EMpower
Data Management

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Creating or Opening a Project

1. Start **EMpower**
2. Click **Manage**
3. **Open or Create a New Project**

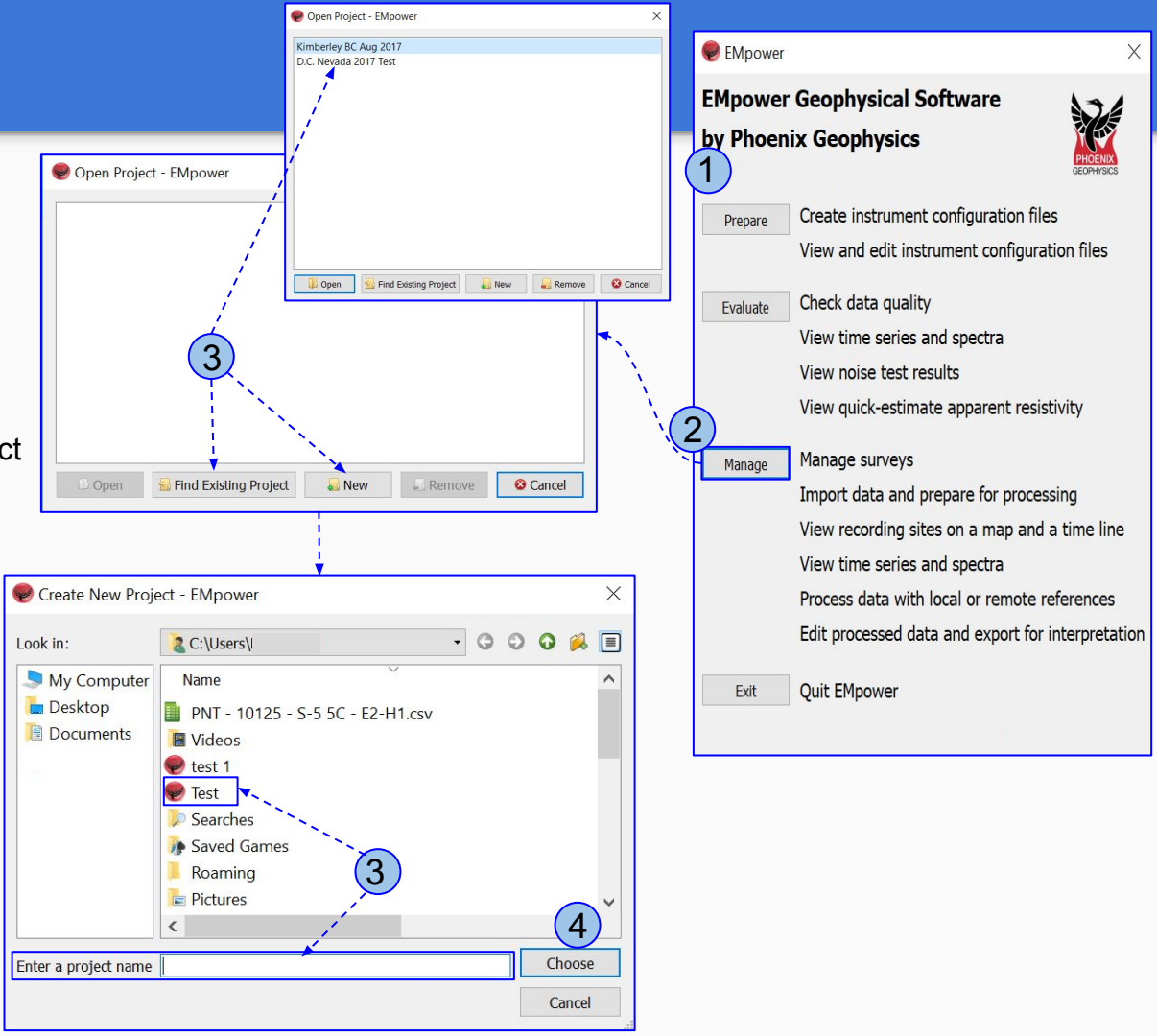
To Open an Existing Project

- 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**



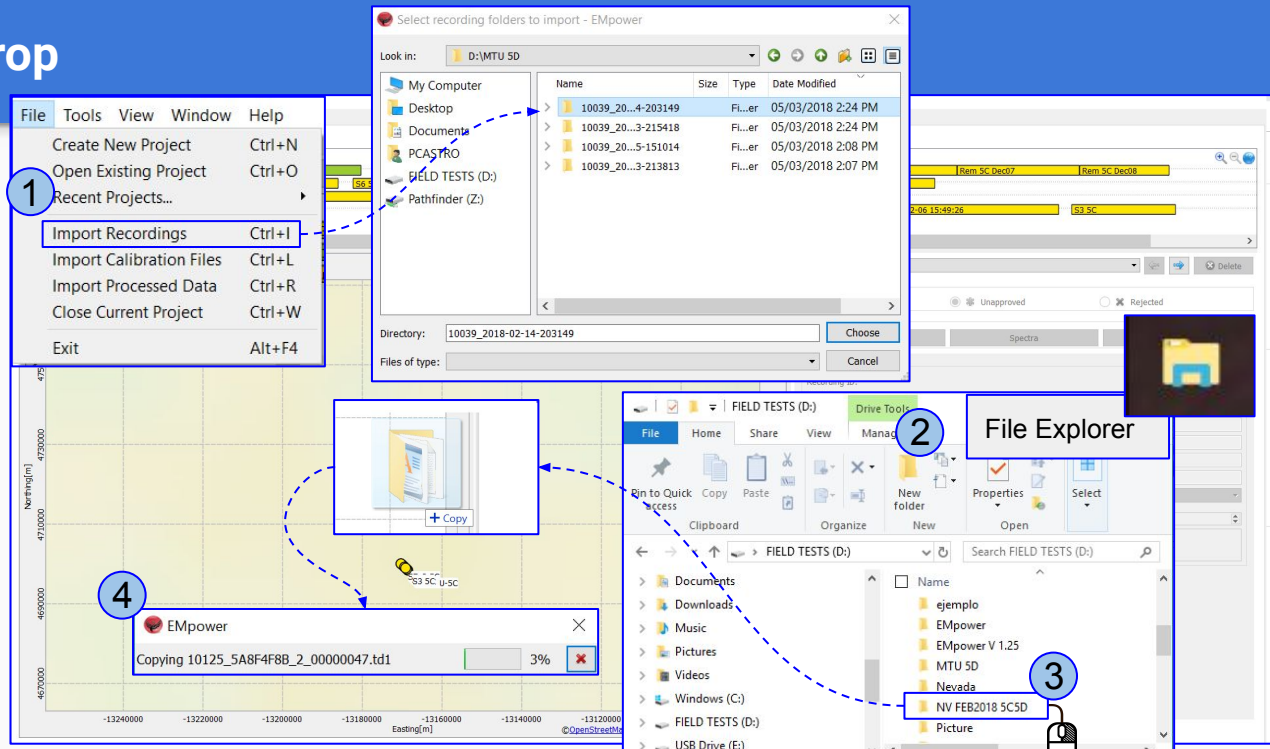
Importing Data / Drag and Drop

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



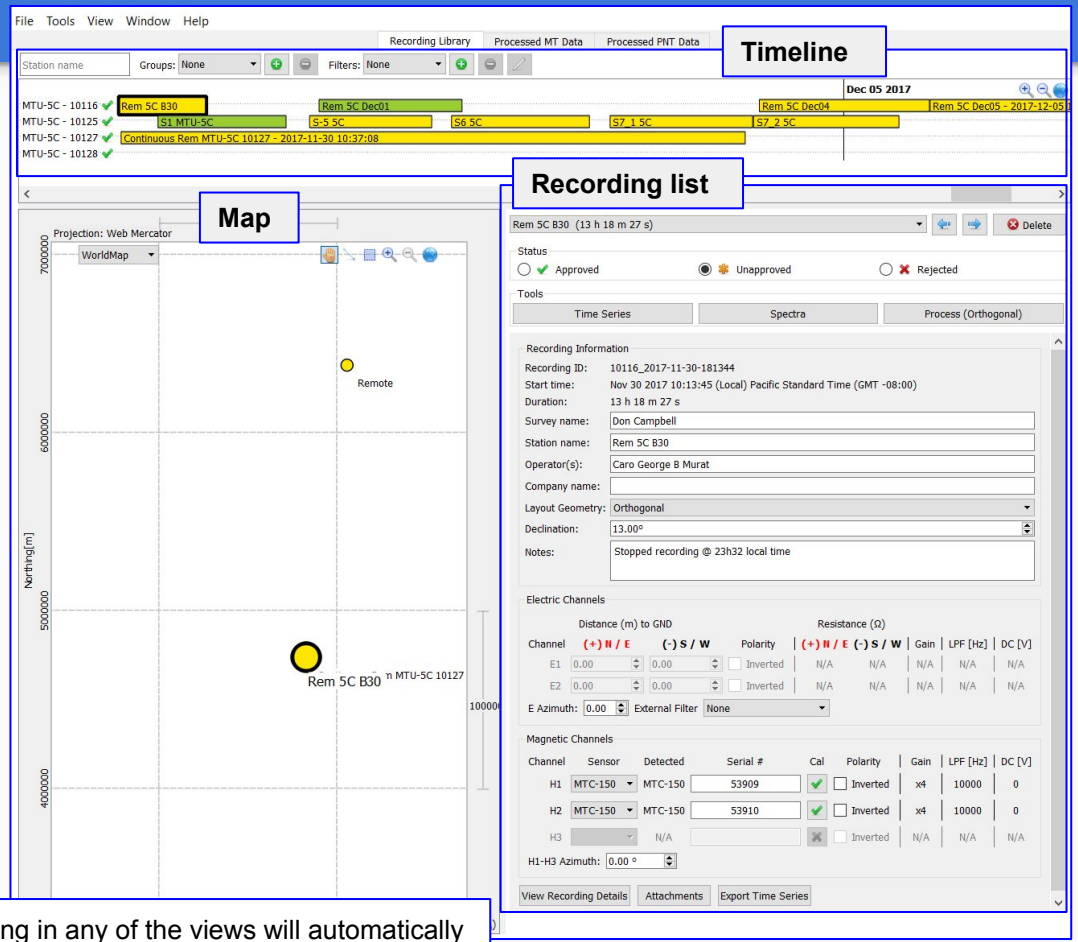
To add a recording from the **SD Card**

- 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

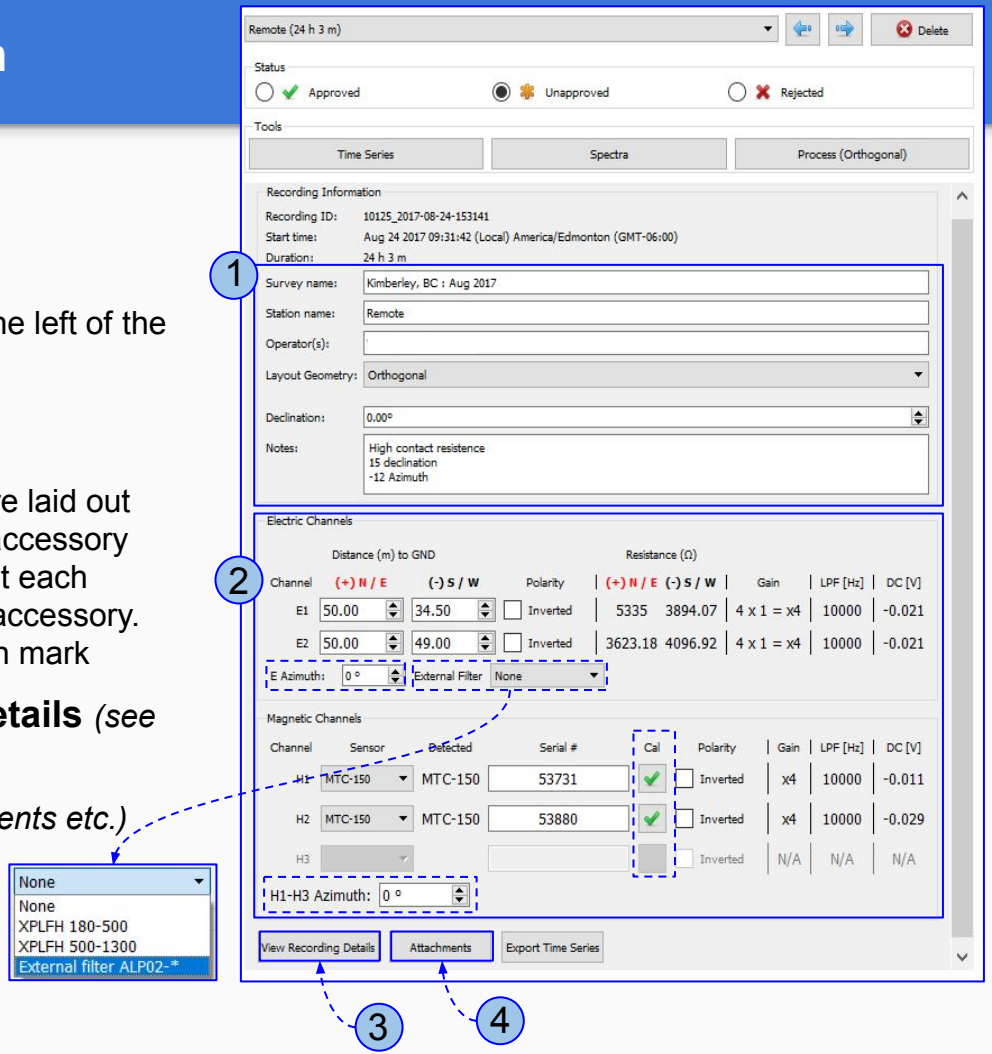


Selecting a recording in any of the views will automatically update the recording information in the other views

Verifying/Editing Recording Information

Data management *(Recording Library)*

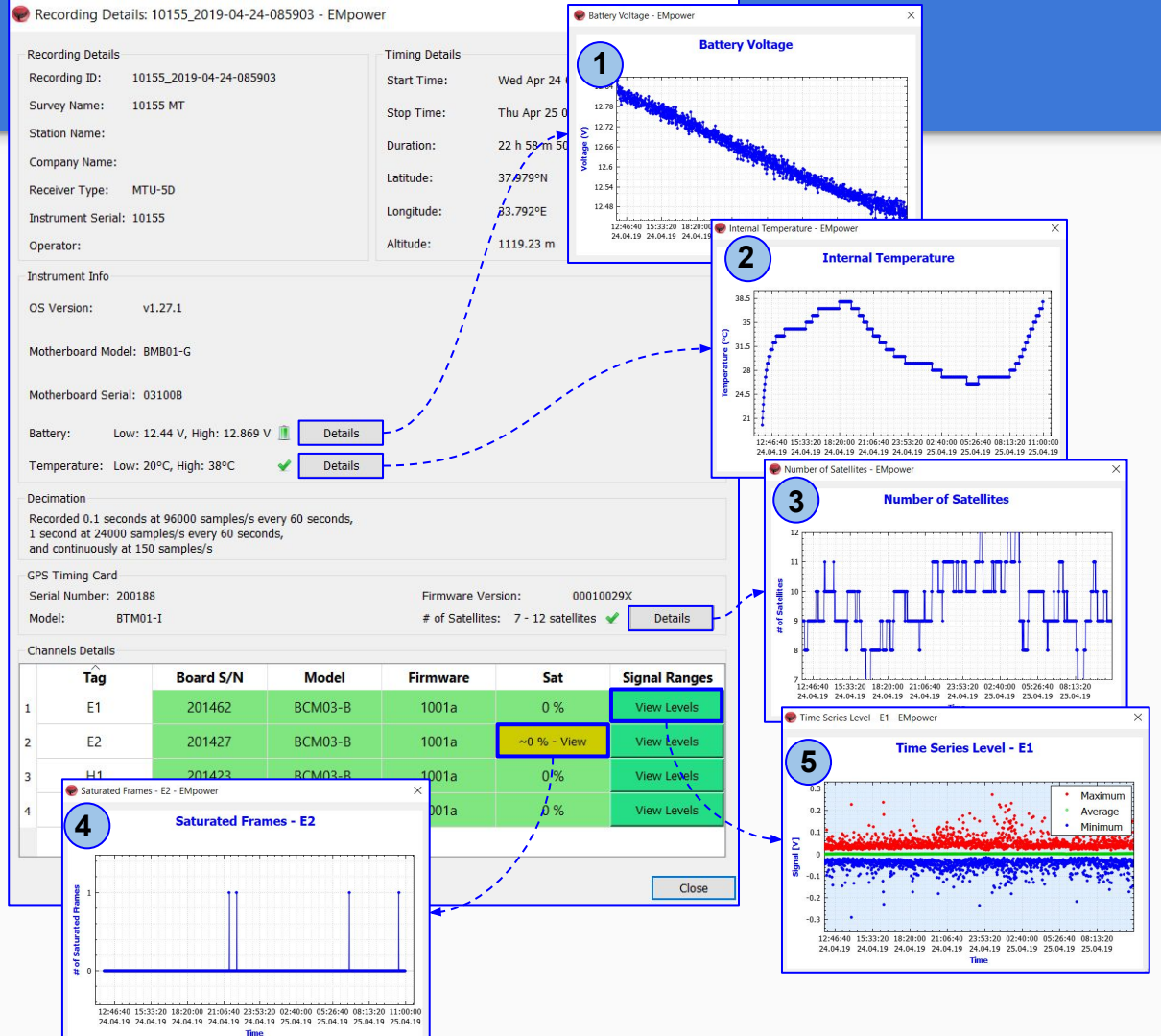
