

Magnetotelluric and TDEM interpretation software

Geotools™ is a modern, interactive platform for the analysis of magnetotelluric (MT) and time-domain electromagnetic (TDEM) data. It features 1D and 2D inversion, 3D forward modeling and 3D model slicing capabilities. **Geotools** encourages explorers to view and manipulate multiple data types, allowing ancillary information to be integrated into MT data analysis.

Key features

Integrated:

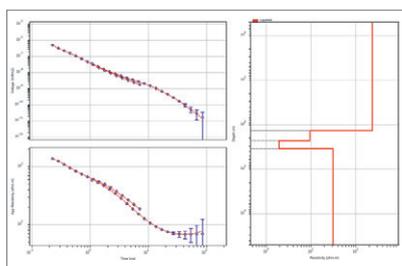
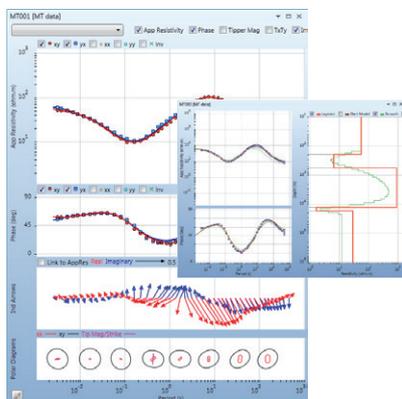
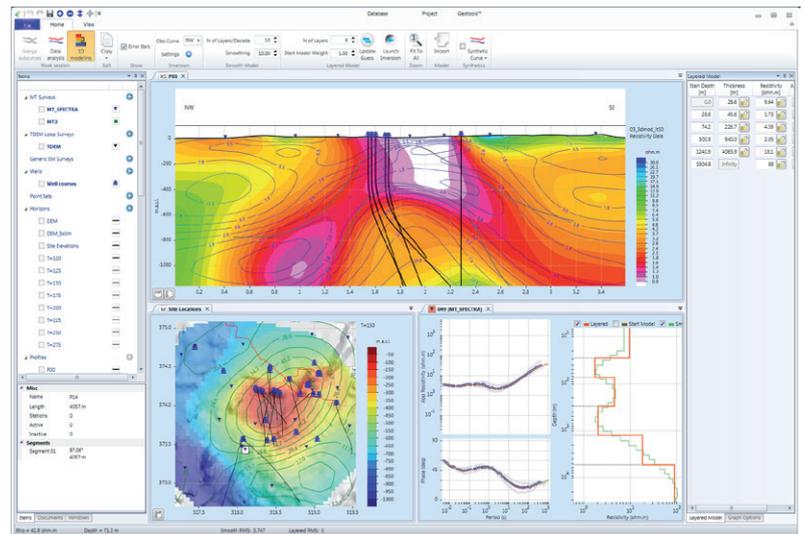
- Import of MT and TDEM data, 1D and 3D models, 2D grids, point and line features, georeferenced images and well traces
- Multi-property 2D and 3D models, with calculator functions

Fast:

- Multi-threaded, real-time 1D and 2D inversions

Convenient:

- Designed to run on Windows OS
- I/O compatibility with standard formats such as EDI and USF soundings



Data analysis and 1D modeling

View maps, data sections and pseudo-sections, and model cross-sections. Superimpose sections of other supported data types along profiles (e.g. gravity).

MT:

