

Joint Inversions for the Source Process of the 2007 Noto Hanto Earthquake with Improved Velocity Structure Models

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The 2007 Noto Hanto earthquake occurred on 25 March 2007 with a JMA magnitude of 6.9. It is one of the largest crustal earthquakes after the 1995 Kobe earthquake. The focal mechanism and CMT solutions mostly indicate reverse faulting. However, the focal mechanism solution includes large strike-slip components than the CMT solution. We performed joint inversions of strong ground motion, teleseismic, and geodetic data by the method of Yoshida *et al.* (1996) and Hikima and Koketsu (2005) to investigate such a complex source process.

We first inverted velocity waveforms of the aftershock by the method of Hikima and Koketsu (2005) to obtain appropriate 1-D velocity structure models to calculate the Green's functions for the strong motion stations, because they are very important for the source process inversion of strong motion data. We then performed source process inversions of velocity waveforms recorded at 10 strong motion stations.

However, because of the location of this earthquake, there is not enough azimuthal coverage of the strong motion stations to constrain the solution. Therefore, we additionally included 18 teleseismic waveforms through IRIS DMC. 8 horizontal static displacements by GEONET were also included to determine a more stable source model. A zone of large slip (asperity) is found near the rupture initiation point on the assumed fault. The rake angles in most of the subfaults indicate reverse dip-slip faulting, but large strike slip components in a deeper part around the rupture initiation point. These features are consistent with the differences between the focal mechanism and the CMT solution. The estimated maximum slip is about 3.5 m and the total seismic moment M_0 is 1.60×10^{19} Nm (Mw 6.7). The asperity coincides with the offshore active faults known previously.