

THE FEASIBILITY OF THE FURTHER RESEARCHING OF THE UCHBASH-KARSHINIAN FLEXURE-BREAK ZONE

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ABSTRACT

The Uchbash-Karshinian flexure-break zone is the interesting geological region. The existing views about its internal structure were reviewed. The four main systems of views about the nature of the Uchbash-Karshinian flexure-break zone were determined. The imposition of the detailed images of the Uchbash-Karshinian flexure-break zone on the geotectonic basis allowed to select a wide "strip" of the ambiguous interpretation of the geological and geophysical data. The results of the comparison showed that the "strip" of the ambiguous interpretation of the geological and geophysical data can be considered at regional level under research. To solve the problem of ambiguous interpretation of the geological and geophysical data, some operations were performed.

Keywords: *Uchbash-Karshinian Flexure-Break Zone, Tectonic Step, Fault, Tectonically Shielded Trap, Oil And Gas Perspective Object, Seismic Exploration, Geodynamics*

INTRODUCTION

The Bukharo-Khivinian oil and gas region plays the most important role in the increase of hydrocarbon raw materials in the Republic of Uzbekistan. The Jurassic carbonate formation is the main productive lithological and stratigraphic complex. The degree of development of the Jurassic carbonate formation is about 70%. The deposits have been opened there recently which usually belong to the small deposits category. Most of them are previously identified like "perspectiveless" traps. Long-term reserve of the resource base of the Bukharo-Khivinian oil and gas region, the low-middle-jurassic-terrirogenous sediments and individual structures of the Paleozoic complex were considered. Currently, their development is impossible, as it requires additional research.

MATERIALS AND METHODS

The Uchbash-Karshinian flexure-break zone is of a certain practical interest in all these geological section's intervals. Within it's territory, the Garby, Uchkyr, Kaltakyr, Koshtepa, Hosyl, Shimoly Darbaza deposits and others, were opened. For the zone, a broken-block type of inner structure is characterized with the development of tectonically shielded traps. Therefore, the detailed research of the internal structure of the Uchbash-Karshinian flexure-break zone is a relevant scientific problem.

The purpose of this article is to localize the object of the research in a geological space. It is important to determine the directions of the further research. To achieve this goal, the following tasks were delivered:

1. A brief analysis of the views on the nature of the Uchbash-Karshinian flexure-break zone.
2. The Uchbash-Karshinian flexure-break zone and its elements were traced on a regional tectonic basis.
3. The method of the geological and geophysical researching and detailing of the Uchbash-Karshinian flexure-break zone has been proposed.

In 1962, Tal-Virsky B.B. proposed a scheme of the tectonic zoning of the Bukharo-Khivinian oil and gas region for the first time. This scheme is used now. According to it, the Bukhara, Charjou and Bagajin tectonic steps stand out in the structure of the region. They are divided by the Pre-Kizylkumian, Uchbash-Karshinian and Amudarynian flexure-break zones of the northwestern stretch. Within the steps there are tectonic uplifts, separated by transverse tectonic troughs.

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Currently, the Uchbash-Karshinian flexure-break zone is a linear disjunctive structure with a complex geological structure. It is extended in the southeastern direction by more than 400 km from the Mountains of Sultanuvays to the southwestern revolts of the Gissar Range. It shares the Bukhara and Charjou tectonic steps throughout its entirety. Its formation is closely connected with the Bukhara-Gissar long-lived deep fault. It is a crossing the lithosphere tectonic shift and has a slight slop in the southwest direction. In all over its entirety, the Uchbash-Karshinian flexure-break zone is characterized by a sharp drop in the capacity of the Jurassic and less sharp drop of the Cretaceous deposits.

With the more detailed consideration of the Uchbash-Karshinian flexure-break zone has the form of a broken strip with a non-permanent width. The areas of sublatitudinal and northwestern striking are predominate in its structure. In some areas, it is contrasting in the different parts of the geological section. In different areas it appears like the ledge on the surface of the Paleozoic complex and is leveled by the Jurassic sediments. The stretching with the formation of the neogene-anthropogenic grabens is typical for the Uchbash-Karshinian flexure-break zone. The largest of them is the Kokchiniangraben. In the north-western part, the narrow Kimirek Graben is adjacent to it. It is filled with the low-jurassic terrigenous sediments of high power up to 1.5 km. In the southeastern part of the zone there are complicated folds of the Maymanaktau, Kasantau, Kungurtau and Chim associated with compression.

