4 Survey

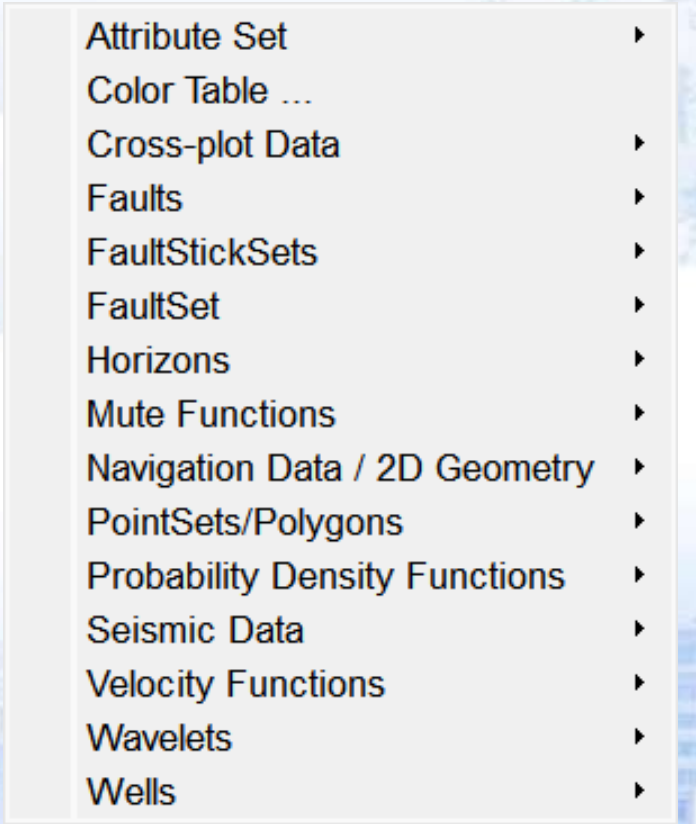
4.3 Import

本节操作就是：导入之前保存的各种数据，包括：seg-y地震数据、断层、层位、点集、多边形等。

4.3 Import

PetrelDirect插件需要购买许可证。
与Landmarks' Seiswork和Geoframe IESX交互需要购买ARK CLS插件。

Survey >



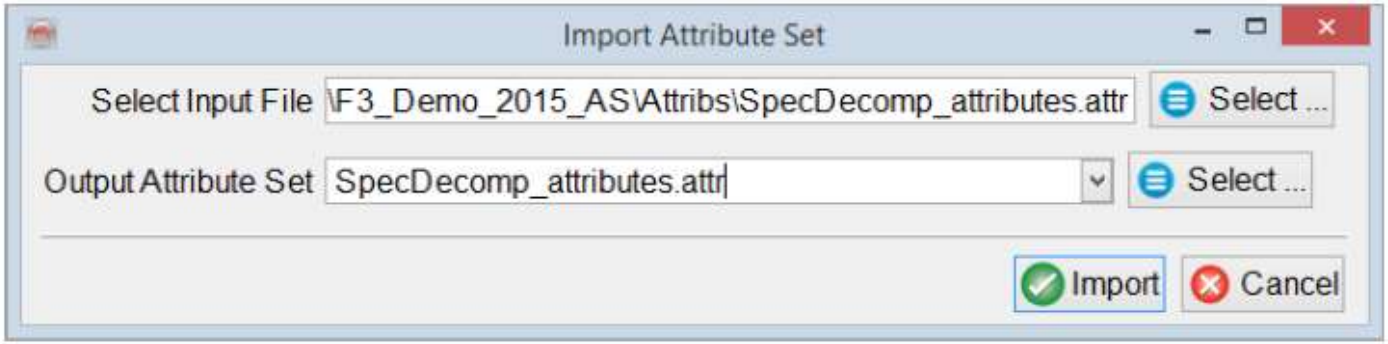
4.3.1 Import Attributes

An OpendTect attribute set can be imported via *Survey* > *Import* > *Attribute* > *ASCII*....

An OpendTect attribute set file contains a set of attribute definitions created in the Attribute Set window. OpendTect attribute sets are stored in ../'Survey Data Root folder'/Attribs/ and have '.attr' extensions.

.attr后缀

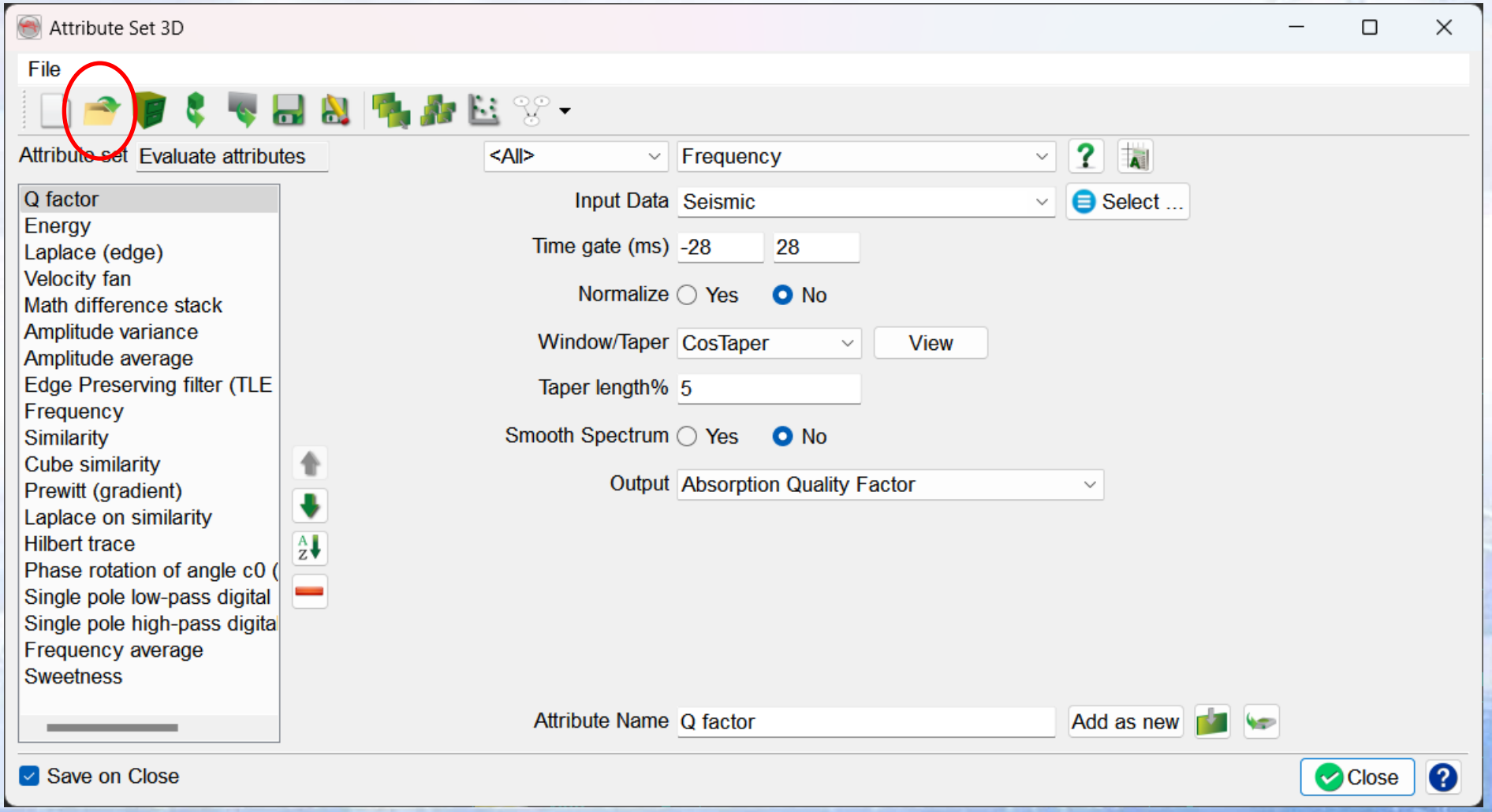
In the *Import Attribute Set* window: locate an OpendTect attribute set, and provide an *Output Attribute Set* name to be used in the current project.



The imported attribute set can then be opened within the Attribute Set window. 在Attribute Set窗口中打开

More options for importing attribute sets are available in the Attribute Set window itself.

Attribute Set窗口

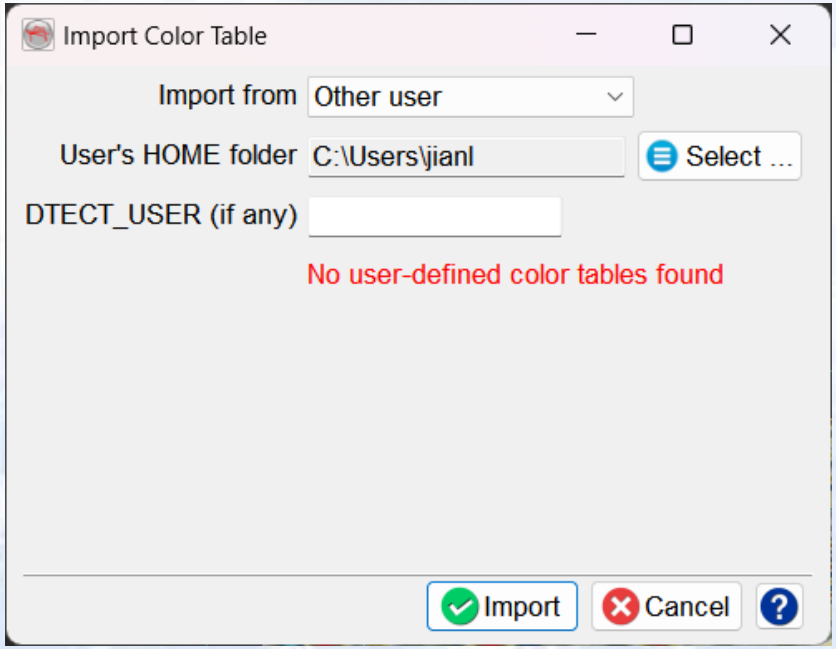


4.3.2 Import Color Table

An OpendTect color table can be imported via *Survey* > *Import* > *Color Table...* or *Manage Color Tables* window > *Import* button.

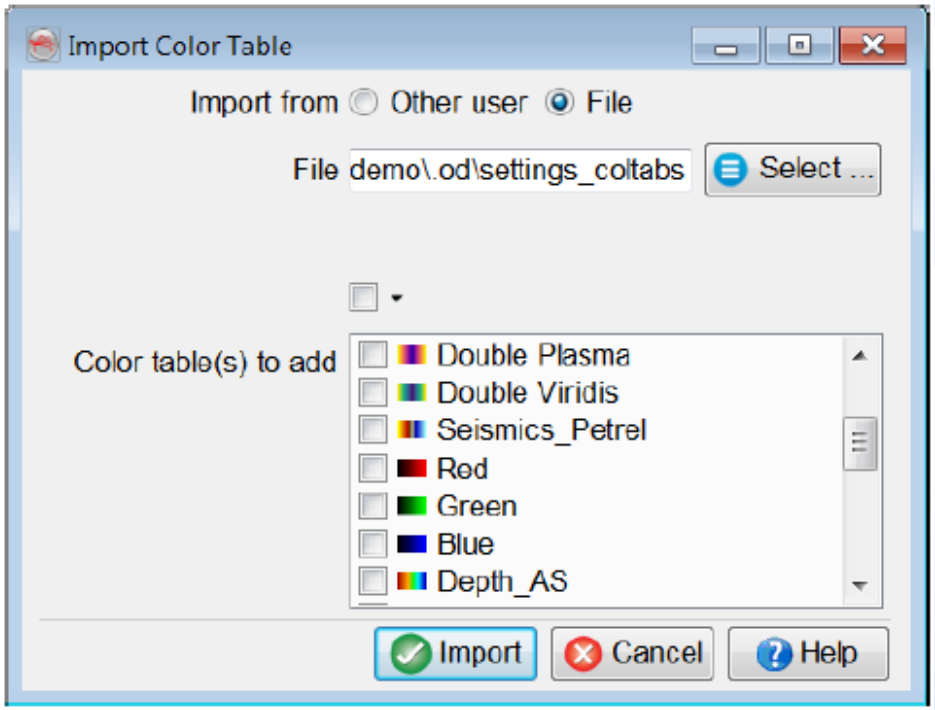
There are two ways to import a color table:

- *Other user* option is used when it's possible to browse to the other user's home directory. Navigate to the folder and type in DTECT_USER name (if any).



