Using Probabilistic Seismic Hazard Analysis in Assessing Seismic Risk for Taipei City and New Taipei City

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In this study, we evaluate the seismic hazard and risk for Taipei city and new Taipei city, which are important municipalities and the most populous cities in Taiwan. The evaluation of seismic risk involves the combination of three main components: probabilistic seismic hazard model, exposure model defining the spatial distribution of elements exposed to the hazard and vulnerability functions capable of describing the distribution of percentage of loss for a set of intensity measure levels. Seismic hazard at Taipei city and New Taipei city assumed as the hazard maps are presented in terms of ground motion values expected to be exceed at a 10% probability level in 50 years (return period 475 years) and a 2% probability level in 50 years (return period 2475 years) according to the Taiwan Earthquake Model (TEM), which assesses two seismic hazard models for Taiwan. The first model adopted the source parameters of 38 seismogenic structures identified by the TEM geologists. The other model considered 33 active faults and was published by the Central Geological Survey (CGS), Taiwan, in 2010. The 500m by 500m Grid-based building data were selected for the evaluation which capable of providing detail information about the location, value and vulnerability classification of the exposed elements. The results from this study were evaluated by the Openquake engine, the open-source software for seismic risk and hazard assessment developed within the global earthquake model (GEM) initiative. Our intention is to give the first attempt on the modeling the seismic risk from hazard in an open platform for Taiwan. An analysis through disaggregation of hazard components will be also made to prioritize the risk for further policy making.