

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
Қазақстан Республикасының Ғылым Академиясының
Қ. И. Сәтпаев атындағы Қазақ ұлттық техникалық зерттеу университеті

NEWS

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**

1 (433)

JANUARY – FEBRUARY 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. Web of 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.

Б а с р е д а к т о р ы
э. ғ. д., профессор, ҚР ҰҒА академигі

И.К. Бейсембетов

Бас редакторының орынбасары

Жолтаев Г.Ж. проф., геол.-мин. ғ. докторы

Р е д а к ц и я а л қ а с ы:

Абаканов Т.Д. проф. (Қазақстан)
Абишева З.С. проф., академик (Қазақстан)
Агабеков В.Е. академик (Беларусь)
Алиев Т. проф., академик (Әзірбайжан)
Бакиров А.Б. проф., (Қырғыстан)
Беспәев Х.А. проф. (Қазақстан)
Бишимбаев В.К. проф., академик (Қазақстан)
Буктуков Н.С. проф., академик (Қазақстан)
Булат А.Ф. проф., академик (Украина)
Ганиев И.Н. проф., академик (Тәжікстан)
Грэвис Р.М. проф. (АҚШ)
Ерғалиев Г.К. проф., академик (Қазақстан)
Жуков Н.М. проф. (Қазақстан)
Қожахметов С.М. проф., академик (Қазақстан)
Конторович А.Э. проф., академик (Ресей)
Курскеев А.К. проф., академик (Қазақстан)
Курчавов А.М. проф., (Ресей)
Медеу А.Р. проф., академик (Қазақстан)
Мұхамеджанов М.А. проф., корр.-мүшесі (Қазақстан)
Нигматова С.А. проф. (Қазақстан)
Оздоев С.М. проф., академик (Қазақстан)
Постолатий В. проф., академик (Молдова)
Ракишев Б.Р. проф., академик (Қазақстан)
Сейтов Н.С. проф., корр.-мүшесі (Қазақстан)
Сейтмуратова Э.Ю. проф., корр.-мүшесі (Қазақстан)
Степанец В.Г. проф., (Германия)
Хамфери Дж.Д. проф. (АҚШ)
Штейнер М. проф. (Германия)

«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/>

© Қазақстан Республикасының Ұлттық ғылым академиясы, 2019

Редакцияның Қазақстан, 050010, Алматы қ., Қабанбай батыра көш., 69а.

мекенжайы: Қ. И. Сәтбаев атындағы геология ғылымдар институты, 334 бөлме. Тел.: 291-59-38.

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

Г л а в н ы й р е д а к т о р
д. э. н., профессор, академик НАН РК

И. К. Бейсембетов

Заместитель главного редактора

Жолтаев Г.Ж. проф., доктор геол.-мин. наук

Р е д а к ц и о н н а я к о л л е г и я:

Абаканов Т.Д. проф. (Казахстан)
Абишева З.С. проф., академик (Казахстан)
Агабеков В.Е. академик (Беларусь)
Алиев Т. проф., академик (Азербайджан)
Бакиров А.Б. проф., (Кыргызстан)
Беспаяев Х.А. проф. (Казахстан)
Бишимбаев В.К. проф., академик (Казахстан)
Буктуков Н.С. проф., академик (Казахстан)
Булат А.Ф. проф., академик (Украина)
Ганиев И.Н. проф., академик (Таджикистан)
Грэвис Р.М. проф. (США)
Ергалиев Г.К. проф., академик (Казахстан)
Жуков Н.М. проф. (Казахстан)
Кожаметов С.М. проф., академик (Казахстан)
Конторович А.Э. проф., академик (Россия)
Курскеев А.К. проф., академик (Казахстан)
Курчавов А.М. проф., (Россия)
Медеу А.Р. проф., академик (Казахстан)
Мухамеджанов М.А. проф., чл.-корр. (Казахстан)
Нигматова С.А. проф. (Казахстан)
Оздоев С.М. проф., академик (Казахстан)
Постолатий В. проф., академик (Молдова)
Ракишев Б.Р. проф., академик (Казахстан)
Сейтов Н.С. проф., чл.-корр. (Казахстан)
Сейтмуратова Э.Ю. проф., чл.-корр. (Казахстан)
Степанец В.Г. проф., (Германия)
Хамфери Дж.Д. проф. (США)
Штейнер М. проф. (Германия)

«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>

© Национальная академия наук Республики Казахстан, 2019

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

E d i t o r i n c h i e f

doctor of Economics, professor, academician of NAS RK

I. K. Beisembetov

Deputy editor in chief

Zholtayev G.Zh. prof., dr. geol-min. sc.

