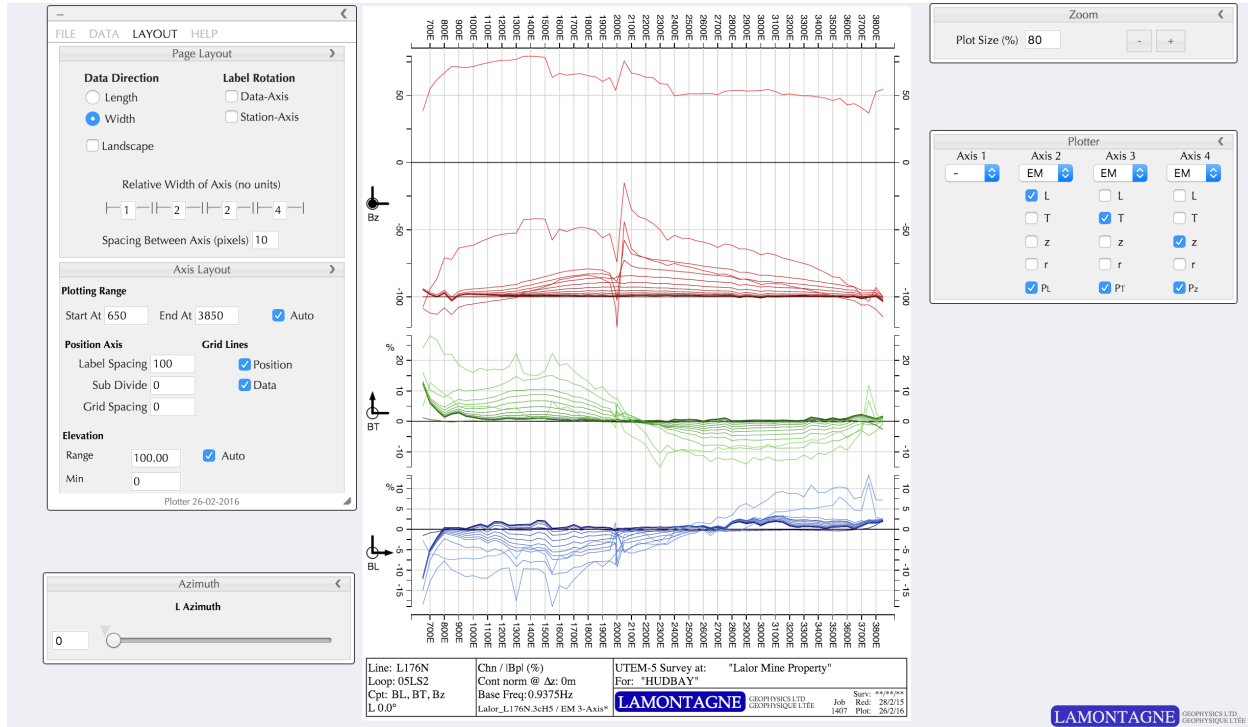


3C PLOTTER

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The 3C Plotter is a geophysical data plotter that runs in any modern web browser running locally on your machine or online. The 3C Plotter is designed to aid in visualization and interpretation of electromagnetic data. The output is in Scalable Vector Format (SVG), which means it can be presented in large format without loss in quality and is suitable for printing and exporting to pdf.



Opening 3C Plotter

To run locally, download the latest plotter by navigating to <http://www.lamontagnegeophysics.com/plotter.zip>

and open the directory and find the file 'index.html' by double clicking or dragging onto a browser of your choice. To run directly from the website, navigate to

