PSHA; Model and Results for northeast India; An example

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Abstract

We have calculated earthquake hazard for Northeast India and Bhutan applying a hybrid PSHA method on a large two-stage declustered earthquake catalogue, to the eastern area boundary. In implementing a regional fault model, we estimated the earthquake potential using a preferred regional model. The results are mapped for the region and compared to existing data. Maximum PGA for the region is around 3.8 m/s², while the median PGA is around 1.5 m/s². The hazard is calculated using the EHB bulletin and the PDE catalogue. The results are compared to other recent studies and the hazard is found to be lower than previous studies. The hazard is mapped for the region and compared to existing data. The results are calculated using the EHB bulletin and the PDE catalogue. The results are compared to other recent studies and the hazard is found to be lower than previous studies. The hazard is mapped for the region and compared to existing data. The results are calculated using the EHB bulletin and the PDE catalogue. The results are compared to other recent studies and the hazard is found to be lower than previous studies.

Background: Data

Several methods for declustering were applied. Since declustering methods are based on conceptual models of seismic faulting, there is a prior expectation method (VanSluys et al., 2012). Thus, we use two different deterministic declustering methods, a seismic hazard method by Gardner and Knopoff (1974), and a cluster method by Reasenberg (1985). In addition, we use two alternative seismic parameter settings by Greensmith (VanSluys et al., 2012) and Uchihashi (1986). We use the algorithm recommended by the online supplement to VanSluys et al. (2012) downloaded from the CIRS website (www.cisr.niim.ac.in).

Fault model and potentials

The fault model is based on maps by the Indian Geological Survey and faults that are quantified by this method. We calculated the earthquake potential using a preferred regional model. The results are calculated using the EHB bulletin and the PDE catalogue. The results are compared to other recent studies and the hazard is found to be lower than previous studies. The hazard is mapped for the region and compared to existing data. The results are calculated using the EHB bulletin and the PDE catalogue. The results are compared to other recent studies and the hazard is found to be lower than previous studies. The hazard is mapped for the region and compared to existing data. The results are calculated using the EHB bulletin and the PDE catalogue. The results are compared to other recent studies and the hazard is found to be lower than previous studies.

Conclusions

• All results are computed at 5% earthquake occurrence probability, and the results demonstrate Site maximizes with PGA around 4 m/s² along the subduction zone bordering Myanmar and India.
• The PGA results are significantly lower than the old ISH results both along collision and subduction zones as well as in Assam. The obtained results are also lower than indicated in the more recent India Earthquake Zone map (Zone 3) and the ISH-ESD - HTMA - NODA published results (http://wce earthquakes island-appropriate seismic hazard analysis of India).
• The northern Assam and Arunachal states along the Himalaya collision zone show low seismic activity range. The PGA values around 0.5 m/s² are mainly due to the quantification of active faults (geology and geology interpretation).
• The relatively low PGA values demonstrate the low seismic activity rates along the eastern Himalayas.
• The four models implemented provide uncertainties and possibilities for deterministic weighting: The recurrence models based on areo- and point sources are based on seismic analysis of historical activity. The recurrence models for degrading faults (rectangular and buffer zones) are developed from geological and geophysical observations. The Kernel approach is based on historical earthquake observations, but also historical earthquake catalogue completeness. The main objective of the presented results is to demonstrate how different types of information can be used and can help to assess earthquake shaking probabilities within a probabilistic and statistically consistent approach.