Original Article

Morphological Types of Uzbekistan Mountain Glaciers and their Present Condition

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Abstract

This article describes the distribution of mountain glaciers in the highlands of Uzbekistan by morphological types and their current status based on tables and diagrams.

Keywords: Morphology, Caucasus, Scandinavia, Spitsbergen, Mountain Glacier, Glacier, Trog, Kar, Cirque, Curling, Landscape, Hanging Glacier, Sha¬vursoy, Maidontol, Basin, Slope, Piskom.

INTRODUCTION

The natural geographical aspects of mountain glaciers in the territory of Uzbekistan are formed in a unique way, and this feature is reflected in the genetic types, morphological sizes, structure, saturation, melting and movement of glaciers.

Mountain glaciers are divided into several types according to their morphological structure, saturation order, distribution in parts and other natural geographical features. Their classification was made by scientists such as the American glaciologist W.G. Hobbs and the Russian geographer, glaciologist S.V. Kalesnik: These are Alpine type glaciers, Alaskan type glaciers, Caucasian type glaciers, Scandinavian type glaciers, Himalayan type glaciers, Spitsbergen type glaciers, studied into Central Asian type glaciers.

Glaciers of the Central Asian type. The saturation of the glaciers of this category is formed not only due to the atmospheric precipitation that occurred in the firn area, but also due to the avalanches that are often observed along the slopes or the glaciers that have broken off from other glaciers and collapsed. Central Asian type glaciers are often very large and long, but their firn part is relatively small. Glaciers of the Central Asian type are typical for the mountainous regions of Uzbekistan. The appearance of the mountain glaciers of Uzbekistan, the characteristics of their formation in a certain terrain are more diverse, and from the glaciological point of view, they are divided into two groups and 8 sub-groups. Therefore, they can be classified as follows.

I. Glaciers formed on slopes. Glaciers of this type are formed along the slopes at favorable points for the formation of glaciers. Such places are the parts of the rocks opposite to the sun, and some concave depressions appear. From this point of view, the glaciers formed on the slopes can be divided into five groups as follows. It is worth noting that the glaciers scattered on the slopes are the most common type of mountain glaciers in Uzbekistan, although they are small in terms of area.

a. Hanging glaciers. Glaciers belonging to this category are formed on somewhat steep parts of the slopes, and the saturation part is also formed on the same slope and gives the impression of hanging from the steepness of the slope (Fig. 1). When the glacier reaches a steeper part of the slope due to its movement, it hangs down and falls to the bottom of the valley. According to such characteristics, hanging glaciers can be considered as rare species that are rarely found in Uzbekistan (Table 1). For example, Aksuv-5 at the beginning of the Aksuv river, a large tributary of Kashkadarya, at the beginning of the Tamshush river, Ogishayton-5 at the beginning of the Kshtut river, Kshtut-2 in the Kshtut river basin, Kshtut - 14, Takatur in the Shavursoy basin - 1, Kovurgyoptor in the Maidontol basin - 5, Korintor - 9. glaciers are among them. Their area is very small, around 0.1-1.0 km2.

