

Tech Limit Toolbox

Release Notes 2023.4

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for further information

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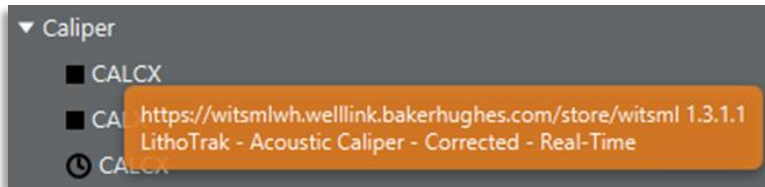
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Data IO

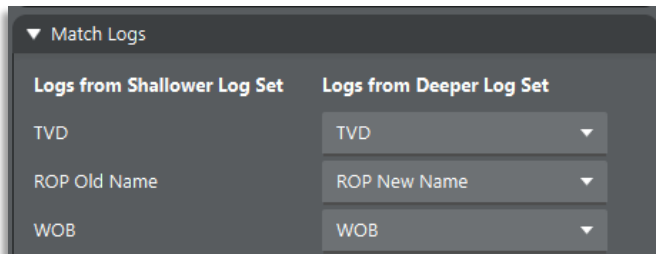
LAS files are now written with a STEP of 0 in the case where the depths are not regularly sampled, as per the LAS 2.0 specification.

```
-----  
~Version -----  
VERS. 2.0 : CWLS log ASCII Standard -VERSION 2.0  
WRAP. NO : One line per depth step  
DLM . SPACE : Column Data Section Delimiter  
-----  
~Well -----  
STRT.m 1990.97254 : START DEPTH  
STOP.m 2390.179 : STOP DEPTH  
STEP.m 0 : STEP  
NULL. -9999.25 : NULL VALUE  
COMP. Tech Limit Toolbox : COMPANY
```

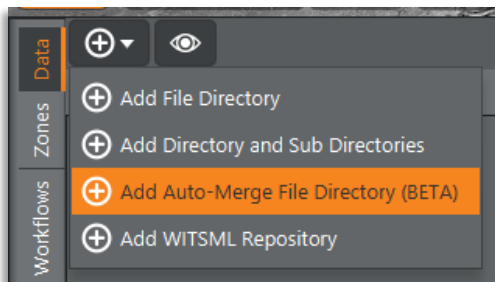
The software reads log/curve descriptions from WITSML and LAS files and displays the information in the mouse hover text on the data tree and in the Log Editor.



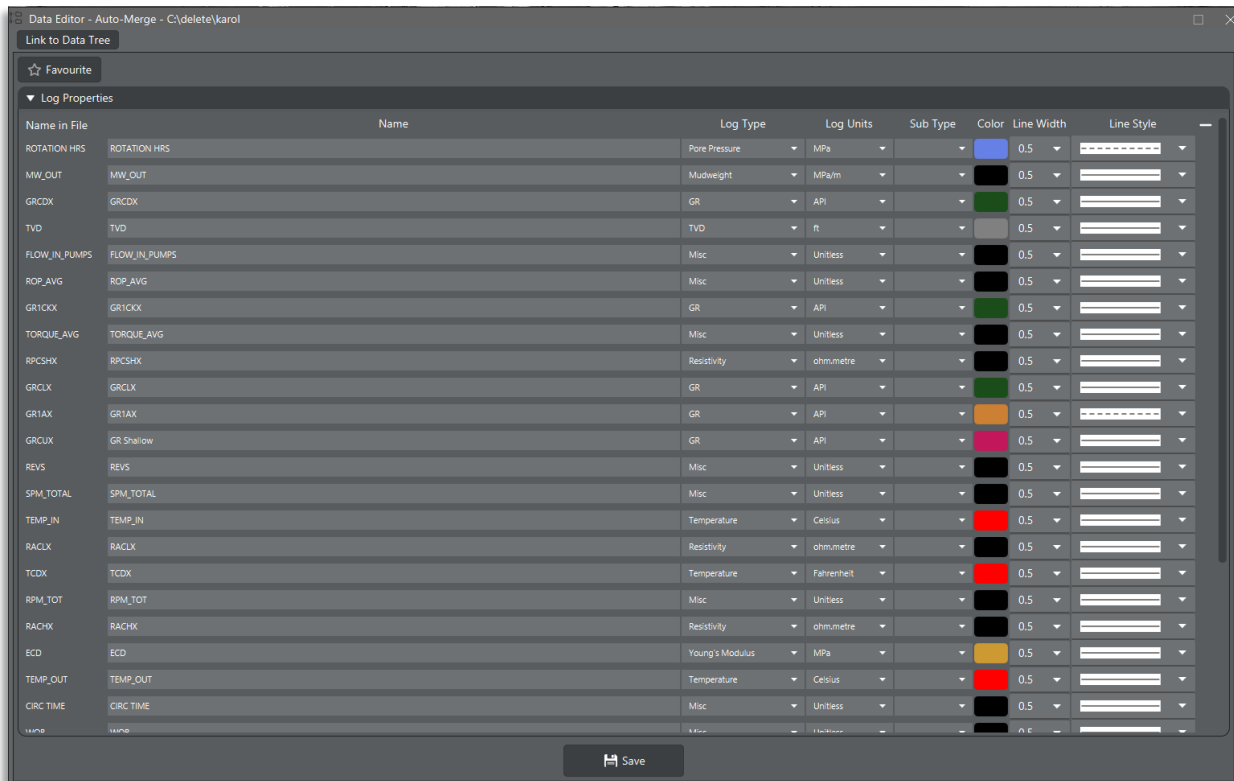
The **Append New Log Data** tool now uses the log name in the data file in addition to log's display name to match logs, which removes the need for manual selection.



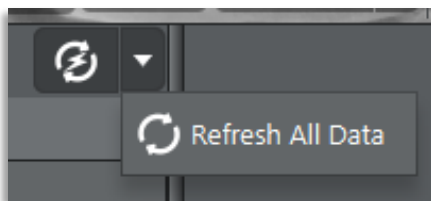
There is now a new option to add an **Auto-Merge File Directory** to the study, which will automatically merge all files in the folder. This option is used primarily for real-time monitoring projects where log data is split across multiple files.



There is a data editor for Auto-Merge repositories to set the properties of the merged logs.

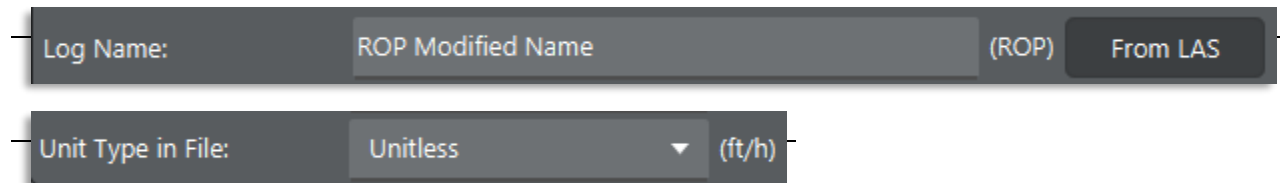


When there is a WITSML repository in a study there is now a new **Quick Refresh Data** button above the Data tree in addition to the **Refresh All Data** button. The quick refresh will load in the latest log data from WITSML but will not refresh wells or reload previously loaded data. The new option is the default. For file-based repositories there is no difference between the two refresh options.



