36**	**2.32**	**2.90**	**3.64**	**4.35**	**2.06**	**2.84**	**3.74**	**4.35**
	SD		0.00	0.04	0.05	0.07	0.06	0.09	0.10	0.16	0.07	0.06	0.08
	C.o.V.		0.0%	1.0%	1.0%	2.9%	1.9%	2.5%	2.3%	7.6%	2.4%	1.6%	1.9%
	Rating		**3%**	**100%**	**100%**	**84%**	**50%**	**82%**	**82%**	**29%**	**65%**	**23%**	**71%**
1	gen-23			3.75	4.42	2.38	3.01	3.71	4.45				4.38
2	gen-23			3.71	4.45	2.34		3.75	4.34		2.85		4.45
3	gen-23			3.75	4.34	2.38		3.79	4.39		2.85		4.38
1	gen-23			3.75	4.41	2.38	3.01	3.71	4.49				4.38
2	gen-23			3.71	4.45	2.34		3.79	4.34	2.34	2.89		4.49
3	gen-23			3.75	4.41	2.34		3.75	4.38	2.11		3.75	4.38
1	gen-23			3.75	4.41	2.38	3.01	3.75	4.49				4.38
2	gen-23			3.71	4.45	2.34		3.79	4.34		2.81		4.49
3	gen-23			3.71	4.49	2.38		3.75	4.34		2.81		4.38
1	feb-23			3.75	4.42	2.38		3.75	4.34	2.19	2.97	3.79	4.38
2	feb-23			3.75	4.38	2.34		3.71	4.34				
3	feb-23			3.75	4.42	2.11	2.93	3.75	4.34			3.79	
1	feb-23			3.75	4.41	2.38		3.75	4.34	2.15	2.97	3.79	4.38
2	feb-23			3.75	4.41	2.34		3.67	4.34				
3	feb-23			3.75	4.41	2.11	2.93	3.75	4.34			3.71	
1	feb-23			3.75	4.41	2.38		3.67	4.34			3.75	
2	feb-23			3.71	4.41	2.11		3.75		2.07			
3	feb-23			3.75	4.38	2.34		3.71				3.75	4.41
1	mar-23			3.71	4.34	2.38	2.93	3.55	4.3	1.91	2.81	3.83	4.21
2	mar-23			3.75	4.38	2.38	2.89	3.71	4.26	1.95	2.89		
3	mar-23			3.71	4.34	2.11	2.93	3.78	4.3		3.01		4.3
1	mar-23			3.71	4.34	2.34	3.05	3.55	4.3	1.91	2.81	3.79	4.22
2	mar-23			3.75	4.41	2.34	2.89	3.71	4.26	1.99	2.89		
3	mar-23			3.75	4.34	2.11	2.89	3.49	4.26		3.01	3.68	4.3
1	mar-23			3.71	4.34	2.34	3.05	3.55	4.3	1.91	2.81	3.75	4.22
2	mar-23			3.75	4.38	2.34	2.89	3.71	4.3	1.99	2.89		
3	mar-23			3.71	4.34	2.3	2.89						4.38
1	apr-23			3.67	4.38	2.34		3.71	4.26	2.03	2.93		4.41
2	apr-23			3.67	4.3	2.3	2.93	3.59	4.41				4.34
3	apr-23			3.71	4.33	2.42	2.97	3.75			2.85		4.34
1	apr-23			3.67	4.38	2.34		3.67	4.26	2.03	2.93		4.38
2	apr-23			3.67	4.26	2.3	2.93	3.55	4.41				4.34
3	apr-23			3.71	4.34	2.3	2.89	3.67	4.34				

1	apr-23		3.71	4.38	2.34	3.01	3.71	4.26	1.99	2.93		4.41
2	apr-23		3.67	4.26	2.34	2.93	3.6	4.41				
3	apr-23		3.71	4.38	2.34					2.77		4.22
1	mag-23		3.67	4.34	2.3	2.85	3.52	4.38	2.11	2.77		4.18
2	mag-23	2.93	3.71	4.34	2.3	2.81	3.67	4.3	1.95	2.77		4.3
3	mag-23		3.55	4.3	2.34		3.55	4.3		2.73		4.26
1	mag-23		3.67	4.34	2.3	2.85	3.52	4.38	2.1	2.77		4.19
2	mag-23	2.93	3.71	4.34	2.3	2.81	3.67	4.3	1.99	2.77		4.3
3	mag-23		3.67	4.34	2.34		3.52	4.3		2.77		4.34
1	mag-23		3.67	4.34	2.3	2.81	3.52	4.38	2.11	2.77		4.18
2	mag-23	2.93	3.67	4.34	2.3	2.81	3.67	4.3	1.95	2.77		4.3
3	mag-23		3.67	4.38	2.34		3.55	4.3				
1	giu-23		3.71	4.38	2.34					2.81		4.26
2	giu-23		3.71	4.34	2.38	2.85	3.55	4.22	1.85	2.77		
3	giu-23		3.71	4.3	2.38		3.67	4.34		2.73		
1	giu-23		3.71	4.38	2.34					2.81		4.26
2	giu-23		3.71	4.3	2.34	2.85	3.55	4.26	1.85	2.77	3.67	4.3
3	giu-23		3.71	4.34	2.38		3.63	4.34		2.73		4.26
1	giu-23		3.71	4.3	2.34					2.81		4.26
2	giu-23		3.67	4.3	2.34	2.85	3.55	4.26	1.88	2.77		
3	giu-23		3.75	4.34	2.34		3.63	4.3				
1	lug-23		3.71	4.3	2.34		3.55	4.3	2.1	2.77		4.3
2	lug-23		3.71	4.3	2.34	2.85	3.55	4.19		2.77		4.22
3	lug-23		3.71	4.3	2.38		3.55	4.88				
1	lug-23		3.71	4.3	2.38			4.3		2.77		4.3
2	lug-23		3.71	4.3	2.34	2.85	3.55	4.19		2.77		4.22
3	lug-23		3.71	4.34	2.38		3.55	4.84				
1	lug-23		3.71	4.3	2.34			4.36	2.1	2.77		4.3
2	lug-23		3.71	4.3	2.34	2.85	3.55	4.18	2.1	2.77		4.22
3	lug-23		3.71	4.34	2.34	2.85	3.48	4.34				
1	ago-23		3.67	4.34	2.34	2.89	3.59	4.19	2.27	2.77		4.34
2	ago-23		3.75	4.34	2.34	2.85	3.59	4.41	2.34			4.26
3	ago-23		3.67	4.34	2.34		3.69	4.38	2.27	2.77	3.67	4.26
1	ago-23		3.75	4.34	2.34	2.89	3.59	4.19	2.34			4.26
2	ago-23		3.67	4.3	2.34	2.85	3.59	4.41	2.27	2.77		4.34
3	ago-23		3.67	4.34	2.34		3.69	4.38	2.27	2.77	3.67	4.26
1	ago-23		3.71	4.33	2.34	2.89	3.59	4.19	2.34	2.89	3.67	
2	ago-23		3.71	4.34	2.34	2.85	3.55	4.22				
3	ago-23		3.67	4.34	2.34		3.63		2.38			
1	set-23		3.67	4.34	2.3	2.89	3.48	4.34		2.77		4.38
2	set-23		3.63	4.34	2.34	2.93	3.55	4.34	1.91	2.89	3.71	4.34
3	set-23		3.67	4.3	2.3		3.55	4.34	1.88	2.85	3.71	4.34
1	set-23		3.63	4.34	2.34	2.89	3.48	4.34		2.77	3.89	4.45
2	set-23		3.63	4.34	2.34	2.93	3.55	4.34	1.91	2.96	3.59	4.38
3	set-23		3.63	4.34	2.34	2.85	3.59	4.34		2.81		4.3
1	set-23		3.67	4.38	2.3	2.89	3.48	4.34		2.77		4.45
2	set-23		3.67	4.38	2.34	2.93	3.55	4.38	2.3			
3	set-23		3.67	4.34	2.3		3.55	4.38	2.3			
1	ott-23		3.75	4.41	2.15	2.93	3.75	4.41		2.89		4.34

2	ott-23	3.75	4.34	2.34	2.85	3.55	4.3		2.85		4.41
3	ott-23	3.75	4.41	2.38		3.75	4.3		2.93		4.38
1	ott-23	3.75	4.41	2.15		3.75	4.41		2.89		4.34
2	ott-23	3.75	4.41	2.34	2.89	3.55	4.3		2.85		4.38
3	ott-23	3.75	4.34	2.3		3.59	4.38	1.91	2.85	3.75	4.41
1	ott-23	3.75	4.34	2.15	2.97	3.75	4.41		2.89		4.34
2	ott-23	3.75	4.41	2.34		3.75	4.34		2.93		4.38
3	ott-23	3.75	4.41	2.3		3.55	4.3		2.85		4.41
1	nov-23	3.75	4.41	2.34		3.67	4.3	2.03	2.85		4.45
2	nov-23	3.75	4.41	2.19	2.93	3.71	4.45	1.88	2.89		4.38
3	nov-23	3.75	4.41	2.34	2.93	3.63	4.34		2.81		4.38
1	nov-23	3.71	4.38	2.19	2.93	3.71	4.45	2.05	2.85		4.45
2	nov-23	3.71	4.41	2.34		3.67	4.34	1.88	2.89		4.38
3	nov-23	3.75	4.41	2.34	2.93	3.59	4.34		2.89		4.45
1	nov-23	3.75	4.41	2.19	2.93	3.71	4.45	2.03	2.85		4.49
2	nov-23	3.75	4.41	2.34		3.75	4.38	1.88	2.89		4.38
3	nov-23	3.75	4.41	2.34		3.63	4.34		2.85		4.49
1	dic-23	3.75	4.41	2.34		3.71	4.3		2.89	3.79	4.45
2	dic-23	3.75	4.41	2.38	2.93	3.75	4.45	2.03	2.89		4.49
3	dic-23	3.75	4.38	2.38		3.83	4.41		2.93	3.75	4.41
1	dic-23	3.75	4.41	2.38		3.71	4.3	2.07	2.93		4.45
2	dic-23	3.75	4.38	2.38	2.93	3.75	4.45		2.89	3.73	4.41
3	dic-23	3.75	4.45	2.19	2.93	3.75	4.38		2.89	3.71	4.41
1	dic-23	3.75	4.38			3.63	4.38	1.95	2.85	3.79	4.41
2	dic-23	3.75	4.41	2.38		3.71	4.3	1.95		3.79	
3	dic-23	3.75	4.41	2.38	2.93	3.75	4.45				





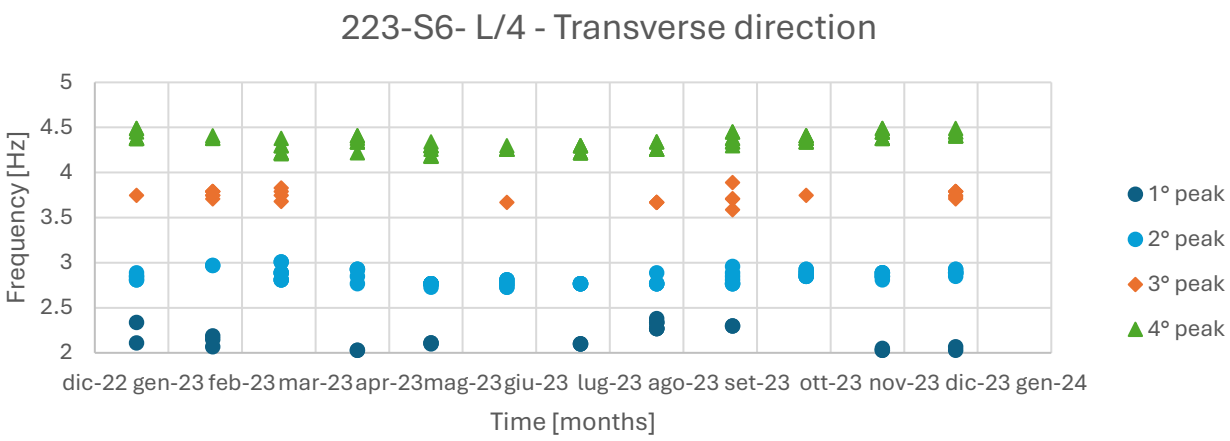


Figure 15-146: Main identified frequencies for sensor 2BCF9 – bridge 223 – Sp6 – L/4

16. Annex 16 – Bridge 223 – Span 6 – L/8 - Sensor 2BCAF

The Bridge 223 counts 2 monitored decks: span 2 and span 6 (see Figure 1-1)

On each deck, 4 sensors are present: one in the midspan (L/2), one at L/4 of the span, one at L/8 of the span and the last one near the pier.

The sensors present on deck number 2 are:

- 2BE0F – situated in the midspan;
- 2BA63 – situated at a distance of L/4;
- 31205 – situated at a distance of L/8;
- 319BC – situated nearby the vest pilar;
- 319E3 – situated nearby the east pilar.

The sensors present on deck number 6 are:

- 2B5E7 – situated in the midspan;
- 2BCF9 – situated at a distance of L/4 of the deck;
- 2BCAF – situated at a distance of L/8 of the deck;

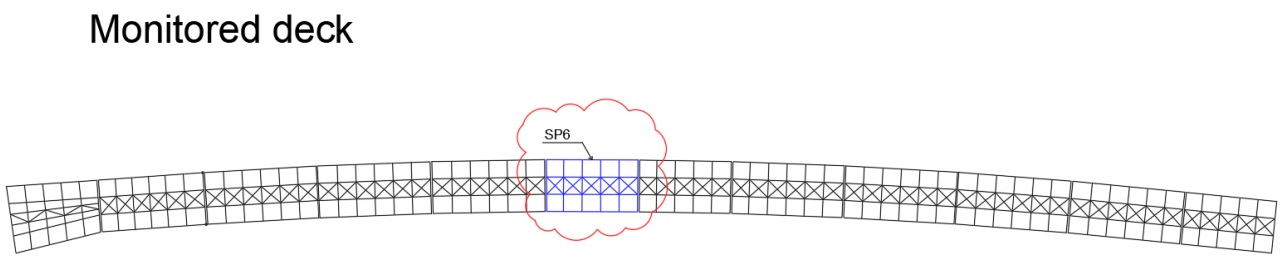


Figure 16-1 Monitored decks of 223 bridge

The accelerograms of the 2BCAF sensor have been analyzed and the results are represented in the following paragraphs.

16.1 January

The results obtained for the January dataset are shown in the following tables.

Table 16-1: January 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-01-16_13-00-21	1.73E-03
	2°	2BCAF_2023-01-03_13-00-20	1.73E-03
	3°	2BCAF_2023-01-30_19-00-20	1.68E-03
Longitudinal direction (y)	1°	2BCAF_2023-01-16_13-00-21	4.96E-04
	2°	2BCAF_2023-01-30_07-00-20	4.86E-04
	3°	2BCAF_2023-01-03_13-00-20	4.51E-04
Transverse direction (z)	1°	2BCAF_2023-01-30_19-00-20	6.40E-04
	2°	2BCAF_2023-01-16_13-00-21	6.22E-04
	3°	2BCAF_2023-01-03_13-00-20	6.13E-04

Table 16-2: January 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-01-24_01-00-21	6.55E-06	2BCAF_2023-01-16_13-00-21	6.07E-07
2	2BCAF_2023-01-30_19-00-20	6.34E-06	2BCAF_2023-01-30_19-00-20	5.74E-07
3	2BCAF_2023-01-30_07-00-20	5.19E-06	2BCAF_2023-01-30_07-00-20	5.48E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-01-30_07-00-20	3.77E-07	2BCAF_2023-01-16_13-00-21	5.08E-08
2	2BCAF_2023-01-30_19-00-20	3.69E-07	2BCAF_2023-01-30_07-00-20	4.93E-08
3	2BCAF_2023-01-24_01-00-21	2.90E-07	2BCAF_2023-01-30_19-00-20	4.01E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-01-30_19-00-20	6.34E-07	2BCAF_2023-01-30_19-00-20	8.34E-08
2	2BCAF_2023-01-03_13-00-20	5.80E-07	2BCAF_2023-01-16_13-00-21	7.84E-08
3	2BCAF_2023-01-30_07-00-20	4.66E-07	2BCAF_2023-01-30_07-00-20	7.21E-08

Table 16-3: January 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	A	D	A	C	C	C
2	-	C	C	D	C	D	A	B	A
3	C	D	D	-	-	C	B	D	D

16.1.1 Vertical direction (x)

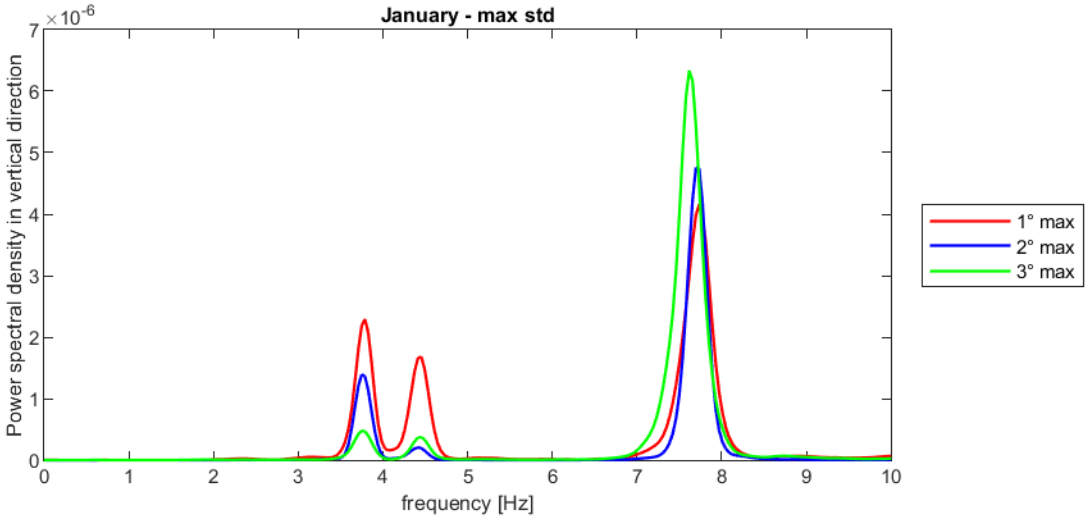


Figure 16-2: Results obtained from the 3 accelerograms with maximum SD in time domain

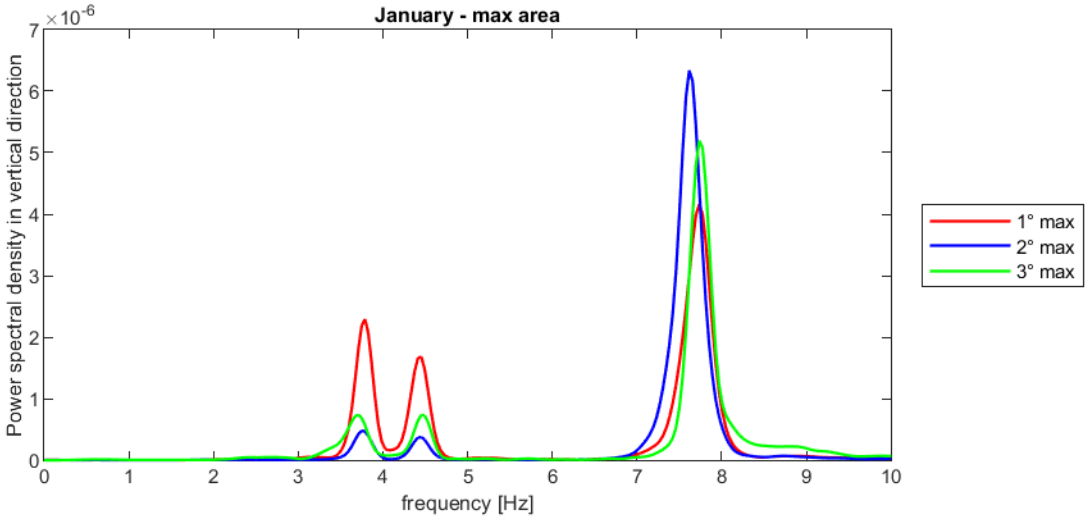


Figure 16-3: Results obtained from the 3 accelerograms with maximum area of PSD

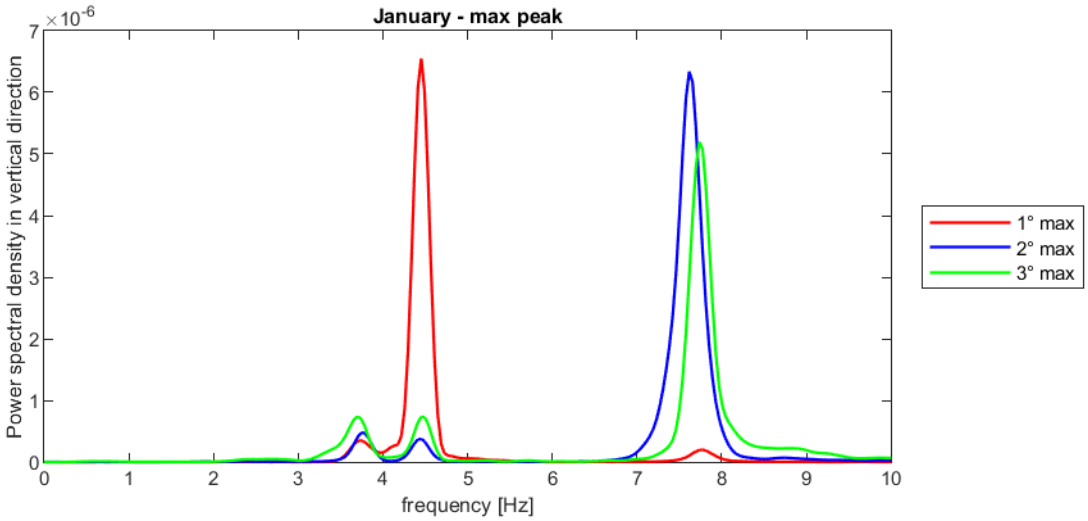


Figure 16-4: Results obtained from the 3 accelerograms with highest peak if PSD

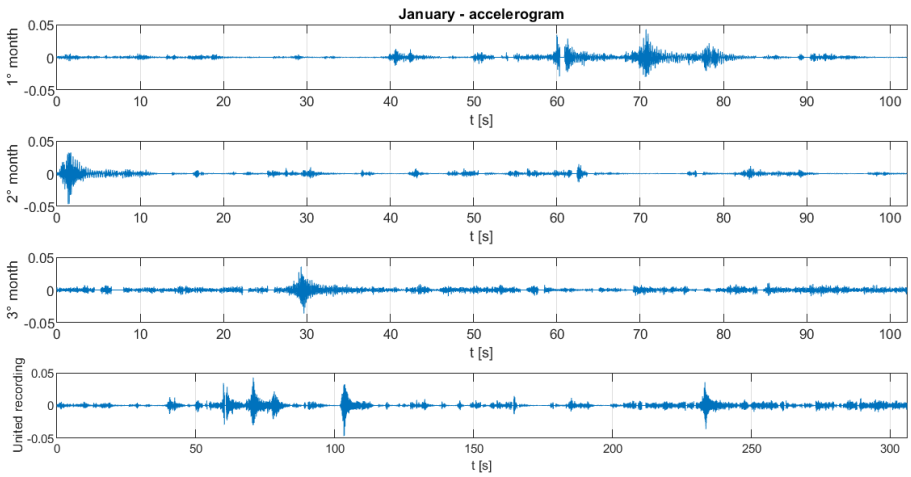


Figure 16-5: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.1.2 Longitudinal direction (y)

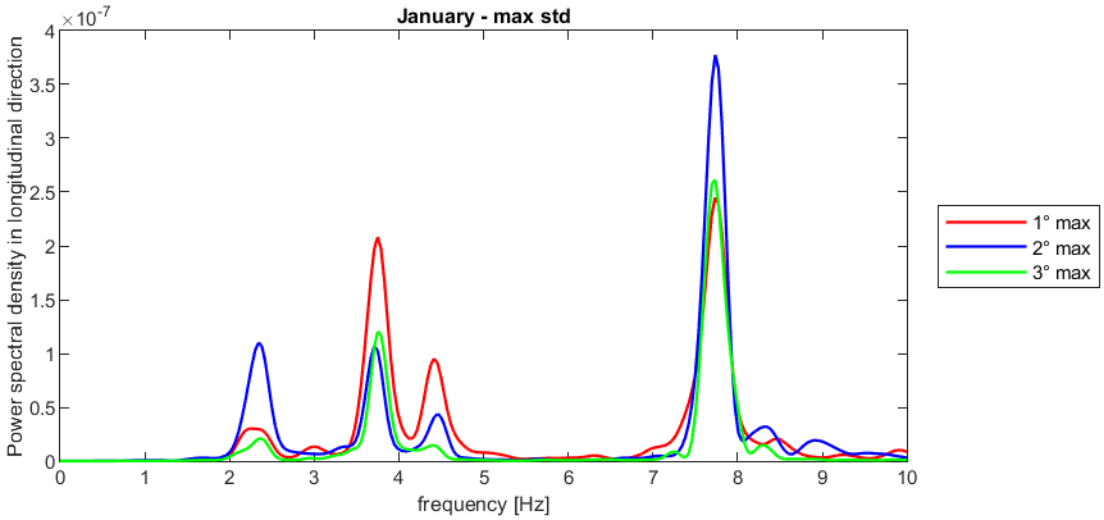


Figure 16-6: Results obtained from the 3 accelerograms with maximum SD in time domain

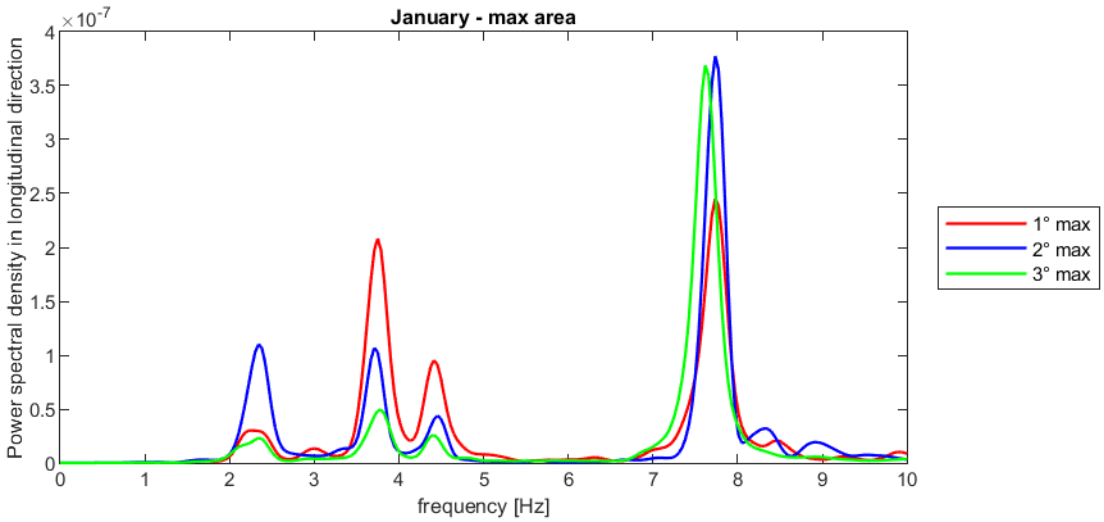


Figure 16-7: Results obtained from the 3 accelerograms with maximum area of PSD

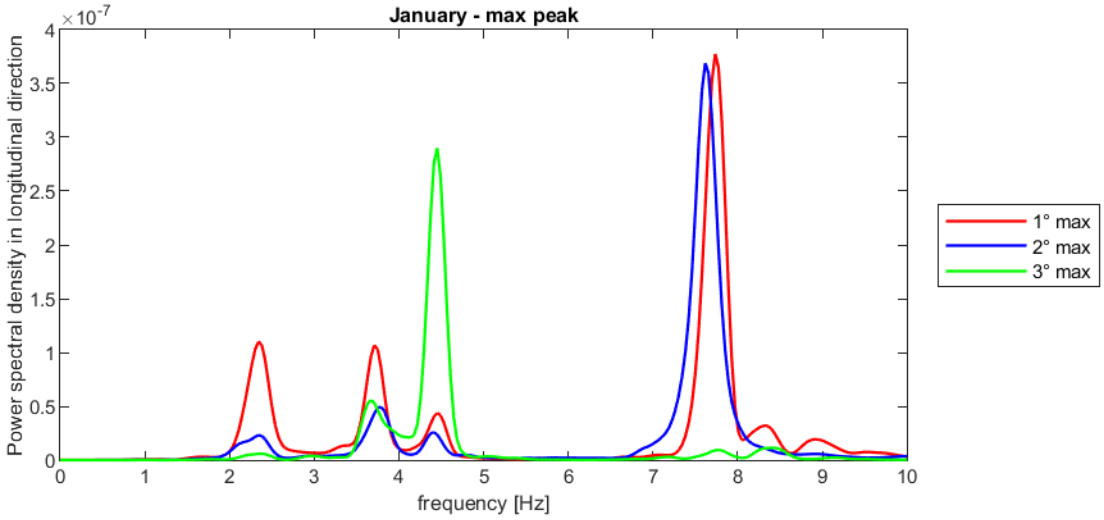


Figure 16-8: Results obtained from the 3 accelerograms with highest peak in PSD

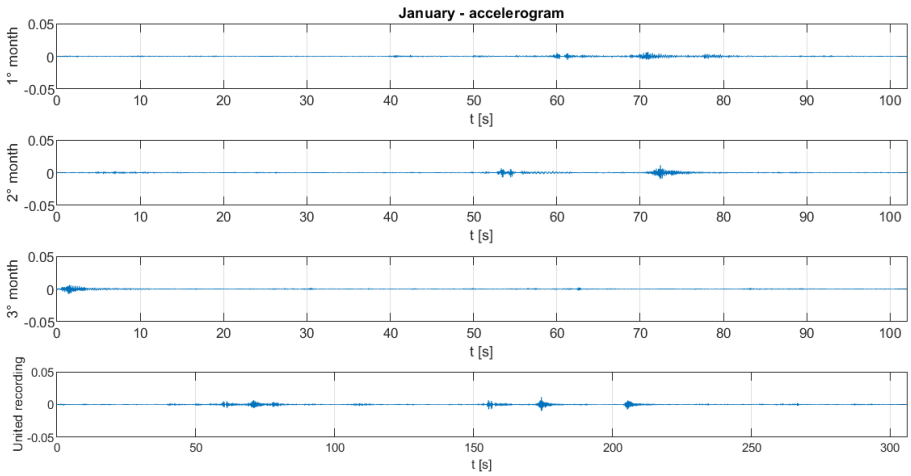


Figure 16-9: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

16.1.3 Transverse direction (z)

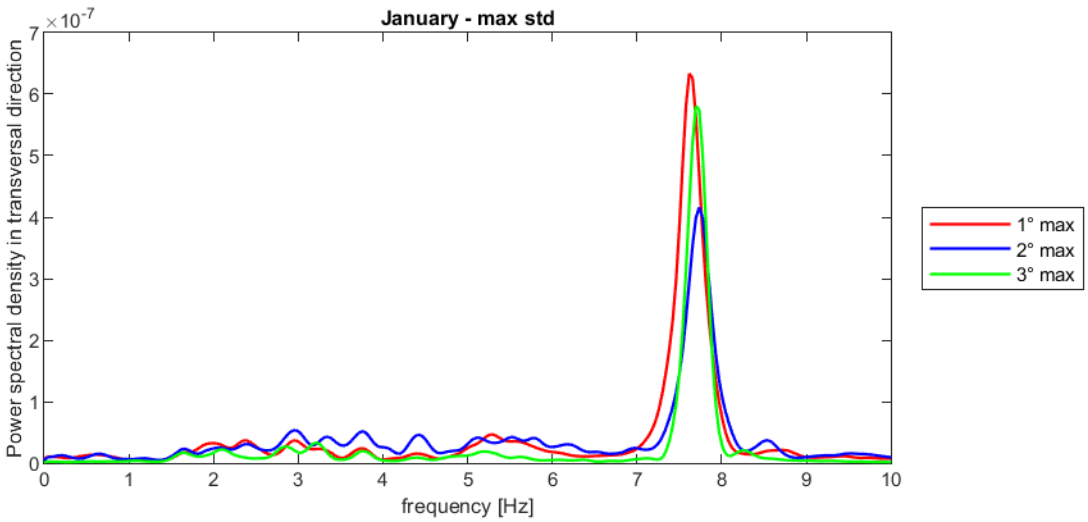


Figure 16-10: Results obtained from the 3 accelerograms with maximum SD in time domain

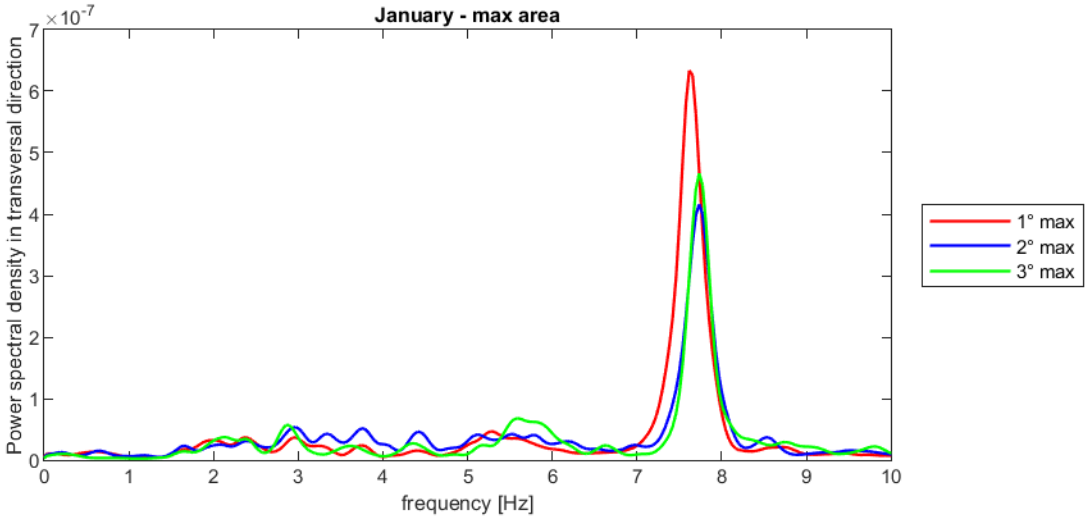


Figure 16-11: Results obtained from the 3 accelerograms with maximum area of PSD

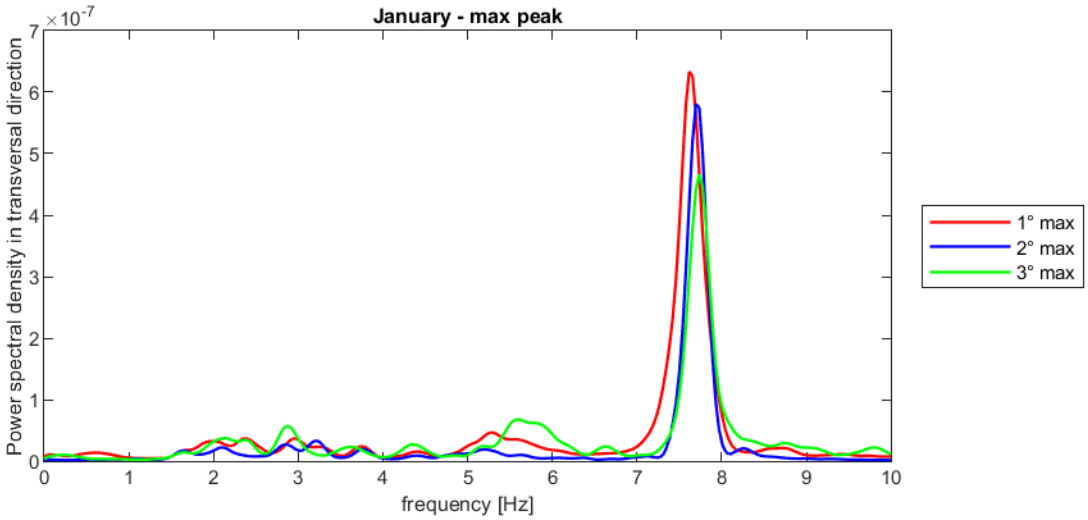


Figure 16-12: Results obtained from the 3 accelerograms with highest peak in PSD

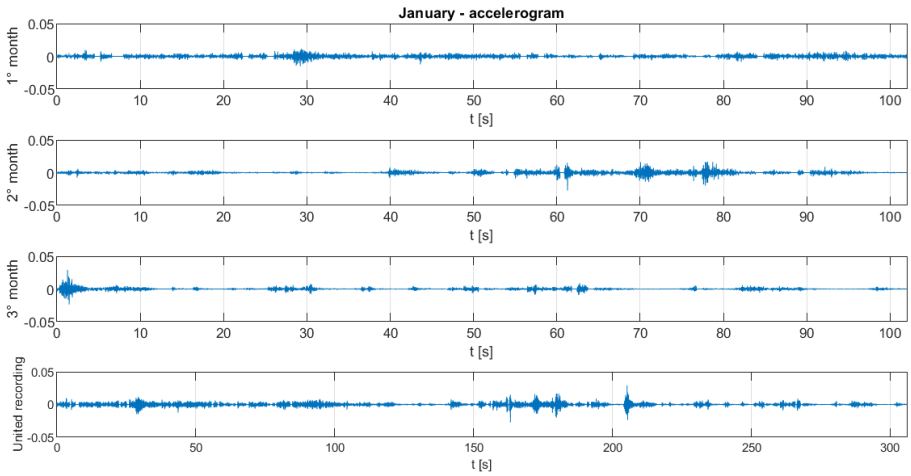


Figure 16-13: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

16.2 February

The results obtained for the February dataset are shown in the following tables.

