S3GRAF 2022.10 Release Notes

S3GRAF
Version 2022.10
October 2022

Table of Contents

1. Introduction

S3GRAF v2022.10 is the latest version of the Reservoir Engineering Visualisation software from Sciencesoft Ltd. S3GRAF provides functionality to quickly and efficiently visualise and analyse reservoir simulation data from a range of simulators. Line plots of well production data (for example) and views of the simulation grid can be created. With the 3D module three-dimensional displays of simulation grid data can be generated. The HPG module permits extremely fast loading of grid geometry and vector data, especially for large datasets.

The new features to be found in the 2022 versions of S3GRAF are outlined as follows:

Workflow Manager

The Workflow Manager has continued to be updated to improve the user interface and make setting the necessary options clearer and more intuitive.

Support for tNavigator 22 Eclipse-Formatted Simulation Output

Support has been added for the updated native output and changes to the Eclipse-formatted output from the tNavigator simulator.

Support for Intersect

Support has been added for changes to the Intersect simulation output.

Support for Echelon

Support has been added for Eclipse-formatted output from the Echelon simulator from Stone Ridge Technology.

Support for CMG SR3 Format

Further optimizations have been performed to improve the load performance of the SR3 formatted data files from the CMG simulators.

Support for Meteor and UTChem

Support has been added to support the changes in Meteor and UTChem data file formats.

Default Units for Nexus/VIP Observed Data

The default units for Observed (OBS) data are now assumed to be as defined by Nexus rather than VIP. The unit system can be set by the user as either Nexus or VIP with a system setting.

Support for UTChem Start Date

UTChem models with a defined simulation start date are now supported.

Default Graph Font Option

A system setting for the default font height for Graphs. This setting will scale all the fonts within Graphs to the new chosen height.

2. Updates to the Workflow Manager

The Workflow Manager is a way of using the power of S3GRAF for plotting, creating new quantities and performing analyses. Workflows capture a standard reservoir engineering task and allow it to be recreated quickly and easily from the Workflow Manager.

The Workflow Manager presents all the included workflows in a list that can then be selected for application. The user will then set the relevant properties, based on the loaded data, to produce the analyses and plots required.

Workflows are based on modified GRF files, however the user does not need to understand the GRF script. Instead they are presented with a description of the workflow's actions and a list of user-definable parameters, which are usually data dependant, that are then set before the workflow is executed.

2.1.Accessing the Workflows

Once any data set has been loaded into the Treeview, the *Workflow Manager* tool will be enabled. This can be accessed from the *Tools* menu or from the *Derived Quantities* toolbar, as seen in Figure 1.

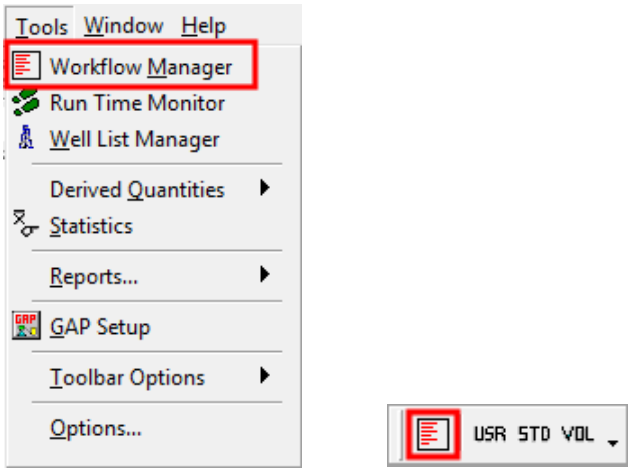

Figure 1 – Menu and Toolbar Access for Workflow Manager

Click on the **Workflow Manager** item and the *Workflow Manager* dialog will appear, as seen in Figure 2.

The presented workflows are dependent upon what data has been loaded into S3GRAF, i.e. if only Eclipse data sets are loaded then only the Eclipse specific Workflows are listed. This filtering can be changed by selection from the *Simulator* drop-down list, and can be refined further by specifying a filter using the *Name Filter* textbox and standard wildcards (*, ?, partial names, etc.).

The dialog will contain a list of valid Workflows that can then be applied to the loaded data. Double-clicking on a workflow or clicking the **Next** while a workflow is highlighted will then open a dialog for the chosen workflow where the necessary parameters can be set before execution.

