Petrophysics of shale intervals in the Skjold Field, Danish North Sea - DTU Orbit
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Stratigraphical variation of shale petrophysical properties in the Central North Sea was studied by laboratory analysis of cuttings samples and compared to wireline logging data obtained from Skjold Flank-1 well, Skjold field in the Danish North Sea. The logged section is split into six depth intervals based on wireline log pattern, and with reference to the mud log, cuttings samples were selected. The shallowest intervals (1–3) are silty shale. Interval 2 is rich in organic material. Interval 4 comprises of chalk and underlying calcareous shale. Interval 5 is shale with sand stringers; whereas interval 6 is mainly shale. X-ray diffraction analysis reveals the dominance of inter-layered smectite/illite in interval 1–3 and upper part of interval 4, whereas illite dominates interval 5 and 6. Other minerals include kaolinite, chlorite, quartz, calcite, Opal-CT, dolomite and plagioclase. Mineralogical variation is reflected in cation exchange capacity, BET specific surface, and grain density. Shales vary in total organic carbon, radioactivity, carbonate content, porosity and modeled permeability. Cross plots of logging data splits intervals according to mineralogy, porosity, modeled permeability, and induration. The most effective of intervals splitting is obtained by cross-plotting shear velocity and gamma ray.

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