

ECLIPSE 2010 Reservoir Engineering Software

Solves reservoir engineering challenges

ECLIPSE Overview

The ECLIPSE* family of reservoir simulation software offers the industry's most complete and robust set of numerical solutions for fast and accurate prediction of dynamic behavior for all types of reservoirs and degrees of complexity, structure, geology, fluids, and development schemes.

ECLIPSE software covers the entire spectrum of reservoir simulation, specializing in black-oil, compositional and thermal finite-volume reservoir simulation, as well as streamline reservoir simulation. Streamline simulation capabilities are provided by ECLIPSE FrontSim reservoir simulation software. By choosing from a wide range of add-on options—such as coalbed methane, gas field operations, calorific value-based controls, reservoir coupling, and surface networks—you can tailor simulator capabilities to meet your needs, enhancing the scope of reservoir simulation studies. ECLIPSE reservoir simulators have been the bench-mark for commercial reservoir simulation for more than 25 years because of their breadth of capabilities, robustness, speed, parallel scalability, and unmatched platform coverage.

ECLIPSE + Petrel software for integrated, transparent workflows

ECLIPSE plus Petrel software packages integrate the necessary workflows surrounding simulation and make the dataflows transparent and the interface easy to learn. Petrel Reservoir Engineering provides the ideal reservoir engineering environment.

ECLIPSE Blackoil simulation

Uses three-phase, 3D reservoir simulations supporting extensive well controls, field operations planning, and comprehensive enhanced oil recovery (EOR) schemes.

ECLIPSE Compositional simulation

Describes reservoir fluid phase behavior and compositional changes associated with multi-component hydrocarbon flow.

ECLIPSE FrontSim simulation

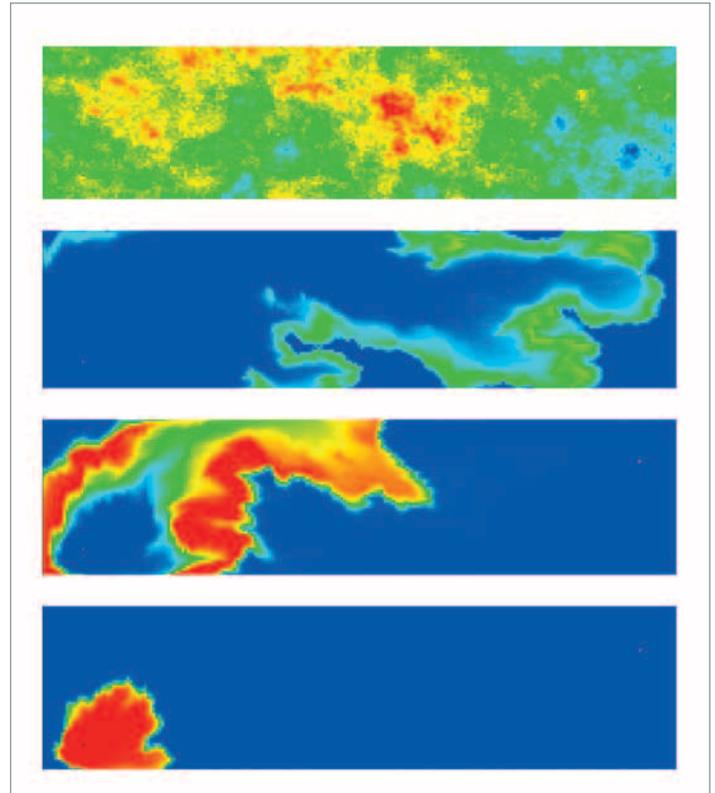
Models multiphase fluid flow along streamlines; enable better visualization of fluid flow in the reservoir.

ECLIPSE Thermal Simulation

Simulates a wide range of thermal recovery processes, including steam-assisted gravity drainage, toe to heel air injection, and cold heavy oil production with sand.

Additional simulation options

Enhance the scope of your reservoir simulation studies with a wide range of add-ons to ECLIPSE software, such as ECLIPSE Coalbed Methane (CBM) and Multisegmented Well (MSW).



Alkaline-surfactant-polymer (ASP) flooding.

ECLIPSE 2010—Solves Reservoir Engineering challenges

To meet the challenge of producing increasingly remote and complex reservoirs, the 2010 release includes enhancements to the ECLIPSE and Petrel Reservoir Engineering solutions focusing on

- uncertainty and optimization
- streamline-based screening and pattern flood management
- carbon storage
- CO₂ EOR
- complex wells
- heavy oil recovery
- chemical EOR
- unconventional gas
- shale gas and hydraulic fractures
- flexible reservoir and surface control
- geomechanics.

ECLIPSE 2010 Reservoir Engineering Software

Uncertainty and optimization

With the ECLIPSE 2010 user environment Petrel Reservoir Engineering, you can improve your understanding of uncertainty and optimize recovery using dedicated workflows. Petrel 2010 provides the ability to create, submit, and analyze a large number of simulation runs. The workflows include sensitivity and uncertainty analysis, optimization workflows, and proxy-model workflows—for both simulation cases and static volumetric cases.

