Here we describe the functioning of the following two buttons and functions:

REMOVE ARTEFACTS
(band-reject or notch filtering)

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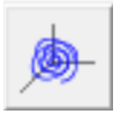
3D PARTICLE MOTION



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REMOVING ARTEFACTS (band-reject or notch filtering)

If you suspect that your H/V curve shows some artefacts, as in Figure 1, it is recommended that:

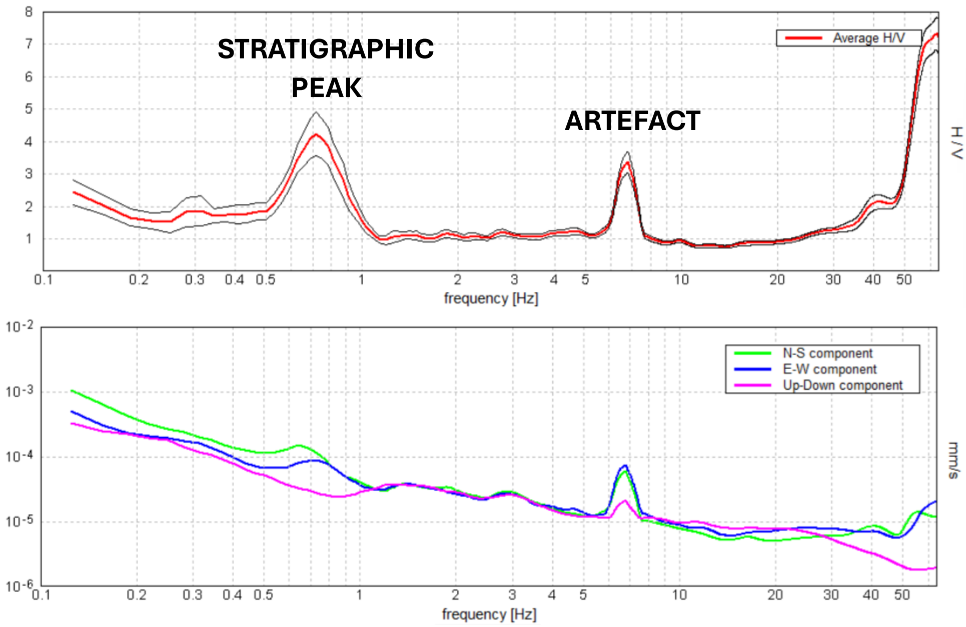

Figure 1. H/V curve and spectra showing an artefact at 7 Hz.

1) You reanalyze the H/V curve by setting smoothing to zero (Figure 2).

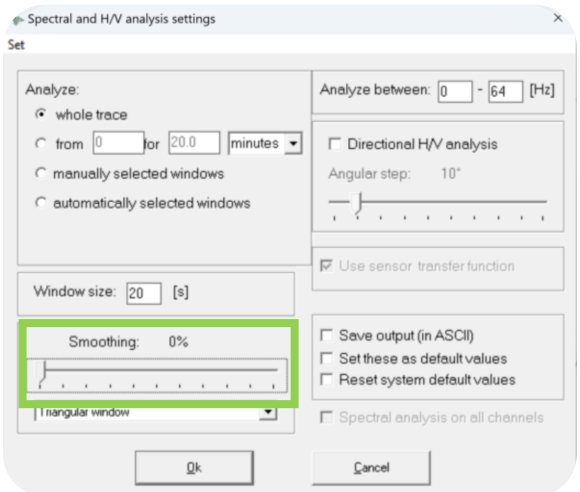

Figure 2. Spectral analysis panel in Grilla.

2) Click  *Remove artefacts* from the spectra toolbar and select the start (left, in blue) and end (right, in red) frequency of each band-reject filter to apply. Clicking on the spectra will populate the table on the right.

