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Research Article

STRUCTURAL AND TECTONIC FEATURES OF THE STRUCTURE AND PROSPECTS OF OIL AND GAS POTENTIAL OF THE CRETACEOUS DEPOSITS OF THE EASTERN SIDE OF THE BESHKENT TROUGH

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ABSTRACT
The article considers the structural and tectonic features of the eastern side of the Beshkent trough and their influence on the conditions of formation of oil and gas deposits in the sediments of the Cretaceous formation. The presence of three mandatory factors to explain the prospects of oil and gas potential in the studied area is substantiated. Based on a comprehensive analysis, the construction of a three-dimensional geological model and the interpretation of the materials of geophysical studies of wells, the prospects of the oil and gas potential of the identified traps in the Cretaceous sediments of the eastern side of the Beshkent trough are substantiated. The prospective gas resources of the identified traps are estimated using a three-dimensional geological model. Further recommendations have been issued on conducting geological exploration in order to detect gas deposits in Cretaceous sediments.

Keywords: *Cretaceous Deposits, Tectonic Disturbance, Structure, Migration, Oil and Gas Content, Deposit*

INTRODUCTION
Currently, the main task of the oil and gas industry in each country is to replenish the hydrocarbon raw material base by conducting geological exploration in order to increase reserves that provide the industry with hydrocarbon raw materials. In developing countries, energy consumption is increasing annually, as a result of which the hydrocarbon resource base is depleted. In such conditions, there is a need to accelerate exploration work with the study and study of the patterns of the structure and formation of oil and gas deposits. Therefore, in order to solve this task, work was done to clarify the features and patterns of the placement of hydrocarbon deposits in the Cretaceous sediments of the eastern side of the Beshkent trough.

MATERIALS AND METHODS
In different years, A.M. Akramkhodjaev, V.P. Alekseev, A.G. Babaev, R.A. Gabrilyan, Z.S. Ibragimov, A.G. Ibragimov, O.E. Muradov, N.S. Khayitov and many others studied the prospects of oil and gas potential of the Cretaceous deposits of the Beshkent trough (Ibragimov *et al.*, 2013; Sunnatov, 2023).
To substantiate the prospects of oil and gas potential of a certain stratigraphic complex, it is necessary to find out the presence of three mandatory factors: 1) The presence of a potentially oil and gas-bearing stratum in the studied oil and gas region; 2) The presence in this oil and gas region of large positive structural elements serving as an oil and gas accumulation zone; 3) The presence of conditions for the conservation of hydrocarbon accumulations.
The Mesozoic deposits of the eastern side of the Beshkent trough are characterized by the presence of two genetic types of formation of hydrocarbon deposits belonging to Jurassic and Cretaceous age deposits. The first genetic type includes rocks of continental genesis with humus types of initial organic matter(s), the second – rocks of marine genesis with sapropel type of initial s. The source of generation for the formation of oil is the oil–producing "black shales", and for the formation of gas is the coal-bearing formation (Sunnatov, 2023).
The presence of large tectonic elements within the Amudarya syneclise, such as the Uchajin uplift, Bagajin, Chardzhou and Bukhara stages, extending from southwest to northeast and separated from each other by regional faults, served to form deposits in Cretaceous and Jurassic sediments.

These positive large tectonic elements (with their local traps) served as gas accumulation zones. At the same time, the presence of a powerful salt-anhydrite stratum of tithonum in the section, which is a reliable screen, contributing to the creation of conditions for the conservation of gas and oil deposits, played an important role. For example, within the Turan plate, which includes the Amudarya syneclise, large reserves of sulfur-free gas have been discovered in the Lower Cretaceous suprasalt deposits (XIV horizon) at the Davletabad-Donmez, Shekhitli-Jujukli, Farab (Turkmenistan) fields. The results of the analysis of the formation of gas deposits in the XIV horizon of these deposits show that they were formed due to the flow from Jurassic sediments through tectonic disturbances (Ibragimov *et al.*, 2013).

Some researchers (Sitdikov, 2008) considered the Cretaceous deposits of the Chardzhou stage promising for the search for oil and gas deposits, based on the presence of hydrocarbon deposits within the Bukhara stage and in Turkmenistan.

