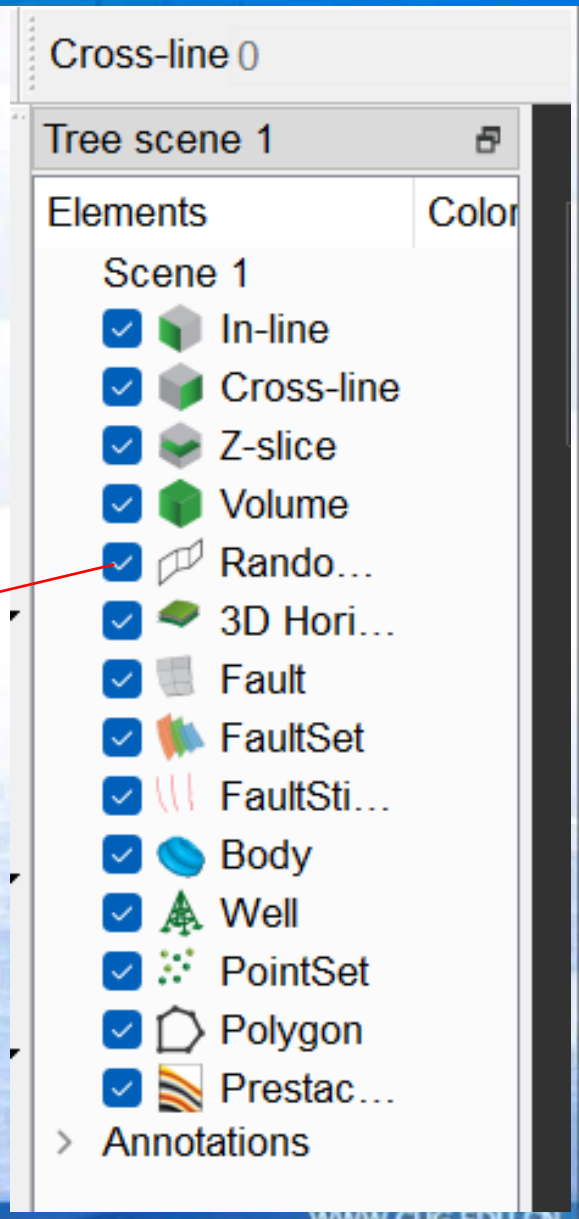
第3章 Tree和Elements

3.4 Random Line



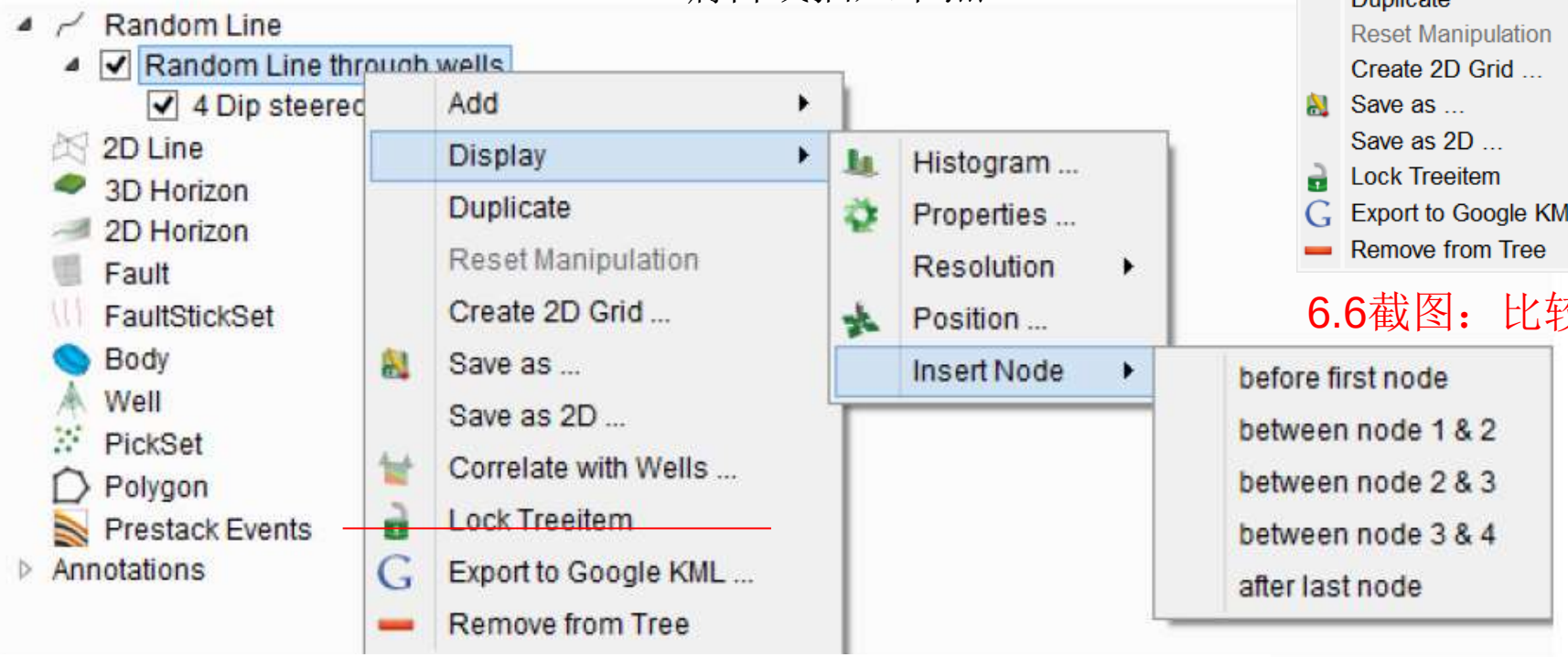
3.4 Random Line

If you click on the *Random line* in the tree, four options will be available: *Add Empty*, *Add Stored*, *Add Color blended* and *New*.

注：类似Petrel的Arbitrary Line，也可以叫User Line，就是用户自己创建的线或面。

Add Empty: Right-click on Random line and select 'Empty'. The new line will be added as a sub-element of the random line. By default, this is the centre inline of the cube. To create the new arbitrary direction of random line, the user can modify nodes by editing or inserting nodes:

