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Formation of Zaminsuv River and Distribution Through the Years.

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Abstract This article presents the results and analysis of the formation and classification of floodplain rivers over the years. Key terms, methodology, research objectives, and approaches are identified to analyze the formation of floodplain rivers. The article is based on research conducted to understand the classification of floodplain rivers over the years. The obtained results and their interpretation are presented. Furthermore, the main findings related to the formation of floodplain rivers and their classification over the years are discussed. The analysis includes the examination of factors indicating the affiliation of rivers to a particular type based on the conditions of river convergence.

Key terms: floodplain, river, water issues, sedimentation, convergence, groundwater, surface water, atmospheric precipitation, basin, annual discharge, water resources, water supply.

Introduction: A concept for the development of Uzbekistan's water infrastructure for the period 2020-2030 has been formulated for discussion. It is evident that this document is of great importance for addressing the remaining issues in the water sector.

Risks and Challenges. Water is considered a vital natural resource for sustaining the livelihoods and activities of the population, economy, and particularly the agricultural sector, as well as for preserving ecological balance.

The future balance of Uzbekistan's water resources is influenced by various factors such as the significant reach of rivers forming the main basins, the impacts of climate change, the growing water needs of the population, and the development of industry.

Like in the entire Central Asia region, climate change poses a threat to Uzbekistan, primarily in terms of the potential expansion of water scarcity areas that shape the main rivers. Over the past 50-60 years, the extent of water bodies has decreased by an estimated 30 percent. According to projections, with a 2-degree increase in temperature, the volume of water bodies is expected to decrease by 50 percent, and with a 4-degree increase, it may diminish by 78 percent. The situation related to water availability is further complicated by the fact that around 80 percent of water used is sourced from outside the country.

Methodology: To study the formation of an alluvial river and its division over the years, the information was compiled based on a wide range of research conducted using the database of investigations.

A translation of the provided text would be:

The alluvial river is a source of water resources. The main source of the formation of an alluvial river is atmospheric precipitation. The formation of an alluvial river has a significant impact on its overall quantity and the amount of water it carries. Taking these factors into account, we can determine how an alluvial river is formed.

Furthermore, the conditions for formation vary for different rivers. For this reason, V.L. Shultz classified the rivers of Central Asia into the following four types, mainly based on the lower reaches of the rivers that receive water from various sources:

Rivers that receive water from glaciers and snowmelt.
Rivers that receive water from snowmelt and glaciers.
Rivers that receive water from snowmelt.
Rivers that receive water from snowmelt and rainfall.

Please note that the translation provided is a general understanding of the text, and some technical terms may have different translations based on the context.

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Criteria indicating which type rivers belong to depending on their saturation conditions.

Table 1

Depending on the saturation conditions types of rivers	Criteria		
	δ	WVII-IX, %	Water most months
Rivers fed by glacier-snow waters	1,00	>38	VII,VIII
Rivers fed by glacial waters	0,99+0,26	37+17	V,VI
rivers that are filled with blind waters	0,25+0,18	16+12	IV,V
rivers fed by rainwater	0,17+0,001	11+0	III,IV,V

The factors listed below have a significant impact on the formation of an alluvial river channel and the accumulation of sediment in the basin:

a) In terms of the water obtained from precipitation,

b) Fluvial waters and the water obtained from precipitation,

c) Groundwater.

Based on specific calculations, information about the δ (delta), WVIH (water volume index of hydrological year), WIII-VI (water inflow index of hydrological year), and WIII-VI (water inflow index of volume year) can be obtained, which describe the conditions of the river's formation.

Flow rate and its determining factors.

River flow is formed due to rainwater and melting of mountains and glaciers. In both cases, a part of the formed water evaporates, and only the remaining part participates in the formation of the stream.

The erosion caused by the flow of water and the availability of sediment and debris contribute to the shaping and formation of the riverbed. The speed of erosion and the deposition of sediments onto the riverbed play a significant role in the formation of the river channel.

The formation of a river channel is a complex process influenced by the following factors:

Climatic conditions of the basin.

Topography and relief of the basin's surface.

Composition and condition of the basin's soils and rocks.

Accumulation of organic matter in the basin.

Geological and meteorological characteristics of the basin.

Presence of lakes, wetlands, and vegetation in the basin.

Distribution of flow throughout the year

The division of rivers during the year, i.e., their classification based on months and seasons, is quite complex as it is influenced by a variety of natural, geographical, and anthropogenic factors. Natural factors include atmospheric precipitation and temperature variations, which are closely related to seasonal changes throughout the year.

