



Distribution and variation of the inorganic fraction of Devonian to Bashkirian black shales in the north-western part of the Dniepr-Donets Basin, Ukraine

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Mineralogical data of 112 core samples from 12 wells are used to investigate lateral and vertical variations in the lithofacies of Devonian to Bashkirian black shales in the north-western part of the Dniepr-Donets-Basin. Sulphur and carbonate contents as well as organic geochemical parameters, including TOC and Hydrogen Index have been determined on the same sample set within the frame of an earlier study (Sachsenhofer et al. 2010). This allows the correlation of inorganic and organic composition of the black shales. Aims of the study are to distinguish between detrital and authigenic minerals, to relate the lithofacies of the black shales with the tectono-stratigraphic sequences of the Dniepr-Donets Basin, to contribute to the reconstruction of the depositional environment and to relate diagenetic processes with the thermal history of the basin. Mineral compositions were determined primarily using XRD-measurements applying several measurement procedures, e.g. chemical and temperature treatment, and specific standards. Major differences exist in the mineralogical composition of the black shales. For example, clay mineral contents range from less than 20 to more than 80 Vol%. Kaolinite contents are significantly higher in rocks with a Tournaisian or Early Viséan age than in any other stratigraphic unit. This is also true for two Lower Viséan coal samples from the shallow north-westernmost part of the basin. Chlorite contents reach maxima in uppermost Viséan and overlying rocks. Quartz contents are often high in Upper Viséan rocks and reach maxima in Bashkirian units. Feldspar-rich rocks are observed in Devonian sediments from the north-western part of the study area and may reflect the proximity to a sediment source. Carbonate contents are typically low, but reach very high values in some Tournaisian, Lower Viséan and Serpukhovian samples. Pyrite contents reach maxima along the basin axis in Tournaisian and Viséan rocks reflecting anoxic conditions. Mixed layer minerals are dominated by illite. Their presence in samples from depth exceeding 5 km reflects the low thermal overprint of Paleozoic rocks in the north-western Dniepr-Donets-Basin.