

Resistivity Methods and Applications for Petrophysicists

Summary

This course teaches the fundamentals and multiple applications of resistivity and dielectric logs used in the discovery and development of oil and gas fields. The instructors lead the class with a description of the multiple resistivity sensors used in logging, including their operating principle and limitations: Induction and Laterolog sensors, Logging While Drilling arrays, micro-resistivity and electrical imaging sensors, and dielectric instruments. The instructors then focus on the applications of interest to geoscientists, and particularly to petrophysicists. They describe in great detail important applications in unconventional resources, in navigation for horizontal wells, and evaluation of laminated reservoirs among others.

Expectations

Participants should leave the class with a good understanding of resistivity logs principles and their applications. Resistivity is perhaps the most important parameter in formation evaluation. It can be, however, a challenging entity to measure and to interpret. Geoscientists attending this training course will learn about the different types of resistivity logging sensors and how to select them depending on the environment and requirements. Specific sensors are designed for oil base mud, others for salt saturated mud. The course will explain the approach for evaluating finely laminated reservoirs or low salinity formations. The geoscientists will be also exposed to the application of some specialized resistivity sensors to reservoir navigation.

Topic Outline

1. Resistivity and Dielectric Sensors Overview
 - a. Induction vs. Laterolog; Wireline vs LWD; Microresistivity
 - b. Electrical Imaging
2. Electrical Anisotropy
 - a. Laminated Reservoirs; Shale-Sand Sequences
 - b. Micro vs Macro Anisotropy
3. Dielectric Logging
 - a. Fundamental Principles and Applications
 - b. Dielectric Logging in Unconventional Resources
4. High Angle, Horizontal Wells; Geosteering with Resistivity
 - a. Resistivity Logs in High Angle Wells
 - b. Tilted Coils; Azimuthal Resistivity
 - c. Geosteering with Micro-Imaging
 - d. Deep and Ultradeep Arrays

Lab Exercises

No

Who Should Attend ?

The course is primarily aimed for geoscientists and more particularly petrophysicists, and for reservoir engineers who use logs in the conduct of their projects.

Prerequisites

A basic understanding of log based formation evaluation is required.

Teaching Methods

The lectures will include fundamental theory and multiple applications based on real-life examples.

Duration 1 day

1. one full day virtual lecture, for a total of 6.5 hours. 8:00a -3:00p

- Complete course: April 16th, 2024

Are handouts provided? (optional)

Yes PDF (large selection of slides)

Instructor(s) Photo

Course Instructor Bio(s)



Roland Chemali has over 50 years' experience in Resistivity Logging and Petrophysics. He started his career at Schlumberger Doll Research where he co-developed resistivity sensors and studied electrical rock properties. He then joined Gearhart Industries, Halliburton, and Baker Hughes where he managed the development of more advanced wireline and LWD sensors and new petrophysical methods. He was also a Petrophysics Consultant at Occidental Petroleum. He is currently Technology Consultant at Well ID. Roland Chemali has received the SPWLA Technical Achievement Award in 1997. He was SPE Distinguished Lecturer in 2011 and Halliburton Technology Fellow. He has co-authored over 70 patents and publications.



Hanming Wang joined Chevron ETC in 2008. Beginning his oil-career in 1992, he worked at China Petroleum University as an assistant professor. He was a summer intern with ExxonMobil Upstream Research Company in 1997 and Schlumberger Sugar Land Product Center in 1998. From 1999 to 2008, he was a scientist of Schlumberger Sugar Land Product Center. He holds a BS degree in Physics from Zhejiang Normal University of China, MS degree in earth science from China Petroleum University, and PhD in electrical engineering from the University of Houston. He is an adjunct professor of University of Houston and was the recipient of the SPWLA Distinguished Technical Achievement Award in 2014. He has co-authored over 70 patents and publications. Hanming Wang was recently appointed Chevron Technology Fellow. He is the recipient of the 2023 SPWLA Gold Medal Award.

