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DISTRIBUTION THE DAILY NUMBER OF AIR EFFECTIVE TEMPERATURE ACCORDING TO MISSENARD IN BATUMI BY MONTH

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Abstract: *The paper presents data on distribution of the number of daily mean and maximum values of air effective temperature according to Missenard in Batumi by month in 2018-2023. In particular, on average, for the mean daily values of effective air temperature with the category "Comfortable", the largest number of days are observed from June to September (15, 18, 17 and 13, respectively). For the maximum daily values of effective temperature – in June, September and October (14, 13 and 12, respectively).*

Key words: *Effective temperature, bioclimate, human health, ecology.*

Introduction

Information on the bioclimatic characteristics of the territory is important both in terms of determining the degree of their impact on public health and promoting the development of the resort and tourism industry [1–7], etc. There are many simple and complex bioclimatic indices (a combination of temperature and relative humidity, wind speed and other meteorological parameters) [1,4-13], one of which is the frequently used effective air temperature according to Missenard ET [6,11,13,14,15].

For example, in [13], the results of a statistical analysis of average monthly data on ET values in the Autonomous Republic of Adjara and the Kakheti region are presented. The intra-annual distribution of ET values was studied, their repeatability by ET categories, etc. was obtained.

In the work [15] the results of statistical analysis of the daily mean and maximum values of effective air temperature (ET_mean and ET_Max respectively) in Batumi in 2018-2023 are presented. In particular, it was found that in cold periods the highest repeatability of ET_Mean values is in the "Cold" category (50.0%), and the lowest is in the "Comfortable" category (0.8 %). The highest repeatability of ET_Max values is in the "Cold" category (41.1 %), and the lowest is in the "Hot" category (0.2%).

In warm season the highest repeatability of ET_Mean values is in the "Comfortable" category (34.3%), and the lowest is in the "Very cold" category (1.4 %). The highest repeatability of ET_Max values is in the "Hot" category (25.1 %), and the lowest is in the "Very cold" category (0.3%).

This work is part of the investigation [15]. Below are the results of a study on distribution of the number of daily mean and maximum values of air effective temperature according to Missenard in Batumi by month in 2018-2023.

Study area, material and methods

Study area – Batumi (the capital of the autonomous republic of Adjara, Georgia).

The work uses data from the Georgian National Environment Agency on average daily and urgent (at 4 p.m. local time) values of temperature (T), relative humidity (RH) and wind speed (V) for the period from 2018 to 2023.

The air effective temperature according to Missenard was calculated using the formula [14]:

$$ET = 37-(37-T)/(0.68-0.0014\cdot RH+1/(1.76+1.4\cdot V^{0.75})) -0.29\cdot T\cdot (1-0.01\cdot RH)$$

The categories of ET are presented in Table 1.

Table 1. The degree of human thermal sensation (category) depending on the values of air effective temperature.

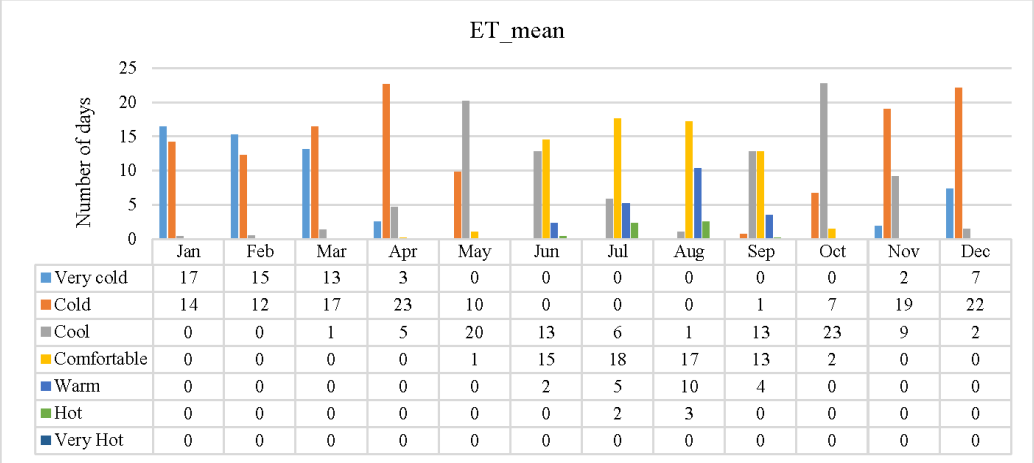
ET	<1°C	1-9°	9-17°	17-21°	21-23°	23-27°	>27°
ET Category	Very cold	Cold	Cool	Comfortable	Warm	Hot	Very hot

In the proposed work the analysis of data is carried out with the use of the standard statistical analysis methods. The following designations will be used below: ET_Mean – daily average air effective temperature; ET_Max – daily maximum air effective temperature.

