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Қ. И. Сәтпаев атындағы Қазақ ұлттық техникалық зерттеу университеті

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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.

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N. Ramazanova[1], Zh. Berdenov[1], S. Ramazanov[2],
N. Kazangapova[3], S. Romanova[4], S. Toksanbaeva[1], Jan Wendt[5]

[1]L. N. Gumilyov Eurasian national university, Astana, Kazakhstan,
[2]Deputy Director of the West Kazakhstan regional center of History and Archaeology, Uralsk, Kazakhstan,
[3]S. Seifullin Kazakh Agrotechnical University, Astana, Kazakhstan,
[4]Al-Farabi Kazakh national university, Almaty, Kazakhstan
[5]Gdańsk University, Faculty of Oceanography and Geography, Institute of Geography, Gdańsk, Poland.
E-mail: berdenov-z@mail.ru; nurgulram@gmail.com;serik-ram@mail.ru;kazangapova@bk.ru;sofiyarom@mail.ru;sabina.toksanbaeva@mail.ru; jan.wendt@ug.edu.pl

LANDSCAPE-GEOCHEMICAL ANALYSIS OF STEPPE ZONE BASIN ZHAIYK

Abstract. The need to study the landscape-geochemical analysis of steppe Zhaiyk river basin area has arisen because of human impacts on the landscape of the steppe zone, pollution Zhaiyk river basin. For the study was taken steppe zone, as the steppe zone - this is one of the most favorable areas for human settlement, and this study is very relevant today. These experiments allow describing the landscape of steppe Zhaiyk river basin area and showing the landscape and geochemical characteristics of the study object. The aim of the study is to describe the landscape, exploring the nature and landscape-geochemical analysis of the steppe zone Zhaiyk basin. The article shows a landscape-geochemical analysis of the steppe zone Zhaiyk basin. For this purpose was drawn landscape mapofsteppe zone Zhaiyk river basin and characteristics carried out geochemical state of landscapes on plant and soil samples, water in key areas in the zone of anthropogenic impact. Established chemical elements such contamination in plant samples as a Cu, Ni, Cd and Co, soil Zn, Cu, Ni, total phosphorus in water, Mg, Pb, K, Na, chlorides, water hardness and pH.

Keywords: basin, geochemistry landscape, landscape-geochemical analysis of chemical compounds.

Introduction. Geochemistry of the landscape as well as geophysics of landscape, has roots that go back centuries, but as an independent science landscape geochemistry was formed only in the 30-40-ies. of XX century[1]. Chemistry - Geochemistry - Geochemistry of the landscape - such is the way of formation of landscape geochemistry[2]. From domestic scholars a prominent role in the development of geochemistry belongs V.I. Vernadsky and his disciple A.E.Fersman [3]. The first, which laid the foundations of the new science of landscape geochemistry, was B.B.Polynov [4]. Another outstanding classic landscape geochemistry undoubtedly called A.I. Perelman [5].The modern landscape geochemistry operates a broad set of indicators, which is caused by multiple tasks facing science[6]. This theoretical problem arising in the study of migration patterns of chemical elements and practical aspects related to the development on the landscape basis of geochemical techniques to the study of natural systems of states in technogenesis and conduct forward-looking landscape-geochemical studies [7].

In the modern period, geochemical and landscape analysis are closely interrelated, and the study of landscapes is just as important in the studies[8]. So the steppe zone of the river basin Zhaiyk West Kazakhstan region has been studied for a long time, but it is at the moment the study was more thorough and detailed. An example is the study of landscapes of the West Kazakhstan region such scholars as V.I. Amelchenko, M.A. Galimov, S.K. Ramazanov, T.A. Tereshchenko, G.A. Kabdulova, T.F. Cherevatova. They had 31-isolated landscape of class lowland landscapes, divisible into two subclasses: the relatively lowered plains and elevated plains [9]. Also taken into account geochemical studies [10, 11].

Considerable latitude and the meridian stretch, the diversity of natural conditions and factors, particularly economic use of the territory Zhaiyk river basin in the steppe zone, predetermined factors of the spatial distribution of adverse environmental phenomena and processes. In the north-east of the territory dominated by agricultural use, in the north-western and central prevail pasture use. In the north area of widespread industrial impact on the environment. As a result of industry, various types of waste are generated. The main ones are mucus and dust from gas cleaning equipment. Usually wastedumped under a layer of water in artificial reservoirs [12-14].

Materials and methods of the study. Landscape ecological analysis takes into account landscape differentiation of the territory with allocation of ecological-landscape zones and expresses sustainability of the territory to external impacts delivered in certain parts of the landscape (areas, stows, substows, and facies). The result is a territorial frame of nature management with ecologically homogeneous areas. It seems necessary to use a differentiated approach to assess the landscape ecological state of the delta territories. This, in turn, entails the presence of structuring criteria of the ecological state of landscape complexes of the corresponding taxonomic rank. Specification of a representative set of analytical and synthetic quantitative indicators should be based on structural specifics of morphological complexes (first on terrain types and their variants, and groups of stow kinds) that set the landscape capacity of the relative region [15].

