

## **MODIFICATIONS ON WSINV3DMT TO APPLY SEAFLOOR MT DATA**

NORIKO TADA 1, Kiyoshi Baba 2, Weerachai Siripunvaraporn 3, Makoto Uyeshima 2, Hisashi Utada 2

1 Japan Agency for Marine-Earth Science and Technology, Japan,  
e-mail: norikot@jamstec.go.jp

2 Earthquake Research Institute, University of Tokyo, Japan

3 Mahidol University, Thailand

We have modified a three-dimensional magnetotelluric (MT) inversion code, WSINV3DMT (Siripunvaraporn et al., 2005), to apply complex topography and seafloor data. In recent years, a number of seafloor electromagnetic (EM) experiments have been carried out by using Ocean Bottom Electromagnetometers (OBEMs). The density of marine MT data has been increasing so that imaging electrical conductivity structures under the seafloor in three dimensions are now feasible. A 3-D inversion code which can treat marine MT data, however, has not been in practical use yet. A key for the modification is a cost-effective manner to calculate seafloor MT responses for 3-D conductivity model. Existence of seawater distorts the electromagnetic field on the seafloor significantly, thus the seafloor topography must be incorporated into a model. However, it requires huge number of grids in a usual way. Therefore, we introduced volume-weighted average of the electrical conductivity in a block containing land surface or seafloor, and calculation of the MT responses at an arbitrary point in a block. Both can keep the number of grids in a moderate level and make the numerical calculation realistic. We verified the most effective method with using a very simple structure which has only two layers, seawater and 100 ohm-m medium. The averaged conductivity of the blocks conserves the horizontal conductance. The magnetic field in an arbitrary point in a block is calculated by extrapolation of the fields in a calculation points just above the blocks. In this case, extrapolated magnetic field shows the best agreement with analytical solution.

3D inversion, marine MT, topographic effect

Noriko Tada, Japan Agency for Marine-Earth Science and Technology, 2-15 Natsushima-cho, Yokosuka, Japan, tel: +81-46-867-9341, fax: +81-46-867-9315, e-mail: norikot@jamstec.go.jp