

STRUCTURAL-TECTONIC PECULIARITIES OF THE NORTH-WESTERN PART OF SOUTH CASPIAN

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ABSTRACT. Decreasing of potential of oil and gas bearing resources of Productive series sediments gradually in land and sea territories of Azerbaijan creates a need to attract pay sandstone lying deeper in terms of stratigraphy and hypsometry to prospecting drilling.

In this regard, the main prospecting directions are related with Paleogene-Miocene and especially Mesozoic sediments lying at depth. The main perspectives about Productive series are related with productive horizons of South Caspian basin, but with the sediment of Mesozoic and partly productive series in North Absheron uplift zone. Widening geophysical prospecting works in these fields and drawing them into research and prospecting dwelling are rational with the purpose of studying the mentioned fields comprehensively. Besides deep depth of South Caspian drawing its coastal transit zone into research and prospecting works is one of the necessary principles.

Participation of Lower Cretaceous (Valanzhin) and Middle Jurassic sediments in sections of this region, also exposing of Upper Jurassic sediments to erosion in some paleo-uplifts and not participating of them in geological sections in such uplifts are assumed as a result of analysis of the materials and taking into account the close connection of geological development history of the north-east part of South Caspian with development history of South-Eastern Caucasus. Participation of Mesozoic, Paleocene-Miocene and Pliocene-Anthropogenic sediments in the geological structure of the north-western part of the investigation field and surface appearances of current sediments in sea bottom are observed according to extension condition.

North Absheron uplift zone is divided into two parts: north-west and south-east, which differ significantly from each-other according to their regional tectonic peculiarities.

The north-west part of North Absheron uplifts zone, which stretches in the sub latitudinal direction, differs by its location at the height of more than 1000m from the south-east part and by its more complex structure on the hypsometric aspect (according to lower parts of Productive series).

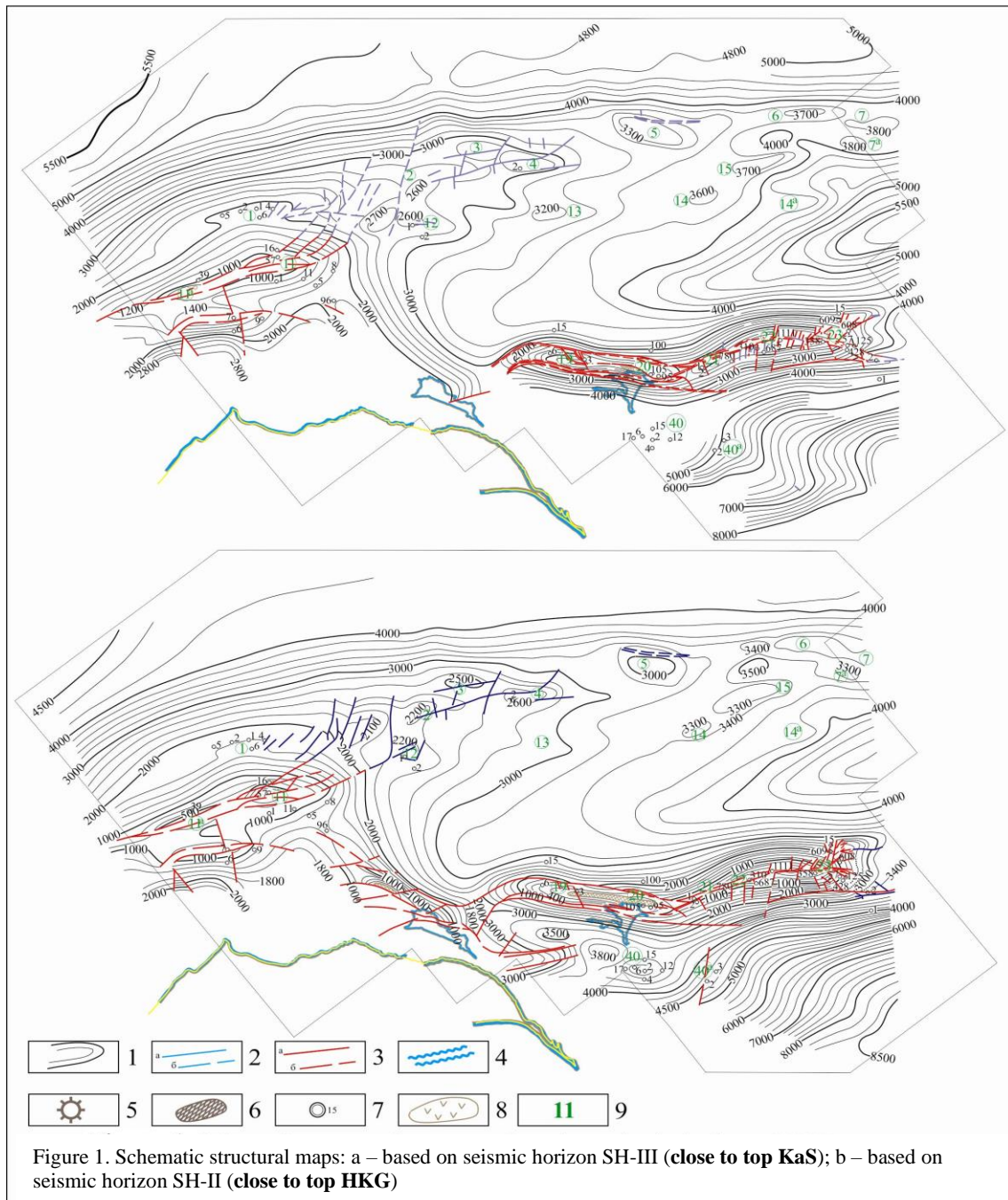
Goshadash, Aghburun anticline uplifts, also West Absheron, East Absheron and other uplifts situated in the north from them have been discovered during structural and research drilling here and by methods of seismic prospecting. Goshadash anticline, which has been broken into blocks by longitudinal and diagonal directed faults, is separated from Aghburun anticline comparatively by deep and wide anticlines, but Western Absheron and Eastern Absheron uplifts are separated from each other by narrow anticline [1].