编辑或插入节点

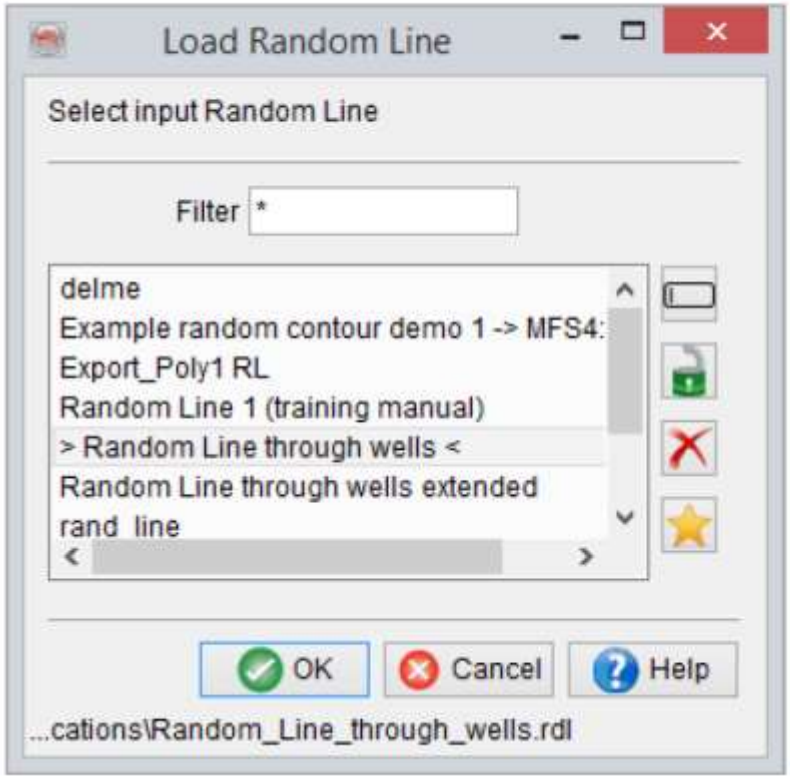


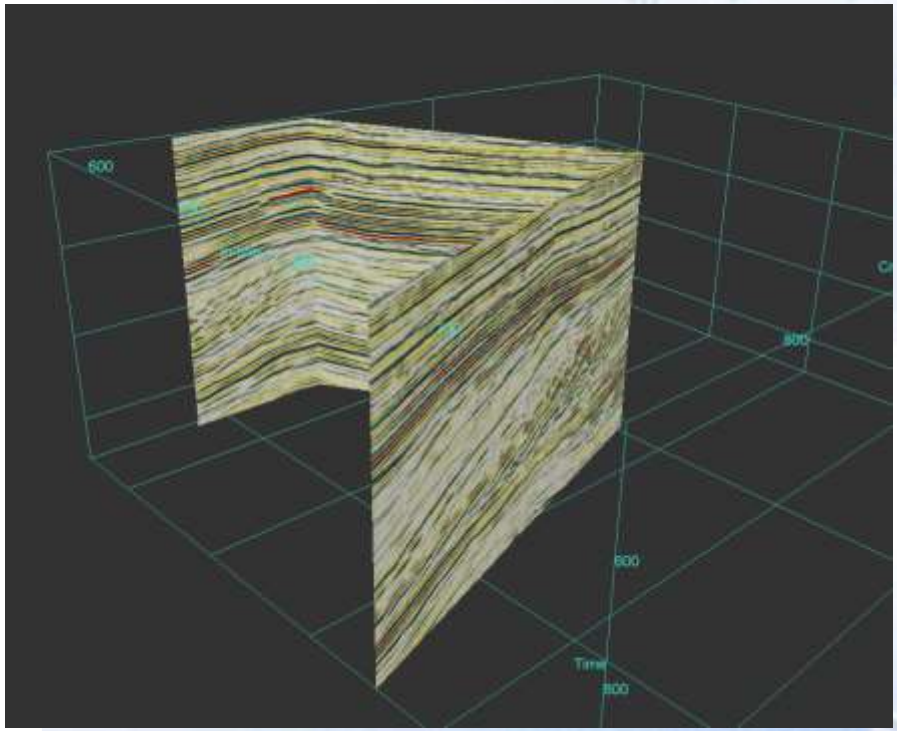
6.6截图：比较差异

With multiple nodes, the random line can also consist of multiple flat sections. The sections of one single random line may intersect one another. In interact mode, the little plane of a node can be used to drag the node laterally, and the vertical tube can be used to shift the edge of the random line vertically. Nodes can be added from the pop menu by right clicking on the random line in the Interact mode.

交互模式下，可侧向拖拽节点。垂向tube可垂向移动边。添加节点（右击）

Add Stored: Select from a list of (previously stored) random lines to display it in the scene.

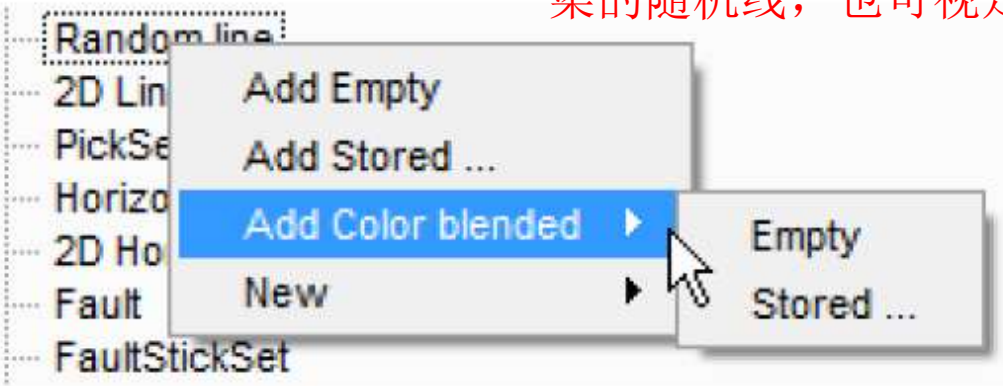


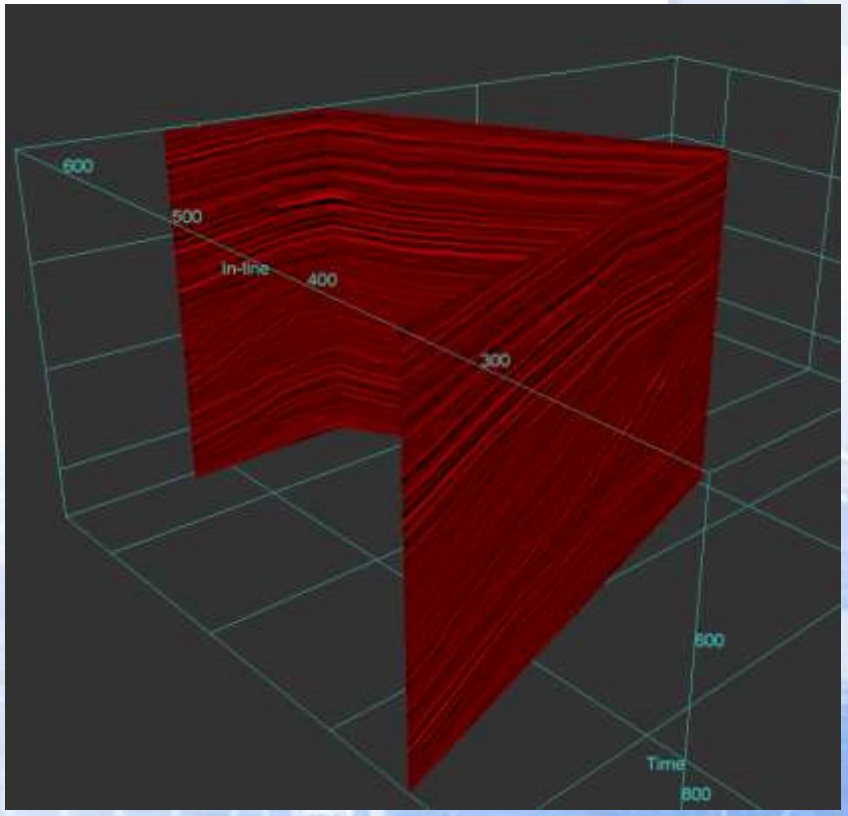


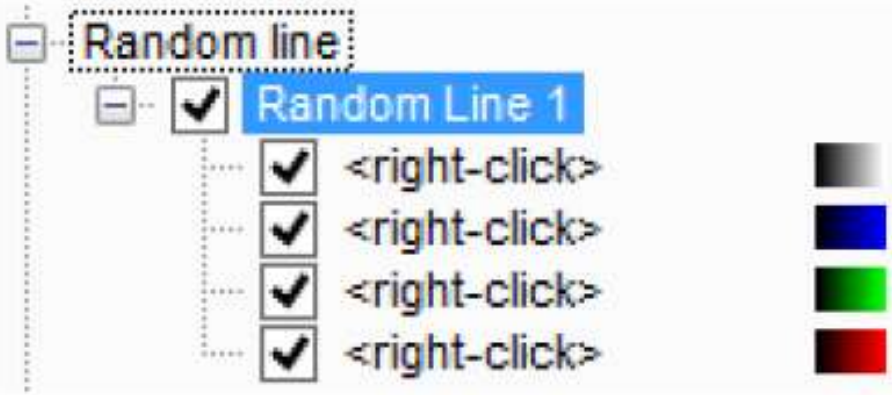
从保存的random lines文件加载，在视图中显示。

Add Color blended: A color blended Random Line may be added. This may be either a color blended version of a previously-stored random line, or an 'Empty' color blended random line:

添加颜色渲染的Random Line,可以是之前存储的颜色渲染的随机线，也可视是Empty的颜色渲染随机线。





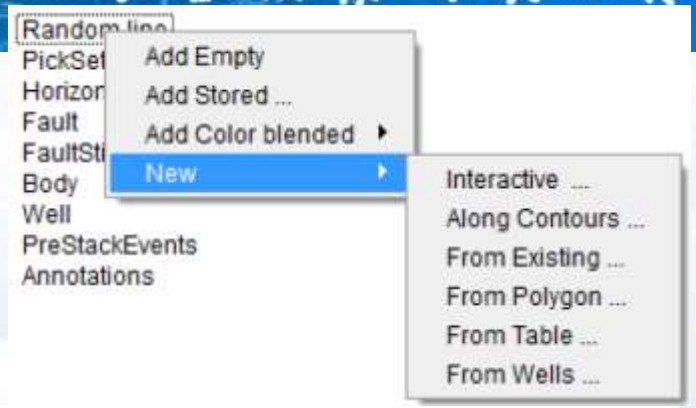


使用自定的RGB颜色渲染属性，创建归一化的显示，突出差异，提高细节的制图视觉。例如，以离散频率上输出振幅的谱分解。根据地质条件或对象，可选择使用FFT短窗口或CWT。
可以添加第4个颜色属性，突出构造特征，如断层/裂隙（即：添加相似性属性）

RGB(A*) color-blended attribute display is used to create a normalized color-blended display that often show features with greater clarity and enhances a detail map view. Though traditionally, it is used to blend the iso-frequency responses (Spectral Decomposition), RGB(A) can also be used to blend three or four different attributes that define a comparable spectrum. For instance, spectral decomposition outputs the amplitude at discrete frequencies. So, it renders the same output (unit-t=amplitude). Depending upon a geological condition or the objective, FFT short window or CWT (continuous wavelet transform) can be chosen.

