TSG 8

What’s new since TSG7

Overview

- Product line & licensing
- TSG8 Compatibility
- TIR reference libraries
- The Spectral Assistant
- Floaters
- Summary screen
- Scatter screen
- PLS screen
- Checklist & Event Journal
- External Libraries
- Downsampler
- Image export
- Batch mode
- Drag & drop
- Keyboard support
- Scalars
- Import
- Settings
- Other dialogs
- Miscellaneous

Product line & Licensing (1/2)

- Online licensing system
  - Rapid turn-around – purchase / update
  - Local admin privilege is not required
  - Off-line activation is possible
  - Easy to move a licence
  - TSG Dongles are supported

Product line & Licensing (2/2)

- Licensed modules

Old name	New name	Modules
TSG Lite	discontinued	discontinued
TSG Pro, Core, HotCore and Enterprise	TSG	Stats + Core + HotCore
TSG-Viewer	TSG-Viewer	N/A

- QC and Viewer are named as before
- Core now includes “HotCore” functionality

TSG8 compatibility

- **TSG7 cannot open a dataset that has been created or modified by TSG8**
- TSG8 asks to recalculate old (TSG7) TIR TSA and TIR CLS scalars for the new MS8 reference library
  - It tries quite hard to preserve ancillary data
  - **Check** your domain TIR RMS lists and TIR TSA / CLS plots afterwards!

TIR Reference Libraries – MS7 (2015)

- New
  - Anhydrite
  - Iron-rich Chlorite
  - Volume-scattered Calcite
  - Volume-scattered Quartz
- Renamed
  - Forsterite to Olivine-Mg
  - Fayalite to Olivine-Fe
  - Olivine to Olivine-FeMg
- Deleted
  - About 24 spectra, most of which were off by default in MS6

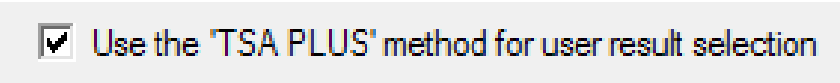
- TIR TSA version bump – 7.03 to 7.04
- Settings -> Dbase; click “Update standard algorithm definitions”

TIR Reference Libraries – MS8 (2016)

- New:
  - Phengite (2)
  - Glauconite (2)
  - Kyanite (2)
  - Sillimanite (2) (but on probation)
- Deleted:
  - Chlorite (NR-CHL02, really serpentine)
  - Pyrolusite (really cryptomelane)
  - Marialite (fine-grained)
  - Meionite (fine-grained)
- Version bump, 7.04 to 7.05

- Experimental MS8.1 (with other metamorphic silicates from Broken Hill) available as an external library
- Settings -> Dbase; click “Update standard algorithm definitions”

TSA 1/3

- Andy Green's **TSA+** extension for SWIR TSA
  - Uses independent feature fitting to guide TSA's result choice
    - **FeOH** (2255), Prehnite (~1474), Amphibole (~2390), Epidote (*fussy* ~1550), Sulphate (~1750), Carbonate (TIR SAM)
  - Fewer false positives with artefacts (notably plastic)
    - Aspectral is reported instead, for low-strength artefact results
  - Version bump, 7.04 -> 7.05
  - "Plus" mixture choices are shown in Floater **Overlay** mode
  - Always on for **system** SWIR TSA
  - Optionally on for user / domained SWIR TSA
    - **Settings->TSA**: 

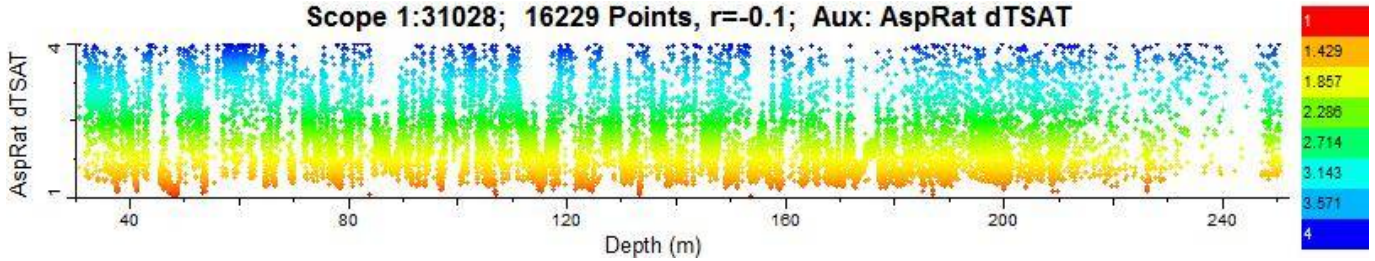
TSA 2/3

- Andy Green's **jCLST** replacement for TIR TSA
  - Uses SWIR TSA+ for guidance, for minerals that respond better in the SWIR than TIR
  - Uses other methods for guidance with carbonates, quartz, talc, apatite, hematite
  - Always on for **system** TIR TSA
  - Optionally on for user / domained TIR TSA
    - **Settings->TSA**: 

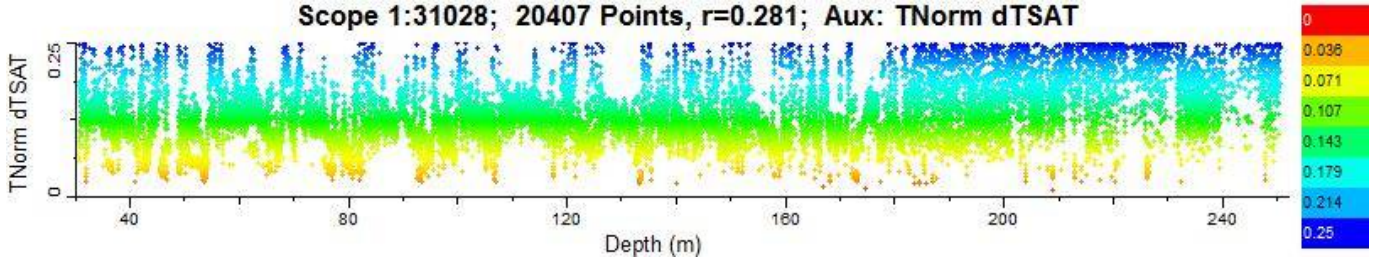
  - No floater support yet

TSA 3/3

- New scalars for spectral “strength”
  - **AspRat** – Aspectral Ratio, pulled out as a scalar. (Big is “strong”.)

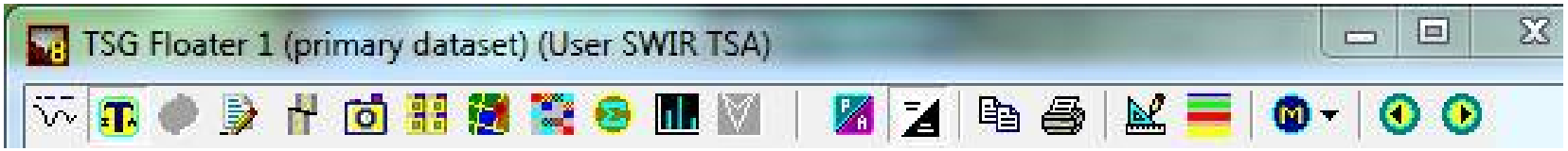


  - **Tnorm** – for scaling raw fitting weight to proportion. (Inverted; big is “strong”.)



Floaters

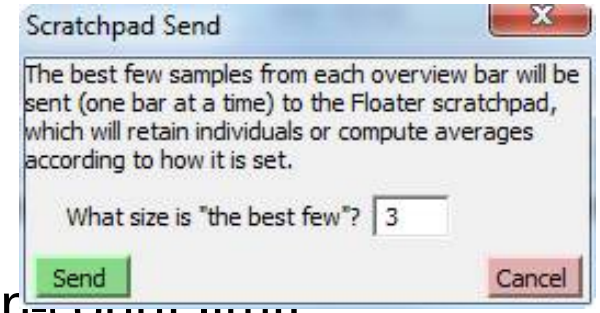
- Four floaters (all TSG8 installations)
- A floater is not locked to VSWIR / TIR
- The interface has received some attention



  - Menu bar is gone
  - Icons for main options
  - Intelligent right-click menu for other options (also available from the “M” icon)
- PNG images are supported (“Pic” and “Map Pic” modes)

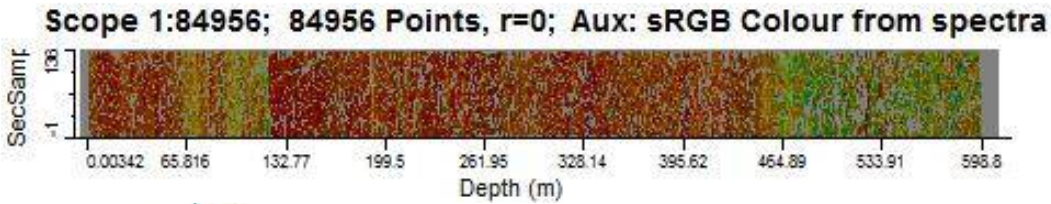
Summary screen

- Overview plot
  - Current sample markers
  - Colour and sort tiles by any scalar (from same dataset)
  - Sort bars large to small
    - Domain editor link (careful)
  - Special scratchpad send (end-member collection)
- Spatial plot
  - Better default bin size and higher bin-count limit
  - Ribbon gets printed now!
- General
  - Discrete reminder about system TSA (used to be indiscrete)

