TEMcompany

TEMimage

USER MANUAL

Ver.26.3.01

TEMcompany
Value groundwater assets

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1. INTRODUCTION

TEMimage is TEMcompany's processing software for time-domain electromagnetic (TEM) data. Supported data include data from TEMcompany's full range of TEM systems (sTEM, tTEM and TEM2Go), as well as equivalent instruments sold by Guideline Geo (GroundTEM i-series, Ralli, and Trek).

TEMcompany's Lupus inversion code supports both Lateral Constraint Inversion (LCI) and Spatial Constraint Inversion (SCI). Built-in processing tools and default settings provide a straightforward workflow for routine processing, while additional processing, inversion, visualization, and export options are available for more advanced workflows.

The interface integrates data processing, mapping, visualization, and quality control within a single workflow. Available functionality includes viewing raw and processed electromagnetic data, reviewing 1D resistivity models, creating custom resistivity profiles, and generating resistivity depth slices. Models and other results can be exported in several formats for further interpretation, reporting, or use in other software and GIS platforms.

TEMimage uses a single database structure in which projects from different supported instrument types can be managed within the same software environment. Autosave functionality preserves generated profiles, maps, and resistivity grids throughout the workflow.

This manual describes the general workflow for working with TEM data, including data import, processing, and inversion, as well as visualization and additional features available in TEMimage.

Before You Begin

Please review the following requirements before proceeding:

- TEMimage is compatible only with data collected using supported TEMcompany instruments and equivalent Guideline Geo instruments. Other data formats are not supported.
- 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, contact: *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 "Activate license"
- If activation is successful, the top bar will turn green and display **License Active** together with the license expiration date and the support and updates expiration date.
- Once activated, additional information is available by expanding the **License details** section, including:
  - License type
  - License identifier
  - Active installations
  - Offline validity
  - Active users
- To deactivate the license, open **License Manager** from the **Help** menu and click on the **Release license**.

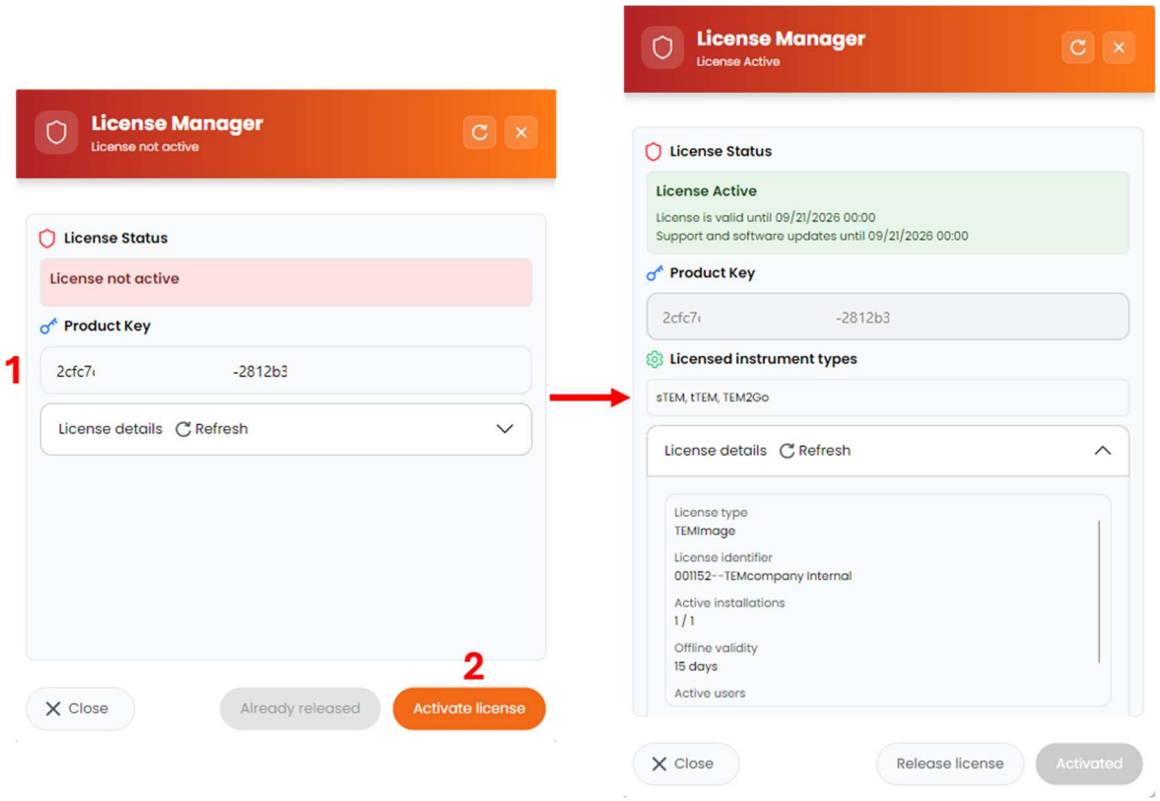

Figure 1: License manager window. "License not Active" (left) and "License Active" (right)

Note for TEMimage 1.0/beta users: In TEMimage 1.0, activating a license was referred to as **Check Out License**, while deactivating or releasing a license was referred to as **Check In License**. In TEMimage 2.0, these actions are called **Activate License** and **Release License**, respectively.

Notes:

- Perpetual licenses will have an expiration date in the far future.
- Software support and updates are renewed annually. The support expiration date indicates when this period ends.
- Active users show who is currently using the software.
- Offline validity indicates how long the license can remain activated. When working offline, this also defines how long the software can be used without reconnecting. Once expired, the license must be manually activated again while online.

2.2 Creating a database

A database file is required to import data and create projects in TEMimage. The database stores processed data, inversion models, maps, visualizations, and other project information.

To create a database:

1. In the welcome window, click **New Database** (Figure 2). Alternatively, select **File > New Database** from the menu bar.
2. In the window that opens, select the **name and location** for the database file (*.tiw).
3. Click **Save** to create the database.

Once the database has been created successfully, a confirmation message will appear, together with a prompt to import data (Figure 2).

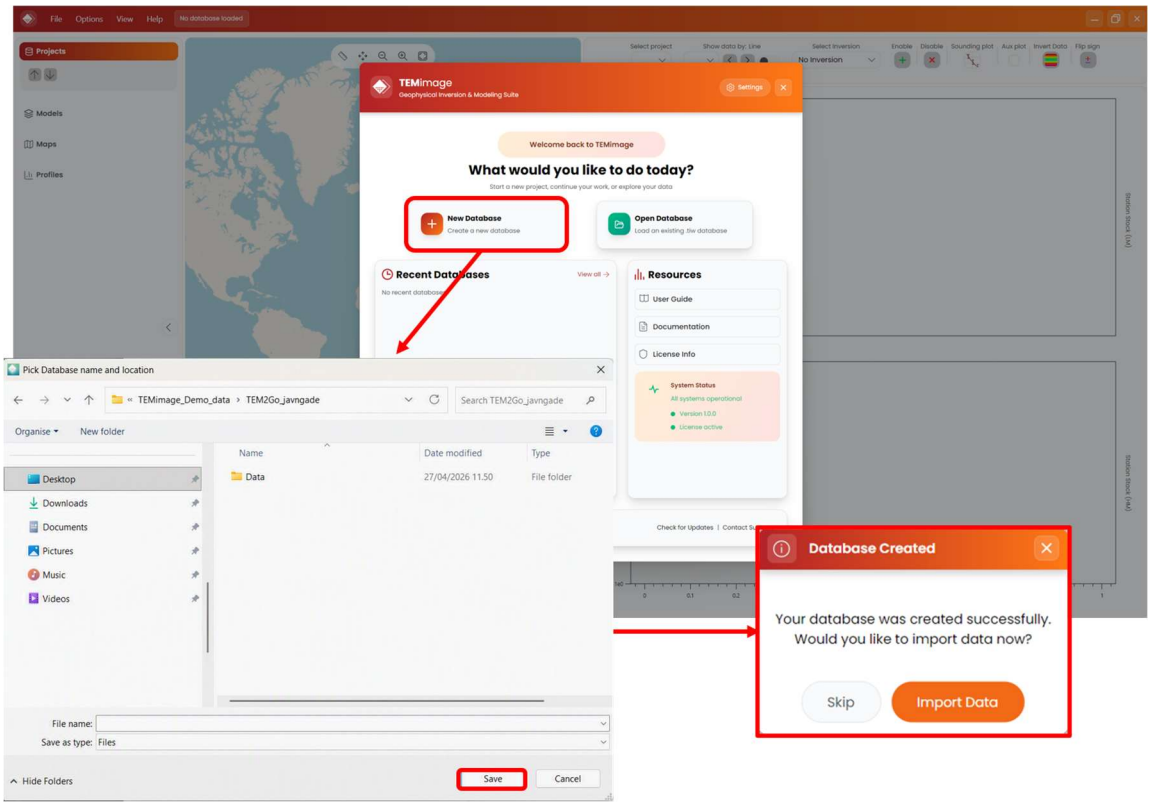

Figure 2: Steps of creating a new database from the welcome window

2.3 Importing data

Once a database has been created, click **Import Data** to begin importing a dataset. You will be prompted to select the **Data folder** containing the measurements.

After selecting the folder, the **Import Settings** window will appear (Figure 3). The instrument type is detected automatically. Depending on whether the data are stationary (sTEM with different coil configurations) or continuous (TEM2Go and tTEM), different import options are available.

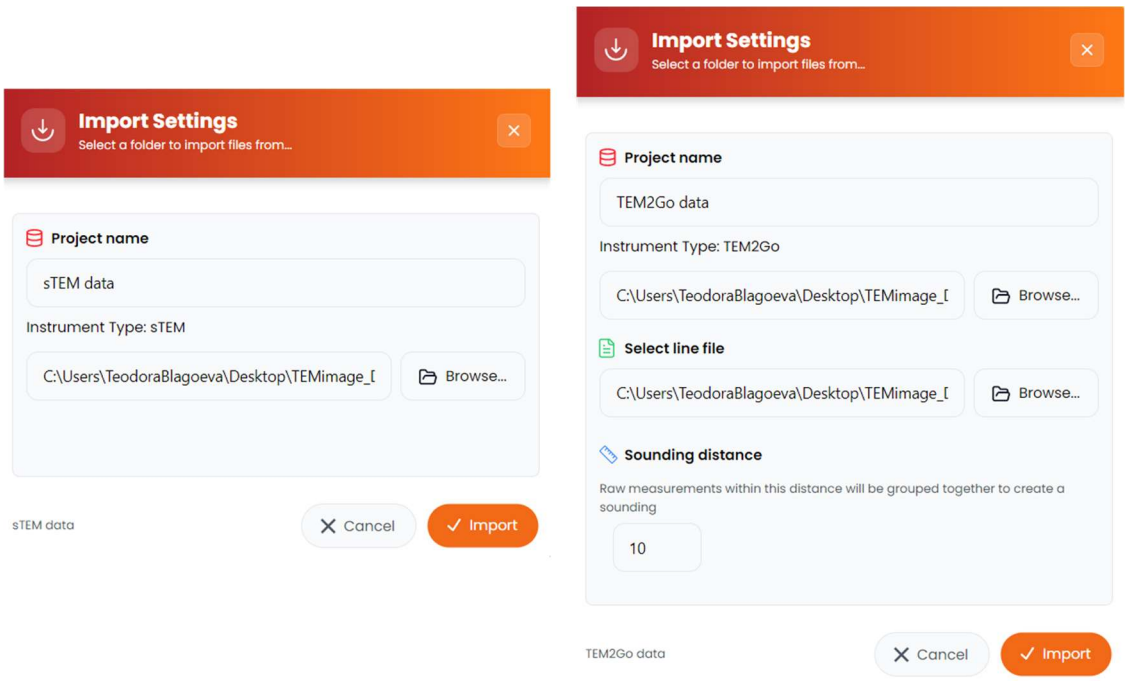

Figure 3: Import settings window for stationary (sTEM) data (left) and continuous (TEM2Go and tTEM) data (right)

Importing sTEM Data (central loop coil configurations and Profiler family)

For sTEM and Profiler data, the following processing is performed during import:

- All **.stb** and **.stn** files in the selected Data folder(s) are read.
- Raw data are processed and stacked into soundings, including the associated GPS positions. Datasets without GPS information are not supported.

- Data are grouped according to line number. If line number information is missing or duplicated, an option is provided to assign new line numbers automatically.

Importing TEM2Go or tTEM Data

For TEM2Go and tTEM data, additional import options are available:

Line File (*.lin)

- If a **.lin file** is selected, it defines how the data are divided into lines. The file is available in the main project folder of the downloaded dataset and contains the line segmentation defined during data acquisition.
- If no **.lin file** is selected, TEMimage automatically divides the data into lines. In this case, all acquired data are retained, including sections where the instrument was stationary or the line was otherwise stopped.

Sounding Distance (m)

- Defines the spacing at which raw measurements are averaged into stations.

Importing Additional Datasets

A single database can contain projects from different supported instrument types. Each imported dataset is stored as a separate **Project**, which can be processed and managed independently.

To import additional data:

1. Select **File > Import to Database** from the menu bar Figure 7.
2. Follow the same import procedure described above.

Additional datasets can be imported regardless of whether they are from the same or a different instrument type. Project names can be changed after import.

2.4 General workflow

Recommended Processing Workflow

1. Import data.
2. Review the soundings.
3. Disable clearly problematic data points.

4. Review raw data where necessary.
5. Run a preliminary inversion.
6. Review the model and misfit.
7. Refine processing if required.
8. Run the final inversion.

3. INTERFACE OVERVIEW

The TEMimage interface is divided into several main areas used for data navigation, processing, visualization, and project management (Figure 4). The layout can be adapted to suit the user's workflow and preferences.

