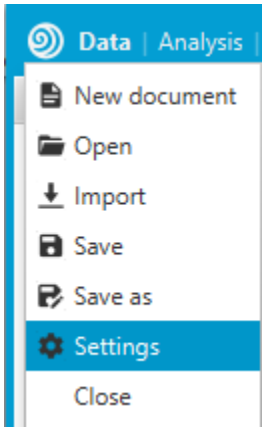
SiamWellTest

User's guide

Contents

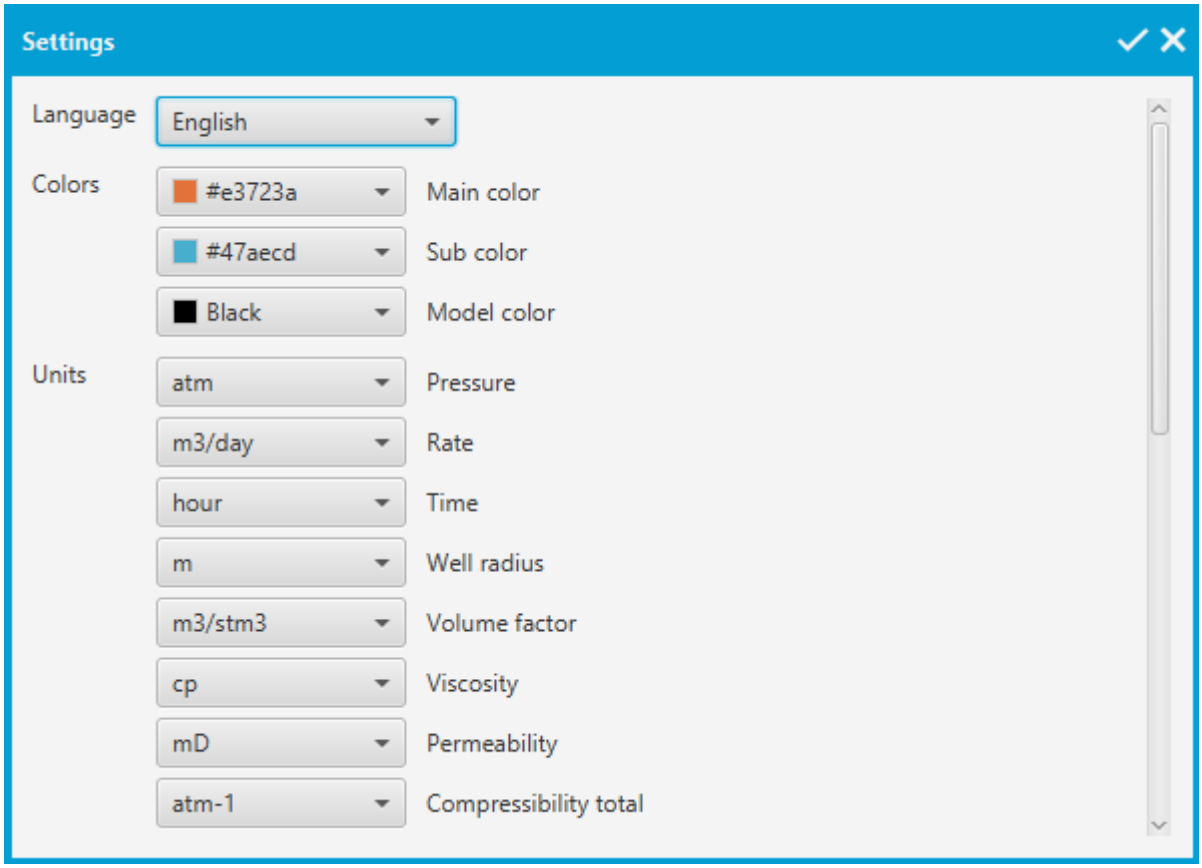
Application settings



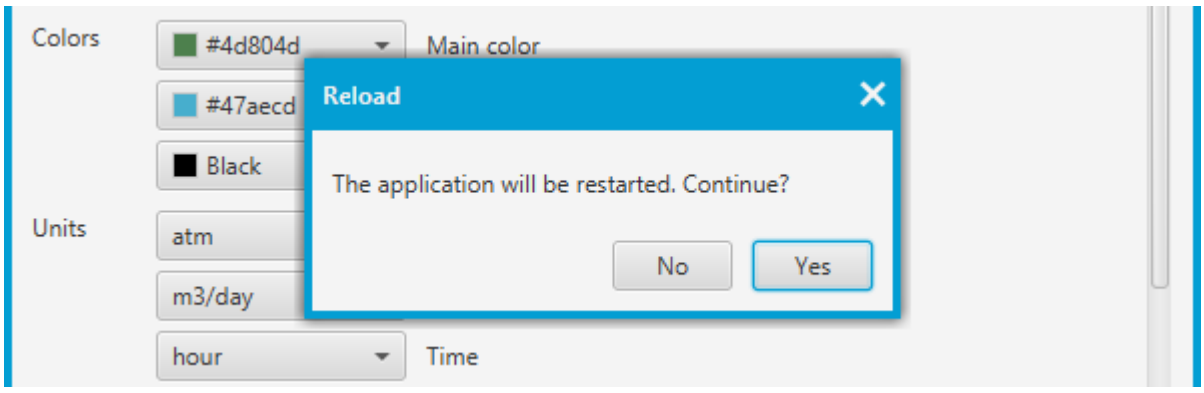
Application settings let you change the language, the main colors of plots and the main units by default.

Application settings windows can be opened by opening the Menu in the top-left pane of the application.

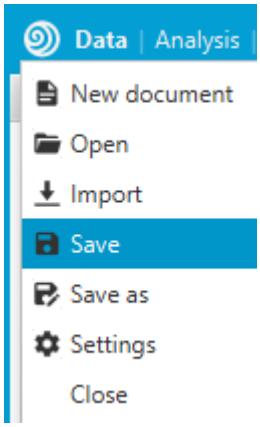
If the application is installed in the system folder, Settings can be changed if only the User has admin privileges.



To confirm changes, the application must be reloaded. Reloading is offered by force.



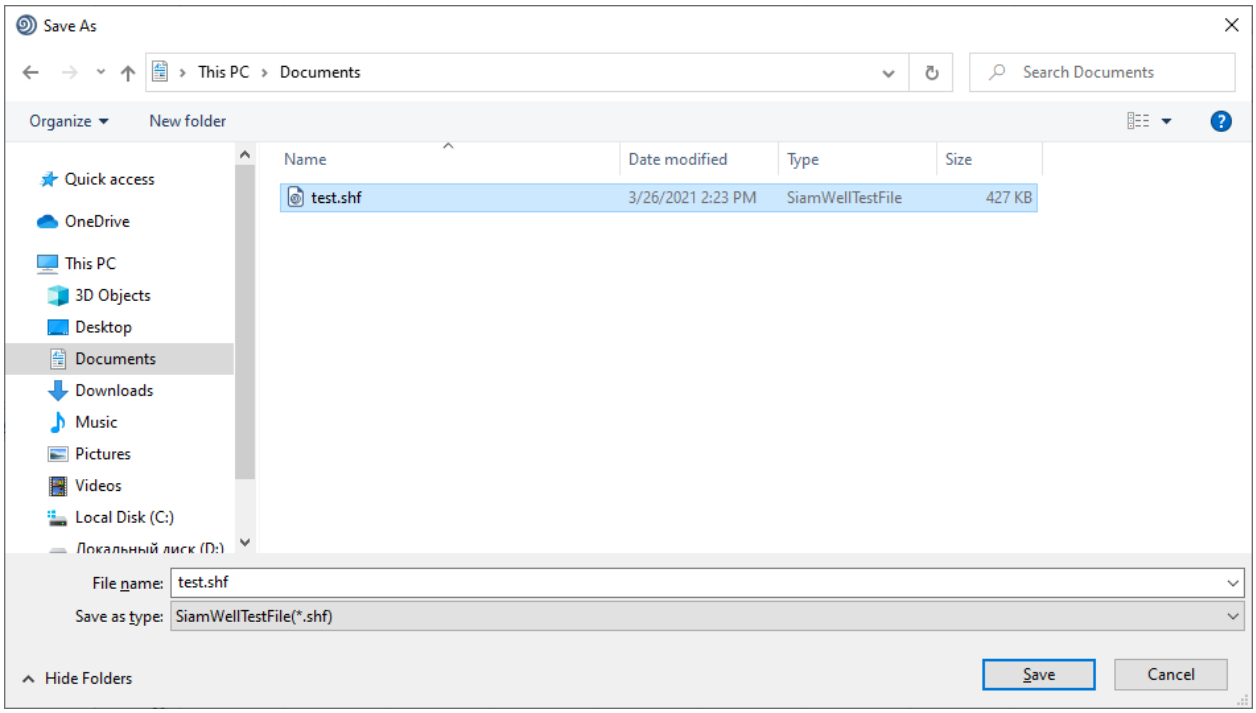
Saving, loading, creating a new file



To work with files, open the Menu in the top-left pane of the application and choose the option from the list.

A new file choice dialog appears while choosing options Save or Open.

In Save / Open window select the directory, name the file and click Save / Open.



