

EMpower Data Management



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Recording Library

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Creating / Opening a Project

1. Start **EMpower**

2. Click **Manage**

3. Open or Create a New Project

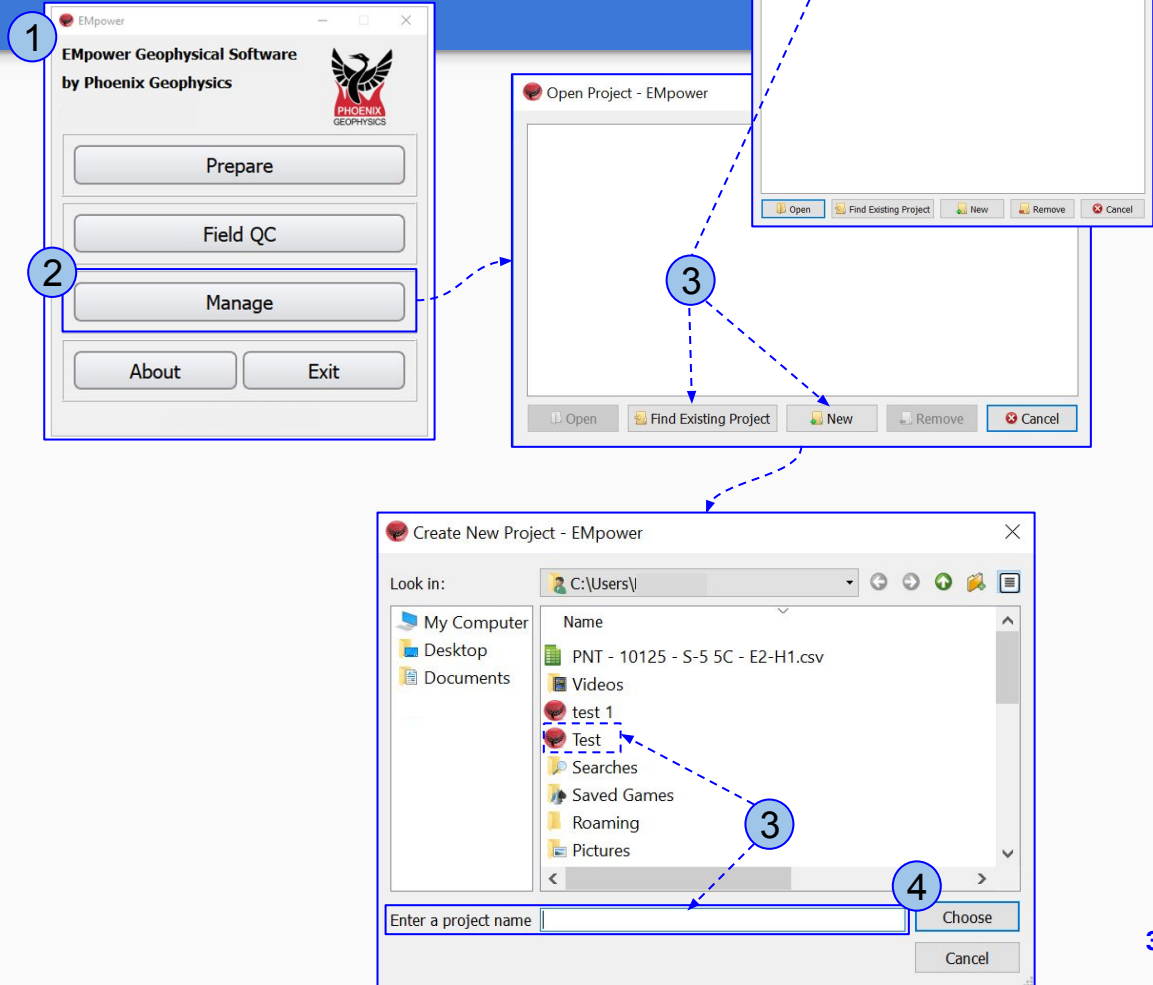
To Open an Existing Project

- Click **Find Existing Project** or select from the list (*previously used*)
- Select the Project

To create a New Project

- Click **New**
- Type the Project Name

4. Click **Choose**



Importing Data / Drag and Drop

Importing Data

1. Select **Importing Recordings** from **File** menu
 - Select the recording and click **Choose**

Drag and drop

2. Select the **recording file** in the **File Explorer** window
3. Drag and drop the **Recording data** to the Timeline or Map
4. Wait until charging is completed

1

2

3

4



To add a recording from the **SD Card**

- Insert **SD card** in the computer SD Card slot or use an external USB memory card reader

Visual Representation of Sites

- **Imported recordings are shown in three synchronized views**

- Timeline
- Map
- Recording information

- **Visual tracking**

Green	Approved
Yellow	Unapproved
Red	Rejected

The screenshot displays the EMpower software interface for a 'D.C. Nevada 2017 Test'. It features three main views:

- Timeline:** Shows a list of recordings for various stations (MTU-SC-10116, 10125, 10127, 10128) with colored bars indicating their status: green for approved, yellow for unapproved, and red for rejected. A 'Recording list' box highlights the 'S7_1 5C' recording.
- Map:** A map view showing the location of the recording site 'S7_1 5C' in a remote area. A 'Map' box highlights the site location.
- Recording list:** A detailed view for the selected 'S7_1 5C' recording, showing its status (Unapproved), tools (Time Series, Spectra, Process (Orthogonal)), and recording information (Recording ID, Start time, Duration, Survey name, Station name, Operator(s), Company name, Layout Geometry, Declination, Notes).

The recording information section includes a table for Electric Channels:

Channel	(+) N / E	(-) S / W	Polarity	(+) N / E	(-) S / W	Gain	LFF [Hz]	DC [V]
E1	50.00	50.00	Inverted	235.522	305.681	4 x 4 = x16	10000	-0.011
E2	50.00	50.00	Inverted	231.074	305.313	4 x 4 = x16	10000	-0.014

Below this is a section for Magnetic Channels with a table for Channel, Sensor, Detected, Serial #, Cal, Polarity, Gain, LFF [Hz], and DC [V].



Selecting a recording in any of the views will automatically update the recording information in the other views

Verifying/Editing Recording Information

The layout and recording information can be consulted and edited using the recording list

1. Review the Recording Information

- Edit the enabled fields, if required
- ⚠ If a warning is found, consult the troubleshooting manual

2. Review the following information:

- Declination
- Dipole length
- The **Azimuth** at which the E and H sensors were laid out
- Use the External filter selector to indicate if an accessory was used during the recording. For details about each specific accessory, consult the manual of such accessory.
- The correct **Calibration** sensor will show a green mark

3. Review the information on **View Recording Details** (see next page)

4. To add more information (such as pictures, documents etc.) click the **Attachments** button

5. Export (see page 9)

Status: Approved Unapproved Rejected

Tools: Time Series Spectra Process (Orthogonal)

Recording Information

Recording ID: 10501_2022-06-27-160923
Start time: Jun 27 2022 09:09:23 (Local) Eastern Daylight Time (GPS -07:00)
Duration: 33 m 57 s
Survey name: Nevada June 2022
Operator(s): EE/DF/JT
Company name: Phoenix Geophysics
Layout Geometry: Scalar CSAMT
Declination: 0.00°
Notes:

Electric Channels

Channel	(+) N / E	(-) S / W	Polarity	(+) N / E	(-) S / W	Gain	LPF [Hz]	DC [V]
E1	50.00	34.50	<input type="checkbox"/> Inverted	4824.383	3345.035	4 x 1 = x4	10000	-0.022
E2	50.00	49.00	<input type="checkbox"/> Inverted	2684.518	3053.859	4 x 1 = x4	10000	-0.019

E Azimuth: 0.00° External Filter: None

Magnetic Channels

Channel	Sensor	Detected	Serial #	Cal	Polarity	Gain	LPF [Hz]	DC [V]
H1	MTC-155	MTC-155	53729	<input checked="" type="checkbox"/>	<input type="checkbox"/> Inverted	x4	10000	-0.011
H2	MTC-155	MTC-155	53739	<input checked="" type="checkbox"/>	<input type="checkbox"/> Inverted	x4	10000	-0.03
H3		N/A		<input checked="" type="checkbox"/>	<input type="checkbox"/> Inverted	N/A	N/A	N/A

H1-H3 Azimuth: 0.00°

View Recording Details Attachments (0) Export

View Recording Details

Review that the following levels are within valid limits for quality control:

1. Battery Voltage
2. Internal Temperature
3. Number of Satellites
4. Saturated Frames
5. Time Series Level

- If saturation is not close to ~0%, review the channel configuration (see page 5), the gain might be too high and/or there is artificial noise on your site

Recording Details: 10155_2019-04-24-085903 - EMpower

Recording ID: 10155_2019-04-24-085903
Survey Name: 10155 MT
Station Name:
Company Name:
Receiver Type: MTU-5D
Instrument Serial: 10155
Operator:

Timing Details
Start Time: Wed Apr 24
Stop Time: Thu Apr 25 0
Duration: 22 h 58 m 50
Latitude: 37.679°N
Longitude: 83.792°E
Altitude: 1119.23 m

Instrument Info
OS Version: v1.27.1
Motherboard Model: BMB01-G
Motherboard Serial: 03100B
Battery: Low: 12.44 V, High: 12.869 V Details
Temperature: Low: 20°C, High: 38°C Details

Decimation
Recorded 0.1 seconds at 96000 samples/s every 60 seconds,
1 second at 24000 samples/s every 60 seconds,
and continuously at 150 samples/s

GPS Timing Card
Serial Number: 200188
Model: BTM01-I
Firmware Version: 00010029X
of Satellites: 7 - 12 satellites Details

Tag	Board S/N	Model	Firmware	Sat	Signal Ranges	
1	E1	201462	BCM03-B	1001a	0%	<input type="button" value="View Levels"/>
2	E2	201427	BCM03-B	1001a	~0% - Yellow	<input type="button" value="View Levels"/>
3			1001a	0%	<input type="button" value="View Levels"/>	
4			1001a	0%	<input type="button" value="View Levels"/>	

Channels Details

4 Saturated Frames - E2

5 Time Series Level - E1

1 Battery Voltage

2 Internal Temperature

3 Number of Satellites

Recording Details and QC

1. The **Time Series** and **Spectra** shows the data available for QC

2. **Data Type** allow to switch between different data sampling rates (96K / 24K / 150 Hz)

