

Working with Profiles in IX1D v 3 – A Tutorial

Version 1.0

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Creating Profiles in IX1D

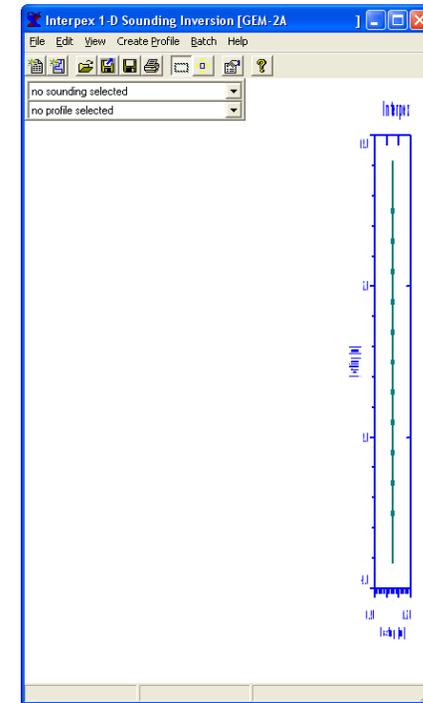
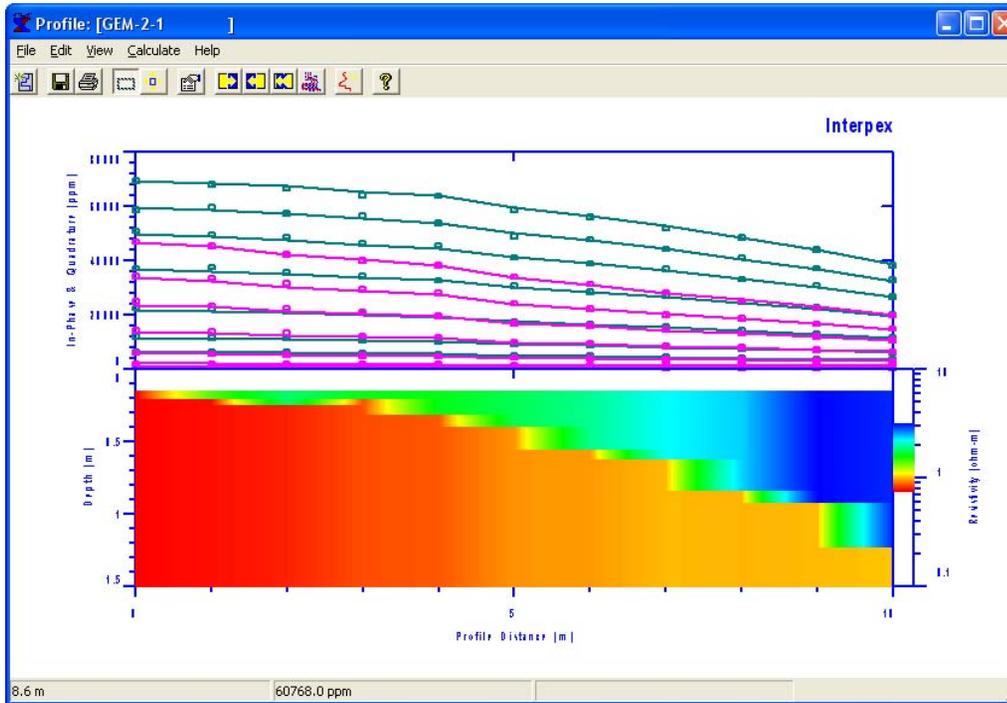
Profiles in IX1D are profiles which consist of a series of soundings. Each sounding has a data curve, layered and smooth models as well as synthetic curves for those models. There are two types of profiles, those with consistent soundings and those with inconsistent soundings.

Profiles with consistent soundings have the same type of data and the same number of points for each sounding, with the same abscissa (AB/2, frequency, time, etc) values. Only the actual measured data values are different.

Importing data from an XYZ file will import the soundings in the file and at the same time create one or more profiles as the data are loaded.

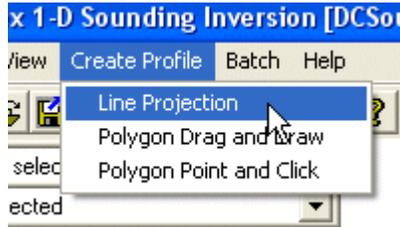
Profiles can also be created using the mouse and the sounding locations displayed on the map window. This method can create inconsistent profiles as there is nothing to prevent combining soundings with different data types or abscissas.

Creating Profiles by XYZ Import



When an XYZ file is imported, one or more profiles are created automatically as the data are loaded. Please see the tutorial “Importing Data into IX1D v 3” (IX1DImportTutorial.pps).

Creating Profiles Using the Mouse



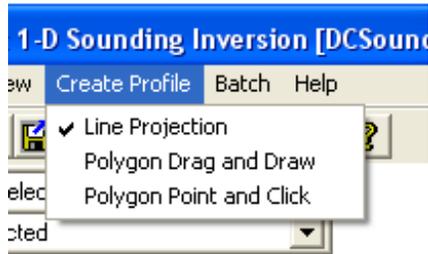
Profiles can be created from existing single soundings by using the mouse. There are 3 methods:

Line Projection allows the user to draw a line on the map and soundings near the line are gathered and projected onto the best fit line from their locations.

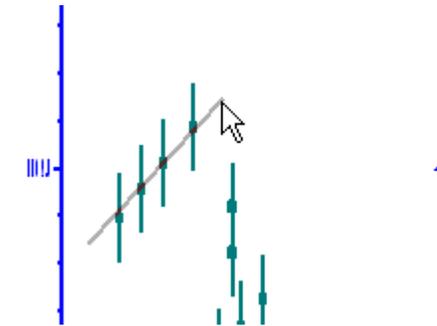
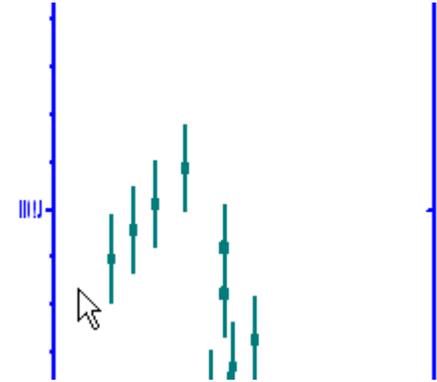
Polygon Drag and Draw allows the user to depress the left mouse button and draw a polygon enclosing the soundings for creating the profile.

Polygon Point and Click is similar but each polygon side is created by a click. The polygon is closed and the profile line created by clicking on the first point.

Creating Profiles Using Line Projection

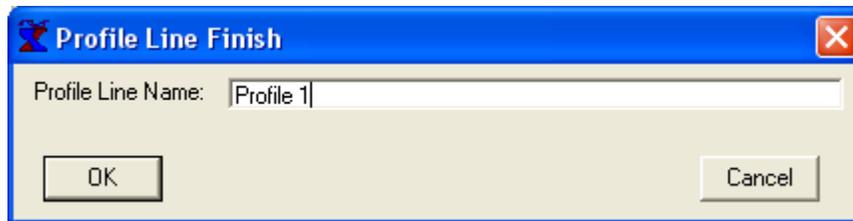


If Line Projection is selected, that menu item will be checked as shown.

