EMpower
Data Management

PHOENIX
GEOPHYSICS

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Creating or 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
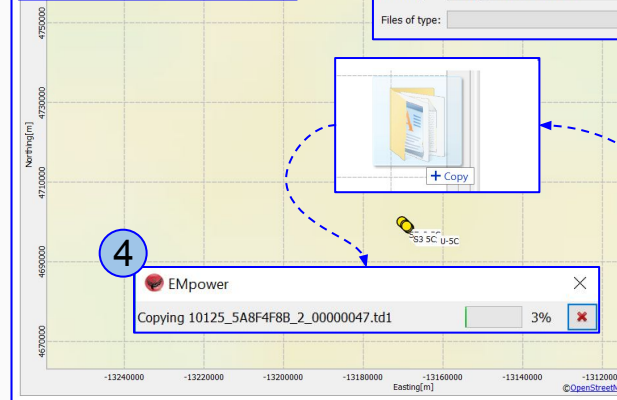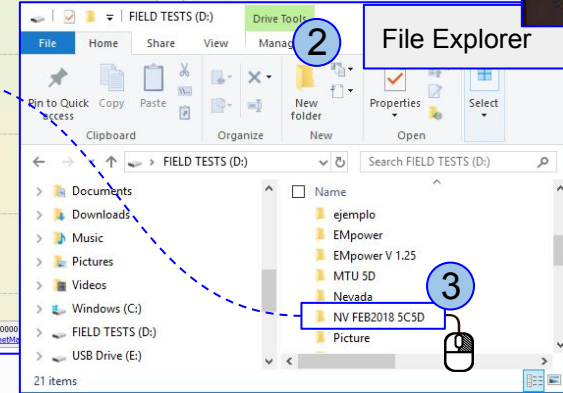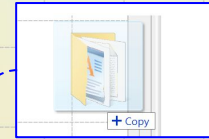
4. Click **Choose**

Importing Data

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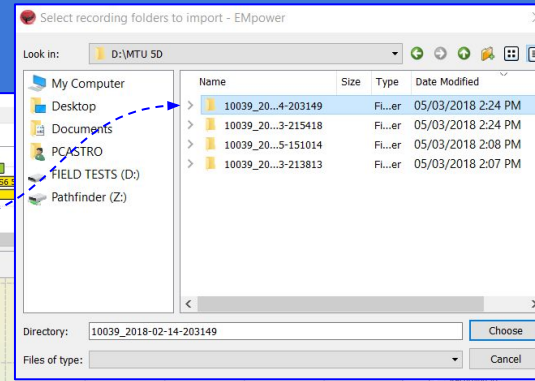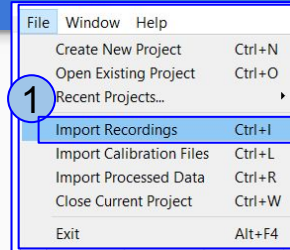
Drag and drop

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

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 list

- **Visual tracking**

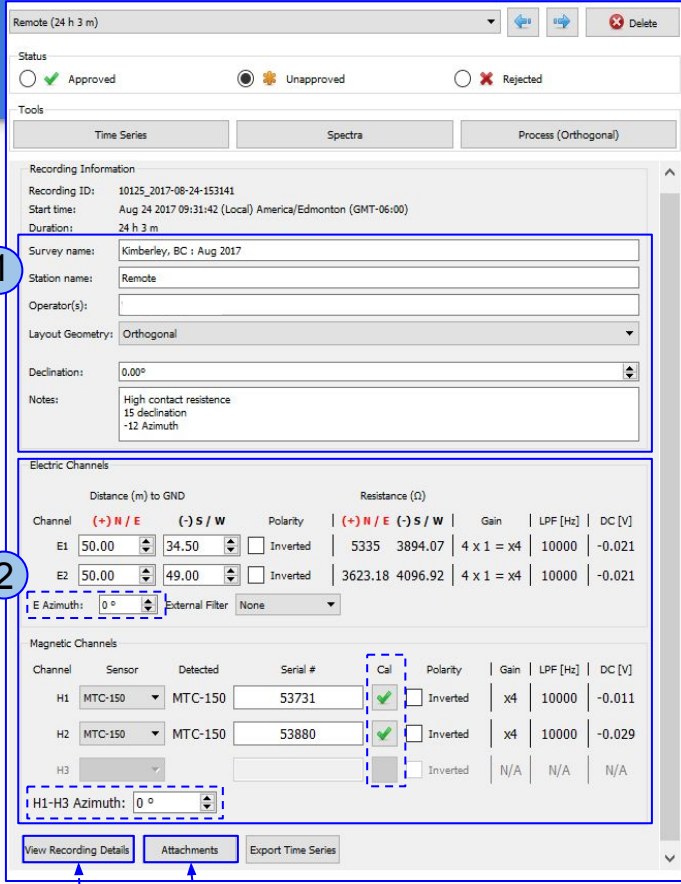| Green	Approved
Yellow	Unapproved
Red	Rejected

