УДК 93.1 10.51889/5615.2022.98.63.014
IRSTI: 39.29.15

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IDENTIFICATION OF CHANGES IN THE LANDSCAPE OF NATURAL OBJECTS DURING THE HISTORICAL PERIOD BASED ON TOPONYMIC DATA (on the Balkhash-Alakol depression example)

Abstract

This article collects toponymic data concerning historical names of large lake systems and rivers of Kazakhstan. Toponymic data are important in determining the geographical representation of natural objects in the historical period. The use of valuable geographical names data as a source of information and research is an essential component of toponymy.In the article, we considered this using the example of hydronyms of the southeastern part of the country. That is, the historical names of the Balkhash and Alakol lakes, the main artery of the Zhetysu Land, the Ili River, which are of great importance in the socio-economic development of the country, explained from different sides based on scientific sources.Landscape changes of natural objects over time were determined based on historical and cartographic data and scientific writings. The information burden of toponyms, language and explanatory reasoning may be a source for the fields of applied science related to history, geography and the environment.

Keywords: natural objects, toponymy, historical period, landscapes, Balkhash-Alakol depression.

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ТОПОНИМИКАЛЫҚ ДЕРЕКТЕР НЕГІЗІНДЕ ТАБИҒИ НЫСАНДАРДЫҢ ТАРИХИ КЕЗЕҢДЕГІ ЛАНДШАФТ ӨЗГЕРІСТЕРІН АНЫҚТАУ (Балқаш-Алакөл ойысы мысалында)

Аңдатпа

Бұл мақалада Қазақстанның ірі көлдер жүйесі мен өзендерінің тарихи атауларына қатысты топонимикалық деректер жинақталған. Табиғи нысандардың тарихи кезеңдегі географиялық бейнесін анықтауда топонимикалық деректердің маңызы өте зор. Географиялық атауларда жинақталған құнды деректерді ақпарат және зерттеу көзі ретінде пайдалану - топонимиканың маңызды компоненті саналады. Мақалада біз мұны еліміздің оңтүстік-шығыс бөлігіндегі гидронимдер мысалында қарастырдық. Яғни, еліміздің әлеуметтік-экономикалық дамуында аса зор мәнге ие Балқаш және Алакөл көлдерінің, Жетісу жерінің басты артериясы саналатын Іле өзенінің тарихи кезеңдегі атаулары ғылыми дереккөздер негізінде әр қырынан түсіндірілді. Табиғи нысандардың уақыт кезеңіндегі ландшафт өзгерістері тарихи-картографиялық деректер мен ғылыми еңбектерге сүйене отырып анықталды. Топонимдердің ақпараттық жүктемесі, тұжырымдаулар мен түсіндірмелік негіздеме – тарихи-география мен қоршаған ортаға қатысты қолданбалы ғылым салаларына қажетті дереккөз бола алады.

Түйін сөздер:табиғи нысандар, топонимика, тарихи кезең, ландшафттар, Балқаш-Алакөл ойысы.

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ОПРЕДЕЛЕНИЕ ЛАНДШАФТНЫХ ИЗМЕНЕНИЙ ПРИРОДНЫХ ОБЪЕКТОВ ЗА ИСТОРИЧЕСКИЙ ПЕРИОД НА ОСНОВЕ ТОПОНИМИЧЕСКИХ ДАННЫХ (на примере Балхаш-Алакольской впадины)

Аннотация

В данной статье собраны топонимические данные, касающиеся исторических названий крупных озерных систем и рек Казахстана. Топонимические данные важны для определения географического представления природных объектов в исторический период. Использование ценных данных о географических названиях в качестве источника информации и исследований является важным компонентом топонимики. В статье мы рассмотрели это на примере гидронимов юго-восточной части страны. Исторические названия озер Балхаш и Алаколь, главной артерии земли Жетысу, реки Или, которые имеют большое значение в социально-экономическом развитии страны, объясняются с разных сторон на основе научных источников. Ландшафтные изменения природных объектов определялись на основе исторических и картографических данных и научных трудов. Информация, заложенная в топонимах может служит источником для прикладных исследований, связанных с историей, географией и окружающей средой.

