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«Л.Н. ГУМИЛЕВ АТЫНДАҒЫ ЕУРАЗИЯ ҰЛТТЫҚ УНИВЕРСИТЕТІ» КЕАҚ

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Жинаққа студенттердің, магистранттардың, докторанттардың және жас ғалымдардың жаратылыстану-техникалық және гуманитарлық ғылымдардың өзекті мәселелері бойынша баяндамалары енгізілген.

The proceedings are the papers of students, undergraduates, doctoral students and young researchers on topical issues of natural and technical sciences and humanities.

В сборник вошли доклады студентов, магистрантов, докторантов имолодых ученых по актуальным вопросам естественно-технических и гуманитарных наук.

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Conclusion:

To sum up, through geographic profiling, we will have learned a lot about the behavior of serial killer whose spatial patterns play a key role in the dynamics of crime. The researchers can make use of analyzing the patterns of offender behavior and the spatial distributions of crime scenes to unveil and reveal hidden facts which are vital to the investigations of crime and security.We have found out the geographical factors might influence attackers' pondering and target decision thus, giving law enforcement the necessary tools to identify and capture serial killers.

Moreover, the repercussions of geographic research are not limited to one case but are also at the core of the criminal justice and public policy questions. Through this cognitive process, policymakers can design more successful plans of crime prevention and community policing, the point of high chances being determined and the resources allocated there.

In the near future, the exploration of geographic profiling research and the study of serial assaults will give valuable data that can be used to better criminal investigation and prevention. Through integrating emerging technologies, promoting interdisciplinary collaboration and applying them in various fields, researchers can be able to develop farther the field that may mean significant benefits to mankind.

In summation, geographic profiling is a lense through which one sees the complex weave of geography, psychology and crime behaviors. The use of the geographical data can enable us to work towards a safer and more fair society not just for everyone.

References

1. https://thoughtnova.com/30-horrific-serial-killer-crime-scene-photos
2. https://youtu.be/971kdUpJmeo?si=SP2CFKbDvHWoRttm
3. https://www.historydefined.net/gary-ridgway/
4. https://www.crimemuseum.org/crime-library/serial-killers/the-boston-strangler/
5. Geographic profiling : target patterns of serial murderers Darcy Kim Rossmo 1995

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SURFACE WATER QUALITY AND ECOLOGICAL CONDITION OF RIVER BASINS IN THE SOUTH OF KAZAKHSTAN

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Surface waters of the Republic of Kazakhstan represent an integral resource that plays a key role in providing water supply, agriculture and biodiversity in this region. Both economic and environmental aspects are closely linked to their strategic distribution and quality, giving these water resources a high importance for the sustainable development of the country. Complicating the situation, the main sources of water in Kazakhstan are transboundary rivers, which further complicates water management in these regions.

Hydroeconomic basins of the southern region of Kazakhstan:

1) Balkhash-Alakol basin;
2) Shu-Talas basin;
3) Aral-Syrdarya basin

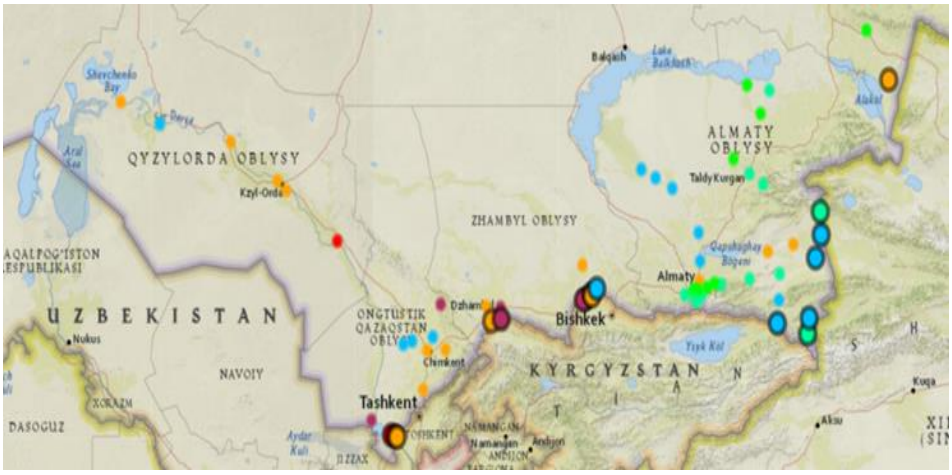

Figure 1 Surface water quality monitoring of the Republic of Kazakhstan
Month: December 2023

According to the Water Code of the RK article No. 12

1. Surface water bodies are subdivided into:

1) water bodies - rivers and equated canals, lakes, reservoirs, ponds and other inland water bodies, territorial waters;

2) glaciers, swamps [1].

