IMDEX ioGAS™

New Features v8.3

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What's New in ioGAS 8.3

The following is a guide to the new features and improvements in this version of ioGAS.

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        - Niggli mg-c-(al-alk) (Minerals and Rocks)
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See below for detailed information about new features and additional improvements in ioGAS 8.3.

Python Script Tools

Run a python script from within ioGAS using one of the following tools:

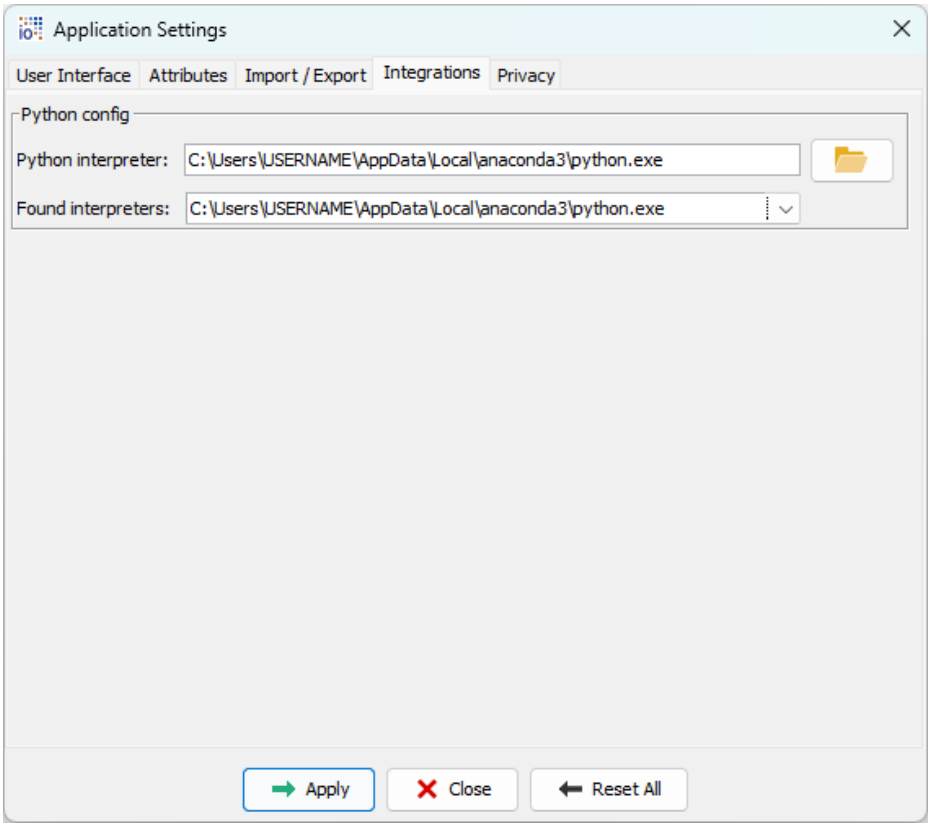
-  **Import via Python** - located on the **File** ribbon. Run a python script to collate and/or process data *prior* to importing it into ioGAS. Removes the step of exporting to CSV from python script and manually importing into ioGAS.

-  **Run Python Script** - located on the **Workflow** ribbon. Run a python script to perform data analysis or other process on the currently open dataset in ioGAS.

The python script tools are currently available in Windows versions of ioGAS only.

Configure Python environment

Located under the **Integrations** tab of the Settings dialog, the python config is required in order to use the python integration tools. Choose from a list of automatically detected python interpreters found by ioGAS or browse to another installed executable or virtual environment location.



The python environment path and port number can also be configured manually in the python.ini file located in the file located in the following folder:

Windows installation - C:\Users\Username\AppData\Roaming\ ioGAS\userConfig (change 'Username' to your login)

The following python packages are required to run python scripts in ioGAS:

- import socket
- import json
- import importlib
- import logging
- import os
- import sys
- import pandas as pd
- import importlib.util
- import argparse
- import inspect

- import numpy as np
- from collections import Counter

Python script importer

Run a python script to collate and/or process data *prior* to importing it into ioGAS

1. Click on the  **Import via Python** tool on the **File** ribbon.

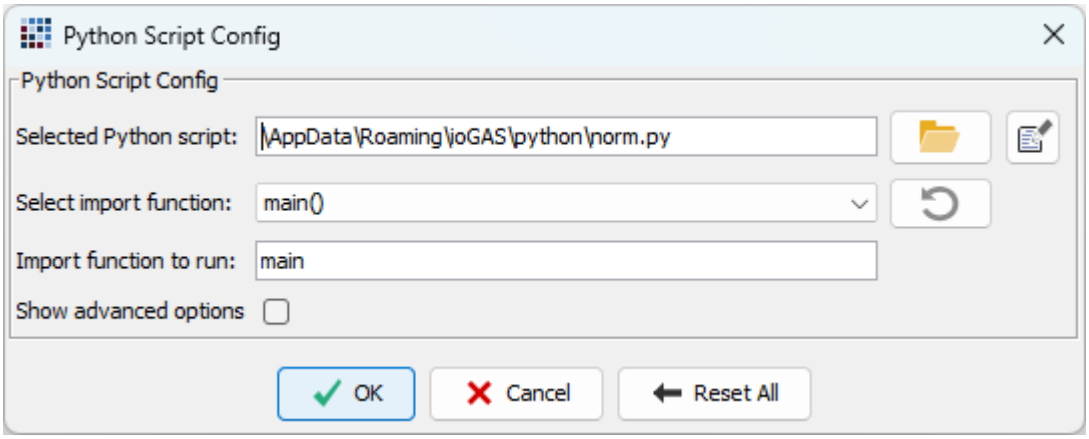
2. Browse to the python script to run on the data to import. By default, the browser opens into one of the following folders:

   Windows installation - C:\Users\Username\AppData\Roaming\ ioGAS\python (change 'Username' to your login)

*contains import_random_data.py example script

This browser is only displayed the first time a python script is selected to run. On subsequent runs, the python configuration dialog is displayed.

3. When selected, the **Python Script Config** dialog is displayed. During loading, the python server is parsing the script for matching functions with the signature:
   - no required arguments
   - returns a pandas DataFrame

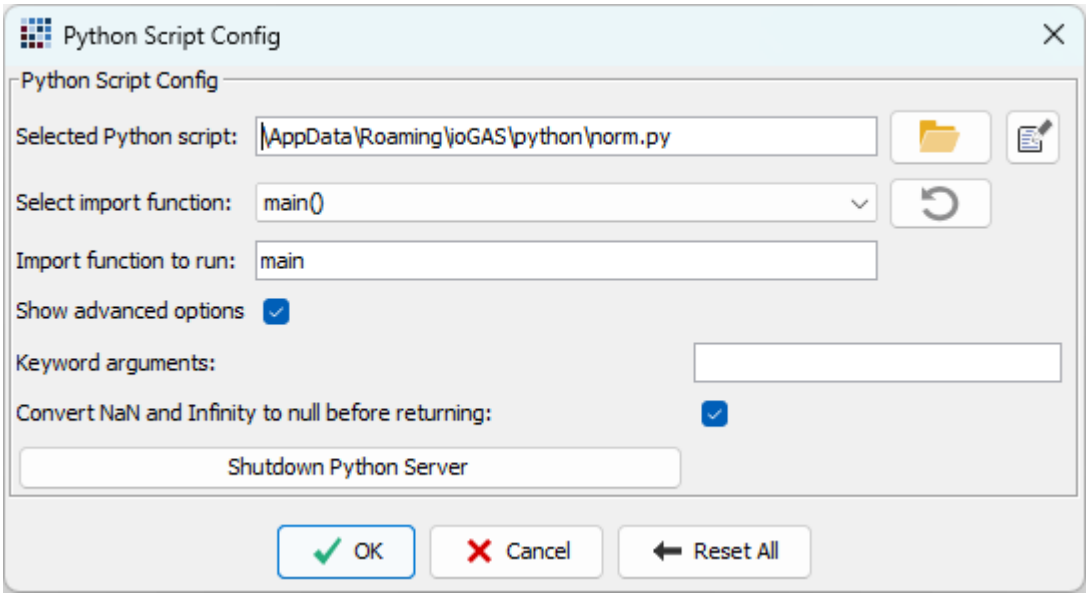


See below for troubleshooting issues that may be encountered.

4. All returned matching functions are added to the **Select import function** drop-down list.

   Select the desired import function from the list. This will automatically populate the **Import function to run** text box.

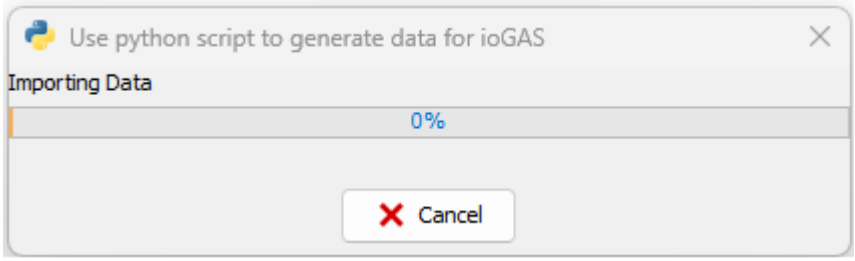
5. To configure arguments sent to the function, check the **Show advanced options** box.



   Enter desired arguments to the function in the **Keyword arguments** textbox such as intParam=5, stringParam="string".

