

Sound Velocity Profile (SVP) Analyzer - Manual

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Sound Velocity Profile Analyzer

The SVP Analyzer is a new desktop application introduced in the HYPACK 2026 Q2 release. Use the SVP Analyzer for loading, viewing, editing, and saving Sound Velocity Profile (SVP) data used in hydrographic surveying.

Article Keywords:

- Sound Velocity Profile
- SVP Analyzer
- Cast Files
- Depth and Sound Velocity

The tool allows operators to:

- Import SVP data files from devices or directly from connected instruments (ex: AML, Valeport, CastAway).
- Visualize profiles on an interactive Depth vs. Sound Speed chart.
- Edit individual data points in a spreadsheet or by dragging nodes on the chart.
- Filter data by depth and velocity ranges.
- Convert units between metric and imperial.
- View cast locations on an OpenStreetMap-based interactive map.
- Compute and display an average profile across all loaded casts.
- Save/export modified profiles to *.vel or *.svp file formats.

Supported File Formats

For the SVP Analyzer, HYPACK® supports *.vel, *.svp, *.csv, and *.bin files. Additionally, any SVP files that match the header/data format described below can also be loaded.

Supported File Formats

Extension	File Type	Description
*.vel	Valeport velocity file	FTP header + depth/speed data pairs
*.svp	Sound Velocity Profile file	FTP header + depth/speed data pairs
*.csv	AML Import	Comma-separated AML instrument data
*.bin	Valeport Import	Binary Valeport instrument download
.	Other	Any file matching the header/data format

File Header Format

Files loaded in the SVP Analyzer must adhere to the following file header and data formats in order to be supported.

- File Header Format (*.vel, *.svp): FTP NEW 3 <Latitude> <Longitude> <Time> <Date>

Example Header String:

FTP NEW 3 10.3961219787598 -75.5604934692383 16:34:00 09/05/2025

- Data Line Format (one per depth sample): <Depth> <Speed>

Example Data Strings:

0.50 1503.42

1.00 1503.38

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Revision History

Date	Revision	Notes
July 2026	Initial Release	Initial release.

SVP Analyzer Program

To open the SVP Analyzer program, from the HYPACK Shell, click Processing -> Sound Velocity -> SVP Analyzer.

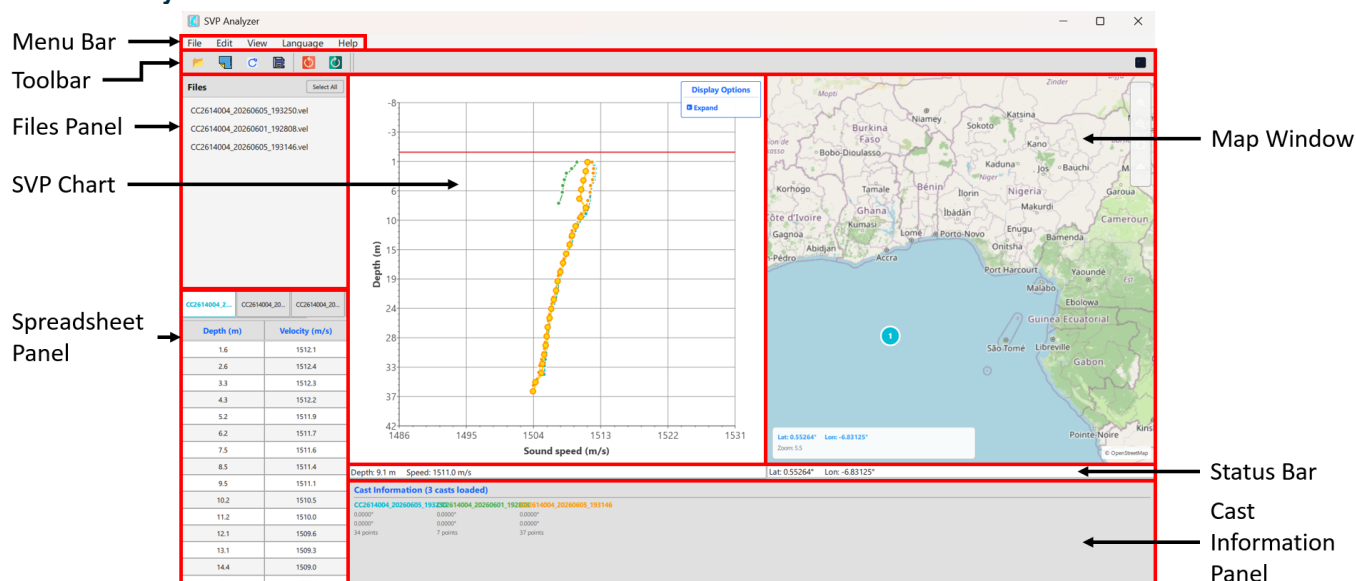
SVP Analyzer Interface

The following table lists the information displayed and actions available in each section of the SVP Analyzer interface.

