E134-004 **Room: 101A** **Time: May 16 14:30-14:45**

Magnetotelluric analysis of the data collected in Petit Spot area, northwestern Pacific

Kiyoshi Baba[1]; Masahiro Ichiki[2]

[1] ERI, Univ. of Tokyo; [2] JAMSTEC

Seafloor magneotelluric data collected in northwestern Pacific around 37:30E, 149:50N have been analyzed. In the meeting, regional and local topographic effect on the data are discussed in advance of the modeling of the subsurface structure.

The data were collected using ocean bottom electromagnetometers (OBEMs) at four sites with the spacing of 100 - 150 km, between May and August, 2005. The survey was conducted as a part of Petit Spot project. Petit Spot is young volcanic activity on very old (~120 Ma) oceanic plate characterized as a clump of small knolls which erupted strong to moderate alkaline basalt. This volcanic field is associated with neither any plate boundaries nor hot spots. To elucidate the magma generation process of this new-type volcanic activity, collaborative study of various geophysical and geochemical approaches has been initiated. The MT survey aims to constrain the physical state of the lithosphere and asthenosphere where the Petit Spot melt is probably generated. In addition, the data are expected to detect strain-induced anisotropy in olivine that contains water in the form of dissolved hydrogen.

The acquired electromagnetic field variation data were analyzed with robust processing after appropriate corrections of the instrumental tilt and clock. The MT response was obtained in the period range between 480 and 122880 seconds. Geomagnetic transfer functions were not obtained with significant coherence in the period range. The MT responses are quite similar among the sites: The off-diagonal apparent resistivities split in shorter periods, which the xy element is larger than the yx element, where x and y are geomagnetic north and east, respectively. The diagonal apparent resistivities are more than one order smaller than the off-diagonal ones. These features suggest that the lateral heterogeneity in electrical conductivity is less significant beneath the survey area. The splitting of the off-diagonal responses and non-zero diagonal response are likely attributed to large-scale structure around the survey area and/or anisotropic structure.

We first assess the effect for the topographic change and the land-sea distribution using a 3-D forward modeling method by Baba and Seama (2002). Regional large-scale topography and local fine-scale topography are separately modeled respectively. We assume a layered structure beneath the seafloor, which fit the rotation invariant apparent resistivity and phase calculated from the observed MT response. The conductivity of the top two layers, which correspond to relatively conductive crust and highly resistive lithospheric mantle, are changed and the topographic effect is modeled again because the effect is mutually coupled with the subsurface conductivity. The results show that most of the features of the observed MT responses are well explained by large-scale regional topography with highly resistive lithospheric mantle. The fine-scale local topography has little influence. The resistivity of the second layer significantly affects the difference in level of the apparent resistivity between the diagonal and off-diagonal elements. 5000 Ohm-m for it makes good fit but 500 Ohm-m results insufficient level of the diagonal apparent resistivities although both models fit the rotation invariant response. This indicates that we can constrain the resistivity of lithospheric mantle more strongly by taking account for the topographic effect.

The possible effect of anisotropic structure is also assessed using forward modeling method by Pek and Santos (2002). Asthenospheric mantle is assumed anisotropic which is more conductive in the direction of the plate motion (N70W). The model response does not reconstruct the features of the observed responses.