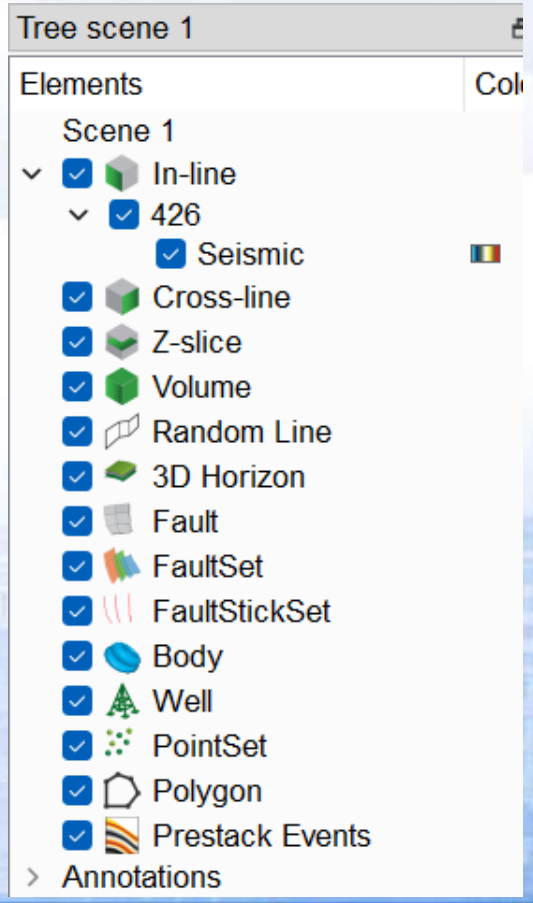
第3章 Tree和Elements



3.11 Body

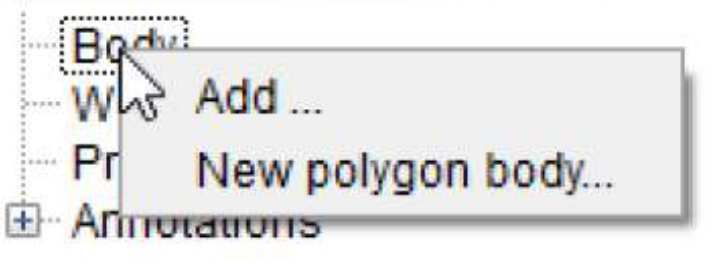
3.12 Well

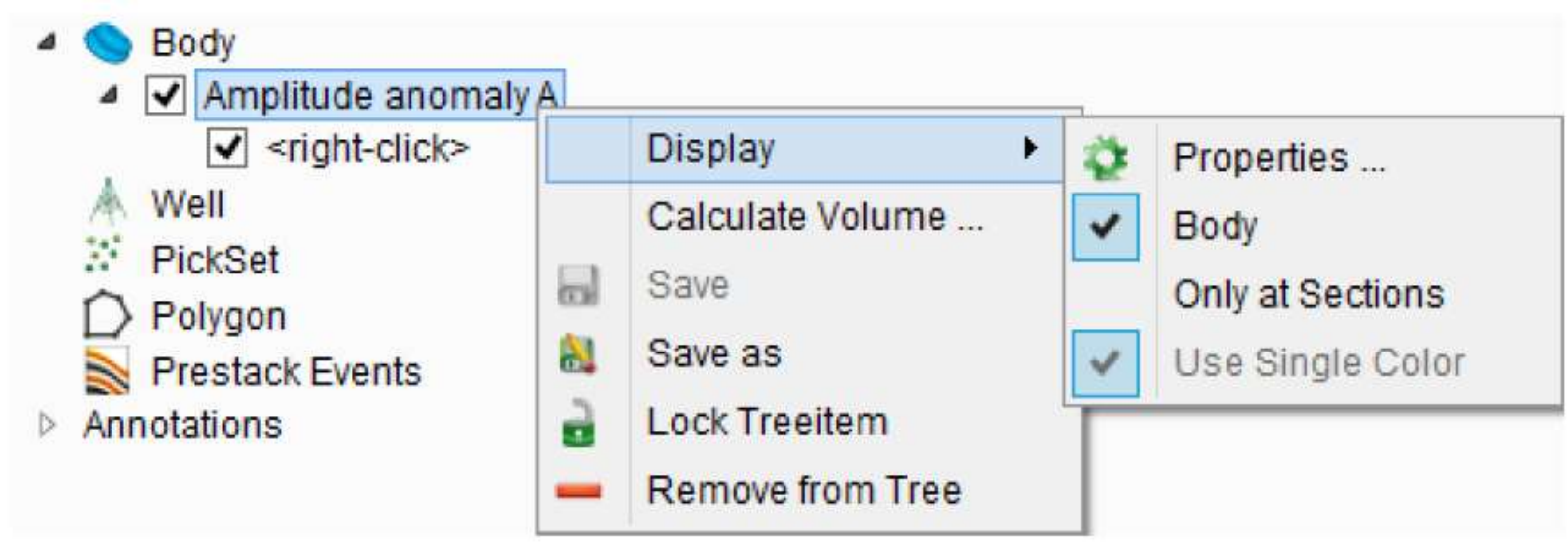
3.13 Pre-Stack Events

3.14 Pre-Stack 3D Viewer

3.15 Annotations

3.11 Body





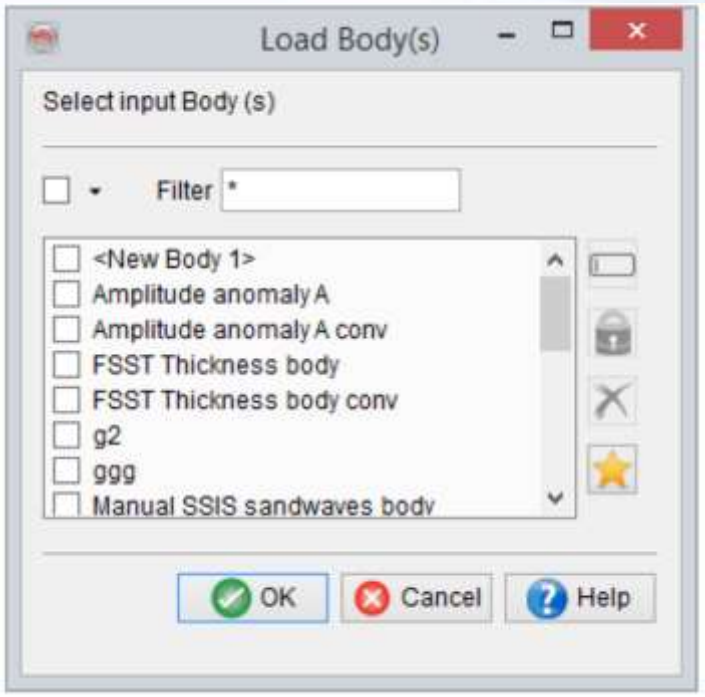
Bodies are displayed and created from this tree item. Using the option "New polygon body" the bodies can be drawn by picking on vertical and horizontal slices. The body will always be the convex envelope around the picked locations.

It is also possible to create bodies from:

- An isovalue surface (implicit representation): The body is extracted from a volume based on the amplitude distribution.
- A polygon projected between two horizons.

Bodies may be used for display but also the creation of volumes using the volume builder: The inner and/or outer parts of the body are filled with constant value(s).

Stored bodies may be displayed in the scene by using *Add...*

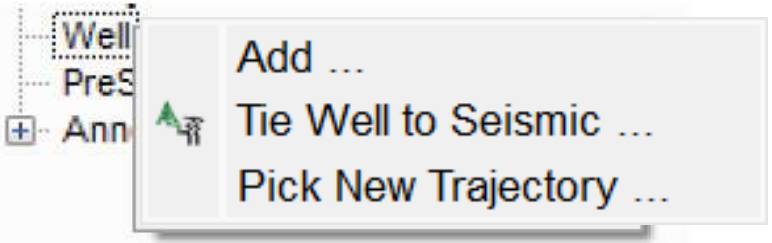


可以从下列几何创建Body:
1 等值面（隐式表征）:基于振幅分布，从数据体提取body
2 2个层位之间投影的多边形

Add..