找到颜色表格文件

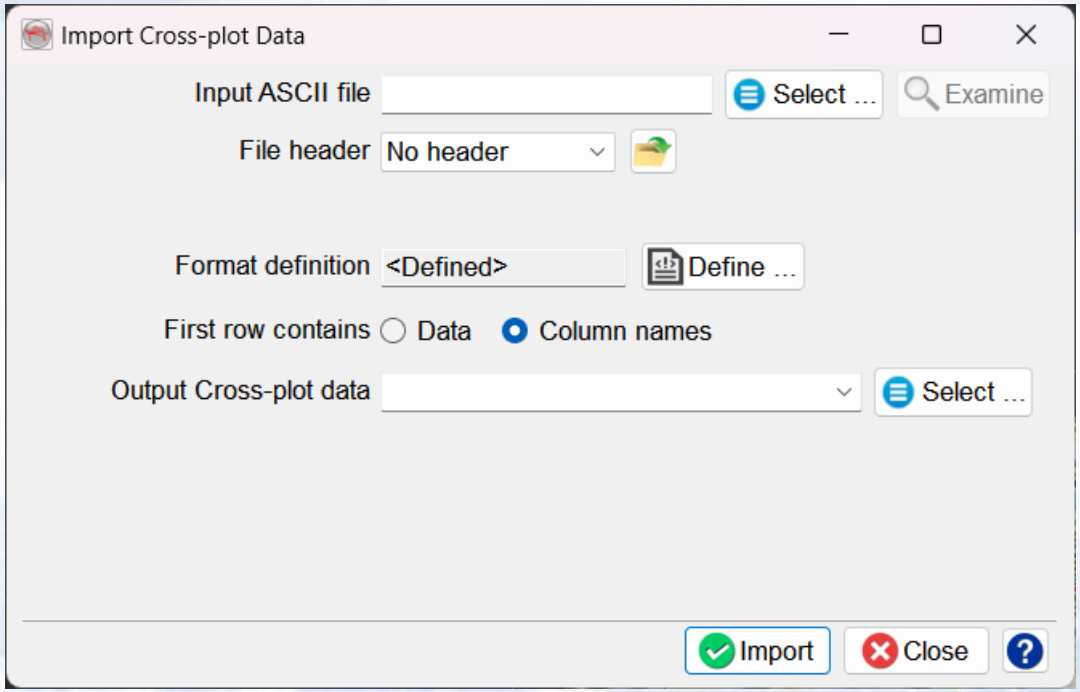
- Choose the *File* option if other users' home directories are not accessible. The color tables created by OpendTect users are stored in a settings_coltabs.DTECT_USER file (DTECT_USER = OpendTect username) that is located in the user's home directory $HOME/.od/.



The default OpendTect color tables are stored in a ColTabs file that is located in the OpendTect installation directory e.g. /home/your-username/OpendTect/6.6.0/data/ or *C:\Program Files\OpendTect\6.6.0\data* .

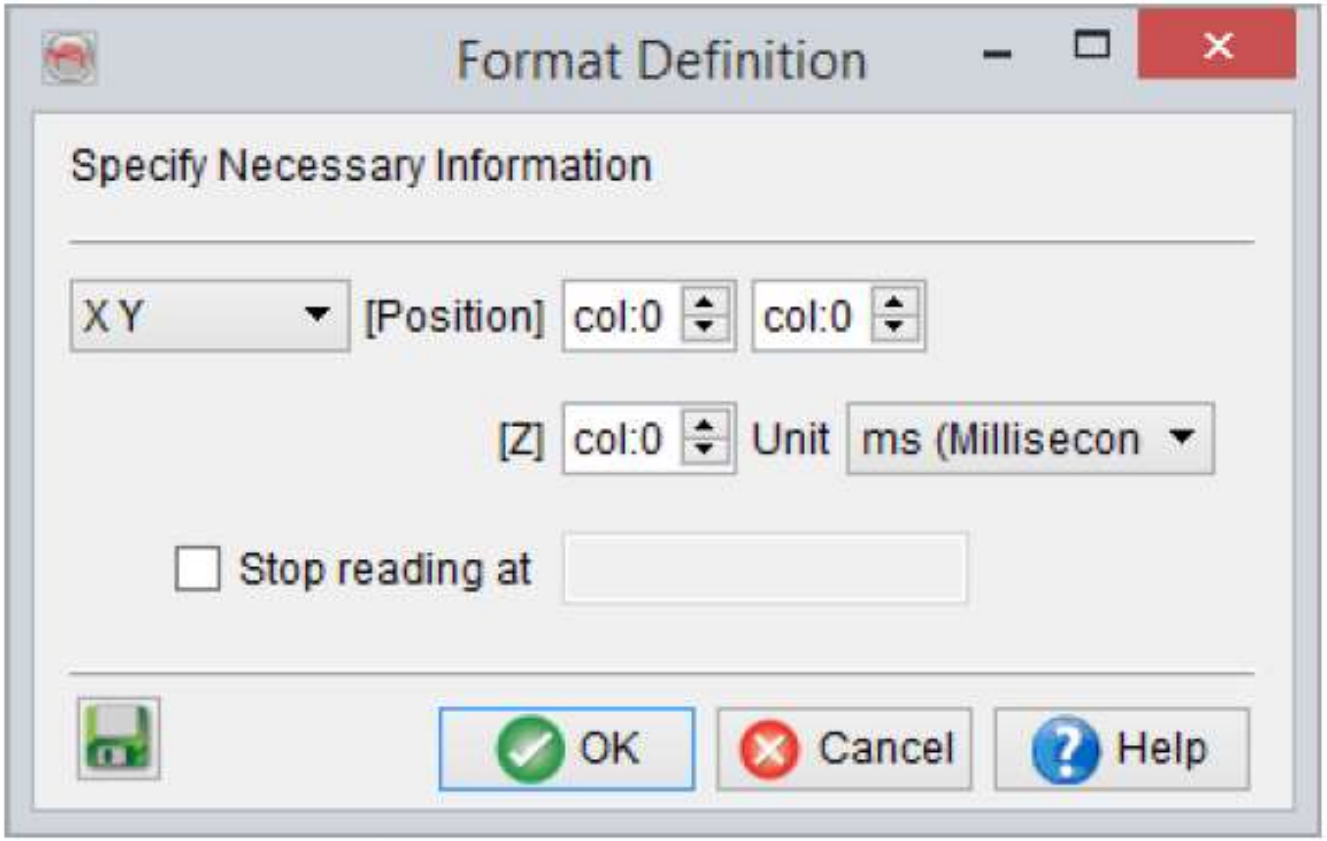
4.3.3 Import Cross-Plot Data

选择输入的ASCII文件。点击Examine按钮显示输入文件。输入文件将按列排序，每行一个点。



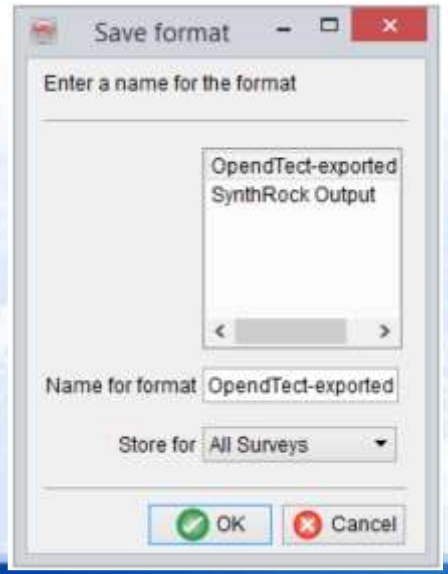
The main work is to specify the presence of a *file header* and the file *format definition*. The header, if present, can be of fixed length (number of lines), or delimited on its last line by a keyword.

Predefined and saved file formats are available by pressing the icon. Otherwise the format must be manually specified. The *Define* button gives access to the format definition window.



You must specify in the format definition window the column numbers for the position, in terms of an X-Y-Z or an inline-crossline-Z. The Z units can be seconds, milliseconds or microseconds (meters of feet in depth surveys). All other columns with be treated as amplitude data referenced with respect to the given position. The first row may contain either the first vector with its position and the corresponding amplitudes ("Data"), or the name of the attributes in each column ("Column names"). Reading may be stopped at a specific line by providing the adequate keyword.

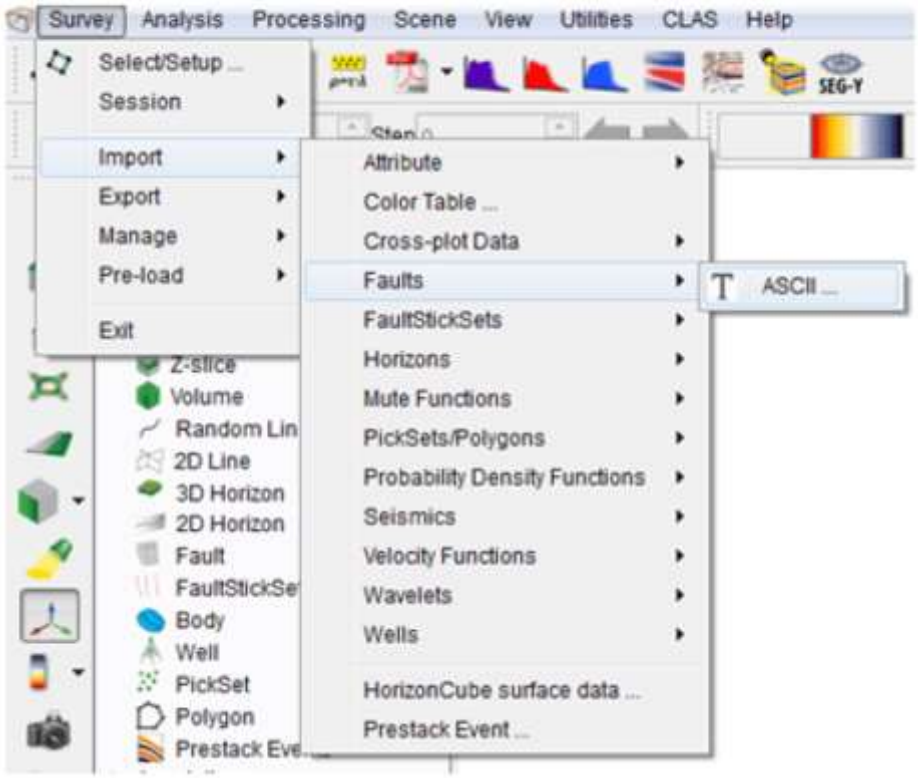
It is recommended to save the format definition for a later use and QC, by clicking on the  icon . In pop-up window, write the name of the format and store it. The format can be stored at different levels (All surveys, Current survey, Current OpendTect user level) depending on the usage. Press OK when done.



4.3.4 Import Faults

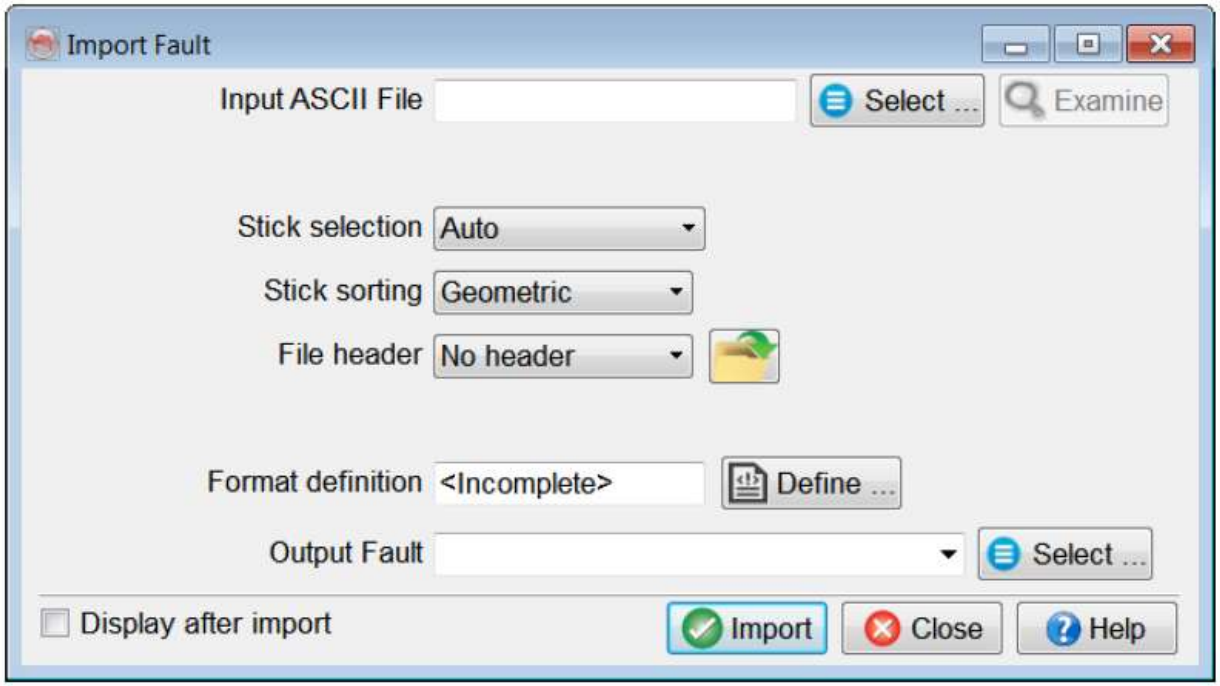
Faults are non-editable objects that may be used as display element in the 3D scene, displayed in full or a section. Attributes can also be applied along faults. If you are looking for an editable object that can be converted at a later stage into a fault plane, please load your data as fault stick sets.

