

VALLON EVALUATION SOFTWARE

EVA4ALL



OPERATION MANUAL

Issue EN 08/2023

Version: 4.14

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Annex

A Open source software and third party rights

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1 Prior to starting

Thank you for purchasing one of our leading-edge products. Our company, which has been certified in accordance with ISO 9001 by an independent testing institute, stands for highest quality in the development and manufacturing of devices, assemblies and PC applications.

The technology and the equipment are state-of-the-art regarding their functionality and safety in accordance with national and international requirements. Further developments and improvements are continuously taken into account. Therefore, the figures, technical data, and general contents specified in this document may change due to adjustment to new findings¹.



This operation manual is designed to help you to use our product with its versatile possibilities optimally and safely.

This is why we ask you to read this manual thoroughly prior to putting the product into operation. Always keep this manual near the product so that it is quickly available when needed.

Please do not hesitate to contact us if you have any further questions.

¹All details as stated in this document comply with the technical standard that is applicable at the date of printing. It is subject to technical modifications and error.

1.1 Intended use

The evaluation software EVA4ALL is a software solution for the evaluation, display, georeferencing and documentation of surface and borehole data - both from active and passive VALLON detectors. It uses physical data and targets to calculate abstract representations that do not have to match the real shape and position of real targets. A precise standardization of targets cannot be done with this evaluation software.

1.2 Liability information

This operation manual can only provide the user with assistance in evaluating surface and borehole data with the EVA4ALL evaluation software.

When evaluating surface and borehole data with the evaluation software EVA4ALL, the plausible evaluation of the information on the evaluated / calculated targets remains with the user.

In this context we refer to our general terms and conditions.

1.3 Necessary personnel qualification

Before starting to evaluate data, the personnel must be familiarized with the functions and possibilities of the evaluation software EVA4ALL and trained in the evaluation of data under the guidance of experienced trainers and in accordance with this operation manual. Only adequately trained and instructed personnel may use the evaluation software EVA4ALL within the scope of the intended use.

1.4 Trademark reference

Microsoft® and Windows® are registered trademarks or trademarks of Microsoft Corporation in the USA and/or other countries.

All other registered trademarks and unregistered trademarks are the property of their respective owners.

1.5 Open Source

The evaluation software EVA4ALL contains open source program parts.
Further information can be found on page [147](#)

2 Description

2.1 General

The evaluation software EVA4ALL is a complete solution for the visualization, evaluation and documentation of measurement data from Vallon detection systems. For this purpose, the data are transferred from the detection system used to the PC, or imported from suitable data sources.

2.2 Scope of delivery

The scope of delivery of EVA4ALL contains the following components:

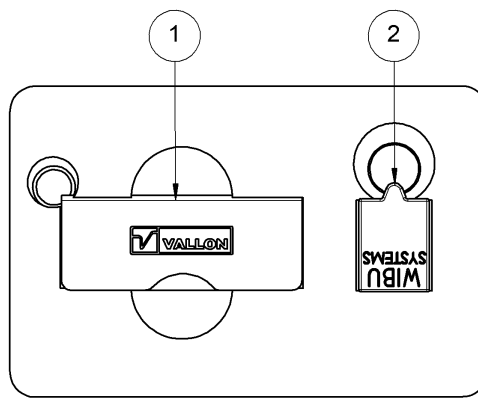


Fig. 2.2.1: Scope of delivery: (1) USB stick with evaluation software and operation manual, (2) USB dongle

The evaluation software EVA4ALL can only be used with a license that can be purchased from Vallon and with the dongle that is part of the scope of supply.

Part numbers

Pos.	Description	Part number
1	EVA4ALL cpl. with USB stick and USB dongle	2009090000
2	Replacement dongle*	20E9090000

* A replacement dongle is only available upon return of the old dongle, or upon proof of total loss.

2.3 Hardware recommendations

The recommended minimum requirements for the PC used are:

- ▷ Operating system: Microsoft Windows 10 (including the latest updates).
- ▷ Processor: Intel i5 or an equivalent CPU.
- ▷ Hard disk: 1 GB free space.
- ▷ Random access memory: 8 GB RAM.
- ▷ Graphics card: For the visualization an up-to-date graphics card is required.
- ▷ Screen resolution: Full HD.
- ▷ Interfaces: USB 2.0 or USB 3.0.
- ▷ Mouse: 2-button mouse with scroll wheel.
- ▷ Keyboard: Standard PC keyboard.

2.4 About this operation manual

Many of the descriptions and illustrations in this operation manual provide examples of how to process and evaluate data from passive detectors.

To a large extent, these descriptions and illustrations can also be applied to the processing and evaluation of data from active detectors.



Information

Clicking on the Vallon logo in the headers of the PDF document will take you to the index.

3 Installation

3.1 Installing EVA4ALL

The installation file for the evaluation software EVA4ALL is on the USB stick included in the scope of delivery (see sect. [Scope of delivery](#) on page 6).

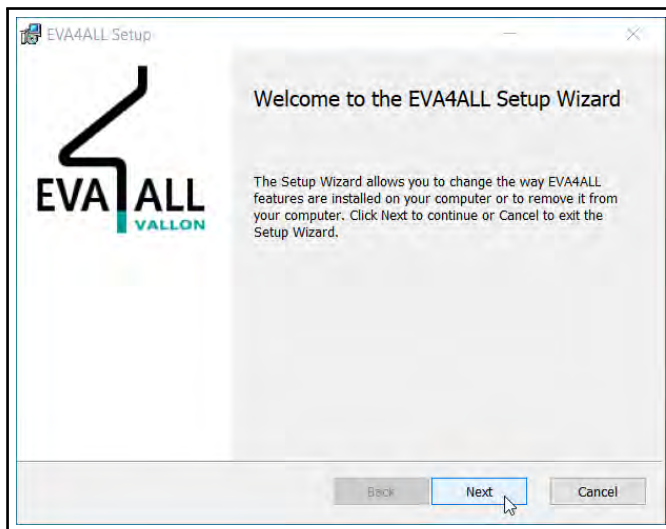
NOTICE: You can also obtain the latest available version of the installation file from the VALLON website. For information on this see sect. [3.2](#).

- ▶ Insert the USB stick into a free USB port on your PC.
- ▶ Insert the USB dongle, that is included in the scope of delivery, (see sect. [2.2](#)) into a free USB port on your PC.

NOTICE: After installation, you can only start the evaluation software EVA4ALL, when the USB dongle is plugged into a USB interface on the PC.

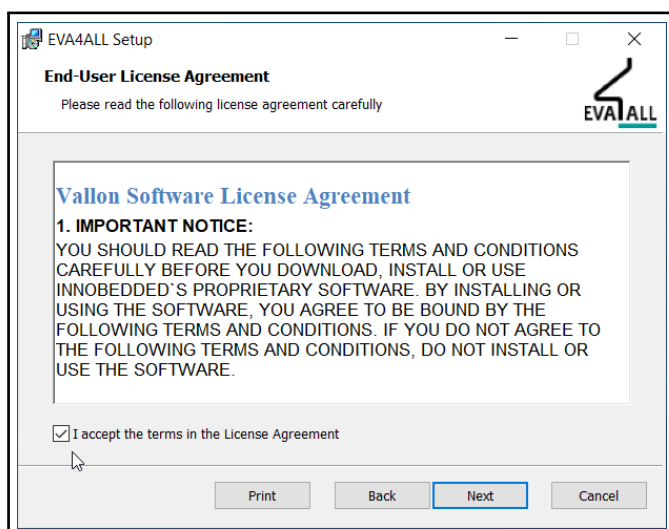
- ▶ Start the installation by double-clicking with the left mouse button on the setup file.

The installation of the evaluation software EVA4ALL is illustrated as follows.



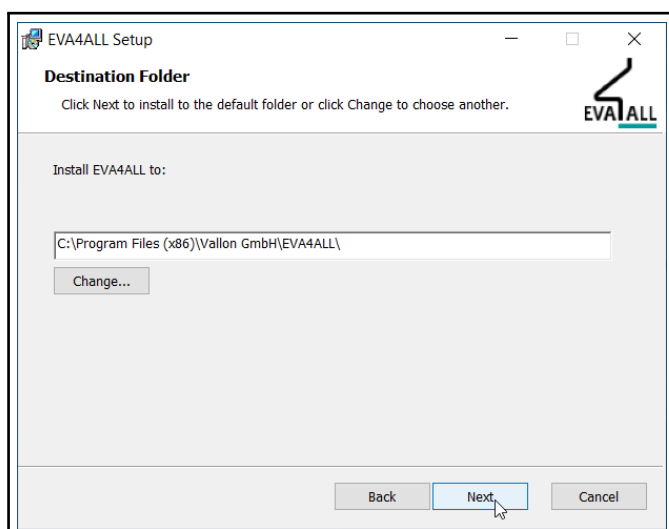
Click on *Next*.

Fig. 3.1.1: Install EVA4ALL



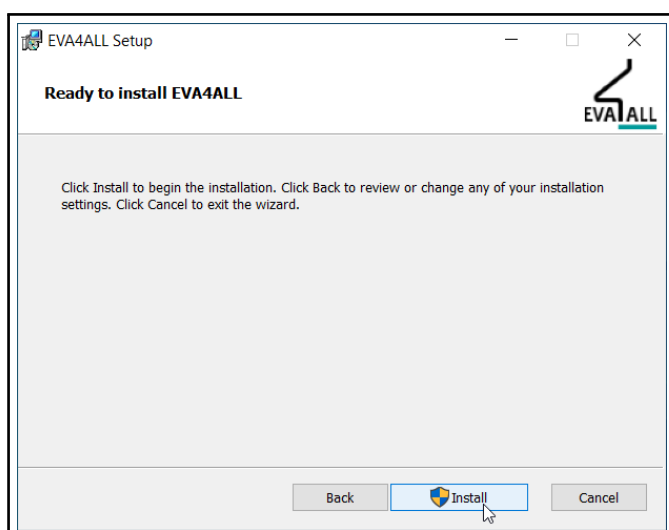
Read the software license agreement. If you accept the software license agreement, check the box at *I accept the terms in the License Agreement* and click on *Next*.

Fig. 3.1.2: Software license agreement



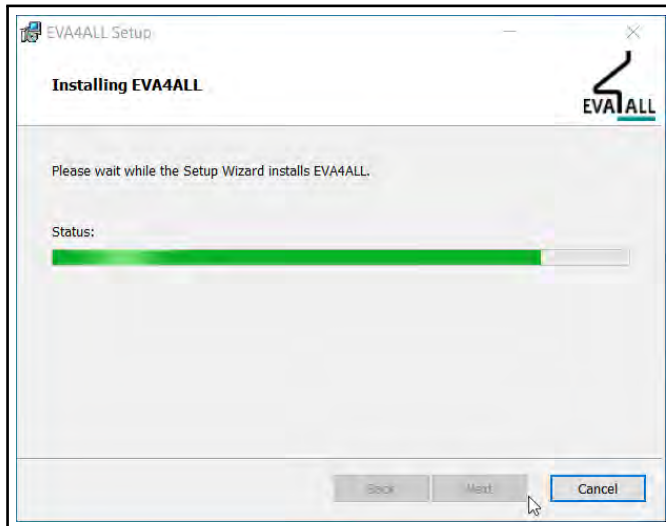
Click on *Next* in order to install EVA4ALL into the designated default folder, or click on *Change* to choose a different folder.

Fig. 3.1.3: Destination folder



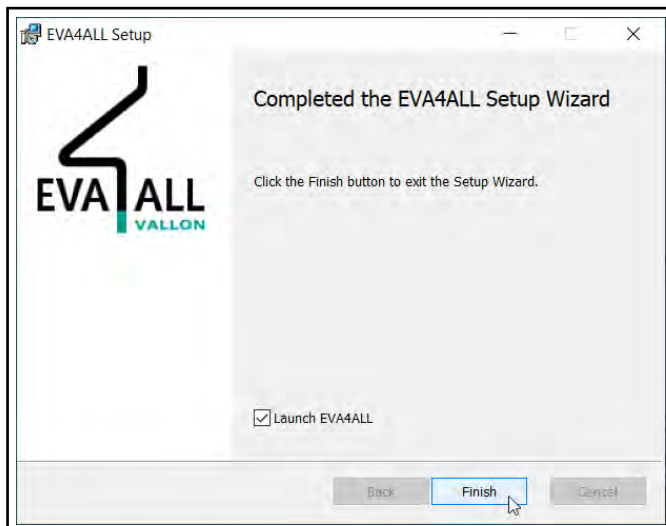
Click on *Install* to begin the installation.

Fig. 3.1.4: Begin installation



The status of the installation is displayed with a progress bar.

Fig. 3.1.5: Progress bar



Check the box at *Launch EVA4ALL* in order to launch the evaluation software automatically after the installation. Click on *Finish* in order to finish the installation.

Fig. 3.1.6: Begin installation

The installation has now been successfully completed.

- ▶ Remove the USB stick with the evaluation software EVA4ALL from the USB port of your PC.
- ▶ Launch the evaluation software EVA4ALL by double-clicking on the icon .

3.2 Updates for EVA4ALL

You can find the current version of the installation file on the VALLON website under the following link:

<https://www.vallon.de/en/software-download>

You can replace an existing program version anytime by installing a newer version and thus bring it up to date.

3.3 USB dongle, Status

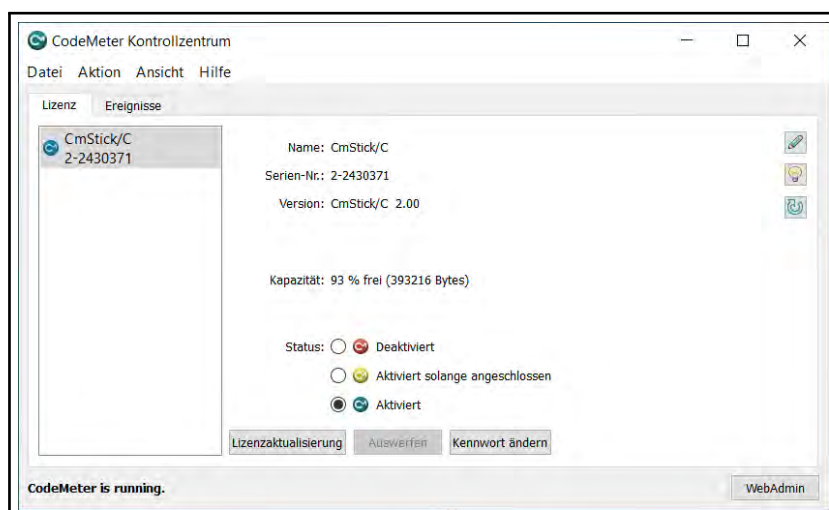
If the USB dongle is not recognized when double-clicking the icon , or if no USB dongle is present, the evaluation software EVA4ALL will not start. A corresponding error message appears on the screen and the icon  in the task bar is highlighted in gray.

Clicking this icon opens the window *CodeMeter Control Centre*.

No information about the USB dongle or the serial no. is displayed.

If a USB dongle is recognized when starting the evaluation software EVA4ALL, the icon  in the task bar is highlighted in green.

Clicking this icon opens the window *CodeMeter Control Centre* with information about the serial no. and the status of the USB dongle.



Serial number and status of the USB dongle.

Fig. 3.3.1: CodeMeter Control Centre

4 Windows, keys and symbols on the screen

4.1 Main screen

Launch the evaluation software EVA4ALL by double-clicking on the icon  .

The main screen opens. The graphical user interface of the main screen is divided into different areas. Some buttons and areas are only active, when a project is open.

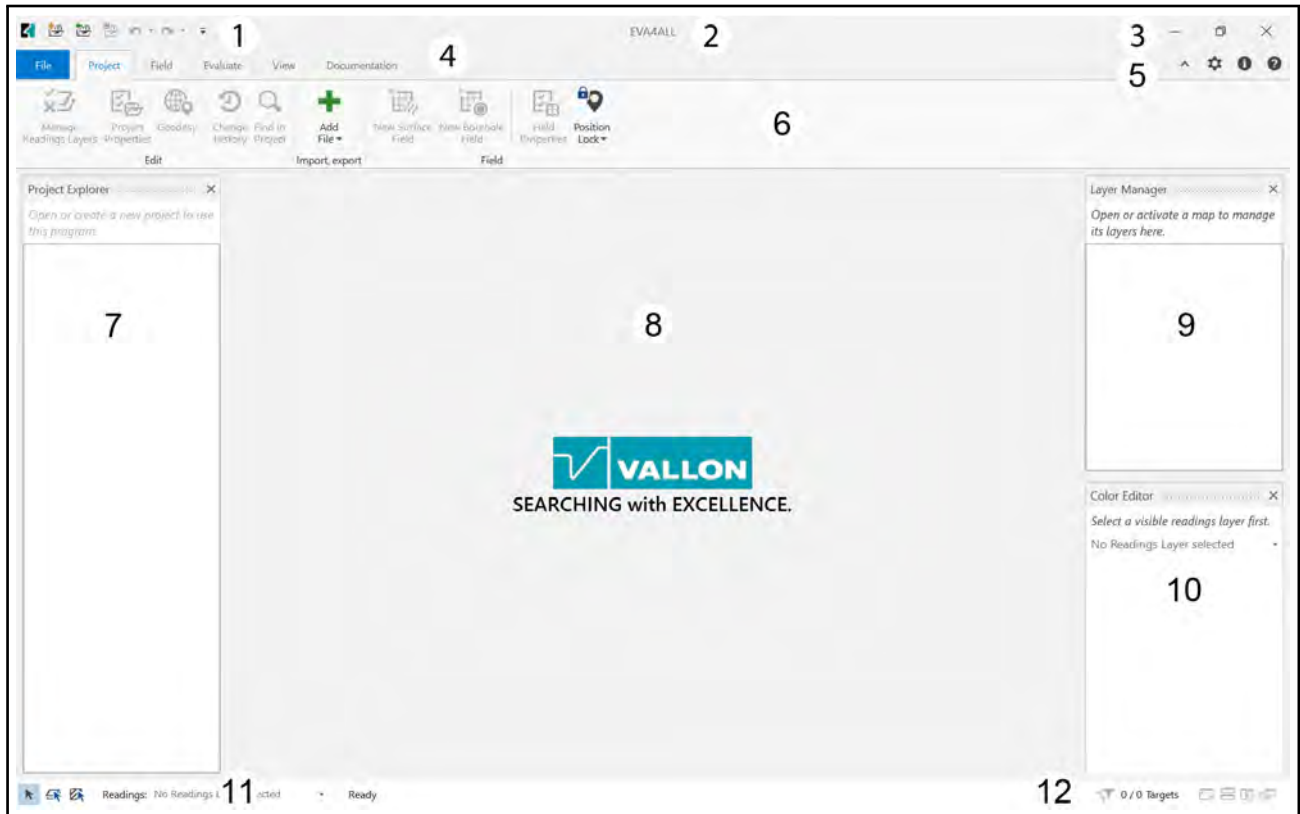
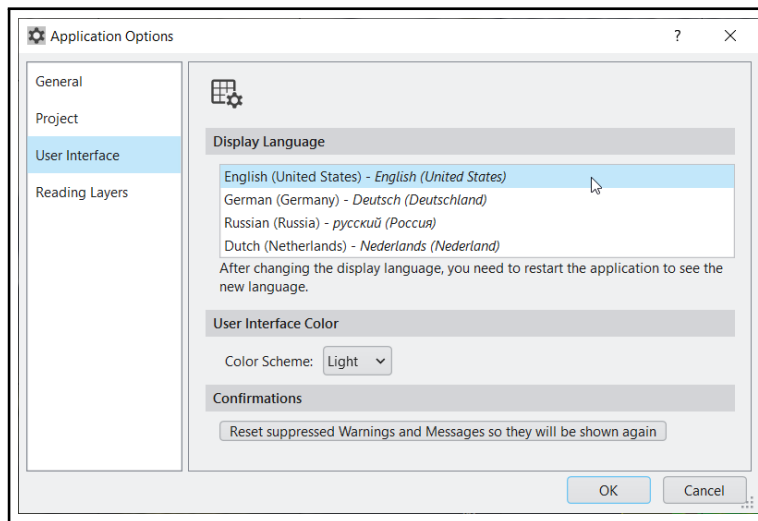


Fig. 4.1.1: Main screen

Pos.	Designation	Description
1	Quick access toolbar	Quick access to various commands.
2	Title bar	The file name of the open project is displayed.
3	Window buttons	Minimize, restore, close the evaluation software.
4	Tabs	The tabs are divided into different command groups, see pos. 6 und sect. 4.2.
5	Symbol bar	Expand / minimize ribbon. Buttons options, info, help.
6	Command groups	In each command group, the individual commands are symbolized by buttons, see sect. 4.2.

Pos.	Designation	Description
7	Project explorer	The project explorer shows the project structure. Folders and all files that belong to the project, e.g. fields, media, placemarks etc. are displayed and can also be added or deleted here, see sect. 4.5
8	Display window	Display of fields, data maps with tracks/boreholes and targets, background maps . . .
9	Layer manager	All layers of a project are displayed in the layer manager. The individual layers can be switched on and off. Disabled layers are not shown on the map, see sect. 4.6.
10	Color editor	The color editor offers the possibility to optimize the color representation of the data or to adapt it individually, see sect. 4.7.
11	Display of the mouse modes and status display	Mouse modes <i>Panning</i> , <i>Selection</i> and <i>Evaluation</i> , see sect. 4.3 Display of the active field with measured values and status text.
12	Status bar	Display of coordinates and project-specific values related to the active field. Switching target filter on and off, full screen and window arrangement.

4.1.1 Adjusting user interface color and language



Click on the button *Options* in the symbol bar (5) (see sect. 4.1) on the main screen.

Click on the button *User Interface* and select the desired color scheme for the user interface (light or dark) and the desired display language.

For more information about window *Application Options* see sect. [Button Options](#) on page 25.

Fig. 4.1.2: Adjusting color scheme and language

4.1.2 Arrange user interface

You can move and dock the *project explorer*, the *layer manager*, the *color editor*, the *target list* and other screen elements to different, predefined positions on the user interface.

Move the cursor to the title bar at the top of the window to be moved. Then hold down the left mouse button and move the window. Various position marks now appear on the screen. Slide the window onto the arrow in one of the position marks, the new position of the window is now displayed on the screen as a blue rectangle. Release the left mouse button, when the blue rectangle appears at the desired position. The window is now docked there.

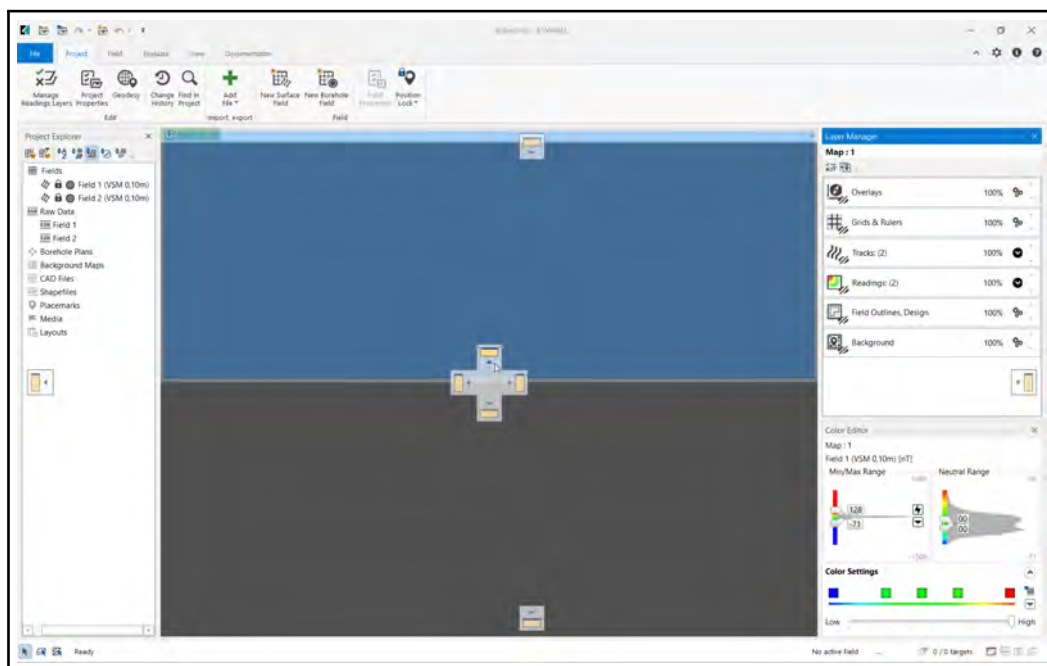


Fig. 4.1.3: Arrange user interface

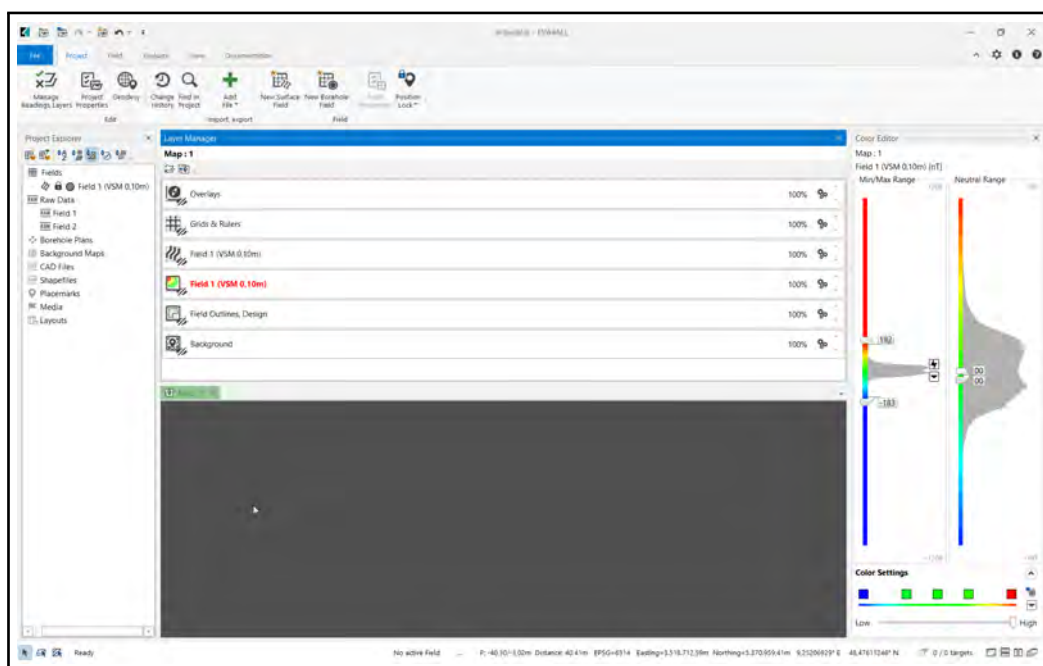


Fig. 4.1.4: Move layer manager

You can also show and hide the *project explorer*, the *layer manager* and the *color editor*. For information see sect. [Tab View](#) on page 78.

You can copy a map with all the layers it contains and, as described above, move it to different, predefined positions on the user interface. For copying a map refer to [Layer Manager](#) on page 107.

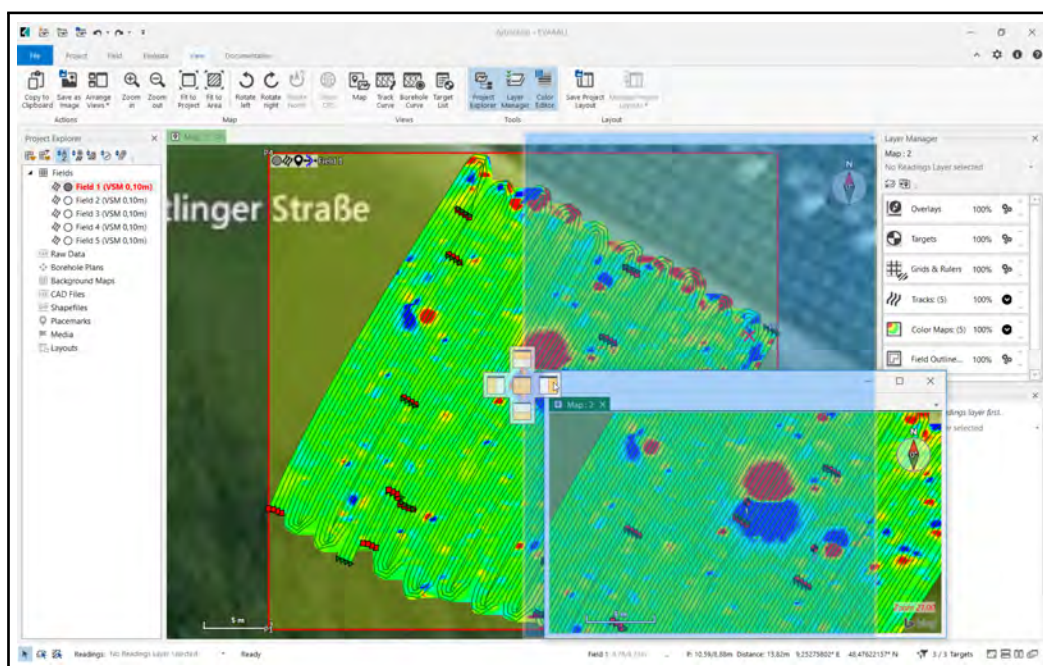


Fig. 4.1.5: Move map

In this way, a field with different settings (e.g. with different color or filter settings) can be viewed side by side.

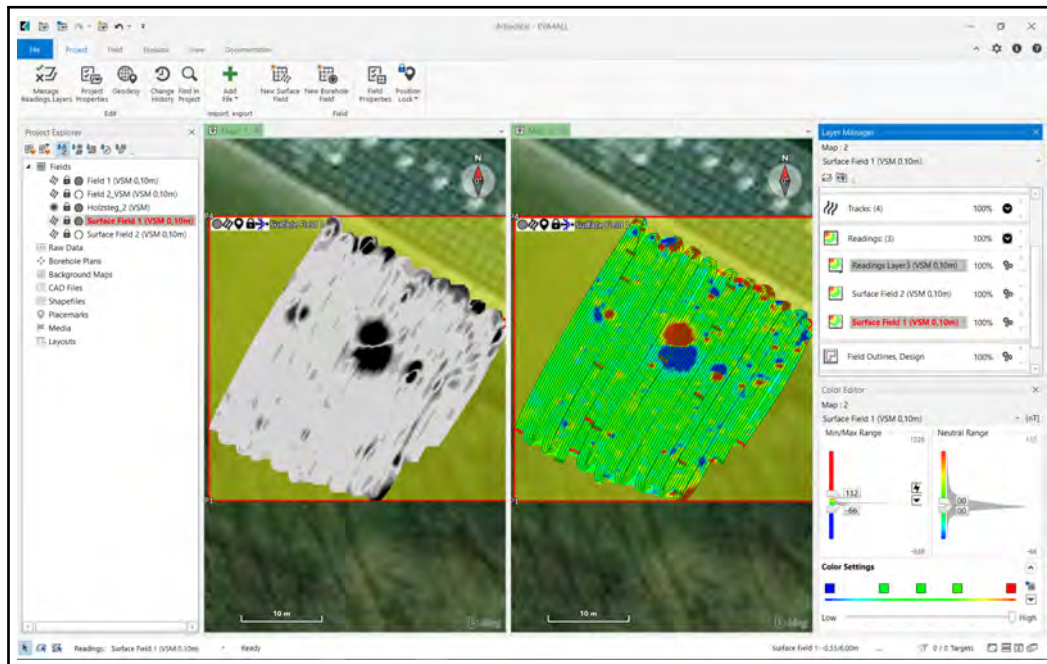


Fig. 4.1.6: Two identical maps next to each other

You can generate a target list, move it to a predefined position on the user surface and dock it there.

For generating a target list see [Target List](#) on page 132.

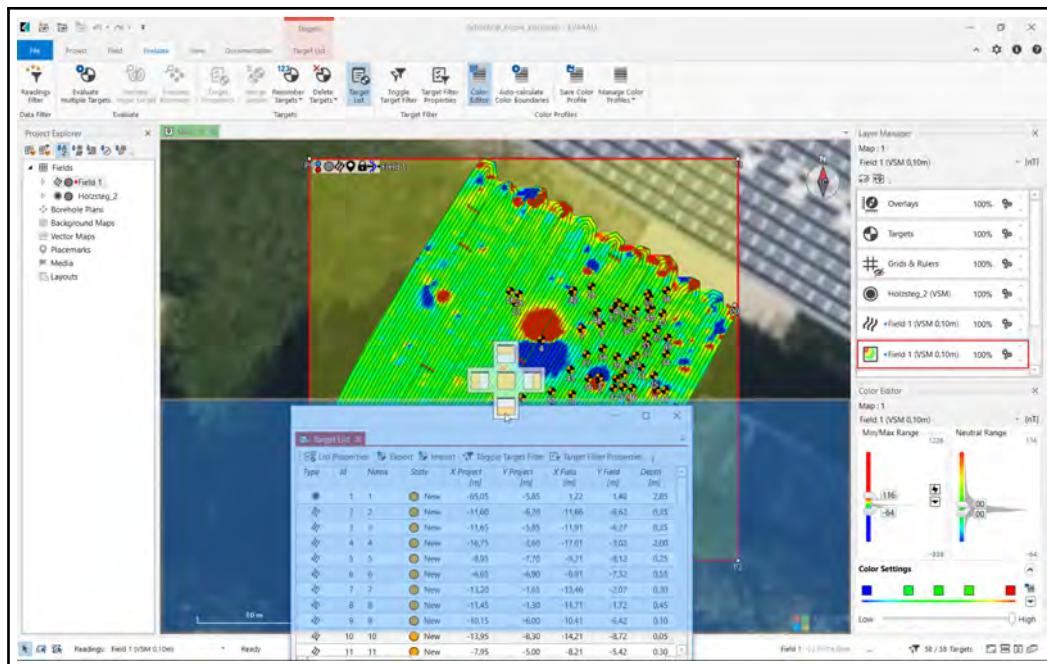


Fig. 4.1.7: Move and dock target list

4.2 Tabs and command groups

The main screen contains the tabs *File*, *Project*, *Field*, *Evaluate*, *View* and *Documentation* (see also fig. [Main screen](#) on page 12) to select the different command groups.

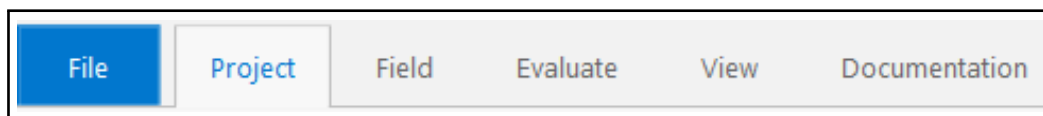


Fig. 4.2.1: Tabs

The individual tabs and the corresponding command groups are explained in the following sections.

Some icons of the buttons in the individual command groups have colored elements. The colors have the following meaning:

- ▷ Green: Add files.
- ▷ Orange: Create a new project / field.
- ▷ Red: Delete targets.
- ▷ Blue: Color highlighting of certain buttons / functions.

Right-clicking on different elements on the graphical user interface opens context menus that offer the user various commands for a specific context. To find explanations for the commands in the context menus, the index at the end of this operation manual can be helpful.

4.2.1 Tab File

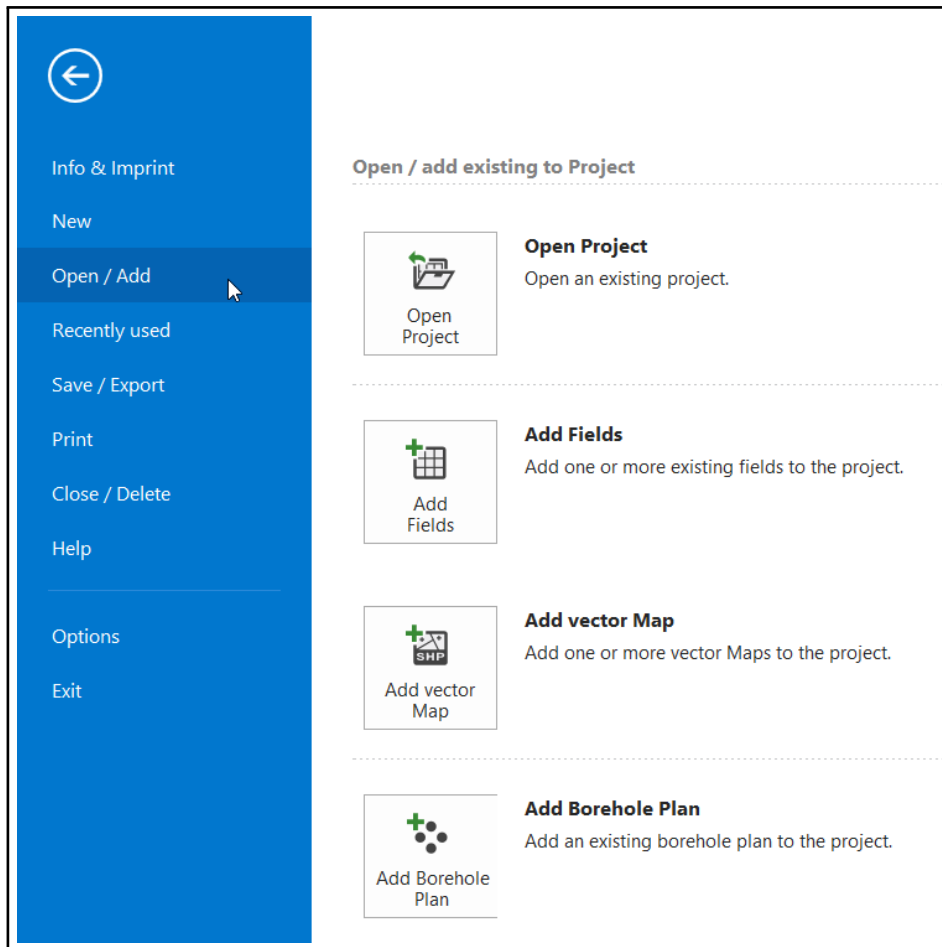


Fig. 4.2.2: Tab File

4.2.1.1 Button Back

Symbol	Name	Description
	Back	Back to main screen.

4.2.1.2 Button Info

In the window *Info* you find the contact details, the version number as well as information on the license conditions. Close the window by clicking on the button *OK*.

4.2.1.3 Button *New*

Symbol	Name	Description
	New Project	<p>Add a new project.</p> <p>Opens the window <i>New Project-Name and Description</i>. Enter here the name of the new project and further descriptions or information such as designation, originator, remarks etc. about the project in the individual fields.</p> <p>Click on the symbol  and select the storage location for the project data.</p> <p>Then click on the button <i>Next</i> and define the origin of the new project in the window <i>Geodetic Reference</i> (see also sect. Geodesy on page 32). There are several ways to do this. The defined project origin is identified by a red cross in the display window.</p> <p>No GNSS: The project origin is not georeferenced and is located in the display window at point 0, 0. The project origin can also be defined at a later time.</p> <p>WGS84: Enter the coordinates of the desired project origin in the fields <i>Longitude</i> and <i>Latitude</i>.</p> <p>Select on Map: You can select the project origin directly on the map (internet connection required). Zoom and move the map (turn the mouse wheel or hold down the left mouse button) until the desired project origin lies in the middle of the map (<i>Origin</i>, red mark). You can also define the project origin by entering an address in the field <i>Optional Address</i>.</p> <p>After defining the project origin click on the button <i>Finish</i>.</p> <p>For subsequent georeferencing or changing / moving the project origin see sect. Geodesy on page 32.</p> <p>The new project can then be exported to the Vallon field computer for further processing or data recording. If a project is not georeferenced, it will adopt the origin of the georeferenced field being imported. Double-click on the field in the project explorer to navigate to the field on the map.</p>
	New Surface Field	<p>Create a new surface field in the currently open project.</p> <p>Opens the window <i>Create new Surface Field</i>. For a detailed description see sect. New Surface Field on page 38.</p>

Symbol	Name	Description
	New Borehole Field	Create a new borehole field in the currently open project. Opens the window <i>Create new Borehole Field</i> . For a detailed description see sect. New Borehole Field on page 41.

4.2.1.4 Button *Open* / *Add*

Symbol	Name	Description
	Open Project	<p>Open an existing project (see also sect. 6.2 on page 128).</p> <p>To be able to open a project, a project file in .e4x or .epr format must be available on the PC.</p> <p>Select the project to be opened in the selection window and click on the button <i>Open</i>.</p> <p>EVA4ALL can be configured in such way that the last project that was worked on is automatically opened when EVA4ALL is started. See sect. 4.2.1.10 on page 25.</p> <p>For evaluating fields in the open project see sect. <i>Evaluate fields</i> on page 129.</p>
	Add Fields	<p>Add one or more field in the formats *.e4x (EVA4mobile) or *.efl (EVA2000) to the project. Various other formats are available.</p> <p>Select the desired field in the selection window and click on the button <i>Open</i>.</p> <p>See also sect. <i>Add File</i> on page 35.</p>
	Add Vector Map	<p>Add ESRI® shapefiles (*.shp) and CAD drawings (*.dxf) to the project.</p> <p>Georeferenced ESRI® shapefiles with and georeferenced CAD drawings can be added to the project and displayed on the map.</p> <p>Select the desired shapefile or drawing in the selection window and click on the button <i>Open</i>.</p> <p>See also sect. <i>Add File</i> on page 35.</p>
	Add Borehole Plan	<p>A borehole plan is a list of borehole coordinates that can be displayed on a borehole field. You can add borehole plans to the project. Select the desired borehole plan in the selection window <i>Add Borehole Plan(s)</i> and click on the button <i>Open</i>.</p> <p>See also sect. <i>Add File</i> on page 35.</p> <p>The added borehole plan is displayed in the project explorer (see sect. 4.5). Right-click in the project explorer on the borehole plan and select the desired editing option from the context menu. With <i>Create field from plan</i> you can create a new borehole field on the map from the borehole plan.</p>

4.2.1.5 Button *Recently used*

Shows a list of the most recently edited projects.
Click on a project to open it.

4.2.1.6 Button *Save / Export*

Symbol	Name	Description
	Save Project	Save the open project and all contained fields in the format *.e4x in the file from which it was opened.
	Copy Project as	Save a copy of the open project and all contained fields under a new name in the format *.e4x. Select the desired storage location in the selection window and click on the button <i>Save</i> .
	Export Project	Exports the entire project in the file format *.e4x, *.geojson or *.epr. The project can then be opened e.g. with the Vallon PC application EVA2000. Select the desired file format and storage location in the selection window and click on the button <i>Save</i> . If the project is exported in the *.e4x file format, individual fields can also be selected for export. After selecting the desired storage location and clicking on the button <i>Save</i> , another window opens in which individual fields can be selected for export. Select the fields to be exported and click on the button <i>OK</i> .