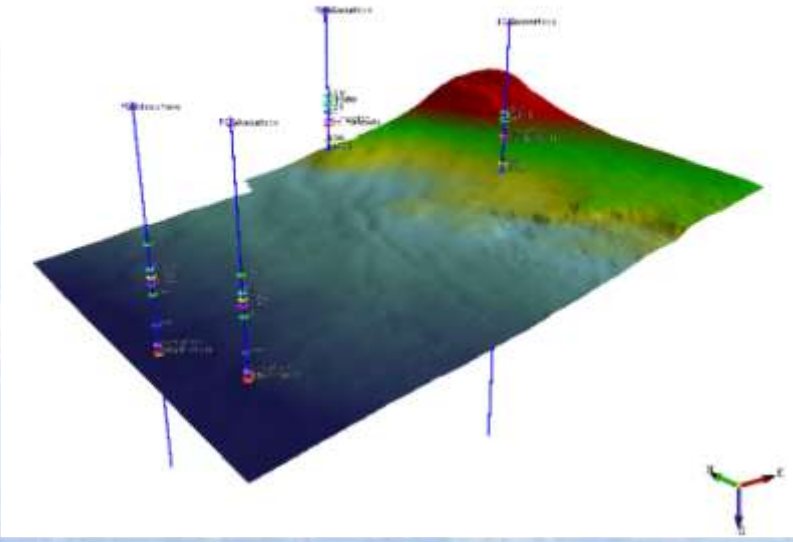
3.12 Well

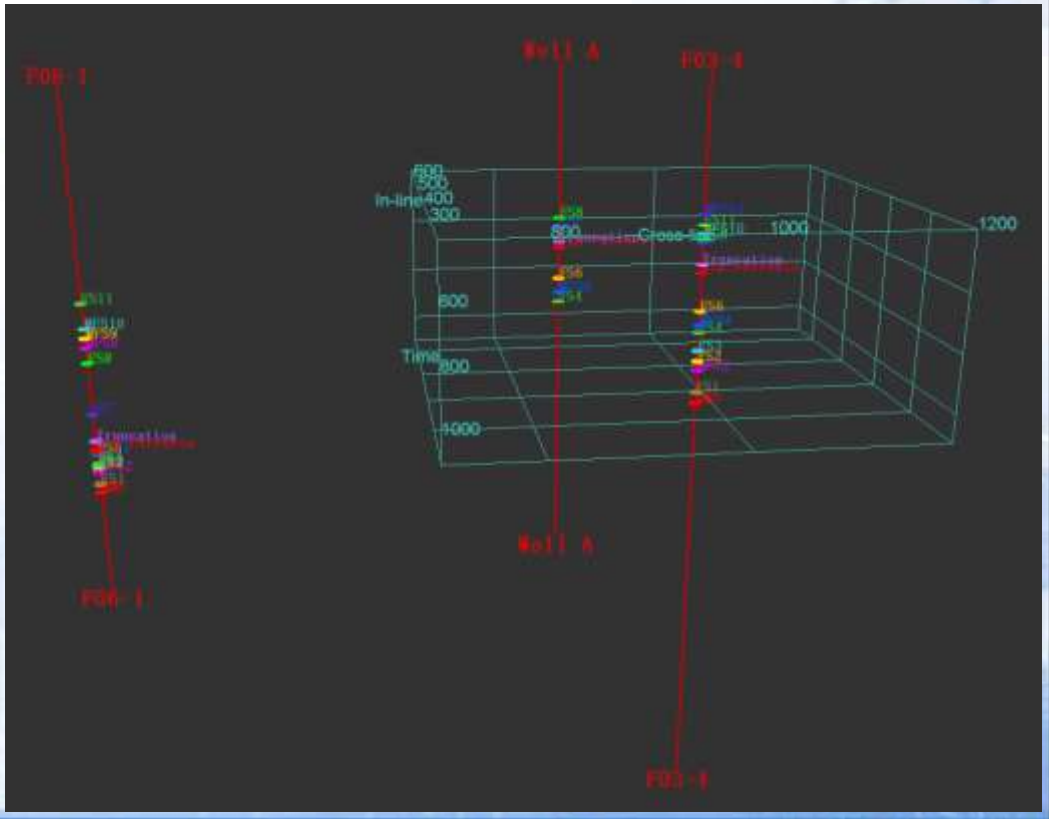
Clicking the well-element in the pops up a menu with 3 options: *Add*, *Tie Well to Seismic* and *New WellTrack*



Basic Well Pop-up Menus

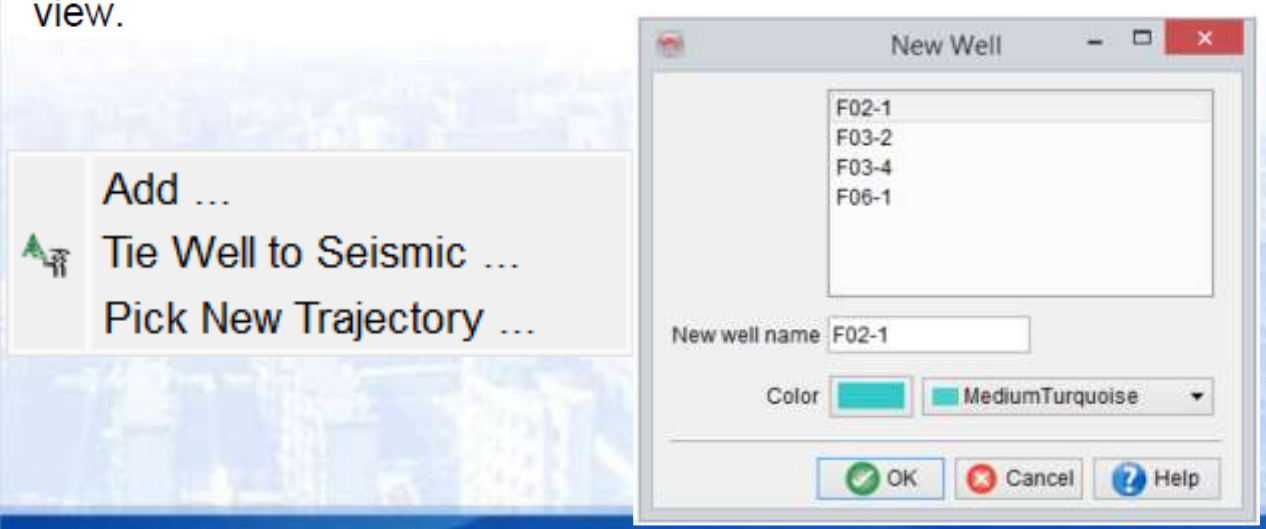
Add: Wells are added and displayed in the scene using Add option.



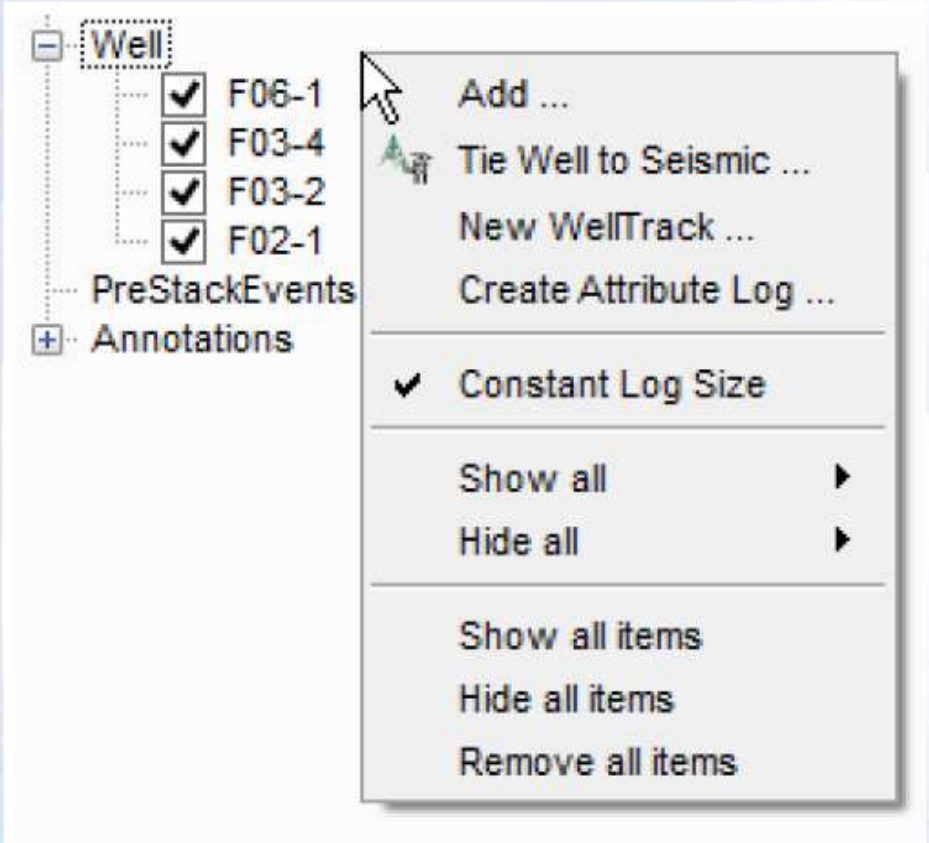


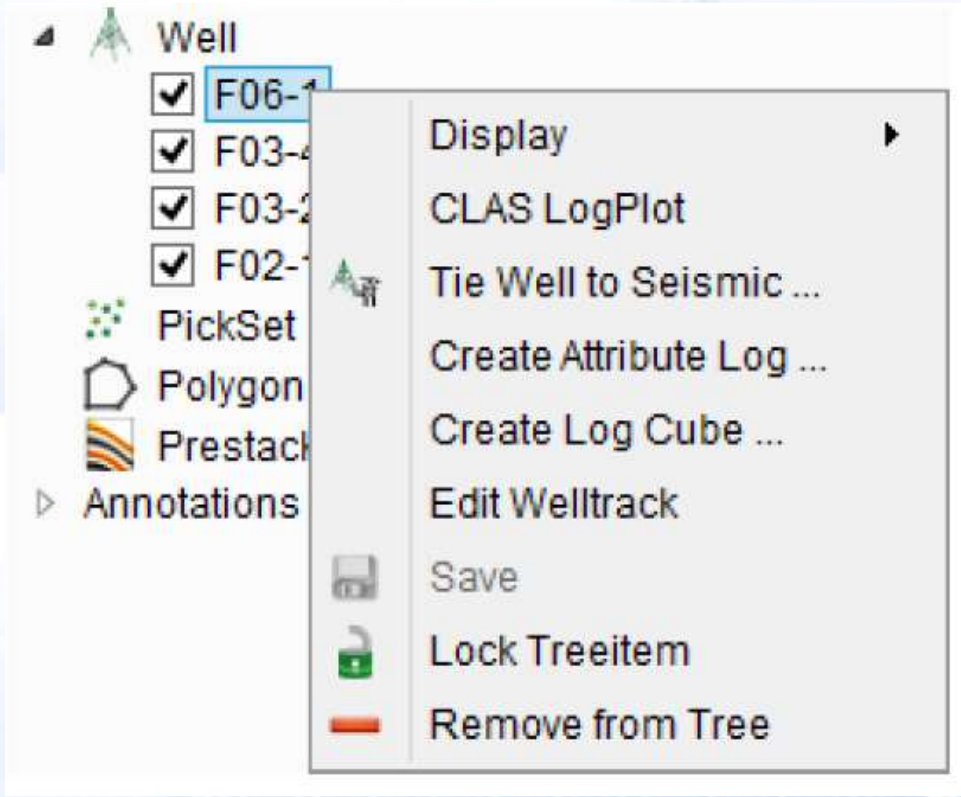
Tie Well to Seismic: Access the seismic to well tie module. Generally, three parameters are needed for a successful well-seismic tie: sonic/velocity log, density log and a reference wavelet. The wavelet can be either imported or extracted in OpendTect. Logs can also be created in the Well Manager.