3D Faults (planes) can be imported in OpendTect via *Survey -> Import -> Faults*, from Ascii files or from GeoFrame Workstation (plugin).



4.3.4.1 Import Fault Ascii 3D

Select the input Ascii file. You may display the input file by pressing the *Examine* button. The input file should be column sorted with one point per record (line).

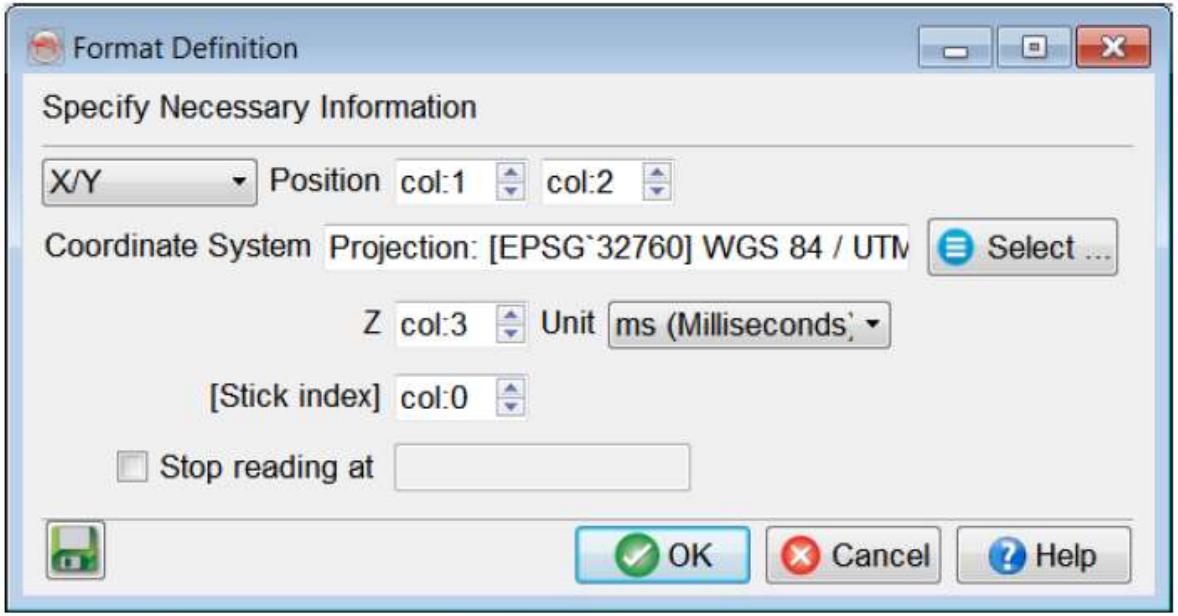


The main work is to specify the *type* of data, the presence of a *file header*, and the *file format definition*.

The sticks composing the planes can be either gathered automatically, either from picked slices (inlines or crosslines), and/or based on their slope. The sorting can be done based on the geometry of the fault sticks, on an index written in the input file, or in the order found in the file. The header, if present, can be of fixed length (number of lines), or delimited on its last line by a keyword.

Note: that OpendTect does not support crossing fault sticks (a fault plane cannot cross itself). If faults were picked on inlines, crosslines and horizontal slices, only the largest subset of the three will be used to import the faults.

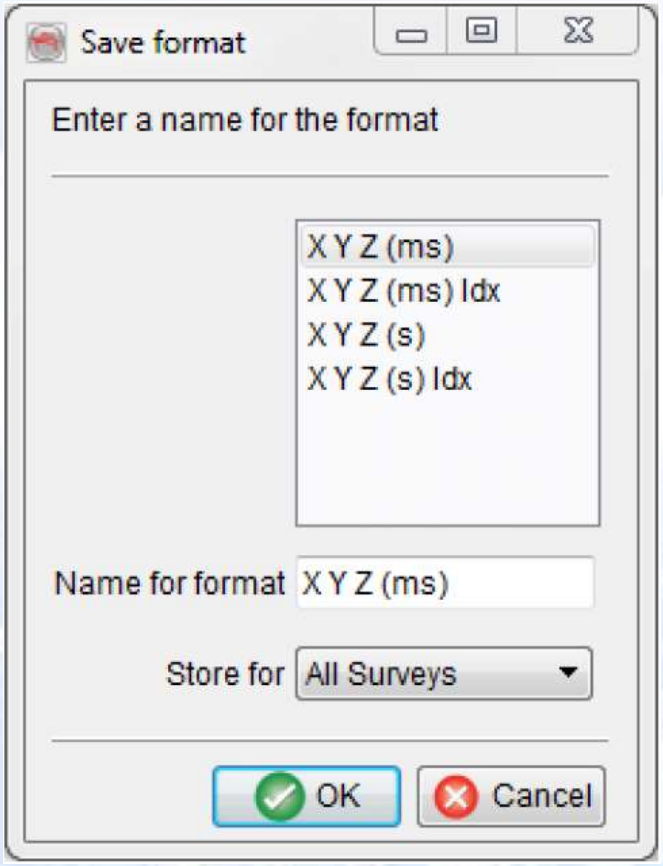
Predefined and saved formats are available by pressing the  icon. Otherwise the format must be manually specified. The Define button gives access to the format definition window.



You must specify in the format definition the column numbers for the position; in terms of an X-Y pair, point column, and optionally stick index (0 = no stick index). The Z units can be seconds, milliseconds or microseconds. Reading may be stopped at a specific line by providing the adequate keyword.

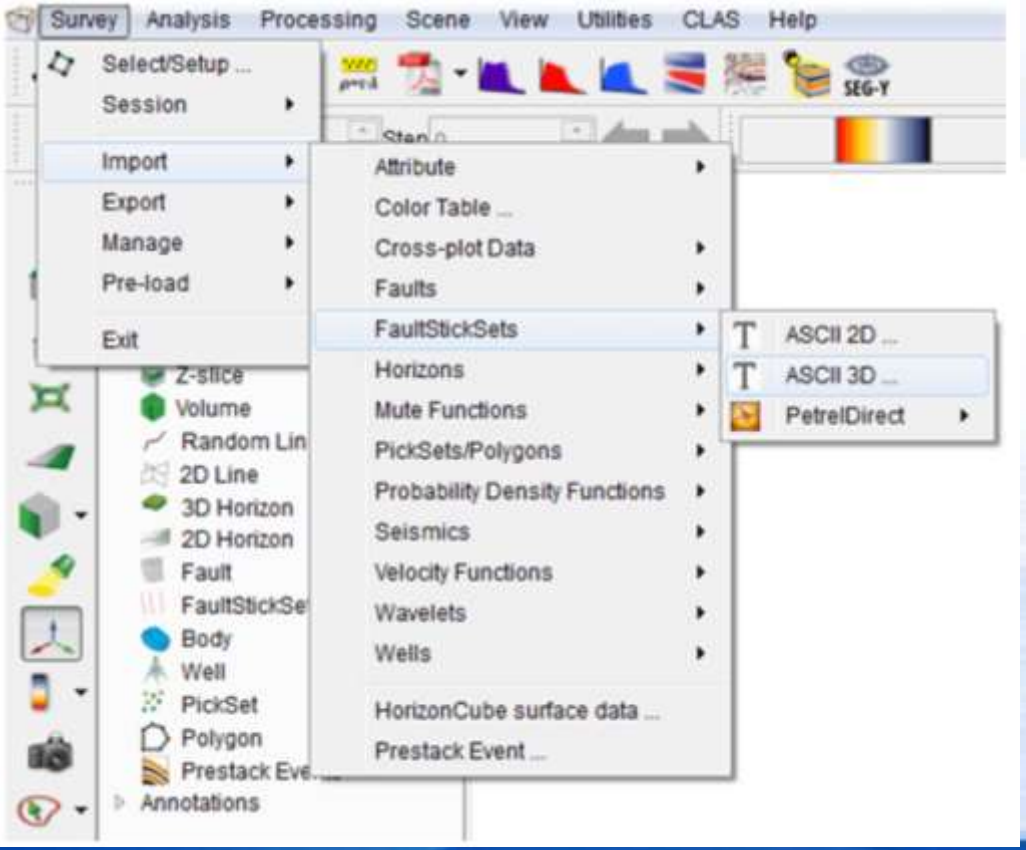
If Coordinate Reference System (CRS) is defined for the survey, CRS conversion will be available in the import window.

It is recommended to save the format definition for a later use and QC, by clicking on the icon . In pop-up window, write the name of the format and store it. The format can be stored at different levels (All surveys, Current survey, Current OpendTect user level) depending on the usage. Press OK after having provided the name of the fault to be imported.



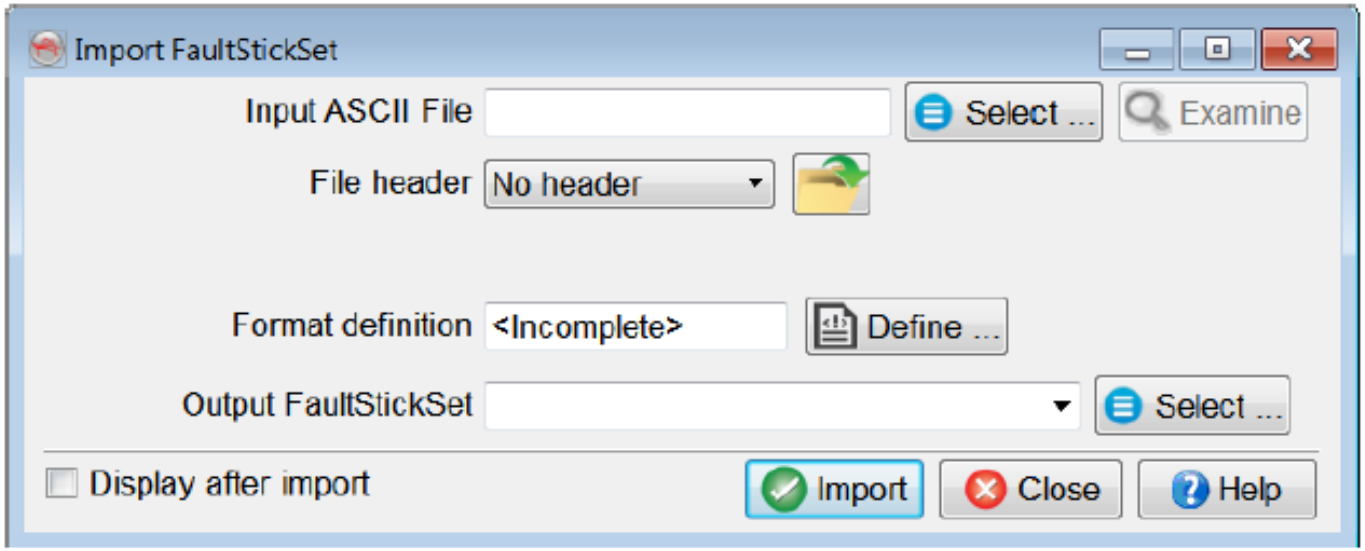
4.3.5 Import FaultStickSets

Fault stick sets are the editable version of the fault planes. Fault stick sets are fully editable objects either for faults interpretation , or later as fault input to correct for the fault throw. They can be imported in OpendTect via *Survey* > *Import* > *FaultStick-Sets*, from Ascii files of from GeoFrame Workstation (plugin).



