ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)

ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ
Қ. И. Сәтпаев атындағы Қазақ ұлттық техникалық зерттеу университеті

Х А Б А Р Л А Р Ы

ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК
РЕСПУБЛИКИ КАЗАХСТАН
Казахский национальный исследовательский технический университет им. К. И. Сатпаева

N E W S

OF THE ACADEMY OF SCIENCES
OF THE REPUBLIC OF KAZAKHSTAN
Kazakh national research technical university
named after K. I. Satpayev

SERIES
OF GEOLOGY AND TECHNICAL SCIENCES

4 (436)

JULY – AUGUST 2019

THE JOURNAL WAS FOUNDED IN 1940

PUBLISHED 6 TIMES A YEAR

ALMATY, NAS RK

NAS RK is pleased to announce that News of NAS RK. Series of geology and technical sciences scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of News of NAS RK. Series of geology and technical sciences in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential content of geology and engineering sciences to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Webof Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабарлары. Геология және техникалық ғылымдар сериясы Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді геология және техникалық ғылымдар бойынша контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Известия НАН РК. Серия геологии и технических наук» был принят для индексирования в Emerging Sources Citation Index, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Известия НАН РК. Серия геологии и технических наук в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному контенту по геологии и техническим наукам для нашего сообщества.

«ҚР ҰҒА Хабарлары. Геология мен техникалық ғылымдар сериясы».
ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)
Меншіктенуші: «Қазақстан Республикасының Ұлттық ғылым академиясы» РҚБ (Алматы қ.).
Қазақстан республикасының Мәдениет пен ақпарат министрлігінің Ақпарат және мұрағат комитетінде 30.04.2010 ж. берілген **№10892-Ж** мерзімдік басылым тіркеуіне қойылу туралы куәлік.

Мерзімділігі: жылына 6 рет.
Тиражы: 300 дана.

Редакцияның мекенжайы: 050010, Алматы қ., Шевченко көш., 28, 219 бөл., 220, тел.: 272-13-19, 272-13-18, http://www.geolog-technical.kz/index.php/en/

Редакцияның мекенжайы: Қазақстан, 050010, Алматы қ., Қабанбай батыра көш., 69а.
Қ. И. Сәтбаев атындағы геология ғылымдар институты, 334 бөлме. Тел.: 291-59-38.

Типографияның мекенжайы: «Аруна» ЖК, Алматы қ., Муратбаева көш., 75.

«Известия НАН РК. Серия геологии и технических наук».
ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)
Собственник: Республиканское общественное объединение «Национальная академия наук Республики Казахстан (г. Алматы)
Свидетельство о постановке на учет периодического печатного издания в Комитете информации и архивов Министерства культуры и информации Республики Казахстан **№10892-Ж,** выданное 30.04.2010 г.

Периодичность: 6 раз в год
Тираж: 300 экземпляров

Адрес редакции: 050010, г. Алматы, ул. Шевченко, 28, ком. 219, 220, тел.: 272-13-19, 272-13-18,
http://nauka-nanrk.kz /geology-technical.kz

Адрес редакции: Казахстан, 050010, г. Алматы, ул. Кабанбай батыра, 69а.
Институт геологических наук им. К. И. Сатпаева, комната 334. Тел.: 291-59-38.

Адрес типографии: ИП «Аруна», г. Алматы, ул. Муратбаева, 75

News of the National Academy of Sciences of the Republic of Kazakhstan. Series of geology and technology sciences.
ISSN 2518-170X (Online),
ISSN 2224-5278 (Print)
Owner: RPA "National Academy of Sciences of the Republic of Kazakhstan" (Almaty)
The certificate of registration of a periodic printed publication in the Committee of information and archives of the Ministry of culture and information of the Republic of Kazakhstan N 10892-Ж, issued 30.04.2010

Periodicity: 6 times a year
Circulation: 300 copies

Editorial address: 28, Shevchenko str., of. 219, 220, Almaty, 050010, tel. 272-13-19, 272-13-18,
http://nauka-nanrk.kz/geology-technical.kz

Editorial address: Institute of Geological Sciences named after K.I. Satpayev
69a, Kabanbai batyr str., of. 334, Almaty, 050010, Kazakhstan, tel.: 291-59-38.

