

Republic Hydrometeorological Service of Serbia

Kneza Viseslava 66
11000 Belgrade
Republic of Serbia



MONTHLY BULLETIN FOR SERBIA

MAY 2023

Belgrade, the 5th of June 2023

Division for Climate Monitoring and Climate Forecast
Department of National Center for Climate Change, Climate Model Development and Disaster
Risk Assessment

web: <http://www.hidmet.gov.rs>

mail: office@hidmet.gov.rs

Contents

AIR TEMPERATURE	1
Mean monthly air temperature	1
Maximum air temperature	3
Minimum air temperature.....	4
PRECIPITATION	6
CLOUD COVER, BRIGHT AND CLOUDY DAYS	11
FOG	13
SUNSHINE DURATION (INSOLATION)	13
OVERVIEW OF THE SYNOPTIC SITUATION*	14
APPENDIX	15
Mean air temperature	15
Maximum air temperature	19
Minimum air temperature.....	23
Precipitation	27

- ❖ *Rainy May in parts of western and northern Serbia and averagely warm in most of the country*
- ❖ *2nd wettest May for Loznica, 7th wettest for Novi Sad and 8th wettest for Zrenjanin*
- ❖ *Banatski Karlovac observed record-breaking number of days with precipitation*
- ❖ *Zlatibor saw record-breaking number of fog days*

AIR TEMPERATURE

Mean monthly air temperature

Mean air temperature in May ranged from 14,3°C in Dimitrovgrad to 17,4°C in Belgrade, and on the mountains from 7,3°C at Kopaonik to 12,0°C at Zlatibor (*Figure 1*).

Departure of the mean monthly air temperature from the normal¹ for the 1991-2020 base period ranged from -1,7°C in Zajecar to -0,1°C in Novi Sad, Čuprija and Kopaonik (*Figure 2*).

Mean May air temperature, based on the percentile method², was in the normal category in most of the country and cold category in Smederevska Palanka, Negotin and Crni Vrh, and very cold in Zajecar (*Figure 3*).

¹ Term *normal* refers to *climatological standard normal*, that is, the average value of a particular climate element, calculated for the period from January 1, 1991 to December 31, 2020

² *n*th percentile of a variable refers to the value of the observed variable below which there is *n* percent of data previously arranged in an ascending order

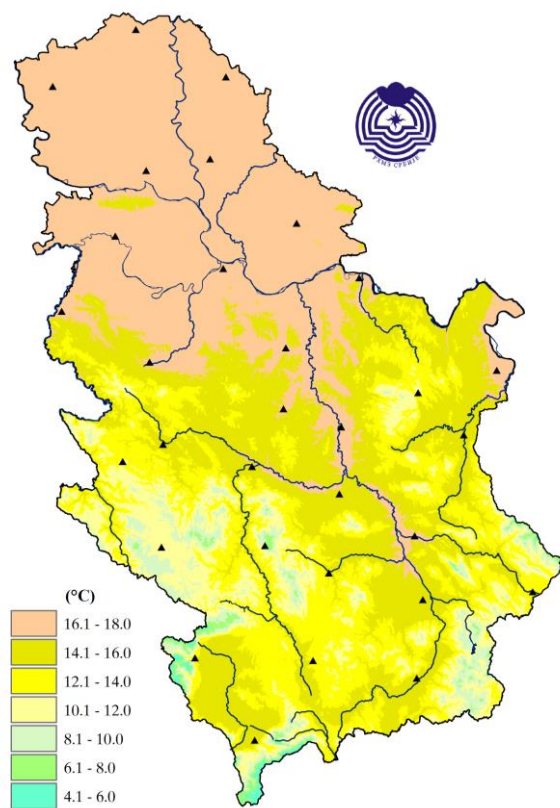


Figure 1. Spatial distribution of mean monthly air temperature (°C)

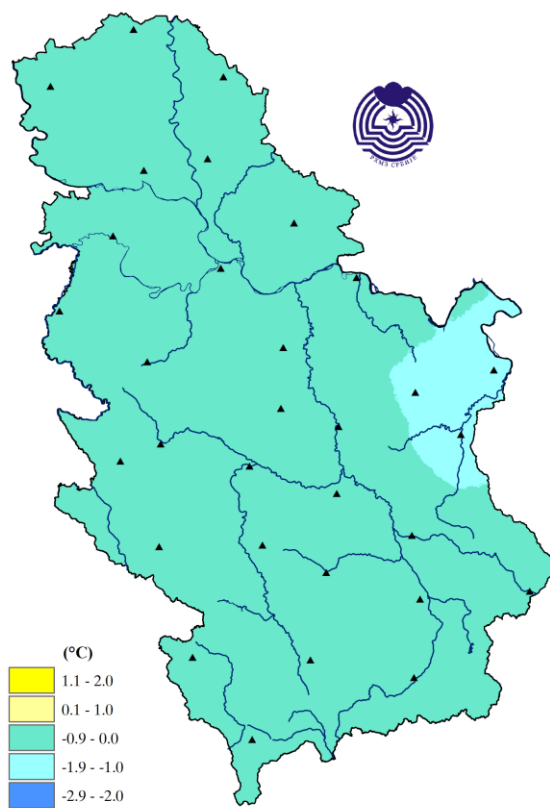


Figure 2. Spatial distribution of mean monthly air temperature anomaly (°C)

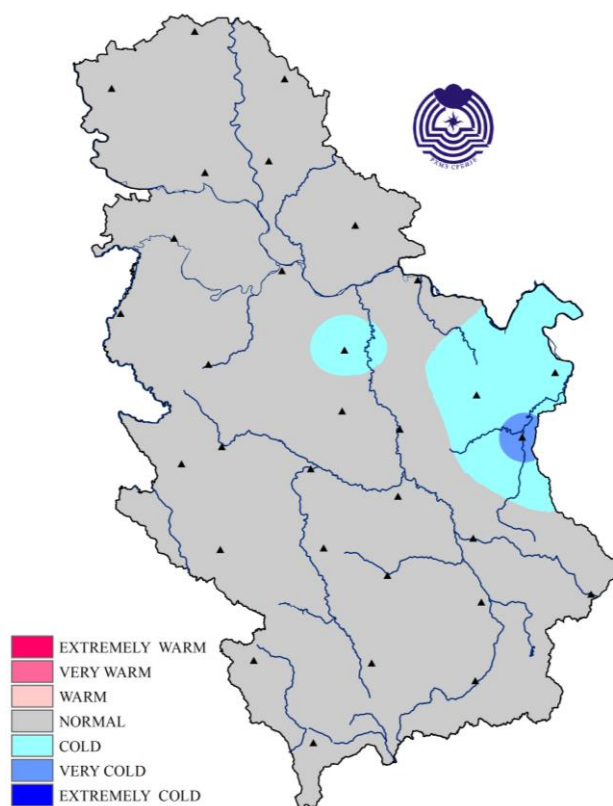


Figure 3. Spatial distribution of the mean monthly air temperature using percentile method

Mean daily air temperature in Belgrade, based on the percentile method, was in the cold and very cold category at the end of the first, beginning and middle of the second decade of May. In the middle of the first decade of May it was in the warm category (*Figure 4*). Daily course of the mean daily air temperature and the accompanying percentiles for the stations Sombor, Novi Sad, Loznica, Negotin, Kragujevac, Zlatibor, Nis and Vranje are given in the [Appendix](#).

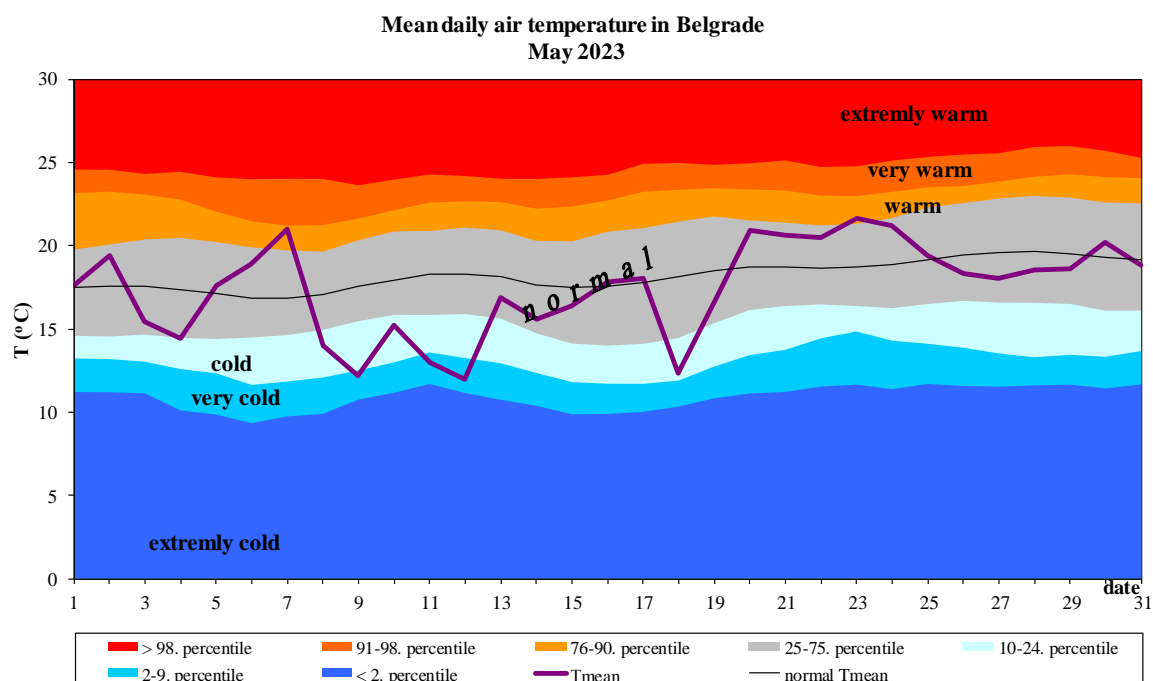


Figure 4. Daily course of the mean daily air temperature and accompanying percentiles for Belgrade

Maximum air temperature

Mean maximum air temperature in May ranged from 21,0°C in Zajecar to 23,0°C in Zrenjanin, while Belgrade saw air temperature of 22,7°C. On the mountains, mean maximum air temperature ranged from 10,9°C at Kopaonik to 16,8°C in Sjenica.

Based on the percentile method, mean monthly maximum air temperature was in the normal and cold categories in most of the country, and cold category in Zajecar.

The highest maximum daily air temperature of 28,3°C was measured in Cuprija on May 24. On May 23, Belgrade observed air temperature of 27,4°C.

Summer days³ were not recorded on the mountains. As for the lowland, number of summer days ranged from 3 days in Dimitrovgrad to 13 days in Kikinda. In most of the country, recorded number of summer days was 2 to 5 days below May average.

Figure 5 shows daily course of the maximum daily air temperature and the accompanying percentiles for Belgrade in May 2023 and for the stations Sombor, Novi Sad, Loznica, Negotin, Kragujevac, Zlatibor, Nis and Vranje are given in the [Appendix](#).

³ Summer day refers to a day with maximum daily air temperature 25°C and above

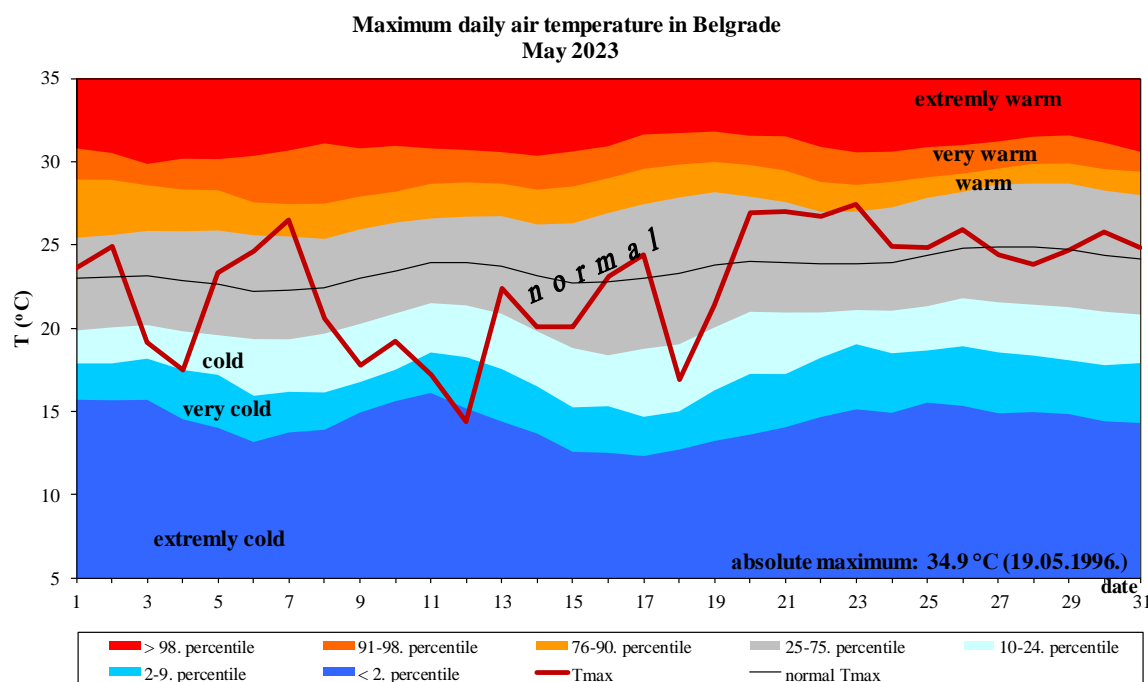


Figure 5. Daily course of the maximum daily air temperature and accompanying percentiles for Belgrade

Minimum air temperature

Mean minimum air temperature in May ranged from 8,9°C in Dimitrovgrad to 13,0°C in Belgrade. On the mountains, mean minimum air temperature ranged from 4,3°C at Kopaonik to 8,3°C at Zlatibor.

Based on the percentile method, mean minimum monthly air temperature was in the normal category in most of the country, warm category in Sjenica, Pozega, Kursumlija, Cuprija and Nis, and cold category in Zajecar.

The lowest minimum daily air temperature of -0,2°C was measured at Kopaonik on May 5. In the lowland, the lowest daily air temperature of 2,9°C was measured in Zrenjanin on May 9. On the same day, Belgrade observed the lowest daily air temperature of 8,0°C.

One frost day⁴ was recorded at Kopaonik.

Figure 6 shows assessment of the minimum and maximum air temperature in Serbia for May based on the tercile distribution relative to the 1991-2020 base period. It can be noted that the mean minimum air temperature was within the average, whilst the mean maximum air temperature was slightly below the upper tercile boundary.

⁴ Frost day is defined as the day with minimum daily air temperature lower than 0°C

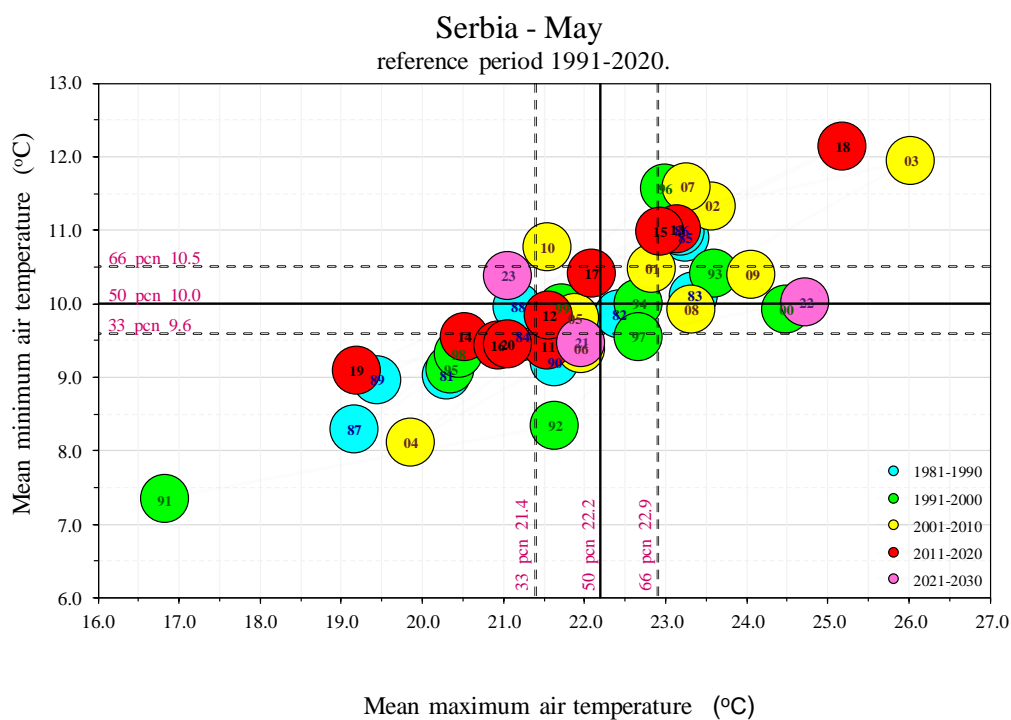


Figure 6. Assessment of minimum and maximum air temperature for Serbia with the accompanying terciles in relation to the 1991-2020 base period

Figure 7 shows daily course of the minimum daily air temperature and the accompanying percentiles for Belgrade in May 2023, and for the stations Sombor, Novi Sad, Loznica, Negotin, Kragujevac, Zlatibor, Nis and Vranje are given in the [Appendix](#).