E d i t o r i a l b o a r d:

Abakanov T.D. prof. (Kazakhstan)
Abisheva Z.S. prof., academician (Kazakhstan)
Agabekov V.Ye. academician (Belarus)
Aliyev T. prof., academician (Azerbaijan)
Bakirov A.B. prof., (Kyrgyzstan)
Bespayev Kh.A. prof. (Kazakhstan)
Bishimbayev V.K. prof., academician (Kazakhstan)
Buktukov N.S. prof., academician (Kazakhstan)
Bulat A.F. prof., academician (Ukraine)
Ganiyev I.N. prof., academician (Tadjikistan)
Gravis R.M. prof. (USA)
Yergaliev G.K. prof., academician (Kazakhstan)
Zhukov N.M. prof. (Kazakhstan)
Kozhakhmetov S.M. prof., academician (Kazakhstan)
Kontorovich A.Ye. prof., academician (Russia)
Kurskeyev A.K. prof., academician (Kazakhstan)
Kurchavov A.M. prof., (Russia)
Medeu A.R. prof., academician (Kazakhstan)
Muhamedzhanov M.A. prof., corr. member. (Kazakhstan)
Nigmatova S.A. prof. (Kazakhstan)
Ozdoyev S.M. prof., academician (Kazakhstan)
Postolatii V. prof., academician (Moldova)
Rakishev B.R. prof., academician (Kazakhstan)
Seitov N.S. prof., corr. member. (Kazakhstan)
Seitmuratova Ye.U. prof., corr. member. (Kazakhstan)
Stepanets V.G. prof., (Germany)
Humphery G.D. prof. (USA)
Steiner M. prof. (Germany)

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>

© National Academy of Sciences of the Republic of Kazakhstan, 2019

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

NEWS

OF THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN

SERIES OF GEOLOGY AND TECHNICAL SCIENCES

ISSN 2224-5278

Volume 1, Number 433 (2019), 216 – 222

<https://doi.org/10.32014/2019.2518-170X.26>

L. I. Skrinnik, R. R. Gadeev

Institute of geological Sciences named after K. I. Satpayev, Almaty, Kazakhstan.

E-mail: lisgeo@inbox.ru, gadeev_ravil@mail.ru

**ON THE CLOSING DATE
OF THE JUNGAR-BALKHASH PALEOBASIN**

Abstract. Analysis of materials on the Southeast of Kazakhstan and the adjacent region of China shows that the development of the Paleasian ocean occurred through the formation of island arcs and separate sedimentation basins. Dzhungaro-Balkhash sea basin existed from the early Ordovician to the middle of the Permian period, as evidenced by the presence of marine fauna in its individual parts. Stratigraphic materials adjacent to the East of Alakol area of China show that most young marine terrigenous deposits, Jungar-Balkhash basin are of Famennian-tournaisian the tournaisian age and overlap-cannabischarlie regional volcanic volcanic belt. This is followed by a break corresponding to the rise of the area, the subsequent accumulation of ground molasses of the Gzhel century, and then the contrasting lower Permian volcanic series. The youngest ophiolites in the area are of early Devonian age. These data indicate the autonomous time of laying the pools that make up the paleo-ocean and the close time of their closure (probably early Permian). Closing method-a collision in combination with a simple filling sedimentary material. The active edge of the Dzhungaro-Balkhash basin is the Ili plate separating It from the South Tien-Shan paleocean. Volcanic accumulation of the Devonian, Carboniferous and Permian periods are part of a volcanic belt that framed Jungar-Balkhash sea basin on the part of the Kazakhstan continent, talking about the geological and petrochemical data.

Key words: Paleoocean, ophiolites, island arc, active margin, Gzhel age, petrochemical data.

Introduction. Late Paleozoic history of South-East Kazakhstan and Tien Shan is connected with development of the Paleo-Asiatic ocean and adjoining areas of the Kazakhstan continent. Initial stage of subsidence the Paleo-Asiatic ocean was connected generally accepted opinion, with disintegration paleocontinent Rodiniya and the most further his(its) development was shown in shaping the row of the insular arcs and in accordance with them Ural, Obi-Zaysan, Kirghiz-Terskey, Dzhungaro-Balhash basins [1, 2]. Time of the closing the Paleo-asiatic ocean is a subject to discussions and is taken within late Carboniferous to Permian period.

Axial for that ocean is Dzhalaïr-Nayman ophiolite zone, terminated its development in early Ordovician [3]. The Second ophiolite zone, Itmurundy in North Balhash area- is taken as ensimatic island arc, torn right-side shift on Itmurundin and Tekturmas branches. Her(its) development was terminated in medium of Silurian period. The Large island arc system, separated Dzhungaro-Balhash and Obi-Zaysan basins, was Chingiz-Tarbagatay ensimatic insular arc, existed in Cambrian and Ordovician [4, 5]. From located south-west Dzhungar-Balhash basin she is separated with large Chingiz shift; northeast border of the insular arc was not well-marked, it was facial, with change island-arc sediments into ocean ones to axial for Obi-Zaysan paleocean Char-Gornostaev ophiolite suture.

Dzhungar-Balhash paleobasin occupied the space to south-west from Chingiz-Tarbagatay arc and from Ili plate to northward. In modern cut he has a wedge-shaped outlines and is framed with three sides by volcanic belts. In the opinion of leading kazakhstan specialist Bespalov V.F, Afonichev N.A., Zaycev Yu.A., V.Ya. Koshkin and others Dzhungar-Balhash sea pool was gradually narrowed and migrated in south-east direction [4-7]. Right behind for basin and in the same side framing his(its) marginal volcanic belts moved.

