

Geomage g-Viewer™

USER MANUAL

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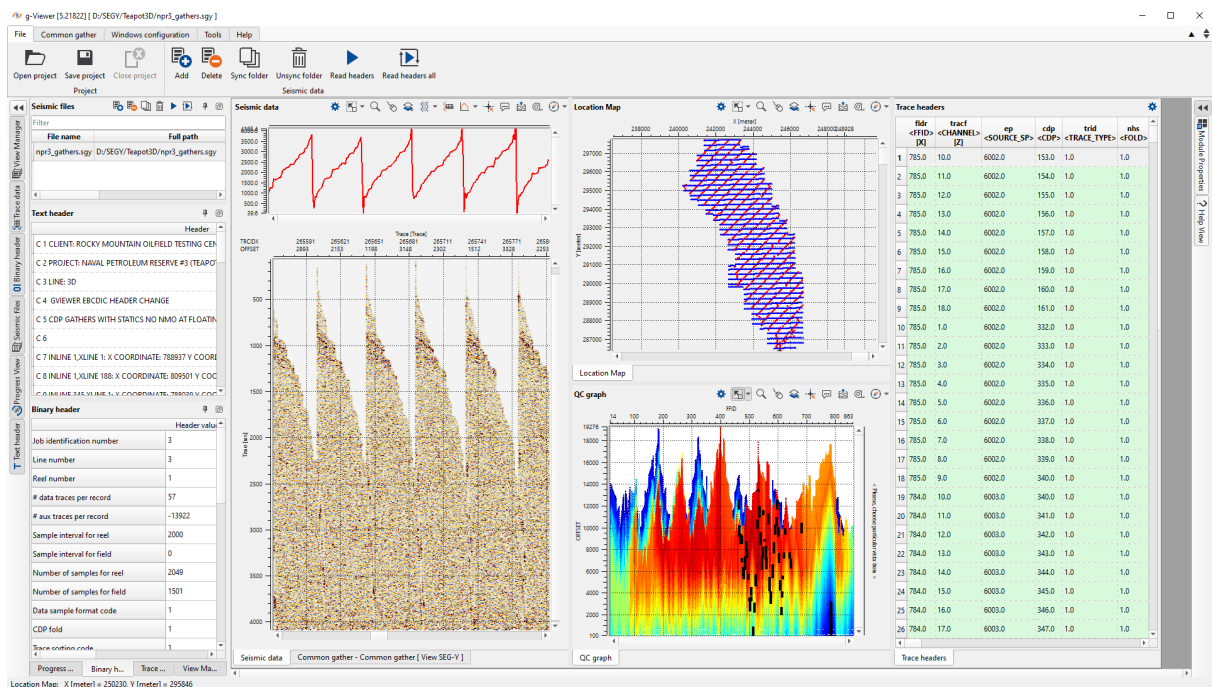
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Introduction

1 Introduction

This manual is designed for users seeking to visualize or modify seismic data headers (Text/EBCDIC, binary, & trace headers) using **g-Viewer**®, a geophysical visualization software developed by Geomage.

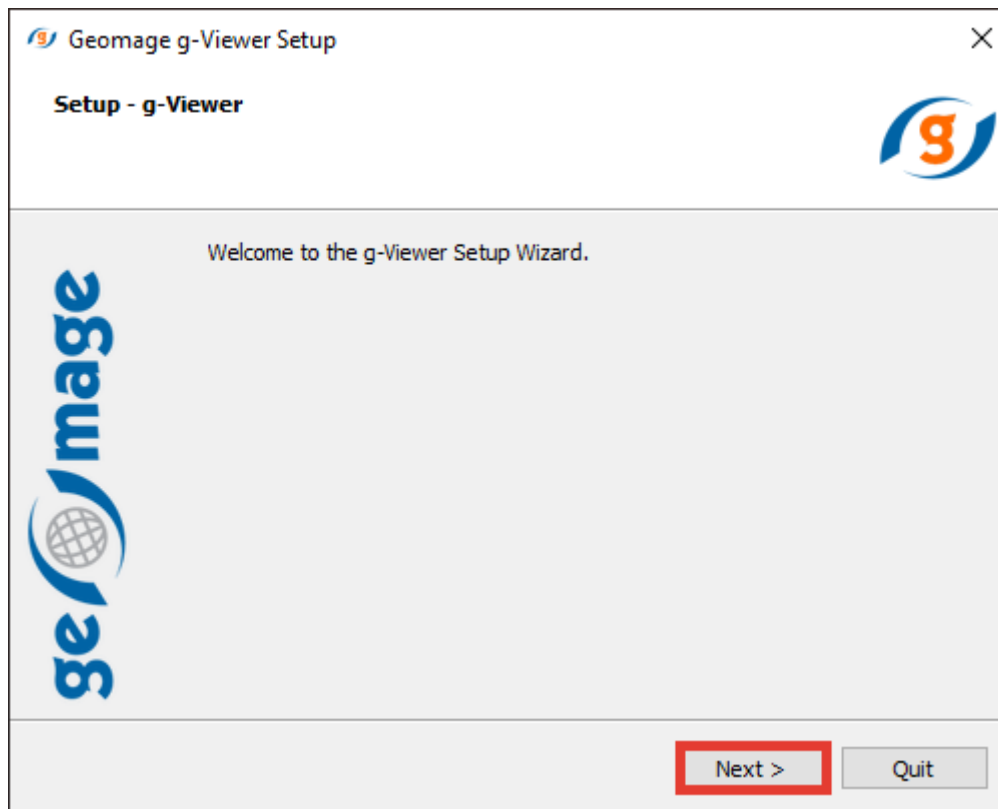
Please note that this manual is not a comprehensive tutorial; rather, it serves as a guide. The software's capabilities are primarily focused on data visualization and limited basic processing procedures as outlined in this document. However, g-Viewer can be customized to meet specific user requirements.



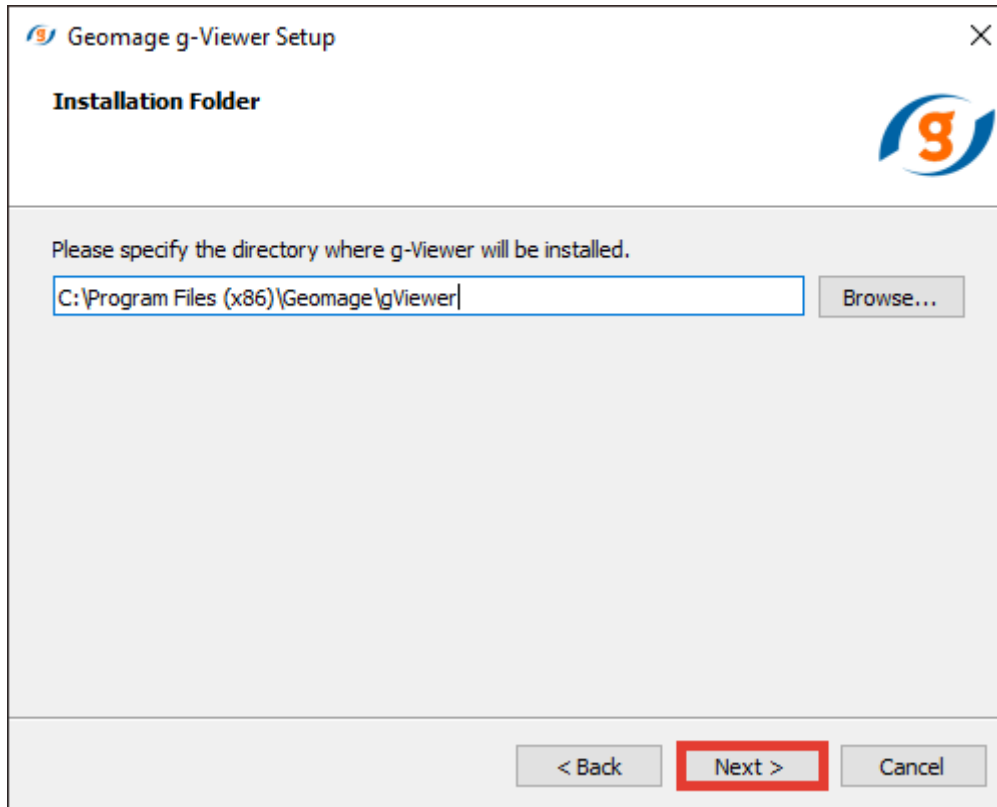
Installation

2 Installation

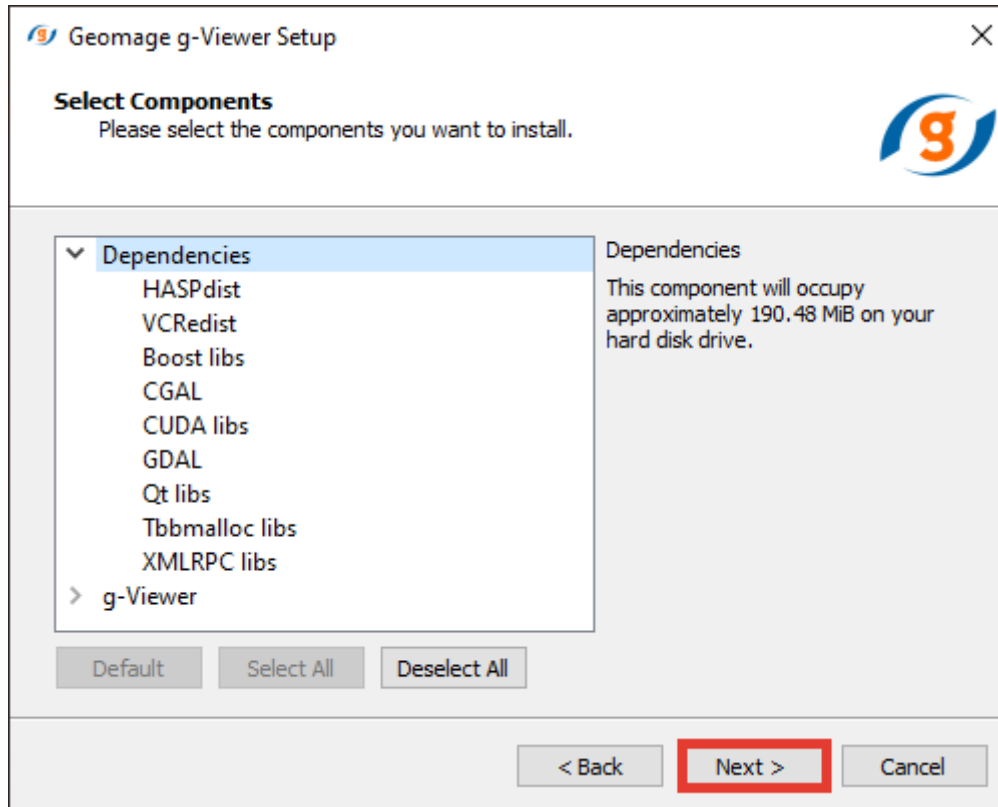
Installation of g-Viewer software is just a mouse click away. Double click on the **.exe** file and launch the program.



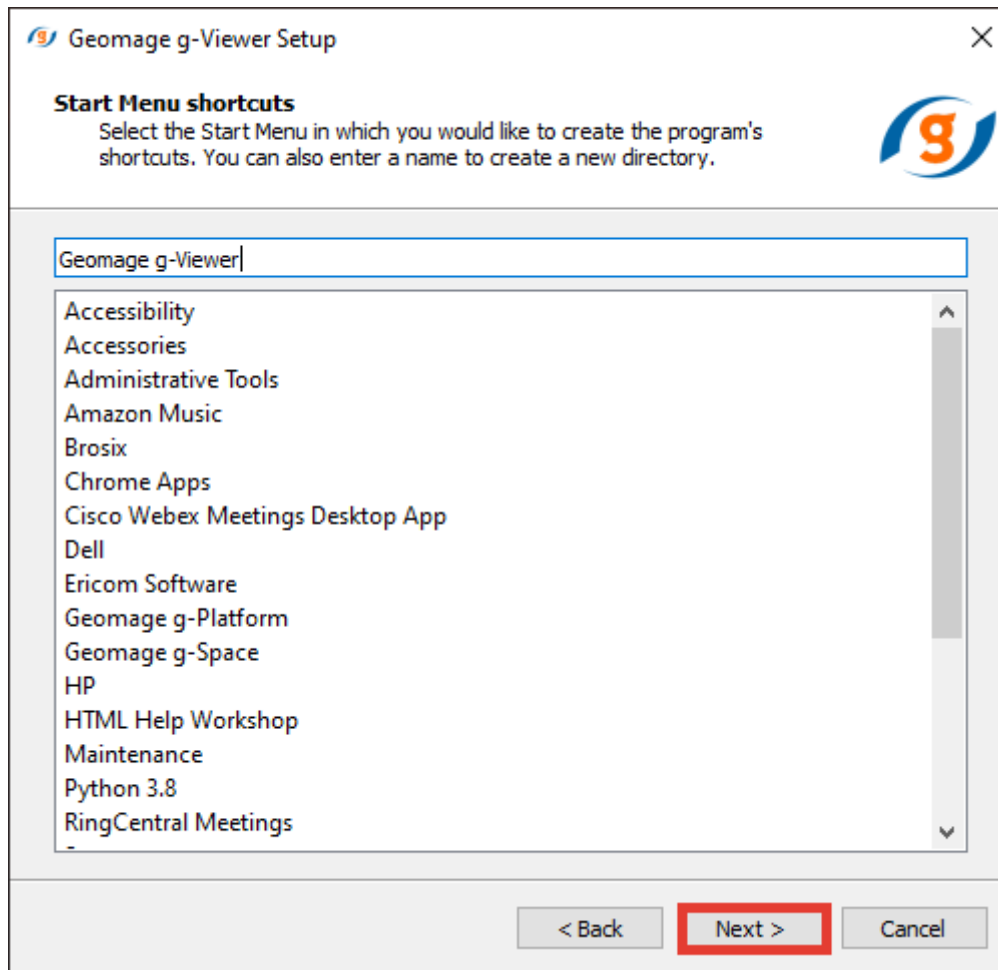
Click **Next** and provide the installation path



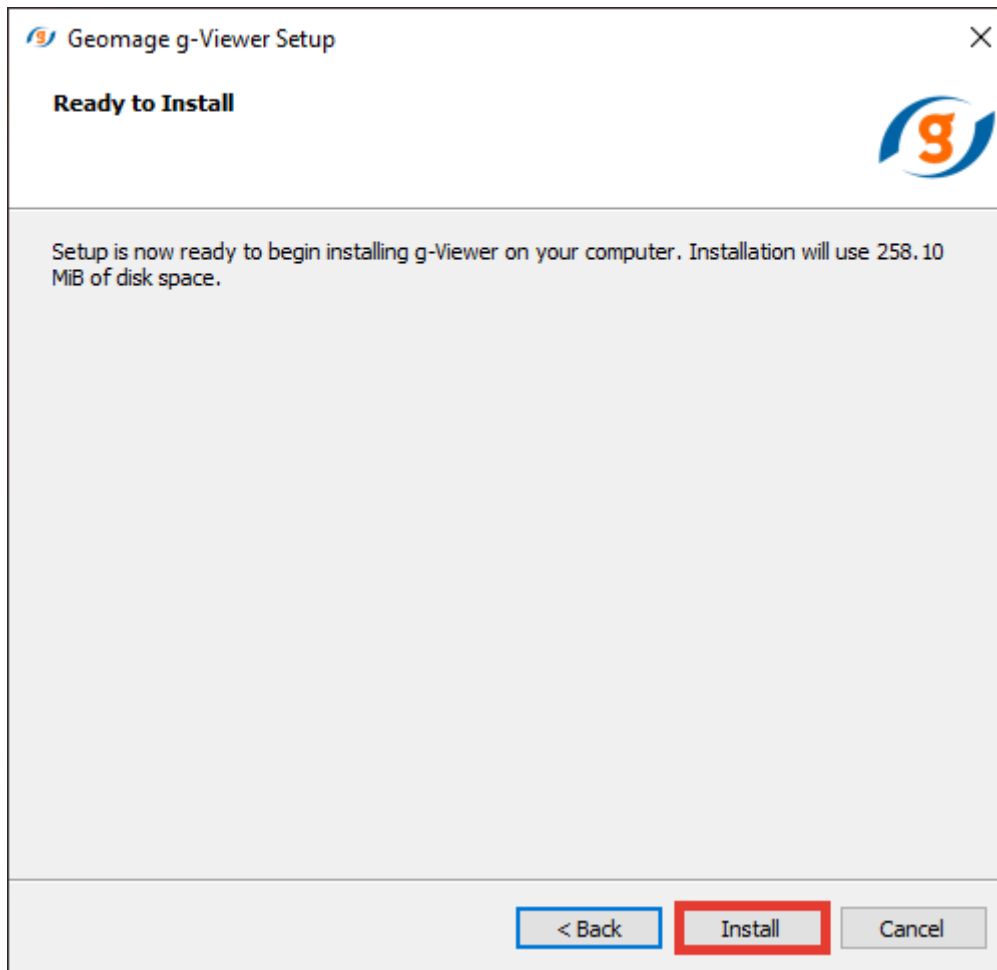
Click **Next**



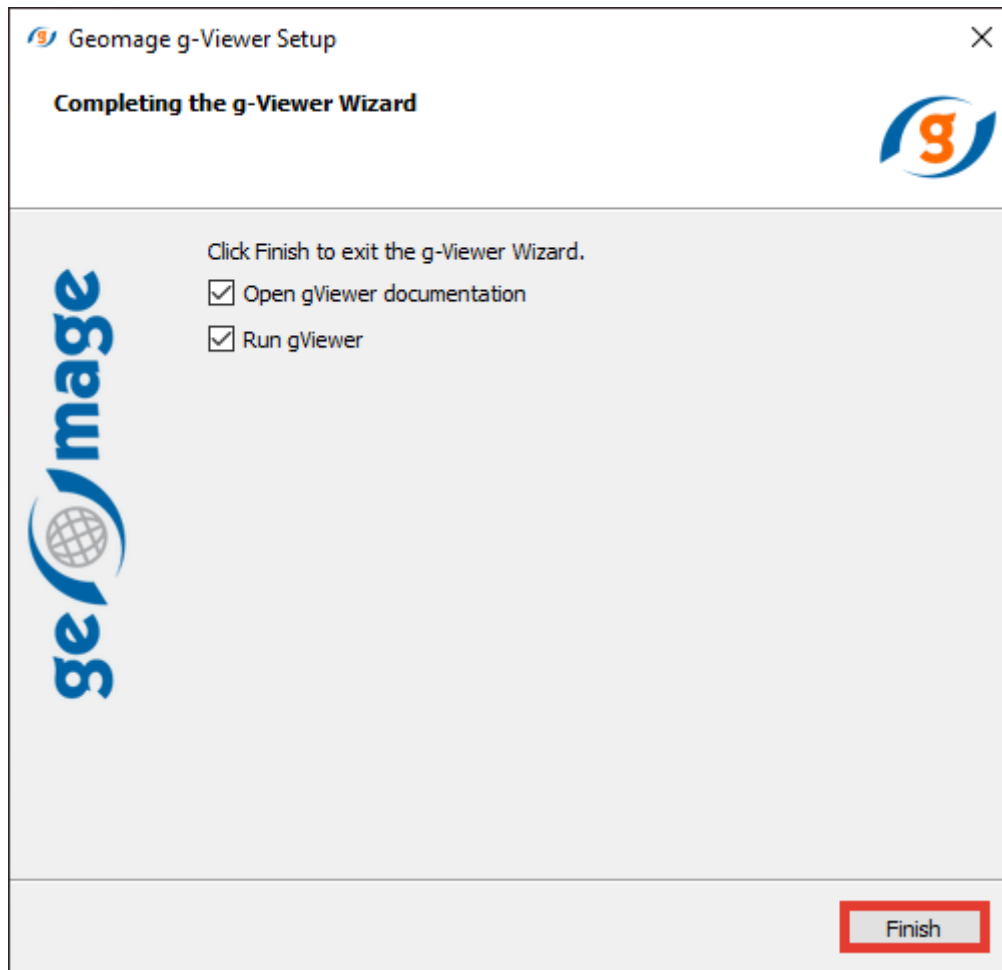
Press **Next** and agree to the License Agreement (If you want to continue using the software) by selecting the option "**I accept**" and press **Next**. In the following screen it will display the window for creating the g-Viewer start menu shortcuts



Click **Next** and we are Ready to install.



Click **Install** button



And then **Finish**

2.1 Requirements

General assumptions for workstation are:

Operating system – 64-bit Only

- Windows: 7/8/10
- Linux and MacOS - please contact Geomage for updated status of release for those OS.

CPU

- 1 core minimum. Since g-Space designed to work in multi-thread mode in order to get better performance, it is advised to have as many CPU cores as possible to achieve best performance during calculation processes.

Disk

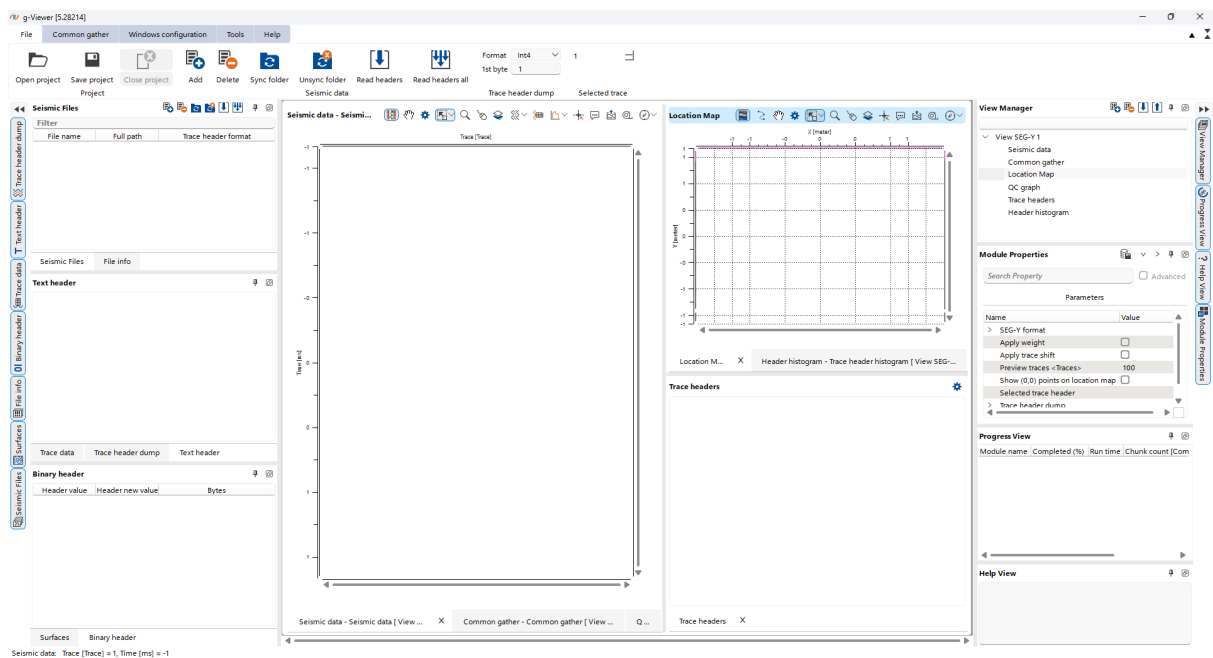
- SSD storage for seismic prestack data (recommended)
- HDD drive for the rest of the project data

RAM

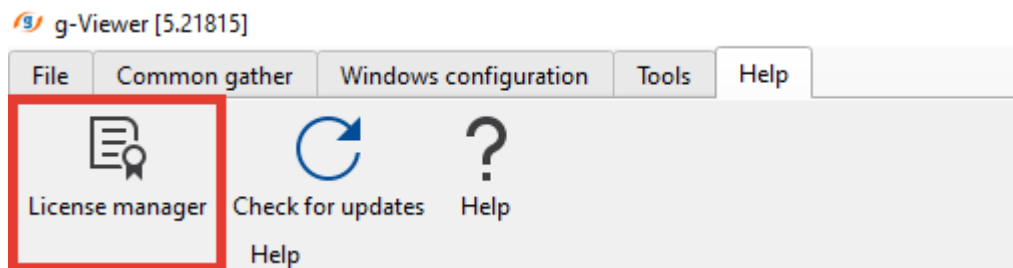
- 4GB minimum
- the best practice is to have 2 times of loaded seismic data size

2.2 Licensing

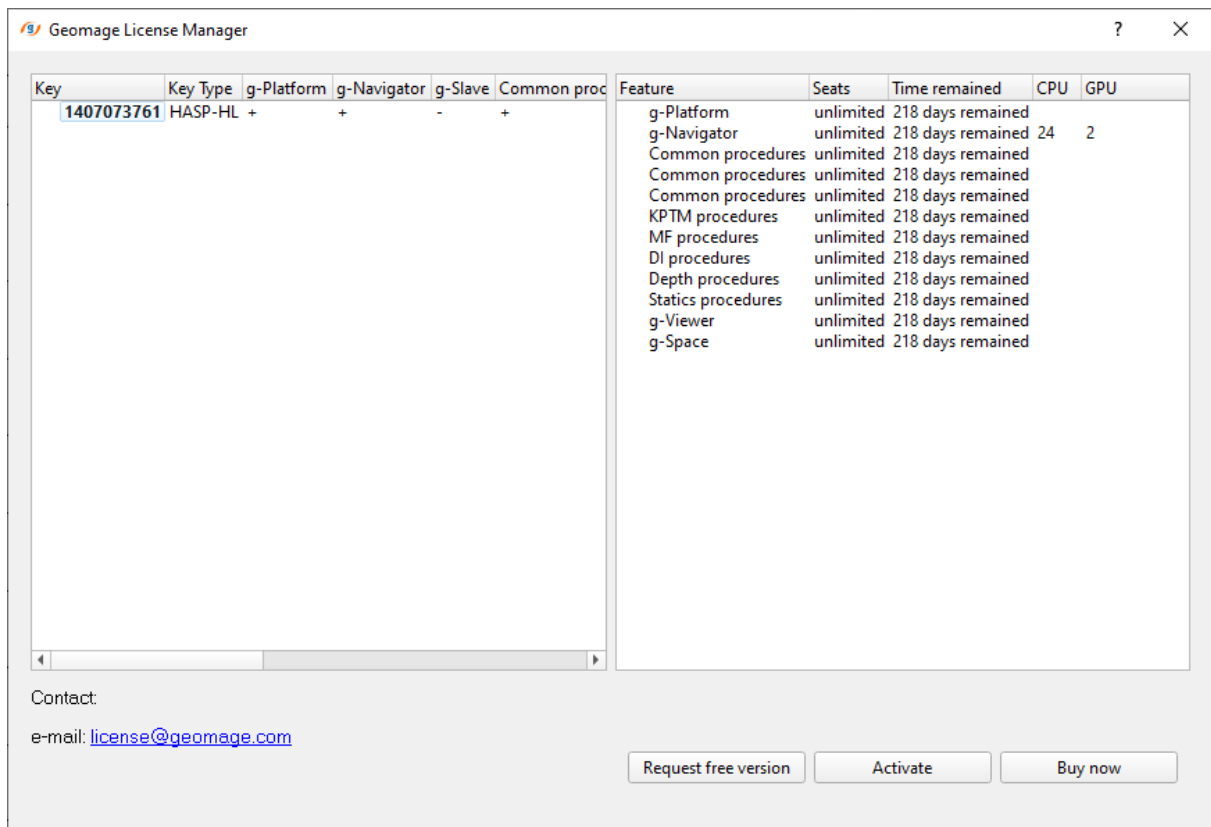
To launch g-Viewer, the user should simply click on the short cut icon g-Viewer on the desktop or select g-Viewer from the **Start Menu--> Geomage g-Viewer --> gViewer** option. Upon opening the software the display will appear as shown below.



To request a license, the user should select the following option as shown below to request the license file (c2v) and update the received license file (v2c) as shown below.



After clicking on the **License manager** icon, there will be a pop-up window with many options as shown below.



To manage your g-Viewer license, three options are available:

Request a License: To request a license, click the **Request a license** button. This will allow you to generate a request file to send to the Geomage license team at license@geomage.com. Once you receive the **Activation key**, you can upload it to activate your license.

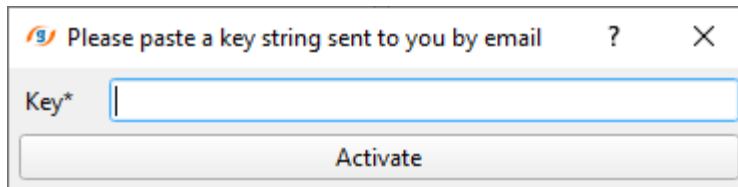
Please fill all values to get a free license by email

First Name*

Last name*

Email*

Activate: If you already have a license key, select **Activate**. Enter your key in the provided field and click **Activate** to enable your license. It will automatically read the file and we will be ready to launch **g-Viewer**.

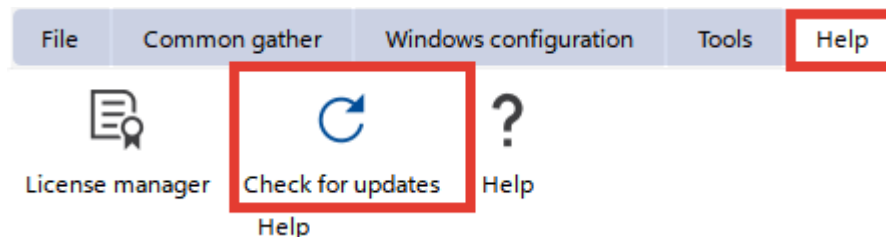


Buy: Clicking **Buy** will redirect you to our [website](#), where you can select a version of g-Viewer, add plugins, and contact us for more details.

2.3 Software update

On start of g-Viewer the application checks (on a daily basis) if a new version was uploaded to repository of Geomage. In case there is a newer version than installed an appropriate message will appear with suggestion to install the update.

In addition, when needed, User can get the latest version of g-Viewer by clicking on Help menu and selecting **Check for updates** as shown on the image



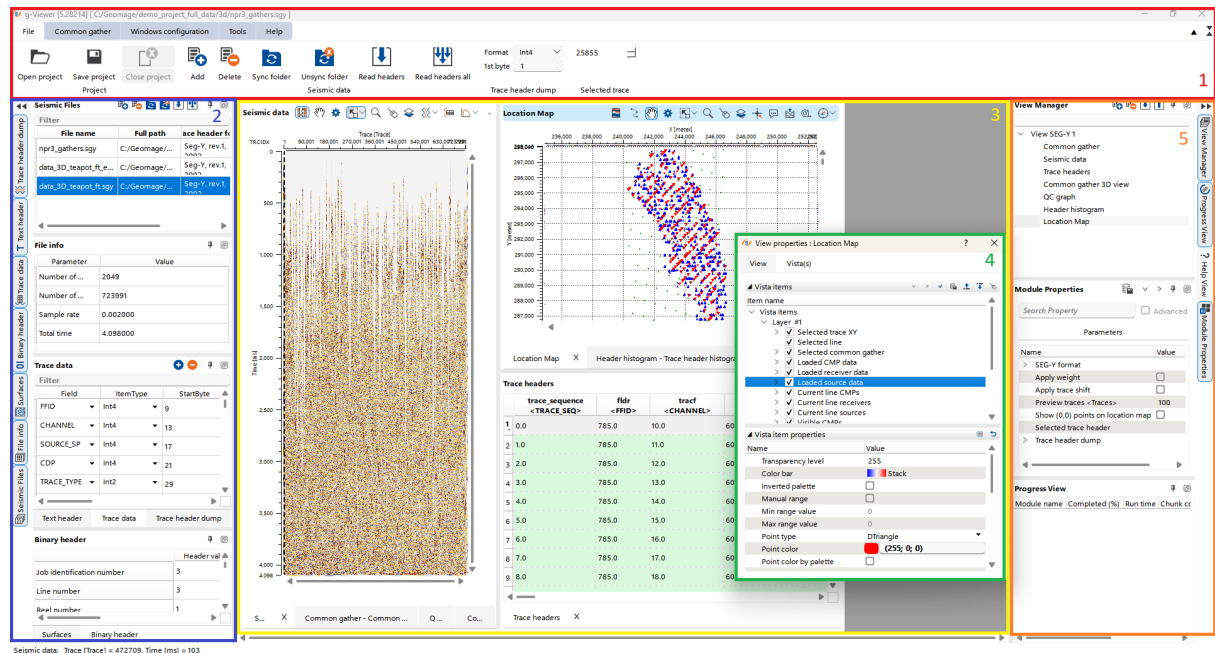
User Interface

3 User Interface

Let's start by getting acquainted with the program by exploring the interface.

Subscribe to our channel and watch g-Viewer interface overview on [YouTube](#)

The g-Viewer interface consists of several areas:



1. The **Ribbon bar**^[18] is the topmost section of the interface, highlighted in the red box. The Ribbon Bar is a place where you can access the main functionalities of the g-Viewer software. It is organized into several thematic tabs that group related tools and commands.

2. The **Panels**^[41] that are located on the left side of the interface, highlighted in the blue box, included: **Seismic files**^[41], **File Info**^[43], **Trace data**^[45], **Text header**^[44], **Trace header dump**^[50], **Surfaces**^[54], **Binary header**^[60].

3. The **Workspace area**^[112]. The central area of the interface, highlighted in the yellow box. The Workspace area serves as the central hub for data visualization and analysis. This area is dedicated to displaying multiple **Views**^[80] that are part of the project. Each view within the workspace can represent different types of data, such as seismic sections, well logs, map views, etc.

The cursor position can be synchronized on the map and section.

The active window is highlighted in blue as shown in our Location map example, and its corresponding **Module Properties**^[63] Panel is displayed.

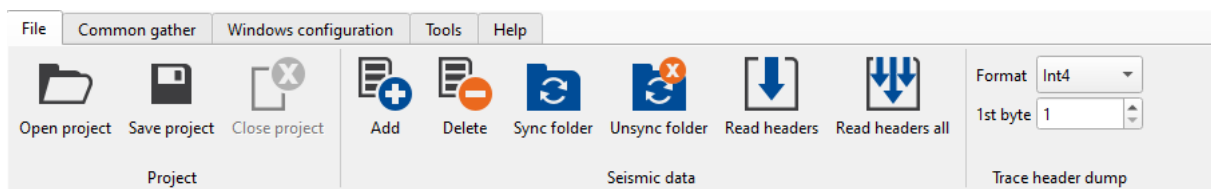
4. The [View properties](#)^[64] is a dynamic panel that allows customization of view settings. The content of the window depends of the selected object.
5. The [Panels](#)^[41] that are located on the left side of the interface, highlighted in the orange box, included: [View Manager](#)^[62], [Module Properties](#)^[63], [Progress View](#)^[64].

At the bottom of the interface, you can see an information bar that displays data corresponding to the current cursor position, regardless of the active window.

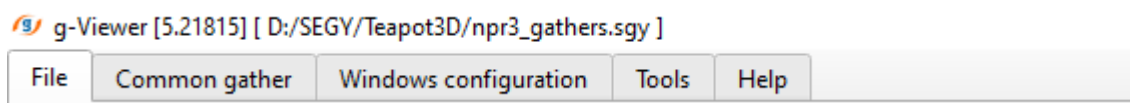
3.1 Ribbon bar

In g-Viewer, we have various menus designed to perform various tasks. These are all available in the top part of g-Viewer software as a Ribbon. It can be toggle on/off using the button

 at the top right most corner of the **g-Viewer** main window as shown below.



For any reason, user wants to toggle OFF the ribbon then they simply need to click on the  button. Then all the icons like Add, Delete, Read headers etc will be collapsed and hidden.

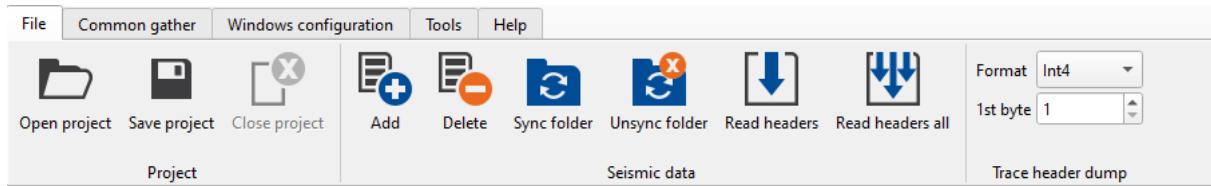


If the user wants to bring them back, they can click on the  button to bring it back to its original position.

What about the significance of the other icon  (If you hover the cursor, it will display the tool tip as **Switch toolbar**) on the extreme right of the ribbon. Let's see what will happen if we click on this icon...



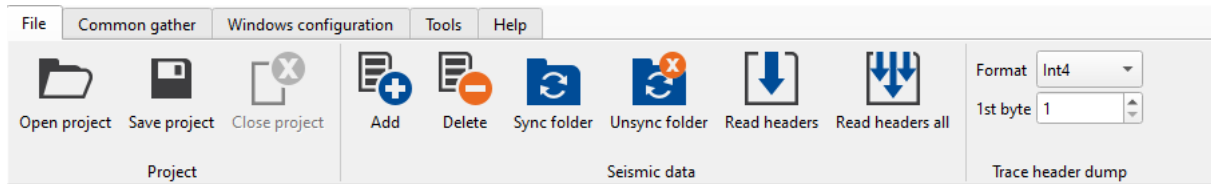
The entire design layout can be adjusted to a more standardized appearance. These changes are purely cosmetic, and users can customize the settings to suit their preferences. If users wish to revert to the default layout at any time, they can simply click the  icon, which will restore the original display.



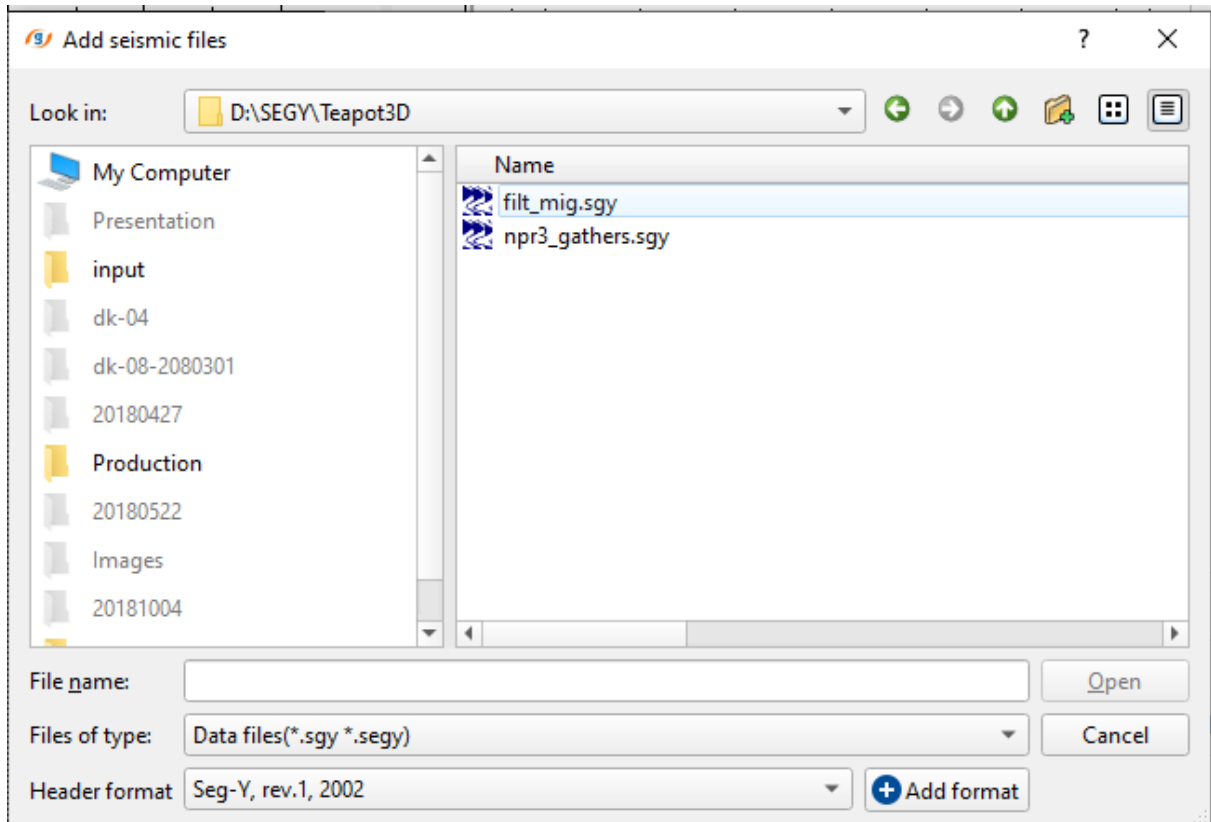
As we see, within the ribbon we have few menus. We are going to discuss each one of them briefly in the following sections.

3.1.1 File bar

Upon starting the g-Viewer, by default **File** menu is activated. Under the **File** menu, we have following options.

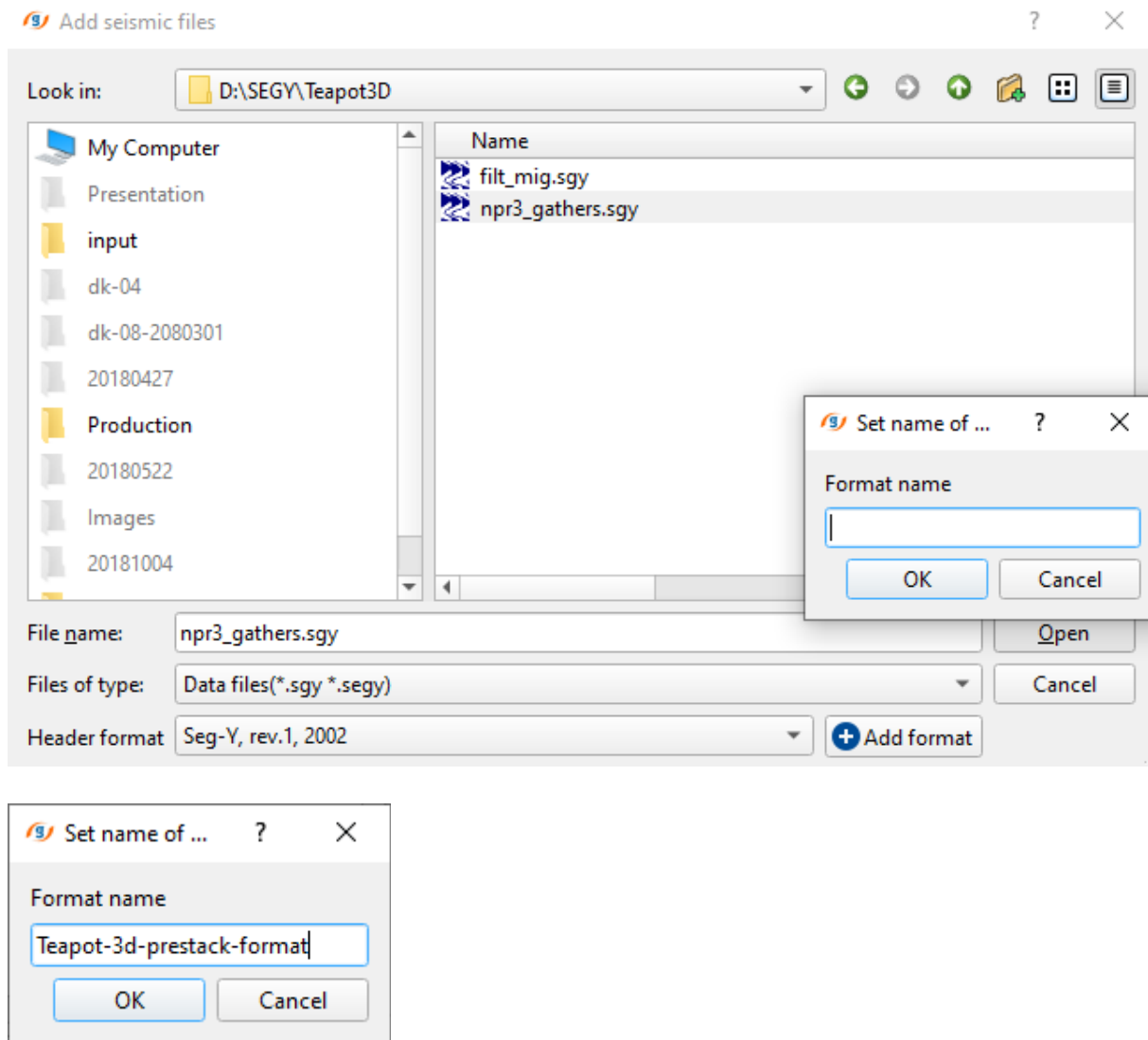


- Open project** : Browse and open the previously saved g-Viewer project.
- Save project** : The user can save the g-Viewer project by clicking on the Save project button.
- Close project** : By selecting this option, the user can close the project.
- Add** : In order to add any seismic files(SEG-Y), user should click on Add icon. The user can add as many files as they can.

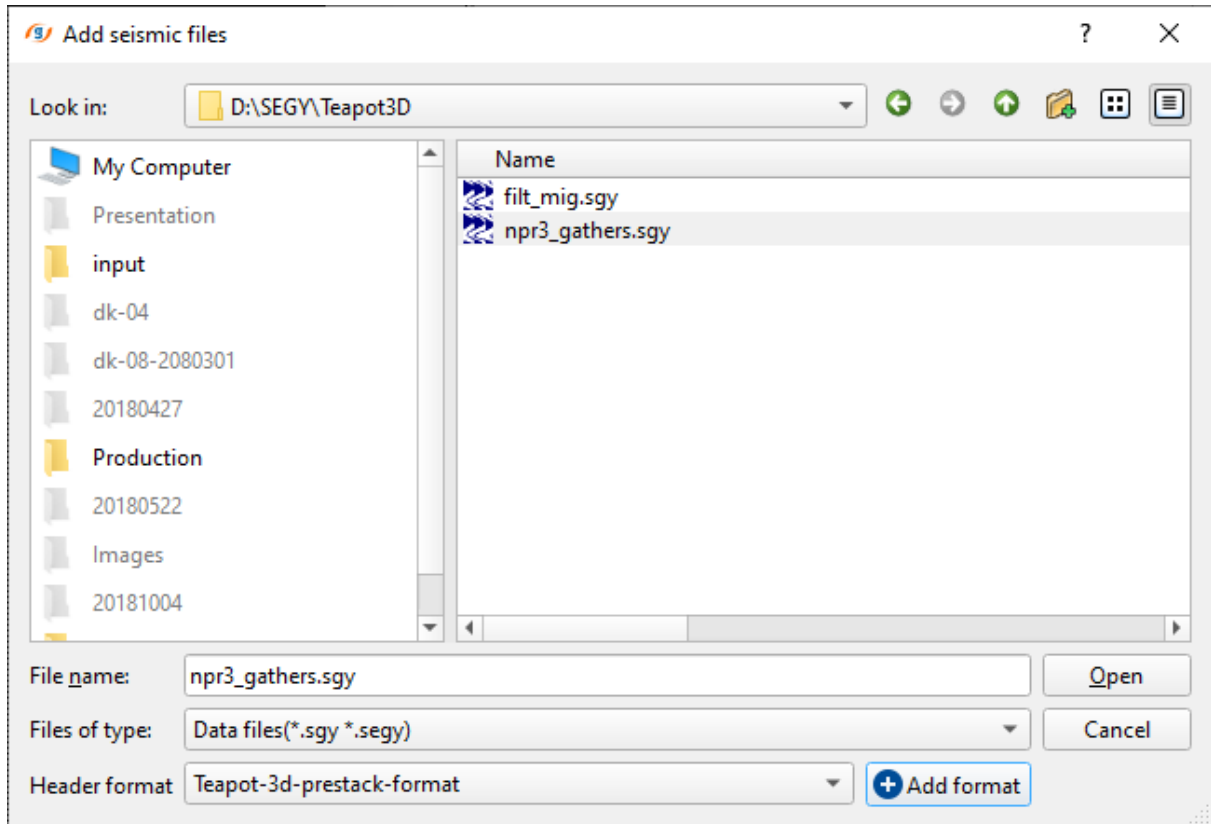


While adding any SEG-Y file, the user can able to select the trace header format from the drop down menu. By default it will be Seg-Y rev.1. 2002 format. However the user can able to select the pre-existing header format or create a new header format by clicking on the Add format button next to the Header format.

When the user clicks on the **Add format**, it will open a pop-up window. The user should provide a name to the new header format and proceed further.



Click **OK** and the new header format will be changed from the default Seg-Y rev.1. 2002 format to the user defined format.



Delete : This option is to delete any particular loaded file(s) in the [Seismic files](#) window.

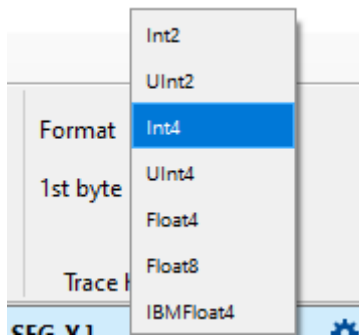
Sync folder : When there is a continuous supply of seismic files into the existing folder by means of continuous shooting in onshore/offshore, the files will be automatically in Sync within the folder and the user can able to access them without adding them separately.

UnSync folder : This is just opposite of the Sync folder where the user can select this option to Unsync the folder.

Read headers : After adding the files, g-Viewer partially loads all the trace headers. To load the trace headers completely, the user should click on this icon.

Read headers all : If the user added multiple seismic files, then they should select this option to read headers of all the files.

Trace header dump : It is very useful tool to identify the trace headers information in case we don't know the actual byte locations of the input. With this, we can scan the data and find out the value of the corresponding byte location.



Select the appropriate Format type and choose the 1st byte. By default, it is Int4 Format and 1st byte as 1. It will display the trace headers information as shown below.

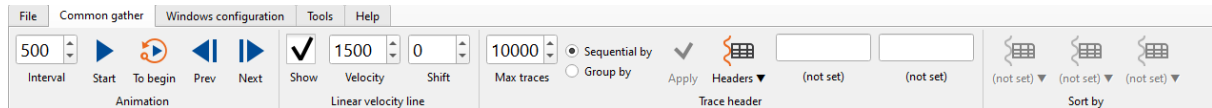
Trace header dump	
Filter	
Bytes	Value
1-4	1
5-8	1
9-12	1
13-16	0
17-20	0
21-24	101
25-28	1
29-32	65537

3.1.2 Common gather bar

Within the **Common gather** menu, the user can able to

- Quickly go through the loaded gathers
- Can able to plot near surface velocity on the gathers

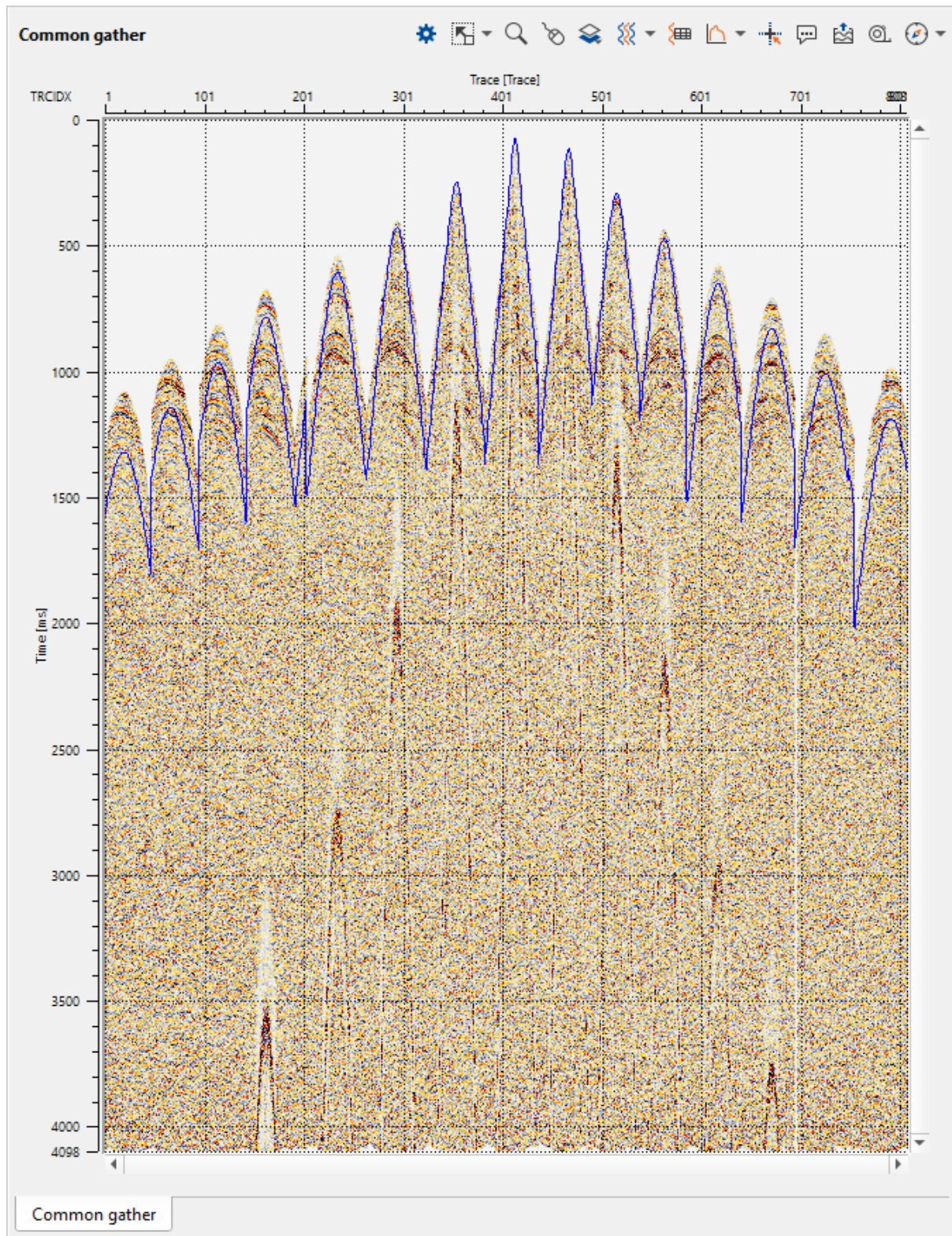
- Apply a constant shift on the gather (Please note it's not a constant shift to move the data but it is move out)
- Can load the traces either by Sequential order or Group order
- The use can able to sort by selected trace headers



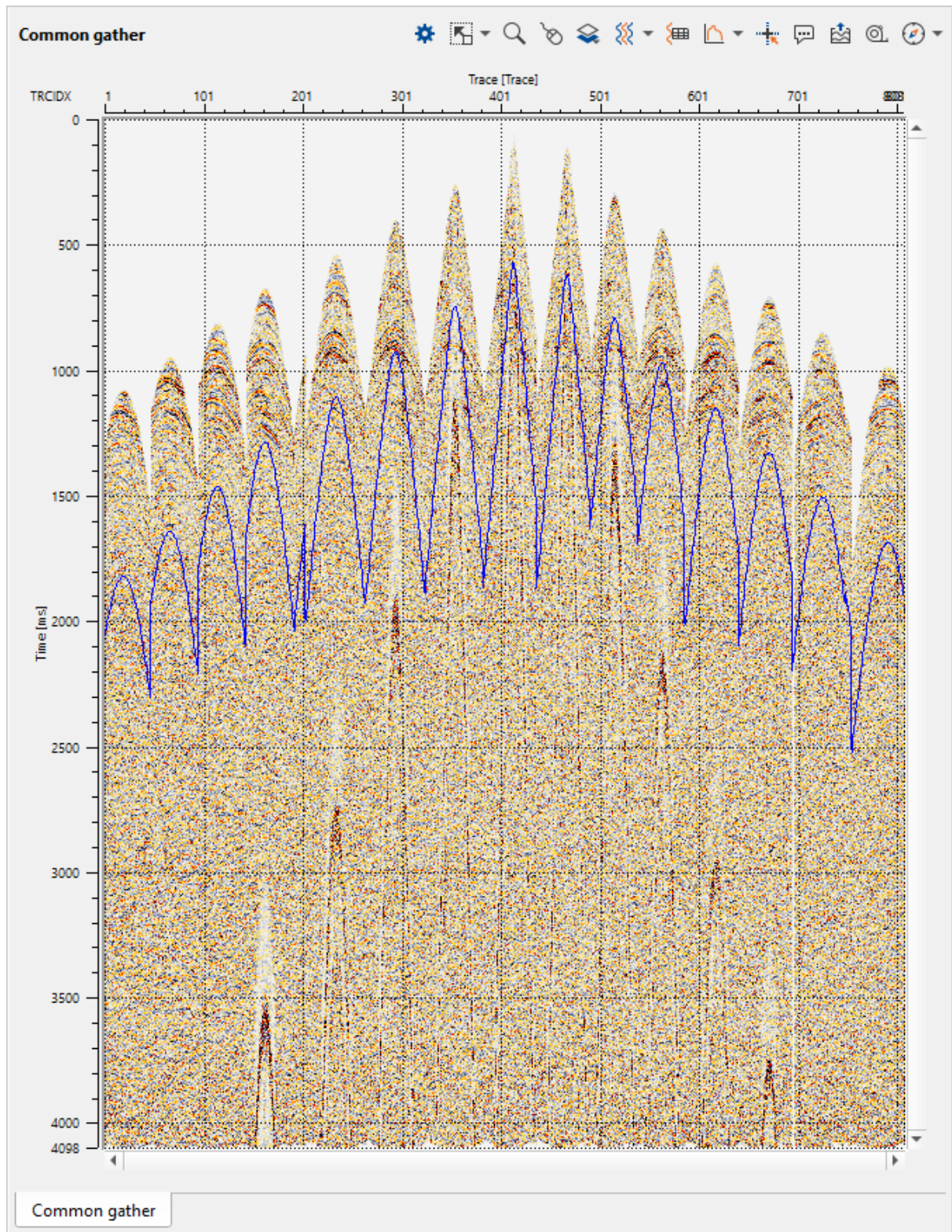
To quickly go through the gathers, the user should choose the desired Interval (By default 500 ms) and click the **Start** button. It will display one gather after another with an interval of 100 ms until the user interferes by means of **Stop/Pause**.

Similarly, the user can go to the Next or previous gather by clicking on the **Prev** and **Next** icons.