The zones of oil and gas accumulation in the BHNGR are large tectonic elements of the third order, such as the Chardzhou, Ispanly-Chandyr uplift, Dengizkul shaft and organogenic structures (reefs, bioherms) of the Kushab and Beshkent bends. In the process of Alpine tectogenesis, numerous tectonic disturbances formed, crossing the entire Meso-Cenozoic section. Regarding the studied region, within the eastern side of the Beshkent trough there is the Liangaro-Karail fault, due to which, in the areas located on the eastern side of the Beshkent trough, Lower Cretaceous sand layers contact with Jurassic productive limestones of the South Caucasus. Thus, conditions appeared for the flow of hydrocarbons from the Jurassic to the Cretaceous deposits, and in the presence of traps – to the accumulation of deposits.

The diverse nature of the tectonic disturbances presents here, according to the author, played a certain role in the placement of hydrocarbon deposits even within a single field. Surges and discharges crossing the Jurassic and Cretaceous sediments could well serve as routes for vertical fluid migration during the formation of hydrocarbon deposits not only in the Jurassic, but also in the Cretaceous sediments.

If, at the same time, the vertical migration of hydrocarbons occurred due to tectonic disturbances, then the horizontal migration should take place along permeable sand layers of Cretaceous age (VIII-XIV horizons). Their concentration (accumulation) should occur in positive structures with reliable tires in their section. In the upper part of the Lower Cretaceous there is a thick layer of Albian clays (with a capacity of more than 100 m) and in the middle part of the Upper Cretaceous there is a thickness of Turonian clays (with a capacity of 120-160 m), which are good tires in many BHNGO deposits (Sunnatov, 2023).

In addition to substantiating the available two factors for the formation of hydrocarbon deposits, the ultimate goal of the author's research on the analysis of the geological structure of the deposits was to find out the presence of traps in the Cretaceous sediments of the eastern side of the Beshkent trough within each field, oil and gas deposits in which are associated with subsalt Jurassic limestones.

RESULTS AND DISCUSSION

A huge number of structures (more than 100 areas) have been searched within the Beshkent trough and adjacent territories and about three dozen hydrocarbon deposits have been discovered. A large number of these discovered deposits are located within the eastern side of the Beshkent trough. To detect local structures in the Cretaceous deposits of explored and explored deposits, the author studied the features of the geological and tectonic structure, stratigraphic section and patterns of deposits of more than 20 deposits and areas of this area located near the large Lyangar-Karail fault (Ibragimov *et al.*, 2013).

The construction of a structural and tectonic model of the deposits of the eastern side of the Beshkent trough was based on the features of the geological and tectonic structure, as well as the selected stratigraphic boundaries of horizons along the Cretaceous deposits of wells in the studied area. Based on the widespread reflecting horizons and data from the stratigraphic boundaries of the Cretaceous sediment horizons, structural maps were constructed along the roof of the VIII-XIV horizons of the studied deposits, one of which is shown in Fig. 1.