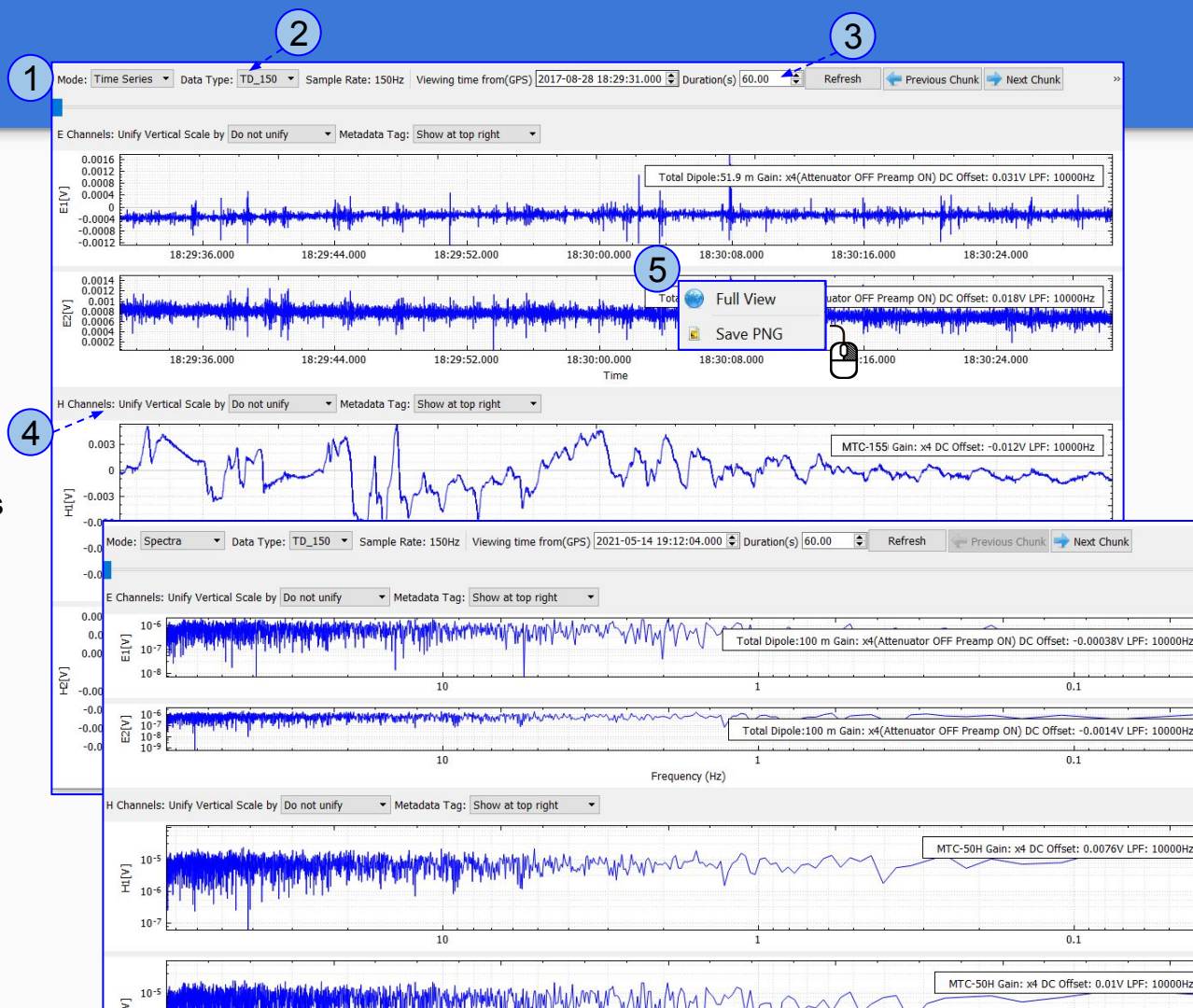
3. Define the duration in the plot

- Select or type the date and/or time as needed and refresh the plot

4. The **Unify Vertical Scale by**, allows to visualize by Channel scale

5. **Exporting**

- Right-click on the plot
- Save PNG



Electric Channels Corrections

EMpower is able to correct possible mistakes in the field layout (polarity or connection) by using the **Manage** module.

Review the **Recording Information** and correct the parameters as needed.

1. Polarity Inverted on E1

- Invert the **North** electrode to the **South** connector, and the **South** electrode to the **North** connector.

2. Polarity Inverted on E2

- Invert the **East** electrode to the **West** connector, and the **West** electrode connected to the **East** connector.

3. Connections Interchanged on NS and EW

- When the **North** electrode is connected to the **East** connector, and the **South** electrode is connected to the **West** connector, and vice versa.

In the Electric components section of the Site processing wizard, click **Select Manually** and apply the appropriate correction.

Channel	Distance (m) to GND		Polarity	Resistance (Ω)		Gain	LPF [Hz]	DC [V]
	(+) N / E	(-) S / W		(+) N / E	(-) S / W			
E1	50.00	50.00	<input checked="" type="checkbox"/> Inverted	505.807	1251.798	4 x 1 = x4	10000	0.017
E2	50.00	50.00	<input type="checkbox"/> Inverted	427.056	418.831	4 x 1 = x4	10000	-0.03

E Azimuth: 0.00 ° External Filter: None

Channel	Distance (m) to GND		Polarity	Resistance (Ω)		Gain	LPF [Hz]	DC [V]
	(+) N / E	(-) S / W		(+) N / E	(-) S / W			
E1	50.00	50.00	<input type="checkbox"/> Inverted	505.807	1251.798	4 x 1 = x4	10000	0.017
E2	50.00	50.00	<input checked="" type="checkbox"/> Inverted	427.056	418.831	4 x 1 = x4	10000	-0.03

E Azimuth: 0.00 ° External Filter: None

Select a recording to use for the electric components

S-5 SC - 10125 - Dec 01 15:07:12 - Dec 02 09:34:55

E-Channel details

E-Channel Selection

Ex = E1
 Ey = E2

Ex	Ey
Dipole length: 100 m	Dipole length: 100 m
North resistance: 232 Ω	East resistance: 136 Ω
South resistance: 141 Ω	West resistance: 175 Ω
Ex Calibration Serial: N/A	Ey Calibration Serial: N/A

Channel Selection - ...

Ex	Ey
<input type="radio"/> E1	<input checked="" type="radio"/> E1
<input checked="" type="radio"/> E2	<input type="radio"/> E2

S-5 SC - 10125 - Dec 01 15:07:12 - Dec 02 09:34:55



Note:

For (3) repeat the channel mapping procedure every time data needs to be processed with these channels

Magnetic Channels Corrections

EMpower will adjust the parameters to compensate for layout errors.

- H1(Hx) Polarity Inverted:** occurs when the sensor's free end is to the South
 - Check the Inverted checkbox
- H2(Hy) Polarity Inverted:** occurs when the sensor's free end is to the West
 - Check the Inverted checkbox
- H Connections interchanged**
 - Identify the sensors that were plugged to the wrong connector in the receiver. Then, while selecting the Magnetic Components in the Site processing wizard, click on **Select Manually** and choose the appropriate connection mapping from the dropdown lists.



Note:

For (3) repeat the channel mapping procedure every time data needs to be processed with these channels

1

Channel	Sensor	Detected	Serial #	Cal	Polarity	Gain	LPF [Hz]	DC [V]
H1	MTC-155	MTC-155	53291	✓	<input checked="" type="checkbox"/> Inverted	x4	10000	0
H2	MTC-155	MTC-155	2666	✓	<input type="checkbox"/> Inverted	x1	10000	0

2

Channel	Sensor	Detected	Serial #	Cal	Polarity	Gain	LPF [Hz]	DC [V]
H1	MTC-155	MTC-155	53291	✓	<input type="checkbox"/> Inverted	x4	10000	0
H2	MTC-155	MTC-155	2666	✓	<input checked="" type="checkbox"/> Inverted	x1	10000	0

3

Channels

Hx = H1 MTC-155 53917
Hy = H2 MTC-155 53918
Hz = H3 MTC-155 53194

Source recording of Hz: 10125_2022-02-01-230711 Select Manually

Magnetics Selection - EMpower

Hx: Hy: Hz:

Use H1-H3 band azimuth: 40 °
 Use custom azimuth

⚠ Hx and Hy are mandatory channels

Ok

Export Recording

Select the Recording(s) from the Timeline, Recording Library or Map

**To export multiple recordings, see [Groups and filters](#)*

1. Use Export Recordings

- Right-click over the timeline or map
- **Export** button

2. Choose the Exporting Format

3. The recording(s) not supporting by JSON format will be market in red

The screenshot displays the software's interface during the export process. At the top, a menu is open with 'Export Recordings' selected, indicated by a blue circle '1'. Below the menu, a map shows a recording location with an 'Export Selected' button, also marked with a blue circle '1'. A dialog box titled 'Export Recordings - EMpower' is open, showing a list of recordings. One recording, '10426_2021-05-19-204847 - Txd (15 m 47 s)', is highlighted in red, indicating it is not supported for JSON export, marked with a blue circle '3'. Another dialog box shows the export format options, with 'Recording metadata report (CSV)' selected, marked with a blue circle '2'. The background shows a timeline and recording library with various recording entries, some marked with a blue circle '1'.



Processing Data

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Processing MT Data

From the Recording Library tab:

1. Choose a recording to process
2. Review the Layout Geometry
3. Run the Process Site Creation Wizard, selecting:

Wizard, selecting:

- Electric Components
- Magnetic Components
- Reference Channels
- Processing Timeframe
- Processing Parameters

**These steps will be explained in the Following pages*

Verify that there is not a warning icon on the left of the channels or next to the Recording ID

The screenshot displays the software interface for processing MT data. At the top, the 'Recording Library' tab is active, showing a list of recordings with status icons (green checkmarks for approved, red X for rejected). A recording 'S7_1 5C' is selected, highlighted in orange. Below the library is a map showing the location of the recording site 'S7_1 5C' in a remote area. The map includes a scale bar and a north arrow. To the right of the map is the 'Process (Orthogonal)' wizard configuration panel. This panel includes fields for 'Recording ID', 'Start time', 'Duration', 'Survey name', 'Station name', 'Operator(s)', and 'Company name'. It also has a 'Layout Geometry' dropdown set to 'Orthogonal' and a 'Declination' field set to '13.00°'. Below these are sections for 'Electric Channels' and 'Magnetic Channels'. The 'Electric Channels' section shows two channels, E1 and E2, with their respective parameters like distance to GND, resistance, gain, and LPF. The 'Magnetic Channels' section shows three channels, H1, H2, and H3, with their sensor types, detected status, serial numbers, calibration, polarity, gain, and LPF. A red circle with an exclamation mark is overlaid on the 'Recording ID' field in the wizard, indicating a warning icon should not be present. Blue dashed lines with numbered circles (1, 2, 3) point to the recording selection, the map, and the wizard configuration respectively.

Process Site Creation wizard

Electric components

1. Select the recording with the desired electric lines from the Map, Timeline or Drop-down list
2. Review / Edit the E-Channel details
 - 2.1. Use the **Select Manually** button to change the Channel Selection (Ex/Ey)
 - 2.2. To change or add details use the **Edit** button
3. The **Navigation Bar** will display the components of the processed site being created
4. Click Next to continue

The screenshot shows the 'Process Site Creation - S7_2_5C - EMpower' application. At the top, a 'Channel Selection - EMpower' dialog is open, showing radio buttons for Ex (E1, E2) and Ey (E1, E2). The main interface features a timeline at the top with dates from Nov 17 to Dec 05, 2017, and a map of the western United States. A recording 'S7_2_5C' is highlighted on the map with a yellow dot and a blue circle labeled '1'. A callout box labeled '3' points to the recording name, stating: 'When a recording is selected, the letter P (Primary) will appear next to the channel name'. The 'E-Channel details' dialog is open, showing 'E-Channel Selection' with radio buttons for Ex = E1 and Ey = E2, and a 'Select Manually' button (callout 2.1). Below this, there are fields for Dipole length, North/South resistance, and Ex/Ey Calibration Serial, with an 'Edit' button (callout 2.2). At the bottom, a 'Navigation Bar' shows 'Electric Components: S7_2_5C - 10125 - Dec 04 10:14:38 - Dec 05 08:14:20' and a 'Next' button (callout 4). A legend at the bottom right explains the status icons: a blue 'i' for 'The recording is good to process', a yellow warning triangle for 'The recording does not have an available calibration file', and a red exclamation mark for 'The recording does not have two mandatory electric channels'.

