

This course can be adapted to virtual classroom mode

Structural Geology, Basin Development & Associated Traps

5 days
Overview

STRUCT-EN-A

LEVEL

Awareness

PURPOSE

This course provides an in-depth knowledge of key elements which characterize the structural style of a sedimentary basin.

LEARNING OBJECTIVES

Upon completion of the course, participants will be able to:

get familiar with both brittle and ductile deformations identification and analysis, in various types of sedimentary basins, at different scales and under different stress regimes: at lithosphere scale: plate tectonics and basin formation (rifts, passive margins, active margins and thrust belts); at basin scale: subsidence and inversion, structural traps (tilted blocks, horsts, shale and salt domes, folds), at field and reservoir scales: behavior of faults (seal or drain), fracturing, cap rock integrity...

be able to identify the specific structural style of a petroleum area, on outcrop pictures and on seismic profiles,

be able to grasp issues linked to tectonic evolution versus petroleum system evolution (in different structural contexts).

WAYS AND MEANS

Interactive course: lectures illustrated by practical exercises and personal work.

LEARNING ASSESSMENT

Knowledge assessment with multiple choice questions and open explanatory questions.

PREREQUISITES

Degree in G&G.

No prerequisites in structural geology.

Agenda

PLATE TECTONICS & STRUCTURAL STYLES

1.5 d

Earth structure, global dynamics and time scales.

Structure of continental and oceanic lithospheres: thermicity, rheology, stress and strain.

Fundamentals of structural analysis:

Extensional regimes: geodynamics and architecture of related basins (rift basins, passive margins).

Compressional regimes: geodynamics and architecture of related basins (foreland basins, active margins, thrust belts).

Intra-plate basins and tectonic inversion.

EXTENSIONAL & COMPRESSIONAL DEFORMATIONS - STRUCTURAL TRAPS

1.5 d

Structural traps in extensional context.

Structural traps in compressional context.

Wrench faulting and related traps.

Salt tectonics and related traps.
Relationship between tectonic and sedimentary processes.
Case study: the Arabian plate and margins, relations with petroleum systems.

EXPLORATION & DEVELOPMENT PROBLEMS ASSOCIATED WITH STRUCTURAL STYLES

1.5 d

Folding mechanisms and styles, impact on fractures distribution.
Conductive and sealing faults.
Migration pathways and petroleum systems timing.
Seal efficiency and time of residence of hydrocarbons in structural traps.

SUMMARY, SYNTHESIS & WRAP-UP

0.5 d