

Blizzard Cases in Georgia from 2014 to 2018

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Abstract

According to the National Environment Agency data, the cases of blizzards in the period of 2014-2018 on the territory of Georgia are discussed. The existing data on blizzards are analysed, and the distribution of climatic characteristics of blizzards on the territory of Georgia is determined. In particular, the distribution of blizzards cases, wind speed, areas, as well as the type of synoptic processes causing blizzards according to the respective regions and municipalities. Based on the studied data, a geo-information map showing the distribution of blizzards by regions on the territory of Georgia was compiled, which covers the period 2014-2018. Examples of blizzard damage in 2014-2018 on the territory of Georgia are given, which illustrates the scale of the damage caused by the snowstorm and the negative consequences.

Keywords: Blizzard, wind speed, synoptic processes, geo-information map

Introduction

A Blizzard is one of the most dangerous meteorological phenomena that cause significant damage to the country's economy and endanger human life. Blizzard is not uncommon in the territory of Georgia. Dominated by weak and medium strength blizzards [1-3]. Blizzards are a rare occurrence. However, the damage caused by them is pretty extensive. Blizzards on the territory of Georgia are especially typical for highland areas [4-6], frequent on the passes, whereas a result of limited visibility and the formation of sediments, it threatens the movement of transport. There are frequent cases of being stuck in the disaster zone during a blizzard, posing a significant danger to human health and life.

Because of the limitation of horizontal vision, the blizzard creates great aviation difficulties. It disrupts the uniform bedding of snow and causes the formation of cornices, snowdrifts and other forms of snow accumulation. Snowdrifts on the windward slopes can serve as a reason for equilibrium disruption between the layers of snow cover, contributing to the sliding down of snowy avalanches.

In the mountain regions of Georgia, blizzards are possible from November through April. They are observed only in the highest parts from October through May, and it is scarce in September.

The direction of dangerous winds is determined by the atmospheric processes, during which are conceived the blizzards. For Georgia, such flows are mainly winds with the western and eastern components. However, depending on area relief, the direction of dangerous winds can enormously change. The significant part of the blizzards in the territory being investigated is connected with the western processes. Wind speeds with an eastern component in most are below, which decreases their danger.

65% of the territory of Georgia occupies a mountain landscape, and the development of mountain regions has high value for our country. For the development of mountain health resorts, it is crucial to liquidate the negative consequences of different dangerous weather phenomena, including a blizzard, and conduct preliminary measures to reduce damage to a minimum. Also, introducing effective measures for control of blizzard for a trouble-free operation of the Georgia as regional transport hub.

Therefore, the study of the climatic characteristics of the blizzard is on the agenda, especially the study of the areas of the blizzards and their dynamics that have developed recently, which will allow us to mitigate the consequences caused by the blizzard and implement preventive measures.

Methods and Materials

The article summarizes the cases of a blizzard in the period 2014-2018 on the territory of Georgia. The study of the five-year data allows us to identify blizzard-hazardous areas, to analyse blizzard-covered trends.

Data provided by the National Environment Agency. The article is carried out using probability theory and mathematical statistics [7, 8].

Results and Discussion

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As a result of the study of blizzard cases, we have compiled a table (Table 1), which shows the number of days of a blizzard in 2014-2018 by regions and relevant municipalities in Georgia. The table also shows the wind speed (m/s) during the blizzard and the synoptic processes type during which a blizzard was formed in different parts of Georgia.

Table 1. Blizzard indicators in the period 2014-2018 by regions on the territory of Georgia

| Region | Municipality | Number Of Days | Wind Speed (m/s) | Type of synoptic process |
|----------------------------------|---|----------------|------------------|--------------------------|
| Abkhazia | - | - | - | - |
| Adjara | Kobuleti, Khulo, Batumi, Shuakhevi | 4 | 24 | Western process |
| Kakheti | Sagarejo | 1 | - | - |
| Shida Kartli | - | - | - | - |
| Kvemo Kartli | - | - | - | - |
| Imareti | - | - | - | - |
| Guria | - | - | - | - |
| Samegrelo - Zemo Svaneti | - | - | - | - |
| Samtskhe-Javakheti | Ninotsminda, Akhaltsikhe, Akhalkalaki | 6 | - | Western process |
| Raja-Lechkhumi and Kvemo Svaneti | - | - | - | - |
| Mtskheta-Mtianeti | Dusheti (Mleta-Gudauri), village. Mukhrani, Stepantsminda | 3 | 20 | Western process |
| Tbilisi | Tbilisi | 1 | 24 | Western process |

As Table 1. shows, a blizzard in most regions of Georgia during the five-year study period (2014-2018) was not observed. Blizzards cases (even one case) were observed in only five regions of Georgia, including the capital of Georgia - Tbilisi (1 day). As Table 1 shows, most cases are recorded in the Samtskhe-Javakheti region and are six days. The maximum wind speed of 24 m / s was observed in the Adjara region and Tbilisi city. Adjara region, after Samtskhe-Javakheti, is also characterized by a high number of blizzard cases (4 days).