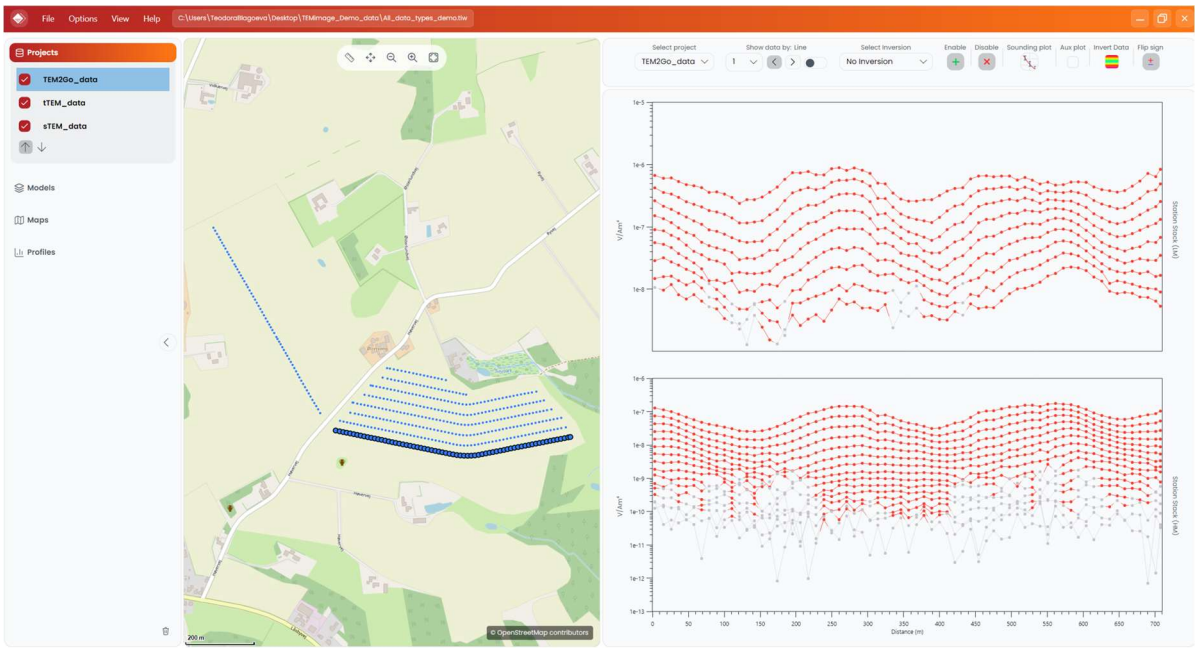

Figure 4: Default main window view after importing data. The main menu bar is located at the top of the window, the Navigation Panel on the left, the Map Panel in the centre, and the Data Panel on the right.

3.1 Main window

Figure 4 shows the default main window after a database has been created and data have been imported into a project.

The main menu is in the top bar and contains the **File**, **Options**, **View**, and **Help** menus (Figure 5). Further information about these menus is provided in Section 8.1

The default view of the main window is separated into three main panels:

1. **Navigation Panel** – Located on the left side of the window, this panel provides access to projects, models, maps, and profiles.

2. **Map Panel –** Located in the center of the window, this panel displays the geographical location and spatial distribution of the project data.
3. **Data Panel –** Located on the right side of the window, this panel is used to navigate, review, and process the acquired data.

All panels can be undocked by right clicking the panel and selecting **Undock**. Undocked panels can then be rearranged within the main window or moved to separate screens according to the user's preferences.

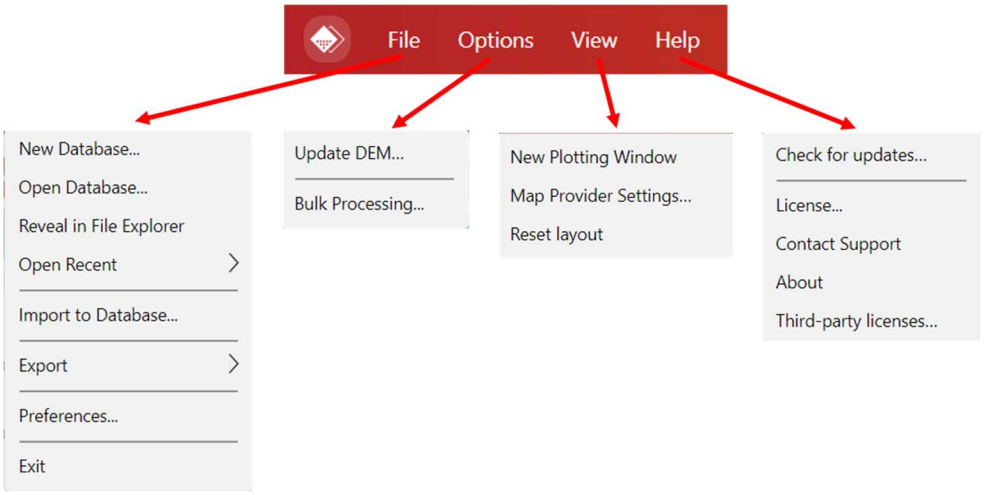

Figure 5: Main menu bar showing the available menus: File, Options, View, and Help, along with the actions available within each menu.

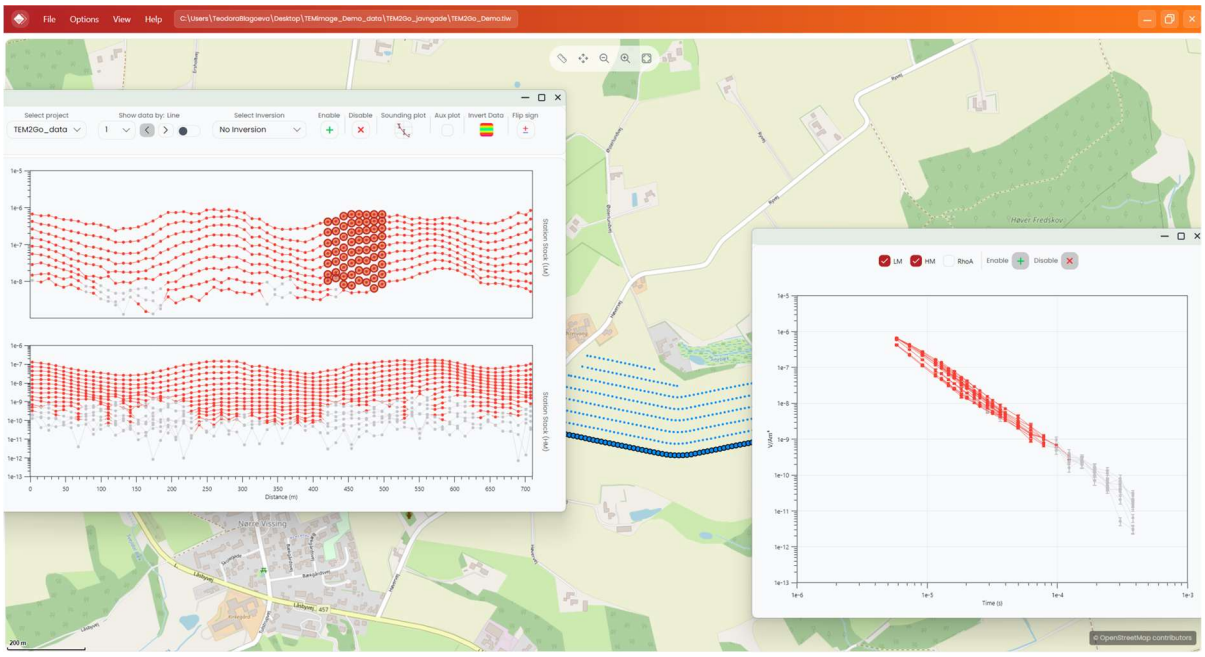

Figure 6: Example of the main window with the Navigation Panel collapsed and the Data Panel and Sounding Plot undocked.

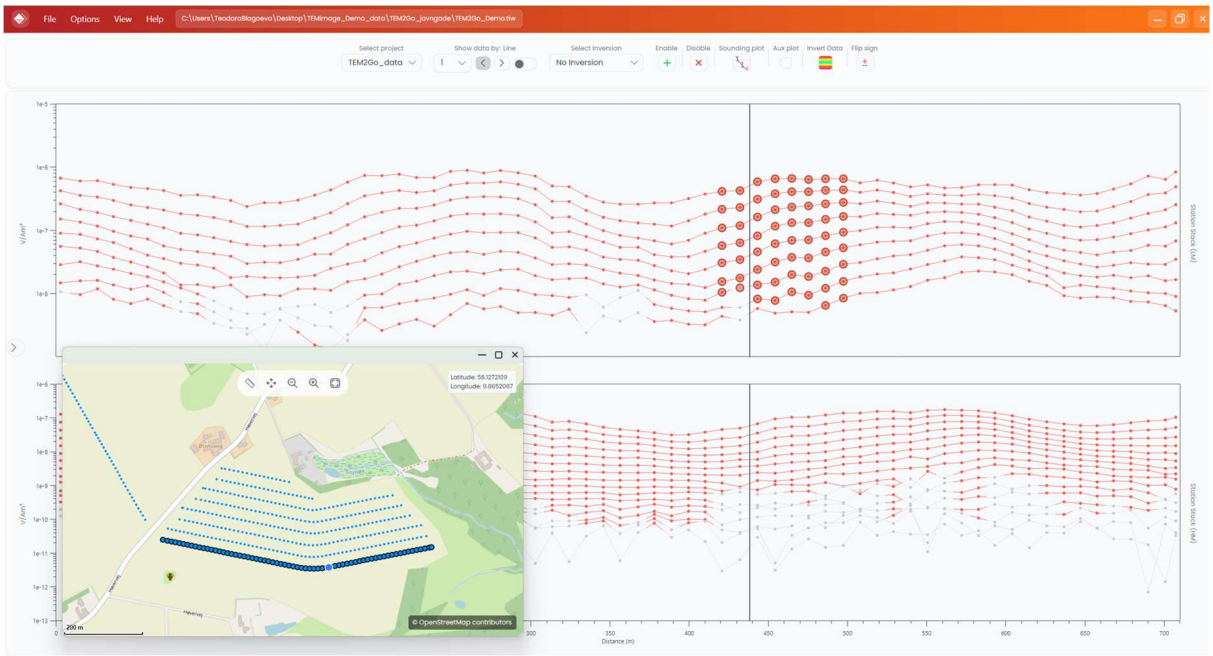

Figure 7: Example of the main window with the Navigation Panel collapsed and the Map Panel undocked.

3.2 Navigation

The **Navigation Panel** is used to organize and manage the contents of the active database. It contains four main sections: **Projects**, **Models**, **Maps**, and **Profiles** (Figure 8).

The **Projects** section contains the datasets imported into the database. Selecting a project automatically updates the other panels: the Map Panel moves to the location of the selected dataset, and the Data Panel displays the corresponding data.

After an inversion has been completed, the resulting inversion models are available in the **Models** section. Models can be selected and managed independently, and their visibility can be controlled on the Map Panel.

The **Maps** section contains the map layers available in the database, including generated resistivity maps and other map layers. The visibility and display order of individual layers can be controlled from this section.

The **Profiles** section contains manually created profiles. Profiles can be selected from the list and displayed or managed as required.

Additional management and display options are available by right-clicking items in the Navigation Panel. These options are described in the relevant sections of this manual.

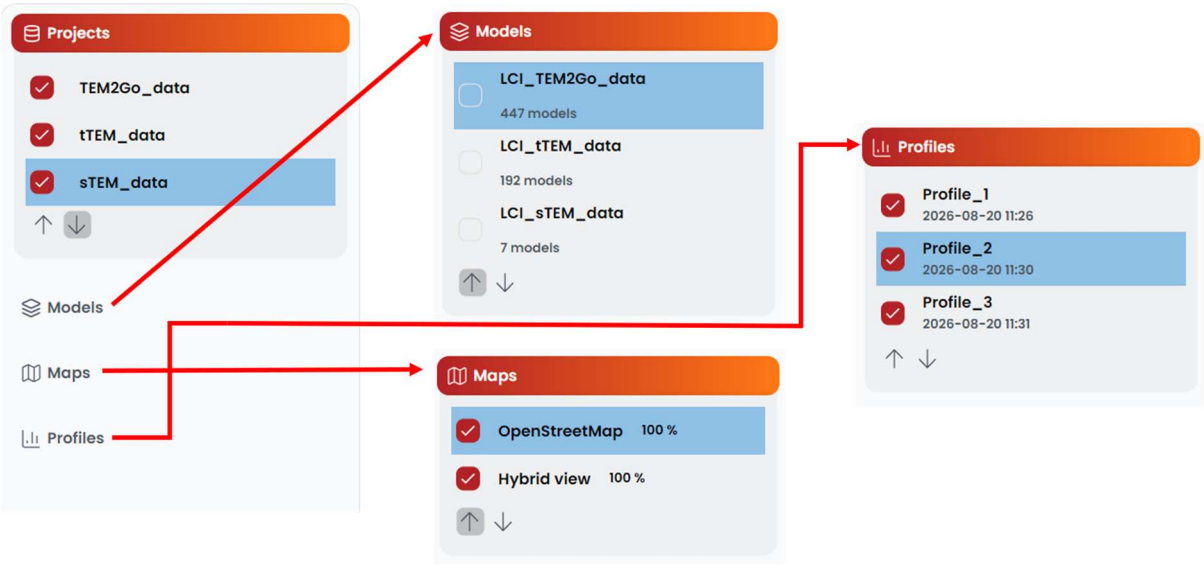

Figure 8: Navigation panel available sections overview

3.3 Map

The main purpose of the Map Panel is to display the geographical location and spatial distribution of the TEM data within the selected project. By default, the map uses an OpenStreetMap basemap. Additional map providers can be added through Map Provider Settings; see Section 8.1.3 View for more information.

The current latitude and longitude of the cursor position are displayed in the upper-right corner of the Map Panel. A small toolbar located at the top centre of the panel provides the following tools:

- Ruler – Measures distances on the map.
- Pan – Allows the map view to be moved.
- Zoom Out – Zooms out from the current map view.
- Zoom In – Zooms in on the current map view.
- Take Snapshot – Saves a snapshot of the current map view.

Projects and inversion models can be displayed on the map using different markers and visual representations. Additional information about the display and visualization of projects and models is provided in Sections 6 and 8.2.

The Map Panel is linked to the Data Panel. When moving the cursor along a data plot, the corresponding measurement location is simultaneously highlighted on the map.

3.4 Data panel

The Data Panel displays the recorded TEM data and provides the main workspace for data navigation and processing (Figure 9). By default, the panel contains two data plots showing the stacked Low Moment (LM) and High Moment (HM) data.

The vertical axis displays the measured data normalized by the transmitter coil area, in V/Am^4, while the horizontal axis displays distance along the selected data line in meters. The horizontal axis can also be displayed as time in seconds. Additional display and plot settings are described in Section 4.

The Data Panel is linked to the Map Panel. The data line currently displayed is highlighted on the map, and moving the cursor over a sounding in either data plot simultaneously highlights the corresponding measurement location in the Map Panel.

Data points can be selected directly from the plots by left-clicking and dragging over the desired area. Selected data points are highlighted in red (Figure 9). Selected data can then be used with the available processing actions or displayed in the Sounding Plot for further inspection.

