CARBONATE RESERVOIR CHARACTERISATION AND MODELLING FOR THE ENERGY TRANSITION (RES62)

Level: Skill / Advanced

Instructor: Sebastian Geiger

This interdisciplinary course integrates modern reservoir modelling and reservoir engineering concepts to address and overcome the key challenges encountered when creating meaningful static and dynamic reservoir models of (fractured) carbonate reservoirs across a range of subsurface reservoir applications that support the transition to a sustainable low-carbon energy future.

DESIGNED FOR YOU, IF YOU ARE...

- A geomodeller, reservoir engineer or petrophysicist working on (fractured) carbonate reservoirs, wishing to build a strong foundation in characterising and modelling these complex reservoirs, specifically in the context of the energy transition.

HOW WE BUILD YOUR CONFIDENCE

- Discuss how and why carbonate reservoirs matter for the energy transition
- Examine how oil and gas expertise for carbonate reservoirs can be applied to other subsurface applications such as CCUS and geothermal energy
- By using case studies, you will review the challenges and best practices when characterising and modelling (fractured) carbonate reservoirs
- Discussions of the integration of core and log data for creating robust reservoir rock-typing approaches for carbonates
- It will be explained how fractures can be detected and incorporated in static and dynamic reservoir models
- Modern reservoir modelling approaches for carbonate reservoirs will be introduced, that allow us to capture their multi-porosity nature (not specific to certain software packages)
- You will understand how uncertainties in carbonate reservoir modelling can be quantified using static and dynamic data, and how these data can be used for model calibration

THE BENEFITS FROM ATTENDING

By the end of this course, you will feel confident in your understanding of:

- Why carbonate reservoirs are important for the energy transition
- Integrating core and log data for reservoir rock-typing in carbonates

- Detecting, characterising and modelling fractures in carbonates
- State-of-the-art carbonate reservoir modelling approaches and best practices
- Quantifying uncertainties in carbonate reservoir modelling

TOPICS

- The role of carbonate reservoirs in the energy transition (e.g., geothermal energy or CCUS)
- Heat and mass transfer in (fractured) carbonate reservoirs
- Petrophysics for carbonate reservoirs
- Reservoir rock-typing for carbonates
- Detecting, characterising and modelling fractures
- Multi-scale and multi-porosity reservoir modelling and upscaling
- Model ranking and clustering using static and dynamic data
- Uncertainty quantification for carbonate reservoir modelling

FEEDBACK

"The course is delivered with extensive coverage of both static and dynamic aspects." - Lead Reservoir Engineer at Trident Energy

"I liked the integrated nature of the course material which combined the different disciplines." - Reservoir Engineer at Trident Energy

"Up to date and recent methods were shown on the course. Lots of papers were referenced with interesting aspects." - Lead Geologist at Trident Energy

INSTRUCTOR:

Sebastian Geiger is Professor for Sustainable Geoenergy at Delft University of Technology. Previously he was Director of Research for the School of Energy, Geoscience, Infrastructure and Society at Heriot-Watt University and Director of the Institute of GeoEnergy Engineering at Heriot-Watt University. He spent time as a visiting researcher at the Australia National University, Imperial College London, and Aramco Research Centre in Houston, and was a post-doctoral researcher at ETH Zurich. Sebastian's research interests include the characterization, modelling, and simulation of naturally fractured (carbonate) reservoirs across all scales, with applications to hydrocarbon production, CCUS, and geothermal energy. He has authored or co-authored more than 190 technical papers and edited one book.

Sebastian holds a Ph.D. degree in Computational Geology from ETH Zurich and an M.Sc. degree in Hydrogeology from Oregon State University. He is a member of EAGE, SPE, and Interpore Society.

Sebastian received the 2017 Alfred Wegener Award from the EAGE for his pioneering research into carbonate reservoir modelling and simulation. He was elected as a Fellow of the Energy Institute in 2019 and as a Fellow of the Royal Society of Edinburgh, Scotland's Academy for Sciences and Letters, in 2020.