

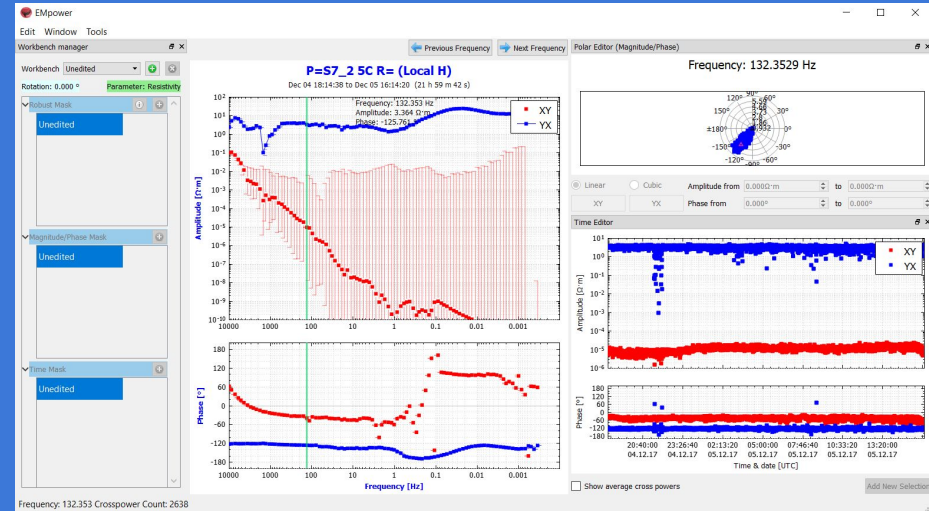
EMpower Cross Power Editor



- Cross Power Editor
- Processed MT Data
- New Workbench
- Rotating a Workbench
- Robust mask
- Magnitude / Polar
 - Copying Ranges
 - Exclusive Ranges copying
- Time Editor
 - Copying Ranges
- Workflow
- Shortcuts

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

The screenshot displays the EMpower software interface. At the top, the title bar reads "Kimberley BC Aug 2017 (D:/Kimberley BC Aug 2017) - EMPower". The main window is divided into several panes. On the left, a "Site / Workbench Name" list shows various sites, with "P=Remote R= (Local H) - (Unedited)" selected. A context menu is open over this site, with "Edit Cross Powers" highlighted. A blue circle labeled "1" points to the "Processed MT Data" tab, and another blue circle labeled "2" points to the "Edit Cross Powers" button in the context menu. Below the site list is a map showing a topographic view of the site area with a red line indicating the TCT (Trench Cross-Track) and several yellow circles representing electrode locations. The map includes a scale bar of 10000m and coordinates. On the right, a table lists processed data for the selected site, with columns for "Reference / Status" and "Filter / Geophysical". The table shows several entries for "Resistivity" and "Magnetic" data, with some entries marked as "Unapproved" and others as "Approved". A blue circle labeled "2" points to the "Approved" status of the "Magnetic" entry. Below the map and table, there are two plots. The top plot is a resistivity curve showing "Amplitude [Ω m]" on a logarithmic y-axis (10⁻¹ to 10⁴) versus frequency on a logarithmic x-axis (10000 to 0.001). The bottom plot is a phase curve showing "Phase [°]" on a linear y-axis (-180 to 180) versus frequency on a logarithmic x-axis (10000 to 0.001). Both plots show data for "P=Remote R= (Local H) (Unedited)" with red and blue lines representing different data series.


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*




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

The screenshot displays the EMpower software interface. On the left, the 'Workbench manager' shows three workbenches: 'Unedited', 'Robust Mask', and 'Time Mask'. A green plus icon is highlighted in the 'Robust Mask' section. In the center, a plot titled 'P=S7_2' shows Amplitude [r.m] and Phase [°] versus Frequency. 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' points to the dialog box. Below the plot, another 'Workbench manager' window is visible with a circled 'a' next to the 'Robust Mask' section. A circled 'b' points to the 'Magnitude/Phase Mask' section, and a circled 'c' points to the 'Time Mask' section. At the bottom right, a plot titled 'Test V1353' shows Amplitude [r.m] and Phase [°] versus Frequency.

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 process of rotating a workbench in EMpower. It shows three stages: 1. Initial state with a rotation of 0.000 degrees. 2. The 'New Workbench - EMpower' dialog box where 'Workbench name' is 'Workbench 5', 'Parameter to edit' is 'Resistivity', and 'Rotation type' is 'Strike Angle' with a rotation angle of 0.000 degrees. 3. The resulting state where the rotation is 'Strike' and the phase is 43.327 degrees. The graphs show Amplitude [r.m] vs Frequency [Hz] and Phase [degrees] vs Frequency [Hz].

