Integrated Formation Evaluation in Clastic and Carbonate Reservoirs

INTRODUCTION

- This training course provides the participants with an advanced understanding of the integrated formation evaluation techniques and well log analysis applications. This Integrated Formation Evaluation in Clastic and Carbonate Reservoirs training course will cover the physical principles of the logging tools and the full advanced interpretation workflow for reservoir characterization.
- More specifically, by the end of this training course, the participants will understand the properties of the rocks and the reservoir fluids; analyse and integrate the core analysis datasets; evaluate the NMR logs and run the full NMR interpretation workflow; run pressure plots and detect the free water level / oil water contact and run saturation height modeling.
- This Integrated Formation Evaluation in Clastic and Carbonate Reservoirs training course will cover the advanced log interpretation workflow with the quantitative techniques for the quality control and quality assurance procedures for the raw datasets. Different real examples from different parts of the world will be used throughout the training course to help the attendees understanding the reservoir characterization concept and the integrated analysis in either clastic or carbonate reservoirs.

This training course will highlight:

- Conventional tools principles and their applications in log interpretation
- Logs QC / QA, depth matching, splicing and logs normalisation
- Core data analysis and Integration with conventional and advanced E-Logs
- NMR tool principles / interpretation and saturation height modeling
- Advanced reservoir characterization including facies and permeability modeling
- Practical training examples using different wells in different reservoir types

OBJECTIVES

By the end of this training course, participants will learn the following:

- Tools' theories and tools' petrophysical applications
- Running complete petrophysical interpretation for clastic reservoirs
- Integration of the core analysis with conventional / advanced logs workflows
- Generating reservoir electrofacies and permeability modelling
- Reservoir fluid and pore volume characterization

TRAINING METHODOLOGY

- This training course will utilise a variety of examples to ensure an in-depth learning and understanding for the advanced petrophysical evaluation techniques. The daily training course sessions will be highly interactive and participative. This involves regular discussions of applications as well as hands-on exercises that will be solved manually and/or using Microsoft Excel.
- This training course will be delivered through a power point presentation. Each attendee will need a laptop for the practical examples. The participants will have access to the printed training course materials and the examples they will have access to during the training course. Challenging well logs examples will be used from different countries in the world to help the participants understand the full workflow in details.

ORGANISATIONAL IMPACT

- This training course will help the participants enrich their knowledge in reservoir characterization and log interpretation.

  By the end of this training course, the participants will have covered the following:

- Understanding the role of advanced reservoir characterization in fields' assessment
- Gain knowledge on the advanced formation evaluation techniques and workflows
- QC and QA for the log analysis outputs before the integration in the static and dynamic modeling
- Using the NMR data for reservoir fluid characterization and integration with the well test results
- Complete petrophysical evaluation for new blocks and frontier areas (Exploration petrophysics)

PERSONAL IMPACT

- The participants will gain extensive knowledge for the advanced formation evaluation techniques. They will be fully capable of running advanced petrophysical workflows, NMR interpretation, saturation height modeling, and facies and permeability modeling. This training course will enrich the participants knowledge in core data statistics, core dataset analysis, detecting the reservoirs nature and variations, and how to integrate the core data with the conventional and advanced logs.

WHO SHOULD ATTEND?

- Petrophysicists / Log Analysts
- Geologists
- Reservoir Engineers
- Geophysicists
- Geomodellers

Course Outline

Introduction to Logging Tools and Formation Evaluation

- Lithology tools
- Porosity tools
- Resistivity tools
- Invasion profile
- Difference between clastic and carbonate reservoirs
- Reservoir geosteering and reservoir development

Petrophysical Evaluation

- Logs QC/QA, depth matching, splicing, log normalization
- Using crossplots to detect lithology, porosity and mineralogy
- Shale volume calculation
- Porosity evaluation in clean and shaly formations
- Water resistivity calculation
- Saturation calculation in clean and shaly reservoirs
- Determining the cementation factor and saturation exponent from the core analysis
- Running petrophysical analysis in clastics and carbonates
- Petrophysical analysis in highly deviated and horizontal wells

Core Analysis

- Core data analysis
- Core data statistics; Detecting the reservoir heterogeneity
- Rock quality index and flow zone indicator
- Different facies models
- Reservoir electrofacies and permeability modeling
- Actual core data for advanced reservoir evaluation
- Core integration with wireline and LWD logs
- Exploration and development petrophysics

Nuclear Magnetic Resonance

- NMR tools' theory
- Understanding the NMR log
- Advanced NMR applications
- NMR interpretation workflow
- NMR integration with well testing
- NMR core integration
- NMR interpretation integration with conventional logs

Saturation Height Modeling

- Capillary pressure concept
- Facies variations from the capillary pressure curves
- Reservoir pressure analysis
- Understanding the concept of the oil water contact and free water level
- Saturation height modeling
- Saturation height modeling in clastics and carbonate reservoirs