



# N171: Stratigraphic Interpretation of Siliciclastic Reservoirs: An Integrated Approach

Tutor(s): Doug Boyd

5 Days

Competence Level:  
Basic Application



Classroom Course

## Summary

This course will examine the data types and techniques involved in the stratigraphic analysis of siliciclastic reservoirs, and demonstrate how these must be integrated to produce a robust and predictive interpretation of reservoir distribution, geometries and architecture. Lecture material, case histories and exercises have been selected from a variety of play types to illustrate generic concepts.

## Learning Outcomes

Participants will learn to:

1. Analyse the impact of reservoir stratigraphy on reservoir performance.
2. Demonstrate how integrated multi-disciplinary stratigraphic analysis provides an optimal reservoir description and the basis for efficient reservoir development and management.
3. Critique the inevitability of uncertainty in the subsurface.
4. Analyse the contribution of different data types to reservoir stratigraphic analysis including interpretation ambiguities the use of dynamic data in its various forms.
5. Examine the differences between lithostratigraphy and chronostratigraphy including the role of each, and their relationship to seismic stratigraphy.
6. Employ the concepts underpinning sequence stratigraphy and understand the effects of sediment supply and accommodation space on depositional systems.
7. Analyse siliciclastic depositional systems (shallow marine, shoreline, fluvial, aeolian, deltaic, deepwater) in terms of their constituent depositional elements or 'building blocks' and their chronostratigraphic surfaces.
8. Interpret the 3D organisation of these depositional elements, and their internal reservoir character and trends.

## Duration and Training Method

A five-day classroom course. Lectures, exercises and discussions introduce participants to the techniques that will enable them to effectively integrate various datasets into their exploration and development activities.

## Who Should Attend

Geologists, geophysicists or others who seek to understand how integration of various data types can improve stratigraphic interpretations, thereby improving their reservoir models and stratigraphic predictions.

## Prerequisites and Linking Courses

None, although a familiarity with wireline logs is desirable. This is available in N003 (Geological Interpretation of Well Logs), which provides further lessons on extracting geological data from well logs.

Within the Nautilus Training Alliance Clastics portfolio this course links well with other Basic Application Level courses including N155 (Introduction to Clastic Depositional Systems: A Petroleum Perspective)



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and N156 (Clastic Depositional Systems in a Basinal Framework: Exploration and Reservoir Implications, Pyrenees, Spain).

## Course Content

Through an integrated approach to available well and seismic data, the geoscientist reconstructs depositional histories, predicts reservoir properties, and creates maps and models that will guide exploration and development work. Interpretation concepts are rooted in knowledge of, or working hypotheses about, the depositional environment. Key stratigraphic surfaces (sequence boundaries, flooding surfaces, maximum flooding surfaces) are defined and subsequently used to construct a stratigraphic framework that allows the fundamental controls on depositional systems (tectonics, relative sea-level change, sediment supply) to be understood.

Production data (e.g. pressure, well performance, 4D seismic) can also be an invaluable integrated component of the overall interpretation.

This course will provide participants with a skill set that will allow them to effectively integrate log, core, seismic and production data to make meaningful stratigraphic correlations in clastic reservoirs. Lectures provide background into the technologies and concepts (e.g. sedimentology, sequence stratigraphy). Exercises provide participants the opportunity to apply knowledge gained in lectures to datasets from a range of siliciclastic reservoirs.

The course covers the following topics:

### Clastic depositional environments

- Deepwater
- Deltas
- Shorelines and shelves
- Fluvial
- Aeolian

### Stratigraphic concepts

- Lithostratigraphy
- Chronostratigraphy
- Sequence stratigraphy

### Logs

- Wireline logs
- Image logs
- Calibration to core
- Log facies
- Correlation methods



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## Seismic methods

- Physical basis
- Resolution
- 3D and 4D methods
- Attributes

## Petroleum engineering concepts

- Pressure data
- Well performance data

## The integrated model