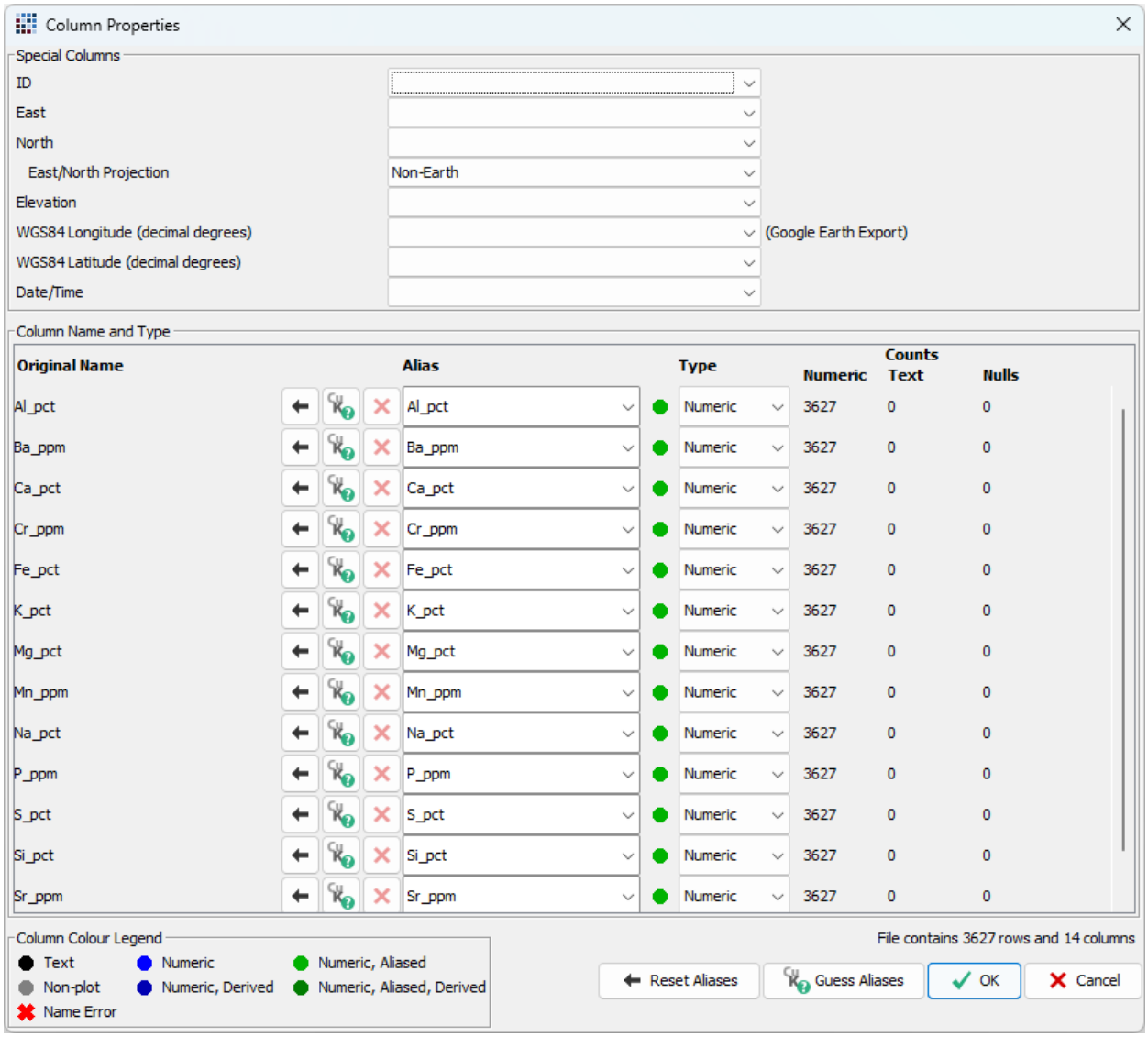
6. Check the **Convert NaN and Infinity to null before returning** box to automatically replace these values. If left unchecked, NaN and Infinity values can be replaced with null later using the Data Doctor.

7. Click OK to run the import function.



If the script is cancelled, ioGAS will attempt to shut down the python run cleanly. If a clean shut down is not possible, ioGAS will force the launched python process to terminate.

8. Once the data import is complete the **Column Properties** dialog is displayed showing the columns in the output DataFrame:

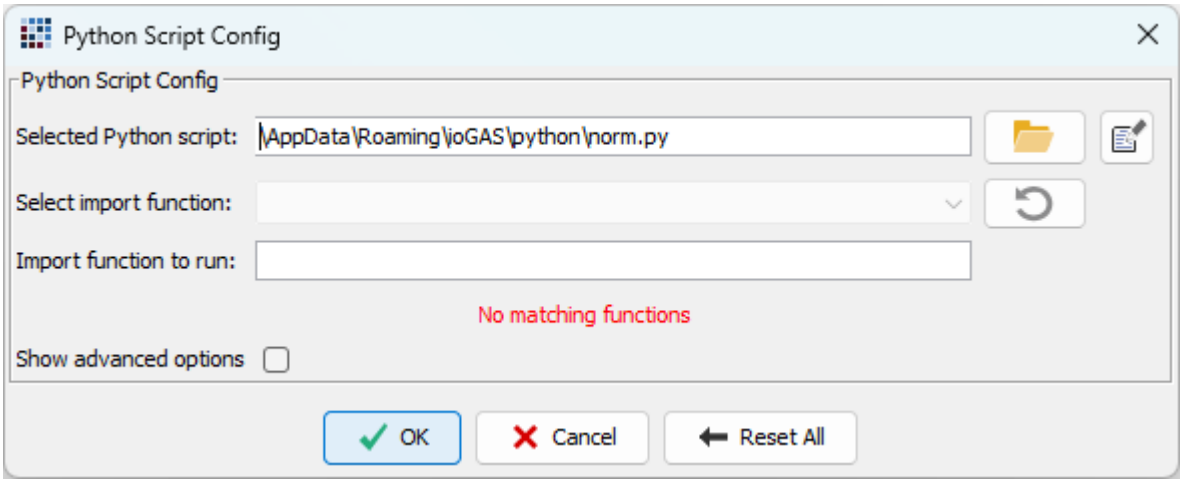


9. Configure the dataset as usual and click OK to open the data into ioGAS.

Troubleshooting

If no matching functions are found, a red status error is displayed. The tooltip will show the required signature for the function.

Use the  **Edit** button to open the python script in the default python editor, the functions to be edited. Use the  **Reload** button to refresh the drop-down list.



The name of the function to run can also be typed directly into the **Import function to run** text box, even if it does not appear in the combo box.

If no functions matching the expected signature (returning a DataFrame) are in the file, the PythonServer will also consider functions that do not declare a return value.

Python Script Runner

Run a python script to perform data analysis or other process on the currently open dataset in ioGAS.

1. Open a dataset into ioGAS.

2. Select the columns to use as the input to the python script in the **Select Variables** dialog.

3. Click on the  **Run Python Script** tool on the **Workflow** ribbon

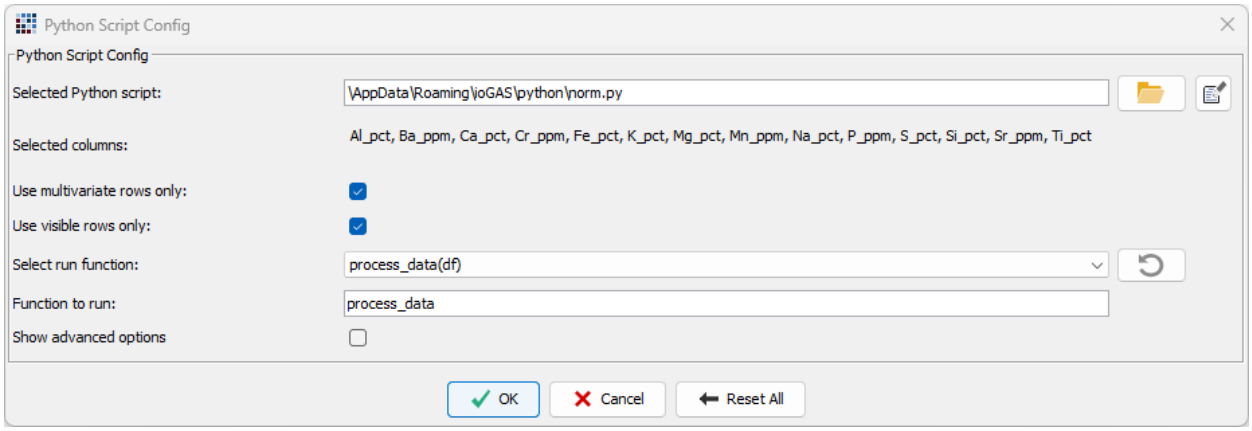
4. Browse to the python script to run on the data to import. By default, the browser opens into one of the following folders:

   Windows installation - C:\Users\Username\AppData\Roaming\ ioGAS\python (change 'Username' to your login)

*contains row_ diffs.py, pacmap.py and hdbscan.py example scripts. Pacmap and hdbscan scripts require relevant modules to be installed.

This browser is only displayed the first time a python script is selected to run. On subsequent runs, the python configuration dialog is displayed.