Following display will appear with the Velocity of 1500 m/s on the shot gather

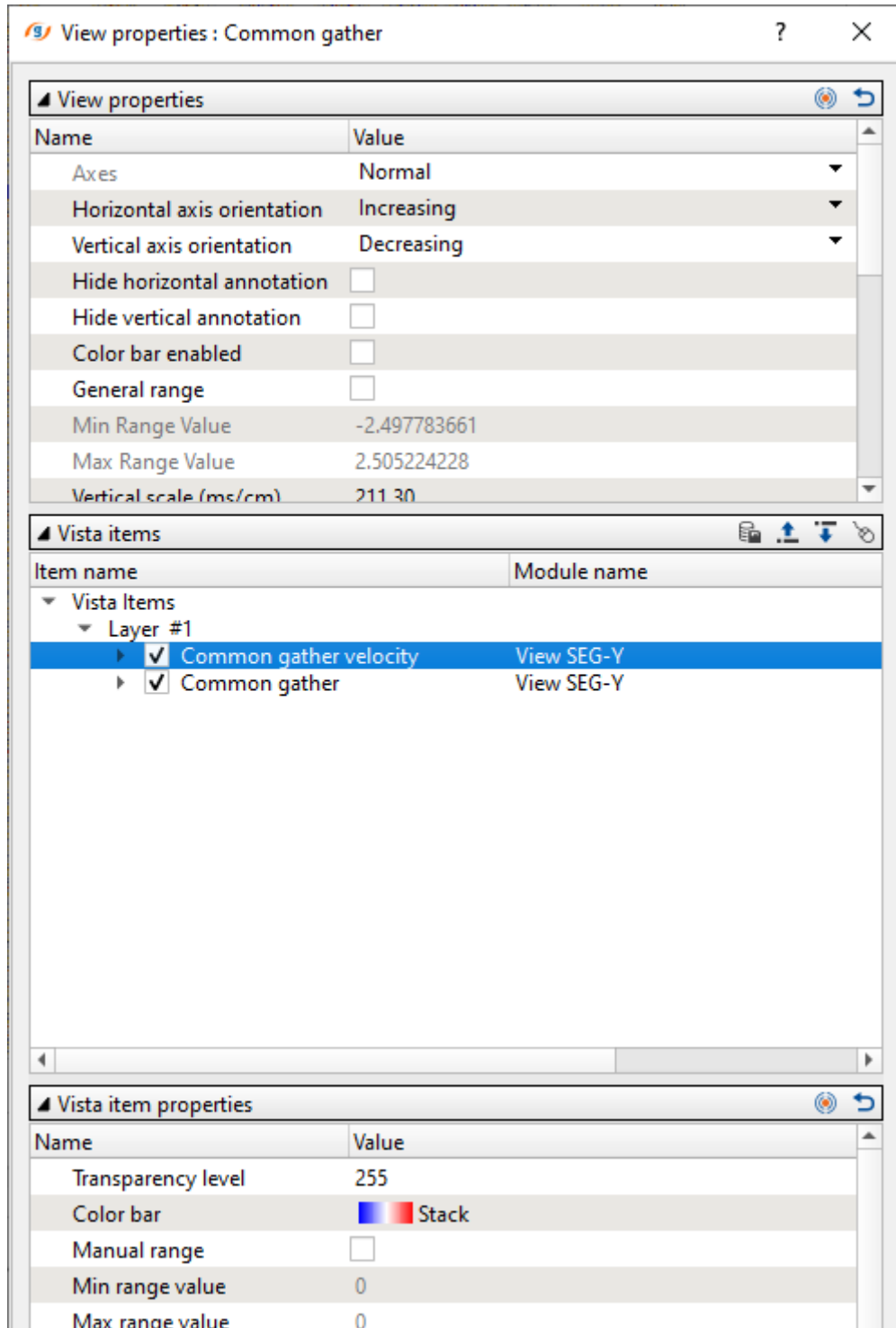


If we apply a 500ms of shift then the the velocity lines will be pushed down by 500ms as shown in below picture.

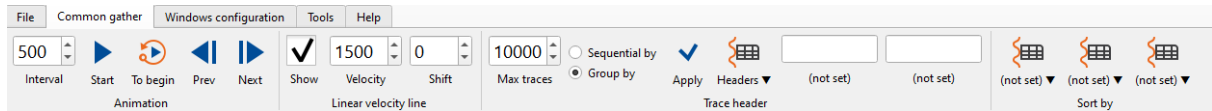


In case the velocity lines are not appearing on the Common gather, please click on the  (Show properties) of **Common gather vista** item and see the order of the vista items. It should

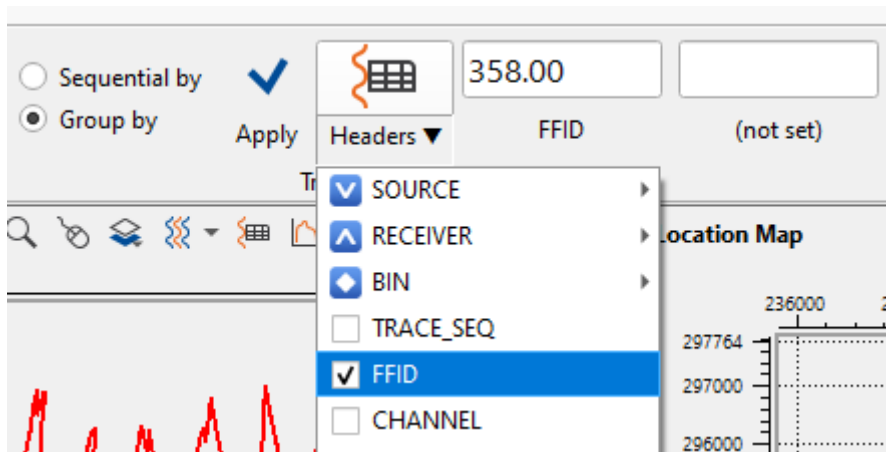
be like the one shown below i.e. Common gather velocity should be on the top of the Common gather display. If not then the user should change the order by clicking on the  Up or down button.

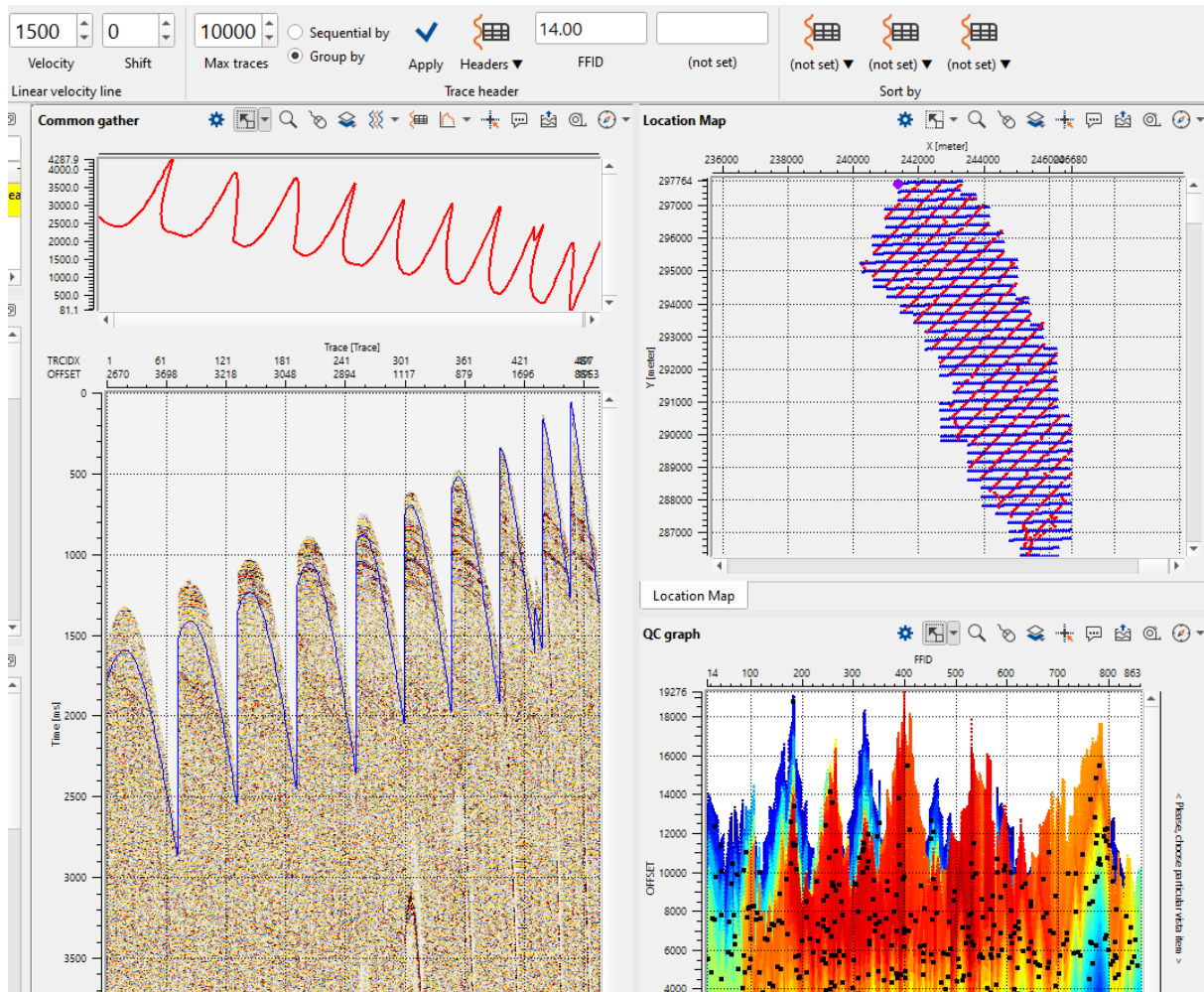


When the user launches the g-Viewer and loads the seismic files, by default the gather is sorted by sequential order. But if the user wants to sort the data in any order they should select the option **Group by**.

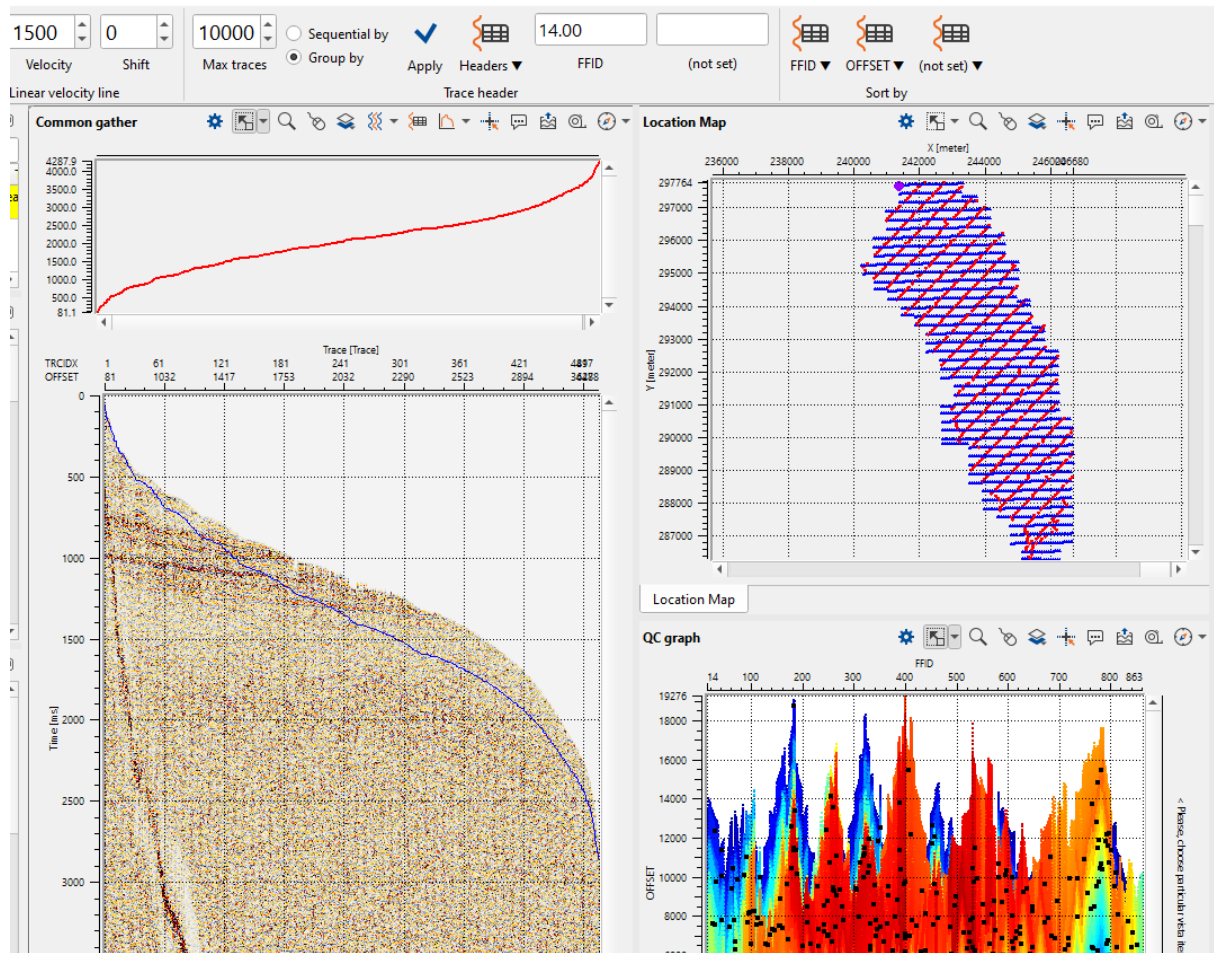


Now choose one of the headers from the drop down menu of the Headers icon  and click **Apply**.



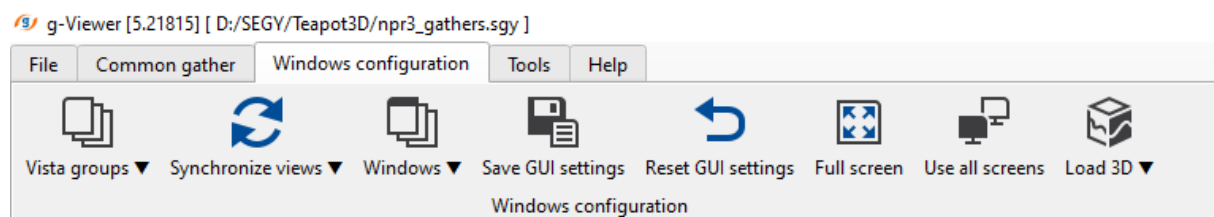


Similarly the user can select any trace header and select the desired gather whether a Source/Receiver/CMP gather. In the following image, we sorted the data by FFID and OFFSET. If we observe the Sort by section of the Common gather tab, we've selected FFID and OFFSET.



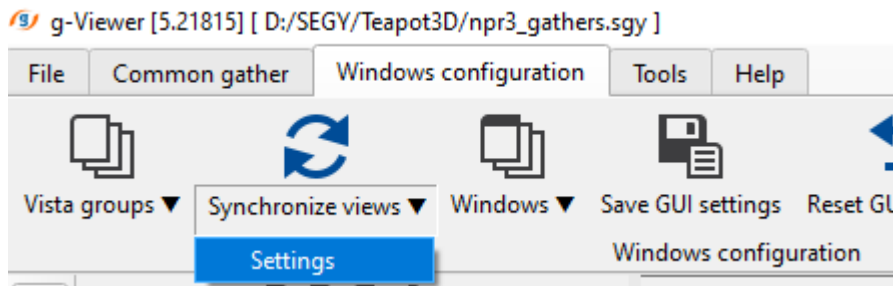
3.1.3 Windows configuration bar

In this section, the user has the options to display the [Vista group \(View\)](#)^[80], synchronizing the views etc.

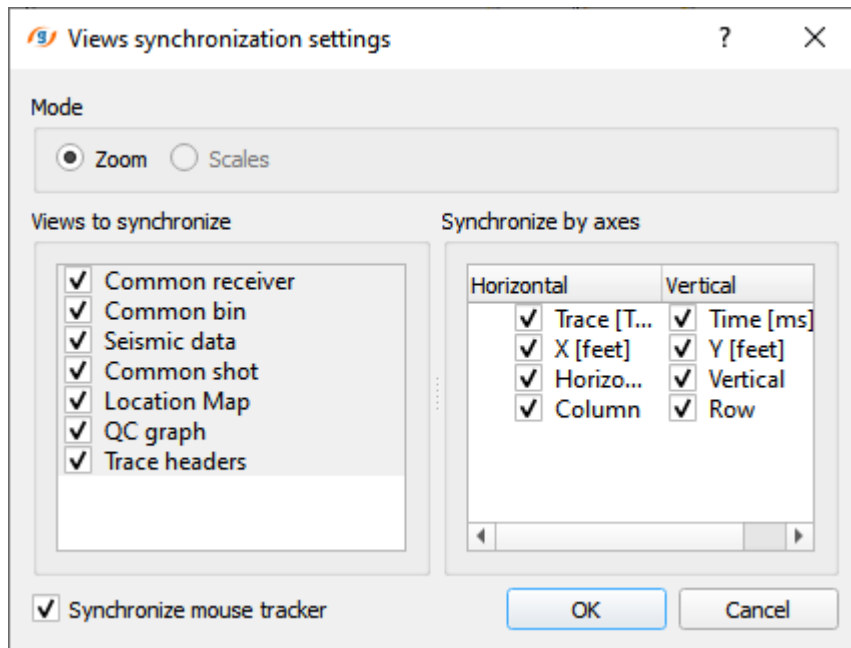


Vista groups : Vista groups and it's functionalities were discussed more in detail at the [Views](#)^[80] chapter

Synchronize views : To synchronize all the seismic views (for an example to zoom IN in seismic data window, the same zoom will be applicable on other seismic views like Common shot, Common receiver and Common bin). If user click on the Synchronize views, we have an option settings as shown below.

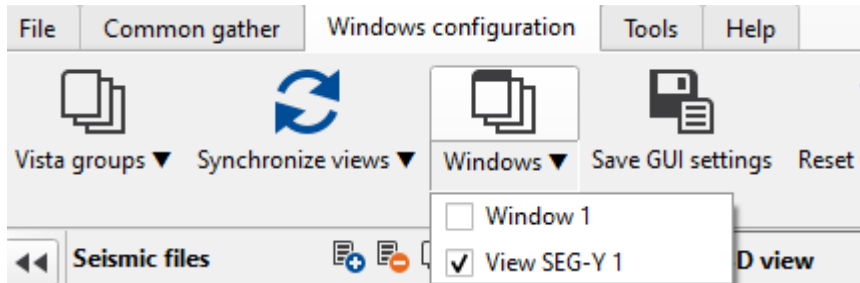


When we click on the Settings options, it will pop-up a window as shown below.



If we observe on the left hand side of the window, whatever the vista items are available for the module View SEG-Y are appearing and they all were synchronized both horizontally and vertically. However if the user wants to synchronize only few then they can un-check the others and keep only the desired ones. Same like on the right hand side, if the user wants to synchronize only the horizontal axis and not the vertical one of any vista item then they can simply uncheck the vertical axis.

Windows : This displays the number of windows present/added into the View Manager. And also we can able to see what is the current active window.

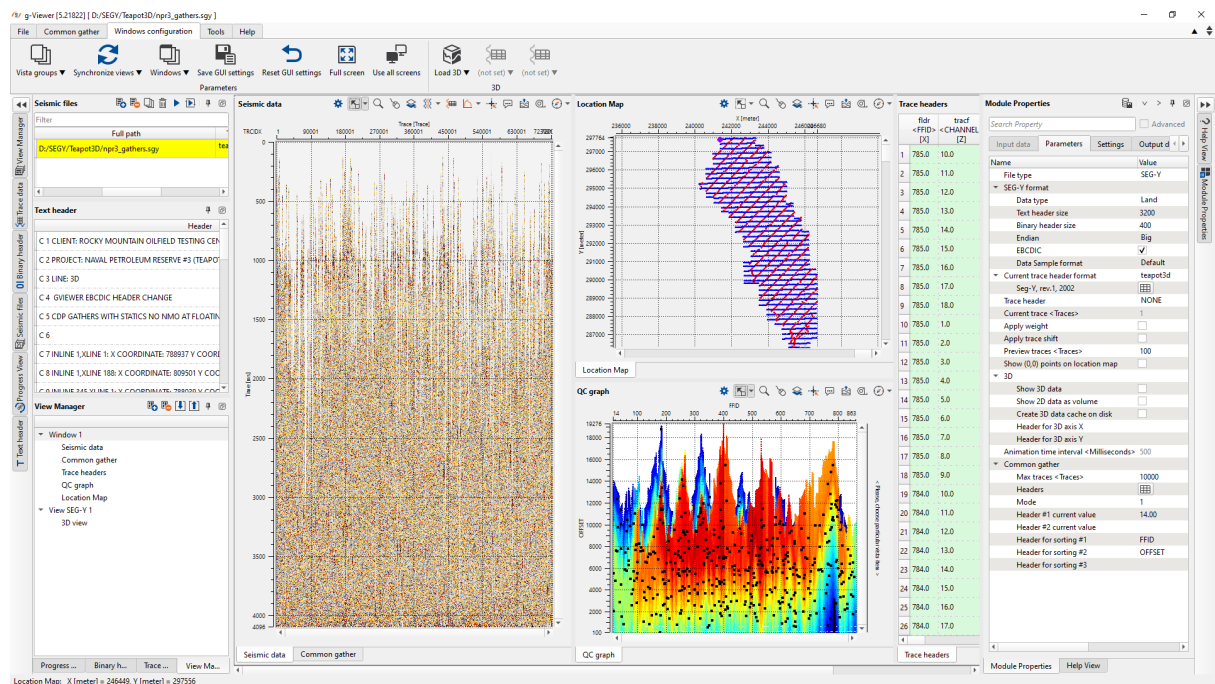


Save GUI Setting : This will save the the user preferred display settings. When the user launches the g-Viewer next time, the dispaly will remain the same as the previous session.

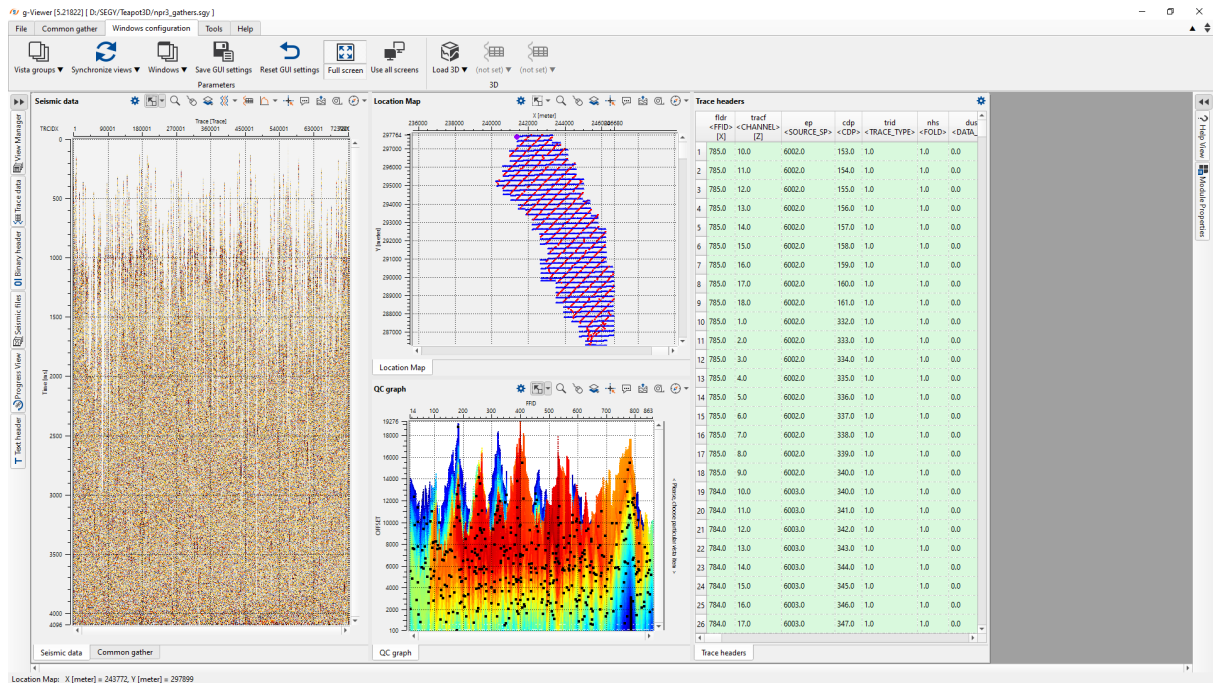
Reset GUI setting : At any given point of time if the user wants to bring back the default display settings then they can choose this option. Besides, this option is useful to display the velocity lines if the g-Viewer software(prior to 5.21238 versions) was previously installed and unable to see the velocity lines on the gather then the user should click on Reset GUI settings.

Full screen : This option collapses/expands the left and right hand side of the panels like the Seismic files, View Manager, Progress view, Module Manager etc. and gives more room for the actual seismic display.

Before clicking the Full screen, the display will be something like this..

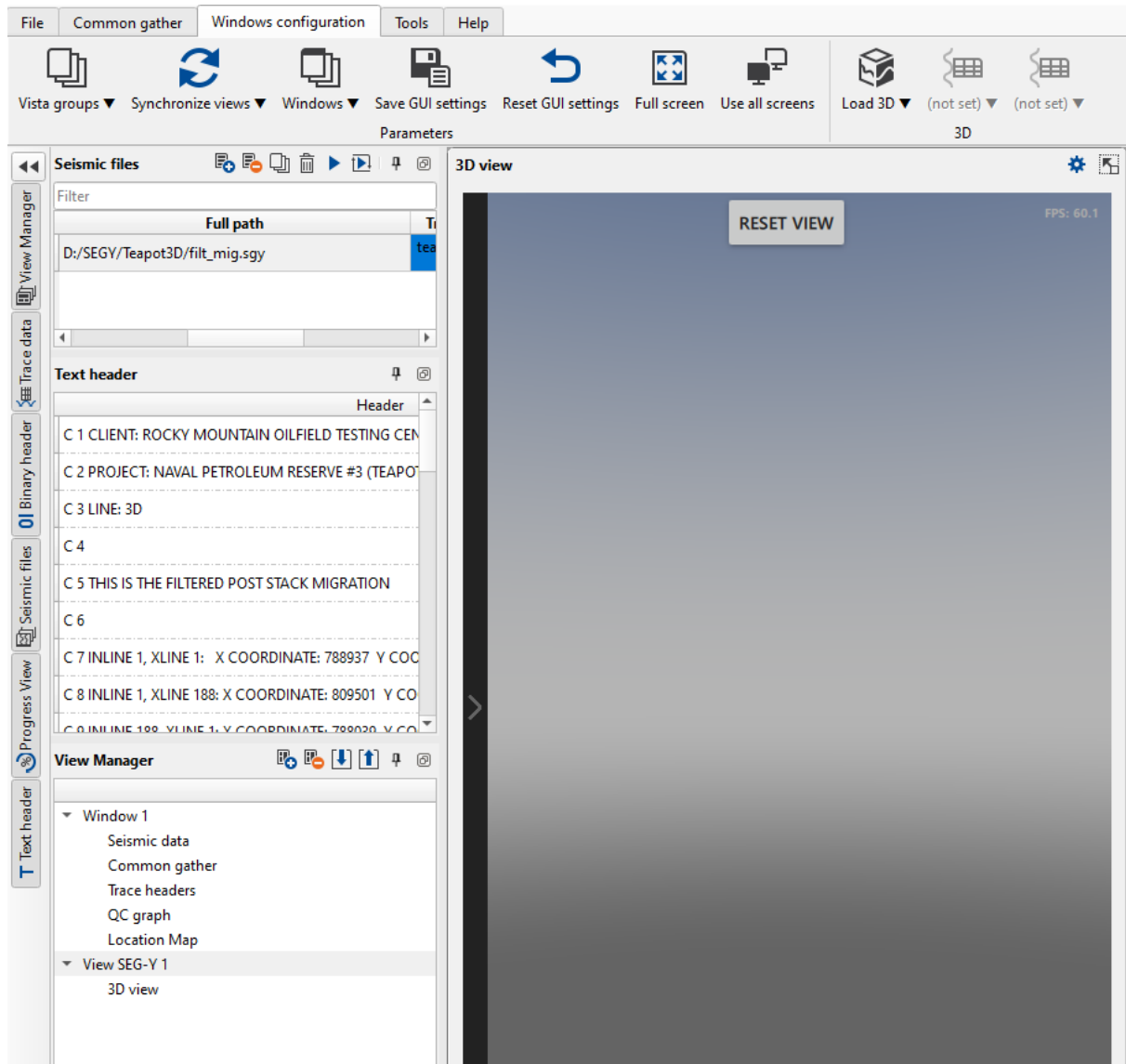


Once the user selects the **Full screen** option then the display will be like this

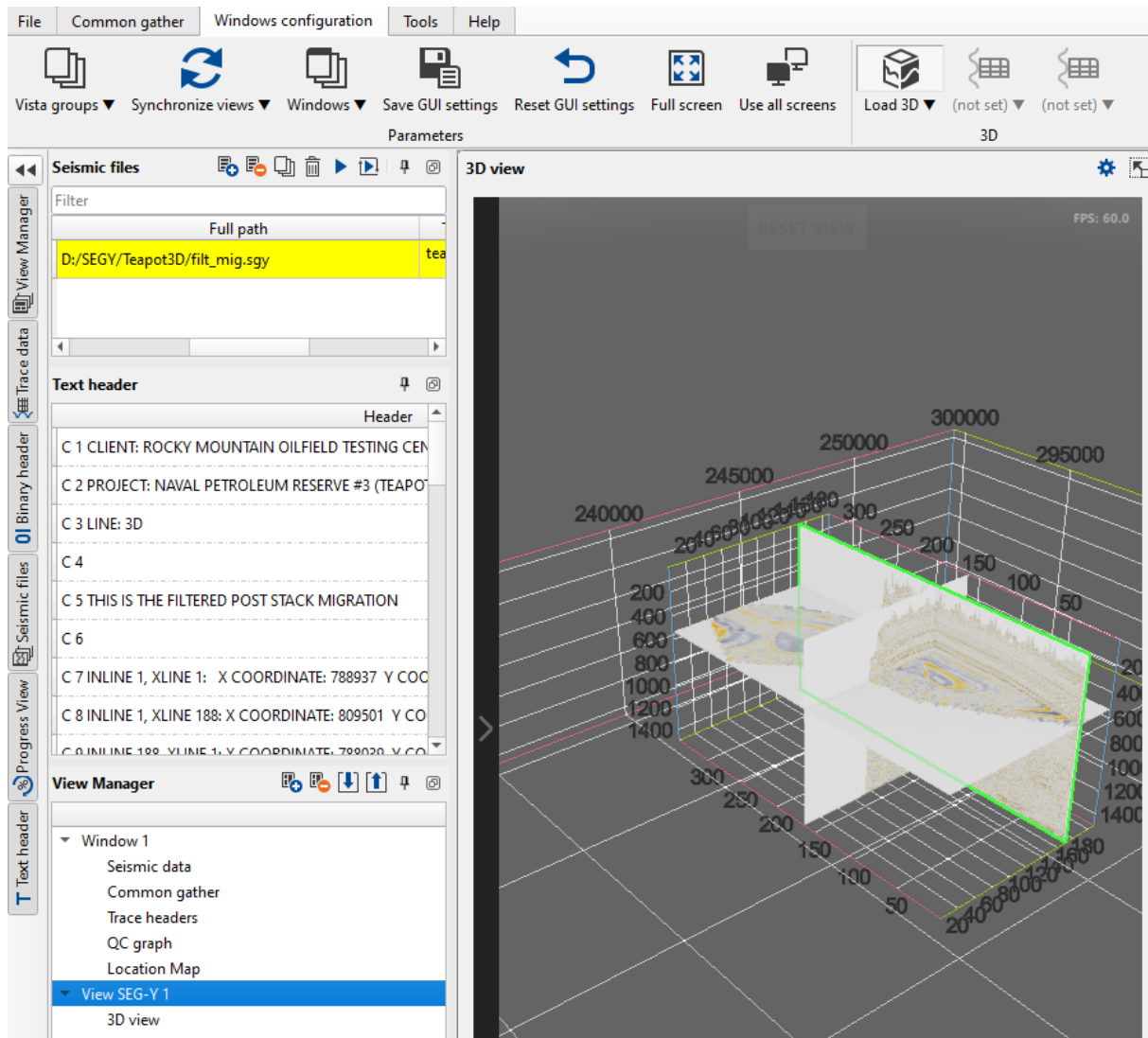


Use all screens : This is a very cool feature. If the user wants to expand the current display into multiple screens (2 or more), simply click on the **"Use all screens"** icon to distribute the display in all available screens. Cool, isn't it?

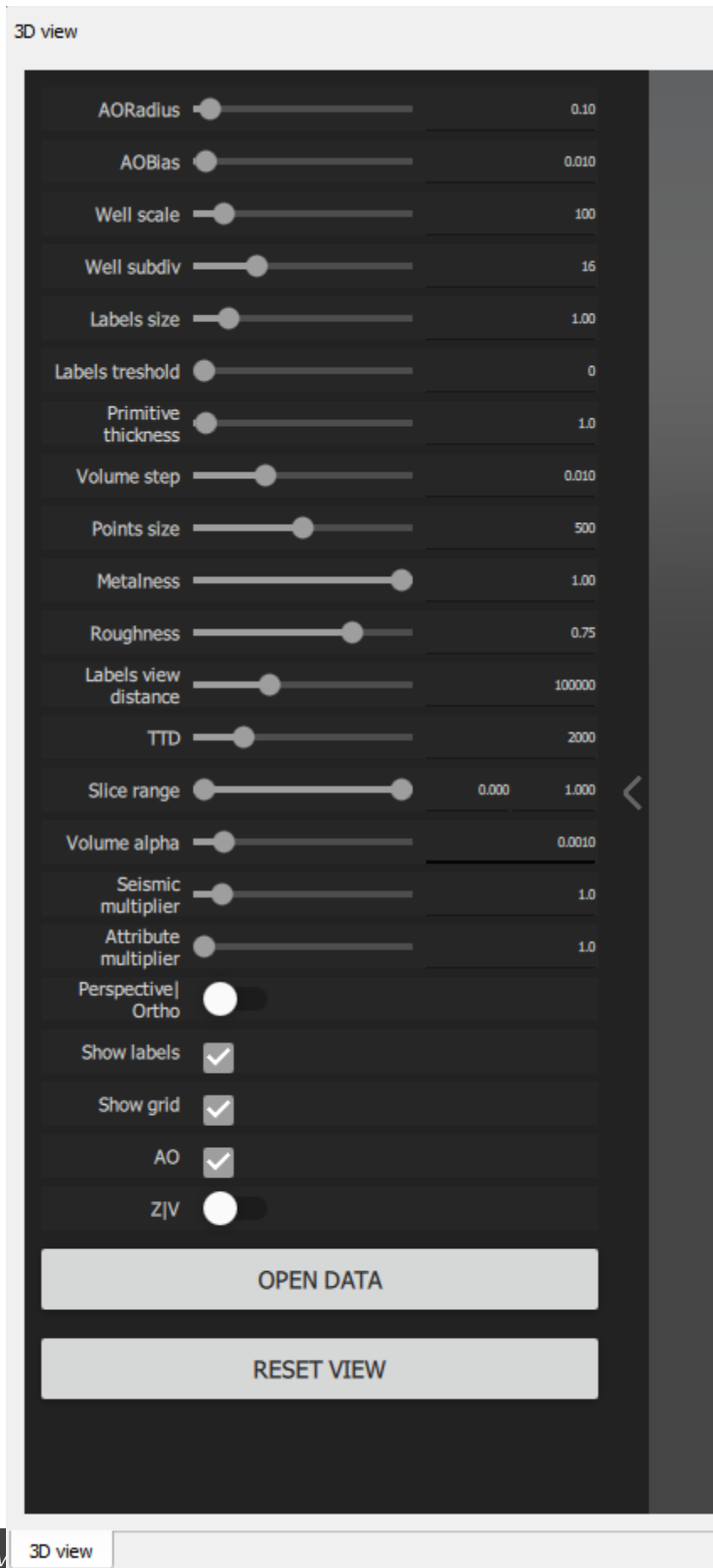
Load 3D : This icon is for visualizing 3D volumes/cubes. To display any 3D cube, user should load the 3D volume first and then select **Load 3D** option and select **Vista groups-> 3D view-> Add view or Add view in a new window** option. Initial display should look like this. When the user hover the cursor at the top middle part of the 3D view display, RESET VIEW will be visible.



Now click on the REST VIEW button to display the 3D volume according to it's geometry.



If, for any reason, the user is unable to see any visuals in the 3D view, they can click the ">" icon located on the left-hand side of the 3D view. This will expand a menu with several options. From there, select Reset View and then choose the Load 3D option again to restore the visuals.



3.1.4 Tools bar

In the **Tools** menu, we have



Options : It is useful in visualizing the data in different measurement systems and/or placing of the annotations at Top/Bottom of the Windows & Tabs.

Update binary headers : This option give us the ability to modify the binary headers of the seismic data.

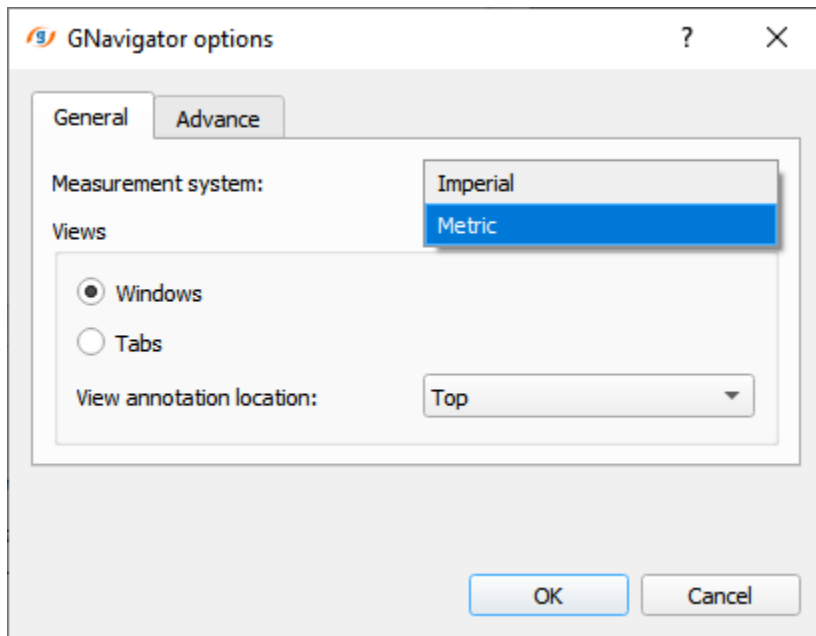
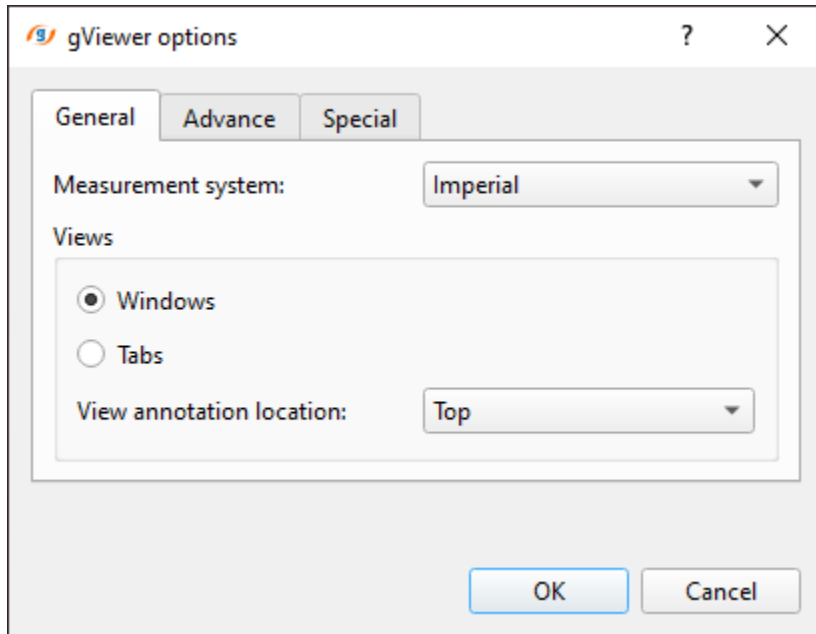
Update text header : With this option, the use can update the EBCDIC/Text header

Save Seg-Y : In this option, the user can export/save full or partial gather/stack/volume of the input data.

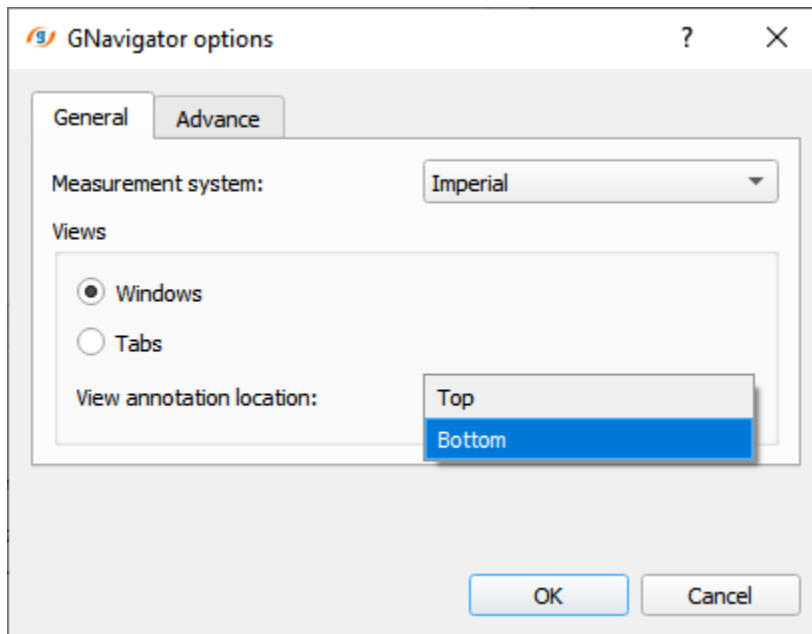
Save text header : This option is to export the EBCDIC/text headers

Save trace headers : In this option, the user can select the required trace headers and export/save them in **CSV** format

Options basically gives the user to change/choose the **Measurement system** from **Imperial** to **Metric** or vice versa. Please note that this is only a visualization tool and won't change the actual metrics of the measurement units.

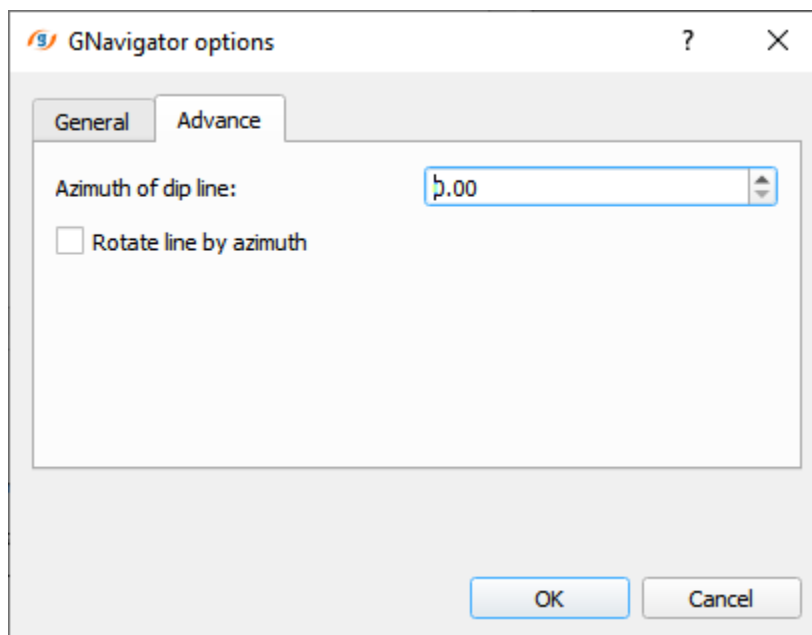


In Views section, by default Windows option is activated the View annotation location set as Top. This can be changed to bottom by simply clicking on the drop down menu to bring the options.

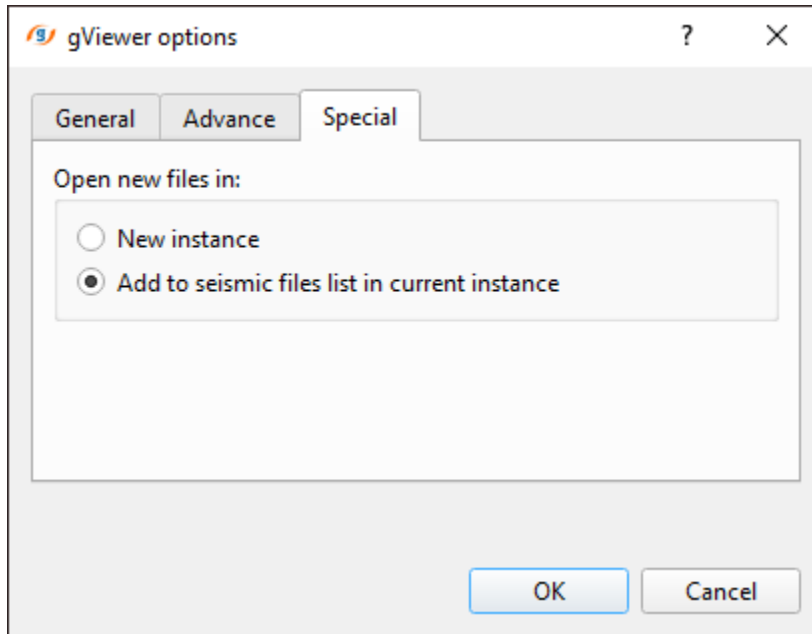


Similarly for Tabs also, the user can choose where to put the annotations i.e. at Top or Bottom.

In the **Advance** tab option, we have



Likewise, in Special section we have two options as shown below.

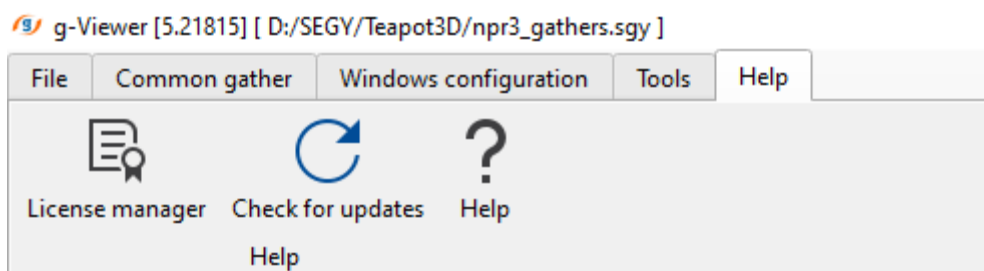


If the user selects the option New instance that means a new seismic instance will be created and the files will be added to that instance

Add to seismic files list in current instance (By default). This means, whenever the user adds new seismic files they will add to the existing instance.

3.1.5 Help bar

Under the **Help** menu, we have the following options:



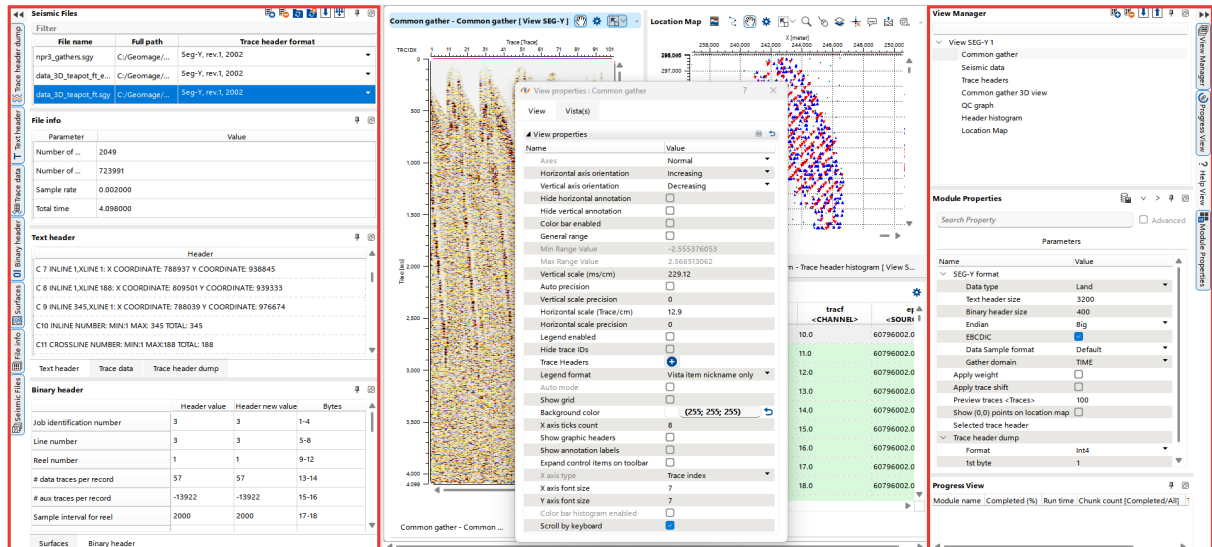
License manager : This is where the user can able to request and update the license file. More in details discussed at [Licensing](#) ¹³.

Check for updates : User can able to update the g-Viewer without downloading/uninstalling previous version to the latest version by clicking this option. This will connect to the Geomage software repository and if there is an updated version then it will automatically updates the current version.

Help : This will open up the **g-Viewer** help documentation.

3.2 Panels

In this chapter you will get the general introduction to panels in g-Viewer



Panels are positioned along the left and right edges of the g-Viewer interface and are grouped into panel sets.

By default:

- Left side: Contains the [Seismic Files](#)^[41], [File Info](#)^[43], [Trace Data](#)^[45], [Text Header](#)^[44], [Trace Header Dump](#)^[50], [Surfaces](#)^[54], and [Binary Header](#)^[60] panels.
- Right side: Hosts the [View Manager](#)^[62], [Module Properties](#)^[63], and [Progress View](#)^[64] panels.

Additionally, there is a dynamic panel, called [View properties](#)^[64], which can be moved and docked anywhere in the interface according to user preference.

3.2.1 Seismic files

In this **panel**, users can add as many seismic files as needed. There are several ways to add files to the **Seismic Files** panel:

1. Using the Plus Button:

The most straightforward method is to click the **plus button** and select the seismic files to add. Once files are added, their contents will begin to load. The loading progress can be tracked in the [Progress View](#)^[64] panel. Loaded contents include **Trace Data**, **Text Header**, **Binary Header**, **Trace Header Information**, and the **Location Map**.

Seismic Files

Filter

File name	Full path	Trace header format
npr3_gathers.sgy	C:/Geomage/demo_project_full_data/3d/...	Seg-Y, rev.1, 2002
data_3D_teapot_ft_envelope.sgy	C:/Geomage/demo_project_full_data/3d/...	Seg-Y, rev.1, 2002
data_3D_teapot_ft.sgy	C:/Geomage/demo_project_full_data/3d/...	Seg-Y, rev.1, 2002

2. Drag-and-Drop Method:

Users can simply drag and drop a SEGY file into the Seismic Files panel. It may take some time for the contents to fully load depending on the data size.

The Seismic Files panel displays key information such as **File Name**, **Full Path**, and **Trace Header Format**. If users prefer to display only the file name, they can right-click within the panel and uncheck the other fields to hide them.

When a SEGY file is loaded into g-Viewer, it initially loads only partial header information. To load all header details:

- Select the file and click the **Play button**
- To fully load all lines, use the **Fast Forward button**

Seismic Files

Filter

File name	Full path	Trace header format
npr3_gathers.sgy	C:/Geomage/demo_project_full_data/3d/...	Seg-Y, rev.1, 2002
data_3D_teapot_ft_envelope.sgy	C:/Geomage/demo_project_full_data/3d/...	Seg-Y, rev.1, 2002
data_3D_teapot_ft.sgy	C:/Geomage/demo_project_full_data/3d/...	rev.1, 2002

+ Copy



Add file(s): Allows the user to manually add seismic SEGY files to the Seismic Files panel. Clicking this button opens a file browser for selecting files from the local computer.



Delete file(s): Removes the selected seismic files from the Seismic Files panel. This action does not delete the actual file from the user's computer, only its reference in the panel.



Sync folder: Links a specific folder on the user's PC to the Seismic Files panel. If new seismic files are added to this folder on the PC, they are automatically loaded into the Seismic Files panel.

Note

This feature is particularly useful for projects where files are being continuously generated or updated in a shared folder, saving time on manual imports.



Unsync folder: Unlinks the previously synced folder from the Seismic Files panel. New files added to the folder will no longer be automatically loaded into the panel.



Load trace headers for selected file(s): Loads trace header information for the files selected in the Seismic Files panel.



Load trace headers for all files: Loads the complete trace header information for all seismic files in the panel.

3.2.2 File Info

The **File Info** panel provides a quick overview of key parameters for the loaded seismic dataset. It contains the following information:

1. **Number of Samples:** Displays the total number of samples per trace in the seismic file.
2. **Number of Traces:** Indicates the total count of traces in the dataset.
3. **Sample Rate:** Specifies the time/depth interval between successive samples in each trace.
4. **Total Time:** Represents the total recording time or the total depth for each trace, calculated as the product of the number of samples and the sample rate.

File info	
Parameter	Value
Number of samples	751
Number of traces	64860
Sample rate	0.004000
Total time	3.004000

3.2.3 Text Header

The **Text Header Panel** displays the metadata and processing history from the seismic data file's SEG-Y text header. It provides valuable details about the project, survey geometry, and data processing steps. This panel is essential for understanding the context of the seismic dataset and verifying the accuracy of its associated metadata.

For users who need to modify the text header, an explanation is provided in the [Features](#)¹⁵² chapter under [Text Header Editing](#)¹⁵³.

Text header	
Header	
C 1 CLIENT: ROCKY MOUNTAIN OILFIELD TESTING CENTER	
C 2 PROJECT: NAVAL PETROLEUM RESERVE #3 (TEAPOT DOME); NATRONA COUNTY,WYOMING	
C 3 LINE: 3D	
C 4	
C 5 CDP GATHERS WITH STATICS NO NMO AT FLOATING DATUM	
C 6	
C 7 INLINE 1,XLINE 1: X COORDINATE: 788937 Y COORDINATE: 938845	
C 8 INLINE 1,XLINE 188: X COORDINATE: 809501 Y COORDINATE: 939333	
C 9 INLINE 345,XLINE 1: X COORDINATE: 788039 Y COORDINATE: 976674	
C10 INLINE NUMBER: MIN:1 MAX: 345 TOTAL: 345	
C11 CROSSLINE NUMBER: MIN:1 MAX:188 TOTAL: 188	
C12 TOTAL NUMBER OF CDPS: 64860 (33594 LIVE) BIN DIMENSION: 110' X 110'	
C13 DATUM 5500' VR 9500 FPS	
C14	
C15	
C16 GENERAL SEG Y INFORMATION	
C17 OUTPUT DATA LENGTH (MS): 4096.00 SAMPLE INTERVAL (MS): 2.00	
C18 DATA FORMAT: 4 BYTE IBM FLOATING POINT	

3.2.4 Trace data

The **Trace Data Panel** is a powerful and versatile tool for accessing and editing trace header information. This window provides comprehensive details about all trace headers, including their format type, starting byte location, values, ranges, histograms, and an expression column for modifying trace header values.

Trace data

Filter

Field	ItemType	StartByte	Value	Ranges	Histogram	Expression
FFID	Int4	9	699.000	[60.000; 857.000]		
CHANNEL	Int4	13	37.000	[10.000; 918.000]		
SOURCE_SP	Int4	17	60986048.000	[60196139.000; ...]		
CDP	Int4	21	10310.000	[153.000; ...]		
TRACE_TYPE	Int2	29	1.000	[1.000; 1.000]		
FOLD	Int2	33	1.000	[1.000; 1.000]		
DATA_USE	Int2	35	0.000	[0.000; 0.000]		
OFFSET	Int4	37	3172.968000	[170.993; 4499.458]		
RECEIVER_ELEV	Int4	41	1709.989000	[1504.645; ...]		
SOURCE_ELEV	Int4	45	1613.794000	[1507.754; ...]		
SOURCE_DEPTH	Int4	49	0.000000	[0.000; 0.000]		
RECEIVER_DATUM	Int4	53	0.000000	[0.000; 0.000]		
SOURCE_DATUM	Int4	57	0.000000	[0.000; 0.000]		
SOURCE_WDEPTH	Int4	61	0.000000	[0.000; 0.000]		
RECEIVER_WDEPTH	Int4	65	0.000000	[0.000; 0.000]		
SCAL_ELEV	Int2	69	0.000	[0.000; 0.000]		

Key Features of the Trace Data Panel

1. Field Column

Displays the name of the trace header, such as **FFID**, **CHANNEL**, **CDP**, etc.

2. Item Type Column

Indicates the data type of each trace header (e.g., Int4 for 4-byte integers or Int2 for 2-byte integers). Knowing the format is essential for accurate data manipulation.

3. Start Byte Column

Shows the starting byte location of the trace header in the SEG-Y file. This information is critical for mapping header values to their physical location in the file.

4. Value Column

Displays the current value of the selected trace header. For example, the value of the **OFFSET** trace header might be 3172.968000, indicating the distance between the source and receiver in meters.

5. Ranges Column

Provides the minimum and maximum values for each trace header across the dataset. For instance, the **FFID** (field file identifier) range might be [60.000; 999.000]. This helps users quickly identify variability or anomalies in their data.

6. Histogram Column

Visualizes the distribution of trace header values across the dataset. This column is particularly helpful for spotting patterns, trends, or outliers in your data. For example, a histogram for the

OFFSET field might reveal a bell-shaped distribution, indicating a uniform spread of offset values.

7. Expression Column

Allows users to input custom expressions to modify trace header values. For example, to convert coordinates from meters to feet for **Source_X** and **Source_Y**, users can enter the following expression:

Int4(73) * 3.28084

- **Int4**: Specifies the data type of the trace header.
- **73**: Denotes the starting byte location of the trace header.
- *****: Represents the multiplication operator.
- **3.28084**: Conversion factor from meters to feet.

Modifying Trace Header Values

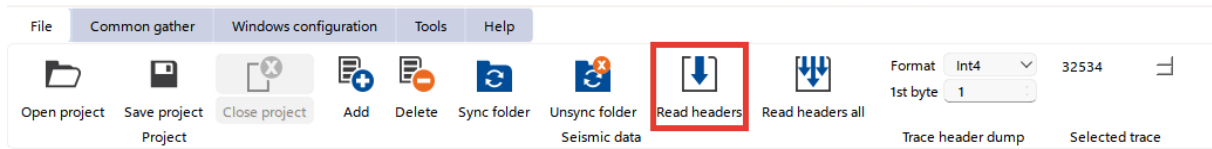
1. Enter Expressions

Input the desired formula in the **Expression** column for the target trace header(s). For example, to multiply all offset values by 1.5, you can input `Int4(37) * 1.5`.

Trace data						
Filter						
Field	ItemType	StartByte	Value	Ranges	Histogram	Expression
RECEIVER_WDEPTH	Int4	65	0.000000	[0.000; 0.000]		
SCAL_ELEV	Int2	69	0.000	[0.000; 0.000]		
SCAL_COORD	Int2	71	0.000	[0.000; 0.000]		
SOURCE_X	Int4	73	808983.151000	[791134.025; ...]		Int4(73) * 3.28084
SOURCE_Y	Int4	77	808983.151000	[791134.025; ...]		Int4(73) * 3.28084
RECEIVER_X	Int4	81	808983.151000	[791134.025; ...]		Int4(73) * 3.28084
RECEIVER_Y	Int4	85	808983.151000	[791134.025; ...]		Int4(73) * 3.28084
COORD_UNIT	Int2	89	0.000	[0.000; 0.000]		
SOURCE_UPHOLE	Int2	95	0.000000	[0.000; 0.000]		
RECEIVER_UPHOLE	Int2	97	0.000000	[0.000; 0.000]		
SOURCE_STATIC	Int2	99	0.000	[0.000; 0.000]		
RECEIVER_STATIC	Int2	101	0.000	[0.000; 0.000]		
TIME_DELAY	Int2	109	0.000	[0.000; 0.000]		
SAMPLE_NB	UInt2	115	0.000	[0.000; 0.000]		
SAMPLE_INTERVAL	UInt2	117	0.000	[0.000; 0.000]		
TRACE_WEIGHT	Int2	169	0.000	[0.000; 0.000]		

2. Apply Changes

After entering the expressions, click on **Read Headers** to update the trace header values in the panel.



