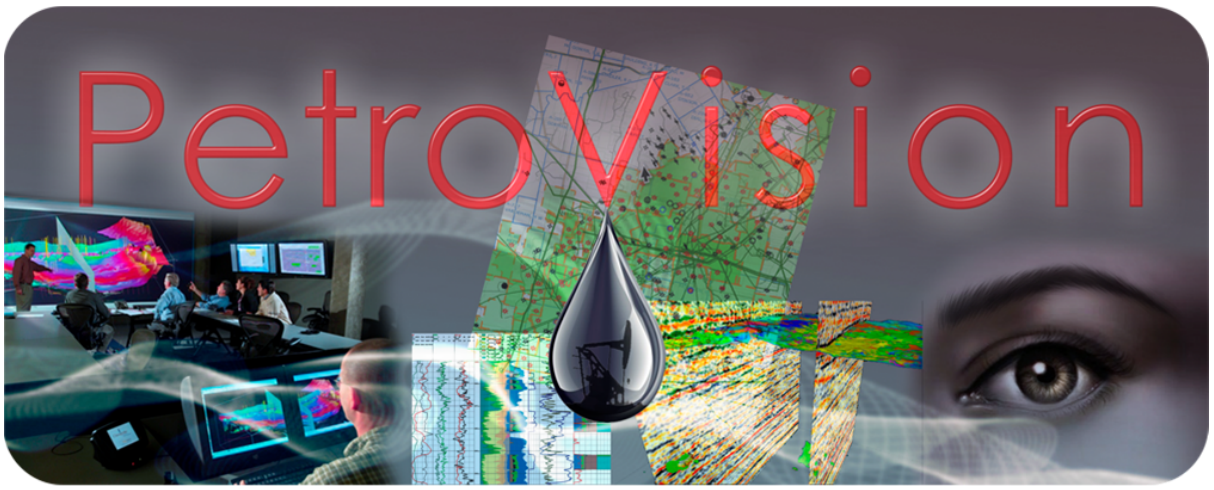
SEG-Y Viewer



User Guide

Introduction

SEG-Y Viewer is a companion utility for PetroVision designed for visual interpretation of seismic data. It can be used to view documents of the following formats:

1. *SEG-Y* files (can be written as *.sgy*, *.segy*, regardless of case):
   1.1. ***seg-y* rev 0** [1]
   1.2. ***seg-y* rev 1** [2]

2. *SEG-D* demultiplex files (can be written as *.segd*, *.sgd*, regardless of case):
   2.1. ***seg-d* rev 0** [3]
   2.2. ***seg-d* rev 1** [4]
   2.3. ***seg-d* rev 2** [5]
   2.4. ***seg-d* rev 3** [6]

3. Encapsulation formats:
   3.1. *Record oriented data encapsulation* format standard (***RODE***) [7]
   *3.2. Tape Image Format (**TIF**)*
   3.3. ***STAGE***

To support specialized formats, you can independently compose their description using the GeoSeisQC application or contact the support service of Geoleader company.

[1] https://www.seg.org/Portals/0/SEG/News%20and%20Resources/Technical%20Standards/seg_y_rev0.pdf
[2] https://seg.org/Portals/0/SEG/News%20and%20Resources/Technical%20Standards/seg_y_rev1.pdf
[3] https://seg.org/Portals/0/SEG/News%20and%20Resources/Technical%20Standards/seg_d_rev0.pdf
[4] https://seg.org/Portals/0/SEG/News%20and%20Resources/Technical%20Standards/seg_d_rev1.pdf
[5] https://seg.org/Portals/0/SEG/News%20and%20Resources/Technical%20Standards/seg_d_rev2.pdf
[6] https://seg.org/Portals/0/SEG/News%20and%20Resources/Technical%20Standards/seg_d_rev3_1-oct2015.pdf
[7] https://seg.org/Portals/0/SEG/News%20and%20Resources/Technical%20Standards/seg_rode_w_segy.pdf

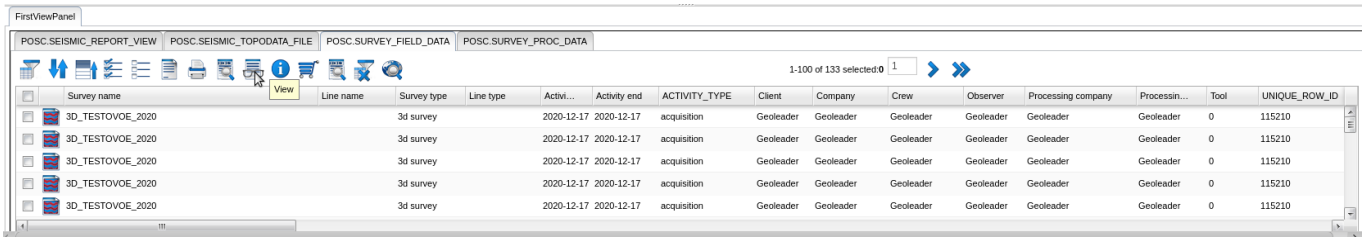
This application allows not only to display visual interpretation of seismic data, but also helps to customize their display according to the needs of the user. The application works with both 3D and 2D data.

Data visualization and analysis are conveniently organized with various settings for the following parameters:

- Color Schemes
- Geophysical parameters
- Scale
- Range of traces and times
- Viewing headers, etc.

