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

2 (434)

MARCH – APRIL 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 2, Number 434 (2019), 55 – 61 **https://doi.org/10.32014/2019.2518-170X.38**

DOI 631.439

Zh. O. Ozgeldinova[1], K. M. Dzhanaleeva[1], Zh. T. Mukaev[2], Zh. F. Tenkebayeva[1], K. M. Arykbayeva[1], L. M. Korytny[3], G. T. Ospan[1]

[1]Eurasian national university named after L. N. Gumilyov, Astana, Kazakhstan,
[2]Shakarim state university, Semey, Kazakhstan,
[3]Irkutsk state university, Irkutsk, Russia.
E-mail: ozgeldinova@mail.ru

GEOMATIC FEATURES OF GEOSYSTEMS FORMATION OF THE SARYSU RIVER BASIN

Abstract. It was shown the results of a study of the geomatic factors in the formation of geosystems in the Sarysu river basin. Within the framework of the basin under consideration are the subgeosystems of upper-Sarysu, middle-Sarysu and lower-Sarysu, where the spatio-temporal relationships of the channel-forming processes from the source to the mouth of the river dominate. The basic factors of the formation and functioning of modern isolated subgeosystems of the basin under consideration are revealed.

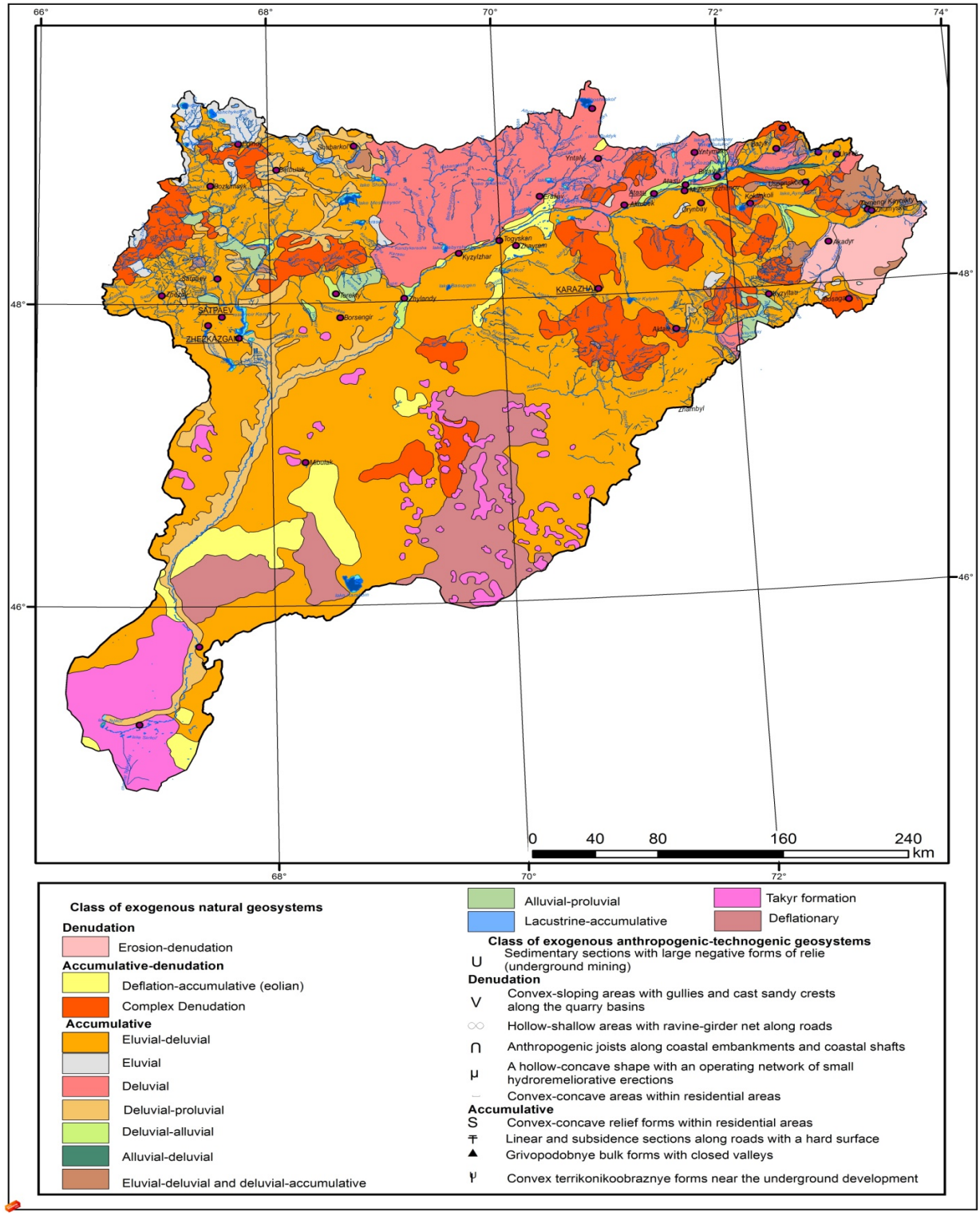
On the map we compiled on the scale of 1: 500 000 modern exodynamic processes of the basin under consideration, classes of exogenous natural geosystems and classes of exogenous anthropogenic and technogenic geosystems are differentiated, requiring different approaches in developing the optimal structure of the nature use of the Sarysu river basin. When considering modern geodynamic processes, the main factors of anthropogenic activity are identified, which are the most powerful factor of self-organization and dynamics of geosystems.