Zhaiyk river - one of the largest transit rivers of Kazakhstan, which flows through the territories of Russia and Kazakhstan, the third extent river in Europe after the Volga and the Danube river, originates on the slopes of the hill ridge tops round Uraltau in Uchaly Bashkortostan region Southern Urals [16, 17]. In the beginning, the river flows from north to south, meeting the lofty plateau of the Kazakh steppe, turns sharply to the north-west of Orenburg changes the direction of south-west, near the city of Uralsk makes a new sharp bend to the south and in the main direction, twisting the to the west, the east, flows into the Caspian sea. The river basin occupies the sixth place in size among Russian rivers and equals 237 000 km^2. It is length is 2428 km, including in Kazakhstan river length is 1082 km. The basin is made up of rivers flowing from the Common Syrt and rivers flowing from the Subural plateau. For the West Kazakhstan region Zhaiyk river is an important character.

The objects of research were the landscapes of the steppe zone of the river basin Zhaiyk 20 key areas. Of which 10 samples of plant and soil samples, water samples at 10. Medium-scale maps (1: 500 000) landscapes of the steppe zone Zhaiyk river basin (figure 2) is based on a generalization of cartographic material and statistical data using ArcGIS software with standard tools. Statistical calculations and processing study data and materials of field work were conducted using software of Microsoft Office, Statistica 6.0, MapInfo Professional 11, ArcGIS 10.1 [18]. The legend landscape card (number on the map, figure 1) are grouped depending on the class, type and kind, characterizing the morphology and genesis of relief with the description of vegetation and soil (Note to figure 1).To carry out complex physical and geographic research in the early stages of research were defined support points are selected key areas on which the semi-field studies were carried out on the basic elements of the natural environment components. Location of key sections of samples of plant and soil samples, water on the landscape map steppe Zhaiyk basin area are shown in table 1, 2 and figures 3, 4. Chemical analyzes of samples of vegetation, soil and water (30 samples) for the content of individual ingredients of pollutants made in the testing laboratory of State Enterprise in West Kazakhstan State University named after Makhambet Utemisov MES RK Uralsk. Results of analyzes of chemical compounds of plant and soil samples, water samples for the content of individual pollutant components shown in tables 3, 4 and 5.

Results and discussion

In the study of steppe Zhaiyk Basin area 20 landscapes were allocated: 18 plain landscapes and 2 valley landscape. The flat landscapes attributed to the steppe type, of which 7 denudation plains and 11 accumulative plains. Below is a figure 2 and landscapes map legend steppe Zhaiyk basin area (note to figure).

Location of key areas of physical and geographical studies of a steppe zone on samples of plant and soil samples Zhaiyk river basin are shown in table 1. In the top ten key areas of plant samples and soil samples dominated territory and Zelenovsky Burlin district, 2, 19, 20 landscapes (figure 2).

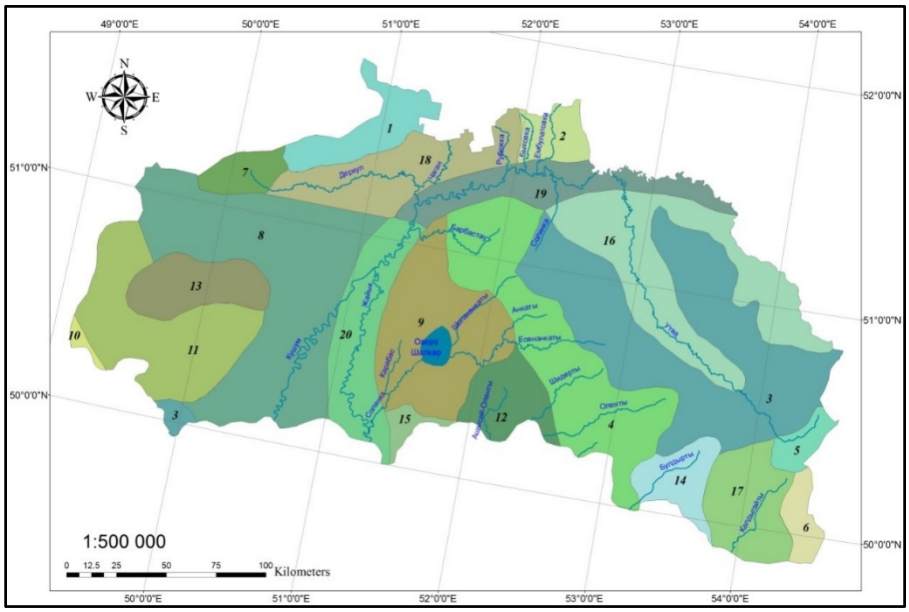

Figure 1 – Map the landscape of steppe zone Zhaiyk basin

Note to Figure

The flat landscape

Steppe

Plains denudation

1. Structural dissected plateau, composed of clays, loess, loams, sandy loams with fescue-grass vegetation on southern chernozems, in conjunction with wormwood-white wormwood vegetation on intermediate-solonetz

