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OIL AND GAS PROSPECTS OF THE AGBURN-DENIZ STRUCTURE RELATED TO THE PETROPHYSICAL CHARACTERISTICS OF THE ROCKS

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Abstract. The article discusses the relationship between the oil and gas prospects of the Agburn-Deniz uplift zone with rich oil and gas condensate fields and its geological and tectonic development features. The main object of study in the Agburn-Deniz is the Productive serie and sediments below it. Relevant studies have been conducted in several structures to investigate whether there is a regularity in the change of collector properties of rocks on a regional scale and individual structures. The oil and gas prospects of the Northern Absheron archipelagoare mainly due to traps due to lithological cracking in the Post kırmalı suite and Kala Suite sand horizons of the PS and their fault zones, and tectonic shielding in the parts complicated by fractures and partly to carbonate-fractured sediments of the Upper Cretaceous.
Keywords: oil, gas, sedimentation, archipelago, facies, carbonate, psammite

AĞBURUN DƏNİZ STRUKTURUNUN SÜXURLARIN PETROFİZİKİ XÜSUSİYYƏTLƏRİ İLƏ ƏLAQƏDAR NEFT-QAZ PERSPEKTİVLİYİ

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Xülasə. Məqalədə Ağburun-dəniz qalxımının neft-qaz perspektivliyinin poqnozlaşdırılması, onun geoloji quruluşu və tektonik inkişaf xüsusiyyətlərindən bəhs edirlir. Bu qalxımda əsas tədqiqat obyekti Məhsuldar qat və ondan altda yatan çöküntülərdir. Regional miqyasda Ağburun-dəniz strukturunda süxurların kollektorluq xüsusiyyətlərinin dəyişməsində qanunauyğunluğun olub-olmamasını araşdırmaq məqsədi ilə bir sıra tədqiqatlar aparılmışdır. Bu strukturun neft-qazlılıq perspektivliyi əsasən Məhsuldar qatın Qırmakialtı lay dəstəsi(QALD)və onun qumlu horizontları, onların pazlaşma zonalarında litoloji pazlaşma, qırılmalarla mürəkkəbləşmiş hissələrdə isə tektonik ekranlaşma ilə əlaqədar tələlərlə və qismən üst Təbaşirin karbonatlı-çatlı çöküntüləri ilə əlaqədar olduğu proqnozlaşdırılır.
Açar sözlər: neft,qaz, çöküntütoplama, arxipelaq, fasiyalar, karbonat, pisamit

Introduction. The Agburn-Deniz Uplift Zone, located in the vicinity of richoil and gas condensate fields, covers a large area from the northwest of the Absheron Peninsula to the southeast. This zone includes the following structures: Goshadash, Agburun-Deniz, Absheron earring, Northern Absheron, Western Absheron, Khazri, Gilavar, Arzu, Day of Murder, Vusal, Sevinj, Dan Ulduz, Novkhani, Aymara, Ganjlik, Ashrafi, Galaba, Zirve, Hamdam, Karabakh folds. More than 90% of Azerbaijan's annual oil production comes from the Productive Formation (MG). At the same time, in terms of the prospects of hydrocarbon exploration, the rock complex above and below the MG in different regions of Azerbaijan is highly valued [1,2].

Methods. From this point of view, the main object of research in the Northern Absheron archipelago is the PS and the sediments below it. Relevantstudies have been conducted in several structures at the regional level and in individual structures to investigate the regularity of changes in the collector properties of rocks. It should be noted that the Agburun-sea structure in the southern hemisphere of the Northern Absheron archipelago creates another undulation of the hinge. This structure is separated from the Goshadash uplift by a shallow saddle. The rise has been studied by aerial photography, mapping, exploratory drilling (southeast periclinal section), AMS seismic

exploration, gravimetric exploration, and seismoacoustic profiling. The Auburn-Deniz structure was first discovered in 1948 byseismic surveys. Various geophysical surveys conducted in 1960-1980 reaffirmed theexistence of the Auburn-Deniz structure near the south-western wing of the Abshe PS, measuring 11x3.25 km according to the 1400 m ships and 3.5x12.5 km according to the upper surface of the chalk (2000 m ships). The wrinkle has an asymmetrical structure in both transverse and longitudinal sections. The north-east wing is inclined (10-12º) and the south-west wing is relatively steep (25-30º).

