Petromod

Basin modeling software

Release Notes

Version 2024.2

Contents

About Petromod

Petromod basin modeling software combines seismic, well, and geological information to model the evolution of a sedimentary basin. Petromod software has several applications. Classically, applied for hydrocarbon exploration, Petromod predicts if and how a reservoir has been charged with hydrocarbons. This includes the source and timing of hydrocarbon generation, migration routes, quantities, and hydrocarbon type in subsurface or at surface conditions.

Petromod is equally suitable for other basin modeling usages such as carbon storage site screening, natural hydrogen modeling, and geothermal modeling among others. Petromod can be used in all geological environments, regardless of their complexity. This includes compressional and extensional tectonic environments and salt provinces.

Petromod software has a standardized user interface across the entire 1D, 2D, and 3D software suite and employs the same simulators in 1D, 2D, and 3D to ensure that all technical features and tools are available and identical in all dimensions. Multiple simulation methods, for example, Darcy, flow path (ray tracing), invasion percolation (IP), and the Petromod hybrid and combined methods (Darcy/flow path/IP) are used with the same data models. It is possible to couple water solubility including dissolution and advection with all migration methods.

Petromod fluid migration modeling technology is the most advanced commercially available tool and the only commercial system with fully PVT controlled modeling of n-component/3-phase relationships during the entire migration process. The 2D and 3D migration modeling technology delivers an improved understanding and prediction of fluid properties for several basin model applications by offering flash calculations throughout the entire model and its geologic history.

For further analysis and post-processing Petromod input and output data are easily integrated with the Petrel E&P platform. Petromod takes advantage of high-performance computing by allowing to submit simulations for parallel processing in the cloud.

Petromod 2024.2 is compatible with Petrel 2024.3 and later 2024.x versions.

MPI runtime environment

An MPI runtime environment must be installed on your computer. Otherwise, you cannot use the Petromod 2024 simulator.

The MPI runtime environment is required for both single and parallel processing on **Windows** and **Linux** systems:

- **Windows**: Microsoft MPI v10.1.2
- **Linux**: Intel MPI 2018.2.199

For more information, refer to the *Petromod 2024.2 Installation Guide.*

Licensing

To use Petromod 2024 you must use the **Schlumberger license server version 2021.1**. If you have been working on Petromod versions prior to 2021.1, you must upgrade your Schlumberger license server before you install Petromod 2024.2 or later. For information on upgrading the license server, refer to the *Schlumberger Licensing User Guide*.

New licenses are issued based on your maintenance contract expiration date. This is how you read the licensing format in the license file:

FEATURE petrobuilder3D slbsls <yyyy.mm> <dd-mmm-yyyy> <#>

Where

- <yyyy.mm> is the maintenance expiration year and month
- <dd-mmm-yyyy> is the license expiration day, month, year
- <#> is the number of licenses.

Maintenance renewal is required to run any Petromod version released after your maintenance expiration date. You will be contacted by SLB before your maintenance expires.

WARNING

When you specify the location of your license server in an environment variable like SLBSLS_LICENSE_FILE, be sure to include the port number (e.g. 27002@localhost). Configurations without port number (like @localhost) are not supported anymore.

For more information, refer to the *Petromod Installation Guide* or the *SLB Licensing User Guide*.

System requirements

Hardware requirements

Processor with x64 instruction set including AVX extensions.

For workstations

Processor	16 core (fast clock speed)
Memory	64 GB RAM
Primary storage	SSD
Graphic card	Nvidia RTX 3000 Ada

For laptops

Processor	8 core (fast clock speed)
Memory	32 GB RAM
Primary storage	SSD
Graphic card	Nvidia RTX 3000 Ada

For Linux clusters

Processor	Dual 16 core (fast clock speed)
Memory	256 GB RAM
Primary storage	SSD
Network card	10 GBit NIC
Infiniband (optional)	Mellanox Connect X

Software requirements

Microsoft Windows 10 (version 23H2 or newer) or Microsoft Windows 11 with Microsoft.NET Framework and Microsoft Visual Studio runtime environment	64 bit 4.8 2022
RedHat Enterprise Linux 8.6 (or newer)	64 bit

Petromod Open Simulator: You must install the Python scripting language on your system to use the Open Simulator which is a prerequisite for the Nested Model workflow.

Important: You must use Python 3 to write your own scripts. A Python 3.9.x installation is required.

For more information, refer to the *Petromod 2024.2 Installation Guide*.

***Caution**: Graphics may not display correctly when using older graphics cards and drivers. We recommend installing the latest graphics card drivers to avoid OpenGL display errors. The driver version that comes with the OS is usually old or generic, this means that graphics hardware is not recognized correctly during the installation of the OS. These drivers therefore support only basic functionalities and do not offer the OpenGL features required by Petromod.*

To avoid performance problems and visualization errors, a dedicated graphics card is required. As most onboard graphics hardware does not support OpenGL, we recommend disabling the onboard graphics unit in the BIOS

***Warning for Linux users:** Due to known issues concerning the instability of OpenGL graphics, Petromod only supports local rendering on 3D graphic cards with stable graphic drivers. Rendering using a network could cause stability issues.*

***Warning for Linux users:** Do not change the GUI style of your window manager (for example via qtconfig) while Petromod is running. If you do, Petromod could stop responding.*

Convert Petromod projects to Petromod 2024.x

Petromod 2023 projects (or older) must be converted before they can be opened in Petromod 2024. To convert a project, use the **Convert project to 2024** tool in the Petromod Command Menu. With the tool, you can convert projects from version 2013.1 onwards (for example: 2021.x to 2024). For projects from 2018/19 and later, you can also include the existing output into the conversion.