As a result of revealing the natural and climatic features of the development of modern geodynamic processes of pollution of geosystems in the conditions of intensive anthropogenic activity, the growing aridity of the climate and anthropogenic load within the Sarysu river basin contribute to the intensification of arid denudation processes, leads to a sharp activation of water-wind erosion and the expansion of lands subject to a planar washing, spoiling, deflation and other processes.

Key words: geosystem, river basin, geomatic processes, relief-forming processes, anthropogenic impact.

The geomatic components, the aggregate of abiotic processes in the geosystem (geological, tectonic, geomorphological, hydroclimatic, etc.) are considered the basic factors that determine the isolation of one geosystem from others, their structural and functional specifics. Thus, for example, the behavior of local air masses, from which the weather develops and, ultimately the climate will proceed strictly according to changes in the properties of the lithogenic base. The same applies to water masses - both terrestrial and underground, the places of their accumulation on the surface are entirely determined by the relief forms, and the underground ones - by the presence of aquifers. Consequently, the lithological composition of the rocks, the nature of their occurrence and the depth of the water bodies are significant factors in the runoff formation, which affect its magnitude and distribution over time. Geomatic processes have a significant effect on the shape of the valleys and the longitudinal profile of the river, on the composition of river alluvium and on the riverbed stability. Thus, it is obvious that all geomatic components are interrelated and vary spatially and temporally.

In the study of the Sarysu River Basin, we identified three subgeosystems: the Upper-Sarysu, the Middle-Sarysu and the Low-Sarysu, the development of which is confined to the drain of the river within the basin, dominated by the spatio-temporal relationships of the channel-forming processes from the source to the mouth (figure).



Map of the exo-dynamic processes of geosystems in the Sarysu basin

The modern relief of the Sarysu River basin was developed in arid climate conditions by weathering and deflation processes, flat flushing and suffusion, erosion and denudation of the contorted base. Insufficient atmospheric moisture, high evaporation, wide spreading of rocky fissured and sometimes karst rocks leads to active planar denudation and intensive washout of loose formations with the formation of various small erosion forms (ruts, ravines, sais, etc.), respectively.

On the territory of the Sarysu River basin, taking into account paleogeographical and geological features, it is possible to distinguish five main types of relief: lowlands, Uplands, denudation plain, stratal or denudation-accumulative plain, ancient and modern river valleys. A hilly, hilly-rugged, hilly-ridge relief predominates among the types mentioned above, called the Uplands, reflecting the toponymic name of the region.

