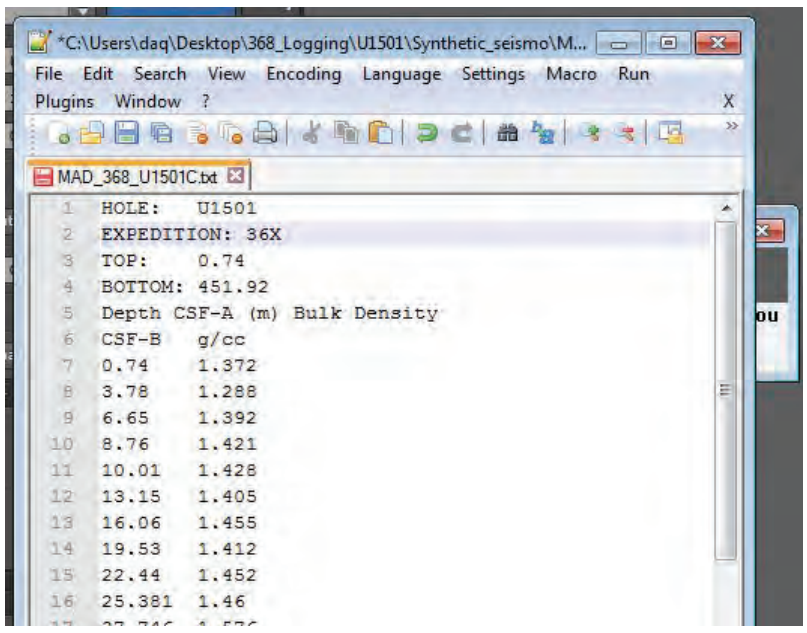
Load Core Data into Petrel (ex. Physical Properties from LIMS or Wireline logging data)

This is a Workflow Guide for loading "log data" data into Petrel (v.2016.) It assumes you have a Project file with a Well (hole) and Well header information (lat/lon, depth, etc.) already loaded. The following steps are a guide to loading data and associating the data with a specific well (or hole) in Petrel.

1

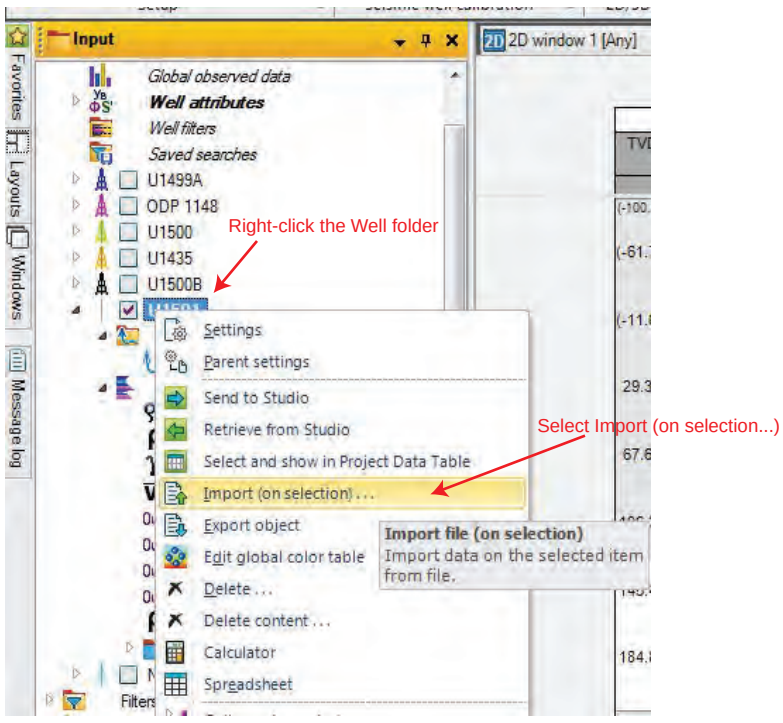
Find your core or log data file(s).
Below is a sample of edited MAD density data downloaded from LIMS. The headers were added, and all the parameters, but two (depth and bulk density), were deleted. It is helpful to convert the data into this format, but it is not required. You can load multiple columns of data and specify the ones you want loaded into the Well project. Quality controlled wireline log data from Columbia are typically prepared in this format.



