



# N090: Seismic Structural Styles Workshop

Instructor(s): Gloria Eisenstadt

5 Days

Competence Level:  
Foundation



Classroom Course

## Summary

This hands-on workshop offers unique treatment of the subject of structural styles, including new concepts and advances in structural geology. It introduces the underlying conceptual and experimental models behind structural interpretation and then builds interpretation skills by applying the models to increasingly complex or poorly imaged seismic data. Topics include interpretation of extensional, compressional, strike-slip, inversion, gravity-driven systems, igneous events and salt and shale structures.

## Learning Outcomes

Participants will learn to:

1. Use structural analysis tools such as regional elevation, recognizing growth layers, fault-fold relationships, rigid body and internal deformation, recognizing detachments and ductile layers to constrain interpretations.
2. Demonstrate common pitfalls in structural interpretation.
3. Understand the impact of detachments and ductile layers on structural styles.
4. Explain the theoretical and empirical basis for structural models of extension, compression, strike-slip, inversion, salt and shale deformation.
5. Distinguish key differences in structural styles.
6. Apply lessons learned about structural styles to both good and poor data.
7. Apply the concepts of restoration and forward modelling and employ them in interpretation.
8. Analyze pre-existing structural interpretations.
9. Interpret gravity driven systems, along with intrusive and extrusive igneous events in seismic data.

## Duration and Training Method

This is a highly interactive and participatory five-day classroom course oriented towards problem solving rather than theory. It contains short lectures interspersed with seismic interpretations exercises, discussions, and experimental models. Participants are encouraged to bring samples of problem data for group discussion.

## Who Should Attend

This course is appropriate for both early-career and experienced geoscientists. They should be familiar with basic interpretation methodology at least college-level structural geology.

The course incorporates new ideas in structural geology and so will also benefit the more experienced interpreter who is working in a new structural regime or who desires a refresher course that covers recent developments in structural geology.

## Prerequisites and Linking Courses

There are no prerequisites for this course, however it is assumed that participants have a good grasp of basic structural geology and sedimentology principles and terminology and know the basics of seismic interpretation. The course will best suit geologists and geophysicists who have at least one year experience of interpreting seismic data and a basic understanding of geophysics and seismic



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interpretation. A good foundation for this class is N085 (Introduction to Seismic Interpretation).

Related Basic Application Level classes include: N005 (Tectonic Controls on Basin Development and Petroleum Systems) which focuses on integrating sedimentation with stratigraphic architecture and basin dynamics using modern and ancient examples; N138 (Structural Interpretation in Petroleum Exploration and Development) which describes the trap types encountered in various structural settings; N240 (Seismic Interpretation Workshop - Exploration to Early Field Development) in which participants work through the first half of a field's lifecycle. At Skilled Application level, N288 (Interpretation of Seismic Data in Structurally Complex Settings) addresses similar topics but is intended for experienced staff.

## Course Content

Classroom discussions focus on evaluating seismic data that deviate from idealized models and how and when to apply simple structural models. Exercises, physical models and lectures focus on how to best delineate structures, determine timing, and evaluate exploration risk.

### Basic Structural Tools

- Vertical Exaggeration
- Recognizing Ductile Layers and Detachments
- Packaging Tectonic-Lithic Events
- Translation and Rotation
- Introduction to Internal Deformation, Forward Modeling, and Restoration
- Regional Elevation
- Recognizing and Predicting Growth Layers

### Extensional Structures

### Compressional Structures

### Strike-Slip Structures

### Inversion Structures

### Salt Structures

### Shale Structures

### Linked Extensional and Compressional Systems

### Igneous Events