<http://www.lamontagnegeophysics.com/plotter/>

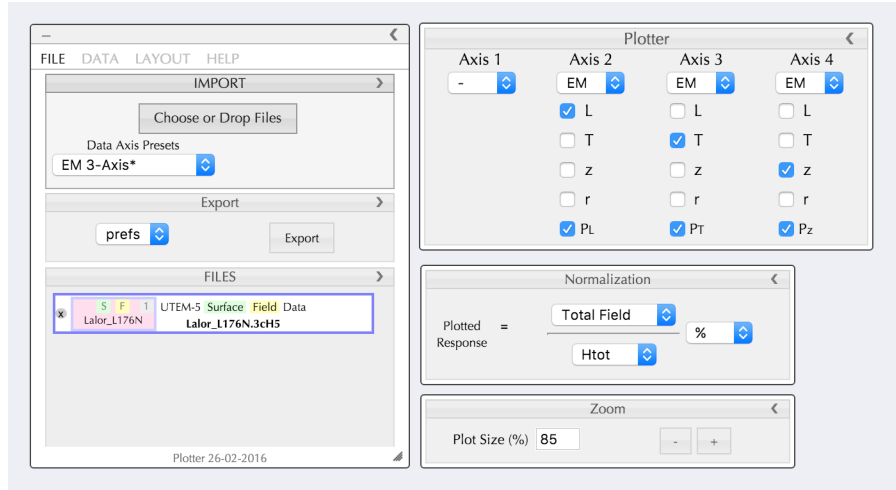
The following browsers were tested for compatibility, and have been up to date since then.

Chrome 31, 34
Safari 7 (Mavericks)
Firefox 25, 29 (small printing issue, see 'Printing')
Opera 17, 21

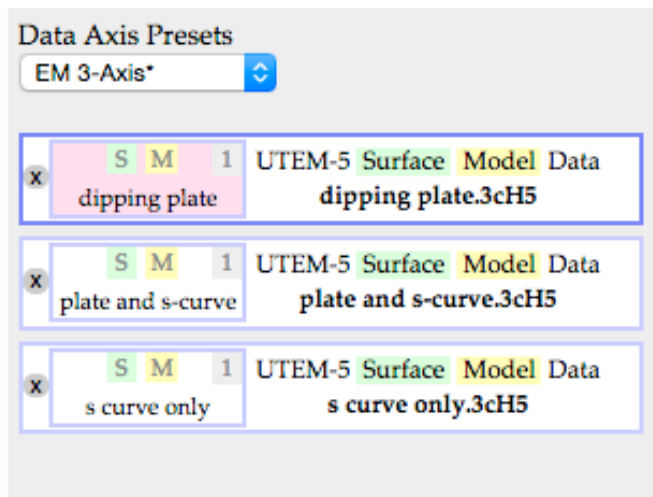
The User Interface

The user interface for Plotter is standard to all Lamontagne web apps. The user interface contains a main dialog holder with tabs. This main holes can be hidden by clicking the minimize icon on the left, or docked and undocked by clicking the dock and undock arrow on the right.

Similarly, this can be done for all individual dialogs allowing you to unpin and drag out the dialogs you use the most and hide the ones you use the least. To unpin a dialog, click the arrow on the right. To hide a dialog, click the title bar once. To drag a dialog, grab the dialog by the title bar and drag it. The user interface saves to your browser's local storage and will remember your preferences upon the next reload. You can reorder the appearance of each dialog in the tray and you can revert to default settings in the help dialog.



Displaying Data



The 3C Plotter is designed to work with 3CH5 surface or borehole files that have already been reduced. It will also display “old-style” 3C files, and there is an option to load your preferences as a ‘.pref’ file as well.

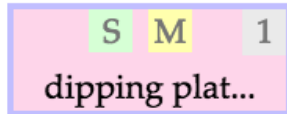
To display the data, click the file input button or drag a 3C or 3CH5 file into the browser window. You can drag or select more than one file at a time, and a list will be populated such as the one displayed to the right. To view each hole, click the corresponding entry in the list. You can sort the list by dragging the main handle on the right of each hole or line entry. The

secondary handle on the left is reserved for use with the compare plotter discussed below. Finally, to remove the hole from the list, click the grey X on the left.

