

Repeated GPS measurements and ground tilt observation in Kuju Volcano

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We have been conducted the observation of ground deformation with the single frequency GPS receivers and high precision tiltmeter to detect the three dimensional ground deformations caused by the 1995 eruption. Contractions of baseline up to 15mm, were detected from April 1999 to July 2000. The pressure source is estimated to be A region (one of the pre-existing fumarolic fields) and approximately 700m in depth. The observed tilt was 6 micro radian down in southeasterly direction from 9 October 2000 to 4 December 2000.

Kuju volcano, central Kyushu, began, to erupt on 11 October 1995. And the second eruptions occurred in December 1995. After that no eruptions occurred, but crater activities still continue. We have been conducted the observation of ground deformation with the single frequency GPS receivers and high precision tiltmeter to detect the three dimensional ground deformations caused by the 1995 eruption.

Repeated GPS measurements

GPS survey began from April 1999 at 5 observation points, to clarify ground deformation caused by the 1995 eruption. We have conducted the GPS observation 5 times up to the present. We used the single frequency GPS receivers (TOPCON GP-SX1). The session length is 1 hour and the sampling interval is 10 seconds, and GPS Software Win S/D Ver.1.31 is used for the baseline analysis. We repeated the session any number of times (10-20 times) every observation point.

Contractions of baseline up to 15mm, were detected from April 1999 to July 2000. Horizontal displacement vector is toward westerly direction in some stations (HOKORA, IW3) near the pre-existing fumarolic fields. Applying a point source model on the change in length of baselines, the location of a pressure source is estimated to be A region (one of the pre-existing fumarolic fields) and approximately 700m in depth.

Tilt observation

We used Pinnacle Technologies high precision borehole tiltmeter (5500 series). The tiltmeter site is located north mountainside of Mt. Hossyo and drilled 12m in depth.

We eliminated the effect of earth tide using BAYTAP-G (Ishigro et al, 1984). The observed tilt was 6 micro radian down in southeasterly direction from 9 October 2000 to 4 December 2000. This direction is toward the pre-existing fumarolic fields and a pressure source estimated from repeated GPS measurements.