Process Site Creation wizard

Magnetic Channels

If the desired magnetic channels are in the same recording

1. Keep the option **Use magnetic channels from the same recording as electric channels** selected
2. Use **Select Manually** to modify as needed and click **Next**

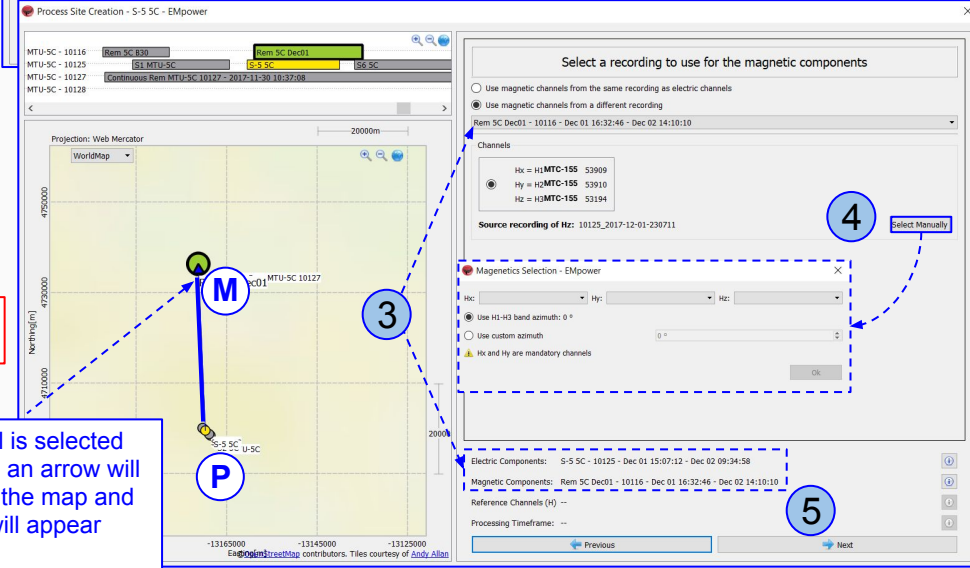
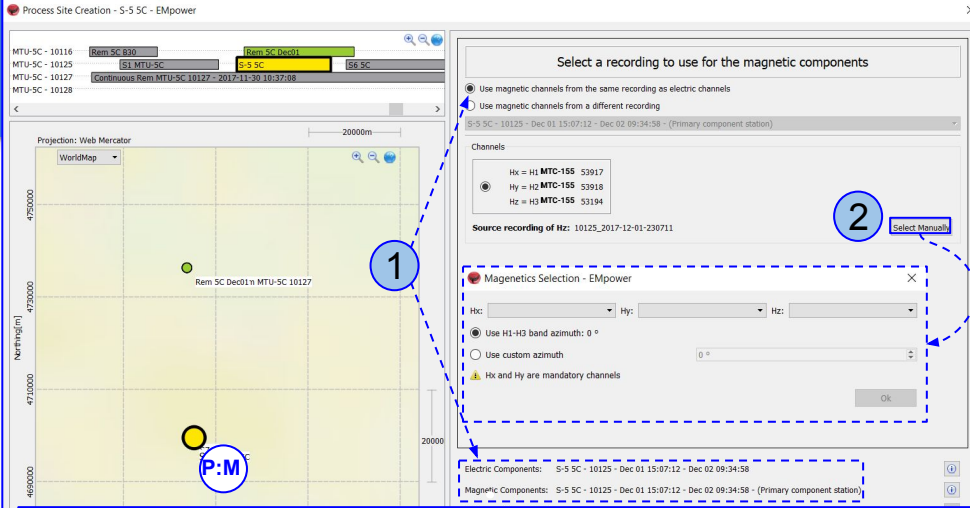
If need to borrow the magnetic channel data from a different recording

3. Select **Use magnetic channels from a different recording**
 - o Select a valid recording/magnetic sensors from the Map / Timeline or using the Drop-down and click **Next**

! Recordings with different Sampling Mode and/or Sampling Rate will not appear on the dropdown list "Use magnetic channels from a different recording".

4. Use **Select Manually**
5. Click **Next**

i When a magnetic channel is selected from a different recording, an arrow will be pointing to that site on the map and the letter **M (Magnetic)** will appear next to that site



Process Site Creation wizard

Reference Channels

Same recording

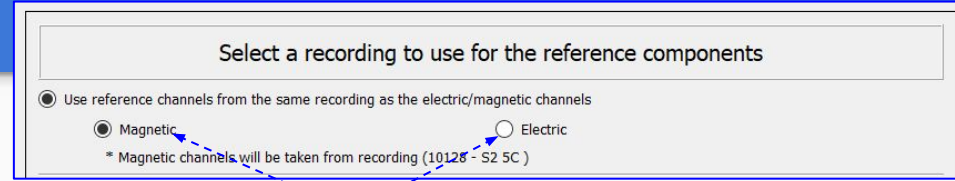
- To use reference channels from the same recording as the electric/magnetic channels
 - Select either the Magnetic Channels or Electric Channels
 - Click **Next**

Remote reference

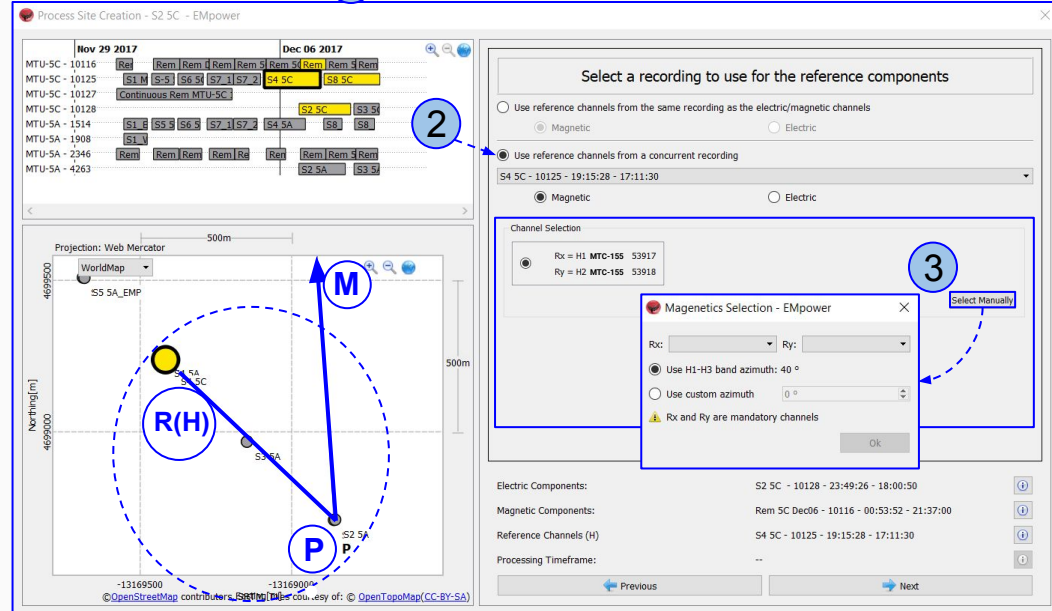
- To use Reference channels from a concurrent recording select **“Use reference channels from concurrent a recording”**
 - A concurrent recording with valid magnetic or electric channels will appear as non-gray in the Map / Timeline and in the drop-down list

Recordings with different Sampling Mode and/or Sampling Rate will not appear on the dropdown list “Use reference channels from concurrent a recording” .

- Use **Select Manually** as needed
 - Click **Next**



1



2

3



When a channel (**H** magnetic or **E** electric) is selected from a concurrent site the letters **R(H)** or **R(E)** appears next to the Reference site name

Processing Timeframe / Parameters

1. The **Select Processing Timeframe**, allows to select the time segment of the recording that will be processed
 - Use the **Start - End fields** or move the blue indicators in the **Duration** selectors to select the desired Start and End times of the Processing Timeframe.
 - Click Next
2. In the **Processing Parameters** window to reduce the effect of power line noise
 - Select the frequency of the **Electric power grid filter** that corresponds to the frequency carried by the power lines in the region
3. Type the **Process site name**
4. Robust Templates (*see next page*)

1 Select Processing Timeframe

Processing timeframe

Time zone

GPS Site time zone: America/Edmonton (GPS-06:00)

Start: 2017-08-27 10:53:11 End: 2017-08-28 10:34:29

Sunrise: 06:54 Sunset: 20:40
Duration: 23 h 41 m 18 s

2 Processing Parameters

3

4

Electric power grid filter

50 Hz 60 Hz None

Process site name

P=MB 1 R= (Local H)

Robust Templates

Process with robust templates enabled

Multiple Coherence [0.1] (Default)

Mask name: Multiple Coherence

Robust algorithm: Multiple Coherence

Attack: 0.10

Cross powers to reject: 10%

Set Default + -

Robust Template / Processing Queue

4. Enable Robust Templates by checking **Process with robust templates enabled**

4.1. Select the **Robust Mask**

- Change the parameters as needed

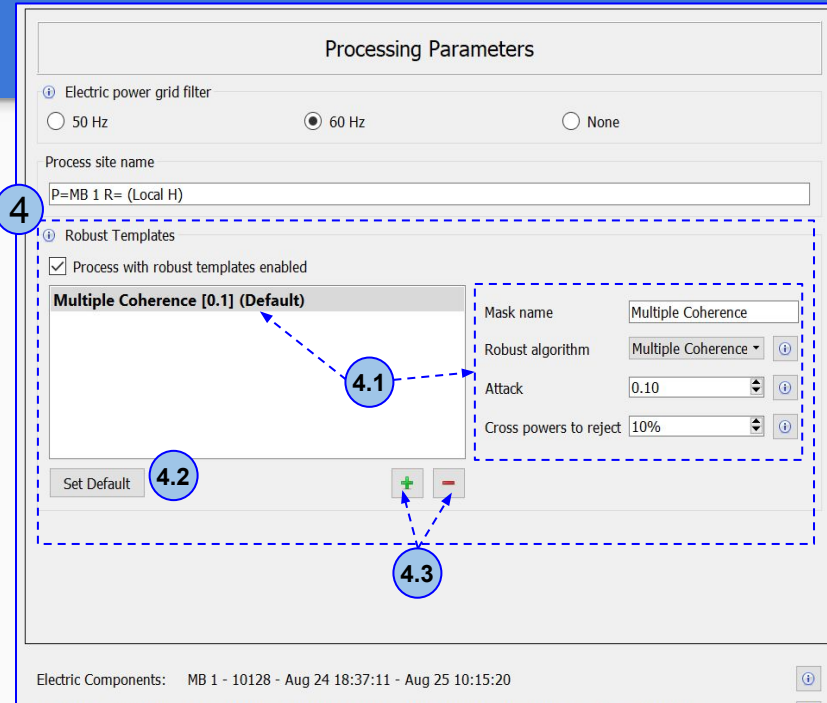
4.2. Use the **Set Default** button to change the default Mask for the current processing site(s)

4.3. Add or delete Robust Mask Template(s)

**All changes will be applied to the current processing task only and subsequent processing will default to the Robust Template configured in the Project Settings.*

