What's new in TSG8, 10 December 2018
TSG build 8.0.3.16

The more interesting updates are:
- A new import option (with "headless" support) to create a HyLogger2-like profile dataset from a Corescan HCI-3 drillhole dataset;
- Scatter and grid plot options for the Floater's "Feature Frequency Chart";
- Custom scratchpad colours.

Aside from that there have been a number of small additions and fixes.

Corescan HCI import

TSG's Import wizard (from the File -> New menu) has a new Format option:

"**Core logging: Corescan HCI-3 hole to HyLogger-compat. profile**".

It imports a Corescan HCI-3 drillhole to a TSG profile dataset that is formatted much like one from a HyLogger-2.

The HCI-3 VNIR-SWIR hyperspectral imagery is resampled according to a tile size that you specify (e.g., 8mm across by 8mm down), giving one spectrum per tile[1]. The HCI-3 2D profilometer imagery is resampled to the same tile, giving a 1D profilometer datastream.   The HCI-3 colour imagery is kept at its native resolution.   Basic "core logging scalars" (Tray, Section, SecDist, Depth etc) are constructed automatically, and additional standard scalars (Prof_min, sec_end_mask, kahuna etc) can optionally be calculated during the import.

The output dataset looks and works like a HyLogger-2 dataset with VNIR-SWIR spectra, a linescan raster and a profilometer datastream.   You can use TSG's Tray screen, do depth logging, calculate recovery rates, and so on[2].

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[1] To be clear, the input is a high-resolution hyperspectral *image* (typically 100 or more columns wide with a pixel size of 0.5mm by 0.5mm) and the output is a spectral *profile* (1 column wide with a relatively large pixel size, e.g., 8mm by 8mm).

[2] One thing you *can't* do is to create a "colour from spectra" scalar, as the HCI-3 spectra only go down to around 450nm.

Running an import

Page 1 of the Import wizard is for input-format selection. Select the new Corescan HCI-3 **Format** and click **Next** to move on to page 2 (example shown above).

Click **Select** to provide an HCI-3 drillhole directory. This directory will normally have a simple name (like **DDH-778** in the example above) and will contain one subdirectory per tray named (also simply[3]) along the lines of **0001**, **0002** etc.

TSG will then grind away checking files. This could take a couple of minutes. Once done you will see two to three lines of information about the HCI-3 dataset and the tile controls will become visible.

Adjust the extraction **Tile size** if you like. It doesn't have to be square. The default is square, 8mm across-scan (X) by 8mm along-scan (Y), and with the normal HCI-3 spectrum cell size of 0.5mm by 0.5mm this will average 256 HCI-3 spectra down to 1 output spectrum.

The extraction tile is normally placed in the centre (across scan) of the HCI-3 hyperspectral image but you can move it to the side if you like. Enter a negative number (mm) in **X shift** to move it left of centre or a positive number to move it right. Click **Next** to move on to wavelength resampling page, where you can adjust spectral range and resolution if you like. By default TSG will take the full HCI-3 spectral range and resolution. Another **Next** will move on to the automatic scalar creation page, as seen in HyLogger imports. One last **Next** will take you to the output-file-selection page, where you can click **Finish** to get the import going.

"Headless" mode

TSG's headless mode has a new task **CLIMPORT** that does the HCI-3-to-profile import. In addition, headless mode's "multifile" system has a new option **DIRS** that has it finding directories rather than files. This enables you to set the import loose on a whole directory of HCI-3 drillhole directories if you like, leaving you with one TSG dataset per drillhole.

The headless-mode documentation has been updated and is current: ftp://ftp.csiro.au/MMTG/tsg_headless_reference.pdf

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[3] I stress "simple" / "simply" because further down in the directory structure you will find long, complicated subdirectory names. If you see such names then you have gone down too far down the structure for the import module.

