Sequence Stratigraphy and its expression on Seismic, Logs and Cores (G001)

GeoLogica TRAINING

Tutor(s)

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Overview

The application of sequence stratigraphy allows for the geologic interpretation of core, well log, seismic and outcrop data to predict play elements, presence and quality before drilling. This course introduces sequence stratigraphy and presents workflows to describe, correlate and map strata. The terminology of surfaces, systems tracts, sequence sets and stratigraphic hierarchy will be described and then applied to subsurface data exercises in non-marine, shallow marine and deep marine depositional settings. The emphasis will be on the recognition and mapping of play elements from exploration to production scales.

Duration and Logistics

Classroom version: A 4-day course comprising a mix of classroom lectures and discussion (50%), and exercises (50%). 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.

Virtual version: Ten 3-hour interactive online sessions presented over 5 days. A digital manual and hard-copy exercise materials will be distributed to participants before the course. Some reading and several exercises are to be completed by participants off-line.

Level and Audience

Intermediate. This course is intended for geoscientists (reservoir modellers, seismic interpreters, sedimentologists), reservoir engineers and petrophysicists who want to understand and apply the concepts of sequence stratigraphy.

Objectives

You will learn to:

1. Apply the basic terminology of sequence stratigraphy.
2. Contrast the various approaches to sequence stratigraphy.
3. Apply the concept of facies, facies stacking and shoreline trajectory to define parasequences, surfaces and system tracts.
4. Evaluate main controls on depositional sequences in non-marine, shallow marine and deep marine environments.
5. Assess and interpret cores, well logs and seismic lines to characterize and map hydrocarbon play elements in different settings.
6. Implement sequence stratigraphic methods to predict play element presence and quality on seismic data.
7. Describe the Accommodation Succession Method and Sequence Stratigraphy Hierarchy.
8. Apply chronostratigraphic techniques.

Course Content

Sessions 1 and 2: Introduction and key concepts

- Class objectives
- A history of stratigraphy
- Lithostratigraphy vs chronostratigraphy
- Price River C – core description and interpretation
- Sequence stratigraphy concepts
- Sequence stratigraphy method applied to well logs

Sessions 3 and 4: Well log interpretation and seismic facies mapping

- *Exercise: Urdanetta well log interpretation and correlation*
- Well log loop-tie interpretation and mapping
- Sequence stratigraphy method applied to seismic
- Idealized depositional sequences
- Seismic facies mapping
- Woodbine seismic facies and EoD mapping

Sessions 5 and 6: Sequences and seismic stratigraphic mapping

- Sequence sets and composite sequences
- Seismic stratigraphic mapping at exploration scale
- *Exercise: Pelotas Basin*

Sessions 7 and 8: Unconventional resource applications and stratigraphic traps

- Application of sequence stratigraphy for unconventional resources
- *Exercise: Vaca Muerta*
- Reservoir distribution in deepwater settings
- Play definition at regional scale – North Sea example
- Identification of stratigraphic traps in deepwater settings

Sessions 9 and 10: High-resolution mapping and course wrap-up

- Reservoir compartments in deltaic and deepwater reservoirs
- High-resolution mapping at production scale – deltaic reservoirs
- High-resolution mapping at production scale – OW reservoirs
- Course wrap-up