

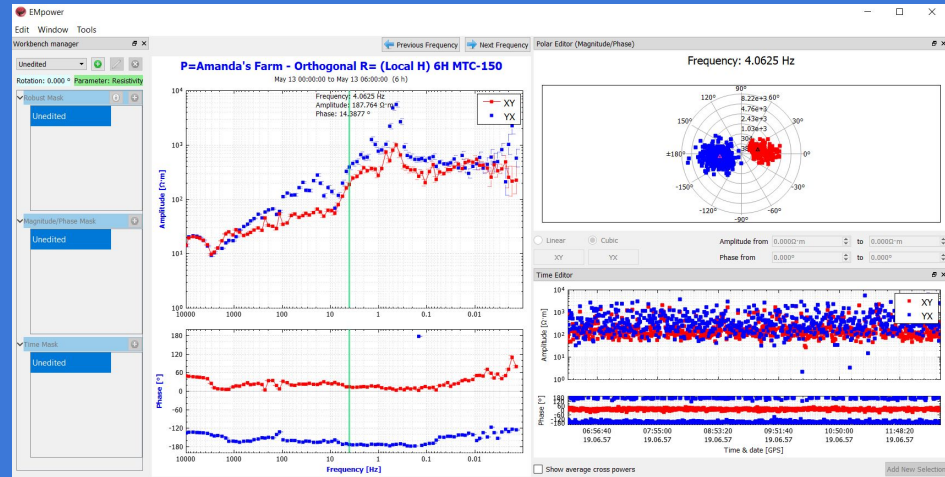
EMpower Cross Power Editor



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Cross Power Editor

The Cross Power Editor is designed to improve the quality of processed data



Processed Sites

Processing might yield a noisy resistivity curve. In such cases, editing the site with the Cross Power Editor can improve the quality of the processed data.

1. The Cross Power Editor is available in the Processed MT Data tab
2. From the processed data list
 - Double click on a processed site
 - Right-click on a processed site and click **Edit Cross Powers**
 - Use the Edit Cross Powers button

File Tools View Settings Window Help

Recording Library Processed MT Data Processed CSAMT Data Processed P...
1

Select All Site name Groups: None Filters: None Export Selected

Site / Workbench Name	Reference / Status	Filter / Geophysical Param	Sensor	Has Remote	Tipper	Sta
Unedited Test	Approved	Resistivity/Impedance				
Unedited P=Remote R= (Local H) - (Robust)	Approved	Magnetic	MTC-155	Yes	No	20
Unedited Robust	Unapproved					
Unedited P=Remote R= (Local H) - (Workbench 1)	Unapproved	Electric	MTC-155	No	No	20
Unedited Workbench 1	Unapproved					
Unedited P=Remote - (Workbench 1)	Unapproved	Magnetic	Unknown	No	No	20

Projection: Web Mercator 5000000m

WorldMap

15000000

10000000

50000

2

Highlighted Site: P=Remote R= (Local H): Robust

Resistivity

Ampl: Log Linear Freq.: Log Linear Phase Unit: Deg Rad

P=Remote R= (Local H) (Robust)
Aug 23 23:47:43 (GPS) to Aug 24 15:24:32 (GPS)
15 h 36 m 49 s

Amplitude [m]

Phase [°]


Frequency [Hz]

