



# TEMimage

PRODUCT MANUAL



Ver.2026.1.5

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## 1. INTRODUCTION

TEMimage is the TEMcompany's processing software developed specifically to make TEM data processing as simple and accessible as possible. It supports data from multiple TEM systems, including sTEM, sTEM Profiler, tTEM and TEM2Go, and the equivalent instruments sold by Guide-line Geo (GroundTEM i-series, Ralli and Trek)

The software uses TEMcompany's own inversion code (Lupus) and is designed for both beginners and advanced users. Beginners can rely on default inversion settings for quick results, while advanced users have access to a wide range of detailed processing and inversion options.

In addition to viewing electromagnetic data in raw dB/dt, stacked dB/dt, and apparent resistivity, TEMimage allows users to process and visualize inverted data in various formats, including 1D models, resistivity sections, and resistivity depth slices.

The resulting models can be exported in multiple formats, making it easy to integrate results with other software and GIS platforms.

This document explains how to import, process, and invert time-domain data collected using our instruments. TEMimage is optimized for data collected in a line and is particularly well-suited for generating profile sections.

### **Before You Begin**

Please review the following requirements before proceeding:

- TEMimage is compatible only with data collected using TEMcompany products. Other data formats are not supported.
- It requires datasets recorded in dual-moment mode; both Low Moment (LM) and High Moment (HM) data must be included.
- For best performance, use the original project or data folder structure as downloaded directly from the instrument.
- A valid product key is required to activate the license and run the program.
- If you do not have a valid product key, please contact: [support@temcompany.com](mailto:support@temcompany.com).

## 2. GETTING STARTED

### 2.1 Activating the license

Once the program has been installed and launched, you will be prompted to activate your license. To do so, follow these steps (Figure 1):

- Enter the provided Product Key in the designated field.
- Click on “Checkout license”
- If activation is successful, the top bar will turn green and display “License is active.”
- Once activated, additional license information will appear in the field below, including:
  - Expiration date
  - Support expiration date
  - License ID
  - Active users
  - Offline checkout remaining
  - Allowed instrument types
- To deactivate the license, Open License Manager and click on the “Check-In” button

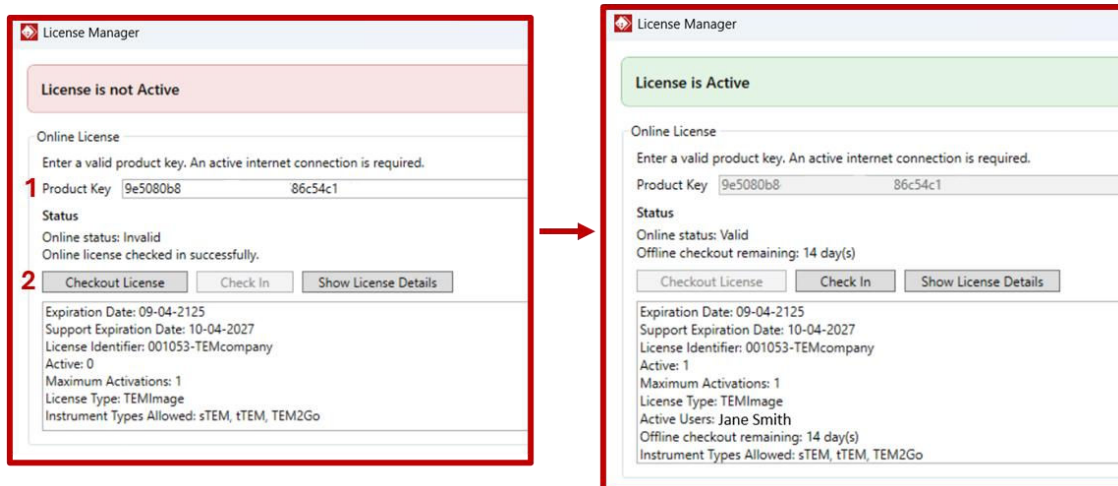


Figure 1: License manager window. “License not Active” (left) and “License Active” (right)

#### Notes:

- The licenses are usually perpetual, meaning the expiration date may appear unusually far in the future.
- Software support and updates are renewed annually. The support expiration date indicates when this period ends.
- Maximum activations refers to the number of users who can access the software simultaneously using the same product key.
- Active users show who is currently using the software.

- Offline checkout remaining indicates how long the license can remain checked out. When working offline, this also defines how long the software can be used without re-connecting. Once expired, the license must be checked out again while online.

## 2.2 Startup screen

Once TEMImage is installed and a valid license is checked out, the startup screen will appear as shown in Figure 2



Figure 2: Startup screen displayed after launching TEMImage

### Menu Bar Overview

The menu bar located in the upper left corner, provides access to the following options:

- **File** – Import, export, save, and access settings.
- **Visualization** – Options for manually creating profiles and resistivity layer maps based on inversions (see Section 6).
- **Options** – Includes advanced processing selections and the option to update DEM (elevation data).
- **Help** – Displays application version details and license manager.

## 2.3 Adding a new map provider

In TEMImage, background maps can only be added using WMS (Web Map Service) layers. By default, the application loads the Open Street Map. However, you can add other WMS layers as long as you have a valid URL and access to it.

### Adding a new online background map (Figure 3):

- Right-click on the map window.
- Select "Add new map provider".
- Enter a name for your map (e.g., "MyMap").
- Paste the valid WMS URL.
- If the URL is valid, the new background layer will be added automatically.

### Viewing and setting the new background layer:

- Right-click again and select "Select Map Provider".
- You should see the newly added background layer listed.
- Select it to set it as an active background map.

Once selected, the new map layer will be saved with your project and remain active until you choose a different one.

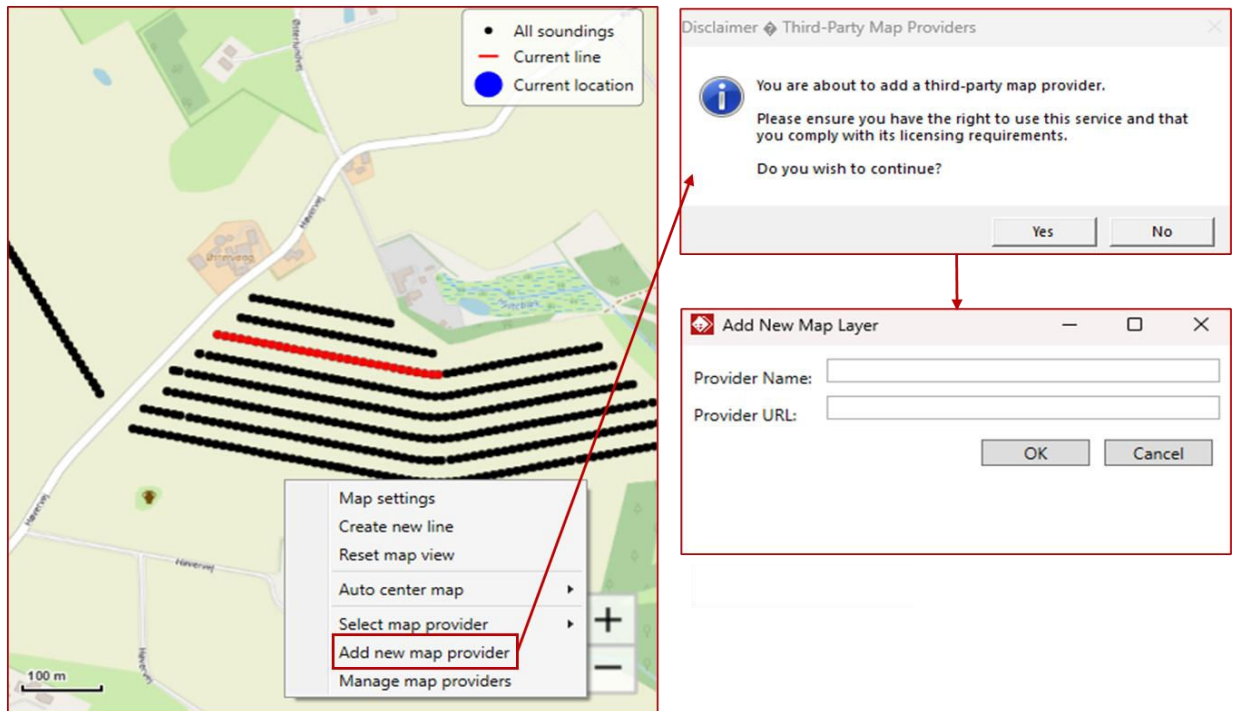


Figure 3: Adding new map provider and managing map providers

### 3. DATA IMPORT

To begin, click on **File** and select **Create New Project**. A window will open prompting you to create a database file (.db), where all processed data will be stored.

Once the database file is created, an **Import Data** window will appear (Figure 4). Here, you must:

- Select the data type (*sTEM/sTEM Profiler, TEM2Go or tTEM or GroundTEM equivalents*).
- Choose the **Data** folder containing the acquired measurements.

