

Development and distribution of erosion processes in the mountain-meadow zone of the south-eastern slope of the great Caucasus

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ABSTRACT

The soils of the mountain-meadow zone of the south-eastern slope of the Greater Caucasus are spread at an altitude of 1800-3500 m above sea level under giant and subalpine meadows. Primary, grassy, gray mountain-meadow subtypes of mountain meadow-soil type are spread in the area. The total area is 75,290.0 hectares, which is 13.4% of the total area, of which 1,7582.5 hectares (23.4%) are unwashed, 2,4670.0 hectares (32.8%) are weak, 19,740.0 hectares (28.2%) - medium, 13297.5 hectares (17.6%) are subject to severe erosion. The soils of the mountain-meadow zone of the south-eastern slope of the Greater Caucasus are spread at an altitude of 1800-3500 m above sea level under giant and subalpine meadows. Primary, grassy, gray mountain-meadow subtypes of mountain meadow-soil type are spread in the area. The total area is 75,290.0 hectares, which is 13.4% of the total area, of which 1,7582.5 hectares (23.4%) are unwashed, 2,4670.0 hectares (32.8%) are weak, 19,740.0 hectares (28.2%) - medium, 13297.5 hectares (17.6%) are subject to severe erosion.

KEYWORDS

southern slope; the great Caucasus; erosion process; meadow zone

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INTRODUCTION

The southeastern slope, where the object of our research is located, is one of the largest agricultural regions of the republic. Such branches of agricultural production as field cultivation, animal husbandry, and viticulture are widely developed here. However, due to the complexity of the physics and geographic conditions of farming, it is fraught with great difficulties, the strong ruggedness of the relief, the irrational use of slope lands without observing the rules of elementary anti-erosion measures led to the intensive development of erosion processes.

The development of erosion processes in the southeastern slope of the Greater Caucasus is associated with a complex of natural factors (relief, geology, geomorphology, climate, vegetation, soil) and human economic activity. A number of researchers (1,2,3,4,5,6,7,8,9,10,11,12, etc.) are devoted to the study of erosion processes, the role of vegetation in reducing soil washout on the southeastern slope of the Greater Caucasus.

On the basis of earlier and our research, taking into account the factors of erosion and its development, the territory of the southeastern slope of the Greater Caucasus is divided: mountain meadow. Mountain-forest and mining-agricultural zones.

By the nature of the soil-forming process, the mountain-meadow zone is divided into subalpine and alpine areas, which differ from each other both in climatic parameters, vegetation cover and in the development of the soil-forming process. Depending on the height of the terrain and the nature of the rocks, mountain meadow soils have a different capacity, underdevelopment and its richness in non-rotten plant residues, a gradual transition of humus horizons and an abrupt transition to parent rocks, structure, lack of neoplasm and roughness in texture.

The comparatively high heating capacity of the surface of the southern slopes and their dryness determine the development of a thinned vegetation cover, and the intense surface runoff contributes to the intensification of erosion processes. Therefore, the soils of the southern slopes are characterized by thinness, low humus content and gravelly.

It should be noted that in terms of the content of the most important nutrients for plants, as well as physical properties, mountain meadow soils represent an environment favorable for the development of herbaceous plants. In the study area, mountain meadow soils are represented by the following subtypes:

- (1) mountain meadow primitive,
- (2) mountain meadow Soddy,
- (3) mountain meadow steppe.

TABLE 1: Distribution of soil cover in mountain meadow zone of the southeastern slope of the Greater Caucasus

Н/н	Почвы	Общая площадь га %	В том числе			
			несмытые	слабо- смытые	средне смытые	сильно смытые
1	Горно-луговые примитив-ные	<u>14897,5</u> 19,8	<u>3145,0</u> 21,1	<u>7632,5</u> 51,2	<u>3207,5</u> 21,5	<u>9125</u> 6,1
2	Горно-луговые дерновые	<u>44687,5</u> 59,4	<u>10750,0</u> 24,0	<u>12417,5</u> 27,8	<u>12325,0</u> 27,6	<u>9195,0</u> 20,6
3	Горно-луговые степные	<u>15705,0</u> 20,8	<u>3687,5</u> 23,5	<u>4620,0</u> 29,4	<u>4207,5</u> 26,8	<u>3190,0</u> 20,3
	Всего	<u>75290,0</u> 100,0	<u>17582,5</u> 23,4	<u>24670,0</u> 32,8	<u>19740,0</u> 26,2	<u>13297,5</u> 17,6