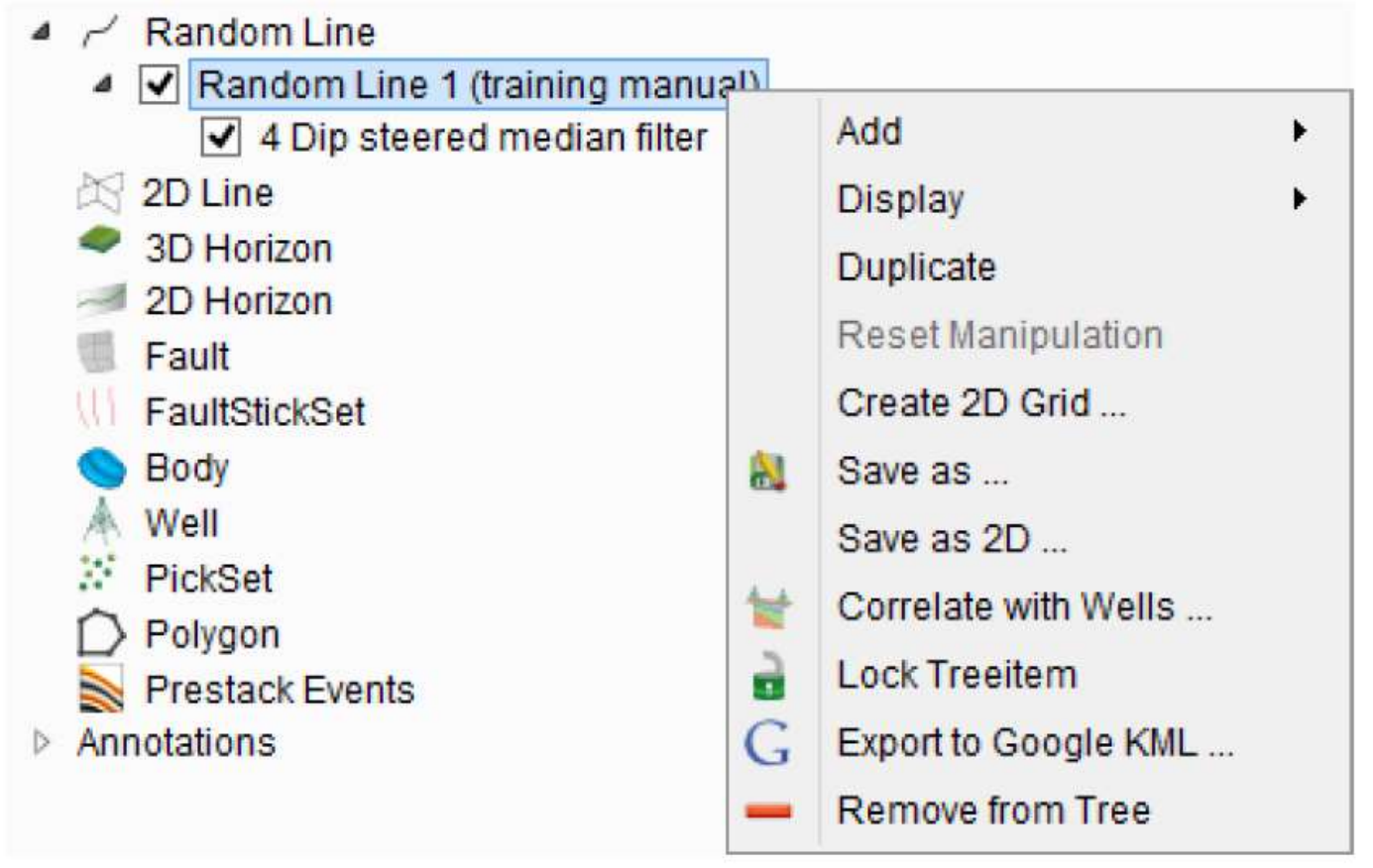
* Once you have your inputs selected for the appropriate color attributes, it is also possible to add a fourth attribute (the 'A' or 'Alpha channel') to highlight structural features such as faults/fractures (ie: add a similarity attribute).

其他几种创建Random Line的方法：



- *Interactive:* When creating a random line from interactive mode, a horizon or Z slice must be loaded in the scene first, a random line can then be created by picking nodes on the displayed horizon/Z-slice.
- *Along Contours:* Create random lines between specified contour ranges. Note that a interpreted horizon grid will be required to provide the contours.
- *From Existing:* Generate random line(s) from existing random line(s). There is an option available to generate random line at some distance away from existing random geometry and store it in new random line geometry.
- *From Polygon* Create random line from a saved polygon. 保存的Polygon是什么格式？
- *From Table:* Create random line from table. The input will be X/Y coordinates, Inline/Crossline and Z ranges.
- *Create From Wells:* Connect several wells by a random line. The line follows the deviated well paths (optional). By right clicking on the random line tree, and selecting Create from wells, a dialog box appears with a list of wells that can be selected in order to set up the random line path.

When right-clicking on the newly created random line, the following options are available in a pop-up menu:



Add

- *Add attribute:* When selected, choose to display data from stored cubes, from an attribute from the current attribute set or from an output node of the current neural network. To display an attribute or neural network, select or create an attribute set or neural network first.
- *Add Volume processing attribute:* Display volume created from the volume builder
- *Add HorizonCube display:* Display the stored HorizonCube
- *Add System tracts display:* This option will add systems tract interpretation.

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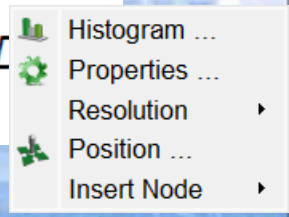
Display:

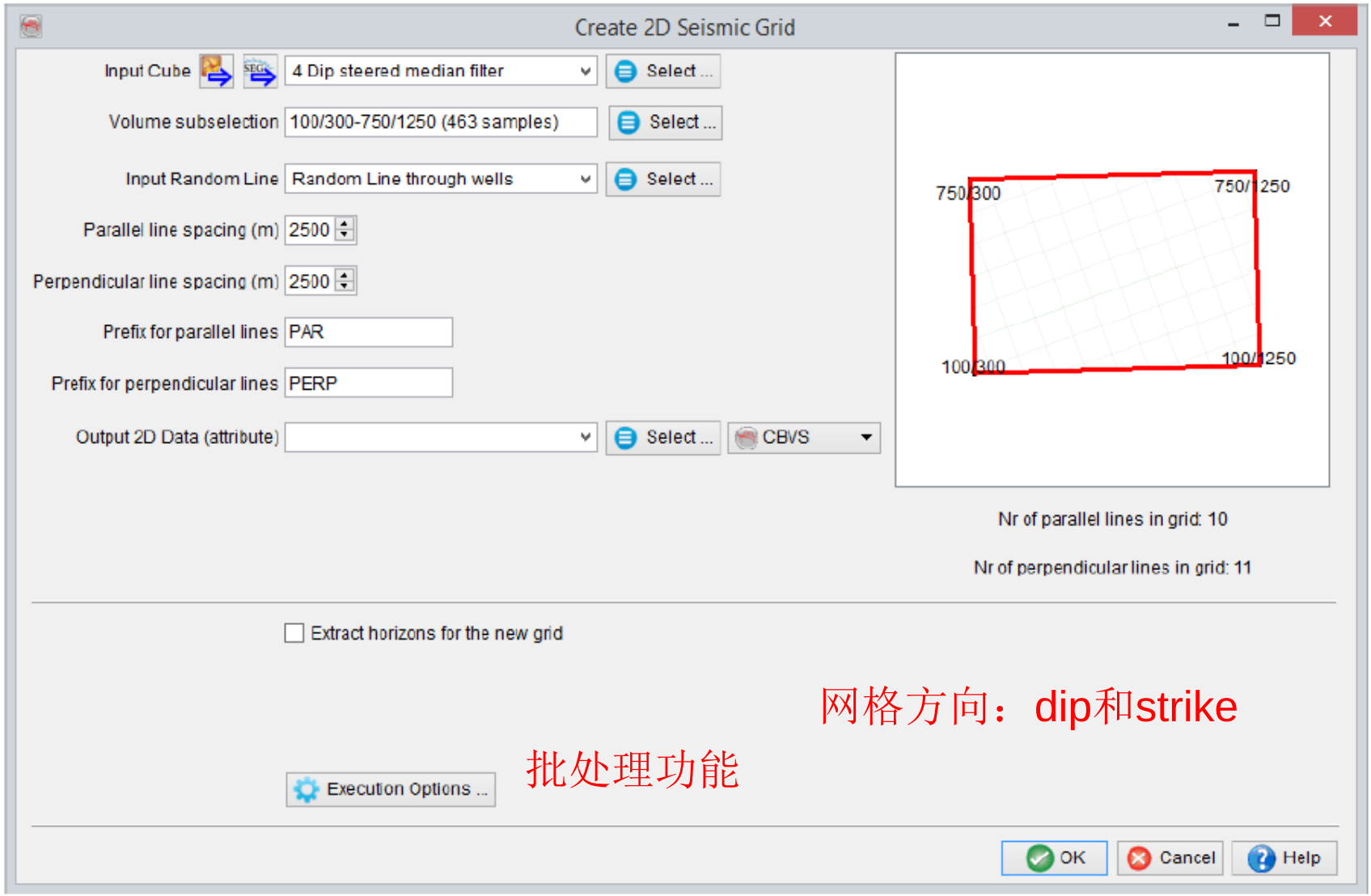
- *Histogram:* Displays multiple histograms for the randomline. If there are more than one attributes displayed, it will show the histograms of each in a pop-up view.
- *Resolution:* Choose the resolution between standard/higher/highest
- *Position:* It is used to manipulate the nodes / position of a random line. To read more, please go to the Manual mode sub-section of this chapter.
- *Insert node:* Insert a new node before the selected node.
- *Properties:* This option refers to display parameters such as *Ambient reflectivity, D fuse reflectivity, Transparency.*



