

## Relation between flow of geothermal fluids and occurrence of microearthquakes in hydrothermal systems

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Microseismic observations have not been always conducted in order to clarify the hydrothermal system in the volcano, although geothermal and resistivity measurements have been successfully applied to many volcanoes.

However, the clear relation between microseismic activity and geothermal fluid flow is detected at some of land and submarine volcanoes. In this paper two examples are shown in the following.

The first example is the case of the fumarolic field of Kuju volcano, central Kyushu, Japan. We detected an active seismic zone down to 1.5km deep just beneath the fumarolic field. Numerical modeling clarified the high temperature two phase volcanic geothermal reservoir beneath the fumarolic field, that is, the zone of the uprising fluid flow is seismic active. The numerical model also shows that the reservoir pressure is higher than that of the surrounding recharge zone. We think that the seismic activity is originated in such higher reservoir pressure. However, we did not detect the seismic activity in the recharge zone.

The second example is the case of a submarine volcano at the East Pacific Rise(Tolsty et al.,2008). They detected also an active seismic zone down to 1.5km below the sea bottom. Their results show that the most active seismic zone is in the recharge zone of sea water and the intermediate seismic active zone is in the heating zone of downgoing sea water. They detected also a weak seismic activity in the discharge zone.

The above two examples show close relation between seismic activity and geothermal fluid flow. But the physical meanings of the relation are very different between two cases. We must consider the tectonic stress concerned, the subsurface structure, the thermal and pressure states of the reservoir and other parameters etc., in order to clarify the relation between the seismic activity and the hydrothermal system.