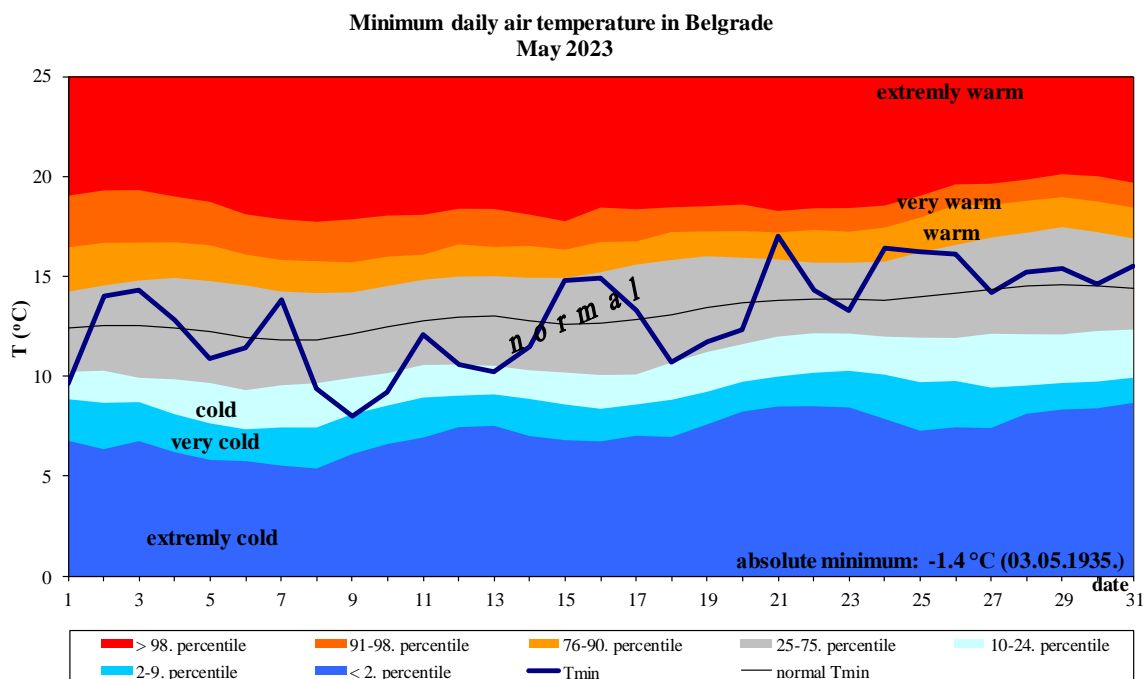


Figure 7. Daily course of the minimum daily air temperature and accompanying percentiles for Belgrade

PRECIPITATION

May precipitation totals ranged from 32,1 mm in Veliko Gradiste to 249,2 mm in Loznica, whilst Belgrade recorded 92,8 mm of precipitation (*Figure 8*).

Precipitation totals relative to the normal for the 1991-2020 base period ranged from 44% in Veliko Gradiste to 274% in Loznica (*Figure 9*).

Based on the percentile method, precipitation sums were in the following categories: normal category in most of the country, extremely rainy in Loznica, very rainy in Novi Sad and Zrenjanin, rainy in Sombor, Kikinda, Sremska Mitrovica, Valjevo, Belgrade, Kraljevo, Dimitrovgrad and Vranje, dry in Veliko Gradiste (*Figure 10*).

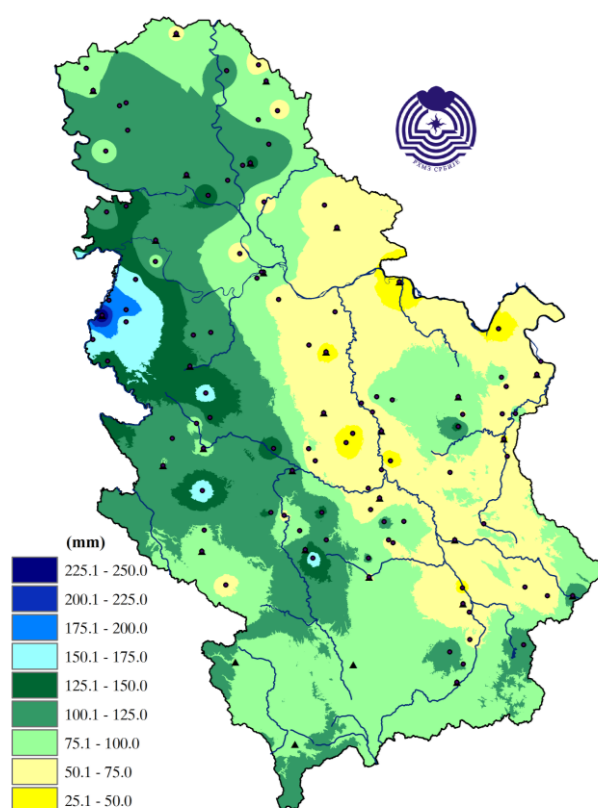


Figure 8. Spatial distribution of the monthly precipitation sums (mm) according to data from 28 major meteorological, 16 climatological and 66 rain gauge stations

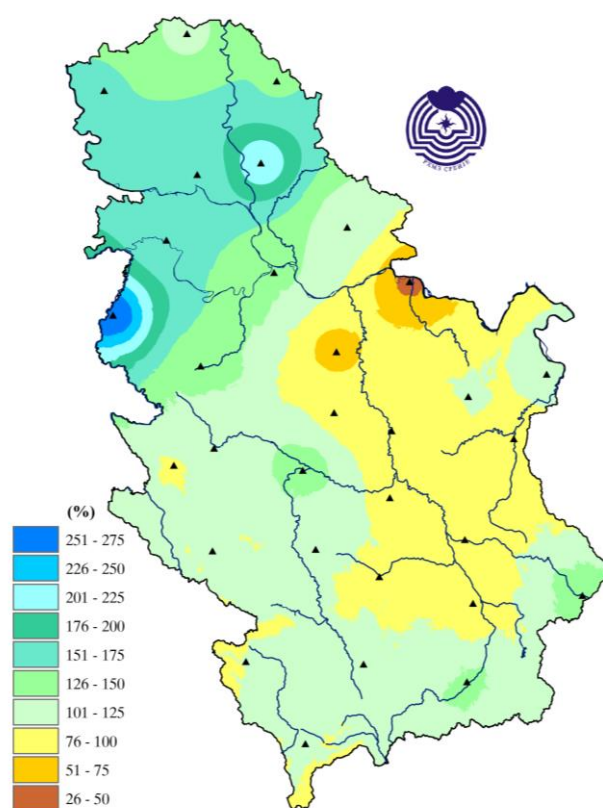


Figure 9. Spatial distribution of the monthly precipitation sums in the percentages of normal for the 1991–2020 base period

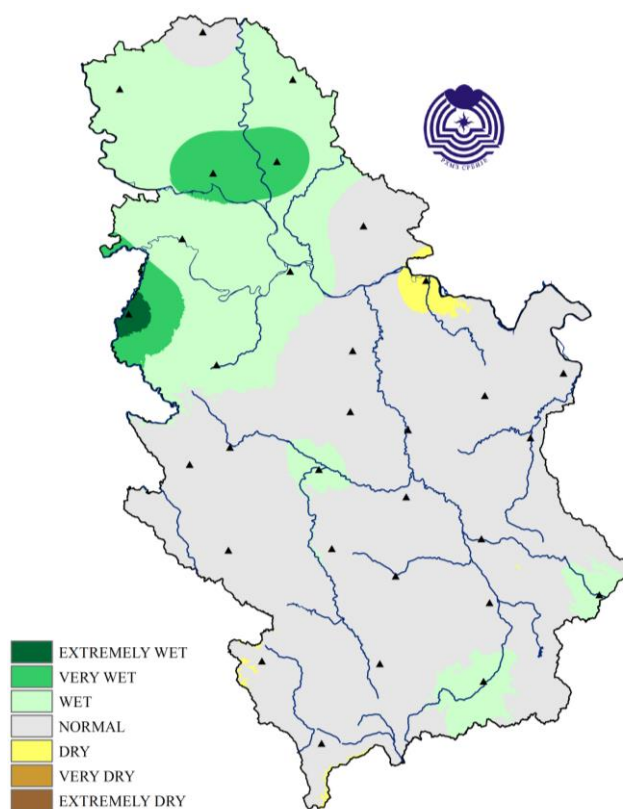


Figure 10. Monthly precipitation sums according to the percentile method

May 2023 ranks as **the 2nd wettest** for Loznica in the period since 1925 (*Figure 11*), only behind the May 2014 with 321,2 mm of precipitation.

May 2023 ranks as the 7th wettest for Novi Sad (*Figure 12*) and 8th wettest for Zrenjanin (*Figure 13*) since the record-keeping at these stations began.

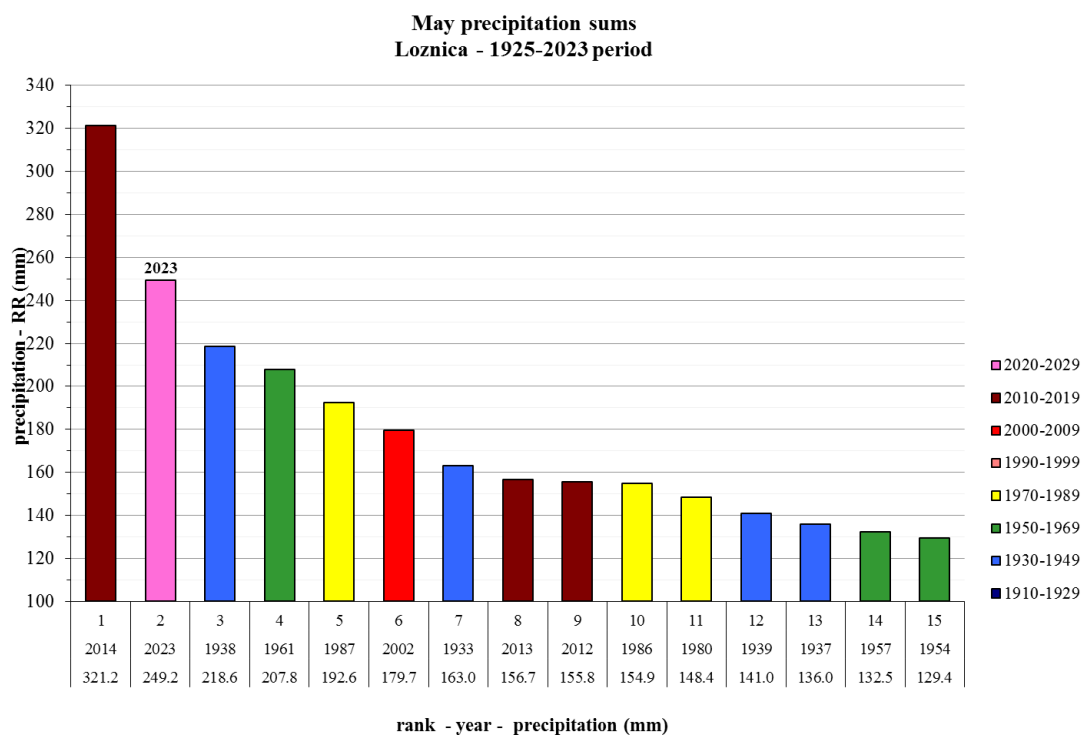


Figure 11. The highest precipitation in Loznica

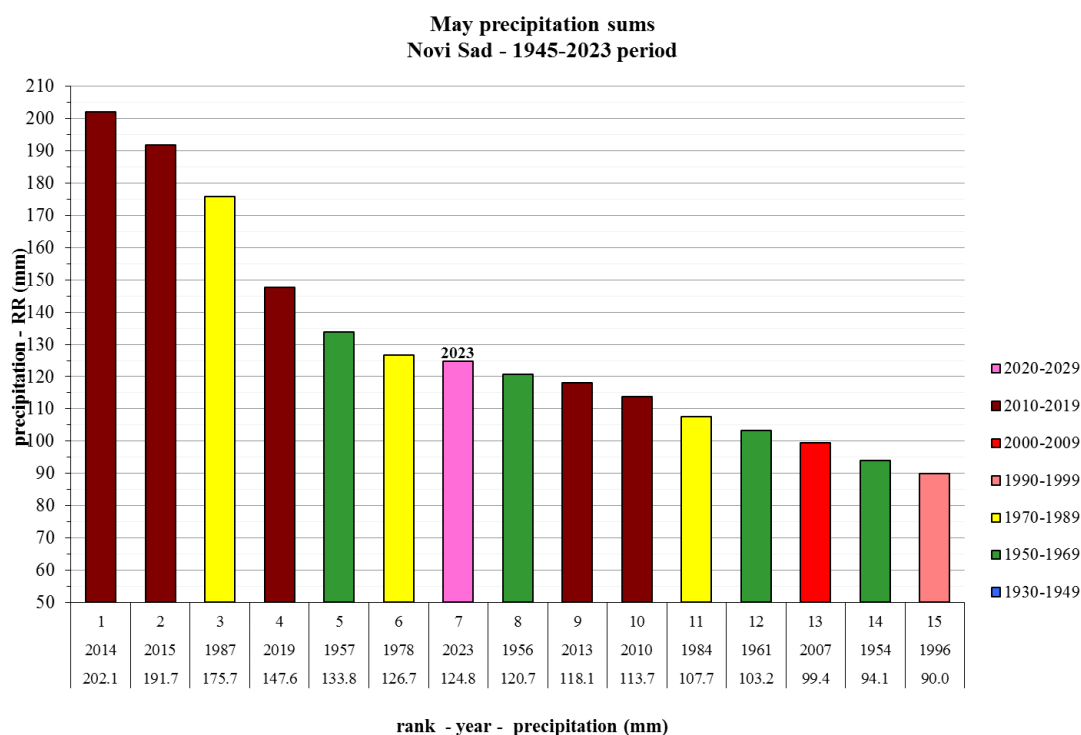


Figure 12. The highest precipitation in Novi Sad

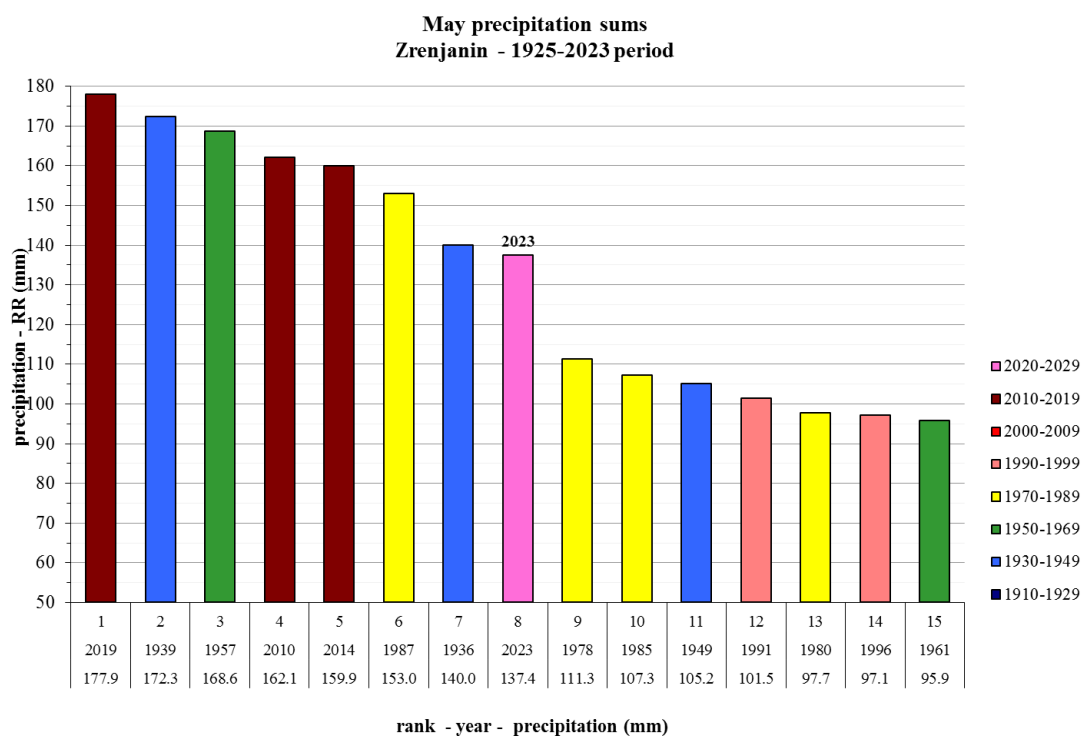


Figure 13. The highest precipitation in Zrenjanin

The highest daily precipitation sum of 73,0 mm was measured in Loznica on May 31. On May 17, Belgrade observed the highest daily precipitation sum of 18,1 mm.

Number of days with precipitation in May ranged from 14 on Palic, Smederevska Palanka and Veli Gradiste to 22 in Dimitrovgrad, Zlatibor and Kopaonik (*Figure 14*). The observed number of days with precipitation was 2 to 7 days above the May average in most of the country (*Figure 15*). Banatski Karlovac saw 20 days with precipitation **thereby breaking the previous record** of 19 days set in May 1991 and 2019.

Loznica and Zrenjanin saw 2 and 1 day with precipitation of 50 mm and above, respectively.