XY P=Remote R= (Local H): Robust

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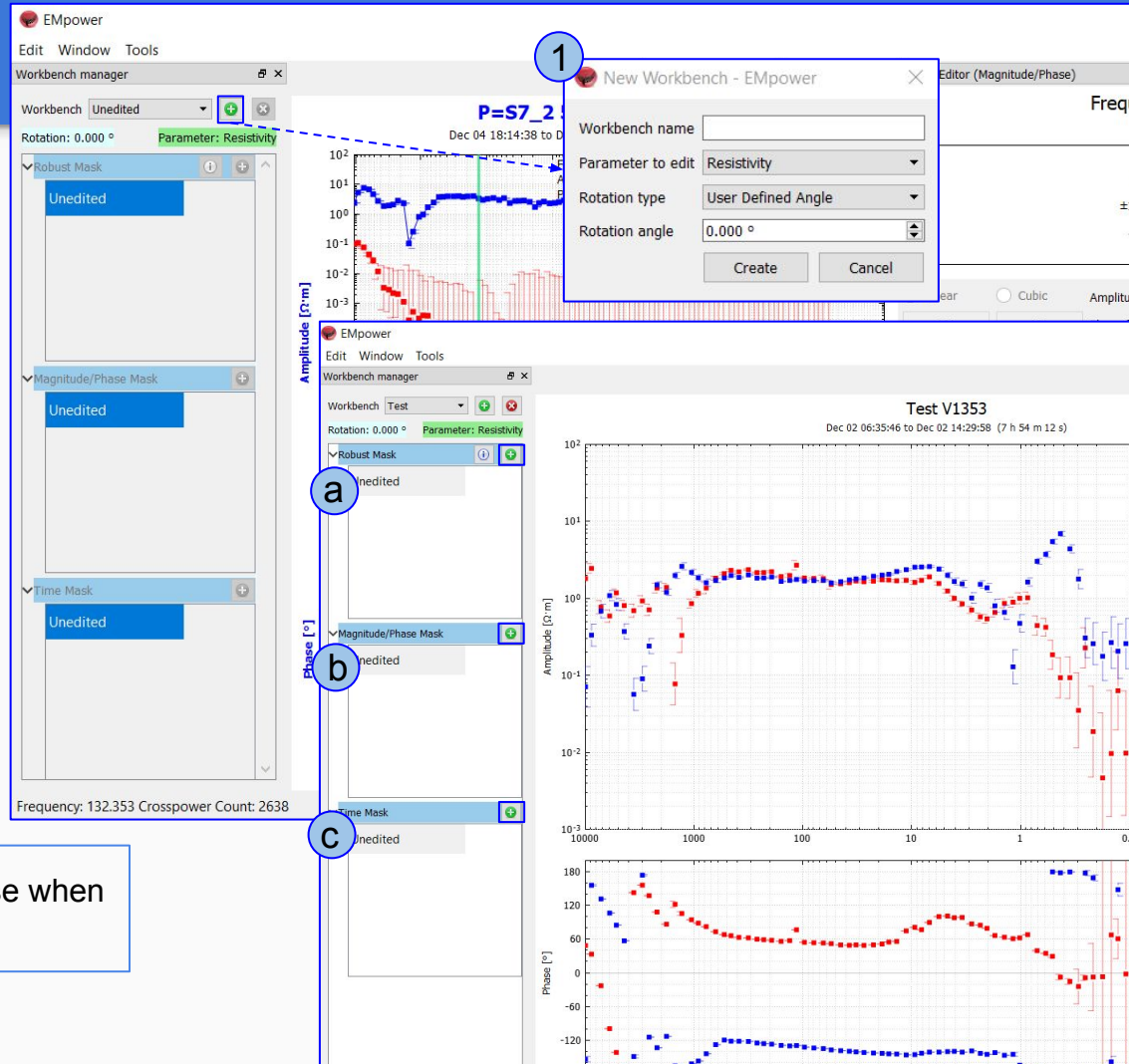
New Workbench

Each Workbench can contain multiple masks. All edits are done on a specific mask, and the plot will update as cross powers are added or removed from the selected masks.


1. Click the  button to create a new Workbench. Up to three different types of mask can be added to a Workbench

- a. Robust Mask
- b. Magnitude / Phase Mask
- c. Time Mask

**More details in the following pages*





The screenshot displays the EMpower software interface. The 'Workbench manager' window shows a list of workbenches: 'Unedited', 'Robust Mask', 'Magnitude/Phase Mask', and 'Time Mask'. Each mask has an 'Unedited' status and a plus icon for adding new masks. A dialog box titled 'New Workbench - EMpower' is open, with the following fields: 'Workbench name' (empty), 'Parameter to edit' (Resistivity), 'Rotation type' (User Defined Angle), and 'Rotation angle' (0.000 degrees). The 'Create' and 'Cancel' buttons are visible. The main plot area shows 'Amplitude [r.m]' and 'Phase [degrees]' vs 'Frequency'. The plot title is 'P=S7_2' and 'Test V1353'. The plot shows two data series: a blue line with square markers and a red line with square markers. The blue line is relatively flat around 10^0, while the red line shows a significant dip around 10^1. The plot axes are logarithmic. A callout box '1' points to the plus icon in the Workbench manager. Callouts 'a', 'b', and 'c' point to the plus icons in the 'Robust Mask', 'Magnitude/Phase Mask', and 'Time Mask' sections respectively. The status bar at the bottom shows 'Frequency: 132.353 Crosspower Count: 2638'.

