

Probabilistic seismic hazard assessment for Thailand

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A set of probabilistic seismic hazard maps for Thailand has been derived using procedures developed for the latest US National Seismic Hazard Maps. In contrast to earlier hazard maps for this region, which are mostly computed using seismic source zone delineations, the presented maps are based on the combination of smoothed gridded seismicity, crustal-fault, and subduction source models. Thailand's composite earthquake catalogue is revisited and expanded, covering a study area limited by 0° – 30° N Latitude and 88° – 110° E Longitude and the instrumental period from 1912 to 2007. The long-term slip rates and estimates of earthquake size from paleoseismological studies are incorporated through a crustal fault source model. Furthermore, the subduction source model is used to model the megathrust Sunda subduction zones, with variable characteristics along the strike of the faults. Epistemic uncertainty is taken into consideration by the logic tree framework incorporating basic quantities, such as different source modelling, maximum cut-off magnitudes and ground motion prediction equations. The ground motion hazard map is presented over a 10 km grid in terms of peak ground acceleration and spectral acceleration at 0.2, 1.0, and 2.0 undamped natural periods and a 5% critical damping ratio for 10 and 2% probabilities of exceedance in 50 years. The presented maps give expected ground motions that are based on more extensive data sources than applied in the development of previous maps. The main findings are that northern and western Thailand are subjected to the highest hazard. The largest contributors to short- and long-period ground motion hazard in the Bangkok region are from the nearby active faults and Sunda subduction zones, respectively.

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