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High-resolution X-ray computed microtomography use in geology – a case study of Baltic Basin unconventional reservoir rocks

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

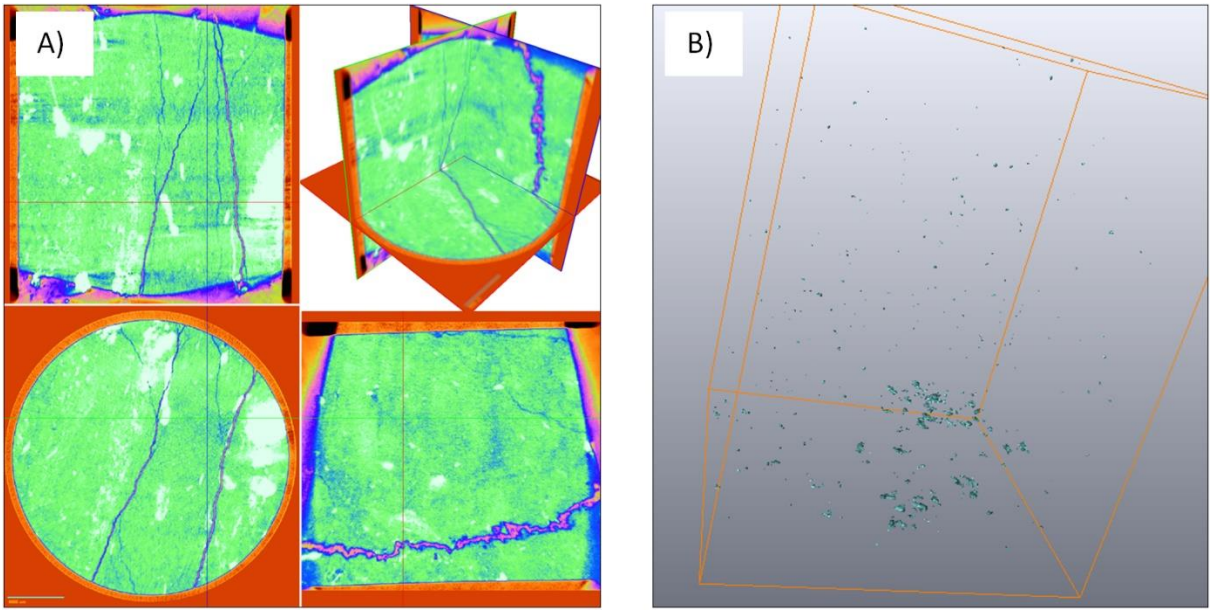

Figure 1: A - Internal structure of bituminous shale; B - Pores distribution of mudstone sample