# Opening a database

Select a Database

Or

Create a New Database

Note: If Creating a new database, it is recommended to put the new database in a new subdirectory

Importing Data - 1

1 Import a dataset

Emigma 8.1

⚠ Do you want to create a new Project?

Usually, Yes

Yes   No

EM31-R

2 Name for New Project

Type Name for New Project

Give Me a name

Cancel   OK

Other Sources

Data Groups
- ◉ EM
- ○ Potential Field
- ○ IP/Resistivity

Select EM31

3

Airborne TEM
AMIRA
CRONE
Dipole-Dipole FEM
EM31 - 3
EM31 / EM38
EM34
FUGRO
GEONICS 61
GEONICS q34

Select

OK   Cancel   Help

Importing Data - 2

Following systems and go to the next step.

- ○ Em34
- ○ Em31/Em38
- ● EM31-R
- ○ Max-Min
- ○ Fugro
- ○ AeroQuest
- ○ Unknown

[EM31-R] System Name
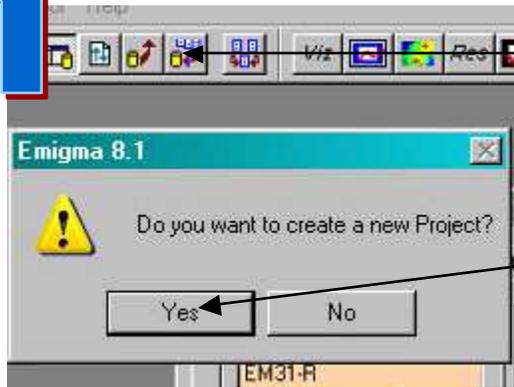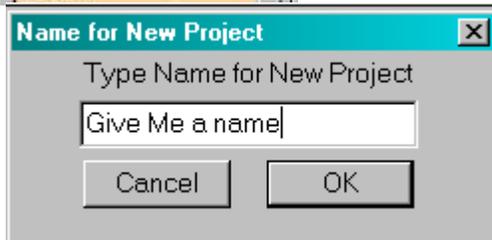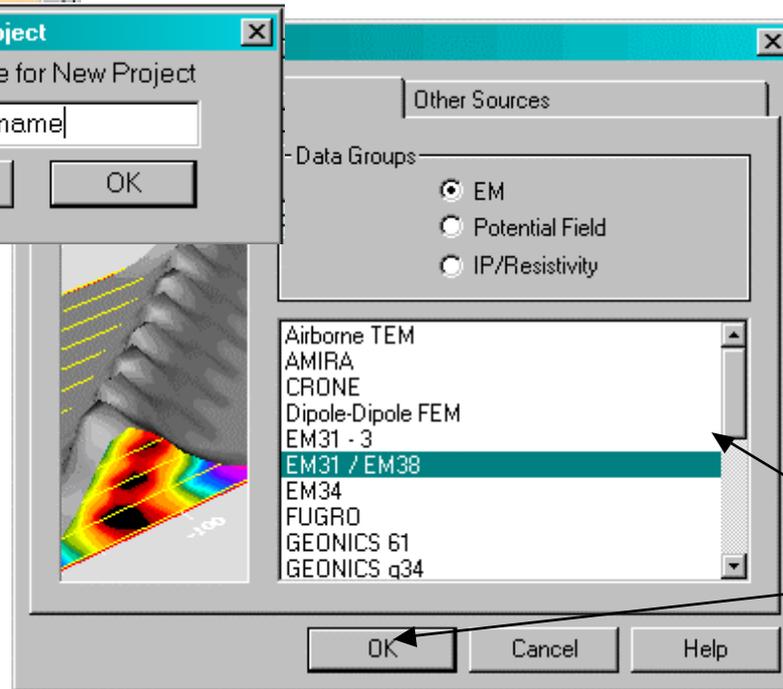
1
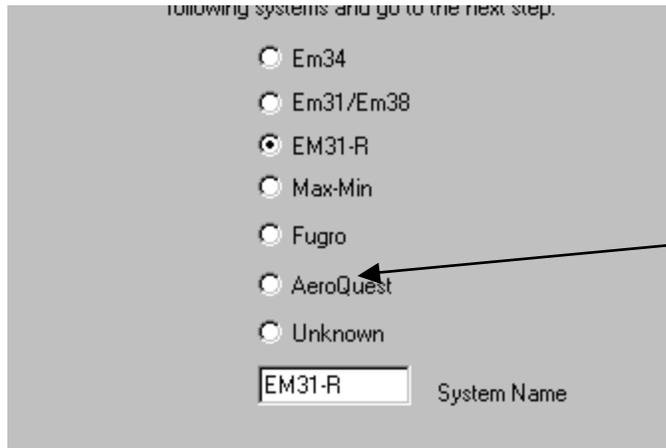
Select System

For other systems select Unknown and give it a name

2

Inputs. Import Wizard Step 1.