#### Importing sTEM or sTEM Profiler Data

When importing sTEM or sTEMprofiler data, TEMimage automatically performs the following:

- Reads all .stb and .stn files from the selected Data folder(s)
- Processes and stacks the raw data into soundings, including associated GPS positions. TEMimage does not support datasets without GPS information.
- Groups data by line number. If line number information is missing or duplicated, there is an option to assign a new line number automatically.
- Multiple datasets of the **same data type** can be imported into a single project in TEMimage. In addition, sTEM datasets from different configurations (eg. 40x40 and sTEM Profiler) can also be combined and processed within the same project.

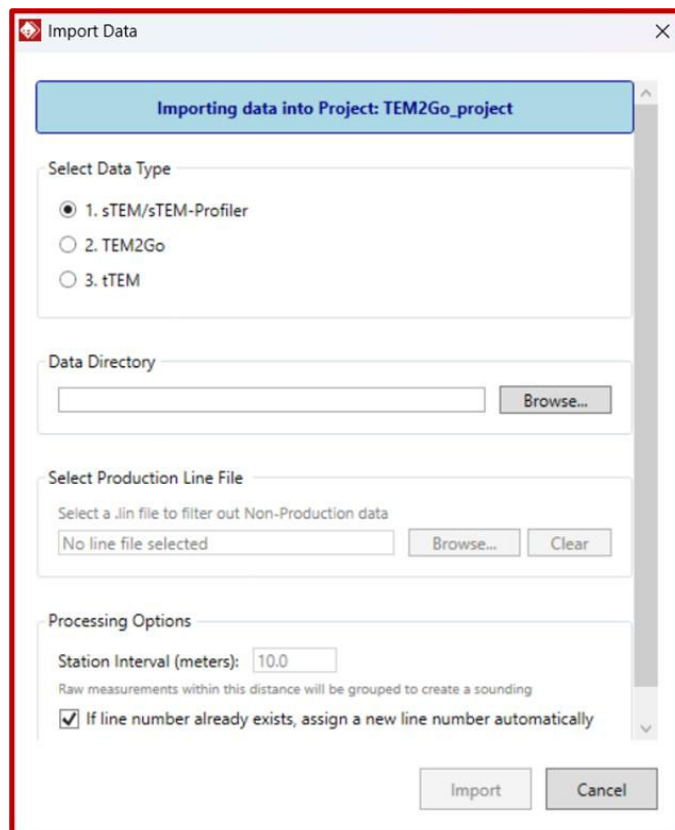


Figure 4: Import data window

## Importing TEM2Go or tTEM Data

When importing TEM2Go or tTEM data, additional options are available:

- Select Production Line File (.lin)
  - If a .lin file is selected, it defines how the data is split into lines.
  - If no .lin file is provided, TEMImage will automatically split the data, but will keep all data including sections where the line was otherwise “stopped”.
- Processing Options – Station Interval (m)
  - Defines the spacing used to average raw measurements into stations

## Data Display After Import

After import, both Low Moment (LM) and High Moment (HM) data displayed, along with a map showing the location of the acquired measurements (Figure 5).

- All GPS positions are shown as black points
- The currently selected line is highlighted in red
- Map display settings can be adjusted by right-clicking on the map and selecting Map Settings

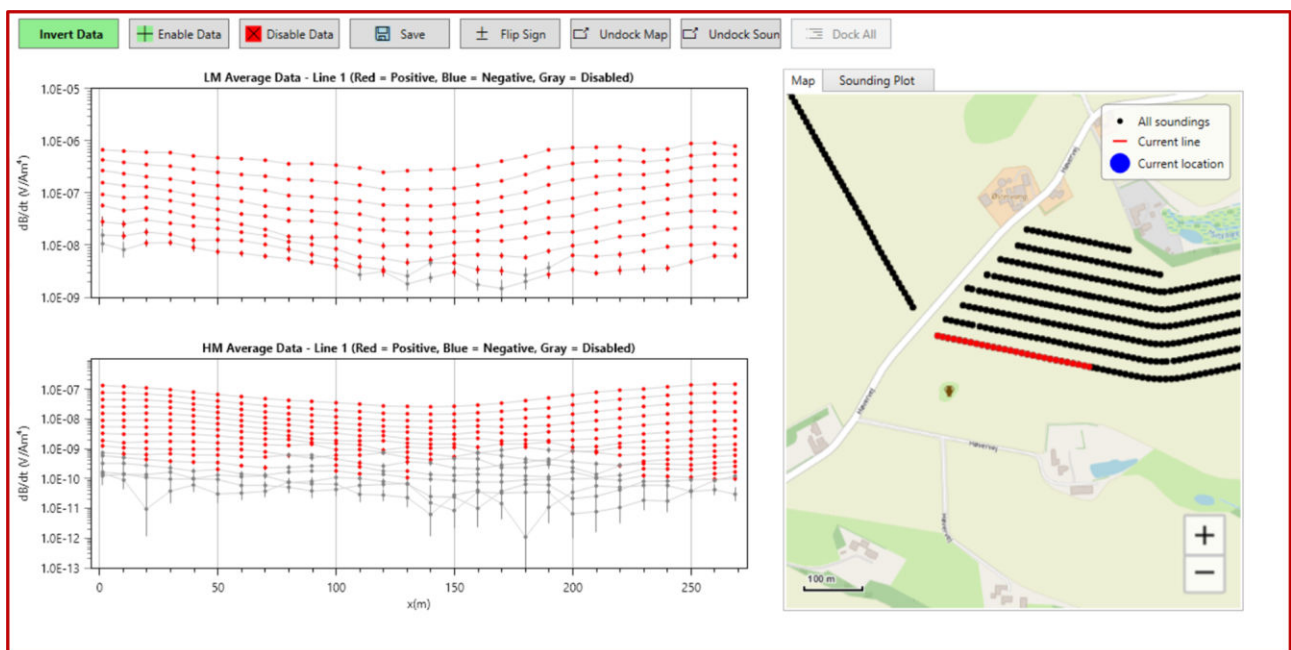


Figure 5: Overview of the home screen after importing (in this case) TEM2Go data.

## 4. DATA PROCESSING

When data is imported, TEMimage automatically applies a slope filter to the averaged data. This filter will auto disable the oscillatory data points due to couplings from external sources.

After import, the data must be manually reviewed and adjusted by enabling or disabling specific data points in the Low Moment (LM) and High Moment (HM) profile plots (Figure 6). This ensures that only high-quality data is used for inversion.

In projects containing multiple survey lines, you can switch between them using the Line Navigation option in the panel on the left(Figure 6).

You can manage data points in two main ways:

### 1. Using the Data Profiles

- Left-click and drag the mouse to select the data points you want to modify on the profile plot. The selected points will be highlighted (Figure 6).
- From the top menu, choose **Enable** (or **Ctrl+E**) to include the points in the inversion process, or **Disable** (or **Ctrl+D**) to exclude them.

### 2. Using the Sounding Plot

- When a data point is selected in the profile, the corresponding sounding is displayed in the **Sounding Plot** (Figure 6).
- Click on the Sounding Plot tab to view the details. Data can be displayed in either **dB/dt (LM and HM)** mode or **Apparent Resistivity** mode.
- Use the “Show Disabled” option to display data points that have been excluded.
- Data points can also be selected directly in the sounding plot and enabled or disabled in the same way as in the profile view.

### Notes:

- Pay close attention to data points near roads, houses, or other infrastructure, as they are more likely to be affected by noise.
- Disabled data points are excluded from inversion but not deleted, allowing them to be re-enabled if needed.