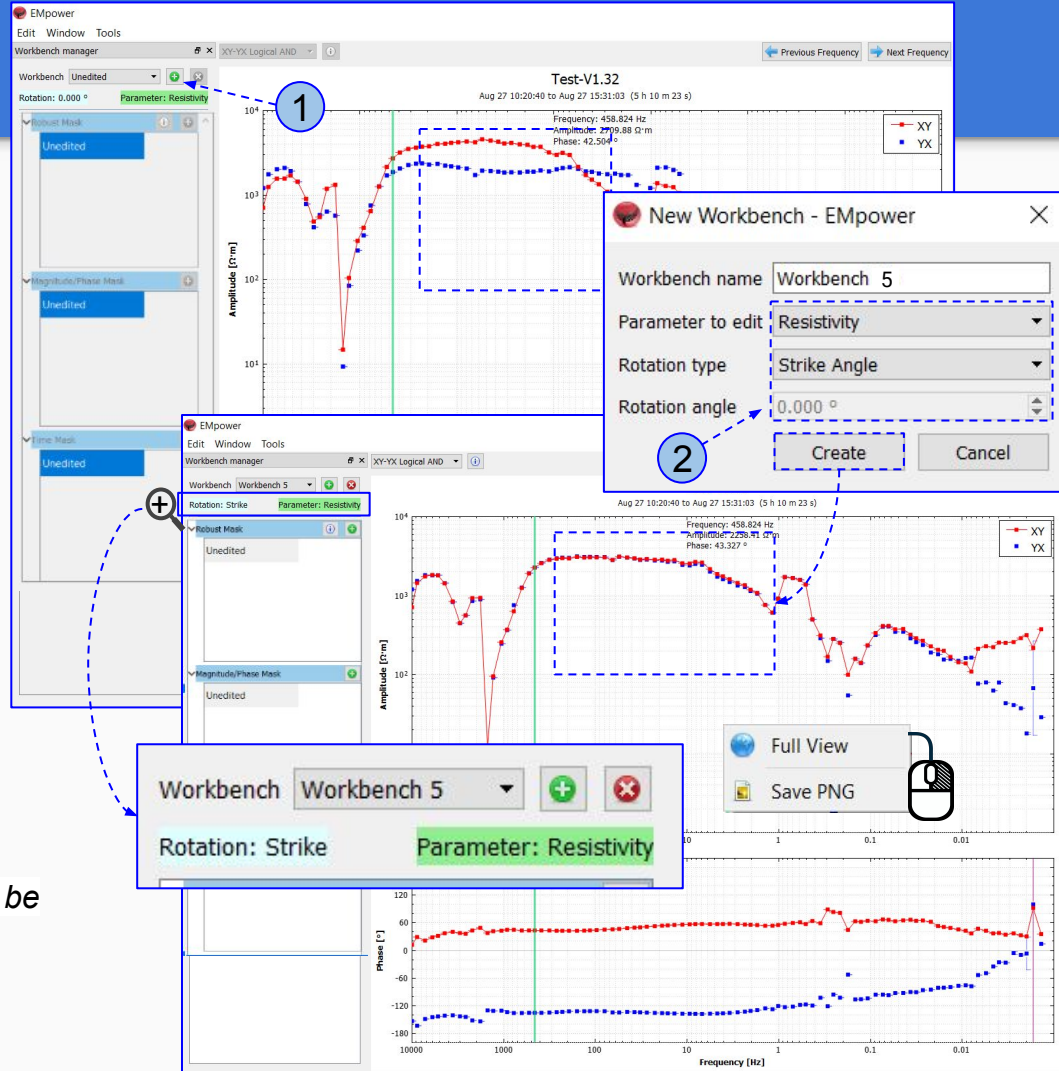
To help in understanding which parameters to use when creating a Robust Mask click on the  icon

Rotating a Workbench

Workbenches can be rotated to a manually specified angle or automatically rotated to the calculated Strike Angle in the New Workbench dialog.

1. Create a Workbench by clicking the  button
2. Select the Rotation type and angle in the New Workbench dialog

 The **Strike Angle** uses fixed parameters, and cannot be changed.



The screenshot illustrates the EMpower interface. At the top, the 'Workbench manager' shows a list of workbenches. A blue circle '1' highlights the '+' button used to create a new workbench. A dialog box titled 'New Workbench - EMpower' is shown, with a blue circle '2' highlighting the 'Create' button. The dialog contains the following fields:

- Workbench name: Workbench 5
- Parameter to edit: Resistivity
- Rotation type: Strike Angle
- Rotation angle: 0.000 °

Below the dialog, the 'Workbench manager' shows 'Workbench 5' selected. A '+' icon next to it indicates it can be rotated. The main plot area shows two graphs: 'Amplitude [r.m.]' and 'Phase [°]' versus 'Frequency [Hz]'. The amplitude plot shows two curves, XY (red) and YX (blue), with a peak at 458.824 Hz. The phase plot shows the phase difference between XY and YX. A 'Full View' button and a 'Save PNG' button are also visible.

Robust Mask

When the processed site contains noise a **Robust Mask** can be created to reduce the noise.

