

## Hydrothermal systems of Izu-Oshima Volcano inferred from AMT surveys

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Izu-Oshima is one of the most active volcanoes in Japan and caused much serious eruption disaster frequently. It is required to carry out the monitoring of the volcanic activity appropriately and to predict the time and the place of a future eruption correctly. During the latest eruption in 1986-87, various phenomena indicating interaction between magma and ground water were observed as magma ascended and descended. In order to raise the accuracy of prediction of volcanic activities in future eruptions, it is important to get to know the development process of the hydrothermal system accompanying magmatic intrusion. Hence, we conducted AMT (audio-frequency magnetotellurics) measurements at 18 sites along two ENE-WSW profiles traversing Izu-Oshima volcano in 2006 and 2007 to investigate the resistivity structure of the hydrothermal system beneath the Izu-Oshima volcano.

In these surveys, we used four Phoenix MTU-5A (5-channel) systems to correct the time series data for electric and magnetic fields at two or four sites simultaneously. The data were analyzed by remote reference processing to estimate MT quantities such as apparent resistivity, phase and induction vector for frequencies between 0.35 and 10400 Hz. In general, the data quality was very good for all sites. At high frequencies more than 100 Hz, the induction vectors near Mt. Mihara point to the Mihara crater. This indicates the existence of a shallow conductor there. From distribution of the induction vectors and the tensor decomposition of AMT impedance, we decided the two-dimensional strike to be N40W. The AMT data were rotated to the direction and the orthogonal direction to obtain apparent resistivities and phases of the TM and TE modes and 2-D analyses were done for two profiles.

The analyzed resistivity models are basically interpreted as a two-layer structure; an upper resistive layer and a lower conductive layer. Because the boundary of the two layers corresponds to a sea level nearly, the low resistivity may be due to sea water which has invaded under the volcano. The lower conductive layer gets shallower beneath the caldera area. It indicates that the sea water gets shallower there. Moreover, the high temperature beneath the caldera area may lower the resistivity further. The near-surface resistive layers correspond to unsaturated scoria and lava layers. However local conductive regions are found near the surface in the northeast and southwest parts of the Mihara crater. In these areas, geothermal manifestations such as fumaroles (steaming vents) are observed at the surface and SP (self potential) shows high values locally. It seems that the conductive regions reflect the rise regions of geothermal fluid.