Address of printing house: ST "Aruna", 75, Muratbayev str, Almaty

N E W S
OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN
SERIES OF GEOLOGY AND TECHNICAL SCIENCES
ISSN 2224-5278
Volume 4, Number 436 (2019), 6 – 11 **https://doi.org/10.32014/2019.2518-170X.92**

UDC 553.982.2:553.984

S. M. Ozdoyev[1], N. S. Abduev[1], V. A. Popov[1], N. Tileuberdi[1], Ma Hua Dong[2]

[1]Satbayev University, Institute of Geological Sciences named after K. I. Satpaev, Almaty, Kazakhstan.
[2]The research center of nature resources and ecological environment in Xinjiang, Xinjiang, China.
E-mail: Ozdoyevsultan@mail.ru; Nureke-17@mail.ru

COMMON AND DIFFERING GEOLOGICAL FEATURES OF THE ALAKOL AND CHINESE DZUNGARIAN TROUGHS IN VIEW OF THEIR OIL-AND-GAS PROSPECTS

Abstract. In the current paper, an attempt has been made to consider the history of geological development of the Alakol trough in East Kazakhstan and the Dzungarian trough in China. Reconstruction of commonness and difference in development of these troughs has been implemented on the base of the analysis of their thickness, lithological structure and paleographical conditions of rock reservoirs with purpose of determining the prospects of their oil-and-gas content.

Key words: the Alakol trough, the Dzungarian trough, paleographic conditions, lithology, rocks, the Paleozoic age, the Cenozoic age, conglomerates, sandstone, clay, carbonate, tectonic movements, oil-and-gas content.

Many researchers see similarity between the two original troughs, emphasising their common geological features, which are manifesting in the continuity of petroleum strata between the Dzungarian to the Alakol trough [1, 2].

The article considers works of the pioneers, thus paying the due tribute. References are made to the works published in recent years, their materials being sufficiently substantiated.

In order to inspect the geological structure of these troughs, we considered the following works: A.K.Buvalkin (1960), A.K. Buvalkin and V.I.Vlasov (1961), A.K.Buvalkin and M.Ts.Zhaimin (1958), A.Kh.Ivanov (1962), K.V.Kurdukov (1954), V.Ya.Kolubin (2002), G.Zh.Zholtaev and S.M.Ozdoev (2010), N.S. Abduev, S.M.Ozdoev and R.Kh.Ostapenko (2010) – on Alakol, and A.Kh.Ivanov (1962), F.S.Maisenko and G.K.Nevsky (1960), V.A.Obruchev (1948), N.M.Saidov (1956), N.P.Tuaev (1963), L.Chzhan, A.V.Sidnev (2010), Go Ming and A.V.Sidnev (2015), G.P.Kuznetsova, Van Tse and Lu Inzhu (2017) – on the Dzungarian trough.

The authors of the current paper do not pretend to the exceptional accuracy of the study on history of geological development of these peculiar structures.

Alakol is a promising oil and gas bearing region, geologically associated with the intermountain trough of the same name, limited in the north by the Tarbagatai range, in the southwest by the Dzungarian Alatau range, and in the southeast by the Berlik and Maily ranges. The area of the trough is 25,600 sq.km.

Rocks of the Paleozoic, Mesozoic and Cenozoic ages take part in the geological composition of the trough. Paleozoic rocks within the trough are not exposed and have been studied only in its framing boundaries. They are intensely dislocated, broken by faults and intrusions, and form the Alakol trough's foundation [3]. According to geophysical data, volcanogenic and volcano-sedimentary deposits of the Early and Middle Devonian with thickness of up to 4,000 m are supposed to be developed under the trough.

The Dzungarian intermountain trough, located in the western part of China with the area of 130 thousand sq.km, is limited in the northwest by spurs of the Maily-Dzhair range, in the south by the East Tian-Shan, in the east by the branch of the Karamaily range and in the southeast is framed by the Mechinula range.