New Well Track: Create new well tracks interactively in the 3D scene. After selecting this option the system will prompt for a well track name. After specifying the well track name, display an element (inline/crossline/2D line) in the scene. Drawing the well track on the selected element is enabled. After drawing the well track, right click on the well track name and select the *Save* option. Note that drawing a new well track works similarly to editing a existing well track. Well track-nodes can be picked on the active elements displayed in the scene. Also note that a display with a Z-scale (View - Z-scale) other than 1 distorts the appearance of distance in the 3D view.



After loading new wells, items are added to the right-click menu as follows:



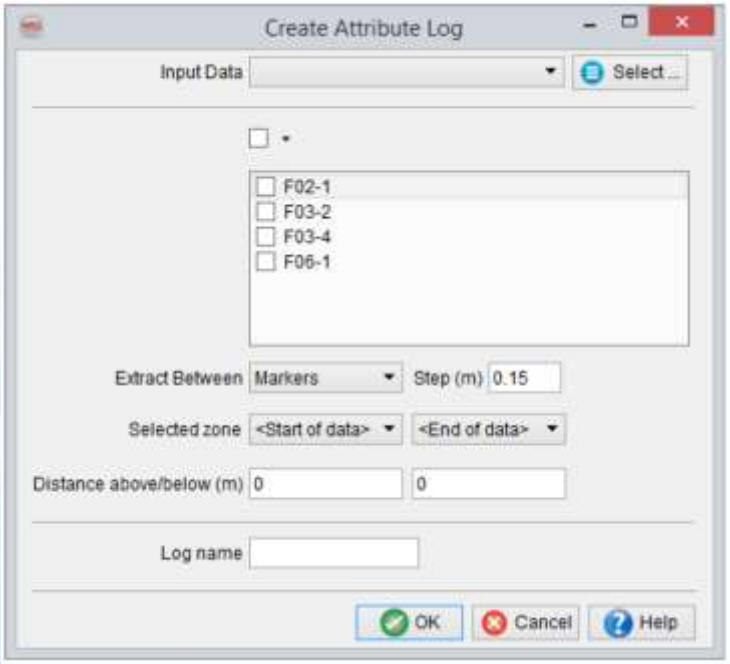


Well popup menu (multiple) and menu for individual wells.

Multiple Well Options

These options are available only when more than one well is loaded in the tree, and can be accessed by right-clicking Well in the tree. The new options available when multiple wells are loaded. Items described in the previous sections above will not be described again here.

Create Attribute Log: creates selected seismic data as a log for multi-wells.



Constant Log Size: keeps a well log display width relative to a scene zoom ratio i.e. a log display width increases with the zoom in and vice versa. However, this option can be toggled off by clicking on the sub menu item (Basic Well Pop-up Menus). In the later case, a log display width is adjusted opposite to the zoom i.e. if a scene is zoomed in, a log display width is reduced relative to the scene zoomed in ratio and vice versa.

Show all: allows the user to toggle on all well names (top),well names (bottom), markers, marker names, and logs.

Hide all: allows the user to toggle off all well names (top),well names (bottom), markers, marker names, and logs.

Show all items: allows the user to toggle on all wells currently loaded and visible in the tree.

Hide all items: allows the user to toggle off all wells currently loaded and visible in the tree.

Remove all items: allows the user to remove all wells currently loaded and visible in the tree. This only removes the wells from the scene, it does not delete them from the disk.

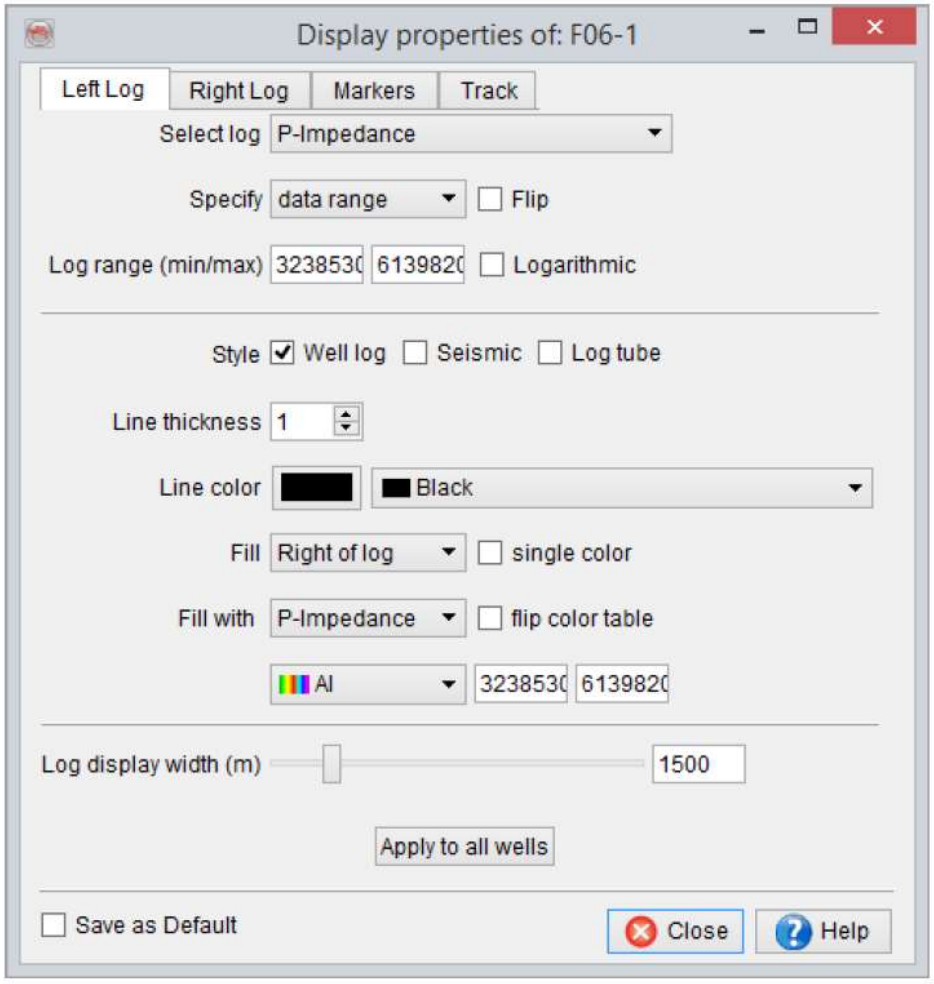
Individual Well Options

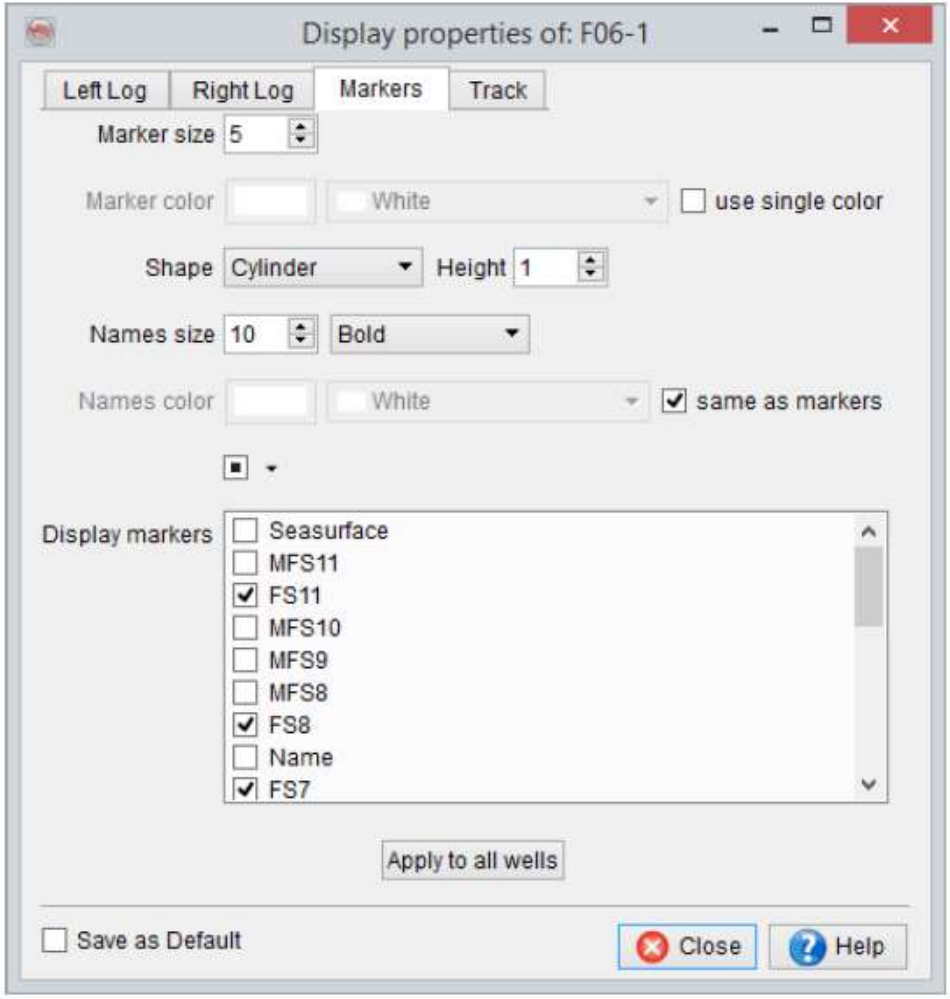
Once a well has been loaded into the scene and is visible in the tree, right-clicking an individual well pops-up a window with the following options:

