

Three-dimensional Q structure around the source region of the 1984 western Nagano Earthquake

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By using a combined inversion method, which determines source parameters and Q values, simultaneously, we estimated a three-dimensional attenuation structure beneath the western Nagano Prefecture, Japan, where the 1984 Western Nagano Prefecture earthquake (M6.8) occurred. We use high sampling frequency (10kHz) P wave waveform data from events occurring in this region recorded by 51 stations. Obtained Q values from the surface to a depth of 2km are very low and the low Q regions correspond to low P-wave velocity regions at depths of -1km and 0km (Sekiguchi et al., 2004). These low Q and low velocity regions are mainly located on the alluvium-dominant area. This indicates the Q values near the surface are strongly affected by surface geology. Comparing distributions of Q values with that of hypocenters at depths less than 4km we found that earthquakes tend to occur in low Q region. Such tendency is not clear at depths deeper than 4km. Earthquakes are hardly distributed in low Q regions at depths deeper than 6 km. It might indicate low Q regions in the shallower depth are created mainly by cracks of many small earthquakes, while the Q values at the deeper part are affected by temperature there.