Data Editors

The **Log Editor** now displays the log name from the original file in brackets where the name has been changed in the software. It also shows the units string from the original file (or WITSML server) where appropriate so it can be referenced when specifying file units.



The **File Editor** now has an option to show additional columns in the Log Properties table to set the display properties of all logs in the file.

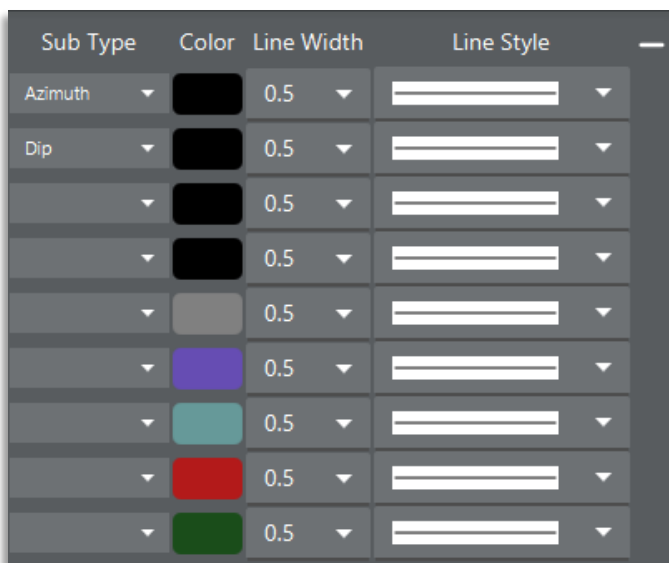
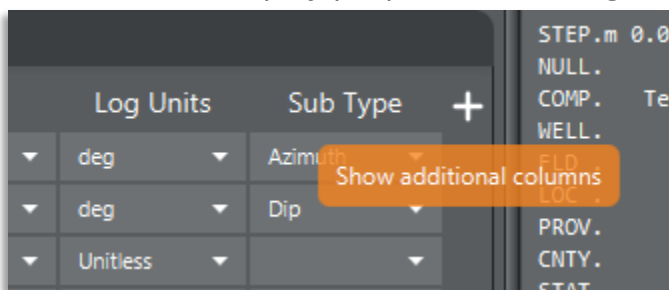
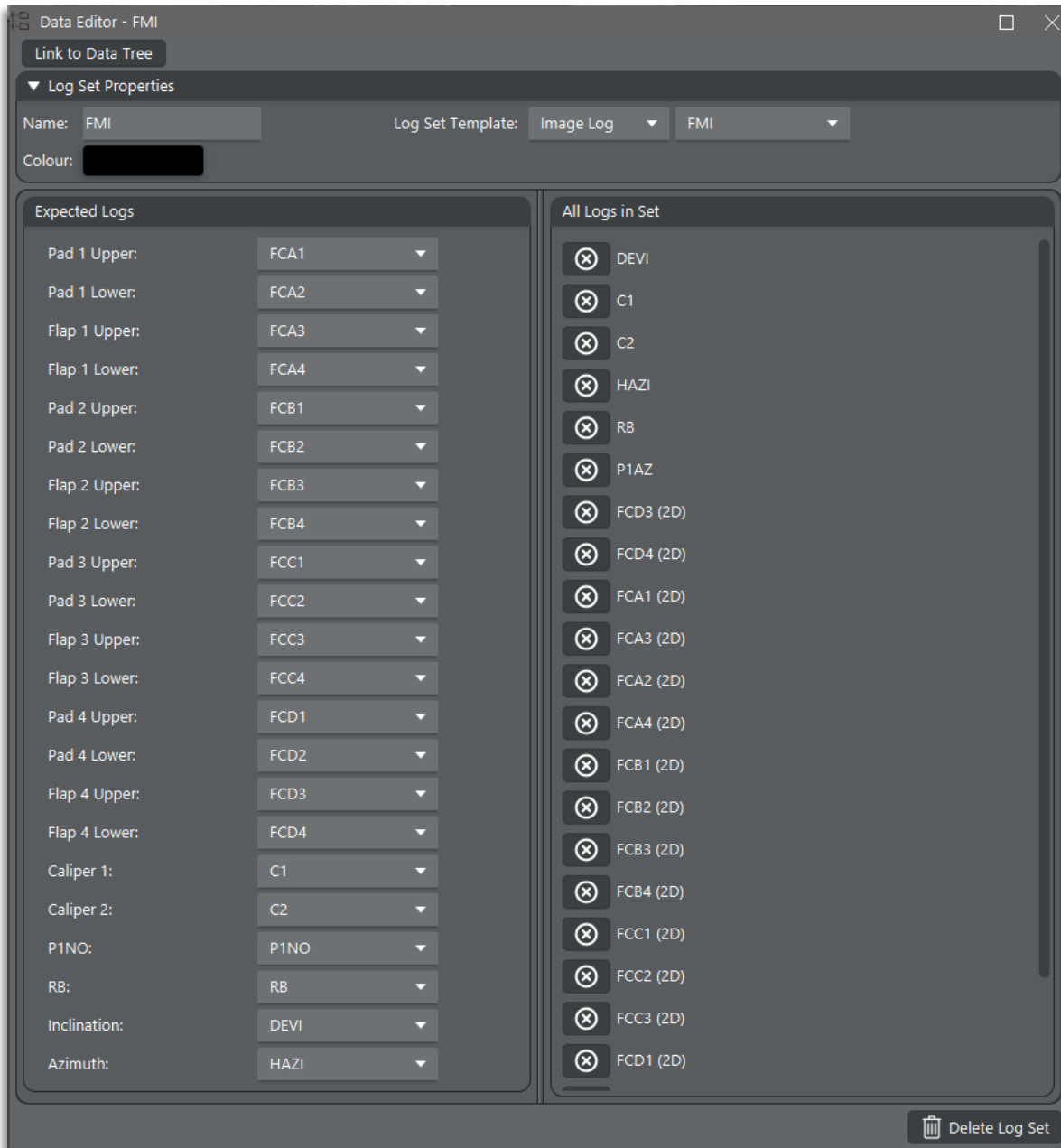
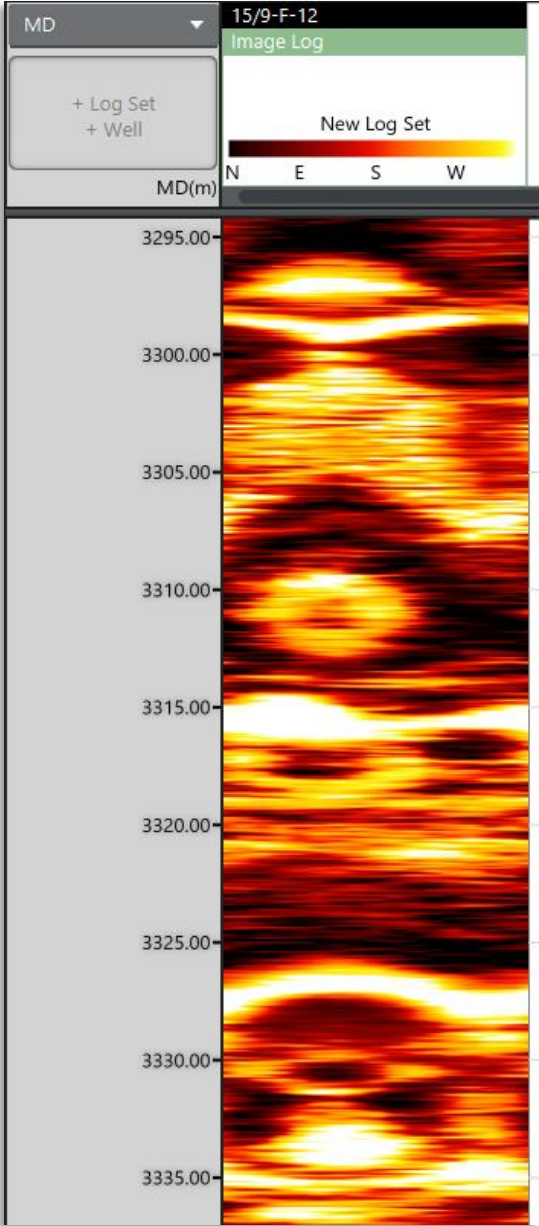


