Appendix C

Magnitude

This algorithm automatically calculates the magnitude values of a list of earthquakes, as it is described in Chapter 2 and 3. The code is developed in a form of a function that can be imported into a python shell, using the different input parameters described below. The code outputs a text file with the list of earthquakes with the respective magnitude values. This code was developed to be used with the "s-file", "select" and "collect" standard file format from SEISAN.

Source code:

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

Function:

determ_magn(s_file, t_window, wav_path, dataless_path, plot_wavs = False, distance_type = 'hypocentral', print_stat_mag = False)

Parameters:

s_file: "s-file" default format from SEISAN software. It reads single s-file or gathered s-files ("select.out" or "collect.out" outputs from SEISAN);

t_window: time window for magnitude estimation, in seconds;

wav_path: path for waveforms. It considers the waveform/s name inserted in the respective s-file. Can be a normal path (e.g., ".../waveforms") or the direct path for the SEISAN database (".../SEISAN/WAV/DATABASE");

dataless_path: path for the different datalesses (accepts a list in the form of "dataless*");

distance_type (optional): 'hypocentral'/'epicentral'. Calculates the distance based on the 'hypocentral' or 'epicentral' distance. Default is 'hypocentral';

plot_wavs (optional): True/False. If true, plots the horizontal traces (N and E) and the modulus of the amplitude for each trace in a folder named "/figures". An output example is shown in Fig. C.1. Default is False;

print_stat_mag (optional): True/False. Saves the individual magnitudes from each station in the final output file. Default False.

Necessary Packages:

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

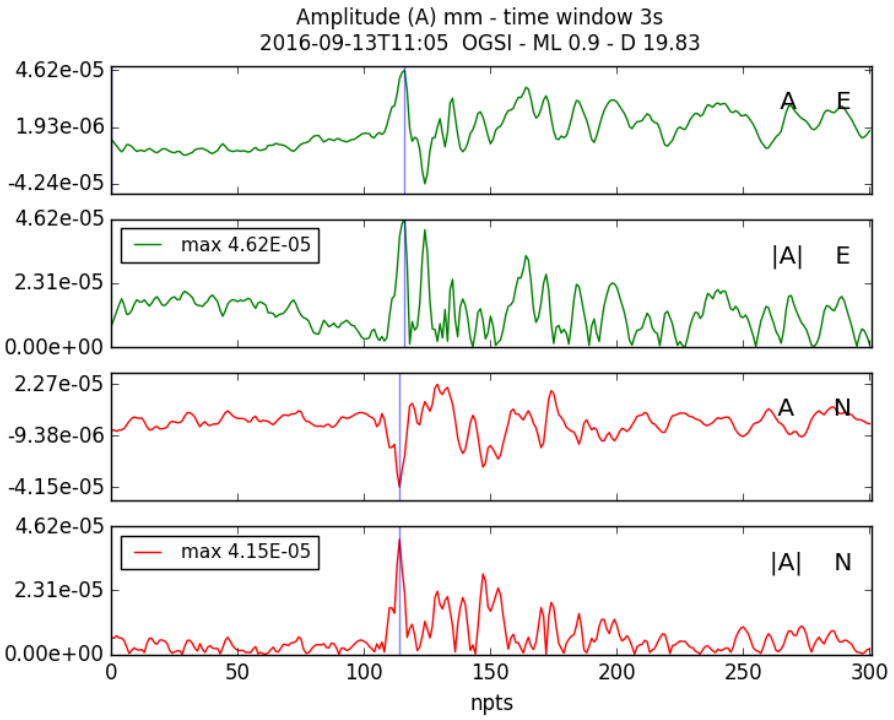

Figure C.1 – Output figure example if plot_wavs option is set True.