1. Review the Recording Information
   - Edit the enabled fields, if required
   - Verify that there was not a warning icon ⚠ on the left of the channels or next to the Recording ID
2. Review the following information:
   - Dipole length
   - The **Azimuth** at which the E and H sensors were laid out
   - 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 **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



View Recording Details

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

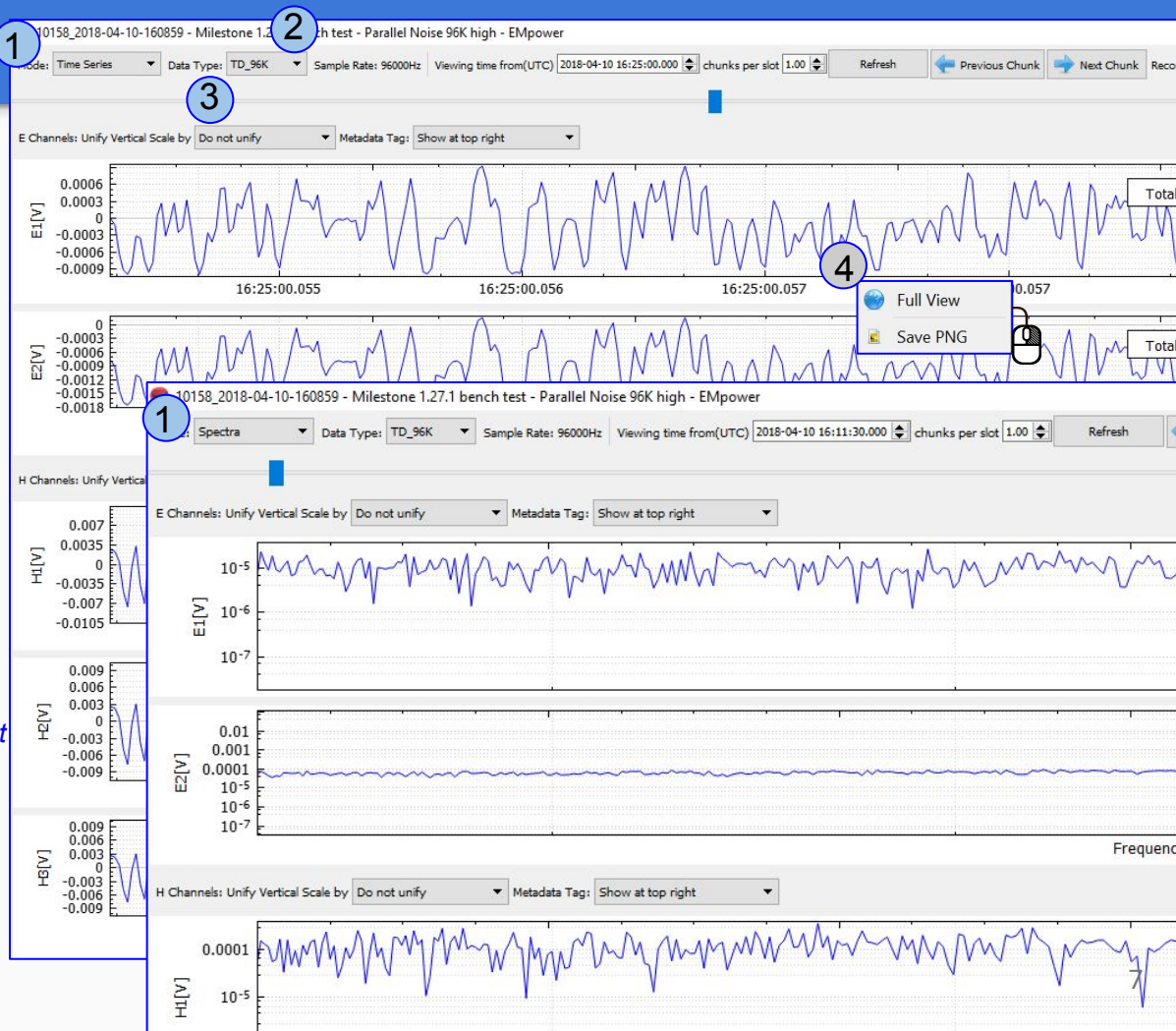
1. **Battery Voltage**
2. **Internal Temperature**
3. **Number of Satellites**
4. **Saturated Frames**
   - If saturation is not close to ~0%, review the channel configuration *(see pages 4 - 6)*, the gain might be too high and/or there is artificial noise on your site
5. **Time Series Level**