5. When selected, the **Python Script Config** dialog is displayed:



- **Selected columns** - input columns as defined in the Selected Variables dialog

- **Use multivariate rows only** - option to only use rows that contain a valid entry for all of the selected variables

- **Use visible rows only** - option to only use visible rows as defined in the Attribute Manager

- **Select run function** - matching functions drop-down list

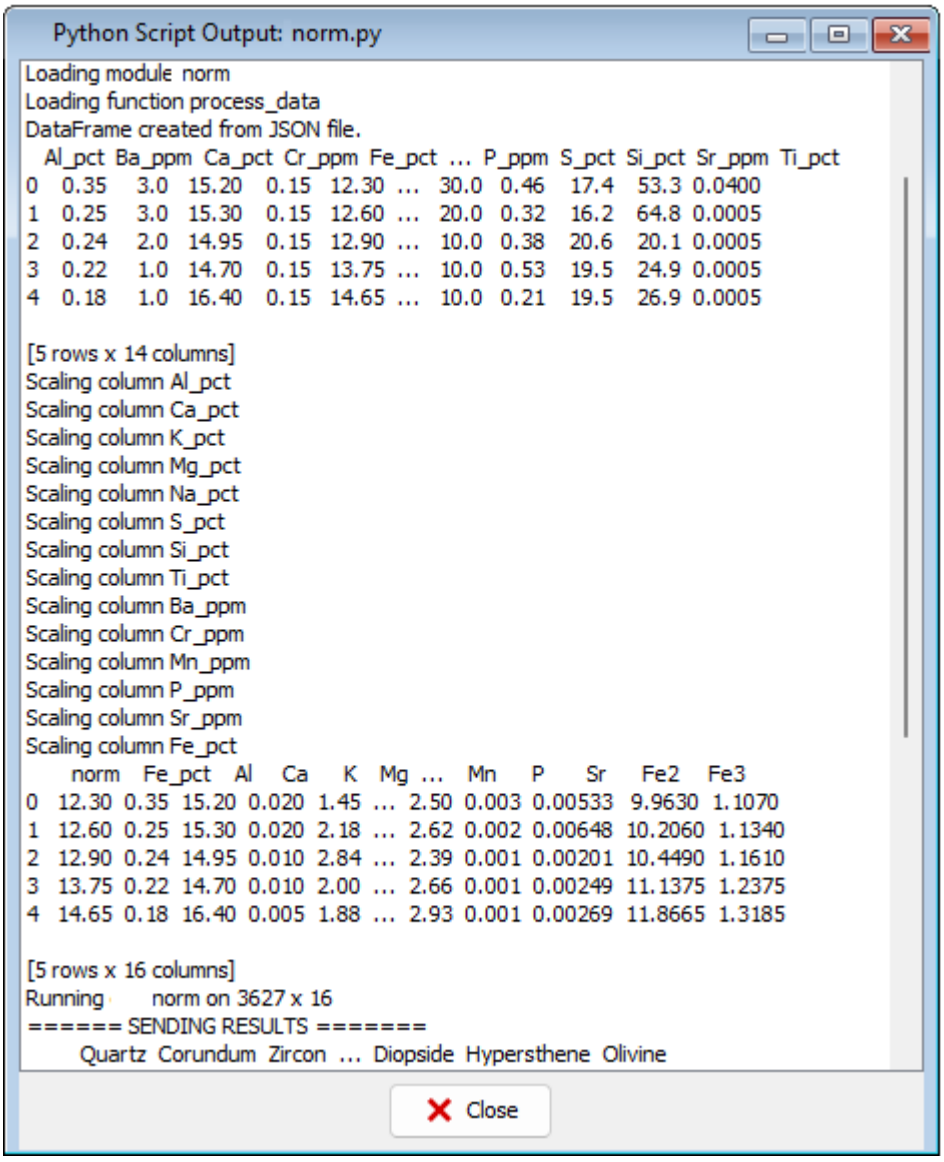
- **Function to run** - text box with function that will be run. Must be a function taking a DataFrame as its first argument and returning a DataFrame. It is recommended to write an entrypoint function named process_data(df) in the target script that calls other required functions.

The drop-down list will also include functions with one untyped argument and with no return type declared, as secondary possibilities.

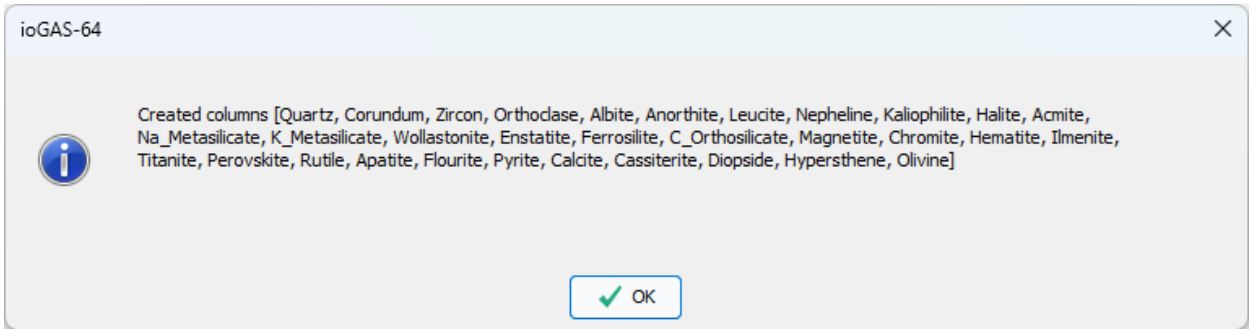
Advanced options

- **Keyword arguments** - enter any arguments to the function in the Keyword arguments textbox, e.g. intParam=5, stringParam="string"
- **Convert NaN and Infinity to null** - automatically replace NaN and Infinity with null values
- **Shutdown Python Server** - use to terminate any hung processes

6. Click OK to run the script. The output window displays the processing steps and any print statements from the script:



7. When the script has successfully completed, it should return a DataFrame containing named columns. These columns will be added to the currently open dataset in ioGAS.

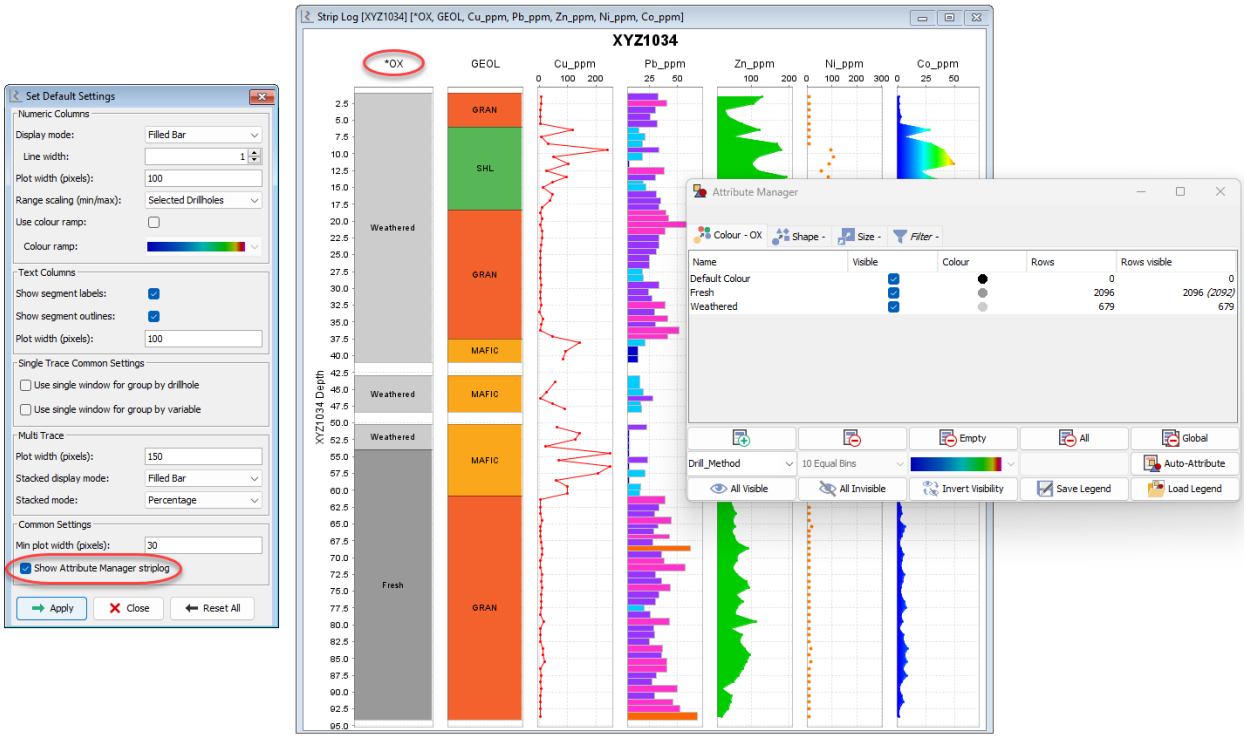


Drillhole Ribbon

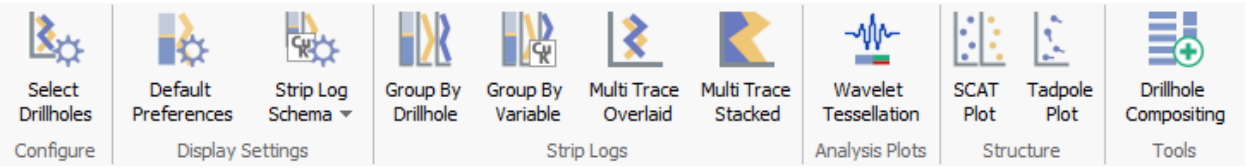
Display colour attribute as strip log

Display the current colour attribute groups as a separate column in a strip log. The attribute column is denoted by an asterisk (*) in the strip log name and responds dynamically to changes to the colour attributes in the Attribute Manager.

