Quantification of source uncertainties in Seismic Probabilistic Tsunami Hazard Analysis (SPTHA): towards PTHA assessment for the coasts of Italy

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We propose a procedure for uncertainty quantification in Probabilistic Tsunami Hazard Analysis (PTHA), with a special emphasis on the uncertainty related to statistical modelling of the earthquake source in Seismic PTHA (SPTHA), and on the separate treatment of subduction and crustal earthquakes. Differently from classical approaches that commonly adopt the hazard integral and logic tree, we use an event tree approach and ensemble modelling. The procedure was developed in the framework of the EC projects ASTARTE and STREST, of the Italian National Flagship project RITMARE, and of the agreement between Italian Civil Protection and INGV. A total of about 2×10^7 different potential seismic sources covering the entire Mediterranean Sea, and more than 1×10^5 alternative model implementations have been considered to quantify both the aleatory variability and the epistemic uncertainty. A set of hazard curves is obtained along the coasts of the entire Italian territory. They are the prototype of the first homogeneous Italian national SPTHA map.