

Carbonate Reservoir Sedimentology

Fall, 2024 in Calgary, AB, Canada. Dates to be set by June 1, 2024.

Objective: to provide an overview of Carbonate Sedimentology and Stratigraphy, focusing on factors that impact the characterization of reservoirs for carbon capture and sequestration, extraction of fossil fuel and energy minerals, and water resources.

Syllabus:

- 1) Introduction to Carbonates
- 2) Carbonate Sedimentology, Components, and Rocks
- 3) Carbonate Depositional Systems and Environments of Deposition
- 4) Carbonate Stratigraphy and Sequence Stratigraphy
 - a. Comparative sedimentology
 - b. Shallowing-upward successions
 - c. Building cycle sets and more
- 5) Carbonate Diagenesis
- 6) Non-Matrix Porosity and Effects on Fluid Flow
- 7) Imaging Carbonate reservoirs
 - a. Carbonate Scorecard and Carbonate Atlas
- 8) Carbonates Through time
 - a. Paleogene -Neogene Carbonate reservoirs
 - b. Mesozoic Carbonate Reservoirs
 - c. Paleozoic Carbonate Reservoirs
- 9) Describing Carbonate Core

Description:

This 5-day course reviews the basics of carbonate sedimentology and stratigraphy. It starts with an introduction of the components that make up carbonate rocks and the depositional environments where these rocks are created. This is followed by a review of stratigraphy using comparative sedimentology concepts. From here, stratigraphy continues by building a shallowing-upward succession and exploring what that means laterally. We continue by building cycle sets and larger bundles to understand what vertical successions are trying to tell us. The next topic changes focus by providing a basis for understanding the pore network. Diagenesis begins almost immediately and impacts the quantity and shape of pores found in carbonate rocks. The second half of the course starts with a review of non-matrix porosity and its unique impact on fluid flow, followed by a section on imaging of carbonate systems. We explore the nuances of the stratigraphic architecture and seismic characterization of carbonate rocks. Then, carbonate systems through time are discussed. The evolution of organisms through time has a significant impact on the type of carbonate systems that develop, as do climate influences, eustatic sea-level changes and paleo-oceanic chemistry. The final day includes a brief overview on how to describe carbonate core followed by hands-on experience in applying those newly discovered skills.

Instructors:

Rob Forkner - Rob earned his PhD in Geology from the University of Texas at Austin in 2007, studying cyclostratigraphy in the Dolomite Alps under Bob Goldhammer. Rob has worked for several multinational companies, including Maersk Olie og Gas (Copenhagen, DK), Shell carbonate production research (Rijswijk, NL), and Statoil/Equinor North American Exploration Research (Austin, Texas, USA). Currently, Rob works with Blackdiamond Exploration LLC as a consulting geologist, geochemist, and data scientist.

Jean Hsieh - Jean received her B.Sc. (1987) in Geology from Carleton University in Ottawa, Canada, and her PhD (1997) in Geology from the California Institute of Technology. In 1999, Jean joined Texaco which became Chevron the following year. In 2011, she began as a carbonate sedimentologist with Talisman Energy Inc. which was subsequently acquired by Repsol in 2015. She is currently working with Sedimentary Geology Consultants as a consulting geologist. During her 20+ years in industry, she has provided stratigraphic support for exploration and production projects in west Texas, West Africa, Kazakhstan, Turkey, Ukraine, Turkmenistan, the Middle East, and Southeast Asia. Her interests lie in carbonate stratigraphy and diagenesis, particularly the ability to predict the spatial distribution of different geobodies by integrating geological, geochemical, and geophysical data and visualizing this through 3-D geocellular models.

Cost: The fee for this course is \$1500 USD per person with a minimum of 8 attendees. Please contact us for a discounted fee if there are more than 3 people attending from the same company.

The fee includes:

- Coffee, lunch and snacks during breaks
- Course notes as a handout. Digital version will be available if desired.
- Hand lens for core description.

The fee does **not** include travel to the course location in Calgary, AB, Canada, Hotel costs if necessary, nor breakfasts or dinners.

Refund Policy

A full refund will be given upon receipt of written cancellation one month prior to the course. No refunds will be given after that, but substitutions are allowed.

Late enrollment less than 1 month before the course will incur a late fee of \$100 USD and will only be available if there is space.

For more information or to register for this seminar, please contact Jean Hsieh at 403-819-0913 or jean.hsieh@sedimentarygeology.com .