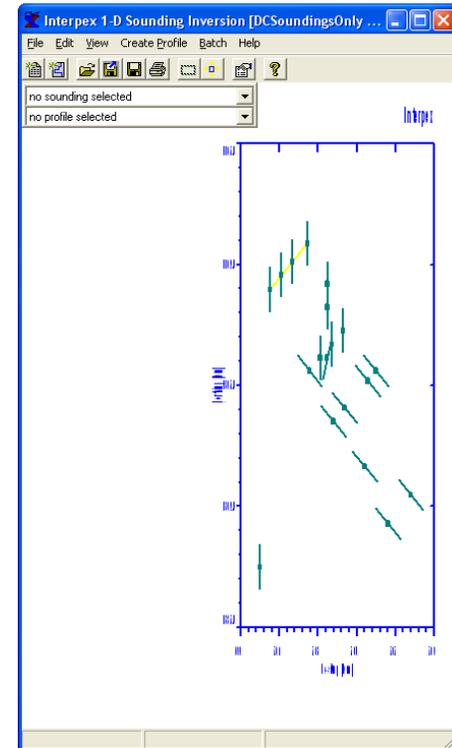
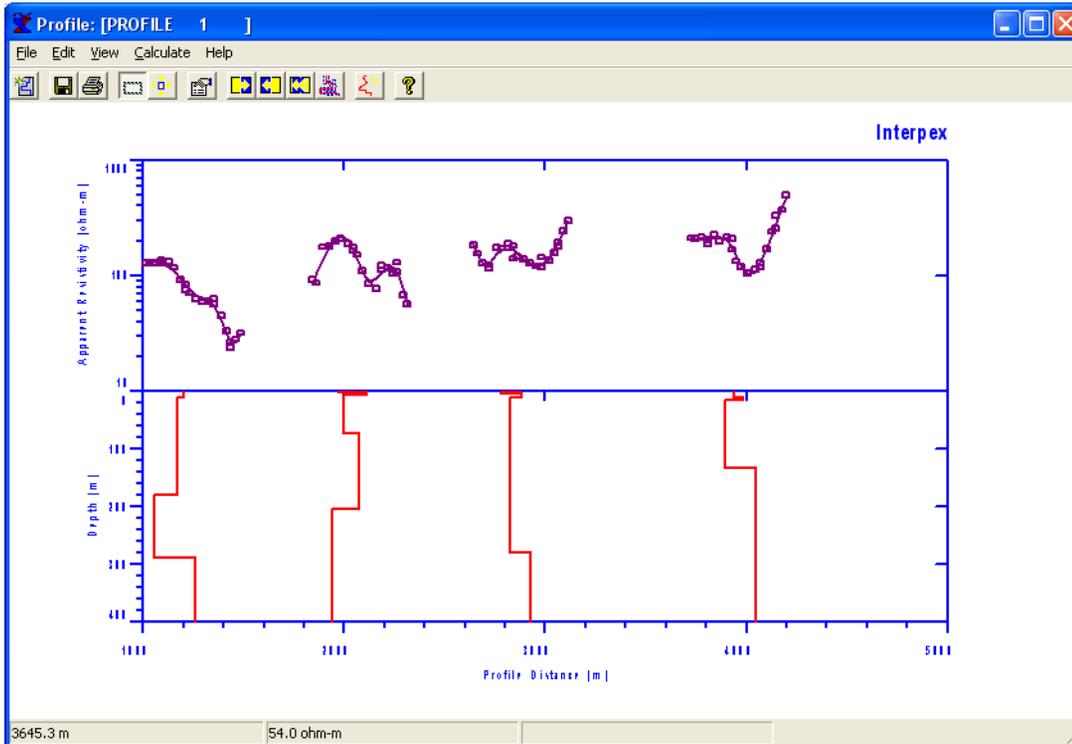


Position the mouse cursor at the beginning of the profile line, depress the left button and move the cursor to the end of the line. A line will be drawn.

Release the left button to create the profile and a dialog will pop up. Enter the profile name and press OK (or press Cancel to abort the creation).



Creating Profiles Using Line Projection

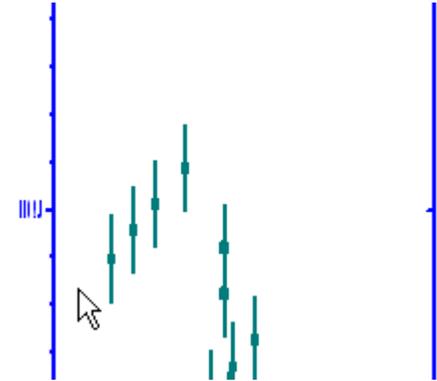


Enter a name for the profile and press OK. Now a window is opened displaying the profile data. The profile is now selected and the profile line is drawn on the map.

Creating Profiles Using Drag and Draw

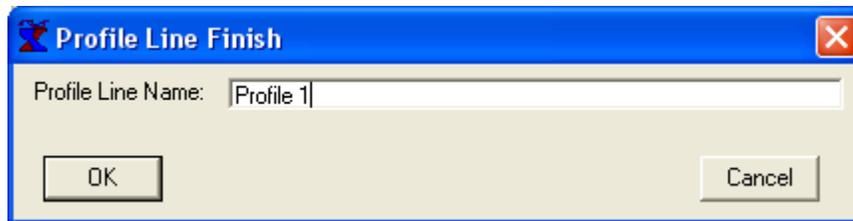
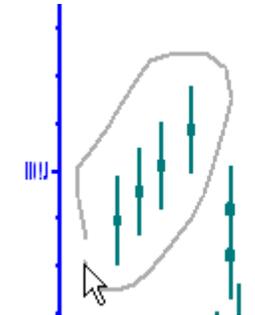


If Polygon Drag and Draw is selected, that menu item will be checked as shown.



Decide which soundings you want to include in the profile and position the mouse at some point near them. Depress the left mouse button and draw a polygon around the soundings.

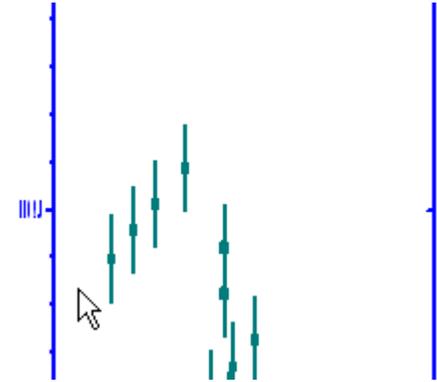
Release the mouse button to display the profile name entry box. Enter the name and press OK to display.



Creating Profiles Using Point and Click

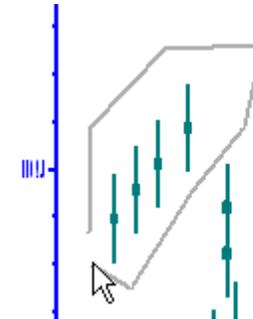


If Polygon Point and Click is selected, that menu item will be checked as shown.

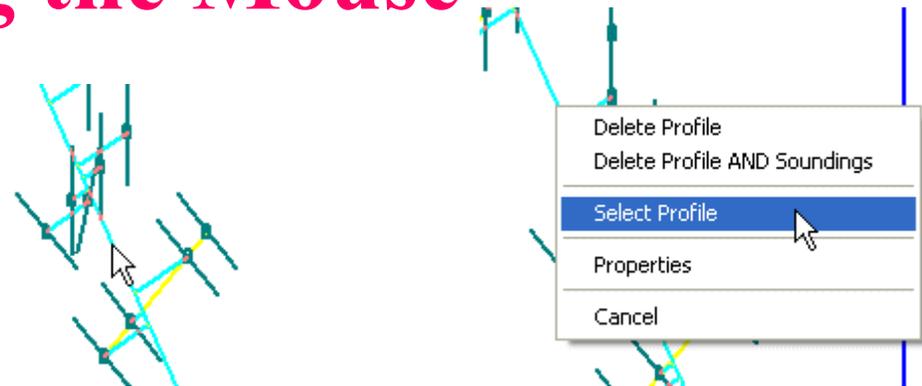
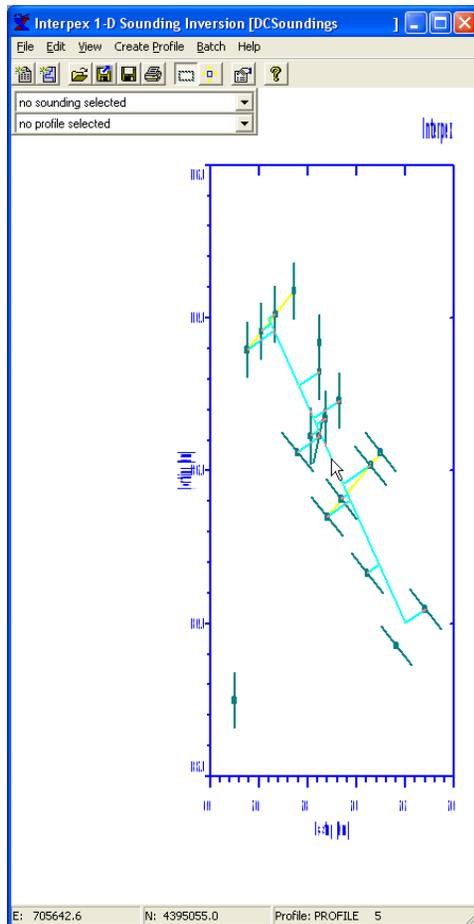


Decide which soundings you want to include in the profile and position the mouse at some point near them. Click the left mouse button and then move and click repeatedly to draw a polygon around the soundings.

Double click the mouse to finish and display the profile name entry box. Enter the name and press OK to display.



