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磁場変換関数データによる九州地方の 3 次元比抵抗構造
3D Electrical Resistivity Imaging beneath Kyushu by Geomagnetic transfer function data

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The Kyushu island in the Southwest Japan Arc has many Quaternary active volcanoes in relation to the subduction of the Philippine Sea Plate (PSP). The volcanoes exist along the volcanic front of N30^{o}E-S30^{o}W, whereas the volcanoes are densely located in the northern and southern regions of the island. The Kyushu island has a non-volcanic region in the central region of the island between the two volcanic regions. We performed three-dimensional (3D) inversion analyses to obtain a litospheric-scale electrical resistivity model beneath the entire Kyushu island using the Network-Magnetotelluric (MT) data. The electrical resistivity model, however, has a limited resolution in a horizontal direction because of the sparse Network-MT data in several areas of Kyushu. Thus data of geomagnetic variations are used anew to improve the uncertainty of the electrical resistivity structure in a horizontal direction. Data of geomagnetic variations were obtained at the entire Kyushu island and several islands off the western coast of Kyushu from 1980's to 1990's [e.g., Handa et al., 1992; Shimoizumi et al., 1997; Munekane et al., 1997]. In this study, accessible data of geomagnetic variations around Kyushu are compiled. Geomagnetic transfer functions for the data of geomagnetic variations in the northern Kyushu are re-estimated using the BIRRP code [Chave and Thomson, 2004] in order to enhance the quality of the transfer functions and their error estimation. The transfer functions at about 150 sites, which are 12 periods between 20 and 960 s, are obtained with improving quality at the entire Kyushu island. The induction vector representation [Parkinson, 1962] is generally used to delineate the lateral variation of electrical resistivity structure because the vectors point to current concentration in conductive anomalies. Induction vectors determined using the improved transfer functions have the following specific features. First, the vectors on the northern and central Kyushu do not point to the Pacific ocean off the eastern coast of Kyushu but point to the East China Sea of the shallow sea off the western coast of Kyushu. Second, the induction vectors on the southern Kyushu point to the Pacific ocean in the eastern part and point to the East China Sea in the western part at short period, whereas the vectors are arranged along a direction parallel to a direction of the coast line at longer period (>300 s). These results are consistent with the previous work [Handa et al., 1992; Shimoizumi et al., 1997; Munekane, 2000]. It is considered that the complex behavior of the induction vectors are influenced by conditions of the Earth's mantle relating to the igneous activities. Then we applied three-dimensional (3D) inversion analyses for geomagnetic transfer functions using the WSINV3DMT inversion code [Siripunvaraporn and Egbert, 2009]. The electrical resistivity of a starting model is based on values of the 3D electrical resistivity model estimated by using the Network-MT data. In this presentation, we will mainly describe features of the 3D electrical resistivity structure using the geomagnetic transfer functions and them of the 3D electrical resistivity structure using only the Network-MT data [Hata et al., 2013].