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Regularities of snow cover changes in winter mountain resorts of Georgia against the background of climate change

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Abstract
Mechanisms for mitigating and protecting against the negative impacts of climate change on the tourism sector are discussed. Data (from the National Environmental Protection Agency's climate database) on changes in snow cover duration at Georgian winter resorts (Mestia, Goderdzi, Gudauri, and Bakuriani) were collected. Two 30-year periods (1956-1985) and (1956-2015) were compared, and patterns were identified and assessed.

Keywords: Snow cover, climate, tourism

Relevance of the topic

In the mountainous regions of Georgia, against the background of noticeable climate change, mountain and ski tourism shows special sensitivity to spatial-temporal fluctuations of snow cover. The feasibility of its further development requires systematic research and exploration of the geographical-synoptic aspects of global climate change and the practical application of the obtained, scientifically proven results. Currently, the relevance of studying the problem posed is determined by the wide and organic connections between global climate change and the growing trend in the development of tourism in mountainous regions [1].
The feasibility of its further development requires systematic research and investigation of the geographical-synoptic aspects of global climate change and the practical application of the obtained, scientifically proven results. Currently, the relevance of studying the problem is determined by the broad and organic connections between global climate change and the growing trend of tourism development in mountainous regions.

Research Objective

Solving this problem requires the following goal. Mitigating and protecting the negative impact of climate change on the tourism sector requires recording data (from the National Environmental Agency's climate database) on changes in snow cover duration within the Georgian winter resorts (Mestia, Goderdzi, Gudauri, Bakuriani) and comparing the differences between two 30-year periods (1956-1985) and (1956-2015), identifying patterns, and evaluating them.

Research results

In order to process data on snow cover, meteorological stations with a long series of multi-year observations of the main characteristics of snow cover were selected. It was found out:
Mestia: In the first period, the snow season covered the period from November 30 to March 19, and the average duration of the cover was 108 days. In the second period, the duration of the snow cover was reduced by 17% compared to the first period.
Gudauri: The average snow season in the first period of observations was 23
It lasted between November and May 5. The duration of snow cover during the entire period was 162 days. The snow cover trend was negative. The duration of snow cover during the second period was reduced by 12% compared to the first.
Goderdzi: The snow season during the first observation period lasted on average from November 8 to May 10. The duration of snow cover during the entire observation period was 182 days, and the snow cover trend was positive. The duration of snow cover during the second period was reduced by 3% compared to the first.
Bakuriani: The snow season during the first period fluctuated between November 26 and March 28. The duration of snow cover during the entire observation period was 122 days. And the snow cover trend was negative. The duration of snow cover during the second period was reduced by 8% compared to the first.
The analysis of the obtained data shows that the duration of the mountain-skiing season, along with climatic factors, is determined by the physical-geographical factors of the location of the tourist facility (height above sea level). A ski area is considered reliable in terms of snow cover when the snow cover (artificial or natural depth) exceeds 30 cm for 100 days.

Interpretation of the research results

Based on the above data, it is advisable to: include climate change issues in tourism policies, strategies and implementation plans; assess and take into account possible risks caused by climate change when investing; cooperate with the meteorological service, transport, insurance sectors: transfer ski runs to high hypsometric levels or to cold slopes of northern exposure;
A ski area is considered reliable in terms of snow cover when the depth of snow cover (artificial or natural) during the day. 30 cm exceeds 100. According to its annual distribution, it was found that: the average snow cover depths in Bakuriani were recorded in February (61.3 cm), and the minimum in June and September (0.1 cm). The maximum depth of snow cover, 130 cm, was recorded in Bakuriani in March 1956. In Gudauri, the greatest average depth of snow cover was recorded in March (115.1 cm), the minimum in October (0.7 cm), and the maximum of 330 cm in February 2008.
Adaptation measures. Integrating climate change issues into tourism policies, strategies and implementation themes; Assessing and considering potential risks due to climate change when investing; Integrating adaptation issues into consulting and educational programs in the tourism industry; Raising awareness among businessmen, tour operators and stakeholders about the impact of climate change on the tourism sector; Finding/attracting finance for the implementation of adaptation projects; Relocating ski runs to higher hypsometric levels or slopes with cold winter exposure; Leveling ski slopes; Mobilizing snow at winter mountain resorts to ensure sufficient snow for skiing and sledding; Planning measures to prevent beach erosion due to rising sea levels, implementing the construction of free beaches.

ლიტერატურა - REFERENCES

[1]. Kartvelishvili L., Tatishvili M., Amiranashvili A. Weather, Climate and the Regularities of Their Changes in Georgian Conditions. Universal Publishing House, Tbilisi 2023.

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კლიმატის ცვლილების ფონზე საქართველოს ზამთრის მთის კურორტებზე თოვლის საფარის ცვლილების კანონზომიერებები /ლიანა ქართველიშვილი, ლიანა მეგრელიძე /სტუ-ის ჰმი-ის შრომათა კრებული-2026.-ტ.139.-გვ. 80-81-ქართ., რეზ. ქართ., ინგლ., რუს.

განიხილება მექანიზმები, რომლებიც მიზნად ისახავს კლიმატის ცვლილების უარყოფითი ზემოქმედების შერბილებასა და მისგან დაცვას ტურიზმის სექტორში. შეგროვდა მონაცემები (გარემოს დაცვის ეროვნული სააგენტოს კლიმატური მონაცემთა ბაზიდან) საქართველოს ზამთრის კურორტებზე (მესტია, გოდერძი, გუდაური, ბაკურიანი) თოვლის საფარის ხანგრძლივობის ცვლილებების შესახებ. შედარებულ იქნა ორი 30-წლიანი პერიოდი (1956–1985) და (1956–2015), გამოვლინდა და შეფასდა მათთვის დამახასიათებელი კანონზომიერებები.

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Закономерности изменений снежного покрова на зимних горных курортах Грузии на фоне изменения климата /Лиана Картвелишвили, Лиа Мегрелидзе/Сб. Трудов ИГМ ГТУ. - 2026. – том 139. - с.80-81 - Груз.; Рез: Груз., Англ., Рус.

Обсуждаются механизмы смягчения и защиты от негативного воздействия изменения климата на туристический сектор. Были собраны данные (из климатической базы данных Национального агентства по охране окружающей среды) об изменениях продолжительности снежного покрова на зимних курортах Грузии (Местия, Годердзи, Гудаури, Бакуриани). Были сопоставлены два 30-летних периода (1956-1985) и (1956-2015), выявлены и оценены их закономерности.