



Geodynamic settings and depositional environments of carbon rich sediments in Russia

T.N. Koren^{*}, N.N. Sobolev, T.Yu. Tolmacheva and E.O. Petrov

Russian Geological Research Institute, St.Petersburg, Russia (Tatiana_koren@vsegei.ru)

Vast territory of Russia reveals heterogeneous mosaics of different continental blocks and fold areas with a complex geological history. Carbon rich sediments are confined to all major tectonic structures including the Baltic, Kara, Aldan, Anabar and other shields, Urals, Altay-Sayan, Taimyr-Severnaya Zemlia, Baikal and Verkhoyano-Chukotka fold areas, as well as basements and sedimentary covers of ancient and young platforms such as East European, Skithian, West and East Siberian. Black shales recorded from almost all stratigraphic levels of the Precambrian to Cenozoic, however, maxima of this type of sedimentation correspond to the following intervals: the Lower Archean, Upper Proterozoic, Upper Cambrian to Lower Silurian, Devonian, Lower and Upper Jurassic. In some cases black shale sedimentation is induced by eustasy (the Llandovery successions of the western Urals) whereas in others cases it triggered by regional tectonic and environmental changes (the Llandovery sections of the Northeast of Russia, the Lower Ordovician of the north-western part of Russia).

Carbon rich sediments in Russia were deposited in a wide variety of geodynamic settings including continental rifts at their early and late stages as well as passive and active continental margins. Depositional environments of carbon rich sediments vary from those in deep-water basins with restricted bottom water circulation to those in shallow epicontinental seas. However, a reconstruction of depositional settings of the Precambrian carbon rich sediments, that are often metamorphosed and have unclear structural and stratigraphic position, is uncertain.

Deep-water black shale sedimentation can be exemplified by the Devonian-Carboniferous successions of Novaya Zemlia. In this case the deposition of carbon rich sediments is strongly influenced by tectonic activity coupled with climatic changes. Hydrodynamic regime of the basin and character of water circulation that

avored the deposition were controlled by increase of tectonic activity and shifts from aridic (in Famennian, Late Viséan to Serpukhovian) to humidic climate (Middle to Late Frasnian, Tournaisian to Early Viséan).

The carbon rich sediments formed of the shallow water depositional environments are well known from the north-western part of Russia. However, the difference in deposition of the Lower Ordovician “Dictyonema” Shale (the Pakerort Regional Stage) and Upper Ordovician oil shales –“kukersites” (Kukruse Regional Stage) are due to contrasting hydrodynamic and temperature regimes and varying water circulation in the Balto-Scandian basin.

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