Symbol	Name	Description
	Export Field	<p>Exports the field marked in the project explorer (see sect. 4.5) into different file formats. The file formats *.e4x, *.dxf, *.tbl, *.xyz, *.kml, *.uxo, *.dat, *.grd, *.efl, *.csv, and others are available for selection.</p> <p>Select the desired file format and storage location in the selection window and click on the button <i>Save</i>.</p> <p>Depending on the selected file format, the window <i>Geodetic Properties of Export File</i> opens and according to the region different coordinate systems (also UTM and others) are supported.</p> <p>When exporting fields in *.csv format, the easting and northing of the selected coordinate reference system and other parameters are exported in addition to longitude and latitude.</p> <p>When exporting fields in *.kml, *.dxf and *.geojson formats, annotations, lines, shapes, illustrations and comments on the map are now also exported to Google Earth, AutoCAD and GeoJSON.</p> <p>NOTE: If offset compensation has been applied to a field (see sect. 4.2.3.4) this field is exported with compensated measurement data.</p>
	Export Target List	<p>Exports the target list in CSV format (*.csv) or as an Excel workbook (*.xlsx) to the desired storage location. The prerequisite for this is that the targets have been evaluated and a target list has been generated (see sect. Target List on page 132).</p> <p>In the window <i>Target List Export</i> you can select the target list parameters to be exported. Click on the button <i>OK</i>.</p> <p>Then select the desired storage location in the window <i>Export Target List</i> and click on the button <i>Save</i>.</p> <p>The structure and column arrangement of the exported list corresponds to the target list.</p>

Targets that come from sources other than an evaluation (e.g. by importing a target in *.csv format) and that are not assigned to a specific field are now also exported.

The list of file formats into which projects, fields, target lists, borehole plans . . . can be exported is constantly being expanded. You can see the exportable file formats in the respective selection window at the bottom in the drop-down menu.

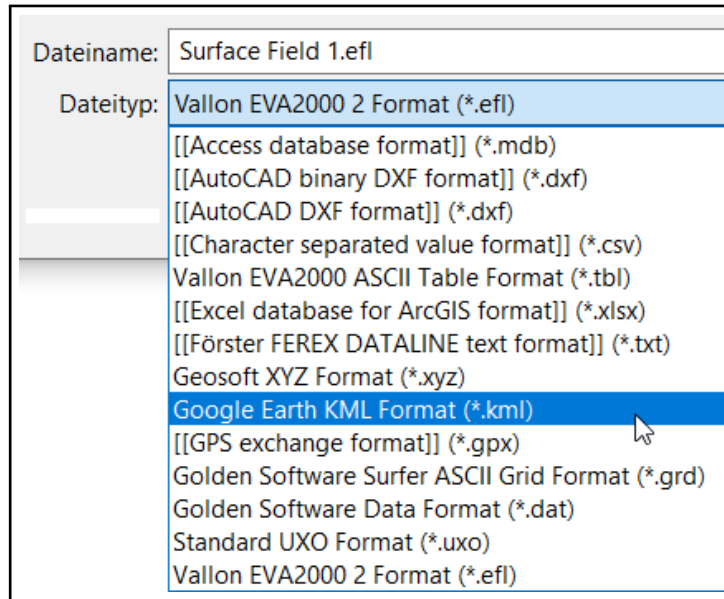


Fig. 4.2.3: Exportable file formats

4.2.1.7 Button *Print*

Symbol	Name	Description
	Create Project Report	Creates a project report (see also sect. 4.2.6 on page 82). The project report can then be printed out. For a complete project report, targets must first be evaluated and a target list generated (see sect. <i>Target List</i> on page 132).

4.2.1.8 Button *Close / Delete*

Symbol	Name	Description
	Close Project	Closes the current project. Choose whether you want to save the changes to the project before closing it.
	Delete Project	Closes and deletes the current project.

4.2.1.9 Button *Help*

Symbol	Name	Description
	Help Index	Opens the operation manual for EVA4ALL.

4.2.1.10 Button *Options*

Clicking on the button *Options* opens the window *Application Options*.

You can also open the window *Application Options* by clicking on the button *Options* in the symbol bar (see sect. 4.1).

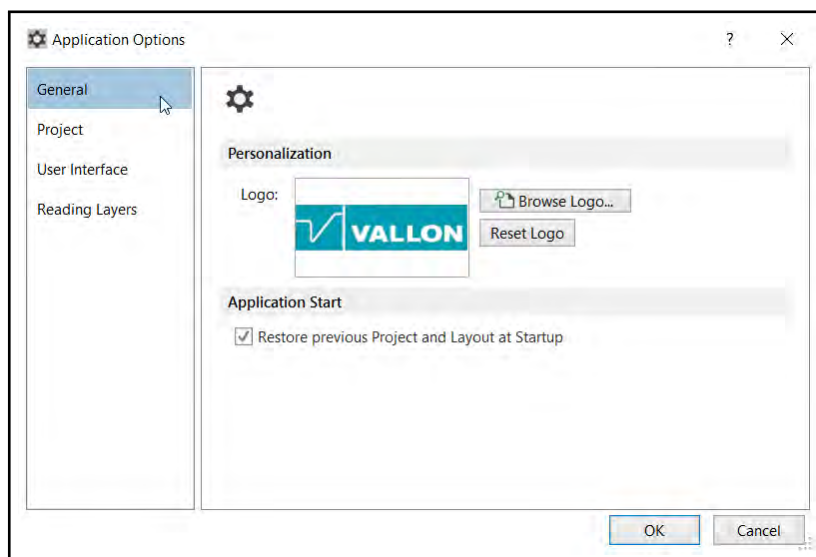


Fig. 4.2.4: General

Personalization: Store or delete a company logo.

See also sect. [Project Properties](#) on page 31.

The stored company logo appears in the project report.

For the project report see page 24 and page 84.

Application Start: Check the box here, if EVA4ALL should always open the last edited project and the screen layout used, when started.

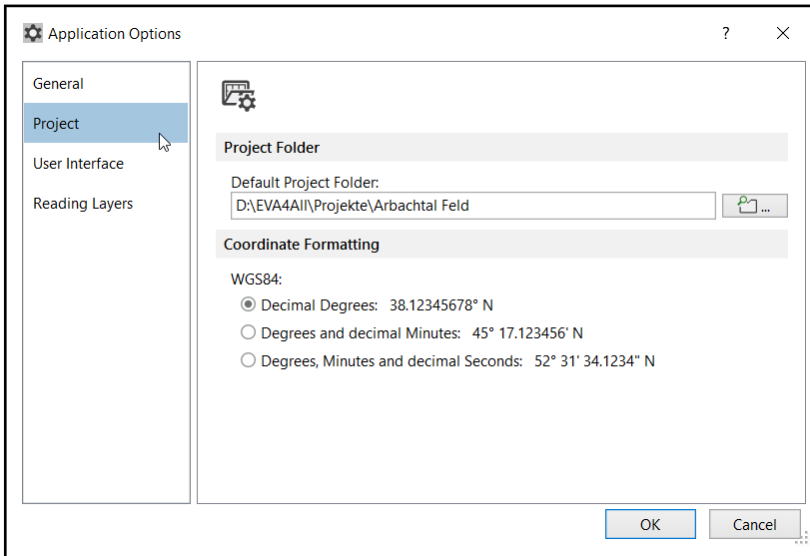


Fig. 4.2.5: Project

Project Folder: Select the *Default Project Folder*, in which this and following projects are to be saved.

Coordinate Formatting: Select the presentation of the WGS84 coordinates.

You can choose between:

- Decimal degrees
- Degrees and decimal minutes
- Degrees, minutes and decimal seconds

The selected presentation appears on the screen in the status bar, on the target list and in the project report.

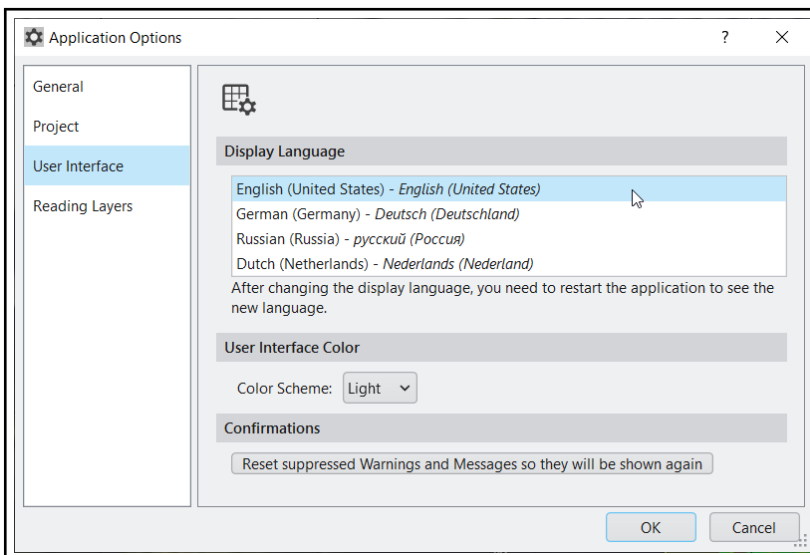


Fig. 4.2.6: User Interface

Display Language: All available display languages appear here. Select the desired language.

User Interface Color: Select the desired color scheme for the user interface (light or dark).

Confirmations: Various warning and information messages can be suppressed by checking a box and no longer appear on the screen. By clicking the button *Reset suppressed Warnings and Messages*, these messages are displayed again.

NOTE: After changing the display language, you must exit and restart EVA4ALL for the setting to take effect.

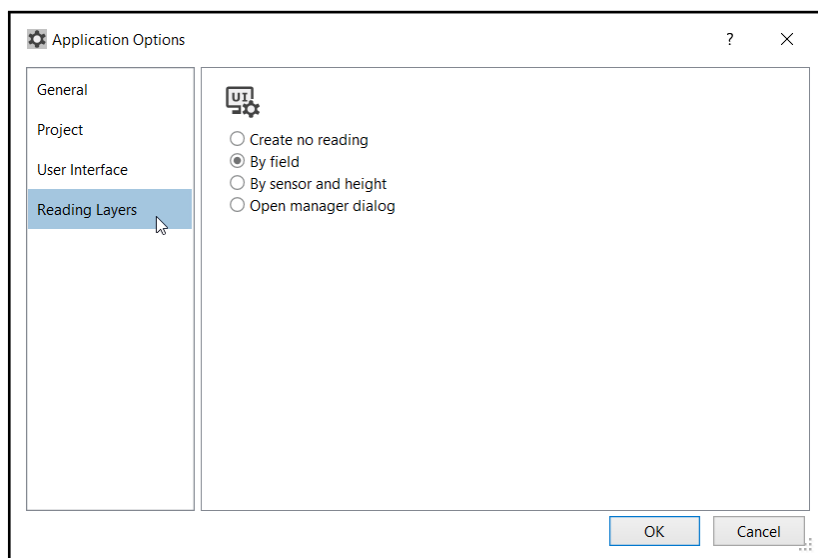


Fig. 4.2.7: Reading Layers

When starting EVA4ALL and opening a project, it is possible to choose whether or according to which criteria readings layers are created for the fields contained in the project (see sect. [Open a project](#) on page 128). The following options are available:

Create no reading
By field
By sensor and height
Open manager dialog

The option selected when starting or opening a project is marked here.

Click on the button *OK* to apply the selected settings and close the window.

4.2.1.11 Button *Exit*

Clicking on the button *Exit* closes the evaluation software EVA4ALL.

4.2.2 Tab Project

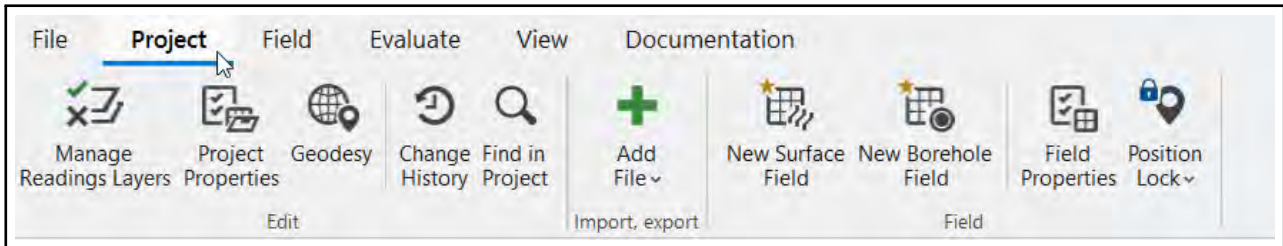


Fig. 4.2.8: Tab *Project*

Symbol	Name	Description
	Manage Readings Layers	Opens the window <i>Manage Readings layers</i> . See sect. Manage Readings Layers on page 30.
	Project Properties	Opens the window <i>Project Properties</i> . See sect. Project Properties on page 31.
	Geodesy	Opens the window <i>Project Geodetic Properties</i> . See sect. Geodesy on page 32.
	Change History	Opens the window <i>Project Changes</i> . See sect. Change History on page 34.
	Find in Project	Opens the window <i>Find in Project</i> . See sect. Find in Project on page 34.
	Add File	Opens the window <i>Add File</i> . See sect. Add File on page 35.
	New Surface Field	Opens the window <i>Create new Surface Field</i> . See sect. New Surface Field on page 38.

Symbol	Name	Description
	New Borehole Field	Opens the window <i>New Borehole Field</i> . See sect. New Borehole Field on page 41.
	Field Properties	Opens the window <i>Field Properties</i> . The button <i>Field Properties</i> is only active, when the current project contains a surface field or a borehole field. See sect. Field Properties on page 42.
	Position Lock	Opens the window <i>Position Lock</i> . See sect. Position Lock on page 44.

4.2.2.1 Manage Readings Layers

A *Readings Layer* contains data (surface or borehole data) of one or more fields. These *Readings Layers* are displayed in the window *Layer Manager* (see also sect. [Layer Manager](#) on page 107).

Readings layers for the individual fields of a project can be displayed, generated and deleted in the window *Manage Readings Layers*. You can generate additional readings layers for a field, or you can combine several fields of a project into one readings layer. This can e.g. make sense, when several fields with the same probe type and the same measuring height have been recorded.

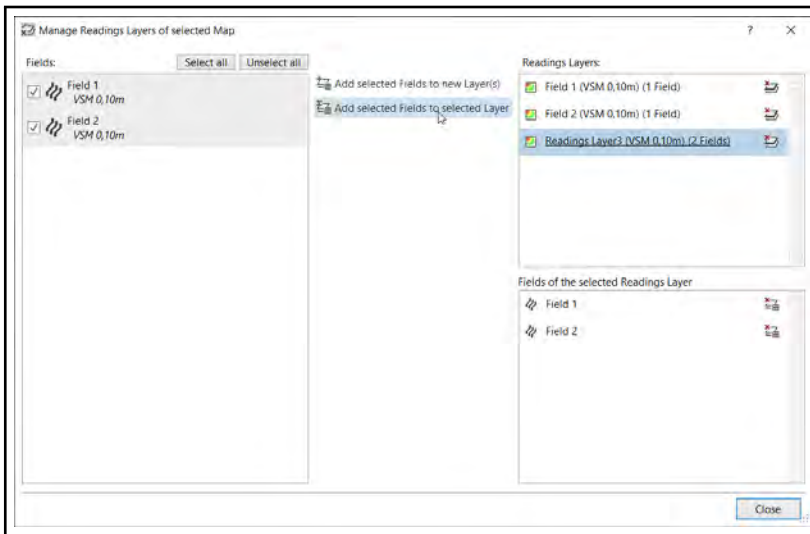


Fig. 4.2.9: Manage readings layers

Click in the tab *Project* (see sect. 4.2.2 on page 28) on the button *Manage Readings Layers*.

Fields: Display of the surface or borehole fields contained in the project.

Readings Layers: Display of the generated readings layers.

Fields of the selected Readings Layer: Display of the individual fields of the selected readings layer.

All fields of the project are displayed in the list *Fields*.

With a left mouse click you can select all fields for which further readings layers shall be created or which shall be combined into one readings layer.

Button *Select all*: All fields in the list are selected.

Button *Unselect all*: All fields in the list are unselected.

After selecting one or more fields in the list *Fields* the button *Add selected Fields to new Layer(s)* becomes active.

If there already exist readings layers for the selected fields, clicking on this button opens the window *Data Field used*. Confirm the selection with Yes.

If you have selected only one field in the list *Fields*, a new readings layer is now created for this field and displayed in the list *Readings Layers*.

If you have selected several fields in the list *Fields*, select in the field *Create Readings Layers*, if a readings layer is created for every field (*One for each Field*) or if a readings layer is created for compatible fields (same probe, same measuring height) (*Group by Sensor and Measurement Height*). In this case, the list *Readings Layers* displays a new *Readings Layer* that contains several fields. These fields are displayed in the list *Fields of the selected Readings Layer*.

If there is not yet a readings layer in the list *Fields* for the selected field, clicking on *Add selected Fields to new Layer(s)* creates a new readings layer without further enquiry.

The created readings layers are displayed in the list *Readings Layers* as well as in the *Layer Manager* (see sect. 4.6).

One or several fields can be added to an existing readings layer. Select the readings layer, where you want to add the fields, from the list *Readings Layers* and the desired fields from the list *Fields* and click on the button *Add selected Fields to selected Layer*.

Click in the lists *Readings Layers* and *Fields of the selected Readings Layer* on the button



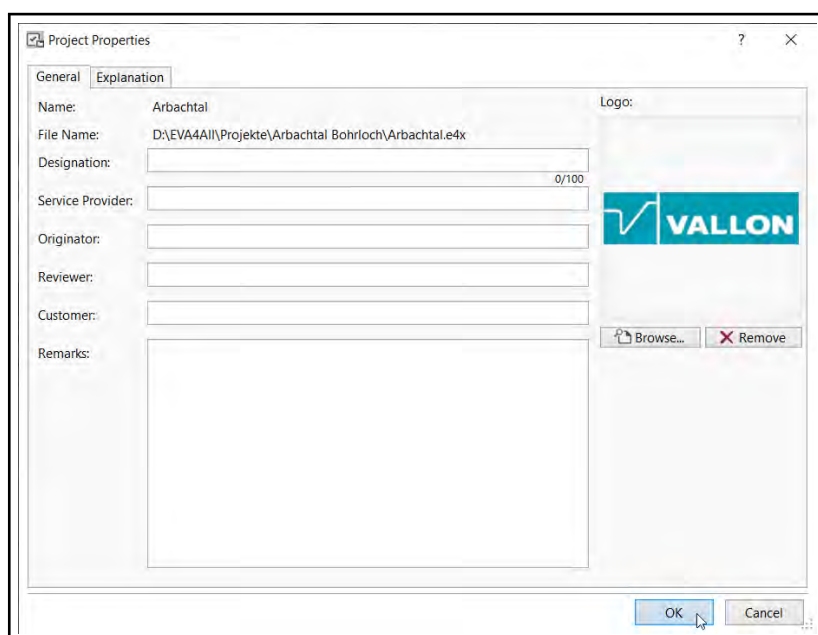
to delete fields and readings layers.

Evaluate Fields see sect. 6.3.

4.2.2.2 Project Properties

In the window *Project Properties* details and information about the project like e.g. project name, customer, remarks etc. can be entered in the individual fields, as well as a company logo.

This information and the company logo also appear in the project report (see sect. 4.2.6).



Click in the tab *Project* (see sect. 4.2.2 on page 28) on the button *Project Properties*.

Tabs *General* and *Explanation*: Enter information about the project. Click with the cursor in the corresponding field and type the text with the keyboard.

Logo: Save a company logo. Click on the button *Remove* to delete the current logo. Click on the button *Browse* to select and save a new logo.

Fig. 4.2.10: Project properties

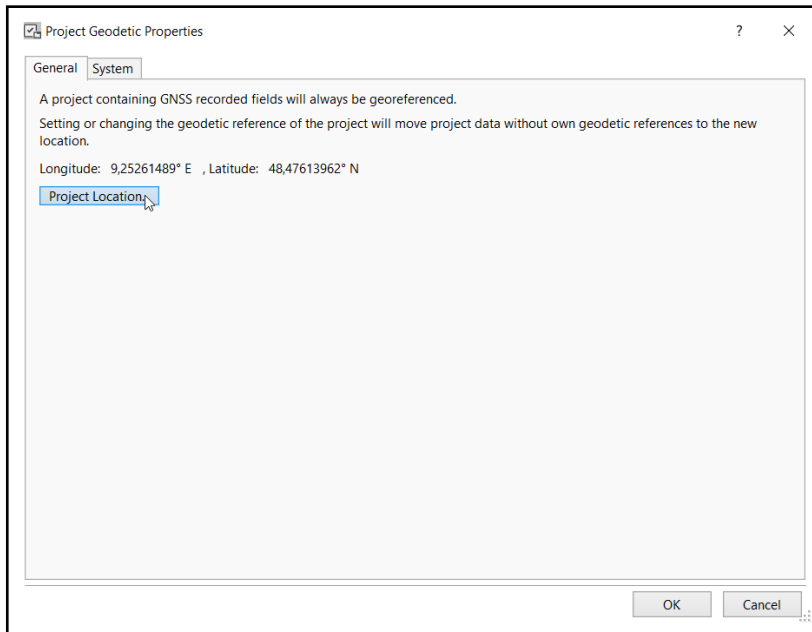
Evaluate Fields see sect. 6.3.

4.2.2.3 Geodesy

In the window *Project Geodetic Properties* the project origin can be defined or moved, and the coordinate reference system for the project can be selected.

Attention! Only change the settings in this window, if you have sufficient experience with coordinate reference systems and geodetic calculations.

Tab General:



Click in the tab *Project* (see sect. 4.2.2 on page 28) on the button *Geodesy* and then on the tab *General*.

A non-georeferenced project can be georeferenced here by entering WGS84 coordinates or by determining the project origin on the map. When a project is not georeferenced, a corresponding message appears in the window.

The origin of a georeferenced project can be moved.

Fig. 4.2.11: Geodetic Properties, General

Click on the button *Project Location*. The window *Location Entry - Geodetic Reference* opens.

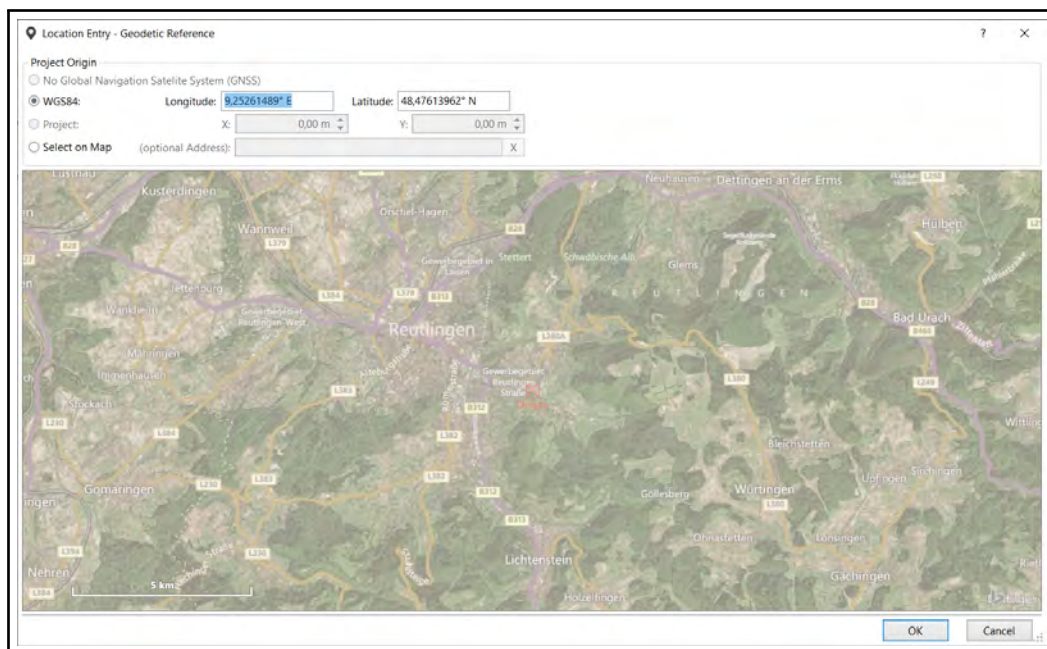


Fig. 4.2.12: Project origin

No GNSS:

The project is not georeferenced. You can georeference the project by entering WGS84 coordinates or by determining the project origin on the map. Select the desired background for the map in the layer manager [4.6](#).

WGS84:

Determine the project origin of a non-georeferenced project by entering WGS84 coordinates. Move the project origin of a georeferenced project by entering new WGS84 coordinates.

Project:

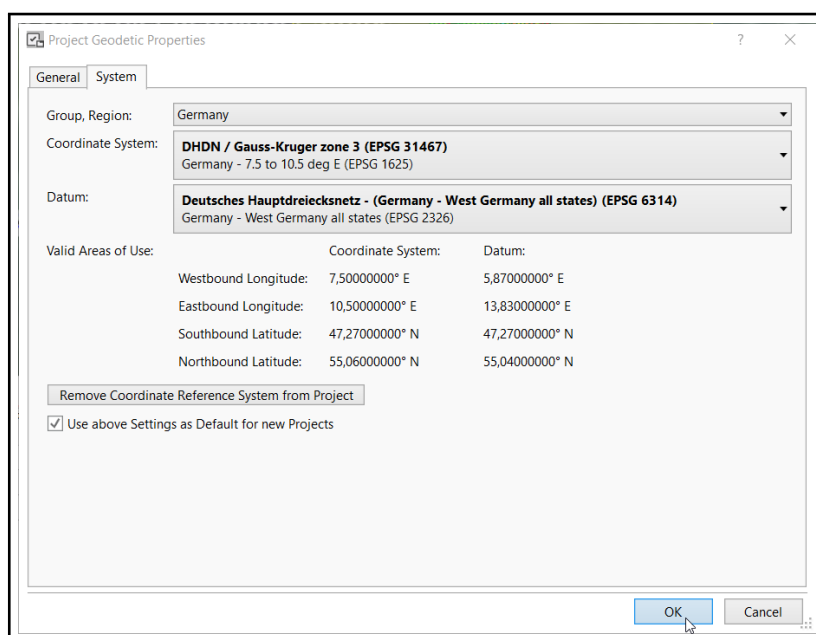
Is only active when creating a new field (see sect. [4.2.2.7](#)).

Select on Map:

You can select the project origin directly on the map (internet connection required). Zoom and move the map (turn mouse wheel or hold down the left mouse button) until the desired project origin is in the middle of the map (origin, red marking). You can also define the project origin by entering an address in the field *Optional Address*. After determining the project origin click on the button *OK*.

Tab System:

The desired coordinate reference system for the project can be defined here.



Click in the tab *Project* (see sect. [4.2.2](#)) on the button *Geodesy* and then on the tab *System*.

Selection of the coordinate reference system for the project.

All available coordinate systems for different regions are displayed.

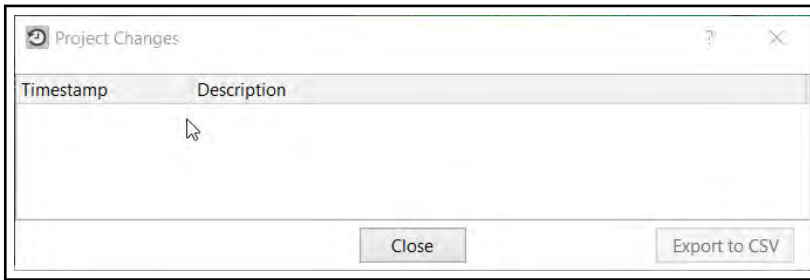
Fig. 4.2.13: Geodetic Properties, System

First select the region in which the data recording for the current project took place in the drop-down menu *Group, Region*, then select the corresponding coordinate system in the drop-down menu *Coordinate System*.

If the project does not lie in the area valid for the selected coordinate system, a corresponding note in red appears in the window. In this case select the coordinate system that corresponds to the recorded data. Clicking on the button *Remove Coordinate Reference System from Project* deletes the selection in this window.

4.2.2.4 Change History

Important changes to the project are displayed in the window *Project Changes*.



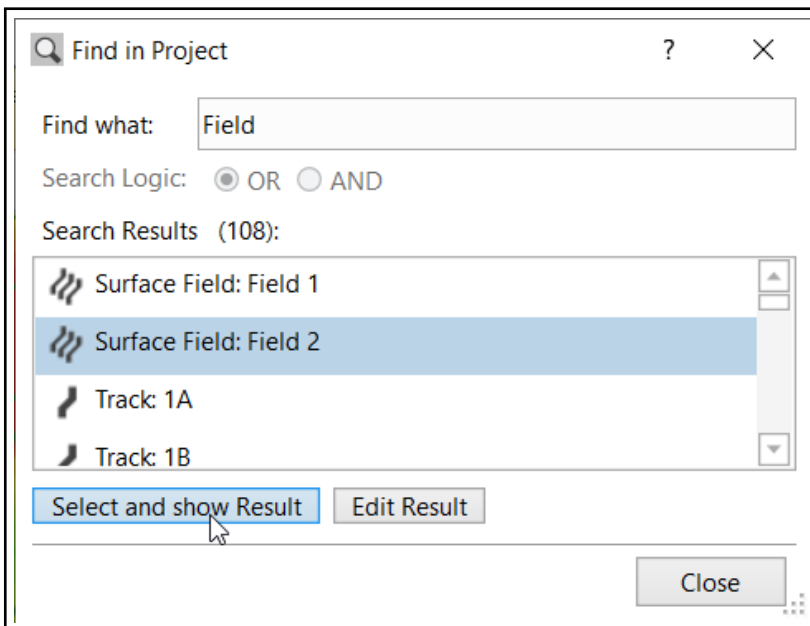
Click in the tab *Project* (see sect. 4.2.2 on page 28) on the button *Change History*.

Fig. 4.2.14: Project Changes

Click on the button *Export to CSV* to export the list in CSV format (*.csv) to the desired location.

4.2.2.5 Find in Project

The window *Find in Project* offers a convenient search function for fields, tracks, targets... within a project.



Click in the tab *Project* (see sect. 4.2.2 on page 28) on the button *Find in Project*.

Fig. 4.2.15: Find in Project

Click with the cursor in the line *Find what* and use the keyboard to enter a keyword for the object you are looking for, e.g. field.

Select the desired field in the selection window *Search results* and click on the button *Select and show Result*. The field you are looking for is now displayed in the window.

When you click on the button *Edit Result*, the window *Properties* for this field opens. Here you can enter or change details or information about the field. Further information can be found in sect. [Field Properties](#) on page 42.

If you select a track in the selection window *Search Results* and click on the button *Select and show Result*, the track you are looking for is marked in color in the field.

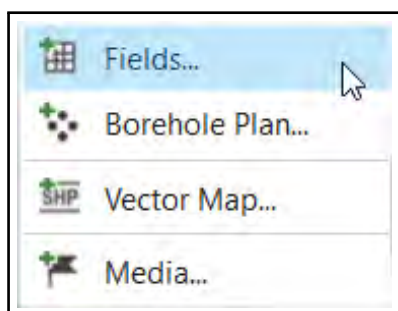
Clicking on the button *Edit Result* opens the window *Track Properties* for this track. Further

information can be found in sect. [Track Properties](#) on page 48.

If several search words are entered in the line *Find what*, the search logic *OR / AND* becomes active.

4.2.2.6 Add File

You can add different files to the project such as fields, borehole plans, vector maps and media in different file formats. These are then displayed in the project explorer (see sect. 4.5) in the corresponding folders and can also be deleted there (right mouse click).



Click in the tab *Project* (see sect. [Tab Project](#) on page 28) on the button *Add File*.

Click in the drop-down menu on the object that you want to add to the project and select it in the selection window that opens.

Fig. 4.2.16: Add File

The list of file formats for fields, vector maps, borehole plans, media... that can be imported is constantly being expanded. You can see the importable file formats in the respective selection window at the bottom right of the drop-down menu.

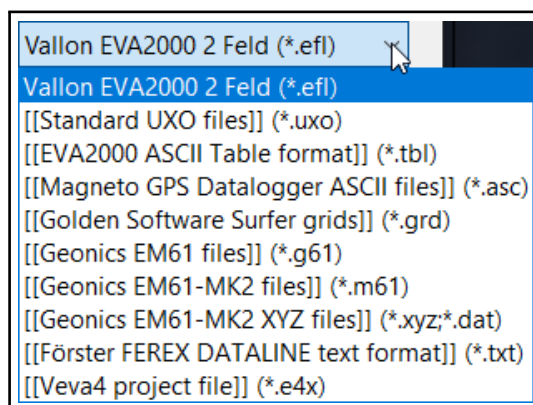


Fig. 4.2.17: Importable file formats

Fields:

You can add one or more existing fields to the project in different formats. In addition to the *.efl (EVA2000) and *.e4x (EVA4mobile) formats, various other formats are available for this purpose.

Select the desired field in the selection window *Add existing field(s)* and click on the button *Open*. See also sect. 4.2.1.4 on page 21.

If a project is not georeferenced, it will adopt the origin of the georeferenced field being imported. A double-click on the field in the project explorer navigates to the field on the map. You can also add individual fields from other e4x project files to the open project. To do this, select the format *Veva4-project file(*e4x)* from the drop-down menu at the bottom right of the selection window *Add existing field(s)* and then navigate to the desired e4x project file. Double-clicking on the e4x project file opens a window with the individual fields in this project.

Select the desired field and click on the button *OK*. The selected field is imported into the project.

Evaluate Fields see sect. 6.3.

Borehole Plan:

A borehole plan is a list of borehole coordinates that can be displayed on a borehole field. You can add borehole plans to the project. Select the desired borehole plan in the selection window *Add Borehole Plan(s)* and click on the button *Open*.

See also sect. 4.2.1.4 on page 21.

The added borehole plan is displayed in the project explorer (see sect. 4.5). Right-click in the project explorer on the borehole plan and select the desired editing option from the context menu. With *Create field from plan* you can create a new borehole field on the map from the borehole plan.

Vector Map:

Add ESRI® shapefiles (*.shp) and CAD drawings (*.dxf) to the project.

Georeferenced ESRI® shapefiles and georeferenced CAD drawings can be added to the project and displayed on the map.

See also sect. 4.2.1.4 on page 21.

Select the desired shapefile or drawing in the selection window *Add one or more Vector Maps* and click on the button *Open*.

You can also open the selection window *Add one or more Vector Maps* by right-clicking in the project explorer on *Vector Maps* and then left-clicking on *Add Vector Maps*.

NOTE: When adding shapefiles, all required additional data such as index and attributes must be present in the same directory.

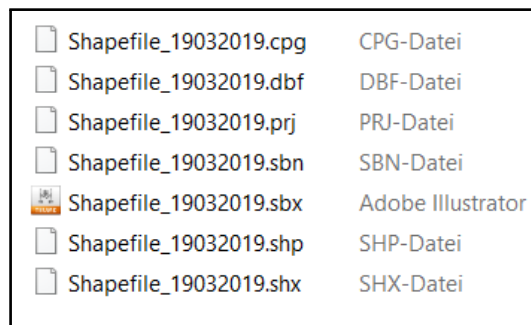


Fig. 4.2.18: import shapefile

When inserting shapefiles and DXF data, the corresponding coordinate system must be known and specified.

Select the region, the coordinate system and the date in the window *Shapefiles Geodetic Properties*.

The added shapefile/DXF appears in the project explorer in the directory *Vector Maps*. A double-click on the shapefile/DXF navigates to the corresponding position in the map.

Media:

Add other files to the project such as photos, videos, PDFs etc.

Select the desired file in the selection window *Add Media File(s)* and click on the button *Open*.

In the window *Media Element Properties* you can determine various insertion and display options depending on the type of the file to be inserted (*.jpeg, *.pdf, *.wav, *.avi...). You can

for example determine whether an added image or the icon of the inserted PDF is displayed on the map or not. Then click on the button *OK*. After inserting the element, you can move it to the desired position in the display window or change its size.

For added files or media a new layer *Media* is created in the layer manager (see sect. 4.6).

You can open the window *Media Element Properties* again by double-clicking on the corresponding element in the display window and add further information or change settings.

A right mouse click on the element in the map or in the project explorer opens a context menu with various options. Among other things, you can use *Lock Position* to lock the element against moving.

NOTE: Media such as images, PDFs etc. can be placed on the map via drag & drop from the file explorer.

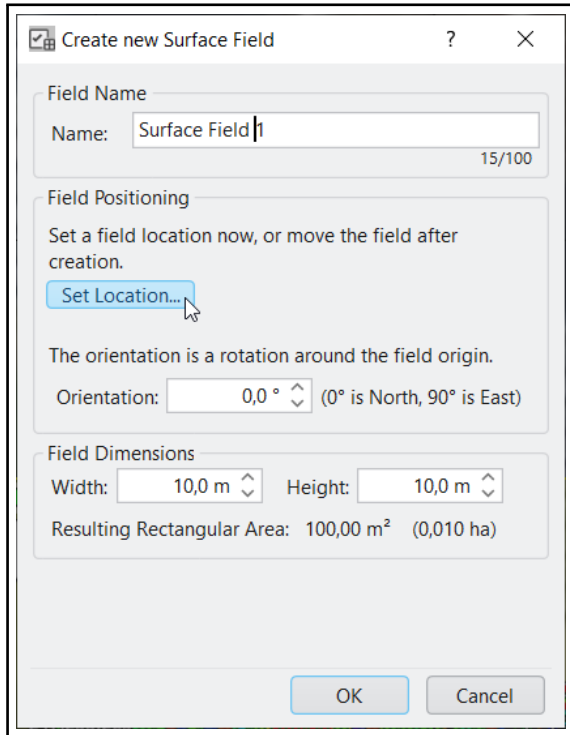
Images in GeoTIFF data format can also be added to the project. These contain additional data about the georeference and are thus placed georeferenced on the map.

4.2.2.7 New Surface Field

New, empty surface fields can be created in the currently open project. These fields can be transferred to the field computer for data recording. (see sect. [Transfer the data](#) on page 127).

Creating a new project see page 19.

Opening an existing project see page 21.



Click on the tab *Project* (see sect. 4.2.2 on page 28) on the button *New Surface Field*.

You can also open this window by clicking in the tab *File* (see sect. 4.2.1 on page 18) on the button *New* and then on *New Surface Field*.

Field Name: Enter the desired name of the new surface field in the input field *Name*.

Field Dimensions: Enter the desired dimensions of the new surface field in the input fields *Width* and *Height*.

Fig. 4.2.19: New Surface Field

Field Positioning:

Click on the button *Set Location* and define the origin of the new field in the window *Field Origin*. There are several options available for this. The defined field origin is indicated in the display window by a red cross.

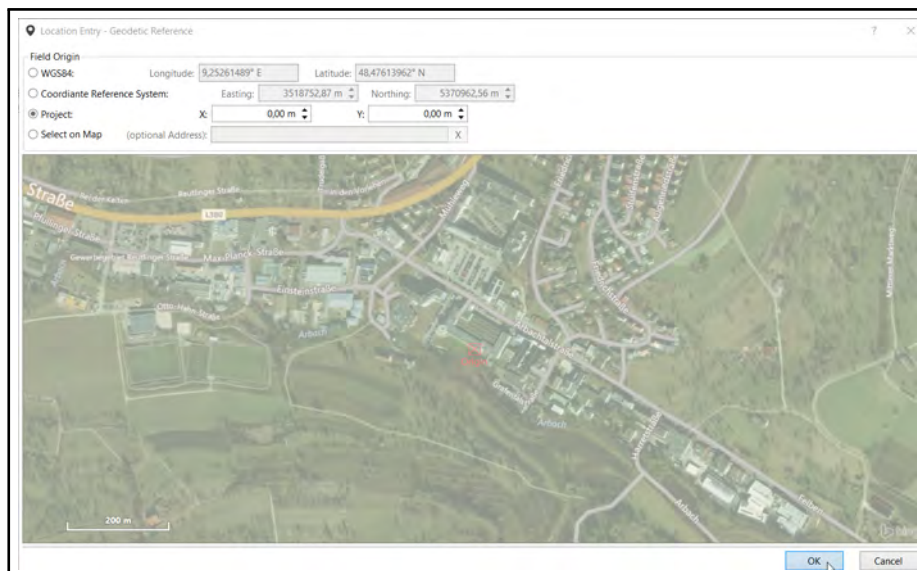


Fig. 4.2.20: Field Origin

WGS84:

Enter the WGS84 coordinates for the desired field origin here.

Coordinate Reference System:

Enter the coordinates of the selected CRS (coordinate reference system) for the desired field origin.

Project:

If the values are 0.00 in both input fields X and Y, the origin of the new field is on the project origin. The project origin is already marked by a red cross in fig. 4.2.20. Information on the definition of the project origin can be found in sect. 4.2.1.3 on page 19.

If the origin of the field must not be be on the project origin, you can change the values in the input fields X and Y to move the origin of the field accordingly.

Select on Map:

You can choose the origin of the field by entering an address or directly on the map (internet connection required). Zoom and move the map (turn mouse wheel or hold down left mouse button) until the desired field origin lies in the middle of the map (origin, red marking).

Orientation:

Enter the desired orientation of the field here.

Note: Fields without georeferencing or fields that were later georeferenced are always oriented to the north in georeferenced projects.

Click on the button *OK*. The new field appears in the display window. The field name is displayed at the top of the field.

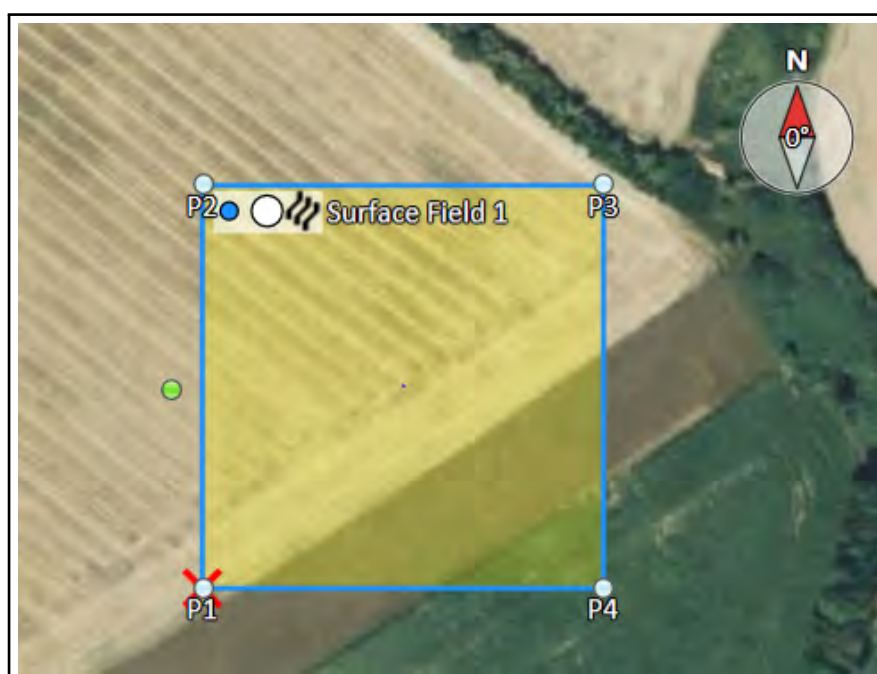


Fig. 4.2.21: Creating a new field

In fig. 4.2.21 you see the project origin marked by a red X. The 4 corners of the field are marked with P1 - P4, and the origin of field P1 lies on the project origin. You can now rotate and move the field with the mouse, and change its shape and size. Move the cursor on the

green point and rotate the field with the left mouse button pressed. The field is rotated around the field origin.



Fig. 4.2.22: Aligning orientation, shape and size of the new field

Proceed in this way, when you want to create further fields in this project.



Fig. 4.2.23: Creating further fields

Information on the different colors of the field outlines can be found in sect. 4.5 and 4.6.2.