Results and discussion

Results in Fig. 1 and 2 are presented.

In Fig. 1 data about the number of days with different categories of ET_Mean in Batumi from January to December are presented.

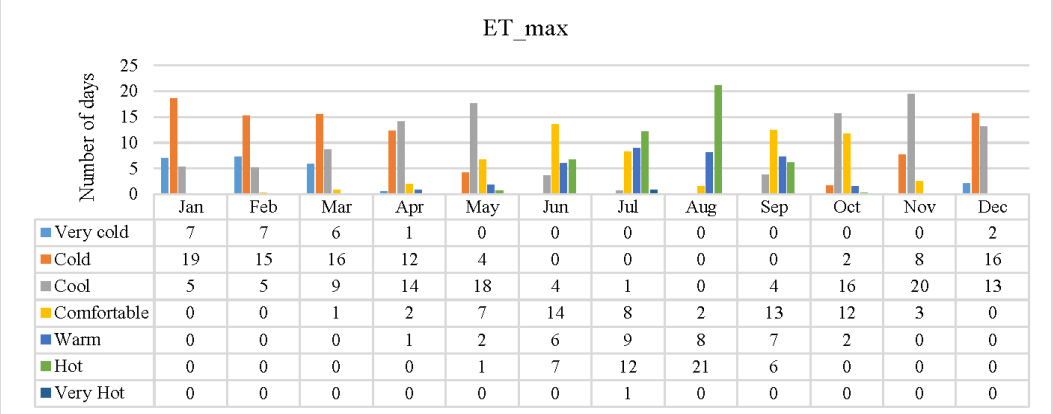


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Very cold	17	15	13	3	0	0	0	0	0	0	2	7
Cold	14	12	17	23	10	0	0	0	1	7	19	22
Cool	0	0	1	5	20	13	6	1	13	23	9	2
Comfortable	0	0	0	0	1	15	18	17	13	2	0	0
Warm	0	0	0	0	0	2	5	10	4	0	0	0
Hot	0	0	0	0	0	0	2	3	0	0	0	0
Very Hot	0	0	0	0	0	0	0	0	0	0	0	0

Fig. 1. Number of days with different categories of ET_Mean in Batumi from January to December.

In particular, as follows from Fig. 1, on average during the year for mean daily values of effective air temperature with the "Comfortable" category, the greatest number of days are observed from June to September (15, 18, 17 and 13, respectively), etc.

In Fig. 2 data about the number of days with different categories of ET_Max in Batumi from January to December are presented.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Very cold	7	7	6	1	0	0	0	0	0	0	0	2
Cold	19	15	16	12	4	0	0	0	0	2	8	16
Cool	5	5	9	14	18	4	1	0	4	16	20	13
Comfortable	0	0	1	2	7	14	8	2	13	12	3	0
Warm	0	0	0	1	2	6	9	8	7	2	0	0
Hot	0	0	0	0	1	7	12	21	6	0	0	0
Very Hot	0	0	0	0	0	0	1	0	0	0	0	0

Fig. 2. Number of days with different categories of ET_Max in Batumi from January to December.

In particular, as follows from Fig. 2, on average during the year for max daily values of effective air temperature with the “Comfortable” category, the greatest number of days are observed from June, September and October (14, 13, and 12, respectively). The highest number of days of ET_Max with the “Hot” category is observed in August (21 days), etc.

Conclusion

The paper presents data on the number of daily mean and maximum values of air effective temperature according to Missenard in Batumi for each month of year, which, in addition to scientific interest, may also have practical significance for planning resort and tourist activities depending on the seasons of the year. In the future, we plan to continue similar studies for different regions of Georgia.

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