CARBONATE DIAGENESIS AND EVOLUTION OF RESERVOIR QUALITY

Jeffrey J. Dravis PhD
Dravis Interests, Inc., Houston, Texas USA

PRIVATE VERSION ONLY AVAILBLE: ONLINE OR IN-PERSON

INTRODUCTION

Diagenesis strongly influences reservoir quality in limestones and dolostones and is one of the critical controls on the development of subsurface carbonate plays. As such, its influence must be factored into the risking of prospects or development of existing reservoirs. Determining the relative timing of carbonate diagenesis and effective porosity evolution (early, near-surface versus deeper-burial) often reveals where diagenetic fluids come from, aiding exploitation of porous trends in the subsurface.

Newer petrographical and geochemical techniques now permit more effective unraveling of the role diagenesis plays in modifying carbonate reservoir quality, thus enhancing the prediction of porosity trends in the subsurface. For example, the simple white paper technique developed by this instructor often detects relict grains and diagenetic fabrics in massive dolostones where such fabrics were invisible with older popular petrographic techniques. This allows porosity to be related to depositional facies, aiding mapping of porosity trends, and helps establish the timing of secondary porosity in these dolostones.

Carbonate diagenesis also often impacts seismic and wireline log response by modifying a rock's petrophysical attributes. Thus, any earth scientist (geologist, geophysicist, reservoir engineer, log analyst) involved in the evaluation of carbonate, or mixed carbonate and siliciclastic, sequences should be aware of the varying styles of carbonate diagenesis and the potential pathways for porosity and permeability evolution.

This seminar is designed to provide each participant with a thorough introduction to carbonate diagenesis as it relates to the evolution of porosity and permeability. Procedures and guidelines for resolving diagenetic problems are presented and common misconceptions about carbonate diagenesis and porosity evolution are also addressed. Reviews of both exploration and development geology case studies , for both limestones and dolostones, demonstrate how diagenesis can make or break a carbonate play.

SEMINAR FORMAT

The seminar is a blend of lectures and case studies. It is very much an applied carbonate seminar. The seminar notebook provides written summaries and bibliographies for most topics discussed, as well as copies (in color) of the power point slides shown in the lectures. Each participant receives digital copies of key bibliographies and published papers by Dravis related to topics discussed in the seminar.

CARBONATE DIAGENESIS AND EVOLUTION OF RESERVOIR QUALITY

DAY 1

8:30 Introduction

9:15 Carbonate Constituents and Textural Relationships

10:15 Coffee Break

10:30 Classification of Carbonate Porosity

11:00 Tools for Evaluating Carbonate Diagenesis and Porosity Evolution

12:00 Lunch

1:00 Introduction to Carbonate Geochemistry

2:15 Coffee Break

2:30 Limestone Diagenesis: Processes, Products, Controls; Porosity Evolution Within the Context of Diagenetic Environments

3:30 Break

3:45 Limestone Diagenesis: Processes, Products, Controls; Porosity Evolution Within the Context of Diagenetic Environments (Continued)

5:00 Adjourn

CARBONATE DIAGENESIS AND EVOLUTION OF RESERVOIR QUALITY

DAY 2

8:30 Dolomitization: Models, Controls, Pathways for the Evolution of Porosity and Permeability

9:30 Coffee Break

9:45 Dolomitization: Pathways for the Evolution of Porosity and Permeability (Continued)

10:45 Break

11:00 Influence of Carbonate Diagenesis on Well Log Petrophysics and Seismic Response

12:00 Lunch

1:00 Limestone and Dolostone Case Studies: Applications of Carbonate Diagenesis

2:00 Coffee Break

2:15 Limestone and Dolostone Case Studies: Applications of Carbonate Diagenesis (Continued)

3:30 Break

3:45 Limestone and Dolostone Case Studies: Applications of Carbonate Diagenesis (Continued)

5:00 Adjourn

NOTE: Contact Jeff Dravis at jdravi@rice.edu or 713-819-4444 for pricing.
This seminar can be given online using a Zoom format, or delivered in-person at a company's office.