2. The reservoir-plinth pologovolnistoy plain, made of sand, clay, sandstone, limestone with herb-peristokovylnoy vegetation on the southern solonetzic chernozems with solonetz and meadow-bog soils

3.Produced intensively dismembered plain, made of clay, loess loam with fescue-grass vegetation on dark-chestnut normal soils

4. Produced steeply sloping plain, made of clay, loess loam with fescue-grass vegetation on chestnut soils

5. Produced intensely dissected plain, made of clay, sandstone, limestone with fescue and herb-erkekovoy vegetation on chestnut normal and incompletely developed soils

6.Household remnant plateau, folded shales, limestones, sandstones with polynnotyrsovoy vegetation on chestnut normal and residually calcareous soils

7. Structural and steeply sloping hills and plateaus, composed of clay, loam, loess with xerophytic-forb and fescue-grass vegetation on dark chestnut soils

Plains accumulative

8. Marine undivided plain, made of clay, loam, sand with fescue vegetation on solonetz svetlokashatnovoy with chestnut solonetz meadow soil

9. Sea slaboraschlennenoy plain, made of clay, loam, sandy loam with fescue-feather grass steppes on meadow-chestnut and meadow soil

10. Marine dissected plain, made of clay, loam, sand with chernopolynnoy kokpekovo-chernopolynnoy, Anabasis salsa-chernopolynnoy vegetation on light chestnut alkaline soils, combined with meadow solonetz

11. Sea plain with numerous beams lows (estuaries), composed of clays with modern talus deposits with herb-pyreynikovoy vegetation on meadow soils solodized

12. Marine hilly plain, made of clay, loam, sand with grass-perhovopolynnoy vegetation on light-normal and meadow-chestnut soils with solonetz

13. Sea plain with small lakes, composed of clay, loam, sand with forb-grass-meadow vegetation on meadow soils

14. Alluvial hilly plain, folded sand, loam with herb-erekovoy vegetation on meadow, brown meadow soils and sands

15. Alluvial plains, lakes, salt domes, composed of clay, loam, sandy loam with white wormwood-fescue-zhitnyakovoy vegetation on meadow kashatnovoy solonetz, meadow-chestnut, light chestnut soils on solonetz

16. Slaboraschlenennoy alluvial plain, composed of loam, sandy loam, sand with white wormwood-fescue and zhitnyako-voy vegetation on chestnut soils with meadow solonetz

17. Alluvial-proluvial plain, made of loam, clay, sand with herb-erkekovoy vegetation on the meadow-chestnut and light-chestnut soils

18. Talus-proluvial dissected plain, made of gravelly loams and clays with fescue-grass vegetation on dark kashatanovoy carbonate-alkaline soils

Valley landscapes

19. Flood plains composed of loam, sand, gravel and pebbles with forb-grass meadows and aspen forests in the floodplain meadow soils

20. Floodplain strongly dissected, folded loam, sandy loam, sand with tree and shrub, and wheatgrass and herbs on the meadow and alluvial meadow marsh soil

Table 1 – Key areas of physical and geographical studies of a steppe zone Zhaiyk basin (on samples of plant and soil samples)

Number on the map	Key areas	Coordinates	Selection date	The water temperature, °C
1	Burlin district, Kanai village	51° 24' 46,8" N 52° 36' 32,3" E	07.07.16.	22
2	Burlin district, river Utva	51° 25' 11,6" N 52° 47' 14,2" E	07.07.16.	24
3	Burlin district, Oblavka village, river Gayik	51° 28' 22,9" N 52° 57' 17,3" E	07.07.16.	21
4	Burlin district, Zharsuat village	51° 29' 13,4" N 53° 17' 15,1" E	07.07.16.	22
5	Zelenovskiy district, Rubezhka the mouth of the river	51° 23' 05,6" N 51° 58' 07,9" E	09.07.16.	24
6	Zelenovskiy district, river Bykovka	51° 37' 0,0" N 52° 07' 3,9" E	09.07.16.	21
7	Zelenovskiy district, Bykovka mouth of the river, near the village Spartacus	51° 25' 5,6" N 52° 2' 35,7" E	09.07.16.	22
8	Zelenovskiy district, river Bykovka, and the area between Bykovka Zhaiyk	51° 27' 54" N 52° 2' 39,7" E	09.07.16.	24
9	Zelenovskiy district, river floodplain Embulatovka	51° 33' 17" N 52° 17' 56,7" E	15.07.16.	22
10	Zelenovskiy district, the mouth of the river Barbastau	51° 06' 17,0" N 51° 17' 20,0" E	15.07.16.	24