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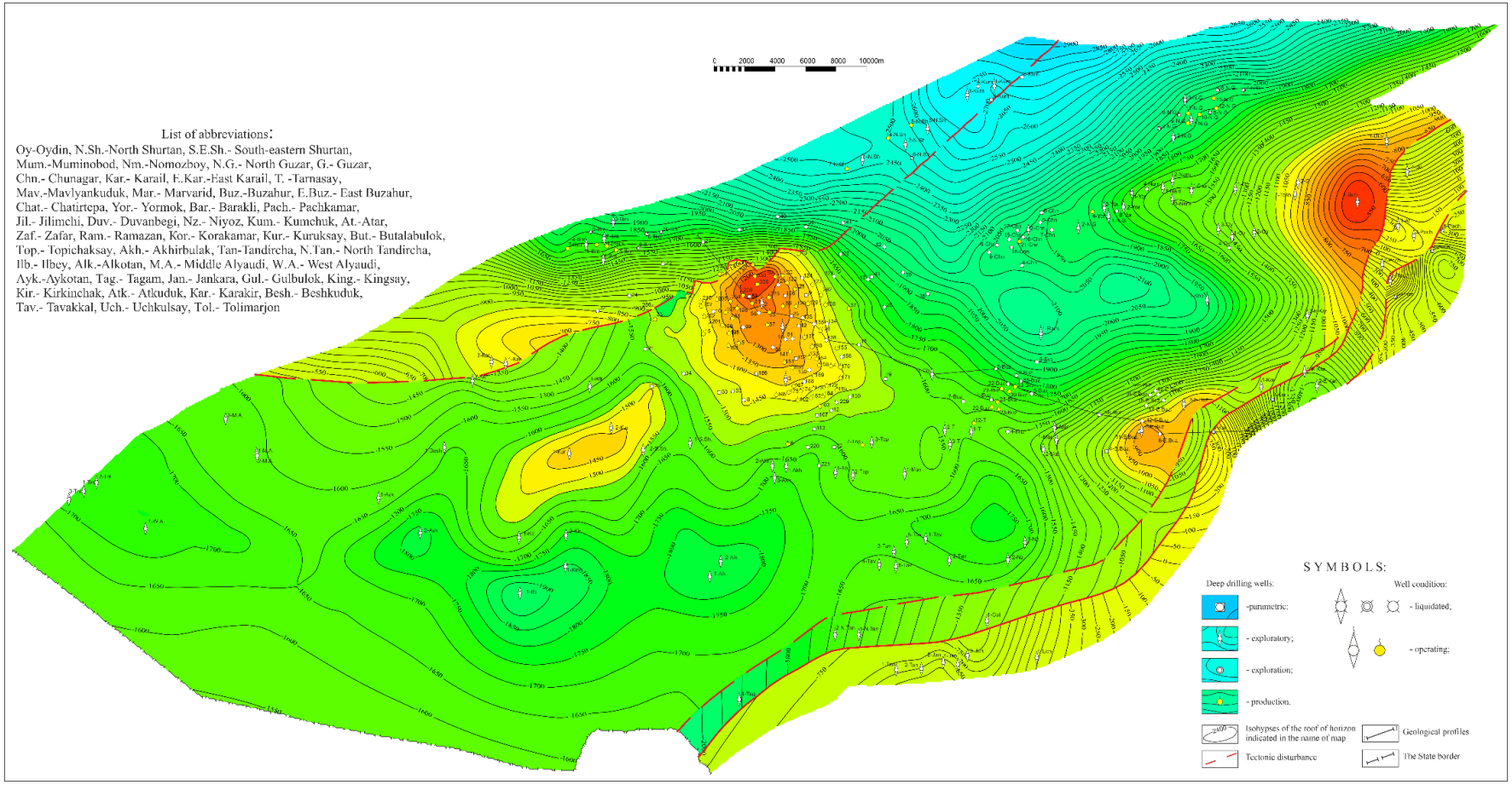

Figure 1. Structural map of the roof of the XII horizon of the eastern side of the Beshkent trough