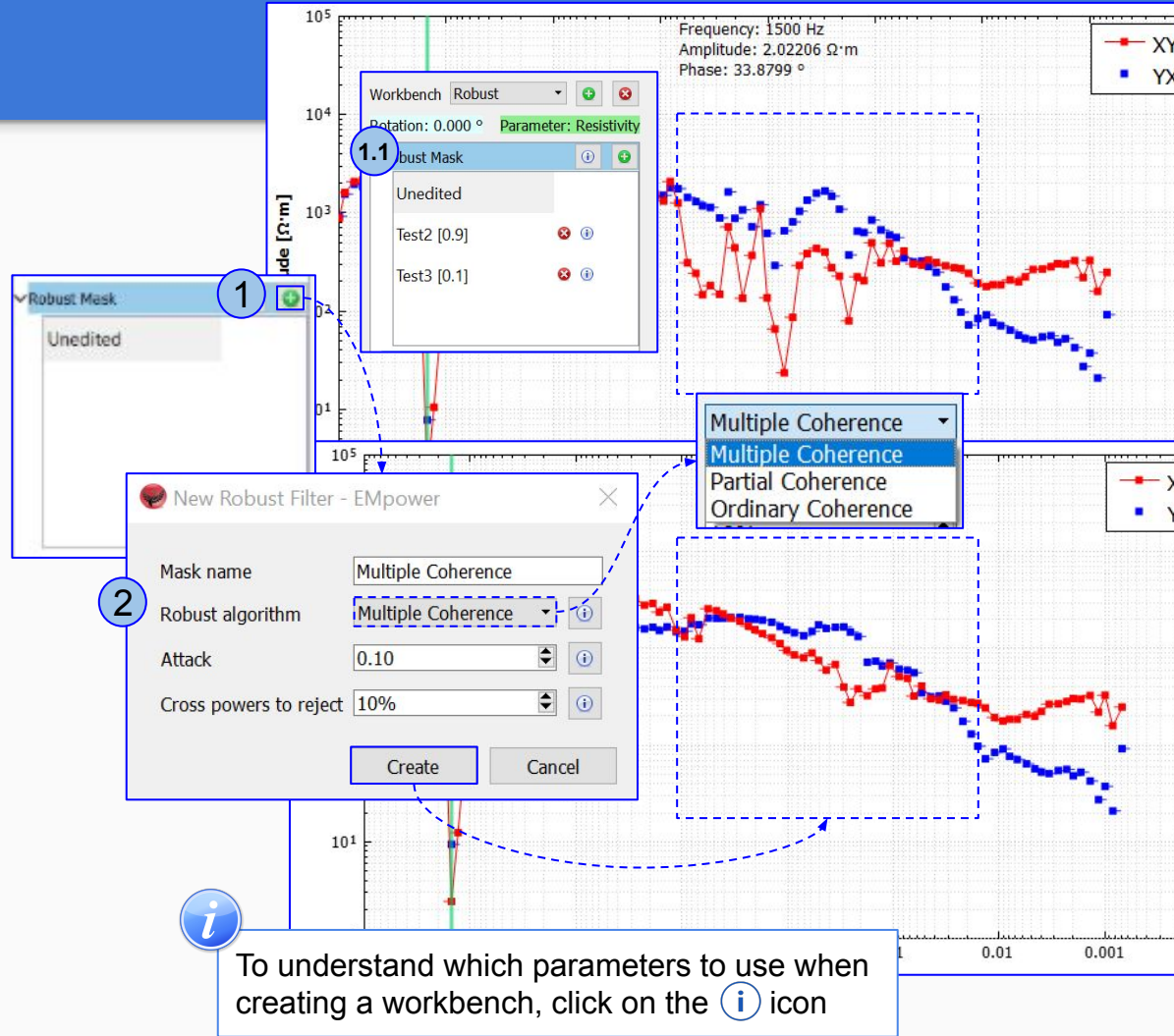
1. Create a Robust Mask

1.1. When the site is processed using a Robust Template, the Workbench list will include Robust and the Robust mask will display the Robust Templates created on the Project setting (see *Data Management Manual*)

2. Define the parameters needed

- Robust algorithm
- Attack
- Cross powers to reject

If the result of applying the Robust Mask is unsatisfactory, try a new Robust Mask with new parameters.



To understand which parameters to use when creating a workbench, click on the icon

