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Geodynamical and Geochemical Features of Oil Generation in Sedimentary Basin of Volga-Ural Region

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Oil and gas prospects of Paleozoic sedimentary rocks of Volga-Ural Anticline (VUA) various researchers evaluate in different ways. More than 150 oil fields in Paleozoic formations were discovered in the eastern half of Republic of Tatarstan of the East European Platform. There were not found any significant fields in the western areas of investigation region. According to many investigators, the western part of the Tatarstan has unfavourable geological structure from oil and gas potential view. Solution of problem concerning revealing HC source for the fields of Volga-Ural oil and gas province certainly would alow to discuss about further prospects of this territory. Data available evidence that during Paleozoic time, an area of the present-day South-Tatarian Arch (STA) and North-Tatarian Arch was a passive continental margin along which a sediments rocks up to 2 km thick was accumulated. Generation potential of organic matter containing in increased concentrations in domanikoid deposits was obtained. It has been discovered that the cumulative production in some oil areas of the Romashkino oil field substantially exceeds formerly proven, recoverable, reserves. Moreover, the volume of oil produced has already significantly exceeded the amount of oil that the Domanik strata could have generated as supposed source rocks of the South Tatarstan arch and the adjacent areas. Cumulative oil production in Tatarstan has already reached 3.0B tons, thus substantially exceeding 709M tons, calculated geochemically on the basis of the Paleozoic source rock potentials of all sedimentary strata. This discrepancy obviously shows the impossibility for the commercial amounts of hydrocarbons of being generated from the available material of the sedimentary cover. Some experts explain this phenomenon by the errors made in the reserve estimates. But another consider this as the inflow or replenishment by the hydrocarbon flow from the crystalline basement along the faults. Who is right? It is very difficult and debatable scientific problem. Based on numerous facts of many years studies of Archean-Proterozoic basement and it role in oil field formation of sedimentary cover it is being developed a working hypothesis about sources of oil. Oil from the Paleozoic of the STA is genetically identical to bitumoids of the basement, which is in itself indicative of the vertical migration of oil, for the sedimentary cover above STA has no adequate petroleum source. It is possible, source of oil don't connected with only sedimentary rocks of STA and the adjacent areas. This fact is forced us to search for another reasons of formation such gigantic oil field as Romashkino. As result of this there is appear the hypothesis of vertical migration of oil and oil saturated fluid from source located below the surface of crystalline basement. Existence of process of the modern fluid migration is confirmed by results of different examinations, which have carry out independently in different field of science. Analysis of a variety of elements by several methods of rocks, oil, bitumen samples from sedimentary cover and crystalline basement was performed. New geodynamical features of generation of Kamsko-Kinelskaia intraformational flexure were investigated.