The contour of Dzhungaro-Balhash sea basin is outlined it enough clearly. Inwardly it composed powerful sedimentary, mainly terrigenous and siliceous-terrigenous sediments of Devonian and Carboniferous systems. Devonian, Carboniferous and Permian volcanic accumulations surrounded the sea pool with north, west and south, on measure of the removing behind it with local develop changed with terrigenous by red-colour postponing intracontinental zone [6, 7]. The time of existence Dzhungar-Balhash basin from formation of marginal rifts at the beginning Ordovician to infilling by the end of Paleozoic [8-10].

Time of the full closing Dzhungar-Balhash paleocean on that moment is object of discussion. In his(its) Kazakhstan part by majority of geologists it is taken as early Permian or as border early and late Permian period[11]. The Reason for such dating serves presence of Permian sea fossils in layers of Durnorechen suite beside north bottom of Main Dzhungar range [12]. Here V.A.Bush and others are described sea Low Permian sediments (the sandstones and siltstones with lenses of limestone, power 220 m, containing brioza and rugosa). The last is presented by forms Artins complex similar known on Ural.

Northward from town Zharkent, near southern bottom of Dzhungar Alatau and in Toksanbay range it is known outcrops of different-colour conglomerate-sandstone of the postponing Jamanbulak suite, containing fauna brachiopodes, and foraminifers, the remainders of the flora and palinocomplexes of late Carboniferous age. In most top of her(its) sequence L.N.Sergeev was described late Carboniferous brachiopodes, but after M.M.Marfenkova – Hemifuzulines of upper part of the Moscow stage [13]. Palinocomplex is presented by forms typical of bottom, but from sequense of Toksanbay range - by a typical upper Carboniferous forms: Florinites luberae Samoil., Cordaitina rotata Samoil., nigritellus (Lub) Shurk and others.

Carboniferous sequence of the sediments of the south part Dzhungar Alatau within active margin of paleobasin Kugaly suite presented lake grey-yellow sandstone, siltstones, argillites, tuffites, flint and algae limestones with the remainders of the flora, palinocomplex and imprint amphibious crowns. The Remainder of the flora in her(its) is typical of upper Carboniferous and bottom перми. Palinologic determinations Potoniesporites novicus Bhar., Punctatisporites granifer Pot., Shophipollenites principalis Lub. Cordaitina sp and others give the narrower age interval of the accumulation of the sediments: late Carboniferous [13]. The Imprint of amphibian Protritron Brochiozaurus Gredu from these sediments in Kurty region also have late Carboniferous or early Permian age [14]. Thereby, we have given on different parts of the region about existence sea Dzhungar-Balhash basin in late Carboniferous and, may be in early of the Permian.

Sedimental and geohronological materials of chinese geologist, studied upper Paleozoic volcanic-sedimentary sequence in mountain Barleyk West Dzhungary (the Northwest China) helped to restore time of the closing Dzhungaro-Balhash ocean in his(its) the most east, chinese part [15] Upper Paleozoy sequence of this region includes from below upwards litoral sedimentary layers, containing glauconite sandstones of shallow shelf (Famen-Tourneous), volcanic rocks of orogenic belt of Tournaisian - Early Bashkir age, sandstones and conglomerates of Gzhel stage of with gradational bedding unrepresentative for sea sediments. The sequence has been terminated by bimodal volcanic assotiation, on geochronological data corresponding to Asselianian and Sakmarian stages of lower Permian.

Northward from Zharkent town, beside south bottom of Dzhungar Alatau and in Toksanbay range known outcrops of different-colour conglomerate-sandstones of the postponing Jamanbulak formation, containing fauna brachiopods foraminifer, the remainders of the flora and palinocomplexes of late Paleozoic age. In most top of her(its) sequence L.N.Sergeeva was described late Carboniferous brachyopodes, and M.M.Marfenkova – hemifusulines of bottom the Moscow stage [13]. Palinocomplex is presented by forms of bottom upper Carboniferous, but from Toksanbay sequence - a typical Late Carboniferous forms: Florinites luberae Samoil., Cordaitina rotata Samoil., Nigrisporites nigritellus (Lub) Shurk and others.

Carboniferous sequence of the south part Dzhungar Alatau within active margin of paleobasin Kugaly formation presented with lake grey-yellow sandstones, siltstones, tuffites, flints and limestones with the remainders of the flora, palynocomplexes and imprints of amphibious. The remainder of the flora in her(its) layers are typical of upper Carboniferous and bottom Permian formes. Palinocomplex includes Potoniesporites novicus Bhar., Punctatisporites granifer Pot., Shophipollenites principalis Lub., Cordaitina sp. and others forms give the narrower age interval of the accumulation of the retinue: late Carboniferous

[13]. The Imprint amphibian *Protriton Brochiozaurus Gredu* from these postponing in Kurty region also are Carboniferous or Early Permian age [14]. Thereby, we have data on different parts of the region about existence sea facet Dzhungar-Balhash pool in late Carboniferous and, may be in early Permian.

