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Probabilistic Seismic Hazard Assessment for Assam, North-East India

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Abstract

In this study, Probabilistic seismic hazard assessment (PSHA) is performed for Assam, North-East (NE) India. NE India being bounded by latitude 200-300 N and longitude 870-980 E, is considered as one of the most earthquake-prone areas in the world. As per seismic zoning map of India (IS 1893 (2016), Part 1), most of the states in NE region have been placed in seismic zone V, which has the highest zone factor in the country. Among the eight north-eastern states, Assam serves as the gateway to the other seven states. As this region lies on one of the most vigorous tectonic plates in the world, it has experienced several devastating earth-quakes in the past. The most devastating earthquakes include 1869 Cachar Earthquake (M_w=7.5), 1897 Assam-Shillong Earthquake (M_w =8.1) and 1950 Assam Earthquake (M_w =8.7). Considering the seismicity of this region, seismic hazard assessment plays a significant role to assess the seismic risk for the future. The NE India region is broadly divided into four seismogenic sources, and further sub-divided into eleven seismogenic sources based on the tectonic features and seismicity characteristics. For the study of hazard assessment, a unified moment magnitude catalogue has been used, where the events are assembled from various databases (ISC, IMD, USGS-NEIC). The catalogue has been declustered and the seismicity parameters are calculated for each source zone. The hazard maps have been presented at the bedrock level, in terms of peak ground acceleration (PGA) and spectral acceleration (Sa) values. The PGA values vary in between 0.16-0.57 g, while the Sa values are obtained in the range of 0.12-0.77 g. These hazard maps are expected to give insight to the local site-specific seismic hazard variation for the Assam region and would be useful for the preparedness of risk and disaster mitigation measures.

Keywords: PSHA, NE India, Assam, PGA, Hazard map