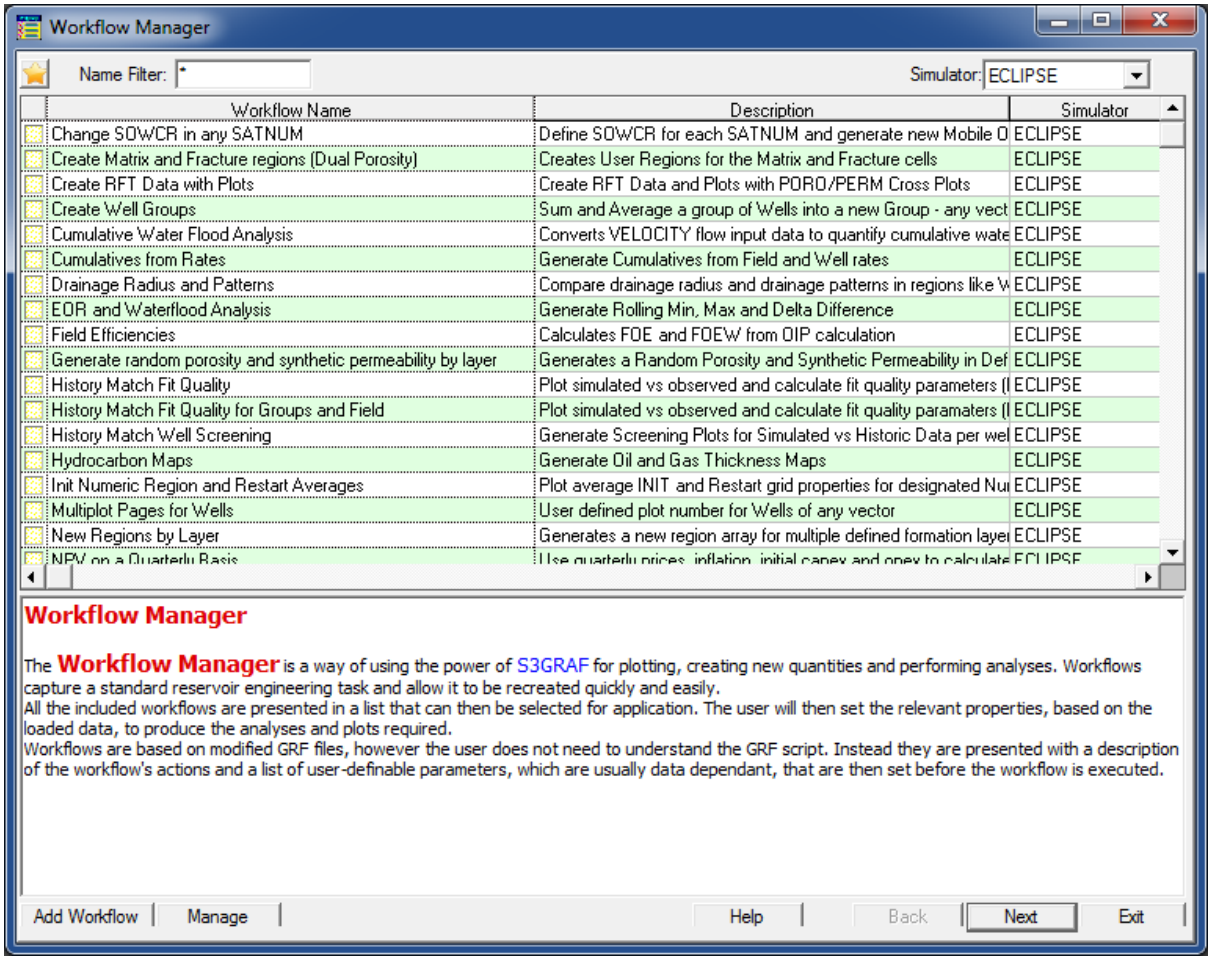

Figure 2 - Workflow Manager Dialog

2.2.Running a Workflow

The procedure for running a Workflow can be summarised as follows:

1. Load the data set upon which to perform the Workflow.
2. Open the *Workflow Manager*.
3. Select the Workflow to perform.
4. Set the required parameter values for the analysis.
5. Run the Workflow.
6. Examine the created plots and new items in the Treeview.

Workflow Selection

Once the *Workflow Manager* has been opened select a workflow from the list and click **Next**.

In this example the *Cumulatives from Rates* Workflow has been selected, as shown in Figure 3.