SVP Analyzer Interface Sections

Section Name	Description
Menu Bar	Contains the File, Edit, View, and Language menus
Toolbar	Contains quick-access icon buttons
Files Panel	Lists all loaded SVP files
Spreadsheet Panel	Tabular depth/velocity data for the active cast
SVP Chart	Interactive chart plotting Depth (Y axis, reversed) vs. Sound Speed (X axis)
Map Window	OpenStreetMap with cast location markers
Cast Information Bar	Horizontal scrollable summary cards for all loaded casts
Status Bars	Display cursor coordinates (depth/speed on chart; lat/lon on map)

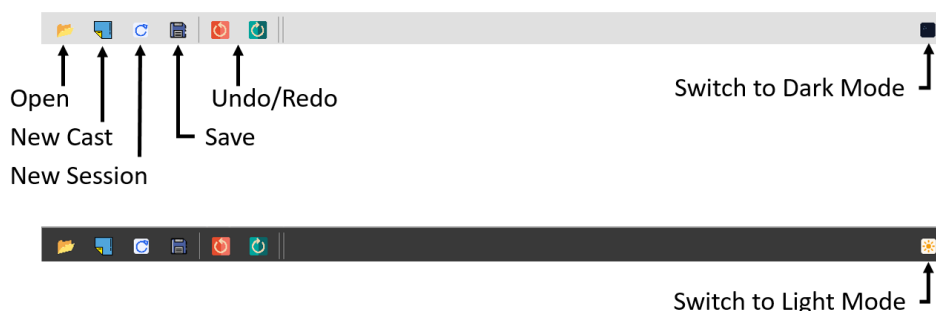
The SVP Analyzer Interface



SVP Analyzer Top Toolbar

The SVP Analyzer toolbar contains icons for users to quickly perform actions that are also located in the file File and Edit menus.

The SVP Analyzer Top Toolbar



Details on actions that can be performed and items that can be added using the icons from the top toolbar are listed in the following table:

SVP Analyzer Top Toolbar Icons and Actions

Icon Name	Action
Open	Opens file dialog to import SVP files.
New	Creates a new empty cast with user-specified metadata.
New Session	Clears all loaded data and starts a fresh session.
Save	Opens save dialog to export selected casts.
Undo	Reverts the last edit.
Redo	Re-applies the last undone edit.
Switch to Dark/Light Mode	Toggles between Light and Dark Mode for the display.

Cast Information Panel

Located at the bottom of the main area, this panel displays the Cast Information header, which shows the total number of casts loaded, and a horizontally scrollable list of summary cards for all loaded cast files. Each card shows the cast file name (color-coded to match the corresponding data displayed in the graph), latitude and longitude (up to four decimal places), and point count. If the number of casts loaded exceeds the amount of display space, you will see a small scroll bar at the bottom of the panel. Click and drag the Cast Information panel to scroll through the files.

Display Settings

Change Language

The SVP Analyzer currently supports 22 different languages. To switch the language used in the UI, in the Menu Bar, click Languages, and select from the drop down menu. The language switch is instant, the choice persists even after the application is closed and reopened, and the current language in use is indicated with a checkmark in the menu.

Switch Between Dark and Light Mode

To switch between dark mode and light mode color schemes, click the Switch to Light Mode/Switch to Dark Mode icon in the upper right corner of the toolbar. All UI elements immediately update.

Convert Between Units

The SVP Analyzer allows you to display depths in meters or feet, and sound velocity in m/s or ft/s.

- To change depth units, right-click selected file(s) in the Files panel -> Convert Depth, and select between Meters -> Feet or Feet -> Meters.
- To change sound velocity units, right-click selected file(s) in the Files panel -> Convert Velocity, and select between m/s -> ft/s or ft/s -> m/s.
- To perform batch unit conversion on multiple files, select all files of interest and right click them to bring up the Convert Depth or Convert Velocity options.