After modifying trace headers using the **Trace Data Panel**, you can apply the changes to the current SEG-Y file by following these steps:

1. Navigate to the Tools Menu

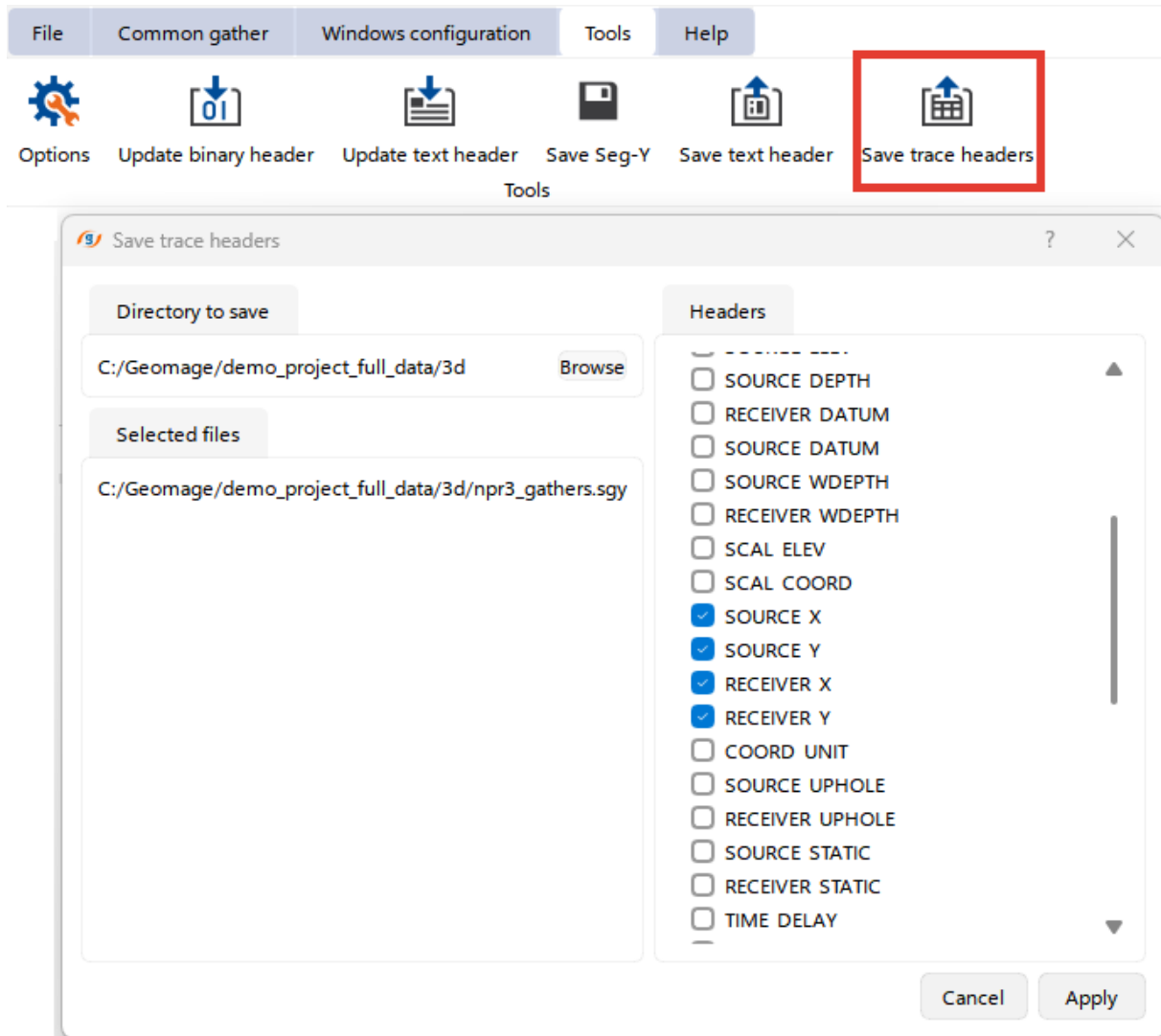
Go to the **Tools** menu and select **Save Trace Header**.

2. Select Headers to Modify

In the dialog that appears, choose the specific trace headers you want to apply changes to. This ensures that only the selected headers are updated in the current SEG-Y file.

3. Apply Changes

Once the desired headers are selected, click **Apply**. This action will update the current SEG-Y file with the modified trace header values.



To save the modified trace headers as a new SEG-Y file:

1. Navigate to the Tools Menu

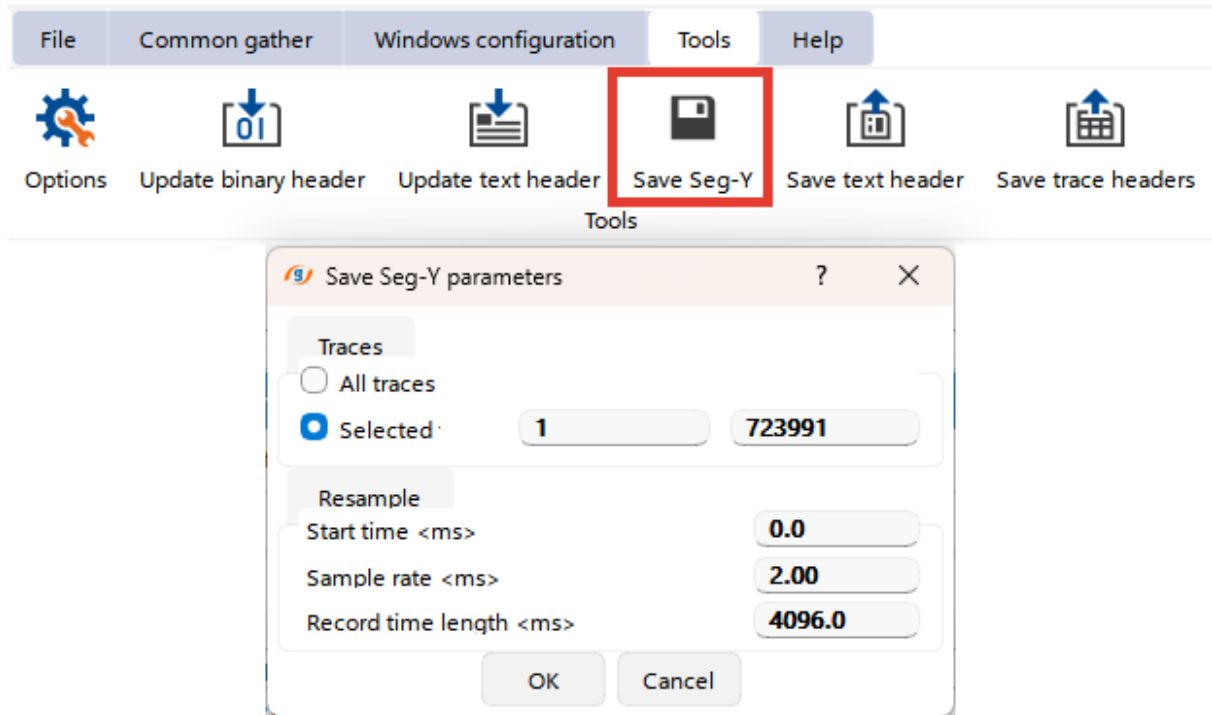
Go to the **Tools** menu and select **Save Seg-Y**

2. A pop-up window will appear, allowing you to:

- Save all traces or only selected traces.
- Resample the data if required.

3. Choose the appropriate options and click OK.

4. In the next pop-up window, specify the file name with the .sgy or .seggy extension and click **Save**.



If there are issues with the expressions or incompatible data formats, the system will notify the user. Ensure all formulas match the trace header's data type for successful updates.

3.2.5 Trace header dump

The **Trace Header Dump** panel is a valuable tool for identifying trace header information, particularly when the byte locations of the input are unknown. It allows the user to scan the data and retrieve the corresponding values at specific byte locations, providing an efficient way to analyze SEG-Y trace headers.

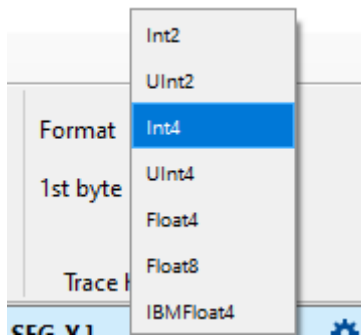
Features of the Trace Header Dump Panel

1. Bytes Column

This column displays the byte locations within the trace headers. Each row corresponds to a specific byte or byte range that contains trace header information. By selecting a starting byte, users can investigate the relevant data.

2. Values Column

This column shows the values at the selected byte locations. The values are interpreted based on the selected format type (e.g., Int4, Int2, Float, etc.). This provides insight into what each byte represents in the trace header.



Begin by selecting the appropriate format type from the dropdown menu (e.g., Int4, Int2, Float). The default format is **Int4**.

Trace header dump  

Filter

Bytes	Value
1-4	777347
5-8	32534
9-12	755
13-16	294
17-20	60916018
21-24	9921
25-28	0
29-32	65536
33-36	65536
37-40	7199
41-44	53308999
45-48	53573999
49-52	0
53-56	0
57-60	0
61-64	0
65-68	0
69-72	-655295464
73-76	807596875
77-80	942934875
81-84	801669188

Read headers Read headers all

Format Int4 32534

1st byte 2

Trace header dump Selected trace

Trace header dump

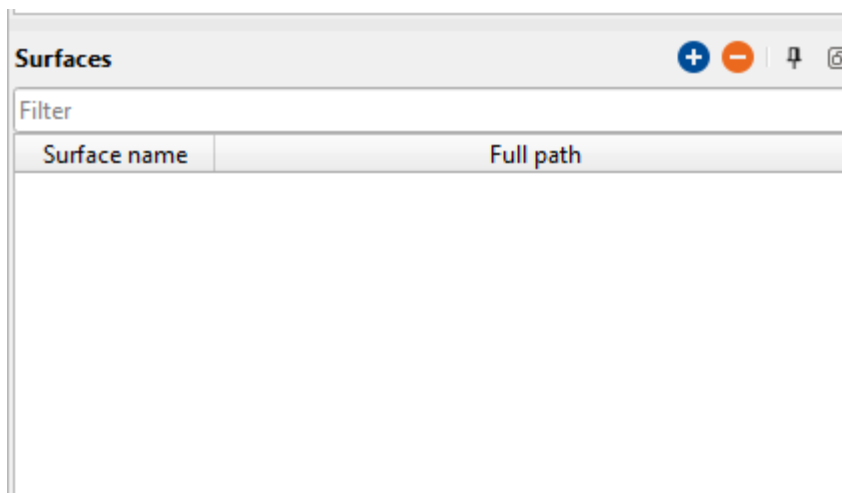
Filter

Bytes	Value
2-5	199000832
6-9	8328704
10-13	193280
14-17	75267
18-21	-1585368576
22-25	2539776
26-29	0
30-33	16777216
34-37	16777216
38-41	1842947
42-45	762201859
46-49	830041856
50-53	0
54-57	0
58-61	0
62-65	0
66-69	216
70-73	-251914192
74-77	586369848
78-81	873159471

3.2.6 Surfaces

Surfaces:

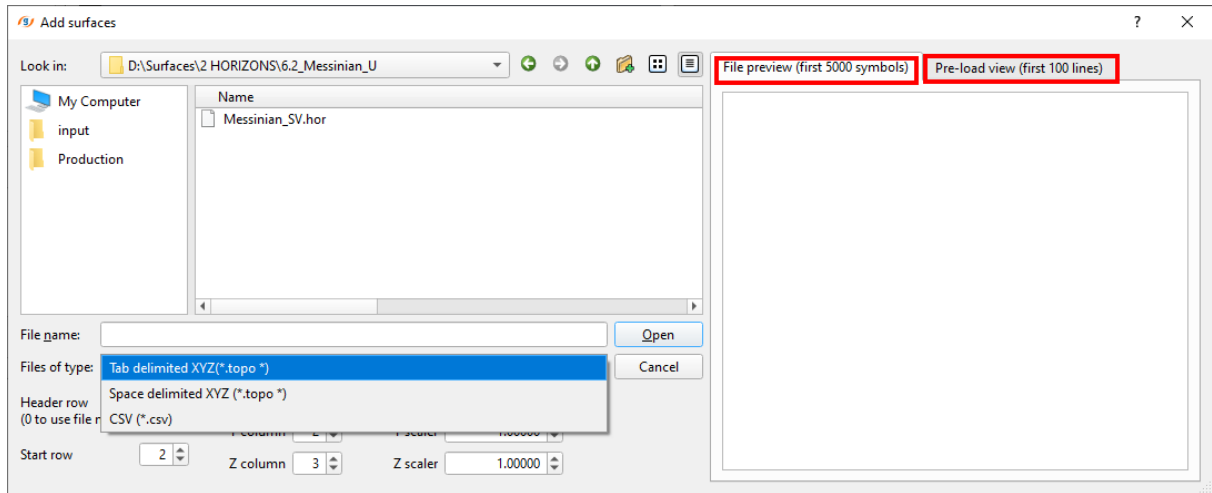
Under this panel, the user can add the surfaces.



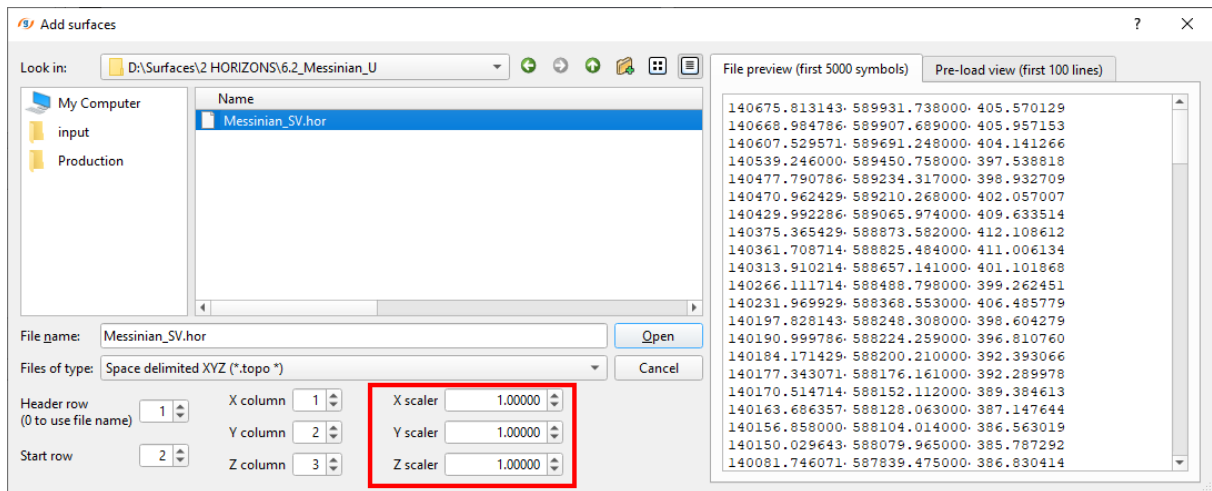
There are three types of surfaces (file format types) **g-Viewer** accepts. They are

1. **Tab delimited XYZ (By default option)**
2. **Space delimited**
3. **CSV**

To add any surfaces, the user should go to **Surfaces** panel and click on the  icon. A new window will pop-up as shown below.

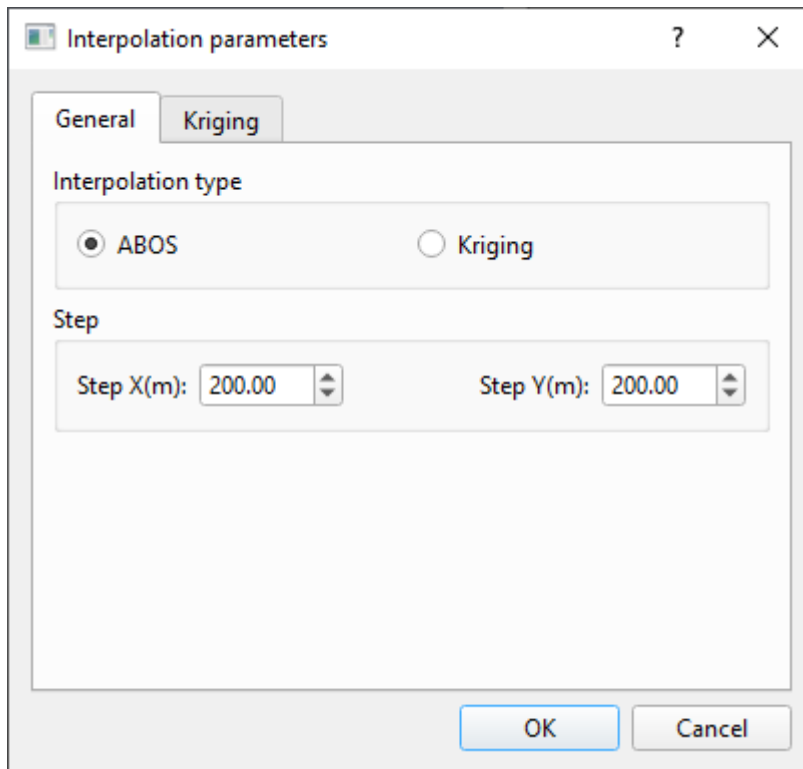


Prior to browse the file name, the user should select the **Files of type** from the drop down menu. If it is a wrong format, usually the user can't able to see the **File Preview** which is next to it. Also the user can able to see **Pre-load view** of the selected file.

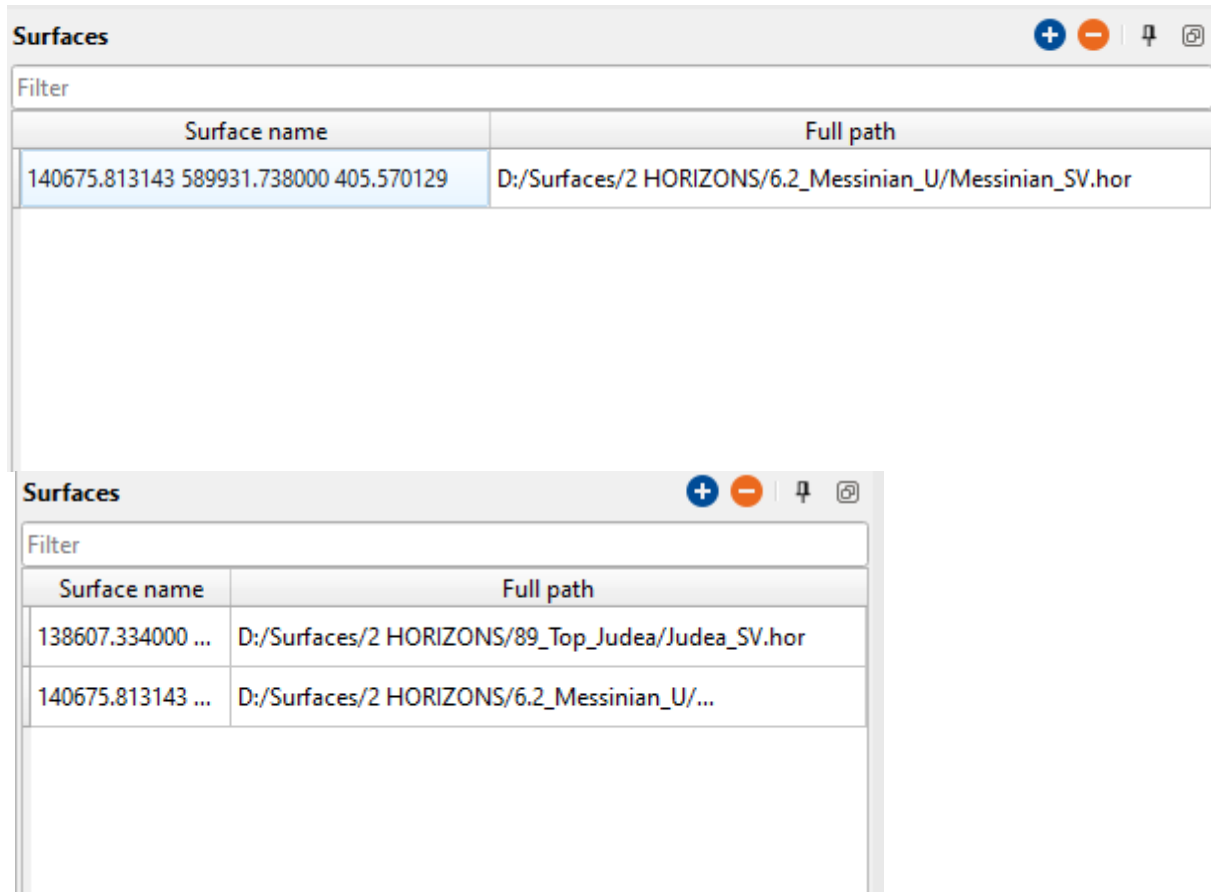


At the bottom of the Files of type, we can observe the **X,Y & Z scaler**. User should pay attention to this and adjust their scalars according the actual seismic.

Once the user click on **Open**, it will pop-up with a new window for interpolation parameters.

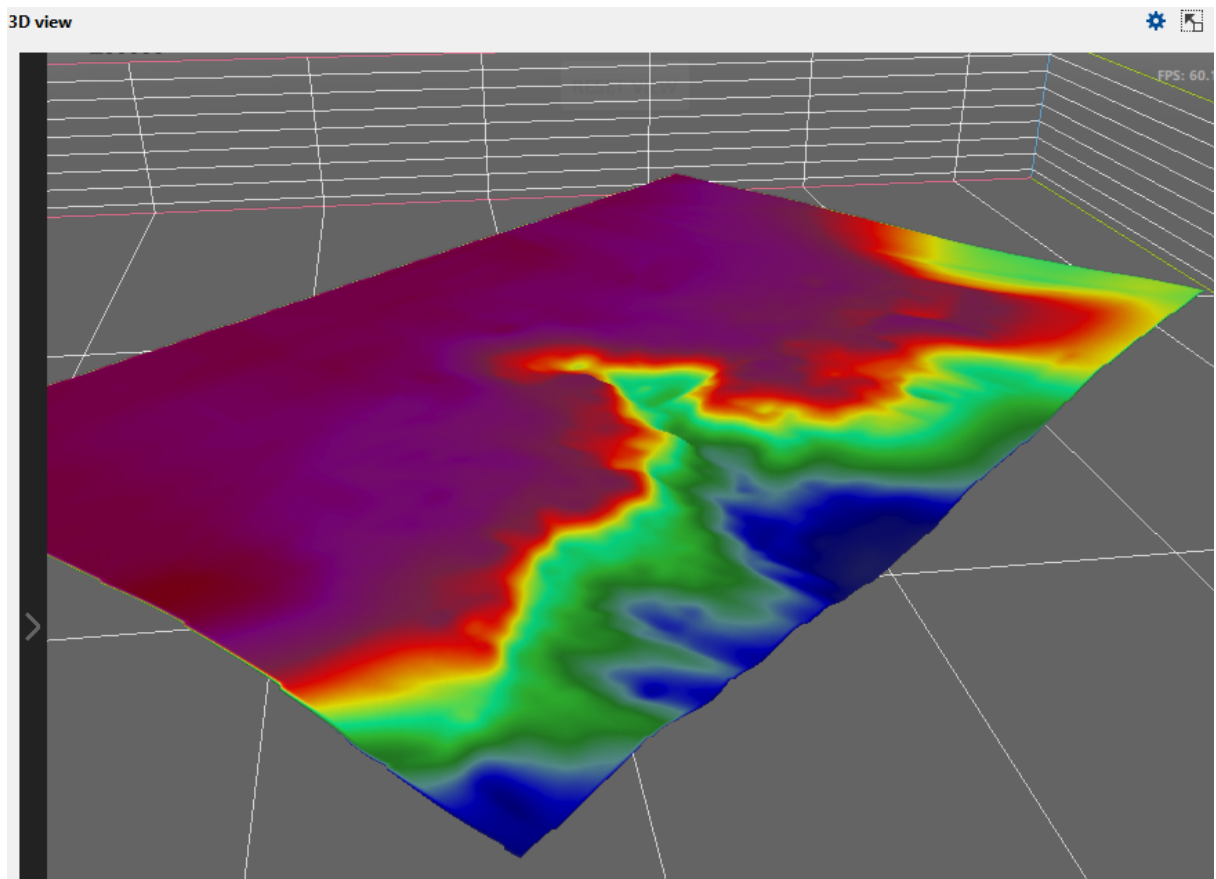


Click **OK**. Now if we look at the Surfaces panel, we can see the the surface name and it's full path as shown below.

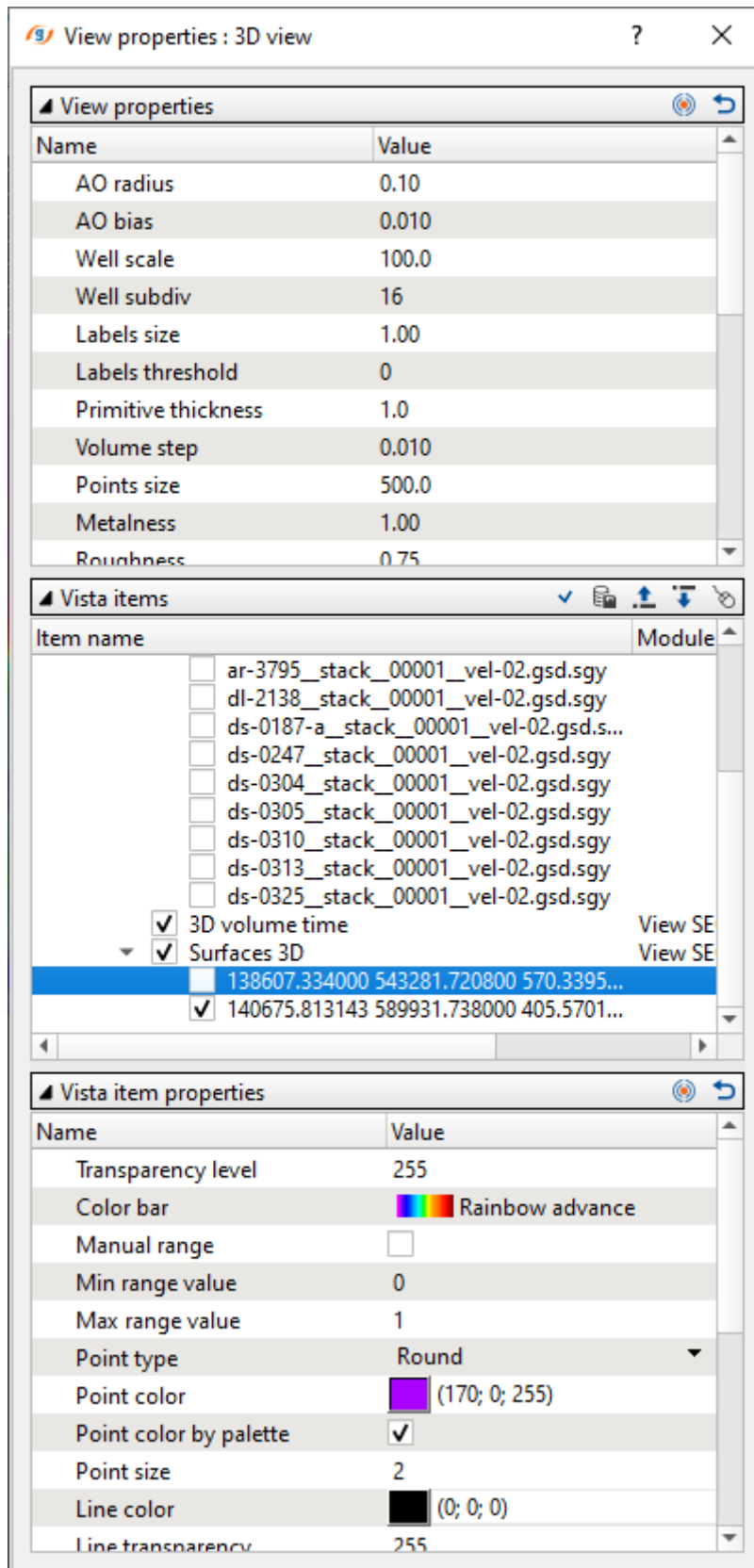


Similarly, the user can add as many surfaces as they can.

Now click on **Load 3D** icon and **RESET VIEW** in case the map is not fit. In case the surfaces are not displaying properly, better check with the scalar and put the right scalar value.



To change the display settings or to select a particular surface, the user can click on the  icon on the **3D view** window. It will open a **View properties** window. Here the user have the options to enable/disable seismic display, surfaces etc.



3.2.7 Binary header

Binary header:

Just like the Text headers, we can able to edit the Binary headers as well.



In this example, we are going to edit the Measurement system from Meters(1) to Feets(2) as shown below.

Binary header			
	Header value	Header new value	Bytes
Binary gain recovered	1	1	51-52
Amplitude recovery method	4	4	53-54
Measurement system	1	1	55-56
Impulse signal polarity	0	0	57-58
Vibratory polarity code	0	0	59-60
SSC Co SEG-Y samples number	0	0	63-66
SEG-Y Rev	256	256	301-302
Fixed trace flag	1	1	303-304
Number of Extended Textual Headers	0	0	305-306

In order to change it, user needs to enter the new value in the "**Header new value**" field by clicking inside of it and hit Enter. Here also it changes the back ground color which tells us that the field is ready to be edited. Follow the procedure as described above to save the EBCDIC/text header but select "Update binary header" option from the action items.

Binary header			
	Header value	Header new value	Bytes
Binary gain recovered	1	1	51-52
Amplitude recovery method	4	4	53-54
Measurement system	1	2	55-56
Impulse signal polarity	0	0	57-58
Vibratory polarity code	0	0	59-60
SSC Co SEG-Y samples number	0	0	63-66
SEG-Y Rev	256	256	301-302
Fixed trace flag	1	1	303-304
Number of Extended Textual Headers	0	0	305-306

The process is similar to the Text header editing. Confirm and click **Yes**. Observe the changes in the Binary header window under “**Header value**” field.

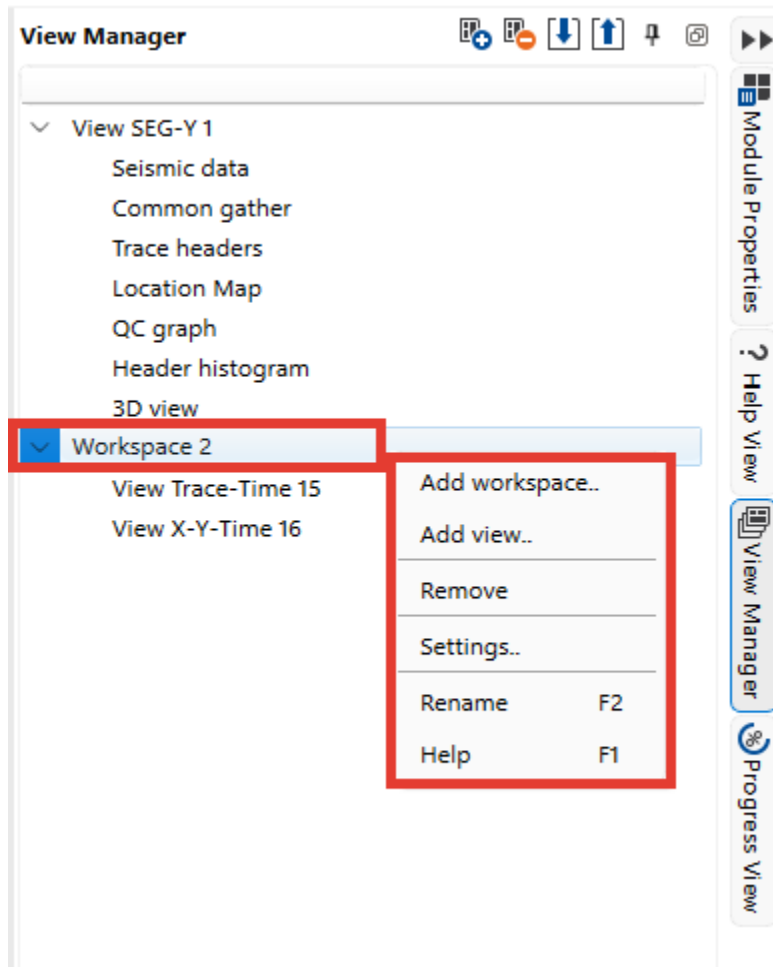


Now it has changed the value from 1 to 2 permanently

Binary header			
	Header value	Header new value	Bytes
Binary gain recovered	1	1	51-52
Amplitude recovery method	4	4	53-54
Measurement system	2	2	55-56
Impulse signal polarity	0	0	57-58
Vibratory polarity code	0	0	59-60
SSC Co SEG-Y samples number	0	0	63-66
SEG-Y Rev	256	256	301-302
Fixed trace flag	1	1	303-304
Number of Extended Textual Headers	0	0	305-306

3.2.8 View Manager

The **View Manager** panel, located by default on the **right side** of the interface, organizes and manages different **workspaces** (equivalent to different desktops) and **views** for data visualization in g-Viewer.



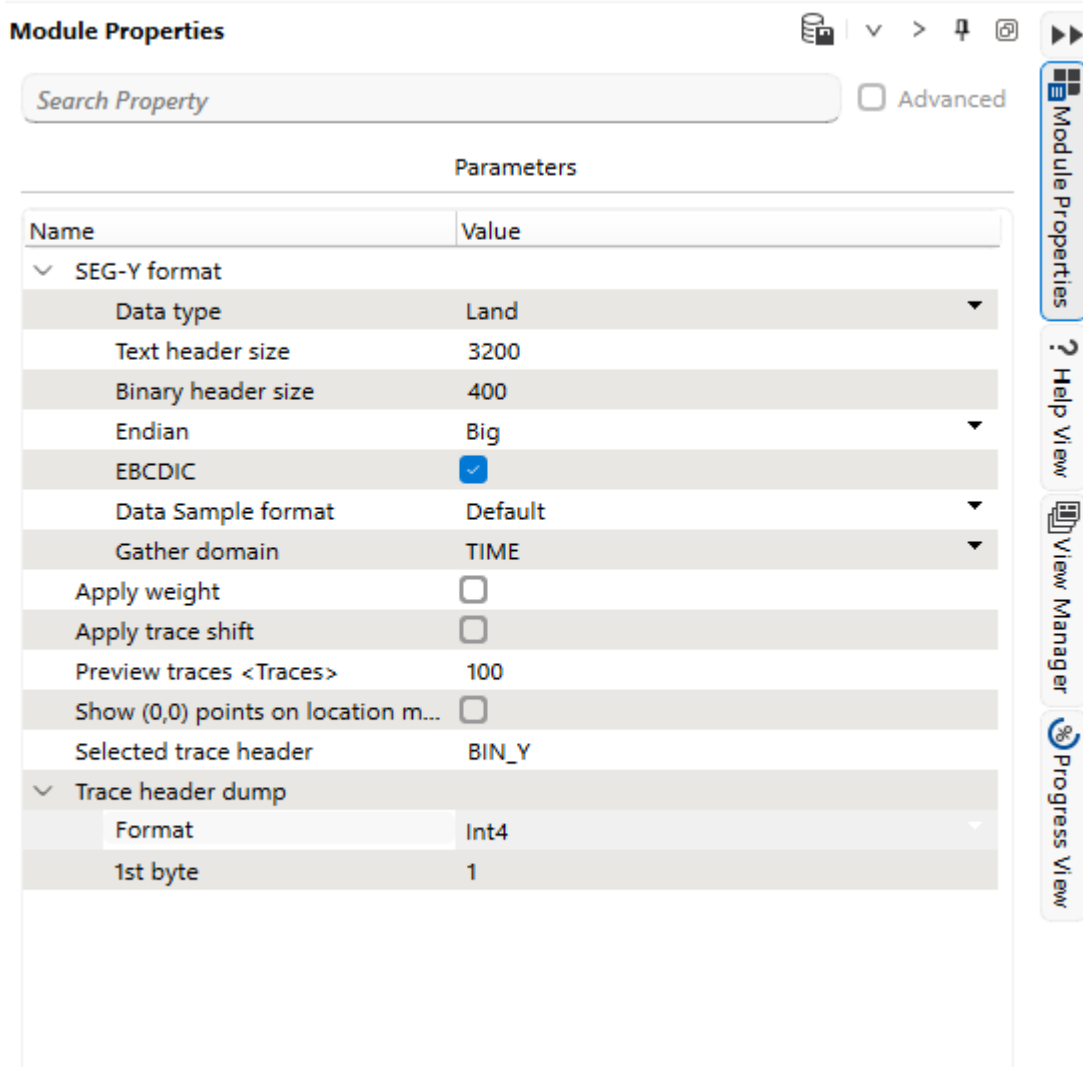
Key Functions:

- **Adding a Workspace:** Click the **Plus (+) button** at the top of the panel or right-click in the panel and select **"Add workspace.."**.
- **Adding a View:** Use the **Plus (+) button**, right-click on a workspace, and choose **"Add view.."**.
- **Removing a View or Workspace:** Right-click on the item and select **"Remove"**.
- **Settings and Customization:** Access additional options via the **"Settings.."** menu.
- **Renaming:** Use **F2** to rename a selected workspace or view.
- **Help:** Press **F1** for further assistance.

The View Manager stores all available views for **g-Viewer** data visualization, such as seismic sections, gathers, attribute maps, and QC tools.

3.2.9 Module Properties

The **Module Properties** panel allows users to configure and adjust various parameters related to data processing and visualization. By default, it is located on the **right side** of the interface.



Key Features and Functions:

- **Search Property:** Use the search bar at the top to quickly find specific parameters.
- **Advanced Mode:** Enables additional settings for advanced users (checkbox).
- **Parameters Table:** Displays a list of configurable properties categorized under different sections.

Example Sections and Parameters:

1. SEG-Y Format

- **Data Type:** Specifies the type of seismic data (e.g., Land, Marine).
- **Text Header Size:** Defines the size of the textual header (default: 3200 bytes).
- **Binary Header Size:** Defines the size of the binary header (default: 400 bytes).
- **Endian:** Select between **Big** or **Little** endian formats.
- **EBCDIC:** Checkbox to enable/disable EBCDIC encoding for headers.
- **Gather Domain:** Defines how seismic gathers are organized (e.g., TIME).
- **Apply Weight / Apply Trace Shift:** Optional processing adjustments.
- **Preview Traces:** Defines how many traces are previewed in the UI.
- **Selected Trace Header:** Specifies which header field to use for trace selection.

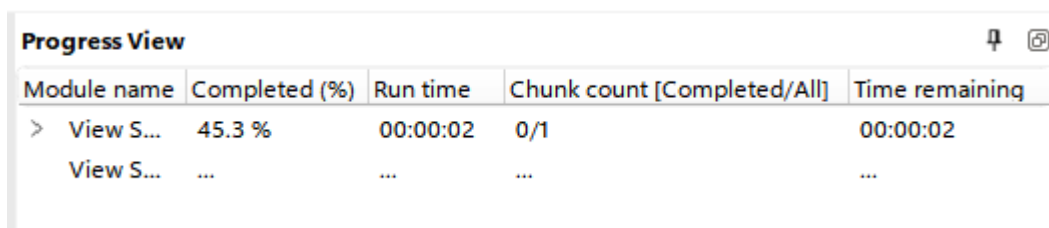
2. Trace Header Dump

- **Format:** Defines the data format (e.g., Int4).
- **1st Byte:** Specifies the starting byte for header dump analysis.

This panel provides essential customization options to ensure correct SEG-Y data handling and interpretation.

3.2.10 Progress View

Progress view panel provides information about the currently running process, its progress and the estimated time it will be completed



Module name	Completed (%)	Run time	Chunk count [Completed/All]	Time remaining
> View S...	45.3 %	00:00:02	0/1	00:00:02
View S...	...	...	...	...

3.2.11 View properties

View properties is a dynamic panel that displays the parameters for the active view or object. The content of the window depends of the selected object.

By default View properties is located on the right.

To open the View properties panel open a panel bar or click the **Settings** button on the tool bar on the upper part of any View.

View properties is divided to two tabs:

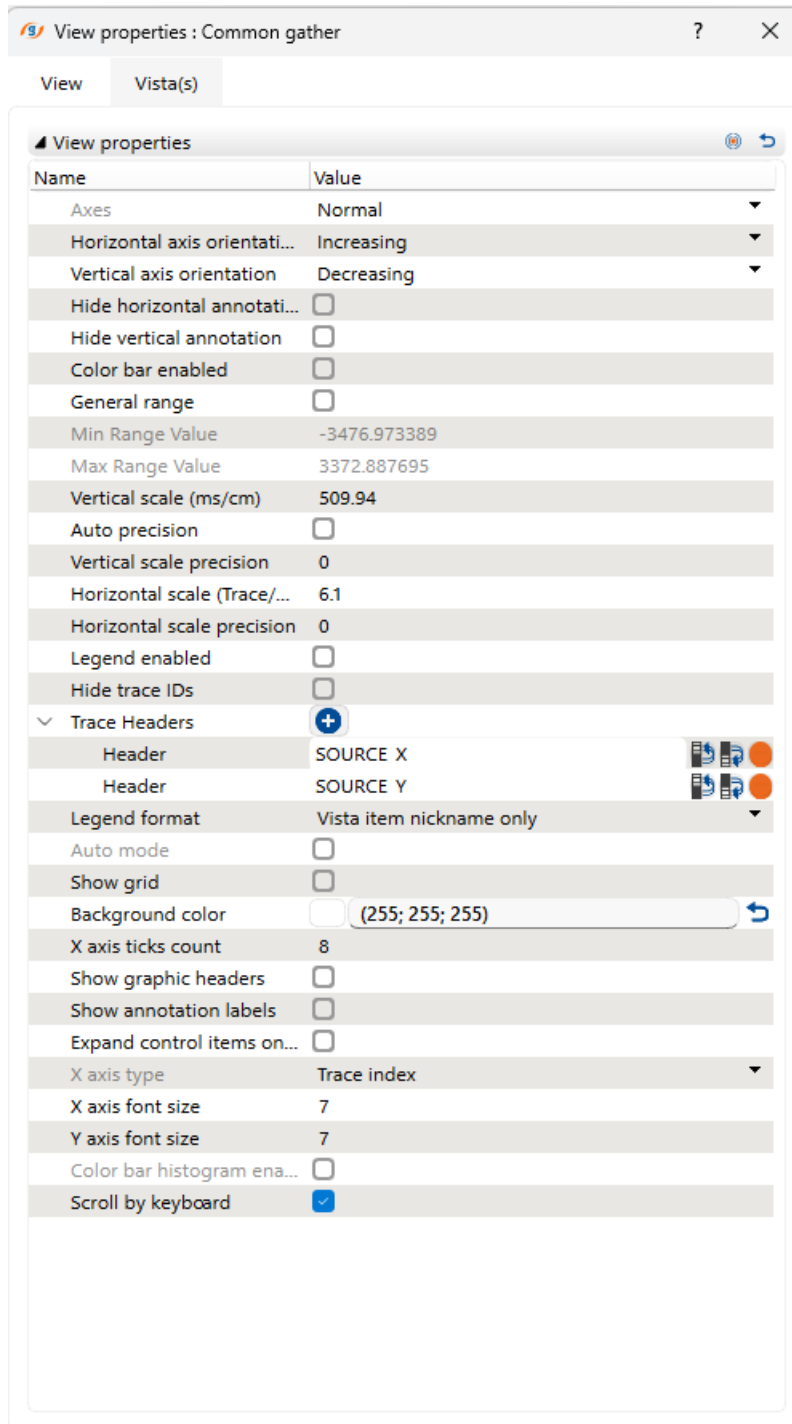
[View](#)  - allows to set active view settings

[Vista](#)  - allows to set visibility, order and appearance of all vista items of the active view

3.2.11.1 View

View tab allows user to adjust views visual setting in g-Space. The settings list may vary depending on the active view type.

In the upper part you can reset properties to default parameters  or propagate properties to other same type views 



Here is the list of the settings you can make for the active view (it may not be complete and depends on the active view type):

- Axes - default: Normal, but currently that property is disabled. Designed to change Horizontal and Vertical axes by rotating it 90 degrees.
- Horizontal/vertical axis orientation - flips orientation of horizontal/vertical axis
- Hide horizontal/vertical annotation - hide annotation from horizontal/vertical axis

- Color bar enabled - when enabled adds color bar on right side of the view
- General range - when selected, the program will consider next 2 parameters for colorbar range of the palette
- Min/Max Range Value - when enabled define minimum/maximum value of the palette for all Vistas on the view
- Vertical scale (feet/cm) - defines the actual vertical scale of the view
- Auto precision - when checked, application will define automatically the precision of vertical scale
- Vertical scale precision - when auto-precision not checked, this parameter defines precision for the vertical scale
- Horizontal scale (feet/cm) - defines the actual horizontal scale of the view
- Horizontal scale precision - when auto-precision not checked, this parameter defines precision for the horizontal scale
- Legend enabled - when enabled adds legend on the view
- Legend format - defines legend format
- Auto mode - default settings
- Show grid - shows grid on the view
- Background color - defines background color
- Isometric mode - when checked, vertical and horizontal scales will be the same
- X axis ticks count - number of ticks for horizontal axis
- Horizontal axis scale type - defines linear or log type for horizontal scale
- Vertical axis scale type - defines linear or log type for vertical scale
- Expand control items on toolbar - allows to show more icons in the upper part of the view
- Hide trace IDs - hides traces IDs on section views
- Trace Headers - allows to add additional information to section views from the segy headers

3.2.11.2 Vista

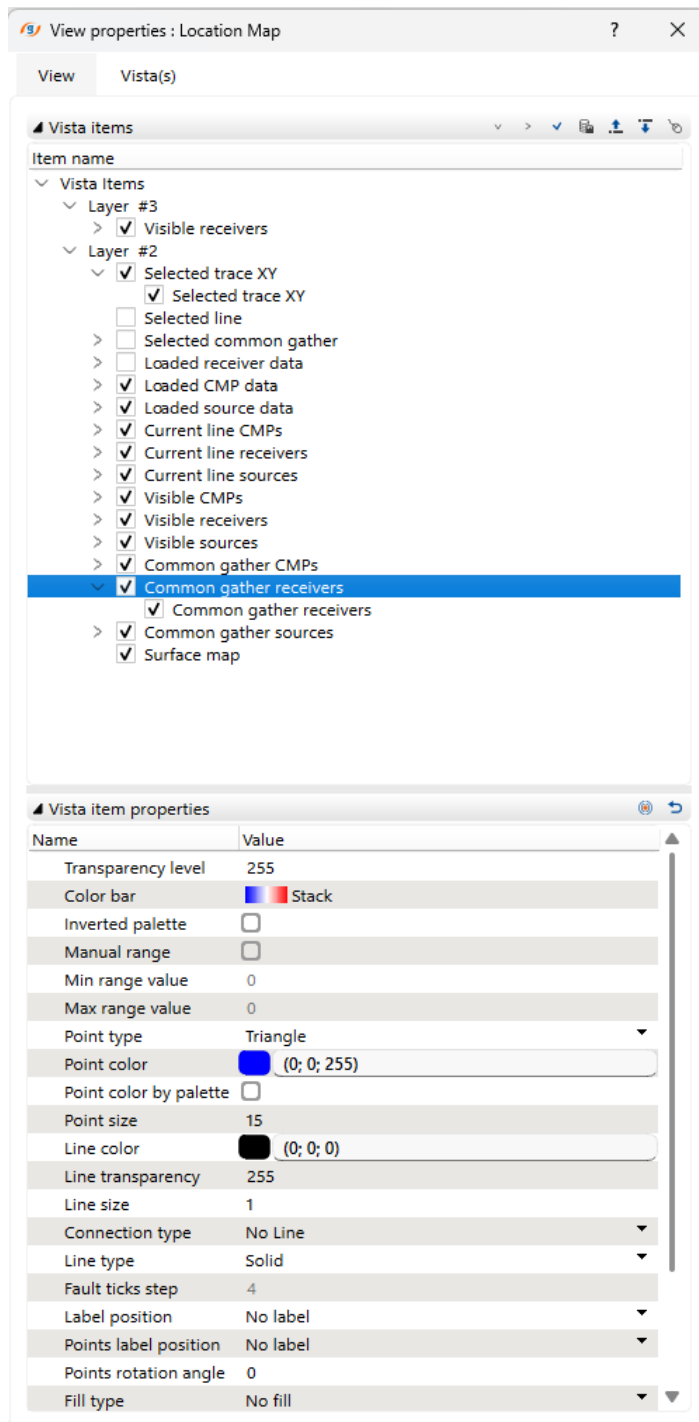
Vista tab - allows to set visibility, order and appearance of all vista items of the active view. It divided for two sections: **Vista items** and **Vista item properties**

Vista items allows you to turn on/off visibility of the objects on the view. This is a dynamic part of the window and shows the items according to the active view

You can re-order the layers , turn on/off visibility of all objects  and switch between working modes  (Selected trace, Set control item) on current view.

Vista items properties section gives access to settings of selected object in the **Vista items** section.

The settings list may vary depending on the active item type



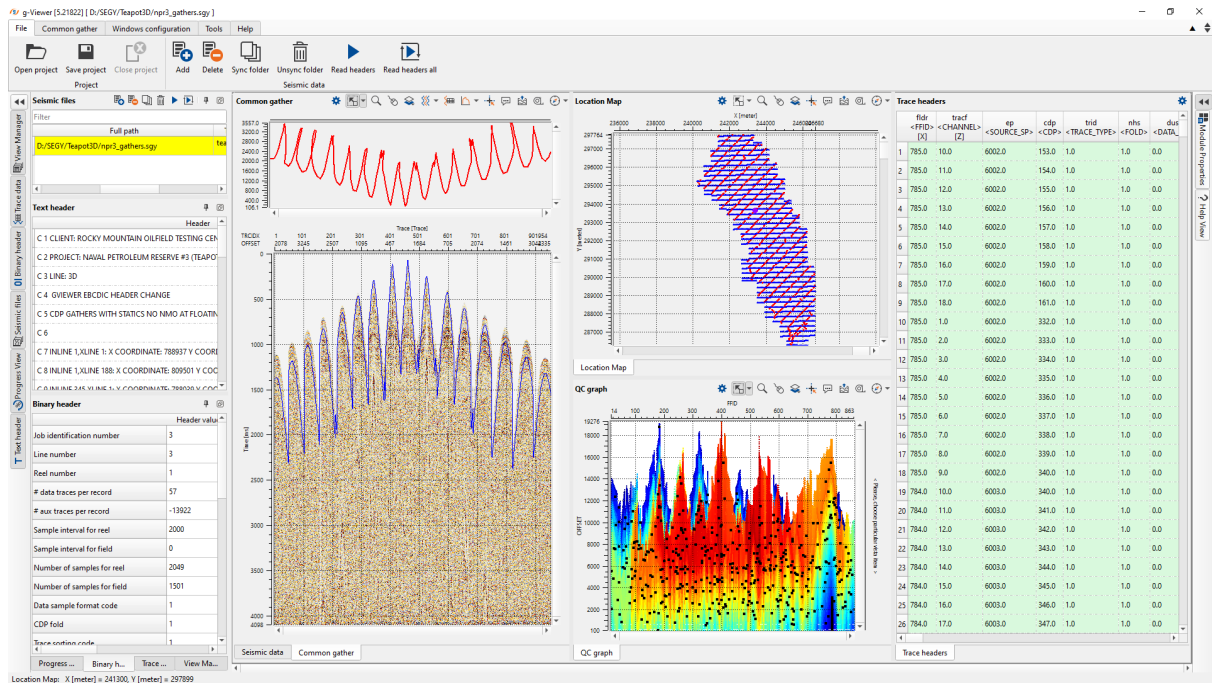
Here is the list of the settings you can make for the active item (it may not be complete and depends on the active item type):

- Transparency level - set the opacity level of the item
- Color bar - allows to select a color bar
- Inverted palette - inverts a color bar

- Normalization - allows to select the source for color range
- Min/max range value - allows to select the min/max range values for user defined normalization
- Hide out of range - hides values outside the selected range values
- Gain - allows to choose gain for the visualization
- AGC <ms> - allows to set AGC
- Show interpolated values
- Enable errors on matrix
- Auto normalization
- Value precision - set precision of the displayed data
- Isolines show mode - allow to turn on isolines
- Major each isoline - set the step of the bold isolines
- Minor line size - set thickness of minor isolines
- Minor line color - set color of minor isolines
- Major line size - set thickness of major isolines
- Major line color - set color of major isolines
- Isolines round mode - set isolines smoothing
- Show isolines labels - shows isolines values
- Isolines color by palette - set isolines color according the color bar
- Point type - set points style
- Point color - set points color
- Point color by palette - set points color according the color bar
- Point size - set points size
- Line color - set line color
- Line transparency - set opacity level for the line
- Connection type - set connection type for the points
- Line type - set line style (like solid, dashed, dotted etc.)
- Label position - set the label position
- Points label position - set the label position for the points
- Points rotation angle - set the points rotation
- Fill type - allow to fill the object
- Fill color - set the first filling color
- Fill color2 - set the second filling color

3.3 Window

g-Viewer provides a streamlined and unified interface for visualizing essential seismic data. It includes a wide range of features, organized neatly into various windows. In this section, we will provide a brief overview of the different windows and their functionalities.

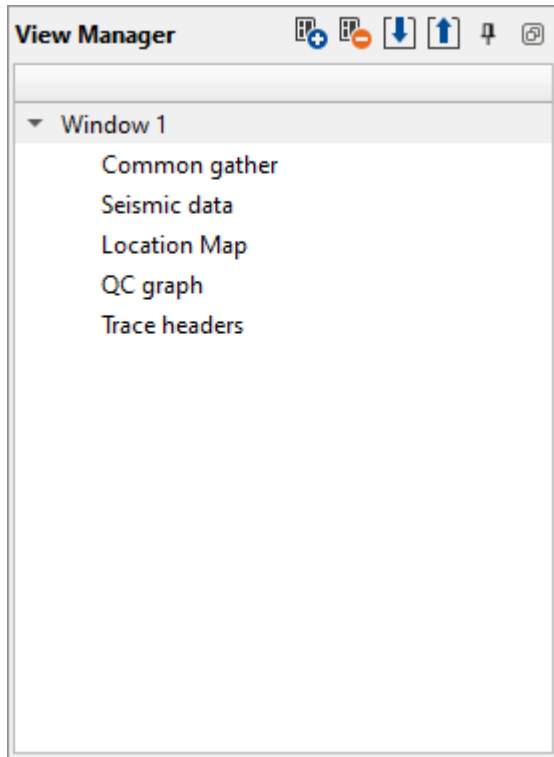


In the above image, we see different windows in the **left**, **middle** and **right** side. Let's jump into Left side windows first.

- **View Manager**
- **Trace data**
- **Binary header**
- **Seismic files**
- **Progress view**
- **Text header**

View Manager:

View Manager is a key component to visualize the seismic data. It will display the vista items (any display component of that particular module is known as **Vista item(s)** like location map, common shot, common bin etc.) Whenever user clicks/selects a particular vista item in the View Manager it will activate the respective display item. The user can add as many View Manager windows as they can (it automatically puts the View Manager window name as the Module name) however please pay attention when selecting the option to display the **Vista Groups**-> **All Groups**-> **In new window**. If the user selects the option as "**In current window**" then it will mix up with the existing vista items in the View Manager and create confusion.



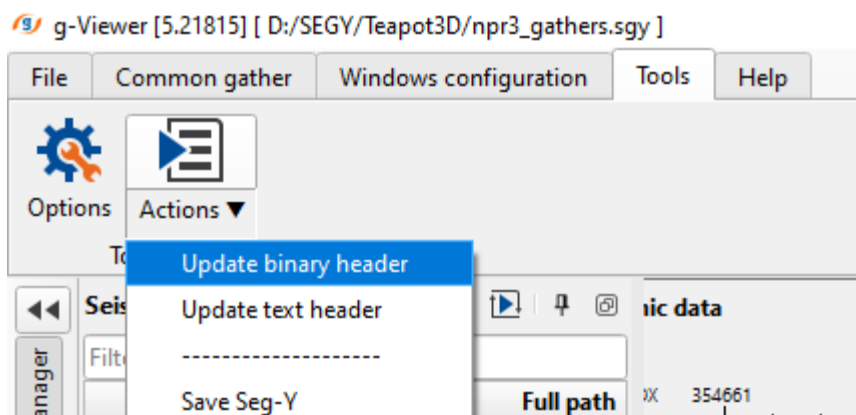
Note: In the next topic, we are going to discuss more about what and how to get **Vista Groups** etc.

Trace data: This is a very useful window with respect to getting the trace data information. In this window, it displays all the trace headers and their corresponding format type (Integer, float), Start byte location, Value of that particular trace header, Ranges of the trace header and finally an expression to modify the trace headers.

Trace data						
Filter						
Field	Item Type	StartByte	Value	Ranges	Expression	
FFID	Int4	9	785.000	[14.000; 863.000]		
CHANNEL	Int4	13	10.000	[1.000; 1063.000]		
SOURCE_SP	Int4	197	6002.000	[6002.000; 6174.000]	int4(17)%10000	
CDP	Int4	21	153.000	[153.000; 64758.000]		
TRACE_TYPE	Int2	29	1.000	[0.000; 2.000]		
FOLD	Int2	33	1.000	[1.000; 1.000]		
DATA_USE	Int2	35	0.000	[0.000; 0.000]		
OFFSET	Int4	37	371.856	[30.480; 5875.325]		
RECEIVER_ELEV	Int4	41	1683.471	[1503.060; 1724.193]		
SOURCE_ELEV	Int4	45	1621.567	[1504.005; 1647.688]		
SOURCE_DEPTH	Int4	49	0.000	[0.000; 0.000]		
RECEIVER_DATUM	Int4	53	0.000	[0.000; 0.000]		

Binary header:

Just like the Text headers, we can able to edit the Binary headers as well. In order to change it, user needs to enter the new value in the "Header new value" field by clicking inside of it and hit Enter. Here also it changes the back ground color which tells us that the field is ready to be edited. Follow the procedure as described above to save the EBCDIC/text header but select **"Update binary header"** option from the action items



Seismic files:

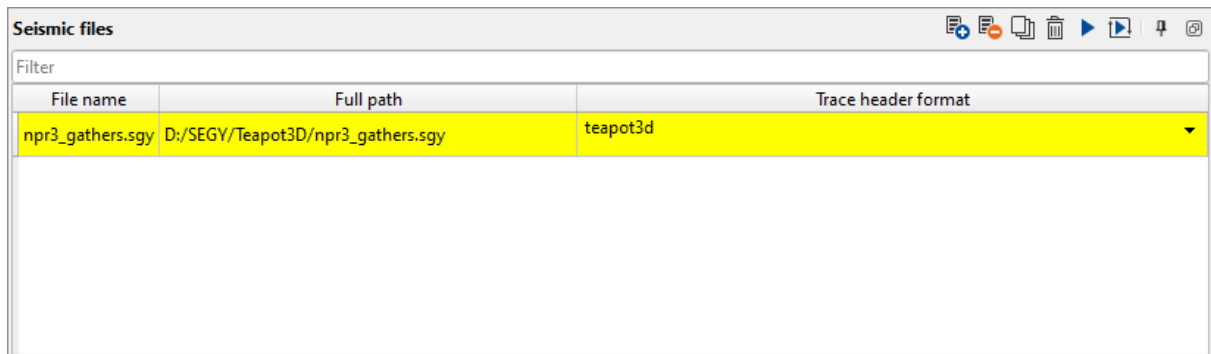
In this window, the user can add as many as seismic files as they want. There are different ways to add the seismic files into the seismic files window. The simple and most straight forward method is simply click on the plus button  and add the seismic files into the window.

Upon adding the files, it will load (can see the status of the loading at **Progress view** window) the contents of seismic file like **Trace data, Text header, Binary header, Trace headers information** and **Location map**.

The second method of adding seismic files is, drag and drop method. Simply select the desired seismic file (SEG-Y) file and drop into the seismic files window. Give it a minute or two to load the contents of the seismic file.

Within the Seismic files window, it will display the **File name, Full path & Trace header format** information. If the user wants to display only the File name, they can right click inside the seismic files and uncheck the other fields.

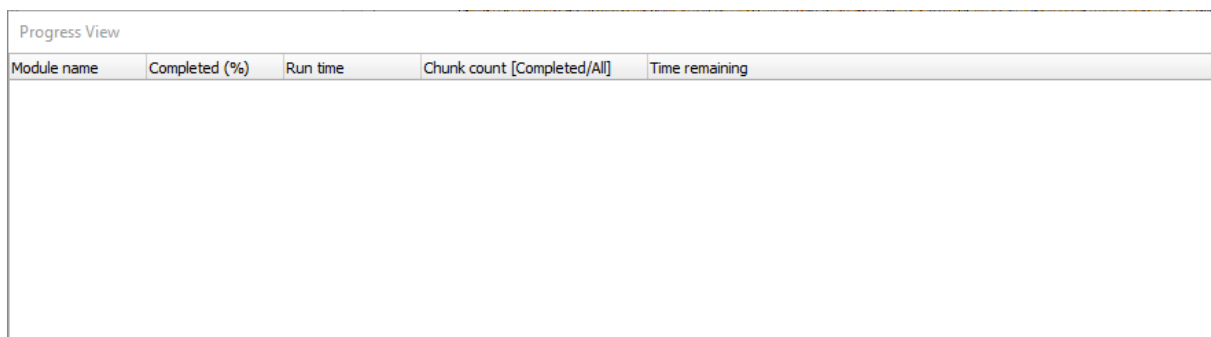
When the SEG-Y file loaded into the **g-Viewer**, it partially loads all the headers. In order to load all the headers information, the user should select the file and click on the Play button  (fast forward button is to load all the lines fully). User can observe the change in color of the back ground before and after.