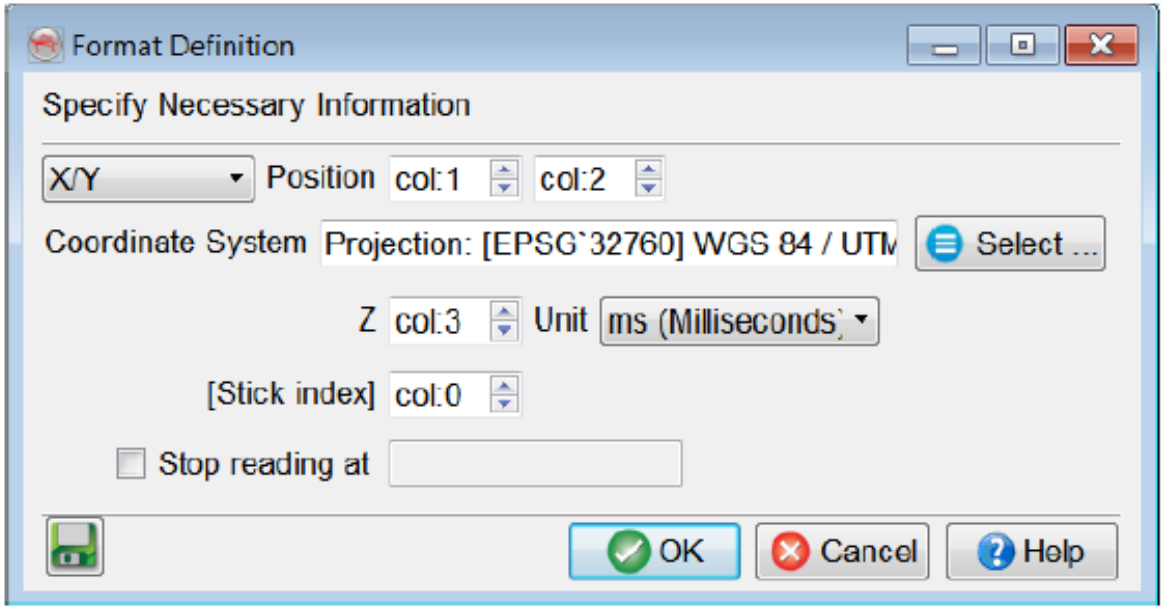
1 Import FaultStickSets Ascii 3D

Select the input ASCII file. You can display the input file by pressing the *Examine* button. The input file should be column sorted with one point per record (line).



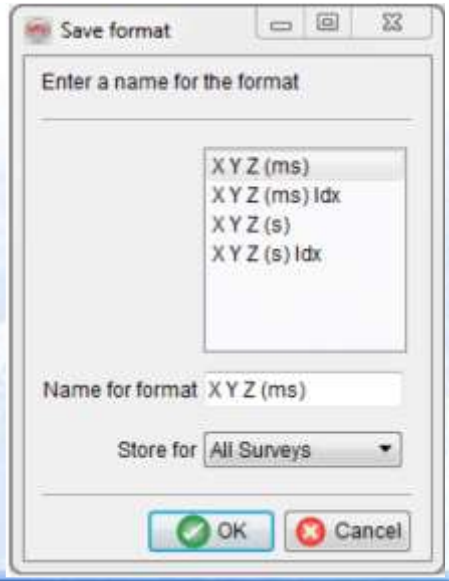
The important point is to specify the presence of a *file header* and the file *format definition*. The header, if present, can be of fixed length (number of lines), or delimited on its last line by a keyword.

Predefined and saved formats are available by pressing the  icon. Otherwise the format must be manually specified. The *Define* button gives access to the format definition window.



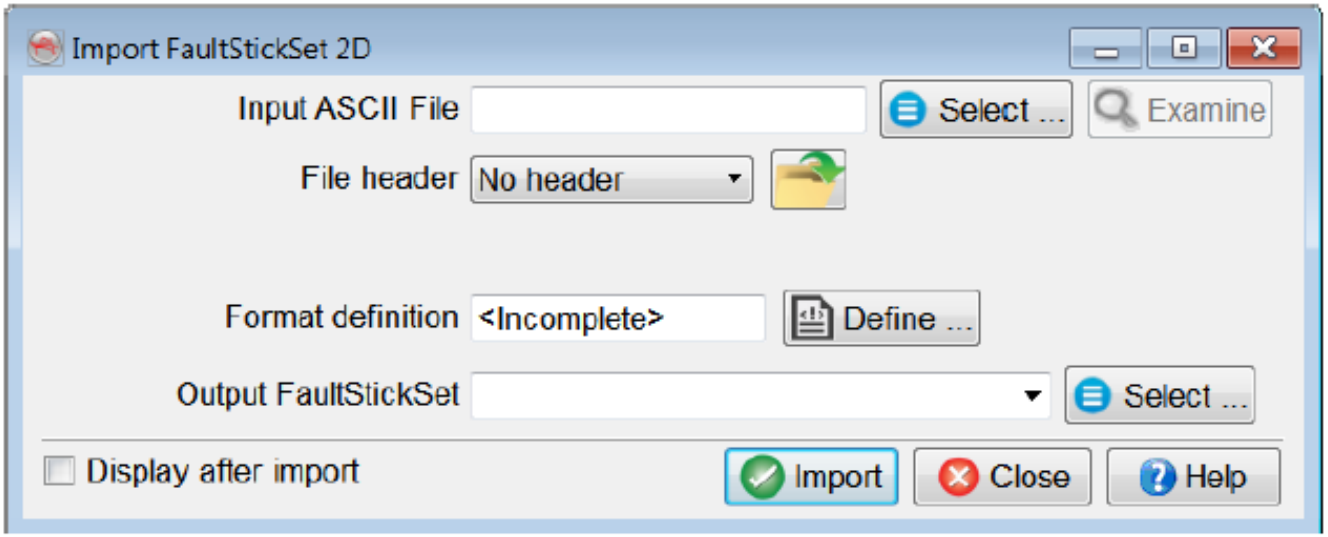
You must specify in the format definition the column numbers for the position, in terms of an X/Y pair, point column, and optionally stick index (0 = no stick index). The Z units can be seconds, milliseconds or microseconds. Reading may be stopped at a specific line by providing the adequate keyword. If Coordinate Reference System (CRS) is defined for the survey, CRS conversion will be available in the import window.

It is recommended to save the format definition for a later use and QC, by clicking on the icon . In pop-up window, write the name of the format and store it. The format can be stored at different levels (All surveys, Current survey, Current OpendTect user level) depending on the usage. Press OK after having provided the name of the name of the faultstickset to be imported.



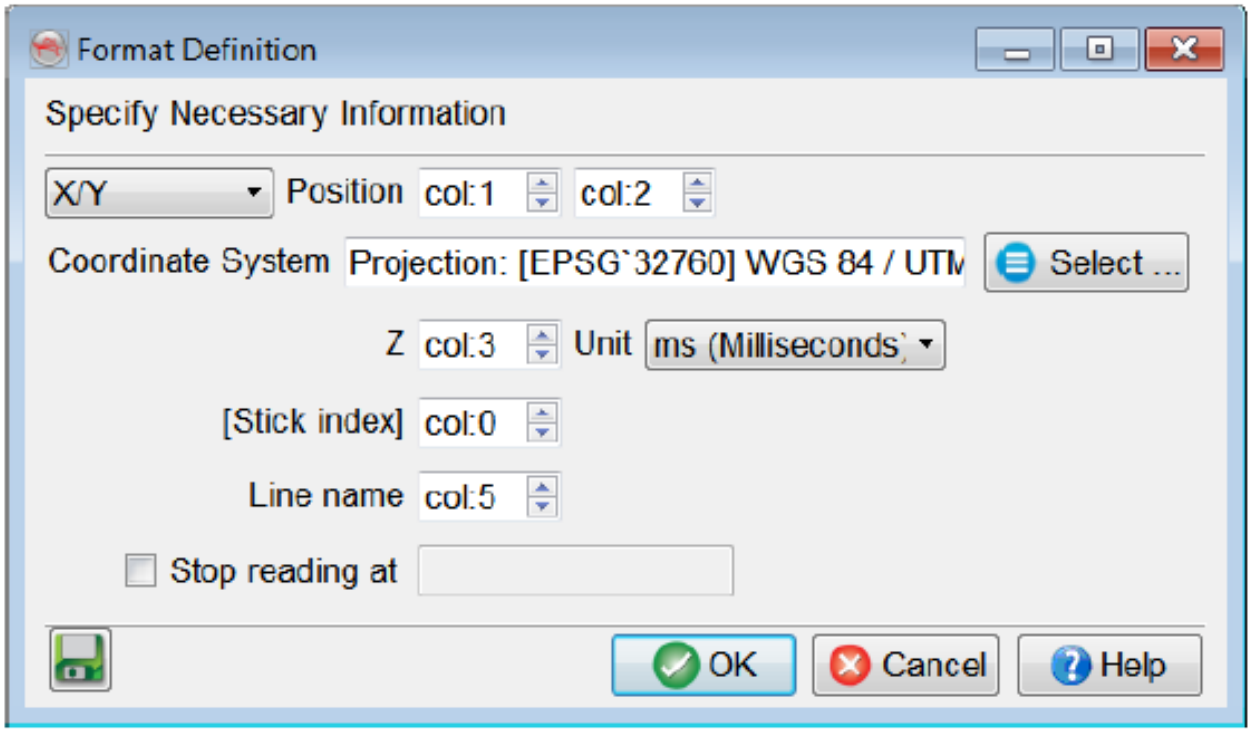
2 Import FaultStickSets Ascii 2D

Select the input Ascii file. You may display the input file by pressing the *Examine* button. The input file should be column sorted with one point per record (line).



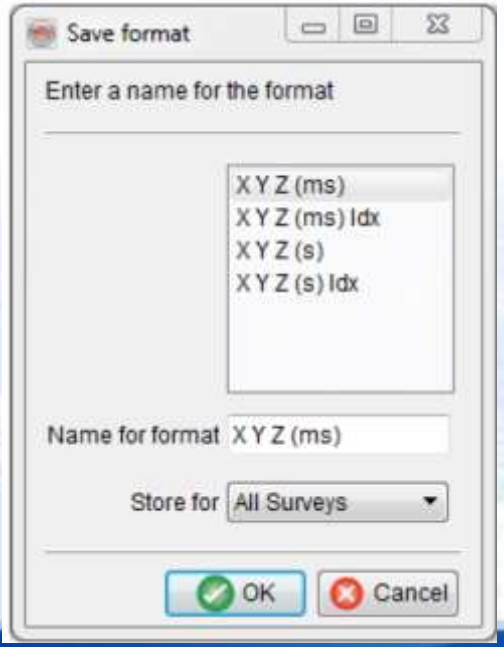
The main work is to specify the presence of a *file header*, and the file *format definition*. The header, if present, can be of fixed length (number of lines), or delimited on its last line by a keyword.

Predefined and saved formats are available by pressing the icon. Otherwise the format must be manually specified. The *Define* button gives access to the format definition window.



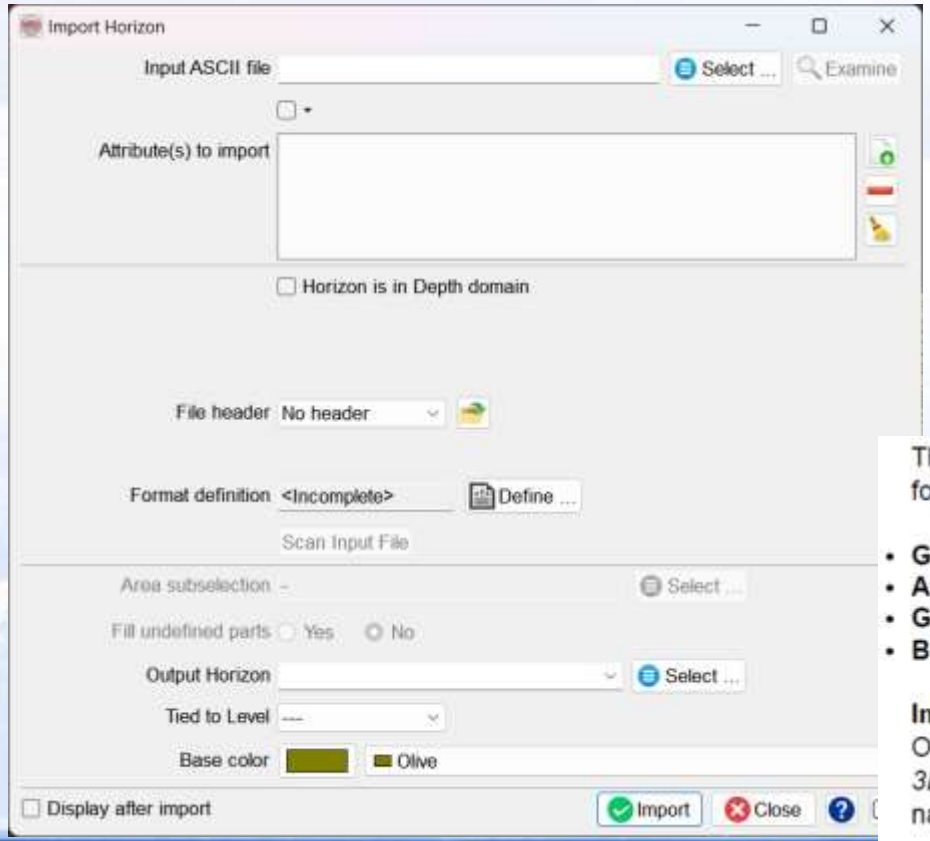
You must specify in the format definition the column numbers for the position, in terms of an X-Y pair, point column, and optionally stick index (0 = no stick index). The Z units can be seconds, milliseconds or microseconds. The name of the 2D line (s) must also be provided. Reading may be stopped at a specific line by providing the adequate keyword. If Coordinate Reference System (CRS) is defined for the survey, CRS conversion will be available in the import window.