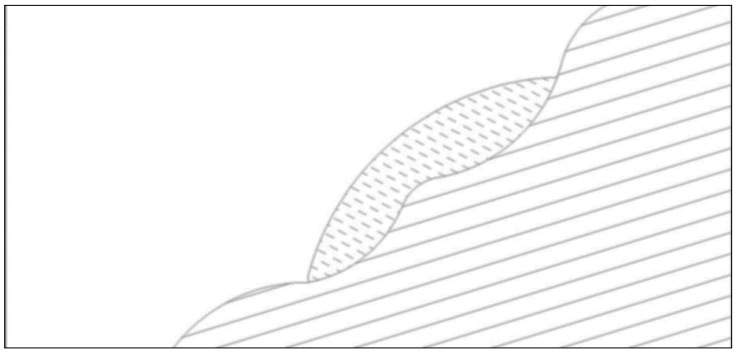

Figure 1. Hanging glaciers

Table 1. Geographical location of glaciers in our republic spreading

T/p	Catalog number	The name of the glaciers	Location (river basin)	The length (km)		The area (km^2)		The slope where the glacier is located
				1960*	2020 (July-August)	1960*	2020** (July-August)	
Piskom river basin								
1	36	Tundiksay -5	Piskom	0.8	0.5	0.2	0.1	North-western
2	37	Tundiksay -4	Piskom	0.8	0.6	0.2	0.12	North-western
3	39	Tundiksay -2	Piskom	0.8	0.4	0.2	0.05	North-western
4	40	Tundiksay -1	Piskom	0.7	0.5	0.2	0.05	North-western
5	57	Tundiksay -2	Piskom	0.8	0.9	0.4	0.4	North-western
6	59	№59	Piskom	1.2	0.6	0.2	0.15	North-western
7	73	Akkapchigay -2	Piskom	1.0	0.7	0.6	0.2	North-western
8	82	Teketur -2	Piskom	0.8	0.7	0.1	0.15	North-western
9	83	Teketur -1	Piskom	1.7	0.7	0.9	0.2	North-western
10	84	№ 84	Piskom	0.6	0.5	0.1	0.07	North-western
11	85	Vostok (East)	Piskom	1.7	2.0	0.7	1.7	North-western
12	86	№ 86	Piskom	0.4	0.8	0.2	0.3	North-western
13	90	Tokmoksaldi -4	Piskom	0.5	0.2	0.1	0.002	North-western
14	91	Tokmoksaldi -3	Piskom	0.9	0.9	0.3	0.3	North-western
15	92	Tokmoksaldi -2	Piskom	1.3	0.8	1.0	0.3	North-western
16	94	Named Geography SAGU	Piskom	1.6	1.2	0.9	0.8	North-western
17	101	Tuzoszow	Piskom	1.8	1.6	1.0	0.8	South-western
18	103	Saribash	Piskom	1.0	0.8	0.6	0.3	South-western
19	109	Ayutor -4	Piskom	0.7	0.6	0.3	0.25	South-western
20	110	Ayutor -3	Piskom	0.8	0.7	0.3	0.25	South-western
21	112	Ayutor -3	Piskom	0.8	0.5	0.2	0.12	South-western
22	113	Ayutor -3	Piskom	0.9	0.7	0.2	0.12	South-western
23	114	Tekeshsay -4	Piskom	0.8	1.1	0.2	0.4	South-western
24	115	Tekeshsay -4	Piskom	1.2	1.1	0.4	0.38	South-western
25	119	№ 119 (Tekesh)	Piskom	0.4	0.3	0.1	0.04	South-western
26	124 (191)	Karabu	Piskom	0.5	0.5	0.2	0.15	South-western
27	133 (200)	Anaulgan -6	Piskom	1.1	1.1	0.4	0.4	South-western
28	134 (201)	Anaulgan -5	Piskom	0.5	0.7	0.1	0.3	South-western
29	135 (202)	Anaulgan -4	Piskom	1.0	1.2	0.3	0.4	South-western
30	136 (203)	Anaulgan -3	Piskom	0.6	0.8	0.2	0.3	South-western
31	137	Anaulgan -2	Piskom	0.7	0.7	0.2	0.2	South-western

