



VERIFICATION OF THE SEECOF-33 SUMMER 2025 CLIMATE OUTLOOK AND SEASONAL BULLETIN FOR THE TERRITORY OF SERBIA

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Temperature

The SEECOF-33 outlook for the summer 2025 in Serbia indicated above- normal temperature in Serbia with 70% probability relative to the 1991–2020 climatological base period (*Figure A*).

Climatological monitoring showed that the summer 2025 was warm in the entire Serbia, with above-normal temperature based on the tercile method (*Figure B*). The outlook for a warm summer was correct.

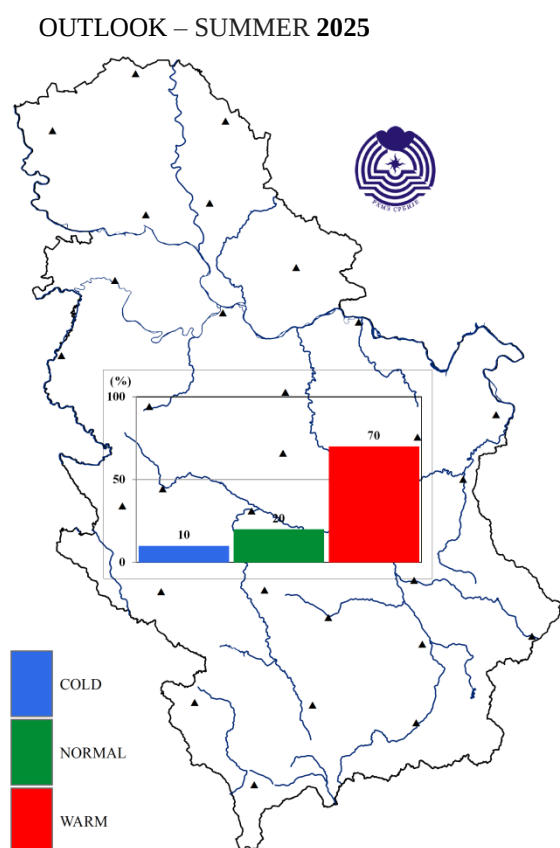


Figure A. SEECOF-33 - summer temperature outlook

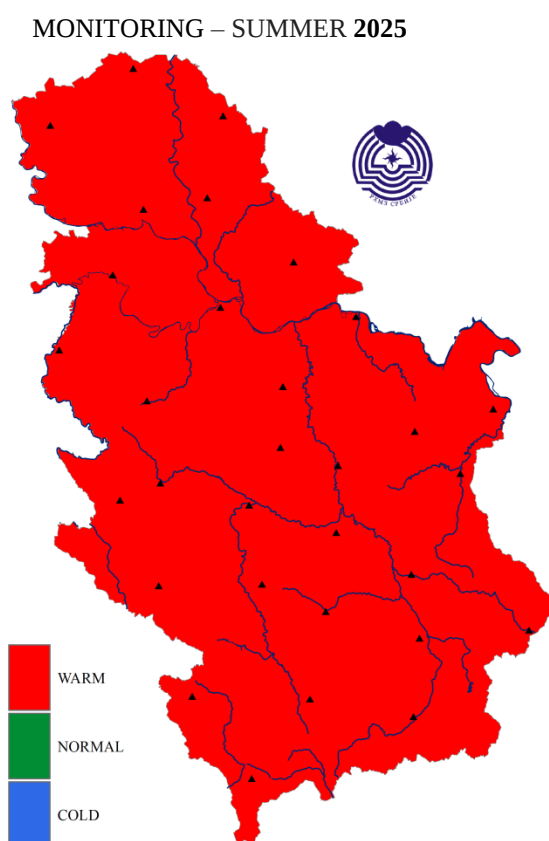


Figure B. Monitoring of the summer temperature using tercile method compared to the 1991-2020 base period

Precipitation

According to the SEECOF-33 outlook for the summer 2025, below-normal precipitation sums were indicated for most of Serbia, relative to the 1991–2020 climatological base period (*Figure C*). Summer 2025 in Serbia is forecast to be drier than average.

Based on the climatological monitoring of precipitation, the summer of 2025 was dry in the entire Serbia (*Figure D*). The outlook for the dryer summer precipitation sums was correct.

