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News in ERTLab +

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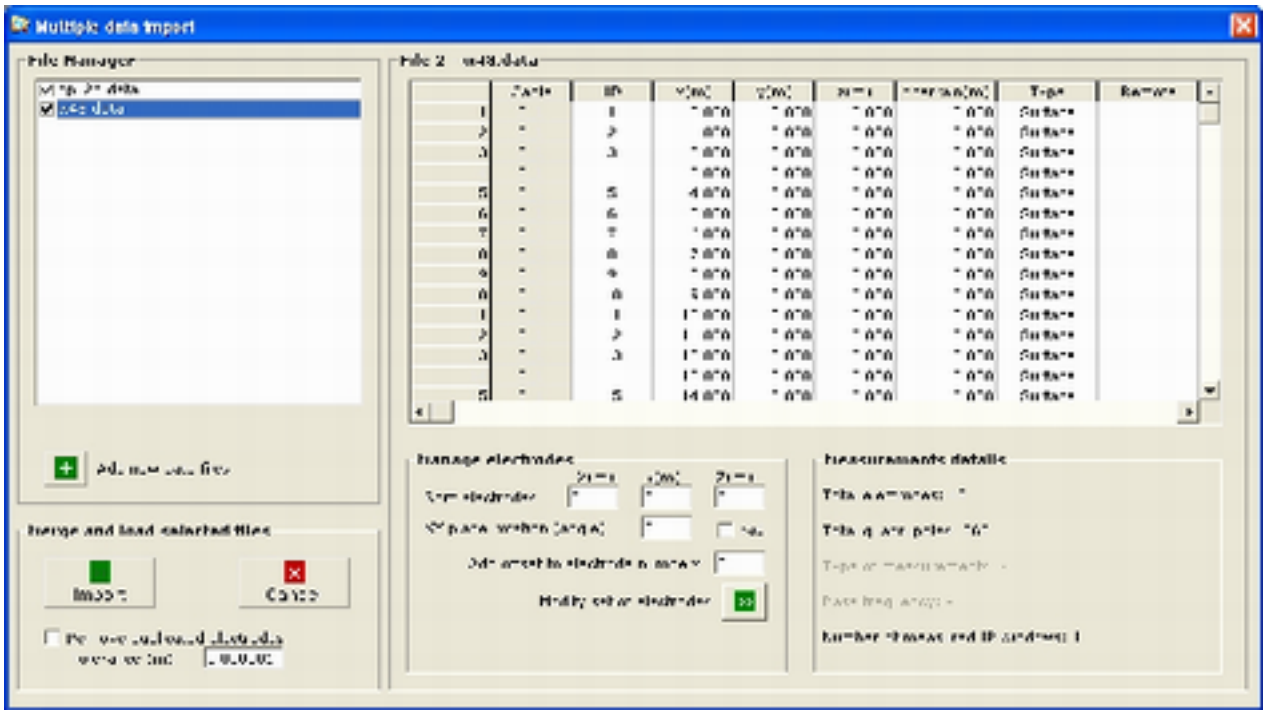
1. Loading data file into the Inversion Workspace

The command to load the data file into the **Inversion Workspace,** now labelled **"Load Data File"**, allows for **loading multiple data-sets** for merging different ERTLab+ data files: in the dialog box "Open file" one can select multiple files with the mouse or with the combination of CTRL key + left mouse button.

The dialog window that appears after selecting the files is given below.:



Features of this new import window:

1. left panel: **displays a list of the selected data files**. It's possible to deselect any files you don't want to import.

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2. Right panel: **displays the electrodes of the file** currently highlighted. Note that the name of the cables is modified with respect to the original data file, by adding a prefix number equal to the number of order in the list of the selected files. This is done to avoid ambiguity between the cable names of electrodes for two data files.
   Coordinates **of the electrodes can be edited** directly in the table (the same way in the Table of electrodes for ERTLab+) and it is also possible to provide shift, rotation, or even adding an offset to the number of electrode, using the commands in the bottom panel **"Manage Electrodes"**.
3. Panel at the bottom right summarizes the number of electrodes and quadrupoles of the current file, plus some features of the MPT-DAS-1 resistivity-meter file format.
4. Bottom left panel allows finally the **definitive import** into ERTLab+ of the selected files. Before importing the full data-set, one can also delete duplicated electrodes .

2. Configuration parameters into the Inversion Workspace

Two new configuration items have been added to the configuration table: the **"Constrain to reference model"** - Inversion parameters - and the **"Number of CPU threads"**in Globals, the old “Savings and Plotting” section. This last parameter is the one that defines how many threads ERTLab+ has to use for the processing task on a 64-bit platform: the more threads, the more the inversion goes fast. The default is 1 thread.
If you want to avoid having to set the parameter at each inversion, save the default parameters in a configuration file and use the ERTLab+ menu item **Options >> User defined default configurations ...** to load the user-defined parameters from file. The configuration file may contain all or only a few of the parameters: if you want, only the above described #pc_num_core= (for example equal to 3) can be saved.

