

Imaging of the volcanic activity process beneath the Yugama crater at Kusatsu-Shiranesan volcano

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Around the Yugama crater at Kusatsu-Shiranesan, seismic activity, crustal deformation, and other fluctuations have appeared since 2014, and activity has increased. Although a small phreatic eruption occurred at the Moto-Shiranesan crater in 2018, no eruption has occurred from the Yugama crater. The 1983 eruption from the Yugama crater was the last one.

At the Yugama crater, various observations have been conducted since around 1970. From the viewpoint of medium- to long-term activity evaluation, volcanic activity in the past several decades was examined comprehensively by collecting and organizing past geochemical and geophysical observations and research results.

The volcanic phenomenal sources estimated by various observations were plotted. Most of the pressure sources obtained by GNSS and EDM (Takagi et al., 2018), the demagnetization sources obtained by repeated measurements of total magnetic intensity (Takahashi et al., 2014) and the hypocenter of volcanic earthquakes were located in the same area on the northeast side of Yugama crater. The hypocenter was located at an altitude of around 1000 m above sea level, but the pressure sources and demagnetization sources were located at shallower than the earthquake occurrence area. Nurhasan et al. (2006) showed that a low resistivity layer exists in this region shallower than the altitude of around 1000 m above sea level, and proposed that a fluid reservoir exists below this layer.

Based on these observations and the spatio-temporal relationship of various phenomena those have been repeated at the shallow part beneath the Yugama crater, we tried to build a conceptual model of the activity process from the viewpoint of the inflow and outflow of volcanic fluid around the fluid reservoir (Hirabayashi, 2000). And then we consider how to monitor and evaluate volcanic activity of Kusatsu-Shiranesan.

Keywords: Kusatsu-Shiranesan, Yugama crater, phreatic eruption, fluid reservoir