Table 16-4: February 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-02-01_13-00-19	1.87E-03
	2°	2BCAF_2023-02-11_13-00-20	1.76E-03
	3°	2BCAF_2023-02-25_07-00-21	1.75E-03
Longitudinal direction (y)	1°	2BCAF_2023-02-06_13-00-19	6.02E-04
	2°	2BCAF_2023-02-01_13-00-19	5.88E-04
	3°	2BCAF_2023-02-23_13-00-20	4.93E-04
Transverse direction (z)	1°	2BCAF_2023-02-01_13-00-19	8.47E-04
	2°	2BCAF_2023-02-06_13-00-19	7.84E-04
	3°	2BCAF_2023-02-11_13-00-20	6.87E-04

Table 16-5: February 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-02-25_07-00-21	5.90E-06	2BCAF_2023-02-06_13-00-19	6.26E-07
2	2BCAF_2023-02-05_13-00-20	5.62E-06	2BCAF_2023-02-05_13-00-20	6.19E-07
3	2BCAF_2023-02-11_13-00-20	5.45E-06	2BCAF_2023-02-25_07-00-21	6.06E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-02-25_07-00-21	3.72E-07	2BCAF_2023-02-06_13-00-19	7.42E-08
2	2BCAF_2023-02-06_13-00-19	3.26E-07	2BCAF_2023-02-01_13-00-19	6.22E-08
3	2BCAF_2023-02-03_13-00-19	3.09E-07	2BCAF_2023-02-03_13-00-19	4.88E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-02-05_13-00-20	6.13E-07	2BCAF_2023-02-06_13-00-19	1.30E-07
2	2BCAF_2023-02-20_01-00-20	5.65E-07	2BCAF_2023-02-01_13-00-19	1.26E-07
3	2BCAF_2023-02-25_07-00-21	5.51E-07	2BCAF_2023-02-11_13-00-20	9.47E-08

Table 16-6: February 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	-	B	-	C	-	C	D	-	C
2	A	E	E	D	C	D	C	-	D
3	B	A	B	-	F	F	A	-	A

16.2.1 Vertical direction (x)

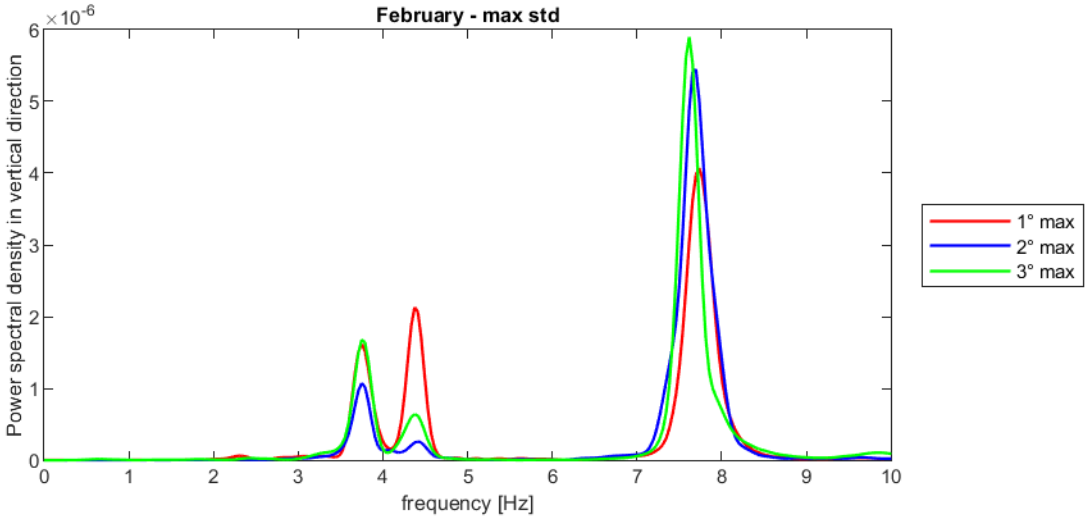


Figure 16-14: Results obtained from the 3 accelerograms with maximum SD in time domain

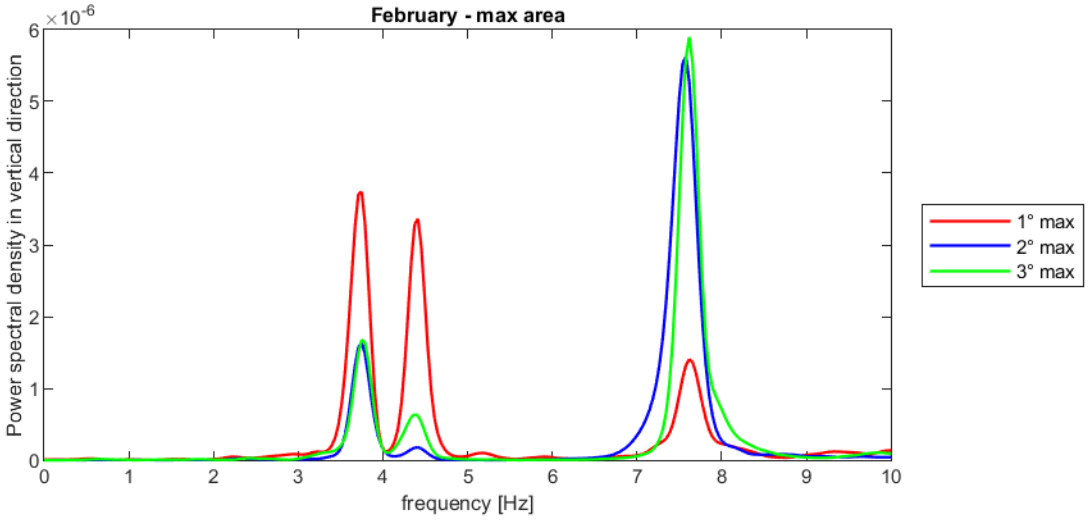


Figure 16-15: Results obtained from the 3 accelerograms with maximum area of PSD

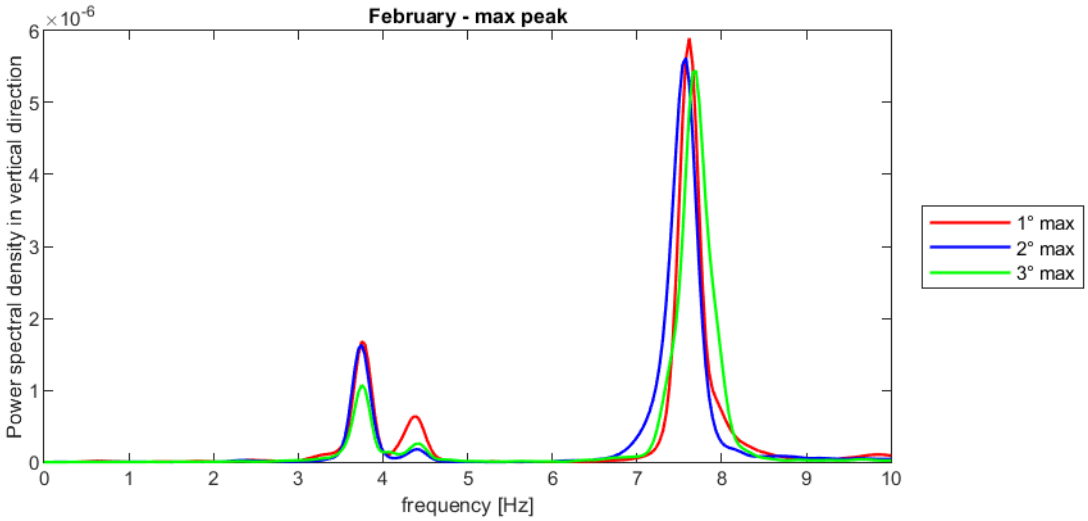


Figure 16-16: Results obtained from the 3 accelerograms with highest peak if PSD

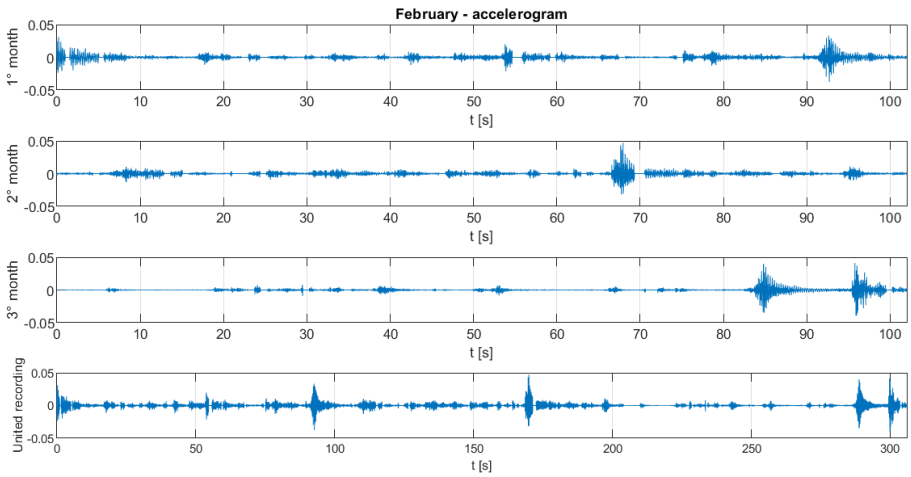


Figure 16-17: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.2.2 Longitudinal direction (y)

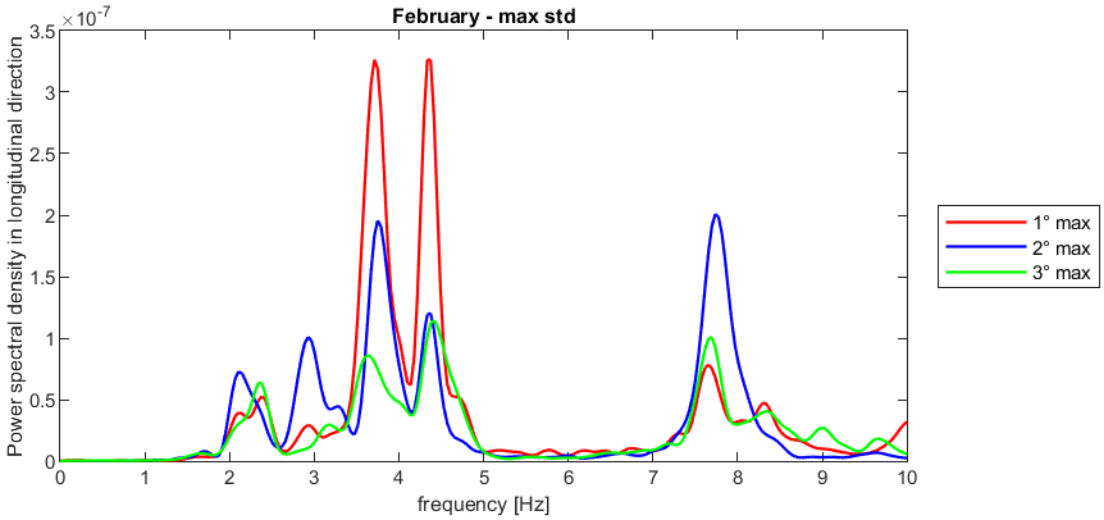


Figure 16-18: Results obtained from the 3 accelerograms with maximum SD in time domain

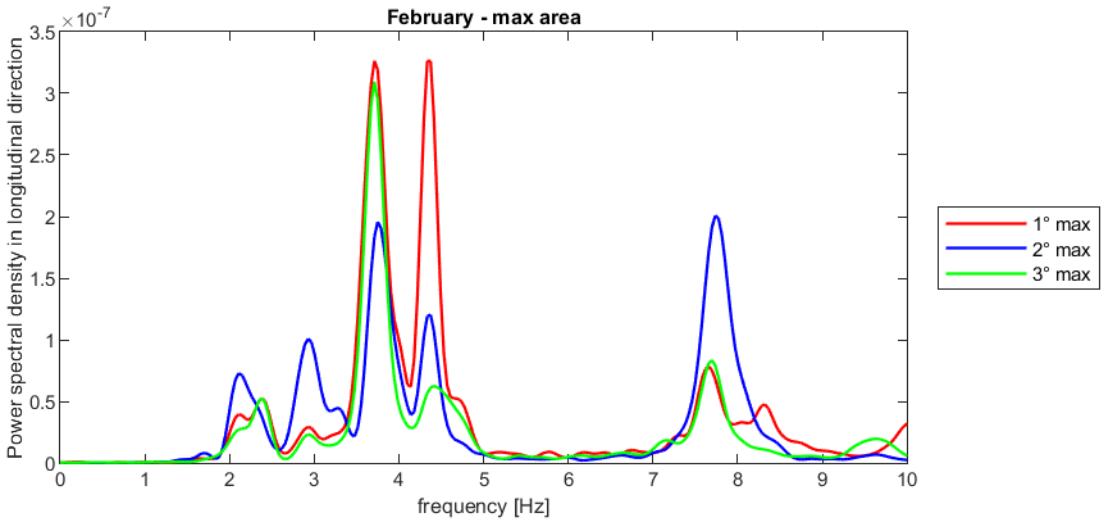


Figure 16-19: Results obtained from the 3 accelerograms with maximum area of PSD

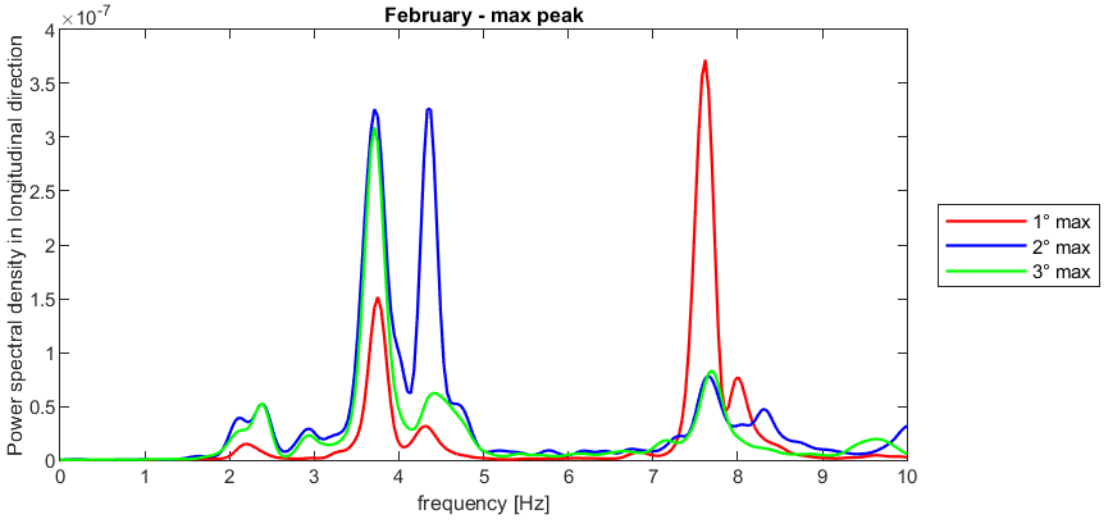


Figure 16-20: Results obtained from the 3 accelerograms with highest peak if PSD

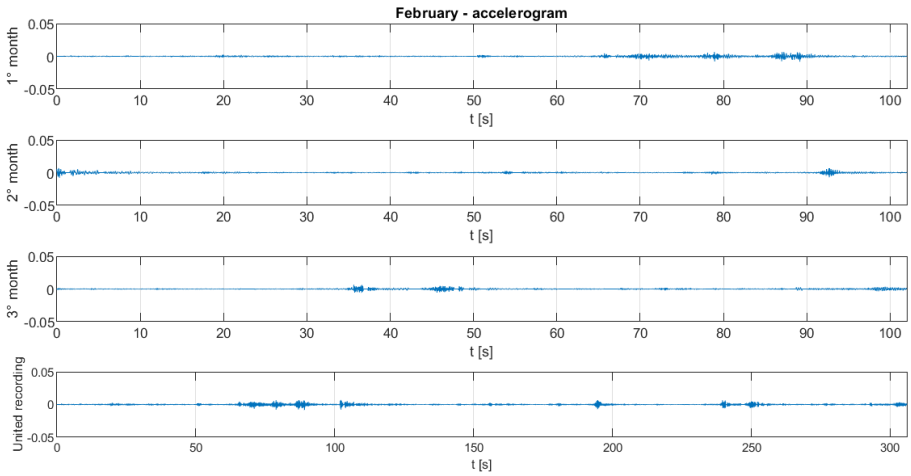


Figure 16-21: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

16.2.3 Transverse direction (z)

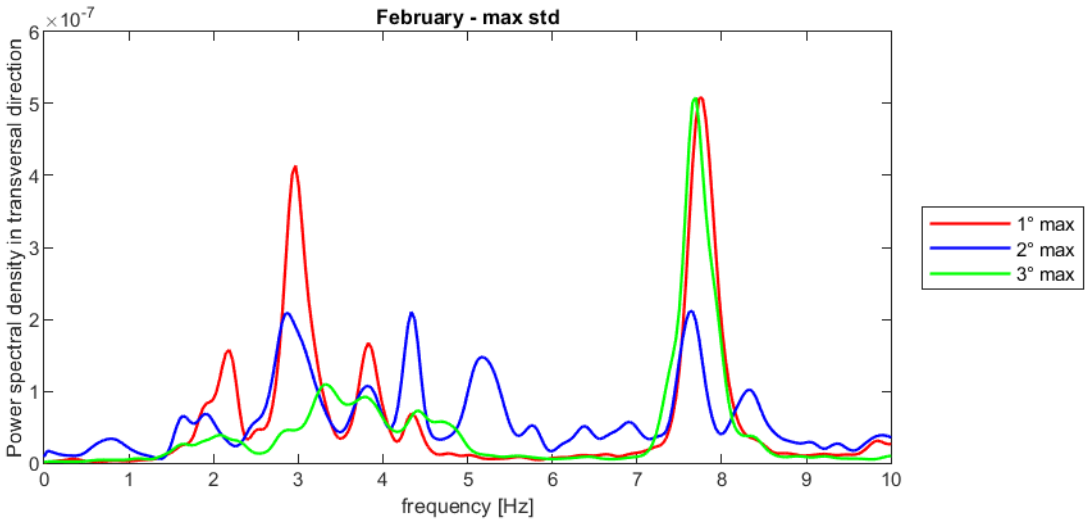


Figure 16-22: Results obtained from the 3 accelerograms with maximum SD in time domain

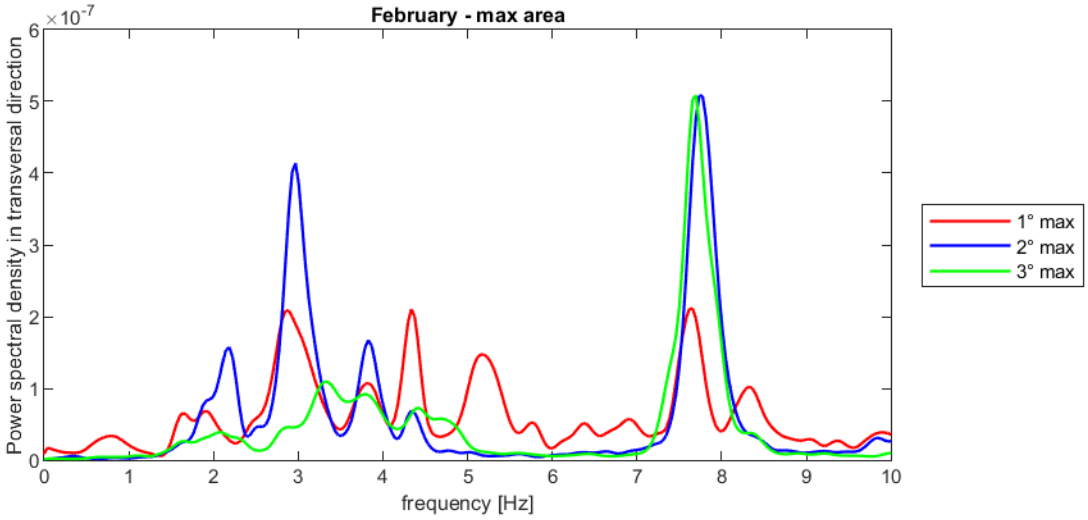


Figure 16-23: Results obtained from the 3 accelerograms with maximum area of PSD

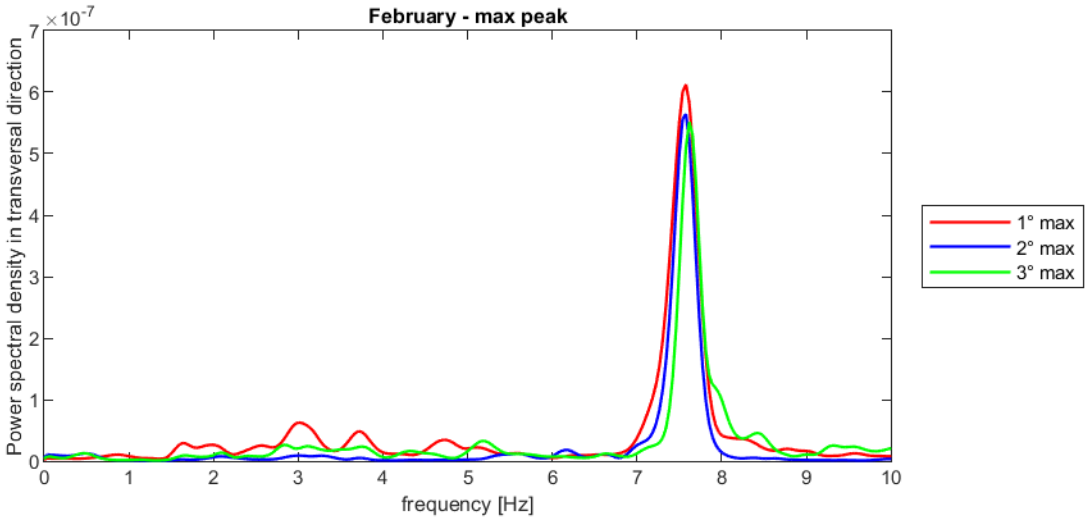


Figure 16-24: Results obtained from the 3 accelerograms with highest peak if PSD

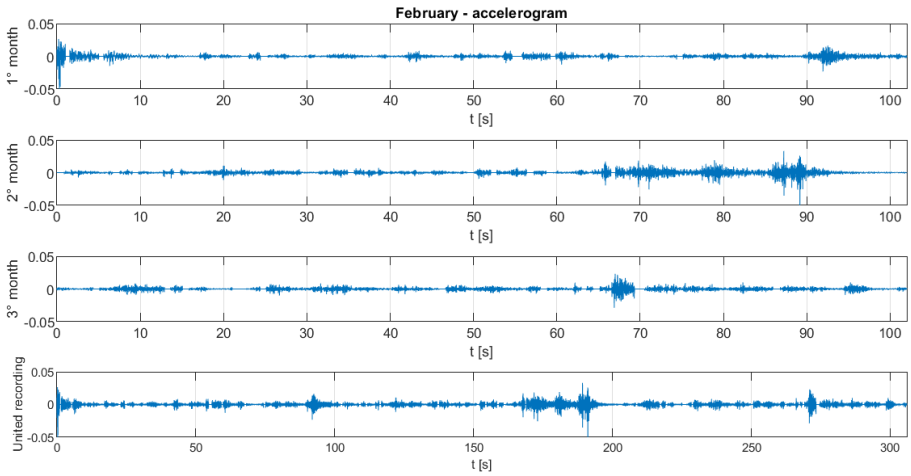


Figure 16-25: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

16.3 March

The results obtained for the March dataset are shown in the following tables.

Table 16-7: March 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-03-04_13-00-20	2.35E-03
	2°	2BCAF_2023-03-31_08-00-20	2.10E-03
	3°	2BCAF_2023-03-30_08-00-20	2.02E-03
Longitudinal direction (y)	1°	2BCAF_2023-03-04_13-00-20	9.74E-04
	2°	2BCAF_2023-03-16_13-00-20	8.50E-04
	3°	2BCAF_2023-03-08_13-00-21	6.78E-04
Transverse direction (z)	1°	2BCAF_2023-03-16_13-00-20	1.98E-03
	2°	2BCAF_2023-03-07_19-00-21	1.16E-03
	3°	2BCAF_2023-03-04_13-00-20	9.93E-04

Table 16-8: March 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-03-04_13-00-20	6.60E-06	2BCAF_2023-03-04_13-00-20	1.21E-06
2	2BCAF_2023-03-10_13-00-20	5.78E-06	2BCAF_2023-03-31_08-00-20	9.14E-07
3	2BCAF_2023-03-23_19-00-20	5.49E-06	2BCAF_2023-03-30_08-00-20	8.25E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-03-04_13-00-20	1.15E-06	2BCAF_2023-03-04_13-00-20	2.06E-07
2	2BCAF_2023-03-16_13-00-20	5.80E-07	2BCAF_2023-03-16_13-00-20	1.29E-07
3	2BCAF_2023-03-10_13-00-20	3.76E-07	2BCAF_2023-03-08_13-00-21	9.49E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-03-16_13-00-20	9.96E-06	2BCAF_2023-03-16_13-00-20	7.82E-07
2	2BCAF_2023-03-07_19-00-21	2.99E-06	2BCAF_2023-03-07_19-00-21	2.43E-07
3	2BCAF_2023-03-08_13-00-21	1.88E-06	2BCAF_2023-03-04_13-00-20	2.08E-07

Table 16-9: March 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	A	A	A	D	D	D
2	B	-	B	D	D	D	F	F	F
3	C	-	C	E	-	E	A	-	A

16.3.1 Vertical direction (x)

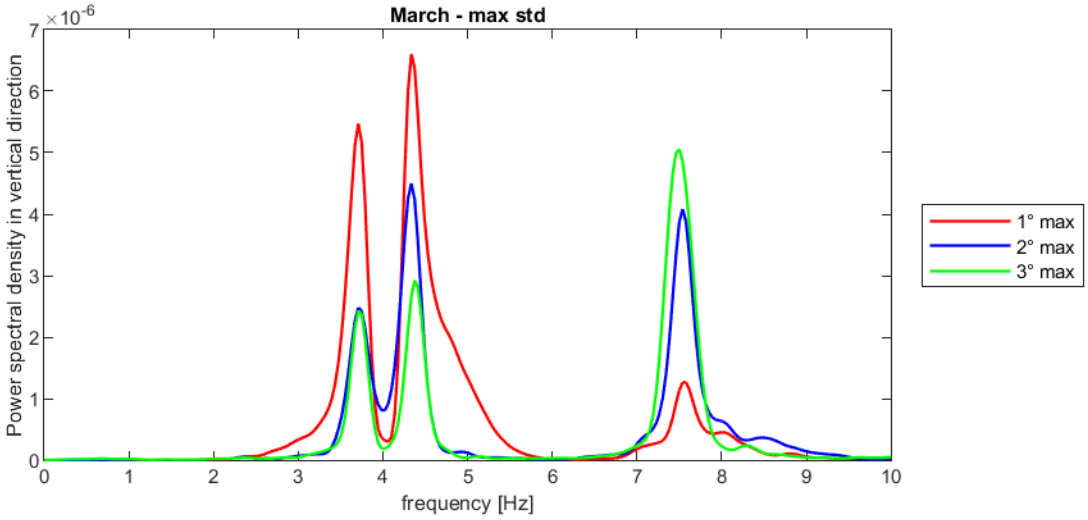


Figure 16-26: Results obtained from the 3 accelerograms with maximum SD in time domain

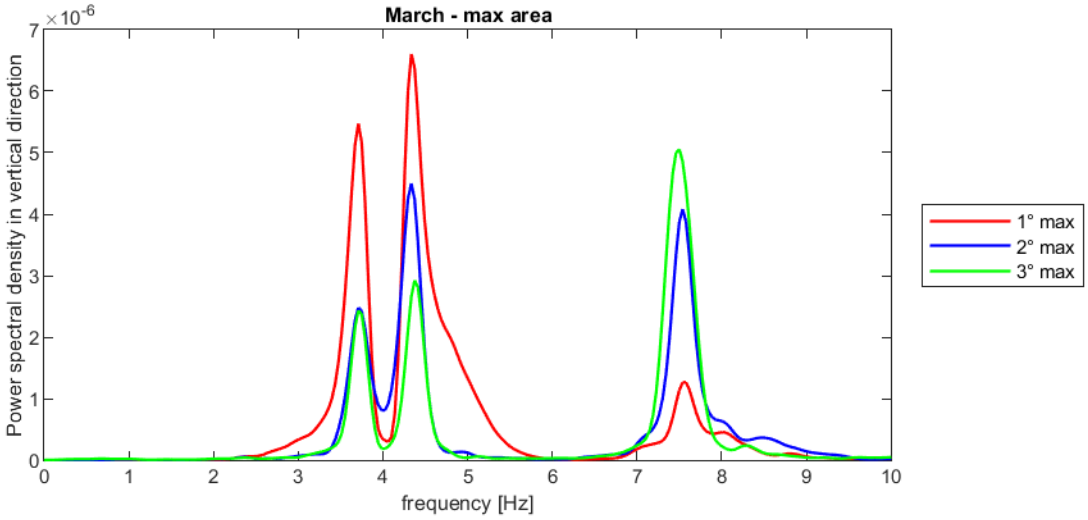


Figure 16-27: Results obtained from the 3 accelerograms with maximum area of PSD

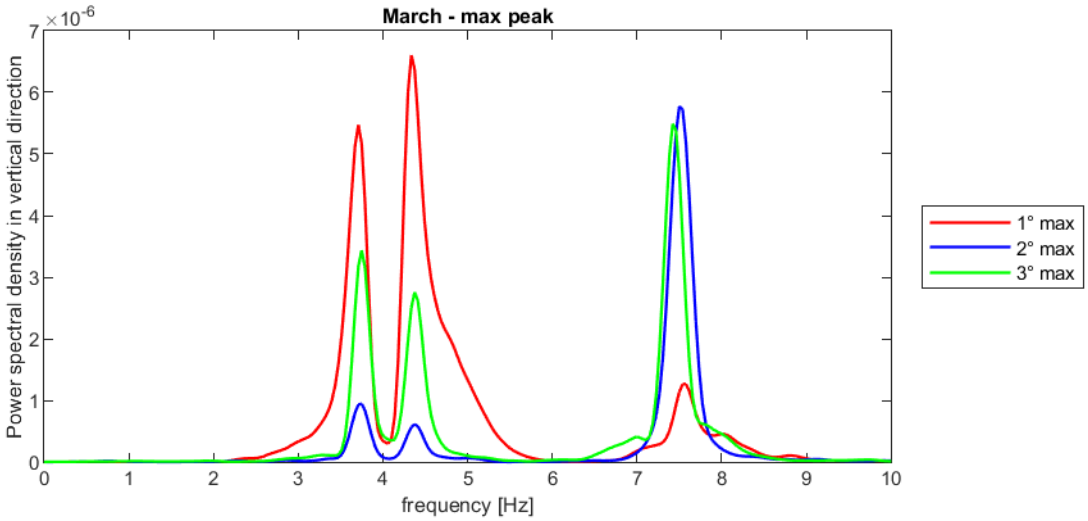


Figure 16-28: Results obtained from the 3 accelerograms with highest peak if PSD

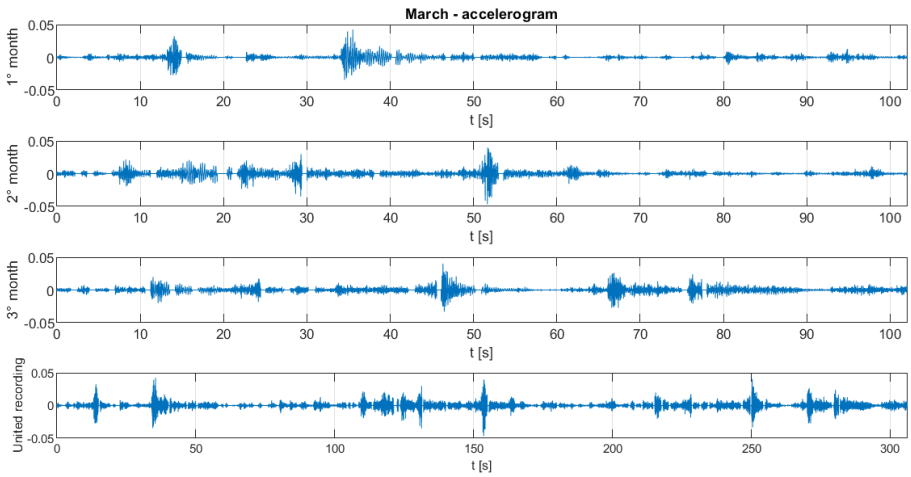


Figure 16-29: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.3.2 Longitudinal direction (y)

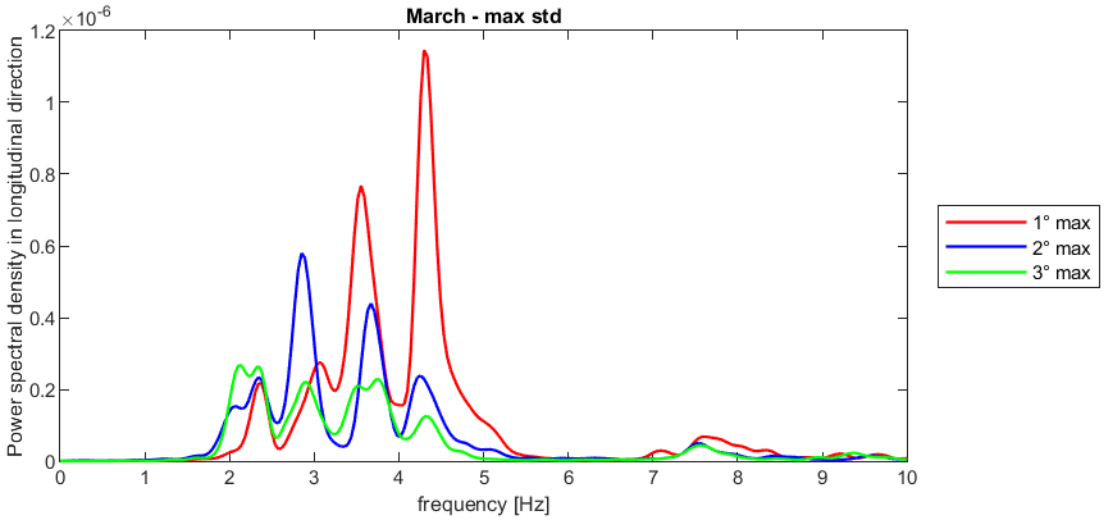


Figure 16-30: Results obtained from the 3 accelerograms with maximum SD in time domain

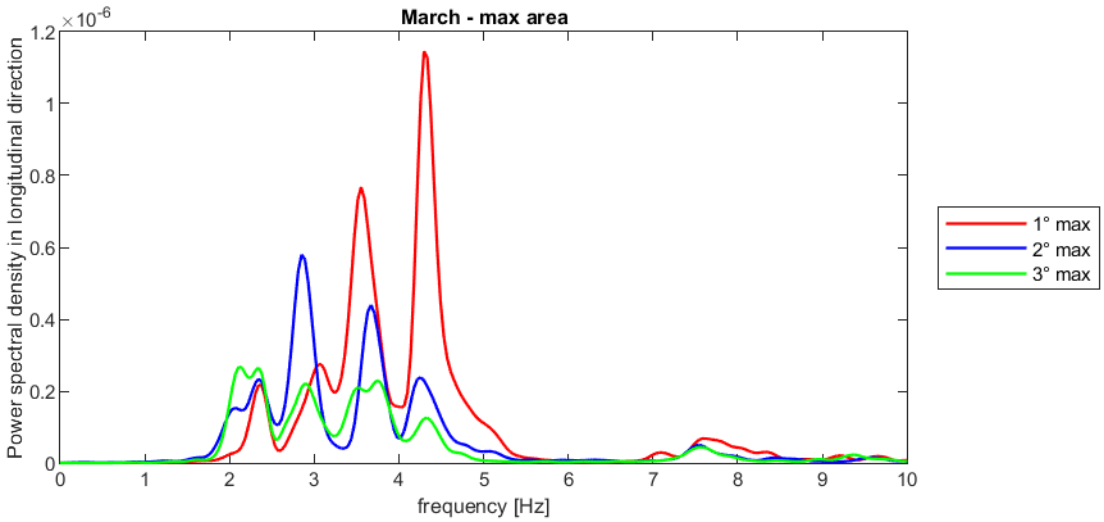


Figure 16-31: Results obtained from the 3 accelerograms with maximum area of PSD

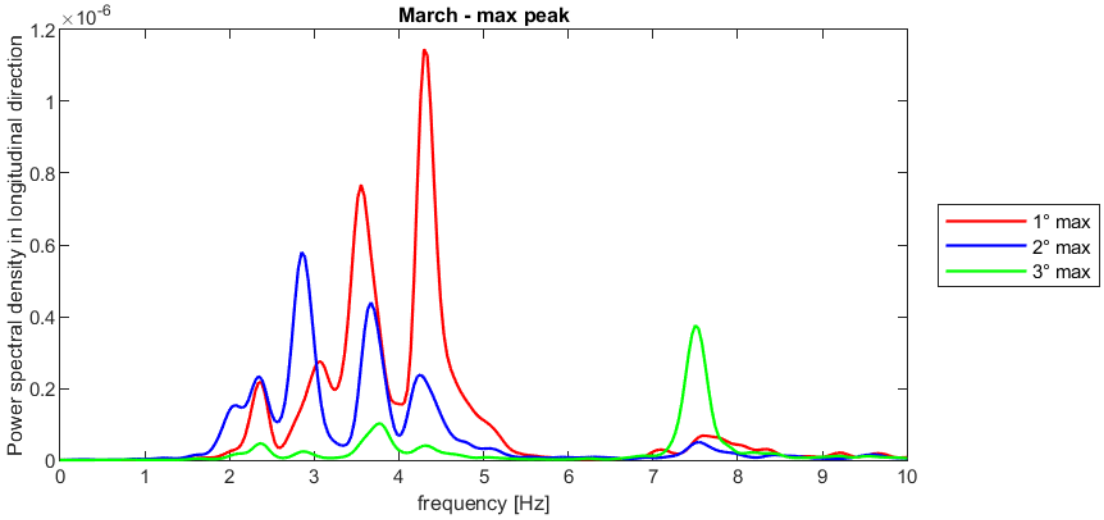


Figure 16-32: Results obtained from the 3 accelerograms with highest peak if PSD

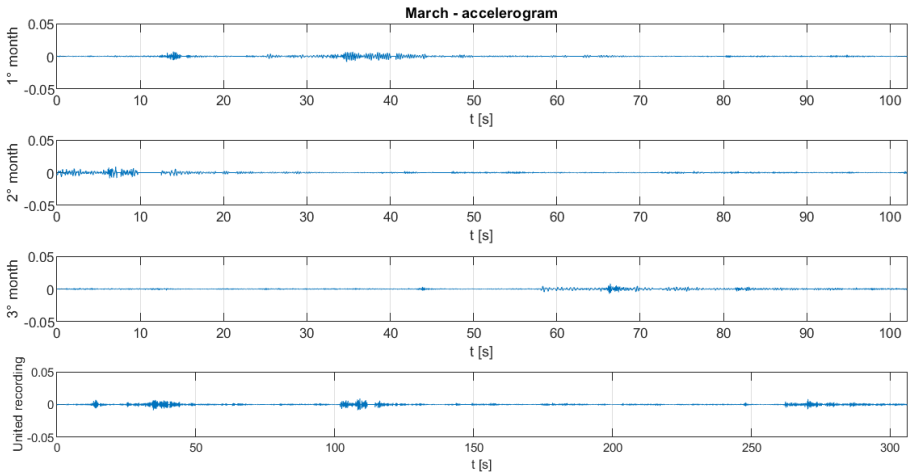


Figure 16-33: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

16.3.3 Transverse direction (z)

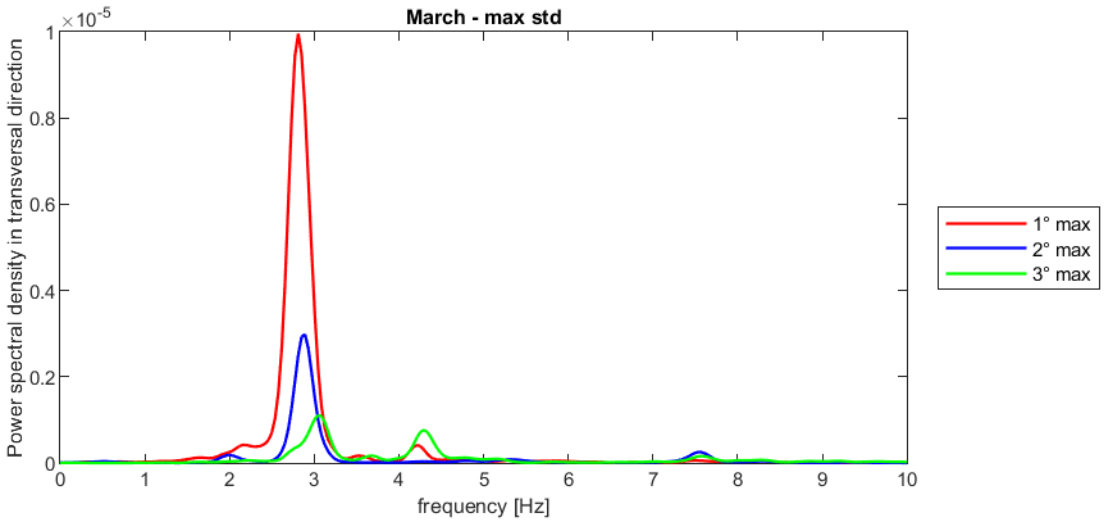


Figure 16-34: Results obtained from the 3 accelerograms with maximum SD in time domain