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*

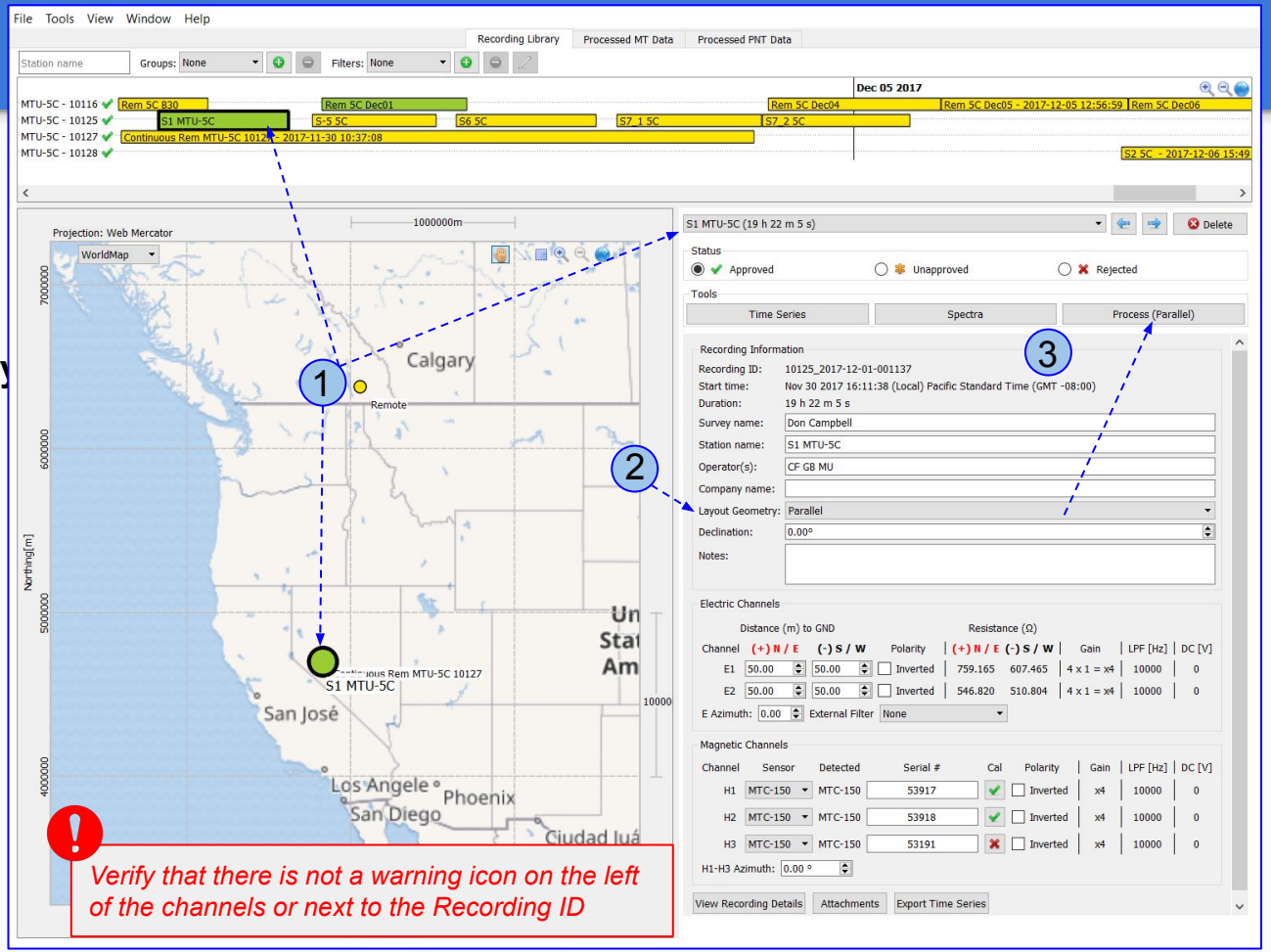


Processing MT Data

From the Recording Library tab:

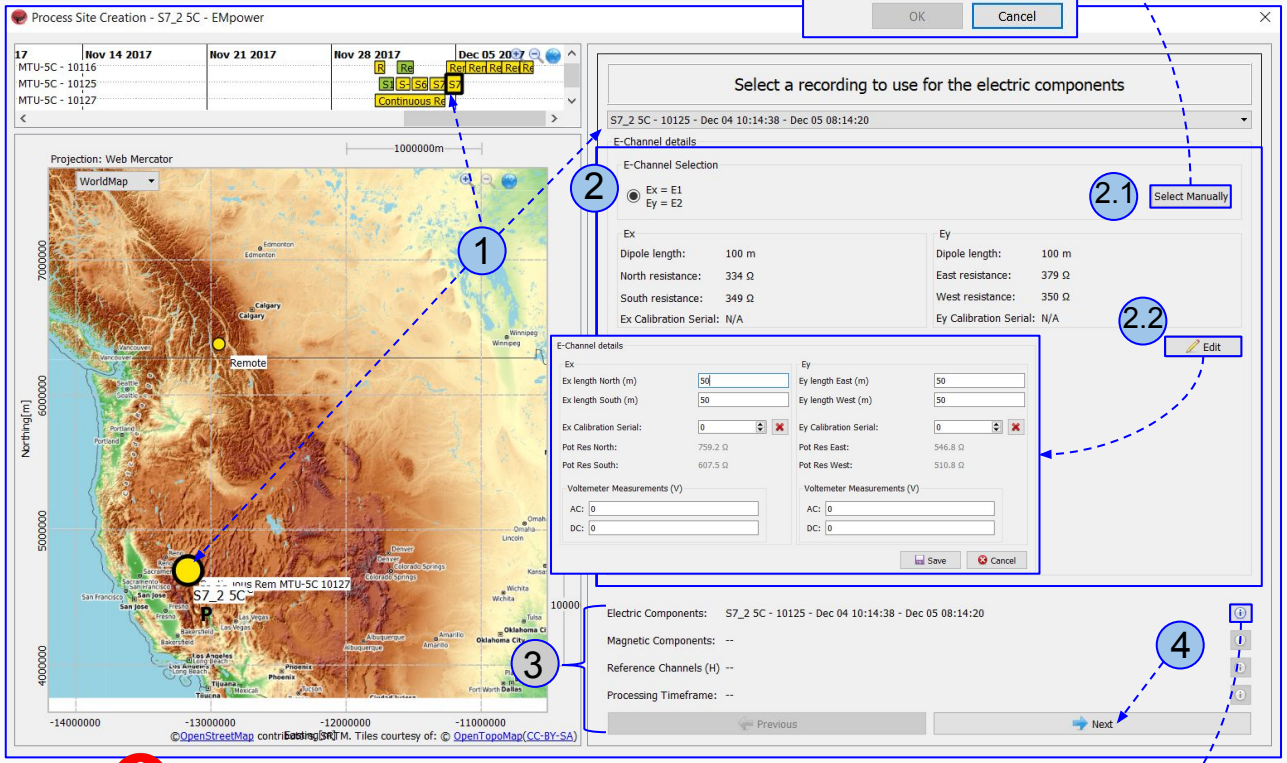
1. Choose a **recording** to process
2. Review the **Layout Geometry**
3. **Process Site Creation Wizard*:**
   - Electric Components
   - Magnetic Components
   - Reference Channels
   - Processing Timeframe
   - Processing Parameters

**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
   - Use the **Select Manually** button to change the Channel Selection (Ex/Ey)
   - To change or add details use the **Edit** button
3. **Navigation bar** display the components of the processed site being created
4. Click Next to continue



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

Process site is not available in network projects

The recording is good to process

The recording does not have an available calibration file

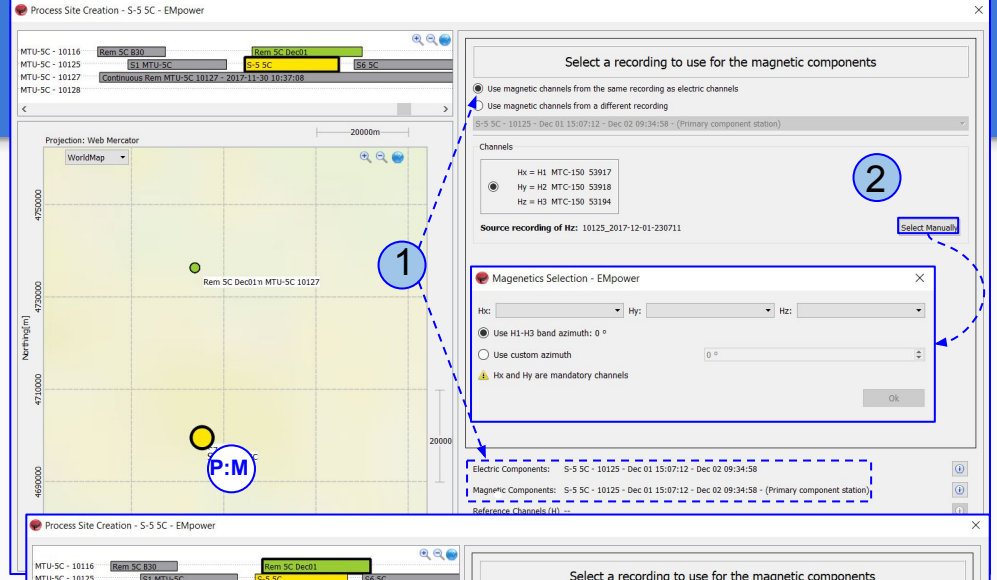
Process Site Creation wizard
Magnetic Channels

