

## Reservoir Quality Analysis of Sandstone & Carbonate Rock Types

*Kuala Lumpur (Malaysia)*

*21 - 25 October 2024*

UK Traininig

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# Reservoir Quality Analysis of Sandstone & Carbonate Rock Types

Code: OG28 From: 21 - 25 October 2024 City: Kuala Lumpur (Malaysia) Fees: 4400 Pound

## Introduction

This Blackbird training course is aimed at giving oil industry geologists a detailed introduction to the study of sandstone and carbonate rock-types in terms of reservoir quality. Reservoir quality analysis permits to identify the main depositional, provenance and diagenetic controls on the evolution of the poro-perm characteristics of sandstone and carbonate reservoirs e.g. evolution of porosity vs. burial depth, mineralogical content and diagenetic environments. Examples from sandstone and carbonate oil/gas reservoirs i.e. current East & West Africa basins are also taken into consideration.

## Course Objectives of Reservoir Quality Analysis of Sandstone & Carbonate Rock Types

- Understand what are the different types of sandstone hydrocarbon reservoirs and their main controls on reservoir quality
- Understand what are the different types of carbonate reservoirs and their main controls on reservoir quality
- Be able to differentiate depositional, provenance and diagenetic markers of analysed sandstones and carbonates
- Be able to integrate and interpret poro-perm data vs. stratigraphy and regional geology e.g. well correlations
- Understand the main rock-based methodologies of analysis applied to reservoir quality studies
- Be conversant with the concepts of Rock typing and petrophysical comparison of cuttings and core samples

## Reservoir Quality Analysis of Sandstone & Carbonate Rock Types Course Outlines

### Day 1

#### Introduction to Siliciclastic Reservoirs

- Siliciclastic rocks, sediment texture, detrital components
- Sandstone classification, minerals and source areas, depositional markers
- Sandstone composition, provenance, and tectonic settings
- Grain size analysis and digital image analysis
- Depositional environments, provenance, and reservoir quality
- Definition of matrix and pseudo-matrix
- Compaction and authigenic components
- Diagenesis of siliciclastic rocks, diagenetic environments & sequences
- Concepts of SEM, EDAX and XRD analyses, chronology of diagenesis
- Concepts of CL analysis on the distribution of quartz cement

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## Day 2

### Reservoir Quality Analysis of Sandstone Rock-Types

- Reservoir quality definition and methods of work
- Cementation and reservoir quality
- Porosity types in sandstones
- Porosity-permeability analysis and interpretation, cuttings TS descriptions/analysis tied to wireline logs
- Estimating subsurface reservoir quality from outcrop samples
- Rock Typing, petrophysical assessment of cuttings, rock typing analysis of cuttings petro-types
- Rock Typing classification schemes as from oil industry methodologies
- Rock Typing and reservoir quality
- Diagenetic controls on reservoir quality and porosity variation with depth & stratigraphy

## Day 3

### Introduction to Carbonate Reservoirs

- Introduction of carbonate reservoirs
- Components of limestones, carbonate depositional environments and facies, calcite vs. aragonite seas in the geological record
- Matrix and authigenic components, taxa vs. mineralogy, classification of limestones
- Rates of carbonate production, microfossils, paleoenvironmental markers, carbonate platform facies, carbonates and sea level changes, regional carbonate petrography vs. stratigraphy
- Carbonate diagenesis: Neomorphism, compaction, marine diagenesis, meteoric diagenesis, burial diagenesis
- Diagenetic markers, carbonate diagenetic stages
- Dolomite textures and stable isotope signatures

## Day 4

### Reservoir Quality Analysis of Carbonate Rock-Types

- Carbonate diagenesis and reservoir quality, dolomite texture vs. petrophysics, dolomitization models, limestone vs. dolostone reservoir quality
- Porosity in carbonate rocks, classification schemes, petrophysics by carbonate rock-types, porosity preservation, visual estimation of porosity vs. point count porosity
- Controls on reservoir quality, rock fabric and wireline logs, porosity evolution vs. geological time
- Carbonate reservoir models and reservoir quality, porosity vs. petro-facies
- Rock typing concepts, petrophysical assessment of cuttings, rock typing classification schemes, Rock typing datasheets, rock typing and reservoir quality
- Emphasis on single well or multi-well studies, with regional reservoir quality correlations

## Day 5

### Examples of Siliciclastic and Carbonate Reservoirs and Practical Work

- Cretaceous siliciclastic reservoirs from north, east and west Africa
- Italian carbonate reservoirs, Angolan Pre-Salt Pre-Aptian reservoirs, Kenyan carbonates, Indonesian carbonate reservoirs, New Zealand carbonate reservoirs, Oman reservoirs
- Practical session in polarizing microscopy on: Texture, composition, diagenesis, porosity, and reservoir quality of siliciclastic and carbonate rocks-types
- Visual estimation of sandstone and carbonate porosity. Porosity of core samples point count porosity and point count porosity vs. CA data



- Differences in the controls on reservoir quality between sandstones and carbonates
- SEM/EDX/XRD images and plots
- References on petrography/petrophysics/reservoir quality for self-training sessions





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