

PALEOZOIC OF UZBEKISTAN – A NEW OBJECT IN THE SEARCH FOR HYDROCARBON ACCUMULATIONS

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ABSTRACT

This article provides a brief historical overview of Paleozoic oil in Uzbekistan. It is devoted to the study of the oil and gas potential of Paleozoic sedimentary formations of Uzbekistan.

Keywords: *Paleozoic, Biostratigraphy, Oil, Sedimentation, Delta, Oil and Gas Potential*

INTRODUCTION

The development areas of Paleozoic sedimentary formations in closed territories of the Republic of Uzbekistan are represented as the object of research. The wide areal development and thickness of sedimentary polyfacial weakly metamorphosed formations of the Paleozoic of Uzbekistan, among which submarine delta and marine carbonate deposits became noticeably developed, that allow us to assess the prospects for their oil and gas potential positively.

MATERIALS AND METHODS

The geological materials of biostratigraphers are considered (A.D. Miklukho-Maclay, V.I. Volgin, O.I. Sergunkova, F.R. Bensh, A.V. Dzhenchuraeva, etc.). As a result of many years of work, complex lithologic-facies and biostratigraphic studies of Paleozoic deposits were studied in detail and divided into formations of various sections of the biostratigraphic scales. The completeness (more than 10 km) and biostratigraphic studies of the Upper Paleozoic sedimentary section in the Karachatyr Mountains (Southern Fergana) allowed the participants of the 8th International Congress on Carboniferous Geology (1975) to classify it as a reference and supporting point for Central Asia, covered in the stock and published works of a number of geological scientists. Traditional and modern research methods were used.

RESULTS AND DISCUSSION

The obtained results are substantiated by materials from geological, biostratigraphic, paleogeographic and geophysical studies of Upper Paleozoic sedimentary strata of the Fergana depression in outcrops and well cores. The results of analytical studies are based on analyzes of leading laboratories of the Republic of Uzbekistan. The article is based on factual material collected personally by the author while performing a number of fundamental, applied, innovative and contractual research works using the results of previous researchers. The conclusions are consistent with the basic concepts of paleogeography, lithofacies and biostratigraphic studies and do not contradict existing concepts.

CONCLUSION

- Basic information was obtained on the conditions of sedimentation of the studied strata, paleogeography and biostratigraphy based on the presence of numerous textures and organic remains in the Fergana depression.
- It has been established that a wide range of sedimentation conditions of the strata created favorable preconditions for the formation of occurrences of minerals in them, primarily oil and gas deposits.

- The study of the Paleozoic formations of the Fergana depression allows us to put it forward as a lower oil and gas bearing floor.

For many years of the last century, the attention of oil geologists in Uzbekistan was drawn primarily to the Meso-Cenozoic structural stage, the knowledge and relative accessibility of the subsoil of which ensured the validity of exploration of favorable structures. Geographically, the fields were united into several oil and gas provinces and basins (Fergana, Bukhara-Khiva, etc.), but at all sites production was carried out only from various Meso-Cenozoic horizons. Over time, such a one-sided trend in search and exploration led to an inevitable decrease in the stock of promising structures. However, even at the initial stages of systematic geological study of Uzbekistan, at the beginning of the last century, the first data were obtained on the presence of signs of oil and gas potential in Paleozoic sedimentary strata. This gave grounds to the leading oilman of those years, Academician I.M. Gubkin, to recommend the study of the Paleozoic structural stage of the region and its prospects.

But for many years, in thematic geological publications of the republic, with varying intensity, there was only a discussion between supporters and opponents of studying the prospects for oil and gas potential of Paleozoic strata (Akramkhodzhaev A.M., Karimov A.K., Simonenko I.A., Saidkhodzhaev Sh.G., 1966; Akramkhodzhaev A.M., Egamberdyev M.E., Yurtaev Yu.S., Yakovets Yu.A., 1975; Starobinets I.S., Palomoshnikov A.D., Chirkov E.V., Karimov A.K., 1962; Starobinets I.S., Khaimov R.N., Zuev Yu.N., Lyashkevich D.P., 1964). An important argument in favor of the occurrence of Paleozoic oil in Fergana was the geochemical studies of O.A. Radchenko et al. (Radchenko O.A., Karpova I.P., Chernysheva A.S., 1951), who established the difference in the composition of oil of the Mesozoic-Cenozoic cycle from the supposed Paleozoic.

