

Frequency-dependent Site Amplifications with $f \geq 0.01$ Hz Evaluated from the Velocity and Density Models in Central Taiwan

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Abstract

This study is the extent of Huang et al. (2005) for the evaluation of site amplification with frequency greater than 0.01 Hz. The frequency-dependent site amplifications at 87 free-field strong-motion station sites in central Taiwan are evaluated from the velocity and density structures constructed from borehole data measured at shallow depths and the velocity models inferred from earthquake data at depths. Results based on the quarter-wavelength approximation method proposed by Boore and Joyner (1997) show that the site amplifications increase with frequency and are larger in the Western Plain with thick Holocene alluvium than in the Western Foothill with Pleistocene and Miocene formations. Considering wave attenuation, site amplification first increases and then decreases with increasing frequency. The turning frequency, f_t , associated with the maximum amplification for each κ varies site by site.