Input Filename [   ] Browse

File View   Select one line as the header

Set header line

Import Data file

Look in: 📁 rawdata

📄 cb1_head.xyz

Apply first Multiplier

Apply first Separation

Separation
dY   dZ

	0
	0
	0
	0
	0
	0
	0
	0
	0

File name: [   ] Open

Files of type: [XYZ Files (*.xyz)] Cancel

Help
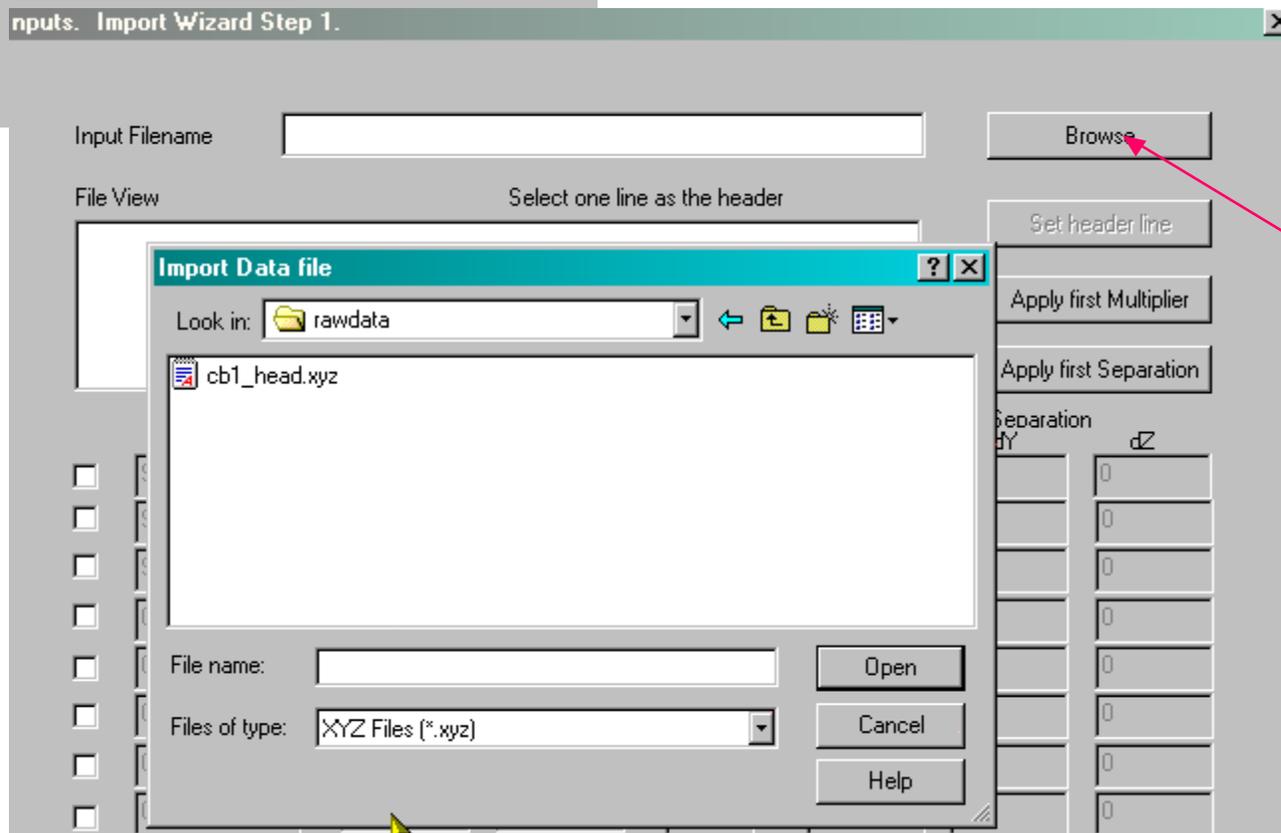
Browse
for
XYZ
columnar
datafile

Importing Data - 3
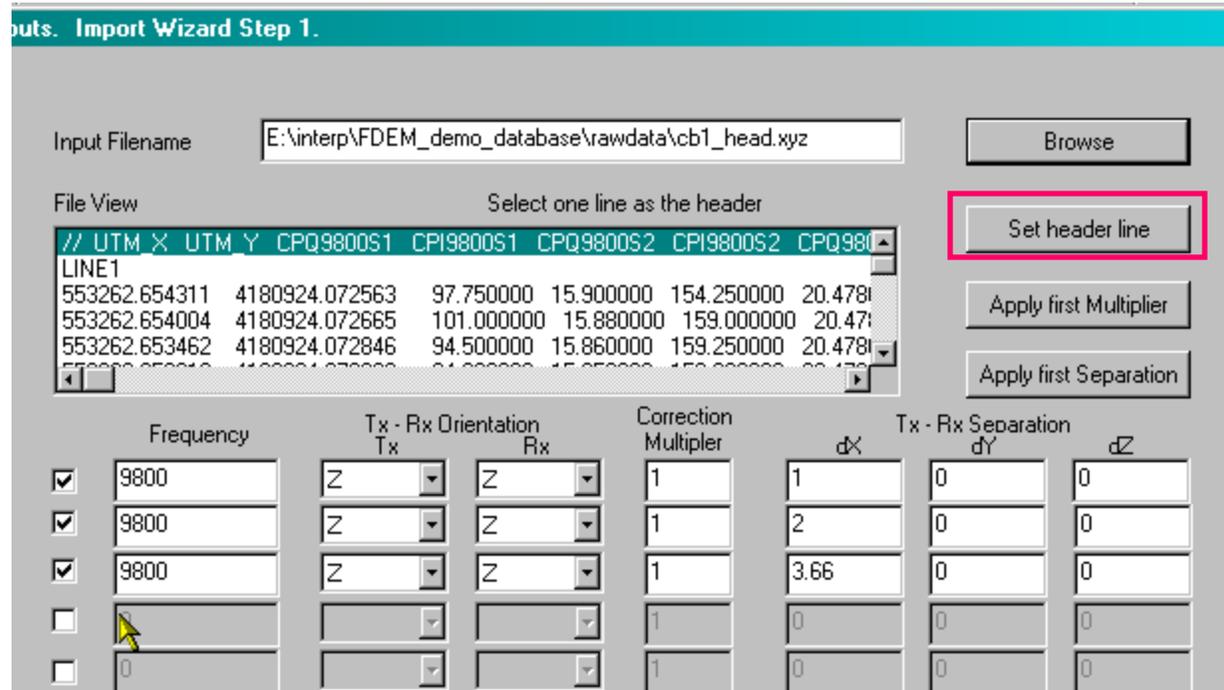
If your file does not contain a Header line with our specific annotation then use 'Set Header line' to set the header.
Use the provided example file for assistance.

Importing Data - 3b

| Input Filename | E:\interp\FDEM_demo_database\rawdata\cb1_head.xyz | Browse |

File View   Select one line as the header

```
// UTM_X  UTM_Y  CPQ9800S1  CPI9800S1  CPQ9800S2  CPI9800S2  CPQ980
LINE1
553262.654311    4180924.072563    97.750000  15.900000  154.250000  20.478
553262.654004    4180924.072665    101.000000  15.880000  159.000000  20.47
553262.653462    4180924.072846    94.500000  15.860000  159.250000  20.478
```

Set header line

Apply first Multiplier

Apply first Separation

	Frequency	Tx - Rx Orientation Tx	Rx	Correction Multipler	dX	Tx - Rx Separation dY	dZ
☑	9800	Z	Z	1	1	0	0
☑	9800	Z	Z	1	2	0	0
☑	9800	Z	Z	1	3.66	0	0
☐				1	0	0	0
☐	0			1	0	0	0

Note 1: Dipole orientations may be X,Y, or Z. These are in reference to the 'Horizontal" co-ordinate system (Manual). For example, Z-Z is horizontal co-planar and Y-Y or X-X or vertical coplanar. Y is perpendicular to line and X is tangential to the line.

Note 2: Separations may be dX, dY or dZ. dX is along line while dY is across line. For example, a dipole configuration with X-X and a separation of (0,dy,0) is vertical co-planar 'broadside'.

Importing Data - 4

Check that the import has recognized the columns correctly.

Set the height of the instrument.

Check the data units.

Note:
 mS/m is not an actual data unit. The data has been converted by the instrument manufacturer through an approximation to this unit. EMIGMA converts it back to the original data units. You may later display in these approximate units.