2

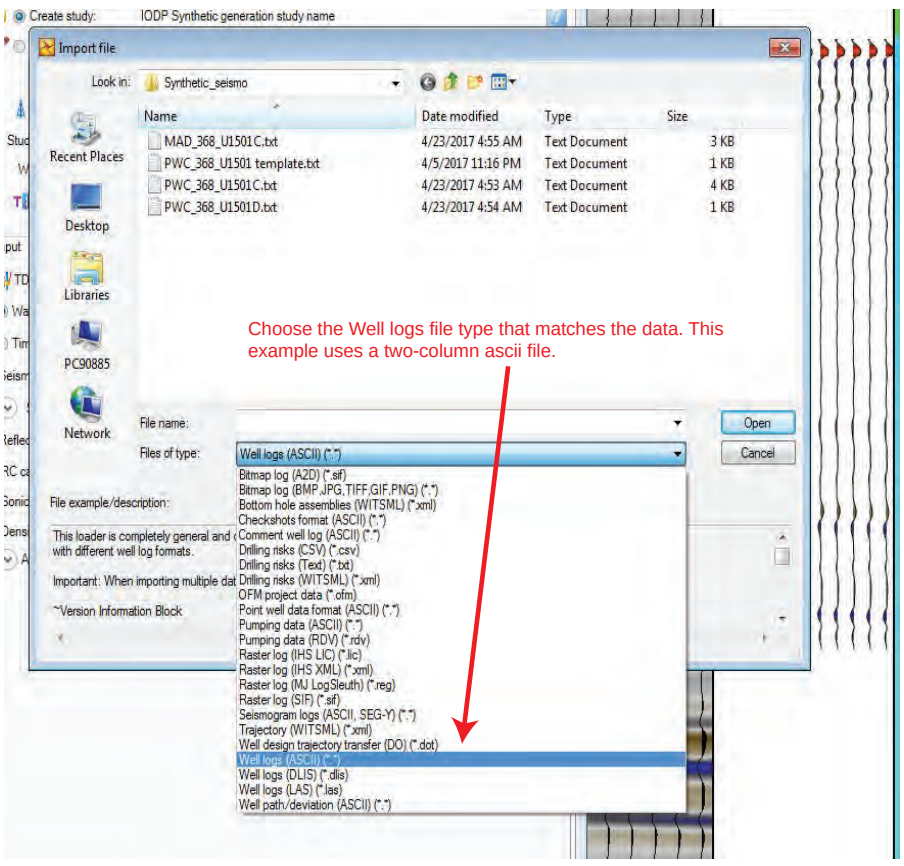
To load the well log data (e.g. physical properties, wireline, etc.)

i. Right-click the Well corresponding to the data you want to load
ii. Select – "Import (on Selection)"



3

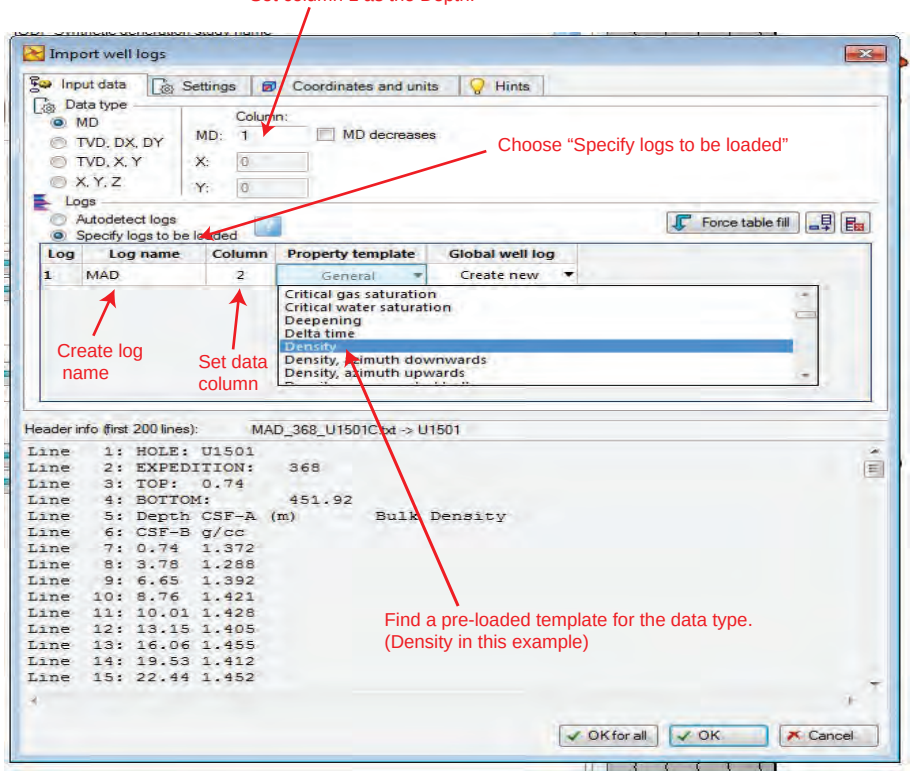
Choose the appropriate file type and choose the file.



4

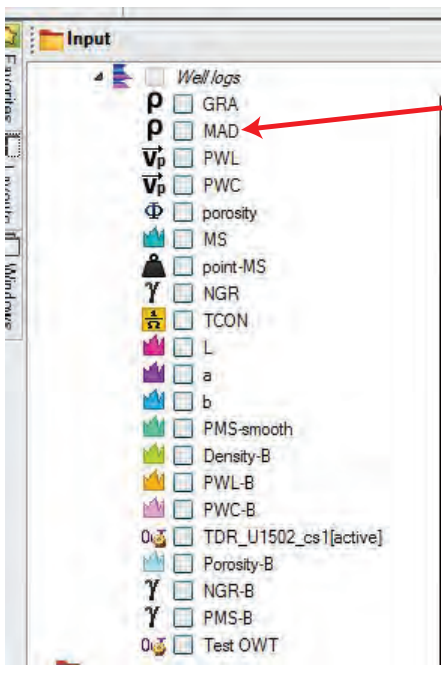
For a 2-column data file (depth, parameter), set the correct measured depth (MD) column. In this case, the depth is the first column.