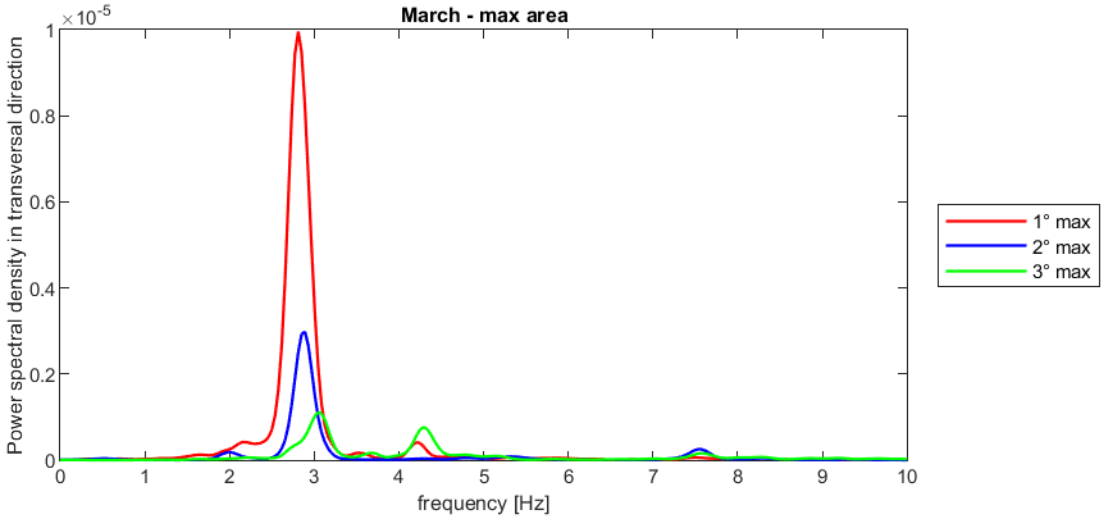


Figure 16-35: Results obtained from the 3 accelerograms with maximum area of PSD

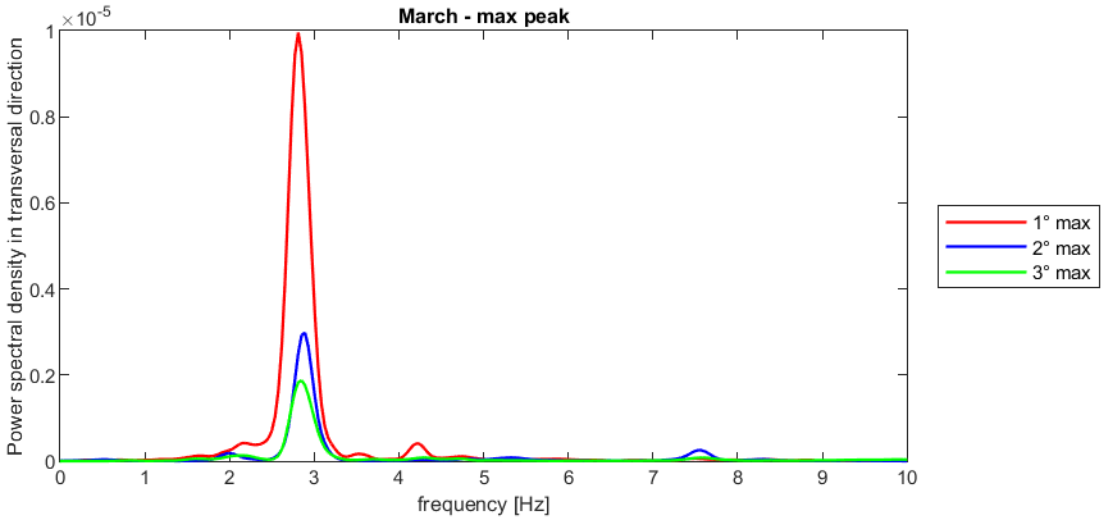


Figure 16-36: Results obtained from the 3 accelerograms with highest peak if PSD

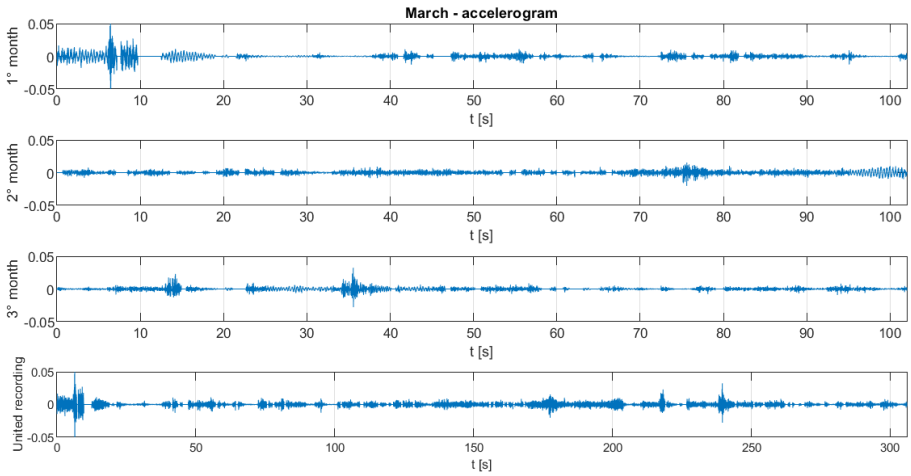


Figure 16-37: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

16.4 April

The results obtained for the April dataset are shown in the following tables.

Table 16-10: April 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-04-13_08-00-20	2.11E-03
	2°	2BCAF_2023-04-19_08-00-20	1.73E-03
	3°	2BCAF_2023-04-24_14-00-20	1.71E-03
Longitudinal direction (y)	1°	2BCAF_2023-04-24_14-00-20	7.86E-04
	2°	2BCAF_2023-04-13_08-00-20	7.13E-04
	3°	2BCAF_2023-04-18_14-00-20	5.93E-04
Transverse direction (z)	1°	2BCAF_2023-04-13_08-00-20	1.35E-03
	2°	2BCAF_2023-04-24_14-00-20	8.40E-04
	3°	2BCAF_2023-04-20_08-00-21	8.16E-04

Table 16-11: April 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-04-13_08-00-20	9.85E-06	2BCAF_2023-04-13_08-00-20	8.50E-07
2	2BCAF_2023-04-19_08-00-20	5.97E-06	2BCAF_2023-04-19_08-00-20	6.43E-07
3	2BCAF_2023-04-05_08-00-20	5.08E-06	2BCAF_2023-04-05_08-00-20	5.91E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-04-24_14-00-20	1.24E-06	2BCAF_2023-04-24_14-00-20	1.25E-07
2	2BCAF_2023-04-13_08-00-20	3.49E-07	2BCAF_2023-04-13_08-00-20	9.92E-08
3	2BCAF_2023-04-19_08-00-20	3.03E-07	2BCAF_2023-04-18_14-00-20	7.22E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-04-13_08-00-20	4.70E-06	2BCAF_2023-04-13_08-00-20	3.64E-07
2	2BCAF_2023-04-24_14-00-20	1.17E-06	2BCAF_2023-04-24_14-00-20	1.43E-07
3	2BCAF_2023-04-04_14-00-19	1.17E-06	2BCAF_2023-04-20_08-00-21	1.29E-07

Table 16-12: April 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	C	C	C	A	A	A
2	B	B	B	A	A	A	C	C	C
3	-	F	F	D	-	D	E	-	E

16.4.1 Vertical direction (x)

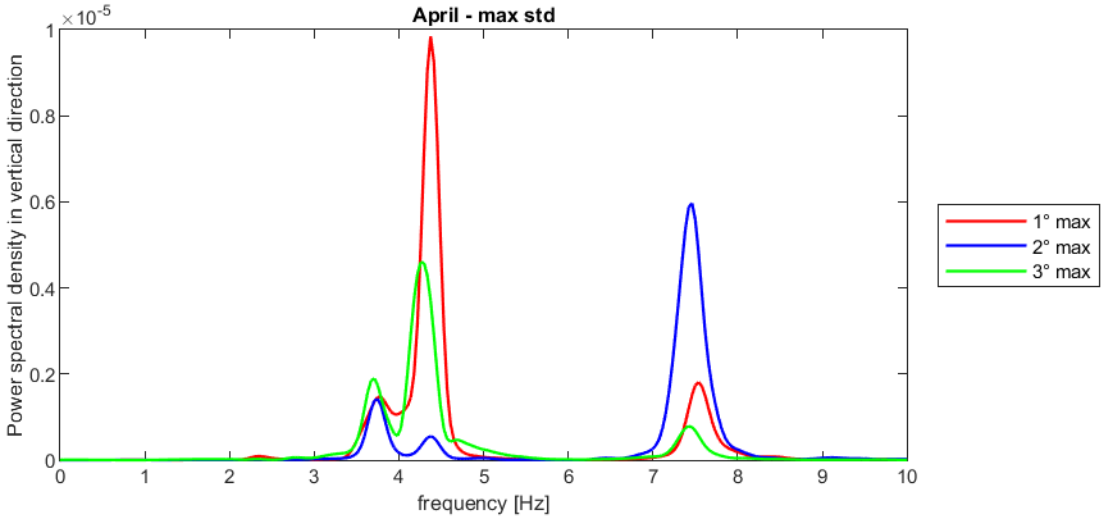


Figure 16-38: Results obtained from the 3 accelerograms with maximum SD in time domain

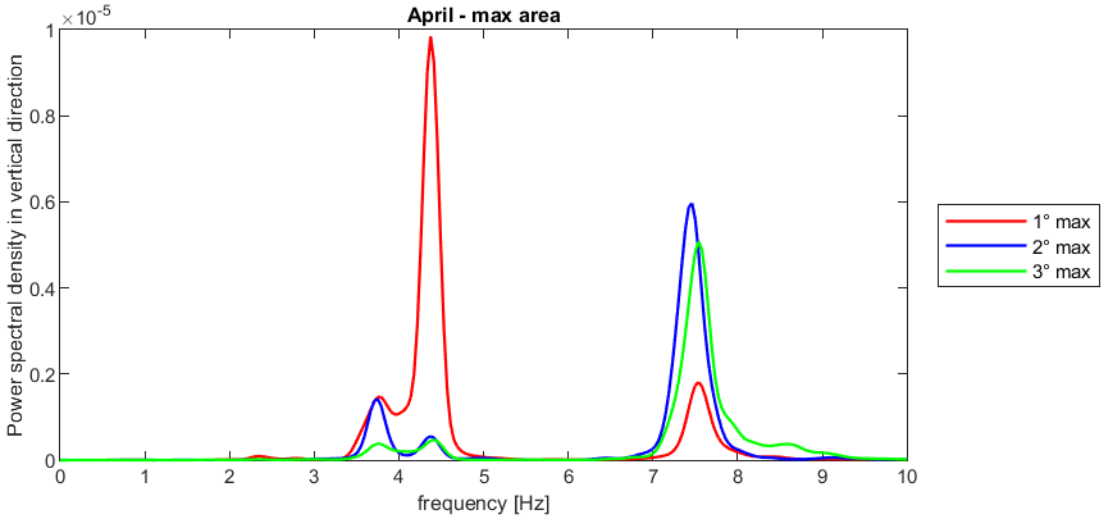


Figure 16-39: Results obtained from the 3 accelerograms with maximum area of PSD

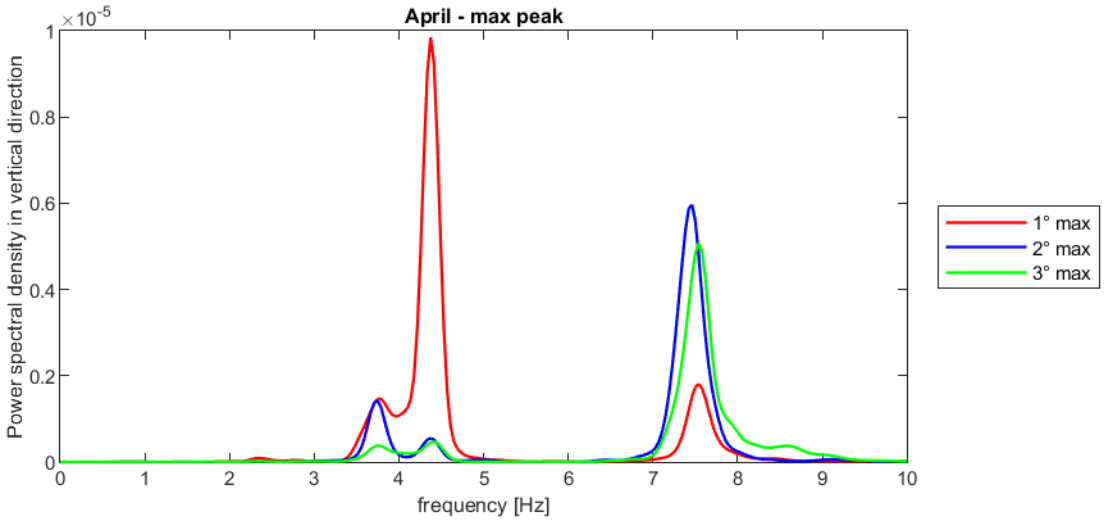


Figure 16-40: Results obtained from the 3 accelerograms with highest peak if PSD

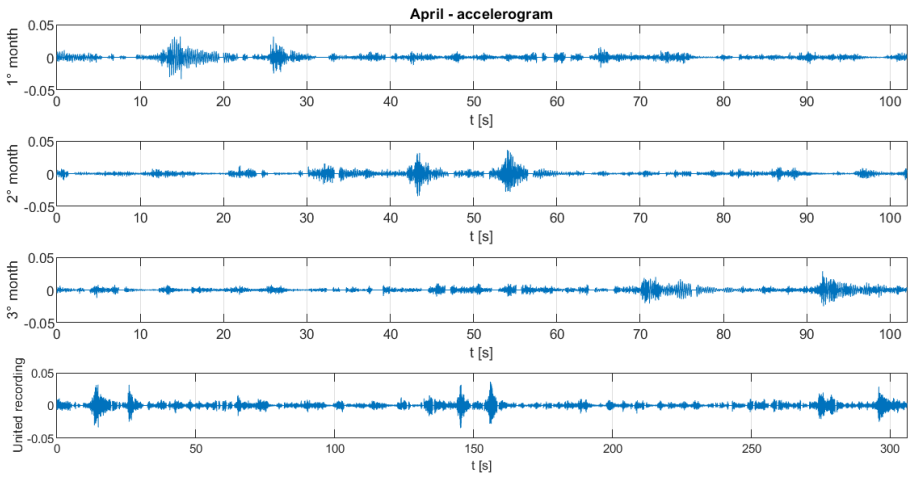


Figure 16-41: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.4.2 Longitudinal direction (y)

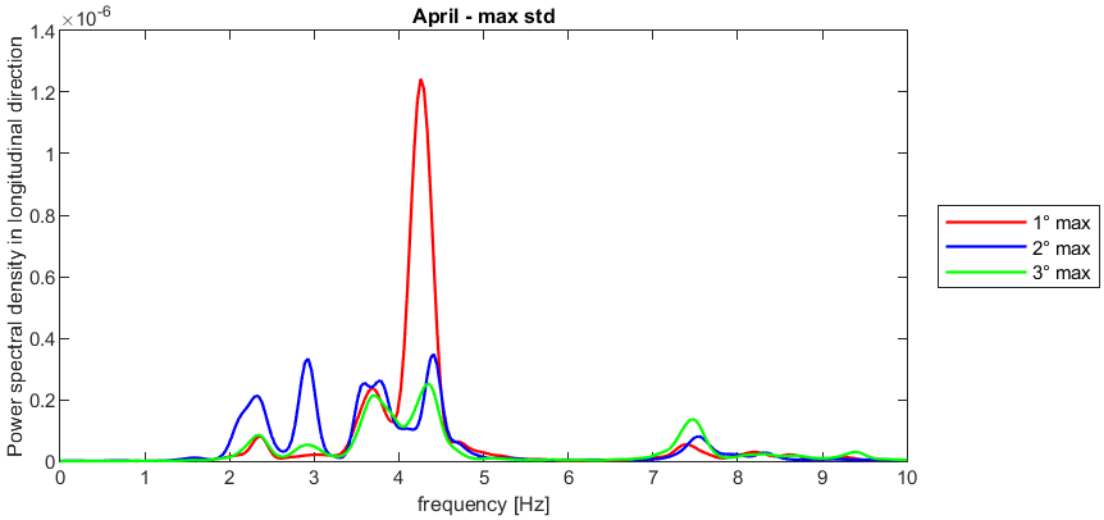


Figure 16-42: Results obtained from the 3 accelerograms with maximum SD in time domain

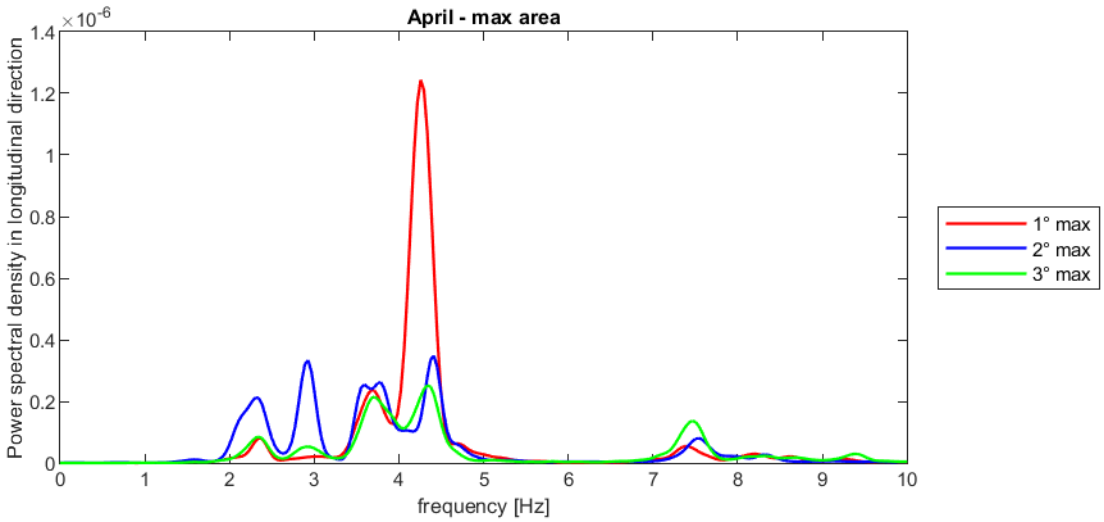


Figure 16-43: Results obtained from the 3 accelerograms with maximum area of PSD

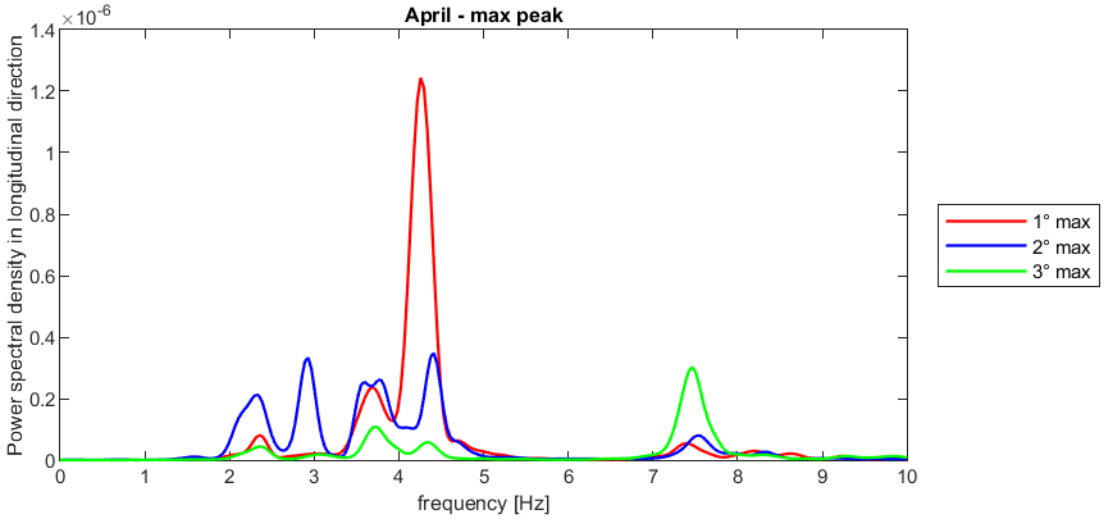


Figure 16-44: Results obtained from the 3 accelerograms with highest peak if PSD

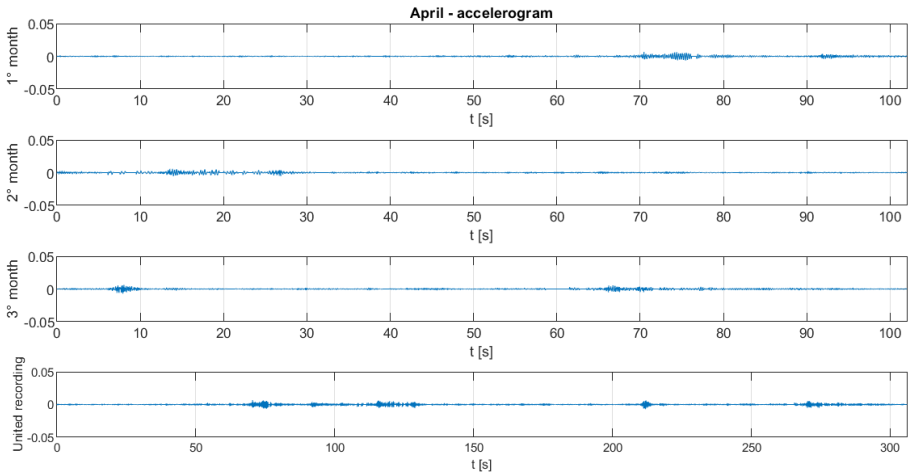


Figure 16-45: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

16.4.3 Transverse direction (z)

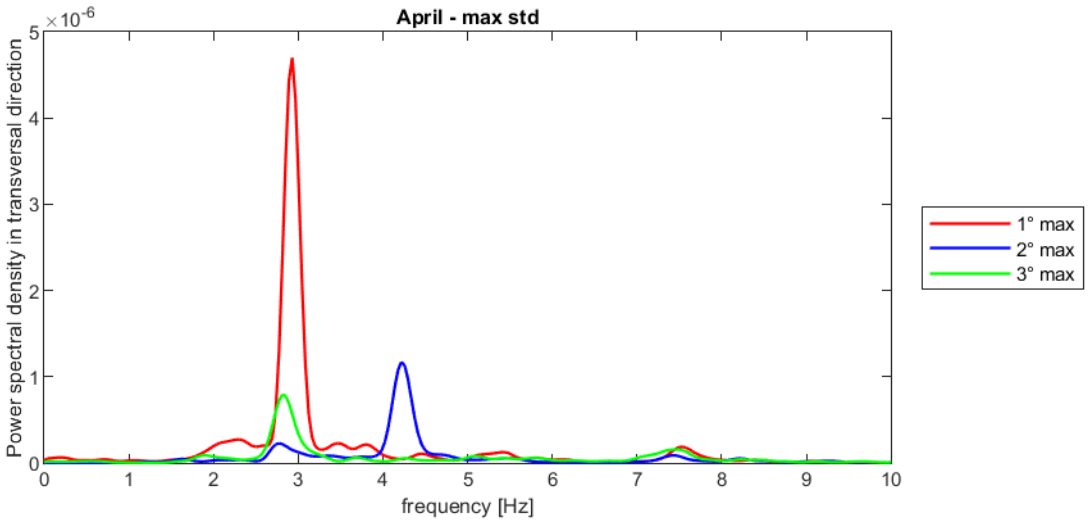


Figure 16-46: Results obtained from the 3 accelerograms with maximum SD in time domain

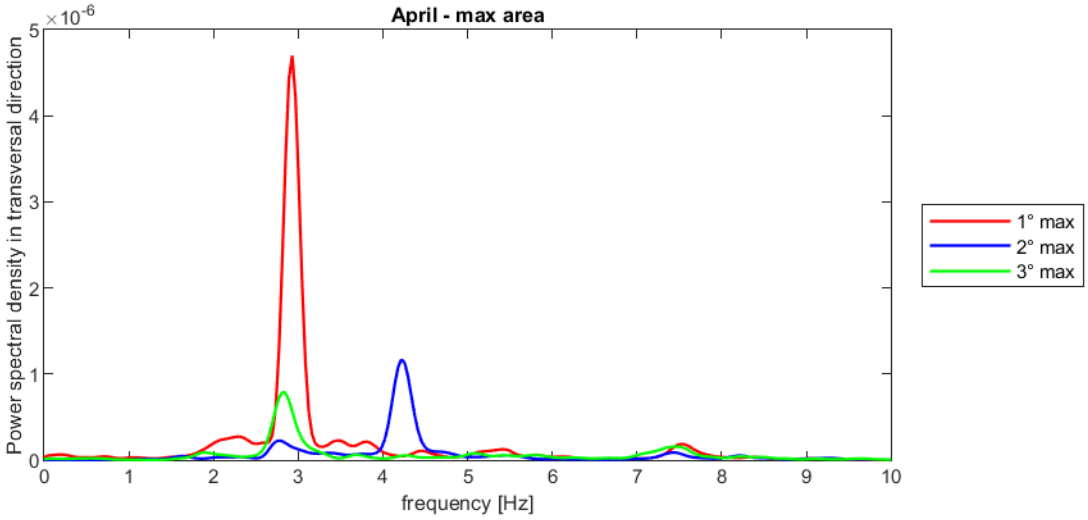


Figure 16-47: Results obtained from the 3 accelerograms with maximum area of PSD

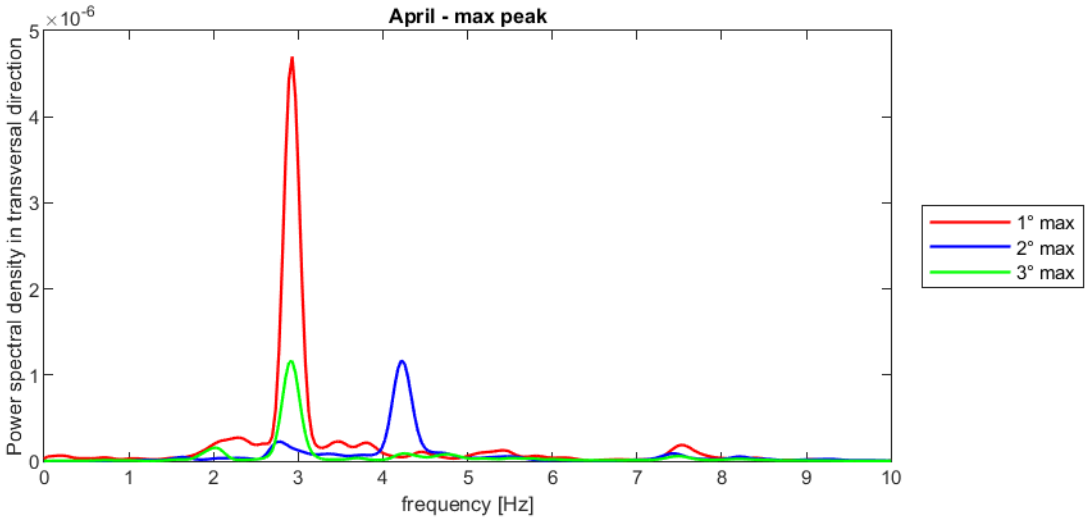


Figure 16-48: Results obtained from the 3 accelerograms with highest peak if PSD

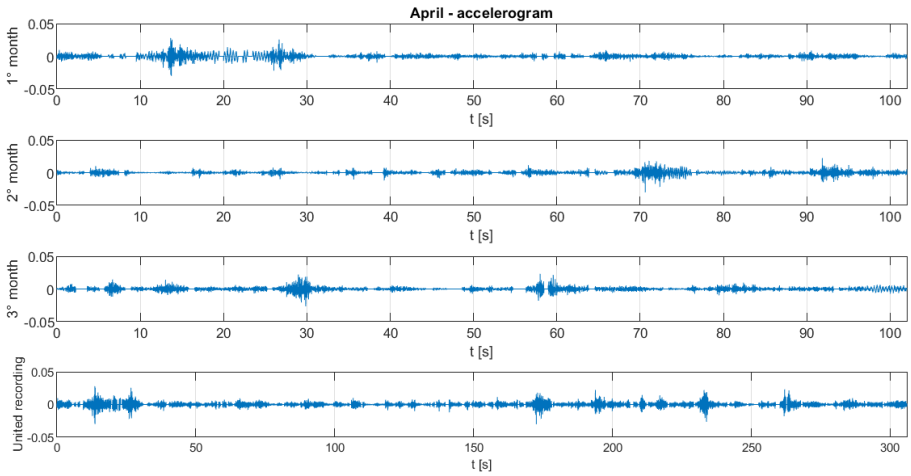


Figure 16-49: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

16.5 May

The results obtained for the May dataset are shown in the following tables.

Table 16-13: May 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-05-04_14-00-20	2.10E-03
	2°	2BCAF_2023-05-23_14-00-20	2.07E-03
	3°	2BCAF_2023-05-31_14-00-20	1.97E-03
Longitudinal direction (y)	1°	2BCAF_2023-05-23_14-00-20	1.08E-03
	2°	2BCAF_2023-05-04_14-00-20	8.96E-04
	3°	2BCAF_2023-05-31_14-00-20	7.28E-04
Transverse direction (z)	1°	2BCAF_2023-05-23_14-00-20	2.22E-03
	2°	2BCAF_2023-05-04_14-00-20	1.61E-03
	3°	2BCAF_2023-05-31_14-00-20	9.74E-04

Table 16-14: May 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-05-04_14-00-20	1.06E-05	2BCAF_2023-05-04_14-00-20	9.44E-07
2	2BCAF_2023-05-11_20-00-21	7.00E-06	2BCAF_2023-05-23_14-00-20	9.43E-07
3	2BCAF_2023-05-23_14-00-20	6.92E-06	2BCAF_2023-05-31_14-00-20	7.40E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-05-23_14-00-20	8.67E-07	2BCAF_2023-05-23_14-00-20	2.43E-07
2	2BCAF_2023-05-04_14-00-20	7.45E-07	2BCAF_2023-05-04_14-00-20	1.68E-07
3	2BCAF_2023-05-31_14-00-20	3.92E-07	2BCAF_2023-05-31_14-00-20	1.02E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-05-23_14-00-20	1.17E-05	2BCAF_2023-05-23_14-00-20	1.03E-06
2	2BCAF_2023-05-04_14-00-20	6.48E-06	2BCAF_2023-05-04_14-00-20	5.45E-07
3	2BCAF_2023-05-31_14-00-20	7.70E-07	2BCAF_2023-05-31_14-00-20	1.85E-07

Table 16-15: May 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	A	A	B	B	B	B	B	B
2	B	-	B	A	A	A	A	A	A
3	C	B	C	C	C	C	C	C	C

16.5.1 Vertical direction (x)

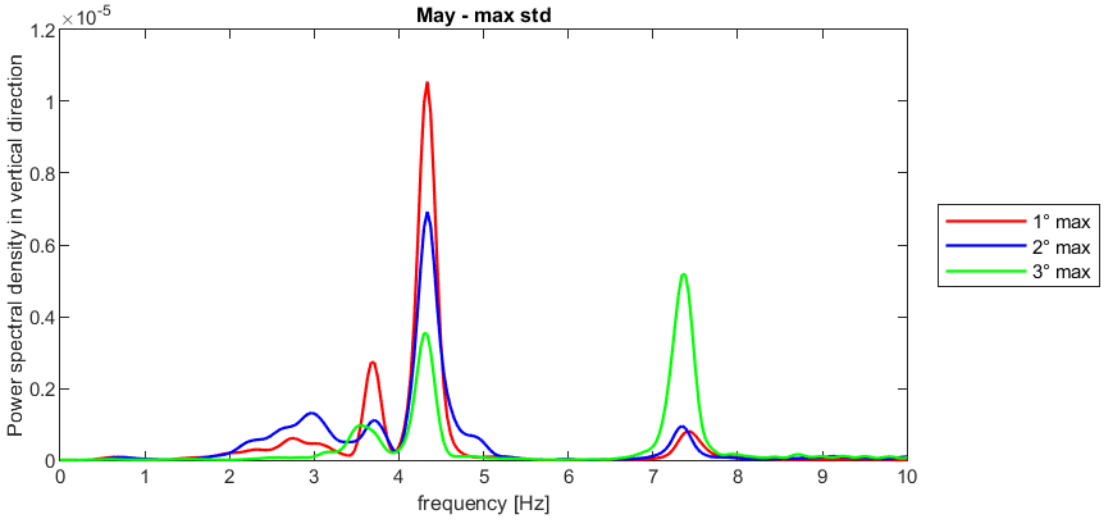


Figure 16-50: Results obtained from the 3 accelerograms with maximum SD in time domain

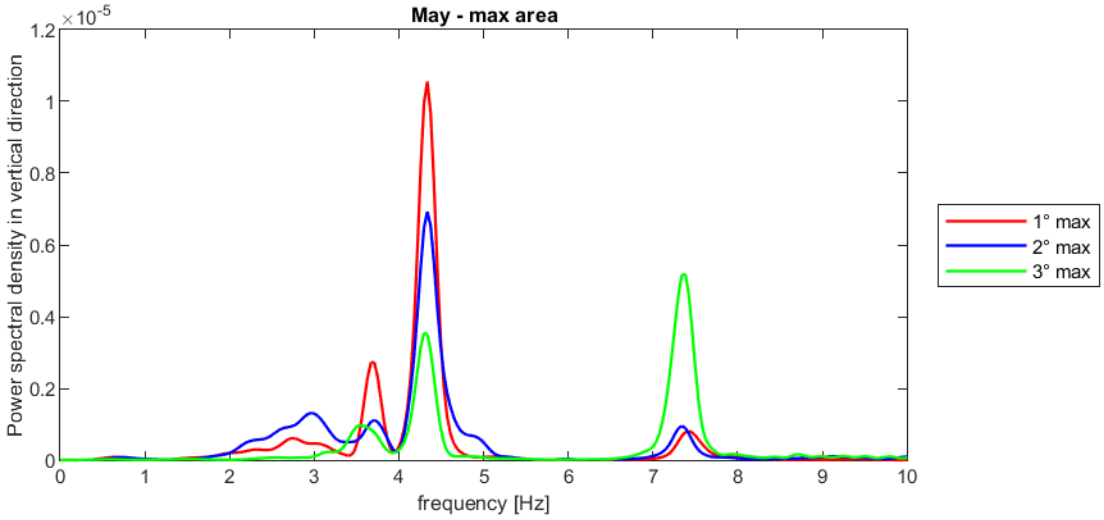


Figure 16-51: Results obtained from the 3 accelerograms with maximum area of PSD

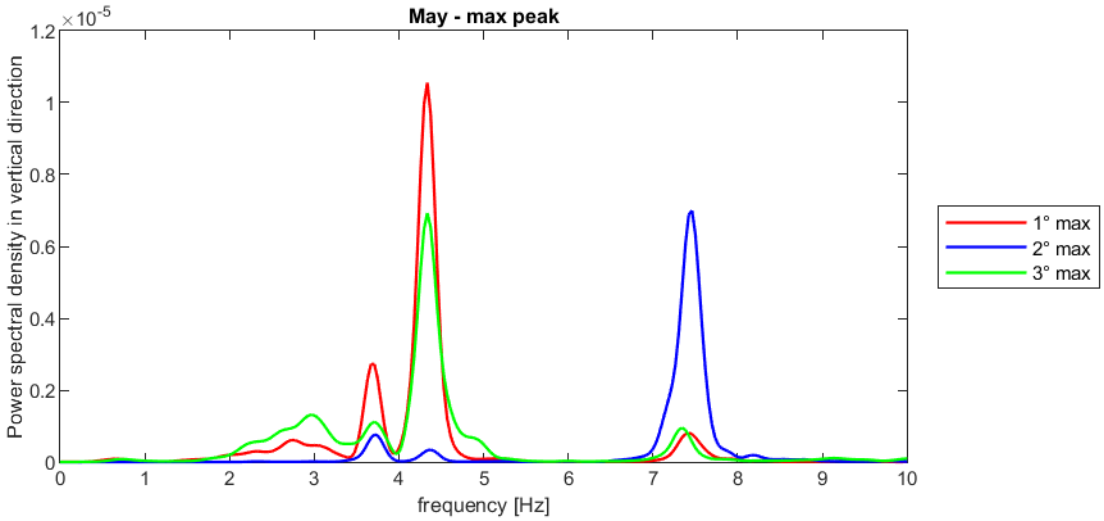


Figure 16-52: Results obtained from the 3 accelerograms with highest peak if PSD

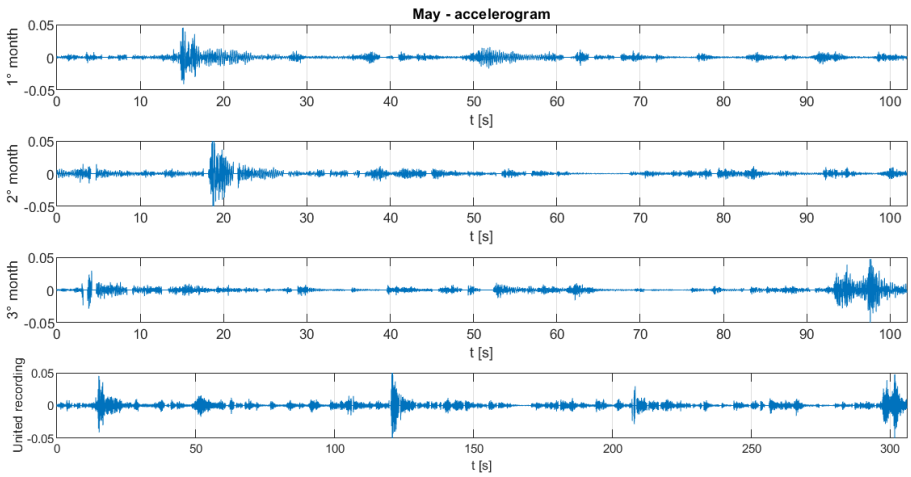


Figure 16-53: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.5.2 Longitudinal direction (y)

