

PetroMod TecLink

2D and 3D petroleum systems modeling in complex tectonic environments

PetroMod* petroleum systems modeling software combines seismic, well, and geological information to model the evolution of a sedimentary basin. PetroMod software will predict if, and how, a reservoir has been charged with hydrocarbons, including the source and timing of hydrocarbon generation, migration routes, quantities, and hydrocarbon type in the subsurface or at surface conditions.

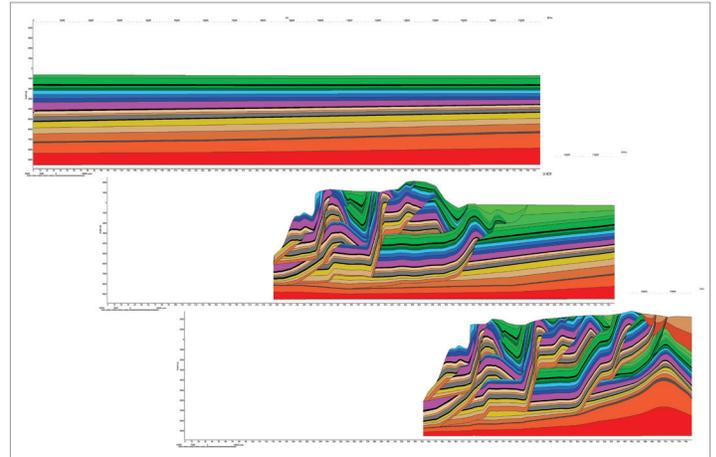
Linking structural modeling and petroleum systems modeling

Many of the world's exploration plays are structurally challenging because of complex tectonic histories. Structural modeling techniques are needed to interpret, reconstruct, and validate these histories. Petroleum systems modeling simulates hydrocarbon generation and migration to improve predictions of hydrocarbon locations and properties. Integrating structural modeling and petroleum systems modeling has profound benefits.

PetroMod software simulates petroleum migration in complex tectonic environments through links to structural modeling packages, supporting reconstruction of the geologic history. This enables users to work with their preferred software tools for both structural and petroleum-systems modeling. The full functionality of each tool is retained, for example, advanced phase/component handling methods such as flash calculations for petroleum migration modeling.

TecLink add-on for PetroMod software

The PetroMod TecLink 2D and 3D add-ons are available for the PetroGen* and PetroFlow* 2D and 3D packages. The TecLink add-on enables the complete range of petroleum generation and migration methods in the PetroMod tools to be applied in complex tectonic environments—such as those affected by shale diapirism or salt structures in extensional environments and especially in compressional tectonic environments such as thrust belts. With this linked solution, PetroMod software is able to perform fully PVT-controlled, three-phase, n -component petroleum migration simulations in complex tectonic environments. Any type of structural complexity can be handled. Additionally, PetroRisk* risk management technology can be applied to these complex models to assess uncertainties in the input data on the simulation results.

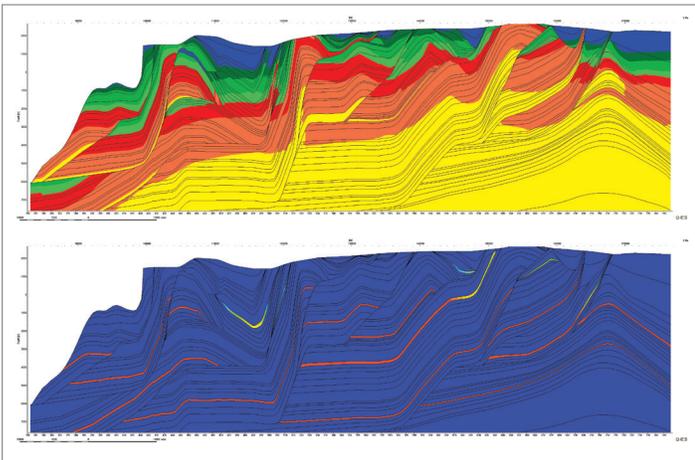


Three paleo sections built in PetroBuilder 2D, fixing the geometries of the section at a certain point in time—a “snapshot.”

