Analysis of the 2016 Kumamoto earthquakes using ALOS-2/PALSAR-2

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An earthquake of M6.5 occurred in Kumamoto Prefecture at 21:26 on April 14, 2016. Following this earthquake, earthquakes occurred at 00:03 on April 15 (M6.4) and at 01:25 on April 16 (M7.3). We report the analysis of such crustal deformation associated with these earthquakes including their aftershocks using the emergency observed data by ALOS-2/PALSAR-2.
There are 13 pairs of data that can be used for InSAR analyses of these earthquakes. One of them is a pair covering foreshocks that occurred on April 14 and 15. There are two pairs covering only the main shock of April 16; three pairs after the main shock; the remaining pair covering both a foreshock and the main shock.
In the image of the pair that contains foreshocks, the southwest area from the two epicenters shows crustal deformation up to 12cm away from satellite in the radar line-of-sight (LOS) direction, displacement up to 9cm toward the satellite can be seen in the northwest area from the epicenter. The simulation pattern of the interferometry fringe, calculated based on source processes of JMA, indicated relatively smaller dip angle fault of NW-dip.
The image of the pair that contains main shock suggests the right-lateral strike-slip fault along the Futagawa fault zone and Hinagu fault zone. Furthermore, more complex phase changes are recognized in the vicinity of the fault zone in the LOS direction.
For some of the pair, we also tried analysis of the intensity image and correlation image. As a result, areas that are assumed to have been heavily damage were detected along the Futagawa fault zone. Details of these analyses are reported together in this poster.
Some of PALSAR-2 data were prepared by the Japan Aerospace Exploration Agency (JAXA) via Geospatial Information Authority of Japan (GSI) as part of the project 'ALOS-2 Domestic Demonstration on Disaster Management Application' of the SAR analysis of earthquake Working Group. Also, we used some of PALSAR-2 data that are shared within PALSAR Interferometry Consortium to Study our Evolving Land surface (PIXEL). PALSAR-2 data belongs to JAXA. We would like to thank Dr. Ozawa (NIED) for the use of his RINC software. In the process of the InSAR, we used Digital Ellipsoidal Height Model (DEHM) based on 'the digital elevation map 10m-mesh' provided by GSI, and Generic Mapping Tools (P.Wessel and W.H.F.Smith, 1999) to prepare illustrations.

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