***Note**: Petromod 2024.1 projects are compatible with Petromod 2024.2. Therefore, no conversion is necessary.*

When you convert a Petromod project to the current version, you will not lose the earlier version(s). Instead, Petromod creates a converted copy. The converted copy includes the entire project directory, which means it converts all models in the project. There is no option for converting individual models. If you choose to include output in the conversion, ensure that enough diskspace is available as 3D output can be large (approximately 0.5-2TB).

The tool converts Petromod models, including all data intrinsic to a model, and then copies the user data in the *project/data/...* folders.

***Note**: For projects older than 2018.1, only input data is converted to the current version. Output data from simulation runs is not converted or copied to the new Petromod project directory (except, optionally, for projects from 2018.1 onwards).*

1. On the menu bar of the **Command Menu,** click **Tools,** and then **Convert project to 2024**. The **Convert to Petromod 2024 project** dialog box opens.

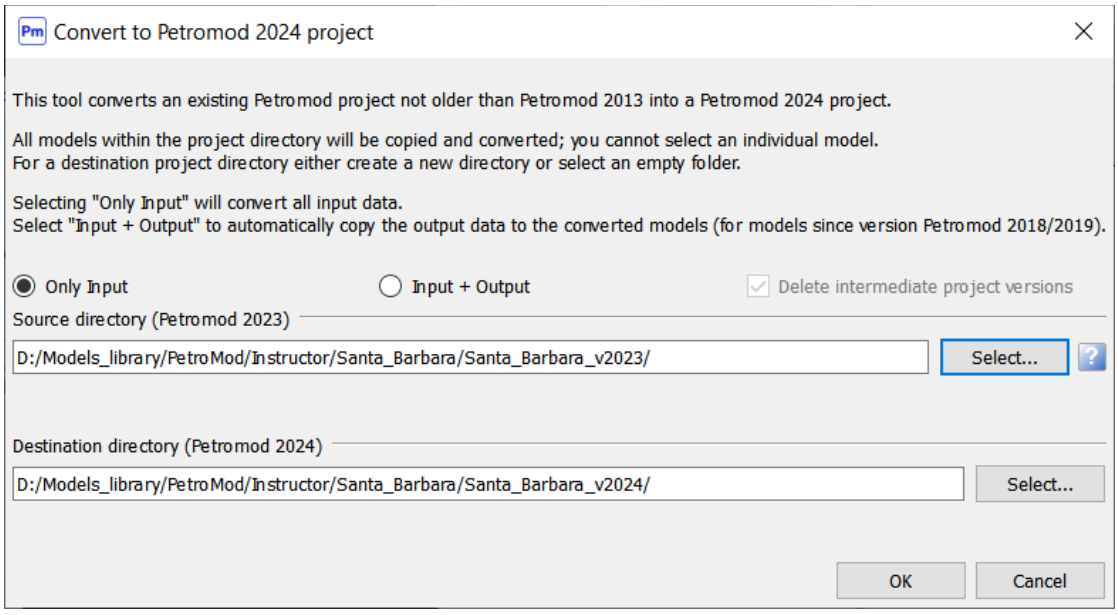

Fig 1: The Convert to Petromod 2024 project dialog

2. In the *Source directory (Petromod 20XX)* field choose or enter the path of the project directory you wish to convert. The title of the field changes to the Petromod version of the source directory after the selection. The current project directory is shown by default.
3. In the *Destination directory (Petromod 2024)* field choose or enter a path for the **Petromod 2024** project.
4. Select **Only Input** or **Input + Output** as required.

   ***Note**: Be aware that copying the output is only intended to view previous results without having to re-simulate the models. Re-running the simulation with the current simulator will most likely produce slightly different output. Also, some workflows (such as nested model extraction) might not work as expected with output from previous Petromod versions. If you encounter any issues, re-simulate the models with the current simulator.*

   For Nested Models: When you convert Petromod 2023 projects to 2024, the precalc folder containing the extracted boundary conditions from the parent model will also be copied.
5. Select or clear the **Delete intermediate project versions** check box as required.

   If you launch a conversion spanning over several versions of Petromod, from for example, a Petromod 2017 project to the current version, Petromod performs this task step-by-step, creating intermediate projects for each Petromod version in between. The **Project Manager Output** dialog box lists the conversion log step-by-step. This means: *Convert Petromod 2021 project to Petromod 2022 project -> Convert Petromod 2022 project to Petromod 2023 -> Convert Petromod 2023 project to Petromod 2024 project*. The conversion steps will be separated by a line of blue hash-symbols. Each conversion is reported as either **Successful** or **Failed**. After the last conversion – into version 2024 – a **Conversion summary** is displayed.

   By default, the intermediate projects are deleted after the successful conversion has been completed. If you want to keep the intermediate versions, (to analyze the changes caused by each conversion individually, or to correct possible errors, for example), you must clear the **Delete intermediate project versions** check box.

   ***Note**: This requires more space on your drive, as the destination folder will contain a subfolder for each interim version of Petromod. This means that when you convert a project from 2021 to 2024, there will be folders for the 2022, 2023, and 2024 versions respectively in your destination folder. If you no longer require them, you can delete the project folders of interim versions.*
6. Click **OK** to start the conversion. A dialog box opens to ask if you are sure you want to convert the project. Click **Yes** to continue.