Importing Data - 5
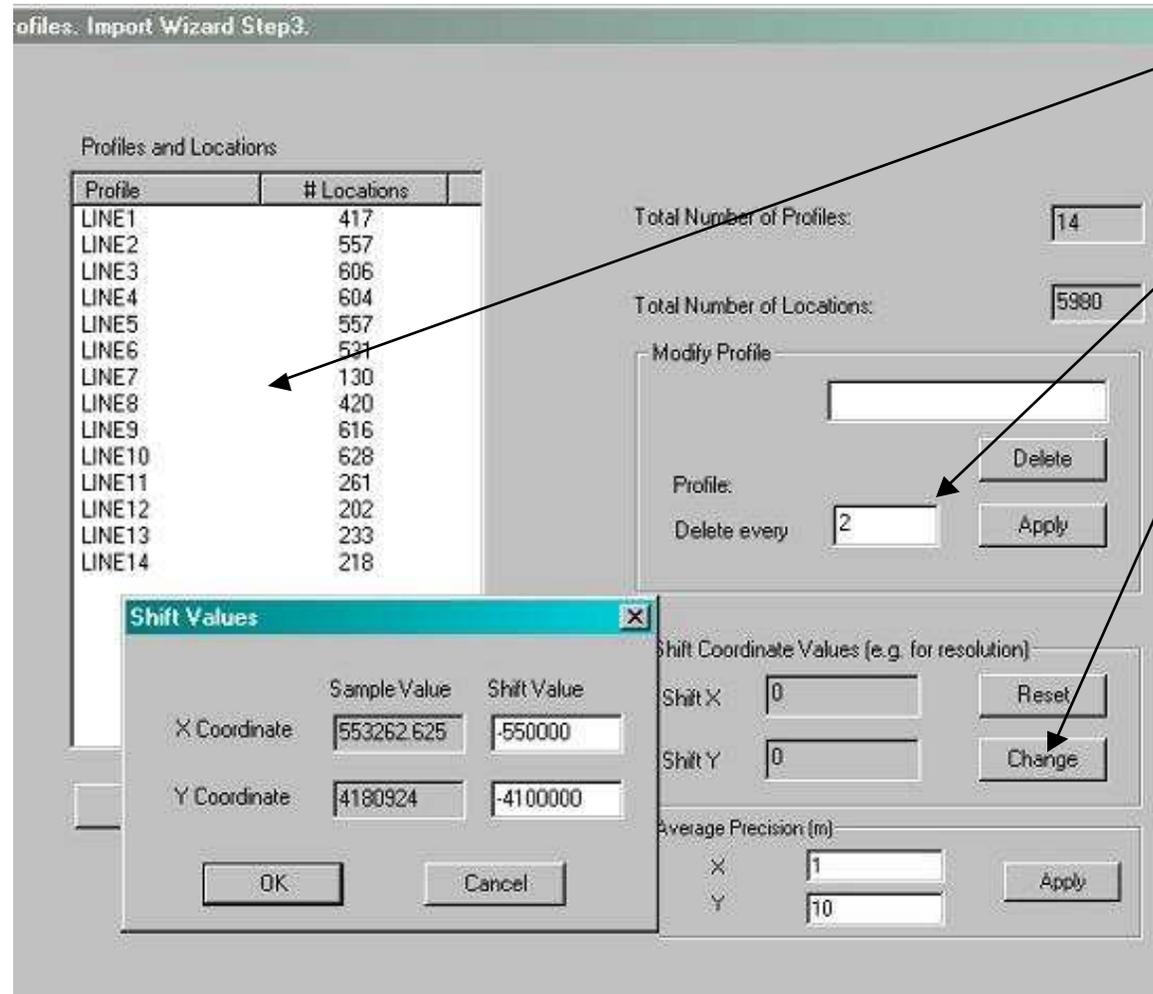
You may choose not to import all profiles or decimate the data.

In addition, if you require sub-metre accuracy in your data positioning you may wish to strip off the leading numbers of the UTM positions

Importing Data - 6

If using an EM31-R, then your data is probably positioned at a common Tx reference point. This is because the data is collected from a common Tx antennae

**Note: The centre point of the 3 Rx-Tx data are not the same.**

Run Import:

n. Import Wizard Step 3.

System Parameters

Survey Type: Moving Tx -- Moving Rx

Coordinate Systems: Horizontal

Separation Reference Point: Tx

Normalization Type: Continuous

Normalization Divisor: Inphase

Normalization Convention: Percent

Project Name: Give Me a name

Import to the Database

Messages:

Run Import

...frequencies....creating...
...system.........creating...
...components.....creating...
...locations......creating...
...data.file......creating...
Processing Completed

Importing Data - Final

**You will find a new project and then use Survey Editor to see the survey positions for multiple lines**
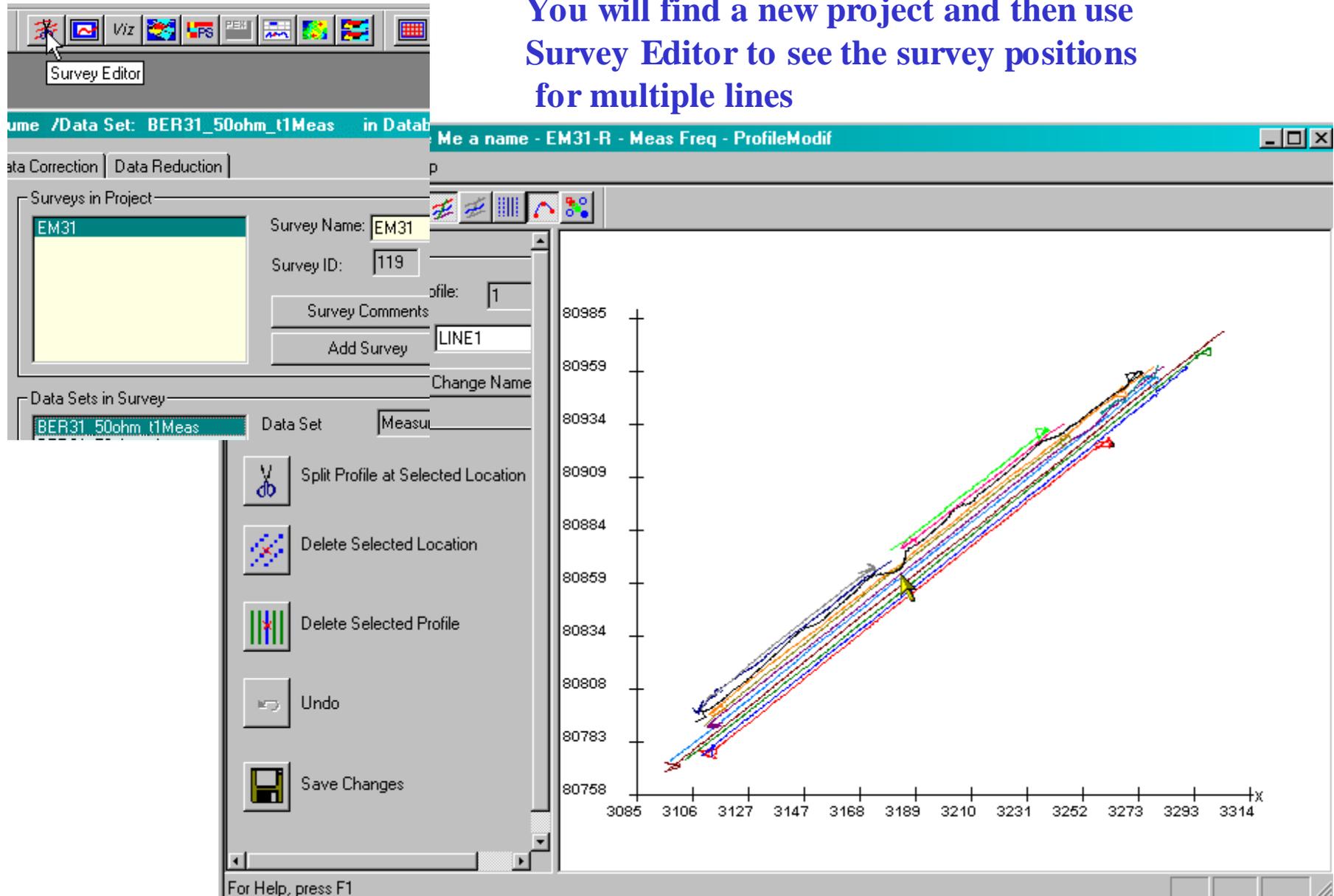
Calculating Apparent Resistivity