Sedimentology and geochronology data of Chinese geologist, who have studied [ate Paleozoic volcano-sedimentary sequence in mountain Barleyk of West Dzhungary (the NorthWest China) helped to restore time of the closing Dzhungar-Balhash paleocean in his(its) the most east, chinese part [15]. Upper Paleozoic sequence of this region includes from below upwards litoral sedimentary rocks, containing glauconitic sandstones of shallow shelf (Famenian-Tourneous age), volcanic serie of orogenic belt Tourneous-Early Bashkirian age, sandstones and conglomerates of Gjhelian stage which have gradational layers unrepresentative for sea sediments. Bimodal volcanic association terminates that sequence, on geochronological data corresponding to Asselian and Sakmar grade of Lower Permian.

The most young age of detrital zircon from sandstone and U|Pb age of the volcanic rocks said that these rocks sedimented in Famenian-Tourneisian, Tourneisian – Early Bashkirian, in Gjhelian and Asselian-Sakmar stages accordingly. Tourneisian Early Bashkirian age of volcanic rocks and their overland look point to their probable attribute united with Pribalhash-Ili volcanic belt, his(its) east continuation. The Absence of Upper-Bashkirian, Moscow and Kasimov of the postponing, in the opinion of chinese authors data, is obliged tectonic to ascent Dzhungar Alatau. Dzhungar-Balhash paleobasin, upon their opinion, was definitively closed before Gjhelian stage, close on time with others ocean pools of the south part of Paleo-Asiatic ocean [15]. The tops of that sequence composed with the Early Permian basalts and riolite-dacitic ignimbrites. One sample of dacite from this serie gave on zircon U-Pb age ~298 mln years [15] that is indicative of Asselian stage of time to crystallizations poured.

Alongside with stated stratigraphic material reliable paleomagnetic data show that Paleo-asiatic ocean was not an united broad ocean, but included several pools, prepared by volcanic arcs and continental blocks [15, 17]. In particular, as of Bo Liu, Bao-Fu Han and others [16], narrow age interval of the shaping ophiolites shows that between Boschekul and Zaysan arcs Early Ordovic ocean pool have been existed, too as a part of Paleo-asiatic ocean. Besides, on near-border of the territory of China, adjoining to Zharna-Saur and Chingiz-Bakanas Kazakhstan systems, there else row of the zones of ophiolite mélange were revealed. Some of they include the Cambrian gabbro blocks and are overlaid with Middle Ordovician chert rocks, but then unconformable – with an Low Carboniferous sediments [15]. In central part of West-Dzhungar block, verging with orient to Alakol trough, ophiolites associate to Late Devonian chert rocks of ocean bottom, overlapped by Low Carboniferous sedimentary rocks and is tornd by Carboniferous granitoids with geochemical signs of subductional zones [15]. Thereby, probably, different basins, being included in Paleo-Asiatic ocean, were formed and developed enough autonomous, but their closing occurred by simple filling of sedimentary material.

Time of existence Dzhungar-Balhash sea pool in Chinese West Dzhungar covers the length of time from beginning of Devonian period to beginning or mediums Tourneisian centure [15]. In kazakhstan part of region it is more vast: from low Ordovician riftogenezis in Tekely zone to accumulation Low Permian Durnorechen suite of the retinue Alakol region [18]. The border Dzhungar-Balhash pool and paleocontinent, referred in chinese publications Ili plate, is facial, with gradual transition overland, mainly volcanic rock of the active margin in coastal ones, containing more significant share terrigenic material and then, on removing from coast line inside pool - in sea sedimentary with gradually decreasing admixture ash [18, 19]. Dzhungaro-Balhash pool within north part Dzhungar Alatau before medium Carboniferous period was an arena of the accumulation mainly siliceous and terrigenic sea sediments. Followed time of accumulation of carbonates was short, has occupied the Bashkirian stage and occurred only in Borotal region [5]. For Moscow stage characteristics of local accumulation variegated sandstones of Jamanbulak suite in coast part of pool [6]. The Internal space Dzhungar-Balhash basin in the second half of Carboniferous period presented itself area, removed from the sources of the demolition with very faded clay-chert accumulation.

Relatively recently appeared the publications on Tien-SHan [8, 10, 11, 19] and others], characterizing South East Kazakhstan and North Tien-SHan as active margin not Dzhungar-Balhash ocean, but located to south of it Turkestan (South-Tien-Shan ocean, which developed on background subduction ocean crust with south under Ili plate [11]. To such conclusion authors of enumerated publications come, outgoing from proximity Ili segment of the volcanic belt with South-Tien-SHan ocean basin, but without regard

petrochemical zones composition of the volcanic rocks of Ili belt. The Authors were repeatedly indicated on asymmetric petrochemical zones composition of the rocks of Ili volcanic belt fragment, first of all on growing potassium on measure of the removing from Dzhungar-Balhash sea in south direction on all his(its) length from Kurty region to China[20]. The most enriching potassium Devonian, Carboniferous and Permian volcanic rocks formed the rear synclines on narrow band along south edge paleocontinent in Kirghiz range, near Issykkul lake and in Karatau Ketmen. On the contrary, calc-alkaline, more sodium-volcanic rocks are typical of adjoining to Dzhungar-Balhash basin of the north edge of the belt, where they form the extensive fields, having transition to coast-sea facies. On figures 1, 2 there are brought comparison coeval main rocks of lower Carboniferous Dzhungar Alatau (the Guantobe suite, 145 samples and Altynebel series, 149 samples) and ranges of North Tien-Shan (the Ketmen, 161 samples and Kuluktay series, 60 samples). Distinctly more high contentses of alkaline are seen in Djungar volcanites contentses ferric and lowered in contrast with alkalinity. For greater contrast $\text{SiO}_2:100$, but $\text{Al}_2\text{O}_3:10$ (in mass %).