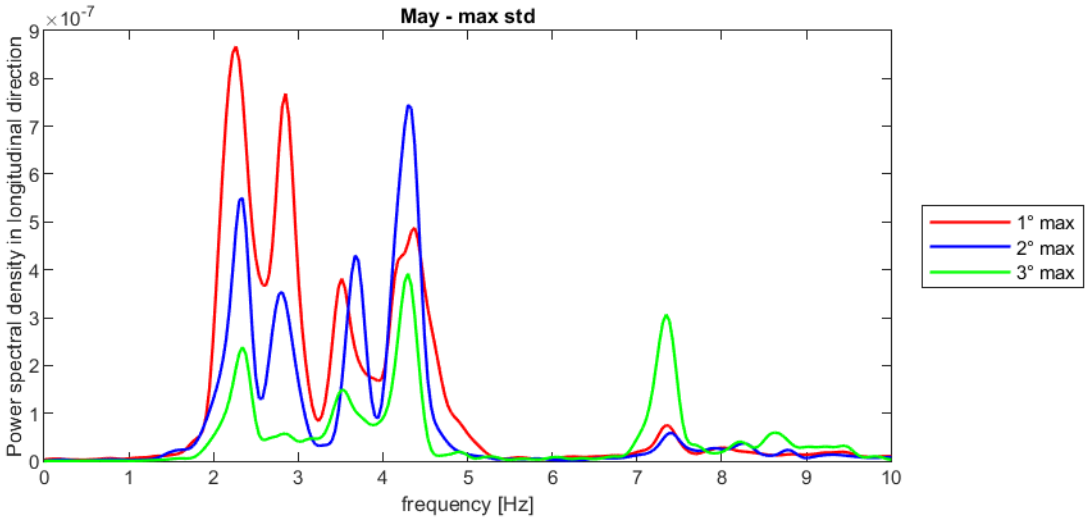


Figure 16-54: Results obtained from the 3 accelerograms with maximum SD in time domain

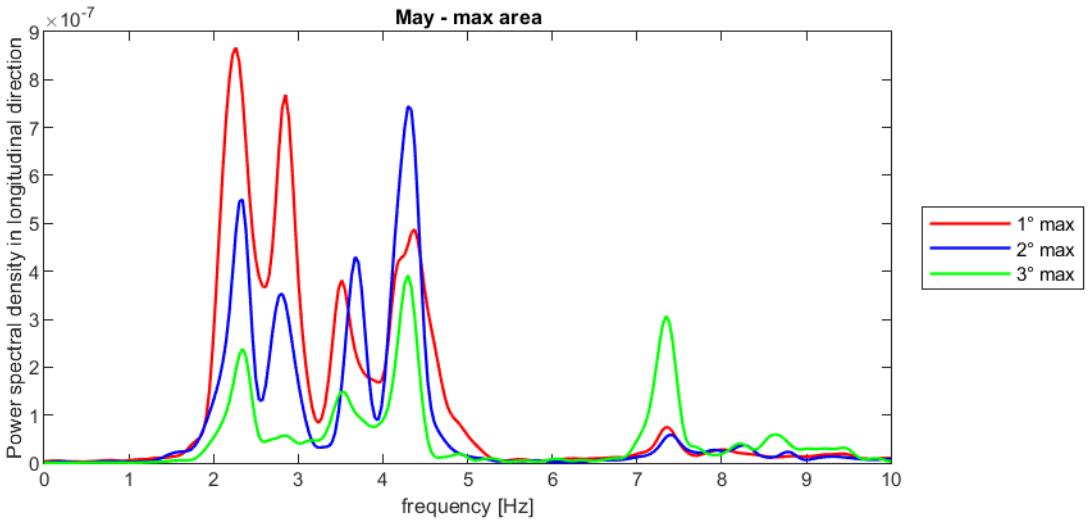


Figure 16-55: Results obtained from the 3 accelerograms with maximum area of PSD

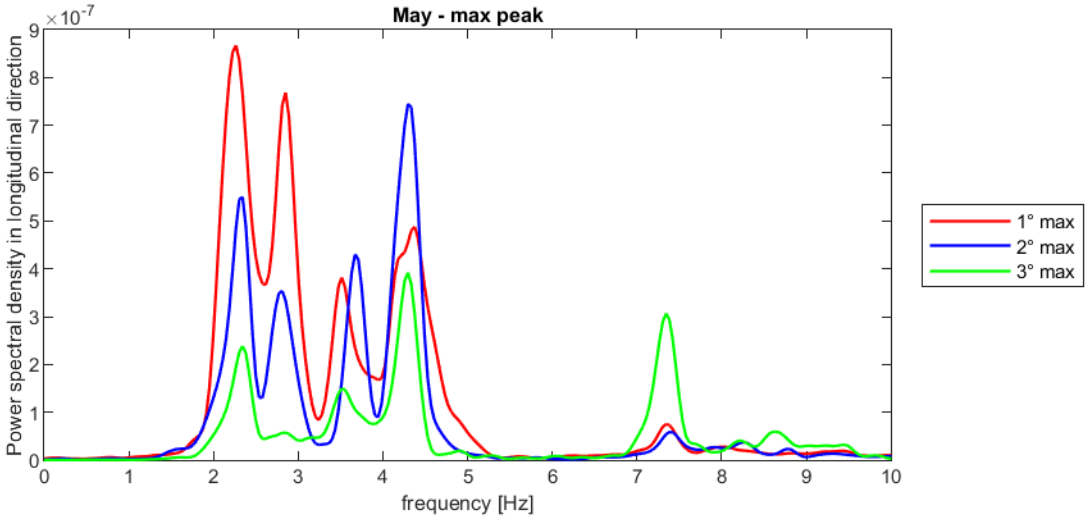


Figure 16-56: Results obtained from the 3 accelerograms with highest peak if PSD

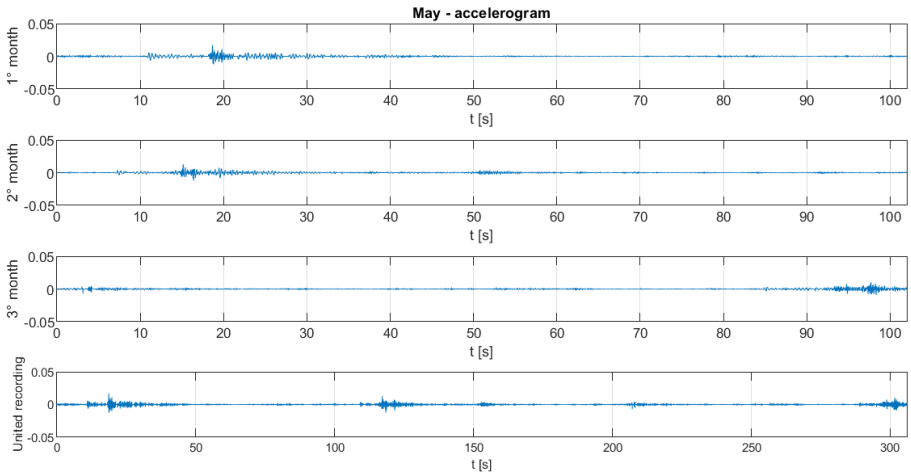


Figure 16-57: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

16.5.3 Transverse direction (z)

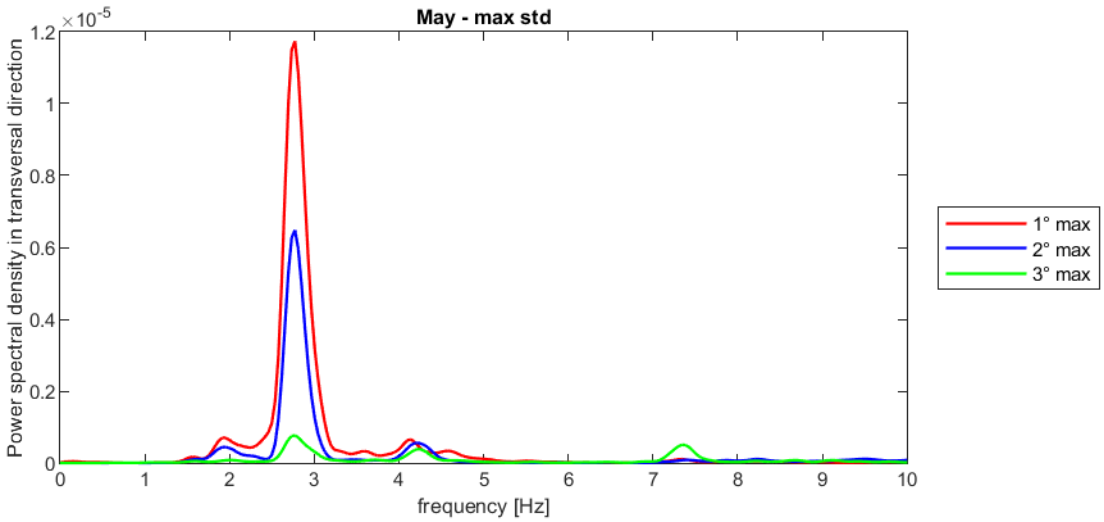


Figure 16-58: Results obtained from the 3 accelerograms with maximum SD in time domain

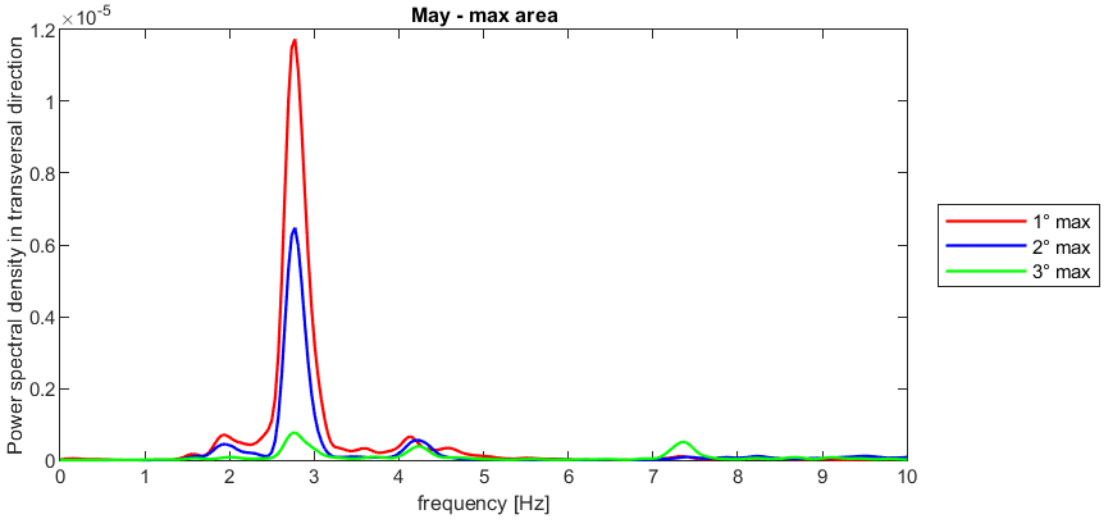


Figure 16-59: Results obtained from the 3 accelerograms with maximum area of PSD

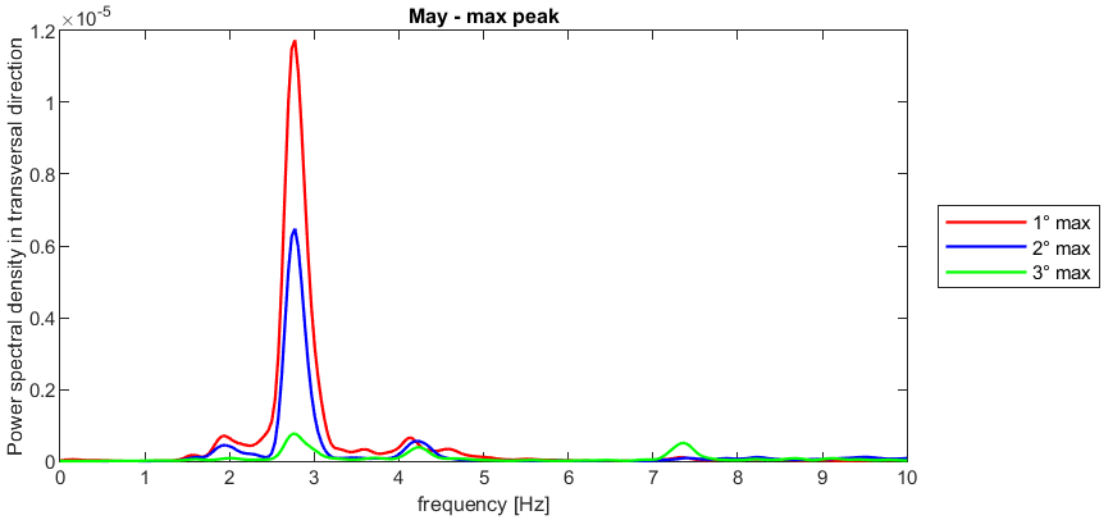


Figure 16-60: Results obtained from the 3 accelerograms with highest peak if PSD

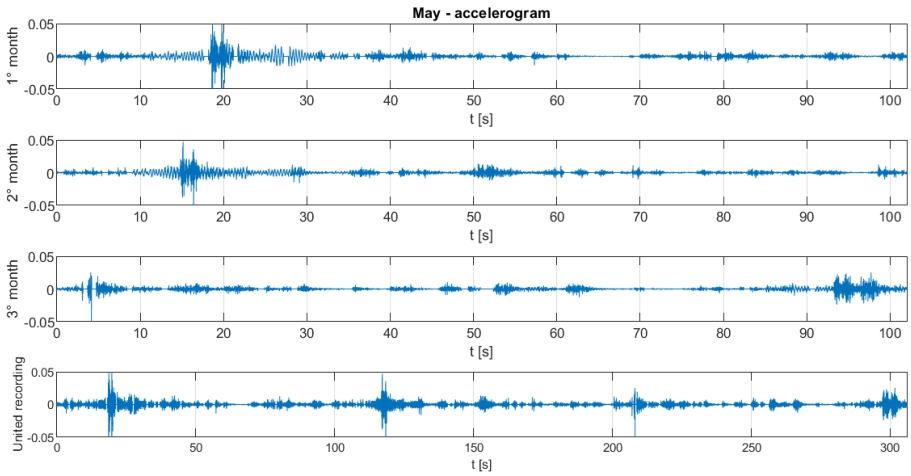


Figure 16-61: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

16.6 June

The results obtained for the June dataset are shown in the following tables.

Table 16-16: June 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-06-13_08-00-21	1.87E-03
	2°	2BCAF_2023-06-20_14-00-20	1.87E-03
	3°	2BCAF_2023-06-19_08-00-21	1.85E-03
Longitudinal direction (y)	1°	2BCAF_2023-06-27_14-00-20	8.41E-04
	2°	2BCAF_2023-06-13_08-00-21	7.72E-04
	3°	2BCAF_2023-06-10_08-00-21	7.70E-04
Transverse direction (z)	1°	2BCAF_2023-06-21_08-00-21	1.19E-03
	2°	2BCAF_2023-06-10_08-00-21	1.06E-03
	3°	2BCAF_2023-06-13_08-00-21	8.49E-04

Table 16-17: June 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-06-14_20-00-21	7.75E-06	2BCAF_2023-06-20_14-00-20	7.58E-07
2	2BCAF_2023-06-20_14-00-20	6.99E-06	2BCAF_2023-06-13_08-00-21	7.51E-07
3	2BCAF_2023-06-08_08-00-21	5.26E-06	2BCAF_2023-06-19_08-00-21	7.22E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-06-27_14-00-20	1.53E-06	2BCAF_2023-06-27_14-00-20	1.44E-07
2	2BCAF_2023-06-20_14-00-20	6.13E-07	2BCAF_2023-06-13_08-00-21	1.22E-07
3	2BCAF_2023-06-13_08-00-21	5.68E-07	2BCAF_2023-06-10_08-00-21	1.20E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-06-21_08-00-21	3.30E-06	2BCAF_2023-06-21_08-00-21	2.88E-07
2	2BCAF_2023-06-10_08-00-21	2.37E-06	2BCAF_2023-06-10_08-00-21	2.38E-07
3	2BCAF_2023-06-14_20-00-21	9.17E-07	2BCAF_2023-06-13_08-00-21	1.45E-07

Table 16-18: June 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	B	D	D	D	F	F	F
2	B	B	A	A	-	A	G	G	G
3	C	-	C	E	A	E	A	-	A

16.6.1 Vertical direction (x)

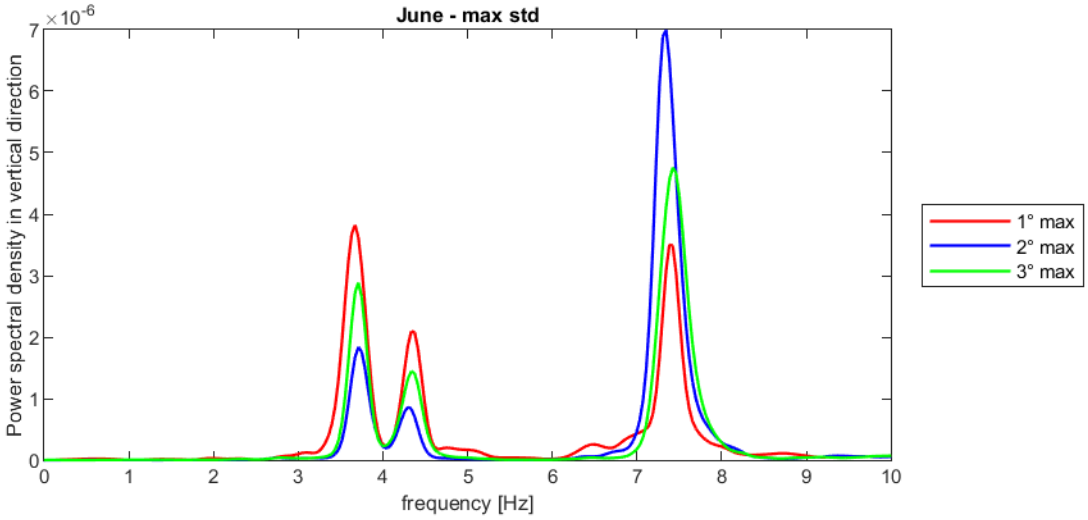


Figure 16-62: Results obtained from the 3 accelerograms with maximum SD in time domain

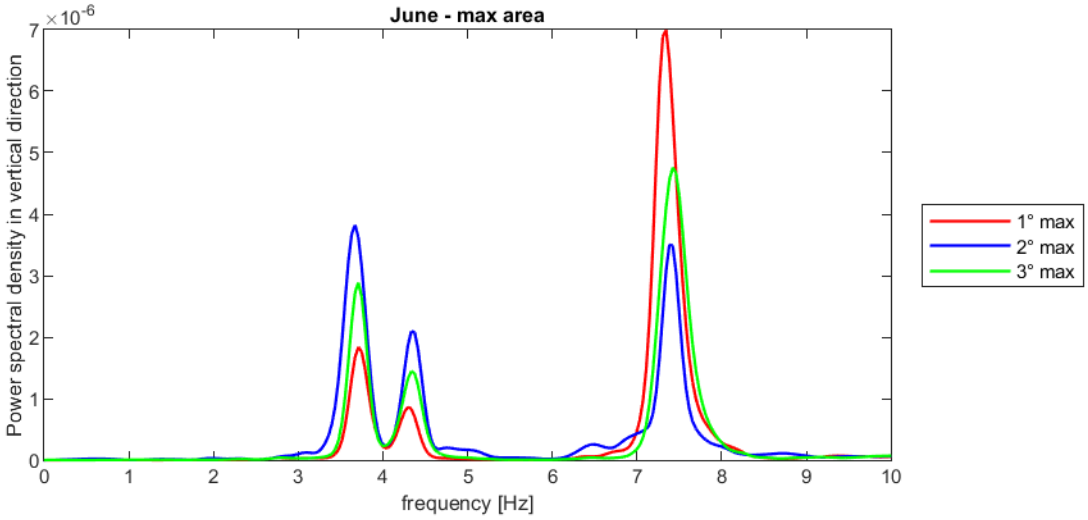


Figure 16-63: Results obtained from the 3 accelerograms with maximum area of PSD

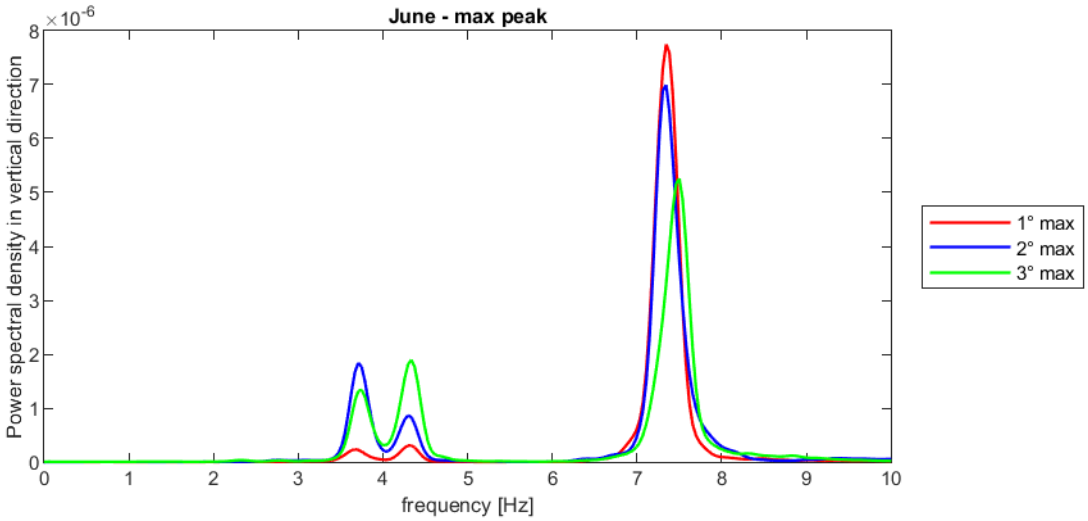


Figure 16-64: Results obtained from the 3 accelerograms with highest peak if PSD

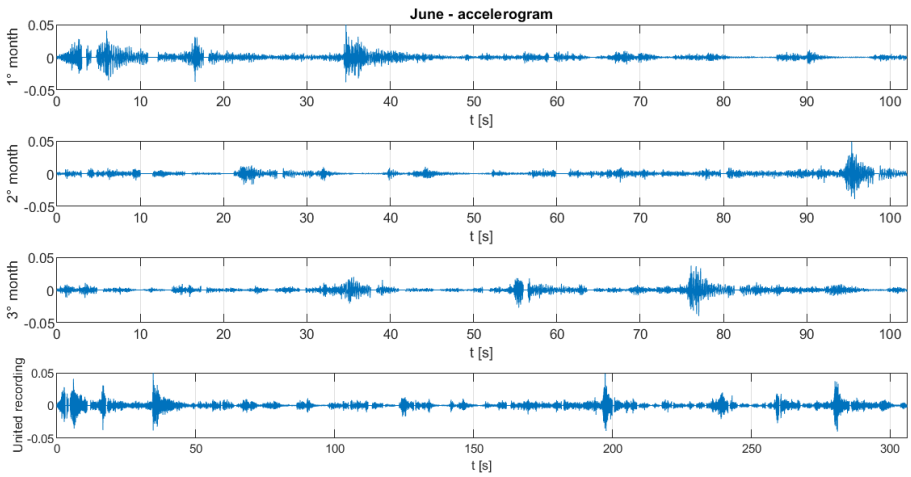


Figure 16-65: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.6.2 Longitudinal direction (y)

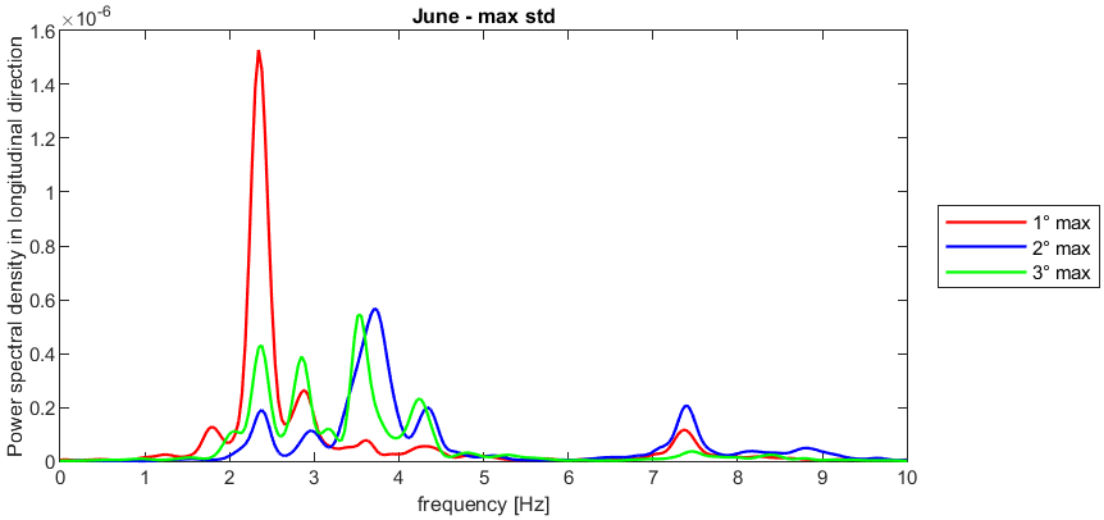


Figure 16-66: Results obtained from the 3 accelerograms with maximum SD in time domain

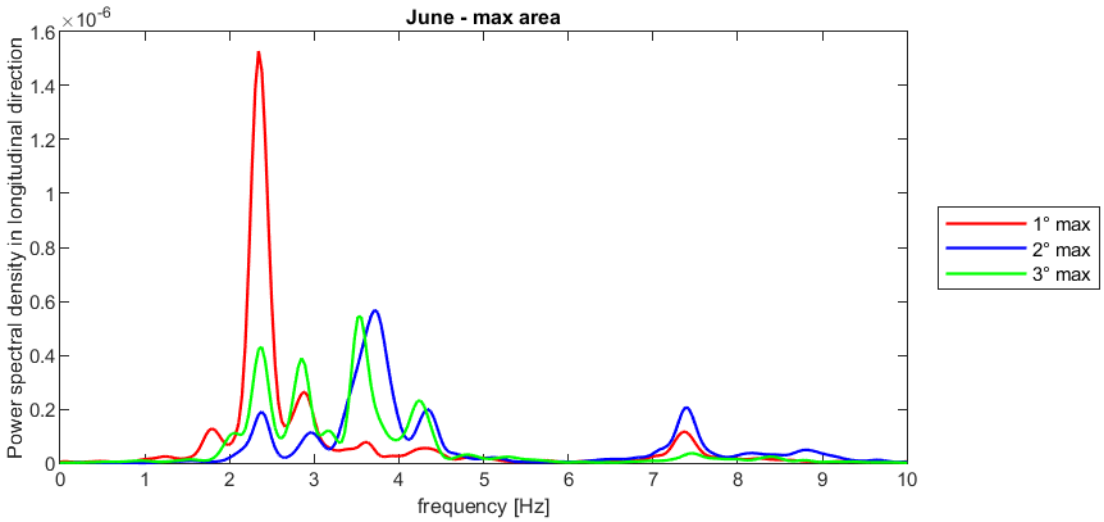


Figure 16-67: Results obtained from the 3 accelerograms with maximum area of PSD

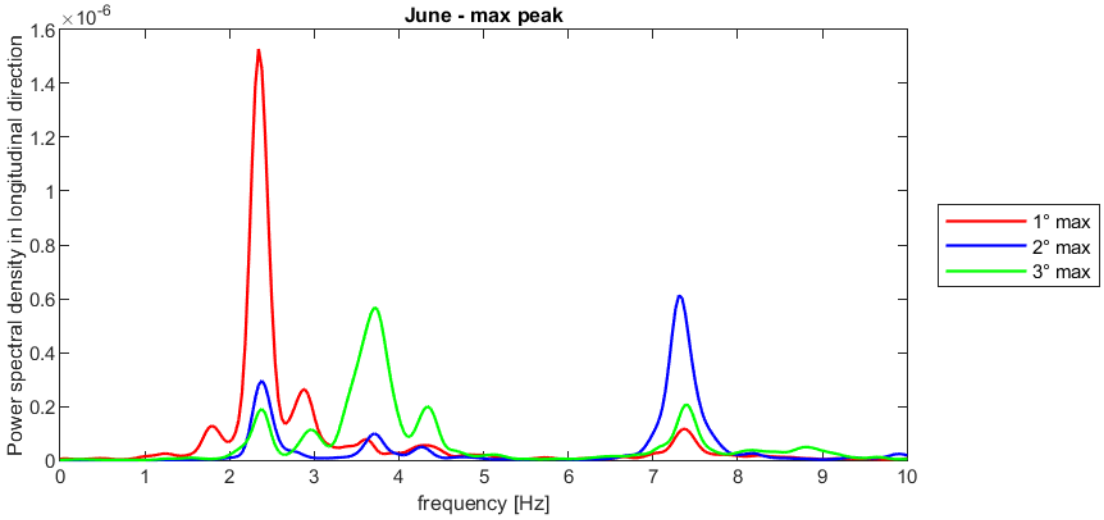


Figure 16-68: Results obtained from the 3 accelerograms with highest peak if PSD

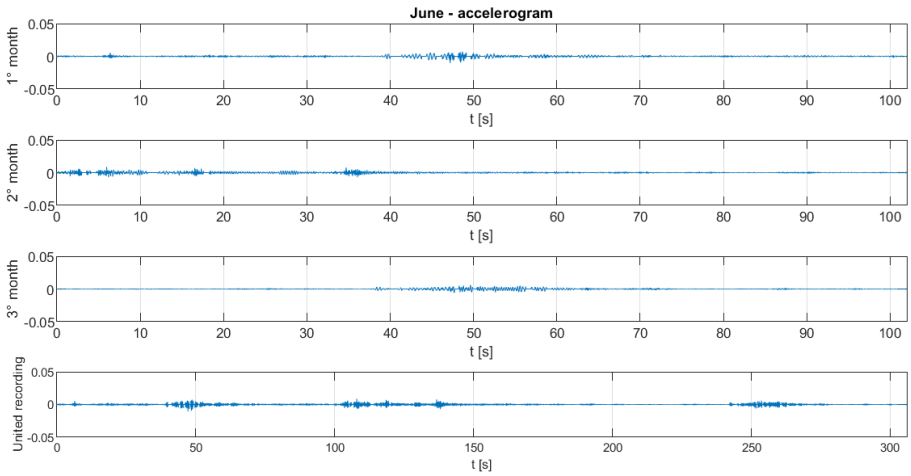


Figure 16-69: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

16.6.3 Transverse direction (z)

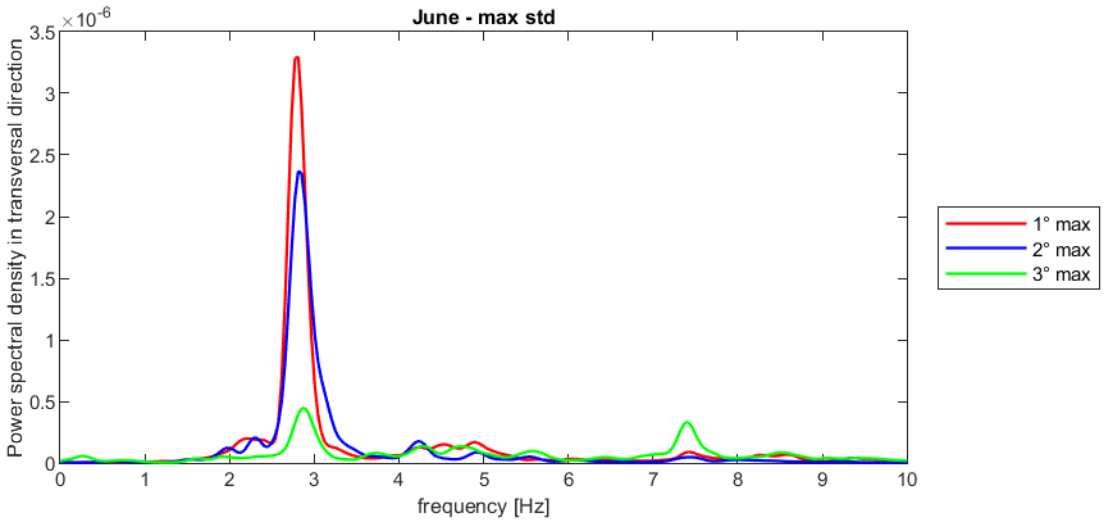


Figure 16-70: Results obtained from the 3 accelerograms with maximum SD in time domain

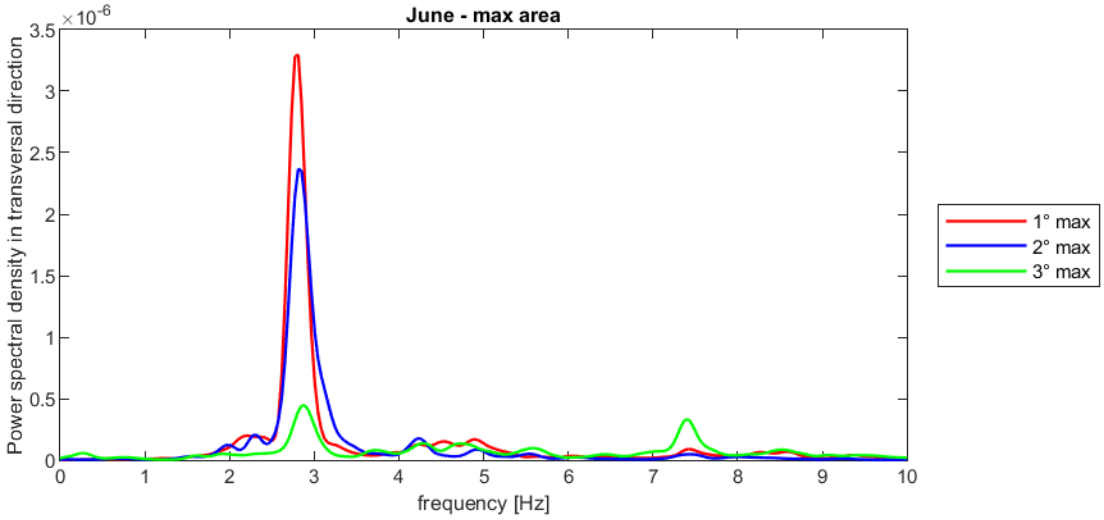


Figure 16-71: Results obtained from the 3 accelerograms with maximum area of PSD

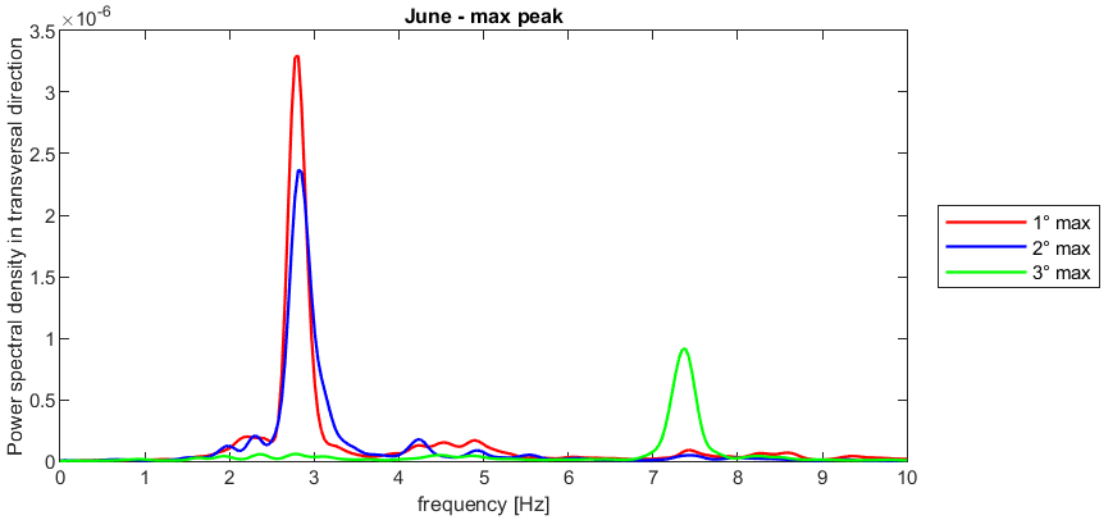


Figure 16-72: Results obtained from the 3 accelerograms with highest peak if PSD

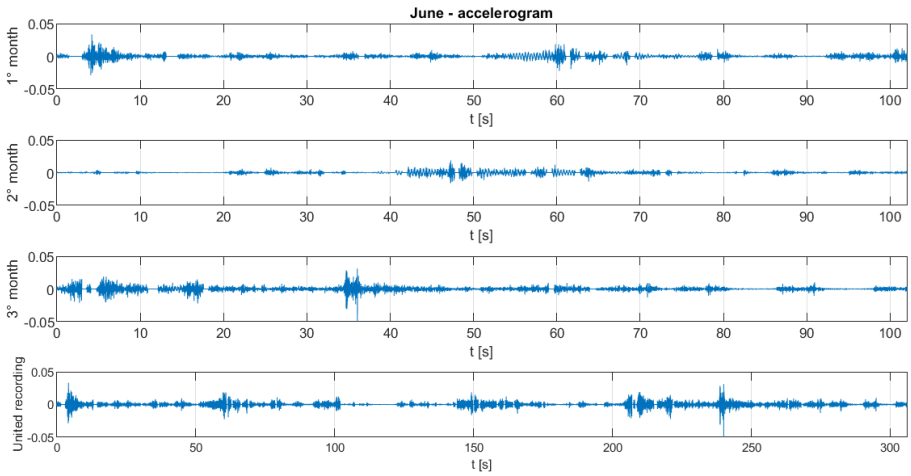


Figure 16-73: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

16.7 July

The results obtained for the July dataset are shown in the following tables.