The conversion modifies all data points in the selected cast(s). The cast file is marked as modified with an asterisk (*) to the right of the file name. To reverse the conversion command, use the Undo action. The SVP graph also automatically performs zoom-to-fit after each conversion to accommodate the new value range.

Running the SVP Analyzer

1. Open HYPACK®.
2. Start the SVP Analyzer program by selecting Processing -> Sound Velocity -> SVP Analyzer. The SVP Analyzer will open in a separate window.

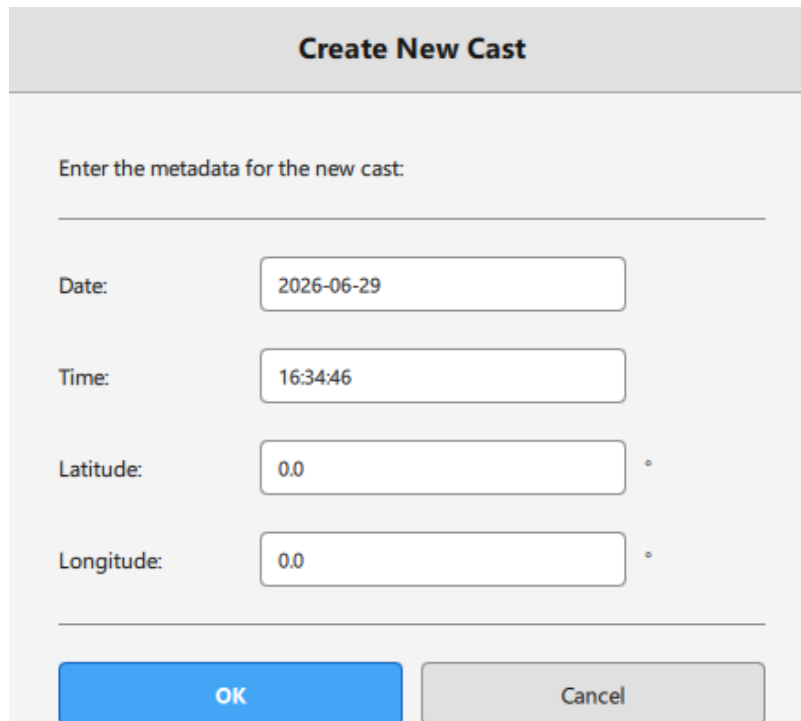
New Session

- 1) Click File -> New Session. A confirmation dialog appears ("This will remove all loaded SVP files from the current session. Any unsaved changes will be lost. Continue?"). Click [Yes] to continue. After [Yes] is selected, all files are removed, and the SVP Analyzer is restored to its initial, empty state. Note that Undo/Redo history cleared.

Create New Cast

- 1) Click File -> New. The Create New Cast dialog appears.

Create New Cast Dialog



The 'Create New Cast' dialog box is a light gray window with a title bar. Inside, there is a section titled 'Enter the metadata for the new cast:' followed by four input fields: 'Date' (2026-06-29), 'Time' (16:34:46), 'Latitude' (0.0), and 'Longitude' (0.0). Each field has a small asterisk to its right. At the bottom, there are two buttons: 'OK' (blue) and 'Cancel' (gray).

2) In the Create New Cast dialog, enter the following required information and click [OK]:

- Date: Format is YYYY-MM-DD
- Time: Format is HH:MM:SS
- Latitude: Range is -90 to 90, 6 decimal places
- Longitude: Range is -180 to 180, 6 decimal places

Click [OK] to create a new empty cast object with the specified metadata. Data points can then be added in the spreadsheet.

Open SVP File

- 1) Click File -> Open. The File Explorer appears.
- 2) In the File Explorer, select the SVP file or files and click [Open].

Save Cast Files

- 1) Click File -> Save. The Save Cast Files dialog appears, with a list of all cast files that are currently opened in the SVP Analyzer.

Save Cast Files Dialog

Save Cast Files

Select the casts you want to save:

Select All Unselect All

☐	CC2614004_20260601_192808 7 points
☐	CC2614004_20260605_193146 37 points
☐	CC2614004_20260605_193250 34 points
☐	Average Cast 26 points

OK Cancel

- 2) Select the casts to save by clicking the box next to the names of the cast file(s). You can also use the [Select All] and [Unselect All] buttons if there are multiple files you need to select or unselect. There is also an option to export the average casts.