Magnitude / Polar Editor

1. Create a Magnitud Mask

- The Polar Editor can view information in two ways:
Linear or Cubic

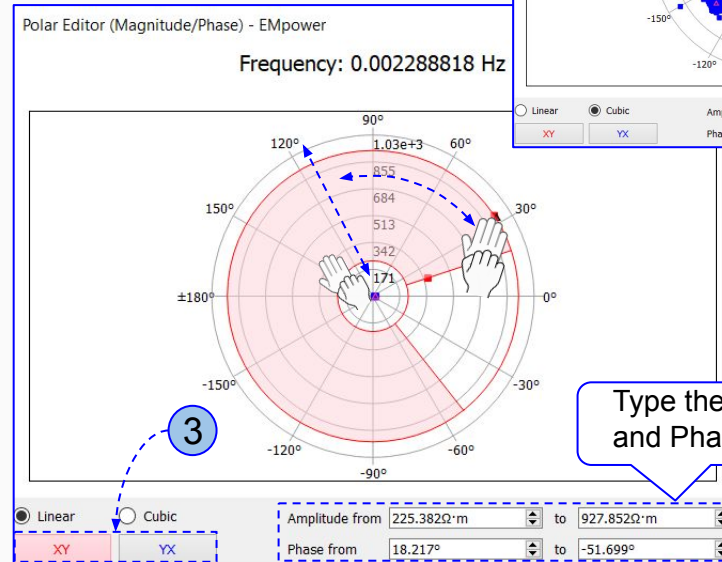
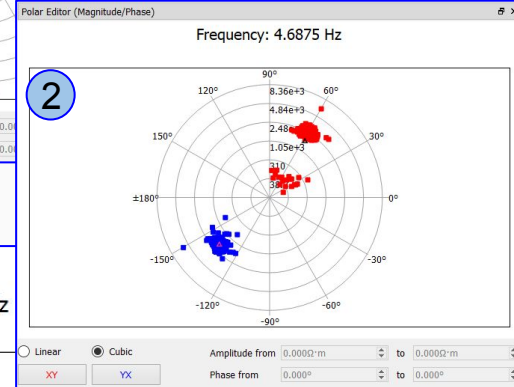
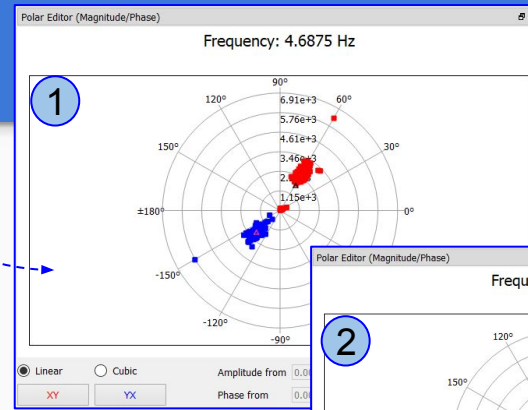
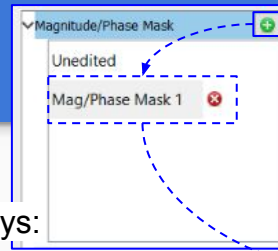
2. The Cubic view changes the scale

logarithmically, which can make it easier to see data trends

3. To select ranges

- Click **XY** or **YX** button to switch between ranges.
- Edit the ranges by either dragging the handles with your mouse or manually entering values into the spin boxes.

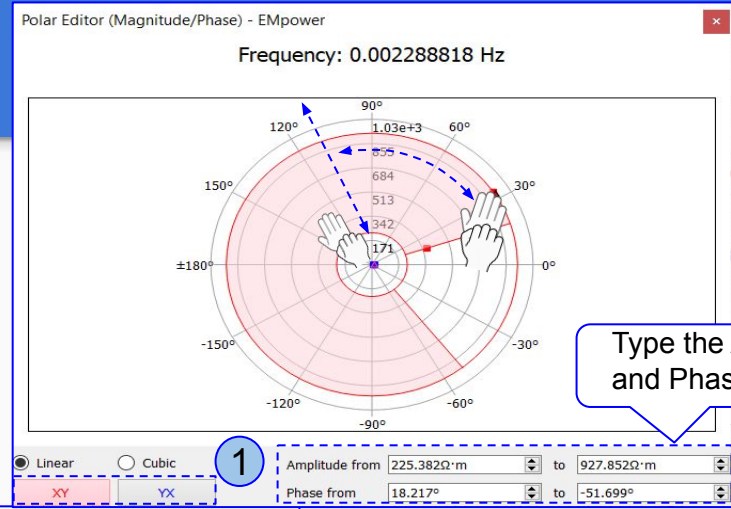
**This tool offers minimal improvement to some data sets, but it should be used sparingly.*



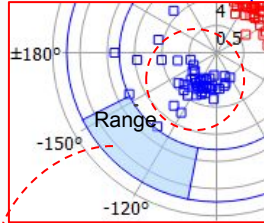
Copying Ranges (Magnitude / Polar)

1. Select the range
2. Hold down the **Ctrl** button and use **Right** or **Left Arrow** keys.
 - The **XY** and **YX** ranges will be copied to the next frequency.

