

Probabilistic seismic hazard assessment for northern Southeast Asia

^a Chung-Han Chan, ^a Yu Wang, ^b Nguyen Le Minh, ^c Suwith Kosuwan, ^a Xuhua Shi, and ^a Kerry Sieh

^a *Earth Observatory of Singapore, Nanyang Technological University, Singapore, chchan@ntu.edu.sg*

^b *Department of Seismological Survey, Institute of Geophysics, Vietnam Academy of Science and Technology, Vietnam*

^c *Active Fault Research Division, Department of Mineral Resources, Thailand*

We assess seismic hazard for northern Southeast Asia through constructing an earthquake and fault database, conducting a series of ground-shaking scenarios and proposing seismic hazard maps for the region and hazard curves for some cities. Our earthquake database contains global catalogues, including the ISC, ISC-GEM and the global ANSS Comprehensive Catalogues, and local ones, from Seismological Bureau, Thai Meteorological Department, Thailand, and Institute of Geophysics Vietnam Academy of Science and Technology, Vietnam. To harmonize the earthquake parameters from different catalogue sources, we remove duplicate events and unify magnitudes into the same scale. For active fault database, we utilized active fault data from previous studies, including the active fault parameters determined by Wang et al. (2014), Department of Mineral Resources, Thailand, and Institute of Geophysics, Vietnam Academy of Science and Technology, Vietnam. We determined the earthquake recurrence models of seismogenic sources using the parameters from these updated databases (i.e. the Gutenberg-Richter relationship, slip rate, maximum magnitude and the elapse time of last events). To evaluate the ground shaking behaviours in different tectonic regimes, we conducted a series of tests by matching the felt intensities of historical earthquakes to the modelled ground motions from ground motion prediction equations (GMPEs). By incorporating the best-fitting GMPEs and site conditions based on V_{s30} (the average shear-velocity down to 30 m depth) from analysis of topographic slope in global scale and microtremor array measurements in city scale, we utilized site effect and assessed probabilistic seismic hazard. To analyse the sensitivities of each parameter to the assessment and contribution of each seismogenic source to seismic hazard, we propose tornado diagrams source category disaggregation, respectively.

References

Wang, Y., Sieh, K., Tun, S. T., Lai, K. Y., & Myint, T. (2014), Active tectonics and earthquake potential of the Myanmar region. *Journal of Geophysical Research: Solid Earth*, 119(4), 3767-3822.