	(204)							
32	138 (205)	Anaulgan -1	Писком	0.4	0.5	0.1	0.3	South-western
Kashkadarya basin								
34	37	Naushur -37	Kashkadarya	0.5	0.5	0.1	0.1	Northern
Surkhandarya basin								
35	12	Mastovat -2	Surkhandarya	1.3	1.3	0.6	0.6	Northern
36	17	Upper Khojapiryakh	Surkhandarya	0.6	0.5	0.3	0.2	Northern
37	19	Chilik -2	Surkhandarya	0.4	0.7	0.1	0.3	Northern
38	20	Chilik -3	Surkhandarya	0.4	0.4	0.1	0.2	Northern
39	31	Aksu -5	Surkhandarya	0.3	0.4	0.1	0.2	Southern
59	95	Oghishayton -1	Surkhandarya	1.3	1.6	0.4	0.6	South, South-West
60	96	Oghishayton -2	Surkhandarya	0.5	0.6	0.3	0.3	South, South-West
61	97	Oghishayton -3	Surkhandarya	0.5	0.4	0.1	0.06	South, South-West
62	100	№ 100	Surkhandarya	0.3	0.6	0.1	0.2	South, South-West
63	101	№ 101	Surkhandarya	0.2	0.2	0.1	0.07	South, South-West
64	103	№ 103	Surkhandarya	0.7	0.5	0.2	0.15	South, South-West
65	104	Bodomistan -1	Surkhandarya	0.9	0.8	0.4	0.3	North-western
66	106	Bodomistan -3	Surkhandarya	1.1	0.9	0.5	0.4	North-western
67	111	Kshtut -2	Surkhandarya	0.4	0.4	0.1	0.08	North-western
68	120	Kshtut -11	Surkhandarya	0.7	0.4	0.3	0.2	North-western
69	121	Kshtut -12	Surkhandarya	2.3	1.2	1.2	0.7	North-western
70	123	Kshtut -14	Surkhandarya	0.3	0.3	0.1	0.07	North-western
71	130	Hodjagaspi -4	Surkhandarya	1.1	0.8	0.3	0.15	Northern
72	131	Hodjagaspi -5	Surkhandarya	0.8	0.7	0.3	0.25	Northern
73	132	Hodjagaspi -6	Surkhandarya	1.5	1.1	0.6	0.3	Northern
74	133	Hodjagaspi -7	Surkhandarya	2.5	1.9	0.8	0.5	Northern
75	134	Hodjagaspi -8	Surkhandarya	1.8	1.5	0.8	0.7	Northern
76	139	Delhi -3	Surkhandarya	2.3	1.2	0.8	0.3	Northern

*Note: * Based on the information of L.D.Podkopaeva, A.S.shchetinnikov (1960).*

***Based on space photos (Google earth pro.) and data from the Directorate of Mountain Glaciers of Uzbekistan (2020).*

b. Glaciers on the slopes (sclonovy). Mountain glaciers are mountain glaciers that are short and longer in width compared to their length, which are formed along wide-spreading, but slowly fragmented and not steep slopes (Fig. 1.3). Another characteristic feature of the glaciers on the slopes is that there are no moraines and cracks along their surface. Or very rarely observed. Their difference from hanging glaciers lies in the fact that the tongue part falls flat on steep slopes without breaking.

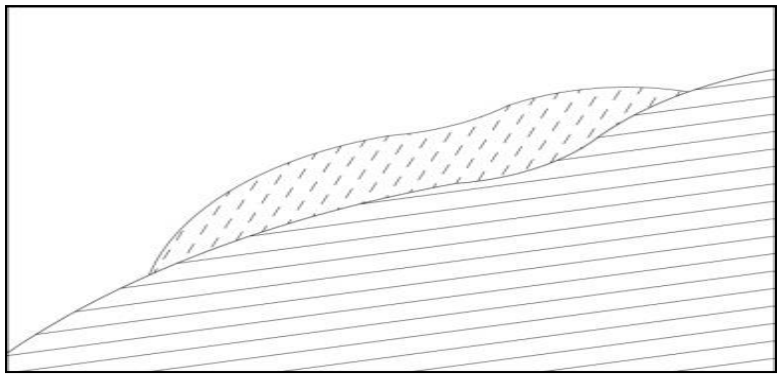

Figure 2. Glaciers on slopes

c. Glaciers at the foot of the slope. Glaciers of this type are formed at the foot of the slopes or along the slope (Fig. 1.4), in slightly curved areas, on terraces. The glaciers of this category are also small in size (mostly around 0.1 m2) and are formed due to the snow covers blown by the wind or pushed down due to avalanches. In accordance with the width of the slope on which its plan view is located (in most cases), the width is superior to the height. 31 of the glaciers scattered in the mountains of

Uzbekistan belong to the type of glaciers formed at the foot of the slopes.