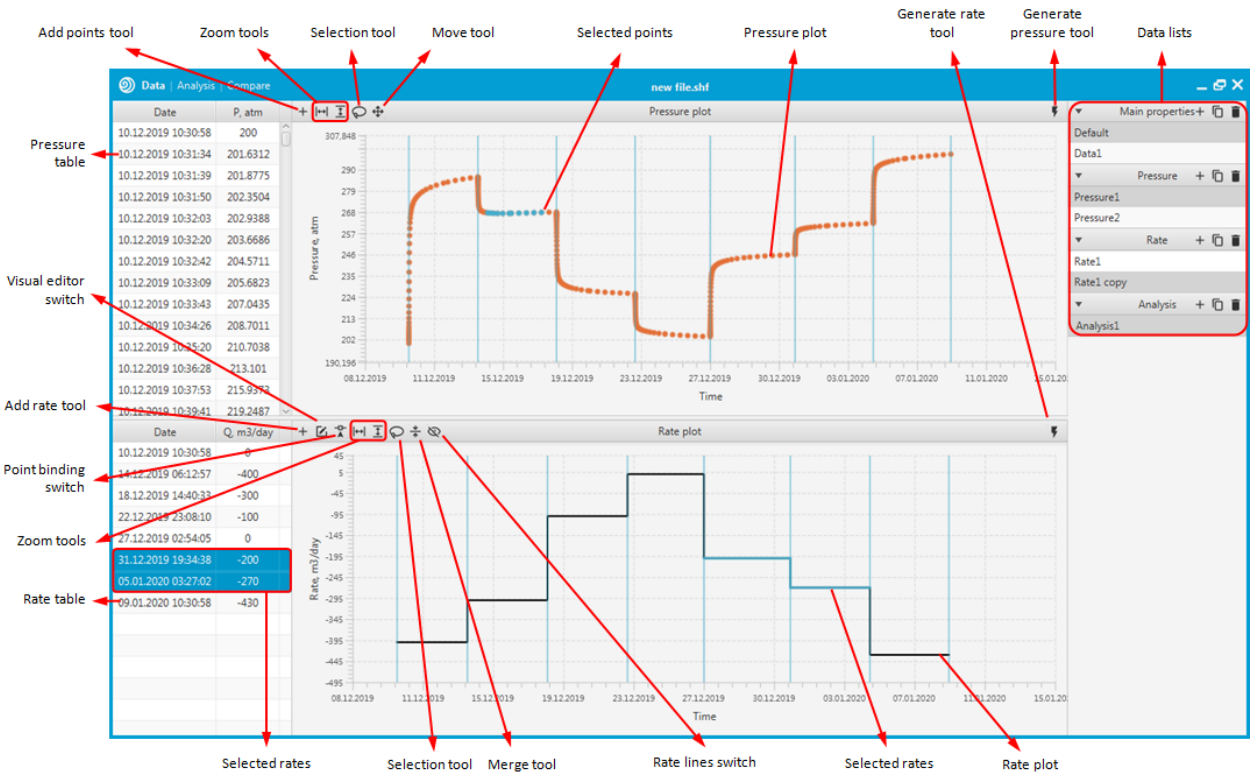
If this analysis has been saved as a file, the application doesn't ask for the directory during the next saving. To save changes to a new file, choose Save as.

The "Data" module

General information

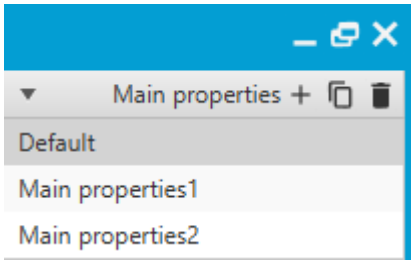
This module consists of 3 logical blocks: the list of data (the right pane), the pressures editor (the upper pane), the rate editor (the lower pane). Pressure plots and rates plots are interrelated in X-axis direction. The editor is presented by a table and a plot. Every element has a toolbar in the header, if there are such in this editor.

This module is used as a tool to process analysis data. Data lists let you create unlimited number of fields with data about system properties, pressures, rates and analyses.



Processing of system properties

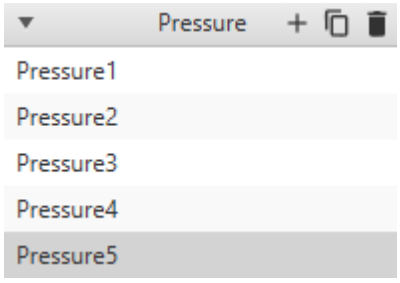
Data about a well, fluids and a formation are the single object which is anchored to system properties. The application lets you create several different objects with input data variations to be further used for interpretations. Tools to work with these objects are in the "Data" module in the right pane of the window.



The button + adds a new data row to the list with the default data;
The button clones data object selected from the list;
The button deletes the chosen object. This action is replicated by the Delete key;
Double left-click on a data row to open the "Input" module.

Processing of pressures data

The application lets you load or generate several different packs of pressures to be further used for interpretation. Tools to work with the pressures objects are in the "Pressure" module in the right pane of the window. The pressure chosen from the list can be seen and edited in the Pressure editor.



The button + opens drop-down menu of data loading method;
The button clones data object selected from the list;
The button deletes the chosen object. This action is replicated by the Delete key;
Left-click on a data row to load pressure pack into the editor;
Double left-click on a data row to activate the editor of a row

name.

Removal of selected pressures points is possible by pressing the Delete key when a plot or a table is on focus.

The selection of pressure points is possible in the table or on the plot by using Lasso tool which is available in active button state and done by left-clicking and dragging. The selected points are highlighted both in the table and the plot.

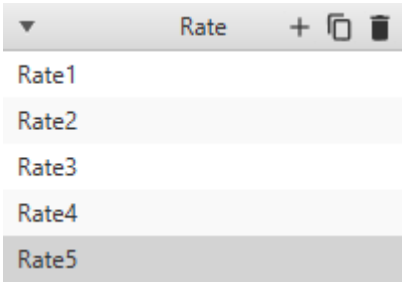
Editing of pressure point values is available in the Pressure table. Values are corrected according to the table editing rules. You can also edit selected pressure points with the Move tool. Dragging is possible in active button state and done with left-clicking on the plot and its dragging.

Adding of pressures points on the plot is done with the Add tool. New pressure points will be added in active button state and done with left-clicking on the plot.

Click to open the "Generate" module, which saves created pressure in a new row of pressure list. This module opens only if a row with data and rates is chosen. Otherwise, the error message occurs.

Processing of rates data

The application lets you load or generate several different rate packs to be further used for interpretation. Tools to work with the rates objects are in the "Pressure" module in the right pane of the window. The rate chosen from the list can be seen and edited in the Rate editor.



The button opens drop-down menu of data loading method;
The button clones data object selected from the list;
The button deletes the chosen object. This action is replicated by the Delete key;
Left-click on a data row to load rate pack into the editor;
Double left-click on a data row to activate the editor of a row name.

The rate selection is available via table or via Lasso tool. The selected rate steps are highlighted both in the table and the plot. The delete operation is activated by pressing the Delete key.

Adding rate step to the beginning / end is done with the button. When you press this key, the relevant list appears.

Editing of rate step values is available in the rates table. Values are edited according to the rules of table editing. There is also the function of averaging rate steps, which is done with the tool. When you press this button, the drop-down menu with the averaging selection: with merging or without. If the averaging with merging is chosen, the whole interval between the first chosen and the last chosen rate step including nonselected steps lying in the interval are joined together. Averaging without merging differs in the number of steps that remain the same. Moreover, there is a possibility to edit visually when the button is activated.

Visual editing:

- Left-click needed step on the plot and drag it to change the step end time;
- Right-click needed step on the plot and drag it to change the rate of selected step.
- Double left-click to divide a step into 2 parts.

Clicking generates a new rates row in the relevant list with single time, where start and end time equal relevant values of current pressure row.

Pressing activates rates line – pressure points binding feature.

Processing of analysis

The analysis object consists of 4 parts: the properties object, the pressure data, the rate data, and the area chosen for interpretation. Double left-click on the needed area between rate lines on the plot to choose a pressure area to be analysed.

- The button creates a new analysis if all 4 components are chosen. Otherwise, the error message occurs;
- The button clones data object selected from the list;
- The button deletes a chosen object. This action is replicated by the Delete key;
- Double left-click on a data row to activate the editor of the row name.

Created analyses are available in the “Interpretation” module.

The analysis stores copies of data, not data themselves. Thus, changes to data analysis do not lead to changes to input data and vice versa.

The “Input” module

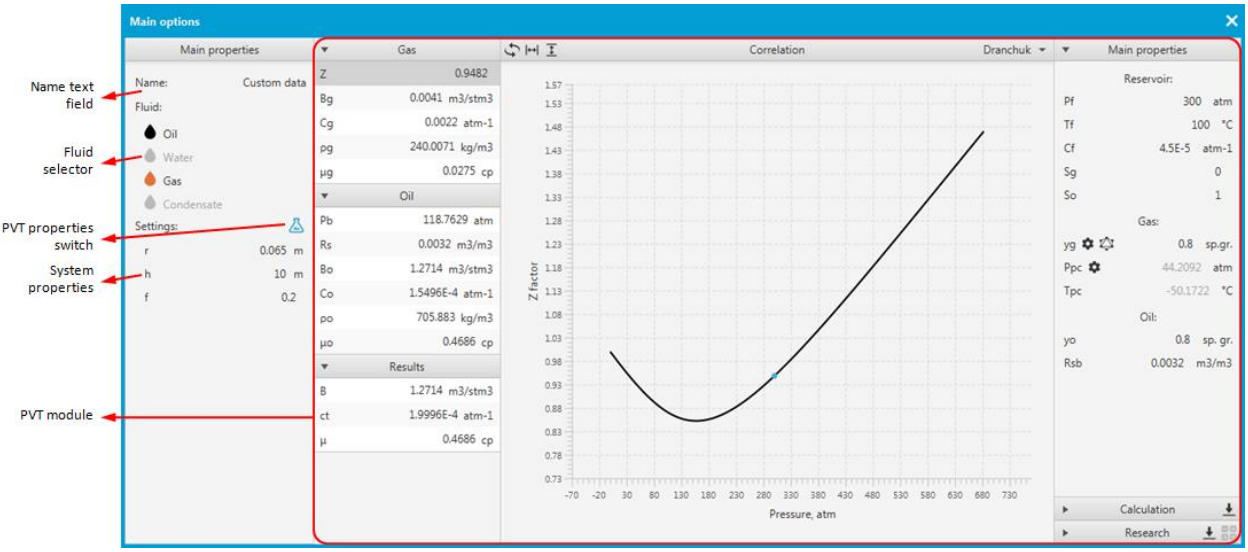
This module is used to process data about a formation, a well, and fluids to be further used for interpretation. The dialog box displays the tools of fluids selection, the “PVT” module activation button, and manually data input fields.

Data generated by default have Oil as the chosen fluid, the “PVT” module is disabled. In disabled “PVT” module such properties as volume factor, viscosity and total compressibility are input manually.

Click on the fluid to enable or disable it.

- When chosen phases are Oil, Oil + Water, Oil + Water + Gas, the main fluid is oil Oil, the rest fluids take part in calculating average system properties.
- When chosen phases are Gas, Gas + Water, the main fluid is Gas, Water takes part in calculating average system properties.
- When chosen phases are Condensate, Condensate + Water, the main fluid is Condensate, Water takes part in calculating average system properties
- When chosen phase is Water, the main fluid is Water.

The button enables or disables the “PVT” module, which is generated according to selected phases. In the active module manual input fields of volume factor, viscosity and total compressibility disappear. The “PVT” module is activated, in which these properties are calculated according to the correlations.



The “Input” module does not have the Save button. All input data are saved automatically.

The “PVT” module

General information

This module consists of 3 logical blocks: data input (the right pane), calculated properties (the left pane), graphical representation of the correlation (the central pane).

