N556: Building the Structural Framework for a Reservoir Model

Instructor(s): Douglas Paton

Format and Duration

Classroom - 3 Days
Virtual - 5 Sessions

Summary

With the advent of extensive 3D data it is all too easy to determine top reservoir horizon from well picks, autopick the seismic volume and generate a structure map. Despite being fundamental in volumetric determination and prediction of fluid migration, the uncertainty, and inaccuracy, in this structure map is often overlooked. Recent advances of automated fault picking, in part, reduces the time taken to generate structure maps and corresponding fault networks, which can reduce this uncertainty, but the baseline interpretation needs to be QC'd and be valid. Critically, these advances still require the interpreter to understand both fault behaviour and impact on reservoir distribution and integrity, whilst requiring the modeller to appreciate the complexity in a simplified fault model. The central themes of this workshop are the construction of robust structural models, the development of an understanding and appreciation of the uncertainties within them, and how these impact the resultant reservoir model.

Business Impact: The development of a well constrained structural framework is critical for reservoir modelling and requires a balance between capturing structural complexity and modelling feasibility.

Learning Outcomes

Participants will learn to:

1. Evaluate the data that are used as inputs to each stage of the process, including the importance of evaluating time versus depth domains.
2. Develop an appropriate strategy for seismic data interpretation for model construction and critique existing interpretations.
3. Apply conceptual structural models to real data and appreciate the strengths and limitations of such an approach.
4. Understand the importance of differentiating between seismic scale and reservoir scale resolutions on interpretation and modelling.
5. Consider how geostatistics can be used to predict sub-seismic resolution structures.
6. Apply seismic attributes to constrain fault geometry and assess connectivity.
7. Have an awareness of the impact of fault zone geometry/composition on fluid flow through a model.
8. Be aware of the role of critically stressed faults on the modelling process.

Training Method

A classroom or virtual classroom workshop comprising exercises supported by short seminars.

Who Should Attend

Geophysicists, geologists, seismic interpreters, reservoir modelllers, and managers.

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Course Content

The following topics will be addressed during this course:

- The interface of seismic interpretation, structural geology, reservoir distribution/integrity and reservoir modelling.
- Definition of fault geometry in high confidence areas and application of fault model concepts to aid fault interpretation and modelling.
- Application of fault statistics to validate fault interpretation.
- Constraining your faults below seismic resolution.
- Fault zone characterisation and impact on fluid flow; critically stressed faults.
- Discussion on strategy for developing structural framework and pillar gridding in different reservoir settings.