Choose "Specify logs to be loaded" option. The data in this example are Bulk Density, and they are in column 2. Petrel will recognize common data types and their associated units with a property template. In this case, density was chosen (there is also "bulk density" and others in the list. Create a new or overwrite a previous data log. Click "OK" to load the data.



5

Find the well log in the input pane in the sublistings of the Well/Hole.
You can plot it in most 2D/3D windows and use it for other operations/workflows (e.g. creating a synthetic seismogram.) In general, you can plot the well log data by clicking the empty box. A check-mark will appear to show that is is visible. If the well log data object is greyed out, then you cannot plot it on the current window.

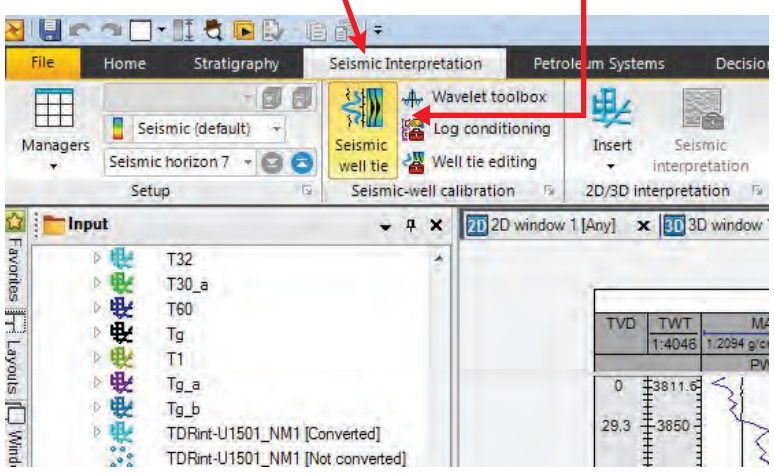


Create a Synthetic Seismogram in Petrel

This is a Workflow Guide for creating Synthetic Seismograms in Petrel (v.2016.) It assumes you have a Project file with a Well, Well header information and seismic data already loaded. Density and velocity data, from cores or logging data, can be used to calculate a seismogram. These are data inputs used in this example workflow.

1

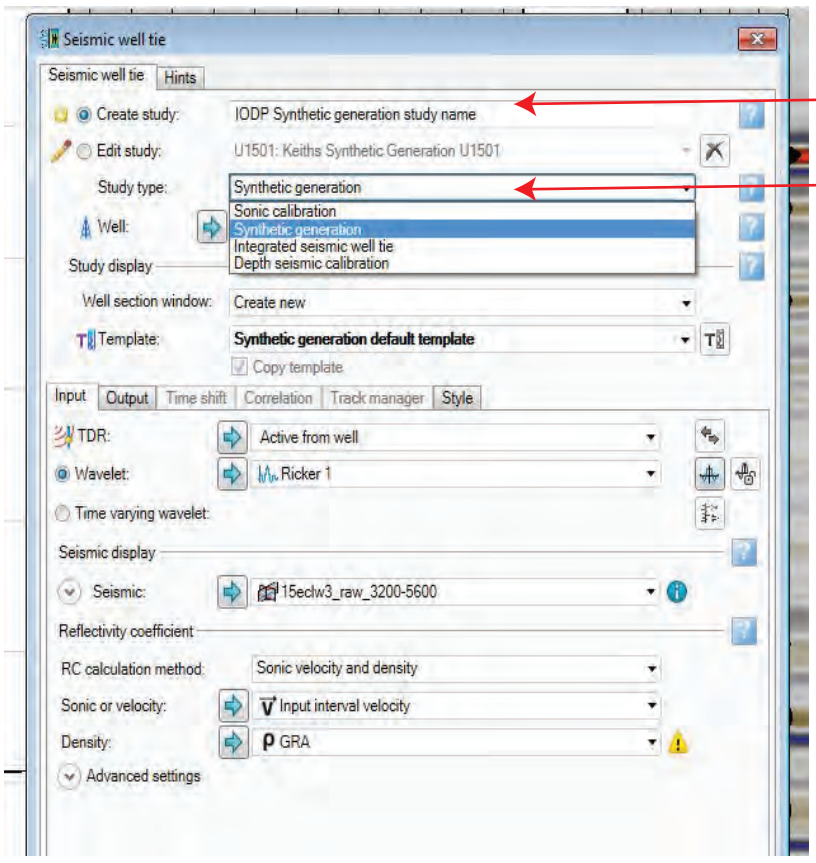
Click the Seismic Interpretation tab and find the Seismic well tie icon.



2

Click the Seismic well tie icon to open the Petrel workflow/toolbox.

a. To create a Synthetic seismogram, create a new study and enter a name in the top entry field.
b. Choose “Synthetic generation” in the study type list.