Table 16-19: July 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-07-05_20-00-20	2.27E-03
	2°	2BCAF_2023-07-06_14-00-21	2.15E-03
	3°	2BCAF_2023-07-07_14-00-20	1.86E-03
Longitudinal direction (y)	1°	2BCAF_2023-07-17_14-00-20	8.66E-04
	2°	2BCAF_2023-07-20_14-00-21	8.65E-04
	3°	2BCAF_2023-07-07_14-00-20	8.48E-04
Transverse direction (z)	1°	2BCAF_2023-07-06_14-00-21	1.50E-03
	2°	2BCAF_2023-07-07_14-00-20	1.32E-03
	3°	2BCAF_2023-07-17_14-00-20	1.02E-03

Table 16-20: July 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-07-06_14-00-21	1.03E-05	2BCAF_2023-07-06_14-00-21	9.35E-07
2	2BCAF_2023-07-05_20-00-20	9.95E-06	2BCAF_2023-07-05_20-00-20	9.23E-07
3	2BCAF_2023-07-07_14-00-20	7.02E-06	2BCAF_2023-07-07_14-00-20	7.12E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-07-17_14-00-20	1.19E-06	2BCAF_2023-07-17_14-00-20	1.52E-07
2	2BCAF_2023-07-27_14-00-20	9.16E-07	2BCAF_2023-07-20_14-00-21	1.52E-07
3	2BCAF_2023-07-07_14-00-20	8.31E-07	2BCAF_2023-07-07_14-00-20	1.47E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-07-06_14-00-21	4.44E-06	2BCAF_2023-07-06_14-00-21	3.66E-07
2	2BCAF_2023-07-07_14-00-20	3.73E-06	2BCAF_2023-07-07_14-00-20	3.31E-07
3	2BCAF_2023-07-27_14-00-20	1.32E-06	2BCAF_2023-07-17_14-00-20	2.05E-07

Table 16-21: July 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	B	D	D	D	B	B	B
2	B	A	A	E	-	E	C	C	C
3	C	C	C	C	C	C	D	-	D

16.7.1 Vertical direction (x)

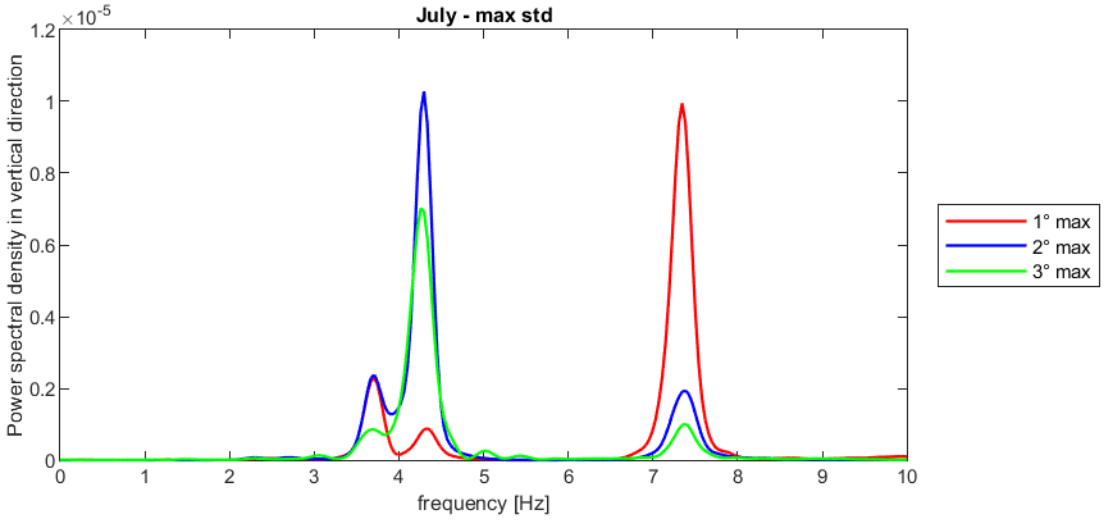


Figure 16-74: Results obtained from the 3 accelerograms with maximum SD in time domain

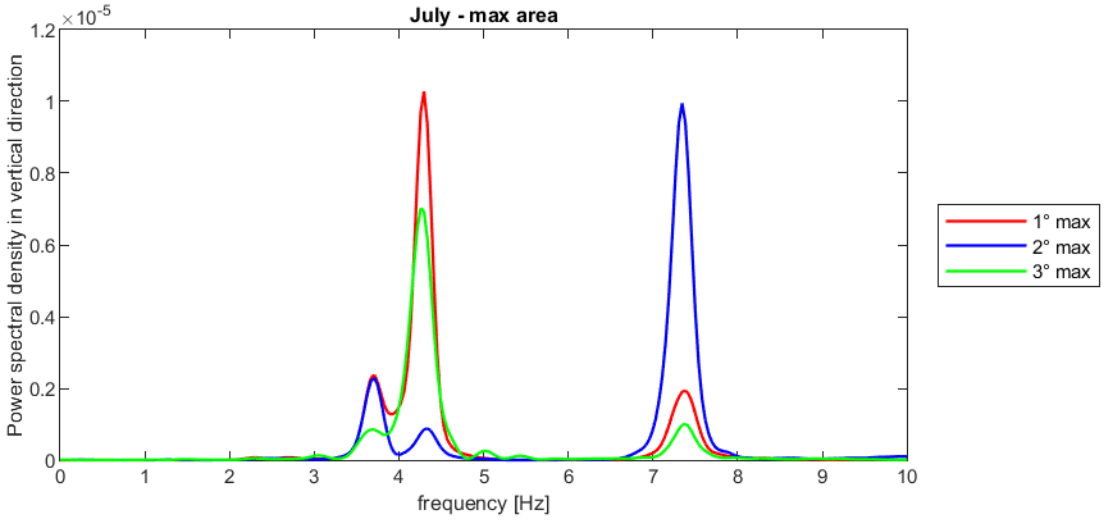


Figure 16-75: Results obtained from the 3 accelerograms with maximum area of PSD

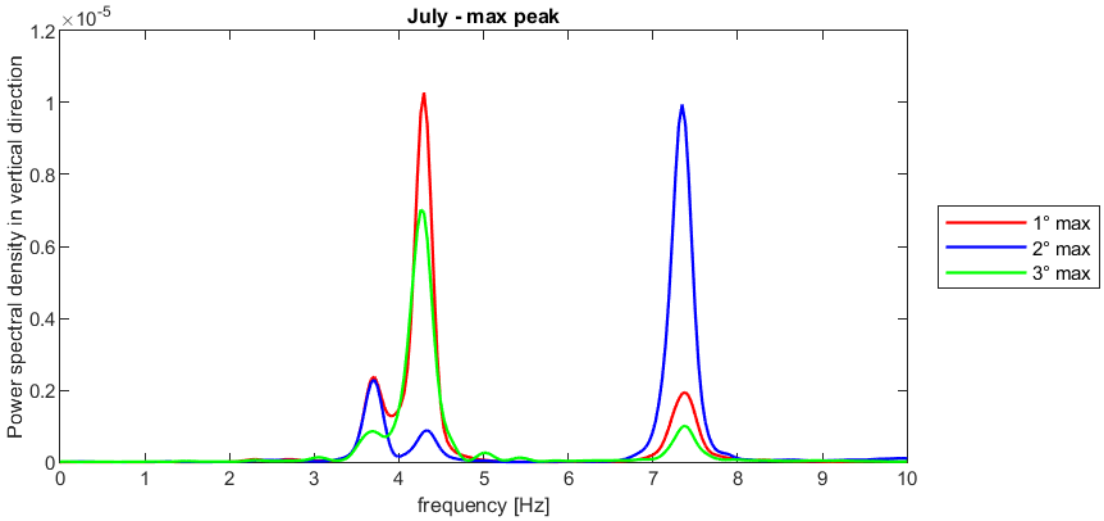


Figure 16-76: Results obtained from the 3 accelerograms with highest peak if PSD

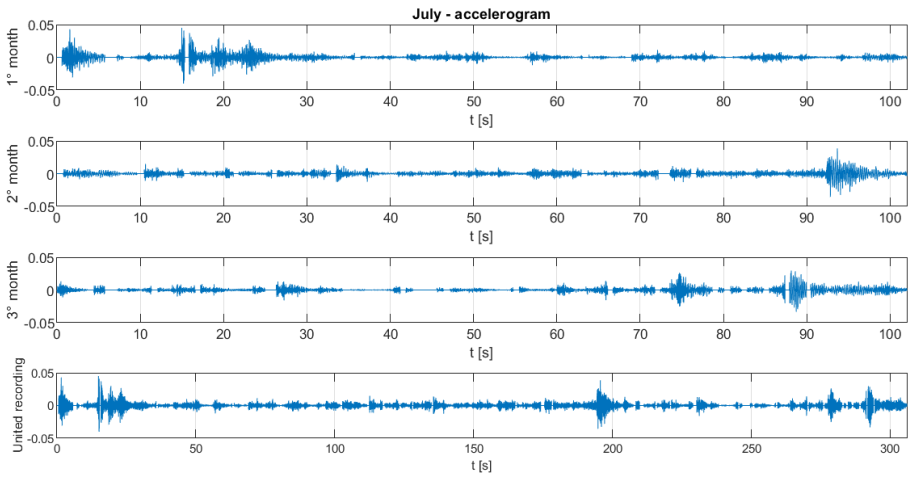


Figure 16-77: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.7.2 Longitudinal direction (y)

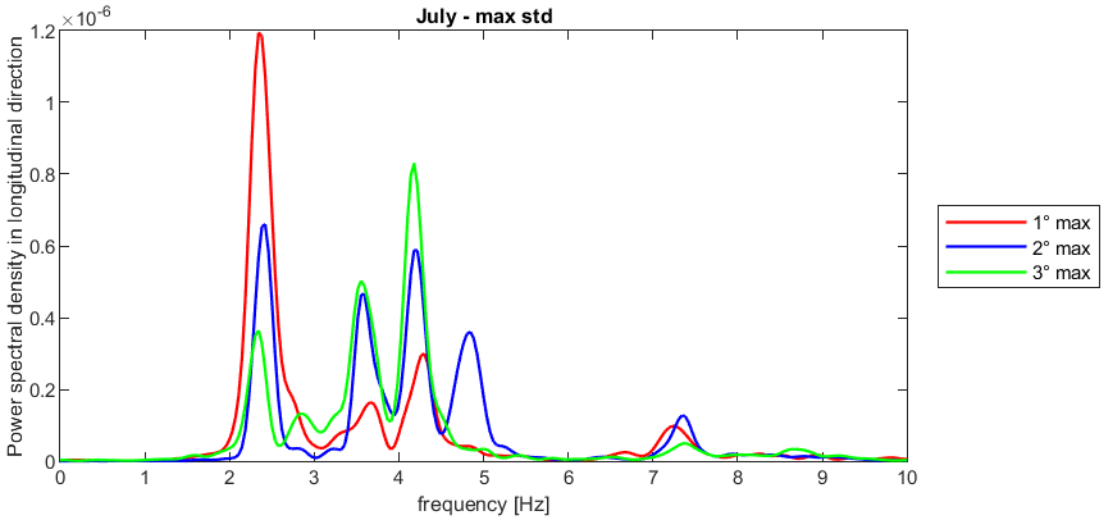


Figure 16-78: Results obtained from the 3 accelerograms with maximum SD in time domain

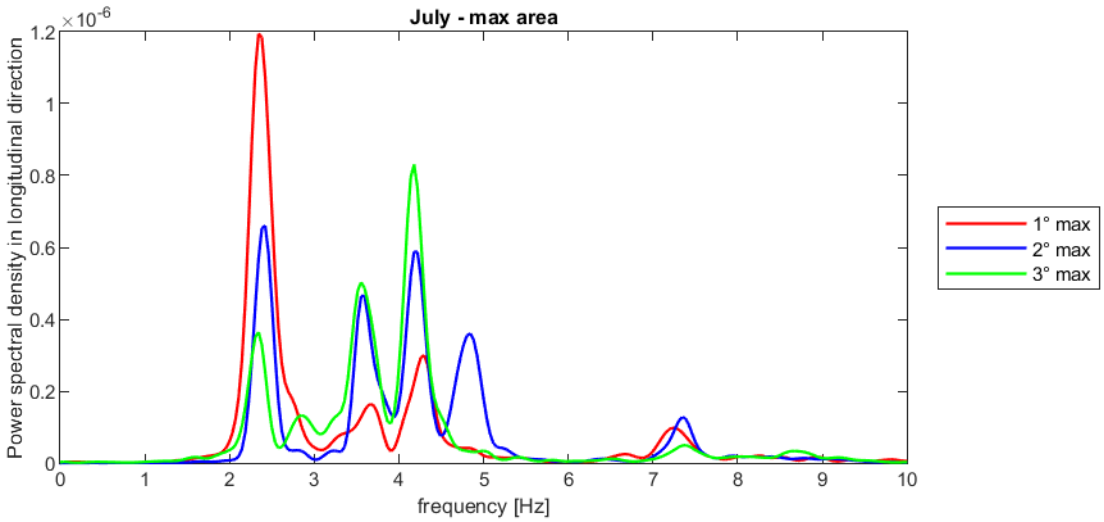


Figure 16-79: Results obtained from the 3 accelerograms with maximum area of PSD

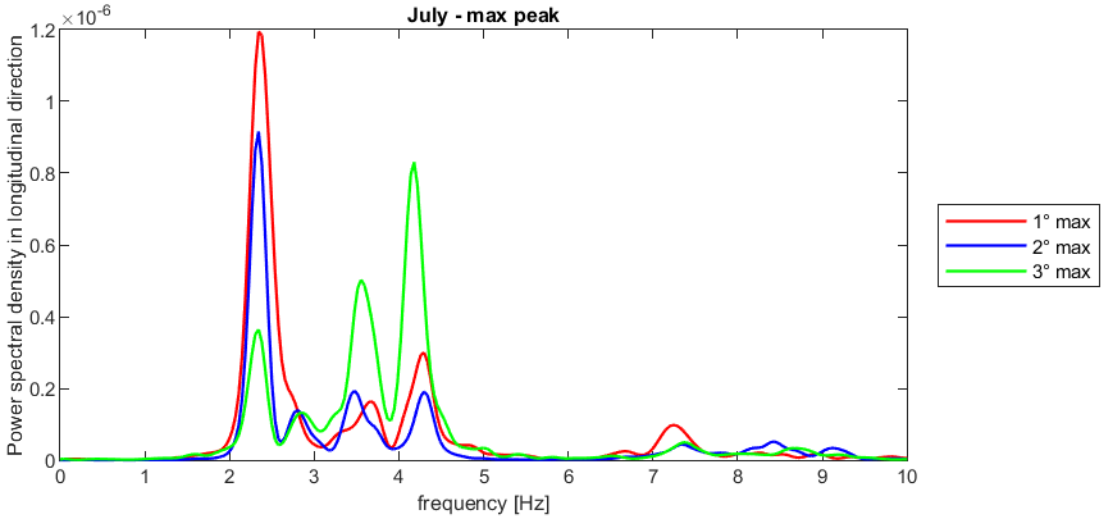


Figure 16-80: Results obtained from the 3 accelerograms with highest peak if PSD

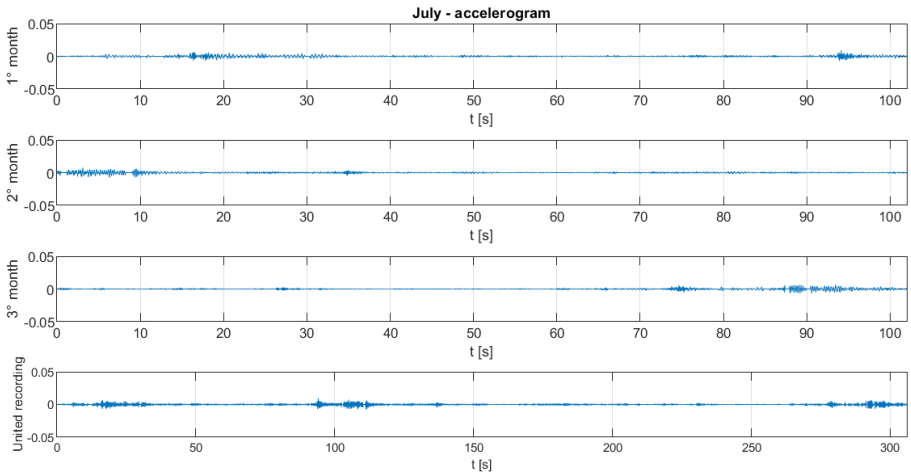


Figure 16-81: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.7.3 Transverse direction (z)

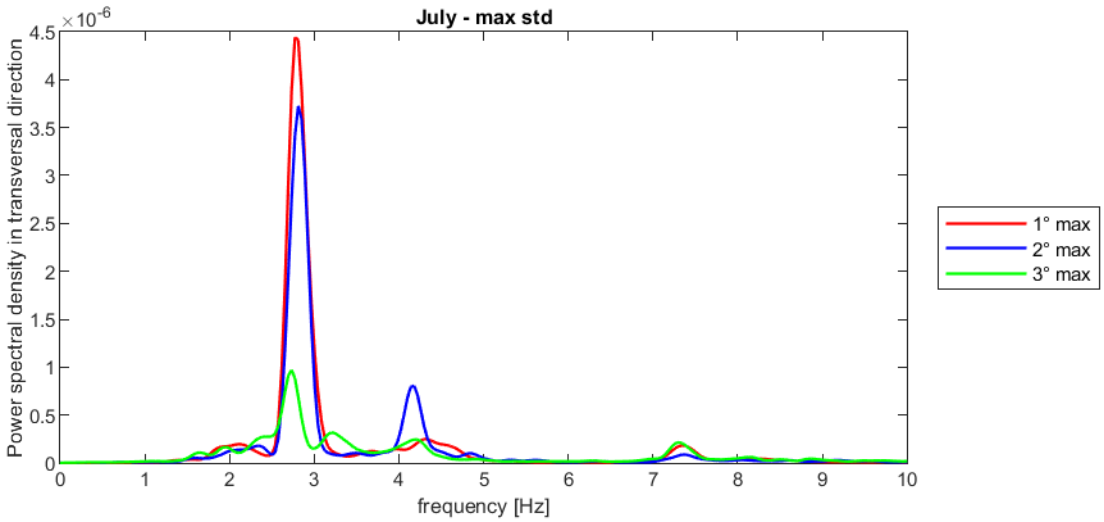


Figure 16-82: Results obtained from the 3 accelerograms with maximum SD in time domain

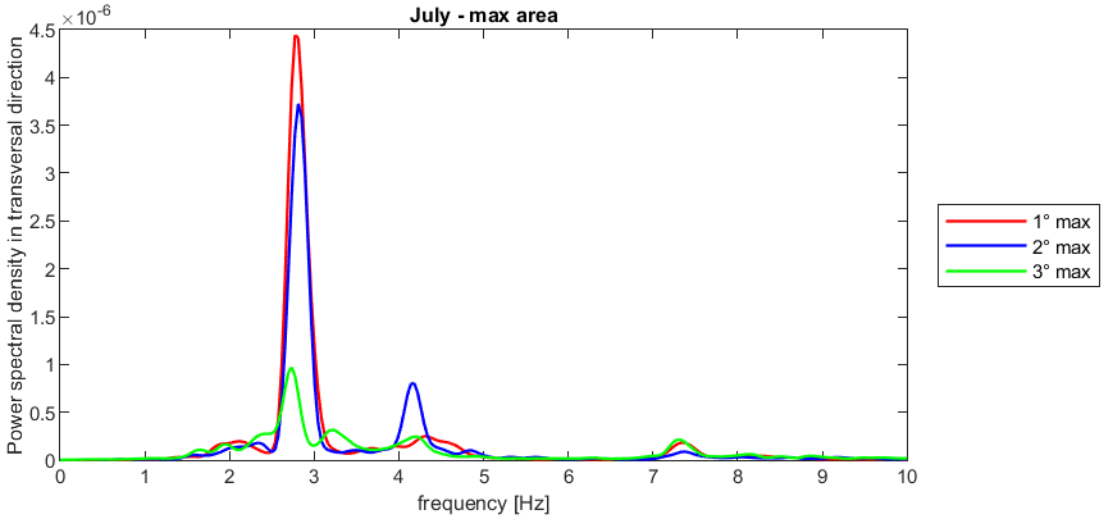


Figure 16-83: Results obtained from the 3 accelerograms with maximum area of PSD

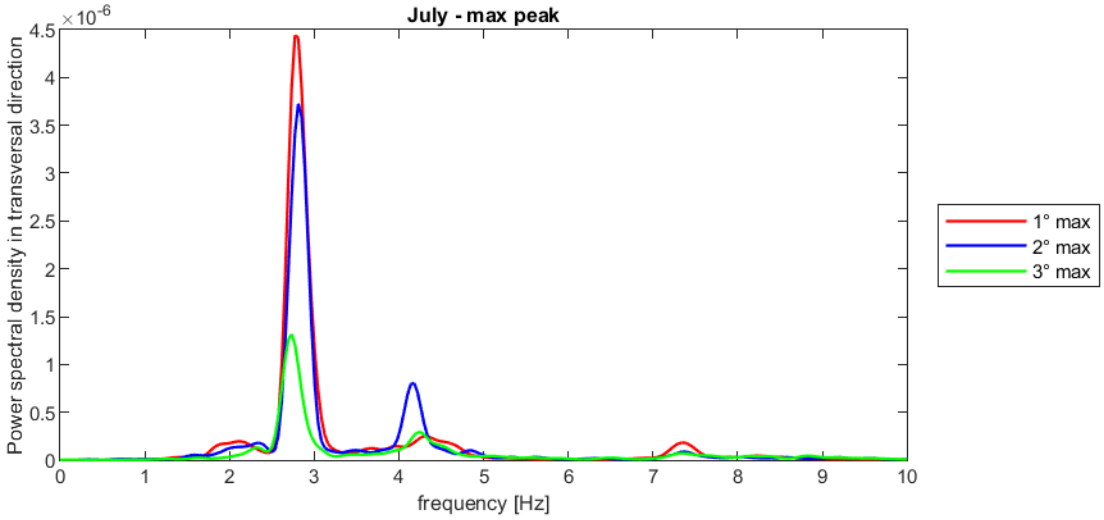


Figure 16-84: Results obtained from the 3 accelerograms with highest peak if PSD

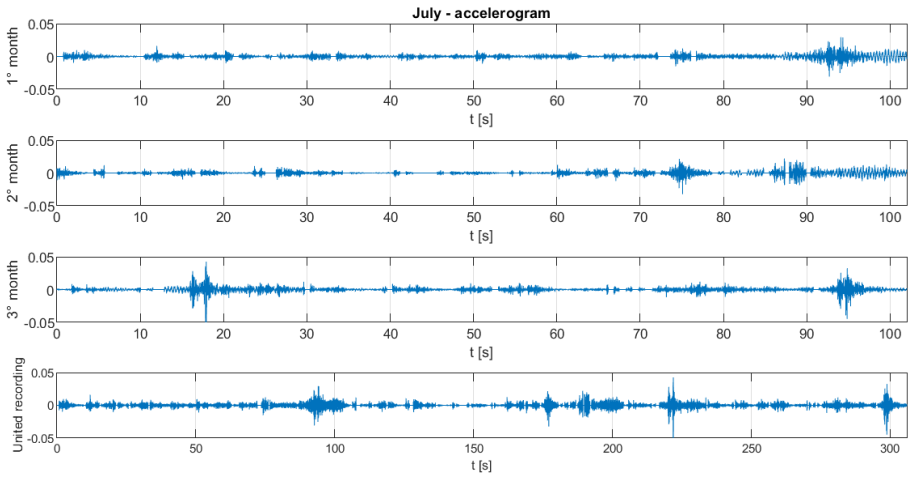


Figure 16-85: Accelerograms in transversal (z) direction with maximum standard deviation in time domain

16.8 August

The results obtained for the August dataset are shown in the following tables.

Table 16-22: August 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-08-02_08-00-21	1.65E-03
	2°	2BCAF_2023-08-07_14-00-21	1.63E-03
	3°	2BCAF_2023-08-07_20-00-20	1.56E-03
Longitudinal direction (y)	1°	2BCAF_2023-08-07_14-00-21	7.84E-04
	2°	2BCAF_2023-08-03_08-00-21	6.43E-04
	3°	2BCAF_2023-08-02_08-00-21	6.20E-04
Transverse direction (z)	1°	2BCAF_2023-08-02_08-00-21	8.59E-04
	2°	2BCAF_2023-08-07_14-00-21	7.76E-04
	3°	2BCAF_2023-08-07_20-00-20	6.54E-04

Table 16-23: August 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-08-03_08-00-21	6.35E-06	2BCAF_2023-08-02_08-00-21	5.31E-07
2	2BCAF_2023-08-15_20-00-20	5.08E-06	2BCAF_2023-08-07_20-00-20	5.26E-07
3	2BCAF_2023-08-08_14-00-21	4.67E-06	2BCAF_2023-08-07_14-00-21	4.98E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-08-07_14-00-21	7.13E-07	2BCAF_2023-08-07_14-00-21	1.22E-07
2	2BCAF_2023-08-03_08-00-21	5.40E-07	2BCAF_2023-08-03_08-00-21	8.40E-08
3	2BCAF_2023-08-08_14-00-21	3.26E-07	2BCAF_2023-08-02_08-00-21	7.80E-08
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-08-08_14-00-21	5.03E-07	2BCAF_2023-08-02_08-00-21	1.55E-07
2	2BCAF_2023-08-15_20-00-20	4.78E-07	2BCAF_2023-08-07_14-00-21	1.20E-07
3	2BCAF_2023-08-03_08-00-21	4.64E-07	2BCAF_2023-08-07_20-00-20	9.26E-08

Table 16-24: August 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	-	A	B	B	B	A	-	A
2	B	-	C	D	D	D	B	-	B
3	C	-	B	A	-	A	C	-	C

16.8.1 Vertical direction (x)

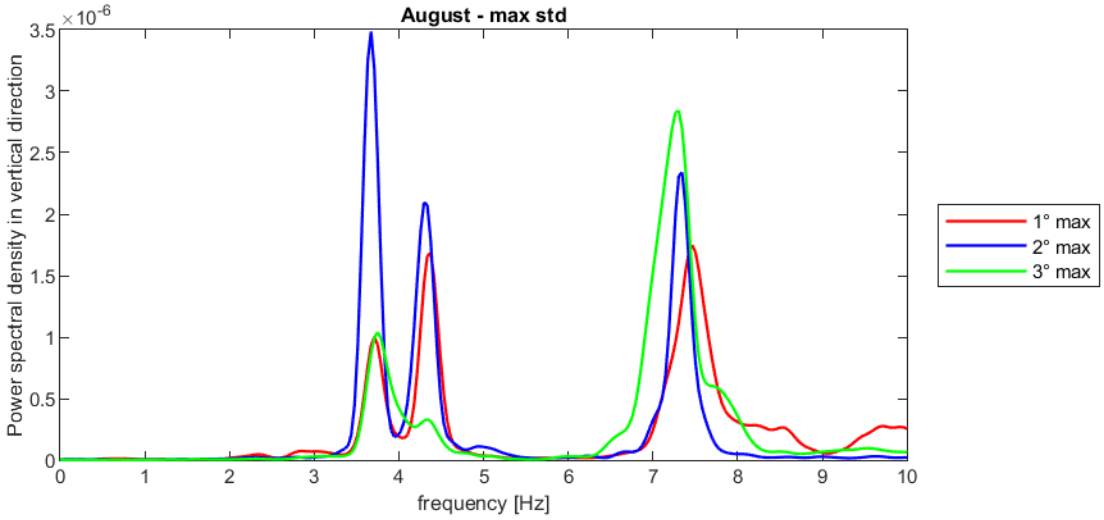


Figure 16-86: Results obtained from the 3 accelerograms with maximum SD in time domain

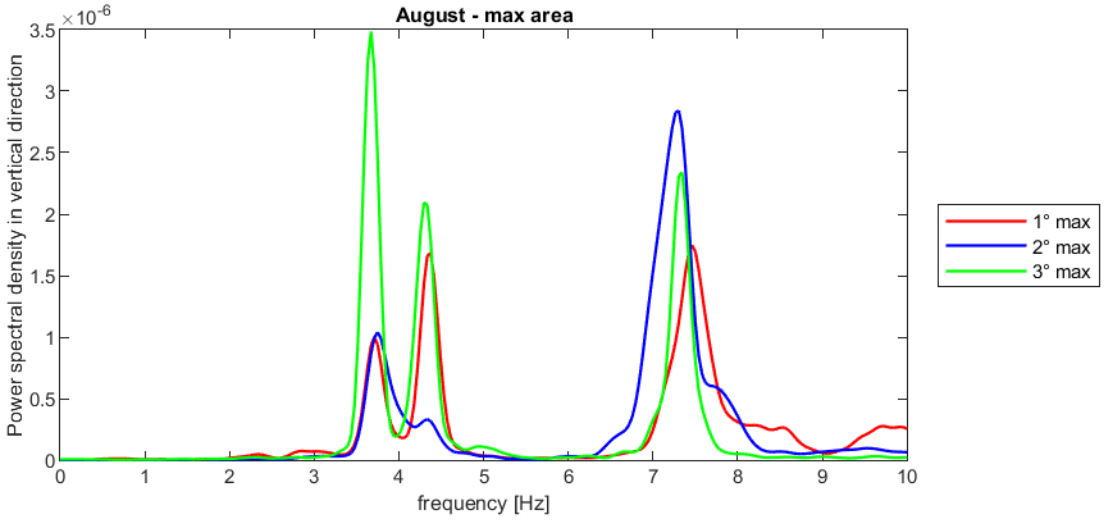


Figure 16-87: Results obtained from the 3 accelerograms with maximum area of PSD

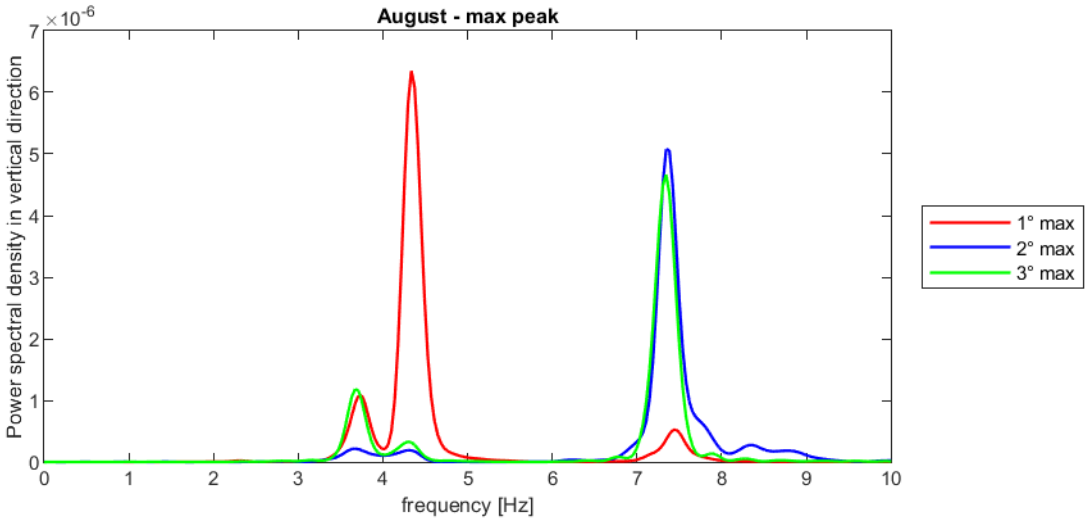


Figure 16-88: Results obtained from the 3 accelerograms with highest peak if PSD

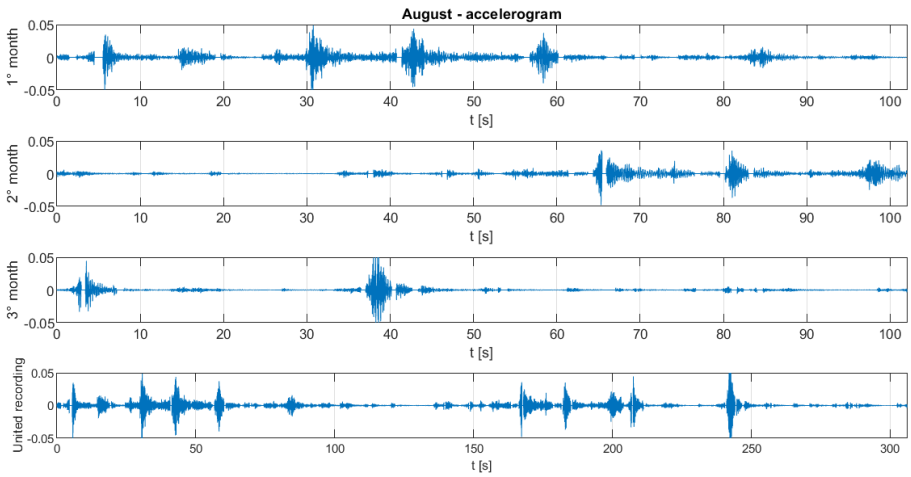


Figure 16-89: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.8.2 Longitudinal direction (y)

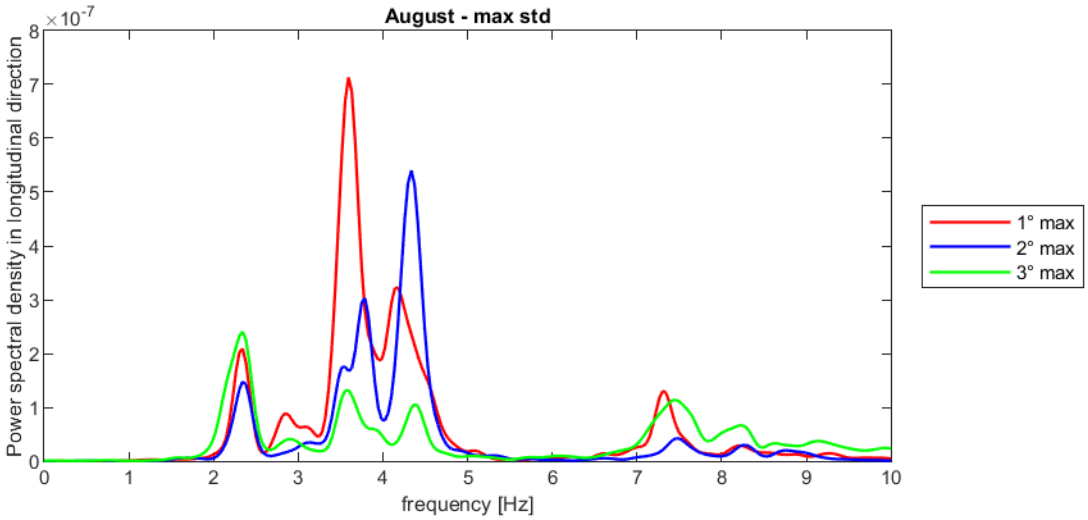


Figure 16-90: Results obtained from the 3 accelerograms with maximum SD in time domain

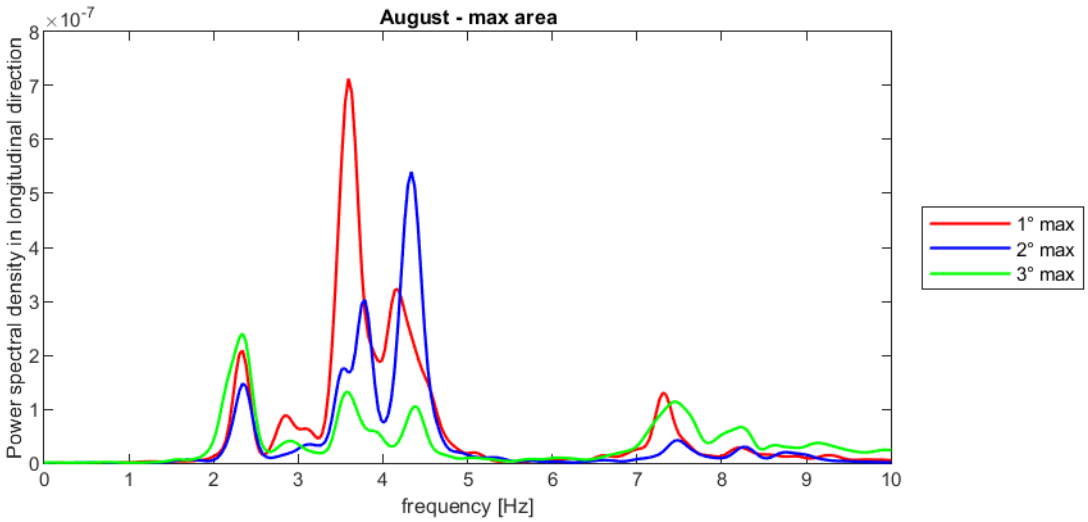


Figure 16-91: Results obtained from the 3 accelerograms with maximum area of PSD

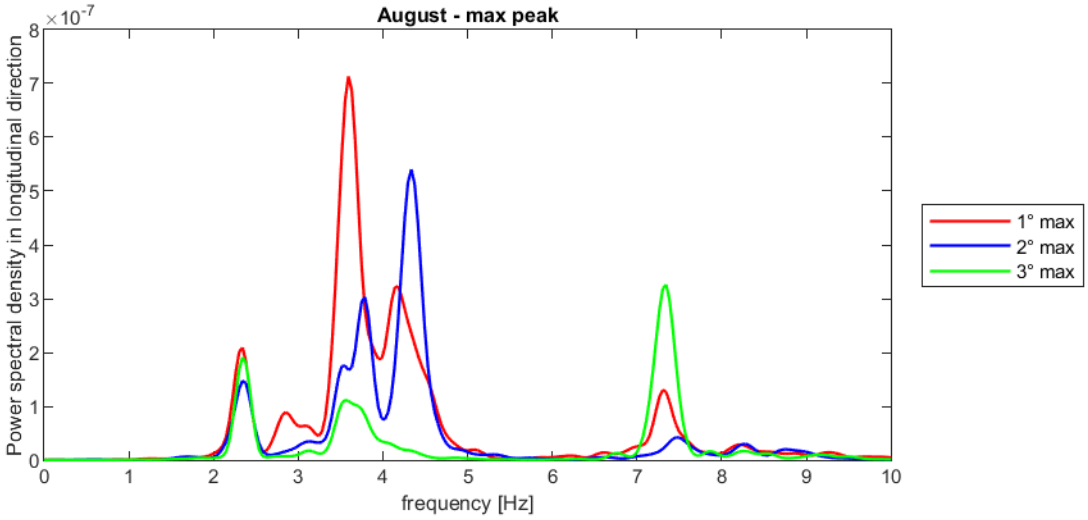


Figure 16-92: Results obtained from the 3 accelerograms with highest peak if PSD

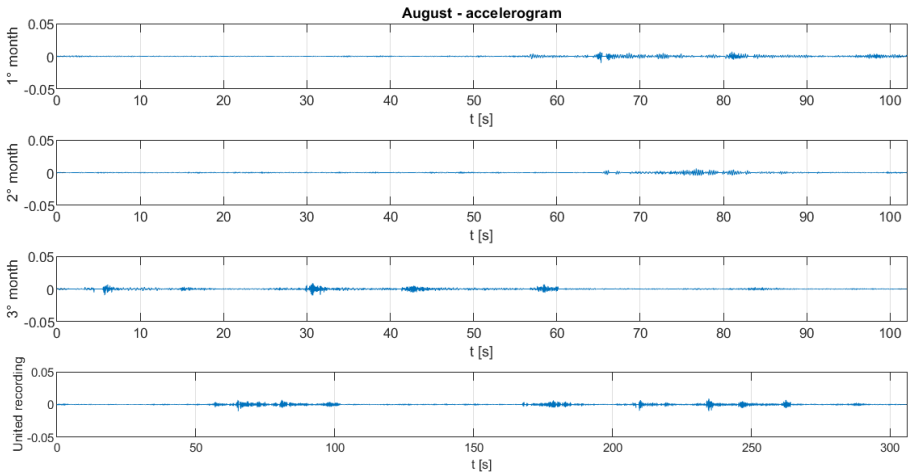


Figure 16-93: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

16.8.3 Transverse direction (z)

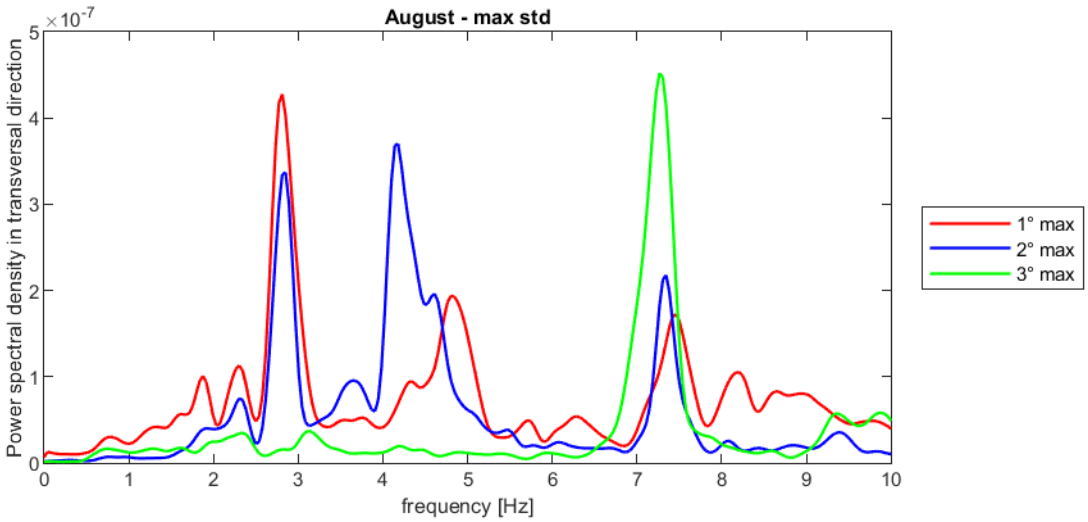


Figure 16-94: Results obtained from the 3 accelerograms with maximum SD in time domain

