

Monitoring of Active Volcanoes in Kyushu by the Interferometric SAR and Optical Sensors

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We have planned a monitoring project of active volcanoes in the Kyushu district using satellite remote sensing techniques such as interferometric synthetic aperture radar (InSAR) and optical sensor. In Kyushu, there are two major volcanic zones - `Beppu Shimabara rift` zone contains Mt. Kuju, Mt. Aso and Mt. Unzen and `Volcanic front line` on which Mt. Kirishima and Sakurajima etc. range. We investigated and summarized the surface activities after the 1990s in and around each volcano using various satellites data - LANDSAT, SPOT, JERS-1, ERS1/2, RADRAST, ENVISAT.

(1) Mt. Unzen in Shimabara peninsula have erupted from 1990 to 1995. We detected thermal anomaly due to the upwelling lava and visualized damaged area caused by the debris and pyroclastic flow in the east side of the summit using LANDSAT TM data. Using JERS-1 InSAR, deflation deformation near summit crater was clearly detected.

(2) Mt. Kuju erupted in Oct. 1995. Time series of crustal deformation were obtained by JERS-1 InSAR data acquired from 1992 to 1998. Two visible circular fringes were extracted at the north-eastern flank of Mt. Hosho. Extension of the line-of-sight displacement was observed by InSAR and the amount of the displacement was nearly 18cm during Apr. 1996 to Sep. 1998. Such movement suggested inflation that was likely occurred by over effusion from the upper part of the geothermal system.

(3) Mt. Aso and Mt. Sakurajima: We analyzed RADARSAT C-band InSAR data around Mt. Aso acquired in 2002 and verified its good coherence over the whole area including summit craters and grassy plains. HH polarization is seemed to be not so sensitive to interferometric decorrelation of the surface due to the vegetation and so on. Then, we have just started new continuous observations by ENVISAT ASAR with HH polarization in the wide areas including Mt. Kuju, Mt. Aso, the Kumamoto plain, Mt. Kirishima and Mt. Sakurajima. We attempt to detect subtle deformations around Mt. Aso and subsidence of Kumamoto plain. Also, we have a great interest in Mt. Sakurajima in which remarkable deformations have been detected by JERS-1 InSAR in and around Sakurajima island.