Launching SEG-Y Viewer

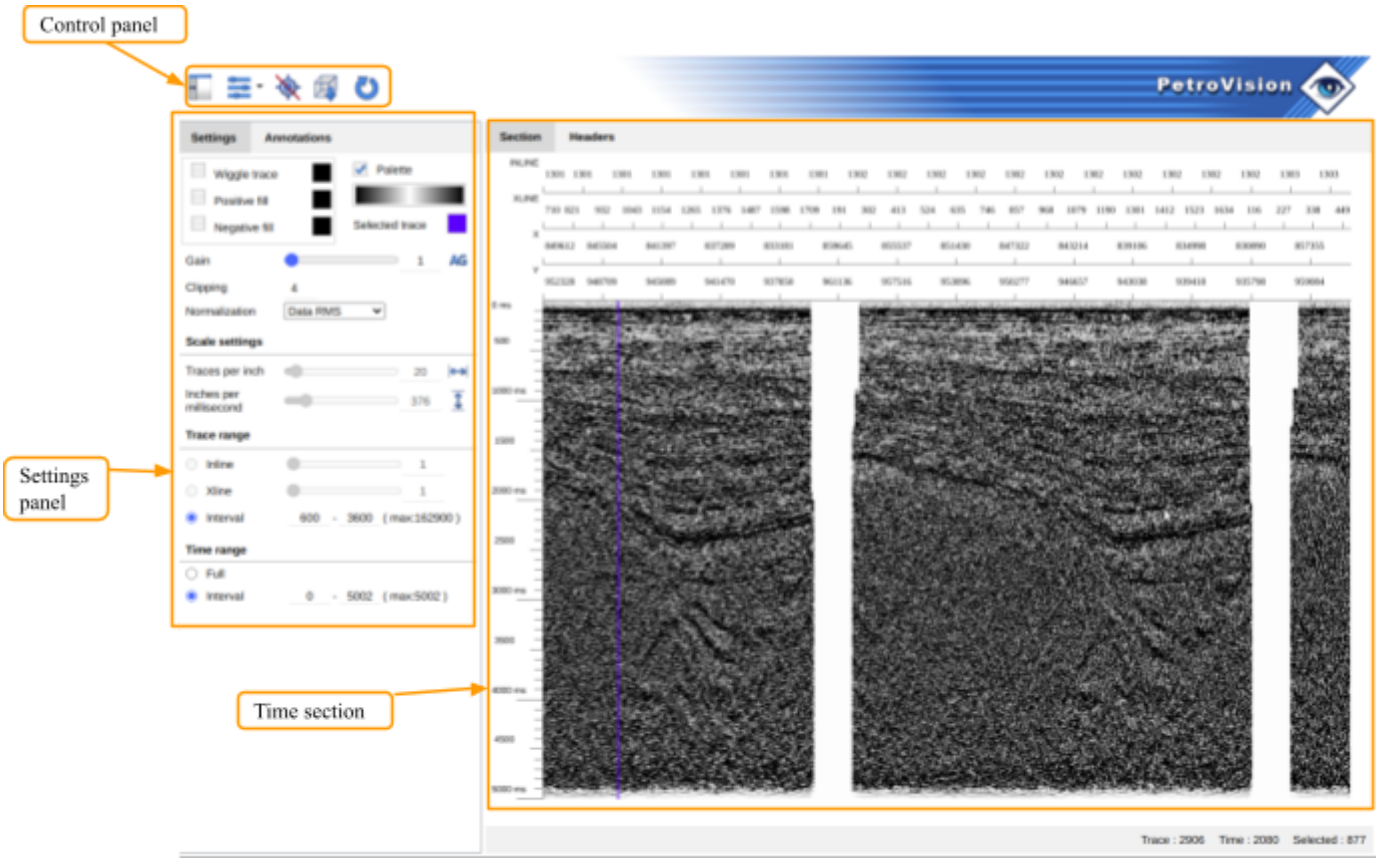
This application is a utility for viewing *.segy* and *.segd* documents and is available from the *PetroVision* web application. *SEG-Y Viewer* is launched automatically by double-clicking on documents of the specified formats or by using the icon:



Functionality

The functionality of the *SEG-Y Viewer* application includes several blocks:

- ➢ Control panel
- ➢ Settings panel with “Settings” and “Annotations” tabs
- ➢ Window with the display of the time section - "Section"
- ➢ Window of common headers and trace headers - "Headers"



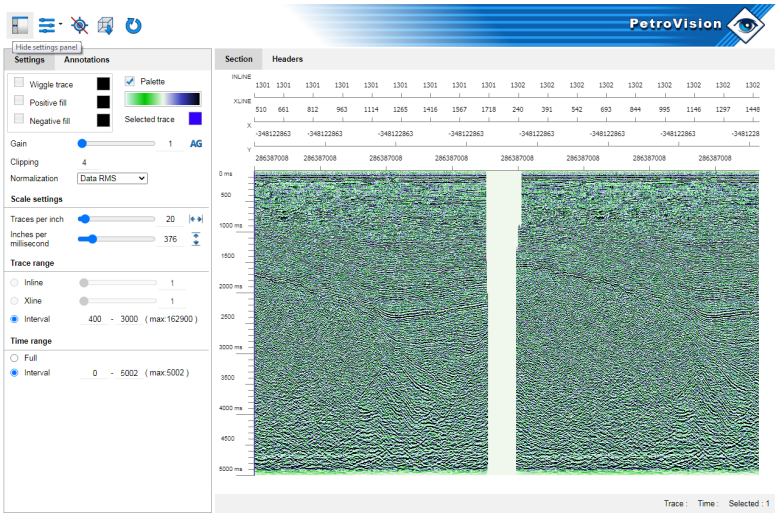
Below you will find a detailed description of each of the listed blocks.

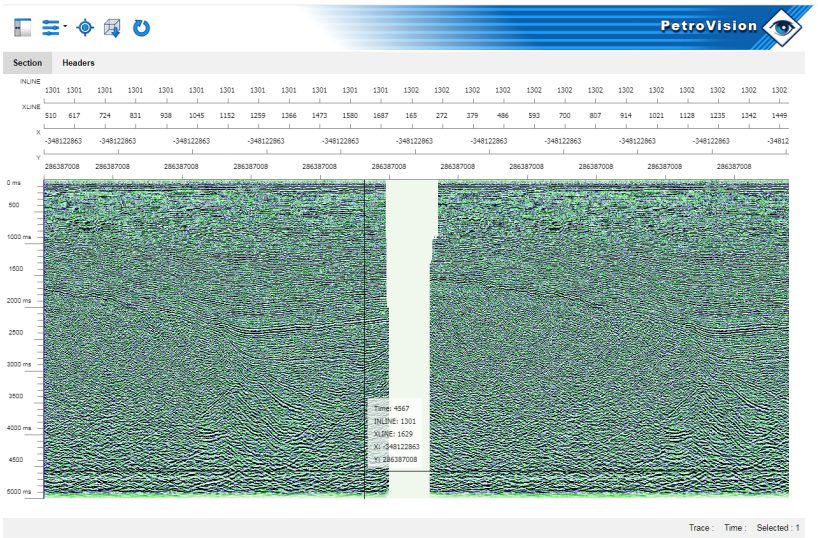
Control panel

The Control panel is located in the upper left corner of the application. It consists of the following buttons:

❑ Hide / Show Settings panel 

This button allows you to focus exclusively on data display in the "Section" window or to be able to work with its settings;





