Possibility of anisotropic structure in electrical conductivity for the upper mantle beneath northwestern Pacific Ocean

*Kiyoshi Baba[1], Hisashi Utada[1]

1.Earthquake Research Institute, The University of Tokyo

We have estimated isotropic one-dimensional (1-D) structure in electrical conductivity beneath the northwestern Pacific through Normal Oceanic Mantle Project. However, the model did not explain observed magnetotelluric (MT) responses perfectly. The misfits should be attributed to the lateral heterogeneity and/or anisotropic structure. In this study, we examined if some possible anisotropic structures can explain the observed MT responses better or not. We consider anisotropic structures that the conductivity in the asthenospheric mantle is higher in the direction parallel to the current plate motion (~N63°W) and that the conductivity in the lithospheric mantle is higher in the direction parallel to the past plate spreading direction (~N22°W). We also consider the effect on surface heterogeneity due to ocean-land distribution and bathymetric change. We simulated MT responses in the survey area A (northwest of the Shatsky Rise) to the 3-D surface heterogeneity over 1-D anisotropic structures and compared with the MT responses observed and simulated to the isotropic model. The result showed that any models considered in this study did not improve the misfit to the data, suggesting that rather laterally heterogeneous structure is more likely.

Keywords: marine magnetotellurics, electrical conductivity, anisotropy, lithosphere, asthenosphere, Northwestern Pacific Ocean