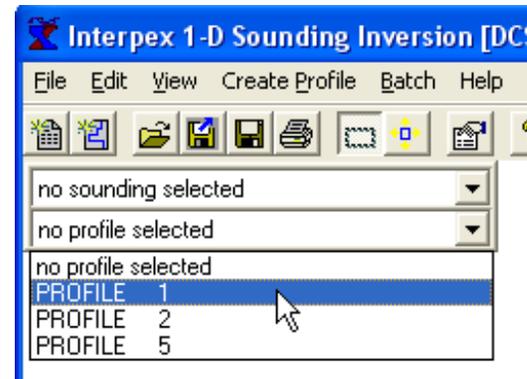
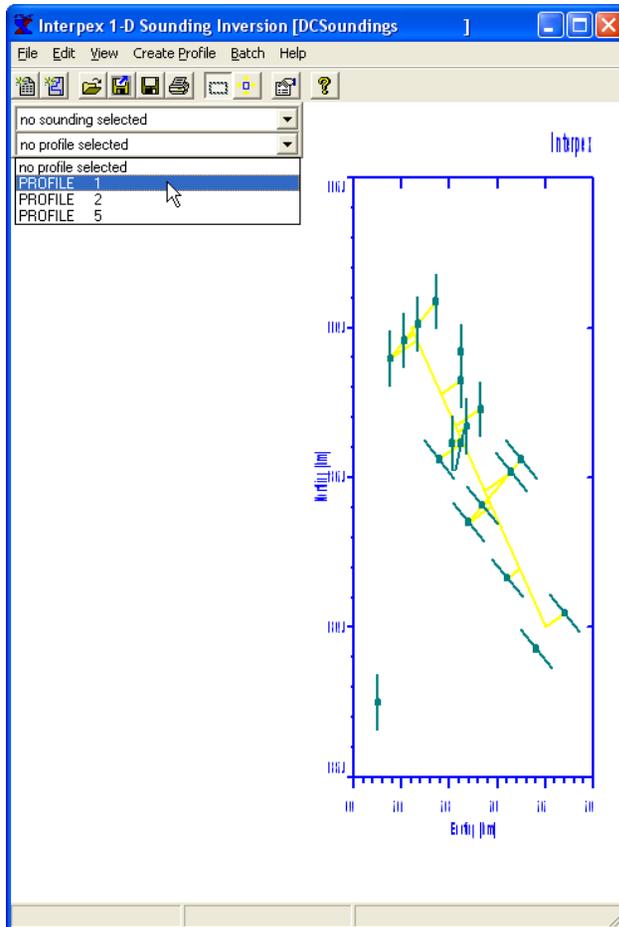
Select a Profile from the Map Display using the Mouse



If you point at a profile in the map window, the cursor does not change, but the profile “lights up” (turns from blue to yellow).

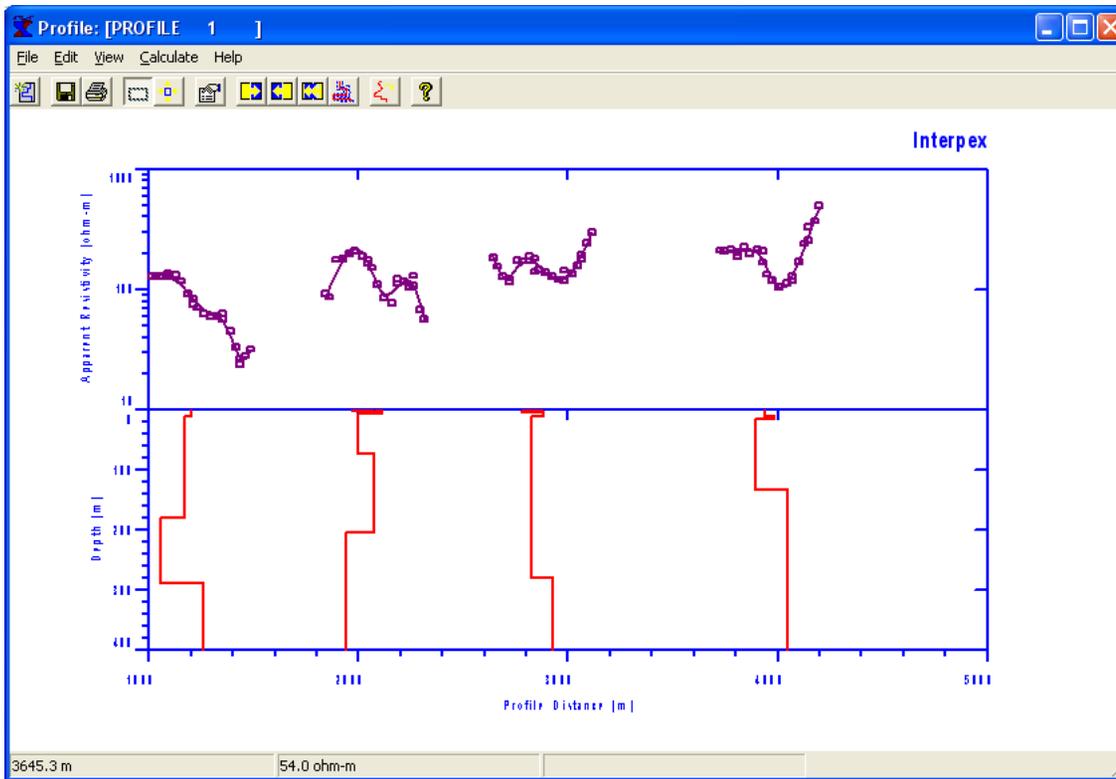
Click on it to open the profile. Right-click to produce a pop-up menu. Now you can delete the profile (and soundings too), select it or edit map display properties.

Select a Profile from the Map Display using the Drop-Down Menu Box



Click on the down arrow on the right of the profile menu box to open the list. Scroll down to point at the profile you want and click the mouse to display the data in the profile window.

The Profile Data are Displayed on the Top with the Model Displayed on the Bottom

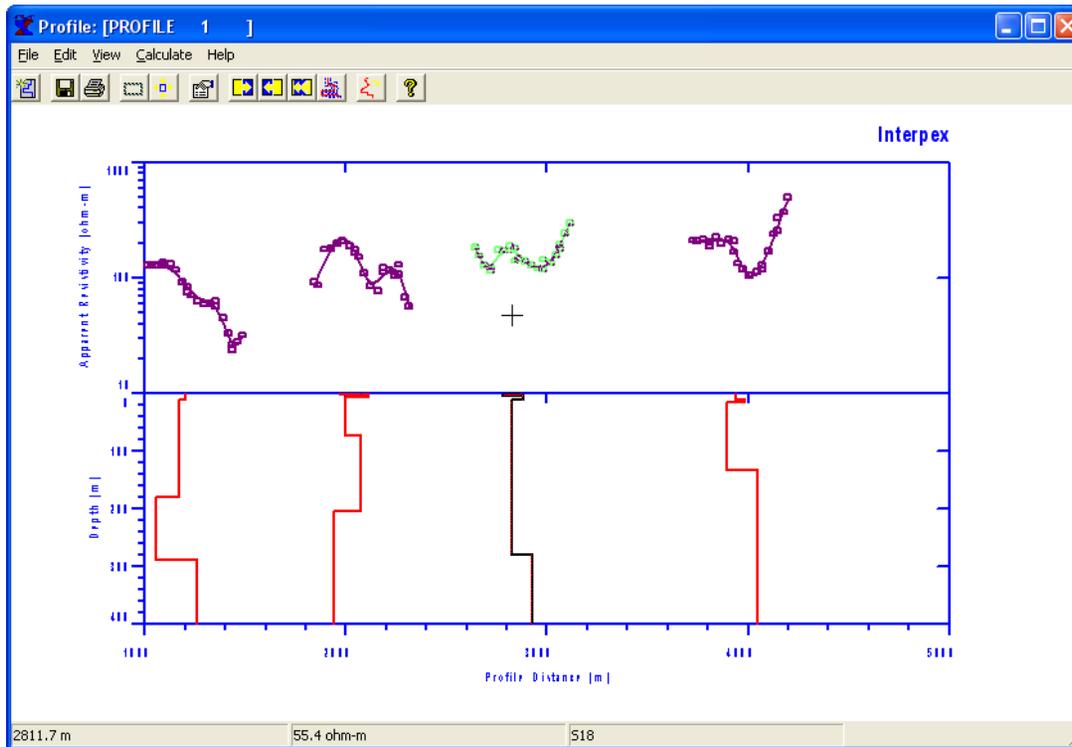


The default display mode is the Zaborovsky plot for both data and models

The toolbar buttons can be used to perform quick-batch calculations. You can do a forward calculation  for the models shown on the display

