Crustal deformation of Iwojima volcano detected by GPS observations

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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. The most recent phreatic eruptions occurred at September 21-22 and November 19, 2001. The GEONET system detected remarkable uplifting of Iwojima before 9/21 eruption. But, the GEONET data are not enough to estimate deformation source because we have only two GPS observation stations in Iwojima.

To appear the deformation filed 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 campaign GPS observations. The stations around Motoyama have displaced constantly. In contrast, the speed of displacements around Chidoriga-hara is not constant but decreasing with time. These features of deformation appeared by GPS campaign observations is similar to interferograms from JERS-1 InSAR (Yarai et. al., 2002).

We constructed a preliminary model for the deformation field of Iwojima. The deformation field can be explained by two sources, a deflation point source beneath the center of Motoyama and a tensile fault beneath Chidoriga-hara. The location of the deflation source estimated from GPS observations has little relocated since starting campaign GPS observations. We will try to explain deformation field all over Iwojima volcano by combination campaign GPS observations with previous observation results of GEONET.