

Crustal deformation around Mt. Karakuni, Kirishima volcanoes, revealed by JERS-1 SAR interferometry

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In recent years, Japanese nationwide GPS network (GEONET) has revealed the detailed crustal deformation field around Japan, but the investigation of volcanic activity needs spatially denser information. SAR interferometry can detect the crustal deformation field with the resolution of several ten meters, and is useful for such investigation. In this presentation, we will show the crustal deformation around Mt. Karakuni, one of the Kirishima volcanoes, derived from SAR interferometry. SAR data used in this study were acquired at Jan. 13, 1994 (Master) and Mar. 2, 1997 (Slave), and the crustal deformation derived from this pair is the line-of-sight direction (LOS) component of displacement for a period of 1144 days. The concentric fringes appeared around northwestern area of Mt. Karakuni, and its diameter was about 500 m. The center of deformation area was near Iwo-yama, and LOS component of displacement is about 12 cm to the direction that left from satellite. If this point moved to vertical direction only, this displacement was consistent with about 15-cm subsidence. We attempted to estimate the parameters of deformation source from the crustal deformation field applying Mogi model [Mogi, 1958]. The estimated source depth and volumetric change were about 200 m and about $4.0 \times 10^4 \text{ m}^3$, respectively. Though the factor inducing this deformation can not clear from the geodetic measurement, we suspect that this is related to the volumetric change of groundwater. Because estimated source depth is consistent with the upper depth of aquifer [Kagiyama et al., 1996].