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

Verifying/Editing Recording Information

Data management (Recording Library)

1. Review the Recording Information
   - Edit the enabled fields, if required
   - Verify that there was not a warning icon ⚠ on the left of the channels or next to the Recording ID

2. Review the following information:
   - Dipole length
   - The **Azimuth** at which the E and H sensors were laid out
   - The correct **Cal**ibration 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

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**
   - If saturation is not close to ~0%, review the channel configuration *(see pages 4 - 6)*, the gain might be too high and/or there is artificial noise on your site

5. **Time Series Level**

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

4. **Exporting**
   - Right-click on the plot
   - Save PNG

   This feature applies to the Time Series and Spectra plot
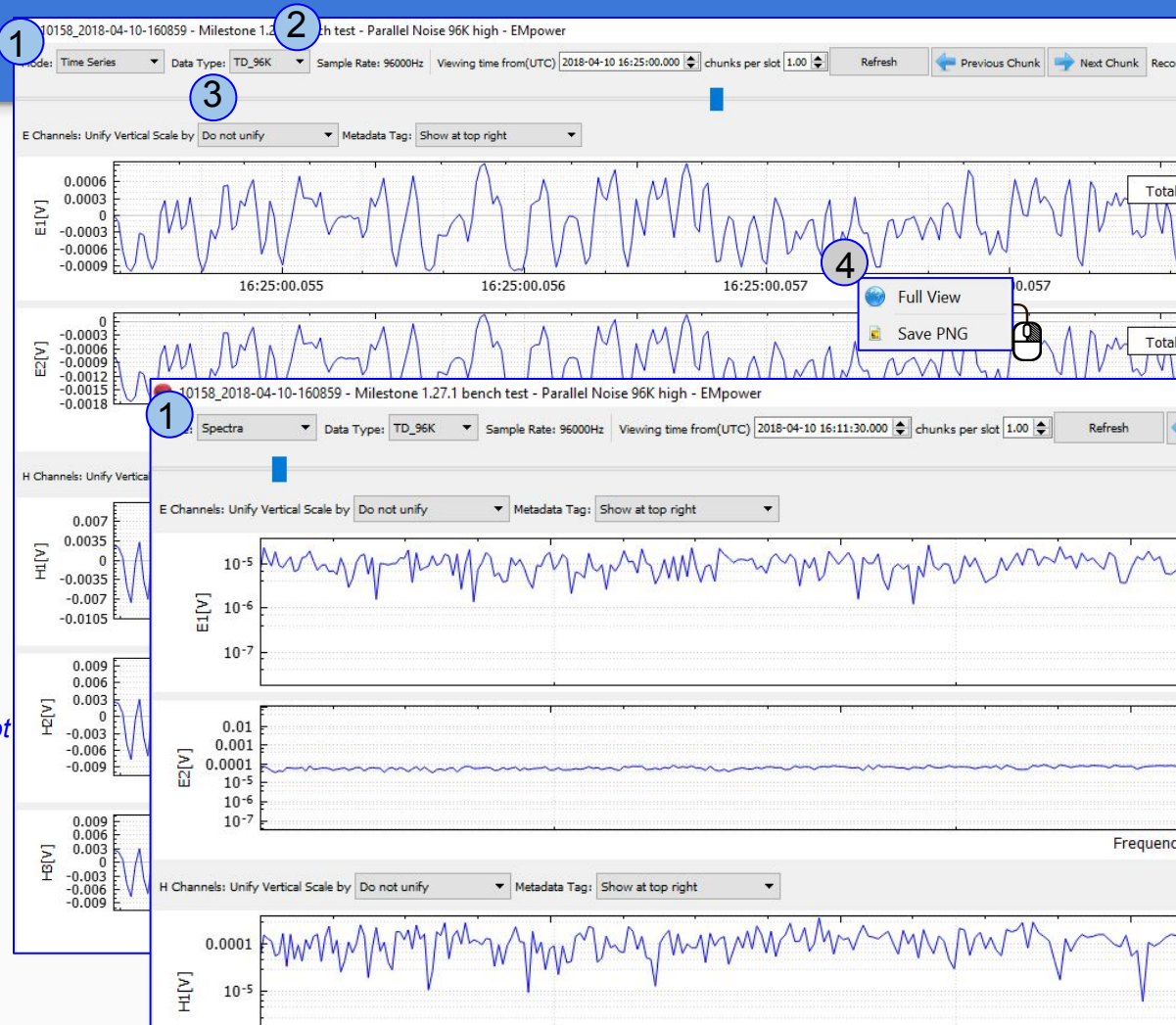
Processing MT Data

