

Crustal deformation of the 2016 Kumamoto earthquake sequence (2) - Mainshock -

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Coseismic deformation derived from the 2016 Kumamoto Earthquake sequence was observed by GNSS stations of the permanent GNSS Earth Observation Network system (GEONET) and ALOS-2/PALSAR-2 SAR analysis. We will introduce the crustal deformation and estimated fault model of the Kumamoto earthquake mainshock that occurred on Apr. 16th, 2016 with a Japan Meteorological Agency (JMA) magnitude (M_j) of 7.3.

Clear coseismic displacements due to the Kumamoto earthquake were observed by GEONET. NE displacement of 75 cm and subsidence of 20 cm was detected at the Kumamoto observation station, which is located on the north side of the Futagawa fault. On the south side of the fault, SW displacement of 97 cm and uplift of 28 cm was detected at the Choyo stations.

We have also successfully detected distributed ground displacements for the Kumamoto Earthquake by applying a SAR interferometry, MAI and Pixel Offset analysis of ALOS-2 data. The obtained displacement field shows clear displacement boundaries linearly along the Futagawa, the Hinagu, and the Denokuchi faults across which the sign of displacement component turns to be opposite, suggesting that the fault ruptures occurred there.

We invert the InSAR results with GNSS data to construct a fault model of the earthquake. Our fault model for the main shock suggests that the main rupture occurred on the Futagawa fault with a right-lateral motion including a slight normal fault motion. Due to the normal faulting movement, the northern side of the active fault subsides with approximately 2 m. The rupture on the Futagawa fault extends into the Aso caldera with slightly shifting the position northward. Of note, the fault plane oppositely dips toward southeast. It may be a conjugate fault against the mainly-slipped fault.

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