❑ "Schemes" dropdown menu

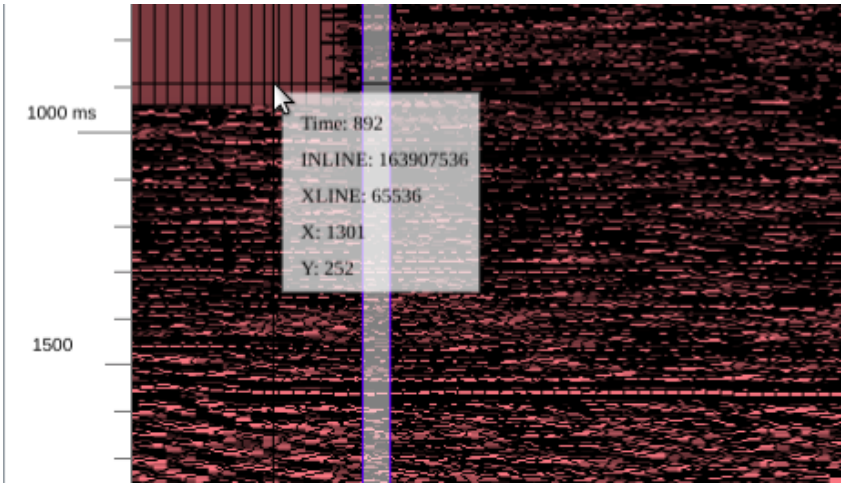
Scheme is a set of settings that is applied to the time section at a particular moment of work.

The application provides an ability to select and save various scheme settings for a more accurate display of the time section: geophysical parameters, visual settings, scale and annotations.

Working with the list of the drop-down "Schemes" menu is described in detail below in the paragraph "Working with schemes"

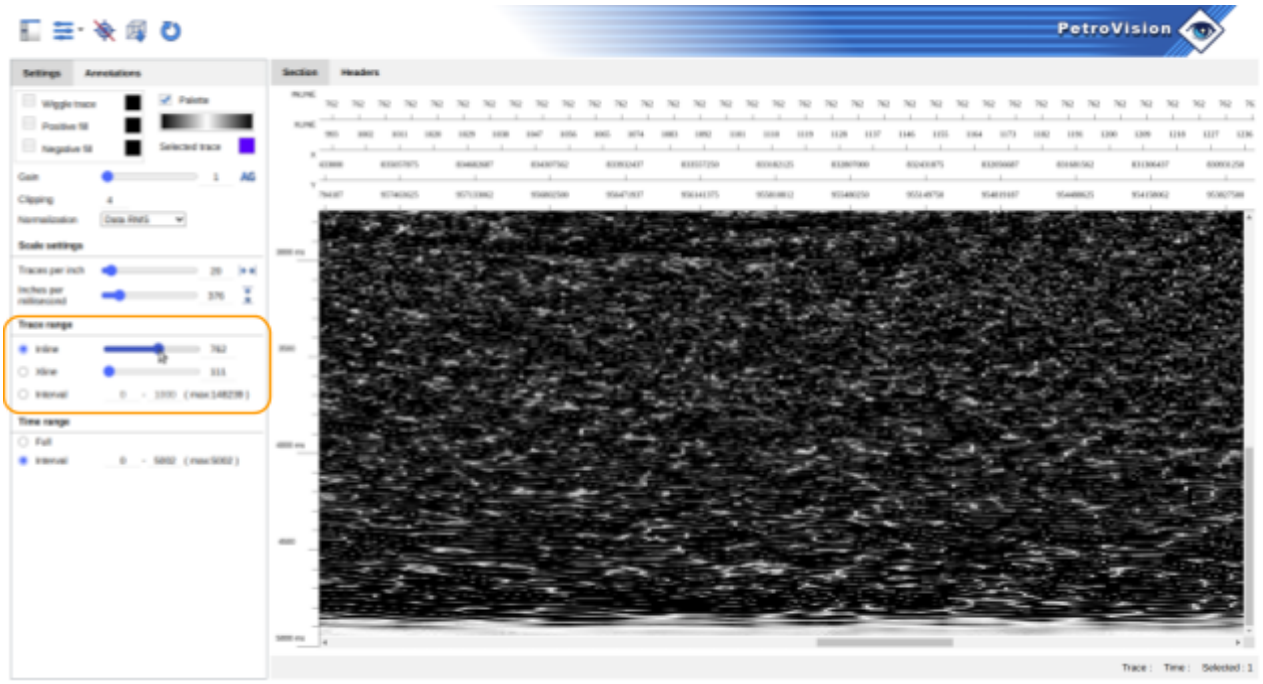
❑ Show/Hide locator

The locator is a display of data about time and selected parameters from the "Annotations" tab belonging to the point on the trace where the cursor is currently located.



❑ Load line options 

If the positions of annotation parameters are correctly set, this button loads information about the Inline and Xline parameters from the file. After that, it becomes possible to view the data slice for a single Inline or Xline parameter;



❑ Reload image 

Allows you to redraw the image to apply the default settings, settings for the selected scheme, or manually set settings.