Recent studies within the Dzungarian sedimentary basin have revealed new additional structural elements of the second order: uplifts, deflections, depressions, which made it possible to map the complex geological structure and revise the basin's structural plan [4, 5].

Paleozoic, Mesozoic and Cenozoic rocks take part in geological structure of the basin; the foundation is considered by some researchers as heterogenic, by others as composure of Caledonite and Hercynide rocks.

The Atlas of lithological and paleogeographic, structural, palinspastic and geo-ecological maps of Central Eurasia, compiled in 2002 with participation of experts from geological services of China, adopted the Paleozoic age of the foundation, while it is rather confined to the Lower Paleozoic. The base of the Dzungarian trough is formed by crystalline shale, occurred at depths of 16 km down in the south part and monoclinal wedging for 2 km to the north [3]. The main capacity of the sedimentary cover rocks is concentrated within the Urumqi trough There is no information on the Alakol trough in the Baikal tectonic epoch, at the end of the Proterozoic and in the beginning of the early Paleozoic. At that time, the eastern part of the nascent Dzungarian basin was a land with non-segmented deposits.

Starting from the Ordovician, under marine conditions, deposits accumulate on the continental slope of the Alakol trough. In the Dzungarian trough, marine conditions are preserved, forming a deep-water trough, composed of siliceous shale and sandstone rocks of up to 1000 m thick.

In the Silurian and Devonian ages, the sea transgression increased, rock formation took place in the Alakol trough's inner shelf zone, with activation of volcanism. Formations of various lithological composition are represented by tuffy sandstone, siltstone, siliceous shale, conglomerates, limestone, tuffs and porphyrites of up to 800 m thick.

Deep-water troughs expanded in the Dzungarian basin. Tectonic activation of folding processes led to deposition of metamorphic shales, argillites and basalts up to 3000 m thick on the continental slopes. In the Lower Devonian age, a shift occurred along the submeridional fault touching the junction area of the Alakol and Dzungarian troughs. It was the faults formed in the Ordovician that determined difference in tectonic conditions and geological development records of the Alakol and Dzungarian troughs. Common to them is manifestation of horizontal movements, as well as shifts along the two boundary faults of sublatitudinal strike in the Lower Devonian.

In Early Carboniferous, due to increased tectonic activity in the troughs, differentiation of the lithological-paleographical situation occurred, along with spatial dissociation of rock formation conditions.

In the southern part of the Alakol trough, the inner-shelf marine conditions for formation of coarse-clastic rocks with thickness of up to 720 m were preserved, while continental volcanic movements in the northern part, shaping rhyolites, dacites and andesites of up to 1300 m thick, were active.

Minor changes occurred in the Middle Carboniferous age. The northern part of the trough was busily occupied with orogenic manifestations. Lime deposits with peltsipodic fauna and inclusions of tuffy aleurolites of total capacity of up to 700 m accumulated on the main part of the trough.

In the Dzungarian trough, rocks formed at the foot of the continental slope, under deep oceanic conditions; sediments were composed of metamorphic shales and mudstones of up to 2000 m.

In the Middle Carboniferous, the Dzungarian trough experienced regression of the sea, development of coastal plains, foothills of continental slopes and contrast relief of mature island arcs with accumulation of limestone, sandstone, tuff sandstone, clay sandstone with organic remains of trilobites, corals and terrestrial flora. According to the borehole data, thickness of deposits in the Urumqi deflection is 2375 m.

In the Early Permian age, accumulation of sediments takes place under the plain-coastal paleogeographic conditions, with formation in the north part of the Alakol trough of continental volcanic mountains up to 1300 m high. Lithologically, rocks are similar to those of underlying rocks of the Middle Carboniferous with thickness of up to 700 m.

In the Early Permian, the Dzungarian trough undergoes deflecting with development of coastal plains and lakes. Lithologically, these are green and dark-gray sandstone, conglomerates, shales; their thickness in the Karamaily district is 1470 m, reaching in the Urumqi trough 4700 m. Found among the rocks, are bituminous shale and coal interlayers.

By the end of the Early Permian age, mobility of geodynamic directions of the quasi-platform cover is exhausted.

It is believed that in the Lower Permian age the time came for transition from geological development to the orto-platform stage.

