

HYDROCARBON SYSTEMS OF BARENTS-KARA REGION

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Barents-Kara region is one of the most economically perspective regions of the Arctic shelf nowadays. This is proved by discovering of gigantic HC fields within its limits, such as Shtockmanovsk, Rusanovsk, Leningradsk and a row of other smaller ones.

In spite of high estimation of oil-gas-bearing capacity of this region, there is a row of unsolved geological problems that could more certainly evaluate perspectives of oil- and gas-bearing capacity of these regions. There are different approaches for evaluating presence of oil; one of the most popular is basin modelling. Favorable combination of oil-gas-generating and collector horizons at appropriate thermal and pressure conditions, presence of structural forms and possibilities of accumulation and conservation of HC deposits provide forming of wide HC generation in lateral and vertical sections of the sedimentary oil-gas-bearing basins.

Within the limits of an oil-gas-bearing basin it is possible to mark out hydrocarbon systems by peculiarities of oil- and gas-generating processes that are characterized by the unity of generation, accumulation and conservation of hydrocarbons. Dynamic regime of evolution of the generation processes is observed to be one of the main elements of HC system development that is leading to forming of oil and gas accumulation zones.

Barents oil-gas-bearing basin has two-stage structure and is characterized by big thickness of the sedimentary sequence reaching 15-20 km. Mesozoic-Cenozoic basin is imposed on the basin of an ancient Paleozoic platform. One can use analogues in the structure and development of oil and gas generating and accumulating processes of Paleozoic Timan-Pechora and Mesozoic West-Siberian basins. Using such an approach we tried to follow development of HC systems in time and within the area of Barents-Kara region.

Paleozoic sequence of the Barents Sea region has been studied by the outcrops of these deposits from shelf outskirts on archipelagoes Schpitzbergen and Novaya Zemlya. Detachment of HC systems has been realized by the analogue with a well-studied northern part of Timan-Pechora basin. Correlation of Paleozoic source rocks of these regions in most cases shows proximity of their composition, although the level of their catagenetic transformation is different. All this allowed defining three HC systems within Paleozoic deposits of Barents basin framing: pre-Lower Frankian oil-generating, Upper Devonian –

Lower Permian predominantly oil-generating, and Upper Permian predominantly gas-generating.

Geological development of oil-generating processes of Barents Sea Mesozoic basin is correlated with the northern part of West-Siberian basin, particularly with the marine part of Kara Sea and Yamal region. HC systems in Lower-Middle Jurassic, Upper Jurassic, Lower Cretaceous and Upper Cretaceous deposits are marked out there. Geochemical data on investigation of oil-generating possibilities of Jurassic and Cretaceous deposits and peculiarities of fluid composition in West-Siberian and Barents Sea basins testify that in the last one can mark out Lower-Middle Jurassic and Upper Jurassic HC systems similar by development dynamics with the West-Siberian. Moreover, one or more HC systems are also present in Triassic deposits within Barents Sea region.

Every single HC system is characterized by presence of one or several source rocks with unilateral development of oil- and gas-generating process dynamics and geologically uniform forms of the traps providing zoning in forming of oil-gas-accumulation zones. Determination of HC borders distribution could serve as a basis for oil exploration.