Image Logs

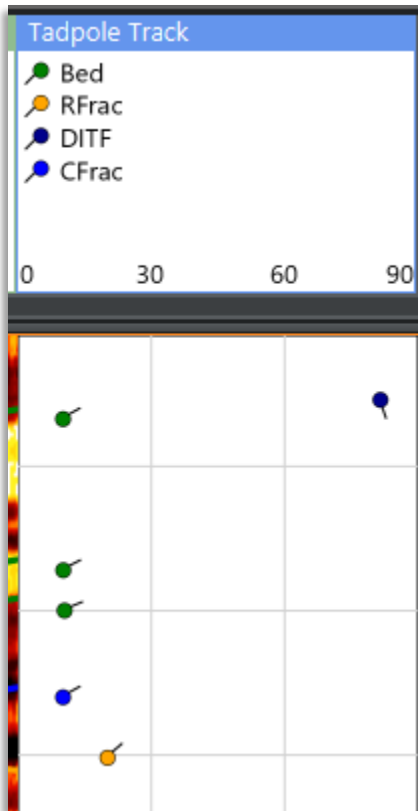
A new **Log Set Template** has been added for defining image logs from data loaded from DLIS files. There is initial support for simple 2D images and FMI tools. Additional image log tool support can be added via shared repositories.



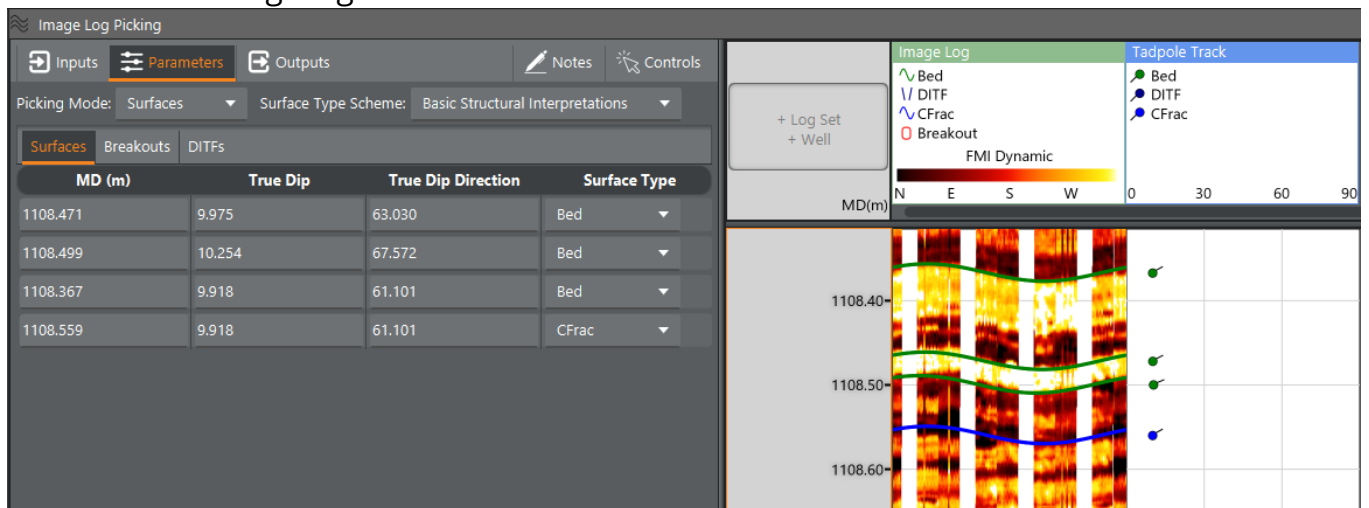
An **Image Log Track** has been added to display image logs, together with surfaces, breakouts and DITFs.