N / A Soil Total
square
ha

% Including
unwashed weakly
washed off medium
washed away strongly
washed away

(1) Mountain meadow primitive 14897.5

19.8 3145.0
21.1 7632.5
51.2 3207.5
21.5 9125
6.1

(2) Mountain meadow sod 44687.5

59.4 10750.0
24.0 12417.5
27.8 12325.0
27.6 9195.0
20.6

(3) Mountain meadow steppe 15705.0

20.8 3687.5
23.5 4620.0
29.4 4207.5
26.8 3190.0
20.3

Total 75290.0

100.0 17582.5
23.4 24670.0
32.8 19740.0
26.2 13297.5
17.6

(a) Mountain meadow primitive soils

Distributed above the alpine zone on steep and steep slopes. They occupy 14897.5 hectares or 19.8%. Of these, unwashed varieties are 3145.0 hectares (21.1%), slightly washed out 7632.5 hectares (51.2%), moderately washed off 3207.5 hectares (21.5%) and heavily washed off 912.5 hectares (6.1 %). Table 1.

According to morphological features, these soils are very thin and are characterized by the absence of genetic horizons, only horizon A is sharply expressed, they are very strongly skeletal. The surface is represented by rubble and detrital products, the color of the upper horizons is dark brown, the structure is silty with a very weakly expressed granularity. In terms of mechanical composition, mountain meadow primitive soils are represented by light loamy and medium loamy varieties. In the upper horizon of the unwashed varieties of these soils, the amount of physical clay is 38.08%, and the silty fraction is 25.92%. Under the influence of erosion processes, the content of physical clay is significantly reduced, so in highly washed varieties, the content of physical clay is 25.86%, (clay fraction - 8.0%) (Table 2.)

Erosion processes also affect the content of humus and total nitrogen. In the upper horizon of the mountain meadow primitive soils, the humus content is 9.4%, the total nitrogen content is 0.46%, and in the heavily washed out up to 2.19%, 0.11% (Table 3).

The content of absorbed bases (Ca + Me) also, accordingly, decreases from 32.21 mg / eq (in uncrumpled varieties) to 12.8 mg / eq (in highly washed off varieties) per 100 g of soil. (Table 3.)

The amount of nutrients in primitive mountain meadow soils, as the degree of smoke increases, significantly decreases. So, in the upper horizon of uncrumpled varieties, the content of assimilable phosphorus is 47.18 mg / kg, exchangeable potassium is 536.4 mg / kg, and in highly washed varieties, their content decreases by 11.6 and 255.6 mg / kg. Table 3. Structural and aggregate composition of mountains no-meadow primitive soils are presented in Table 4. In the upper horizon of uncrumpled differences, the content of structural particles of more than one mm is 43.3%, of which 29.20% are water-resistant; as a result of erosion processes, their number decreases to 66.90 and 18, respectively, 00%.

(b) Mountain meadow soddy soils

Distributed in the upper part of the river basins: Pirsatichay, Kozluchay, Geokchay, Girdymanchay, in the north-west of the village. Demirchilar, Zarat-Kheybbari, Gudar Yaylag, Baskal, Kaladzhyk, Lahich. and others where the height above sea level is higher than 1600 m, but in some places, it drops to 1400 m. These soils are characterized by a dark-colored, powerful structural profile. Favorable soil conditions, humus content, good pronounced granularity, lack of signs of compaction, all this indicates the suitability of these soils.