Duplicate: Duplicate the line as an empty element in the tree. This option displays different attributes on the duplicated line whilst keeping the original data.

Reset Manipulation: This will reset any change in the position of the random line (or its nodes) that you have applied and it will set line to its original position. This option is only available if changes have been made to the position of the element.

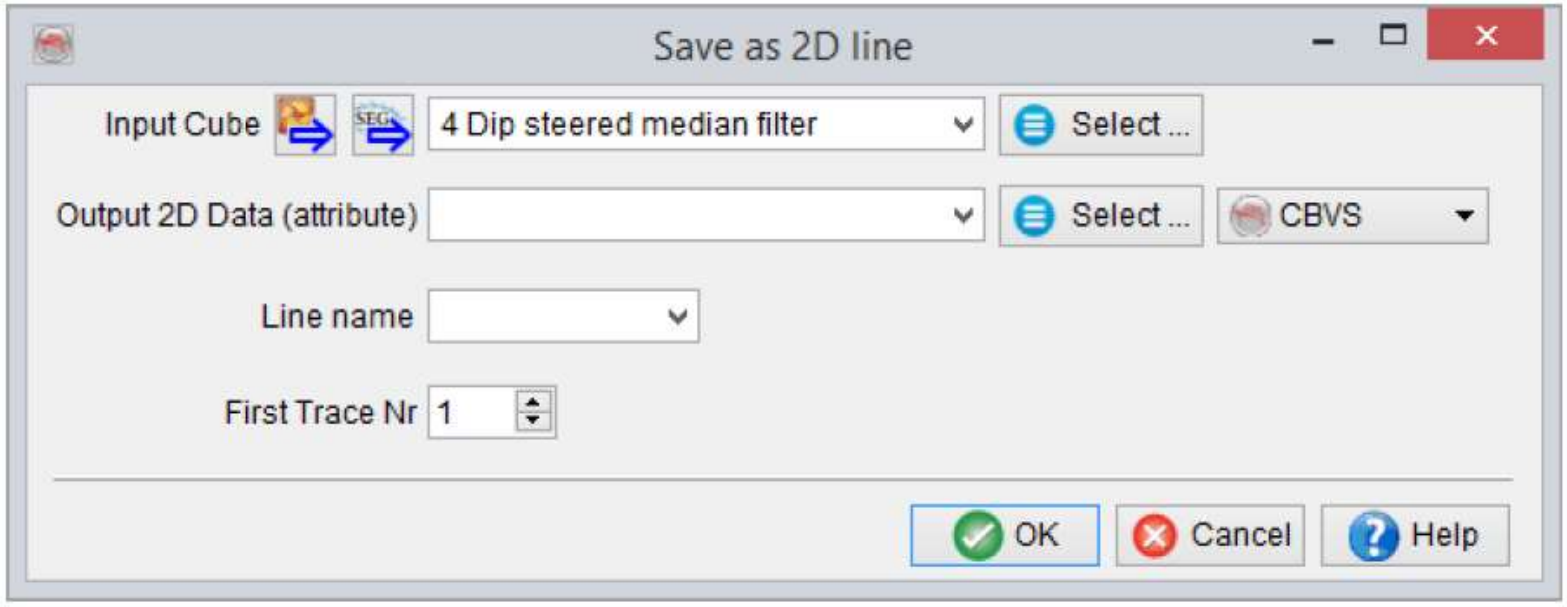
Create 2D Grid: The random lines (with two nodes only) can be used to create a 2D grid with a fixed grid spacing. When selected, the *Create 2D Grid* window is launched (see below). Here, specify the input 3D seismic volume and the output data set name. The output grid is generated according to the dip (parallel) and strike (perpendicular) direction of the selected random line. The prefix labels are used as prefixes to the output line names, stored to the specified new data set name. The grid spacing is the constant spacing between the two lines. At the bottom, the total number of parallel and perpendicular lines will be updated according to the grid spacing. By pressing *OK*, a batch process will start to generate the 2D grid. When the batch program is finished, the data can be displayed in the scene (see 2D Seismic section for details).



使用random lines(仅有2节点)创建2D网格（固定间距）

Save As: Save the random line as a new name or overwrite the existing.

Save As 2D: Creates a 2D line from a Random line. Right-click on the random line in the tree and select *Save As 2D*. A window will pop up, as shown below. Select the *Input cube*, the *output line* and the *line name*. The *first trace nr* number of line is also necessary.



保存random line

Correlate with wells: This option is used to correlate a random line with wells. Well - seismic correlation is normally done in the Well Correlation Plugin (WCP), which requires a commercial license.

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Lock: Locks the selected object. This will prevent accidental removing, moving or displaying data on the object. After clicking *lock* again, editing is again enabled.

Export to Google KLM: Export selected random line to a Google KML file. Specify the KML file parameters in the pop-up dialog.

Annotate the start and end of the random line with a user defined *line annotation* in the output file settings.

Remove: Remove the random line from the tree and the scene. Do ensure to first '*Save*' (any changes to) the random line before removing it.

Select Attribute: When selected, data can be displayed from stored cubes or an attribute from the current attribute set (if available). To display an attribute, select or create an attribute set first.

Save Colour Settings: Save color settings for a specific stored volume and make them available for later use.

Move: Move the attribute up, down, to top of the list, or to bottom of the list.

