

Coseismic and postseismic deformation and a fault model of the 2014 Northern Nagano Prefecture Earthquake

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Coseismic deformation derived from the 2014 northern Nagano Prefecture earthquake (Mj6.7) was observed by GPS stations of the permanent GPS Earth Observation Network system (GEONET) and ALOS-2/PALSAR-2 interferometric SAR.

We used ALOS-2/PALSAR-2 data acquired by both right and left look direction from descending orbits and right look direction from ascending orbit. 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.

Postseismic deformation was detected by GEONET and ALOS-2 InSAR.

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