

Crustal deformation derived from the northern Nagano prefecture earthquake detected by InSAR analysis using ALOS-2 data

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ALOS-2, launched by JAXA on 24 May, 2014, is the newest L-band SAR satellite. Applying interferometric SAR (InSAR) analysis using ALOS-2 data to the northern Nagano prefecture earthquake (Mj 6.7, occurred on 22 November, 2014), we succeeded in a mapping a coseismic ground displacement. We used ALOS-2/PALSAR-2 data acquired by both right and left look direction from descending orbits. The interferograms suggest that fault motion of the earthquake has reverse dip slip with left-lateral motion on an east dipping plane. The most concentrated crustal deformation is located in the southern part of rupture area near epicenter of the mainshock, showing displacements toward to the satellite with ~1 m at the maximum. Clear displacement discontinuity is recognized along western margin of the large crustal deformation area, which is just on the Kamishiro fault. We invert the InSAR results with GNSS data to construct slip distribution model of the earthquake. From fringe pattern of InSAR images, we assumed that a fault plane changes dip angle at 2 km depth, low dip angle shallower than 2 km and steep dip angle deeper than 2 km. Our preliminary model shows large (over 1 m) slip on southern part of shallower segment and moderate (~1 m) slip around hypocenter of the mainshock on deeper segment. Both segments demonstrate reverse dip slip with left-lateral motion. On the other hand, no significant slip is estimated on northern part of shallower segment.

Keywords: Northern Nagano Prefecture earthquake, ALOS-2, InSAR