

Temporal change in the Shinmoe-dake crater detected by SAR analysis

OZAWA, Taku^{1*}, MIYAGI, Yosuke¹

¹NIED

In the 2011 Shinmoe-dake (Kirishima-yama) eruption, lava appeared in the crater, and the topography in the crater was changed significantly. We analyzed SAR images acquired by several satellites and revealed that lava in the crater had rapidly grown during January 29 until January 31. Its extrusion rate was estimated to 7.5 million m³/day, and volume of lava reached to 15 million m³ at January 31. After that, lava was covered by volcanic ejecta, and it seems that volume in the crater slightly increased from that of January 31, according to SAR images which were acquired in March.

A small eruption occurred on September 7 and has not been observed after that. To investigate change in the crater after the last eruption, we applied SAR interferometry using four RADARSAT-2 data which were acquired every 24 days from November 22. High coherences were obtained in and around the crater. Significant phase differences were obtained in the crater, indicating the sum of the phases due to the topographic change and surface deformation. So we divided it based on the assumption that deformation speed has been constant. Volume of ejecta accumulated in the crater (including lava) was estimated to 20 million m³, indicating that volume change from March was insignificant. Estimated surface deformation component indicates that the slant-range contraction has occurred; its speed was 5cm/24days. Assuming its slant-range change to be uplift, volume change rate is estimated to 275m³/day.

Keywords: Shinmoe, Kirishima, crater, SAR, deformation, lava