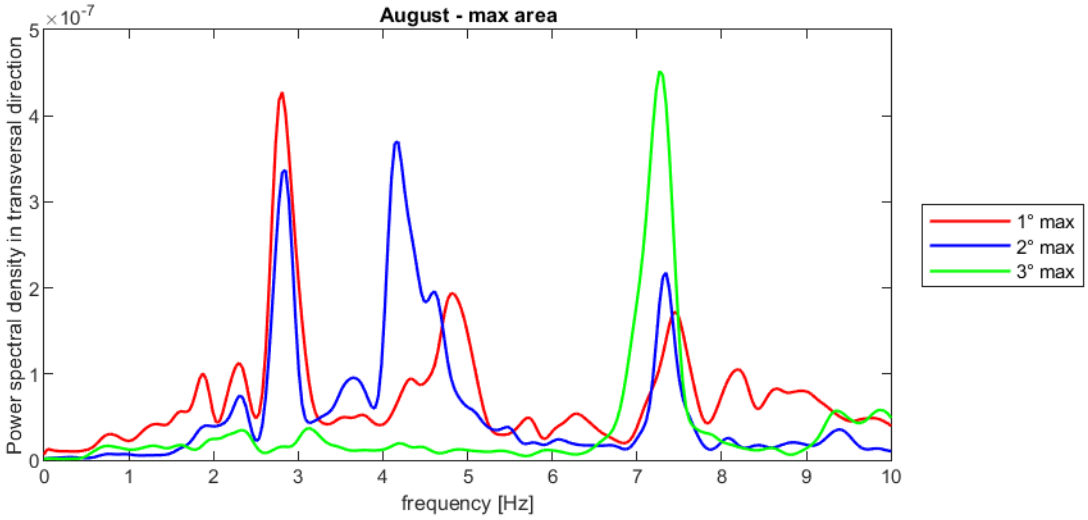


Figure 16-95: Results obtained from the 3 accelerograms with maximum area of PSD

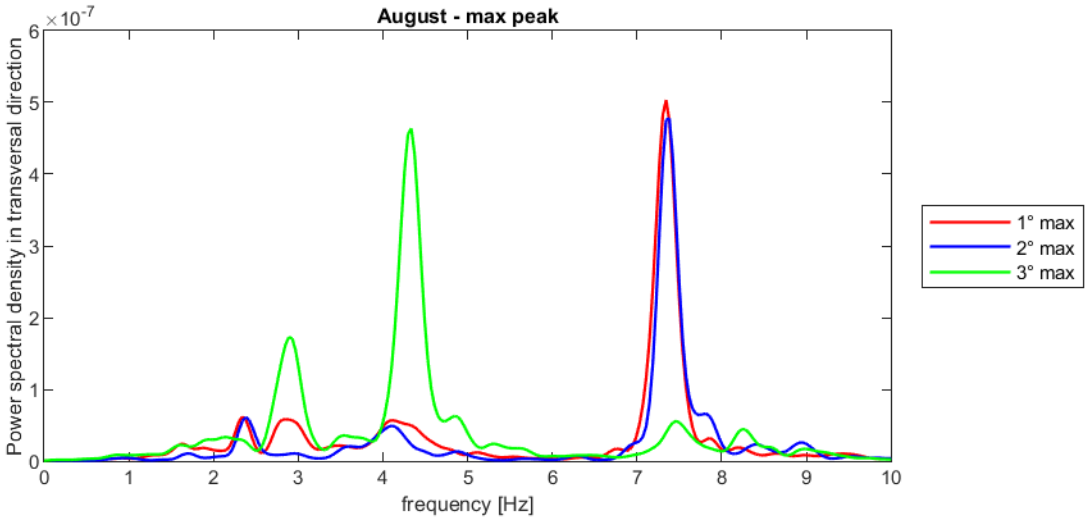


Figure 16-96: Results obtained from the 3 accelerograms with highest peak if PSD

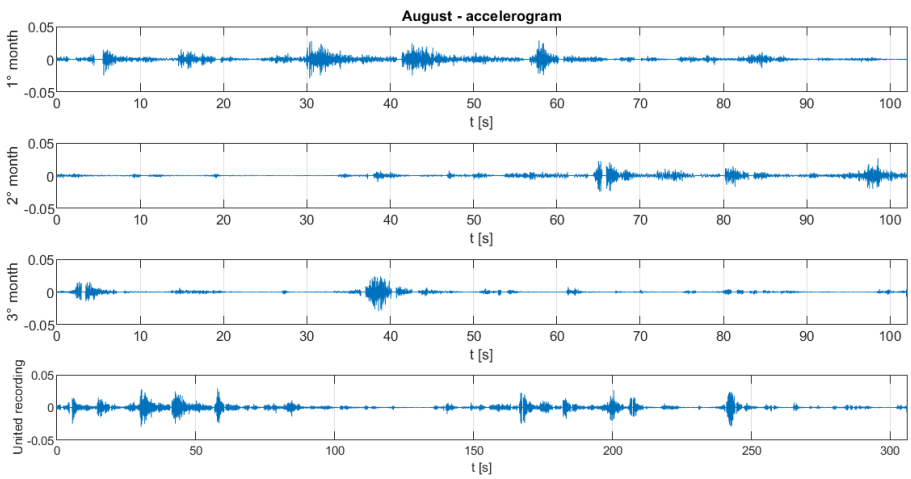


Figure 16-97: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

16.9 September

The results obtained for the September dataset are shown in the following tables.

Table 16-25: September 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-09-14_11-00-20	2.45E-03
	2°	2BCAF_2023-09-19_10-00-20	2.24E-03
	3°	2BCAF_2023-09-21_14-00-21	2.07E-03
Longitudinal direction (y)	1°	2BCAF_2023-09-26_15-00-21	1.26E-03
	2°	2BCAF_2023-09-20_11-00-20	1.01E-03
	3°	2BCAF_2023-09-26_09-00-20	1.00E-03
Transverse direction (z)	1°	2BCAF_2023-09-20_11-00-20	1.35E-03
	2°	2BCAF_2023-09-26_15-00-21	1.05E-03
	3°	2BCAF_2023-09-26_09-00-20	1.04E-03

Table 16-26: September 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-09-19_10-00-20	1.38E-05	2BCAF_2023-09-14_11-00-20	1.13E-06
2	2BCAF_2023-09-14_11-00-20	1.28E-05	2BCAF_2023-09-19_10-00-20	1.03E-06
3	2BCAF_2023-09-21_14-00-21	9.11E-06	2BCAF_2023-09-26_09-00-20	9.53E-07
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-09-26_15-00-21	2.96E-06	2BCAF_2023-09-26_15-00-21	3.41E-07
2	2BCAF_2023-09-19_10-00-20	1.24E-06	2BCAF_2023-09-26_09-00-20	2.11E-07
3	2BCAF_2023-09-15_11-00-20	1.04E-06	2BCAF_2023-09-20_11-00-20	2.04E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-09-20_11-00-20	4.06E-06	2BCAF_2023-09-20_11-00-20	3.67E-07
2	2BCAF_2023-09-25_13-00-21	1.88E-06	2BCAF_2023-09-26_09-00-20	2.31E-07
3	2BCAF_2023-09-26_09-00-20	1.74E-06	2BCAF_2023-09-26_15-00-21	2.31E-07

Table 16-27: September 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	D	D	D	E	E	E
2	B	A	B	E	-	F	D	-	F
3	C	C	-	F	-	E	F	F	D

16.9.1 Vertical direction (x)

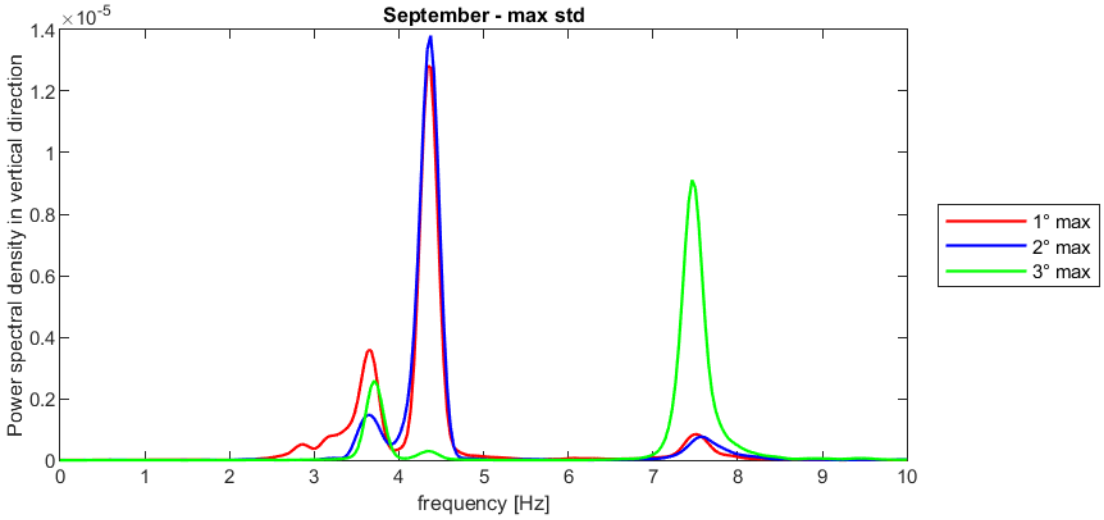


Figure 16-98: Results obtained from the 3 accelerograms with maximum SD in time domain

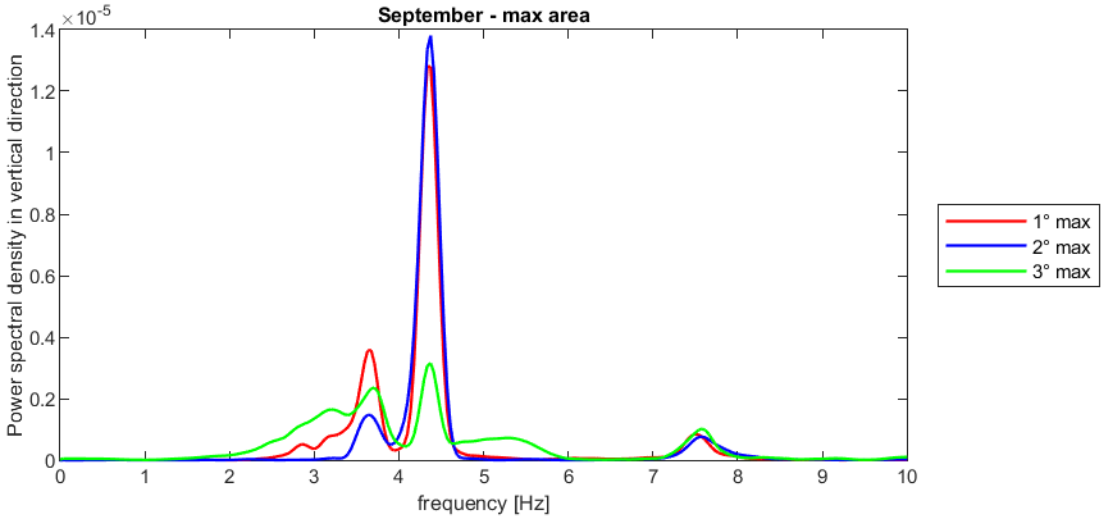


Figure 16-99: Results obtained from the 3 accelerograms with maximum area of PSD

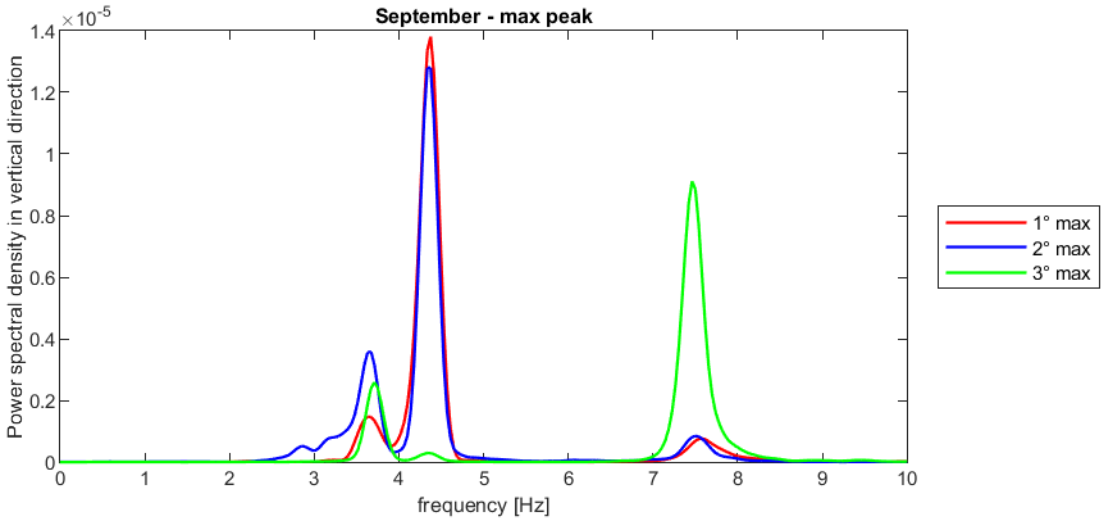


Figure 16-100: Results obtained from the 3 accelerograms with highest peak if PSD

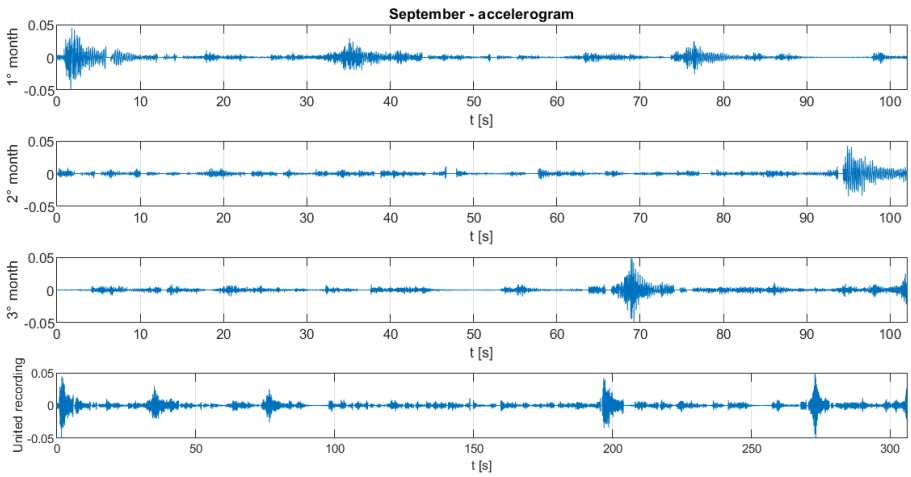


Figure 16-101: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.9.2 Longitudinal direction (y)

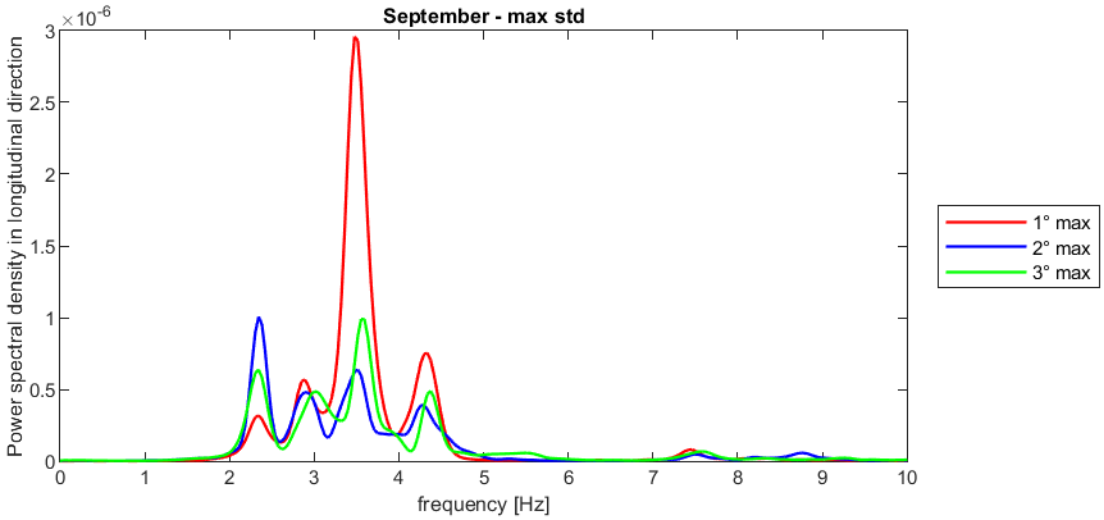


Figure 16-102: Results obtained from the 3 accelerograms with maximum SD in time domain

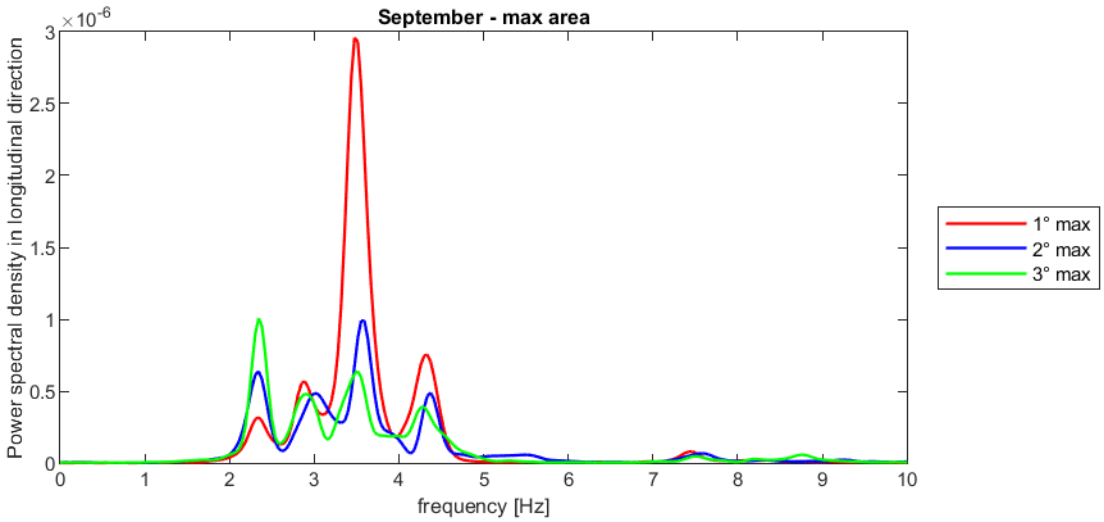


Figure 16-103: Results obtained from the 3 accelerograms with maximum area of PSD

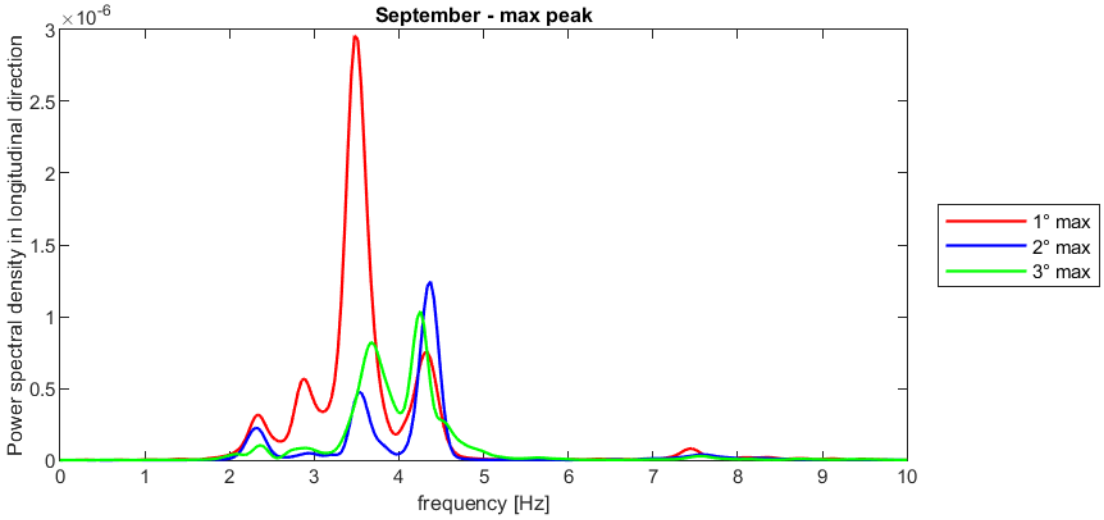


Figure 16-104: Results obtained from the 3 accelerograms with highest peak if PSD

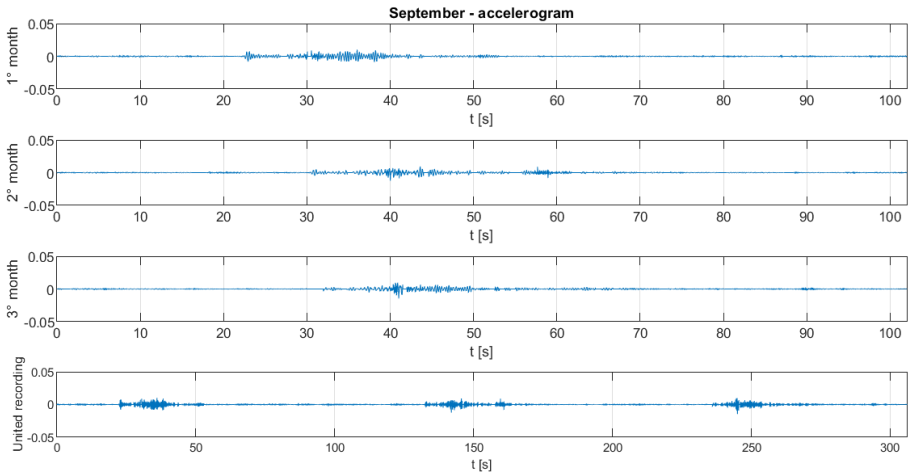


Figure 16-105: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

16.9.3 Transverse direction (z)

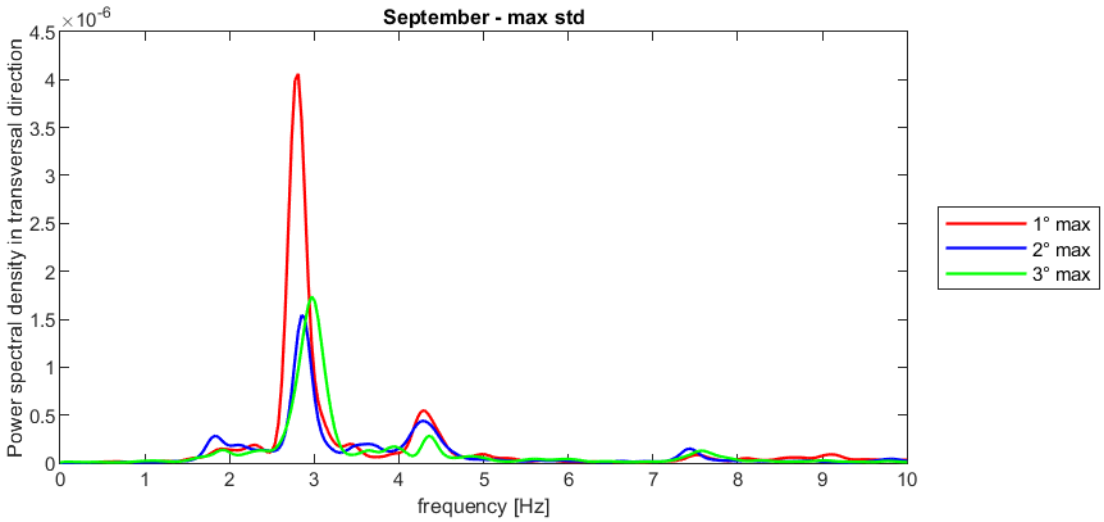


Figure 16-106: Results obtained from the 3 accelerograms with maximum SD in time domain

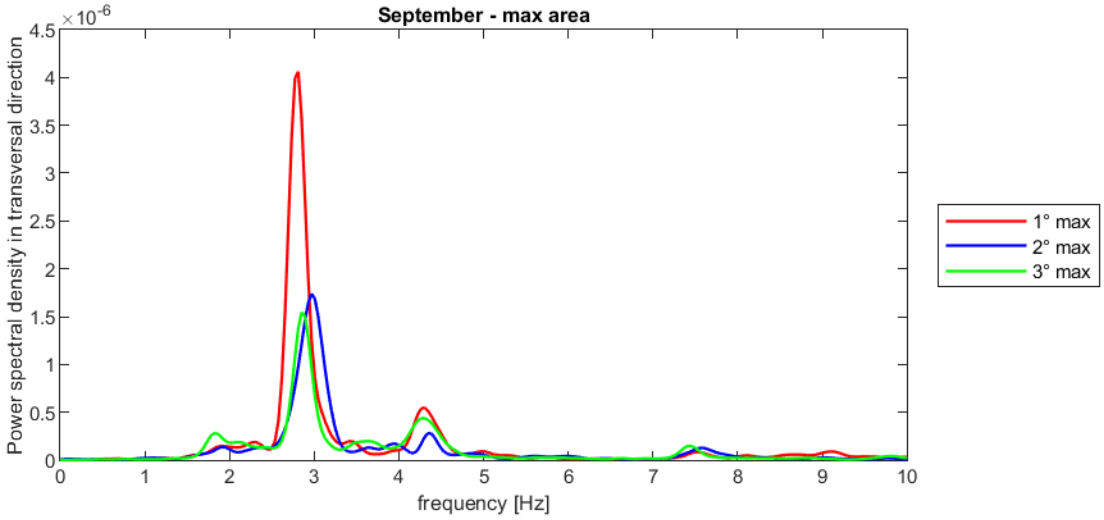


Figure 16-107: Results obtained from the 3 accelerograms with maximum area of PSD

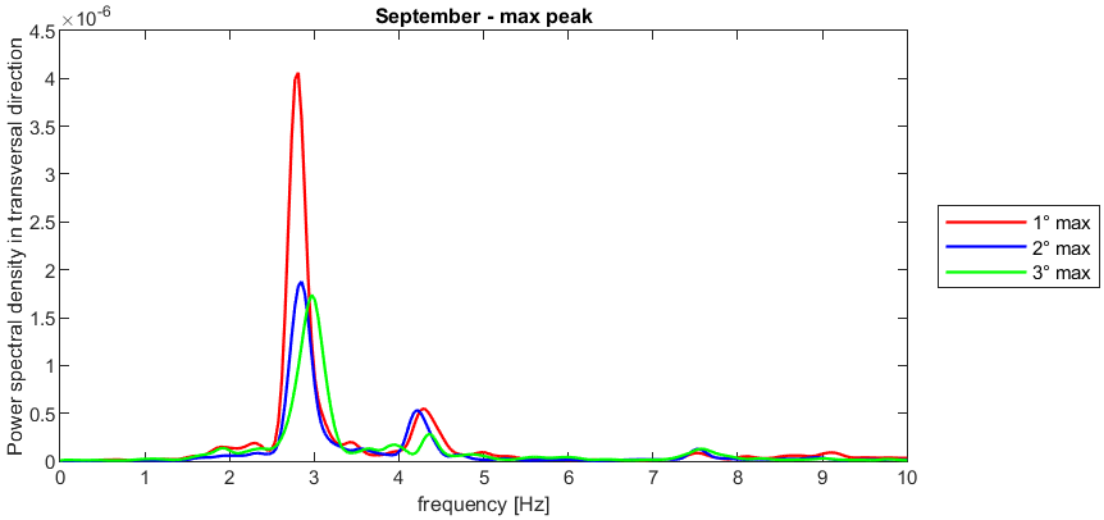


Figure 16-108: Results obtained from the 3 accelerograms with highest peak if PSD

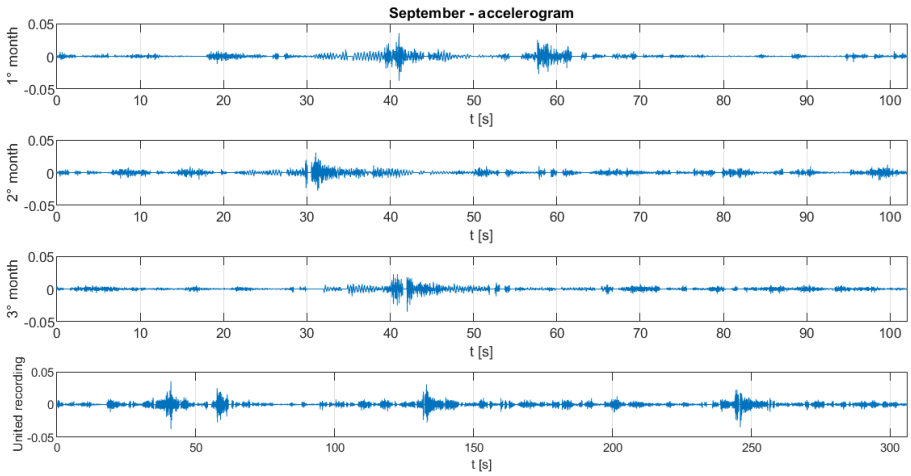


Figure 16-109: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

16.10 October

The results obtained for the October dataset are shown in the following tables.

Table 16-28: October 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-10-24_10-00-21	2.43E-03
	2°	2BCAF_2023-10-19_12-00-20	2.38E-03
	3°	2BCAF_2023-10-25_10-00-21	2.37E-03
Longitudinal direction (y)	1°	2BCAF_2023-10-25_10-00-21	9.13E-04
	2°	2BCAF_2023-10-12_09-00-21	8.25E-04
	3°	2BCAF_2023-10-09_13-00-20	7.89E-04
Transverse direction (z)	1°	2BCAF_2023-10-12_09-00-21	1.23E-03
	2°	2BCAF_2023-10-26_12-00-20	1.05E-03
	3°	2BCAF_2023-10-09_13-00-20	1.00E-03

Table 16-29: October 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-10-19_12-00-20	1.22E-05	2BCAF_2023-10-25_10-00-21	1.21E-06
2	2BCAF_2023-10-25_10-00-21	1.04E-05	2BCAF_2023-10-24_10-00-21	1.18E-06
3	2BCAF_2023-10-12_09-00-21	1.01E-05	2BCAF_2023-10-19_12-00-20	1.04E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-10-25_10-00-21	9.91E-07	2BCAF_2023-10-25_10-00-21	1.72E-07
2	2BCAF_2023-10-02_10-00-20	6.95E-07	2BCAF_2023-10-12_09-00-21	1.36E-07
3	2BCAF_2023-10-16_08-00-21	5.99E-07	2BCAF_2023-10-09_13-00-20	1.28E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-10-12_09-00-21	3.63E-06	2BCAF_2023-10-12_09-00-21	3.14E-07
2	2BCAF_2023-10-26_12-00-20	3.11E-06	2BCAF_2023-10-26_12-00-20	2.26E-07
3	2BCAF_2023-10-24_10-00-21	1.10E-06	2BCAF_2023-10-25_10-00-21	2.11E-07

Table 16-30: October 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	C	C	C	C	D	D	D
2	B	C	A	D	-	D	F	F	F
3	C	-	B	E	-	E	-	-	-

16.10.1 Vertical direction (x)

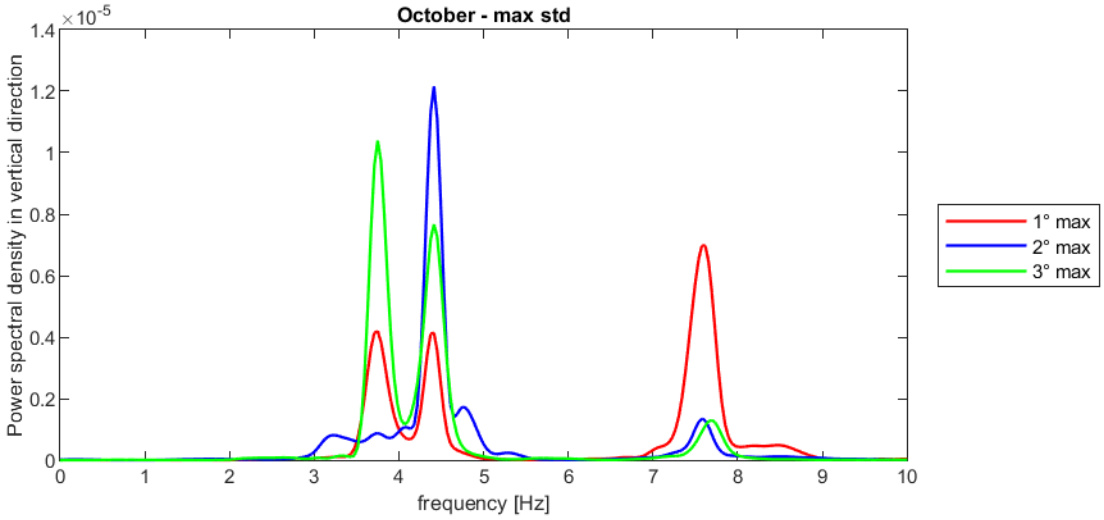


Figure 16-110: Results obtained from the 3 accelerograms with maximum SD in time domain

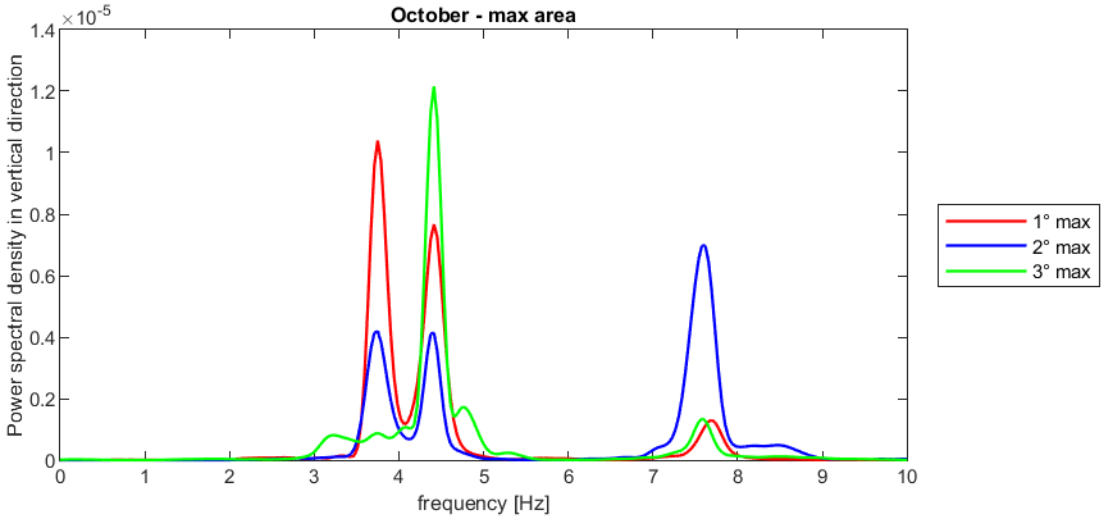


Figure 16-111: Results obtained from the 3 accelerograms with maximum area of PSD

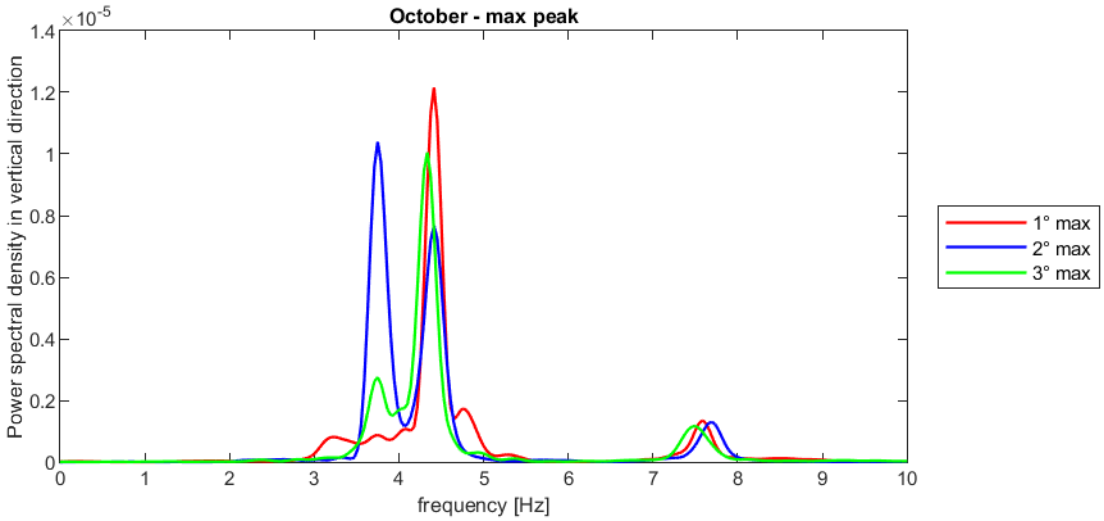


Figure 16-112: Results obtained from the 3 accelerograms with highest peak if PSD

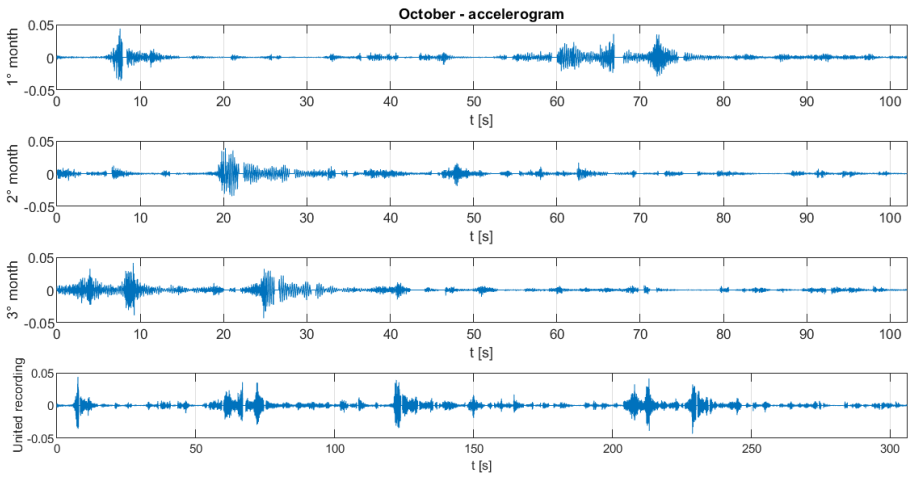


Figure 16-113: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.10.2 Longitudinal direction (y)