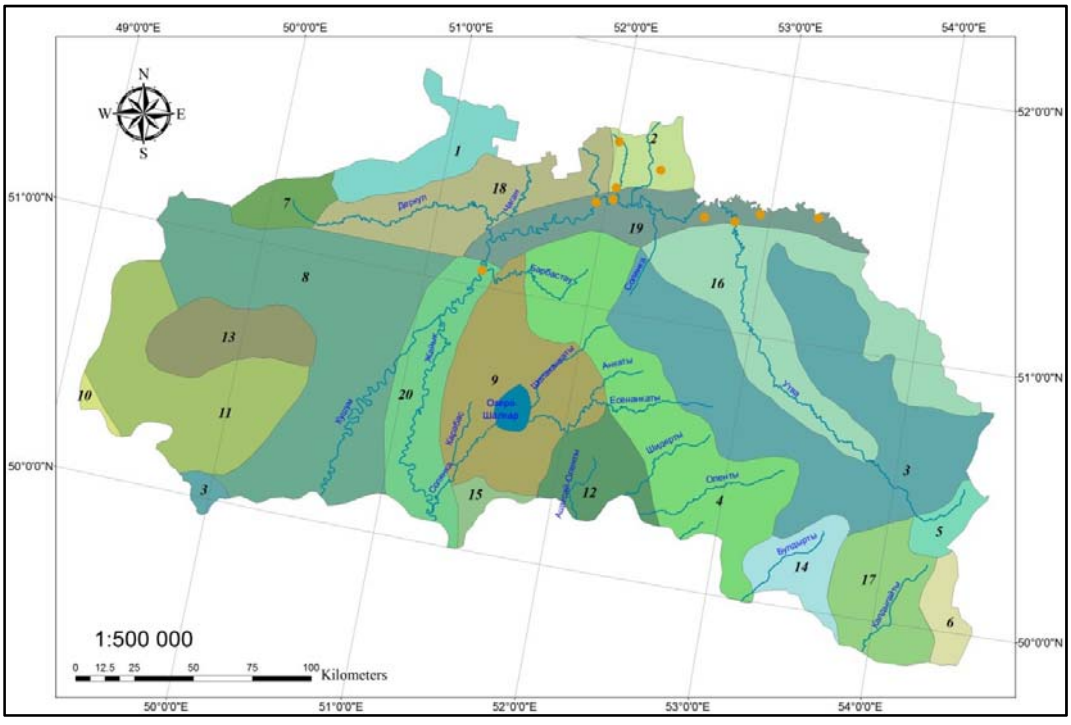

Figure 2 – Map of the location of the key areas of plant and soil samples in the sample landscapes steppe zone Zhaiyk Basin

Table 2 shows the 10 key areas of physical and geographical research steppe Zhaiyk basin area for the natural samples, surface water. In the water samples also dominated the territory and Zelenovsky Burlin district and the lake area Shalkar 2, 9, 16, 18, 19, 20 landscapes (figure 3).

Table 2 – Key areas of physical and geographical studies of a steppe zone Zhaiyk Basin

Number on the map	Key areas	Coordinates	Selection date	The water temperature, °C
1	Burlin district, Kanai village, river Burla	51° 24' 53,1" N 52° 34' 52,0" E	07.07.16.	20
2	Burlin district, river Utva	51° 25' 11,6" N 52° 47' 14,2" E	07.07.16.	22
3	Zelenovskiy district, river Rubezhka	51° 29' 35,6" N 51° 53' 07,2" E	09.07.16.	21
4	Zelenovskiy district, Rubezhka the mouth of the river	51° 23' 05,6" N 51° 58' 07,9" E	09.07.16.	22
5	Zelenovskiy district, river Zhaiyk	51° 23' 05,6" N 51° 58' 07,9" E	09.07.16.	20
6	Zelenovskiy district, river floodplain Embulatovka	51° 33' 17" N 52° 17' 56,7" E	15.07.16.	22
7	Zelenovskiy district, the mouth of the river Barbastau	51° 06' 17,0" N 51° 17' 20,0" E	15.07.16.	21
8	Zelenovskiy district, river Chagan	51° 17' 17,0" N 51° 20' 20,0" E	15.07.16.	20
9	Zelenovskiy district, river Derkul	51° 18' 17,0" N 51° 0,0' 0,0" E	15.07.16.	22
10	Lake Shalkar	50° 38' 17,0" N 51° 40,0' 0,0" E	15.07.16.	21

