

Advanced Carbonate Reservoir Geology and Diagenesis Training Course

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Overview

Advanced Carbonate Reservoir Geology and Diagenesis Training Course is a one-week course for geoscience and subsurface teams who leave with a Carbonate Reservoir Depositional, Diagenetic and Quality Interpretation File. Participants connect carbonate depositional systems, diagenetic history, pore-system interpretation, reservoir quality prediction, and carbonate rock typing across core, petrography, logs, seismic context, and analogs. Agile Leaders Training Center presents carbonate reservoir geology and diagenesis.

Who Should Attend

- Geoscience functions responsible for carbonate facies, stratigraphy, and depositional interpretation
- Core and laboratory functions responsible for description, petrography, pore systems, and rock properties
- Petrophysical functions responsible for integrating core, image, and log evidence
- Geomodelling functions responsible for rock types, facies architecture, and property frameworks
- Subsurface functions responsible for reservoir quality, uncertainty, well placement, and development decisions
- Exploration functions responsible for analog selection, play evaluation, and geological risk

The course assumes participants interpret geological, core, log, or reservoir data at work, and it leaves out basic sedimentology, clastic-only systems, detailed log processing, dynamic simulation, well stimulation, and software instruction.

Departments and Industries

The course supports departments and industries that characterize carbonate rocks and subsurface uncertainty.

- Oil and gas exploration and field development
- Reservoir characterization and geomodelling
- Core analysis, petrography, and geoscience laboratories
- Geophysical interpretation and petrophysical integration
- Subsurface consulting and technical assurance
- Geothermal and subsurface-storage characterization

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Learning Objectives

By the end of this course, participants will be able to:

- Analyze carbonate factories, classifications, and depositional settings
- Build facies and sequence-stratigraphic architecture
- Evaluate diagenetic pathways and pore-system evolution
- Use core, petrography, log, and seismic-context evidence
- Compare rock-typing and reservoir-quality prediction methods
- Prioritize geological scenarios and static-model uncertainty

Course Agenda

Day 1: Classify Carbonates and Depositional Settings

- Carbonate Factory, Grain, Mud, and Skeletal Component Inventory
- Dunham and Folk Carbonate Classification Comparison Sheet
- Platform, Shelf, Ramp, Basin, and Margin Setting Matrix
- Reef, Buildup, Shoal, Lagoon, Tidal-Flat, and Slope Facies Atlas
- Shallow- and Deep-Water Carbonate Depositional Model

Day 2: Build Facies and Stratigraphic Architecture

- Core Description, Texture, Fabric, Fossil, and Sedimentary-Structure Log
- Facies Association and Depositional-Process Interpretation Table
- Accommodation, Relative Sea-Level, and Carbonate Sequence Framework
- Stacking Pattern, Cycle, Surface, and Correlation Panel
- Outcrop, Core, Log, and Seismic-Scale Analog Transfer Checklist

Day 3: Reconstruct Diagenesis and Pore Evolution

- Marine, Meteoric, Burial, and Hydrothermal Diagenetic Environment Map
- Cementation, Compaction, Dissolution, and Recrystallization Paragenetic Chart
- Dolomitization, Evaporite Replacement, and Sulfate Emplacement Model
- Karst, Stylolite, Vug, Fracture, and Breccia Feature Register
- Porosity, Permeability, Connectivity, and Pore-Fabric Evolution Path

Day 4: Predict Reservoir Quality and Rock Types

- Thin-Section, Core-Analysis, Image-Log, and Conventional-Log Integration Matrix
- Depositional Facies versus Diagenetic Overprint Diagnostic Grid
- Carbonate Pore-Type, Rock-Fabric, and Flow-Unit Classification Sheet
- Reservoir Quality Sweet-Spot and Baffle Prediction Map
- Conceptual Geological Model, Scenario, and Uncertainty Register

Day 5: Practice Carbonate Interpretation

- Suggested Exercise: Classify Carbonate Textures and Depositional Facies
- Suggested Exercise: Correlate Cycles and Build a Facies Architecture
- Suggested Exercise: Sequence Diagenetic Events and Pore-System Changes
- Suggested Exercise: Compare Rock Types and Reservoir-Quality Scenarios
- Capstone Exercise: Complete the Carbonate Reservoir Depositional, Diagenetic and Quality Interpretation File

Practical Exercises

The course uses suggested activities to turn multiscale carbonate observations into traceable geological interpretations.

- Suggested activity: classify core and thin-section descriptions and place facies within ramp, platform, reef, shoal, lagoon, or slope settings.
- Suggested activity: correlate cycles, surfaces, and stacking patterns while recording alternative stratigraphic scenarios.
- Suggested activity: build a paragenetic sequence linking cementation, dissolution, dolomitization, compaction, karst, and fracturing to pore changes.
- Suggested activity: integrate core, petrography, logs, analogs, and seismic context into rock types, quality predictions, and uncertainty actions.

FAQs

Who suits carbonate reservoir geology and diagenesis training, and what does it assume?

Carbonate reservoir geology and diagenesis training suits geologists, sedimentologists, petrophysicists, geomodellers, geophysicists, core analysts, and subsurface engineers. It assumes experience interpreting geological, core, log, or reservoir evidence.

How does carbonate reservoir geology differ from clastic sedimentology training?

Carbonate reservoir geology emphasizes biologically and chemically produced sediments, carbonate factories, platform architecture, early alteration, complex pore fabrics, and diagenetic overprints. Clastic sedimentology centers on transported siliciclastic grains, provenance, and different depositional controls.

Why does diagenesis matter for carbonate reservoir quality?

Diagenesis can destroy, preserve, create, or reconnect pore space through cementation, compaction, dissolution, dolomitization, recrystallization, karst, and fracturing. Its geometry may cross depositional boundaries and alter flow-unit continuity.

How are carbonate reservoir rock types built?

Carbonate reservoir rock types combine depositional texture, pore type, diagenetic fabric, porosity, permeability, connectivity, capillary behavior, and log response into units that support geological and flow interpretation.

What evidence supports carbonate reservoir quality prediction?

Carbonate reservoir quality prediction uses core description, petrography, mineralogy, core analysis, image and conventional logs, stratigraphic position, diagenetic history, seismic context, analogs, and explicit uncertainty scenarios.

Conclusion

Participants take back a Carbonate Reservoir Depositional, Diagenetic and Quality Interpretation File linking facies, architecture, paragenesis, pore systems, rock types, quality predictions, and uncertainty. It changes separate observations into a traceable geological interpretation. The file supports correlation, static modelling, reservoir characterization, well decisions, and development assurance.

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