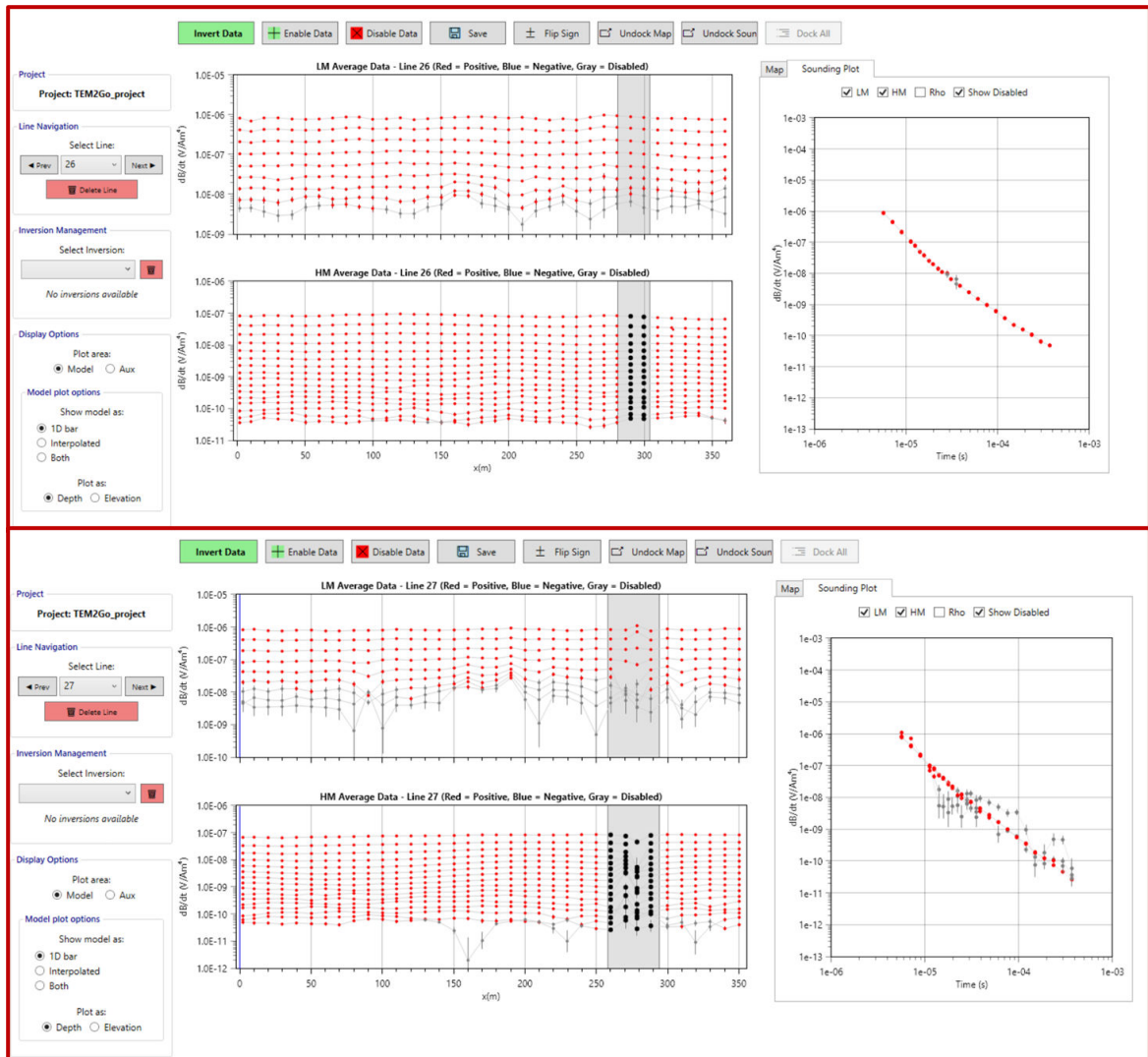


Figure 6: Representation of TEM2Go data acquired along a survey line. Data points are selected from the profile plots on the left, while the corresponding soundings are displayed on the right in the Sounding tab (shown here in dB/dt). Line 26 (top) illustrates an example of good-quality data, whereas Line 27 (bottom) shows data affected by noise, which should be disabled before running the inversion.

## 4.1 Viewing Raw Data

Viewing raw data can provide valuable insight into data quality and support better processing decisions. The method for accessing raw data depends on the data type.

### 4.1.1 Continuous Data (TEM2Go or tTEM)

For continuous data types such as TEM2Go or tTEM, raw data can be accessed directly from the profile view:

- Right-click on the profile plot
- Select **Data > Raw**

This will display the full raw dataset acquired along the selected line (Figure 7).

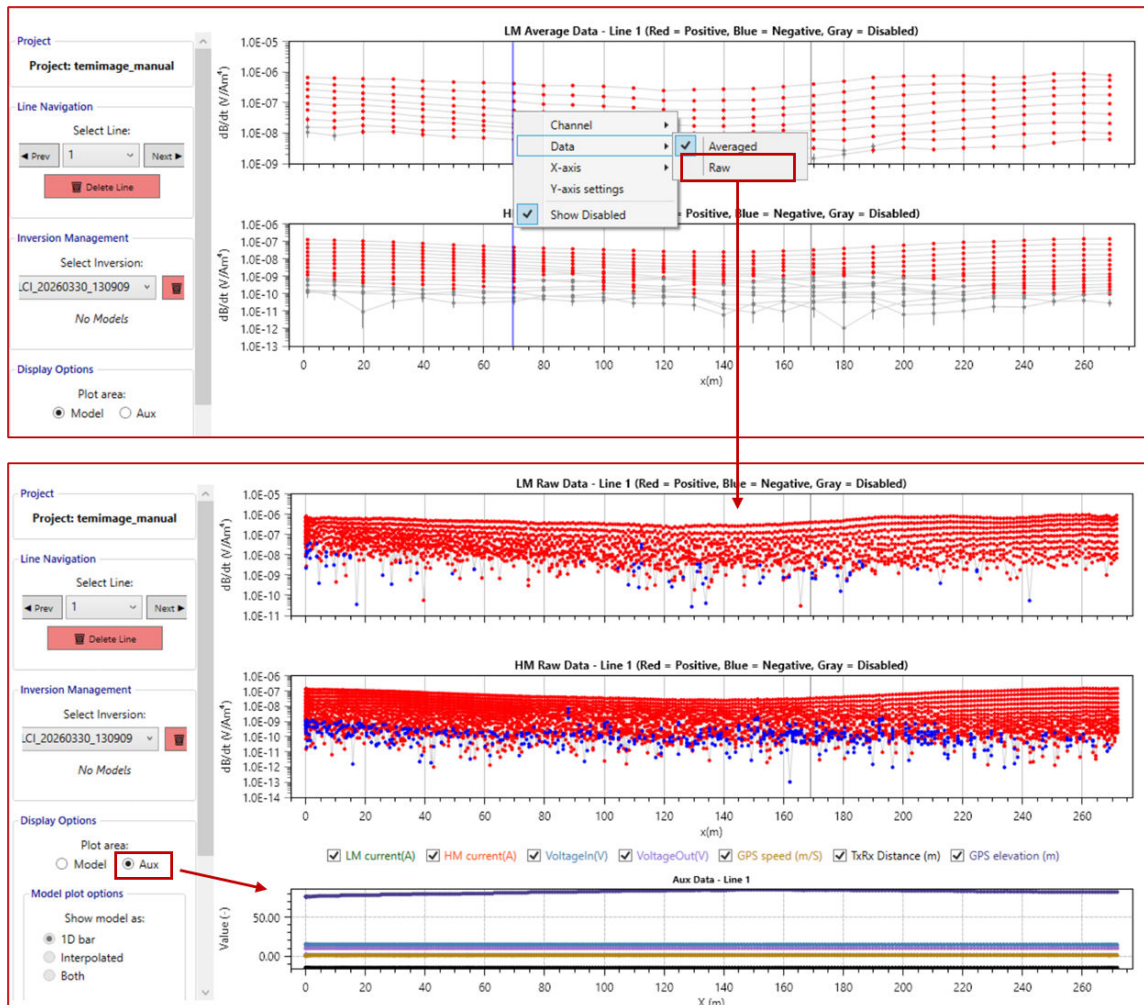


Figure 7: Visualization of raw data for continuous measurements (TEM2Go and tTEM). Right click on top of the data plot and choose Data > Raw.

#### 4.1.2 Stationary Data (sTEM)

For sTEM data, measurements are collected at fixed locations. The sounding shown in the profile plot represents an average of continuous stationary soundings acquired at that location for a selected period of time.

To view and process individual soundings:

- Go to the **Menu** and select **File > Process Individual Sounding**
- A new window will open displaying all individual soundings (and corresponding resistivity models, if inversion has already been performed) (Figure 8)
- Data points can be enabled or disabled directly within this window

To view raw data for a specific station:

- Select the desired **line** and **station ID** from the left panel
- Right-click and select **Show Raw Data** (Figure 9)