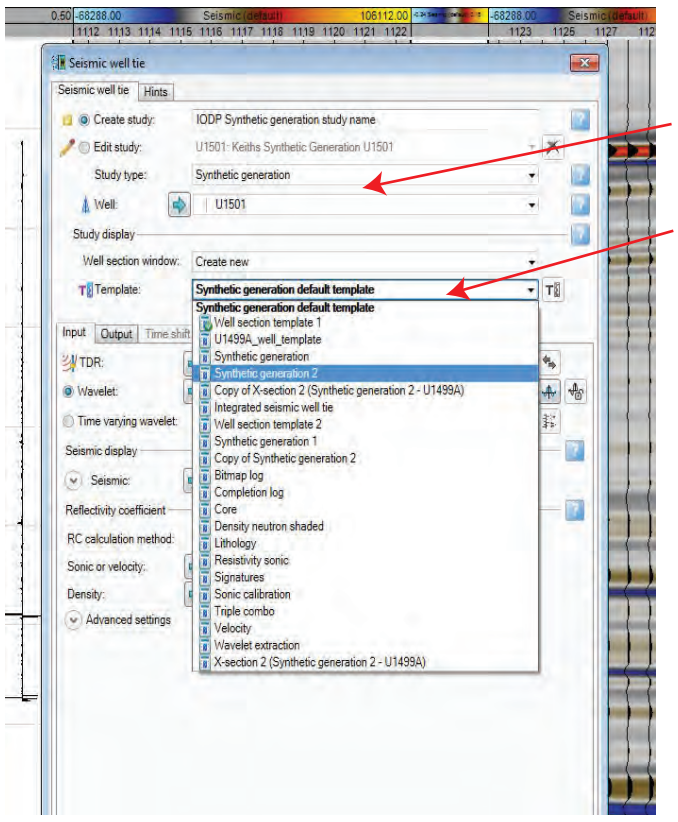
Create a study. Name it.

Choose “Synthetic generation”

3

Set the correct well and choose or create a display window/template.

The well tie workflow will create a window for plotting the results – a “Well section window.” You can create your own template to display various data (inputs, output or both.) There are also templates available.



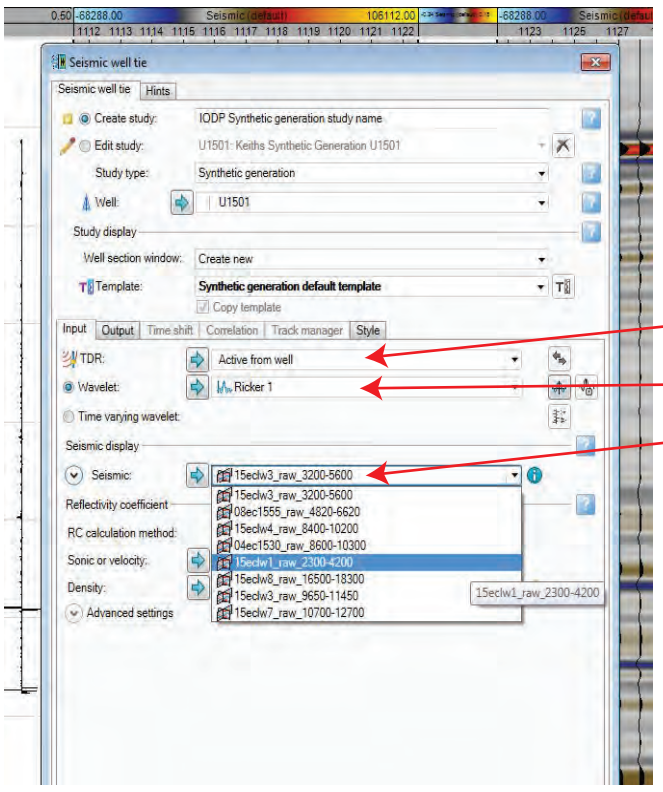
Set the correct Well.

Choose a display template (or create a new template.)

4

Set the Input and Output parameters

Finally, choose the input and outputs for the model creation. Petrel has standard inputs available. If you are unsure what to use for inputs, try things or consult a professional. You will need to choose a time-depth relation (TDR) and a wavelet filter (see professionals.)



Input parameters:

- Time-depth relation (TDR)

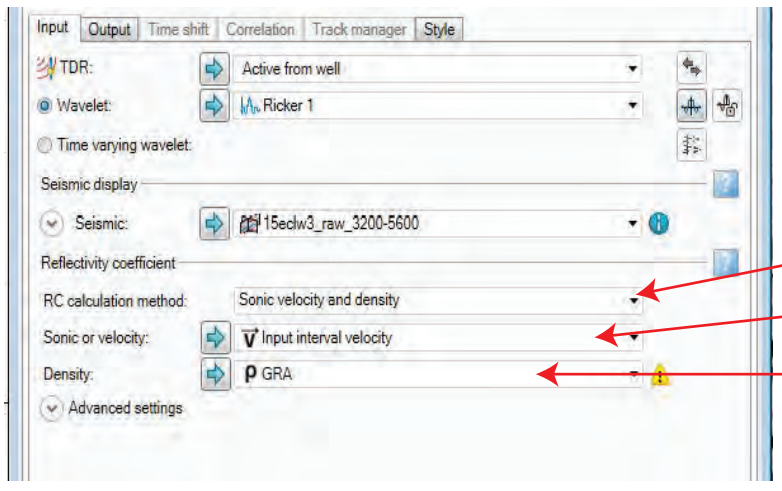
- Wavelet (previously “Ricker”)

- Set the seismic data to display for comparison to synthetic.