Properties, according to which PVT properties of chosen fluids are calculated, are input into the Data tab. When inputting new information, all results are recomputed automatically.

The left pane contains the list of properties, correlations of which can be changed. The current value of a property, calculated according to the Data tab, is displayed in a property row. Click the row and a correlation plot appears. The type of correlation for the selected property can be changed with the drop down menu under the plot. Above the plot there is the button , which is responsible for switching 2D/3D plot view.

PVT plot features

- Left-click X-axis, the dropdown menu of available parameters for correlations (pressure, temperature, gas content) calculation will appear;
- Right-click X -axis, the dropdown menu of available units of the chosen parameter will appear.

Data entry buttons

- The button of changing of gas gravity correlation yg is used to choose the type of gas gravity calculation. You may select manual input, calculations based on gas composition and calculations based on wet gas correlations. The latter becomes active only if the main phase is Gas. Hover the mouse over the button to display the current selected type;
- The button of changing of pseudocritical gas properties correlation Ppc, when clicked, displays the choice of the way to calculate pseudocritical properties. Hover the mouse over the button to display the current selected type;

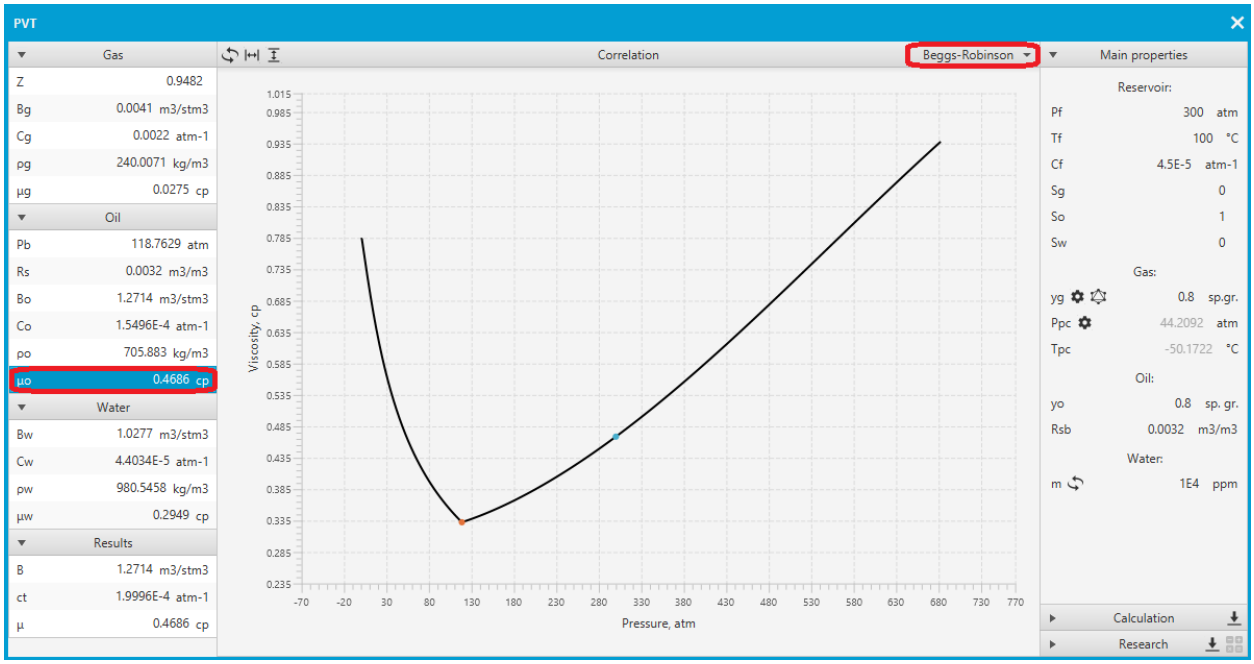
Gas composition

Component	N, fraction	M, g/mol	Pc, atm	Tc, °C
C1	0.4	16.042	45.3867	-82.5889
C2	0.3	30.069	48.0813	32.1778
C3	0.2	44.096	41.8823	96.6222
i-C4	0.1	58.122	35.9215	134.6722
n-C4	0	58.122	37.4865	151.9722
i-C5	0	72.149	33.3697	187.2222
n-C5	0	72.149	33.2609	196.5556
C6	0	86.175	29.7293	234.3333
C7+	0	100.202	27.0006	267.1667
CO2	0	44.01	72.8092	30.9778
N2	0	28.014	33.5126	-146.9611
H2S	0	34.082	88.902	100.45

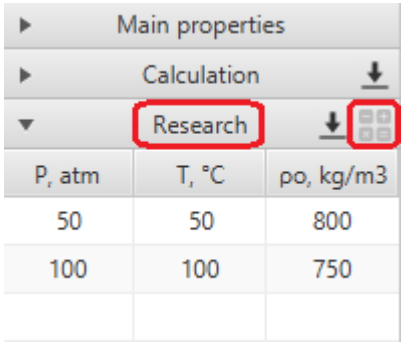
- The button displays the table of gas composition to calculate gas gravity. In this table editable cells are those in which the text is in italics. The sum of the fraction of components must be equal 1. The set of table components depends on gas gravity and pseudocritical gas properties correlations chosen by the user. If “user-defined” is selected in both correlations, the button disappears;
- The button m is responsible for changes to method of water gravity data input (gravity / salinity).

Changing the correlation type

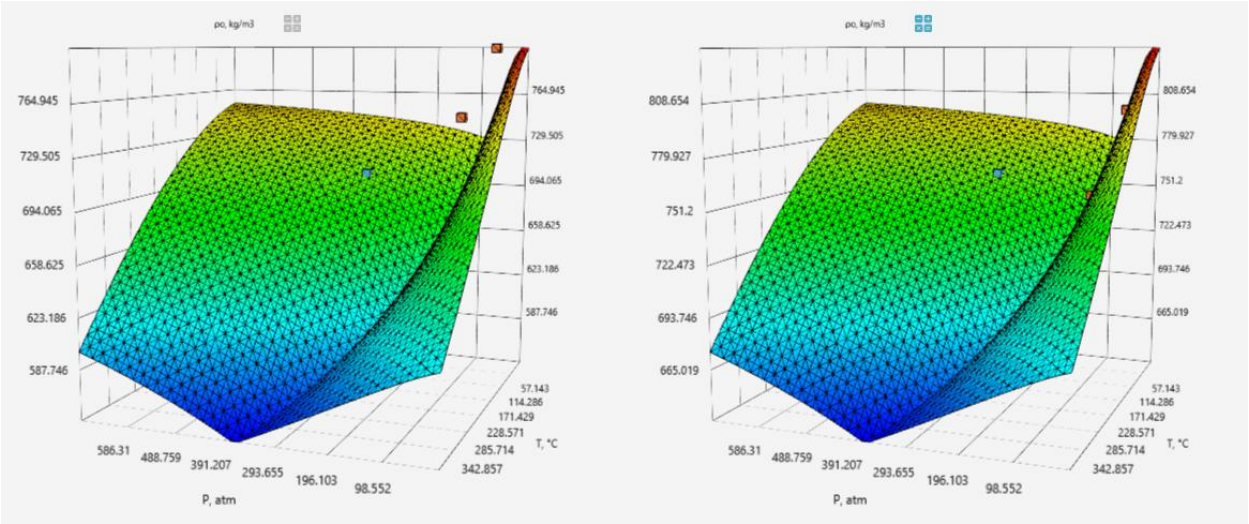
To change the correlation type of the chosen property, it is necessary to select needed property from the list (left pane). After that regeneration of the plot takes place. In the right part of the plot header dropdown menu of available correlations for this property appears. When choosing a new correlation, the plot is rebuilt and related properties are recalculated.



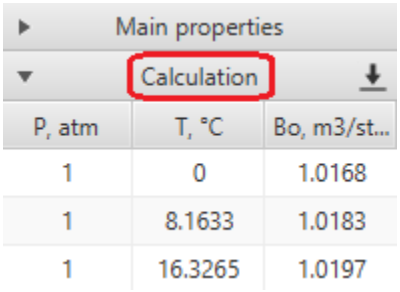
Improving correlation



Use the Research tab in the right pane to improve chosen correlation. Data input may be done manually as well as with the import from the clipboard / file by clicking the button . After filling in the table with data, click the button to apply changes. Correlation will be improved according to the table data after clicking. The button becomes active . It means that this correlation has been improved. Click it again to disable improvement.