Feature Frequency Chart

The Floater's FFC ("feature frequency chart") mode is accessed via the ◫ toolbar button. In the past it just offered a histogram plot, but scatter and gridded-scatter plots are now available too. The new plots provide a semi-spatial view of the dataset's features as they have a scalar like Depth (along hole) driving the X axis. In addition they can navigate the rest of TSG with mouse clicks (unlike the histogram). To access the new functionality, bring up the FFC mode's control panel (shown opposite) using the **FFC settings** menu. The new radio buttons for selecting **Plot type** are along the top. Other new controls will be mentioned below.
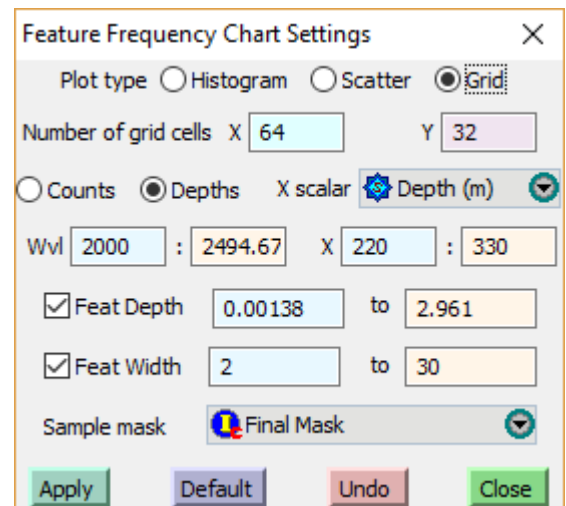
Common functionality

All of these plots draw on the dataset's hidden feature-extraction scalars. (These scalars were calculated when the dataset was imported.) All featex scalars for all samples *can* be used, but it is often a good idea to do some **filtering**.

- Turn on **Feat Depth** to get bounds fields for feature depth filtering. By default the full feature-depth range is displayed in these fields (and used). Increase the lower threshold to leave out tiny features (recommended) and / or reduce the higher threshold to leave out very strong features.
  The histogram and grid plots can show feature counts or depth totals. When showing counts it is highly recommended that tiny features be excluded.
- Turn on **Feat Width** to get bounds fields for feature width filtering. (Feature widths are always in nanometres here.) Width filtering is not used as often as depth filtering but works in much the same way.
- Select a **Sample mask** scalar. Features from masked-off samples will not be used. The dataset's "final_mask" scalar is commonly selected here but you are encouraged to experiment, e.g., create a mask for a certain lithology or mineral assemblage.

New to this release are the **Wvl** bounds fields. These can be used to restrict the plot's wavelength range – only features whose centres are within bounds will be used. In the past these bounds could be adjusted via the (separate) Scale dialog but it is convenient to allow adjustment here as well.

