

Imaging of S-wave reflectors in and around the hypocentral area of the 2004 Niigata-ken Chuetsu Earthquake (M6.8)

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An S-wave reflector is considered to relate to the existence of liquid in the seismogenic zone of the crust, which plays an important role in understanding the mechanism of earthquakes. We studied a distribution of S-wave reflectors in and around the hypocentral zone of the 2004 Niigata-ken Chuetsu Earthquake (M6.9). The earthquake was followed by several aftershocks that were greater than M6. Moreover, the aftershocks were not only located on the fault plane of the main shock but also on a conjugate fault plane that lies parallel to that of the main shock. In order to discuss the relationship between this complex activity and the crustal heterogeneities, we analyzed the seismograms observed at the seismic stations in this region. Normal moveout processing (NMO) was applied to the data of the aftershock. Several S-wave reflectors could be identified from the NMO sections for every station. In particular, relatively strong S-wave reflectors exist in the lower crust at a depth of approximately 20–25 km in the middle part of the aftershock region. Additionally, reflectors were found beneath the fault planes of the main shock and largest aftershock. This suggests a possibility of the correlation of the crustal heterogeneities to the occurrence of an earthquake.