Papers

Statistical Properties of Strong Ground Motions Based on the Spectral Inversion Method

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The objective of this study is to investigate the characteristics of strong ground motions separated from Fourier and response spectra based on a generalized spectral inversion method applied to the data observed by K-NET, KiK-net, and JMA Shindokei Network in Japan. The separation method that we used here is the same method proposed by Kawase and Matsuo (2004). We include all sources larger than $M_{\mathrm{JMA}}4.5$ observed from 1996 to 2011. Our results are in good agreement with the results by Kawase and Matsuo (2004) on the characteristics estimated from Fourier spectra, but ours show higher stability. By using the same method, we also separated strong motion characteristics based on acceleration response spectra, successfully. However, the separated characteristics of strong ground motions of both results are different, especially in the frequency range lower than 1 Hz. These differences come from the difference between Fourier spectra and response spectra found in the observed data; that is, predominant components in the high frequencies of Fourier spectra contribute to increasing the response in lower frequencies with small Fourier amplitude because strong high-frequency components act as an impulse.