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Section 4. ACTUAL PROBLEMS IN MODERN ART AND ARCHITECTURE.....61

MUKHAMEDOVA ZUHRAKHAN KAZIMOVNA, KASIMOVA AZIZA BAHODIROVNA /// INVESTIGATION OF HYGIENIC AND OPERATIONAL INDICATORS OF WORKWEAR OF MINING AND METALLURGICAL PERSONNEL.....61

Section 5. ACTUAL PROBLEMS OF NATURAL SCIENCES.....66

SHERZOD IBROIMOV IBRAIM OGLU /// IMMUTABLE SMALL DELTAS ARE "TREE-LIKE" STRUCTURES AND CHANGES IN NATURAL GEOGRAPHICAL PROCESSES IN THEM.....66

KOMILOVA NILUFAR KARSHIBOYEVNA /// SOME THEORETICAL ISSUES OF HUMAN ECOLOGY.....70

Section 6. ACTUAL PROBLEMS OF HISTORY, PHILOSOPHY AND SOCIOLOGY.....79

KHODJAEV SOBIR /// SATISFACTION OF THE ELDERLY WITH THEIR LIVING CONDITIONS AND SOCIAL PROTECTION.....79

RAKHMONOV SUNNATILLO MAVLONOVICH /// LIFE AND SCIENTIFIC HERITAGE OF JALAL AL-DIN RUMI.....87

TUKHTAEV KHAKIM PRIMOVICH /// THE FIELD OF NEW VALUES BASED ON NATIONAL DEVELOPMENT.....93



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ACTUAL PROBLEMS OF NATURAL SCIENCES

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IMMUTABLE SMALL DELTAS ARE "TREE-LIKE" STRUCTURES AND CHANGES IN NATURAL GEOGRAPHICAL PROCESSES IN THEM.

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Annotasiya. Ushbu maqolada Amudaryo hozirgi del'tasida ilk bor ajratilgan kichik del'talar daraxtsimon landshaft komplekslarining invariantligi ko'rib chiqiladi. Shu bilan bir qatorda, kichik del'talardagi tabiiy geografik jarayonlar o'zgarishining qonuniyatlari ochib berildi. Kichik del'talarning daraxtsimon landshaft komplekslari o'zlarining doimiyliigi bilan ajralib tursa, u holda ro'y berayotgan jarayonlar kichik del'talarning invariant strukturalari bilan aloqadorligi dala ma'lumotlari negizida asoslandi.

Kalit so'zlar: del'ta, jarayon, daraxtsimon, invariant, struktura, havza, Amudaryo, irmoq, davr, Sariqamish, Orol dengizi.

Аннотация. В статье рассматриваются инвариантность мелких дельт древовидных ландшафтных комплексов, впервые выделенных в современной дельте Амударьи. А также, выявляются закономерности изменения природно-географических процессов в мелких дельтах. Древовидные ландшафтные комплексы мелких дельт отличаются своими постоянством, а тогда взаимосвязь происходивший процесс с инвариантной структурой мелких дельт обоснованы по полевым материалам.

Ключевые слова: дельта, процесс, древовидные, инвариант, структура, бассейн, Амударья, приток, период, Сарыкамыш, Аральское море.

Abstract. The article examines the invariance of small deltaic tree-like landscape complexes, first identified in the modern delta of the Amudarya, and also reveals the patterns of changes in natural-geographical processes in small deltas. While the tree-like landscape complexes of small deltas are characterized by constancy, the process that took place was based on field data on the relationship of small deltas with an invariant structure.



Key words: delta, process, treelike, invariant, structure, basin, Amudarya, tributary, period, Sarykamysh, Aral Sea.

Introduction. In a comprehensive study of each object, the knowledge of the history of its formation was of particular scientific importance and remains relevant to this day. The current delta of the Amudarya, which we want to study, has also attracted many naturalists. It was studied by many Russian scientists in the late 19th and early 20th centuries [9]. In the twentieth century, the study of the history of the modern delta of the Amudarya was carried out according to a certain plan and was carefully studied.

It is very important to study the geological history of the relief in order to know the internal structure of the delta, that is, the relationship between the components of nature. The natural structure of the relief of the delta was formed under the influence of the Amu Darya and its tributaries Erkindarya, Kazakhdarya, Raushan, Uldarya, and others. As a result of the geological work of these rivers, "tree-like" landscape systems appeared. Together, these small deltas make up the geosystem, that is, this entire object. In a word, the relief of the delta is flat, and they are distinguished by a very gentle slope towards the Aral Sea. In addition, the site has isolated hills (Kuskantau, Parlitau, Krantau, and Itkir), which consist of marls and gypsum from the Cretaceous, Paleogene, and Neogene periods. Their upper parts are, in some cases, covered with sand.

