九州地方における磁場変換関数データのコンパイル：Network-MT データと磁場変換関数データの統合解析に向けて

畑 真紀 [1]; 上嶋 誠 [2]; 下泉 政志 [3]; 田中 良和 [4]; 鍵山 恒臣 [5]; 歌田 久司 [6]; 大志万 直人 [7]; 吉村 令慧 [7]; 市來 雅啓 [8]
[1] 東大・地震研; [2] 東大・震研; [3] 九州能開大; [4] 京大; [5] 京大・理; [6] 東大・地震研; [7] 京大・防災研; [8] 東北大・院理・地震噴火予知センター

Compilation of geomagnetic transfer function data in Kyushu toward joint analysis with Network-MT data

Maki HATA[1]; Makoto Uyeshima[2]; Masashi Shimoizumi[3]; Yoshikazu Tanaka[4]; Tsuneomi Kagiyama[5]; Hisashi Utada[6]; Naoto Oshiman[7]; Ryokei Yoshimura[7]; Masahiro Ichiki[8]
[1] ERI, the University of Tokyo; [2] ERI, Univ. Tokyo; [3] KPC; [4] Kyoto Univ.; [5] Graduate School of Science, Kyoto Univ.; [6] ERI, Univ. Tokyo; [7] DPRI, Kyoto Univ.; [8] RCPEV, Grad. School of Sci, Tohoku Univ.

The Kyushu island lies in the Southwest Japan Arc where the Philippine Sea Plate (PSP) subducts beneath the Eurasian plate in the N60^{o}W direction. Many Quaternary active volcanoes in relation to the subduction of the PSP exist along the volcanic front of N30^{o}E-S30^{o}W in the northern and southern Kyushu (two volcanic regions). On the other hand, no active volcano exists in the central Kyushu (non-volcanic region). Little is known about the reason why the two volcanic regions and the non-volcanic region exist in Kyushu. In order to answer the question, we have performed three-dimensional (3D) inversion analyses to obtain a large-scale electrical resistivity structure beneath the entire Kyushu using the Network-Magnetotelluric (MT) data, which have geoelectromagnetic information on the litospheric scale. Unfortunately, the electrical resistivity structure 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. Generally, data of geomagnetic variations are sensitive to a change in the state of an electrical resistivity structure in a horizontal direction whereas Network-MT data are sensitive to it in a vertical direction. Thus electrical resistivity imaging of a high resolution in both of vertical and horizontal directions can be achieved by a joint analysis by using two data sets of Network-MT and geomagnetic variations. 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]. Observations of geomagnetic variations have been carried out to investigate a subsurface electrical resistivity structure associated with the subduction system since the 1950's in Japan [e.g., Rikitake, 1969]. The induction vector analysis [Parkinson, 1962] is generally adapted to represent geomagnetic variations because the vectors point to current concentration in conductive anomalies. The induction vectors on the Japanese arcs are known to point to the Pacific ocean of the deep sea in a large sense [e.g., Yukutake et al., 1983]. On the other hand, 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 [Handa et al., 1992]. Additionally, 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 long period (>300 s) [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 originating in the igneous activities. 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 geomagnetic transfer functions and their error estimation. In this presentation, spatial and frequency dependence of the geomagnetic transfer functions, which are expressed by the induction vectors, are summarized throughout the Kyushu island. Additionally, the observed induction vectors are compared with the synthetic ones, which are computed based on the 3D electrical resistivity structure using the Network-MT data [Hata et al., 2013], to examine consistency between geomagnetic and Network-MT responses.