5. Click the **Process** button

6. The **Processing Queue** shows the processing of the site(s) selected



Processing Parameters

Electric power grid filter
 50 Hz 60 Hz None

Process site name
P=MB 1 R= (Local H)

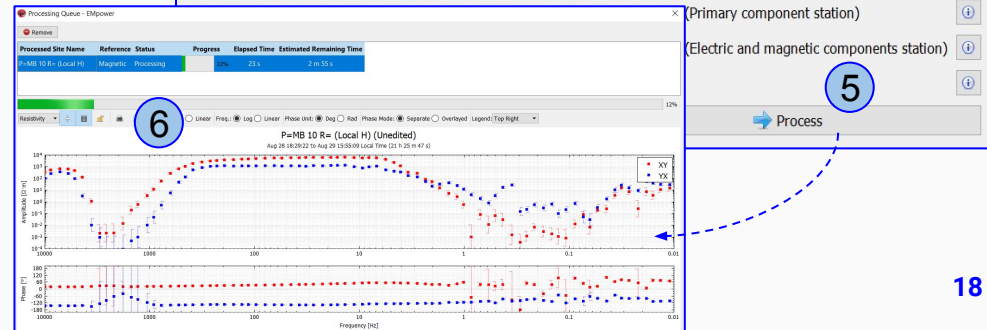
Robust Templates
 Process with robust templates enabled

Multiple Coherence [0.1] (Default)

Mask name: Multiple Coherence
Robust algorithm: Multiple Coherence
Attack: 0.10
Cross powers to reject: 10%

Set Default
+ -

Electric Components: MB 1 - 10128 - Aug 24 18:37:11 - Aug 25 10:15:20



Processing Queue - EMpower

Processed Site Name	Reference	Status	Progress	Elapsed Time	Estimated Remaining Time
P=MB 10 R= (Local H)	Magnetic	Processing	<div style="width: 20%;"></div> 20%	23 s	2 m 55 s

Resolvability: 12%

Amplitude (dB) vs Frequency (Hz) graph showing XX and YY components.

Process

All the processing with **Robust Templates** enabled will automatically generate a workbench named "Robust" in the Crosspower Editor (see page 22)



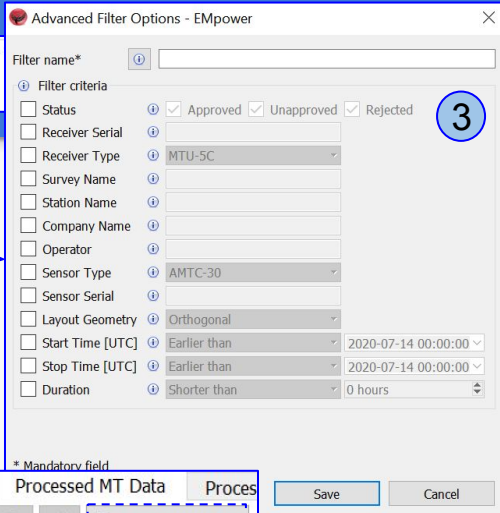
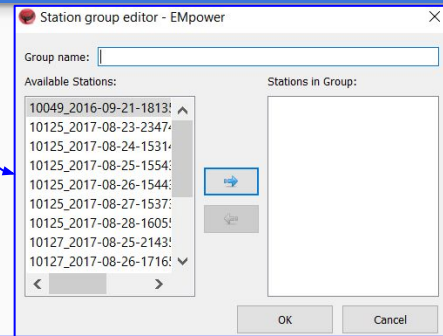
Advanced Search

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Toolbar (Sites list)

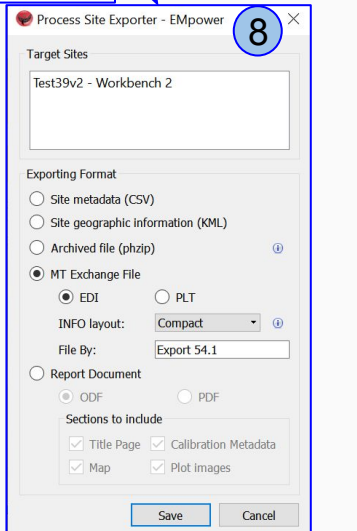
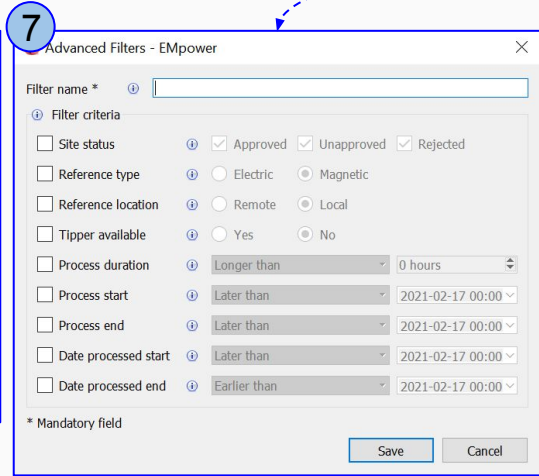
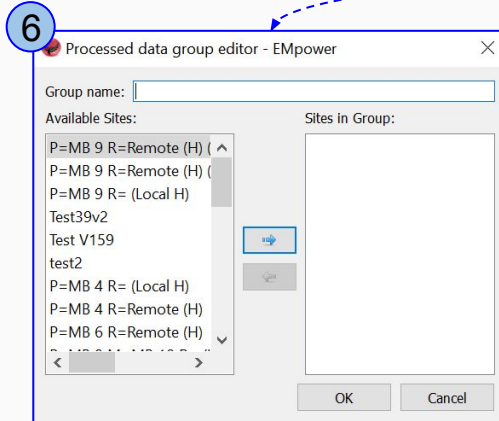
Recording library

1. Quick search by **Site name**
2. **Groups** (Slide 19-20)
3. **Filters** (Slide 21)



Processed MT Data

4. **Select All** the Sites
5. Quick search by **Site name**
6. **Groups** (Slide 19-20)
7. **Filters** (Slide 21)
8. **Export Selected**



Groups (Timeline)

1. Create new group

2. Type the **Group Name**

2.1. Select the sites from the right list using the blue arrow

3. Add sites to an existing group

3.1. Use left-click to select the site and hold down the **Ctrl** key to select multiple sites (release the buttons)

3.2. Select **Add to group** from the Right-click menu and select the existing group

OR

4. Select the sites

4.1. Use left-click to select the site and hold down the **Ctrl** key to select multiple sites (release the buttons)

4.2. Select **Add to group** from the Right-click menu and **Add to new group**


5. Create new group

The new group will appear in the drop-down Groups list


Groups (Map)

Select the sites using one of two options:

1. Use the **Line Selection** tool for specific sites

 Hold down the left-click and draw the line over the sites on the map

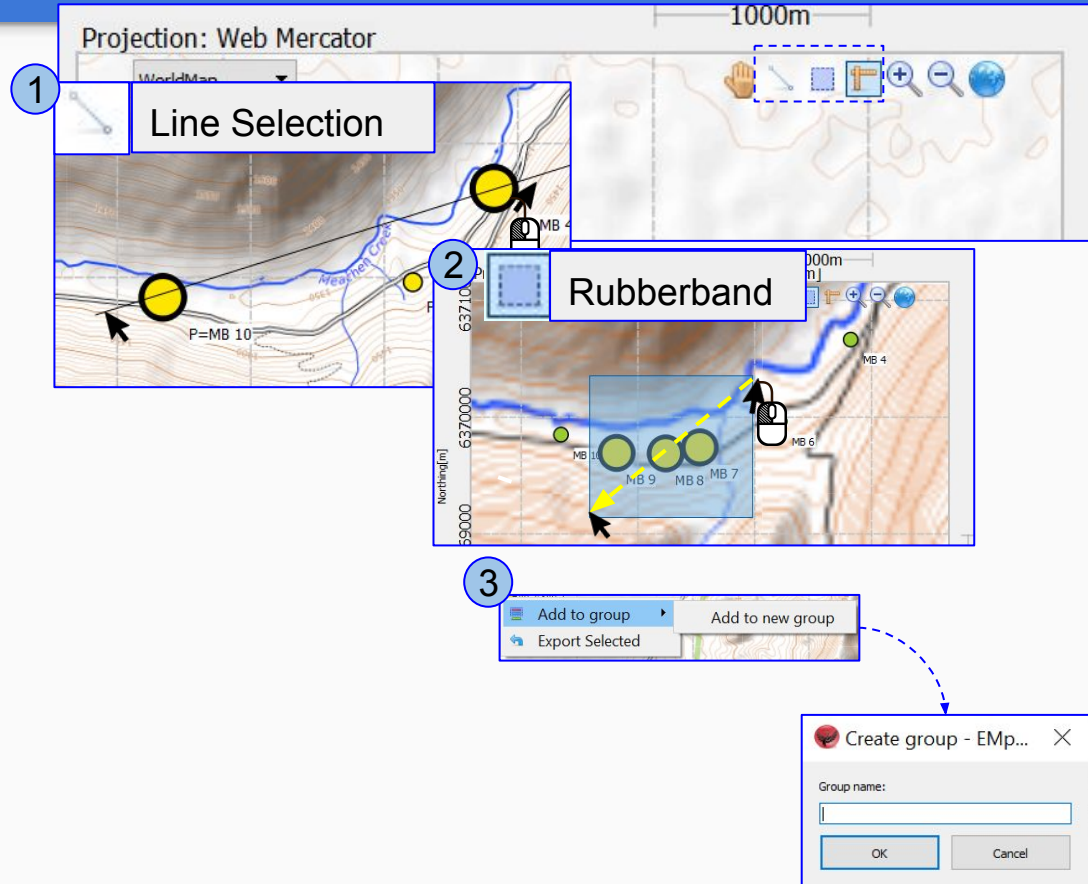
2. Use the **Rubberband** for large ranges

 Hold down the left-click and drag over the sites on the map (*ensure to cover entirely all the sites needed*)

Create a group


3. Create a Group

- Use the Right-click menu on the Map
- **Add to group**
- **Create new group**
- Type the **Group name**



Filters (Processed MT Data)

The Advanced Filter can work with individual sites or with Groups

1. Name the **Filter** (*mandatory field)
2. Select the **Filter criteria**
3. Save the **Filter**
4. The new **Filter** will be added to the drop down list
5. Use the Edit  button to add or change **Filter criteria**

Advanced Filters - EMpower

Filter name *

Filter criteria

- Site status Approved Unapproved Rejected
- Reference type Electric Magnetic
- Reference location Remote Local
- Tipper available Yes No
- Process duration
- Process start
- Process end
- Date processed start
- Date processed end

* Mandatory field

Site / Workbench Name	Reference / Status	Filter / Geophysical Param	Sensor
▼ P=S6 5C R=Rem Dec02 5C (H) - (Unedited)	Magnetic	60Hz	Unknown
Unedited	Approved	Resistivity/Impedance	
▼ P=S4 5C R= (Local H) - (Unedited)	Magnetic	60Hz	MTC-155
Unedited	Approved	Resistivity/Impedance	
▼ P=S1 MTU-5C R=Rem 5C B30 (H) - (Unedited)	Magnetic	50Hz	MTC-155
Unedited	Approved	Resistivity/Impedance	

