

Hypocentral distribution of the volcanic earthquakes at Kusatsu-Shirane Volcano

Mio Hori[1]; Yuhki Kohno[1]; Takeshi Matsushima[2]; Hiroshi Shimizu[2]; Shin'ya Onizawa[3]; Jun-ichi Hirabayashi[4]; Kenji Nogami[5]; Tomoki Tsutsui 2003 Kusatsu-Shirane Volcano Seismic Experiment Group[6]

[1] Grad. Sch. Sci., Kyushu Univ.; [2] SEVO, Kyushu Univ.; [3] VFRC, TITECH; [4] VFRC, Tokyo Inst. Tech.; [5] Kusatsu-Shirane Volcano Obs., TIT; [6] -

<http://www.sevo.kyushu-u.ac.jp/>

Kusatsu-Shirane Volcano is an active volcano located in the central part of Honshu, Japan, and it has repeated the phreatic explosions in the vicinity of the Yugama, Mizugama, and Karegama craters in recorded history. The volcanic earthquakes which occur inside the volcanic edifice have also concentrated under the craters (e.g., Ida et al., 1989). These suggest that the occurrence of volcanic earthquakes is related to the hydrothermal activity under the craters. Therefore, it is important to determine precisely the hypocenter of these earthquakes, for clarifying the hydrothermal system and eruption mechanism of the volcano. In this study we show the hypocentral distribution revealed by the temporary seismic observation in the summit area of Kusatsu-Shirane Volcano.

The temporary seismic observation was carried out in the seismic experiment of Kusatsu-Shirane Volcano from September to October 2003. More than a hundred seismic stations were deployed in the experiment, and about 30 volcanic earthquakes were recorded in addition to three artificial explosions. Those were comparatively high frequency volcanic earthquakes of which the predominant frequency was 8-10Hz with the amplitude of about 1×10^{-6} m/s. The data from the 10 seismic stations in the vicinity of the summit were used for the hypocenter determination. We presumed the horizontal stratified structure from the travel time distribution obtained by the seismic experiment, and used it in the hypocenter determination.

The results show that the hypocenters are concentrated beneath the summit craters, which is similar to the results of previous studies. While, the depth of the earthquakes obtained in this study is shallower than 500m, which is different from the previous results of about 1km below the surface. Our result is thought to be more accurate than the previous ones, because a more realistic model of the velocity structure was used and because the onset time of the S-waves was read from the records of the 3-component seismometer which had been installed above the source region.