File name	Full path	Trace header format
npr3_gathers.sgy	D:/SEG-Y/Teapot3D/npr3_gathers.sgy	teapot3d

Progress View

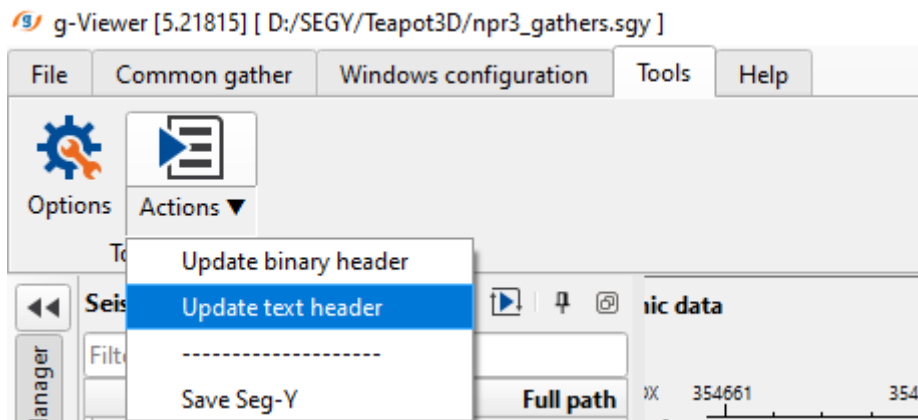
This window displays the current running/executing module(s)s status like Module name, % completed, Run time, Chunk count [completed/all] and the time remaining to finish the task.



Module name	Completed (%)	Run time	Chunk count [Completed/All]	Time remaining
-------------	---------------	----------	-----------------------------	----------------

Text Header:

Editing text (**EBCDIC**) and binary headers in **g-Viewer** is straightforward. The user has to go to the Text headers table and make the necessary changes. To update the data with the changes, the user must click on the **Actions** icon and select the respective action item to implement the changes.



In the middle part of the main **g-Viewer**, we have

- **Seismic data**
- **Common gather - Common gather [View SEG-Y]**
- **Location map**
- **Trace headers**
- **QC Graph**

Seismic data

It is the main display window where the user can able to visualize the entire dataset within a window. The entire dataset is loaded into the memory and display the full content of the data in the seismic data window. However if the user wants to zoom in/out in any part of the "**Seismic data**" then that particular section of the display will be displayed on the screen.

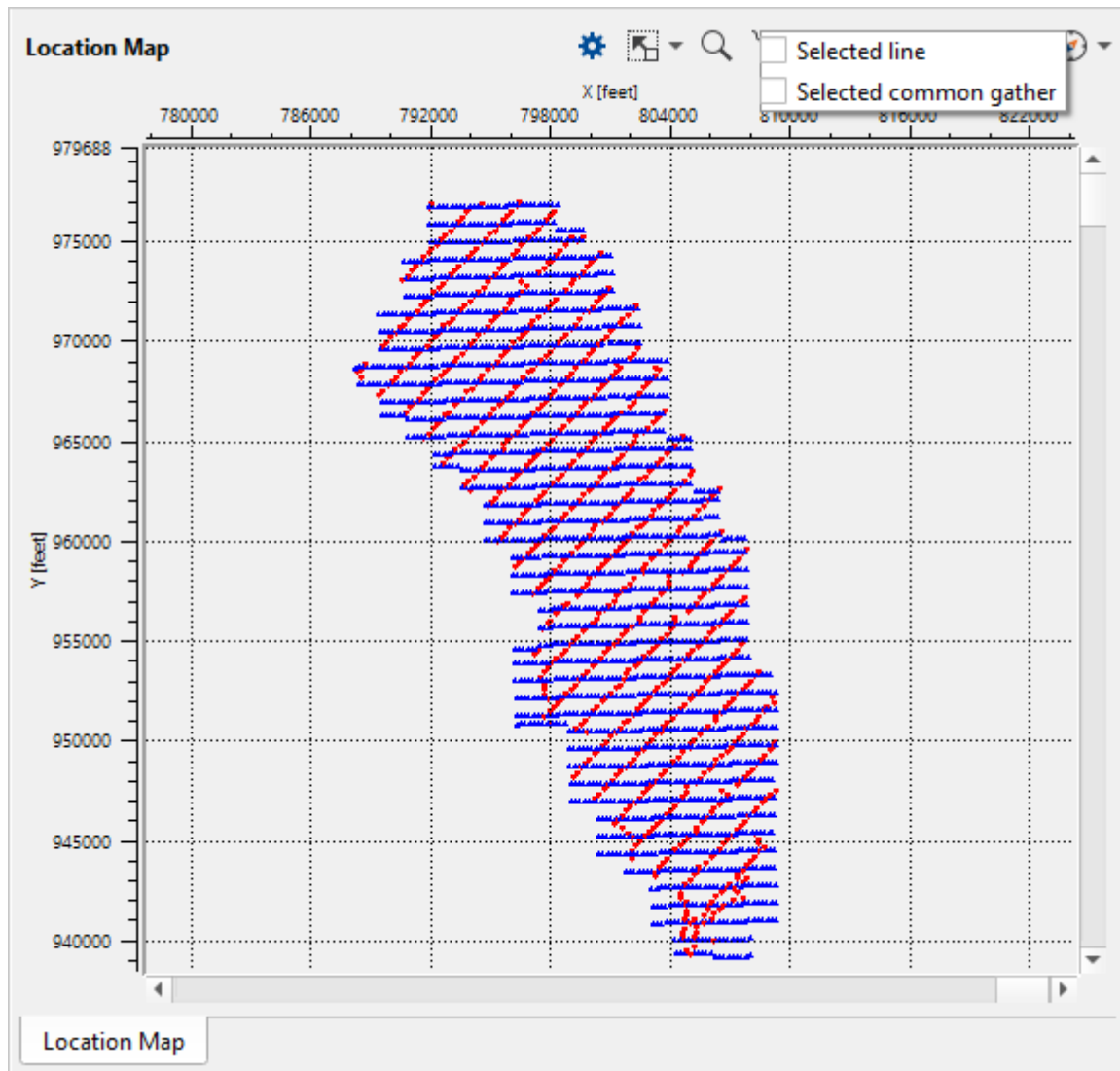
Common gather - Common gather [View SEG-Y]

This window is useful in displaying any random gather by selecting a location on the location map. More in details were discussed in the Common gather

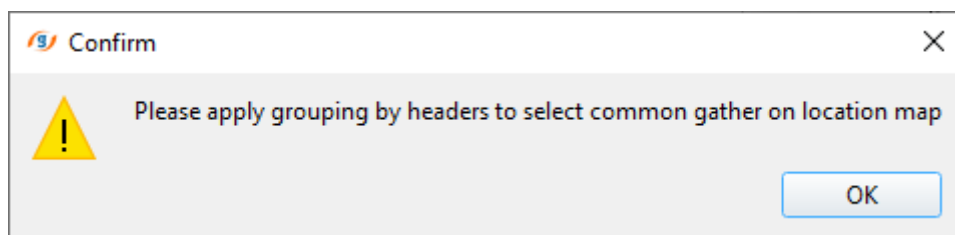
Location map

With the interactive location map in **g-Viewer**, the user should find it easy to choose **Selected line** and/or **Selected common gather** from the location map by selecting the **Control item**

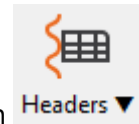
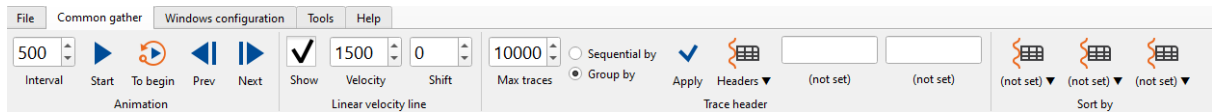
icon . Within the location map the user can not only can select desired **Selected line** and/or **Selected common gather**, but also measure the distance between Shot/Receiver/CMP gathers and/or line length etc. by using the **Ruler** icon.



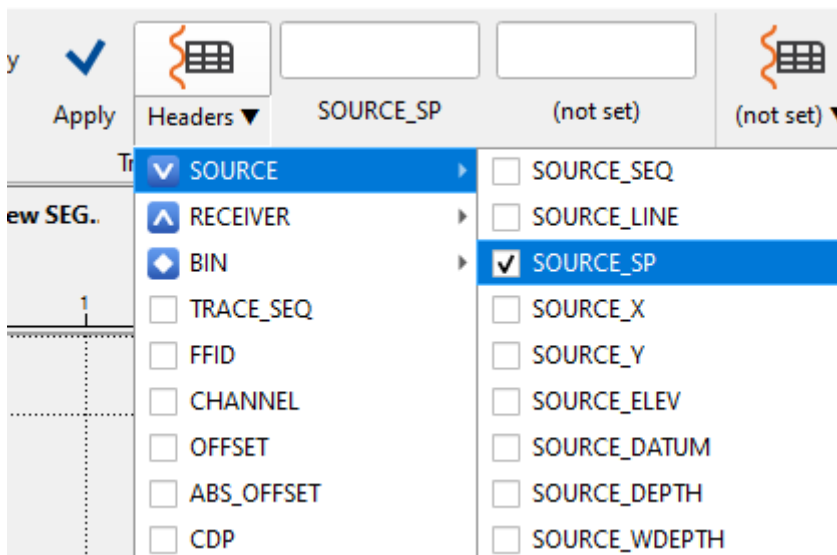
In case the user wants to select any random gather on the location map and decides to choose the option "Selected common gather" then it comes up with a pop-up window



To do the grouping, the user should goto the Common gather type in the ribbon and select the option "Group by"



Now choose one of the headers from the drop down menu of the Headers icon and click **Apply**.



Similarly the user can select any trace header and select the desired gather whether a Source/Receiver/CMP gather.

Trace headers

g-Viewer displays all the trace headers information in tabular form. The user can select any particular trace or scan through it to find the desired information. Besides it can be used to cross plot any of the seismic trace headers as a quick QC tool.

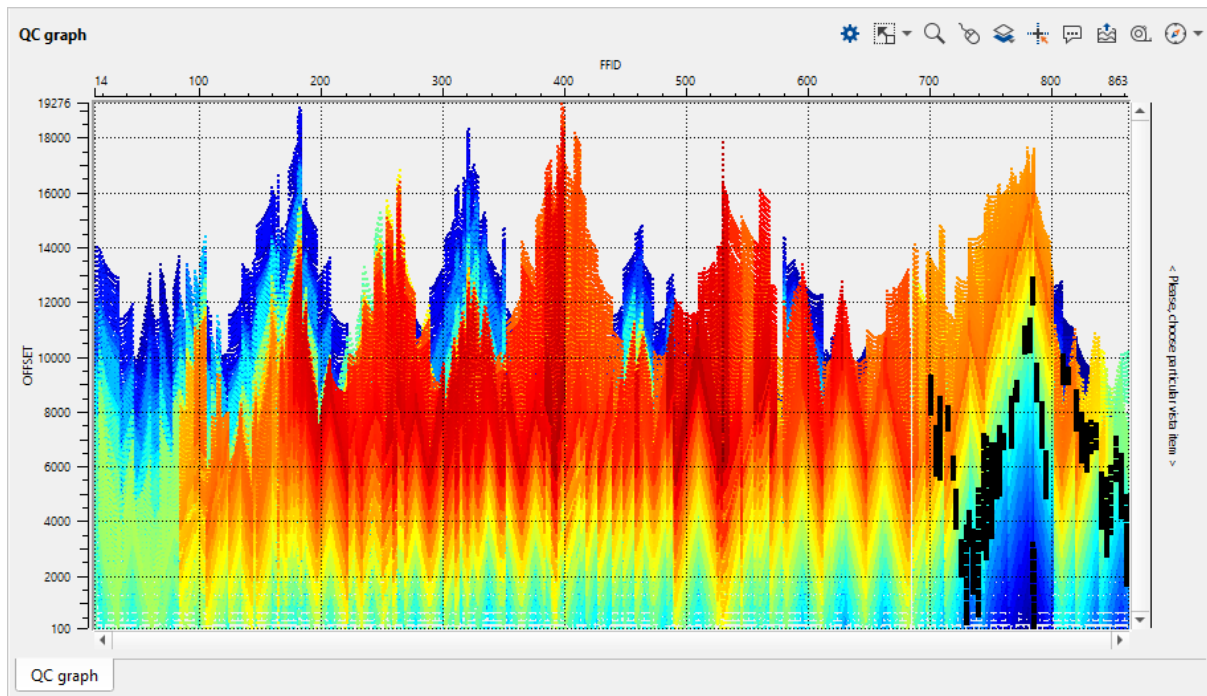
Trace headers

	fldr <FFID>	tracf <CHANNEL>	ep <SOURCE_SP>	cdp <CDP>	trid <TRACE_TYPE>	nhs <FOLD>	duse <DATA_USE>	offset <OFFSET>	gelev <RECEIVER_ELEV>	selev <SOURCE_ELEV>	sdept <SOURCE_ID>
1	785.0	10.0	60796000.0	153.0	1.0	1.0	0.0	1220.0	55232000.0	53201000.0	0.0
2	785.0	11.0	60796000.0	154.0	1.0	1.0	0.0	1439.0	55254000.0	53201000.0	0.0
3	785.0	12.0	60796000.0	155.0	1.0	1.0	0.0	1659.0	55502000.0	53201000.0	0.0
4	785.0	13.0	60796000.0	156.0	1.0	1.0	0.0	1878.0	55805000.0	53201000.0	0.0
5	785.0	14.0	60796000.0	157.0	1.0	1.0	0.0	2096.0	55897000.0	53201000.0	0.0
6	785.0	15.0	60796000.0	158.0	1.0	1.0	0.0	2316.0	55783000.0	53201000.0	0.0
7	785.0	16.0	60796000.0	159.0	1.0	1.0	0.0	2535.0	56304000.0	53201000.0	0.0
8	785.0	17.0	60796000.0	160.0	1.0	1.0	0.0	2755.0	56568000.0	53201000.0	0.0
9	785.0	18.0	60796000.0	161.0	1.0	1.0	0.0	2976.0	56286000.0	53201000.0	0.0
10	785.0	1.0	60796000.0	332.0	1.0	1.0	0.0	773.0	54235000.0	53201000.0	0.0
11	785.0	2.0	60796000.0	333.0	1.0	1.0	0.0	554.0	52702000.0	53201000.0	0.0

Trace headers

QC graph

In **g-Viewer**, the user can able to plot any trace header from the trace headers table and QC them immediately and interactively.



Finally in the far right hand side, we see

- **Module Properties**

- **Help View**

Let's briefly discuss about each one of them.

Module Properties

This window/tab allows the user to specify the file name path or edit the parameters. In the below image, we can able to see the **Module parameters** of **View SEG-Y** module.

Module Properties     

☐ Advanced

Input data Parameters Settings Output c  

Name	Value
File type	SEG-Y
▼ SEG-Y format	
Data type	Land
Text header size	3200
Binary header size	400
Endian	Big
EBCDIC	☒
Data Sample format	Default
▼ Current trace header format	teapot3d
Seg-Y, rev.1, 2002	
Trace header	NONE
Current trace <Traces>	1
Apply weight	☐
Apply trace shift	☐
Preview traces <Traces>	100
Show (0,0) points on location map	☐
▼ 3D	
Show 3D data	☐
Show 2D data as volume	☐
Create 3D data cache on disk	☐
Header for 3D axis X	
Header for 3D axis Y	
Animation time interval <Milliseconds>	500
▼ Common gather	
Max traces <Traces>	10000
Headers	
Mode	1
Header #1 current value	358.00
Header #2 current value	
Header for sorting #1	
Header for sorting #2	
Header for sorting #3	

Help View

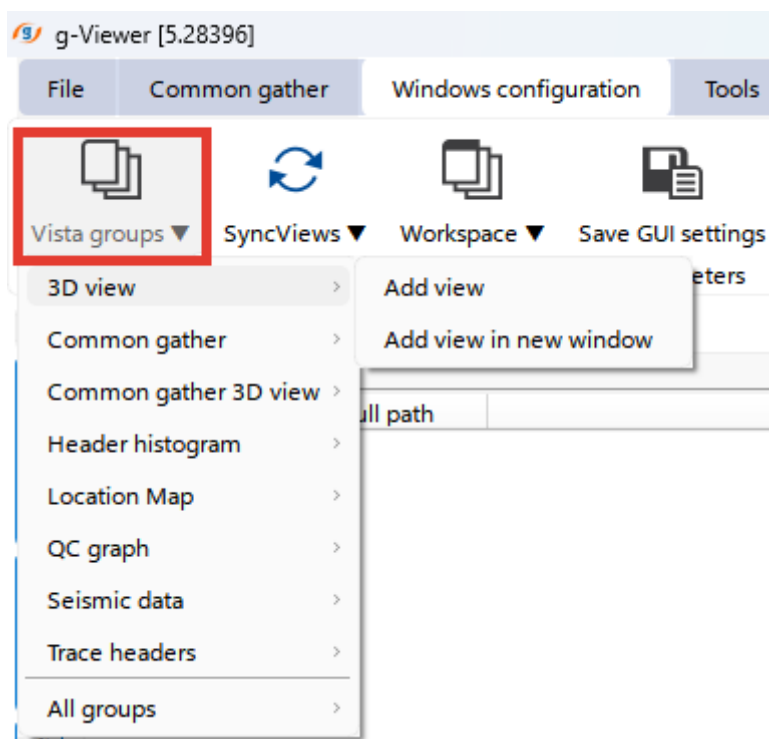
This window displays the documentation of the selected module wherein it describes the each one of the parameters and their usage etc.

3.4 Views

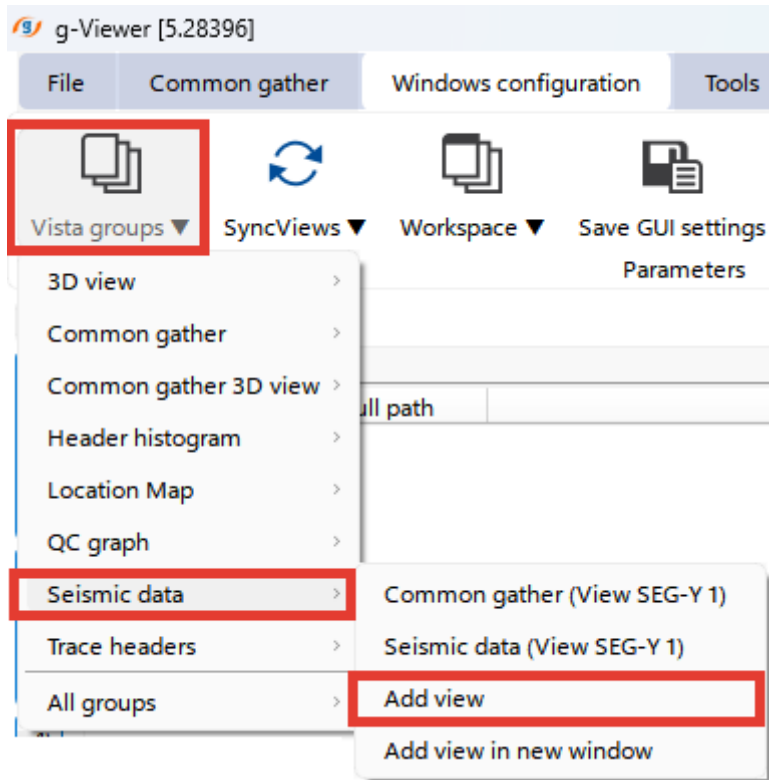
Views in g-Viewer are designed to help users visualize, quality control (QC), and manipulate various types of geophysical data. Each view type offers a unique way to interact with the data.

In the **Geomage software suite**, the term *Vista* or *Vista items* refers to any displayable data item, such as a shot gather or a selected source line. When multiple Vista items from a single module are grouped together, they form a **Vista Group**.

Expanding the **Vista groups** option displays all available Vista items



To display an individual **Vista item**, the user must select it and proceed as shown in the image.

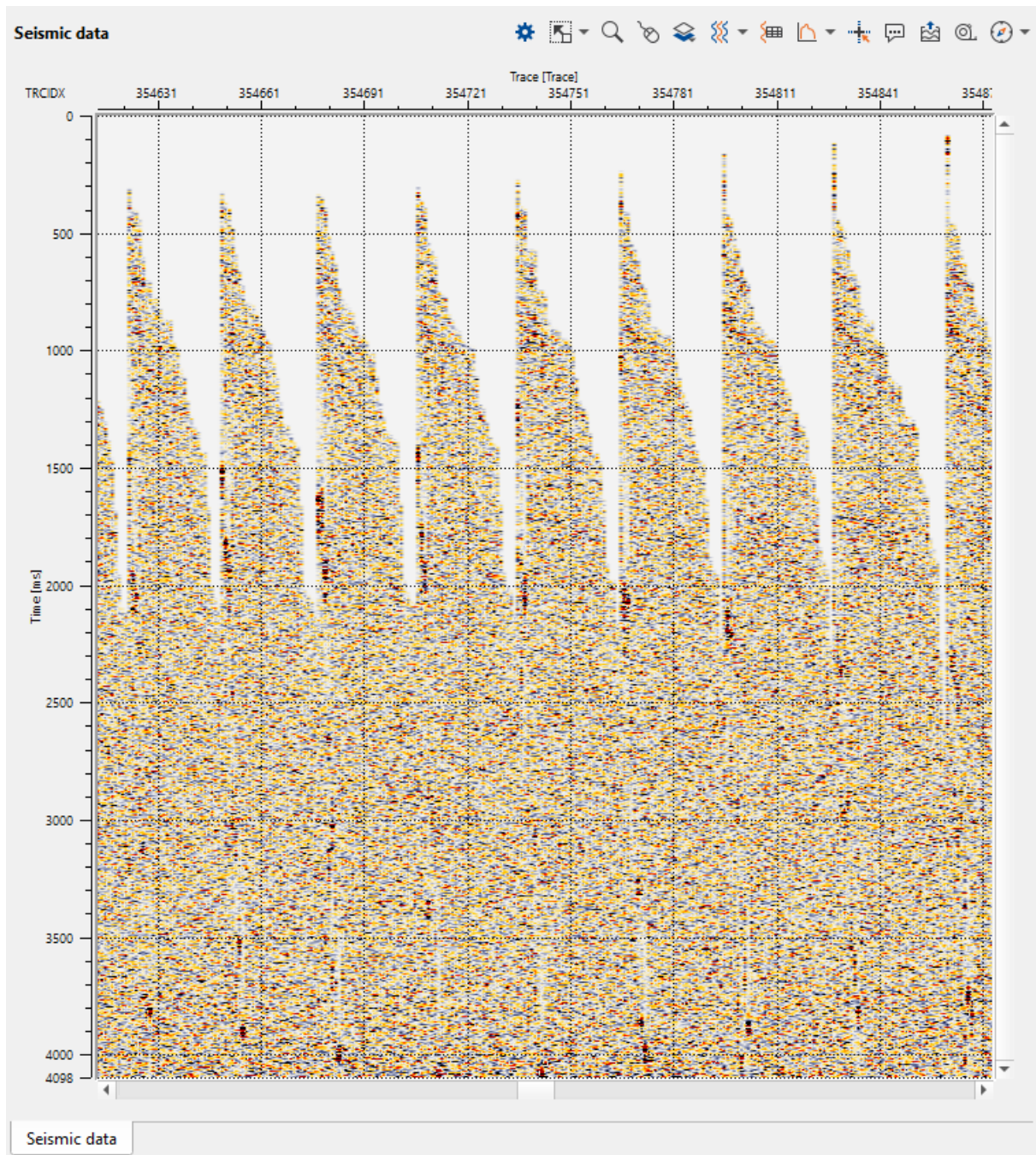


In this case, we want to display **Seismic data** in a **new window**. The user should select "**Add view in new window**" to open it separately.

Alternatively, selecting "**Add view**" will add the selected display to the **existing window**, combining it with other active views.

To avoid confusion, it is recommended to use "**Add view in new window**", ensuring that only the selected **Seismic data** Vista item is visible in a separate window.

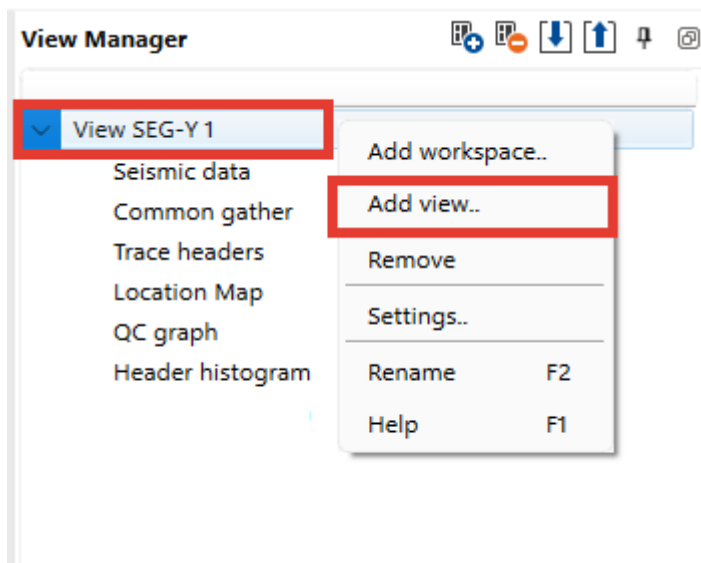
The newly opened window and its contents will then be displayed in the **View Manager**.



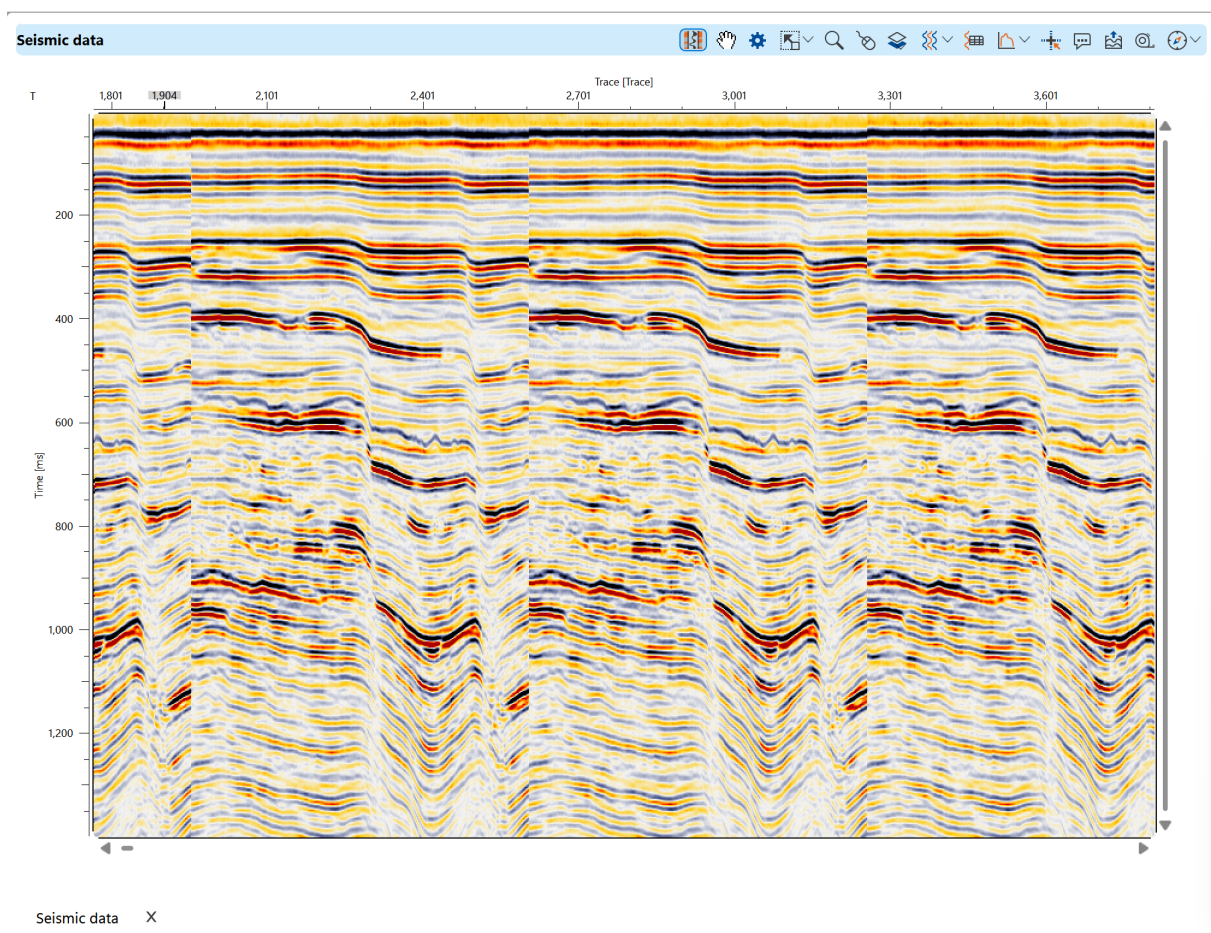
3.4.1 Seismic view

The **Seismic View** is a core visualization tool in **g-Viewer**, designed for displaying and analyzing seismic data.

To open this view navigate to the [View Manager](#) ⁶² Panel, right-click within it, and select **Add View**.



A pop-up window appear, specify a View type and click OK



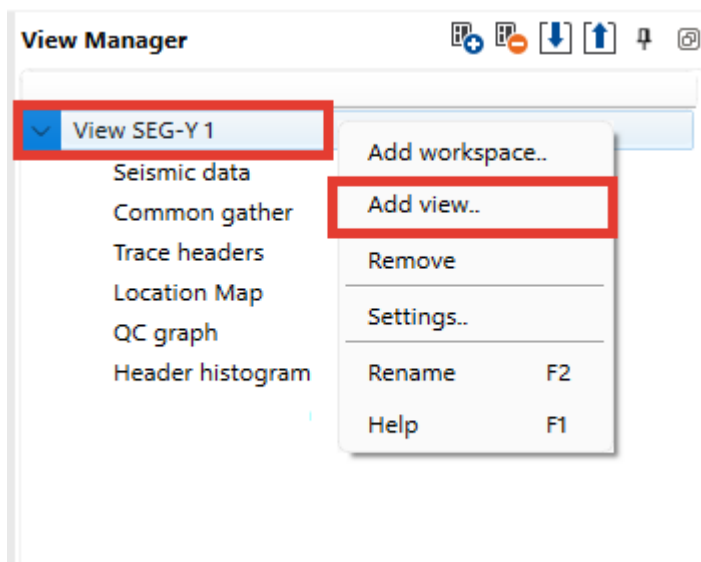
Functional panel allows user to perform the following actions:

-  open View properties panel
-  adjust view area to all visible objects
-  adjust horizontal scale
-  adjust vertical scale
-  set/unset zoomable
-  set control item
-  add vista
-  select traces
-  trace data
-  spectral analysis tool - multi selection
-  spectral analysis tool - single selection
-  enable mouse tracker
-  enable tool tip
-  export picture
-  ruler tool
-  show compass
-  show minimap
-  show scale bar

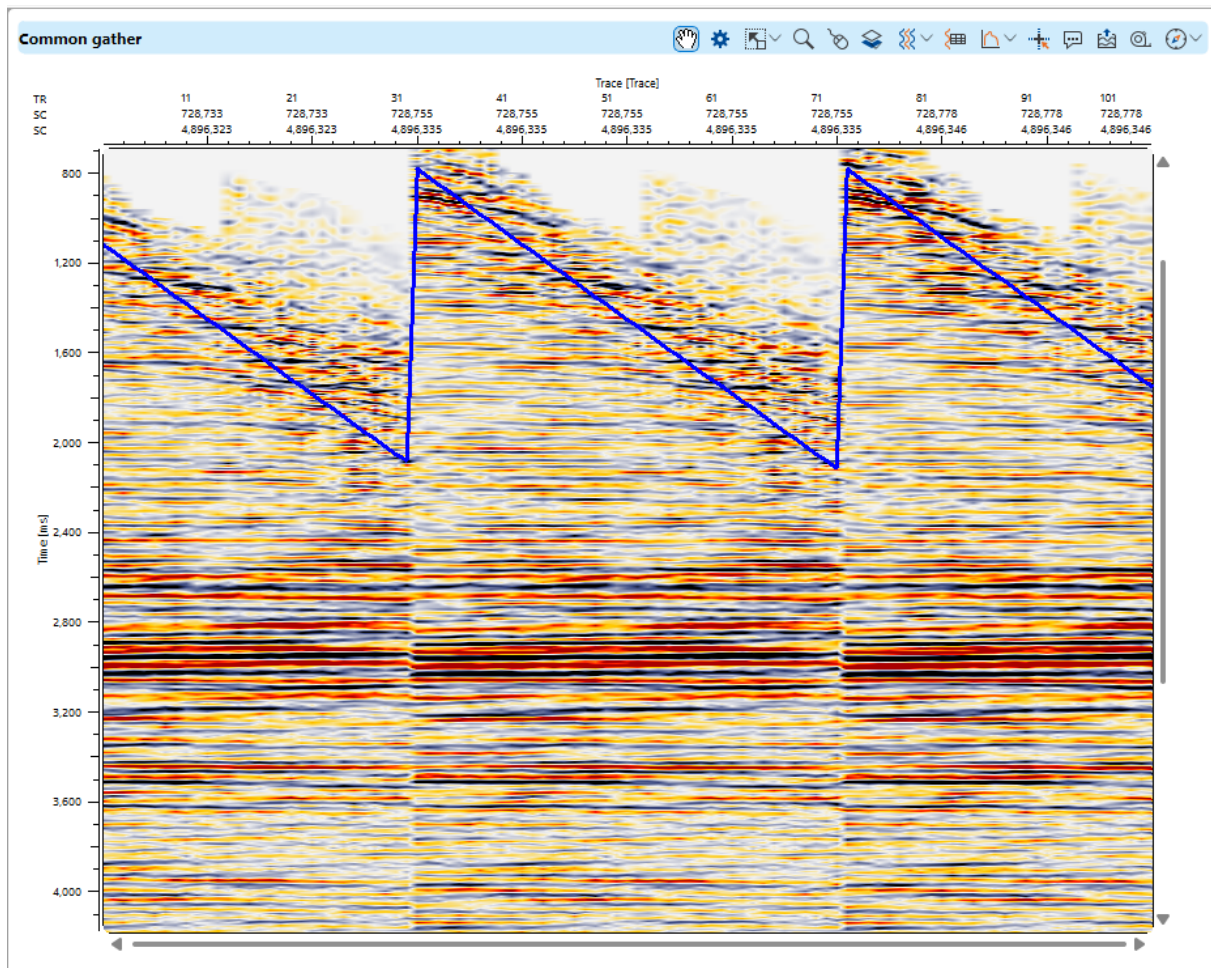
3.4.2 Common gather

The **Common gather** is a core visualization tool in **g-Viewer**, designed for displaying and analyzing seismic data.

To open this view navigate to the [View Manager](#) Panel, right-click within it, and select **Add View**.



A pop-up window appear, specify a View type and click OK



Functional panel allows user to perform the following actions:



open View properties panel



adjust view area to all visible objects



adjust horizontal scale



adjust vertical scale



set/unset zoomable



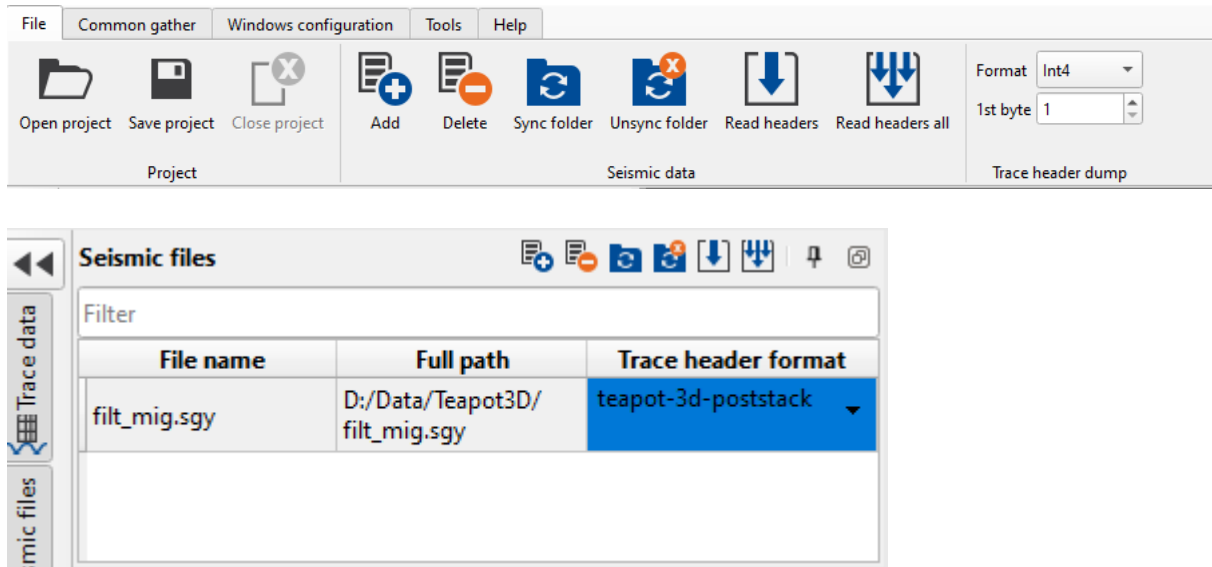
set control item

-  add vista
-  select traces
-  trace data
-  spectral analysis tool - multi selection
-  spectral analysis tool - single selection
-  enable mouse tracker
-  enable tool tip
-  export picture
-  ruler tool
-  show compass
-  show minimap
-  show scale bar

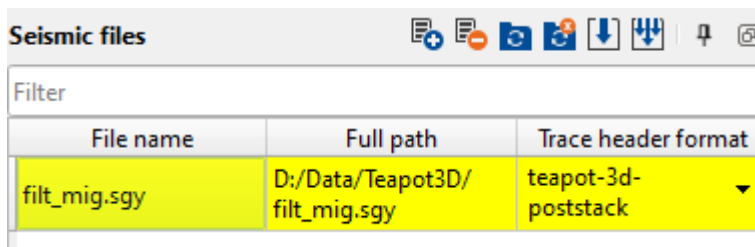
3.4.3 3D View

Note: *The suggested 3D volume size should be less than the current workstation RAM size. It is also worth to mention that the RAM size should be 2.5 times bigger than the input data size.*

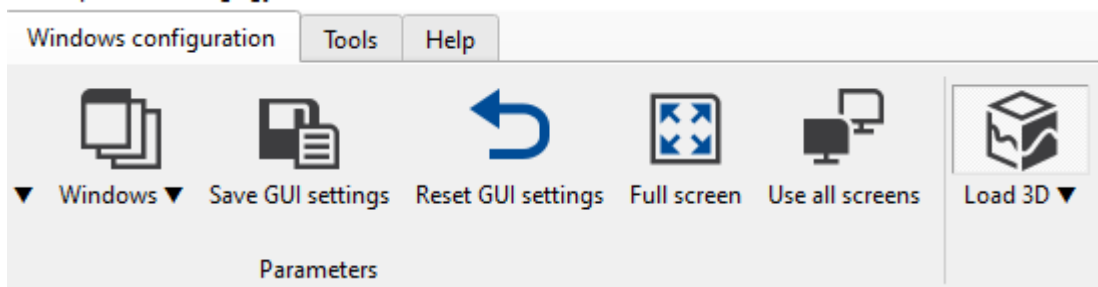
To view 3D volumes in **g-Viewer**, the user should first load the 3D volume by adding the data file(s) from the **File** tab and click the **Add** button.



Once the file is loaded, it partially loads the trace headers information. In order to see the all the trace headers information, the user must click on the "**Load trace headers from selected files**"  option located on the **Seismic files** window. It will load all the trace headers information. This will update the Location map. Please check the **Location map** and confirm whether the positioning is satisfactory. If not then the user should check the "**Trace header format**" and redo it again.



Now click on **Load 3D** icon from the **Windows configuration** tab.

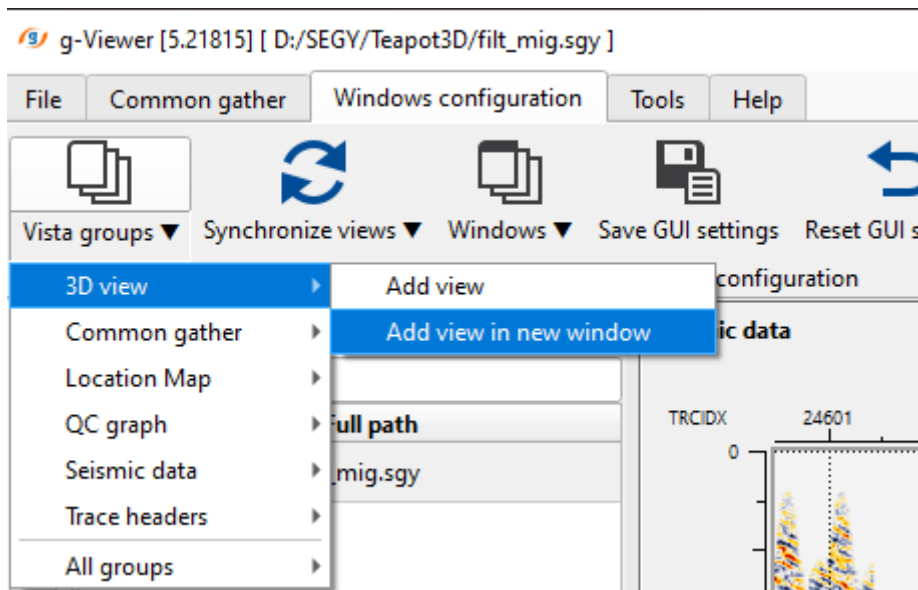


When the user clicks on a small inverted triangle of **Load3D** icon, it gives two options to choose from.

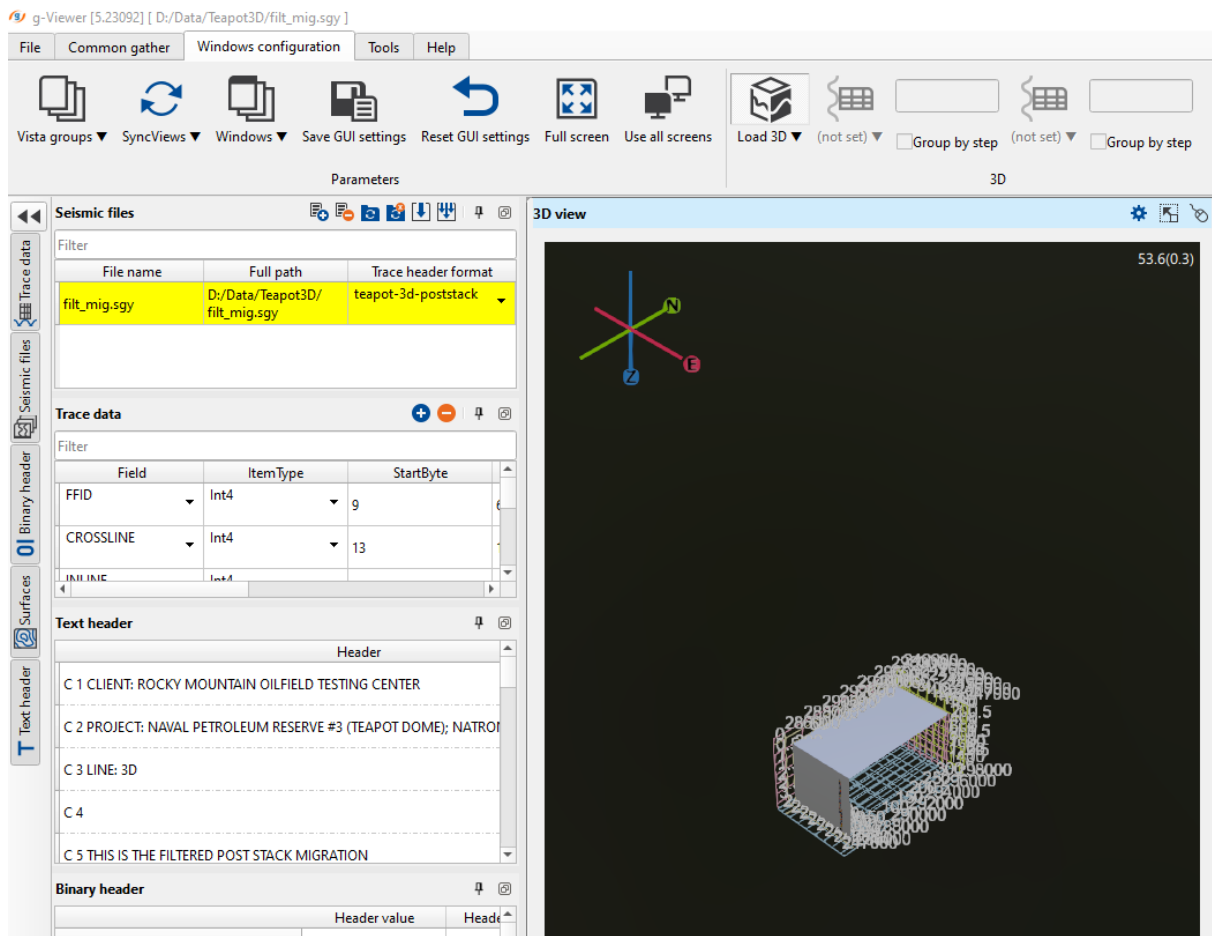


Select the appropriate option. In order to **show 2D data as volume** then the user should set the **Group** accordingly and click **Apply**. Please keep in mind that the 2D data should be **Prestack only**.

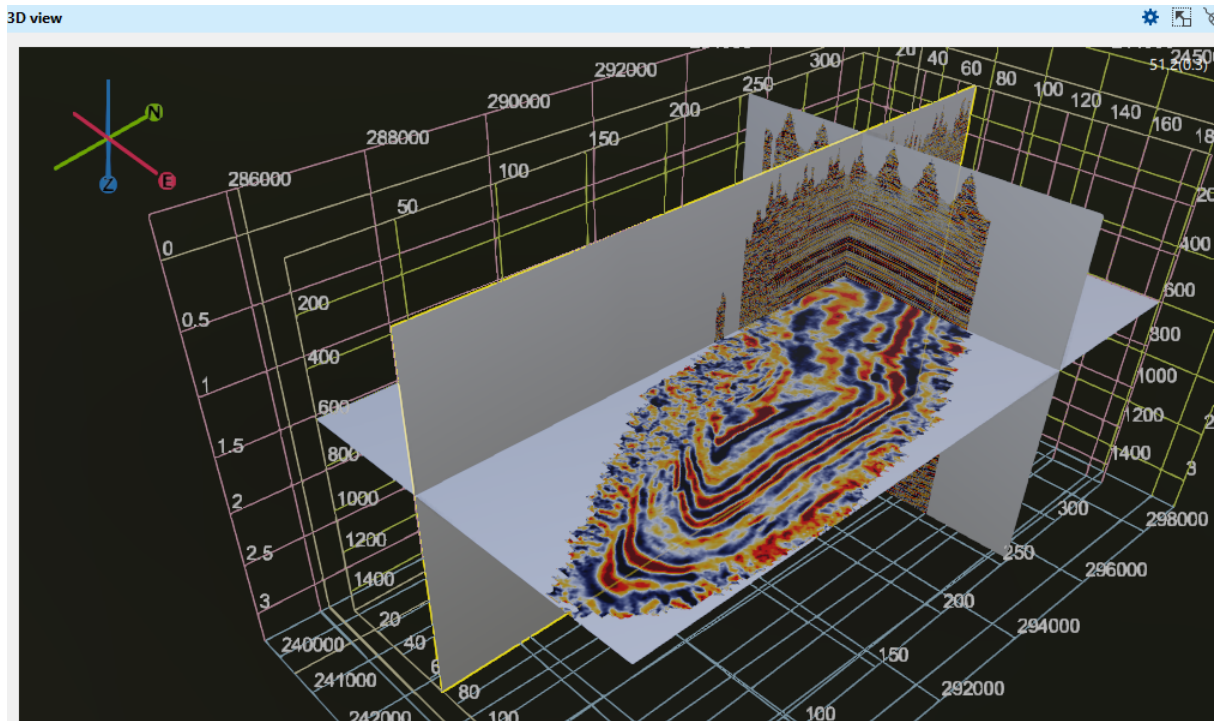
Now go to **Windows Configuration** tab in the ribbon and click on **Vista Groups -> 3D view -> Add view in new Window**.



Once we added the vista items in the new window, now we can able to see the vista items as shown below.



To adjust the view, the user can click on the "**Adjust to size (Ctrl+A)**" icon  from the **3D view** window. To Zoom In/Out, the user can use the mouse wheel to go back and forth.



How to move around the volume?

To rotate the volume in any direction use **MB3** (Right mouse button). User can also able to do the rotation by holding **Ctrl+MB3** button.

To move the volume either up/down or left/right, use **Shift+MB3**(Right mouse button). This option won't rotate the volume. It will remain in it's original position during the movement of volume quite contrast to using **Ctrl+MB3** where it rotates the volume

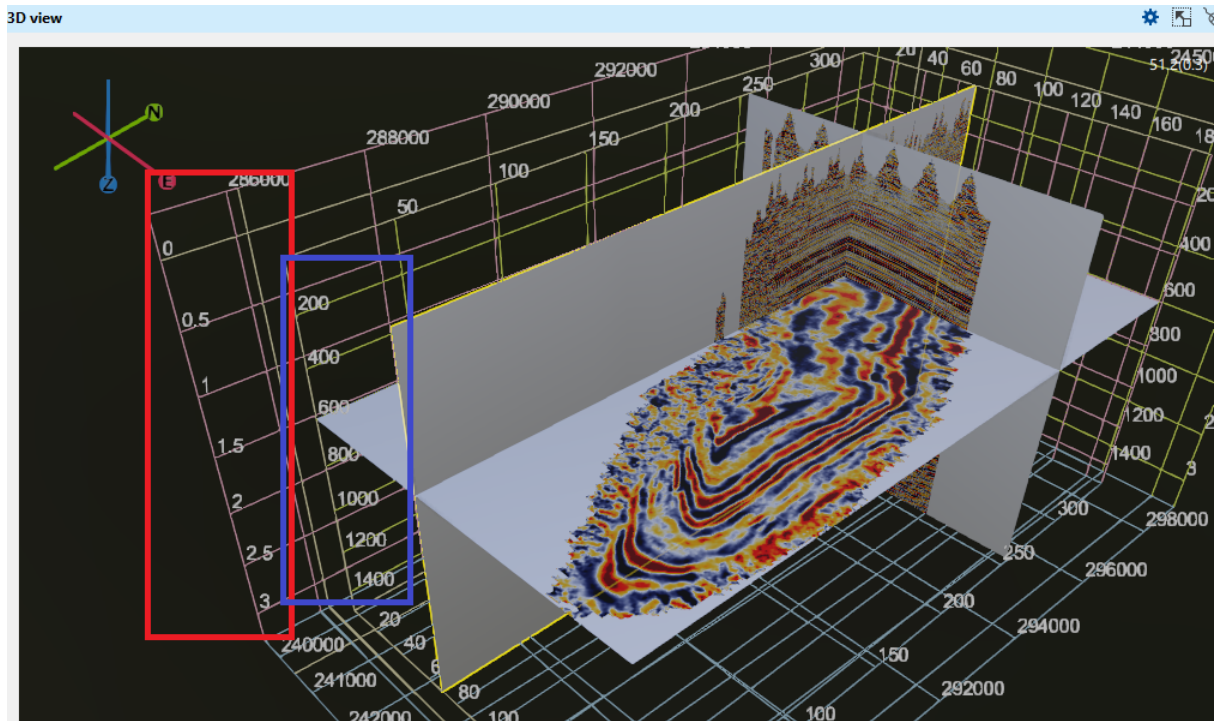
To move any inline/xline, just click/select on that inline/xline with **MB1** and move wherever you want.

To move the time/depth slice, it's as same as the inline/xline. Simply hold **MB1** and move up/down.

The user can use the mouse wheel (**MB2** or middle mouse button) to zoom in/out the volume.

Vertical scale

In 3D view, we have two vertical scales. One is inside the volume and other is outside the volume. These two vertical scales shows us two different set of values. Why?



The vertical scale of the inside grid (marked as blue rectangle) is showing the volume in **samples**. Like if we have 3000ms of record length and we have 4ms of sample interval, it will display like 200, 400 etc.

The vertical scale of the outside grid (marked as red rectangle) is showing the volume in **seconds**. If the record length is 3000ms then we can see it as 1s, 1.5s etc.

View properties of 3D view:

View properties of 3D view window is divided into 3 parts.

View properties

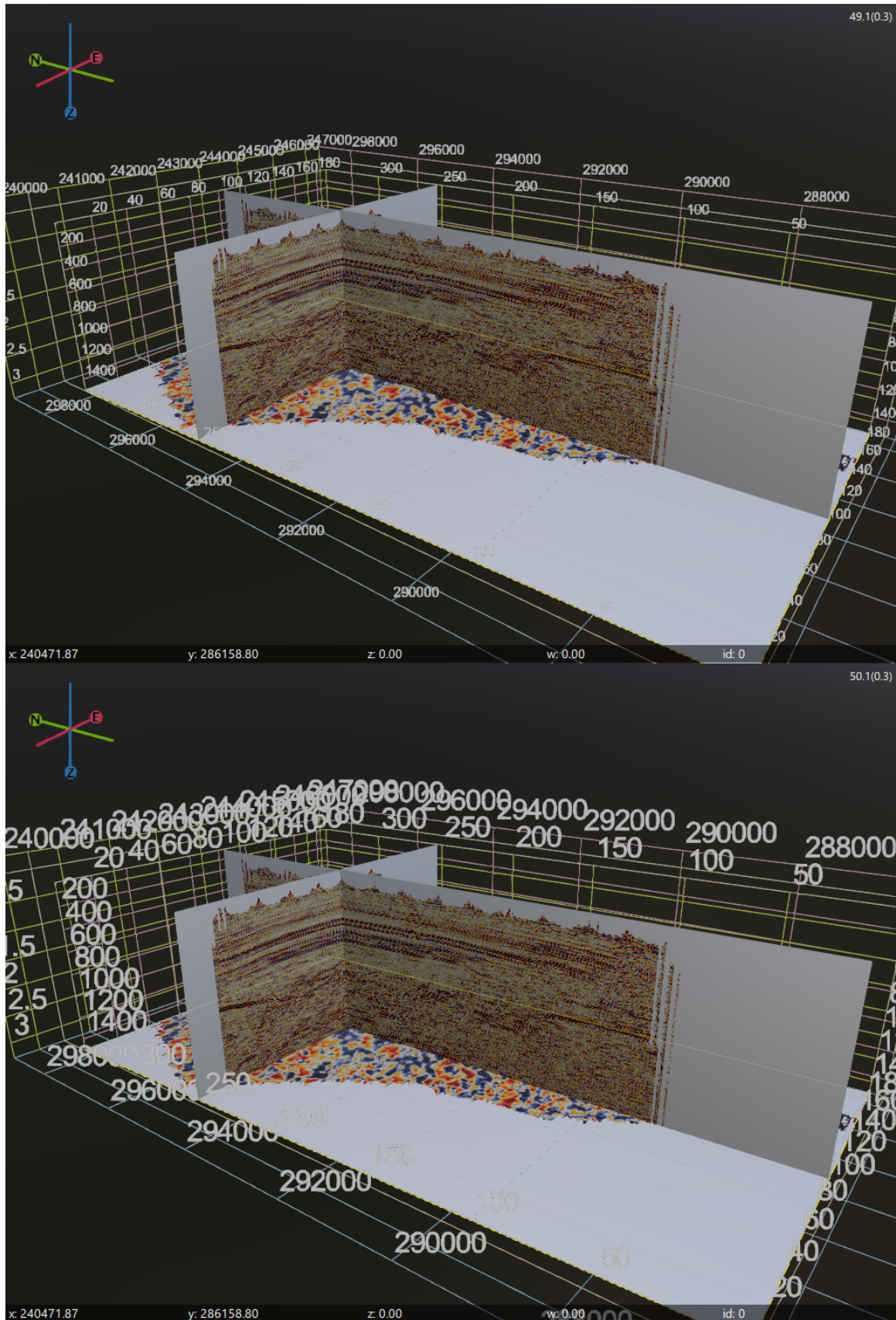
Vista items

Vista item properties

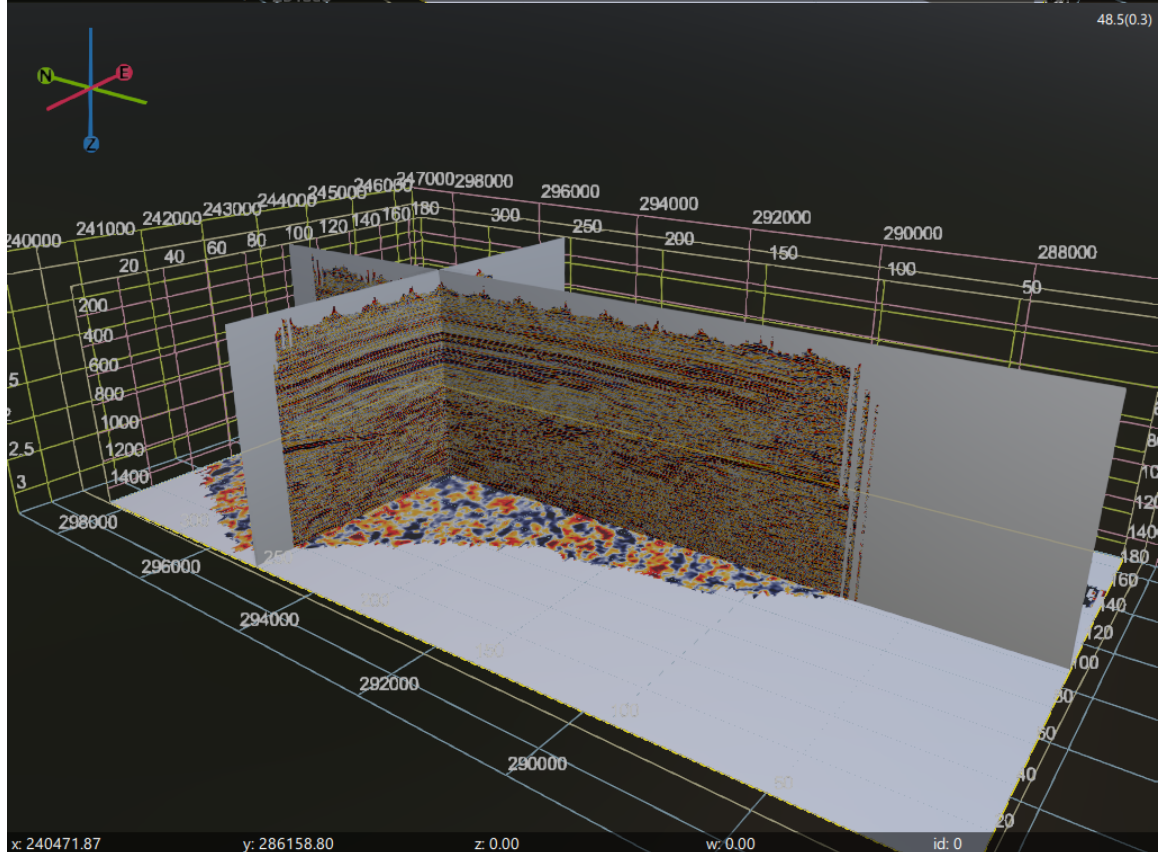
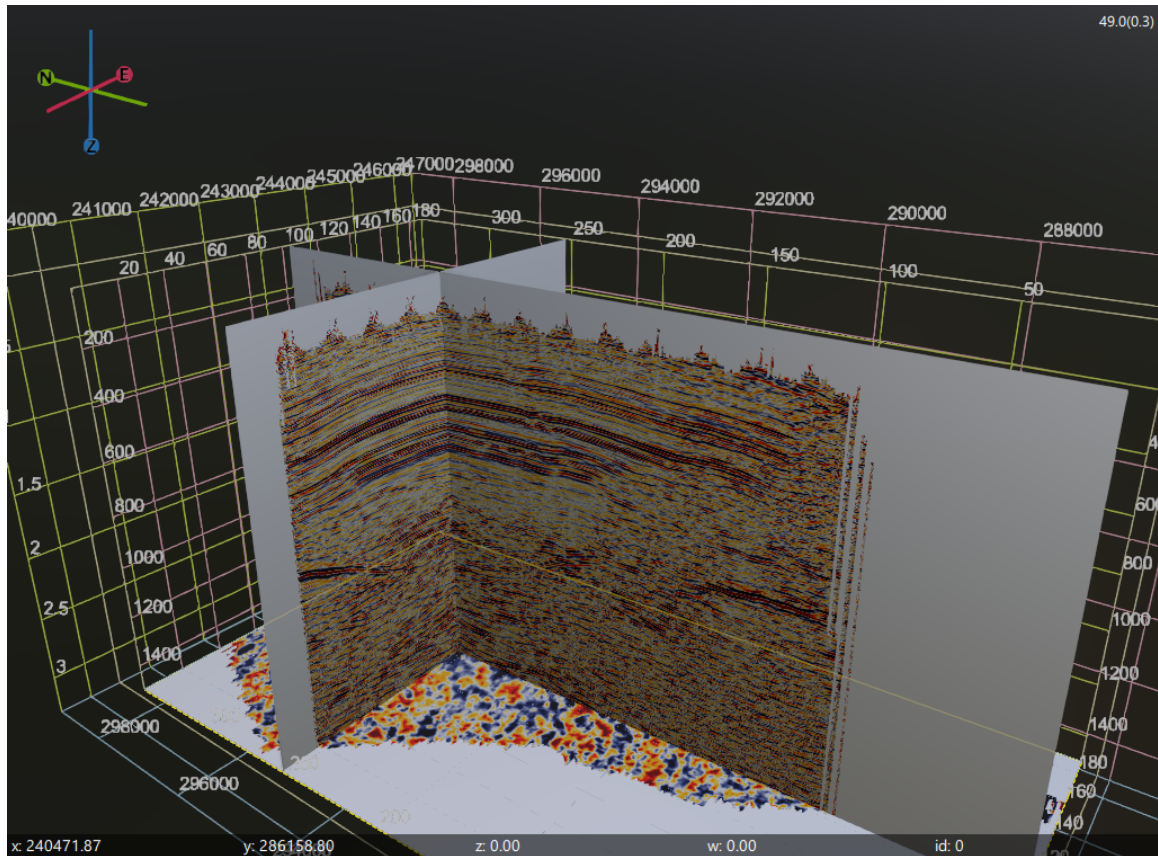
View properties

It is the top of the section. The user can pay attention to few parameters.