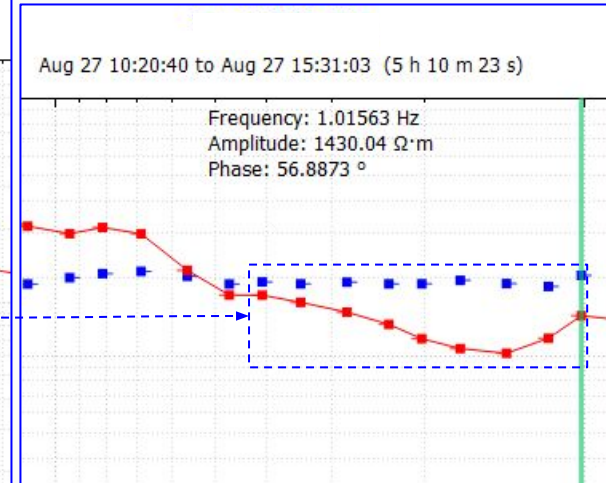
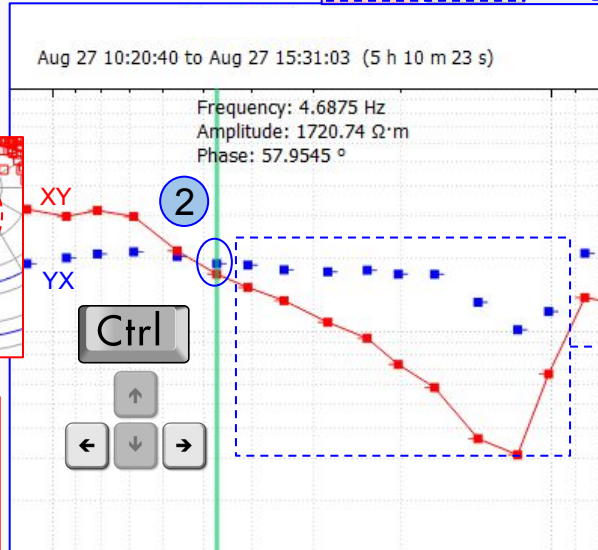
**This tool offers minimal improvement to some data sets, but it should be used sparingly.*



Use this tool only after the Robust mask is applied.



When the range copied is higher or lower than the frequency, the frequency points will disappear on the plot.



Exclusive Range Copying (Magnitude/Phase)

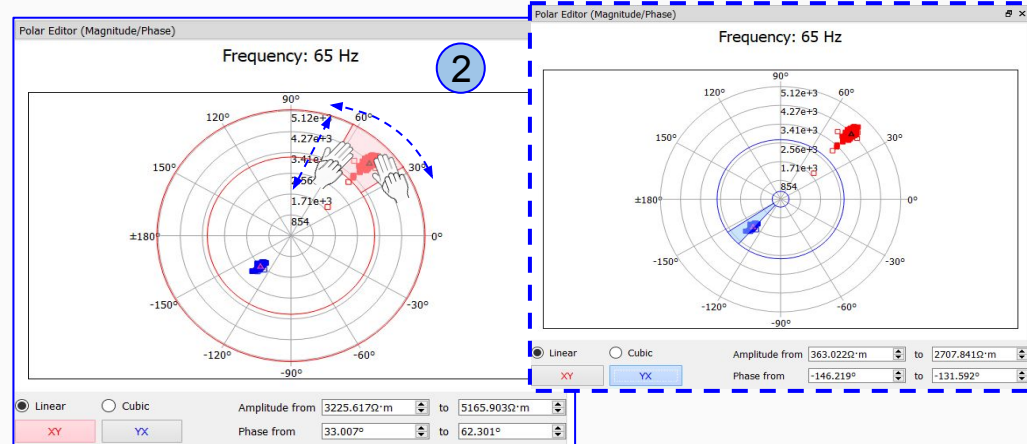
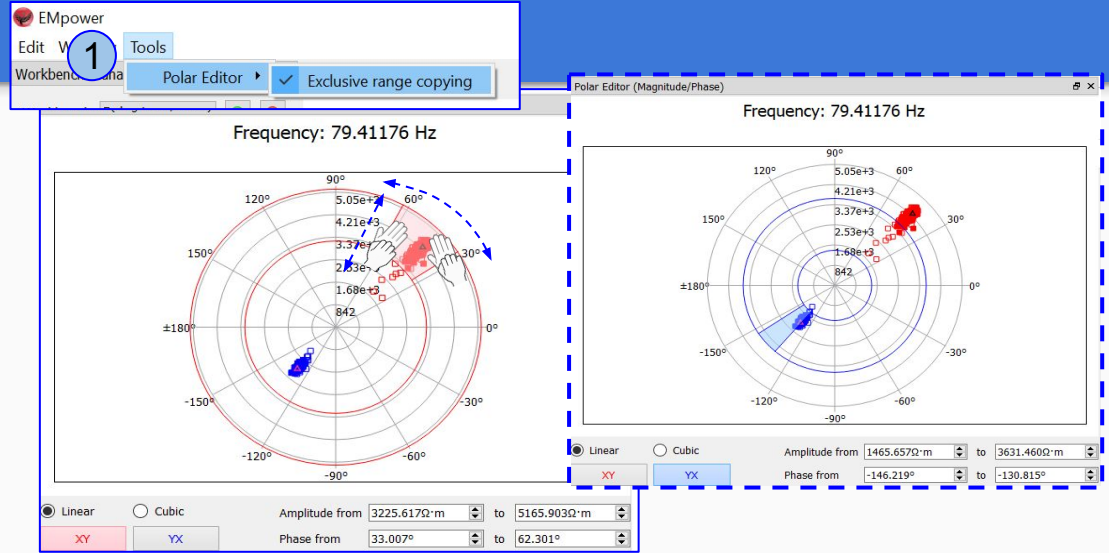
The Exclusive Range option on the Tools menu allows for editing one curve at a time

