Lava dome deformation at Unzen dolcano as viewed from ALOS PALSAR Interferometry

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At the Unzen Volcano, after the small eruption from summit in September 1990, the lava dome was appeared and pyroclastic flows occurred frequently resulting from collapse of the dome since February 1995. The dimension of the lava dome (called Heisei-Shinzan) was 1000m X 500m and the thickness was 230m approximately. The extrusion of lava was almost terminated by the beginning of 1995 and contraction and sinking were observed after that. This study shows that ALOS PALSAR interferometry detected the deformation of the lava dome.

ALOS (Daichi), launched in February 2006, has L-band SAR (PALSAR) and the sensor has many advantages to analyze the crustal deformation around volcano areas using InSAR. In this study, we use one pair of images captured at August 26 and October 11, 2006 (interval 46days), took from westward, and the perpendicular baseline was 620m. The SAR data were processed using the JAXA/SIGMA-SAR software [M.Shimada,1999]. The coherence of two images were very good and nice interferometry image was created. The turbulence caused by water vapor was observed, but it could be removed by subtraction the value calculated from terrain height.

Interferometry image shows that the deformation of the lava dome was several centimeters in the direction that went away from the satellite. MRI observed the deformation of lava dome using GPS receivers with Fukuoka district Meteorological observatory and (former) Unzen weather station. The result of observations shows several tens centimeters per year. This result is consistent with InSAR observation.