4.2.2.8 New Borehole Field

To create a new borehole field follow the description for creating a new surface field in sect. [New Surface Field](#) on page 38.

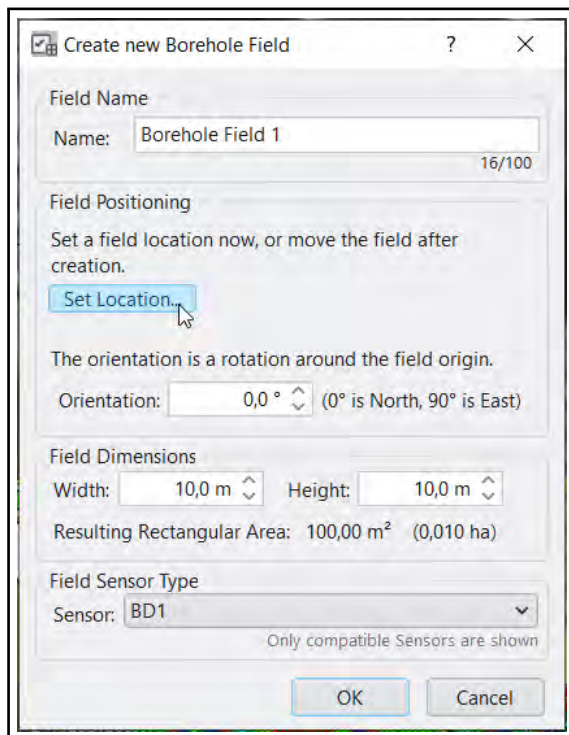


Fig. 4.2.24: New Borehole Field

Click in the tab *Project* (see sect. [4.2.2](#) on page 28) on the button *New Borehole Field*.

You can also open this window by clicking in the tab *File* (see sect. [4.2.1](#)) on *New* and then *New Borehole Field*.

Field Name: Enter the desired name of the new borehole field in the input field *Name*.

Field Positioning: Define the origin of the field. See sect. [4.2.2.7](#) for this.

Field Dimensions: Enter the desired dimensions of the new borehole field in the input fields *Width* and *Height*.

Field Sensor Type: Select the sensor used for data recording from the drop-down menu. All compatible sensors are shown here.

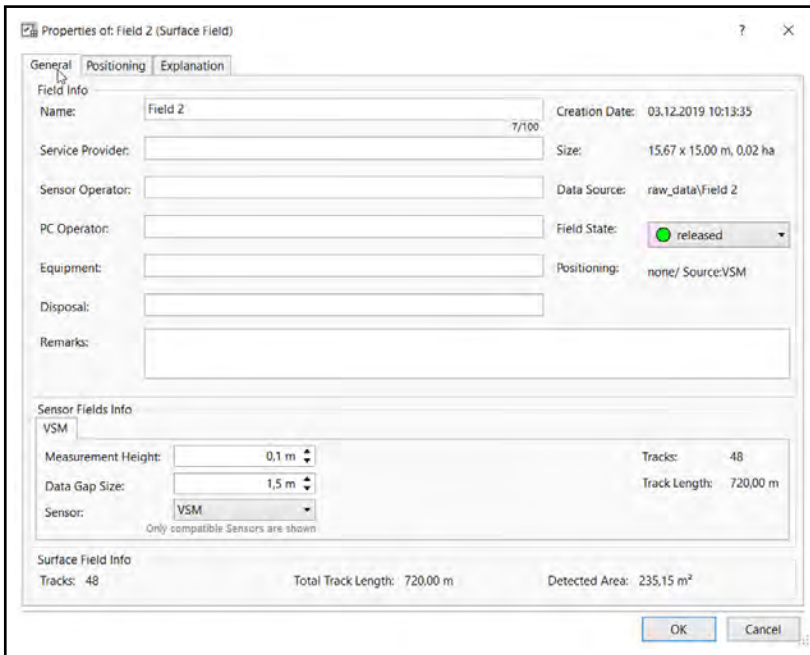
Clicking into the borehole field, the tab *Borehole Field* appears among the tabs. Here you can add boreholes individually or in different patterns to the borehole field.

Information on the tab *Borehole Field* can be found in sect. [4.2.7](#) on page 87.

4.2.2.9 Field Properties

In the window *Field Properties* you can enter information about the active surface / borehole field or view information and properties of the active field and, if required, change and complete them. These details and information also appear in the project report (see sect. 4.2.6 on page 82).

When a project has several fields, click in the project explorer (see sect. *Project Explorer* on page 105) or in the map on the field for which you want to open the window *Field Properties*.



The screenshot shows the 'Field Properties' window for 'Field 2 (Surface Field)'. The 'General' tab is selected. The 'Field Info' section includes fields for Name, Service Provider, Sensor Operator, PC Operator, Equipment, Disposal, and Remarks. The 'Sensor Fields Info' section shows 'VSM' as the sensor, with measurement height (0.1 m) and data gap size (1.5 m). The 'Surface Field Info' section shows 48 tracks, a total track length of 720.00 m, and a detected area of 235.15 m². The 'Field State' is set to 'released' with a green indicator.

Click in the tab *Project* (see sect. 4.2.2), in the tab *Field* (see sect. 4.2.3) or in the tab *Borehole Field* (see sect. 4.2.7) on the button *Field Properties*.

You can also open this window by double-clicking the left mouse button in a field on the map or by right-clicking the mouse and click in the context menu on *Properties*.

Click on the tab *General*.

Fig. 4.2.25: Field Properties, General

In the left column of this window, general information about the field (such as field name, service provider, equipment used for data recording etc.) can be viewed or entered. Click with the cursor in a input field to make new entries or change or delete existing information.

The right and bottom columns contain information on the creation date of the field, its size, positioning (without / with GNSS), data recording (used sensors, measuring height) and the recorded tracks.

NOTE: Depending on the selected field (surface field or borehole field) the drop-down menu *Sensor* displays the respective compatible sensors.

The processing state of the field can be specified in the drop-down menu *Field State*. A color code is assigned to every processing state. The corresponding color code appears as an icon in the top left of the field (see sect. *Field symbols* on page 103).

Information about *Data Gap Size* can be found in sect. *Color Editor* on page 115.

Click on the tab *Positioning*.

Field position by origin and orientation: The origin (button *Set*) and the orientation of the field are displayed and can be changed.

Further information can be found in sect. [New Surface Field](#) on page 38 and in sect. [Geodesy](#) on page 32.

Field position by two points: Fields can be georeferenced here by entering the local coordinates and the GNSS coordinates (button *Set*) of two points / boreholes.

A checkmark at *Field locking* locks the field, tracks and boreholes against moving. See also sect. [Position Lock](#) on page 44.

Field Points shows the coordinates of the origin and corner points of the field.

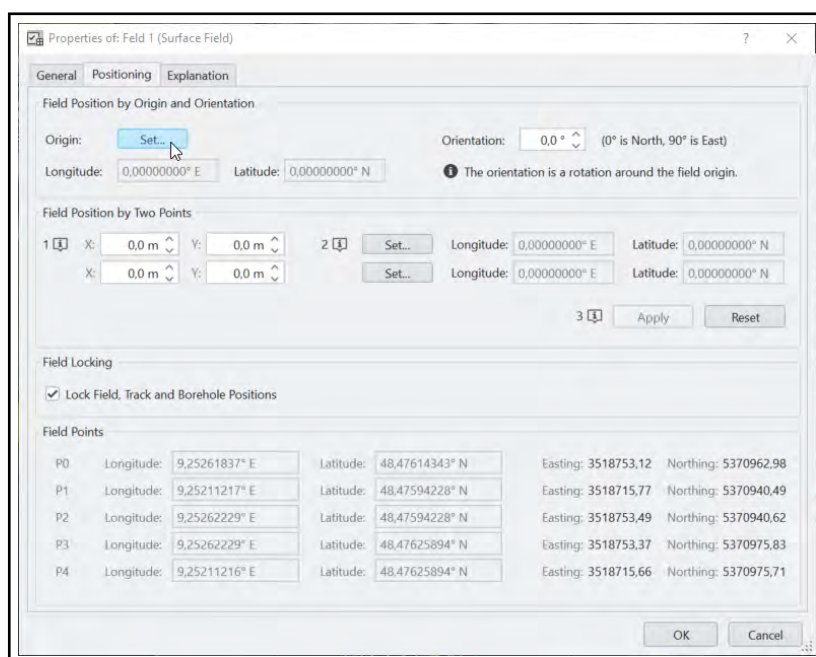


Fig. 4.2.26: Field Properties, Positioning

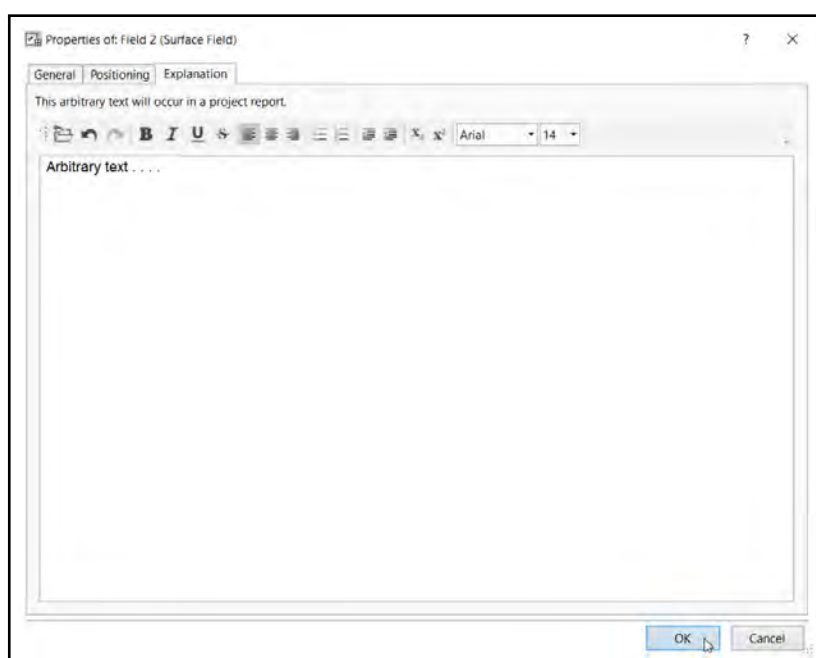


Fig. 4.2.27: Field Properties, Explanation

Click on the tab *Explanation*.

Here you can insert text files in *.rft and *.txt format, or enter further details and information about the field using the keyboard. You can format the entered text (font, size,...). This format is adopted in the project report.

Close the window by clicking the *OK* button.

4.2.2.10 Position Lock

Locking fields, tracks and boreholes against moving and rotating.

The position lock is activated by default and all fields, tracks, boreholes as well as evaluated targets are locked against moving and rotating.

The position lock can be deactivated.

ATTENTION: Unlocking can result in unintentional moving of fields, tracks and boreholes and thus lead to errors in the evaluation.

When a field is moved or rotated, objects that have already been evaluated are moved / rotated with it.



Click in the tab *Project* (see sect. 4.2.2 on page 28) on the button *Position Lock*.

Choose in the drop-down menu, if you want to lock only the active field or all fields in this project against moving.

Locked fields can also be unlocked here.

Fig. 4.2.28: Position Lock

See also *Position Lock* in sect. *Field Properties* on page 42

When the position lock is active, there is a corresponding icon in the top left of the field (see also sect. *Field symbols* on page 103).

NOTE: When EVA4ALL is restarted, the position lock is active again and all map elements are locked against moving.

4.2.3 Tab Field

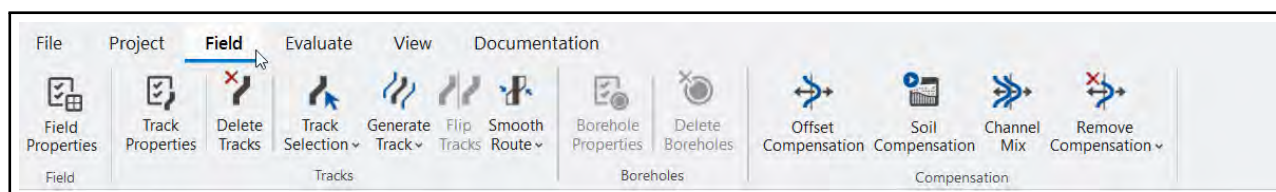
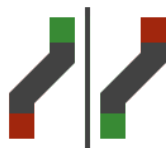
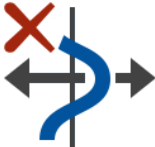


Fig. 4.2.29: Tab *Field*

Symbol	Name	Description
	Field Properties	<p>Opens the window <i>Properties of Field</i>. The button <i>Field Properties</i> is only active, when the current project contains a surface field or a borehole field. See sect. Field Properties on page 42.</p>
	Track Properties	<p>Opens the window <i>Track Properties</i>. The button <i>Track Properties</i> is only active, when a track has been selected by clicking. See sect. Track Properties on page 48.</p>
	Delete Tracks	<p>Click on a track in the field - the button <i>Delete Tracks</i> becomes active. Click on the button <i>Delete Tracks</i> and confirm in the <i>Delete Operation</i> window with <i>Yes</i> to delete the selected track. For clicking on several tracks, keep the button <i>CTRL</i> pressed.</p>
	Track Selection	<p>Click on the button <i>Track Selection</i> and select among the following options in the drop-down menu: <i>Select Forward Tracks</i>: All tracks in the active field are marked, for which the data recording took place in the forward direction. <i>Select Backward Tracks</i>: All tracks in the active field are marked, for which the data recording took place in the backward direction. <i>Invert Track Selection</i>: Marked and unmarked tracks are inverted. <i>Select same Array Sensor Tracks</i>: All tracks recorded with the same probe are marked. Mark one track to activate this option. <i>Array Selection Mode</i>: When active (symbol with a blue background), all tracks recorded with the same sensor array can be marked.</p>

Symbol	Name	Description
	Generate Track	<p>For metal detectors with a coil size of more than 0,5 m it is possible to calculate additional reading right and/or left to the actual reading in the center to allow visualization of the readings covering the full area measured by the search coil.</p> <p>The button <i>Generate Track</i> is only active, when a track is selected in a readings layer with metal detector data. Further tracks can be generated to the right and/or left of this track.</p>
	Flip Tracks	<p>The direction of the selected tracks is reversed. This function can be helpful in correcting data recording errors, e.g. if the direction travel was not entered correctly in the field computer.</p>
	Smooth Route	<p>Smoothing the running route.</p> <p>The button <i>Smooth Route</i> is only active, when the active borehole field contains tracks that were recorded with GNSS.</p> <p>See sect. Smooth Route on page 48.</p>
	Borehole Properties	<p>Opens the window <i>Borehole Properties</i>.</p> <p>The button <i>Borehole Properties</i> is only active, when the current project contains a borehole field and a borehole has been selected.</p> <p>See sect. Borehole Properties on page 49.</p>
	Delete Boreholes	<p>Click on a borehole in the active borehole field - the button <i>Delete boreholes</i> becomes active. Click on the button to delete the selected borehole.</p> <p>For clicking on several boreholes, keep the button <i>CTRL</i> pressed.</p>
	Offset Compensation	<p>Compensating the recorded data.</p> <p>See sect. Offset Compensation on page 52.</p>
	Soil Compensation	<p>This button is active, when the data recording has been made with a metal detector.</p> <p>See sect. Soil Compensation on page 54.</p> <p>Information about soil compensation can also be found in the operation manual of the metal detector.</p>
	Channel mix	<p>This button is active, when the data recording has been made with a metal detector. Information about the channel mix can be found in the operation manual of the metal detector.</p>

Symbol	Name	Description
	Remove Compensation	<p>This button becomes active, when an offset compensation of the recorded data was made (see sect. Offset Compensation on page 52).</p> <p>You can remove the offset compensation that has been carried out.</p> <p>Select among the following options in the drop-down menu:</p> <p><i>Remove from active Field:</i> The compensation is removed from the active field.</p> <p><i>Remove from all Fields:</i> The compensation is removed from all fields of the project.</p>

4.2.3.1 Track Properties

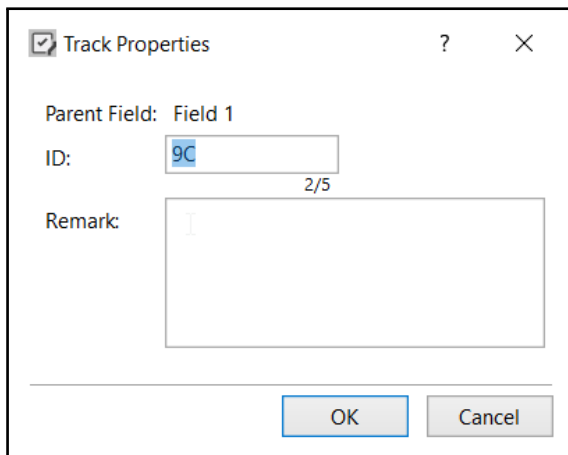


Fig. 4.2.30: Track Properties

Click on a track in the active field - the button *Track Properties* in the tab *Field* (see sect. 4.2.3 on page 45) becomes active.

Click on the button *Track Properties* - the window *Track Properties* appears on the screen. The identification of the track (ID) is displayed and can be renamed, if required. The new ID must always begin with a number, e.g. 1ABC.

Comments about the track can be entered in the field *Remark*.

NOTE: Renaming track identifications is not recommended.

4.2.3.2 Smooth Route

In case of GNSS recordings in the active field, this function smoothes the route taken by removing all small inaccuracies, e.g. due to inaccurate GNSS reception.

Click in the tab *Field* (see sect. 4.2.3 on page 45) on the button *Smooth Route* and select among the following options in the drop-down menu:

Apply Operation: Select in the window *Smooth Route* the desired *Interval Duration* between 0 and 20 seconds and click on the button *OK* or *Apply*, in order to start to smooth the route. The degree of smoothing can be influenced by the interval duration. The greater the interval duration, the more inaccuracies are removed.

Remove from active field: The smoothing of the route is removed from the active field.

Remove from all fields: The smoothing of the route is removed from all fields of the project.

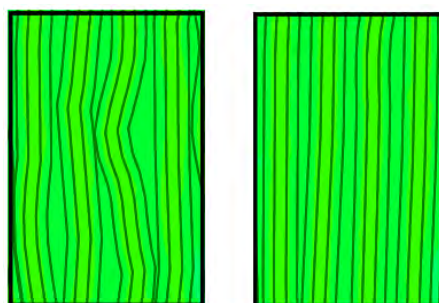


Fig. 4.2.31: Smooth the route

Example image on the left: Route before smoothing.

Example image on the right: Route after smoothing.

When the route has been smoothed, a corresponding icon appears in the top left of the field (see sect. *Field symbols* on page 103).

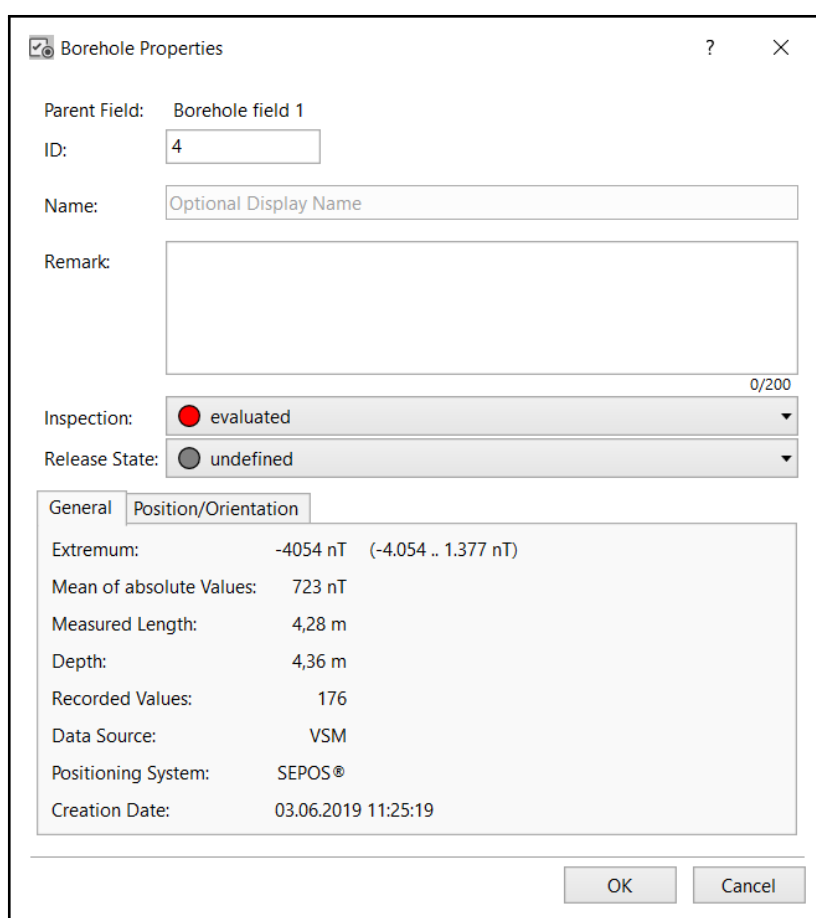
4.2.3.3 Borehole Properties

Open a borehole field (see sect. 4.2.1.4 on page 21).

In the window *Borehole Properties* you will find information about the currently active borehole. You can change the borehole's ID and assign a name, as well as define or change the position of the borehole. These details and information also appear in the project report (see sect. 4.2.6).

The boreholes in the borehole field are color-coded. Information on this can be found in sect. *Color Editor Borehole* on page 122.

Click with the cursor on a borehole, in order to make this borehole the active borehole. The active borehole is framed in red and the button *Borehole Properties* is active.



The screenshot shows the 'Borehole Properties' dialog box with the 'General' tab selected. The 'Parent Field' is 'Borehole field 1'. The 'ID' is '4'. The 'Name' is 'Optional Display Name'. The 'Remark' field is empty. The 'Inspection' status is 'evaluated' (indicated by a red circle). The 'Release State' is 'undefined' (indicated by a grey circle). The 'General' tab is active, showing the following data:

Extremum:	-4054 nT	(-4.054 .. 1.377 nT)
Mean of absolute Values:	723 nT	
Measured Length:	4,28 m	
Depth:	4,36 m	
Recorded Values:	176	
Data Source:	VSM	
Positioning System:	SEPOS®	
Creation Date:	03.06.2019 11:25:19	

At the bottom are 'OK' and 'Cancel' buttons.

Click in the tab *Field* (see sect. 4.2.3 on page 45) on the button *Borehole Properties*.

Click in on the tab *General*.

You can also open this window by double-clicking on the borehole with the left mouse button or by right-clicking and selecting *Properties* in the context menu.

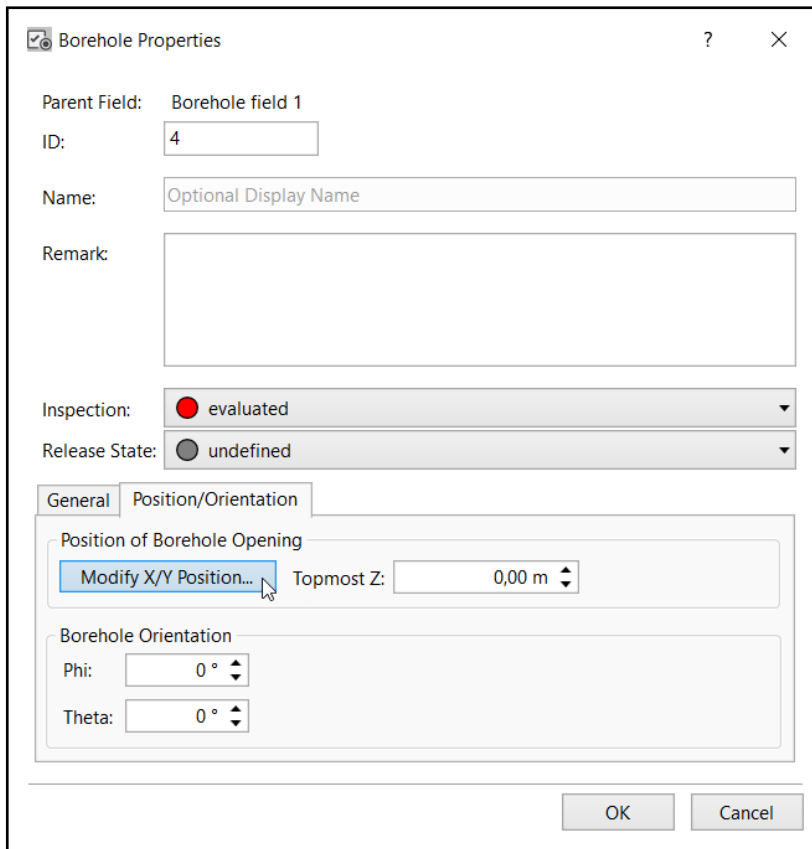
Fig. 4.2.32: Borehole Properties, General

The processing status of the borehole can be specified in the drop-down menus *Inspection* and *Release State*. Every processing status has its own color code. The borehole is colored according to the selected *Release State*.

In the lower area of this window you will find information about the borehole such as the creation date, the positioning system and sensor used for data recording as well as other data like extremum, borehole length and depth etc..

NOTE: The measured borehole length is shorter than the actually drilled borehole length (depth) as the measuring point is in the center of the probe.

When creating a project report (see sect. 4.13), it can be selected whether the measured borehole length or the actually drilled total length of the borehole should be displayed in the report.



Borehole Properties

Parent Field: Borehole field 1

ID: 4

Name: Optional Display Name

Remark:

Inspection: ● evaluated

Release State: ● undefined

General | **Position / Orientation**

Position of Borehole Opening

Modify X/Y Position... Topmost Z: 0,00 m

Borehole Orientation

Phi: 0 °

Theta: 0 °

OK Cancel

Click on the tab *Position / Orientation*.

The angle of inclination Φ and the angle of declination Θ are displayed and provide information about the orientation of the borehole. Information on this can be found in sect. 6.4.

Click on the button *Modify X/Y Position* to display or move the position of the borehole. The window *Borehole Top Location* opens.

Fig. 4.2.33: Borehole Properties, Position / Orientation

Attention! Only change the settings in this window, if you have sufficient experience with coordinate reference systems and geodetic calculations.

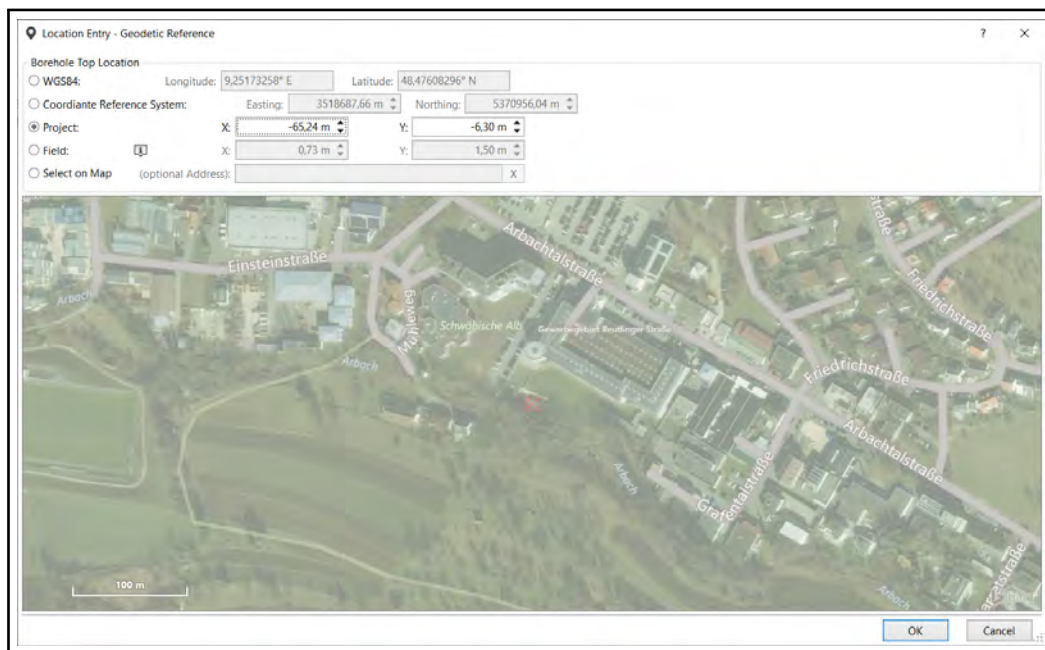


Fig. 4.2.34: Borehole Properties, Borehole Top Location

WGS84:

Determine the position of a non-georeferenced borehole by entering WGS84 coordinates. Move the position of a georeferenced borehole by entering new WGS84 coordinates.

Coordinate Reference System:

Enter the coordinates of the selected CRS (coordinate reference system) for the desired borehole position.

Project:

Distance of the borehole in X and Y directions from the project origin.

Field:

Distance of the borehole in X and Y directions from the field origin.

Select on Map:

You can select the borehole position directly on the map (internet connection required). Zoom and move the map (turn the mouse wheel or hold the left mouse button down) until the desired borehole position is in the middle of the map (red marking). You can also define the borehole position by entering an address in the input field *Address*. After determining the borehole position click on the button *OK*.

4.2.3.4 Offset Compensation

The offset compensation compensates a data offset in every single track (as caused e.g. by a bad probe compensation or a temperature drift).

Click in the tab *Field* (see sect. 4.2.3 on page 45) on the button *Offset Compensation*.

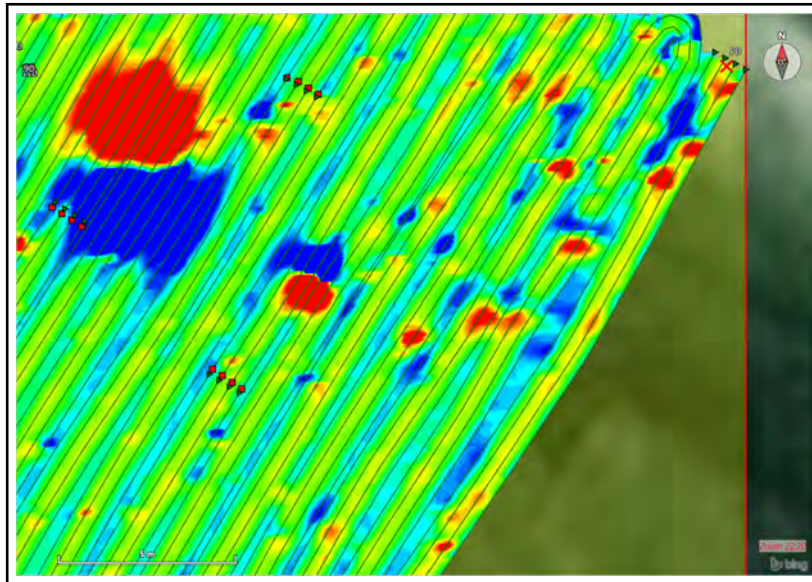


Fig. 4.2.35: Readings layer before offset compensation

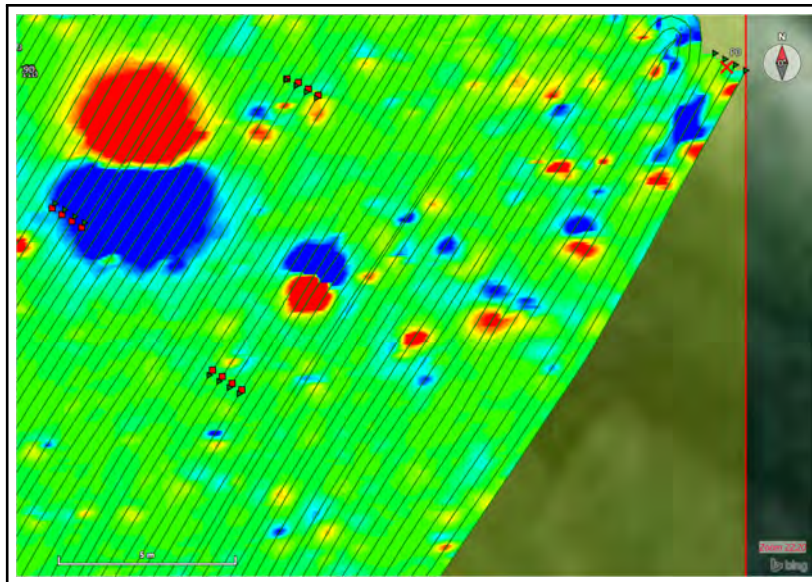


Fig. 4.2.36: Readings layer after offset compensation

ATTENTION: Before evaluating the recorded data (see sect. *Evaluate multiple Targets* on page 67 and *Evaluate single Target* on page 69) it is recommended to carry out an offset compensation for every readings layer.

When an offset compensation has been carried out, a corresponding icon appears in the top left of the field (see also sect. *Field symbols* on page 103).

Evaluate Fields see sect. 6.3.

NOTE: An offset compensation can be carried out for readings layers with magnetometer and metal detector data.

An offset compensation can have an effect on the number and position of the evaluated targets.

The readings layer fig. 4.2.37 was evaluated before the offset compensation.

The readings layer fig. 4.2.38 was only evaluated after the offset compensation.

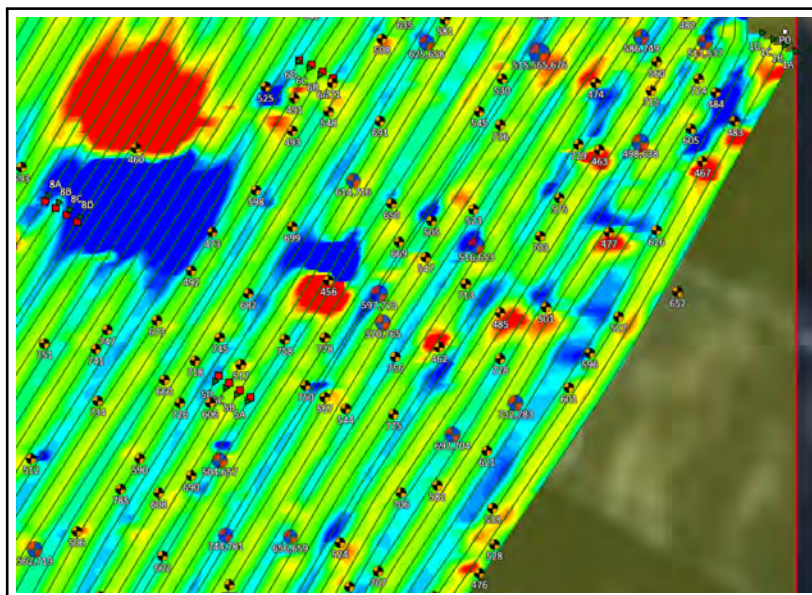


Fig. 4.2.37: Readings layer evaluated before offset compensation

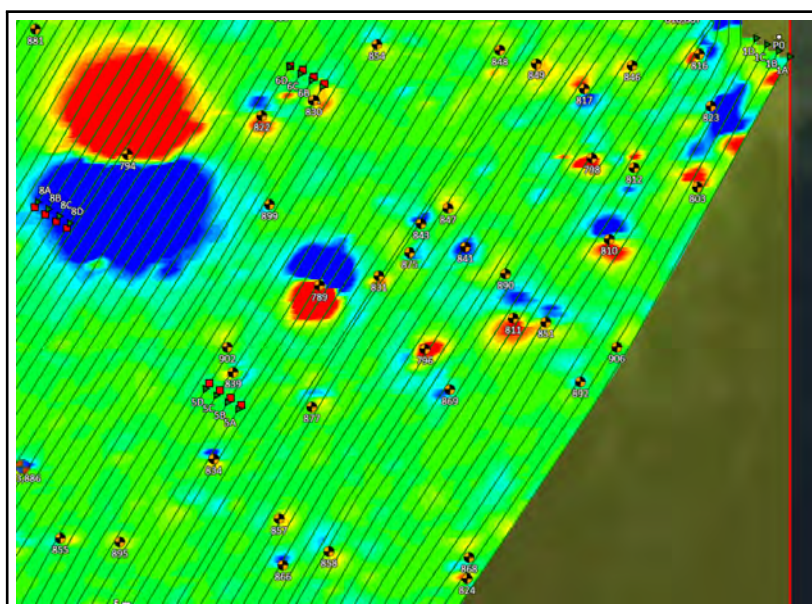


Fig. 4.2.38: Readings layer evaluated after offset compensation

Removing the compensation from the field see sect. 4.2.3.

4.2.3.5 Soil Compensation

The soil compensation can be carried out for readings layers with metal detector data.

The soil compensation compensates unwanted signals or anomalies that may emanate from mineralized soil.

Click in the tab *Field* (see sect. 4.2.3 on page 45) on the button *Soil Compensation*.

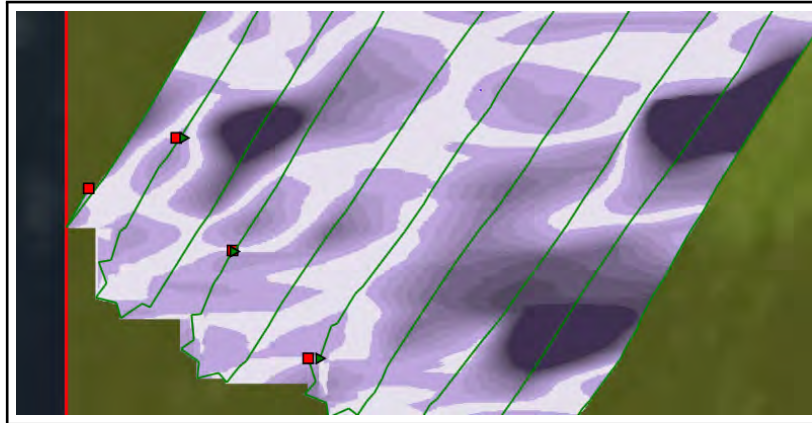


Fig. 4.2.39: Readings layer before soil compensation

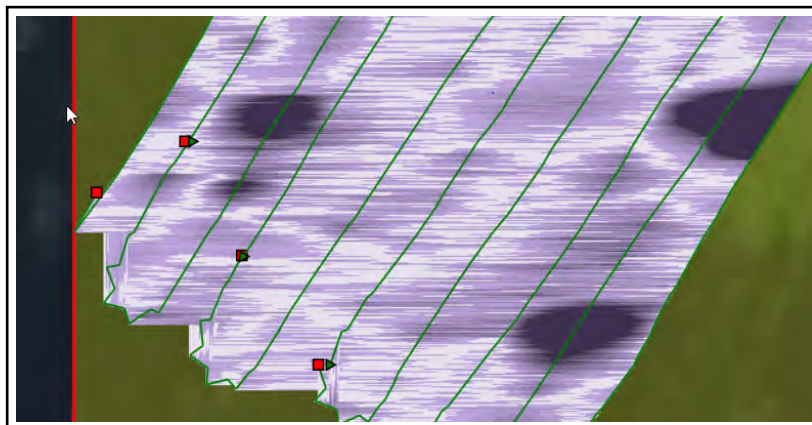


Fig. 4.2.40: Readings layer after soil compensation

ATTENTION: Before evaluating the recorded data (see sect. [Evaluate multiple Targets](#) on page 67 and [Evaluate single Target](#) on page 69) it is recommended to carry out a soil compensation.

When a soil compensation has been carried out, a corresponding icon appears in the top left of the field (see also sect. [Field symbols](#) on page 103).

Evaluate Fields see sect. 6.3.

A soil compensation can have an effect on the number and position of the evaluated targets. The readings layer fig. 4.2.41 was evaluated before the soil compensation. The readings layer fig. 4.2.42 was only evaluated after the soil compensation.

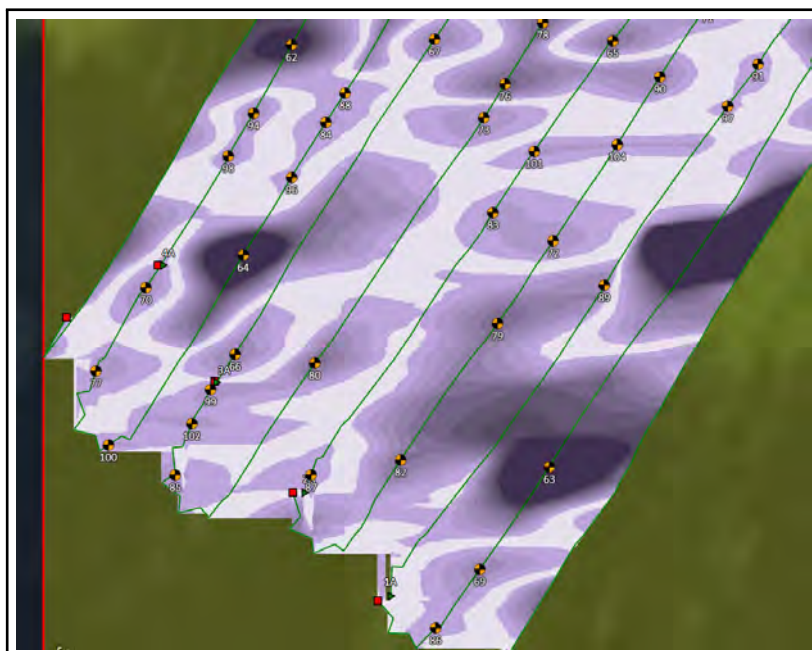


Fig. 4.2.41: Readings layer evaluated before soil compensation

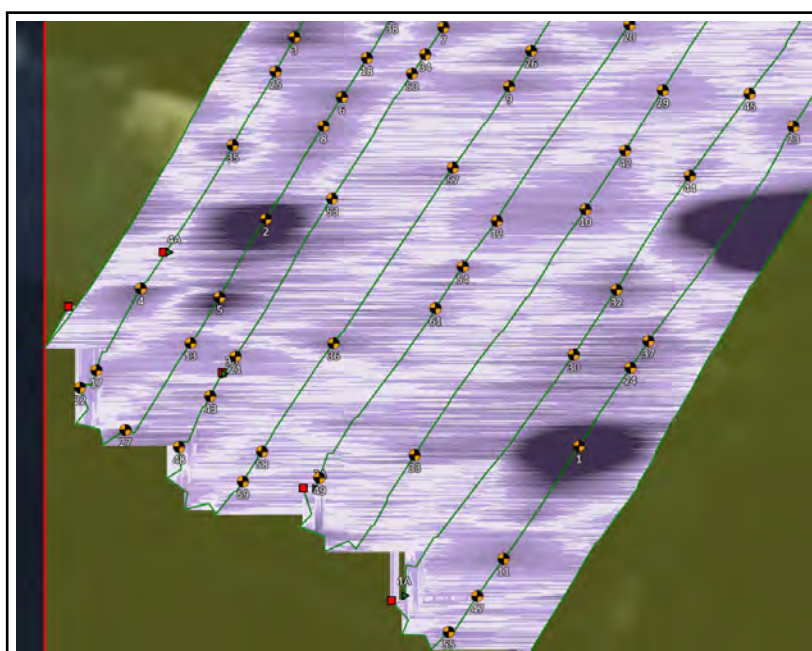


Fig. 4.2.42: Readings layer evaluated after soil compensation

Removing the compensation from the field see sect. 4.2.3.