   The **Project Manager Output** window opens to enable you to keep track of the conversion process. Do not close this window before the conversion has finished, as doing so will interrupt the process. When the conversion is finished, the **Project Manager Output** window will display the message: *Conversion successful*. If the conversion was unsuccessful, the message *Conversion failed* is displayed. To find out the cause of the failure, check the messages displayed in the **Project Manager**

Window. If you cannot fix the original project for a successful conversion, contact SLB Customer Support.

The **Project Manager Output** displays success messages in green, warnings in orange, and errors in red.

New in Petromod 2024.2

Editors

Phase Editor

The Phase Editor has been completely redesigned to enhance user interaction. The **Water**, **Liquid**, **Vapor** and **Ice** tabs are now merged into the **Main** tab. The dissolution options have been reworked so the Liquid and Vapor settings are updated when selecting a different dissolution model. Finally, the Phase Editor has new menu options and commands such as **Reload**, **Undo** and **Redo**.

Simulator

Reduced Flowpath calls

The standard Flowpath migration algorithm performs several calculations per time step. This can lead to long simulation times. With Petromod 2024.2 we have introduced the special option *Oprxcall 1* to reduce the Flowpath calls to one for each event. Depending on the model configuration, this can reduce the simulation time up to 30%.

***Note**: When using this special option, the results might be different than that of o a model ran without it. For some models the differences will be insignificant, for others they will be more noticeable.*

New overlays

There are four new overlays:

- **Solubility in water:** Shows the maximum possible amount of a given component dissolved in water per water volume.
- **Change in mass in water:** Shows the net mass of the component that is transferred between the free phase and the water phase.
- **Dissolution mass:** Shows the mass of the component that dissolves from the free phase into the water phase.
- **Exsolution mass:** The mass of the component that exsolves out of the water phase into the free phase.

Enhancements and bug fixes in 2024.2

A small selection of important changes, further enhancements, and bugfixes is listed below.

Command Menu

Message Viewer

A new Refresh option has been added to the **Message Viewer** enabling the user to see new errors and messages without closing and reopening the dialog box. The interface has been reorganized, with all options moved to the top of the dialog box.

Unitless Unit

In the **Unit Settings** list, when adjusting parameters such as porosity, the "unitless" option was previously represented by a blank field in the list. This has been updated to be displayed as "[ ]" to enhance visibility and recognition, making it more intuitive to identify and select the "unitless" option.

Petromod 1D

Overlay selection box

The **Overlay selection** dialog box has been extended to enhance the selection of overlays. In previous versions, this box was very narrow, making it difficult to select the required overlay.

PetroBuilder 2D, PetroBuilder 3D

Lithology mixing

In previous versions, the **Lithology mixing** dialog box added two endmembers when adding rows into the table. Now, the number of endmembers to be added can be set by the user.

Table selection

The table selection options have been extended to include **Greater than** and **Less than** options. In the past, only **Greater and equal than** and **Less and equal than** options were available. Various options have also been renamed to better describe the operations performed.

PetroBuilder 2D

Age assignment table

In Petromod 2024.1 the application stopped responding when switching from the **Age assignment** table to the **Simulation preview** if no ages were defined in the **Age assignment** table. This has been fixed.

PetroBuilder 3D

Regrid model

In previous versions, there was an inconsistency when using the Regrid model process in combination with **Undo** and **Redo**. After selecting **Undo** or **Redo** the fields of the process were not updated accordingly. This has been fixed.

Assigning maps in Crustal HF Tool

In previous versions, when creating Heat Flow Maps from the McKenzie Crustal Model, there was an issue where maps were created but not assigned. To assign the maps you had to create a new row or change the map mode to value. This has been fixed and maps are now assigned automatically.

Create heat flow trend from McKenzie model

In previous versions, when creating crust/mantle facies after selecting a point of extraction, the application occasionally stopped responding. This has been fixed.

Map Editor

Petromod Express

There was a bug introduced in 2023 that broke the map assignment using the blue arrow in Petromod Express within the MapEditor. This has been fixed.

Simulator

Lithology mixing

In previous versions, the simulator check for NaN (Not a Number) fractions was done for all elements inside the AOI, including elements that are invalid at present day. This led the simulation to abort if zero-thickness cells at present day did not have a valid lithology fraction. This has been fixed and a proper check for zero-thickness cells is now applied.

Multiple scenarios

In Petromod 2024.1 it was not possible to copy or paste data in the **Multiple scenarios** property table. This has been fixed in 2024.2, enabling the copying and pasting of data

across models and projects.

Multiple scenarios & Risk

When starting multiple scenario runs for models simulated with Risk and with **Write output for all risk runs** selected, the model path for the main model was not retained. Therefore, the multiple scenario files were written to last created Risk run instead of the main model. This has been fixed.

***Note**: A workaround for previous versions is to close and reopen the simulator interface.*

Write output for all risk runs

There was an inconsistency when stopping a risk simulation submitted with the **Write output for all risk runs** check box selected. If the simulation was stopped during one of the risk runs and then restarted, the simulator created new output models linked to the run where the model was stopped instead of the main run. This has been fixed. Regardless of which run the simulation is stopped in, when it is restarted, the results are written to the main run.

