

Revised reference structure of the electrical conductivity of the upper and mid-mantle in the North Pacific region

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Obtaining a reliable reference structure is indispensable for a study of 3D structure of the interior of the Earth. Seismic community has well-established 1D reference structures, such as PREM, and intensive inversion studies of the 3D seismic velocity structure of the mantle are now carried out. On the other hand, reference structure of the electrical conductivity of the mantle still has rooms for discussions, see e.g. Utada et al. (2003), Kuvshinov et al. (2005), Kuvshinov and Olsen (2006), although a 3D structure of the mid-mantle by an inversion study has been already carried out by Koyama (2002). In this study, we re-estimate geomagnetic and submarine cable MT responses in the North Pacific region appropriate for semi-global studies using longer time series of the geomagnetic and geoelectric field obtained by the Ocean Hemisphere project and INTERMAGNET, and then, we obtain a new reference structure in the region. The effect of the ocean-land conductivity contrast in the surface layer is taken into account as the previous studies. The effect of the inhomogeneous lithosphere on the response functions is also examined. Newly obtained reference (1D) structure is compared with those obtained in the previous studies and a discussion in reference to the results of recent high-pressure experimental studies of electrical conductivity of mantle materials (e.g. Hae et al. 2006, Yoshino et al. 2007, Huang et al. 2007) will be made.