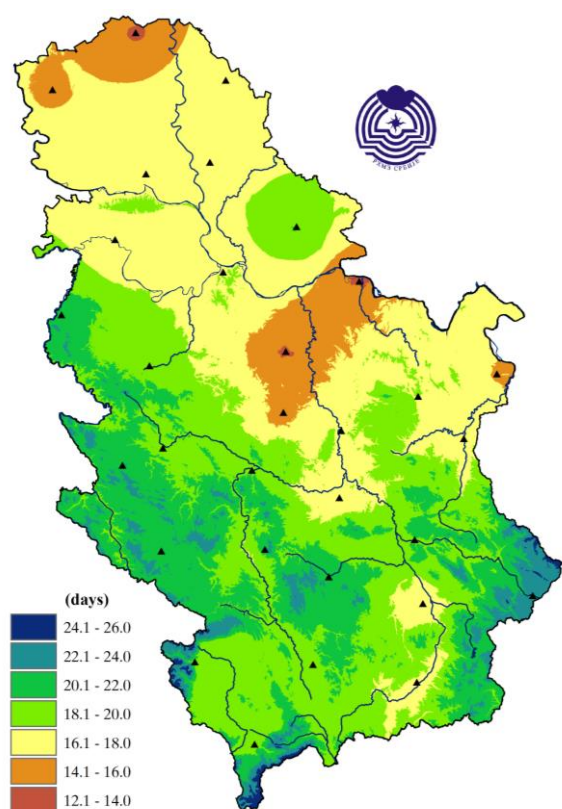


Figure 14. Spatial distribution of number of days with precipitation

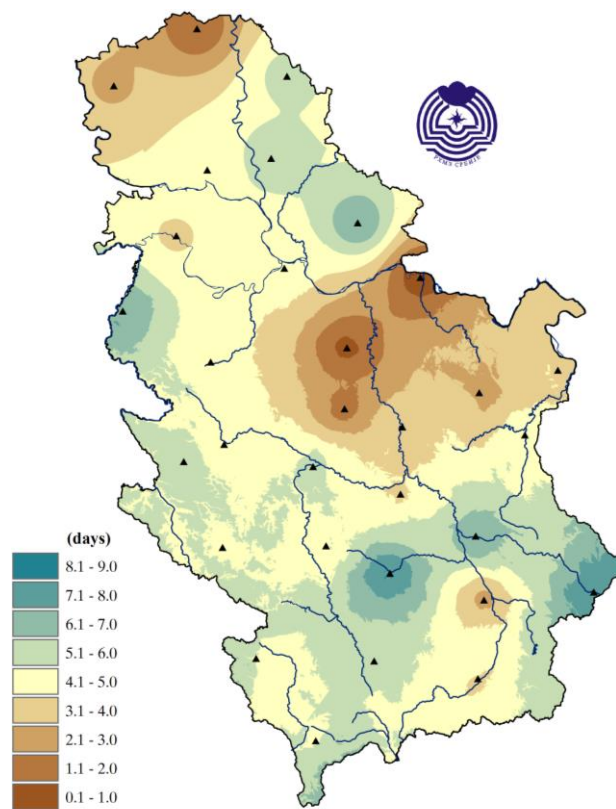


Figure 15. Spatial distribution of deviation of number of days with precipitation

Figure 16 shows assessment of air temperature and precipitation sums for Serbia for May based on the tercile distribution relative to the 1991 – 2020 base period. It can be noted that May 2023 was marked by air temperature at the lower tercile boundary and precipitation sums slightly above the upper tercile boundary.

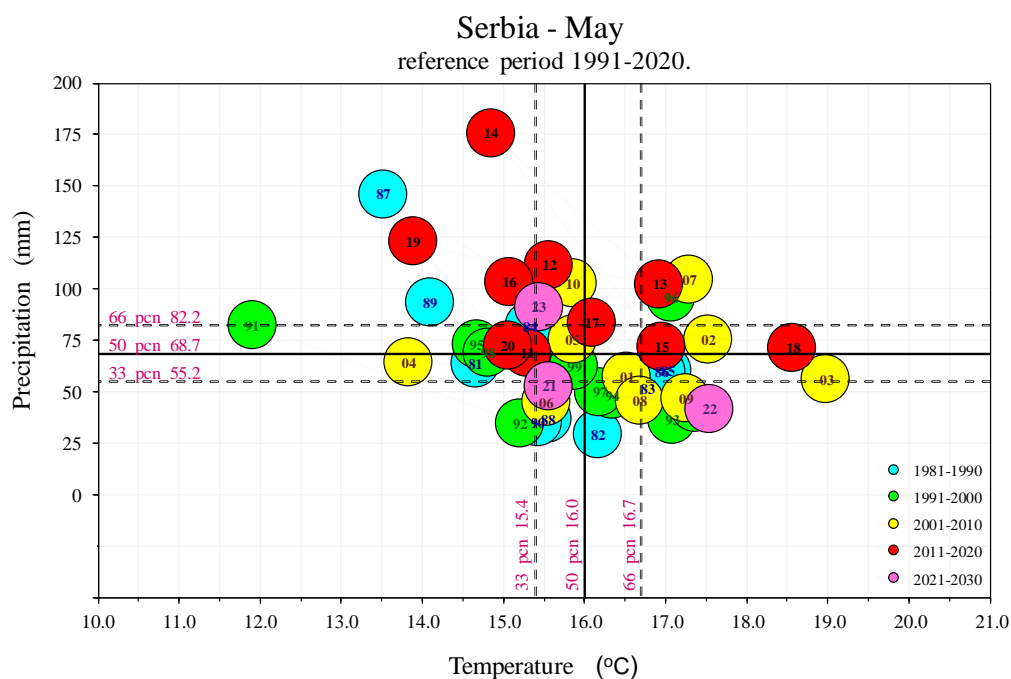


Figure 16. Assessment of air temperature and precipitation for Serbia with the accompanying terciles in relation to the 1991-2020 base period

Figure 17 show daily and cumulative precipitations sums with averaged normal 1991-2020 for May in Belgrade, and for the stations Sombor, Novi Sad, Loznica, Negotin, Kragujevac, Zlatibor, Nis and Vranje precipitation sums are given in [Appendix](#).

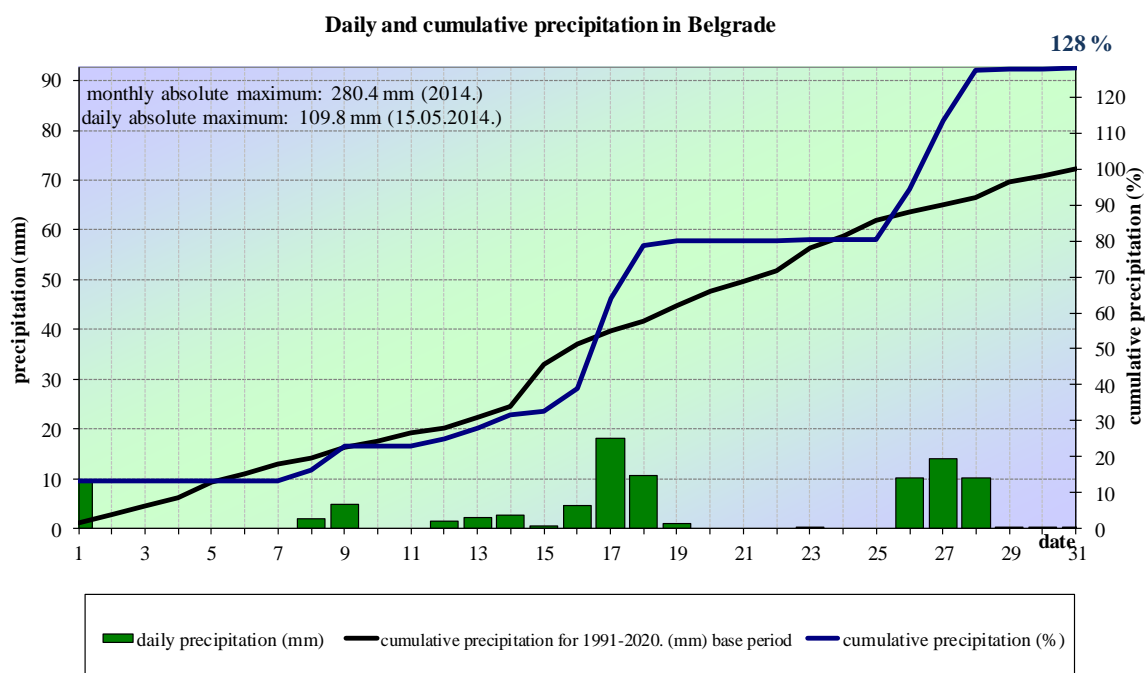


Figure 17. Daily and cumulative precipitation in Belgrade

CLOUD COVER, BRIGHT AND CLOUDY DAYS

Mean May cloud cover in Serbia was around and slightly above the average, ranging from 6/10 to 8/10. Figures 18, 19 and 20 show average daily cloud cover in May for Belgrade, Dimitrovgrad and Veliko Gradiste.

Bright days⁵ were not observed in Sremska Mitrovica, Sjenica, Dimitrovgrad, Crni Vrh and Kopaonik whereas the highest number, total of 5 days, was registered in Banatski Karlovac. Belgrade saw 2 bright days. The observed number of bright days was 2 to 4 days below May average.

The fewest number of cloudy days⁶ is recorded in Veliko Gradiste, total of 7 days, whilst the highest number of cloudy days, total of 18 days, was recorded on Zlatibor. Belgrade saw 9 cloudy days. Number of cloudy days was 5 to 8 days above May average at most places.

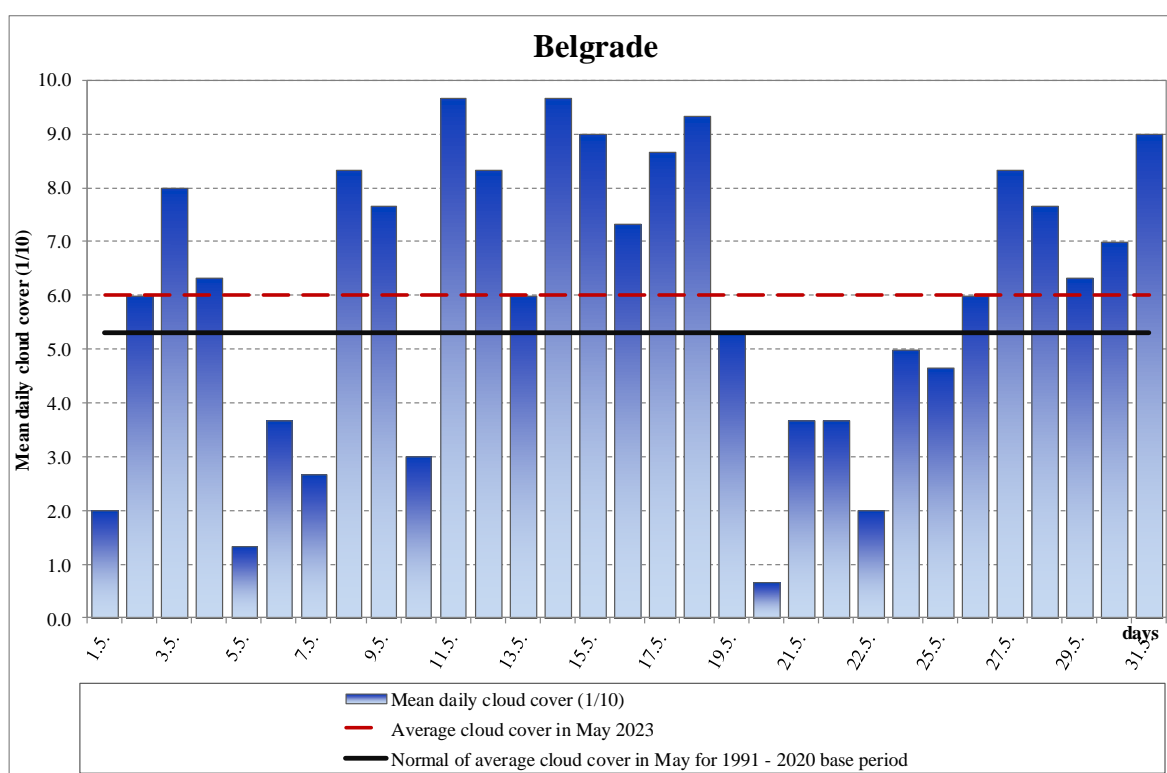


Figure 18. Mean daily cloud cover in Belgrade

⁵ Bright day refers to a day with cloud cover less than 2/10

⁶ Cloudy day refers to a day with cloud cover over 8/10

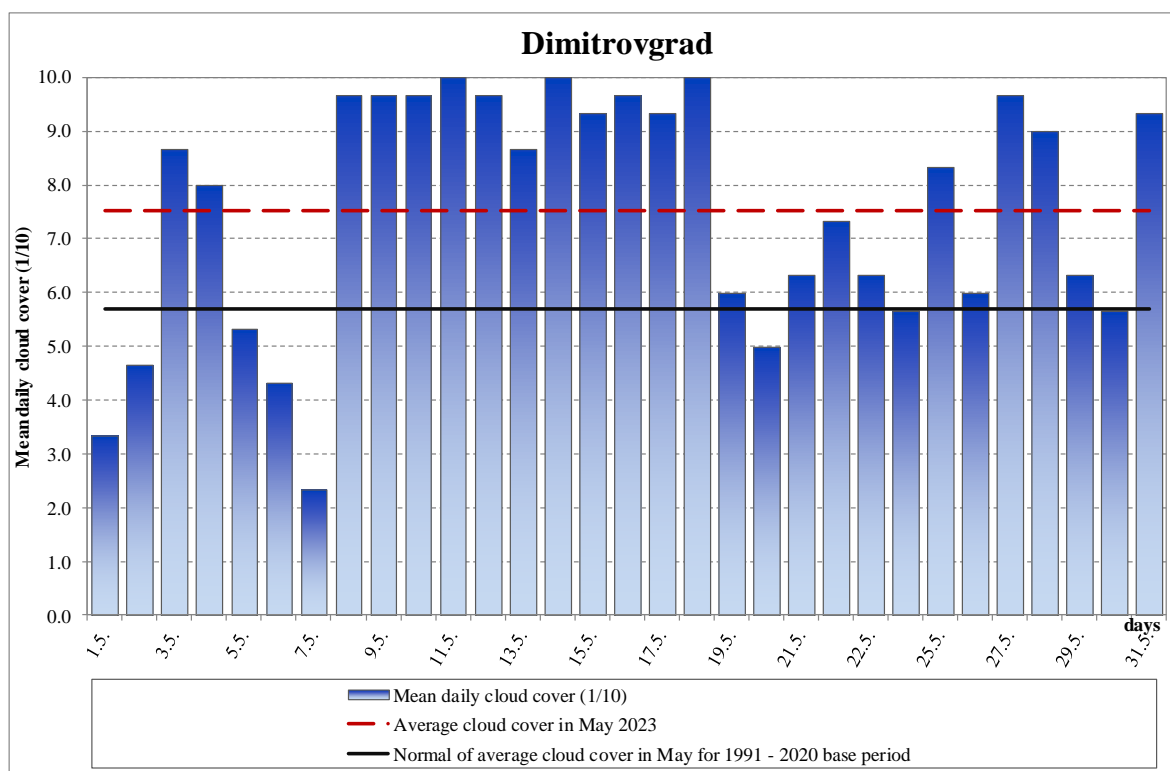


Figure 19. Mean daily cloud cover in Dimitrovgrad

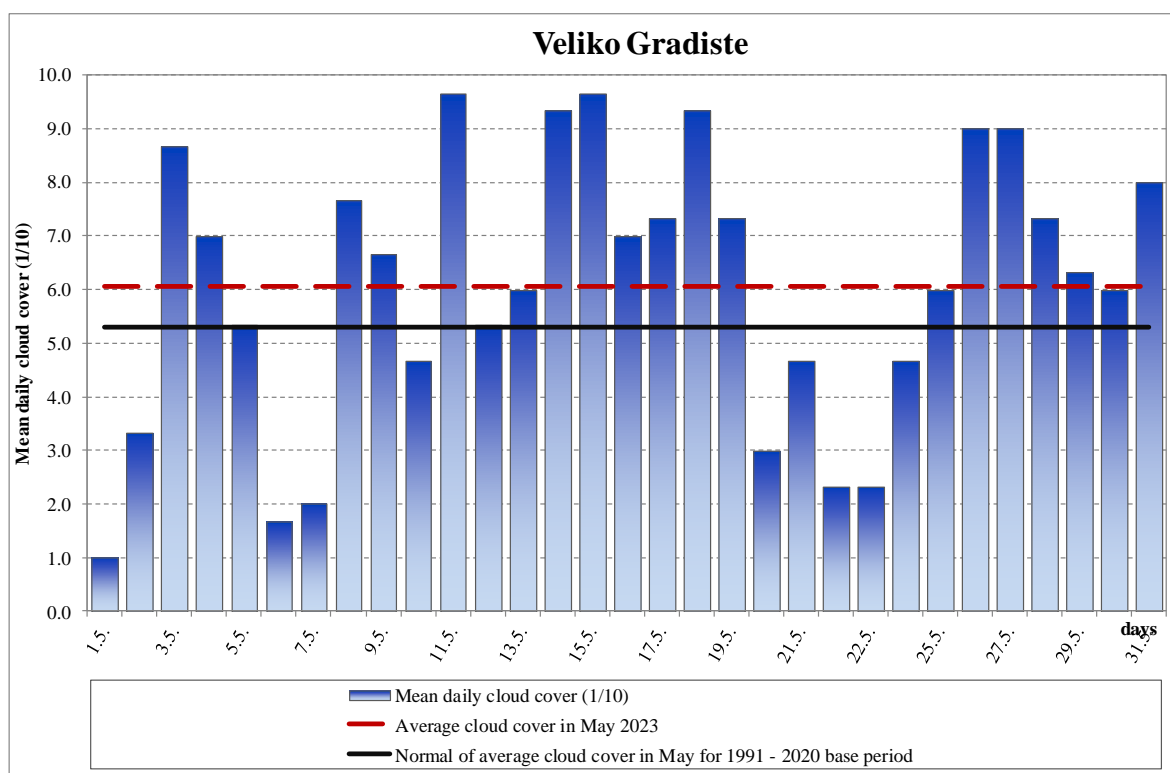


Figure 20. Mean daily cloud cover in Veliko Gradiste

FOG

Highest number of days with fog⁷ was observed on the mountains, parts of central and western Serbia. Zlatibor observed 21 fog days breaking the previous record of 17 days set in May 2011.

