



SPECTROGRAMS

This algorithm plots spectrograms in a specific plot format. It is developed in two different functions. The first, `wav_spectrogram` saves independent figures for each station trace and compares with the trace filtered with two different filters. Usefully to compare different types of waves in the same trace. Fig G.1 shows an example of the output figures when using the `wav_spectrogram` function. The second function, `all_spectrogram`, plots all spectrograms together in a unique figure, using the same color-scale in all plots. Fig G.2 shows an example of the output figures when using the `wav_spectrogram` function. To successfully use this functions, it is necessary to change the spectrogram function in the Obspy source code ("spectrogram.py" file), as it is described in the following link: <https://github.com/obspy/obspy/issues/2053>.

Source code:

https://github.com/veronica-antunes/PHD_GGB/blob/master/plot_spectrograms.py

Functions:

`wav_spectrogram(waveforms, fmi1, fma1, fmi2, fma2, clip, yscale = 'linear')`

`all_spectrogram(waveform, maxv, fx = 5, fy = 4, fs = 11, outfile = 'spectrogram.png')`

Parameters:

waveforms/waveform: waveform list/waveform name;

fmi1, fma1: minimum and maximum frequency range for Filter 1;

fmi2, fma2: minimum and maximum frequency range for Filter 2;

clip: maximum value to clip amplitudes, in percentage and normalized. Number must be between 0 and 1. For more information see clip option in <https://docs.obspy.org/packages/autogen/obspy.imaging.spectrogram.spectrogram.html>;

yscale (optional): 'linear'/'log'. Default is 'linear';

maxv: Maximum amplitude value (clips all amplitudes below maxv value). Important to set the same color scale in all traces;

fs (optional): font size for titles and labels. Default is 11;

outfile (optional): name for figure output. Default is 'spectrogram.png';

Necessary Packages:

- Obspy;
- Matplotlib;
- Pylab;
- Numpy;
- Glob;
- Datetime.

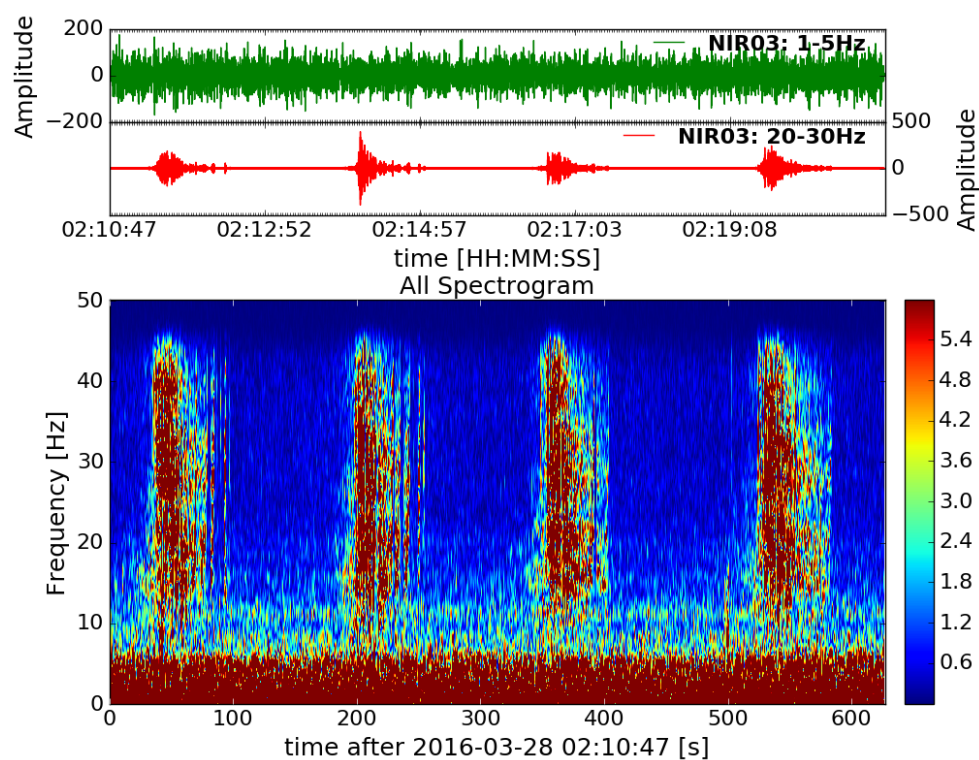


Figure G.1 – Example output for function `wav_spectrogram`. It plots each station individually.

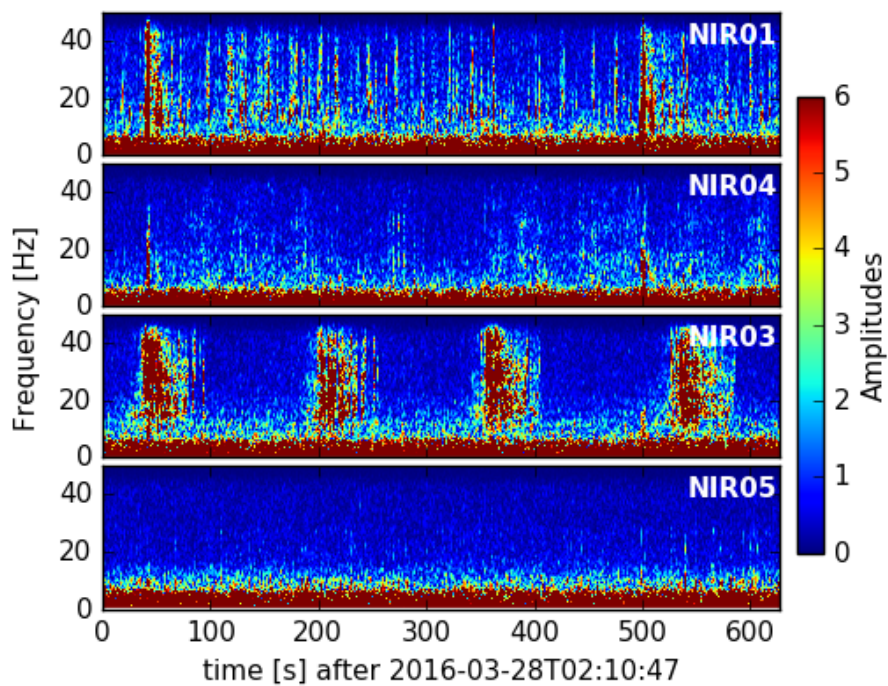


Figure G.2 – Example output for function `all_spectrogram`.