

Rapid Deformation Caused by Dike Intrusion in The Miyakejima Volcano on June 26-27, 2000 : Results of Kinematic GPS Analysis

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The 2000 Miyakejima Volcano eruption started with an earthquake swarm in the southern part of the volcano at 6:30 p.m. on July 26, 2000. A small submarine eruption which ejected 5×10^{-6} km³ materials was occurred 1.5 km off the western coast of Miyakejima at 9 a.m. on June 27. On July 1, large earthquake of magnitude 6.4 occurred at the east offshore of Kozu and many earthquakes were observed in the area between the Kozu Island and Miyakejima Islands. Ground deformations over 30 cm was also observed at Kozu Island by continuous static GPS measurements. It suggested the existence of a large dike intrusion between the Miyakejima and Kozu Islands. During the great dike intrusion between the Kozu and Miyakejima Islands, Miyakejima volcano was erupted on July 10, August 18, and 30. Especially, the eruption column of August 18 reaches to a height of 18km. Strikingly, before this large eruption, a caldera with 1km wide was formed and volcano gas on massive scale was spouted from the caldera.

We used thirty seconds kinematic GPS analysis to study rapid deformation of Miyakejima Volcano at June 26-27, 2000. We found that the first ground deformation toward east and uplift was observed in the southeastern part of the volcano at 6:30 on June 26 (JST). Model of the GPS data indicate that this deformation was caused by dike intrusion in south flank of Miyakejima volcano summit crater with shallow depth. We found that after this intrusion the magma was moving to western part of Miyakejima island and created opening crack few hours prior to the submarine eruption.