

4D REPRESENTATION OF DEEP OCEAN CONTROLLED SOURCE ELECTROMAGNETIC DATA

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Deep ocean controlled source electromagnetic (CSEM) methods in oil and gas exploration have undergone rapid development in recent years. The CSEM transmitter generates coupled vector fields at low frequencies (less than 0.1 Hz) for a large number of transmitter receiver offsets on or close to the Ocean floor. Representation of the distribution and propagation of the transient electromagnetic fields within and below the ocean is of considerably importance to those people engaged in both pure research and the practical applications of electromagnetic methods.

Typically, representation of deep ocean CSEM field data is via simple plots of amplitude and phase versus transmitter offset from each fixed receiver position. However, the reality of EM field propagation in 4D is more fully represented by distributions of rotating vectors for the total and scattering electric and magnetic fields. Methods for 4D representation in stereo projection are provided. The co-location of acquired and model data in the same virtual space imposes additional requirements on the visualisation methods and several examples are provided. The 4D representations are developed in Open Source Mayavi software.