

N149: Practical Salt Tectonics

Instructor(s): Mark Rowan

Format and Duration

Classroom - 4 Days

Summary

This class provides a comprehensive overview of all aspects of global salt tectonics, covering content ranging from the depositional and tectonic settings of salt basins, mechanics, diapirism, structural styles of salt deformation, salt-sediment interaction and the impact of salt on the petroleum systems. The course comprises lectures and exercises involving interpretation of seismic data from basins around the world.

Business Impact: Geoscientists completing this class will help their companies to **identify, evaluate and risk** salt-related prospects; **build more accurate velocity models** in areas of tough seismic imaging; and **assess the results of appraisal wells** and plan development scenarios.

Learning Outcomes

Participants will learn to:

1. Summarise the nature of layered-evaporite basins and their tectonic settings.
2. Evaluate how salt impacts deformation in different tectonic environments including rift basins, passive margins and convergent-margin fold-and-thrust belts.
3. Describe how salt differs from other lithologies and what factors drive salt flow.
4. Characterise the ways in which differential loading, extension and contraction trigger salt flow and diapir growth.
5. Interpret typical salt and stratal geometries associated with salt evacuation and diapirism, welds, turtle structures and expulsion rollovers.
6. Predict how drape folding around passive diapirs impacts stratal geometries, faulting, and reservoir distribution in diapir-flank traps.
7. Evaluate the geometries that result from extension or shortening of pre-existing diapirs and minibasins.
8. Interpret salt structures on seismic data, while avoiding the pitfalls associated with complex salt bodies.
9. Assess the effect of salt on various aspects of the petroleum system, including reservoir presence and quality, hydrocarbon maturation and migration, and weld seal.

Training Method

This is a classroom course comprising lectures, discussion, and practical exercises.

Who Should Attend

Exploration and development geologists and geophysicists working in salt basins around the world. A basic working knowledge of structural geology and seismic interpretation is required.

Course Content

- Introduction

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- Salt basins
 - Layered evaporite sequences
 - Tectonic settings
- Exercise 1 – Salt and presalt, South Atlantic
- Mechanics
- Exercise 2 - Intrasalt deformation, North Sea and Santos Basin
- Extensional salt tectonics
 - Thin-skinned contraction
 - Diapir initiation and reactivation
 - Thick-skinned contraction
- Exercise 3 - Extensional Structures, Espiritu Santo Basin
- Contractual salt tectonics
 - Thin-skinned contraction
 - Diapir initiation and reactivation
 - Thick-skinned contraction
- Exercise 4 - Contractual structures, Espiritu Santo Basin
- Strike-slip salt tectonics
- Vertical salt tectonics
 - Differential loading
 - Expulsion-rollover and turtle structures
 - Passive diapirs
- Exercise 5 - Diapirs and minibasins, Nordkapp Basin
- Near-diapir deformation
- Salt dissolution
- Exercise 6 - Diapir flanks, Gulf of Mexico
- Allochthonous salt tectonics
 - Emplacement and advance
 - Salt-sheet styles
- Exercise 7 - Allochthonous salt, Gulf of Mexico
- Petroleum Systems Implications
 - Trap
 - Reservoir distribution and facies
 - Hydrocarbon maturation and migration
 - Seal
- Interpretation guidelines