The four main systems of views on the nature of the Uchbash-Karshinian flexure-break zone and the directions of further research were determined.

The first system of view is based on a "flexure" or the knee-like type of the structure of the Mesozoic-Cenozoic sedimentary cover. The cover is complicated by tectonic faults. The main oil and gas objects are tectonic traps. They are located as a part of the traditional lithological and stratigraphic complexes on the both sides of the flexure-break zone. To implement this direction, a sufficient amount of the seismic exploration data with the high quality field materials is needed. Babajanov T.L., Rubo V.V., Tal-Virskiy B.B., Alekseev V.P., Zaripova D.M., Hikmatullayev B.S., Safonova L.N., Muratov R.A., Yahyaev A.A. and others made a significant contribution to the direction's development (Tal-Virskiy *et al.*, 2001; Hikmatullaev *et al.*, 2013).

The second system of view is based on the "parograd" or the impushing type of the structure of the Paleozoic complex. Sedimentary cover deposits have undergone forced deformation. The main oil and gas local objects are individual areas of the Paleozoic sedimentary rocks on the both sides of the flexure-break zone. To implement this direction, it is necessary to have a sufficient amount of the deep drilling data in combination with the depth seismic exploration data. A significant contribution to the development of this direction was made by Babaev A.G., Nishanov B.U., Solopov G.S., Eydelnant N.K., Uzakov H.U., Babajanov T.L., Rubo V.V., Bashaev V.N., Gafurov T.A., Mordvintsev O.P., Bogdanov A.N. and others (Abdullayev *et al.*, 2019).

The third system of view is based on the paleogeodynamic affiliation of the Paleozoic complex in accordance with the reconstruction of the tectonics of the lithospheric plates. There is no complete unity of views on the role of the flexure-break zone. According to the constructions of Abidov A.A., Dolgoplov F.G., the most part of the zone is coincides with the northern border of the Central Graben of the Bukhara-Khiva Paleorift. It is characterized by a fragmented structure with the large number of transverse shifts. A significant contribution to the development of this direction was made by Abidov A.A., Abetov A.E., Dolgoplov F.G., Atabekov I.U., Khodzhimetov A.I., Babajanov T.L., Kim G.B., Fox L., Ingerov A.I., Basov M.D. and other researchers. To implement this, it is necessary to conduct a complex of the 3D seismic survey, magnetotelluric sounding and parametric drilling on the certain perspective areas.

According to the constructions of Mirikamalov R.H., a modern flexure-break zone acts as an inherited element of the active outskirts of the Kazakhstan continent. The main oil and gas perspective objects are the local antiforms in the parts of the central graben and the blocks of the Paleozoic and Mesozoic rocks on the both sides of the flexure-break zone which were in contact with the zones of the transform faults (Mirkamalov, 2009).

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The fourth system of view is based on the dominant geodynamic nature of the faults of the Bukhara-Khivian region associated with the impact of the inhomogeneous horizontal compression in the Neogene period. According to the ideas of Abdullaev G.S. and Dolgoplov F.G., the South-Eastern part of the Uchbash-Karshinian flexure-break zone is a system of the converging sub-vertical shifts. They were born in the crystalline foundation and interrupted in the salt-anhydrite sediments. The smaller transverse faults, such as thrusts and underthrusts, are adjacent to the shifts. In the amount, all of the faults form the wedge-shaped broken-block appearance of the southeastern end of the flexure-break zone. To implement this direction, it is necessary to conduct a complex of the 3D seismic survey, magnetotelluric sounding. These geodynamic ideas found their partial confirmation in the results of cosmodecryption of the Mubarek-Azyltepin dislocation system, which adjacents from the north to the southeastern part of the Uchbash-Karshinian flexure-break zone (Abdullayev *et.al.*, 2016).

RESULTS AND DISCUSSION

The imposition of the detailed graphic images of the Uchbash-Karshinian flexure-break zone by the different authors on the geotectonic basis allows you to select a wide "strip" of the ambiguous interpretation of the geological and geophysical data. The average width of this "strip" is about 5-15 km. The maximum values of 20-25 km, it reaches on the border of the Beshkent and Kashkadarya deflections. The minimum values up to 5 km, it reaches on the border of the Mesheklyn raising and the Birgutlin deflection (Fig. 1).

