



D468: Deep Water Reservoirs – Exploration Risking and Development Characterisation (Distance Learning)

Tutor(s): Vitor Arbeu

5 Days

Competence Level:
Basic Application



Virtual Course

Summary

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**. It 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.

The course emphasizes key changes in deep water reservoir models that have a major impact on exploration and production of these reservoirs. 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.

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.

Duration and Training Method

A virtual classroom course divided into 10 three-hour long webinar sessions over a two-week period (equivalent to a five-day classroom course), comprising lectures, exercises, and observations from core, well logs and seismic profiles to be completed by participants during and between sessions.

Who Should Attend

This 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, those that have some experience and wish to broaden their understanding, and more experienced people who want exposure to some of the most recent



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technologies and practices. It is not intended as an advanced course for individuals with extensive experience working these reservoirs.

Prerequisites and Linking Courses

There are no prerequisites for this course.

Complementary courses at a Basic Application level include N155 (Introduction to Clastic Depositional Systems: A Petroleum Perspective), N305 (Core Facies Analysis for Resource Plays), and N251 (Well Log Sequence Stratigraphy: Applications to Exploration and Production) and N080 (Geophysics for Subsurface Professionals).

More advanced coverage of deep water reservoirs can be found in a number of courses, including N442 (Reservoir Architecture of Deep Water Systems, California, USA), N033 (Characterisation, Modelling, Simulation and Development Planning in Deepwater Clastic Reservoirs, Tabernas, Spain), and N292 (Deepwater Depositional System Stratigraphy for Exploration and Development, Arkansas, USA), and N302 (Deepwater Reservoir Presence and Architecture: Permian Basin Brushy Canyon Formation, Guadalupe and Delaware Mountains, West Texas, USA).

Course Content

Well-logs and seismic examples will be used as a comparison to core information to help participants link 1-D core 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. The resulting new depositional models will have strong impact from exploration to production scales.

Session 1

- Initial Remarks
- Sequence Stratigraphic Context
- Seismic Exercise

Session 2

- Review of Previous Session
- Recent Advances in Deep Water Models
- East Breaks Exercise

Session 3

- Review of Previous Session
- DW Depositional Models - Channelized Systems



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- Exercise – Interpretation of a DW Channel

Session 4

- Review of Previous Session
- DW Channels in Cores, Wells and Seismic
- DW Channels in Outcrops – Facies and Internal Organization
- Channel System Mapping Exercise

Session 5

- Review of Previous Session
- DW Depositional Models – Mud-Rich Fan Systems
- Exercise – Danube Fan System

Session 6

- Review of Previous Session
- DW Depositional Models – Sand-Rich Fan Systems
- Exercise – Golo Fan
- Process Sedimentology of DW Systems

Session 7

- Review of Previous Session
- DW Lithofacies vs EOD – Examples from Cores and Outcrops
- Core Description of DW Reservoirs - Exercise

Session 8

- Continuation of Core Description Exercise
- Exercise Wrap Up and Discussion

Session 9

- Review of Previous Session
- High-Resolution Interpretation and Production Data Integration

Session 10

- Review of Previous Session
- Global Examples of DW Strat Traps - Trap Configuration and Risking
- Reservoir Presence Risking and Net:Gross Prediction



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