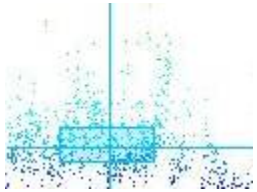


Scatter screen

- Set Mineral and Set Weight virtual scalars are offered along with Set scope
- Raster-mode scatter-plot
  - Set X=Virtual Section, Y=SecSamp
  - Genuine raster render
  - ***Labelled*** by Depth



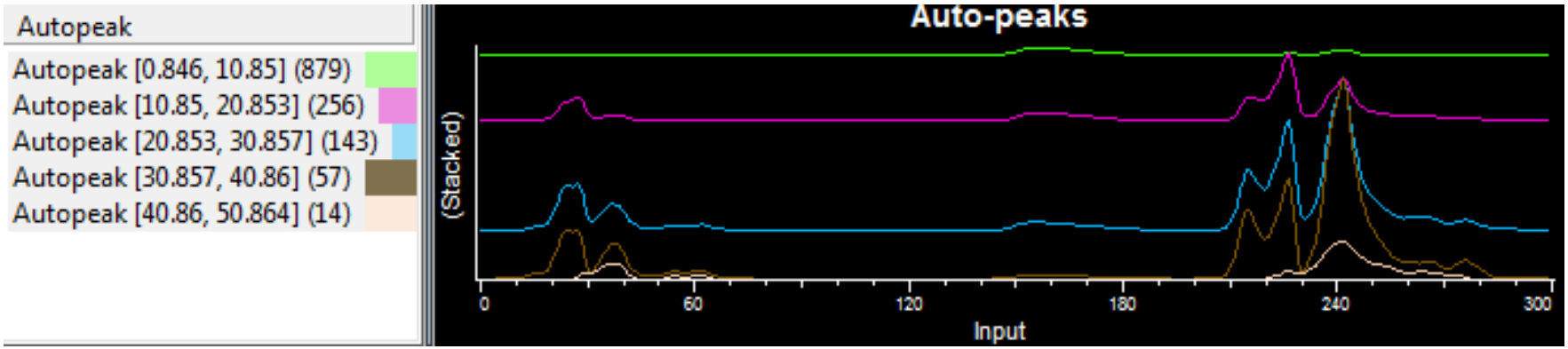
- Scatter-plot whisker overlays
  - 1 to 16 of them, or 1 per X-class



- More line-fitting options (now 7)
- Tamed “quick zoom”: double-click in the plot title area (not in the main plot area)
- Lasso button is always available
- The colourbars can now be sorted in the same way as the Summary screen’s colourbars
- Histograms are sorted on overall class abundance; order matches the colourbar
- Colour sorting is now offered for a true-colour scalar (works on hue * intensity)

PLS screen (1/3)

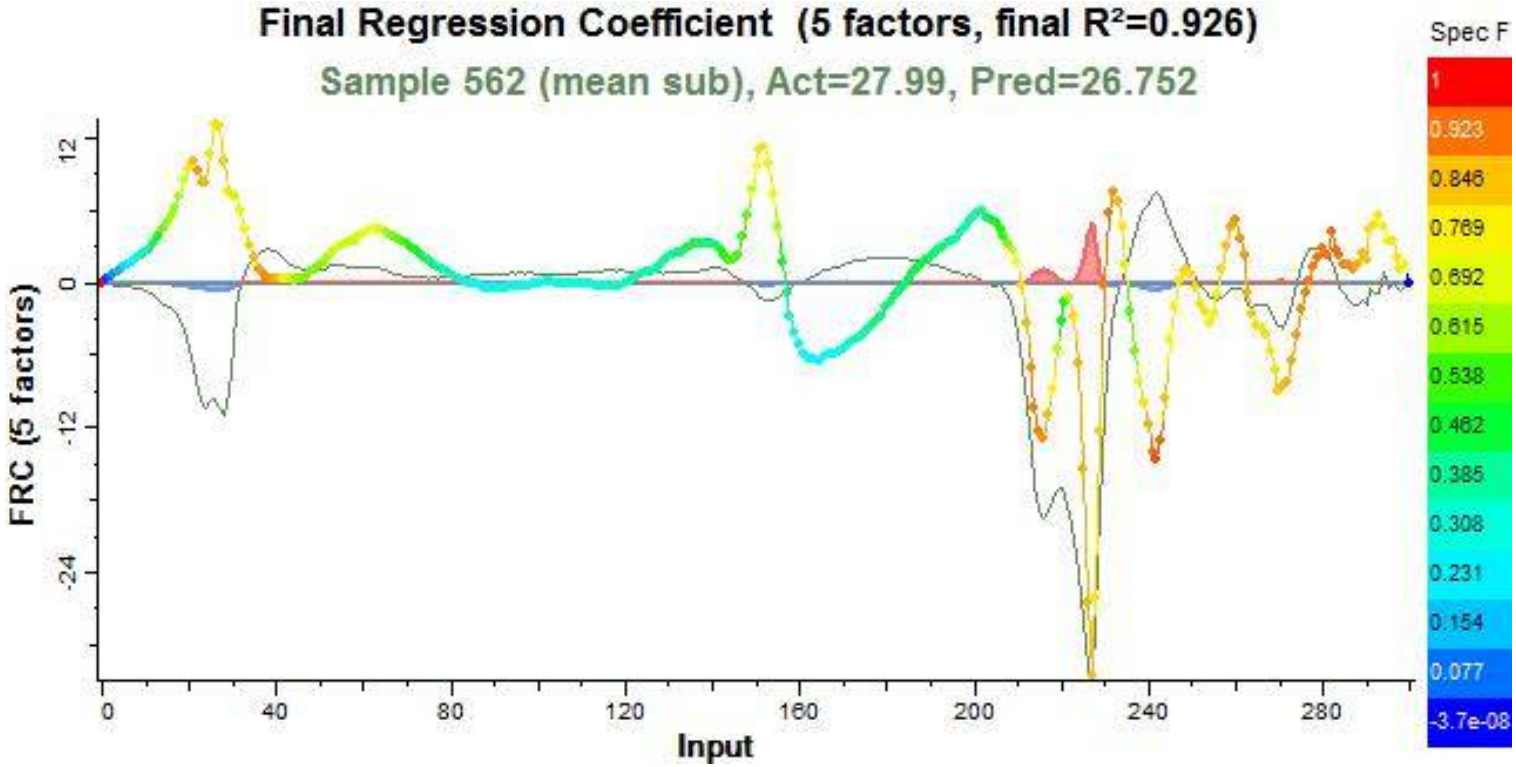
- New plot type – Correlation
  - 2D synchronous correlation matrix
  - Autopeaks plots (response change over concentration)



  - 2D asynchronous correlation matrix

PLS screen (2/3)

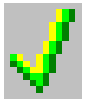
- New FRC overlay – input prediction details

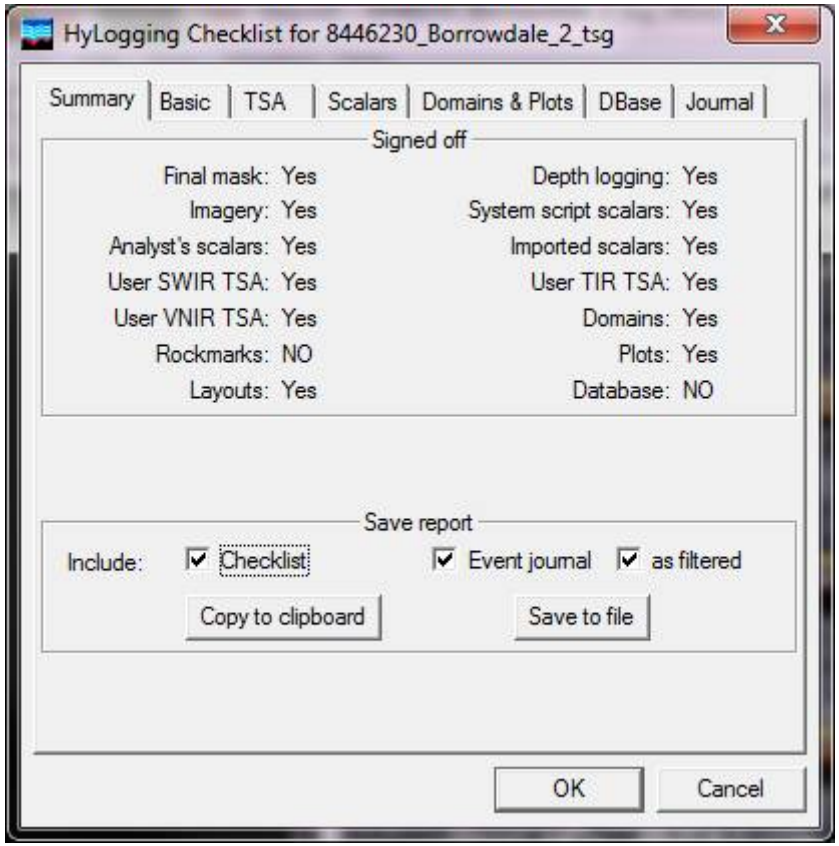


PLS screen (3/3)

- Selected (list or lasso) samples to scratchpad
- Actual vs Predicted plot: “SEP” now called “RMSEP” and accompanied by a new readout “BIAS”.