From the **Recording Library** tab:

1. Choose a **recording** to process

2. Review the **Layout Geometry**

3. **Process Site Creation Wizard*:**
   - Electric Components
   - Magnetic Components
   - Reference Channels
   - Processing Timeframe
   - Processing Parameters

*These steps will be explained in the Following pages

Process Site Creation wizard
Electric components

1. Select a recording from the Map, Timeline or Drop-down list

2. **Review / Edit** the E-Channel details

3. **Navigation bar** Display the components of the processed site being created

When a recording is selected, the letter **P (Primary)** will appear next to the channel name

Local

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

Remote

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

4. Use **Select Manually** / **Edit** as needed and click **Next**

When a magnetic channel is selected from a different recording, this records will be connected on the map and the letter **M (Magnetic)** will appear next to the channel name

Local

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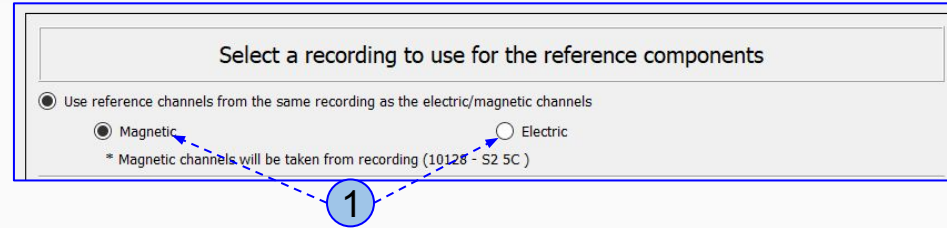
Remote

2. 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

3. Use **Select Manually** / **Edit** as needed and click **Next**
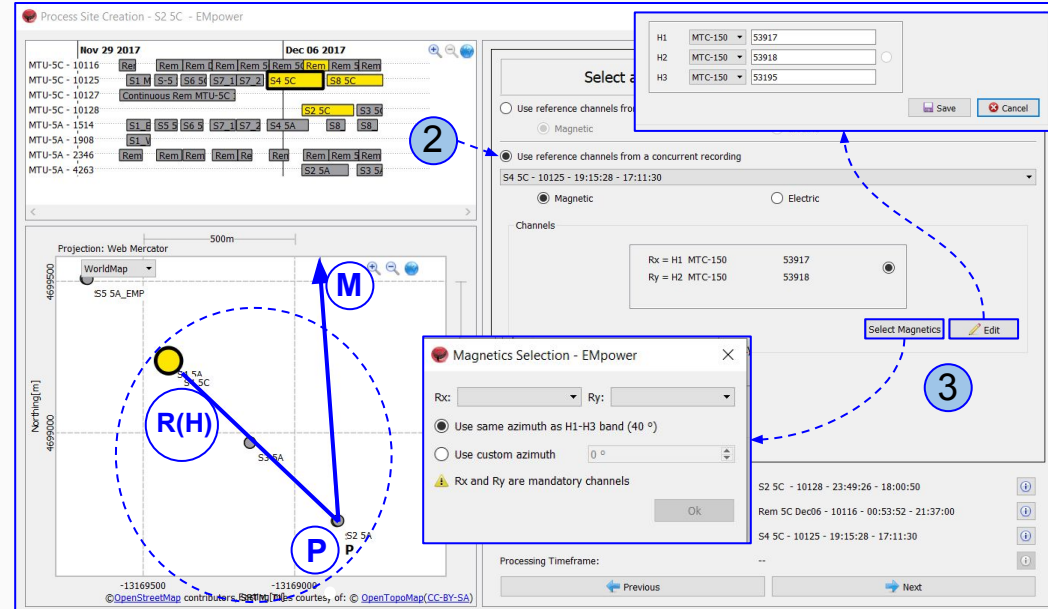
When a channel (**H** magnetic or **E** electric) is selected from a concurrent recording the letters **R(H) or R(E)** appears next to the **R**eference channel name