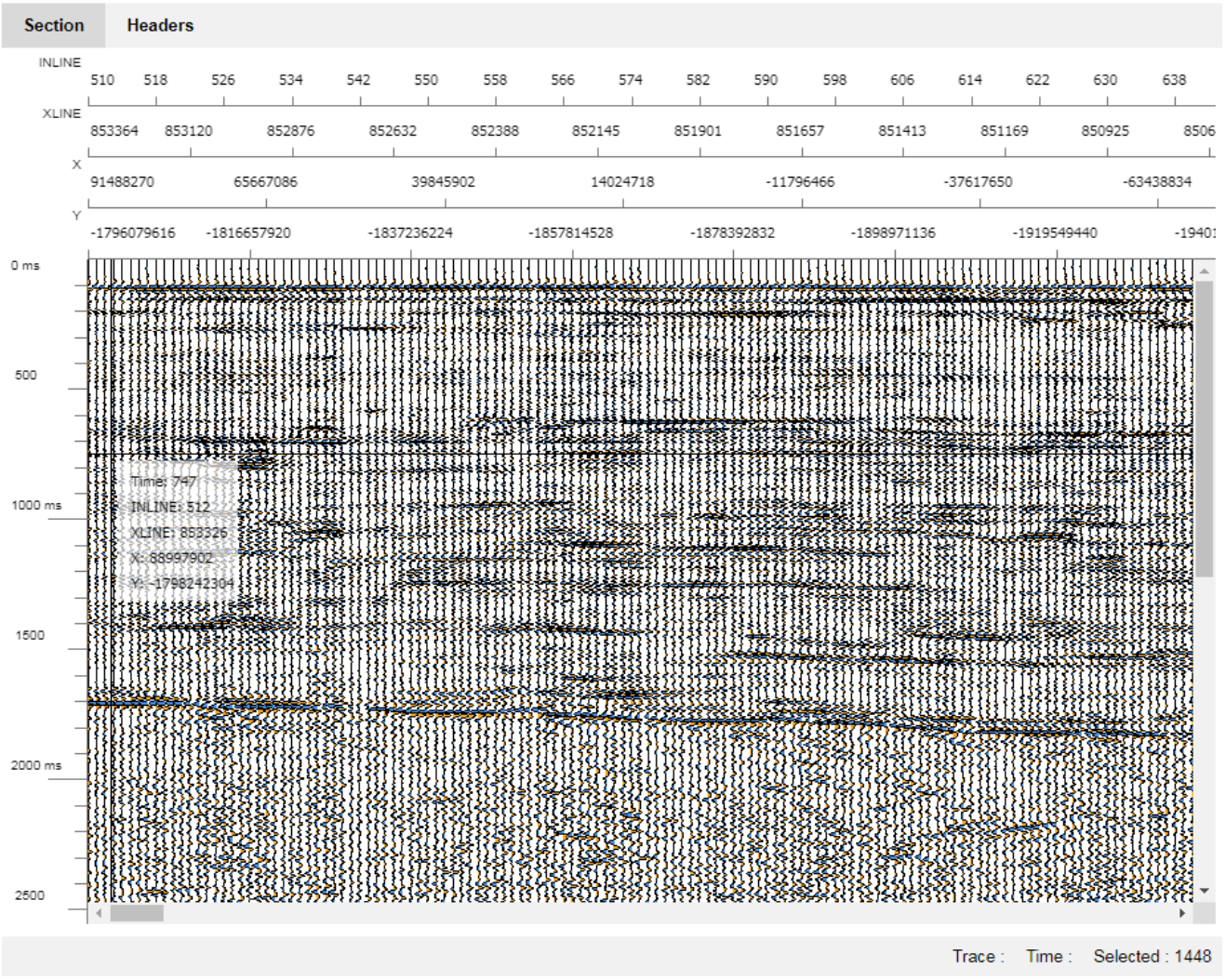
Section

The "Section" window is an image of a section with a Time scale along the ordinate axis.

Three parameters are displayed in the lower right corner of the window: Trace, Time, Selected. They show the number of the highlighted trace and the Time/Trace values for the position at which the cursor is currently located.

The selected trace display settings have been applied to the image. Also, the image has a scale, trace range and time range. Each of the listed settings can be changed in the "Settings" panel.

Above the image of the section, the data on the parameters are shown, the display of which can be edited on the “Annotations” tab. If there are more than four of these parameters, they can be viewed using the scroll bar.

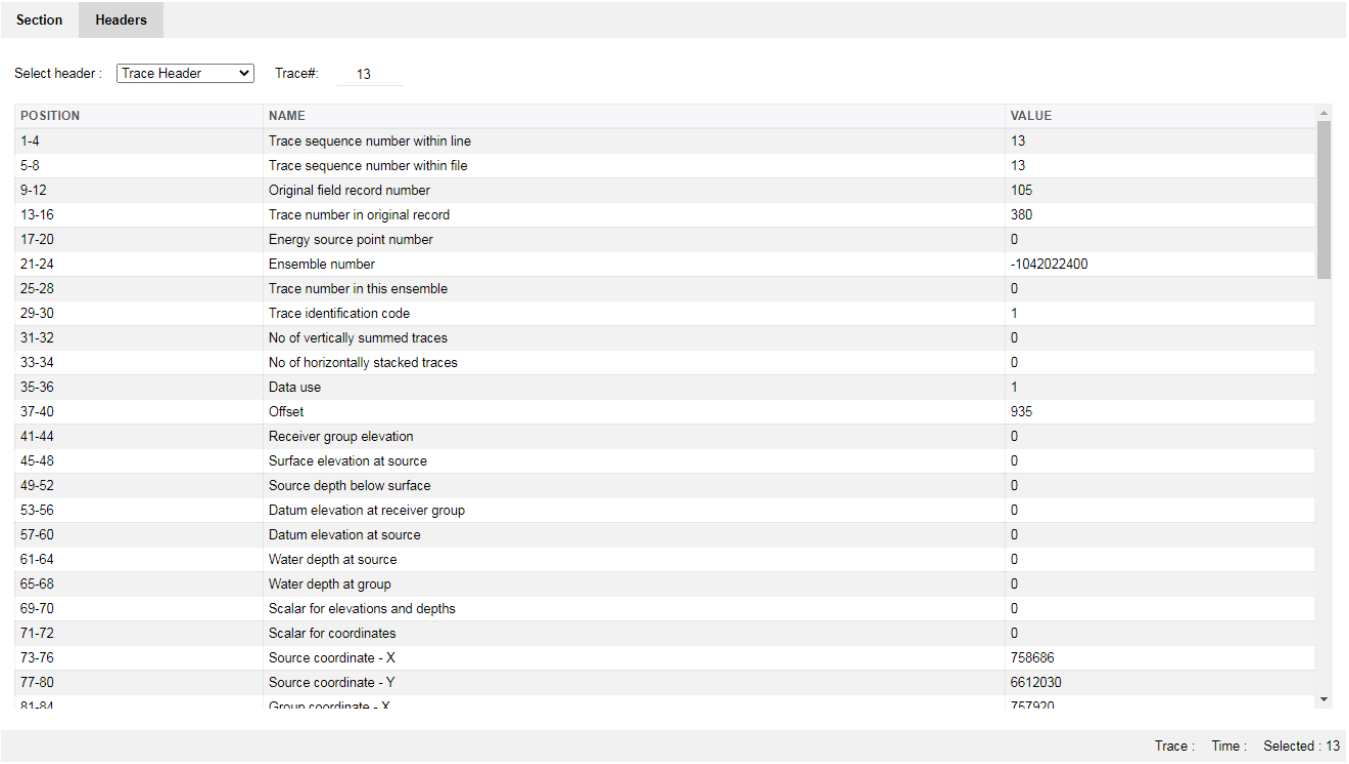


Headers

The Headers window displays all available header information.

For *SEG-Y* and *SEG-D* documents, there is a trace header that refers to the specific trace selected in the section.