Miocene sediments were covered by clayey sediments of Pontian stage after significant erosion during Pontian break in the arch part of the uplifts, which is located in the north-west part of Absheron archipelago. Although these sediments are preserved in Aghburun-sea, Mardakan-sea, Pirallahi island, Gurgan-sea, South, South-2 uplifts and Khali-Chilov island-Palchig Pilpilesi uplifts, but these sediments exposed to intensive erosion in territory of North Absheron uplifts after Pliocene erosion. Gala suite sediments - the basis horizon of Productive series lay on erosion surface of Miocene sediments in arch part of Ashfari and Garabagh uplifts in the south flanks of Absheron bank and Novkhani uplifts, sediments of Girmakialti suite lay on arch part of WestAbsheron and Darwin bank uplifts, sediments of Girmaki suite lay on Khazri, Gilavar, Arzu, Dan Ulduzu uplifts and

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sediments of Girmakiustu sandy, Girmakiustu clayey suite, also “Fasila” suite lay on North Absheron uplift (Fig. 1,2).



Pontian sediments are covered by Gala suite sediments in Pirallahi-Kilkor depression and in Pirallahi island Gurgan-sea, South, South-2, uplifts situated in the south-west from it and in Khali-Chilov island-Palchig Pilpilesi uplifts.

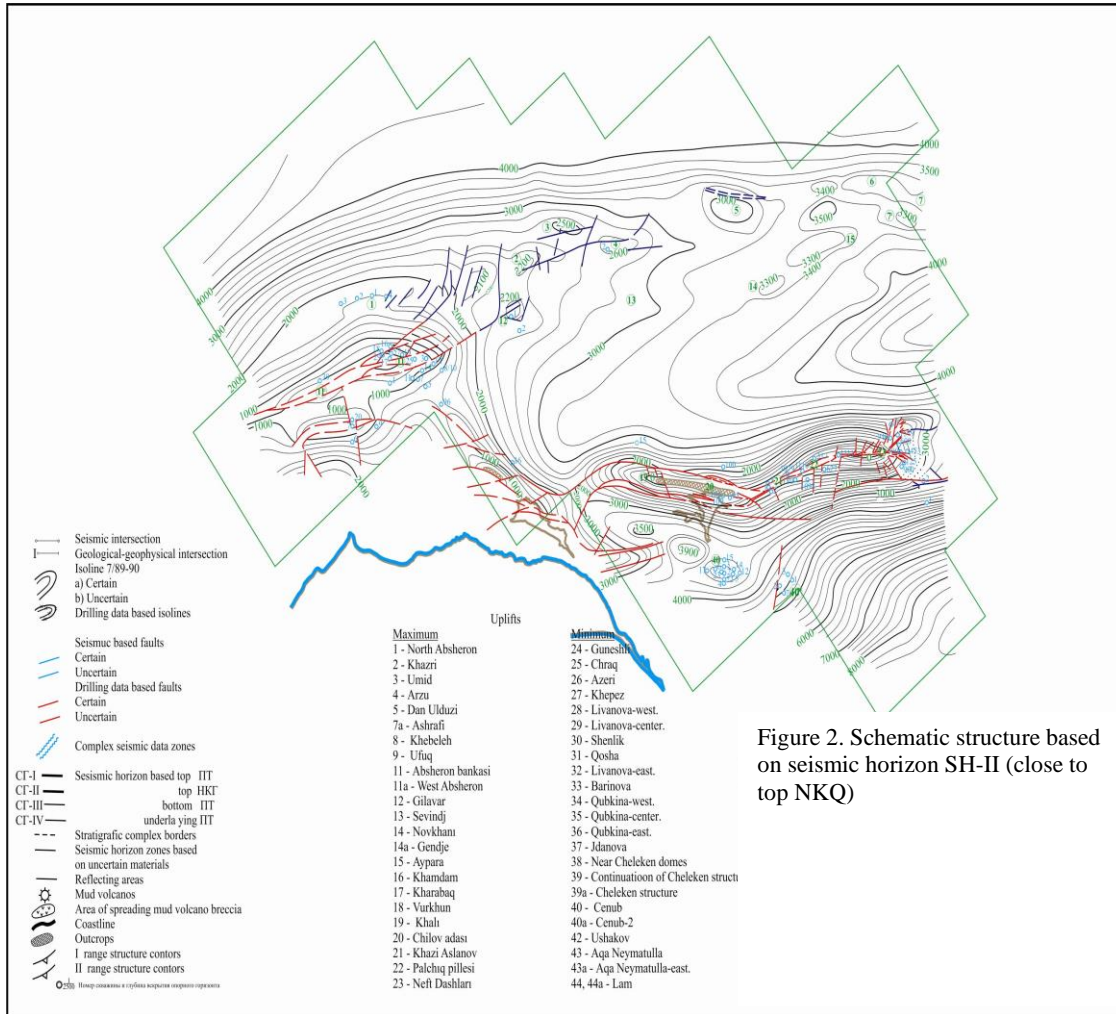


Figure 2. Schematic structure based on seismic horizon SH-II (close to top NKQ)

Tectonic peculiarities of the north-west part of Absheron archipelago are pinching in the south-west flanks of North Absheron uplifts according to Gala suite spread in comparatively limited area and pinching territories take shape of gulf between the uplifts.

The ceiling of Gala suite is at depth of 4400m in Pirallahi-Kilkor depression, but it rises to 800-1000m in Khali-Chilov island-Palchig Pilpilesi uplifts.

The north-east and the south-west flanks of these uplift groups, which reflected sharp enough according to surface of Gala suite, complicated by large amplitude (1000-1500m) longitudinal and some latitudinal faults.

Tectonic faults participate only in the south flank of Gala suite of Absheron bank, but diagonal directed faults are more typical for Darvin bank and Gurgan-sea uplifts (Fig. 3).

Available longitudinal (also regional) transform faults play exceptional role in active development of hydrodynamic processes. Anticline uplifts situated in the south-east part of North Absheron uplifts zone significantly differ from uplifts situated in the north-west part of the zone for their small size [2].

