BLIZZARD DURATION ON THE TERRITORY OF GEORGIA

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Abstract

The article is devoted to researching the duration of the blizzard in Georgia. Summed up the data for 1966-2017 based, existing materials from 40 meteorological stations countrywide. A multi-year change of the blizzard duration was investigated. It was determined its dependence on the height of the sea level. Geoinformation map of blizzard duration was created for Georgia.

The results of the blizzard duration, along with other climatic features, will help to study the formation and development of a blizzard on the territory of Georgia, which is essential for the country's economy to reduce the damage caused by the blizzards.

Keywords: *Atmospheric processes, Climate, Meteorology, Blizzard*

1. INTRODUCTION

In the territory of the Georgia blizzard are connected with the invasions of cold air masses both from the west and from the east. The blizzards, connected with the western processes, cover almost entire territory of the Georgia. In western Georgia they are accompanied with the snowfalls, in the remaining regions they can bear the nature of ground blizzard. During the eastern processes of blizzard they cover entire eastern Georgia and significant part Southern-Georgian upland, sometimes being extended into the mountain alpine regions of Western Georgia.

The nature of blizzard determines entire complex the condition: a quantity of falling out solid precipitation, speed and the direction of the winds, the configuration of relief and the connected/bonded with it protection of point. The intensity of snow-storm strongly depends on the speed of snow-wind flow, power and nature by snow-cover, sizes of snowy particles, also, from temperature and humidity of air. The blizzard are bonded always with the more or less strong loss of visibility. Impairing visibility, they create large difficulties in the functioning of transport. As a result of the blizzard the electric power lines can be disrupted [1].

The blizzard disrupt the uniform bedding of snow and cause the formation of cornices, snowdrifts and other forms of snow-accumulation. They also act on snowy surface, condensing it and changing the structure of snowflakes. Snowdrifts on the windward slopes can serve as a reason for equilibrium disruption between the layers of snow cover and this contribute to the sliding down of snowy avalanches. Snowdrifts and avalanches lead to snow concentration in the concave forms of the relief: niches, valleys, the places where the majority of glaciers is located. On the rivers, which feed from the glaciers, where is great the contribution of metelevogo and avalanche snow, the vteploye season there are strong floods [2].

As it is known, most of territory of the Georgia occupy mountain landscape, and the development of mountain regions has high value for our country. Against the background of the development of the mountain health resorts of Georgia and tourism as a whole, that goals the creation of Georgia as the tourist country to all seasons of year, it is important to eradicate the damage, caused by different dangerous weather phenomena, including blizzard, to undertake preliminary measures for reducing to the minimum of damage and formation of the safe situation in this respect. And also, the introduction of effective measures for control of blizzard for a trouble-free operation of Georgia as regional transport (both automobile and railroad, and also air and sea) hub.

The blizzard are extended in the entire territory of Georgia, especially in the regions with steady snow cover. The blizzard in the territory of Georgia is predominantly observed on the passes of the Caucasus, Adjara-Imereti, Surami and Trialeti passes, and on the mountains Samtskhe-Javakheti.

In the mountain regions of Georgia the blizzards are possible in essence from November through April. Only in the highest parts they are observed from October through May and it is very rare - in September.

The duration of the blizzard is given special significance between its climatic characteristics, as well as the number of blizzard days. There is a very close connection between them all year round - The more number of blizzard days are, the more duration it is [3].

The current article examines the duration of the blizzard in the territory of Georgia. Statistic data has been processed on 40 meteorological stations on the basis of the observation material, which covers the period of 1966-2017.

2. MATERIALS AND METHODS

2.1. Materials

For the work were used materials: archive data of Institute of hydrometeorology at the Georgian Technical University; Climatic reference books [4,5,6]. National Environmental Agency observational data; Mikheil Nodia Institute of Geophysics of Ivane Javakhishvili Tbilisi State University existing data.

2.2. Methods

In the study was used the methodology of mathematical statistics and probability theory. Also, the methodological basis of the study was processed at the department climatology and agro meteorology of the Institute of Hydrometeorology.

3. RESULTS

The amount of damage caused by the blizzard depends on the duration of the blizzard, especially on auto highways and mountain passes, where the Interruption of long-term traffic is causing negative economic consequences, which is caused by the deterioration of the visibility of the snowstorm and the formation of snowdrift [7].

As a result of statistical analysis (which is based on the data on 36 meteorological stations throughout Georgia) it was revealed, revealed that the average duration of blizzard in most areas of Georgia does not exceed 10 hrs per year.

Table 1 provides data average and maximum duration of snowstorm over the years. There are also a list of stations where the data about the blizzard are taken and height above sea level.