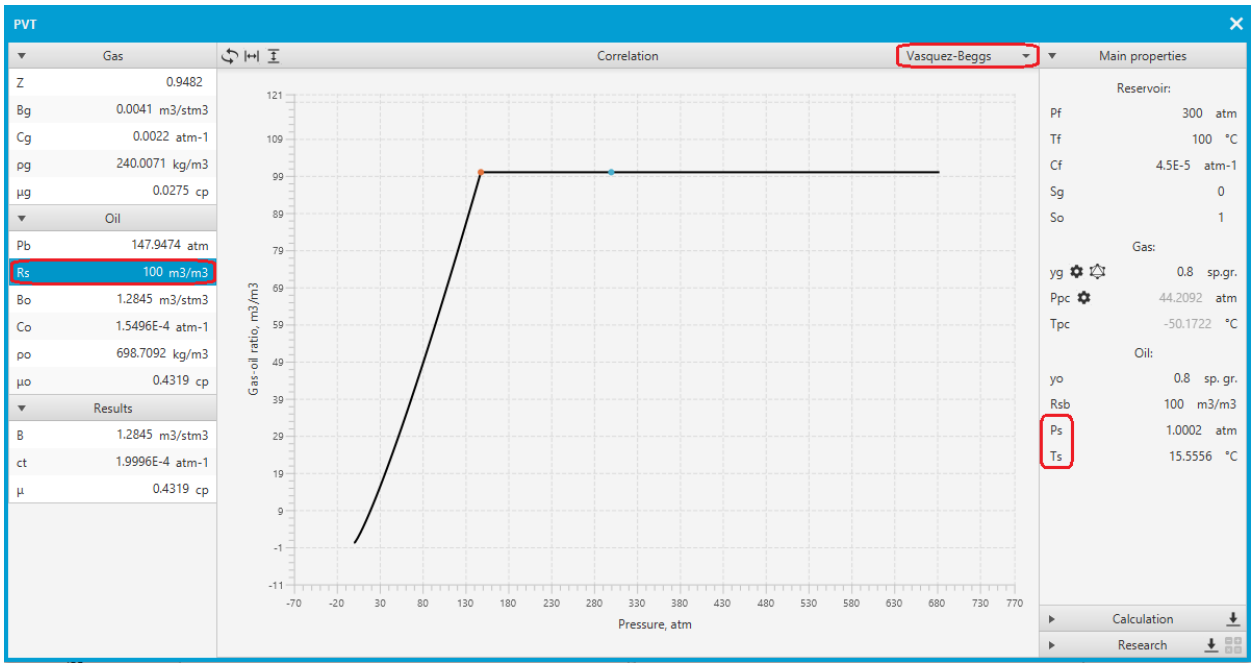
Loading custom correlation



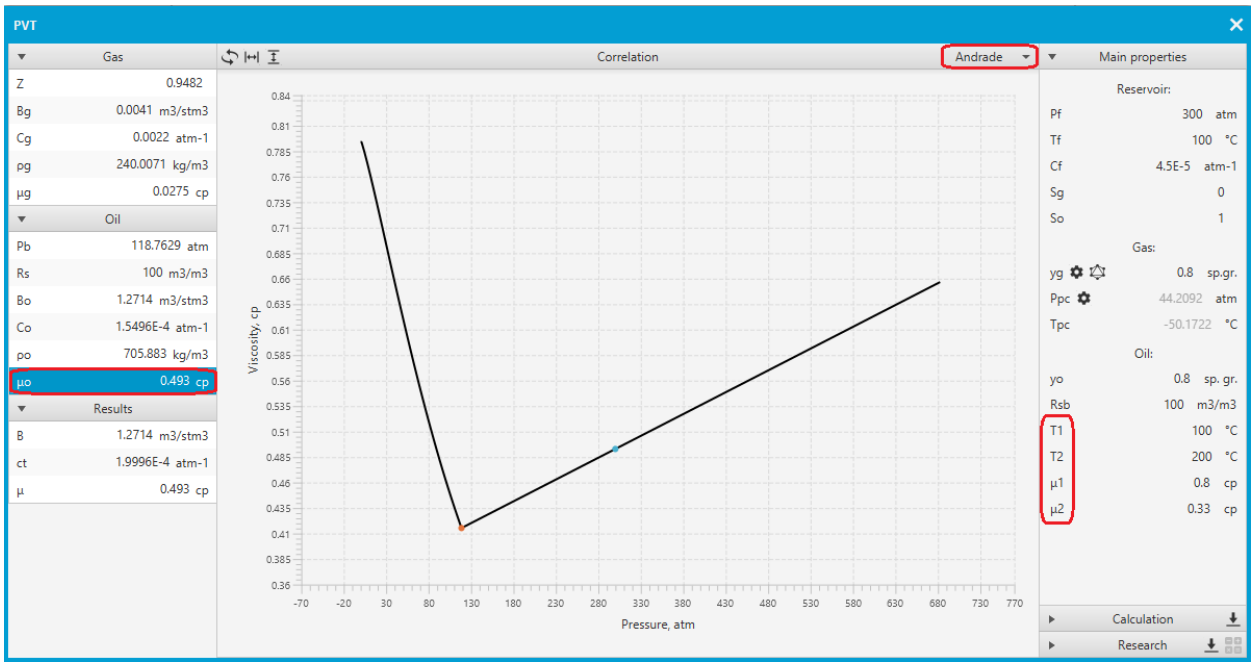
To load custom correlation, use the Calculation tab in the right pane. Correlation input is carried out with input data in the table. Data input in the table may be done manually as well as with the import from the clipboard / file by clicking the button . After filling in the table with data, select the User defined correlation to apply custom correlation.

Special correlation of oil properties

When selecting Vasquez-Beggs correlation for bubble point pressure, gas oil ratio, or volume factor, new input properties appear in input oil properties. These properties are pressure separator (Ps), temperature separator (Ts) as these correlations use nominal gas gravity in separator conditions instead of gas gravity.



When selecting Andrade for correlation of oil viscosity, new input properties will appear in input properties: temperature 1 (T1), density under temperature 1 (μ1), temperature 2 (T2), density under temperature 2 (μ2). The correlation computes oil viscosity according to mentioned properties.



The "Interpretation" module

General information

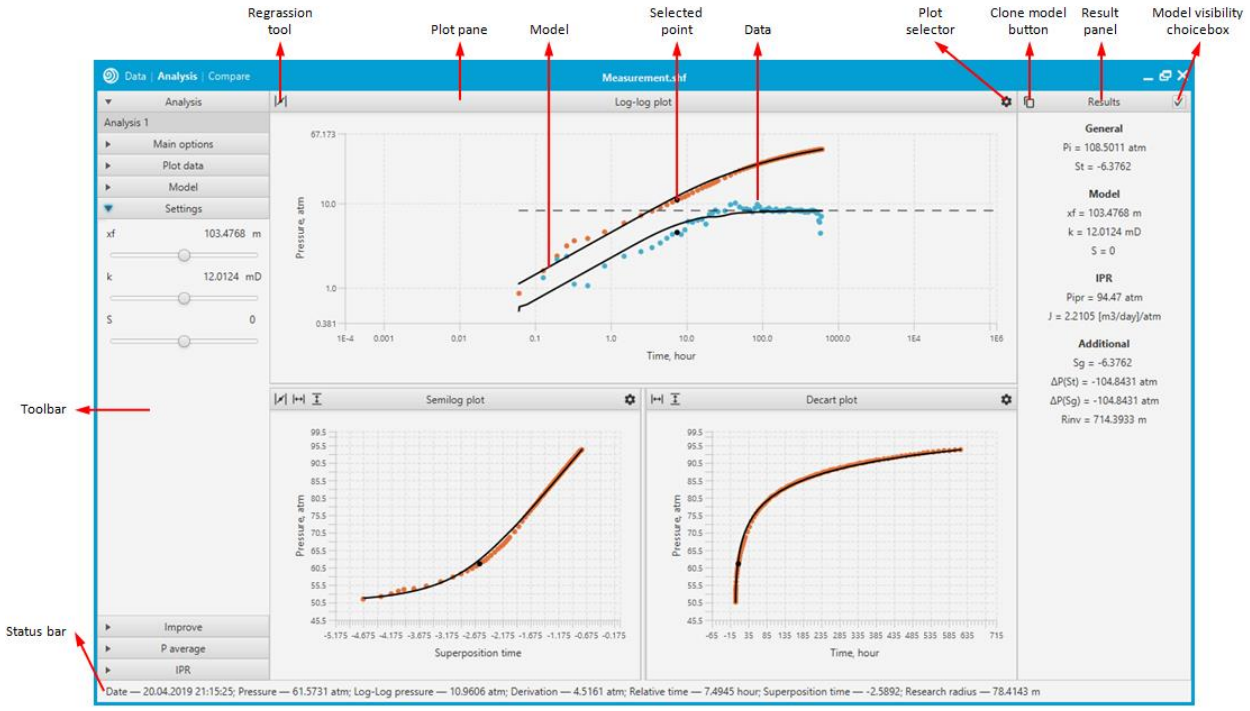
This module consists of 4 logical blocks: the toolbox (the left pane), plots (the central pane), result panel (the right pane), status bar (at the bottom).

The toolbox contains the following tabs:

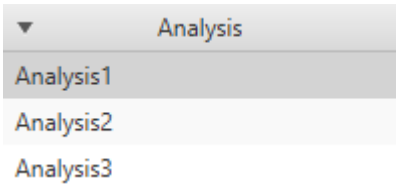
- "Analysis" to choose analysis for displaying and interpretation;
- "Input data" to edit parameters of a well, a formation, and fluids for selected analysis;
- "Plot data" to configure decimation and smoothing data;
- "Model" to select analytical model;
- "Parameters" to configure parameters of a chosen model;
- "Improve" to automatically search for model parameters;
- "P average" to calculate average reservoir pressure on the basis of a model;
- "IPR" to construct an inflow performance relationship.

There are 3 widgets in the central pane. They are identical objects, displaying one of a number of plot types: total model plot, descartes plot, log-log plot, semi-log plot, Horner plot, MDH plot, variable skin plot, IPR plot, 2D map. Every section has its own toolbar, displaying the select button and some dynamically on the fly appearing elements depending on the type of a selected plot.

The Result panel in the right pane of the module displays the parameters of an analytical model and parameters calculated on their basis. The results are returned as logically separated blocks. The status bar at the bottom of the module displays all the information about selected point on the plot.