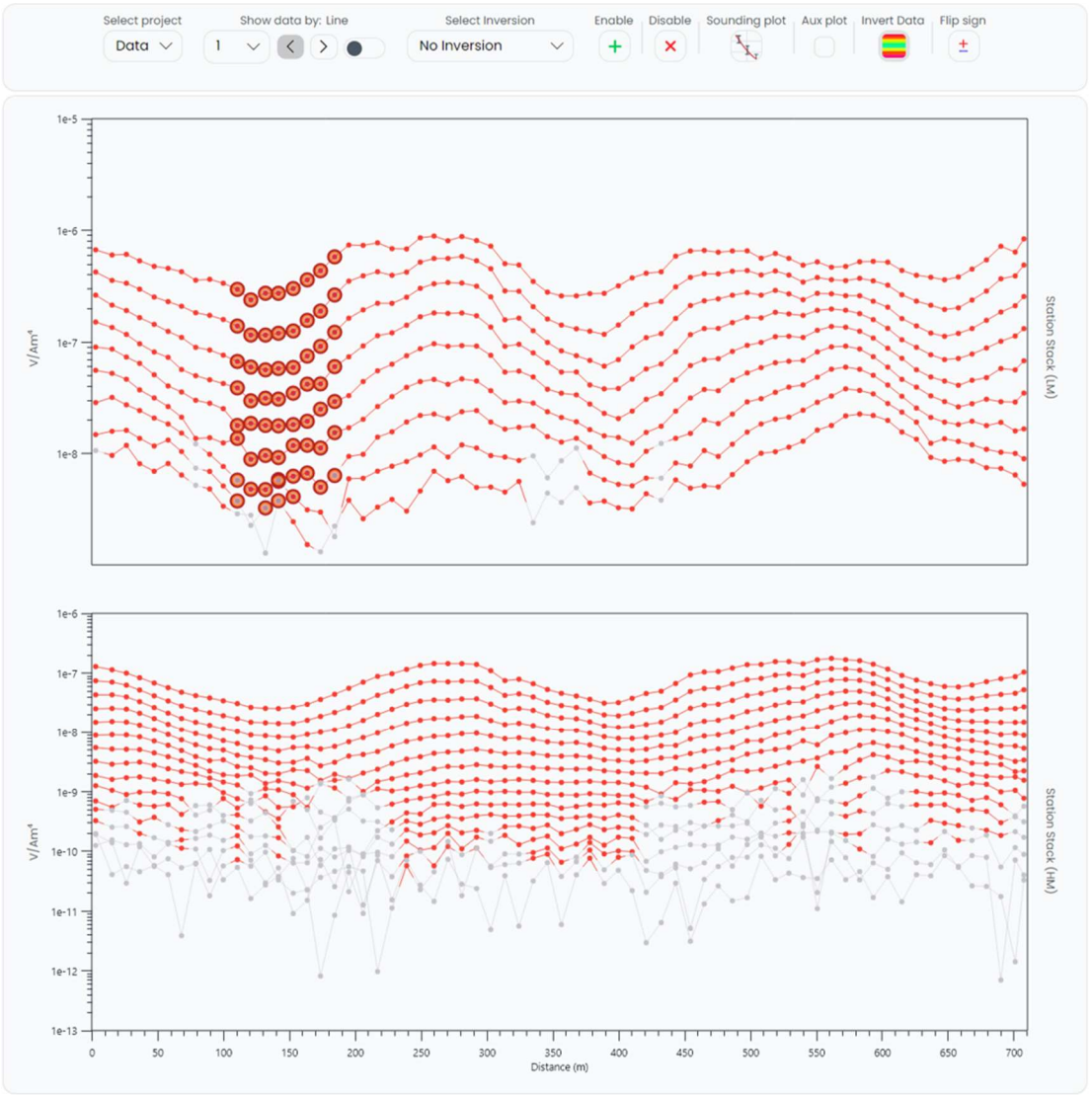

Figure 9: Data panel overview. The Navigation and Actions ribbon is located at the top of the panel. By default, the upper data plot displays the Low Moment (LM) data, while the lower data plot displays the High Moment (HM) data. In the LM plot data are selected.

3.4.1 Navigation

The upper part of the Data Panel contains controls for navigating between projects, data lines, distance intervals, and available inversion results (Figure 10).

Select Project

The Select Project drop-down menu is used to choose which project is displayed in the Data Panel. When another project is selected, the corresponding

data are displayed, and the Map Panel automatically updates to the location of that project.

Show Data by Line

The Show Data by Line controls are used to navigate between the individual data lines within the selected project. Use the arrow buttons to move to the previous or next line, or select a specific line directly from the drop-down menu (Figure 10).

The keyboard shortcut for navigating between lines is, by default, the Up and Down Arrow keys. These shortcuts can be changed in the **Preferences** menu (see Section 8.1.1 Preferences)

Show Data by Distance

The Show Data by Distance option divides the data into distance intervals rather than displaying the original acquired lines. By default, the data are divided into 500 m (1,640 ft) intervals. The interval length can be adjusted using the **Distance** button (Figure 10).

Select Inversion

If multiple inversions have been performed for the selected project, the Select Inversion drop-down menu can be used to switch between the available inversion results. Selecting a different inversion also updates the corresponding model displayed in the Model Plot (see Section 6.1).

3.4.2 Actions

The Actions section contains the main commands used during data processing.

Enable Data

Enable Data activates previously disabled data points, allowing them to be included in subsequent inversion calculations. Only disabled data points can be enabled.

Enabled positive data are displayed in red, while enabled negative data are displayed in blue.

Disable Data

Disable Data deactivates selected data points, excluding them from subsequent inversion calculations. Disabled data are displayed in light grey.

Invert Data

Invert Data opens the Inversion Setup window, where inversion settings can be configured and the data to be included in the inversion can be selected. Further information about the inversion workflow is provided in Section 5.

Flip Sign

Flip Sign reverses the polarity of the selected data. This function should only be used when the data have been recorded with an incorrect polarity.

A change in data sign is not necessarily an error and may occur naturally due to geological or other effects Section 9.3.1 Sign Change in Data. Therefore, naturally occurring sign changes should not be corrected using this function. The Flip Sign action changes both the LM and HM data simultaneously.

3.4.3 Additional Plot Windows

Additional plots are available to support data inspection and quality control.

Sounding Plot

The Sounding Plot can be opened from the Data Panel and is displayed below the Map Panel. It shows the dB/dt decay curve as a function of time for the selected data.

The Sounding Plot provides a more detailed view of individual measurements and can be used for additional data quality assessment. Data points can also be enabled or disabled directly from this plot.

Auxiliary Plot

The Auxiliary Plot can be opened from the Data Panel and is displayed below the data plots. It provides additional information recorded during data acquisition, which may include parameters such as:

- Transmitter current
- Instrument temperature
- Distance between the receiver and transmitter

The available information depends on the instrument and dataset. The Auxiliary Plot can be used to assess acquisition conditions and identify whether changes in recorded system parameters may have affected the data quality.

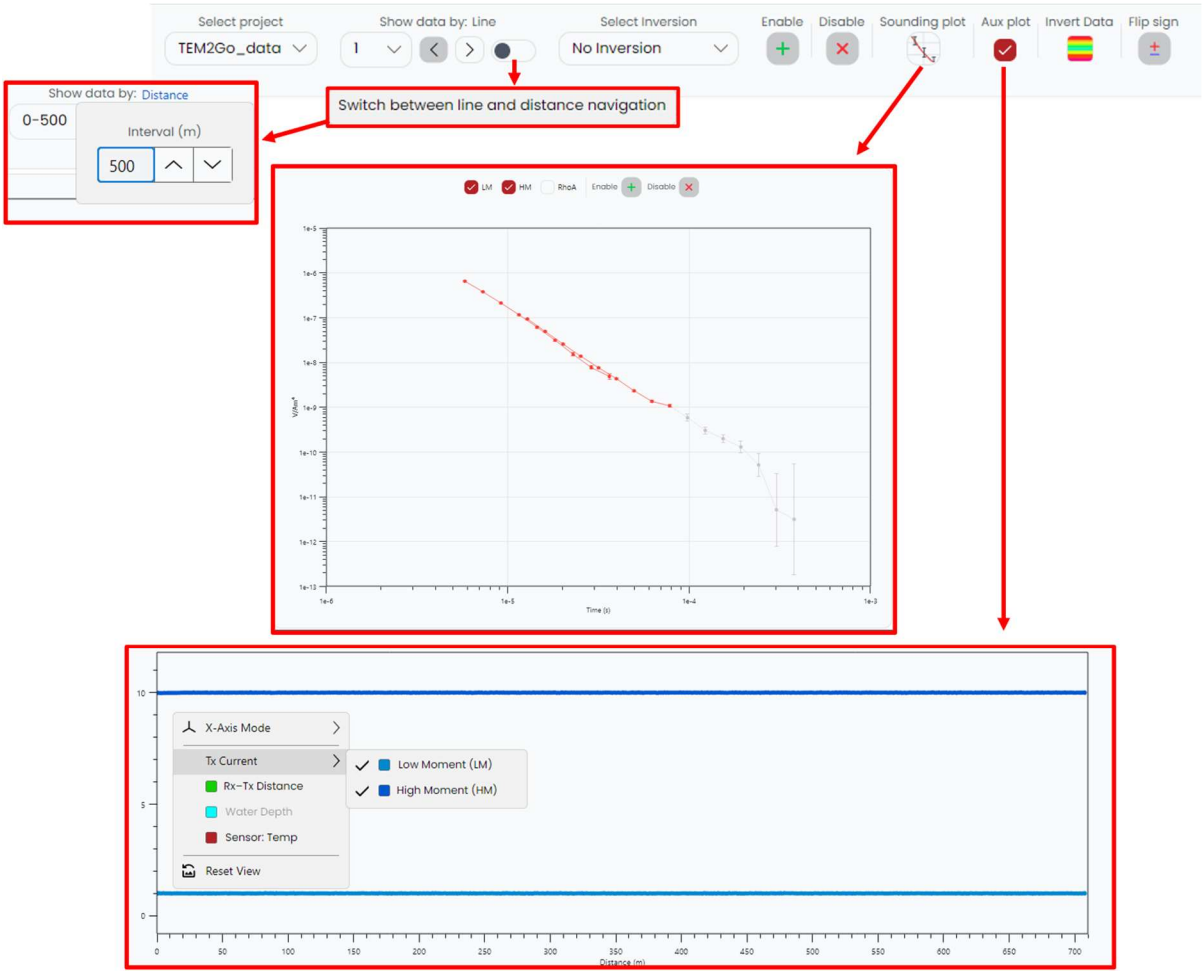

Figure 10: Main options available in the top ribbon of the Data Panel, including navigation menus, action buttons, and options for opening additional plots.

4. DATA PROCESSING

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 11). This ensures that only suitable data are included in the inversion.

Data points can be reviewed and managed in two main ways:

1. Using the Data Profiles

- Left-click and drag across the profile plot to select the data points you want to modify. The selected points will be highlighted (Figure 11).
- From the top ribbon, select Enable (or use the keyboard shortcut **E**) to include the selected points in the inversion, or Disable (or use the keyboard shortcut **D**) to exclude them.

2. Using the Sounding Plot

- When data points are selected in the data plot, the corresponding sounding or soundings are displayed in the **Sounding Plot** (Figure 11).
- Select the **Sounding Plot** tab to review the data in more detail. Data can be displayed in either **dB/dt (LM and HM)** mode or **Apparent Resistivity** mode.
- Data points can also be selected directly in the sounding plot and enabled or disabled in the same way as in the data plot.

Notes:

- Pay particular attention to data collected near roads, houses, power lines, or other infrastructure, as these locations may be more susceptible to noise or coupling effects.
- Disabled data points are excluded from inversion but not deleted, allowing them to be re-enabled if needed.

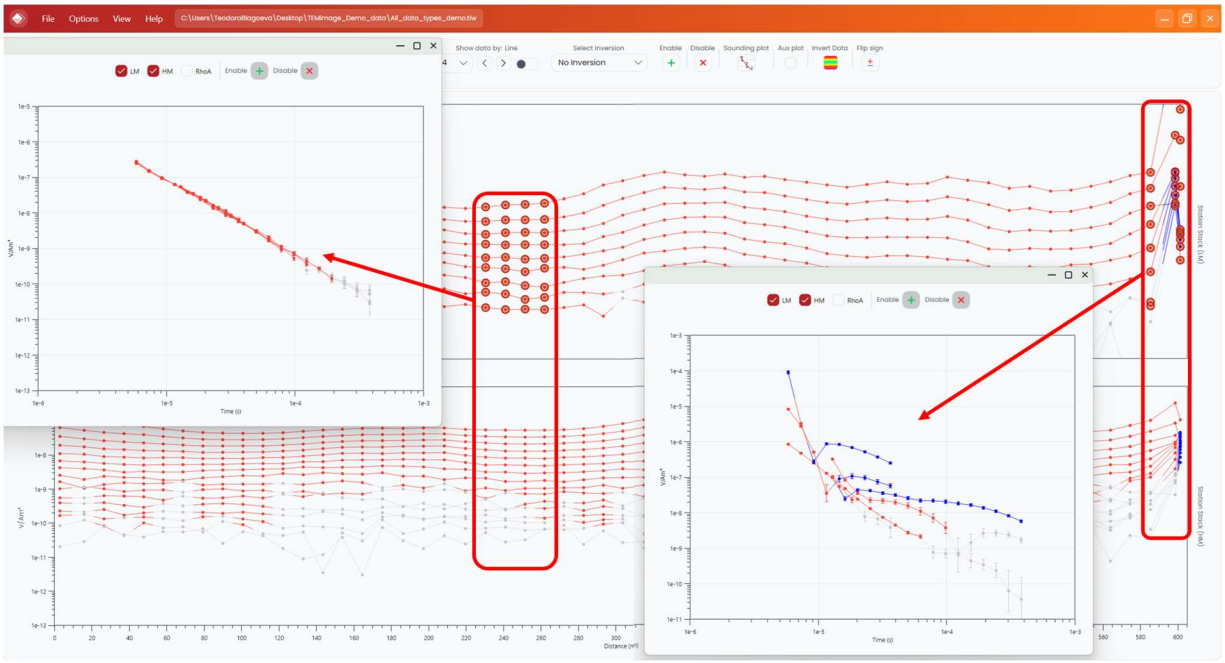

Figure 11: Representation of TEM2Go data acquired along a survey line. Data points are selected from the data plots, while the corresponding soundings are displayed in the Sounding tab (shown here in dB/dt). In this line, there is an example of good-quality data (left), and data affected by noise (right), which should be disabled before running the inversion.

Viewing Error bars and Raw Data

Viewing error bars and raw data can provide valuable insight into data quality and support processing decisions. To switch the display in the data plot:

- Right-click anywhere in the data plot
- Select **Toggle Error bars/data points** or **Toggle Raw/Station**

The plot will then display the corresponding selection (Figure 12).