The South border of Ili plates, presenting hercinides an active margin of Dzhungar-Balhash paleobasin, tectonic, passes on Atbashi-Inylichek shift, southward from which sea faces South-Tien-Shan sea basin are presented [19, 21]. Petrochemical materials on volcanic formations of Ili plate are indicative of growing in south direction of the powers of the eath crust[20]. Usually on active Andy type margin her(its) growing occurs on measure of the advancement deep into continent and only large rifting breaks exist in rear parts these volcanic belt and are formed zones powerful basalt volcanism type to Provinces Pools and ranges of North America. The Similar situation existed in Carboniferous period on Ili plate, allowing to speak of possible take-off in medium Visean stage her(its) south edge (Issykkul block) from the main part on rear North-Kungey high angled fault. The torning away block with large Sonkul and Sarydzhaz batolites belonged inland part of Ili plate - the zone overland volcanic outlying-continental type. With south she was limited North-Kungey fault, providing in contact volcanic belt and synchronous him terrigen-carbonate sequences of rear Karatau-Nothern Tien-Shan- basin.

Saur phase of tectogenezis has caused the manifestations basalt volkanizm (basalt Satin suite of Kungey-range Dalashik and calcareous-basalt-rhyolitic series along Kokpak-river. It was formed sublatitudinal graben, during Visean and beginning of Serpuhov stages of Carboniferous period, filled with basalt, lenses and horizon organic limestones, arcoz and quartz sandstones, which the source served the

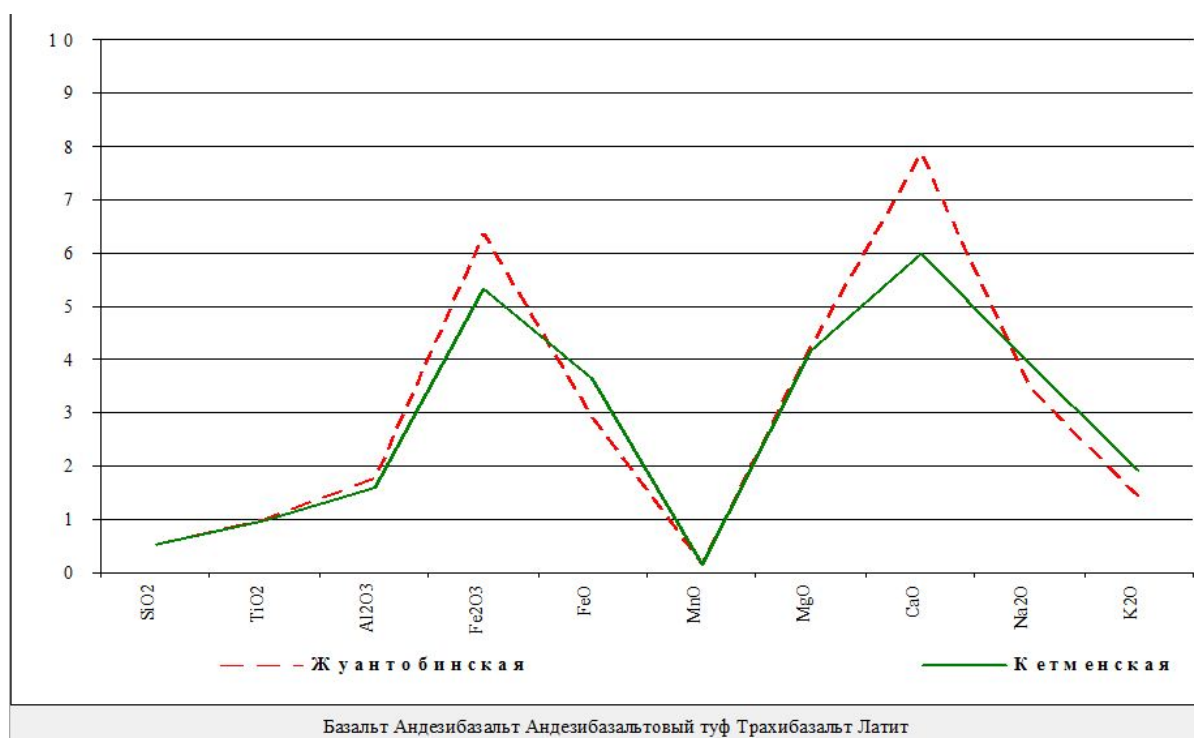


Figure 1 – Comparison of composition Tournaisian-low Visean basalts Dzhungar Alatau (Juantobe series, 145 samples) and Ketmeni range (Ketmen series, 161 samples)

