



D129: Hydrocarbon Habitat in Rift Basins (*Distance Learning*)

Tutor(s): Joe Lambiase

5 Days

Competence Level:
Skilled Application



Virtual Course



Computer Usage

Summary

Business Impact: Participants in this course will learn how the **tectonic** and **stratigraphic development** of rift basins controls **hydrocarbon formation and distribution** as the driver for **strategies to assess exploration potential** and improve **geological modelling**.

The course describes the sedimentology and stratigraphic evolution of rift-fill and post-rift successions in non-marine and marine settings, as a product of structural evolution, climate variation, and sea level change. These principles are applied to the acquisition and evaluation of exploration acreage and illustrated by worldwide case studies.

Learning Outcomes

Participants will learn how to:

1. Characterise rift basin types and tectonic regimes under which rift basins form and assess their probable structural evolution through pre-, syn- and post-rift stages of development.
2. Compare models of rift basin evolution and contrast these with a range of real rifts.
3. Assess sedimentary and stratigraphic features of rift basin fill.
4. Assess the role of both climatic and tectonic controls in determining rift basin fill, especially as it relates to the deposition of likely source, reservoir and seal formations.
5. Reconstruct likely sediment fairways based on the structural architecture of a given rift system and predict possible locations for source and reservoir facies.
6. Apply sequence stratigraphic principles and models to both marine and non-marine rift basins.
7. Appraise the petroleum systems in rifts and characterise both common and under-explored play concepts.

Duration and Training Method

This is a virtual classroom course divided into 10 three-hour webinar sessions (equivalent to a five-day classroom course), comprising lectures, discussions, case studies, and practical exercises to be completed by participants during and between sessions.

Who Should Attend

Geologists, sedimentologists, geophysicists, petrophysicists, and petroleum engineers involved with exploration in rift basins or looking to broaden and deepen their knowledge of rift systems.

Prerequisites and Linking Courses

There are no prerequisites but participants are assumed to have a basic knowledge of structural geology and sedimentology.

This course is complementary to other courses focusing on extensional tectonics and fault systems, such as N041 (Extensional Tectonics and Normal Fault Patterns, Utah), N144 (Rift Systems, Faulting and Fault-Controlled Sedimentary Architecture: Gulf of Corinth (Greece)), and N407 (Predicting Reservoir and



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Petroleum Systems in Rifts and Extensional Basins (New Mexico & Colorado, USA)).

Course Content

The focus of the course will be sedimentation and stratigraphic development in rift basins as a response to structural evolution. Sedimentary processes and products are discussed in detail as is their role in the generation and storage of hydrocarbons. A key component is a discussion of rift basin exploration plays and strategies for efficient acreage evaluation.

Course Introduction

- Format, content, aims and objectives of the course

Rift Tectonics and Structure

- Basin evolution
- Extension and trans-tension
- Inversion

Stratigraphy

- Syn-rift, post-rift and passive margin stratigraphic geometries
- Non-marine syn-rift successions
- Marine and mixed syn-rift successions

Controls on Sedimentation

- Tectonics versus climate
- Sediment sources and rift topography
- External versus internal drainage
- Local and basin-wide sediment sources and deposition
- Sedimentation versus subsidence rate

Sedimentary Processes and Facies Distribution

- Processes controlling the character of fluvial, alluvial fan, paludal, aeolian, shallow/evaporitic lake, deltaic, lacustrine, shoreline, turbidite, fan delta and carbonate sediments

Sequence Stratigraphy

- Application to marine and non-marine rifts
- Lake level/sediment supply linkage

Syn-Rift Stratigraphic Development

- Facies distribution



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- Tectonic and climatic influences

Marine Rifts

- Sea level and sediment supply
- Facies distribution and stratigraphic evolution

Post-Rift Successions

- Marine, nonmarine and mixed sag basins
- Tectonic and sea level controls
- Facies and stratigraphic development
- *Exercise: facies distribution and stratigraphy*

Source Rocks, Reservoirs and Seals

- Deposition of source, reservoir and seal facies
- Spatial distribution in rift basin successions

Petroleum Systems

- Source rocks and migration
- Reservoirs and seals
- Trap types

Hydrocarbon Habitat

- Reserve distribution in rift basins

Play Concepts and Exploration Strategy

- Proven plays: case studies worldwide
- Prospecting in rift basins
- Under-explored plays
- *Exercise: acreage evaluation*