Or a single iteration of inversion , Or multiple iterations 

Working with Data in the Profile Display

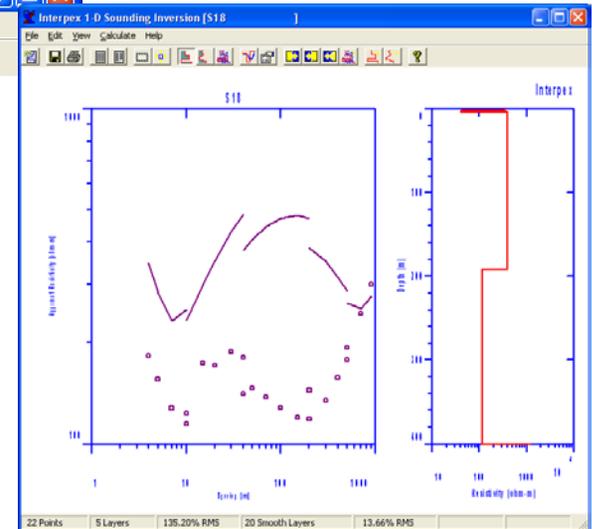
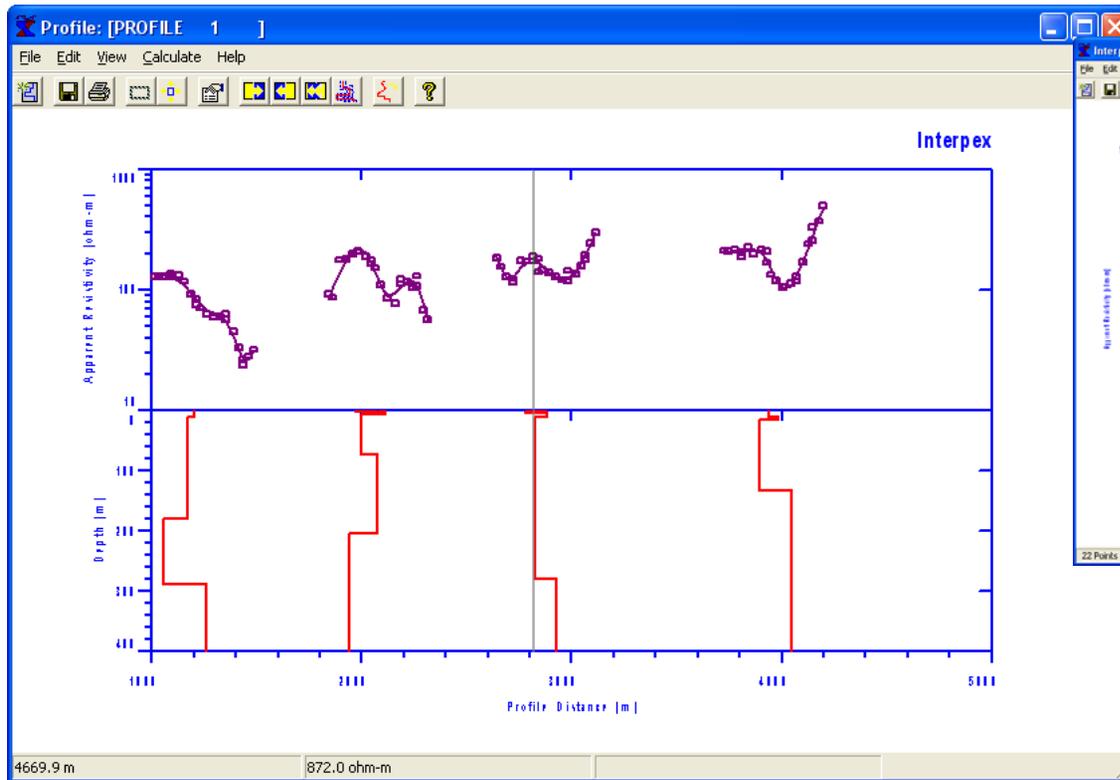


Moving the mouse along the profile display will “light up” the sounding curve and model curve when positioned at a sounding. The cursor will turn into a crosshair as shown.

Clicking the mouse will then select the sounding and display it in the sounding window.

If the Zaborovsky plot option is selected for data and model, the data are plotted as displaced sounding curves and the models are plotted as displaced well log plots.

Working with Data in the Profile Display



If the sounding is modified in any way, it is replaced in the profile when a new sounding is opened.

When a sounding is selected for display from the profile, a vertical line appears on the profile marking the sounding. Using the left/right arrow keys will select the next sounding to the left or right. Home/End selects first/last sounding.

Working with Quick Batch in the Profile Display

Using Forward/Inverse/Estimate commands in the Profile Window performs quick-batch operations on some or all of the soundings along the profile.

Using Forward, Inverse..., Analyze Equivalence, Estimate Smooth Model or Estimate Layered Model from the Calculate section of the menu will perform the requested operation on every sounding in the profile. So will using the buttons 

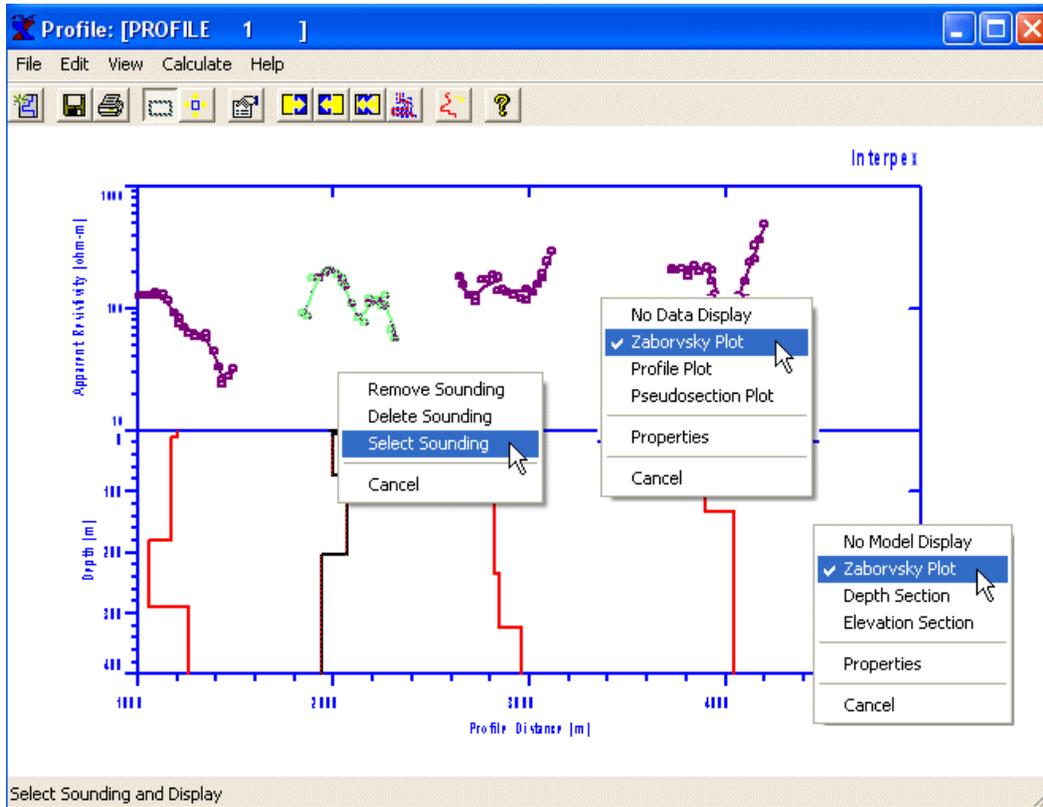
Forward, Inverse..., Analyze Equivalence operations will use whatever happens to be a part of each individual sounding as a starting point, so there is no attempt to force consistency among the soundings.

Developing a model in a sounding window and using Edit/Copy Model puts that model in the clipboard. Using Edit/Paste Model to All in the profile window pastes that model to all soundings in the profile. This copies and pastes not only the model parameters themselves, but the Fix/Free status and whether depths or thicknesses are used in the inversion.

If you use File/Export/Model to save a model in a file, and then use File/Import Model in the profile window, that model will be imported to every sounding in the profile. This imports model parameters only, not Fix/Free status and whether depths or thicknesses are used in the inversion.

Some of these operations can be carried out on a subset of the soundings in the profile by right-dragging the mouse. Right dragging is done by depressing the right button and dragging the mouse to draw a rubber-band box. The width of the box is important, not the height. Now selected operations can be carried out only on the soundings which are within the lateral limits of the box.

Right-Clicking the Mouse in the Profile Display

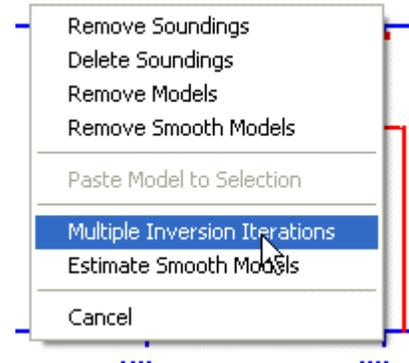
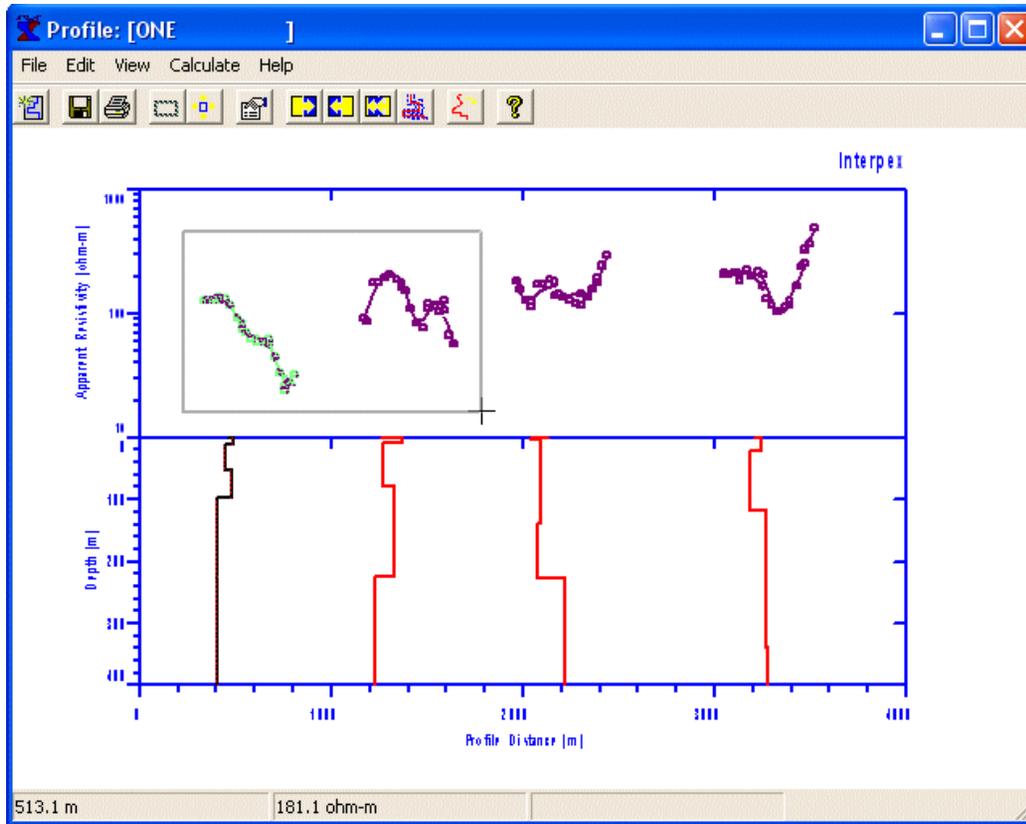


If you right-click in the data area of the profile display when you are not pointing at a sounding, you have the option of selecting the data display type or editing the View Properties.