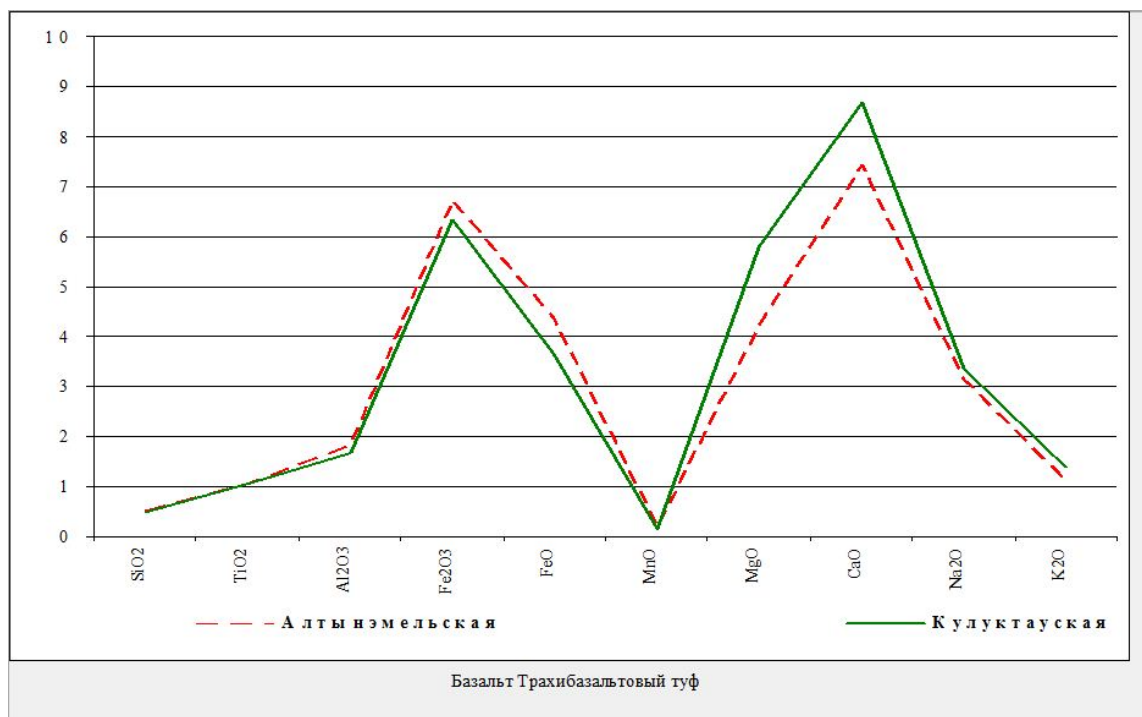


Figure 2 – The Comparison of composition Visean basalts Dzhungar Alatau (Alтынөмель series, 149 samples) and Ketmeni range (Кулуктау series, 60 samples)

salients precambrian sediments and granites of Sarydzhas batolit. The Width of graben is more 10 km, visible extent is of the order 200 km. Southward from it wide-spread shallow calcareous sediments, including thin bedding/oncolitic limestones of Central Tien Shan, but here in after southward - a gneisses and eclogites, forming powerful zone of metamorphic rocks, belonged to South-Tien-Shan paleobasin.

Degradation of Karatau-North-Tyanishan rear basin was expressed in his(its) salting, appearance gypsum and shallowing. By the end of Carboniferous period dominating his(its) sediments become the red coloured sandstones and siltstones with the remainder of overland flora (Tekes suite) and Late Carboniferous complex spores and pollens. They formed outcrops in Kopyl range and along Karkara-river, where rumpled; creased in steep folds, places are pulled over on Low Carboniferous-bashkirian grey coloured complex [21].

Disappearance of the last sea basin and the beginning of accumulation continental the red coloured molass at the end of Asselian - the Sakmar century marks the beginning of a rigid collision on the Southern Tien Shan [11, 22]. Possibly, and for the North Tien Shan continent the beginning of a rigid collision with Tarim is necessary on Asselian-Sakmara centuries of Permian period.

Work is performed with assistance of Committee of Science of Ministry of education and science Republic Kazakhstan at the expense of resources of the agreement № 189 of 15.03.2018. "Scientific ensuring complication and expansion of mineral raw material resources of Republic Kazakhstan".

Л. И. Скринник, Р. Р. Гадеев

«Қ. І. Сәтбаев атындағы геологиялық ғылымдар институты» ЖСШ, Алматы, Қазақстан

ЖОҢҒАР-БАЛҚАШ ПАЛЕОБАССЕЙНІН ЖАБУ УАҚЫТЫ ТУРАЛЫ СҰРАҚТАР

Аннотация. Оңтүстік-Шығыс Қазақстан және Қытаймен шекаралас облыстар бойынша материалдарды талдау арқылы Палеоазиаттық мұхиттың дамуы арал доғалары мен окшауланған бассейндердің седиментациялық қалыптасу жолымен келип шыққандығы айқындалды. Жоңғар-Балхаш теңіз бассейндері ерте ордовик пен перм кезеңінің ортасына дейін қалыптасқан, оның шөгінділерінде теңіз фауналарының болуы