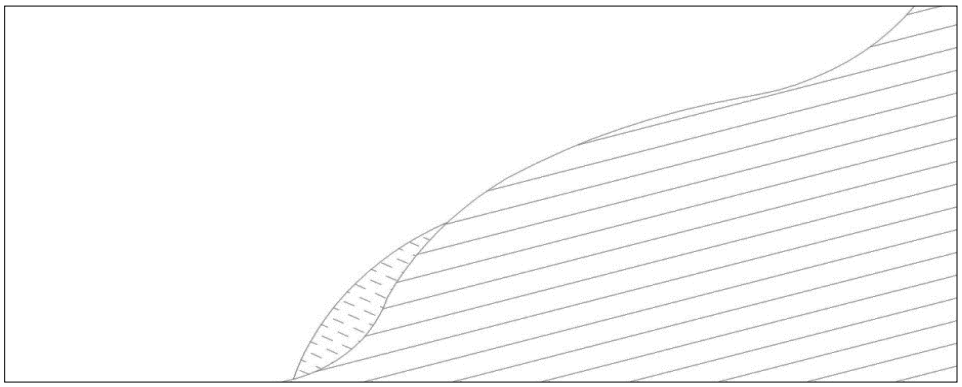

Figure 3. Glaciers at the foot of the slope

d. Glaciers in Kars. Glaciers belonging to this category are formed in hollows characteristic of deaf people, and are usually formed above the snow line. Snows below the snow line are always observed in an empty state, and in most cases traces of paleoglaciers are clearly visible. In accordance with the morphological size of the formed deaf ears, their area is also observed in large cases. Therefore, it belongs to the smallest mountain glaciers. Glaciers in Kars are formed in a state where they do not go out of the Kar bowl, but occupy a part of it, and sometimes completely occupy the Kar bowl (Fig. 1.5). This type of glacier is one of the most common types of glaciers in the mountains of Uzbekistan. Their size is very small, around 0.1 - 1.0 km2. 195 glaciers were formed in our republic (appendices 3 and 4). In addition to the glaciers in the Kars, there are types of overhangs, i.e., the type where the tongue of the glacier hangs out of the Karp bowl, the type that hangs from the rock into the Karp bowl, the type that hangs from the top of the asymmetric Karp, and the types that fill the Karp bowl and hang down. is also available. All these types are small mountain glaciers, their geographical distribution across the territory of our republic is shown in the table.

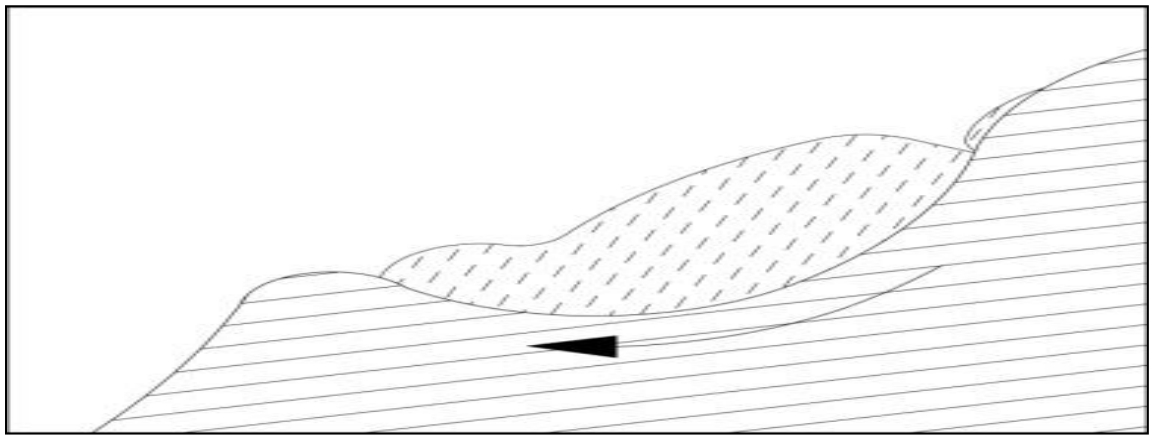

Figure 4. Glaciers in Kars

e. Kar-vadi glaciers. The glaciers that filled the Kar bowls and flowed into the valley at the lowest point of the Kar edge are included in this category and are therefore called Kar-valley glaciers (Fig. 1.6). There are 25 glaciers of the deaf-valley type in the territory of our republic, their description is given in the table below (Table 4). In the saturation of the glaciers belonging to this category, the snow layers, which were blown into the bowls under the influence of strong winds and formed due to avalanches from above, play an important role.