The inclusion of the colour attribute strip log is controlled via the **Default Preferences** settings on the Drillhole ribbon.



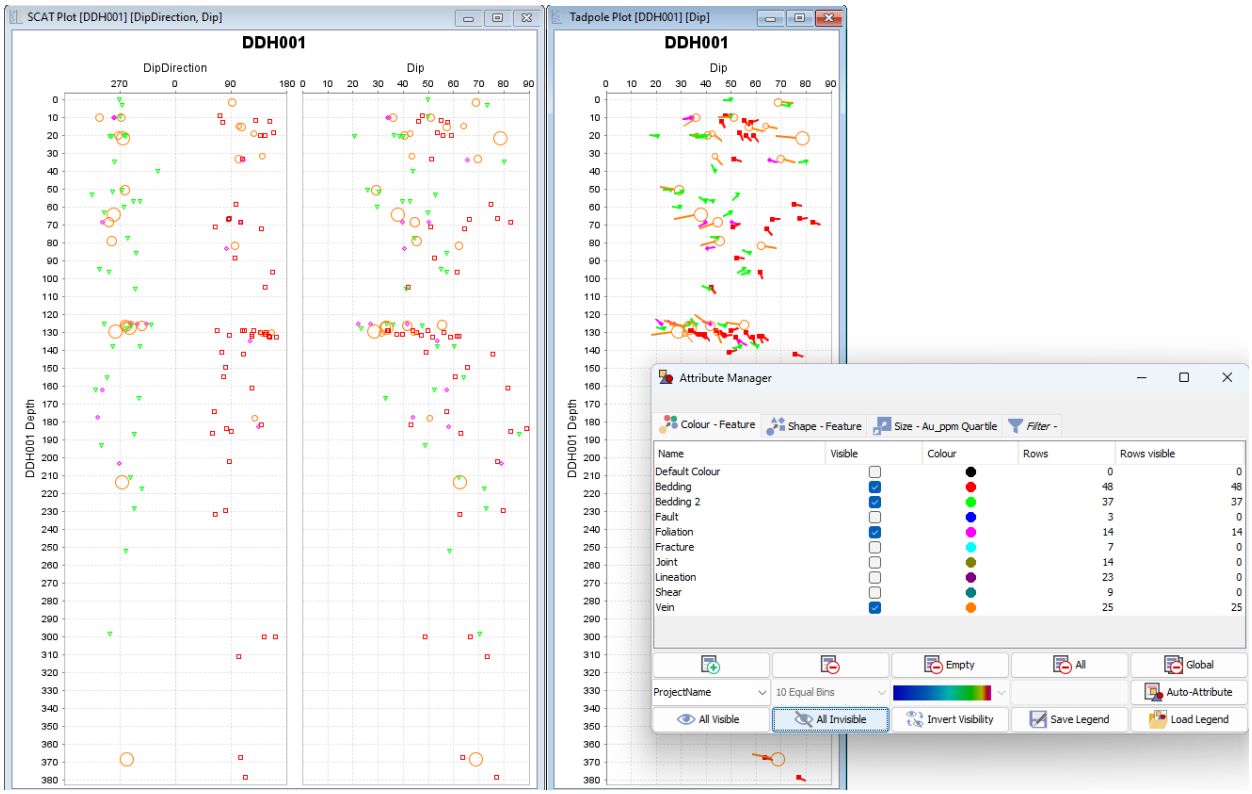
Tadpole plot and SCAT plots



New Structure band on the Drillhole ribbon containing SCAT and Tadpole plot options for displaying downhole structural data in a strip log.

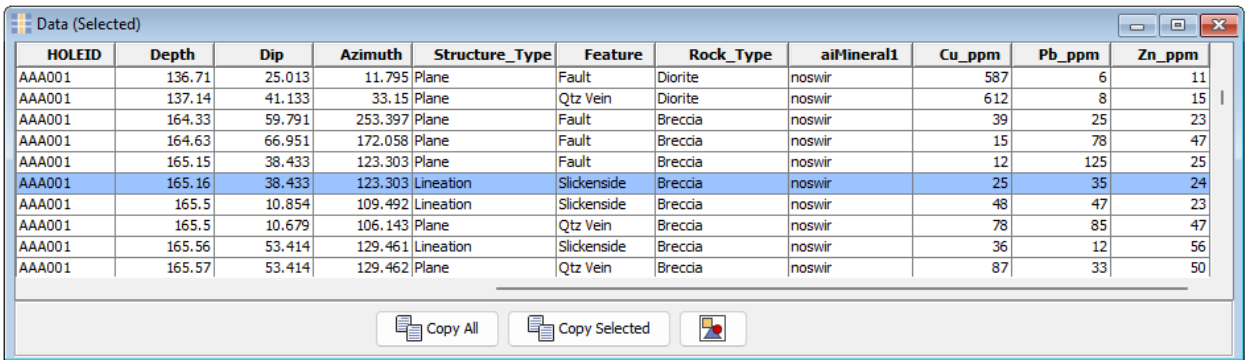
A SCAT plot displays structural geology feature dip and azimuth or dip direction measurements plotted against depth in two separate downhole logs. A tadpole plot displays the dip angle of a structural feature against depth, the tail of the plotted symbol

indicating the feature azimuth/dip direction. Symbols can be coloured by structure type and/or attribute manager symbology.



Drillhole compositing - point data

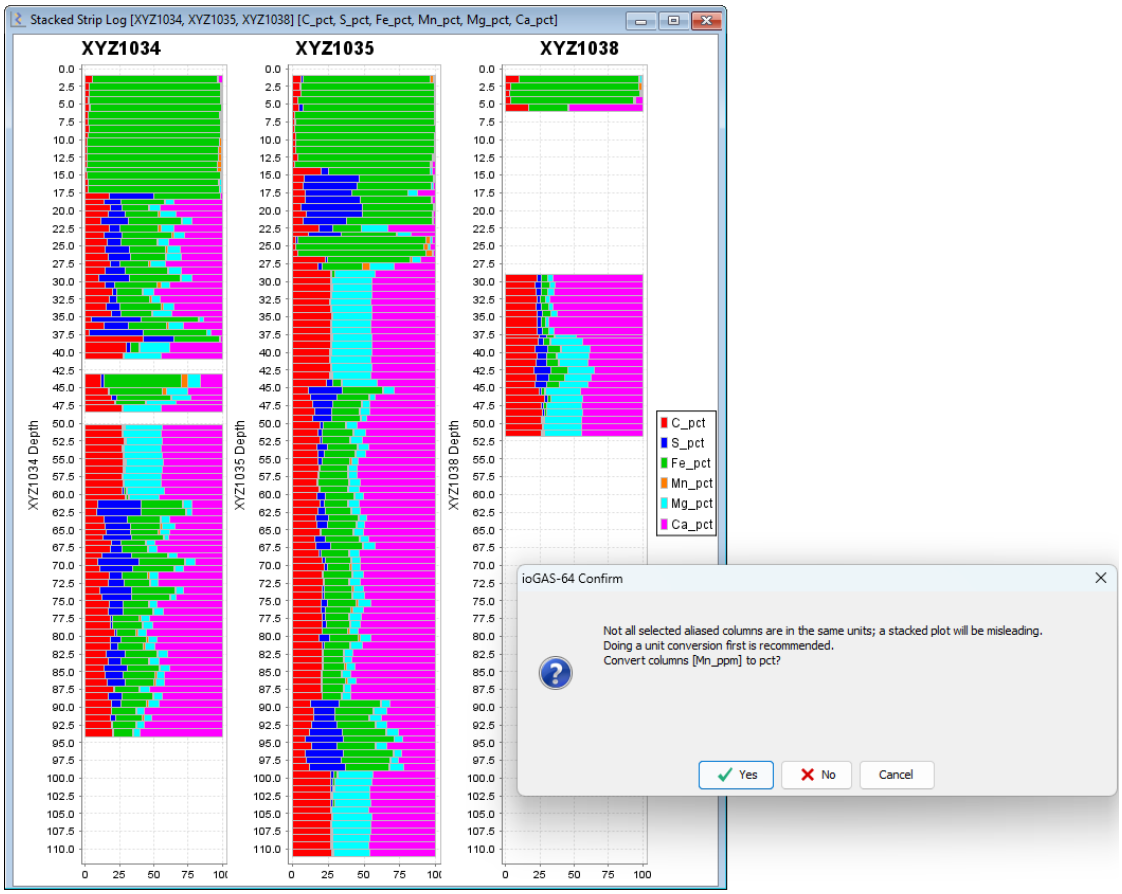
Use the Drillhole Compositing tool on the Drillhole ribbon to assign incoming lithology, assay or other interval data values to existing single point downhole data measurements, e.g. structural features or geophysical readings.