Despite these data, in a number of major monographs devoted to the problems of oil and gas formation and oil accumulation in the depths of Uzbekistan, published in 1960-1970. Only data on Jurassic-Cretaceous-Paleogene deposits are presented (Akramkhodzhaev A.M., Karimov A.K., Simonenko I.A., Saidkhodzhaev Sh.G., 1966; Akramkhodzhaev A.M., Egamberdyev M.E., Yurtaev Yu.S., Yakovets Yu.A., 1975; Akramkhodzhaev A.M., Babadagly V.A., Dzhumagulov A.D., 1986). During this time, many dozens of manifestations of asphalt and drop-liquid oil were discovered at many stratigraphic levels of the Paleozoic section from the Silurian (Aravan River basin) to the Permian. The occurrence of liquid oil in the siliceous shales of the Silurian in the Aravan region was established during the war years by N.B. Vassoevich, a famous oilman and lithologist. Later, in the same areas on the southern side of the large Tuleikan syncline, the manifestation of bitumen was revealed in Permian deposits (Gonchar A.D., Shevchenko G.M., 1975). On account of the lack of factual material on drilling Paleozoic sedimentary formations, it has now turned out that all information on their composition and sedimentation history is based on the study of protrusions of the Paleozoic basement. Here, thick sections of sedimentary formations, weakly metamorphosed and saturated with various organic inclusions, are available for study. This circumstance attracted the attention of many biostratigraphers (A.D. Miklukho-Maclay, V.I. Volgin, O.I. Sergunkova, F.R. Bensch, A.V. Dzhenchuraeva, etc.).

As a result of many years of work, complex lithologic-facies and biostratigraphic studies of Paleozoic deposits were studied in detail and divided into formations of various sections of the biostratigraphic scale. The completeness (more than 10 km) and biostratigraphic knowledge of the Upper Paleozoic sedimentary section in the Karachaty Mountains (South Fergana) allowed the participants of the 8th International Congress on Carboniferous Geology (1975) to classify it as a supporting point and reference section for Central Asia. It was established that at this stage in the history of the geological development of the region, sea basins repeatedly arose and retreated, having connections in the south with the Tethys paleocean, and in the west with the Russian Basin.

During the Late Carboniferous - Early Permian, sediments of submarine deltas developed widely, forming thick strata of sandy-shale interbedding. The high thickness of sediments corresponds to a stable river flow and the presence of an appropriate humid climate in the region, promoting its circulation. The monographic work of A.M. Akramkhodzhaev and V.A. Babadagly, who highly appreciated their potential, is devoted to

a detailed analysis and the problem of the connection between submarine delta deposits and oil and gas accumulation. It should be noted that the resumption of discussion about the prospects of the Paleozoic region for oil and gas content in the sixties - eighties of the last century (Akhmedzhanov M.A., Aripov A.A., Borisov O.M., Kurbaniyazov K., Radzhabov F.Sh., 1964; Akhmedzhanov M.A., Borisov O.M., Khaimov R.N., 1983; Popov V.I., Dzhumagulov A.D., Tal-Virsky B.B., Zaprometov V.Yu., Gonchar A.D., Babadagly V.A., 1982; Ryzhkov O.A., Vitchinkin M.M., Zuev Yu.N., 1962; Starobinets I.S., Palomoshnikov A.D., Chirkov E.V., Karimov A.K., 1962).

The characteristics of the main types of oil and gas promising basins of the Late Paleozoic are analyzed in detail from the standpoint of mobilism in the monograph (Masumov A.S., Khusanov S.T., Bykovskaya T.A., 2001). These are described in the text of geodynamic models of sedimentary basins. According to the views of the authors of the monograph, large, potentially oil-and-gas-bearing basins in Western Central Asia were formed against the backdrop of events that took place on its territory at the end of the Middle and beginning of the Late Paleozoic. They believe that first, in the Late Devonian - Early Carboniferous, convergence began, and from the Middle Carboniferous, a collision of northern (North Ustyurt, Kazakhstan-Dzungarian) and southern (South Ustyurt, Afghan-Tajik, Tarim) continental masses began. These processes entailed the reduction and closure of the oceanic systems and marginal seas of the Paleotethys at the end of the Bashkir Middle Carboniferous. As bodies of water, they closed completely in the Asselian of the Early Permian. The work provides a detailed history of the development of other large regional blocks in the region.

Currently, oil fields in the Paleozoic basement have been discovered in Southern Kazakhstan, including the large Tengiz field. Geologists in Kyrgyzstan are also actively working to study the prospects of Paleozoic sedimentary formations. In the territory of Tarim, China, a number of fields are already being exploited, where oil is produced from several stratigraphic levels of the Paleozoic.

The wide areal development and thickness of sedimentary polyfacial, weakly metamorphosed formations of the Upper Paleozoic of Uzbekistan, among which submarine deltaic and marine carbonate deposits have received noticeable development, allow us to positively assess the prospects for their oil and gas potential (Akhmedzhanov M.A., Aripov A.A., Borisov O.M., Kurbaniyazov K., Radzhabov F.Sh., 1964; Akhmedzhanov M.A., Borisov O.M., Khaimov R.N., 1983; Troitsky V.I., Khusanov S.T., Khusanov A.S., 2017; Masumov A.S., Khusanov S.T., Bykovskaya T.A., 2001; Popov V.I., Dzhumagulov A.D., Tal-Virsky B.B., Zaprometov V.Yu., Gonchar A.D., Babadagly V.A., 1982).

The given brief historical overview of the development of the problem of Paleozoic oil in the region and the factual material show, in our opinion, the relevance and inevitability of studying the oil and gas potential of the Paleozoic sedimentary formations of Uzbekistan, which will strengthen the economic position of the Republic of Uzbekistan.

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