Geoteric 2019.1 release notes

Quick and reliable fault interpretation is the foundation for successful hydrocarbon studies. Geoteric 2019.1 focuses on a complete transformation of the fault interpretation workflow. Using Geoteric's powerful edge detection algorithms and Fault Detect attribute, fault sticks can be extracted quickly. Structural & geological investigation is performed through sorting and filtering methods such as the fault stick Rose Plot, and visually clipping sticks to vertical and horizontal slices. Fault networks can be built quickly by using grouping functionality. Usability improvement was a key motivator to update fault interpretation workflows, now with a focused toolbar, and changes which will reduce mouse clicks and mouse travel times.

Hydrocarbon Height Maps provide greater understanding, quantification and delineation of plays, leads, prospects and fields and can be made at any point during structural interpretation, to increase confidence to take operations forward.

Performance around the fault interpretation workflows has also been a key focus, enabling hundreds of thousands of fault stick interpretations to be viewed, investigated and arranged quickly.

All functionality listed here is within the base "Interpret" License.

Key areas of updates in Geoteric 2019.1

- Fault Interpretation Usability
- Unassigned Fault Set Interpretation Workflow
- Fault Detect Stick Extraction
- Fault Stick grouping
- Fault Stick Filtering
- Fault Stick Rose Plot Filtering
- Fault Stick Clipping
- Volume Height Maps
- Bug Fixes

Fault Interpretation Usability

Client feedback regarding the fault interpretation workflow has been incorporated to make a smoother fault interpretation experience in Geoteric 2019.1. Usability improvements also focused on the reduction of mouse clicks and reduction of mouse travel times. The fault interpretation workflow now has a dedicated and focused toolbar with all relevant filtering, grouping and editing functionality which can be moved close to the area being interpreted. The editing of fault sticks has been updated to make it easier to cut, extend, join, and move the individual sticks. The need for the Shift key to start interpretation has been removed.

Unassigned Fault Set Interpretation Workflow

A fast interpretation technique on individual inline, crossline or horizontal-slice is through an unassigned fault set. This is an established workflow and frequently re-

quested client functionality. Multiple different fault sticks, representing many different fault surfaces, can be gathered within the unassigned fault stick set and this set assumes that the fault sticks it contains are not related. Subsequently these fault sticks can be filtered, visually clipped and finally grouped into relevant sets representing structural fault planes. By default, the unassigned fault stick set is found at the top of the fault set list in the project tree.

Fault Detect Stick Extraction

Fault Detect volumes are powerful for visualization and determination of the presence and position of faults within the seismic volume. In previous versions of Geoteric prior to 2019.1 these volumes required manual fault interpretation to extract the fault surface information.

In Geoteric 2019.1 the Fault Sticks can be automatically extracted from the Fault Detect attribute. Sticks can be extracted either on single vertical slices (inline and crossline) or from the entire seismic volume from every inline or crossline, to any slice increment of choice. Upon extraction, all fault sticks are gathered within one set and can be subsequently edited and grouped into relevant fault surfaces.

Fault Stick Grouping

When presented with many fault sticks, a fast method to create sets which represent fault surfaces is required. A new method for grouping fault sticks into sets has been developed for Geoteric 2019.1 by on-screen painting which will group and assign selected sticks from the 3D scene, into individual sets. The functionality is available from within the fault interpretation workflow toolbar.

Fault Stick Filtering

New methods of automatic fault stick extraction in the software industry such as Machine Learning or Artificial Intelligence workflows will increasingly create a mass of data. The Fault Detect Stick Extraction workflow in Geoteric 2019.1 itself creates many fault sticks.

To make sense of all the fault stick data, statistical information regarding each individual stick itself is available for use in the fault stick filter. Key parameters which can be filtered are the stick length, its vertical length, its apparent stick dip direction and apparent stick dip angle. Using mathematical syntax and numerical input, these parameters enable filtering of all sticks in the project and remain active when the stick sets are viewed in the 3D scene. The number of sticks in the project which meet the filter criteria is displayed, enabling instant feedback on the validity of the filter parameters. Many different filter criteria can be created, and all are additive. Once a filter is created all the sticks which meet the criteria can be moved into a new fault set or deleted.

Fault Stick Rose Plot Filtering

A powerful method to investigate the geological structure hidden within the fault stick data cloud is by use of the Rose Plot for filtering. The apparent stick dip direc-

tion and apparent stick dip angle are combined and plotted on the Rose Plot diagram which can be used to visually filter both stick direction and dip angle by interaction and selection within the Rose Plot itself.

Fault Stick Clipping

For targeted viewing of fault sticks, visual clipping of those fault sticks within defined distance parameters has been enabled. This impacts any one of three chosen slices; inline, crossline or horizontal. The cropping of fault sticks around a horizontal slice is a convenient visualization of the fault network.

The cropping distance can be altered from small (which is very close to the slice plane), though medium to large for a longer length of stick. The cropped fault sticks can be grouped and filtered in the same way as described above.

