Ground Deformation around Domestic Active Volcanoes detected by D-InSAR of ALOS-2/PALSAR-2 (2014 -2016)

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Monitoring of volcanic activity by observing ground deformation is one of useful means to understand signs of eruption such as migration and accumulation of magma and volcanic fluids. Japan Meteorological Agency (JMA) monitors volcanic activity by tiltmeter, light wave distance measuring and GNSS around volcanoes. However, there are some problems only using these ground-based observation methods. Observable ground deformation is restricted to point information such as the tilt at the observation point and relative position between observation points. Also, it is difficult to install and maintain observation device due to bad transportation infrastructure at remote mountainous volcanoes, heavy snow and keep-out area by eruptions. It is important to grasp surface ground deformation around volcanoes using not only ground-based observation but also satellite data like SAR (Synthetic Aperture Rader).
PALSAR-2, an L-band SAR on ALOS-2, is useful to understand ground surface state, and its interferometric coherence is highly effective for the ground deformation observation. PALSAR-2 has higher efficiency than ALOS/PALSAR. It is short repeat observation cycle (14days) and has a high resolution sensor and can realize right-side and left-side observation. Therefore, we can use higher resolution and more frequently data. Under the cooperation of Meteorological Research Institute (MRI), JMA conducts D-InSAR using PALSAR-2 data around domestic active volcanoes and analysis results are used for the volcanic activity evaluation and judging eruption alert level such as the activation of Hakone volcano in 2015, the eruption of Kuchinoerabujima, the magma intrusion in Sakurajima (Secretariat of Satellite Analysis Group, Coordinating Committee for Prediction of Volcanic Eruption, 2016). In this presentation, we mainly report on the analysis results of the long-term pair (2014 to 2016.) around the domestic active volcanoes. The results were reported to Coordinating Committee for Prediction of Volcanic Eruption as well as the results of 2014 to 2015 (Ando, et al., 2016).
Some of PALSAR-2 data were prepared by the Japan Aerospace Exploration Agency (JAXA) via Coordinating Committee for the Prediction of Volcanic Eruption (CCPVE) as part of the project ‘ALOS-2 Domestic Demonstration on Disaster Management Application’ of the Volcano 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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