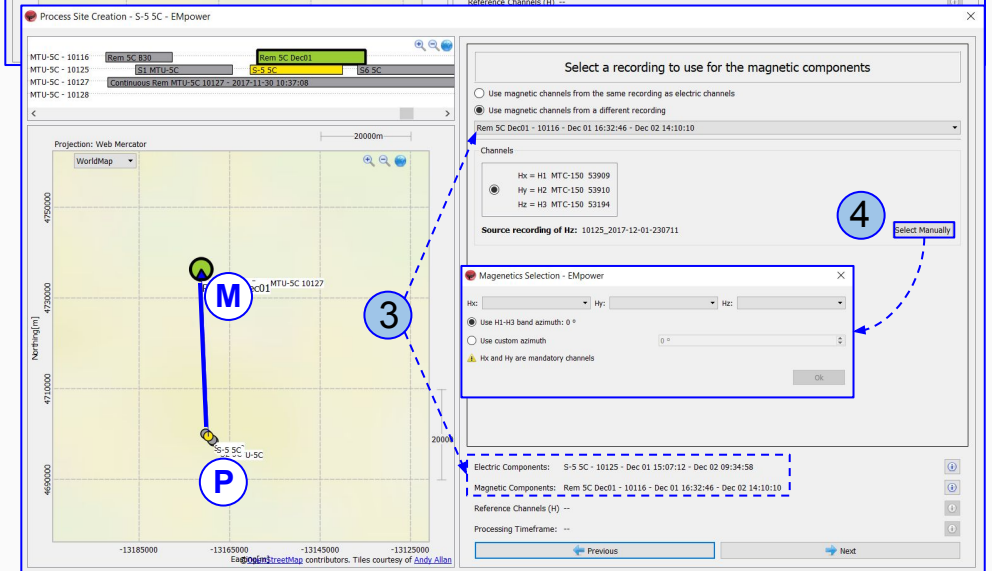
Same recording

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**

Different recording

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**
5. Click **Next**



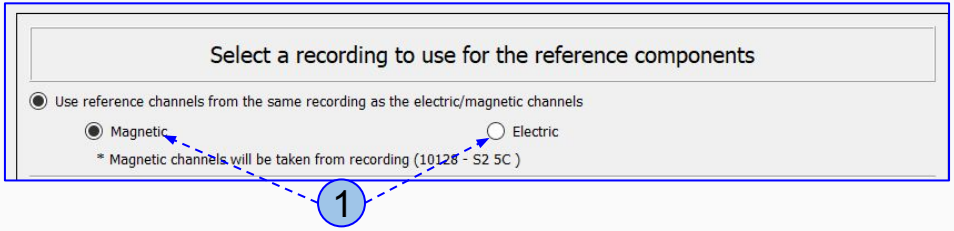


When a magnetic channel is selected from a different recording, an arrow will be pointing to that recording on the map and the letter **M (Magnetic)** will appear next to that recording

Process Site Creation wizard
Reference Channels

Same recording

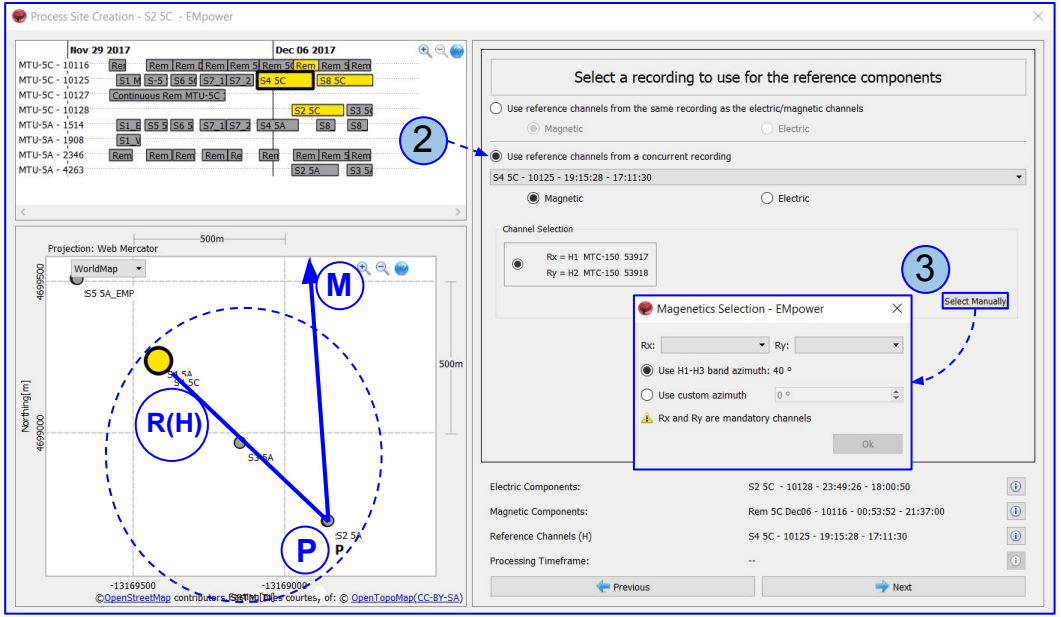
1. To use reference channels from the same recording as the electric/magnetic channels
   - Select either the Magnetic Channels or Electric Channels
   - Click **Next**



Remote reference

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

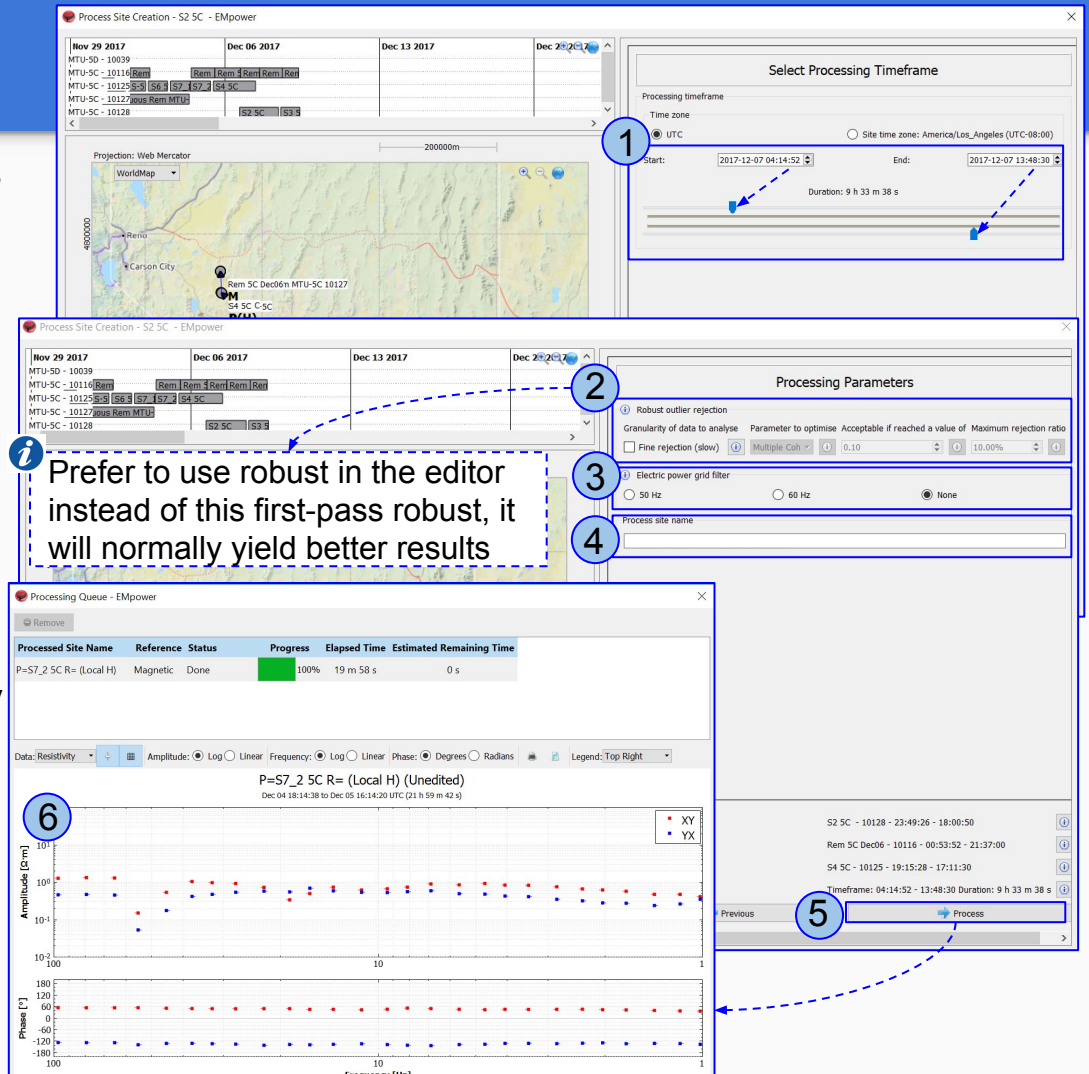
3. Use **Select Manually** as needed
   - Click **Next**



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

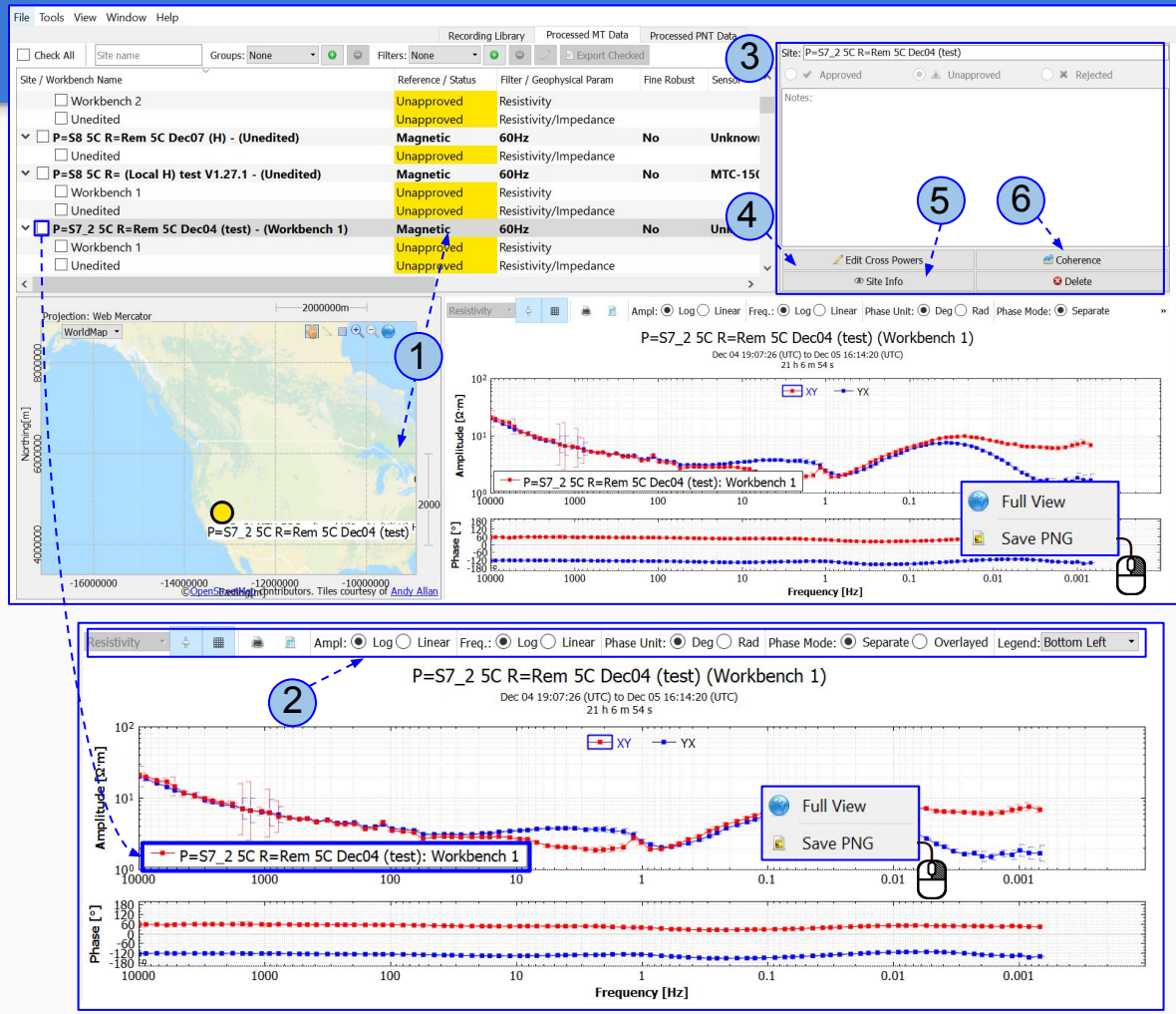
Processing Queue

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
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