Select Algorithm

Helicopter Data:

- ● Homogeneous half-space apparent resistivity model
- ○ Pseudo-layer half-space model + Centroid depth algorithm

- ○ Export Resistivities to the PEX-file

Cancel   Select
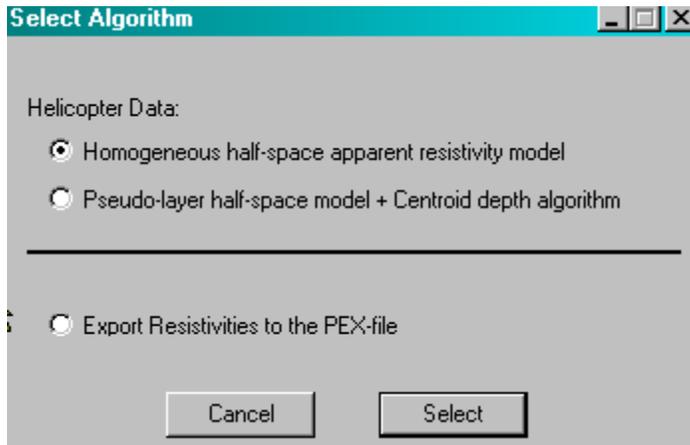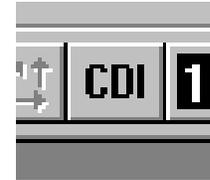
Calculate the best fitting half-space app rho for any dipole-dipole frequency EM data airborne or ground

Homogeneous half-space apparent resistivit...

Start Resistivity:
`100`

Fit Tolerance:
`0.01`

Target Type:
- ○ Amplitude
- ○ Inphase
- ● Quadrature

PROCESS

Cancel
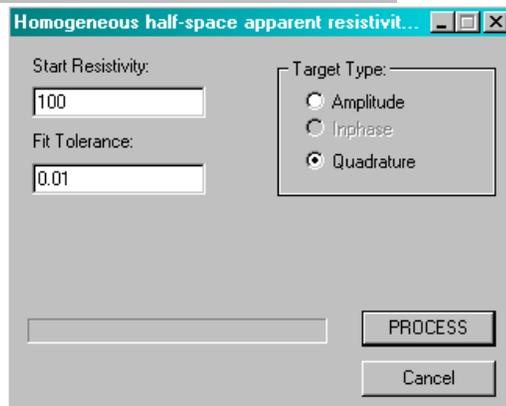
Calculate the best fitting half-space app rho choose which data elements to use e.g. for EM34 then Quadrature is default

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⚠ Do you want to store resistivity data in a new Data Set?

Yes   No

Store to new dataset or attach to original data

CDI

Plotting Data - 1   (V81_tutorial .pdf for more details)

app rho display
converts normalized
data to app rho
through short separation
algebraic formula

For apparent conductivity:
Settings -> Custom -> App Cond
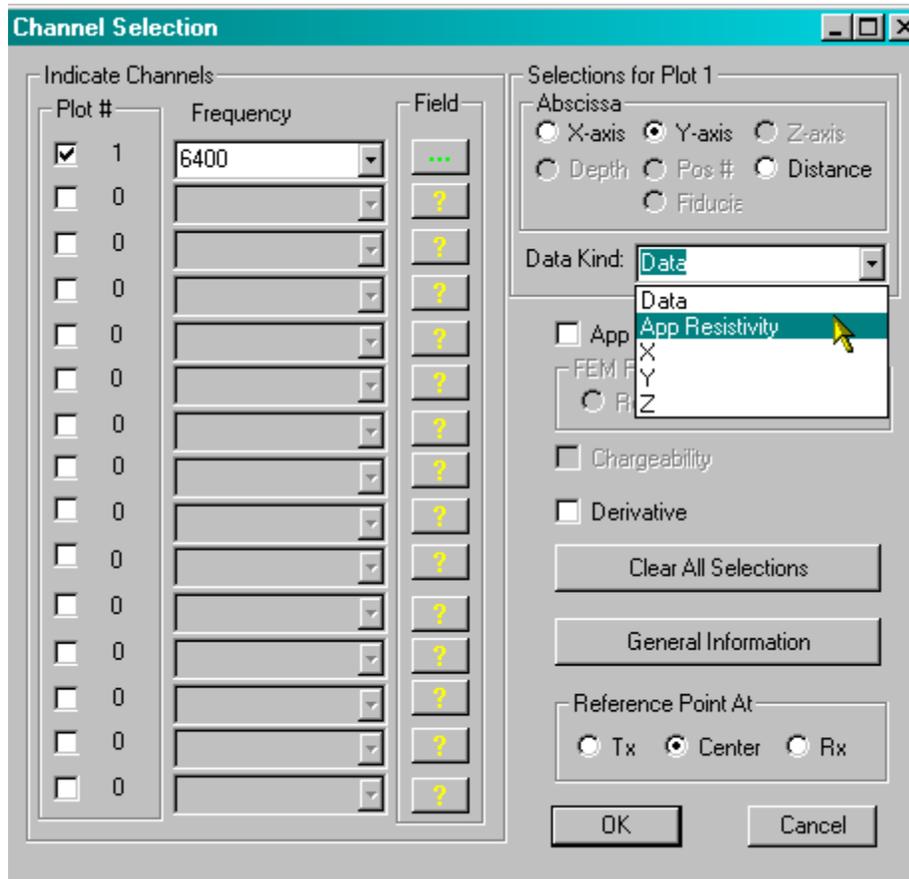
Plotting Data - 2