Results. The arch part of the fold is complicated by large longitudinal cracks in the formof horsts. According to the Cretaceous sediments, the uplift is composed of wrinkles complicated by reverse faults. The angle of inclination of the north-eastern wing (lower Cretaceous) is 50º, while that of the south-eastern wing (upper Cretaceous) is 70º (Figure 1) [3,4].

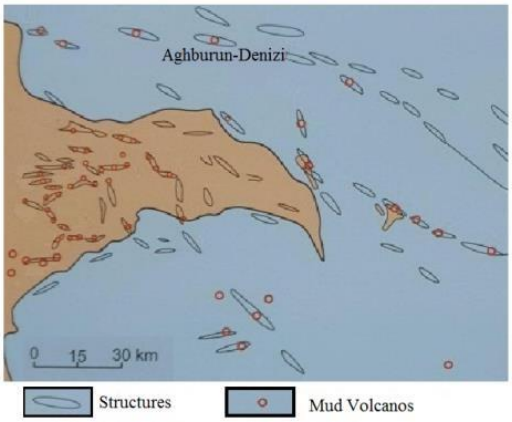

Figure 1. Inclination of the north-eastern and south-eastern wing [4]

The seismological profile of the Agburun-Deniz-Absheron-Northern Absheron line shows that the folds are mainly sedimentary. The dynamics of this type of development of folds and the complication of most folds in the study area with mud volcanoes is a direct indication of both high tectonic activity and high conditions for the formation of traps in which hydrocarbon deposits can form (Figures 1, 2) [5, 6]. The folds are complicated by a large number of transverse, longitudinal, and radial faults, which suggests that the oil and gas deposits that may be present there are mainly due to lithological faults and tectonic shielded traps. The fact that the rocks of the same age in the Pontus, QAD, and QAD centuries are folded from the wings ofthe fold to the arch shows that the rate of development of the uplift is greater than the rate of sedimentation during that geological time. The fracture, which complicates thearch of the structure, developed as a fault-type fracture from the first stage of development, that is, from the beginning of the Pliocene to its end, and did notchange its direction of deposition much. It can be concluded that active technological processes continued in the Fourth Period [7,12] (Fig.2).

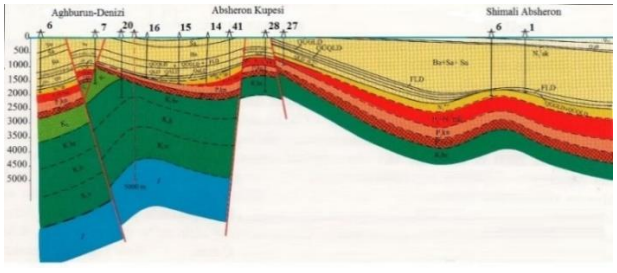

Figure 2. Geological profile in the direction of Agburun-Deniz-Absheronearring-Northern Absheron [12]

It should be noted that in 2014, exploration well No. 1, located in the Auburn- Deniz structure at a depth of 10 meters, near the arch of the south-western wing of thestructure, was delivered to the project horizon and more detailed information on stratigraphy, lithology, oil and gas content was obtained. are.

The well was drilled to a depth of 860 meters, fully opened the project horizon Girmekialti formation (GALD), and a 168.3 mm production pipe was lowered into the well. The interval of 1773-1792 m of QALD in terms of oil content in the section of well No. 6 in the Agburun-Deniz exploration area is noteworthy. In the explorationwell No. 7 drilled between the two longitudinal fractures in the arch part of the uplift, the QALD sediments are also characterized by positive electrocardiographic features in terms of oil content.