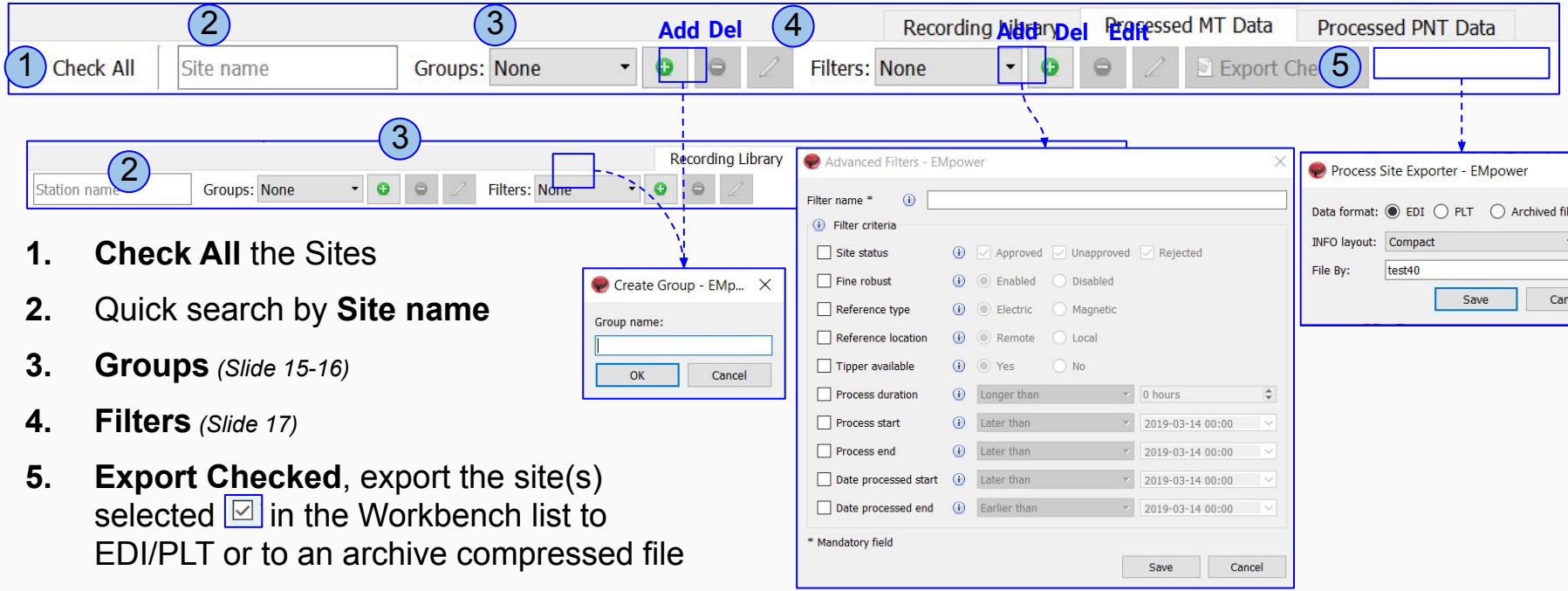


Visualizing Processed Data

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)



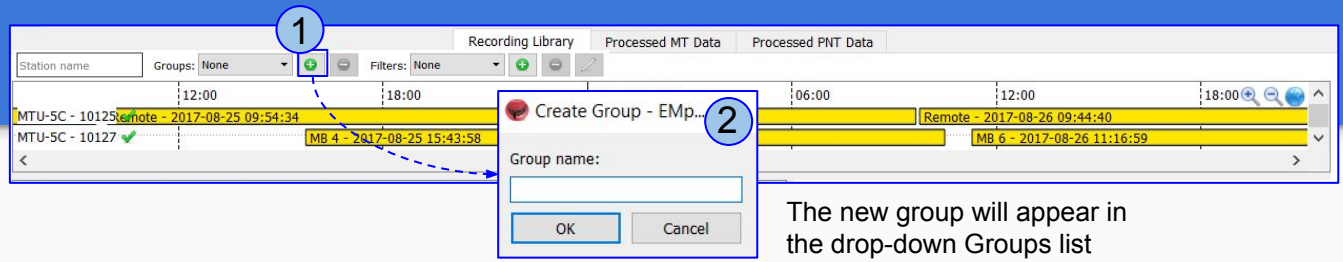
1. **Check All** the Sites
2. Quick search by **Site name**
3. **Groups** *(Slide 15-16)*
4. **Filters** *(Slide 17)*
5. **Export Checked**, export the site(s) selected ☑ in the Workbench list to EDI/PLT or to an archive compressed file

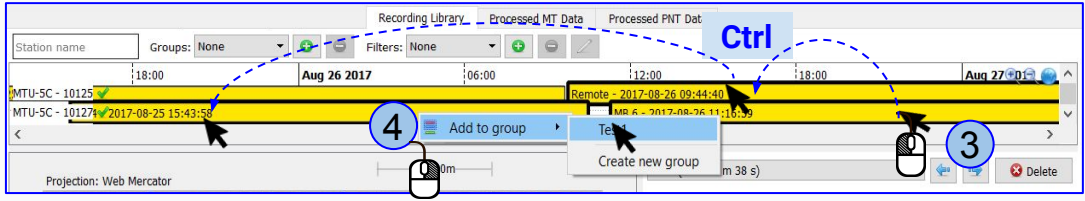
Groups (Timeline)

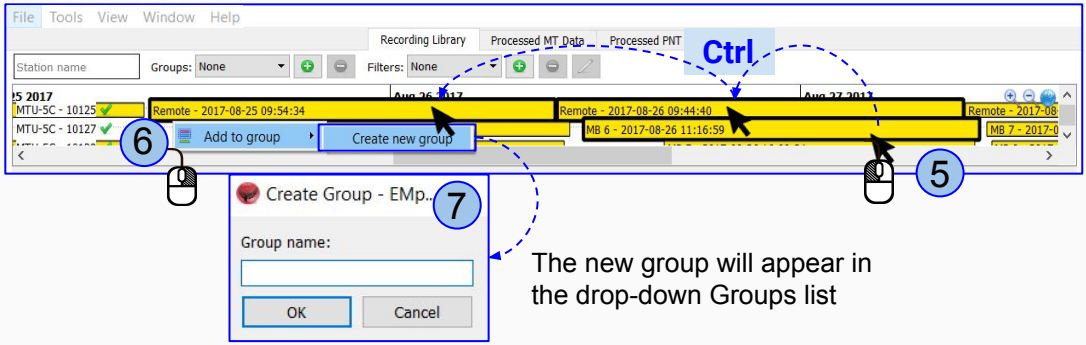
1. Create new group 
2. Type the **Group Name**
3. Select the sites
   - Use left-click to select the site and hold down the "Ctrl" key to select multiple sites (release the buttons)
4. Use the Right-click menu
   - **Add to group**
   - Select the group

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**







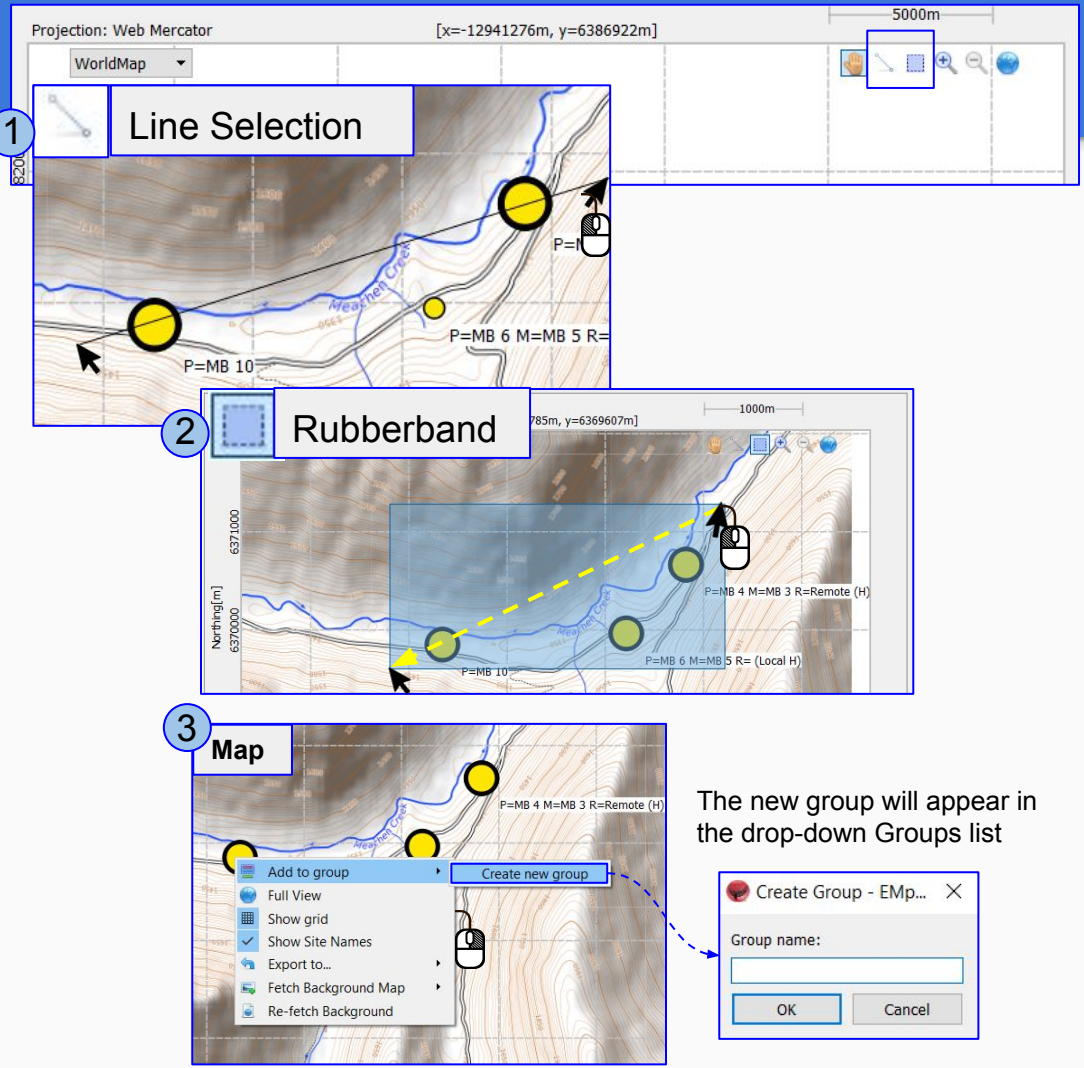
Groups (Map)