It is recommended to save the format definition for a later use and QC, by clicking on the icon . In pop-up window, write the name of the format and store it. The format can be stored at different levels (All surveys, Current survey, Current OpendTect user level) depending on the usage. Press OK after having provided the name of the faultstickset to be imported.



4.3.6 Import Horizons

Horizons interpreted on 3D and 2D seismic data and (attribute) grids can be imported in a OpendTect survey via *Survey* > *Import* > *Horizons*. The grids are called "Surface data" in Opendtect and are attached to 3D horizons. Horizon import supports the following:



与手册介绍有差别，需要进一步考察

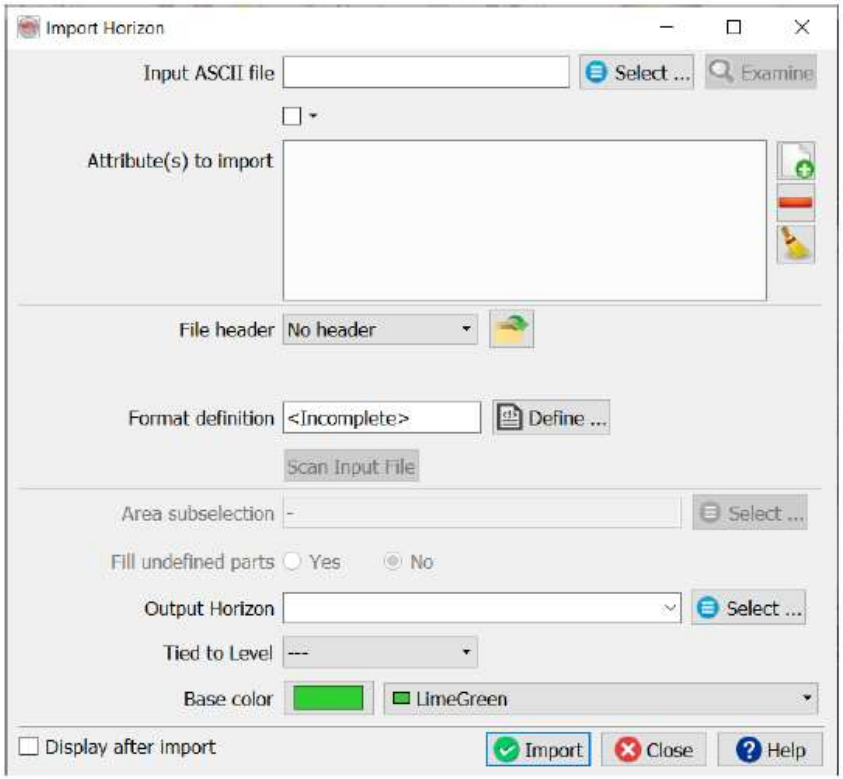
The standard input data is *Ascii* files. Three options are available (explained in the following subsections):

- **Geometry 3D:** Import horizons interpreted on a 3D grid (e.g. XYZ)
- **Attributes 3D:** Import an attribute grid as a surface data, for a given 3D horizon.
- **Geometry 2D:** Import horizons interpreted along 2D lines.
- **Bulk 3D:** Import multiple 3D horizons from a single file

Import Horizon from Geoframe/Petrel: Horizons can also be imported into OpendTect from Geoframe 2D/3D (*Survey* > *Import* > *Horizon* > *GeoFrame* > *2D or 3D*). The following dialog will pop up. Select the GeoFrame project and the survey name that contains the horizon to be imported.

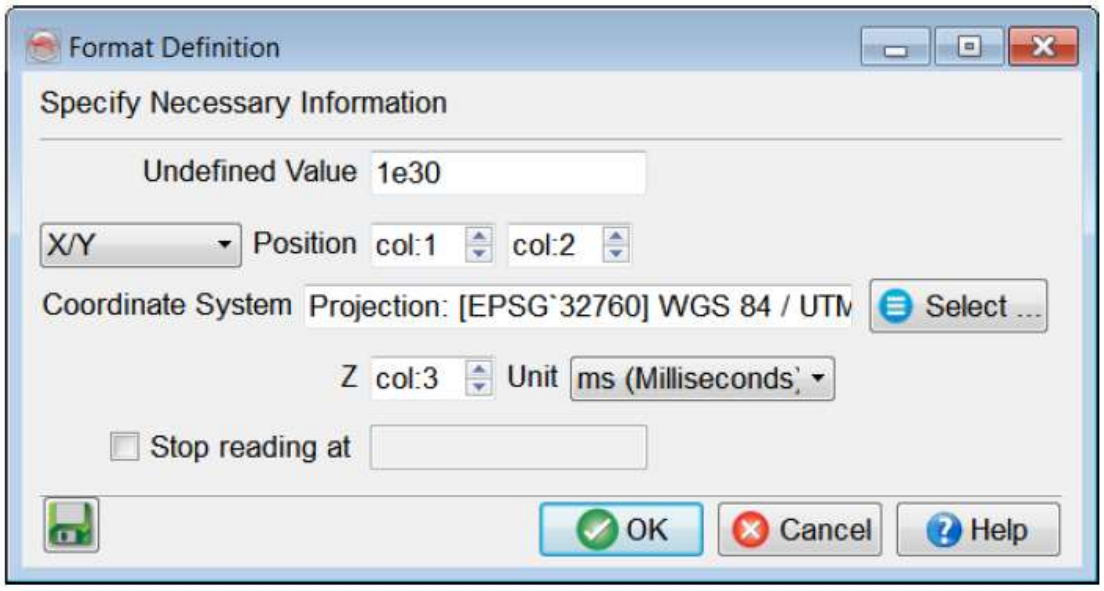
1 Geometry 3D

Select the input ASCII file. You may display the input file by pressing the *Examine* button. Available grids (attributes) present in the input file may also be imported semultaneously. The input file should be column sorted with one point per record (line).



The main work is to specify the presence of a *file header* and the file *format definition*. The header, if present, can be of fixed length (number of lines), or delimited on its last line by a keyword.

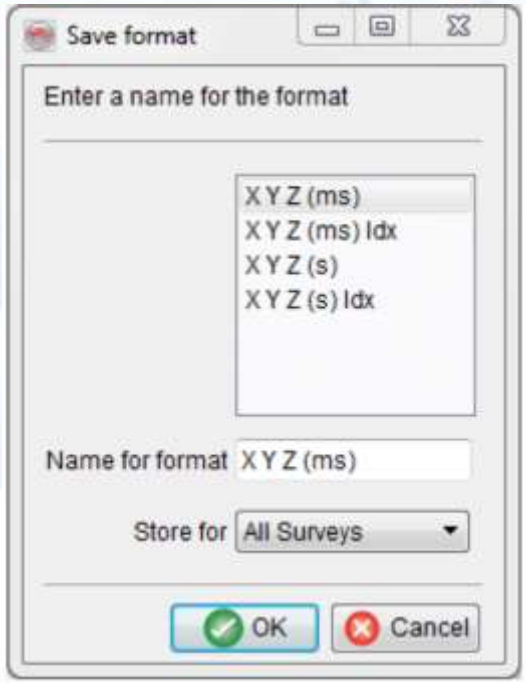
Predefined and saved file formats are available by pressing the  icon. Otherwise the format must be manually specified. The *Define* button gives access to the format definition window.



You must specify in the format definition window the column numbers for the position, in terms of an X-Y pair or an inline-crossline pair, and the point column. Points that should not be read must all have the same numerical value, which is to be filled in as the "Undefined value". The Z units can be seconds, milliseconds or microseconds. Optionally, if attributes were added in the Import Horizon window, additional columns with given attribute(s) name(s) will also appear in this format definition window. Reading may be stopped at a specific line by providing the adequate keyword.

If Coordinate Reference System (CRS) is defined for the survey, CRS conversion will be available in the import window.

It is recommended to save the format definition for a later use and QC, by clicking on the  icon . In pop-up window, write the name of the format and store it. The format can be stored at different levels (All surveys, Current survey, Current OpendTect user level) depending on the usage. Press *Ok* when done.



It is highly recommended to scan the input file after providing its format, and prior to the actual import. The scanned information will pop-up and error(s) or warning(s) may suggest a change of the format definition.

The area sub-selection can be used in two ways:

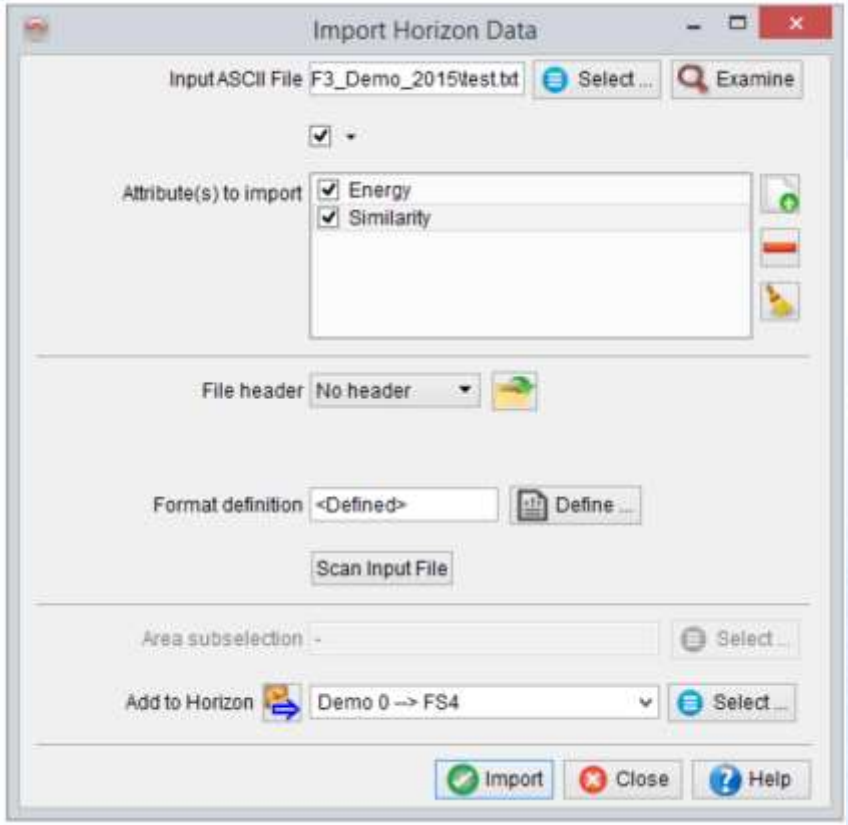
- Reduce the amount of data to be loaded: By reducing the inline/crossline ranges
- Specify a new grid size if a coarse input grid should be gridded during import: By decreasing the inline/crosslines steps to the survey steps (minimum).

The option *Fill undefined parts* will be toggle on if gaps were found during scan. A triangulation to the convex hull with an interpolation where the maximum size is the input grid step (in XY units, thus meters or feet), and *Keep holes larger than* toggled off, should be the optimal settings in most cases.

Tied to level is additional option specifically designed to tie horizons to well markers, for correlation purposes. In order to define the stratigraphic information of the survey, please read about Manage Stratigraphy.

2 Attributes 3D

This window is used to import grids from ascii files and attached them to Existing 3D horizons. *Select* the input Ascii file. You may display the input file by pressing the Examine button. The input file should be column sorted with one point per record (line).

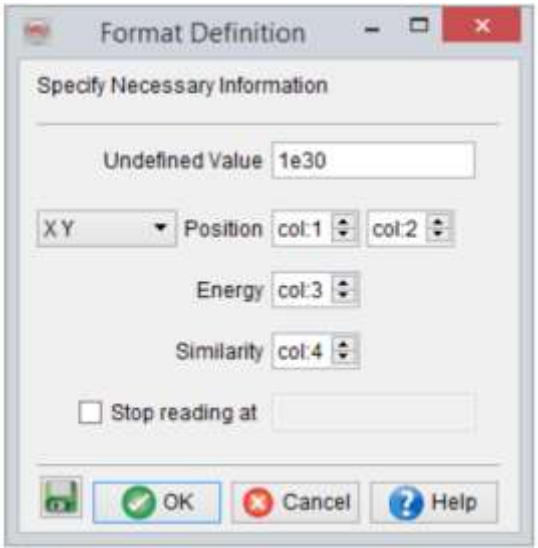


Grid names must first be provided in front of *Select Attribute(s) to import*. This can be done by pressing *Add new* right of it, and providing each time a new grid name.