Pollution of surface water is considered to be a change in physical, biological, chemical properties of water. The main causes of water pollution in the river basins of the republic are both natural (natural factors) and anthropogenic impacts. Natural sources of pollution of river water resources include ore deposits and ore occurrences and various geochemical anomalies. As a result of their impact, the natural background of the content of certain chemical substances in water exceeds the existing norms of both fish economic and less stringent household MAC [2].

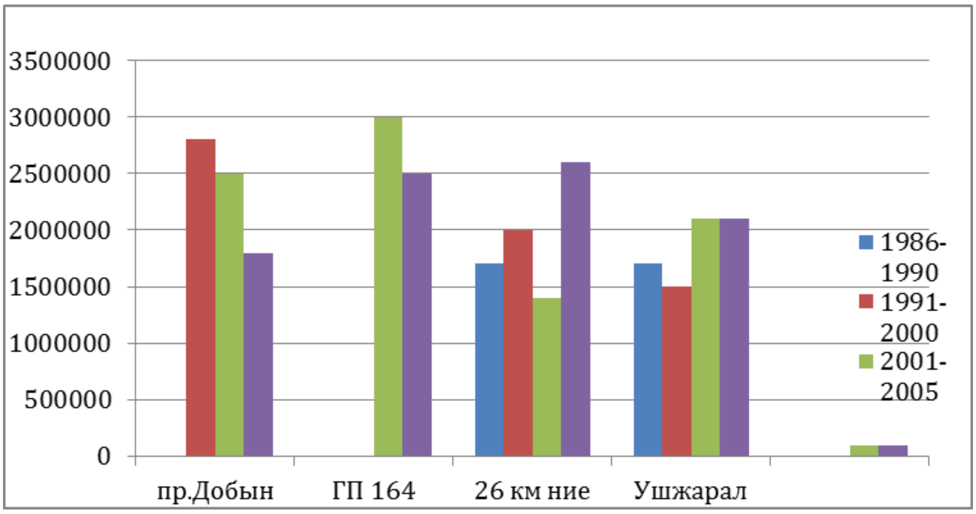

Figure 2 Total mass of pollutants migrating with river runoff
for the calculation period along the length of the Ile River

Calculation of pollutant mass:

$$M = 31.536 \times c \times q \qquad (1)$$

M - mass of pollutants migrating with river runoff, t/year;

c - concentration of pollutants in water, mg/dm^3

q - average annual water flow rate in the river at the given gauging station, m^3/sec
31.536 - coefficient of conversion to a single dimensionality
River Ile
- Stvor pr. Dobyn for 2020

Magnesium: $M = 31{,}536 \times 21{,}8 \times 309 = 212{,}432$ (2)

Ammonium:$M = 31{,}536 \times 0{,}73 \times 309 = 7\ 113$ (3)

- HP 164 km in. Kapshagay HPS

magnesium exceeds the background class: $M = 31{,}536 \times 21{,}3 \times 309 = 207\ 560$ (4)

- Tamgalytas gauging station nitrite anion: $M = 31{,}536 \times 0{,}2 \times 309 = 1\ 948$ (5)

COD: $M = 31{,}536 \times 23 \times 309 = 224\ 126$ (6)

- Kapshagay locality, 26 km downstream of HPS, in the vicinity of the water post COD:

$M = 31{,}536 \times 20 \times 31{,}536 = 194\ 892$ (7)

For fluoride $M = 31{,}536 \times 1{,}29 \times 309 = 12\ 570$ (9)

- Bakanas village nitrite anion: $M = 31{,}536 \times 0{,}171 \times 309 = 1\ 666$ (10)

For fluoride: $M = 31{,}536 \times 1{,}03 \times 309 = 10\ 036$ (11)

- Bakanas village nitrite anion: M=31,536×0,154×309=1 500 (12)

COD: $M = 31{,}536 \times 16 \times 309 = 155\ 913$ (13)
Fluorides: $M = 31{,}536 \times 1{,}29 \times 309 = 12\ 570$ (14)

- water quality of Ushzharma village, is classified as class 1.