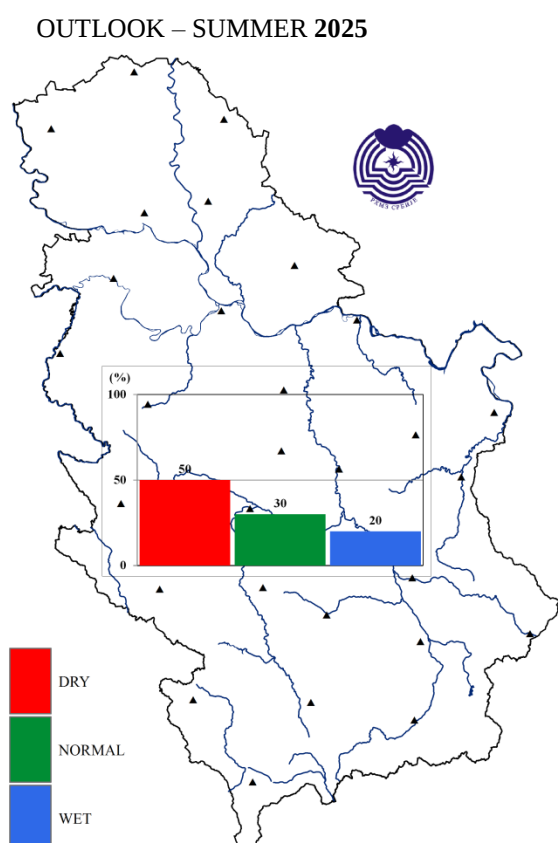


Figure C. SEECOF-33 - summer precipitation outlook

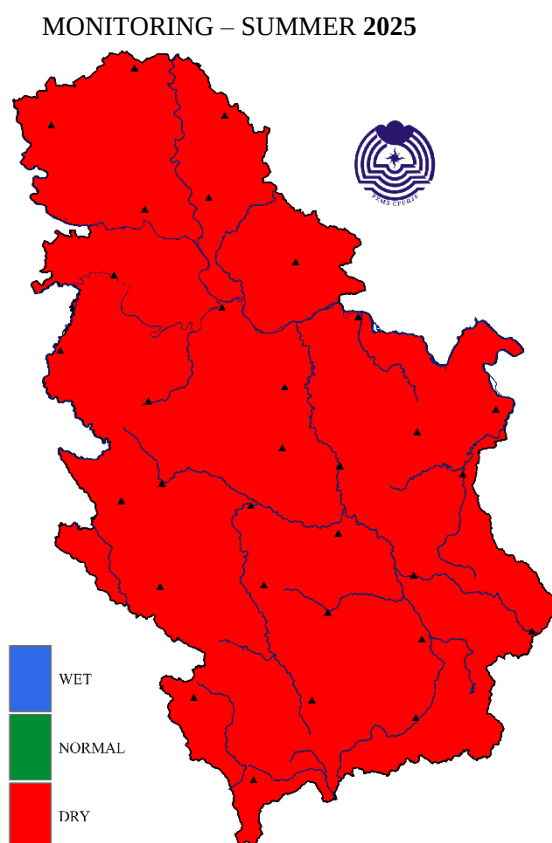


Figure D. Monitoring of the summer precipitation using tercile method compared to the 1991-2020 base period

Summer 2025			Air Temperature (°C)			
Station	Rank*	Rank**	33	50	66	Observed value
Beograd (1888-2025)	4	4	22.5	23.2	23.6	25.4
Palić (1945-2025)	5	5	21.6	22.1	22.7	23.9
Sombor (1942-2025)	5	5	21.2	21.7	22.2	23.3
Novi Sad (1948-2025)	5	5	21.1	21.8	22.2	24.1
Zrenjanin (1946-2025)	8	7	21.5	22.2	22.7	23.8
Kikinda (1948-2025)	4	4	21.6	22.1	22.6	24.1
Banatski Karlovac (1986-2025)	4	4	21.3	21.8	22.1	23.6
Loznica (1952-2025)	6	6	21.2	21.8	22.2	23.4
Sremska Mitrovica (1925-2025)	9	6	20.9	21.6	21.7	22.9
Valjevo (1926-2025)	5	4	21.2	21.9	22.1	23.8
Kragujevac (1925-2025)	2	2	21.5	21.7	22.0	24.2
Smederevska Palanka (1939-2025)	4	4	21.6	21.9	22.2	23.8
Veliko Gradište (1926-2025)	3	2	21.2	21.8	22.2	23.6
Crni Vrh (1967-2025)	3	3	16.4	16.7	17.0	19.5
Negotin (1927-2025)	4	2	22.9	23.3	23.7	25.8
Zlatibor (1950-2025)	3	3	16.9	17.4	17.8	19.6
Sjenica (1946-2025)	3	3	15.9	16.3	16.6	18.2
Pozega (1952-2025)	3	3	19.4	19.8	20.1	21.3
Kraljevo (1926-2025)	3	3	21.3	21.7	21.8	24.2
Kopaonik (1950-2025)	3	3	12.3	12.6	12.9	15.0
Kursumlija (1952-2025)	3	3	19.6	20.0	20.2	22.5
Krusevac (1927-2025)	4	3	21.3	21.6	22.0	24.3

Cuprija (1948-2025)	2	2	21.3	21.6	21.8	24.4
Nis (1925-2025)	3	3	22.1	22.4	22.8	25.1
Leskovac (1948-2025)	3	3	21.1	21.5	21.9	23.7
Zajecar (1929-2025)	5	4	21.7	22.0	22.2	23.2
Dimitrovgrad (1945-2025)	4	3	19.6	19.9	20.3	22.2
Vranje (1926-2025)	4	3	21.2	21.4	21.7	23.9

*Rank –period of stations work (warmest season)

**Rank – 1981-2025 period (warmest season)

Summer 2025			Precipitation sums (mm)			
Station	Rank*	Rank**	33	50	66	Observed Value
Beograd (1888-2025)	10	3	156.7	234.3	264.1	92.6
Palić (1945-2025)	8	5	141.5	208.1	229.4	93.9
Sombor (1942-2025)	5	3	180.1	203.0	242.7	90.8
Novi Sad (1948-2025)	5	4	168.9	203.1	265.3	88.2
Zrenjanin (1946-2025)	3	2	140.9	177.1	226.4	69.3
Kikinda (1948-2025)	6	3	140.3	174.9	207.0	71.6
Banatski Karlovac (1946-2025)	2	2	158.6	209.7	269.3	81
Loznica (1926-2025)	25	11	219.1	257.9	301.5	179.9
Sremska Mitrovica (1925-2025)	5	3	153.1	184.7	202.4	67.2
Valjevo (1926-2025)	4	2	189.6	219.7	318.1	101.7
Kragujevac (1925-2025)	7	3	166.4	210.5	233.2	91.6
Smederevska Palanka (1939-2025)	20	8	144.4	195.2	247.0	120
Veliko Gradište (1926-2025)	23	13	163.5	189.8	245.6	128.2

