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Developing a Seismic Landslide Hazard Map for Taiwan

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Following Lee et al. (2008), the statistical approach is applied to the seismic landslide hazard analysis for whole Taiwan and all the works are done by using new data sets. These new data include a new and carefully mapped Chi-Chi earhquake-incuced landslide inventory, a 5mx5m DEM, and a new version of 1 to 50,000 scale geologic map for whole Taiwan. Landslide causative factors used in the susceptibility analysis include slope gradient, slope aspect, terrain roughness, slope roughness, total curvature, total slope height, and lithology. A corrected Arias intensity which considered topographic amplification is used as a triggering factor.
Firstly, a susceptibility model is built by using the 1999 Chi-Chi shallow landslides as a training data set and mulitivariate logistic regression as an analytical tool. This model is validated by using the 1998 Jueili earhtquake-induced landslide data. Then, a probability of failure curve is established by comparing the Chi-Chi landslide data and the susceptibility values, and the spatial probability of landslide occurrence may be drawn. The temporal probability may be accounted by the triggering factor – hazard level of Arias intensity, which may be got through a regular probabilistic seismic hazard analysis. Finally, the susceptibility model and the probability of failure curve are applied to whole Taiwan by using a topographic corrected 475-year Arias intensity as triggering factor, so that a seismic shallow landslide probability map for 475-year earthquake is completed.