- stvor of the Konaev bridge COD: $M = 31{,}536 \times 16 \times 309 = 155\ 913$ (15)

Fluorides: $M = 31{,}536 \times 1{,}233 \times 309 = 12\ 015$ (16)

- v. Akkol: manganese: $M = 31{,}536 \times 0{,}0115 \times 309 = 112{,}063$ (17)

COD: $M = 31{,}536 \times 22 \times 309 = 214\ 381$ (18)

Fluoride: $M = 31{,}536 \times 1{,}03 \times 309 = 10\ 036$ (19)

- HP 1 km downstream from the branch of the Zhideli channel:

Fluoride: $M = 31{,}536 \times 0{,}82 \times 309 = 7\ 990$ (20)

- HP 16 km downstream from the source, COD: $M = 31{,}536 \times 17 \times 309 = 165\ 658$
(21)

Fluoride: $M = 31{,}536 \times 0{,}81 \times 309 = 7\ 893$ (22)

- Stvor HP Zhideli village, 0.5 km downstream the central estate, suspended solids:

$$M = 31{,}536 \times 11{,}3 \times 309 = 110\ 114 \quad (23)$$

- Ir pr. Manganese: $M = 31{,}536 \times 0{,}0146 \times 309 = 111{,}673$ (24)

Fluoride: $M = 31{,}536 \times 1{,}14 \times 309 = 11\ 108$ (25)

The huge decrease in the volume of water in the Aral Sea, caused mainly by huge water withdrawals from tributaries of the Aral Sea, has turned the former fourth largest inland lake in the world into a new desert called Aralkum. Due to long-term use in agriculture, persistent organic pollutants (POPs), including organochlorine pesticides (OCPs) and polychlorinated biphenyls (PCBs), play a special role in polluting the tributaries of the Aral Sea and the Aral Sea itself. The main sources of PCB pollution in the BAMB area include transboundary runoff from the Syr Darya River; cities and towns located in the river basin; and salt and dust export from the dried up bottom of the Large Aral Sea. One of the most negative consequences of the drying up of the Aral Sea is the windborne transport of salt and dust aerosols into the atmosphere from the bottom of the dried lake. One of the main causes of deep degradation of the natural environment of the Aral Sea basin was the excessive use of pesticides on irrigated lands, i.e. their contamination of soils, drainage water from irrigated areas and all surface water resources in this basin[3].The main rivers of the Shu-Talas basin, Talas and Assa are transboundary.80% of surface water resources of the Shu-Talas basin are formed on the territory of neighboring Kyrgyzstan. Agriculture is the main economic sector in the regions of the two river basins. Crop production on irrigated land is increasing in both countries, and the areas devoted to pastures, fields and hayfields are increasing. The environment is subject to anthropogenic impacts associated with both agricultural activities and fertilizer production. Pollutants enter the waters of the Shu-Talas basin from a variety of sources, including industrial and mining enterprises, agricultural lands, residential houses, farms and especially from the urban sewage networks of the cities of Tokmak, Bishkek, Talas, Shu and Taraz. The most significant pollutants at the border sites are basic ions (magnesium, sodium, calcium, nitrates, sulphates, chlorides, phosphates) and heavy metals (copper and zinc compounds).In general, according to observations at the border stations with Kyrgyzstan, the water quality of the transboundary rivers Shu and Talas is characterized as "moderately polluted"[4].70-80% of the water inflow to Lake Balkhash is provided by the Ile River. Due to the reduced flow of the Ile River, the level of Balkhash has also decreased. The problem is aggravated by pollution from industrial waste. Since the construction of the Kapchagai hydroelectric complex, the water level in the lake has dropped by 2 meters. Currently, Lake Balkhash is polluted by various industrial wastes, especially large damage is caused by industrial wastes of the Balkhash Copper Smelting Combine. Copper smelting plant annually uses 59 million m3 of water from Lake Balkhash for production purposes. And the used water without full purification is discharged back into the lake, as a result of which in the composition of the lake water content of copper has increased dozens of times, the existing waste of molybdenum and zinc continue to destroy the sources of life in the lake. The pikeperch fish dumped in the lake is prone to disease, as a result it turned out to be unfit for consumption[5].