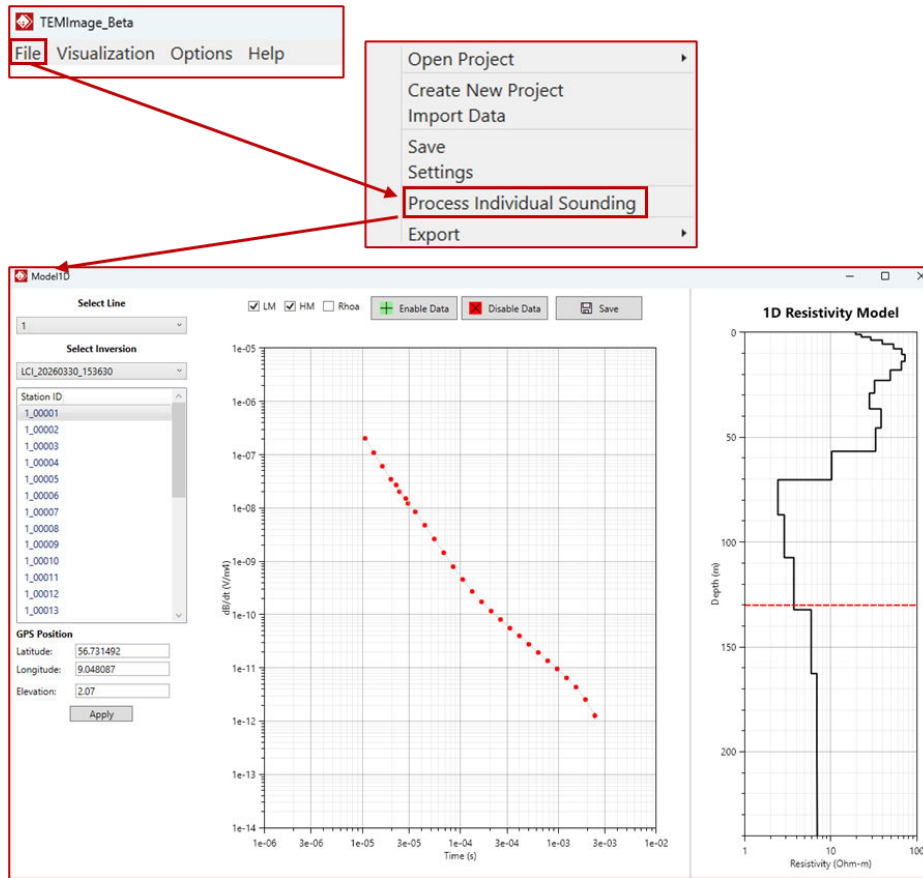


Figure 8: Processing individual soundings for sTEM data

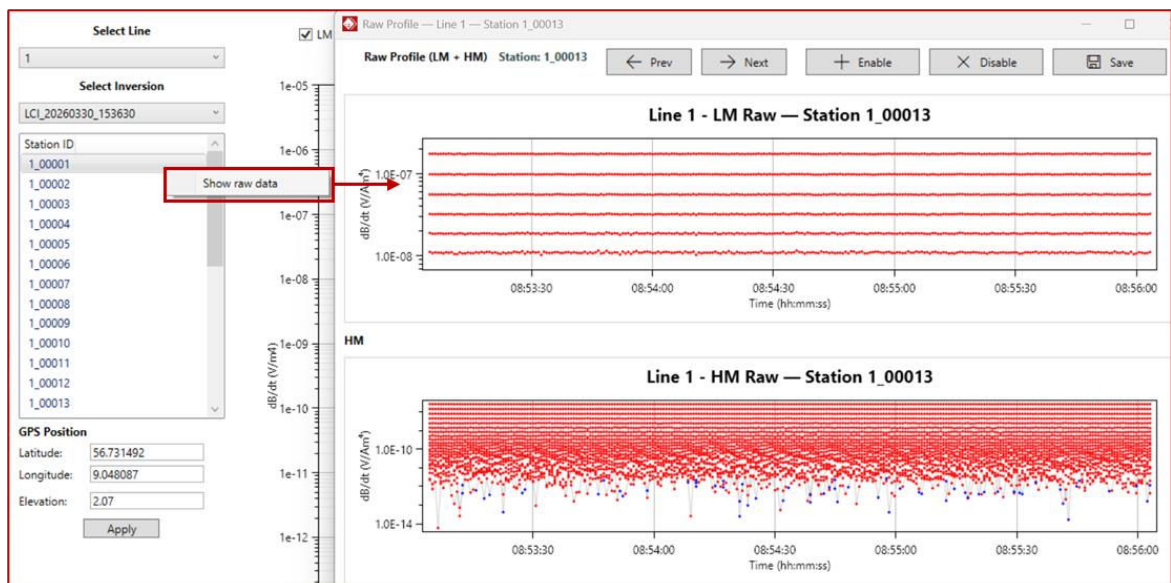


Figure 9: Visualization of raw sTEM data

## 4.2 Creating a Custom Line

This feature allows you to create custom lines from existing data points, making it easier to reorganize data and analyze profiles in any desired direction.

To create a new line:

- Right-click on the **Map** and select **Create New Line** (Figure 10)
- A prompt will appear asking you to define a **search radius (in meters)**
  - The search radius determines how many nearby data points are included in the new line, choose the radius based on the desired line direction and data density

To draw the line:

- **Left-click** on the map to add points along the desired path
- **Double-click** to finish the line

The custom line can be drawn in any direction to include the desired data points (Figure 10).

Once created, the new line will be added as the **last line in the project**. It can then be selected via the **Line Navigation panel** and processed in the same way as other lines.

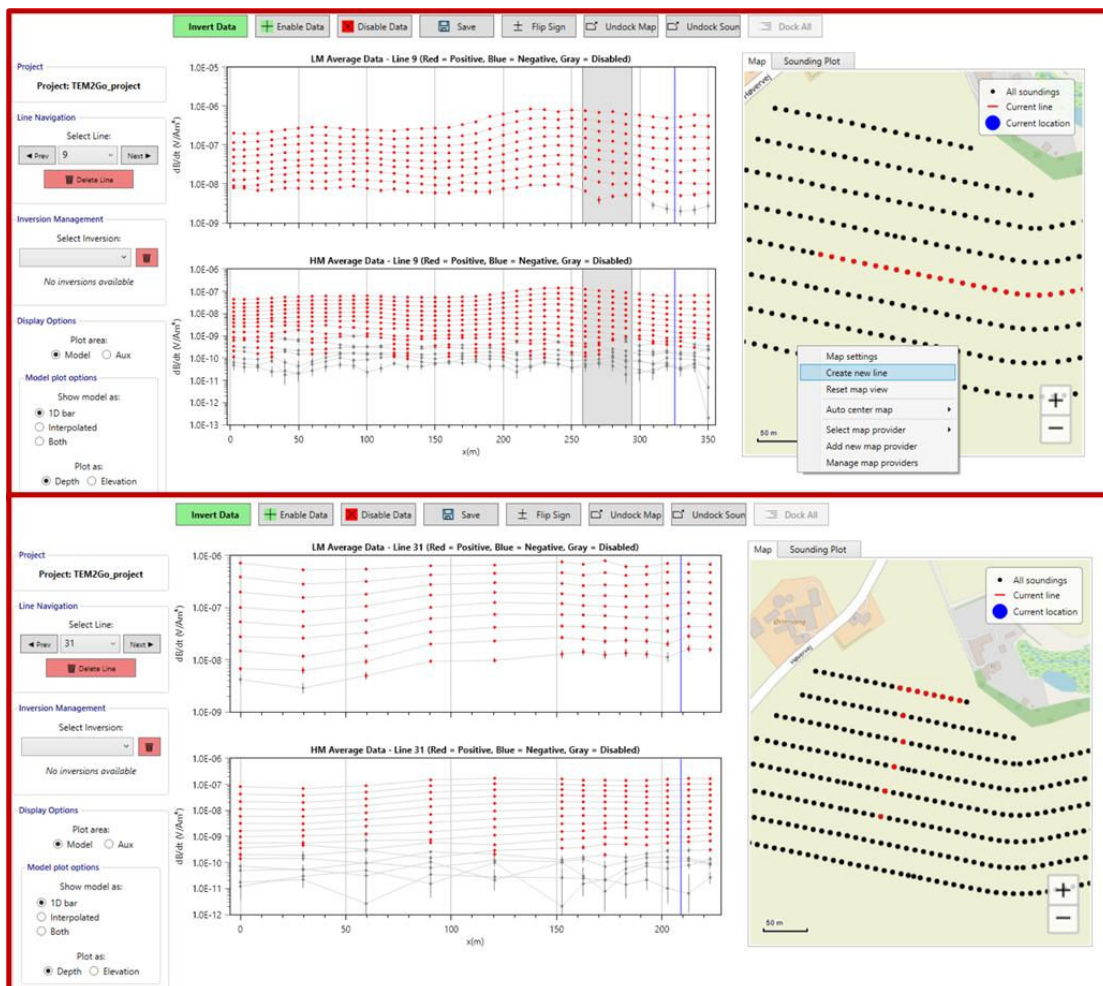


Figure 10: Creating a custom data line. Right-click on Map > Create new line (top). Draw the desired line in any shape and direction and it will be created as the last line in the project (bottom).

### 4.3 Additional options

Another advanced option in TEMImage is the ability to update the elevation data of your measurements by applying a Digital Elevation Model (DEM) to the project.

To update elevation data:

- Go to **Options > Update DEM**
- A window with different options will appear (Figure 11):
  - Use an **online DEM source**
  - Upload an **external DEM file**
    - The file must be in **GeoTIFF format**, and only **WGS84 UTM** coordinate systems are supported
  - **Remove or revert** a previously applied DEM from the project

Additional advanced processing options are available under: **Options > Advanced Processing**

The main tools include:

- **Sync HM > LM**
- **Delete Gates and Enable Gates**
- **Flip Sign**

These tools provide more detailed control over the data and should be used with care, as they can significantly influence the processing and inversion results.