Gas manifestations were recorded during the opening of Miocene sediments inthe northern Absheron archipelago. However, the low sand content at the intersection does not allow to accept these sediments as a basic object for prospecting. It is more expedient to study the oil and gas content of Miocene sediments in exploratory wells drilled in the Mesozoic (Mz). The oil and gas content of carbonate-fractured sediments of the Valanj floor of Cretaceous, lying at relatively great depths, shouldbe studied primarily in the Agburun-Deniz and Goshadash areas formed in the north- west of the archipelago [8, 10, 13]. In well No. 20 drilled in the arch part of the north-eastern wing of the Agburun-Deniz uplift, the clay deposits of the Barrel floor were drilled to a depth of 1,400 m, and in the search wells No. 37 and 39 drilled in the north-eastern wing of the Absheron Cup, at depths of 906 and 1930 m, respectively.It is possible that the promising Valanjin-Berries age carbonate-fractured sediments were discovered at relatively shallow depths in the Goshadash and Agburun-Deniz uplift, which are located at the same hypsometric level as these uplifts due to the sediment ceiling (Figure 2).

According to the data of deep exploration wells, oil and gas analysis of the studied part of the section allows saying that gas and gas condensate fields are likely to be formed as a result of gradual migration of hydrocarbons in the Agburun-Deniz and adjacent formations. Analysis of changes in the reservoir properties of rocks along the field and depth allows to objectively assess the fluid capacity and oil and gas prospects in natural reservoirs. For this purpose, porosity and permeability variation graphs characterizing the collectorship of rocks up to a depth of about 3000 m in the Agburun-Deniz area were compiled and analyzed (Fig.3).

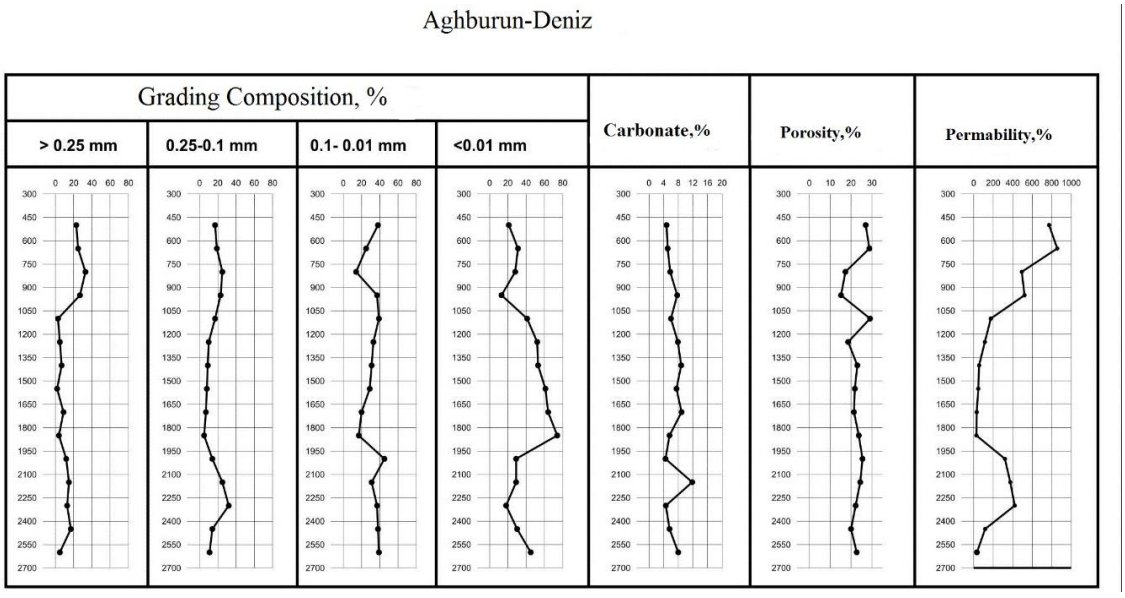

Figure 3. Depth variation of granulometric and collector properties of rocksalong with the depth [12]

The analysis allows to characterize the collectorship of deep-sea rocks in the Agburun-Marine area as follows: rocks at a depth of 400-550 m contain 23% of epiphytes, 17% of psammites, 38% of siltstones, and 22% of pelites, while the carbonate content is about 5%. The porosity of the rocks in this composition is 26- 27%, and the permeability is 773 MD on average.

