ERT Lab 64

MODELLING AND INVERSION SOFTWARE FOR

3D RESISTIVITY AND CHARGEABILITY ERT DATA

ERTLab *Solver*

Software for 3D finite element inversion of electrical resistivity and chargeability measurements

MAIN FEATURES

- Tetrahedral finite elements modelling
- Data quality control Q / A and data filtering based on threshold values or interactive histograms
- Free definition and modification of topographic coordinates of the measuring points
- Able to manage any surface and downhole measurements with any electrode geometry
- Free definition of the *mesh*
- Possibility of inclusion of any topographic model
- Possibility to define targets or resistivity models
- Manual or automatic definition of the starting model
- Export and data management via easy-to-handle ASCII file

Interactive statistical data analysis, control and filtering
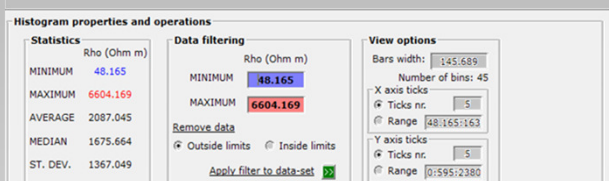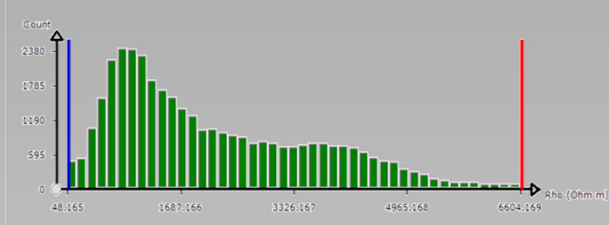
IN DETAILS

Data quality control

- Data visualization using pseudo-three-dimensional maps
- Graphical and numerical filtering of inaccurate measures
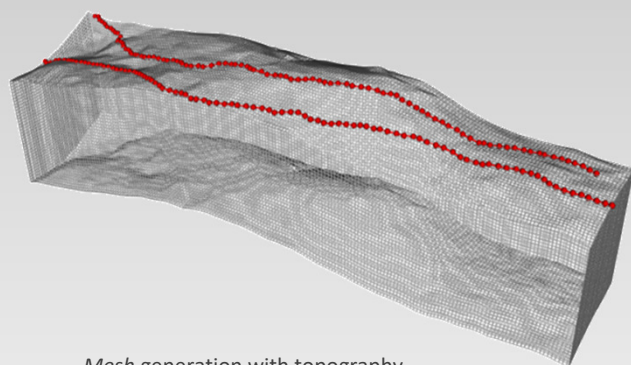- Reciprocals check function

Inversion

- Least Squares Inversion algorythm with regularity constraints (*smoothness constrained*)
- Robust inversion (data variance iterative reweighting)
- Full control of all parameters involved into inversion
- Direct solver (accuracy *solver*, n. iterazioni, *preconditioning*)
- Boundary conditions (*Neumann, Dirichlet, mixed*)
- Regularization factors
- Roughness functions weights
- Noise estimation
- *Time-lapse* processing

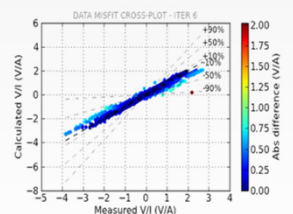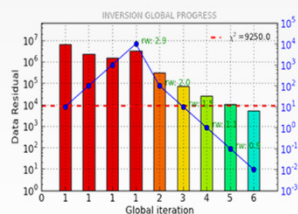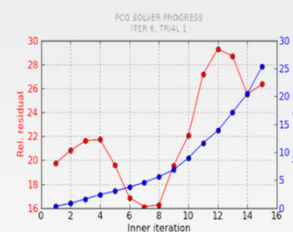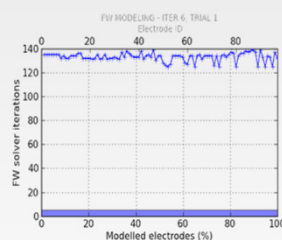
Mesh generation with topography