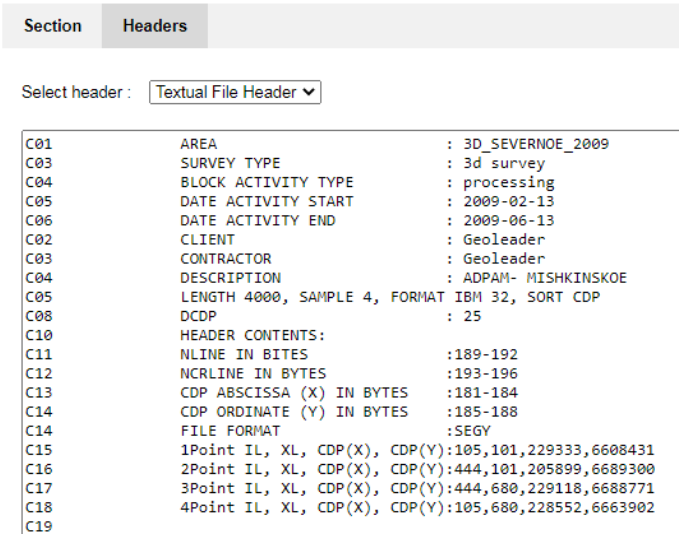
This window shows data for the trace selected in the viewing area and implements an ability to switch the trace with the counter. Similarly, you can write the trace number manually - the header data will be recalculated automatically.



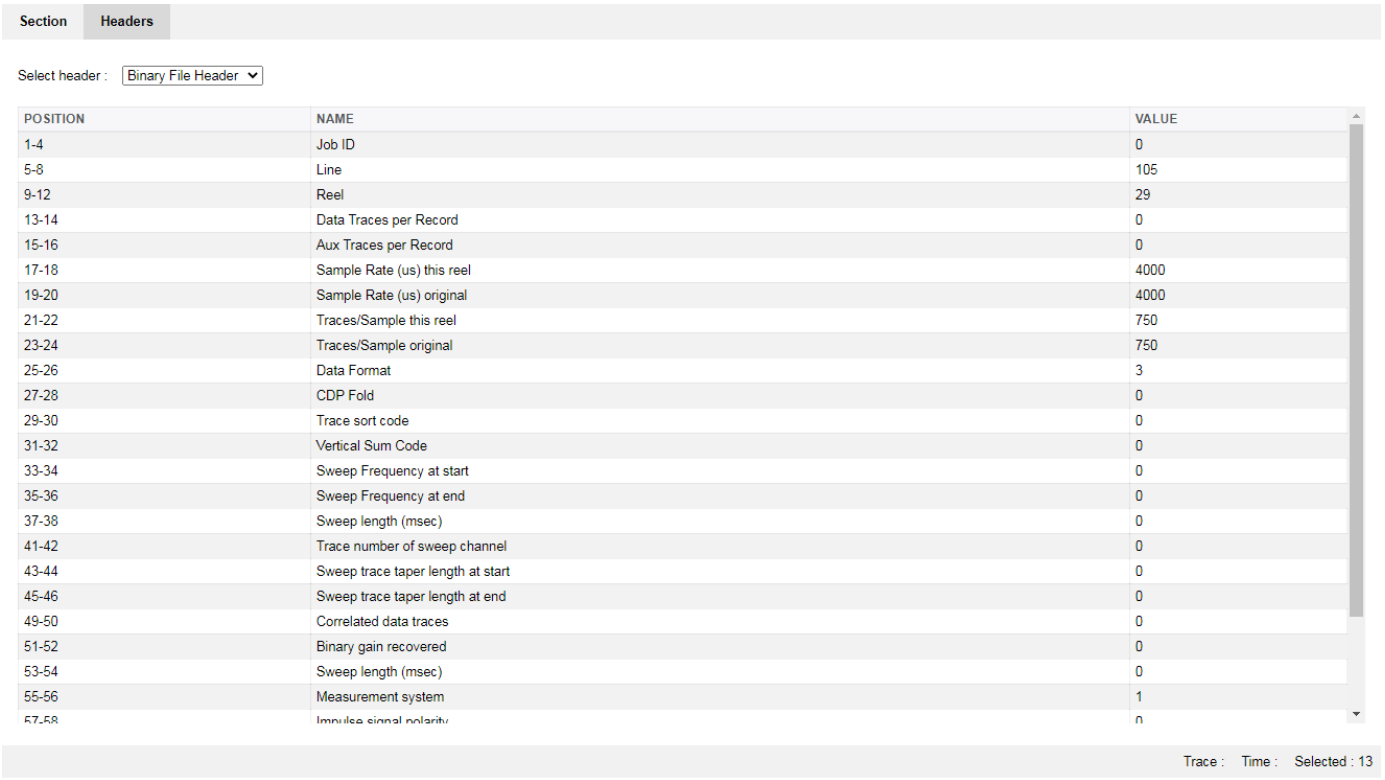
For *SEG-D* files, the structure can initially include specialized headers, they are also available in the drop-down menu. In most cases, such data are independent of a specific trace and refer to the entire document as a whole.

In addition to the trace header for *SEG-Y* documents, in the drop-down menu you can select:

- Text header - to view the attributive information associated with the file (year of creation, manufacturer, area, etc.)



- Binary header - to display information directly related to the data (number of traces, number of samples in a trace, etc.)



Settings panel

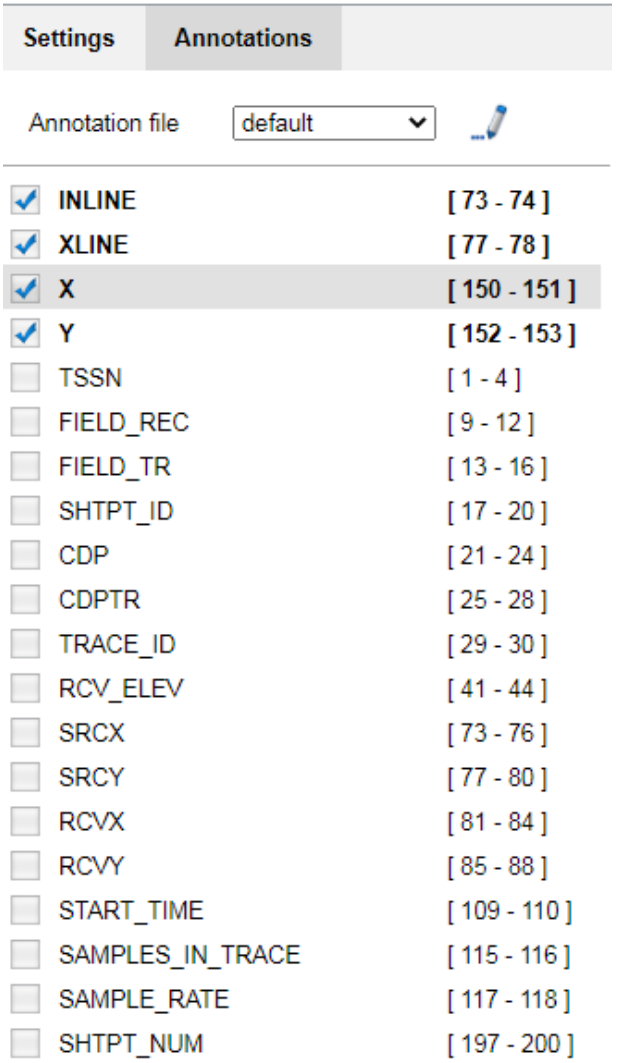
This panel is represented by two tabs: Settings and Annotations