Display: There are several display settings / features that are briefly explained below:

- *Show Histogram:* Display data statistics (selected attribute) of the randomline as a histogram in a pop up window.
- *Show Amplitude Spectrum:* Amplitude vs frequency plot will be shown in pop up window.
- *Change transparency:* Change the transparency of the attribute item to view one or more overlaying attributes simultaneously.
- *2D Viewer - VD / Wiggles:* Display the selected attribute in the 2D viewer as "Wiggle" or "VD" (Variable Density). For more details, please refer to: 2D viewer

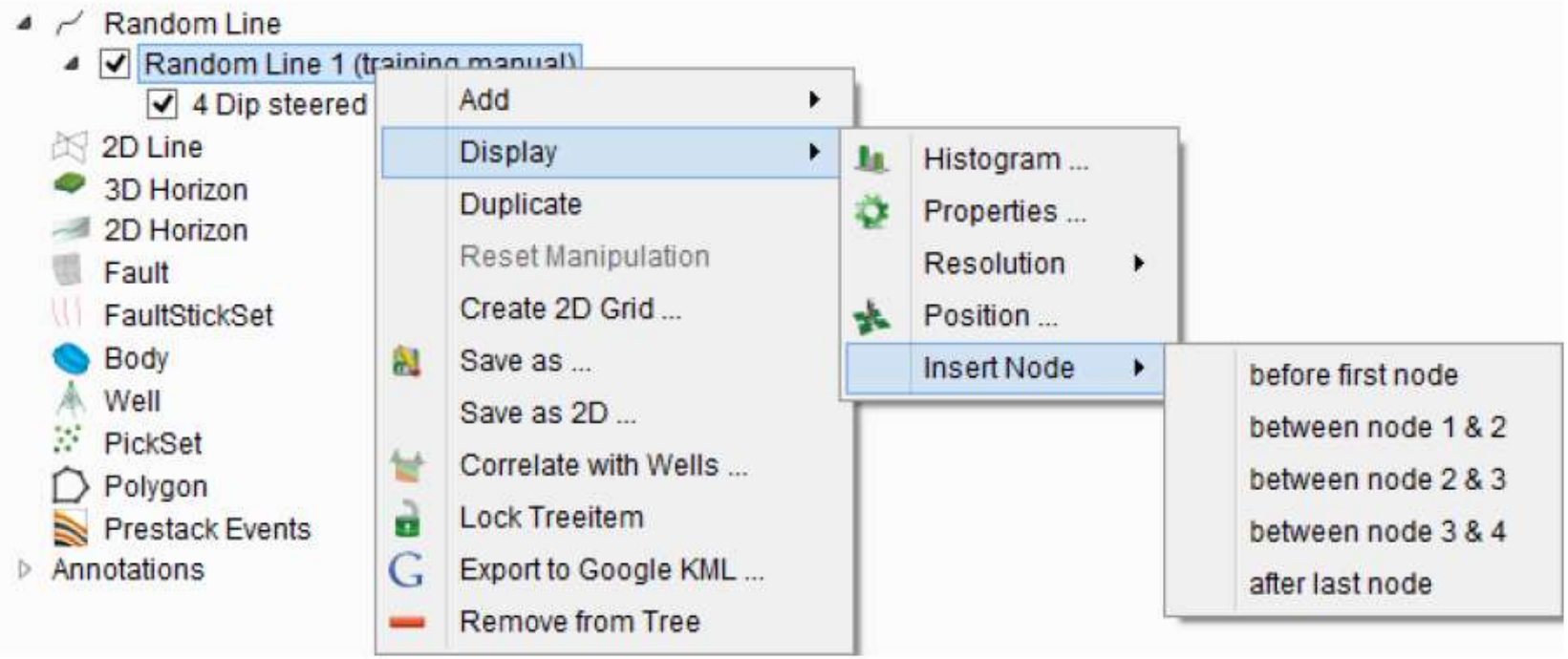
Remove: Removes the attribute item from the tree.

与inline/crossline的类似

3.4.1 Manual Mode (Empty)

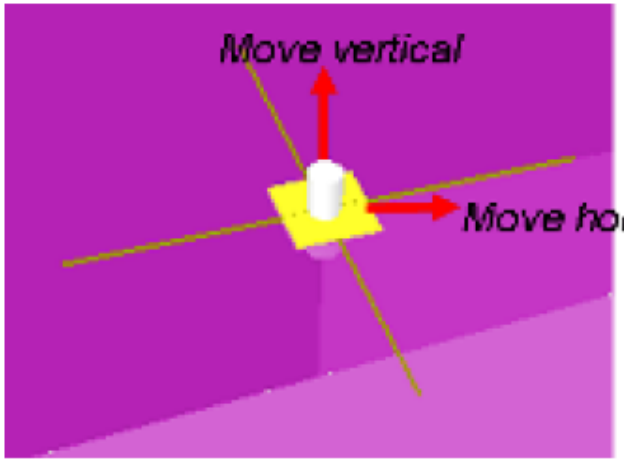
手动编辑Random line上的节点

Manual Mode. In manual mode, the random line will first be displayed in the 3D scene. Nodes may be added and their position changed interactively, in a second step. This starting random line will have two nodes, one at each end of the central inline. More nodes can also be inserted in the right click menu of the random line in the tree (see figure below). Please note that the same menu is available with the right-click on the random line in the scene.



Adding/inserting new nodes between the existing nodes

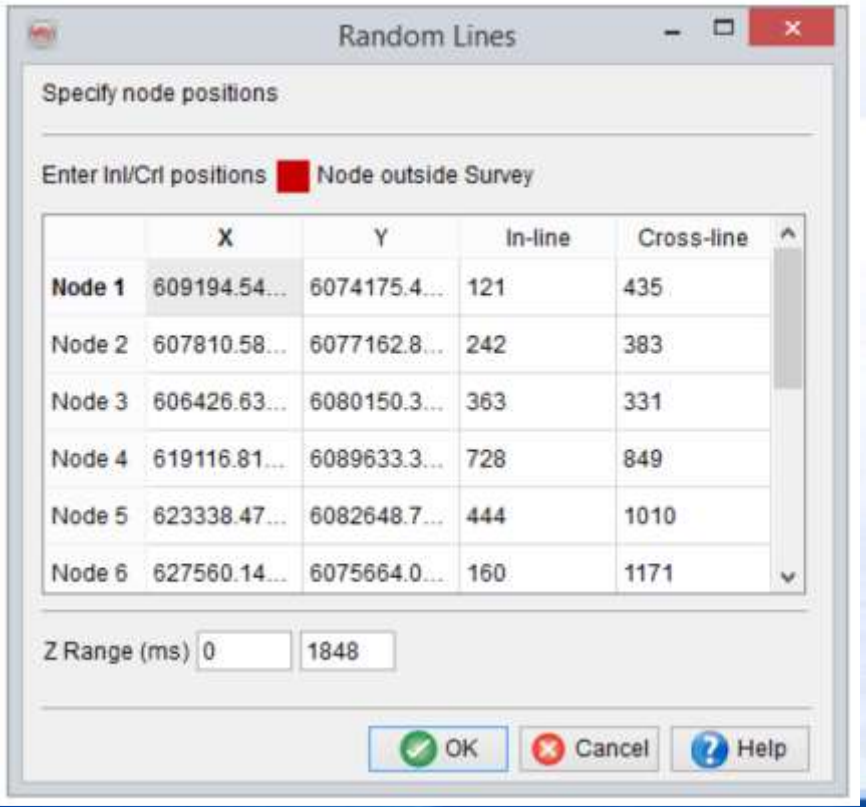
The node on the left-hand side of the newly created random line is designated node 0, and the one in the right hand side node 1. It is possible to insert a node before node 0, before node 1, and after node 1. The node will be created half-way between the two surrounding nodes. In order to move a node to a desired position, click on the random line to make the nodes visible/editable. In the interact mode, click at the node plane (horizontal/vertical) to move the node location. A purple surface appears around the node and the node can be moved in any direction inside the survey area.



按住Ctrl键，改变节点方向

*The node can be moved in two directions (horizontal and vertical). The node's orientation can be changed by placing the mouse pointer over the node and pressing the **Ctrl** key.*