1. Select **Polar Editor** option to enable Exclusive Range copying

- Select the **XY** (or **YX**) button on a selected Magnitude/Polar Mask
- Copy the selected frequency

2. Observe that the range of **XY** (or **YX**) has been copied, but the range of **YX** has not been.

This applies to both **XY and **YX***



Time Editor

1. Create the Time Mask

2. Click the **Add New Selection** button

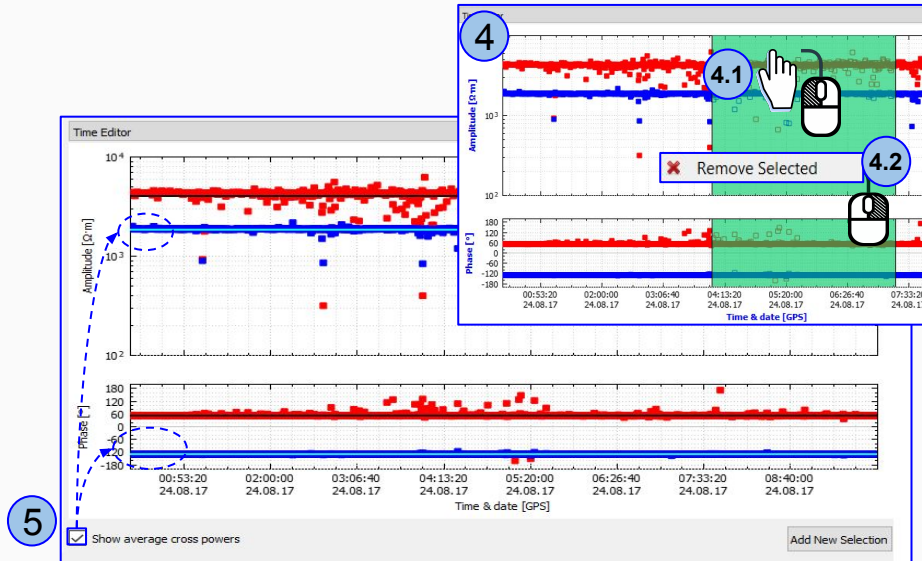
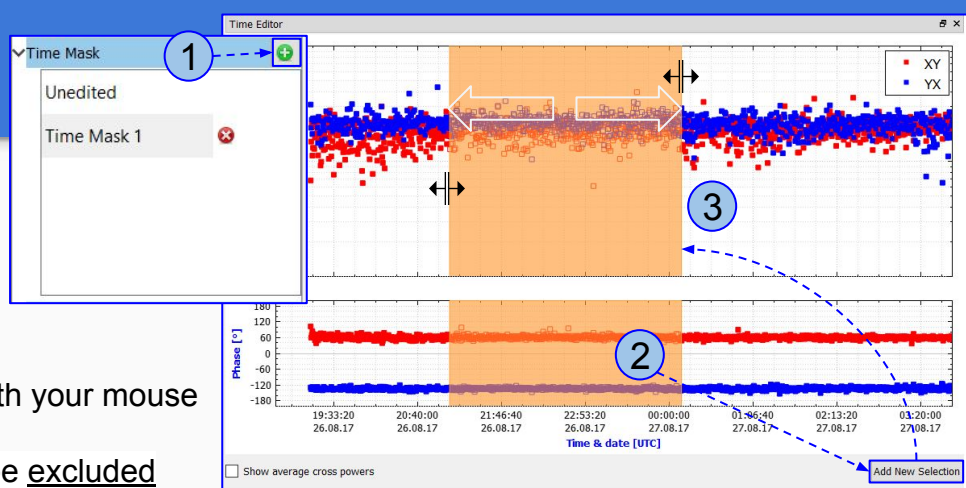
3. To Add a New rejection area

