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Ranking ground-motion prediction models in different seismotectonic contexts: the experience for the new Italian seismic hazard model (MPS16)

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The MPS16 project, started in 2015, aims at updating the existing reference seismic hazard model for Italy, released in 2004-2006. As known, ground-motion prediction equations (GMPE) play a basic role in probabilistic seismic hazard assessment and, thus, special care should be taken to select and rank them in a proper way.
The increasing amount of strong-motion records that are now available at the Italian accelerometric archive (itaca.mi.ingv.it) and the Engineering strong-motion database (esm.mi.ingv.it) allow us to rank a set of GMPEs developed at global and regional scales for different tectonic environments in the Italian peninsula. The performance of all selected GMPEs is tested against several intensity measures, such as PGA, PGV and acceleration spectral ordinates in the range 0.05 - 4 s.
In particular, from many available models at global, European and regional/local scale, we select: i) 13 GMPEs for shallow active crustal regions; ii) 4 for subduction zones to be applied to the Calabrian arc, and iii) 2 for volcanic areas, specifically for Mount Etna.
Several scoring techniques have been applied, included the renowned method based on the log-likelihood value (Scherbaum et al., 2009), the Euclidean Distance-Based Ranking (EDR) method (Kale and Akkar, 2013) and two novel methods commonly used for evaluating general probabilistic forecasts, such as the gambling score (Zechar and Zuang, 2014) and the scoring rule for quantiles (Gneiting and Raftery, 2005).
Besides presenting the selection and scoring of a set of GMPEs, we also aim at investigating if regional GMPEs are consistently better than global models, and assessing the overall fit of the selected GMPEs for the whole country and some specific tectonic environments such as, for example, volcanic areas and subduction zones.