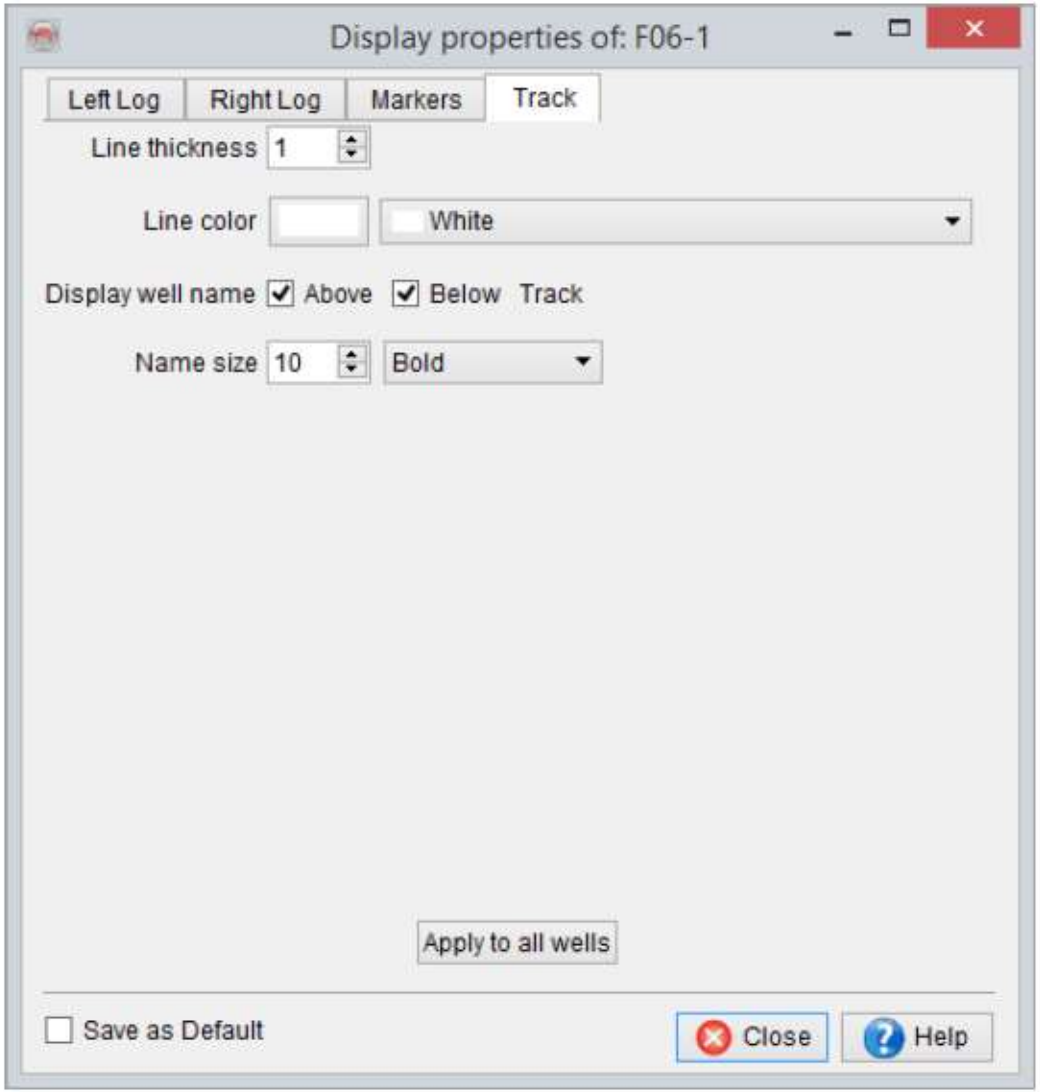
Create attribute log: allows to create a new log by calculating an attribute along the well track. A new window pops up where the attribute, log name, and the depth range should be provided. The Depth range is defined as start depth, stop depth, and sample distance.

Create log cube: enables to create a volume of a selected log. The log is duplicated on a user-defined number of traces around the well location. More than one log can be selected at once and one volume for each log will be generated. This allows easier comparison between well logs and seismic data.

Properties: sets various display settings of a well track, the logs, and the markers. The properties can be set for each well and can also be updated for all wells displayed in a scene. The later can be done using the button Apply to all wells available in the Well Display Properties window.


Display properties of: F06-1
Left Log
Right Log
Markers
Track
Select log P-Impedance
Specify data range
Flip
Log range (min/max) 3238530 6139820
Logarithmic
Style Well log Seismic Log tube
Line thickness 1
Line color Black
Fill Right of log
single color
Fill with P-Impedance
flip color table
AI 3238530 6139820
Log display width (m) 1500
Apply to all wells
Save as Default
Close
Help


Display properties of: F06-1
Left Log
Right Log
Markers
Track
Marker size 5
Marker color White
use single color
Shape Cylinder
Height 1
Names size 10
Bold
Names color White
same as markers
Display markers
Seasurface
MFS11
FS11
MFS10
MFS9
MFS8
FS8
Name
FS7
Apply to all wells
Save as Default
Close
Help


Display properties of: F06-1
Left Log
Right Log
Markers
Track
Line thickness
1
Line color
White
Display well name
Above
Below
Track
Name size
10
Bold
Apply to all wells
Save as Default
Close
Help

Log display, Markers display and Track display properties

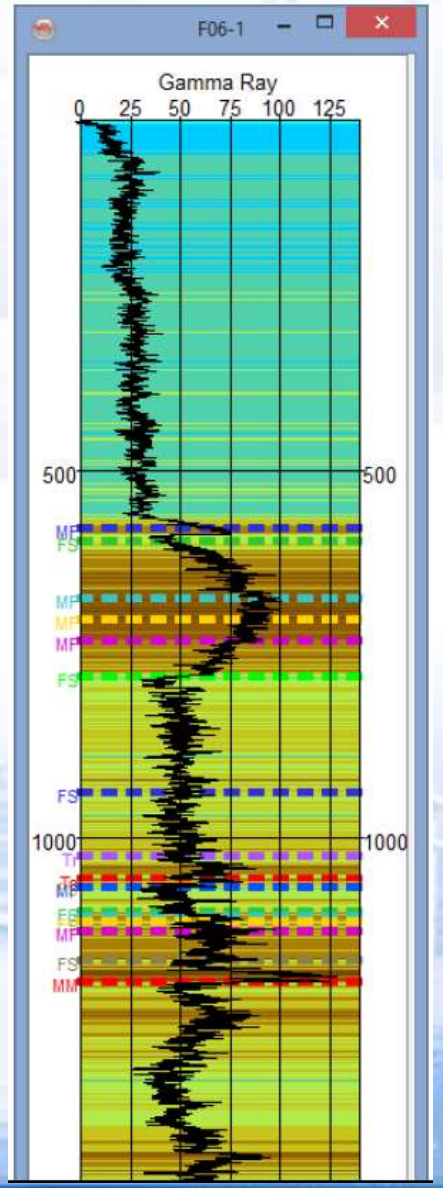
Well Log Properties: In a scene, the log are displayed using the Left Log and Right Log tabs. The logs are displayed on the left and/or on the right of a well track according to a current view. The log properties include the log selection, log range, fill color and the the thickness of the log line. None refers to no log selection/display. If the logs are already imported, the Select log should contain the name of the logs in the drop down list. The data ranges and the color ranges are updated automatically from the selected log. However, both fields are editable. Two types of log displays styles are supported. For a standard log trace display style Well log radio button is selected. For a wiggle display, the Seismic radio box is selected. The well logs can be filled with any selected color table. The color ranges can also be manually set/clipped. However, the seismic style contains different settings. The synthetic seismic traces can be displayed by toggling the Seismic radio box ON. The seismic traces can be repeated by specifying the repetition numbers in the spin box adjacent to the Repeat text. The Overlap field refers to the overlap percentage of the repeated traces. Optionally, dual logs spectra can be displayed together on the same side by displaying one log as a trace and filling the color with another log (Fill with Log).

Well Track Properties: The track properties are modified in this tab. The track line thickness is changed by scrolling the Line Thickness spin box. The well track/name color is updated by pressing the colored button. The well name can be displayed above and below the track. The name size can also be increased or decreased. It may be noted that the name size is adjusted relative to the 3D zoom.

Well Marker Properties: Well marker properties tab include the settings for marker's name size, color, shape (3D), etc. The marker size is adjusted using the spin box (up/down). The limits for the size are set from 1 to 100. The color of all markers of a well track can be changed in to a one unique color. This is supported by the 'use single color' option. If the same color is to be assigned to all available well markers, set check to this field and select the color. Additionally, three different 3D shapes are supported (Cylinder, Sphere, Square). The cylindrical shape is added for orthographic camera displays, which is better for the visualization purposes. The height of a cylinder is supported.

