

Petrel Exploration Geology

Advanced geological workflows for exploration

APPLICATIONS

- Simulation of source rock maturation in 1D models
- Map-based petroleum systems screening
- Building of 3D petroleum systems models, including boundary conditions
- Construction of 3D simulation cases
- Running PetroMod® petroleum systems modeling software simulations from the Petrel® E&P software platform
- Analyzing PetroMod 3D simulation results
- Play chance mapping

BENEFITS

- Integrate play-based workflows for the evaluation of petroleum systems, plays, and prospects
- Understand and visualize source rock maturation and hydrocarbon generation, migration, and entrapment
- Build 3D Petrel models, ready for full dynamic petroleum systems simulation with PetroMod software
- View potential hydrocarbon kitchens, flowpaths, and accumulations

FEATURES

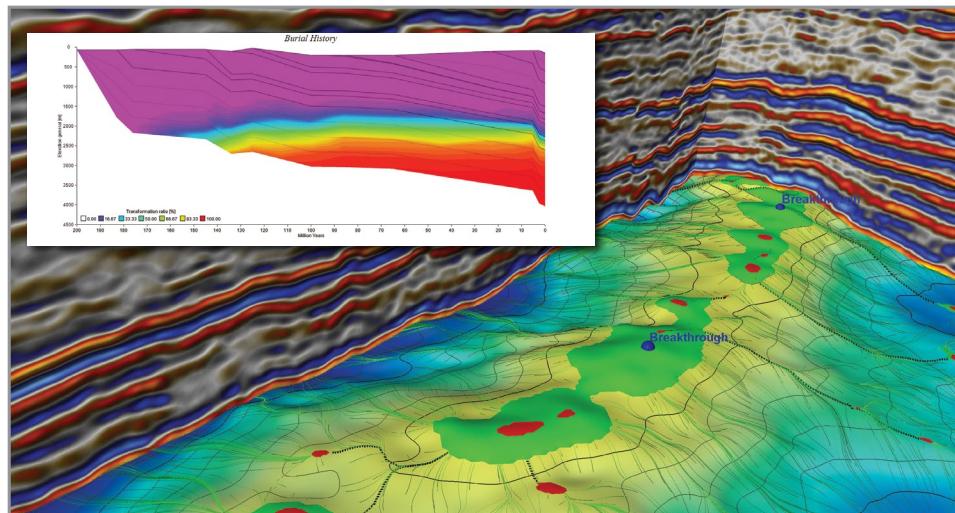
- Evaluation of seal capacity and maximum hydrocarbon column height
- Combining results from evaluation of key geological exploration components to produce final play chance maps
- Play chance calculation for areas of interest
- Flexible templates for play evaluation

The Petrel® Exploration Geology module enables rapid initial exploration screening workflows—including 1D petroleum systems modeling—followed by construction of the 3D model for full dynamic simulation in PetroMod petroleum systems modeling software. It supports integrated evaluation of the key components of exploration uncertainty: reservoir and seal properties, trap integrity, source rock maturation, hydrocarbon generation and migration, and relative timing of hydrocarbon generation and trap formation.

Play chance maps and play-element chance maps can be analyzed quickly to rank opportunities. Efficient screening workflows enable uncertainty investigation at both the play and prospect scale.

Evaluate uncertainty in a unified environment

The Petroleum Systems Quick Look process supports rapid simulation and evaluation of key exploration risk components—trap, reservoir, charge, and seal—enabling uncertainty evaluation and screening in a unified exploration environment. The impact of uncertainty is easily investigated for essential components, such as depth conversion, sedimentary burial rates, basin thermal conditions, and lithologies.



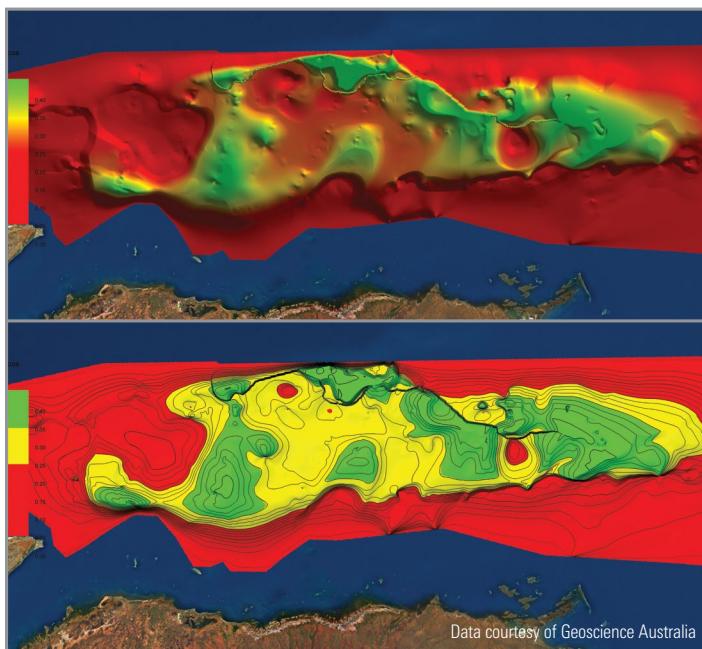
Migration results showing flow paths and accumulations. Inset shows burial history plot with transformation ratio color overlay and prospect probabilistic volumetric assessment.



Petrel Exploration Geology

Create accurate play chance assessments

The decision support ribbon includes integrated tools for play chance mapping. Play fairway maps for physical properties of various play elements are transformed to play element chance maps, scaled in probability units, which are combined in an overall play chance assessment. The highly flexible play chance process enables the play chance calculation matrix to be customized to fit various play maturities or company standards.

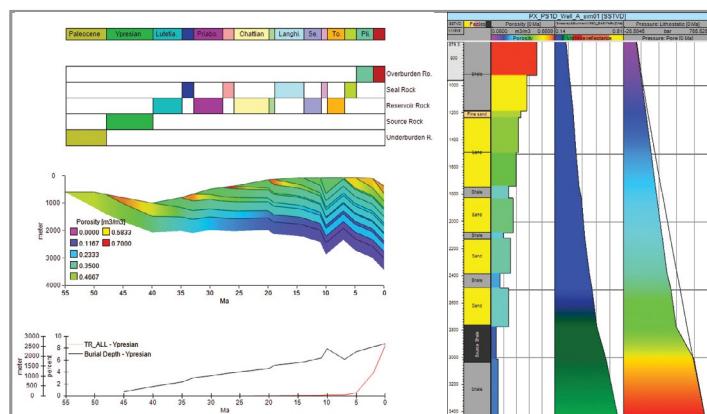


Combined chance of success calculated for an exploration area, with continuous color template (top) and banded color template (bottom).

Petroleum systems modeling

Using well data in the Petrel platform, 1D petroleum systems models can be built. The results can be analyzed and reported in the context of well logs in the well section window. The petroleum systems modeling processes facilitate construction of 3D geocellular models for dynamic forward modeling of geological processes in sedimentary basins over geological time. Litho and chronostratigraphic tables and facies containing lithologies and source rock kinetics are developed in the Petrel workflow. PetroMod simulations from the Petrel platform can also be created using 3D petroleum system models.

The Petrel Exploration Geology module is designed for use with the Petrel platform (64-bit).



Petroleum systems events chart (top left), simulated burial history (middle), simulated properties through time (bottom). Simulated properties with depth (right).



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