Click [OK], and the Save Cast File File Explorer window appears.

- 3) In the Save Cast File File Explorer window, name the file you want to export the casts to. You also have the option to select the file extension from the Save as Type drop down menu.

Click [Save].

Undo/Redo Actions

Use the Undo (Ctrl+Z) and Redo (Ctrl+Y) option to reverse and reapply changes when editing data point values, converting units, filtering data, removing data points, and performing batch operations. Note that up to 100 undo steps are retained.

Keyboard Shortcuts

SVP Analyzer supports the following keyboard shortcuts.

Action	Shortcut	Action	Shortcut
Open	Ctrl+O	Cut	Ctrl+X
New	Ctrl+N	Copy	Ctrl+C
New Session	Ctrl+Shift+N	Paste	Ctrl+V
Save	Ctrl+S	Zoom In	Ctrl++
Undo	Ctrl+Z	Zoom Out	Ctrl+-
Redo	Ctrl+Y	Reset Zoom	Ctrl+0
Switch to Dark/Light Mode	Ctrl+T	Exit Application	Ctrl+Q

SVP Chart

The SVP Chart displays data in each cast file by graphing Depth (x-axis) vs. Sound speed (y-axis). Note that for depth, the values along the axis are reversed (0 at top, increasing depth downward). A red horizontal reference line is drawn at depth = 0 (water surface). The data points from each cast file is rendered with the color corresponding to the cast file as shown in the Cast Information panel. The Average Cast is displayed as a golden line when the Show Average option is enabled in the Display Options menu located in the upper right of the SVP chart.

Use the mouse wheel to zoom in and out of a location on the graph. When you hover your cursor over the graph, the current depth and speed coordinates are displayed in the status bar below the chart. If you click on a data point in the graph, the spreadsheet automatically highlights the corresponding data.

Edit Data Point

You can edit data points by clicking and dragging a data point to a new speed/depth value on the graph.

Chart Display Options

The SVP Chart has a Display Options dialogue in the upper right corner.

Chart Display Options

Display Options

☒ Collapse

AllNone

☒ CC2614004_20260601_19...

☒ CC2614004_20260605_19...

☒ CC2614004_20260605_19...

X Zoom:

