PE Limited

Engineering & Geological Software Development

Integrated Structural Geology – Standard Course

Target Audience:

This course is intended for those that: (i) work with geological models in the exploration or production domain and need to become familiar with structural geology tools/analysis; (ii) attended the course already some time ago, and require a refresher, or; (iii) are in other disciplines trying to understand how structural geology is integrated into the exploration or production context (e.g. accountants, project managers, etc.).

Overall Objectives:

1/ Learn structural geological theory
2/ Discuss the limitations of the theory
3/ Apply the theory and become familiar with **MOVE**

Course Agenda

Day 1 Introduction to integrated structural geology modelling and MOVE

- *Importance of integrated structural geology modelling for reducing uncertainty in the reservoir model.*
- *Geological model components – Terminology, assumptions, rock properties, describing shapes.*
- *Input data for geological models – Data types, collection methods, projection of data.*
- *Stress and Strain – Calculating in-situ stress, elastic properties, deformation, Andersonian faulting.*
- ***Exercises** – Introduction to **MOVE**; setting up a Stratigraphy Table; importing data; stereonet analysis; interpreting sections & calculating apparent dip.*

Day 2 Limitations in geological data and reducing uncertainty

- *Constrained model building using basic geometric principles – Kink-band method.*
- *Material Balance – Assumptions, Simple depth-to-detachment, Area-depth calculation.*
- *Constrained model building using mass balance and geological principles – Constant Heave.*
- *Kinematic Models – Simple Shear, Fault Parallel Flow, Trishear.*
- ***Exercises** – Kink-band method to constrain fold shape; geometric fault construction; forward modelling deformation in 2D; geometric restoration.*

Day 3 Modelling deformational processes

- *Sedimentary basins – Extensional, compressional, strike-slip.*
- *Evolution of rift basins – Tectono-stratigraphic observations, geological processes.*
- *Isostasy, mechanical compaction, thermal subsidence.*
- *Sequential Restoration – Introduction to technique.*
- ***Exercises** – Airy isostasy model, Sclater-Christie compaction model & McKenzie thermal subsidence model; Sequential Restoration in **MOVE**.*

Day 4 Predicting subsurface flow pathways, buffers and barriers

- *Strain and fracture prediction – Relationship between strain and shear plane orientations*
- *Critical failure – Mohr Diagram and Coulomb failure.*
- *3D model building – Techniques available in **MOVE**.*
- *Fault Displacement Analysis – Learn techniques to understand and validate fault displacement.*
- *Fault Seal Analysis – Fault Rock Seal, Shale Gouge Ratio.*
- ***Exercises** – Forward modelling deformation in 3D and calculating strain associated with deformation; generating Discrete Fracture Network (DFN); 3D model building; fault displacement and seal analysis.*

Day 5 Reservoir structural geology modelling workshop

- *Use learnings from first four days to build a model and carry out integrated structural analysis in **MOVE**.*

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