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The Eruption Activity in 2011 at Kirishimayama Sinmoedake volcano revealed by ALOS

Shinobu Ando[1*], Toshiyuki Sakurai[2], Yoshiaki Fujiwara[2], Keiichi Fukui[1]

[1]MRI, [2]Volc,JMA

On January 19th in 2011, a minor phreatomagmatic eruption occurred at Shinmoedake in Kirishimayama volcanoes group, located along the border between Miyazaki and Kagoshima prefectures. This eruption moved into the essential magma eruption in the afternoon on the 26th January. At 18:00, alert level was raised from 2 to 3, transitioning the volcano into a period of possible high activity (Target area had changed from the area around the crater to non-residential areas near the crater). In the morning on the 28th January, a lava dome in the summit crater was confirmed by aerial survey over Shinmoedake. Volcanic activity has been continuing since then, and alert area has been extended to 4-kms radius from the summit (as of March, 1st).

ALOS has the L-band SAR (PALSAR), which is not affected by plume and cloud, and is independent of day and night. In general, when eruptive activity becomes active, we cannot see craters by smoke and/or plume directly. ALOS/PALSAR penetrates cloud and/or plume and can grasp the state inside the crater. As a result, it is one of the most available methods to grasp the changes caused by volcanic activity.

Meteorological Research Institute analyzed amplitude images at Shinmoedake before and after eruptions. Results by ascending orbit revealed the existence of lava fragments inside the summit crater on the night of 27th January. We detected that the maximum size of lava fragments at this point measured 100m wide, and that it grew up to an approximately 500m diameter on the night of 29th January. Also, results by descending orbit confirmed that lava fragments kept almost the same size in the morning on the 30th January. After that, the state of lava fragments inside the crater has remained unchanged through several explosive eruptions. We also are going to report some analyses by optics sensor.

Some of PALSAR data used in this report were prepared by ALOS 'Daichi' Domestic Demonstration on Disaster Management Application that CCPVE. Also, some of PALSAR data were prepared by PIXEL (PALSAR Interferometry Consortium to Study our Evolving Land surface). PALSAR DATA belongs to JAXA/METI (Japan Aerospace Exploration agency/Ministry of Economy Trade and Industry). We would like to thank Dr. Shimada (JAXA) for the use of his SIGMA-SAR software. In the process of the InSAR, we used 'the digital elevation map 50m mesh' provided by GSI (Geological Survey Institute) and some figures were made using GMT (P.Wessel and W.H.F.Smith, 1999). We are also grateful to Dr. Okuyama (HVO) and Dr. Miyagi (JAXA) for the advice of drawing method by GMT.

Keywords: ALOS, Kirishima Shinmoedake, SAR, PALSAR, AVNIR-2