P12

Search for Diffusive Properties in Earthquake Late Coda Recorded by Ocean Bottom Seismometers (OBSs) at Off Fukushima: Implications for H/V Spectral Ratio

○Atikul Haque FARAZI, Yoshihiro ITO, José PIÑA‐FLORES,
Emmanuel Soliman M. GARCIA, Shukei OHYANAGI

Seismic coda waves contain information about the subsurface structure due to multiscattering. To exploit this, the horizontal-to-vertical (H/V) spectral ratio within 0.05–10 Hz was computed from the late coda (or S-coda) of several regional and teleseismic earthquakes recorded by three broadband ocean bottom seismometers (OBSs) in off Fukushima, northeast Japan. Our final goal is to estimate the S-wave velocity structure in off Fukushima by inverting the full H/V spectral ratio, which involves reconstruction of Green's functions (GF) assuming diffuse seismic wavefield. However, there are not yet enough studies at the deep seafloor showing that the seismic coda represents a diffuse seismic wavefield. Since it is theoretically proven that the GF can be reconstructed considering a diffuse field, here we investigate whether the observed coda at the seafloor is in diffusion regime.

It has been established that the elastic wave field is diffusive when the background illumination is azimuthally uniform and complies with the energy equipartition principle. In several investigations, it has been shown that both the earthquake coda and ambient seismic noise are diffusive due to stabilization of the S and P energies. The late coda of nine earthquakes, recorded in a nearly L-shaped array consisting one broadband OBS (AoA70) and two short-period OBSs (AoA72 and AoA73), were used to calculate of spatial derivatives of the displacement and the P and S energies.

First, the orientations of the OBSs were corrected. Then, we carefully determined the appropriate ranges for measuring parameters. Here, the equilibrium of S and P energy was considered a robust indicator of diffusivity or energy equipartition. The coda of all earthquakes was found to be diffusive because the S to P energy ratios were within the range of the theoretical values related to energy equipartition. We also found that evolution of the H/V spectral ratio, especially at the lower frequencies, is linked with diffusion of seismic wavefield. This observation also justifies the analysis of H/V spectral ratio in the framework of the diffuse-field theory.