Edit Welltrack: Allows you to add or delete nodes to the well track. Deleting nodes is done by holding **CTRL** and clicking a node. Adding nodes is done by making "node points" on any of the active elements on your screen. Remember that the Z-scale caused a vertical stretch, distorting the appearance of real distance in the 3D view.

2D Log viewer: This property allows you to display a well log in a 2D scene. The display in log viewer is driven by the 3D scene. To interactively display different logs, go to the well properties and make the desired changes.

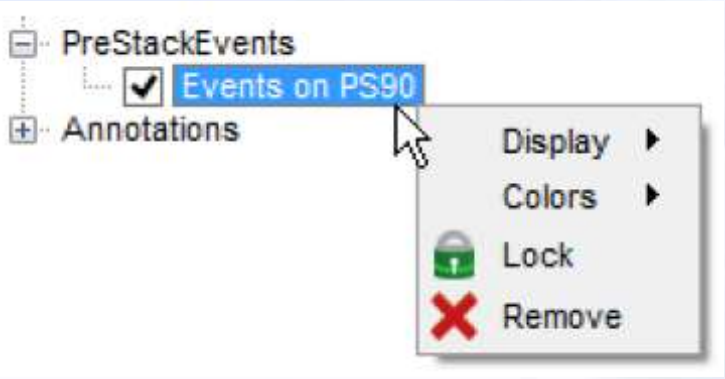


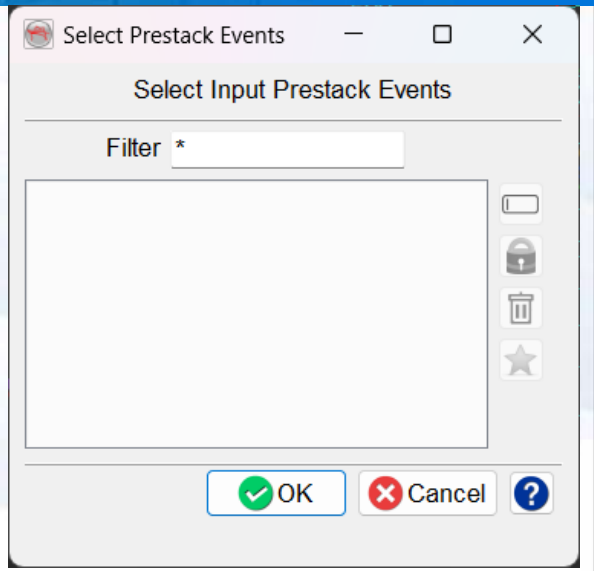
Save: Stores a new well or saves the changes that were made to an existing one. Provide a name for a new well, and if a depth to time model is available, select the file. The file should have the same format as when importing a welltrack. Optionally, you can examine the file using the corresponding button. Specify if the model uses TVDSS or MS, also the measurement units.

Lock / Unlock: Locks the selected object. This prevents accidental removing, moving, or displaying data on the object. After clicking unlock all manipulations are possible again.

Remove: Removes the well from the tree (not from disc).

3.13 Pre-Stack Events





只有Add

This tree item allows you to display picked or imported prestack events in the 3D scene. Note that this tree item is only display when there are prestack events in the current project. Otherwise it is hidden.

There are five display modes:

- **None:** nothing is displayed.
- **Zero offset:** A point shows the location of each prestack events, and the Z value of the zero offset.
- **Sticks from sections:** points show not only the location but also the moveout curve described by the picked events.
- **Zero offset on sections:** Same as zero offset, but only the events that exists on displayed inlines/crosslines will be shown.
- **Sticks to gathers:** Same of sticks from sections, but only the events that exists on displayed 3D prestack planes will be shown.

The displayed points are always linked with a thin line. Regardless of the display mode the points are colour-coded with respect to the following color settings:

- **Single:** Default mode, one single color for all points of the prestack events.
- **Quality:** The color of the points is related to its quality. This attribute is either imported with the prestack event or set when picked in the Velocity Model Building plugin.
- **Velocity:** The color of the points is related to the corresponding interval velocity. Note that for this to work the input prestack datastore and corresponding migration velocity must be specified in the velocity model building plugin.
- **Velocity fit:** The color of the points is related to the deviation between the picked event and velocity of the best fitting normal/residual moveout curve. Note that for this to work the input prestack datastore and corresponding migration velocity must be specified in the velocity model building plugin.

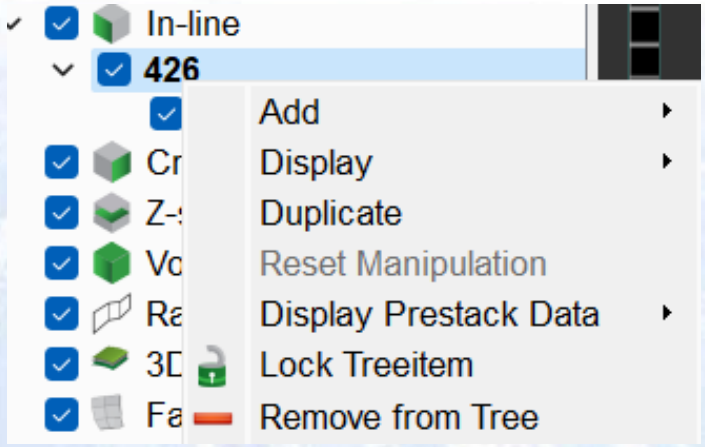
The color of the points, except in single mode, should be adjusted using the colorbar like with any attribute by ajusting the colorbar and amplitude ranges.

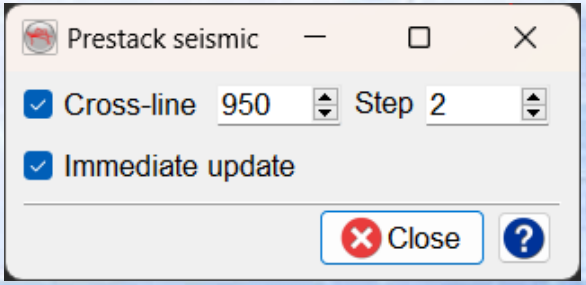
3.14 Pre-Stack 3D Viewer

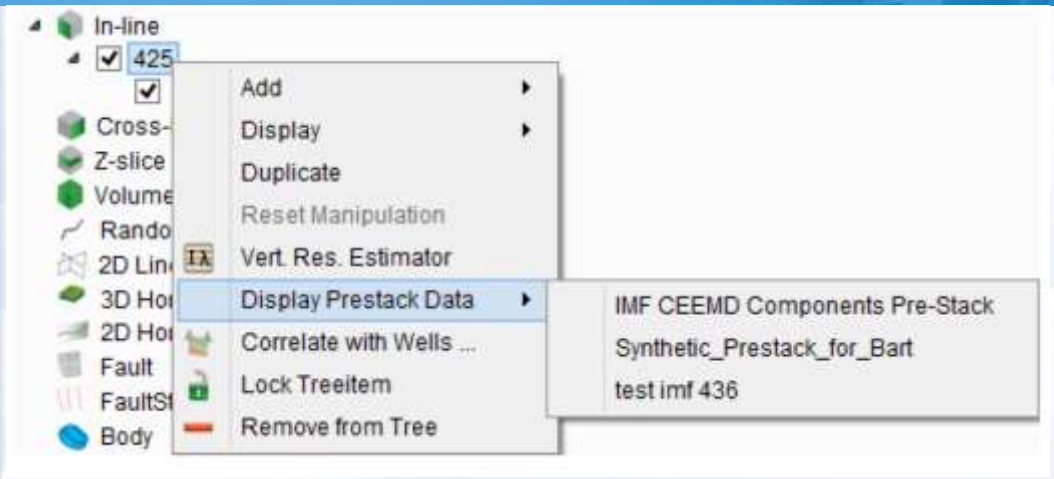
Display Prestack Data

Prestack gather selection from the tree

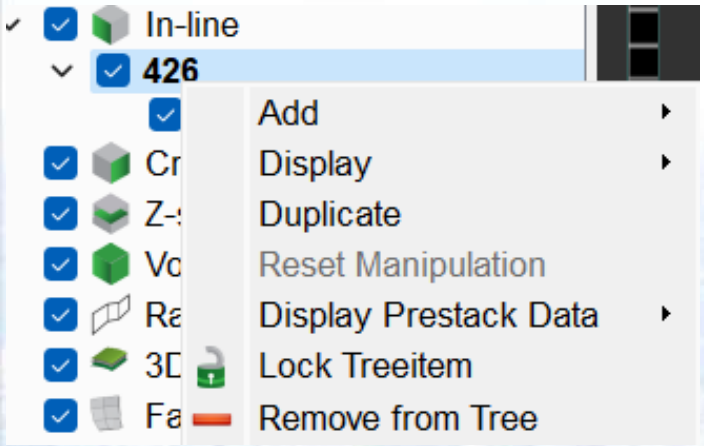
Prestack (PS) gathers can be displayed in the 3D scene, perpendicular to an inline or crossline. Post stack data must first be displayed on an inline/crossline. The post-stack data does not need to be linked to the prestack data. Once the line is loaded, go to interact mode (graphical toolbar, second icon from the left), right-click in the scene your inline and use the option *Display PS gather*. The menu will list any prestack data available (loaded) in the survey. Please note that multiple PS gathers can be displayed on the same inline, and moving the inline to another position will keep the position of the PS gather and update its content.