app rho display

use calculated best fit
apparent resistivity

for apparent conductivity
Settings -> Custom -> App Cond

Gridding data - 1

Interpolate to Grid
interpolate to regular grid

Select Components

Set Grid Settings

Gridding data - 2

Interpolate to Grid
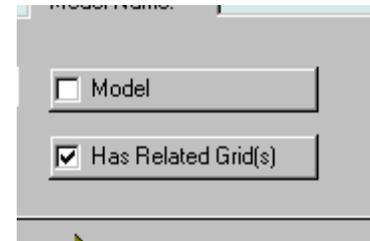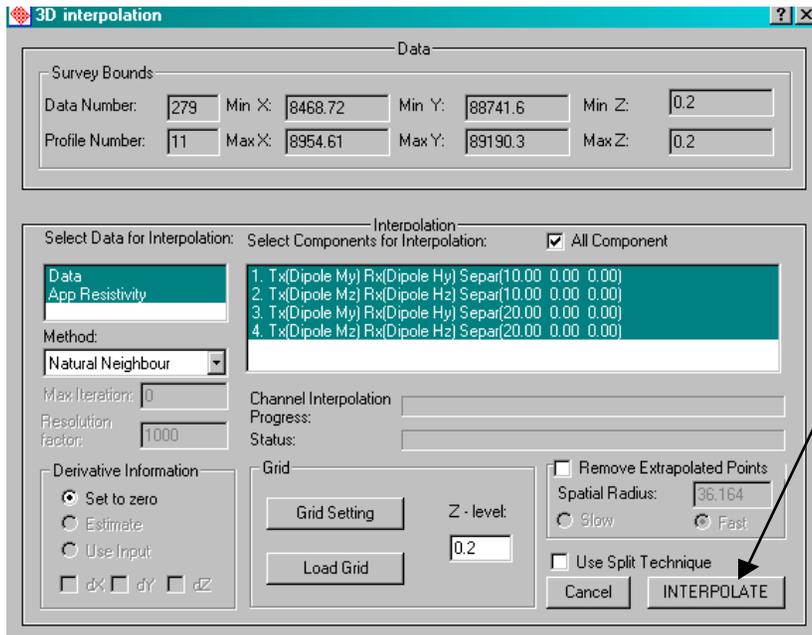
View Grids
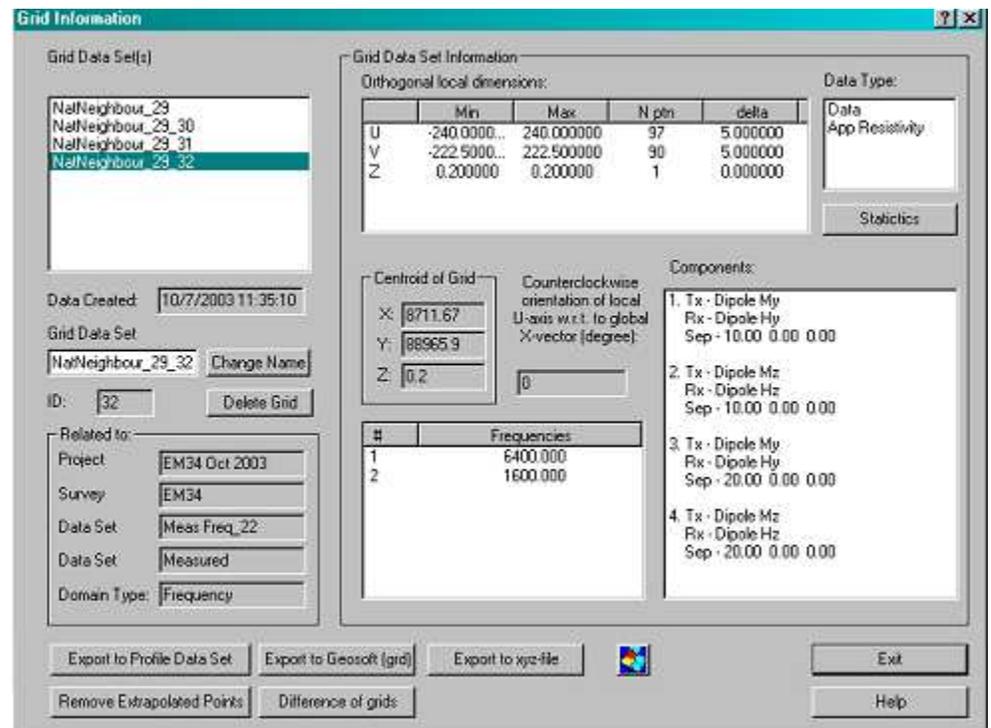
View Grid Characteristics

Viewing Gridded Data - 1

Grid Presentation
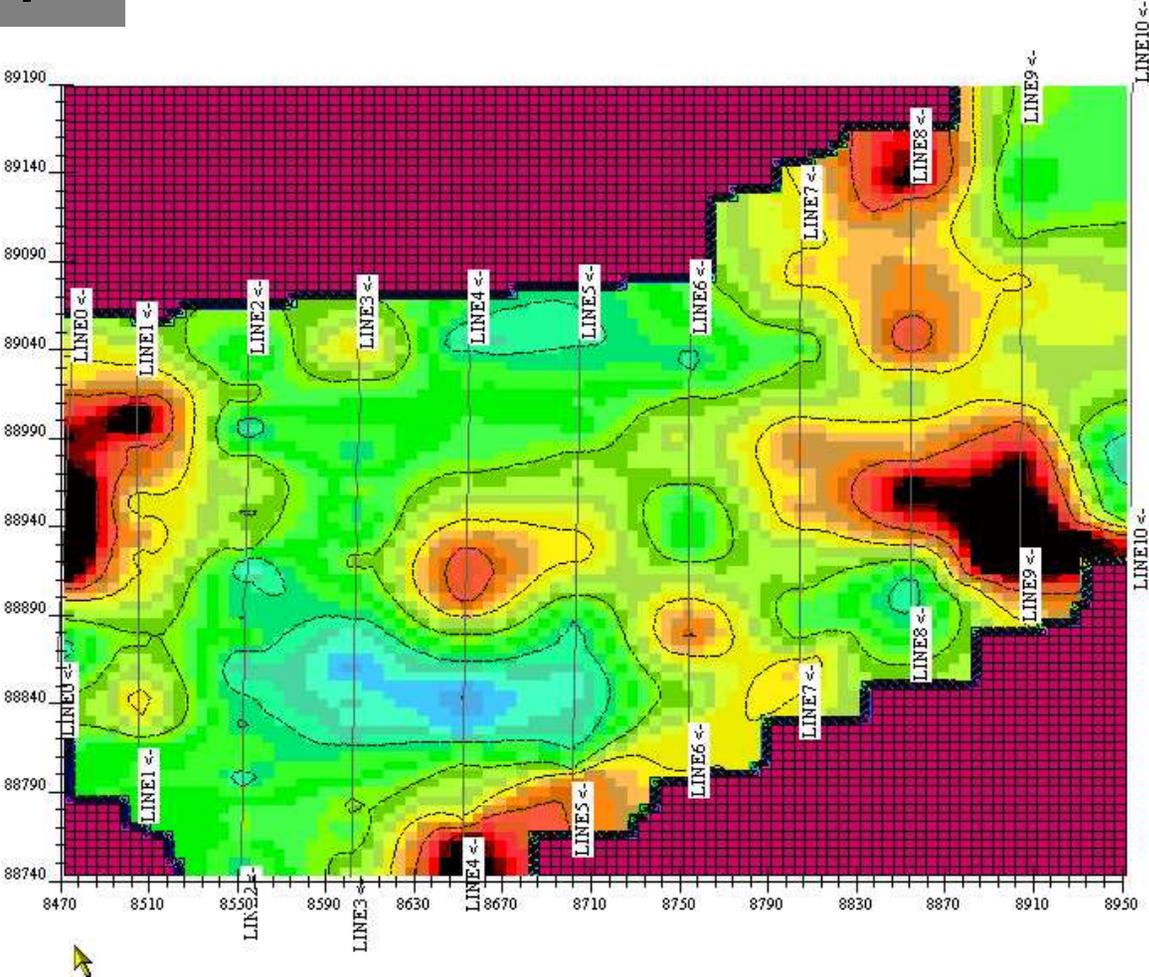
Viewing Gridded Data - 2
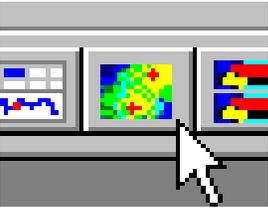
Contour

1D FEM Inversion - 1

INVERSION. Style and Data Selection

Inversion Technique
- ○ L1 - Linear Regression
- ○ Marquardt - Least Square
  - ☐ Use old method
- ○ Standard Least Square Occam
- ⦿ Enhanced Conjugate Gradient Occam with Susceptibility Extension