TABLE 2: The mechanical composition of mountain meadow primitive soils (in%% on absolutely dry soil)

Н/н раз- резов	Степень смытости	Генети- ческие гори- зонты	Глубина взятия образца см	Гигрос- копи- ческая всего %	Фракции в %, размеры частиц в мм						
					1- 0,25	0,25- 0,05	0,05- 0,01	0,01- 0,005	0,005- 0,001	<0,01	<0,01
404	несмытая	A	0-14	4,12	11,98	28,30	21,64	6,08	6,08	25,92	38,08
		A ₁	14-23	3,81	12,86	32,50	23,44	15,52	3,60	12,08	31,20
411	Сильносмы- тая	Bc	0-9	2,73	13,87	18,53	41,84	0,72	17,04	8,00	25,76

N / n
cuts Degree
washout Geneti-ical
sky umbrellas
Depth
taking
sample
see Gigros-copy
total% Fractions in%, particle sizes in mm
1-0.25 0.25-0.05 0.05-0.01 0.01-0.005 0.005-0.001 <0.01 <0.01

404 not washed A 0-14 4.12 11.98 28.30 21.64 6.08 6.08 25.92 38.08

A1 14-23 3.81 12.86 32.50 23.44 15.52 3.60 12.08 31.20

411 Strongly washed Sun 0-9 2.73 13.87 18.53 41.84 0.72 17.04 8.00 25.76

TABLE 3: Some chemical indicators of primitive mountain meadow soils

Н/н раз-рез	Степень смытости	Генети- ческие гори-зонты	Глубина взятия образца см	Гумус	Азот валовой	Поглошение основания в мг-екв на 100 г почвы		Сумма поглашен- ных оснований мг.екв.	Питательные элементы в мг на 1 кг почвы	СО ₂ Карбо- нотов
				в %		Са	Мэ			
404	несмытая	A	0-14	9,46	0,46	27,46	4,75	32,21	47,18	536,40
		A ₁	14-23	5,73	0,29	20,18	6,18	26,36	33,20	473,61
411	Сильно смытая	Bc	0-9	2,19	0,11	10,64	2,18	12,8	11,60	255,60

N / n

cuts Degree of washout Genetic

ical

sky umbrellas

Depth

taking

sample

see Humus Nitrogen

gross Absorption

bases in mg-eq

per 100 g of soil the sum of the bases consumed mg.equ. Nutrients

in mg per 1 kg of soil CO₂

Carbo-notes

in% Ca Me P₂O₅ K₂O

404 not washed A 0-14 9.46 0.46 27.46 4.75 32.21 47.18 536.40 no

A1 14-23 5.73 0.29 20.18 6.18 26.36 33.20 473.61 "----"

411 Strongly washed out Sun 0-9 2.19 0.11 10.64 2.18 12.8 11.60 255.60 "----"

TABLE 4: Structural (numerator) and aggregate (denominator.) Composition of mountain meadow (primitive soils)

Н/н Раз- рез	Степень смытости	Генети- ческие горизонты	Глубина взятия образца см	Фракции в мм								Скелет- ность
				>7	7-5	5-3	3-1	1-0,5	0,05- 0,25	<0,25	<1	
404	несмытая	A	0-14	<u>39,0</u> -	<u>5,70</u> 3,20	<u>7,70</u> 10,40	<u>26,00</u> 15,60	<u>1,80</u> 11,60	<u>5,70</u> 15,60	<u>13,80</u> 8,00	<u>43,30</u> 29,20	24,0
		A ₁	14-23	<u>21,50</u> 1,20	<u>8,80</u> 4,80	<u>15,50</u> 9,20	<u>33,50</u> 14,00	<u>2,00</u> 15,20	<u>0,50</u> 17,20	<u>18,20</u> 22,40	<u>79,30</u> 29,20	15,6
411	Сильно смы- тая	Bc	0-9	<u>26,00</u> -	<u>4,20</u> -	<u>10,00</u> 6,40	<u>26,70</u> 11,60	<u>0,90</u> 6,40	<u>1,20</u> 19,60	<u>31,00</u> 43,60	<u>66,90</u> 18,00	12,40