Robust Mask

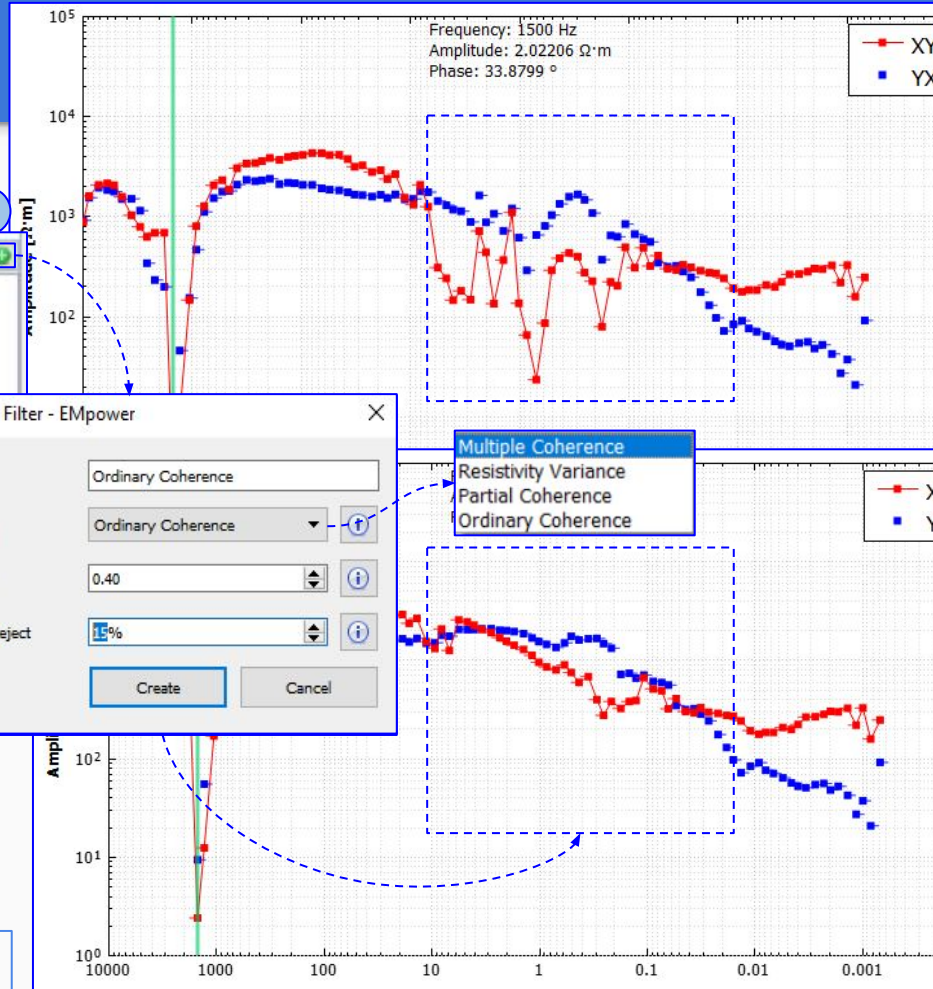
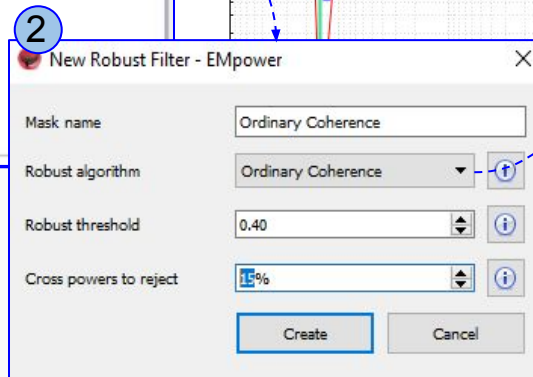
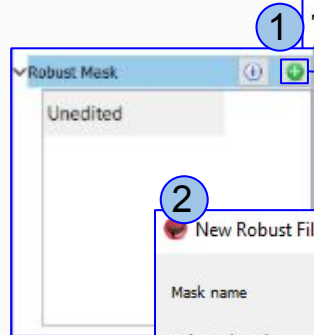
When the processed site contains noise a **Robust Mask** can be created to reduce the noise.