Climate factors, in particular, are governed by geographical and vertical zoning principles and play a significant role in the annual division of rivers. The following types of rivers are distinguished:

1. Spring-dominated rivers, which are characterized by increased water flow during the spring season.

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2. Summer-dominated rivers, which exhibit higher water flow during the warm months of the year.
3. Autumn-dominated rivers, which experience increased water flow during the autumn season.

In addition to climate factors, other natural-geographical factors in the river basin also influence the division of rivers during the year. These factors include the size of the basin, its topography, hydrological conditions, drainage patterns, and the presence of lakes and wetlands.

In addition to that, the division of water resources during the course of the year significantly changes due to the impact of human labor activities. For instance, water reservoirs are constructed to regulate the distribution of river water according to seasonal and yearly patterns. The main task of these water reservoirs, designed to follow seasonal patterns of river flow, is to collect water during periods of abundance and utilize it during times of water scarcity in rivers. Such water reservoirs are recommended to be observed in specifically designated rivers within a given year.

Water reservoirs, which have been constructed to regulate the distribution of river water over the years, gather a portion of the water during periods of high water levels and store it for use during times of water scarcity.

The location of these reservoirs is determined based on the availability of suitable areas within the catchment basin of the river. For example, the distribution of water resources is typically influenced by the accumulation of seasonal rains and snowmelt, which results in a well-defined division of water resources throughout the year. The seasonal division of river water resources is not a constant phenomenon and can be analyzed and calculated using mathematical and statistical methods.

When calculating the annual flow distribution, it is recommended to divide each year into hydrological seasons. This division differs from the division according to the calendar, taking into account the periods of moisture accumulation and its consumption in the river basins, and it was considered as the beginning of the hydrological year.

Results and discussion: The data of the upper and lower water measuring stations (Yettikechuv and Duoba) were used to study the distribution of the flow of the Zominsuv River during the year. According to these data, the figures of the flow of the Zominsuv River and water consumption observed at both stations do not match.

The results of the analysis of water consumption and flow volume from the lower post of the Zaminsuv River (Duoba, 1981-2014) were divided into 3 periods and showed the following:

In the first period, between 1981 and 1990, the annual flow distribution was as follows: in March-June, the total volume of flow was equal to 28.1 m3, and the volume of flow in these months was 49% of the annual flow. In July-September, the amount of flow was equal to 14.4 m3, which was 25% of the annual flow. In October-December, the flow volume was equal to 9.14 m3, which was 16% of the annual flow. In January-February, the total volume of flow was equal to 4.78 m3, which was 10% of the annual flow.

In the second period, between 1991 and 2000, the annual flow distribution is as follows: in March-June, the total volume of flow was equal to 42 m3, and the volume of flow in these months was 53% of the annual flow. In July-September, the flow volume was equal to 20.8 m3, which was 26% of the annual flow. In October-December, the flow volume was equal to 10.9 m3, which was 14% of the annual flow. In January-February, the flow volume was equal to 5.44 m3, which was 7% of the annual flow.

In the third period, from 2001 to 2014, the annual flow distribution is as follows: in March-June, the total volume of flow was equal to 30.7 m3, and the volume of flow in these months was 49% of the annual flow. In July-September, the flow volume was equal to 17.2 m3, which was 26% of the annual flow. In October-December, it was equal to 10.3 m3, which was 16% of the annual flow. The flow volume in January-February was equal to 6.8 m3, which was 9% of the annual flow.

Distribution of Zaminsuv river flow between 1981-2014 (Duoba).

Table 2

	Indicator	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Йиллик
1981-1990	Q м^3/с	0,95	0,93	0,91	1,44	3,6	3,55	2,23	1,43	1,21	1,24	1,13	0,96	1,78
	W·10^6	2,55	2,25	2,44	3,73	9,65	9,19	5,98	3,83	3,13	3,32	2,93	2,57	51,57

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	$м^3$													
	%	4,94	4,36	4,73	7,23	18,71	17,82	11,6	7,43	6,1	6,44	5,66	4,98	100
1991-2000	К $м^3/s$	1,1	1,08	1,12	1,8	5,6	6,2	2,2	2,1	1,8	1,5	1,4	1,2	2,47
	$W \cdot 10^6$ $м^3$	2,95	2,61	3	4,66	15	16,1	6	5,63	4,66	4,02	3,63	3,22	71,48
	%	4,13	3,65	4,2	6,52	20,98	22,52	8,39	7,87	6,52	5,62	5,1	4,5	100
2001-2014	К $м^3/s$	1,22	1,26	1,5	2,1	4,01	4,1	2,7	2	1,7	1,3	1,4	1,2	2,53
	$W \cdot 10^6$ $м^3$	3,27	3,05	4,02	5,44	10,7	10,62	7,24	5,36	4,4	3,5	3,63	3,23	64,46
	%	5,1	4,7	6,2	8,4	17	16,5	11,2	8,3	6,7	5,3	5,6	5	100