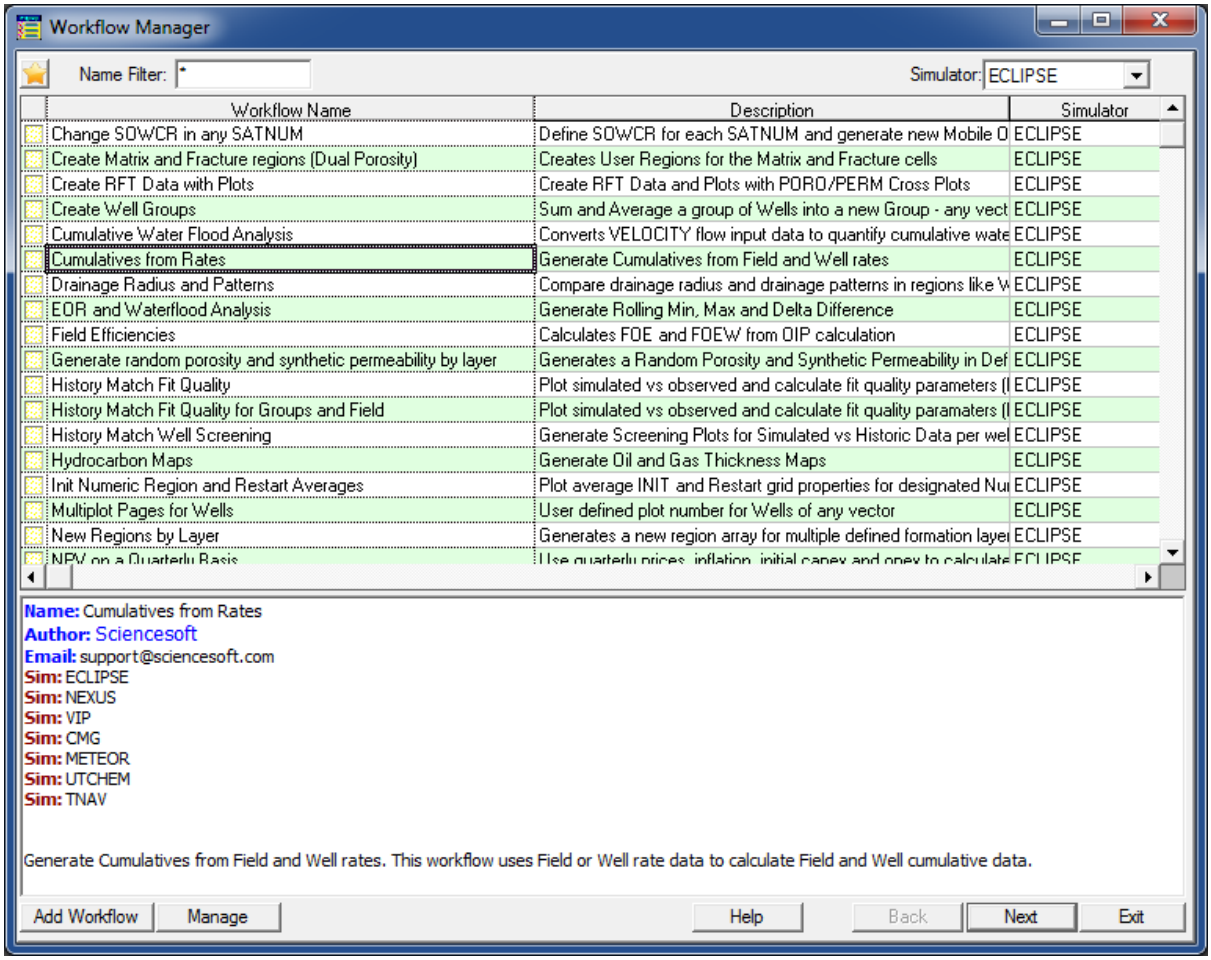

Figure 3 - Selecting a Workflow

Workflow Setup and Parameter Selection

The details for the chosen Workflow will then be presented, see Figure 4. This dialog will show more information on the Workflow including what data may be required, what calculations are performed and what the output will be.

This dialog details what information is required from the user and lists the parameters that need values to be set, such as well names or property values. These are presented in a list below the description of the Workflow. All of the items should be changed to suit the selected data before running the Workflow.