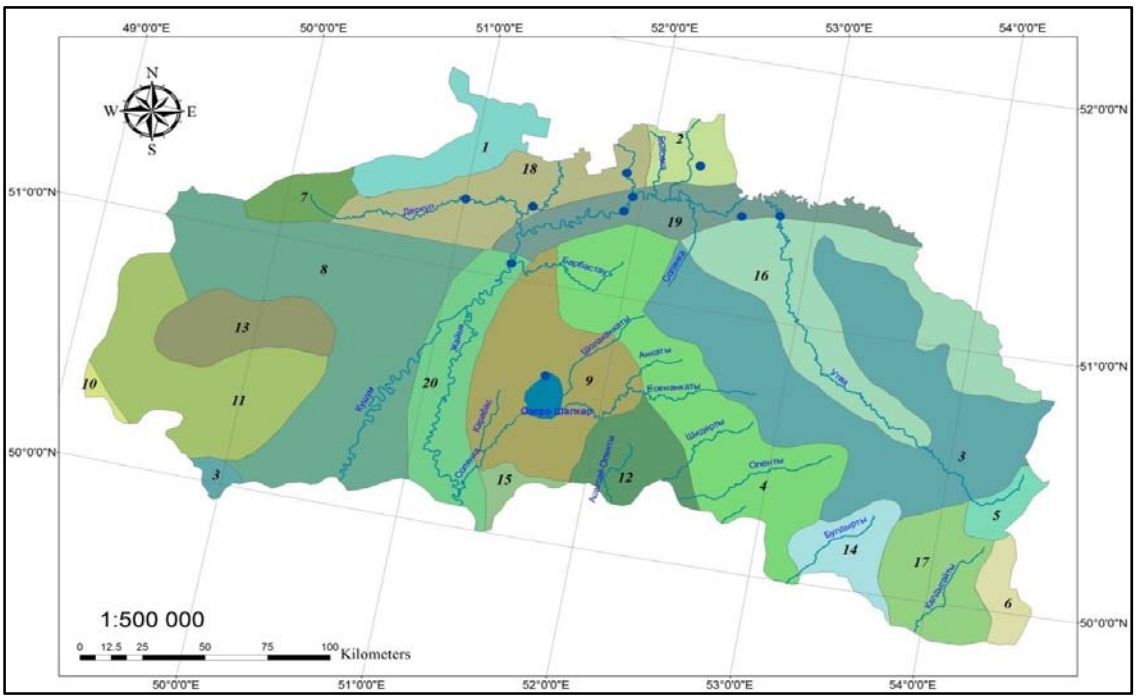

Figure 3 –Map of the location of the key areas of water samples on the landscapes of the steppe zone Zhaiyk Basin

Table 3 shows the results of tests on samples of plant specimens of the steppe zone Zhaiyk basin. According to the analysis in Burlin district in the village Zharsuat Cu> maximum allowable concentration (MAC) at 2.41 mg/dm^3, Ni> MAC at 4.23 mg/dm^3 on samples of plant specimens. On the territory of the district in Zelenovsky Rubezhka estuary has exceeded MAC by Ni and in the river Bykovka for Cd 0.27 mg/dm^3, a significant excess of maximum allowable concentrations of Ni in 38.17 mg/dm^3 and Co 0.21 mg/dm^3. In the area of flood plain Zelenovsk Embulatova river Ni> MAC at 5.16 mg/dm^3. Results of analyzes of plant samples shown in table 3.

Table 3 – Results of the analyzes of the chemical compounds of plant samples steppe Zhaiyk basin area (as of July 2016)

Number on the map	Cu, mg/dm^3	Zn, mg/dm^3	Cd, mg/dm^3	Pb, mg/dm^3	Ni, mg/dm^3	Co, mg/dm^3
1	0.82	0.65	0.01	not upd.	1.04	0.04
2	1.31	0.70	0.03	0.04	0.52	not upd.
3	3.05	0.97	0.004	0.27	0.63	0.02
4	32.41	25.64	0.06	0.97	7.23	0.17
5	25.88	13.59	not upd.	0.76	3.56	0.08
6	18.51	6.0	0.001	0.54	11.19	0.15
7	1.78	1.98	0.01	0.02	0.70	not upd.
8	12.62	0	0.57	6.11	41.17	1.21
9	11.56	0	0.005	0.99	8.16	0.12
10	2.02	1.29	0.03	not upd.	1.42	0.02
MAC	**30.0**	**50.0**	**0.30**	**5.0**	**3.0**	**1.0**