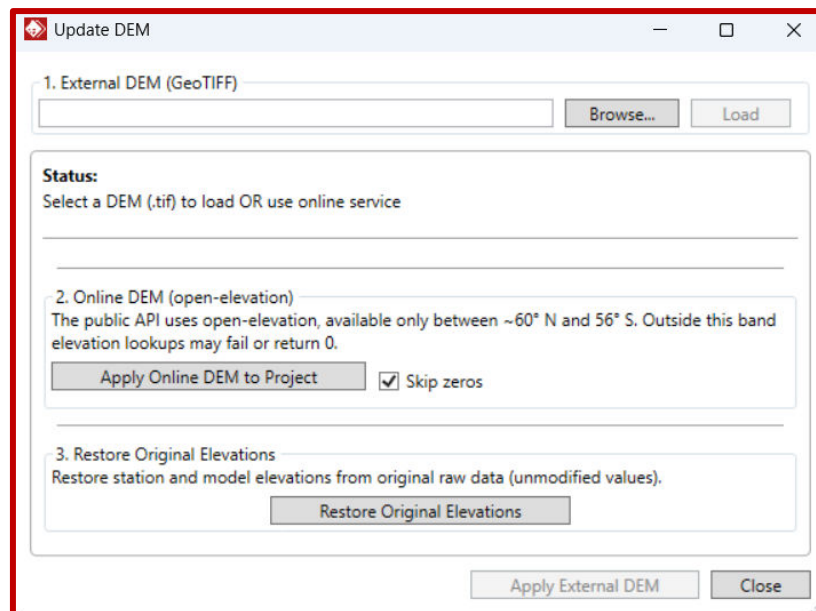


Figure 11: Update DEM window options

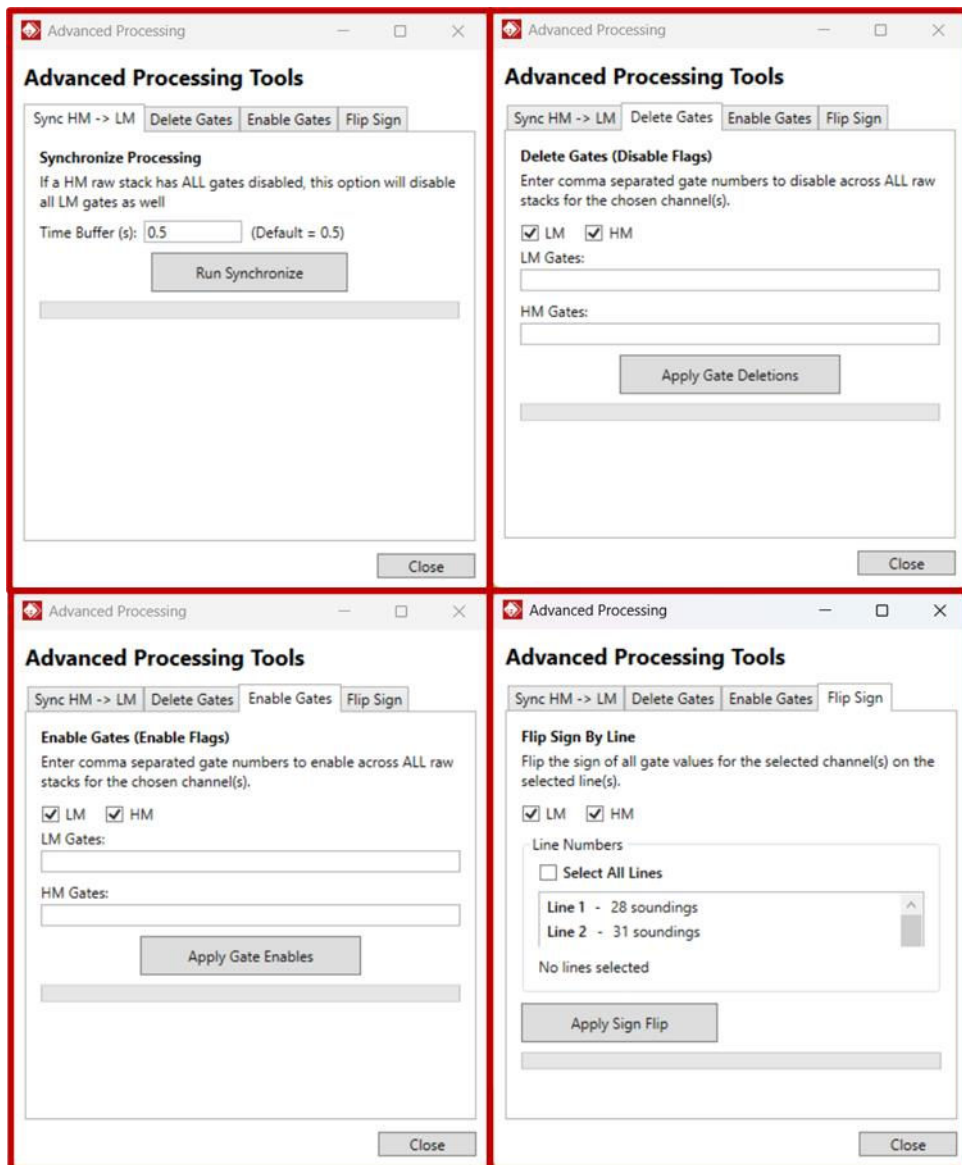


Figure 12: Advanced processing options window

## 5. DATA INVERSION

Data inversion in TEMImage can be performed using either the Lateral Constraint Inversion (LCI) or the Spatial Constraint Inversion (SCI) scheme.

Once data processing is complete, click the **Invert Data** button in the top panel. This will open the Inversion Setup window (Figure 13), where you can:

- Select one or multiple survey lines to invert
- Adjust key inversion settings, such as:
  - Constraint mode (LCI or SCI)
  - Moment selection (LM, HM, or both)
- Access additional advanced settings through the drop-down menu, including:
  - Startup model setup
  - Constraint setup
  - Constraint strength

These advanced parameters are preconfigured with default values. While they can be modified for more advanced inversion workflows, beginner users are advised to use with caution.

### **Inversion Progress**

Once the inversion starts, a progress window will appear (Figure 13) displaying:

- Current and previous iteration times
- A graph showing data misfit per iteration

The inversion process will automatically stop once the defined stop criteria are met.

### **Inversion Results**

When the inversion is complete:

- Close the progress window
- The resulting resistivity models will be displayed in the bottom panel (Figure 14).