Ключевые слова:природные объекты, топонимика, исторический период, ландшафты, Балхаш-Алакольская впадина.

Introduction. The toponymic method is one of the main methods of research in historical geography. To date, considerable experience has been accumulated in the use of toponymic data in various sections of historical geography. The continuing deterioration of the environment makes it necessary to pay attention to the historical aspects of the formation of the modern ecological situation (natural conditions, landscape dynamics, history of nature management), which makes it relevant to use toponymic information in historical and geoecological research.

The ancient history of the research area is preserved in geographical names, namely toponyms. The impact of intensive economic activity on the natural environment during the development of human society can be clearly traced through toponyms. The study of the problem of geographical toponymic research and theoretical and methodological foundations, the grouping of names of natural objects from the standpoint of physical geography, the justification of applied problems of using toponymic data in geographical science as information can become a prerequisite for the formation and development of toponymy based on geographical science. From this point of view, the accumulated experience of the Kazakh people in the process of using natural resources over the centuries has become the basis for an effective organization of the economy.It is possible to extract information from Kazakh geographical names that contributes to a complete physical and geographical justification of its life, and also it is possible to see the features inherent exclusively to the Kazakh people, that is, we will see the connecting closeness of the Kazakh people with nature, the peculiarities of naming natural objects.

Currently, historical science is faced with topical problems of a geopolitical, economic, demographic, cultural and patriotic nature, the origins of which go back to the historical past of Kazakhstan. The study of toponyms – geographical names, as it is the historical memory of the Kazakh people, will help us to solve these ethnic, political and patriotic problems. The relevance of the article is seen in the fact that this work will allow a new approach to solving a number of ethnopolitical problems of independent Kazakhstan [1].

It is impossible to imagine modern civilization without geographical names. Toponyms have become an integral part of the development of society. Toponymy is a history and geography mirror, people of any region or country. From this point of view, it is very important to study the meaning of toponyms, conditions of their origin and nature of changes. [2, p.9]. Geographical names are essentially labels which distinguish one part of the earth's surface from another, and as such they must be considered with great care. Researchers are often faced with a deficiency of data sources when investigating the historical evolution processes of various landscapes. Archeological data and historical cartographic documents are traditional sources of geographic information regarding historical entities, but such data often appear to be subjective. In addition, it is difficult

to discern the useful geographic information from these types of data without human recognition and interpretation. Alternatively, toponyms represent a powerful data source for historical geographical information [3-4, p.2].

Along with the unevenness of spatial and temporal magnitudes of natural and anthropogenic factors that cause changes in the landscape, the diversity of the "degree of stability" of individual components of the landscape requires the use of different methods and techniques in the restoration of landscapes. The results of historical and geographical studies show that changes in the landscape caused by natural factors (climate instability, etc.) are reversible, and anthropogenic, technogenic activities are subject to strong changes.Toponymic data can be included among the data «proving» the above changes.

Materials and research methods. The history of the formation of the studied territory. The Balkhash-Alakol depression is a flat closed depression in southeastern Kazakhstan, located at an altitude of 342-600 m above sea level. The total length is 800 km, width is 100-300 km. Most of the depression is occupied by the drainless Lake Balkhash. Lake Balkhash is a large endorheic water body, the third largest by size in Eurasia and the second largest salt lake of the world. With its half-moon elongated morphology and 78% of inflows provided by the Ili River from the West, the lake has a freshwater basin in the West and saline water basin in the East, separated by the 4-km narrow and 6-m deep Uzunaral Strait. The average bathymetry is shallow, with a maximum water depth of 11 m in the West and 26 m in the East. In the eastern part of the basin, which is also called the Balkhash-Alakol lowland or depression, there are lakes Sasykkol and Alakol. The depression also includes the Taukum and Moyinkum sand massifs. The lowest place of the Chu-Balkhash basin is the lower reaches of the Chu. It was formed as a result of a deflection filled with river sediments. In the carboniferous, there was an intracontinental Dzungarian Sea - a relic of the Paleoasiatic Ocean. In the Permian period, this sea disappeared, and in the Eocene, the South Balkhash trough was laid here with the formation of a single Balkhash-Alakol reservoir, the greatest depths of which were northeast of the modern village of Bakanas. The resulting depression was filled with salty waters, after which there was an extensive lake transgression of Balkhash-Alakol and neighboring lakes from the east – Zaisan and Gobi Lake [5].