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**

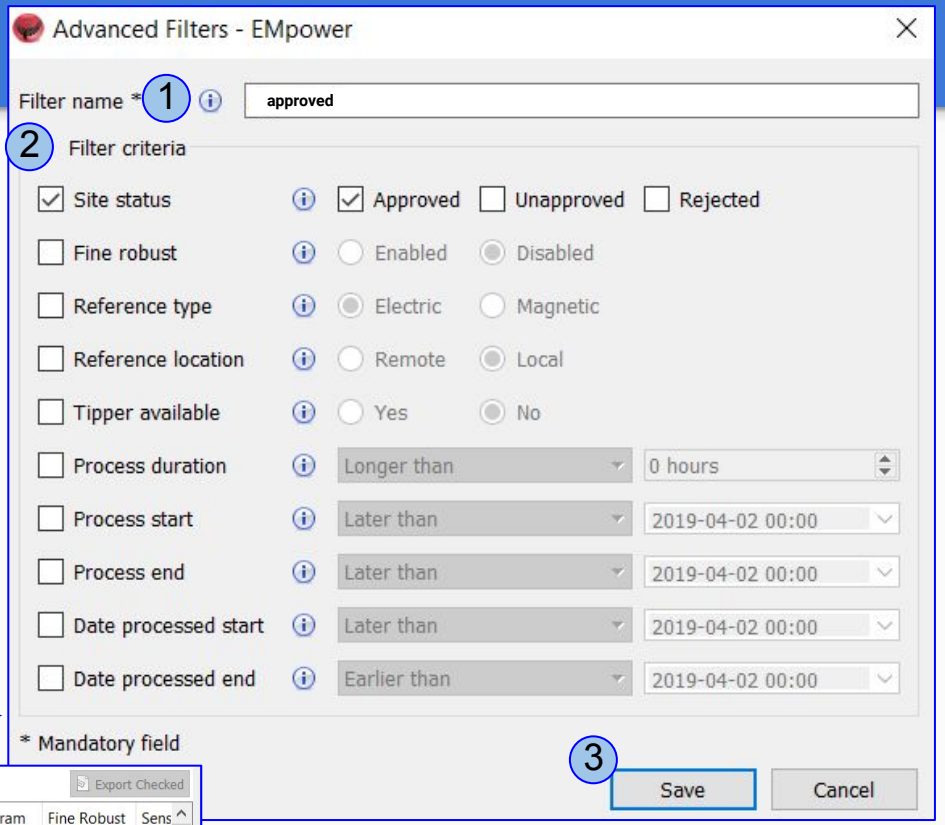


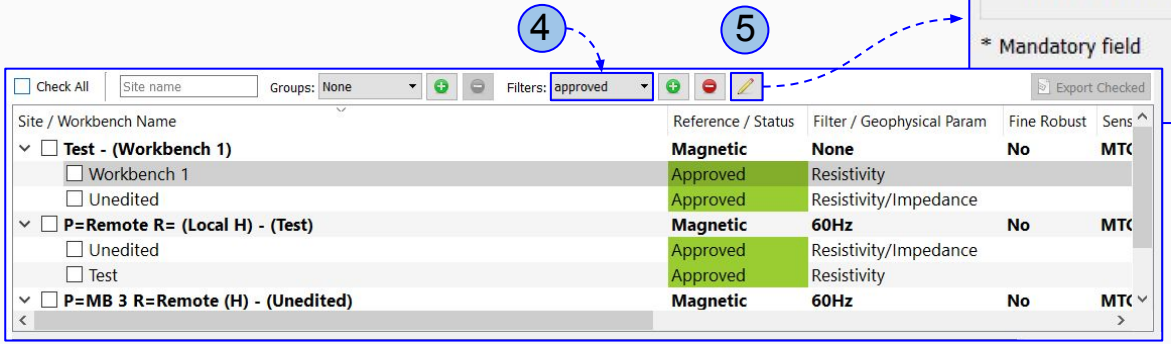
The new group will appear in the drop-down Groups list

Filters

The Advanced Filter can work with individual sites or with Groups

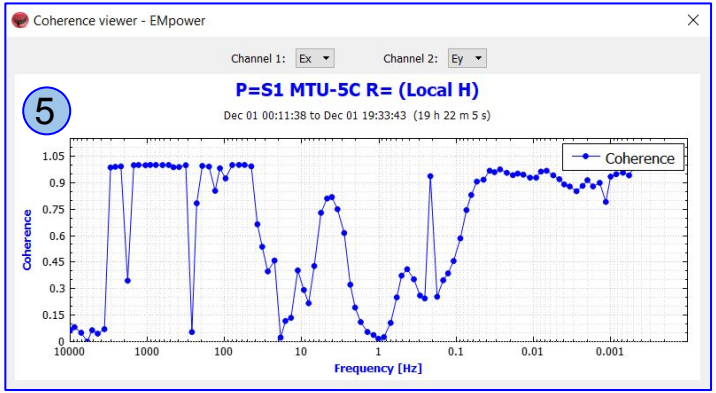
1. Name the **Filter** *(*mandatory field)*
2. Select the **Filter criteria**
3. Save the **Filter**
4. The new **Filter** will be added to the drop down list
5. Use the Edit button to add or change **Filter criteria**

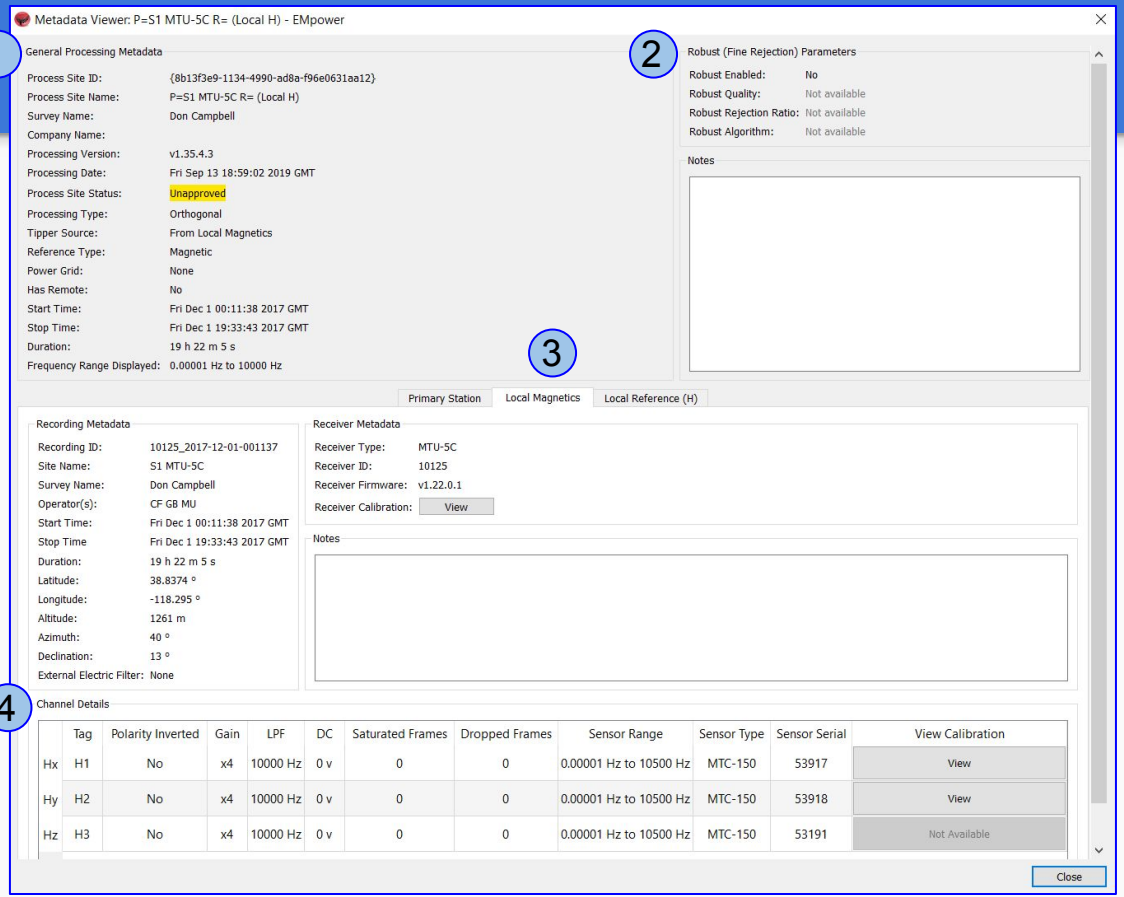




Site Info - Coherence

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



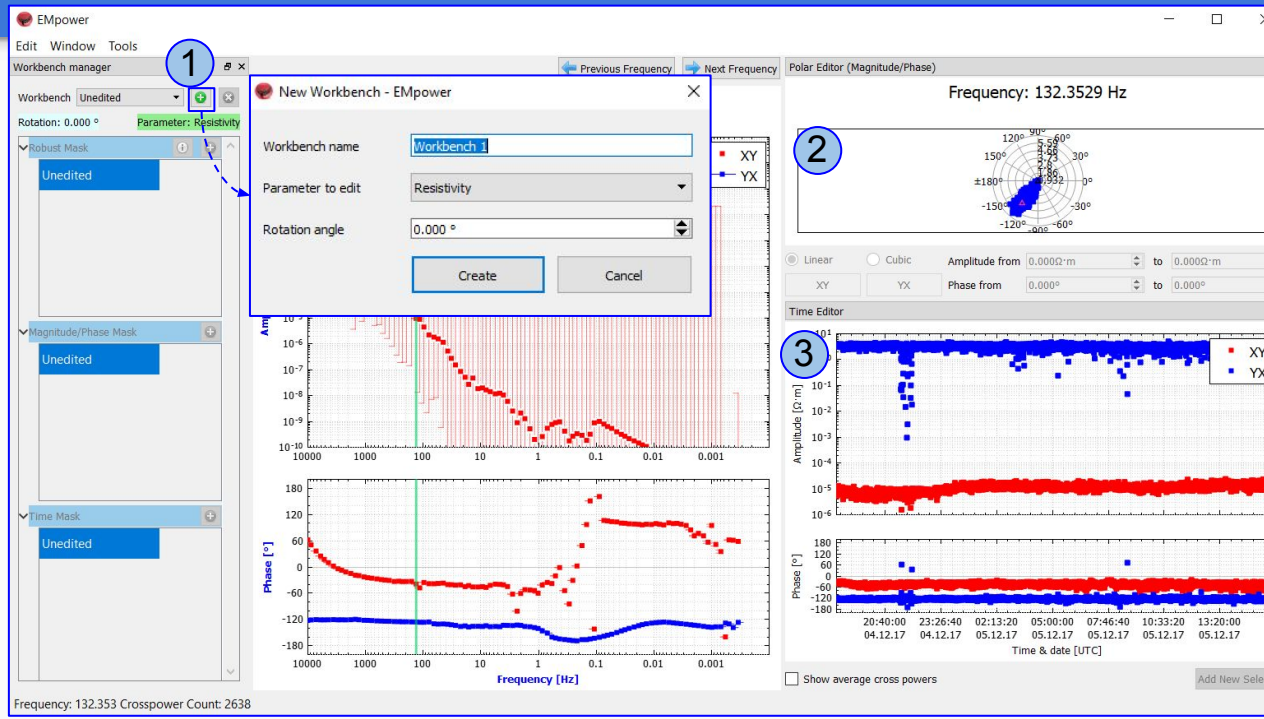


Editing Cross Powers

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)