The sources of the Sarysu River in the east are in the Buguly Mountains (the highest point of 1184 m is in Burkitti), Kosmuryn, Ortau (1068 m), etc. The upper courses of the Sarysu River basin are in the central elevated areas of the Kazakh Uplands. Kasin KG. [1], Gerasimov I.P. [2], Medoev G.T. [3], Borsuk B.I. [4], Svarichevskaya Z.A. [5], Bespalov V.F. [6], et al. studied the geological structure and relief of the Kazakh Uplands. These works characterized not only the stratigraphy and tectonics of the region, but also identified morphostructures and analyzed the latest tectonics, in close connection with which the main features of the modern relief are.

The Kazakh Uplands is confined to the Kazakh epihercine shield and is characterized by a flat-mountainous relief. The surface of the Uplands is characterized by a tiered structure, and the tiers are of different geological ages. Elevated forms of relief are composed mainly of crystalline rocks of the Dopaleozoic and Paleozoic age. The area we studied is a remnant of a large mountainous country, destroyed by time and processes of denudation and erosion, partially buried under loose sediments. The external appearance of the Uplands relief is closely related to its structural and lithological features. Hilly-ridge and undulating form with pinnacles of rocks on the tops and slopes are typical for the hills stacked with effusive rocks (porphyries, tuffs, diabase). Hilly-ridge Uplands prevail in the regions of dislocated rocks of the Paleozoic (sandstones, shale, and limestone). In the regions of granite intrusions, the tops of the hills are composed of rounded mattress-shaped mesorelief forms.

All the researchers link the stage of neotectonic movements within the Kazakh shield with the formation of a modern relief. Most of them believe the start of the neotectonic stage as the end of the upper Oligocene - the beginning of the Miocene, that is, the time for the completion of kaolinite crustal formation on the ancient peneplain. Z.A. Svarichevskaya (1965) directly connects neotectonic movements with heterogeneous types of Uplands. She has isolated young and old erosion relief caused due to the dismemberment of the primary peneplain surface - Uplands slopes and watershed Uplands, as well as young (middle pliocene-Quaternary) relief of lowlands of the latest denudation neotectonic origin.

Under the influence of the above mentioned geomatic conditions the geosystems of Upper Sarysu sub-geo-system is formed with the pinnacle of parent rocks, temporary streams riverbeds composed of effusive-sediments with calciphyte -herb-wormwood-tyrsa, shrub-petrophytic-herb flora and meadows on light chestnut solonetzic and brown desert soils used for grain-fallow-grass-field rotations of crop and pasture lands. The Upper-Sarysu sub-geo-system that functioning in the basin runoff formation zone is subject to changes in the water-salt balance of geosystems as a result of the negative impact of anthropogenic factors represented by large irrigation massifs.

In the middle course of the basin, except for the flat-shallow relief, the islet lowlands predominate. Orographically, the low mountain region of Ulytau is here, which has a meridian direction, with a total length of about 200 km. The low-mountain configuration is defined by the Ulytau anticlinorium - a large Caledonian structure. The highest point has the main peak of the Ulytau mountain itself - Akmechet - 1133 m. In the area of Ulytau mountains shale, gneiss, quartzite, marbles, conglomerates, sandstones and limestone are widespread. The relief “scab stones” (chipped rocks, so called because of the many different forms of weathering) is characteristic. Due to weathering and deflation processes, cornices, bizarre rocks, weathering cells, blowing niches were formed. From the eastern slopes of the Ulytau Mountains, in particular, the components and tributaries of the most full-flowing river system Sarysu- Karakengir River flow.

Strongly fractured and karst limestone are found in the upper and middle parts of the basin. Large massifs of granites with considerable fracturing are present in the upper reaches of the Zhaman-Sarysu, Zhaksy-Sarysu and Atasu Rivers. Karst forms are also common in the Karakengir basin (Kengira).