Label size - The user can change the size of the X,Y,Inline, Cross line, Time/Depth slice labels. By default it is 1. Here we are changing it from 1 to 2. We can see the changes in the below image.



TTD - Time To Depth. By changing this parameter value, the user can either expand or compress the volume. By default, this value is set to 2000



In the above display, on the left hand side we can see the display TTD at 2000. The same volume is displayed on the right hand side with TTD as 1000.

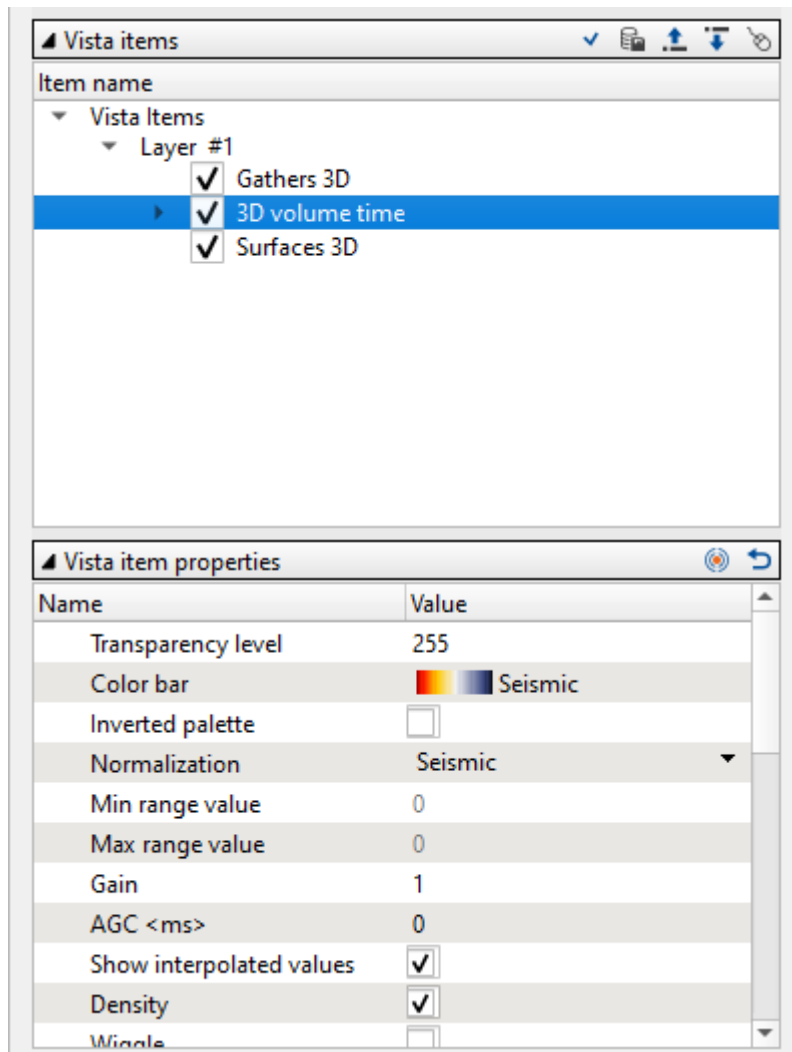
Vista items:

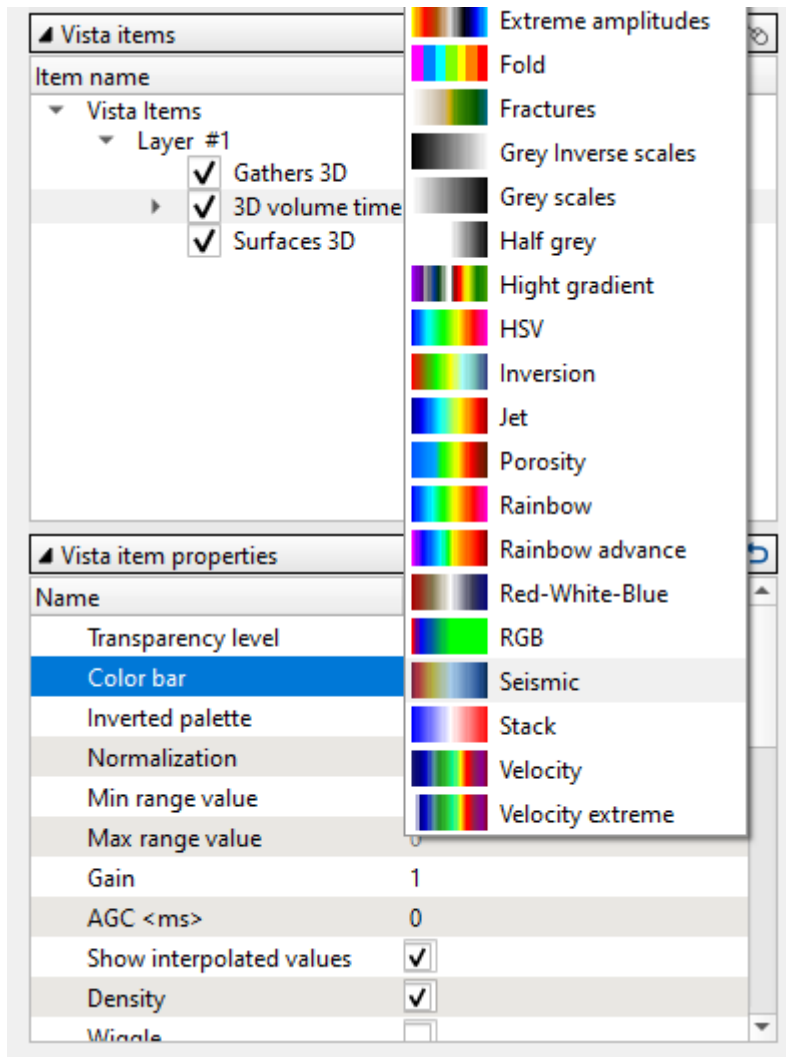
In this window, all the displayable items present. In case of 3D view, usually we have **Gathers 3D, 3D volume time, Surfaces 3D items**.

Whenever the user selects any one of the Vista items in this window, their corresponding properties will appear in the bottom window. Here the user can change the display properties of the selected Vista item.

Vista item properties:

As we mentioned earlier, this is a direct connection with the selected Vista items. If the user wants to change Color bar of 3D volume time vista item, first they need select in the Vista items and come to Vista item properties window and choose the desired color bar option available from the drop down menu.





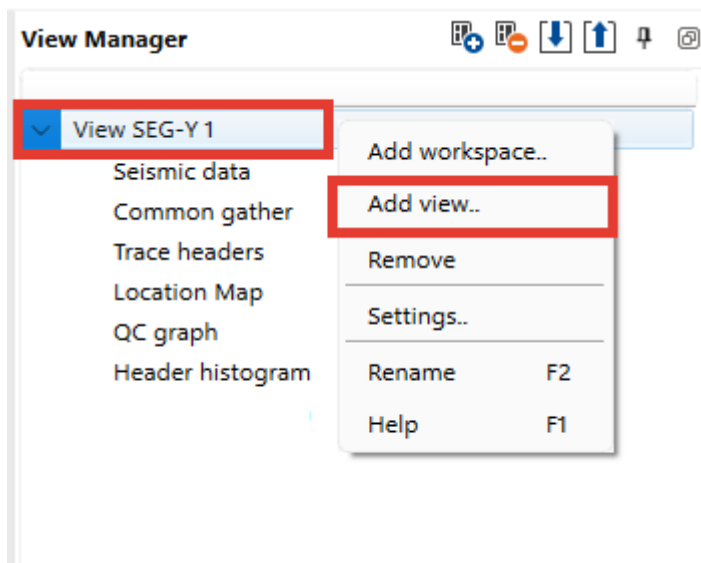
3.4.4 Header histogram view

Header histograms are used to evaluate and validate trace header fields.

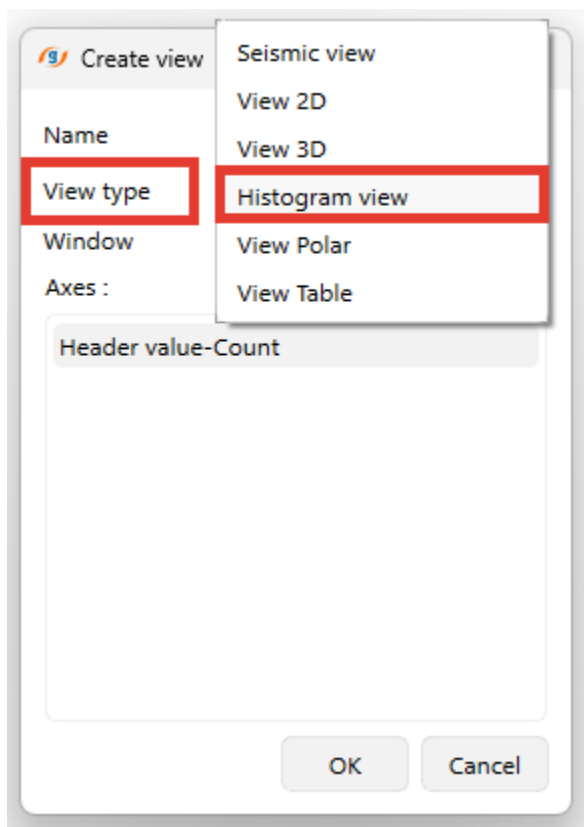
Users can identify potential issues such as missing data, outliers, or irregularities in binning.

It aids in ensuring proper alignment and consistency of seismic traces before further processing steps like stacking or migration.

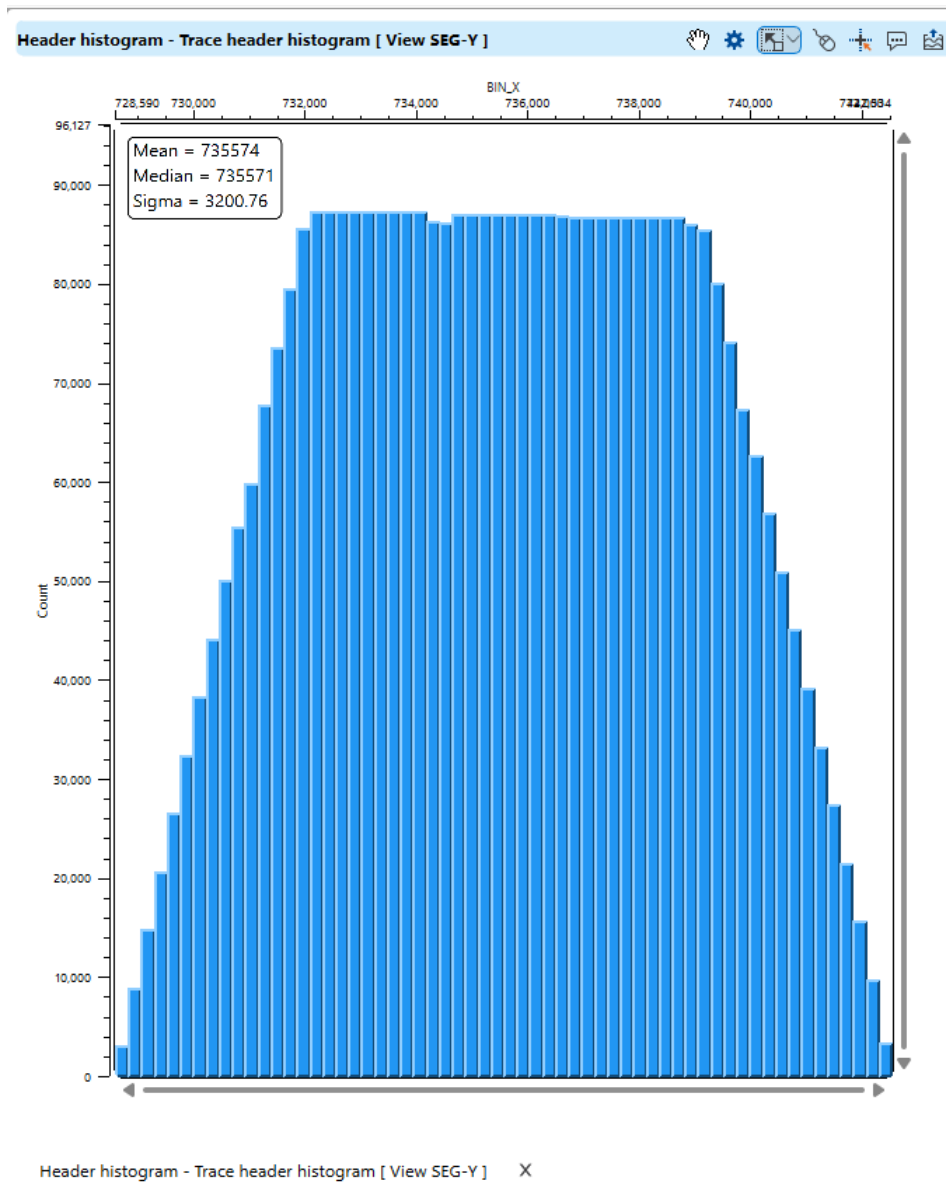
To open this view navigate to the [View Manager](#) ⁶² Panel, right-click within it, and select **Add View**.



A pop-up window appear, specify a View type and click OK



This histogram serves as a diagnostic tool for quality control and data exploration within seismic datasets.



Functional panel allows user to perform the following actions:



open View properties panel



adjust view area to all visible objects



adjust horizontal scale



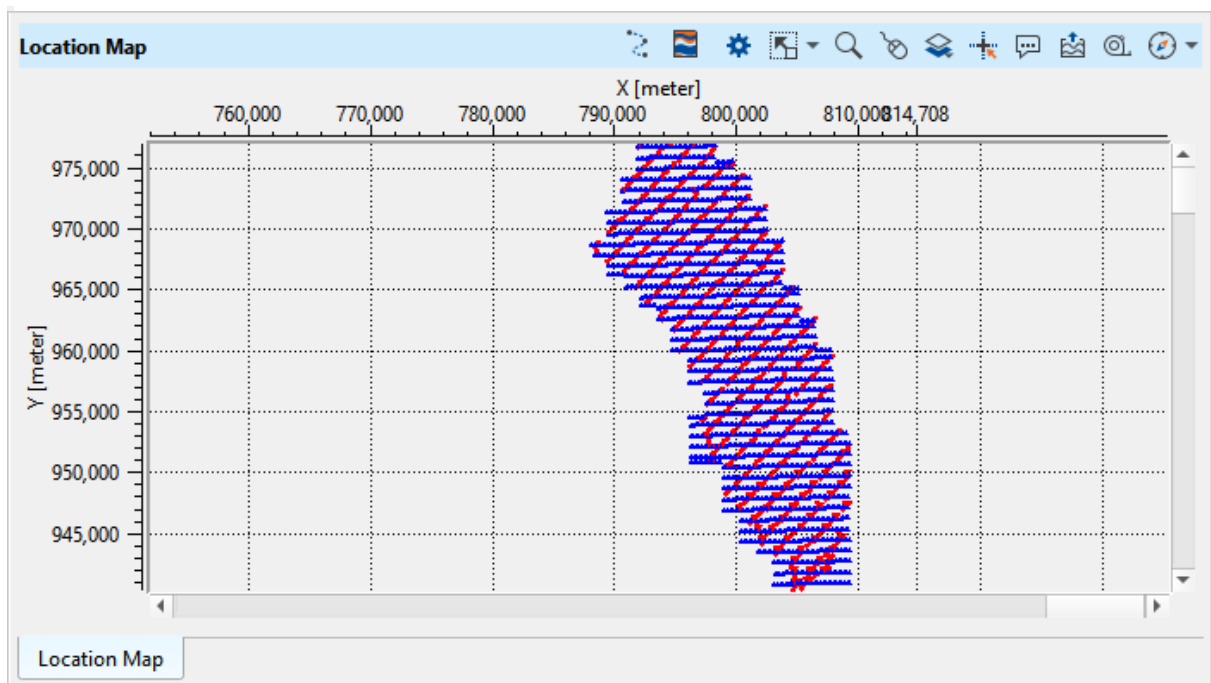
adjust vertical scale

-  set control item
-  enable mouse tracker
-  enable tool tip
-  export picture

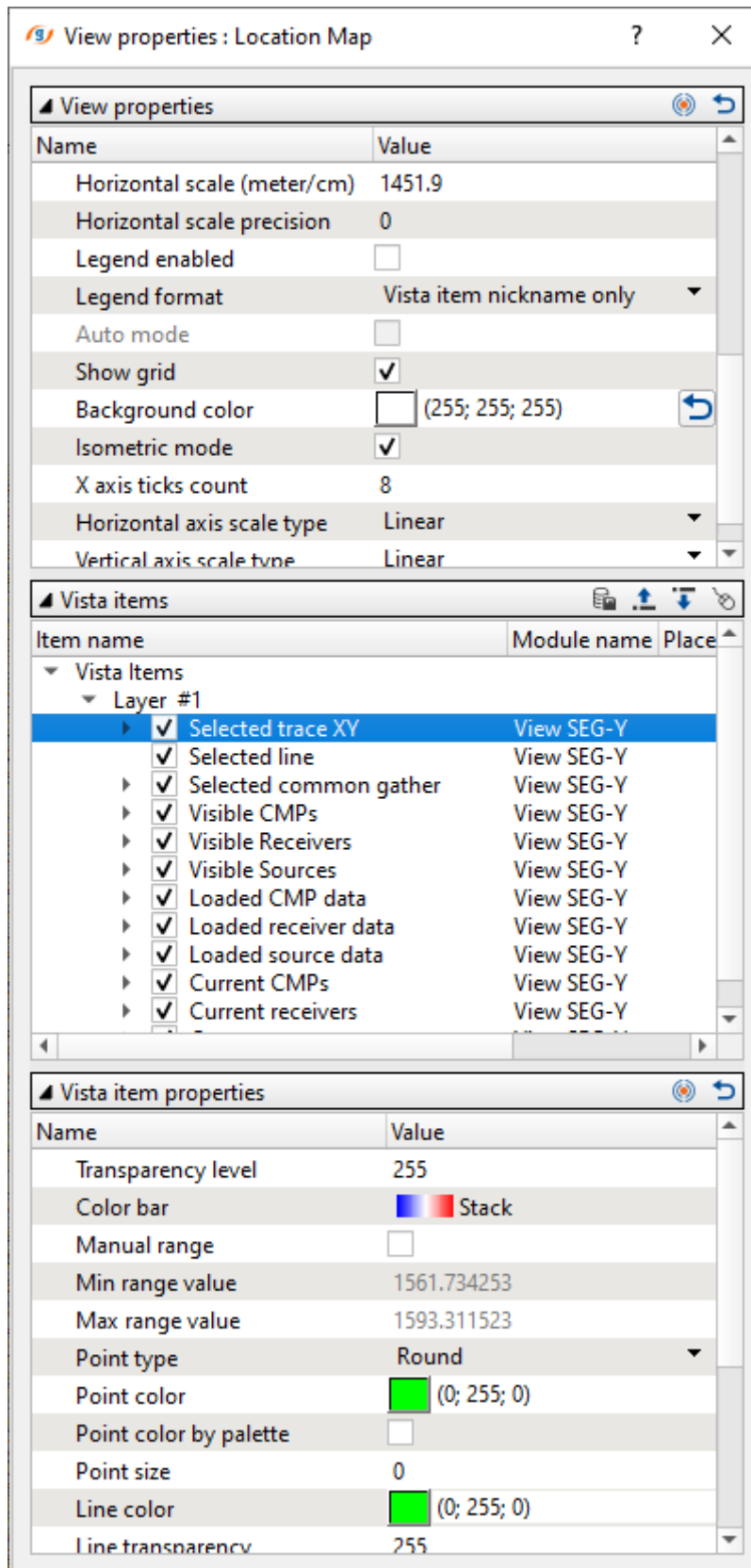
3.4.5 Location Map

With the interactive location map in g-Viewer, the user should find it easy to choose Common Shot, Common Receiver, or Common Mid-Point gathers from the location map by selecting the **Control item** icon (4th icon from left). Within the location map the user can not only can select desired CS/CR/CMP gathers, but also measure the distance between Shot/Receiver/CMP gathers and/or line length etc. by using the **Ruler** icon (2nd icon from right).

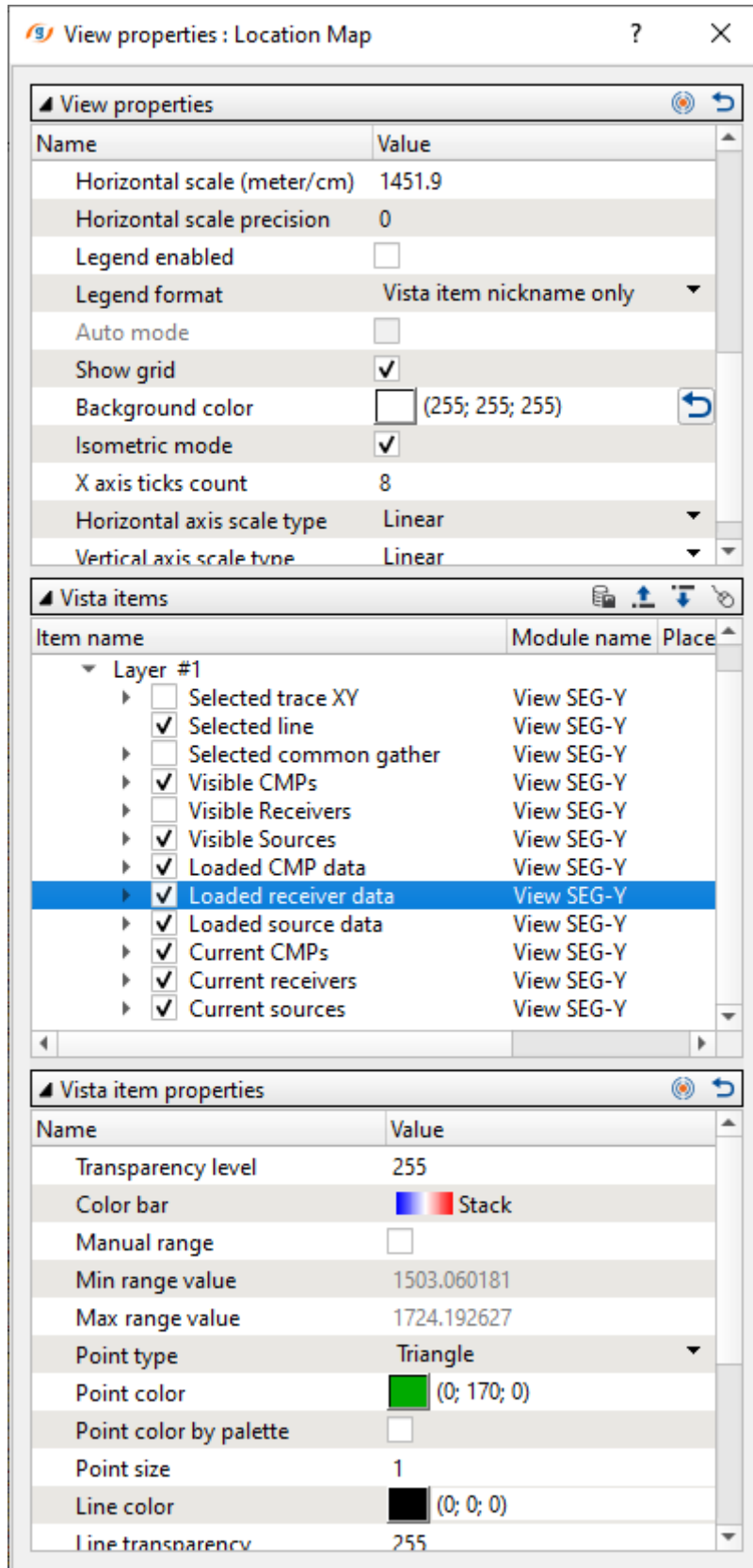
To expand or compress the horizontal or vertical scales of the location map, the user can able to do so by holding the **MB1** button either on the horizontal/vertical scale and move up and down to see the changes. To do the same in the middle of the location map, the user should use the middle mouse button (**MB2**) to activate the hand grab symbol to move around.



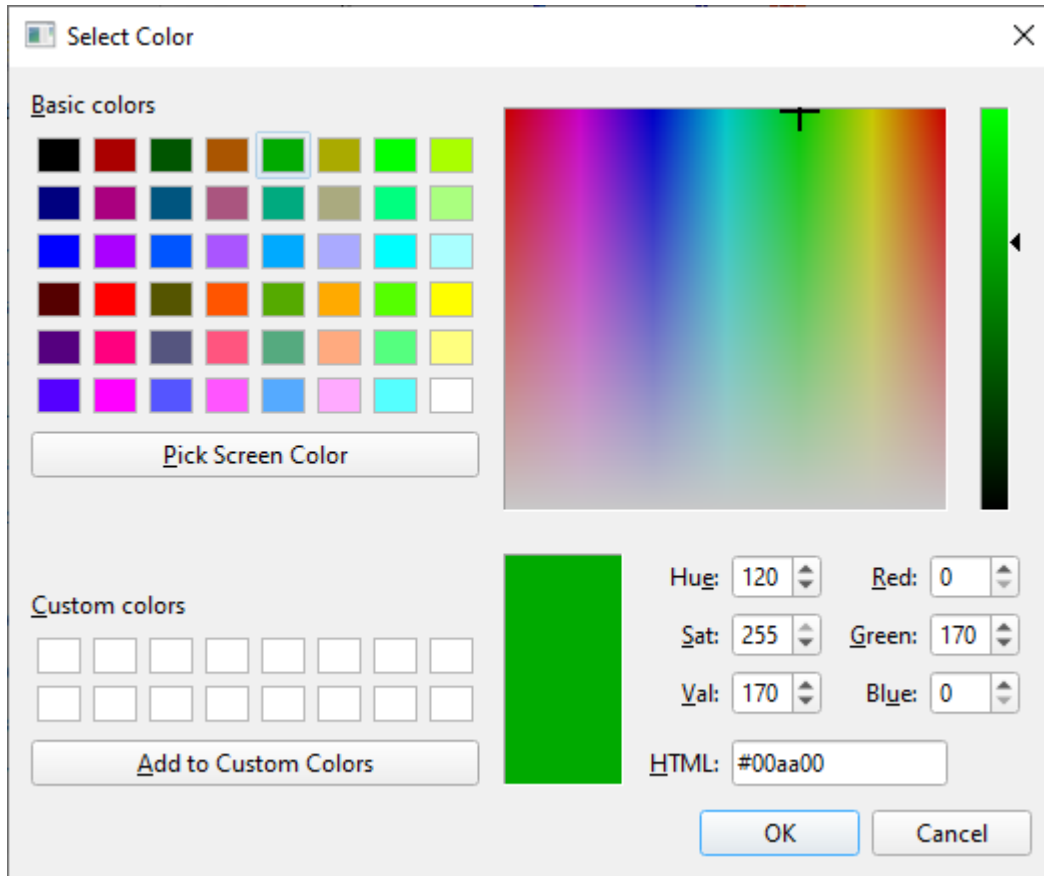
To make any visual changes to the location map, user should click on **Show Properties** (cog wheel) button then the **Show properties** windows pops-up.



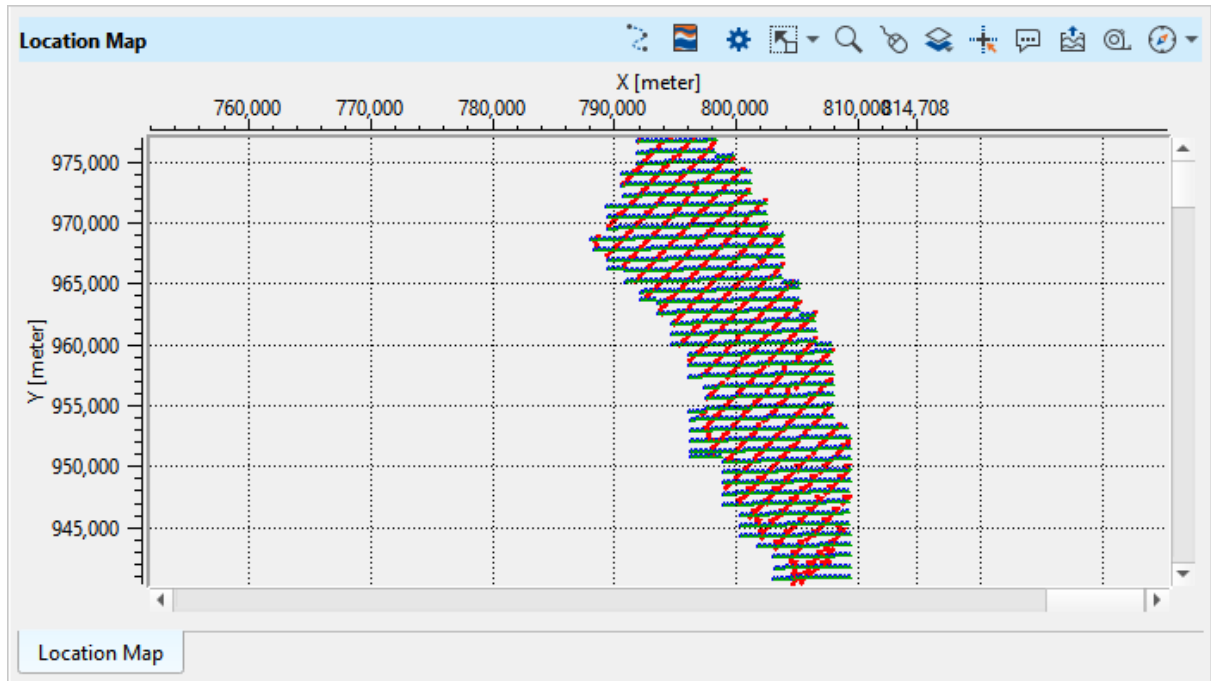
To make any changes of the visuals, user should select any vista item (middle window) and the corresponding **Vista item properties** window activates and show the contents of it to make the necessary changes.



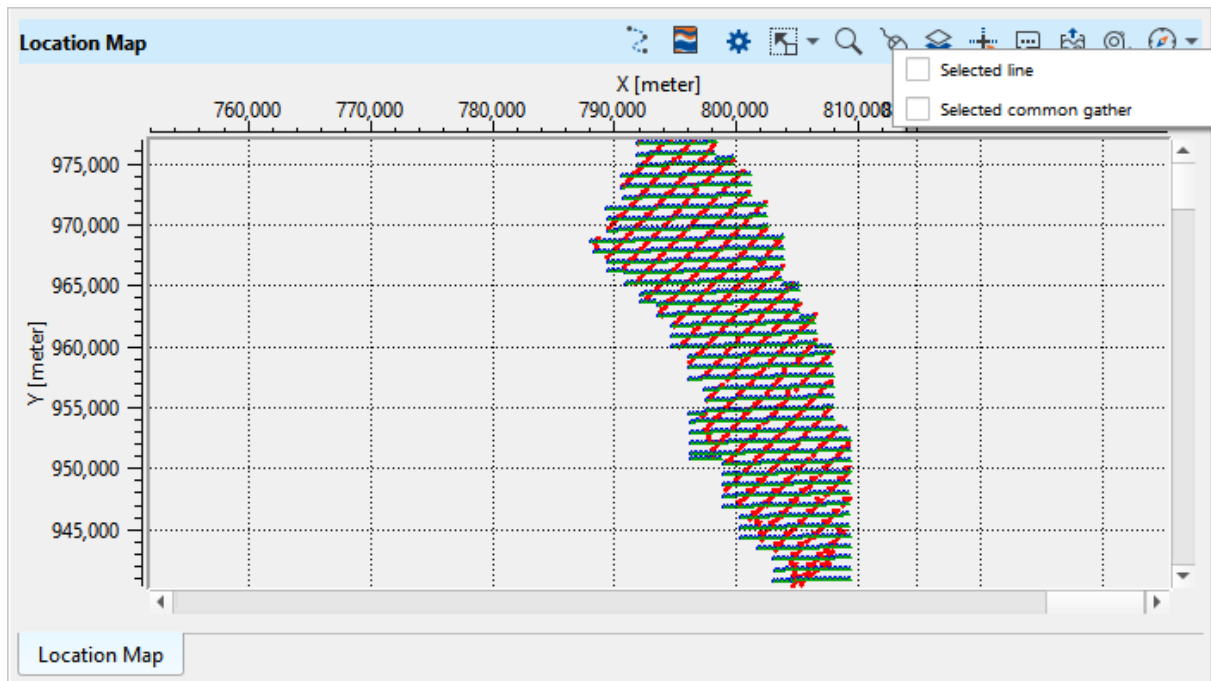
In this instance, we've selected the vista item **Loaded receiver data** and the corresponding vista items properties activated. If you observe the Point color of Receiver is Blue and now we would like to change it into Green or whatever color the user wants to change.



To do that, the user should click on **Point color** inside the **Vista item properties** and then we see a Select color window pops up. Now select the desired color and click **OK** and look at the changes(receivers color) in the location map.



Likewise the user can able to make necessary changes not only in the location map but also in the g-Viewer where there is a **Show properties** (cog wheel) icon is available. Besides, location map got other features to select any particular **Selected line** and/or **Selected common gather**. To achieve this, the user should select the **Control item** and choose the specific option from the available.



If we observe the above image, we can see that there are 2 options available to display the contents from the location map.

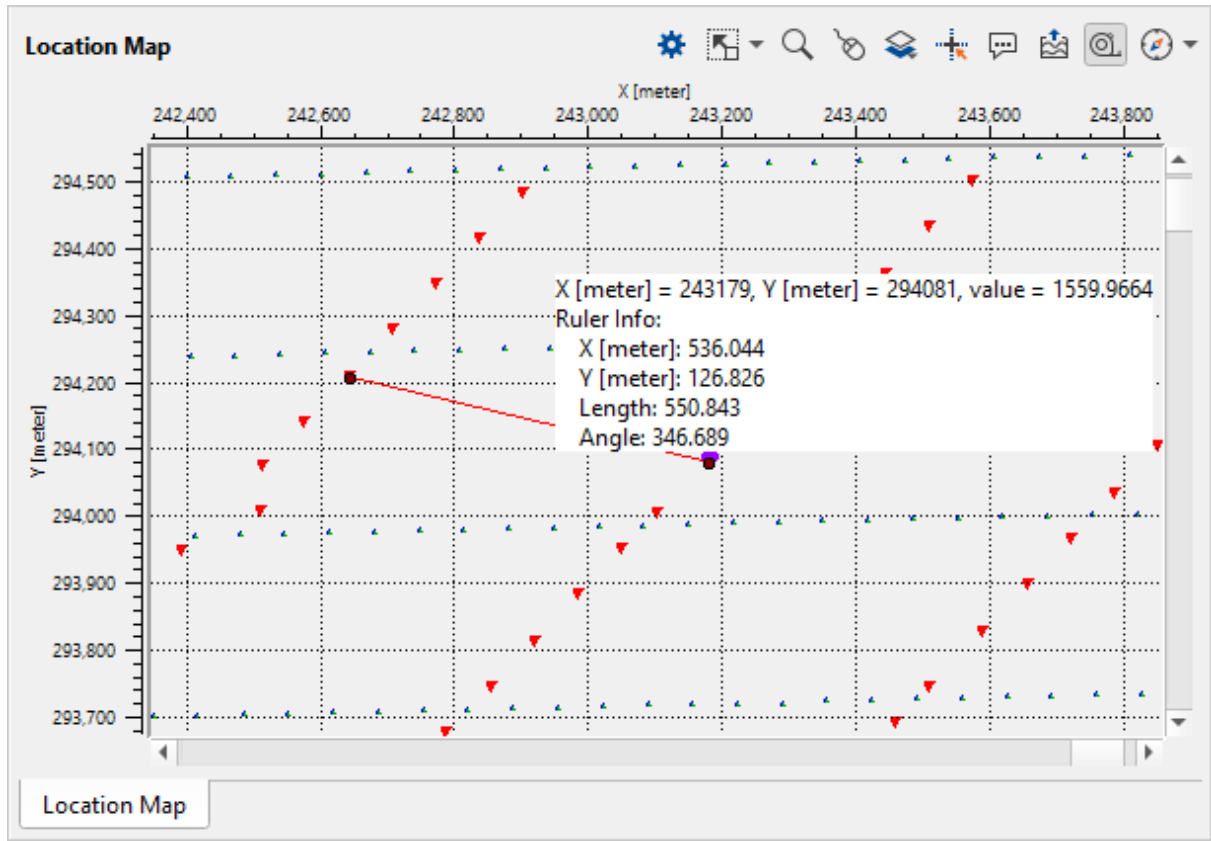
From the Select control item icon in the Location map, we have two options.

Select line - This option is useful in case there are **multiple 2D lines** are loaded and the user wants **to select a particular line among those 2D lines**. In case, there are **multiple 3D volumes** with different coordinate positions then by choosing this option, the user can able to **select one of the volumes**.

Selected common gather - With this option, the user can able to select **FFID, Source_SP, Receiver_SP, Source_Seq, Receiver_Seq, Source_Line, Receiver_Line etc** from the location map. To do that, the user should go to **Common Gather** tab and select the **Group by** option and select preferred headers from the **Headers** icon. More detailed explanation is covered **Common gather**.

As we mentioned earlier, location map is not only used for displaying the selected line and/or common gather but it can also be used to measure the distance between to points.

If the user wants to measure the distance between two shot points for example, then they should select the **"Ruler"** icon (2nd icon from right to left) on the location map, and draw a line between the two points to measure the distance between the two shot points. The functionality is the same to measure between any two points on the location map, even for an arbitrary straight line.



Here we would like to measure the distance between two source lines. So we selected the Ruler icon and draw a line by holding MB1 and continue draw till to the desired location. Now the tool tip will give all the information.

3.4.6 QC graph

In **g-Viewer** the user can plot any 3 trace headers. 2 trace headers can be plotted as horizontal and vertical axes and the 3rd trace header graphed in color. In the Trace Headers table the user can select any desired trace headers and plot them. The resultant plot can be seen in the QC graph tab.

Trace headers

	ffid <FFID> [X]	tracf <CHANNEL> [Z]	ep <SOURCE_SP>	cdp <CDP>	trid <TRACE_TYPE>	nhs <FOLD>	duse <DATA_USE>	offset <OFFSET> [Y]	gelev <RECEIVER_ELEV>	selev <SOURCE_ELEV>	sd <SOURCE>
1	785.0	10.0	6002.0	153.0	1.0	1.0	0.0	1220.0	55232000.0	53201000.0	0.0
2	785.0	11.0	6002.0	154.0	1.0	1.0	0.0	1439.0	55254000.0	53201000.0	0.0
3	785.0	12.0	6002.0	155.0	1.0	1.0	0.0	1659.0	55502000.0	53201000.0	0.0
4	785.0	13.0	6002.0	156.0	1.0	1.0	0.0	1878.0	55805000.0	53201000.0	0.0
5	785.0	14.0	6002.0	157.0	1.0	1.0	0.0	2096.0	55897000.0	53201000.0	0.0
6	785.0	15.0	6002.0	158.0	1.0	1.0	0.0	2316.0	55783000.0	53201000.0	0.0
7	785.0	16.0	6002.0	159.0	1.0	1.0	0.0	2535.0	56304000.0	53201000.0	0.0
8	785.0	17.0	6002.0	160.0	1.0	1.0	0.0	2755.0	56568000.0	53201000.0	0.0
9	785.0	18.0	6002.0	161.0	1.0	1.0	0.0	2976.0	56286000.0	53201000.0	0.0
10	785.0	1.0	6002.0	332.0	1.0	1.0	0.0	773.0	54235000.0	53201000.0	0.0

Trace headers

Here we are selecting FFID as horizontal axis. To do that, user should right click on the FFID column and choose Show as horizontal axis option. Similarly we can select the other trace headers for vertical axis (In this case OFFSET) and color to display.

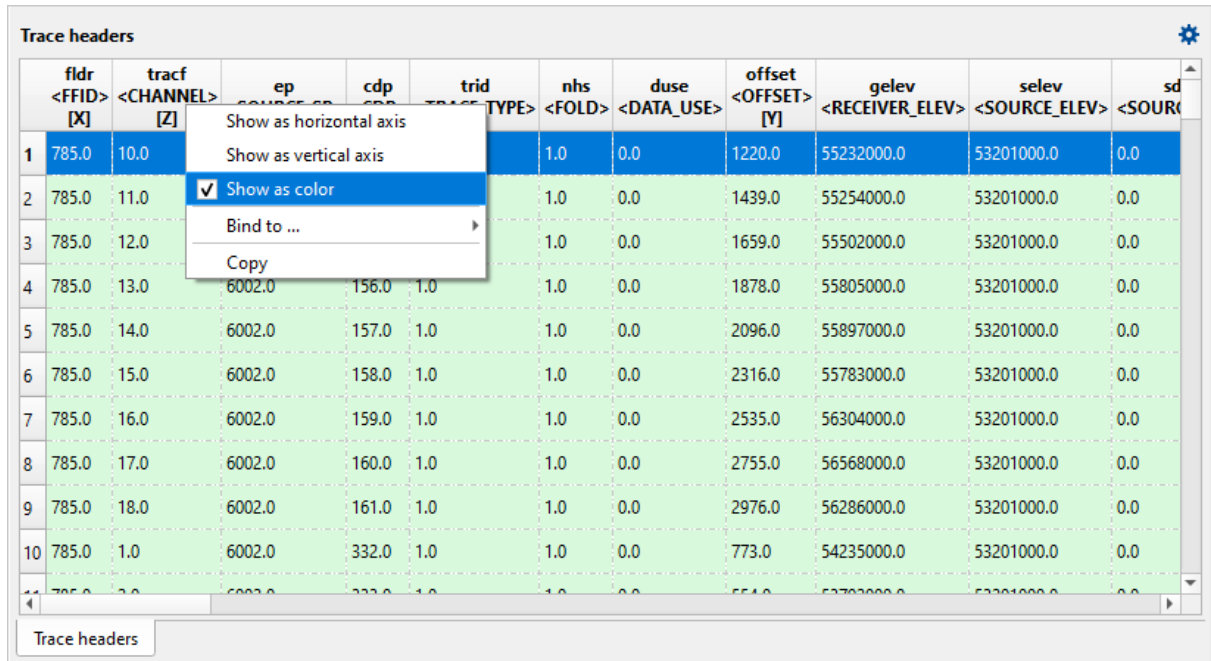
Trace headers

	ffid <FFID> [X]	tracf <CHANNEL> [Z]	ep <SOURCE_SP>	cdp <CDP>	trid <TRACE_TYPE>	nhs <FOLD>	duse <DATA_USE>	offset <OFFSET> [Y]	gelev <RECEIVER_ELEV>	selev <SOURCE_ELEV>	sd <SOURCE>
1	785.0	10.0	6002.0	153.0	1.0	1.0	0.0	1220.0	55232000.0	53201000.0	0.0
2	785.0	11.0	6002.0	154.0	1.0	1.0	0.0	1439.0	55254000.0	53201000.0	0.0
3	785.0	12.0	6002.0	155.0	1.0	1.0	0.0	1659.0	55502000.0	53201000.0	0.0
4	785.0	13.0	6002.0	156.0	1.0	1.0	0.0	1878.0	55805000.0	53201000.0	0.0
5	785.0	14.0	6002.0	157.0	1.0	1.0	0.0	2096.0	55897000.0	53201000.0	0.0
6	785.0	15.0	6002.0	158.0	1.0	1.0	0.0	2316.0	55783000.0	53201000.0	0.0
7	785.0	16.0	6002.0	159.0	1.0	1.0	0.0	2535.0	56304000.0	53201000.0	0.0
8	785.0	17.0	6002.0	160.0	1.0	1.0	0.0	2755.0	56568000.0	53201000.0	0.0
9	785.0	18.0	6002.0	161.0	1.0	1.0	0.0	2976.0	56286000.0	53201000.0	0.0
10	785.0	1.0	6002.0	332.0	1.0	1.0	0.0	773.0	54235000.0	53201000.0	0.0

Trace headers

Finally we can select CHANNEL column as a color for the QC graph display.

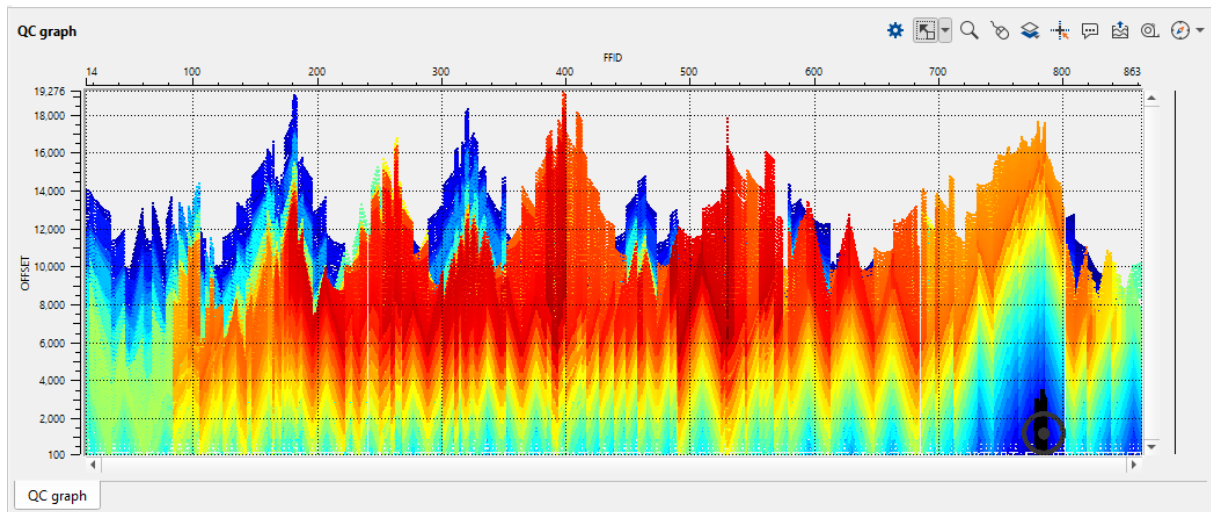
Trace headers



	fldr <FFID> [X]	tracf <CHANNEL> [Z]	ep <SOURCE_ELEV> [E]	cdp <CDP> [C]	trid <TRACE_TYPE> [T]	nhs <FOLD> [F]	duse <DATA_USE> [D]	offset <OFFSET> [Y]	gelev <RECEIVER_ELEV> [R]	selev <SOURCE_ELEV> [S]	sd <SOURCE_DEPTH> [D]
1	785.0	10.0	6002.0	156.0	1.0	1.0	0.0	1220.0	55232000.0	53201000.0	0.0
2	785.0	11.0	6002.0	157.0	1.0	1.0	0.0	1439.0	55254000.0	53201000.0	0.0
3	785.0	12.0	6002.0	158.0	1.0	1.0	0.0	1659.0	55502000.0	53201000.0	0.0
4	785.0	13.0	6002.0	159.0	1.0	1.0	0.0	1878.0	55805000.0	53201000.0	0.0
5	785.0	14.0	6002.0	160.0	1.0	1.0	0.0	2096.0	55897000.0	53201000.0	0.0
6	785.0	15.0	6002.0	161.0	1.0	1.0	0.0	2316.0	55783000.0	53201000.0	0.0
7	785.0	16.0	6002.0	162.0	1.0	1.0	0.0	2535.0	56304000.0	53201000.0	0.0
8	785.0	17.0	6002.0	163.0	1.0	1.0	0.0	2755.0	56568000.0	53201000.0	0.0
9	785.0	18.0	6002.0	164.0	1.0	1.0	0.0	2976.0	56286000.0	53201000.0	0.0
10	785.0	1.0	6002.0	332.0	1.0	1.0	0.0	773.0	54235000.0	53201000.0	0.0

Trace headers

The resultant QC graph is as shown below.



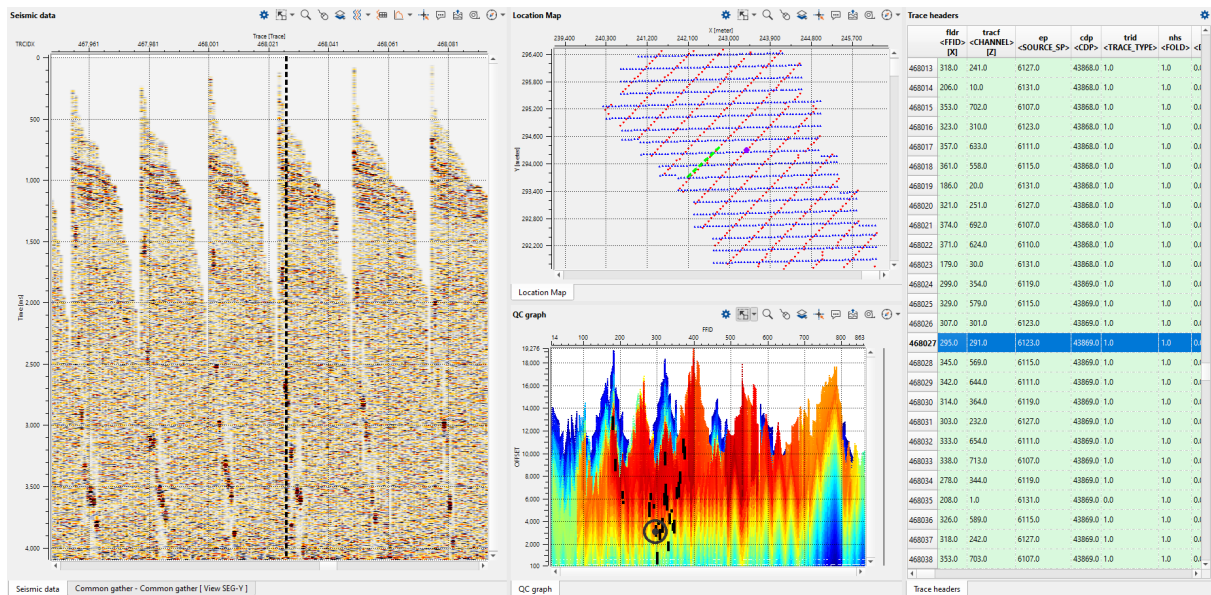
Likewise the user can cross plot any of 3 trace headers to quickly visualize and QC the trace headers in a more efficient way.

3.4.7 Trace headers

g-Viewer displays all the trace headers information in tabular form. The user can select any particular trace or scan through it to find the desired information. Besides it can be used to cross plot any of the seismic trace headers.

Let's see how we can select a trace from the trace header table and how it synchronizes with the other display views like Seismic data, Location map, QC Graph.

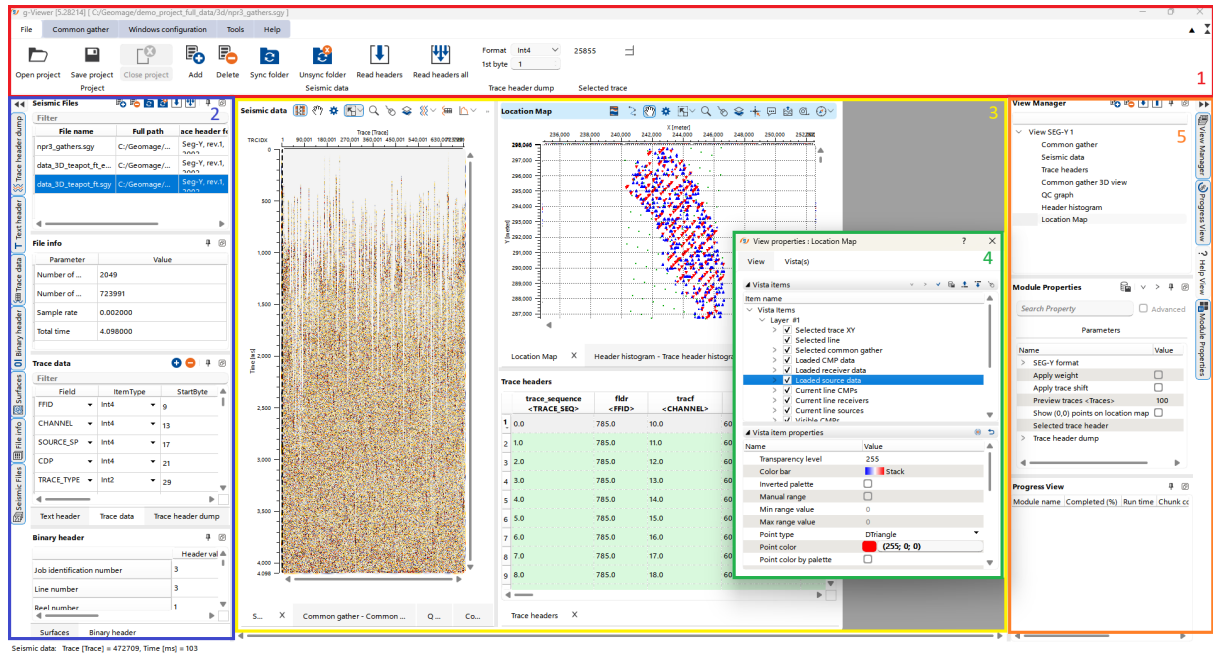
Click on any row in the Trace headers window and the corresponding trace is displayed on the seismic data (as a **vertical dotted line**) tab, location map (as a **Green dotted line**) and on the QC graph (as a **dot within a circle**) as shown below.



3.5 Workspaces

Workspace is a graphical setup of views that used to organize working process according to user's habits. User can add unlimited number of workspaces with unlimited number of [Views](#) in each Workspace.

The central area of the interface, highlighted in the yellow box, is a Workspace.

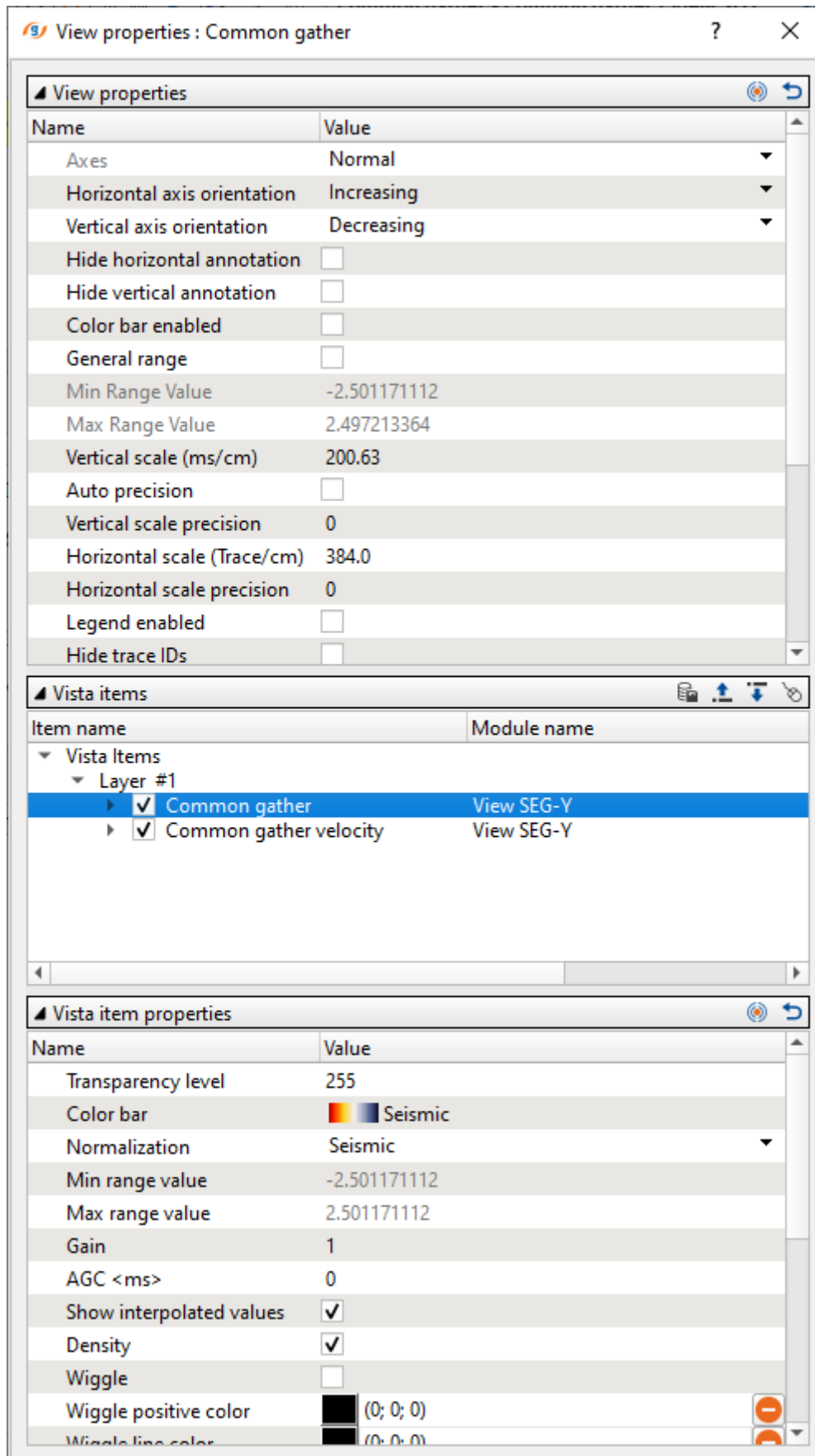


The Workspace area serves as the central hub for data visualization and analysis. This area is dedicated to displaying multiple [Views](#) that are part of the project.