- Select the area by dragging the handles with your mouse to the right or left.
- All cross powers in that selected area will be excluded from the calculation

4. To delete the selection

- 4.1. Left-click on the area to be deleted
- 4.2. Then right-click the option **Remove Selected** that appears on the screen

5. The **Show average cross powers** checkbox will show or hide the average **XY** and **YX** amplitude and phase values



Copying Ranges (Time Editor)

1. Create a Time Mask

○ Add New Selection

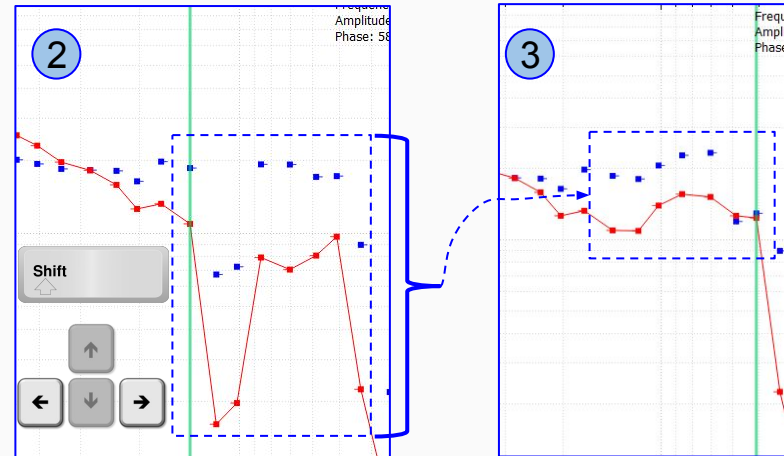
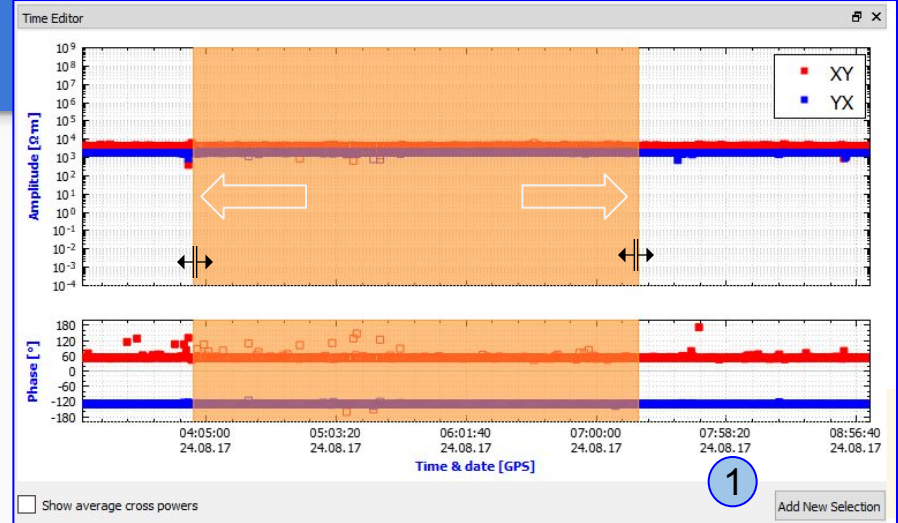
- Select the time interval on the plot Right to Left or Left to Right

2. Hold **Shift** and use the **Right or Left Arrow** keys to move

3. The time interval selected will be copied to the next frequency

- Sometimes the point on the plot may disappear. This happens when all cross powers have been removed for that frequency (Review the time interval)

**This tool offers minimal improvement to some data sets, but it should be used sparingly.*



Workflow <Best Editing Practices>

Processed Sites

Processing the Site could fix some problems, but not always remove all ambient noise from the recording, and the data may need to be adjusted.

(See the Data Management Manual for more information)

Cross Power Editor

The Cross Power Editor helps to improve the data, by using different tools for filtering out the noise. Always create a 'Robust Mask' first. This algorithm fixes the most common problems.

Mask Editor

Besides the Robust mask, EMpower has additional masks available such as the Time Editor or Magnitude/Phase Mask.

Although those tools have many options for fine-tuning, it is recommended to use them modestly because they may also introduce invalid results.

Shortcuts

Shortcuts	Description
CTRL+C	Copy frequency masks
CTRL+V	Paste frequency masks
CTRL+Right arrow button	Copy the current ranges in Polar plot to next frequency
Shift+Right arrow button	Copy the current ranges in Times plot to next frequency
CTRL+Shift+Right arrow button	Copy the current ranges in Polar and Times plot to next frequency



Please check out the [FAQs](#)

<https://phoenixgeophysics.freshdesk.com/>

Or email us at: support@phoenix-geophysics.com