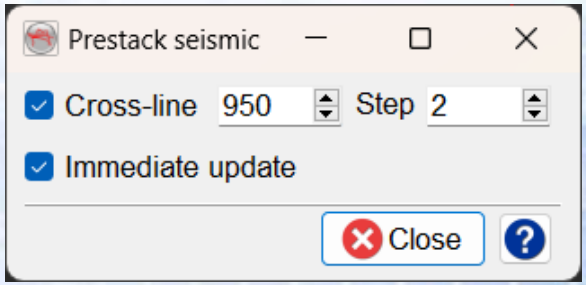






手册截图





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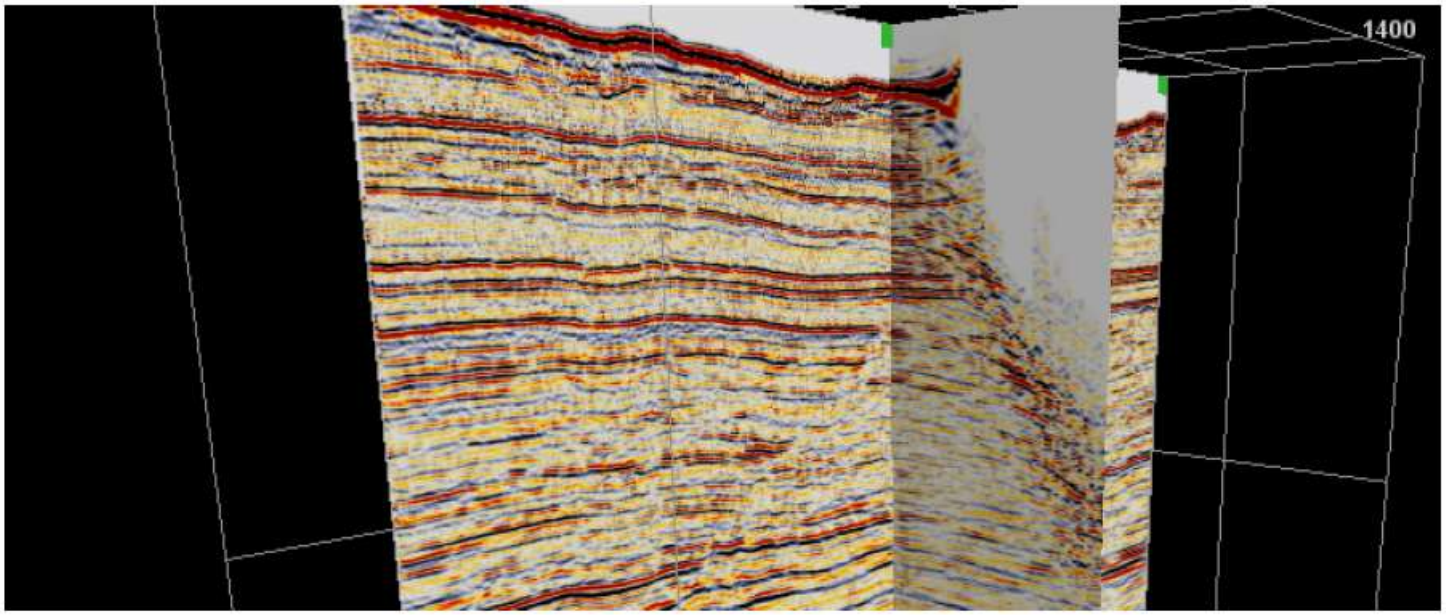
Right-click menu of a vertical slice tree item when prestack datasets are available.

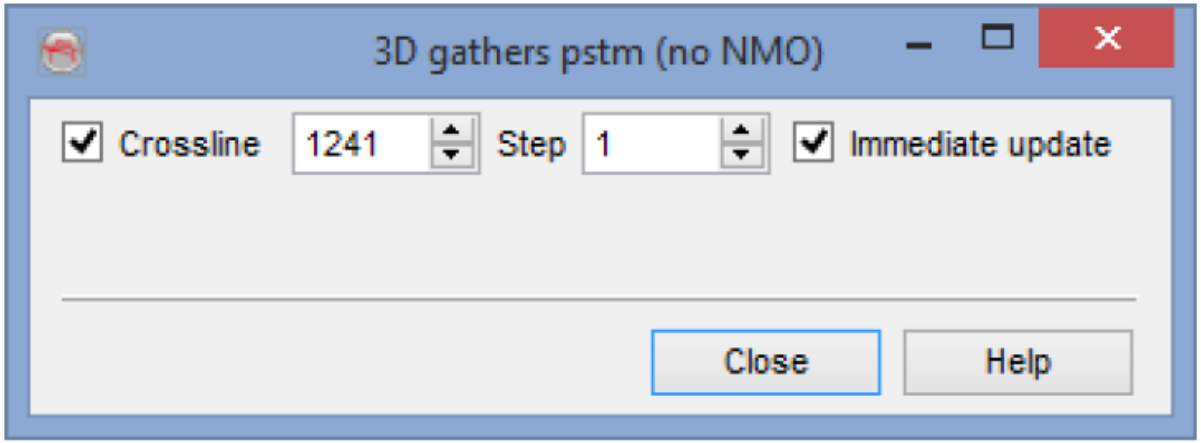
Poststack data on an inline (left) with a prestack gather displayed perpendicular to it.

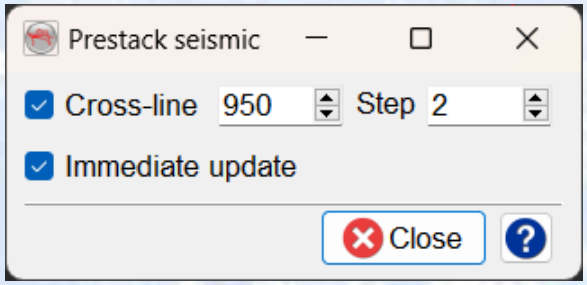


与Inline面垂直的Prestack数据

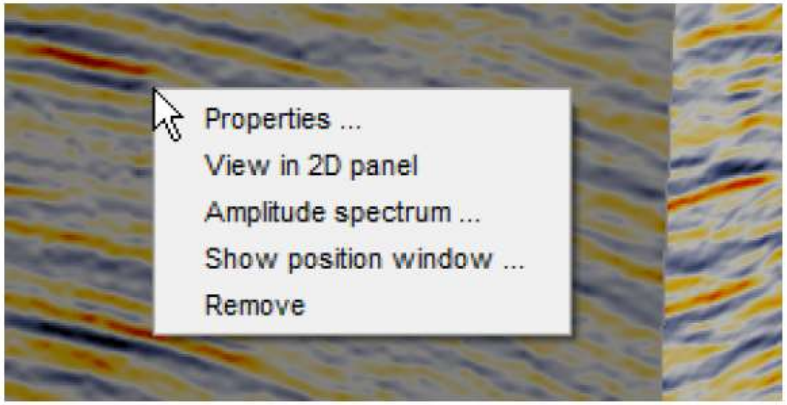
Positioning the prestack gather

When a prestack data is displayed in a scene, the prestack positioning window also pop-ups (look at the corners of the screen). By using this window, the prestack data can be scrolled interactively. The crossline value locates the currently-displayed prestack panel. That can be scrolled at given steps (increment). You can use either the arrows or the mouse wheel over the inline/crossline value.