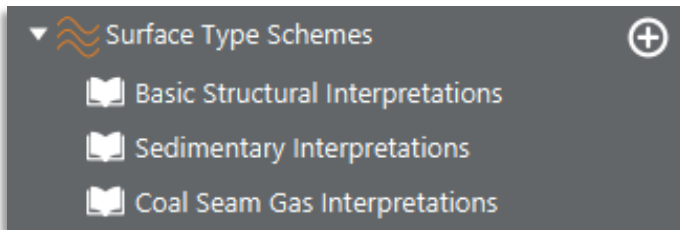
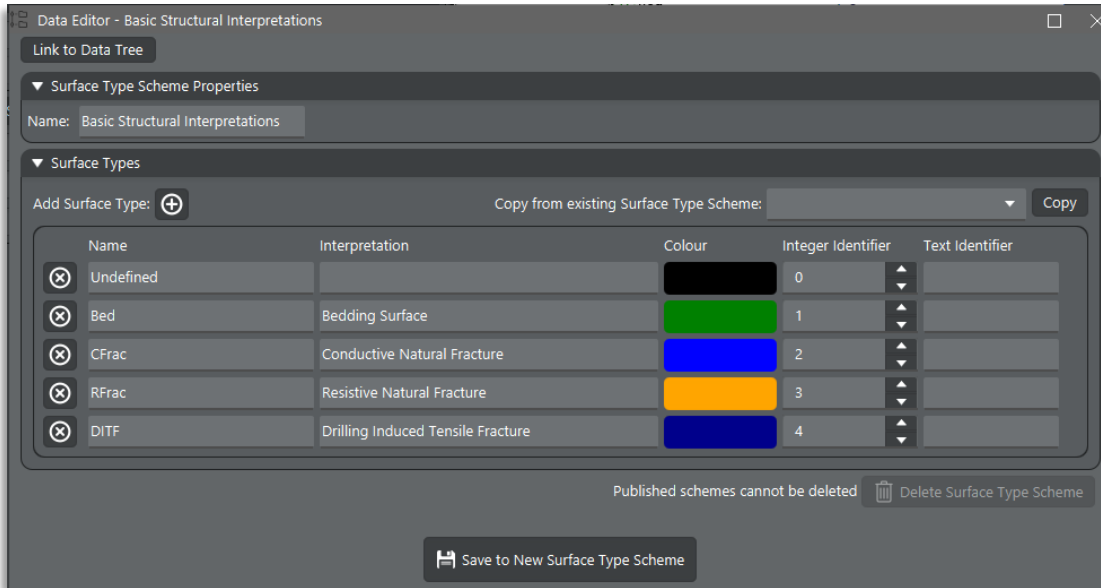
A **Tadpole Track** has been added to display surfaces and DITFs



There is a new **Image Log Picking** tool for manually picking surfaces, breakouts and DITFs on image logs.

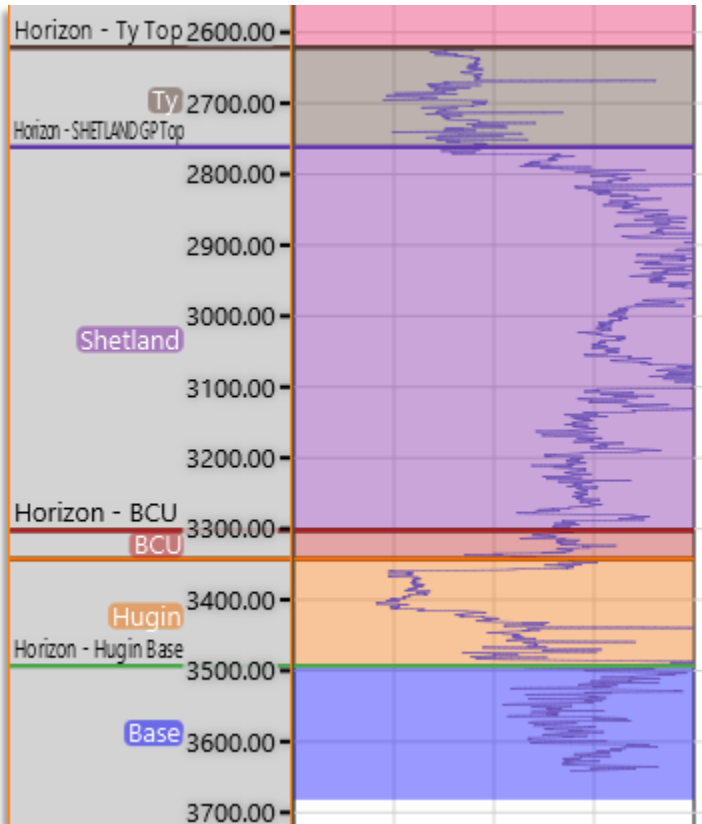


Surface Type Schemes have been added, which define the surface types available for selection when picking surfaces on an image log. These can also be used to interpret a 'surface type' column when importing surface data from other applications. A number of default Surface Type Schemes are defined, and others can be added manually.



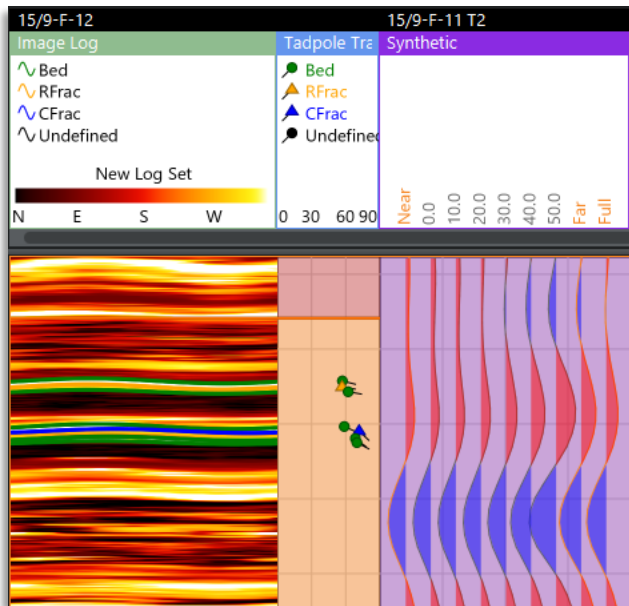
Well Viewer

Improved labelling of zones in the depth axis on the well viewer so that it's easier to match the zone to the label, and to make it less likely that labels draw on top of each other.



It is now possible to multi-select logs in the data tree (using shift/ctrl + click) and drag them all into a log track, log set or tool.

Dragging an image log, surface/DITF set or synthetic seismic into an empty track now converts the track to an Image Log, Tadpole or Synthetic track automatically. This means you don't have to manually add the correct type of track upfront.