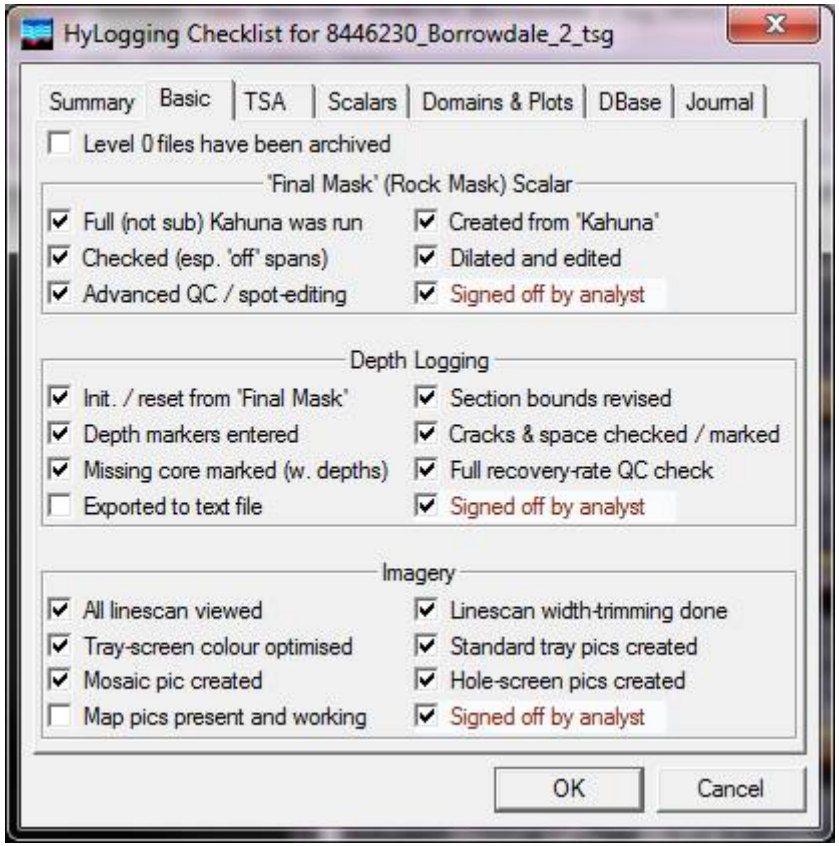
Checklist and Journal (1/3)

- New toolbar button: 
- The checklist and journal are stored in a dataset's `.TSG` file
- TSG Viewer can show the checklist
- **Page 1**: Summary
  - Summary of signed-off checklist groups
  - Checklist and / or journal reports to clipboard or file



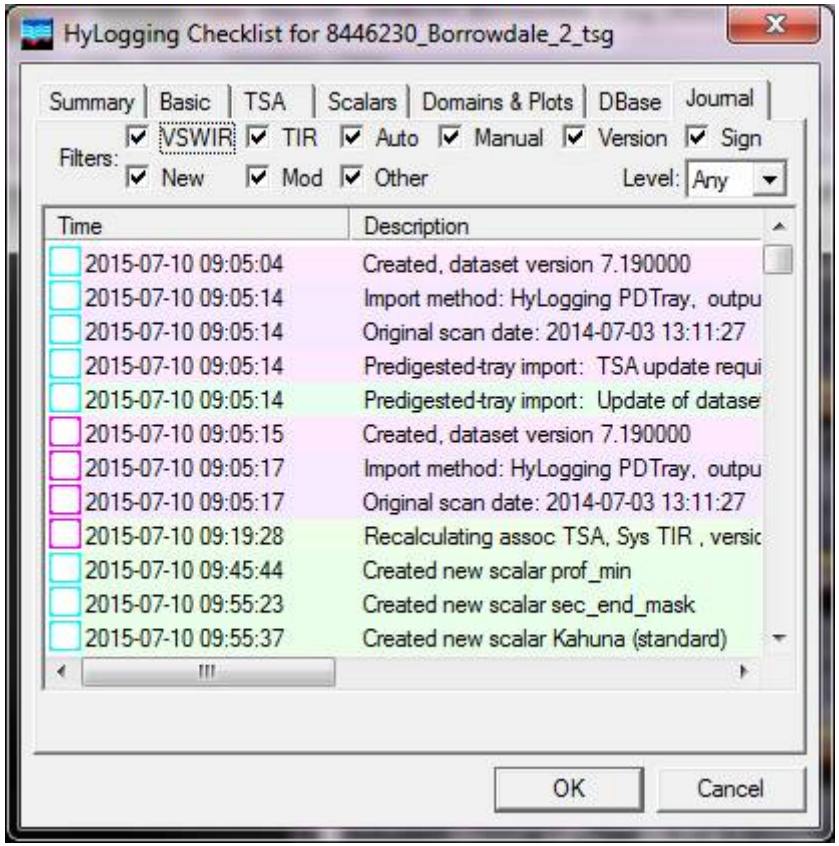
Checklist and Journal (2/3)

- **Pages 2..6**: Checklist
  - 5 pages, 14 groups, 84 items!
  - Basic HyLogging workflow represented
  - Journaled signoff for each group
  - You *shall* comply



Checklist and Journal (3/3)

- **Page 7**: Event Journal
  - Various sorts of changes to a dataset are logged by TSG
  - Most entries are logged automatically. (The exception: optional analyst comments.)
  - Date / time, TSG site & version, and username are recorded against each event
  - The display can be filtered by category /priority, and is coloured by priority
  - Entries cannot be deleted

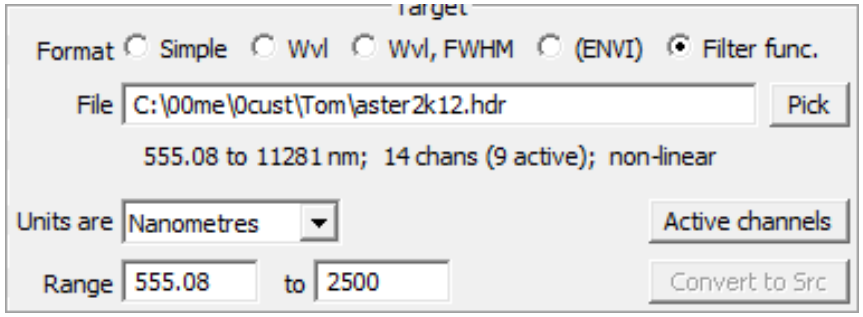


External Libraries

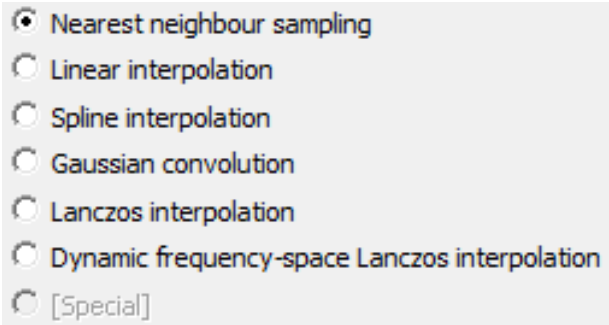
- Advanced support that requires suitably marked-up spectrum names
- New linking procedure to associate library samples with TSG's table of "known minerals"
- It starts with an updated "Attach aux"
- Domain RMS editing
- Domain-RMS-subsetted CLS results
- Floater TSA and CLS support

Downsampler (1/2)

- New option – spectral downsampling.
  - Supported in unsupervised mode; good for jobs like batch resampling to HyMap
  - More options than in TSG's import (e.g., filter-function library)



  - Several resampling methods



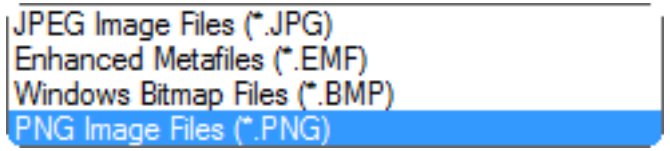
  - Result does not have to be at fixed channel spacing