Right-click options for a prestack dataset



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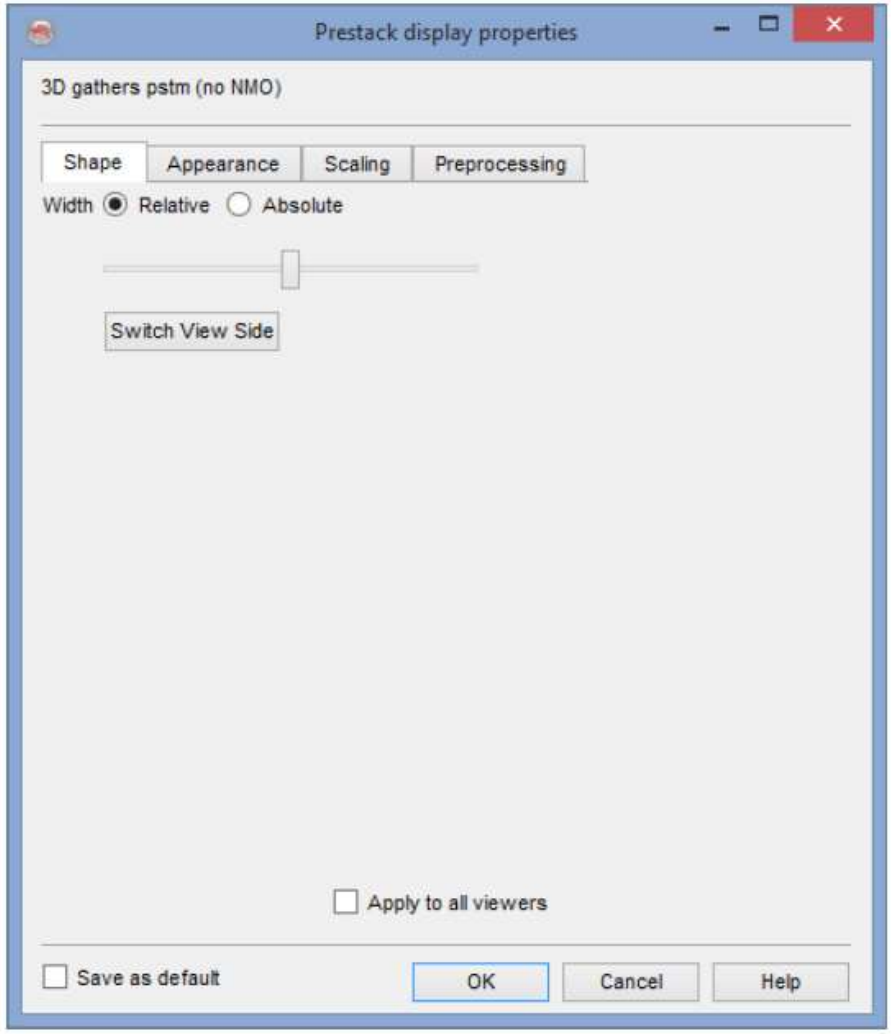
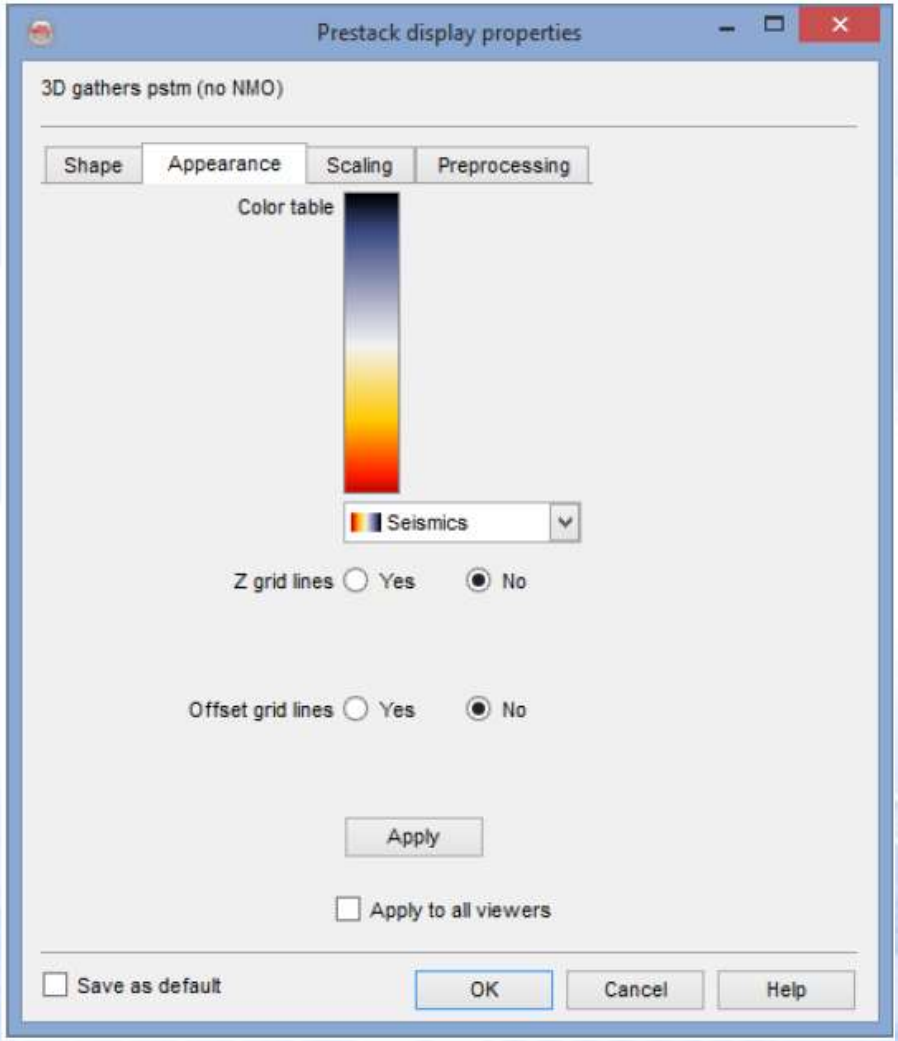
Right-click menu on the prestack gather display to open it in the prestack 2D viewer.

Properties

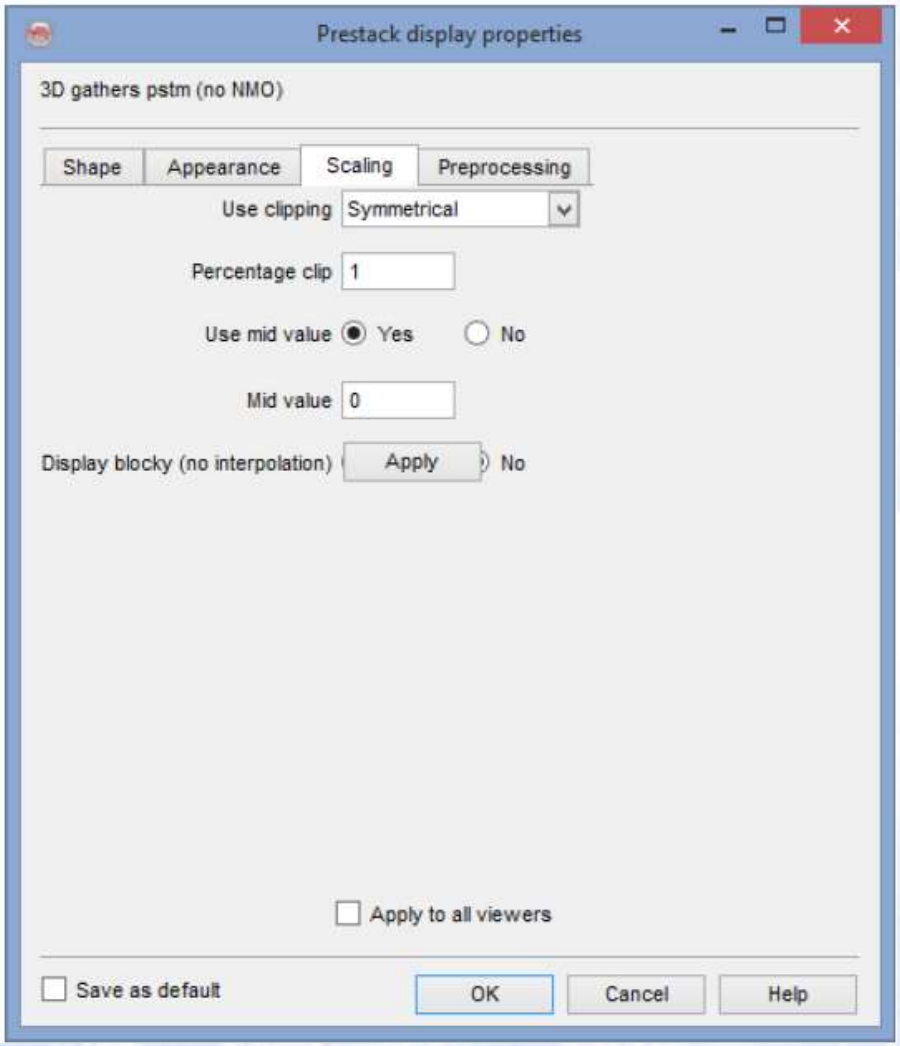
There are several display properties available that are described below. Please note that the gathers are first displayed without any processing. This can be set together with other properties in the PS gather display properties:

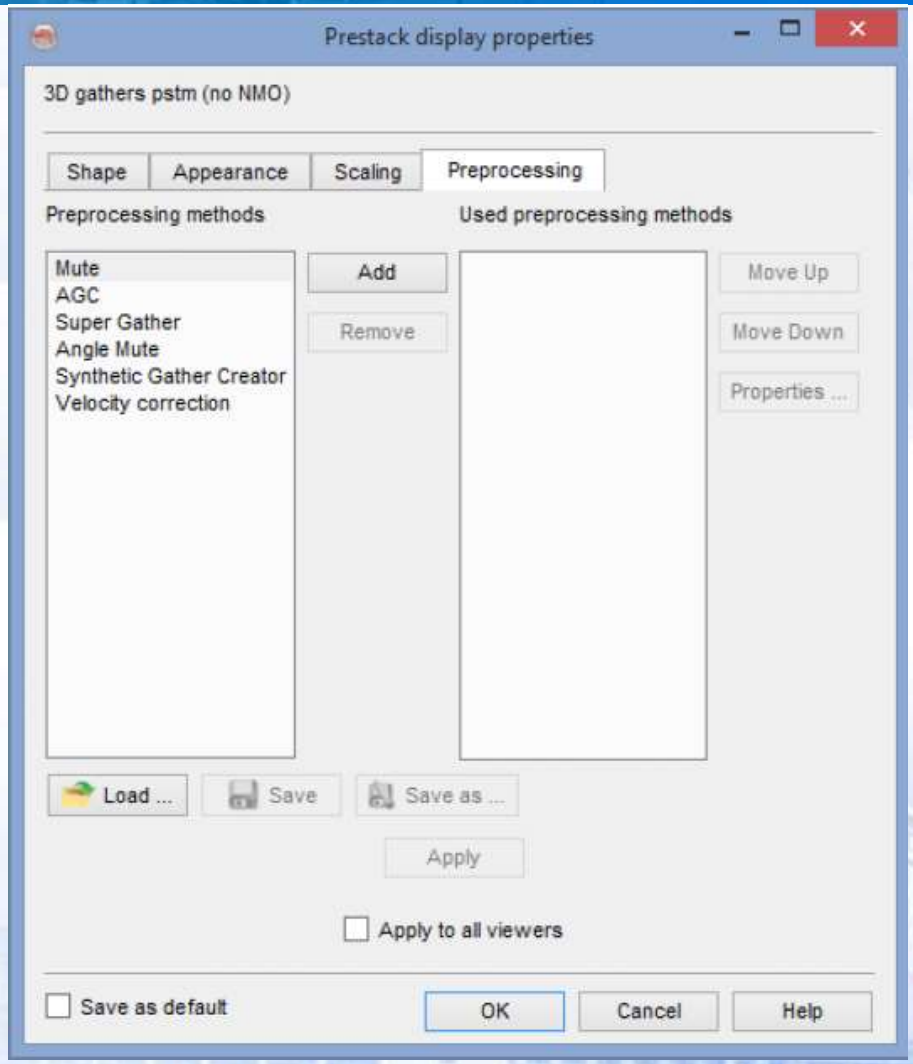
- **Shape:** The shape tab will set the size of the gather with respect to other 3D elements and its relative position
- **Appearance:** Color bar, amplitude ranges and grid lines can be set in this tab.
- **Scaling:** This tab is used to scale (clip) the amplitude range of the displayed data.
- **Preprocessing:** Pre-processing may be applied to enhance the display. The available algorithms are presented in the prestack processing chapter.