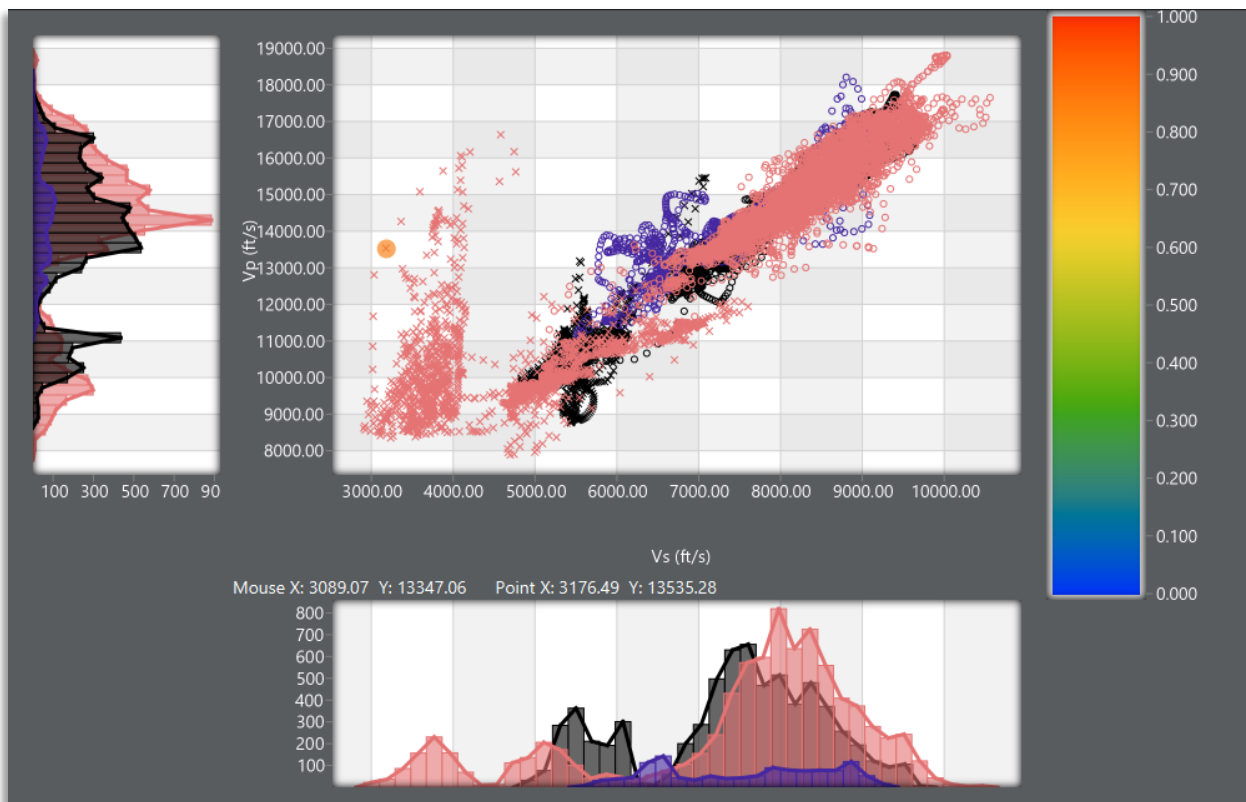


Crossplot

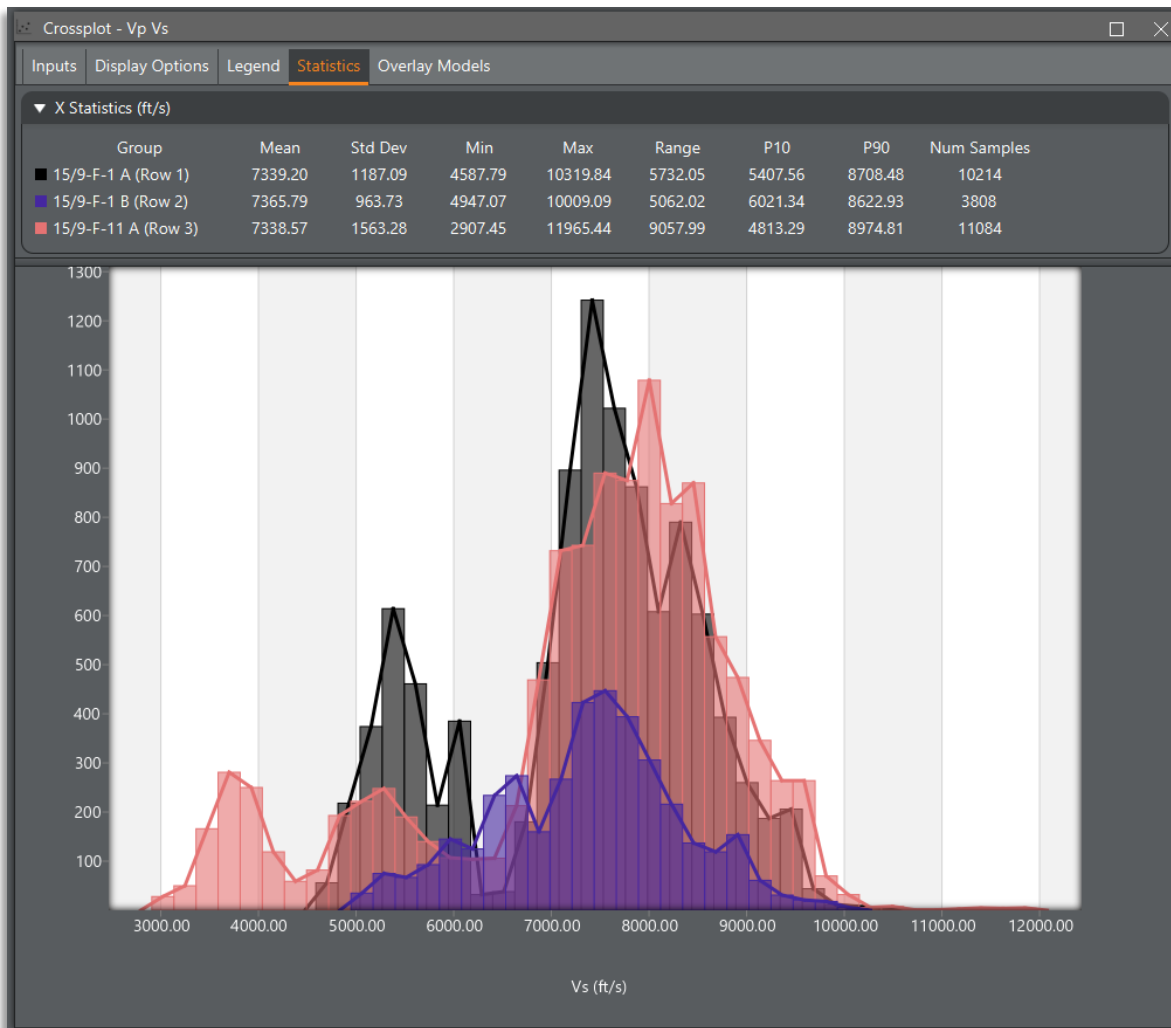
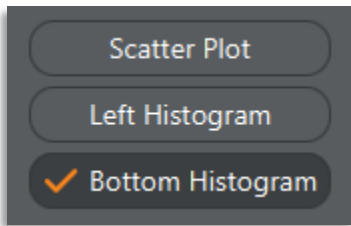
If the axis log types of a Crossplot have been selected you can now drag and drop a well onto the plot to add the well and plot the favourite logs.

You can now mix discrete and continuous logs in the Crossplot. The continuous logs will be sampled at the depths of the discrete log.

Histograms have been added to the Crossplot showing the distribution of values in the X and Y directions. Histograms can be drawn as bars or lines, and the bar width can be adjusted manually.



The Crossplot's Display Options tab contains controls to turn off the scatter plot and histogram plots. This can be used for instance to show a histogram on its own.