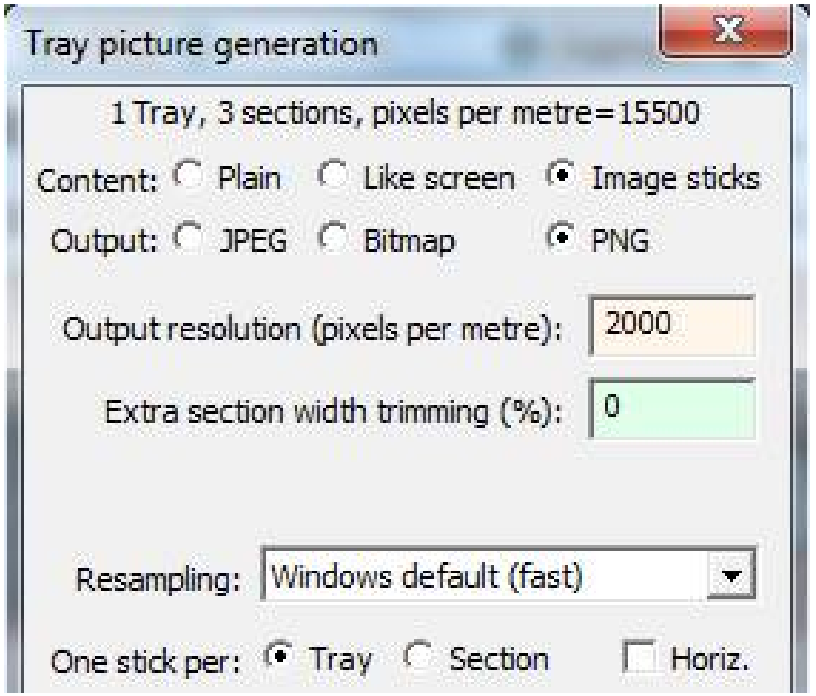
Downsampler (2/2)

- New sub-option – direct batch-scalar calculation on resampled spectra
  - Supported in unsupervised mode; useful for certain workflows.
  - Works directly on resampled spectra (arbitrary channel spacing)
  - Most batch-script methods are supported. (“Import” and “FeatEx” currently aren’t supported.)
  - If this sub-option is used then the resampled spectra don’t have to be saved

Image export

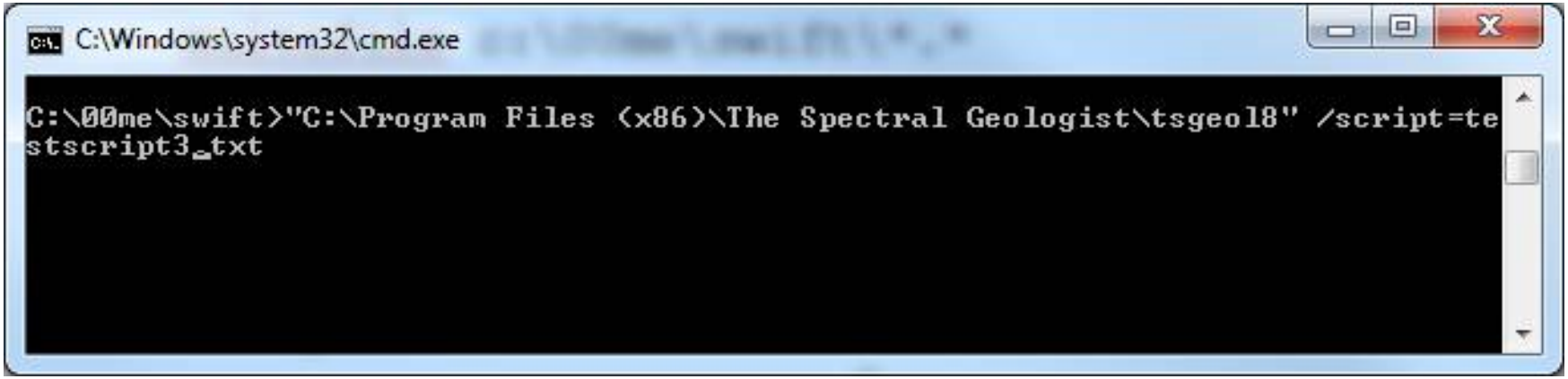
- PNG format for general graphics export (supplements BMP, JPG and EMF)
- Uncompressed linescan from Downsampler
  - ENVI image output
  - Requires no chaperone
- Section and Tray **image sticks** from Tray screen





Batch mode (1/4)

```
MULTIOPTIONS noassoc nodive
multifile c:\00me\swift\*.*
task_begin
operation update
update_items all
task_end
```



- Old Skool! (2015)

Batch mode (2/4)

- TSG runs in the background without showing any windows or dialogs.
- TSG runs one or more tasks specified in a text file.
- TSG can run the tasks on each dataset found by a wildcard file match. It can traverse nested directories. There are some options to restrict the matching.
- A log file records what was done.

Batch mode (3/4)

- Database upload
  - Some checking options (e.g., user TSA present)
- Database download
  - Single dataset only – multi-file system not supported
- Dataset update
  - Some options on what to update: dataset format; specific system and user TSA result sets; SWIR and TIR CLS result sets
- Copy processing
  - Works according to a template TSG dataset
  - Options to copy scalars and / or layouts
  - Can include the dataset update task (run first)
- Downsample
  - Works according to a configuration script saved from the downsampler
  - Option to override output directory (e.g., one directory for result collection)
  - Some options for tolerance (e.g., carry on even if some config scalars aren't found)

Batch mode (4/4) (2016)

- Hasta la vista, command line! TSG can schedule unsupervised jobs. **File -> Special -> Schedule a script for unsupervised TSG**.
- The Downsampler's new functionality is supported.
  - Datasets can be opened **read only** (i.e., no TSG7->TSG8 update forced / required)
- New task: Testrocks
  - Works on one or more VNIR-SWIR Testrocks datasets
  - Datasets can be opened **read-only**
  - Uses a profile method to find feature positions
  - Reports on feature positions for one or more of: mylar (7 features); pyrophyllite (6 features); kaolinite (3 features); talc (11 features)
  - Collates results in one table.
- New task: "Kaolin" wavelength checker
  - Works on one or more general VNIR-SWIR or TIR datasets
  - Datasets can be opened **read-only**
  - Uses TSA to filter candidates, then uses a profile method to find feature wavelengths
  - Reports (wavelength, Std. Dev.) on kaolin 2160 or 2206 for VNIR-SWIR; Quartz 8625, Quartz 12625 or Apatite 9200 for TIR
  - Collates results in one table

Drag & drop

- Opened up considerably
- Main TSG window now takes one TSG file (open); multiple TSG files (merge); PLS file; identifiable import files (e.g., _pdtray.TSG, SDS, SDF, HDR, DSP, SED, CSV)
- Floater takes TSG (aux); HDR (scratchpad); STA (stats)
- Most dialogs that have file selection (e.g., individual import-wizard pages) take files or directories

Keyboard support

- Many “keyboard accelerators” (hotkeys) now
- TSG main window and Floater windows have their own sets of keyboard accelerators
- Tray screen’s depth-logging tool has its own keyboard accelerators
- One or two special accelerators (<CTRL><DEL>)
- See **Help -> Keyboard accelerators** - or press **<ALT>F1**!
- Most plots that have a sample marker or a sense of “the current sample” understand **arrow keys**

Scalars

- New batch-script method **aux match**
- New Profile scalar result - **relative peak height**
- New Profile scalar result – **relative range**
- New Pfit scalar result – **relative range**
- New HyLogging import-time scalars

```
p1 = auxm, layer=REF, auxlib=tmp1.tsg,
algo=correl, method=names, level=group,
localbkrem=yes, minscore=0.9,
wmin1=2100, wmax1=2450
```

- Like relative depth but for peaks (TIR)
- (max-min) / mean

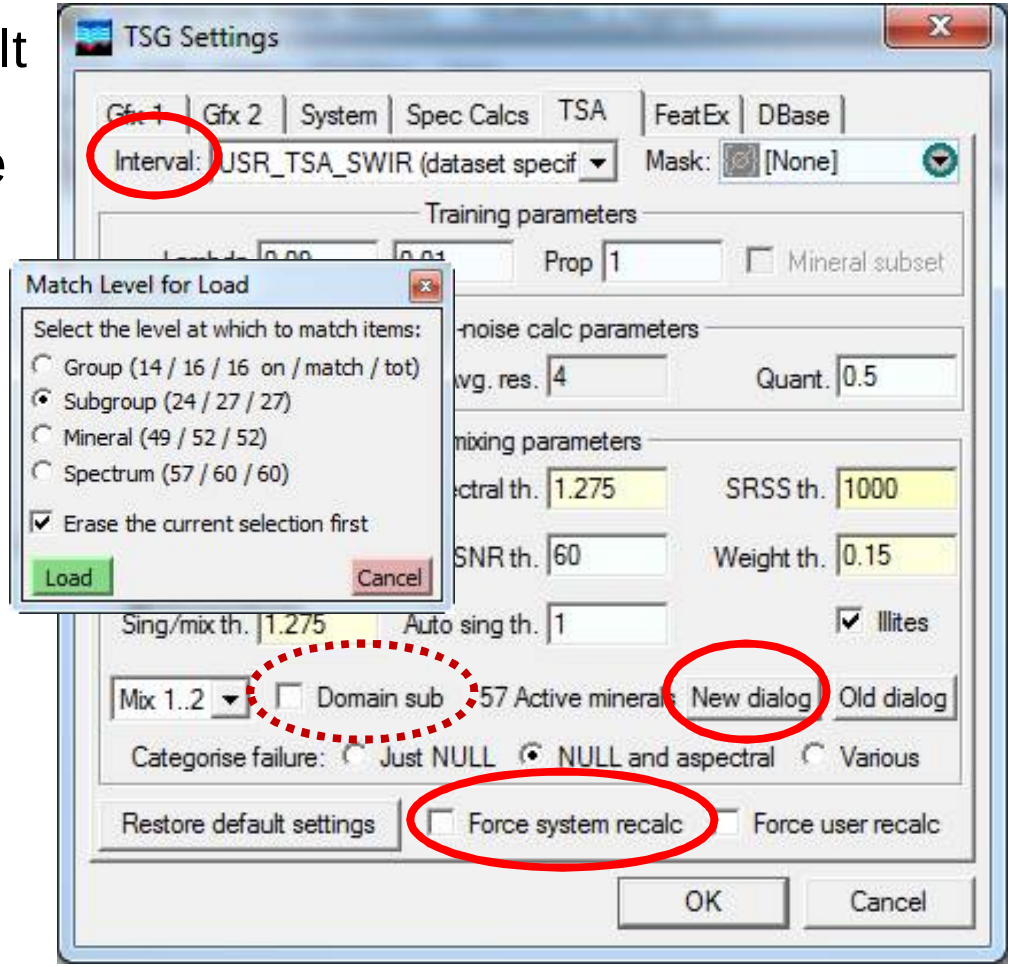
- Poly de-trend; (max-min) / mean
- Virtual Section and PFit Relative Range