To change the data display, you can select from 5 Data Axis Presets, namely EM 3-Axis, 3-Axis Mag-Acc, 3-Axis Tradeoff (1), 3-Axis Tradeoff (2), 3-Axis Tradeoff (3). This will repopulate the Data Axis with appropriate values and update the plot.

To open your own preference file, click the file input button or drag a '.pref' file into the browser window. Exporting your own preference file is outlined below.

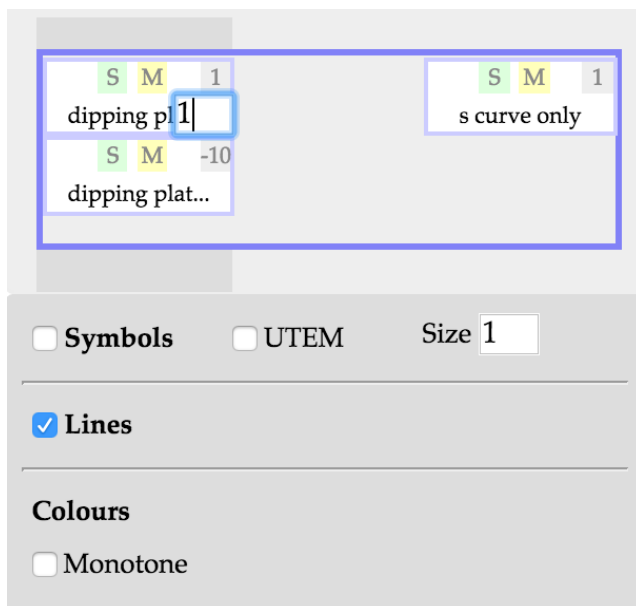
The Secondary Handle



The secondary handle is designed for use with the compare plotter. It can be dragged from the main handle by clicking it and moving it to the compare plotter. The secondary handle includes a short-hand description of the hole or line file as well as several symbols. A green 'S' or 'B' for Surface or Borehole Data, and a yellow 'M' or 'F' for Model or Field data. There is also a factor in the top right corner that can be edited by clicking on it. This will multiply the entire line or hole by this factor, which is useful for adjusting a current or when adding plots together while in compare mode.

The Comparison Plotter

Below the file list there is a compare plotter that allows you plot several lines at once or add



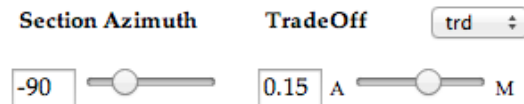
them together. To populate the compare plotter, drag a secondary handle from the file list above into one of the three drop zones. This will make a copy of the hole or line in the file list and place it in the compare plotter. The compare plotter has two main functions: To stack data in the columns, and to add data in the rows. Therefore, you can see more than one hole or line at a time by placing each in a separate column, and you can add two holes or lines together by placing them in the same column and adjusting the factor in the top right corner by clicking on the factor and hitting enter when done. Any stations that do not line up are linearly interpolated to the top most line or hole.

The appearance of each column can be manipulated by selecting the greyed out column in the background, behind the compare plotter. Symbols, lines and colour can all be modified for each column, making it easier to differentiate between lines. To remove a hole or line from the compare plotter, drag it outside of the boundary and the secondary handle and plot will be removed.

To exit the compare plotter, select a hole or line file handle in the file list above. The compare plotter acts the same as the plotting handles above in this way. Note that the plotting handles will display data depending on which column in the compare plotter is selected.

Section Azimuth and Tradeoff

If you have opened a newer 3cH5 file, you can adjust the tradeoff and section azimuth in real time in the Data Axis Tab. You will see the plots update as you slide each slider — for better performance you may find it helpful to disable symbols.



If you have imported a surface file or “old-style” 3C file, the TradeOff will be disabled. Note that you can only use this slider when you select “Oriented (s n w)” data, or in the case of surface data, an L-azimuth can be adjusted when you select “LTz Cartesian”. In any other orientation, the sliders will be disabled! (Technically you can also select LTz cartesian for a borehole, in which case the last S-azimuth will be retained, and then the L azimuth will be applied when you switch to “LTz Cartesian”).