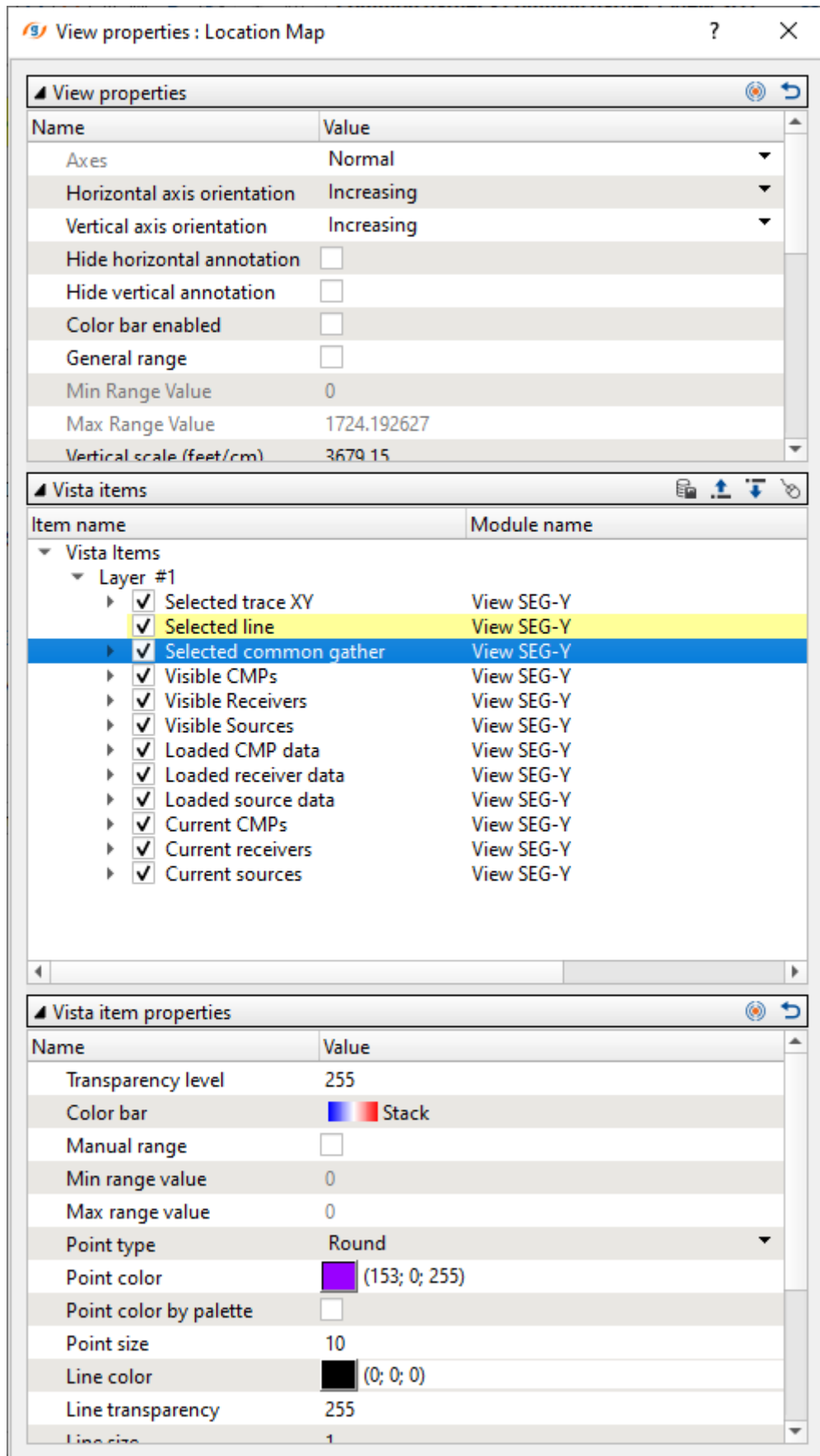
Each view within the workspace can represent different types of data, such as seismic sections, well logs, map views, etc.

3.6 Vista

Vista and/or **Vista items** are used interchangeably in the documentation. **Vista** can be defined as any individual item that can be displayed or visualized within in the **g-Viewer**. For instance, when the user selects the **Show properties** of **Common gather - Common gather [View SEG-Y]** window, **Common gather** is a **Vista item** in the below image.



Similarly, in the location map we have many vista items to display as shown below.



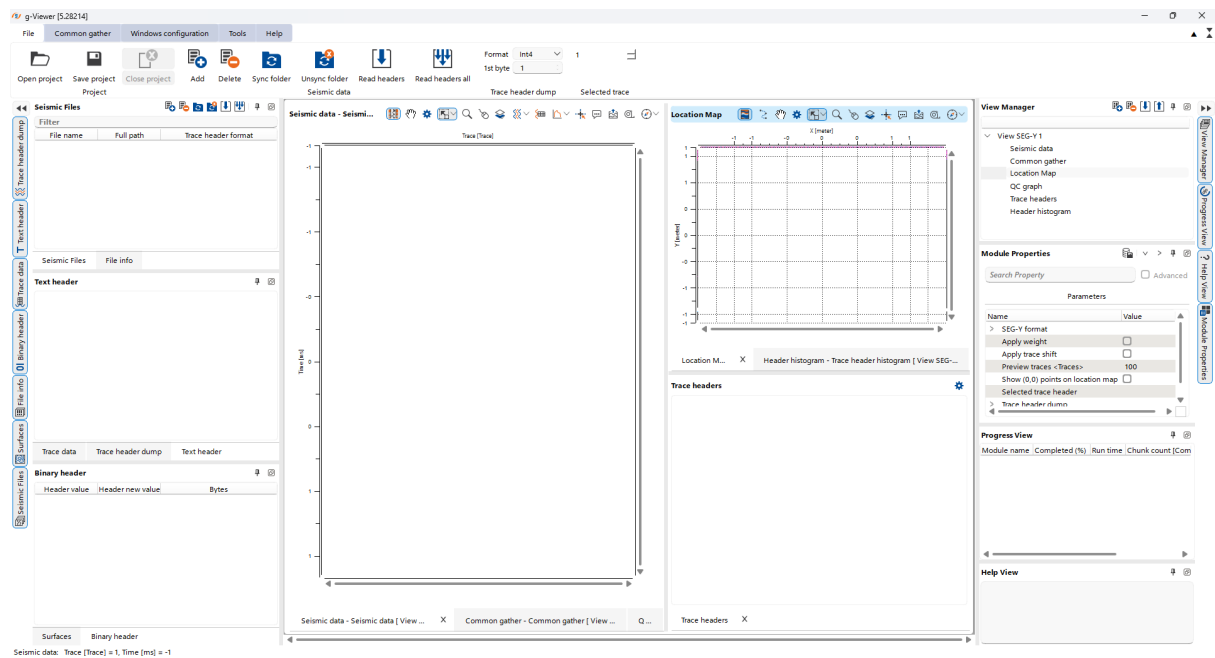
In the above image, we can see many Vista items like **Selected trace XY, Selected line,**etc.

Getting Started

4 Getting Started

In the following sections, we are going to describe how to operate the g-Viewer software to visualize seismic data.

To launch g-Viewer, the user simply clicks on the short cut icon **g-Viewer** on the desktop or selects **g-Viewer** from the **Start Menu** -> **Geomage g-Viewer** -> **gViewer** option. Upon opening the software the display will appear as shown below



Import data

5 Import data

In g-Viewer, the user can able to load, display and the edit the contents of the **SEGY** data. It can be done by adding files under **Seismic files** window.

Seismic files:

In this window, the user can add as many as files as they want. There are different ways to add the seismic files into the seismic files window. The simple and most straight forward method is simply click on the plus button  and add the seismic files into the window. Upon adding the files, it will load (can see the status of the loading at **Progress view** window) the contents of seismic file like **Trace data, Text header, Binary header, Trace headers information** and **Location map**.

The second method of adding seismic files is, drag and drop method. Simply select the desired seismic file (SEGY) file and drop into the seismic files window. Give it a minute or two to load the contents of the seismic file.

Within the Seismic files window, it will display the **File name, Full path & Trace header format** information. If the user wants to display only the File name, they can right click inside the seismic files and uncheck the other fields.

When the SEGY file loaded into the g-Viewer, it partially load all the headers. In order to load all the headers information, the user should select the file and click on the Play button  (fast forward button is to load all the lines fully).

Seismic files		
Filter		
File name	Full path	Trace header format
npr3_gathers.sgy	D:/SEGY/Teapot3D/npr3_gathers.sgy	teapot3d

User can observe the change in color of the back ground before and after.

Seismic files		
Filter		
File name	Full path	Trace header format
npr3_gathers.sgy	D:/SEG-Y/Teapot3D/npr3_gathers.sgy	teapot3d ▼

In the future releases, we are going to add more options like **SEG-D**, **LAS**, **Shape files**, **ASCII**, **SU** and many other formats.

Export data

6 Export data

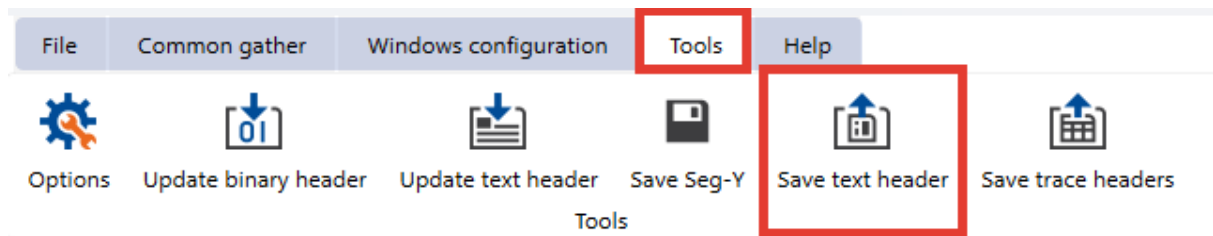
g-Viewer currently supports exporting data in SEG-Y format only.

This industry-standard format ensures compatibility with a wide range of geophysical software applications.

Exporting your data to SEG-Y allows for easy sharing and analysis across different platforms. The process is straightforward and preserves the integrity of your seismic data.

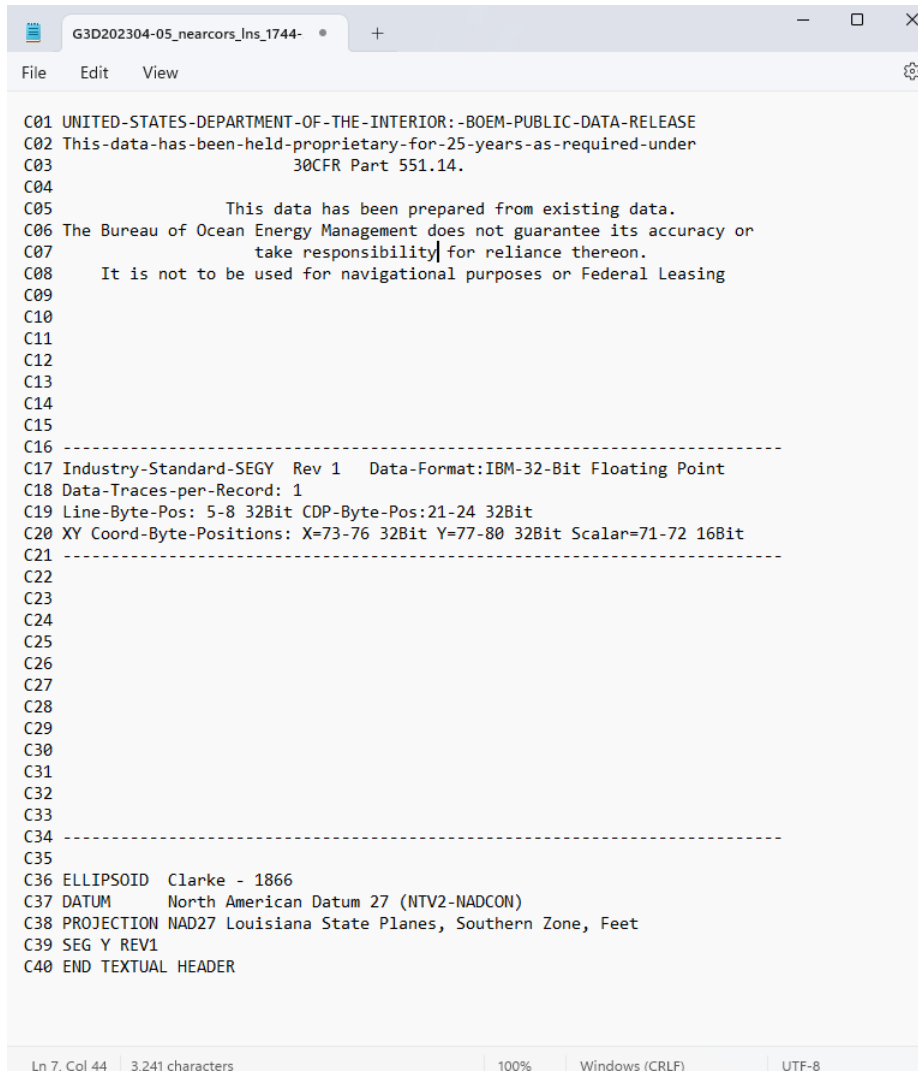
For detailed instructions on how to export your data, please refer to the [Save Seg-Y file](#)¹²⁷ subchapter.

Text Header Export: g-Viewer allows exporting the text header information to a *TXT file. Navigate to the [Tools bar](#)³⁷ and click **Save text header**

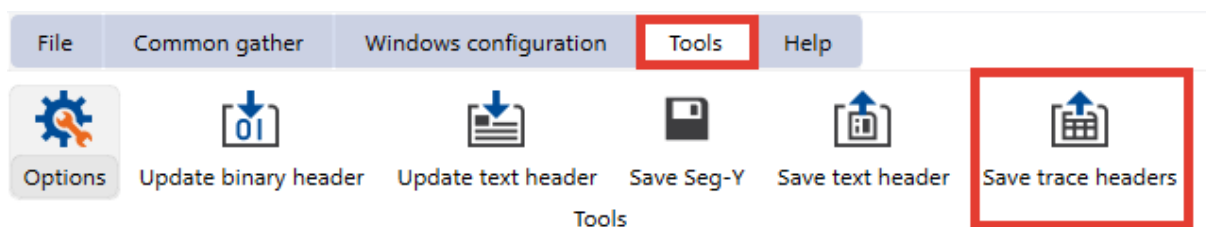


A pop-up window will appear, prompting you to specify the directory where the TXT file should be saved.

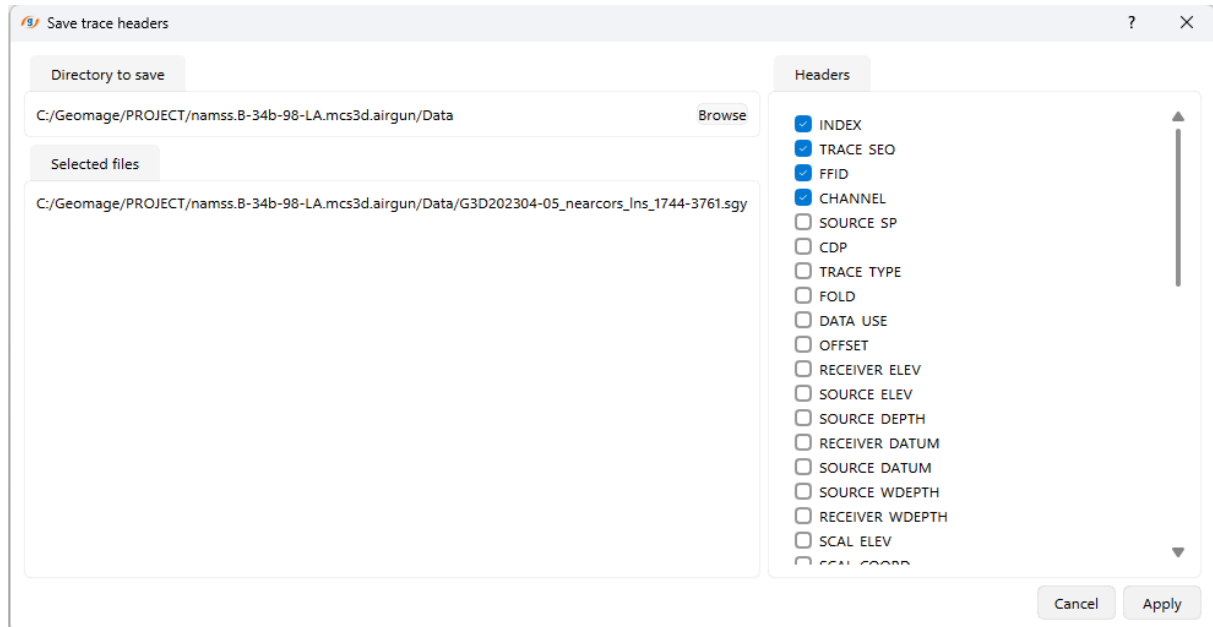
Enjoy your data in text format.



Trace Header Export: Users can save trace headers as an Excel file. This option includes the ability to select specific trace headers for export, allowing for customized data extraction. Navigate to the [Tools bar](#)³⁷ and click on the [Save trace headers](#)¹²⁹ button.



A pop-up window will appear, prompting you to specify the directory where the Excel file will be saved.



- Selected files: Displays the path of the seismic file(s) you are working with.
- Headers: A list of available trace headers is shown on the right. Use checkboxes to select specific headers you want to export. You can scroll through the list and choose as many or as few headers as needed.

After selecting your desired headers and specifying the save directory, click **Apply** to confirm.

The selected trace headers will be exported to an Excel file in the specified directory.

L14

:

✕

✓

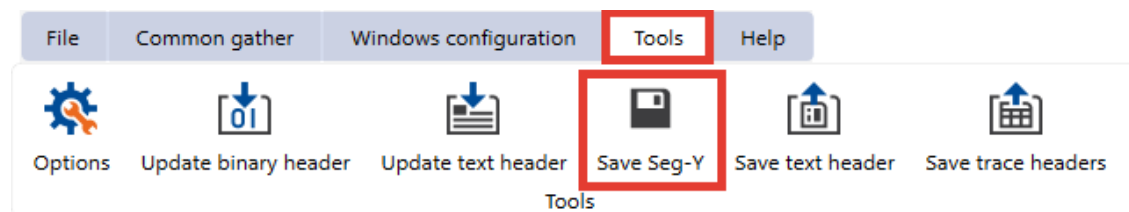
fx

	A	B	C	D	E	F	G	H	I
1	INDEX	TRACE_SEQ	FFID	CHANNEL	SOURCE_X	SOURCE_Y	INLINE	CROSSLINE	
2	1	0	1744	1	1.61787e+0	243756	1744	2045	
3	2	1	1744	2	1.61787e+0	243701	1744	2046	
4	3	2	1744	3	1.61787e+0	243646	1744	2047	
5	4	3	1744	4	1.61787e+0	243591	1744	2048	
6	5	4	1744	5	1.61787e+0	243536	1744	2049	
7	6	5	1744	6	1.61787e+0	243481	1744	2050	
8	7	6	1744	7	1.61787e+0	243426	1744	2051	
9	8	7	1744	8	1.61787e+0	243371	1744	2052	
10	9	8	1744	9	1.61787e+0	243316	1744	2053	
11	10	9	1744	10	1.61787e+0	243261	1744	2054	
12	11	10	1744	11	1.61787e+0	243206	1744	2055	
13	12	11	1744	12	1.61787e+0	243151	1744	2056	
14	13	12	1744	13	1.61787e+0	243096	1744	2057	
15	14	13	1744	14	1.61787e+0	243041	1744	2058	
16	15	14	1744	15	1.61787e+0	242986	1744	2059	
17	16	15	1744	16	1.61787e+0	242931	1744	2060	
18	17	16	1744	17	1.61787e+0	242876	1744	2061	
19	18	17	1744	18	1.61787e+0	242821	1744	2062	
20	19	18	1744	19	1.61787e+0	242766	1744	2063	
21	20	19	1744	20	1.61787e+0	242711	1744	2064	
22	21	20	1744	21	1.61787e+0	242656	1744	2065	
23	22	21	1744	22	1.61787e+0	242601	1744	2066	
24	23	22	1744	23	1.61787e+0	242546	1744	2067	
25	24	23	1744	24	1.61787e+0	242491	1744	2068	
26	25	24	1744	25	1.61787e+0	242436	1744	2069	
27	26	25	1744	26	1.61787e+0	242381	1744	2070	
28	27	26	1744	27	1.61787e+0	242326	1744	2071	
29	28	27	1744	28	1.61787e+0	242271	1744	2072	
30	29	28	1744	29	1.61787e+0	242216	1744	2073	
31	30	29	1744	30	1.61787e+0	242161	1744	2074	
32	31	30	1744	31	1.61787e+0	242106	1744	2075	

6.1 Save Seg-Y file

To save a SEG-Y file in the g-Viewer follow these steps:

Navigate to the [Tools bar](#)³⁷ and click **Save Seg-Y** button.



Save Seg-Y parameters wizard will appear

Save Seg-Y parameters

Crop

☐ No crop

☐ Selected traces

☒ Selected IL/XL

Trace from: 0 Trace to: 2165313

Inline from: 1744 Inline to: 3761

Crossline from: 2045 Crossline to: 3117

Resample

Start time <ms>: 0

Sample rate <ms>: 25

Record time length <ms>: 30000

OK Cancel

Define Cropping Parameters

In the "Crop" section of the wizard:

- **No Crop:** Select this option if you want to save all traces without any restrictions.
- **Selected Traces:** If specific traces are required, define the trace range by entering values for "Trace from" and "Trace to."
- **Selected Inline/Crossline (IL/XL):** Use this option to save data for specific inline and crossline ranges. Enter the desired values for:
 - *Inline from* and *Inline to*.
 - *Crossline from* and *Crossline to*.

Set Resampling Parameters

In the "Resample" section:

- Specify the **Start time (ms)** for the seismic data.
- Define the **Sample rate (ms)**, which determines the time interval between consecutive data points.

- Set the **Record time length (ms)**, which indicates the total duration of each trace.

Save the File

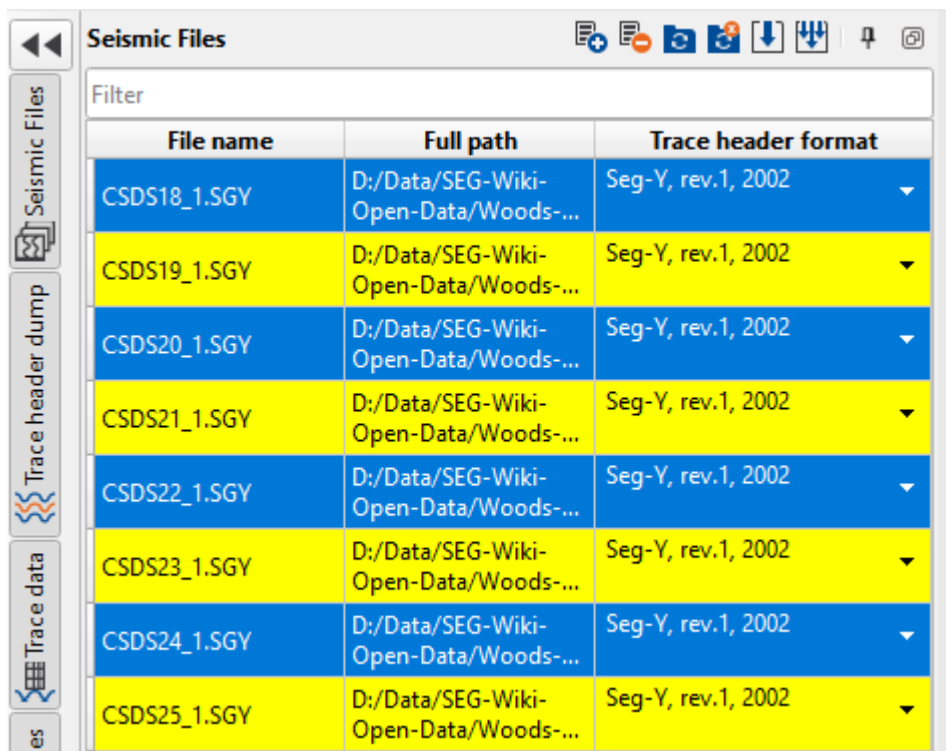
Once all parameters are configured:

1. Click **OK** in the wizard to proceed.
2. A file-saving dialog box will appear. Enter a name for your file.
3. Choose a location on your system where you want to save the file, then click **Save**.

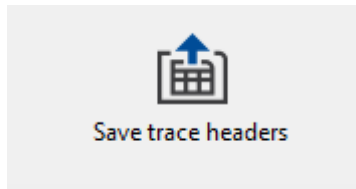
6.1.1 Save trace headers

This option let the user to export trace headers for single or multiple lines. To export the trace headers, the user should follow the instructions as outlined below

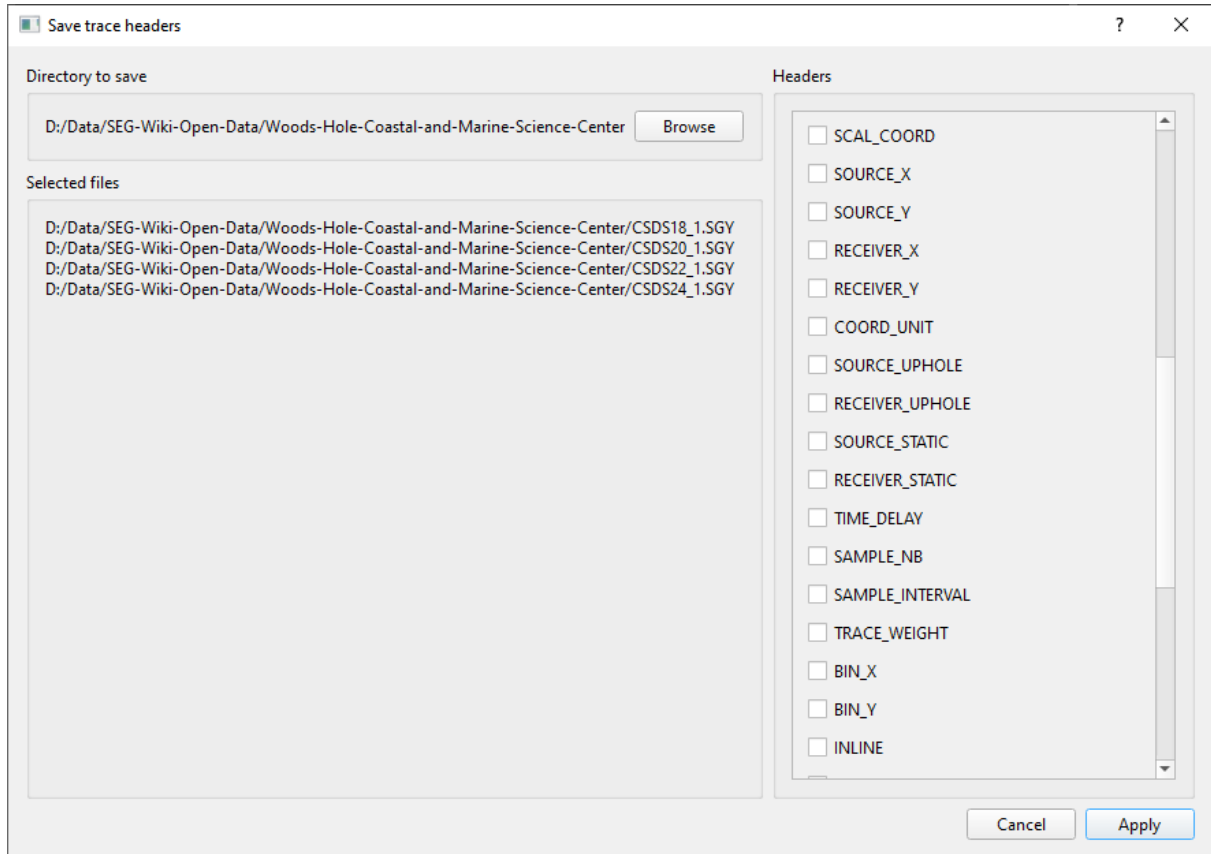
1. Select single or multiple seismic files from the "**Seismic Files**" window. To select multiple files, hold **Ctrl** button/key and select one by one.



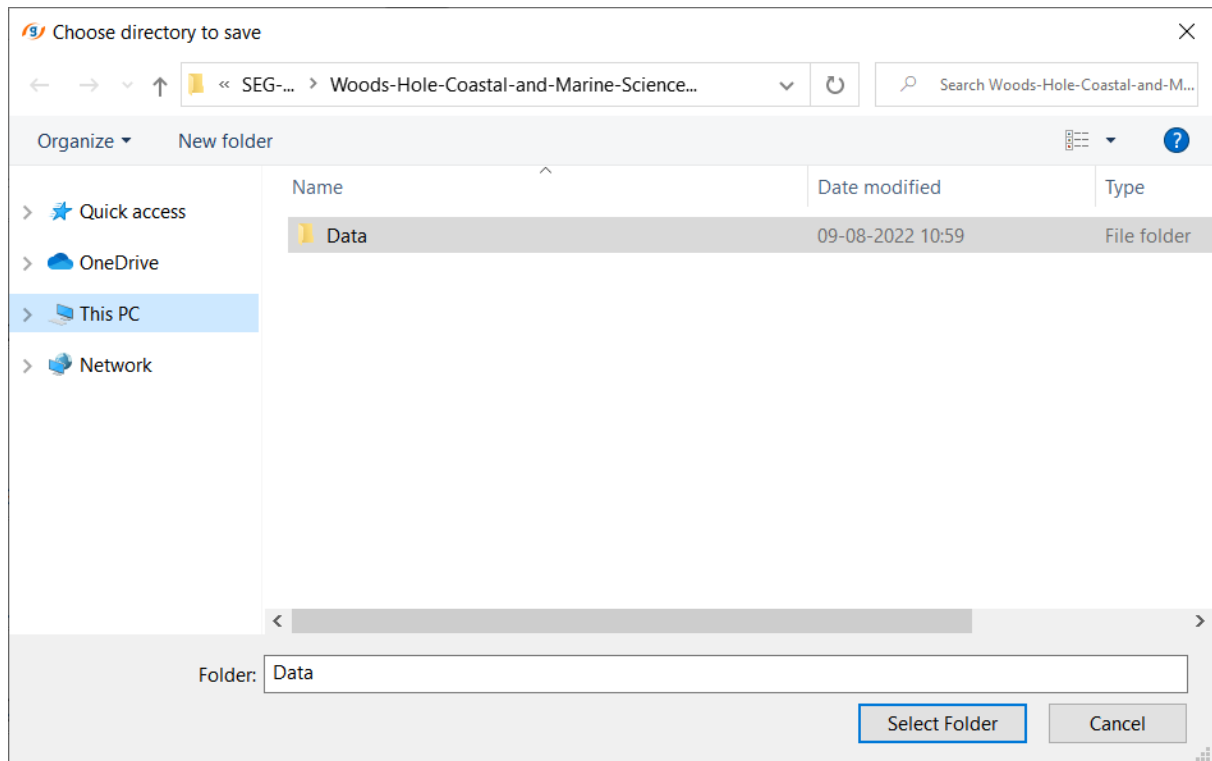
2. Click on "**Save trace headers**" icon.



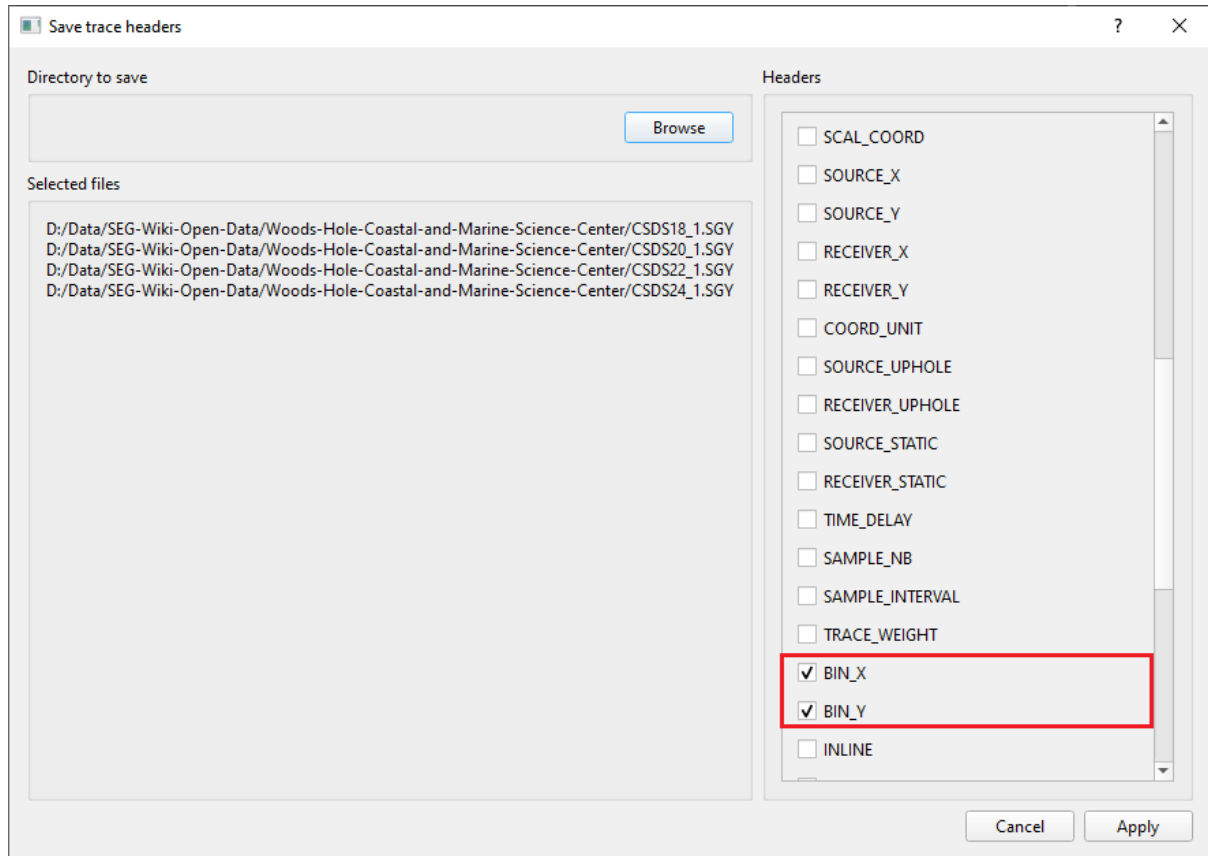
A new pop up window opens.



3. (Optional) Click on "**Browse**" to change the default saving directory. By default, it will save it in input file directory where we first read the input data.



4. Select the desired trace headers



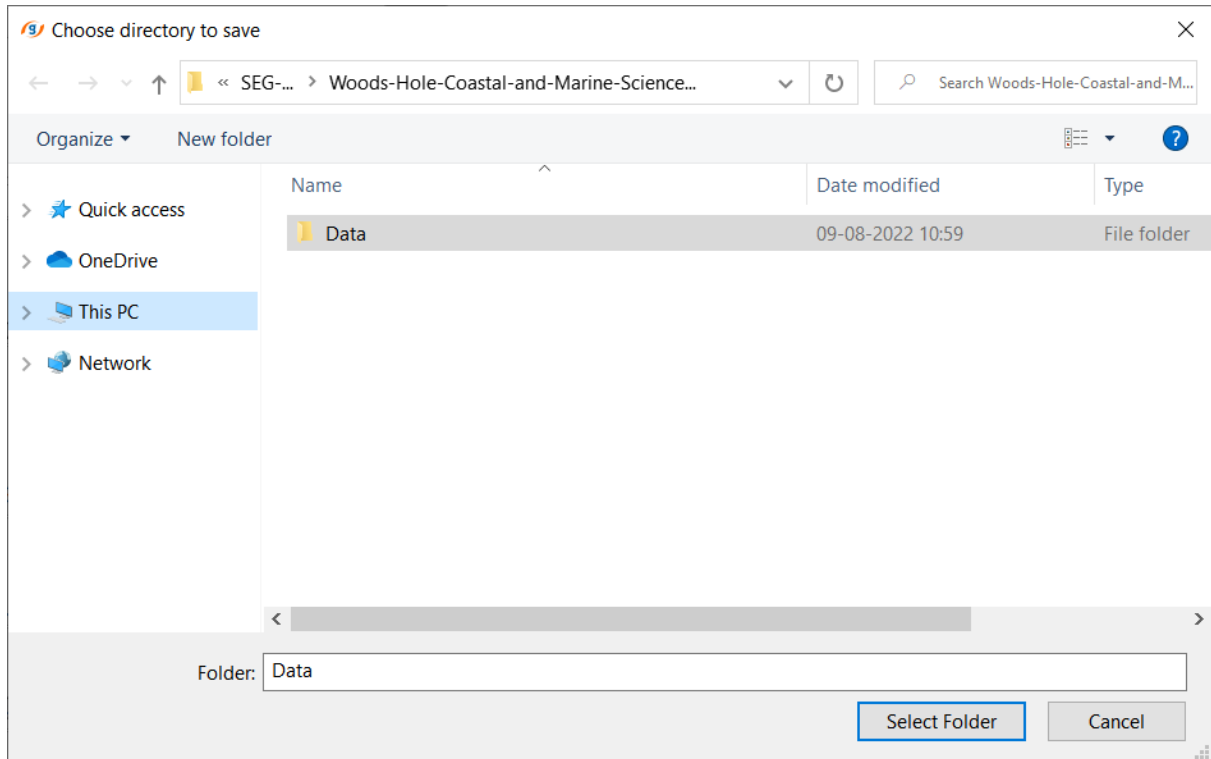
5. Click **Apply**

Output files will be saved in "**CSV**" format.

6.1.2 Save text header

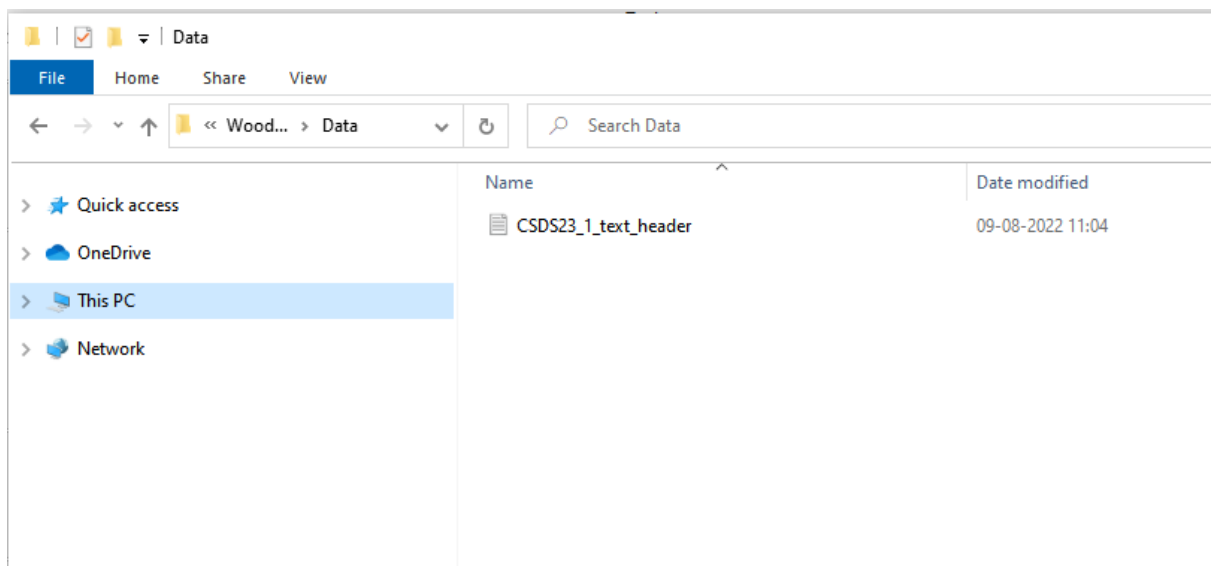
This option let the user to save/export the EBCDIC/text header.

In order to save the EBCDIC/Text header, the user should click on "Save text header" option. It will pop up a window



Here the user should select the already existing folder to save the EBCDIC/Text header or create a new folder and select that particular folder and click "**Select Folder**" option.

Now go to the folder and look for the saved EBCDIC/Text header. It will be saved with naming convention as the selected input file name with "**_text_header.txt**"



6.1.2.1 Update binary header

Updating Binary header:

Just like the Text headers, we can able to edit the Binary headers from the **Tools** tab.



In this example, we are going to edit the Measurement system from Meters(1) to Feets(2) as shown below.

Binary header			
	Header value	Header new value	Bytes
Binary gain recovered	1	1	51-52
Amplitude recovery method	4	4	53-54
Measurement system	1	1	55-56
Impulse signal polarity	0	0	57-58
Vibratory polarity code	0	0	59-60
SSC Co SEG-Y samples number	0	0	63-66
SEG-Y Rev	256	256	301-302
Fixed trace flag	1	1	303-304
Number of Extended Textual Headers	0	0	305-306

In order to change it, user needs to enter the new value in the "**Header new value**" field by clicking inside of it and hit Enter. Here also it changes the back ground color which tells us that the field is ready to be edited. Follow the procedure as described above to save the EBCDIC/text header but select "**Update binary header**" option from the tools tab.

Binary header			
	Header value	Header new value	Bytes
Binary gain recovered	1	1	51-52
Amplitude recovery method	4	4	53-54
Measurement system	1	2	55-56
Impulse signal polarity	0	0	57-58
Vibratory polarity code	0	0	59-60
SSC Co SEG-Y samples number	0	0	63-66
SEG-Y Rev	256	256	301-302
Fixed trace flag	1	1	303-304
Number of Extended Textual Headers	0	0	305-306

The process is similar to the Text header editing. Confirm and click **Yes**. Observe the changes in the Binary header window under “**Header value**” field.



Now it has changed the value from 1 to 2 permanently

Binary header			
	Header value	Header new value	Bytes
Binary gain recovered	1	1	51-52
Amplitude recovery method	4	4	53-54
Measurement system	2	2	55-56
Impulse signal polarity	0	0	57-58
Vibratory polarity code	0	0	59-60
SSC Co SEG-Y samples number	0	0	63-66
SEG-Y Rev	256	256	301-302
Fixed trace flag	1	1	303-304
Number of Extended Textual Headers	0	0	305-306

6.1.2.2 Update text header

Update Text Header:

Editing text (EBCDIC) and binary headers in **g-Viewer** is straightforward. The user has to go to the Text headers table and make the necessary changes. To update the data with the changes, the user must click on the **Tools** tab and select the **Update text header** to implement the changes.



Let's try to change the Text header first. In order to do that, first we need to click inside the Text header at the desired row (C1 – C40) and make the necessary changes then hit Enter. That particular row will change its back ground color.

Text header	
Header	
C 1 CLIENT: ROCKY MOUNTAIN OILFIELD TESTING CENTER	
C 2 PROJECT: NAVAL PETROLEUM RESERVE #3 (TEAPOT DOME); NATRONA COUNTY,WYOMING	
C 3 LINE: 3D	
C 4	
C 5 CDP GATHERS WITH STATICS NO NMO AT FLOATING DATUM	
C 6	
C 7 INLINE 1,XLINE 1: X COORDINATE: 788937 Y COORDINATE: 938845	
C 8 INLINE 1,XLINE 188: X COORDINATE: 809501 Y COORDINATE: 939333	
C 9 INLINE 345,XLINE 1: X COORDINATE: 788039 Y COORDINATE: 976674	
C10 INLINE NUMBER: MIN:1 MAX: 345 TOTAL: 345	
C11 CROSSLINE NUMBER: MIN:1 MAX:188 TOTAL: 188	
C12 TOTAL NUMBER OF CDPS: 64860 (33594 LIVE) BIN DIMENSION: 110' X 110'	
C13 DATUM 5500' VR 9500 FPS	
C14	
C15	
C16 GENERAL SEG Y INFORMATION	
C17 OUTPUT DATA LENGTH (MS): 4096.00 SAMPLE INTERVAL (MS): 2.00	
C18 DATA FORMAT: 4 BYTE IBM FLOATING POINT	

Here we are going to edit the text in C 4 to "g-Viewer EBCDIC header change" from the blank line and hit Enter to see the change.

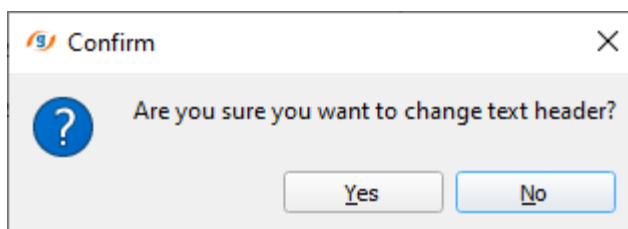
Text header

Header
C 1 CLIENT: ROCKY MOUNTAIN OILFIELD TESTING CENTER
C 2 PROJECT: NAVAL PETROLEUM RESERVE #3 (TEAPOT DOME); NATRONA COUNTY,WYOMING
C 3 LINE: 3D
C 4 gViewer EBCDIC header change
C 5 CDP GATHERS WITH STATICS NO NMO AT FLOATING DATUM
C 6
C 7 INLINE 1,XLINE 1: X COORDINATE: 788937 Y COORDINATE: 938845
C 8 INLINE 1,XLINE 188: X COORDINATE: 809501 Y COORDINATE: 939333
C 9 INLINE 345,XLINE 1: X COORDINATE: 788039 Y COORDINATE: 976674
C10 INLINE NUMBER: MIN:1 MAX: 345 TOTAL: 345
C11 CROSSLINE NUMBER: MIN:1 MAX:188 TOTAL: 188
C12 TOTAL NUMBER OF CDPS: 64860 (33594 LIVE) BIN DIMENSION: 110' X 110'
C13 DATUM 5500' VR 9500 FPS
C14
C15
C16 GENERAL SEG Y INFORMATION
C17 OUTPUT DATA LENGTH (MS): 4096.00 SAMPLE INTERVAL (MS): 2.00
C18 DATA FORMAT: 4 BYTE IBM FLOATING POINT

To save the changes, click on Actions icon and choose the option Update text header option as shown below.



After selecting this option we get a pop-up window to ask us to confirm the operation as shown below.



Select the Yes option and observe the change in the back ground color of C 4 row which tells us that the Text header has been successfully modified/edited. Also we observe that the text in C 4 has been changed from Lower case to UPPER case.

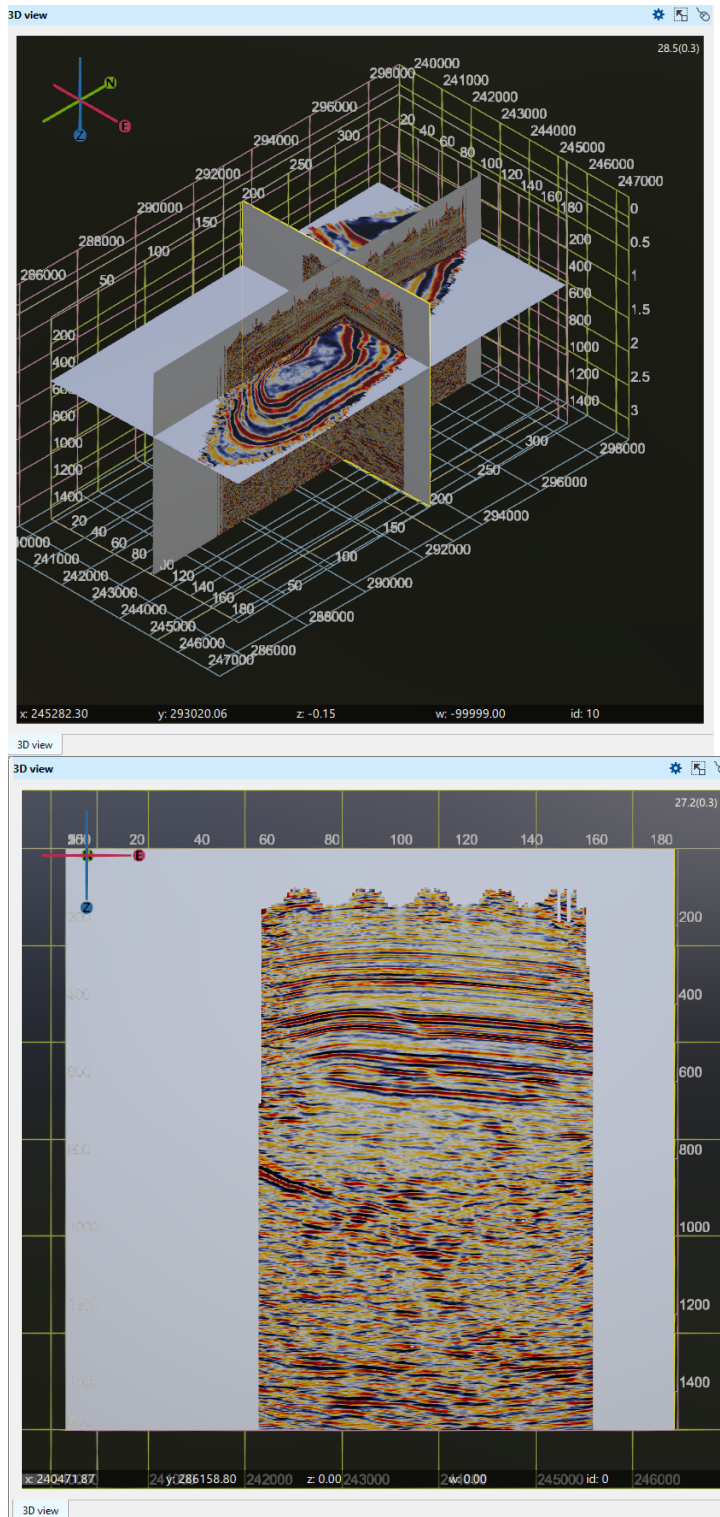
Text header	
Header	
C 1 CLIENT: ROCKY MOUNTAIN OILFIELD TESTING CENTER	
C 2 PROJECT: NAVAL PETROLEUM RESERVE #3 (TEAPOT DOME); NATRONA COUNTY,WYOMING	
C 3 LINE: 3D	
C 4 GVIEWER EBCDIC HEADER CHANGE	
C 5 CDP GATHERS WITH STATICS NO NMO AT FLOATING DATUM	
C 6	
C 7 INLINE 1,XLINE 1: X COORDINATE: 788937 Y COORDINATE: 938845	
C 8 INLINE 1,XLINE 188: X COORDINATE: 809501 Y COORDINATE: 939333	
C 9 INLINE 345,XLINE 1: X COORDINATE: 788039 Y COORDINATE: 976674	
C10 INLINE NUMBER: MIN:1 MAX: 345 TOTAL: 345	
C11 CROSSLINE NUMBER: MIN:1 MAX:188 TOTAL: 188	
C12 TOTAL NUMBER OF CDPS: 64860 (33594 LIVE) BIN DIMENSION: 110' X 110'	
C13 DATUM 5500' VR 9500 FPS	
C14	
C15	
C16 GENERAL SEG Y INFORMATION	
C17 OUTPUT DATA LENGTH (MS): 4096.00 SAMPLE INTERVAL (MS): 2.00	
C18 DATA FORMAT: 4 BYTE IBM FLOATING POINT	

Hotkeys

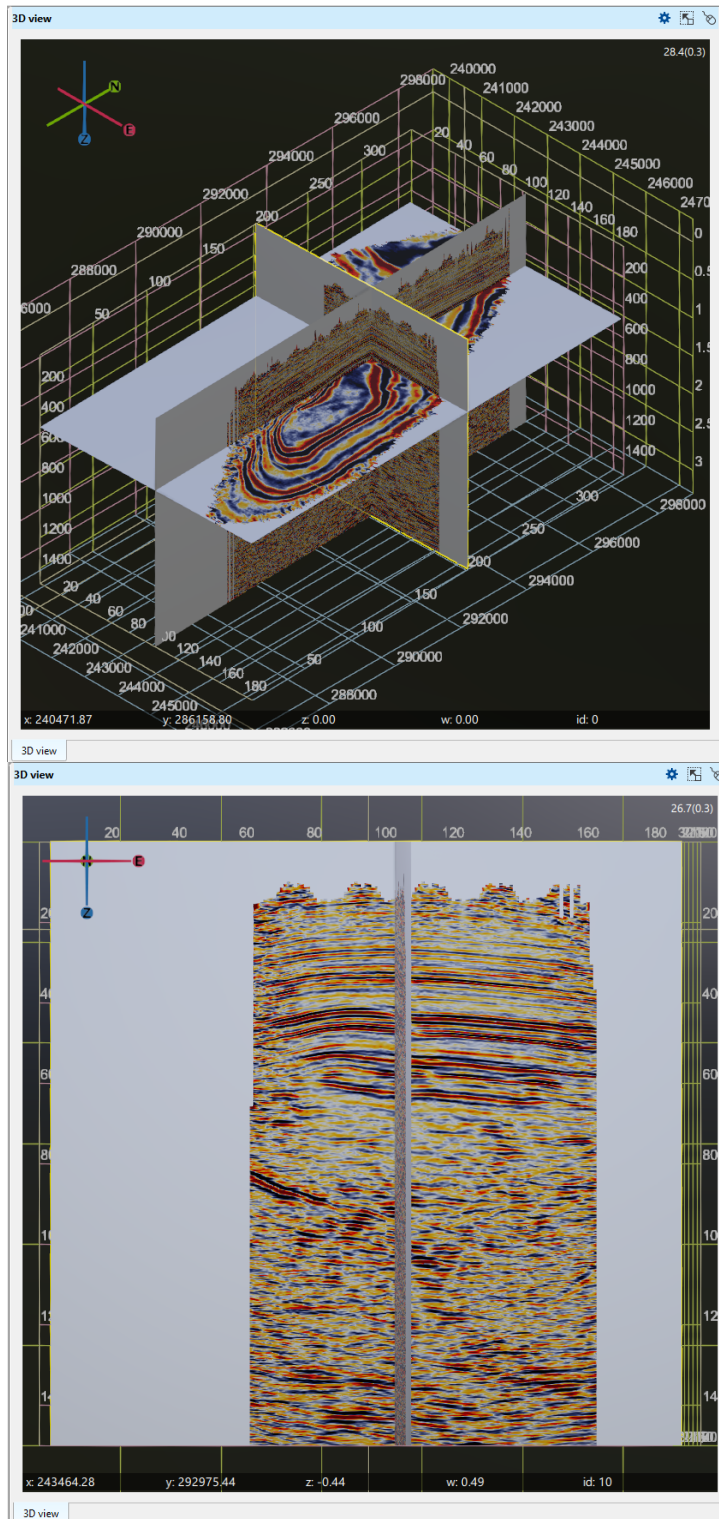
7 Hotkeys

g-Viewer got some hotkeys aka shortcut keys to make everyone's life easier. Here are some of them.

