Practical Technique of Geological Modeling

Instructor
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Objectives
A detailed description of the practical techniques of building 3D reservoir geological models will be presented and discussed throughout the course. To this end specific goals of this course include the development of skills in quality assessment and in interpreting all the input data that are necessary to build a static reservoir model and to understand reservoir features.

Course Outline
The course shows the sequence of processes that lead to the construction of 3D reservoir geological models from the definition of the 3D geometrical model to the petrophysical characterization and to the volume calculation and uncertainty evaluation. The multi-disciplinary nature of the reservoir modeling workflow will be emphasized through the different steps of the modeling.

Course Contents
Geometrical Modeling (approx. 1 day)
(1) Structural modeling
   • Structured and unstructured grid construction
   • Stair-step approach
   • Seismic horizon integration
   • Demonstration
(2) Stratigraphic modeling
   • Well correlation
   • Stratigraphic zonation
   • Sublayering
   • Demonstration
(3) Compartment identification
   • Fluid contact identification (well logs, RFT)
   • Demonstration

Property Modeling (approx. 3 days)
(1) Well log upscaling
   • Continuous properties
   • Discrete properties
   • Demonstration
(2) Basic Geostatistics
   • Variography
   • Kriging
   • Cokriging
   • Demonstration
(3) Facies modeling
   • Facies classification (integrated well log-core data analysis, NN)
   • Algorithms used for facies distribution (TGS, SGS, object modeling, MPS)
   • Use of variograms, VPC
   • Demonstration
(4) Petrophysical modeling
- Net-to-gross, porosity, fluid saturation, permeability calculation
- Techniques and algorithms used for distributing petrophysical properties
- Demonstration

Volume Calculation and uncertainty evaluation (approx. 1/2 day)
- Volume calculation
- Risk analysis
- Demonstration

Dynamic grid (approx. 1/2 day)
- Upgridding for dynamic simulation
- Property upscaling and QC
- Demonstration

Who Should Attend
This course is intended for the disciplines listed below, as well as anyone with a specific interest in the topic.
- Geologists
- Geophysicists

Prerequisites
Fundamentals of sedimentology, stratigraphy, log analysis, and geostatistics.

Course Method
The course method will be a combination of the following,
- 50% Lectures
- 20% Step by step demonstration of the workflow using well-known commercial software (Petrel by Schlumberger)
- 20% Case studies & practical exercises (individually and/or in teams)
- 10% Group discussion

Daily Course Schedule
The course schedule will include a morning and afternoon break as appropriate during throughout the training sessions.

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<th>Time</th>
<th>Day 1</th>
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<td>Afternoon Session 1:45 – 5:00 (3h15min)</td>
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