If you right-click in the model area of the profile display when you are not pointing at a sounding, you have the option of selecting the model display type or editing the View Properties.

If you point at a sounding in the profile display, the sounding “lights up” and the cursor changes to a crosshair. Right clicking gives the option to Remove the sounding from the profile (leaving it in the database), Deleting it from both the profile AND the database, or Selecting the sounding for display.

Right-Dragging the Mouse in the Profile Display



Remove Soundings takes them out of the profile but leaves them in the database.

Delete Soundings removes them from both the profile AND the database.

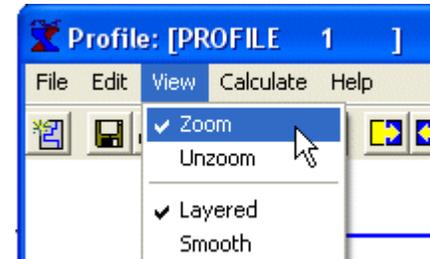
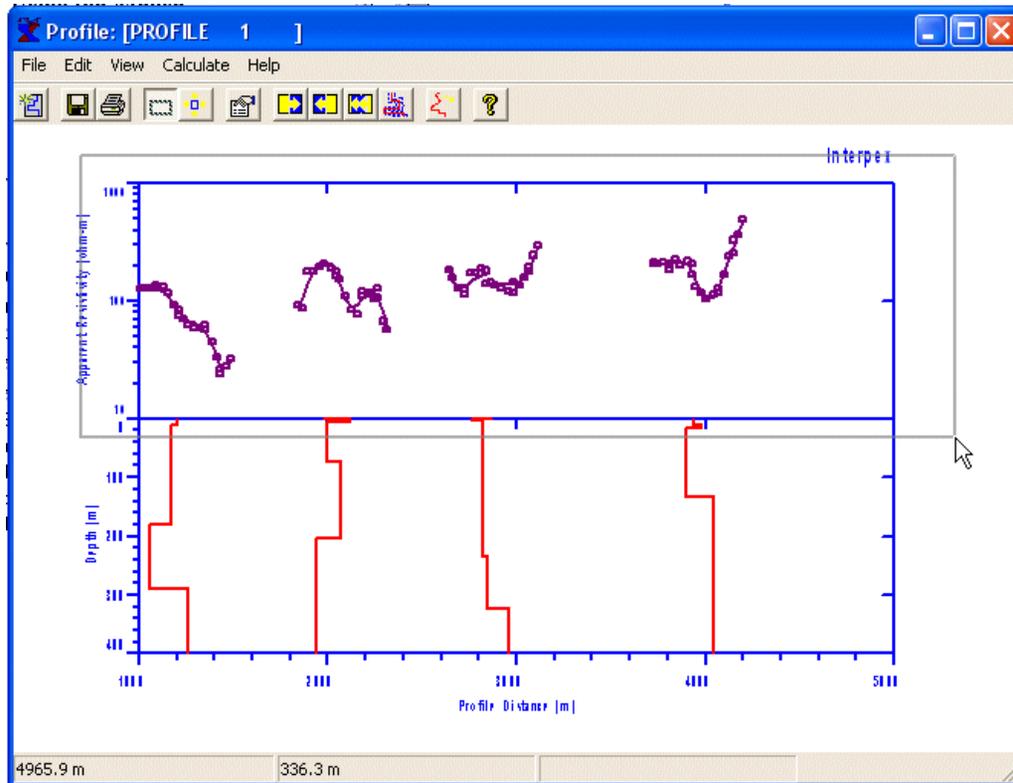
Remove (Smooth) Models strips the synthetic curves from the soundings.

Paste Model to Selection (if available) copies clipboard model to selected soundings.

For Example, to select the two soundings on the left, depress the right button and drag the mouse so that the soundings are between the left and right side of the rubber-band box which is created. Then release the mouse to display the pop-up menu.

Multiple iteration inversion and Estimate Smooth Models will work only on the selected soundings.

Dragging the Mouse in the Profile Display

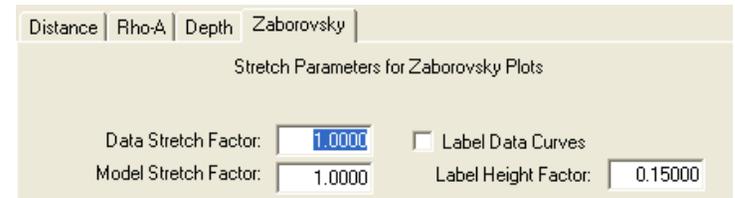
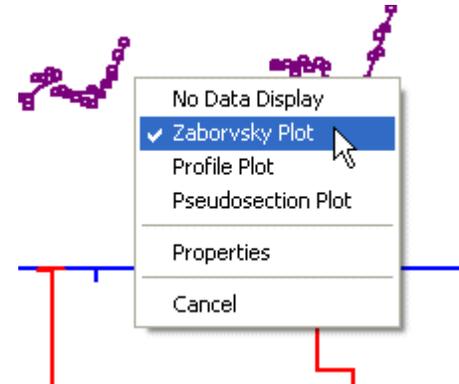
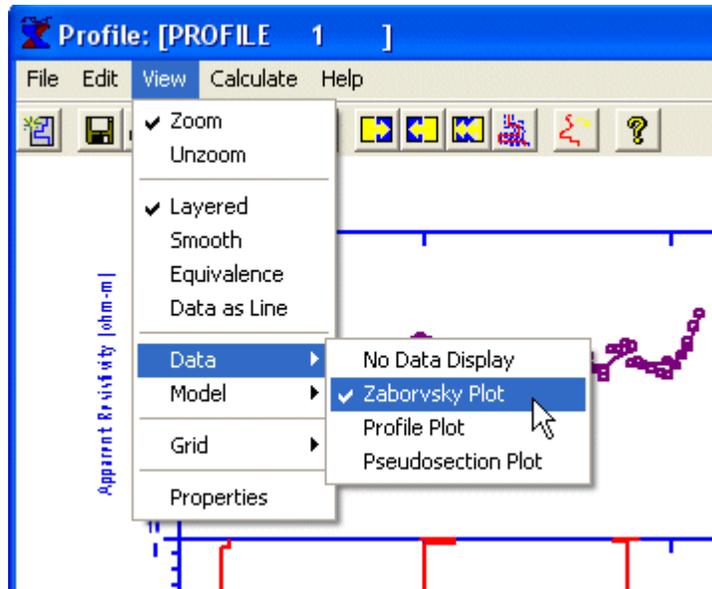


When IX1D is in the Zoom mode, The View/Zoom menu item will be checked and the Zoom toolbar button will be depressed as shown.

Click on View/Zoom or the button to toggle the Zoom state.

Dragging the mouse (with the left button depressed) is used to zoom the display. This works in a fashion similar to the Unzoom (Autoscale) except that the boundaries of the zoom box are used to calculate the new scales. The zoom box can be inside, partially outside or completely outside of the graphic display. If the center is within the data graph, the data are zoomed. Likewise for the model.

Fine-tuning the Profile Display



Profile plots are available only for consistent data. Zaborovskiy plots and Pseudosection plots are available for all data.