HOLEID	Depth	Dip	Azimuth	Structure_Type	Feature	Rock_Type	aiMineral1	Cu_ppm	Pb_ppm	Zn_ppm
AAA001	136.71	25.013	11.795	Plane	Fault	Diorite	noswir	587	6	11
AAA001	137.14	41.133	33.15	Plane	Qtz Vein	Diorite	noswir	612	8	15
AAA001	164.33	59.791	253.397	Plane	Fault	Breccia	noswir	39	25	23
AAA001	164.63	66.951	172.058	Plane	Fault	Breccia	noswir	15	78	47
AAA001	165.15	38.433	123.303	Plane	Fault	Breccia	noswir	12	125	25
AAA001	165.16	38.433	123.303	Lineation	Slickenside	Breccia	noswir	25	35	24
AAA001	165.5	10.854	109.492	Lineation	Slickenside	Breccia	noswir	48	47	23
AAA001	165.5	10.679	106.143	Plane	Qtz Vein	Breccia	noswir	78	85	47
AAA001	165.56	53.414	129.461	Lineation	Slickenside	Breccia	noswir	36	12	56
AAA001	165.57	53.414	129.462	Plane	Qtz Vein	Breccia	noswir	87	33	50

Multi-trace stacked plot unit conversion

When creating a multi-trace stacked plot the input variables may be in different unit combinations which produce undesired results particularly when creating percentage plots. When this is detected users can elect to convert the selected variables into the same units prior to plotting.



Installation (Windows OS)

Single ioGAS launcher

The new ioGAS installation executable file for Microsoft Windows is designed to automatically compute ioGAS performance limits based on the computer usable installed RAM.

This removes the need to install a higher limit ioGAS executable file when existing application limits for importing data, gridding or opening a SPLOM are reached.

Renamed installation folder

The ioGAS default installation location for computers running the Microsoft Windows OS is now C:\Program Files\IMDEX (previously ioAnalytics).

Installation (MacOS)

Renamed installation folder

The application name of the ioGAS installation on the Mac is now called IMDEX ioGAS.app (previously ioGAS.app).

New licence file location

MacOS licence files are now located in the following directory:

- /Users/Shared/ioGAS

New user folders location

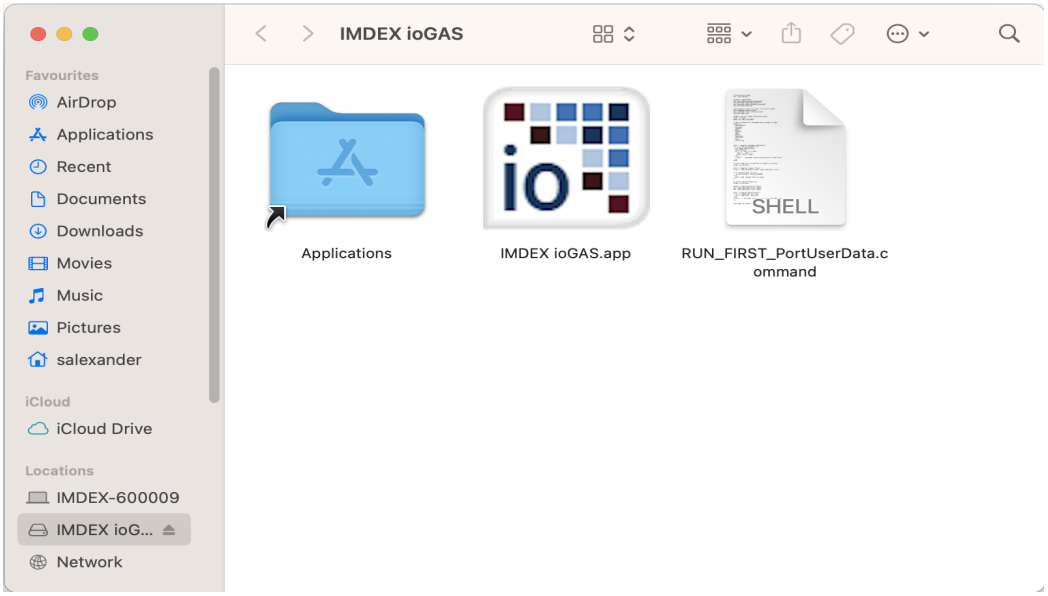
The user configuration files and other associated user folders such as custom diagrams, calculations, workflows, legends, spider plots, classification trees, etc are now located in the following directory:

- ~/Documents/ioGAS

In ioGAS 8.2 and earlier installations, these files and folders were located within the ioGAS.app application folder.

****EXISTING CLIENTS ONLY - RUN FIRST SCRIPT****

If there are existing custom user files in any of these folders, they can be automatically copied to the new location by running the RUN_FIRST_PortUserData.command script.



Right-click and select **Open** to run the script.

Any existing licence files are also copied to the new licence file location outside of the installation folder.

To install the ioGAS application drag the IMDEX ioGAS™.app into the **Applications** folder.

Installation General

Improved log file handling

New log file naming convention using date/time stamp to enable multiple instances of ioGAS to be logged concurrently. Log file size limit increased to assist in troubleshooting of support queries.

acQuireDirect installation

acQuireDirect now installs into the same Windows parent folder as the ioGAS installation, whether that is in Program Files, user AppData\Local\Programs or another location.

Improved Publication Capabilities

Save export window and plot settings

Set preferred export file parameters including width and height dimensions, type, location, scaling or page size/orientation to use when generating output images, vector and pdf files for reports and publications.

Two types of export settings can be saved:

- **Export Window** - settings used for exporting the contents of window as a single output file. The width and height dimensions saved in this dialog relate to the size of the entire plot window which may contain multiple individual plots. The Export Window tool is located in the Window band on the Home and other selected ribbons.

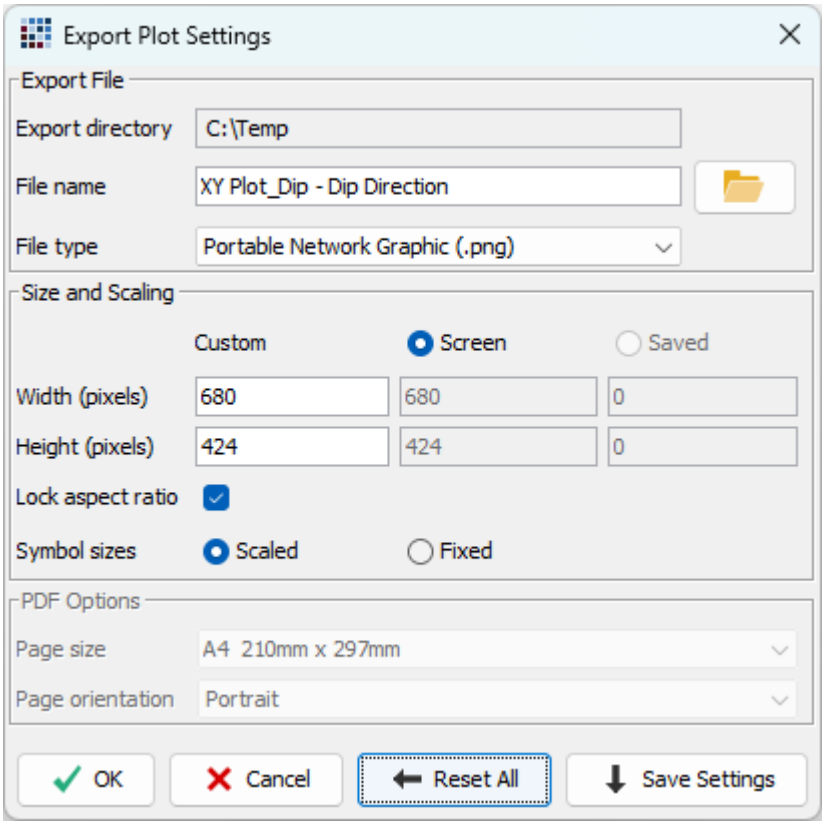
- **Export Plot/Export Batch** - settings used for exporting the contents of an individual plot as a single output file. The width and height dimensions saved in this dialog relate to the size of the plot only.

  To export one plot in a window right-click on it and select Export Plot from the pop-up menu. To export multiple plots in a window as individual files use the Export Batch tool located in the Window band on the Home and other selected ribbons.

Note that PDF export settings use width and height dimensions expressed in mm not pixels.

1. Open the export dialog and choose the file type and location.

   If exporting to PDF file select the page size and orientation.



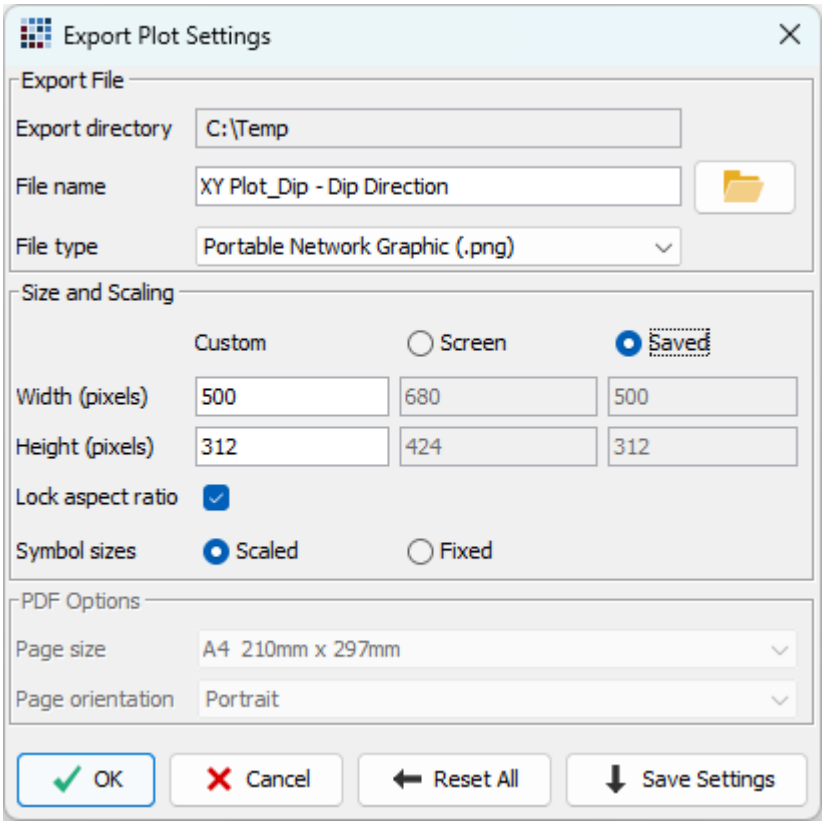
By default the width and height dimensions of the window or plot as shown on the screen are displayed in pixels or mm depending on the file type selected. Update these dimensions manually in the Current windows if desired.