SUNSHINE DURATION (INSOLATION)

Sunshine duration in May ranged from 117,8 hours in Sjenica to 236,7 hours in Kikinda (*Figure 21*).

May insolation ranged from 60% in Sjenica to 91% in Kikinda relative to the normal for the 1991-2020 base period (*Figure 22*).

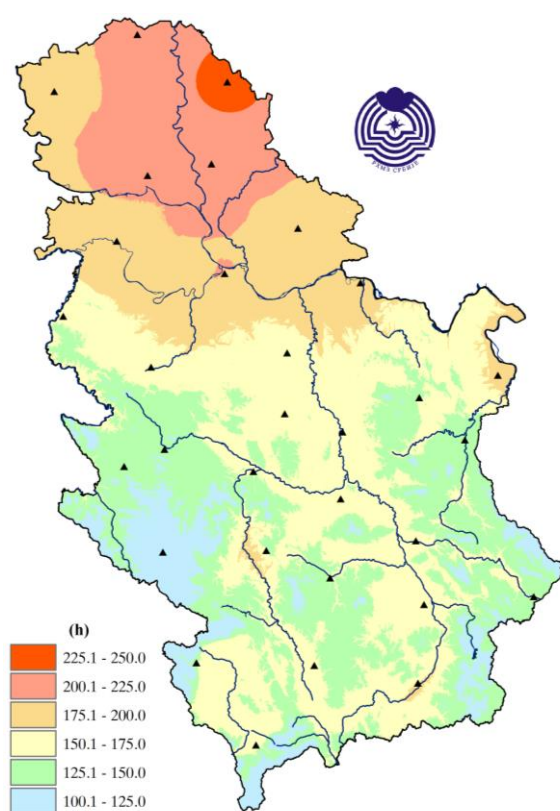


Figure 21. Insolation, expressed in hours

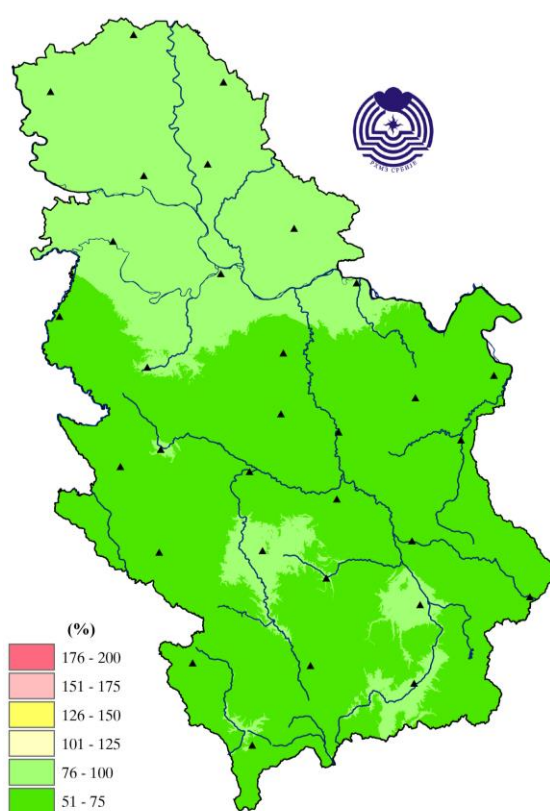


Figure 22. Insolation expressed in the percentages of normal

* **Note:** Climate analysis of meteorological elements was done based on the preliminary data obtained from 28 main meteorological stations

⁷ Day with fog is defined as the day when fog is observed at the meteorological station

OVERVIEW OF THE SYNOPTIC SITUATION*

Series of low pressure emanating from the western Mediterranean as well as spatial, weak gradient low pressure area most of the month in the south of the continent and east and southeast of the Balkans, unsettled and relatively warm air mass.

At the beginning of May, most of the country was under the prevalence of low pressure and accompanying frontal waves from the southwest, western Mediterranean and northern Adriatic. The weather was changeable and mostly rainy except in the north and northwest of the country.

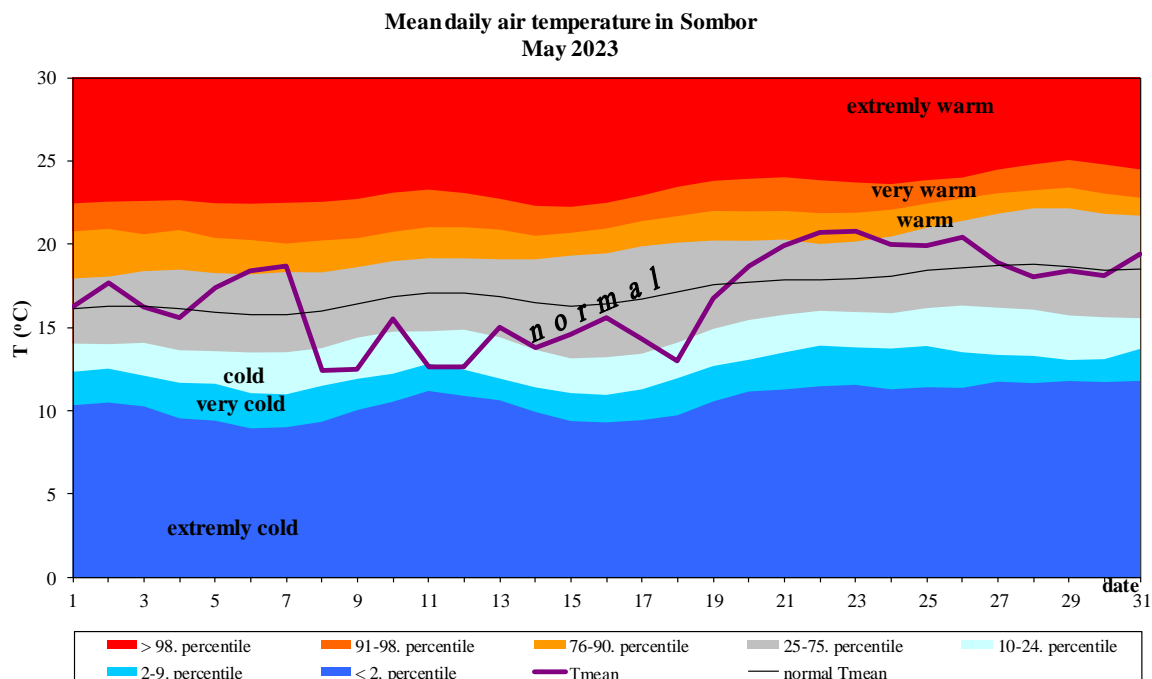
Consequently, spatial low pressure area within the Mediterranean as well as high pressure in the east and northeast of the continent prevailed. It was windy in Kosova area, southeasterly wind and scattered light precipitation remained, elsewhere it was mostly cloudy with intermittent rain and isolated heavy thundershowers, in the north and northeast of the country. The end of the second and beginning of the third decade marked the period of dry and warmer weather relative to the previous days due to the influence of ridge from Mediterranean and advection of warm air mass.

Period in the middle of the third decade was marked by labialization of the air mass, incursion of humidity from central and eastern Mediterranean as well as from the areas from the Black sea within the upper air low pressure circulation. The weather was unsettled, warm and humid, with isolated severe events accompanied by heavy showers, strong winds and hail particularly affecting western and northwestern parts of the country.

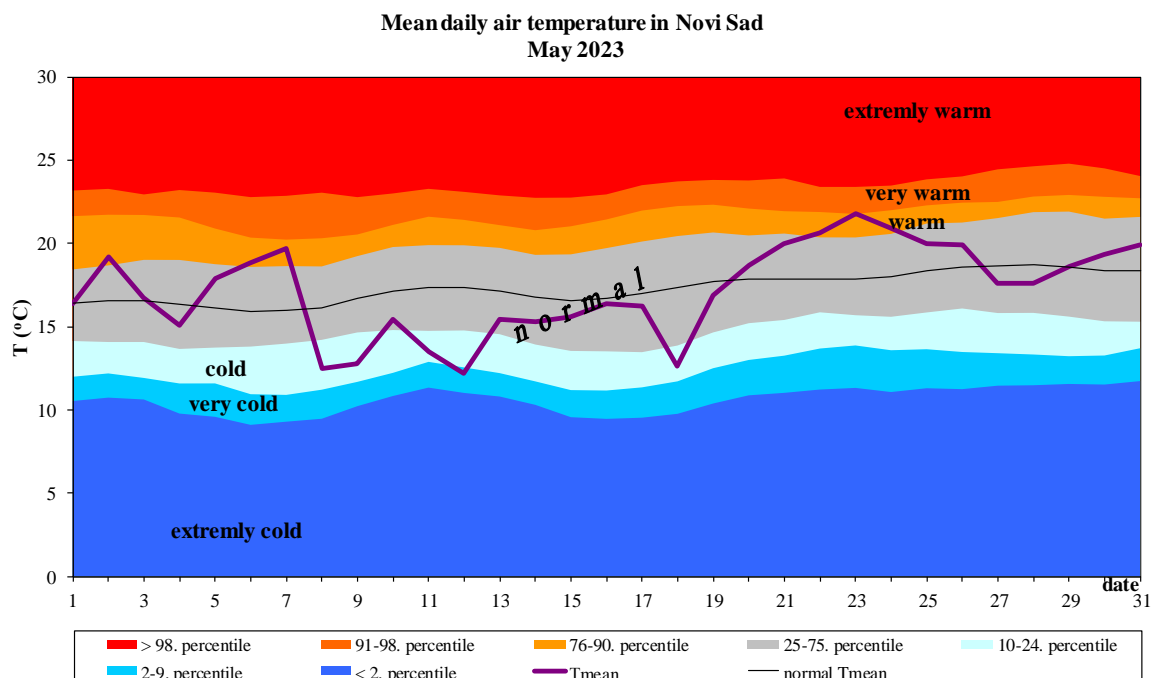
* National Center for Hydrometeorological Early Warning System

APPENDIX

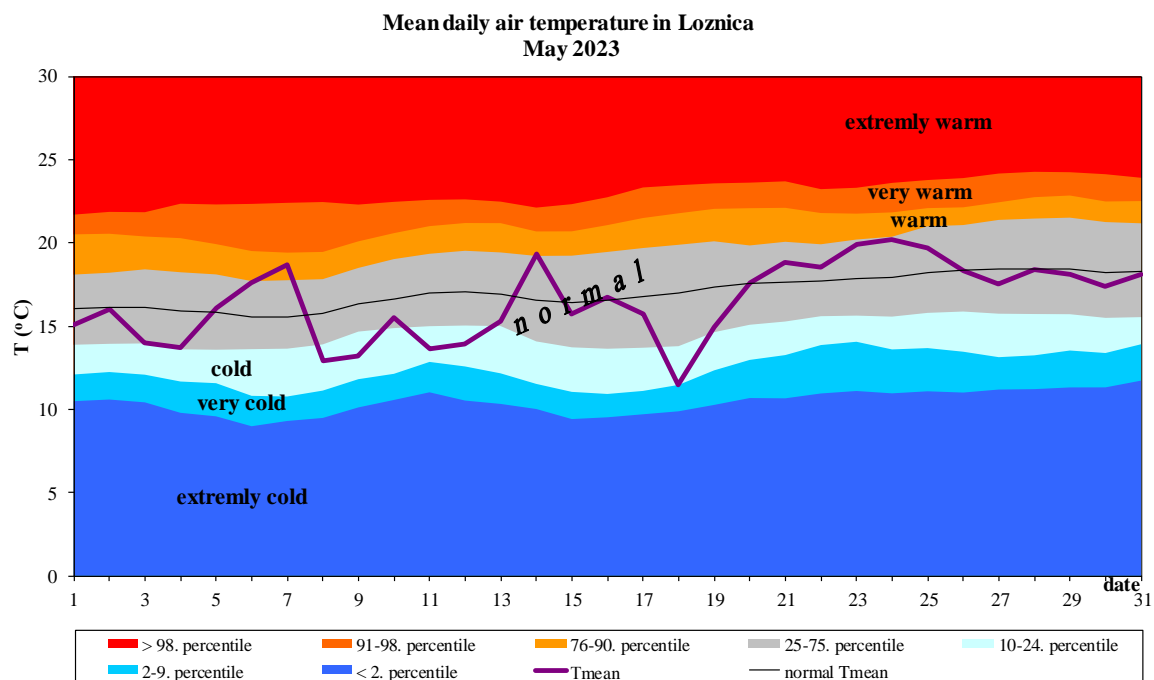
Mean air temperature



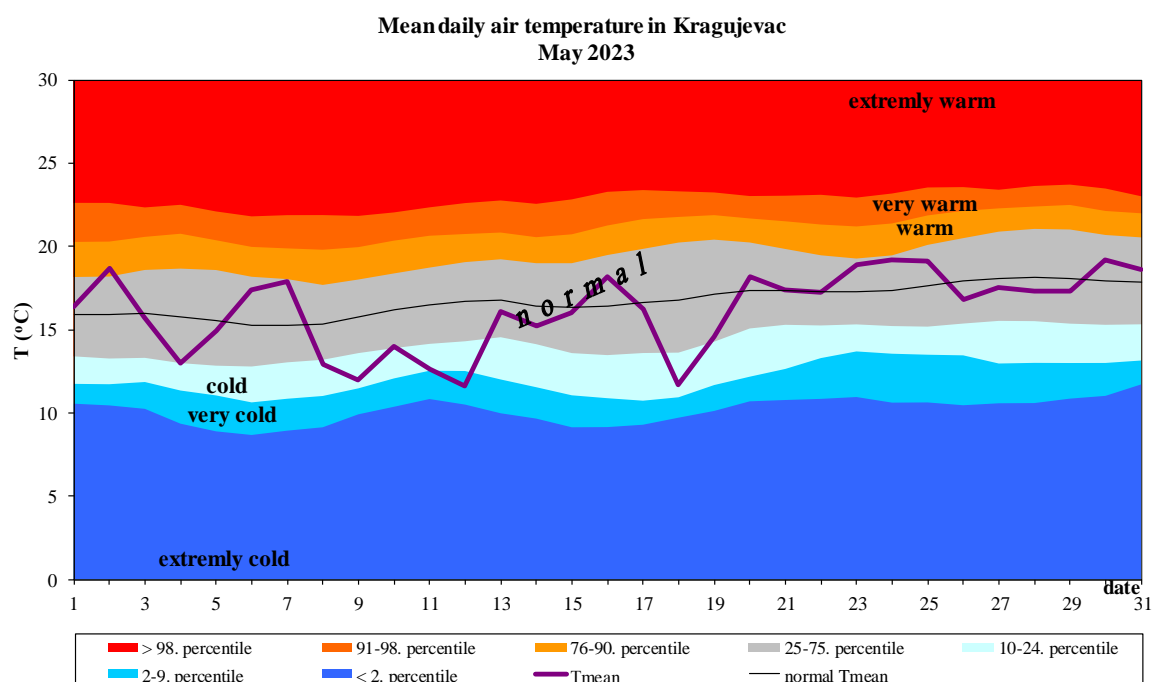
Appendix 1. Daily course of the mean daily air temperature and accompanying percentile for Sombor



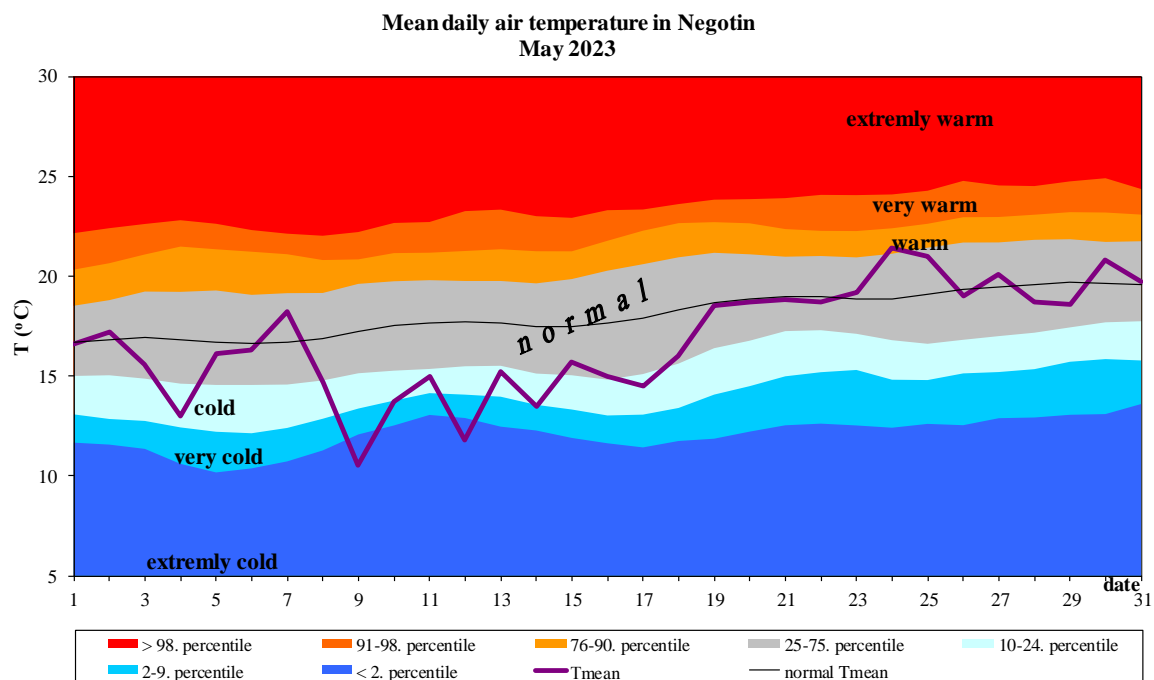
Appendix2. Daily course of the mean daily air temperature and accompanying percentile for Novi Sad