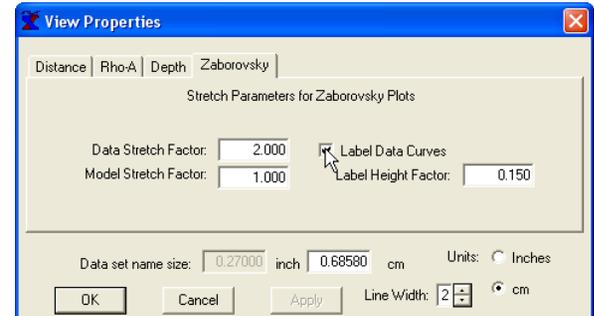
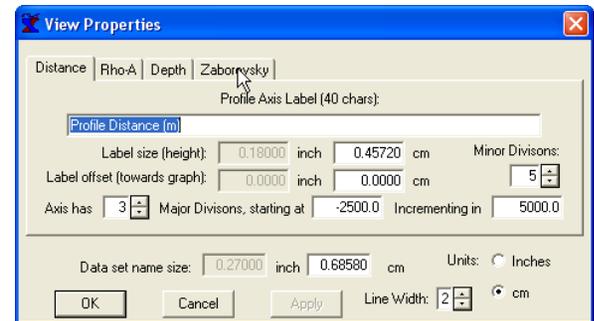
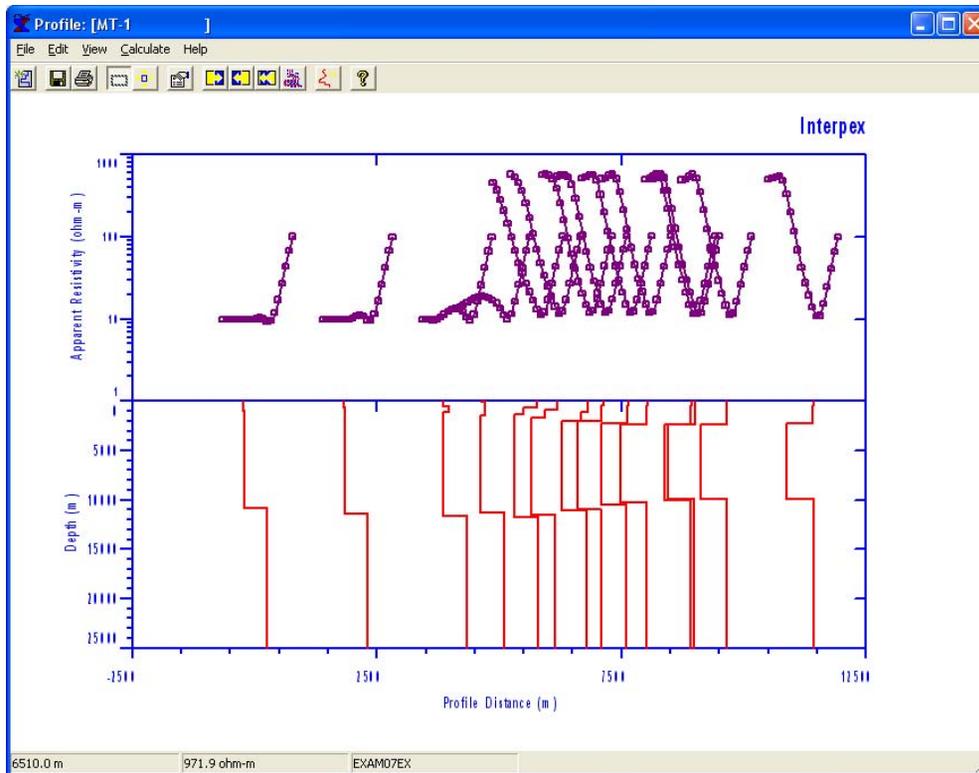
Properties allows control over the Stretch Factor for Zaborovskiy plots, and for labeling the data curves.

Adjust the Stretch Factor and Label Height Factor for each profile to get the best display.

There are three methods of displaying the data and the data display can be switched off.

Use View/Data options to select one of the displays or right-click inside the data display to pop-up a list of options.

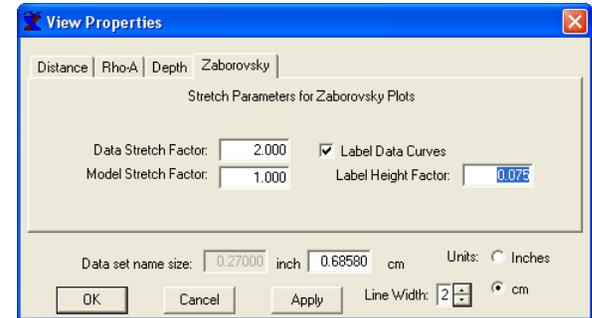
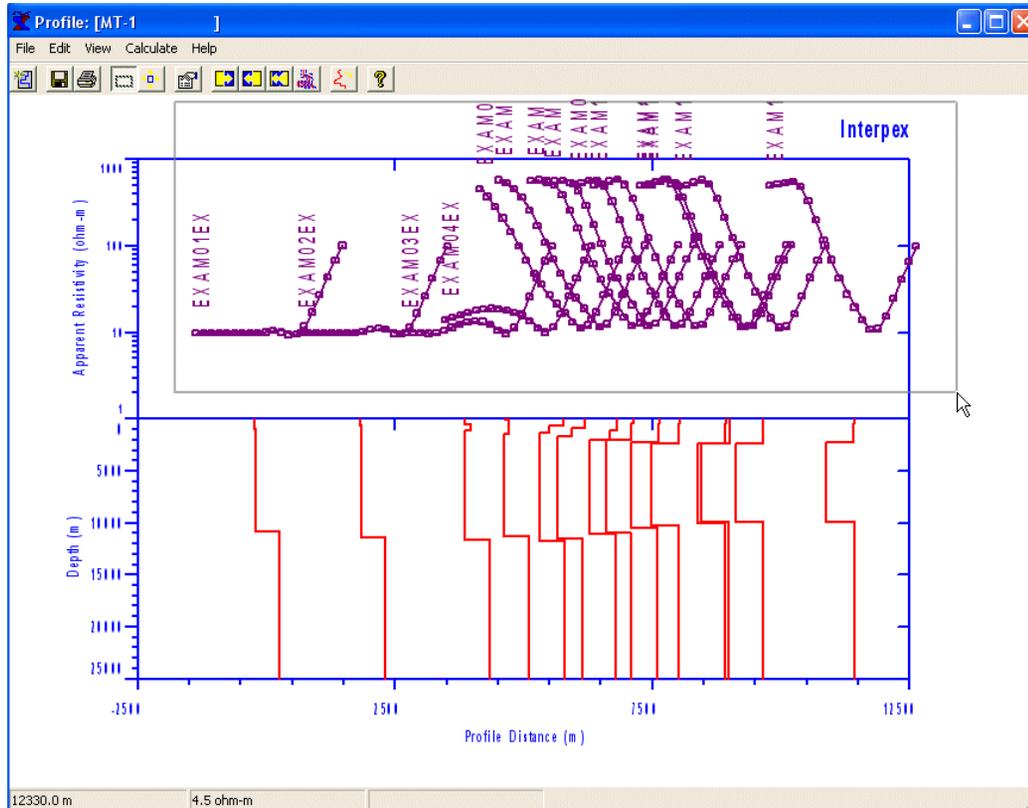
Fine-tuning the Profile Display



For these MT data, the sounding curves appear too short on the Zaborovsky plot. We edit properties by using View/Properties, pressing the toolbar button  or right clicking in the display (normal cursor) and selecting Properties.

Select the Zaborovsky tab, change the Data Stretch Factor to 2, select Label Data Curves and press OK.

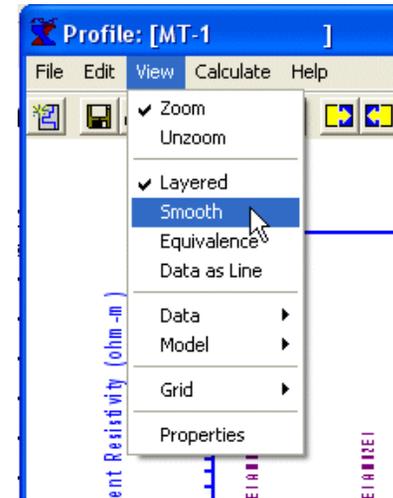
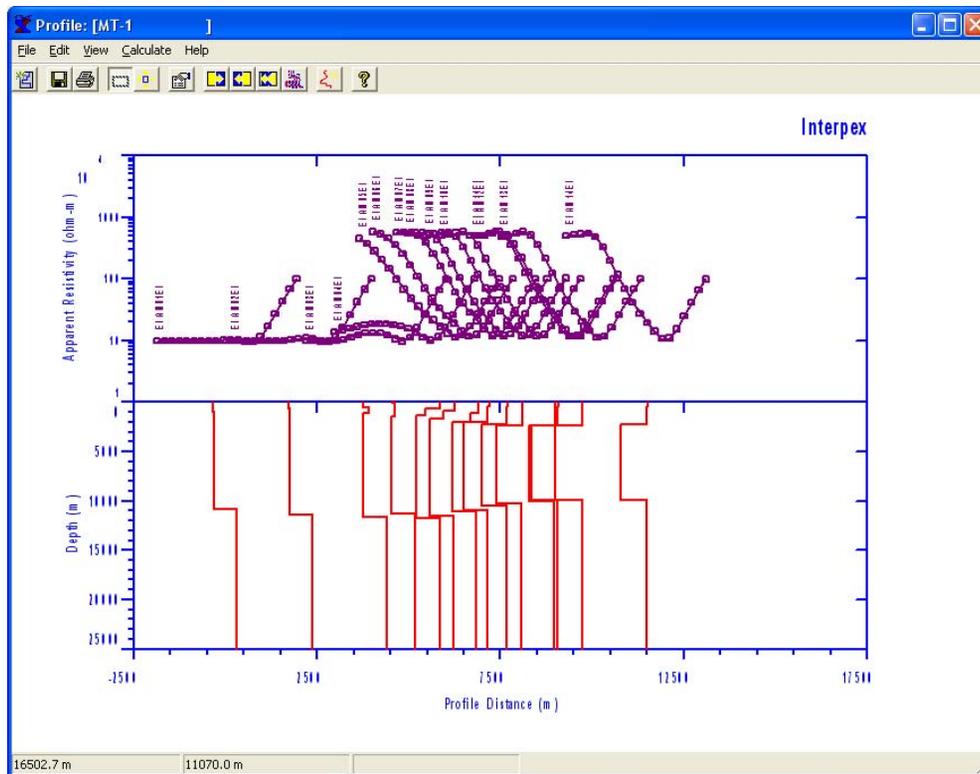
Fine-tuning the Profile Display



The sounding curves look OK now, but the labels are too large and we need to add more to the top and right of the data display. Use the mouse and left button to drag the rubber-band box as shown and release to zoom the display out.

