

Workflow from Grid_3D to ModEM3D: modelling response and inversion results

As a user of ModEM3D forward modelling and inversion, I present, in this abstract, some details about modelling process for synthetic examples, DTM3.0 and DTM 3.1. In both cases, I have used Grid_3D software (version 1.2.42, Meqbel 2006-2013) to create the meshes of the models with the regional and local conductors, and locate the 72 MT sites, following the provided information. The periods to calculate responses from forward models are also considered (25 periods from 0.01 s to 10000 s). The dimension of meshes is 110x110x30 in both models and the Grid_3D is used to create the necessary files (input model and appropriate data file format). Then, the modelling has been solved using ModEM3D code. The responses of models can be observed with Grid_3D software. The ModEM3D software runs in a cluster with 5 nodes with 16 processors, the CPU speed is 96 cpus, the ram memory is 78 Gb and the memory disc is 1,5 Tb. The Job_file is programmed only with nodes=2, ppn=16 (processors) and the required time for DTM3.0 was 46 minutes, while for DTM3.1 the required time was 52 minutes.

Relating to inversion process, the work flow is the same as the modelling. The initial homogeneous model mesh has been built with Grid_3D (60x60x48). Then, this is modified in order to take into account the sea using the bathymetry. The mesh parameters that represent the sea could be fixed in order to maintain the resistivity value at 0.3 Ohm-m. This model will be the initial model of later inversion process. The 420 edi files of MT sites, with latitude and longitude location, have been imported and resistivity, phase and tipper can be observed with this software. Then, topography and bathymetry should be added to the mesh and the sites projected to this. Finally, data file is created as an input for the ModEM3D inversion process. This data file considers topography and real error of data to make the inversion. I have some problems with dimension of exercise due to the high number of periods, sites and number of parameters in the mesh, and as a consequence the used time for each iteration is really high. So, results are still in process.

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Task performed: DTM3.0, DTM3.1 + Preliminary inversion DSM3

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