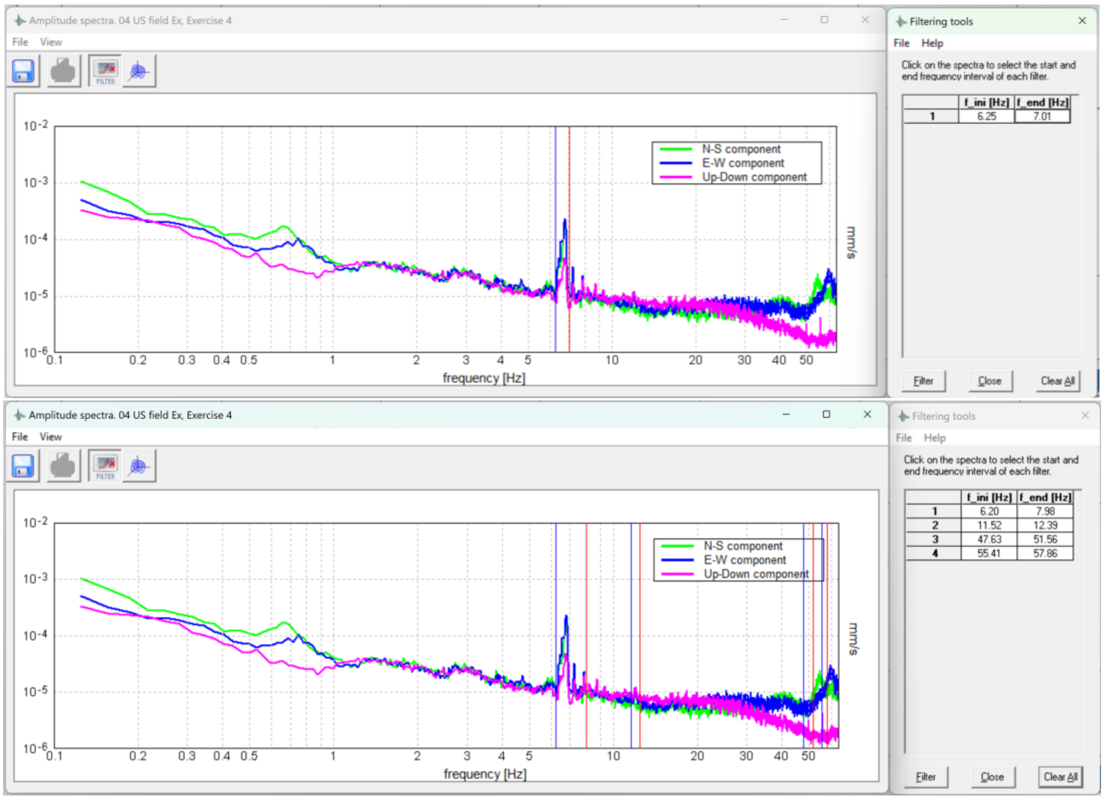

Figure 3. Individual spectra of motion. Click on the figure to select the start (blue) and end (red) frequency for each band-reject (notch) filter to apply. You can select a single band or multiple bands.

3) When you are done with the selection, click *Filter* on the right panel. Wait a few seconds while *Grilla* creates a filtered copy of your original data.

4) Click the refresh button in the *Grilla* database  and you will see the filtered copy of your original file, marked with a /F in the serial number column and in the site name column.

NoiseyStationRecordings	Filtered	TEB-0605/01-21/F	16/09/2022	14:40:39
NoiseyStationRecordings	Original	TEB-0605/01-21	16/09/2022	14:40:39

5) Process the filtered data as usual. A comparison with the original file will show you something like in Figure 4.

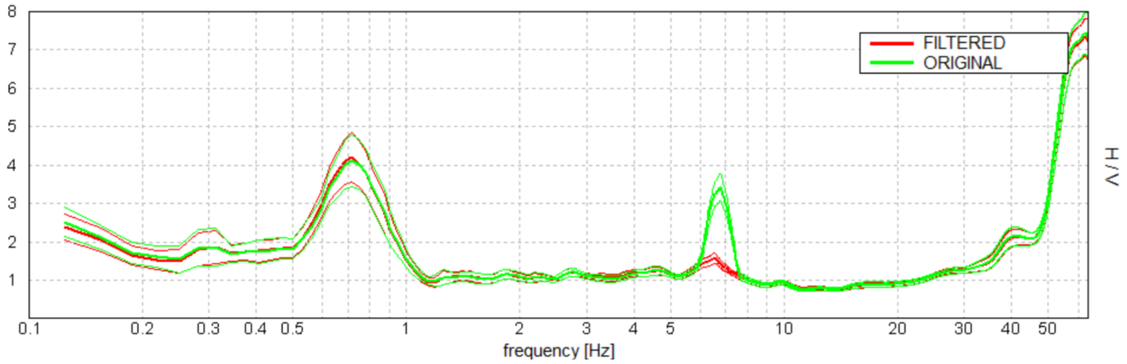

Figure 4. Comparison between the H/V curve on the original and the filtered data.