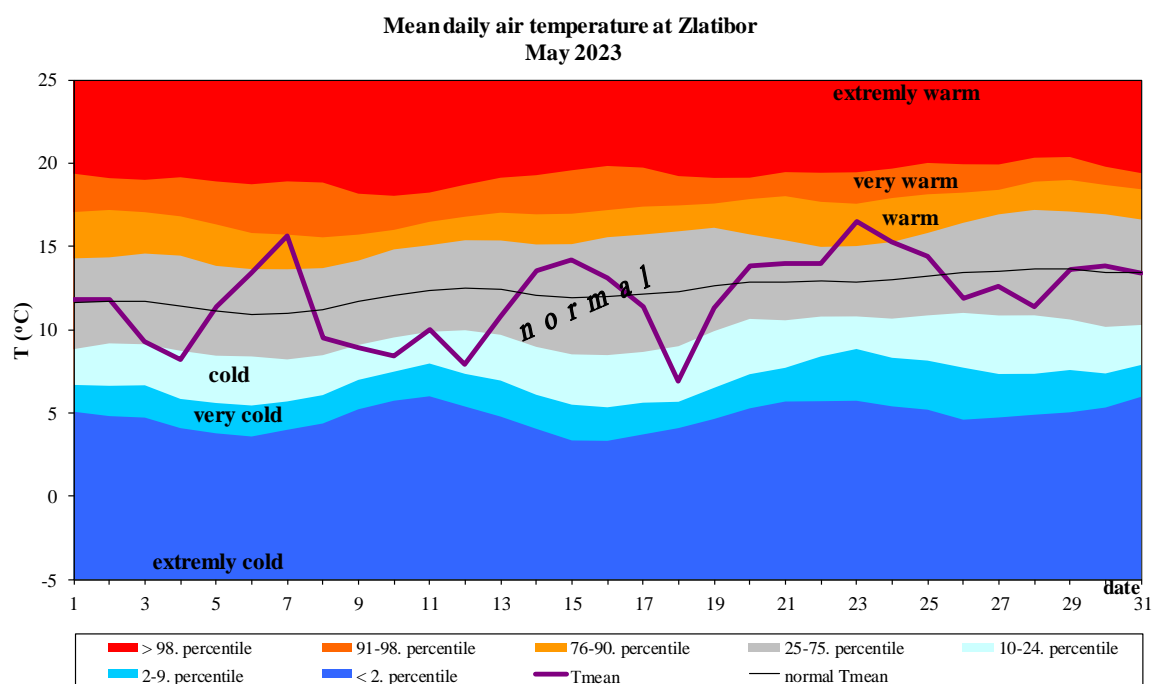
Appendix 3. Daily course of the mean daily air temperature and accompanying percentile for Loznica



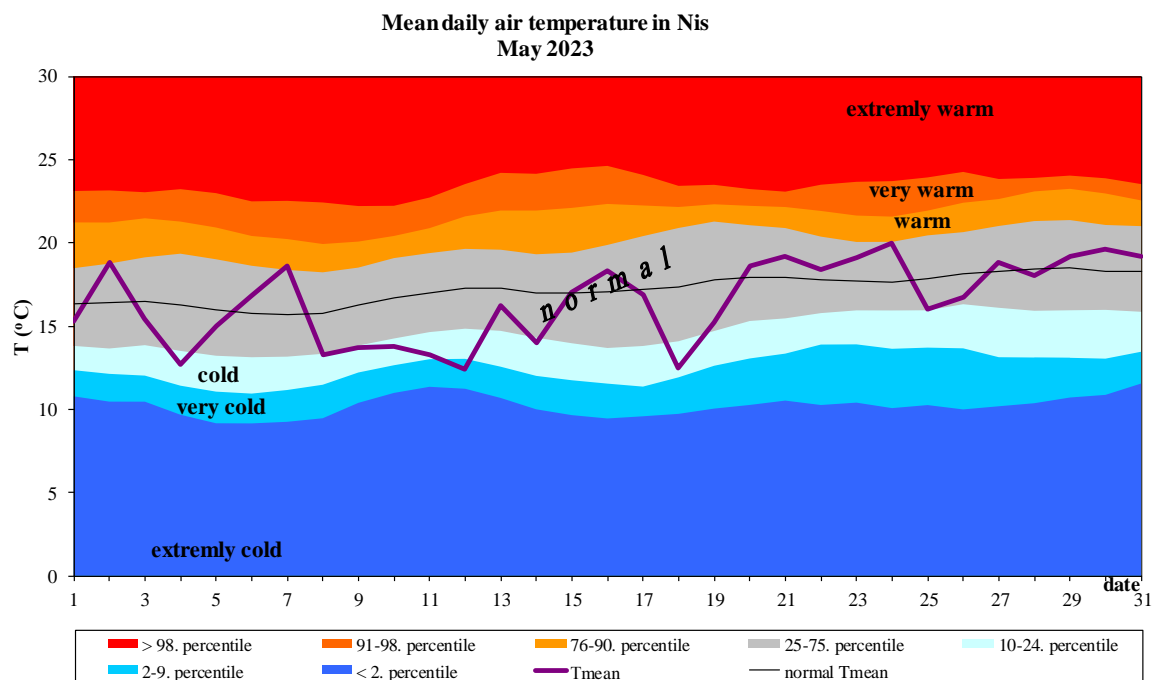
Appendix 4. Daily course of the mean daily air temperature and accompanying percentile for Kragujevac



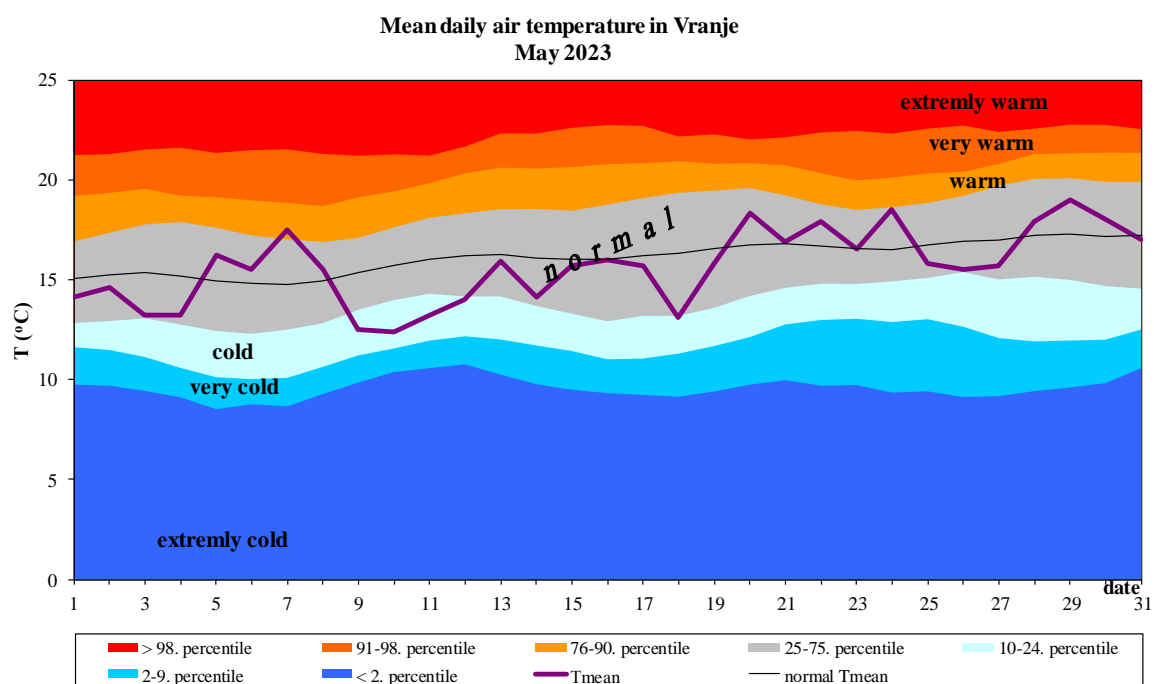
Appendix 5. Daily course of the mean daily air temperature and accompanying percentile for Negotin



Appendix 6. Daily course of the mean daily air temperature and accompanying percentile on Zlatiboru

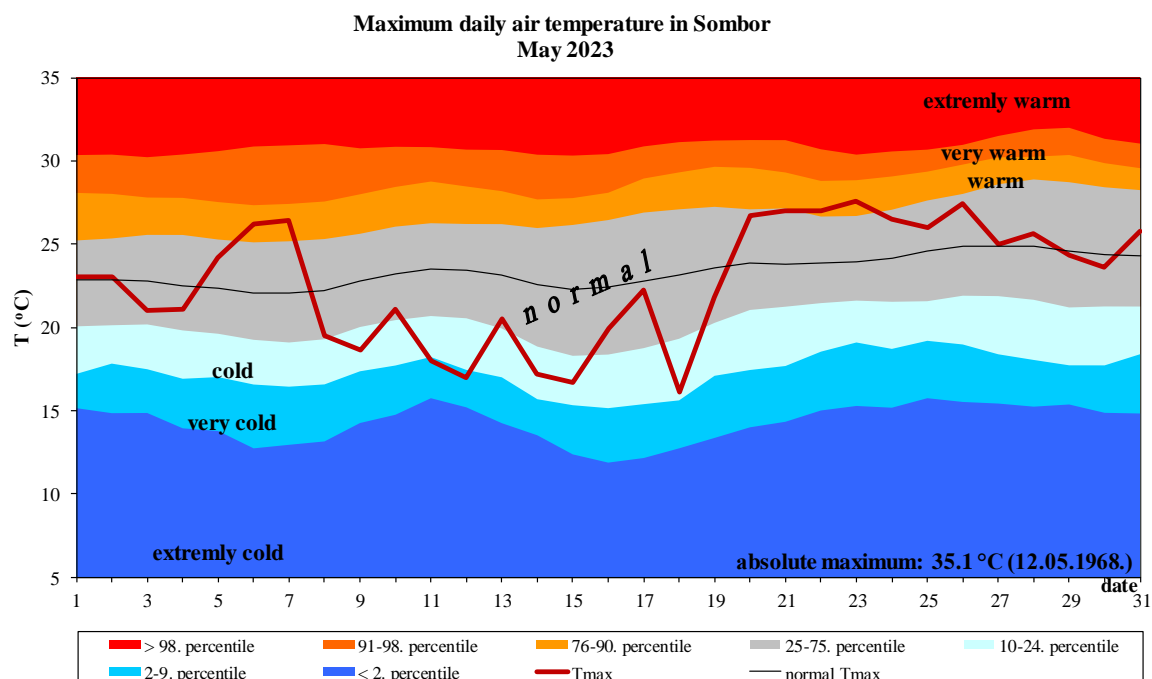


Appendix 7. Daily course of the mean daily air temperature and accompanying percentile for Nis

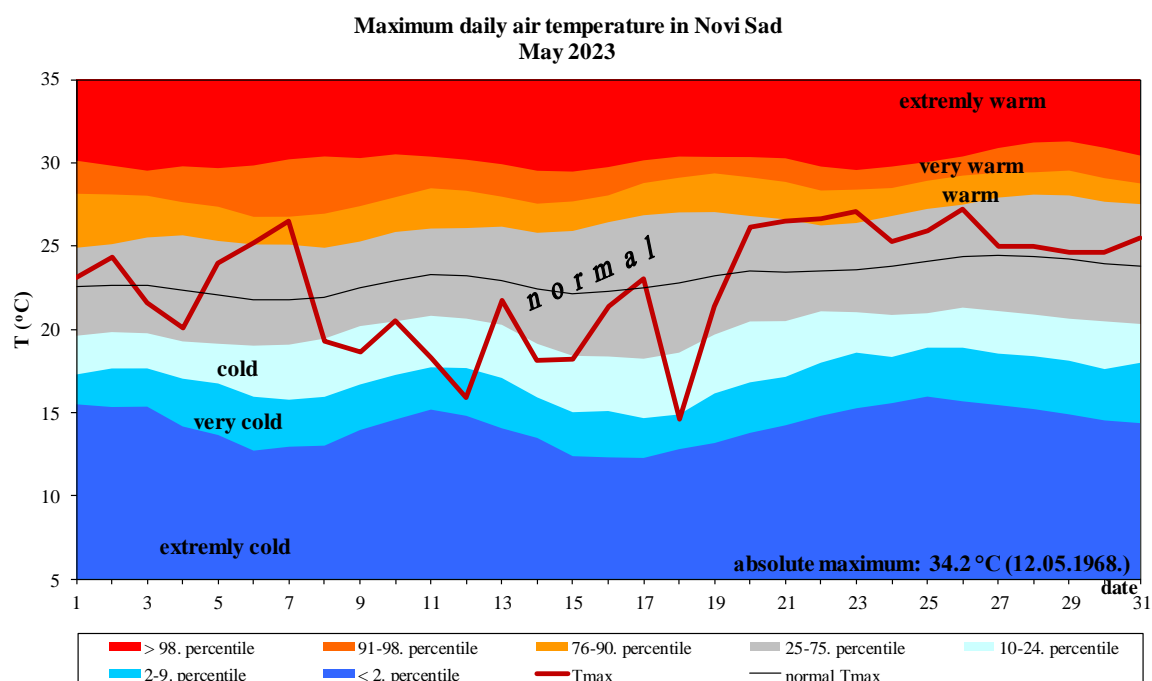


Appendix 8. Daily course of the mean daily air temperature and accompanying percentile for Vranje

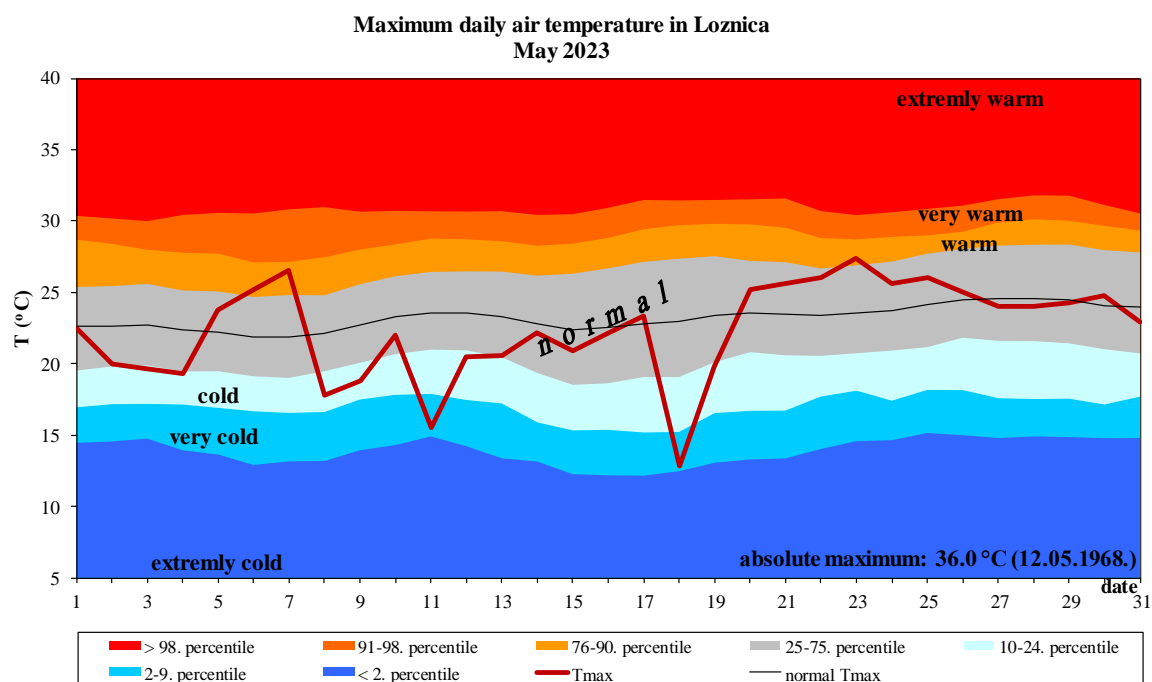
Maximum air temperature



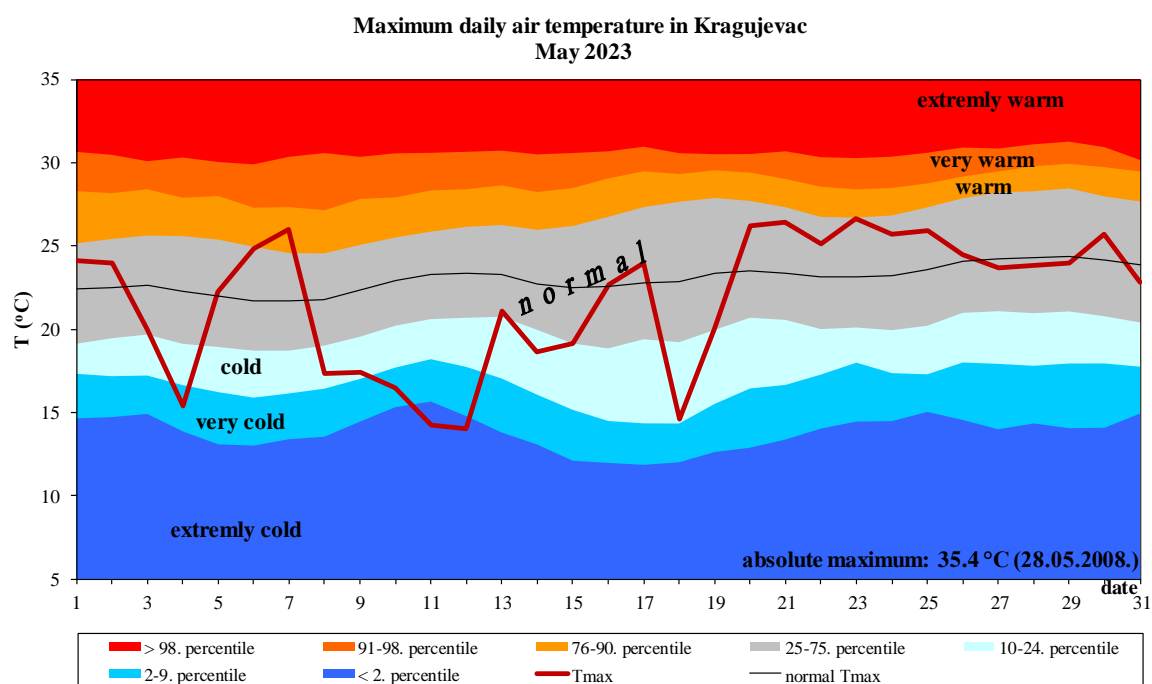
Appendix 9. Daily course of the maximum daily air temperature and the accompanying percentile for Sombor



