Geophysical Research Abstracts
Vol. 18, EGU2016-4583-1, 2016
EGU General Assembly 2016

Towards a Time-Dependent Probabilistic Seismic Hazard Assessment: the Case of Calabria, Italy

Aybige Akinci, Paola Vannoli, Giuseppe Falcone, Matteo Taroni, Mara Tiberti, Maura Murru, Pierfrancesco Burrato, and Maria Teresa Mariucci

Istituto Nazionale di Geofisica e Vulcanologia, Rome, Italy (aybige.akinci@ingv.it)

In this study, we attempted to improve the standards in Probabilistic Seismic Hazard Assessment (PSHA) towards a time-dependent hazard assessment in the Calabria region, Italy. To this end, we first improved the knowledge of the seismotectonic framework of the Calabrian region by using any available geologic, tectonic, paleoseismic, and macroseismic information in the literature. Secondly we constructed a PSHA model based on the long-term recurrence behavior of seismogenic faults, together with the spatial distribution of earthquakes observed historically. We derived the characteristic earthquake model for those sources capable of rupturing the entire fault segment independently with a single characteristic magnitude. However, the floating rupture model was applied to those earthquakes whose location is not known with sufficient precision and correlated to longer fault systems. In order to connect the time dependence of the seismic processes to predict the future events in the region, we used a Brownian Passage Time (BPT) model characterized by a mean recurrence, aperiodicity, or uncertainty in the recurrence distribution and elapsed time since the last earthquake. Besides, we considered a physical parameter of the static Coulomb stress change (ΔCFF) to be due to the fault interaction from earthquakes that influence the probability of earthquake occurrence and adopt a model built on the fusion of BPT model (BPT+ΔCFF). Finally, we presented our results for both time-dependent and Poisson models in terms of Peak Ground Acceleration (PGA) maps for 10% probability of exceedance in 50 years using equally weighted Ground Motion Predictive Equations (GMPEs) through a logic tree approach in Calabria. We observed that the effect of the different occurrence models on the seismic hazard estimate is quite high: the hazard may increase by more than 20% or decrease by as much as 50%, depending on the applied model.