Mesh generation

- Mesh generation for complex 3D topographic surfaces
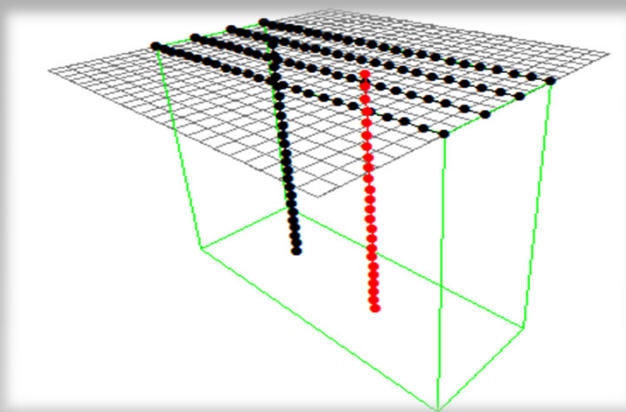- Special tools for customized user defined *mesh* generation
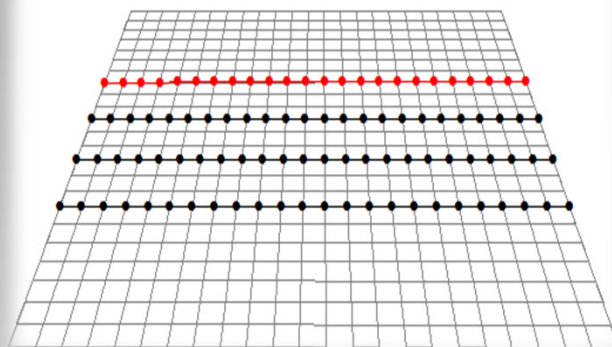- Mesh and model import/export tools

Inversion analysis progress control
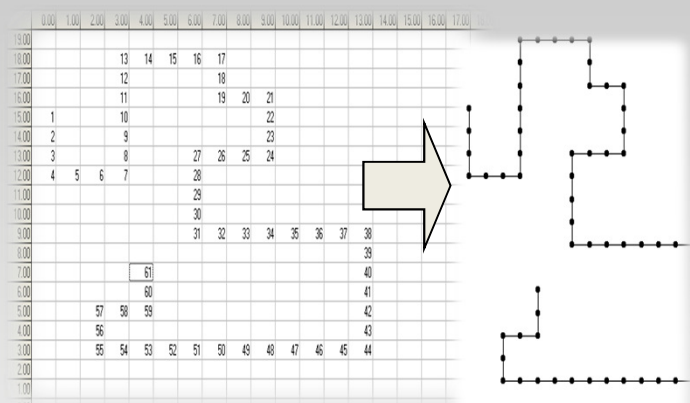
ERTLab *Sequencer*

Special and complete tool for the creation of 2D and 3D arrays/schedules of surface and borehole electrical resistivity measurements
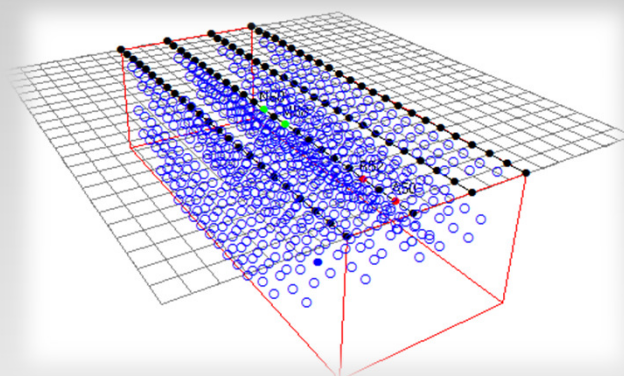