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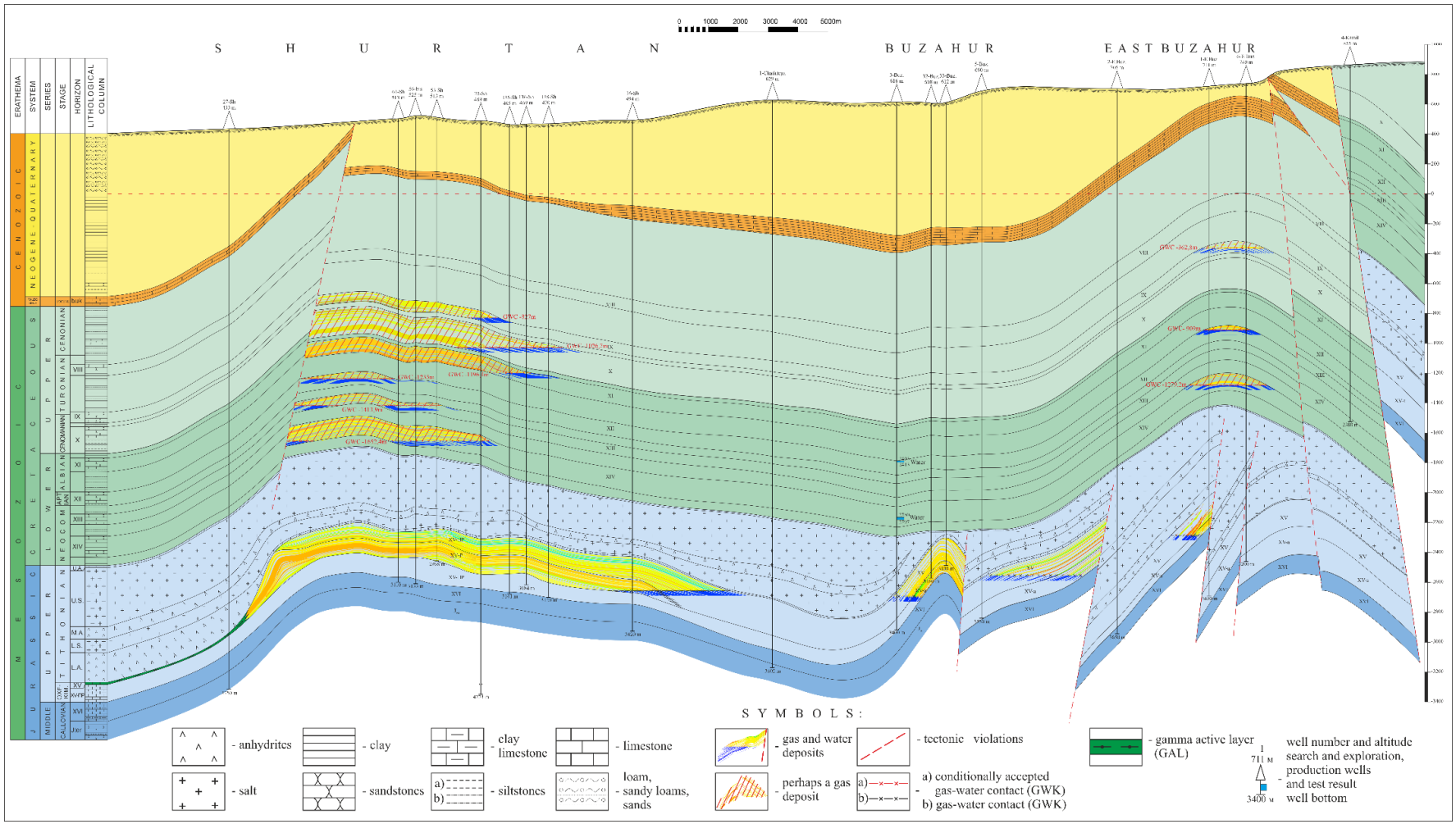

Figure 2: Regional geological profile along the I-I line

On the constructed structural map (Fig. 1), five local structures are noticeably distinguished: the Shurtan, Vostochny Buzakhur deposits and the Butalabulok, Karakyr, and Kuruksai areas.

The geological structure of the Shurtan, Vostochny Buzakhur and Butalabulok and Karakyr fields is characterized by the presence of a tectonic disturbance in Cretaceous sediments extending from southwest to northeast. The revealed structures of the Cretaceous sediments are brachianticlinal folds and belong to tectonically shielded traps. Kuruksai Square is an anticline structure elongated in the north-east and south-west directions. There were no tectonic disturbances crossing the horizons of the Cretaceous deposits.

Based on the results of the identification of local structures Shurtan, Vostochny Buzakhur, Butalabulok, Karakyr and Kuruksai in the studied region, a geological profile was built along the line of wells (Fig. 2).

On the constructed geological profile (Fig. 2) it can be seen that at the Vostochny Buzakhur field, the southeastern block is pushed to the northwestern. Due to the development of the Liangar-Karelian thrust, the Lower Cretaceous sediments were in contact with the Jurassic carbonate deposits of the southwestern spur of the Gissar range. The thrust amplitude was about 1,480 m.