Literature review. Geologist N.A. Kenesarin, taking into account the geological history, divides the process of formation of the Amudarya delta into three stages [1].

1. Very old (ancient) stage. At this stage, the Upper Quaternary Akchadarya is formed (after the Khvalynian period). According to our scientists, in the early and middle periods of the Holocene, the main part of the Amu Darya waters filled the Sarykamysh and Aseke-Audan basins and flowed through the Uzbaï into the Caspian Sea. This direction of the Amu Darya persisted until two millennia BC, when the Sarykamysh delta was formed. This was confirmed by studies carried out by our archaeologists (Tolstov, 1948; Gulamov, 1959; Akulov, 1960). As a result of the expedition, they found many fossils of hunters and fishermen of the Neolithic era in the vicinity of the Sarikamysh delta, on the shores of the Sarikamysh and Uzbaï lakes. According to G. V. Lopatin, the period of formation of alluvial deposits in the Sarikamysh delta is about 10 thousand years. The general geological age of the Amudarya delta is about 17-18 thousand years (Lopatin, 1957). This period also determines the period of the confluence of the Amu Darya into the Arola-Sarikamysh basin.

2. New era. After the formation of the Sarykamysh delta in the second millennium and the beginning of the first millennium BC, the Amu Darya again changes its direction towards the Akchadarya delta and flows towards the Aral Sea. According to A.S. Kes (1991), in the second half of the 2nd millennium BC. The Amu Darya flows into the Aroles Basin from the south. It was from this period that the current channel of the Amu Darya and the delta of the Gulf of Arol begin to form. As a result, the current Amudarya delta existed in the first half of the first millennium BC. Depending on the period of formation of the Amudarya delta, it can be divided into two parts: the southern, much more ancient, and the northern, "living", currently dry.



Until the 60s of the 20th century, river sediments were brought and laid in this part. At this stage, the Kyzketken-Chimbay (Takhiatash), Uldarya and Shortambay deltas were formed.

3. Present period. During this period, the northern "living" part of the modern Amudarya delta (Erkindarya, Raushan, Kunyadarya-Kazakdarya, Kipchakdarya, Akbashli) arose.

The modern relief of the modern Amudarya delta is associated with the formation of its last tributaries. The relief of the Akchadarya delta was formed in the Upper Quaternary and Holocene, while the relief of the modern Amudarya delta appeared after the 60s of the 20th century. Of course, the main features of the relief of the delta appeared earlier, i.e., during the period of deposition of river sediments. Modern features of the relief are closely related to the construction processes of the delta.

According to A. A. Rafikov (1984), the modern appearance of the "living" part of the delta appeared before 1974, i.e. by that time the delta had completed its stage of swampy development. The modern appearance of the relief of the delta mainly appeared in the middle of the 20th century [1].

An analysis of the above literature shows that the Amu Darya changed its course several times during the development of the delta. During these times, as a result of the work of river waters, a relief appeared in "tree-like" forms. In other words, there are several small deltas in the Amudarya delta, and their directions are also different. In a word, the southern part of the Amudarya delta (the deltas of Kizketken-Chimbay, Shortambay, Uldarya) was formed over 5 thousand years, Akbashli formed about two and a half thousand years (Lopatin, 1957).

Research methodology. A.K. Urazbaev (2002) comprehensively analyzed the geological period of the modern Amudarya delta and identified nine small deltas for the first time. In his recent study (2021), the author considered the elementary landscape groups of small deltas as "tree-like" landscape complexes [2,8] and introduced this concept into the science of natural science. According to the author, their attribute is "tree-like" landscape complexes of small deltas, that is, landscape complexes formed as a result of surface water runoff always have a "tree-like" structure. The "tree-like" landscape complexes of each of the small deltas have their own history of origin and differ sharply from each other in their internal structure.

Results and discussion.

Our studies show that all emerging landscape complexes have a "tree-like" structure, but are diverse in form.

Each of the identified groups is distinguished by varying degrees of change in their natural and reclamation conditions. So, for example, since there are no branching "elements" in the extended uplands of the Kiyatjargan sub-delta with an elongated structure, the natural reclamation conditions on these extended uplands are almost the same, and in the Kizketken-Chimbay sub delta, which is an example of a typical "tree-like" structure, branching" with a large number of "elements", the natural and reclamation conditions are very variable even at a short distance. Sharply different from each other "tree-like" landscape complexes of small deltas are the scientific basis