Forward Method
- ○ Old ⦿ New ○ Emigma
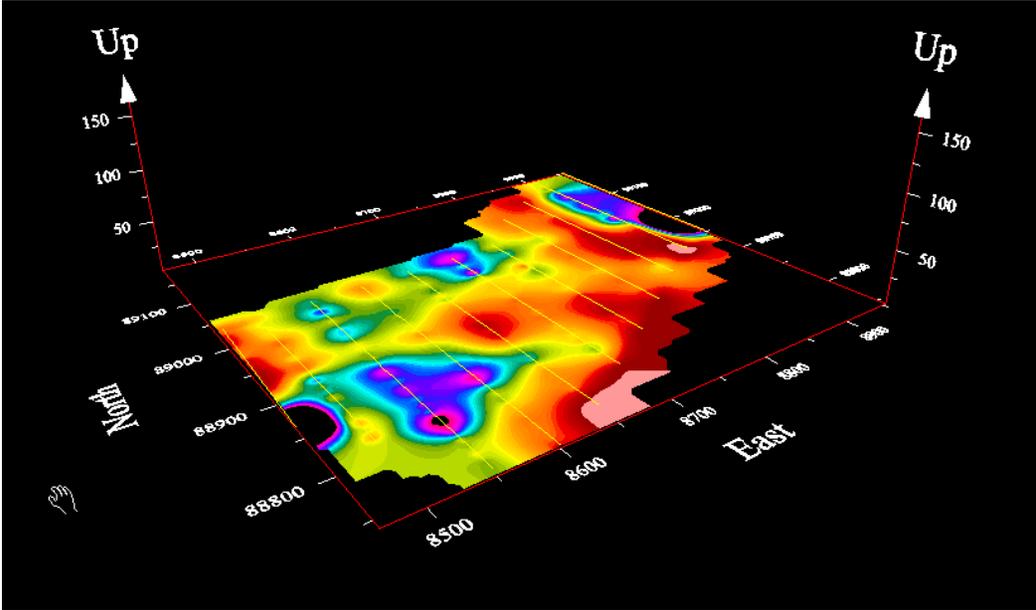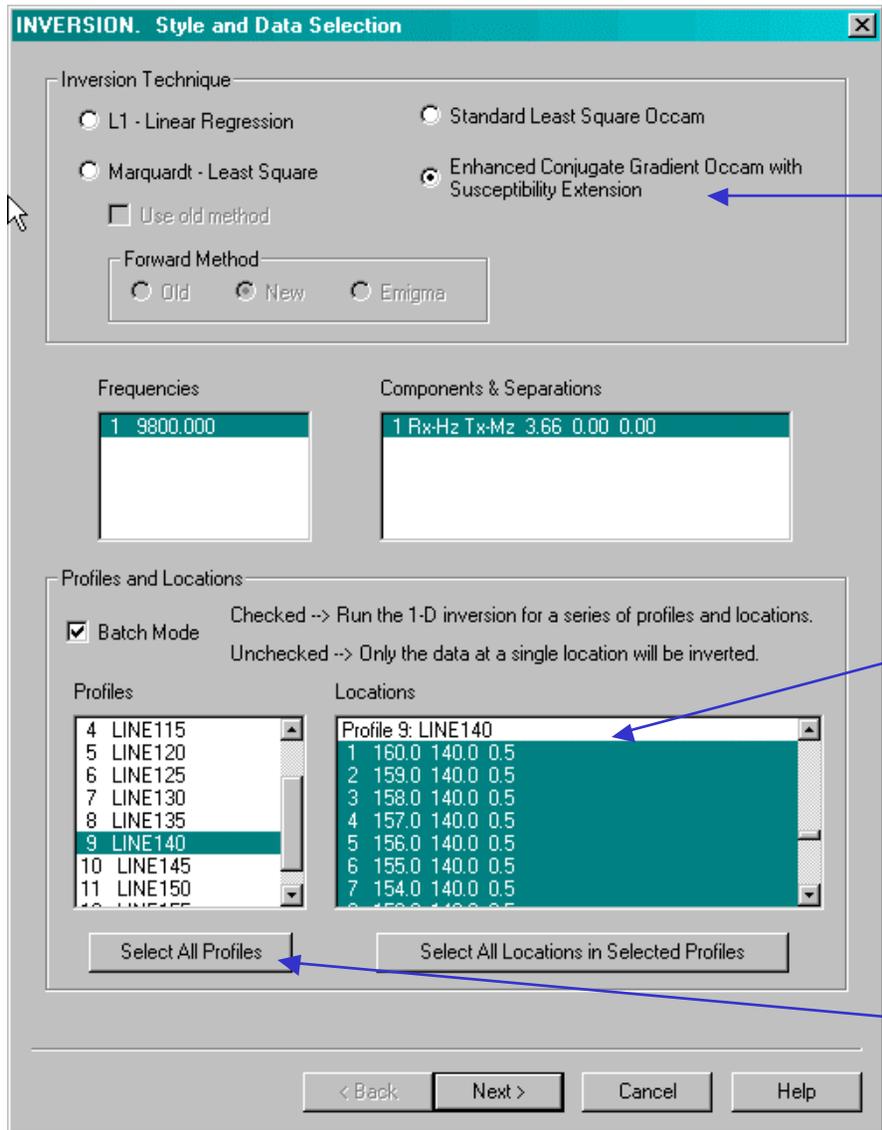
Optimized conjugate-gradient or Occam, Linear Regression and Marquardt

Frequencies
```
1  9800.000
```

Components & Separations
```
1 Rx-Hz Tx-Mz  3.66  0.00  0.00
```

Profiles and Locations

☑ Batch Mode   Checked --> Run the 1-D inversion for a series of profiles and locations.
Unchecked --> Only the data at a single location will be inverted.

Profiles
```
4   LINE115
5   LINE120
6   LINE125
7   LINE130
8   LINE135
9   LINE140
10  LINE145
11  LINE150
```

Locations
```
Profile 9: LINE140
1   160.0  140.0  0.5
2   159.0  140.0  0.5
3   158.0  140.0  0.5
4   157.0  140.0  0.5
5   156.0  140.0  0.5
6   155.0  140.0  0.5
7   154.0  140.0  0.5
```

data points for selected profile

[Select All Profiles]   [Select All Locations in Selected Profiles]