N / n

Cut-cut Degree

washout Geneti-

ical

horizons

Depth

taking

sample cm Fractions in mm

Skeleton-
ness

> 7 7-5 5-3 3-1 1-0.5 0.05-0.25 <0.25 <1

404 unwashed A 0-14 39.0

- 5.70

3.20 7.70

10.40 26.00

15.60 1.80

11.60 5.70

15.60 13.80

8.00 43.30

29.20 24.0

A1 14-23 21.50

1.20 8.80

4.80 15.50

9.20 33.50

14.00 2.00

15.20 0.50

17.20 18.20

22.40 79.30

29.20 15.6

411 Strongly washed Sun 0-9 26.00

- 4.20

- 10.00

6.40 26.70

11.60 0.90

6.40 1.20

19.60 31.00

43.60 66.90

18.00 12.40

In many cases, these soils are covered with beautiful subalpine forb meadows and have a high fodder value, which indisputably proves their suitability for use as pastures. The total area of mountain meadow soddy soils is 44687.5 hectares or 7.96% of the total area of the territory. Of these, 10750.0 hectares (24.0%) are not crumpled -12417 hectares (27.8%) are slightly washed away, 12325.0 hectares (27.6%) are medium washed out, 9195.0 hectares (20.6%) are highly washed out varieties ... (Table 1).

These soils are well differentiated by morphological character, color changes gradually along the profile. In connection with the irrational use of land resources, erosion processes are intensively developing. The mechanical composition along the profile is clayey and medium loamy, the amount of physical clay (<0.001) in the upper horizon is 77.56%, of which 43.48% is the share of the silty fraction. Due to the fact that with the development of erosion processes, the thickness of the fine-grained soil layer decreases, along with this, the color of the upper horizon changes, and the soil becomes structureless, which contributes to intensive washout and erosion of the soil. Thus, the content of physical clay in the upper horizon of highly eroded varieties is up to 35.04% (6.80 silty fraction) (Table 5).

In the upper horizon of uncrumpled mountain meadow soddy soils, the content of structural particles larger than 1 mm is 70.70%, of which 67.20% falls on water-resistant aggregates. Under the influence of erosion processes, the content of structural particles and especially water-resistant aggregates is significantly reduced. So, in highly washed varieties, their content is, respectively, 43.30% and 3.79%. Table 7.

TABLE 5: The mechanical composition of mountain meadow sod soils (in% on absolutely dry soil)

Н/н раз- рез	Степень смытости	Генети- ческие горизо- нты	Глубина взятия образца см	Гипро-ско- пическая всего %	Фракции в %, размеры частиц в мм						
					1- 0,25	0,25- 0,05	0,05- 0,01	0,01- 0,005	0,005- 0,001	<0,001	<0,01
100	несмытая	A ₀	0-3	д	е	р	н	и	н	а	
		A ₁	3-8	5,18	1,03	20,49	0,92	3,72	30,36	43,48	77,56
		A ₂	8-23	5,11	2,58	22,38	1,12	6,56	30,32	37,04	73,92
		B	23-55	5,04	1,20	26,44	17,04	2,28	27,96	25,08	55,32
191	сильносм- ытая	B	0-13	4,70	0,42	47,82	16,72	13,04	15,20	6,80	35,04
		C	13-35	4,10	0,32	76,12	3,56	0,44	11,24	8,32	20,00