Crustal Heat Flow

The border points of the natural AOI were the cause of the simulator running into an error during the Crustal Heat Flow run. This happened when a thickness value was assigned, but not all facies' cells had a valid facies. This has been fixed.

***Note**: A workaround for 2024.1 and earlier versions is to create and assign an AOI map and rerun the crustal heat flow run.*

Decoupled source rock

In previous Petromod versions, the simulator aborted at the beginning of the simulation if the user defined a decoupled source rock with a pure biogenic kinetics. This happened because the decoupled source rock option was not enabled for pure biogenic kinetics. This has been fixed.

***Note**: A workaround for 2024.1 and earlier versions is to assign biogenic kinetics to the facies instead of using the decoupled source rock process.*

Age display

In previous Petromod versions, ages greater than 100 Ma during a crustal heat flow run were shown in scientific notation. That made the identification of events with ages higher than 100 Ma very difficult. In Petromod 2024.2 the ages have been fixed and are written in normal format.

Component injection

In previous Petromod versions, component injection was not properly working for deviated wells. This occurred when having a highly deviated well and when selecting **Layer** as the vertical mode. During the simulation Petromod was injecting the components in the wrong depth. This has been fixed.

***Note**: The workaround in version 2024.1 or earlier is to use depth as vertical model instead of layer.*

Open Simulator

User defined path not remembered

Previously, when double-clicking the **Script** field it always opened the demo scripts path, regardless of the last accessed location. The system now correctly retrieves and displays the path of the assigned script, whether it is in the default demo scripts path or any other specified directory.

User-defined Lithologies

When running an Open Simulator script, where as an argument lithology was needed, user-defined lithologies were not recognized. This has been fixed.

Viewer 2D

Overlay selection box

The **Overlay selection** dialog box has been extended to enhance the selection of overlays. In previews versions, this box was very narrow, making it difficult to select the required overlay.

Viewer 3D

Petromod Express

There was a bug introduced in 2023 that broke the map assignment using the blue arrow in Petromod Express within the **Map Editor**. This has been fixed.

Video Producer

Under certain circumstances, the Video Producer used paleo water depth maps from the simulation output to produce a video. Those maps were not read correctly and hence the Video Producer aborted. This has been fixed.

Set custom AOI

In previous versions, the set custom AOI tool was enabled for models with a closed boundary only. This restricted the usage of the set custom AOI tool to models without erosion or pinch-outs. This has been fixed.

Overlay selection box

The **Overlay selection** dialog box has been extended to enhance the selection of overlays. In previews versions, this box was very narrow, thus it was cumbersome to select the required overlay.

Overlay data export

In previous Petromod versions there was an issue when exporting overlay data when some

cells in the exported overlay contained values close to the Petromod undefined value 99999.0. This caused Petromod to incorrectly set this cell to undefined (99999.0) instead of exporting the data in the required unit. In Petromod 2024.2 we have reduced to a minimum the cases where this can happen. However, if a cell contains a value equal to 99999.0 it still will be exported as an undefined value.

IP Express

Legend

Colors can now be selected from the legend when assigning rock properties. In previous versions, color selection was limited to the seismic image.

Seismic value

After selecting a color from either the legend or the seismic image, the value of the seismic corresponding to that color is displayed on the **Color** column of the **Rock Properties** table where possible. This allows more control on the color selection for the property interpolation.

Rock Properties table size

In previous versions, the **Rock Properties** table did not remember its custom size once it was closed. This was problematic when dealing with tables with large number of rows. This has been fixed and the size of the table is now remembered after it is closed.

High vertical resolution seismic

In previous versions, IP Express could only read seismic volumes if the vertical resolution was lower than 5 meters. All volumes with seismic resolution lower than 5 meters were visualized incorrectly. From Petromod 2024.2 onwards, IP Express supports cubes with vertical resolution down to 10 cms.

Rock properties definition

In previous versions, IP Express could be run and generate results even when the **Rock Property** table was empty. For this, default values were used internally by the engine to allow the simulation to run. To avoid confusions and to have more control on the results, IP Express can now only be run if at least two entries are filled in the **Rock Property** table.

Highlighted menu entries

IP Express highlights some menu options when they are active. In 2024.1, the highlighting feature worked in Windows 10, but not in Windows 11. In 2024.2, the highlighting feature has been fixed and works correctly in Windows 11.

Injection points

In previous versions, while editing the injection points to map rock properties, the injection was shown automatically as soon as its properties were changed. This happened even if the **Show injections** check box was cleared. This has been fixed. Now, the injection is only shown, if **Show injections** is selected.

3D View

When customizing the menu bar by right-clicking it, **General** and **Injection 2D** options are available for selection. However, these options are only relevant for 2D. Therefore, after customizing the pane and using any of the 2D options, the user selection was reset, which was confusing behavior. In Petromod 2024.2 the user can still see these 2D options, but they are dimmed in 3D view.

Inconsistent coloring

When running 2D screening, CO_2 accumulations were colored as hydrocarbon vapor (red) instead of purple if reloading the seismic without saving the input data. This was caused by an internal reset that did not keep the CO_2 settings. This has been fixed.

Incomplete error message

In previous versions, if a seismic cube was moved or deleted from its original location while performing a detached run, the simulator stopped with a generic error message. In the old error message, it was not clear what to do to solve the problem. It has been changed from "Scanning of log-file indicates an invalid simulation run" to "Scanning of log-file indicates an invalid simulation run. For more details, you can check the corresponding error log in the **Message Viewer** (Command Menu)."

