

Crustal deformation and a fault model of the 2016 central Tottori prefecture earthquake

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The Mj 6.6 inland earthquake occurred on Oct. 21th, 2016 in the central Tottori prefecture, western Japan. Coseismic deformation derived from the earthquake was observed by GNSS and ALOS-2/PALSAR-2 interferometric SAR.

Continuous GNSS observation network (GEONET) is deployed in all over Japan with an average placement interval of approximately 20 km. The displacement field detected by GEONET exhibits NW-SE shortening and NE-SW lengthening around focal area, which is consistent with the focal mechanism of the earthquake. But it remains difficult to obtain detailed displacement field near focal area.

For capturing coseismic deformation of the earthquake, ALOS-2 conducted SAR observations from four different directions, ascending/descending and right-/left-looking. We succeeded in mapping three-dimensional (3-D) displacement using those InSAR data. The 3-D displacement field shows left lateral motion along a NNW-SSE strike fault clearly.

We inverted the GNSS and InSAR data to construct a slip distribution model. Our model shows almost pure strike slip motion on NNW-SSE strike fault plane. The slip distribution model shows a maximum coseismic slip of more than 1 m at a depth of around 5 km, shallower than the epicenter. The estimated seismic moment is 2.64×10^{18} Nm (M_w 6.21) from the slip distribution model.

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