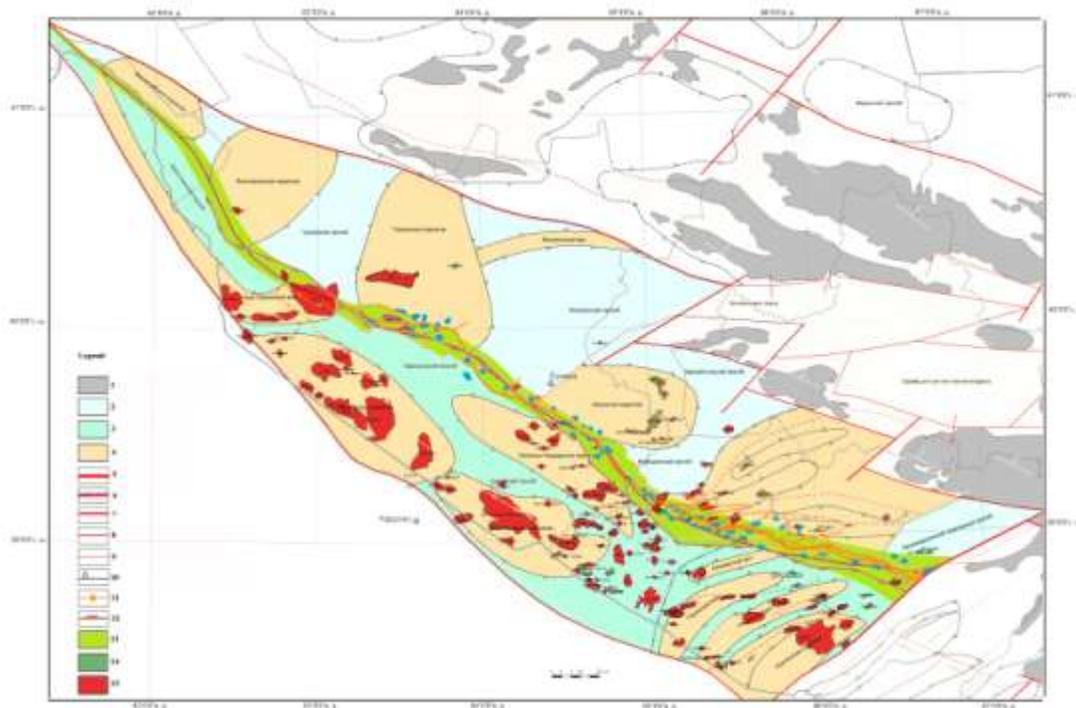


Figure 1: The map of the “strip” of ambiguous interpretation of the geological and geophysical data within the Uchbash-Karshinian flexure-break zone (compiled by: Kuvshinova, 2021).

1 – outcrops of the Paleozoic formations, 2 – Bukhara tectonic step, 3 – Charjou tectonic step, 4 – uplift of the sedimentary cover, 5 – borders of the lithosphere blocks, 6 – flexure-break zones, 7 – first range faults, 8 – second range faults, 9 – third range faults, 10 – borders of the second range tectonic structures, 11 – border of the Central Graben of the Bukhara-Khiva Paleorift, 12 – configuration of the Bukhara parograd fault, 13 – zone of the ambiguous interpretation of the geological and geophysical data, 14 – oil deposits, 15 – gas deposits.

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As a result, the total area of the territory with a low degree of research is about 5000 km². This territory is comparable to a large oil and gas perspective area of the Bukhara-Khivinian region. The selected oil and gas local objects cannot be accurately identified by the type of reservoir. The absence of established patterns of the internal structure of the Uchbash-Karshinian flexure-break zone makes it difficult to forecast new perspective objects.

The results of the comparison showed that the "strip" of the ambiguous interpretation of the geological and geophysical data can be considered a regional level under research. The subject of the research is the various types of hydrocarbons reservoirs in the Paleozoic complex and the lower horizons of the sedimentary cover, which are associated with the faults within the Uchbash-Karshinian flexure-break zone.

CONCLUSIONS

To solve the problem of ambiguous interpretation of the geological and geophysical data within the Uchbash-Karshinian flexure-break zone, the following operations must be performed:

1. To make the systemic reinterpretation of the 2D seismic profiles across the stretch Uchbash-Karshinian flexure-break zone.
2. To make the complex reinterpretation of the 2D seismic profiles with the data of the deep seismic sounding, the refracted correlation method, the earthquake converted-wave method and the magnetotelluric sounding.
3. To map the faults along the main structural surfaces with the modern stress-strain state of the earth's crust and materials of the cosmodecryption.

The successful solution of these operations will allow to evaluate the hydrocarbon potential of the Phanerozoic complex of the Uchbash-Karshinian flexure-break zone and the adjacent territories.

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