

Shallow volcanic Structure of Kusatsu-Shirane volcano

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The chemical compositions and emission rate of acidic hot spring water and volcanic gas around the Kusatsu-Shirane volcano suggest that the high temperature volcanic gas from the magma formed vapor-liquid phase reservoir at beneath of the summit crater. The location and depth of the reservoir, however, could not know from the chemical information. The volcanic structure include of geothermal system is one of the most important factor to know the eruption mechanism.

The seismic exploration, audio-magnetotelluric observation, high density electric sounding observation, leveling, GPS surveying, microgravity survey, geomagnetic total force observation and so on have been done to clear up the volcanic structure of Kusatsu-Shirane volcano.

Volcanic gas from the magma is ascent to under the Mizugama crater. The gas formed two-phase reservoir about 300 m depth of the crater. The reservoir has low resistivity, and low frequency tremor is occurred in this reservoir. Gas phase of the reservoir is discharged as fumarolic gases from the summit and flank of the volcano. And the liquid phase is flowed out as hot spring waters around the flank. It is considered that the upper and lower surface of the reservoir is correspond to the low frequency tremor zone and the bottom of the sinking associated with negative gravity anomaly, respectively.

A little high resistivity (LHR) zone under the reservoir is present until 1500m of depth. Seismic activity, changes of geomagnetic total force associated with volcanic activity is occurred in this LHR zone. And pressure source of ground deformation exists under the 1 km of the summit near the LHR zone.

The volcanism of Kusatsu-Shirane volcano is cleared by the shallow volcanic structure which is obtained with joint observation.