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Process Site Creation wizard

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
   - Click Next

2. In the **Processing Parameters** window
   - Robust **outlier rejection** is used to reject outliers in the Processed data at high granularity

   Prefer to use robust in the editor instead of this first-pass robust, it will normally yield better results

3. 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

4. Type the **Process site name**

5. Click the **Process** button

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

Visualizing Processed Data

1. Select the **Processed Site** from the Workbench list or Map

2. The **Plot** shows the Amplitude and Phase of the selected Processed Site
   - Use the **Plot toolbar** to access additional plot features
   - Add Processed Site(s) by selecting the checkbox beside the site in the Workbench list

3. **Edit** the Processed Site (Name, Status and Notes)

4. The **Edit Cross Powers** feature removes outlying cross powers from the calculation of resistivity, phase, and other geophysical parameters (see pages 19-21)

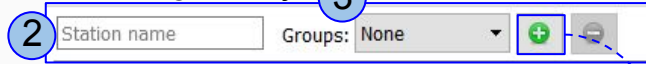5. Site Info (see pages 18)

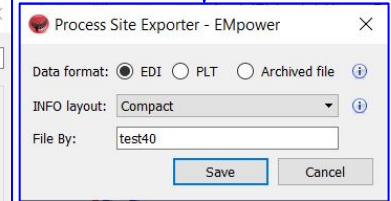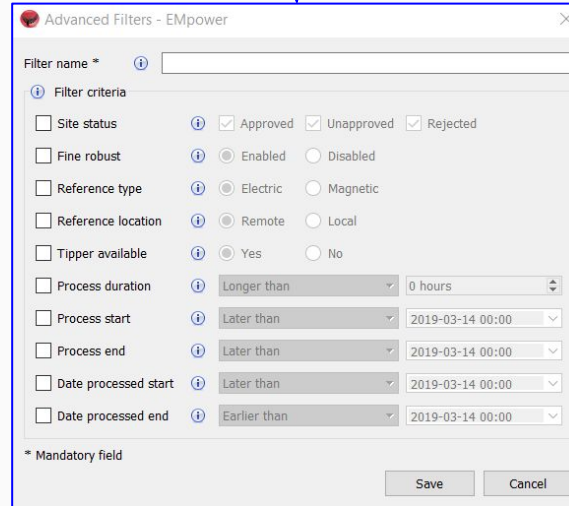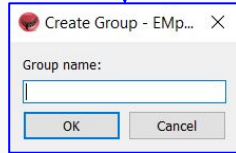6. Coherence (see pages 18)
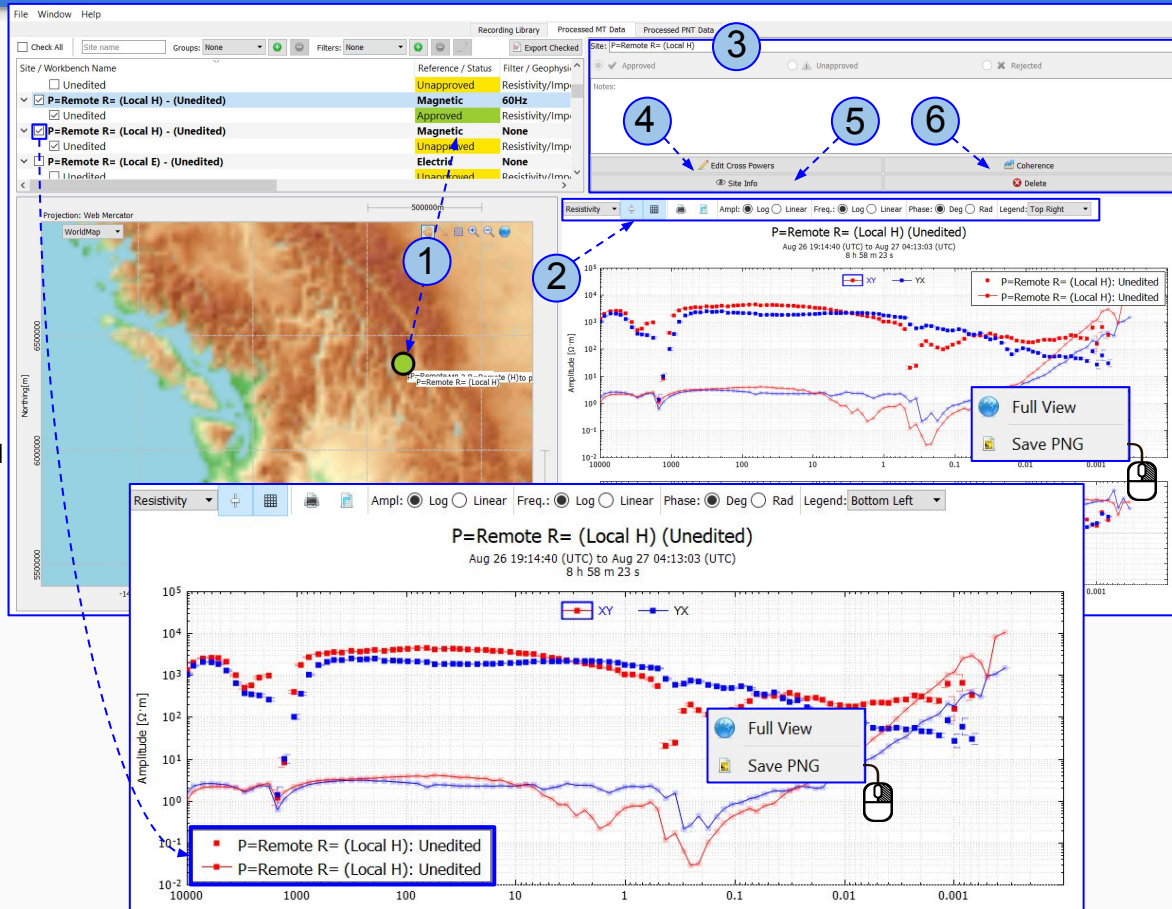
Toolbar (Sites list)
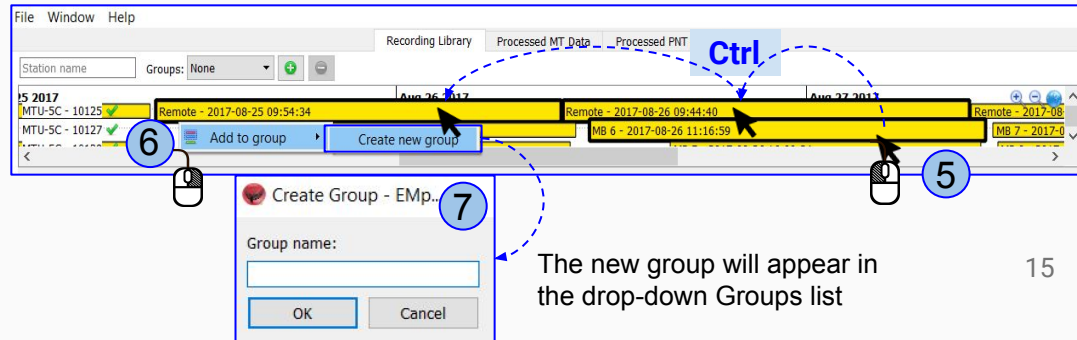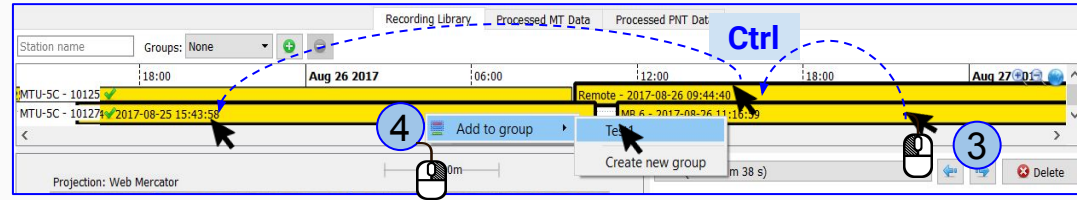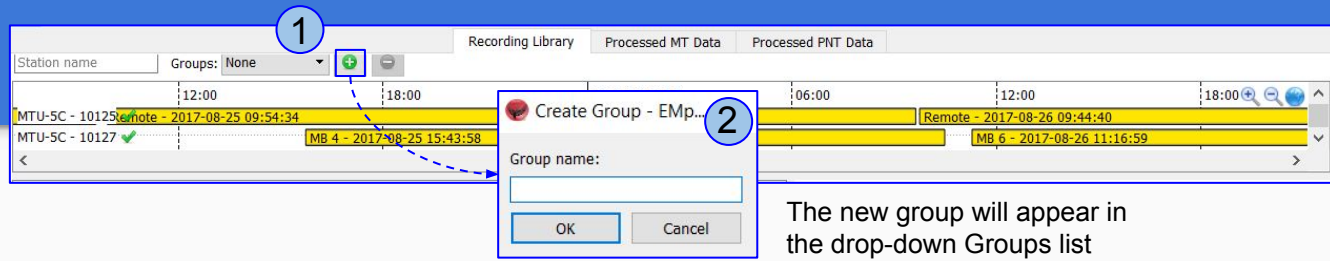
Processed MT Data

