Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

BBG21-P02 Room:Convention Hall Time:May 21 10:45-12:15

Electrical resistivity structure of the upper mantle beneath the southern Mariana Trough

SHINDO, Haruka[1*], SEAMA, Nobukazu[1], MATSUNO, Tetsuo[1], KIMURA, Maho[1], SHIBATA, Yuki[1], OKINO, Kyoko[2], NOGI, Yoshifumi[3]

[1]Department of Earth anf Planetary Sciences, Faculty of Science, Kobe University, [2]Ocean Research Institute, University of Tokyo, [3]National Institute of Polar Research

In the Southern Mariana Trough, the seafloor spreading rate is 45km/Myr at present (Kato et al., 2003) that is relativity slow, but there are characteristics of the fast spreading ridge. Specifically, the southern Mariana region has an axial topographic high (Martinez et al., 2000) and a low-gravity region under the spreading axis in associated with high magmatic activity as well as a sheet-like mantle upwelling (Kitada et al., 2006). In this study, we carried out an electromagnetic experiment along a profile across the spreading axis to estimate an electrical resistivity structure and hence the physical property like temperature, water and melt content in the upper mantle beneath the Southern Mariana Trough. The experiment was carried out with 11 Ocean Bottom Electro-Magnetometers (OBEM), which were deployed on a 126km length survey line across the spreading axis. Time-variation of electric and magnetic fields are obtained from recoverd 10 OBEMs. The observation period is from August 2010 to November 2010, the data was record for ˜85 days in two OBEMs and for ˜60 days in the rest of the OBEMs. In this presentation, we show a result of an investigation of a 2-D electrical resistivity structure using OBEM data with good quality at 8 sites. The magnetotelluric(MT) method is a base for the data analysis. We performed an inversion analysis of the electrical resistivity structure by using an upper boundary of the subducted slab inferred from a seismic research (Gudmundsson and Sambridge, 1998) as a prior constraint. This structure show that the resistivity gradually decreases with distance from the Mariana Trough. Especially, at depths less than 40km the trenchward region has higher resistivity (300 Ohm-m) than the opposite side (30 Ohm-m). The less resistive region prevails below the spreading center.

Keywords: resistivity structure, the sourthern Mariana, upper mantle, subduction zone