Orientation

There are four options for orientating data in the 3C Plotter. The behaviours of each option depends on if the data file is surface or borehole.



Borehole Data

Rotation Raw (u v w) - Data is plotted as it was collected in the field with no rotation applied.

Oriented (s n w) - Data is rotated according to the section azimuth. This is the coordinate system most borehole data is plotted in.

Cartesian (x y z) - An transverse u v w rotation is applied to convert the u v w borehole data into x y z cartesian coordinates. Note that this system is the same as raw surface data.

LTz Cartesian (L T z) - After having already been rotated from u v w into s n w, it is possible though not advisable to again orient the data from s n w to L T z. For borehole, the S-azimuth will be remembered from the s n w rotation and then the L azimuth will be applied to this.

Surface Data

Rotation Raw (u v w) - Data is oriented from cartesian to u v w coordinates. Note that this system is the same as raw borehole data.

Oriented (l t z) - Data is rotated according to the local l-azimuth, but is not rotated into any cartesian system. It is an individual orientation per station.

Cartesian (x y z) - Data is plotted as it was collected in the field with no rotation applied.

LTz Cartesian (L T z) - Surface data is oriented according to a global L-azimuth. This is the coordinate system most surface data is plotted in.

Preference Export

In order to save your preferences as a file, click EXPORT and a file called 'settings.pref' will be saved. If the file is saved to your downloads folder or desktop, drag it in with your data and it can be used later on. If the file is displayed in your browser, you can copy it into a text editor and save it as a .pref file, or you can save it from the browser. Please ensure the file ends with .pref so it can be read later by the 3C Plotter. Otherwise, you can rename the file to your liking.

Next time you work with this data you can drag the .pref file into your browser and your Data Axis Settings will be remembered.

You can also drag a .pref file into the 3D scene of *Multiloop X*. Doing so will orient your data to the Z and S- azimuths you exported as well as match up the normalization. This way, model data and field data can be compared in the same orientation.

Plot Scales

There are two toggle buttons to the left labelled 'A' (Auto) or 'M' (Manual). Also there is a 'use range' check box in the settings tab related to this.

<input type="checkbox"/> M	<input type="text" value="1"/>	<input type="text" value="300"/>	<input type="text" value="300"/>	<input type="text" value="300"/>	Range
<input type="checkbox"/> A	<input type="text" value="-0.5"/>	<input type="text" value="-200.84"/>	<input type="text" value="-179.85"/>	<input type="text" value="-151.79"/>	Min

If 'use range' is not selected in Settings (Max/Min mode)

The program automatically sets Max and Min to the maximum and minimum values when both are set to Auto. If you wish to enter your own minimum or maximum values, you can type in your own and press enter, invoking manual mode for the min or max you entered.

If 'use range' is selected in Settings (Range/Min mode)

The program automatically sets a Range and Min such that the maximum and minimum values are framed to the plot. If you wish to enter your own minimum, the range will automatically adjust to span from that minimum to the maximum value of the plot. If range is manual and minimum is automatic, then the minimum will automatically find the best value to centre the plot over the range entered. If both are manual, then you are able to manually choose a range and shift this around by inputting a new minimum and pressing enter.

Note that toggling back to Auto will display all automatic values and adjust the plot. Toggling back to manual will return you to your last entered manual values. Should you wish to update the manual values, pressing enter in the input field will commit them to memory.

Axis Components

The drop down menus plot a variety of components in Mag, Acc or EM, and can also plot Volt and Temp in Auxiliary (Aux).

When 'Split on Channel' is unchecked, the plotter plots all channels on each axis. Otherwise the first channel 'Start' is on Axis 2, while channels 'Start' to the channel specified in 'split on ch' are reserved for Axis 3 and the rest of the channels up to 'Max' are plotted on Axis 4. To see an individual channel, observe Axis 1 while entering the channel in 'Start' with 'split on ch' selected. There is also a special mode for Axis 1, where if you select 'EM' you have the option of plotting Elevation, and another axis split becomes available as well as the primary field.