1. **Check All** the Sites

2. Quick search by **Site name**

3. **Groups** *(Slide 15-16)*

4. **Filters** *(Slide 17)*

5. **Export Checked**, export the site(s) selected ☑ in the Workbench list to EDI/PLT or to an archive compressed file

Groups (Timeline)

1. Create new group

2. Type the **Group Name**

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

4. Use the Right-click menu
   - **Add to group**
   - Select the group

OR

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

6. Use the Right-click menu
   - **Add to group**
   - **Create new group**

7. Type the **Group Name**

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

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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**

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

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

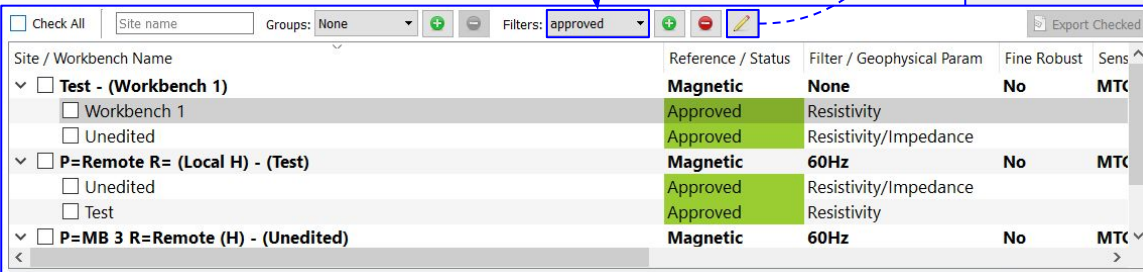5. Use the Edit ✎ button to add or change **Filter criteria**

Site Info - Coherence

1. General Processing Metadata information

2. Robust (Fine Rejection) Parameters

3. Recording Metadata
   - Primary Station
   - Local Magnetics
   - Local Reference (H)

4. Channel Details

5. Coherence

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. **Polar Editor**
   - Create a **Polar Editor Mask**(see page 16)

