modification of a 3-D forward code of WSINV3DMT to be consideringtopography effect

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We are modifying a three-dimensional inversion code which can directly invert seafloor data distorted by topography. In recent years, a number of seafloor electromagnetic (EM) experiments have been carried out by using Ocean Bottom Electromagnetometers (OBEMs). The density of marine Magnetotelluric (MT) data has been increasing so that imaging electrical conductivity structures under the seafloor in three dimensions is now feasible. Because of high conductivity of seawater, electric and magnetic field data obtained from OBEMs are much distorted. Electric and magnetic field distorted by topography are separated into short and long

wavelength parts; long wavelength part can be modeled by a grid spacing that can be realistic for 3-D inversion, while the short wavelength part should be corrected from individual responses by detailed topographic modeling. So that direct inversion is practical.

Forward code of WSINV3DMT (Siripunvaraporn et al., 2005) is modified to be able to calculate electromagnetic field including topographic effect directly as follows. Topography in each computational cell is represented as a ratio between seawater and solid Earth. Volume average

of conductivity of each cell is calculated by using the ratio and conductivities of seawater and solid Earth under saving horizontal or vertical conductance conservation. Modified forward code of WSINV3DMT calculates long wavelength part of electromagnetic field variation, and

FS3D (Baba and Seama, 2002) calculates short wavelength part of those.

It is very important to modify source field of modified WSINV3DMT to fit that of FS3D, because we build FS3D into WSINV3DMT. The source field of WSINV3DMT is a constant electric field. On the other hand, the source of

FS3D is the magnetic field. In this presentation, we will show coherence of these source fields. The estimations of topographic effect using volume average are also discussed in detail.