Histogram plot
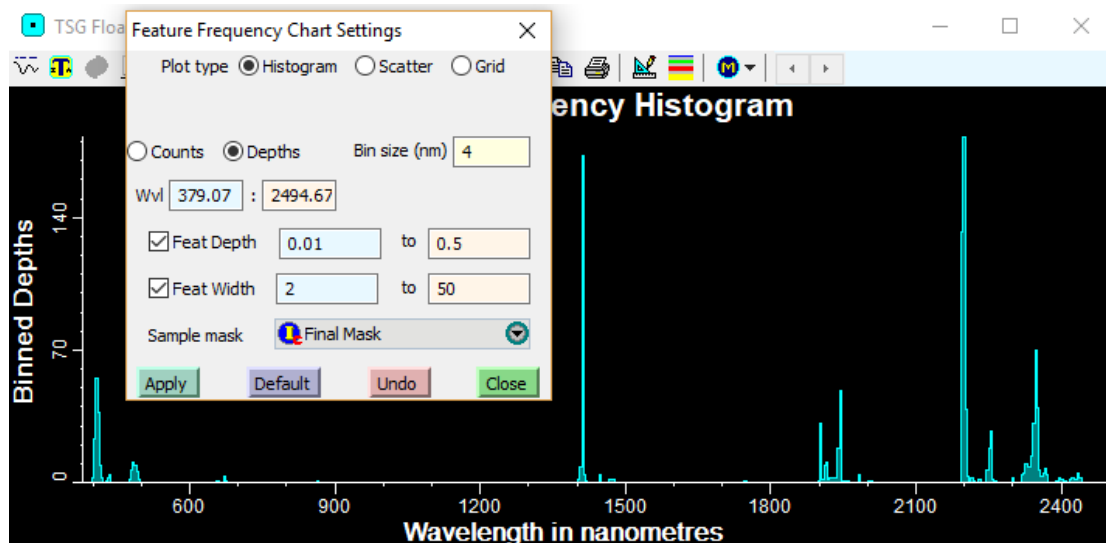
This plot has been in TSG for a long time.   All that I'll write here is a reminder that it can show a useful overview of what's "kicking" in the dataset if you know your way around mineral absorption features.
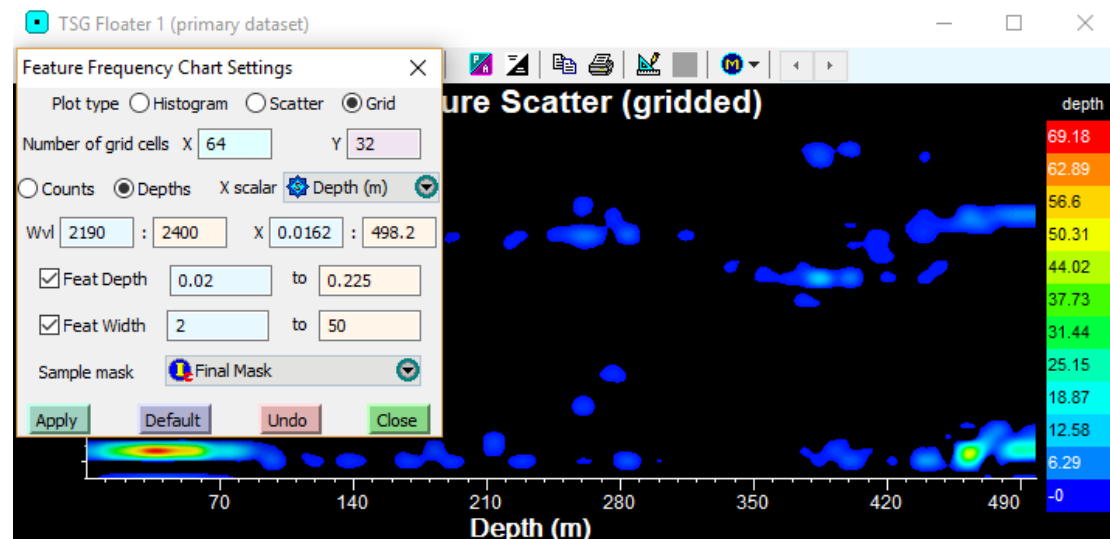
Scatter plot
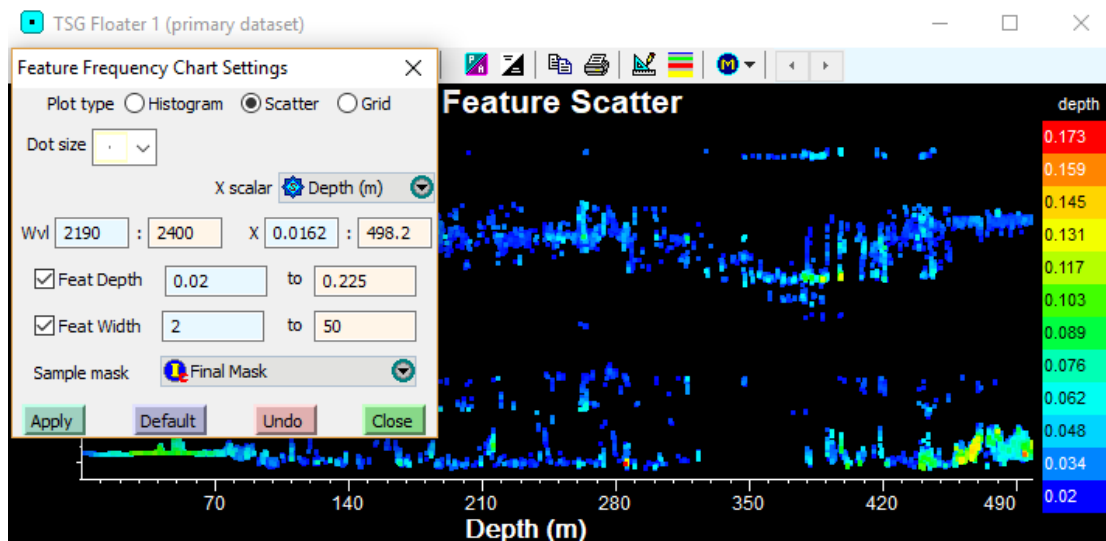
This plot scatters feature wavelength on Y against a numeric scalar of your choice on X, and colours the dots according to feature depth.   Like the histogram it is a good introduction to a dataset and can serve as a guide to more in-depth analysis, e.g., making feature-extraction scalars.