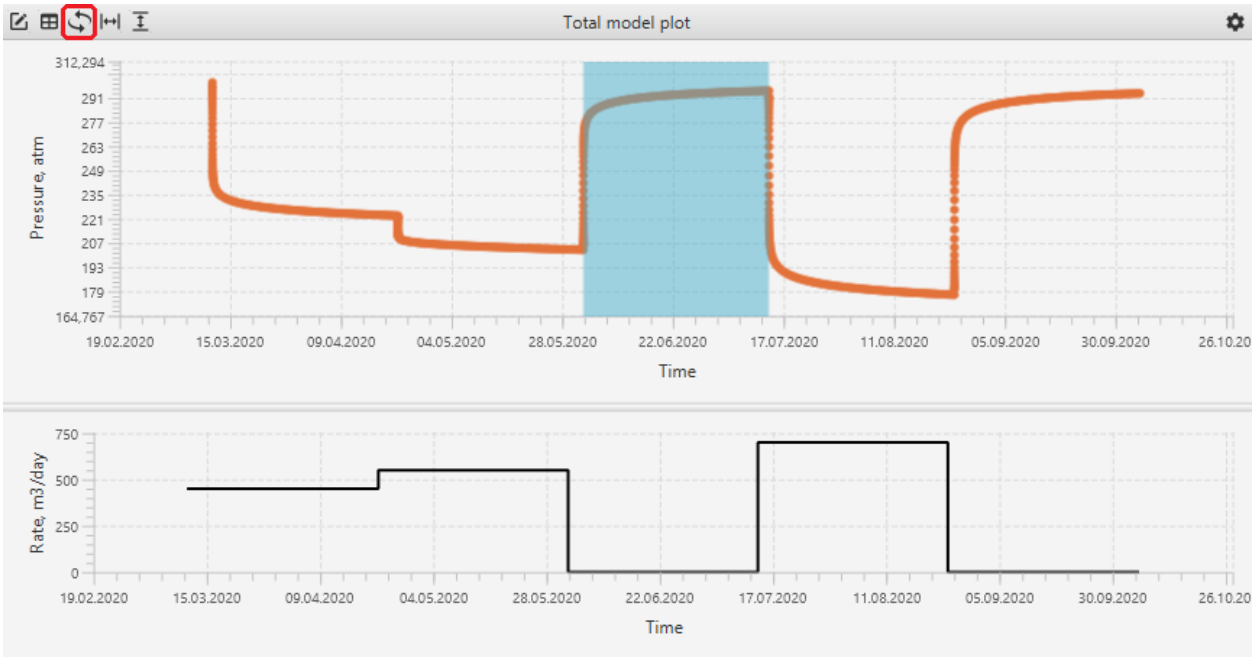


Analysis selection



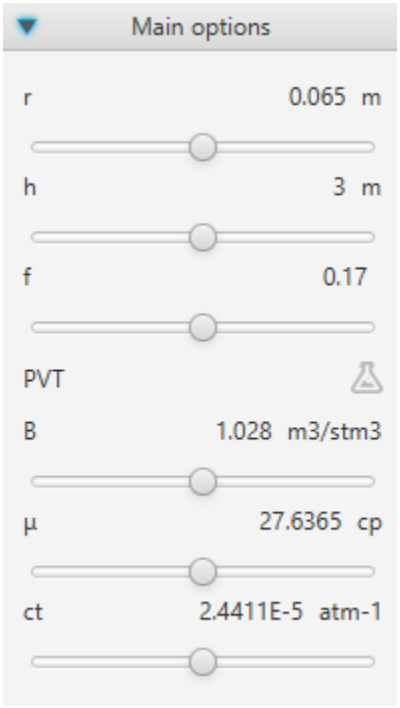
To choose the analysis for displaying and editing, open the Analysis tab in the toolbar (the left pane). After that when choosing the bar with the analysis, it will be loaded into the “Interpretation” module. All the changes of the previous analysis will be saved.

Analyzable step changing



The current analyzable step can be seen on the main plot, its background is highlighted in contrast color. It can be changed to any available area by clicking the button . It activates interval selection mode, selectable steps will be highlighted when hovered over. Left-click to change the area to selected one.

Main options editing



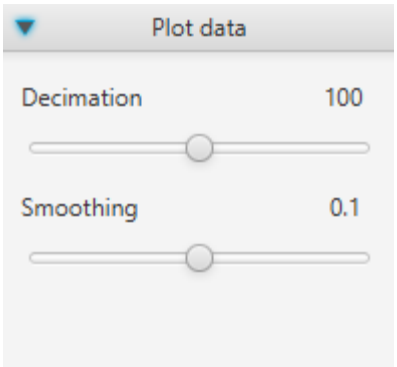
Analysis object contains the copy of the object of the well, formation and fluids data which can be edited. Hereby original data from "Data" module remain unchanged.

Data can be changed manually in the textbox as well as with the slider. Left-click the parameters line with units of measurement to change them. The context menu with possible choices will be displayed.

When clicking the button , fields located below become inactive, the button becomes active and the "PVT" module responsible for the calculation of general fluids parameters is displayed. When clicking the active button , inactive fields get back on manual input performance, the button becomes inactive .

In the main phase Gas or Condensate the "PVT" module is always active as in this case the fluid parameters are variable and can't be constant.

Plot data editing

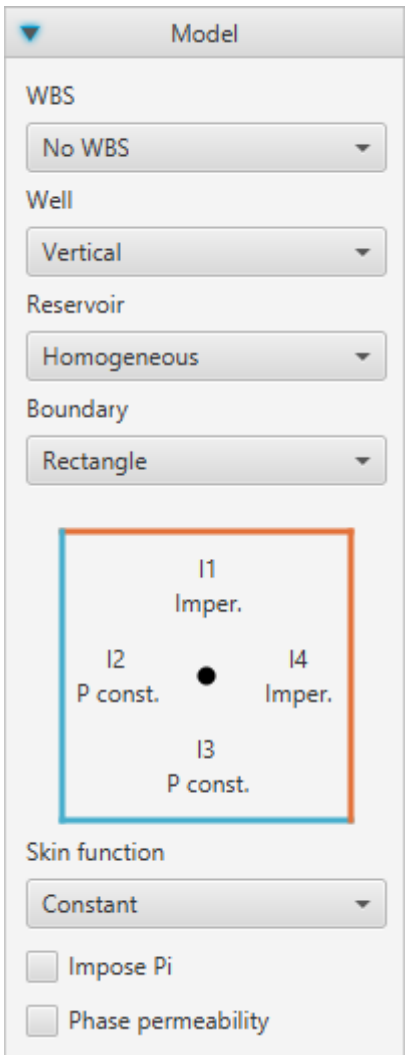


Decimation is responsible for the quantity of points on the interpretation plots. The number of decimation displays the number of points per a log-cycle. The more the value, the more detailed the plot is. Value can be changed manually or with the slider.

Smoothing is responsible for the character of the derivative on the plot. The number shows the size of smoothing window in log-cycles. The more the value, the smoother the plot is. Value can be changed manually or with the slider.

Model selection

The tool of model selection presents the set of 5 logically separated lists: the list of WBS model, the well model list, the reservoir models list, the boundaries model list, the skin factor model list. There are also additional options: «Impose Pi», "Phase permeability".



When choosing the element, automatic model rebuilding occurs.

If besides oil phase Oil any additional phase is chosen, additional checkbox “Phase permeability” appears in the model list. When the checkbox is activated, new additional fields responsible for relative permeabilities appear in the Parameters tab, and fields responsible for Perrine calculations appear in the Result panel.

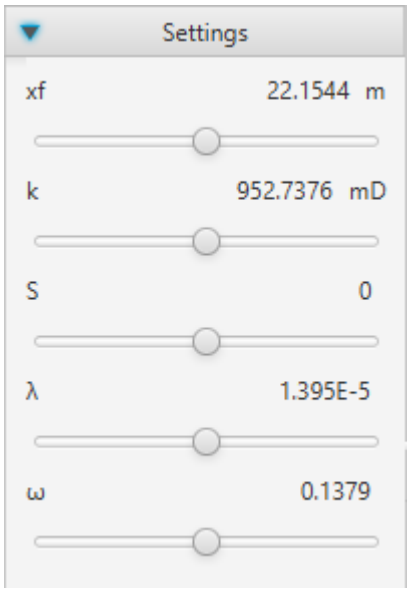
When choosing the “Radial composite” model of reservoir, boundary “Infinite” is automatically set as boundary calculations in this type of the formation are incorrect.

When choosing boundaries model from the view “Model”, the additional view for the selected boundary model appears. The type of every boundary can be changed by clicking .

Activation of «Impose Pi» checkbox lets you use arbitrary value of Pi.

To enable the function of variable skin factor depending on the rate, it is necessary to select “Function” or “Custom” model of skin factor.

The model parameters



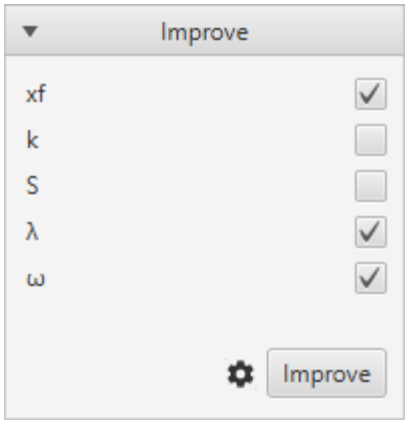
Elements of view are generated according to a selected model. The parameters change leads to immediate model rebuilding and result calculation.

Parameters can be changed manually or with the sliders.

Left-click the parameters row with units of measurement to change them. After that the context menu with possible choices will be displayed.

Some parameters have dynamic (f.e. fracture half-length can’t be longer than the distance to boundary) or static (f.e. storativity ratio can’t be more than 1) limits.

Model improving

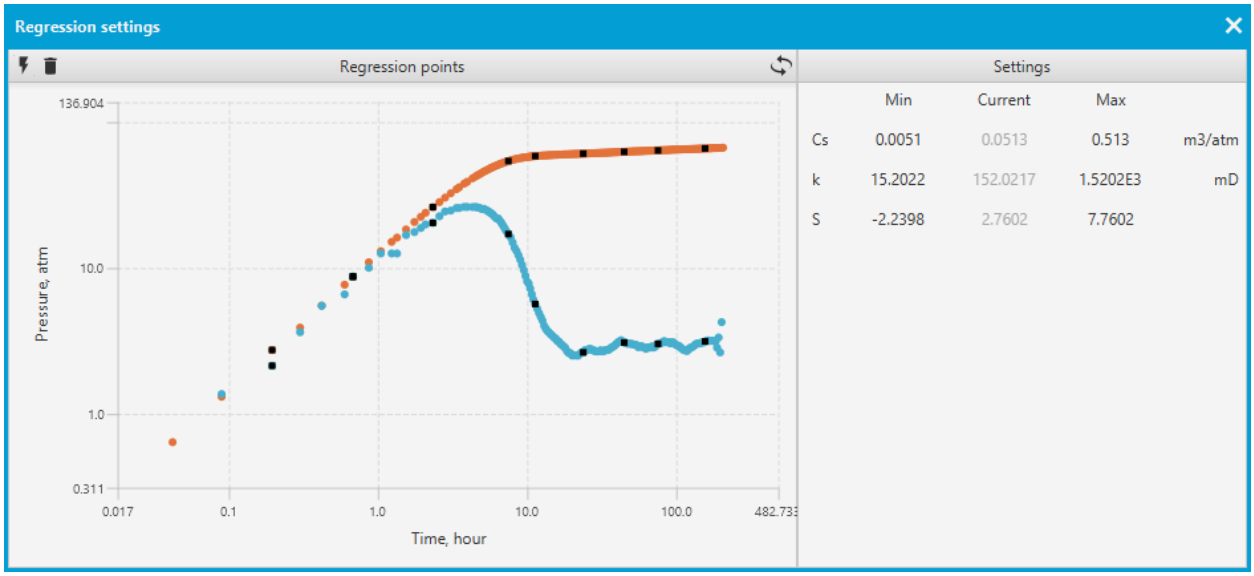


The Improve tool is used to automatically search model parameters. It includes checkboxes to select parameters, the button of regression points settings and the button of running optimization process.

To run the process, it is necessary to select needed parameters clicking relevant checkboxes, select regression points, if necessary, and click the Improve button.

To stop the process of selecting parameters, press the Esc key.

Regression points are selected in a new window which is activated by clicking the button .

