

Characteristics of Horizontal-to-Vertical (H/V) Spectral Ratios Determined from Microtremor and Earthquake Recordings

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A dense network of strong motion seismic instruments, such as the one in Yokohama city, reveals locally variable ground motions. In southwest Japan where Nankai earthquake ($M=8$ or greater) is anticipated, it is not realistic to build a database based on felt-earthquake recordings in a short time. Thus, we study characteristics of spectra using seismograms of microtremors and earthquakes recorded at ad hoc stations. First, we calculated spectra of microtremors over various time windows (morning, day, night) and tested horizontal-to-vertical spectral ratios (HV ratios) following the method of Horike et al. (2001). We found that the microtremor HV ratios are stable and the peak-spectral ratios are found at about the same frequency among all the time windows. Next, we calculated HV ratios for S waves from earthquakes recorded at the same station. We found that the peak-spectral ratio of microtremors agree with those of earthquake motions. In addition, we found that the HV ratios from earthquakes at closer distances (smaller than 200km) are larger than that of microtremors in a higher-frequency band (4-8Hz), and the variation of HV ratios between microtremors and earthquakes is larger for events at further distances (greater than 600km). We suggest that HV ratios of microtremors seem to be a good tool for on-site estimation of strong ground motions.