Meteorological station/post	Average annual duration (h.)	Maximum annual duration (h.)	Height above sea level, m
Mestia	6	31	1500
Lebarde	5.9	49	1600
Pass Mamisoni	1054	2731	2854
Kazbegi, h⁄m	835	1972	3665
Kazbegi	106	655	1750
Pass Djvari	229	546	2380

Tkibuli	7.3	95	590
Korbouli	19	273	790
Tianeti	26	138	1100
Mta sabueti	180	676	1248
Tsipa	5	22	673
Khashuri	11	34	700
Sioni	4.2	40	1000
Gori	2.9	52	588
Bakhmaro	209	701	2050
Pass Zekari	252	755	2182
Tbilisi	2.1	30	550
Bakuriani	54	124	1700
Sagarejo	1.3	12	772
Manglisi	46	396	1250
Pass Ckhratskaro	902	1934	2462
Kodjori	8.9	86	1400
Akhaltsikhe	1.1	18	1000
Tsalka	31	78	1460
Udabno	12	59	750
Paravani	244	685	2073
Dedoplistskaro	6.6	42	800
Dmanisi	6.3	53	1171
Ninotsminda	147	560	1940
Ermani	3	34	2220
Tskinvali	13	94	870
Akhalgori	2.3	26	800
Ridge Gagra	174	559	2432
Batumi	11	111	5
Khulo	20	87	923
Pass Goderdzi	640	1055	2025

Table 1. Average and maximum annual duration in Georgia, 1966-2017.

Table 1 shows that it is particularly distinguished by the passage, where the average duration of the blizzard is 600-100 hours a year.

As we have already noted, the duration of the blizzard is directly proportionate to the number of blizzard days. But as for increase the elevation of the place height from sea level, this attitude is not

always relevant and often depends on various factors, such as wind speed and direction, weather change, relief configuration, the safety of the related points, etc. [8].

The dependence between the average and maximum duration of the blizzard and the elevation of the place from sea level it is presented as diagrams (Fig.1,2), with the respective regression equation and determination coefficient (R^2).

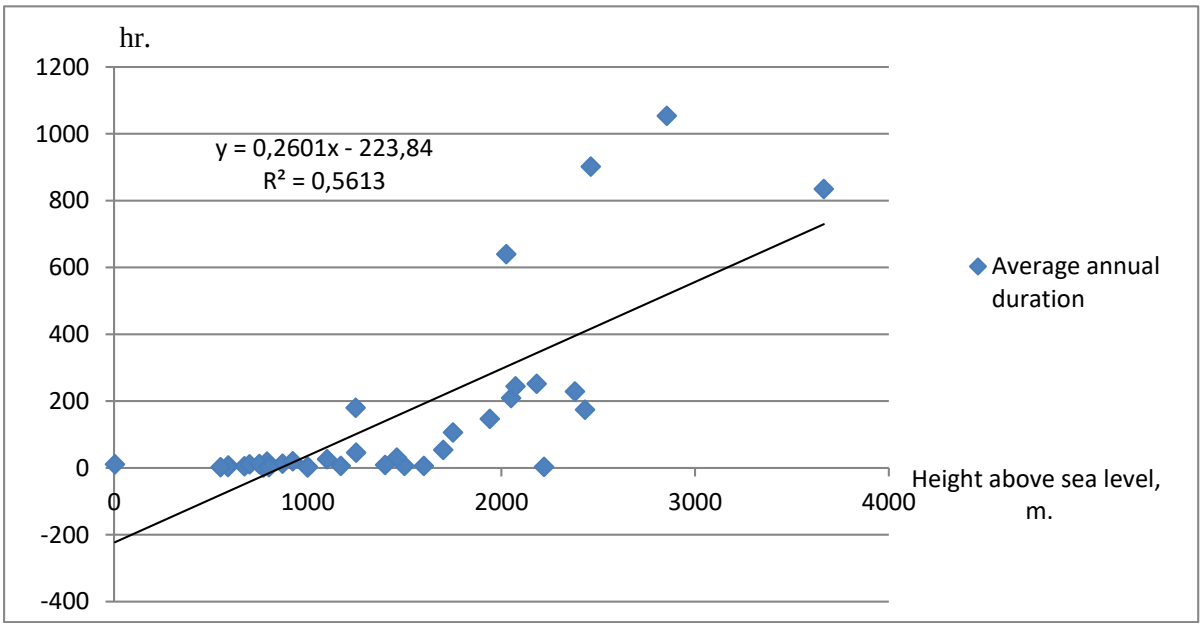

Fig. 1. The dependence between the average annual duration of the blizzard and the elevation of the place from sea level.

