Geophysical Research Abstracts
Vol. 19, EGU2017-6307, 2017
EGU General Assembly 2017

The R-package eseis – A toolbox to weld geomorphic, seismologic, spatial, and time series analysis

Michael Dietze
GFZ German Research Centre for Geosciences, Section 5.1 Geomorphology, Potsdam, Germany (mdietze@gfz-potsdam.de)

Environmental seismology is the science of investigating the seismic signals that are emitted by Earth surface processes. This emerging field provides unique opportunities to identify, locate, track and inspect a wide range of the processes that shape our planet. Modern broadband seismometers are sensitive enough to detect signals from sources as weak as wind interacting with the ground and as powerful as collapsing mountains. This places the field of environmental seismology at the seams of many geoscientific disciplines and requires integration of a series of specialised analysis techniques.

R provides the perfect environment for this challenge. The package eseis uses the foundations laid by a series of existing packages and data types tailored to solve specialised problems (e.g., signal, sp, rgdal, Rcpp, matrixStats) and thus provides access to efficiently handling large streams of seismic data (> 300 million samples per station and day). It supports standard data formats (mseed, sac), preparation techniques (deconvolution, filtering, rotation), processing methods (spectra, spectrograms, event picking, migration for localisation) and data visualisation. Thus, eseis provides a seamless approach to the entire workflow of environmental seismology and passes the output to related analysis fields with temporal, spatial and modelling focus in R.