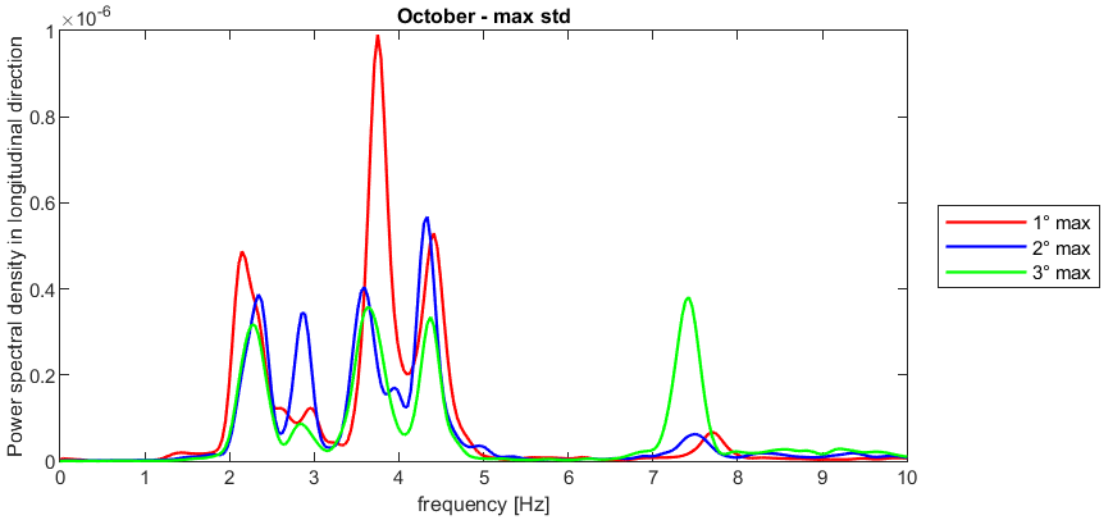


Figure 16-114: Results obtained from the 3 accelerograms with maximum SD in time domain

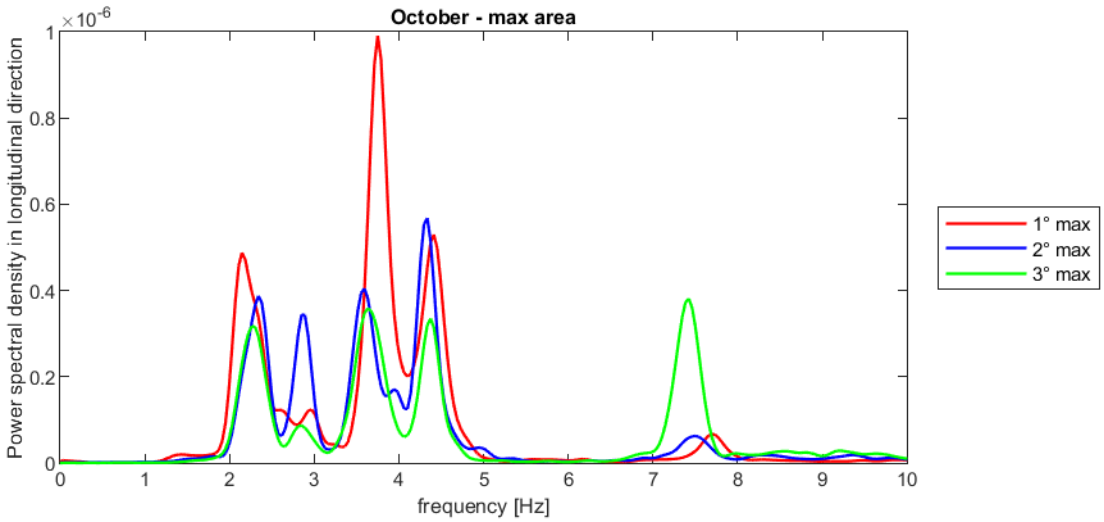


Figure 16-115: Results obtained from the 3 accelerograms with maximum area of PSD

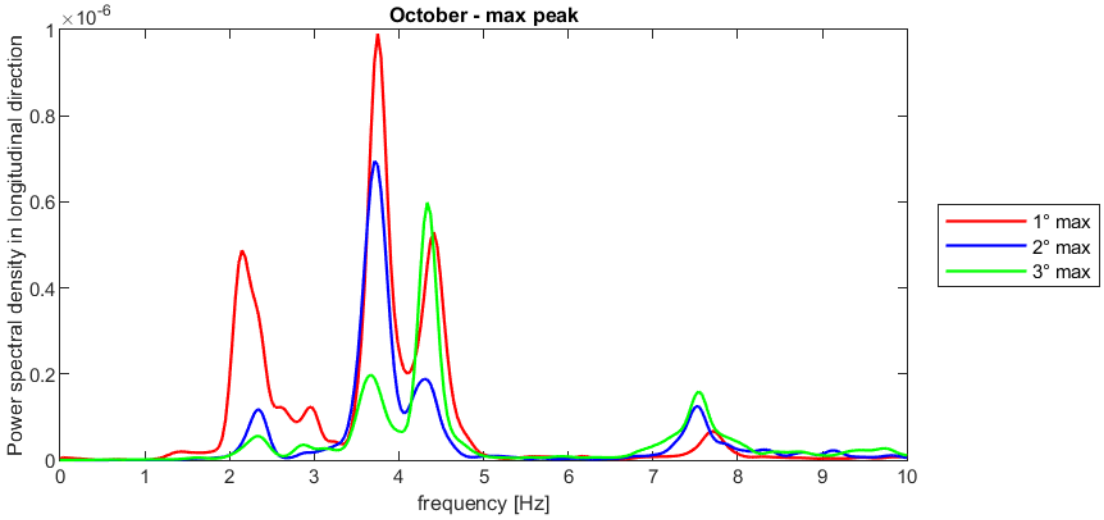


Figure 16-116: Results obtained from the 3 accelerograms with highest peak if PSD

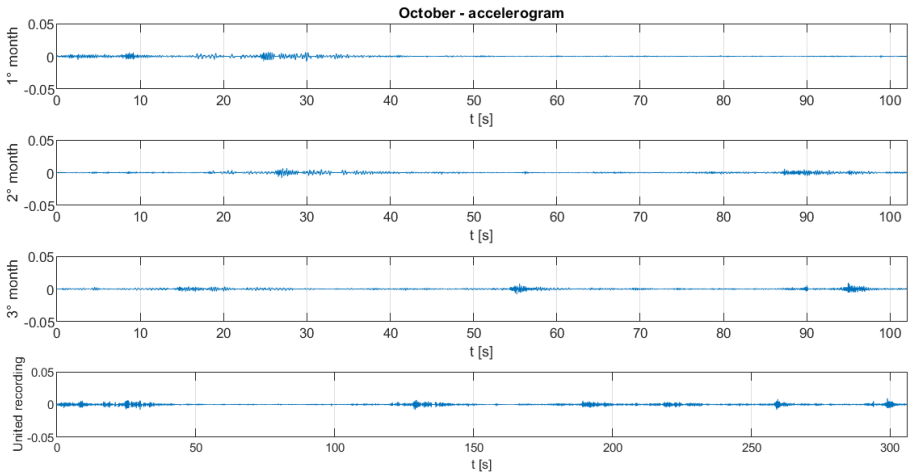


Figure 16-117: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

16.10.3 Transverse direction (z)

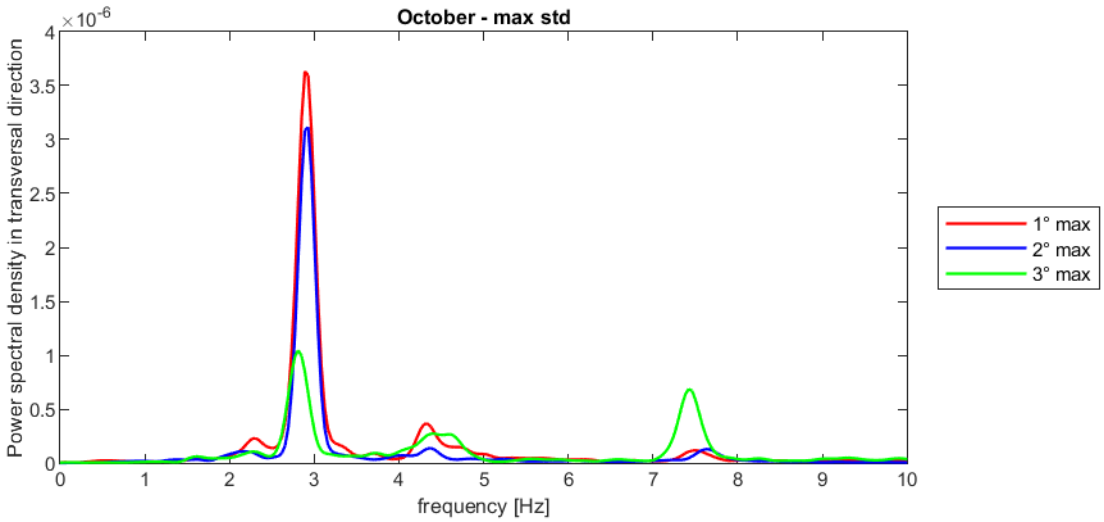


Figure 16-118: Results obtained from the 3 accelerograms with maximum SD in time domain

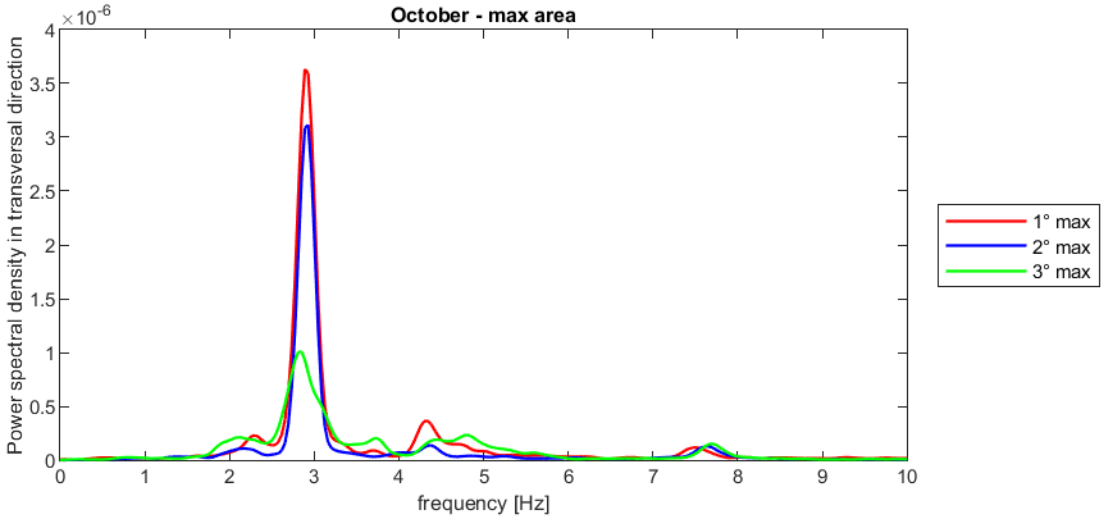


Figure 16-119: Results obtained from the 3 accelerograms with maximum area of PSD

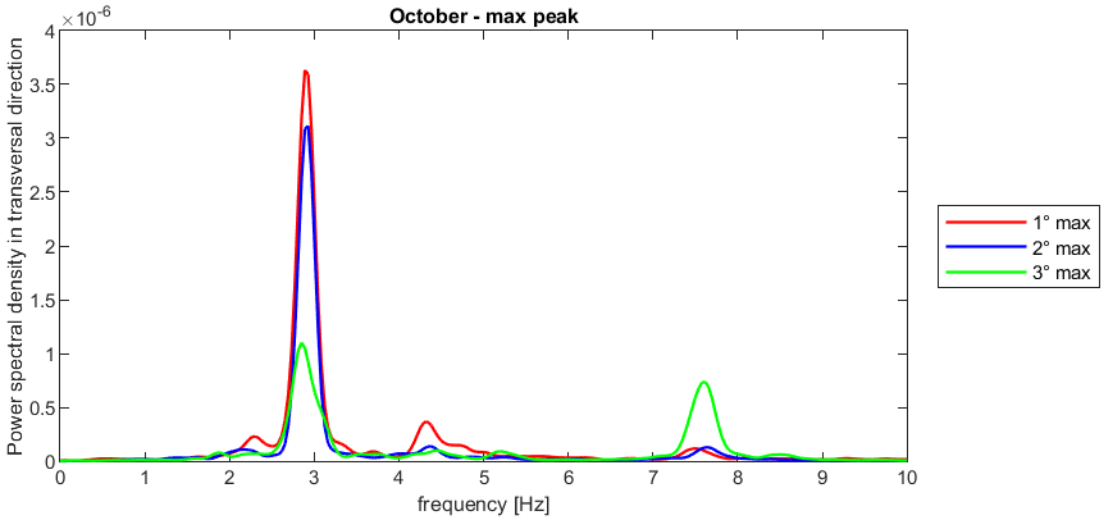


Figure 16-120: Results obtained from the 3 accelerograms with highest peak if PSD

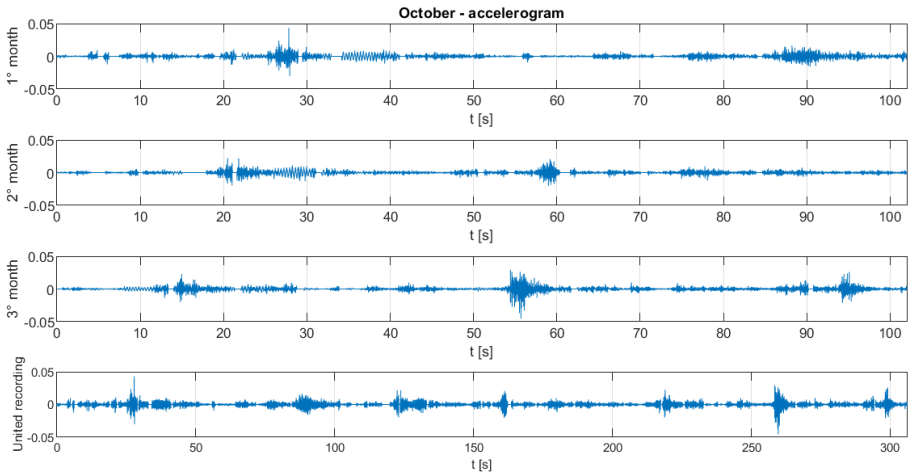


Figure 16-121: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

16.11 November

The results obtained for the November dataset are shown in the following tables.

Table 16-31: November 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-11-07_17-00-21	2.49E-03
	2°	2BCAF_2023-11-06_17-00-21	2.33E-03
	3°	2BCAF_2023-11-27_17-00-20	2.32E-03
Longitudinal direction (y)	1°	2BCAF_2023-11-07_17-00-21	8.29E-04
	2°	2BCAF_2023-11-06_17-00-21	7.92E-04
	3°	2BCAF_2023-11-07_15-00-21	7.80E-04
Transverse direction (z)	1°	2BCAF_2023-11-06_17-00-21	1.25E-03
	2°	2BCAF_2023-11-28_11-00-20	1.21E-03
	3°	2BCAF_2023-11-10_08-00-20	1.03E-03

Table 16-32: November 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-11-27_17-00-20	1.20E-05	2BCAF_2023-11-07_17-00-21	1.23E-06
2	2BCAF_2023-11-07_13-00-20	1.01E-05	2BCAF_2023-11-06_17-00-21	1.13E-06
3	2BCAF_2023-11-29_16-00-20	9.98E-06	2BCAF_2023-11-29_16-00-20	1.02E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-11-28_15-00-20	7.80E-07	2BCAF_2023-11-07_17-00-21	1.37E-07
2	2BCAF_2023-11-29_16-00-20	7.30E-07	2BCAF_2023-11-06_17-00-21	1.31E-07
3	2BCAF_2023-11-07_17-00-21	6.74E-07	2BCAF_2023-11-07_15-00-21	1.24E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-11-28_11-00-20	3.57E-06	2BCAF_2023-11-06_17-00-21	3.16E-07
2	2BCAF_2023-11-06_17-00-21	2.57E-06	2BCAF_2023-11-28_11-00-20	3.06E-07
3	2BCAF_2023-11-10_08-00-20	2.36E-06	2BCAF_2023-11-10_08-00-20	2.19E-07

Table 16-33: November 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	C	A	A	-	A	B	D	B
2	B	-	B	B	-	B	D	B	D
3	C	F	F	G	A	G	E	E	E

16.11.1 Vertical direction (x)

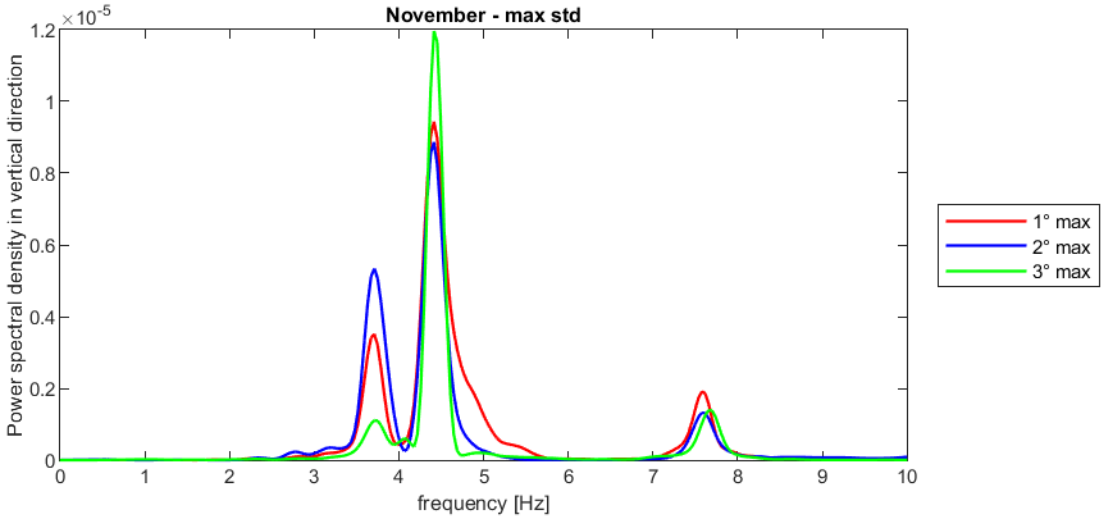


Figure 16-122: Results obtained from the 3 accelerograms with maximum SD in time domain

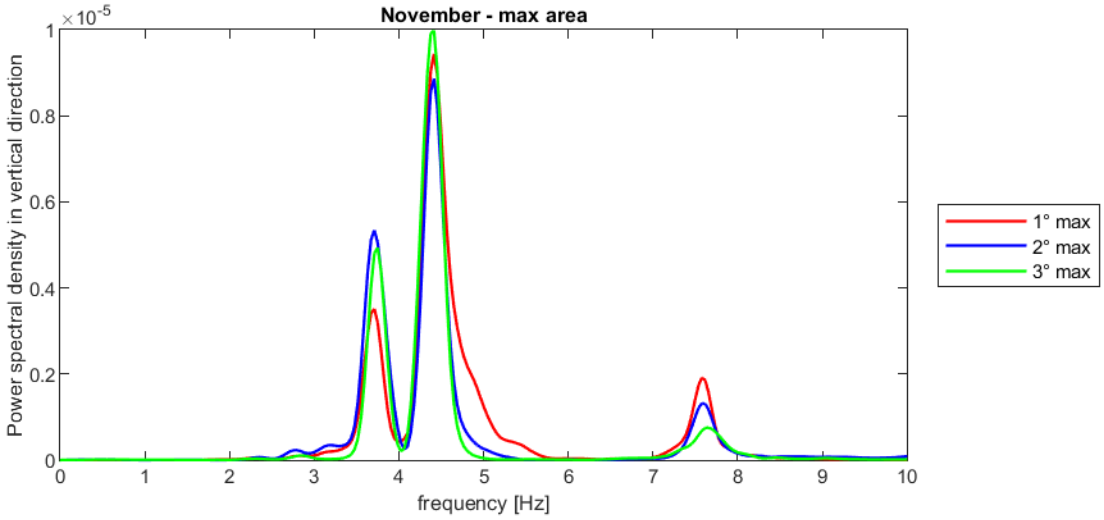


Figure 16-123: Results obtained from the 3 accelerograms with maximum area of PSD

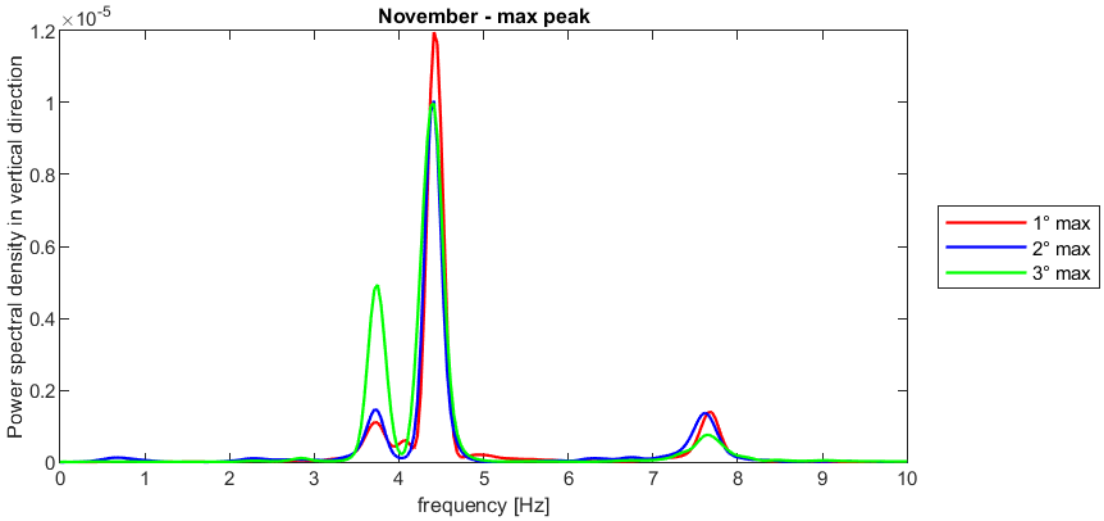


Figure 16-124: Results obtained from the 3 accelerograms with highest peak if PSD

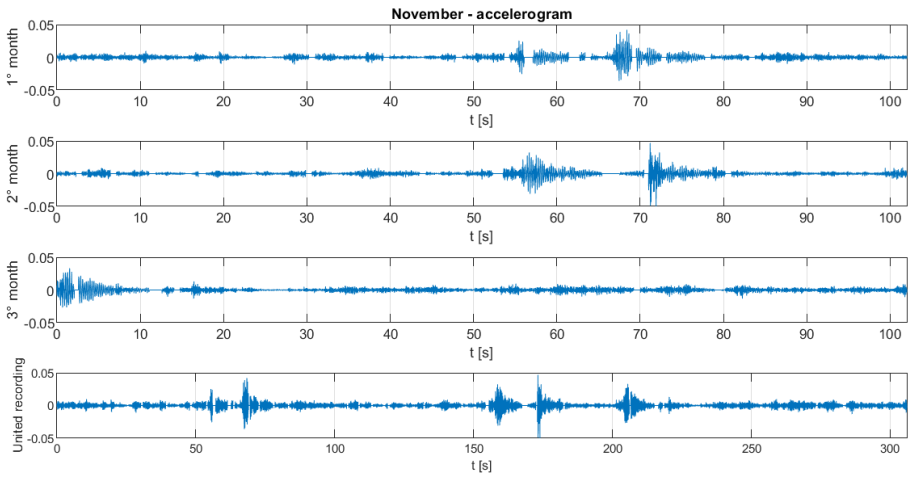


Figure 16-125: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.11.2 Longitudinal direction (y)

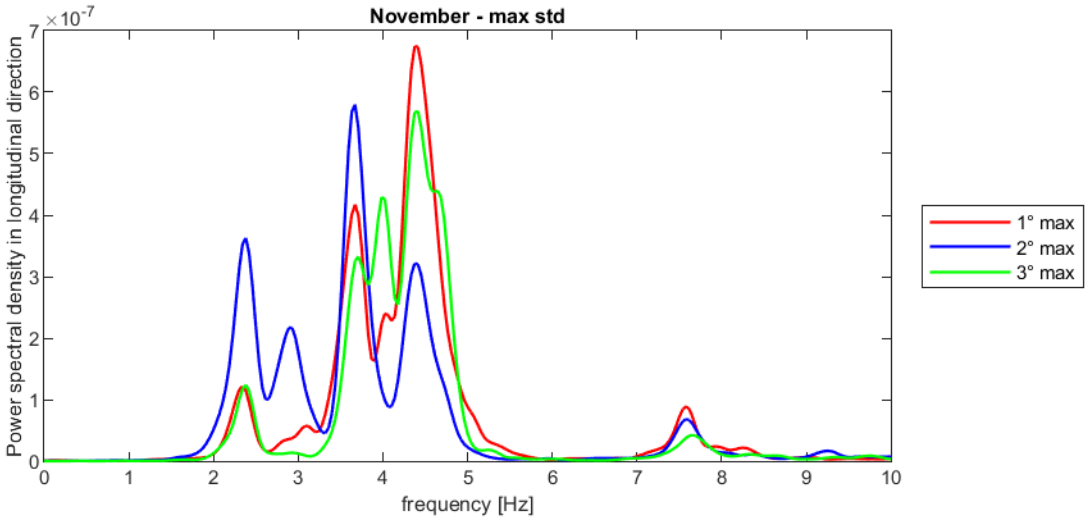


Figure 16-126: Results obtained from the 3 accelerograms with maximum SD in time domain

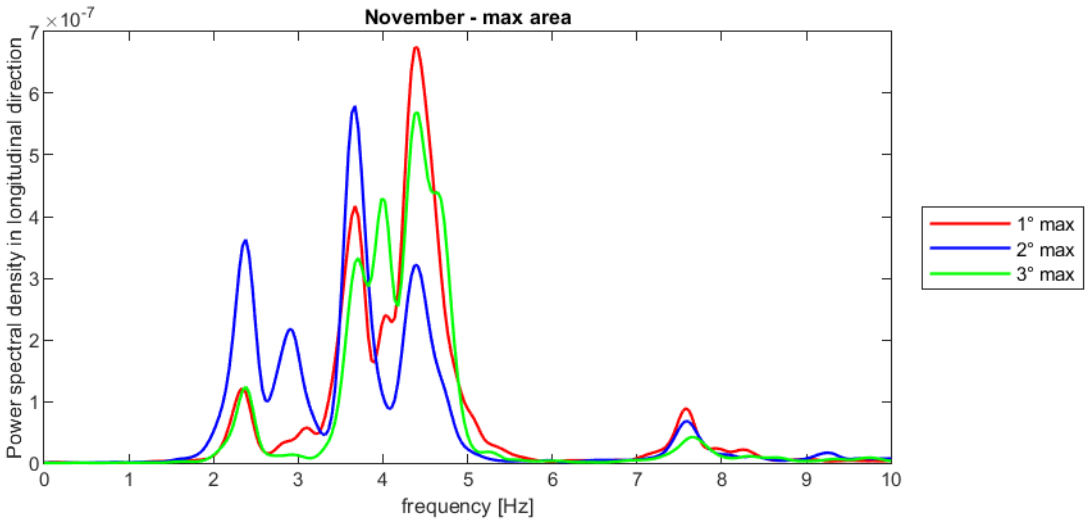


Figure 16-127: Results obtained from the 3 accelerograms with maximum area of PSD

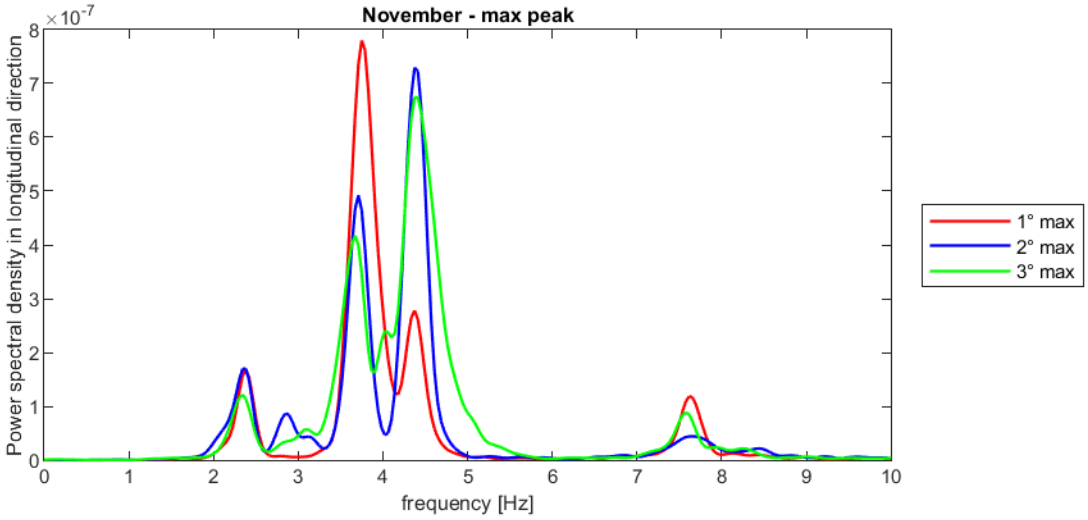


Figure 16-128: Results obtained from the 3 accelerograms with highest peak if PSD

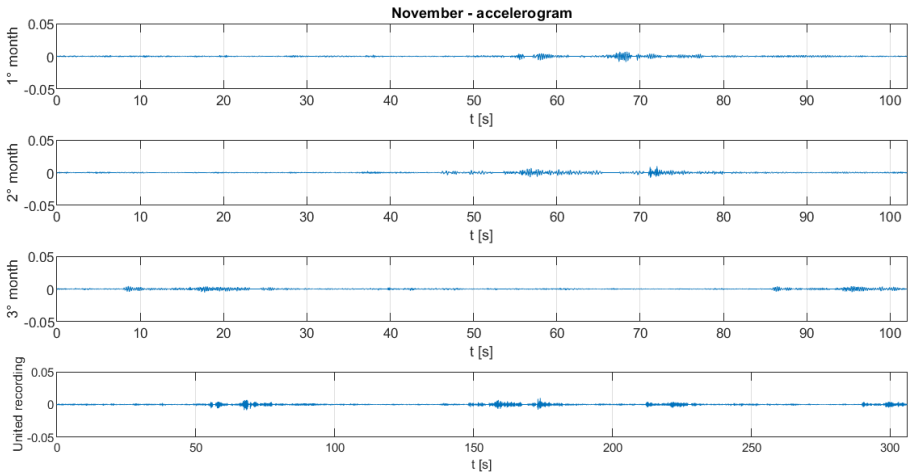


Figure 16-129: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

16.11.3 Transverse direction (z)

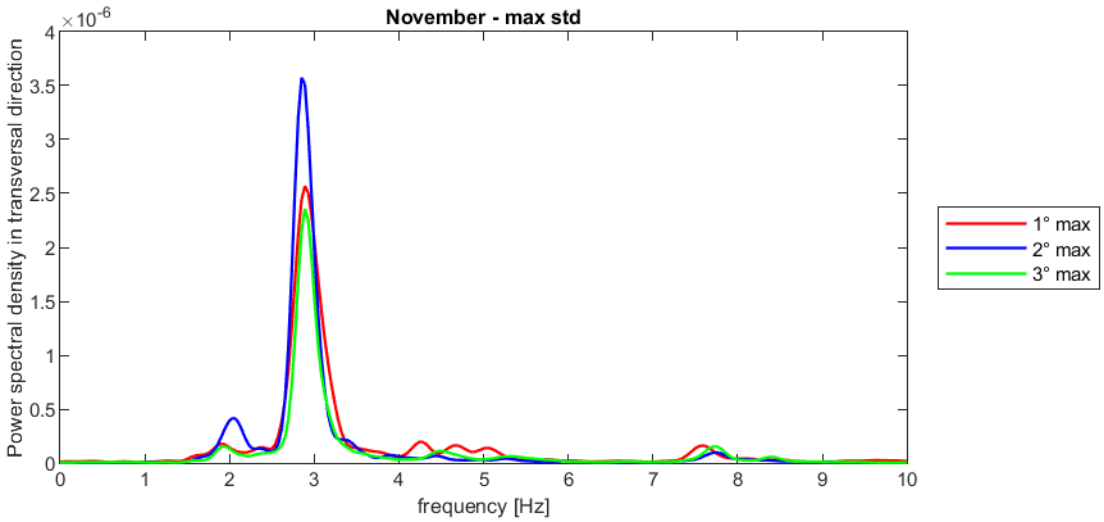


Figure 16-130: Results obtained from the 3 accelerograms with maximum SD in time domain

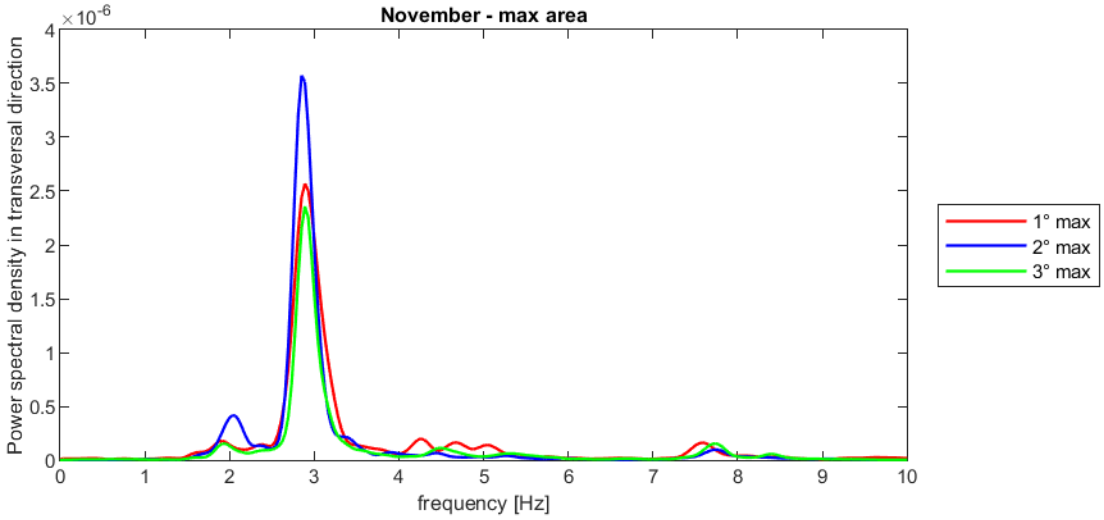


Figure 16-131: Results obtained from the 3 accelerograms with maximum area of PSD

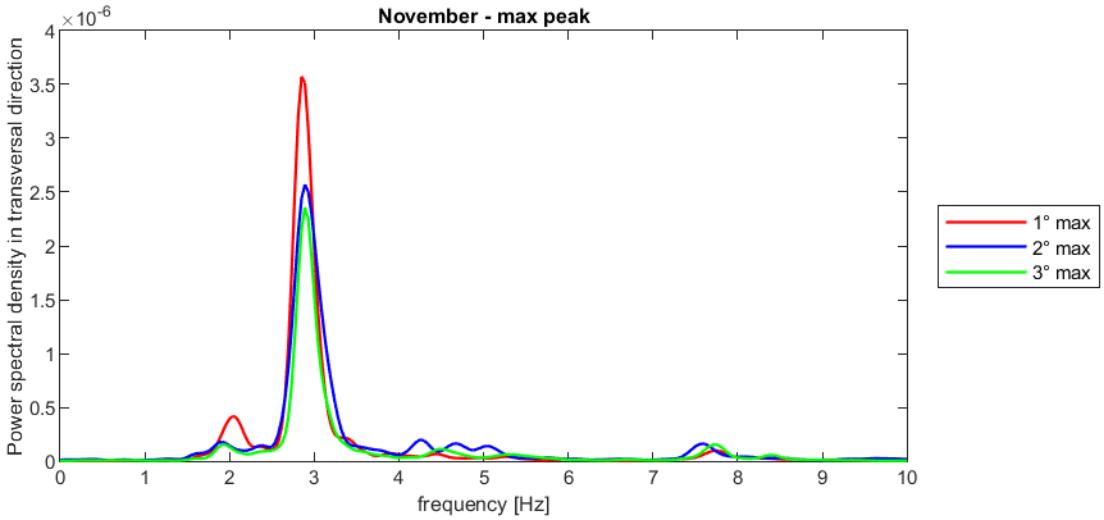


Figure 16-132: Results obtained from the 3 accelerograms with highest peak if PSD

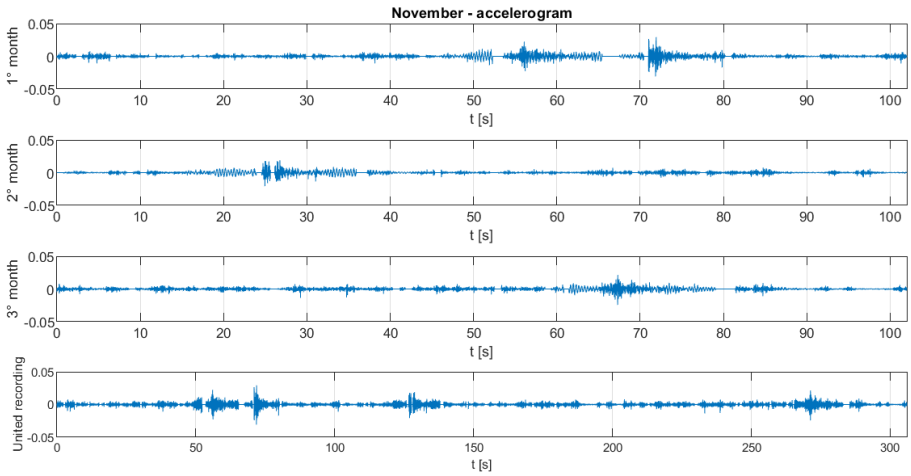


Figure 16-133: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

16.12 December

The results obtained for the December dataset are shown in the following tables.