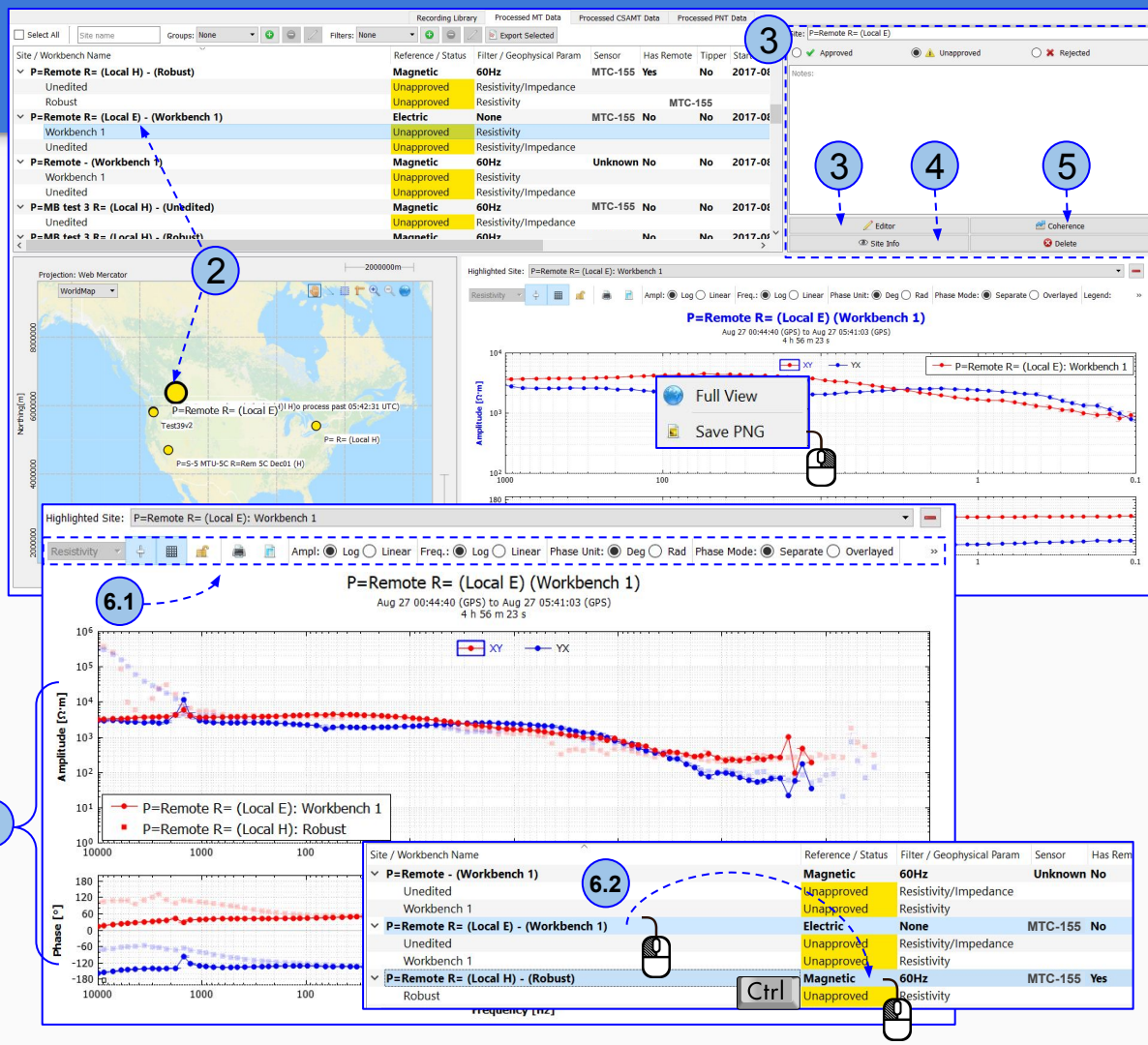


Processed MT Data

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Visualizing Processed Data

1. Select the **Processed Site** from the Workbench list or Map
2. Edit the Processed Site (Name, Status and Notes)
3. The **Edit Cross Powers** feature removes outlying cross powers from the calculation of resistivity, phase, and other geophysical parameters
4. Site Info
5. Coherence
6. The **Plot** shows the Amplitude and Phase of the selected Processed Site
 - 6.1. Use the **Plot toolbar** to access additional plot features
 - 6.2. Add Processed Site(s) by selecting the site in the Workbench list



Process Site Selection

Select:

1. Select all the processed sites
2. Select a group of processed sites
 - 2.1. Left-click on the first site on the list, press and hold the **Shift** key and left-click on the last site

Or

- 2.2. Hold the Left-click on the site and drag up/down to select items

3. To select specific processed sites

- 3.1. Left-click on the first site on the list and hold the **Ctrl** key until the last processed site is selected

*To select site(s) from the map see [page 22](#)

Export:

4. Click the **Export Selected** button
 - 4.1. Complete the information as needed and click the **Save** button

The screenshot displays the 'Workbench list' window with a table of site data. The table has columns for Site / Workbench Name, Reference / Status, Filter / Geophysical Param, Sensor, and Has Remc. The 'Export Selected' button is highlighted in the top right. A 'Process Site Exporter - EMpower' dialog box is open, showing 'Target Sites' and 'Exporting Format' options. The 'MT Exchange File' format is selected, and the 'Save' button is highlighted.

Site / Workbench Name	Reference / Status	Filter / Geophysical Param	Sensor	Has Remc
Test	Magnetic	60Hz	MTC-150	Yes
Unapproved	Unapproved	Resistivity/Impedance		
Unapproved	Unapproved	Resistivity		
test 4505 2 - (Workbench 1)	Electric	None	MTC-155	No
Workbench 1	Unapproved	Resistivity		
Unapproved	Unapproved	Resistivity/Impedance		
test 4505 - (Unedited)	Electric	None	MTC-155	No
Unedited	Unapproved	Resistivity/Impedance		
P=Victoria Park R= (Local H) - (Workbench 2)	Magnetic	None	MTC-155	No

Target Sites:

- P=Remote R= (Local E) - Workbench 1
- P=Remote R= (Local H) - Unedited
- P=Remote R= (Local H) - Robust

Exporting Format:

- Site metadata (CSV)
- Site geographic information (KML)
- Archived file (phzip)
- MT Exchange File
 - EDI
 - PLT

INFO layout: Compact

File By: Export 54.1

Report Document:


- ODF
- PDF

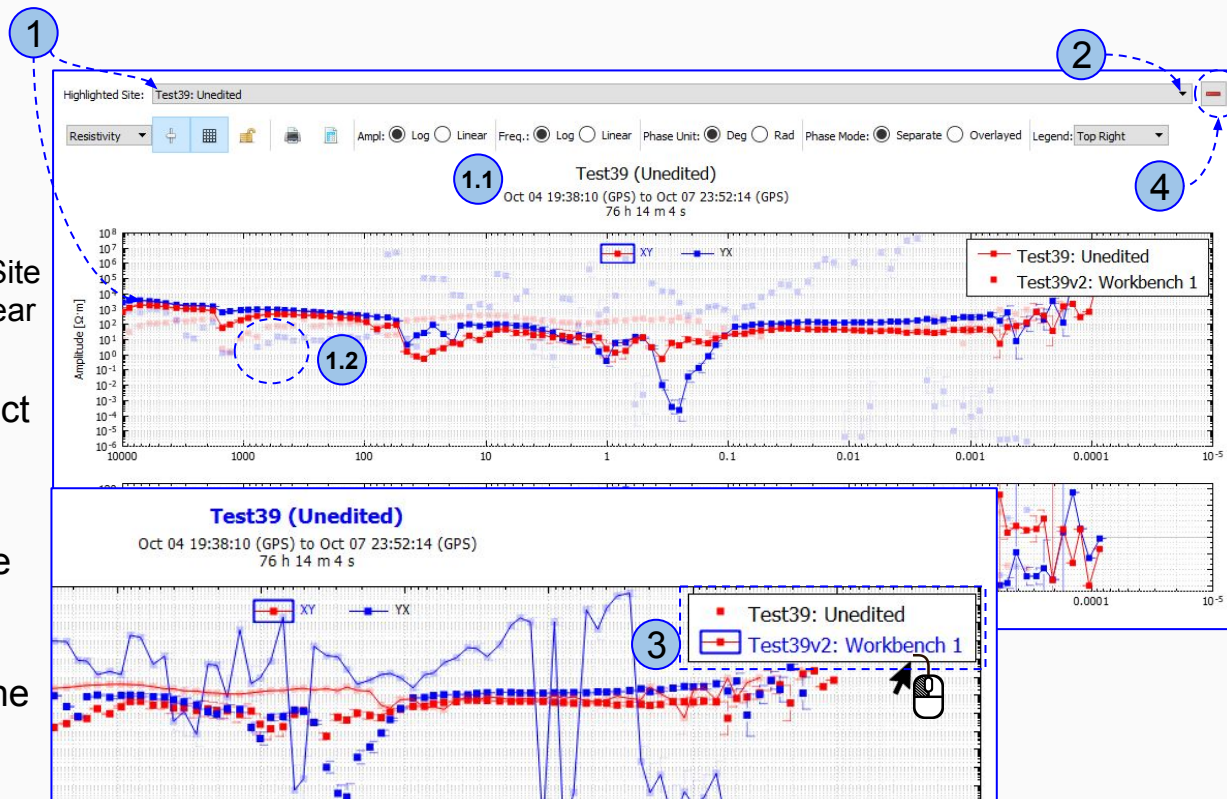
Sections to include:

- Title Page
- Calibration Metadata
- Map
- Plot Images

Working with multi-sites

EMpower has the functionality to work with multiple sites. Select the sites as needed (see *previous page*)

1. The highlighted site will be in the foreground
 - 1.1. The plot title will show the Highlighted Site
 - 1.2. Other selected sites in the plot will appear in attenuated colour
2. To change the Highlighted Site, select the Highlighted Site from the drop down menu
3. To switch between curves, select the site on the plot legend
4. To remove a site from the plot use the button 



Site Info - Coherence

1. General Processing Metadata information

2. Channels details

- Electrics
- Magnetics
- Remote Reference (E)

3. Recording Information

4. Coherence

1 Metadata Viewer: P=S6 5C R=Rem Dec02 5C (H) - EMpower

2

Processing Metadata

Site ID:	{68d7ac2f-b935-489d-895b-961d3f1d0026}	Tipper Source:	From Local Magnetics
Site Name:	P=S6 5C R=Rem Dec02 5C (H)	Reference Type:	Magnetic
Survey Name:	Don Campbell	Reference Location:	Remote
Company Name:		Process Date:	Not available
Power Grid:	60Hz	Start Time:	Sat Dec 2 22:26:22 2017 GMT
Process Type:	Orthogonal	Stop Time:	Sun Dec 3 17:20:02 2017 GMT
Version:	Not Available	Duration:	18 h 53 m 40 s
Site Status:	approved	Frequency Range:	0.00005 Hz to 12500 Hz

Processing Notes

Electrics Magnetics Remote Reference (E)

	Tag	Polarity Inverted	Gain	LPF	DC	Saturated Frames	Dropped Frames	Pot REsistance(+)	Pot Resistance(-)	Dipole Leng
Ex	Not Available	No	0 x 0 = x0	Not Available	Not Available	0	0	0 Ω	0 Ω	0 m
Ey	Not Available	No	0 x 0 = x0	Not Available	Not Available	0	0	0 Ω	0 Ω	0 m