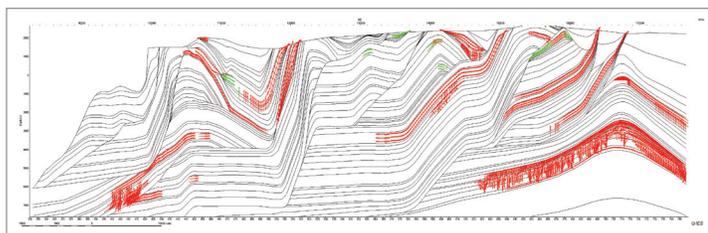
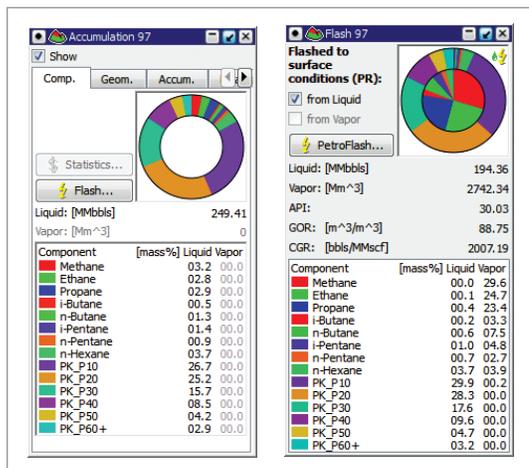
The TecLink concept

In complex tectonic environments—such as massive vertical structural movements and other extensional structures—kinematic, palinspastic, and structural restorations are needed to take the movements of masses into account. These reconstructed paleogeometries can be directly integrated into the petroleum systems modeling process as paleo-sections or paleomodels—creating snapshots in time. Instead of building one model with present day geometry, users build several models with fixed paleogeometries and assign ages to each model. This is beneficial for validating the present interpretation, and it provides a more complete structural history.

Used with PetroBuilder 2D and 3D, the TecLink add-on performs data loading and editing. This solution is designed to handle complex structural models: Geometries can be corrected, properties such as litho- and organofacies can be assigned, and additional timesteps can be created to closely control the structural development of the section through geologic time.



All PetroMod overlays can be used for results analysis; e.g., thermal and maturation histories can be assessed, as well as all hydrocarbon expulsion and migration processes.



Oil and gas accumulations in the section can be selected, and in situ 3-phase/n-component relationships can be studied and flashed to surface conditions to calculate properties such as API gravities and GORs. There are no restrictions to PetroMod simulation technology.

The block concept

The block concept was introduced in PetroMod software to handle the vertical repetition of a layer in situations with vertical and lateral movements of masses—e.g., during thrusting and compression. With this method, paleosections are divided into individual blocks. Each block is a mini-model with unique z-values for each layer, meaning no vertical repetition. The blocks are then combined into one model during simulation.

The blocks and the paleosections retain their structural integrity during the model's tectonic evolution, but at the same time, they are connected with respect to all geophysical and geochemical parameters.

Simulation

The entire range of PetroMod simulation functions is available with the TecLink add-on, including three-phase, n-component phase and component modeling and source rock tracking technology. Special functions in the PetroMod simulator ensure that the properties and hydrocarbon contents of each cell in the model are tracked through geologic time—even in the most complex thrusting scenarios.

Licensing

The PetroMod TecLink add-on is an integrative functionality of the PetroMod software suite. TecLink is FLEXnet™ license controlled.

Schlumberger Information Solutions

Schlumberger Information Solutions (SIS) is an operating unit of Schlumberger that provides software, information management, IT, and related services. SIS collaborates closely with oil and gas companies to solve today's tough reservoir challenges with an open business approach and comprehensive solution deployment. Through our technologies and services, oil and gas companies empower their people to improve business performance by reducing exploration and development risk and optimizing operational efficiencies.

E-mail petromod@slb.com or contact your local Schlumberger representative to learn more.