The intracontinental Khankhai Sea was formed, which occupied most of the Semirechye and Dzungaria, but in the Oligocene it dried up with the formation of relict (residual) lakes — Balkhash, Alakol, Zaisan and Gobi [5].

In the Miocene, the Balkhash depression was filled with precipitation, Balkhash became shallow and desalinated. At the same time, Alakol and Zaisan were a single lake. In the Pliocene and Pleistocene, tectonic processes intensified — the entire depression deepened, and the rising Tarbagatai ridge divided the Zaisan (fresh) and Alakol (brackish) lakes into independent reservoirs, which at the same time significantly decreased in size. However, Balkhash has increased and acquired a modern configuration with a division into the western part (fresh) and eastern (salty). At the same time, the formation of the Ili, Karatal and other rivers began. In the Pleistocene, the area of Balkhash increased greatly due to glaciation and intensive melting of ice, as a result, the lake was reunited with Alakol and formed a single reservoir. In the Holocene, it became shallow and divided into modern lakes Balkhash, Alakol and Sasykkol [5].

The peculiarities of the geographical environment are the main factor in the nomination of geographical objects. Despite the so-called "law of relative negativity of names" revealed by toponymists, toponyms very often reflect the physical and geographical realities of the territory. But we tend to think that in some names there really is the most atypical geographical feature for a given area. For example, toponyms with the lexeme «agash (tree)» and «su (water)» are often found in areas of semi-deserts and deserts. This can be explained by the fact that in a monotonous landscape environment, atypical phenomena serve as a guide. Thus, when identifying the distribution areas of toponyms based on certain geographical terms, it is necessary to take into account the landscape conditions under which these names function.

In the physico-geographical section of historical geography, toponymic data are used primarily in reconstructing the nature of the landscape as a whole. To restore the character of the landscape, toponyms formed from geographical terminology are most important.

In the twentieth century, the foundations of the toponymic study of folk geographical terms of Kazakhstan were just being laid. Kazakh toponymy was characterized by the predominance of linguistic direction. Reconstruction of the areas of a specific geographical term or toponym was not the subject of special research. There were separate examples of etymological, comparative-lexical research, which led to attempts to reconstruct the areas of concentration of the most famous geographical terms, including landscape ones.

One of the first scientists who paid special attention to geographical names was the Russian geographer and historian V.N. Tatishchev (1686-1750), who along with the analysis of the origin of individual names considered toponymic studies as a part of geography. Meanwhile, the toponymic method in physical geography relies mainly on historical-physical-geographical approaches based on the study of the most rapidly

changing elements of landscapes, which called natural indicators of their development. Usually classified three groups of natural indicators, called biogenic, hydromorphic, and lithogenic. Among them, the study of biogenic indicators gives particularly good results, so toponyms associated with species of flora, fauna, biocenoses, soils, which belong to the most changeable components of the landscape, most accurately reflect changes in the natural environment.

V.S. Zhekulin named the toponymic and landscape-lexicological method as one of the main methods of historical-landscape research [6].The essence of the toponymic method in his works revealed in connection with the "distribution of toponymic and landscape-lexical data on geocomplexes and the analysis of landscape features and human impact on nature" [7, p.77]. After all, toponyms "fixed" in a certain landscape the peculiarities of the early development of this territory and certain features of the natural complex. The value of the scientist's research in this direction is that toponymy in science substantiated by V.N. Nikonov (1958) proves that the legitimacy of "relative negativity" is not universal.

