N137: Seismic Facies Mapping in a Sequence Stratigraphic Framework

Tutor(s): Rob Kirk

5 Days	Competence Level: Skilled Application
Classroom Course	

Summary

An understanding and application of the principles of sequence stratigraphy is essential for the successful prediction and analysis of seismic facies in the subsurface. This seismic facies mapping course includes multiple class exercises and case history examples, integrated with lectures on sequence stratigraphic concepts, providing the relevant knowledge and skills for participants to successfully use sequence stratigraphy in exploration and prospect identification.

Learning Outcomes

Participants will learn to:

1. Formulate the observational techniques used to interpret both well and seismic facies (clastic and carbonate) within a simple stratigraphic framework.
2. Evaluate the use and integration of the Exxon model, system tracts, chronostratigraphy and seismic stratigraphy.
3. Assess the principles of seismic facies mapping methods to sequence stratigraphy, and describe the possible pitfalls in interpretation; mispicking, scale, mounds and HRDZ's.
4. Appraise and locate Lowstand facies; slope fans, prograding complexes, incised valleys, sediment waves and contourites, basin floor fans and debrites.
5. Appraise and recognise Transgressive facies; basal transgressive sands and source rocks.
6. Appraise and pin point Highstand facies; prograding slope and shelves, fluvial and alluvial sediments.

Duration and Training Method

A five-day classroom course comprising of lectures and practical exercises.

Who Should Attend

This workshop is hands-on and is suitable for both geologists and geophysicists-anyone interested in deducing geology from seismic and well data.

Prerequisites and Linking Courses

Previous seismic experience is useful but not mandatory. Attendance on course N007 would also be a benefi t but not a prerequisite. The course links well with field courses focusing on sequence stratigraphy including N035, N115, N244 and N269.

Course Content

The course examines well and seismic facies, both clastics and carbonates, within a simple sequence stratigraphic framework. The class will operate more as a workshop format as there are multiple operational exercises which have lectures interspersed between them to emphasise key concepts. The aim is to supply participants with an international spread of real-world examples which can serve as an analogue database for future work. The lectures will show pitfalls and things that went wrong as well as where seismic facies mapping worked. Participants will have the opportunity to practice construction of seismic facies maps during the course.

A) Introduction

• Format, content, aims and objectives

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B) Sequence Stratigraphy
- The Exxon model
- Other models
- System tracts
- Chronostratigraphy
- Seismic stratigraphy
- Well facies

C) Seismic Facies Mapping
- Introduction
- Scales, phase, datumming
- ABC method
- Other methods
- Automated methods
- A simple ABC mapping exercise will be done to teach principles

D) Lowstand Seismic Facies
- Basin floor fans and debrites
- Slope fans
- Sediment waves and contourites
- Prograding complexes
- Incised valleys
- Exercises will include deepwater sediments in the Gulf of Mexico, Carnarvon and Canning Basins. The Carnarvon exercise will also include a relative sea level change curve calculation and prediction of basinal facies.

E) Transgressive seismic facies
- Basal transgressive sands
- Source rocks
- Exercises will include source rocks in China and North Slope as well as basal transgressive sands in Pakistan and Carnarvon Basins

F) Highstand seismic facies
- Prograding slopes and shelves
- Fluvial
- Alluvial
- Exercises will include prograding deltas and carbonates in Morocco, Vietnam and the Great Australian Bight

G) Stratimagic Examples

H) Pitfalls and "Oddball" facies
- Scale
- Misspicking
- Mounds
- HRDZ's
- Other problems

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I) Seismic Facies Mapping Exercise

We will do an exercise on the Pearl River Mouth Basin, China