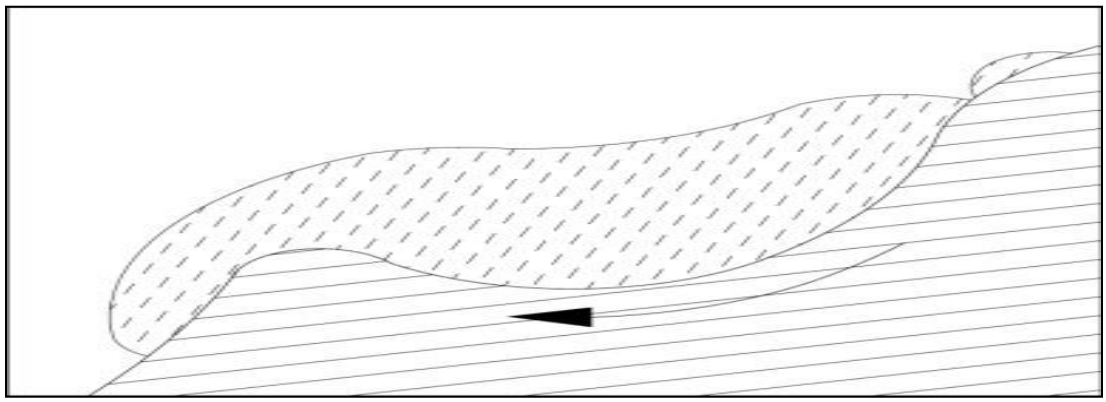

Figure 5. Kar-valley glaciers

II. Valley type glaciers. As the snow cover thickens in the firn part, in proportion to the saturation of the glaciers, their glacier and tongue parts also develop and occupy the valleys moving downwards. Therefore, this category is called valley glaciers. Valley glaciers are divided into three groups according to their structure.

a. Typical valley type glaciers. Glaciers belonging to this type are characterized by having a single saturation zone and a single tongue section (Fig. 1.7). The total number of them in our republic is 10 and is shown in the table below.

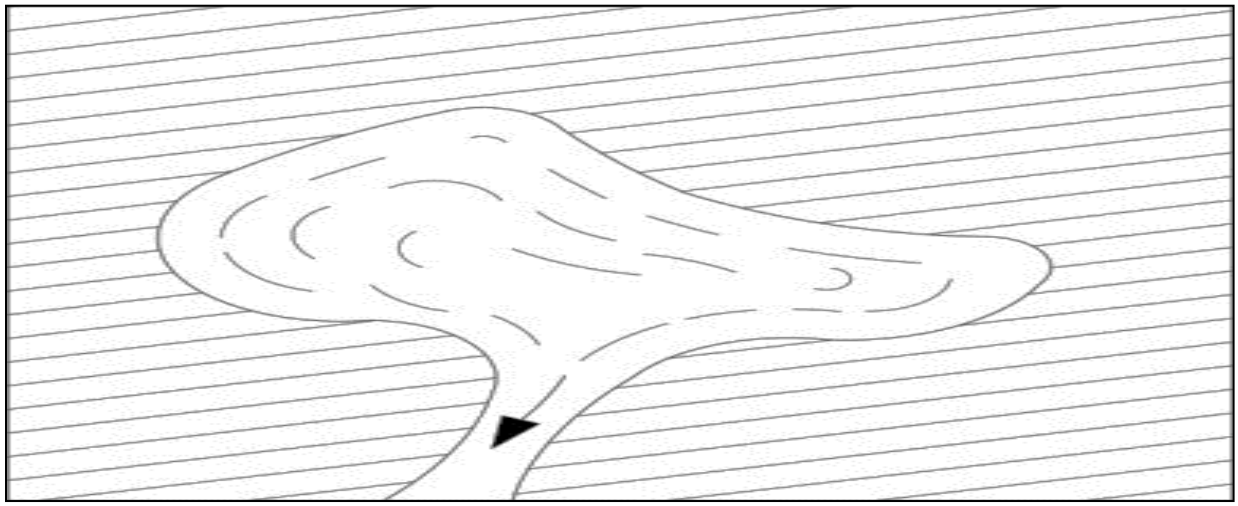

Figure 6. Typical valley glaciers

b. Complex valley type glaciers. Since they have many saturation parts, they fill the side valleys and join the glacier occupying the main valley, therefore, the saturation part, i.e. the firn region, has a single tongue part, lying in separate basins separated from each other (Fig. 1.8). There are 6 complex valley type mountain glaciers in our republic (Table 7).