3D PARTICLE MOTION

Looking at the 3D particle motion of soils or structures at specific frequencies reveals interesting properties about their modal shapes and about the nature of the seismic waves involved (compressional, shear, surface waves).

Let us consider a basin and a cross-section along it where first three main vibration modes (longitudinal, transverse and vertical) are given in Figure 5.

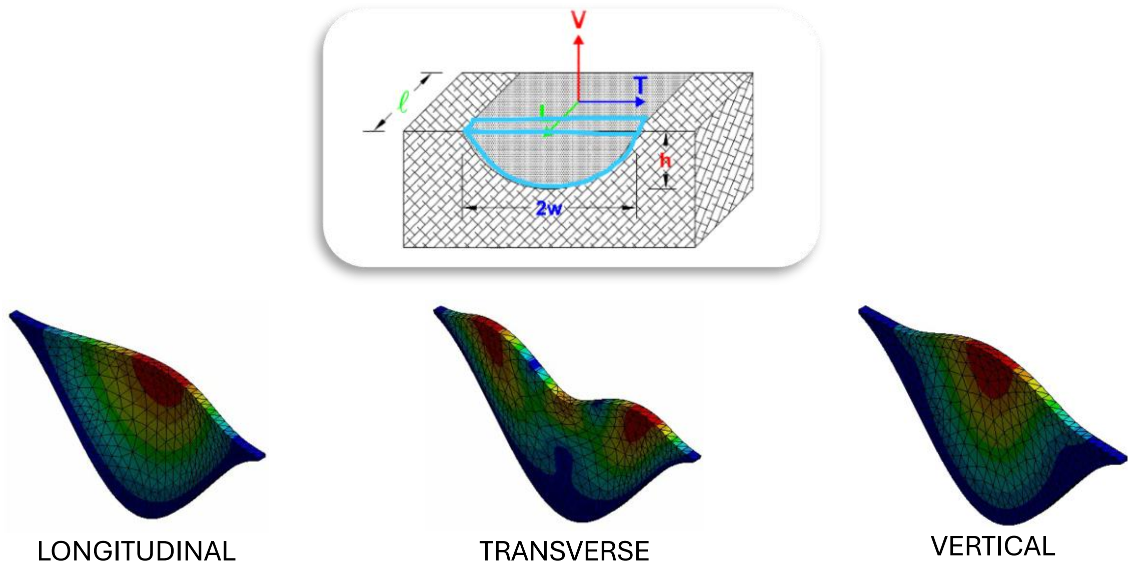

Figure 5.Top: Idealized basin and a section across it (blue).Bottom: fundamental vibration modes along each main exis.

To visualize the 3D particle motion:

1) select the corresponding button  from the spectral window toolbar (Figure 6),
2) click on the frequencies to analyze (a maximum of 20 at a time is allowed to make results readable)
3) click *Filter*.

The 3D particle motion will appear as in Figure 7. Each subplot can be rotated for better understanding.

The 3D particle motion is applied only to the windows selected in H/V stability plot. Thus, if you want to reduce the number of points, analyze a shorter part of the signal.

