



eGSIM: a web service for selecting and testing ground shaking models in Europe

Riccardo Zaccarelli, Graeme Weatherill, Dino Bindi, Angelo Strollo, and Fabrice Cotton
German Research Centre for Geoscience GFZ, Potsdam, Germany (riccardo.zaccarelli@gfz-potsdam.de)

We present a first prototype of the web service for selecting and testing ground shaking models in Europe (eGSIM), developed in the framework of the Thematic Core Services for Seismology of EPOS-IP (European Plate Observing System-Implementation Phase).

The service is subdivided into three components: data (flat files), computation libraries and web interface. Input flat-files (e.g. those of the Engineering Strong Motion (ESM) database) include our application-oriented earthquake database obtained by means of an already implemented open-source tool (stream2segment), which retrieves information from the European Integrated Data Archive (EIDA) and processes it in form of flat file. The tool features a highly customisable processing component (not restricted to the production of flat files) and a Graphical User Interface to explore the data with detailed information tailor made to each use case, including the possibility to assign labels to segments (e.g., in the framework of supervised machine learning hand labelling, when waveform segments with class labels are needed to train a statistical classifier). An extensive library of ground motion models is provided by OpenQuake, an open source software for probabilistic seismic hazard and risk assessment (PSHA), and its accompanying Ground Motion Toolkit, which perform the scientific calculations to produce the desired outputs, including Trellis plots, Sammons maps and, by means of input flat files, analysis of model to data fit and model ranking using the latest generation of GMPE testing methods (e.g. Mak et al., 2017) developed under the umbrella of CSEP (Collaboratory for the Study of Earthquake Predictability) and GEM (Global Earthquake Model) / GFZ testing center. A web interface offers the possibility to visualise the desired output in a given location by selecting ground motion models according to different regionalisation schemes or hazard source models defined in previous PSHA (probabilistic seismic hazard assessment) studies.

With this tool we envisage the definition and dissemination of the ground motion logic tree for the next generation of probabilistic seismic hazard assessment in Europe (SERA project). Moreover, eGSIM is foreseen to support investigations on the spatial variability of ground motion through the computation and dissemination of event-specific or station-specific residuals.