-

+

Zoom to Fit

Align Y

☒ Show Points

☒ Show Average

☒ Zero Line

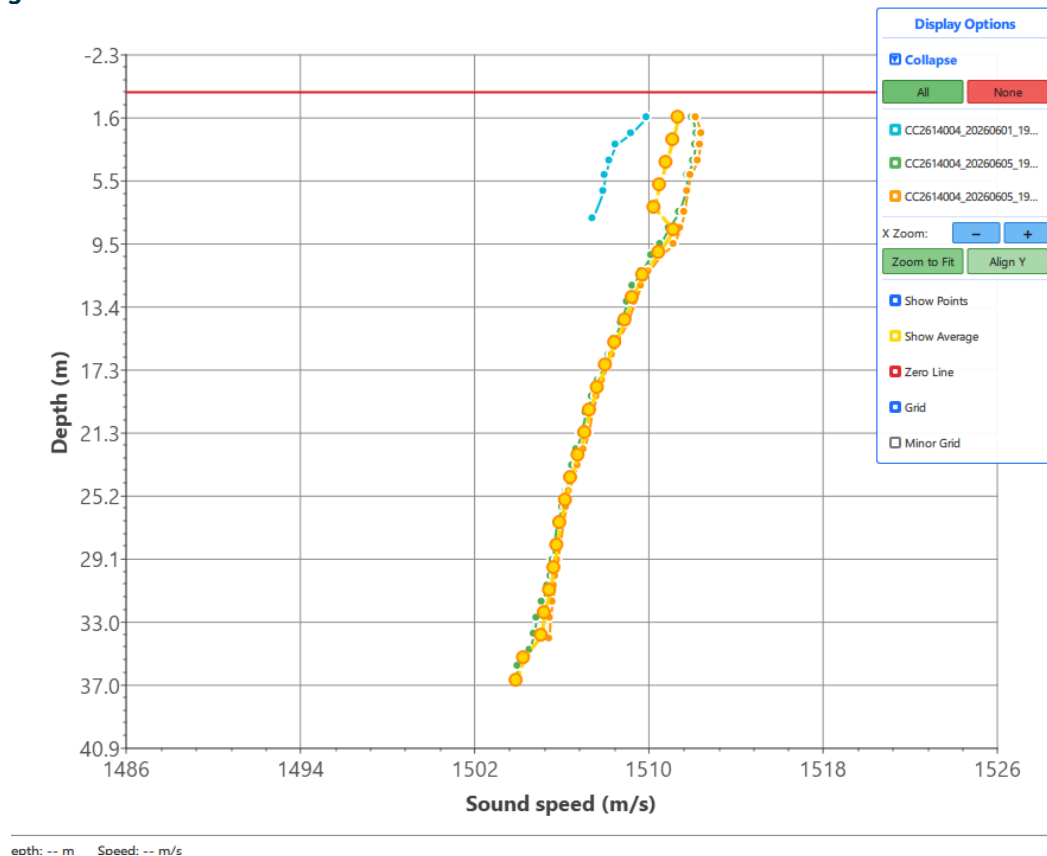
☒ Grid

☐ Minor Grid

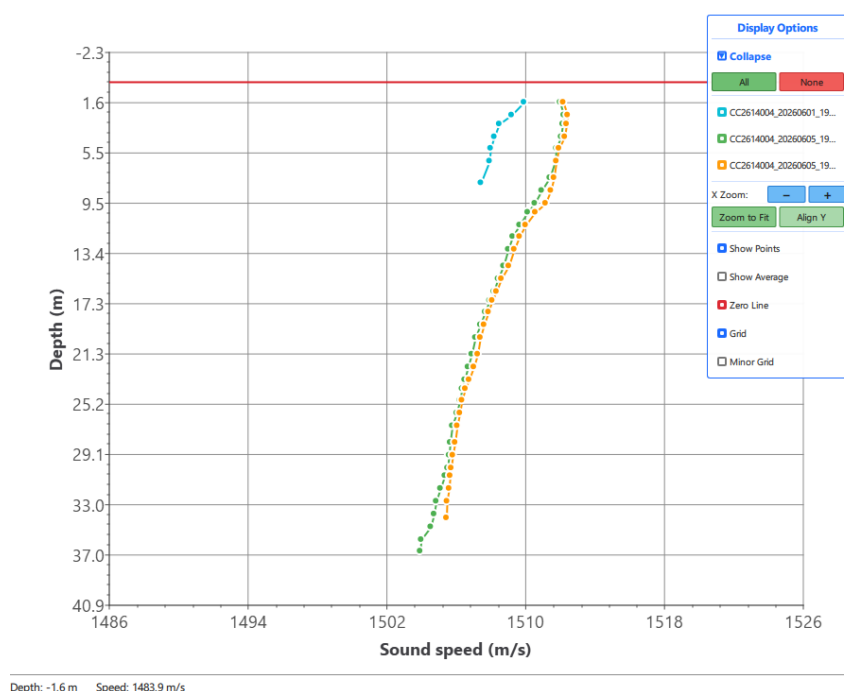
Click Expand or Collapse to open or close the dialog. When the dialogue is expanded:

- Click the [All] button to display all data points from all cast files on the chart.
- Click the [None] button to remove all data displayed on the chart.
- There is a list of all cast files in the Display Options with checkboxes in front of them. Click the check box next to a cast file to enable and display the data in the chart. Uncheck the checkbox to remove the data associated with the cast file in the chart. Note that hidden casts (any cast files that are unchecked) are excluded from the average cast line calculation – this cast line is displayed with the Show Average checkbox.
- Next to X-Zoom, click the minus [-] button to increase the range of the x-axis, click the plus [+] button to reduce the range of the x-axis.
- Click the [Zoom to Fit] button to instantly adjust the chart to display all active datasets in the selected cast files.
- Click the [Align Y] button to instantly adjust the y-axis (depth) so the intervals are a factor of 10.
- Show Points – Check the box to display each data point marker on data lines.
- Show Average – Check the box to display the computed average cast line as a separate golden line and scatter series. Note that hidden casts (any cast files that are unchecked) are excluded from the average calculation, and the average cast line is computed using only casts visible in the SVP chart. The calculation averages the speed values at corresponding depth levels.

