

Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

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SVC070-P28

Room:Convention Hall

Time:May 23 16:15-18:45

SAR data analysis for 2011 Kirishima-yama (Shinmoe-dake) eruption

Taku Ozawa^{1*}

¹NIED, Japan

Volcanic eruption of Shinmoe-dake, Kirishima-yama, began in January 2011. To investigate volcanic activity of Kirishima-yama, we analyzed satellite synthetic aperture radar (SAR). First, we investigated temporal change of the crater from SAR images. PALSAR image of January 27 showed that the crater lake had disappeared, and lava was identified in PALSAR data of January 29. It rapidly grew until January 31, its extrusion rate was estimated to $7.7 \times 10^6 \text{ m}^3/\text{day}$. After that, it seems that volume change of lava was negligible but that surface configuration of lava changed associated with eruptions. Next, we investigated crustal deformation applying Interferometric SAR technique (InSAR). Slant-range shortening indicating the inflation in the west of Kirishima-yama was detected from ascending and descending interferograms for pre-eruption period, and it changed to slant-range extension indicating deflation in the co-eruption period. Their results corresponded to results of GPS observations. After February 1, significant deformation was not detected. In the ascending interferogram generated from 2008/2/12 and 2011/2/20 PALSAR data, 12cm slant-range shortening was found in the southeast of Shinmoe-dake. Its area corresponds to the area where volcanic ash accumulated thickly. So we assume that its slant-range change was due to accumulation of volcanic ash, and we estimate its thickness. Estimated thickness was in good agreement with result of field investigation of volcanic ash by NIED and ERI, the University of Tokyo.

Keywords: SAR, Kirishima-yama, eruption, lava, deformation, volcanic ash