INVERTING MT 3D DATA USING LOCAL COORDINATES AND TAKING DISTORTION PARAMETERS INTO ACCOUNT: PROGRESS AND PRELIMINARY RESULTS

Marion P. Miensopust 1,2, Colin G. Farquharson 3, ALAN G. JONES

1 Geophysics Section, Dublin Institute for Advanced Studies, 5 Merrion Square, Dublin, Ireland
2 National University Ireland, Galway, Ireland
3 IFM Geomar, Wischhofstrasse 1-3, 24148 Kiel, Germany.

Three-dimensional inversion of magnetotelluric data is becoming more widespread due to the availability of a small number of academic codes and access to some commercial codes. All of the existing ones lack the ability to consider the effects of local, near-surface inhomogeneities as galvanic distorters, and require fine meshing close to recording sites in order to mimic the observations. In addition, rotating field data into a uniform reference frame for modelling/inversion introduces higher noise levels on all channels. To combat both of these deficiencies, our inversion program, which uses a finite-element forward engine, differs from previous ones by solving for galvanic distortion parameters as well as Earth structure, and by using individual, local coordinate systems for each MT site instead of one global coordinate system. The code is called MCMT3DID (Marion and Colin's MT 3D Inversion code including Distortion).
We will present the structure of the 3D finite-element code with the focus on some of the more interesting aspects (e.g., local coordinate system and distortion) including the different options and features (e.g., different approaches to include the distortion in the inversion process and to define the starting values for the distortion parameters) as well as the status of progress at the time of the conference. We will also show some preliminary results obtained from the first test data sets using the options in the code, which are fully implemented at that stage.

magnetotellurics, inversion.

Alan G Jones, Geophysics Section, Dublin Institute for Advanced Studies, 5 Merrion Square, Dublin 2, Ireland. email: alan@cp.dias.ie