ITEM Description	Default Values
Number of reweight iterations-IP	3
Global parameters	
Plot bounds: -X +X -Y +Y [-Z +Z] or [Depth of inv]	0 47 -0.5 0.5 -7.835 0
Save inverted model for each iteration (Yes: 1; No: 2)	1
Export full mesh for each iteration (Yes: 1; No: 2)	2
Number of CPU threads	1

3. Run Inversion

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When launching a processing task, **Run Inversion** command, or forward modeling (**Run Forward Solver**) or **Sensitivity analisys**, the user is prompted to set a **working directory where saving all the files involved** in the processing. This directory has a suffix .ERTprj that makes it recognizable. For inversions, at the end of processing the folder contains the following files:

a. InvScript.txt is the script that contains the task that the numerical routines of ERTLab+ have to perform (mesh generation, inversion, ...);
b. InvLog.prg is the log file for inversion (the old progress);
c. DataInput.data is the data file with the complete configuration to be processed;
d. InvDataOutput.data is the data file at the end of the inversion (also contains the modeled data and used std deviations);
e. InvModelOutput.vwer is the file with the results of the inversion to load into the Viewer;
f. InvFullMeshOutput.vwer is the file with the entire mesh and model after inversion;
g. DataInput_Rho_Iter_X.vwer files are the inverted models to each iteration, if the configuration parameter "Save inverted model for each iteration" is setted to true.
h. DataInput_Rho_Iter_X.data are data files at each iteration and also contain the entire mesh and model, if configuration parameter "Export full mesh for each iteration" was setted to true. They can also be used to extract vwer files to display into ERTLab Viewer. To do this, use the menu item **Tools >> Convert ERTLab+ data to vwer**.

4. Progress of the inversion

The new window with graphics that opens once launched the inversion, contrary to the past, is non-blocking for ERTLab +, so, with processing in background, you can continue to work in ERTLab+, if you want.
If you try to close the progress dialog you are prompted with a message to abort the inversion processing.
With regard to graphics, the upper left panel represents the progress of the forward modeling: progress percentage for bottom x axis, number of electrode vs. nr. fw. iterations for top x-axis.
The plot in the upper right shows the trend of the parameters of roughness and the residual in the conjugate gradient resolution at each iteration.
The lower graph on the left shows the progress of the inversion: the bars represent the progress of the chi-square statistic, the blue graph the trend of the roughness, the green labels the parameters of reweight at different iterations.
Finally, the cross-plot in the lower right panel shows the modeled data vs. the measured data. The color scale is based on the absolute differences: modeled data-measured data. The dotted lines represent the thresholds of percentage differences between modeled and measured data.

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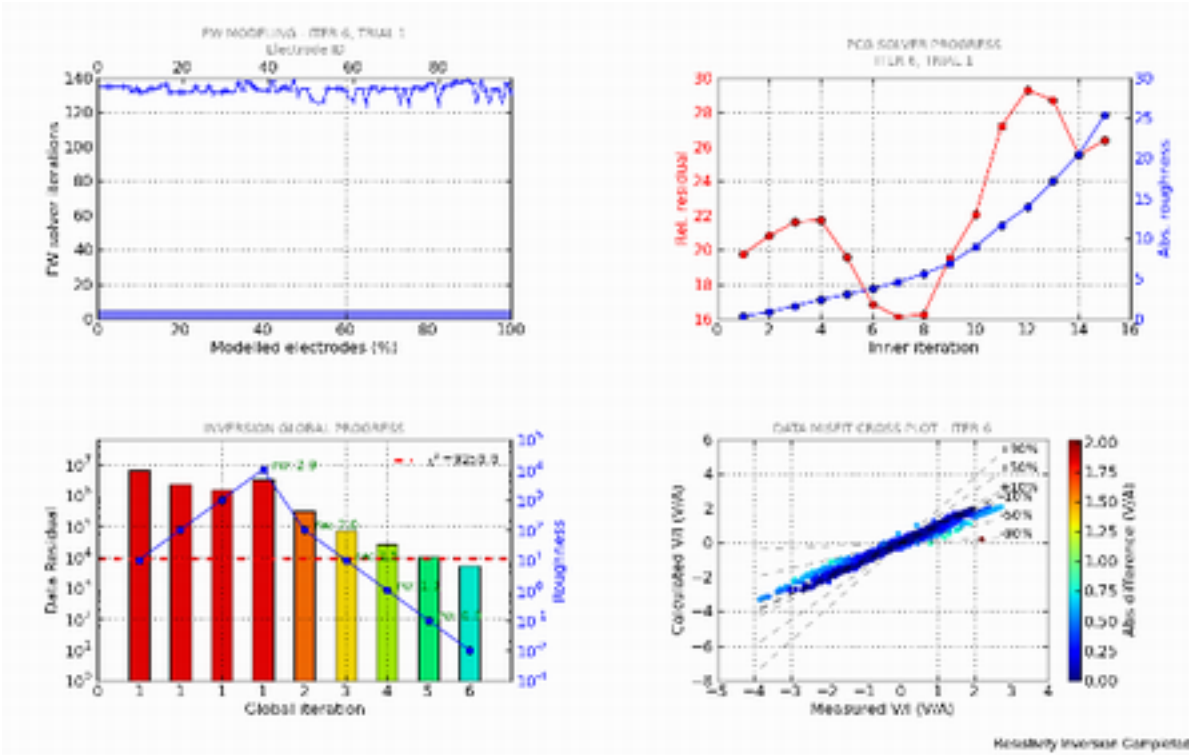

Hovering the mouse on each of the four graphs highlights the x and y coordinates of the point on which lies the mouse - the bottom right status bar.

The toolbar at the bottom left allows zooming, panning, go back to the default view, save a screen image (png, jpg, pdf)
There are also keyboard commands or a combination keyboard / mouse to the following table:

Command	**Keyboard Shortcut (s)**
Home / Reset	h or r or home
Back	c or backspace or left arrow
Forward	right arrow
Pan / Zoom	Zoom-to-p
rect	o
Save	s

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Toggle full screen	f
Constrain pan / zoom to x axis	hold x
Constrain pan / zoom to y axis	holdy
Preserve aspect ratio	hold CONTROL
Toggle grid	g
Togglex axis scale (log / linear)	k
Toggle y axis scale (log / linear)	l