PRODUCT SHEET



CougarFlow® Uncertainty Analysis

CougarFlow[®] is a versatile package to efficiently optimize basin and reservoir models through a thorough analysis of their uncertainties, allowing for safer and enlightened decision making.

Response surface model based approach

Through a multiple realizations approach based on experimental design and state of the art optimization algorithms, CougarFlow® aims at reducing the number of simulation runs to properly explore the possible solutions. CougarFlow® is usable for any type of numerical simulation at both basin and reservoir scales. CougarFlow® allows:

- A thorough screening of uncertainties on a given range of input parameters and their influence on key simulation outputs;
- Uncertainty analysis for quantifying parameters impact and associated optimization;
- For stratigraphic modeling and regional basin modeling, assisted calibration to well data, and for reservoir simulation, rapid and robust Assisted History Match. Both use a fast converging gradient method (local optimizer) and a thorough Bayesian approach (global optimizer).

Risk & sensitivity analysis and assisted calibration for stratigraphic modeling and regional basin modeling

Seamlessly linked to Beicip-Franlab stratigraphic modeling software DionisosFlow® and basin modeling package TemisFlow®, CougarFlow® features effective sensitivity and



Use of CougarFlow® with TemisFlow®: sensitivity analysis (top) and risk analysis (bottom) on biogenic gas presence over the whole area of interest at once.

risk analysis. It encompasses the full range of intimatelycoupled phenomena controlling hydrocarbon fluids occurrence in sedimentary basins, from the stratigraphic architecture and facies distribution up to the trapped hydrocarbon charge and quality. Through its optimization capability, it also allows a fast improvement of the models calibration.

Combining experimental design and response surface methodologies, CougarFlow® is one of the few affordable solutions to reliably express DionisosFlow® and TemisFlow® results in a probabilistic manner. CougarFlow® eases uncertainty quantification and model optimization by offering a systematic and rigorous approach. It allows users to explore their models beyond the conventional best and worst case concept.

Uncertainty analysis & AHM for reservoir models

By integrating the whole set of uncertainties related to a reservoir study - from geological to engineering or even economical parameters - into a complete risk analysis and optimization workflow, CougarFlow® provides reservoir engineers with a better grasp of the key influential parameters of a reservoir study and allows for safer decision making at every stage of the field development.

Key benefits

- Flexible and integrated workflows for uncertainty screening, quantification and model optimization
- Handling both static and dynamic uncertain parameters, or full model uncertainties
- Unmatched Map Analysis module for TemisFlow® and DionisosFlow® models
- Connected to FracaFlow[®] and PumaFlow[®]
- Also open to third-party packages : geomodelers (Petrel) - reservoir simulators (ECLIPSE, VIP/ Nexus, CMG)
- Innovative and proven algorithms for AHM, using a custom gradient-method for efficient optimization and a Bayesian approach for thorough investigation
- Easy data and scenario management with powerful QC and visualization tools

BeicipFranlab