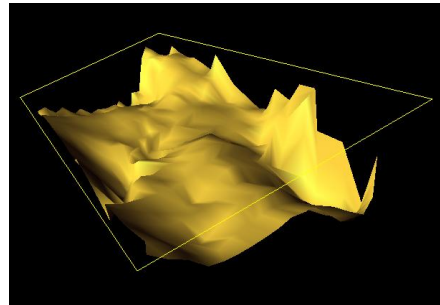


EMIGMA for TEM

May 2015

The TEM package allows Ground and Borehole TEM and can be acquired as part of EMIGMA Premium Complete, as an add-on to other EMIGMA Premium licenses or as a standalone product. The Complete version includes airborne applications. There is also an add-on for marine surveys.

The EMIGMA for TEM license is a comprehensive license that offers a wide array of unconventional and powerful features to better understand the data through its various display and modeling tools.



Ground applications include fixed and moving loop configurations, with measurements taken at the surface (inside and/or outside of the loop), while borehole applications are based on a fixed transmitter with measurements down a borehole (with a probe). EMIGMA allows for both single- and multi-component receivers with either induction coils or magnetometers. Typical field conventions are used for data components and modeling.

The import procedures set up the survey configuration, and the location and orientation of receivers are stored in EMIGMA ready for interpretation or modeling.

EMIGMA is an excellent tool for survey design as well as for interpreting your data. The user may utilize single loops, profiles or boreholes or integrate multiple loops, profiles or boreholes. 3D visualization allows one to view the locations of boreholes in 3-space. ProfileModifier allows for survey design and presentation maps with easy export to a number of formats.

DATA IMPORT

- Calibrated imports from the manufacturer's formats including Geonics Protem, Geonics EM61/63, UTEM3 and UTEM4, Zonge, SIROTEM, Crone, TEM-FAST, TerraTEM and Phoenix
- Airborne imports include VTEM, AeroTEM, HeliGEOTEM, TEMPEST, MEGATEM and GEOTEM systems
- Generic AMIRA format for equipment such as the SMARTEM or SAMSON or DigiAtlantis

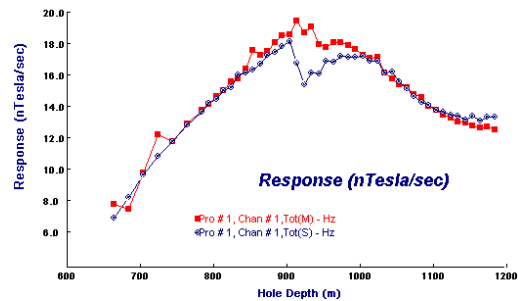
DATA PROCESSING AND CORRECTION

- 1D digital and spatial filters
- Simple and weighted averaging decimation
- Data Correction tool combining dynamic spreadsheets and line plotter for data cleaning, missing data interpolation and simultaneous plotting of different data channels for fast cross-analysis

DATA DISPLAY AND ANALYSES

Our plotting tool allows the user to analyze and view their data in a unique, thorough manner as well as to compare models and data

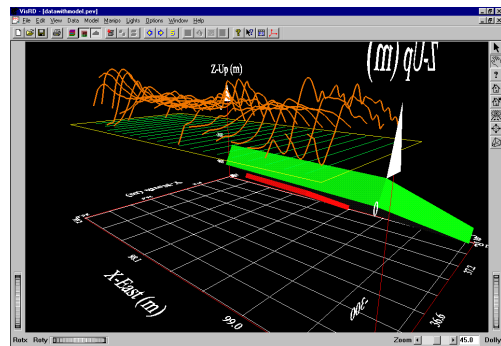
- Quick toggles between time channels
- Multi-channel grids
- Display of Apparent Resistivity as a surface or spatial contour
- Display of 3D section cutting of models in the 3D Visualizer
- PEXShow tool - 2D representation of geoelectric sections
- Gridding algorithms: Natural Neighbor, Delaunay Triangulation, Minimum Curvature and Thin-Plate-Splines
- Contours: 2D and 3D surfaces
- Time decay contours
- Line plots with the option to display the 'derivative' of data sets
- Residual plots
- Plotting data as a function of separation for moving loop surveys

