N669: Continental and Shallow Marine Depositional Environments Sampler *(Utah, USA)*

Instructor(s): Anton Wroblewski

Format and Duration

Field - 5 Days
Moderate Physical Demand

Summary

This course provides hands-on experience with a variety of clastic reservoir body types in diverse climatic, depositional, and accommodation regimes. These provide calibration points for accurate facies and reservoir models and allow for more targeted exploration, appraisal, and development wells, ultimately increasing reservoir production potential and overall profitability. Participants will learn how climate, tectonism (including diapirism), and sea level interact to drive sand delivery to sedimentary basins. Geomorphology, stratigraphy, and sedimentology are linked through the use of outcrop, core images, and log data to provide insights into three-dimensional subsurface interpretations.

Learning Outcomes

Participants will learn to:

1. Identify aeolian, fluvial, lacustrine, deltaic, sabkha, tidal inlet, shoreface, and shelf deposits based on grain size profile, sedimentary structures, and ichnofossils in a variety of climatic and accommodation regimes.
2. Predict sedimentary heterogeneity and reservoir architecture in a variety of continental and shallow marine reservoir bodies in seasonal/dry and humid climate settings and high and low accommodation basins, including salt mini-basins.
3. Predict reservoir properties of fluvial and shallow marine geobodies away from well bore and beyond seismic resolution by using first principle observations and appropriate modern and ancient analogs.
4. Construct depositional environment maps calibrated by appropriate modern and ancient analogs.
5. Evaluate potentially significant stratal surfaces and constrain local to regional-scale sequence stratigraphic reconstructions.

Training Method

This is a field course, supported by classroom sessions in a 70:30 ratio. Classroom sessions will comprise presentations, case studies, exercises, and reviews of the fieldwork.

Physical Demand

The physical demands for this class are MODERATE according to the Nautilus Training Alliance field course grading system. The class is on rocky, inclined surfaces in Utah. Weather can be cool and damp or hot and dry, depending on the time of year. The longest walk on the class is less than 4 km (2.5 miles) with an elevation gain of 250 m (800 ft). Most days are spent in open areas, with little shade from the sun. Insects may be prevalent.

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Who Should Attend

Exploration and production staff working fluvial and shallow marine environments, including integrated asset teams of geologists, geophysicists, and reservoir, petroleum, geothermal, and CCS engineers.

Course Content

Day 0:

- Participants travel to Salt Lake City, UT.
- Evening lecture on course content and introduction to local and regional geological context, implications for potential analogs, natural history, and wildlife.

Day 1: Fluvial and Lacustrine Deposits in Seasonal and Humid, Rapidly Subsiding Basin.

- Lacustrine deposits and lake basin types (Green River Fm)
- Single storey channel body in seasonal floodplain (Colton Fm)
- Amalgamated fluvial sand and critically evaluating fluvial sequence stratigraphic reconstructions (Type section Castlegate SS).
- Parasequence overview and controls on basinward sand delivery (Helper Water Tower)

Day 2: Wave, Tide, and Fluvial Influences on Deltaic Deposits in a Humid, Rapidly Subsiding Basin.

- Aberdeen road cut (upper shoreface through fluvial deposits)
- Panther Tongue at Gentile Wash (River Dominated)
- Delta parasequences Ferron Fm (Mixed Processes)
- Woodside Overview of sandy parasequences and Lunch
- Wave-dominated parasequences and tidal inlet at Woodside

Day 3: High Accommodation, Humid Rivers and Offshore Sand Bodies.

- Mud-prone channel fill in the Aberdeen prodelta.
- Incised valley or distributary channel? Castlegate in Tusher Canyon
- Offshore sandy body and multiple working hypotheses at Hatch Mesa
- Sego Canyon Pictographs

Day 4: Fluvial, Paralic, and Eolian Deposits in a Seasonal/Dry, Slowly Subsiding Basin

- Exhumed, 3D fluvial channel bodies, Cedar Mountain Fm (Green River, UT)
- Shallow marine, sabkha, and eolian deposits of the Jurassic Carmel, Summerville, and Entrada Fms (San Rafael Swell margin)
- Eolian deposits (Navajo SS in Buckhorn Draw)
- Overview of Basin Scale Shallow Marine to Eolian and Fluvial Transition (Spotted Wolf Cnyn and

Capitol Reef View Areas).

Day 5: Low Accommodation, Seasonal to Dryland Fluvial and Eolian Systems

- Eolian Deposits (Arches Visitor Center)
- Amalgamated, Dryland Fluvial Channel System and transition to eolian (Kayenta and Navajo Fms, Poison Spider Trail)
- Salt-influenced fluvial deposits and crayfish burrows in Chinle Fm
- Optional evening hike out to Delicate Arch - 5 km (3.2 mi) round trip
- Final trip review and banquet

Day 6:

- Drive to Grand Junction, CO, depart.