осыны дәлелдейді. Алакөл ауданымен шекаралас Қытай территориясы бойынша стратегиялық материалдар Жоңғар-Балхаш палеобассейнінің ең жас теңіздік терригенді шөгінділері фамен-ертетурней кезінде екендігін және шеткі вулкандық белдеудің турней-ерте башқырлық вулканииттері жауып жатқандығын айқындайды. Әрі қарай сәйкесті көтерілімді аудандарда үзілістер жалғасып, гжелдік дәуіріндегі соңғы жиналған жерүсті молассы, одан кейін контрасты төменгі перм вулканды сериясы жалғасуда. Бұл ауданның ең жас офиолиттері ерте девон дәуіріне жатады. Бұл деректер бассейндердің жатысы, құраушы палеомұхиттық және олардың жабылу уақыты (ерте перм болуы мүмкін) туралы әртүрлі дәуірлерді айқындайды. Коллизия араласқан әдеттегі шөгінді материалдармен толтыру жабылу жолы болып табылады.

Жоңғар-Балхаш бассейнінің белсенді шеті – оны Оңтүстік Тянь-Шань палеомұхитынан бөліп туратын Іле плитасы болып табылады. Девон, таскөмір және перм кезеңдерінің вулкандық жинақталуы Қазақстан континенті жағындағы Жоңғар-Балхаш теңіздік бассейні қоршап тұрған вулкандық белдемнің бөлігі болып табылады, бұл туралы геологиялық және петрохимиялық мәліметтерде айтылады.

Түйін сөздер: палеомұхит, офиолиттер, аралдық доға, белсенді шеті, фауна, гжелдік ярус, петрохимиялық параметрлер.

Л. И. Скринник, Р. Р. Гадеев

Институт геологических наук им К. И. Сатпаева, Алматы, Казахстан

К ВОПРОСУ О ВРЕМЕНИ ЗАКРЫТИЯ ДЖУНГАРО-БАЛХАШСКОГО ПАЛЕОБАССЕЙНА

Аннотация. Анализ материалов по юго-востоку Казахстана и прилегающей области Китая показывает, что развитие Палеоазиатского океана происходило путем формирования островных дуг и обособленных бассейнов седиментации. Джунгаро-Балхашский морской бассейн существовал с раннего ордовика до середины пермского периода, о чем свидетельствует наличие морской фауны в его отложениях. Стратиграфические материалы по прилегающей к Алакольскому району территории Китая показывают, что наиболее молодые морские терригенные отложения Джунгаро-Балхашского палеобассейна имеют фамен-раннетурнейский возраст и перекрываются турнейско-раннебашкирскими вулканиитами краевого вулканического пояса. Далее следует перерыв, соответствующий поднятию района, последующее накопление наземной молассы гжелского века, а затем контрастной нижнепермской вулканической серии. Наиболее молодые офиолиты этого района имеют раннедевонский возраст. Эти данные говорят о разном времени заложения бассейнов, составляющих палеоокеан и близком времени их закрытия (вероятно, ранняя пермь). Способ закрытия – коллизия в сочетании с простым заполнением осадочным материалом.

Активной окраиной Джунгаро-Балхашского бассейна является Илийская плита, отделяющая его от Южно-Тянь-Шанского палеоокеана. Вулканические накопления девонского, каменноугольного и пермского периодов являются частью вулканического пояса, обрамлявшего Джунгаро-Балхашский морской бассейн со стороны Казахстанского континента, о чем говорят геологические и петрохимические данные.

Ключевые слова: палеоокеан, офиолиты, островная дуга, активная окраина, фауна, гжелский ярус, петрохимические параметры.

Information about authors:

Skrinnik Lyudmila Ivanovna, candidate of geological-mineralogical Sciences, Chief researcher of LLP «Institute of geological Sciences named after K. I. Satpayev», Almaty, Kazakhstan; lisgeo@inbox.ru; <https://orcid.org/0000-0001-6489-8065>

Gadeev Ravil Ravilevich, master of applied Geology, researcher of LLP «Institute of geological Sciences named after K. I. Satpayev», Almaty, Kazakhstan; gadeev_ravil@mail.ru; <https://orcid.org/0000-0002-9428-8142>

REFERENCES

- [1] Dobrecov N.L. The Evolution of the structures Ural, Kazakhstan, Tien-Shan and Altai-Sayan areas in Ural-Mongolian plected belt(the Paleo-asiatic ocean) // Geology and geophysics. 2003. Vol. 44, 1-2. P 5-27 (in Rus.).
- [2] Samygin S., Heraskova T.N., Kurchavov A.M. Tectonic development of Kazakhstan and Tien-Shan in Neoproterozoic and in early-middle Paleozoic // Geotectonic. 2015. N 6. P. 12-24 (in Rus.).
- [3] Rjazancev A.V., Tolmacheva T.Yu., Nikitina O.I. Ophiolites, island-arcs and intracontinent rifts complexes in system of tectonic covers of Chu-Ili region Kazakhstan // Geodynamic evolution of the lithosphere Central-Asiatic fold belt (from ocean to continent): Material of the confer. N 4. Irkutsk, 2006. Vol. 2. P. 104-108 (in Rus.).