Prestack display properties
3D gathers pstm (no NMO)
Shape
Appearance
Scaling
Preprocessing
Width
Relative
Absolute
Switch View Side
Apply to all viewers
Save as default
OK
Cancel
Help


Prestack display properties
3D gathers pstm (no NMO)
Shape
Appearance
Scaling
Preprocessing
Color table
Seismics
Z grid lines
Yes
No
Offset grid lines
Yes
No
Apply
Apply to all viewers
Save as default
OK
Cancel
Help

显示的属性设置

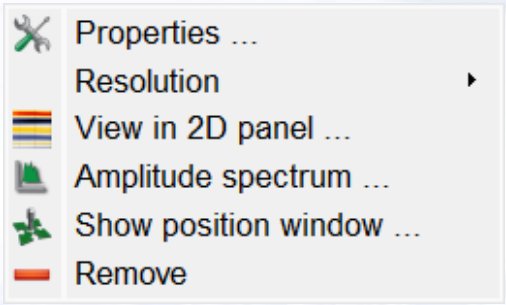

Prestack display properties
3D gathers pstm (no NMO)
Shape
Appearance
Scaling
Preprocessing
Use clipping
Symmetrical
Percentage clip
1
Use mid value
Yes
No
Mid value
0
Display blocky (no interpolation)
Apply
No
Apply to all viewers
Save as default
OK
Cancel
Help


Prestack display properties
3D gathers pstm (no NMO)
Shape
Appearance
Scaling
Preprocessing
Preprocessing methods
Used preprocessing methods
Mute
AGC
Super Gather
Angle Mute
Synthetic Gather Creator
Velocity correction
Add
Remove
Move Up
Move Down
Properties ...
Load ...
Save
Save as ...
Apply
Apply to all viewers
Save as default
OK
Cancel
Help

Resolution: Interpolates the data to get a better display (consumes more memory).

View in 2D panel: Transfer this dataset to view it in the prestack 2D viewer.

Amplitude spectrum: Display the average frequency spectrum of the trace of that gather, for the displayed Z range.



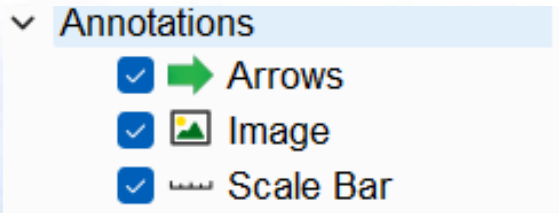
GNU版本

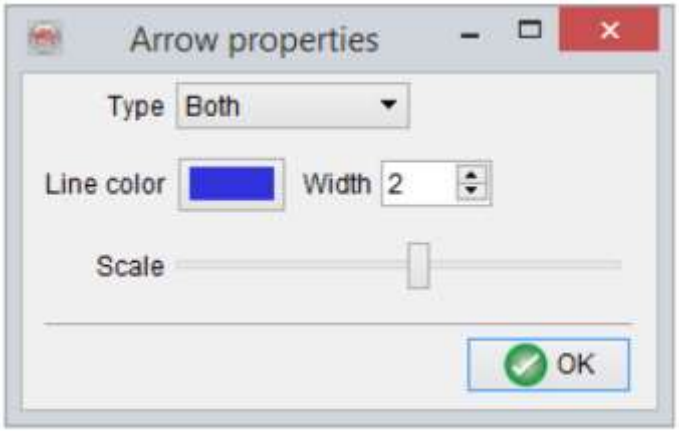
3.15 Annotations

With this option, you can draw arrows, load images, and write text on the display window by right clicking in one of the items in this tree.

Arrow: You can *add* new arrow groups, change the properties, lock-unlock, and remove them by right clicking on this element.

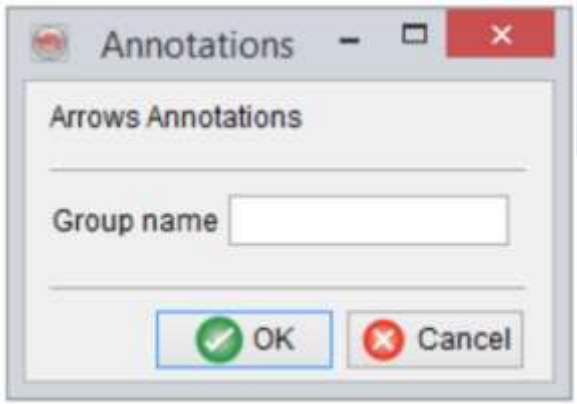
Once you have added a new arrow group, named it and saved it, you can now click in the scene to add arrows (CTRL+left-click to remove an arrow). The arrow properties can then be changed by right-clicking on the newly inserted arrow group and selecting the properties from the fold-out menu. In the arrow properties, arrow type (top, bottom or both heads), color, width and size are adjusted.

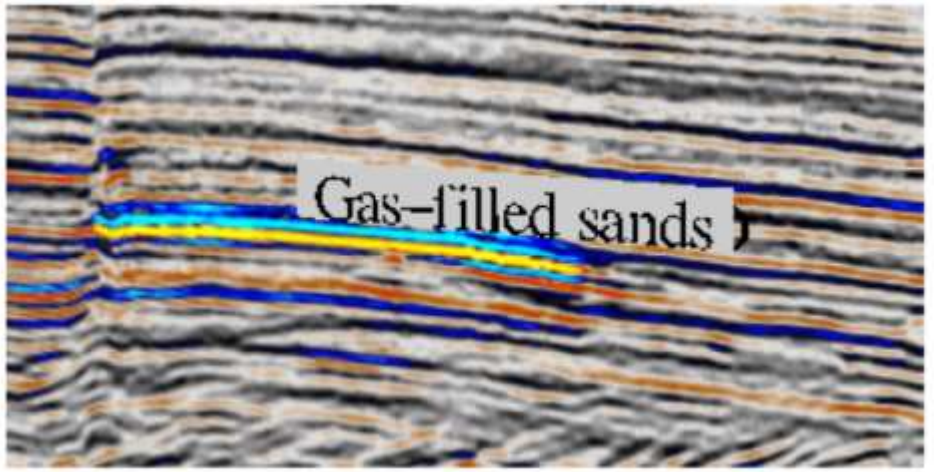




Arrow style properties

Image: Once you have *added* a new image group, you can click in the scene to add an image (CTRL+left-click to remove an image). It is then possible to store, resize, change image, lock-unlock, and remove it by right clicking on the relevant image group in the tree.





添加了一个新的Image组，可以点击Scene添加一个图片。

Add a new annotation group and changing the position of the annotation

Text contains two pop-up menus:

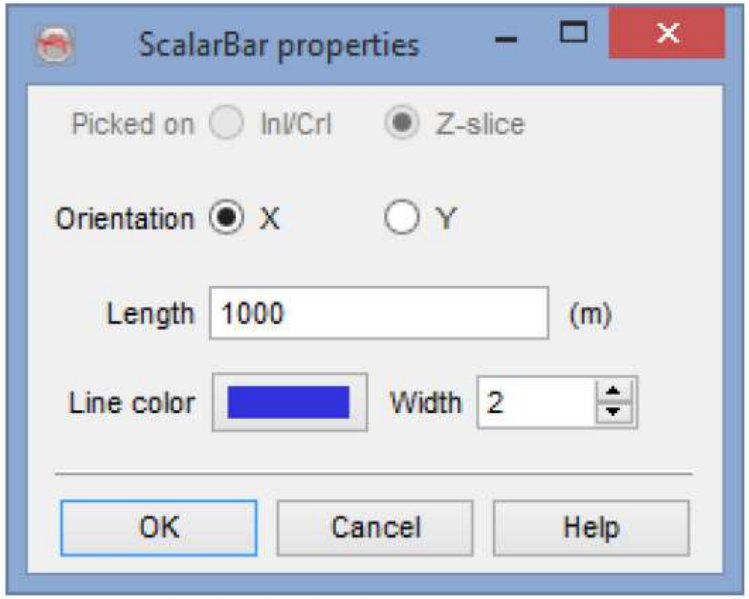
- **Add Text Group:** Adds a blank text group
- **Load:** It is used to load the stored annotation group(s).

The text group pop-up menu can be launched by right clicking on the text group name.

- **Size:** Resize the text group. It may be noted that it will resize the all inserted text sub-elements according to the new size.
- **Save/Save as:** Saves the text group in to an existing name/new name.
- **Change Text:** it is used to replace/change the text of the selected annotation. It may be noted that in the tree pop-up menu it si inactive. A user can only change the text of a selected annotation. It is done by right-clicking over the annotation in a working scene.
- **Background Color:** Modifies the background color of the annotation.
- **Lock:** If lock is selected, it will prevent further modification of the group.
- **Remove:** It removes the group from the tree/scene.

Scale Bar: Use this option to *add* a scale bar to an inline, crossline or Z-slice. Once added and saved, right-clicking on this element will also give you the option to change the properties.

For Inlines and Crosslines, this includes the Horizontal or Vertical direction options



For Z-slices, this includes the X or Y direction option