Show Average Casts Enabled

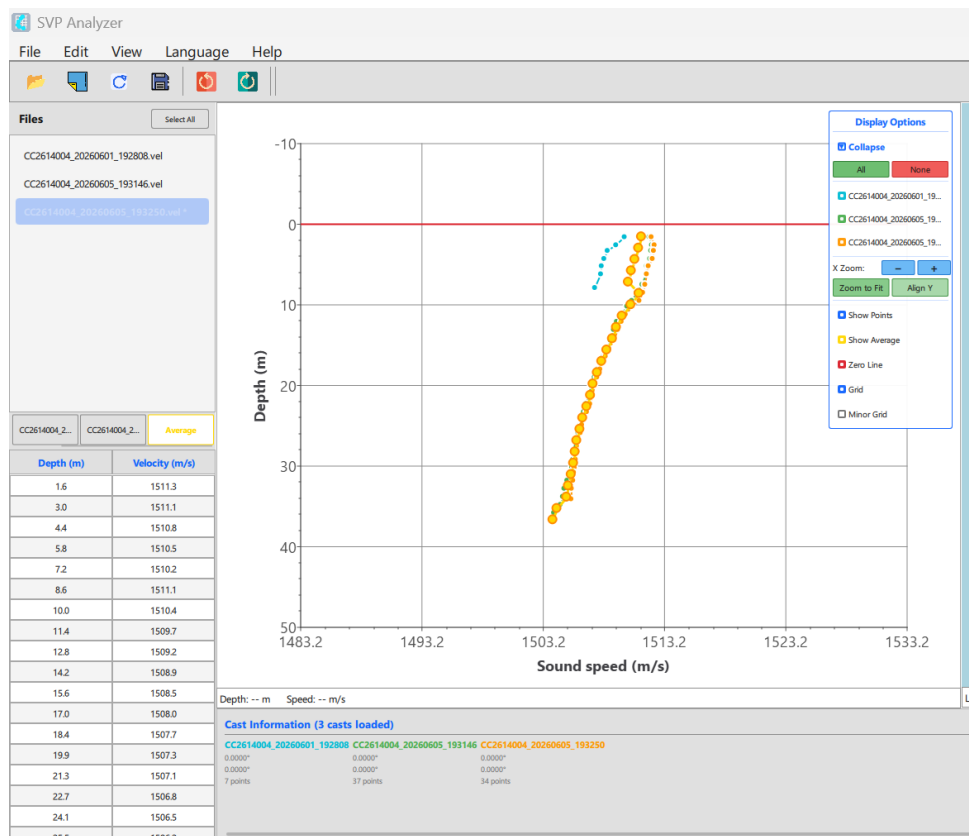


Show Average Casts Disabled



The Average tab in the spreadsheet shows these calculated values. You may need to click on the tabs and drag your arrow to the left to show the Average tab. The Average values can be included in file export.

SVP Analyzer Spreadsheet - Average Tab

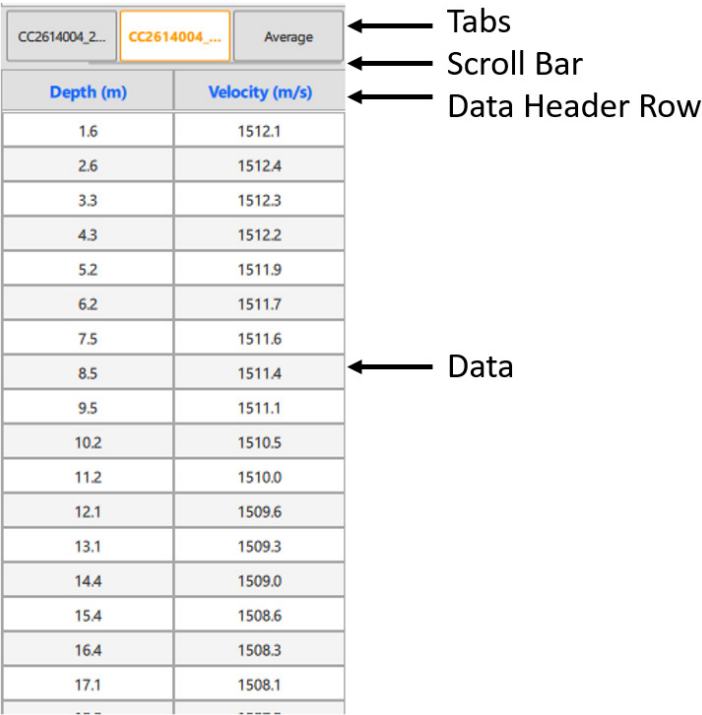


- Zero Line – Check the box to show the red horizontal reference line at depth = 0.
- Grid – Check the box to show major grid lines corresponding to x and y axis intervals.
- Minor Grid – Check the box to show minor grid subdivisions.