The Crossplot now contains a **Statistics** tab showing the distribution of values in each population. Hovering the mouse over the panel displays a Copy All button, which copies the values to the clipboard so that they can be pasted elsewhere (i.e. Excel)

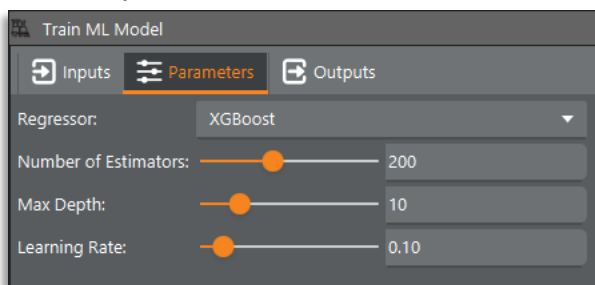
| X Statistics (ft/s) | | | | | | | | |
|--------------------------------|---------|---------|---------|----------|---------|---------|---------|-------------|
| Group | Mean | Std Dev | Min | Max | Range | P10 | P90 | Num Samples |
| 15/9-F-1 A (Row 1) - Ty | 5652.41 | 341.08 | 4831.68 | 7088.06 | 2256.38 | 5253.98 | 6046.78 | 1402 |
| 15/9-F-1 A (Row 1) - Shetland | 7877.32 | 726.26 | 5278.94 | 9640.94 | 4362.00 | 7059.59 | 8832.28 | 5407 |
| 15/9-F-1 B (Row 2) - Ty | - | - | - | - | - | - | - | 0 |
| 15/9-F-1 B (Row 2) - Shetland | 7563.88 | 1010.55 | 5515.46 | 9260.31 | 3744.84 | 6284.30 | 8902.24 | 1228 |
| 15/9-F-11 A (Row 3) - Ty | 4743.90 | 1102.13 | 2907.45 | 7604.56 | 4697.11 | 3514.99 | 6509.40 | 1694 |
| 15/9-F-11 A (Row 3) - Shetland | 8158.66 | 848.85 | 4605.79 | 10560.33 | 5954.54 | 7324.29 | 9213.87 | 6688 |

| Y Statistics (ft/s) | | | | | | | | |
|--------------------------------|----------|---------|----------|----------|---------|----------|----------|-------------|
| Group | Mean | Std Dev | Min | Max | Range | P10 | P90 | Num Samples |
| 15/9-F-1 A (Row 1) - Ty | 10686.43 | 762.91 | 8766.20 | 15454.45 | 6688.24 | 9908.51 | 11239.13 | 1402 |
| 15/9-F-1 A (Row 1) - Shetland | 14564.85 | 1277.30 | 10085.03 | 17736.06 | 7651.04 | 13112.31 | 16369.56 | 5407 |
| 15/9-F-1 B (Row 2) - Ty | - | - | - | - | - | - | - | 0 |
| 15/9-F-1 B (Row 2) - Shetland | 14448.61 | 1411.31 | 11152.91 | 18205.55 | 7052.64 | 12601.62 | 16517.79 | 1228 |
| 15/9-F-11 A (Row 3) - Ty | 10264.36 | 1190.84 | 7884.76 | 16636.17 | 8751.41 | 8989.17 | 11495.18 | 1694 |
| 15/9-F-11 A (Row 3) - Shetland | 14896.52 | 1348.89 | 9242.57 | 18809.37 | 9566.80 | 13555.83 | 16598.06 | 6688 |

Machine Learning

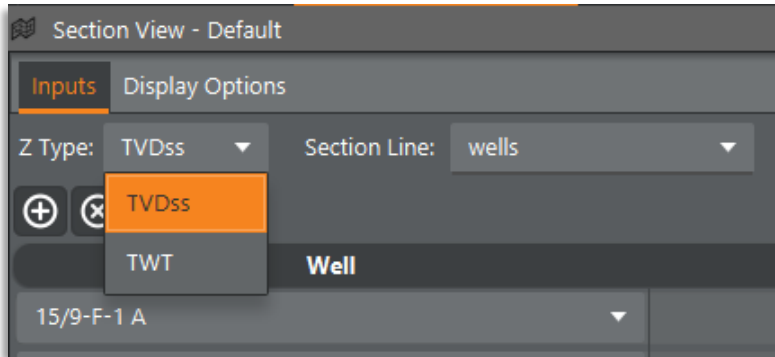
An indeterminate progress bar has been added to the **Train ML Model** tool to show that calculation is being performed.

The **Train ML Model** tool now contains Gradient Boosting and XGBoost (Extreme Gradient Boosting) regressor models in addition to Random Forest. XGBoost is the default option.

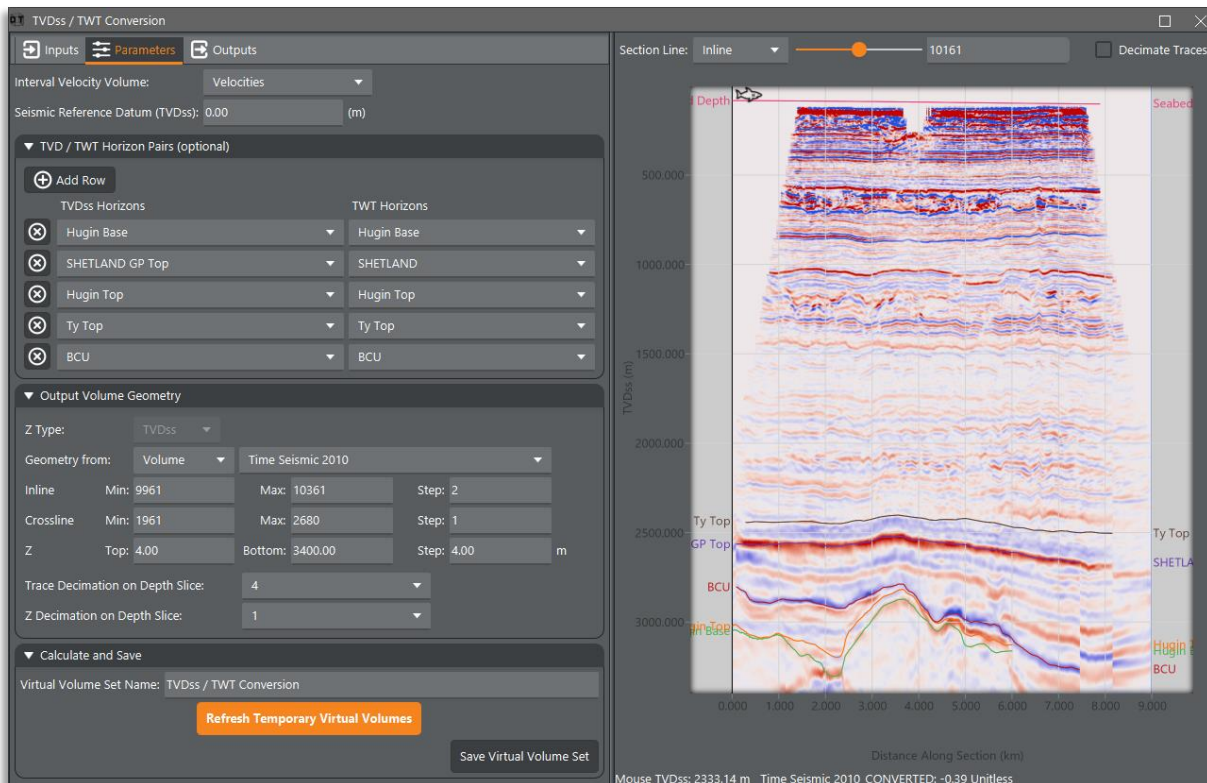


Depth Conversions

The **Section View** can now display data in either TVDss or TWT. There is a new Z Type selector on the Inputs tab to switch between the two. There have also been performance improvements made to the Section View, resulting in an increased frame rate when displaying logs along well paths.



