



N494: Controls on Carbonate Depositional Systems and Reservoir Characterisation (*Oligo-Miocene - Apulia, Italy*)

Instructor(s): Michele Morsilli

5 Days	Competence Level: Foundation
 Field Course	
 Classroom Elements	
 LOW	Low Physical Demand

Summary

The southern Apulia Region hosts excellent outcrops of Upper Cretaceous, Eocene and Oligocene to Miocene carbonate rocks. The Oligo-Miocene systems illustrate variations in the dominant carbonate factories and platform morphology relating to changing environmental, physiographic, eustatic and tectonic conditions. The course will use a process-product based approach that examines temporal variation of carbonate production. This approach is an effective aid in the prediction of platform geometry and key reservoir heterogeneities, avoiding the direct use of surface analogues as facies models. In addition to the depositional systems represented, early and post-depositional diagenesis will be examined and the impact of this on porosity and permeability in reservoir settings will be discussed.

The key learnings from this course can be applied throughout the E&P life-cycle to better predict carbonate reservoir potential and conduct volumetric assessments with greater confidence.

Learning Outcomes

Participants will learn to:

1. Discuss the essential aspects of carbonate-producing biota, sediments, rocks and depositional facies and how these have evolved over geological time.
2. Review modern and ancient carbonate platform types and the controls on platform geometry.
3. Determine the controls on carbonate reservoir quality and relate these to original depositional facies, rock textures and diagenesis.
4. Analyse the textures, biota, facies and architecture of selected Oligo-Miocene carbonate systems in Apulia.
5. Assess the key controls on the dominant carbonate-producing biota in the Oligo-Miocene and hence location of the main carbonate factories.
6. Assess how the location of carbonate factories in the platforms studied affects platform geometry and reservoir architecture.
7. Apply the learnings from outcrop studies to subsurface carbonate systems to aid reservoir prediction.
8. Determine the likely impact that heterogeneities deriving from stratigraphy, diagenesis and structure might have on reservoir behaviour.

Duration and Training Method

A five-day field and classroom course, training will take place mostly in the field with supporting lectures covering fundamental aspects of carbonate rocks and specific aspects of the local geology. Exercises will be incorporated to consolidate field and classroom learning. The proportion of field to classroom time is approximately 80:20.

Physical Demand

The course is graded LOW on the Nautilus Training Alliance field grading system. Fieldwork is conducted



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primarily on coastal sections that are easily accessed by walking along easy trails, as well as at road-side stops. The longest walk is 2 km (1.2 miles) through scrub with 10 m elevation gain. Weather conditions are generally warm but rain and wind are possible. Transport will be by coach on paved roads.

Who Should Attend

This course is designed for geoscientists who wish to better understand how to characterise carbonate reservoirs. Attendance on this course would also benefit reservoir engineers and petrophysicists looking to broaden their knowledge on carbonate porosity distribution and how these impact hydrocarbon in-place volumes, as well as production behaviour.

Team leaders and managers working on carbonate assets can also benefit from attending this course.

Prerequisites and Linking Courses

There are no pre-requisites for the course although a familiarity with basic geological concepts and field methods would be an advantage. This course is complementary to other courses in the Nautilus Training Alliance Carbonates programme, including N059 (Carbonate systems and Facies Architecture: Exploration and Reservoir Implications (Mallorca & Menorca, Spain)).

Course Content

Day 0

Participants arrive in Brindisi and transfer by coach to the hotel in Otranto town (Lecce Province), approx. 1.30 hrs travel.

Day 1

Morning: Classroom - Introduction to the course. Safety briefing. Regional geology and setting. Carbonate rock components, textures and fabrics. Carbonate classification systems. Exercises on carbonate components and textures.

Afternoon: Fieldwork to examine Cretaceous basement and other Cenozoic platforms unconformably covered by Oligocene systems of Castro and Porto Badisco Limestones (Chattian).

Day 2

Morning: Fieldwork – The drowning of Porto Badisco Limestones and the Aturia Level, a Miocene condensed interval (lower Burdigalian-lower Messinian).

Afternoon: Fieldwork – The Upper Miocene (Messinian) reef complex: corals, halimeda and vermetids bioherms.

Day 3

Fieldwork – Facies types in the Castro Limestones inner ramp and distally steepened ramp.



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Day 4

Fieldwork - Facies types in the Porto Badisco Limestones: a transect from inner platform euphotic facies to mid ramp oligophotic facies.

Day 5

Morning: Fieldwork – Geology of Eocene (Priabona) Torre Specchialaguardia Limestone

Afternoon: Classroom – Review of Cenozoic carbonate systems and course summary.

Day 6

Depart for Brindisi airport and connections in Italy (Rome, Milan, Venice etc) and connecting international flights (Optional stop to visit the historic Lecce city en route to Brindisi airport).