The existing tectonic disturbances within the study area, in particular on the structures of Shurtan, Vostochny Buzakhur, Karakyr and Butalabulok, which are one of the main factors of fluid flow from Jurassic to Cretaceous sediments, make us think about the possible prospects for the oil and gas content of Cretaceous deposits of these structures (Ibragimov *et al.,* 2012).

Thus, in order to search for the identified traps in Cretaceous sediments, a reinterpretation of the GIS materials of the VIII-XIV horizons of wells of the above-mentioned fields and areas was performed, which made it possible to determine the filtration and capacitance properties of the selected reservoir layers, on the basis of which gas-water contacts for the VIII-XIV horizons were conditionally accepted and taken as a basis for assessing promising gas resources (C_3) on the local structures of Shurtan, East Buzakhur, Butalabulok. Karakyr, Kuruksai. The total reserves of promising resources of the above-mentioned fields and areas amounted to more than 160 billion m^3.

The results of the comprehensive studies carried out in the region under consideration made it possible to scientifically and practically substantiate the formation of hydrocarbon deposits in Cretaceous sediments by migration of fluids from Jurassic to Cretaceous sediments through tectonic disturbances.

CONCLUSION

The present tectonic disturbances on the territory of the Eastern side of the Beshkent trough favor the flow of hydrocarbons from the Jurassic to the Cretaceous sediments and are supply channels for the formation of deposits of identified local traps. In this regard, these areas are of significant search interest for the detection of significant concentrations of hydrocarbons.

To verify the reliability of the conclusions and conclusions, it becomes necessary to resume exploration work on the priority promising areas of Shurtan, Vostochny Buzakhur, Butalabulok. Karakyr, Kuruksai. To do this, it is necessary to use liquidated wells on the listed structures, in which it is proposed to carry out major repairs of wells followed by perforation work in order to save capital and material resources.

Based on a comprehensive study of the features of the geological structure of the deposits, the areas of the eastern side of the Beshkent trough and the conclusions drawn on this basis, it is recommended:

1. To carry out exploration work at the Shurtan, Vostochny Buzakhur fields and in the areas of Karakyr, Kuruksai, Butalabulok, Guzar, Toshguzar in order to detect deposits of sulfur-free gas in Upper and Lower Cretaceous sediments.
2. In order to accelerate the solution of this task and save capital and material costs, it is necessary to start testing Cretaceous, possibly productive horizons, inactive wells located in the set of identified traps, if the technical condition of the wells allows.
3. In the event of the discovery of industrial gas reserves in Cretaceous deposits, further directions of exploration work on the territory of the Chardzhou stage, in particular the eastern side of the Beshkent trough, will be justified.

REFERENCES

Sunnatov MS (2023). Substantiation of the prospects for oil and gas potential of the Cretaceous deposits of the eastern side of the Beshkent trough. Bulletin of the University of Geological Sciences. Tashkent, 45-50 (in Russian).

Ibragimov AG, Fortunatova NK, Sunnatov MS (2013). Prospects for the discovery of sulfur-free gas deposits in the Cretaceous sediments of the Beshkent trough of the Bukhara-Khiva oil and gas region. Geology of Oil and Gas No. 5. Moscow, 28-33 (in Russian).

Sitdikov BB (2008). On large forecast resources of sulfur-free gas in the Cretaceous sediments of the Chardzhou stage of the Bukhara-Khiva region. Uzbek Journal of Oil and Gas No. 3. Tashkent, 4-6 (in Russian).

Ibragimov AG, Sunnatov MS (2013). New ideas about the possible gas content of the Cretaceous deposits of the eastern side of the Beshkent trough. Materials of the Republican scientific and practical conference "Topical issues of oil and gas geology and geophysics and possible solutions". Tashkent, 49-50 (in Russian).

Ibragimov AG, Sunnatov MS (2012). On the need to test the XIV-XII horizons of the Lower Cretaceous at the Shurtan field to determine the presence of overflow gas from the Jurassic to the Lower Cretaceous deposits. Materials of the International Scientific and Technical Conference. Tashkent, 34-36 (in Russian).