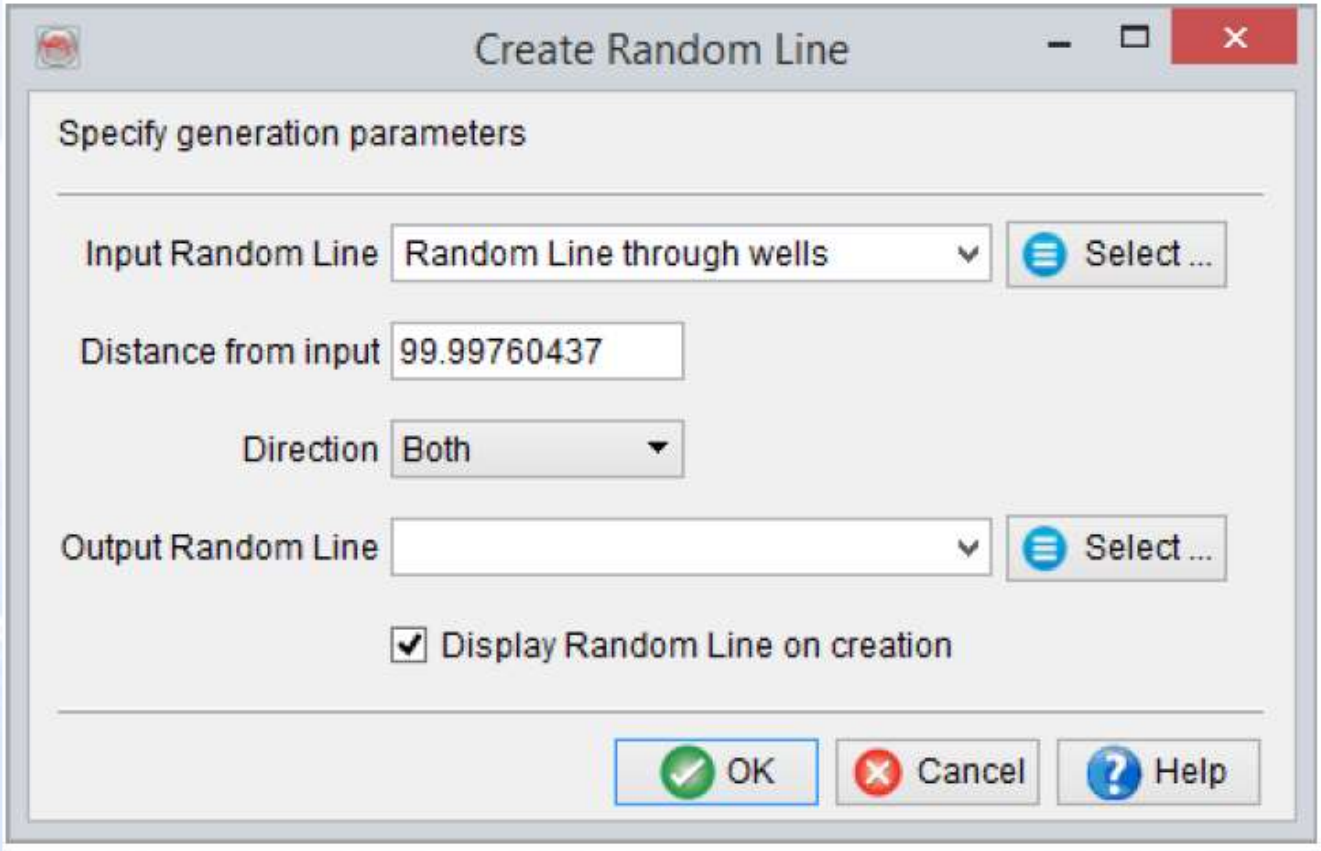
Editing or modifying the position of the nodes is also possible through clicking the option *Edit nodes*.... The following windows will pop-up and the nodes are editable. Modifying or inserting new nodes is also enabled. In this table, each node is defined by its inline/cross-line or X/Y position. The nodes can also be removed by right clicking over the desired cell and selecting the 'remove node' option. Similarly, for the pop-up menu, more nodes can be inserted before/after the selected cell (node).



右击，删除

3.4.2 Create from Existing

This option allows the user to generate random line offset from an existing random line. There is an option available to generate a random line at some distance away from existing random geometry and store it in new random line geometry.



Create Random line from existing line geometry in left/right or both directions. The direction is defined by the path described by the nodes, in the order seen in the table.

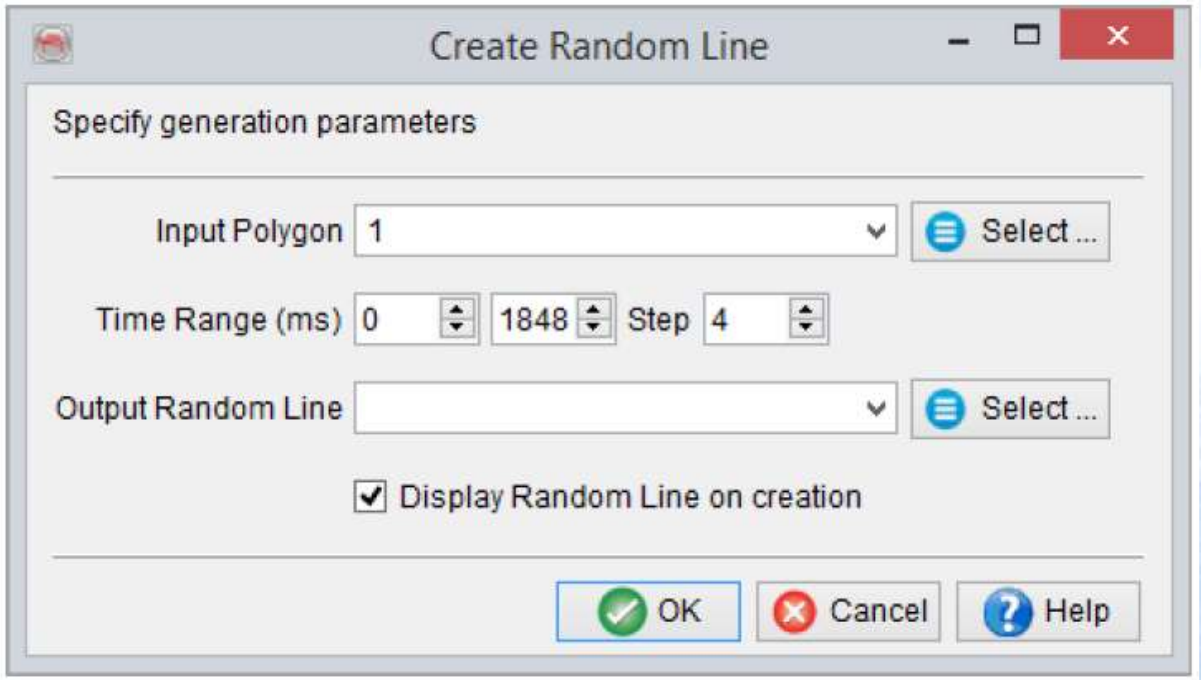
The first generation parameter is the *input random line*, which has to be chosen between the already existing random lines. Then, define the *distance from input* in meters and the direction in which the node will be added. There are three directions: left, right, and both. The final step is to name the output random line.

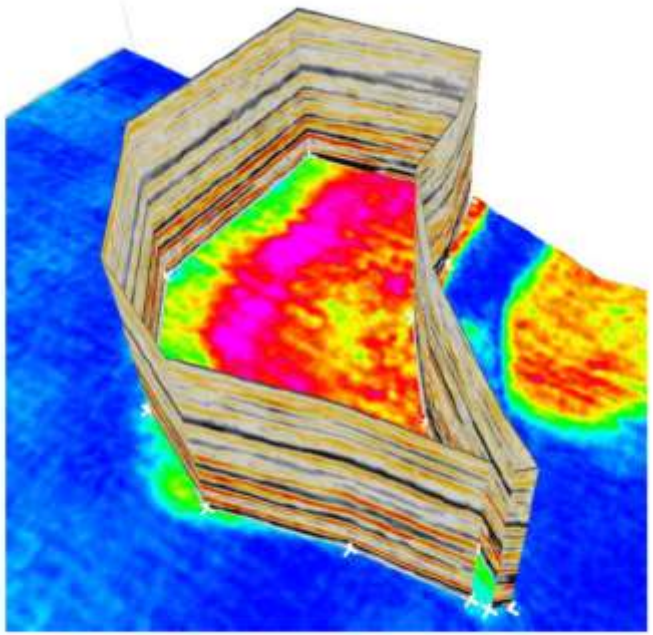
Click on the *Display Random line on creation* box to immediately visualize the random line.

3.4.3 Create from Polygons

This option allows the user to create random line definition from already created polygon. In the parameters, select the existing polygon and sub-select the Z-range for the random line, which will be generated. Write an output name for this random line and optionally, set check to display random line on creation so that after creation it will be displayed in the scene/tree. Press OK to proceed.

Polygon文件的格式？





An example random-line generated along the white colored polygon. The polygon approximates the closure of a gas anomaly.