Crni Vrh (1967-2025)	2	2	169.4	196.6	254.7	80.9
Negotin (1927-2025)	1	1	112.7	146.9	192.2	24.1
Zlatibor (1950-2025)	9	7	233.9	284.6	331.5	159.9
Sjenica (1946-2025)	25	8	192.9	215.8	233.1	148.4
Pozega (1952-2025)	5	2	175.4	221.1	280.5	109.2
Kraljevo (1926-2025)	8	3	146.8	238.5	280.1	105.7
Kopaonik (1950-2025)	4	2	246.6	288.6	323.8	115.7
Kursumlija (1952-2025)	9	4	137.5	186.2	215.3	59.1
Krusevac (1927-2025)	17	7	154.3	182.5	210.9	97.5
Cuprija (1948-2025)	3	2	143.8	197.1	205.8	78.4
Nis (1925-2025)	3	2	116.5	151.2	176.6	40.4
Leskovac (1948-2025)	11	6	115.0	152.6	187.0	74
Zajecar (1929-2025)	13	6	115.9	163.3	183.1	80.1
Dimitrovgrad (1945-2025)	34	17	159.3	174.8	203.5	155.5
Vranje (1926-2025)	7	3	108.0	144.3	172.7	53.7

*Rank –period of stations work (lowest/highest seasonal precipitation)

**Rank – 1981-2025 period (lowest/ highest seasonal precipitation)

Country	Seasonal temperature JJA		Seasonal precipitation JJA		High Impact Events
	Observed	SEECOF-33 climate outlook for temperature	Observed	SEECOF-33 climate outlook for precipitation	
Serbia (1)	Above normal	Above-normal (10, 20, 70)	Below normal	Below-normal (50, 30, 20)	❖ <i>Third hottest and fourth driest summer since 1951</i> ❖ <i>The warmest and the driest June for Serbia</i> ❖ <i>The 5th warmest July in Serbia</i> ❖ <i>The new absolute maximum daily air temperature in Krusevac (44,0 °C) and Banatski Karlovac (42,0 °C), measured on July 26</i> ❖ <i>The driest summer in Negotin since 1941 (24.1 mm of precipitation)</i> ❖ <i>Kikinda recorded the maximum number of insolation hours (1049)</i> ❖ <i>Exceeded the minimum number of days with thunderstorms in Negotin (eight days), Pozega (12), Palic (nine) and Kopaonik (nine)</i>

Analysis of the summer season 2025 for Serbia compared to the 1991-2020 base period

The 3rd warmest and the 4th driest summer with the mean seasonal air temperature extremely above the normal¹ (Figure 1) in almost entire Serbia and the summer precipitation sums extremely below the average in most of Serbia.

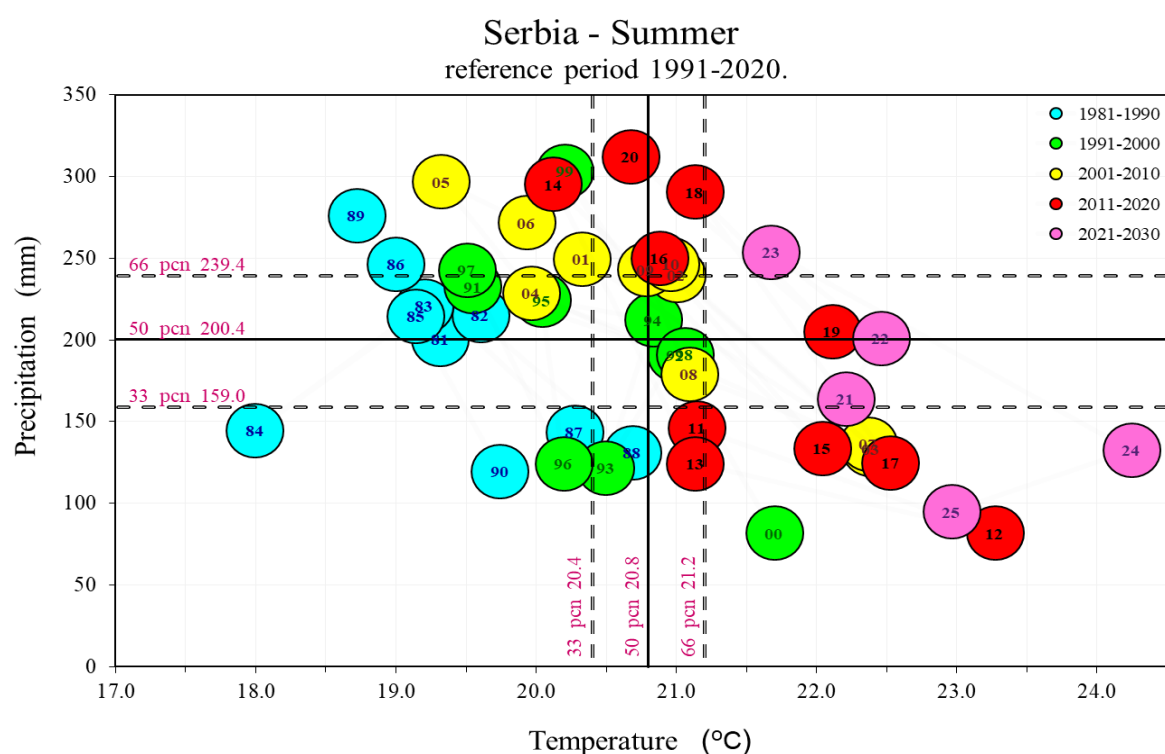


Figure 1. Assessment of maximum and minimum air temperature for summer in Serbia based on the accompanying terciles relative to the 1991-2020 base period

