Geophysical Research Abstracts
Vol. 18, EGU2016-15403, 2016
EGU General Assembly 2016

Near fault broadband ground motion simulation with empirical Green's functions: the Upper Rhine Graben case study

Sergio Del Gaudio (1), Sébastian Hok (1), Mathieu Causse (2), Gaetano Festa (3), and Maria Lancieri (1)
(1) IRSN, Paris, France (sergio.delgaudio@irsn.fr), (2) ISTerre, University Joseph Fourier, Grenoble, France, (3) University of Naples Federico II, Naples, Italy

A fundamental stage in seismic hazard assessment is the prediction of realistic ground motion for potential future earthquakes. To do so, one of the steps is to make an estimation of the expected ground motion level and this is commonly done by the use of ground motion prediction equations (GMPEs). Nevertheless GMPEs do not represent the whole variety of source processes and this can lead to incorrect estimates for some specific case studies, such as in the near-fault range because of the lack of records of large earthquakes at short distances. In such cases, ground motion simulations can be a valid tool to complement prediction equations for scenario studies, provided that both source and propagation are accurately described and uncertainties properly addressed. Such simulations, usually referred to as "blind", require the generation of a population of ground motion records that represent the natural variability of the source process for the target earthquake scenario.
In this study we performed simulations using the empirical Green's function technique, which consists in using records of small earthquakes as the medium transfer function provided the availability of small earthquakes located close to the target fault and recorded at the target site. The main advantage of this technique is that it does not require a detailed knowledge of the propagation medium, which is not always possible, but requires availability of high quality records of small earthquakes in the target area. We couple this empirical approach with a k-2 kinematic source model, which naturally let us to introduce high frequency in the source description.
Here we present an application of our technique to the Upper Rhine Graben. This is an active seismic region with a moderate rate of seismicity and for which it is interesting to provide ground motion estimation in the vicinity of the faults to be compared with estimations traditionally provided by GMPEs in a seismic hazard evaluation study.
We performed several sensitivity analyses to test the correlation between different source parameter and the influence that each of them has on the simulations. Finally we performed blind simulations to make a comparison with GMPEs estimations.