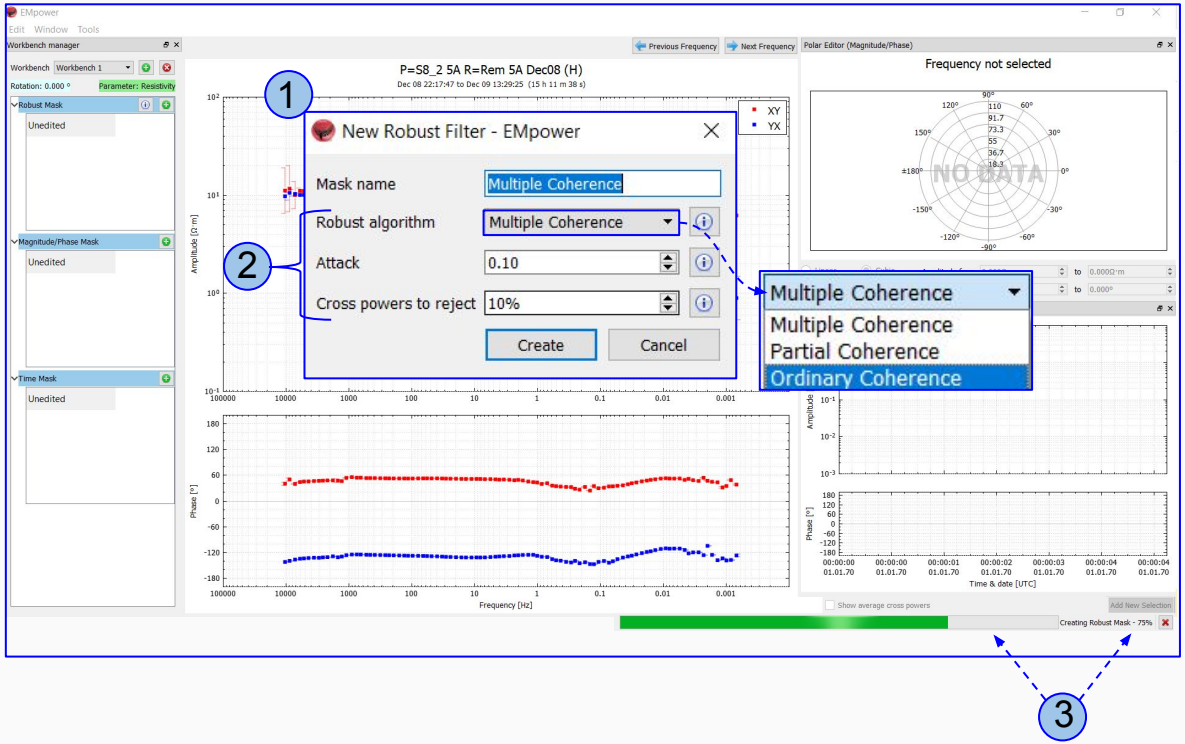
**For more details see the Crosspower Editor manual*



Robust Mask

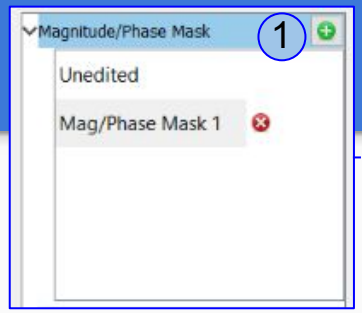
The Robust Mask algorithm fixes the most common problems

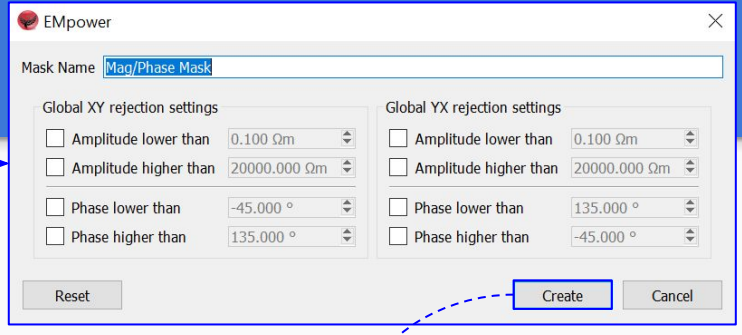
1. Create a **Robust Mask**
   - Type the **Mask Name**
2. Use the different options to obtain the desired information
   - Select the **Robust algorithm**
   - Define the **Attack**
   - Select the percent of **Cross powers to reject**
3. Wait until the process is completed



For more details see the Crosspower Editor manual

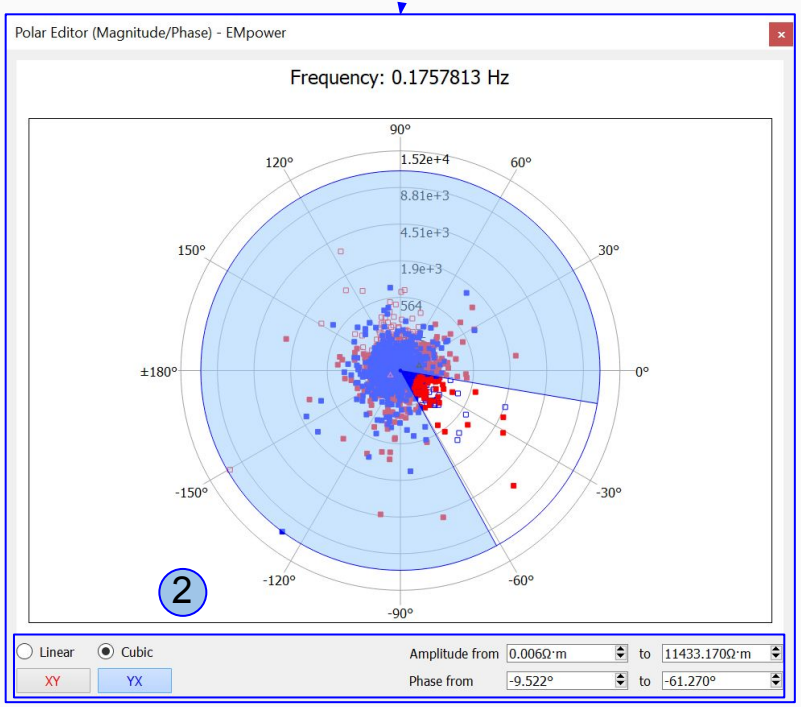
Polar Editor





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

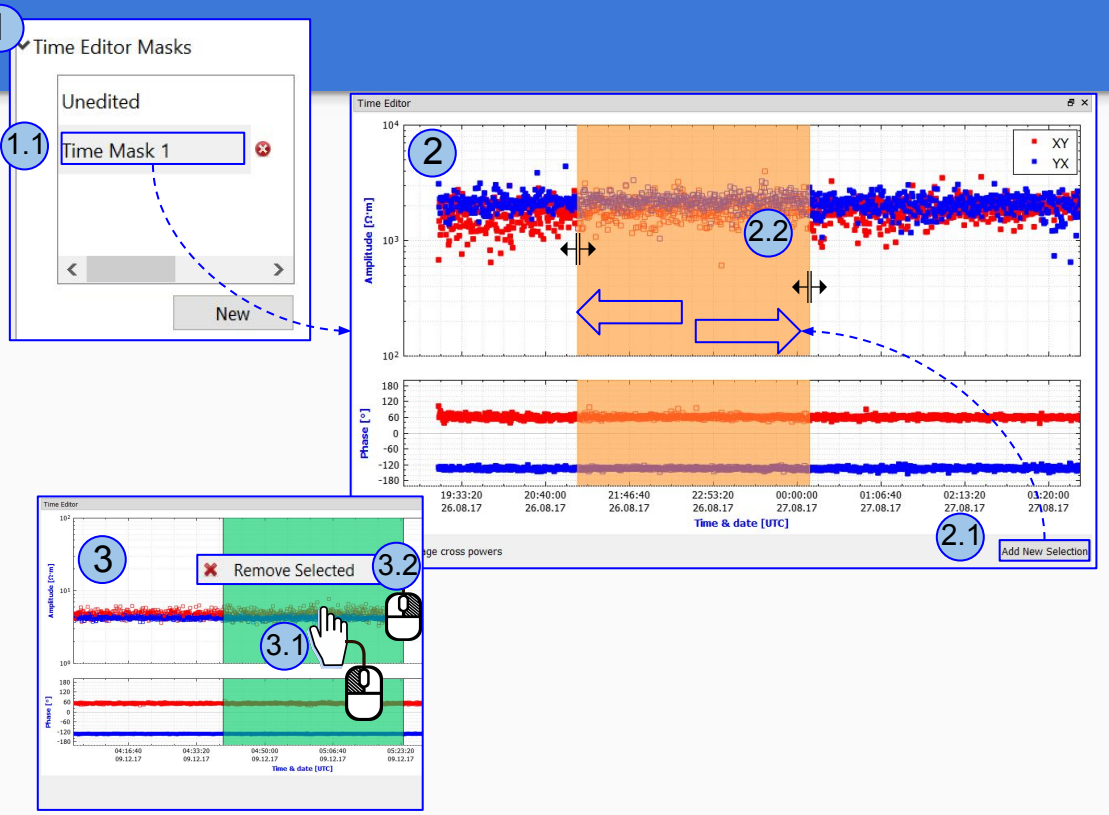
**For more details see the Crosspower Editor manual*