Axis 1	Axis 2	Axis 3	Axis 4
EM	EM	EM	EM
<input type="checkbox"/> Ch0	<input checked="" type="checkbox"/> l	<input type="checkbox"/> l	<input type="checkbox"/> l
<input type="checkbox"/> elev	<input type="checkbox"/> t	<input checked="" type="checkbox"/> t	<input type="checkbox"/> t
	<input type="checkbox"/> z	<input type="checkbox"/> z	<input checked="" type="checkbox"/> z
	<input type="checkbox"/> r	<input type="checkbox"/> r	<input type="checkbox"/> r
<input type="checkbox"/> Ptz	<input checked="" type="checkbox"/> P1	<input checked="" type="checkbox"/> Pt	<input checked="" type="checkbox"/> Pz

split ch: 1 4 Start: 1 Max: 14

The Primary Field

The primary field is the last row of checkboxes in the axis components section. The primary field is only available if you have a corresponding component selected above. When the primary field component is selected it will display all components that were selected above for the corresponding axis. The primary field has no symbols by default.

Normalization

Plotted Response = $\frac{\text{Minus Latest}}{\text{Htot}}$ %

The plots can be normalized and displayed as percent of the primary field or latest time channel or displayed in raw values. The plot will update automatically as you select your combination.

A note on raw values: Raw values can be displayed in nanotesla (nT) or picotesla (pT) and also in nT/A and pT/A. The current is multiplied by the value to get absolute nT or pT by selected (— not implemented yet—).

All of the above settings in the Data Axis tab can be exported using the export button described above.

Transmitter Current

A nominal transmitter current can be entered. This will only be affected for raw data plots (normalization denominator is '1'). In this case the units of the plot will be in raw nT/A or pT/A if

the current is not used, and raw pT or nT if the current is used in calculating the field. This is simply a multiplication operation to convert the units. When you import a 3CH5 file a suggested current is imported from the file which you can later adjust — soon to be implemented will be nominal current, average current, and station current.

Layout

The Layout tab contains all of the display characteristics of the plotter and other non-data specific preferences. These will not be saved in the “.pref” file but will instead be saved to your browser’s Local Storage, which will then remember your preferences even after you reload or quit your browser.

At the top of the layout tab is the ‘transition time’ in milliseconds. This adjusts the animation speed, which you can see each time you change the graph. You can enter ridiculously large values if you really want to. Conversely you can turn animation off by setting to 0.

Page Layout can be portrait or landscape, presumably depending on if you are working with surface or borehole files. When switching the page layout, it is also important to change the label rotation to align the labels with the new orientation of the plot.

Relative width of axis and axis padding adjust the size and spacing of each axis. The size is expressed as a ratio, with each width relative to the others.

‘Use Range’ effects the scaling factors outputs in the Data Axis tab. If this is unchecked, Max/Min will be used.

Depth settings starting at zero will include 0m regardless of when the first station was read. If 'Auto' is checked for 'End At', the plot will always fit to the last station. Should you wish to keep the depth scale equal across all holes, uncheck 'Auto' and put in, for example, the depth of the deepest hole.

The y-axis or depth axis can be controlled in the layout section. Entering ‘0’ for subdivide will have no subticks. Gridlines can be toggled on and off here as well.

Plus/Minus signs on the bottom of this tab increase or decrease the scale of the plot by 5%. There is an input field to scale the plot directly. Double click the plot to centre at 100%.

Printing

You can print by selecting 'Print' in your browser of choice. From the print dialogue you can do normal browser print functions such as export to pdf, save as jpg, or print to a traditional printer.

Relative Width of Axis (no units)

1 2 2 2

Axis Spacing 10

Use Range