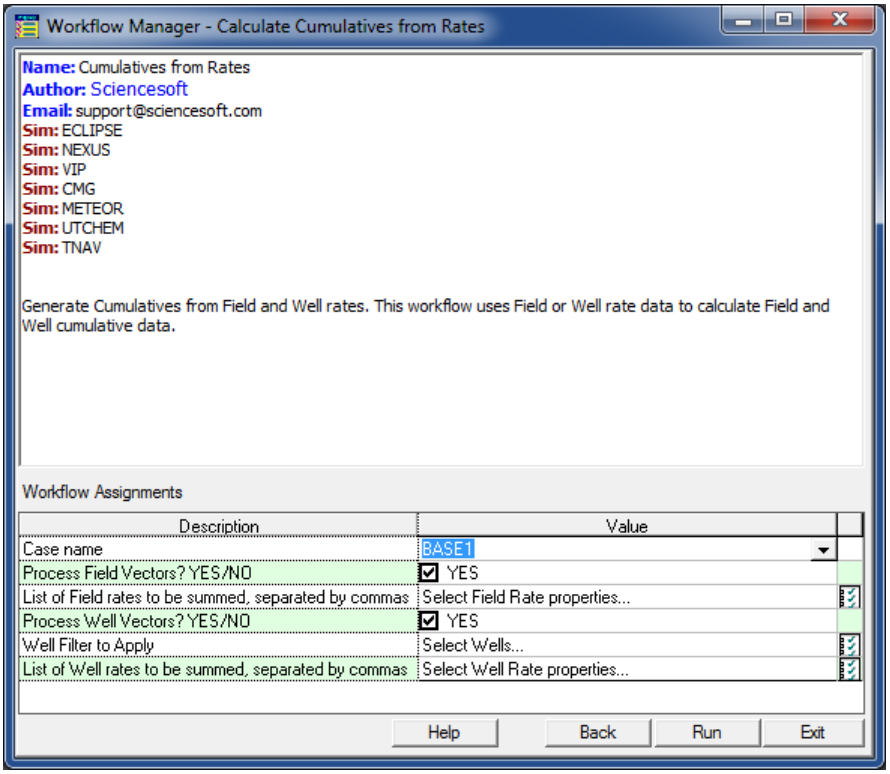

Figure 4 - Selected Workflow

Clicking on any editable value will allow the replacement of the item value by typing. Clicking on the checkbox of a YES/NO parameter will toggle its value. Changing a YES/NO parameter may enable new options. Clicking on the checkboxes on the end of an applicable row will present a list of available values to pick from to set the workflow parameter.

These parameter pickers are available to select values based on data loaded from the chosen case name. They are available in both single- and multi-select. Single-select will allow the user to choose a single item to complete the assignment for the workflow parameter, for example a particular INIT property. Multi-select will allow the selection of one or more items by checking their checkboxes, for example the producer wells in a model.

Continuing the above example, clicking on the *Well Filter to Apply* parameter checkbox will present the list of wells found in the loaded model as shown in Figure 5. Clicking on the *List of Well rates to be summed* will present a list of well properties found in the model, as shown in Figure 6.

Once the user has selected the required items clicking on **Update** will log them in the workflow. Clicking on **Close** will close the picker frame. The items can be re-edited at any time and altered to suit by reopening the pick list by clicking on the checkboxes once again.

As an alternative the user can always type in the necessary values directly into the textbox instead of selecting them with the parameter picker.

Once the parameters have been set clicking **Run** will execute the workflow and generate the specified output for the user's analysis.

