Salt Tectonics of the Gulf of Mexico

Discipline: **Salt Tectonics, Structural Geology, Petroleum Systems**

Length: **3 days**

Instructor

Mark G. Rowan, PhD

Mark received a B.S. in biology from the California Institute of Technology in 1976, an M.S. in geology from the University of California, Berkeley, in 1982, and a Ph.D. in structural geology from the University of Colorado at Boulder in 1991. He worked for Sohio Petroleum Co. (1982 to 1985), Geo-Logic Systems (1985-1989), and Alastair Beach Associates in Glasgow, Scotland (1989-1992). He then returned to the University of Colorado as a Research Assistant Professor before founding his own company in 1998, where he consults and teaches for the petroleum industry worldwide and conducts research sponsored by industry.
Although Mark's background includes many types of tectonic environments, his primary research and consulting interests are focused on the styles and kinematics of salt tectonics, the processes of salt-sediment interaction, the architecture and evolution of passive margins, and the applications to petroleum exploration. He is the author or coauthor of over 80 papers and 170 abstracts, is the regular instructor for AAPG's Salt Tectonics school, and has been an AAPG Distinguished Lecturer and an AAPG International Distinguished Instructor.
has authored a number of patents. She is fluent in English, German, and Spanish, and proficient in French and Italian.

COURSE DESCRIPTION

This is a slightly condensed version of the 4-day salt course that focuses on the northern and southern Gulf of Mexico (GoM). It addresses the key fundamentals of salt tectonics but has an emphasis on the structural styles, evolution, salt-sediment interaction, and petroleum systems in both US and Mexican waters. Lecture material is supplemented with seismic-based exercises.

LEARNING OUTCOMES

After this course participants will be able to:
- understand the rift history of the GoM and its influence on salt distribution and tectonics
- describe the mechanics of salt flow and gravitational failure
- evaluate the linked systems of proximal extension and distal contraction in the GoM
- demonstrate how differential loading, extension, and contraction drive salt flow
- understand diapir rise and minibasin subsidence
- predict geometries and salt-sediment interaction in diapir-flank traps

- show how and why allochthonous salt is emplaced and subsequently evolves
- assess the role of allochthonous salt in gravitational failure of the GoM
- interpret seismic data while avoiding associated pitfalls due to complex salt bodies
- appraise the influence of salt on trap, reservoir, hydrocarbons, and seal

COURSE CONTENT

1. Salt basins
   1.1. Layered evaporite sequences
   1.2. Relationship between crustal rifting and salt deposition in the GoM

2. Fundamentals of salt tectonics
   2.1. Mechanics
   2.2. Gravitational failure
   2.3. Definitions

3. Extensional salt tectonics
   3.1. Thin-skinned extension
   3.2. Diapir initiation and reactivation
   3.3. Spatial and temporal distribution of extension in the GoM

4. Translational salt tectonics
   4.1. Deformation styles
   4.2. Distribution

5. Contractional salt tectonics
   5.1. Thin-skinned folds and thrusts
   5.2. Diapir initiation and reactivation
   5.3. Spatial and temporal distribution of contraction in the GoM

6. Strike-slip salt tectonics

7. Vertical salt tectonics
   7.1. Salt-evacuation structures and minibasins
   7.2. Passive diapirism
   7.3. Near-diapir deformation
   7.4. Dissolution

8. Allochthonous salt tectonics
   8.1. Initiation and advance
   8.2. Styles and evolution of salt sheets and canopies
   8.3. Drop-in basins, encased basins, and stacked levels

9. Salt and petroleum systems
   9.1. Trap
   9.2. Reservoir distribution and facies
   9.3. Hydrocarbon maturation and migration
   9.4. Seal