c. Dendritic type icicles. In some literature, they are called tree-like mountain glaciers. Latin "dend¬ros" means tree. Although it has separate firn areas like complex valley-type glaciers, it has a very complex structure in appearance (Fig. 1.9). This situation resembles a giant tree in plan. That is, the main trunk of the glacier is the trunk of a tree, and the side branches joining the glacier from the sides are like the branches and bushes of a tree. Therefore, complex valley-type glaciers are also called dendrite-type glaciers. This species does not exist in the territory of our republic. But Garmomuzligi in Pamir is an example of that type.

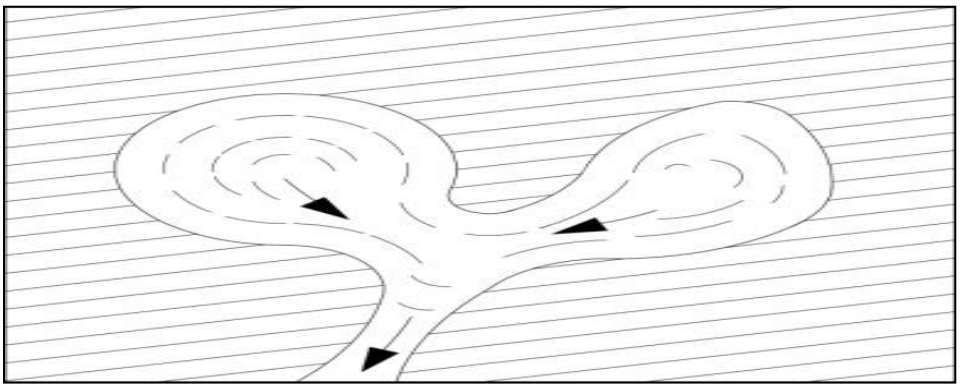

Figure 7. Schematic view of complex valley glaciers or tarhi

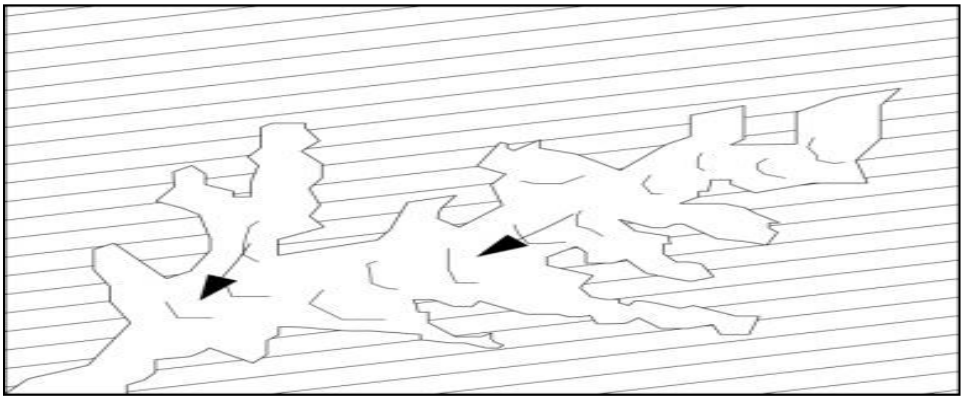

Figure 8. Dendritic type icicles

Mountain glaciers are unevenly distributed across the territory of Uzbekistan. This indicator was created in close connection with the location of glaciers, orographic condition, geomorphological and climatic features of the place. As shown in Table 7, the mountain glaciers located in the territory of Uzbekistan mainly occupy the upper parts of Piskom, Chotkal, Kashkadarya and Surkhandarya basins.

REFERENCES

Bondarev L.G. Features of the Viut century phases of variability of the Tien Shan glaciers vkn. some regularities of the Tien Shan glaciation. Ed. Ilm. Frunze. 1971 pp. 137-145.

Sultonova N., Matnazarov A., Karakulov N., Janzakov A. Characteristics of development in internationally related to climate elements of mountain glaces in Uzbekistan. Turkish Journal of Physiotherapy and Rehabilitation; Dec 06, 2021.

