

Crustal deformation of Iwojima volcano detected by SAR interferometry and GPS observations

Hiroshi Yarai[1], Makoto Murakami[2], Taku Ozawa[3], Mikio Tobita[1], Hiroyuki Nakagawa[4], Satoshi Fujiwara[5]

[1] GSI, [2] Crustal Deformation Lab., The GSI, [3] JSPS/GSI, [4] Space Geodesy Lab., GSI, [5] MLIT

Iwojima volcano is located in the Izu-Bonin islands arc, about 1250 km south of Tokyo. Small phreatic eruptions occurred more than 15 times in Iwojima volcano since 1889. Crustal deformation has occurred on a remarkable scale at the volcano. By geodetic and photogrammetric survey, the northeast coast of the island uplifted about 9-m from 1952 to 1968. We tried to comprehend the deformation field of Iwojima volcano by SAR interferometry and campaign GPS observation. We processed 20 different pairs of JERS-1 SAR data spanning 1992 to 1998. JERS-1 SAR interferometry well detected deformation of Iwojima volcano. The concentric circular fringes around Motoyama, northeastern Iwojima Island, can be seen at most interferograms in this study. The length of sight (LOS) from JERS-1 satellite was increasing constantly between 1992 and 1998. The other area in Iwojima Island, the fringes patterns of the interferograms were not constant but changed episodically. We built preliminary models of the circular fringes around Motoyama by the Mogi model. Numerical modeling indicates that the deflation source is located at shallow depth, about 1.5 to 3 km. After ending mission of JERS-1, the most recent phreatic eruptions occurred at September 21-22 and November 19, 2001. To appear the deformation field of Iwojima volcano after the most recent phreatic eruptions, we have started the GPS campaign observation at 17 stations in the Iwojima volcano since August 2002. The GPS campaign observation stations have been observed at 3 months interval. The shrinking of Motoyam and the inflation of Chidoriga-hara were detected by GPS observations at August and November 2002. The feature of deformation appeared by GPS observation is similar to interferograms from JERS-1 InSAR. We will try to explain deformation field all over Iwojima volcano by combination interferograms with GPS observation results.