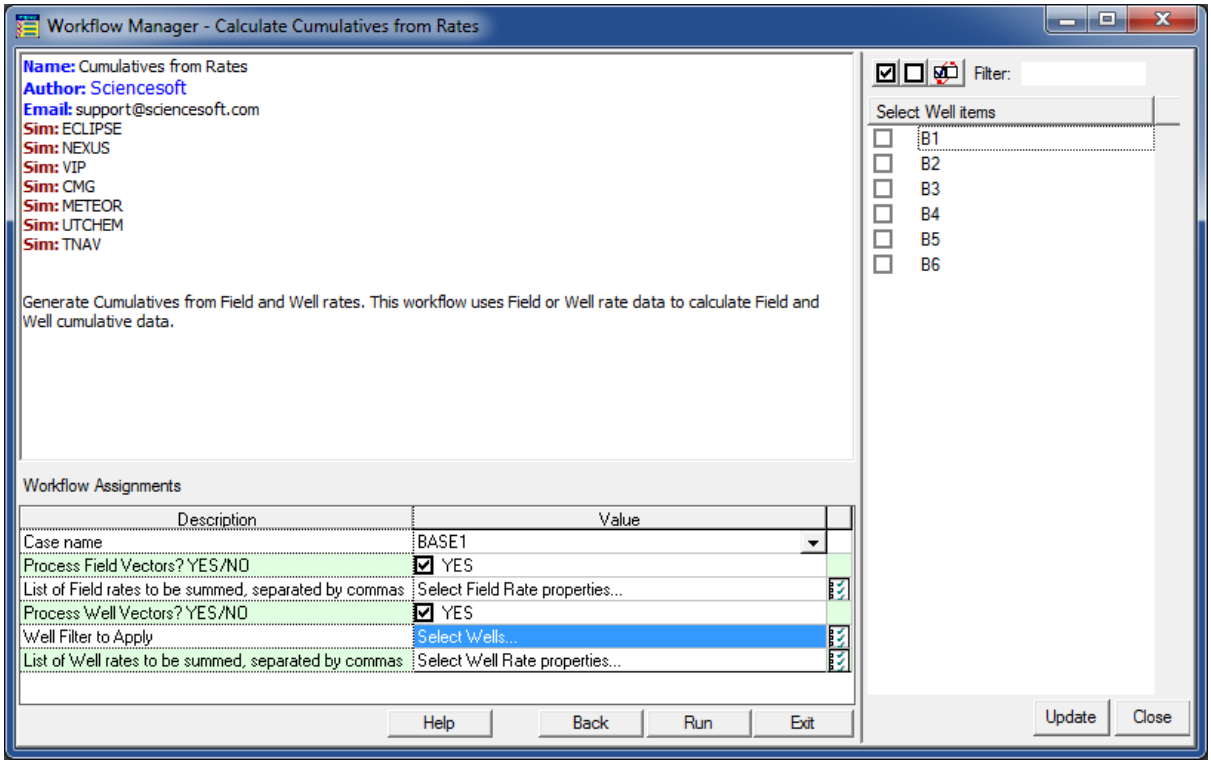

Figure 5 - Selecting Wells

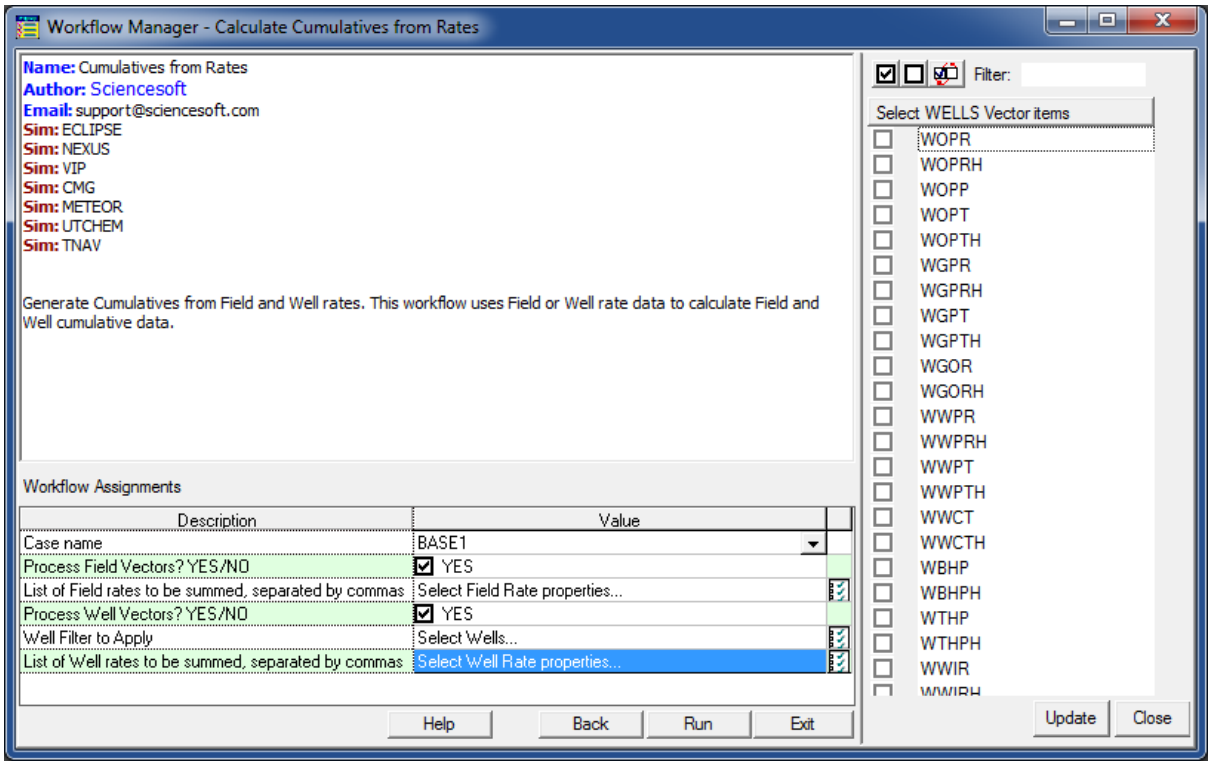

Figure 6 - Selecting Well Properties

3. Default Units for Nexus/VIP Observed Data

The unit systems for interpreting Nexus/VIP Observed data files can be selected between Nexus and VIP. By default, Nexus is assumed.

If there are no units defined for the vectors in the Observed data file then the appropriate unit system is used to assign units. If a unit system is defined in the file (FIELD, METRIC, etc.) the corresponding unit system is used, otherwise it is assumed that they are FIELD units.

The system setting can be found in the main options, found via the **Tools** menu and selection **Options…**, in the *Nexus/VIP* tab. This is highlighted in red in Figure 7.

