Stochastic ground-motion simulation of the 2016 Meinong Taiwan earthquake: Application for case study on nonlinear site response

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We apply the stochastic method for finite-fault modeling of strong ground motions from 2016 Meinong Taiwan, earthquake. New development attenuation models in Southern Taiwan: frequency dependent $Q=86.42\,f^{0.7307}$ (Chang and Wen, 2016) and site dependent Kappa (Chang et al. 2016) were used in the synthetic model. The H/V spectra ratios (HVR) were calculated from weak-motions and Meinong mainshock respectively and utilized for correction of site amplification factors in stochastic ground motion prediction. The PGA predictions after site correction had good agreement with observation indicate the HVR as the suitable amplification factor in stochastic modeling.

The residuals of predicted PGA between utilized the HVR of weak-motions and mainshock for site correction distributed around the locations which occurred liquefactions during Meinong earthquake or has high liquefaction potential area. The result indicated nonlinear site response occurred and reduced PGA during Meinong earthquake around Tainan, Anding and Shanhua distinct.

The nonlinear site response during Meinong mainshock is also identified by degree of nonlinear site response (DNL) which summation of H/V ratio differences between weak-motions and Meinong mainshock records from TSMIP array. The DNL values increase with observed PGA, however, the DNL values has more correlation between observed PGV.

References

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