1. Create a **Robust Mask**
2. Define the parameters needed
 - Robust algorithm
 - Robust threshold
 - 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

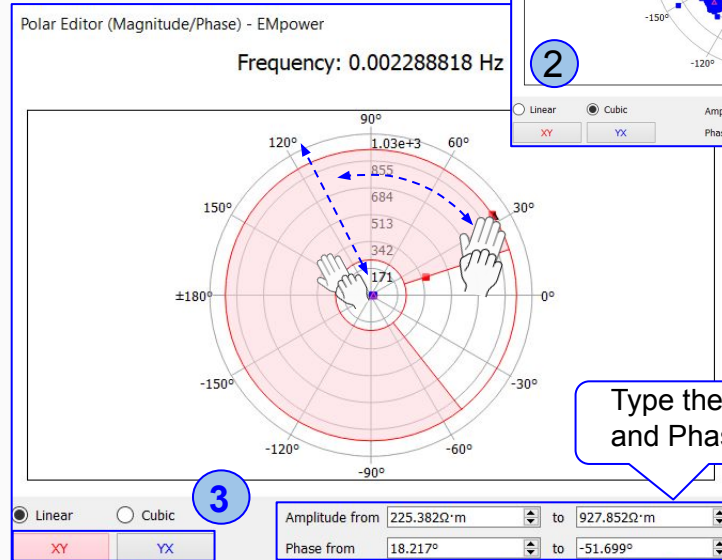
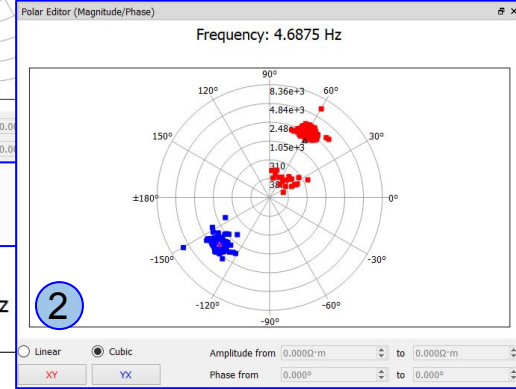
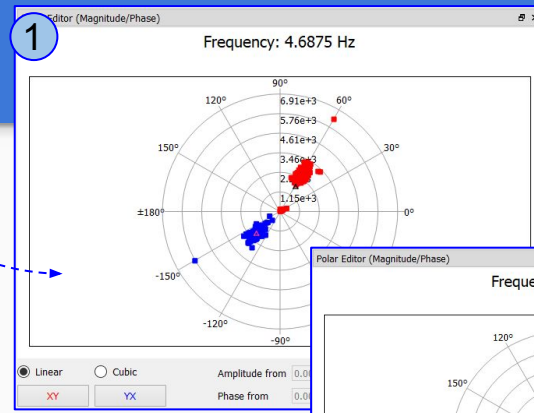
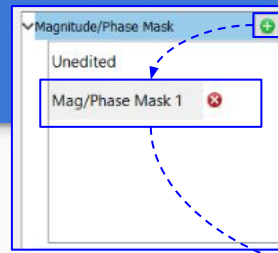
- The Polar Editor can view information in two ways: Linear or Cubic

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.*

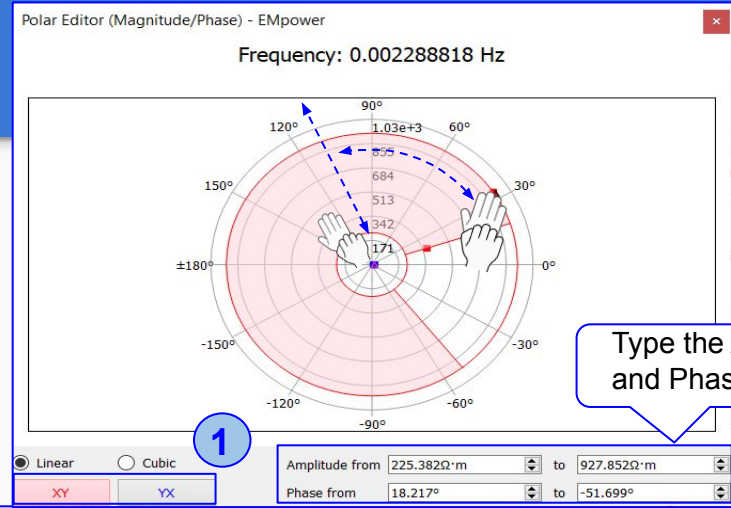



Type the Amplitude and Phase

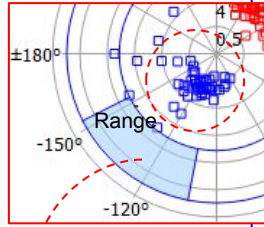
Copying Ranges (Magnitude / Polar)


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.

