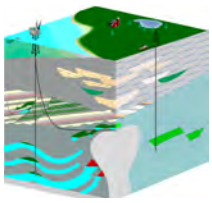
KMS Technologies

Innovating Solutions

3D modeling code ModEM

Additional 3D products:

3D interpretation services



Product description

KMS Technologies in alliance with ModEM Geophysics Inc. is providing 3 electromagnetics modeling code for magnetotellurics and CSEM (land and marine). The code under license from OSU (Oregon State University) to ModEM Geophysics Inc., Prof. Egbert's (the principal author) commercialization company.

3D modeling is used by over 80 users around the globe. It has been working on KMS cluster since 3 years.

ModEM is a modular system of parallel computer codes for inversion of electromagnetic (EM) geophysical data, developed over the past decade at Oregon State University. The code is structured as a flexible system, adaptable to a range EM geophysical data types, and supporting a range of inverse problem solution strategies, and regularization models. ModEM has so far been applied primarily to and (especially) 3D magnetotellurics (MT), with some initial tests also on frequency domain controlled source EM (CSEM) problems, and on joint inversion of multiple method datasets recently completed. A stable version of the code specialized to MT has been publicly released to the academic community, and there are now over registered academic users worldwide.

Ancillary tools are available to support efficient inversion set up, and post-processing visualization.

References

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Kelbert, A., Egbert, G.D., and C. deGroot-Hedlin, 2012, Crust and upper mantle electrical conductivity beneath Yellowstone Hotspot Track, Geology, 40, 447-450.

Kelbert, A., N. Meqbel, G.D. Egbert, and K. Tandon, 2013, ModEM: A Modular System for Inversion of Electromagnetic Geophysical Data, submitted to Computers and Geosciences.

Meqbel, N., G.D. Egbert, P.E. Wannamaker, A. Kelbert, and A. Schultz, 2013, Deep electrical resistivity structure of the Northwestern US derived from 3-D inversion of USArray Magnetotelluric data, paper submitted to Earth Planet. Sci. Lett.

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Product specification & applications

Data input:

- Apparent resistivity data or spectra in EDI format (other format available)
- Geological constraints

Standard outputs:

- 3D model with visualizer
- Models and inversion results
- Data match & risk estimates

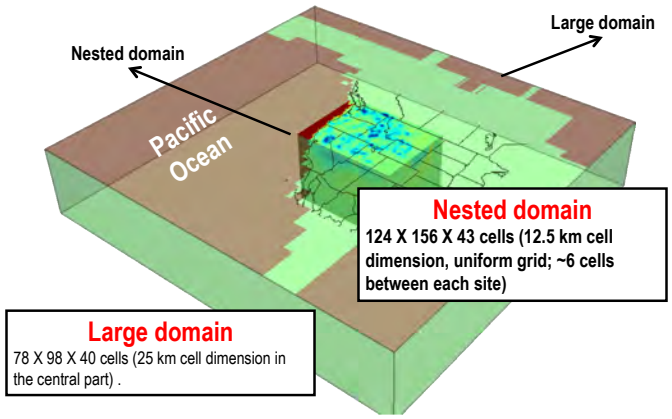

Figure 1: Example of a complex 3D model including detailed model with a large-scale background 3D model.

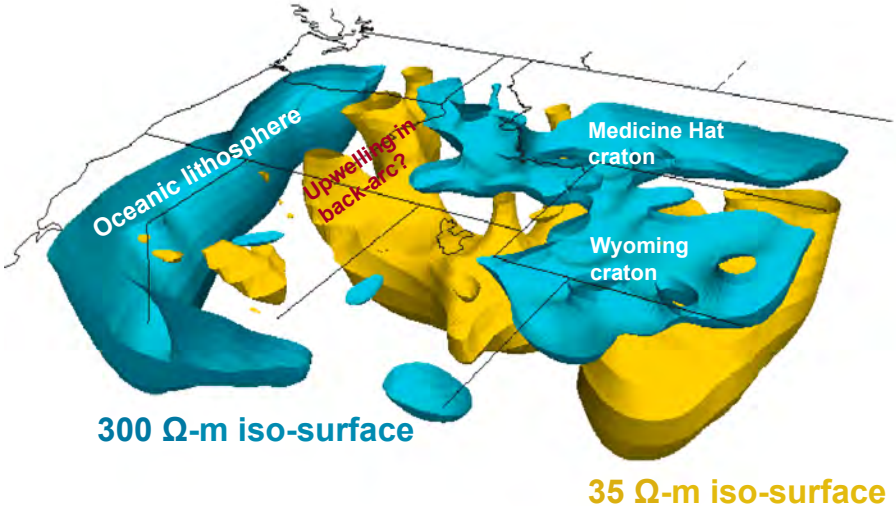

Figure 2: Example of 2 iso-surfaces for 2 units of a 3D model.

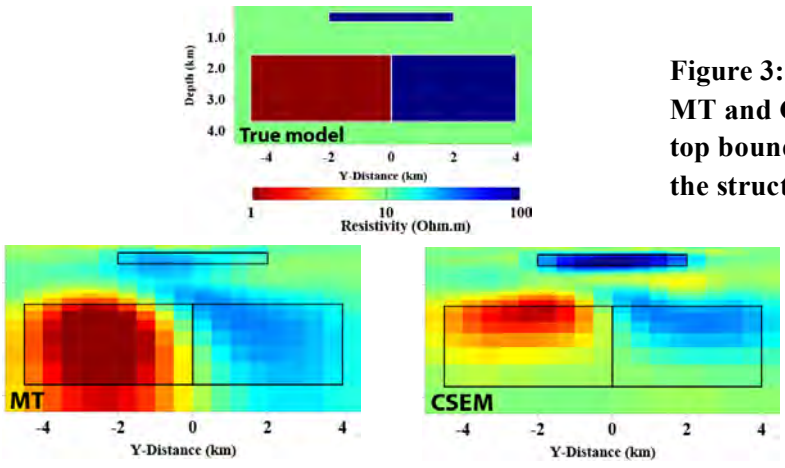

Figure 3: Comparison between inversion of a 3D MT and CSEM model. The CSEM defines the top boundary of the body and the MT the size of the structure.

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