PetroFlash

Highlighted menu entries

PetroFlash highlights some menu options when they are active. In 2024.1, this highlighting feature works in Windows 10 but not in Windows 11. In 2024.2, this highlighting feature has been fixed for Windows 11.

Known issues

All modules

Link to Help Center might not work under Windows 10 with Microsoft Edge

When running Petromod on Windows 10 with the default browser Microsoft Edge, the link to the Help Center might not work for older Edge versions. Current versions of Edge (Versions > 90.0.0) are not showing any of the above issues.
Workaround: We recommend using a different browser (Chrome or Firefox).

Command Menu

Conversion: Problems with output copied from older versions

If you choose **Input+Output** when converting projects from an older Petromod version, be aware that this is only intended for viewing previous results without having to re-simulate the models. Some workflows (such as nested model extraction) might not work as expected.
Workaround: If you encounter any issues with output copied from previous Petromod versions, re-simulate the models with the simulator of the current Petromod project.

Nested Models

Nested model horizon geometry after simulation

The horizon geometry for the nested models is taken automatically from the extracted boundary conditions of the parent model. Thus, the geometry of the nested model is not taken by default (in case it differs from the parent model).

Workaround: Use the **Nested model boundary conditions** table to assign a depth boundary condition from the local model. By doing this, Petromod uses the geometry of the nested model, instead of that of the regional model.

***Note**: It is necessary to modify the paleo water depth in the nested model to match the deposition of the regional layers not present in the nested model. This is important because the nested model might not contain all the overburden layers as in the parent model.*

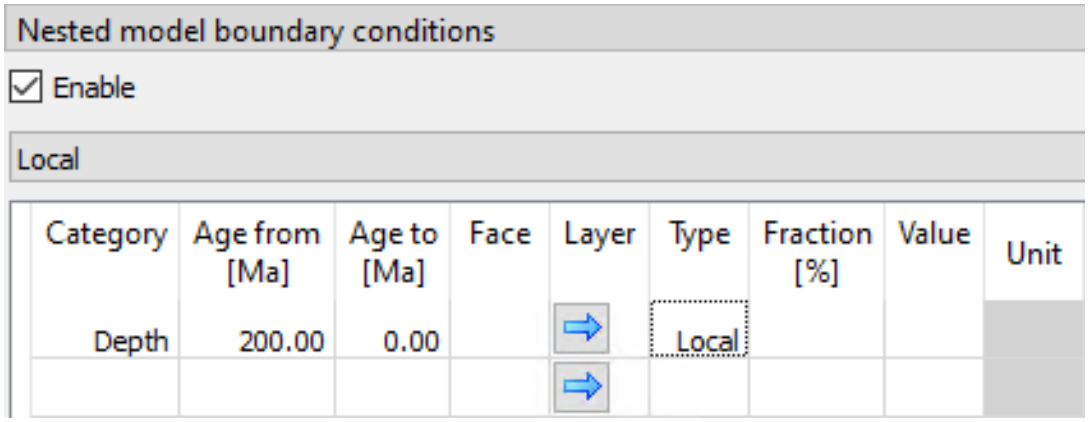

Fig 2: Nested model boundary conditions table

HPC Job Launcher

Simulation results are not downloaded

The simulation results are downloaded only when the **HPC Job Launcher** window is open.

Workaround: If this window is closed for any reason, reopen it to download the simulation results.

Download results from multiple models

Downloading of result files for a model from the **HPC job launcher** is not done in parallel.

If several models finish at the same time, they will download one after another.

PetroBuilder 2D

Holes in gridded faults

When a fault consists of two or more segments, the gridding algorithm would sometimes grid them as separate faults. This can result in gaps in gridded faults.

Workaround: Ensure that faults consist of only one segment before gridding.

PetroBuilder 3D

Petromod Express: Extraction and injection points are not set correctly in Map View.

When you set an extraction point or injection point in **Map View**, the points are not visible and may not be set at the precise location.

Workaround: Set the points in **3D View**.

TecLink models

Quality checks are performed to recognize inconsistencies within TecLink models prior to the start of the simulation. In some instances, your older TecLink models (models build prior to Petromod 2016.1) may not be accepted by the simulator and the simulation will not start. In most cases error messages will be displayed to explain how your model must be updated to pass the quality criteria. Some of the most common inconsistencies are listed here:

- Check that the oldest paleo-section with no multi-z values has a block assigned which forms the parent block of all blocks in the second oldest section.
- Ensure that the paleo-section ages and the **Age assignment** table are consistent. In particular, ensure that layers are not "deposited" after they appear in a section.
- Check that all parent/child block relationships are correct.

If you cannot find a solution to pass the consistency checks for models built with Petromod versions older than Petromod 2016.1, contact SLB support through the Customer Care Center.

Well Editor

LAS Import

When you import LAS files and then create calibration data, the units are displayed incorrectly, this is because the unit set in the file is not automatically imported, leading to falsified values.

Workaround: To display the correct values, you must change the unit settings to the unit used in the file before importing the LAS file. The correct values will then be shown.

Lithology Editor

Rock-Stress parameters for salts

With the release of PM 2018.1, we updated our rock-stress default parameters for lithologies to be more realistic in basin and petroleum systems modeling workflows.

During the project conversion to Petromod 2018/2019, the rock-stress parameters are updated for the project lithologies.