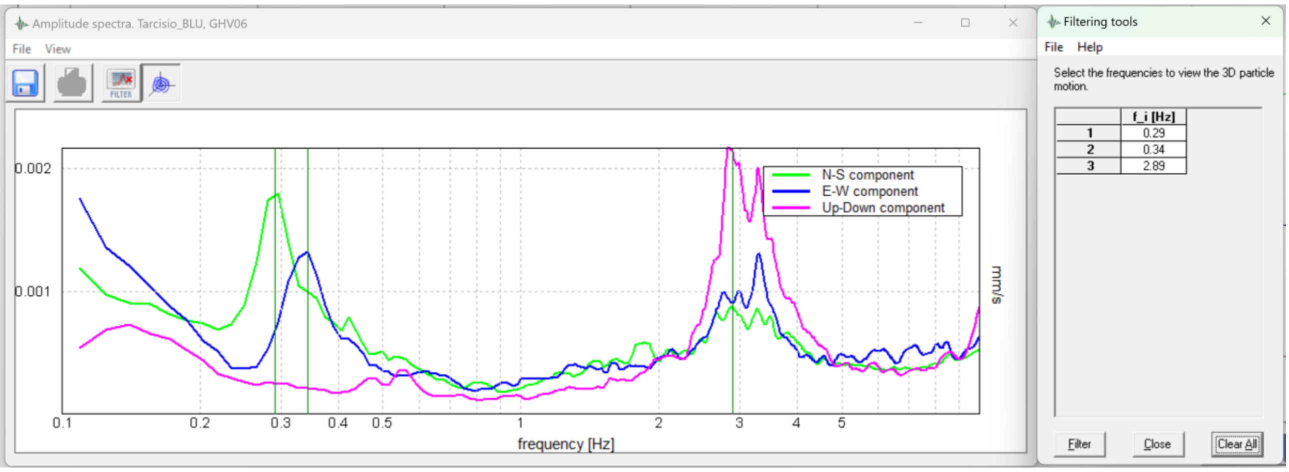

Figure 6. Selection of the frequencies to analyze for the 3D particle motion study.

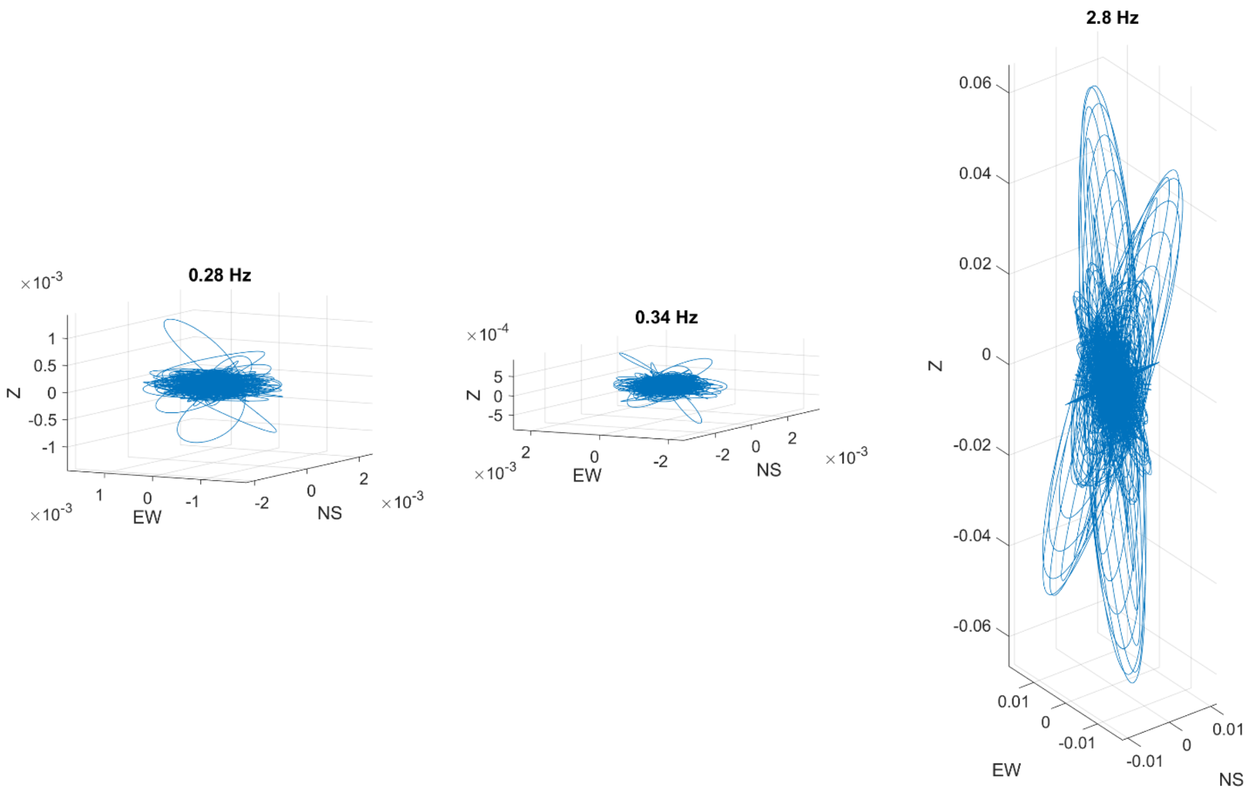

Figure 7. 3D particle motion at the selected frequencies. Each subplot can be rotated.