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Monitoring of Sakurajima Volcano using Cosmo-SkyMed

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Shinmoe-dake in the Kirishima volcano group is located in southwestern part of Japan. In January 2011, eruptive activities started from the Shinmoe-dake crater with a rapid accumulation of lava within the crater. GPS and DInSAR data revealed pre-eruptive inflation, co-eruptive deflation, and post-eruptive inflation. The eruption phase ceased by the beginning of September, and the post-eruptive inflation also ceased by November 2011. After the 2011 eruption, we have continued to monitor the Shinmoe-dake by using RADARSAT-2 and TerraSAR-X. A surface deformation on the lava within the crater after September 2011 revealed a continual shortening of satellite-ground distance even after the end of the main activity. This LOS shortening means uplifts of the lava surface. We estimated the volume increase of the lava after November 2011, using DInSAR processing of TerraSAR-X data, and concluded that the volume increase still continued in December 2012. The volume change rate has decreased with a small fluctuation as an overall trend. PSInSAR and long-term DInSAR results helped us to know deformation around the crater. They show LOS elongation including a subsidence in the northeast flank of the crater. It is interpreted that the subsidence is caused by a deflation of shallow deformation source located just beneath the crater. PSInSAR results also revealed that the subsidence ceased in October 2012. It is interpreted that volume of injection and effused lava achieved an equilibrium condition.

Keywords: SAR, Kirishima, Shinmoe-dake, Crustal Deformation