3. **Time Editor**
   - **Create** a **Time Editor Mask**(see page 17)
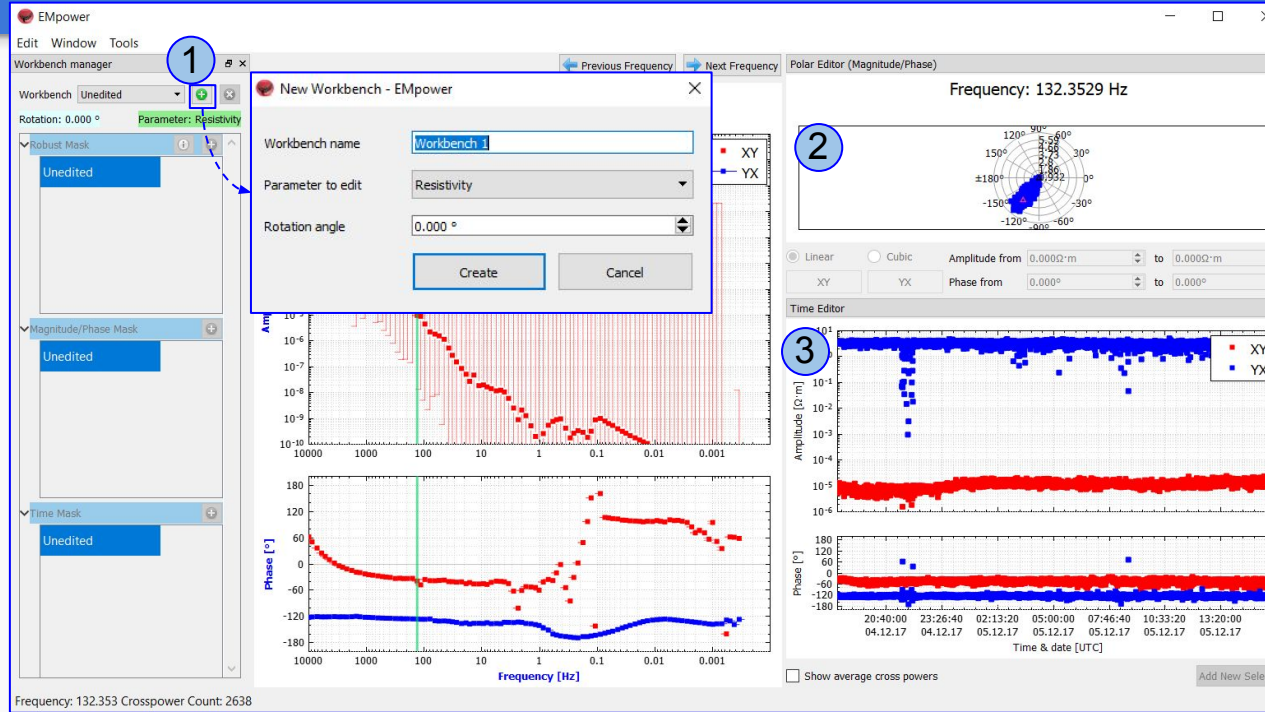
For more details see the Crosspower Editor manual

Polar Editor
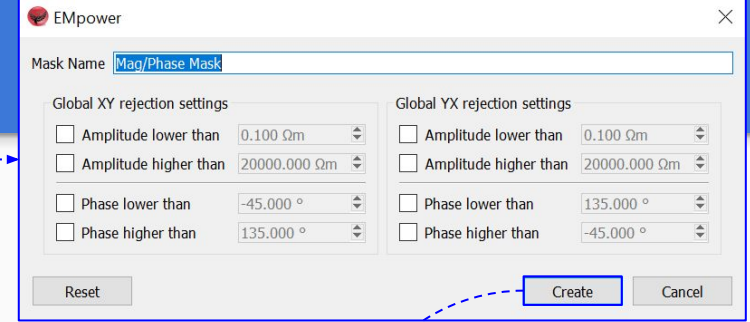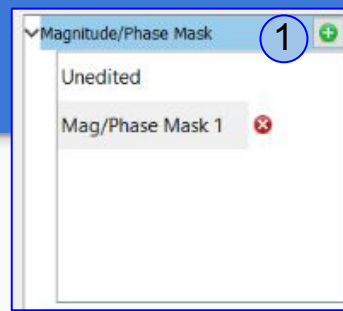
1. **Create a New Magnitude/ Phase Editor Polar Masks**
   - Type the **Mask Name**
   - Edit the **Global XY rejection settings** as needed
   - Click the **Create** button

2. Use the different tools to obtain the desired information
   - Linear / Cubic
   - XY / YX
   - Amplitude range
   - Phase rage

