磁場変換関数データによる九州地方の広域比抵抗構造の推定

Electrical Resistivity Structure beneath the Kyushu District by Using Geomagnetic Transfer Functions

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Abstract

We show an electrical resistivity structure of a three-dimensional (3-D) inversion model, which is obtained by using geomagnetic transfer functions of 12 periods between 20 and 960 s, beneath the whole of the Kyushu Island in the Southwest Japan Arc. The aim of this study is to achieve higher-resolution imaging of a shallow depth in the model compared with it in a 3-D electrical resistivity model, which was obtained previously by using only Network-Magnetotelluric (MT) data of 14 periods between 480 and 40,960 s [*Hata et al.*, 2014], in order to reveal the volcanism/magmatism beneath the Kyushu Island. In the Kyushu Island, Quaternary active volcanoes exist along the volcanic front of N30°E-S30°W in two volcanic regions of the northern and southern parts of the island, whereas a non-volcanic region in the central part of the island exists between the two volcanic regions. Geomagnetic variation data, which are used in this study, were observed at more than 200 sites in the Kyushu district including several islands off the western coast of Kyushu from 1980s to 2000s [e.g., *Handa et al.*,

1992; *Shimoizumi et al.*, 1997; *Munekane et al.*, 1997]. We tried to compile accessible geomagnetic variation data, which had been kept at various data lengths and forms, and finally obtained geomagnetic transfer functions at 167 sites. The geomagnetic transfer functions at 100 sites are determined anew from geomagnetic variation data of raw time series using the BIRRP code [*Chave and Thomson*, 2004] to enhance the quality of the transfer functions and their error estimation after performing time correction by using geomagnetic variation data at Kakioka magnetic observatory of Japan Meteorological Agency. For the other geomagnetic transfer functions at 67 sites, we use transfer functions of original data sets [Munekane, 2000], which were determined using the RRRMT code [*Chave at al.*, 1989]. After the several processes, we have finished to accurately determine the geomagnetic transfer functions of the 167 sites, which are 12 common periods between 20 and 960 s. Then, we apply a 3-D inversion analysis to the transfer functions with the WSINV3DMT inversion code [*Siripunvaraporn and Egbert*, 2009]. One of marked characteristics of a new electrical resistivity structure model is an electrical conductive anomaly, which extends to the Earth's surface clearly, beneath Kirishima volcano in the southern volcanic region. In this presentation, we show further characteristics of the new model beneath the three regions (two volcanic regions and one non-volcanic region) of the Kyushu Island to investigate the volcanism, while comparing the new model and the previous model.

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