W008: North Sea Turbidite Systems: Core Characteristics and Reservoir Quality of Intra-basinal 'Classical' Turbidites vs. Extra-basinal Hyperpycnal Systems

Format and Duration
Classroom - 2 Days

Instructor(s): John Cater and Ron Steel

Summary

The workshop will explain the depositional processes operating in marine gravity-flow systems and will use core and outcrop examples to demonstrate characteristic features of 'classical', hyperpycnal (delta-fed) and bottom-current systems. Cored intervals from Norwegian Jurassic, Cretaceous and Palaeocene reservoirs will demonstrate the depositional facies that characterise each system. Outcrop examples of hyperpycnal systems in Spitzbergen, Utah and Argentina will be compared with cores from recent discoveries offshore Norway to illustrate criteria for distinguishing delta-fed hyperpycnal systems in shelfal and basinal settings from 'classical' surge-type turbidites.

Training Method

A workshop comprising core analysis interdispersed with lectures. Classroom exercises will focus on depositional and diagenetic controls on reservoir quality in these systems and their prediction in the subsurface.

Who Should Attend

It is designed to appeal to all geoscientists working on the subsurface analysis of gravity-flow systems. The concepts discussed are illustrated by cores from offshore Norway but are relevant to the exploration and production geology of turbidite systems worldwide.

Prerequisites and Linking Courses

There are no prerequisites for this workshop.

Course Content

The course will include classroom lectures to explain the depositional processes that operate in submarine gravity-flow systems and their products as seen at core, outcrop and seismic scale. Core viewing and guided hands-on exercises will demonstrate the products of surge-type flows, hyperpycnal flows and bottom-current reworking, using released data from producing fields offshore Norway. The course will focus on the criteria used to recognise the products of hyperpycnal systems and on key controls on their subsurface reservoir properties. Fully illustrated course notes and exercise sheets using published/released data will be provided.

DAY 1 – 'Classical' surge-type, intrabasinal turbidites and bottom-current deposits

- Key processes and products in core and at outcrop
- Exercises using core from the Palaeocene Forties, Turonian Lange and Campanian Kvitnos Formations, offshore Norway
- Recognition and significance of linked debrites, plus mapping exercise using published data
- Core-based and wireline-based facies classification schemes and predictive models

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DAY 2 – Delta-fed hyperpycnal systems

- Key processes and products in core and at outcrop
- Exercises using core from the Aptian/Albian Agat and Oxfordian Heather Formations, offshore Norway
- Depositional controls on reservoir quality and sand-body geometry
- Diagenetic controls on reservoir quality linked to early cementation and under-compaction