Mixed survey geometry surface-borehole

3D surface grid

Non-conventional electrode geometries

3D surface grid + measuring points
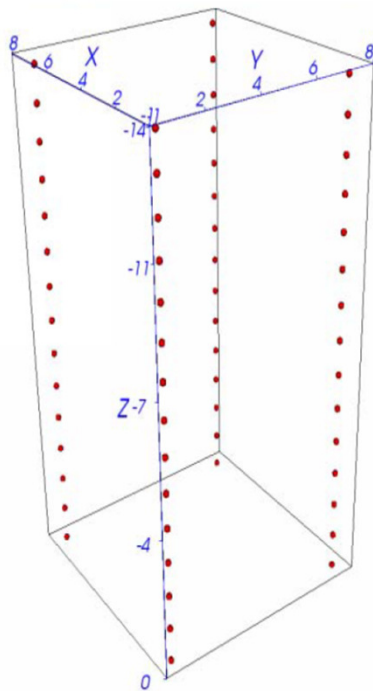
Cable/electrode definition

- User-friendly interface to insert electrodes and cables
- Practical 3D view managing of the inserted objects
- Mouse controlled selection of the electrodes to be skipped or to be used in *roll-along* mode

Sequence generation

- Sequence generator for 2D and 3D surface, borehole or surface-to-hole surveys (Linear Dipole-Dipole, Parallel Dipole-Dipole, Pole-Dipole, Pole-Pole, Wenner, Wenner-Schlumberger)
- Special envinroment for Multi-Borehole sequence creation
- Option to create mixed arrays by appending multiple sequences
- Multi-channel receiver optimization
- Geometric factor constraining
- Reciprocal quadrupoles generation
- Different Import/Export formats (ElectreII, ErtLab Solver, text)
- Conventional pseudo-plots for displaying measurement coverage
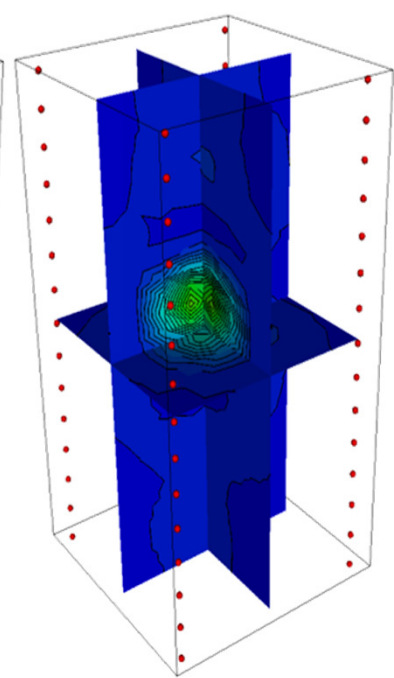
ERTLab *Survey design*

Tool dedicated to 2D/3D ERT measurement synthetic simulations
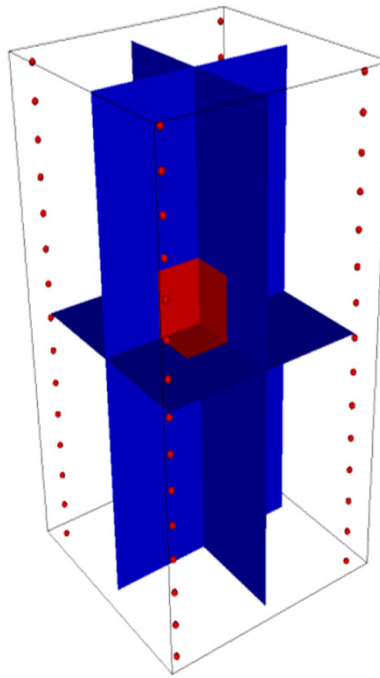
Electrodic array Synthetic model Reconstructed model

Survey Design

This tool is able to perform:

- resistivity/IP 3D forward modelling from generic sequences

- analysis and display of sensitivity functions

- interactive definition of the starting model

Forward modeling is a very powerful tool to evaluate the capacity of the implemented model to detect predefined targets.

