

Volcanic Activity at Mt. Kusatsu-Shirane in the Fall of 2004

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Mt. Kusatsu-Shirane is one of active volcanoes in Japan and located in NW part of Gunma prefecture. In the historical time, the activities are characterized by geothermal activities such as fumaroles and hot springs, and frequent phreatic explosions. In order to understand such phenomena, continuous geochemical and geophysical monitoring has been conducted by Volcanic Fluid Research Center, Tokyo Institute of Technology.

In the fall of 2004, eruptions of Asama volcano and Niigata Chuetsu earthquake occurred in the surrounding area of Kusatsu-Shirane volcano. In the period, anomalous phenomena such as change of water level and increase of floating sulfur at crater lake Yugama, and increase of N-type earthquake occurrence were observed at Kusatsu-Shirane volcano. In order to understand the current state of the volcanic activity and to forecast future, it is important to grasp such phenomena. In the presentation, we describe the recognized phenomena in the fall of 2004, compare these to other kinds of monitoring data, and try to evaluate the current state of the volcanic activity.

On Sep. 5, four days after the first eruption of Asama volcano in 2004, two N-type earthquakes were observed at Kusatsu-Shirane volcano. In the middle of October, anomalous rise of water level occurred at the crater lake Yugama without rain fall. The total amount of rise was about 1 m, which indicates the mass increase of the lake water reached almost 10 % of total mass. About 2 cm drop of the water level was observed at the time of Niigata Chuetsu earthquake occurrence on Oct. 23. Increase of floating sulfur on the lake surface was distinctly recognized in the early of November. The seismicity at Kusatsu-Shirane volcano increased after the earthquake. The frequency of the N-type earthquake also increased until the middle of December. Average occurrence rate from the end of October to the middle of December was about once per two days. These phenomena imply change of the activity of the volcano by the external factors such as magmatic activities of Asama volcano and Niigata Chuetsu earthquake.

On the other hand, distinct changes of chemical compositions of the crater lake and a fumarole were not detected during the period. Drastic temperature changes at the lake, fumaroles and Mizugama ground surface were not also observed. These imply increase of material and heat supplies from magma at depth did not occur.