Volume Height Maps

Hydrocarbon Height Maps provide visual delineation of hydrocarbons and comparison between volumetric property parameters and their impacts on hydrocarbon distribution in different scenarios. They are calculated from within the volumetrics process. Once volumes have been calculated, the 'Save Volume Height Maps' button calculates the Gross Rock Volume, Net Rock Volume, Net Pore Volume, Hydrocarbon Pore Volume and STOIIP/GIIP height maps.

The maps are produced as attributes on the relevant input top reservoir surface and can be displayed as a colour overlay on top of the selected top reservoir horizon. The default colour map can be set to a user-controlled maximum and minimum in meters. All output maps are in meters regardless of a project being in time or in depth.

Link for Petrel

Geoteric 2019.1 is enabled for direct data transfer to Petrel 2017, Petrel 2018 and Petrel 2019 using the link included with the installer.

Links for earlier versions of Petrel are not supported from Geoteric 2019.1.

Backwards Compatibility

Projects opened for the first time in Geoteric 2019.1 will undergo a project upgrade.

For the first instance of opening a project in Geoteric 2019.1 a popup will request confirmation that you wish to open the project. After opening the project in Geoteric 2019.1, it will not be possible to open that Geoteric 2019.1 project in any earlier version.

High DPI Displays

Geoteric 2019.1 is now fully compatible with high DPI displays, such as 2K and 4K resolutions.

Bug Fixes

37 legacy bugs have been fixed in Geoteric 2019.1.

Fixed 2019.1

Bug-10	Fault expression - Floating point data with DIP attribute produced a bad result in Fault Detect
Bug-14	Adaptive Fault preview surface pink intersection line wasn't shown in interpretation window
Bug-20	Interpretation window horizontal annotation bars were not always lined up with the data
Bug-31	Floating point with low average amplitude gave badly scaled data in FD, when the RGB blend was used in the preview in FD the image did not scale properly and nothing could be seen even though when moving the mouse over this, the preview values could be seen but were very small values.
Bug-44	DSG DecisionSpace Error when sending volume from Geoteric to DSG
Bug-57	Body Labelling produced blank output when using Floating Point Data
Bug-60	Adaptive Geobodies: source volume did not show in Sources tab
Bug-64	IFC+ was not working (when picking on volumes) with several data sets/types
Bug-67	Horizon tools was producing an invalid volume and crashing Geoteric when the "Sculpting Option" "Binary" in the Crop/Cut was selected. Occured with Floating point data only
Bug-79	Wells were not appearing in 2D colour Blend Viewer
Bug-81	Body Labelling error and broken volume
Bug-95	Opacity blend horizon viewing mode inverted the horizon
Bug-98	Link to Petrel - Invalid character prevented transfer of data
Bug-110	2D Colour blend Viewer crashed when viewed over horizon and changing post scale
Bug-117	Exception message would occur when quitting Freq Decomp before generating a 3D result
Bug-119	Colour Blend render mode in 3D Scene was incorrect
Bug-125	Floating point showing as clipped incorrectly after importing
Bug-128	Colour Bar changes didn’t work on 8bit Volumes

Bug-145	Horizon Pack properties: Display Mode panel was not fully visible when the window was not maximised
Bug-164	Arb lines unresponsive when there were too many points
Bug-212	Log data transferred using the Link to Petrel sent the logs with the template name instead of the log name
Bug-223	2D slice viewer was not responding to change in step increment adjustment
Bug-224	Iso-Proportional slicing did not remember any colour bar compression or contrast enhancements during the export process
Bug-238	Expression Windows scaled badly on high dpi displays
Bug-245	Basemap UI could be corrupted when docked
Bug-270	Changing the polygon colour would not update in the project tree
Bug-271	The Create Well Log Template window could not be closed
Bug-286	Validate: volumes in dropdown was not selectable when tuning or thickness graphs shown
Bug-288	2D colour blend viewer crashed using Horizon with "Show All" Wells
Bug-289	Faults: moving multiple sets caused Geoteric to crash
Bug-294	Improved performance with lots of Well Markers in scene
Bug-298	Link for Petrel converted depth unit of colour blends when project is in depth
Bug-299	Noise Expression Dip Azi Filter Size did not show the value against the vertical slider
Bug-302	Well dialog on Interpretation Window: checkboxes did not update when selecting/hiding all
Bug-311	Adaptive geobodies: didn't always create new cluster even when that was the selected drawing mode
Bug-315	Interpretation Window: manually entering the slice number didn't work
Bug-323	Adaptive horizons track/fill did not work on volumes in 3D scene.

Fixed 2018.2

Below are listed bugs which were fixed in 2018.2 but were not listed in the 2018.2 release notes.

Bug 232	An issue were clicking on a folder containing many fault sets did not function as indicated. Now all sets contained in that folder are added or removed from the scene.
Bug 9	Adaptive Horizon amplitude fill did not work with floating point data, where an interpretation 'fill' request using amplitude did nothing.
Bug 26	Fixed a problem with HDFD creating bright spots in the preview which resulted in dark blends, usually associated with floating point data. Producing mag vols and blend would result in the bright spots appearing as outliers well beyond the original data range and resulted in dark blends or blends containing the spots, depending on the scaling.