A shallow resistivity structure of Kuju volcano, central Kyushu, Japan

Wataru Kanda[1]; Mitsuru Utsugi[2]; Yoshikazu Tanaka[3]; Yasuaki Okada[4]; Hiroyuki Inoue[5]; Shogo Komori[4]; Tsuneomi Kagiyama[6]

[1] DPRI,Kyoto Univ; [2] Kyoto Univ.; [3] Aso Volcanological Laboratory Kyoto Univ.; [4] Earth and Planetary Sci.,Kyoto Univ; [5] AVL, Kyoto Univ.; [6] Graduate School of Science, Kyoto University

Kuju volcano is a composite volcano, consisting of more than 20 lava domes or cones, located on central Kyushu, Japan. In Oct. 1995, a phreatic explosion occurred after a few hundred years of dormancy with opening of several new vents at the eastern flank of Mt. Hossho, one of the domes of the Kuju complex. The new vents were located about 300m south of a pre-existing fumarolic field called Iwo-yama. Although seismicity around Mt. Hossho showed a decreasing tendency after 1995 to 1996 eruptive activities, fumarolic activity around Iwo-yama has been still in high level. Total intensities showed rapid increase at sites located south of the pre-existing fumarolic area, while it decreased at a site located north, indicating that magnetization of the volcanic rocks occurred beneath around Iwo-yama area by cooling.

We conducted Audio-frequency Magnetotelluric surveys in 2005, 2006, and 2008 around Iwo-yama area. The data were successfully collected at 25 locations and interpreted by 2-D inversion. Following features of resistivity structure were obtained. (1) High resistivity of several hundreds to a thousand ohm$*$m is found near the surfaces of the profile, which correspond to the andesitic lavas of Mt. Hossho and Nakadake. (2) Conductive layer of less than 3 ohm$*$m is seen at the depths between 200m and 600m beneath the northern flank of Mt. Hossho and beneath Naka-dake. This conductive layer is mainly composed of hydrothermally altered rocks and also contains ground water. It appears to be shallower near the fumarolic area, indicating that high temperature zone is inflated due to higher heat flux related to intense fumarolic activity of Iwo-yama.(3) Relatively resistive zone of 10 - 30 ohm$*$m lies beneath Iwo-yama area. Magnetization source is located at this part. Since the highest fumarolic temperature still exceeds 200 degrees, this less conductive body may be vapor rich zone. Gravity data suggested that a great amount of water has flowed into the shallow part beneath the pre-existing fumarolic area. The estimated resistivity section is consistent with this idea.