5

Set the Input and Output parameters (continued)

Choose a RC calculation method and insert the appropriate data (core or wireline.) Previous Expeditions have used density and velocity from core (Physical properties) as inputs. A starting point is MAD bulk density and P-Wave (Caliper.) You may also try a reasonable constant velocity assumption. Techs. should consult a professional. The professionals may want to QC the data before using it in this model calculation.



Select RC calculation method: Past Expeditions have used Velocity and Density.

Ex. Use core PWC or a reasonable constant velocity.

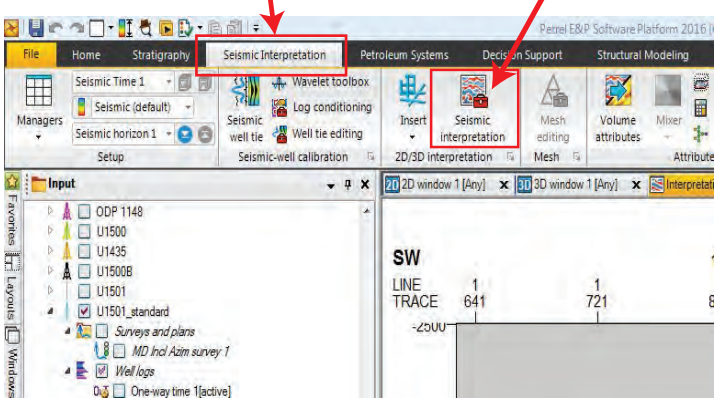
Ex. Use core bulk density (MAD), core GRA or logging GRA.

Trace and Interpret Seismic Horizons in Petrel

This is a Workflow Guide for creating Seismic Horizons in Petrel (v.2016.) It assumes you have a Project file with a Well, Well header information and seismic data already loaded. The Seismic Interpretation tools in Petrel help to trace/draw a horizon of interest. The created horizon can be exported as a table of "X, Y" values corresponding to the TWT (or depth) and LAT/LON (or UTM distances.)

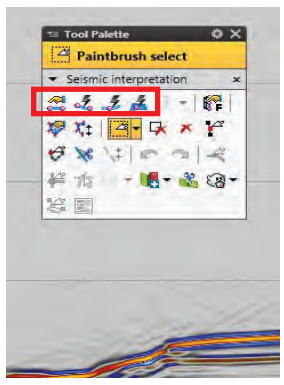
1

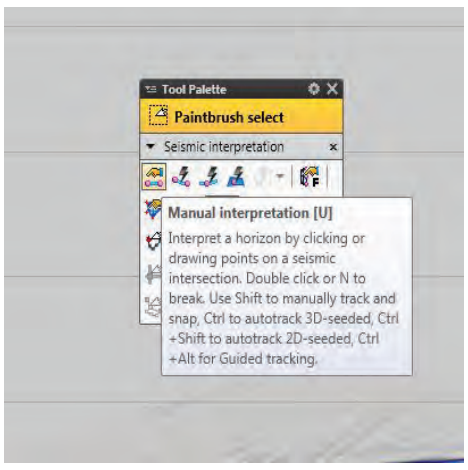
While viewing your seismic data (e.g. in an interpretation window), find the Seismic Interpretation tab and click the Seismic Interpretation toolbox icon.



2

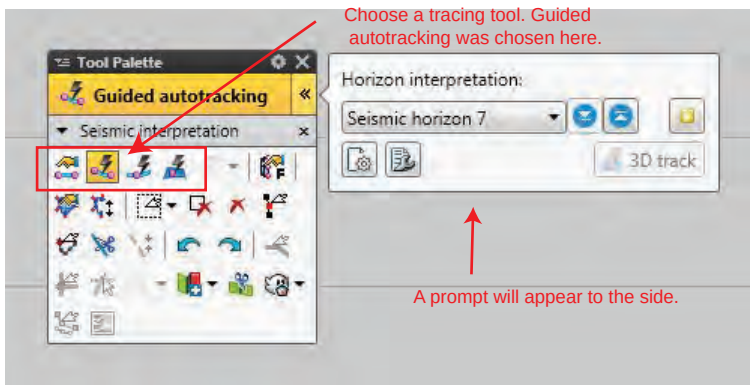
The Seismic interpretation tool palette will display. The first 4 icons on the top can be used to draw or trace a specific horizon. Hover the mouse over the icons for a description of each type of trace you can perform. There are manual and guided types of tracing.

