

CARBON ISOTOPIC COMPOSITION OF EXTRACTS FROM THE ROCKS OF THE BAZHENOV FORMATION AND ITS STRATIGRAPHIC ANALOGUES

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In the practice of regional geochemistry of carbon isotope composition is a proven correlation parameter. This is due to the fact that it reflects, on the one hand, the genetic nature of the organic matter (OM), and on the other, during the process catagenesis (Galimov, 2006). For oil-oil correlation and oil-OM correlation determined the carbon isotope composition of oils and extracts from source rocks, and their individual chromatographic fractions that differ in polarity (Galimov, 2006; Lopatin, 1992).

The Bazhenov formation is the main oil source in the West-Siberian oil-and-gas province. These rocks are represented by highly bituminous, silica-argillo-carbonaceous deposits formed in the conditions of maximum Late Jurassic-Early Cretaceous transgression of the sea basin. Data on the carbon isotopic composition of extracts from the rocks of the Bazhenov Formation and its stratigraphic analogues, as well as the carbon isotopic composition of crude oils formed by these rocks are presented in many publications. However, in the overwhelming number of publications data are presented without comparison with facial conditions and the level of catagenesis rocks. Besides carbon isotopic composition of the extracts studied to a lesser extent and less regularly than crude oils.

In general, the published data we can say that in the extracts from the rocks of the Bazhenov Formation carbon isotope composition varies from -34 ‰ to -28 ‰ with the most common values of -32 ‰ ... -30 ‰ (Kontorovich, 1986). This range corresponds to the oil generated by rocks of the Bazhenov Formation, for which the carbon isotope composition ranges from -30.1 ‰ to -32.6 ‰ (Peters, 1994).

We have made geochemical studies of rocks Bazhenov Formation central part of Western Siberia and its stratigraphic analogues bituminous rocks of the peripheral regions of Western Siberia (Tutlejm Formation, Mariyanovka Formation, Yanovstan Formation, Golchiha Formation). Pyrolytic analysis (Rock-Eval 6) showed that the average content of organic carbon (TOC) for the rocks of the Bazhenov Formation and its analogues is from 3% to 15%. Catagenesis source rocks varies from the early stage (Tmax 420-430 °C) to the late stage of oilwindow (Tmax 455-460 °C, Salym region).

The results of isotope investigations (Delta V Advantage) revealed that the extracts from the rocks carbon isotope composition in a range from -32.5 ‰ to -30.3 ‰ and is dependent both on the facies conditions of sedimentation and the level of organic matter catagenesis. (fig.). At a low degree of maturity (Tmax <435 °C) the carbon isotope composition extracts has a narrow range from -32.5 ‰ to -31,2 ‰. For these samples the carbon isotope composition has a good correlation with the ratio of Pr/Ph, whose values range from 0.7-1.0 (Bazhenov Formation) to 1.8-2.1 (Yanovstan Formation, Golchiha Formation).

A more significant reflection on the values of the carbon isotopic composition of extracts from the rocks is catagenetic level of maturity. For extracts from the rocks of the Bazhenov

Formation of the central regions of Western Siberia, where OM accumulated in close and reducing sedimentation conditions ($Pr/Ph < 1.0$), carbon isotopic composition of extracts varies from $-32,4 \dots -32,1 \text{ ‰}$ in the early stage of oilwindow ($T_{max} 425-430 \text{ °C}$, East-Surgut terraces) to $-30,7 \dots -30,5 \text{ ‰}$ on late stage of oilwindow ($T_{max} 455-460 \text{ °C}$, Salym region).

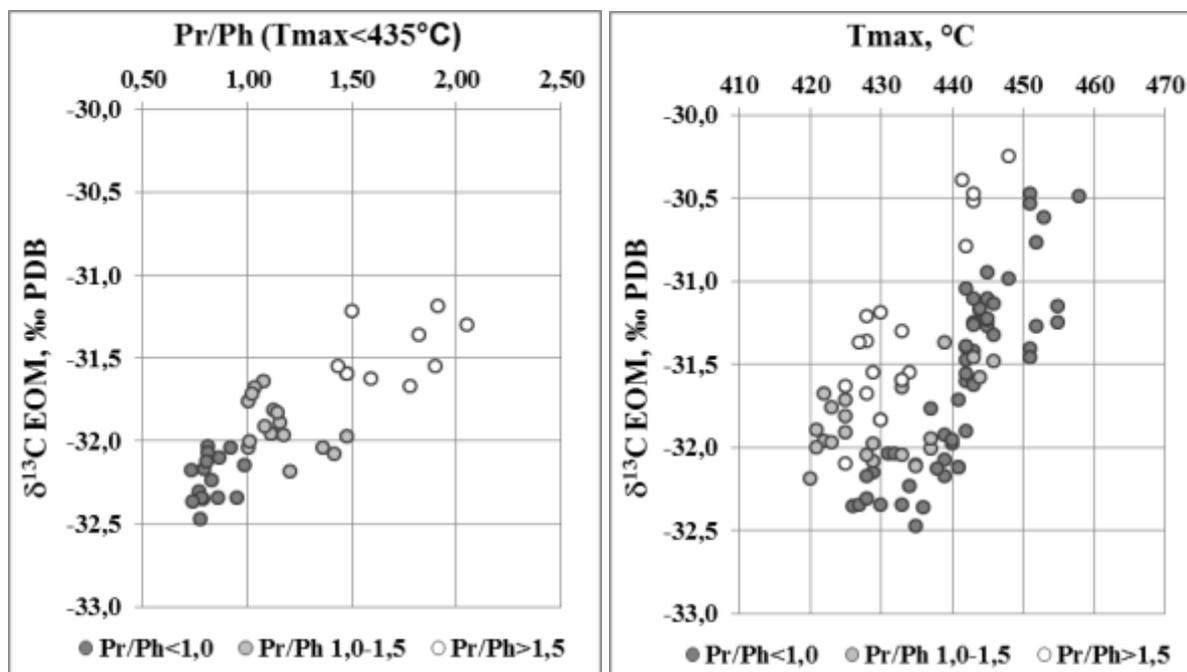


Figure Changing the carbon isotopic composition of extracts from the rocks of the Bazhenov Formation and its stratigraphic analogues

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