Set the Symbol sizes to scale with size or remain fixed.

2. Click on the **Saved Settings** button. Note how the width and height dimensions are now displayed in the Saved column.

   In order for the saved width and height dimensions to be selected for use each time the export dialog is opened, click on the Saved radio button and Save Settings again.

   To open the export dialog showing the screen width and height dimensions leave the Screen radio button selected.



3. To reset to the installation settings click Reset All.

   The saved width and height dimensions are reset to 0 along with file type set to .png, scaled symbol sizes and A4 Portrait PDF options.

Attribute Manager Updates

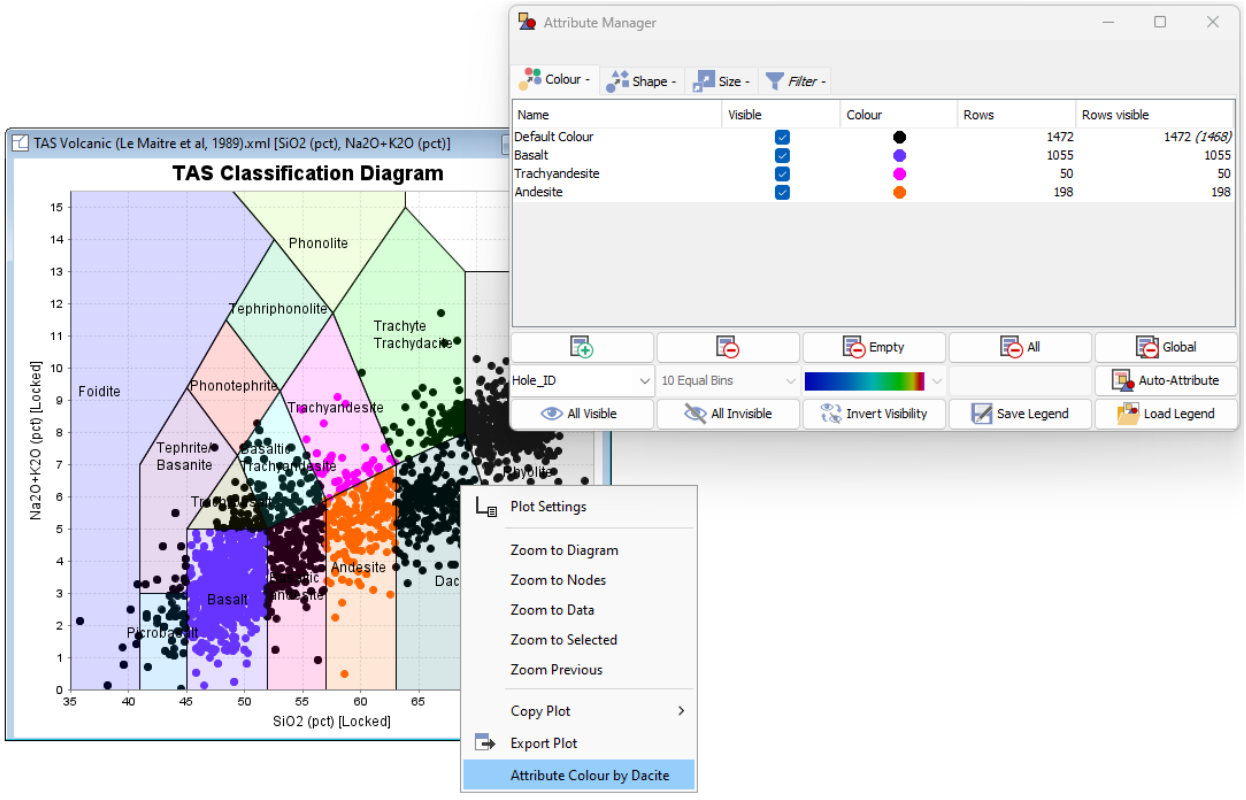
Rapid data attribution

Quickly attribute data points of interest during exploratory data analysis by automatically creating and assigning a new colour attribute group to a data point selection using the **Attribute Polygon** or **Apply Attributes to Selection** tools. Users are also given the option to assign the selected data points to an existing attribute group if one has not been highlighted in the Attribute Manager prior to the selection process.

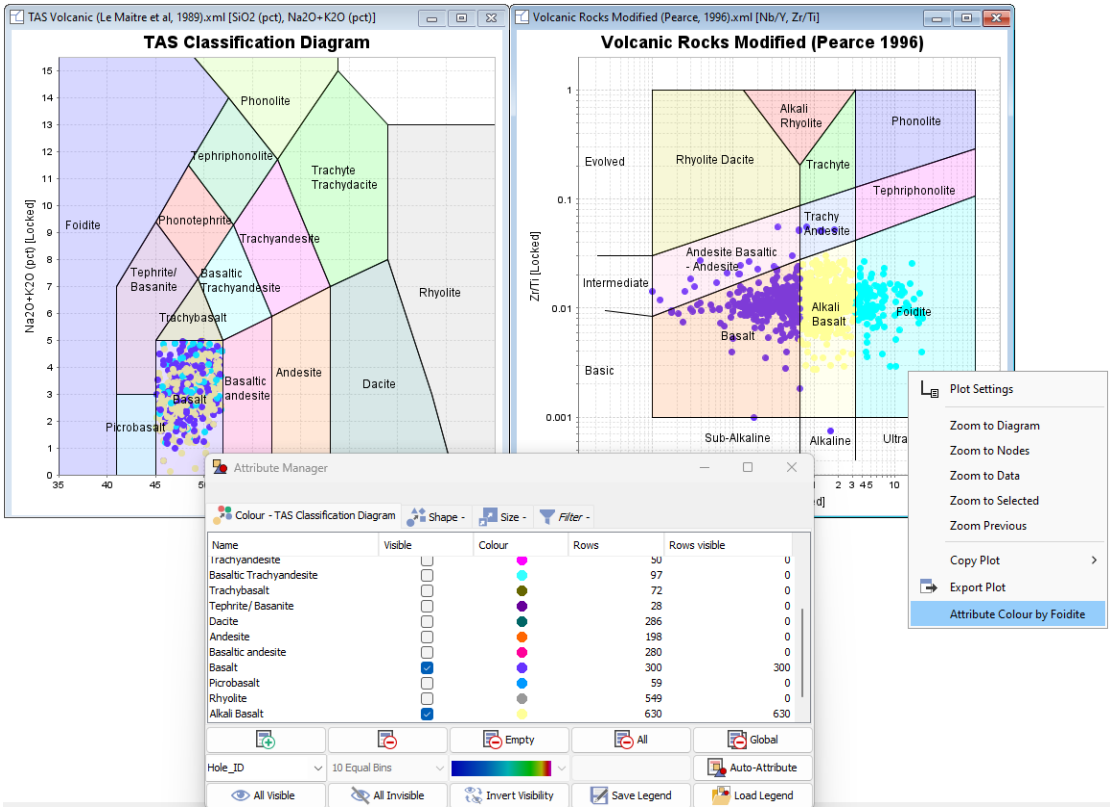
The previous workflow of highlighting an attribute group before selecting the data points to assign to it in the plot window is also retained.

Enhanced diagram attribution

Instead of attributing data within all the polygons of a diagram it is now possible to manually select individual classification polygons and attribute the data within its boundary. Place the cursor within the polygon, right-click and select the **Attribute Colour by** [polygon name] from the menu.



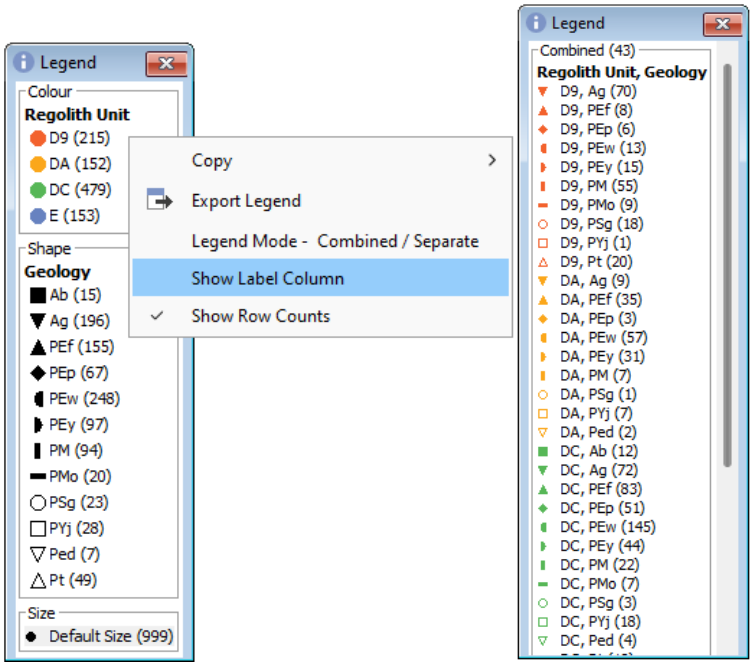
Automatically attribute samples using one classification diagram, change visibility to only display attribute groups of interest and then further classify the data points using another diagram. Each new selection is to the Attribute Manager as new colour group and named accordingly.