Table 4 below shows the results of analyzes of chemical compounds on soil samples of the steppe zone Zhaiyk basin. According to the analysis in the village of Burlin district Kanai found exceeding maximum allowable concentrations of Zn at 9.85 mg/dm^3, a significant excess of maximum allowable concentrations of Cu to 25.39 mg/dm^3 and Ni in 79.76 mg/dm^3. On the territory of Burlin district Utva rivers are the maximum allowable concentration of organic substances 1.93% at Cu ratio of 9.86 mg /dm^3, according to Ni in 21.56 mg/dm^3, the river village Oblavka Zhaiyk Cu and Ni> MAC. On the territory of Burlin district Zharsuat Cu> MAC settlement on 11.56 mg/dm^3 and Ni, significantly exceeding the MAC at 64.61 mg/dm^3. In Zelenovsk area Rubezhka estuary has exceeded MAC by organic matter, Cu and Ni in the Ni River Bykovka> MAC at 29.55 mg/dm^3, at the mouth of the river Barbastau has exceeded MAC by organic matter, Cu, Zn and significant excess at Ni. On the territory of the region between the rivers Zelenovsky Bykovka and Zhaiyk are the maximum allowable concentration for Cu and Zn, in the flood plain Embulatovka are the maximum allowable concentration for Cu and Ni, in Barbastau estuary has exceeded MAC by Cu and Zn.

As shown by studies carried out on the river Zhaiyk on samples of water into the channel of the river village Burla total phosphorus > MAC at 0.1239 mg/dm^3 in Burlin district total phosphorus > MAC at 0.8399 mg/dm^3. In Zelenovsk near the mouth of the river Rubezhka water hardness exceeds MAC by 0.5 mmol/dm^3, in the area of flood plain Embulatovka have exceeded MAC by 0.3 mmol/dm^3 stiffness in Barbastau estuary pH > MAC at 0.1 mg/dm^3.

Table 4 – Results of analyzes of chemical compounds on soil samples steppe Zhaiyk Basin area (as of July 2016)

Number on the map	Organic matter, %	Total phosphorus, %	Cu, mg/dm^3	Pb, mg/dm^3	Zn, mg/dm^3	Cd, mg/dm^3	Ni, mg/dm^3	Co, mg/dm^3
1	3.70	0.16	28.39	12.3	32.85	0.26	83.76	2.09
2	5.93	0.13	12.86	9.0	0	0.21	25.56	0.85
3	2.11	0.12	13.19	6.87	21.51	0.24	47.89	1.25
4	1.38	0.10	14.56	7.83	21.44	0.18	68.61	1.71
5	6.82	0.15	8.76	5.88	20.86	0.15	41.94	0.97
6	2.70	0.07	11.87	6.53	17.92	0.05	33.55	1.09
7	5.74	0.24	34.42	14.03	27.07	0.33	100.02	2.41
8	2.56	0.14	26.11	11.41	31.07	0.20	81.47	2.37
9	0.38	0.04	3.60	3.10	7.45	0.03	24.98	0.63
10	2.39	0.18	21.48	10.87	28.97	0.27	73.12	2.0
MAC	**2.1-4.0**	**–**	**3.0**	**32.0**	**23.0**	**0.5**	**4.0**	**5.0**

On the river Chagan Zelenovsky district pH> MAC 0.3 mg/dm^3, the river Derkul pH> MAC 0.1 mg/dm^3. The area of the lake Shalkar has exceeded MAC by pH> MAC at 1.0 mg/dm^3 chlorides> MAC at 669.7 mg/dm^3, stiffness> MAC 27.3 mmol /dm^3 of Mg> MAC at 208.4 mg/dm^3, Pb> MAC at 0.02 mg/dm^3, K> MCL 3.8 mg/dm^3, Na> MAC at 2837 mg/dm^3.

Results of analyzes of chemical compounds in the water steppe Zhaiyk basin area are shown in table 5.

Table 5 – Results of analyzes of chemical compounds to mimic natural, surface water steppe Zhaiyk Basin area (as of July 2016)

Number on the map	pH, mg/dm^3	Chloride, mg/dm^3	Alkalinity, mg/dm^3	Ca, mg/dm^3	Mg, mg/dm^3	SO_4^{2-}, mg/dm^3	Ni, mg/dm^3	Fe, mg/dm^3	Cu, mg/dm^3	Pb, mg/dm^3	Zn, mg/dm^3	Total phosphorus, mg/dm^3	K, mg/dm^3	Na, mg/dm^3
1	8.5	96	5	74	28.8	129.6	0.01	0.18	0.01	not upd.	0.03	0.124	10.9	67.2
2	8.4	253.8	4.4	96	25.2	163.2	not upd.	0322	0.02	not upd.	0.02	0.084	11.6	161.0
3	8.3	82.3	4.6	68	20.4	91.2	not upd.	0.10	0.009	not upd.	0.03	not upd.	10.4	81.5
4	8.5	123.5	4.5	78	19.2	96	0.003	0.02	0.007	not upd.	0.03	0.12	10.6	98.4
5	8.2	137.2	4.7	80	21.6	81.6	0.002	0.34	0.01	not upd.	0.02	not upd.	10.5	96.5
6	8.4	54.9	5.2	76	18	139.2	not upd.	not upd.	0.004	not upd.	0.02	not upd.	10.3	52.8
7	8.6	115.4	2.2	36	20.4	124.8	0.002	0.2	0.01	not upd.	0.02	–	10.6	120.6
8	8.8	81.5	1.8	30	15.6	110.4	not upd.	0.2	0.02	0.006	0.03	–	11.3	87.6
9	8.6	122.2	2.4	58	15.6	110	0.04	0.12	0.02	0.01	0.01	–	11.1	103.3
10	9..0	1019.7	3.6	130	308.4	254.4	0.0002	0.2	not upd.	0.05	0.02	–	23.8	3037
MAC	**6.5-8.5**	**350**	**6.5**	**200**	**100**	**500**	**0.1**	**0.3**	**1.0**	**0.03**	**1.0**	**0.0001**	**20**	**200**