Spreadsheet Panel

The spreadsheet panel tabulates each cast file's data and displays each depth and velocity value. If more than three cast files are loaded, a scroll bar appears below the tabs allowing you to access data in other cast files. If there is an Average tab (show Average has been enabled), it will be located all the way to the right. Note that clicking on a value in the spreadsheet highlights the corresponding point on the chart.

Spreadsheet Panel



The image shows a screenshot of the Spreadsheet Panel. At the top, there are three tabs: 'CC2614004_2...', 'CC2614004_...', and 'Average'. The 'Average' tab is selected. Below the tabs is a scroll bar. The main area is a table with two columns: 'Depth (m)' and 'Velocity (m/s)'. The first row is the header row. Below it are 15 data rows. An arrow points to the 'Average' tab with the label 'Tabs'. An arrow points to the scroll bar with the label 'Scroll Bar'. An arrow points to the header row with the label 'Data Header Row'. An arrow points to the data rows with the label 'Data'.

Depth (m)	Velocity (m/s)
1.6	1512.1
2.6	1512.4
3.3	1512.3
4.3	1512.2
5.2	1511.9
6.2	1511.7
7.5	1511.6
8.5	1511.4
9.5	1511.1
10.2	1510.5
11.2	1510.0
12.1	1509.6
13.1	1509.3
14.4	1509.0
15.4	1508.6
16.4	1508.3
17.1	1508.1

Add Data Point

To add a new point to a cast file, select the corresponding tab and scroll to the bottom. In the empty row, double click the cells, type in the new values, and press Enter. This adds a new data point to the cast, which automatically appears in the graph.

Edit Data Point

To edit a value, double click the corresponding cell, type in the new value, and press Enter. You must enter a value from 0–999999, maximum 2 decimals.

Delete Data Point

To delete a point, right click on the row corresponding to the data you want to remove, and click Delete Row. In the confirmation window, click [Yes]. The row is deleted, and the corresponding point will be removed from the graph.

Average Tab

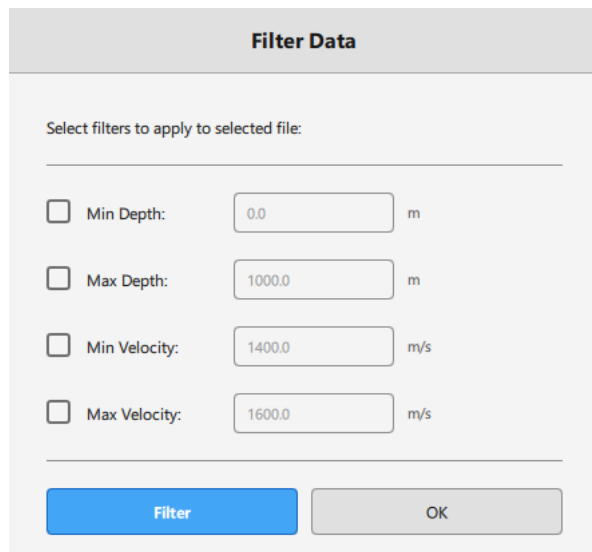
The Average tab shows the computed average depth and velocity values. Values are updated according to which cast files are enabled in the SVP Chart Display Options. Note that unlike the other tables for the cast files, the average tab is read-only, and editing of depth and velocity values are disabled. Rows also cannot be deleted.

Filter Data

Users can filter data in one or multiple cast files. To filter data:

1) First select the cast files of interest. To select multiple files, use CTRL + click. Right click on the file(s) and click Filter Data. The Filter Data dialog appears.

