Geophysical Research Abstracts
Vol. 20, EGU2018-9, 2018
EGU General Assembly 2018

Absolute permeability simulation in carbonate samples using textures of Micro Computed Tomography images

Mohamed Jouini (1), Ali Al-Sumaiti (1,2), Moussa Tembely (1), and Khurshed Rahimov (1)

(1) Khalifa University of Science and Technology, Khalifa University of Science and Technology, Mathematics, Abu Dhabi, United Arab Emirates (mjouini@pi.ac.ae), (2) ADNOC Upstream Abu Dhabi, United Arab Emirates

Carbonate reservoirs represent around half hydrocarbon reserves in the world. However, characterizing rock properties in these reservoirs is highly challenging because of rock heterogeneity revealed at several length scales. In the last two decades, a new approach known as Digital Rock Physics (DRP) revealed high potential to better understand rock properties behavior at pore scale. This approach uses 3D X-ray Micro tomography images to characterize pore network and also simulate rock properties from these images. Even though, DRP is able to predict realistic rock properties results in sandstone reservoirs it is still suffering from a lack of clear workflow in carbonate rocks. The main challenge is the integration of properties simulated at different scales in order to obtain the effective rock property of core plugs. In this paper, we propose an approach to characterize absolute permeability in some carbonate core plugs samples using textures of Micro-computed tomography images and multi-scale numerical simulation. We propose to segment 3D micro-CT image in terms of textures and predict the overall rock permeability by integrating classification result with absolute permeability simulations values computed locally for each texture class. Finally, we discuss and compare our numerical simulation results with experimental measurements from the laboratory.