Conclusions. Compiled medium-scale maps (1: 500 000) steppe landscapes Zhaiyk river basin areas where identified 20 landscape.

Observations and analysis of river basin Zhaiyk possible to establish an association of major pollutants, such as the chemical elements Cu, Ni, Cd, Co, Zn, total phosphorus, hardness, pH.

As a result of monitoring of hydrochemical investigations revealed that the most polluted landscapes steppe Zhaiyk Basin area are plains 9 and 19 landscape valley landscape of key areas 1, 2, 4, 5 and 10, also has a landscape with the norm of the MPC - 2 denudation plains landscape.

Pollution caused by the fact that the main sources of water pollution in the river Zhaiyk steppe zone are Novotroitsky refinery, as well as water Ilek rivers that are polluted waste products Aktobe plant of chromium compounds, and chemical plant Alga Aktobe drive. What is clearly reflected in the research [19]. Small rivers are polluted mainly animal waste and MSW settlements. Exceeding MPC due to the fact that pollutants come mainly due to flushing of the river during the floods from the territory of livestock farms, industry and fields adjacent to open water, in connection with which the rivers increases the concentration of nitrogen-containing compounds, phenol and petroleum.

Thus, the aggregate of samples included superficial natural water in key areas of the steppe zone of the river basin Zhaiyk can characterize it as a moderate level of pollution and Shalkar lake as a high level of pollution.

The main measure to reduce the negative impact on the components of the environment is the strict rational use of natural resources and the use of various sewage treatment plants. One of them is the biological treatment [17].

The soil cover of the steppe Zhaiyk River Basin area is characterized by man-made breach caused by the operation of industrial facilities and transportation, and considerably less agricultural objects. Most have a greater impact on the company of oil and gas production and processing. Soil pollution is melkoploschadnoy and linear, in a significant excess of certain chemical compounds.

The same characteristic is and vegetation of the steppe zone Zhaiyk Basin [15].

**Н. Е. Рамазанова[1], Ж. Г. Берденов[1], С. К. Рамазанов[2],
Н. Б. Казангапова[3], С. М. Романова[4], С. Т. Токсанбаева[1], Jan Wendt[5]**

[1]Л. Н. Гумилев атындағы Еуразиялық ұлттық университеті, Астана, Қазақстан,
[2]Батыс Қазақстан облысы әкімдігінің Батыс Қазақстан облыстық тарихи-өлкетану мұражайы мен мәдениет басқармасының орталығы, Орал, Қазақстан,
[3]С. Сейфуллин атындағы Қазақ агротехникалық университеті, Астана, Қазақстан,
[4]әл-Фараби атындағы Ұлттық университеті, Алматы, Қазақстан,
[5]Гданск университеті, Гданьск қаласы, Польша

ДАЛА АЙМАҒЫНЫҢ ЖАЙЫҚ ӨЗЕНІНІҢ АЛАБЫНДА ЛАНДШАФТЫ-ГЕОХИМИЯЛЫҚ ТАЛДАУ

Аннотация. Жайық өзені алабының ландшафты-геохимиялық талдауын зерттеу қажеттілігі дала аймағының ландшафтына антропогендік факторлардың әсерінен және алаптың ластануынан туындайды.Далалық аймақты зерттеу үшін елді мекендер қолайлы аймақтардың бірі болып табылады және бұл зерттеу бүгінгі күні өте өзекті.