Filter Data Dialog



The screenshot shows the 'Filter Data' dialog box. It has a title bar 'Filter Data'. Below the title bar, it says 'Select filters to apply to selected file:'. There are four filter options, each with a checkbox, a text input field, and a unit: 'Min Depth:' with a value of '0.0' and unit 'm'; 'Max Depth:' with a value of '1000.0' and unit 'm'; 'Min Velocity:' with a value of '1400.0' and unit 'm/s'; and 'Max Velocity:' with a value of '1600.0' and unit 'm/s'. At the bottom, there are two buttons: 'Filter' (blue) and 'OK' (grey).

2) In the Filter Data dialog, check the box next to the parameters you want to filter for, and type in the boundary value in the box. The available parameters are minimum depth, maximum depth, minimum velocity, and maximum velocity.

3) Click [Filter] to apply the boundary values to the selected cast files. Points are kept only if they satisfy all filter conditions simultaneously. All points outside the ranges are removed from the spreadsheet and the chart. Use the Undo function to reverse this change.

4) Click [OK] to close the Filter Data dialog.

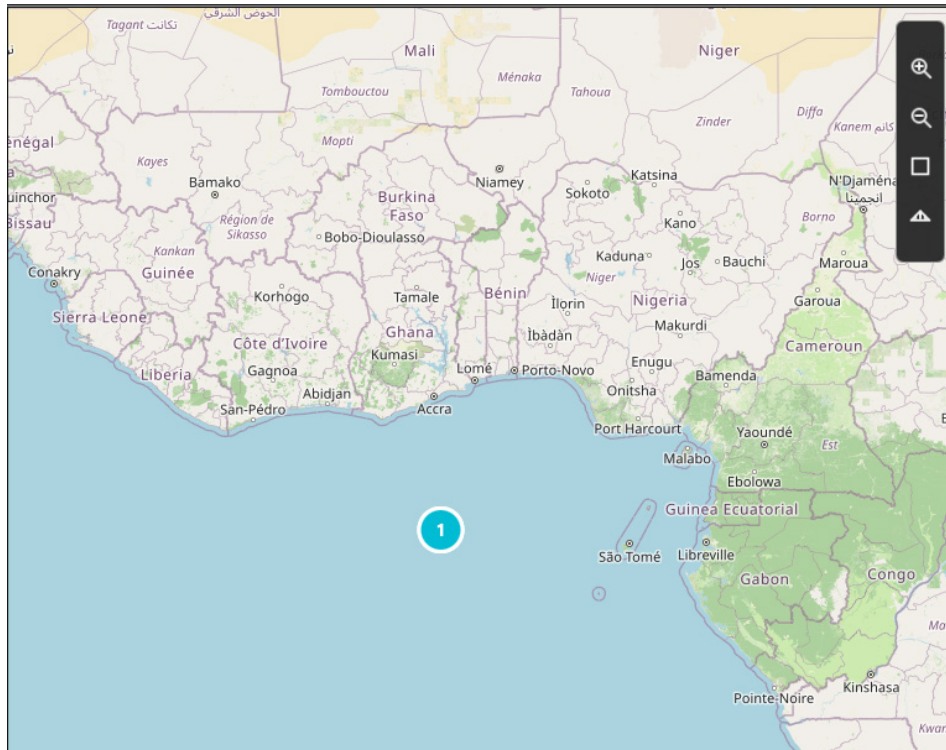
Map Window

The Map window uses OpenStreetMap data to plot the locations of all loaded cast files. Cast locations are displayed as numbered and color-coded markers. The status bar below the map shows current cursor latitude and longitude.

Controls

- Zoom in/out: Use the mouse scroll wheel, OR use the Zoom In and Zoom Out icons in the upper right of the map window.
- Pan the map: Use the left or right mouse button to click and drag.
- Center all casts: Use the Zoom Extents icon in the upper right of the map window.

Map Window



Measure Distances

An interactive distance measurement tool is available via a toggle button in the map controls. To measure a distance on the map:

- 1) Click the Measure Distance icon. The Units dialog appears, and the Measurement Tool data appears in the bottom left widget.
- 2) In the Units dialog, select between Meters/Km or Feet/Miles.
- 3) Left click on the map to add a measurement waypoint. Continue to add as many waypoints as you need. An orange line connects all waypoints.

- 4) Double click on the map to finish the measurement. The total distance, number of points, and measurement status appear in the bottom left Measurement Tool widget.
- 5) Right click to clear all measurement points.
- 6) Click the Measure Distance/Stop Measuring icon to deactivate the measurement tool.

Map Measurement Tool