Table 16-34: December 2023 - Accelerograms with the maximum standard deviation

	#	Accelerogram	Standard deviation
Vertical direction (x)	1°	2BCAF_2023-12-28_09-00-21	2.77E-03
	2°	2BCAF_2023-12-09_11-00-20	2.50E-03
	3°	2BCAF_2023-12-14_16-00-21	2.45E-03
Longitudinal direction (y)	1°	2BCAF_2023-12-28_09-00-21	9.06E-04
	2°	2BCAF_2023-12-06_10-00-20	7.56E-04
	3°	2BCAF_2023-12-18_08-00-20	7.52E-04
Transverse direction (z)	1°	2BCAF_2023-12-18_08-00-20	1.04E-03
	2°	2BCAF_2023-12-11_14-00-20	1.03E-03
	3°	2BCAF_2023-12-28_09-00-21	9.07E-04

Table 16-35: December 2023 - Accelerograms defined by the maximum area and peak of the power spectral density function

Vertical direction (x)				
#	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-12-09_11-00-20	1.90E-05	2BCAF_2023-12-28_09-00-21	1.56E-06
2	2BCAF_2023-12-28_09-00-21	1.19E-05	2BCAF_2023-12-09_11-00-20	1.24E-06
3	2BCAF_2023-12-22_16-00-20	9.27E-06	2BCAF_2023-12-14_16-00-21	1.12E-06
Longitudinal direction (y)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-12-09_11-00-20	1.44E-06	2BCAF_2023-12-28_09-00-21	1.67E-07
2	2BCAF_2023-12-28_09-00-21	8.44E-07	2BCAF_2023-12-11_14-00-20	1.15E-07
3	2BCAF_2023-12-22_16-00-20	5.92E-07	2BCAF_2023-12-18_08-00-20	1.14E-07
Transverse direction (z)				
	Accelerogram	Peak value	Accelerogram	Area
1	2BCAF_2023-12-11_14-00-20	2.96E-06	2BCAF_2023-12-18_08-00-20	2.26E-07
2	2BCAF_2023-12-18_08-00-20	1.40E-06	2BCAF_2023-12-11_14-00-20	2.22E-07
3	2BCAF_2023-12-04_11-00-20	9.53E-07	2BCAF_2023-12-28_09-00-21	1.68E-07

Table 16-36: December 2023 – Statistical analysis

	Vertical X			Longitudinal Y			Transverse Z		
	Std	Peak	Area	Std	Peak	Area	Std	Peak	Area
1	A	B	A	A	-	A	D	E	D
2	B	A	B	-	A	-	E	D	E
3	C	-	C	D	-	D	A	-	A

16.12.1 Vertical direction (x)

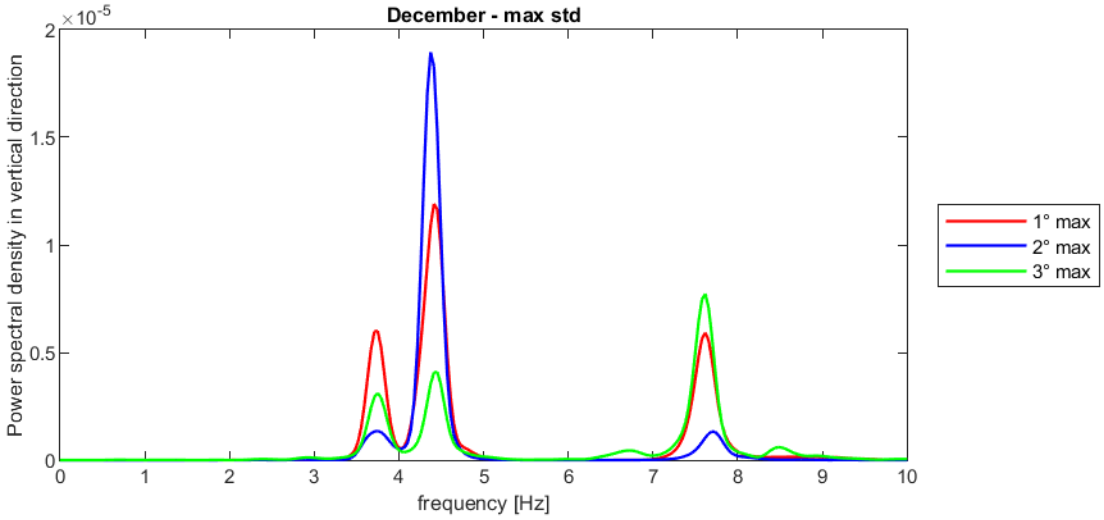


Figure 16-134: Results obtained from the 3 accelerograms with maximum SD in time domain

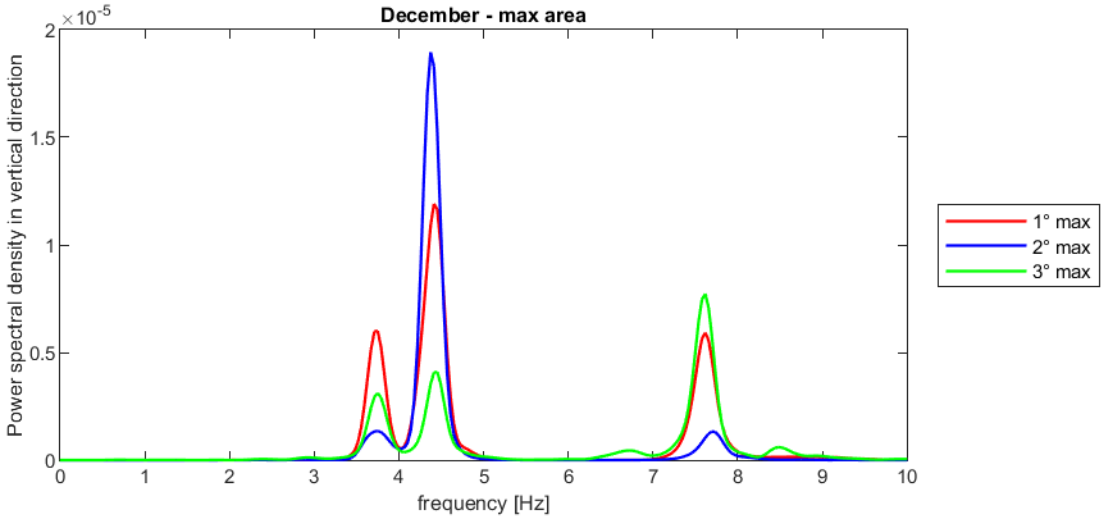


Figure 16-135: Results obtained from the 3 accelerograms with maximum area of PSD

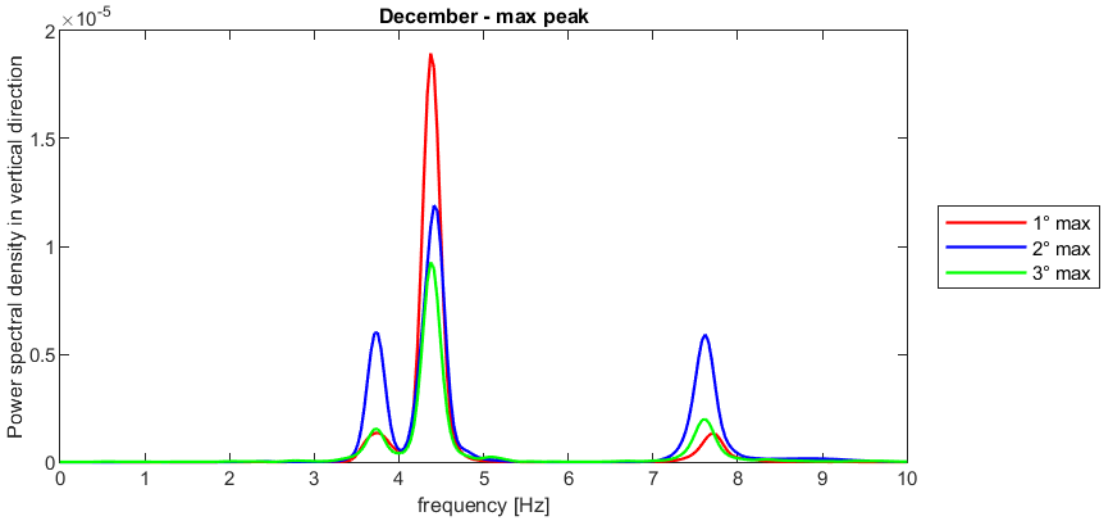


Figure 16-136: Results obtained from the 3 accelerograms with highest peak if PSD

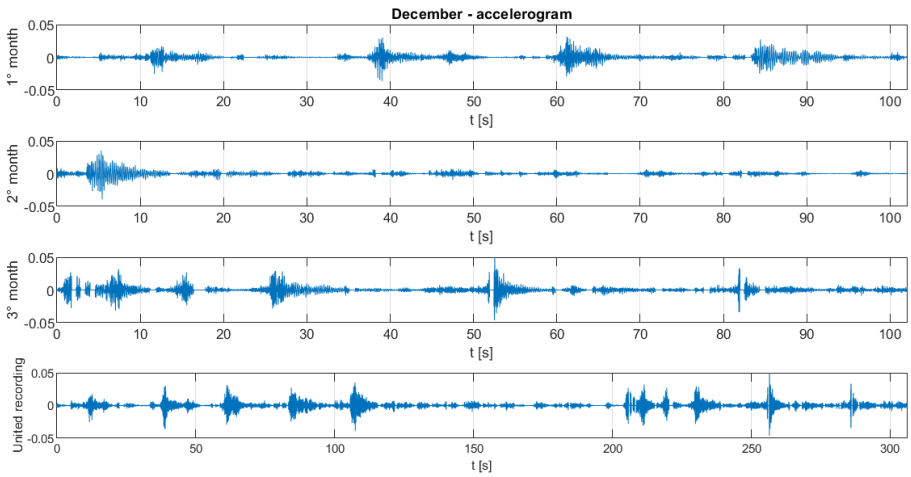


Figure 16-137: Accelerograms in vertical (x) direction with maximum standard deviation in time domain

16.12.2 Longitudinal direction (y)

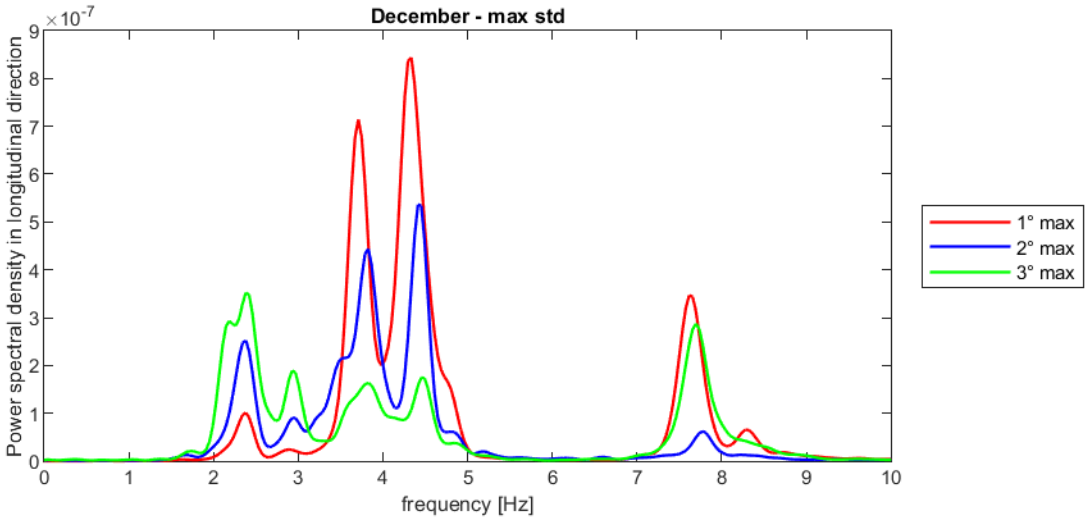


Figure 16-138: Results obtained from the 3 accelerograms with maximum SD in time domain

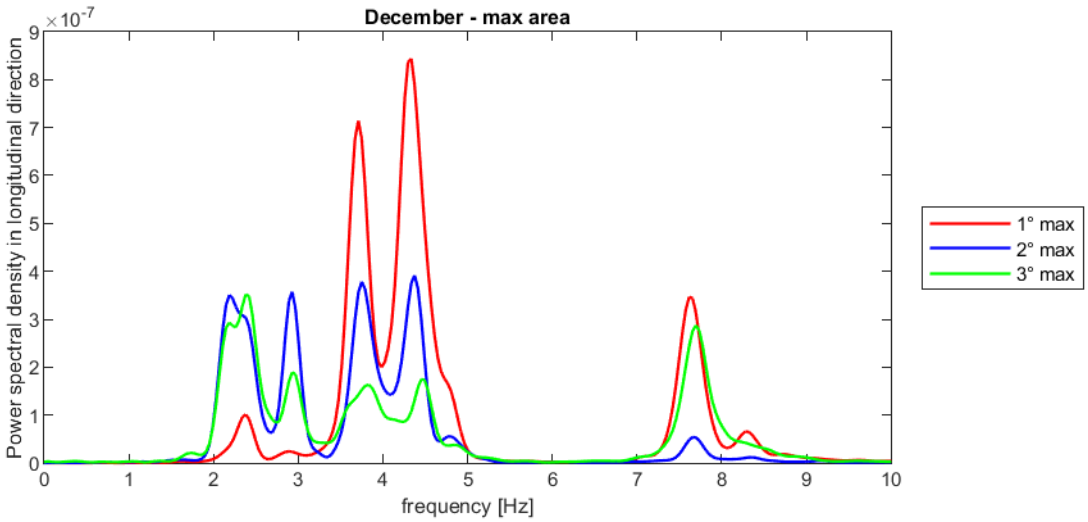


Figure 16-139: Results obtained from the 3 accelerograms with maximum area of PSD

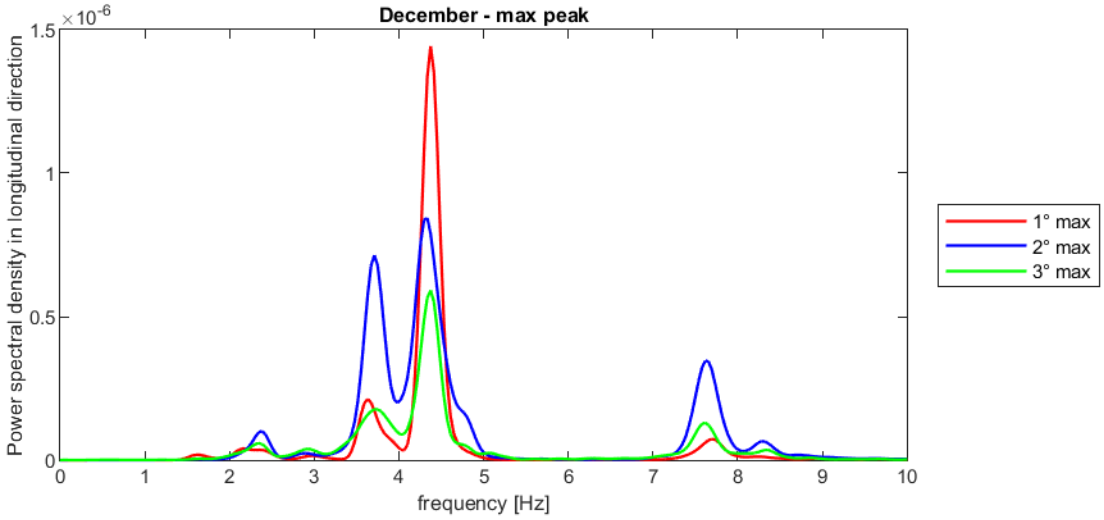


Figure 16-140: Results obtained from the 3 accelerograms with highest peak if PSD

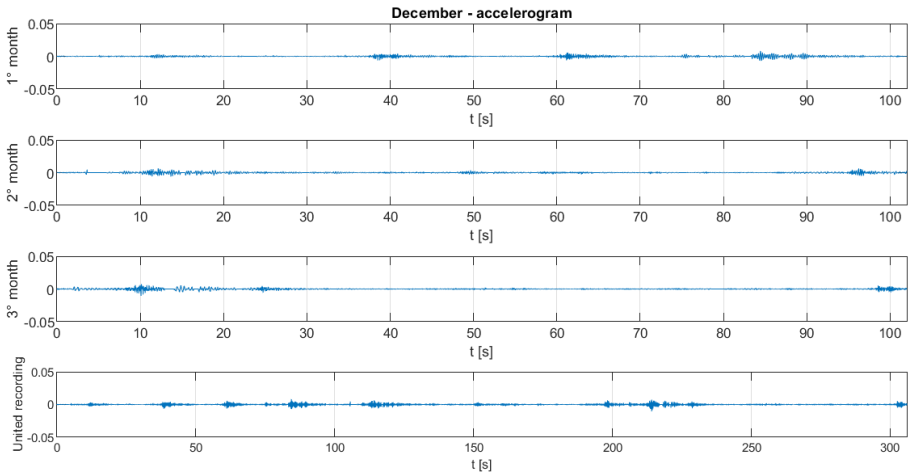


Figure 16-141: Accelerograms in longitudinal (y) direction with maximum standard deviation in time domain

16.12.3 Transverse direction (z)

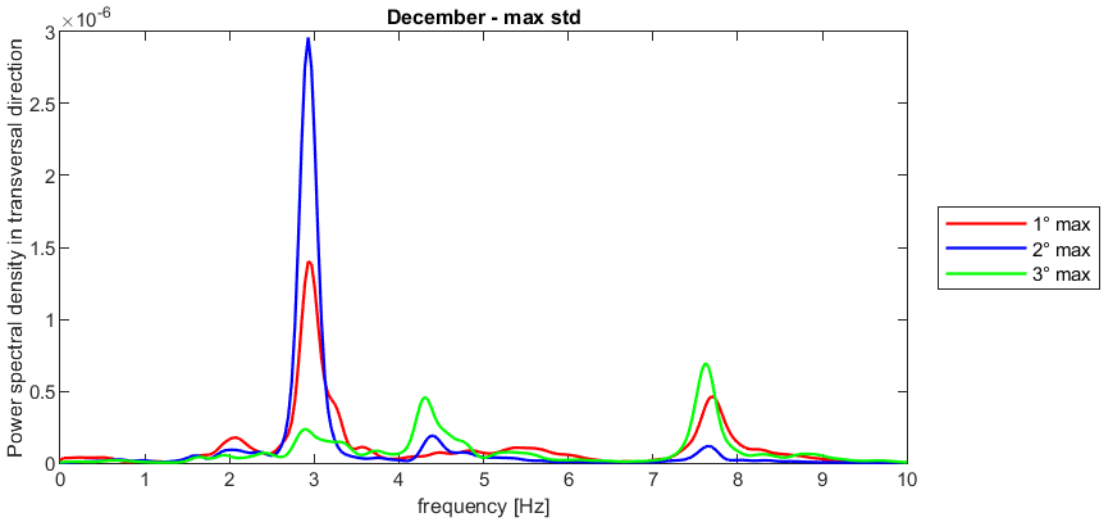


Figure 16-142: Results obtained from the 3 accelerograms with maximum SD in time domain

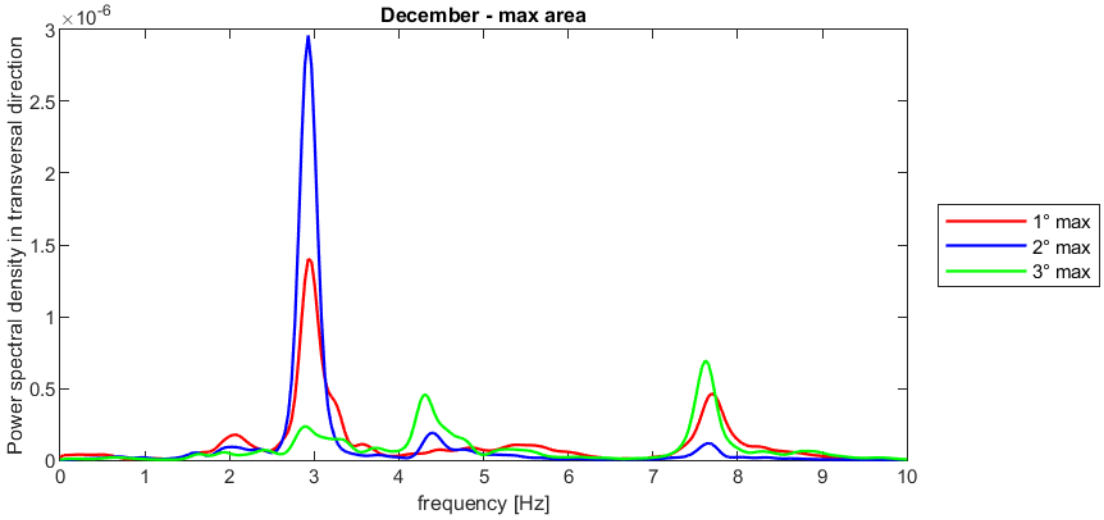


Figure 16-143: Results obtained from the 3 accelerograms with maximum area of PSD

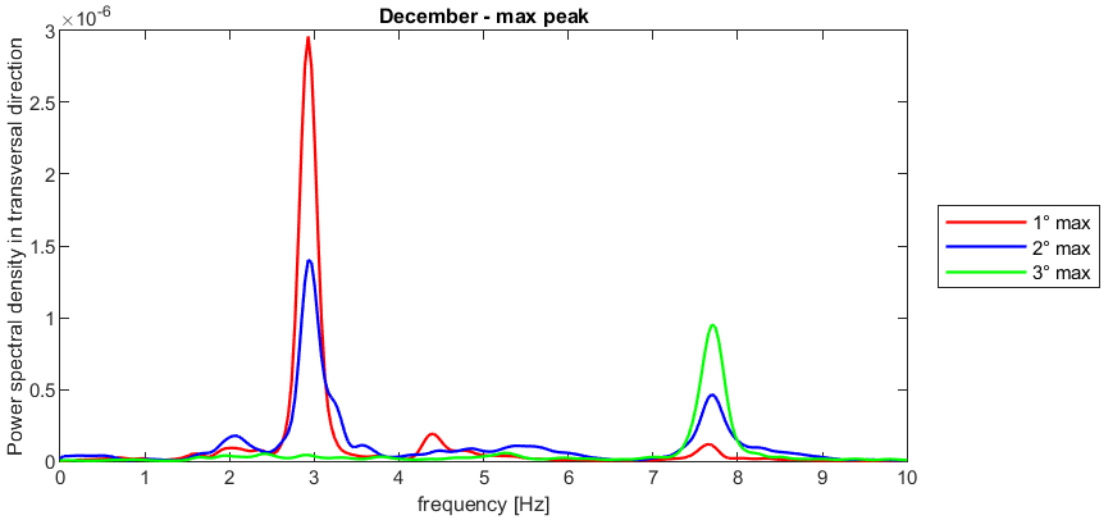


Figure 16-144: Results obtained from the 3 accelerograms with highest peak if PSD

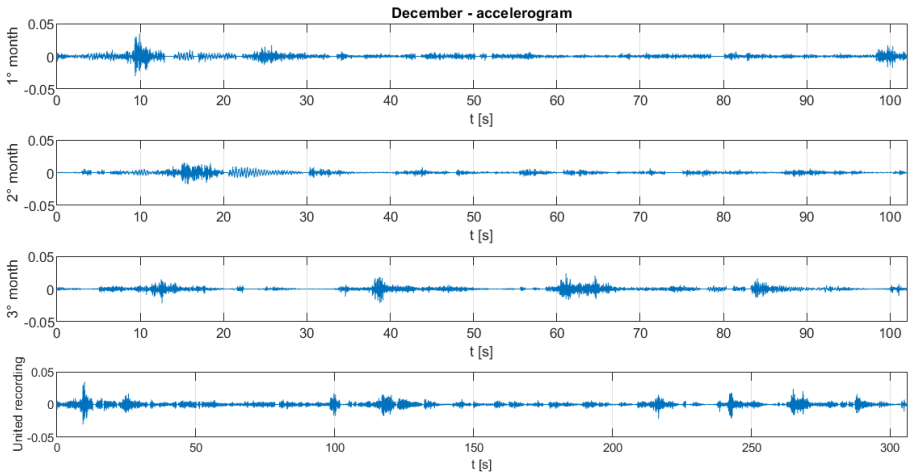


Figure 16-145: Accelerograms in transverse (z) direction with maximum standard deviation in time domain

16.13 Analysis of the complete 2023 year

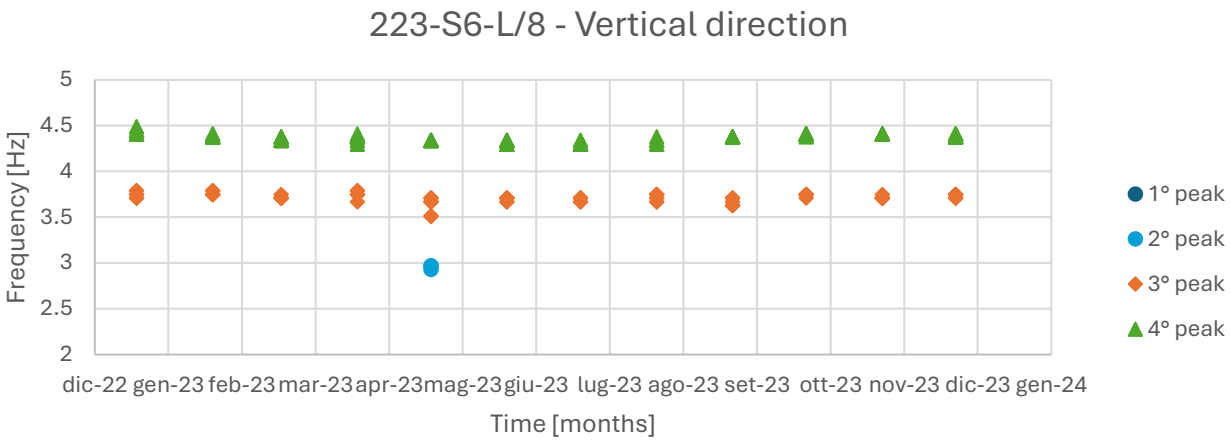
All the obtained frequencies have been now classified and represented in such a way to obtain the variation of the values during the year. So, the peaks value has been separated and the representation for the vertical, longitudinal and transverse direction have been obtained.

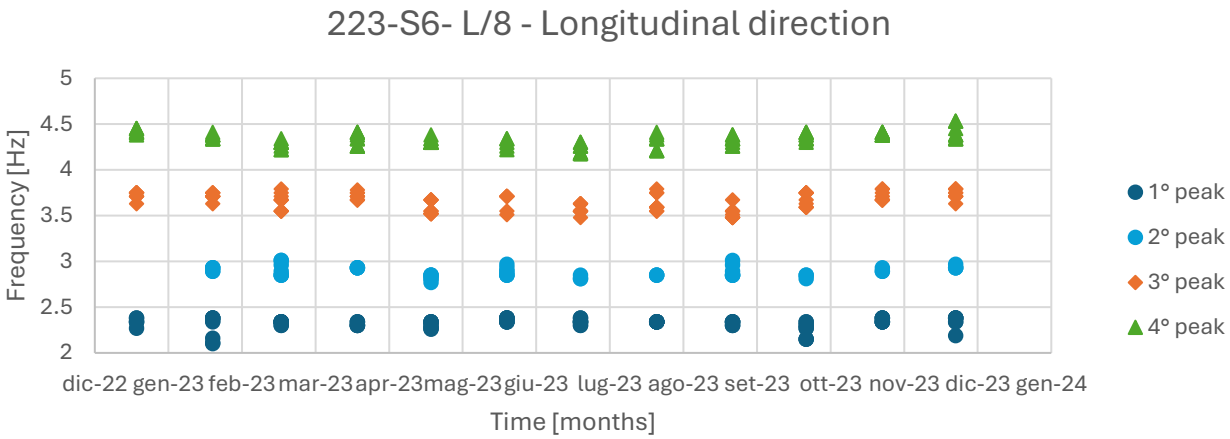
Table 16-37: Main identified frequencies for sensor 2BCAF – bridge 223 – Sp6 – L/8

		Vertical direction				Longitudinal direction				Transverse direction			
		1° peak	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**	**1° peak**	**2° peak**	**3° peak**	**4° peak**
	Numerosity	0	3	97	99	102	52	105	101	34	95	9	64
	MEAN		**2.96**	**3.71**	**4.37**	**2.32**	**2.89**	**3.66**	**4.34**	**2.08**	**2.86**	**3.78**	**4.34**
	SD		0.02	0.05	0.04	0.06	0.06	0.09	0.07	0.18	0.08	0.06	0.17
	C.o.V.		0.6%	1.3%	1.0%	2.5%	1.9%	2.5%	1.7%	8.7%	2.9%	1.6%	4.0%
	Rating		**3%**	**95%**	**100%**	**90%**	**48%**	**93%**	**96%**	**20%**	**82%**	**9%**	**51%**
1	gen-23			3.79	4.41			3.75	4.42				
2	gen-23			3.75		2.34		3.75	4.45		2.93	3.79	4.38
3	gen-23			3.75	4.41	2.38		3.75					
1	gen-23			3.79	4.45	2.27		3.75	4.41		2.93		
2	gen-23			3.71	4.45	2.34		3.71	4.45		2.93	3.79	4.41
3	gen-23			3.71	4.45			3.75	4.41		2.89		
1	gen-23				4.45	2.34		3.71	4.41			3.75	
2	gen-23			3.75	4.41	2.38		3.63	4.38				
3	gen-23			3.71	4.49			3.71	4.45		2.89		4.38
1	feb-23			3.75	4.38	2.34		3.71	4.34	2.15	2.97	3.83	4.38
2	feb-23			3.75	4.38	2.1	2.93	3.75	4.38	1.91	2.85	3.83	4.34
3	feb-23			3.75	4.38	2.35		3.63	4.38		3.09		4.38
1	feb-23			3.75	4.41	2.38	2.93	3.71	4.34		2.85	3.82	4.34
2	feb-23			3.79		2.11	2.93	3.75	4.34	2.15	2.96	3.82	4.38
3	feb-23			3.79	4.41	2.38		3.71	4.38		3.09		4.38
1	feb-23			3.75	4.38	2.16		3.75	4.34		3.01	3.75	4.73
2	feb-23			3.75	4.38	2.38	2.89	3.71	4.38				
3	feb-23			3.75	4.38	2.38	2.89	3.71	4.41				
1	mar-23			3.71	4.34	2.34	3.01	3.55	4.3		2.81		4.22
2	mar-23			3.71	4.34	2.34	2.85	3.67	4.26		2.89		
3	mar-23			3.71	4.38	2.34	2.96	3.75	4.3		3.04		4.3
1	mar-23			3.71	4.34	2.3		3.55	4.3		2.81		4.18
2	mar-23			3.71	4.34	2.3	2.85	3.67	4.22		2.89		
3	mar-23			3.71	4.38	2.34	2.89	3.71	4.34		3.09		4.26
1	mar-23			3.71	4.34	2.34	3.01	3.55	4.3		2.81		4.22
2	mar-23			3.71	4.38	2.34	2.85	3.67	4.22		2.89		
3	mar-23			3.75	4.38	2.34		3.79			2.85		
1	apr-23			3.75	4.38	2.34		3.67	4.26		2.93		
2	apr-23			3.75	4.41	2.3	2.93	3.75	4.41		2.77		4.22
3	apr-23			3.67	4.3	2.34		3.67	4.34		2.81		
1	apr-23			3.79	4.38	2.3		3.67	4.26		2.93		
2	apr-23			3.79	4.34	2.3	2.93	3.75	4.41		2.73		4.22
3	apr-23				4.38	2.3	2.93	3.71	4.34		2.85		

1	apr-23		3.75	4.38	2.34		3.71	4.26		2.93		4.22
2	apr-23		3.75	4.38	2.3	2.93	3.78	4.41				
3	apr-23			4.38			3.71	4.38	1.99	2.89		
1	mag-23		3.67	4.34	2.27	2.85	3.52	4.34	1.95	2.77		4.14
2	mag-23	2.93	3.71	4.34	2.3	2.81	3.67	4.3		2.77		4.26
3	mag-23		3.52	4.34	2.34		3.52	4.3		2.77		
1	mag-23		3.67	4.34	2.26	2.85	3.52	4.34	1.91	2.77		4.1
2	mag-23	2.97	3.67	4.34	2.34	2.77	3.67	4.3	1.91	2.77		4.22
3	mag-23		3.51	4.34	2.34		3.55	4.3		2.73		
1	mag-23		3.71	4.34	2.27	2.85	3.52	4.38	1.95	2.77		4.14
2	mag-23		3.71		2.3	2.81	3.67	4.3	1.91	2.77		4.26
3	mag-23	2.97	3.67	4.34	2.34		3.55	4.3		2.77		
1	giu-23		3.67	4.34	2.34	2.85				2.81		4.92
2	giu-23		3.71	4.3	2.38	2.97	3.71	4.34	2.3	2.81		4.26
3	giu-23		3.71	4.34	2.34	2.85	3.51	4.26		2.89		
1	giu-23		3.71	4.3	2.34	2.89						
2	giu-23		3.67	4.34	2.38		3.55	4.34				
3	giu-23		3.71	4.34	2.38	2.85	3.71	4.22				
1	giu-23			4.34	2.34	2.89				2.81		4.84
2	giu-23		3.71	4.3	2.38		3.71		2.3	2.81		4.22
3	giu-23		3.71	4.33	2.38	2.93	3.71	4.3				
1	lug-23		3.71	4.34	2.34		3.63	4.26		2.77		
2	lug-23		3.71	4.3	2.38		3.55	4.18		2.81		4.18
3	lug-23			4.3	2.34	2.85	3.55	4.18		2.73		4.22
1	lug-23		3.67	4.3	2.34		3.63	4.3		2.77		
2	lug-23		3.67	4.3	2.38		3.55	4.18		2.81		4.3
3	lug-23			4.3	2.3		3.55	4.18		2.73		4.34
1	lug-23		3.71	4.3	2.34		3.63	4.26		2.77		4.18
2	lug-23		3.71	4.34	2.34	2.81	3.48	4.3		2.77		4.22
3	lug-23			4.3	2.3	2.81	3.55	4.19		2.73		
1	ago-23		3.75	4.34	2.34	2.85	3.59	4.21	2.3	2.81		4.8
2	ago-23		3.67	4.3	2.34		3.75	4.34	2.3	2.81	3.63	4.3
3	ago-23		3.75		2.34		3.55	4.38	2.3	3.04		
1	ago-23		3.75	4.38	2.34	2.85	3.59	4.21	2.3	2.81		4.8
2	ago-23		3.75		2.34		3.79	4.34	2.3	2.81		4.3
3	ago-23		3.67	4.3	2.34		3.55	4.41		3.04		
1	ago-23		3.71	4.34	2.34	2.85	3.59	4.21	2.38	2.85		
2	ago-23				2.34		3.75	4.34	2.38			
3	ago-23		3.71		2.34		3.59			2.89		4.34
1	set-23		3.63	4.38	2.34	2.85	3.48	4.34		2.81		4.3
2	set-23		3.63	4.38	2.34	2.85	3.51	4.3	1.84	2.85		4.3
3	set-23		3.71		2.34	2.96	3.55	4.34		2.97		4.38
1	set-23		3.63	4.38	2.3	2.85	3.48	4.34		2.81		4.3
2	set-23		3.63	4.38	2.34	3.01	3.55	4.38		2.96		4.38
3	set-23		3.71	4.38	2.34	2.89	3.48	4.26	1.8	2.85		4.34
1	set-23		3.63	4.38	2.3	2.85	3.48	4.34		2.81		4.3
2	set-23		3.67	4.38	2.3		3.55	4.38		2.85		4.26
3	set-23		3.71				3.67	4.26		2.97		4.38
1	ott-23		3.71	4.38	2.15	2.85	3.75	4.41	2.26	2.89		4.3

2	ott-23		4.41	2.34		3.59	4.34		2.89	
3	ott-23	3.75	4.41	2.27		3.59	4.38		2.81	4.34
1	ott-23	3.75	4.41	2.15		3.75	4.41	2.26	2.89	4.3
2	ott-23	3.75	4.41	2.34	2.85	3.59	4.34		2.89	
3	ott-23		4.41	2.27	2.81	3.63	4.38		2.81	4.8
1	ott-23		4.41	2.15		3.75	4.41	2.26	2.89	4.3
2	ott-23	3.75	4.41	2.3		3.75	4.3		2.89	4.38
3	ott-23	3.75	4.41	2.3		3.67	4.34		2.89	
1	nov-23	3.71	4.41	2.38		3.67	4.41	1.91	2.85	4.25
2	nov-23	3.71	4.41	2.38	2.93	3.67	4.41	2.03	2.85	
3	nov-23	3.71	4.41	2.38		3.79	4.41	1.91	2.85	4.45
1	nov-23	3.71	4.41	2.34		3.67	4.38	1.88	2.89	4.25
2	nov-23	3.71	4.41	2.38	2.89	3.67	4.41	2.03	2.85	
3	nov-23	3.71	4.41	2.34		3.79	4.38		2.89	
1	nov-23	3.71	4.41	2.34		3.75	4.38	2.03	2.85	
2	nov-23	3.71	4.41	2.34	2.89	3.71	4.38	1.88	2.85	4.25
3	nov-23	3.75	4.41	2.34		3.67	4.38	1.88	2.85	4.45
1	dic-23	3.75	4.41	2.38		3.71	4.34	2.07	2.93	
2	dic-23	3.75	4.38	2.38	2.93	3.79	4.45		2.93	4.41
3	dic-23	3.75	4.41	2.38	2.97	3.79	4.53		2.89	4.3
1	dic-23	3.71	4.41	2.38		3.71	4.34	2.07	2.93	
2	dic-23	3.71	4.38	2.19	2.93	3.75	4.38		2.93	4.38
3	dic-23	3.71	4.41	2.38	2.93	3.79	4.53		2.93	4.3
1	dic-23	3.75	4.38			3.63	4.38		2.93	4.14
2	dic-23	3.75	4.41	2.34		3.71	4.34	2.03	2.93	
3	dic-23	3.75	4.38	2.34		3.75	4.38			





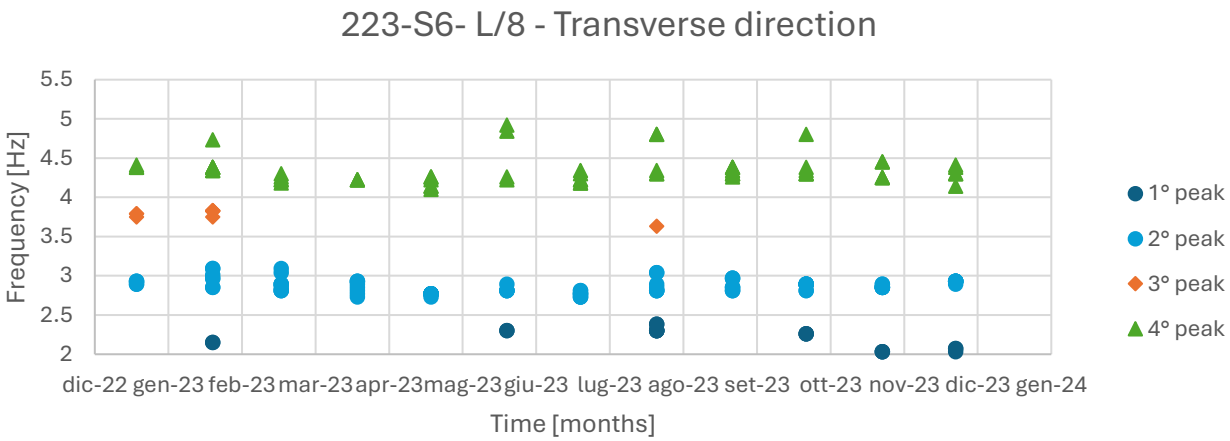


Figure 16-146: Main identified frequencies for sensor 2BCAF – bridge 223 – Sp6 – L/8