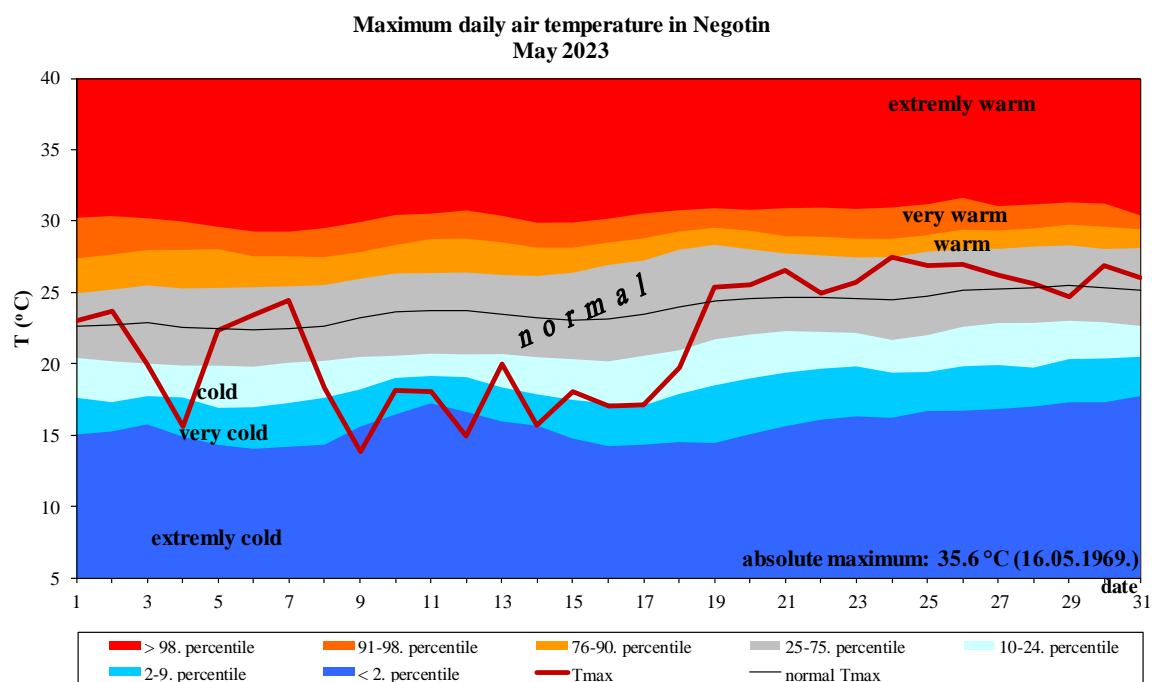
Appendix 10. Daily course of the maximum daily air temperature and the accompanying percentile for Novi Sad



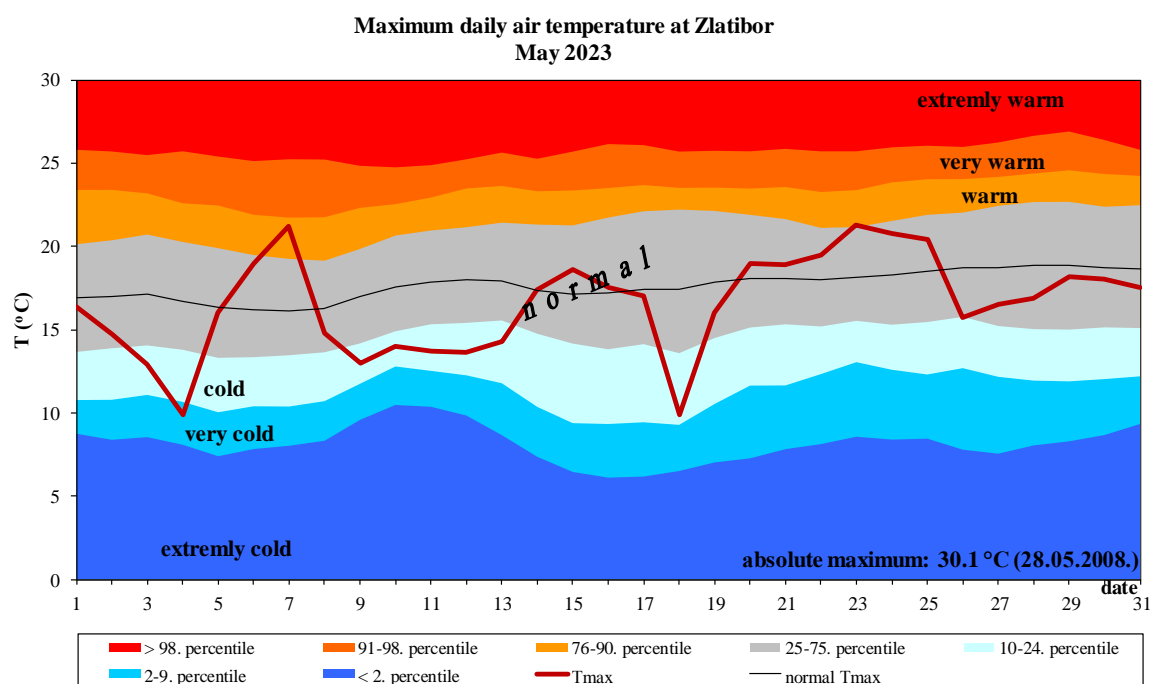
Appendix 11. Daily course of the maximum daily air temperature and the accompanying percentile for Loznica



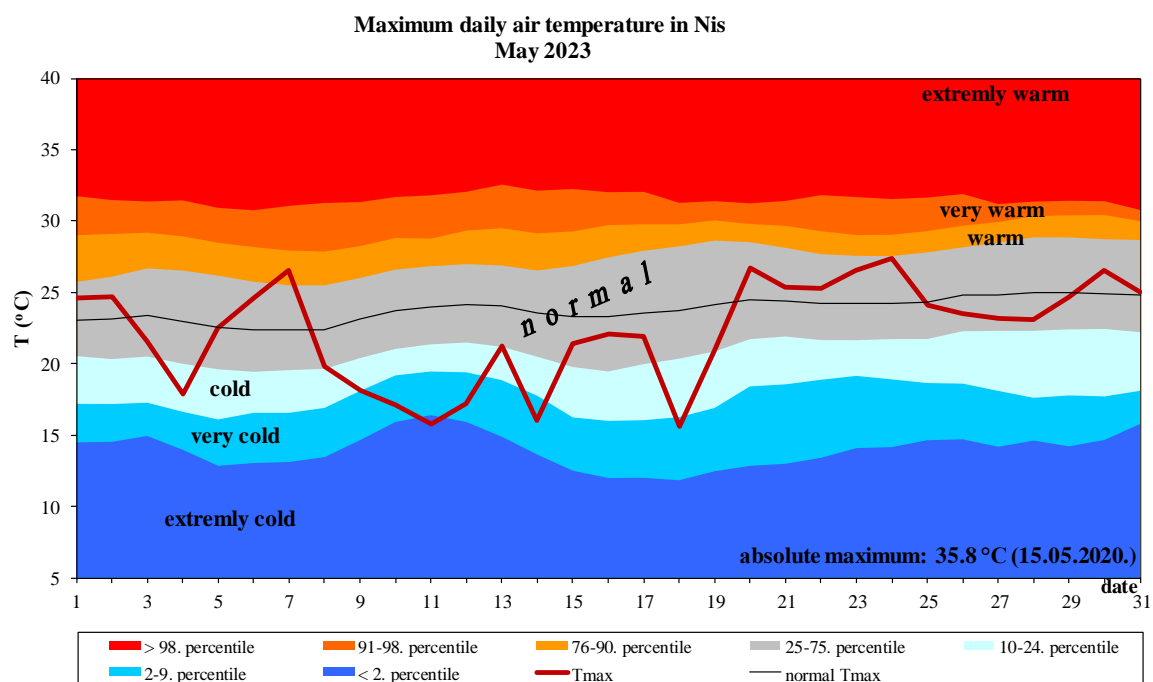
Appendix 12. Daily course of the maximum daily air temperature and the accompanying percentile for Kragujevac



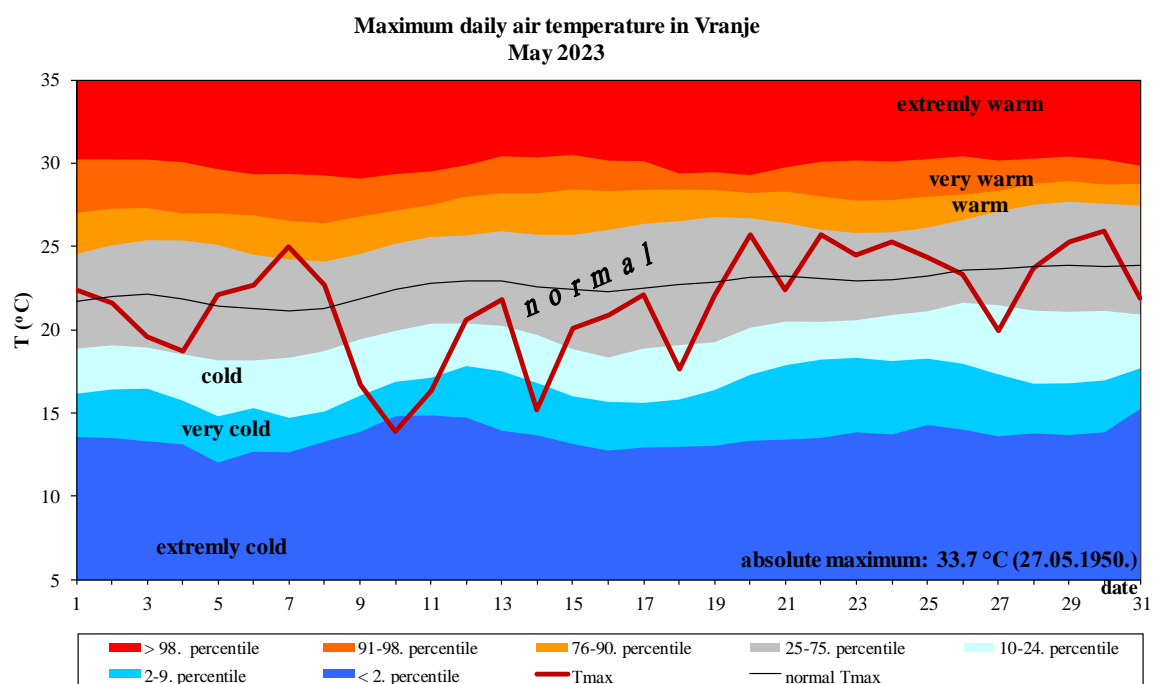
Appendix 13. Daily course of the maximum daily air temperature and the accompanying percentile for Negotin



Appendix 14. Daily course of the maximum daily air temperature and the accompanying percentile on Zlatibor

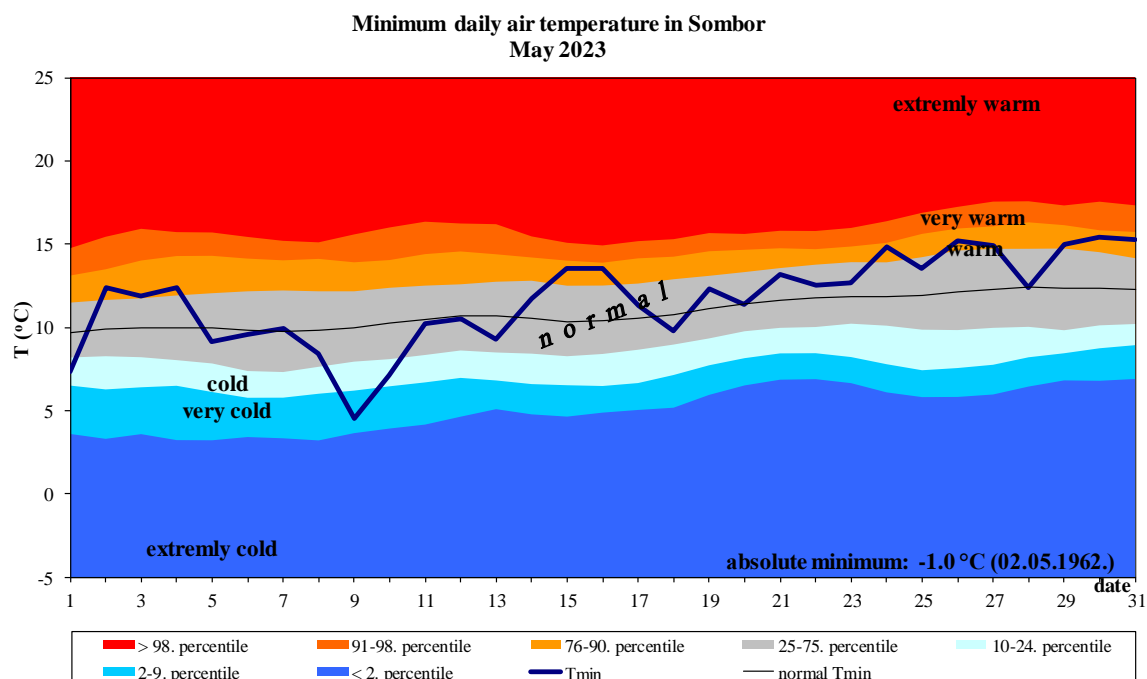


Appendix 15. Daily course of the maximum daily air temperature and the accompanying percentile for Nis

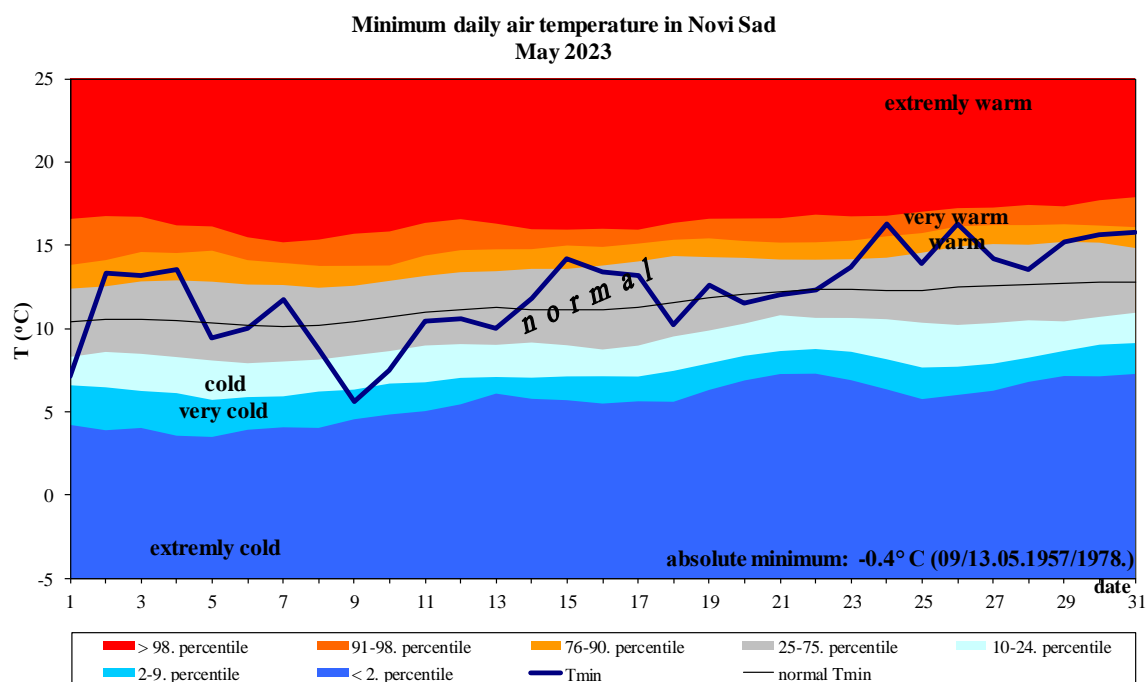


Appendix 16. Daily course of the maximum daily air temperature and the accompanying percentile for Vranje