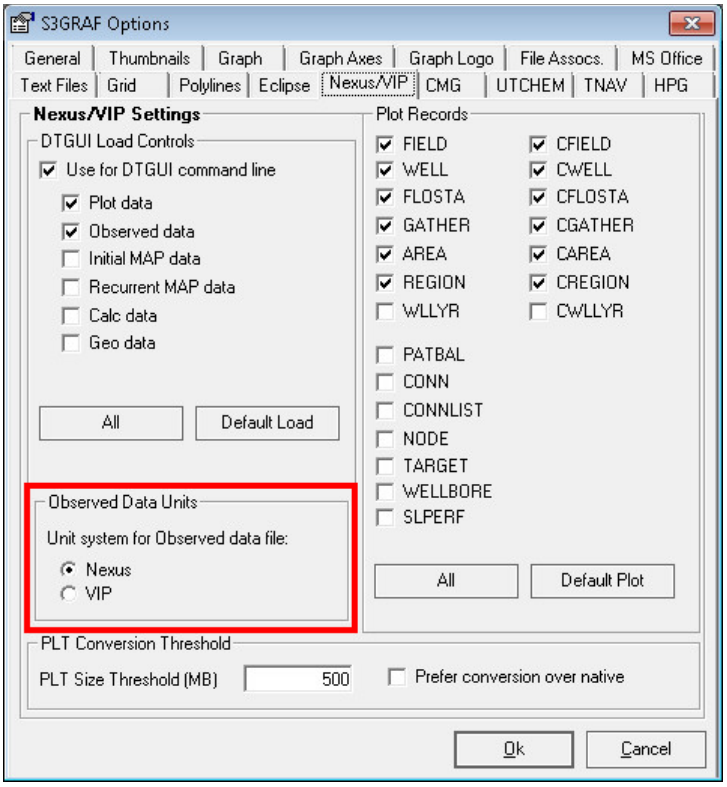

Figure 7 - Nexus/VIP Options with Observed Data Units Settings

When **Nexus** is chosen the vectors are assigned the appropriate units according to the internal dictionary. Otherwise, the **VIP** unit dictionary is used.

If the units are fully defined within the file then they are used rather than the selected unit system.

4. Default Graph Font Option

A system setting for the default font height for Graphs has been added. This setting will scale all the fonts within Graphs to the new chosen height.

The new setting is found in the **Tools** menu and selection **Options…**, in the *Graph* tab. This is highlighted in red in Figure 8.