N / n

cuts Degree of washout Genetic

ical

horizons Depth

taking

sample

cm

Hypro-picic

Total %

Fractions in%, particle sizes in mm

1-0.25 0.25-0.05 0.05-0.01 0.01-0.005 0.005-0.001 <0.001 <0.01

100 unwashed A0 0-3 sod

A1 3-8 5.18 1.03 20.49 0.92 3.72 30.36 43.48 77.56

A2 8-23 5.11 2.58 22.38 1.12 6.56 30.32 37.04 73.92

B 23-55 5.04 1.20 26.44 17.04 2.28 27.96 25.08 55.32

191 strongly washed off B 0-13 4.70 0.42 47.82 16.72 13.04 15.20 6.80 35.04

C 13-35 4.10 0.32 76.12 3.56 0.44 11.24 8.32 20.00

TABLE 6: Some chemical indicators of mountain sod soils

Н/н раз- рез	Степень смытости	Генети- ческие горизо- нты	Глубина взятия образца см	Гумус	Азот валовой	Поглощение основания в мг-екв на 100 г почвы		Сумма погледенных оснований мг.екв.	Питательные элементы в мг на 1 кг почвы		CO ₂ карбо- натов
						Ca	Mg		P ₂ O ₅	K ₂ O	
100	несмытая	A ₀	0-3	д	е	р	н	и	н	а	нет
		A ₁	3-8	1,46	0,73	24,50	6,75	31,25	56,74	675,40	<---->
		A ₂	8-23	5,17	0,54	16,73	5,00	21,73	49,63	544,90	<---->
		B	23-55	5,77	0,28	16,00	5,70	21,70	-	-	<---->
191	слабосмыт- ая	B	0-13	2,33	0,10	13,64	2,11	15,75	12,77	206,5	<---->
		C	13-35	1,40	0,08	9,10	1,93	11,03	-	-	<---->

N / n

cuts Degree of washout Genetic

sky umbrellas Depth

taking

sample

see Humus Nitrogen

gross Absorption

bases in mg-eq per 100 g of soil

bases mg.eq.

Nutrients

in mg per 1 kg of soil CO₂

carbo-notes

in% Ca Me P₂O₅ K₂O

100 unwashed A0 0-3 sod no

A1 3-8 1.46 0.73 24.50 6.75 31.25 56.74 675.40 "----"

A2 8-23 5.17 0.54 16.73 5.00 21.73 49.63 544.90 "----"

B 23-55 5.77 0.28 16.00 5.70 21.70 -- "----"

191 slightly washed off B 0-13 2.33 0.10 13.64 2.11 15.75 12.77 206.5 "----"

C 13-35 1.40 0.08 9.10 1.93 11.03 -- "----"

TABLE 7: Structural (numerator) and aggregate (denominator) composition of mountain meadowturf soils

Н/н раз- рез	Степень смытости	Генети- ческие горизонты	Глубина взятия образца см	Фракции в мм								Скелет - ность
				>7	7-5	5-3	3-1	1-0,5	0,05- 0,25	<0,25	<1	
100	несмытая	A ₀	0-3	д		е	р	н	и	н	а	нет
		A ₁	3-8	<u>19,90</u> 13,60	<u>15,20</u> 11,47	<u>7,70</u> 8,93,	<u>27,90</u> 26,40	<u>8,90</u> 18,43	<u>12,40</u> 11,40	<u>8,00</u> 9,77	<u>70,70</u> 60,40	
		A ₂	8-23	<u>13,50</u> 8,75	<u>13,10</u> 11,45	<u>18,30</u> 17,30	<u>39,20</u> 34,69	<u>8,50</u> 6,43	<u>2,80</u> 1,96	<u>4,60</u> 19,32	<u>84,10</u> 72,12	
		B	23-55	<u>18,70</u> 4,64	<u>6,90</u> 11,60	<u>12,40</u> 10,73	<u>42,00</u> 33,00	<u>4,00</u> 11,60	<u>7,00</u> 4,60	<u>9,00</u> 20,83	<u>80,00</u> 59,97	
191	Сильно- смытая	B	0-13	<u>6,90</u> -	<u>15,80</u> -	<u>13,70</u> 1,43	<u>6,90</u> 2,36	<u>1,70</u> 13,60	<u>0,40</u> 23,40	<u>54,60</u> 59,21	<u>43,30</u> 3,79	«-----»
		C	13-35	<u>5,30</u> -	<u>3,90</u> -	<u>2,80</u> -	<u>9,80</u> 1,34	<u>22,00</u> 23,40	<u>17,20</u> 11,40	<u>39,00</u> 63,36	<u>21,80</u> 1,84	«-----»

