
N575: From Sub-Seismic Faults to Rift Basins: Exploration, Appraisal, and Production Insights (*Gulf of Corinth, Greece*)

Instructor(s): Douglas Paton

Format and Duration

Field - 5 Days
Moderate Physical Demand

Summary

This course integrates field observations from the active rift system in the Gulf of Corinth directly with subsurface understanding and uncertainty across exploration, appraisal, and production workflows. Central to this is a consideration of the spatial and temporal evolution of normal faults and associated sedimentary systems, and how this is critical across the range of sub-seismic, reservoir, basin, and regional scales. Although the course is field based, it will draw heavily on sub-surface geophysical examples to unravel the 4D evolution of rift basins and provide insights into reservoir structural geology.

Business impact: The Gulf of Corinth is one of the **best exposed rift basins** globally and provides an exceptional setting in which to understand the **impact of structural geology on reservoir distribution, effectiveness, and compartmentalisation**.

Learning Outcomes

Participants will learn to:

1. Assess the tectonic setting and evolution of the Corinth Rift.
2. Evaluate the application of field observations to understanding uncertainty in sub-surface data sets at both sub-seismic and regional scales.
3. Characterise the geometry, kinematics, and evolution of an isolated normal fault and fault arrays.
4. Assess the role of sub-seismic faulting on compartmentalisation and segmentation.
5. Compare models for rifting and normal fault growth mechanisms, strain localisation, and the effects on rift basin and passive/transform margin development.
6. Apply field observations to interpret the evolution of a rift basin and its fill, applying this to sub-surface examples.

Training Method

This is a field course supported by classroom seminars and workshops in a ratio of 80:20 percent. Both 2D and 3D seismic data from other regions will be used for discussion on the application of observations and lessons from outcrops to exploration and production challenges in the subsurface.

Participants are encouraged to bring samples of problem data for group discussion.

Physical Demand

The physical demands for this field course are MODERATE according to the RPS field course grading system. There will be multiple walks of up to 1 km (0.5 miles) most days. The longest walk is approximately 3 km (1.5 miles) with an ascent (and descent) of 200 m (80 feet). The field area is at an elevation of approximately 300 m (1000 ft) and conditions are variable but likely to be warm in Autumn

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with a chance of showers. Transport will be by minicoach on paved roads.

Who Should Attend

This course is appropriate for both early-career and experienced geoscientists across the breadth of exploration, appraisal, and production roles. Participation would be equally useful to graduate geoscientists as to experienced practitioners/domain specialists in sedimentology, petrophysics, geophysics, reservoir and/or basin modelling, who are looking to develop a more integrated workflow approach.

The course can also be adapted for non-geoscientists to provide insights into hydrocarbon exploration and production in rift basins and passive/transform margins.

Prerequisites and Linking Courses

Participants should be familiar with basic interpretation methodology and at least college level structural geology.

Course Content

The key topics to be covered are:

- The importance of understanding structural geology from both a reservoir distribution and compartmentalisation perspective in exploration, appraisal, and production workflows.
- The geometry of isolated normal faults and impact on reservoir distribution.
- The role of fault linkage on modifying structural evolution and basin fill.
- The importance of differentiating cumulative versus instantaneous displacement on structural evolution and basin fill.
- The use of field observations from fault zone to rift basin scales to reduce uncertainty in sub-surface data interpretation.
- The evolution of a fault relay ramp and impact on segmentation and reservoir/source rock distribution.
- The impact of sub-seismic faulting on interpretation uncertainty and predicting cross-fault fluid flow.
- Construction of multi-scale cross sections to understand strain distribution, evolution, basin fill, and heat flow variability.

Itinerary

Day 0 – Arrival and Introduction

- Arrival into Athens and transfer to hotel
 - Evening HSSE briefing
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Demand

- Introduction to concepts, region, and application to sub-surface data

Day 1: Loutraki/Perachora Peninsula

- Regional and basin scale exploration of rift basins

Day 2: Achaea

- Stratigraphy and Structure of a single fault block

Day 3: Achaea

- Fault mapping and geometry
- Fault block interaction and influence on reservoir distribution

Day 4: Achaea

- Growth, linkage and death of normal faults

Day 5: Corinthia and Corinth Canal

- Reservoir scale structures
- Impact of structural geology on reservoir model build and production
- Drive to Athens

Day 6: Departure from Athens