Contribution ID: **245**   Type: **Poster Presentation**

Permeability Contribution Estimation of Different Pore Structures in the Heterogeneous Porous Media Using Image-Based Rock Typing

Wednesday, 24 May 2023 16:10 (1h 30m)

Quantitatively estimating the permeability contribution of different pore structures in a heterogeneous porous medium plays a crucial role in assessing the influence of some diagenesis such as intragranular erosion and clay cement on the reservoir permeability. This study proposes an effective method to estimate the permeability contribution of a specific pore structure in a heterogeneous rock sample via six steps. First, the image-based rock typing is implemented to classify a multiscale pore structure into different rock types where each rock type presents a homogeneous pore structure, using the random forest algorithm. Second, the 3D model of the macropore structure and every micropore structure is reconstructed applying the MPS method. Third, the permeability of each reconstructed 3D micropore structure is calculated using LBM, and the corresponding permeability REV of this structure is estimated. Four, an upscaling process is carried out to divide the reconstructed 3D macropore structure into many cells whose length is determined by the maximum permeability REV of the micropore structures. Five, the permeability of every cell of the coarse grid is calculated by LBM except some cells that are randomly selected as micropore structures whose permeability is assigned directly according to their rock types. Finally, the permeability contribution of each micropore structure is evaluated by comparing the permeability calculated before and after assuming the target micropore structure is impermeable. The result shows that the permeability contribution of a micropore structure varies significantly according to its permeability, content, spatial distribution, and the permeability of the macropore structure.

Participation

In-Person

References

MDPI Energies Student Poster Award

No, do not submit my presenation for the student posters award.

Country

Saudi Arabia

Acceptance of the Terms & Conditions

Click here to agree

Energy Transition Focused Abstracts

Primary author: Dr WANG, Yuzhu (Department of Petroleum Engineering, CPG, King Fahd University of Petroleum and Minerals, Dhahran, 31261, Saudi Arabia)

Presenter: Dr WANG, Yuzhu (Department of Petroleum Engineering, CPG, King Fahd University of Petroleum and Minerals, Dhahran, 31261, Saudi Arabia)

Session Classification: Poster

Track Classification: (MS09) Pore-scale modelling