The amount of epiphytes in the sedimentary complexes located in the depth range of 550-700 m varies between 24-26%, psammites 19%, siltstones 25-26%, and pelites 30-32%. As for carbonate, their percentage is almost unchanged. The porosity of such rocks is 28-29%, and the permeability is about 850-860 MD.

Subsequent sediments, ie depths of 700-850 m, are characterized by a relative increase in pseudite and psammite facies (33, 25%), and a relative decrease in siltstone and pelite facies, respectively (14, 28%). Under certain conditions of increasing carbonate content, the porosity decreases to 15-16%, and, accordingly, the permeability decreases with a jump, falling to 490-500 MD.

At a depth of 850-1000 m, the rocks are characterized by 27% of epiphyte fascia, 23% of psammite, and 42-44% of the total amount of siltstone and pelitic fascia. In this interval, the carbonate content of the rocks is again characterized by an increase and reaches 7-8% -3. It is in this range that the porosity gets its lowest value during the cut, 14-15%. Despite the small porosity, a relatively sharp decrease in the pelvic fascia has a positive effect on the permeability value, which increases to 520- 525 MD. Depth intervals of 1000-1150, 1150-1300, 1300-1450, 1600-1750, and

1750-1900 m are characterized by similar collector indices. Thus, on average, it consists of 5-6% psephyte, 13-14% psammite, 28-30% siltstone, and more than 55- 60% pellets. Such a high pellet fascia has led to a sharp decrease in the conductivityof carbonate and even porosity (up to 27 MD).

In the next 1900-2050 m depth range, an increase in petite and psammite facies, a sharp decrease in pellets, a relative decrease in carbonate, and an increase in porosity, led to an increase in permeability to 320 MD.

With minor exceptions, certain changes are observed in the collector of rocksat depths of 2050-2200, 2200-2350, 2350-2500, 2500-2650 m. Thus, the reduction of pelitic fascia and carbonation has a positive effect on porosity and permeability.Based on all this information and analysis, a correlation matrix characterizing the collector rocks of the field is given (Table 1). The geological meaning of this is that ifthe correlation coefficient takes a value of a unit or is close to it, it means that the mathematical dependence between the two parameters is strong. This connection will be the maximum at "1" and the minimum at "0". Naturally, there is no relationship between the two quantities of any parameter at zero value. In addition, the dependence of the conductivity parameter (K) of the rock on its other collector properties is expressed by the formula. The main advantage of expressing this dependence in this way is that it is statistically assumed that the conductivity can be calculated on a limited database or what values it can take.

Table 1. Correlation matrix for Agburun-sea area [12]

	Petite	Psamit	Alevrite	Pelite	$CaCO_3$	Porosity	Conducivity
Petite	1	0,633	-0,174	-0,728	-0,243	-0,246	0,806
Psamit	0,633	1	0,161	-0,855	-0,140	-0,079	0,654
Alevrite	-0,174	0,161	1	-0,474	-0,146	0,205	0,046
Pelite	-0,728	-0,855	-0,474	1	0,265	0,065	-0,742
$CaCO_3$	-0,243	-0,140	-0,146	0,265	1	-0,241	-0,370
Porosity	-0,246	-0,079	0,205	0,065	-0,241	1	0,231
Conductivity	0,806	0,654	0,046	0,742	-0,370	0,231	1

Conclusion

1. The oil and gas prospects of the Northern Absheron archipelago are mainly related to the sandy horizons of the MG QLD and QALD and lithological cracking in their fault zones, and tectonic shielding in the areas complicated by fractures and in part to the upper Cretaceous carbonate-fractured sediments.
2. Lithologically cracked and tectonically shielded traps in the fault zones of QALD and QALDs should be prepared for exploration by seismic survey and the presence of KH deposits in them should also be checked by direct survey methods. The oil and gas content of the Upper Cretaceous sediments can be studied by drilling an exploration well with a project depth of 4,600 m in the arched part of the Agburun-Deniz uplift.
3. It is expedient to drill multi-well wells in the surrounding areas with high prospects.

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