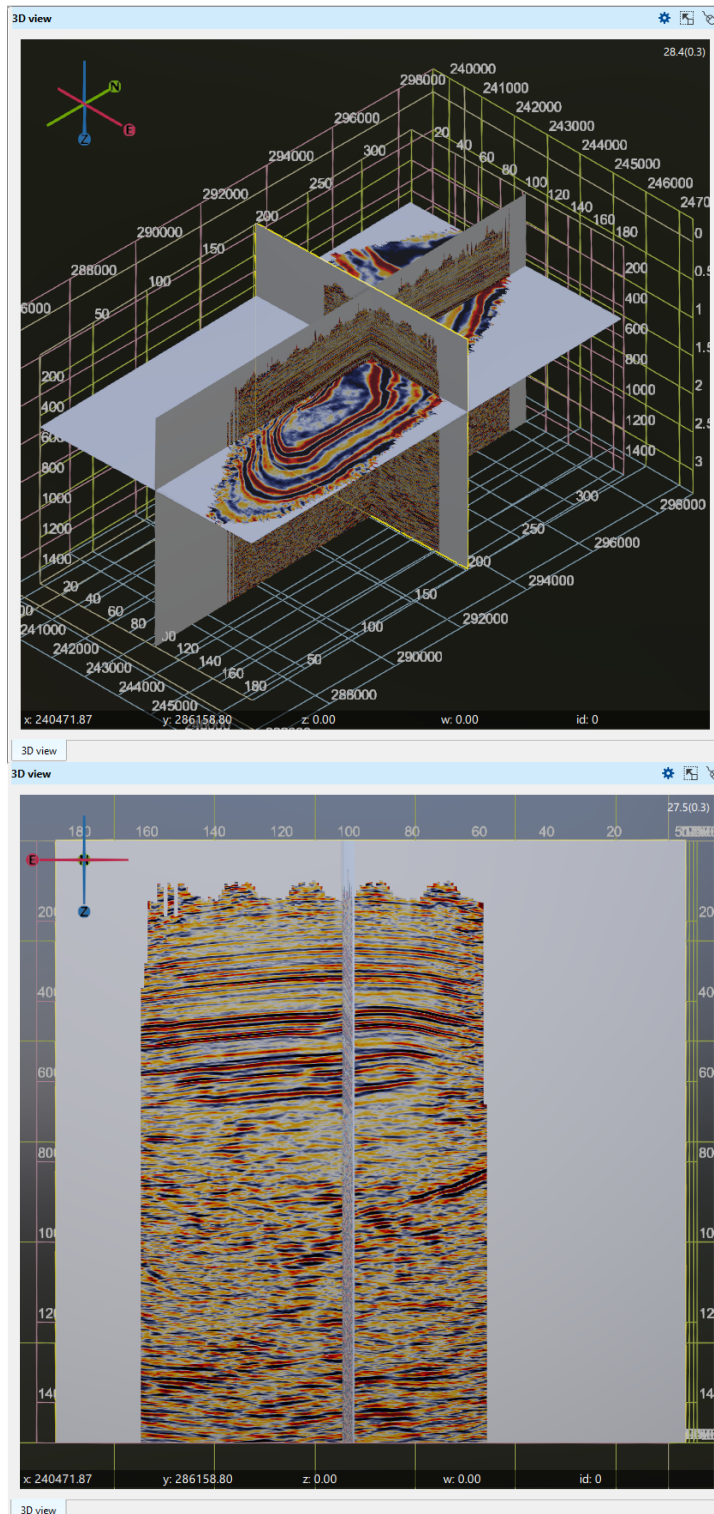
1. To **hide/show side panels** of the g-Viewer i.e. **Full screen** option, press **Shift+F11**
2. To **display g-Viewer using all screens**, press **F11**
3. To **hide/show left or right panels** (Trace data, seismic files, binary header, View Manager etc), press **Shift+Left arrow key & Shift+Right arrow key**
4. In **3D view**, to display the **selected section (Inline, Crossline, Time/Depth slice)**, first select the specific inline/crossline/time/depth slice to activate it and press **Shift+F**



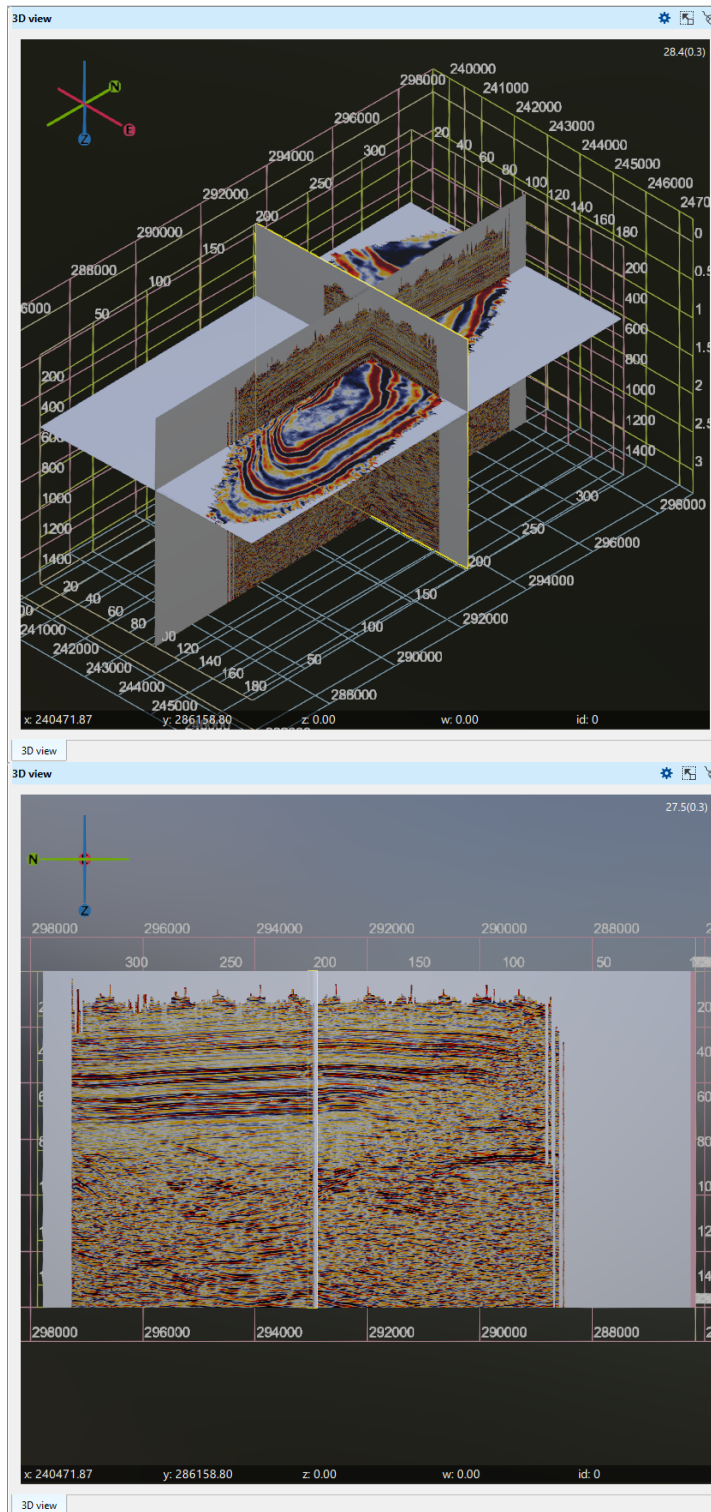
5. To view the selected section from **South** direction, press **Shift+S**



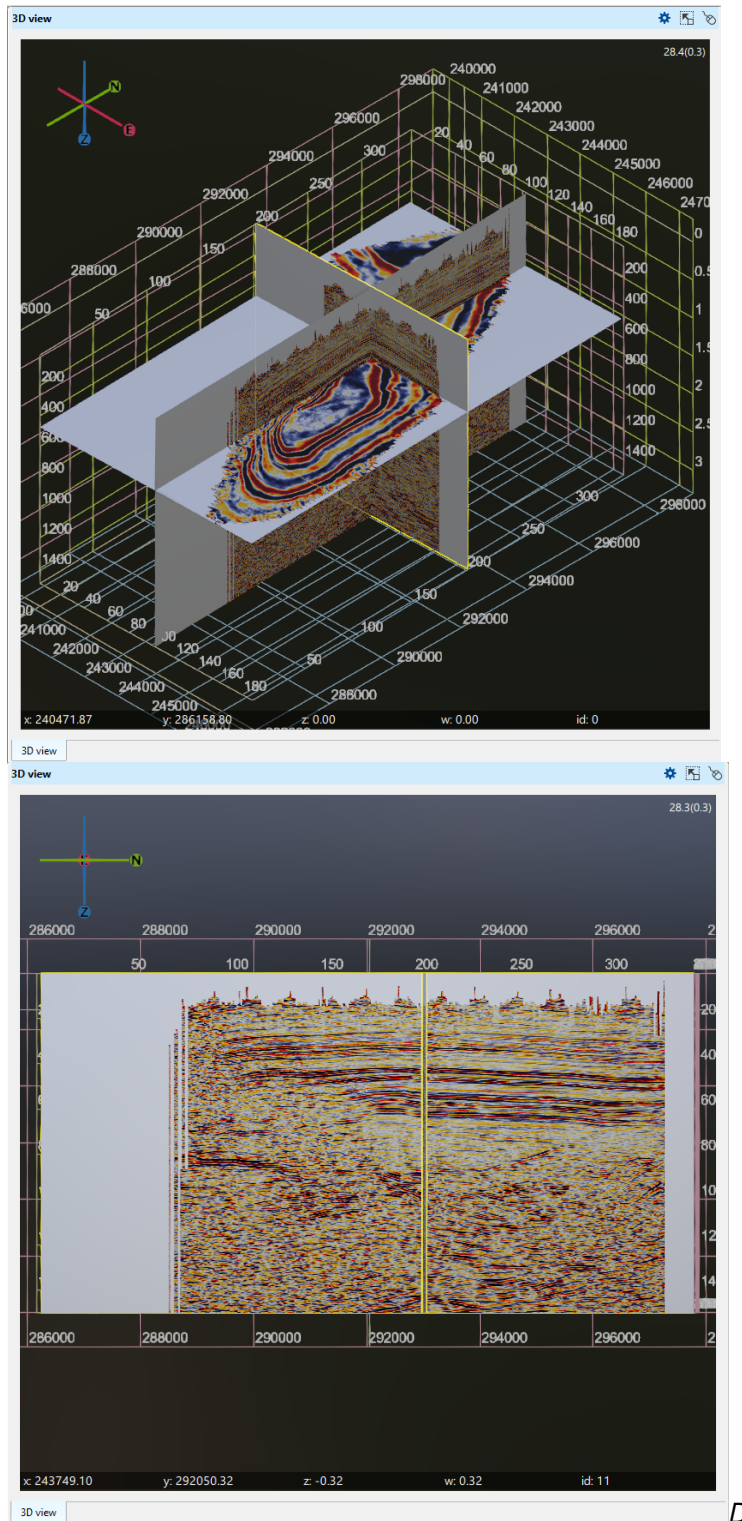
6. To view the selected section from **North** direction, press **Shift+N**



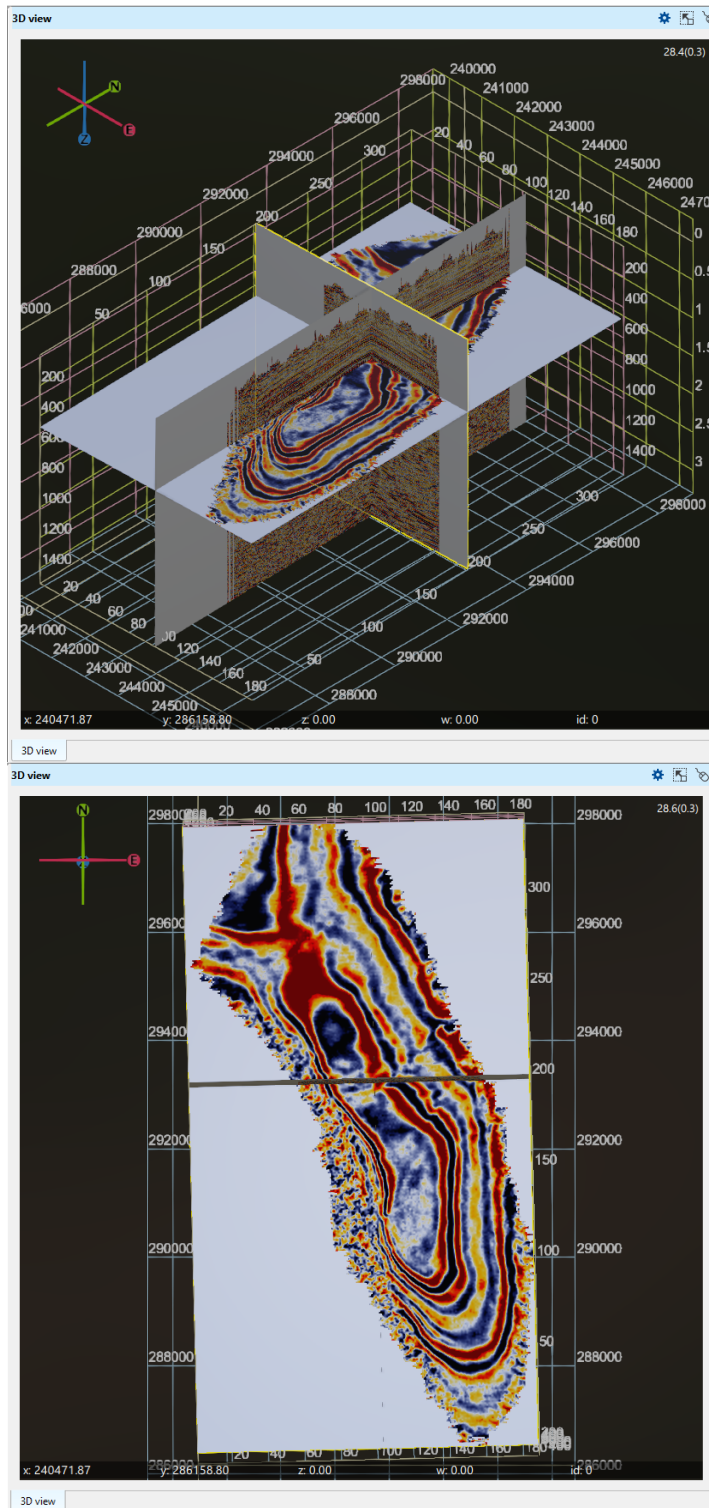
7. To view the selected section from **West** direction, press **Shift+W**



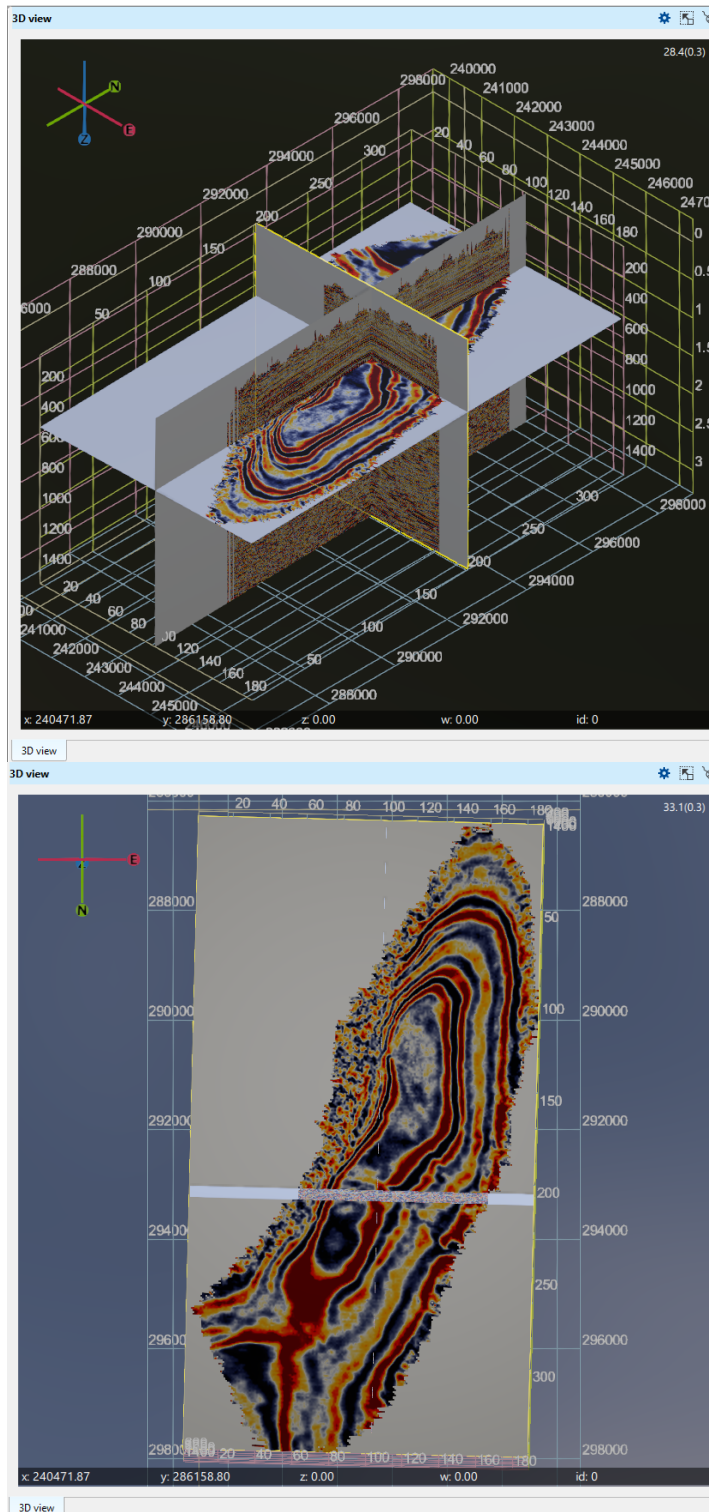
8. To view the selected section from **East** direction, press **Shift+E**



9. To view the selected section from **Top**, press **Shift+U**



10. To view the selected section from **Bottom**, press **Shift+D**



11. To move selected **inline/crossline/slice**, press **left/right arrow keys**
12. To **save** the g-Viewer project, press **Ctrl+S**

Formats

8 Formats

g-Viewer currently supports exporting data in SEG-Y format only.

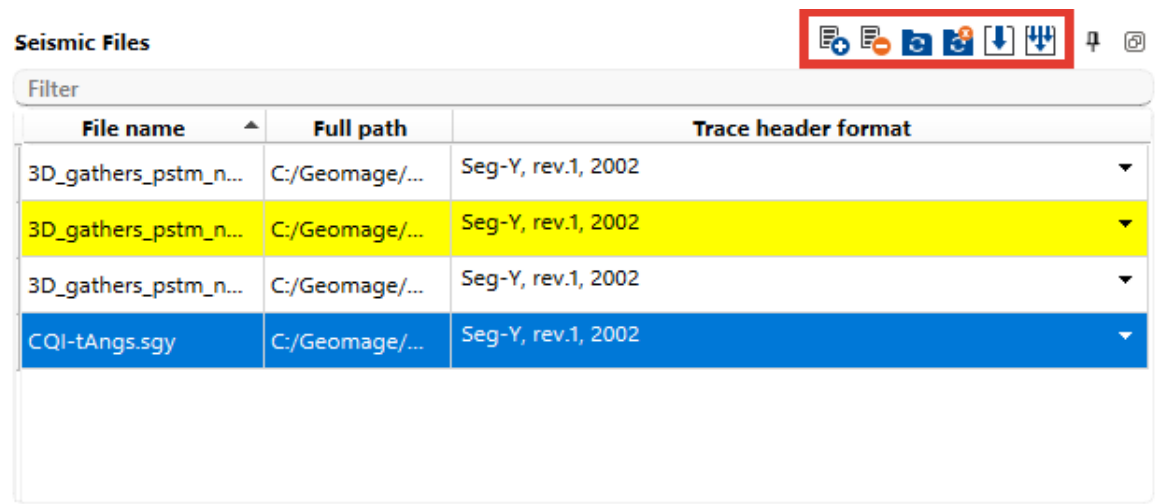
Features

9 Features

9.1 Seg-Y Data Import

To import seismic data into g-Viewer, follow these steps:

1. Navigate to the [Seismic Files](#) ⁴¹ panel.
2. Click the **Add Files** button and select the SEG-Y files you want to open.
3. **Preview Mode** – Once added, the files will be listed in the panel, and a preview mode will be enabled.



File name	Full path	Trace header format
3D_gathers_pstm_n...	C:/Geomage/...	Seg-Y, rev.1, 2002
3D_gathers_pstm_n...	C:/Geomage/...	Seg-Y, rev.1, 2002
3D_gathers_pstm_n...	C:/Geomage/...	Seg-Y, rev.1, 2002
CQI-tAngs.sgy	C:/Geomage/...	Seg-Y, rev.1, 2002

Preview Mode: Quick Data Check

In preview mode, users can immediately inspect:

- **Text and trace headers** – View essential metadata without full loading.
- **Seismic data image** – A quick visual check of the data.
- **Location map** – Displays uploaded traces only, providing an overview of coverage.

This mode is useful for a **quick quality check**, allowing users to verify file content, headers, and seismic sections before committing to a full import.

Loading Full Data

If full dataset access is required, use the **Load Trace Header** option:

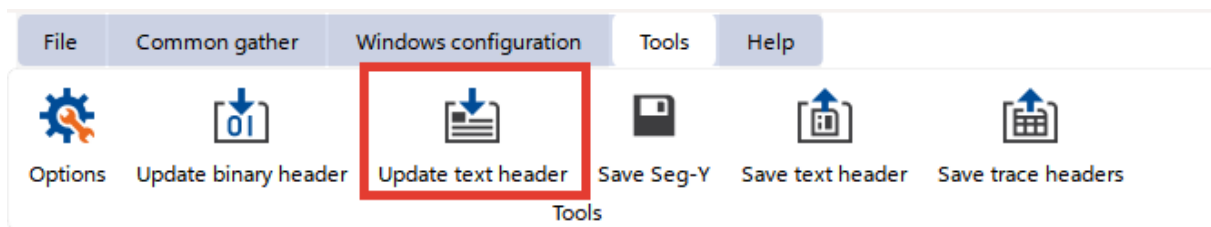
- **For selected files** – Loads headers only for specific files.
- **For all files** – Loads headers for all listed files.

After loading, the complete dataset is available for detailed analysis and interpretation.

To avoid repeated data uploads, users can **save the project**, ensuring quick access to previously imported files without needing to reload them each time.

9.2 Text Header Editing

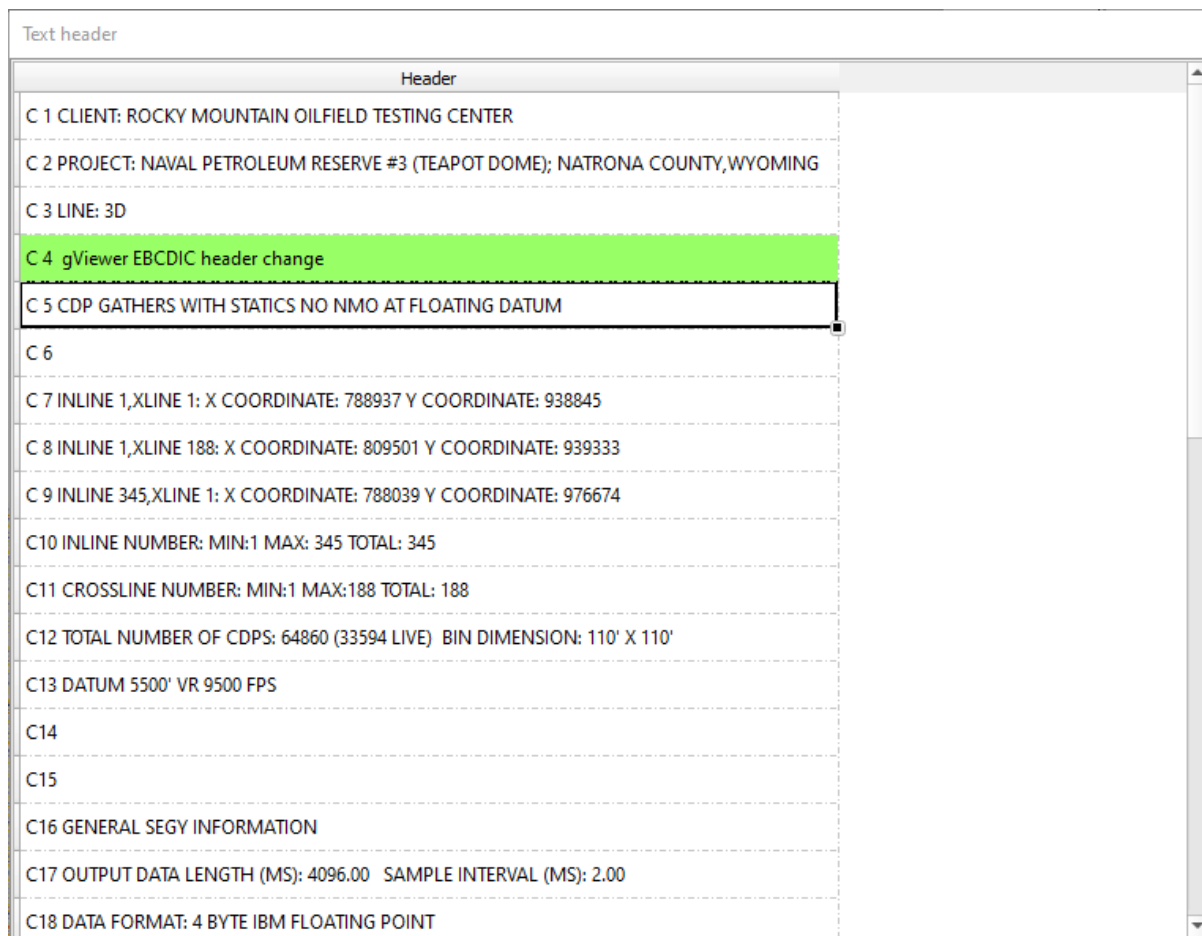
Editing text (EBCDIC) and binary headers in g-Viewer is straightforward. The user needs to navigate to the Text Headers table and make the necessary changes. To apply the changes to the text headers, the user must click on **Tools** and select **Update Text Header** to implement the updates.



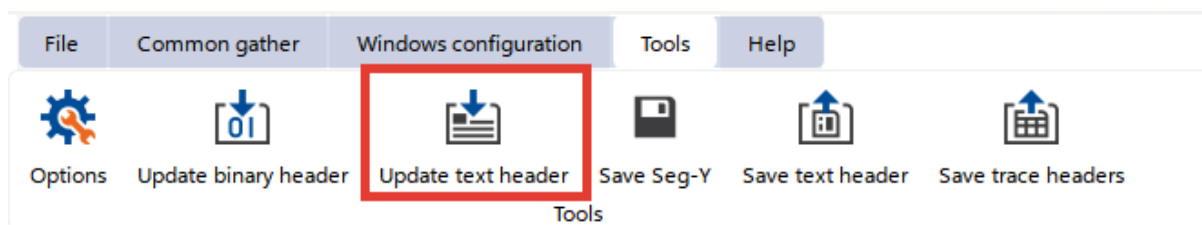
Let's try to modify the Text Header. To do so, first, click inside the Text Header at the desired row (C1 – C40), make the necessary changes, and then press **Enter**. The background color of the edited row will change to indicate modification.

Text header	
Header	
C 1 CLIENT: ROCKY MOUNTAIN OILFIELD TESTING CENTER	
C 2 PROJECT: NAVAL PETROLEUM RESERVE #3 (TEAPOT DOME); NATRONA COUNTY,WYOMING	
C 3 LINE: 3D	
C 4	
C 5 CDP GATHERS WITH STATICS NO NMO AT FLOATING DATUM	
C 6	
C 7 INLINE 1,XLINE 1: X COORDINATE: 788937 Y COORDINATE: 938845	
C 8 INLINE 1,XLINE 188: X COORDINATE: 809501 Y COORDINATE: 939333	
C 9 INLINE 345,XLINE 1: X COORDINATE: 788039 Y COORDINATE: 976674	
C10 INLINE NUMBER: MIN:1 MAX: 345 TOTAL: 345	
C11 CROSSLINE NUMBER: MIN:1 MAX:188 TOTAL: 188	
C12 TOTAL NUMBER OF CDPS: 64860 (33594 LIVE) BIN DIMENSION: 110' X 110'	
C13 DATUM 5500' VR 9500 FPS	
C14	
C15	
C16 GENERAL SEG Y INFORMATION	
C17 OUTPUT DATA LENGTH (MS): 4096.00 SAMPLE INTERVAL (MS): 2.00	
C18 DATA FORMAT: 4 BYTE IBM FLOATING POINT	

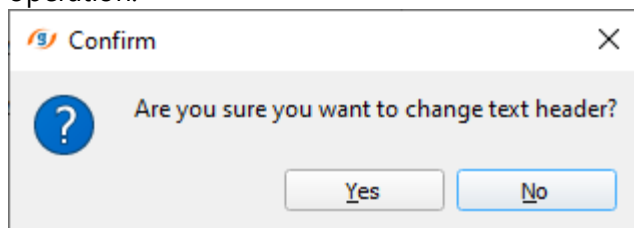
In this example, we are editing the text in **C4**. We will replace the blank line with the text "**g-Viewer EBCDIC header change**" and press **Enter** to apply the change.



To save the modifications, click on the **Actions** icon and choose the **Update Text Header** option as shown below.



After selecting this option, a confirmation pop-up window will appear. Click **Yes** to confirm the operation.



Once confirmed, observe the background color of the **C4** row, which indicates that the Text Header has been successfully modified. Additionally, note that the text in **C4** will be converted from lowercase to UPPERCASE.

Text header	
Header	
C 1 CLIENT: ROCKY MOUNTAIN OILFIELD TESTING CENTER	
C 2 PROJECT: NAVAL PETROLEUM RESERVE #3 (TEAPOT DOME); NATRONA COUNTY,WYOMING	
C 3 LINE: 3D	
C 4 GVIEWER EBCDIC HEADER CHANGE	
C 5 CDP GATHERS WITH STATICS NO NMO AT FLOATING DATUM	
C 6	
C 7 INLINE 1,XLINE 1: X COORDINATE: 788937 Y COORDINATE: 938845	
C 8 INLINE 1,XLINE 188: X COORDINATE: 809501 Y COORDINATE: 939333	
C 9 INLINE 345,XLINE 1: X COORDINATE: 788039 Y COORDINATE: 976674	
C10 INLINE NUMBER: MIN:1 MAX: 345 TOTAL: 345	
C11 CROSSLINE NUMBER: MIN:1 MAX:188 TOTAL: 188	
C12 TOTAL NUMBER OF CDPS: 64860 (33594 LIVE) BIN DIMENSION: 110' X 110'	
C13 DATUM 5500' VR 9500 FPS	
C14	
C15	
C16 GENERAL SEG Y INFORMATION	
C17 OUTPUT DATA LENGTH (MS): 4096.00 SAMPLE INTERVAL (MS): 2.00	
C18 DATA FORMAT: 4 BYTE IBM FLOATING POINT	

9.3 Common Gather Sorting

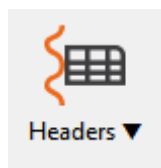
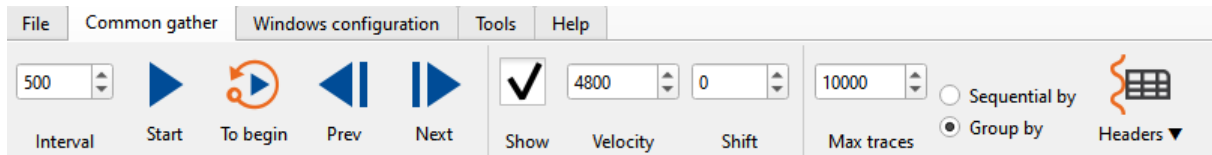
In g-Viewer users have the ability to select and display specific Shot/Receiver/CMP gathers from the seismic data. The main window in g-Viewer contains four tabs in the middle section, each displaying different types of gathers:

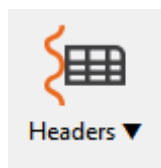
1. Seismic data
2. Common shot - Common shot [View SEG-Y]
3. Common receiver - Common receiver [View SEG-Y]
4. Common bin - Common bin [View SEG-Y]

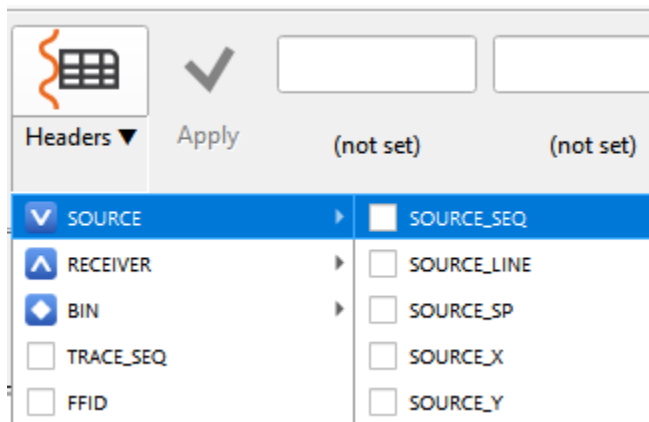
The **Seismic Data** tab displays the entire dataset in a single window, which can be zoomed in and out to view additional details. However, if you want to focus on a specific **Shot**, **Receiver**, or **CMP** gather, you can choose and display only the desired gather.

To display a **Common Shot Gather**, follow these steps:

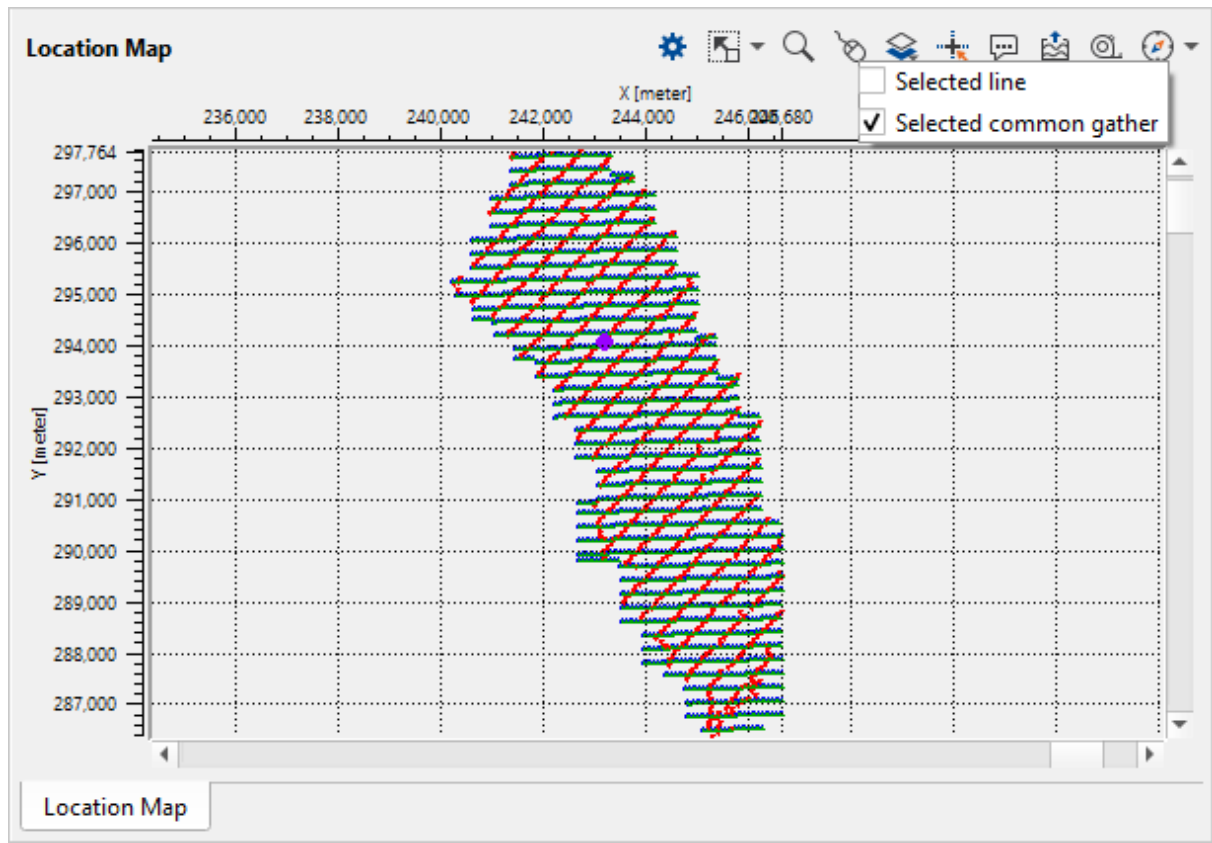
1. Click on the **Control Item** icon in the **Common Shot - Common Shot [View SEG-Y]** tab.
2. Select the "**Selected Common Gather**" option.
3. In the **Common Gather Panel**, locate the **Group By** option.



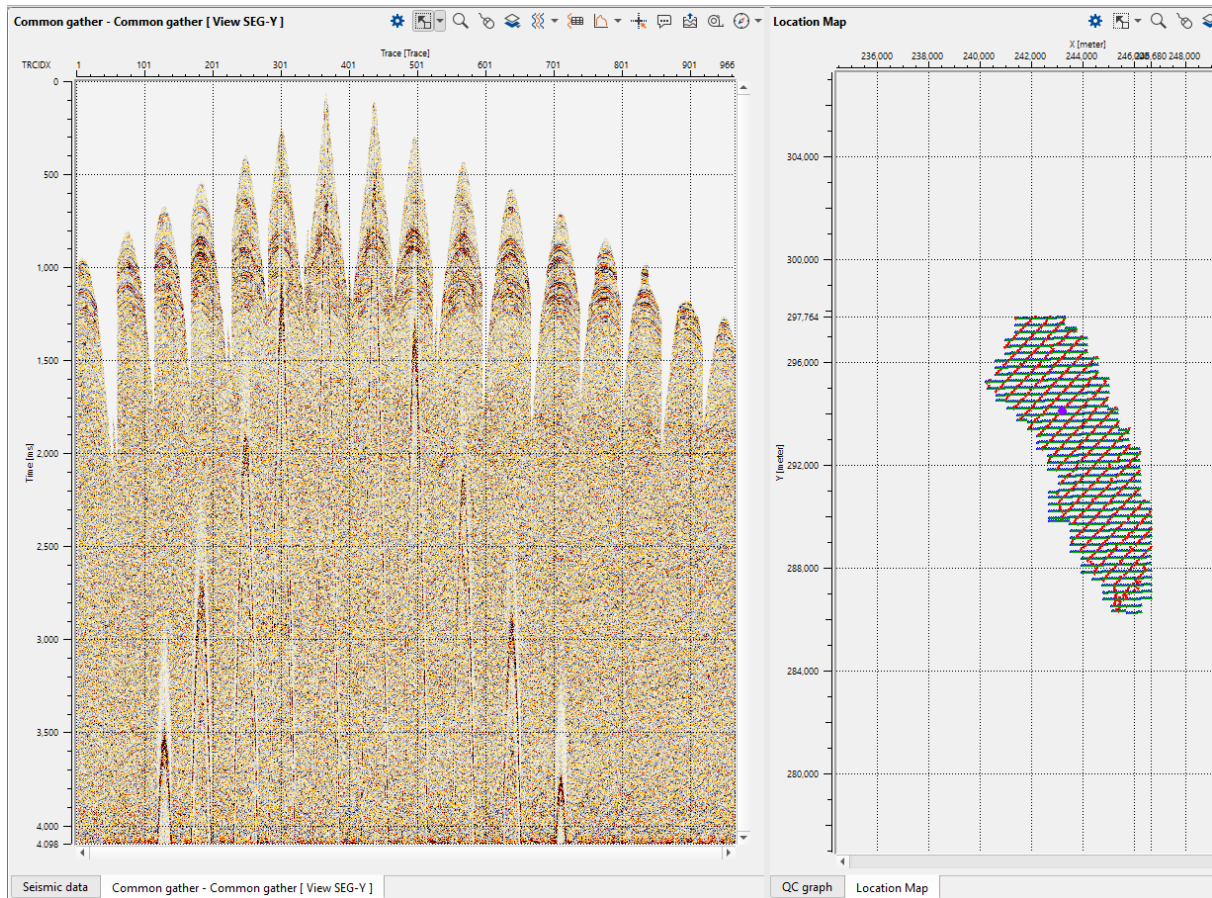
Click on  icon and select the desired headers from the available headers



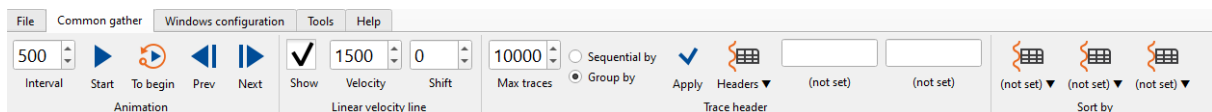
Now click anywhere on the location map to display the selected shot/receiver/cmp gather.



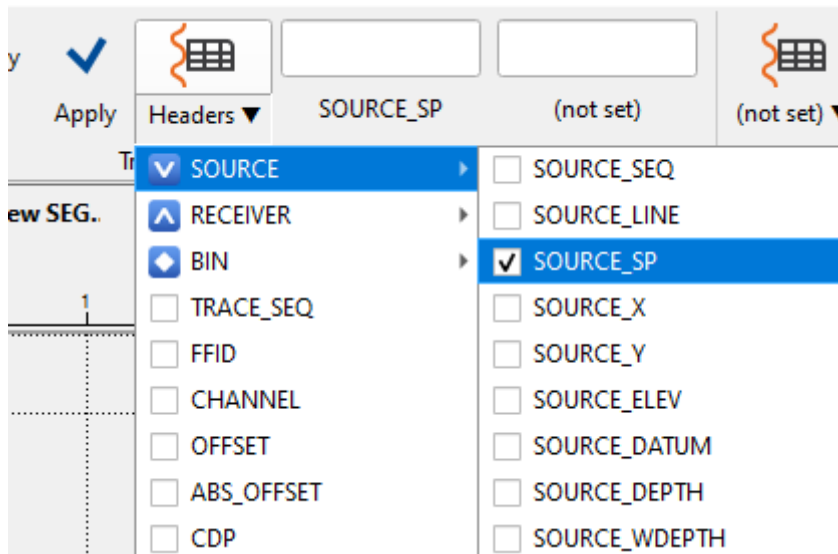
Check the tab of Selected common gather - Common gather [View SEG-Y] and the selected shot gathers will be displayed here.



To do the grouping, the user should go to the Common gather type in the ribbon and select the option **Group by**



Now choose one of the headers from the drop down menu of the Headers icon  and click **Apply**.



Similarly the user can select any trace header and select the desired gather whether a Source/Receiver/CMP gather.

When is This Tool Useful?

1. Quality Control of Seismic Data

- Quickly identifying and sorting gathers to check for missing or inconsistent traces.
- Ensuring trace headers are correctly assigned to their respective gathers, especially when dealing with large datasets.

2. Focusing on Specific Gathers

- Sorting and selecting specific Shot, Receiver, or CMP gathers to perform more focused analysis on particular data subsets.
- Reviewing individual gathers in detail, such as checking trace continuity or visualizing shot-receiver relationships.

3. Assessing Acquisition Geometry

- Verifying the consistency of Shot/Receiver/CMP gathers to detect irregularities in survey geometry.
- Sorting gathers by specific attributes like offset or azimuth to assess the uniformity of the data coverage.

4. Troubleshooting Data Issues

- Sorting and grouping gathers can help detect problematic areas in the dataset, such as misaligned or corrupted traces.
- Isolating gathers that may have acquisition errors or other anomalies.

5. Improving Data Interpretation

- Using common gathers to cross-check seismic data for errors that could affect subsequent interpretation.
- Analyzing selected gathers by specific headers to validate seismic survey parameters, helping ensure the quality of interpreted results.

9.4 Trace Header Editing

The **Trace Data Panel** allows users to modify trace header values using mathematical expressions, apply changes to the current SEG-Y file, and save the updated data as a new file.

This functionality is particularly useful for **data calibration, quality control, and processing adjustments**, ensuring that trace headers align with project requirements. The editing process follows a straightforward workflow: **modifying values, applying updates, and saving changes**.

1. Enter Expressions

Input the desired formula in the **Expression** column for the target trace header(s). For example, to multiply all offset values by 1.5, you can input `Int4(37) * 1.5`.

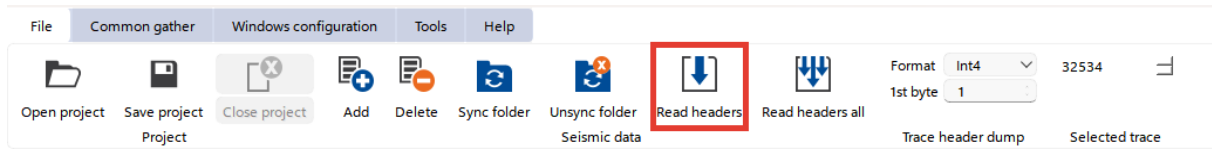
Trace data

Filter

Field	ItemType	StartByte	Value	Ranges	Histogram	Expression
RECEIVER_WDEPTH	Int4	65	0.000000	[0.000; 0.000]		
SCAL_ELEV	Int2	69	0.000	[0.000; 0.000]		
SCAL_COORD	Int2	71	0.000	[0.000; 0.000]		
SOURCE_X	Int4	73	808983.151000	[791134.025; ...]		<code>Int4(73) * 3.28084</code>
SOURCE_Y	Int4	77	808983.151000	[791134.025; ...]		<code>Int4(73) * 3.28084</code>
RECEIVER_X	Int4	81	808983.151000	[791134.025; ...]		<code>Int4(73) * 3.28084</code>
RECEIVER_Y	Int4	85	808983.151000	[791134.025; ...]		<code>Int4(73) * 3.28084</code>
COORD_UNIT	Int2	89	0.000	[0.000; 0.000]		
SOURCE_UPHOLE	Int2	95	0.000000	[0.000; 0.000]		
RECEIVER_UPHOLE	Int2	97	0.000000	[0.000; 0.000]		
SOURCE_STATIC	Int2	99	0.000	[0.000; 0.000]		
RECEIVER_STATIC	Int2	101	0.000	[0.000; 0.000]		
TIME_DELAY	Int2	109	0.000	[0.000; 0.000]		
SAMPLE_NB	UInt2	115	0.000	[0.000; 0.000]		
SAMPLE_INTERVAL	UInt2	117	0.000	[0.000; 0.000]		
TRACE_WEIGHT	Int2	169	0.000	[0.000; 0.000]		

2. Apply Changes

After entering the expressions, click on **Read Headers** to update the trace header values in the panel.



After modifying trace headers using the **Trace Data Panel**, you can apply the changes to the current SEG-Y file by following these steps:

1. Navigate to the Tools Menu

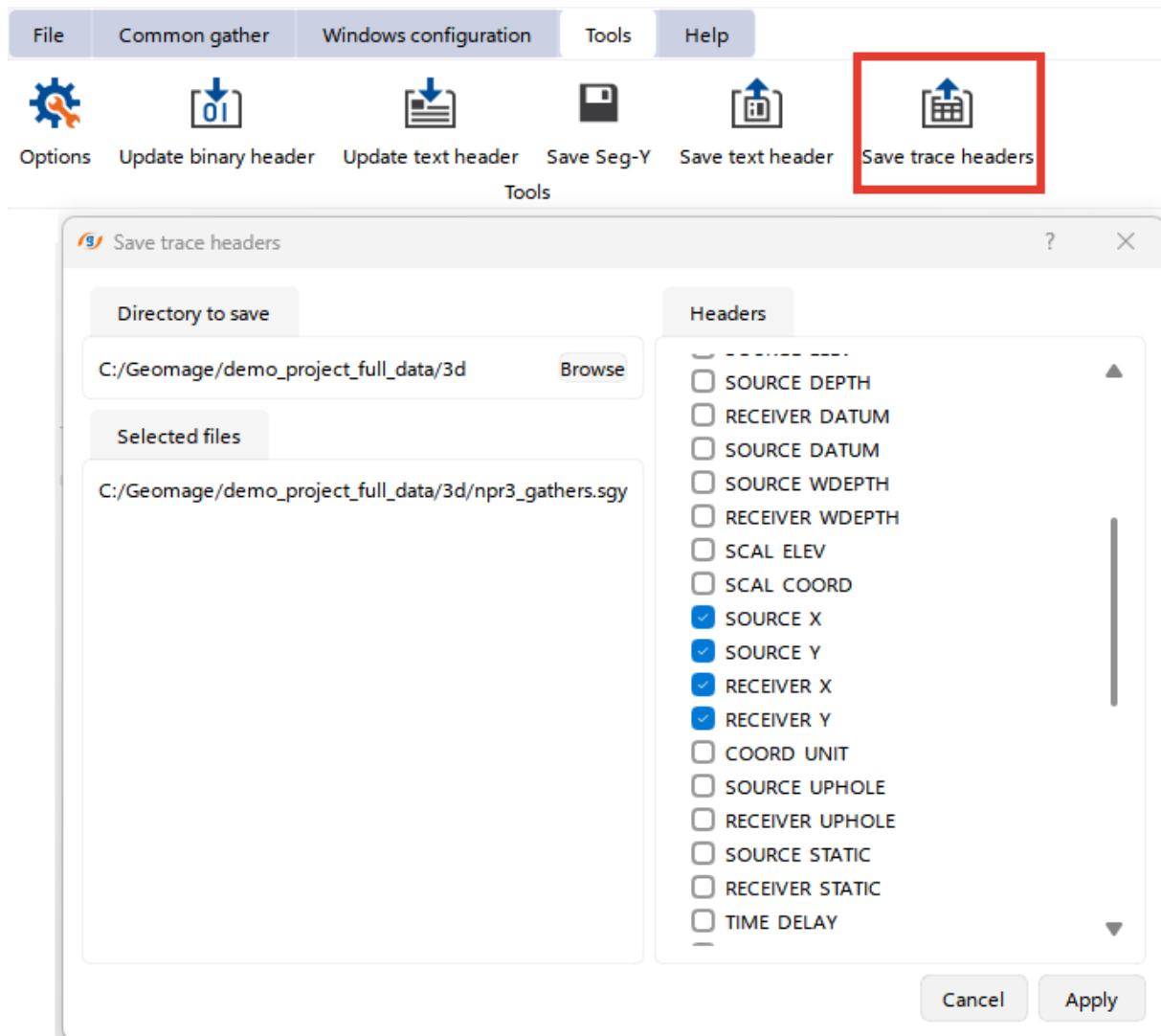
Go to the **Tools** menu and select **Save Trace Header**.

2. Select Headers to Modify

In the dialog that appears, choose the specific trace headers you want to apply changes to. This ensures that only the selected headers are updated in the current SEG-Y file.

3. Apply Changes

Once the desired headers are selected, click **Apply**. This action will update the current SEG-Y file with the modified trace header values.



3. Saving.

To save the modified trace headers as a new SEG-Y file:

1. Navigate to the Tools Menu

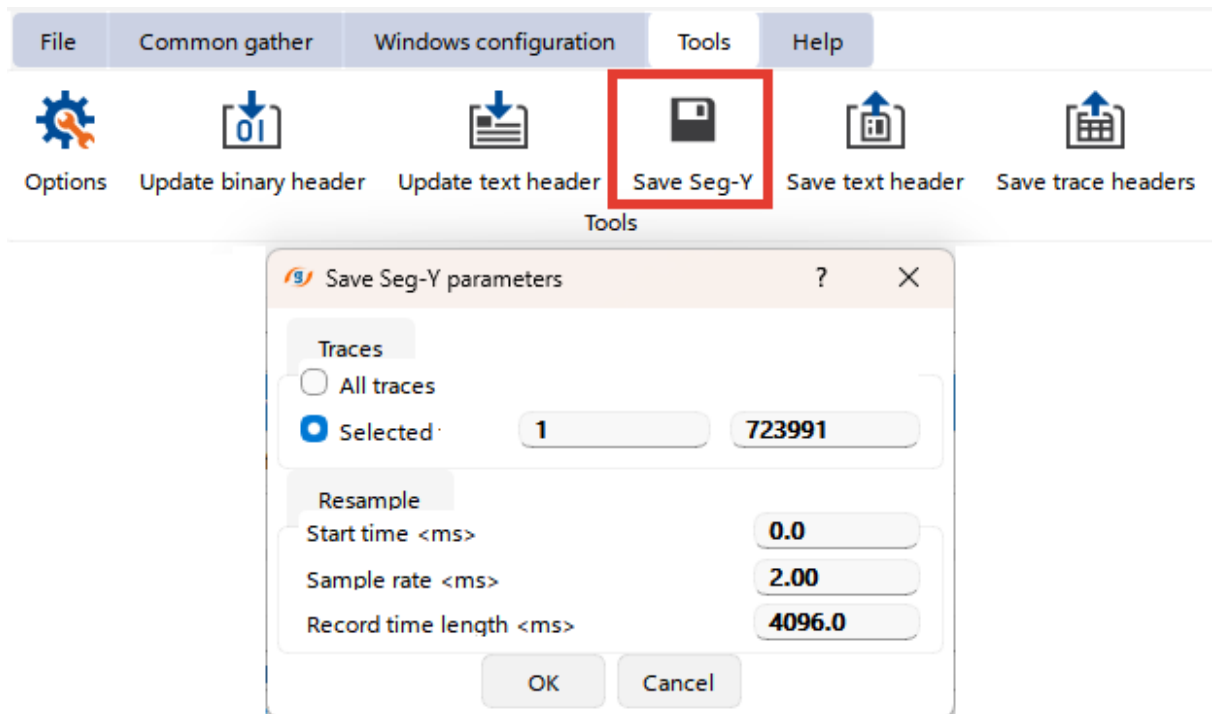
Go to the **Tools** menu and select **Save Seg-Y**

2. A pop-up window will appear, allowing you to:

- Save all traces or only selected traces.
- Resample the data if required.

3. Choose the appropriate options and click OK.

4. In the next pop-up window, specify the file name with the .sgy or .seg.y extension and click **Save**.



If there are issues with the expressions or incompatible data formats, the system will notify the user. Ensure all formulas match the trace header's data type for successful updates.

9.5 Trace Header Crossplotting

The **Trace Header Crossplotting** feature in **g-Viewer** allows users to visualize relationships between trace headers by plotting two headers on the **X and Y axes** and using a **third header for color-coding**. This provides a powerful tool for **data quality control (QC), trend analysis, and anomaly detection** in seismic datasets.

Selecting Trace Headers

- Open the **Trace Headers Table** and identify the headers you want to plot.
- Right-click on a trace header column and choose "**Show as Horizontal Axis**" to assign it to the X-axis.
- Similarly, right-click another trace header column and select "**Show as Vertical Axis**" for the Y-axis.
- Finally, assign a third trace header to be displayed as **color variation** in the plot.

The resultant plot can be seen in the [QC graph](#) ¹⁰⁹ view.

Trace headers

	ffid <FFID> [X]	tracf <CHANNEL> [Z]	ep <SOURCE_SP>	cdp <CDP>	trid <TRACE_TYPE>	nhs <FOLD>	duse <DATA_USE>	offset <OFFSET> [Y]	gelev <RECEIVER_ELEV>	selev <SOURCE_ELEV>	sd <SOURCE>
1	785.0	10.0	6002.0	153.0	1.0	1.0	0.0	1220.0	55232000.0	53201000.0	0.0
2	785.0	11.0	6002.0	154.0	1.0	1.0	0.0	1439.0	55254000.0	53201000.0	0.0
3	785.0	12.0	6002.0	155.0	1.0	1.0	0.0	1659.0	55502000.0	53201000.0	0.0
4	785.0	13.0	6002.0	156.0	1.0	1.0	0.0	1878.0	55805000.0	53201000.0	0.0
5	785.0	14.0	6002.0	157.0	1.0	1.0	0.0	2096.0	55897000.0	53201000.0	0.0
6	785.0	15.0	6002.0	158.0	1.0	1.0	0.0	2316.0	55783000.0	53201000.0	0.0
7	785.0	16.0	6002.0	159.0	1.0	1.0	0.0	2535.0	56304000.0	53201000.0	0.0
8	785.0	17.0	6002.0	160.0	1.0	1.0	0.0	2755.0	56568000.0	53201000.0	0.0
9	785.0	18.0	6002.0	161.0	1.0	1.0	0.0	2976.0	56286000.0	53201000.0	0.0
10	785.0	1.0	6002.0	332.0	1.0	1.0	0.0	773.0	54235000.0	53201000.0	0.0

Trace headers

Here we are selecting FFID as horizontal axis. To do that, user should right click on the FFID column and choose Show as horizontal axis option. Similarly we can select the other trace headers for vertical axis (In this case OFFSET) and color to display.

Trace headers

	ffid <FFID> [X]	tracf <CHANNEL> [Z]	ep <SOURCE_SP>	cdp <CDP>	trid <TRACE_TYPE>	nhs <FOLD>	duse <DATA_USE>	offset <OFFSET> [Y]	gelev <RECEIVER_ELEV>	selev <SOURCE_ELEV>	sd <SOURCE>
1	785.0	10.0	6002.0	153.0	1.0	1.0	0.0	1220.0	55232000.0	53201000.0	0.0
2	785.0	11.0	6002.0	154.0	1.0	1.0	0.0	1439.0	55254000.0	53201000.0	0.0
3	785.0	12.0	6002.0	155.0	1.0	1.0	0.0	1659.0	55502000.0	53201000.0	0.0
4	785.0	13.0	6002.0	156.0	1.0	1.0	0.0	1878.0	55805000.0	53201000.0	0.0
5	785.0	14.0	6002.0	157.0	1.0	1.0	0.0	2096.0	55897000.0	53201000.0	0.0
6	785.0	15.0	6002.0	158.0	1.0	1.0	0.0	2316.0	55783000.0	53201000.0	0.0
7	785.0	16.0	6002.0	159.0	1.0	1.0	0.0	2535.0	56304000.0	53201000.0	0.0
8	785.0	17.0	6002.0	160.0	1.0	1.0	0.0	2755.0	56568000.0	53201000.0	0.0
9	785.0	18.0	6002.0	161.0	1.0	1.0	0.0	2976.0	56286000.0	53201000.0	0.0
10	785.0	1.0	6002.0	332.0	1.0	1.0	0.0	773.0	54235000.0	53201000.0	0.0

Trace headers

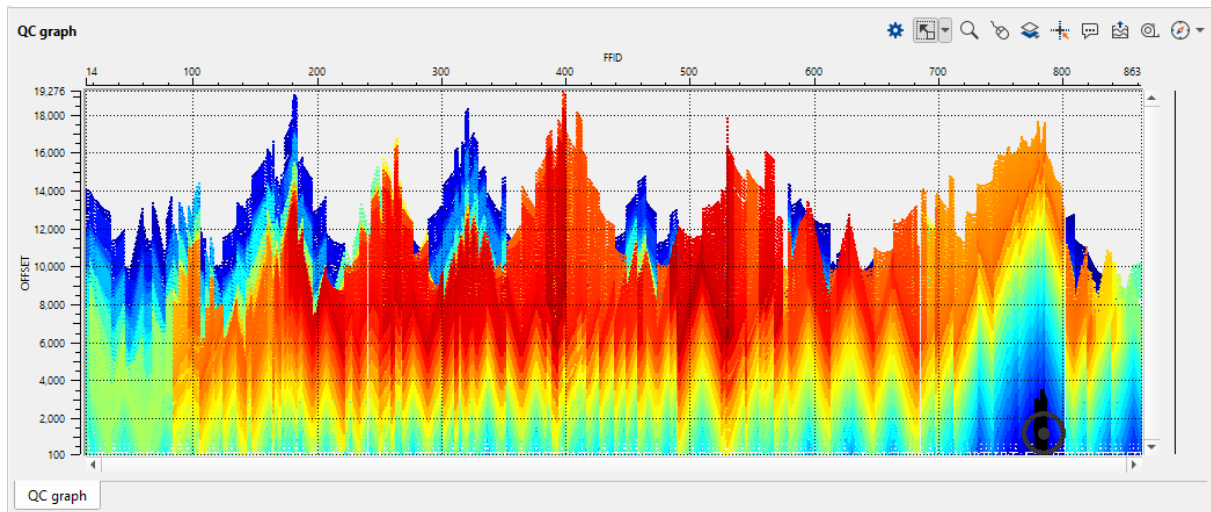
Finally we can select CHANNEL column as a color for the QC graph display.

Trace headers

	fldr <FFID> [X]	tracf <CHANNEL> [Z]	ep <SOURCE_ELEV>	cdp <CDP>	trid <TRACE_TYPE>	nhs <FOLD>	duse <DATA_USE>	offset <OFFSET> [Y]	gelev <RECEIVER_ELEV>	selev <SOURCE_ELEV>	sd <SOURCE>
1	785.0	10.0	6002.0	156.0	1.0	1.0	0.0	1220.0	55232000.0	53201000.0	0.0
2	785.0	11.0	6002.0	157.0	1.0	1.0	0.0	1439.0	55254000.0	53201000.0	0.0
3	785.0	12.0	6002.0	158.0	1.0	1.0	0.0	1659.0	55502000.0	53201000.0	0.0
4	785.0	13.0	6002.0	159.0	1.0	1.0	0.0	1878.0	55805000.0	53201000.0	0.0
5	785.0	14.0	6002.0	160.0	1.0	1.0	0.0	2096.0	55897000.0	53201000.0	0.0
6	785.0	15.0	6002.0	161.0	1.0	1.0	0.0	2316.0	55783000.0	53201000.0	0.0
7	785.0	16.0	6002.0	162.0	1.0	1.0	0.0	2535.0	56304000.0	53201000.0	0.0
8	785.0	17.0	6002.0	163.0	1.0	1.0	0.0	2755.0	56568000.0	53201000.0	0.0
9	785.0	18.0	6002.0	164.0	1.0	1.0	0.0	2976.0	56286000.0	53201000.0	0.0
10	785.0	1.0	6002.0	332.0	1.0	1.0	0.0	773.0	54235000.0	53201000.0	0.0

Trace headers

The resultant QC graph is as shown below.



Likewise the user can cross plot any of 3 trace headers to quickly visualize and QC the trace headers in a more efficient way.

When is This Tool Useful?

1. Quality Control of Trace Headers

- Detecting **inconsistent header values**, such as unexpected offsets or incorrect shot numbers.

- Identifying missing or duplicate traces in the dataset.

2. Checking Source-Receiver Geometry

- Verifying the **distribution of offsets** in relation to FFID to ensure a uniform shot spacing.
- Identifying irregular shot patterns that may indicate acquisition errors.

3. Validating Marine and Land Seismic Acquisition Data

- In **marine surveys**, analyzing the correlation between **shot point number, receiver distance, and channel number** to detect potential positioning errors.
- In **land seismic surveys**, visualizing the relationship between **source-receiver azimuths, offsets, and elevation** to check terrain effects.

4. Identifying Instrumentation or Processing Errors

- Checking variations in **trace scaling, gains, or filter application** by plotting **trace gain vs. channel number**.
- Detecting systematic errors in seismic sensors or processing workflows.

5. Detecting Geometry and Navigation Errors

- Crossplotting **CDP (Common Depth Point) vs. Offset** and color-coding by **Shot Point** to detect incorrect CDP binning.
- Identifying **overlapping or missing CDP bins** in land and marine seismic acquisition.
- Checking for **navigation inconsistencies** by plotting **Source X vs. Source Y** and color-coding by **FFID**.

9.6 Band-Pass Analysis

The Band-Pass Analysis feature in g-Viewer enables users to analyze the frequency spectrum of seismic data by selecting specific areas within a dataset.

Multiple Selections Within a Single Seismic Dataset enables users to select multiple regions within a single seismic dataset for spectrum analysis.

