Relocation of microearthquakes at Kusatsu-Shirane volcano

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Mt. Kusatsu-Shirane is a quaternary volcano situated in the central part of Japan. Its major activity in the past 3000 years consists solely of recurrent phreatic explosions around the craters (Yugama, Mizugama and Karagama, etc). Recent explosions occurred in 1976, 1982, 1983. Even now the volcano maintains fumarolic and seismic activity around these craters. In 2008 new fumarole was also found at the northeastern wall of Yugama crater (Nogami et al. 2008). We have monitored the seismic activity of the volcano with several stations including three borehole ones since 2001 (Mori et al. 2006). Good signal-to-noise ratio data at the borehole stations enable us to locate microearthquakes of which magnitudes are about -2. Previous studies revealed two seismic clusters, one located under Yugama and Mizugama, and the other located to the south of these craters (Mori et al. 2006). Yamawaki et al (2007) searched for repeating similar earthquakes within these microearthquakes based on the waveform similarity. They indicated the existence of three major groups of similar earthquakes. Two of the groups reside around Yugama-Mizugama crater and the rest in the southern seismic cluster. Locations of repeating similar earthquakes can be determined precisely by using relative arrival time difference within such events. Recently, Waldhauser and Ellsworth (2000) developed a double-difference method, and precise relocation has revealed lineation of earthquakes along faults. At Kusatsu-Shirane volcano, it is very important to know the location of hypocenters precisely, in order to monitor the volcanic activity and to prepare for future eruptions. Therefore, we relocate the microearthquakes around Kusatsu-Shirane volcano, and compare the result with the recent surface activities.