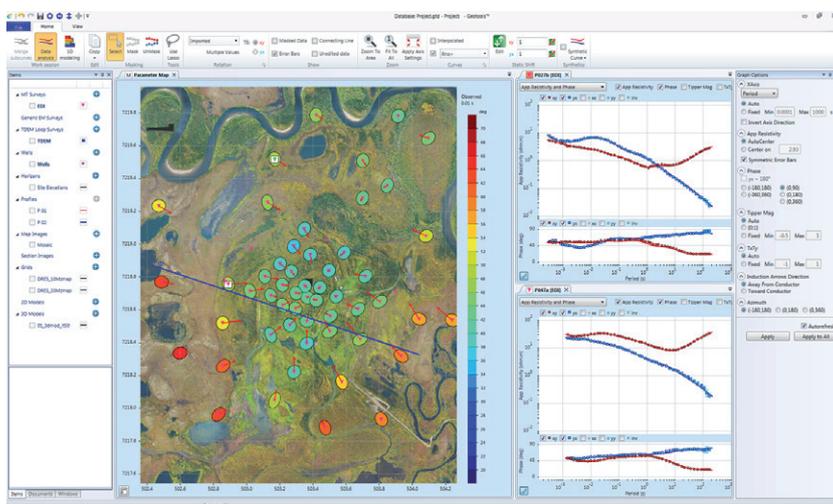
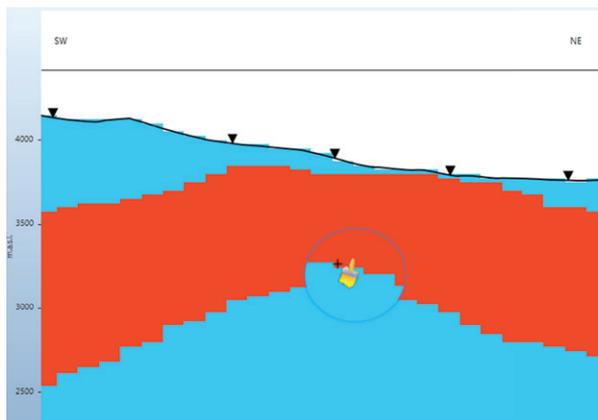
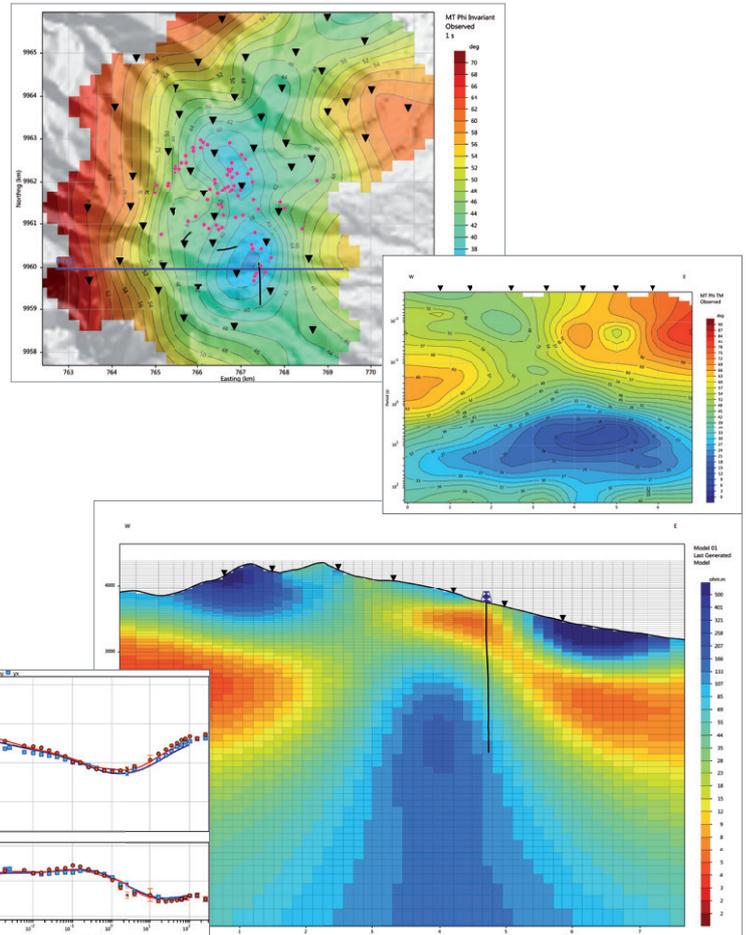
- Single-site and multi-site sounding files; support for partial tensor data
- Apparent resistivity, phase, tipper, azimuth, induction arrows, polar diagrams and phase tensor plots
- Multi-dataset concept [observed, 1D/2D/3D synthetic]
- Rotation, masking, static shift correction, re-sampling, Rho+ fit
- Interactive real-time 1D forward and inverse modeling for discrete layer models
- Non-linear, smooth multi-layer inversions
- Normalized data plots [e.g. observed vs synthetics] in maps and sections

TDEM:

- Central and coincident loop configurations
- Multiple sweeps / repetition rates
- Voltage and apparent resistivity plots
- Interactive real-time 1D forward and inverse modeling for discrete layer models
- Joint inversion of multiple sweeps at different repetition rates
- Display of pseudo-MT curve derived from co-located TDEM sites for MT statics estimation and correction

2D real-time modeling of MT data

- Immediate model update at every inversion iteration
- Multi-threaded 2D smooth inversion code, using all available processor cores: inversions completed in a few minutes on a laptop
- Easy-to-use mesh builder, property population using horizons and/or existing 2D and 3D resistivity models
- Model property editing and painting tools
- Survey design tool, 2D forward modeling study
- Storage of resistivity models, synthetic data, inversion parameters and statistics in recallable snap-shots
- Display of georeferenced images to compare with existing interpretations