Simultaneously with the uplift of uplands and low-mountain massifs in the Neogene-Quaternary period, ancient and modern river valleys and lake basins of the investigated basin were laid. The ancient valleys are confined to grabens and synclines. They are partially filled with Neogene lake clays of the Aral Formation and lacustrine-alluvial deposits of the Pavlodar Formation, on which the Pliocene loams,

pebbles, and gravel lie. The accumulative cover, composed of sands of Middle Late-Leistocene age lies above [7, 8].

In the thicknesses of proluvial sand-and-pebble deposits in the slopes of mountains along the line of geographic flow, powerful currents of groundwater flow that feed on atmospheric precipitation. In the upper parts of the foothills they are fresh, with hydro carbonate-calcium composition, with a dense residue of less than 1 g/L. As you move away from the mountains, the backwater is formed with groundwater with a decrease in the proluvial deposits thickness, which rise to the surface and form a zone of the flow wedging out. Both surface and groundwater take part in this process. Small streams, springs of the "Karasu" type, have a groundwater supply. In the lower part of the foothills, a strip of moist grass is formed, where water is expended on evaporation and transpiration of vegetation. This process of groundwater raising because of backwater and, at the same time, their wedging and evaporation, is accompanied by an increase in their mineralization [9, 10].

In the central part of the Sarysu River basin there is a wide ancient alluvial plain, sometimes reaching a width of up to 100 km. The relief of the Sarysu Valley is extremely peculiar in morphology, and its various parts differ sharply from each other. For example, for the headwaters of the valley, a more lofty ridge-wavy relief is typical, which, stepwise descending, in the middle reaches transforms into a ridge-hollow relief. In the lower reaches, where the river flows along the gorge, the slopes of the massifs are distinguished by bizarre forms of rocks (holes of blowing, mushrooms, canopies, etc.) that formed under the influence of desert weathering.

On the left bank of the river, more often confined to the terraces of the valley, Sub-Sarysu sandy massifs are located. The hilly-ridge sand occupies the most part of the desert, reaching 20-40 m in height, sometimes extending for 5-7 km. Ridges and hillocks are usually fixed with vegetation, but in recent years their area has been greatly reduced.

The Middle-Sarysu sub-geosystem is distinguished by the aridity of the climate, poor productivity of the soil and vegetation cover, limited water resources, and possesses unique deposits of minerals at the same time. General intrusions and effusions determine the richness of the territory under investigation; gold, copper, lead, etc. deposits are associated with the Caledonian intrusions; Hercynian intrusions of various chemical compositions - from ultrabasic to the most acidic, were distinguished by special thickness, which promoted the formation of various minerals, especially copper, molybdenum, iron, gold, tungsten, etc. (Zhezkazgan, Zhayrem, Ushkatyn, Zhomart, etc.). The formation of coal deposits (Shubarkolskoye, Zhalynskoye) is associated with the Paleozoic stage of development.

Thus, under the influence of the above geomatic conditions, the geo-systems of the drain transit zone are formed - the Middle Sarysu sub-geosystem. The geosystems of the Middle Sarysu depository with eolian processing, channels of temporary watercourses, closed basins, composed of shales, gneisses, tuffs, tuff porphyrites, limestone, sandstones with one-year-old wormwood, wormwood, feather grass and tasbiurgun vegetation and meadows on light chestnut incomplete (xeromorphic) advanced rubbly and brown solonetsous soils, are used for grain-fallow-grass-field crop rotations and pasture lands.

Having reached the desert, Sarysu River sharply "dives" to the south and flows along the western edge of the Betpak-Dala plateau. Betpak-Dala is a northern hungry steppe, an extensive desert plain with long and gentle ridges, composed of Upper Cretaceous clays, clayey sands, and sandstones with intercalations of limestones and marls. In Betpak-Dala, coarse crushed stone, especially on the slopes and tops of the hills, represents the weathering crust on the sections between the depressions since all small particles are blown out by the wind or washed off in depression. The processes of weathering are associated with the presence of matrass-shaped separations of granites. As a result of selective weathering, caverns and cavities are formed on the surfaces of granites. The height of the walls of such microforms is 10-15 cm; the width of the bottom is 13-15 cm. The plateau breaks to the valley of the Sarysu River with steep ledge, with a height of 40-60 m.