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

Temperature

Summer 2025 was **the 3rd warmest for Serbia** (*Figure 2*) since 1951, with the mean seasonal air temperature of 23,0 °C which is +2,0 °C above the normal. In **Belgrade**, with the mean seasonal air temperature of 25,4 °C and anomaly of +2,2 °C from the normal (*Figure 3*), the summer was **the 4th warmest since 1888**.

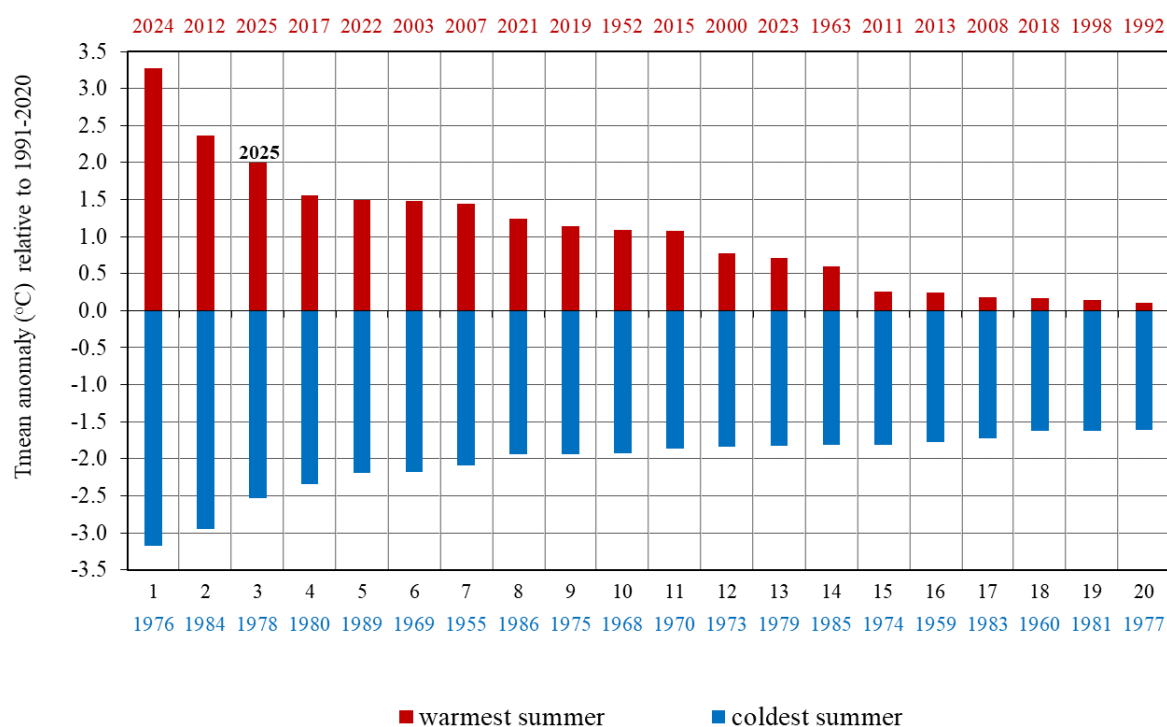


Figure 2. Rank of twenty warmest and coldest summers in Serbia for the 1951-2025 period