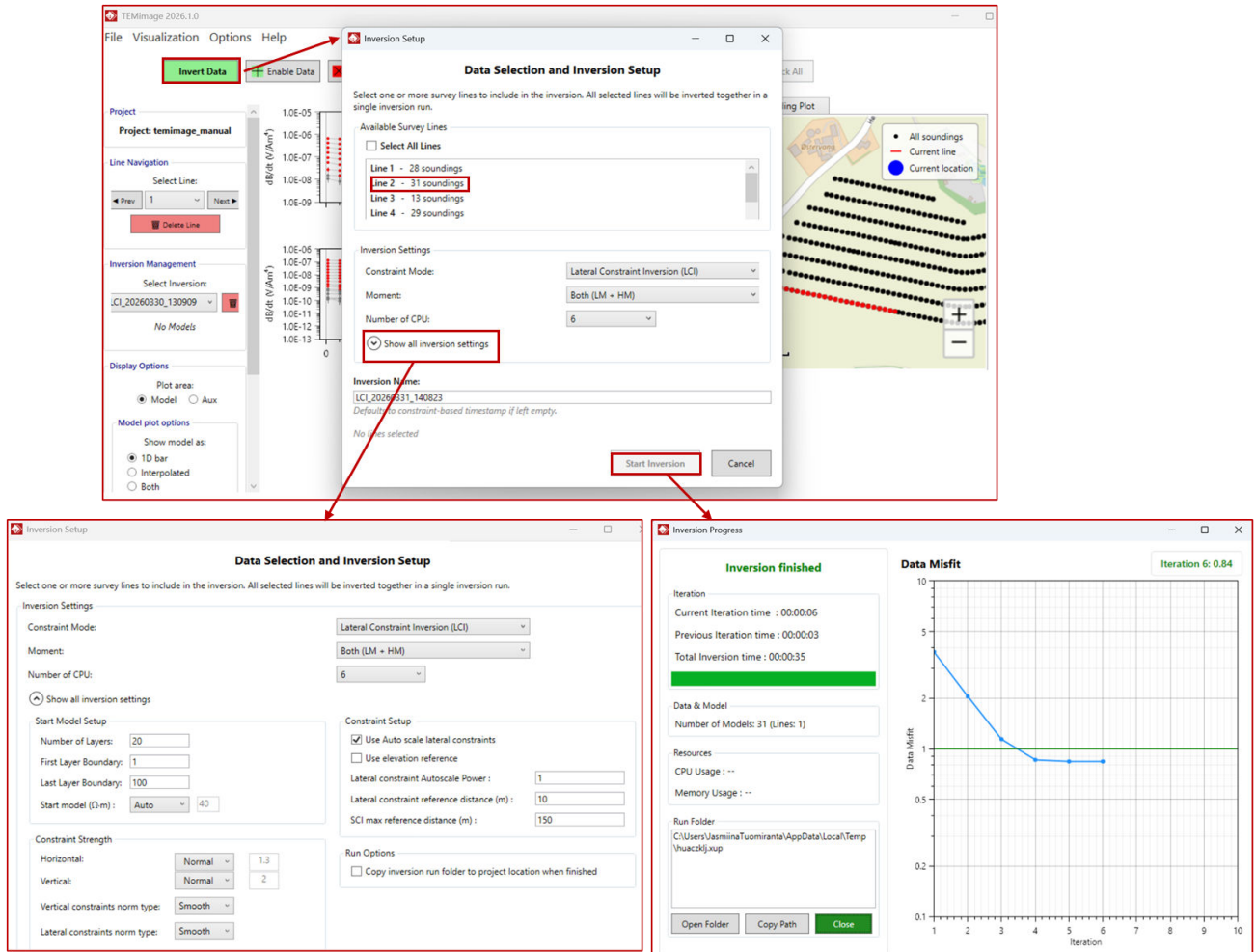


Figure 13: Inversion settings and starting the inversion

## 6. INVERSION RESULTS

### 6.1 Resistivity sections

The resistivity section created as a result of the inversion (Figure 14) can be displayed in three different ways (Figure 15):

- **1D model bars**
- **Interpolated**
- **Both** (1D color bars overlaid on an interpolated section)

If your project contains multiple soundings or survey lines, you can switch between resistivity sections using the **Line Navigation** option.

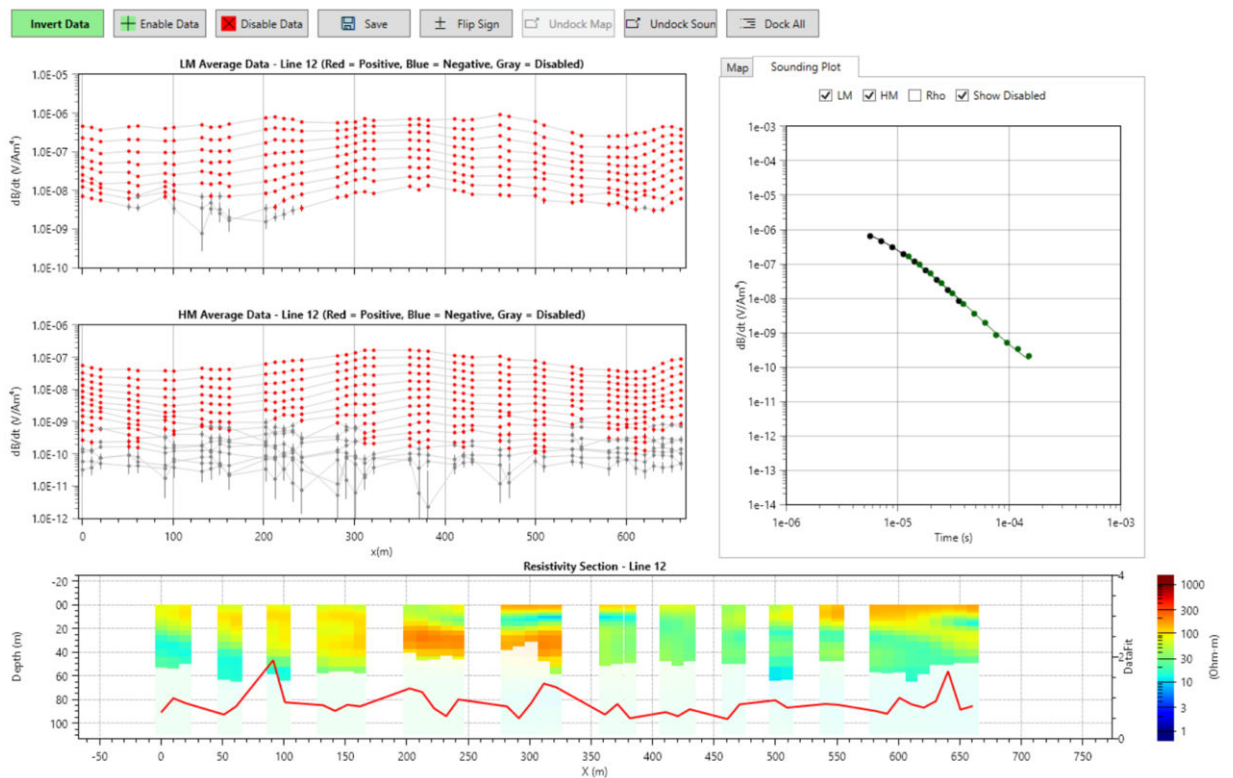


Figure 14: Home screen after the inversion of the data is complete. The bottom panel shows the Resistivity section for the corresponding line. If you click on a model in the Resistivity section, the Sounding plot on the right will show how well the forward model fits the observed data.

Other useful information that can be obtained from the resistivity section, includes:

- **Depth of Investigation** - model layers below the estimated depth of investigation are faded (Figure 14).
- **Data Misfit Line** - a data misfit line is plotted on the y-axis of each section model (Figure 14).

- A consistently high misfit value suggests the presence of poor-quality data that should be reviewed and possibly disabled.
- To check the misfit for a specific sounding, left-click on the model. The Sounding plot will display how well the forward model fits the observed data (Figure 14).

If inversion results are unsatisfactory, you can further process the data, disable problematic points, and re-run the inversion.

### Managing Multiple Inversion Models

Each time you run an inversion, a **new inversion model section** is created for the selected line. When the inversion is complete, TEMimage automatically switches to the latest model.

To review earlier results, use the **Inversion Management** panel (located below Line Navigation on the left) to select and view previous inversion versions.

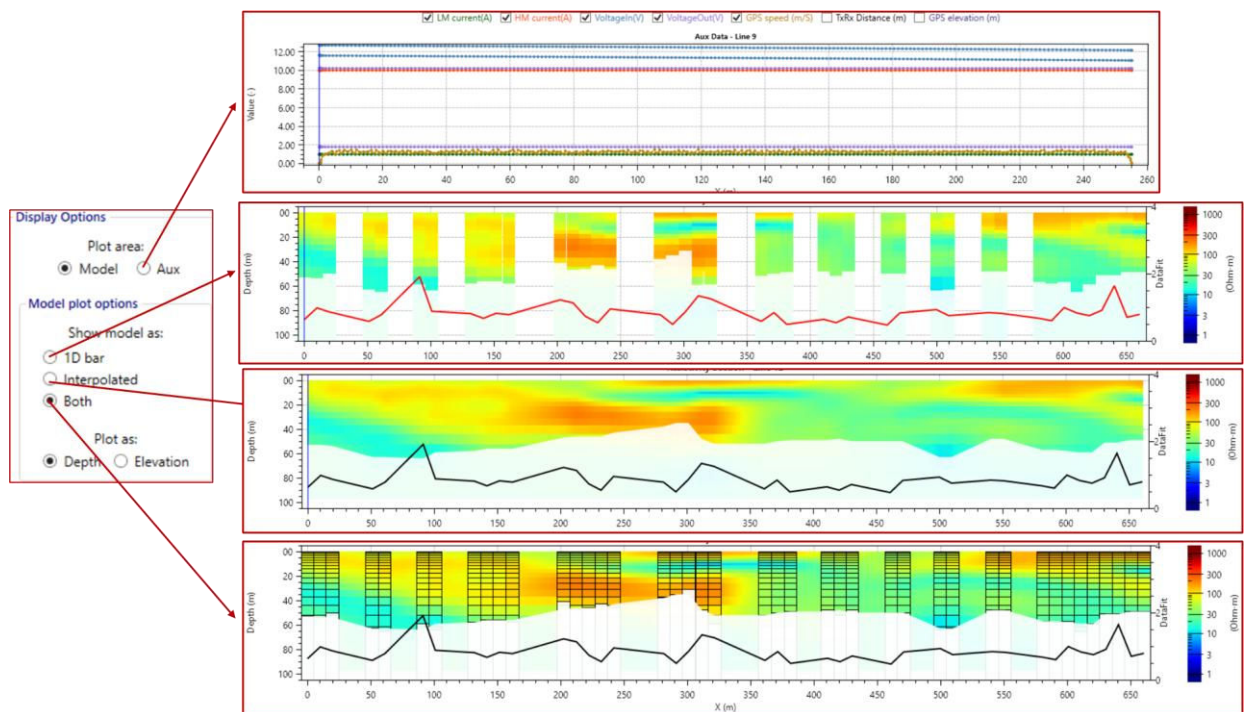


Figure 15: Display Options panel (left). Selecting different options changes what is shown in the bottom panel of the Home screen. The top illustration represents the *Auxiliary Plot*, which provides information about LM/HM current, input/output voltage, GPS speed, and Tx–Rx distance during data acquisition. The other illustrations show the three available display modes for the model plot: 1D Soundings, Interpolated Section, and Both (combined view).