Time Editor

1. Create a New **Time Editor Mask**
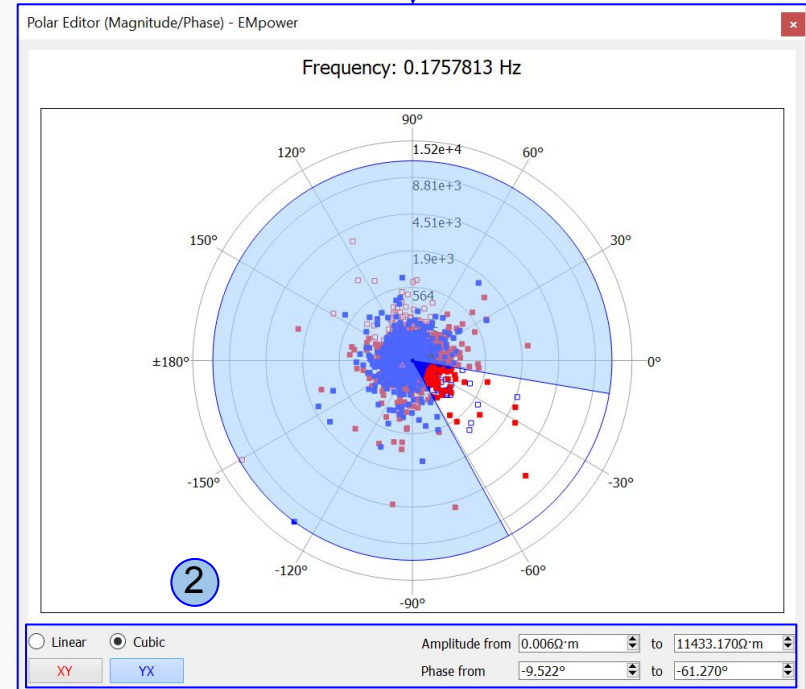   1.1. The Mask Name can be edited by right-clicking on it

2. To add a new rejection area
   2.1. Click the Add New Selection button
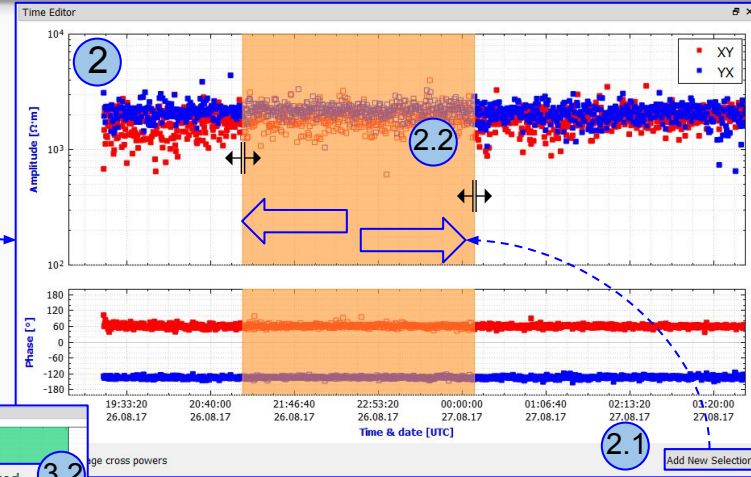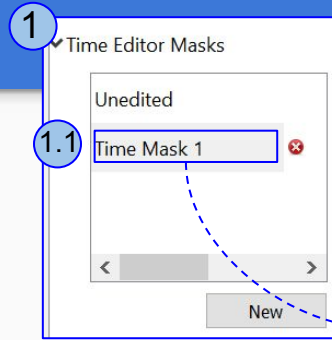   2.2. Left-click and hold, and start dragging to the left or right to select the area of crosspower rejection

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.
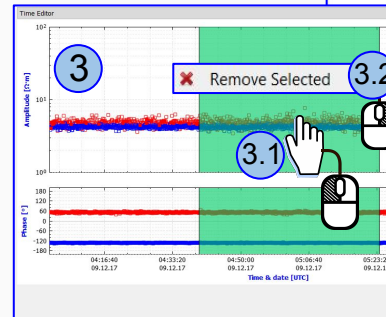
Processed PNT Data

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. **Print tool**

5. **CSV (excel) Export tool**