Ascending movements in the platform development process during the Permian age did not construct significant mountains. Surface of the inspected troughs is characterised by acclivous accidental terrain, they were not affected by sharp tectonic movements.

In the Triassic age, the entire territory of the Alakol trough was represented by low mountains in the northeast part of the country, developing elevations in the southwest part, and these landscapes were separated by an active sublatitudinal fault.

In the lower Triassic, continental coarse-clastic rocks were accumulating in the western part of the Alakol trough, on the Permian effusive sedimentary deposits with angular disagreement. In the Middle Triassic age, the planar erosion prevailed.

In the Lower and Middle Triassic ages, conglomerates of violet-red colour, sandstone, and clays of thickness of up to 700 m deposited in the Dzungarian trough under lacustrine-alluvial conditions.

In the Upper Triassic age, downward movements were noted, especially explicit in the south of the Dzungarian trough as they favoured accumulation of conglomerates, sand-clay rocks and coal interlayers in the Urumqi trough. The general thickness exceeded 1500 m.

In general, the Triassic occupies an intermediate position during the transitional period in geological development of the Hercynian and Alpian epochs of upward tectonic movements in eastern troughs of Kazakhstan and Dzungaria.

For the Alakol trough area, the Jurassic period is divided into two epochs, according to paleographic rock formation conditions. In the Middle Jurassic time, the Alakol trough was a two-part sublatitudinal space. The northeast side was covered with hills, and the southwest was a scene for formation of foothill and intermountain troughs with carrying-out of coarse-clastic material with thickness of up to first hundreds of meters.

In the Dzungarian trough, downward movements which had already started in the Lower Triassic continued in the Lower and Middle Jurassic ages. At this time, the Dzungarian trough expanded sharply to east, where sediment accumulation occurred on lowland plains under lacustrine-alluvial conditions. The lithological composition of rocks includes conglomerates, sandstones, clays, coal interlayers with inclusions of vegetal residues. Thickness of the rocks increases from north to south, from 130 to 982 m in the Urumqi trough.

In the Lower Jurassic time, the Alakol trough area was totally represented by the paleographic situation of denudated elevations and formation of terrigenous rocks.

In the Upper Jurassic time, the size of the Dzungarian trough slightly decreased. Clayey formations, sandstones with terrestrial flora and ostracodal fauna were depositing in the remaining trough area. Sediment thickness varied between 69 m in the north to 683 m in the south.

Nascent in the end of the Upper Jurassic age, upward movements influenced the Alakol trough in the Early Cretaceous age too, as the denudation space of elevated plains. Processes of land levelling were taking place during this time.

In the Early Cretaceous age, all deflections of the Dzungarian trough got involved into the uplift. The trough area reduced a little more, and the formed rocks of sandy-clay composition accumulated with angular disagreement on the Jurassic deposits. The rock thickness of the Lower Cretaceous is 80 m in the north, 684 m in the centre of the trough and 526 m in the south of the Urumqi trough.

Accumulated rocks and conditions of their formation indicate that the Lower Cretaceous age was the time of the least tectonic activity.

In the Lower Cretaceous age, paleographic conditions of lowland plains and uplands with accumulation of lacustrine-alluvial sediments were existent in the Alakol trough. This period is characterised by some increase in tectonic activity. Downfolds of the Alakol trough, located in the southeast along the Dzungarian fault, started developing again, according to the inherited plan, laid yet in the Triassic and Jurassic ages; the sandy clay deposits accumulated there.

In the Upper Cretaceous age, significant reduction of the Dzungarian trough occurred due to continued development of downward movements in its south part. Sandy-clay deposits with thickness of 70 m and 468 m respectively accumulated in the north and the centre of the trough. In the Urumqi trough, conglomerates and sandy clay deposits of dark-brown, redbrick-red colours accumulated with maximal thickness of 513 m. Thickness of accumulated rocks in the trough indicates a decline in intensity of downward movements during the Upper Cretaceous age.