## 6.2 Model Plot Options

The model plot can be customized in several ways. By right-clicking on a model in the plot, additional viewing options become available (Figure 16), including:

- Model Plot Settings
- Reset Axis Settings
- DOI Mask

- DOI Opacity
- Toggle Fit

Additional features available from the right-click menu include:

- Show Online DEM (if applied)
- Show 1D Model – displays the 1D resistivity model graph for the selected model(s) (Figure 17)
- Show Inversion Settings
- Save Plot

Finally, by right-clicking on the color scale, you can:

- Select from different color scale options
- Define minimum and maximum resistivity values for the display

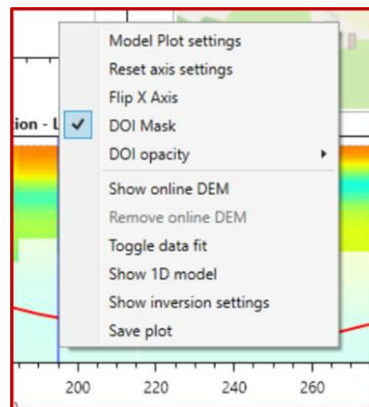


Figure 16: Right-click options for the Model plot

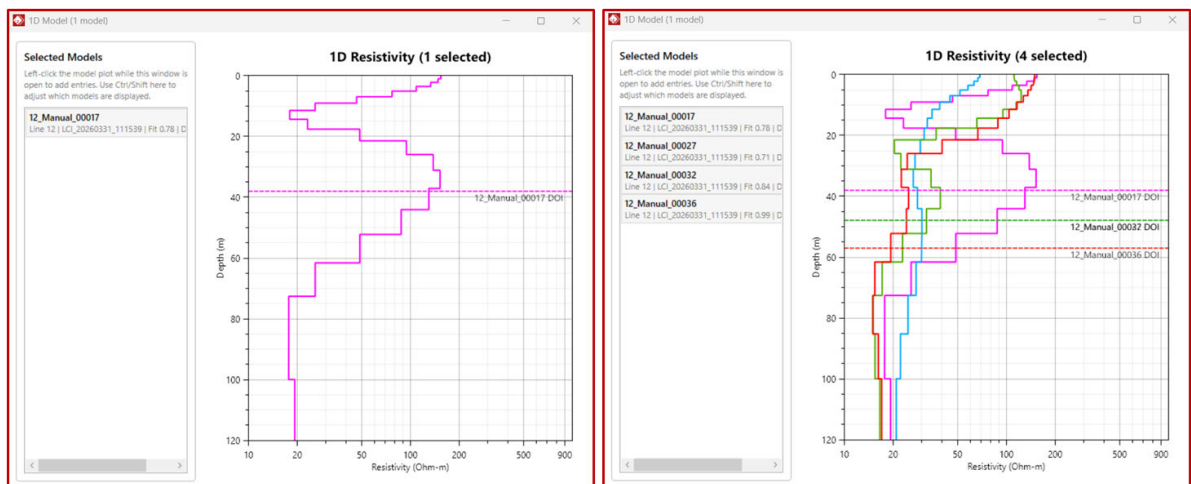


Figure 17: 1D resistivity model graphs. To open this view, right-click on the desired model and select “Show 1D Model” (left). Additional models can be added by clicking on them in the model plot and they will be automatically included in the graph (right).

## 6.3 Creating custom profiles

When the processing and inversion results are satisfactory, further visualization options become available, including drawing and generating custom profiles directly within the survey area.

To create a profile (Figure 18):

- Open the **Visualization** menu. A new window with a map of the inverted data will appear.
- Click the **Draw Profile** button in the top panel.
- On the map, click to set your profile's starting point, then click again to set the next point and double click to end the profile or click **Finish and Save** in the top panel.
- Enter a profile name and specify a search radius in the pop-up window, then click **OK**.
- The profile will appear in the **Profile List** on the left panel of the Visualization window.
- To open your profile, double-click it. A **Profile Plot** window will appear, where you can adjust display settings.

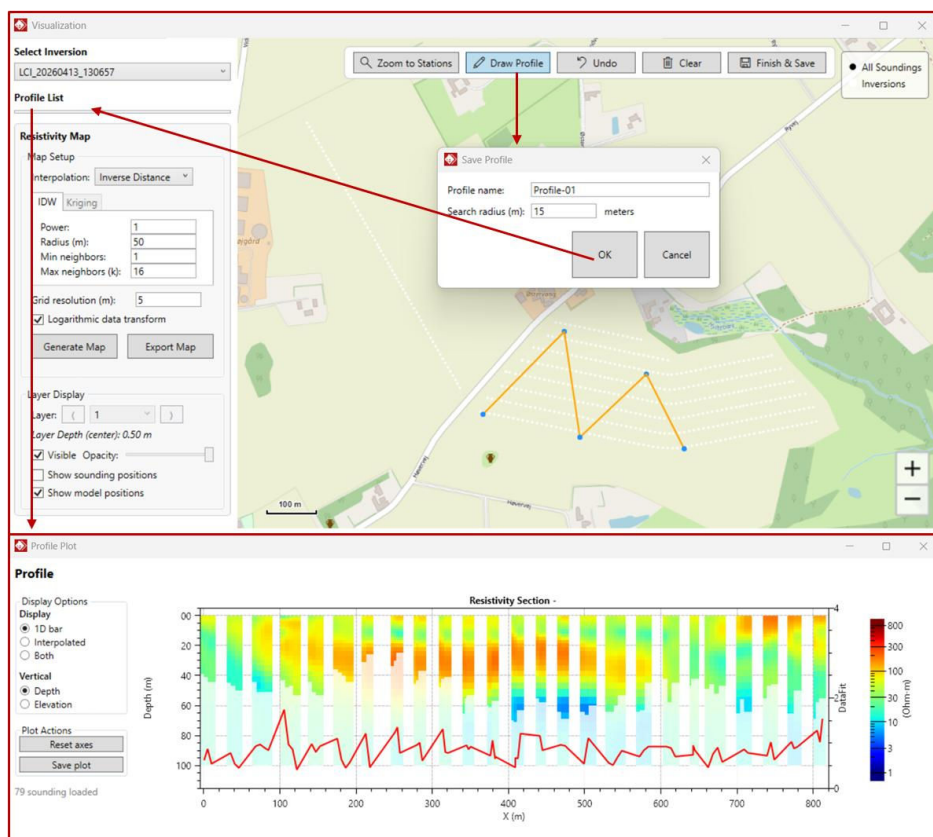


Figure 18: Visualization window and how to create custom profiles.

## 6.4 Generating Resistivity Maps

When working with dense survey areas, another useful tool is to generate Resistivity Maps to visualize depth slices across the project area. These maps are created by interpolating the

resistivity values of a particular layer at regular grid intervals defined by the inversion layer model. There are two interpolation methods available: IDW (Inverse Distance Weighting) and Kriging (Figure 19).

To generate a resistivity map (Figure 19):

- In the left panel, under **Resistivity Map**, select the interpolation method and define the interpolation parameters. If unsure, use the default options.
- Click **Generate Map** to create a layer view of resistivity slices at different depths. Each slice represents the vertically centered depth between the top and bottom of the corresponding layer.
- Use the **Layer Display** panel to adjust settings, such as layer opacity and slice depth.