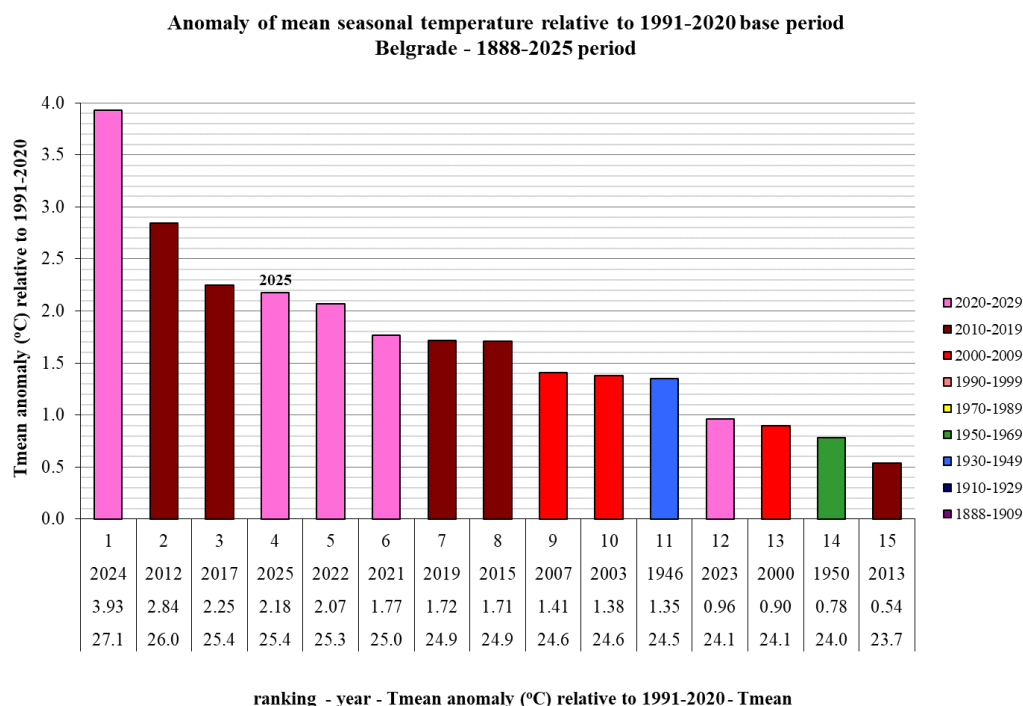


Figure 3. Rank of the warmest summers in Belgrade 1888-2025.

Mean summer air temperature (*Figure 4*) ranged from 21,3 °C in Pozega to 25,8 °C in Negotin, Belgrade observed 25,4 °C and on the mountains it ranged from 15,0 °C at Kopaonik to 19,6 °C at Zlatibor.

Departure of the mean air temperature from the normal during summer (*Figure 5*) ranged from +1,3 °C in Sremska Mitrovica and Zajecar to +2,8 °C in Cuprija, and on the mountains from +1,8 °C in Sjenica to +2,6 °C at Crni Vrh.

Based on the percentile method², mean air temperature (*Figure 6*) during summer was in the categories of extremely warm and very warm in almost entire Serbia, and warm category only in Zrenjanin.

Based on the tercile method, mean air temperature (*Figure 7*) during summer was in the warm category in entire Serbia.

In [appendix](#) are graphs depicting 15 warmest years since the measurements began for the stations: Kragujevac, Cuprija, Veliko Gradiste, Kraljevo, Nis, Kopaonik, Negotin and Vranje.

² nth 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

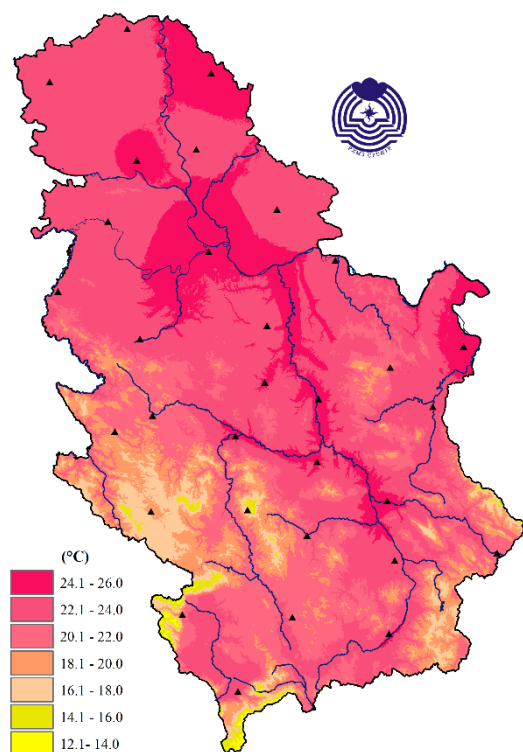


Figure 4. Spatial distribution of mean summer air temperature

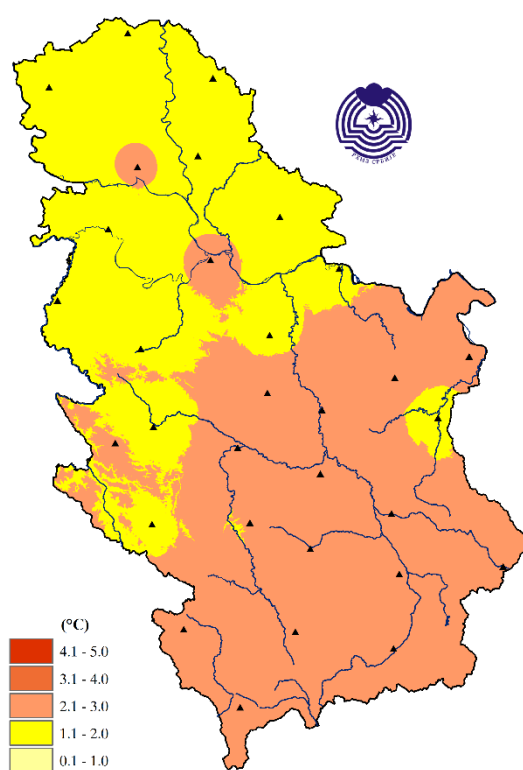


Figure 5. Spatial distribution of mean summer air temperature anomaly from the normal

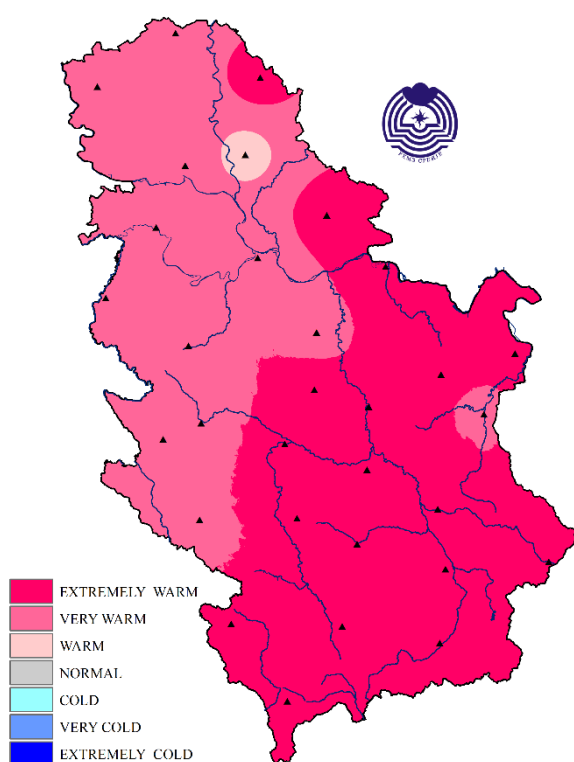


Figure 6. Spatial distribution of mean summer air temperature according to the percentile method