Then use View/Properties to change the Label Height Factor to 0.75 and Press OK.

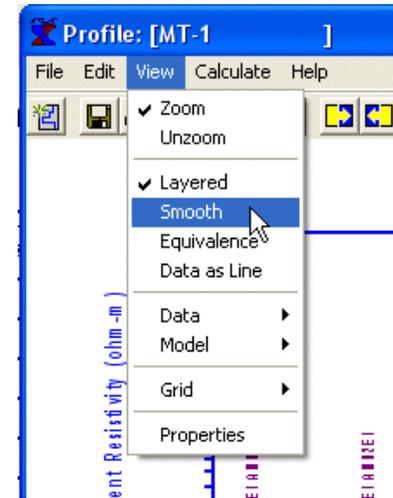
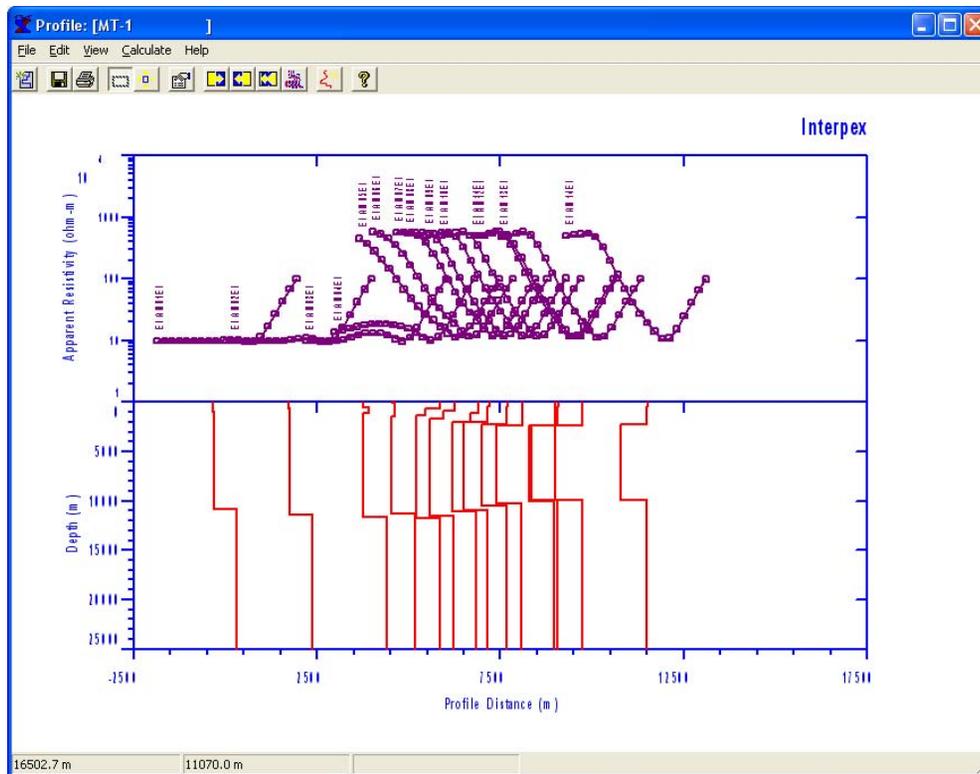
Fine-tuning the Profile Display



That is much better now. We can add the display of the smooth model curves by clicking on View/Smooth as shown. This will display both the smooth and layered models. We could display equivalent models as well by clicking on View/Equivalence, but this would make the display quite busy.

As long as the model is displayed as a Zaborovsky plot, layered, smooth and equivalent models can be displayed on the same graph. For colored section displays, equivalent models cannot be shown at all.

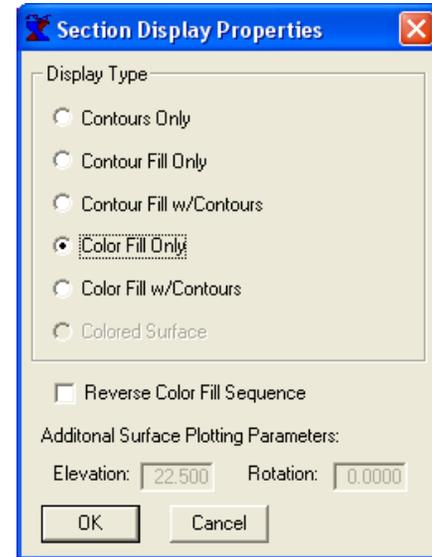
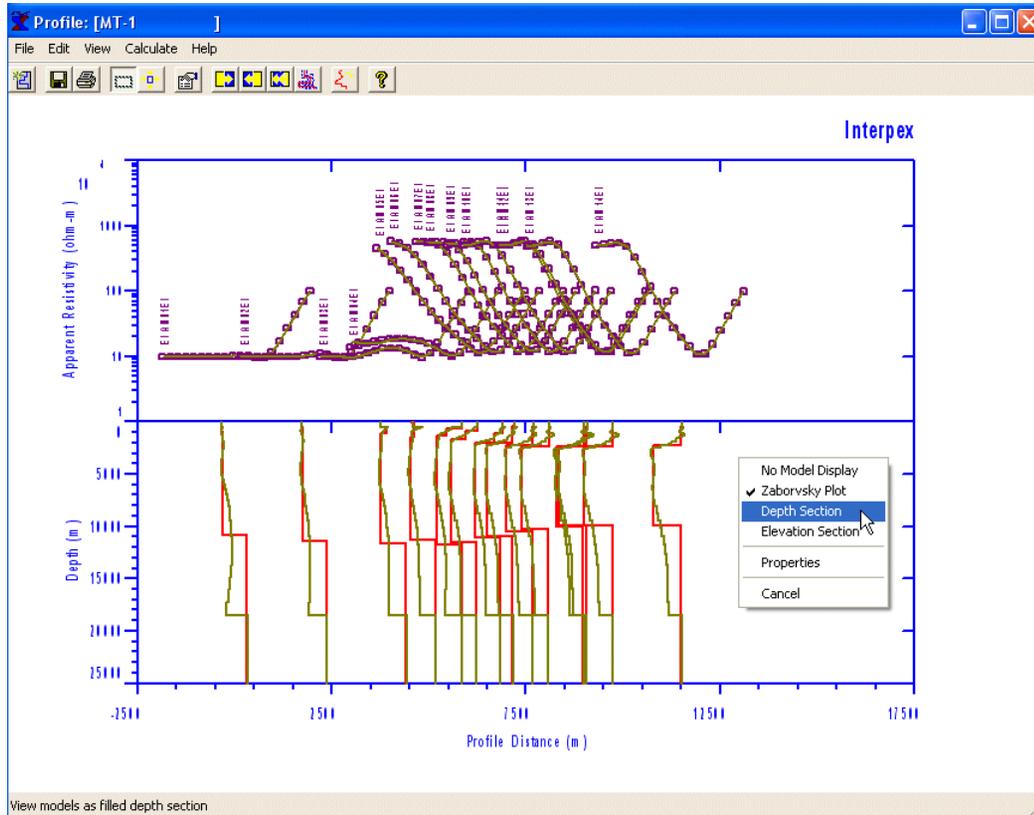
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Fine-tuning the Profile Display