3.4.4 Create From Wells

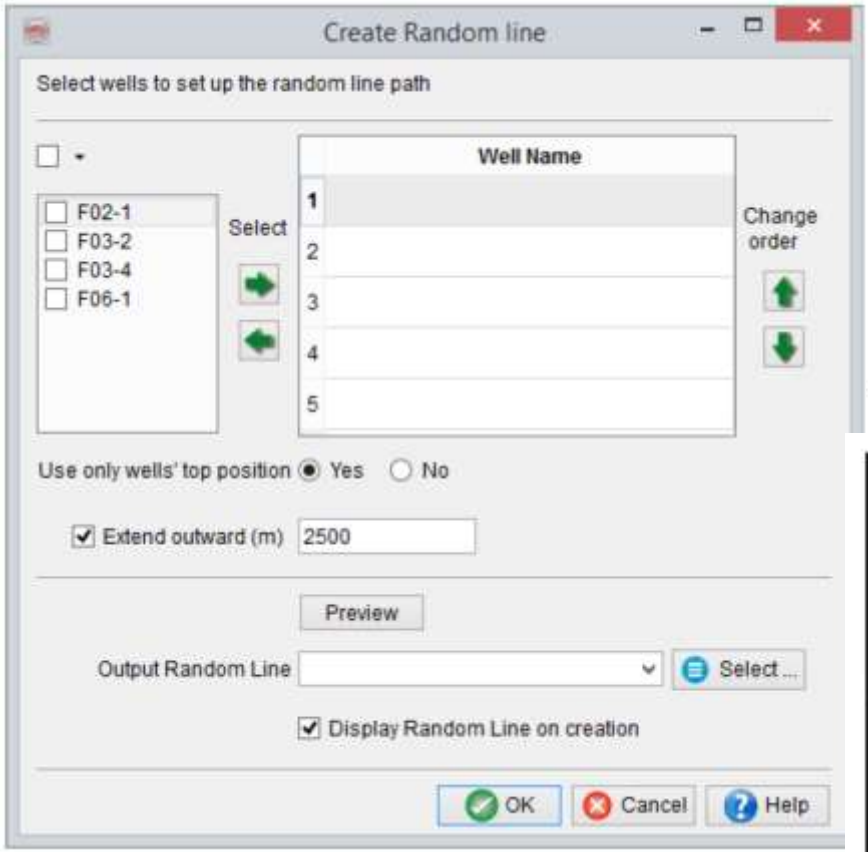
A random line can be created in such a way that it follows wells path. By right-clicking on *Random line* in the tree, and selecting *Generate* > *From Wells* ..., a dialog box appears with a list of wells that can be selected in order to set up the random line path.

Use the arrows to add and/or remove wells. Use the second set of arrows to setup a well sequence. Specify whether you want to use only the well top position or not. When you use all well points, you can specify the order by clicking the *Change Order* arrows.

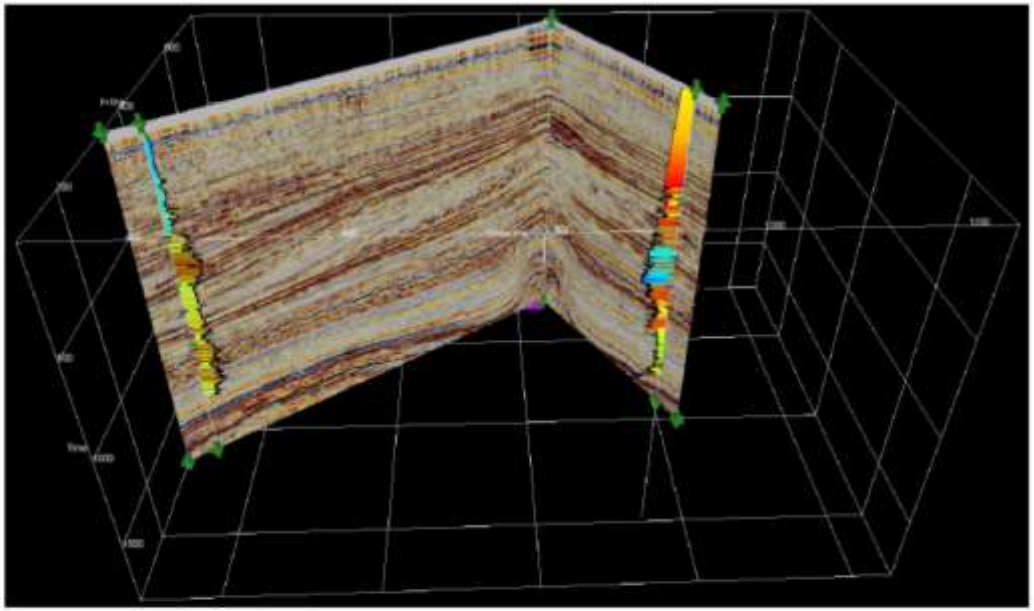
The *Extend outward* allows the extension of the random lines in both sides away from wells.

Press the preview button to see a top view of the random line that will be created. If the preview does not show exactly the desired random line, then change the parameters (the wells involved or the order in which they are listed). You can save the newly created random line by specifying the name in Output Random line(s) field. If you want to display the random line on creation, check the box *Display Random Line on creation*.

3.4.4 Create From Wells



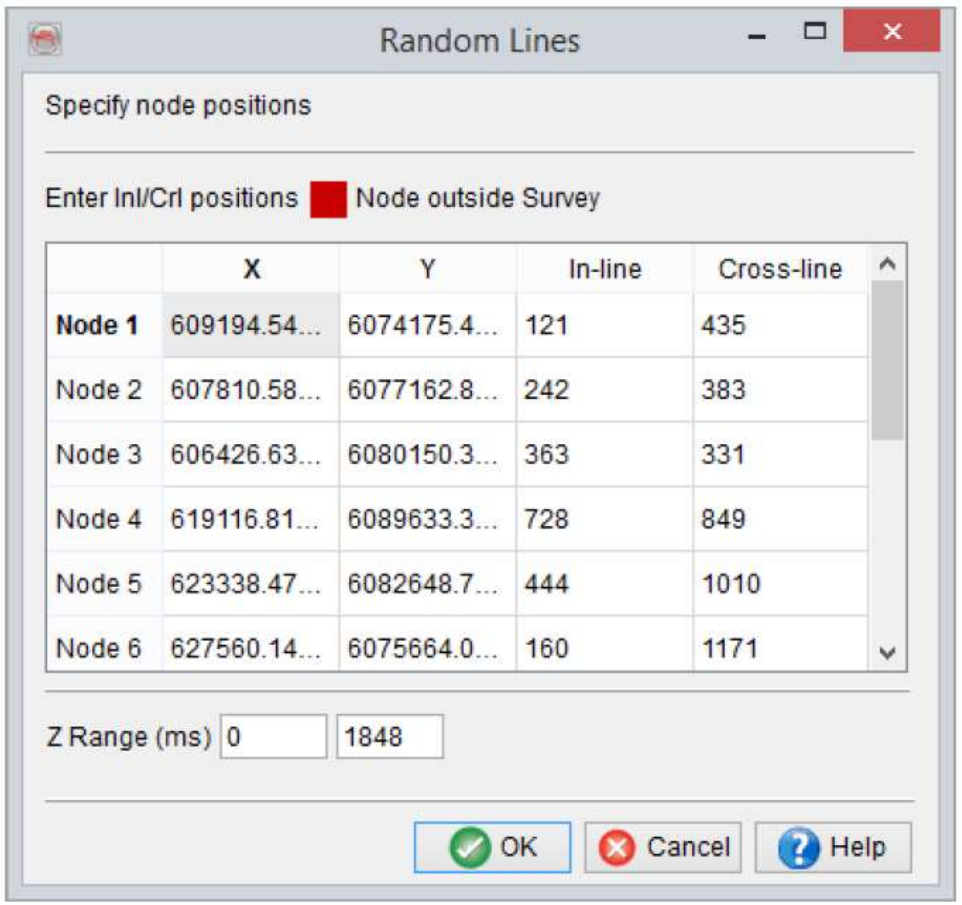
The following picture is an example of random line created from wells.



In this picture, a random line goes through four wells following a random path between these wells (which are used as constraints).