N / n

cuts Degree of washout Genetic

ical

horizons Depth

taking

sample

cm

Fractions in mm Skeleton

> 7 7-5 5-3 3-1 1-0.5 0.05-0.25 <0.25 <1

100

unwashed A0 0-3 sod

A1 3-8 19.90

13.60 15.20

11.47 7.70

8.93, 27.90

26.40 8.90

18.43 12.40

11.40 8.00

9.77 70.70

60.40 no

A2 8-23 13.50

8.75 13.10

11.45 18.30

17.30 39.20
 34.69 8.50
 6.43 2.80
 1.96 4.60
 19.32 84.10
 72.12 "----"
 B 23-55 18.70
 4.64 6.90
 11.60 12.40
 10.73 42.00
 33.00 4.00
 11.60 7.00
 4.60 9.00
 20.83 80.00
 59.97 "----"
 191 Strongly washed off
 V
 0-13 6.90
 - 15.80
 - 13.70
 1.43 6.90
 2.36 1.70
 13.60 0.40
 23.40 54.60
 59.21 43.30
 3.79 "----"
 13-35 5.30
 - 3.90
 - 2.80
 - 9.80
 1.34 22.00
 23.40 17.20
 11.40 39.00
 63.36 21.80
 1.84 "----"

Mountain meadows steppe soils: distributed mainly under alpine meadows in the southern southeastern and southwestern exposures, as well as in the upper part of the river. basins Girdymanchay and Pirsaaatchay. They occupy 15705.0 hectares or 20.8% of the total area of the territory. Of these, 3687.5 hectares (23.5%) are uncrumpled, 4620, hectares (29.4%) are weakly washed away, 4207.5 hectares (26.8%) are medium washed away, 3190.0 hectares (20.3%) - strongly washed off. (Table 1).

Typical morphological features are: dark brown color of the upper horizon, well-pronounced lumpy-granular structure. Genetic horizons differ from each other very clearly. The thickness of the horizon in uncrumpled mountain meadow steppe soils is 77.66%, of which the clay fraction accounts for 27.55%, so the content of physical clay in the upper horizon of highly eroded varieties is 14.72% and 7.64% (table eight).

In the upper horizon of uncrumpled varieties, the humus content is 6.6%, total nitrogen 0.34%, respectively 1.07 and 0.07% (Table 9).

These soils are well supplied with assimilable nutrients. In the upper horizon of uncrumpled varieties, the content of assimilable phosphorus is 46.5 mg / kg, exchangeable potassium -677.4 mg / kg. In strongly washed off differences, respectively, 9.2 mg / kg and 241.0 mg / kg (table 9).

In the upper horizon of uncrumpled varieties of the described soils, the content of absorbed bases is 31.25 mg / eq, in strongly washed out varieties, their amount decreases to 15.75 mg / eq. (table 9).

The content of structural particles larger than 1 mm in the upper horizon of uncrumpled differences is 71.00%, of which water-resistant aggregates are 67.20%. As a result of the development of erosion processes, these soils lose their water resistance, in which the number of structural units more than one mm and water-resistant aggregates decreases 3-6 times (Table 10).

Taking into account the above, it is clear that in the development of accelerated erosion in the mountain-meadow zone, the wrong economic activity of a person plays an important role. As a rule, in the mountain-meadow zone, steeper slopes (more than 150) are used for grazing livestock, and flat areas for haymaking, which, in turn, contribute to the intensive development of erosion processes.

It should be noted that until now, anti-erosion measures have not been carried out in the meadow zone, and therefore the eroded areas are increasing from year to year. The mountain-meadow zone is mainly used as summer pastures, in which the rules for the rational use of pastures are not observed, which contributes to the intensive development of soil washout and erosion. In this zone, every time in different places along the cattle are driven to watering, which leads to the destruction of the turf layer and thereby increases the washout and erosion of the soil.

In the mountain-meadow zone, in heavily washed out areas, cattle grazing is carried out, which completely destroys the vegetation cover, as a result of which it turns them into bare areas.

In this zone, the corral system of grazing cattle is not introduced, which contributes to the intensive development of erosion processes. Therefore, to create a sustainable vegetation cover, preserve and restore high-mountain pastures, increase their protective role is one of the most important tasks of farming in mountainous conditions.

