

Annual Occurrence Rates Computed with a Model Of Long-Term Predictability for the Time-Independent Seismic Hazard Assessment In Italy

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The present study was carried out in the framework of the Center for Seismic Hazard (CPS) INGV-Italy, under the agreement signed in 2015 with the Italian Department of Civil Protection for developing a new map of seismic hazard of the country that will update the earlier assessment released between 2004 and 2006 (MPS04-S1; zonesismiche.mi.ingv.it and esse1.mi.ingv.it). In this initiative, we participated with a time-independent (Poisson) model to provide the annual occurrence rate of a seismic event on the entire Italian territory, from an Mw4.5 minimum magnitude, considering bins of 0.1 magnitude units on geographical cells of $0.1^\circ \times 0.1^\circ$. For each considered catalog (historical, instrumental and individual seismogenic sources) we determined a distinct annual rate value for each cell of $0.1^\circ \times 0.1^\circ$. The following criterion was adopted: if the cell falls within one of the sources in question, we adopted the respective value of occurrence rate, only referred to the magnitude bin of the characteristic event. This value was divided by the number of grid cells that fall on the horizontal projection of the source. If, instead, the cell falls outside of any seismic source, we considered the rates of earthquakes exceeding an Mw4.5 minimum magnitude obtained from the historical and the instrumental catalog, using the smoothing method introduced by Frankel (1995). In order to give an average rate, the two rates were first normalized to the same period of time and then joined together by a weighted average based on the number of events of equal magnitude. The obtained value was then scaled in magnitude by the Gutenberg-Richter relationship in order to give the average rate of background seismicity for each magnitude bin from M4.5 up to M7.0 or higher. Here we present the final results that will be used for the new Italian seismic hazard map.