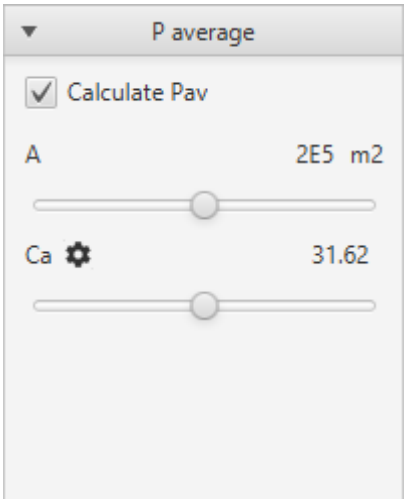


When clicking the button , points are generated automatically. When clicking the button , all points are deleted. The button switches the type of the plot. Left-click on a point on the plot to add it to the regression list.

You can view the current parameters of the model in the right pane as well as set the limits (minimum and maximum values) within which the automatic search for parameters is conducted.

The module of choosing regression points does not have the Save button. All the changes are saved automatically.

Average pressure calculation



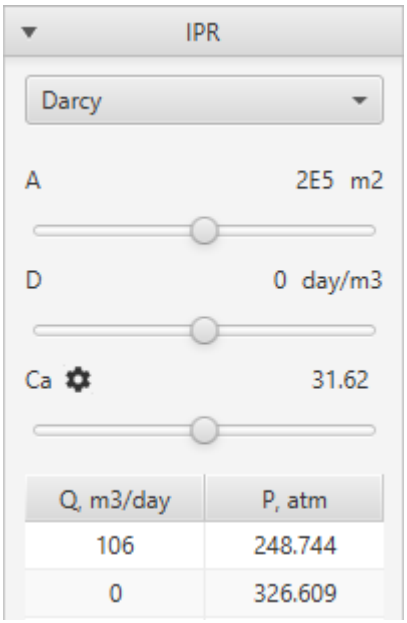
The average pressure calculation is one of the postprocess tools and does not affect the modelling results.

The calculation can be enabled by clicking the relevant checkbox, then relevant bar appears in the result panel.

The average pressure is calculated by the method of MDH according to the data obtained in analysing and additional inputting of information about form factor and drainage area.

Data can be input manually in the text fields or with the sliders. For form factors the table of default values is added. It is enabled by clicking the button .

Inflow performance relationship (IPR)



Inflow performance relationship is the tool of postprocessing and doesn't affect the modelling results.

This tool lets you construct IPR in 3 different ways: the least-square method (Internal), Darcy and Vogel methods. Vogel calculations are available only if selected phases are Oil Gas.

IPR points are generated automatically when conducting the analysis. Further they can be edited in the relevant table.

The curve is plotted on the basis of data obtained during analysis. Additional data are input manually into relevant text fields or with the sliders.

The "Internal" method uses only tabular information about operating modes and detects reservoir pressure and productivity index (in the case with gas well indexes "a" and "b" of quadratic approximate equation) by means of the least-square method.

Darcy and Vogel methods use reservoir pressure as input data. That's why P_{ipr} is not displayed in the results. If average pressure calculation is enabled, calculated average pressure is used as reservoir pressure. If not, calculated initial reservoir pressure is used.

The results of IPR calculations are displayed in the Results panel.

Plot features

- Double left-click plot point to select it on the current plot and others supporting this function. Detailed information about a selected point is displayed in the status bar. Left-click

any area of the plot to clear selections. The list of the plots supporting this function includes descartes plot, log-log plot, semi-log plot, Horner plot, MDH plot.

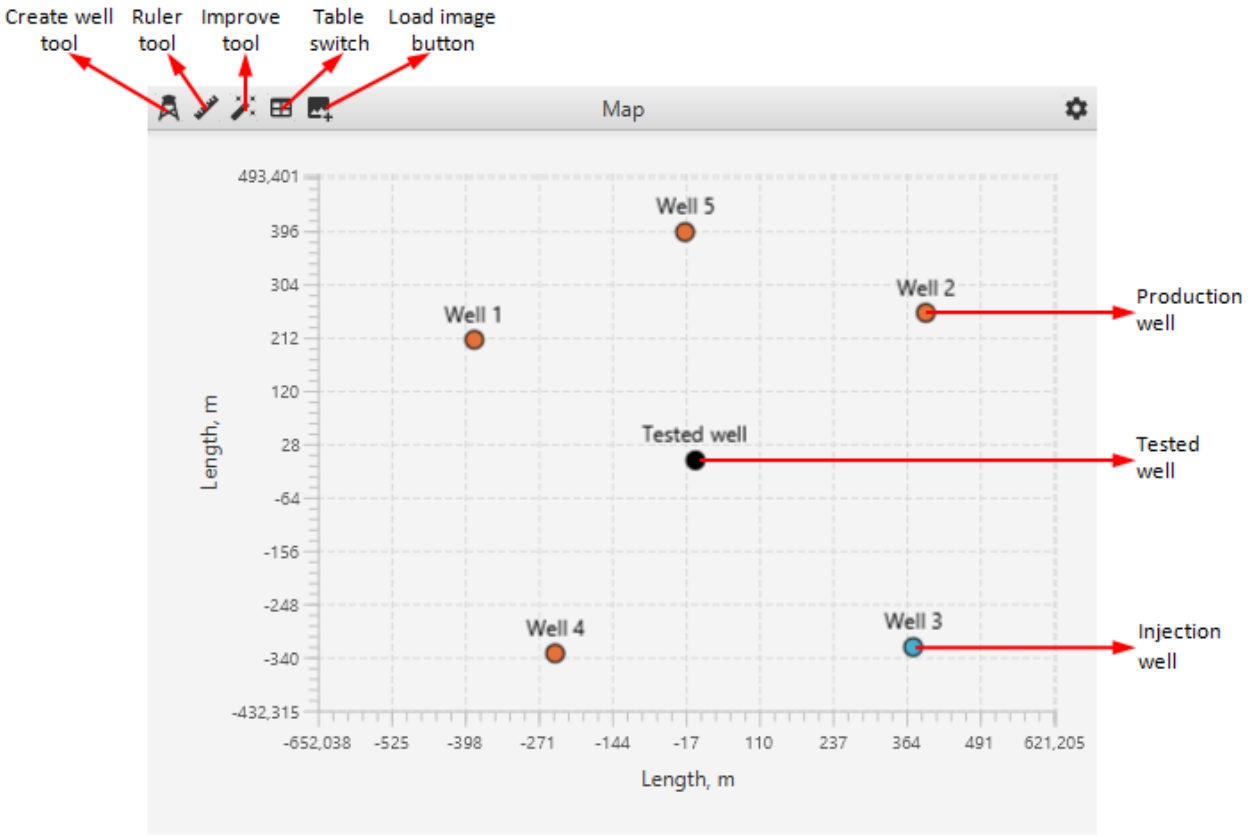
- Interactive editing is available on the total model plot. To activate it, click the button . Further rate parameters can be changed via a mouse click.
    - Drag with the left mouse button the needed step on the plot to change the step end time;
    - Drag with the right mouse button the needed step on the plot to change selected step rate;
    - Double left-click the needed step to divide it into 2 parts;
    - Time offset and step division into parts are not possible for the analyzable step and the step preceding the analyzable one if the value equals 0.
- The model of variable skin factor «Custom» implies manual changes of skin factor in the area. The skin factor values are changed for every step interactively with the mouse. Dragging with the right mouse button the needed step on the plot causes selected step skin-factor changes.
- The plot “Total” and “Skin” have the Table tool . When clicking it, the table of current values appears. When clicking , the table can be edited.
- The plot “Skin” has the tool for averaging and setting values of skin factor . When clicking it, the list of actions appears. To set values of skins for the interval, it is necessary to enter needed value in the text field “Set” and press Enter or click “Set” outside the textbox. Averaging and setting values take place for all the skins from the first selected to the last selected including those skin factors that haven’t been chosen but lie in the given interval. This tool is available only if the “Custom “ model of skin factor is chosen and the Edit tool is active. There is also the tool for choosing skin factor on the plot with the Lasso tool (available if the button is activated and carried out by dragging with the left mouse button on the plot). The selection of skin factors is also available in the table . The selected skins are highlighted both in the table and on the plot.
- Log-log and semi-log plots have the Regression tool. To activate it, click the button . If it is active, calculation permeability line by the least-square method in the interval of the selected points is made by dragging with the left mouse button the needed area on the plot.

Map features

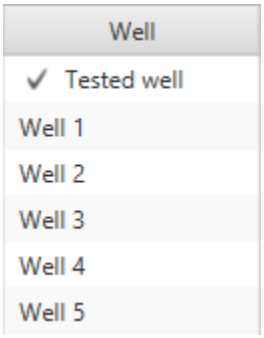
The Creating a well button in active state allows adding wells by double left-clicking on a certain place. In a newly created well, the rate in absolute value equals the rate of analyzable step. If this value equals 0, the value of the previous step is taken.

The Ruler button in active state allows you to measure the length of the straight-line portion drawn on the map by dragging with the left mouse button as well as to set scale of a map.

After releasing the left mouse button, the text field 525.85 м with the length of measured area displayed appears. After editing when the text field is on focus, it is required to press the Enter key.



The Improve button allows choosing the interference ratio for selected wells in the table according to regression points. If no well or an analyzable well is chosen in the table, the search is conducted among all wells. This function is available only in the “Interpretation” module and when the boundaries of the «Interference» model are chosen. To stop optimization process, press the Esc key.



The Table button in state changing displays / hides the well table by clicking. You can choose wells to search interference ratios in this table. Check mark displays the well under analysis. Selected wells are displayed on the map with wider contour line → . Press the Delete key to delete selected wells. The well under analysis can’t be deleted.

The Load image button allows adding an image of jpeg, jpg, png, tiff file format on the map. When clicking this button, the open file dialog in which image must be chosen appears. The scale of an image is set so that the vertical dimension of an image is fully displayed on the map in the current state.

Double right-click on the well to delete it.

Dragging with the left mouse button the needed well when the Ruler button is inactive results in the well movement on the map;

Dragging with the right mouse button the needed well results in changes to well interference ratio;

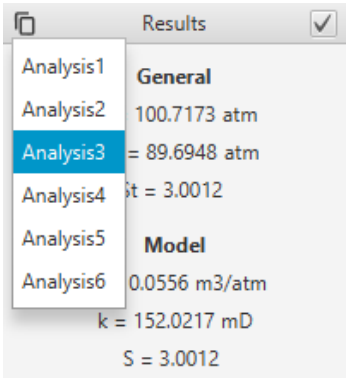
The value of wellbore radius is proportional to the module of well influence coefficient.

