Nation-wide spatial distribution of the ultra-long period magnetic transfer functions in the China Mainland

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China mainland located in the south part of the Eurasian continent is an interesting area, where the Pacific plate is subducting from the east, and the Indian continent collides from the south. Recently, several seismic tomography researches revealed stagnant Pacific slab deep below the central to northern part of China. High crustal heat flow as well as the Neogene-Quaternary basaltic volcanic activities in the NE China area has been interpreted due to the subducting or stagnant Pacific slab and possible fluid supply from the slab. India-Eurasia collision also causes significant crustal uplift in the Tibet and clockwise rotation in the eastern part of the suture. Investigation of nation-wide very deep electrical conductivity structure beneath China mainland will enable us to have a better understanding of the dynamics of the continent and generation mechanism of the intra-continental earthquakes and volcanoes, since electrical conductivity is particularly sensitive to the presence of interconnected highly conductive phases, such as partial melts or aqueous fluids.

In this study, in order to elucidate the mantle electrical conductivity structure down to the transition zone beneath whole China mainland, we investigated the geomagnetic records obtained by the National Geomagnetic Center of China. We analyzed hourly geomagnetic data from 42 stations with absolute measurements for nearly 8 years (2008/01/01-2016/12/31). After we calculated the angle between azimuth of the geomagnetic pole and that of the geographic pole at respective stations with the aid of the IGRF models, we obtained the geomagnetic data rotated to the geomagnetic dipole field coordinates. The vertical component to the horizontal components transfer functions (GDS transfer functions) and inter station horizontal field transfer functions of periods up to 100days were estimated with the aid of the remote reference method with a robust estimation scheme. In the presentation, we will show the characteristics of the spatial distribution of both the GDS and the horizontal transfer functions. We will also show results from the OCCAM 1-D inversion with minimum and smooth structure constraints by using the GDS transfer functions.

Keywords: geomagnetic depth sounding, horizontal transfer function, china mainland, ultra long period, mantle electrical conductivity structure

