

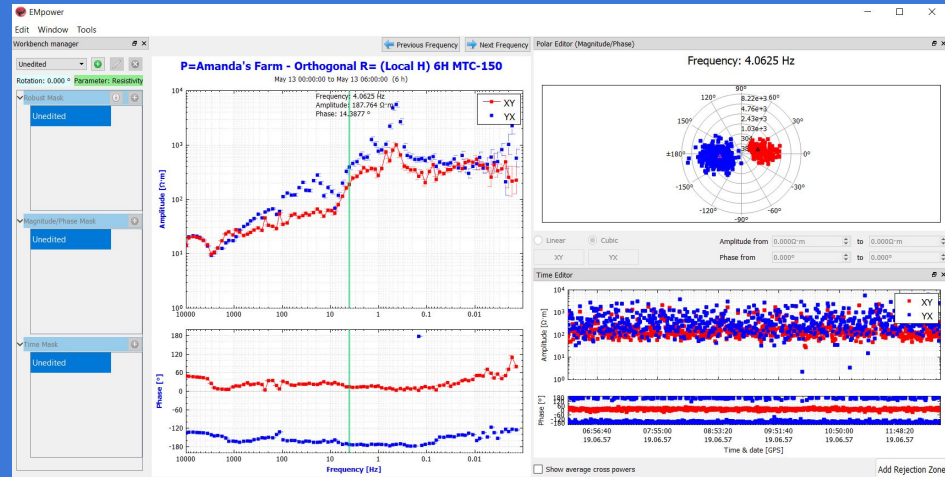
# EMpower Cross Power Editor



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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

Notes:  
Editor Coherence  
Site Info Delete

Projection: Web Mercator 5000000m

WorldMap

15000000  
10000000  
50000

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

Resistivity Amplitude: Log Linear XX-YY Freq.: Log Linear Phase Unit: Deg Linear

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 [mV] XY P=Remote R= (Local H): Robust


Phase [°]

Frequency [Hz]

© OpenStreetMap contributors, SRTM data courtesy of: © OpenTopoMap (CC-BY-SA)