Matnazarov A. “O‘zbekiston tog‘ muzliklarining tabiiy geografik tarqalish qonuniyatlari va ekoturistik ro‘li” mavzusidagi geografiya fanlari bo‘yicha falasafa doktori ilmiy darajasini olish uchun yozilgan dissertatsiyasi. 2021 yil. 120-bet.

Matnazarov A., Safarov U., Hasanova N. The state of international relationship between the formation and activity of mountain glaces of Uzbekistan. CURRENT RESEARCH JOURNAL OF PEDAGOGICS 2(12): 22-25, December 2021.

Nizomov A, Nugmanova A, Matnazarov A. O‘zbekiston tog‘ muzliklari. T. “Fan va texnologiyalar”, 2016. 98 b.

Glazyrin G.E., Komnyanskiy G.M., Pertsiger F.I. Abramov glacier regime. St. Petersburg Gidrometizdat 1993.228 p.

Dikikh A.N. Dikikh L.L. Melting of glaciers with increased total values of saline radiation. Vkn. Glaciation of the Tien Shanya. Publishing house "Ilm" Frunze. 1976 pp 45-47.

Shchetinnikov A.S. Glaciers of the Piskom river basin. L.: Leningrad, Gidrometizdat, 1976. p 120.

Shchetinnikov A.S., Podkopaeva L.D. Catalog of glaciers of the USSR. volume 14. Central Asia. Issue I The basin of the r. Syrdarya. Part I. River Pskem - Leningrad: Gidrometeoizdat, 1968.

Rasulov, A., Madjitova, J., & Islomova, D. (2022). PRINCIPLES OF TOURISM DEVELOPMENT IN DOWNSTREAM ZARAFSHAN DISTRICT. American Journal Of Social Sciences And Humanity Research, 2(05), 11-16.

Rasulov, A. B., Hasanov, E. M., & Khayruddinova, Z. R. STATE OF ENT ORGANS OF ELDERLY AND SENILE PEOPLE AS AN EXAMPLE OF JIZZAKH REGION OF UZBEKISTAN. ЎЗБЕКИСТОН РЕСПУБЛИКАСИ ОТОРИНОЛАРИНГОЛОГЛАРНИНГ IУ СЪЕЗДИГА БАҒИШЛАНГАН МАҲСУС СОН, 22.

Расулов, А. Б., & Расулова, Н. А. (2013). Опыт периодизации географических взглядов. Молодой ученый, (7), 121-123.

Nigmatov, A. N., Abdireimov, S. J., Rasulov, A., & Bekaeva, M. E. (2021). Experience of using⇜ gis⇝ technology in the development of geoecological maps. International Journal of Engineering Research and Technology, 13(12), 4835-4838.

Matnazarov, A. R., Safarov, U. K., & Hasanova, N. N. (2021). THE STATE OF INTERNATIONAL RELATIONSHIP BETWEEN THE FORMATION AND ACTIVITY OF MOUNTAIN GLACES OF UZBEKISTAN. CURRENT RESEARCH JOURNAL OF PEDAGOGICS, 2(12), 22-25.

Saparov, K., Rasulov, A., & Nizamov, A. (2021). Making geographical names conditions and reasons. World Bulletin of Social Sciences, 4(11), 95-99.

РАСУЛОВ, А. Б., & АБДУЛЛАЕВА, Д. Н. (2020). ПЕДАГОГИЧЕСКИЕ И ПСИХОЛОГИЧЕСКИЕ АСПЕКТЫ РАЗВИТИЯ НАВЫКОВ ИСПОЛЬЗОВАНИЯ САЙТОВ ИНТЕРНЕТАВ ПРОЦЕССЕ повышения квалификацииРАБОТНИКОВ НародНОГО ОБРАЗОВАНИЯ. In Профессионально-личностное развитие будущих специалистов в среде научно-образовательного кластера (pp. 466-470).

Kulmatov, R., Rasulov, A., Kulmatova, D., Rozilhodjaev, B., & Groll, M. (2015). The modern problems of sustainable use and management of irrigated lands on the example of the Bukhara region (Uzbekistan). Journal of Water Resource and Protection, 7(12), 956.