

N163: Salt Evolution and Coeval Sedimentation in the Paradox Basin (*Utah, USA*)

Instructor(s): Bruce Trudgill

Format and Duration

Field - 5 Days
Moderate Physical Demand

Summary

The focus of the course will be on the structural development of salt diapirs and salt walls superbly exposed within the Paradox Basin, and controls on stratigraphic sequences that develop in adjacent minibasins. Salt structure development occurred in a continental depositional environment and thus may be thought of as analogous to the southern North Sea. The course will visit salt structures in the Paradox Basin to examine associated deformation and sedimentary features including the evolution of continental minibasins. Comparisons with subsurface analogues will be made throughout the course, and field days are interspaced with appropriate classroom lectures and seismic interpretation exercises.

Learning Outcomes

Participants will learn to:

1. Evaluate the evolutionary models for basin subsidence and evaporite deposition in the northern Paradox Basin.
2. Compare different styles of salt geometry and contrast the activation mechanisms for salt evacuation, inflation and extrusion.
3. Formulate the depositional geometry, thickness and facies architecture of Carboniferous to Jurassic age stratigraphic sequences and propose how they have been controlled by salt wall growth.
4. Evaluate the influence of along-strike variability in salt wall geometry and how growth history influenced stratigraphic architecture.
5. Interpret evidence for surface exposure of evaporites within rim-syncline stratigraphic sequences.
6. Assess the effects of "Paradox-style" salt tectonics on the migration and trapping of hydrocarbons in regions where similar styles of salt tectonics operate (e.g., the Southern North Sea).

Training Method

A field course based in Moab, Utah with field observations and exercises, some classroom lectures and seismic interpretation exercises. The proportion of field to classroom time is approximately 80:20.

Physical Demand

The physical demands of this course are MODERATE according to the RPS field grading system. This is primarily due to the altitude (4,000-4,500 ft/ 1000-1200 m) and prevailing hot and dry conditions in the field area. There are 2 moderately strenuous hikes on this class of around 3 miles/4.8 km length (one is up a 15° slope with about 700 feet/240 m of elevation gain). The remainder of the field stops involve walking a few hundred yards/metres with little significant elevation gain.

Transport will be in SUVs on black-top and unpaved roads.

N163: Salt Evolution and Coeval Sedimentation in the Paradox Basin (*Utah, USA*)

Instructor(s): Bruce Trudgill

Format and Duration

Field - 5 Days
Moderate Physical Demand

Who Should Attend

The course is aimed at geologists and geophysicists who are actively engaged in exploration and development in salt provinces and those moving into salt basins. The class may be of particular value to those working in salt basins associated with continental deposition such as the southern North Sea.

Course Content

Day 0: Participants arrive in Grand Junction.

Day 1: Travel to Moab, Utah with an overview stop at Dead Horse Point en route: Paradox Basin evolution and seismic scale of the salt structures.

Day 2: (Morning) Intro to the salt geometry of the Moab-Spanish Valley salt wall structure: (Afternoon) Salt tectonics theory and diapirism along with seismic exercises.

Day 3: Field excursion along the northern Moab Valley salt wall looking at complex along strike facies variations and faulting associated with a plunging salt wall structure.

Day 4: Upheaval Dome: examination of the evidence for salt diapirism and welding, comparison with sub-surface pinched off salt diapirs.
Afternoon: Exercise.

Day 5: Castle Valley and the Onion Creek Salt diapir: examination of complex minibasin fill in the Triassic, salt-sediment interface geometry, minibasin development associated with the Onion Creek salt diapir, internal diapir deformation.
Return to Grand Junction.

Day 6: Participants Fly Home.