



Lithology and minerageny of black shale of the Taimyr-Severnaya Zemlya region

Irina Mozoleva

A.P. Karpinsky Russian Geological Research Institute (FGUP "VSEGEI"), St. Petersburg, Russian Federation
(irina_mozoleva@vsegei.ru)

In the Taimyr Peninsula and Severnaya Zemlya Archipelago, black shale deposits are widespread – subaqueous fine-grained, often thin-bedded, dark-coloured rocks of clayey, carbonate, silica or mixed composition, significantly enriched (1-18%) with organic matter (OM). Two large age intervals of accumulation are distinguished: Riphean and Early-Middle Paleozoic (with maxima in the Ordovician and Silurian).

Black shale Riphean complexes are spread in the northern part of the Taimyr Peninsula, where they build up a strip 100-150 km wide along the coast from the Gulf of Minin to the Gulf of Thaddeus and on Bolshevik Isl. Two types of black shale deposits are distinguished (Zabiyaka, 1972; Kabankov, 1980). The first type - predominantly siliciclastic deposits. Represented by cyclical alternation of flyschoid and turbidite types of terrigenous deposits with carbonaceous shale members. Deposits are unevenly enriched in OM in the form of filamentous, lenticular, lumpy accumulations and are often accompanied by pyrite. OM content to 2.5%, rarely to 6%. The second type – carbonate-terrigenous-clayey deposits. Represented by intensely displaced metamorphosed sandstone, siltstone, and mudstone interbedded with marble and limestone. Carbonaceous deposits are intensively. OM content 0.66-2.3%. OM is distributed unevenly, often localized along fractures.

Black shale complexes of Middle-Lower Paleozoic age include deposits from the Lower Cambrian to Lower Carboniferous (Sobolevskaya et al., 1979; Lazarenko, 1980). On October Revolution Isl., the Lower Cambrian-Lower Ordovician deposits are spread. In Taimyr, black shale complexes build up a relatively narrow, about 75-100 km, strip stretching in sublatitudinal direction, limited by regional faults (Main Taimyr in the north, Pyasina-Faddey in the south). Deposits are represented by a wide range of lithological genetic rock types. Carbonate-argillaceous rocks with terrigenous material admixture and siliceous-terrigenous with a small admixture of carbonate material prevail among the Lower Cambrian deposits. OM forms a thin dissemination, content 0.44-4.8%. Carbonate content of rocks increases upsection in sections of the Lower Cambrian-Lower Carboniferous terrigenous-carbonate-siliceous deposits carbonate rocks. OM content 2-6 (18 %).

Black shale formations in the region are of great mineragenic interest (Shanurenko, 1979; Zabiyaka, 1972, etc.). Manifestations gold-sulphide-black shale formation (Golysheva-I and Golysheva-II ore shows, gold content respectively 1-3 and 1-2 g/t) are associated with the Riphean black shale complex. Occurrences of gold-quartz formation are associated with the same complex. Metallogenetic potential of the Lower-Middle Paleozoic black shale deposits determine ore concentrations of uranium, vanadium, and molybdenum deposit (Kamenskoye deposit and a series ore occurrences, uranium content to 0.3-1.38%, vanadium - 0.6%, molybdenum – 0.77-1.38%, phosphorous - 10-20 %), as well as increased gold (to 0.4 g/t) and platinum (to 0.035 g/t) contents are observed. A special study of the Middle-Lower Paleozoic black shale deposits for noble-metal mineralization has been conducted, however they revealed manifestations of gold-antimony-mercury-arsenic formation (Izvilistoye, Uzkoye, etc.) of the Nevadian type.

Wide areal and age distribution and not yet fully revealed mineragenic potential of black shale complexes in the Taimyr-Severnaya Zemlya region make them a promising target for further study.