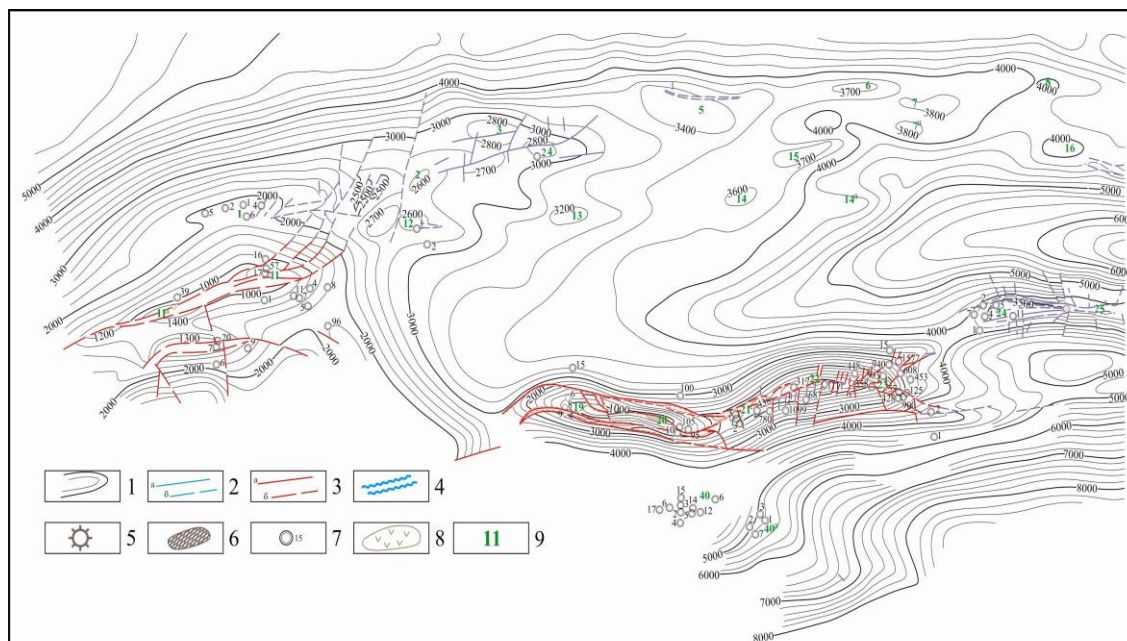


Figure 3. Schematic structure map on seismic horizon of SH-III (close to topKaS)

Legend: 1-seismic horizon isolines; 2-faults based on seismic explore; a-defined, b-assumed;

3-drilling data based faults: 2-defined; b-prognosed; 4-complex seismic zones; 5-mud volcanoes; 6-outflow of mesozoic sediment on the surface; 7-exploration wells; 8-mud volcano breccias area; 9-seismic defined structure number: 1-North Absheron; 2-Khazri; 3-Umud; 4-Arzu; 5-Dan Ulduzu; 8-Khebele; 11-West Absheron; 12-Absheron banks; 13-Gilavar; 14-Sevinj; 15-Novkhani; 14a-Genjlik; 16-Aypara; 17-Khamamdag; 19-Khali; 20-Chilov Island; 21-Hazi Aslanov; 22-Palchig Pillesi; 23-Neft Dashlari; 24-Guneshli; 25-Chirag; 40-Janub; 40a-Janub-2.

The south-east part of this zone has asymmetrical structure in longitudinal and latitudinal directions. Asymmetry in longitudinal direction of this part of the uplifts zone is observed in burying of Girmaki suite sediments at depth from 2300-2400 m to 3400-3600 m at the distance of 60-65 km from Khazri uplift situated in its north-west part to Garabagh uplift situated in the south-east.

It should be noted that falling of hypsometric level is not continuously, structural groups of this part of uplifts zones occur by formation of small and relatively large terraces separating them from each other.

So, the surface of Girmaki sediments were buried at depth from 2300 m to 3000 m in structural group consisting of Khazri, Getl Gunu, Arzu and Gilavar, Vusal and Sevinj situated in the south-south-west from them, uplifts group of Dan Ulduz, Aypara, Ashrafi, Novkhani and Ganjlik which involved larger area limits by isohyps of 3000-3400 m, but Hamdam-Garabagh uplifts limit by isohyps of 3400-3600m.

The asymmetry of this part in latitudinal directions is steepness of its north-east flank directed to North Absheron valley, inclination of its south-west flank directed to Pirallahi-Kilkor valley.

So, Girmaki suite sediments were buried at relatively short distance, from 3000m to 4800 m in the north-east flank directed to North Absheron valley consisted of regional scaled steep monoclines, but incline depth of Girmaki suite changes between 3400-4000 m in the south-west flank directed to Pirallahi-Kilkor valley.

According to lower layer of Productive series Khali-Chilov island-Neft Dashlari anticlines group, which extends from the south-south-west to south-east direction, is situated in the north-west part of Pirallahi-Kilkor valley and Pirallahi island-Darvin bank-Gurgan-sea-South and South-2 uplifts zone is situated in the south-west from this group. Khali-Chilov island-Neft Dashlari anticlinal uplifts group situated in the north-west part of Absheron-Balkhanyani anticline zone combines in linked form with Darwin bank-Pirallahi-Gurgan-sea in the north-west and Guneshli-Chirag-Azeri-Kepez uplifts groups in the south-east.