Where there are overlapping polygons the options to attribute by individual polygon or by the overlapping area only are provided.

Display legend row counts

Display row counts next to each attribute group in the legend window. To turn on, right-click in the legend window and select **Show Legend Counts** from the pop-up menu.



Save Random Forest Classifier

The Random Forests tool now has its own button on the **Analysis** ribbon. On the drop-down menu is a new feature to enable a saved random forest classifier to be loaded and run on other datasets.

Once the original random forest classifier is built, use the **Save random forest as XML** button on the toolbar to save to file. The default location for this file is as follows but the file can be saved anywhere:

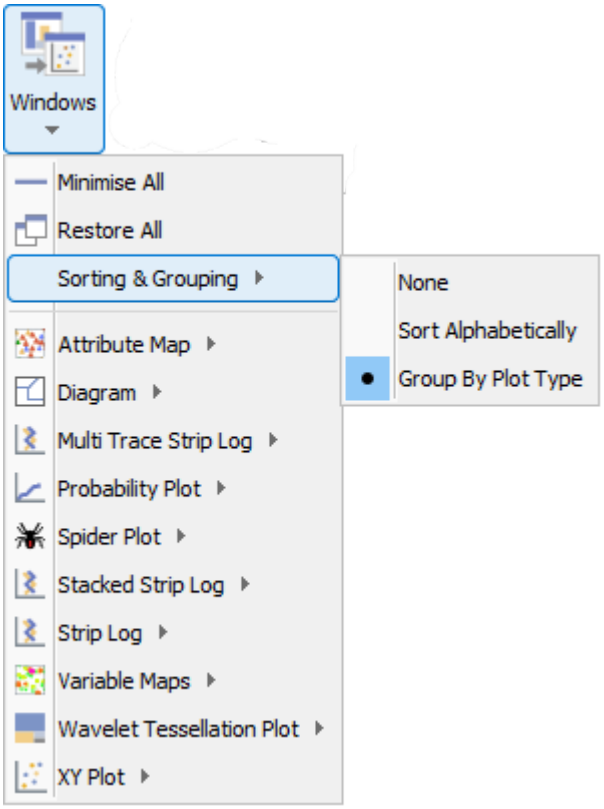
> **Windows installation** - C:\Users\Username\AppData\Roaming\ioGAS\Analysis\Random Forests (change 'Username' to your login)
>
> **Mac installation** - ~/Documents/ioGAS/Analysis/Random Forests

To use the saved random forest with a new dataset, open the new dataset into ioGAS and select **Load Random Forest** from the drop-down menu on the **Analysis** ribbon. Upon completion, two columns containing the random forest model's prediction for all rows and the *a posteriori* probability that the prediction is correct are added to the current dataset.

Other Improvements

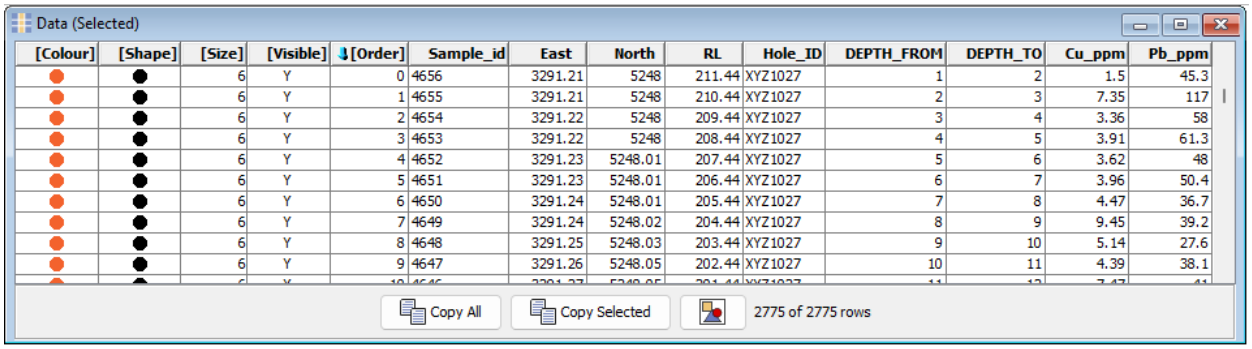
Sort and group open windows list

Sort list of open plot windows alphabetically or group by plot type.



Display special and selected columns

Automatically include drillhole and structural columns such as Hole ID, depth from/to, dip, dip direction and/or azimuth in Data View (Selected Columns) window.



[Colour]	[Shape]	[Size]	[Visible]	[Order]	Sample_id	East	North	RL	Hole_ID	DEPTH_FROM	DEPTH_TO	Cu_ppm	Pb_ppm
		6	Y	0	4656	3291.21	5248	211.44	XYZ1027	1	2	1.5	45.3
		6	Y	1	4655	3291.21	5248	210.44	XYZ1027	2	3	7.35	117
		6	Y	2	4654	3291.22	5248	209.44	XYZ1027	3	4	3.36	58
		6	Y	3	4653	3291.22	5248	208.44	XYZ1027	4	5	3.91	61.3
		6	Y	4	4652	3291.23	5248.01	207.44	XYZ1027	5	6	3.62	48
		6	Y	5	4651	3291.23	5248.01	206.44	XYZ1027	6	7	3.96	50.4
		6	Y	6	4650	3291.24	5248.01	205.44	XYZ1027	7	8	4.47	36.7
		6	Y	7	4649	3291.24	5248.02	204.44	XYZ1027	8	9	9.45	39.2
		6	Y	8	4648	3291.25	5248.03	203.44	XYZ1027	9	10	5.14	27.6
		6	Y	9	4647	3291.26	5248.05	202.44	XYZ1027	10	11	4.39	38.1

Append data updates

Automatically calculate derived column values based on single row calculations such as opening classification diagrams, spiderplots or running a free or geochem calc in existing ioGAS file for newly appended new data rows.

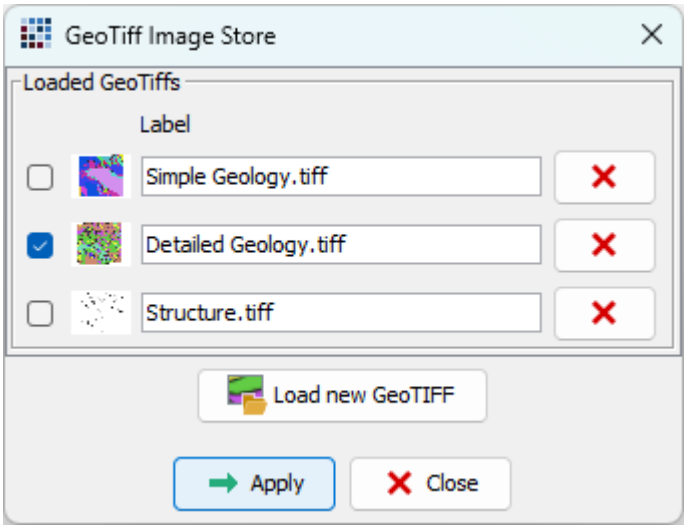
Where incoming appended data contains simple canonical columns, e.g. Ti_pct, Au_ppb, etc and the existing dataset contains aliased columns with the same name that were

created as the result of a calculation, e.g. TiO2_pct converted to Ti_pct, the incoming data is appended to the derived column.

Raster underlay GeoTiff store

Select, add and remove raster underlays in attribute or map windows from central GeoTiff Store dialog.

Loaded GeoTiff images can be selected for display via the **GeoTiff config** tool on the active attribute or variable map window toolbar. All of the images loaded into the current .gas file are listed in the GeoTiff Image Store dialog:



Check the box next to the required image and click **Apply** to add it to the map window. If there is already an image in the window it will be replaced with the new selection as only one image can be displayed at a time.