The possibility of using local toponymic data in activities related to the restoration of indigenous landscapes is due to the pattern "concentration" of place names in certain landscapes and the fact that toponyms in most cases accurately reflect the features of nature. In historical geography, the founders of this method include F.P. Savarensky and P.P. Semenov-Tyan-Shansky.

The words of P.P. Semenov-Tyan-Shansky have not lost their meaning for modern toponymic studies of physical and geographical orientation: "...by the names of geographical areas in which the natural-geographical landscape has repeatedly undergone disastrous changes, the initial position of the landscape in certain areas can be largely restored. The word seems stronger than what it calls" [8, p.156]. If we replace the word "scenery" in this passage with the now existing term "landscape", we can see that the direction we are considering is too far in the past. The scientist analyzed and processed a huge terminological material, which undoubtedly increases the degree of reliability of the author's judgments. Based on the analysis, he put forward the idea "about the possibility of restoring the original landscape of certain places in antiquity" by means of geographical names.The scientist's main attention in the settlements names analysis paid to the names of the elements of relief, rivers-lakes, plant species, animals, the processing of huge statistical data served as the basis for this method to become one of the effective directions in historical geography.

Research results and discussion. The modern lake Alakol in the XII-XIX centuries was called "Gurge-noor". This name in translation from Mongolian means "Bridge Lake".Studies carried out regarding the timing of the mention of Alakol showed that the Swede Renat, who compiled a map of Dzungaria between 1716 and 1733, marked this lake on his map called "Guru Land" [9, p.141]. And in the work of A. Levshin "Description of Kyrgyz-Cossack or Kyrgyz-Kaisatsk hordes and steppes", which published in 1832, according to G. Klaproth, there is a fact that Alakol previously called Gurge-noor, and on the map of Unkovsky, compiled in 1722-1723 years, on the Dzungarian's settlement basis information of the lake has been designated as "Alak-Tugul" [10, p.79]. Based on this, we believe that the name "Gurge-noor" of Alakol existed until the middle of the XVIII century, along with the name of Lake Alakty.

The etymology of this name can be find in the geographical features of the lake [11].The shores of Alakol are smooth and formed by loose rocks of the Quaternary era.Only the southern and partially eastern coasts are steep. A strip of long, thin gravel shelves stretches further from the coast. When the lake level decreased, they connected to each other, forming bridges connecting the two shores of the lake [12]. This explained on basis of factual data, which showing changes in the level of the Alakol and the shape of the coast during the historical period.

Based on written data of researchers it is possible to be convinced that the level of Alakol for the last 170 years repeatedly underwent strong changes.Particularly noteworthy does A. Shrenk, who passed through the southern, eastern and northern Alakol banks in 1840 and leave valuable data about it.During the stay of A. Schrenk in this region, small Alakol sandstones in the form of a continuous strip separated the Small Alakol Bay from the lake. The scientist with his expedition traveled along this land strip with a length of more than 15 kilometers to the opposite side of the lake.A.Schrenk writes that he easily reached the Great Araltobe through the land "bridge", and now its place occupied by the reservoir with the lowest width of 13 km [13]. A. Schrenk left data that this strip of land, through which he passed, was called the "Naryn pond" ("thin hollow") and rose above the surface of the water by 2-3 meters.Moreover, in 1862 A. Golubev, who was in the region, wrote that the central part of the isthmus was flooded with water [14, p. 101].

Changes in the level and shape of the Alakol shores, which occurred in past centuries, also evidenced by the lithological analysis of the lake bottoms and coastal formations. At the bottom of the lake, there are thin underwater ramparts, which now extend in a meridional direction, parallel to each other.According to researcher K.V.Kurdyukov, these deposits represent a structure formed in subaerial conditions, rather than

formed at the bottom of the lake by nature [13, p. 122]. On this basis, we can assume that the Alakol water level was even lower than in past centuries, when A.Schrenk saw.

P.P. Semenov Tyan-Shansky wrote that in the period 1840-1858 Alakol Lake massif consisted of two main lakes: Eastern and Western, which are separated by a swampy isthmus 20 versts wide, partly overgrown with reeds and dotted with small lagoons, which are connected by a channel [8, p.261].