In the south, near the intersection of the Sarysu River and the administrative boundary of the Karaganda region, Moiynkum is wedged as a narrow triangle in the region. This is the most elevated part of the desert (30-40 m above the uneven plain). The catchment area here is inactive. The desert is clay, but sands are widespread on its western outskirts, they are often mobile, moved by the wind ("kums").

In the Quaternary time, the Sarysu and Shu rivers carried their waters to the mighty Syr Darya River from different directions. Because of tectonic processes in the Late Pleistocene, when the uplift of the

Karatau Range rises, the Shu valley shifted northward, as a result of which the lower reaches of the Shu and Sarysu rivers separated themselves from the Syr Darya River and found their end in the plain, in shallow delta lakes [11, 12]. Only in some years Sarysu River brings its flood waters to the Telekol Lake, usually they are lost in their own loose sediments of the river.

Under the influence of the above-mentioned geomatic conditions, the geosystems of the Lower-Sarysu sub-geosystem are formed with the Obian, one-year- halophytic -Sarsazan, Kokpeka and Sageb-rush vegetation on gray-brown underdeveloped and meadow-bog soils used for pasturelands. The Lower Sarysu sub-geosystem is formed in the zone of dispersion (spreading) of the flow and in the zone of intensive salt accumulation and formation of solonchaks (saline lands) under conditions of a rigid dry hydrothermal regime.

The most important factor in the formation of the basin relief is blowing out of snow by strong winds from open surfaces into depressions, creating large deposits of snow, the melting of which leads to the formation of numerous lakes. The water of the latter, eroding the bed, contributes to the formation of a loose "bedding", which by lakes drying is blown away by the wind and as a result, there is a further deepening of the sink-hollow relief. Deficiency of humidity limits the possibility of a permanent surface runoff and the development of a dense hydrographic network. Conditions that are more favorable arise within the Ulytau uplift, at the foot of which the unloading of fractured waters leads to the emergence of numerous springs and sources, small streams and rivers. The lakes are mostly salty and shallow, in summer they greatly reduce their water area, and even dry up completely, turning into fields favorable for wind processes and the formation of suffosive and sore-deflation valleys. The aridity of the climate and its intensification caused the growing development of aeolian processes within the flat parts of the Zhezkazgan-Sarysu Depression [13-17].

The modern exogenous geodynamics of the Sarysu River basin is associated with a special character of manifestation and the degree of relief-forming influence of weathering, denudation and accumulation processes, salinization and erosion processes. The rocks that make up the arid relief are in a state of constant change caused by surface temperature fluctuations, atmospheric precipitation, and biogenic factors [14, 17, 18].

At the present stage, geodynamic processes caused by anthropogenic impact are the most powerful factor of self-organization and dynamics of geosystems. Anthropogenic impact on the river valley state is, first, due to the discharge of industrial and domestic sewage. The largest industrial complex of non-ferrous metallurgy was established on Sarysu River, the raw materials base of ferrous metallurgy of the Republic of Kazakhstan. Metallurgy of the region is represented by a mining and processing plant, a copper smelting plant, concentrating mills, a foundry-mechanical plant, mining and processing of iron ore, and open-type mines. Such enterprises of the region are the "Zhezkazgantsvetmet" PO, "Kazakhmys Corporation" LLC, "Zhezkazganredmet" RSE, "Zhayremsky GOK" JSC and "Atasuruda" JSC, whose sewage flows directly to Sarysu and are the main sources of pollution. The accumulation of river sediments occurs due to sedimentation of suspended solids. An increase in the volume of sediments covering the bottom substrate leads to siltation, swamping, and subsequently - the drying out of the river. Suspended particles influence the speed of sediment growth that is washed off from the surface of the storage tanks of solid industrial and household waste located in the basin valley. In the areas of coal deposits development, such processes as bogging and flooding, wind and gully erosion develop (figure) [19].