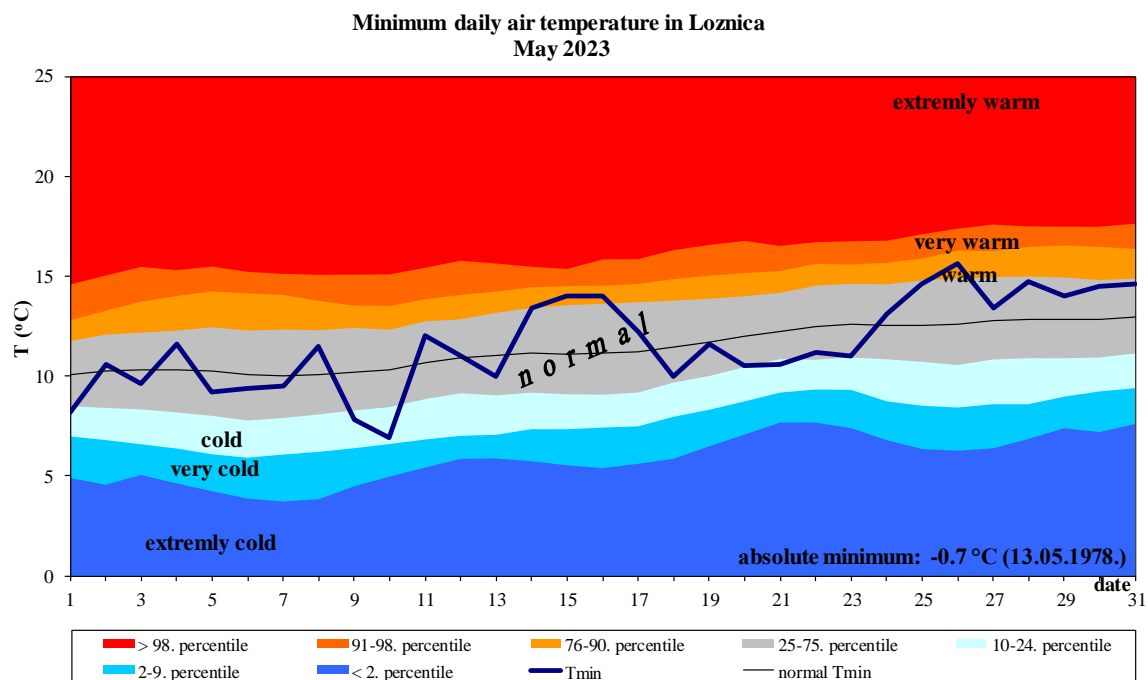
Minimum air temperature



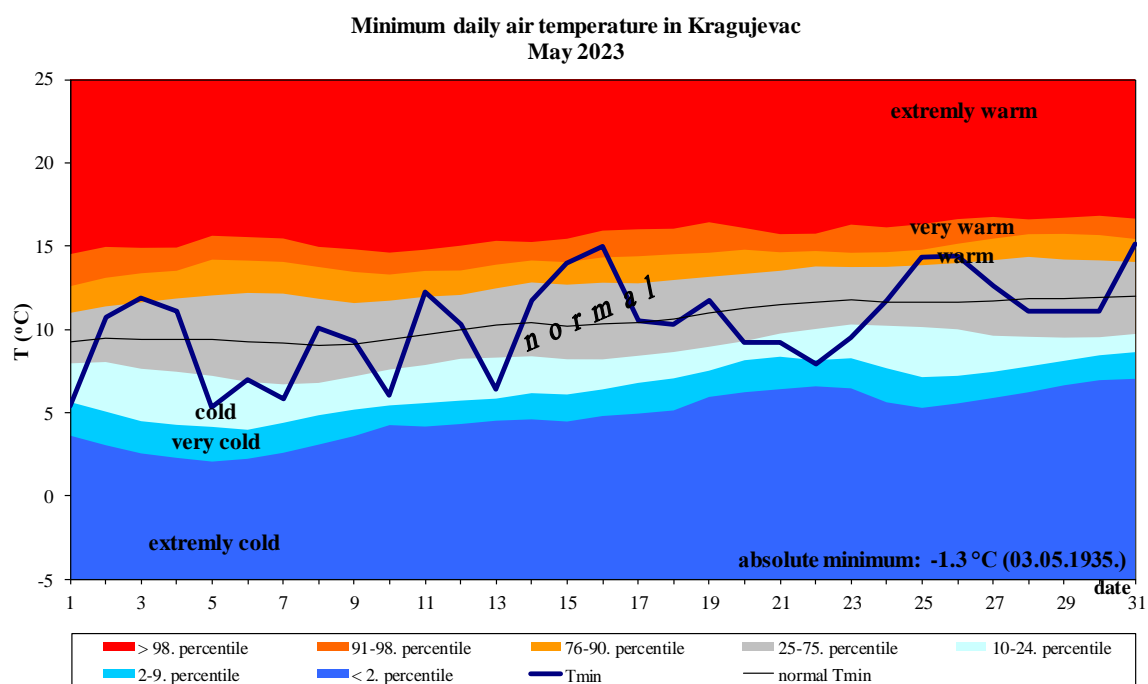
Appendix 17. Daily course of the minimum daily air temperature and the accompanying percentile for Sombor



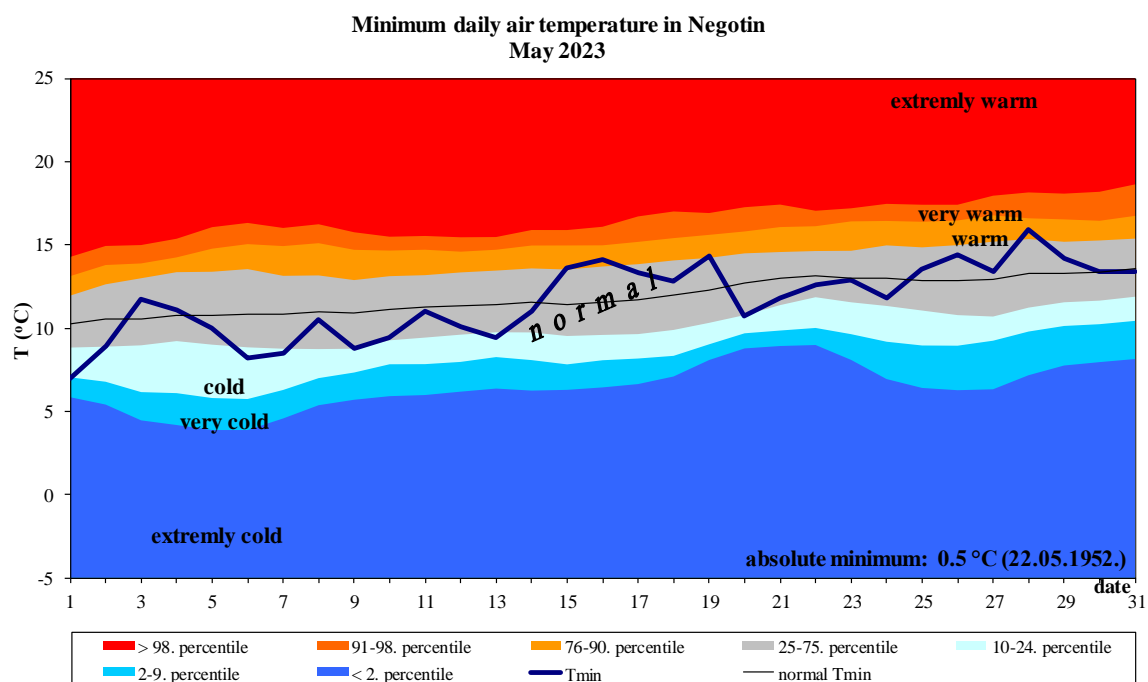
Appendix 18. Daily course of the minimum daily air temperature and the accompanying percentile for Novi Sad



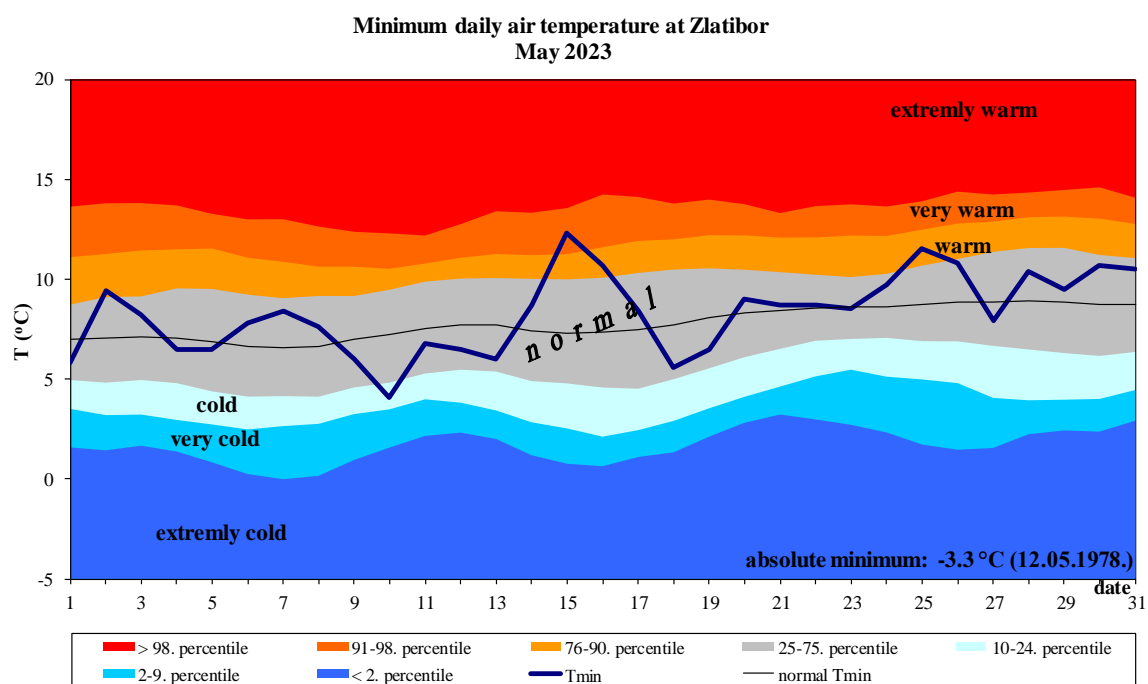
Appendix 19. Daily course of the minimum daily air temperature and the accompanying percentile for Loznica



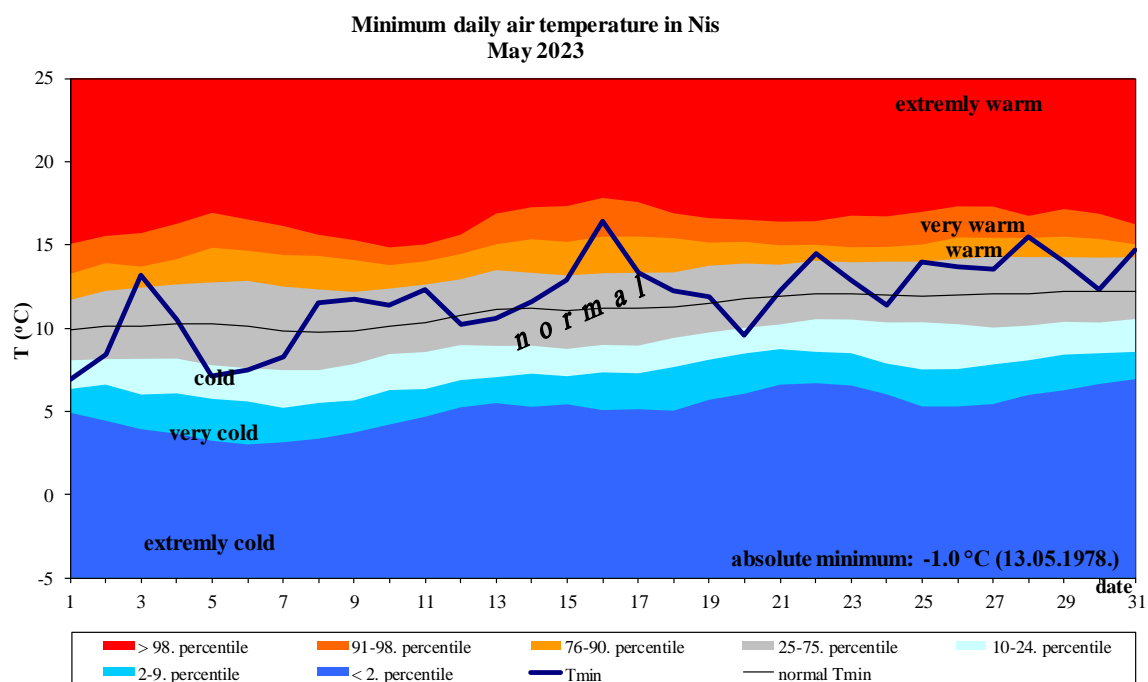
Appendix 20. Daily course of the minimum daily air temperature and the accompanying percentile for Kragujevac



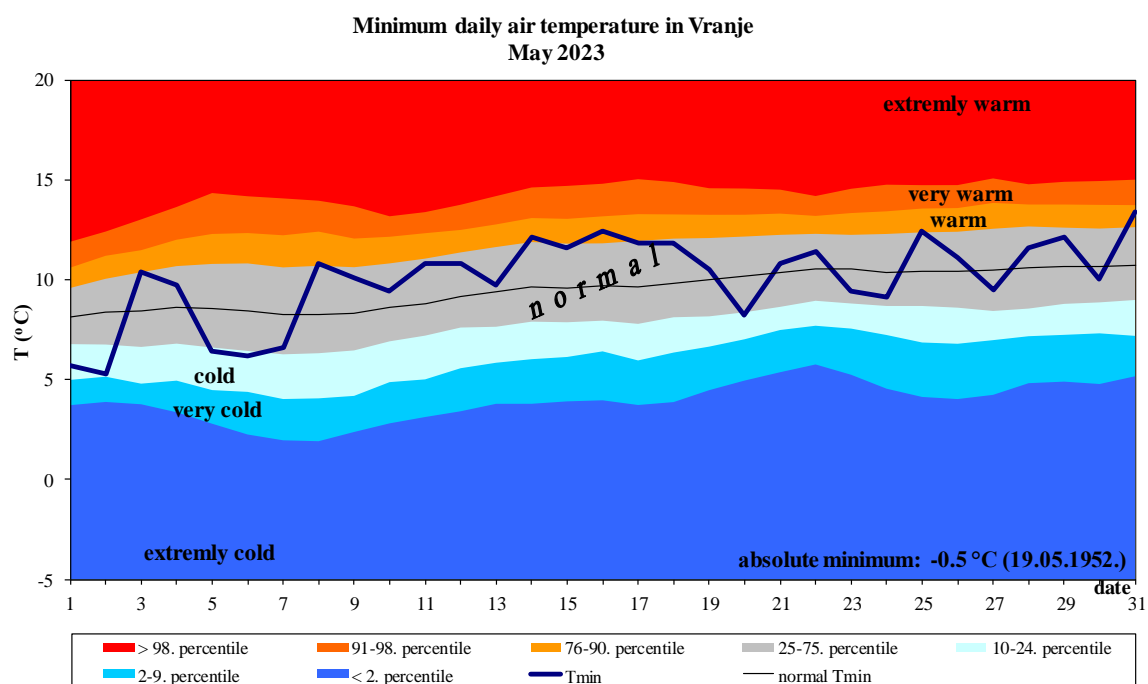
Appendix 21. Daily course of the minimum daily air temperature and the accompanying percentile for Negotin



Appendix 22. Daily course of the minimum daily air temperature and the accompanying percentile on Zlatibor

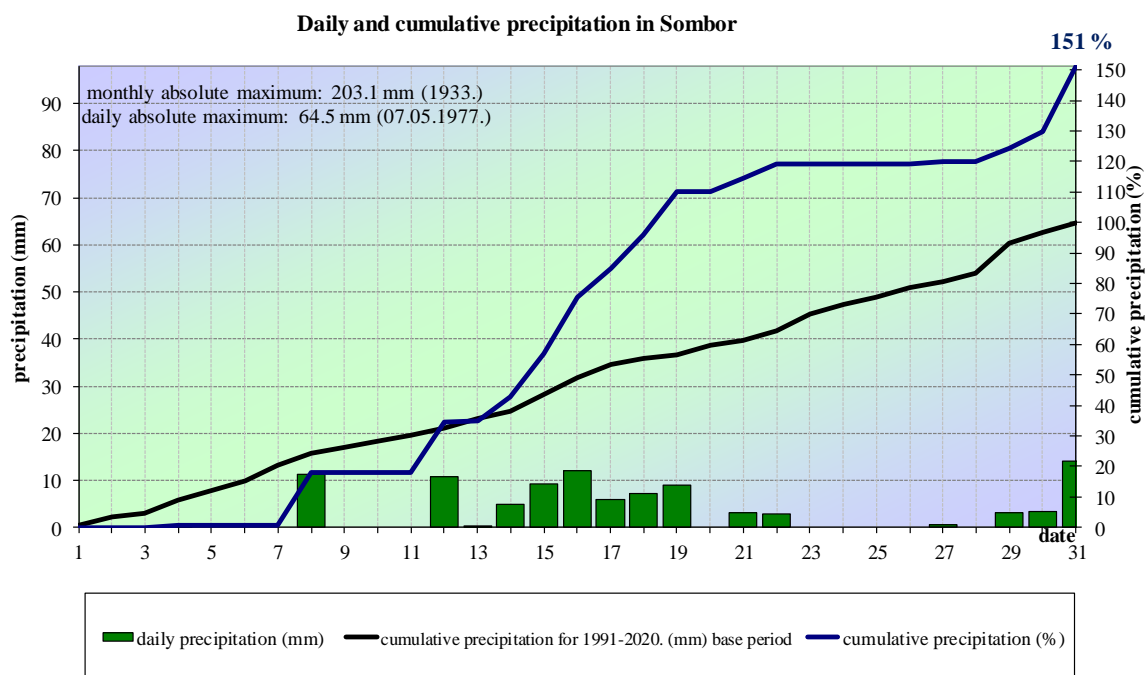


Appendix 23. Daily course of the minimum daily air temperature and the accompanying percentile for Nis

