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Resistivity image around eastern Tottori region deduced by Marine and Land MT surveys

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The eastern part of San-in region in southwestern Japan is classified as an area of high seismicity. Hypocenter distribution extends in a east-west direction, and large earthquakes such as the Western Tottori earthquake and Northern Hyogo earthquake occasionally occurred in this region. It is noteworthy that almost all earthquakes occurred at the shallower than 15 kilometers.
Many types of magma is known to have extrude in this region, and the andecite-dacite magma in particular was caused by dehydration from the subducting Philippine Sea Plate (PHP) or slab melting. Therefore, volcanic activity may be related to seismic activity via subsurface fluid dynamics. However, not only the shape of PHP but also the dynamics in the crust and mantle are not clear beneath the San-in region.
Our group has carried out land magnetotelluric (MT) observation, and low resistivity zones in the lower crust were detected below the San-in region. However, these resitvitity studies based on land MT survey were not sufficient for imaging the deep structure which may be related to various magmatism. The objective of this study is to obtain the crust and mantle resisitivity image using both marine and land MT surveys that enable deep and regional electromagnetic (EM) imaging. Deeper images can clarify the relationship between the magmatism and seismicity.
Marine EM surveys were carried out off Tottori/Hyogo Prefecture in 2006 and 2007, and EM data were obtained at seven sites. After the clock and tilt correction, we calculated MT/VGS/GDS responses using the robust remote reference method code (rrrmt ver.8) of Chave et al. (1987) for the period range from 100 to 10000 seconds.
To evaluate the static shift of the land data, we improved the 2D inversion code developed by Ogawa and Uchida (1996) for the marine data. Using improved 2D code, we carried out the 2D analysis of the marine and land data. As a result of this analysis, the uppermost mantle below the ocean is shown as a relatively-high resitive region. On the other hand, the deeper part of the mantle is portrayed as a conductive body. The conductive zone below the land area was detected at the depth of 10 km. We will be further discussed the 2D analysis in the presentation.

Keywords: Resistivity structure, OBEM, Eastern Tottori