Extraction of solid minerals leads to a change in all geomatic components in the areas of development and adjacent territories, to the development of a number of negative phenomena and processes: linear and planar erosion, landslides, landslips, deflation, deformation of the integumentary covers and formation of troughs subsidence, sagging of rocks under own weight, shear of rocks along bedding planes, collapse of the roof over the produced stratums, the formation of a cracks zone and intensive crushing of rocks, leading to a change in the surface about runoff, flooding and waterlogging sagging areas over the underground excavations. Extracted rocks are a zone of intensive development of chemical and physical weathering, the development of erosion and deflation processes, as well as sources of contamination of soil, groundwater and surface water, atmosphere and biota, which ultimately affect the nature and condition of the ecological and geomorphological systems of the area under study (figure) [19, 20].

Intensive and differentiated in area man-caused impacts on the morpholithic base of the region under consideration led to the creation of new forms (quarries, ditches, sinks, depressions, waste banks,

earthfills, embankments, dams, dumps, slagheaps, etc.) that are not characteristic of the initial relief, the location of which differs with concentrations next to large settlements.

Thus, the geomatic features, the growing aridity of the climate and the anthropogenic load within the region under consideration contribute to the intensification of the arid denudation processes, leads to a sharp activation of water-wind erosion and the expansion of lands prone to flat flushing, takyr- and sporulation formation, deflation and other processes.

Ж. О. Озгелдинова[1], К. М. Джаналеева[1], З. Т. Мукаев[2], Ж. Ф. Тенькебаева[1], К. М. Арыкбаева[1], Л. М. Корытный[3], Г. Т. Оспан[1]

[1]Л. Н. Гумилев атындағы Еуразия ұлттық университеті, Астана, Қазақстан,
[2]Шәкәрім атындағы Мемлекеттік университет, Семей, Қазақстан,
[3]Иркутск Мемлекеттік университеті, Иркутск, Ресей

САРЫСУ ӨЗЕНІ АЛАБЫ ГЕОЖҮЙЕСІНІҢ ҚАЛЫПТАСУЫНЫҢ ГЕОМАТИКАЛЫҚ ЕРЕКШЕЛІКТЕРІ

Аннотация. Мақалада біз Сарысу өзені алабының геожүйелері қалыптасуындағы геоматикалық факторларды зерттеудің нәтижелерін ұсынамыз. Қарастырылып отырған алапта Жоғарғы – Сарысу, Ортаңғы – Сарысу және Төменгі – Сарысу геожүйеастылары берілген, оларда өзеннің бастауынан сағасына дейінгі арна жасау процестерінің кеңістіктік уақыттық қарым-қатынастары басым болады. Қарастырылып жатқан алаптың қазіргі заманғы оқшауланған субгеожүйелерін қалыптастыру мен жұмыс істеуінің негізгі факторлары анықталды.

Құрастырылған 1: 500 000 масштабты карта қарастырылып отырған алаптың қазіргі экзодинамикалық үрдістері Сарысу өзені алабын оңтайлы пайдалану үшін әртүрлі әдістерді талап ететін экзогенді табиғи геожүйелерге және экзогенді антропогенді-техногенді геожүйелерге бөлінген. Қазіргі заманғы геодинамикалық үрдістерді қарастырғанда, антропогендік белсенділіктің негізгі факторлары анықталды, бұл өзін-өзі ұйымдастырудың және геожүйелердің динамикасының ең күшті факторы болып табылады.

Нәтижесінде қарқынды антропогендік әсер жағдайында геожүйелердің ластануының қазіргі заманғы геодинамикалық үдерістерінің табиғи-климаттық ерекшеліктері анықталды және Сарысу өзені алабы маңында антропогендік әсерден аридті денудация үрдіске алып келеді, бұл су-жел эрозиясының күрт белсенді болуына және шайылуға , тақыр, дефляция және басқа да процестердің пайда болуына әсер етеді.