Import

- New format supported – **CSV table of spectra**
  - Spectra in columns or rows
- New format supported – TerraSpec (ASD) **HALO**
  - Project file includes scalars that can be selected for import
  - Concept can be used more generally (i.e., without a HALO)
- New format supported – Spectral Evolution **oreXpress**
  - Custom option in TSG's ASCII XY import
- "TIRSampShift" aux-file kludge for adjusting HyLogger3 TIR alignment in the SDS import
  - Whole number (times 4mm samples), **+** to push TIR down, **-** to pull up
- HyLogger1 SDF import supports the TIR datastream

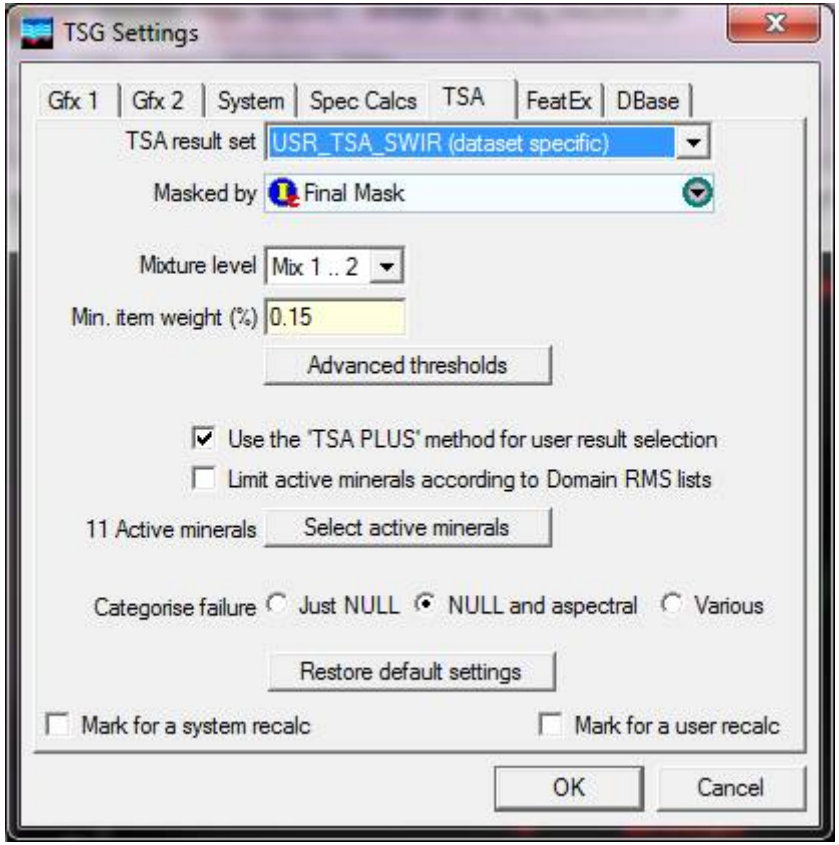
Settings (1/4) – TSA (2015)

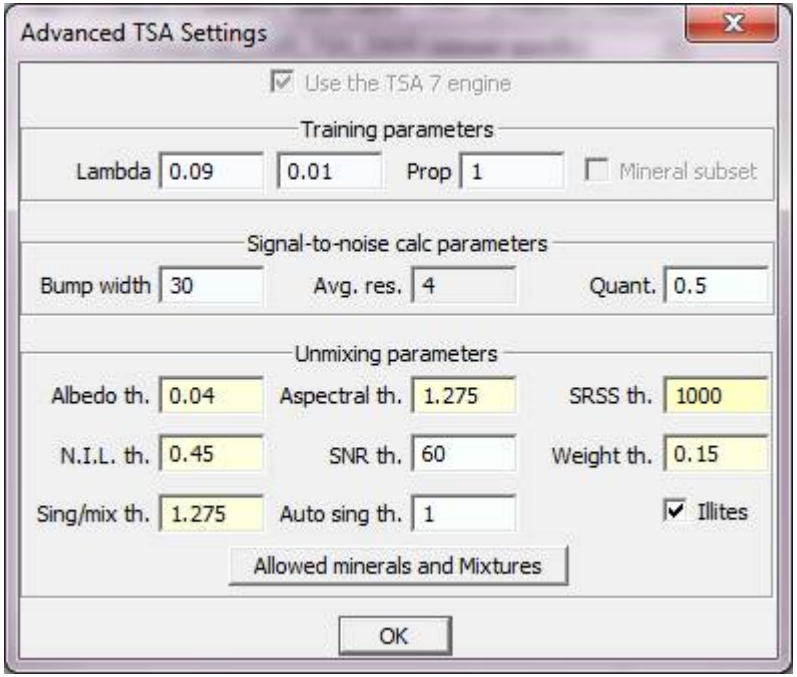
- **Interval** list includes all TSA result sets in a dataset pair.
- **New dialog** button brings up the new-style list for active mineral selection. (Old dialog is still there for the traditionalists.)
  - Right-click menu!
  - Cross-region multi-level import / export
- **Force system recalc** is new. (In the past there just was "force recalc" for user TSA.)
- **Domain sub** is not new, but the TSA scalars it gives you are now called "Domained" instead of "User".



Settings (2/4) – TSA (2016)

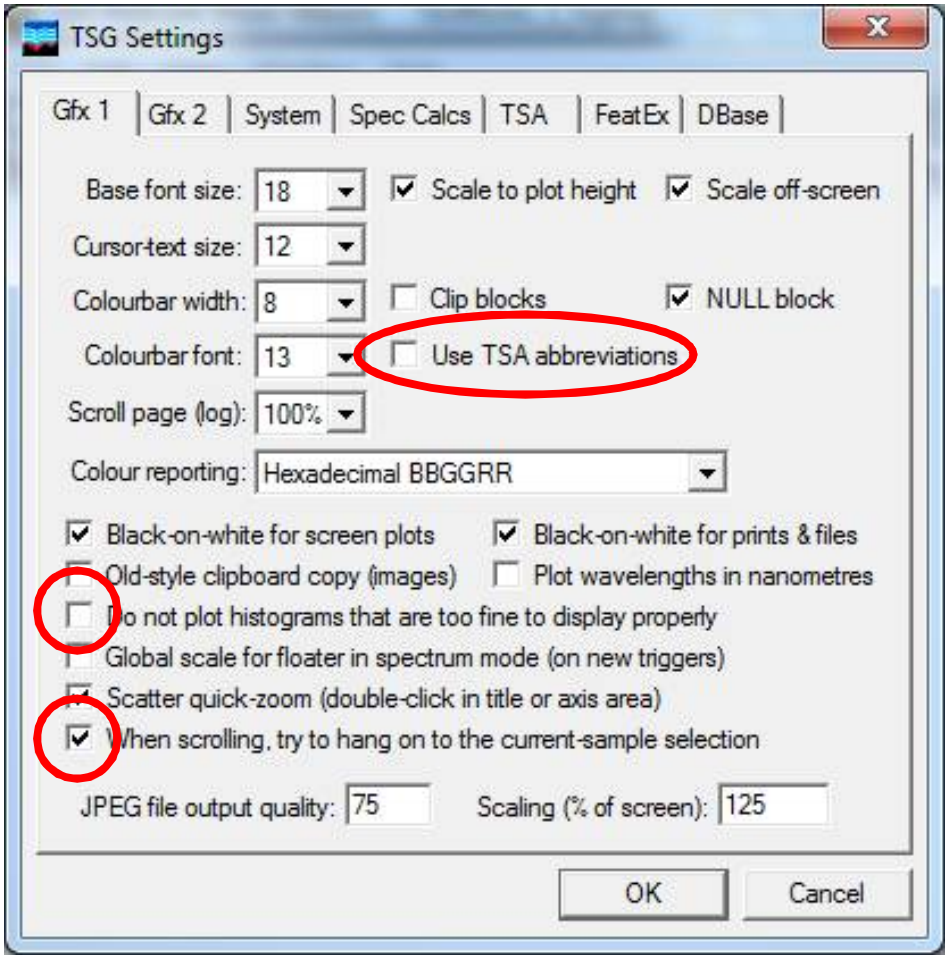
- TSA Settings Reorganised!





