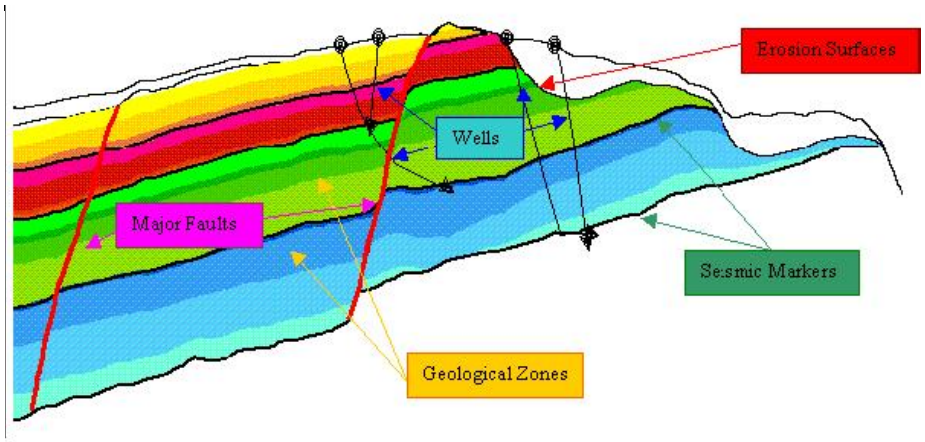
Geovariances
Where no one has gone before

ISATOIL

Stacked Sequence Depth Converted Reservoir Models for Accurate Volumetrics



Nowadays, a key issue in the oil industry is the uncertainty in the calculation of the volume in place. This uncertainty results from the combination of the spatial variability and the scarcity of the data. It is particularly important to make an optimal use of the data of various nature (deviated wells, seismic maps, complex faulting system, contacts).

OVERVIEW

ISATOIL is an advanced 2D modeling technique to construct a consistent 3D, stacked sequence, layered model. It applies a consistent multi-layer global approach as opposed to a sequential approach, whose weakness consists in the propagation of errors from top to bottom.

BENEFITS

- Rely on a true geostatistical risk analysis
- Efficiently update your model when new wells or revised seismic interpretations become available
- Make decisions based on accurate volume calculations
- Handle deviated wells and normal faults

- Improved assessment of uncertainties
- Original geostatistical multilayer approach
- Capabilities to handle deviated wells and normal faults
- Several geostatistical time-to-depth conversion methods
- Volumetrics through numerical simulations
- Integrated workflow designed for automatic updating

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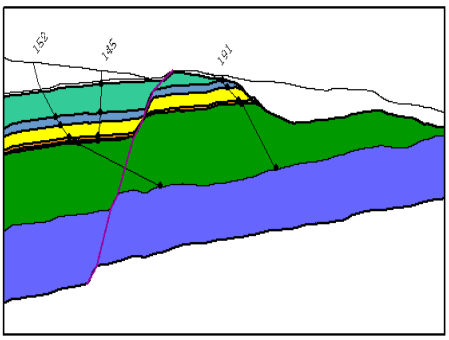
ISATOIL WORKFLOW

Data Loading

The layered reservoir model is stored in a masterfile.

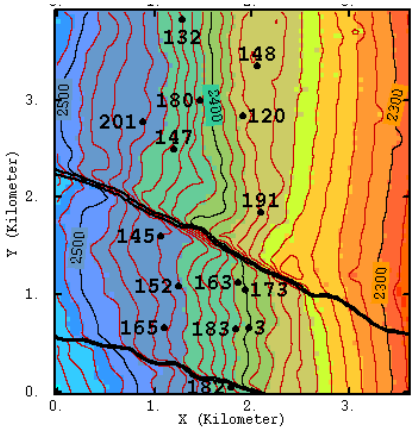
- Deviated wells:
  - intersection with geological surfaces (TVD)
  - petrophysical properties (porosity-N/G-saturations)
- Seismic TWT horizons
- A reference depth converted surface
- Unconformity or major fault surfaces
- Fault polygons



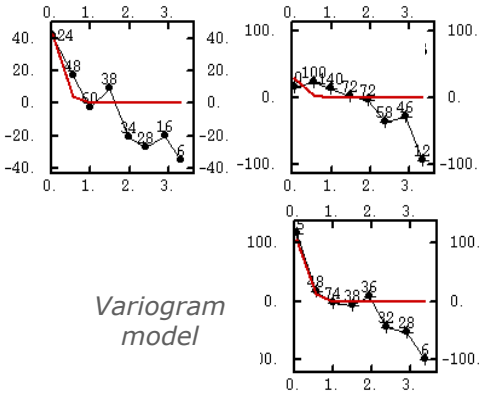
Base Case

The layered reservoir model is created in 3 steps:

- Define the reservoir layers by depth converting, simultaneously, all seismic time horizons using a multivariate geostatistical model, constrained by interval thickness or Interval velocities and external drifts to impose trends
- Divide seismic layers into geological sublayers
  - sublayers thickness consistency is guaranteed using collocated cokriging
  - fault planes are constructed for accurate sublayer intersections
- Populate each reservoir interval with the petrophysical



Base Case (cross-section and basemap)

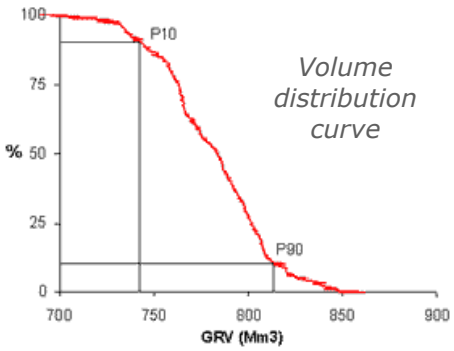


Variogram model

Volumetrics

The oil and gas volumes of each reservoir are calculated from stochastic simulations:

- Same geostatistical models as in the base case
- Contacts can be defined and possibly randomised per segment over the field (GOC, WOC) in order to produce:
  - volume distribution and risk curve per polygon (GRV, HCPV, STOIIP, GIP)
  - reservoir probability and quantile maps
  - uncertainty map for surfaces



Volume distribution curve

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