

3D Seismic Interpretation Workshop

Structural Model Construction & Trap Analysis

10 days

METH/SEISINTERP

Overview

LEVEL

Skilled

PURPOSE

This course provides a practical understanding of 3-D seismic structural interpretation in order to identify prospect locations.

LEARNING OBJECTIVES

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

- get familiar with a 3D seismic structural interpretation workflow,
- perform a seismic structural interpretation: seismic data QC, well-to-seismic tying, horizons and faults picking, structural model construction and trap identification,
- use a velocity field to perform a time-to-depth conversion,
- identify structural prospects.

WAYS AND MEANS

Interactive presentations, exercises and document analysis.

80% of training duration is dedicated to workshop on PC, using a seismic interpretation software tool from the industry.

Software used during workshops: with courtesy of Schlumberger.

LEARNING ASSESSMENT

Knowledge assessment with multiple choice questions and open explanatory questions.

PREREQUISITES

Highly recommended: fundamental knowledge in seismic wave propagation, acquisition and processing, as well as in structural geology.

Agenda

WEEK 1

TEAM WORK ON 3D CASE STUDIES (EXTENSIONAL CONTEXT)

STRUCTURAL INTERPRETATION - PROSPECT GEOMETRY IDENTIFICATION

Workshop presentation and objectives (0.5 day)

Survey introduction - Geophysical context.

Geology and petroleum system overview.

Prospect objectives.

Seismic data analysis and QC (0.5 day)

Parameters for seismic displays: vertical sections, time slices, composite sections, 3D view.

Seismic data analysis: noises, multiples, footprints, frequency content, smoothing.

Seismic data preparation: smoothing/filtering for structural interpretation vs reservoir interpretation.

Well-to-seismic tying and horizons identification (1 day)

Well data calibration to identify main geological markers and main reservoir layers.

Synthetic seismogram calculation.

Seismic data picking and mapping - Potential traps definition (2.5 days)

Structural interpretation (in time) of main horizons key, horizons and faults picking (time picking: manual, guided, automatic, grid, and 3D picking), and correlation.

Picking results QC and estimation of uncertainties.

Volume and surface attributes calculation and analysis.

Surfaces generation to produce a time model.

Mapping.

Velocity model construction and time-to-depth conversion (0.5 day)

Interfaces selection for modeling.

Seismic velocities of intervals: editing and smoothing, control and correction with reference wells.

Velocity model construction via layer stripping.

Time-to-depth conversion.

WEEK 2

INTRODUCTION TO SEISMIC RESERVOIR ANALYSIS

Potential reservoirs analysis (3.5 days)

Reservoir picking and modeling.

Surface attributes calculation and analysis.

Interval attributes calculation and analysis.

Structural prospects identification and evaluation (1.5 days)

Entrapment, reservoir extension.

Time vs. depth structures comparison.

Uncertainties assessment.

Recommendations.

SUMMARY, SYNTHESIS & WRAP-UP