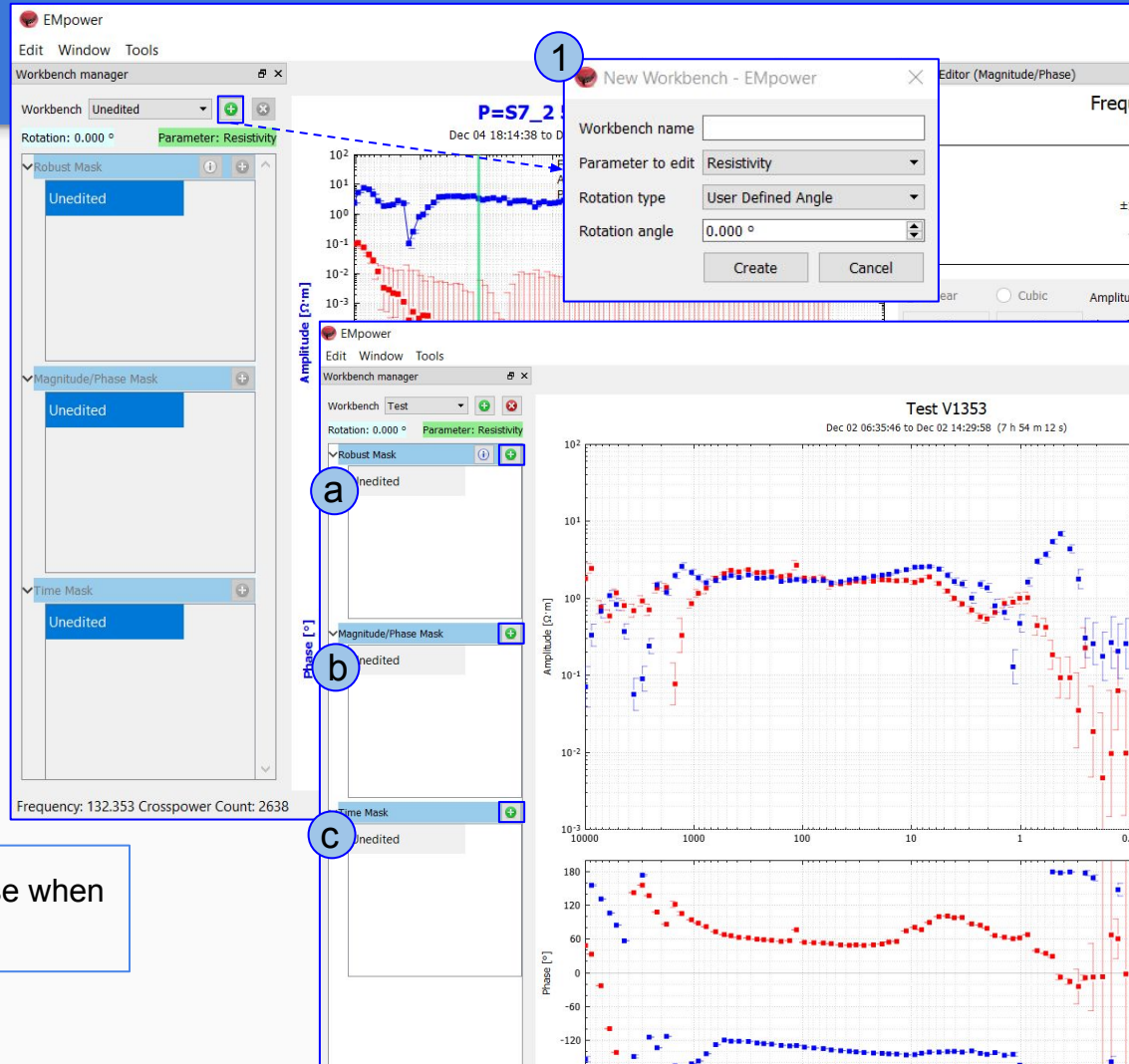
# New Workbench

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. At the top, a 'New Workbench - EMpower' dialog box is open, showing fields for 'Workbench name', 'Parameter to edit' (set to 'Resistivity'), 'Rotation type' (set to 'User Defined Angle'), and 'Rotation angle' (set to '0.000 °'). A circled '1' is placed over the dialog. Below the dialog, the 'Workbench manager' shows three workbenches: 'Robust Mask', 'Magnitude/Phase Mask', and 'Time Mask'. Each workbench has an 'Unedited' mask. A circled 'a' is over the 'Robust Mask' mask, a circled 'b' is over the 'Magnitude/Phase Mask' mask, and a circled 'c' is over the 'Time Mask' mask. The main plot area shows a log-log plot of 'Amplitude [r.m.]' vs 'Frequency' for 'P=S7\_2'. The plot shows two data series: a blue line with square markers and a red line with square markers. A circled '1' is also placed over the plot area. Below the main plot, there are two smaller plots: 'Phase [°]' vs 'Frequency' and 'Amplitude [r.m.]' vs 'Frequency' for 'Test V1353'. The phase plot shows a red line with square markers and a blue line with square markers. The amplitude plot shows a red line with square markers and a blue line with square markers.

