"Unlike many frequency domain CSEM techniques, this accelerated method doesn't require simplifying assumptions to reduce the memory and computational burden and has excelled scaling properties (essentially linear) across clusters of GPU accelerated nodes."

AxCSEM.F™
FORWARD MODELLING FOR MARINE CSEM

acceleware®

AxCSEM.F Specifications

- Materials: Anisotropic
- Excitations: Hard/resistive, Custom time, Custom spatial
- Boundary Conditions: CPML, PEC/PMC, Mur, Higdon, Quasi - static for water air boundary

Advanced Features

- Higher FDTD spatial order with optimized finite difference coefficients
- Plane wave excitation (normal and sine/cosine)
- Sub-gridding: local mesh refinement

GPU Enabled Solver

- Increased computational speed
- Reduced power consumption
- Increased cluster density
- Radically increased price/performance

Production Ready

- Efficient scaling for large volumes
- Optimized computational grid
- Multi-core CPU & GPU enabled

High-level Library

- C API integrates into any workflow
- Matlab interface for research
- HPC implementation
- Customizable for proprietary technology

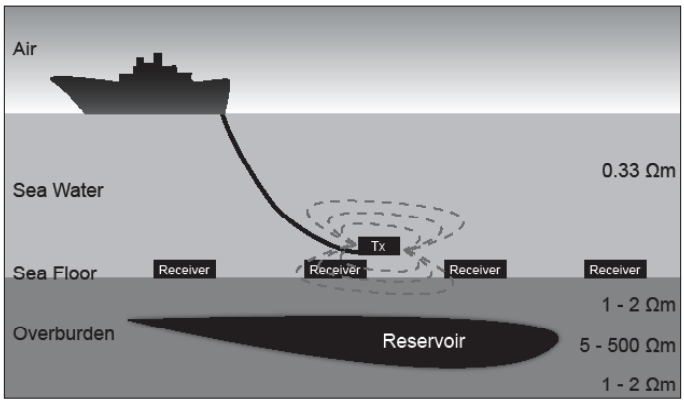
The Marine Controlled Source Electromagnetic (CSEM) method is a low-frequency electromagnetic (EM) geophysical imaging tool which generates electrical resistivity maps of the seafloor to detect the presence of hydrocarbons below the seabed.

To conduct a CSEM survey, an electric dipole transmitter is towed on a buoyant streamer above the seafloor, radiating a low-frequency EM signal. As the EM wave interacts with the subsurface materials it changes its amplitude and phase. The wave is detected in one or more arrays of EM receivers positioned on the seafloor, and logged.

Forward modelling for marine CSEM is the theoretical prediction of how the EM wave will propagate through the subsurface. It is used in the design of marine CSEM surveys and the inverse imaging data processing. The industry commonly uses frequency-domain EM simulation methods such as the finite-difference frequency-domain technique to execute forward modelling. This method, while robust, requires various simplifying assumptions (such as uniform or layered background medium) to reduce the memory and computations burden to a reasonable level.

To overcome these simplifying assumptions, Acceleware has developed AxCSEM.F, a high performance forward modelling library for fast and accurate processing of 3D EM surveys. The AxCSEM.F library is a finite-difference time-domain (FDTD) technique, which offers unique advantages, including ease of parallelization, arbitrarily shaped and anisotropic scatterers and background medium, and broad frequency response in a single run.

AxCSEM.F uses Acceleware's advanced algoritmic and high performance computation techniques to dramatically reduce simulation time. The library is integrated with the latest NVIDIA GPU accelerators to provide exceptional computational performance at an economical price. It is available for purchase with a software development kit (SDK) which features include Matlab support, Windows and Linux support, documentation, examples, and benchmarks.



Learn More About AxCSEM.F™

Contact us today to discuss the benefits and applications of AxCSEM.F
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