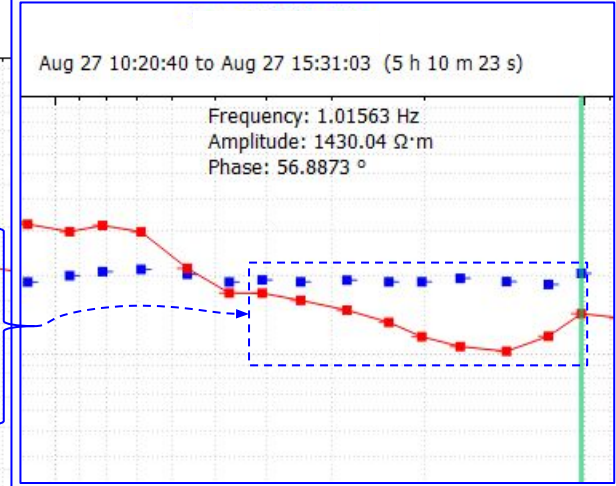
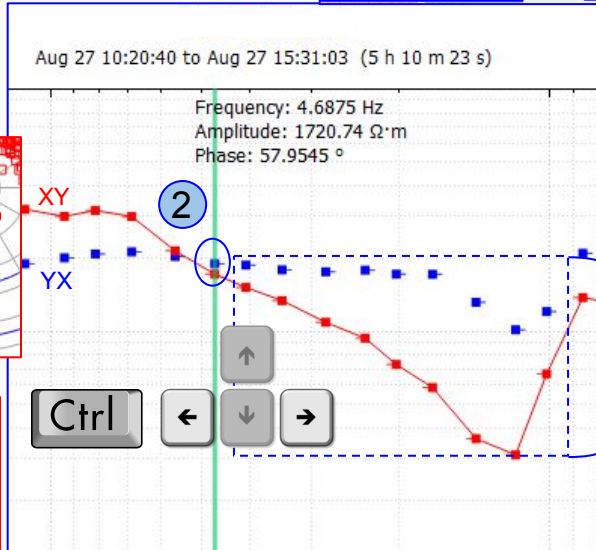
**This tool offers minimal improvement to some data sets, but it should be used sparingly.*



 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.