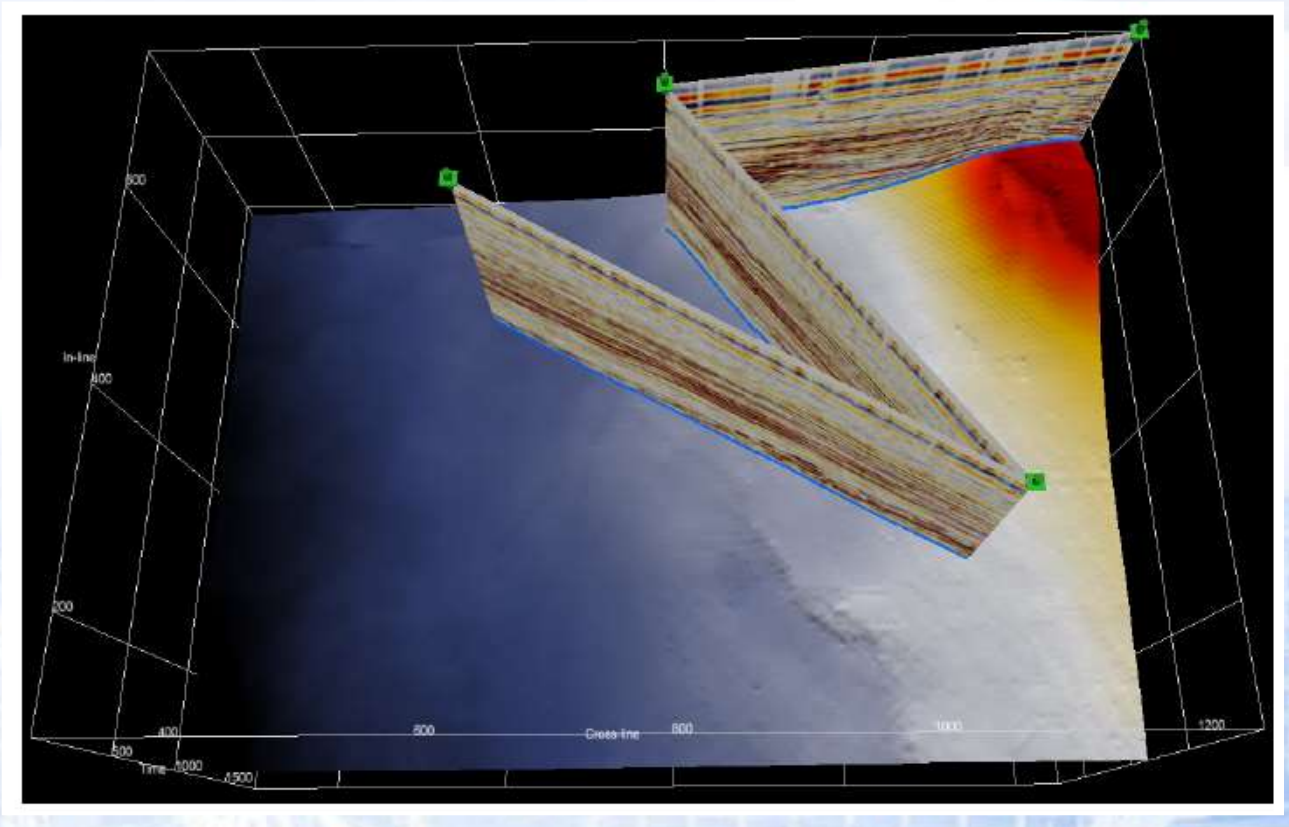
3.4.5 Create From Table

This is launched from: *Random line > right click > New > From Table*



This allows the user to create a random line from table. The input here are whether X/Y coordinates or Inlines/Crosslines and Z range.

The random line resulting from this table is shown below



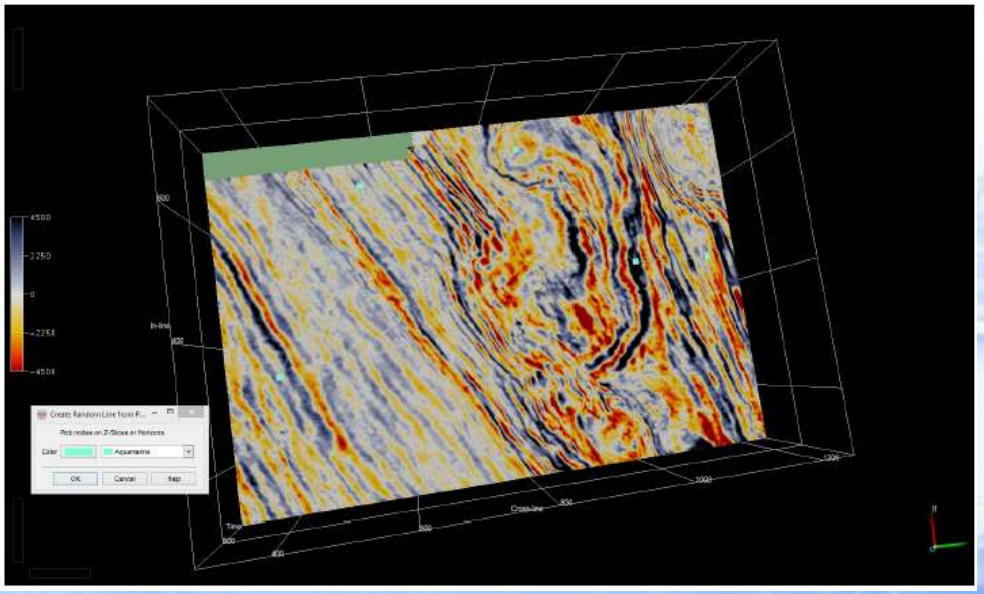
3.4.6 Interactive Mode

This option is launched via right-clicking on *Random line* > *New* > *Interactive...*

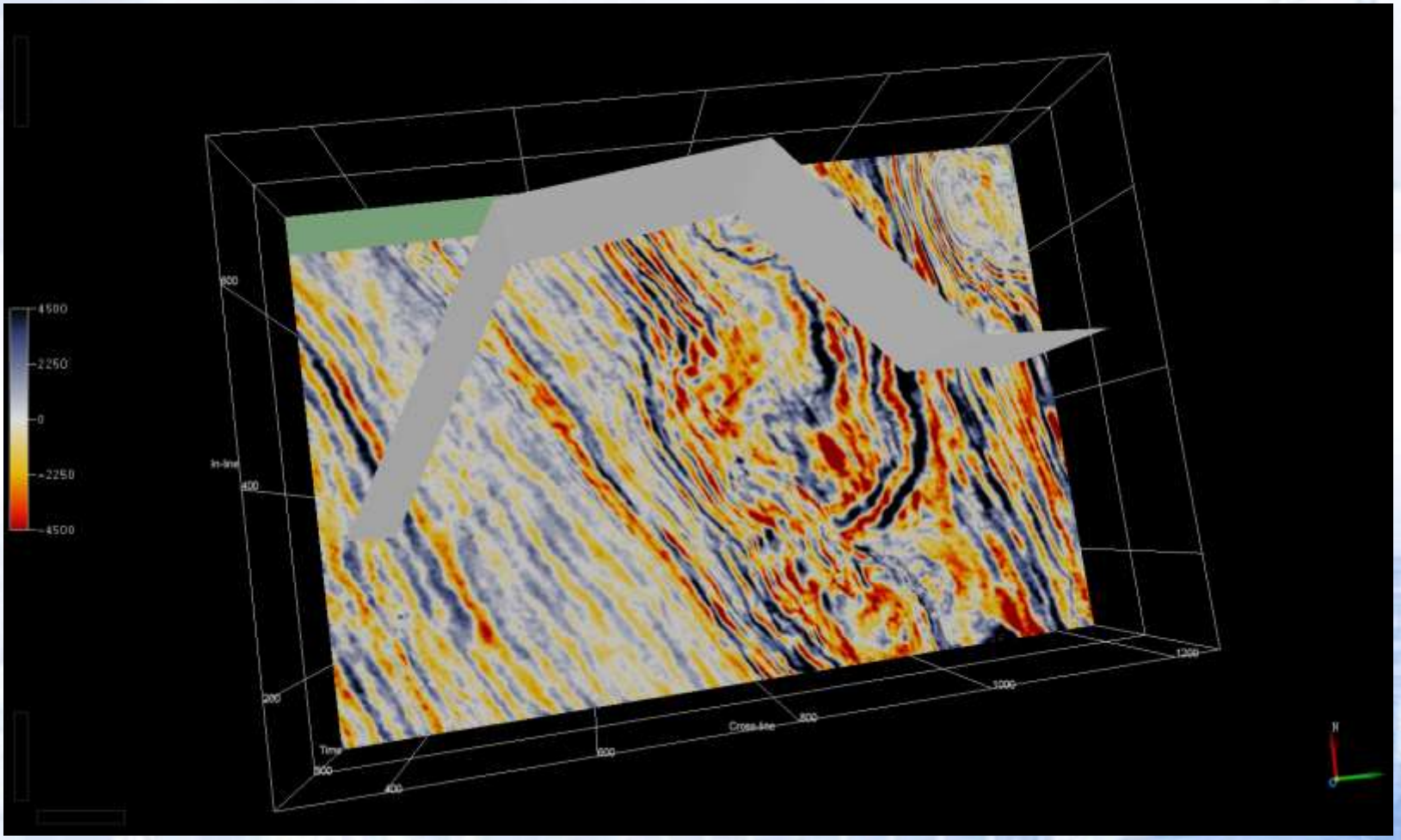
This allows the user to create random line from interactive mode. A horizon or Z slice is first loaded in the scene, then a random line can be created by picking nodes.

A window pops up asking the user to create a randomline from Polyline.

The user can now pick nodes on Z -slices or Horizons, as shown below:



After clicking OK, a random line is created:



An attribute can then be displayed: