Contribution ID: **425** Type: **Poster Presentation**

Modeling digital twins of grain-based reservoir rocks

Thursday, 2 June 2022 15:15 (1h 10m)

The key to accelerate research and production in the energy industry resides in the efficient and generally applicable determination of physical properties of reservoir rocks. Here, we present recent advancements in the generation of statistical digital twins of reservoir rocks, in a workflow that may commonly be applied to any grain-based sample. Digital twins and the modeling of reservoir rocks have become an increasingly powerful tool in numerical simulations applied to digital core analysis in recent years. Indeed, the digital twins of reservoir rocks can be used for further non-destructive digital measurements, reducing costs and resource usage.
Here, we generate digital models of reservoir rocks in a voxel-based geometry at dimensions of at least 1000^3 voxels, with the aim of precisely and accurately replicating the rock and the pore geometry. The generated digital twin is then ready for further applications in the range of digital core analysis since the physical parameters of the original rock sample are represented with fidelity in the modeled digital twin.
This approach is validated via analysis, modeling, and property prediction on the basis of a digital rock core sample. We determine the grain-size distribution of a 3D geometry obtained from the scanned images of a Doddington sandstone and subsequently, generate a statistical 3D digital twin of the rock structure. The absolute permeability is computed and compared for both 3D geometries and validates the approach within sufficient accuracy. We thereby demonstrate the applicability of this workflow to further reservoir rocks by means of a high performance approach.

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References

Andrew, M., Bijeljic, B., and Blunt, M., "Doddington Sandstone." Digital Rocks Portal, Digital Rocks Portal, 30 April 2020, http://www.digitalrocksportal.org/projects/290 Accessed 27 Dec. 2021.
Andrew, M., Bijeljic, B., and Blunt, M.J., Pore-scale imaging of trapped supercritical carbon dioxide in sandstones and carbonates. International Journal of Greenhouse Gas Control. 2014

Time Block Preference

Time Block A (09:00-12:00 CET)

Participation

Unsure

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