

InSAR Detection of the Mt. Aso Volcanic Crater Activity at the event of Sept 14 2014 Eruption

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Synthetic Aperture radar can observe the earth surface with high resolution by the multiple transmission and reception of microwave signals. Since the microwave in L-band is not affected by the weather condition and the eruption ashes, it is adequate to detect the surface deformation from the space. This research will detect the deformation of the volcanic mountain by using the interferometric SAR technique. InSAR measures the differential distance between the satellite and the target between two different observations (dates) and visualization allows the accurate measurement of the distance. This research will detect the volcanic subsidence of the crater using this method and PALSAR-2 data, which was developed and operated by the JAXA since May 24, 2014.

Mt. Aso has been active for these years and had a small-scale eruption on Sept. 14 2014. PALSAR-2 data of UB mode with 85 MHz single polarization were acquired on Sept. 7 and 21 covering these areas, and were InSAR processed (including the atmospheric correction). It was found that there were three small subsidence areas western part of the main volcanic crater. Three these areas had 5cm subsidence in average vertically. This can be interpreted as that the eruption of the magma could reduced the mass of the magma. Validation of the results has been conducted using the GPS data acquired at three points by GSI and NIED, and measured the RSSE of 2.345cm. It can interpreted that the eruption of Sept. 14 2014 were observed by two adjacent PALSAR-2 images as the subsidence of 6.06 cm, the loss of the coherence at the crater area, and resultant loss of the mass were estimated, and thus the mountain could be shrunk.

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