

The Use of X-Ray Computed Microtomography in Petroleum Geology: A Case Study of Unconventional Reservoir Rocks in Poland

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Abstract : High-resolution X-ray computed microtomography (μ CT) is a non-destructive technique commonly used to determine the internal structure of reservoir rock sample. This study concerns μ CT analysis of Silurian and Ordovician shales and mudstones from a borehole in the Baltic Basin, north of Poland. The spatial resolution of the μ CT images obtained was 27 μ m, which enabled the authors to create accurate 3-D visualizations and to calculate the ratio of pores and fractures volume to the total sample volume. A total of 1024 μ CT slices were used to create a 3-D volume of sample structure geometry. These μ CT slices were processed to obtain a clearly visible image and the volume ratio. A copper X-ray source filter was used to reduce image artifacts. Due to accurate technical settings of μ CT it was possible to obtain high-resolution 3-D μ CT images of low X-ray transparency samples. The presented results confirm the utility of μ CT implementations in geoscience and show that μ CT has still promising applications for reservoir exploration and characterization.

Keywords : fractures, material density, pores, structure

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