Laboratory Geomechanics Measurements for Hydrocarbon Exploration and Production

Two four-hour sessions: 13:00-17:00 UTC, 19-20 June 2021
M.T. Myers, L. Hathon. A. Simone, S. Govindarajan, E. Van Oort, D. Gokaraju, A Mitra
MetaRocks Laboratories and University of Houston
Cost: $250

SUMMARY

Starting from reaching to target depth without non-productive time till well abandonment, principles of geomechanics have been used in hydrocarbon exploration and production frequently and with much success in past decades. For geoscientists or reservoir engineers, typical workflow involves extracting critical information from seismic and/or wireline logs to build models representing subsurface. However, the information obtained this way needs to be calibrated against ground-truth data because of resolution issues faced by the datasets, as subsurface rock material is heterogenous and contains small scale features due to the depositional and diagenetic history. This short course aims to familiarize the audience with principles of geomechanics and evolution of geomechanics over timescale and to explain the concept of rock compressibility and anisotropy and the relation of geomechanics to reservoir description. This is followed by an introduction of laboratory geomechanics workflow and equipment, an overview of designing a geomechanics test program, and an introduction of laboratory geomechanics solution relevant to various oilfield unit operations using experimental data. Topics of discussion include stability of shale during drilling and its impact on well abandonment. Additionally, the topics of wellbore stability, hydraulic fracturing, and sanding are discussed. As a final step, a glimpse of recent developments in lab geomechanics is offered along with a virtual lab tour.

PROPOSED COURSE OUTLINE

Section 1: Introduction

- Introduction to Laboratory Geomechanics
- Principles of Geomechanics
- Geomechanics in laboratory, production and geologic time scale
- Geomechanics and rock fabric – compressibility and anisotropy
- Geomechanics and Reservoir Description

Section 2: Laboratory Geomechanics

- Geomechanics Workflow and Equipment, test program design and standard test offerings
- 1D Geomechanics Model Development

Section 3: Application

- Shale stability
- Wellbore Stability
- Hydraulic Fracturing
- Sand production
- CO_2 Sequestration and EOR

Section 4: Conclusion

- Recent Developments in Laboratory Geomechanics
- Virtual Lab Tour