3

Recording Information

Recording ID: 10125_2017-12-02-203505
Station Name: S6 5C
Survey Name: Don Campbell
Operator(s): CF MU and GB
Start Time: Dec 02 2017 12:35:05
Stop time: Dec 03 2017 09:20:02
Duration: 20 h 44 m 57 s
Electric Filter: None
Latitude: 38.8469 °
Longitude: -118.308 °
Altitude: 1250.1 m
Azimuth: 0.00
Declination: 13.000000

Receiver Information

Rx Type: UNKNOWN
Rx ID: 10125
Rx Firmware:
Rx Cal: Not Available

Recording Notes

4

Coherence viewer - EMpower

Channel 1: Ex Channel 2: Hy

Close

Site: P=S1 MTU-5C R=Rem 5C B30 (H)

Approved Unapproved Rejected

Notes:

Edit Cross Powers Coherence Site Info Delete

Process Site Exporter

1. Select Site(s) - Processed MT Data
 - Modify Groups/Filters as needed
 - Check the desired processed sites or use Check all the processed sites to export (See [Advanced Search](#))
2. Use the **Export Selected** option to open the Process Site Exporter
3. Select one of the **Exporting Format**
4. **Report Document** give the option to create a customized report, by selecting the sections that will be included

The image illustrates the workflow for using the Process Site Exporter. It consists of several interconnected windows and panels:

- Top Panel:** A table showing site data with columns for Reference / Status, Filter / Geophysical Param, and Sensor. The 'Export Selected' button is highlighted.
- Map View:** A map showing site locations (MB 4, MB 6, MB 7, MB 8, MB 9) with a blue selection box and arrows pointing to the 'Add to group' and 'Export Selected' buttons.
- Process Site Exporter - E-Mpower Dialog:** A dialog box with the following sections:
 - Target Sites:** P=Remote R= (Local E) - Workbench 1, P=Remote R= (Local H) - Unedited, P=Remote R= (Local H) - Robust
 - Exporting Format:** Radio buttons for Site metadata (CSV), Site geographic information (KML), Archived file (phzip), and MT Exchange File (selected). Under MT Exchange File, 'EDI' is selected, and 'INFO layout' is set to 'Compact'.
 - File By:** Export 54.1
 - Report Document:** Radio buttons for ODF (selected) and PDF. Under 'Sections to include', 'Title Page', 'Map', 'Calibration Metadata', and 'Plot Images' are checked.
- Menu:** A screenshot of the 'File' menu with 'Export MT Processed Sites' highlighted.
- Format Selection:** A dropdown menu showing 'Compact', 'Full JSON', and 'No Info Section'.

Numbered callouts (1, 2, 3, 4) indicate the sequence of steps: 1. Selecting sites on the map and clicking 'Export Selected'; 2. The 'Process Site Exporter' dialog opening; 3. Selecting the 'Compact' format; 4. Configuring the 'Report Document' sections.




Processed data editing Crosspower Editor

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Editing Cross Powers

Edit Cross Powers, is a tool to create multiple edition masks without changing the original (Unedited) data. Masks can be used to clean noisy sites

1. To create a new **Workbench**

- Click the icon 
- Type the **Workbench name**
- Complete the information as needed
- Click the **Create** button

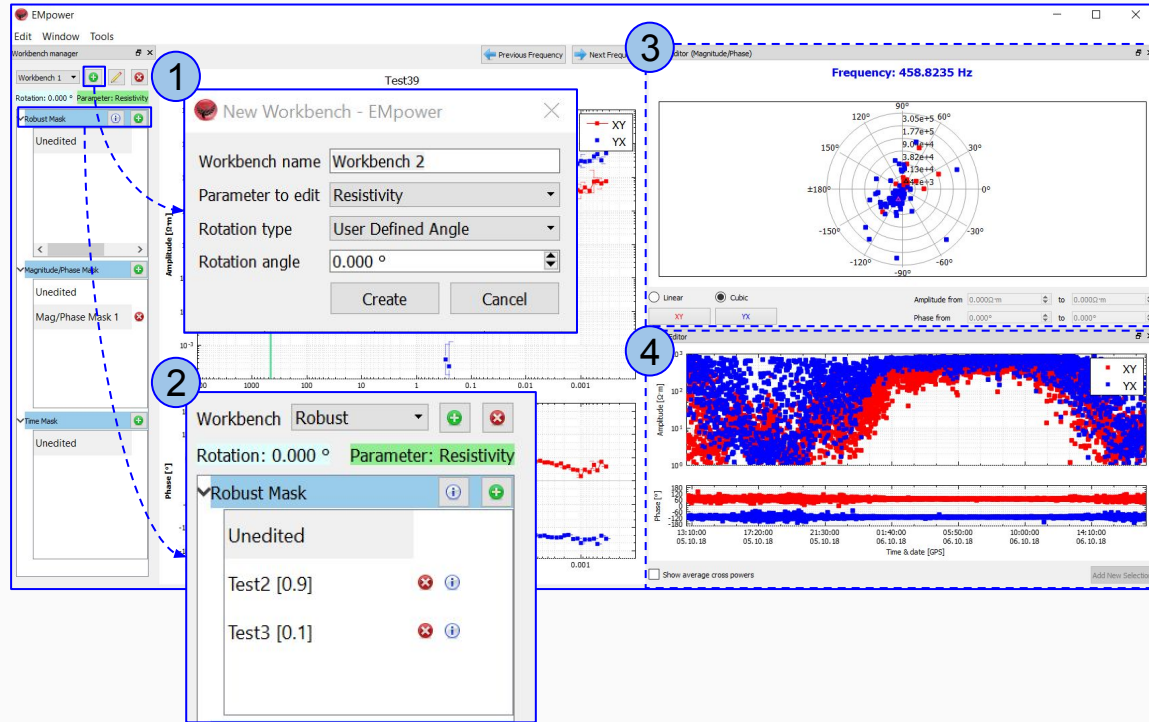
2. When the site is processed using a Robust Template, the Workbench list will include Robust and the Robust mask will display the Robust Templates created on the Project setting (page 8)

3. Polar Editor

- Create a **Polar Editor Mask**(page 24)

4. Time Editor

- Create a **Time Editor Mask**(page 25)



**For more details see the [Crosspower Editor manual](#)*

Robust Mask

The Robust Mask algorithm fixes the most common problems

1. Create a Robust Mask

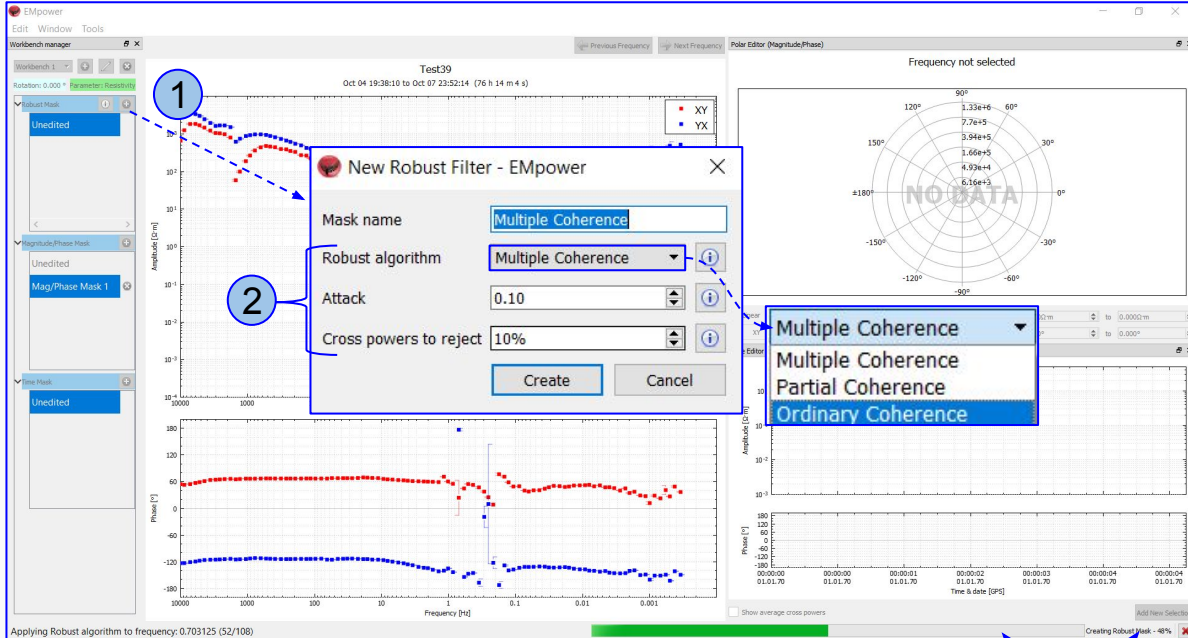
- Type the **Mask Name**

2. Use the different options to obtain the desired information

- Select the **Robust algorithm**
- Define the **Attack**
- Select the percent of **Cross powers to reject**

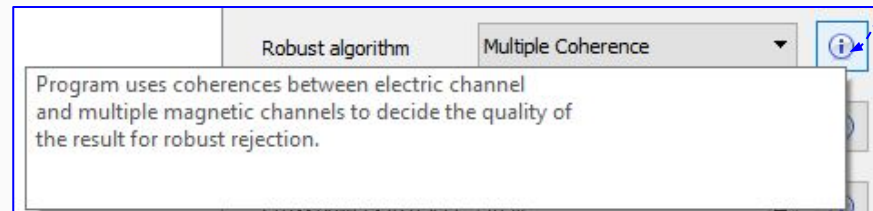
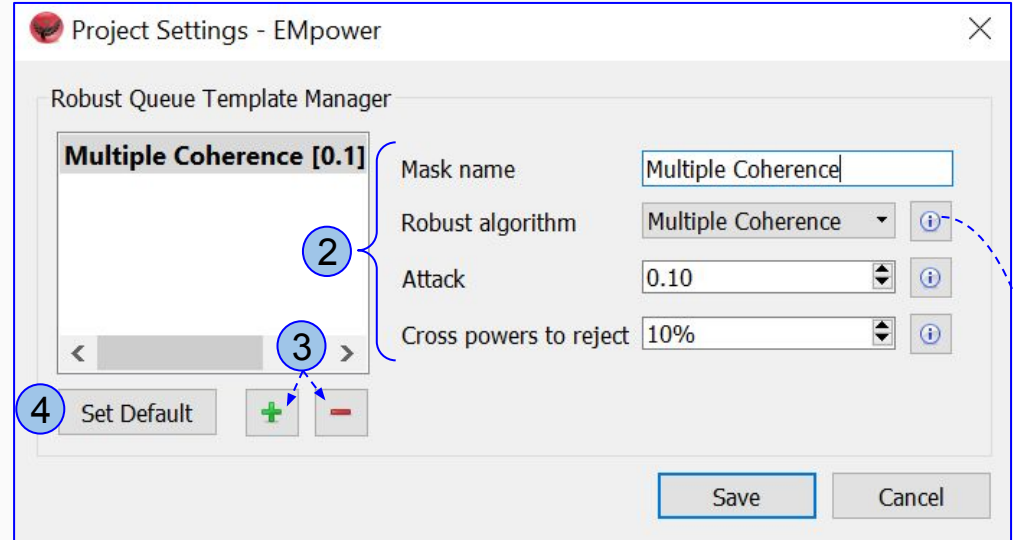
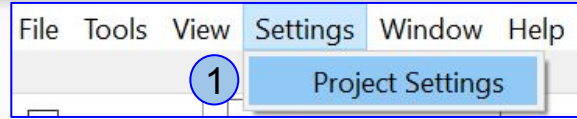
3. Wait until the process is completed

