

**Clay-mineral composition of black shales from the Dniepr-Donets Basin (Ukraine)**

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The amount and type of clay minerals in sedimentary rocks is primarily controlled by the prevailing tectonic setting and compositional features of the clastic influx from the hinterland, often showing high lateral variability within a basin. Besides these obvious influencing factors, a second major aspect is the vertical evolution of clay mineral distribution caused by thermal maturation and diagenetic reactions. Within the frame of this study, both lateral and vertical compositional changes were investigated on Late Devonian to Carboniferous black shales from the Dniepr Donets Basin, a Late Devonian rift basin with syn-rift sediments up to 4 km thickness and post-rift sediments in excess of 15 km. On the base of a numerical modelling study of the thermal evolution of the Dniepr-Donets Basin (Shymanovskyy et al. 2004) the attempt was made to correlate the changes in composition and crystal structure of clay minerals with the thermal history and maturation history of organic matter in black shales. The percentage of illite present in illite-smectite-mixed layer clays was used as an indicator for the reconstruction of the thermal evolution of the basin. Expandable clay minerals are preserved at a depth of more than 5 km as a result of low Mesozoic heat flow. XRD-analyses on core samples of selected profiles show the varying amounts of chlorite, kaolinite, illite, smectite and illite-smectite-mixed layer minerals. A discrete mineralogical composition in contrast to underlying, Lower Viséan shales was observed for the organic rich Upper Viséan "Rudov Beds". Relatively low kaolinite contents and a higher abundance of illite and illite-smectite-mixed layer minerals, the presence of apatite and partly high silica contents stay in clear contrast to the surrounding rocks. Within the so-called Srebren Depression, a vast syncline surrounded by a reef belt, clay rich rocks prevail along the northern reef margin as well as in the NW part, whereas a quartz-dominated siliceous facies occurs in the SE part. The portion of brittle mineral phases is an important factor for hydrocarbon production.