4.2.4 Tab Evaluate

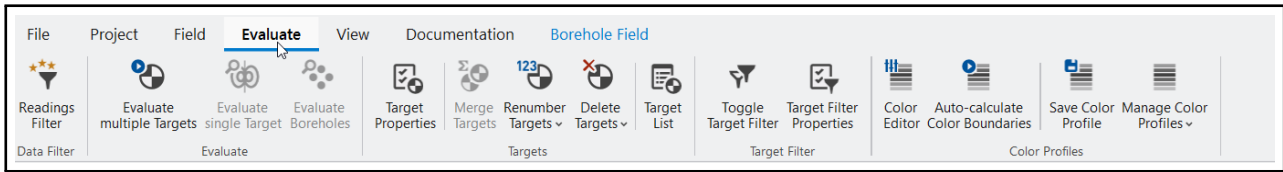
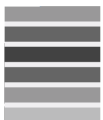


Fig. 4.2.43: Tab Evaluate

Symbol	Name	Description
	Readings Filter	Create a new filter layer and allow the visualization of the recorded data using different filters. See sect. Readings Filter on page 60 and Color Map Layer Properties on page 63.
	Evaluate multiple Targets	Evaluate multiple targets in the selected readings layer or in the marked area and create a target list. See sect. Evaluate multiple Targets on page 67.
	Evaluate Single Target	Evaluate a single target in the selected readings layer or in the marked area and create a target list. See sect. Evaluate single Target on page 69.
	Evaluate Boreholes	Evaluate boreholes in the selected readings layer and create a target list. See sect. Evaluate Boreholes on page 71.
	Target Properties	View and change target properties. See sect. Target Properties on page 74. NOTE: This button becomes active, when targets have been evaluated (see sect. Evaluate multiple Targets on page 67 and Evaluate single Target on page 69) and when a target has been marked on the map or in the target list.

Symbol	Name	Description
	Merge Targets	<p>Two targets lying next to each other, one of which was evaluated from metal detector data and the other from magnetometer data, can be merged to a new target. To do this, mark the two targets in the target list or on the map (hold down the button CTRL). The targets must not be too far apart. Click on the button <i>Merge Targets</i> and you will get an additional target in the target list and on the map. This target has a new number with an underscore (e.g. 1_2). In the column <i>Remark</i> of the target list it is noted that this target was created by the function <i>Merge Targets</i>.</p> <p>NOTE: This button is only active, when targets have been evaluated and marked (see sect. Evaluate multiple Targets on page 67 and Evaluate single Target on page 69).</p>
	Rename Targets	<p>The targets on the map and in the target list are renumbered, e.g. when individual targets have been deleted and the numbering is no longer consecutive. Click on the button <i>Rename Targets</i> and select among the following options in the drop-down menu:</p> <p><i>Project</i>: All targets in the whole project are renumbered.</p> <p><i>Field</i>: All targets in the active field are renumbered.</p> <p><i>Selected</i>: Only the marked targets are renumbered.</p> <p><i>Filtered</i>: Only the targets, to which a target filter has been applied, are renumbered. (Target filter see sect. Target Filter Properties on page 76).</p> <p>NOTE: These options are only active, when targets have been evaluated and a target list has been created. (see sect. Evaluate multiple Targets on page 67 and Evaluate single Target on page 69)</p> <p>Select in the window <i>Rename Targets</i> in which field the targets are to be renumbered and with which number the renumbering is to start.</p> <p>If you want to add an addition to the numbers, you can enter it in the input field <i>Appendix</i>.</p>

Symbol	Name	Description
	Delete Targets	<p>Delete targets.</p> <p>Select among the following options in the drop-down menu:</p> <p><i>Project</i>: Deletes all targets in the project.</p> <p><i>Field</i>: Deletes all targets in the active field.</p> <p><i>Selected</i>: Deletes the marked targets in the active field.</p> <p><i>Filtered</i>: Deletes all visible, filtered targets in the active field.</p> <p><i>Hidden</i>: Deletes all targets in the active field that are hidden by a target filter.</p> <p>(Target filter see sect. Target Filter Properties on page 76.)</p> <p>NOTE: These options are only active, when targets have been evaluated (see sect. Evaluate multiple Targets on page 67 and Evaluate single Target on page 69).</p>
	Target List	<p>Open and close the target list.</p> <p>NOTE: This button only becomes active, when targets have been evaluated (see sect. Evaluate multiple Targets on page 67 and Evaluate single Target on page 69).</p> <p>Moving and docking the target list to different, predefined positions on the user interface see sect. Arrange user interface on page 14</p> <p>Detailed information on the target list can be found in sect. Target List on page 132.</p>
	Toggle Target Filter	<p>Switch the target filter on and off.</p> <p>The target filter is switched on, when this button has a blue background.</p> <p>Target filter see sect. Target Filter Properties on page 76.</p>
	Target Filter Properties	<p>View / enter / change filter criteria according to which the targets are filtered on the map and in the target list.</p> <p>For information on this see sect. Target Filter Properties on page 76.</p>
	Color Editor	<p>Show or hide the color editor.</p> <p>Color editor see sect. Color Editor on page 115.</p>

Symbol	Name	Description
	Auto-calculate Color Boundaries	The color scale (color representation on the map) for the measured values is calculated automatically. Information on this function can be found in sect. Color Editor on page 115.
	Save Color Profile	Save the currently set color profile. Information on this function can be found in sect. Color Editor on page 115.
	Manage Color Profiles	Manage saved, user-defined color profiles. NOTE: This button only becomes active, when user-defined color profiles have been created and saved. See sect. Manage Color Profiles on page 77.

4.2.4.1 Readings Filter

Different filters can be applied to the selected readings layer in order to filter out smaller targets. The measured value curve is smoothed.

By applying a filter, a corresponding filter layer will be created. Since a filter modifies your data, the filter layer is a safe way to experiment with filters without any effect to your raw data shown in the corresponding readings layer.

The lowpass filter is used for readings layers containing a large number of small targets in order find only the larger targets. This function can also be very helpful, when large targets are overlaid by smaller targets.

The FIR lowpass filter is also a lowpass filter that filters out short peaks or high frequencies of smaller targets. The signals of larger targets are retained.

The FIR lowpass filter filters with different filter parameters than the lowpass filter.

Readings filters can be applied to readings layers of surface and borehole fields.

Click in the layer manager (see sect. [Layer Manager](#) on page 107) on a readings layer. When the readings layer is visibly displayed, the corresponding field is framed in red on the map.

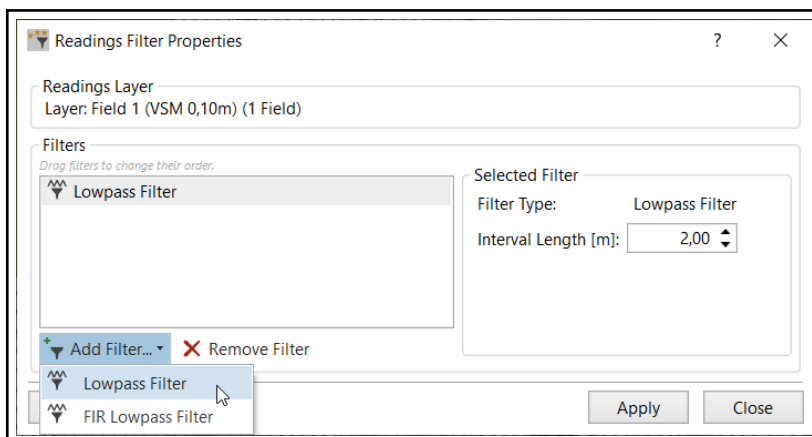


Fig. 4.2.44: Readings filter properties

Click in the tab *Evaluate* (see sect. [4.2.4](#)) on the button *Readings Filter*.

Select the desired readings filter in the drop-down menu *Add filter*.

Parameter for selected filter:
Interval Length: The larger the specified interval length, the larger the targets that are filtered out.

Click on the button *Apply* to apply the selected filter.

Click on the button *Close* to close the window.

Clicking on the button *More Properties* opens the window *Color Map Layer Properties*. Here you can choose, among other things, whether the new filter layer is to be displayed on the map with filled contours or transparent.

For information see sect. [Color Map Layer Properties](#) on page 63.

A new layer is created in the layer manager, the filter layer. This is marked with the filter symbol.

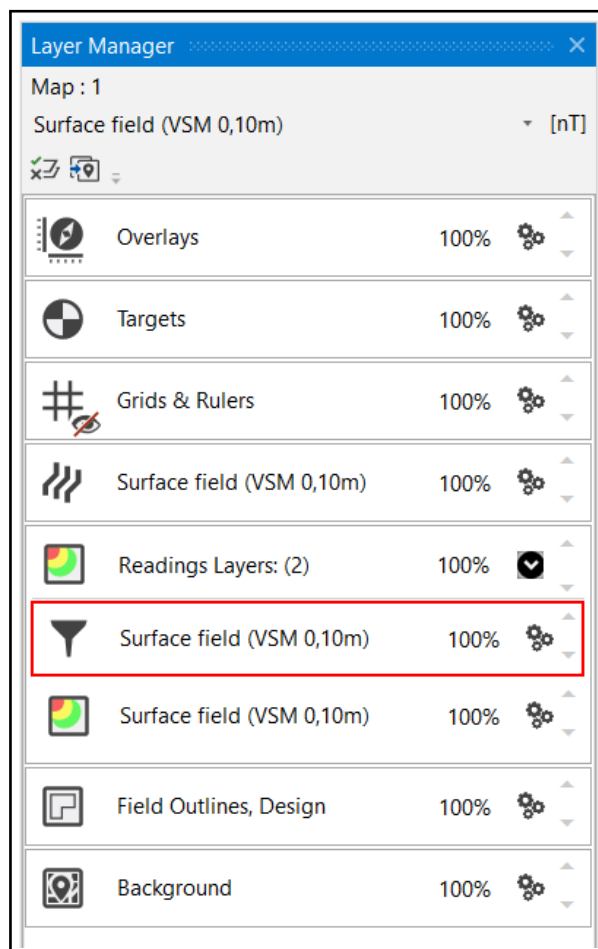


Fig. 4.2.45: Filter layer

You can also open the context menu in the layer manager with a right mouse click on the readings layer and create a new filter layer with *Add Filter Layer*.

The filter layer can be switched on and off or moved in the layer manager.

You can open the context menu in the layer manager with a right click on the filter layer and, in addition to further editing options, delete the filter layer with *Remove Layer*.

If the lowpass filter is applied several times in a row with different interval lengths on a readings layer, a new filter layer is created in the layer manager for every interval length. You can show and hide these filter layers and thus view the effects of the lowpass filter with different interval lengths on the readings layer.

If the lowpass filter is applied several times in a row with different interval lengths on a readings layer, the last entered interval length is used on the readings layer.

If you open the window *Readings Filter Properties* on the filter layer in the layer manager (see sect. 4.6.1), you can see which filters have been applied within a filter layer.

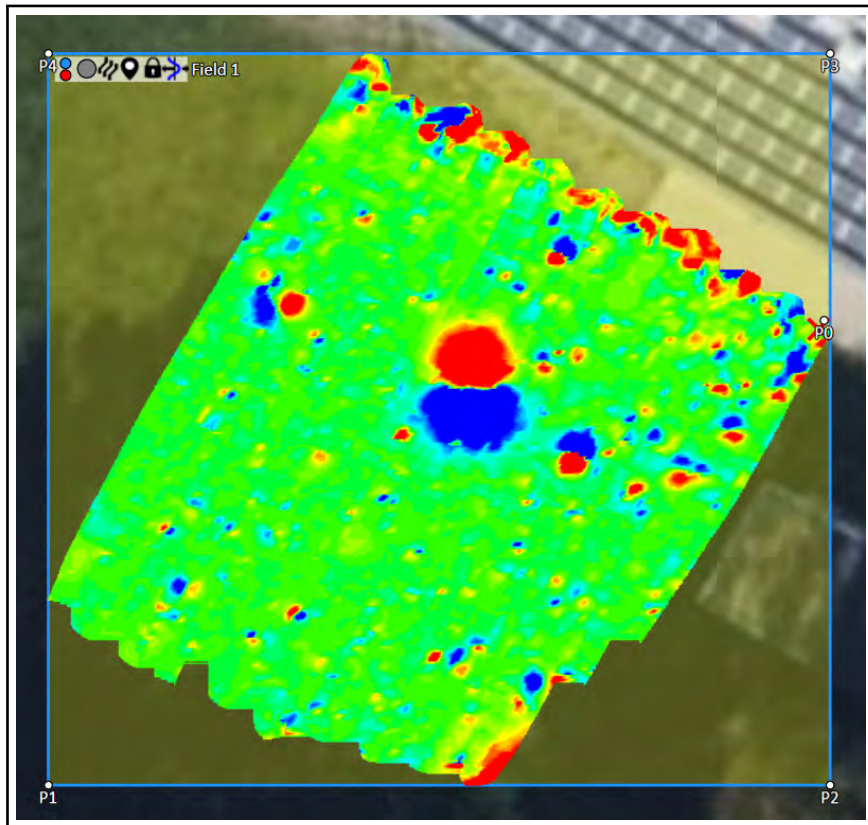


Fig. 4.2.46: Readings layer before applying the lowpass filter

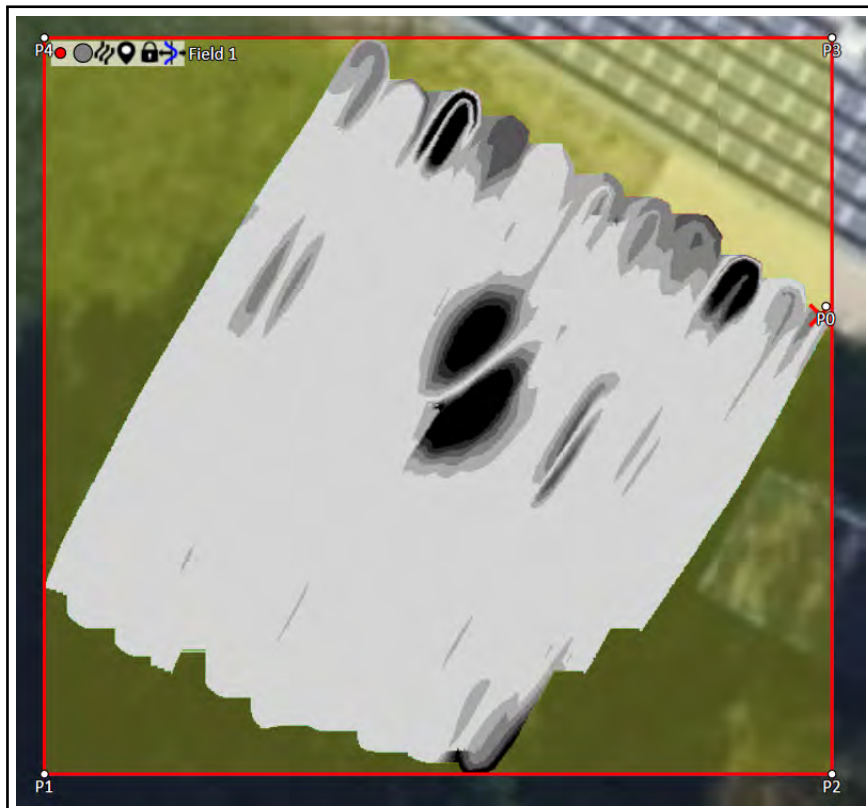
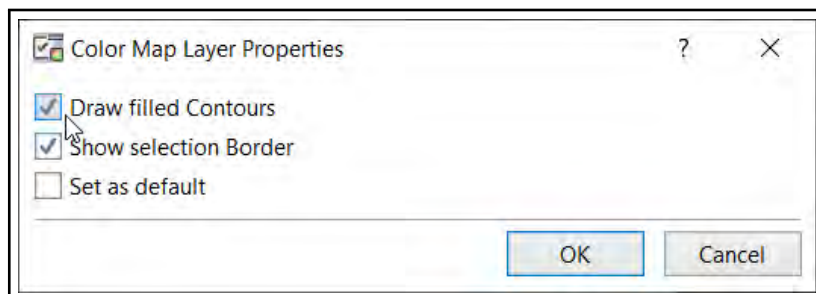


Fig. 4.2.47: Filter layer after applying the lowpass filter

The preset color profile for filter layers is *Grayscale Colors*. Color profiles see sect. [Color Editor](#) on page 115.

4.2.4.2 Color Map Layer Properties

When applying a filter to a readings layer (see sect. [Readings Filter](#) on page 60) you can choose, among other things, whether the new filter layer should be displayed on the map with filled contours or transparent.



Click in the window *Readings Filter Properties* (see sect. [Readings Filter](#) on page 60) on the button *More Properties*.

Fig. 4.2.48: Color Map Layer Properties

Draw filled contours:

If the checkmark at *Draw filled contours* is removed, the contours of the individual gray graduations are not filled with color and the filter layer is transparent. This can be helpful, for example, when viewing superimposed readings and filter layers.

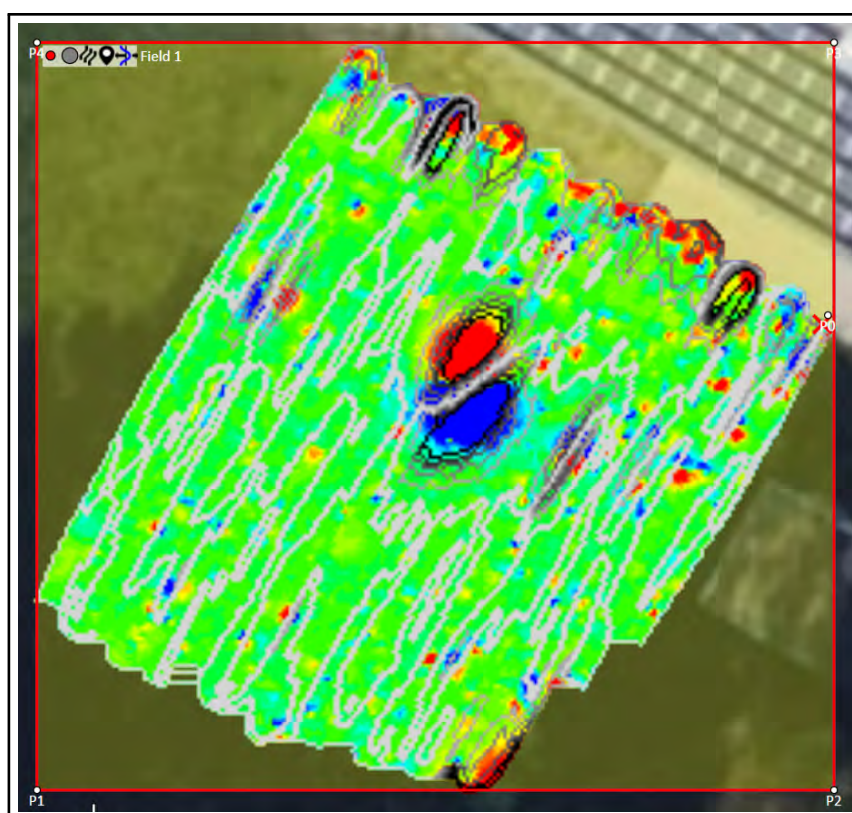


Fig. 4.2.49: Transparent filter layer without filled contours (gray graduations) on readings layer (colored)

Note: The window *Color Map Layer Properties* also opens, when the menu *Properties* is selected in the layers manager in the context menu of the readings layers and filter layers. Then individual readings layers can also be displayed with filled contours or transparently.

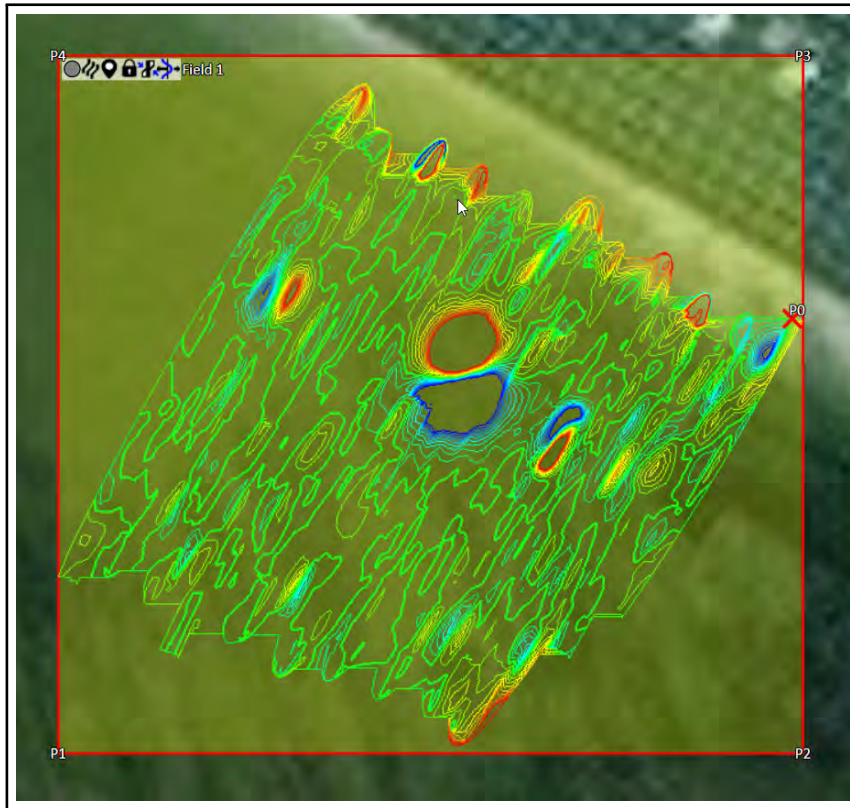


Fig. 4.2.50: Transparent readings layer without filled contours

Readings layers with magnetometer data and readings layers with metal detector data can either be viewed separately or, when the layers are placed on top of each other, together. The preset color profile for readings layers with metal detector data is *Purple Colors*.

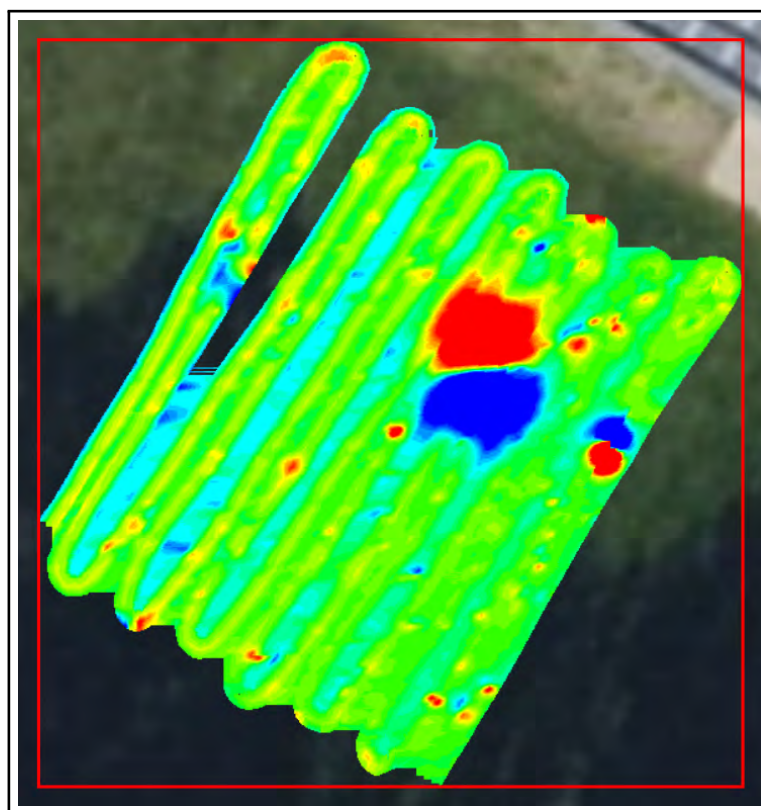


Fig. 4.2.51: Readings layers with magnetometer data

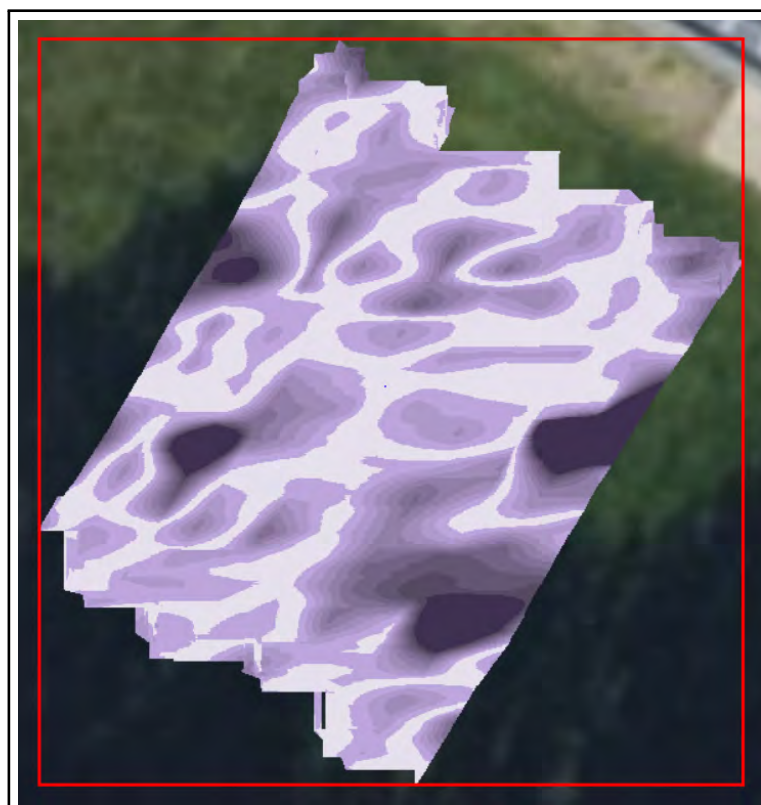


Fig. 4.2.52: Readings layer with the metal detector data

As shown in the example fig. 4.2.53, the readings layer with the metal detector data without filled contours (purple graduations) can be placed over the readings layer with the magnetometer data (colored).

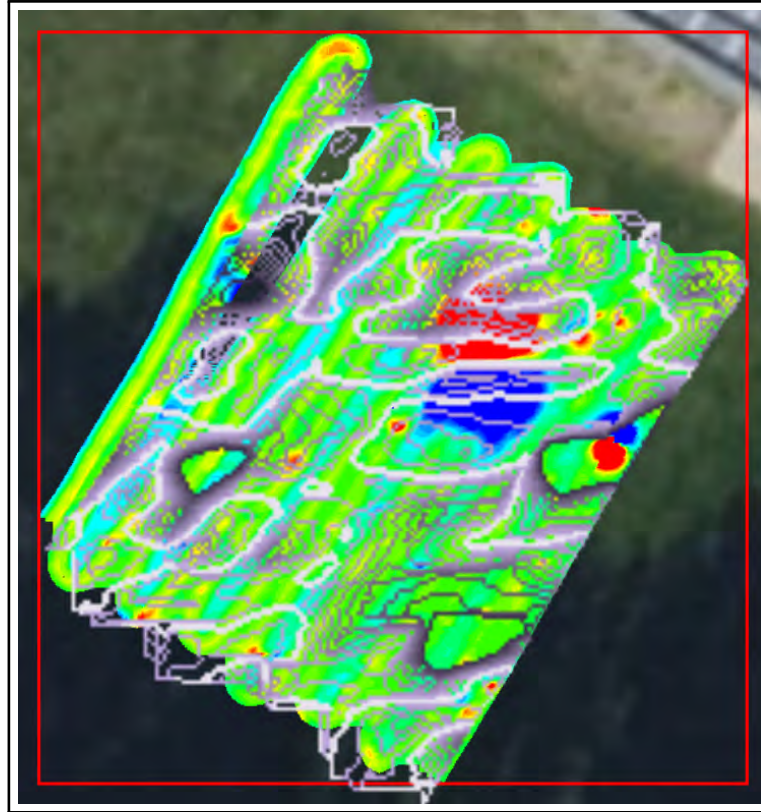


Fig. 4.2.53: Readings layer with magnetometer and metal detector data on top of each other

Evaluate Fields see sect. 6.3.

4.2.4.3 Evaluate multiple Targets

A complete readings layer or a part of a readings layer with recorded data can be evaluated and corresponding targets can be calculated.

Information on the color profile and the meaning of the color representation of the recorded data on the map can be found in sect. [Color Editor](#) on page 115.

ATTENTION: Before evaluating readings layers with magnetometer data, it is recommended to carry out an offset compensation for every readings layer (see sect. [Offset Compensation](#) on page 52).

Before evaluating readings layers with metal detector data, it is recommended to carry out a soil compensation for every readings layer (see sect. [Soil Compensation](#) on page 54).

NOTE: An offset compensation can be carried out for readings layers with magnetometer and metal detector data.

Click in the layer manager (see sect. [Layer Manager](#) on page 107) on the readings layer to select it for the evaluation. When the readings layer is visibly displayed, the corresponding field is framed in red on the map.

If data should only be evaluated in a certain area of the field, an evaluation area can be drawn up here (see sect. [Evaluation, open an Evaluation Range](#) on page 100).

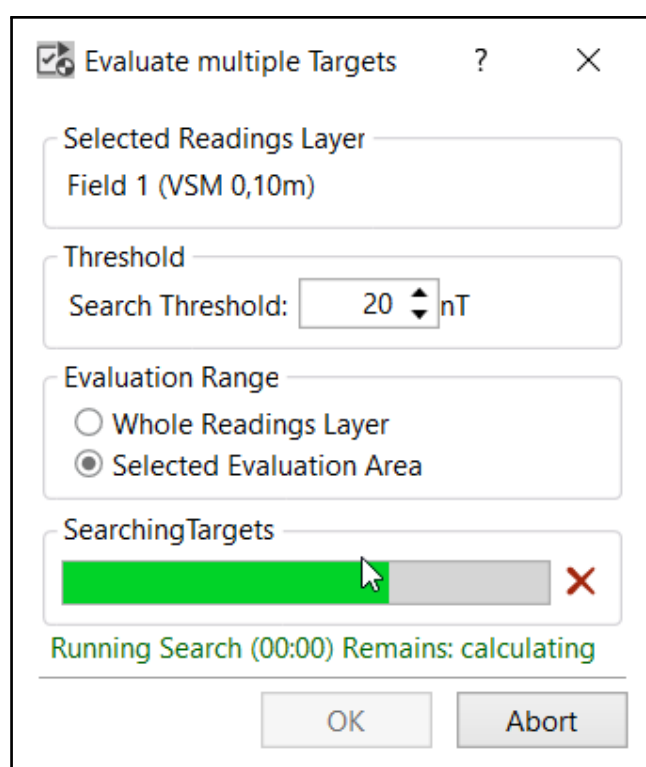


Fig. 4.2.54: Evaluate multiple targets

Click in the tab *Evaluate* (see sect. [4.2.4](#) on page 56) on the button *Evaluate multiple targets*.

Selected Readings Layer:

The selected readings layer for evaluation is displayed.

Threshold:

You can enter a threshold (limit value) for the target search in order to only evaluate values above this threshold (here 20 nT).

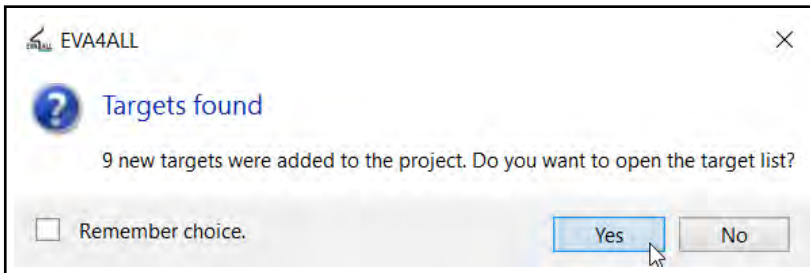
Evaluation Range:

Either evaluate the whole selected readings layer or only a part of it (*Selected Evaluation Area*).

For drawing up an evaluation area see sect. [Evaluation, open an Evaluation Range](#) on page 100.

Click on the button *OK*. The evaluation of the data begins and a target list with the calculated targets are generated. The green bar shows the progress of the evaluation.

After the evaluation is finished, the window *Targets found* opens.



Click on the button *Yes* to open the target list.

Click on the button *No*, when the target list should not be opened.

Fig. 4.2.55: Targets found

Remember choice: Tick here, when the choice you made (*Yes* or *No*) shall be applied for all future evaluations. The window *Targets found* does then not open anymore.

NOTE: If you want to undo the choice you made, click in the window *Application Options* (see sect. 4.2.1.10 on page 25) on the button *Reset suppressed Warnings and Messages*.

If you click in the window *Targets Found* on the button *Yes*, the target list opens with all evaluated and calculated targets.

The evaluated targets are displayed in the target list and on the map.

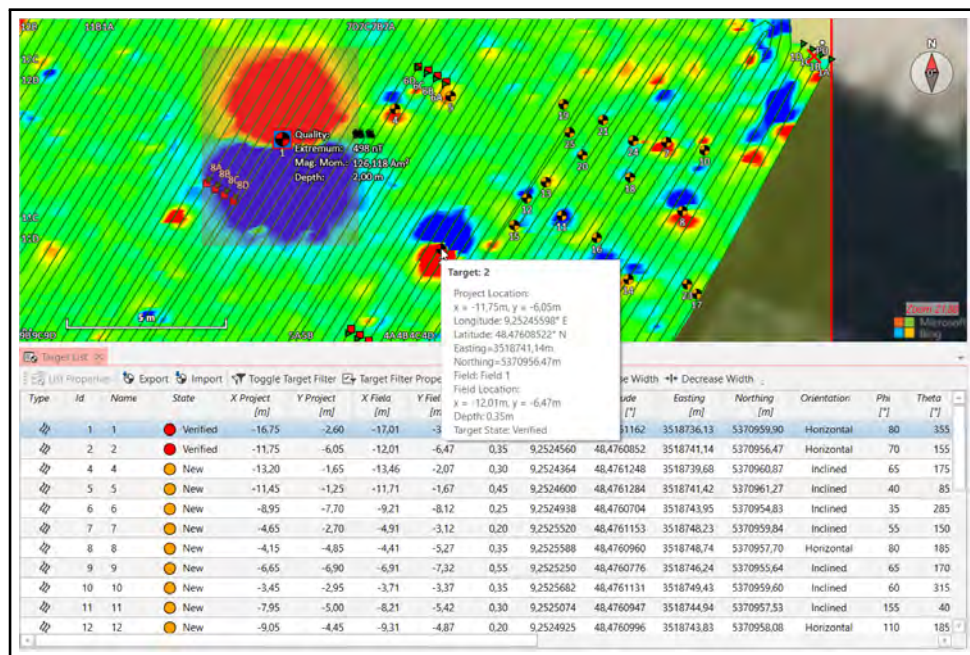


Fig. 4.2.56: Target list

When you click with the cursor on a target, information about the target appears next to it. When you move the cursor over a target, a pop-up window (tooltip) opens with information about the target, the project location, the field location and the remarks made about this target.

For detailed information about the target list see sect. 6.4.

Evaluate Fields see sect. 6.3.

4.2.4.4 Evaluate single Target

Targets can also be evaluated individually.

Information on the color profile and the meaning of the color representation of the recorded data on the map can be found in sect. [Color Editor](#) on page 115.

ATTENTION: Before evaluating readings layers with magnetometer data, it is recommended to carry out an offset compensation for every readings layer (see sect. [Offset Compensation](#) on page 52).

Before evaluating readings layers with metal detector data, it is recommended to carry out a soil compensation for every readings layer (see sect. [Soil Compensation](#) on page 54).

NOTE: An offset compensation can be carried out for readings layers with magnetometer and metal detector data.

Click in the layer manager (see sect. [Layer Manager](#) on page 107) on the readings layer to select this readings layer for the evaluation. When the readings layer is visibly displayed, the corresponding field is framed in red on the map.

To evaluate a single target, an evaluation area must be drawn up, in which this target is located.

Information on drawing up an evaluation are found in sect. [Evaluation, open an Evaluation Range](#) on page 100.

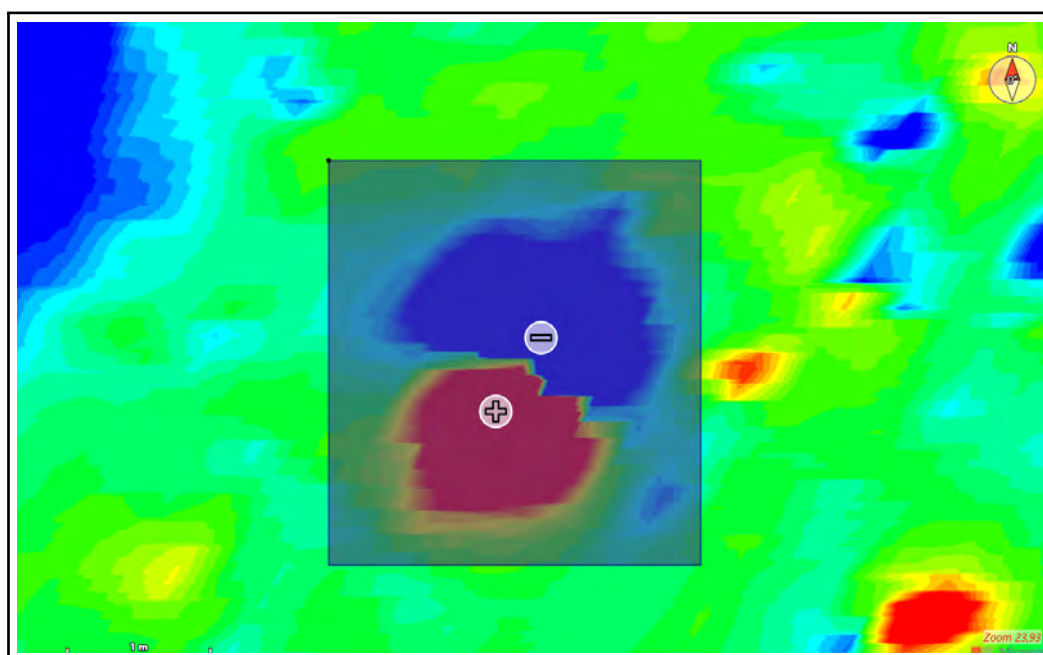


Fig. 4.2.57: Evaluation range around a single target

Click in the tab *Evaluation* (see sect. [Tab Evaluate](#) on page 56) on the button *Evaluate single Target*.

You can also press the space bar instead.

The data is evaluated, the calculated target is displayed on the map and the target list with the calculated target is opened.

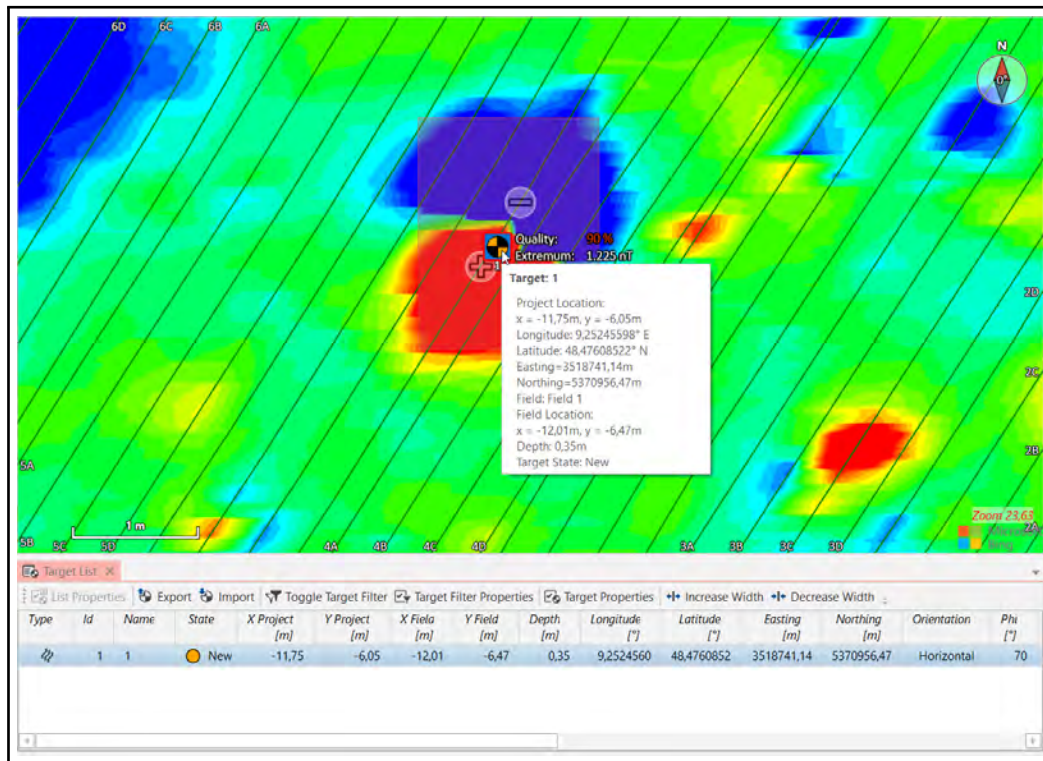


Fig. 4.2.58: Target list

When evaluating individual targets, targets with a threshold value below 5 nT can also be searched for.

When you click with the cursor on a target, information about the target appears next to it. When you move the cursor over a target, a pop-up window (tooltip) opens with information about the target, the project location, the field location and the remarks made about this target.

For detailed information about the target list see sect. 6.4.

Evaluate Fields see sect. 6.3.

4.2.4.5 Evaluate Boreholes

Boreholes that contain data can be evaluated and the corresponding targets can be calculated.

The boreholes are displayed in different colors on the map, depending on the recorded data. Information on the color profile and the meaning of the individual borehole colors can be found in sect. [Color Editor](#) on page 115.

The precondition for the evaluation of boreholes is:

- ▷ The boreholes must contain data.
- ▷ The boreholes must be in a borehole field.
- ▷ 3 - 5 boreholes must be selected for evaluation.
An evaluation can also be carried out with only one or two marked boreholes. In the case of an evaluation with less than 3 boreholes, the significance of the evaluation is reduced and an according hint appears on the screen.
- ▷ The selected boreholes must not be in a straight line.
- ▷ The distance between the individual boreholes must be max. 5 meters.

ATTENTION: Before evaluating readings layers with magnetometer data, it is recommended to carry out an offset compensation for every readings layer (see sect. [Offset Compensation](#) on page 52).

Before evaluating readings layers with metal detector data, it is recommended to carry out a soil compensation for every readings layer (see sect. [Soil Compensation](#) on page 54).

NOTE: An offset compensation can be carried out for readings layers with magnetometer and metal detector data.

Click in the layer manager (see sect. [Layer Manager](#) on page 107) on the readings layer to select it for the evaluation. When the readings layer is visibly displayed, the corresponding field is framed in red on the map.

Select with the CTRL key pressed at least 3 and max. 5 boreholes. The selected boreholes are marked with a frame and the button *Evaluate Boreholes* becomes active.

Click on the button *Evaluate Boreholes*. The window *Evaluate Boreholes* with the reading curves for the marked boreholes opens. Reading curves see sect. 4.2.8.