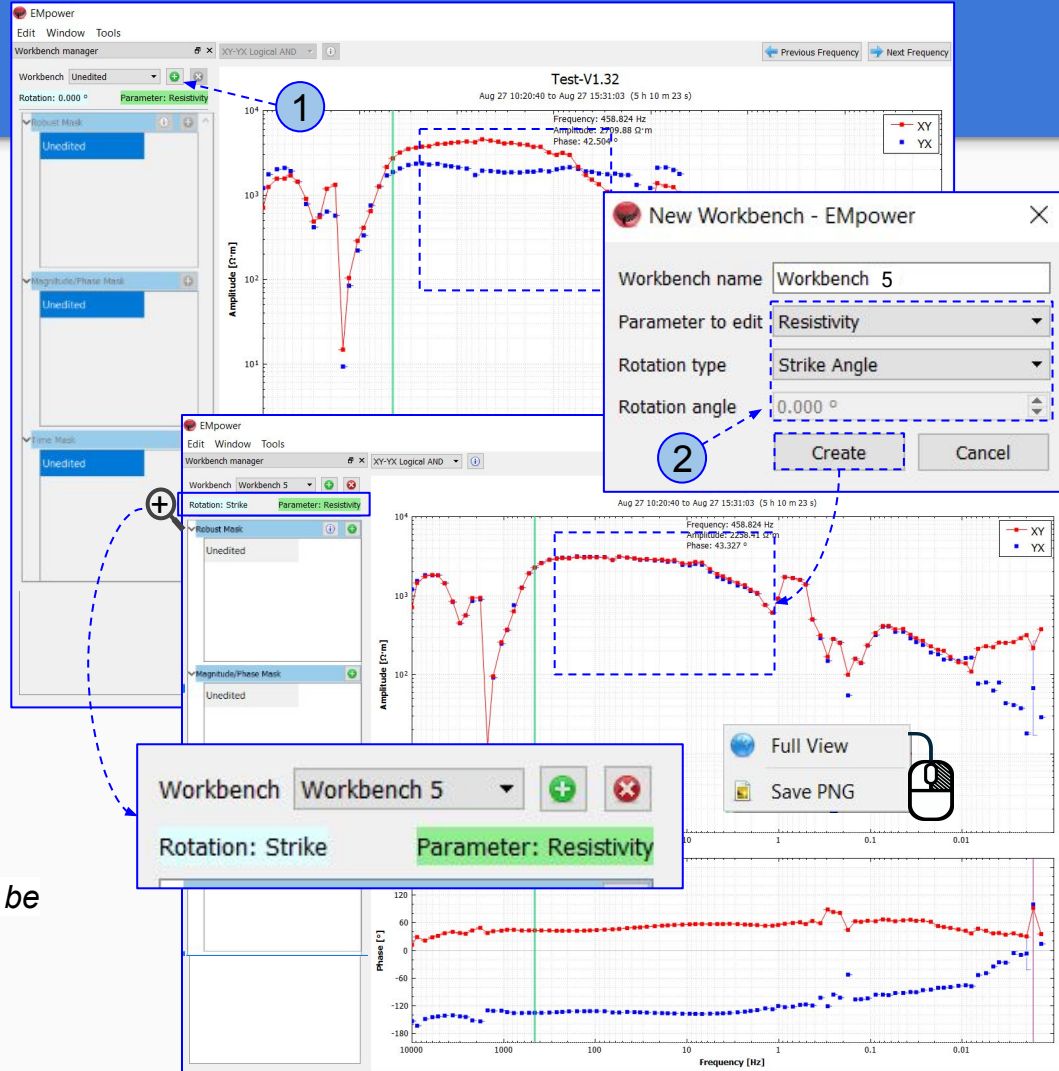
To help in understanding which parameters to use when creating a Robust Mask click on the  icon

# 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 software interface. The top window shows a plot of Amplitude [r.m] vs Frequency [Hz] for 'Test-V1.32'. The plot shows two curves: XY (red) and YX (blue). A blue circle '1' highlights the '+' button in the Workbench manager. A dialog box titled 'New Workbench - EMpower' is open, showing the following settings:

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

A blue circle '2' highlights the 'Create' button in the dialog. Below the dialog, the software interface shows the 'Workbench 5' selected in the Workbench manager. The plot now shows the results for 'Workbench 5' with a rotation of 'Strike' and parameter 'Resistivity'. The plot shows a significant change in the XY and YX curves. 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.