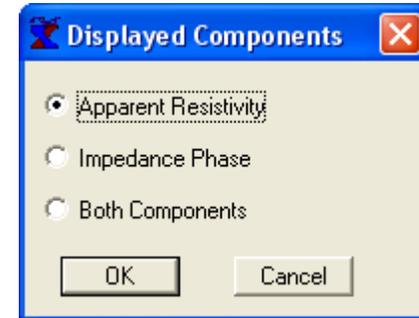
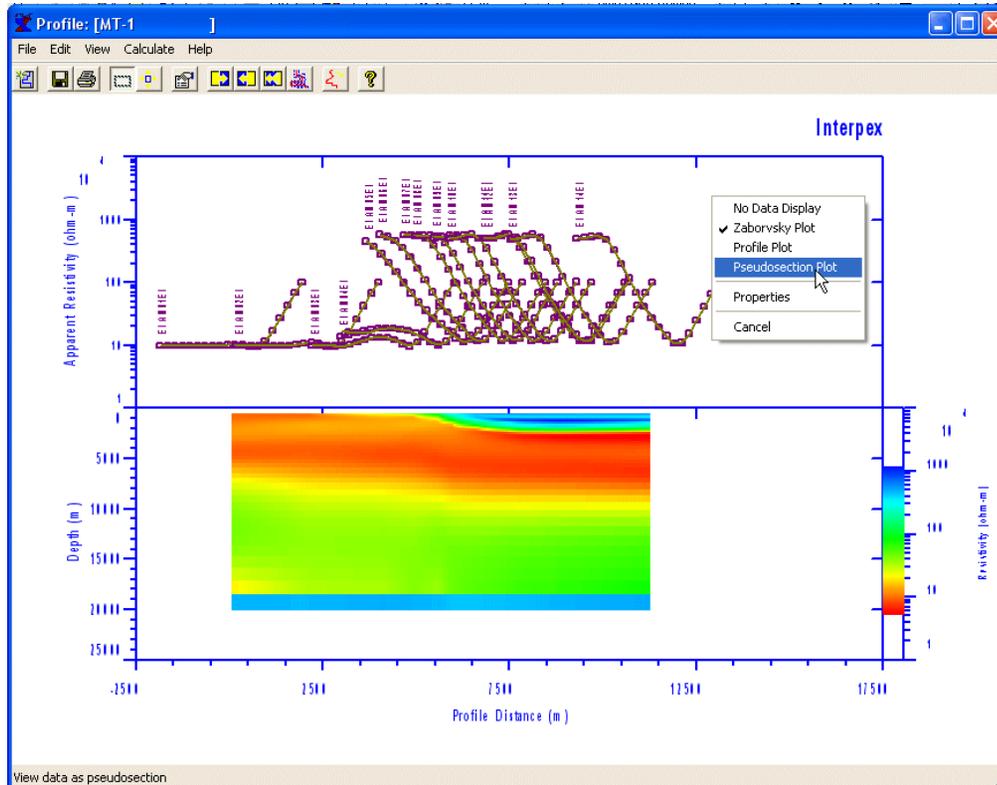


Selecting depth section offers several options. Color fill makes a nice display. You can reverse sequence to make conductors blue and resistors red if you wish.

Now let's try looking at a depth section. Right click in the blank space on the right side of the model area and select Depth Section from the pop-up menu.

Note that only one model can be displayed as a depth section at any time. When View/Smooth is selected, the smooth model will be shown, otherwise the layered model will be shown.

Fine-tuning the Profile Display



Selecting the pseudosection for MT data allows for display of Apparent Resistivity, Impedance Phase or both.

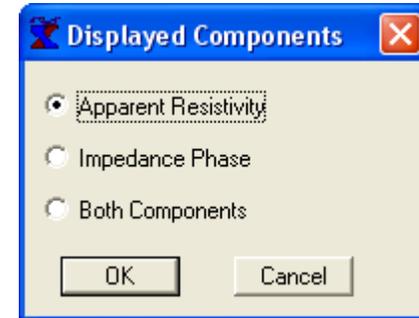
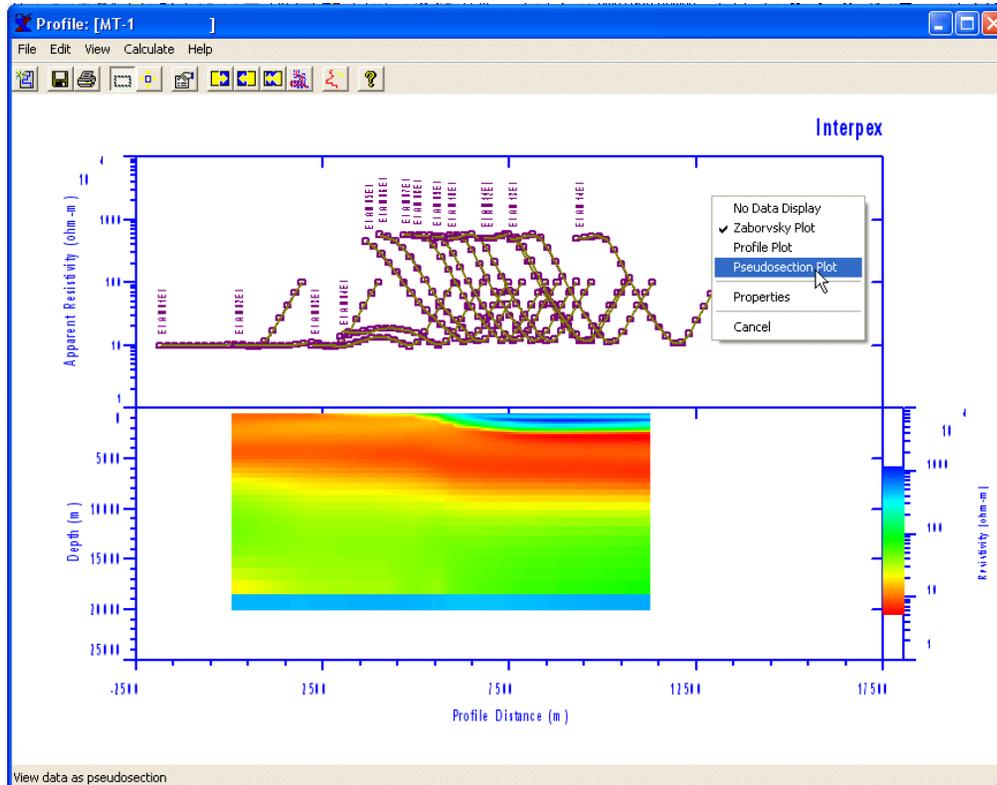
Let's select Apparent Resistivity. Then we get a similar dialog to the one we just had for the model, and select color fill again.

This rescaled the display so we need to use the zoom tool as before to get the data to display correctly.

Now we see the smooth model displayed as a color section with the color scale on the right side.

Now let's display the data as a pseudosection, in similar fashion to the data. Right click on the right side of the data area and select Pseudosection Plot.

Fine-tuning the Profile Display



Selecting the pseudosection for MT data allows for display of Apparent Resistivity, Impedance Phase or both.

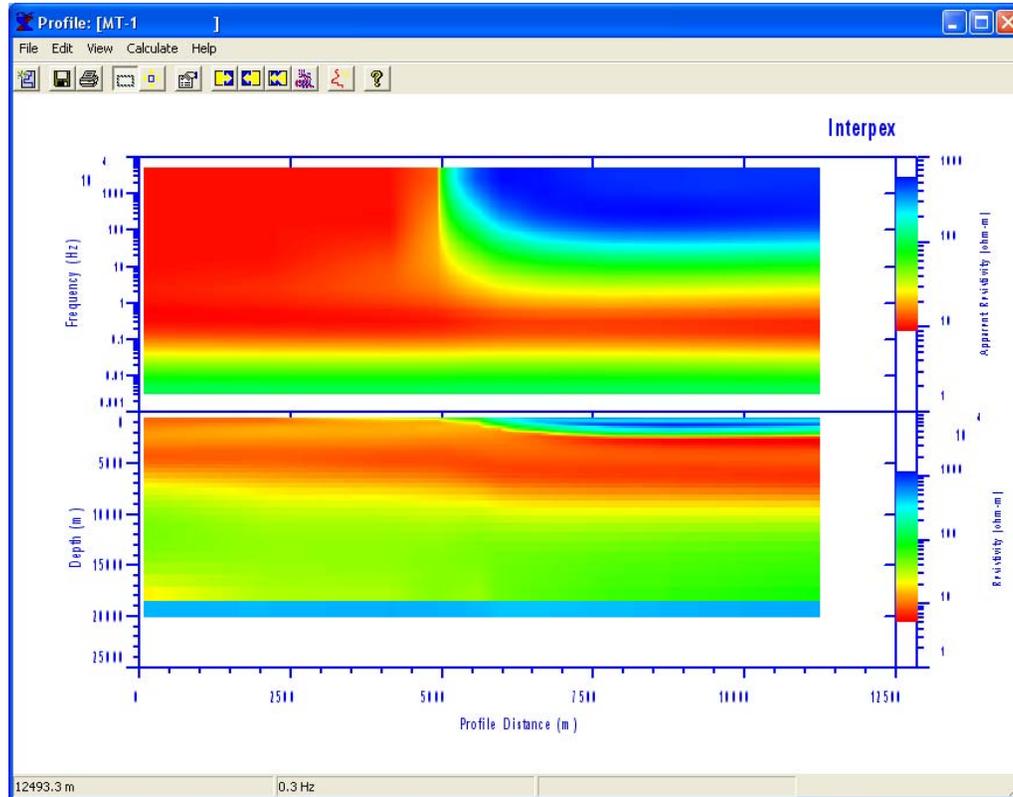
Let's select Apparent Resistivity. Then we get a similar dialog to the one we just had for the model, and select color fill again.

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Now we see the smooth model displayed as a color section with the color scale on the right side.

Now let's display the data as a pseudosection, in similar fashion to the data. Right click in the blank area on the right side of the data area and select Pseudosection Plot.

Fine-tuning the Profile Display



Using the zoom tool once again as we did earlier produces a very nice color fill display of Apparent Resistivity on the top and the Model Resistivity on the bottom.