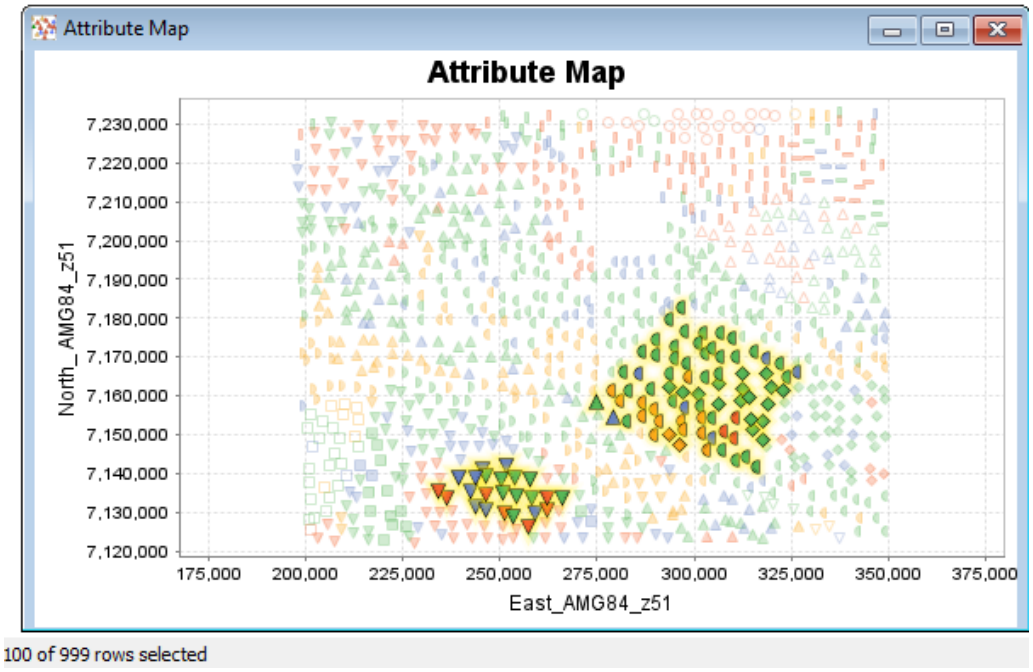
To remove an image from a map window uncheck the box next to the image to the left of the dialog and click **Apply**.

To delete an image from the list click on the red X button and **Apply**. This action will remove the image from any open map windows.

GeoTiff images are saved with the .gas file.

Display selection count

Display number of selected rows in status bar.

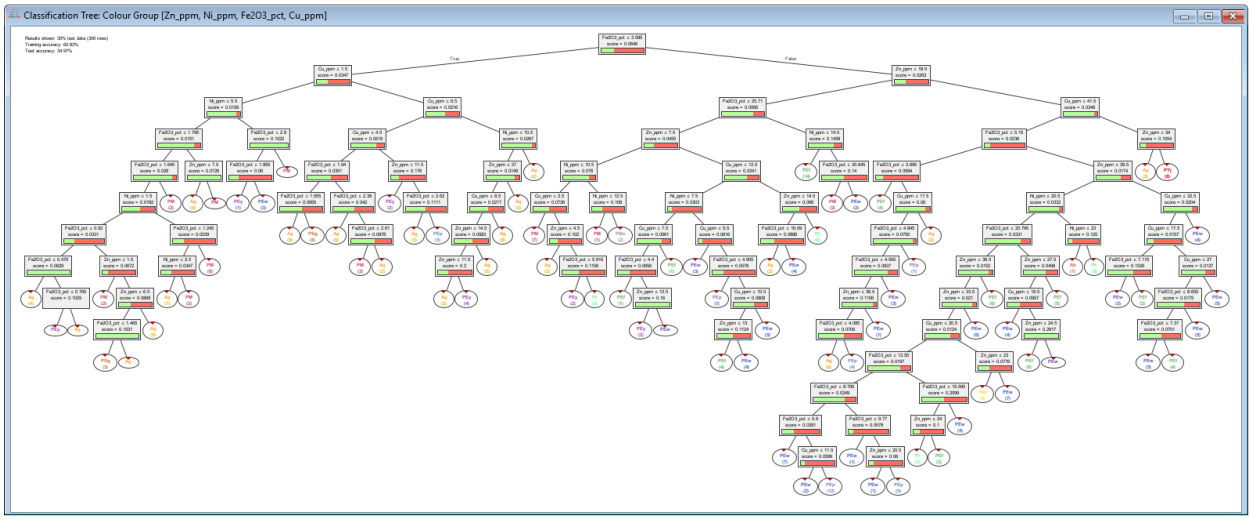


Export special columns and data

Automatically include drillhole and structural columns such as Hole ID, depth from/to, dip, dip direction and/or azimuth when using Export (Selected) options on the File ribbon.

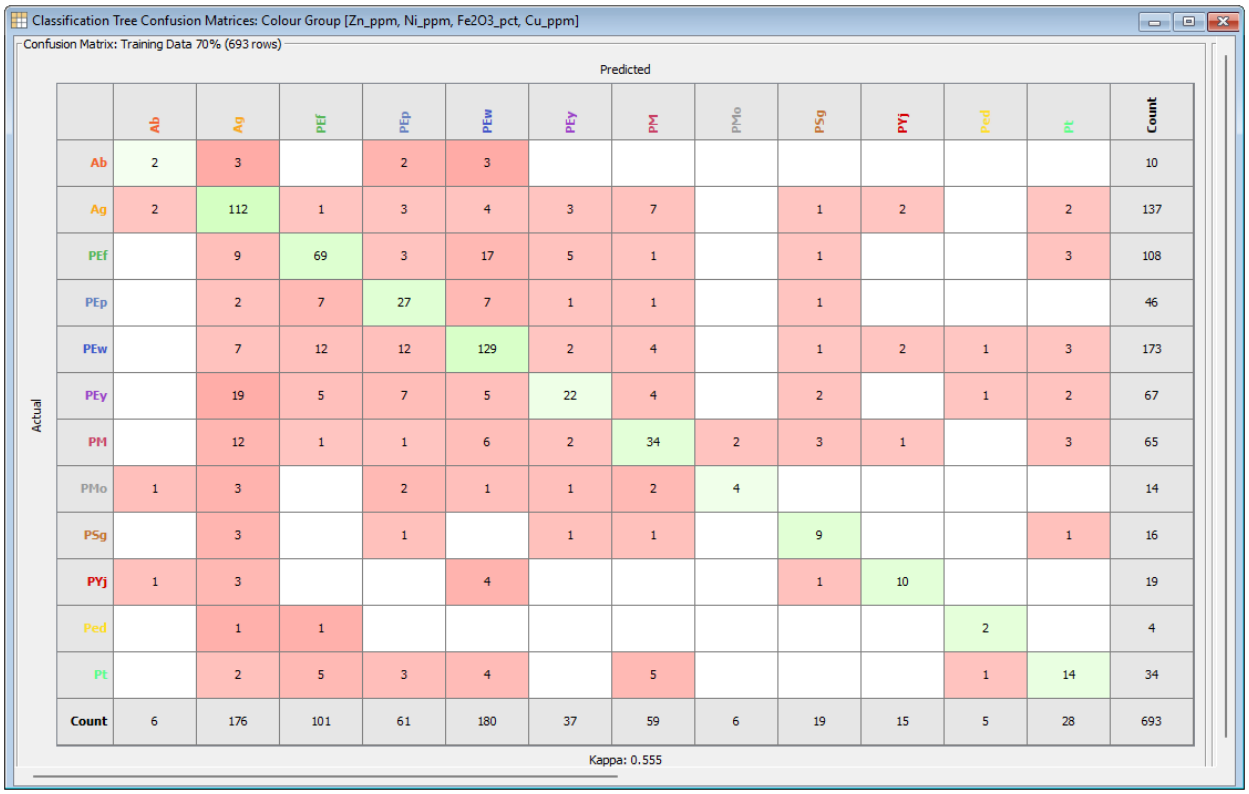
Classification and regression tree navigation

Zoom buttons added to CART window toolbars to assist with navigating larger trees that extend beyond the window field of view. Alternatively, use Ctrl-scrollwheel on mouse to zoom in an out. Double-click in the tree window to return to original view.



Zoom buttons also added to classification tree, regression tree and random forest confusion matrix toolbar. Use the zoom tools to enlarge the both the training and test matrices when there are many colour groups extending beyond the plot view.

Alternatively, use Ctrl-scrollwheel on mouse to zoom in an out within a matrix. Double-click in the matrix to return to original view.



Actual \ Predicted	Ab	Ag	PEf	PEp	PEw	PEy	PM	PMo	PSg	PYj	Ped	Pt	Count
Ab	2	3		2	3								10
Ag	2	112	1	3	4	3	7		1	2		2	137
PEf		9	69	3	17	5	1		1			3	108
PEp		2	7	27	7	1	1		1				46
PEw		7	12	12	129	2	4		1	2	1	3	173
PEy		19	5	7	5	22	4		2		1	2	67
PM		12	1	1	6	2	34	2	3	1		3	65
PMo	1	3		2	1	1	2	4					14
PSg		3		1		1	1		9			1	16
PYj	1	3			4				1	10			19
Ped		1	1								2		4
Pt		2	5	3	4		5				1	14	34
Count	6	176	101	61	180	37	59	6	19	15	5	28	693

Column properties date/time

Automatically set DateTime or SurveyDateTime columns as Date/Time special column

Provided resources

Classification diagram - Porphyry Cu Exploration

PCD Alteration Diagram (Large, 2025)

Classification diagram - Niggli Diagrams

Niggli al-alk-k-c (Minerals and Rocks)
Niggli mg-c-al-alk (Minerals and Rocks)
Niggli si-k-alk (Minerals and Rocks)

Calculation - Mt Isa Exploration Indices

SEDEX4 (Large et al. 2000)
Metal Index (Large & McGoldrick, 1998)

Spiderplot - CRM

OREAS21f, OREAS46 (Blanks, Lithochem, Soil)

OREAS625 (Pb-Zn)

General settings

Configure box cox trim percent to use when applying a power transform to data displayed in scatter plots, SPLOM, probability plots, histograms, data levelling and correlation matrix. Default = 2. Setting located in User Interface tab of Settings dialog located on File ribbon.