This will populate the list of importable grids. Only the highlighted grids will be imported, which is why each new grid is highlighted after providing its name.

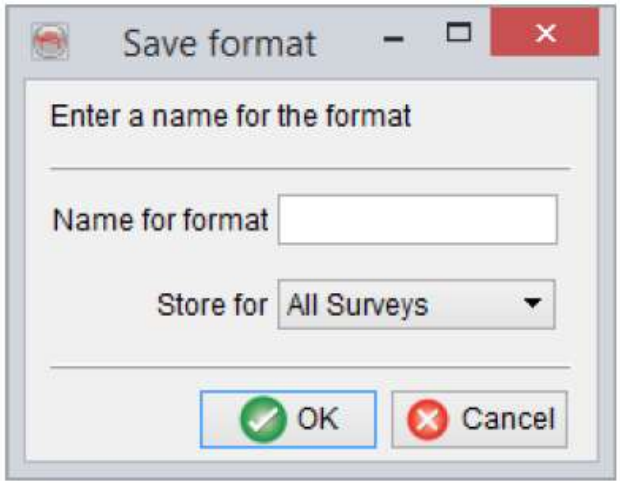
Next, the presence of a file header must be specified and the file format definition must be provided. The header, if present, can be of fixed length (number of lines), or delimited on its last line by a keyword.

Predefined and saved file formats are available by pressing the  icon. Otherwise the format must be manually specified. The Define button gives access to the format definition window.



You must specify in the format definition window the column numbers for the position, in terms of an X-Y pair or an inline-crossline pair, and the grid(s) column(s). Grid values that should not be read must all have the same numerical value, which is to be filled in as the *Undefined value*. Reading may be stopped at a specific line by providing the adequate keyword.

It is recommended to save the format definition for a later use and QC, by clicking on the icon . In pop-up window, write the name of the format and store it. The format can be stored at different levels (All surveys, Current survey, Current OpendTect user level) depending on the usage. Please note that the full grid names will be saved as provided in the format definition. Press OK when done.



It is highly recommended to scan the input file after providing its format, and prior to the actual import. The scanned information will pop-up and error(s) or warning(s) may suggest a change of the format definition. The area subselection is essentially present to optionally reduce the amount of data to be imported, by reducing the inline/crossline range(s).

Finally an horizon must be provided, to attach the grid(s) to it. Grids will be accessible only after having loaded this horizon in the tree. Press *Go* to launch the import.

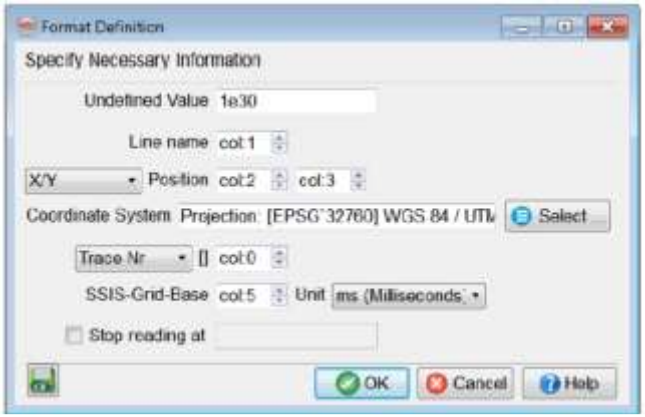
3 Geometry 2D

This window is used to import **2D interpretations** form ascii files. Select the input ascii file. You may display the input file by pressing the *Examine* button. The input file should be column sorted with one point per record (line).

Several 2D horizons can be imported at once. Their name should be provided in front of *Select Horizons to import*. This can be done by pressing *Add new* right of it, and providing each time a new horizon name. This will populate the list of importable horizons. Only the highlighted horizons will be imported, which is why each new horizon is highlighted after providing its name. Ctrl-left click may be used to highlight or deselect an horizon.

Next, the presence of a file header must be specified and the file format definition must be provided. The header, if present, can be of fixed length (number of lines), or delimited on its last line by a keyword.

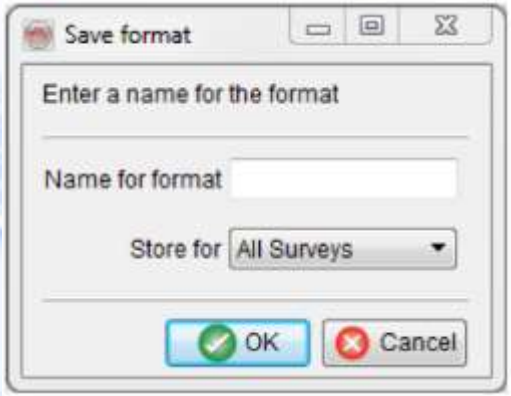
Predefined and saved file formats are available by pressing the icon. Otherwise the format must be manually specified. The Define button gives access to the format definition window.



You must specify in the format definition window the line name, column numbers for the position, in terms of an X-Y pair or a unique trace number, and the horizon(s) column(s). Horizon Z values that should not be read must all have the same numerical value, which is to be filled in as the *Undefined value*. Reading may be stopped at a specific line by providing the adequate keyword.

If Coordinate Reference System (CRS) is defined for the survey, CRS conversion will be available in the import window.

It is recommended to save the format definition for a later use and QC, by clicking the icon . In pop-up window, write the name of the format and store it. The format can be stored at different levels (All surveys, Current survey, Current OpendTect user level) depending on the usage. Press OK when done.



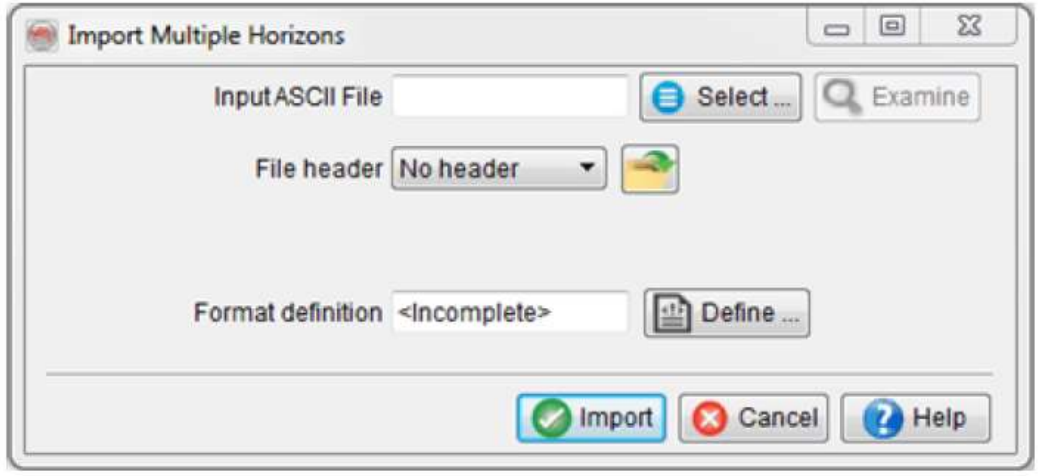
It is highly recommended to scan the input file after providing its format, and prior to the actual import. The scanned information will pop-up and error(s) or warning(s) may suggest a change of the format definition. Press *Go* to launch the import.

4 Bulk 3D

The bulk import tool allows for the import of multiple 3D horizons from one single file. The data is matched by name. This has the following implications:

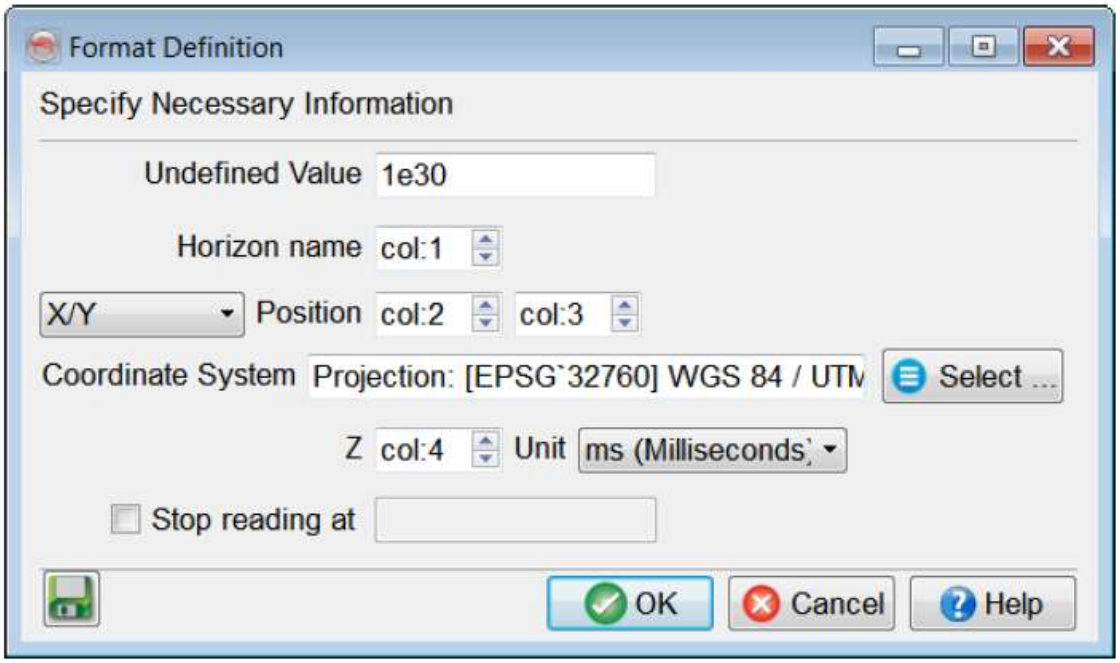
The horizon name must appear on each line of the input file. The horizon name should not contain spaces, otherwise the matching with a given column number will not work as expected.

Apart from being a multiple horizon import tool, it behaves following the rules of the standard horizon import.



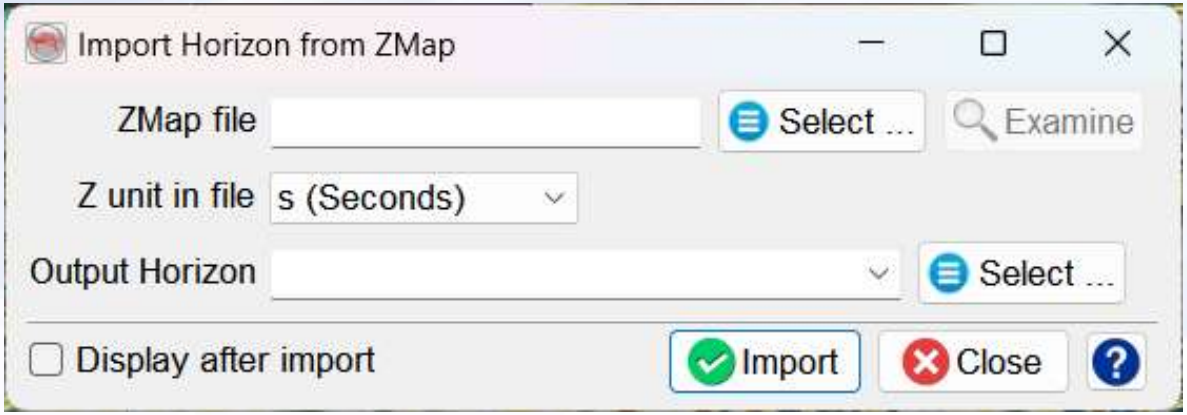
Format definition

You must specify in the format definition window the column numbers for the position, in terms of an X-Y pair or an inline-crossline pair, the point column and the horizon name. If Coordinate Reference System (CRS) is defined for the survey, CRS conversion will be available in the import window.