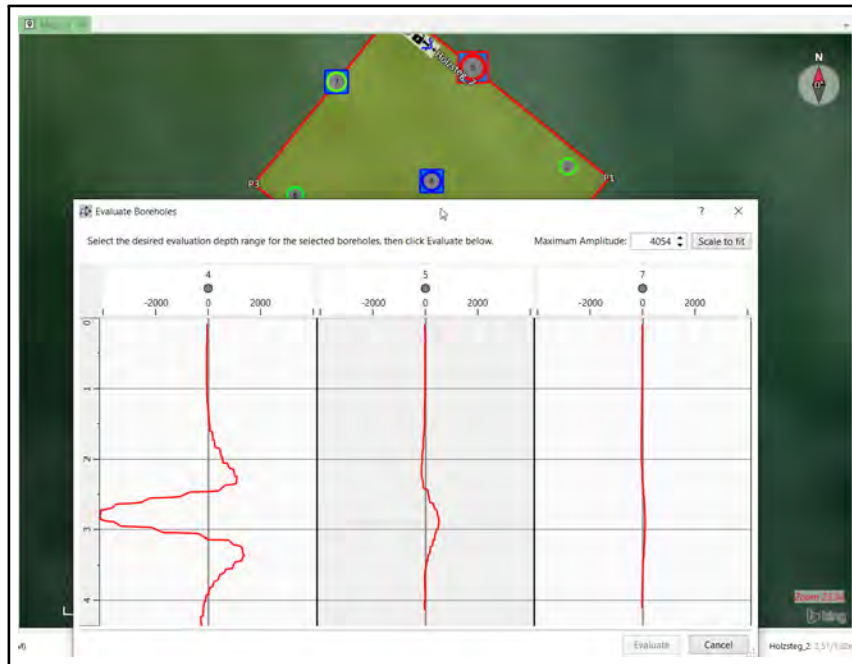


Fig. 4.2.59: Mark boreholes

On the left edge of the window *Evaluate Boreholes* is a scale with the depths of the boreholes in meters. With the left mouse button pressed, select in the reading curves the depth range that you want to evaluate. This range is highlighted in gray. Click then on the button *Evaluate*.

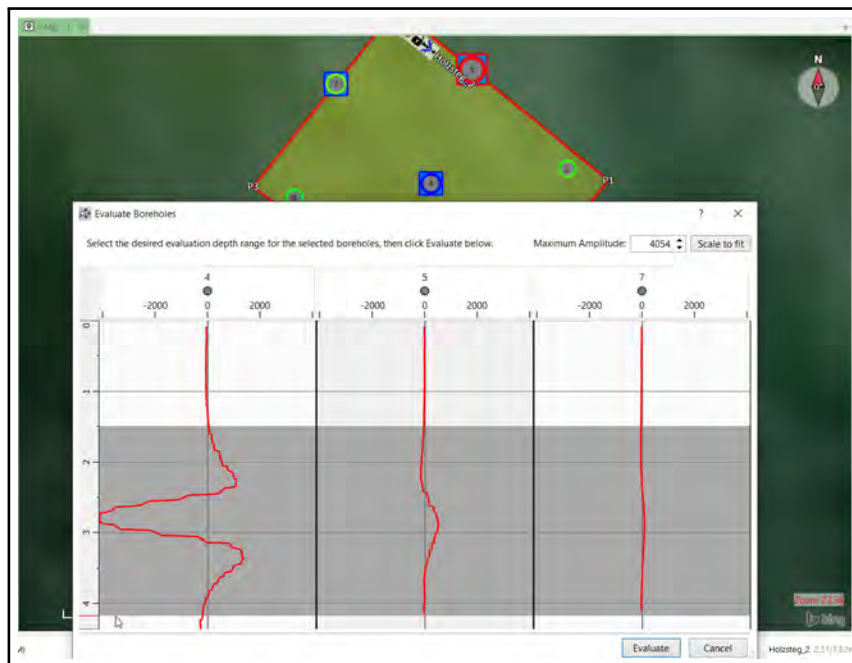


Fig. 4.2.60: Select depth range

The data of the marked boreholes that is available in the selected depth range is evaluated. The calculated target is displayed and the target list with the calculated targets is opened.

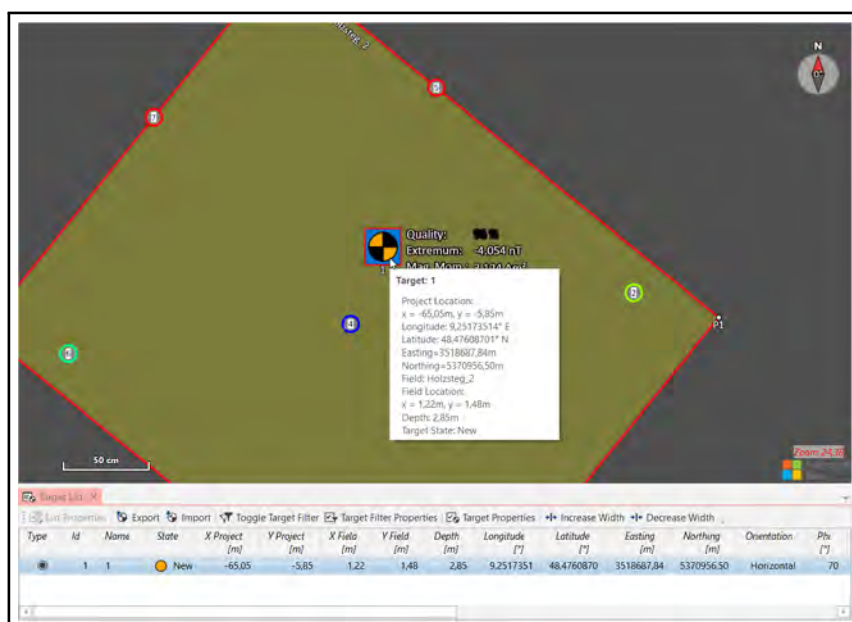


Fig. 4.2.61: Evaluate boreholes

When you click with the cursor on a target, information about the target appears next to it. When you move the cursor over a target, a pop-up window (tooltip) opens with information about the target, the project location, the field location and the remarks made about this target.

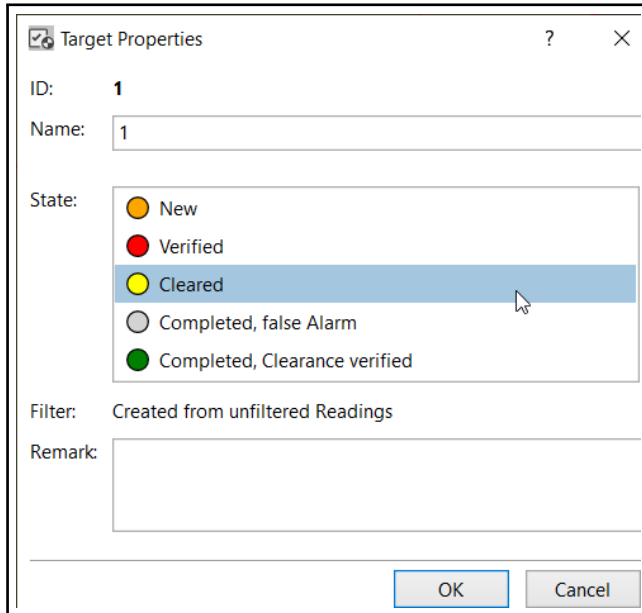
For detailed information on the target list see sect. 6.4.

Evaluate Fields see sect. 6.3.

4.2.4.6 Target Properties

The button *Target Properties* becomes active, when you click on an evaluated target on the map or in the target list.

For evaluating targets and creating a target list see sect. [Evaluate multiple Targets](#) on page 67 and [Evaluate single Target](#) on page 69.



The dialog box titled "Target Properties" contains the following fields and options:

- ID:** 1
- Name:** 1
- State:** A list of five states with corresponding colored circles:
 - New (Yellow)
 - Verified (Red)
 - Cleared (Yellow) - This option is currently selected and highlighted with a blue background.
 - Completed, false Alarm (Grey)
 - Completed, Clearance verified (Green)
- Filter:** Created from unfiltered Readings
- Remark:** A large empty text area for comments.
- Buttons:** OK and Cancel at the bottom right.

Click in the tab *Evaluate* (see sect. [4.2.4](#) on page 56) or in the tab *Target List* (see sect. [6.4.1](#) on page 136) on the button *Target Properties*.

Fig. 4.2.62: Target properties

ID:

The ID number of the selected target on the map and in the target list is displayed.

Name:

You can freely choose a name for this target.

State:

The state of the target is displayed. You can change the target state with one mouse click. The color of the selected state is displayed in the target (see fig. [4.2.63](#)) in the display window and in the target list (see sect. [6.4](#)).

Filter:

Note about applied readings filters.

Remark:

Here you can enter your own comments about the target. The comments also appear in the target list and in the project report.

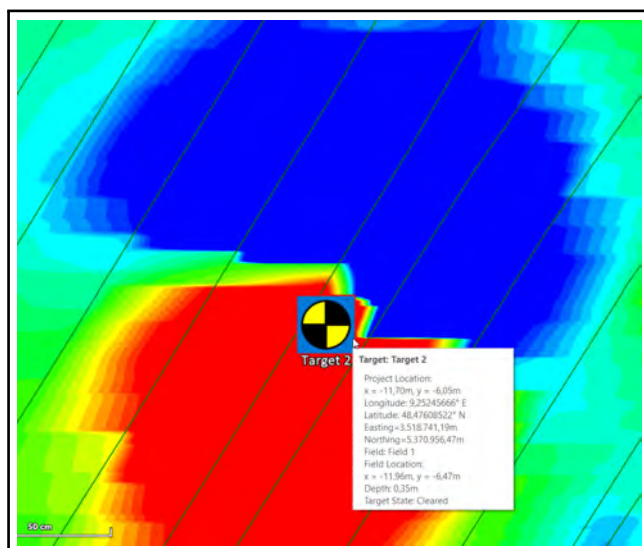


Fig. 4.2.63: Target state

Target 2 is now marked in yellow and has the target state *Cleared*.

When you move the cursor over the target, a window opens with further information about the target .

You can also change the target state of several targets at the same time. Mark the targets on the map with the left mouse button and with the CTRL key pressed. Clicking with the right mouse button on a marked target opens a context menu with various editing options. Move the cursor on *State* and select the desired target state. The window *Specify Context* opens.

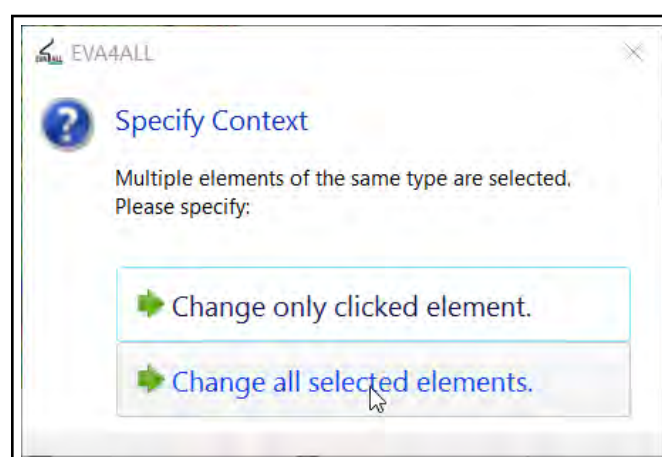


Fig. 4.2.64: Change target state

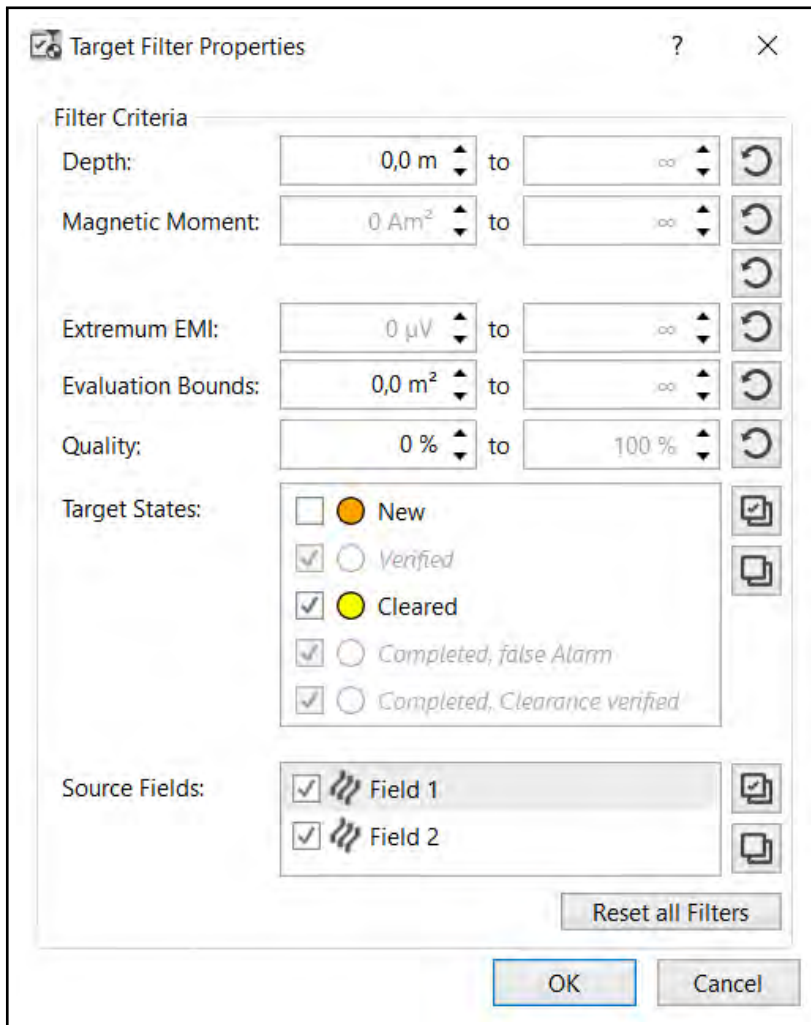
Select here whether the target state is to be changed only for the target clicked with the right mouse button or for all selected targets.

NOTE: If you select several targets in the target list and change the target state in the context menu *Set Target State*, it is changed for all selected targets without being asked again.

4.2.4.7 Target Filter Properties

The targets shown on the map and in the target list can be filtered according to different criteria. If the target filter is switched on, only the filtered targets are displayed on the map and in the target list (see sect. [Target List](#) on page 132).

For switching the target filter on and off see sect. [4.2.4](#) on page 56 or [6.4.1](#) on page 136.



The dialog box 'Target Filter Properties' contains the following sections:

- Filter Criteria:**
 - Depth: 0,0 m to ∞
 - Magnetic Moment: 0 Am² to ∞
 - Extremum EMI: 0 μV to ∞
 - Evaluation Bounds: 0,0 m² to ∞
 - Quality: 0 % to 100 %
- Target States:**
 - ☐ New
 - ☒ Verified
 - ☒ Cleared
 - ☒ Completed, false Alarm
 - ☒ Completed, Clearance verified
- Source Fields:**
 - ☒ Field 1
 - ☒ Field 2

Buttons: Reset all Filters, OK, Cancel. Each criterion has a reset button (circular arrow icon). Target states and source fields have selection/deselection buttons (checkbox icon).

Click in the tab *Evaluate* (see sect. [4.2.4](#) on page 56) or in the tab *Target List* (see sect [6.4.1](#) on page 136) on the button *Target Filter Properties*.

Fig. 4.2.65: Target filter properties

Filter Criteria:

Define here the criteria according to which the targets are to be filtered. Targets that are outside the criteria set here are not displayed on the map and in the target list.

With the button  the individual filter criteria can be reset.

Target States:

Only the states marked with a checkmark are displayed on the map and in the target list.

Source Fields:

Only the targets of the fields marked with a checkmark are displayed on the map and in the target list.

With the buttons  and  all target states or source fields can be selected / deselected.

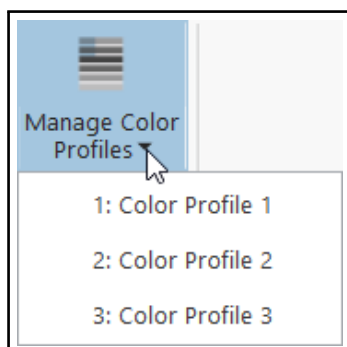
4.2.4.8 Manage Color Profiles

In the window *Manage Color Profiles* you can activate, update, edit and delete user-defined color profiles for the active field.

The button *Manage Color Profiles* only becomes active, when user-defined color profiles have been created and saved.

For information on creating and using color profiles see sect. [Color Editor](#) on page 115.

Select color profile:



Open the drop-down menu in the button *Manage Color Profiles* in the tab *Evaluate* (see sect. 4.2.4).

In the drop-down menu, select the desired color profile to be applied to the active readings layer.

Fig. 4.2.66: Select color profile

Manage color profiles:

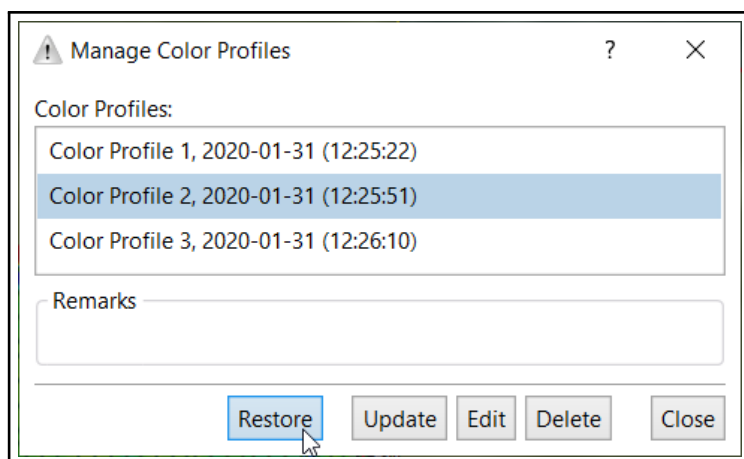


Fig. 4.2.67: Manage color profiles

Click in the tab *Evaluate* (see sect. 4.2.4) on the button *Manage Color Profiles*.

Select among the following options:
Restore: The color profile selected in the window *Color Profiles* is applied to the active readings layer.

Update: The color profile selected in the window *Color Profiles* is overwritten by the color profile currently active in the readings layer.

Edit: Change the color profile name and enter additional information in the field *Remarks*.

Delete: Delete the color profile selected in the window *Color Profiles*.

Close: Close the window *Manage Color Profiles*.

4.2.5 Tab View

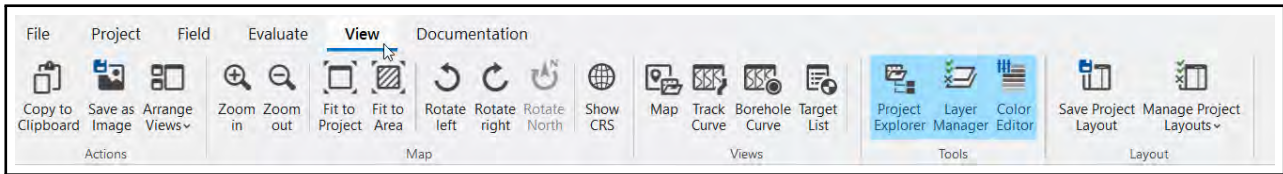


Fig. 4.2.68: Tab View

Symbol	Name	Description
	Copy to Clipboard	<p>Opens the window <i>Copy Image to Clipboard</i>. Select among the following options: <i>Application Window</i>: The view of the entire screen is copied to the PC's clipboard. <i>Active View</i>: The active window (field, target list...) in the display window is copied to the PC's clipboard. The view can be copied from the clipboard to another document, e.g. a Word document.</p>
	Save as Image	<p>Opens the window <i>Save Image to File</i>. Select among the following options: <i>Application Window</i>: The view of the entire screen is saved as an image file in *.png format in a folder of your choice on the PC. <i>Active View</i>: The active window (field, target list...) in the display window is saved as an image file in *.png format in a folder of your choice on the PC.</p>
	Arrange Views	<p>Select among the following options in the drop-down menu: <i>Full Screen</i>: Shows the active window (field, target list...) in the display window in full screen mode. Click again on the button to return to the screen view. <i>Tile horizontally</i>: The individual windows are tiled horizontally in the display window. <i>Tile vertically</i>: The individual windows are tiled vertically in the display window. <i>Cascade</i>: The individual windows in the display window are arranged one above the other.</p>
	Zoom in	<p>After a left mouse click on the map, this button is active. You can zoom into the map by repeatedly clicking on this button. You can also zoom into the map by turning the mouse wheel.</p>

Symbol	Name	Description
	Zoom out	After a left mouse click on the map, this button is active. You can zoom out of the map by repeatedly clicking on this button. You can also zoom out of the map by turning the mouse wheel.
	Fit to Project	The entire project with all fields is displayed in the active window
	Fit to Area	The selected range of a field is displayed in the active window. To select a range in the active field, hold down the SHIFT key and draw up a range with the left mouse button pressed.
	Rotate!Left	Repeated clicking on this button rotates the map in the active window to the left. Only for georeferenced projects.
	Rotate!Right	Repeated clicking on this button rotates the map in the active window to the right. Only for georeferenced projects.
	Rotate!North	Aligns a rotated map in the active window to the north. Only for georeferenced projects.
	Show CRS	Show and hide coordinate reference system grid.
	Map	Creates a copy of the active map. The copy must be docked so that it can be edited in the display window. For docking see sect. Arrange user interface on page 14.

Symbol	Name	Description
	Track Curve	<p>The diagram with the track curves for the selected surface field opens, and an additional tab <i>Track Curve</i> appears in the tabs.</p> <p>For information see sect. 4.2.8 on page 92.</p> <p>The diagram with the track curves must be docked so that it remains visible in the display window.</p> <p>For docking see sect. Arrange user interface on page 14.</p>
	Borehole Curve	<p>The diagram with the borehole curves for the selected borehole field opens, and an additional tab <i>Borehole Curve</i> appears in the tabs.</p> <p>For information see sect. 4.2.8 on page 92.</p> <p>The diagram with the borehole curves must be docked so that it remains visible in the display window.</p> <p>For docking see sect. Arrange user interface on page 14.</p>
	Target List	<p>Opens and closes the target list.</p> <p>For information on the target list see sect. Target List on page 132.</p> <p>The target list must be docked so that it remains visible in the display window.</p> <p>For docking see sect. Arrange user interface on page 14.</p>
	Project Explorer	<p>Opens and closes the project explorer.</p> <p>For information on the project explorer see sect. Project Explorer on page 105.</p>
	Layer Manager	<p>Opens and closes the layer manager.</p> <p>For information on the layer manager see sect. Layer Manager on page 107.</p>
	Color Editor	<p>Opens and closes the color editor.</p> <p>For information on the color editor see sect. Color Editor on page 115.</p>
	Save Project Layout	<p>Saves the current screen view.</p> <p>Clicking on this button opens the window <i>Save or edit Project Layout</i>. Enter here a layout name for the current screen view and click on the button <i>OK</i>.</p> <p>You can save several different screen views and open them with the button <i>Manage Project Layouts</i>.</p>

Symbol	Name	Description
	Manage Project Layouts	<p>The button <i>Manage Project Layouts</i> becomes active, when you have saved one or more screen views (see button <i>Save Project Layout</i>).</p> <p>Open the drop-down menu in the button <i>Manage Project Layouts</i> and select a saved screen view to open it.</p> <p>Click on the button <i>Manage Project Layouts</i> to open the window <i>Manage Project Layouts</i>.</p> <p>In the window <i>Manage Project Layouts</i> select among the following options:</p> <p><i>Restore</i>: The project layout selected in the window <i>Project Layouts</i> is opened.</p> <p><i>Update</i>: The project layout selected in the window <i>Project Layouts</i> is overwritten by the currently open project layout.</p> <p><i>Edit</i>: Change the layout name and enter additional information in the field <i>Remarks</i>.</p> <p><i>Delete</i>: The project layout selected in the window <i>Project Layouts</i> is deleted.</p> <p><i>Close</i>: Closes the window <i>Manage Project Layouts</i>.</p>

4.2.6 Tab Documentation

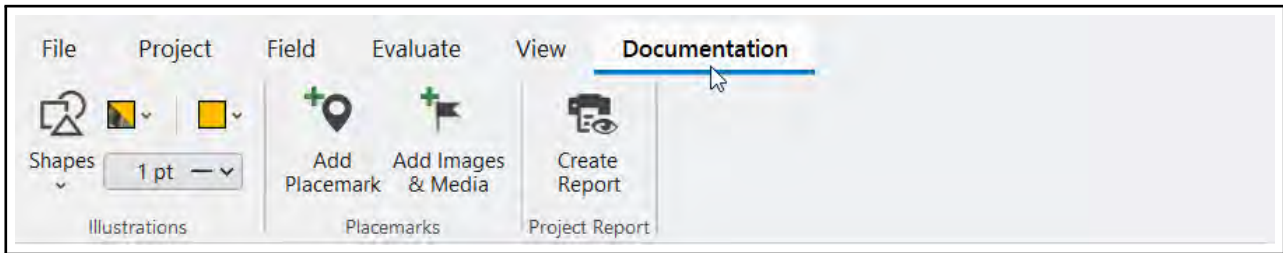
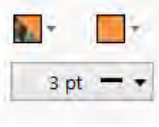


Fig. 4.2.69: Tab *Documentation*

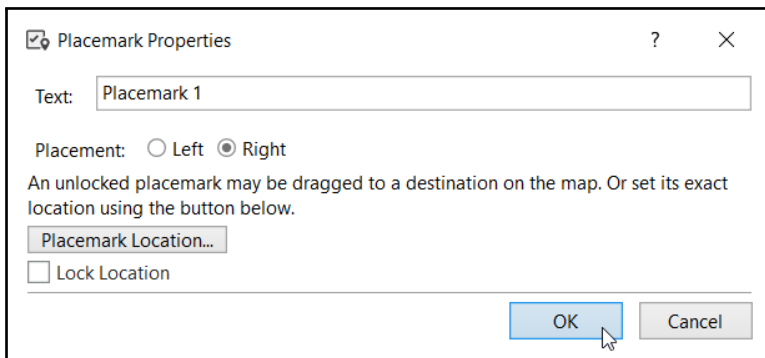
Symbol	Name	Description
	Ruler Tool	<p>The ruler tool enables distance measurement between 2 or more points on the map. The measurement unit is meter.</p>
		<p>Click this button and then left-click on the position on the map where the distance measurement should start. Then click on the point to which the distance is to be measured. The distance is displayed at the starting point of the measurement. You can click on further points, the displayed distance adds up. If you click with the right mouse button, the context menu <i>Annotation</i> opens with various options.</p>
		<p>Press the key <i>Enter</i> on the keyboard to take over the ruler displayed on the map and exit the Ruler command.</p>
		<p>Press the key <i>ESC</i> on the keyboard to cancel the Ruler command. The ruler shown on the map is not taken over.</p>

Symbol	Name	Description
	Shapes	<p>Draw shapes like rectangulars, ellipses or arrows on the map. To do this, hold down the left mouse button.</p> <p>Select among the following options in the drop-down menu:</p> <p><i>Rectangle</i> <i>Ellipse</i> <i>Polygon</i> <i>Free Hand</i> <i>Arrow</i></p> <p>In the layer manager (see sect. 4.6) a new layer <i>Annotations</i> is created.</p> <p>You can move or rotate the shapes on the map. When you right-click in a shape, the context menu <i>Annotation</i> opens with various formatting options. You can also enter a text here, which will appear in the shape.</p>
	Illustrations	<p>Click with the left mouse button into a shape (see button <i>Shapes</i>) on the map. The button becomes active and offers different formatting options for this shape.</p>
	Add Placemark	<p>Click on this button and then click on the map on the position where you want to add a placemark. Double-clicking on the placemark opens the window <i>Placemark Properties</i>.</p> <p>See sect. Placemark Properties on page 84.</p> <p>In the layer manager (see sect. 4.6) a new layer <i>Placemarks</i> is created.</p> <p>NOTE: You can also right-click to add placemarks at the current position of the mouse arrow.</p>
	Add Images and Media	<p>Add files like photos, videos, PDFs etc. to the project. Informationen can be found in sect. Add File on page 35.</p> <p>In the layer manager (see sect. 4.6) a new layer <i>Media</i> is created.</p> <p>NOTE: You can also right-click to add images and media at the current position of the mouse arrow.</p>

Symbol	Name	Description
	Create Report	<p>Create and print project report.</p> <p>In the column <i>Configuration</i> you have several options to influence the content and layout of the project report.</p> <p>In the drop-down menu <i>General</i> you can enter a document name. This will then be inserted in the bottom left-hand corner of all pages.</p> <p>In the drop-down menu <i>Fields</i> you can choose, among other things, if the project report is created for all fields in the project or only for individual, selected fields.</p> <p>In the drop-down menu <i>Map Rendering</i> you have setting options for the display of color maps in the project report.</p>
		<p>After creating the project report, click on the button  to print the project report or save it as PDF to disk.</p>

4.2.6.1 Placemark Properties

You can add placemarks with your own comments to a map or a field.



Click in the tab *Documentation* (see sect. 4.2.6) on the button *Add Placemark* and then click in the map on the position where you want to add a placemark. Double-clicking on the placemark on the map opens the window *Placemark Properties*.

Fig. 4.2.70: Placemark Properties

Text:

Enter the text that should appear in the placemark comment on the map.

Placement:

The placemark comment can be displayed on the left or on the right of the insertion point.

Placemark Location:

The placemark comment can be moved to the desired location on the map by holding down the left mouse button.

You can also determine the location of the placemark comment by clicking on the button *Placemark Location* and entering the location in the window *Placemark Location*. Information on the input options in this window can be found below.

Lock Location:

If you check the box here, the placemark comment cannot be moved with the mouse.

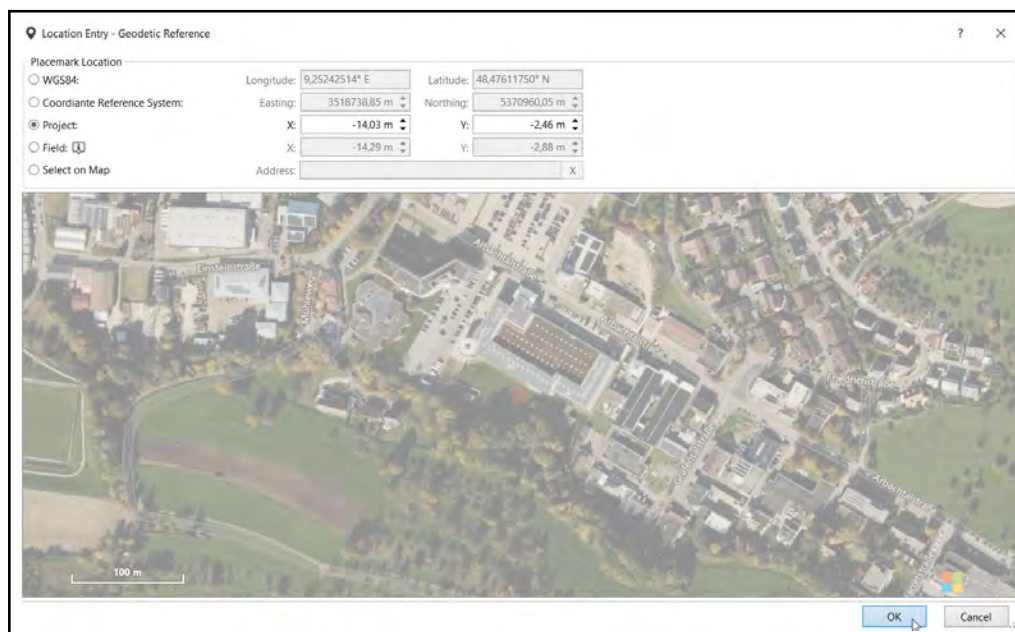


Fig. 4.2.71: Placemark Location

WGS84:

Determine the location of the placemark comment by entering WGS84 coordinates.

Coordinate Reference System:

Enter the coordinates of the selected coordinate reference system for the desired location of the placemark comment.

Project:

Determine the location of the placemark comment in X and Y directions starting from the project origin.

Field:

Determine the location of the placemark comment in X and Y directions starting from the field origin.

Select on Map:

You can determine the location of the placemark comment directly on the map (internet connection required). Zoom and move the map (turn the mouse wheel or hold down the left mouse button) until the desired location is in the middle of the map (red marking). You can also define the location of the placemark comment by entering an address in the input field *Address*. After entering the location, click on the button *OK*.

NOTE: In case of non-georeferenced projects, the location of the placemark comment can only be determined by entering the distance of the X and Y directions from the project origin or the field origin.

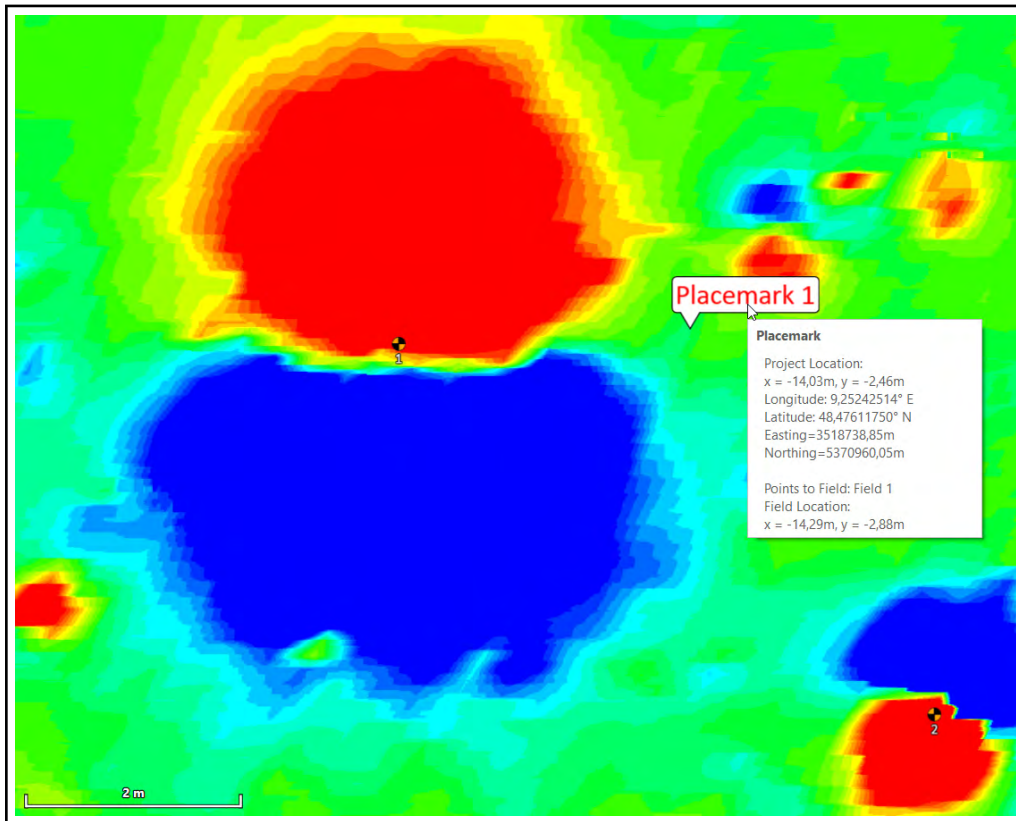


Fig. 4.2.72: Field with Placemark

When you move the cursor over a placemark, a window opens with information about this placemark.

4.2.7 Tab *Borehole Field*

If you click into a borehole field with the left cursor, the tab *Borehole Field* appears among the tabs.

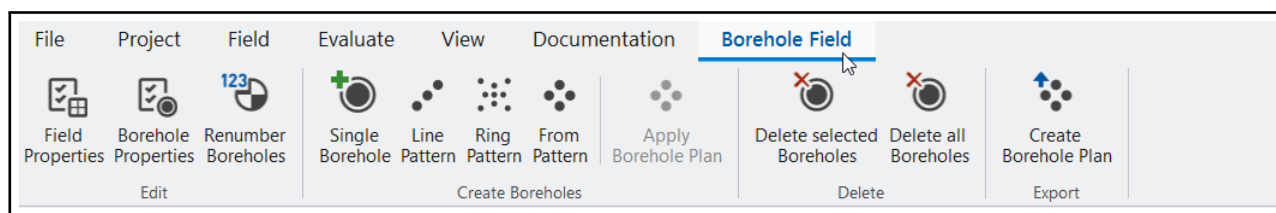


Fig. 4.2.73: Tab *Borehole Field*

Symbol	Name	Description
	Field Properties	Opens the window <i>Field Properties</i> . See sect. Field Properties on page 42.
	Borehole Properties	Opens the window <i>Borehole Properties</i> . See sect. Borehole Properties on page 49.
	Renumber Boreholes	The boreholes on the map and in the target list are renumbered, e.g. when individual boreholes have been deleted and the numbering is no longer consecutive. Click on the button <i>Renumber Boreholes</i> and select in the window <i>Renumber Boreholes</i> with which number the renumbering should start. If the numbers are to be provided with an addition, you can enter this in the input field <i>Appendix</i> .

Symbol	Name	Description
	Single Borehole	<p>Add a single borehole to the borehole field. Clicking on this button opens the window <i>Planned Borehole</i>. The name of the borehole field and the sensor used for data recording are displayed. The <i>ID</i> of the borehole is assigned consecutively. You can also assign the borehole its own ID. Enter the distance of the new borehole from the field origin in X and Y directions. If you check the box <i>Limit new Boreholes to Field Contour</i>, entries outside the borehole field are ignored. Comments about the borehole can be entered directly in the text box. Click on <i>Apply</i> to apply the entries. Click on <i>OK</i> to apply the entries and to close the window.</p> <p>You can also place a new borehole directly in the borehole field. To do this, click with the left mouse button on the location in the borehole field where the new borehole is to be placed. Then select <i>Add Single Borehole</i> in the context menu and click on <i>No</i> in the window <i>Add single borehole</i> that opens. The new borehole is now placed at the selected location.</p> <p>If you click in the window <i>Add Single Borehole</i> on <i>Yes</i>, the window <i>Planned Borehole</i> opens and you can make the entries described above.</p>

Symbol	Name	Description
	Line Pattern	<p>Add a new borehole line pattern to the borehole field. Clicking on this button opens the window <i>New Borehole Line</i>.</p> <p>The name of the borehole field and the sensor used for data recording are displayed.</p> <p>Define the new borehole line pattern by entering the parameters <i>Start Point</i>, <i>End Point</i>, <i>Angle</i>, <i>Number of Holes</i> and <i>Hole Interval</i>.</p> <p>The distance between the individual boreholes must be at least 0.2 m.</p> <p>Some inputs depend on each other, i.e. contradicting entries are automatically corrected.</p> <p>The identification of the boreholes is assigned continuously.</p> <p>If you check the box <i>Limit new Boreholes to Field Contour</i>, entries outside the borehole field are ignored.</p> <p>Click on <i>Apply</i> to apply the entries.</p> <p>Click on <i>OK</i> to apply the entries and to close the window.</p>
	Ring Pattern	<p>Add a borehole ring pattern to the borehole field. Clicking on this button opens the window <i>Add borehole ring pattern</i>. The name of the borehole field and the sensor used for data recording are displayed.</p> <p>Define the borehole ring pattern by entering the parameters <i>Center Point</i>, <i>Radius</i>, and <i>Number of Boreholes in Ring</i>.</p> <p>The identification of the boreholes is assigned continuously. If you check the box <i>Limit new Boreholes to Field Contour</i>, entries outside the borehole field are ignored.</p> <p>Click on <i>Apply</i> to apply the entries.</p> <p>Click on <i>OK</i> to apply the entries and to close the window.</p>

Symbol	Name	Description
	From Pattern	<p>Add a borehole pattern to the borehole field. Clicking on this button opens the window <i>New borehole pattern</i>. The name of the borehole field and the sensor used for data recording are displayed.</p> <p>There are different, predefined <i>Pattern</i> to choose from. Enter the desired <i>Distance</i> of the boreholes. The entries are immediately displayed on the map.</p> <p>If you choose the pattern <i>Custom</i>, more parameters become active that can be modified.</p> <p>You can modify the <i>Area of Interest</i> of the borehole pattern (Rectangle or Circle) and, by changing the parameters, influence the shape, size and location of the borehole pattern.</p> <p>The boreholes are numbered consecutively from right to left or from left to right.</p> <p>If you check the box <i>Limit new Boreholes to Field Contour</i>, entries outside the borehole field are ignored.</p> <p>Click on <i>Apply</i> to apply the entries.</p> <p>Click on <i>OK</i> to apply the entries and to close the window.</p>
	Apply Borehole Plan	<p>The boreholes of a borehole plan contained in the project can be added to the active field.</p> <p>Select the desired borehole plan in the project explorer (see sect. 4.5). The button <i>Apply Borehole Plan</i> becomes active and the boreholes are inserted into the active field by clicking on this button.</p> <p>For adding a borehole plan to the project see Button Open / Add on page 21.</p>
	Delete marked Boreholes	Deletes one or more marked boreholes.
	Delete all Boreholes	Deletes all boreholes in the active field.

Symbol	Name	Description
	Create Borehole Plan	<p>Creates a borehole plan from the active borehole field. In the window <i>Borehole Plan Properties</i> you can enter various information about the borehole plan.</p> <p><i>Name:</i> Enter a name for the borehole plan.</p> <p><i>Originator:</i> Enter the name of the originator.</p> <p><i>Remark:</i> Enter additional information about the borehole plan.</p> <p>Click on the button <i>OK</i>, to create the borehole plan. The created borehole plan is displayed in the project explorer (see sect. 4.5).</p> <p>If you want to export the borehole plan, right-click on the borehole plan in the project explorer and select <i>Export borehole plan</i> from the context menu. Select the desired location and file type in the window <i>Export Borehole Plan</i>.</p>

4.2.7.1 Import / export boreholes in *.csv file format

If you right-click with the mouse in a borehole field, the context menu *Borehole Field* opens. The two commands *Export Borehole Geo Locations* and *Import Borehole Geo Locations* are available here.

Various coordinate systems can be selected for the export of georeferenced borehole positions in *.csv format. The desired coordinate system is selected in the window *Project Geodetic Properties* (see sect. 4.2.2.3 on page 32). The coordinate system set here is exported.

With the command *Import Borehole Geo Locations*, georeferenced borehole positions from files in *.csv format can be transferred to the open project and flexibly configured during import.

The positions of existing boreholes can be changed subsequently by reading in a *.csv file with GNSS coordinates. This function can be helpful, for example, if measurement data of a series of boreholes has been recorded in the field and the positions of the boreholes have been determined by GNSS.

By importing an appropriate file in *.csv format, it is also possible to create a borehole field with boreholes without measurement data.

4.2.8 Tabs *Track Curve* / *Borehole Curve*

Select a surface or a borehole field in the project explorer (see sect. 4.5 on page 105) and click in the tab *View* (see sect. 4.2.5 on page 78) on the button *Track Curve* or *Borehole Curve*. The diagram with the track/borehole curves for the selected field opens and the additional tab *Track Curve* or *Borehole Curve* appears among the tabs. When the diagram is closed, these tabs are hidden again.

Move the diagram e.g. to the lower edge of the display window and dock it there. Information on docking can be found in sect. 4.1.2 on page 14.