Annotations tab

Annotation is a set of section characteristics extracted from trace headers from a given position in a document of a certain format.

This tab provides the ability to select parameters that are displayed above the image on the "Section" tab.

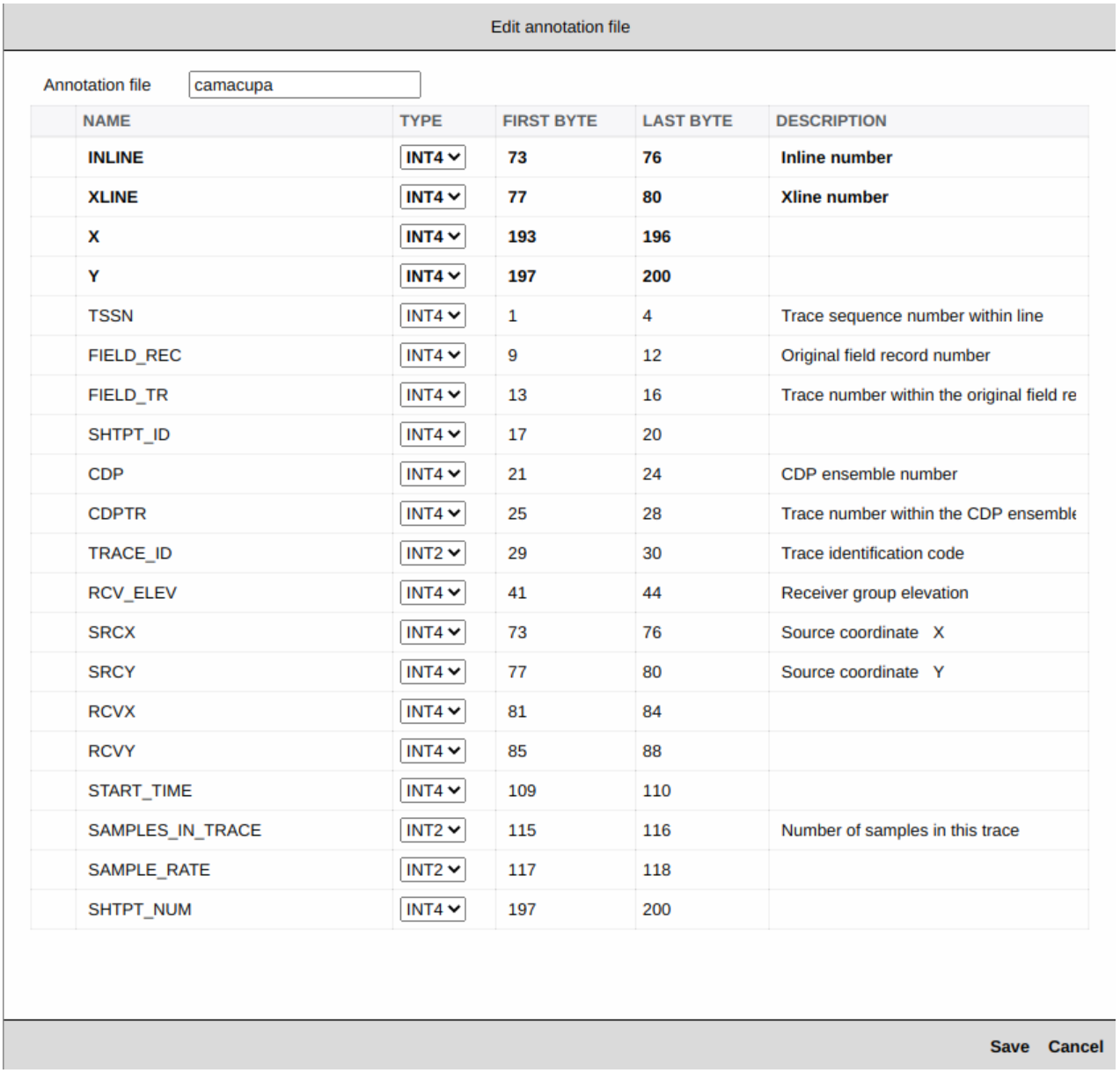
When the "Locator" option is enabled, all values of the selected parameters related to the time/trace intersection point will also be shown.



The user can also edit the annotation file.

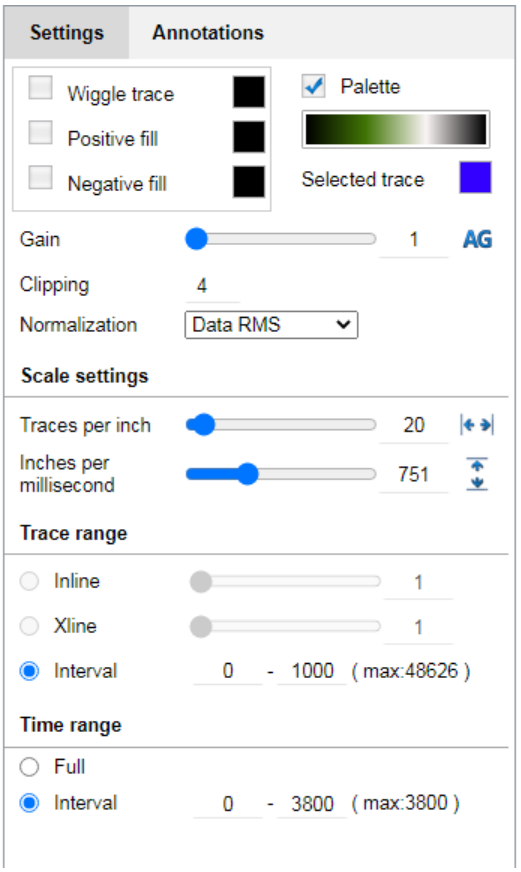
For each parameter, you can select the type (*INT 2* or *INT 4*) and set its position in the trace header. The description for each of the parameters can be written manually and saved. The first four parameters are key and are not available for deleting and editing the Name.