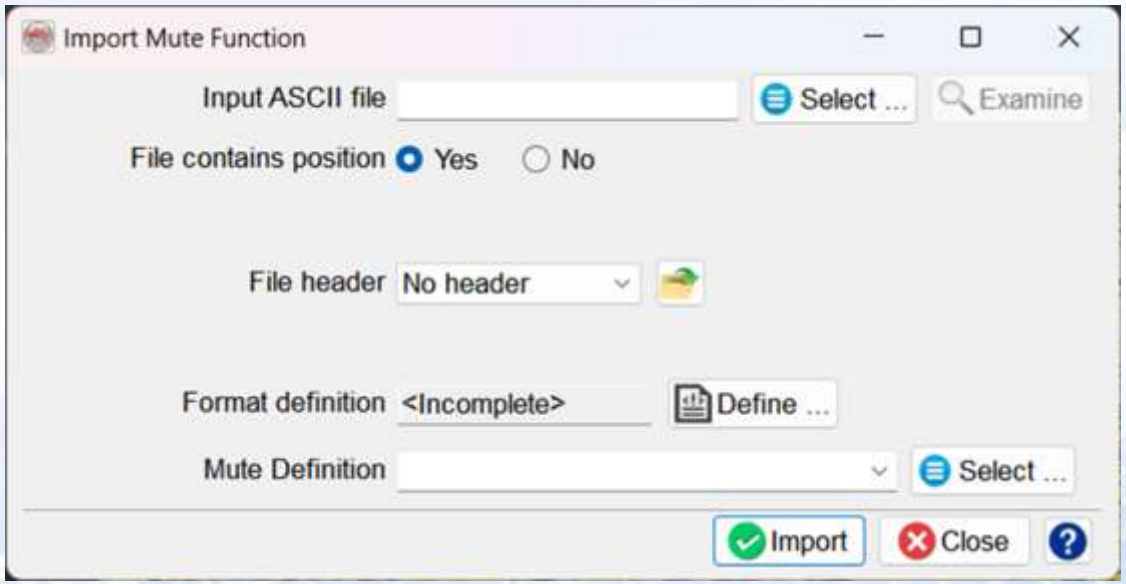
5 From ZMap

这个GNU版本的6.6有这个功能。



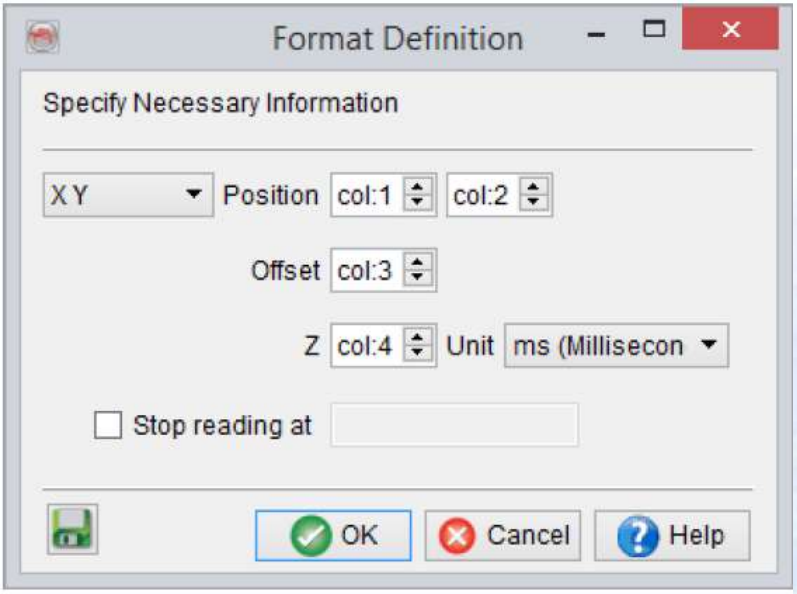
4.3.7 Import Mute Functions

Mute definitions can be imported in OpendTect using Ascii files. The import window is launched from the OpendTect main menu (*Survey* > *Import* > *Mute definitions* > *Ascii*). Select the input Ascii file. You can display the input file by pressing the *Examine* button. The input file should be column sorted with one point per record (line).



The main work is to specify the presence of a *file header* and the file *format definition*. The header, if present, can be of fixed length (number of lines), or delimited on its last line by a keyword. The mute definition can be either variable throughout the survey, in which case a position must be provided in the input file for all data points, or fixed. In this latter case, toggle *File contains position* to *No* and provide any location for the mute definition.

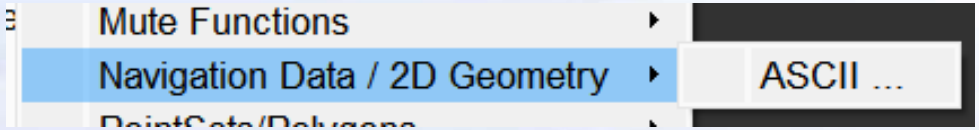
Predefined and saved file formats are available by pressing the  icon. Otherwise the format must be manually specified. The *Define* button gives access to the format definition window.

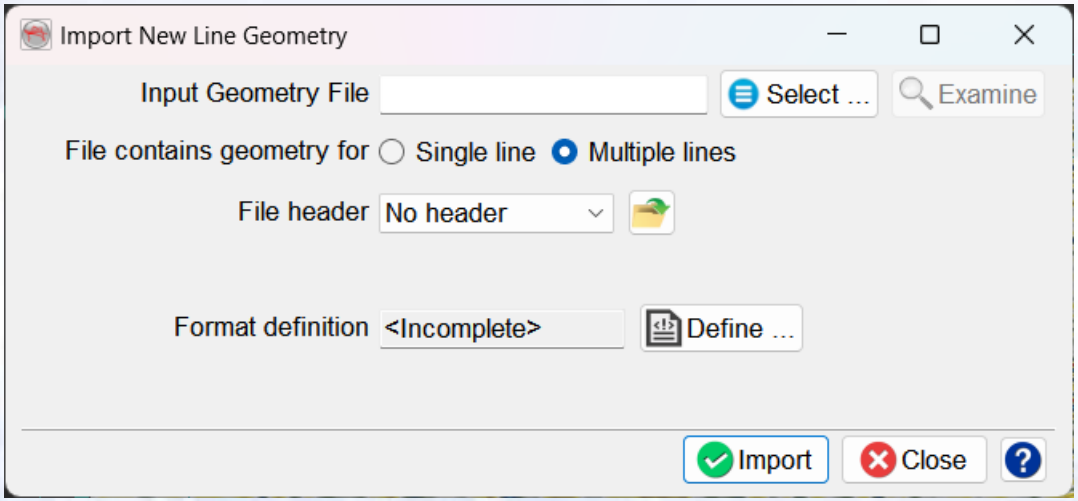


You must specify in the format definition window the column numbers for the position, in terms of an X-Y pair or an inline-crossline pair, and the point column, in terms of an Offset-Z value pair. points that should not be read must all have the same numerical value, which is to be filled in as the "Undefined value". The Z units can be seconds, milliseconds or microseconds (meters of feet in depth surveys). Reading may be stopped at a specific line by providing the adequate keyword.

It is recommended to save the format definition for a later use and QC, by clicking on the  icon . In pop-up window, write the name of the format and store it. The format can be stored at different levels (All surveys, Current survey, Current OpendTect user level) depending on the usage. Press OK when done.

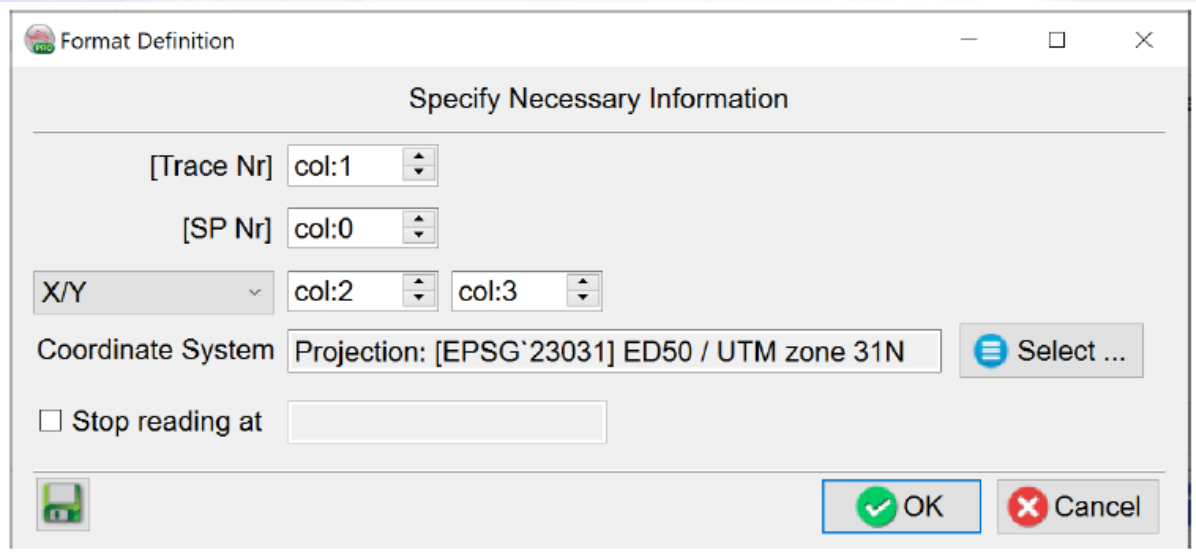
4.3.8 Import Navigation Data / 2D Geometry





The import ASCII file should contain X, Y, trace number and, optionally, shot point number.

During import, *Examine* the file and set the number of header lines, if present, and *Define* the format:

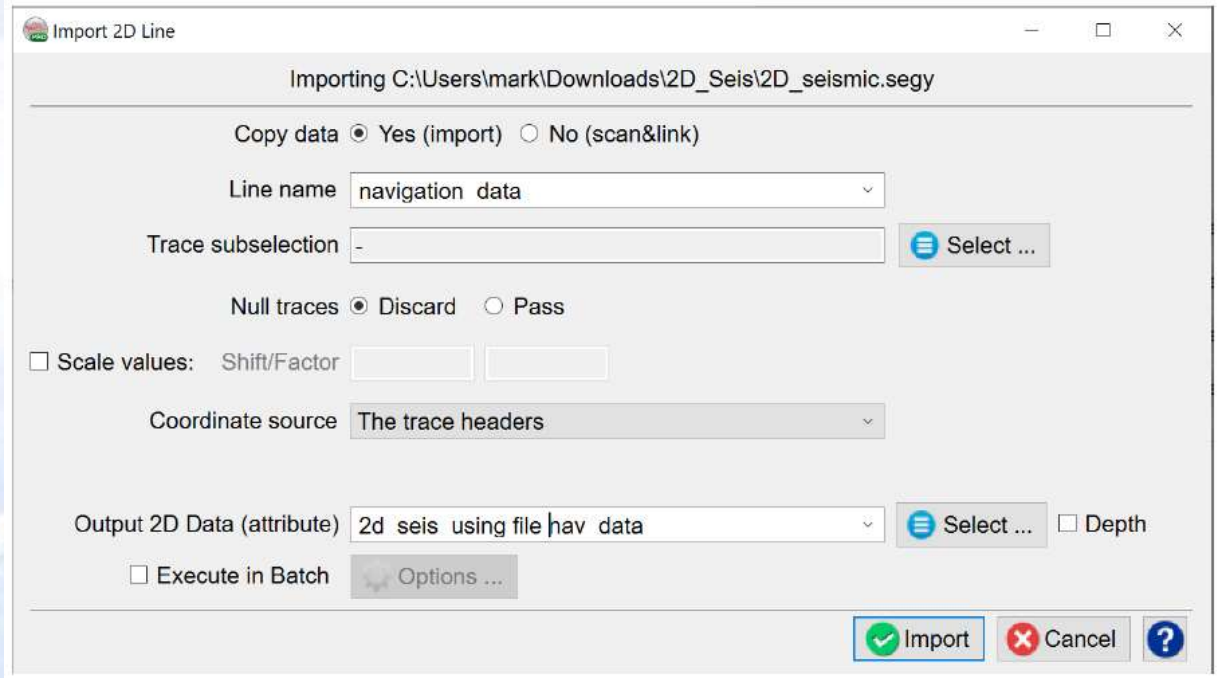


Once completed, click *OK* to import.

The user can then switch to importing the 2D SEG-Y file.