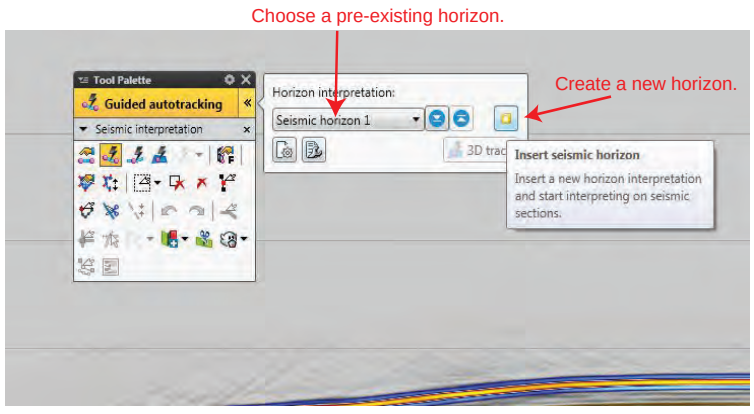




3

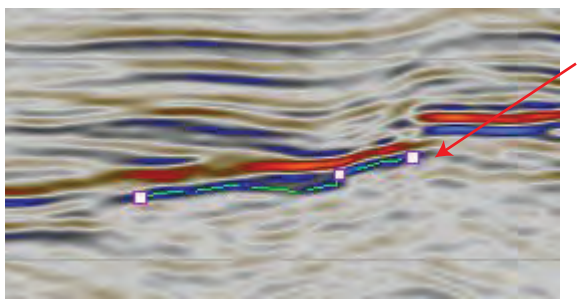
Click one of the tracing tools (e.g. the "Guided autotracking" tool.) This will prompt you to choose a pre-existing horizon (if any) or create and name a new horizon. You can also create a new horizon at the input tab.



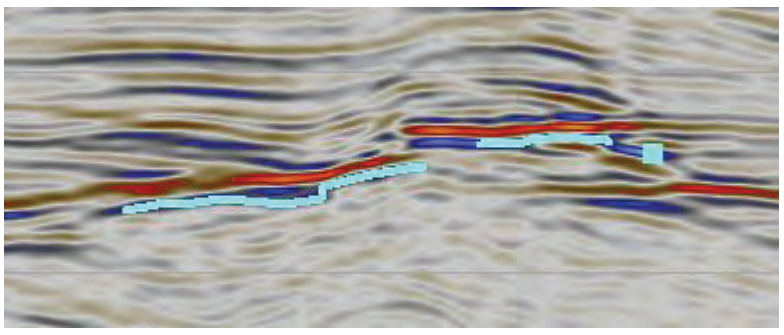


4

After choosing a tracing tool and the horizon name, trace the horizon by clicking on it (e.g. left to right.) The spacing between clicks is interpretive. You can undo clicks. The figure below, shows three clicks and Petrels auto trace of the thick blue line below the thick red line. When you finished tracing double-click on the final piece. The new horizon will become available in the project (typically in an "Interpretation Folder".)



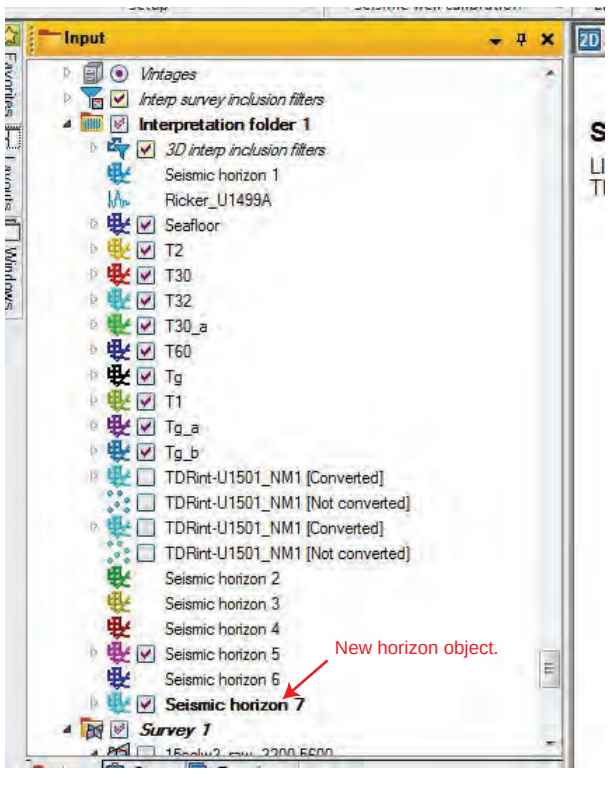
Three points chosen (left to right) along a thick blue horizon. The dashed line between the points is Petrel's draft auto-trace.



To finish tracing, double-click along the tracing path you created. This will create a thick highlighted line to show the Petrel guided track. Try the different tracing tools if you need a better fit or trace.

5

Finally, once you created a trace and double-clicked, you should see the horizon in the input tab with the wells and other data. Horizons are usually created and placed in an Interpretation folder. You can right-click and export the horizon as an ascii file.