**For more details see the [Crosspower Editor manual](#)*

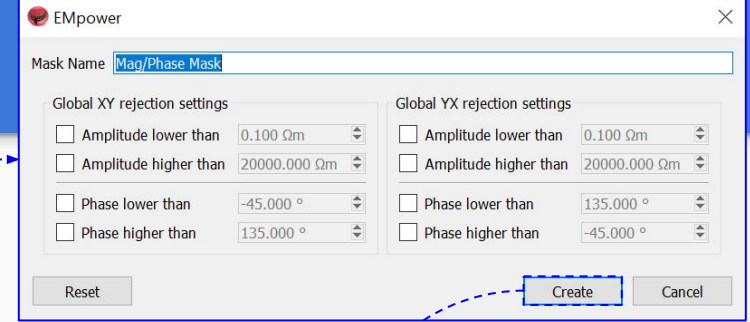
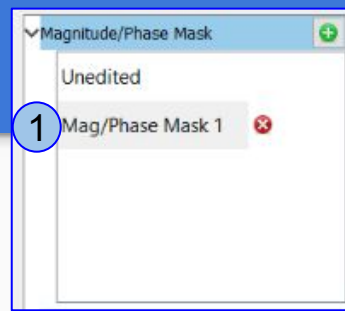


Project Settings - Robust Templates

1. Select **Project Settings** from Setting menu
2. Define the parameters for the **Robust Mask Template**
 - This *template only applies to the current project*
3. Add, Modify or Delete a Robust Mask
4. **Set Default**
 - The "default" in settings will be the robust mask selected after processing for any processing in the project



Polar Editor



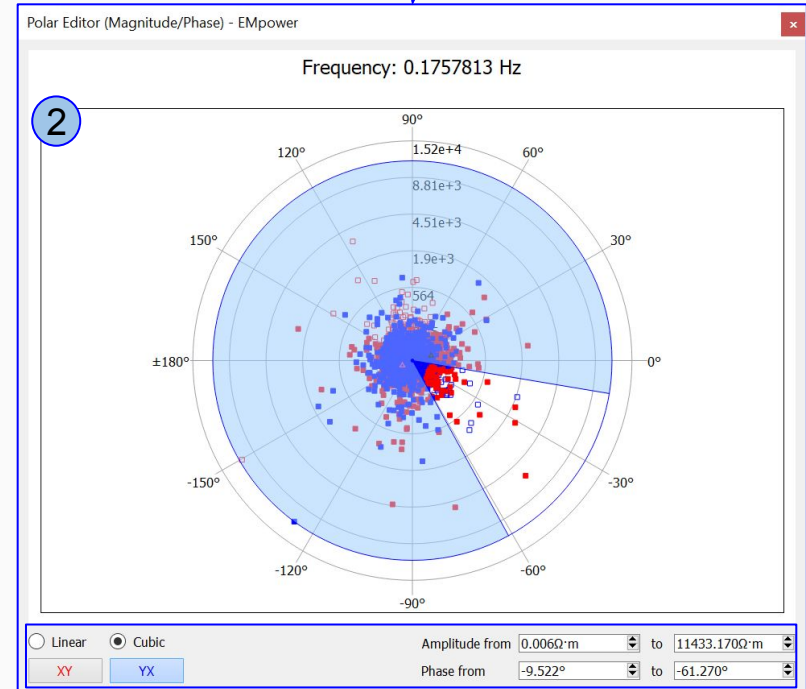
1. Create a New Magnitude/ Phase Editor Polar Masks

- Type the **Mask Name**
- Edit the **Global XY rejection settings** as needed
- Click the **Create** button

2. Use the different tools to obtain the desired information

- Linear / Cubic
- XY / YX
- Amplitude range
- Phase range

**For more details see the [Crosspower Editor manual](#)*



Time Editor

1. Create a New Time Editor Mask

1.1. The Mask Name can be edited by right-clicking on it

2. To add a new rejection area

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

2.2. Left-click and hold, and start dragging to the left or right to select the area of crosspower rejection

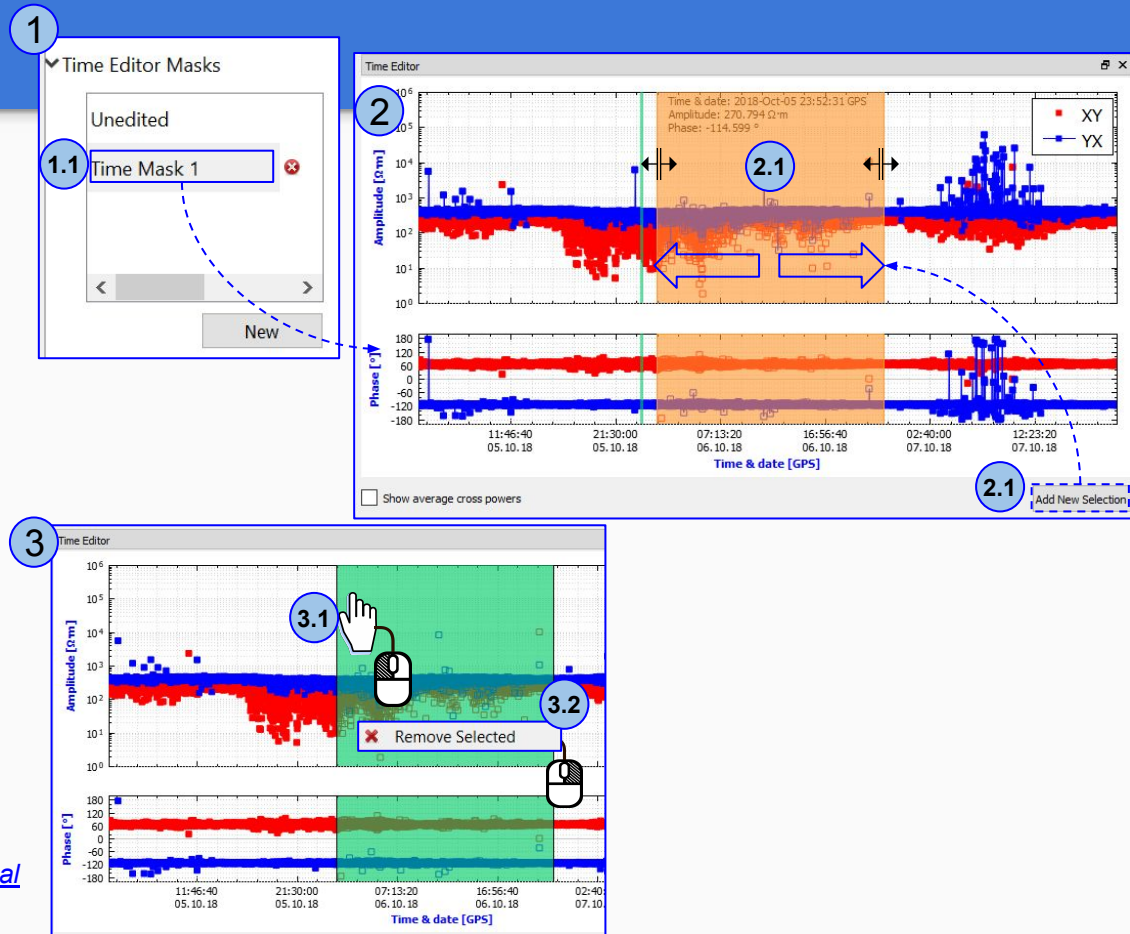
3. To remove an existing rejection area:

3.1. Left-click on the area to be deleted

3.2. Then right-click the option **Remove Selected** that appears on the screen

** The crosspowers rejected in the polar editor will be shown in the time editor and vice versa.*

**For more details see the [Crosspower Editor manual](#)*

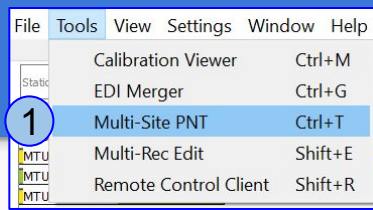




Processed PNT Data

Processed PNT Data	37
Multi-Site PNT	38

Multi-Site PNT



1. Use the **Multi-Site PNT (Ctrl+T)** tool to process Parallel Noise data using specific channels from different recordings

2. Select the recording(s)

2.1. Select the first Recording and define the channels

2.2. Select for another recording(s) the channels that will be used (no more than 7)

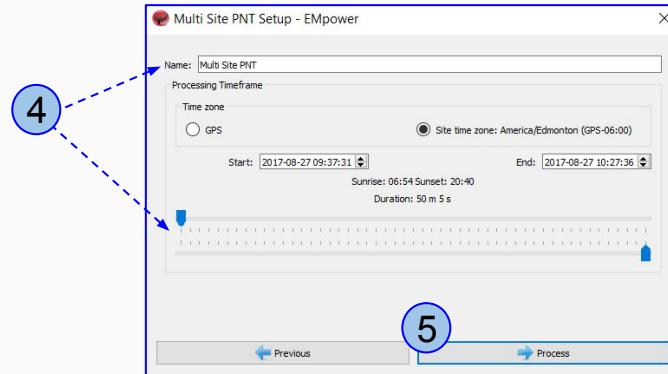
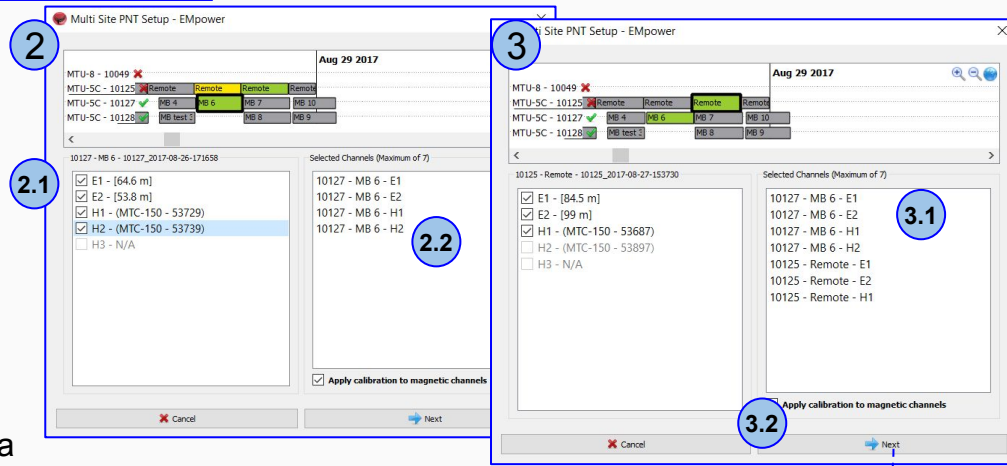
3. **Apply calibration to magnetic channels**

3.1. When the selected sensor does not have associated calibration available in the project **EMpower** will apply a generic calibration