These anticline groups consist of Khali, Chilov Island, Hazi Aslanov, Palchig Pilpilesi, Neft Dashlari uplifts with length of 50 km and reflect enough on sediments of Productive series and they are also divided into two parts according to structural-tectonic peculiarities. Khali and Chilov island are situated in the south-east direction in the first part, but Hazi Aslanov, Palchig Pilpilesi, Neft Dashlari uplifts directed to the north in shape of weak arched and extended in submeridional direction are situated in the second part.

The surface of Productive series is eroded significantly in Khali and Chilov islands uplifts separated from each other by shallow anticline. Sediments of Productive series are eroded completely in arch part of Chilov island uplifts situated in higher in terms of hypsometry. The nucleus of this structure, which has diaper structure, is consisted of Pontian and Diatom sediments [3].

The south-west flank of Chilov island uplift with amplitude of 500 m covered the north-east flank by plus-shaped fault. But the south-west flank of Khali uplift, which is situated in low from Chilov island uplift in terms of hypsometry and separated from it by shallow structural anticline, complicated by some faults with small amplitude. Hazi Aslanov, Palchig Pilpilesi which are separated by small and narrow anticlines from Chilov Island and situated in the west part of Hazi Aslanov, Palchig Pilpilesi, Neft Dashlari uplifts group, consist of small undulation formed in the west periclinal of the uplift extended to 3-4 km. The north-east directed undulation interflows to complicated Palchig Pilpilesi by fault in the direction of structure axis by turning to the direction of parallel.

Neft Dashlari uplift, which is separated from Palchig Pilpilesi uplift by shallow anticline and extends in the south-east direction, is branchy anticline structure with asymmetrical texture. The north-east flank of the structure has been complicated by longitudinal faults with large amplitude and many latitudinal directed faults. Sediments of lower layer of Productive series crop out in the north-west part of Neft Dashlari structure.

Darvin bank-Pirallahi island-Gurgan-deniz-South-South-2 uplifts zone consists of two different parts. The north part is complicated by extended in sub meridian al direction, sharp reflected, some longitudinal and diagonal directed faults and consists of Pirallahi island-Darvin bank-Gurgan-sea anticlines, but the other part extended in the south-east direction consists of buried and simple structural South and South-2 uplifts.

Darvin bank uplift is situated in the north of submeridional directed part and it separates from sub latitudinal directed uplift of Absheron bank of North Absheron uplifts zone by structural anticline, which central part amplitude reaches to 200 m, is complicated by meridional directed fault and indicated by isohyps of 1600 m.

Darvin bank, Pirallahi-North, Pirallahi-South and Gurgan-sea anticlines of this group rose highly in terms of hypsometry and very complicated tectonic unit.

North and South Pirallahi uplifts, which are situated in Pirallahi Island and different according their structural and tectonic peculiarities, are separated from each other by sub latitudinal directed faults.

Close valley is surrounded by uplifts of North Pirallahi, Darvin bank from the east, by Aghburun-sea from the north and by Merdakan-sea from the west and situated in the north from the sub latitudinal fault, but wide gulf-shaped valley is situated in the direction of Shuvalan-Zira in the south and opened to South Caspian valley.

Darvin bank-Pirallahi-Gurgan-sea uplifts group is separated from Khali-Neft Dashlari anticlinal zone, which combines in linked form with North and South Pirallahi uplifts in the east from Pirallahi Island, by wide structural anticline.

Gulf-shaped valley is situated between the north-east sent cline of Pirallahi-Kilkor valley in the north from this structural anticline and Gurgan-sea and Khali-Chilov island uplifts in the south and opened to South Caspian valley in the east.

This gulf-shaped valley separates Darvin bank-Pirallahi-Gurgan-sea uplifts group in the south-east from buried South and South-2 uplifts.

Remains are exposed to sharp variation in the north-west of the archipelago as a result of lying of Productive series sediments on Miocene sediments by angular disconformity and erosion of surface part significantly [2]. So, Gala suite sediments don't participate in the north flank of Goshadash, West Absheron, Absheron bank uplift situated in the north-west part of North Absheron uplifts zone, in Aghburun-deniz uplift, as well as in the sections of lifted parts of Khazri, Arzu, Dan Ulduzu uplifts. Exposing of investigation area to active tectonic processes and formation of deposits according to geodynamic tension are observed more active towards depth.

Conclusion

1. The role of existing regional longitude transform faults is important in distribution, formation of oil and gas deposits and activity of hydrodynamic processes.
2. Studying of geodynamic tension condition and seismic activity (related with earthquakes) in complicated areas by tectonic faults in Absheron uplifts zone of South Caspian basin is one of the important issues.

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