

Structural Geology: Key Concepts for Exploration and Production (G111)



Tutor(s)

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Overview

The workshop will be practically based, supplemented by a number of group thought experiments. It will cover an introduction to the fundamentals of structural geology and its impact on hydrocarbon distribution and prediction. It will then outline, with examples, the essential geometric components expected in normal faults / rift basins, reverse faults / contractional environments, inversion / multi-phase settings, and salt and strike-slip influenced systems.

Duration and Logistics

Classroom version. A 4-day course comprising a mix of lectures, case studies and exercises. The manual will be provided in digital format and participants will be required to bring a laptop or tablet computer to follow the lectures and exercises.

Level and Audience

Fundamental. The course is aimed at new hires who need a thorough introduction to the fundamentals of structural geology.

Objectives

You will learn to:

1. Understand the fundamental importance of structural geology in modelling the subsurface.
2. Appreciate the concept of structural styles and why it is essential to aid the interpretation of subsurface and outcrop data.
3. Assess input data required for resource modelling and appreciate its limitations.
4. Apply relevant and appropriate models to areas of limited data or zones of complexity and capture the implications of the inherent uncertainty.
5. Apply relevant techniques and understanding to enhance resource prediction in extensional, compressional and multi-phase settings, including salt.
6. Appreciate the importance of developing a structural robust understanding for any energy transition resource model.

Course Content

Course Details

The workshop will cover the following topics:

- Review of key components of structural geology, including the importance of differentiating syn and post kinematic systems, stress and strain, and critically stressed faults.
- Overview of basin forming processes and impact understanding and predicting the petroleum system.
- Extensional systems – from normal fault geometry to rift basin and lithospheric extension.
- Compressional systems – the challenges of reverse faults and how they interact to form larger scale contractional systems.
- The importance of understanding multi-phase deformation.
- Unravelling the complexity of strike-slip deformation.
- Role of salt in petroleum basins.
- Impact of faults on predicting fluid migration.

The course can also be delivered to an audience interested in developing structural skills applicable to energy transition subject areas including CCS and geothermal. In this instance, case studies from across the energy transition would be used to illustrate the application of the concepts.