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Attenuation Structure beneath Kanto Region using Maximum Amplitude

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Introduction

The seismic attenuation structure beneath the Japanese islands should be three-dimensionally complex to a similar degree as the velocity structure. Especially, in the Kanto region, the similarity with the velocity structure is unlikely to be seen in other parts of the Japanese islands because seismic attenuation implies inelasticity or scattering, whereas seismic velocity represents elastic properties. A precise estimate of the seismic attenuation leads to a better estimate of the strength of an earthquake source, in turn allowing for proper scaling. Information on seismic attenuation is also important in the simulation of strong ground motions. In this study, tomographic inversions are performed for the three-dimensional (3D) attenuation structure beneath the Kanto Region.

Data and Grid setting

In this study, tomographic inversions are performed for the three-dimensional (3D) attenuation structure beneath the Japanese islands from NIED Hi-net catalog. Vertical amplitudes of ground velocities reported between January 2004 and February 2009 are used in this study. Amplitudes from 11766 earthquakes are selected for P- and S-wave tomography. The number of the ray is 552,935 for P and 393052 for S, respectively. A grid with interval of 0.1 in Kanto region and 0.5 in other region is applied to this region at depths of every 5 km.

Results

We estimate regional detail attenuation structure in Kanto region using tomography method with NIED Hi-net maximum amplitude data. In Kanto region, a High-Q zone is clearly found along the upper boundary of the Philippine Sea slab, and below the slab, we found a distinct wedge mantle low-Q zone.

Keywords: Q, Attenuation Structure, Kanto Region