Plot Core or Wireline data on a Seismic Image

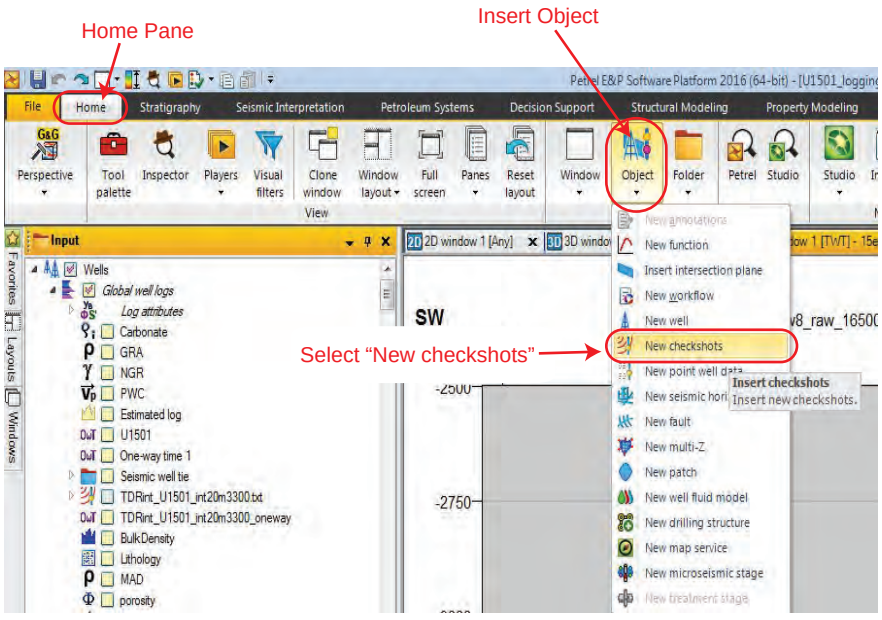
This is a Workflow Guide for plotting core or wireline logging data onto a Seismic Image (e.g. TWT axis) in Petrel (v.2016.) It assumes you have a Project file with a Well, Well header information and seismic data already loaded. For help loading core data, use the Workflow Guide "Loading Core Data into Petrel." Finally, this assumes you have a time-depth relation (TDR) for the associated Site/Hole (i.e. a model or check-shots), and it is not loaded in Petrel.

Background: Core data are referenced to depth. Seismic data are not automatically referenced to depth, but usually two-way travel time (TWT.) The depth data need to be referenced or related to TWT (or vice-versa) in order to plot them on the same axis. The first step in this process is to associated a (pre-existing) time-depth relationship (TDR) with your Site/Hole.

1

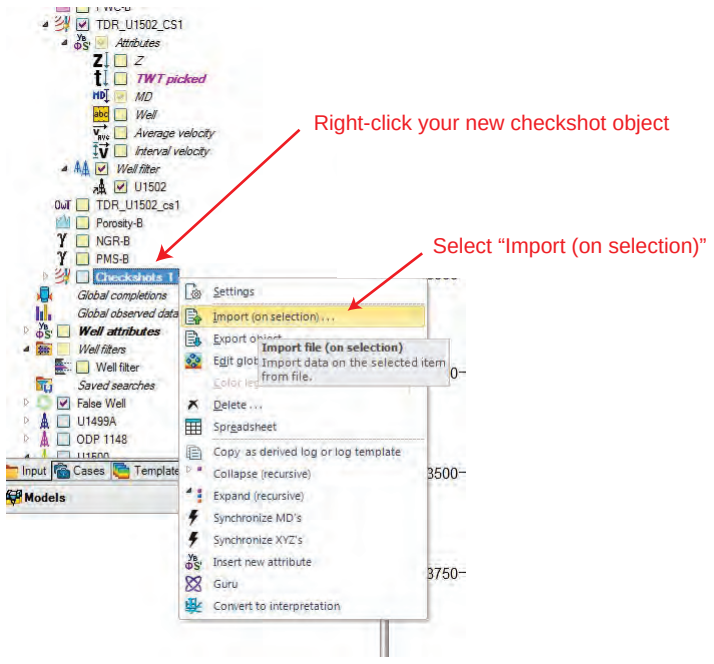
Load check-shot data or a time-depth relationship model from a data file.