Caution: If you have custom salt-type lithologies (created in Petromod 2017 or earlier), this automatic update of rock-stress properties is not correct. Check your custom salt-type lithologies and update their rock-stress parameters. Use the standard Petromod salt lithology as a reference when modifying the salt rock stress parameters.

Mixing lithologies

- Formulae cannot be used when mixing lithologies.
- Problems may arise when mixing two or more properties from different theoretical schemes (such as Athy's depth law for compaction and Schneider's effective stress formulation for compaction). You may however use map-based or cube-based lithology

mixing instead. The simulator then mixes the properties (such as porosity and permeability), not compaction models.

Kinetics Editor and Component Editor

WARNING – Potential data loss when saving user-defined data

The Kinetics Editor and the Component Editor write data into the same files.
This could potentially result in data loss or data corruption if:

- Several people are working on the same set of data within one project;
- On your desktop, both the Kinetics and the Component Editor are open and you are alternating between both and saving changes.

Heat Flow Calibration Tool

The Heat Flow Calibration tool might abort when used on models larger than 13 million cells.

Workaround: Reduce the model's size to perform runs on the Heat Flow Calibration tool.

Simulator

Multi-model overlay inconsistency

The concept of assigning overlay IDs was not designed for multi-model analyses. Therefore, when multiple models are analyzed at the same time, the same overlay IDs might correspond to different properties leading to incorrect interpretations. This inconsistency can be seen in overlays that do not have fixed IDs (such as all overlays related to calibration models, generation potential, biomarkers, Tmax_Kinetics, TR_Kinetics, and so on).

Workaround:

1. Always check the overlays in the simulator interface in the same order.
2. Always use the same number of overlays. We recommend checking them all.
3. Always check the same number of generation potential overlays in all the models within one project.
4. If you are not sure in which order the overlays were selected, check the *ovl3.pmt* file in the **out** directory to see which IDs were given.

Runtime estimation

The runtime estimation prediction is based on the simulation times of several models performed in our Linux cluster in Aachen. Therefore, this prediction might differ from the actual simulation time depending on the machine specifications, processes running in parallel, and model settings.

Flowpath migration

The flowpath migration cannot be fully parallelized. Therefore, the flowpath simulation routine is always performed on the main core. Additionally, when running a model that includes the flowpath algorithm and using sampling, the simulator will run the migration in the original grid. This provides a high-resolution migration regardless of the sampling, but simulation times could therefore become high.

Workaround: Sampling can be performed in PetroBuilder, or Invasion Percolation can be used to avoid high-resolution flowpath calls.

No map-based mixing for Poisson's ratio when Rock stress is not enabled

When **Rock stress** is not enabled, map-based mixing for the **Poisson's ratio** overlay is not considered.

Re-factored TecLink Shift functionality

The **Horizon Geometry** table in PetroBuilder allows you to disable the simulator's shifting functionality by setting **Disable Shifting** to Y**es**. However, this setting is no longer required by the re-factored shift functionality.

If you want to disable the shifting, set the **Disable Shifting** table to **Yes** and turn off the re-factored shift functionality using the simulator Special Option *Onsi 0*.

Extensive disk space required when using "Write output for all risk runs"

When you select to write full model output for all risk-runs (by clicking **Processes & Tools**, **Risk**, and then selecting **Write output for all risk runs**) the risk-simulation creates a full output dataset for each risk-model and scenario. Depending on the number of risk-runs, a huge amount of additional output data might be created. Ensure that there is enough disk space available before you run the simulation.

***Note**: The above functionality risk-simulations can only be started from the Petromod simulator interface*.

2D diagonal faults on parallel processors

Simulating 2D diagonal faults using the Hybrid or Darcy migration methods on parallel processors causes errors. When this occurs, the simulator stops with an error message.

Workaround: There are two options, as follows:

- Simulate the model on a single processor
- Use the special option *Odfg 0* to switch off diagonal faults.

Convection does not work with locally refined volumetric faults

For convection through faults, use the **Volumetric Elements** option in the simulator interface (click PetroFlow, then Fault Method).

Open volumetric faults running underneath reservoirs do not drain accumulations

This issue occurs when a model is simulated using the following simulator settings:

Fault method: Volumetric faults

Migration method: Hybrid

Figure 3 shows an open volumetric fault running underneath a reservoir layer (yellow). The reservoir contains an oil and a gas accumulation. The hydrocarbons should have drained out of the reservoir through the open fault.

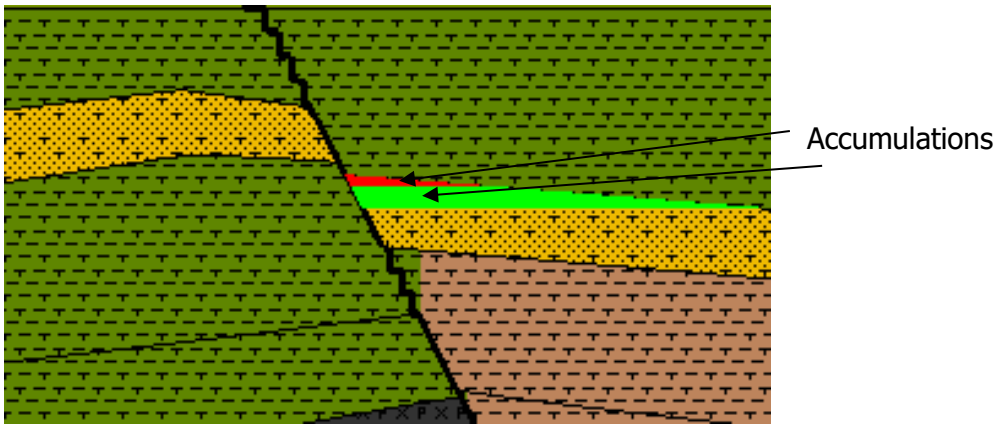

Fig 3: Hydrocarbons should have drained out of the reservoir

Faults ending at the top of an accumulation cause a breakthrough, even when the seal is intact

When a fault runs through an accumulation and finishes by running along the horizon at the top of the accumulation, the simulator allows hydrocarbons to migrate through the top of the fault and out of the reservoir, even if the overlying seal is intact (Figure 4).