References

1. Water Code of RK from July 9, 2003 № 481-II (with amendments and additions as of 01.05.2023).

2. M.J.Burlibayev, N.A.Amirgaliev, I.V.Shenberger, V.A.Skolsky, D.M.Burlibayev, D.V.Uvarov, D.A.Smirnova, A.V.Efimenko, D.Yu.Milyukov. Problems of pollution of the main transboundary rivers of Kazakhstan.Volume 1-Almaty, 2014, 744 p.

3.NarimanAmirgaliyev, ChristianOpp, MaulkenAskarova, Laura Ismukhanova, AzamatMadibekov, andAskhatZhadiThe article: Long-Term Dynamics of Persistent Organic Pollutants in Water Bodies of the Aral Sea-Syrdarya Basin-2023.
4. TovassarovAdylkhanDadebaevich,General Director, Candidate of Chemical Sciences
Central Asian Institute for Ecological Research LLP.STUDY OF THE CONDITION OF SURFACE WATER IN SHU-TALAS BASIN IN THE TERRITORY OF KAZAKHSTAN
5. Hydrochemical indicators of the environment: reference materials: textbook for students of higher educational institutions / edited by T.V. Guseva. - Moscow: Forum: Infra-M, 2007.- 190 c.

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DETERMINATION OF THE R COEFFICIENT IN THE KURCHUM RIVER BASIN BASED ON THE ARCGIS PROGRAM (USING THE RUSLE FORMULA)

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The RUSLE is a revision of the Universal Soil Loss Equation (USLE) which was originally developed to predict erosion on croplands in the US. Following the revision, the equation can be employed in a variety of environments including, agricultural site, rangeland, mine sites, construction sites, etc.which is greatly accepted and has wide use, is simple and easy to parameterize and requires less data and time to run than most other models dealing with water erosion. GIS on the other hand facilitates efficient manipulation and display of a large amount of georeferenced data. There are various methods that consider soil erosion in watersheds, these methods vary from simple to more complex and differ in their need for data input and their ability to predict erosion. The revised universal soil loss equation (RUSLE) is an upgraded version of USLE, which was proposed by Wischmeier and Smith in (1978), with higher accuracy. RUSLE was the most widely used model in predicting the loss of soil. It is described by the following Equation (1),:

$$A = R \times K \times L \times S \times C \times P \qquad (1)$$

where A is the estimated average soil loss in ton/ha/year, R is the erosivity of rainfall in mj mm/ha/h/year, K is the soil erodibility factor in ton ha h/ha mj mm, LS is the topographic factor integrating slope length and steepness (LS) dimensionless, C is the cover-management factor, dimensionless, and P is the support practice factor, dimensionless.

The Kurchum is a right tributary of the Irtysh. Its length is bounded on the left by the Kurchum Ridge, and on the right by the Sarymsakty ridges, separating the Kurchum basin from the Bukhtarma river basin. The sources of the river are located near Lake Markakol in the zone of sparsely wooded taiga, where the Kurchum is a winding, fast, mountain-taiga river with a width of up to 25 meters and a speed of up to 10 km/h, channels and islands in the channel are frequent. The average annual water consumption (Voznesenskoye village) is 60 cubic meters / s (in May - 212 cubic meters /s), the length of the river is 210 kilometers, width is 10-150 meters, depth is up to 3 meters. The Kurchum flows into the Bukhtarma reservoir (Lake Zaisan).

First, you need to create the Kurchum River basin in the ArcGIS program. A river basin is an area of the earth's surface from which all surface and groundwater flows into a given river, including its various tributaries.

The river basin is being built on the basis of DEM (SRTM v4) using standard and specialized ArcGIS tools.