The results of the analysis of water consumption and flow volumes from the upper post of the Zominsuv River (1981-2014 Yettikechuv) were divided into 3 periods and showed the following:

In the first period, between 1981 and 1990, the annual flow distribution was as follows: in March-June, the total volume of flow was equal to 14.1 m3, and the volume of flow in these months was 48% of the annual flow. In July-September, the amount of flow was equal to 7.8 m3, which was 26.9% of the annual flow. In October-November, the flow volume was equal to 3.23 m3, which was 11.7% of the annual flow. In December-February, the total volume of flow was equal to 3.9 m3, which was 13.4% of the annual flow.

In the second period, the annual distribution of the flow between 1991-2000 is as follows: in the months of March-June, the total volume of the flow was equal to 13.53 M, and the volume of the flow in these months was 43.7% of the annual flow. In July-September, the flow volume was equal to 8.83 m3, which was 28.5% of the annual flow. In October-November, the flow volume was equal to 3.91 m3, which was 12.6% of the annual flow. In December-February, the flow volume was equal to 4.68 m3, which was 15.1% of the annual flow.

In the third period, from 2001 to 2014, the annual flow distribution is as follows: in March-June, the total volume of flow was equal to 30.7 m3, and the volume of flow in these months was 49% of the annual flow. In July-September, the flow volume was equal to 17.2 m3, which was 26% of the annual flow. In October-December, it was equal to 10.3 m3, which was 16% of the annual flow. The flow volume in January-February was equal to 6.8 m3, which was 9% of the annual flow.

The Zominsuv River provides water supply to cultivated areas in Jizzakh region and effective use of available water resources for periods of low water by estimating the amount of water consumption and flow volume distribution throughout the year. The flow volume of the river is the main source of water for irrigation of cultivated fields in the region.

Table 2

Zominsuv distribution between 1981-2014 (Yettikechuv)

Years	Indicator	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Yearly
1981-1990	Q $м^3/s$	0,49	0,49	0,46	0,72	1,92	2,24	1,4	0,84	0,7	0,65	0,59	0,52	0,92
	$W \cdot 10^6$ $м^3$	1,3	1,19	1,23	1,87	5,15	5,8	3,75	2,25	1,8	1,7	1,53	1,4	28,97
	%	4,49	4,11	4,25	6,45	17,8	20	12,9	7,77	6,21	5,87	5,28	4,83	100
1991-2000	Q $м^3/c$	0,55	0,54	0,51	0,91	1,81	1,91	1,56	0,98	0,78	0,75	0,73	0,7	0,98
	$W \cdot 10^6$ $м^3$	1,47	1,31	1,37	2,36	4,85	4,95	4,18	2,63	2,02	2,01	1,9	1,9	30,95
	%	4,75	4,23	4,43	7,62	15,67	15,99	13,5	8,5	6,53	6,49	6,14	6,14	100

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2001-2014	Q м^3/s	1	1	1,13	1,7	2,7	3,1	2,1	1,5	1,2	1,1	1,1	0,98	1,55
	W·10^6 м^3	2,68	2,42	3,03	4,4	7,24	8,03	5,63	4,02	3,11	2,95	2,95	2,63	49,09
	%	5,46	4,93	6,17	8,96	14,75	16,36	11,5	8,19	6,33	6,01	6,01	5,36	100

Conclusion

In conclusion, it should be said that the main goal is to closely study the production of water resources and get to know the flow norms. Based on these data, we calculated and analyzed the annual flows. The Zaminsuv River is described as a process of confluence caused by the confluence of moderate and abundant waters of the river. This meeting is carried out for the purposes of adapting food to the population's perspectives, organizing the irrigation system, developing water sources, producing energy and preserving the ecological environment.

The formation of the Zominsuv River can be attributed to several main factors in stages:

The formation of the Zominsuv River is mainly determined by the climate. Increases during peak season or cargo seasons. In addition, most of the water from the upper valleys is in the mouth.

The formation of the Zominsuv River can be explained by year. For example, the transfer of food, the transfer of agriculture and the profession of organic architecture.

If the water resources of the river have been formed in the past few years and their monitoring has been carried out, it is necessary to develop recommendations for the coming years. Constant monitoring of water quantity and quality should be strengthened in all hydroposts from the head of the river to the last.

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