- Click Object under the Home pane.
- Select New checkshots



2

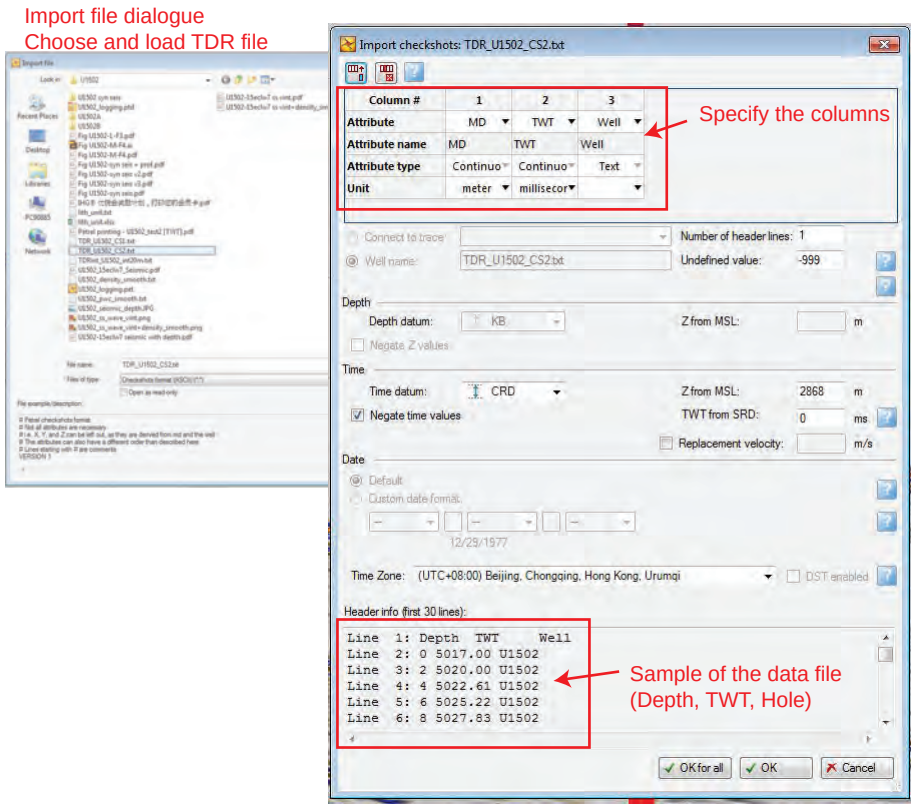
After selecting "New checkshots", find your checkshots object in the Input Pane under Global Wells. Right-click on the Checkshots icon and select "Import (on selection)...". This will prompt you to load your TDR.



3

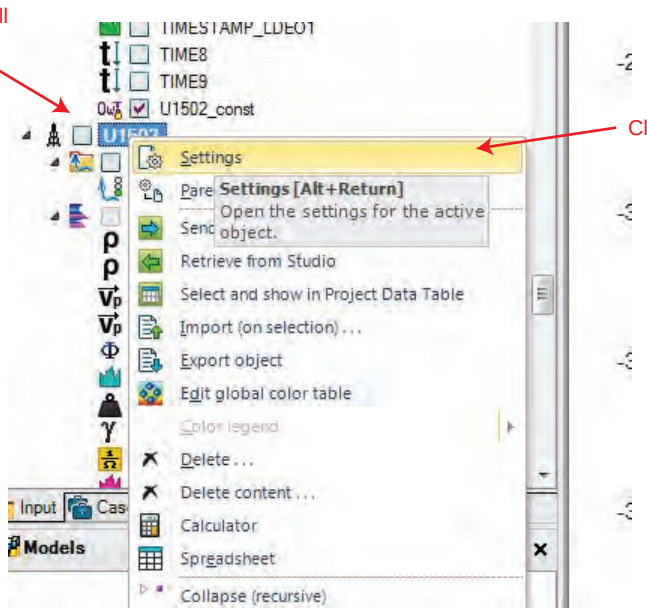
After selecting Import (on selection), import the TDR from a file. Format the file with three columns: Depth, TWT and Well. The Well is the name of the Site or Hole. The Well in the file should match the Well name in your project folder.

Import file dialogue
Choose and load TDR file



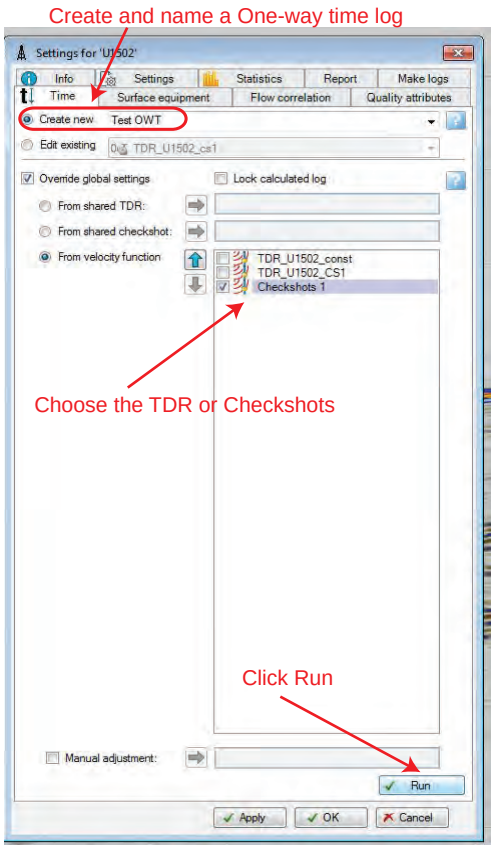
4

Right-click the Hole/Site of interest and click Settings. This will show a box with different tabs. Select the "Time" tab.



5

The "Time" tab will allow you to associate a TDR with a Hole. First, create a one-way time (OWT) object by selecting "Create new." Then choose your Checkshots/TDR that was loaded in the previous steps (under the "From velocity function" option.) Then click "Run."



6

Now ensure that the OWT object is associated with the Well/Hole. You can check under the Well object by finding your OWT. It will say "Active" next to the name of the object if it is set. After the OWT/TDR is set for the well, any data you load (i.e. via import on selection) in the well will have the TDR associated with it. If you have the seismic data plotted in an Interpretation window, then select any log data (e.g. GRA, MAD) and it should plot on the TWT axis.