- [4] Bogdanov A.A., Zaycev YU.A., Mazarovich O.A., Maksimov A.A., Tihomirov V.G., CHetverikova N.P. Tektonic районирование paleozoic array Central Kazakhstan // Bulletin Mosc. University. Series geol. 1963. N 5 (in Rus.).
- [5] Geology construction of Kazakhstan / Bekzhanov G.R., Koshkin V.YA. and others. Almaty: AMR RK, 2000. 396 p. (in Rus.).
- [6] Afonichev N.A. The Main line of the structured plan Dzhungar Alatau, Tarbagatay and North-East Pribalhash area // Mat-ly on geologies and useful fossilized Altay and Kazakhstan. VSEGEI. New series. 1960. Vol. 33. (in Rus.).
- [7] Skrinnik L.I south-east Kazakhstan - active late Paleozoic border of the Paleo-Asiatic ocean // Geology and metallogeny Kazakhstan. Almaty, 2000. P. 99-108 (in Rus.).
- [8] Buslov M.M., Cai K. Tectonics and geodynamics of the Altai-Junggar orogen in the Vendian-Paleozoic: implications for the continental evolution and growth of the Central Asian fold belt // Geodynamics and tectonophysics. 2017. Vol. 8, N 3. P. 421-427 (in Eng.).
- [9] Filippova I.B., Bush V.A., Didenko A.N. Middle Paleozoic subduction belts: The leading factor in the formation of the Central Asian fold-and-thrust belt // Russian Journal of Earth Sciences. 2001. 3(6). P. 405-426 (in Eng.).
- [10] Buslov M.M., Safonova I.Y., Watanabe T., Obut O.T., Fujiwara Y., Iwata K., Semakov N.N., Sugai Y., Smirnova L.V., Kazansky A.Y. Evolution of the Paleo-Asian ocean (Altai-Sayan region, Central Asia) and collision of possible Gondwana-derived terranes with the southern marginal part of the Siberian continent // Geosciences Journal. 2001. N 5(3). P. 203-224 (in Eng.).
- [11] Бискэ Yu.S., Alexeev D.V., Dzhenchuraeva A.V., Van B. History of the closing ocean basins in late Paleozoic between Tarim and Dzhungary: geodynamics and stratigraphic problems // Scientific notes Kazan university. The Series of natural sciences. 2016. Vol. 158, kn. 1. P. 75-93 (in Rus.).
- [12] Bush B.A., Dmitrieva V.K., Iliina T. Sea Permian sediments in East Kazakhstan // Bulletin M. o-va исп prirody. dept. geologies. 1967. Vol. HLII(6). P. 6-12 (in Rus.).
- [13] Skrinnik L.I., Grishina T.S., Radchenko M.I. Stratigraphy and paleogeography of Carrbonifer of south-east Kazakhstan // Geology and prospecting of mineral wealth Kazahstana. 1998. 4. P. 9-14 (in Rus.).
- [14] Radchenko I.I. First discovery of fossilized amphibian in South Kazakhstan // News of AS KazSSR. 1959. N 6 (in Rus.).
- [15] Bo Liu, Bao-Fu Han, Jia-Fu Chen, Rong Ren, Bo Zheng, Zeng-Zhen Wang, Li-Xia Feng. Closure Time of the Junggar-Balkhash Ocean: Constraints From Late Paleozoic Volcano-Sedimentary Sequences in the Barleik Mountains, West Junggar, NW China // Тектонics. 2017. N 36. P. 1-23 (in Eng.).
- [16] Gao X., Wei J.H., Fu L.B., Wang M., Zhang L., Yue P. Geochemical character and tectonic significance of the Kalagang Formation volcanic rocks in Tuoli area, West Junggar [in Chinese with English abstract] // Geological Science and Technology Information. 2014. 33. P. 16-24 (in Eng.).
- [17] Van der Voo R., Levashova N.M., Skrinnik L.I., Kara T.V., Bazhenov M.L. Late orogenic, large-scale rotations in the Tien Shan and adjacent mobile belts in Kyrgyzstan and Kazakhstan // Tectonophysics. 2006. Vol. 426. P. 335-360 (in Eng.).
- [18] Skrinnik L.I. To geodynamic of South-East Kazakhstan // Tectonic, geodynamic and processes of magmatism and metamorphism. M., 1999. P. 135-136 (in Rus.).
- [19] Burtman V.S., Samygin S.G. Tectonic evolution to High Asia in Paleozoic and Mesozoic // Geotectonic. 2001. 4. P. 34-54 (in Rus.).
- [20] Skrinnik L.I. Petrochemical zone volcanic belt of South-East Kazakhstan // Geology Kazakhstan. Full-grown. Int. Geol. Congress. Almaty, 2008. P. 91-101 (in Rus.).
- [21] Skrinnik L.I., Esmintctev A.N. Lateral rows of the Carboniferous deposits of North Tian-Shan // News of as RK. Ser. geol. 2008. N 3. P. 4-16 (in Rus.).
- [22] Biske Ju.S. Paleozoic structure and history of South Tien-Shan. S-Peterburg, 1996. 192 p.

**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](http://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 06.02.2019.

Формат 70x881/8. Бумага офсетная. Печать – ризограф.

16,7 п.л. Тираж 300. Заказ 1.