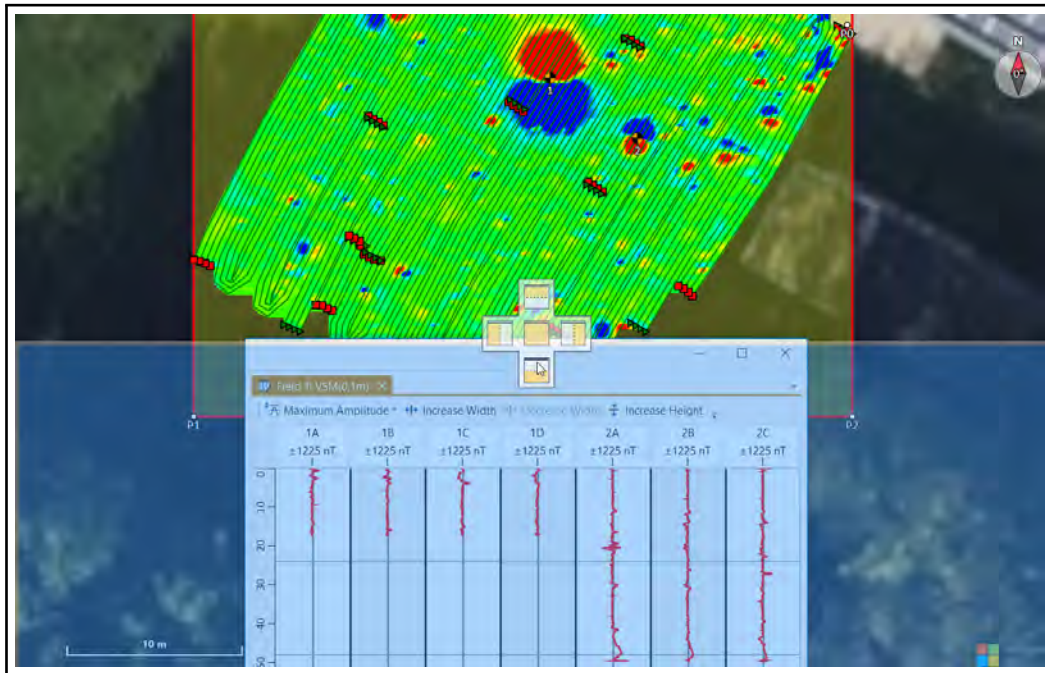


Fig. 4.2.74: Open and dock track/borehole curve

After docking the diagram, you can click on the individual commands in the tabs *Borehole Curve* (see fig. 4.2.77) or *Track Curve* (see fig. 4.2.78) on page 95.

NOTE: As an alternative to docking, you can move the track/borehole curve to a second monitor (if available) and use the commands in the toolbar of the track/borehole curve for editing.

In the diagrams with the track/borehole curves, the measured values of the probes are displayed as readings curves.

For surface fields recorded with different sensors (multi-sensor fields), a track curve diagram opens for each sensor type.

The readings curves in the diagrams and the tracks or boreholes on the map are interactive. If you click on readings curves in the top line of the diagram, the corresponding tracks or boreholes are marked on the map, and vice versa.

By pressing the CTRL key, several individual tracks / boreholes can be marked on the map and in the diagram.

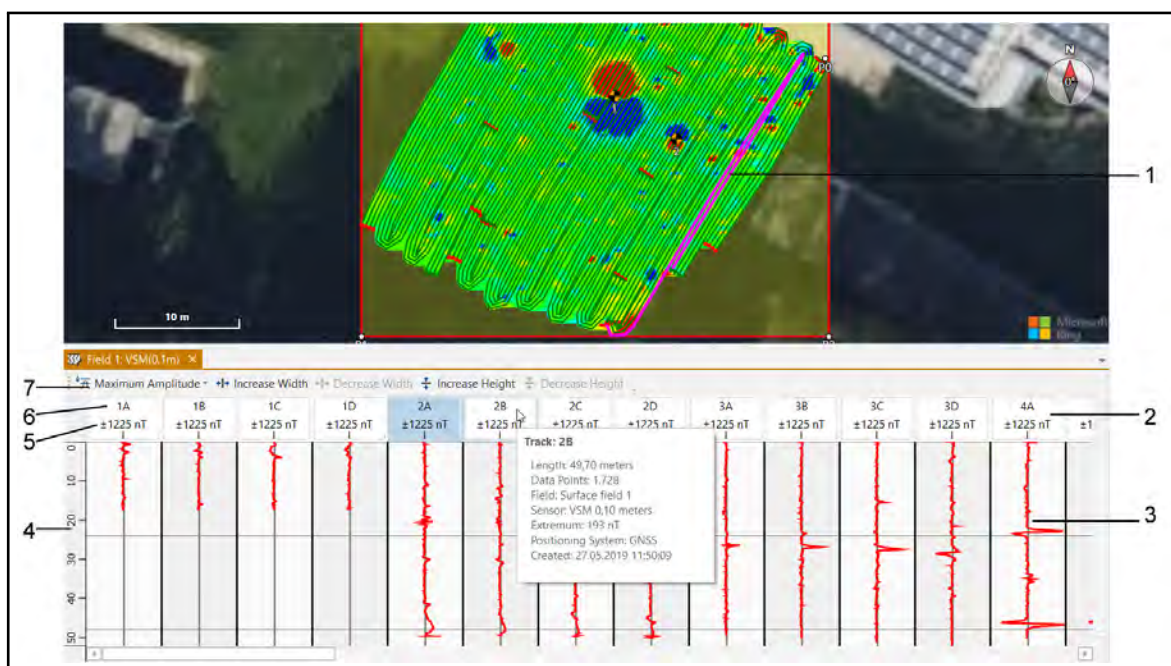


Fig. 4.2.75: Surface field with corresponding track curve diagram

(1) Surface field with tracks, (2) Track curve diagram, (3) Readings curves, (4) Track length in m, (5) Maximum measured value, (6) Tracks with identification (designation), (7) Toolbar

The readings curves of the tracks provide information about the maximum measured value in the surface field. On the basis of the readings curves of the tracks, anomalies can be recognized which may have influenced the measured values, such as an incorrect calibration of the probe, the presence of power lines nearby, the operator's shoes with metal parts, etc....

The start of a track is marked with a green triangle on the map. The end of a track is marked with a red square.

The length of the individual tracks is shown using the scale (4).

Further information on the individual tracks can be found in the information windows that open when you move the cursor over a track in the top line of the diagram.

A right mouse click on a track in the diagram (top line) opens a context menu with various editing options.

NOTE: If you want to see the readings curve of only one track in the track curve diagram in a greatly enlarged scale, first click on the desired track on the map and then on the button *track curve*. The diagram with the readings curve of the selected track opens.

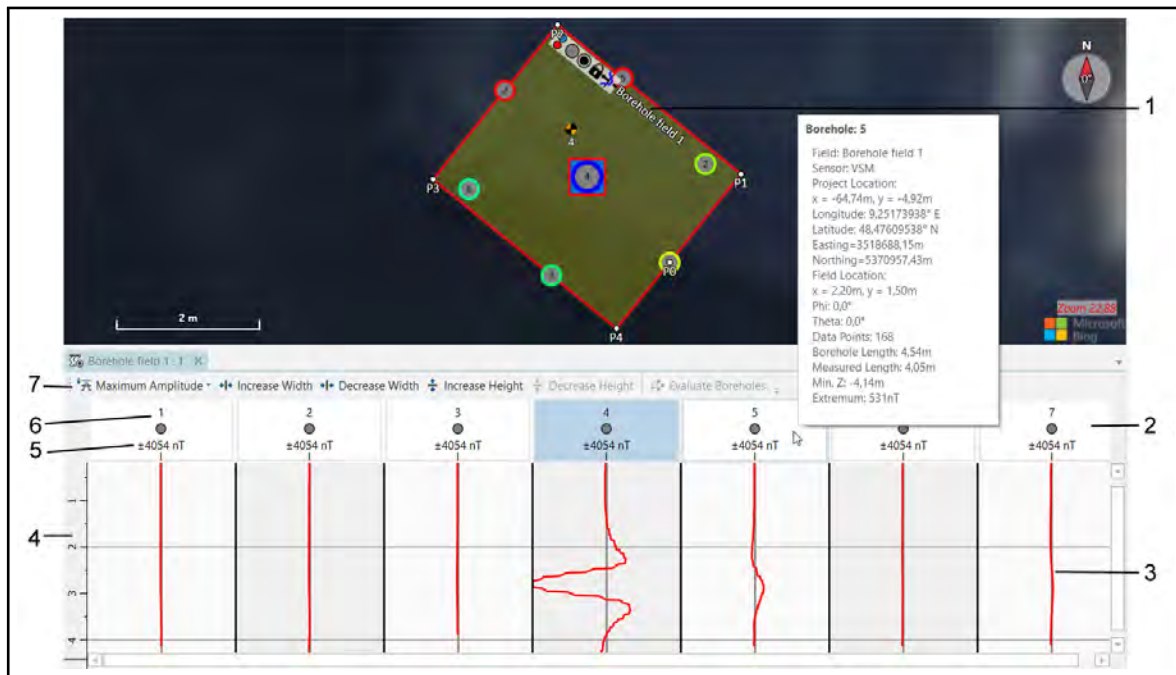


Fig. 4.2.76: Borehole field with corresponding borehole curve diagram
 (1) Borehole field with boreholes, (2) Borehole curve diagram, (3) Readings curves, (4) Borehole depth in m, (5) Maximum measured value, (6) Boreholes in the diagram, (7) Toolbar

The readings curves of the boreholes provide information about the maximum measured value in the borehole field and about the depth in which a target is suspected.

The release state of the borehole is displayed in color in the top line of the diagram.

The boreholes are displayed in different colors on the map.

The color profile corresponds to the settings in the color editor (see sect. [Color Editor](#) on page 115).

In the preset color profile for magnetometer data, positive readings values are displayed as a color gradient from green to yellow to red. Negative readings values are displayed as a color gradient from green to blue.

Ranges around 0 nT are displayed in green.

These color settings can be customized in the color editor.

Further information on the individual boreholes can be found in the information windows that open when you move the cursor over a borehole in the top line of the diagram.

A right mouse click on a borehole in the diagram (top line) opens a context menu with various editing options.

NOTE: If you want to see the readings curve of only one borehole in the borehole curve diagram in a greatly enlarged scale, first click on the desired borehole on the map and then on the *b borehole curve*. The diagram with the readings curve of the selected borehole opens.

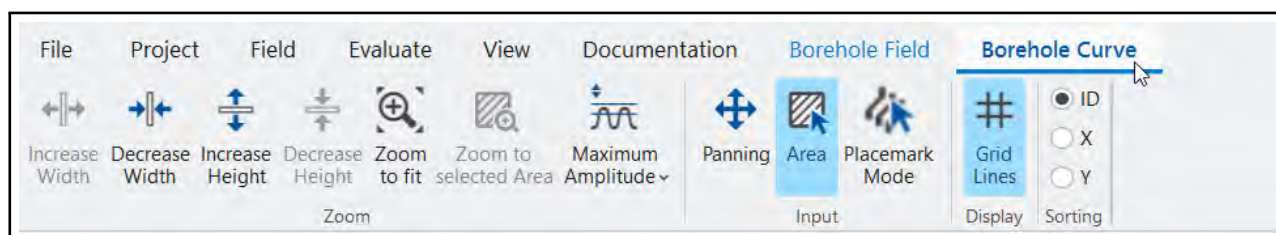


Fig. 4.2.77: Tab *Borehole Curve*

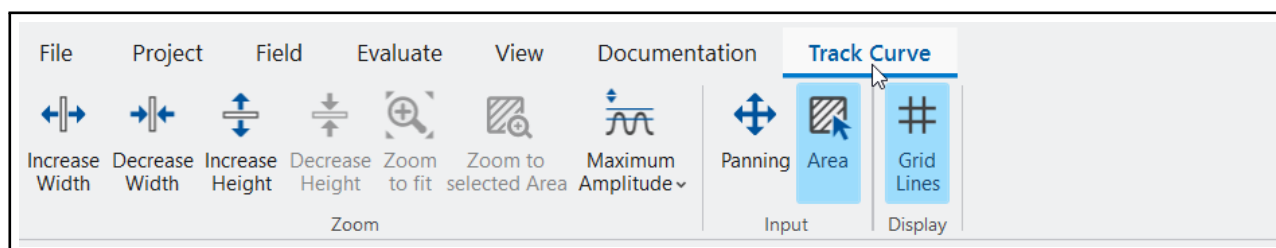
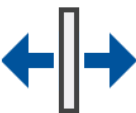
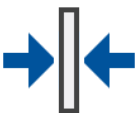
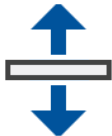
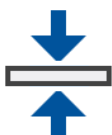


Fig. 4.2.78: Tab *Track Curve*

Symbol	Name	Description
	Increase Width	Repeated clicking on this button increases the width of the track / borehole curves in the diagram step by step. This allows a more detailed examination of the track / borehole curves.
	Decrease Width	Repeated clicking on this button decreases the width of the track / borehole curves in the diagram step by step. This button becomes active, when the width of the track / borehole curves has previously been increased.
	Increase Height	Repeated clicking on this button increases the height of the track / borehole curves in the diagram step by step. This allows a more detailed examination of the track / borehole curves.
	Decrease Height	Repeated clicking on this button decreases the height of the track / borehole curves in the diagram step by step. This button becomes active, when the height of the track / borehole curves has previously been increased.
	Zoom to fit	Resets the track / borehole curves to their original size, if they have previously been increased or decreased in any way.

Symbol	Name	Description
	Zoom to selected Area	Clicking on this button zooms into a selected area of the track / borehole curve diagram, the curves in this area are displayed with increased height. This button becomes active, when you have clicked on the button <i>Area</i> and marked an area in the track / borehole diagram with the left mouse button pressed. This area is highlighted in gray.
	Maximum Amplitude	You can scale the display of the track / borehole curves in the diagram. Select the desired scaling factor in the drop-down menu. Select <i>Scale to fit</i> in the drop-down menu in order to reset the changed scaling to the original value.
	Panning	Move track/borehole curves. Click on this button to move the track/borehole curves horizontally and vertically with the left mouse button pressed.
	Area	Click on this button to mark an area in the track/borehole curve diagram with the left mouse button pressed. This area is then highlighted in grey. You can then zoom into the marked area by clicking on the button <i>Zoom to selected Area</i> .
	Placemark Mode	Right-click on a borehole curve in the diagram and then select <i>Add Placemark</i> in the context menu. A circle appears on the borehole curve, which you can move to the desired location on the borehole curve with the cursor. Then click the left mouse button at the desired location and enter the desired text in the window <i>Placemark Properties</i> . Confirm the entry with <i>OK</i> . By clicking on the button <i>Placemark Mode</i> you can show and hide the texts of the placemark comments.
	Grid Lines	Show and hide the grid lines (auxiliary lines) in the track/borehole curve diagram.

Symbol	Name	Description
<div> ☒ ID ☐ X ☐ Y </div>	Sorting	Sorts the borehole curves in the diagram in the direction of the X axis, in the direction of the Y axis, or by identification (number).

4.2.9 Tab *Target List*

Information on the tab *Target List* can be found in sect. [Target List](#) on page [132](#)

4.3 Mouse modes

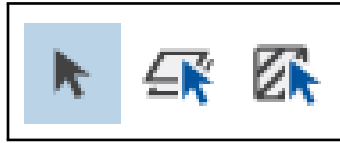


Fig. 4.3.1: Mouse Modes *Panning*, *Selection* and *Evaluation*

The icons for the 3 different mouse modes *Panning*, *Selection* and *Evaluation* are in the main screen at the bottom left.

These icons show which mouse mode is currently active. The icon of the active mouse mode is highlighted in blue.

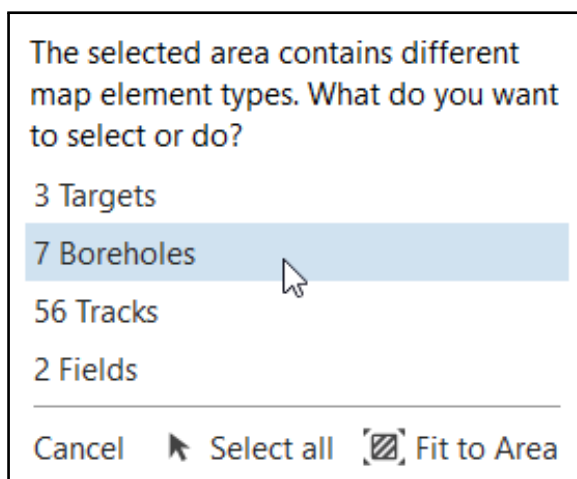
The mouse mode *Panning* is active by default.

By pressing the CTRL key, the mouse mode *Selection* becomes active.

By pressing the SHIFT key, the mouse mode *Evaluation* becomes active.

Symbol	Name	Description
	Panning	<p>Moving the map in the active window. Move the cursor over the map and keep the left mouse button pressed in order to move the map. Fields are locked against moving. To move fields, they must first be unlocked (see sect. Position Lock on page 44). ATTENTION: When moving fields, targets that have already been evaluated are also moved.</p>
	Selection	<p>Draw up a selection range to select and mark map elements. Hold down the CTRL key and draw up a selection range in the display window while holding down the left mouse button. See sect. Selection, open a Selection Range on page 99. After releasing the CTRL key, the mouse mode <i>Panning</i> is active again.</p>
	Evaluation	<p>Draw up an evaluation range to evaluate detected targets. Hold down the SHIFT key and draw up an evaluation range in the display window while holding down the left mouse button. See sect. Evaluation, open an Evaluation Range on page 100. After releasing the SHIFT key, the mouse mode <i>Panning</i> is active again.</p>

4.3.1 Selection, open a Selection Range



Hold down the CTRL key and draw up a selection range in the display window while holding down the left mouse button.

The window *Selection* appears. All map elements, that have not been hidden in the layer manager (see sect. 4.6 on page 107) and are visible in the selected range, are displayed.

Fig. 4.3.2: Fenster *Auswahl*

You can now select individual map elements (e.g. targets). The selected elements are marked on the map.

By clicking on *Select all* all elements in the window are marked on the map.

By clicking on *Fit to area* the selected area is adapted to the display window.

4.3.2 Evaluation, open an Evaluation Range

4.3.2.1 Magnetometer data

The preset color profile for readings layer with magnetometer data is *Rainbow Colors*. Color profiles see sect. [Color Editor](#) on page 115.

Information on the color profile and the meaning of the individual colors on the map can be found in sect. [Color Editor](#) on page 115.

Click in the layer manager (see sect. [Layer Manager](#) on page 107) on a readings layer to select it for the evaluation. When the readings layer is displayed visibly, it is framed in red on the map.

Hold down the SHIFT key and draw up an evaluation area with the left mouse button pressed.

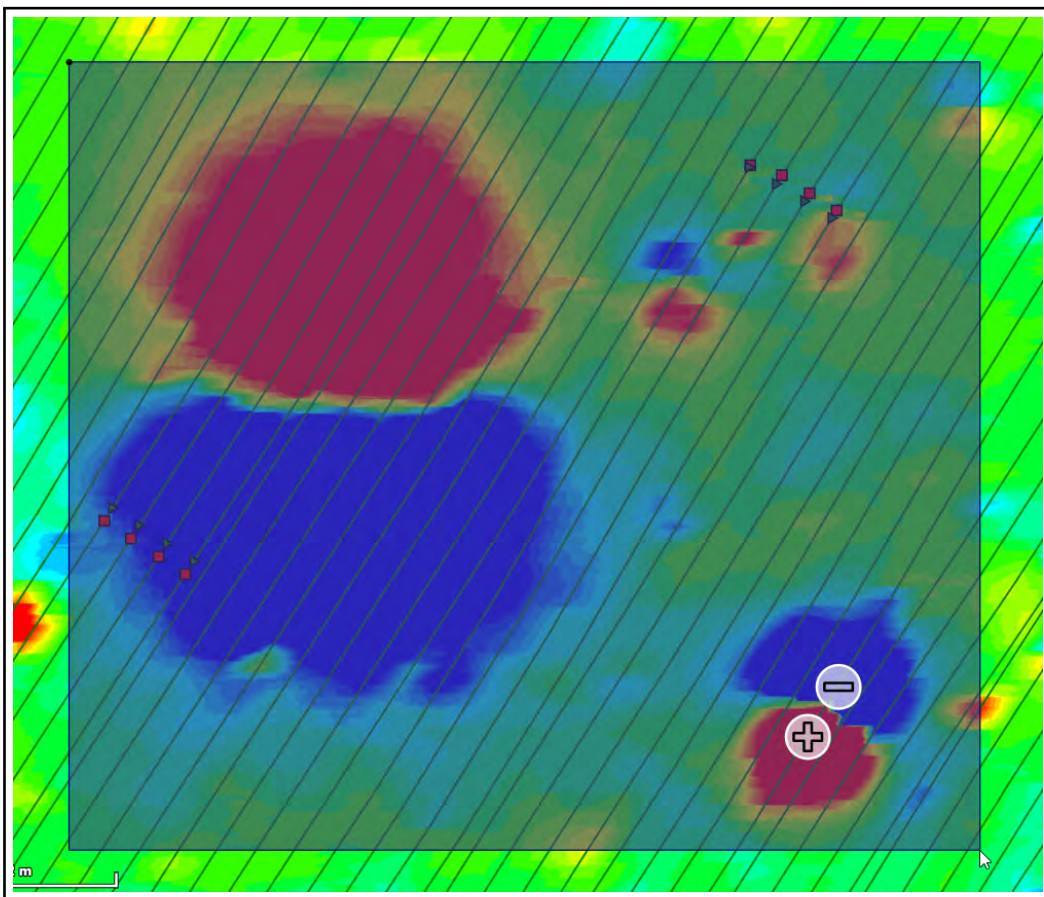


Fig. 4.3.3: Draw up an evaluation area

The two poles + and - jump to the spots with the highest measured values in the evaluation area.

The size, shape and color of the display of the measured values on the map as well as the arrangement of the + and - poles allow conclusions to be drawn about the possible shape and position of the target.

If the color representation of the measured values on the map and / or the automatic positioning of the dipoles allow the assumption that a deeper, large target is overlaid by a smaller target near the surface, the poles can be shifted manually.

To shift a pole, move the cursor over the pole and keep the left mouse button pressed.

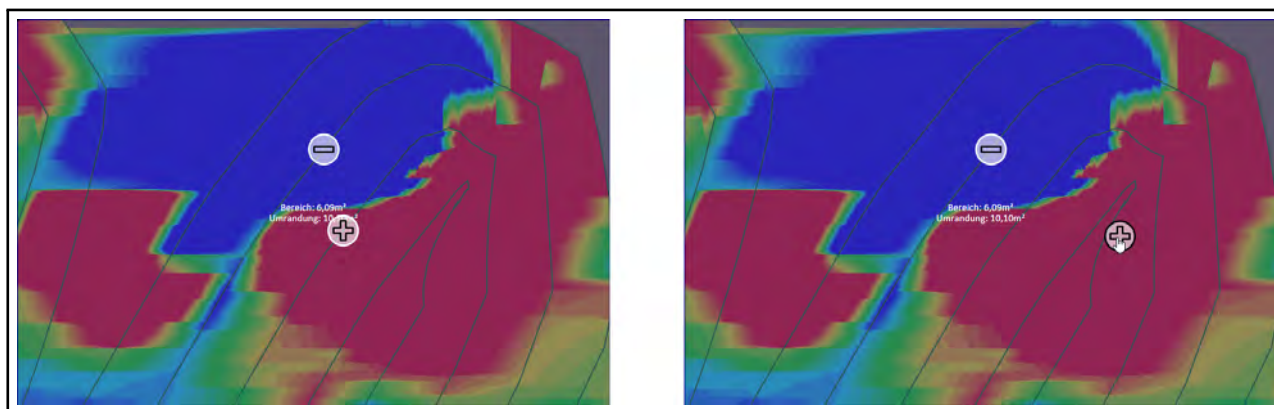


Fig. 4.3.4: Measured values before and after shifting the + pole

ATTENTION: A manual shift of the poles will affect the calculation of the target during the evaluation.

For evaluating recorded data in an evaluation area see sect. [Evaluate multiple Targets](#) on page 67 and [Evaluate single Target](#) on page 69.

A step-by-step guide on the evaluation of fields can be found in sect. [Evaluate fields](#) on page 129.

4.3.2.2 Metal detector data

The preset color profile for readings layer with metal detector data is *Purple Colors*. Color profiles see sect. [Color Editor](#) on page 115.

Information on the color profile and the meaning of the individual colors on the map can be found in sect. [Color Editor](#) on page 115.

Click in the layer manager (see sect. [Layer Manager](#) on page 107) on a readings layer to select it for the evaluation. When the readings layer is displayed visibly, it is framed in red on the map.

Hold down the SHIFT key and draw up an evaluation area with the left mouse button pressed.

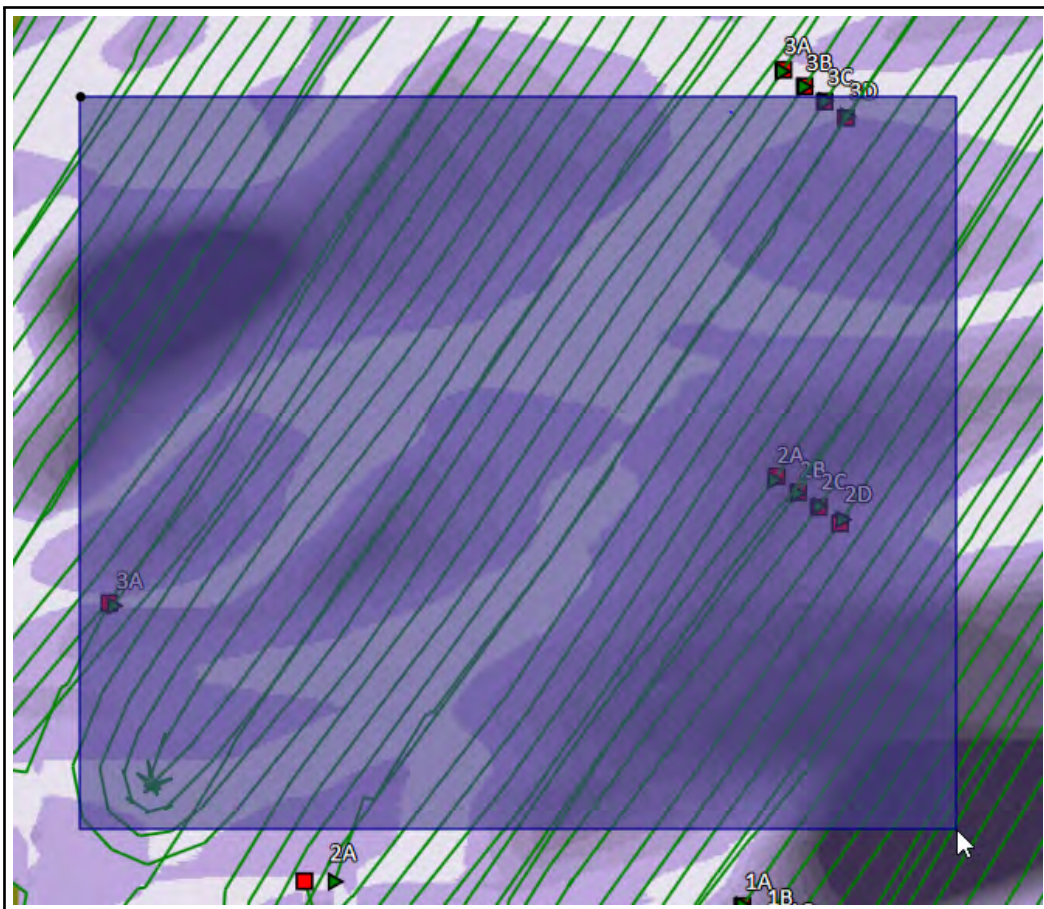


Fig. 4.3.5: Draw up an evaluation area

The two poles + and - jump to the spots with the highest measured values in the evaluation area.

The size, shape and color of the display of the measured values on the map allow conclusions to be drawn about the extremum (EMI) and the position of the target.

For evaluating recorded data in an evaluation area see sect. [Evaluate multiple Targets](#) on page 67 and [Evaluate single Target](#) on page 69.

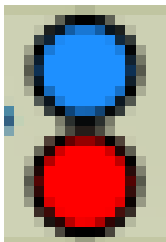
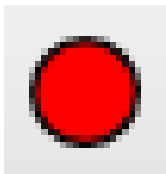
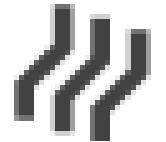
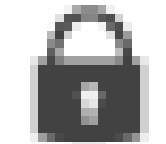
A step-by-step guide on the evaluation of fields can be found in sect. [Evaluate fields](#) on page 129.

4.4 Field symbols

The field characteristics are indicated by symbols in the upper left corner of the field.



Fig. 4.4.1: Field symbols

Symbol	Name	Description
	Field / Readings Layer marked	Symbolizes whether a field / a readings layer is marked in the project explorer / layer manager. Blue: Field is marked in the project explorer. Red: Readings layer is marked in the layer manager. See sect. Project Explorer on page 105 und Layer Manager on page 107.
	Field State	Possible field states are: <i>Planned</i> <i>Unreviewed</i> <i>Indetermined</i> <i>Released</i> <i>Locked</i> See sect. Field Properties on page 42.
	Surface	Symbolizes a surface field.
	Borehole	Symbolizes a borehole field.
	GNSS	The data were recorded with GNSS support.
	Position Lock	Field, tracks, boreholes are locked against moving. See sect. Position Lock on page 44.

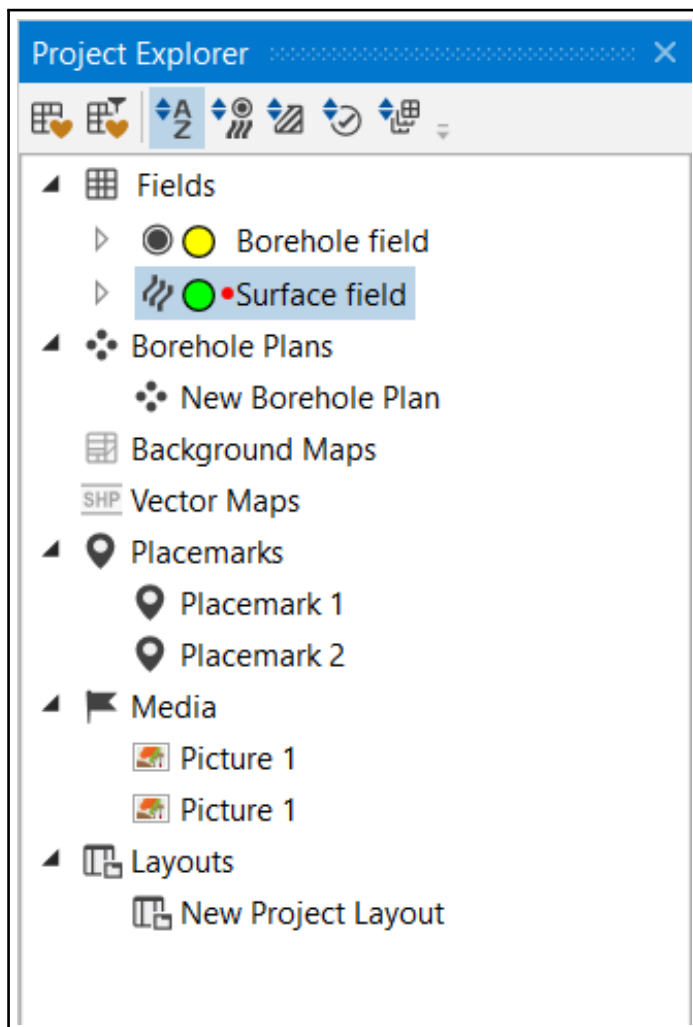
Symbol	Name	Description
	Smooth Route	The running route was smoothed. See sect. Smooth Route on page 48.
	Offset Compensation	An offset compensation was carried out. See sect. Offset Compensation on page 52.
	Soil Compensation	A soil compensation was carried out. See sect. Soil Compensation on page 54.

4.5 Project Explorer

The project explorer is a file manager and is used to manage EVA4ALL.

The project explorer shows the project structure. Folders and all files belonging to the project, such as fields, media, placemark comments etc., are displayed and can also be added or deleted here.

A click with the right mouse button on a folder or a file opens a context menu with the various editing options.



Click in the tab *View* (see sect. 4.2.5 on page 78) on the button *Project Explorer* to show or hide the project explorer.

The buttons under the title bar provide various filter and sorting options for the files displayed in the project explorer.

Under *Fields* all fields contained in the project are displayed with symbols for the various field properties such as the type of the field (surface or borehole field), field state, field lock, etc..

The files contained in the project such as background maps, CAD files, media (photos, videos, PDFs ...) etc. are displayed in the other folders.

Information on adding files can be found in sect. *Add File* on page 35.

Fig. 4.5.1: Project Explorer

In the project explorer, individual fields can be marked by clicking with the left mouse button, e.g. when an offset compensation (see sect. 4.2.3.4 on page 52) is to be carried out for a field, or to save a field (see sect. 4.2.1.6 on page 22). The marked field is marked blue in the project explorer.

If a field (here surface field 2) is marked in the project explorer, it is highlighted in blue. The readings layer (or several readings layers) containing this field is marked with a blue point in the layer manager (see also sect. [Layer Manager](#) on page 107). The track layer is also marked with a blue point. The corresponding field is framed in blue on the map.

If a readings layer (here readings layer surface field 1) is marked in the layer manager, it is framed in red. The contained field (or several fields) is marked with a red point in the project explorer. If the readings layer is displayed visibly on the map, this readings layer is framed in red on the map.

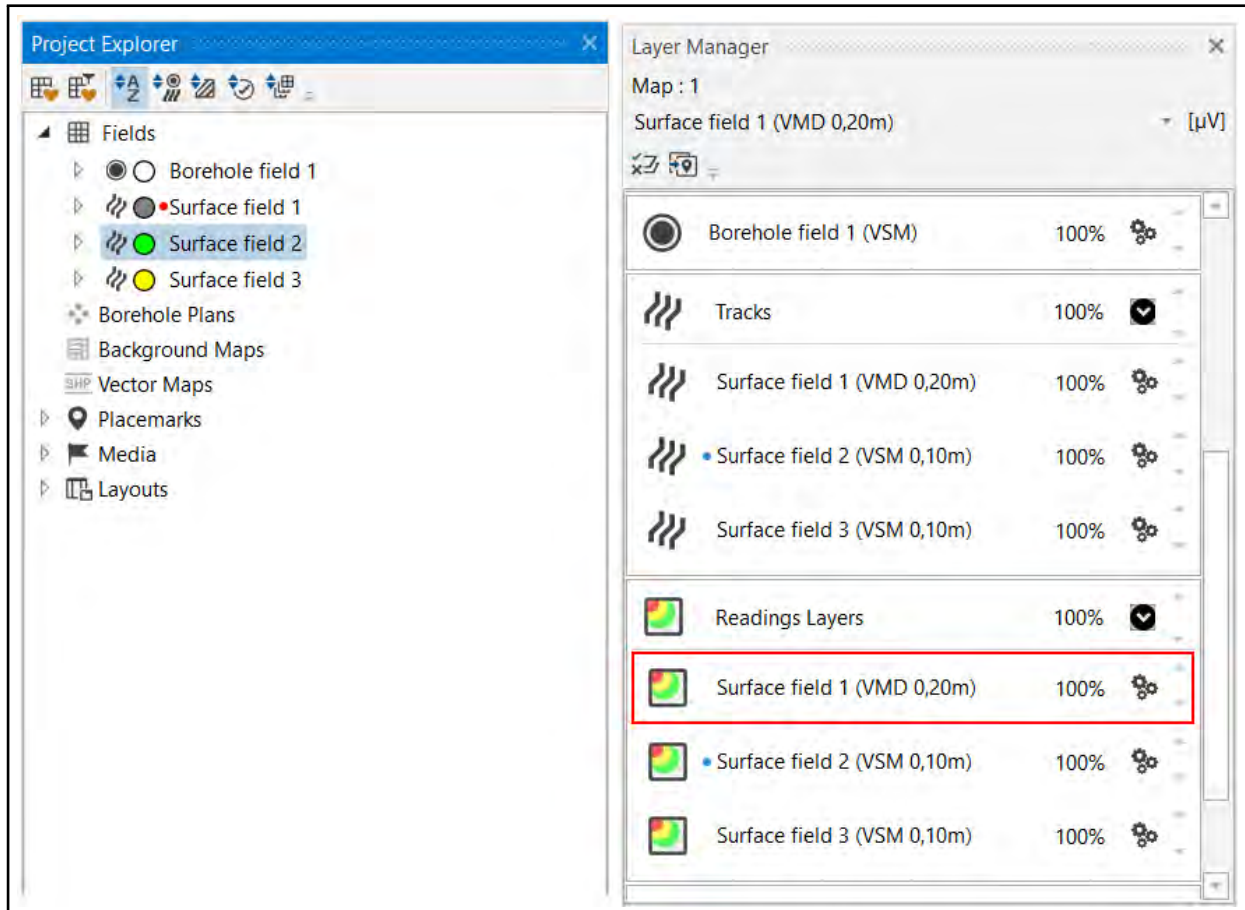


Fig. 4.5.2: Marked fields / readings layers in the project explorer and in the layer manager.

If a field or a readings layer is neither marked in the layer manager nor in the project explorer, the field or the readings layer is framed in yellow on the map.

4.6 Layer Manager

All layers of a project are displayed in the layer manager.

The layers can be imagined as overlapping foils that represent different information about the project on the map.

The individual layers can be visible or hidden (see sect. 4.6.1). Hidden layers are not displayed on the map.

The layers can be moved in the layer manager, i. e. the arrangement of the layers on top of each other can be changed. This can change what is displayed on the map. To do this, move the cursor over a layer and move the layer up or down to the desired position with the left mouse button pressed.

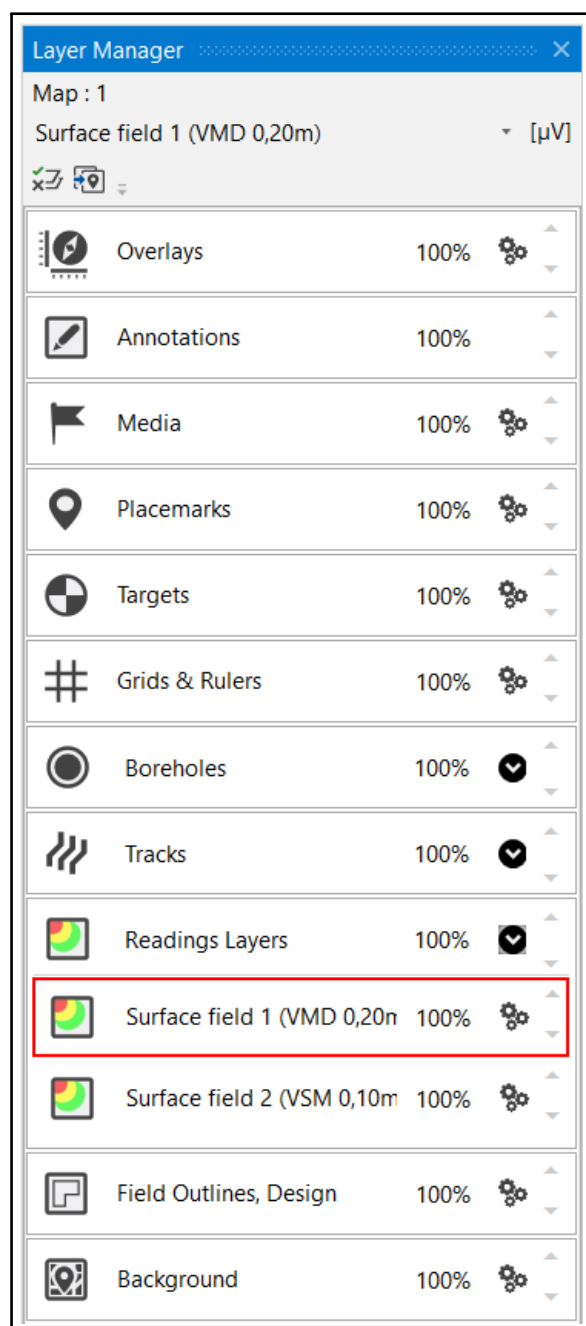


Fig. 4.6.1: Layer manager

Click in the tab *View* (see sect. 4.2.5 on page 78) on the button *Layer Manager* to show or hide the layer manager.

The button  under the title bar opens the window *Manage Readings Layers* (see sect. 4.2.2.1 on page 30).

The button  copies the active map with all the layers it contains.

The copied map can be moved and docked to different predefined positions on the user interface (see sect. 4.1.2 on page 14).

In this way, a field with different settings (e. g. with different color or filter settings) can be viewed side by side.

Thereunder, the individual layers of the project are displayed.

Generated readings layers for surface and bore-hole fields (see sect. 4.2.2.1) are displayed.

There are additional layers for overlays, grids and rulers, field outlines, background maps. etc.

Other layers are created while the project is being edited, e. g. the layers for targets (after evaluating targets, see sect. 4.2.4.4 and 4.2.4.3), placemark comments (after adding placemark comments, see sect. 4.2.6.1), media (after adding media, see sect. 4.2.2.6) etc.

Layer Background

Background maps obtained from an online map service can only be displayed with an active internet connection.

The supported background maps are displayed when you click on the button *settings* in the layer *Background* (see sect. 4.6.1).

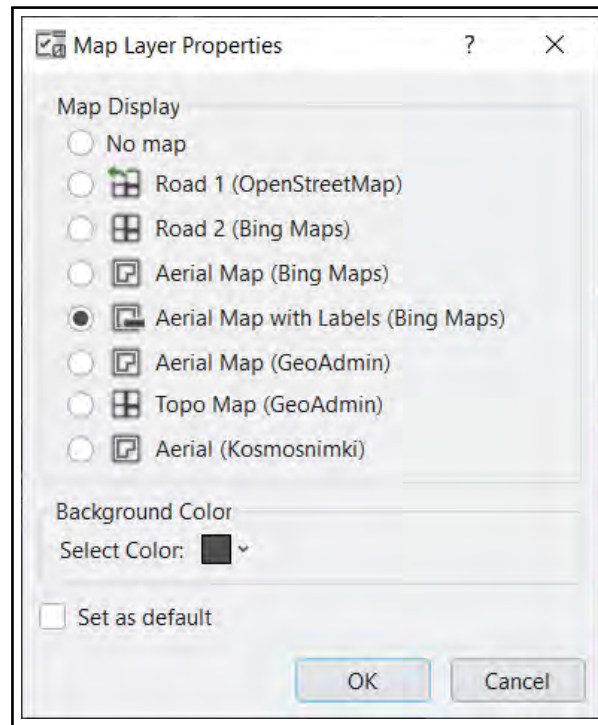


Fig. 4.6.2: Background maps

Layer Overlays

In the layer *Overlays*, click on the button *layer settings* (see sect. 4.6.1) to enable or disable various display options such as field labels, scale, compass... .

Click the button *Compass Properties* to change the size of the compass on the map.