Workflow:

- Open a seismic dataset in g-Viewer.
- Activate the **Band-Pass Analysis** tool at the top of the view
- Select multiple regions of interest within the seismic data using left mouse button
- Each selected region will be analyzed, and its corresponding frequency spectrum will be plotted

Spectral Analysis Panel

Once selections are made, the spectral analysis panel displays:

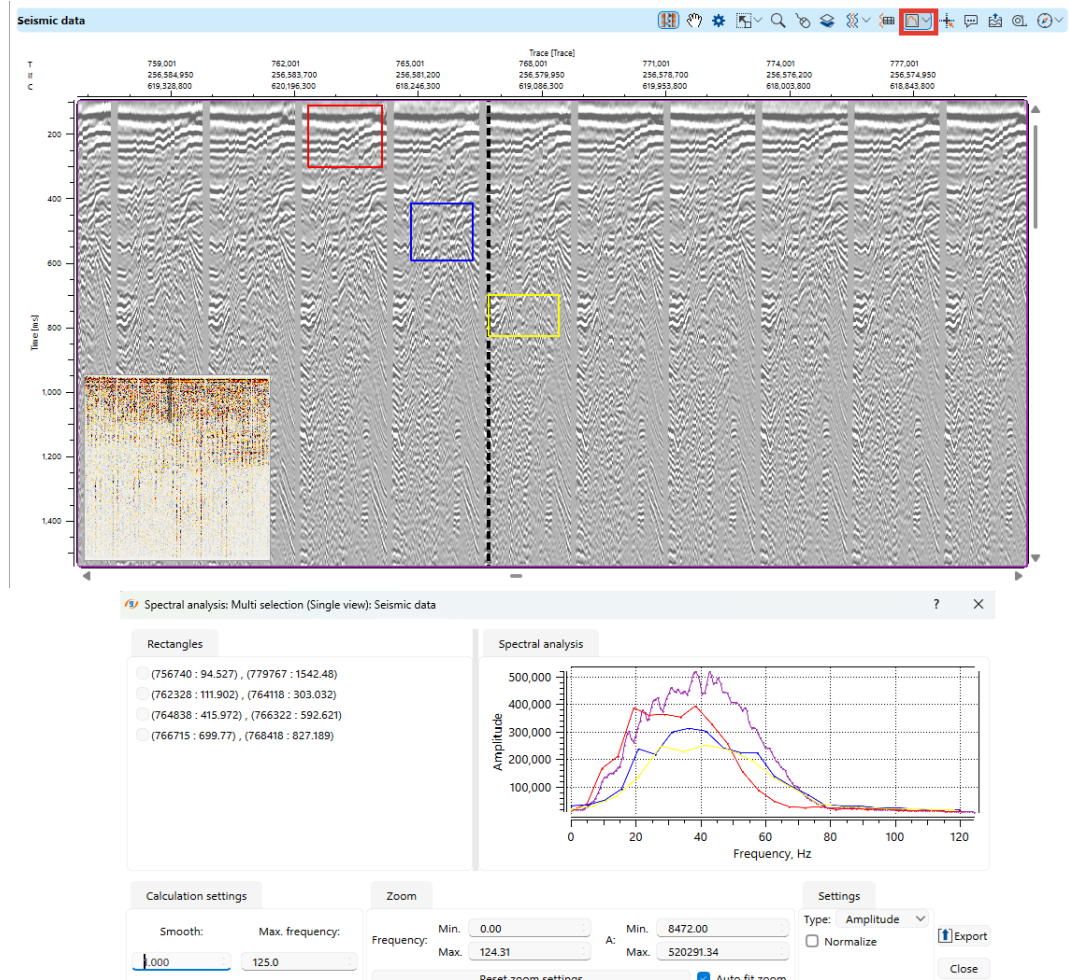
- The list of selected regions.
- The computed amplitude spectrum for each selection.
- The option to change color, the same color will be highlighted a rectangle on Seismic data view and show spectrum plot
- Options to adjust frequency smoothing and zoom settings.
- Export functionality for saving results.

Calculation Settings

- **Smoothing:** Adjusts the level of spectral smoothing.
- **Max Frequency:** Defines the upper limit of the analyzed frequency range.

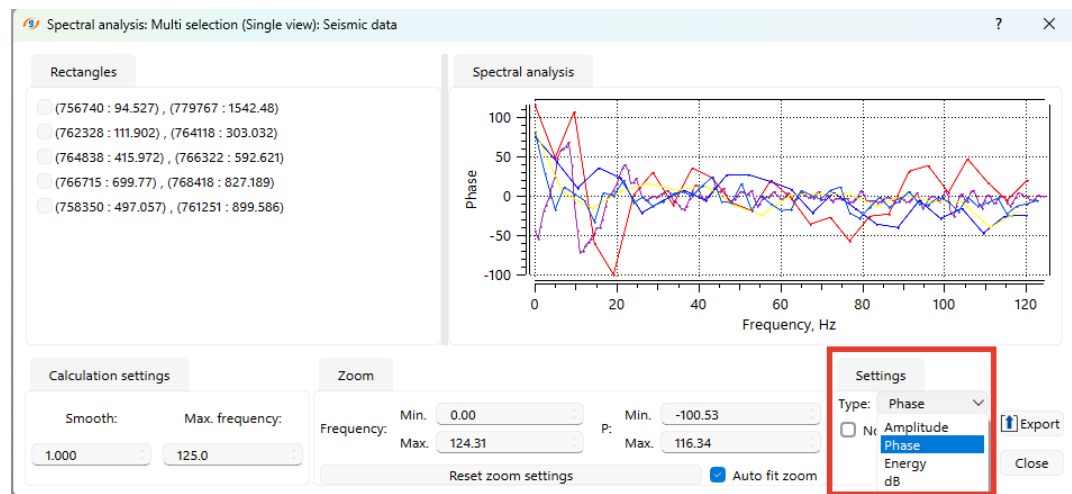
Zoom & Display Options

- Users can zoom into specific frequency ranges.
- The "Auto fit zoom" feature optimizes the view for better visualization.



Users can analyze the frequency spectrum using different types of spectral analysis:

- **Amplitude:** Displays the amplitude of each frequency component.
- **Phase:** Shows the phase shift of each frequency component.
- **Energy:** Represents the energy distribution across frequencies.
- **dB:** Provides a decibel scale representation of spectral content.



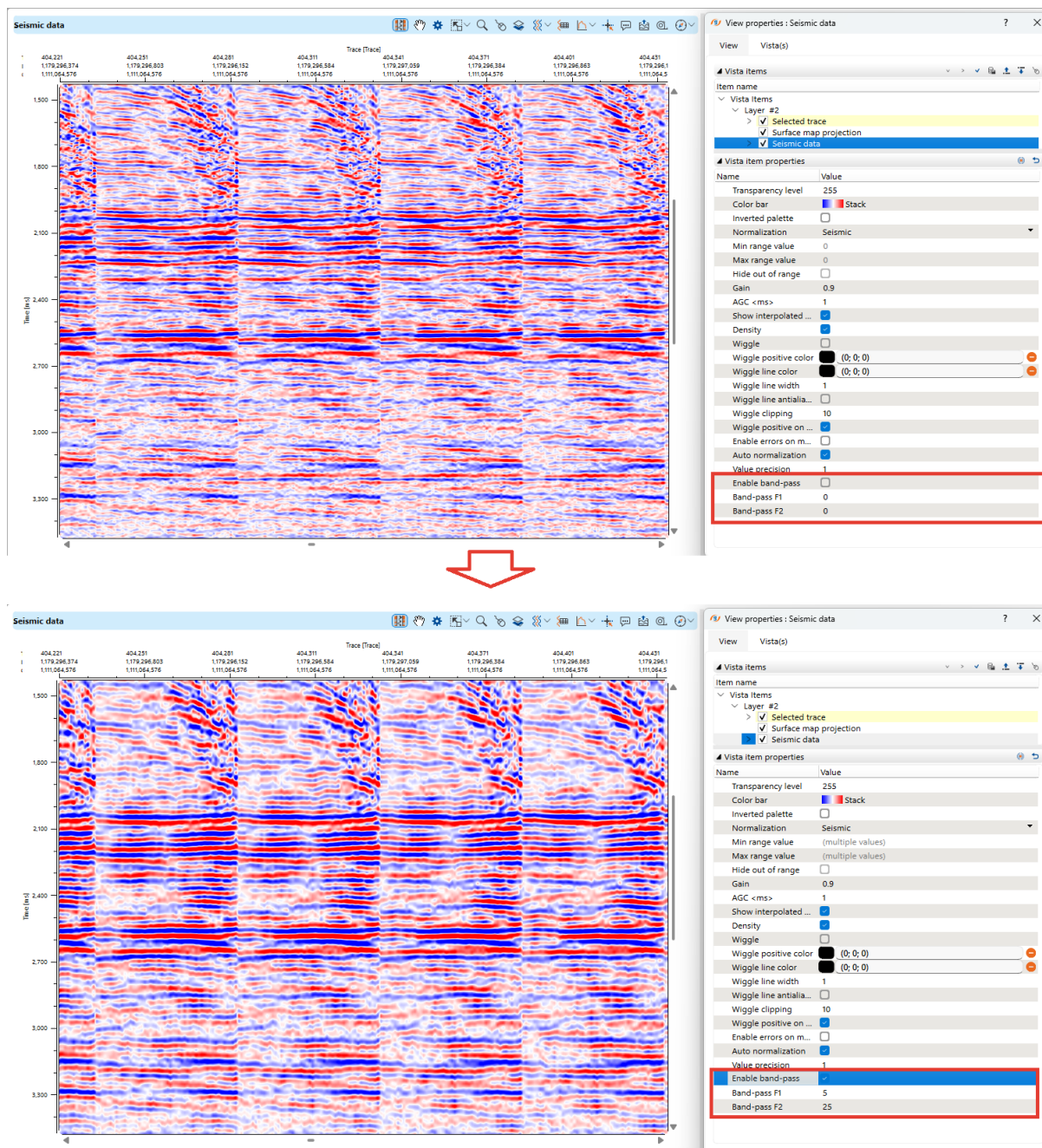
9.6.1 Band-pass filtering

Band-pass filtering can be enabled through the **View Properties** panel in the seismic data visualization interface.

Find the "Enable band-pass" option and activate it.

- **Band-pass F1:** Sets the lower cutoff frequency, removing very low-frequency noise.
- **Band-pass F2:** Defines the upper cutoff frequency, eliminating high-frequency noise.
- Adjust these values based on the desired frequency range for enhanced seismic visibility.

Band-pass filtering is a visual-only setting and does not modify the input seismic data.

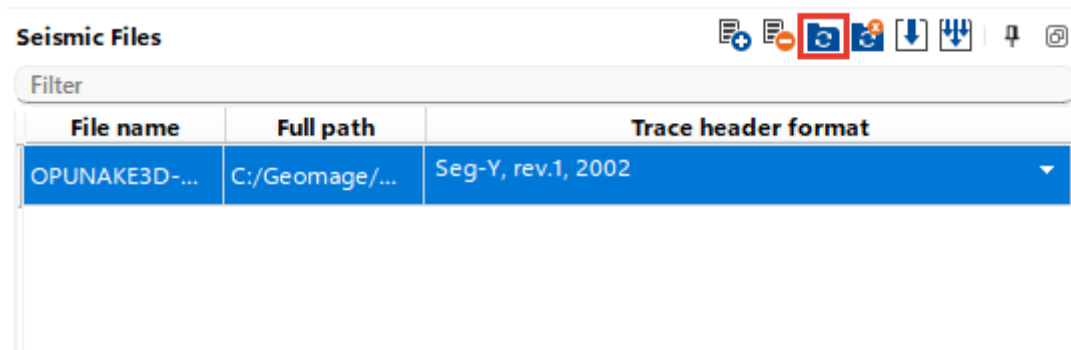


9.7 Folder synchronization

g-viewer allows users to **link a specific folder on their PC** to the **Seismic Files panel**, ensuring seamless integration of newly added seismic data. Once a folder is linked, any **new seismic files added to this directory** on the user's computer will be **automatically detected and loaded** into the Seismic Files panel without requiring manual imports.

This feature is especially beneficial for **collaborative projects or workflows** where seismic data is continuously generated, updated, or shared across teams.

The **Seismic Files panel** features a **Sync Folder** button at the top, allowing users to link a specific directory on their PC to the software. When the user clicks this button, a **directory selection window** opens, enabling them to choose a folder for synchronization.



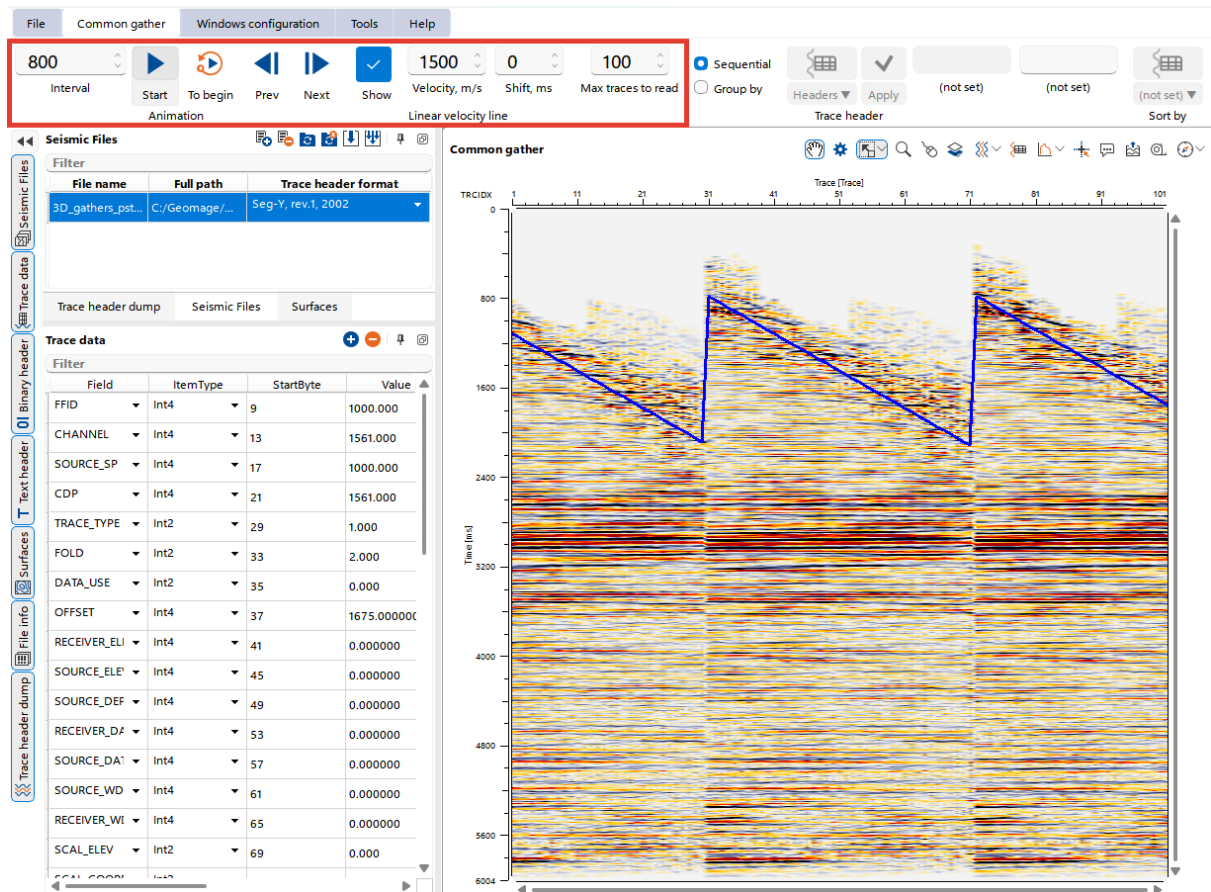
To **unsynchronize the folder**, users can simply click the next **Unsync folder** button at the top of the panel. This action will **unlink the directory**, stopping automatic updates while keeping the previously loaded files available in the panel.

9.8 Animating Common Gather

The **Common Gather View** in g-Viewer allows users to visualize seismic data dynamically using an animation feature. This functionality enables users to step through seismic traces automatically, making it easier to observe waveform changes and identify patterns in the dataset.

To animate the **Common Gather View**, follow these steps:

1. **Open a Seismic File:** Ensure that a seismic file is loaded in the **Seismic Files** panel.
2. **Select the Common Gather View:** Open a seismic dataset in the **Common Gather View**.
3. **Locate the Animation Controls:** The animation settings are located in the [Common gather bar](#), where you can configure playback parameters.



Before starting the animation, users need to configure key parameters:

- **Interval (ms):** Define the time step between frames in milliseconds. A smaller interval results in smoother and faster animation.
- **Velocity (m/s):** Set the velocity parameter to adjust scaling and representation.
- **Shift (ms):** Define an optional time shift to align traces dynamically.
- **Max Traces to Read:** Specify the maximum number of traces to include in the animation.
- **Sequential Mode:** Ensure the animation progresses in a logical, sequential order.

Running the Animation

Once the parameters are set:

1. Click the **Start** button to begin the animation.
2. Use **To Begin, Prev, and Next** controls to manually step through traces.
3. Click **Stop** to pause the animation.
4. Adjust parameters as needed and restart the animation.

Practical Applications

- **Seismic Event Analysis:** Observe how reflections change across gathers.

- **Quality Control (QC):** Identify inconsistencies or missing traces.
- **Velocity and Amplitude Adjustments:** Tune parameters while viewing the dynamic response.

9.9 Data Quality Control (QC)

9.10 Gain Application

- Applying AGC (automatic gain control) for better visualization
- Trace normalization for cross-section comparison
-

Visualization

10 Visualization

10.1 Seismic view

Seismic view is the main display window where the user can able to visualize the entire dataset within a window. The entire dataset is loaded into the memory and display the full content of the data in the seismic data window. However if the user zoom in/out in any part of the "**Seismic data**" then that particular section of the display will be displayed on the screen.

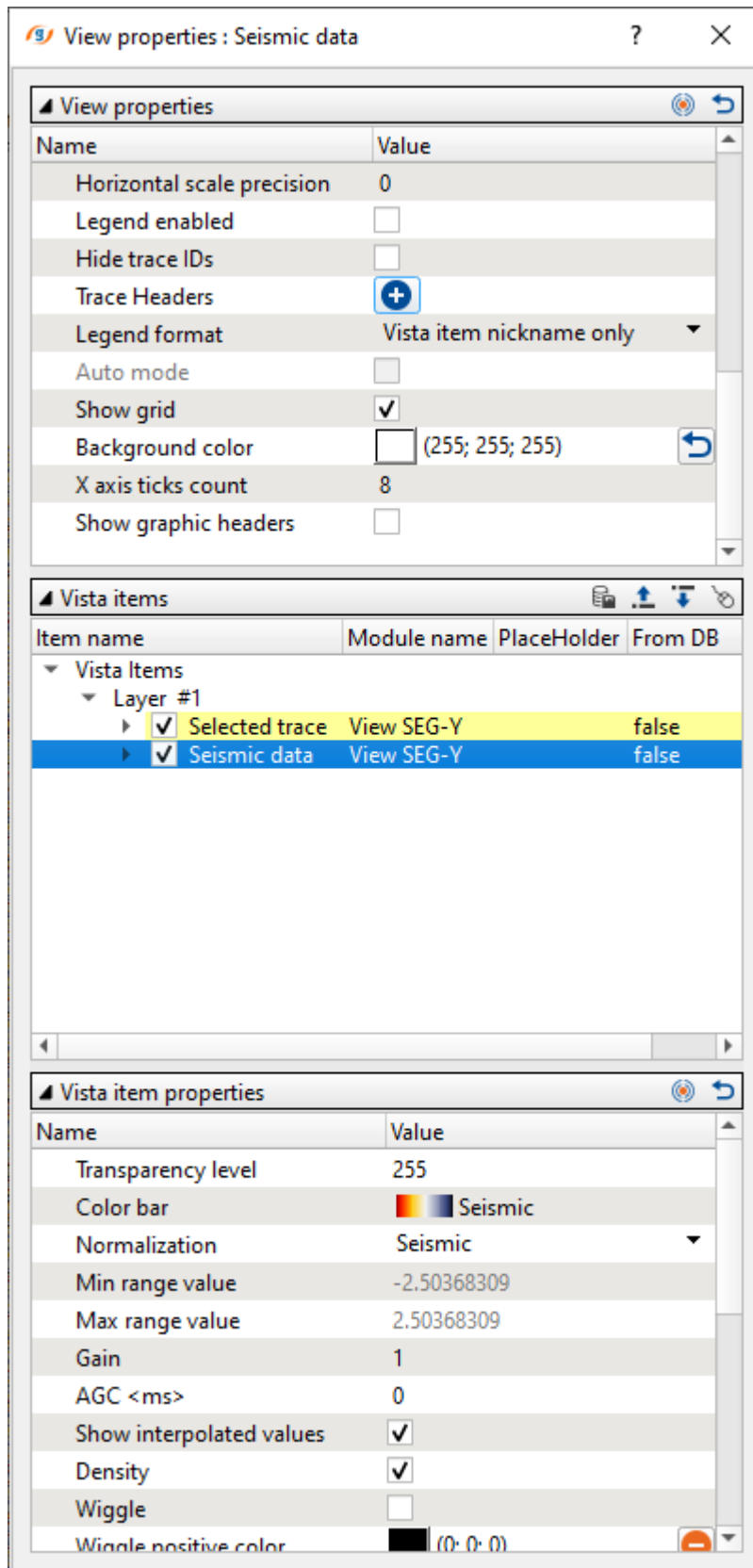
Within the seismic data window, we have many option to visualize the data. For an example if the user wants to display the Offset plot on the top of the annotations, it can be done fairly easy. Before that we need to introduce various icons on the top of the seismic data window each got it's own significance.



We are going to briefly describe about each of them (order from left to right).

1. Show properties

This will open up a pop-up window to change the display settings like placing annotations on the top, changing the color of the display from density to wiggle, applying AGC etc.



Show properties is designed into 3 parts.

View properties predominantly takes care of Trace headers annotations , showing graphic headers etc.

Vista items deals with the main components of the data like seismic data, selected trace, selected shot gather etc

Vista item properties helps in adjusting the gain, AGC, change the color scheme, applying Band pass filter etc.

2. Adjust to size :

This option adjust the display size into the original position. Zoom Out.

3. Set/Unset zoomable :

If the user wants to zoom a particular area, simply click on the icon to activate the zoom and draw a polygon on the seismic data to zoom that particular area. Please note that after the initial operation, the icon resets to zoom out position and the user needs to reselect the **set/unset zoomable** icon to zoom again.

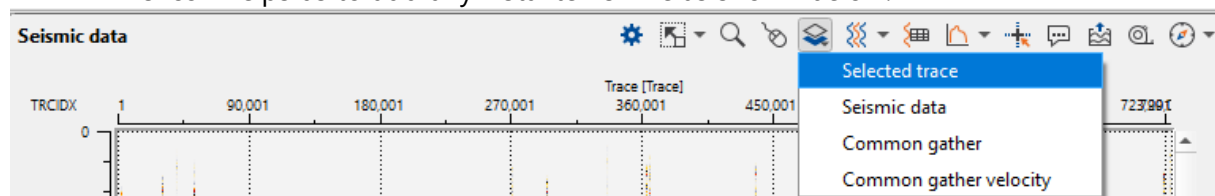
4. Set control item :

This icon helps in selecting any particular item inside the seismic data window. For instance, if the user wants to select a trace then click on **Set control item** icon and it will give the options to choose. In this instance we have only one option i.e. select trace.



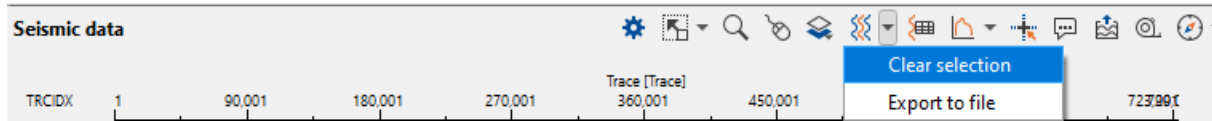
5. Add Vista :

This icon helps us to add any vista items like as shown below.



6. Select traces :

By selecting this icon, the user can able to select a trace. Besides this, we have an option to clear the selection and Export to file option if the user click on the downward triangle right next to the Select traces icon.



7. Trace headers table

This option will work in tandem with the Select traces module. The trace headers information should be available in the Trace data window.

8. Spectral Analysis

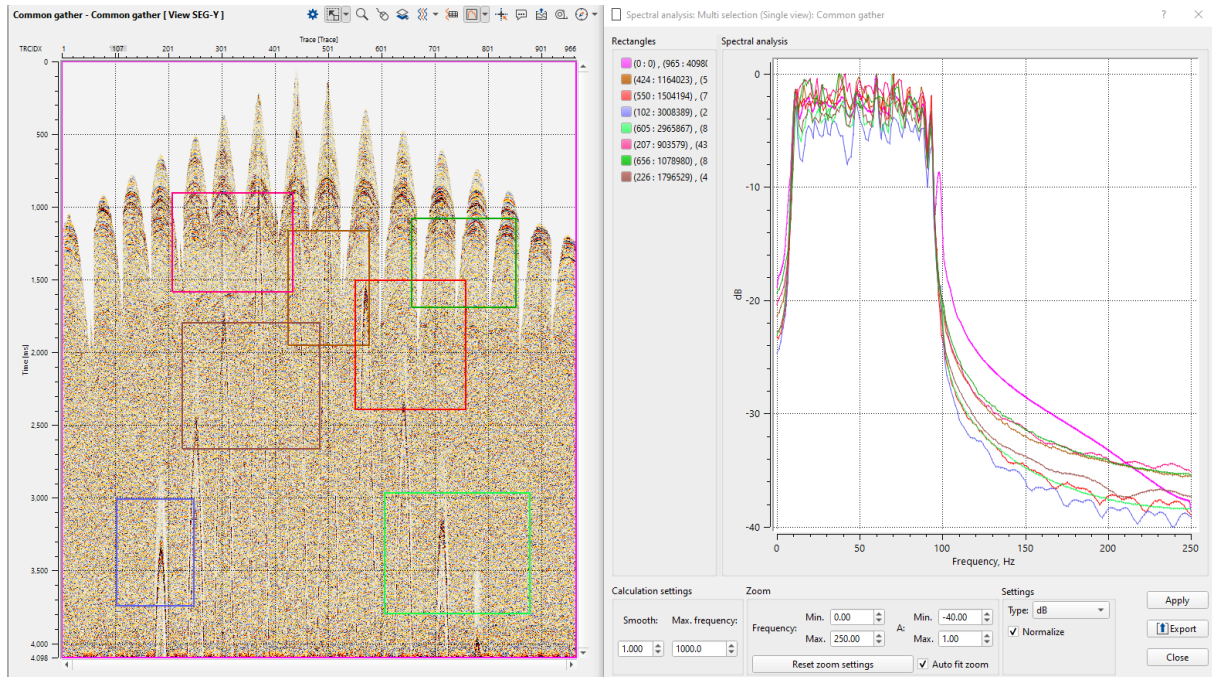
Within g-Viewer the user has the ability to analyze the amplitude and frequency of the seismic data via a spectral analysis. To perform this the user should go to either the Seismic data or the Common shot/receiver/bin tab.

Click on the **Spectral analysis** icon and it will generate the spectral analysis window as shown below.

To draw a polygon, simply hold and drag MB1 button at the desired location on the display window. Several window selections and their corresponding spectra are displayed below.

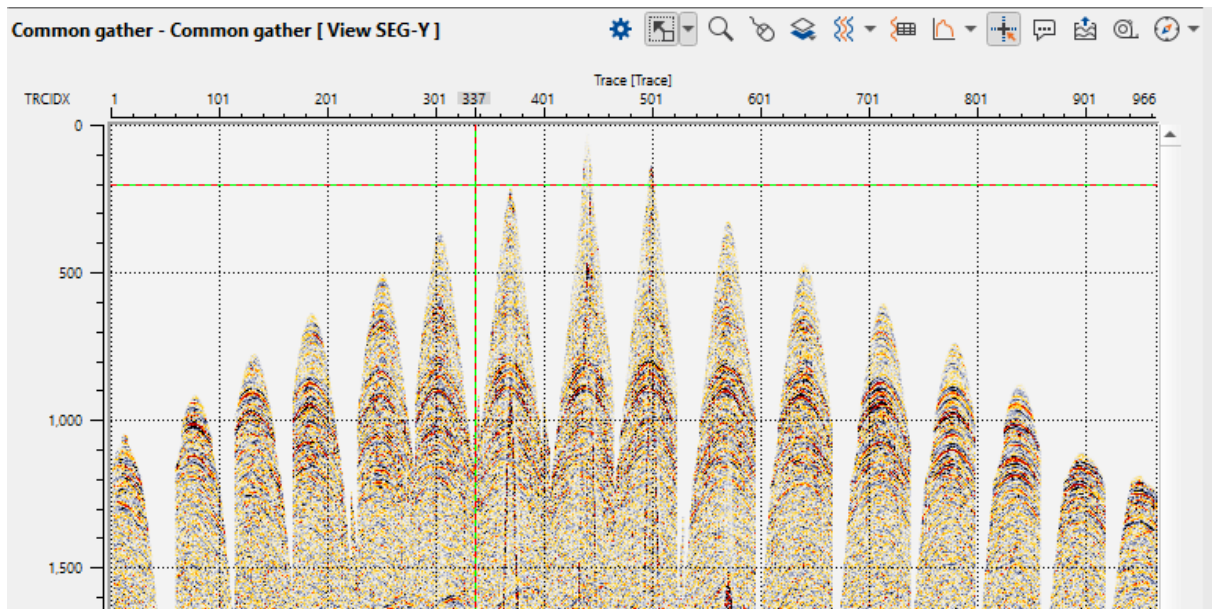
To delete a rectangle right-click on the polygon.

By default g-Viewer shows a spectrum for the full visible section.



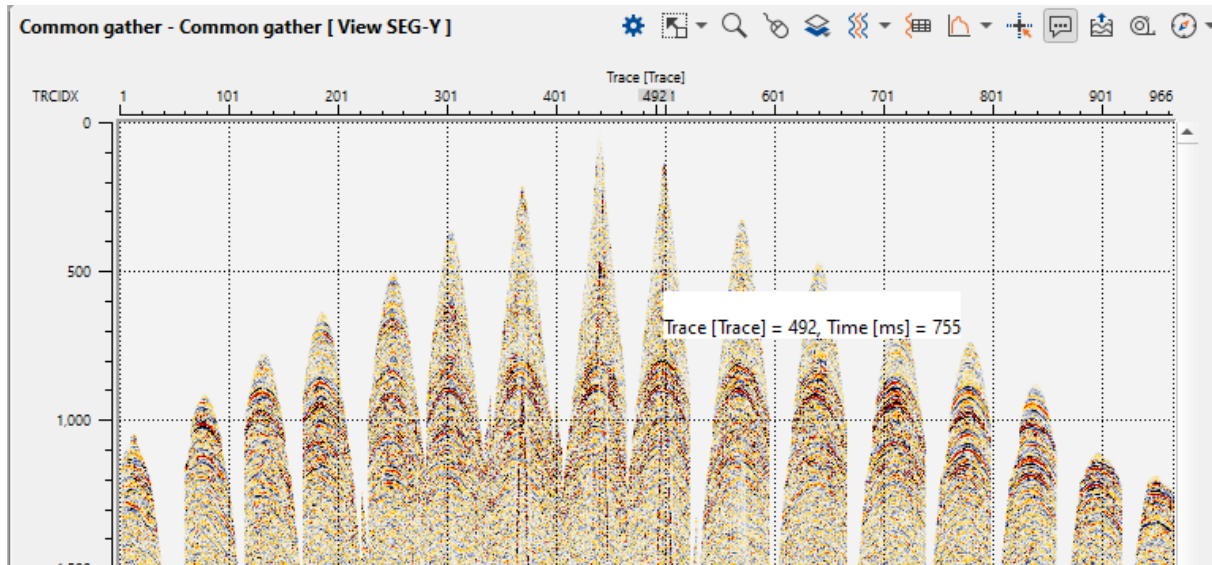
9. Set/unset mouse tracker

When the user selects this option, it will show the dotted horizontal and vertical lines to show the mouse tracker as shown below.



10. Tool tip

Upon selecting this option, it will display the available information depending on the cursor position.

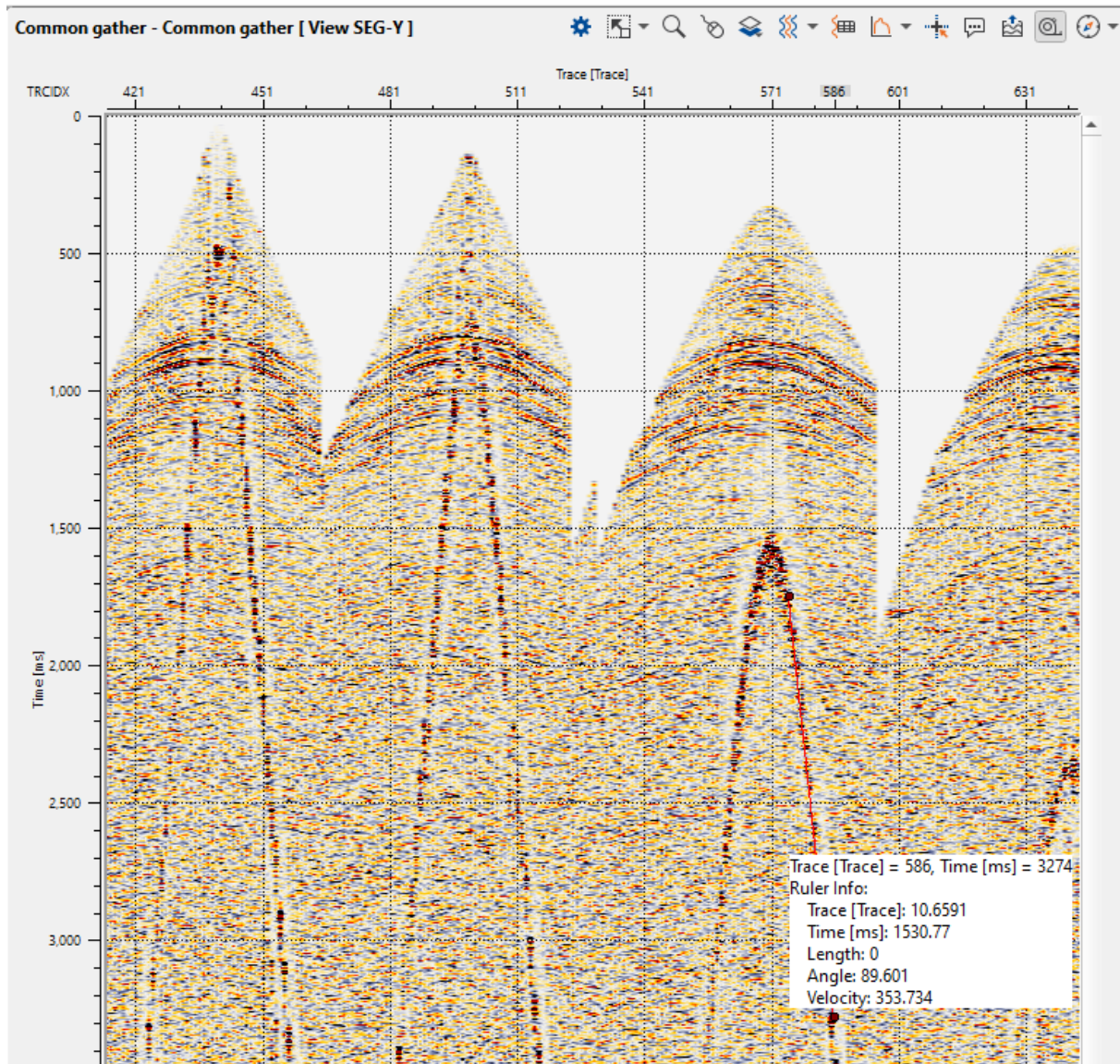


11. Export picture :

Captures and saves seismic views in various formats for documentation or presentations.

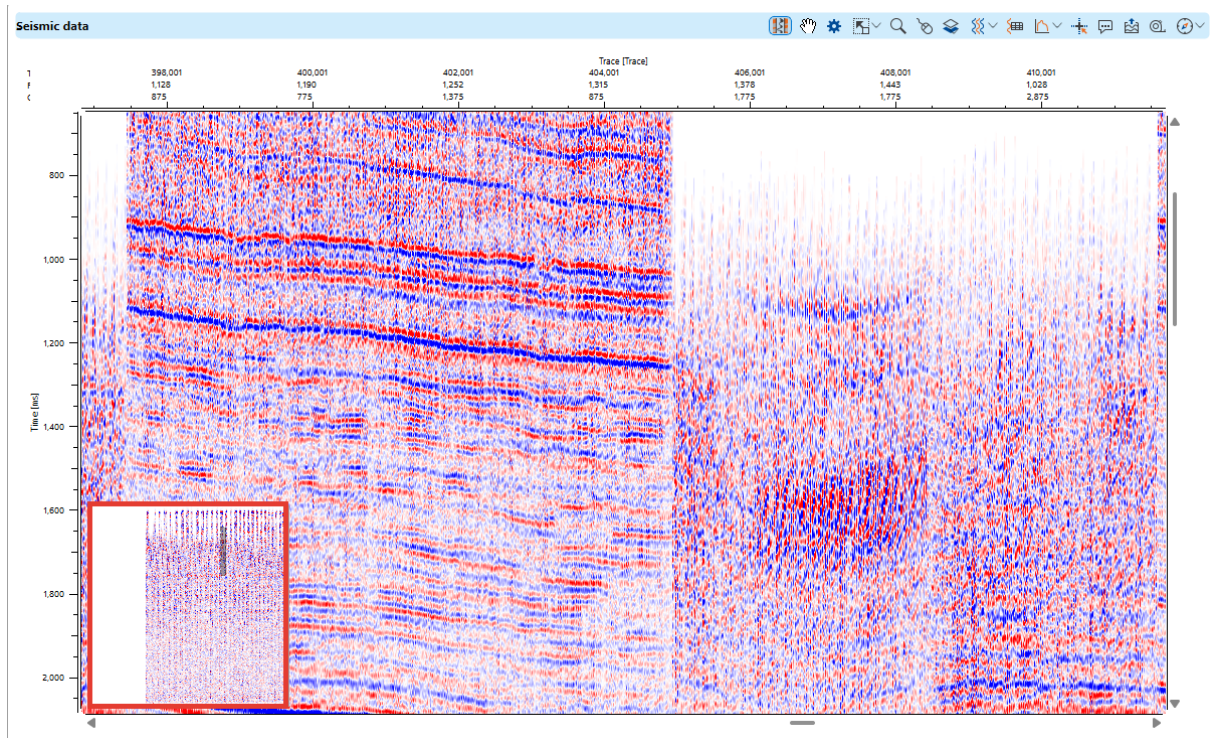
12. Ruler :

Measures distances, such as event velocity, by drawing a line on the display. Click on the Ruler icon and hold MB1(left mouse button), draw a line. It will display the information as a tool tip as shown below.



13. Region map

Enables users to create and manage regions of interest within the seismic dataset for detailed analysis.



Display Modes

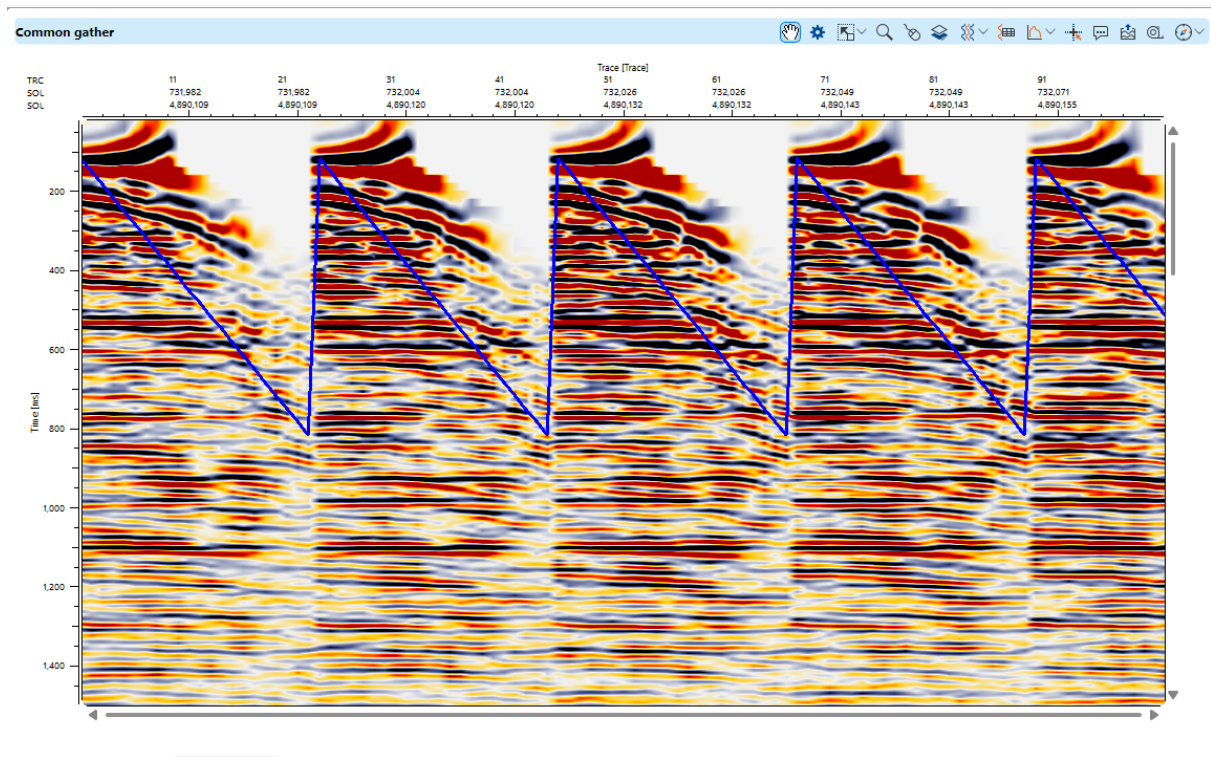
- **Wiggle and Variable Density:** Users can switch between wiggle traces and color-filled sections.
- **Trace Spacing and Overlap:** Adjustments allow better visibility and clarity of seismic events.
- **Custom Gain Settings:** Helps enhance signal clarity in wiggle mode.

More visual settings are available in the [View Properties](#)  panel.

10.2 Common gather view

Common Gather View is another essential display for analyzing seismic data, particularly in pre-stack interpretation.

It allows users to examine traces grouped by offset, shot, or receiver locations, aiding in velocity analysis, AVO studies, and noise removal.



Visualization and Display Options

Like Seismic View, Common Gather View provides multiple ways to visualize the data, including adjusting trace alignment and overlaying attributes for analysis. The toolbar contains several icons that help users manage and interact with the dataset efficiently.

Toolbar Functions (Left to Right)

1. Show Properties

Opens a settings window where users can adjust display preferences, such as trace annotations, color modes (wiggle, variable density), and gain adjustments (AGC).

- **View Properties:** Manages trace headers, graphic headers, and annotations.
- **Vista Items:** Controls display elements like common gathers, selected traces, and selected shot/receiver locations.
- **Vista Item Properties:** Adjusts gain, AGC, color schemes, and applies filters.
- **More visual settings are available in the View Properties panel.**

2. Adjust to Size



Resets the display to its original zoom level.

3. Set/Unset Zoomable



Enables zoom functionality for focusing on specific trace sections. The tool resets after use and must be reselected for further zooming.

4. Set Control Item

Allows selection of specific elements within the Common Gather View, such as individual traces or offset groups.

5. Add Vista

Adds additional visualization elements like shot gathers or receiver gathers.

6. Select Traces

Enables trace selection with options to clear selections or export selected traces to a file.

7. Trace Headers Table

Displays header information for selected traces in a separate data window.

8. Spectral Analysis

Provides amplitude and frequency analysis for common gathers.

9. Set/Unset Mouse Tracker

Displays horizontal and vertical guide lines for precise tracking.

10. Tool Tip

Shows relevant data based on cursor position.

11. Export Picture

Captures and saves seismic gather views in various formats for documentation or presentations.

12. Ruler Tool

Measures distances, such as event velocity, by drawing a line on the display.

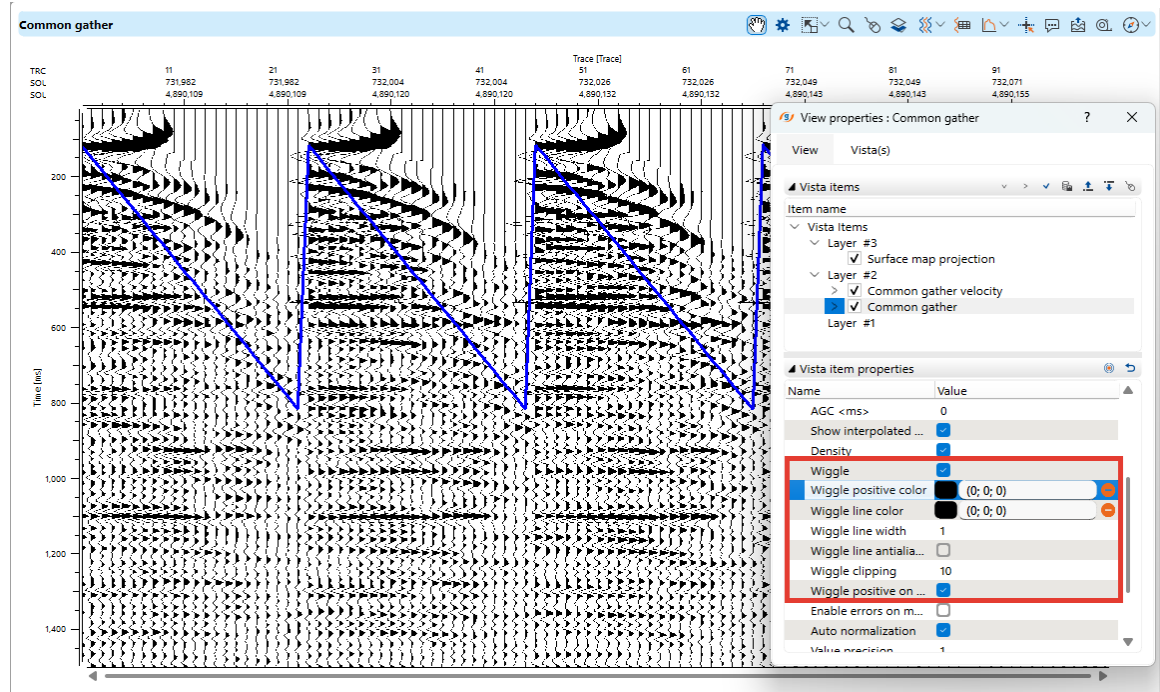
13. Region Map Tool

Enables users to create and manage regions of interest within the common gather dataset for detailed analysis.

Display Modes

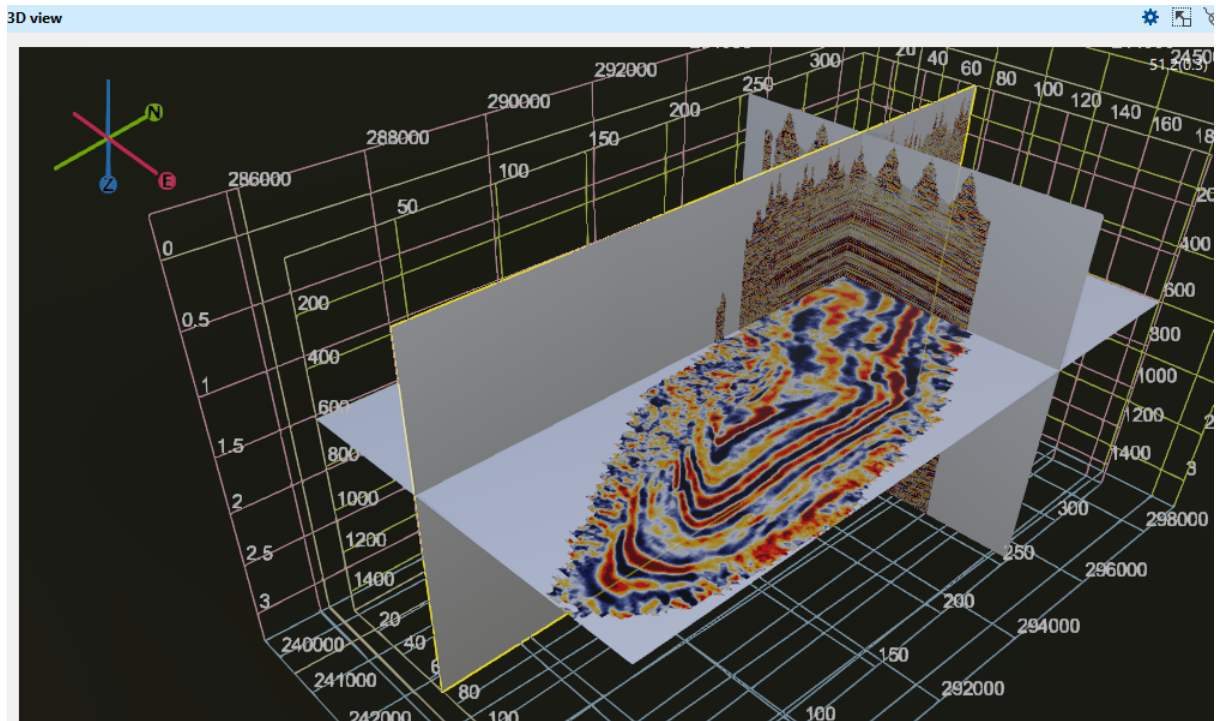
- **Wiggle and Variable Density:** Users can switch between wiggle traces and color-filled sections.

- **Trace Spacing and Overlap:** Adjustments allow better visibility and clarity of seismic events.
- **Custom Gain Settings:** Helps enhance signal clarity in wiggle mode.



10.3 3D view

To adjust the view, the user can click on the "**Adjust to size (Ctrl+A)**" icon  from the **3D view** window. To Zoom In/Out, the user can use the mouse wheel to go back and forth.



How to move around the volume?

To rotate the volume in any direction use **MB3** (Right mouse button). User can also able to do the rotation by holding **Ctrl+MB3** button.

To move the volume either up/down or left/right, use **Shift+MB3**(Right mouse button). This option won't rotate the volume. It will remain in it's original position during the movement of volume quite contrast to using **Ctrl+MB3** where it rotates the volume

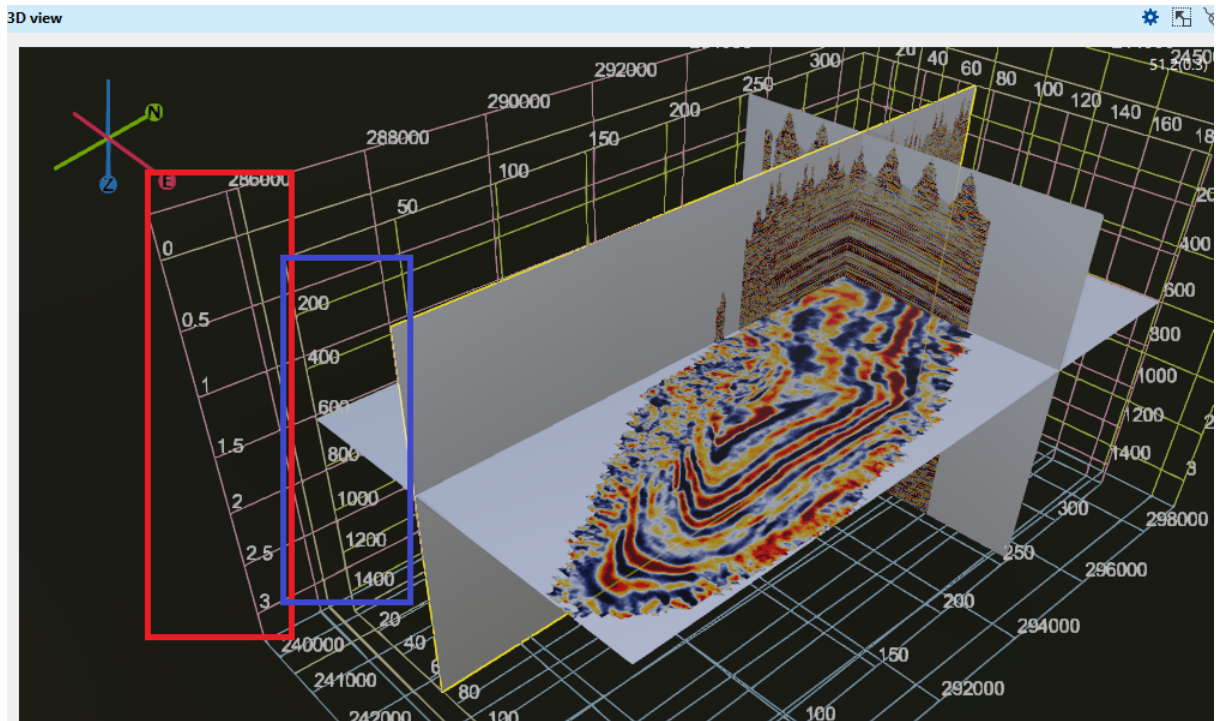
To move any inline/xline, just click/select on that inline/xline with **MB1** and move wherever you want.

To move the time/depth slice, it's as same as the inline/xline. Simply hold **MB1** and move up/down.

The user can use the mouse wheel (**MB2** or middle mouse button) to zoom in/out the volume.

Vertical scale

In 3D view, we have two vertical scales. One is inside the volume and other is outside the volume. These two vertical scales shows us two different set of values. Why?



The vertical scale of the inside grid (marked as blue rectangle) is showing the volume in **samples**. Like if we have 3000ms of record length and we have 4ms of sample interval, it will display like 200, 400 etc.

The vertical scale of the outside grid (marked as red rectangle) is showing the volume in **seconds**. If the record length is 3000ms then we can see it as 1s, 1.5s etc.

View properties of 3D view:

View properties of 3D view window is divided into 3 parts.

View properties

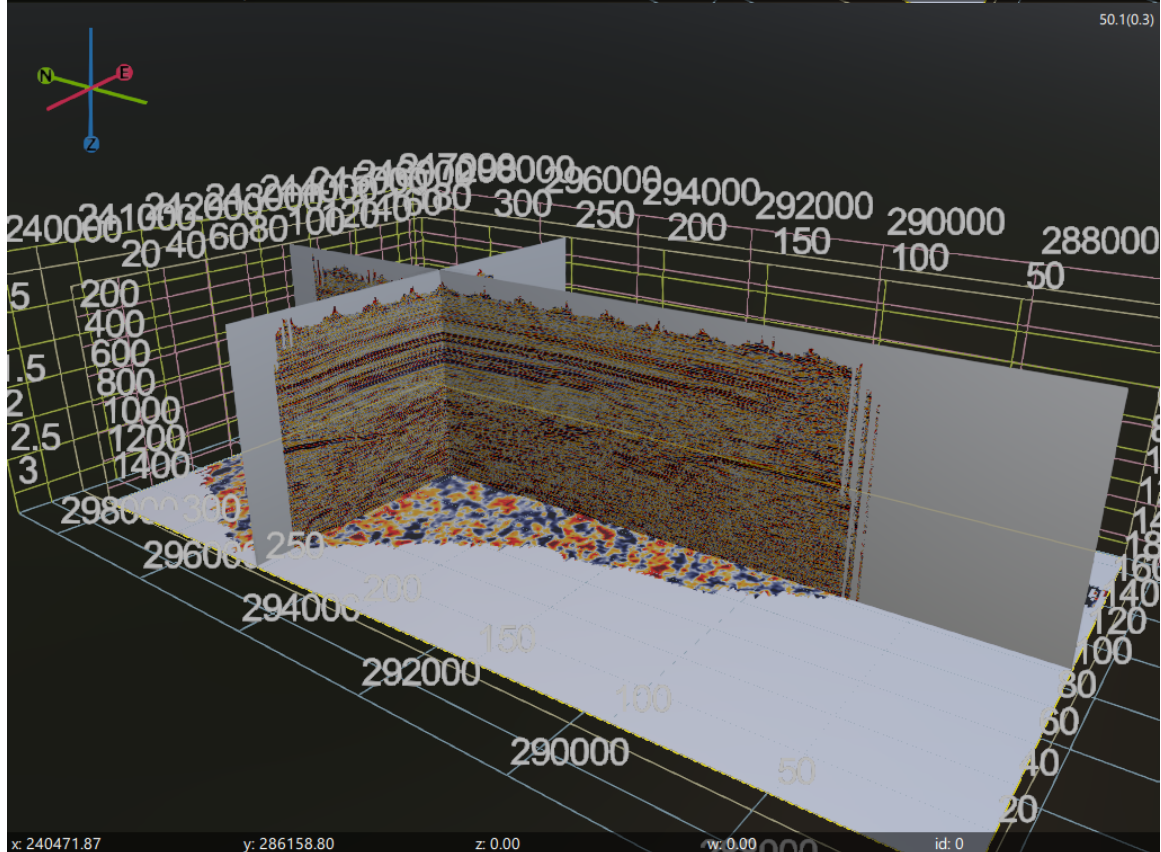
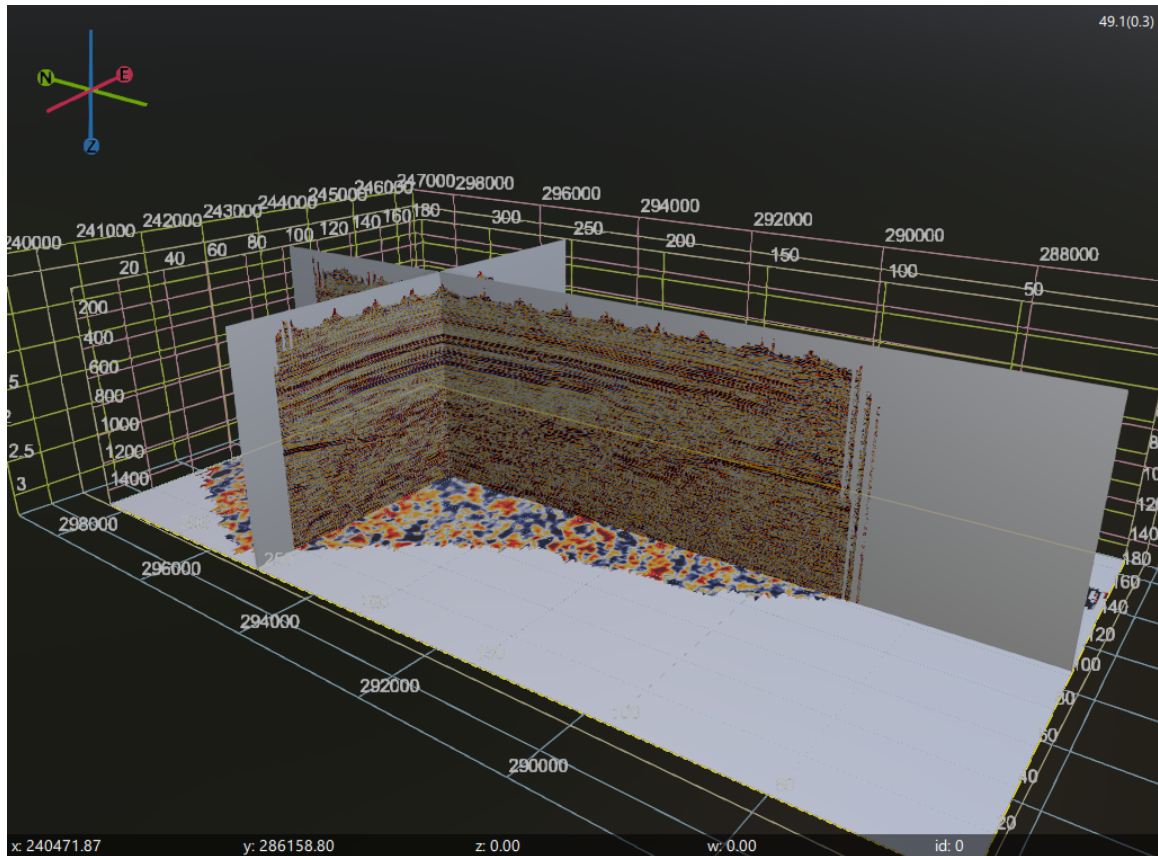
Vista items

Vista item properties

View properties

It is the top of the section. The user can pay attention to few parameters.

Label size - The user can change the size of the X,Y,Inline, Cross line, Time/Depth slice labels. By default it is 1. Here we are changing it from 1 to 2. We can see the changes in the below image.



TTD - Time To Depth. By changing this parameter value, the user can either expand or compress the volume. By default, this value is set to 2000



In the above display, on the left hand side we can see the display TTD at 2000. The same volume is displayed on the right hand side with TTD as 1000.

Vista items:

In this window, all the displayable items present. In case of 3D view, usually we have **Gathers 3D, 3D volume time, Surfaces 3D items**.

Whenever the user selects any one of the Vista items in this window, their corresponding properties will appear in the bottom window. Here the user can change the display properties of the selected Vista item.

Vista item properties:

As we mentioned earlier, this is a direct connection with the selected Vista items. If the user wants to change Color bar of 3D volume time vista item, first they need select in the Vista items and come to Vista item properties window and choose the desired color bar option available from the drop down menu.