Түйін сөздер: геожүйе, өзен алабы, геоматиялық үрдістер, рельефтік процестер, антропогендік әсер.

Ж. О. Озгелдинова[1], К. М. Джаналеева[1], З. Т. Мукаев[2], Ж. Ф. Тенькебаева[1], К. М. Арыкбаева[1], Л. М. Корытный[3], Г. Т. Оспан[1]

[1]Евразийский Национальный университет им. Л. Н. Гумилева, Астана, Казахстан,
[2]Государственный университет им. Шакарима, Семей, Казахстан,
[3]Иркутский государственный университет, Иркутск, Россия

ГЕОМАТИЧЕСКИЕ ОСОБЕННОСТИ ФОРМИРОВАНИЯ ГЕОСИСТЕМ БАССЕЙНА РЕКИ САРЫСУ

Аннотация. В работе представлены результаты исследования геоматических факторов формирования геосистем бассейна реки Сарысу. В рамках рассматриваемого бассейна выделены подгеосистемы Верхне-Сарысуйская, Средне-Сарысуйская и Нижне-Сарысуйская, где доминируют пространственно-временные связи руслообразующих процессов от истока к устью реки. В работе выявлены основополагающие факторы формирования и функционирования современных выделенных подгеосистем рассматриваемого бассейна.

На составленной нами карте в масштабе 1: 500 000 современных экзодинамических процессов рассматриваемого бассейна дифференцированы классы экзогенных природных геосистем и классы экзогенных антропогенно-техногенных геосистем, требующих разных подходов при разработке оптимальной структуры природопользования бассейна реки Сарысу. При рассмотрении современных геодинамических процессов выявлены основные факторы антропогенной деятельности, являющиеся наиболее мощным фактором самоорганизации и динамики геосистем.

В результате выявления природно-климатических особенностей развития современных геодинамических процессов загрязнения геосистем в условиях интенсивной антропогенной деятельности установлено нарастающая аридность климата и антропогенная нагрузка в пределах бассейна реки Сарысу способствуют усилению процессов аридной денудации, приводит к резкой активизации водно-ветровой эрозии и

расширению земель, подверженных плоскостному смыву, такыро- и сорообразованию, дефляции и других процессов.

Ключевые слова: геосистема, бассейн реки, геоматические процессы, рельефообразующие процессы, антропогенное воздействие.

Information about authors:

Ozgeldinova Zhanar Ozgeldinovna, PhD, Eurasian National university named after L. N. Gumilyov, Astana, Kazakhstan; ozgeldinova@mail.ru; https://orcid.org/0000-0001-6004-9066

Dzhanaleeva Kulzhan Mukhitovna, Doctor of Geographical Sciences, Professor, Eurasian National university named after L. N. Gumilyov, Astana, Kazakhstan; https://orcid.org/0000-0001-9557-7061

Mukayev Zhandos Toleubekovich, PhD, Shakarim state university, Semey, Kazakhstan; zhandos.mukaev@mail.ru; https://orcid.org/0000-0003-0538-2645

Tenkebayeva Zhadra Faizuldaevna, Senior Lecturer, Eurasian National university named after L. N. Gumilyov, Astana, Kazakhstan; tenkebaeva@yandex.com; https://orcid.org/0000-0001-5828-215X

Arykbayeva Kamshat Maksutovna, Senior Lecturer, Eurasian National university named after L. N. Gumilyov, Astana, Kazakhstan; kama.maksut@mail.ru; https://orcid.org/0000-0002-8772-9499

Korytny Leonid Markusovich, Doctor of geographical sciences, professor, Chairman of the Irkutsk Regional Branch of the Russian Geographical Society, Irkutsk, Russia; sibirkina_alfira@mail.ru; https://orcid.org/0000-0003-2562-8390

Ospan Gaukhar Tashymkyzy, Teacher, Master of Science, Eurasian National university named after L. N. Gumilyov, Astana, Kazakhstan; gauhara_ast@mail.ru; https://orcid.org/0000-0002-6382-0511

REFERENCES

[1] Kassin K.G. About ancient valleys in the Central Kazakhstan // Problems of Soviet geology. M.; L., 1936. Vol. 6, N 1. P. 77-82.