Жүргізілген далалық жұмыстары Жайық өзен алабының ландшафттарын сипаттауға және зерттеу объектісінің ландшафты-геохимиялық жағдайын көрсетуге мүмкіндік береді. Зерттеудің мақсаты - дала аймағының Жайық алабы ландшафтын, табиғатын сипаттау және ландшафты-геохимиялық талдауын зерттеу болып табылады. Мақалада дала аймағының Жайық алапбы ландшафты-геохимиялық талдауы көрсетілген. Осы мақсатта Жайық өзені алабында дала аймағының ландшафтық картасы жасалды және антропогендік әсер аймағында негізгі учаскелерде өсімдіктер, топырақ және су үлгілері бойынша ландшафтардың геохимиялық жағдайы сипаттамасы берілді. Өсімдік үлгілерін (Cu, Ni, Cd, Co), топырақты (Zn, Cu, Ni) және суды (жалпы фосфор, Mg, Pb, K, Na, хлоридтер мөлшері, судың кермектігі, pH) ластайтын химиялық элементтер анықталды.

Түйін сөздер: өзен алабы, геохимиялық ландшафт, химиялық қосылыстардың ландшафты-геохимиялық талдауы.

**Н. Е. Рамазанова[1], Ж. Г. Берденов[1], С. К. Рамазанов[2],
Н. Б. Казангапова[3], С. М. Романова[4], С. Т. Токсанбаева[1], Jan Wendt[5]**

[1]Евразийский национальный университет им. Л. Н. Гумилева, Астана, Казахстан,
[2]Западно-Казахстанский областной центр истории и археологии управления культуры акимата Западно-Казахстанской области, Уральск, Казахстан,
[3]Казахский агротехнический университет им. С. Сейфуллина, Астана, Казахстан,
[4]Казсхский национальный университет им. аль-Фараби, Алматы, Казахстан,
[5]Гданский университет, Гданьск, Польша

ЛАНДШАФТНО-ГЕОХИМИЧЕСКИЙ АНАЛИЗ СТЕПНОЙ ЗОНЫ БАССЕЙНА РЕКИ ЖАЙЫК

Аннотация. Необходимость изучения ландшафтно-геохимического анализа территории бассейна реки Жайык возникла из-за антропогенного воздействия на ландшафт степной зоны, загрязнения бассейна реки Жайык. Для исследования была выбрана степная зона, так как степная зона - это одна из самых благоприятных зон для населенных пунктов, и это исследование очень актуально сегодня. Эти эксперименты позволяют описать ландшафт территории степной зоны бассейна реки Жайык и показать ландшафтно-геохимические характеристики объекта исследования. Целью исследования является описание ландшафта, изучение природы и ландшафтно-геохимический анализ степной зоны Жайыкского бассейна. В статье представлен ландшафтно-геохимический анализ степной зоны Жайыкского бассейна. Для этого была составлена ландшафтная карта степной зоны бассейна реки Жайык и дана характеристика геохимического состояния ландшафтов по образцам растений и почв, воды на ключевых участках в зоне антропогенного воздействия. Определены химические элементы- загрязнители в растительных образцах, как Cu, Ni, Cd и Co, почвы Zn, Cu, Ni, общий фосфор в воде, Mg, Pb, K, Na, хлориды, жесткость воды и pH.

Ключевые слова: бассейн реки, геохимический ландшафт, ландшафтно-геохимический анализ химических соединений.

Information about authors:

Ramazanova Nurgul Yesenovna, PhD, Associate Professor, Department of Physical and Economic Geography, Astana, Kazakhstan, L. N. Gumilyov Eurasian National University, Astana, Kazakhstan; nurgulram@gmail.com; http://orcid.org/0000-0001-9120-7995

Berdenov Zharas Galimzhanovich, PhD, and Associate Professor of the Department of Physical and Economic Geography, L. N. Gumilyov Eurasian National University, Astana, Kazakhstan; berdenov-z@mail.ru, http://orcid.org/0000-0002-2898-8212

Ramazanov Serik Kishbekovich, Candidate of Geographical Sciences, Deputy Director of the West Kazakhstan regional center of History and Archeology, Uralsk, Kazakhstan; serik-ram@mail.ru; https://orcid.org/0000-0003-4812-1357

Kazangapova Nurgul Burkitbaevna, Candidate of Geographical Sciences, Senior LecturerDepartment of Forest Resources and Forestry, Saken Seifullin Kazakh Agrotechnical University, Astana, Kazakhstan; kazangapova@bk.ru; http://orcid.org/0000-0002-3504-3348

Romanova Sofiya Maksimovna, Doctor of Geographical Sciences, Professor al-Farabi Kazakh National University; sofiyarom@mail.ru; http://orcid.org/0000-0002-4875-1749

Toksanbaeva Sabina Tursynovna, Master of Geography, Lecturer, Department of Physical and Economic Geography, L. N. Gumilyov Eurasian National University, Astana, Kazakhstan; sabina.toksanbaeva@mail.ru; https://orcid.org/0000-0002-4411-9623

Wendt Jan, PhD, Full ProfessorGdańsk University, Faculty of Oceanography and Geography, Institute of Geography, Department of Regional Geography Development; jan.wendt@ug.edu.pl; https://orcid.org/0000-0003-1712-4926

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