Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)
©2009. Japan Geoscience Union. All Rights Reserved.

SEM031-01 Room: 301B Time: May 26 15:30-15:45

On the electrical conductivity structure beneath the land-sea EM array including Mt. Daisen

Takuto Minami[1*], Hiroaki TOH[1], Takafumi Kasaya[2], Masashi Shimoizumi[3], Masahumi Shingai[3], Naoto Oshiman[4], Ryokei Yoshimura[4], Ichiro Shiozaki[5], Ikuko Fujii[6], Akira Yamazaki[6], Satoru Yamaguchi[7], Hideki Murakami[8], Makoto Uyeshima[9]

[1]Graduate School of Science, Kyoto Univ., [2]JAMSTEC, [3]Kyushu Polytechnic College, [4]Disaster Prevention Research Institute, [5]Tottori University, [6]Japan Meteorological Agency, [7]Graduate School of Science, Kobe Univ., [8]Faculty of Science,Kochi University, [9]Earthquake Research Institute

The eastern part of the San-in region in southwest Japan is classified as an area of high seismicity, and our group have carried out many EM surveys in this area. On land, both Network-MT and wideband observations from northern region of Hyogo to Shimane Prefectures have been conducted. On the other hand, off the San-in region, seafloor MT observations have beencarried out using Ocean Bottom ElectroMagnetometer (OBEM) and Ocean Bottom Electrometer (OBE) since 2006. So far, we have obtained EM data at 11 sites in total off the San-in region including the site located on the Oki island.

There are two main EM seafloor arrays off the San-in region. One is an array extended to the north-northwest of Mt. Daisen including Oki island, and the other extends to the north of the boundary between Tottori and Hyogo Prefectures. In this study, we focus on the former array including the land part extended further to the south of this array. Along this land-sea EM array, EM data were obtained at four seafloor sites and five land sites.

Using these data sets, we calculated induction vectors, conventional skewness, and phase tensors. At all seafloor sites, skewness is mostly less than 0.2, and real parts of induction vectors have a tendency to point to NNW in periods longer than 500 s, which suggests that in this region we can assume the strike direction of the regional conductivity structure to be in approximately east-west direction. This is consistent with the fact that major axes of phase tensors are mostly directed to the northeast direction. However, absolute values of beta angles of phase tensors of all seafloor sites tend to increase over the period range from 1000 to 10000 s exceeding 10 deg at some sites, while mostly smaller than 5 deg for periods from 100 to 1000 s. We, therefore, conducted forward calculations using the non-uniform thin sheet approximation (McKirdy et al., 1985) to investigate bathymetric effects on the EM responses in the San-in region.

As a result, the following implications have been obtained so far:

(1) Real parts of induction vectors off the San-in region are basically directed to the north by the bathymetric effect of this region, being unable to reproduce westward components of the observed induction vectors.
(2) Absolute values of beta angles calculated by the thin sheet approximation are lower than those of observation at almost all the sites and periods. Particularly, over the period range from 1000 to 10000 s, the thin-sheet calculation cannot explain the observed large beta angles at all.

Considering these points, we will discuss dimensionality of the electrical conductivity beneath the San-in region, and report the results of 2D structure analyses by using the land-sea EM array

data.

Keywords: magnetotellurics, electrical conductivity structure, land-sea array