You can select any numeric scalar for X, but the plot was really introduced for spatial datasets (e.g., drill holes) and the default selection for X is the **Depth** scalar if there is one or **Index** if not.   In such cases the plot can reveal interesting spatial changes in mineralogy, and assist in tasks like judging domain boundaries.

The dots are plotted in depth-sorted order so that the deepest features are plotted last, on top of any shallower ones that might be close by.   Still, the plot does not give a sense of point density.   The dataset could have a thousand 2205.25nm features and you wouldn't see them here as they'd all be plotted one on top of another.

Although the plot doesn't show a "current sample" marker at this time, you can navigate the rest of TSG (including sample-aware floaters) with the left mouse button.

Gridded scatter plot

As noted the scatter plot does not show **point density** – where many dots are plotted on or near one another. That's what the grid plot is for. It divides the scatterplot into little cells and accumulates counts or depths for the features that fall into each cell. Cells are coloured by their totals and the grid is smoothed to make it a little more appealing. **Red** areas indicate high point density (many features) and **blue** low (few features).

You get to control how big a grid cell is via the **Number of grid cells** fields. The default of X=64 and Y=32 means that the scatterplot will be divided up into a grid of 64 columns and 32 rows. These fields work in "plot space". In the example above the (feature centre) **Wvl** range has been zoomed in to [2190, 2400] nm. If it were opened up to [380, 2500] nm, the grid would *still* have 64 * 32 cells.

You can have the plot total up feature **Counts** *or* **Depths** using the radio buttons. Depths seems like the safe choice here, but Counts can be effective when a meaningful lower threshold is used in **Feat depth** filtering.

As with the scatter plot, you can navigate the rest of TSG with the left mouse button. The resolution for this is like the scatterplot's – it isn't degraded by the gridding.
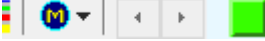
Floater scratchpad colours

(It's a small change but there were more than one or two requests for it so it gets a headline.)

Until now the floater scratchpad has given you no control over colour in its plots, colouring things according to its own peculiar fancy[4]. Now you can make it relinquish its control. This doesn't happen on its own – you have to go into the scratchpad menu and select the **Use 'other' colours please** item.

By default your Scratchpad spectra will be coloured by system palette of well-separated colours but you can change each spectrum's colour individually. You will find a new

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[4] with set colours for this dataset's individuals & averages, other datasets' individuals & averages, and external library "imports".

icon (solid coloured square) on the right of the floater's toolbar:
Click it to get a Windows colour-selection control.

Minor updates

"PSCLR" scalar script method

The 'psclr' (pseudocolour) method has a new option to make it operate on script-*scalar* inputs rather than spectral channels.   The main TSG help file has been updated for the change.

Go-to tool

When working off the **Index** scalar with the "equals" operator you can now enter non-numeric text, to make the tool do a lexical substring match against **sample names**.

Edit scalar names and groups dialog

"Published" status can now be toggled group-wise.

Layout copying

Scatter-screen set-virtual scalars are now handled.
Summary-screen and hole-screen layout copying should be working now.

Settings, system

There is a new option to have the **Dataset Info [Description]** dialog shown on dataset open.

Downsampler

When downsampling scalars on Index with a bin size of 1 and outputting to CSV you get 2 new columns on the left: "Sample_Name" and "Sample_Comment".

Dynamic datasets

Log-screen column plot (X) ranges are preserved across dynamic imports.

Fixed bugs / glitches

Settings, spectral layer recalcs

When a spectral layer's calculations are changed and dependent scalars are automatically recalculated, a failed scalar recalc does not halt the proceedings anymore. (For example a scalar recalc that can easily fail is an auxmatch where the aux dataset can't be located.)   Further, batch-script scalars with layer dependencies were not automatically recalculated in the past, but they are now.

NVCL Database upload

Hole-image validation has been fixed.   (There was a path-related tracking issue.)
Attention has been given to preserving the HyLogger machine name.
"Custodian" field length has been increased from 48 to 64.
Preservation of customised TSA-scalar colours has been improved.
Borehole WFS checking – a status message is shown when waiting for a response to this check, and the timeout has been changed from none (infinite) to 20 seconds.

Downsampler

Commas are stripped more thoroughly than before from scalar names, class names, and class descriptions.   (They were able to ruin CSV output.)

Auxmatch scalar

Bug fixed in the checking of overlaps when the wavelength subsetting option is used.