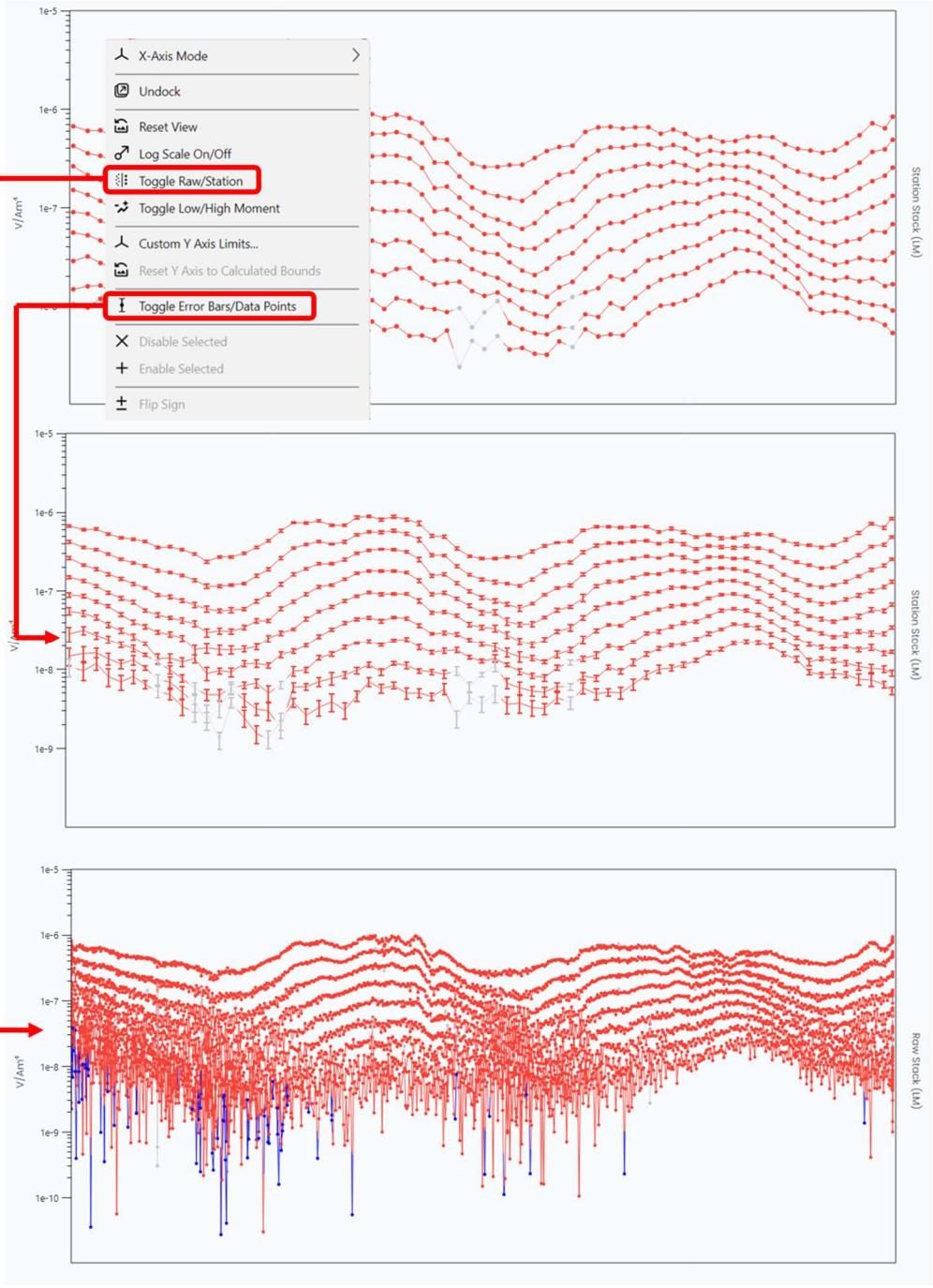

Figure 12: Viewing data points (top), error bars (middle) and raw data bottom, using TEM2Go data as an example.

5. INVERSION

Data inversion in TEMimage can be performed using either **Lateral Constraint Inversion (LCI)** or **Spatial Constraint Inversion (SCI)**. Both inversion schemes convert the measured TEM data into subsurface resistivity models, but they differ in how neighboring soundings are linked during the inversion.

Once data processing is complete, click the **Invert Data** button in the top ribbon. This opens 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 setup of:
    - Constraints
    - Start model
    - Miscellaneous

These advanced parameters are preconfigured with default values. Although they can be modified for more advanced inversion workflows, inexperienced users are advised to use the default settings unless specific changes are required.

5.1 LCI and SCI

Lateral Constraint Inversion (LCI) links neighboring soundings primarily along the survey line. Each sounding is inverted while applying lateral constraints that encourage neighboring models to remain reasonably similar. This generally produces smooth and stable results along profiles.

LCI is a fast and computationally efficient inversion method and is particularly well suited for line-based TEM surveys. However, because the constraints are mainly applied along individual survey lines, LCI does not fully utilize information from nearby or crossing lines and may be less suitable for strongly three-dimensional geological settings.

Spatial Constraint Inversion (SCI) connects soundings within a spatial network. In addition to relationships along individual survey lines, SCI considers nearby soundings in other directions. This allows more information from the complete dataset to be included in the inversion.

SCI is particularly useful for dense survey coverage, multiple nearby or crossing lines, and grid-like datasets. It can provide improved consistency between neighboring lines and is generally better suited for complex spatial variations. However, SCI is more computationally demanding than LCI and may require longer inversion times. Strong spatial constraints can also smooth sharp geological boundaries.

5.2 Recommended Workflow

For surveys consisting of multiple lines or dense data coverage, it is generally recommended to begin with data processing followed by an LCI inversion. Because LCI requires less computational time and fewer resources, it provides a useful preliminary result for evaluating data quality, reviewing model misfit, and identifying areas where additional processing may be required.

Once the data processing is considered satisfactory and the data misfit is acceptable, a final SCI inversion can be performed if the survey geometry and data density are suitable. By incorporating spatial relationships between neighboring soundings and survey lines, SCI can produce a smoother and more spatially consistent result for final interpretation.

This workflow can help reduce overall processing time by ensuring that poor-quality data are identified and addressed before performing the more computationally demanding SCI inversion.

5.3 Inversion Progress

Once the inversion starts, a progress window will appear (Figure 14) 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.

5.4 Inversion Results

When the inversion is complete:

- Close the progress window
- The resulting resistivity models will be displayed in the top of the data panel (Figure 15).

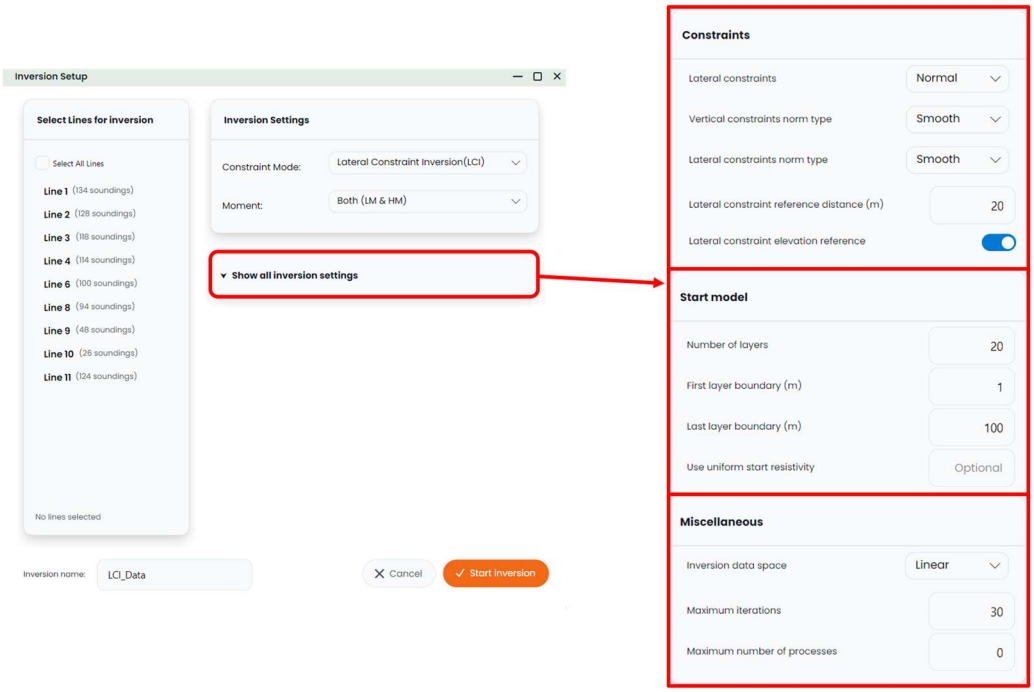

Figure 13: Inversion setup and settings

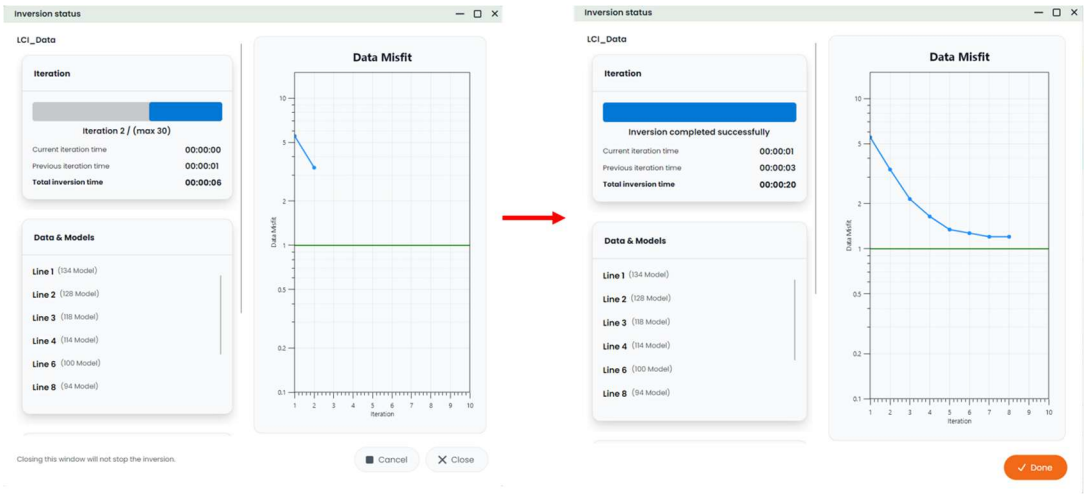

Figure 14: Inversion status window. Once the inversion is started, the window displays information about the iteration time and a graph showing data misfit as a function of the number of iterations (left). Once the stop criteria are met, the inversion is completed (right)

6. MODEL VISUALIZATION

Once an inversion has been completed, the resulting resistivity models can be reviewed and visualized in several ways. TEMimage provides tools for viewing individual survey-line sections, inspecting 1D models and model fit, creating custom profiles, and generating resistivity depth slices.

The available visualization options can be accessed from the Model Plot, Map Panel, and Navigation Panel, depending on the type of result being displayed.

6.1 Resistivity sections

The resistivity model created as a result of an inversion can be displayed as a resistivity section (Figure 15). Two display modes are available (Figure 16):

- **1D bars**
- **Interpolated**

If a project contains multiple survey lines, you can switch between resistivity sections by navigating between survey lines using the **Line Navigation** options described in Section 3.2.

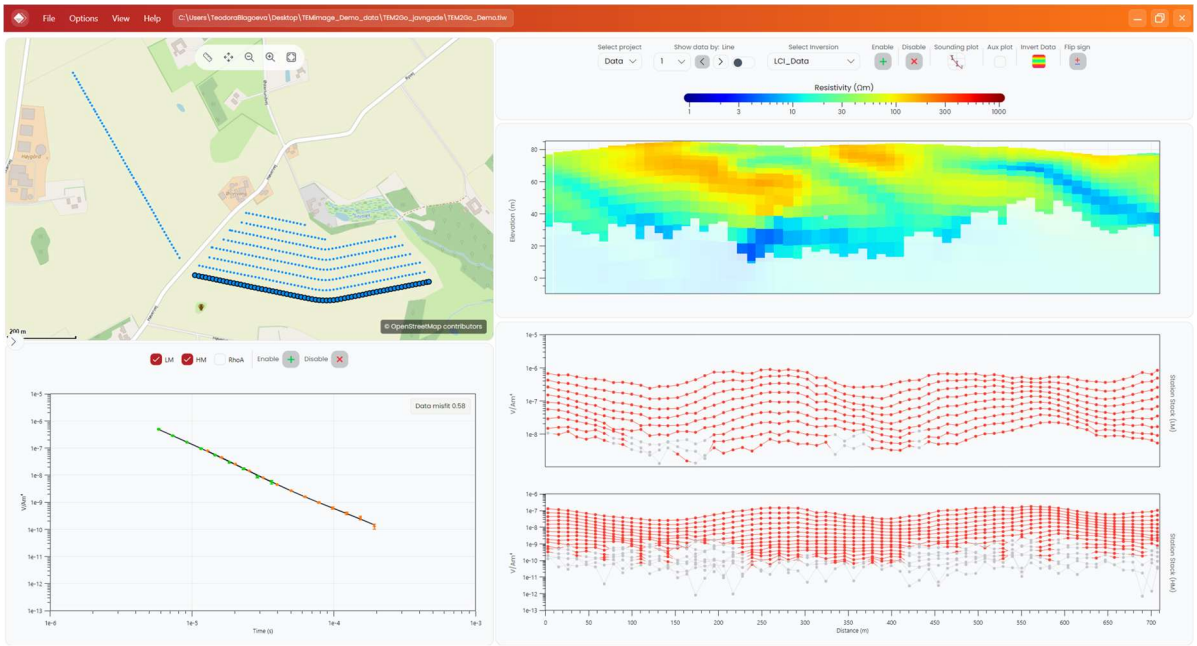

Figure 15: TEMimage view after the inversion is complete. The upper plot in the Data Panel (top right) displays the resistivity models for the selected survey line. Clicking an individual model in the Model Plot displays the corresponding model fit in the Sounding Plot (bottom left), showing how well the forward model fits the observed data.

Additional information can also be displayed on the model plot, including:

- **Depth of Investigation (DOI)** - model layers below the estimated depth of investigation are faded (Figure 16). The DOI transparency can be adjusted using the right-click options.
- **Data Misfit** - data misfit line can be displayed alongside the resistivity section (Figure 16).
    - 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, right-click the model and select **Show Model Fit**. The **Sounding Plot** will open and display the observed data, the forward response of the model, and the data misfit value (Figure 15).

If the inversion results are unsatisfactory, the data can be processed further, problematic data points can be disabled, and the inversion can then be run again.

Managing Multiple Inversion Models

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

To review earlier results, use the **Select Inversion** menu described in Section 3.2. to select and view previous inversion versions.