To add a new annotation or delete a selected one, you need to right-click on the editing window.



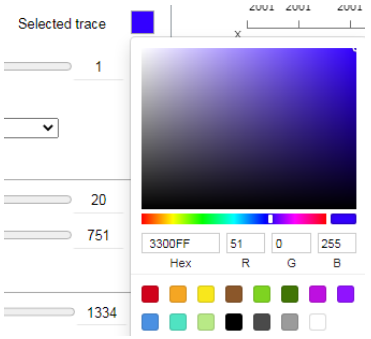
NAME	TYPE	FIRST BYTE	LAST BYTE	DESCRIPTION
INLINE	**INT4**	**73**	**76**	**Inline number**
XLINE	**INT4**	**77**	**80**	**Xline number**
X	**INT4**	**193**	**196**	
Y	**INT4**	**197**	**200**	
TSSN	INT4	1	4	Trace sequence number within line
FIELD_REC	INT4	9	12	Original field record number
FIELD_TR	INT4	13	16	Trace number within the original field re
SHTPT_ID	INT4	17	20	
CDP	INT4	21	24	CDP ensemble number
CDPTR	INT4	25	28	Trace number within the CDP ensemble
TRACE_ID	INT2	29	30	Trace identification code
RCV_ELEV	INT4	41	44	Receiver group elevation
SRCX	INT4	73	76	Source coordinate X
SRCY	INT4	77	80	Source coordinate Y
RCVX	INT4	81	84	
RCVY	INT4	85	88	
START_TIME	INT4	109	110	
SAMPLES_IN_TRACE	INT2	115	116	Number of samples in this trace
SAMPLE_RATE	INT2	117	118	
SHTPT_NUM	INT4	197	200	

Settings tab



This tab is used to directly adjust the time section image with user-defined settings for schemes.

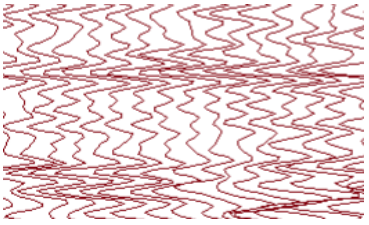
The ability to customize the color of the Selected trace is implemented with a mouse click.



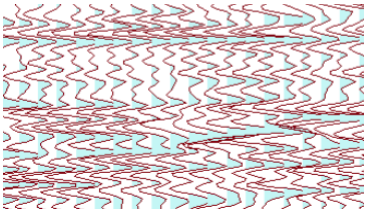
When choosing a color for any of the parameters, it is possible to adjust the transparency.

Similarly, here you can adjust the color, as well as show/hide the display of the following parameters:

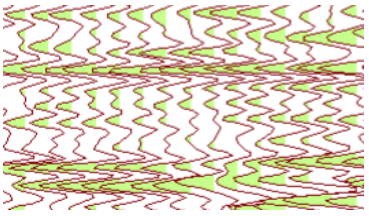
- Trace Curve - a full view of each trace



- Positive phase - color filling of positive trace values

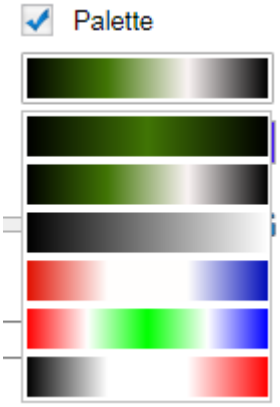


- Negative phase - similar filling of negative values



Palette

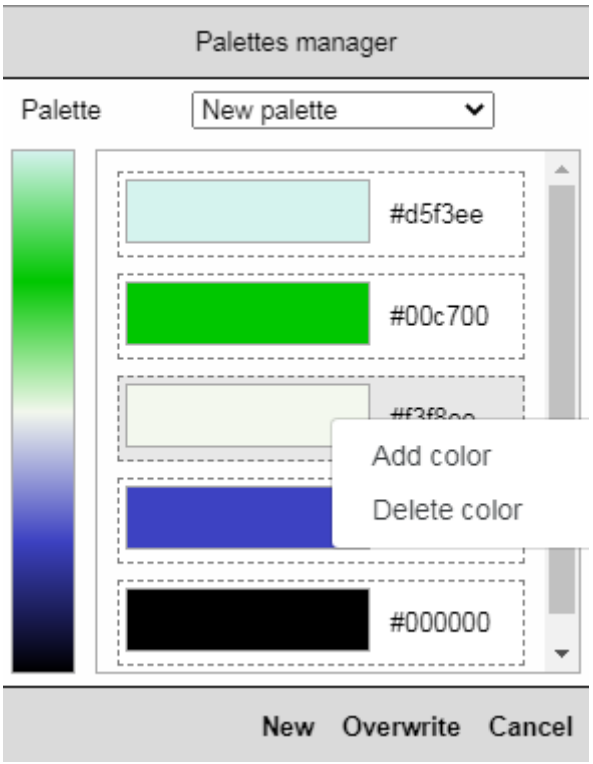
Palette - gradient highlighting depending on the trace value in a time interval of 2 ms.



The option to show/hide the Palette is available in the Settings tab, as well as the choice of color schemes in the drop-down menu

To edit an existing palette or add a new one, you need to:

1. On the Control panel, click the "Schemes" button
2. In the drop-down menu select "Palettes manager"
3. Create a new palette or edit and save the current one.



You can add or remove a color by right-clicking in the Palettes manager pop-up window.

