

Pore-scale characterization of Norwegian Continental Shelf Reservoir based on Digital Rock Simulation

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Abstract. In OMV a digitalization and innovation campaign, the so called DigitUP initiative, has been kicked off to transform our business and to take it to the next technology level. The project “Digital Rock Simulation” is part of the OMV Upstream digitalization roadmap. The main goal of the project is to provide multiple realizations of reservoir properties at the pore scale efficient in time to speed up project decisions. Therefore, OMV’s Petrophysics department aims to design fit-for-purpose workflows for different types of reservoirs in OMV’s portfolio. The focus of the project is to simulate petrophysical and displacement properties, which are needed for static and dynamic modelling.

Furthermore, in close collaboration with the Petroleum Engineering Department of the Montanuniversität Leoben (MUL) advanced simulation concepts will be developed to optimize OMV’s reservoir characterization also for enhanced recovery methods.

The first pilot project is an offshore gas-bearing sandstone reservoir with high porosity (ca. 20 – 30 %) and permeabilities above 1000 mD. Some parts of the reservoir are also of medium-to-lower quality (porosity < 15% and permeability < 100 mD). Five core samples – representatives of the variation in rock quality – have been selected and where scanned at MUL by means of laboratory- and synchrotron-based micro computed tomography. The first results have been already simulated in the past weeks and a comparison to experimental results on basic parameters show good agreement, such as porosity, permeability and capillary pressure.

The focus for the upcoming phase of the project will be to look into comparison of different simulation approaches (direct computation vs. pore network model), more complex reservoirs (e.g. carbonates) and test different approaches for upscaling.