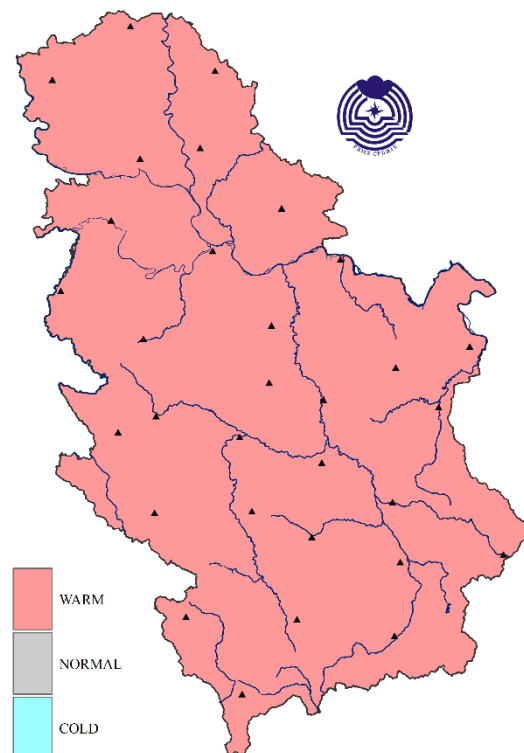


Figure 7. Spatial distribution of mean summer air temperature according to the tercile method

The highest daily air temperature of **44,0 °C** was measured on July 26 in Krusevac thereby **breaking the previous record** of 43,7 °C set on July 24, 2007. On the same day, **Banatski Karlovac** saw **the new absolute maximum daily air temperature** of **42,0 °C** (previous record was 41,6 °C set on July 24, 2007). Belgrade observed the maximum air temperature of 38,6 °C on 26 July and 7 July.

Number of summer days³ ranged from 80 in Pozega to 91 in Leskovac and Zajecar, and in the upland from 8 at Kopaonik to 58 in Sjenica. Departure of the number of summer days from the normal was positive almost in entire Serbia (*Figure 8*) ranging from 6 at Kopaonik to 30 days above the average at Crni Vrh.

Number of tropical days⁴ ranged from 47 on Palic to 72 in Negotin, and on the mountains from 16 in Sjenica, whilst Kopaonik didn't observe any tropical days. Number of tropical days was above the average, ranging from 6 at Zlatibor to 29 days in Dimitrovgrad.

During summer there weren't any tropical nights⁵ in Kursumlija and Dimitrovgrad, nor in the upland at Kopaonik and Sjenica, whereas the maximum number of tropical nights, total of 42 was observed in Belgrade, and up to 5 were registered at Crni Vrh. The recorded number of tropical nights was above the average (*Figure 9*) in the northwest, east and parts of central Serbia, in Belgrade 18 days above the average, elsewhere within the normal.