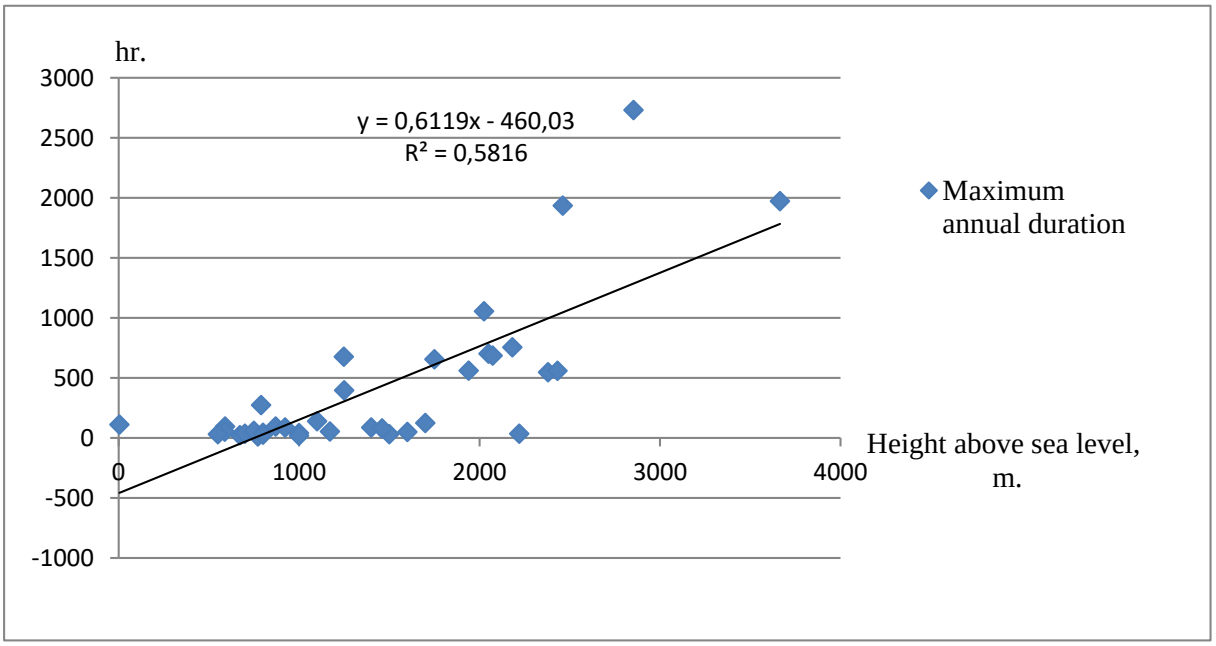

Fig. 2. The dependence between the maximum annual duration of the blizzard and the elevation of the place from sea level.

As shown from diagrams, the duration of the blizzard is less dependent on the increase in the height of the sea level. In case of average annual duration of blizzard, the determinant coefficient is only 0.56 (Fig.1), at maximum duration – 0.58 (Fig.1).

The highest rate of average duration of blizzard is 10-12 hours during the year most of the territory of Georgia. Figure 3 shows the histogram of the different gradation of the average duration of the blizzard.