Invert single profile or All profiles

[< Back] [Next >] [Cancel] [Help]
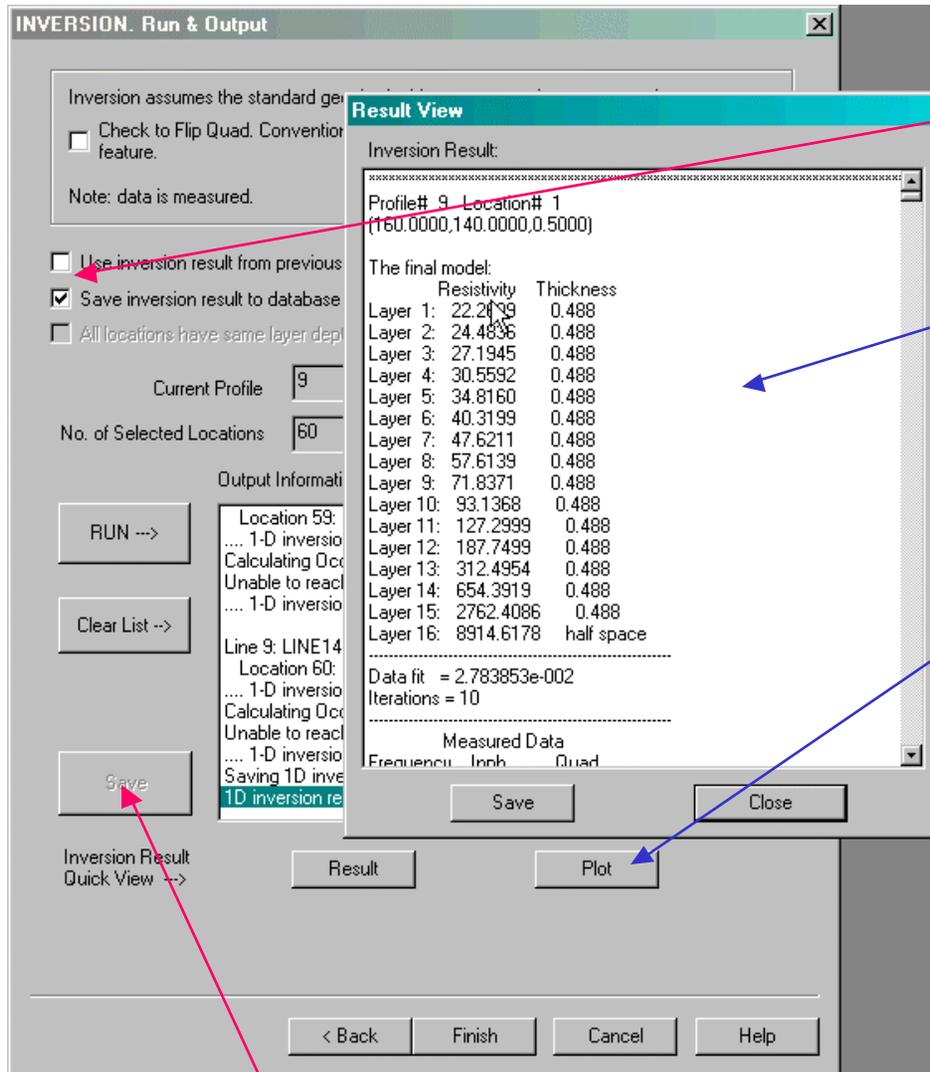
1D FEM Inversion - 2

automatic save to database

**contents of *.mod file
point by point information**

**Single line depth contour
available only for single line
inversions**

**Save to database
after completion**

1D FEM Inversion - 3
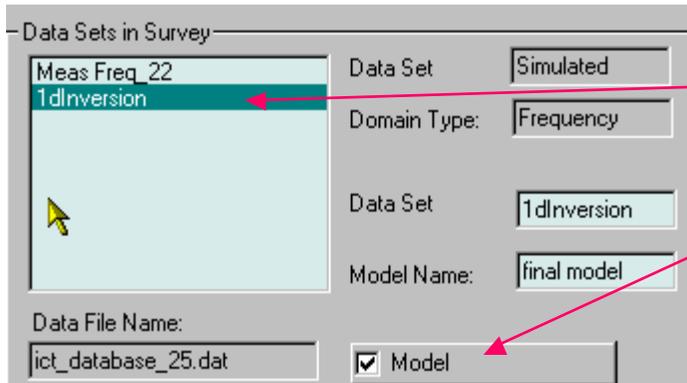
inversion results saved to database contains synthetic data under the model with the model attached – (*.pex)
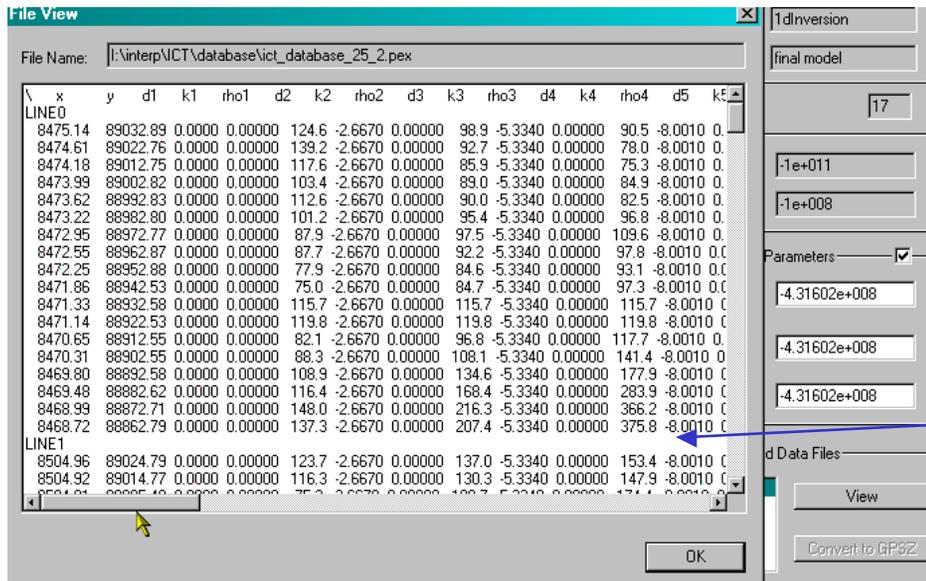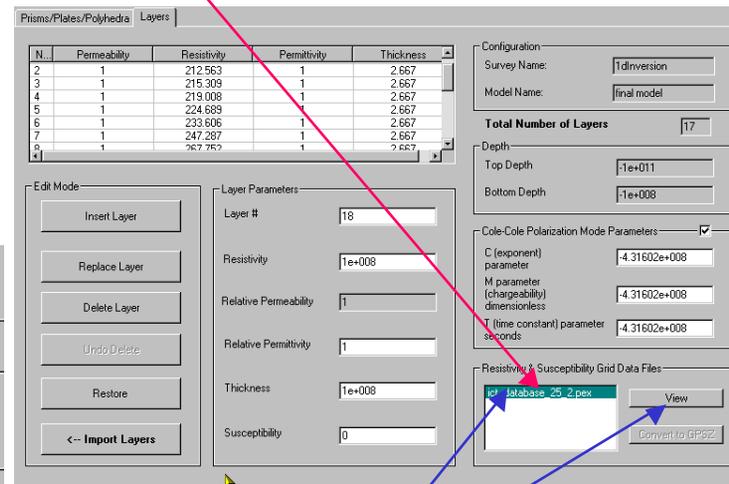
The *.pex file is a columnar ASCII file inside your database directory

