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Rapid Estimation of Shake Map for Emergency Response in Taiwan

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A shakemap system providing rapid estimates of strong ground shaking could be useful for emergency response providers in a disaster earthquake. A hybrid procedure, which combines site-dependent ground motion prediction models and the limited observations of the Real-Time Digital stream output system (RTD system operated by CWB), was setup to provide a high-resolution shakemap in a near-real-time manner for disaster earthquakes in Taiwan.

One of the main factors that affect the result of ground motion prediction analysis is the existence of site effects. The purpose of this paper is to investigate the local site effects and its influence in the ground shaking and, then, establish an early estimation procedure of potential hazard for disaster earthquakes. Based on the attenuation law, the site effects of each TSMIP station are discussed in terms of a bias function that is site and intensity-level dependent function (Figure 1). The standard deviation of the site-dependent ground motion prediction model can be significantly reduced. The nonlinear behavior of ground soil is automatically taken into account in the intensity-level dependent bias function. Both the PGA and the spectral acceleration are studied in this study. Based on the RTD data, event correctors are calculated and applied to precisely estimate the shakemap of disaster earthquakes for emergency response.

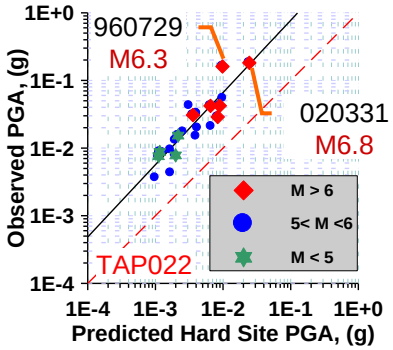

Figure 1. Comparison between the predicted and observed PGA to indicate the site amplification

References

[1] Jean, W.Y., Y.W. Chang, and C.H. Loh (2003), *Early Estimation Procedure of Seismic Hazard for Major Earthquake*, Joint NCREE/JRC Workshop International Collaboration on Earthquake Disaster Mitigation Research, Rep. No. NCREE-03-029, pp 435-440