Streamline-based screening and pattern flood management

ECLIPSE 2010 has enhancements to the streamline-based tracer solver in the ECLIPSE Compositional simulator. It is now compatible with Cartesian LGR and parallel. Streamlines are traced into and through the local grids, enabling tracer tracking. FrontSim simulator enhancements include extensions to geological screening and ranking, waterflood management, grid transmissibilities, and well management. Multithreading has been introduced to enhance performance significantly.

Carbon storage

ECLIPSE 2010 provides enhanced support for carbon storage simulations. These enhancements enable you to perform modeling of salting-out effects, higher temperature modeling, and pure water–density modeling.

CO₂ EOR

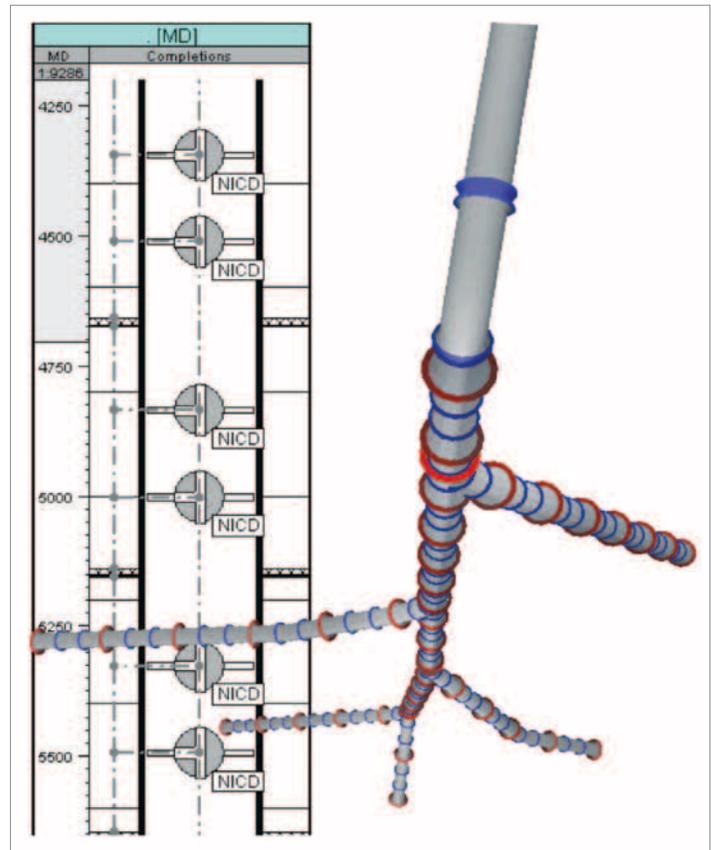
ECLIPSE 2010 contains enhancements to extend the modeling support for CO₂ EOR. The ECLIPSE Compositional simulator features improvements to modeling of depleted gas and oil reservoirs and gas mixtures in aquifers.

