



The effective Q values inferred from the high-frequency decay parameter for the sediments in Taipei basin, Taiwan

Ming-Wey Huang (1), Kuo-Liang Wen (2), Chi-Ling Chang (1), and Sheu-Yien Liu (1)

(1) Nat. S&T Center for Disaster Reduction, New Taipei City, Taiwan (mwhuang@ncdr.nat.gov.tw), (2) Institute of Geophysics, National Central University, Zhongli, Taoyuan County 32001, Taiwan

In this study, the high-frequency decay parameter κ , proposed by Anderson and Hough (1984), are measured from the seismograms recorded by stations, which installed in the Taipei basin. The spectral amplitudes decay exponentially with frequency, f , which can be formulated as $A(f)=A_0e^{-\pi\kappa f}$, for $f > f_e$, where $A(f)$ is the spectral amplitude, and A_0 depends on the earthquake source and epicenter distance, and the value of κ is independent of frequency, unit in second. The time windows applied to seismograms are suggested to be shear waves that are transformed to spectra by the technique of Fourier transform. The seismograms from the downhole array in Taipei Basin by Academia Sinica since 1992, provide a good opportunity to estimate the attenuation factor of the sedimentary strata over the Tertiary base rock beneath the Taipei basin (Wang et al., 2004). The seismograms of 23 earthquakes with magnitude ranges of 5.1-7.1 over the period of 2003-2010 at 9 downhole array stations are taken into calculation of the κ values for the shear waves. The results show that the κ values vary with depth and are in the range of 0.009-0.095 sec. The averaged $\Delta\kappa$ values from observations range +/- 0.02 seconds respective to $\Delta\kappa$ values at surface of each of station. The effective Q values for the sedimentary layers are inferred from the varied $\Delta\kappa$ at each downhole stations following the evaluation method of 1-D analytical transfer function (Safak, 1995).