

Crustal deformation since eruption in 2000 at Miyakejima by GPS observation

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Densely GPS observation network was constructed cooperate with University of Tokyo, Kyushu University and Nagoya University since 1995 at Miyakejima volcano, Izu Islands. GPS Campaign observation was carried out for next Miyakejima eruption every year. Rapid static survey was carried out at about 40 fiducial points of Tokyo Metropolis. Maximum of 70cm displacement was observed at the eruption in June 2000. Sign of magma intrusion from southwest to western part of Miyakejima was grasped in detail by amounts of displacement at these points of observation. However, we lost many fiducial points because of eruption disaster and reconstruction work after the eruption. In addition to that, the Universities stopped continuous stance for observation and research at Miyakejima. As the result, the GPS observation was kept stopping since 2002. Presently, detailed crustal deformation at Miyakejima cannot obtain because there were only four GEONET sites of GSI. It was difficult to grasp in detail circumstances of Miyakejima volcano. Therefore, we carried out GPS campaign observation at Miyakejima in September 2011. We aimed to grasp detailed crustal deformation since 2000 eruption at Miyakejima, to get data of basis of the next eruption activity.

We carried out static and rapid static measurement at this time GPS campaign observation. Static measurement was carried out fifteen observation points at Miyakejima on September 6-9, 2011. Among these, the existing observation point is eight points and a newly establishing point is seven points including five observation stations of NIED. Rapid static measurement was carried out along ring road at Miyakejima on September 8. By this rapid static observation, the level point 1004 located in the south of an island was made into a base station. Observation for about 10 minutes was carried out for 22 points of a public fiducial point in sampling interval 5 seconds.

The data derived from observation on September 2011 and January 2001 was analyzed by RTK-LIB (Takasu et al. 2007). The data of two GEONET sites of GSI and GPS precise ephemeris from IGS were also used. As the result, horizontal deformation from January 2001 to September 2011 was shown shrunk tendency toward the center of Miyakejima. Pressure source was estimated based on data of crustal deformation. Deflation source of $1.6 \times 10^7 \text{ m}^3$ was estimated at the depth of 4km directly under Mt. Oyama. However, there were major differences from observed value to calculated value at the west side observation points of the island. Therefore, it is necessary to calculate more complicated model. The accumulation of data is important in order to prepare for next eruption.

Keywords: Miyakejima, GPS, Crustal Deformation