The Result panel

The Result panel displays the model parameters of the current analysis and parameters calculated on their basis. View fields are formed by separate logical blocks according to the selected model, activated calculation modules, and posrprocessing.

The Results checkbox Results ☑ is responsible for displaying the results in the panel and the model in the plot panes.

When right-clicking on the Result view, the context menu with the function of copying the results into the clipboard appears.



The button lets you copy model data from other analyses into the current one. When clicking, the context menu with analysis selection from which data are to be copied appears.

When coping model data, input data such as: well radius r, formation height h, porosity f, are also copied.

The “Data load” module

Before loading rates, it is necessary to select the row with prepared input data on the research. It is necessary to form multiphase loader correctly.

The “Data load” module is used to import pressure and rates data into the application. Information can be additionally loaded from text files, clipboard, and Excel files. This module consists of 2 logical blocks: the toolbox (the right pane) and the data table (the central pane).

When loading data from files or clipboard, only first 100 lines are loaded. The rest data are loaded into the application after marking.

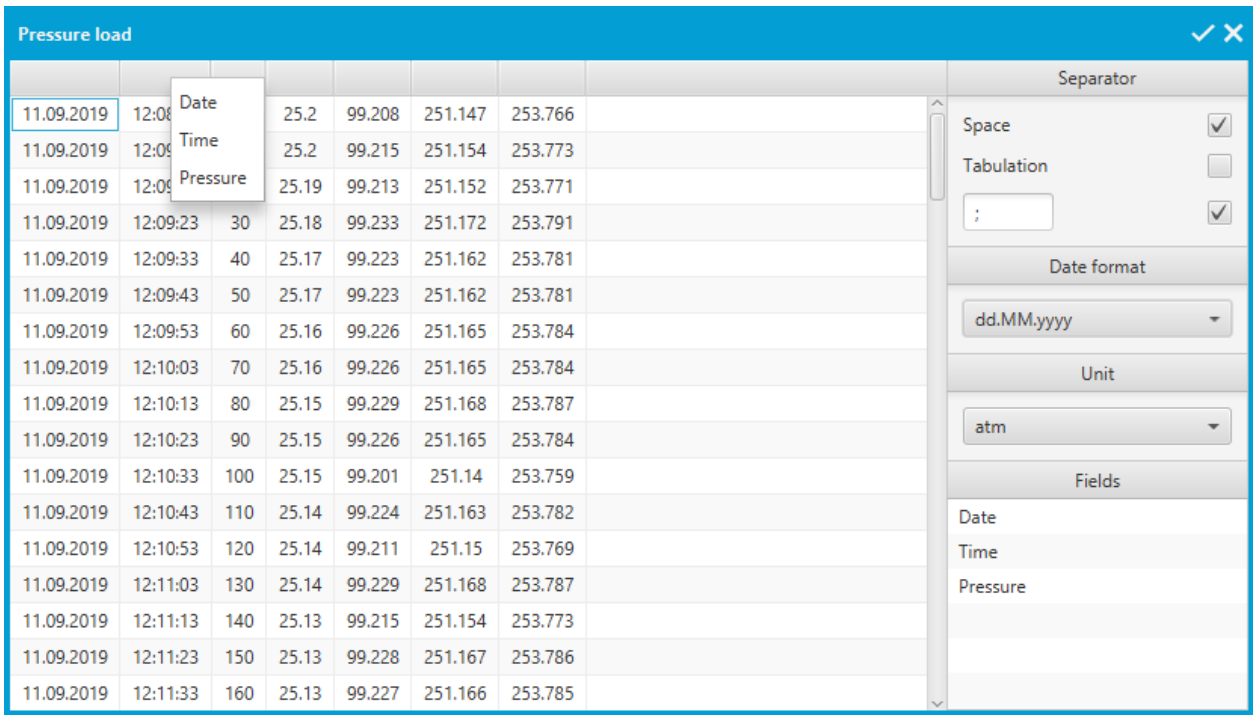
The Separator tab appears when loading data from text files or clipboard. The type of the character of the text separator is shown here. You can use 3 separators at one time: space, tabulation, custom in this module. When changing separators, the table is automatically rebuilt.

The Sheet tab appears when data are additionally loaded from Excel files. It is used to choose a sheet from which data are read.

The Date format tab is used to choose date format from the relevant column.

The Time steps tab appears when rates are loaded. You can choose the load method of rate steps according to time: start, end, duration, by means of a choice box in this tab.

The Unit tab is used to choose the parameter unit (pressure or rate) locating in the data being loaded.



11.09.2019	12:08		25.2	99.208	251.147	253.766
11.09.2019	12:09		25.2	99.215	251.154	253.773
11.09.2019	12:09		25.19	99.213	251.152	253.771
11.09.2019	12:09:23	30	25.18	99.233	251.172	253.791
11.09.2019	12:09:33	40	25.17	99.223	251.162	253.781
11.09.2019	12:09:43	50	25.17	99.223	251.162	253.781
11.09.2019	12:09:53	60	25.16	99.226	251.165	253.784
11.09.2019	12:10:03	70	25.16	99.226	251.165	253.784
11.09.2019	12:10:13	80	25.15	99.229	251.168	253.787
11.09.2019	12:10:23	90	25.15	99.226	251.165	253.784
11.09.2019	12:10:33	100	25.15	99.201	251.14	253.759
11.09.2019	12:10:43	110	25.14	99.224	251.163	253.782
11.09.2019	12:10:53	120	25.14	99.211	251.15	253.769
11.09.2019	12:11:03	130	25.14	99.229	251.168	253.787
11.09.2019	12:11:13	140	25.13	99.215	251.154	253.773
11.09.2019	12:11:23	150	25.13	99.228	251.167	253.786
11.09.2019	12:11:33	160	25.13	99.227	251.166	253.785

The Field tab is necessary to set relevant data type to column name. To do this, select any column cell with a mouse, then click the needed field in the Field tab. After these actions the data type must be displayed in the column header. Also to set the field type for the column, right-click on the column header and choose relevant data type in the drop down menu.

The Field tab may include additional rows, such as: Oil rate, Gas Rate, and Water Rate, which appear depending on the selected phase of input data chosen before loading. In the case of multiphase rate loading there is a possibility to load rate in two ways: total flow rate and phase rates. In the second case total rate is calculated according to PVT properties, obtained from the chosen input data.

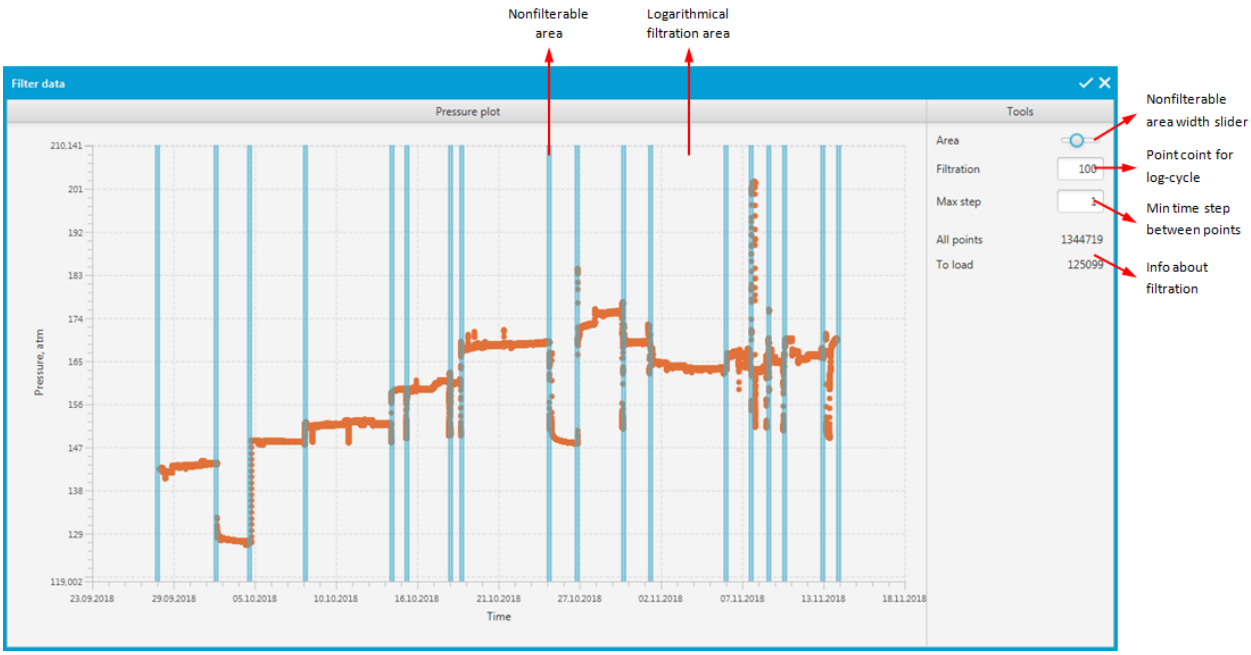
The application stores and uses only total flow rate for calculations. The information about phase rates isn't saved.

After all types of data are organized in columns, the load can be continued by clicking the button in the top right pane. If everything has been input correctly, the window closes and the data appear in the "Data" module. Otherwise the error message appears.

When loading mass data on pressure (>500 000 points), an additional module of input data decimation appears.

The location of nonfilterable data area is set up by double left-clicking. Double click the necessary area to delete it. The width of nonfilterable data area is modified with the tool .

Other areas of data are subjected to logarithmical filtration. For every log-cycle (f.e. period from 10 to 100 hours) the number of points is left according to the number indicated in the Filtration field. But the lag time between points do not exceed the value in the Max step field. The load of pressure is available after the number of filtered point decreases to 500000.