In 1933, Z.A. Svarichevskaya noted a significant increase in the level of Alakol compared to the first half of the 19th century. The researcher writes that anglers are unable to set nets in these areas because they are torn by the roots and broken branches of flooded shrubs and trees on the southeastern outskirts of Alakol and at the mouth of the Emil River [15, p. 28].

The morphometric dimensions of the Alakol also characterized in the direction of increasing over the last 170 years: according to A.Schrenk in 1840, the area of the lake was 1,700 km^2,and according to A.F. Golubev in 1862 was 1776 km^2, currently has an area of 2,650 km^2. While A.F. Golubev defined the length of the lake as 70 km and width as 43 km, B.K. Terletsky (1931) gives that these dimensions are 75 and 48 km respectively, and according to V.K. Kurdyukov (1951) 90 and 50 km, nowadays these values are considered 104 and 52 km respectively.

These large changes in the morphometric dimensions of the lake during the last two centuries indicate that the present shape and area of this lake differed greatly from the previous 2-8 centuries. Thus, we can say that the name of the modern Alakol - Bridge Lake in the Middle Ages - fully explained geographically.In general, a number of names reflecting the nature of the water regime in connection with oscillating climate changes recorded in this region: Beskol (lake), Koltaban (settlement), Kurozek (settlement), Kyzylkak (settlement), etc.

The modern name Alakol is among the limnonyms most common in Kazakhstan. P.P. Semenov Tien-Shansky notes that data on Lake Alakol are also available in the Chinese annals, and a feature of the Alakol massif is the presence of a high island and peninsular hills, called Araltobe, visible on its flat shores.Scientist not hiding his surprised, that the two neighboring lakes, which in the people's memory formed one basin, and now sometimes merge into one water area, known under one name.The name "Alakol", this entire basin may have collectively received from the fact that from its level rise in the form of high hills rocky, porphyry islands and peninsulas, and the isthmus, dividing the entire basin into two lakes, consists of intermittent lagoons, ducts overgrown with halophyte salts, and extensive reedbeds [16, p. 262-263].

On the surface of Alakol, located in the intermountain basin, the wind direction and speed often change. Because of this, the direction and speed of the resulting waves also change several times a day, and the color of the lake's greenish water takes on the appearance of a tidal effect. This character of the lake water is especially well traced on the coast. Because the appearance of the lake "ala"(from Kazkah means "motley") is its main feature, the local population gave it the name "Alakol".

Their names also reflect the large islands' geographical nature, remotely located as hills in the middle of the lake. The names Big Araltobe and Small Araltobe clearly depict the size of the islands and the area relief. Thus, the name Alakol fully corresponds to the modern lake character.

Among toponymic sources, reflecting changes of natural object in the historical period can be included Balkhashlimnonym.This name can be associated with the term Balkhash, which means "clay" in the ancient Kazakh language. As noted by G.Konkashbayev (1951), this term is now out of use and found only as part of toponyms.Except this region, natural objects named Balkhash registered in other places Balkhash (settlement, Aktobe region), Balkhash (lake, Pavlodar region), Balkhashsor (salt lake, Pavlodar region), Balkhashtybulak (spring, South Kazakhstan region).Nevertheless, A. Gorbunov cited data that the lake called Jo-Hai ("Dead Sea") in the VII-X centuries,Kyzylbash-Nur ("Persians Lake") during the Genghis Khan journeys, in XVI century *Koksheteniz,* and at the turn of XVII-XVIII centuries on Russian maps *Teniz* (Sea) [17, p.27].

Chinese maps from the Three Kingdoms period (220-280) show a small lake on the site of Balkhash, which is the deepest part of Balkhash today, because of which scientists assume that most of Balkhash dried up in III century [18, p. 47]. On a Chinese map compiled in the ninth century during the Tang Dynasty, Balkhash in its current appearance shown as a large lake, resembling the Balkhash-Alakol depression [13, p. 129].