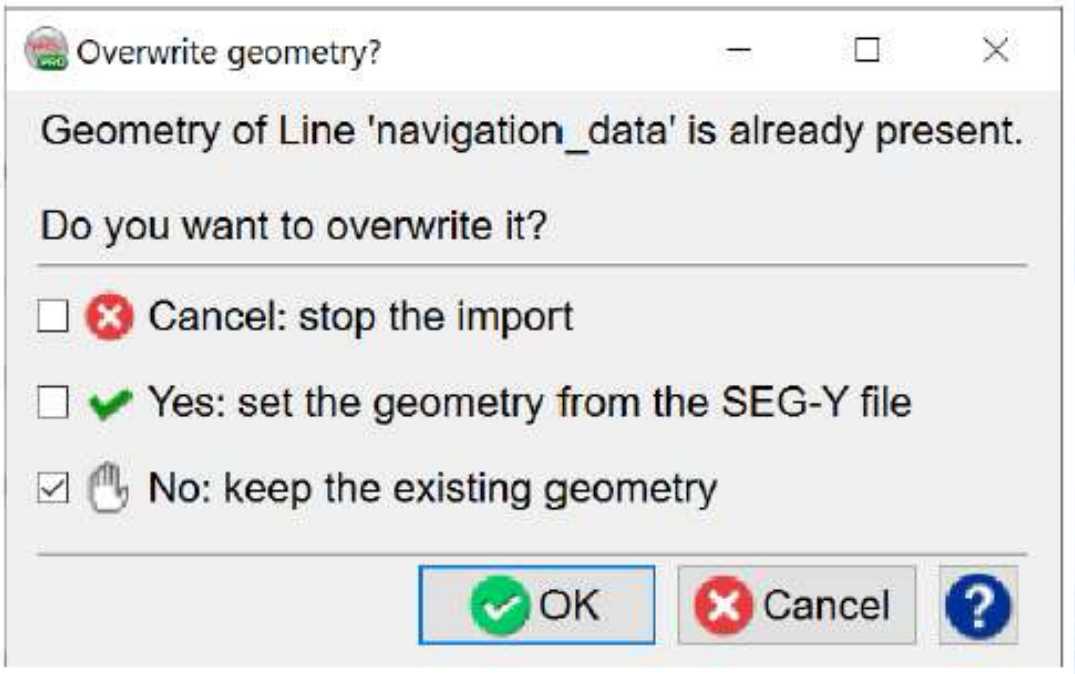
During this import, the traces are matched to the geometry by trace number, so ensure selection of the correct byte number, click *Next*.

On this next screen, use the drop-down for the *Line name* field to select the just-imported navigation data and name the 2D Data before clicking *Import*:

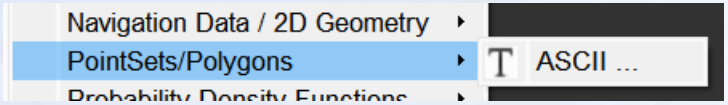


Finally, a choice will be given as to which navigation data to use.

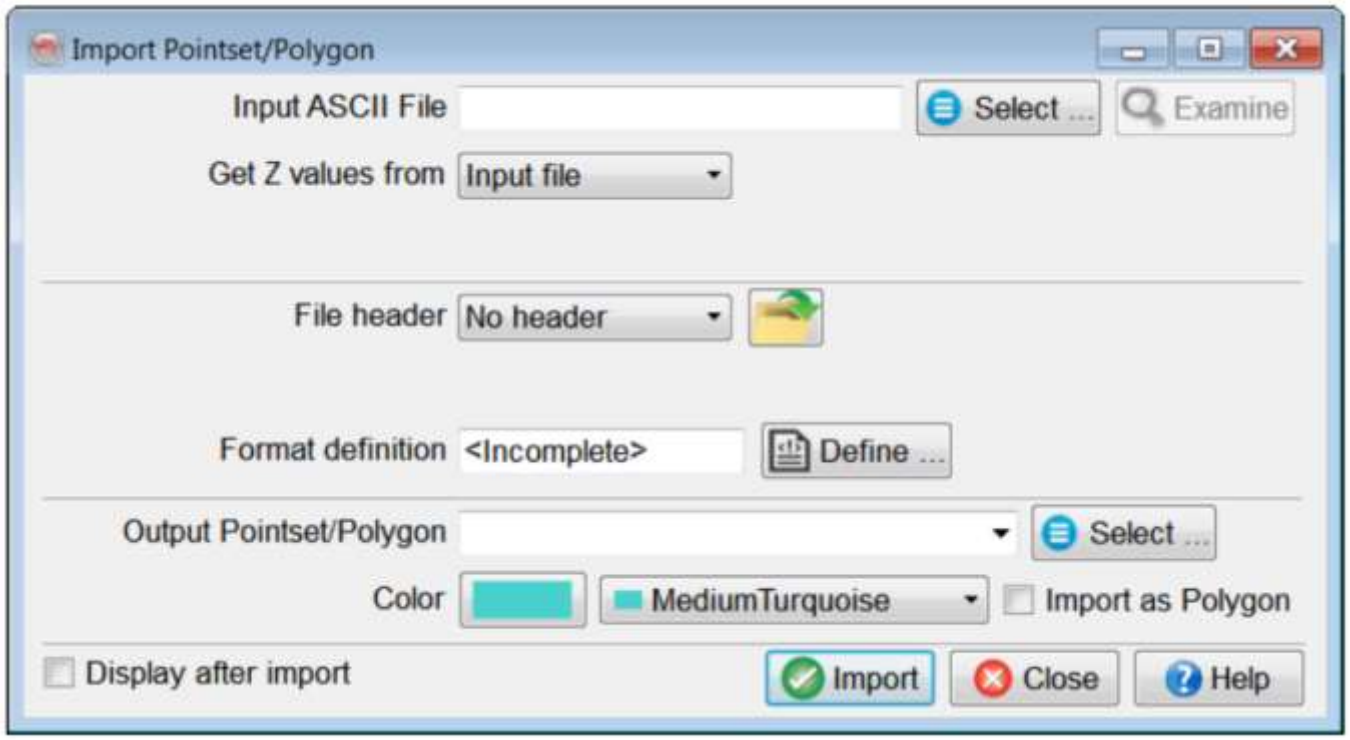
Select *No: keep the existing geometry* and click *OK*:



4.3.9 Import Pointsets & Polygons

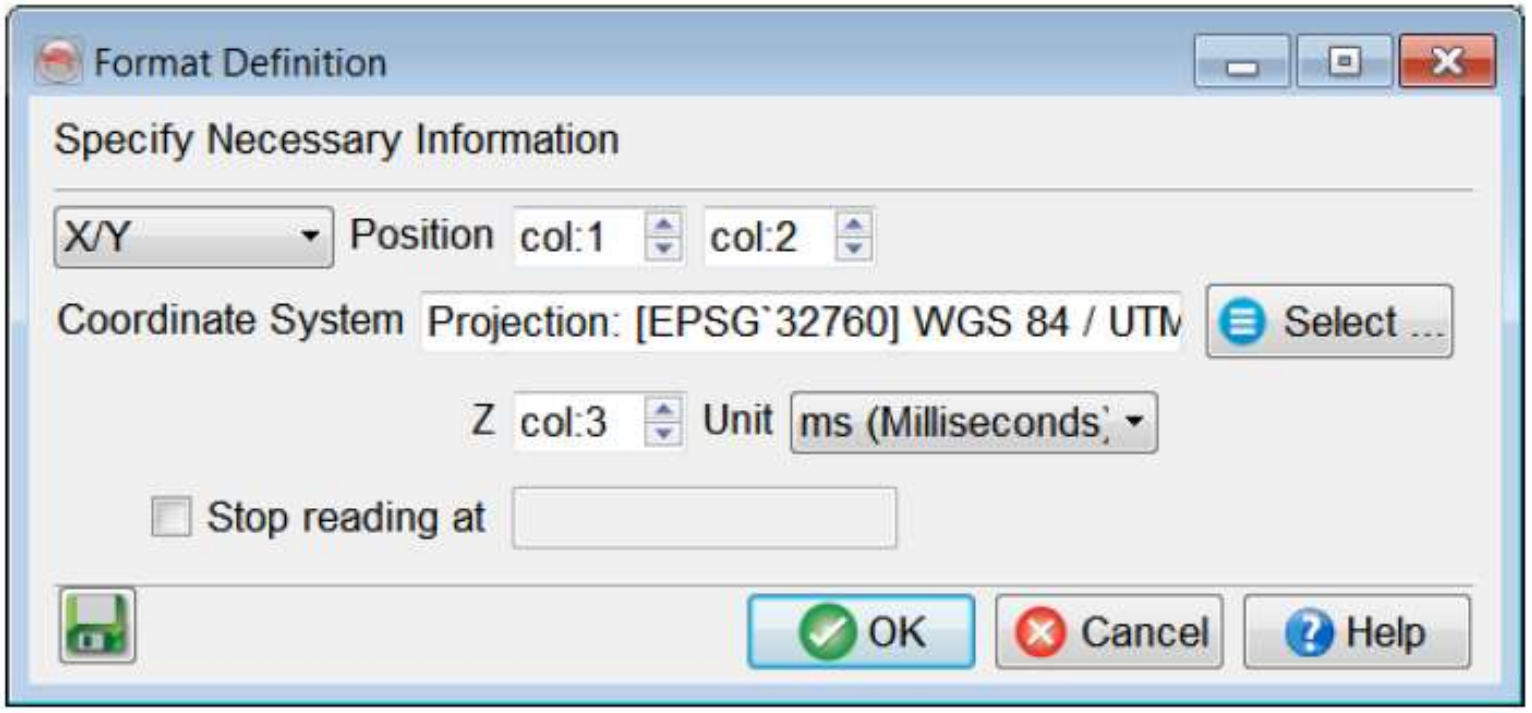


Select the input Ascii file. You can display the input file by pressing the *Examine* button. The input file should be column sorted with one position per record (line).



The main work is to specify the presence of a *file header* and the file *format definition*. The header, if present, can be of fixed length (number of lines), or delimited on its last line by a keyword.

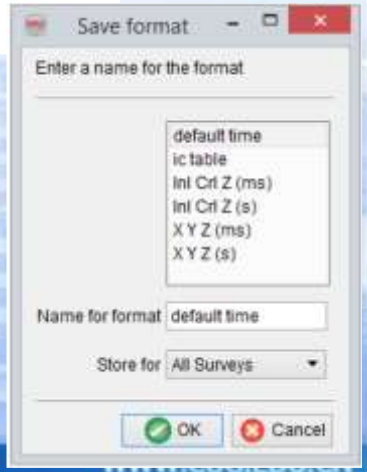
Predefined and saved file formats are available by pressing the  icon. Otherwise the format must be manually specified. The *Define* button gives access to the format definition window.



You must specify in the format definition window the column numbers for the position, in terms of an X/Y pair or an inline-crossline pair, and the point column. points that should not be read must all have the same numerical value, which is to be filled in as the "Undefined value". The Z units can be seconds, milliseconds or microseconds. Reading may be stopped at a specific line by providing the adequate keyword.

If Coordinate Reference System (CRS) is defined for the survey, CRS conversion will be available in the import window.

It is recommended to save the format definition for a later use and QC, by clicking on the  icon . In pop-up window, write the name of the format and store it. The format can be stored at different levels (All surveys, Current survey, Current OpendTect user level) depending on the usage.



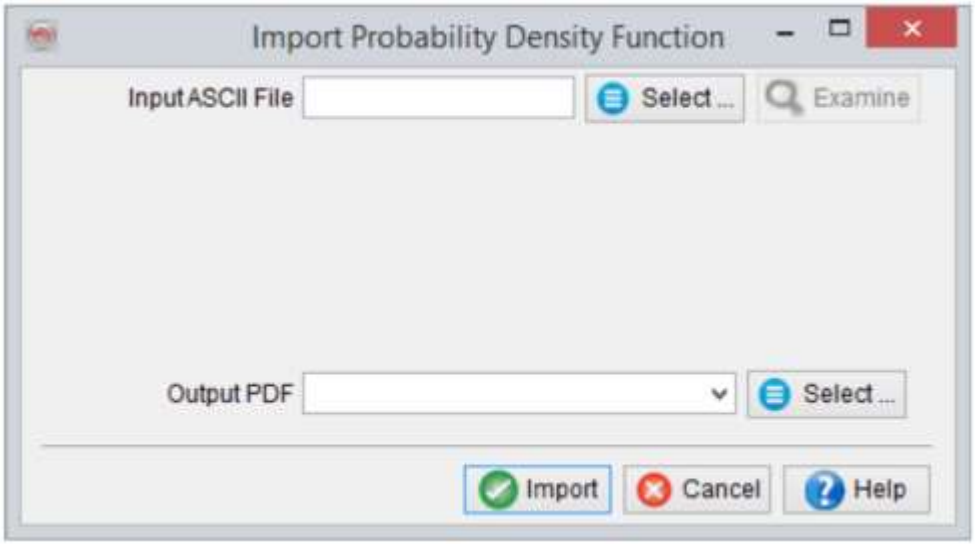
The option *Import as polygon* will flag this specific datatype to the loaded data. It also adds as constraint during loading that the points are ordered in the expected way. The import tool will not apply any sorting.

Press OK when done.

4.3.10 Import Probability Density Functions

Probability density functions can be imported in order to run Bayesian classifications. The manage tool can later be used to edit the PDF before running the Bayesian classification.

RokDoc formatted data is required for importing PDF in OpendTect. After having selected the input file, the two contained variables will be shown in the import window, together with their amplitude ranges and bin size.



The variable names and parameters may be modified before pressing the *Go* button that will launch the import. The icon to the right can be used to quickly extend both variable ranges by one bin size outwards.