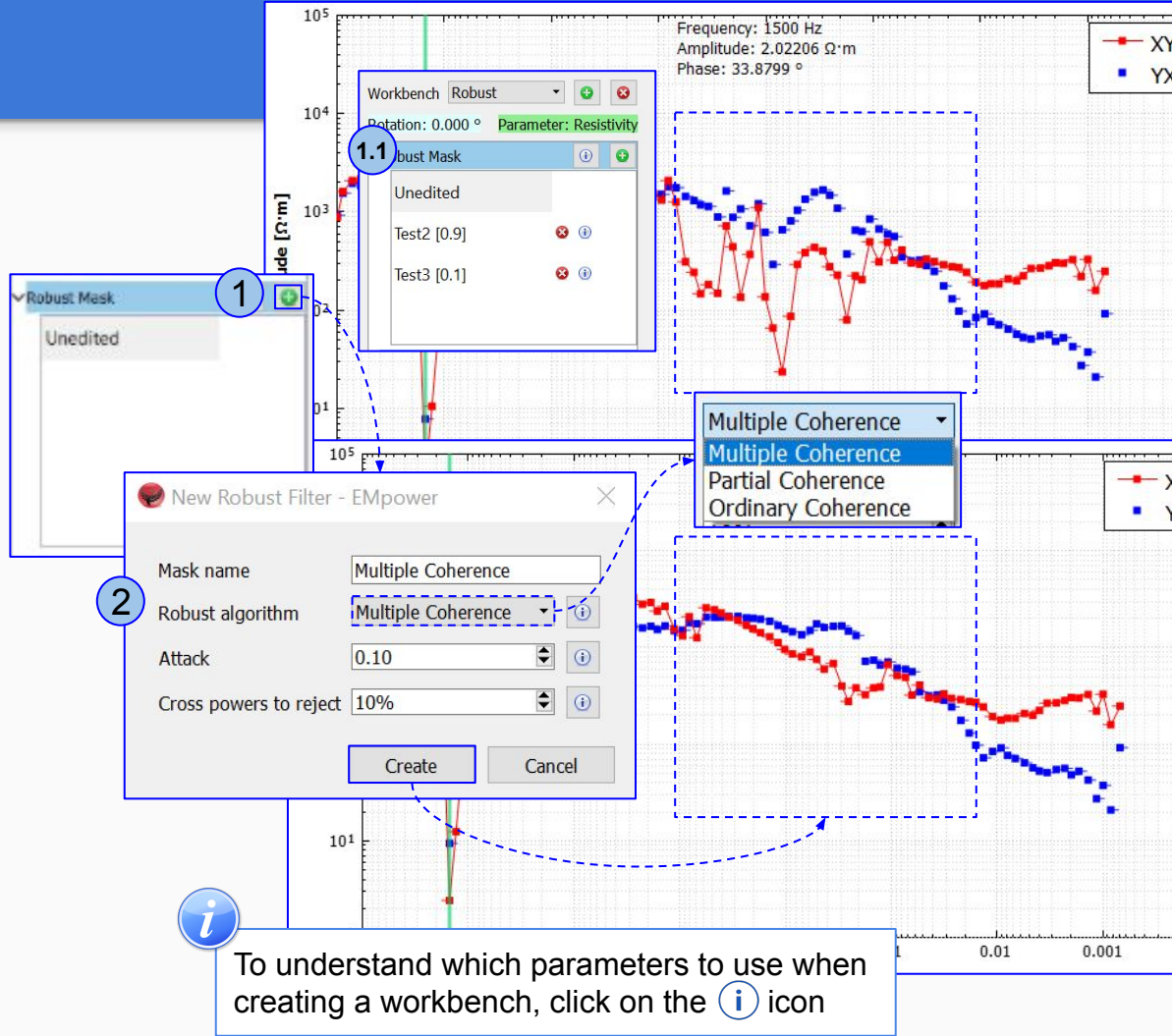
## 1. Create a Robust Mask

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.



# Magnitude / Polar Editor

## 1. Create a **Magnitude Mask**

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

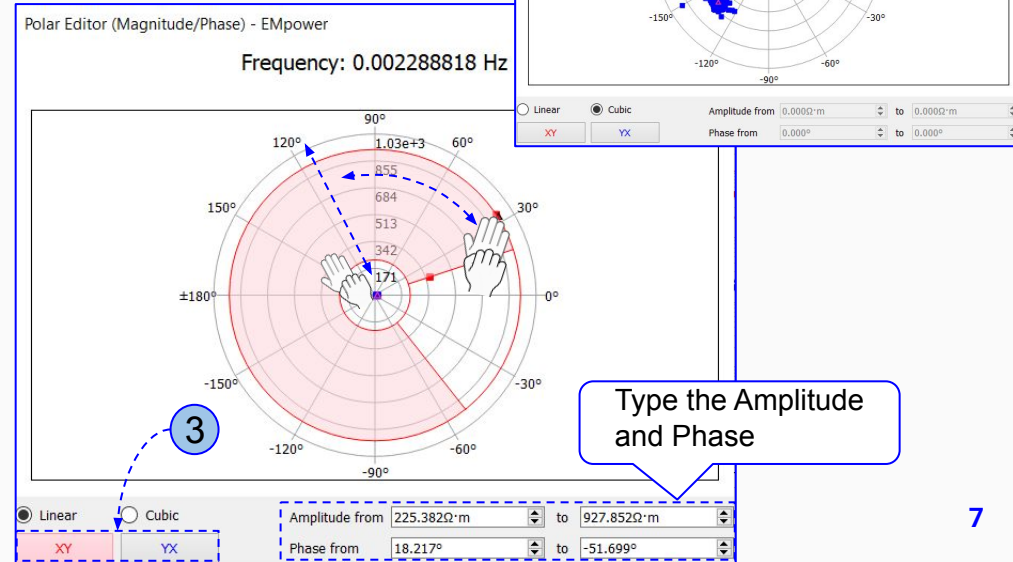
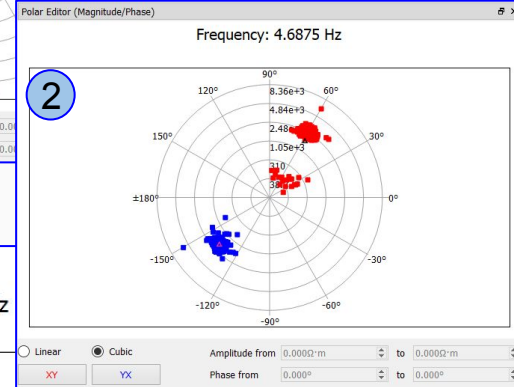
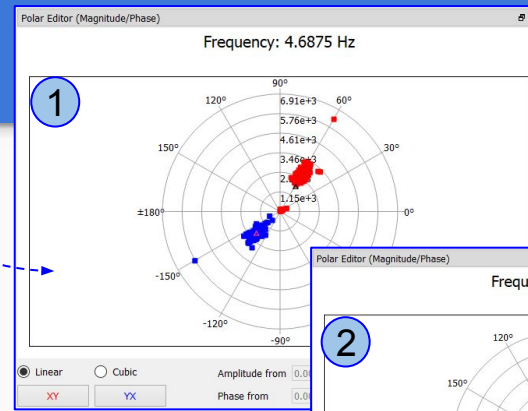
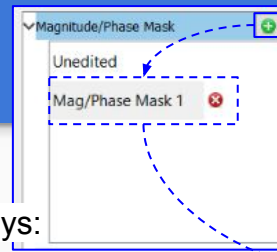
## 2. The Cubic view changes the scale

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.

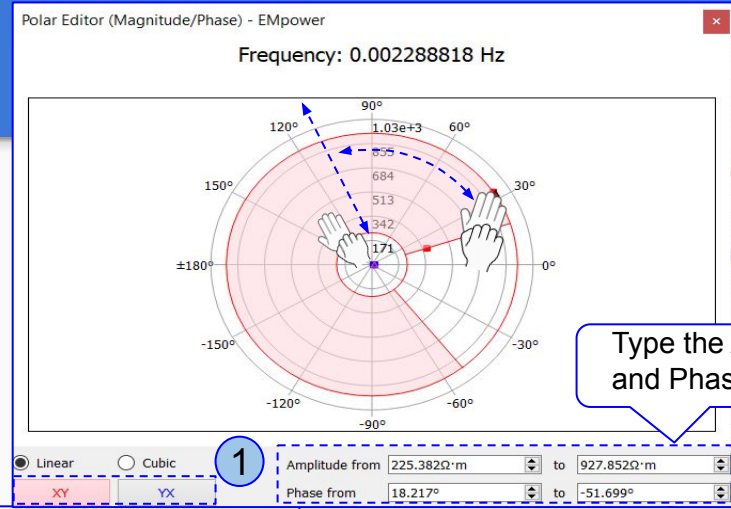
*\*This tool offers minimal improvement to some data sets, but it should be used sparingly.*



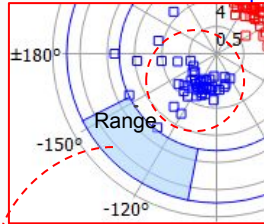
# Copying Ranges (Magnitude / Polar)

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.

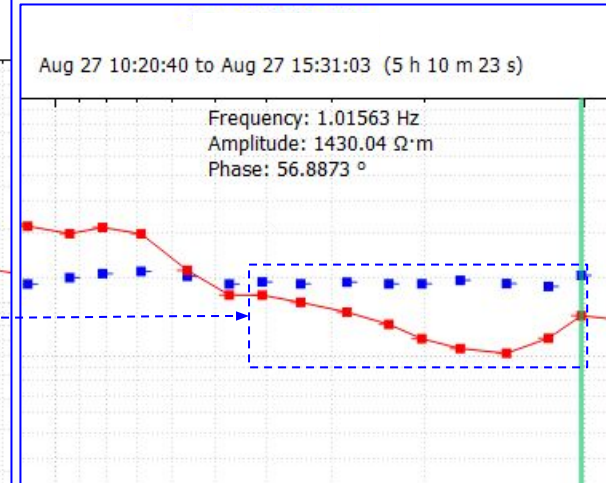
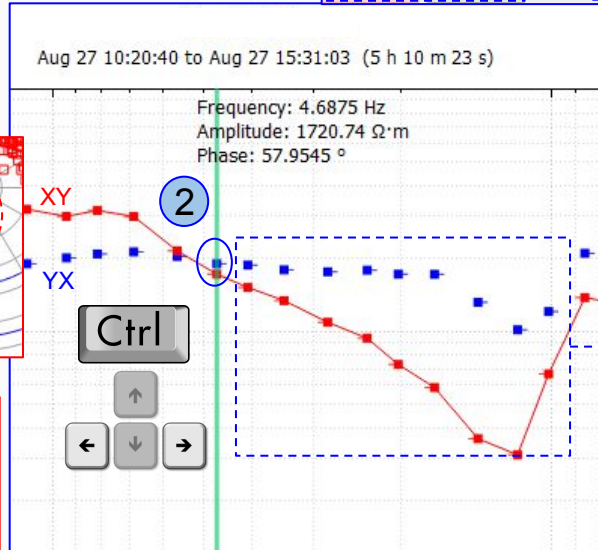
*\*This tool offers minimal improvement to some data sets, but it should be used sparingly.*



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 Rejection Zone** button

## 3. To Add a New rejection area

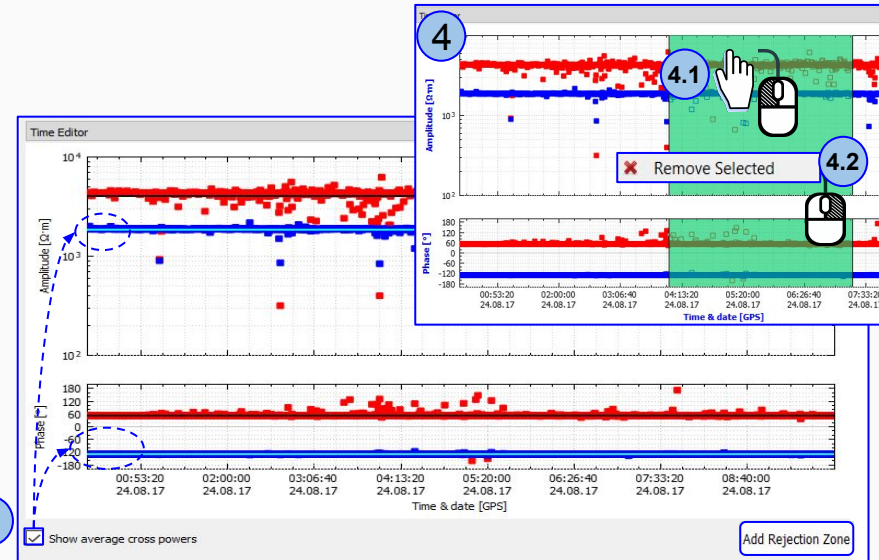
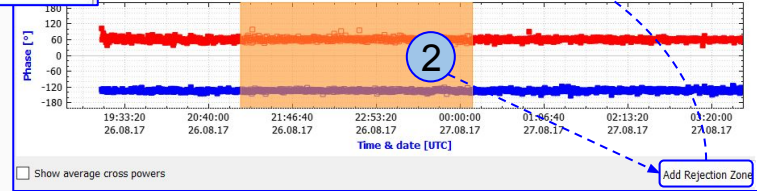
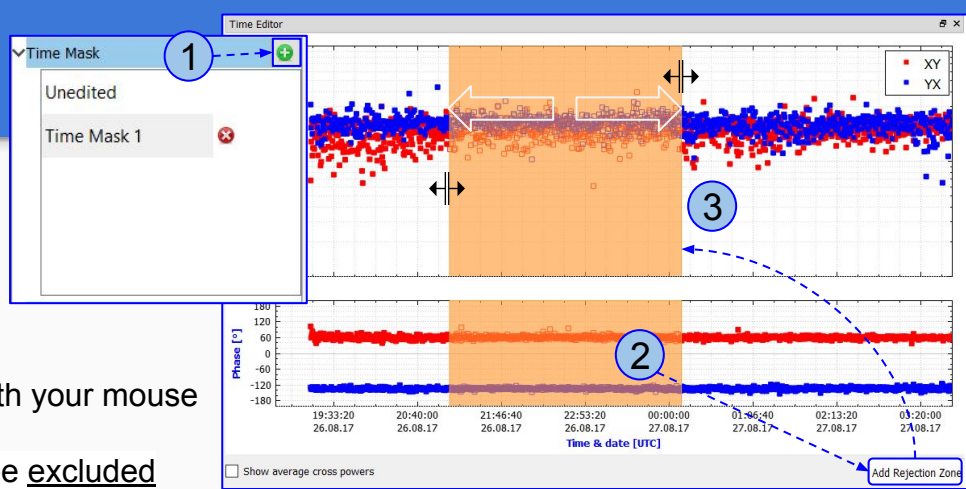
- Select the area by dragging the handles with your mouse to the right or left.
- All cross powers in that selected area will be excluded from the calculation

## 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

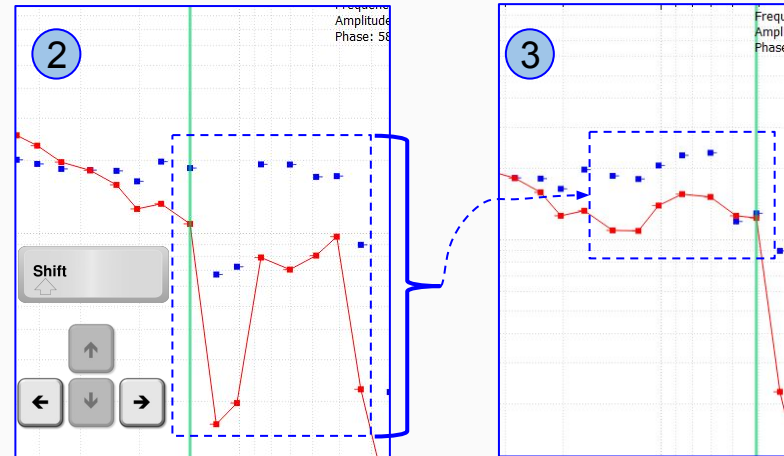
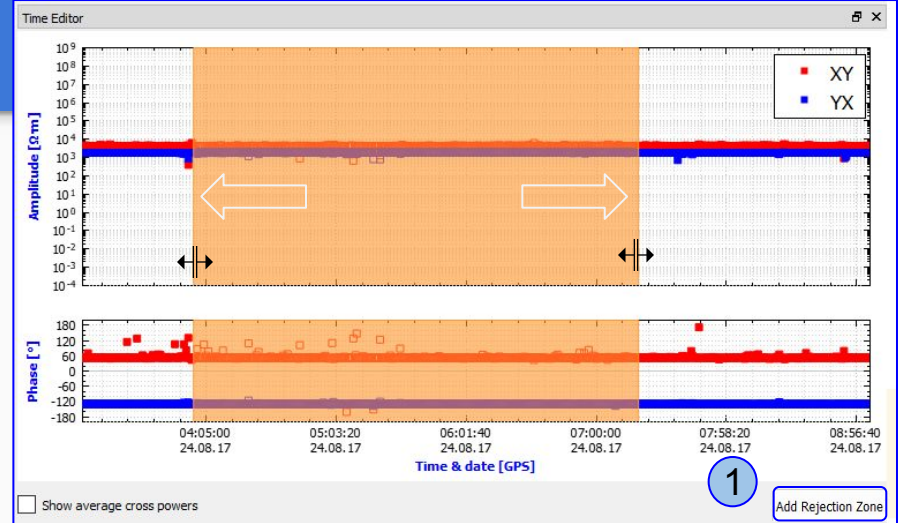
- Add Rejection Zone
- Select the time interval on the plot Right to Left or Left to Right

## 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](mailto:support@phoenix-geophysics.com)*