Complex wells

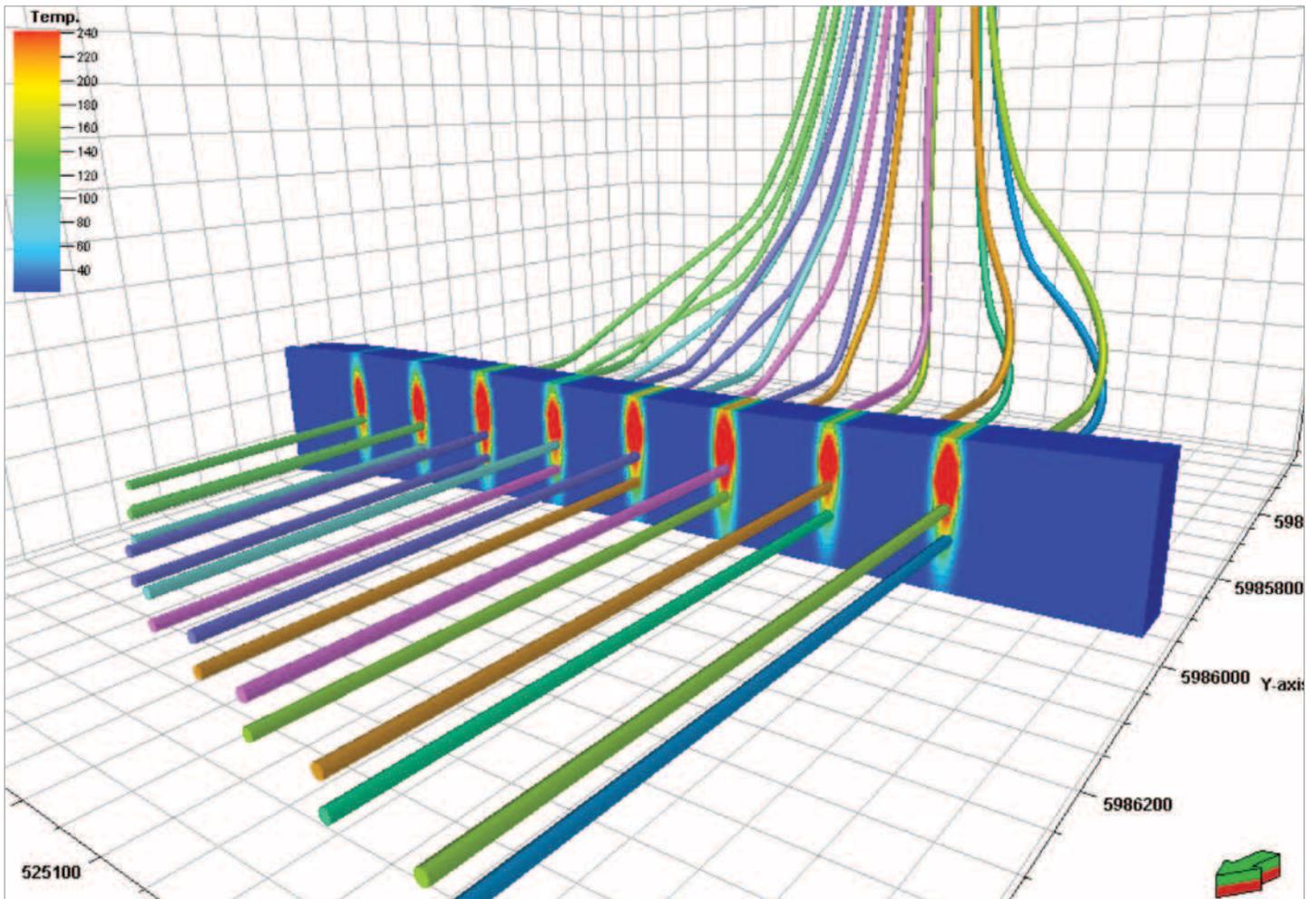
Complex wells are increasingly common as reservoirs become more problematic and remote. ECLIPSE software's robust, mature, and advanced multisegmented well model enables you to model complex-well topology and multiphase flow effects in the wellbore. ECLIPSE 2010 includes enhancements to the multisegmented well model to allow for multiple tubing strings. Dual tubing is increasingly being used in SAGD processes in heavy oil recovery. Petrel 2010 provides enhanced complex-well handling capabilities with automated placement and completion optimization—enabling you to design sophisticated wells.

Heavy oil recovery

ECLIPSE 2010 features several enhancements to the ECLIPSE Thermal simulator to aid the modeling of heavy oil recovery processes. The thermal heavy-oil equilibration method has been enhanced for more accurate modeling of the water-oil contact. Low-temperature thermal simulations suitable for lab experiments or cold heavy oil production with sand (CHOPS) are now possible. Extension of the ECLIPSE Thermal Simulator's temperature limits provides the ability to model a wider range of problems. The Thermal Palmer-Mansoori rock model enables you to alter the transmissibility as the rock porosity is modified as a function of pressure and temperature. The exponential model is particularly flexible, enabling you to define the response to the porosity change on a cell by cell and directional basis. Additional tuning of the thermal linear solver (JALS) provides superior performance. And alternative thermal rock-filled energy convergence has been implemented.



Complex well design with ECLIPSE and Petrel software.



Steam chambers in a steam-assisted gravity drainage (SAGD) simulation.

Chemical EOR

Chemical EOR involves complex technology that requires a high level of expertise and experience. ECLIPSE software supports a comprehensive suite of chemical EOR technologies, including alkaline surfactant polymer flooding. Multipartitioned tracers in ECLIPSE 2010 allow a tracer to be present in any number of phases, for example oil, water, and gas. The new functionality enables you to define pressure-dependent partitioning functions. For environmental partitioned tracers, adsorption, decay, and diffusion are generalized to all phases with phase-specific parameters.

Unconventional gas

ECLIPSE software provides the most comprehensive unconventional gas simulation technologies in the industry—for shale gas, tight gas, and coalbed methane. These technologies are mature and have been in use for many years around the world. ECLIPSE 2010 contains extensions and enhancements to these technologies.

Shale gas and hydraulic fractures

Given the heterogeneous nature of shale gas reservoirs and the importance of directional stresses, accurate reservoir characterization is critical to developing an understanding and history-matching.

Enhanced hydraulic fracture workflows in the ECLIPSE Compositional simulator aid in this process. Enhancements include time-dependent hydraulic-fracture property support for diffusivity, transmissibility, permeability, and pore volume; and flexible restarts are now possible using outputs of these properties.

Flexible reservoir and surface control

ECLIPSE 2010 includes more efficient, flexible, and extensible reservoir and surface control options. User-defined tables for look up and calculation of user-defined quantities and user-defined arguments support advanced economic calculations, composite well targets, and facility constraints. User-defined arguments have been restructured for greater efficiency, extensibility, flexibility, and performance.

Geomechanics

A new functionality for mining applications enables you to model well excavation by removing grid blocks from the simulation—during a run. You can use this functionality in coupled ECLIPSE and VISAGE* simulations. ECLIPSE 2010 also contains improvements to the thermal simulator's integration with VISAGE software.

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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.

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