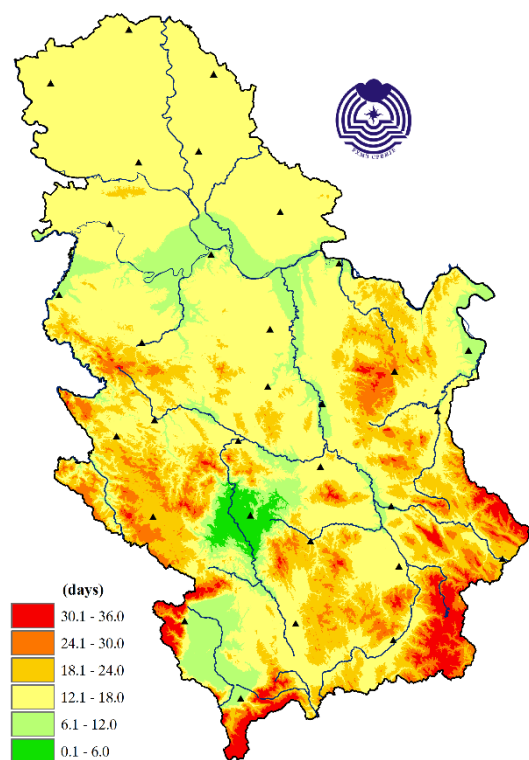


Figure 8. Deviation of the number of summer days from the normal

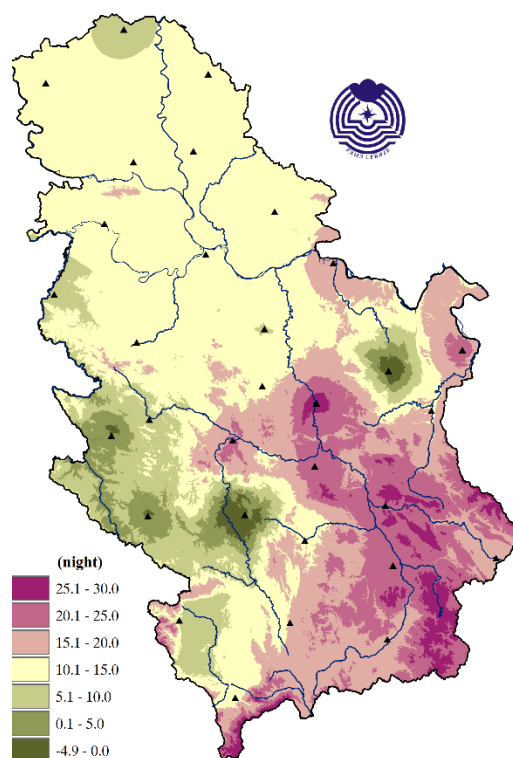


Figure 9. Deviation of the number of tropical nights from the normal

³ Summer day is defined as the day with the maximum daily air temperature of 25°C and above

⁴ Tropical day is defined as the day with the maximum daily air temperature of 30°C and above

⁵ Tropical night is defined as the day with the minimum daily air temperature of 20°C and above

In summer, lowest air temperature of 2,0 °C was measured on August 26, in Sjenica and on the same day, in the lowland, Zajecar observed 4,1 °C. On July 14, Belgrade observed the minimum daily air temperature of 14,0 °C.

In summer, mean, maximum and minimum air temperature in Belgrade were above the multiannual average during the first and third decade of June, during the first decade, mid-July and most of third decade of July, as well as in the middle and end of August, and below the average at the beginning of third decade of June, at the end of the first and middle of the second decade of July, as well as middle of the first and third decade of August (*Figure 10*).

Figure 11 shows assessment of the maximum and minimum air temperature for Serbia for the summer 2025 based on the tercile distribution compared to the 1991-2020 base period. It can be noted that the mean maximum air temperature was extremely above and the mean minimum air temperature at the upper tercile threshold.

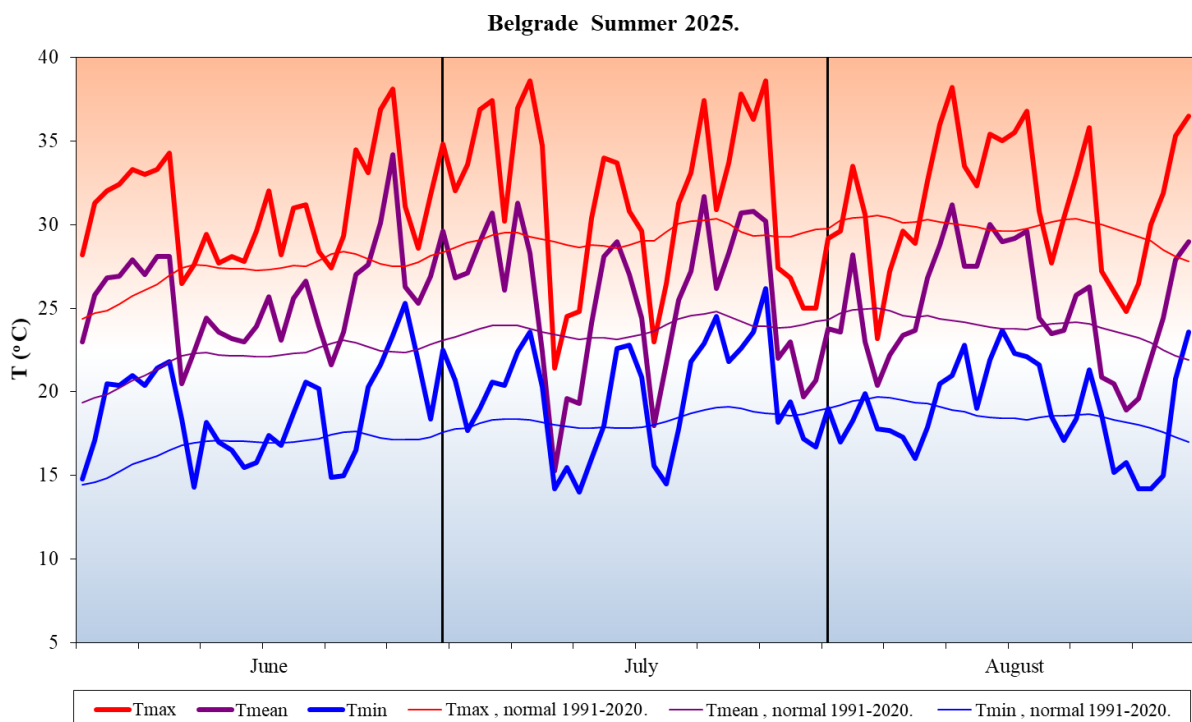


Figure 10. Three – month course of mean, maximum and minimum daily air temperature in Belgrade