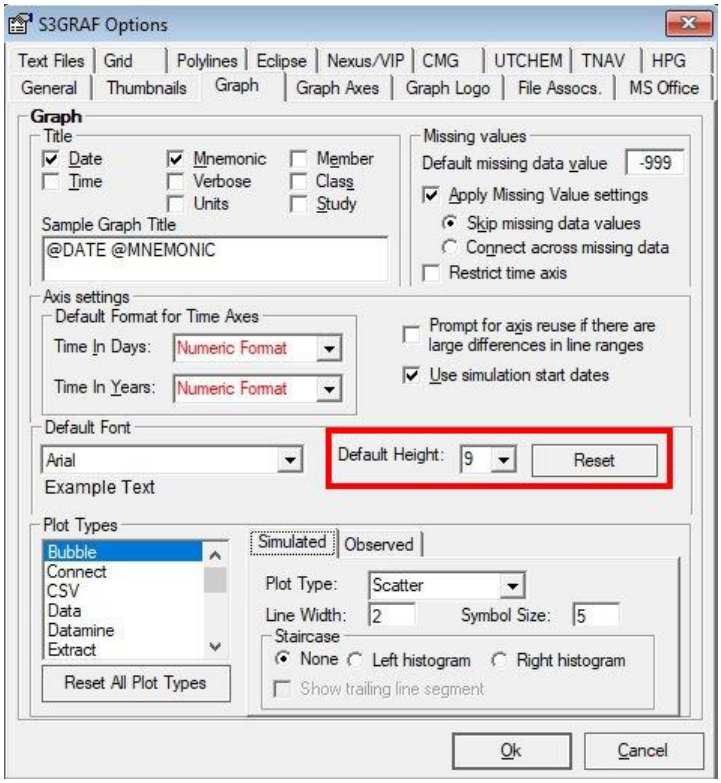

Figure 8 - Graph Options with Default Font Height

This controls the default font height used when producing the text content in Graphs such as the title, axes and legend. This height is the core font height that will be used by default for items on a graph. Graph components are scaled to this setting to maintain their relative proportion. The titles, axes, etc. font heights can still be changed individually. Any font heights set by the user will not be affected by a change to the Default Height setting.

This is intended mainly for larger resolution monitors where a small font can be rendered too small for comfortable reading. Changing this setting will persist between sessions of the application.

The **Reset** button will change the *Default Font* and *Height* settings to the original values.

5. Bug Fixes

This is a list of the bug fixes applied to S3GRAF v2022.10.

- Files
  - Inactive cells for Meteor are now determined by the data for Pore Volume and Permeabilities in X and Y directions
  - The state of Fetch on Demand (FoD) is now correctly initialised
  - The correct meta data for Miscellaneous vectors from tNavigator has been applied
  - CMG models now no longer present default table data where none is defined
  - Updated the Nexus MAP loading for the new naming convention for the INIT data
- Analysis
  - Corrected an issue with exporting a Layer Analysis with Export As Eclipse feature
  - Workflow interface now shows the correct data type when showing the available vectors to pick
- Grids
  - Spurious error message when changing the timestep while the Grid Settings form is open has been removed
- Plots
  - Issues with Broadcast and meta data containing invalid index data has been corrected
- General
  - Licensing correctly initiated upon install

6. Workflow Changes

This is a list of the changes to the Workflows supplied with S3GRAF v2022.10.

All workflows were updated to v3 format in v2021 to support the new interface in the *Workflow Manager*. They all include the new item pickers where applicable.

Workflow Name	Changes
Change SOWCR in any SATNUM	None
Connection Status check using STAT vector	None
Chemical Flood Analysis	None
Create Matrix and Fracture regions (Dual Porosity)	None
Create RFT Data with Plots	None
Create Well Groups	None
Cumulative Water Flood Analysis	None
Cumulatives from Rates	None
EOR and Waterflood Analysis	None
Field Efficiencies	None
Generate random porosity and synthetic permeability by layer	None
Simulated and Historic Differential Comparison	None
History Match Fit Quality	None
History Match Well Screening	None
Hydrocarbon Maps	None
Modify an INIT vector in Single Region or Combined Regions	None
Multiplot Pages for Wells	None
New Regions by Layer	None
NPV on a Quarterly Basis	None
Opportunity Index	None
Petro-Elastic Model	None
Plot Production	None
Plot Well Count vs Field Rate	None
Plot Well Production (Run Comparison)	Corrected the graph formatting
PLT Processing	None
Regional INIT Plots with Histograms	None
Runtime Performance and Well Count	None
SAGD Processing	None
Sensitivity Analysis Processing	None
SOR from SWTT or SWCT	Fixed a bug in SOR calculation
Summarised Group Data	None
Threshold Regions Around Wells	None
UTCHEM / Meteor Production Plot	None
Vector Statistics for Wells	None
Volumetric Sweep	None
Waterflood Progression and By-Layer Sweep Analysis	None
Well Producer and Injector Profile (WAG)	None