東北日本中央部前弧の3次元地殻比抵抗構造解析

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Three-dimensional Crustal Resistivity Modeling at the Central Part of NE Japan Forearc

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Magnetotelluric method can image minor distribution of crustal fluids and melts which are important for inland earthquake and volcanic processes. Previous studies successfully mapped the crustal conductors in the seismogenic and volcanic regions (e.g., Ogawa et al., 2001; Mitsuhata et al., 2001; Misiha, 2009), but the results remained in two dimensional structures.¥

The objective of our research is to make three-dimensional resistivity model over the area with intraplate earthquake activities and volcanoes. We have compiled wide-band magnetotelluric data obtained in the southern part of Miyagi prefecture. This dataset covers Zao volcano, Funagata volcano and Nagamachi-Rifu fault system. We have inverted full impedance tensor components of 95 sites at 8 period data (0.12, 0.39, 1.2, 3.9, .. 390s) with error floor of 10 percent by using the three-dimensional code of Siripunvaraporn and Egbert(2009). The final rms reached 2.0. The 3d model has the following features. (1)The subvertical conductors exist beneath Zao volcano (3ohmm) and Funagata-yama volcano (10km) below 7km. These can probably be interpreted as high salinity fluids and plus probably underlying magmatic melt. (2)The Nagamachi-Rifu fault has western conductor at its deep extension, which coincides with Shirasawa caldera. The intraplate earthquake activities in 1999 and recent induced seismicity after 2011, clusters around the conductor (10ohmm) which is located beneath the Shirasawa caldera at 10km depth. (3)Below 20km depth, along-arc conductor appear which connects Funagata-yama and Zao volcanoes.