6.2 Model Plot Options

The appearance and content of the Model Plot can be customized in several ways. Right-clicking anywhere within the model plot provides access to additional viewing options (Figure 16), including:

- Model Plot Settings – set bar width, Y- and X-axis modes and limits.
- Reset View
- Color Map
- Toggle interpolated view
- Toggle data fit
- Toggle DOI
- DOI Transparency

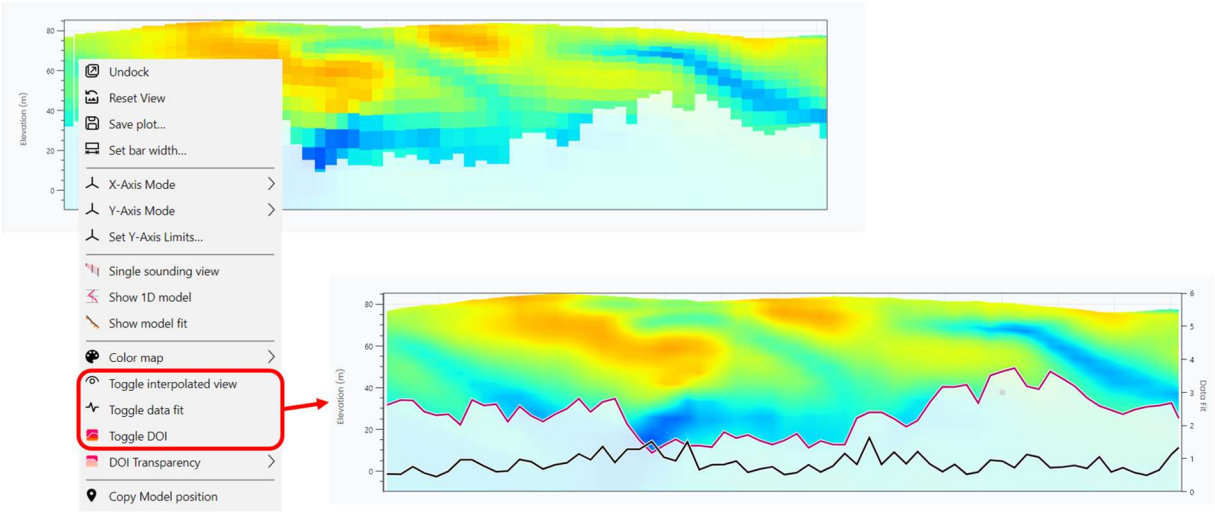

Figure 16: Right-click options available in the Model Plot (left) and the resulting model display with Interpolated View, Data Fit, and DOI enabled (right).

Additional features available from the right-click menu include:

- **Single sounding view** – opens a window displaying the decay curve and resistivity 1D graph (if inversion available) for an individual sounding (Figure 17).
- **Show 1D model** – displays the 1D resistivity model for the selected model(s) (Figure 18)
- **Show model fit** – opens the sounding plot and displays how well the forward model fits the observed data, together with the data misfit value.
- **Save Plot**

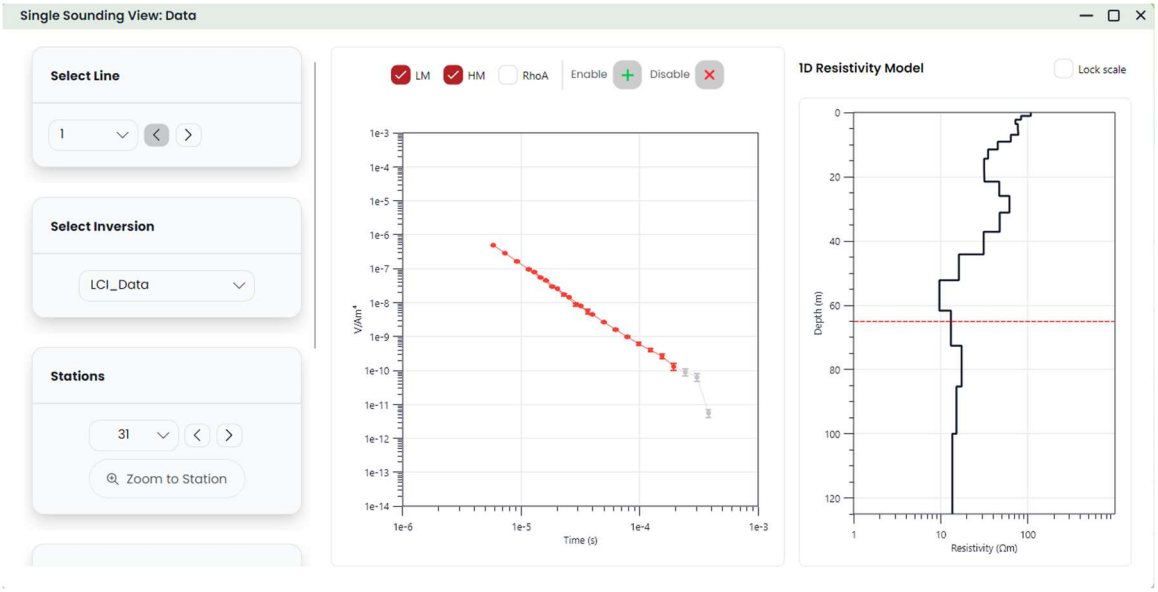

Figure 17: Single Sounding View window, which allows individual soundings to be viewed and processed. The Navigation Panel on the left is used to select the line and station. If an inversion is available, it can also be selected from the Navigation Panel. Once selected, the corresponding 1D resistivity model is displayed on the right side of the window.

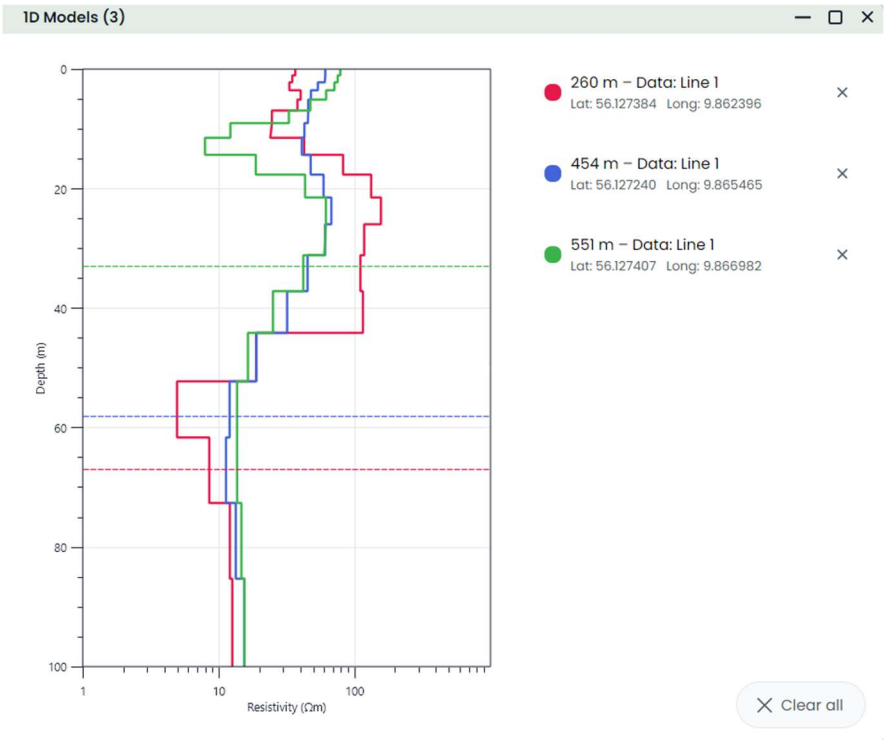

Figure 18: 1D Model window. To open this view, right-click the desired model in the Model Plot and select **Show 1D Model**. Additional models can be added by clicking them in the Model Plot; they are then automatically included in the graph.

Right-clicking the color scale also provides additional display options (Figure 19):

- Set Min/Max – define the minimum and maximum resistivity values of the color scale.
- Color map - select from different color map options
- Flip Color Map – reverses the colors assigned to the minimum and maximum resistivity values.

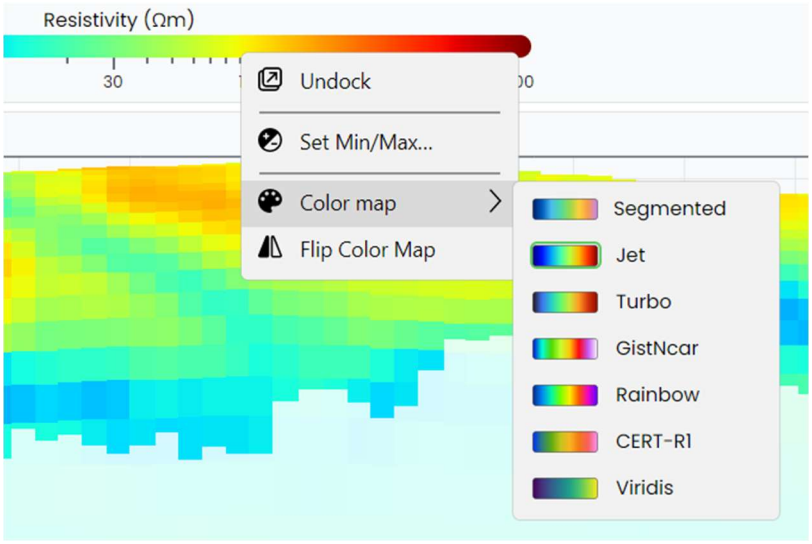

Figure 19: Right-click options for the color scale

6.3 Creating custom profiles

Once resistivity models have been created, custom profiles can be drawn directly within the survey area. This allows resistivity models to be visualized along a user-defined profile rather than being limited to the original survey lines.

To create a custom profile (Figure 20), the feature can be accessed in two ways:

1. Right-click directly on the **Map panel** and select **Create Profile Line**
2. Right-click on top of the **Profiles** section in the **Navigation panel** and select **New Profile**

Both options open the **Create Profile** window (Figure 20), where you can:

1. Type profile name

2. Select inversion run
3. Specify search radius
4. See drawing instructions – click on the map to define the starting point, click again to add additional points, and double-click to finish the profile.

Once created, the profile appears in the **Profiles** list in the **Navigation Panel**, and a Model Plot window opens automatically, where the resulting profile can be viewed and customized using the available model plot options (Figure 21).

To reopen an existing profile, right-click the desired profile in the **Profiles** list and select **Show Profile Model Plot**.

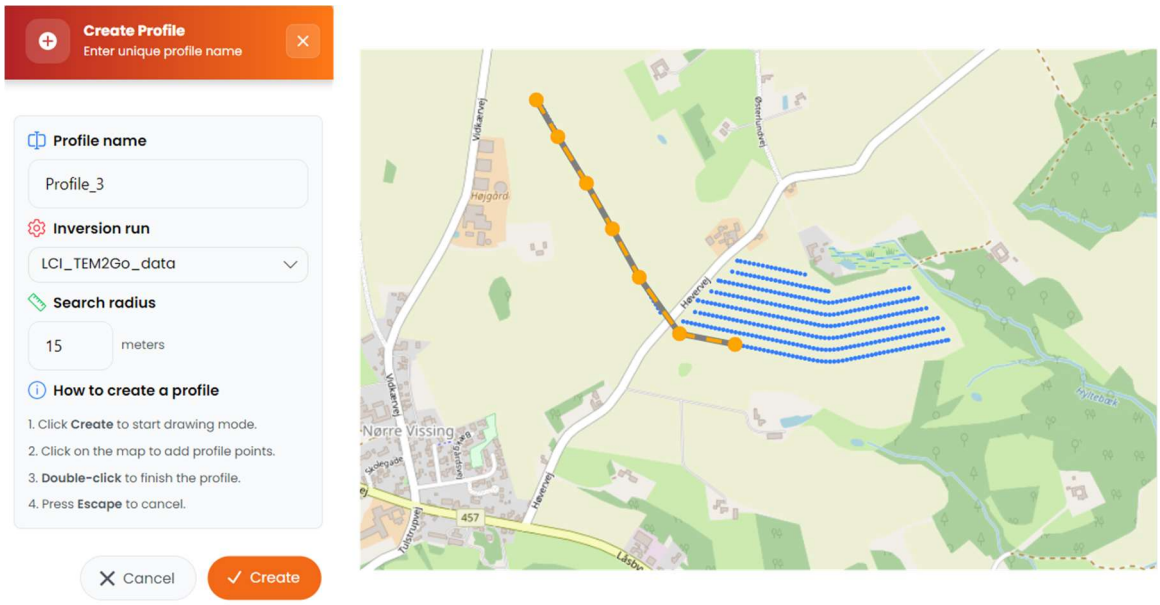

Figure 20: Create Profile window (left) and map display while drawing the profile (right).

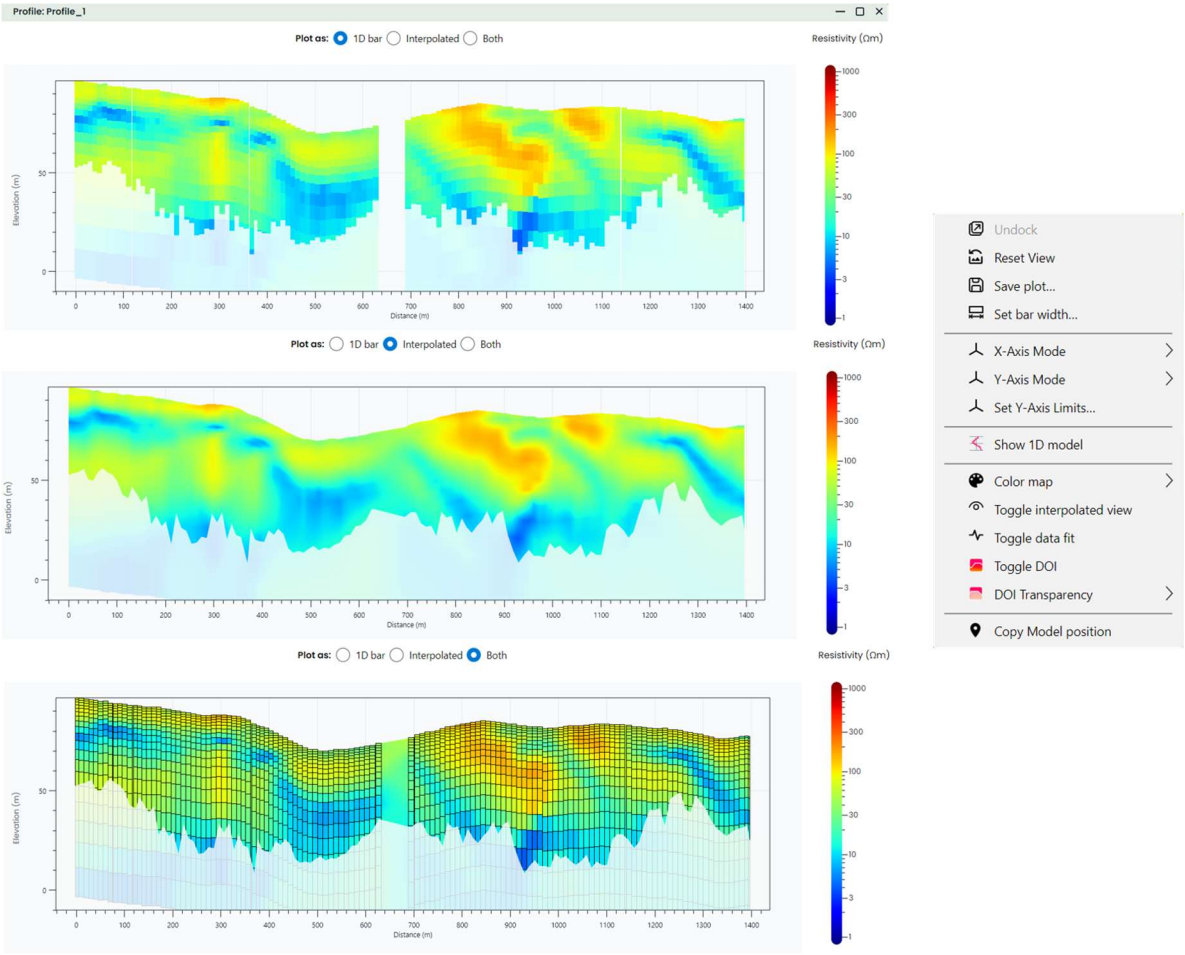

Figure 21: Display options (left) and right-click menu (right) for the Profile Model plot. The models in the profile can be displayed in three different ways: 1D bar (top), Interpolated (middle), and Both (bottom). The right-click settings give access to further plot personalization settings.