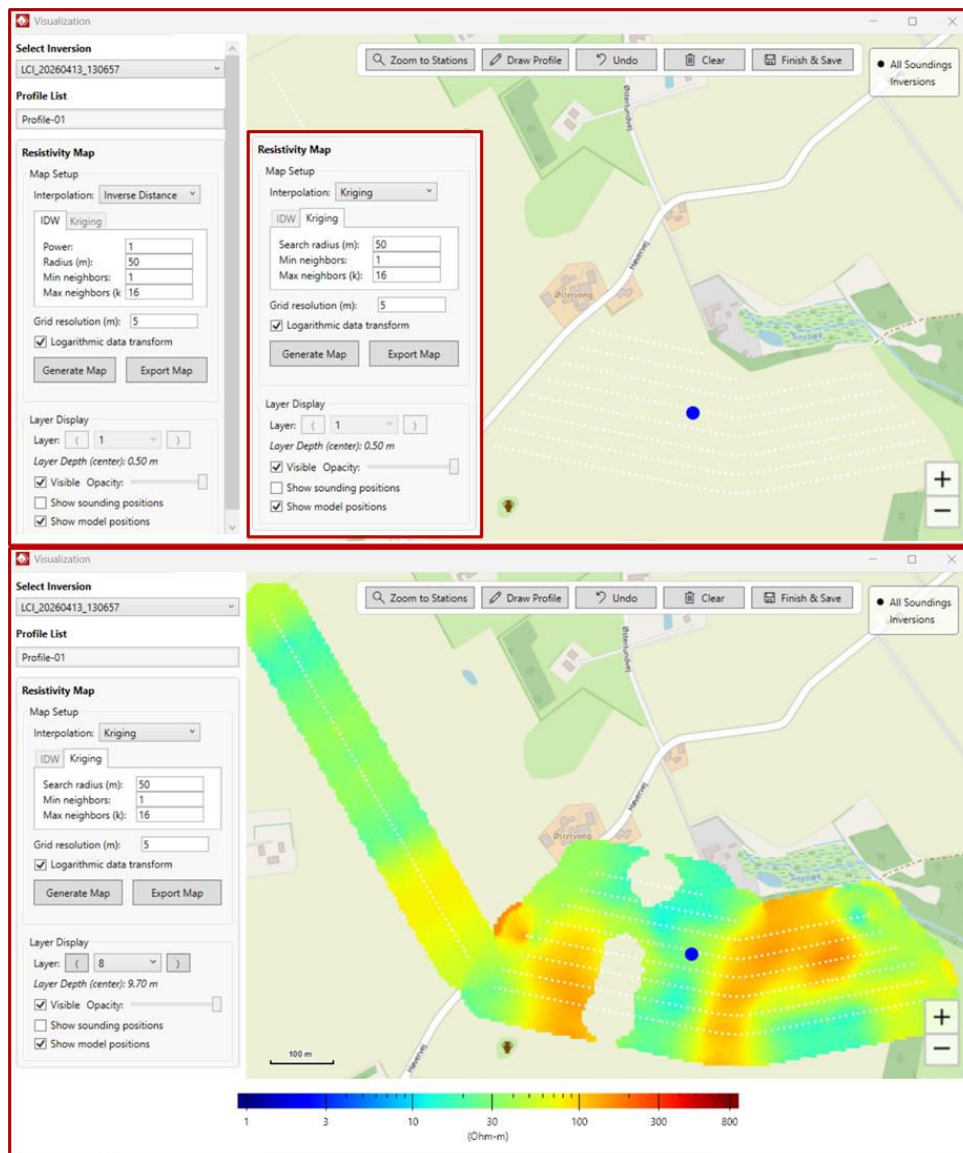


Figure 19: Visualization window and how to generate resistivity maps. Two interpolation methods are available: IDW (Inverse Distance Weighting) and Kriging (top). After clicking on “Generate Map”, resistivity layers are created and can be explored using the Layer Display menu (bottom).

## 7. EXPORT/SAVE OPTIONS

Depending on the type of data that is exported, there are different options.

To export data:

- Go to the **File > Export > Data**.
- In the pop-up window, select the data source: **Station stacked** or **Raw Data**.
- The data can be exported in XYZ format only.

To export a model:

- Go to the **File > Export > Model**.
- In the pop-up window, select the desired inversion version.
- Choose the export format. Supported formats include XYZ, KMZ, VTK, DAT, Leapfrog (.csv), CSV (general) and PDF report.

To export GPS positions:

- Go to the **File > Export > GPS Positions**.
- In the pop-up window, select the data source: **Station stacked** or **Raw Data**.
- Data is exported as an ESRI shapefile (.shp).

To save model plot:

- Click the **Save Plot** button in the left panel, or right-click on the plot and select **Save plot**.
- Choose export resolution (DPI) and export format (TIFF, PNG, SVG)

To save profile plot:

- Open the **Visualization** Menu.
- Select the desired profile from the **Profile list** to open it.
- Click the **Save Plot** button in the left panel, or right-click on the plot and select **Save plot**.
- Choose export resolution (DPI) and export format (TIFF, PNG, SVG)

## 8. TROUBLESHOOTING

This section outlines common issues that may occur when working in TEMimage, along with recommended solutions.

### 8.1 License Issues

#### Cannot Activate License

If you are unable to activate your license, check the following:

- **Expiration Date**
  - If the license has expired, please contact [support@temcompany.com](mailto:support@temcompany.com)
- **Offline Checkout Remaining**
  - If this value is **0**, the license must be checked out again while connected to the internet
- **Active Users / Maximum Activations**
  - If the maximum number of users has been reached, another user must **check in** the license before a new user can activate it
  - If it is not possible check in a license due to a computer or user not being accessible you can contact [support@temcompany.com](mailto:support@temcompany.com) to request a remote check in.

### 8.2 Import Issues

#### 8.2.1 Import Error – Missing Data Files

- This issue most commonly occurs with **TEM2Go data** due to incomplete or incorrect data download from the instrument
- Follow the error message prompts to identify missing files
- Re-download the dataset from the unit and try again

#### 8.2.2 Missing Data Lines (tTEM / TEM2Go)

- If some data lines appear to be missing after import using a **.lin file**:
  - Re-import the dataset **without the .lin file**
  - TEMimage will then automatically segment all available data into lines
- If the automatically generated lines do not match the desired layout:
  - Create **custom data lines** (see Section 4.2)

#### 8.2.3 sTEM Data Not Divided as Expected

- If sTEM data is not grouped into the desired lines:
  - Use the **Create Custom Line** feature (see Section 4.2)

## 8.3 Data Issues

### 8.3.1 Sign Change in Data

A sign change is a common feature in TEM data and is not necessarily an error.

#### Typical case:

- In areas with a very conductive near-surface layer, the signal may start negative and transition to positive (Figure 20)
- If this matches the geological setting, it is likely a natural effect
- After inversion, the data should still fit the model well

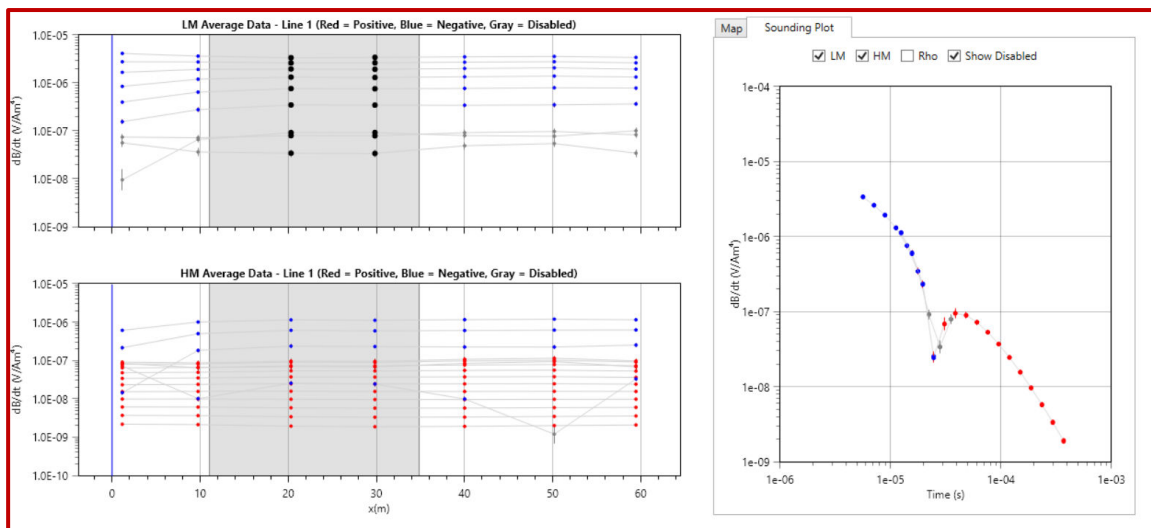


Figure 20: Example of a sign change in TEM data due to the presence of a very conductive near-surface layer (in this case saltwater)

### 8.3.2 Other Causes of Sign Changes

- **Induced Polarization (IP) Effects**
  - Chargeable materials in the ground can temporarily store energy and release it, affecting the signal and causing sign changes
- **3D Effects**
  - Caused by the geometry of the transmitter and receiver loops, as well as ramp time
  - More common in instruments using offset measurements
- **Coupling Effects**
  - Interaction with nearby conductive objects (e.g., fences, cables, infrastructure, buried objects)

## 8.4 Inversion Issues

### 8.4.1. High Misfit

- If the data misfit is high:
  - Inspect misfit values for individual models
  - Revisit and reprocess data points where the misfit is elevated
  - Disable noisy or poor-quality data points

### 8.4.2. Unexpected Anomalies

- If an anomaly:
  - Does not match neighbouring data
  - Does not align with expected geology

It may be an inversion artefact. Treat such results with caution and verify by reviewing the raw data and processing steps.

## 8.5 General Recommendation

When in doubt:

- Re-check data quality
- Compare with neighbouring soundings
- Review acquisition conditions
- Contact [support@temcompany.com](mailto:support@temcompany.com)