A map compiled by I. Unkovsky, who traveled through southeastern Kazakhstan in 1722-1724, contains a map of 58^0 N to 46^0 W Kazakh land. This map shows three separate lakes at the site of present-day Balkhash [19, p. 49]. These data indicate that the level of Lake Balkhash repeatedly underwent rhythmic changes during the historical period. The diverse name of the lake can be called an indicator reflecting its geographical features, i.e. characterizing the state of the lake in historical periods.

In addition, we can cite the assumption of L.S. Berg that the pit of Balkhash used to be dry, and then plunged into the water, so its water has not yet saline. Scientist hypothesized that at the beginning of XIX century, there was so much water in this region that there was a stream connecting Sasykkol and Balkhash

[20]. Thus, based on these data, we connect the origin of the name Balkhash with the period of the XVIII century, when the lake level strongly decreased and some of its parts turned into mud (in the ancient Kazakh language - "Balkhash").

The hydronym Ili is one of the oldest names. In the dictionary of M. Kashgari given following data about this name:"Ila / Ili is the name of one great river. This big river is Zhaihun of Turkish people..." [21, p. 121]. According to the famous geographer A.P. Gorbunov, this name appeared in Chinese chronicles in 270, so it makes no sense to link it with the Mongolian word "il" ("shine"), a name that existed for 1000 years before the campaign of Genghis Khan, is not related to the Mongols [22]. The name "Ili" is also associated with the mighty empire of the Huns, which formed about 2,500 years ago on the North China territory. The Huns, whose main language was Old Turkic, began penetrating the modern Kazakhstan territory in the III century B.C.Subsequently, when this empire weakened and disintegrated, the northern tribes of the Huns in I century AD remained on the territory of modern Zhetysu. According to the A. Gorbunov research, it was during this period that the name "Ili" formed, associated with the Huns word "*great*" meaning "big river", that is, over time this word has undergone changes, the age of the name is estimated at least two thousand years. As evidence, scientist gave the names of the rivers Ilikan (the word "*kan*" means river) in the basin of the Ili, Ilim, Ilyr, and Zeya, which belong to the Angara River valley on Russian territory. The fact that the name "Ili" is one of the oldest Kazakh land names, preserved to this day without any changes over the centuries, it evidenced by its geographical description in the ancient writings. "This river originates in the north of the "Sarymsakty" mountain, the water is muddy, flows to the northwest and goes into a large sandy steppe without water and grass" [23, p.41].

Conclusion. From this article, made based on identifying changes in the landscape over time of natural objects by toponymic data, the following conclusions can made:

- In historical maps and scientific works it is established that the modern Lake Alakol has various names ("Gurge-noor", "Zher Gurge", "Alak-Tugul", etc.). The fact that not only the names, but also the shoreline has undergone strong changes in historical periods is evidenced by the data given by scientists-researchers. We were convinced of that on the basis of written data of researchers A.I. Levshin, K.V. Kurdyukov, P.P. Semenov Tyan-Shansky, Z.A. Svarichevskaya and others. That is, changes in the lake bottom and coastal formations, lake morphometry, transgressive and regressive phenomena are all constantly repeated in the history of the Alakol.
- The historical value associated with the name "Balkhash" represented by the data given by G.Konkashbayev, A. Gorbunov.

G.Konkashbaev scientifically substantiates that the root of this concept is the word "clay". A. Gorbunov give attention to the fact that in historical sources this natural object represented by such names as "Koksheteniz", "Teniz". In addition, in the scientists works there are assumptions that the Balkhash Lake level has repeatedly undergone rhythmic changes during the historical period; the pit used to be dry, and then plunged into the water. In general, the origin of the name linked to the fall of the lake level and the transformation of some parts of it into clay.

- Scientifically substantiated conclusions related to the modern hydronym "Ili" were also made. In his works, A. Gorbunov proved in detail that the formation of this concept dates back to ancient times, it is associated with the word "great". The scientist focuses attention on the fact that the river name itself has undergone linguistic changes over time, the name was based on its geographical nature. That is, the scientific value of toponymic data shows that natural objects can be used as sources of information in the history of language and linguistic geography to identify changes in the historical period.

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