In the Eocene epoch of the lower Paleogene, the sea advance is reinforced with capture of almost the entire area of these troughs, except for plain stripes of denudation elevations. In the Alakol trough, lakes with increased salinity accumulated argillites with interlayers of anhydrites 20-100 m thick. Only in the northeast of the trough, did the coarse-clastic rocks accumulate with clay interlayers.

At this time, the Dzungarian trough developed in the paleographic environment of lowland plains, where, under lacustrine-alluvial conditions, rocks were accumulated, lithologically represented by sandstones in northwest and sandy clay formations with admixtures of tuff lavas throughout the rest of the trough. Thickness of the rocks varies from 74 m in the north to 300 m in the south.

In the same epoch, the Urumqi trough experienced elevation, and coarse rocks and conglomerates 83m thick were torn down from the surrounding ridges.

Because of tectonic activation of the region, the sea was getting shallow. In the Miocene time of the Lower Neogene, shallow marine carbonate deposits accumulated uniformly in the Alakol trough. Encountered are interlayered argillites with lime sandstones and interlays of ash streams of volcanic zones with rocks of reddish tint of up to 100 m thick.

The paleographic situation did not change significantly in the troughs; the paleographic conditions of lacustrine-alluvial sedimentation were preserved. The rocks are composed of greenish-grey clays and reddish-brown sandstones up to 800 m thick.

In the Dzungarian trough, marine paleographic conditions expanded. In the northern part of the trough, sandy-clay rocks accumulated to thickness of up to 435m. The central part accumulates limestones, shallow carbonate deposits, clays with fossilized fish fauna, ostracode and gastropod. The deposits are 196 m thick.

In this time, coarse-clastic rocks with clay interlays of 101 m thick were accumulating in the Urumqi trough.

Aktive tectonic movements in Pliocene of the upper Neogene of the Alpian tectogenesis conditioned sharply differentiated block movements. Accumulated deposits of considerable thickness of 2700 m speak for intense immersion of some blocks and rise of others. Accumulated sediments include gray conglomerates, light-brown and straw-gray aleurolite, sandstone and clay.

The section of the sedimentary cover of the Dzungarian basin is crowned by conglomerates of the Quaternary system with thickness of up to 100 m.

The oil and gas content of sedimentary strata of the Dzungarian basin is associated to almost all suites of the Paleozoic, Mesozoic and Cenozoic deposits. Commercial oil reserves have been established in Carboniferous, Permian, Triassic, Lower-Middle Jurassic, Lower Cretaceous, Paleogene and Miocene deposits.

In total, around 20 oil fields were revealed in the Dzungarian basin. Chinese geologists lay high hopes on discovery of new oil fields in Dzungaria.

During 2006-2010, the oil and gas prospecting (with a break of 48 years) was resumed by the “Remas” company in the Alakol trough. The MOGT-2D seismic surveys were also carried out in the coastal strip around the lake. Two profiles were located in the water area (across the basin’s spread), 35 km away from each other.

Local structures were identified only on land; 3 of them were deep drilled into four wells. According to GIS data, only the A-1 well had revealed 3 perspective horizons, but the well was closed without testing.

The wells were drilled without testing; 5m-core was sampled at the intervals of 1917-1922 m, SKV.72. It should be noted, that sludge from the wells no.1 and no.2 was tested for minerals and bitumoids in the Satpaev Institute of GeoSciences. Analyses have shown up to 0,003% of hydrocarbons of the “МСБА” and “СБА” types of bitumen giving the blue glow.

One of most important indicators in the formation of hydrocarbon deposits are hydrodynamic conditions of water-bearing complexes in basins’ sedimentary strata, as the outcome of an operation mode of illusive and infiltration water exchanges.

In our case, in accordance with the geological structure of the intermountain Alakol trough, the surface and underground runoff from the ridges of the Dzungarian Алатау and Western Tarbagatai drains towards the zones of active water exchange in the central parts of the Sassik-Kol and Alakol lakes.

Known data of analyses of hydrogeological conditions of the upper part of the sedimentary cover, the water chemical composition allow attributing them to surface and infiltration types. They are classified as waters of free exchange with earth surface, negatively affecting the preservation of hydrocarbon deposits.