6.4 Creating resistivity depth slices

For projects with dense spatial data coverage, resistivity depth slices can be used to visualize variations in resistivity across the survey area at different depths.

Resistivity depth slices are created by interpolating resistivity values from the inversion models onto a regular grid. The available depth levels are defined by the layers in the inversion model. Two interpolation methods are available: IDW (Inverse Distance Weighting) and Kriging (Figure 22).

To create a resistivity depth slice, the feature can be accessed in two ways:

1. Right-click directly in the **Map panel** and select **Create resistivity depth slice**
2. Right-click on top of the inversion model you would like to use in the **Models** section in the **Navigation panel** and select **Create resistivity depth slice**

Both options open the **Create Resistivity Maps** window, where you can specify:

1. Source and interpolation method
2. Interpolation parameters.

If you are unsure which interpolation parameters to use, the default settings can be used.

Click **Create Maps** to generate the resistivity map layers. The generated layers appear under the selected inversion in the **Models** section, where their visibility and opacity on the **Map Panel** can be controlled.

The resistivity slices are displayed as layers at different depths in the **Map Panel** (Figure 23). Each slice represents the vertically centred depth interval between the top and bottom boundaries of the corresponding inversion layer.

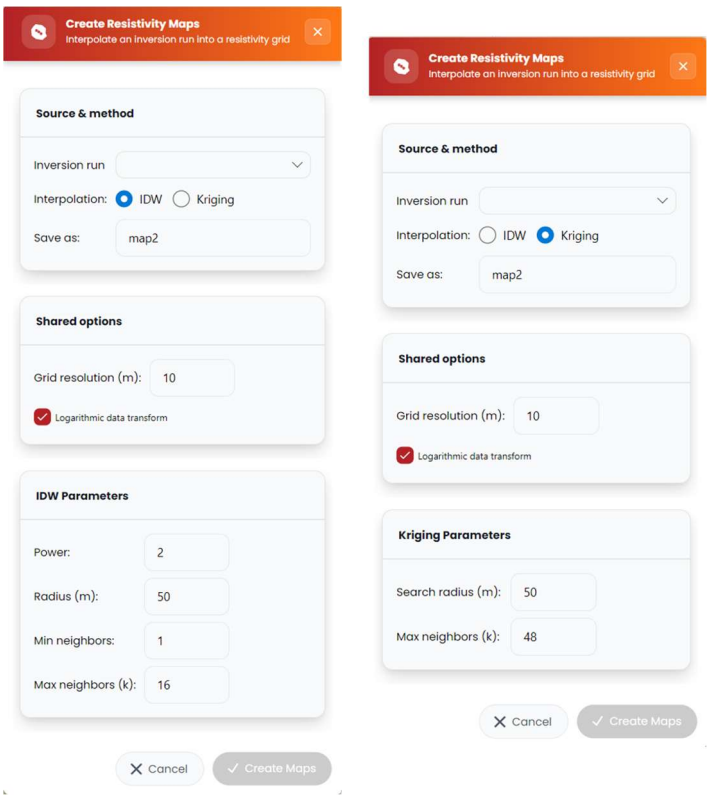

Figure 22: Two interpolation methods are available for creating the resistivity depth slices: IDW (Inverse Distance Weighting) and Kriging.

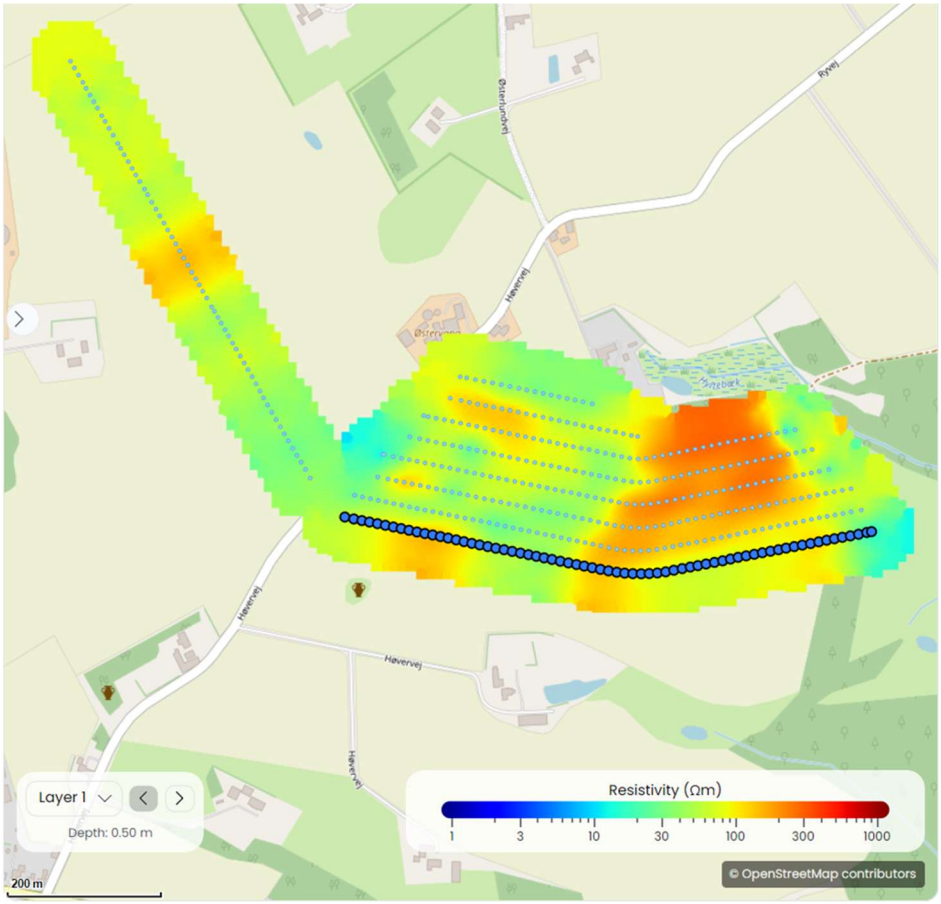

Figure 23: Map panel displaying the created resistivity layers. The different depth slices can be explored using the Layer menu (bottom left).

7. EXPORT OPTIONS

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

To export a model:

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

To export GPS positions:

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

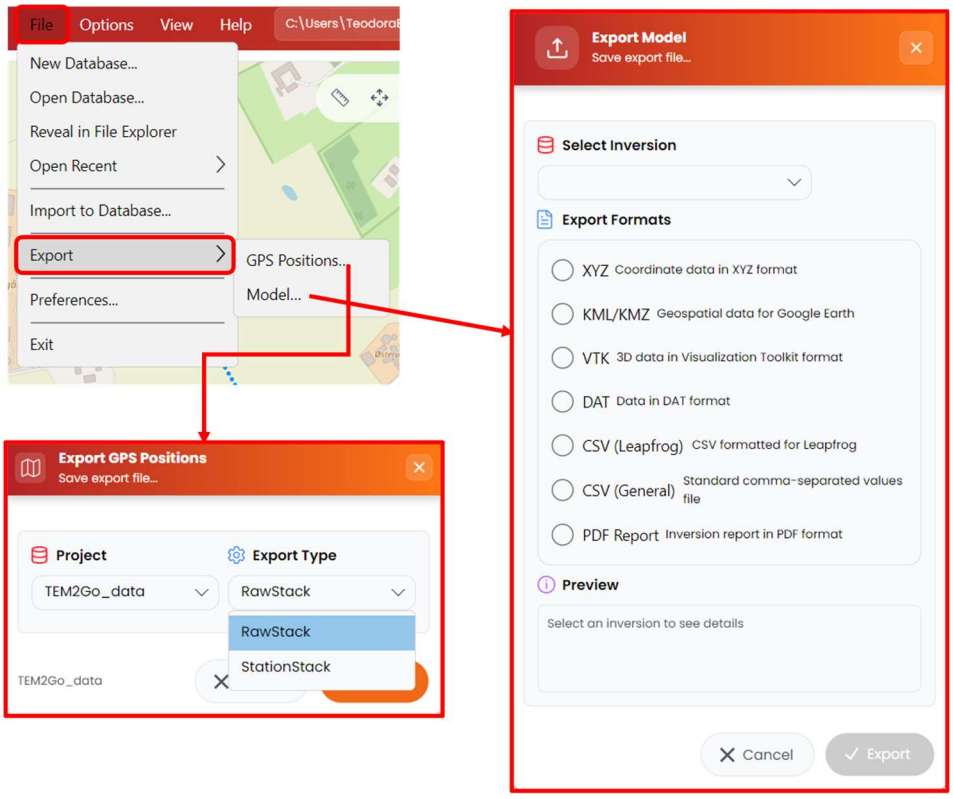

Figure 24: Main export options for GPS Positions (bottom left) and for Models (right)

To save model plot:

- 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. ADVANCED FEATURES AND ACCESS OPTIONS

This chapter describes additional features, alternative access methods, and options that may be useful when working with TEMimage. These features are available through menus, right-click menus, and other parts of the interface and may provide alternative ways of accessing functionality described elsewhere in this manual.

8.1 Main menu additional options

8.1.1 Preferences

In addition to database configuration and import/export options, the **File** menu (Figure 5) provides access to the **Preferences** window (Figure 25). Preferences allow users to customize various application settings, including the appearance of the software, keyboard shortcuts, data filtering, visualization, and inversion settings.

The available preference categories include:

- **Appearance** – configures the application theme.
- **Language** – configures the application language.
- **Map** – configures the distance units used in the application.
- **Shortcuts** – configures keyboard shortcuts used across the application.
- **Model Plot** – settings for model plot visualization and rendering quality
- **Datastacking** – configures settings related to the data stacking functionality.
- **Resistivity Maps** – settings for mean resistivity map overlays in the **Map Panel**.
- **LupusInversion** - configures parameters used by the Lupus inversion.
- **License** – displays the Product Key currently in use and provides an option to automatically release the license when exiting the application.
- **Visualization** – configures visualization settings for data plots
- **Filtering** – configures the parameters used by the Boolean filtering functionality. The following filters are available for both LM and HM data:
    - Transmitter current
    - Minimum signal level
    - Spike
    - Slope

- Sign
- Standard relative error
- Required raw gates
- Minimum enabled gates

Note: *Filtering and inversion parameters should only be modified when their purpose and effect on the data are understood, as inappropriate settings may affect data processing and inversion results.*

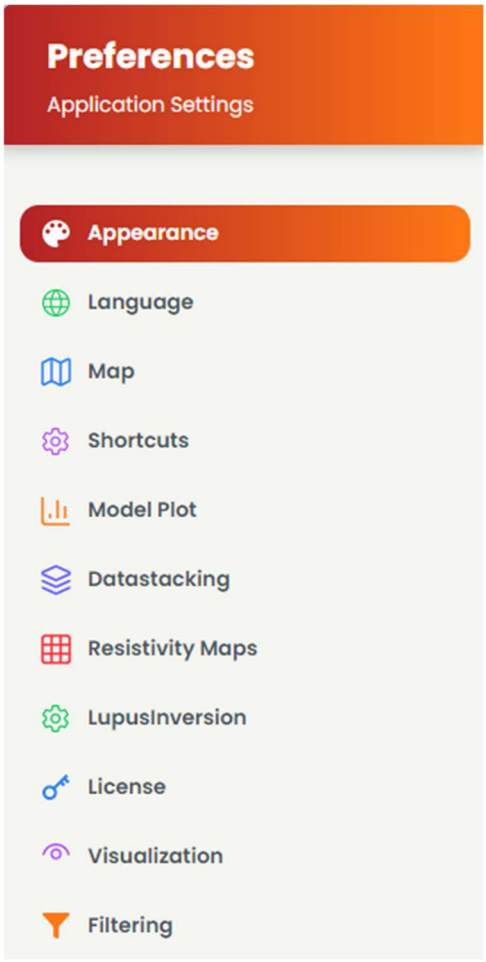

Figure 25: Main preferences settings

8.1.2 Options

The **Options** menu provides access to additional processing and elevation-related functions, including **Update DEM** and **Bulk Processing**.

Update DEM allows the elevation data associated with the measurements to be updated by applying a Digital Elevation Model (DEM) to the project.

Selecting this option opens a window with the following choices (Figure 26):

- **Load elevation data from file** - loads elevation data from an external file. The file must be in **GeoTIFF** format, and only **WGS84 UTM** coordinate systems are supported
- **Fetch elevation data from online API –** retrieves elevation data from an online source.
- **Reset elevation** - removes previously applied DEM from the project

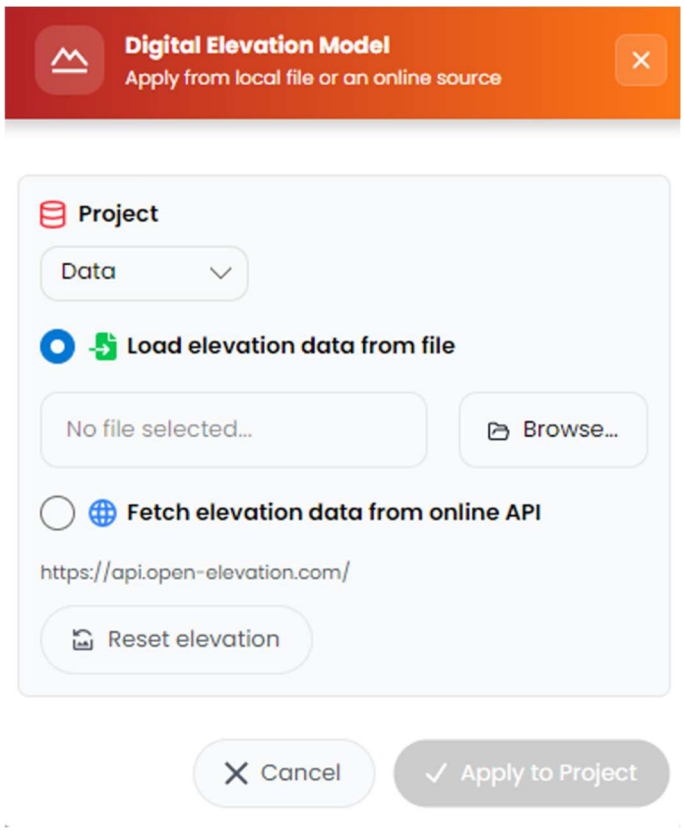

Figure 26: Update DEM window options

The **Bulk Processing** window allows changes to be applied to multiple selected data points or gates simultaneously. For example, if a specific gate is affected by noise throughout a dataset, it can be disabled in bulk rather than processed individually.