3.2. Click **Next**

4. Define the Name and Duration, the time available depends on the overlapped time between all the recordings selected

5. To begin processing click the **Process** button



Processed PNT Data

This tab shows processed Parallel Noise data




1. Area to Select the Site of interest and view its metadata

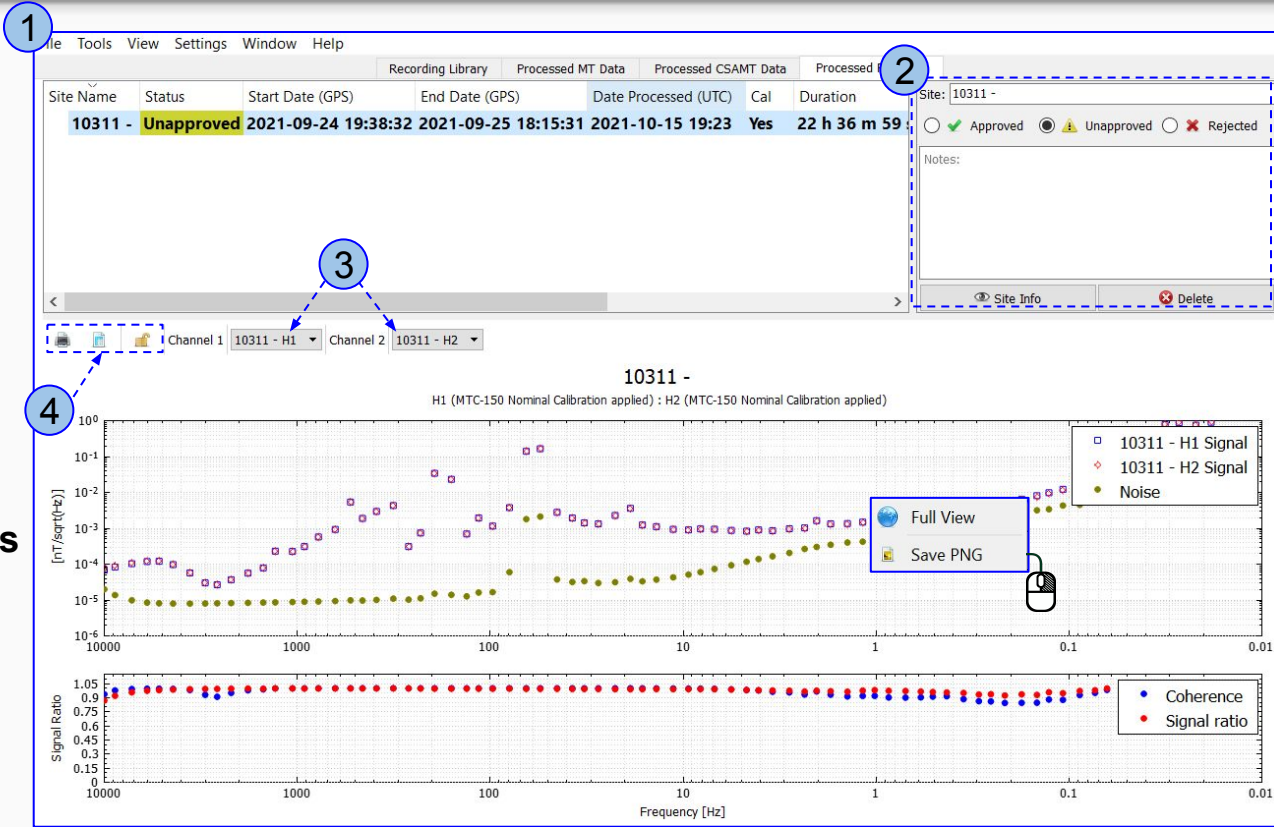
2. Area to edit information of the selected Processed **Site**

- Site Name
- Mark the site as Approved, Unapproved or Rejected
- Relevant Notes for the processing

3. Selectors to choose the **Channels** to be analysed and displayed

4. Tools

-  **Print** the plot
-  **Export** the values in CSV format
-  **Lock / Unlock** plot scale





Tools

EDI Merger <Create>	40
EDI Merger <Edit and Save>	41
Multi-Rec Edit	42

EDI Merger <Create>

1. **EDI Merger (Ctrl+G)** tool is used to combine two EDI files into one.
2. Select the EDI files by using the **Browse for EDI** button
3. Choose one of the Geophysical Mode
4. The **Merged Results** plot shows the highlighted area on the EDI plots

File Tools View Settings Window Help

- Calibration Viewer Ctrl+M
- EDI Merger Ctrl+G**
- Multi-Site PNT Ctrl+T
- Multi-Rec Edit Shift+E
- Remote Control Client Shift+R

EDI Merger - EPower

Amplitude [$\Omega \cdot m$]

Phase [$^{\circ}$]

Frequency [Hz]

Browse for EDI

Look in: C:\Users\PCASTRO\Desktop

Name	Size	Type	Date Modified
Desktop			
Documents			
PCASTRO			
FIELD TESTS (G:)			
P_MB_4_R_Remote_H_Workbench_1.edi	7...B e...e		26/03
P_Remote_R_Local_E_Workbench_1.edi	6...B e...e		26/03
Google Drive		Fi...er	26/03
V1.50		Fi...er	24/03
New Folder2		Fi...er	23/03
v1.31.0.1		Fi...er	27/02
RemoteControlClient_Win		Fi...er	19/02
V1.48		Fi...er	11/02

File name: P_MB_4_R_Remote_H_Workbench_1.edi

Files of type: EDI File (*.edi)

Resistivity

Remove Frequency Restore Frequency Save Close

EDI Merger - EPower

P_MB_4_R_Remote_H_Workbench_1.edi

Merged Result

Amplitude [$\Omega \cdot m$]

Phase [$^{\circ}$]

Frequency [Hz]

Browse for EDI

P_Remote_R_Local_E_Workbench_1.edi

Amplitude [$\Omega \cdot m$]

Phase [$^{\circ}$]

Frequency [Hz]

Resistivity

Remove Frequency Restore Frequency Save Close

Resistivity

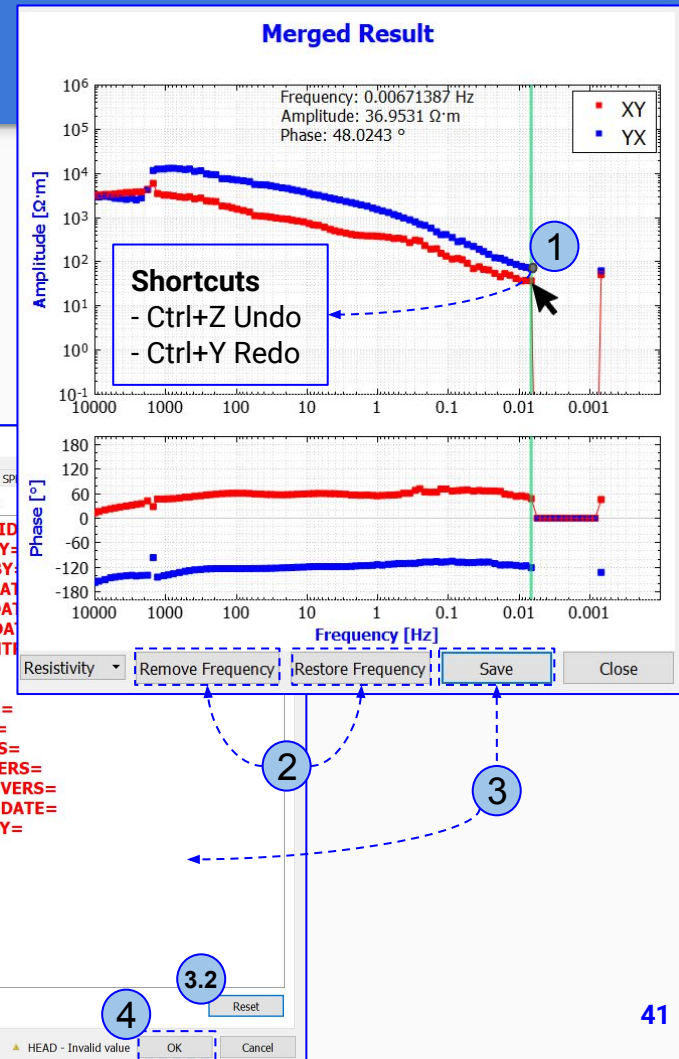
Resistivity

Impedance

Tipper

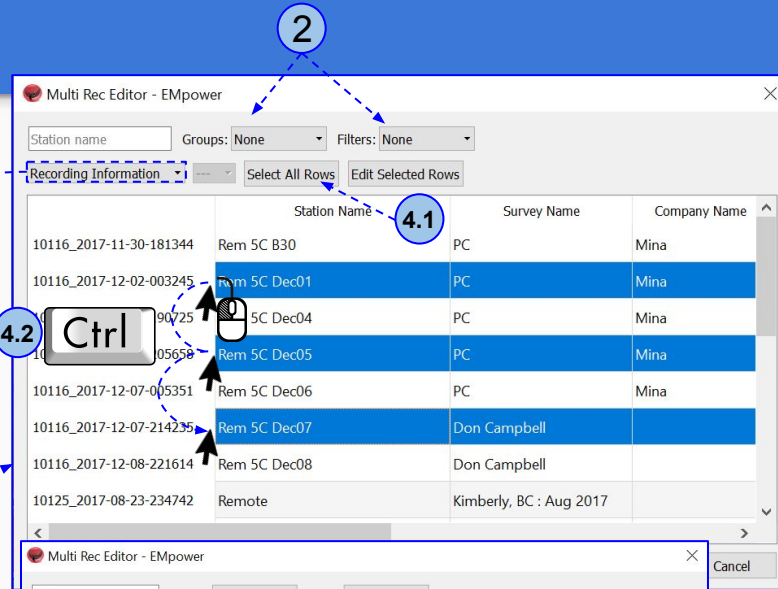
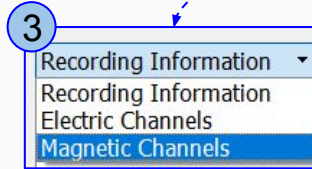
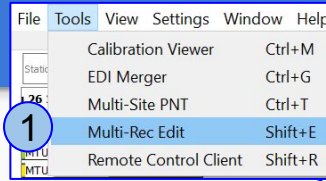
EDI Merger <Edit and Save>

1. To exclude a frequency, select it by using the Left-Click, (*review the information on the top plot*) and click **Remove Frequency** or use the Delete key
2. To recover the frequency, select the frequency and click **Restore Frequency**
3. Click **Save** button and fill out the metadata of the merged EDI in each tab
 - 3.1. Use the blue arrows to select the information from respective EDI file. This information can be manually edited in the merger EDI file.
 - 3.2. To clear the selection use the **Reset** button
4. Once the all the Metadata has been filled click **OK** button to save the merged EDI



Multi-Rec Edit

1. Select **Multi-Rec Edit** from the Tools menu or use the shortcut Shift+E
2. Choose the filters/groups as needed
3. Select to view recording Information or Channels
4. Use the different options to select
 - 4.1. Select all by using **Select All Rows**
 - 4.2. Use left-click to select the site and hold down the Ctrl key to select multiple sites (*release the buttons*)
 - 4.3. To select a group of sites, left-click and hold, and start dragging to the up/down to select the group of sites



! Rows with "----" consist of either disabled channels or not applicable channels of receiver type.

Channel Tag	Sensor Type Name	Sensor Serial Number	Polarity Inverted
H1	MTC-150	53874	false
H1	MTC-150	53729	false
---	---	---	---



Please check out the [FAQs](#)

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

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