Geophysical Research Abstracts
Vol. 16, EGU2014-10466, 2014
EGU General Assembly 2014

Synthetic seismogram web service and Python tools

Sebastian Heimann (1), Simone Cesca (1,3), Marius Kriegerowski (2), and Torsten Dahm (1)

(1) GFZ Potsdam, Section 2.1: Physics of Earthquakes and Volcanoes, Potsdam, Germany (sebastian.heimann@gfz-potsdam.de), (2) Institute of Geophysics, University of Hamburg, Hamburg, Germany, (3) Institute of Earth and Environmental Science, University of Potsdam, Potsdam, Germany

Many geophysical methods require knowledge of Green's functions (GF) or synthetic seismograms in dependence of ranges of source and receiver coordinates. Examples include synthetic seismogram generation, moment tensor inversion, the modeling of depth phases for regional and teleseismic earthquakes, or the modeling of pressure diffusion induced static displacement and strain.

Calculation of Green's functions is a computationally expensive operation and it can be of advantage to calculate them in advance: the same Green's function traces can then be reused several or many times as required in a typical application. Regarding Green's function computation as an independent step in a use-case's processing chain encourages to store these in an application independent form. They can then be shared between different applications and they can also be passed to other researchers, e.g. via a web service.

Starting now, we provide such a web service to the seismological community (http://kinherd.org/), where a researcher can share Green's function stores and retrieve synthetic seismograms for various point and extended earthquake source models for many different earth models at local, regional and global scale.

This web service is part of a rich new toolset for the creation and handling of Green's functions and synthetic seismograms (http://emolch.github.com/pyrocko/gf). It can be used off-line or in client mode. Its core features are:

- greatly simplified generation of Green's function stores
- supports various codes for Green's function computation
- extensible Green's function storage format
- flexible spacial indexing of Green's functions
- integrated travel time computation
- support for other types of Green's functions; e.g. poro-elastic GFs
- written in Python