Seismic velocity and resistivity structure beneath Iide mountains, northeastern Japan

Koichi Asamori[1]; Koji Umeda[1]; Tateyuki Negi[2]; Yasuo Ogawa[3]

[1] JAEA; [2] Nittetsu Mining Consultants; [3] TITECH, VFRC

In this study we have estimated two dimensional (2-D) crustal resistivity structure beneath Iide mountains using magnetotelluric method with far remote reference technique and 2-D inversion code (Ogawa and Uchida, 1996). The survey line is about NW-SE direction with 13 observing sites which were set at intervals of 2-5 km along Iide mountains. In consideration of the noise environment of this region, we observed 15 hours/day for more than 3 nights at each site. In order to reduce the cultural noise, the remote reference site was set in Sawauchi (about 200 km away from the study area).

In addition to the resitivity structure, we have estimated 3-D P-wave velocity structure using tomographic inversion (Zhao et al., 1992). In this inversion, we used 27,699 P and 22,937 S arrival times from the JMA Earthquake Catalogue (October 1997 to May 2005).

A two-dimensional resistivity model showed that an anomalous conductive body is clearly visible beneath the Iide Mountains. The conductor widens with increasing depth, and extends from the near-surface down to the base of the crust and perhaps into the upper mantle. Considering several signals imaging the presence of crustal magma storage, such as high-temperature regime, hot spring gases with high 3He/4He ratio, thinning of the brittle seismogenic layer and anomalies of low seismic velocity, it is reasonable to suppose that the conductor reflects partial melt and/or high-temperature aqueous fluids in the crust, related to renewed magmatism in the present-day subduction system.