TABLE 10: Structural (numerator) and aggregate (denominator) composition of mountain meadow steppe soils

Н/н раз- рез	Степень смытости	Генети- ческие горизонты	Глубина взятия образца см	Фракции в мм								Скелет -ность
				>7	7-5	5-3	3-1	1-0,5	0,05- 0,25	<0,25	<1	
	несмытая	A ₀	0-2	д		е	р	н	и	н	а	
		A ₁	2-19	<u>12,40</u> 10,60	<u>8,20</u> 7,60	<u>14,40</u> 14,40	<u>36,00</u> 35,20	<u>8,20</u> 9,20	<u>9,20</u> 11,30	<u>9,00</u> 13,50	<u>71,00</u> 67,20	нет
		A ₂	19-46	<u>19,20</u> 15,80	<u>5,50</u> 5,20	<u>4,10</u> 4,00	<u>42,70</u> 45,60	<u>4,10</u> 4,40	<u>3,20</u> 3,20	<u>21,20</u> 21,60	<u>71,50</u> 70,60	«----»
		B	46-79	<u>11,00</u> 25,60	<u>8,70</u> 12,30	<u>14,00</u> 21,60	<u>32,70</u> 4,40	<u>4,10</u> 7,60	<u>6,20</u> 4,00	<u>23,30</u> 24,50	<u>66,40</u> 63,90	«----»
	Сильносм ытая	B	0-16	<u>2,40</u> -	<u>2,90</u> -	<u>0,80</u> -	<u>12,40</u> 9,20	<u>36,40</u> 20,80	<u>19,00</u> 18,40	<u>26,10</u> 51,60	<u>18,50</u> 9,20	«----»
		B ₂	16-29	<u>2,11</u> -	<u>2,90</u> -	<u>3,94</u> -	<u>10,40</u> 2,80	<u>32,70</u> 7,20	<u>24,70</u> 46,00	<u>23,79</u> 32,00	<u>18,85</u> 2,80	«----»
		C	29-43	<u>1,70</u> -	<u>1,40</u> -	<u>2,00</u> -	<u>7,70</u> -	<u>48,20</u> 21,20	<u>15,00</u> 19,20	<u>24,00</u> 59,60	<u>12,80</u> -	«----»

N / n

cuts Degree of washout Genetic

ical

horizons Depth

taking

sample

cm

Fractions in mm Skeleton

> 7 7-5 5-3 3-1 1-0.5 0.05-0.25 <0.25 <1

unwashed A₀ 0-2 sod

A₁ 2-19 12.40

10.60 8.20

7.60 14.40

14.40 36.00

35.20 8.20
9.20 9.20
 11.30 9.00
13.50 71.00
67.20 no
A2 19-46 19.20
15.80 5.50
5.20 4.10
 4.00 42.70
45.60 4.10
4.40 3.20
3.20 21, twenty
21.60 71.50
70.60 "---"
B 46-79 11.00
25.60 8.70
12.30 14.00
21.60 32.70
4.40 4.10
7.60 6.20
4.00 23.30
24.50 66.40
63.90 "----"
Strongly washed B 0-16 2.40
- 2.90
- 0.80
- 12.40
9.20 36.40
 20.80 19.00
18.40 26.10
51.60 18.50
9.20 "----"
B2 16-29 2.11
- 2.90
- 3.94
- 10.40
2.80 32.70
7.20 24.70
46.00 23.79
32.00 18.85
2.80 "----"
S 29-43 1.70
- 1.40
- 2.00
- 7.70
- 48.20
21.20 15.00
19.20 24.00
59.60 12.80
- "----"

CONCLUSIONS

In the mountain-meadow zone, three subtypes are distinguished: mountain-meadow primitive, mountain-meadow sod and mountain-meadow steppe, which is the main base of animal husbandry, which is occupied by mountain-meadow sod, and mountain-meadow steppe. The natural conditions of the southeastern slope of the Greater Caucasus and the active impact of anthropogenic factors contribute to the intensive development of erosion processes. In order to increase the productivity of meadows and prevent erosion processes in the mountain meadow zone of the southeastern slope of the Greater Caucasus, the following measures are recommended. In pastures and pastures with unwashed and weakly washed out soils, it is necessary to use a corral system of grazing cattle and adherence to grazing terms. In areas with moderately washed out soils, the rate of grazing of livestock per hectare should be reduced to 50%, and it is advisable to carry out a corral system of grazing livestock. On pastures and pastures with strongly washed off soils, it is necessary to stop grazing for a period of 3-4 years and to widely use overseeding and sowing of perennial grasses.

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