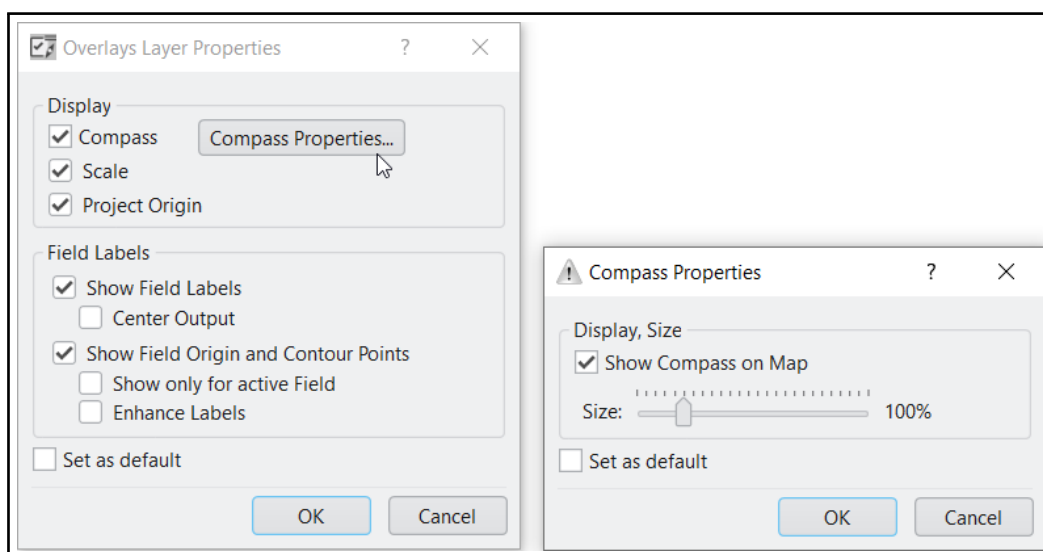


Fig. 4.6.3: Overlays and compass

Layer *Field Outlines, Design*

Each field has a layer *Field Outlines, Design*.

When you click on the button *Layer settings* (see sect. 4.6.1) on a layer *Field Outlines, Design*, the window *Outlines Layer Properties* appears and you can change the formatting of the field outlines.

The field outlines can be shown/hidden for each field individually (see button *Layer visibility* in sect. 4.6.1).

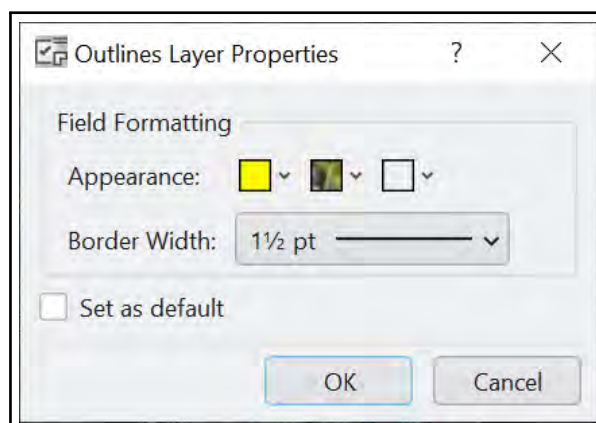


Fig. 4.6.4: Outlines Layer Properties

Layer *Targets*

When you click on the button *Layer settings* (see sect. 4.6.1) on the layer *Targets*, the window *Target Layer Properties* appears and you can change the scale factor for the target size, the font and font size for the target labels and other display options for targets on the map.

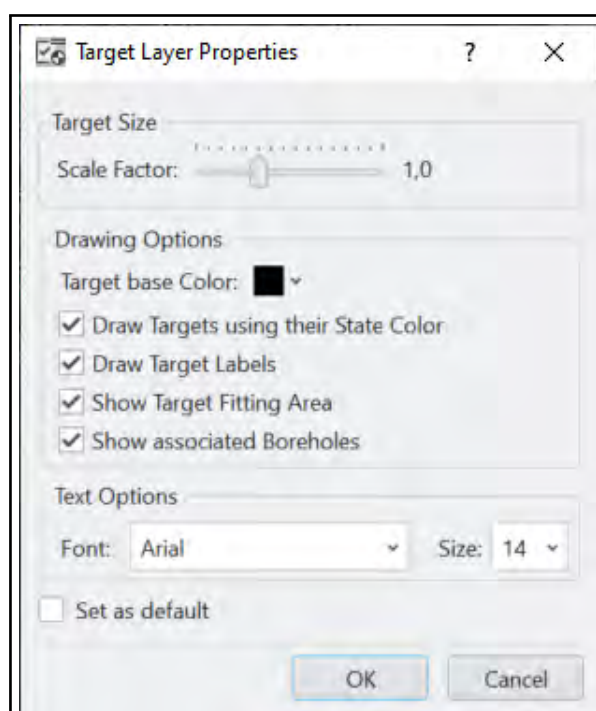


Fig. 4.6.5: Target layer properties

4.6.1 Layer, buttons

The functions of the individual buttons are explained using the layer *Targets*. In principle, this also applies to all other layers in the layer manager.



Fig. 4.6.6: Layer *Targets*

(1) Button layer visibility, (2) Layer name, (3) Slider for layer opacity setting, (4) Depending on the layer access to layer settings or display of further layers, (5) Move the layer up or down

Click with the cursor on the button *layer visibility* (1) to show or hide a layer on the map. Hidden layers are not displayed on the map.

The opacity of the individual layers can be adjusted to optimize the map display. Click with the cursor on the button *slider for opacity setting* (3). A slider is then displayed with which you can adjust the opacity of the layer continuously between 0 and 100 % by holding down the left mouse button. The set value is displayed for the individual layers.

Clicking on the button *settings* (4) opens a window in which specific display parameters for the layer can be set. Many of these settings are immediately displayed on the map. If *set as default* is checked, these settings are applied to all new layers.

Under the layers *Boreholes*, *Tracks* and *Readings Layers*, further layers, if generated, are displayed after clicking on the button (4), e.g. readings layers of fields (see also fig. 4.6.1).

Clicking on the two buttons (5) moves the layer in the layer manager and in the map display up or down.

4.6.2 Working with the layer manager

When EVA4ALL is started and a project is opened, it is possible to select whether or according to which criteria readings layers are created for the fields contained in the project (see sect. [Open a project](#) on page 128).

When generating readings layers for surface fields, corresponding track layers are also generated for these surface fields and displayed in the layer manager.
No track layers are generated for borehole fields.

In fig. 4.6.7 you can see the generated readings layer *Surface field 1* (also at the top of the drop-down menu) and just above it the corresponding track layer *Surface field 1*.

With a left mouse click on this readings layer it is framed and red and active.

Various work steps that are carried out, e. g. add a filter layer, evaluate targets, change color profiles etc. refer to the active readings layer framed in red.

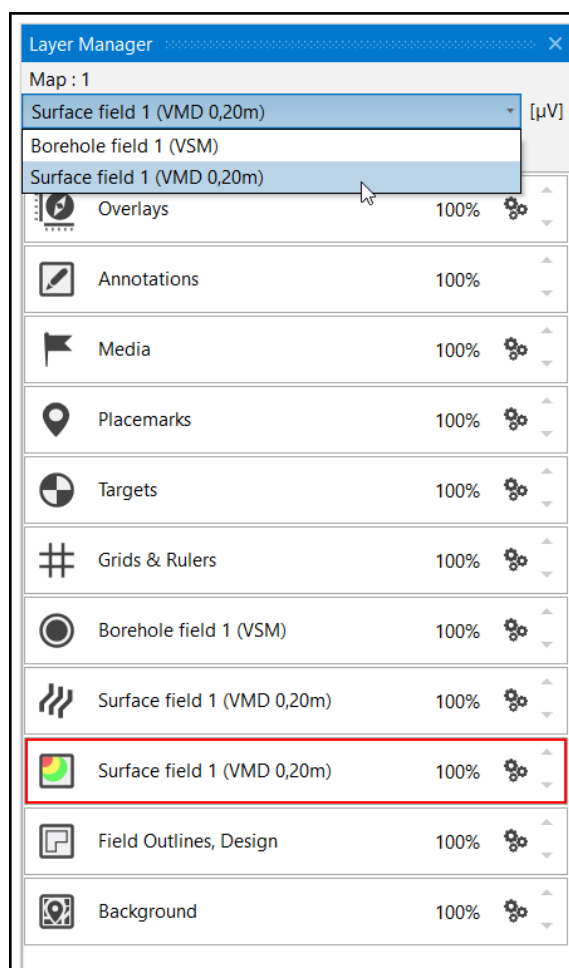


Fig. 4.6.7: Readings Layer Surface field 1

If fields are added to the project, readings layers as well as track layers (only for surface fields) can be generated for these fields (see sect. [Manage Readings Layers](#) on page 30). These are then displayed in the layer manager for each field or for a set of compatible fields. Various work steps that are carried out, e. g. add a filter layer, evaluate targets, change color profiles etc. refer only to the active readings layer framed in red. If the readings layer is visibly displayed, it is also framed in red on the map.

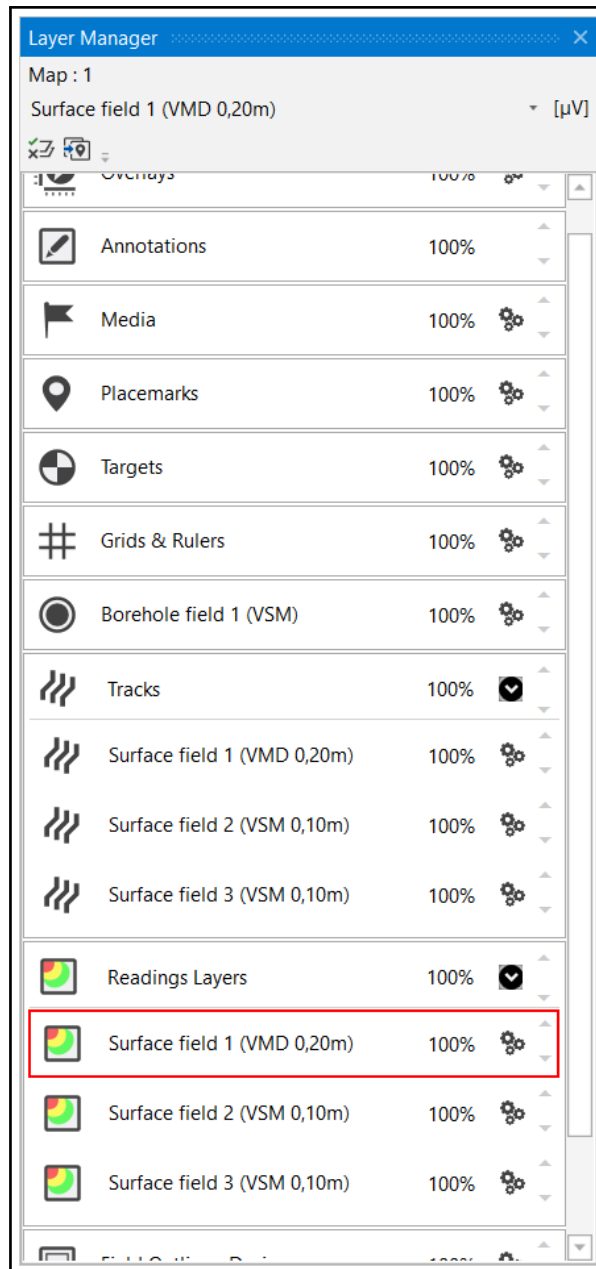


Fig. 4.6.8: Readings Layer Field 1 to Field 3

If a readings layer (here readings layer surface field 1) is marked in the layer manager, it is framed in red. The contained field (or several fields) is marked with a red point in the project explorer. This readings layer is framed in red on the map, if it is visibly displayed.

If a field (here surface field 2) is marked in the project explorer (see also sect. [Project Explorer](#) on page 105), it is highlighted in blue. The readings layer (or several readings layers) containing this field is marked with a blue point in the layer manager. The track layer is also marked with a blue point. The corresponding field is framed in blue on the map.

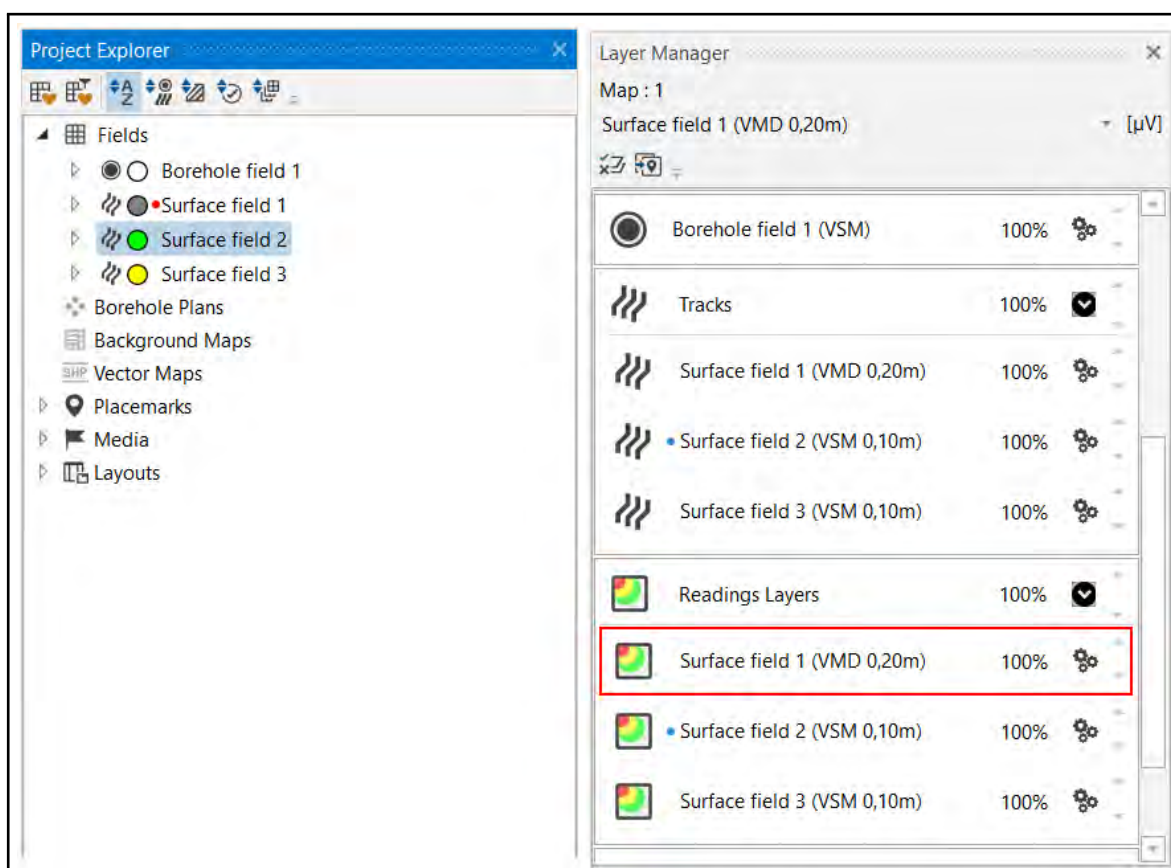


Fig. 4.6.9: Marked readings layers / fields in the layer manager and project explorer

If a field or a readings layer is neither marked in the layer manager nor in the project explorer, the field or the readings layer is framed in yellow on the map.

Any number of individual fields of a project can be combined into one readings layer, if they were recorded with the same probe type and the same measuring height. If this readings layer is marked (readings layer 4, red, in fig. 4.6.10), all fields contained in this readings layer are marked with a red point in the project explorer.

When a field is marked in the project explorer, it is highlighted in blue. All readings layers containing this field are then marked with a blue dot in the layer manager.

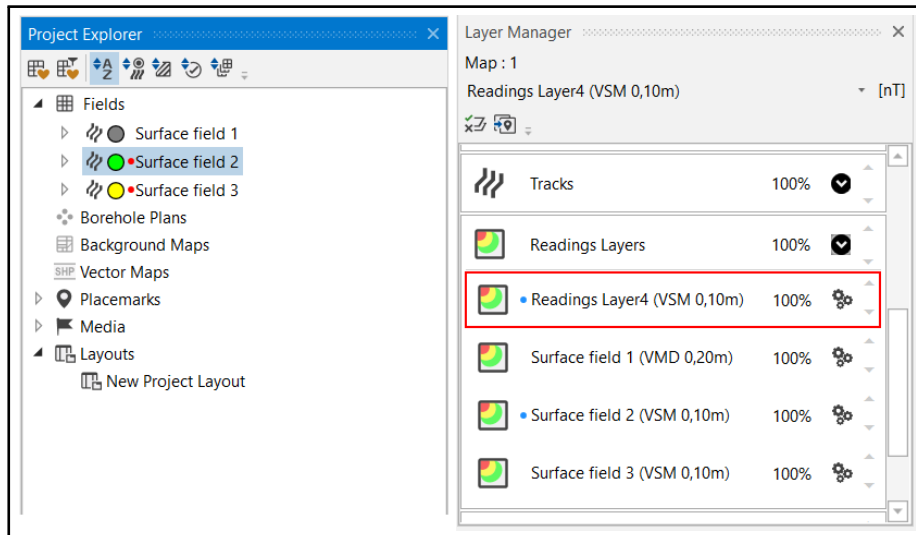


Fig. 4.6.10: Readings layer 4 with 2 fields

Click on the button  under the title bar of the layer manager to open the window *Manage Readings Layers*. Mark a readings layer and the fields contained in this marked readings layer are displayed.

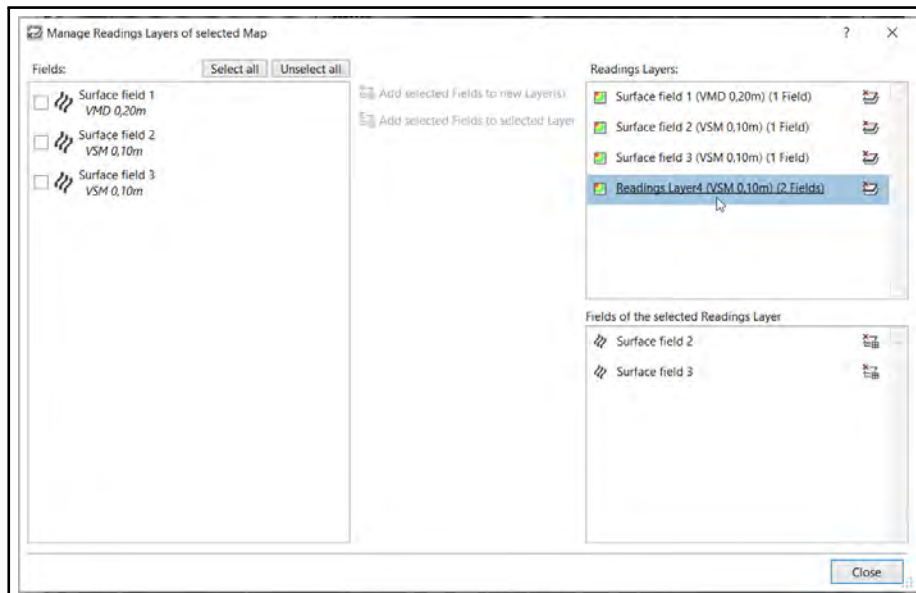


Fig. 4.6.11: Window *Manage readings layers*

More information on this can be found in sect. [Manage Readings Layers](#) on page 30.

4.7 Color Editor

The color editor offers the possibility to optimize and customize the color representation of the map.

The preset color profile for readings layers with magnetometer data is *Rainbow Colors*.

The preset color profile for readings layers with metal detector data is *Purple Colors*.

The preset color profile for filter layers is *Grayscale Colors*.

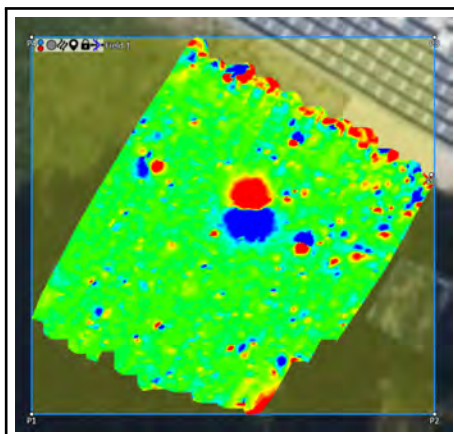


Fig. 4.7.1: Readings layer with magnetometer data, color profile *Rainbow Colors*

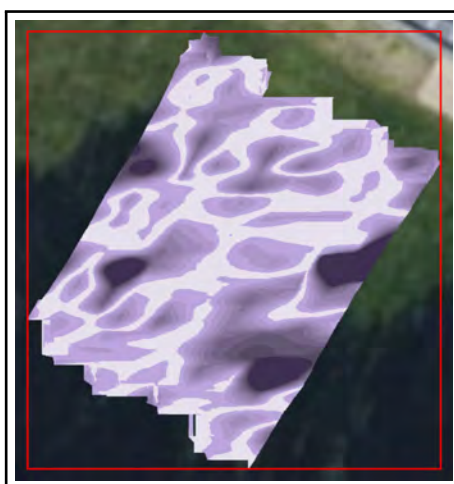


Fig. 4.7.2: Readings layer with metal detector, color profile *Purple Colors*

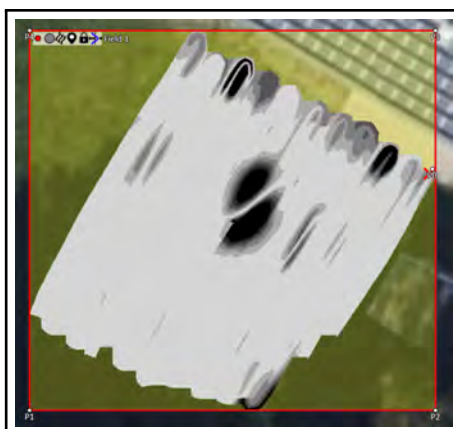


Fig. 4.7.3: Filter layer, color profile *Grayscale Colors*

In the preset color profile *Purple Colors*, color gradients from dark to light purple are displayed for readings layers with metal detector data (see fig. 4.7.2). The darker the displayed hue on the readings layer, the larger the readings value at this point.

In the preset color profile *Rainbow Colors* for readings layers with magnetometer data, positive readings values are displayed as a color gradient from green to yellow to red. Negative readings values are displayed as a color gradient from green to blue. Ranges around 0 nT are displayed in green.

These color settings can be customized in the color editor.

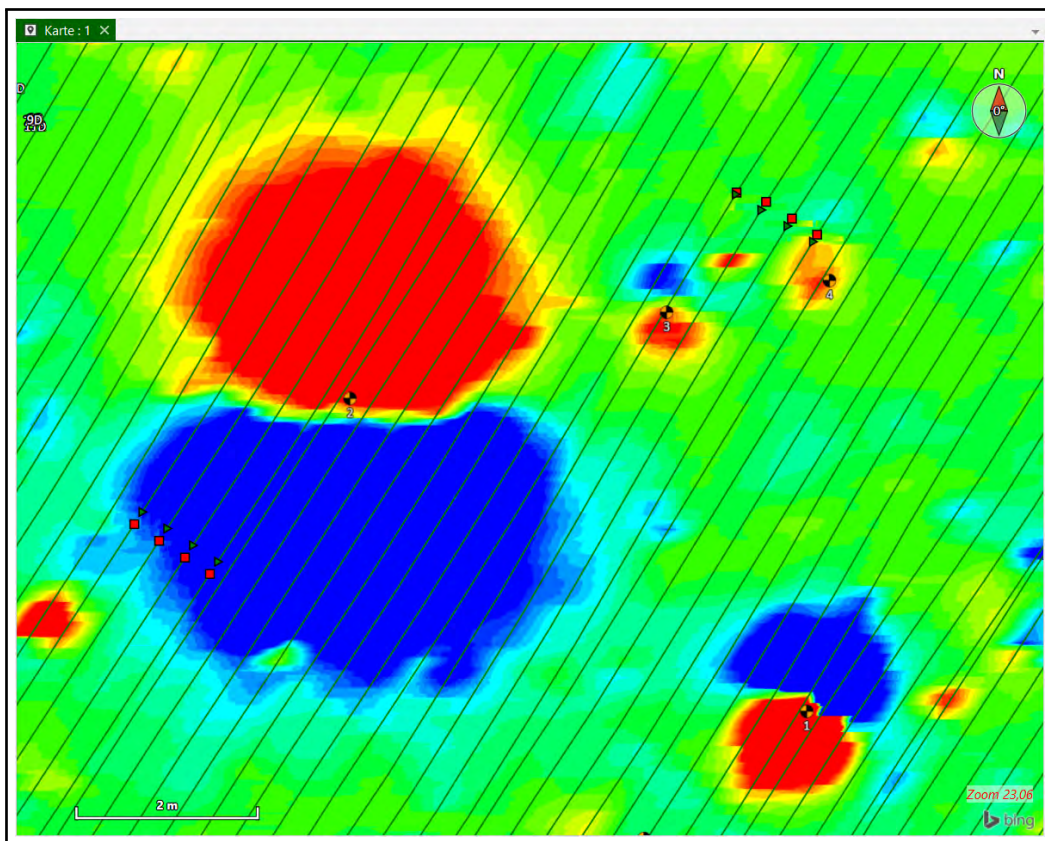


Fig. 4.7.4: Preset color profile for a surface field

Each measured value in nT is assigned a color value on the color scale and thus also on the color map.

Ranges between 'real' measured values are filled with interpolated color gradients in order to depict a closed color map.

The maximum distance of two measured values bridged by interpolation is preset to 1.5 m. If necessary, this value can be changed (see sect. *Field Properties* on page 42, *Data Gap Size*).

This color scale is initially calculated automatically for each field and can be changed as required.

If you want to adapt the color settings for a readings layer, select the corresponding readings layer in the layer manager (see sect. 4.6 on page 107).

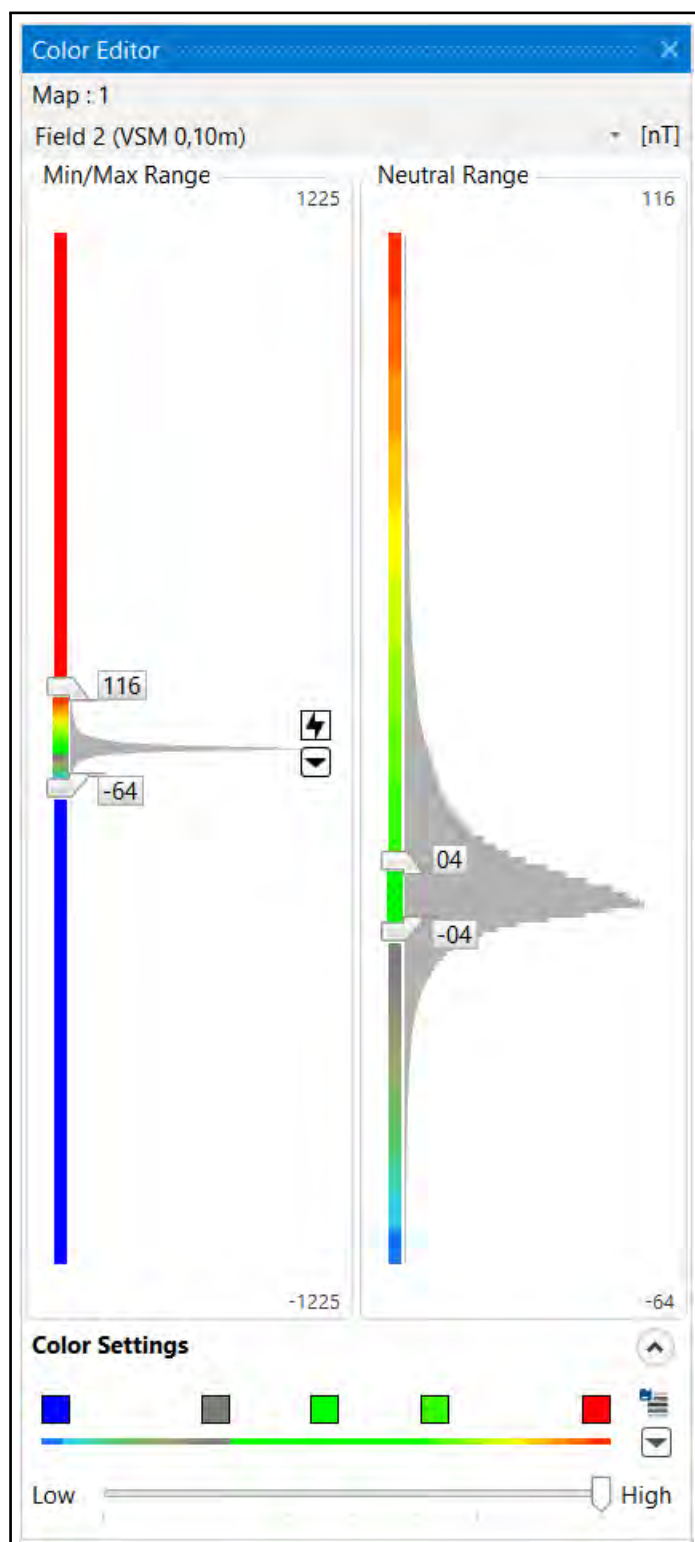


Fig. 4.7.5: Color editor for a surface field

Click in the tab *View* (see sect. 4.2.5 on page 78) on the button *Color Editor* to show or hide the color editor.

Min/Max Range:

The color scale for the measured values can be changed by using the sliders, by entering values in the fields on the sliders, or by selecting a value in the drop-down menu.

Neutral Range:

The neutral range is an enlarged representation of the area between the two sliders in the *Min/Max Range*.

Use the sliders or enter values in the fields on the sliders to determine which measuring range is displayed as the neutral range in green on the map.

Color Settings:

The three standard color profiles *Rainbow Colors*, *Grayscale Colors* and *Purple Colors* cannot be changed or deleted. However, user-defined color profiles can be created and also deleted.

Low - High:

Changes the number of displayed color gradations.

The histograms next to the sliders graphically represent the frequency of measured values.

Min/Max Range:

The color scale for the measured values can be adapted by changing the upper and lower limit values of the color scale by sliders, by entering values in the fields on the sliders, or by selecting a value in the drop-down menu.

In this example, all measured values above the automatically calculated, maximum, positive value displayed in the upper slider are shown in red on the map.

All measured values below the automatically calculated, minimum, negative value displayed in the lower slider are shown in blue on the map.

The measured values in between are represented in color gradations.

The neutral range around 0 nT is displayed in green.

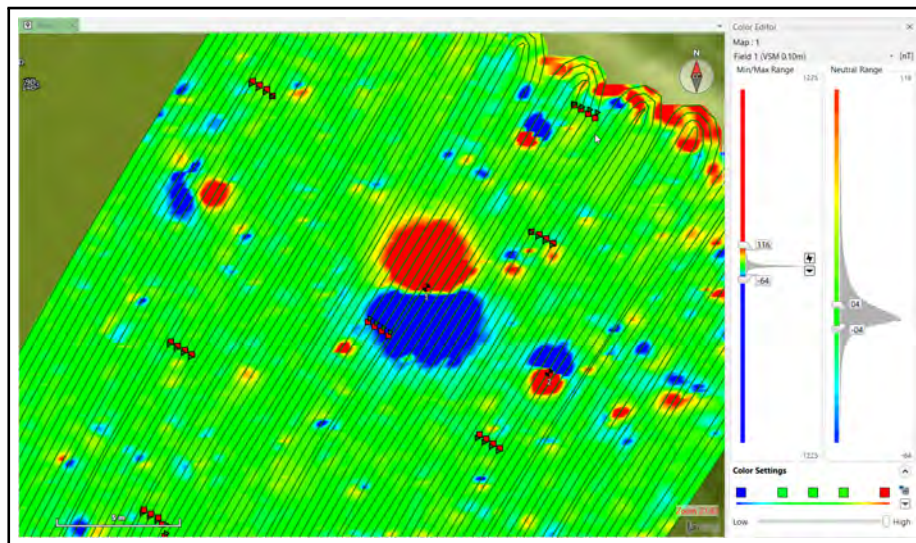


Fig. 4.7.6: Color scale, automatically calculated

After changing the min/max values in the drop-down menu, the color gradations are adapted to the changed value range.

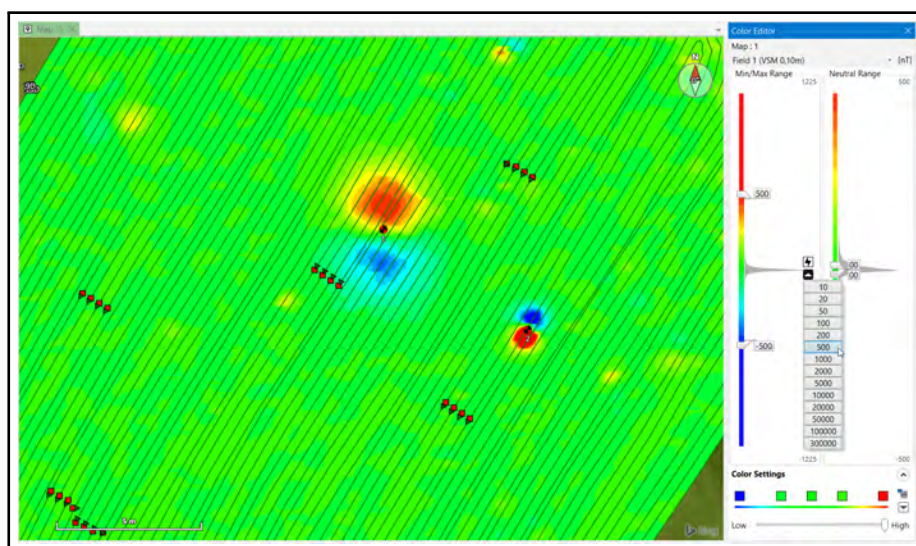


Fig. 4.7.7: Color scale, user-defined limit values

Clicking on the icon  restores the representation with the automatically calculated values.

Color Settings:

The current color profile for the measured values is displayed in the window *Color Settings*.

The 3 buttons on the right of the window serve (from top to bottom) to:

- ▷ Show and hide the window *Color Settings*.
- ▷ Save a user-defined color profile.
- ▷ Select a predefined or user-defined color profile in the drop-down menu.

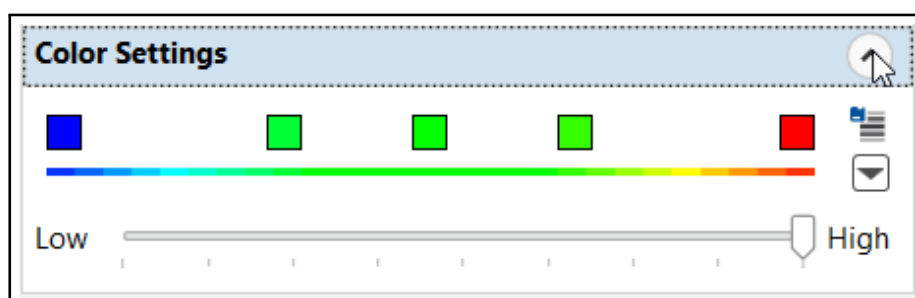


Fig. 4.7.8: Color Settings

For changing the color profile click with the cursor on the color and select the desired color from the color range.

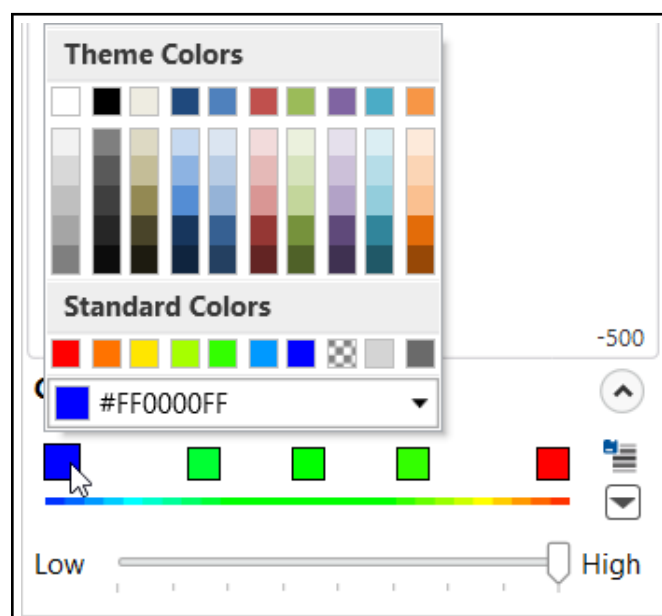


Fig. 4.7.9: Change color settings

Click with the cursor on the icon  (see sect. 4.7.10) to determine the desired color in the chromatic circle or by entering RGB color codes.

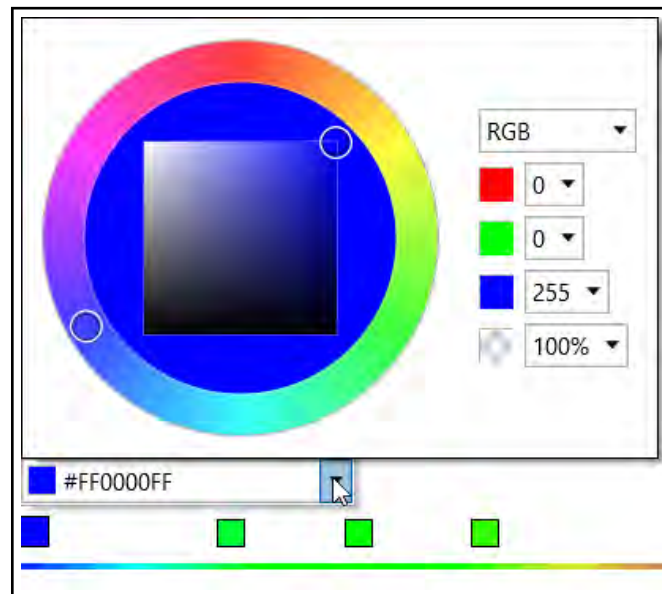


Fig. 4.7.10: Color settings by RGB color codes

Save a user-defined color profile by clicking on the icon  on the right side of the window *Color Settings* (see fig. 4.7.8). Enter a name for the color profile in the input field *Color Profile Name* and click on the button *OK*.

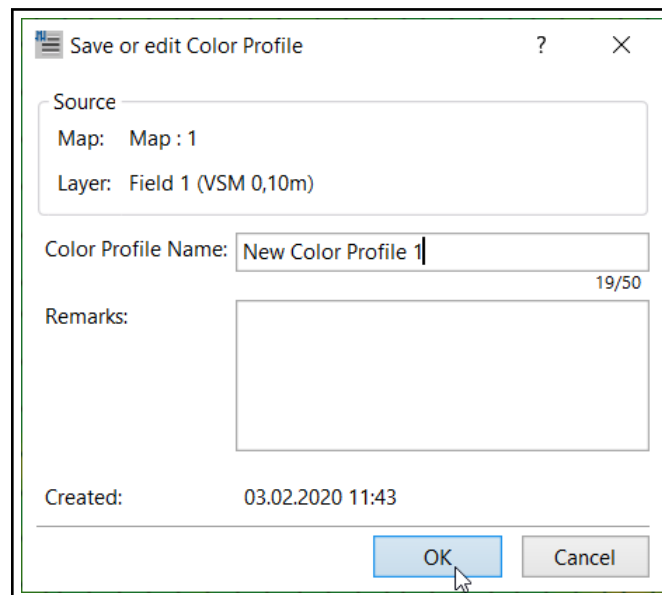


Fig. 4.7.11: Save a user-defined color profile

Open the drop-down menu in the window *Color Settings* (see fig. 4.7.8) by clicking on the icon  , and select the color profile that you would like to use for the active field.

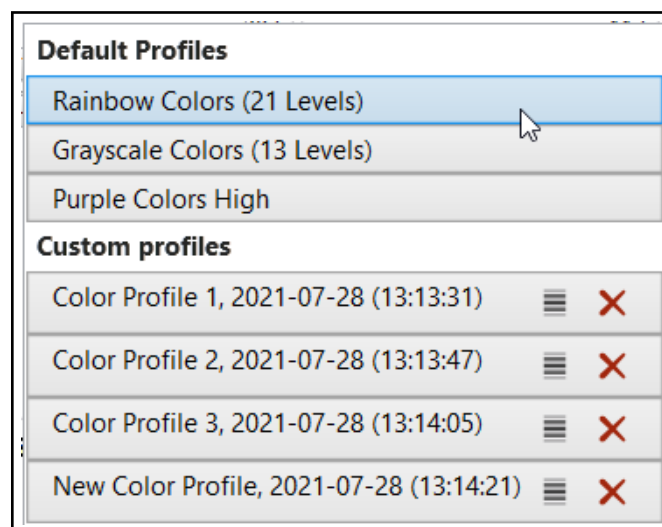


Fig. 4.7.12: Select color profiles

Clicking on the icon  opens the window *Save or edit color profile* (see fig. 4.7.11). Here you can rename the color profile.

Clicking on the icon  deletes a user-defined color profile.

The preset color profiles *Rainbow Colors* and *Grayscale Colors* cannot be renamed or deleted.

For managing color profiles see sect. [Manage Color Profiles](#) on page 77.

For evaluating fields see sect. 6.3.

4.7.1 Color Editor Borehole

In principle, all the information from sect. 4.7 also applies to boreholes in a borehole field.

The color editor also offers the possibility to optimize and customize the color representation of the boreholes.

In the preset color profile, positive readings values are displayed as color gradient from green to yellow to red. Negative readings values are displayed as color gradient from green to blue. Ranges around 0 nT are displayed in green.

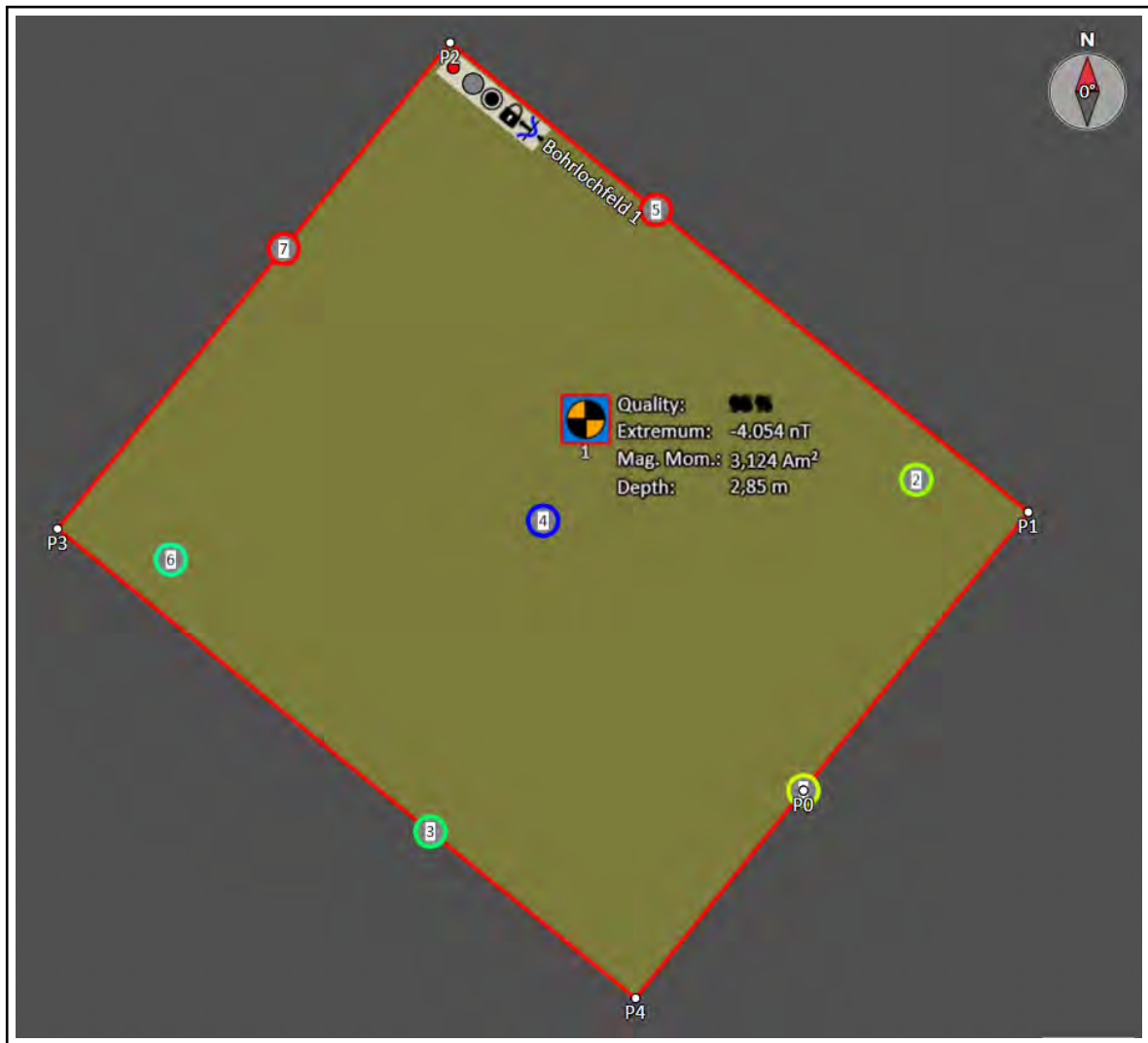


Fig. 4.7.13: Color profile borehole field

Each measured value in nT is assigned a color value on the color scale and thus also for the borehole. This color scale is initially calculated automatically and can be changed as required.