There is a new **TVDss / TWT Conversion** tool to convert 3D volume data between TVDss and TWT (in either direction). The primary input to this tool is a calibrated velocity volume, but the tool can also use TVDss / TWT horizon pairs to guide the conversion.



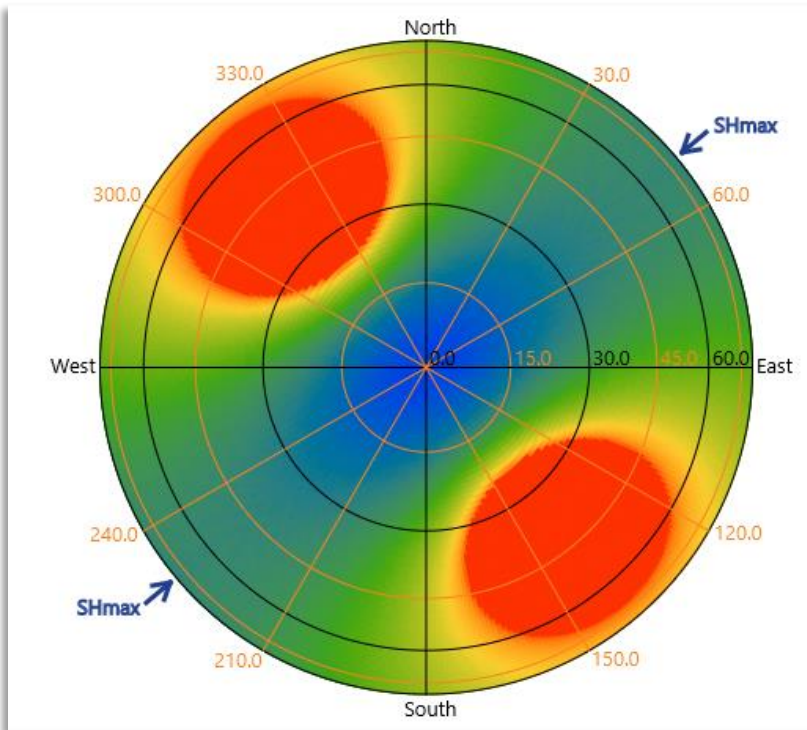
The **Depth and Trajectory Logs** tool can now output TWT and Interval Velocity logs for wells that have a TVDss to TWT conversion defined.



MD to TVD conversions on wells are now calculated at a higher resolution to better constrain the conversion in situations where there are only a handful of survey points (i.e. when the well is created via the Well Builder tool).

Miscellaneous

SHmax orientation is now displayed on **Stereonet** plots



The **Pore Pressure Prediction** tool has a new option to apply constant pressure gradients in a zone from the zone below. This is useful for modelling hydrocarbon columns.

Constant Gradient

Join to zone above

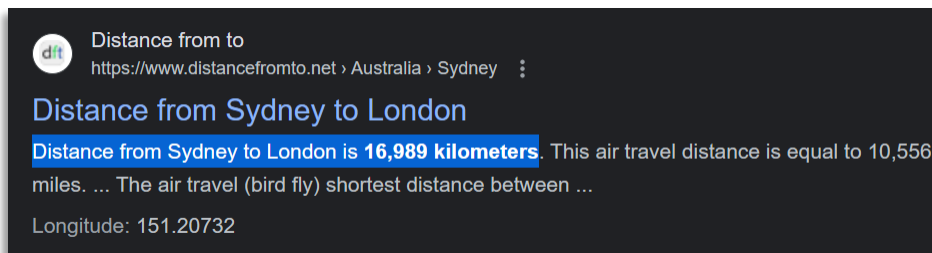
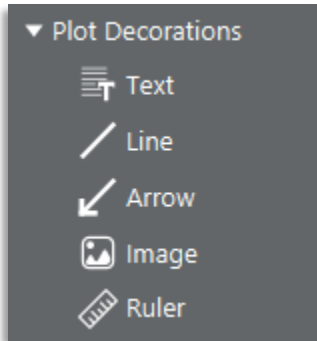
Pressure at zone top: MPa

Fluid Retention Depth (TVDml): m

Join to zone below

Pressure Gradient:

There is now an option to add a **Ruler** plot decoration to measure distances. Rulers can be added to all plots that support decorations (map, log track, crossplot, section view). The behaviour changes slightly depending on the plot, on a map it shows the straight line distance between the points, and includes support for measuring on lat/long views.