The main available options are shown in (

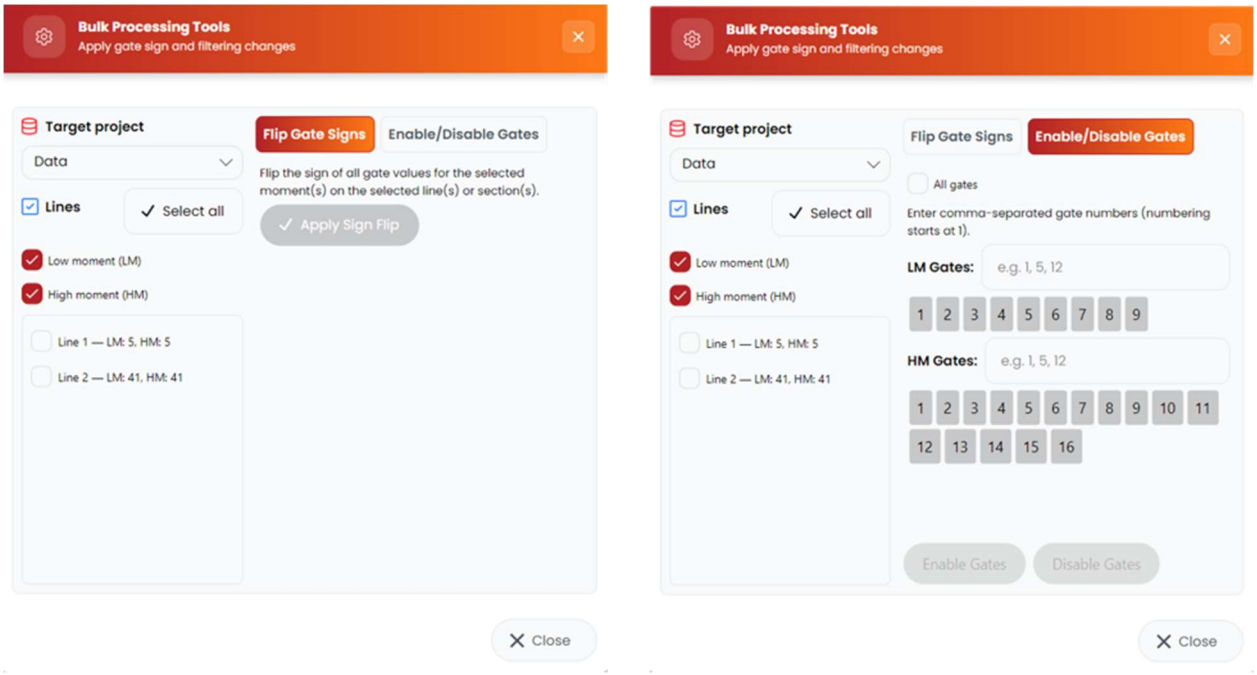

Figure 27):

- **Flip Gate Signs**
- **Enable/Disable Gates**

These tools provide more detailed control over the data and should be used with care, as changes applied in bulk can affect subsequent processing and inversion results.

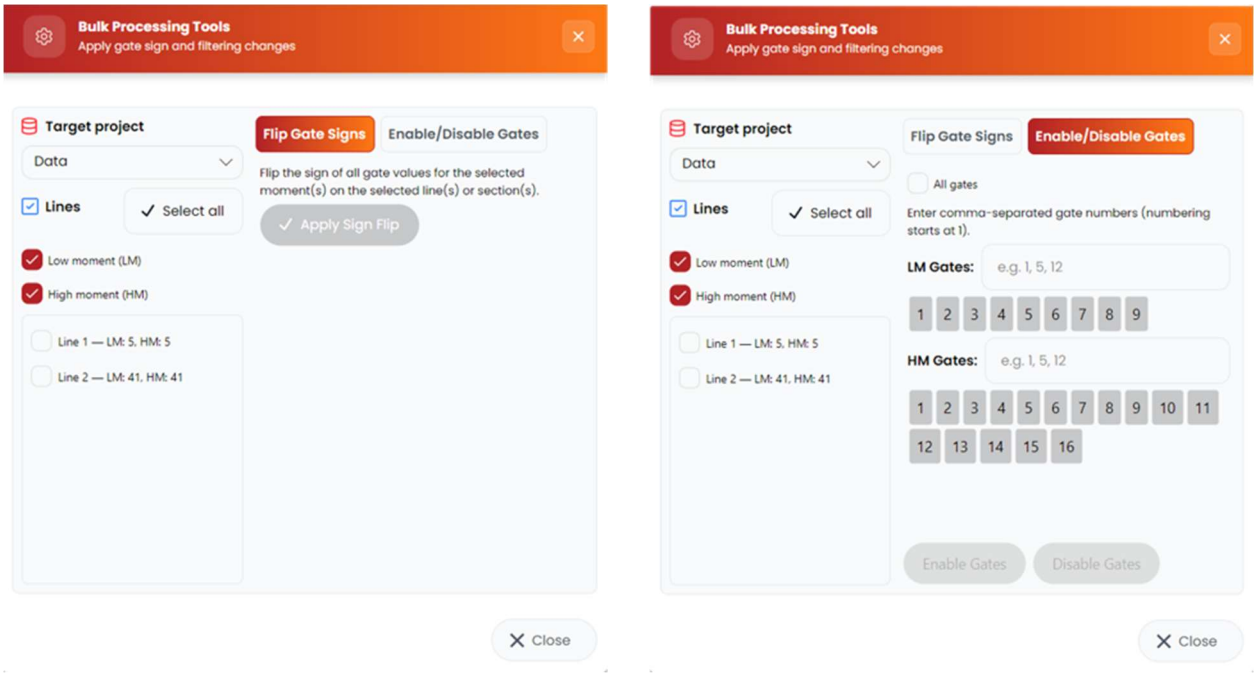

Figure 27: Advanced processing options window

8.1.3 View

The **View** menu provides access to:

- **New Plotting Window**
- **Map Provider Settings**
- **Reset Layout**

New Plotting Window opens an additional plotting window that allows data from different projects to be viewed simultaneously. This can be useful for comparing datasets or viewing multiple projects at the same time (Figure 28).

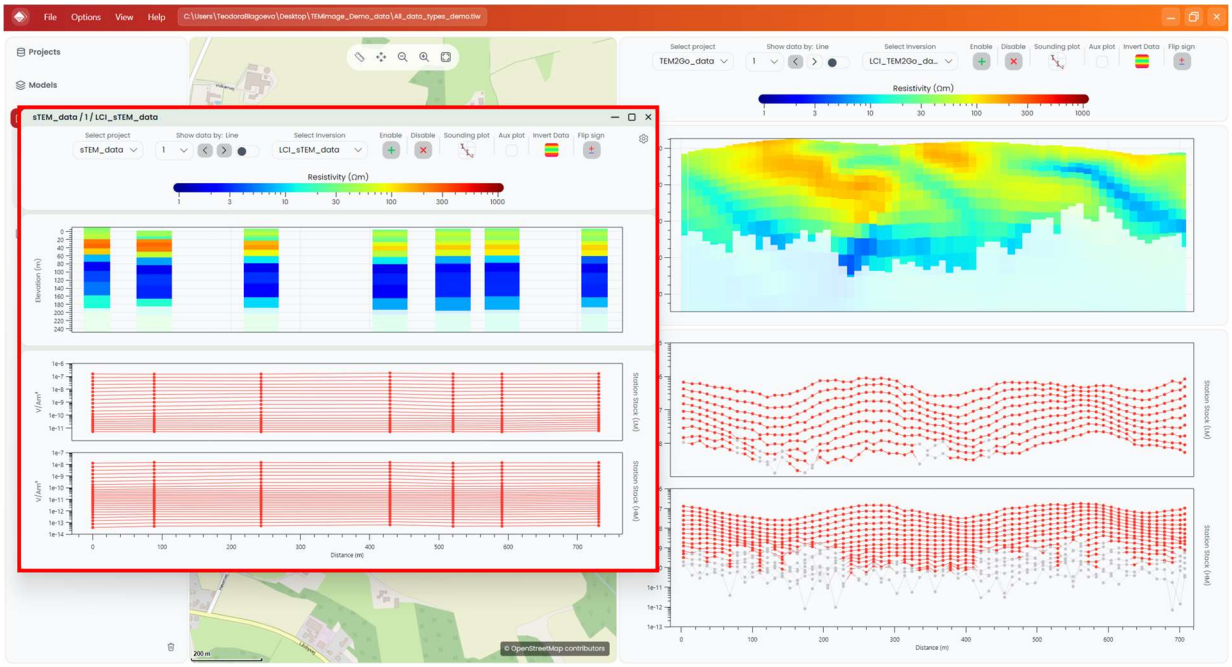

Figure 28: TEMimage view of TEM2Go data on main screen and sTEM data on the New Plotting Window

Map Provider Settings allows additional background map layers to be added to TEMimage. Background maps can be added using **WMS (Web Map Service)** layers.

By default, TEMimage uses **OpenStreetMap** as the background map. Additional WMS layers can be added provided that a valid WMS URL is available and accessible.

To add a new map provider (Figure 29):

1. Select **Map Provider Settings**.

2. Select **Add New Map Tile Provider**.
3. Enter a name for the map provider (for example, *MyMap*).
4. Enter the valid WMS URL.
5. Click **Save**.

The newly added background layer will appear in the **Maps** section of the Navigation Panel. To use it as the active background map, enable its visibility and move it to the top of the list.

Once added, the map layer is saved with the project and remains the active background map until another map layer is selected.

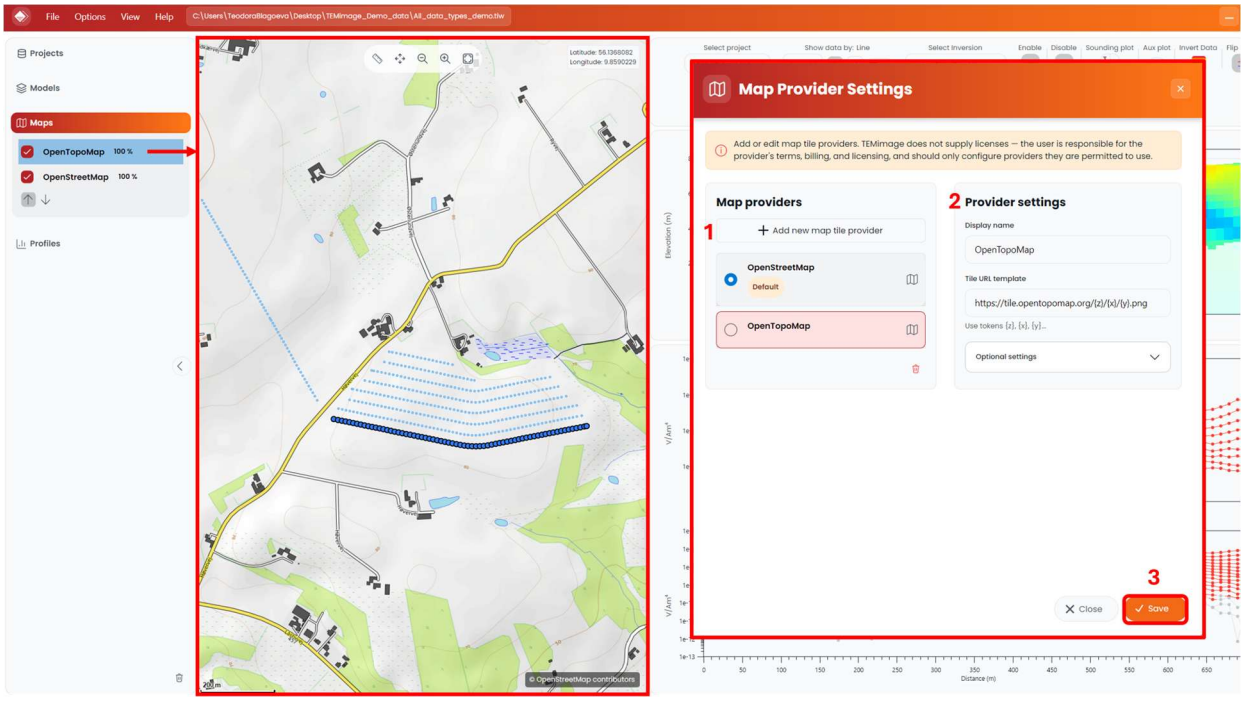

Figure 29: Steps of adding a new Map Provider through the Map Provider Settings

8.2 Additional right-click options

In addition to the functions described in the previous chapters, additional options are available through the right-click context menus. This section describes the main context-menu options available in the **Navigation Panel** and **Map Panel**.

8.2.1 Navigation panel

Right-clicking items in the **Projects**, **Models**, **Maps**, and **Profiles** sections provides access to additional options related to data management, visualization, and processing.

Projects section

The available right-click options for project nodes are shown inFigure 30.

- **Zoom to project** - zooms the Map Panel to the location of the selected project.
- **Import files to project** – imports additional data into the selected project.
- **Reprocess data** – re-runs filtering and stacking on the imported raw data using re-configured settings, overwriting the existing station stacks and filtering.
- **Apply DEM** – applies elevation corrections using a a DEM (see Section 8.1.2 Options)
- **Run inversion** – starts a new inversion run of the data (see Section 5)
- **Line tools** – provides tools for customizing data lines:
    - **Auto Divide Lines** - available for tTEM data only. Automatically divides the data points into lines, while excluding data from turns with the ATV.
    - **Manually draw on Map** - The custom line can be drawn in any direction to include the desired data points (Figure 31). 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.
    - **Configure Lines** – allows user to remove or add .lin files to a project.
- **Custom Map styling –** configures customized data points visualization on the Map panel
- **Single sounding view –** opens the corresponding single sounding view window (see Section Model Plot Options and Figure 17)

