



N393: Depositional Environments and Reservoir Development in Marginal Marine Settings: Reservoir Analogues from the Lusitanian Basin (Portugal)

Instructor(s): To Be Confirmed

3 Days	Competence Level: Skilled
	Field Course
	Classroom Elements

Summary

A field course analysing the distribution, architecture, internal characteristics, and reservoir quality of sandstone bodies from a wide range of predominantly Jurassic-Cretaceous age clastic depositional systems including fluvial, shoreface, estuarine and deep marine. Emphasis is on the spatial distribution of different depositional settings as controlled by the basinal framework associated with an active rift setting.

Learning Outcomes

Participants will learn to:

1. Interpret the sedimentology, stratigraphic architecture and reservoir potential of fluvial systems and wave/tide-dominated shorelines/shelves.
2. Analyse fluvial channel belts in terms of changing channel styles, net to gross variation and associated floodplain/overbank deposits.
3. Assess controls on the scale and distribution of sand bodies at outcrop and the nature of intrareservoir seals, permeability baffles and reservoir flow units in the bodies.
4. Assess interactions between rifting and sedimentation in an extensional passive margin setting.
5. Evaluate the response of the rift fill to structural inversion and its effect on sealing and trapping geometries.
6. Evaluate the use of geological data at different scales in building a robust depositional model for a clastic shoreline succession.

Duration and Training Method

This is a three-day field course to the central and southern part of the Lusitanian Basin comprising field examination of depositional systems at both seismic and, more commonly, sub-seismic, sandstone body scale. The proportion of field time to classroom time is approximately 90:10 and participants will learn via lectures, field-observations, exercises and group discussion.

Physical Demand

The physical demands for this class are LOW according to the Nautilus field course grading system. Outcrops comprise coastal cliff sections and wave cut platforms accessed via cliff tops paths to sandy beaches. The maximum walk on the class is 3 km (1.8 miles) along a sandy beach. Field transport will be by coach.

Who Should Attend

This course is designed for geoscientists who wish to gain an insight into the nature of a wide range of reservoir analogue sandbodies deposited in a variety of marginal marine/paralic settings.



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Prerequisites and Linking Courses

There are no specific prerequisite courses, but participants are expected to have an understanding of the basics of clastic sedimentology; this can be gained from attending NI55: Introduction to Clastic Depositional Systems: a Petroleum Perspective,

Course Content

Developed over the western part of the country and extending offshore, the Lusitanian Basin is the largest of Portugal's sedimentary basins. It comprises an area of some 22,000 km² with a maximum sediment thickness of some 6 km. The bulk of the sedimentary fill comprises Late Triassic to Cretaceous strata. The Lusitanian Basin formed during the opening of the North Atlantic Ocean and records two main episodes of extension and rifting, with two further rifting phases also present.

A series of transtensional basins opened along the Atlantic Margin during the Mesozoic, and those in Portugal (including the Lusitanian Basin) were subjected to compressional inversion during the Neogene. These sections illustrate the contrasting effects of strike-slip deformation, inversion tectonics and halokinetic diapirism, providing an opportunity to analyse the role of each in the preserved geology.

A thick continental succession seen in the north of the region at Baleal records the rapidly in-filled axial part of these rift basins during the late Jurassic. These successions include spectacular exposures of coastal plain systems ranging from braid-plains to meander belts, tide-influenced distributary channels and marginal marine mouth bars.

To the south at Santa Cruz is exposed the shallow marine syn-rift fill within a rift sub-basin. Exposures allow the group to explore how the evolution of the sub-basin and how salt movements may have influenced deposition and later deformation. The latter includes spectacular examples of tranpressional folding and the formation of cataclastic fracture systems.

Jurassic shallow marine deposits extend further along the coast at Praia Azul and display good examples of marginal marine to lagoonal facies, characterised by specific faunal communities.

Itinerary:

Day 0: Arrival and Introduction

- Arrival into Lisbon, Portugal
- Transfer to hotel followed by course introduction and field course safety briefing

Overnight: Peniche



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Day 1: Source rock and Jurassic fluvial deposystems

- Regional field introduction
- Baleal area: Jurassic fluvial channel belts; variable net to gross fluvial channels
- Peniche area: Regional source rocks, fan delta and carbonate basin margin

Overnight: Peniche

Day 2: Alluvial and tide-influenced deposystems

- Pai Mogo: Low net to gross fluvial succession with lacustrine muds
- Areia Branca: tidally-influenced river systems and mouthbar sandstones
- Praia Azul area: Transgressive coastal lagoon and fringing sands

Overnight: Peniche

Day 3: Shelfal and shoreface clastics

- Santa Cruz area: shelfal and shoreface clastics
- Course wrap up and transfer to Lisbon for flights home