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CHARACTERISTICS OF THE SANGZAR RIVER BASIN AS A INDIVIDUAL GEOSYSTEM

Abstract: This article introduces the concept and content of geosystems and examines the Sangzor river basin as a distinct geosystem. The methodology for treating the river basin as a separate geosystem is presented, and the boundaries of the Sangzor river basin have been delineated, with the outermost points identified. The paper also provides information on the basin's natural geomorphological characteristics, the main river and its tributaries.

Keywords: geosystem, river basin, Sangzor river, Morguzar, Chumqor, tributaries.

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ХАРАКТЕРИСТИКА БАСЕЙНА РЕКИ САНГЗАР КАК ОТДЕЛЬНОЙ ГЕОСИСТЕМЫ

Аннотация: В данной статье вводится понятие геосистемы и его сущность, а также показана методология, направленная на изучение особенностей бассейна реки Сангзор как уникальной геосистемы. Проанализированы способы выделения речного бассейна в отдельную геосистему, определены границы бассейна реки Сангзор и отмечены наиболее крайние точки. Также приведены сведения о природных геоморфологических особенностях бассейна, главной реке бассейна и впадающих в него ручьях.

Ключевые слова: геосистема, речной бассейн, река Сангзор, Моргузар, Чумкор, ручьи.

Introduction. The scientist who first introduced the concept of a “geosystem” into physical geography is V. B. Sochava (1963). According to him, a geosystem is a distinct, self-contained, and governable type of system in which all components of nature are interconnected and mutually interacting; furthermore, as a relatively integrated object, it interacts with space and with human society.

Currently, geographical research adheres to systems theory, and the object of study is regarded as a system. The components of the Earth's surface are in

systematic interrelations with one another and, as a coherent whole, constitute a space (the spatial envelope) that interacts with human society. The geosystem is regarded as the real living environment of humans—a natural–anthropogenic territorial system in which economic activity exerts a direct influence.

The river basin is recognized as an integral geosystem, a view that brings together other orientations within basin-oriented approaches.

- S. G. Aleksandrov regards river basins as the most convenient units for geographical zonation (regionalization).

- A. D. Armand (1988) considers the basin a geographic information system; the river trunk functions as a communication channel, providing information about the materials entering the river (substances) and about changes at the level of neighboring basins from downstream to upstream.

L. M. Korytniy emphasizes that the basin, as a specialized spatial unit of the biosphere, is the most promising for the multifaceted study of Earth's nature and economy and for environmental management [4]. In addition, the scientist develops the fundamental principles of the basin concept.

Currently, with the rapid development of information technologies, remote sensing of river basins and the use of Geographic Information Technologies (GIS) are employed to study the various characteristics of river basins. In particular, A. G. Narojnya (2021) studied the morphologic characteristics of the Crimean river relief and divided the Dayo Basin into six hierarchically arranged basins, producing a regional map on this basis [5].

Main section. A river basin, spatially, is a portion of the Earth's surface defined by the drainage network of a river system or its main river and by the relief of the terrain. The basin of each river system encompasses both surface-water basins and groundwater basins. However, surface-water and groundwater basins do not generally coincide. Delineating the boundaries of surface-water basins is comparatively straightforward; consequently, in general hydrological, hydrochemical, and geographic studies, the basin area is taken to be the area of the surface-water basin. As a result, the terms “basin” of a river system and “water

basin” are regarded as having essentially the same meaning.

The boundary of a river basin is the line that separates it from adjacent basins. The basins of rivers are usually clearly defined in mountainous regions, i.e., they are delineated by the watershed lines along the mountain watershed. In plains, delineating the boundary of water basins is somewhat more complex. River basins, or water basins in general, can change over time under the influence of tectonic processes, regressive erosion, or river incision.

Delimitation of river basins takes into account the hydrography, orography, and the direction of surface-water flow. In addition, delineation is done using large-scale geographic and topographic maps.

In defining the boundaries of the Sangzor river basin, the 1:200 000 scale topographic map of Jizzakh province and GIS technologies were employed. The Sangzor basin is orographically situated within the Syrdarya Basin.

The Syrdarya basin includes areas located between longitudes 61° and 78° E and latitudes 39° to 46° N. The southern mountainous boundary of the Syrdarya basin runs along the Oqshiyroq, Borqol'day, Otboshi, Oloy, Turkiston, and the extending Nurota mountain ranges [7, p. 156].

The basin lies on the southern slopes of Morguzar mountain and the northern slopes of the Chumqor mountain, situated on the mountainous massif. The Sangzor river flows through the central part of the valley, with a length of 123 km and a basin area of 2580 km² [1, p. 114].

