



# N380: Seismic Interpretation Workshop: Play Recognition on Passive Margins

Instructor(s): Mark Thompson and Mike Mayall

5 Days

Competence Level:  
Skilled



Classroom Course

## Summary

The deepwater down to 2500 m and beyond has seen huge amounts of exploration activity over the last decade. In this course we will discuss the established deepwater petroleum provinces and we will also discuss emerging new provinces/plays. The emphasis will be on mega-regional seismic lines to understand the structural and trapping styles, the diversity of play systems and how they work. This course aims to teach explorers how to look for petroleum by understanding an outstanding analogue set of world class deepwater provinces, based on excellent quality margin-wide, long offset seismic lines.

## Learning Outcomes

Participants will learn to:

1. Recognise the full range of crustal structures that can underlie passive margins and the impact on hydrocarbon exploration.
2. Develop a systematic and rigorous workflow to evaluate the hydrocarbon potential of passive margins from regional seismic data.
3. Assess passive margin mega-sequences and the potential sources, seals and reservoirs within them.
4. Predict plays and play diversity on passive margins.
5. Evaluate the range of structural and stratigraphic trapping styles in proven plays and how to apply this knowledge to new basins.
6. Evaluate the regional context for new emerging plays.
7. Integrate knowledge of refraction and wide angle reflection seismic data and Deep Sea Drilling Project and Ocean Drilling Programme wells and how they affect evaluation of petroleum systems.
8. Understand the potential of applying descriptions and understanding of successful plays to other basins.

## Duration and Training Method

This is a five-day classroom course based principally around the interpretation of high quality, regional scale seismic data. The course will have a workshop format with the majority of time spent using and interpreting the data under the guidance of industry experts.

## Who Should Attend

The course is aimed at explorers with experience of seismic interpretation, having a sound understanding of other geoscience disciplines and how they impact petroleum systems and plays. The workshop format demands a high degree of commitment and involvement by participants, who are urged to bring to the course relevant material that can contribute to the discussion.

## Prerequisites and Linking Courses

A basic working knowledge of structural geology (as offered in N016/N116) and seismic interpretation (as offered in N085 or N040) is required as well as an understanding of deepwater processes and



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systems (N155 provides a broad introduction to clastic depositional systems). It should be noted however, that participants need not be specialists in any of these subjects.

Field class N295 (Structure and Evolution of a Passive Margin: Implications for Hydrocarbon Exploration, Western Alps, France) provides seismic scale outcrop analogues of the structures and sedimentary fill of a Tethyan passive margin via a transect through the Western Alps.

Related GTA classroom courses include N043 (Gulf of Mexico Petroleum Systems) and N217 (Seismic Imaging and Velocity Model-Building Techniques: Concepts, Examples and Pitfalls) which focuses on accurate subsurface imaging.

## Course Content

Tuition will comprise the interpretation of individual seismic lines from proven and emerging deep water petroleum provinces to identify the mega-sequences, predict plays and understand why each province is successful. The provinces will be tailored for individual needs and could include:

- N Slope Alaska to illustrate the work flow.
- Volcanic passive margins:
  - i. Faeroe-Shetland Basin (iSIMM)
  - ii. Namibia
- Exhumed mantle margins
  - i. Iberia-Newfoundland conjugates
- Gravity sliding/gravity spreading associated with large delta systems (circum-Africa and GOM):
  - i. Niger Delta (shale diapirism)
  - ii. GOM (salt- ponded mini-basins)
  - iii. Levant margin (distal part of the Nile system, covered by thick salt)
  - iv. Lower Congo Basin and Kwanza (salt)
- Stratigraphic plays from the equatorial margins of Africa and South America:
  - i. Deep water Tano Basin (Jubilee)
  - ii. French Guiana (Zaedyus)
  - iii. Sergipe Alagoas (submarine fans draping subtle outer high)
  - iv. Senegal (SNE and FAN discoveries)
- Carbonate margins:
  - i. Santos Basin (pre-salt carbonates)
  - ii. Adriatic (Croatia and Italy)
- Post trap modification
  - i. Westralia Basin, NW Australia (mostly clastics with carbonate cover) contrast Barrow/Dampier Exmouth with Timor JDA



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The seismic lines will be interspersed with selected modules that refresh the basic principles and will include the following topics:

- Latest views on the evolution and structure of passive margins especially of distal margins
- Structural styles and trap types
- Sequence and seismic stratigraphic analysis of clastic and carbonates, mega-sequence break-down and prediction of source, seal and reservoir
- Stratigraphic trapping geometries
- Importance of charge foci
- Use of refraction data, potential fields and importance of Deep Sea Drilling Project and Ocean Drilling Programme wells

We gratefully acknowledge the use of selected seismic to Spectrum Geo Ltd.

## Further Information

The course has received some excellent feedback from participants to date. Here are some selected quotes:

'Thoroughly enjoyed the course, like all the other Nautilus courses I have attended. What was different about this workshop was that sufficient time was given to the practical exercises & group discussions. This allowed Mike & Mark to reinforce the key themes. The course was excellent & good fun as a result.'

'Paper seismic sections were excellent! ...overall a very thought provoking, well run course with high quality material and tutors.'

'Great examples from different settings around the globe. Well chosen. Good to have local examples at the end. I thoroughly enjoyed the course, and the enthusiasm Mike & Mark brought to the room in a very down-to-earth attitude. Thanks!'