

RM14

Building High Resolution Microblock-models to Model Upscaling Behaviour of Heterogenous Carbonates

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SUMMARY

Proper sampling of plugs and upscaling are key steps in generating reservoir models. At core scale many carbonate reservoir rocks exhibit extreme variations in permeability which can frequently not be captured by conventional core plugging. Whole core studies, which investigate the dynamic behaviour at core scale are costly and time extensive. We present a set of 3D microblock models at decimeter scale, which aim to represent the full heterogeneity of carbonate reservoir rocks. The textures range from highly irregular algal mudstones through clast supported wacke- packstones to bioturbated mudstones. The structure of the depositional sedimentary elements at this resolution were mapped in cores and translated into the micromodels using various geostatistic techniques. In example multipoint geostatistics was used to model complex shapes like floating coral debris. Permeability was measured every centimeter using a minipermeameter. The core material was then plugged at centimeter scale and porosity was measured at the generated mini-plugs. The properties were mapped, geostatistically evaluated and simulated using a 3D modeling package. Applying conventional flow simulators in lab mode we study the two-phase flow behaviour of the modeled reservoir rocks and compare to analytical upscaling predictions. We can show how flow is dominated by high permeability streaks at core scale and can simulate under which conditions such behaviour is preserved at reservoir cell scale.

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