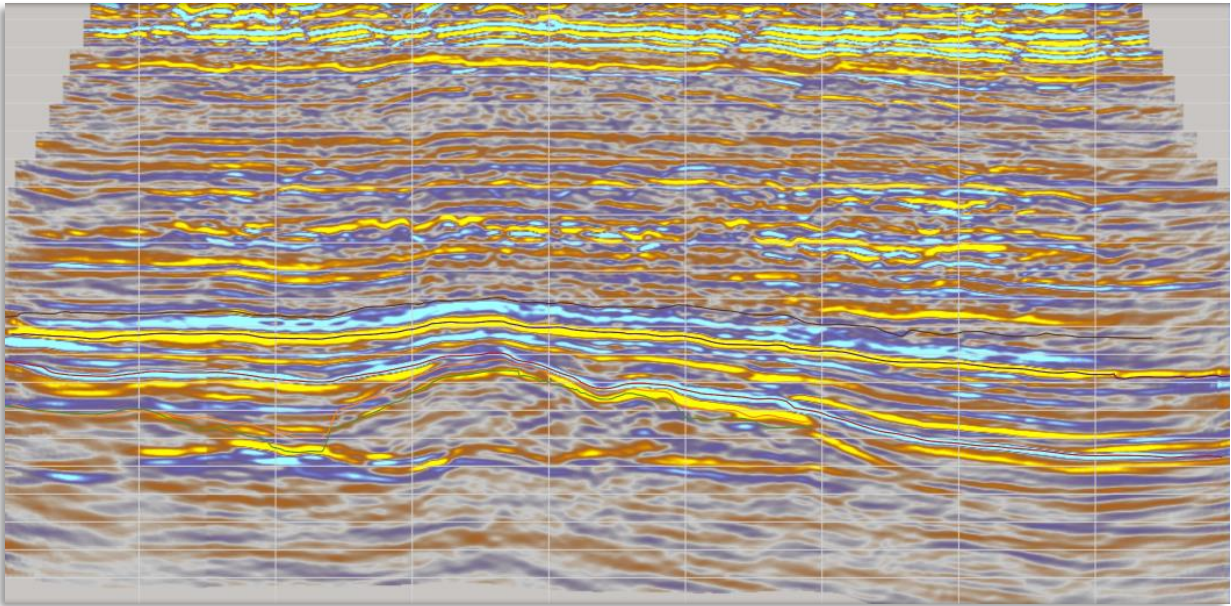
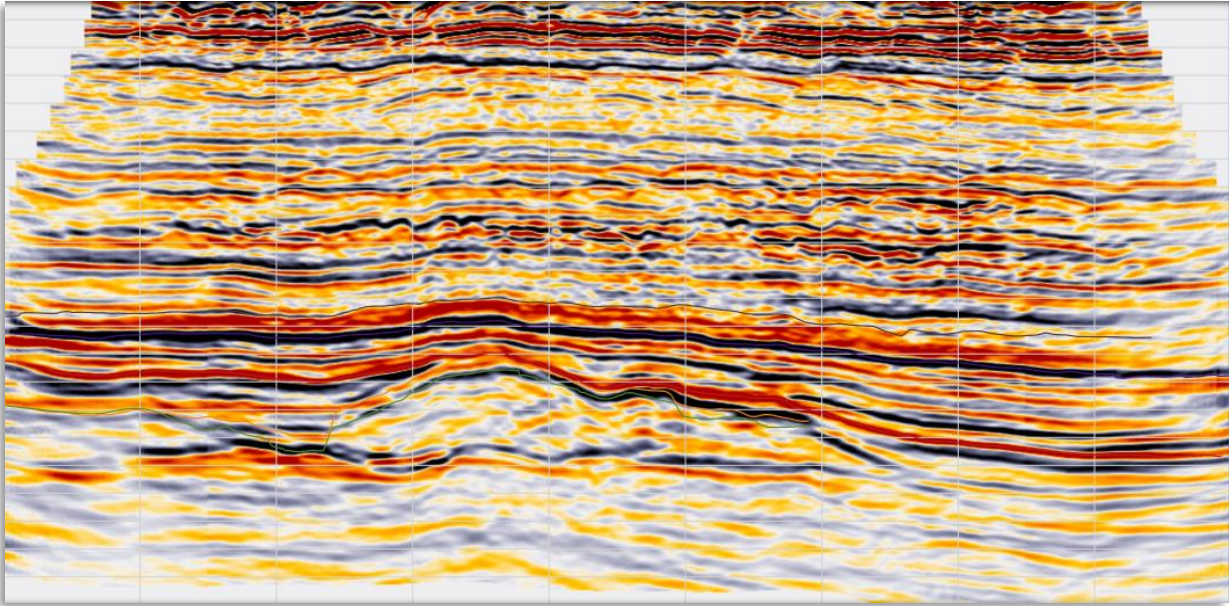
Distance from to
<https://www.distancefromto.net> > Australia > Sydney

Distance from Sydney to London

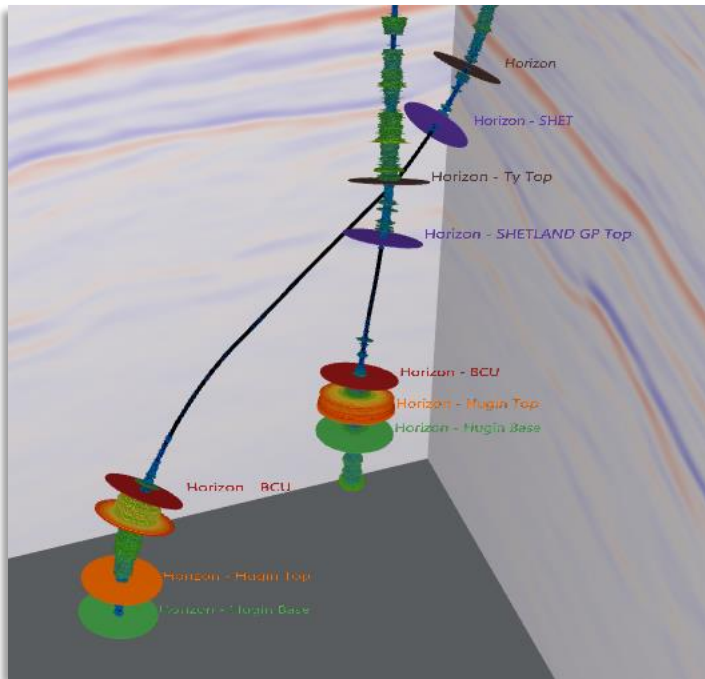
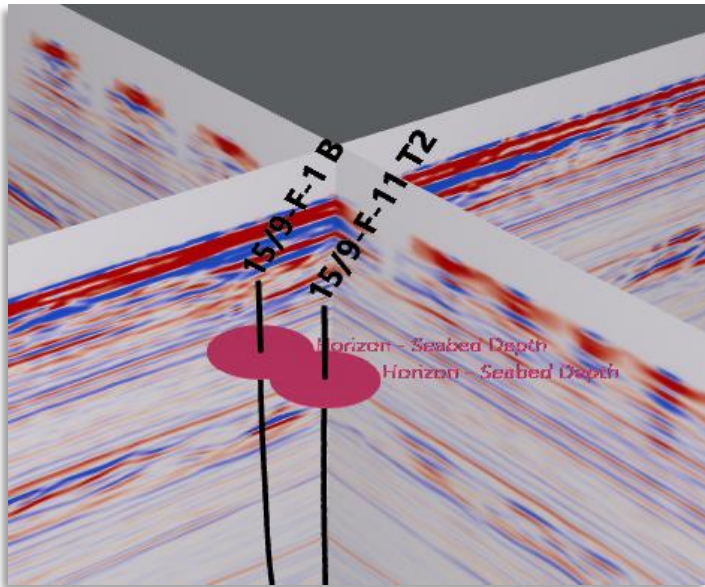
Distance from Sydney to London is **16,989 kilometers**. This air travel distance is equal to 10,556 miles. ... The air travel (bird fly) shortest distance between ...

Longitude: 151.20732

There are 2 new colourmaps included for displaying seismic amplitudes, named "Seismic" and "Seismic 2".



The **3D Viewer** displays well names, well tops and well top names. These can be turned on and off from the Display Options tab.



It's now possible to quickly select an item in any **Log Type** drop down selector by typing the first few letters of the required type.