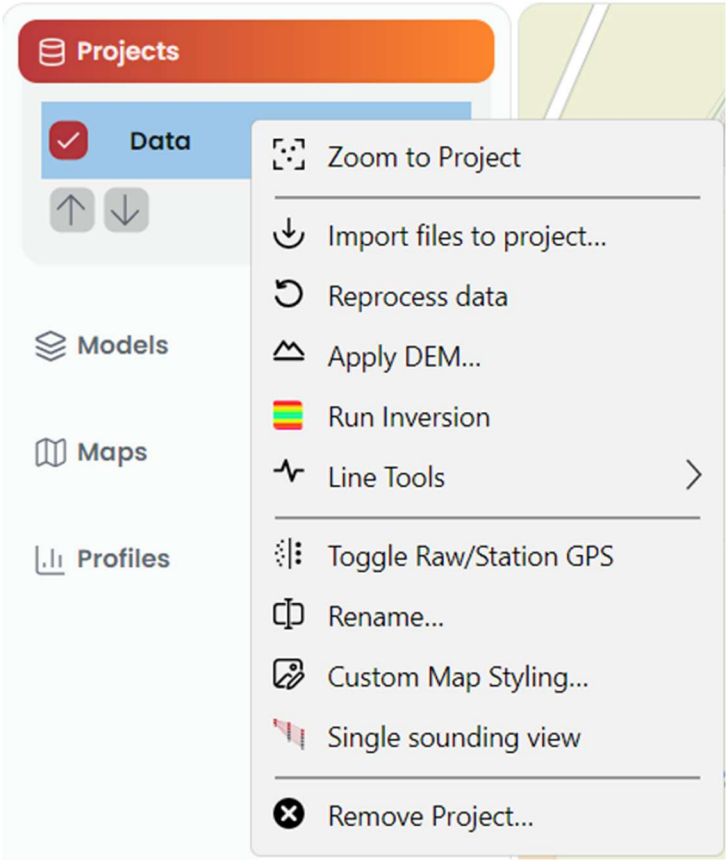

Figure 30: Right-click options for a project node

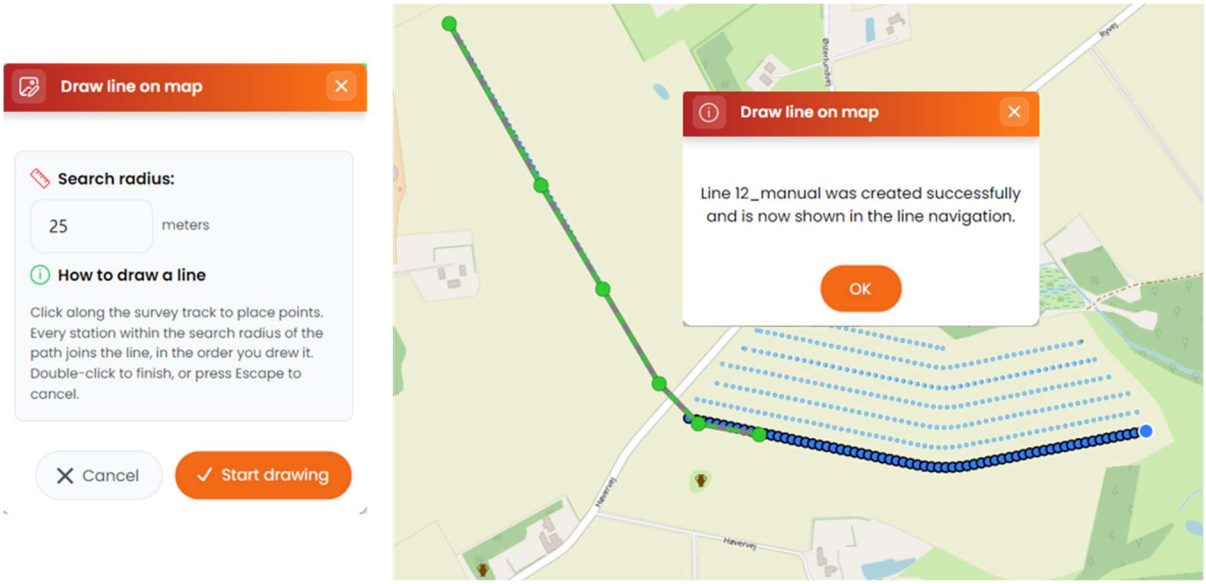

Figure 31: Manually draw on map. When the option is selected a window will open where the search radius needs to be configured and drawing instructions are provided (left).

Draw the desired line in any shape and direction and it will be created as the last line in the selected project (right).

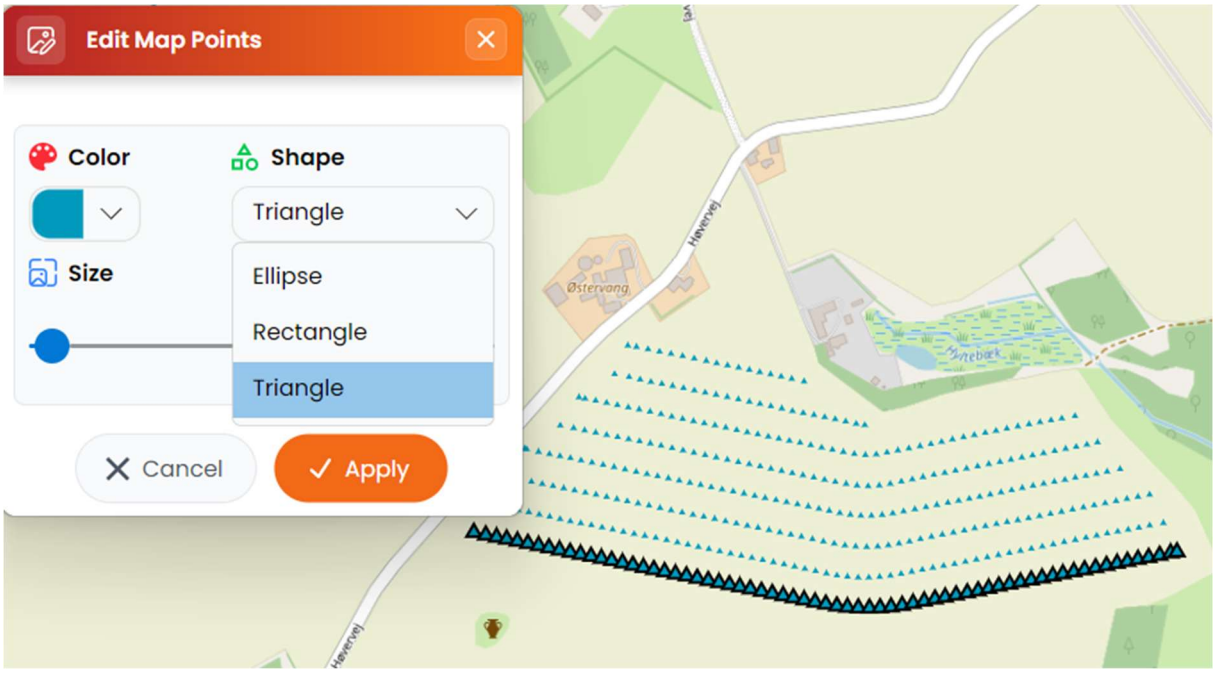

Figure 32: Custom map styling. Data/model visualization cna be customized in terms of color, shape and size.

Models section

Profiles section

Right clicking a profile node in the **Profiles** section (Figure 33) provides access to options for:

- Configuring map visualization settings
- Zooming to the selected profile
- Opening the corresponding Model Plot (see 6.3)Figure 1

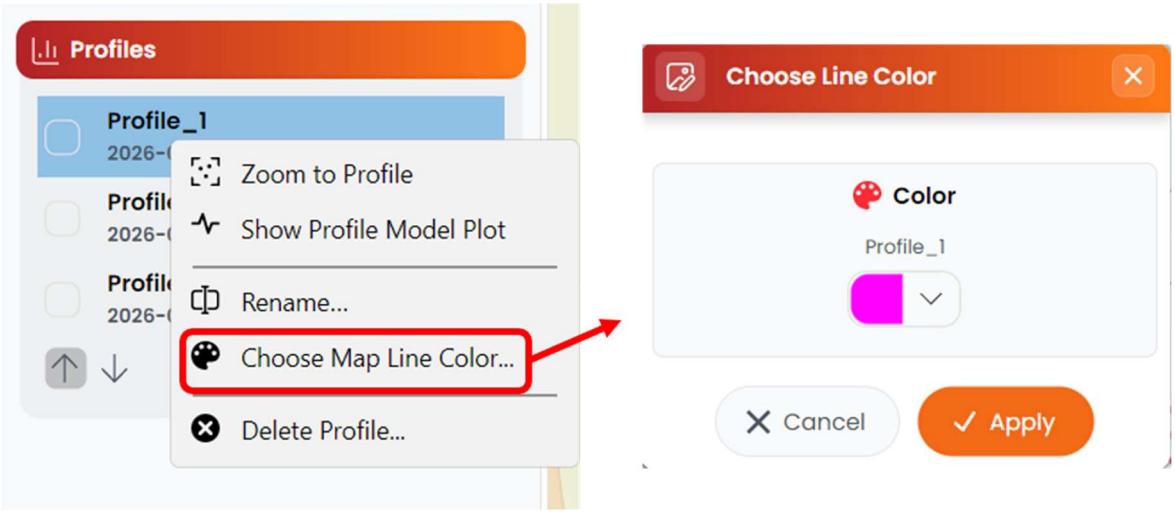

Figure 33: Profile node right-click options

8.2.2 Map panel

In addition to the main functions described in section 3.3, right-clicking anywhere in the **Map panel** provides access to the following options:

- **Create Profile Line** – creates a custom profile directly on the map (see Section 6.3)
- **Create resistivity depth slice** – a resistivity depth-slice grid from the selected data (see Section 6.4)
- **Map Provider Settings** (see Section 8.1.3 View)

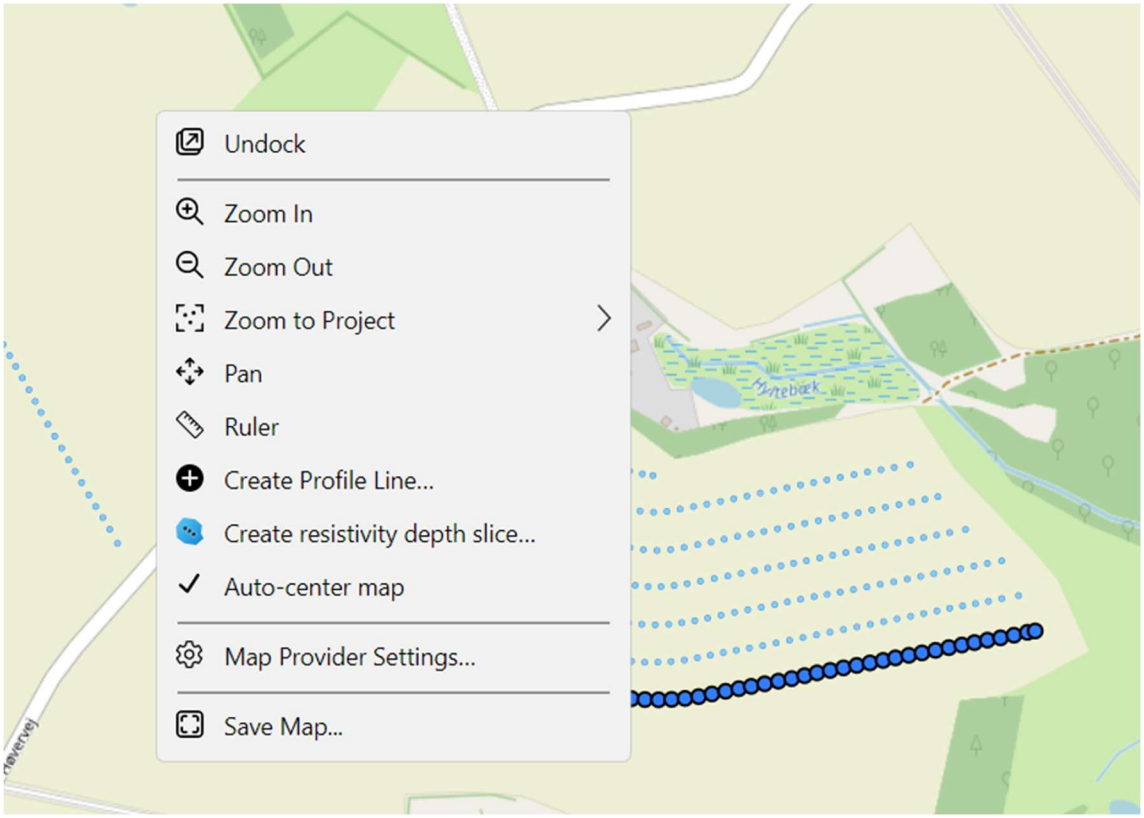

Figure 34: Map panel right-click options

9. TROUBLESHOOTING

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

9.1 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**
- **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** to request a remote check in.

9.2 Import Issues

9.2.1 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

9.2.2 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** or use the **auto divide lines** (see **Line tools** in 8.2.1 Navigation panel)

9.2.3 sTEM Data Not Divided as Expected

- If sTEM data is not grouped into the desired lines:
  - Create **custom data lines** (see **Line tools** in 8.2.1 Navigation panel)

9.3 Data Issues

9.3.1 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 35)
- If this matches the geological setting, it is likely a natural effect
- It may be necessary to adjust the resistivity of the start model (e.g., to 1 Ωm). After the inversion, however, the data should still fit the resulting model well.

9.3.2 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)

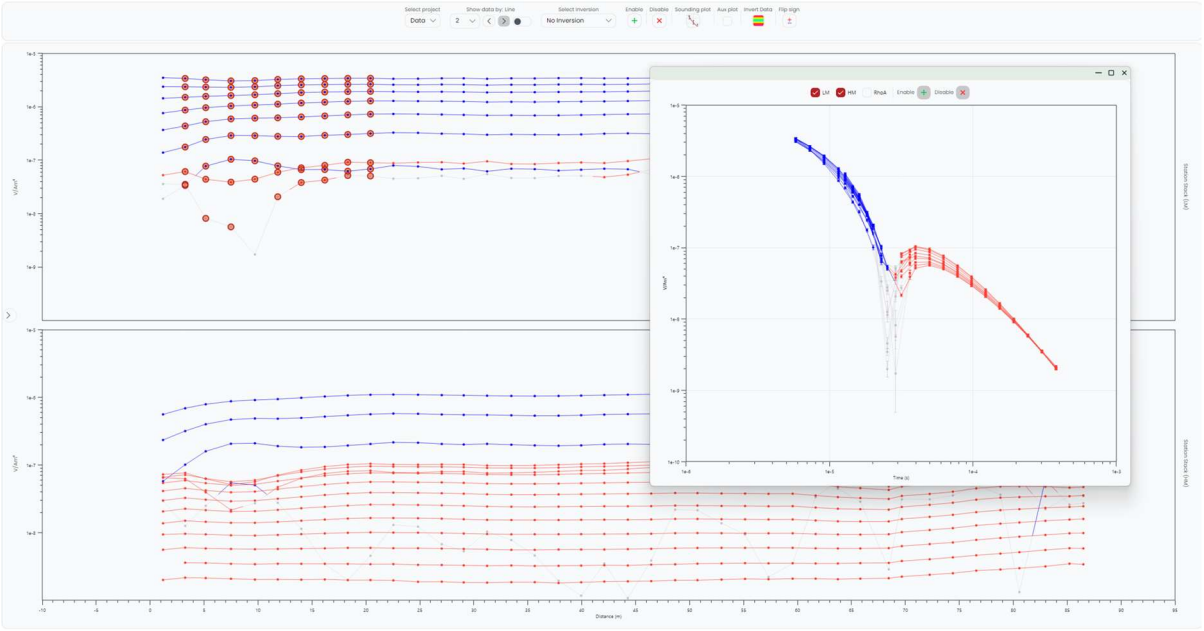

Figure 35: Example of a sign change in TEM data due to the presence of a very conductive near-surface layer (in this case saltwater)

9.4 Inversion Issues

9.4.1. 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

9.4.2. Unexpected Anomalies

- If an anomaly:
    - Does not match neighboring 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.

9.5 General Recommendation

When in doubt:

- Re-check data quality

- Compare with neighboring soundings
- Review acquisition conditions
- Contact **support@temcompany.com**