As for the type of synoptic processes that caused blizzards, it is especially noteworthy that the origin and development of all cases of blizzards during 2014-2018 were due to Western synoptic processes.

Based on Table 1. We compiled a geo-information map showing the distribution of blizzards by regions of Georgia during 2014-2018 (Fig. 1.).

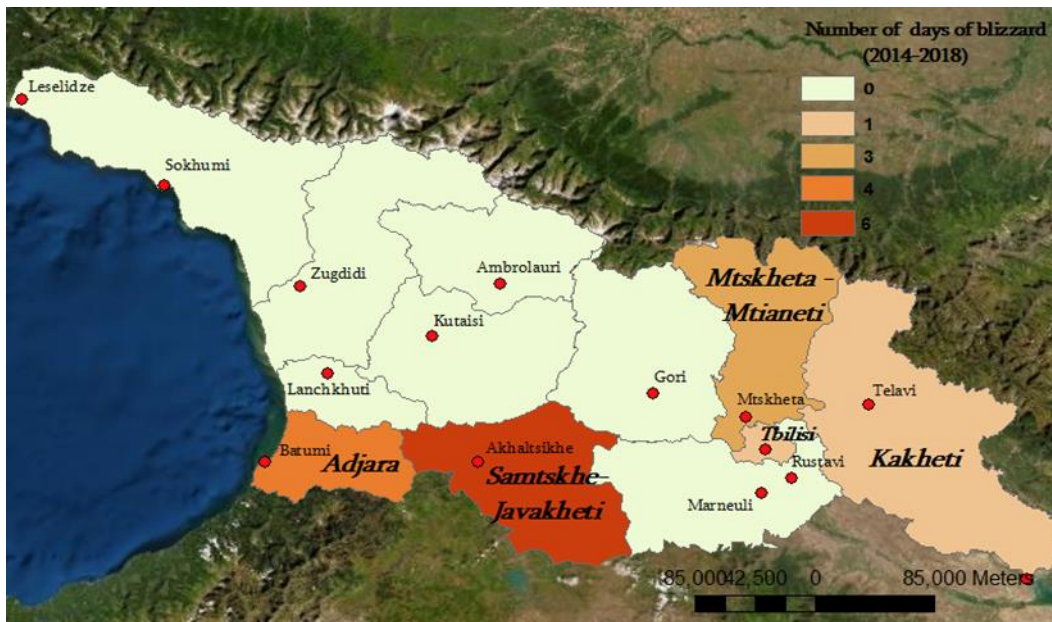


Figure 1. A number of the blizzards cases on the territory of Georgia by regions in 2014-2018

Blizzards cause significant damage, as evidenced by the description of cases related to blizzards that developed in 2014-2018.

For example:

05.01.2015 In Ninotsminda municipality, 200 people were saved from a snow-covered place by a rescue squad due to a blizzard.

06.01.2015 One person froze due to a blizzard in the town of Ninotsminda.

01.04.2016 In Kazbegi municipality, an extreme situation was created after the closure of the Kobi-Gudauri road. Approximately 150 cars were framed in a 17-degree frost and blizzard.

21.11.2016 In Batumi and Akhaltsikhe municipalities, all types of traffic were banned on the 106-123 km section of the Batumi-Akhalsikhe highway. The ban was snow, blizzard, and limited visibility on this section of the road.

02.02.2017 In Sagarejo municipality in village Udabno the road was closed due to blizzard and snowdrift.

Such cases show that to avoid undesirable consequences, it is necessary to take various preventive measures in dangerous areas of a blizzard. We believe that similar studies will facilitate such measures.

Conclusion

The studied five-year period on blizzards shows that the number of blizzard cases in the territory of Georgia is exceptionally high in the Samtskhe-Javakheti region and the mountainous regions of Adjara.

100% of the blizzard, developed on the territory of Georgia during the study period (2014-2018), are due to Western synoptic processes.

Competing interests

The authors declare that they have no competing interests.

Authors' contribution

All authors contributed to the final version of the manuscript.

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