N468: Deepwater Reservoirs – Exploration Risking and Development Characterisation

Instructor(s): Vitor Abreu

Format and Duration

Classroom - 5 Days
Virtual - 10 Sessions

Summary

Participants will learn how to interpret and map environments of deposition (EoD's) in deep water systems, and understand how the different EoD's and sub-EoD's behave as reservoirs. Engineering data will also be used to demonstrate how to improve prediction of reservoir performance.

Business Impact: Through a multidisciplinary approach, this course has a strong business focus in **defining mapping strategies to de-risk reservoir presence** and to **predict reservoir N:G pre-drill**. The course highlights the importance of accurate **environments of deposition** mapping **from exploration to production business scales**, emphasizing the key architectural archetypes and their impact in **predicting baffles and barriers**, as well as the **distribution of porosity and permeability** in the reservoir.

Learning Outcomes

Participants will learn to:

1. Employ interpretation and mapping techniques for cores, well-logs and seismic lines in DW settings from exploration to production business scales.
2. Interpret trap configurations and analyze risk for DW stratigraphic traps.
3. Analyze reservoir presence risk and Net:Gross prediction.
4. Interpret unconventional resources in DW settings, including examples from the Permian Basin.
5. Implement sequence stratigraphy and seismic stratigraphic techniques.
6. Interpret environments of deposition (EoD's) and related reservoir architecture, lithofacies associations and diversity.
7. Describe the different EoD's in deep water that can generate reservoir-scale, sand-rich systems.
8. Identify the different EoD's and sub-EoD's in seismic, well logs, cores and outcrops.
9. Analyze reservoir geometry and connectivity in different EoD's, integrating with production data.
10. Review deep water lithofacies and nomenclature, common lithofacies associations and interpret lithofacies in cores.

Training Method

This is a classroom or virtual classroom course comprising lectures, exercises, and observations from core, well logs, and seismic profiles.

Who Should Attend

This Foundation level course is intended for geoscientists, petrophysicists, engineers, and managers who are seeking a comprehensive introduction to deep water reservoir plays. It is appropriate for those with no previous experience with these reservoirs, as well as those that have some experience and wish to broaden their understanding and/or gain exposure to some of the most recent technologies and practices.

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Course Content

Well-logs and seismic examples will be used as a comparison to core information to help participants link 1-D information to 3-D views of reservoir-scale depositional systems. This class will also review the evolution of concepts in deep water models, emphasizing recent approaches that integrate experimental and numerical models, Quaternary analogues and ultra-high-resolution seismic data.

Deep Water Systems and Stratigraphy

- Sequence Stratigraphic Context
- Seismic Exercise
- Recent Advances in Deep Water Models
- East Breaks Exercise

Channelized Systems

- Deep Water Channelized Systems
- Exercise: Interpretation of a DW Channel
- DW Channels in Cores, Wells and Seismic
- DW Channels in Outcrops – Facies and Internal Organization
- Channel System Mapping Exercise

Fan Systems

- Mud-Rich Fan Systems
- Danube Fan System Exercise
- Sand-Rich Fan Systems
- Golo Fan Exercise
- Process Sedimentology of DW Systems

Deep Water Desposits in Core and Outcrop

- DW Lithofacies vs EoD – Examples from Cores and Outcrops
- Core Description of DW Reservoirs Exercise and Discussion

High-Resolution Interpretation and Production Data Integration

Deep Water Petroleum Systems

- Global Examples of DW Strat Traps - Trap Configuration and Risking
- Reservoir Presence Risking and Net to Gross Prediction