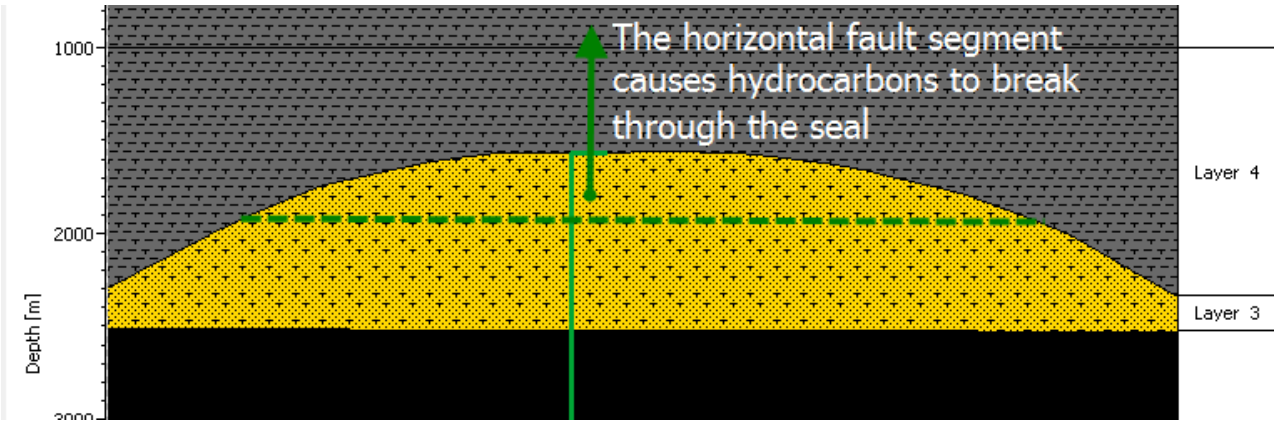

Fig 4: The expected accumulation (green dotted line) is empty.

Workaround: Make sure that faults ending at the top horizon of an accumulation do not continue along the horizon. Pay particular attention to the gridded model – even if your pre-grid fault ends exactly at the horizon, the gridding algorithm might extend the fault along the horizon to the next grid point. In this case, edit the pre-grid fault as required and re-grid the model.

Viewer 2D

Gaps in 2D models in Viewer 2D

Gaps can appear when viewing 2D models in Viewer 2D. This is a purely visual problem based on current limitations of Viewer 2D. The simulated model itself is complete and does not have any gaps. The gaps occur at locations where the cross-section turns through an angle and the turning point does not lie on a grid point.