The basin's boundaries are described as follows (Figure 1):

- The northernmost point lies at 40°15'33" N latitude, in the southeastern part of the Qoytosh Mountains.
- The southernmost point coincides with the upper portion of Boyqo'ng'irsoyn in the Chumqor Mountains along the Uzbekistan–Tajikistan border, at 39°33'07" N latitude.
- The easternmost point lies at 39°38'38" N latitude, corresponding to the part of Morguzar Mountain that is separated from the Turkiston Mountain.

- The westernmost point crosses through the eastern part of the Goʻbdin Mountain at 39°55′02″ N latitude.

The Sangzor basin extends from the northwest to the southeast, narrowing and rising in elevation along its length. Its broadest part lies in the west, about 40–42 km wide, and in the east about 16–17 km.

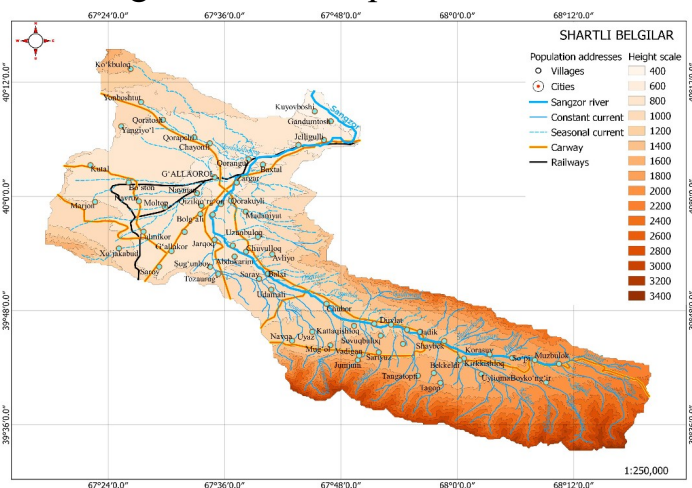


Figure 1. Physical map of the Sangzor River Basin.

The basin is named Sangzor directly because a river of the same name flows through it. The Sangzor river is the longest river in Jizzakh province. It originates on the northern slopes of the Chumqor mountains, where elevations average around 3300 m, and it is formed by the confluence, in the Zartepa village area, of the Jontaka rivers that drain the southern slopes of the Gʻuralash and Morguzar mountains, where elevations exceed approximately 2100 m. The river's mean annual discharge near Gulqishloq is about 1.7 m³/s 2.

Within the basin there are more than a hundred rivers and streams. Of these, the right-bank tributaries—those descending from the southern slopes of the Morguzar Mountains—carry little water and reach the Sangzor only during the spring season and during flood events; in other seasons they persist as dry arroyos. The remaining streams, which originate from the northern slopes of the Chumqor Mountains, are well watered, have perennial flow, and are comparatively long, distinguishing themselves by their length (Table 1).

Table 1

The tributaries discharging into the Sangzor River

No	Tributary name	Length (km)	Basin area (km ²)	No	Tributary name	Length (km)	Basin area (km ²)
Right-bank tributaries				Left-hand tributaries)			
1	Jontaka	14	86	1	Guralashsoy	16,7	67
2	Oqmulla	6	23	2	Boyqo'ng'irsoy	22	65

3	Shaybeksoy	7,5	42	3	Ko'kjar	24	235
4	Yettiqoton	6,7	14	4	Dang'ara	13,5	-
5	Quduqsoy	-	-	5	Oqqo'rg'on	19	48
6	Turgunsoy	-	-	6	Tangatoptisoy	21	65
7	Khojasoy	14	37	7	Sutariqsoy	14	-
8	Tuyatola	9	23	8	Jo'm-jo'm	18	45
9	Otkamar	-	14	9	Baxmazorsoy	21	54
10	Uzunbuloqsoy	16,5	40	10	Navqa	24	94

Conclusion. The river basin constitutes a distinctive geosystem and is an important object in natural geographic research. This is because basins are defined by the boundaries of watersheds on the earth's surface, which allows precise delimitation of basins as natural entities.

The Sangzor river is also one of the major rivers in Jizzakh region, primarily meeting the water needs of Baxmal and G'allaorol districts to a certain extent. The tributaries flowing into the river mainly increase its discharge in the spring season. In other seasons, however, the waters of these tributaries are widely used for agricultural sectors—farming and horticulture—and consequently do not reach the Sangzor River.

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