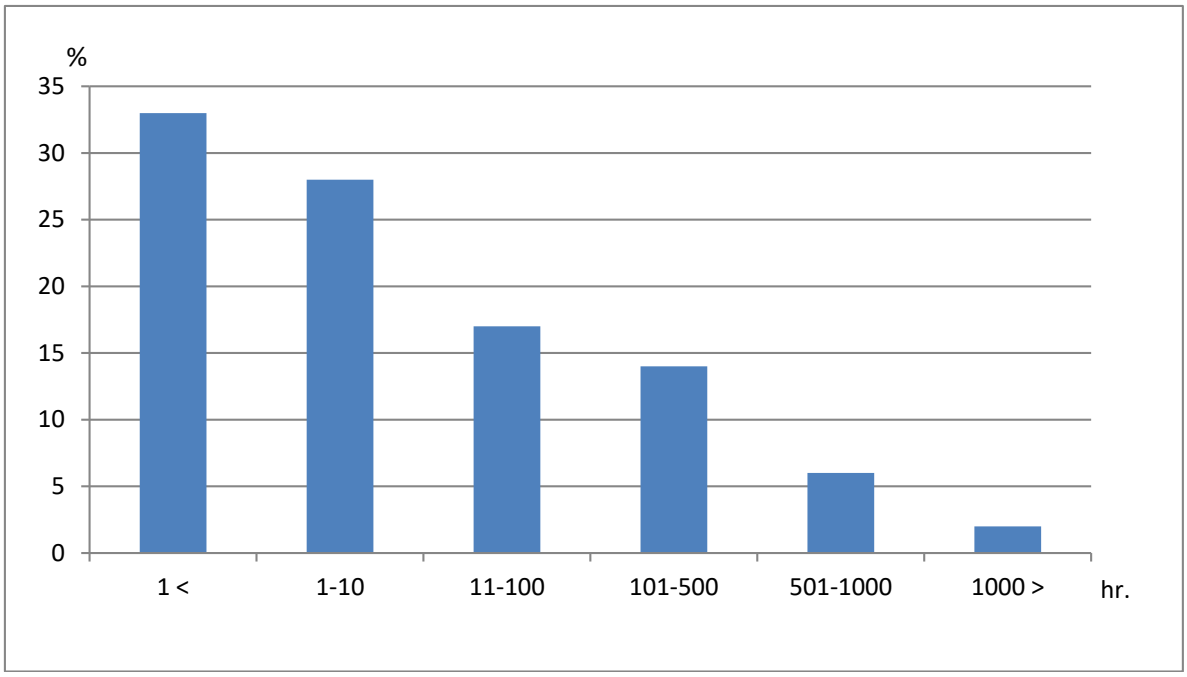

Fig. 3. Repeatability of the various duration of the blizzard at the territory of Georgia.

According to Figure 3, there is a great probability the first two gradations in the territory of Georgia, while the average duration recurrence over the year does not exceed 1 hour, or 1-10 hrs. Their total Recurrence exceeds 60%. The recurrence of more durable blizzard logically reduced and the recurrence of the most durable blizzard is only 2%. For example, the duration of the blizzard at Mamisoni Pass is 1024 hours during the year.

The distribution of the average duration of the blizzard, throughout the year, is given on the geoinformation map (Fig. 4).

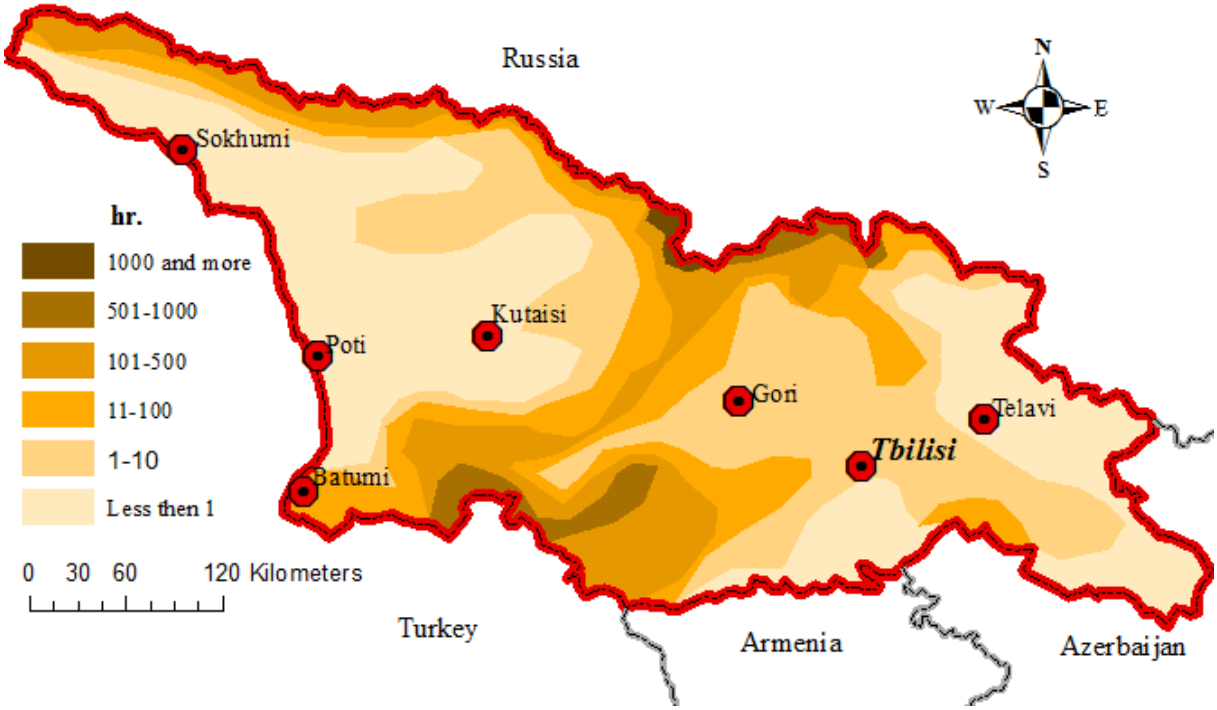

Fig. 4. Average annual duration of blizzard on the territory of Georgia.

As Figure 4 shows the blizzard duration is especially high along the Caucasus Range and the Trialeti Range. The average duration of blizzard in these areas is 500-1000 hours and in some places is more than 1000 hrs. Also, in most of the territory of Georgia, as we have already noted, varies within 0-10 hours.

CONCLUSION

Blizzard is not characterized by duration in most areas of Georgia. Average annual duration is mostly within 0-10 hours.

Durable blizzards that endanger the economy of the country are mostly fixed by the passage, where their average annual duration is 600-900 hours, while in some regions is over 1000 hour.

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