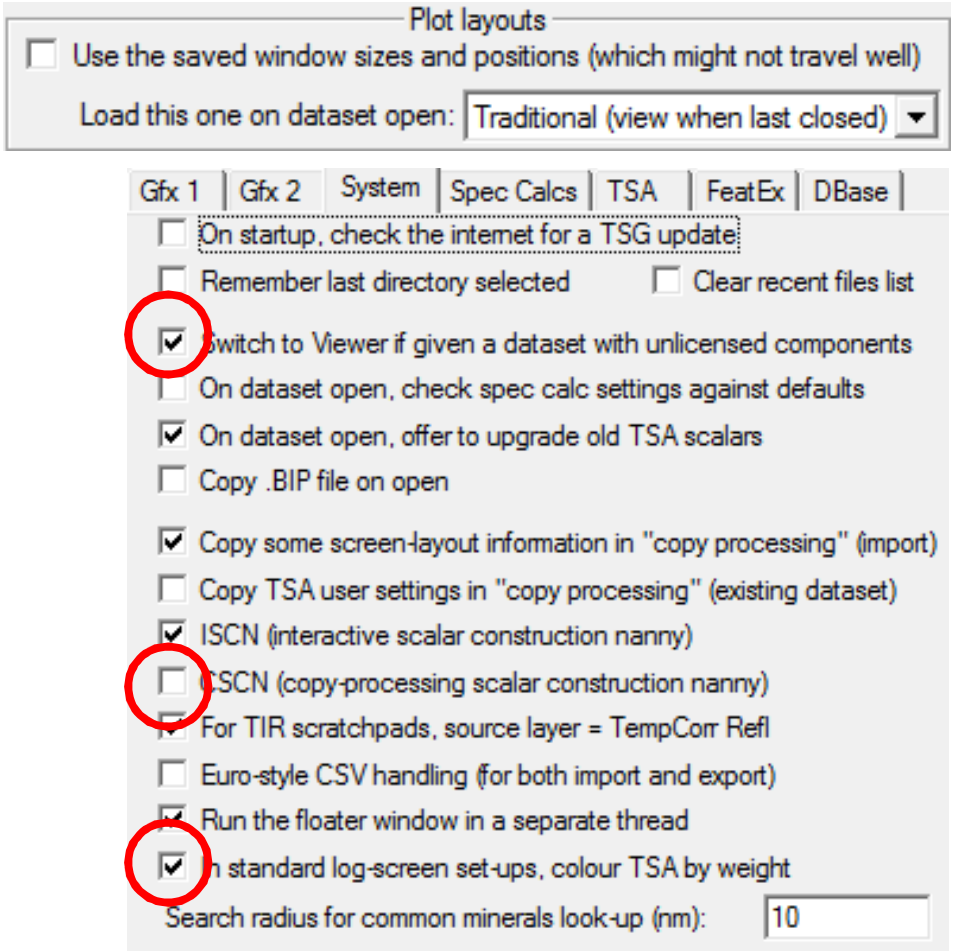
Settings (3/4) – Gfx1

- **Use TSA abbreviations** gives more legible colourbars in TSA-coloured plots.
- The check on **fine histograms** now applies to the Spatial Summary-screen plot too (now that it can have many more bins).
- There's a new option to **lock the sample marker's position on the screen** when scrolling the Log and Stack screens.



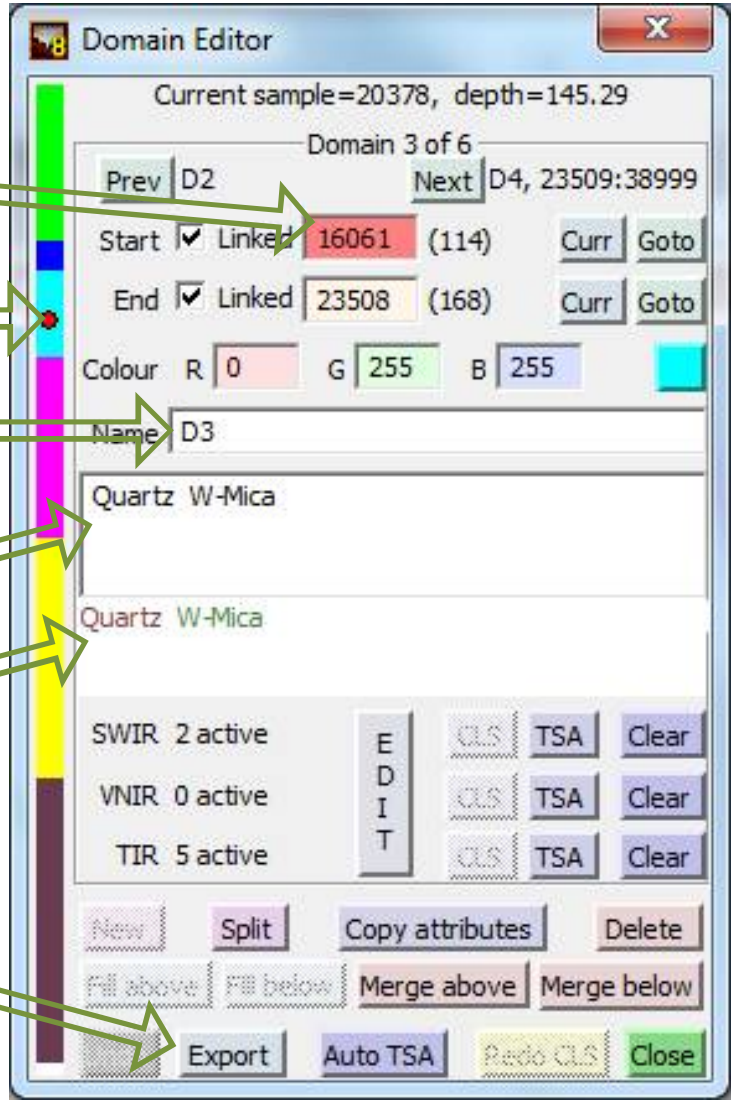
Settings (4/4) – Gfx2 and System

- Remembering window positions is optional.
  - Watch out for that layout list selection (groundhog day experience).
- "Switch to Viewer" has been a useful option for side-kicks with lesser licenses (to turn off), and is more relevant in TSG8.
- CSCN is new.
- The default Log-screen set-up has changed, but you can have "colour by weight" back if you like.



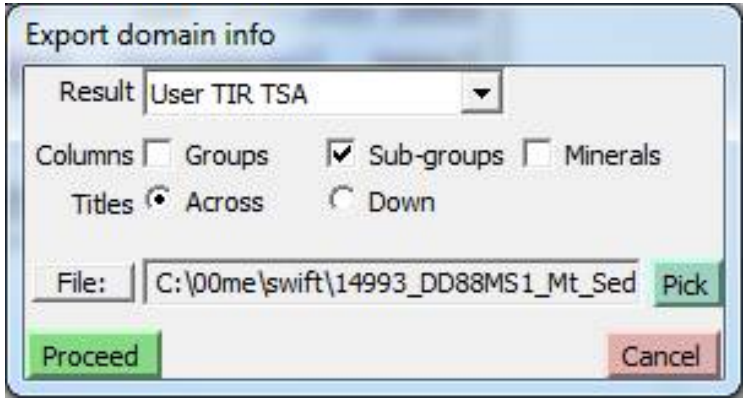
Other dialogs (1/8) – Domain editor

- Domain editor
  - **Boundary field** is strong **red** if on a masked-on sample
  - **Nav dot** is red if current sample is masked off
  - The first 2 characters of the **domain name** are managed by the system. You can enter your own text after that.
  - The **description** field is still yours to play with
  - New ***dynamic***, colour-coded domain **sub-group list** (VNIR, SWIR, TIR)
  - What's that? (See next page)



Other dialogs (2/8) – Domain editor

- Domain editor – **Export**
  - CSV Summary of a TSA or CLS result set
  - One row (or column) per domain; normalised percentages
  - Click the **File** button to toggle it and get a clipboard copy option.



om_Dep	To_Depth	SILICA	K-FELDSP/	PLAGI
0.00342	95.99683	95.99441	0.066297	0.3756
5.00391	113.9975	81.11343	0.751411	1.6941
	168.0016	96.39488	0.07522	

Other dialogs (3/8) – Domain editor

Domain Exported Domain Properties Formats

Domains downwards Minerals Across, or vice versa. Groups or Groups & Minerals for each spectrometer, i.e. 3 csv files, e.g:

Name	Red	Green	Blue	Descriptio	From_Sam	To_Sample	From_Dep	To_Depth	WHITE-MI	SMECTITE	OTHER-AL	CHLORITE	DARK-MIC	AMPHIBOL	EPIDOTE	CARBONA	SULPHATE	INVALID
D1 Arthur	0	255	0	Carb Qtz	0	26959	334.5	523.9068	2.552116	0.259131	0	0.727725	0.001518	0.002205	6.192138	71.45943	0.34912	18.45662
D2 Lower	95	26	255	Qtz carb	26960	29428	523.9068	541.4591	0	0	0	0.104004	0	0.029344	0.393134	6.129785	0	93.34374
D3 Thornt	0	255	255	Quartz Sm	29429	34568	541.467	578.3665	0.081672	0.065028	0	0.055067	0.009571	0	0	99.17847	0	0.610185
D4 Red He	255	0	255	Quartz K-F	34569	38190	578.3745	603.3914	38.13964	1.029442	0	2.705094	0	0	1.273922	48.37985	3.698447	4.773605
D5 Upper l	255	255	0	Quartz K-F	38191	51207	603.3989	693.6895	21.2218	1.027984	0.813107	45.43991	2.547068	19.80014	6.457474	1.304117	0.039613	1.348784
D6 lwr b'm	141	71	71	Quartz K-F	51208	54572	693.6973	717.25	4.890872	0	0	22.89012	37.63008	8.388073	22.21968	0.006546	0	3.97463
D7 lower b	255	0	128	Quartz K-F	54573	60749	717.2578	760	6.508453	0	0.058844	23.04057	23.50904	37.40708	5.854541	0.070546	0	3.550925

Name	D1 Arthur Creek Fm	D2 Lower Arthur Cr	D3 Thorntonia Lst	D4 Red Heart Dolo	D5 Upper basemen	D6 lwr b'ment with	D7 lower basement
Red	0	95	0	255	255	141	255
Green	255	26	255	0	255	71	0
Blue	0	255	255	255	0	71	128
Description	Carb Qtz W-Mica gypsum. Bad vol scattering impacts carb & qtz. Lower part goes aspectral in SWIR with increasing organics. Contains	Qtz carb possibly white mica. Bad vol scattering impacts carb & qtz. Mostly aspectral in SWIR due to organics. Apatite-rich sandy	Quartz Smectite-Al Carbonate-Mg-Ca Apatite. Carb W-mica. Vol scattering on qtz etc near 8200 nm. Not vonsenite!	Quartz K-Feldspar Carbonate-Mg-Ca Gypsum Apatite W-Mica Smectite-Al	Quartz K-Feldspar Albite W-Mica Prehnite Chlorite Amphibole-Ca Epidote Carbonate-Mg-Ca Gypsum Carbonate-Fe-Mn-	Quartz K-Feldspar Albite W-Mica Chlorite Dark-Micas Amphibole-Ca Epidote Amphibole-Na	Quartz K-Feldspar Albite W-Mica Prehnite Chlorite Dark-Micas Amphibole-Ca Epidote Amphibole-Na
From_Sample	0	26960	29429	34569	38191	51208	54573
To_Sample	26959	29428	34568	38190	51207	54572	60749
From_Depth	334.5	523.906799	541.467041	578.374512	603.398926	693.697266	717.257813
To_Depth	523.906799	541.459106	578.366516	603.391357	693.689514	717.25	760
WHITE-MICA	2.552116	0	0.081672	38.139637	21.2218	4.890872	6.508453
SMECTITE	0.259131	0	0.065028	1.029442	1.027984	0	0
OTHER-ALOH	0	0	0	0	0.813107	0	0.058844
CHLORITE	0.727725	0.104004	0.055067	2.705094	45.439911	22.890123	23.040571
DARK-MICA	0.001518	0	0.009571	0	2.547068	37.630081	23.509041
AMPHIBOLE	0.002205	0.029344	0	0	19.800138	8.388073	37.407078
EPIDOTE	6.192138	0.393134	0	1.273922	6.457474	22.219679	5.854541
CARBONATE	71.459427	6.129785	99.178474	48.379852	1.304117	0.006546	0.070546
SULPHATE	0.34912	0	0	3.698447	0.039613	0	0
INVALID	18.456615	93.343735	0.610185	4.773605	1.348784	3.97463	3.550925

Other dialogs (4/8) – Domain editor

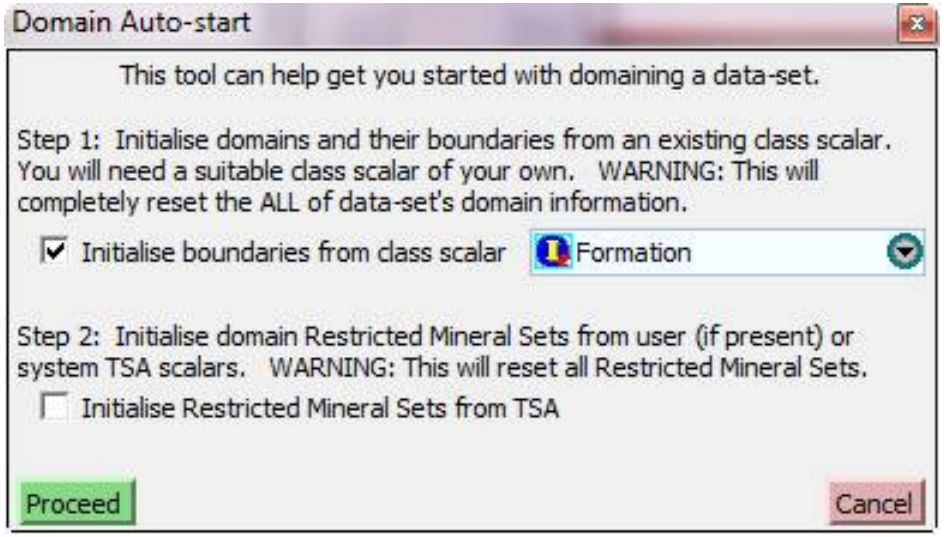
These can be edited and formatted in Excel and/or exported to a traditional logging package and copied directly into your drill hole report or paper

Name	D1 Arthur Creek Fm	D2 Lower Arthur Crk black shales	D3 Thorntonia Lst	D4 Red Heart Dolostone	D5 Upper basement	D6 lwr b'ment with f'spar+biot & less amph	D7 lower basement
From_Depth	334.50	523.91	541.47	578.37	603.40	693.70	717.26
To_Depth	523.91	541.46	578.37	603.39	693.69	717.25	760.00
Interval	189.41	17.55	36.90	25.02	90.29	23.55	42.74
WHITE-MICA	2.6	0.0	0.1	38.1	21.2	4.9	6.5
SMECTITE	0.3	0.0	0.1	1.0	1.0	0.0	0.0
OTHER-ALOH	0.0	0.0	0.0	0.0	0.8	0.0	0.1
CHLORITE	0.7	0.1	0.1	2.7	45.4	22.9	23.0
DARK-MICA	0.0	0.0	0.0	0.0	2.5	37.6	23.5
AMPHIBOLE	0.0	0.0	0.0	0.0	19.8	8.4	37.4
EPIDOTE	6.2	0.4	0.0	1.3	6.5	22.2	5.9
CARBONATE	71.5	6.1	99.2	48.4	1.3	0.0	0.1
SULPHATE	0.3	0.0	0.0	3.7	0.0	0.0	0.0
INVALID	18.5	93.3	0.6	4.8	1.3	4.0	3.6

In this case the long descriptions have been removed

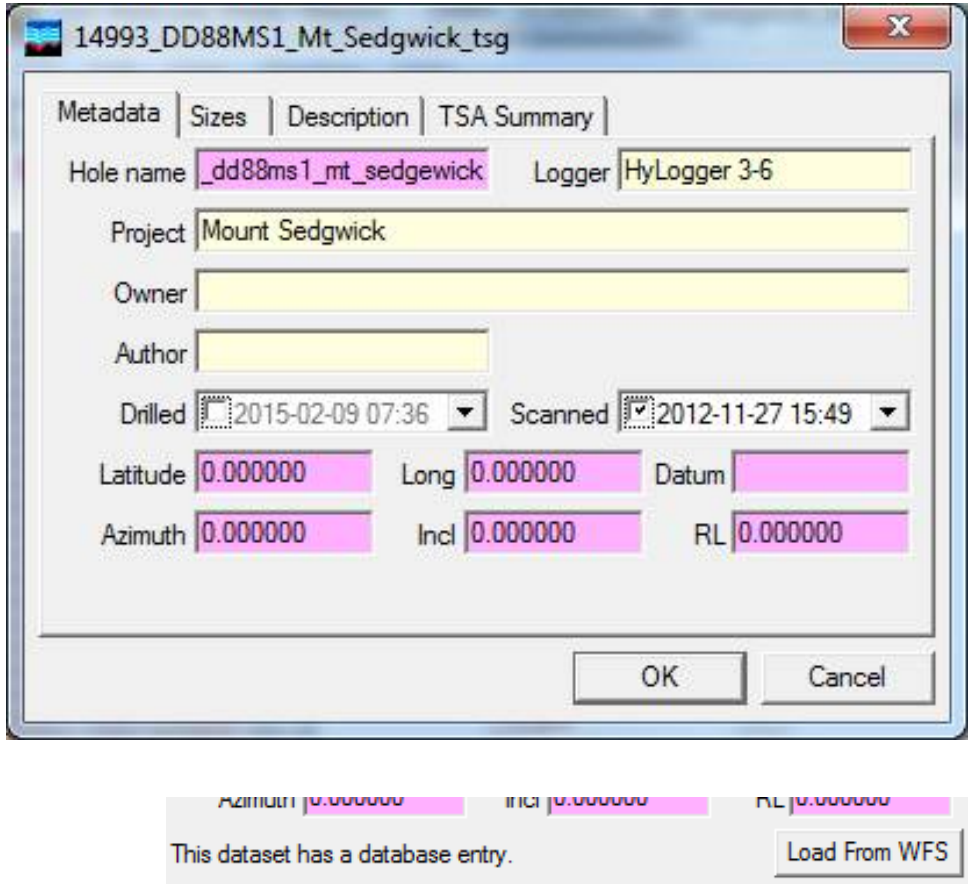
Other dialogs (5/8) – Domain editor

- New button – **Init**
  - You can initialise domains from a class scalar's boundaries
  - You can also do an "Auto TSA" initialisation here.
  - If you do both, the Auto TSA part is done in a special way – class superset RMSes.
  -