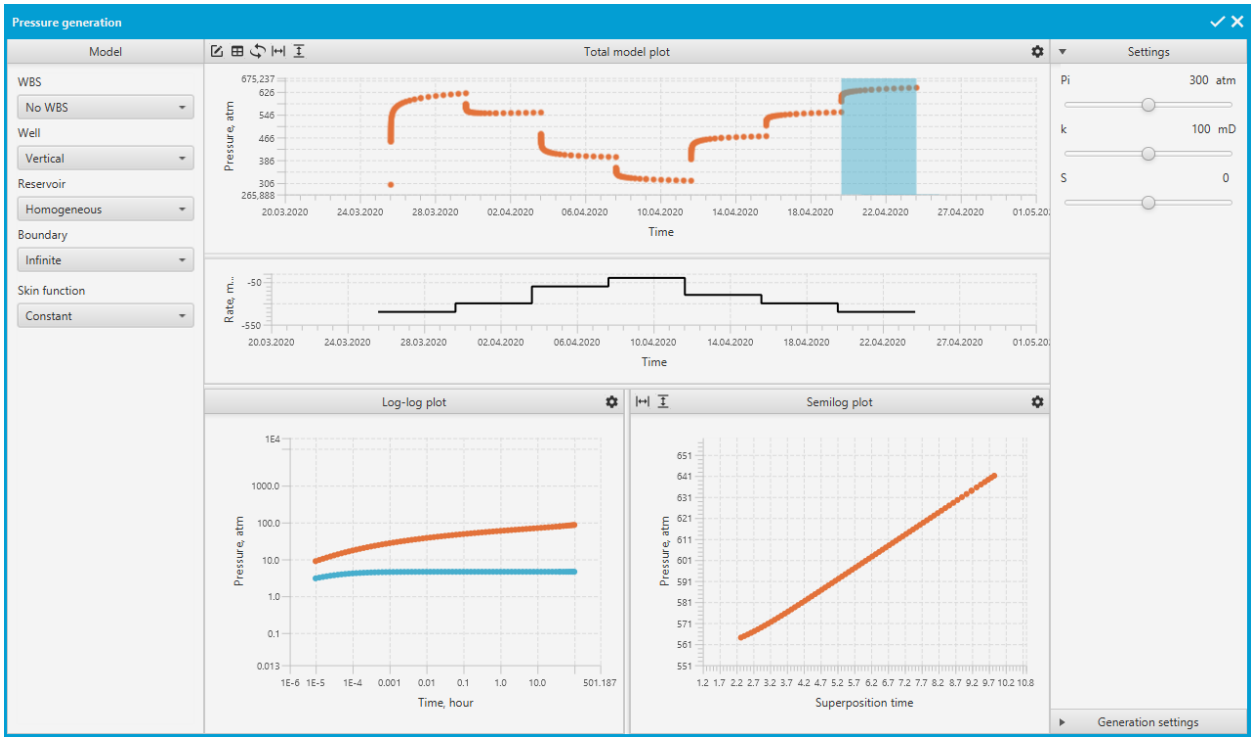


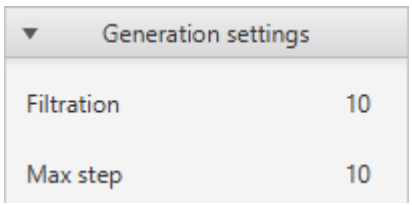
The “Pressure generation” module

This module is a crippled version of the “Interpretation” module. It consists of 3 logical blocks: the model selection panel (the left pane), the model parameters panel (the right pane), plots (the central pane).

The module works on the same principle as the “Interpretation” module. The only difference is that data, not the model, are generated and the model curve is absent.

After modelling, click the button ☑ in the top right pane to generate a new pressure row in the “Data” module.





The number of points for log-cycle (Filtration) and max time step (Max step, hours) responsible for frequency of pressure point generation are set in the Parameters generation tab.

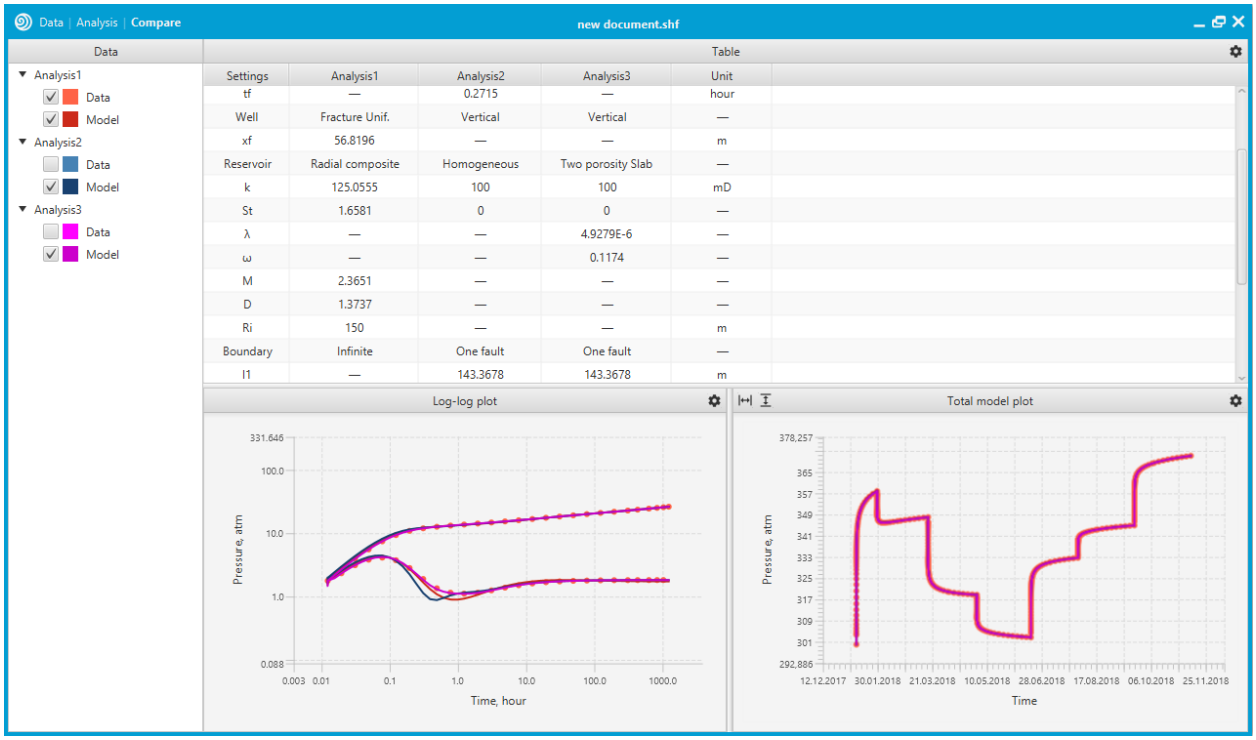
The “Compare” module

The “Compare” module is used to compare results of analysis using plots and table-oriented view. The module consists of 2 logical blocks: the list of analyses (the left pane) and the graphic component consisting of 3 identical views. Each display view is a universal tool and has the same functions – reporting information on data and a model selected from the list.

The list of analyses is described by a tree diagram. Each analysis includes actual data and a calculated model. Each row included in the analysis has a checkbox, a color and a name. The checkbox is responsible for data displaying on plots with color indicated in the row.

The graphic component allows viewing the following plot: total model plot, descartes plot, log-log plot, semi-log plot, Horner plot, MDH plot. To choose a needed plot, click the button  . After that the dropdown menu appears. Logically other element of this list is the result table included in this list.

All main parameters selected for analysis comparison are displayed in the table. When clicking the unit in the column “Unit”, the context menu with available units for a certain parameter appears.



Plots features

Scale and navigation:

- Navigation is done by dragging mouse holding wheel or holding left button and pressing the Shift key ;

- Scale changing is made by scrolling of the mouse wheel  . To change the scale in X direction only, press the Alt key , in Y direction only – press the Ctrl key;
- Auto scale of the plot is done by double clicking the mouse wheel button  , or double left-clicking  and pressing the Shift key .

Changing units:

- Changing of axes units is made by clicking  on an axis. After that context menu containing a list of available units is activated.

Copying the plot data into the clipboard:

- Right-click  on the plot to activate the context menu with options “Copy plot” and “Copy data” which allow exporting image or tabular information into the clipboard respectively.

Tables features

- Double click on a cell to activate the cell edit box;
- To implement changes to a table cell, press the Enter key, or exit the edit mode by clicking  on any other field of the application;
- On inputting a floating point number with separator “,” and implementing changes, the character “,” is automatically replaced with “.”;
- If incorrect data type has been input in the table, new information is not recorded into a cell when implementing changes;
- If the table header has a unit, it can be changed by a mouse click  . After that dropdown menu of available options to choose from appears.

Analytical models list

Wellbore storage:

- No WBS;
- Constant WBS;
- Changing WBS (Fair).

Well:

- Vertical;
- Uniform flux fracture;
- Infinite conductivity fracture;
- Finite conductivity fracture;
- Auto hydraulic-fracture;
- Limit entry;
- Horizontal;
- Horizontal multi fractured.

Reservoir:

- Homogeneous;
- Dual PorosityPSS
- Dual Porosity Slab
- Dual Porosity Sphere
- Radial Composite

Boundary:

- Infinite
- Single fault
- Intersecting faults
- Channel
- Limited channel
- Circle
- Rectangle
- Interference

PVT correlations list

Gas:

- Gas Specific Gravity (yg):
    - By gas composition;
    - wet gas;
- Pseudocritical gas parameters (Ppc, Tpc):
    - By gas composition;
    - Condensate;
    - Sutton;

    - Standing;
    - Carr et al;
- Properties:
    - Supercompressibility factor (Z):
        - Dranchuk;
        - Hall-Yarborough;
        - Standing;
        - Dranchuk-Abou Kassem;
    - Volume factor (Bg):
        - Internal;
    - Compressibility (Cg):
        - Dranchuk;
    - Density (ρg):
        - Internal;
    - Viscosity (μg):
        - Lee et al.

Oil:

- Properties:
    - Bubble-point pressure (Pb), gas oil ratio (Rs):
        - Standing;
        - Vasquez-Beggs;
        - Glaso (volatile);
        - Glaso (non volatile);
        - Petrosky-Farshad;
    - Volume factor (Bo):
        - Standing;
        - Vasquez-Beggs;
        - Glaso;
        - Petrosky-Farshad;
    - Compressibility (Co):
        - Vasquez-Beggs;
        - Petrosky-Farshad;
    - Density (ρo):
        - Internal;
    - Viscosity (μo):
        - Beggs-Robinson;
        - Beal;
        - Glaso;
        - Andrade;
        - Petrosky.

Water

- Properties:
    - Gas water ratio (Rsw):
        - Meehan-Ramey;

        - McCain;
    - Volume factor (Bw):
        - Meehan-Ramey;
    - Compressibility (Cw):
        - Internal;
        - Osif;
    - Density (ρw):
        - Internal;
    - Viscosity (μw):
        - Van Wingen-Frick;
        - Helmholtz-Frick.

Condensate:

- Condensate Specific Gravity (γg):
    - Separator;
- Properties:
    - Dew point pressure (Pd):
        - Internal;
    - Condensate gas ratio (rs):
        - Kleyweg;
    - Compressibility (Cg):
        - Dranchuk;