Probabilistic seismic hazards for Tibetan Plateau and adjacent regions estimated using multiple seismic source and attenuation models

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Tibetan plateau and adjacent region is one of the most seismically active regions of the World. The catastrophic earthquake occurs frequently in this region and causes huge socio-economic losses. For instance, the 2015 Mw7.8 Nepal and the 2008 Mw7.9 Sichuan earthquake caused thousands of casualties and huge unrecoverable damages. The proper seismic hazard quantification is widely used an effective tool to reduce the seismic risk.

In this study, we estimate the probabilistic seismic hazards for the Tibetan plateau and adjacent region based on five attenuation models along with three different seismogenic source models (smoothed gridded, linear, and areal sources). In order to capture the epistemic uncertainties, a logic-tree structure was used assigning different weighting factors for various models. The peak ground acceleration and spectral acceleration at 0.2 s and 1.0 s were quantified for 2% and 10% probability of exceedance over 50 years considering the bed rock site condition. The hazard maps depicted significant spatio-temporal variations. This study provide new constraints on the improvement of seismic zoning map and consequently on the refined seismic building design codes for the Indian-Eurasian continental collision zone.

Keywords: Tibetan plateau, probabilistic seismic hazard, peak ground acceleration, spectral acceleration, logic tree