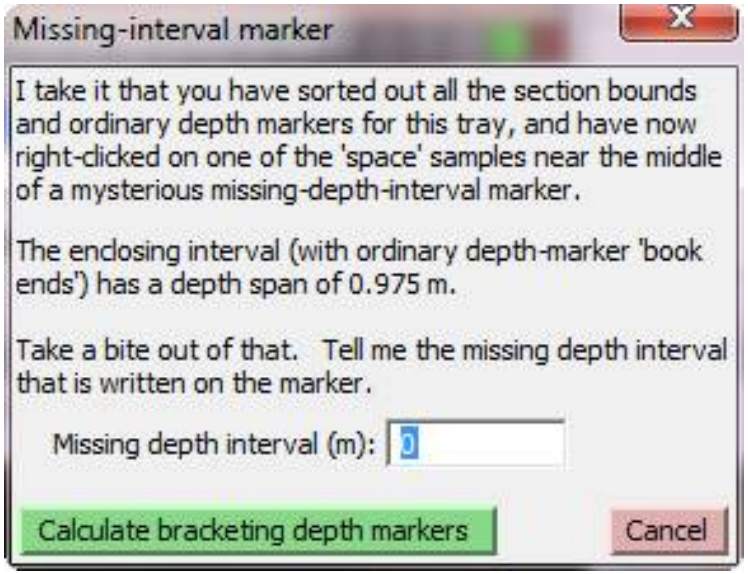
Other dialogs (6/8)

- File -> Dataset Info, “Metadata” tab
  - Contents now saved to and loaded from the NVCL database
  - Pink fields might have proper counterparts in the borehole database; edits in TSG may be overridden
  - If your borehole info is valid then *you can* load the pink locational fields from the borehole database



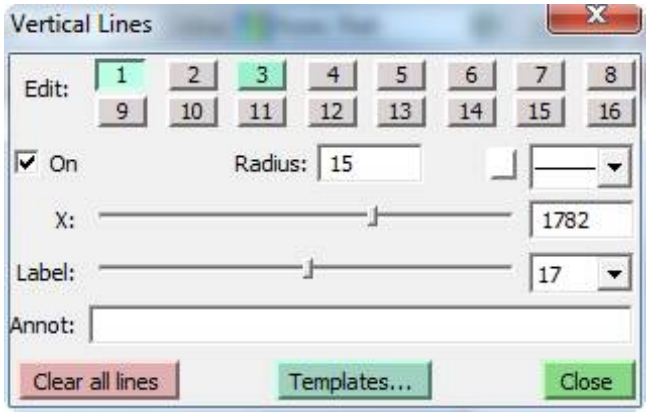
Other dialogs (7/8)

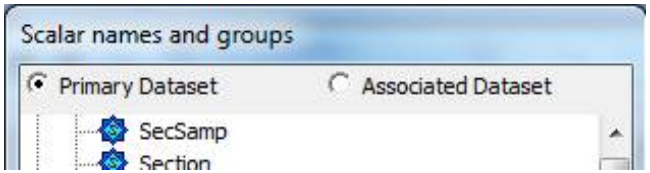
- Depth logging
  - The **right-click menu** has a new option called “Missing interval marker”. It brings up a dialog that will help you deal with those markers that just report something like “0.44 m missing”.
  -

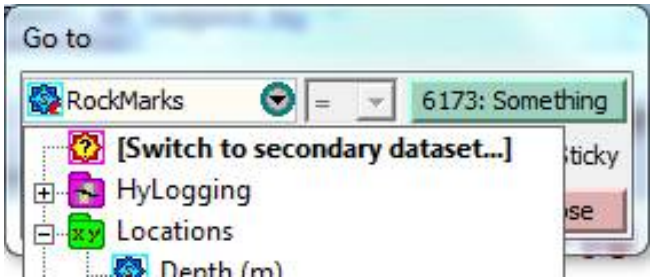


Other dialogs (8/8)

- Vertical Lines
  - Buttons for easy access
- Scalar Names and Groups
  - Both datasets
- Go To
  - Both datasets

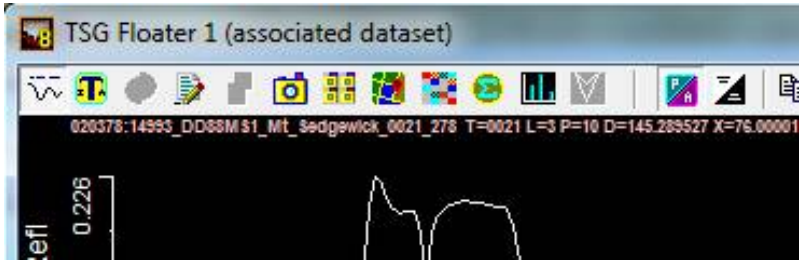


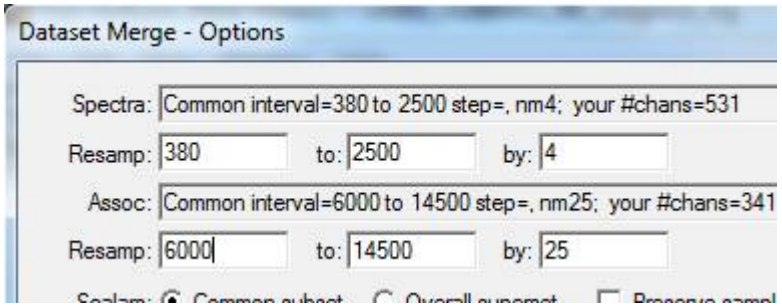


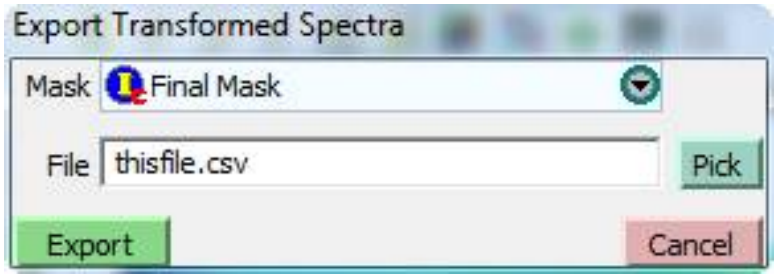


Miscellaneous (1/3)

- Red plot titles
  - Single-sample plots have a **red title** if their sample is off in final_mask
- Merge
  - The Merge module is more tolerant, and deals with dataset pairs
- Floater Stats mode
  - can export transformed spectra to a CSV table







Miscellaneous (2/3)

- New colour tables with fringe focus
  - “Mirrored rainbow” and “Dead centre”
  - Reduced visual impact for mid-range values (e.g., good for spectral derivative plots)
- Change to default Scatter-screen layouts
  - “Set” group scope coloured by Set Mineral
- Change to default Log-screen layouts
  - No spectral columns!
  - Depth instead of Index
  - TSA “coloured by weight” off by default (Setting)
- Downsampler tweak
  - Silent profilometer inclusion when downsampling on Index with a bin size of 1
- Layout manager
  - Spinner control to change layout order

Miscellaneous (3/3)

- ENVI import
  - A “bad bands list” (individual channels marked as dud) is quietly supported. Bad bands are automatically excluded from the import and interpolated over.
- SDS import
  - Lossless (PNG) image import is supported (but the HyLogger currently struggles to keep up). Active use tba
- Linescan image magnification loupe
  - Tray and Log screens
  - It works with a mouse that has a “wheel” middle button.
  - Middle-mouse-button down to bring up the loupe; roll the wheel to adjust the magnification
- Tray pic generation – image sticks
  - You can now create one stick per depth interval, e.g., one stick per 1.5 metres
  - Width trimming now works on them
  - You can discard unwanted intervals by using a mask

A few reminders

- Settings -> Dbase
  - Once, sometime, for TSG8.
- Settings -> Gfx2
  - Maybe I can use those new mirrored colour tables on my Derivative layers?
- Scalar Names and Groups
  - Now I remember. Funny how the list changes depending…
- Scalar construction wizard
  - There's something plain awkward about this one
- Scalar construction – CLS
  - There's something interesting here