

# Carbonate and Fracture Petrophysics - A Roadmap

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[www.petrophysics.net](http://www.petrophysics.net)

## WHO SHOULD ATTEND?

All Petrophysicists, Wellsite Geologists, Operations Geologists, Carbonate or Fracture Reservoir Geologists or Engineers and Core Analysts. Anyone involved with the formation evaluation of Carbonates, Fractured or 'Complex' reservoirs or who use their petrophysical results for reserves or reservoir simulation. Basic petrophysical principles and log analysis are reviewed, however a years experience in formation evaluation is desirable.

## YOU WILL LEARN

- The physical differences between carbonates and clastics and their data response implications
- Why low porosities, extreme pores, fractures & oil wetness occur in carbonates and how to recognize & treat them
- The essential ingredients and process of a successful Carbonate & Fracture evaluation compared to Clastics
- Why well tests (DSTs) are often misleading in fractured reservoirs and what critical other data you must have
- The importance of drilling, mudlogs, cores, capillary pressures, well tests and other data
- The key **Failure Entry Points** which must be identified and healed to achieve cost-effective data acquisition
- Variable cementation exponents (m) and how to recognize, treat and evaluate them
- Key features of a Carbonate & Fracture quicklook log evaluation
- Common pit falls of Carbonate & Fracture petrophysical studies and how to avoid them
- How to perform a **complete, systematic, integrated evaluation of a carbonate or fractured reservoir**
- How to integrate carbonate capillary pressures with routine core & logs in a carefully explained workshop
- How a Non-Petrophysicist can quickly asses if Carbonate or Fracture raw data and results are 'Fit for Purpose'

## ABOUT THE COURSE

[CFP slide example](#)

[Testimonials](#)

This course represents **The Complete Carbonate & Fracture Evaluation Recipe**, from **Quick Look** log analysis to Full Petrophysical Integration. The course explains how drilling logs, LWD, conventional and special wireline, routine core, SCAL, MDT and well tests can all be logically fitted together. **This course establishes a robust template for the optimal data acquisition, integration and evaluation of complex reservoirs and a secure basis for ongoing decisions.**

The same petrophysical principles apply to all reservoirs but a clastics style log analysis can be completely misleading in carbonates or fractured reservoirs. Here, petrophysics is dominated by forces unfamiliar to the clastics geoscientist, including diverse pore-geometries and the absence of total porosity and clays as basic controls on reservoir quality. **This requires the petrophysicist to think hard** if petrophysical results are to provide a secure basis for decisions.

A wide variety of examples from shallow, permeable carbonates to tight fractured carbonates and basement are employed to demonstrate the often severe shortcomings of conventional approaches. The physical differences between clastics and Carbonates & Fractures are contrasted and explained in the context of attempting to achieve answers from conventional logs. The Failure Entry Points which result are highlighted and juxtaposed with Deakin's purpose designed "Recipe" for these reservoirs. First, physical characteristics are translated into petrophysical uncertainties then the Drill-Core-Log-Test acquisition and integration process, specifically designed to address them, is systematically worked through. All theory is interleaved with actual examples, micro-practicals and work sessions to consolidate the principles under discussion. A powerful carbonates theory/workshop to derive and integrate capillary-pressure Sw's with core and logged resistivity concludes the course. Mudlogs, routine core and SCAL, conventional logs, ECS, NMR, Sigma & C:O logs, Sonic scanner, Image logs and MDTs are briefly explained and logically assembled into an exhaustive "petrophysical recipe" for geo-modeling inputs and reserves. **This course provides a new found confidence and much needed systematic process for staff faced with the daunting prospect of managing complex reservoirs.**

This course is "**Think Petrophysics!**" for 5 straight days.

## COURSE CONTENT

[Detailed contents](#)

(Public courses 5 days. Tailored In-House 3 or 5days)

- The Physical Characteristics of Carbonate & Fractures. How and why they differ from Clastics
- Carbonate classifications systems vs. Lucia's "rock fabric" approach and application.
- Fractured reservoir classification: Aquilera
- The Impact of Physical Character on reservoir measurements: drilling, cores, logs, pressures, tests
- Total porosity plus Clays vs. Total porosity plus Pore geometry - What to do
- Achieving cost effective data acquisition
- Misleading data: Logs: gr, rhob, sonic, low Rt, high Rt; NMR; RCA; Well tests; Other
- Useful Data: A comprehensive list of cheap data you have but have not yet used effectively
- Powerful Data! A comprehensive list of powerful data which overcomes or circumvents ALL C&F evaluation problems
- Will your data acquisition program provide Fit-For-Purpose geo.model inputs?
- Achieving Quick Look Fit-For-Purpose results: porosity, vugs, m, multiple Sw's, adaptive k, FWL
- Quick Look Fracture Identification, FIL

### - The Complete Carbonate & Fracture Evaluation Recipe

PPL's innovative and exhaustive process of *sequential data integration* to evaluate any Carbonate and Fractured reservoir. Not a passive, rambling discussion of problems and tool theory but a detailed and passionately expounded, streamlined plan of action. Deakin's "Recipe" exploits the latest hi-tech logs, LWD, mudlogs, cores and tests to reach a definitive set of results.

- The Recipe: Principles, Basic Questions, Source Data and Information Flow
- Multistream m solutions, PetroDB, Analogs, Pulsed neutron (Sigma) logs, Dielectric logs; Capillary pressure Sw, Oil mud core Sw, NMR porosity, Sw, kbrine, Coates equation; Sonic Scanner Stoneley k, Stress and implied fracture sets
- The key to using data and equations more intelligently in difficult reservoirs - Understanding redundancy & hierarchy
- Checklists for logging and petrophysical results prior to their use in reserves or simulation
- Geo.modeling cautions
- Evaluation spreadsheet templates
- **100+ Key Equations in MS Excel ready format!**
- Daily Morning Recaps; Review of Key Themes; Final Course Recap; Key Recommendations
- Geolog real-time demos of key petrophysical procedures. Vendor movies
- Checklists for Non-Petrophysicists, Micro-practicals, Workshops, 30years Experience, Stimulating debate!

## THE INSTRUCTOR

[CV](#)

Dr Mark Deakin is an experienced and innovative mainstream petrophysical consultant, author and [enthusiastic tutor](#) in petrophysics. He holds a Ph.D. in 'Integrated Petrophysics' from London's Imperial College, is an ex Amoco petrophysicist, and has 25 years experience, including 12 as a lecturer, independent consultant and Director of his own consulting company. He has performed over 40 detailed reservoir studies, primarily in Southeast Asia's difficult carbonates and stacked 'low-contrast-pay' reservoirs. Deakin chooses to work frequently in operations to keep abreast of new LWD, coring and wireline technology. His holistic approach is to bring each field's development uncertainties into sharp focus and then systematically reduce them by a cost-benefit ranked plan of action. Innovative integration and clear, practical recommendations typically result in improved simulation and increased reserves, at low cost. Soon after his petrophysics PhD Deakin authored **the first public petrophysical data integration course**. He has continually evolved and chaired this and other courses, publicly and in-house, for eight years through OGCI, HOT and independently. Deakin is a long standing member of the SPWLA.

*PS: If you love petrophysics you will love this course!*

**REGISTER NOW!** [www.petrophysics.net/register.htm](http://www.petrophysics.net/register.htm)