Geophysical Research Abstracts
Vol. 18, EGU2016-13384, 2016
EGU General Assembly 2016

MSNoise: A framework for Continuous Seismic Noise Analysis

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MSNoise is an Open and Free Python package known to be the only complete integrated workflow designed to analyse ambient seismic noise and study relative velocity changes (dv/v) in the crust. It is based on state of the art and well maintained Python modules, among which ObsPy plays an important role. To our knowledge, it is officially used for continuous monitoring at least in three notable places: the Observatory of the Piton de la Fournaise volcano (OVPF, France), the Auckland Volcanic Field (New Zealand) and on the South Napa earthquake (Berkeley, USA). It is also used by many researchers to process archive data to focus e.g. on fault zones, intraplate Europe, geothermal exploitations or Antarctica.

We first present the general working of MSNoise, originally written in 2010 to automatically scan data archives and process seismic data in order to produce dv/v time series. We demonstrate that its modularity provides a new potential to easily test new algorithms for each processing step. For example, one could experiment new methods of cross-correlation (done by default in the frequency domain), stacking (default is linear stacking, averaging), or dv/v estimation (default is moving window cross-spectrum "MWCS", so-called "doublet"), etc.

We present the last major evolution of MSNoise from a "single workflow: data archive to dv/v" to a framework system that allows plugins and modules to be developed and integrated into the MSNoise ecosystem. Small-scale plugins will be shown as examples, such as "continuous PPSD" (à la McNamarra & Buland) or "Seismic Amplitude Ratio Analysis" (Taisne, Caudron).

We will also present the new MSNoise-TOMO package, using MSNoise as a "cross-correlation" toolbox and demystifying surface wave tomography !

Finally, the poster will be a meeting point for all those using or willing to use MSNoise, to meet the developer, exchange ideas and wishes !