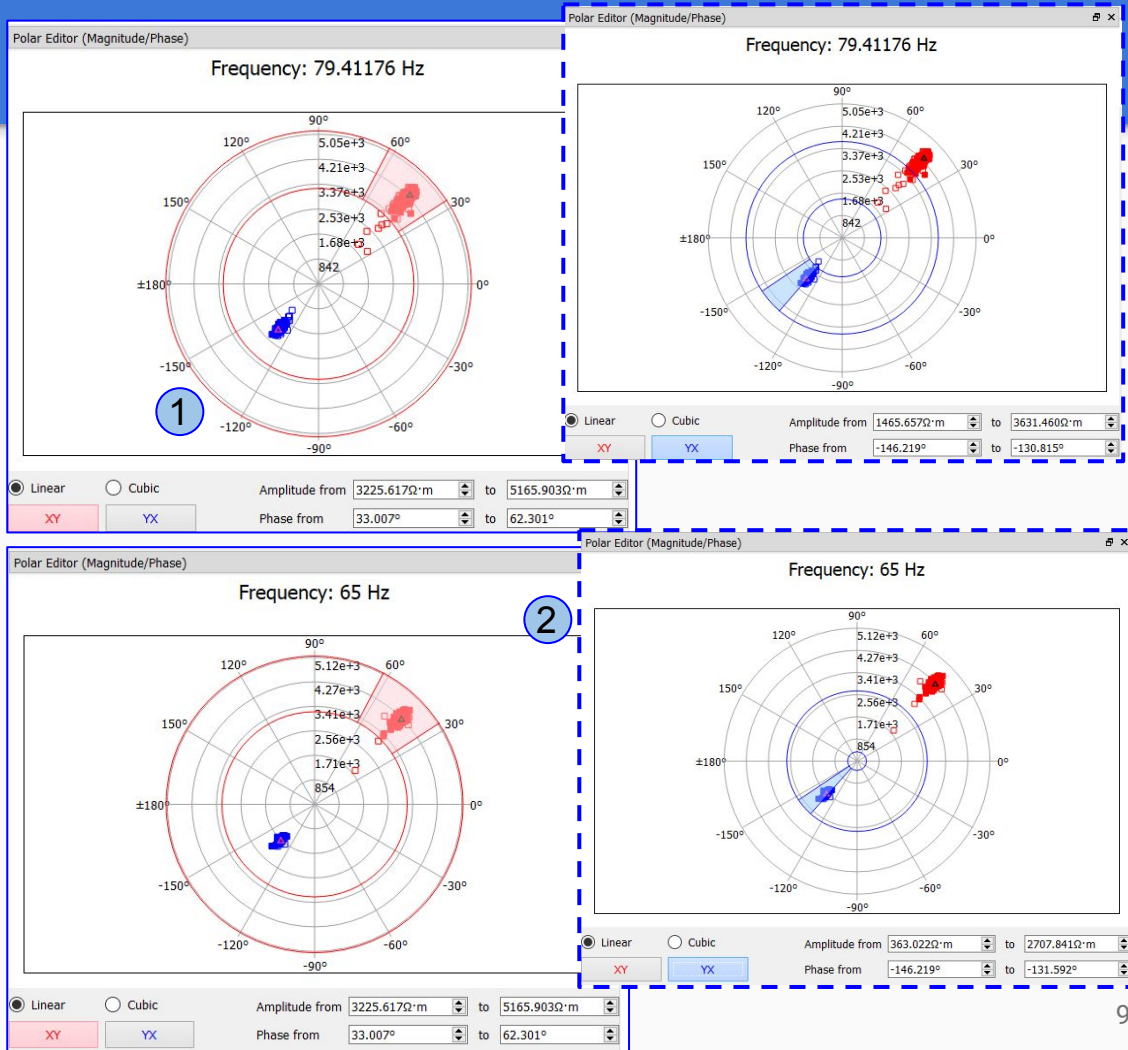


Exclusive Range Copying (Magnitude/Phase)

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 (see slide 3)
 - Copy the selected frequency (see page 6)
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*

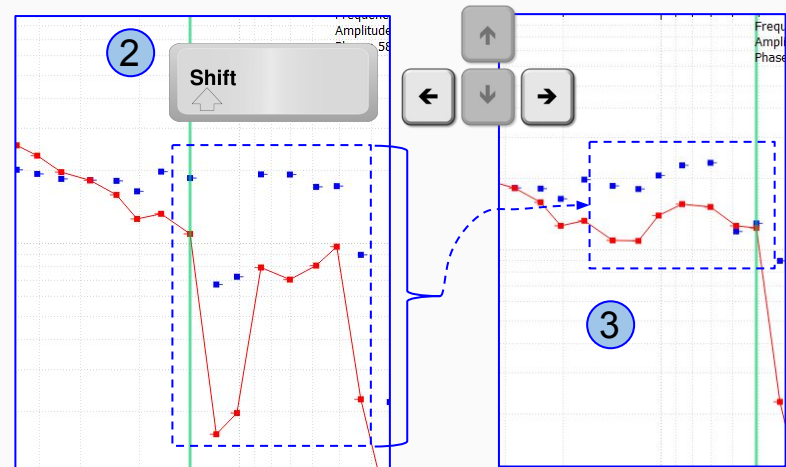
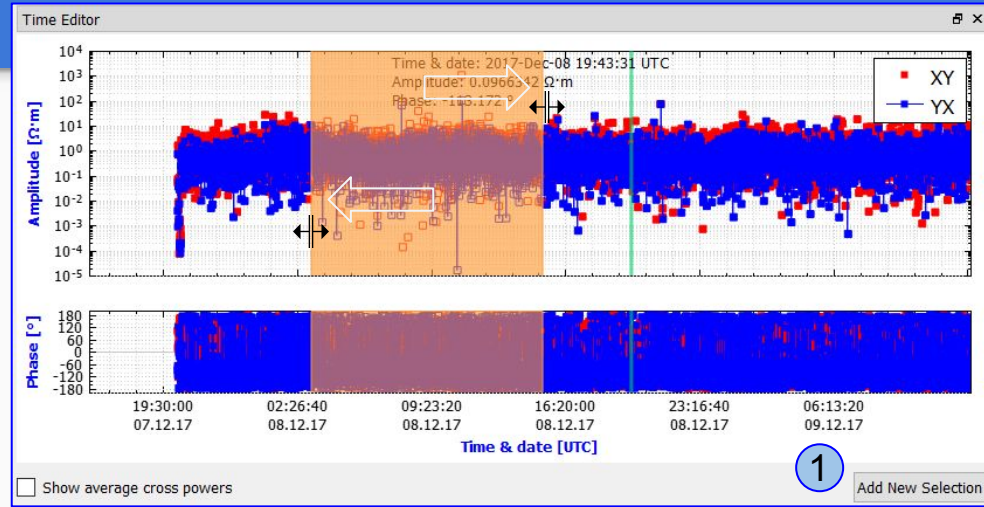


Copying Ranges (Time Editor)

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