



# N160: Seismic Interpretation of Structural Styles: A Workshop for Petroleum Geoscientists

Instructor(s): Mark Cooper and Marian Warren

5 Days

Competence Level:  
Foundation



Classroom Course

## Summary

This course demonstrates the application of structural geology concepts to the interpretation of seismic data in a broad range of different structural regimes. The class has a workshop-style format and will consist of presentations and lectures interspersed with numerous seismic exercises. Participants may bring their own examples of interesting, or problematic, seismic data for discussion.

## Learning Outcomes

Participants will learn to:

1. Examine the basic mechanics and geometry of brittle and ductile rock deformation, and relationship of folding to faulting.
2. Employ fundamental concepts and techniques such as regional elevation, basic fault analysis techniques (e.g. displacement gradients) and simple restoration constraints in the interpretation of geological structures on seismic data.
3. Interpret the principal fold structures associated with contractional structural styles including fault propagation folds, fault bend folds and lateral ramp features.
4. Apply geometrical rules to the interpretation of restorable fold-thrust structures on seismic sections.
5. Distinguish common structural styles, normal fault geometries (planar versus listric) and growth strata patterns developed under extensional regimes.
6. Appraise the effects of extensional fault segmentation and linkage in 3D on sediment distribution patterns.
7. Analyse strike-slip faults and compare and contrast fault geometries and scales with extensional and contractional faults.
8. Interpret common structural styles generated by salt tectonics and recognize associated stratal geometries.
9. Interpret the geometric criteria for structural inversion.

## Duration and Training Method

A five-day classroom course consisting of lecture material that covers the fundamentals of structural interpretation at a seismic scale and the basics of the seismic method. The lectures support the practical examination of seismic data in a series of exercises covering the principal tectonic regimes and their structural styles.

## Who Should Attend

The course is aimed at geoscience professionals starting their career who wish to understand fundamental seismic interpretation in a structural context. Non-specialist geologists, geophysicists and G&G technologists who require an understanding of structural interpretation of seismic data will also benefit from attending this class.

## Prerequisites and Linking Courses

There are no formal prerequisites for this course, although a fundamental understanding of structural geology is desirable, and would be highly beneficial. For individuals new to structural geology, a useful



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course to take prior to attending N160 would be N138 (Structural Interpretation in Petroleum Exploration and Development).

N090 (Seismic Structural Styles Workshop) covers similar topics to N160, while field courses M016 (Structural Geology for Petroleum Exploration, Nevada, USA), N116 (Structural Geology for Petroleum Exploration, SW England, UK), N142 (Structure and Fault Systems in Hydrocarbon Exploration) each examine a broad range of structural styles at outcrop.

## Course Content

### Compressional Structural Regimes:

- 2D examples, 2D balancing exercise and interpretation exercises
- 3D examples and 3D correlation exercise
- Compressional seismic interpretation Workshop

### Hybrid Structural Regimes:

- In Space - Gravitationally driven systems balancing downdip compressional shortening with updip extension
- In Time - Tectonic Inversion, seismic interpretation exercises and the impact of inversion on the petroleum system

### Strike Slip Structural Regimes:

- Transtension, Transpression and reconciling map and seismic data

### Salt and mobile shale Structural Regimes:

- The basics of salt tectonics, application to shale diapirism and seismic interpretation exercises.

Seismic data interpretation and integration of well data for fault seal analysis

Final Seismic interpretation Workshop