In the northern part of the Alakol basin, the water pressure gradient is smaller, and it can be seen as a result of decreased geostatic load and reduced rock compaction. Therefore, we may think that the role of the hydrodynamic factor in the formation of oil deposits in the northern part of the Alakol basin was insignificant.

The situation was different within the southern hydrodynamic area of the Alakol basin, where the flow lines in the connate water pressure system are directed from the zones of greatest deflection to the zones with lower pressure.

As a result, the underground force, moving hydrocarbons along the regional uprising of strata, was added up to water pressure of those reservoirs, where traps, properly locking the anti-current wing, could hold hydrocarbons [6]. These could be northern wings of local structures that are worth paying attention to, when planning oil and gas exploration boreholes.

Even basing on the wing amplitude of 35-40 m/km of structures capable of holding hydrocarbons, oil reserves are to be expected in deposits of the southern part of the Alakol basin with increasing capacity of the sedimentary cover.

Thus, hydro-geological and geological conditions of Mesozoic and Paleozoic sedimentary strata especially in the southern part of the Alakol basin do not contradict to the view about the active participation of hydrodynamic forces in the formation of hydrocarbon deposits.

Thus, the aforesaid, as well as consideration of published papers and geological-geophysical materials, allow drawing a conclusion that the sedimentary basin of the Alakol trough should be considered as an independent perspective object for detecting commercial hydrocarbon reserves. Study of tectonic development of the region and its cover indicates that hydrocarbons could be accumulated in deposits of stratigraphic levels of the Permian-Triassic, Jurassic and Paleogene reservoir rocks.

It should be assumed that formation of hydrocarbon potential of the sedimentary complex is conditioned mainly by vertical flow of hydrocarbon fluids from the underlying Paleozoic terrigenous and terrigenous-carbonate deposits.

Common features in tectonic structure of intermountain troughs of the South-East Kazakhstan and Xinjiang of China, in particular Dzungaria, are in similarity of their sedimentary cover. Deposits' maximal thicknesses concentrate in deflections of the southern framing of deep faults, and the cover is monoclinally reduced towards the north. Such asymmetric development of intermountain troughs is explained in terms of plate tectonic manifestations, differentiated nature of rise and falls of strata blocks.

Discrepancies between Alakol and Dzungarian troughs are not essential as both developed mainly in the platform stage. The difference can be attributed to somewhat greater role of duration of downward movements in case of the Dzungarian trough.

As a result, the capacity of accumulated sedimentary cover in the Dzungarian trough is

16 km [7], while that of Alakol is four times less. The Dzungarian trough area is five times larger than that of Alakol. This is characteristic to a much lower intensity and differentiation of tectonic activity which disposed the Alakol trough to ascending movements.

The Alakol trough shows direct and indirect signs of the oil-and-gas bearing capacity. Here, we observe periods of intense accumulation of multi-meter coal strata in the Carboniferous and Jurassic ages, which is one of the favourable conditions for the formation of oil and gas source rocks.

Undoubtedly positive signs of oil-and-gas bearing capacity in the region are: mud volcanism, spread of bituminous rocks, ozokerites, asphaltites, presence of dissolved heavy gases and phenols in water sources. Significant oil and gas accumulation zones are associated with widely developed mobile structures of the Dzungarian Alatau range. This is confirmed by debris of Mesozoic formations carried out to surface through chimneys of mud volcanoes along the Dzungarian Devonian-Carboniferous fault [8]. A direct sign of oil-bearing capacity can be seen in water self-discharging from a well located 5 km westward from the Zharbulak village: the water bears a film of oil.

Having these obvious prospects for detecting oil and gas deposits in the Alakol basin, most of the issues affecting the geological structure and oil-and-gas bearing capacity will have to be clarified by the upcoming geophysical and exploration work.

