

An Updated Seismic Hazard Map for the Korean Peninsula

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A probabilistic analysis of seismic hazards is an essential part of natural hazard mitigation for construction of safe society. The Korean Peninsula and its surrounding regions have low seismicity. Recent M5-level earthquakes (M5.8, M5.4) raised the public concerns on the potential seismic hazards. Also, historical literatures suggest the occurrence of past destructive earthquakes. We assess the seismic hazard of the Korean Peninsula and its surroundings in latitudes of 33°N-43°N and longitudes of 124°E-131°E. We compose an instrumental catalog for earthquakes in 1978-2018, and collect historical catalogs for earthquakes in 2-1904. We decluster the instrumental seismicity, and remove the aftershocks from the instrumental catalog. We estimate seismicity properties including earthquake occurrence rate and Gutenberg-Richter b value for seismic source models. We consider 3 seismotectonic province models and 8 ground motion prediction equations (GMPEs). Every parameter and model may suffer from inherent uncertainty. We assign weights on the parameters and models considering the uncertainty. We use areal seismic sources that are smoothed by background seismicity. We calculate the seismic hazard map that is discretized by 0.1° in longitude and latitude. We consider three representative focal depths of 6, 10 and 14 km considering the focal-depth distribution in the Korean Peninsula. Maximum magnitudes of M_w 6.8, 7.0 and 7.2 are used considering the earthquake catalogs and geology. We estimate PGA (Peak Ground Acceleration), and 1 Hz and 5 Hz SA (Spectral Acceleration) at 10% probability exceedance in 50 years, presenting peak PGA of 0.1 g.