Geophysical indicators:

➔ **Normalization type**

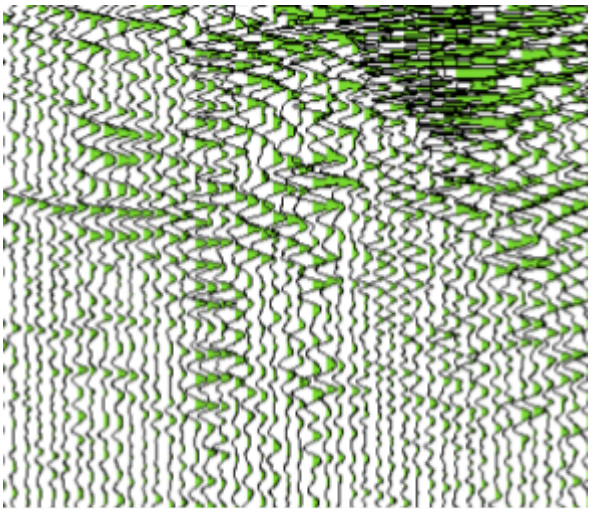
Dropdown menu with the following list of normalizations:

- Trace maximum
- Trace average
- Data maximum
- Data average
- Trace RMS
- Data RMS
- Range

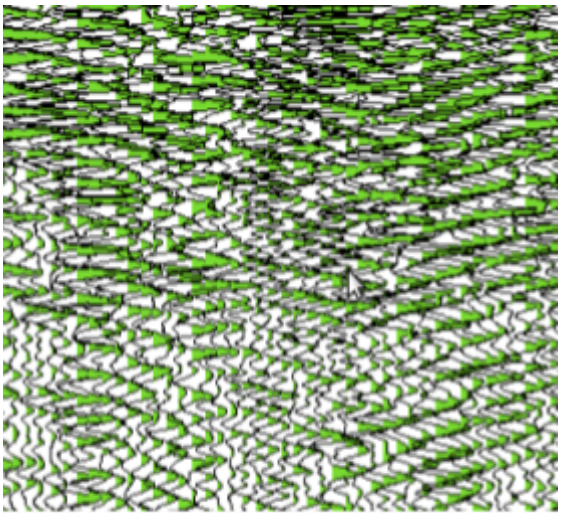
➔ **Gain** - the coefficient by which the trace values are multiplied for a more pronounced visualization of the trace curve behavior

AG (Auto Gain) this button sets the recommended gain value based on the calculated data.

You can also set the parameter using the slider or change the value manually.



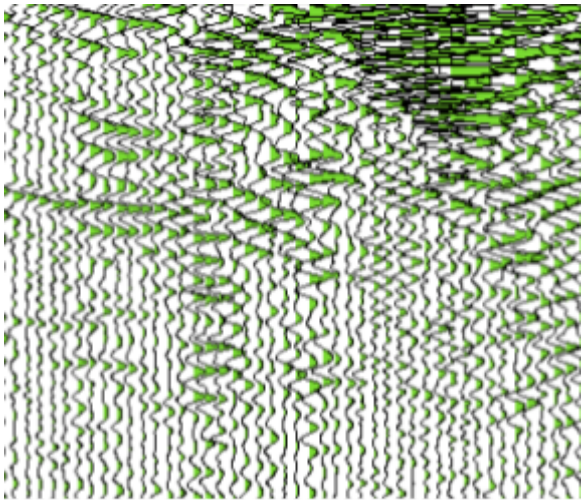
AG, Gain = 1



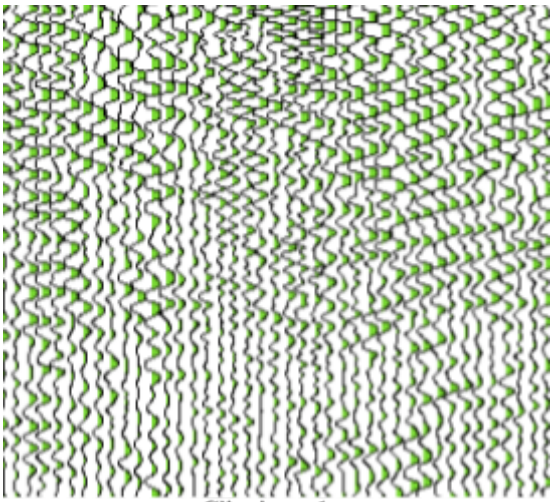
Gain = 3

➔ **Clipping** is the coefficient for limiting trace values. It is applied in such a way that the trace values do not intersect the number of traces greater than the halving value.

Can be changed with a counter or manually;



Clipping = 4



Clipping = 1

Scale

The number of traces and milliseconds that will be included in the inch of the image. It can be set with a slider or manually.

There are also the following scaling functions:

- Fit image to width 
- Fit image to height 

They allow you to fit the image into the display area and view it in its entirety, without resorting to scroll bars.

Range of traces

The ability to select a section for a specific value of *Inline* or *Xline*. It becomes available only when loading line data and a correctly configured annotation file. After that, the selection of the value can be changed with the slider or manually.

You can also view the interval of trace values here. In this case, trace values are set only manually.

Time range

Possibility to choose the display of "Full length" on the time scale or a specific interval of time values, which, in turn, are set manually.

The maximum value for spacing is shown alongside in parentheses. It is not possible to set a value for the interval higher than the maximum.

Working with schemes

Save scheme

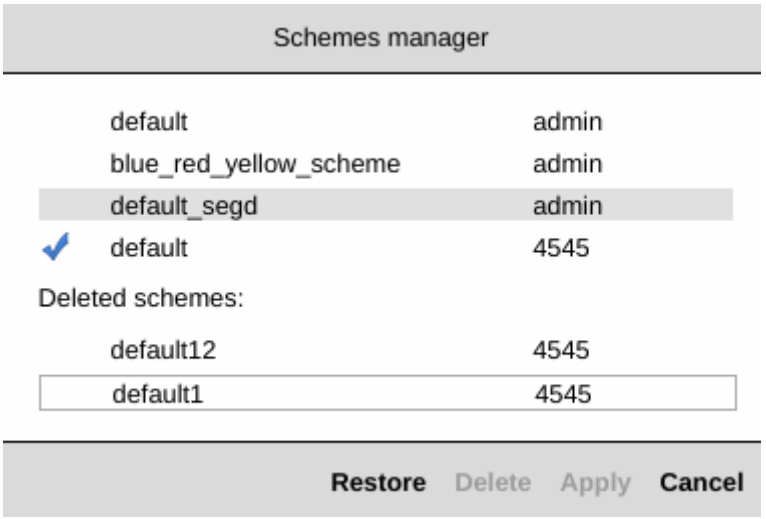
Any settings other than gain, clipping, and ranges can be saved as a scheme.

To do this, click on the “Schemes” drop-down menu on the Control panel and select “Save scheme”. In the “Save scheme dialogue” pop-up window that opens, you can overwrite the existing scheme or, by changing the Scheme name, save it as a new one.

Schemes manager

Using the Schemes manager button, you can select and apply any of the available Schemes.

They are displayed in the Schemes manager pop-up window as:



There is also a delete function for schemes created by your user. Within one session, deleted schemes can be restored without loss.