If you want to adapt the color settings for a readings layer, select the corresponding readings layer in the layer manager (see sect. 4.6 on page 107).

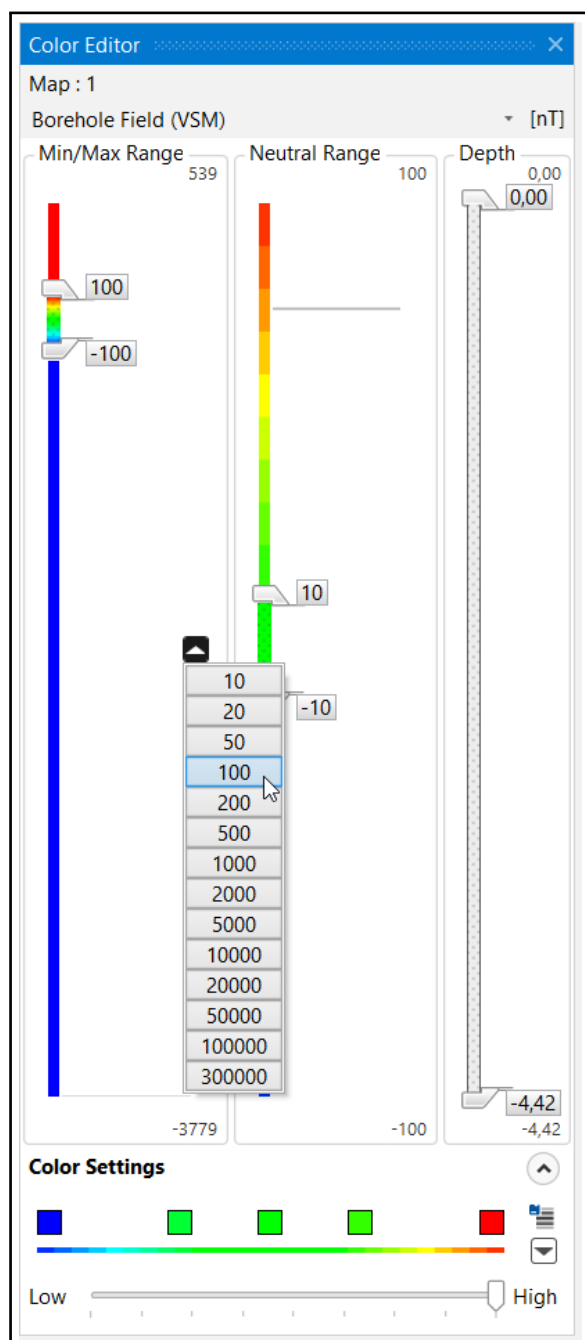


Fig. 4.7.14: Color editor for a borehole field

Click in the tab *View* (see sect. 4.2.5 on page 78) on the button *Color Editor* to show or hide the color editor.

Min/Max Range:

The color scale for the measured values can be changed by using the sliders, by entering values in the fields on the sliders, or by selecting a value in the drop-down menu.

Neutral Range:

The neutral range is an enlarged representation of the area between the two sliders in the *Min/Max Range*.

Use the sliders or enter values in the fields on the sliders to determine which measuring range is displayed as the neutral range in green on the map.

Depth:

Use the sliders or enter values in the fields on the sliders to determine for which depth range the color profile shall be applied to the boreholes.

Color Settings:

The three standard color profiles *Rainbow Colors*, *Grayscale Colors* and *Purple Colors* cannot be changed or deleted. However, user-defined color profiles can be created and also deleted.

Low - High:

Changes the number of displayed color gradations.

Min/Max Range:

The color scale for the measured values can be adapted by changing the upper and lower limit values of the color scale by sliders, by entering values in the fields on the sliders, or by selecting a value in the drop-down menu.

In this example, the boreholes with measured values above the positive value displayed in the upper slider are shown in red.

Boreholes with measured values below the negative value displayed in the lower slider are shown in blue.

The measured values in between are represented in color gradations.

Boreholes in the neutral range around 0 nT are displayed in green.



Fig. 4.7.15: Borehole color and readings curve

This color profile refers to measured values that appear over the measured borehole length (depth). As the measured values are recorded approximately in the middle of the probe tube, the measured borehole length is shorter than the drilled borehole length.

The readings curve for borehole 4 shows a greater negative measured value and a smaller positive measured value. This borehole is displayed in blue on the map.

The readings curve for borehole 5 shows a smaller negative measured value and a greater positive measured value. This borehole is displayed in red on the map.

Readings curve see sect. [Tabs Track Curve / Borehole Curve](#) on page 92.

If you limit the measuring range to a depth range with the sliders, here in the example (Fig. 4.7.16) to a depth between -3.5 and -3.8 meters, a positive measured value appears in this area in borehole 4 (see also the readings curve) and borehole 4 is not displayed anymore in blue on the map but in red.

In borehole 5 there is a measured value between 0 and 100 nT in the depth range between -3.5 and -3.8 meters, so this borehole is displayed in the yellow color gradation on the map.

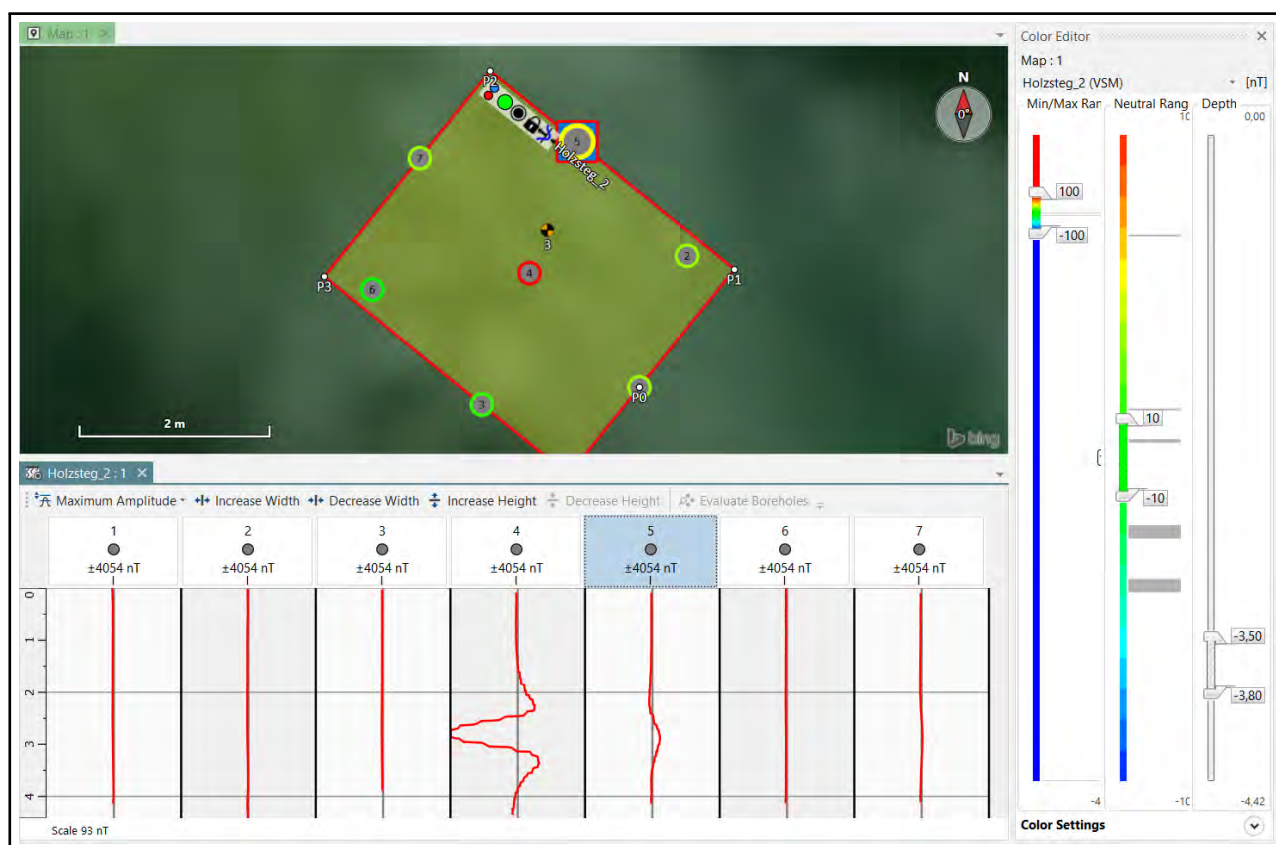


Fig. 4.7.16: Limit the measuring range

You can push the two sliders for the depth together, as shown in fig. 4.7.17, and move them up and down together with the left mouse button pressed. In this way, the color profile of the boreholes is displayed according to the signal at the corresponding depth of the borehole.



Fig. 4.7.17: Color scale, depth slider

5 Transfer the data

The saved data can be transferred for evaluation to the PC via a USB interface (e.g. with a USB stick or a direct connection with a USB cable), or via the Internet/WLAN (e.g. via e-mail). After the evaluation / processing, the data can be transferred from the PC back to the field computer in the same way.

5.1 Transfer data from the field computer to the PC

Information on transferring data from a Vallon field computer to a PC can be found in the separate operation manual for the software for data acquisition EVA4mobile.

5.2 Transfer data from the PC to the field computer via USB

To transfer data of the opened project and all the contained fields in *.e4x format from the PC to a Vallon field computer, click on the tab *File*, then on *Save/Export*.

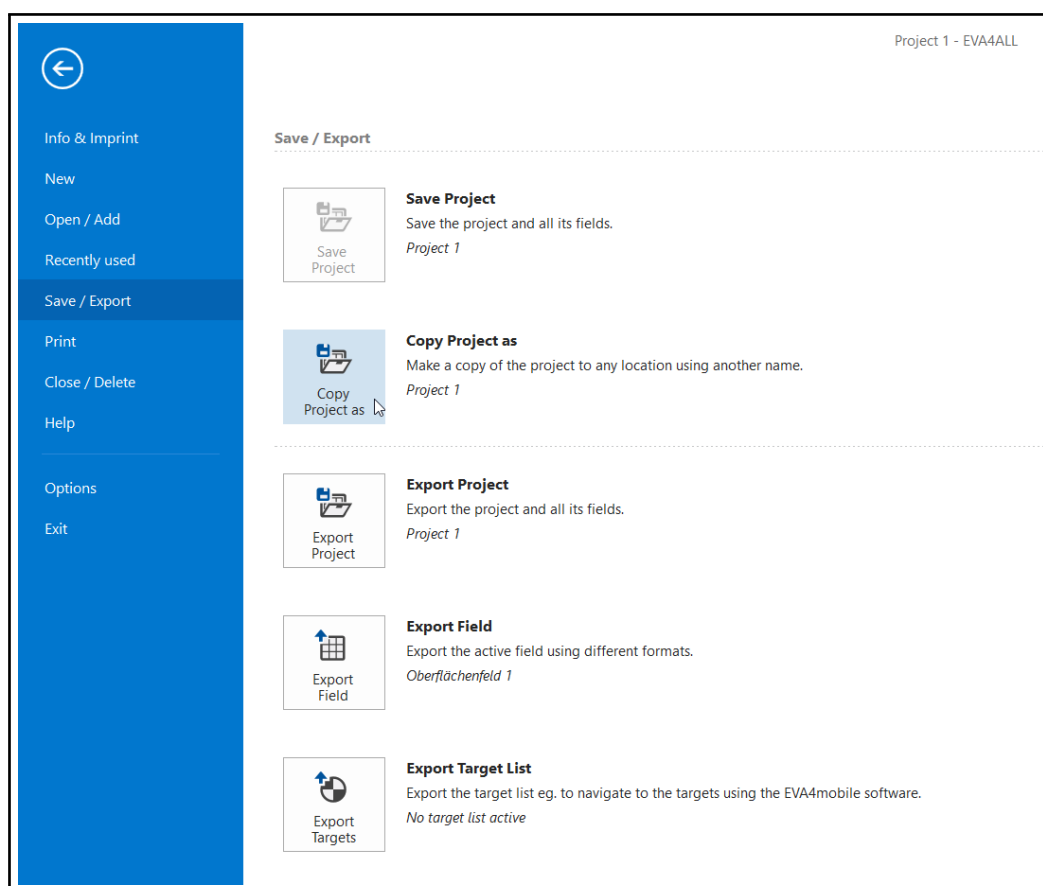


Fig. 5.2.1: Transfer data from the PC to the field computer

Click on the button *Copy Project as*. The window *Save Project as* opens. Select the desired storage location, enter the desired file name and click on *Save*.

Find further information on the buttons in this window in sect. [Button Save / Export](#) on page 22.

6 Operation

6.1 Starting EVA4ALL

Start the evaluation software EVA4ALL by double-clicking on the icon .

The main screen opens. The user interface on the main screen is divided into different areas. You can switch from the main screen to the various work areas. Further information can be found in sect. [Main screen](#) on page 12.

6.2 Open a project

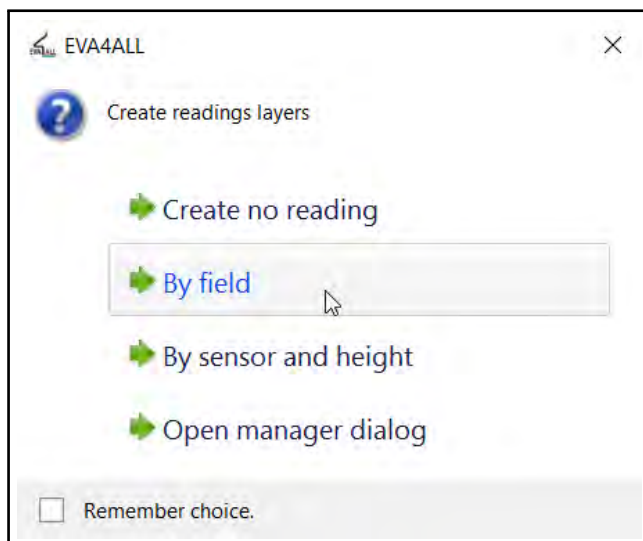
To be able to open a project, a project file in .e4x or .epr format must be available on the PC. Information on transferring data from a Vallon data recording solution to the PC can be found in the separate operation manual for the software for data acquisition EVA4mobile.

Opening a project see sect. [4.2.1](#) and [4.2.1.4](#).

When starting EVA4ALL for the first time, no project is opened.

Information on creating a new project can be found in sect. [4.2.1.3](#).

If a project does not have readings layers for all existing fields or none at all, the window *Create readings layers* opens when EVA4ALL is started and a project is opened. Here you can choose whether or how to create readings layers for the fields contained in the project (see also sect. [Manage Readings Layers](#) on page 30).



Create no reading: No readings layers are generated for the fields contained in the project.

By field: A readings layer is generated for each field in the project.

By sensor and height: A joint readings layer is generated for several compatible fields (same probe, same measuring height).

Open manager dialog: Opens the window *Manage Readings Layers* (sect. [4.2.2.1](#)).

Fig. 6.2.1: Create reading layers

Remember choice: Tick here if the selection made is to be applied automatically each time a project is opened.

6.3 Evaluate fields

The evaluation of the data recorded in a surface or borehole field is described in the following sections [6.3.1](#) und [6.3.2](#).

Before working with EVA4ALL and before evaluating fields, we recommend to fully read this operation manual and especially the details and information on the individual command groups and key functions (see sect. [4](#)), in order to be able to use the entire functions of EVA4ALL.

Only adequately trained and instructed personnel can stringently judge the information and visual representations calculated by EVA4ALL on the evaluated surface and borehole data.

6.3.1 Evaluate surface fields

- ▶ Transfer the data from the field computer to the PC.
Information on this can be found in the separate operation manual for the software for data acquisition EVA4mobile.
- ▶ Open a project. To do this, click in the tab *File* on the button *Open/Add* and then on the button *Open Project*.
See also [Button Open / Add](#) on page 21).
- ▶ Manage the readings layers.
Information on the readings layers can be found in sect. [Manage Readings Layers](#) on page 30 and [Layer Manager](#) on page 107.
- ▶ Add information to the project such as project name, customer, remarks and further details and upload a company logo.
See sect. [Project Properties](#) on page 31.
- ▶ Add shapefiles, CAD files, pictures, videos, audio files... to the project or individual fields in the project.
Information on this can be found in sect. [Add File](#) on page 35.
- ▶ Carry out an offset compensation (see sect. [Offset Compensation](#) on page 52).
- ▶ If necessary, you can apply different readings filters.
Information on this can be found in sect. [Readings Filter](#) on page 60.
- ▶ The color editor offers the possibility to optimize and customize the color representation of the map.
Information on this can be found in sect. [Color Editor](#) on page 115.
- ▶ Evaluate single targets, multiple targets or a complete readings layer.
Information on this can be found in sect. [Evaluate single Target](#) on page 69 and [Evaluate multiple Targets](#) on page 67.
- ▶ The resulting target list provides a lot of information about the evaluated / calculated targets. If necessary, it can be filtered and sorted according to selected criteria.
Information on the target list can be found in sect. [Target List](#) on page 132.
- ▶ Create a project report. You can print the project report and save as PDF on the PC.
Information on creating and printing a project report can be found in sect. [Button Print](#) on page 24 and [Tab Documentation](#) on page 84.
- ▶ Save the current processing status of the project (see sect. [Button Save / Export](#) on page 22).

6.3.2 Evaluate borehole fields

- ▶ Transfer the data from the field computer to the PC.
Information on this can be found in the separate operation manual for the software for data acquisition EVA4mobile.
- ▶ Open a project. To do this, click in the tab *File* on the button *Open/Add* and then on the button *Open Project*.
See also [Button Open / Add](#) on page 21).
- ▶ Manage the readings layers.
Information on the readings layers can be found in sect. [Manage Readings Layers](#) on page 30 and [Layer Manager](#) on page 107.
- ▶ Add information to the project such as project name, customer, remarks and further details and upload a company logo.
See sect. [Project Properties](#) on page 31.
- ▶ Add shapefiles, CAD files, pictures, videos, audio files... to the project or individual fields in the project.
Information on this can be found in sect. [Add File](#) on page 35.
- ▶ Carry out an offset compensation (see sect. [Offset Compensation](#) on page 52).
- ▶ The color editor offers the option of working out individual signals that indicate the same target.
Information on this can be found in sect. [Color Editor](#) on page 115.
- ▶ Evaluate the boreholes.
Information on this can be found in sect. [Evaluate Boreholes](#) on page 71.
- ▶ The resulting target list provides a lot of information about the evaluated / calculated targets. If necessary, it can be filtered and sorted according to selected criteria.
Information on the target list can be found in sect. [Target List](#) on page 132.
- ▶ Create a project report. You can print the project report and save in PDF on the PC.
Information on creating and printing a project report can be found in sect. [Button Print](#) on page 24 and [Tab Documentation](#) on page 84.
- ▶ Save the current processing status of the project (see sect. [Button Save / Export](#) on page 22).

6.4 Target List

The target list provides a lot of information about the evaluated / calculated targets.

The target list is generated when evaluating data. Information on this can be found in sect. [Evaluate multiple Targets](#) on page 67, in sect. [Evaluate single Target](#) on page 69 and in sect. [Evaluate Boreholes](#) on page 71.

Step-by step instructions for evaluating fields can be found in sect. 6.3.

To open the target list, click in the tab *Evaluate* (page 56) or in the tab *View* (page 78) on the button *Target List*.

At the same time, an additional tab *Target List* (see sect. [Tab Target List](#) on page 136) appears next to the tabs.

Move the target list e.g. to the lower edge of the display window and dock it there. Information on this can be found in sect. 4.1.2 on page 14.

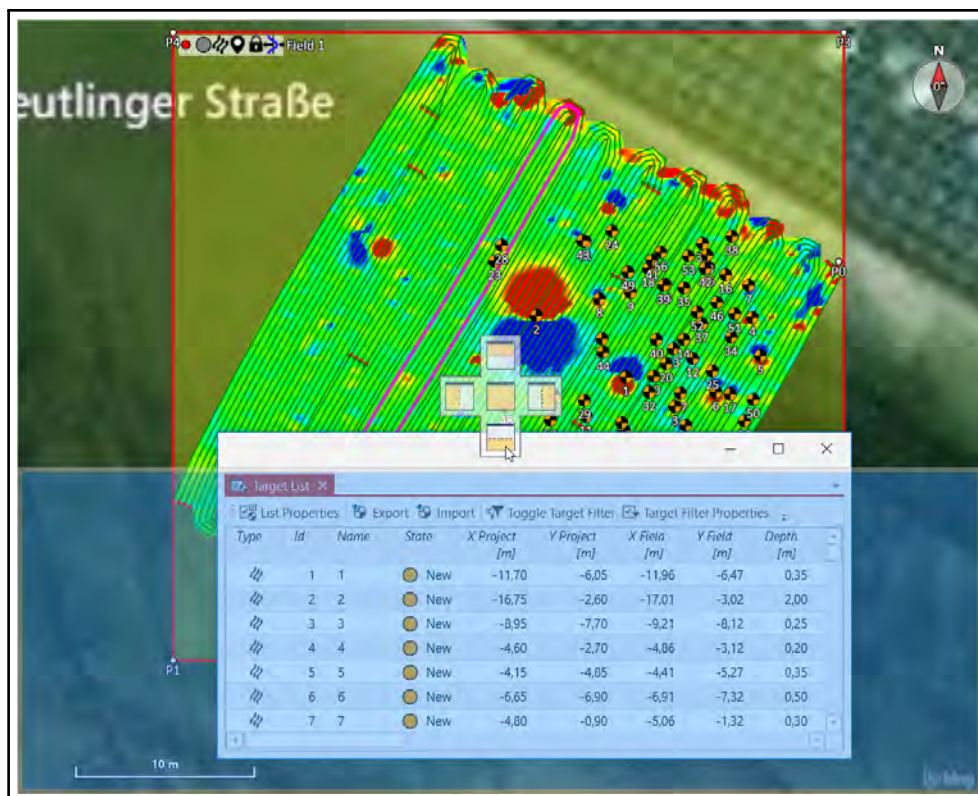


Fig. 6.4.1: Open and dock the target list

After docking the target list, you can click on the individual commands in the tab *Target List*.

NOTE: As an alternative to docking, you can also move the target list to a second monitor (if available) and use the commands in the toolbar of the target list for editing.

The target list and the view in the map are interactive.

When you click on a target in the target list, it is marked with a frame on the map.

When you click on a target on the map, the line is marked in the target list.

When you click on several targets, the active target is framed in red, the other marked targets are framed in blue.

With the CTRL key pressed, you can mark several individual targets on the map and in the

target list. With the SHIFT key pressed, you can mark several targets at the same time in the target list.

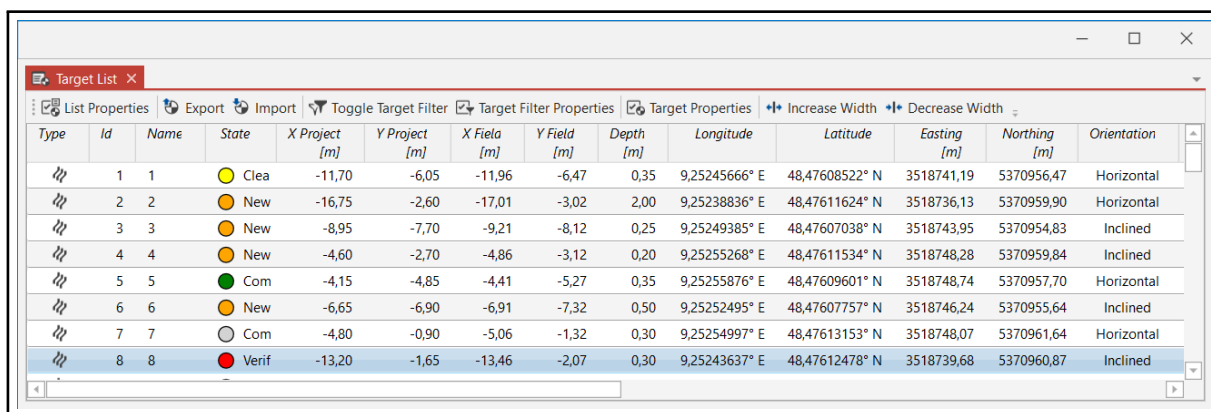
Each column of the target list can be sorted in ascending or descending order. This enables to sort e.g. by ID, target status, depth, extremum etc. To do this, click with the left mouse button into the upper field of the corresponding column, e.g. on *ID*.

Individual columns can be hidden. To do this, click with the right mouse button in the upper field of the corresponding column (e.g. on *Easting*) and select *Hide this Column* in the context menu. In this context menu you can also show hidden columns again (*Unhide all Columns*) and reset all columns.

Individual columns of the target list can be moved horizontally to a different position by holding down the left mouse button.

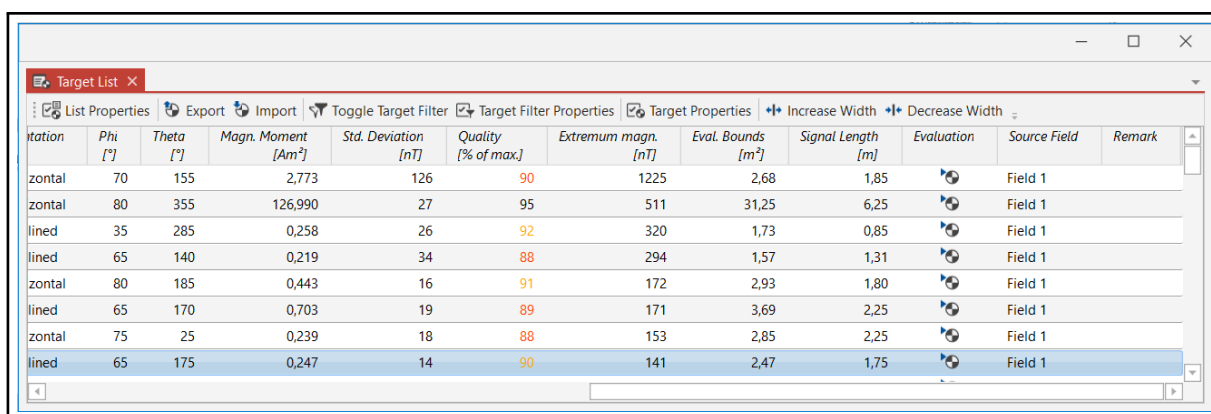
Right-clicking on a target in the target list or on the map opens a context menu with various editing options. A detailed explanation of the individual editing options can be found in sect. [Tabs and command groups](#) on page 17 and in sect. [Tab Target List](#) on page 136. For many editing options of the context menu there is also a button in one of the tabs.

You can, among other things, renumber the target list, delete individual targets in the target list, export the target list in CSV format (*.csv).



Type	Id	Name	State	X Project [m]	Y Project [m]	X Field [m]	Y Field [m]	Depth [m]	Longitude	Latitude	Easting [m]	Northing [m]	Orientation
🌀	1	1	● Clea	-11,70	-6,05	-11,96	-6,47	0,35	9,25245666° E	48,47608522° N	3518741,19	5370956,47	Horizontal
🌀	2	2	● New	-16,75	-2,60	-17,01	-3,02	2,00	9,25238836° E	48,47611624° N	3518736,13	5370959,90	Horizontal
🌀	3	3	● New	-8,95	-7,70	-9,21	-8,12	0,25	9,25249385° E	48,47607038° N	3518743,95	5370954,83	Inclined
🌀	4	4	● New	-4,60	-2,70	-4,86	-3,12	0,20	9,25255268° E	48,47611534° N	3518748,28	5370959,84	Inclined
🌀	5	5	● Com	-4,15	-4,85	-4,41	-5,27	0,35	9,25255876° E	48,47609601° N	3518748,74	5370957,70	Horizontal
🌀	6	6	● New	-6,65	-6,90	-6,91	-7,32	0,50	9,25252495° E	48,47607757° N	3518746,24	5370955,64	Inclined
🌀	7	7	○ Com	-4,80	-0,90	-5,06	-1,32	0,30	9,25254997° E	48,47613153° N	3518748,07	5370961,64	Horizontal
🌀	8	8	● Verif	-13,20	-1,65	-13,46	-2,07	0,30	9,25243637° E	48,47612478° N	3518739,68	5370960,87	Inclined

Fig. 6.4.2: Target List Part 1



Station	Phi [°]	Theta [°]	Magn. Moment [Am²]	Std. Deviation [nT]	Quality [% of max.]	Extremum magn. [nT]	Eval. Bounds [m²]	Signal Length [m]	Evaluation	Source Field	Remark
zontal	70	155	2,773	126	90	1225	2,68	1,85	🌀	Field 1	
zontal	80	355	126,990	27	95	511	31,25	6,25	🌀	Field 1	
lined	35	285	0,258	26	92	320	1,73	0,85	🌀	Field 1	
lined	65	140	0,219	34	88	294	1,57	1,31	🌀	Field 1	
zontal	80	185	0,443	16	91	172	2,93	1,80	🌀	Field 1	
lined	65	170	0,703	19	89	171	3,69	2,25	🌀	Field 1	
zontal	75	25	0,239	18	88	153	2,85	2,25	🌀	Field 1	
lined	65	175	0,247	14	90	141	2,47	1,75	🌀	Field 1	

Fig. 6.4.3: Target List Part 2

Data in the target list

Parameter	Description
Type	Symbol surface or borehole field.
Id	Consecutive numbering of the targets in the target list and on the map. For renumbering targets see sect. 6.4.1 on page 136 .
Name	Name of the target. The name can be chosen freely. When the name is not changed, it corresponds to the ID. For changing the name see sect. Target Properties on page 74 .
State	The state of the target is marked in color. For changing the state see sect. Target Properties on page 74 .
X Project [m]	Position: Distance of the target (in meters) from the project origin in X direction.
Y Project [m]	Position: Distance of the target (in meters) from the project origin in Y direction.
X Field [m]	Position: Distance of the target (in meters) from the field origin in X direction.
Y Field [m]	Position: Distance of the target (in meters) from the field origin in Y direction.
Depth [m]	Depth (in meters) in which the calculated target is located. This specification refers to the distance of the field surface to the center of the target.
Longitude	Longitude (WGS84 coordinate system).
Latitude	Latitude (WGS84 coordinate system).
Easting [m]	Local coordinate of the selected coordinate reference system.
Northing [m]	Local coordinate of the selected coordinate reference system.
Orientation	Orientation of the calculated target in the ground.
Phi [°]	The angle of inclination phi is the angle (0°- 180°) between the magnetic longitudinal axis of the calculated target and the perpendicular axis to the earth's surface. Example: If the angle phi is 0°, the + pole of the target points vertically upwards. If the angle phi is 90°, the magnetic longitudinal axis of the target is horizontal to the earth's surface. If the angle phi is 180°, the + pole of the target points vertically downwards.

Parameter	Description
Theta [°]	<p>The declination angle theta is the angle in degrees (0° - 360°) between the magnetic longitudinal axis of the calculated target and the Y direction (North) measured clockwise, whereas the positive Y direction corresponds to the 12 o'clock position (0°).</p> <p>Example: If the angle theta is 0°, the + pole of the target points to 12 o'clock. If the angle theta is 90°, the + pole of the target points to 3 o'clock. If the angle theta is 180°, the + pole of the target points to 6 o'clock. If the angle theta is 270°, the + pole of the target points to 9 o'clock.</p>
Magn. moment [Am ²]	Specification of the magnetic moment.
Std-Deviation [nT]	<p>Standard deviation (in nT) between the measured curve and the calculated ideal curve.</p> <p>The larger the value, the larger the deviation. With a standard deviation of 0 nT, the measured curve and the calculated ideal curve are identical.</p>
Quality [% of max]	<p>Quality specification that provides information on the probable conformity between the calculated and the actual target parameters.</p> <p>The quality derives from the standard deviation in relation to the measured maximum value. With a quality of 100 % the measured curve and the calculated curve are identical.</p>
Extremum magn. [nT]	Positive or negative maximum value from magnetometer data.
Extremum EMI [µV]	Maximum value from metal detector data.
Eval. Bounds [m ²]	The evaluation area gives an idea about the size of the evaluated target. The larger the evaluation area, the larger the calculated target.
Signal Length [m]	The signal length indicates the length of the evaluation area in meters.
Evaluation	Specification, if the target was evaluated automatically (see sect. Evaluate multiple Targets on page 67) or manually (see sect. Evaluate single Target on page 69).
Source Field	Field, from whose data the target was calculated.
Remark	<p>Display of your own comments, entered for this target.</p> <p>For entering comments see sect. Target Properties on page 74.</p>

NOTE: In the case of targets from metal detector data, no information is given in the object list for the parameters depth, orientation, phi, theta, magn. moment, std-deviation, quality and extremum magn.

6.4.1 Tab *Target List*

When opening the target list by clicking on the button *Target List* (see sect. 4.2.4 on page 56 or sect. 4.2.5 on page 78), the tab *Target List* appears.

Move the target list e.g. to the lower corner in the display window and dock it there (see also sect. 6.4). After docking the target list, you can click on the individual commands in the tab *Target List*.

NOTE: As an alternative to docking, you can move the target list to a second monitor (if available) and use the commands in the toolbar of the target list for editing.

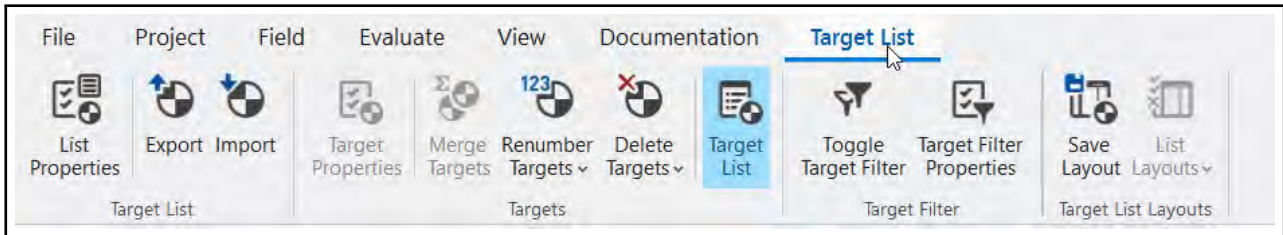


Fig. 6.4.4: Tab *Target List*

Symbol	Name	Description
	List Properties	Change the properties / display of the target list. See sect. Target List Properties on page 140.
	Export	Export the target list in CSV format (*.csv) or as an Excel workbook (*.xlsx) to the desired storage location. In the <i>Target List Export</i> window, select the desired parameters to be exported and click the button <i>OK</i> . Then select the desired file type and the desired storage location in the window <i>Export Target List</i> and click on the button <i>Save</i> . The target list can be used to navigate on a mobile device (e.g. VALLON field computer) with the EVA4mobile software for data acquisition to the individual targets in the target list.

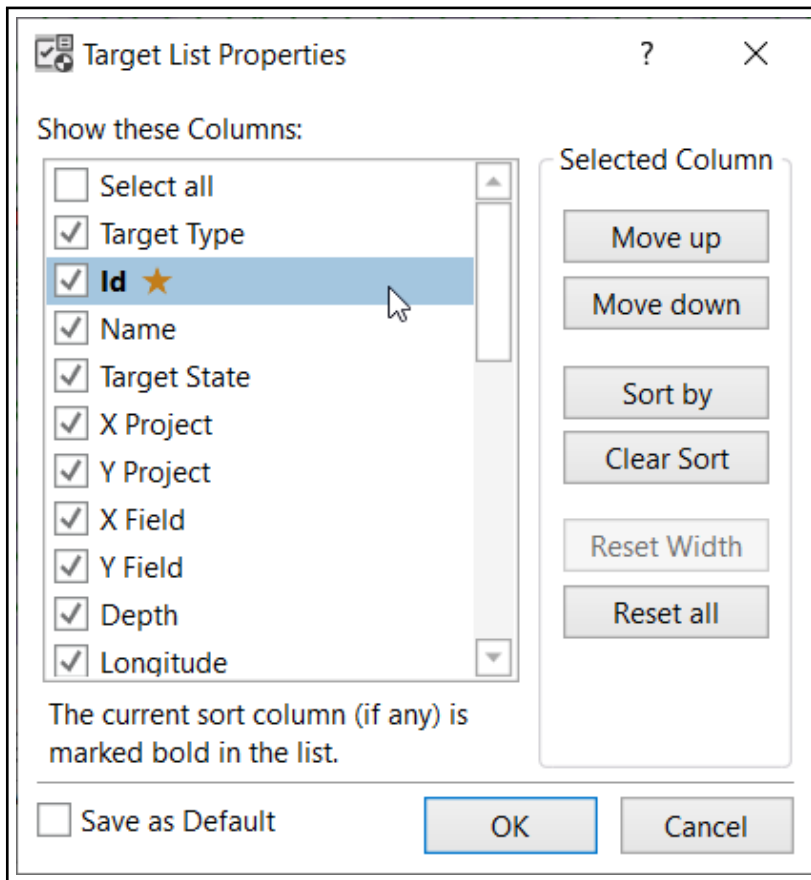
Symbol	Name	Description
	Import	<p>Import a target list in CSV format (*.csv). Select the target list to be imported and click on the button <i>Open</i>. The window <i>Objects.csv</i> opens. Select, among other information, the data separator symbols used in the CSV file, the geodetic system and whether a header is available. The individual list parameters are preset accordingly, but can be changed. Click on the button <i>OK</i>. If you have not selected a coordinate system in the <i>Geodetic System</i> selection field, the window <i>Geodetic Properties</i> opens and offers various coordinate systems for selection according to the selected region. Click on the button <i>OK</i>. The target list and the targets contained in this target list appear on the map. If the project already contains targets with the same identification, the window <i>targetimport</i> opens. Here you can choose how to proceed with these targets.</p>
	Target Properties	<p>View and change target properties. See sect. Target Properties on page 74. NOTE: This button becomes active, when a target has been marked in the target list or on the map.</p>
	Merge Targets	<p>Two targets lying next to each other, one of which was evaluated from metal detector data and the other from magnetometer data, can be merged to a new target. To do this, mark the two targets in the target list or on the map (hold down the button CTRL). The targets must not be too far apart. Click on the button <i>Merge Targets</i> and you will get an additional target in the target list and on the map. This target has a new number (e.g. 14&). In the column <i>Remark</i> of the target list it is noted from which targets this new, merged target was created. NOTE: This button is only active, when targets have been evaluated and marked (see sect. Evaluate multiple Targets on page 67 and Evaluate single Target on page 69).</p>

Symbol	Name	Description
	Renumbrer Targets	<p>The targets on the map and in the target list are renumbered, e.g. when individual targets have been deleted and the numbering is no longer consecutive.</p> <p>Click on the button <i>Renumbrer Targets</i> and select among the following options in the drop-down menu:</p> <p><i>Project</i>: All targets in the whole project are renumbered.</p> <p><i>Field</i>: All targets in the active field are renumbered.</p> <p><i>Selected</i>: Only the marked targets are renumbered.</p> <p><i>Filtered</i>: Only the targets, where a target filter has been applied, are renumbered.</p> <p>(Target filter see sect. Target Filter Properties on page 76.)</p>
	Delete Targets	<p>Delete!Targets.</p> <p>Select among the following options in the drop-down menu:</p> <p><i>Project</i>: Deletes all targets in the project.</p> <p><i>Field</i>: Deletes all targets in the active field.</p> <p><i>Selected</i>: Deletes the marked targets in the active field.</p> <p><i>Filtered</i>: Deletes all visible, filtered targets in the active field.</p> <p><i>Hidden</i>: Deletes all targets in the active field that are hidden by a target filter.</p> <p>(Target filter see sect. Target Filter Properties on page 76.)</p>
	Target List	Close the target list.
	Toggle Target Filter	<p>Switch target filter on and off.</p> <p>The target filter is switched on, when this button has a blue background.</p> <p>Target filter see sect. Target Filter Properties on page 76.</p>
	Target Filter Properties	<p>Opens the window <i>Target Filter Properties</i>.</p> <p>Enter criteria according to which the targets are filtered on the map and in the target list.</p> <p>For information on this see sect. Target Filter Properties on page 76.</p>

Symbol	Name	Description
	Save Layout	The current layout of the target list is saved. Clicking on this button opens the window <i>Save or edit Target List Layout</i> . Enter a layout name for the current target list layout and click on the button <i>OK</i> . You can save various different target list layouts and open them with the button <i>List Layouts</i> .
	List Layouts	This button becomes active, when one or more target list layouts have been saved (see button <i>Save Layout</i>). Click on this button to open a saved target list layout.

6.4.1.1 Target List Properties

In the window *Target List Properties* you can adjust the display of the target list.



Click in the tab *Target List* (see page 136) on the button *Target List Properties*.

Show these Columns:

Remove the checkmarks for the columns that should not appear in the target list.

A column marked in the target list is displayed in bold.

If *Save as Default* is checked, these settings are applied to all new target lists in this project.

Fig. 6.4.5: Target List Properties

Move up:

By clicking on the button *Move up* the column marked in the field *Show these Columns* is moved up one position at a time. This column then moves accordingly to the left in the target list.

Move down:

Like *Move up*, only the marked column moves one position down and accordingly to the right in the target list.

Sort by:

The target list is sorted in ascending or descending order according to the column marked in the field *Show these Columns* (e.g. ID).

By clicking on the button *Clear Sort* the sorting is reset.

Reset Width: You can change the column widths in the target list by dragging with the mouse cursor. Changes on the column widths are reset by clicking on the button *Reset Width*.

Reset all: By clicking on the button *Reset all* all changes on the target list are reset.

Click on the button *OK* to apply the settings made to the target list and to close the window *Target List Properties*.

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<https://github.com/dotnet/reactive>

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TaskDialog (parts)

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<https://github.com/yadyn/WPF-Task-Dialog>

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WPF TreeView Control (parts)

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<https://www.codeproject.com/Articles/23337/A-Versatile-TreeView-for-WPF>

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XAML Map Control (parts)

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<https://github.com/ClemensFischer/XAML-Map-Control>

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