Reservoir Characterization of Deepwater Systems: Ross Formation, County Clare, Ireland (G023)

Tutor(s)

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Overview

Given the high cost of exploration and development of deepwater reservoirs, it is essential to have an accurate pre-drill prediction of reservoir architecture and properties, and to integrate post-drill assessments of reservoir heterogeneity away from well penetrations. The outcrops of the Ross Formation offer a unique opportunity to observe seismic-scale exposures of a deepwater fan system with characteristics similar to the producing fields in West Africa, Brazil and the Gulf of Mexico, to name a few. The size and quality of the exposures allow the participants to observe the main building blocks of fan systems. Lobes and distributary channels can be observed from proximal to distal settings, with excellent exposures of vertical stacking and 2-D arrangements of these elements.

Duration and Logistics

A 7-day field course comprising a mix of field activities with exercises (60%) and classroom lectures with exercises (40%). Exercises emphasize practical applications and will focus on description of deepwater lithofacies, stratal geometries and recognizing key stratigraphic surfaces. The course is based in Kilkee Bay, Ireland, with participants flying in and out of Shannon, Ireland.

Level and Audience

Advanced. This course is intended for geoscientists, petrophysicists, engineers and managers who are seeking to gain a comprehensive understanding of deepwater reservoirs.

Exertion Level

This class requires an **EASY** exertion level. Access to the coastal outcrops is relatively easy and there will be walks of up to 2km (1.2 miles) most days, all at sea level. The longest walk on the class is approximately 3.2km (2 miles), with no ascent or descent over 50m (160 feet). Summer weather can be cool and wet, or warm and wet, with a daily temperature range of 4–24°C (40–74°F). Transport will be by van on paved roads.

Objectives

You will learn to:

1. Interpret and map different archetypes of deepwater reservoirs using cores, well-logs and seismic lines, from exploration to production business scales.
2. Define trap configurations and perform risk assessment for stratigraphic traps.
3. Estimate reservoir presence risk and predict N:G.
4. Interpret environments of deposition (EoDs) and related reservoir architecture, lithofacies associations and diversity.

5. Evaluate reservoir geometry and connectivity in different EoDs, integrating with production data.
6. Define depositional geometries of turbidites in seismic-scale outcrops.

Course Content

Course Details

In addition to visiting world-class outcrops, participants will learn to describe cores and integrate core and well-log information with seismic to generate high-resolution environment of deposition maps of reservoirs in different settings. Additionally, participants will learn how to integrate engineering and production data to improve prediction of reservoir performance. Cores, well-logs and seismic examples are compared to and contrasted with outcrops to help participants extrapolate 2-D outcrop information to 3-D views of reservoir scale depositional systems.

Day 1: Arrive in Shannon

Participants arrive at Shannon Airport and travel to Kilkee.

Day 2: Stratigraphy and Basin Setting

Classroom:

- Class introduction
- Field safety and geologic setting
- Sequence stratigraphy of deepwater systems
- Exercises: Lowstand sequence sets from Pelotas Basin, West Siberia and New Jersey

Fieldwork:

- George’s Point, east side of Kilkee Bay, to introduce the local stratigraphy and setting

Overnight in Kilkee.

Day 3: Lobes

Classroom:

- Deepwater processes and depositional models
- Exercises: Lobes and lobe complexes – Golo Fan

Fieldwork:

- Loop Head; general basinal context and Ross Formation turbidites.
- Bridges of Ross and east of Ross; major slump sheets
- Fisherman's Point; turbidite channels and sand volcanoes

Overnight in Kilkee.

Day 4: Channels

Classroom:

- Deepwater lithofacies and rock properties
- Exercises: Core description of deepwater reservoirs

Fieldwork:

- Ross Formation at Kilcredaun
- Boat trip from Carrigaholt including the Ross Formation in sea cliffs between Carrigaholt and Loop Head and lateral accretion packages at Rehy Cliffs

Overnight in Kilkee.

Day 5: Channels

Classroom:

- Deepwater exploration methods
- Reservoir presence assessment and pre-drill prediction
- Exercises: East breaks mini-basin mapping and pre-drill prediction

Fieldwork:

- Kilbaha Bay and Rinevella Bay turbidite facies including channels and mega-flutes

Overnight in Kilkee.

Day 6: Lobe stacking

Classroom:

- Lectures: Deepwater reservoirs and production behavior
- Exercises: High-resolution reservoir mapping and production data integration

Fieldwork:

- Torkeal Bay – stories, story stacking, lobe and lobe stacking

Overnight in Kilkee

Day 7: Departure

Classroom:

- Course summary and wrap up

Drive to Shannon airport for travel home.