[2] Gerassimov I.P. Development of the relief of the Kazakh melkosopochnik (uplands) (Central Kazakhstan) // Izvestiya. AN SSSR. Series Geography and the geophysics. 1937. N 4. P. 565-579.

[3] Medoev G.T. Geological structure of the southern part of the Karaganda basin. Alma-Ata: Kazgosizdat, 1937. P. 36.

[4] Borsuk B.I. Geological structure of the Paleozoic basement of the eastern part of Betpak-dala. M.: Gosgeoltekhizdat, 1955. P. 304.

[5] Svarichevskaya Z.A. Geomorphology of Kazakhstan and Central Asia. L.: Leningrad Publishing house. un-ta, 1965. P. 269.

[6] Bespalov V.F. Geological structure of the Kazakh SSR. Alma-Ata: Science, 1971. P. 363.

[7] Kalmenova U.A. Physical geography of the Central Kazakhstan. Zhezkazgan, 2000. P. 79.

[8] Temereva F.M. The nature of the Zhezkazgan region. Zhezkazgan, 2002. 105 p.

[9] Dzhanaleeva K.M. Physical Geography of the Republic of Kazakhstan. Astana, 2010. P. 590.

[10] Dzhanaleeva G.M. Geosystem-basin approach in the study of the natural environment of the Republic of Kazakhstan. Almaty, 1997. 44 p.

[11] Filonets P.P., Omarov T.R. Lakes of the Central and Southern Kazakhstan. Alma-Ata: Nauka, 1973. P. 198.

[12] Palgov N.N. Rivers of Kazakhstan. Alma-Ata: AN KazSSR, 1959. P. 99.

[13] Bekseitova R.T. The role of the morpho-orographic factor in the eco-morpholitogenesis of the Central Kazakhstan territory // Domestic geomorphology: past, present, future. Materials of the XXX plenum of the Geomorphology Commission of the Russian Academy of Sciences. SPb., 2008. P. 189-191.

[14] Ecological-geomorphological systems of platform-denudation plains of the arid zone of Kazakhstan: Report on research (intermediate) / KazGU: hands. Beksheitova R. T. Almaty, 2012. 160 p. No. ГР 0112РК 00597.

[15] Landscape-ecological basis for ensuring food security of the Republic of Kazakhstan: Report on R & D (intermediate) / LLP Geography Institute: Medeu A.R. Almaty, 2013. 383 p. No. 0112PK00569.

[16] National Atlas of the Republic of Kazakhstan / Ed. A. R. Medeu and others. Almaty, 2010. Vol. 3. 158 p.

[17] Akpambetova K.M. Geomorphology of arid territories. Karaganda: Publishing house of the university of Karaganda, 2002. P. 52.

[18] Beksheitova R.T. Role of morpho-orographic factors of eco-morpholitogenes of the territory of Central Kazakhstan // Domestic geomorphology: past, present, future: mater. XXX Plenum of the Geomorphology Commission of the Russian Academy of Sciences. SPb., 2008. P. 189-191.

[19] Ozgeldinova Zh.O. Comprehensive assessment of anthropogenic impacts on the geosystems of the Sarysu river basin. Almaty: Evero, 2017. 196 p.

[20] Ozgeldinova Zh.O. Anthropogenic impact on the geosystems of the Sarysu River Basin: Dis. ... doc. PhD. Astana, 2015. 155 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

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

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

Верстка *Д. Н. Калкабековой*

Подписано в печать 12.04.2019.
Формат 70x881/8. Бумага офсетная. Печать – ризограф.
15,2 п.л. Тираж 300. Заказ 2.

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