Use CDI Viewer for viewing models

1D FEM Inversion - 4

CDI Viewer
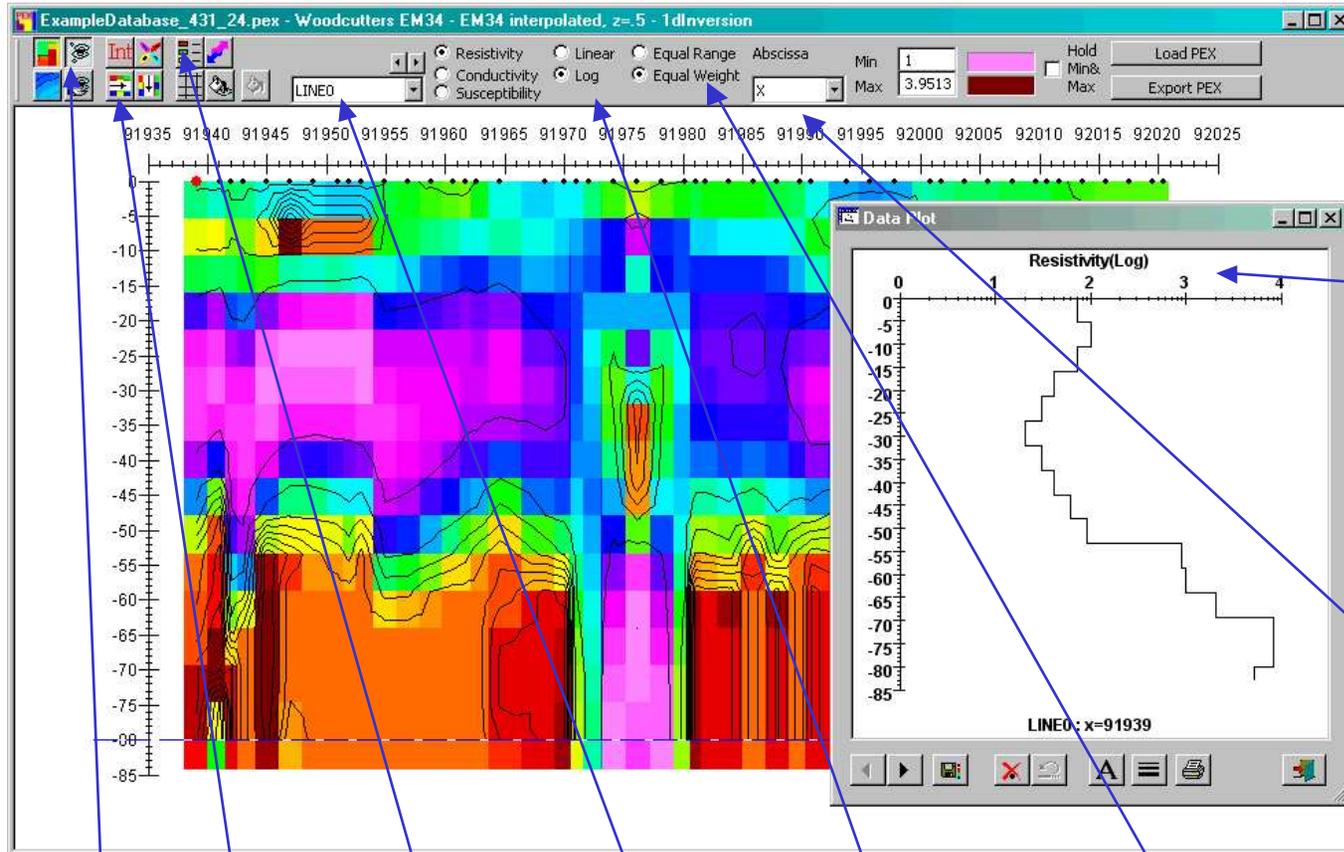
Plot of Resistivity vs. Depth for single point

Horizontal Axis selection

Colour Distribution
Equal Range – intervals equal
Equal Weight – distribution equal

Model Units

Select Line

Legend

Apply Contour

2D Interpolation

1D FEM Inversion - 5

3D Volume Contour
(with Inversion model
dataset selected)
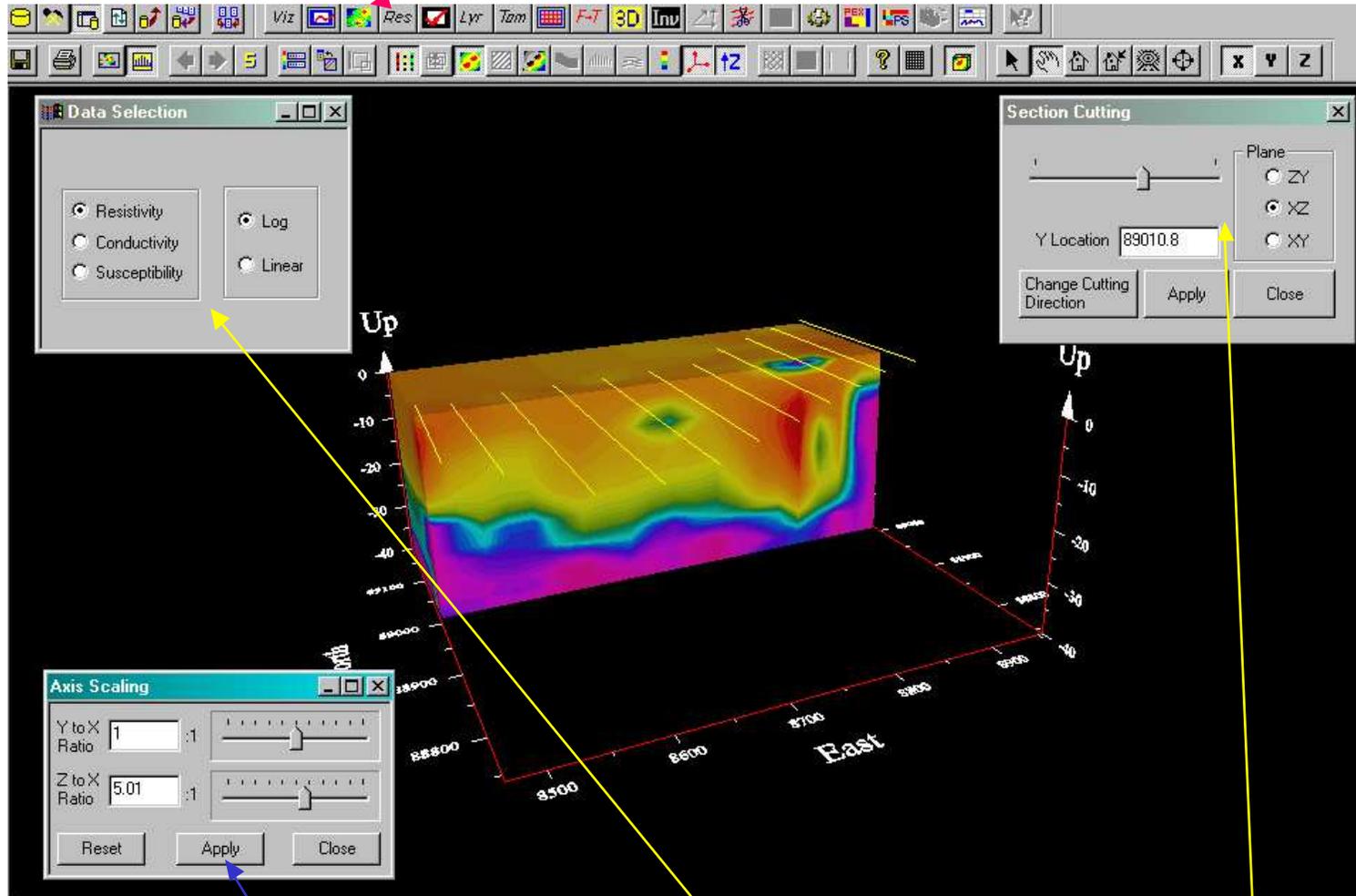
Axis Scaling   **Model Units**   **Section Cutting**

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