

Three-dimensional attenuation structure beneath Kii Peninsula

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Kii Peninsula is located near the seismogenic subduction zone where earthquakes along the Nankai Trough have been repeated in the interval of 100 to 150 years. Shallow earthquake swarm occurs at the northern part of Wakayama and non-volcanic deep low-frequency tremors were observed at the depths around 30-40 km from Ise Bay to Kii Cannel [Obara,2002]. Therefore, the Kii Peninsula is an area that is attracting attention from both sides of the disaster prevent and tectonics. Attenuation factor Q is considered to be the parameter which is sensitive to the physical properties such as rock type, temperature, fluid and so on. Then, we estimated source parameters of earthquakes, Q, amplification factor of seismic stations using the combined inversion method [Tsumura et al.,2000].

We picked 4339 P arrivals of 125 earthquakes to elucidate the subsurface structure beneath Kii Peninsula, and calculated amplitude spectra for time windows 1s by using FFT. The study area was divided into 480 blocks, each having a frequency independent Q. The study area is 134.75E-136.85E and 33.3N-34.75N, and the region is divided into 6 layers of 0-5, 5-10, 10-20, 20-35, 35-50, 50-80 km for the depth direction.

First, we made a checkerboard test to clarify the spatial resolution of the results obtained by the inversion. As a result, pattern of high and low Q are well recovered in the southern part of 34.45N in the top layer. In the second layer and third layer generally good resolution was seen in the southern part of 34.25N. Although good resolution area is limited below the fourth layer, estimated Q for the region where low-frequency tremors occur in shows better estimation. We will add another ray paths that penetrate the top and second layers and try to improve the resolution for the region where shallow earthquake swarm occurs. Detailed attenuation structure estimated from actual spectra will provide us a new information about physical properties for the tremors and the earthquake swarm areas.

Keywords: non-volcanic deep low-frequency tremors, Kii Peninsula, Q value, attenuation, tomography