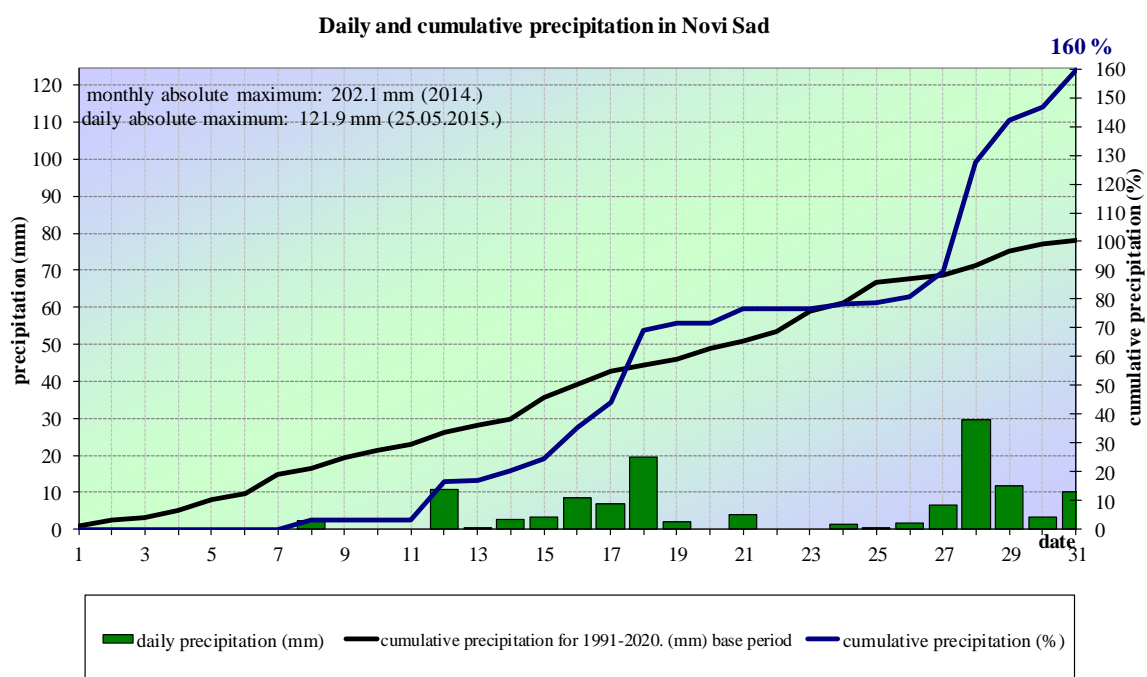


Appendix 24. Daily course of the minimum daily air temperature and the accompanying percentile for Vranje

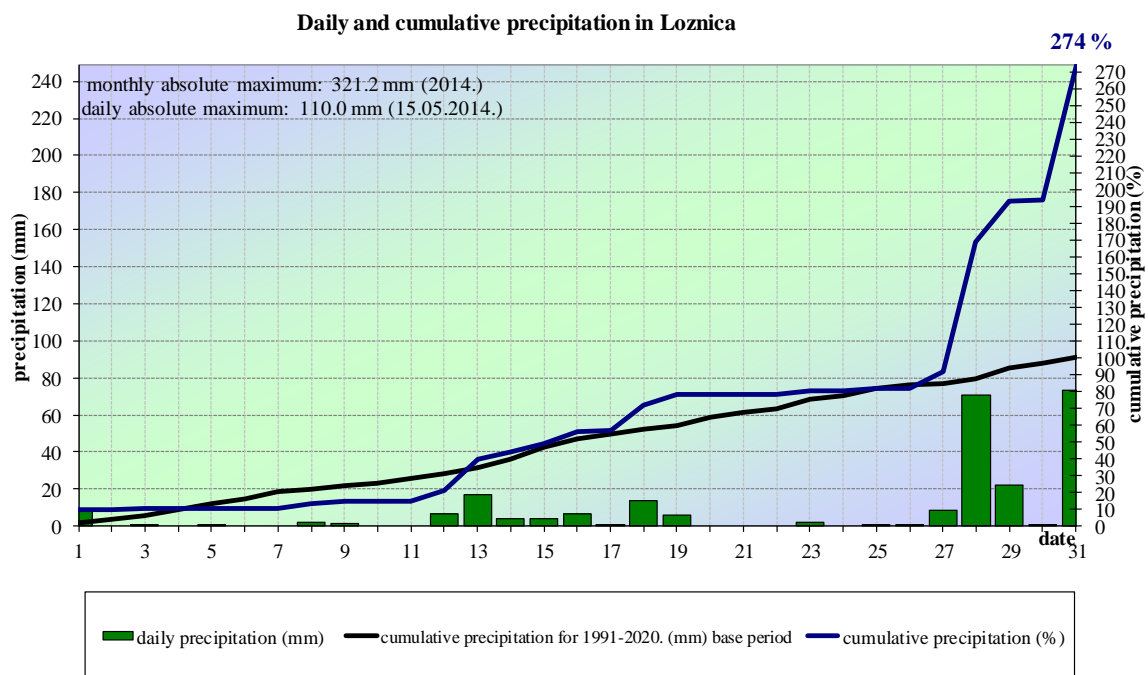
Precipitation



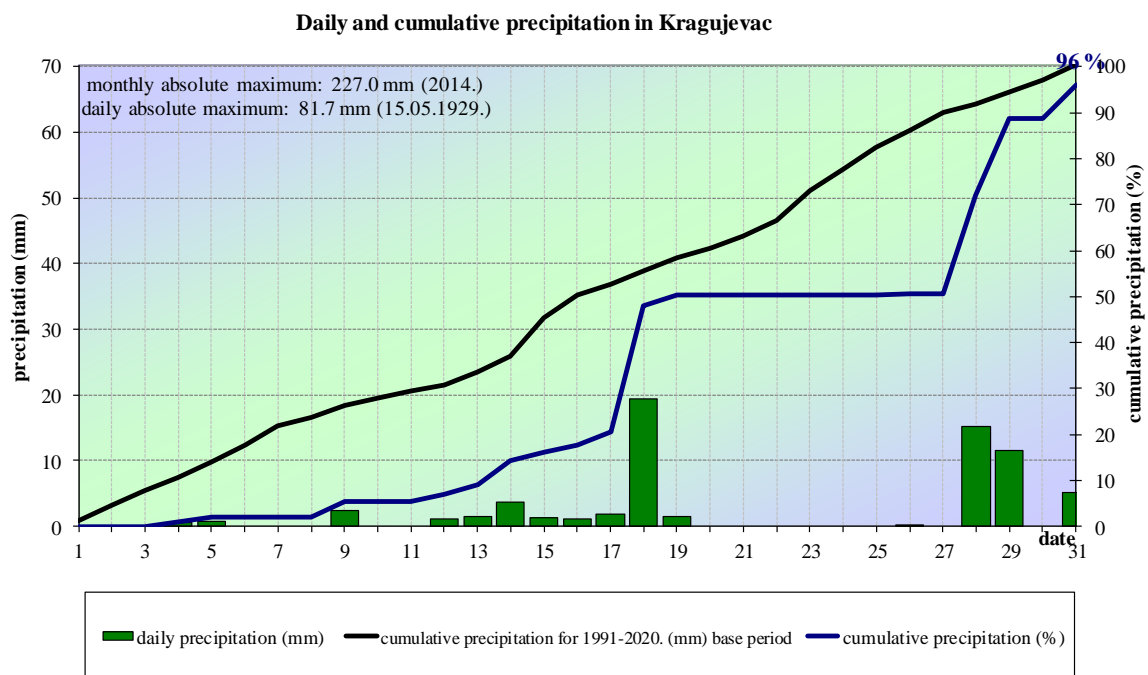
Appendix 25. Daily and cumulative precipitation sums for Sombor



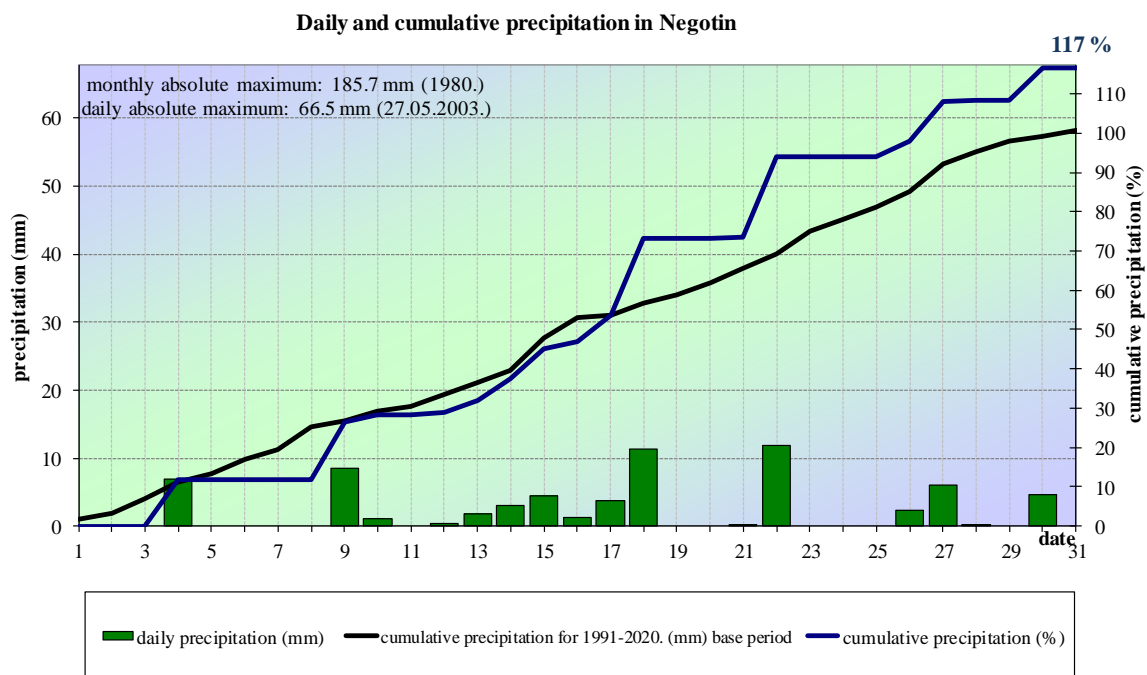
Appendix 26. Daily and cumulative precipitation sums for Novi Sad



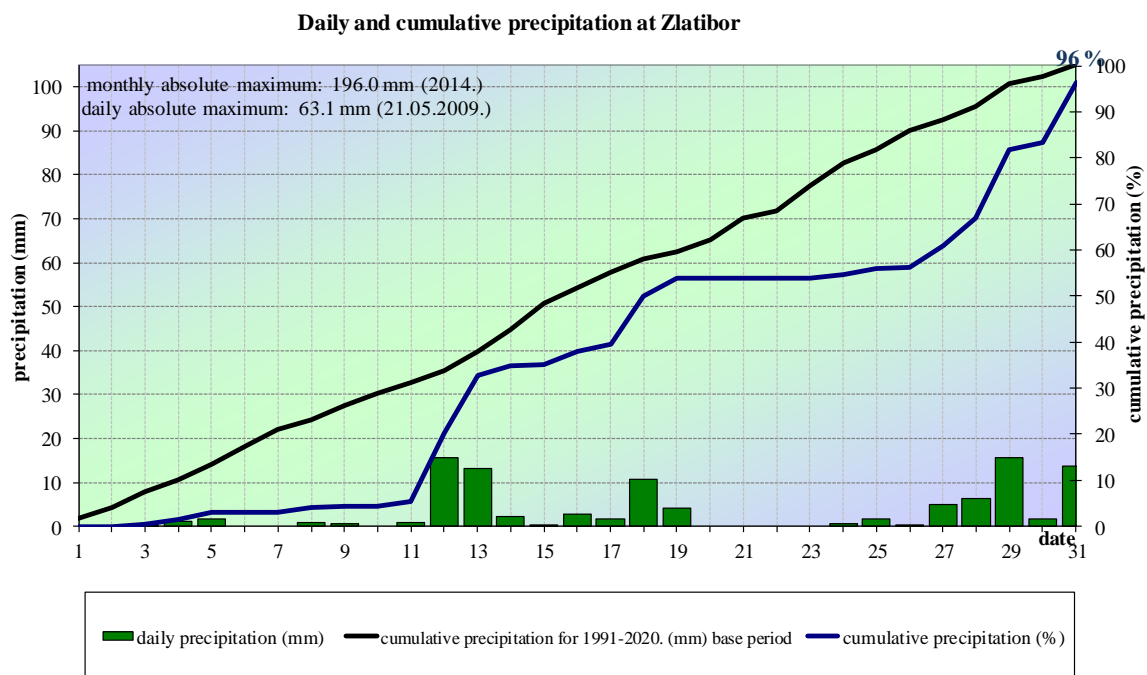
Appendix 27. Daily and cumulative precipitation sums for Loznica



Appendix 28. Daily and cumulative precipitation sums for Kragujevac

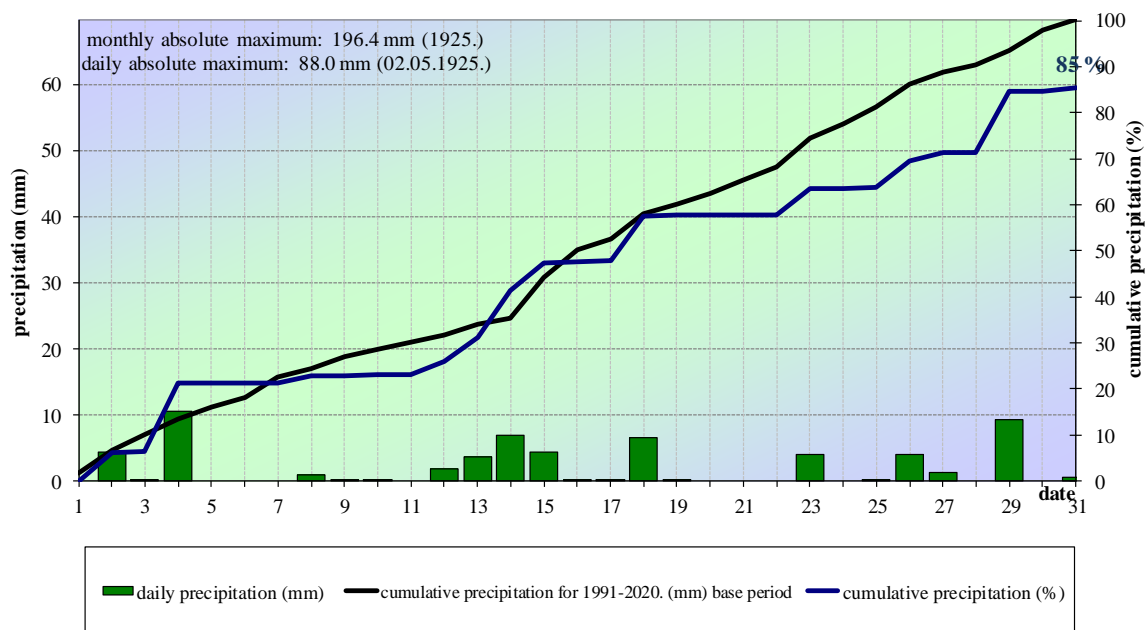


Appendix 29. Daily and cumulative precipitation sums for Negotin



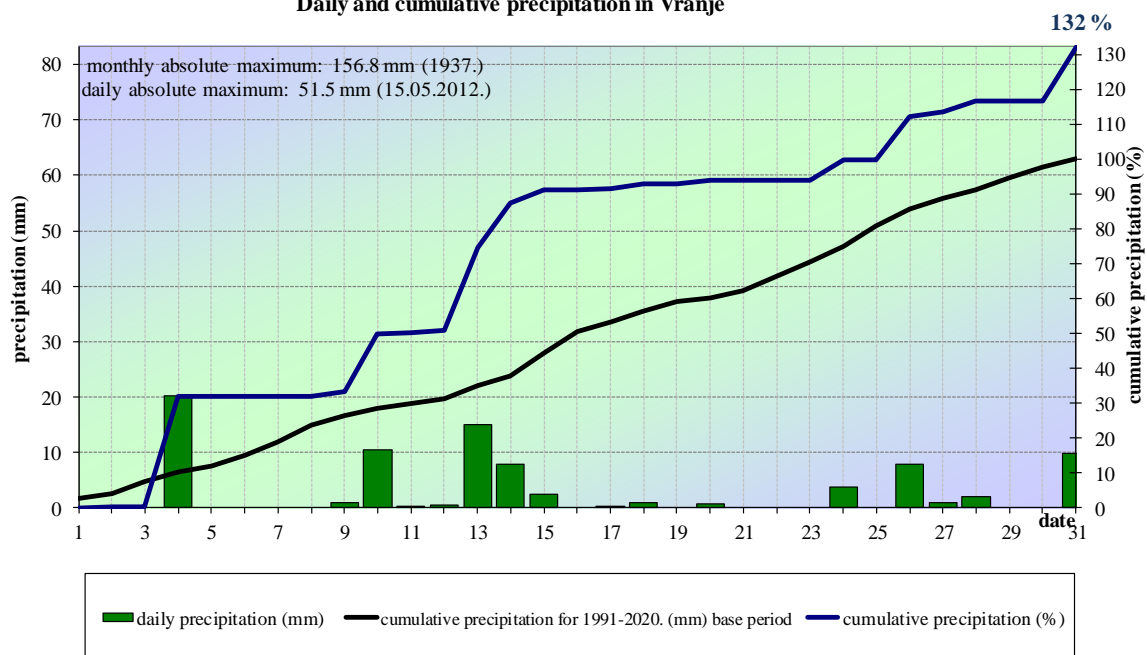
Appendix 30. Daily and cumulative precipitation sums on Zlatibor

Daily and cumulative precipitation in Nis



Appendix 31. Daily and cumulative precipitation sums for Nis

Daily and cumulative precipitation in Vranje



Appendix 32. Daily and cumulative precipitation sums for Vranje