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.*

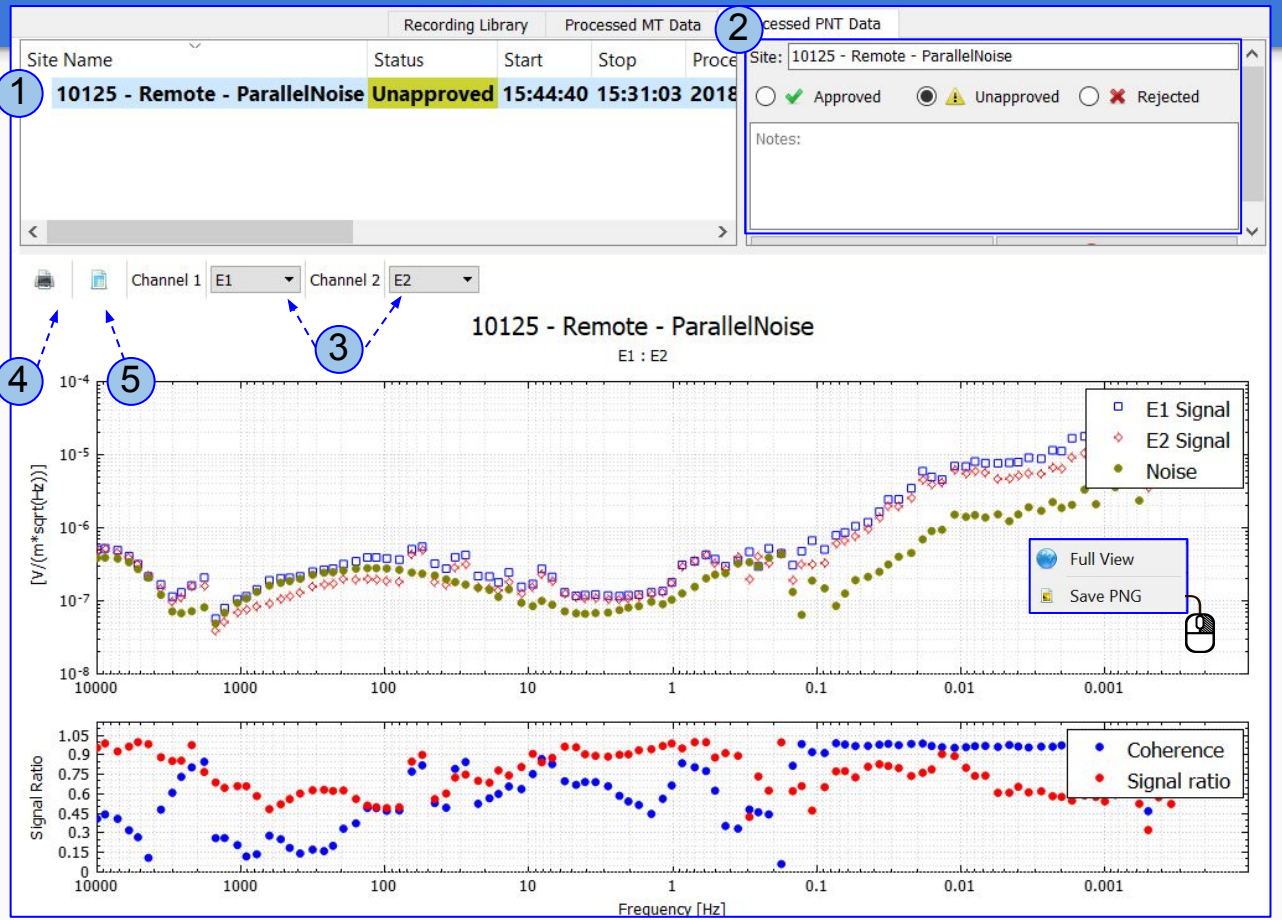


**For more details see the Crosspower Editor manual*

Processed PNT Data

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



Multi-Site PNT

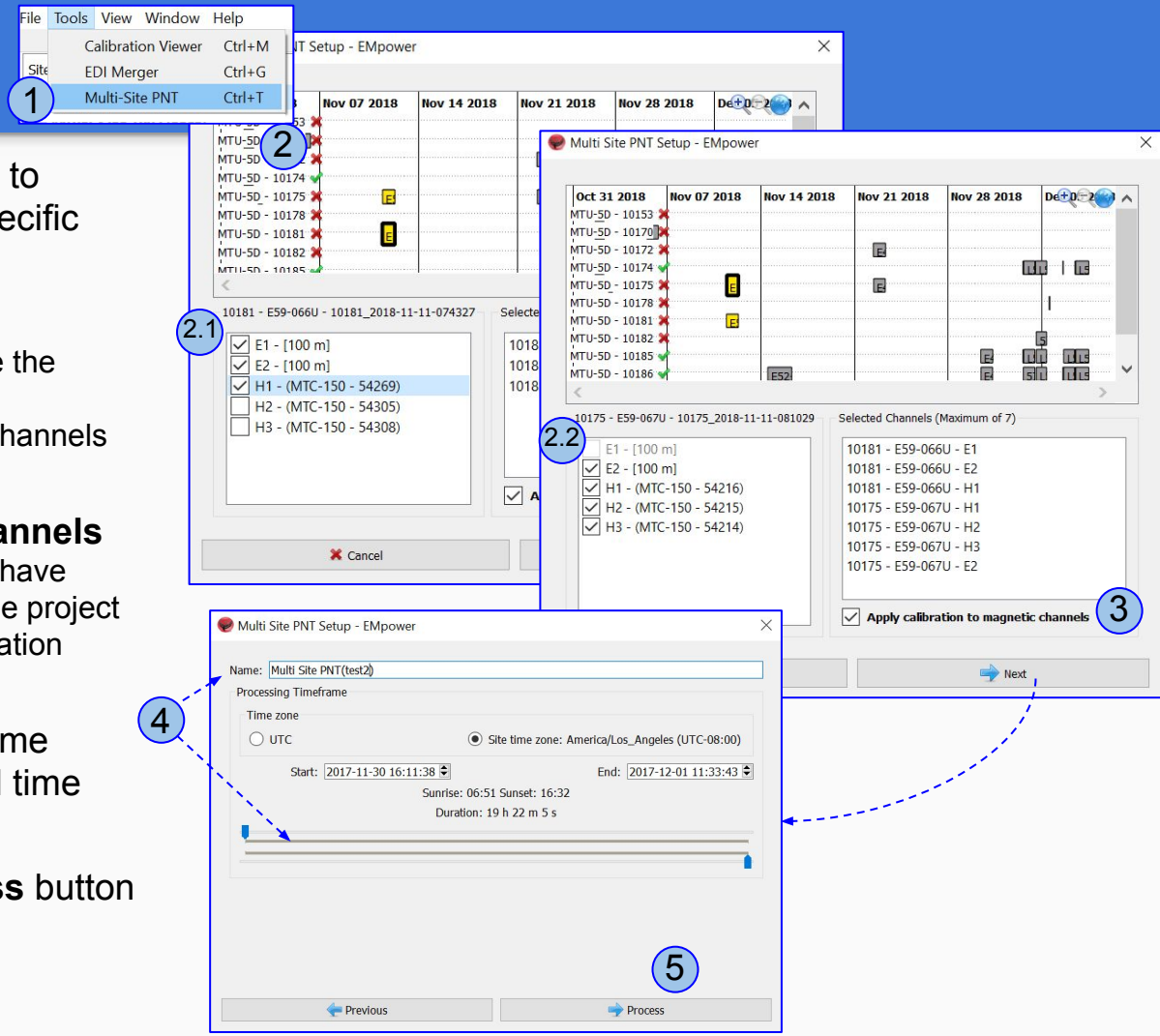
1. Use the **Multi-Site PNT (Ctrl+T)** tool to process Parallel Noise data using specific channels from different sites

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**

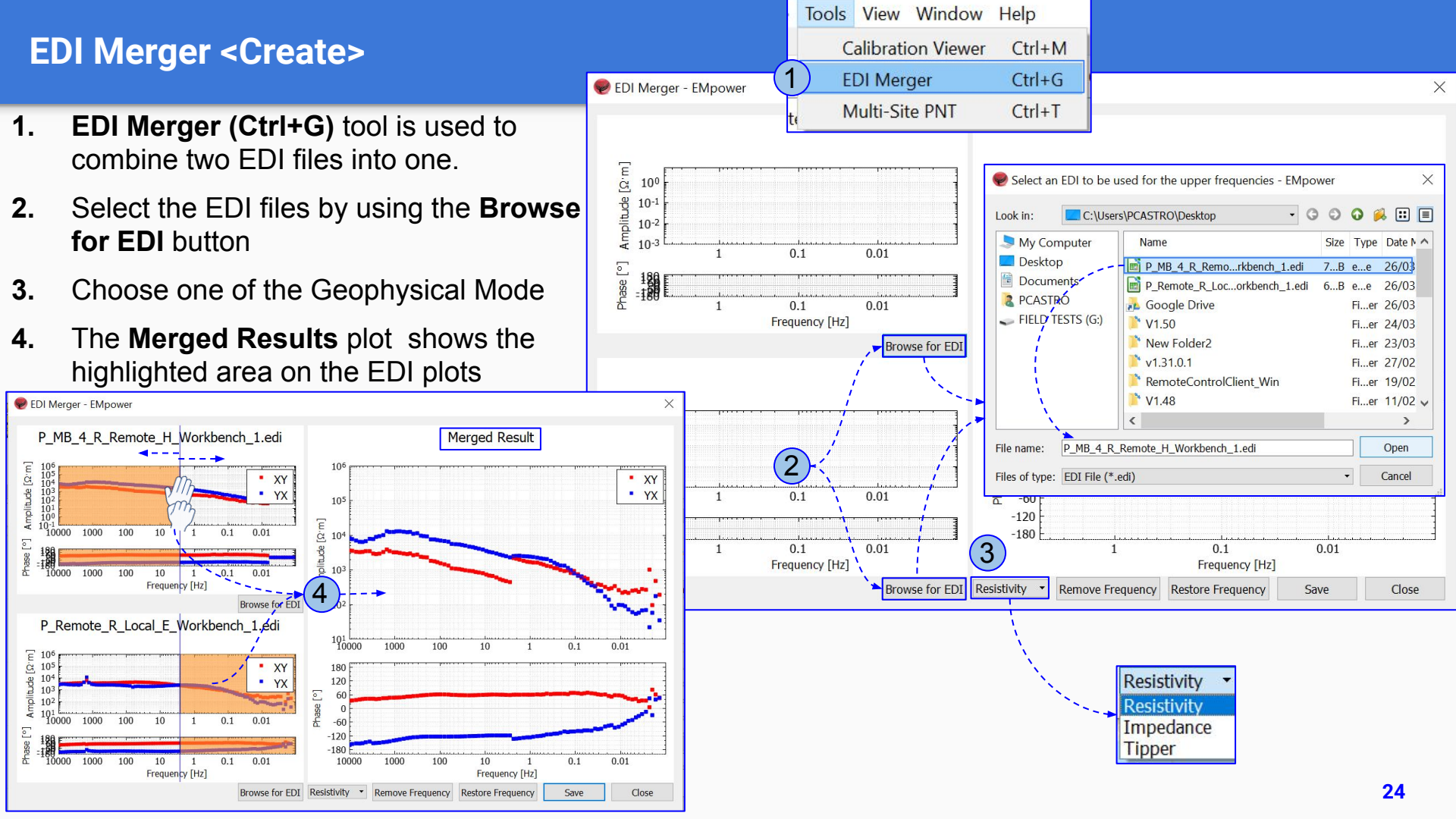
4. Define the Name and Duration, the time available depends on the overlapped time between all the recordings selected

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



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



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