

N450: Clastic Reservoir Characterization: The Importance of Recent Sand Models to Aid Subsurface Interpretations

Format and Duration
Classroom - 3 Days

Instructor(s): Larry Meckel

Summary

This course will examine virtually every clastic reservoir you will ever explore for or develop, from basin margin alluvial fans to deep water units in the basin. For each reservoir type we will use Holocene core and log data to model depositional processes, facies variation and geometries. The models will be applied to outstanding outcrops and then to subsurface analogs via logs, field-trap examples and seismic signatures.

Learning Outcomes

1. Describe the depositional processes that produce each reservoir type.
2. Recognize the depositional record of each type in cores, outcrops, and logs, so as to be able to identify them in the subsurface.
3. Identify the typical geometries and lateral facies variation for each type.
4. Understand how these characteristics provide the depositional model for each reservoir type.
5. Describe the common and acceptable variations for each model.
6. Recognize these reservoir types in some of the best outcrops in the world.
7. Apply this information to subsurface examples using logs, seismic, and examples of trap types.

Training Method

This is a classroom course comprising lectures illustrated by core, log and seismic data.

Who Should Attend

This course is designed to provide an understanding of the size, scale and variability of clastic reservoirs, and so is suitable for geologists assigned to describe the reservoirs, geophysicists working to map them and to engineers developing and producing them.

Prerequisites and Linking Courses

This basic level course provides a solid foundation to clastic reservoirs. For carbonate reservoirs, consider N020 (Carbonate Depositional Systems: Reservoir Sedimentology and Diagenesis). Further understanding of clastics may be found in N251 (Well Log Sequence Stratigraphy: Application to Exploration and Production) and N305 (Core Facies Analysis for Conventional and Resource Plays). For more advanced treatment, consider any of the NTA field courses on clastic environments.

Course Content

We will develop models for, and show examples of, over 20 reservoir types, from alluvial fans at the margin of the basin to a variety of deep water units out in the basin. For each reservoir type, we will look at complete logs and cores through Holocene (modern) examples to document (1) the depositional processes, (2) the typical geometries, and (3) the facies context (i.e. the lateral seals). We will then apply these models, first to outstanding outcrops and then to the subsurface via logs, field-trap examples, and

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finally typical seismic signatures.

- Introduction
 - Clastics have had 2 paradigm shifts:
 - The tie to logs ('50s –'60s)
 - The tie to seismic ('70s)
 - What is the recent (Holocene)
- Alluvial fans
- Aeolian
- Channels
 - General
 - Straight
 - Meandering
 - Braided
 - Incised valleys
 - Estuaries
- Bars
 - General
 - Coastal regressive
 - Transgressive
 - Shallow marine (shelf sands)
- Deltas
 - Some observations about deltas
 - River dominated
 - Wave dominated
 - Tide dominated
 - Unstable, typically lowstand shelf margin deltas
- Deep water reservoirs
 - Depositional processes
 - Ramp systems
 - Submarine canyons
 - Submarine fans
 - Contourites
- Summary