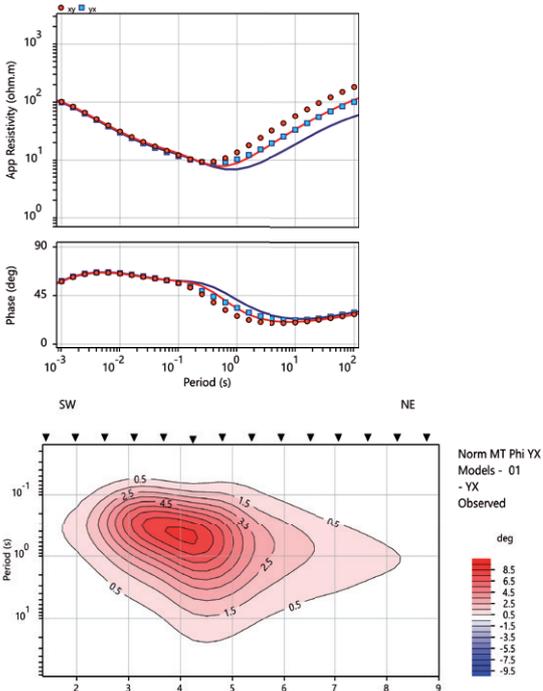
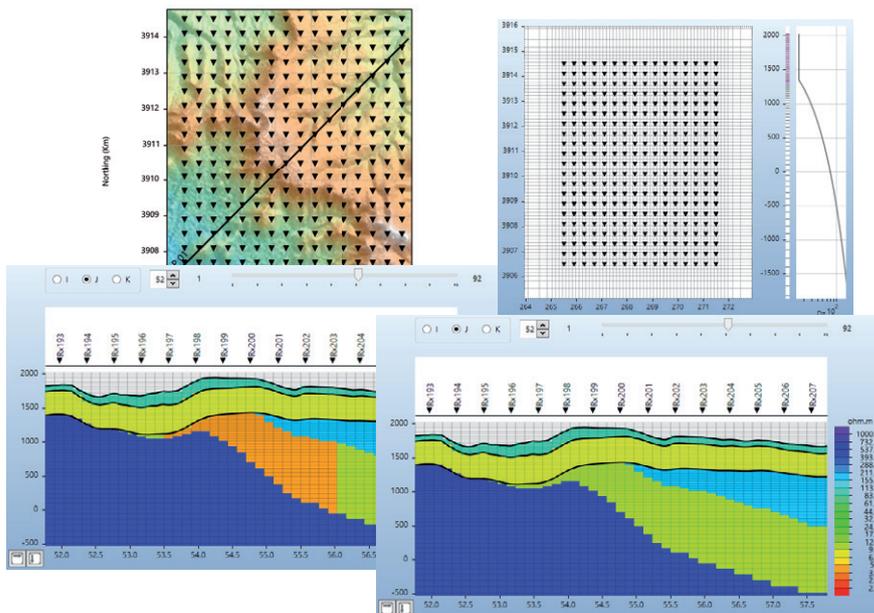
Advanced display capabilities

- Flexible multi-layer compositing on maps and cross-sections allowing for comparisons between different properties
- Linked interactive views with immediate update of all data in all open documents
- Pixel, contoured and sun-shaded layers with variable transparency and color bar control
- Extraction of slices or fences from 3D models in map and cross-section view
- High-quality vector graphics output

New to **Geotools**, **3D MT Forward** enables users to build detailed 3D resistivity models and quickly calculate the complete MT responses; an extremely efficient tool for 3D feasibility studies, scenario testing and MT survey design.

3D model builder

- Guided workflow to create 3D models in a few clicks
- Define a 3D mesh from MT survey geometry
- Set up variable vertical gridding to efficiently sample topography and features of interest
- Populate properties based on imported or picked horizons
- Optionally start from an existing 3D inversion and update the model to test multiple scenarios
- Maintain a suite of scenario models in the **Geotools** database



3D MT Forward

- Compute and store responses in the **Geotools** database
- Produce maps and pseudo-sections of responses
- Display misfit with measured or other synthetic data for scenario testing
- Normalize responses from different scenarios for feasibility studies
- **RLM-3D** finite-difference solver, industry-proven on land and marine 3D projects
- Highly-optimized parallel code, exploiting all available CPU cores:

Model size [cells]	Run-time [16 frequencies]		
	PC1	PC2	PC3
250,000	1 min	3 min	4 min
500,000	3 min	7 min	10 min
1,000,000	6 min	27 min	39 min

PC1: Workstation (2019) 2 x Intel Xeon Gold 5218 CPU 32 total cores 128GB RAM
 PC2: Laptop (2018) Intel Core i7-8650U CPU 4 cores 16GB RAM
 PC3: Legacy PC (2012) Intel Xeon X5650 CPU 6 cores 24GB RAM

Contact

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