The knowledge of these parameters are essential for a correct field survey design providing with important information about the right position of the electrodes and the correct choice of the electrodic device to be used (Wenner, pole-dipole, etc.) in order to achieve the requested purpose

ERTLab *ViewLab3D*

New generation tool for 3D visualization of inverted resistivity/chargeability model
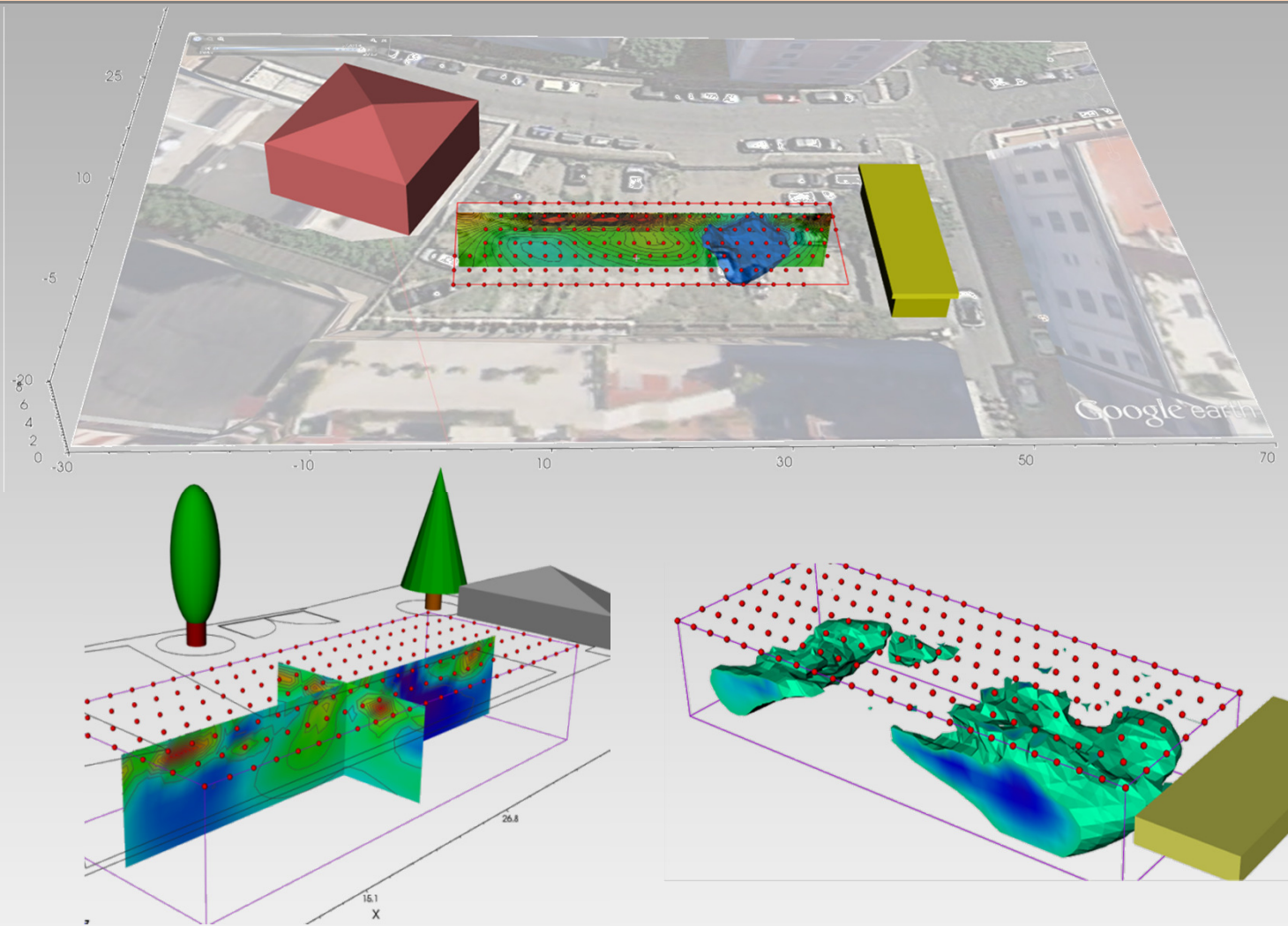
MAIN FETURES

- Import and creation of graphiscal objects, .dxf files, aerial pictures, volumes
- Transparency function to graphycal object
- Automatic generation of 2D sections from 3D model
- Resistivity volumes generation
- Possibility of import for different models in the same 3D window
- Several colour scales available
- Display sections in xy, yz, xz or any generic direction
- Plumes extraction (volumes)
- Isosurface definition
- Ortographic/perspective view
- Axes properties definition, labels editing