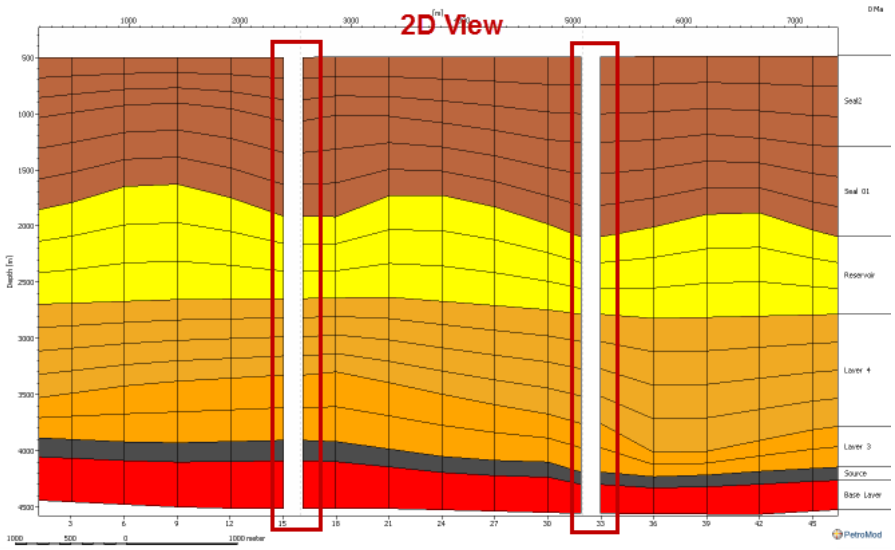

Fig 5: 2D View displaying gaps in the model

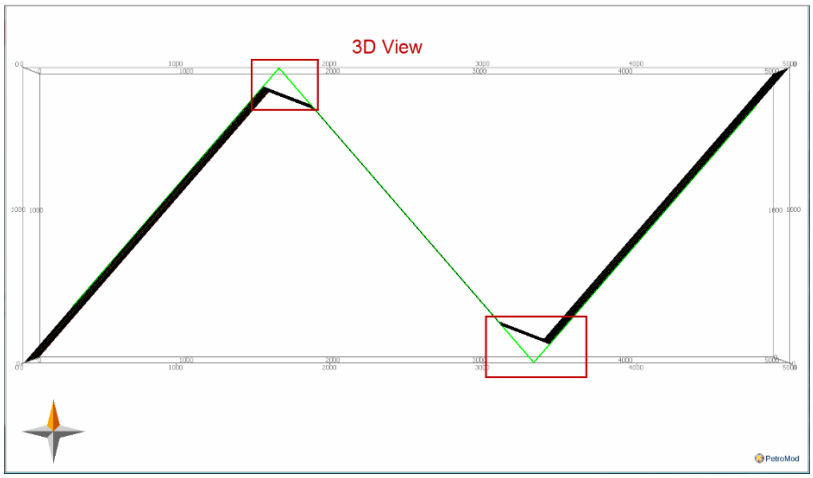

Fig 6: The same model in 3D View as seen from above

The diagram in Figure 6 is from Viewer 2D looking down on the cross section of a 2D model (on the **3D View** tab). The red rectangles mark the locations where the cross-section turns through an angle. The green line is a pre-grid horizon and represents the cross-section as entered by the user in PetroBuilder 2D. The black line is the cross-section as represented in Viewer 2D. You can see that the cross section in Viewer 2D does not turn at the same location as the pre-grid horizon. This is because the turning point of the pre-grid horizon does not lie on a grid point. Viewer 2D shifts the turning point to the adjacent grid point which results in gaps at these locations. As mentioned above, this is a visualization problem only, there are no gaps in the simulated model.

Workaround: Add grid points at each point where the cross-section turns through an angle. The easiest way is to insert a grid point for each cross-section point:

1) Open **PetroBuilder 2D** and load your model.
2) On the **Processes** pane, expand the **Grid** folder and double-click on **Modify Grid Points**.
3) Right-click anywhere in the **Grid Points** table and select **Insert Points from Cross Section**. There will now be a grid point for each cross-section point.

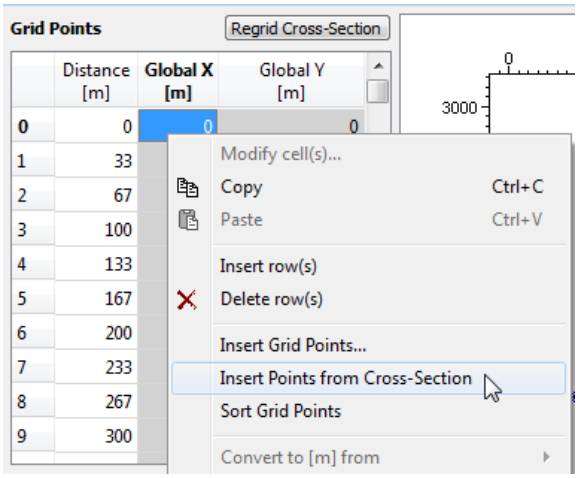

Fig 7: Insert Points from Cross-Section

4) Click **Start** to apply the new grid points 

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Extraction of faults from 3D models to 2D

Currently, the extraction of faults from 3D models is not supported. If you extract 2D sections from Viewer 3D, the faults are be transferred to the 2D model.

Viewer 3D

No proper filtering of accumulations according to user-defined criteria

The option for filtering accumulations according to user-defined criteria (such as Flash Calculations, Depth, and so on) does not always work properly.

PetroCharge Express

Application remains in waiting mode for a long time after opening a file

When loading files from a network drive, PetroCharge Express often does not respond for a long time.

Workaround: Load files by clicking **Files,** and then **Open Project (Quick mode)**.

PetroReport

Incorrect report balance for IP migration with polygons

When you simulate a model with the IP migration method and use polygons in PetroReport, the balance calculations for the polygons are incorrect.

Support

Petromod is provided by © SLB. The software has been designed by the SLB Aachen Technology Center (AaTC).

Submit a support request

1. Visit the SLB Software website at https://www.software.slb.com/products/petromod and login with your user credentials. If you do not have any login credentials yet, you need to request access using the links provided.
2. Select **Software Support**.
3. **Create a ticket:** Select **Support Services** first, then **Tickets. Login** or **Register**. Create a ticket that will be sent to the Customer Care Center. In the ticket, you must

   • Specify the software product
   • Specify the version
   • Specify the platform (operating system)
   • Give a detailed explanation of the problem

   Optional:

   • Add images (file size limited to 2 GB).
   • Attach the error file from the Message Viewer.

4. Optionally, use the **Data Exchange** to attach files to a ticket by uploading them via Secure File Transfer. **Login** or **Register**.

   a. Select **Support Services**.
   b. Select **Data Exchange**.
   c. Enter the *Ticket Incident Number* of the previously created ticket and your e-mail address.
   d. Select the HTML or Java Applet UI upload method: HTML has a default file size limit of 2GB. Java has no file size limit.

Additional help information

Petromod provides the following help information:

• The PDFs of the user guides, installation guide, and release notes are included in the installer and can be downloaded from the **Petromod Documentation** page of the SLB Support Portal via Product Support as explained above.

• Knowledge base, newsletters, videos, and presentations are also available on the Petromod Support page. We are continuously updating the content as it becomes available.

• Task and process-specific information is available in Petromod via the  and  buttons.

• The Petromod Help Center provides online access to the user guides and links to the SLB Software website. Open the **Help Center** from the **Help** menu in any Petromod module.