С. М. Оздоев[1], Н. С. Абдуев[1], В. А. Попов[1], Н. Тілеуберді[1], Ма Хуа Дон[2]

[1]Сәтбаев Университеті, Қ. И. Сәтбаев атындағы геологиялық ғылымдар институты, Алматы, Қазақстан,
[2]Шинжяңдағы тәбиғи ресурстар мен экологиялық ортаны зерттеу орталығы, Шинжяң, Қытай

МҰНАЙ-ГАЗДЫЛЫҚ ПЕРСПЕКТИВТІЛІГІНЕ БАЙЛАНЫСТЫ АЛАКӨЛ ОЙПАТЫ МЕН ҚЫТАЙДЫҢ ЖОҢҒАР ОЙПАТЫНЫҢ ГЕОЛОГИЯЛЫҚ ҚҰРЫЛЫСТАРЫНЫҢ ҰҚСАСТЫҚТАРЫ МЕН АЙЫРМАШЫЛЫҚТАРЫ

Аннотация. Мақалада Шығыс Қазақстандағы Алакөл ойпаты мен Қытайдағы Жоңғар ойпатының геологиялық дамуының тарихы қарастырылды. Ойпаттардың дамуындағы ұқсастықтар мен айырмашылықтарды табу олардың мұнай-газдылық перспективтілігін анықтау мақсатында қабаттар қалыңдығын талдау, литологиялық құрылымы және таужыныстардың қалыптасуының палеогеографиялық жағдайына негізделіп жасалынды.

Түін сөздер: Алакөл, Жоңғар, ойпат, палеогеографиялық жағдай, литология, таужыныстары, палеозой, кайнозой, конгломераттар, құмтастар, саздар, карбонаттар, тектоникалық қозғалыстар, мұнай-газдылық.

С. М. Оздоев[1], Н. С. Абдуев[1], В. А. Попов[1], Н. Тлеуберди[1], Ма Хуа Дон[2]

[1]Сатпаев Университет, Институт геологических наук им. К. И. Сатпаева, Алматы, Казахстан,
[2]Исследовательский центр природных ресурсов и экологической среды в Синьцзяне, Синьцзян, Китай

ОБЩНОСТЬ И РАЗЛИЧИЕ ГЕОЛОГИЧЕСКОГО РАЗВИТИЯ АЛАКОЛЬСКОЙ ВПАДИНЫ И ДЖУНГАРСКОЙ ВПАДИНЫ КИТАЯ В СВЯЗИ С ПЕРСПЕКТИВАМИ НЕФТЕГАЗОНОСНОСТИ

Аннотация. В статье сделана попытка рассмотреть историю геологического развития Алакольской впадины Восточного Казахстана и Джунгарской впадины Китая. Восстановление общности и различия развития впадин проводилось на основе анализа мощностей, литологического строения и палеогеографических условий образования пород с целью определения перспектив их нефтегазоносности.

Ключевые слова: Алакольская, Джунгарская, впадина, палеогеографические условия, литология, породы, палеозой, кайнозой, конгломераты, песчаники, глины, карбонаты, тектонические движения, нефтегазоносность.

Information about authors:

Ozdoyev S. M., Satbayev University, Institute of Geological Sciences named after K. I. Satpaev, Almaty, Kazakhstan; Ozdoyevsultan@mail.ru; https://orcid.org/0000-0003-0262-1583

Abduev N. S., Satbayev University, Institute of Geological Sciences named after K. I. Satpaev, Almaty, Kazakhstan; Remas_abd1949@mail.ru; https://orcid.org/0000-0003-0500-0272

Popov V. A., Satbayev University, Institute of Geological Sciences named after K. I. Satpaev, Almaty, Kazakhstan; 1934popov@mail.ru; https://orcid.org/0000-0001-6178-1283

Tileuberdi N., Satbayev University, Institute of Geological Sciences named after K. I. Satpaev, Almaty, Kazakhstan; Nureke-17@mail.ru; https://orcid.org/0000-0003-0781-2434

Hua Dong Ma, The research center of nature resources and ecological environment in Xinjiang, National 305 Project office, Xinjiang, China; mhd618@qq.com; https://orcid.org/0000-0002-4487-8267

REFERENCES

[1] Koshkin V.Ya. On the oil and gas bearing capacity of the Alakoltrough // «Neftegazonosnost' Kazahstana». Proceedings of the 1st Int’l. conf. Almaty-Atyrau, 2001. P. 66-68.