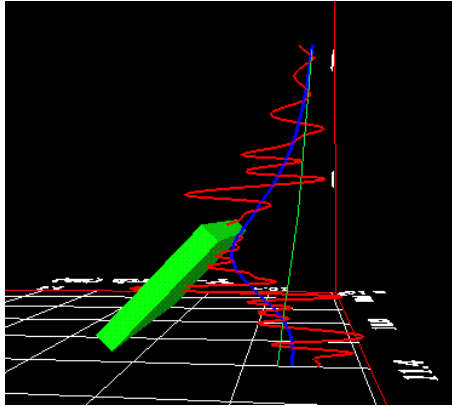


3D MODELING

EMIGMA has an unparalleled ability to model TEM by offering 5 different algorithms.

- Free space thin-sheet
- Conducting host thin-sheet with IP
- Current channeling with IP and magnetic effects for prisms and generally poly 3D
- Inductive extension to current channeling algorithm
- Sphere model allowing extreme modeling
- Fast and accurate 3D simulations: model suite generation and batch mode
- Unlimited prism, thin-sheet plate and polyhedra targets
e.g. pipes (hollow cylinders with or without lids), ellipsoids, shells, bullets, landmines, drums, spheres, general polyhedra...
- Multiple body interactions
- Variations in resistivity, susceptibility and Cole-Cole parameters



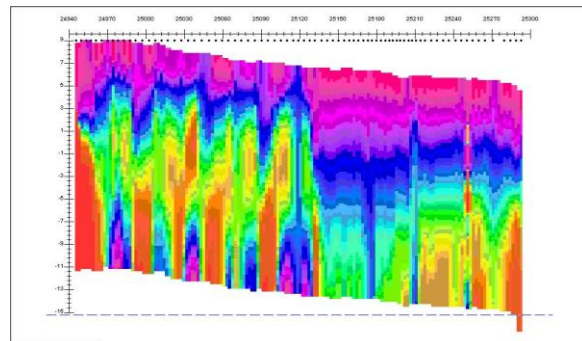


- Modeling of topography effects – Synthetic Topography and Poly Generator
- Accurate handling of topography and 3D structures within layered-earth models
- Modeling of some of the magnetic effects in EM data
- Ability to handle full contrast between host and bodies

- 1D and 3D modeling of airborne and borehole surveys
- Interactive 3D model building tool
- CAD model imports and exports

1D INVERSION

- In-Loop or Out-of-Loop inversions for both moving and fixed transmitter survey configurations
- Multi-component inversions allowing joint inversion of
 - In-loop and out-of-loop data
 - Multi-station inversion
 - Multi-component inversion- e.g. joint Hx, Hz inversion
- Multi-separation inversions for moving loop surveys
- User controlled use of time channels
- User control of inversion constraints
- User-specified starting models
- System calibrated inversions with properly defined system responses including instrument bandwidths
- Smooth Occam technique allowing inversion for multi-layers of uniform thickness with resistivity constraints
- Underparametrized, non-smooth Marquardt inversion allowing multi-layers with both thickness and resistivity constraints
- Incorporation of GPS_Z information
- Multi-station inversions for laterally constrained results
- Multi-component options to reduce model ambiguity



TEM PSEUDO INVERSION

- Inversion based on contoured time decay constants
- Conductivity-Depth imaging

DATA EXPORT

- Model Export to postscript files or raster formats
- Inversion Export to XYZ ASCII file (containing station, position, depth and apparent resistivity) to allow for the geoelectric sections to be utilized in other plotting or printing applications such as Geosoft or Surfer
- Depth slice and Volume exports
- Model export to 3D CAD (dxf)
- Model data and processed data export to XYZ or Geosoft formats
- Gridded data export to raster and Georeferenced formats
- Ability to export maps and underlays to raster, Georeferenced and vector formats including AutoCAD and KML formats
- Export to EMIGMA database or PetRos PEV format (GeoTutor format) permitting the user to share results with colleagues