[2] Nazarbaev B.A., Uzhkenov B.S., Ostanenko R.N. et al. Oil and gas prospects for the Alakoltrough // Petroleum. 2001(5). P. 46-50.

[3] Atlas of lithological, paleogeographical, structural, palynspastic and geo-ecological maps of Central Eurasia / Ed. By S. Zh. Daukeev et al. Almaty: RGP «Centr», 2002.

[4] Chzhan L., Sidnev A.V. Oil and gas basin - Dzungaria and its development prospects. Ufa: RF. UGNTU, 2010. Neftegaz.ru.

[5] Go Min', Sidnev A.V. Oil and gas fields in the Dzungaria basin and problems in their finding in the north-western China // The online science magazine «Neftegazovoedelo». 2015(3). Ufa, RF.

[6] Popov V.A., Ozdoev S.M., Kuznetsova, L.L. Nigmatova S.A., Kasymkhankyzy A. Oil shale of South-Torgay oil and gas basin // News of the National academy of sciences of the Republic of Kazakhstan. Series of Geology and Technical Sciences. 2017. 6(426). P. 5-17 (in Eng.).

[7] Skrinnik L.I., Gadeev R.R. On the closing date of the Jungar-Balkhash paleobasin // News of the National academy of sciences of the Republic of Kazakhstan. Series of Geology and Technical Sciences. 2019. 1(433). P. 216-222 (in Eng.). ISSN 2224-5278 (Print). https://doi.org/10.32014/2019.2518-170X.26

[8] Zholtaev G.Zh., Ozdoev S.M. Oil and gas prospects for the Alakol sedimentary basin // Izvestiya NAN RK. Geol. ser. 2010(3). P. 122-127.

Publication Ethics and Publication Malpractice in the journals of the National Academy of Sciences of the Republic of Kazakhstan

For information on Ethics in publishing and Ethical guidelines for journal publication see http://www.elsevier.com/publishingethics and http://www.elsevier.com/journal-authors/ethics.

Submission of an article to the National Academy of Sciences of the Republic of Kazakhstan implies that the described work has not been published previously (except in the form of an abstract or as part of a published lecture or academic thesis or as an electronic preprint, see http://www.elsevier.com/postingpolicy), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. In particular, translations into English of papers already published in another language are not accepted.

No other forms of scientific misconduct are allowed, such as plagiarism, falsification, fraudulent data, incorrect interpretation of other works, incorrect citations, etc. The National Academy of Sciences of the Republic of Kazakhstan follows the Code of Conduct of the Committee on Publication Ethics (COPE), and follows the COPE Flowcharts for Resolving Cases of Suspected Misconduct (http://publicationethics.org/files/u2/New_Code.pdf). To verify originality, your article may be checked by the Cross Check originality detection service http://www.elsevier.com/editors/plagdetect.

The authors are obliged to participate in peer review process and be ready to provide corrections, clarifications, retractions and apologies when needed. All authors of a paper should have significantly contributed to the research.

The reviewers should provide objective judgments and should point out relevant published works which are not yet cited. Reviewed articles should be treated confidentially. The reviewers will be chosen in such a way that there is no conflict of interests with respect to the research, the authors and/or the research funders.

The editors have complete responsibility and authority to reject or accept a paper, and they will only accept a paper when reasonably certain. They will preserve anonymity of reviewers and promote publication of corrections, clarifications, retractions and apologies when needed. The acceptance of a paper automatically implies the copyright transfer to the National Academy of Sciences of the Republic of Kazakhstan.

The Editorial Board of the National Academy of Sciences of the Republic of Kazakhstan will monitor and safeguard publishing ethics.

Правила оформления статьи для публикации в журнале смотреть на сайте:

www:nauka-nanrk.kz

ISSN 2518-170X (Online), ISSN 2224-5278 (Print)

http://www.geolog-technical.kz/index.php/en/

Верстка *Д. Н. Калкабековой*

Подписано в печать 22.07.2019.
Формат 70x881/8. Бумага офсетная. Печать – ризограф.
15,7 п.л. Тираж 300. Заказ 4.

Национальная академия наук РК
050010, Алматы, ул. Шевченко 28, т. 272-13-19, 272-13-18