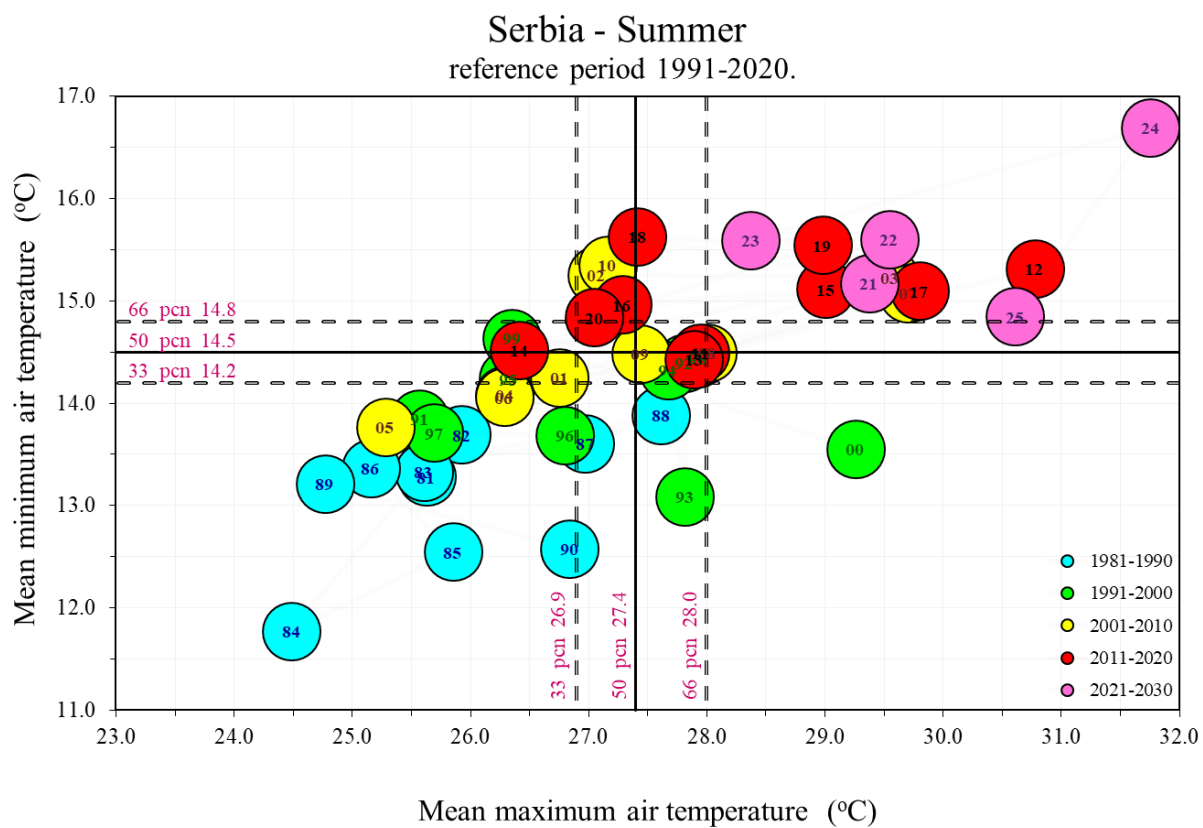


Figure 11. Assessment of maximum and minimum air temperature for summer in Serbia based on the accompanying terciles relative to the 1991-2020 base period

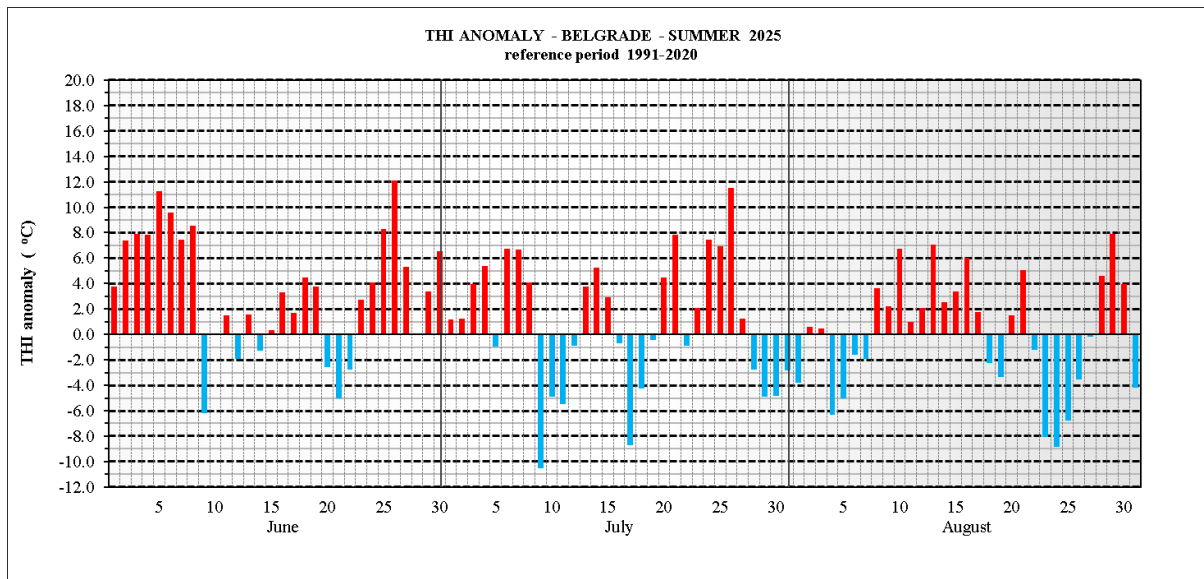


Figure 12.

Departure of the Temperature Heat Index (THI)⁶ was positive most of the summer, especially in June, as well as the beginning and middle of the second part of August when it was negative (*Figure 12*). The highest discrepancy between the feels like temperature and the maximum daily air temperature was 7,0 °C measured on July 27 (*Figure 13*). The maximum summer THI value was 44,7 °C measured on July 26, 2025. There were 5 days with THI above 40 °C and 72 days with THI above 30 °C.

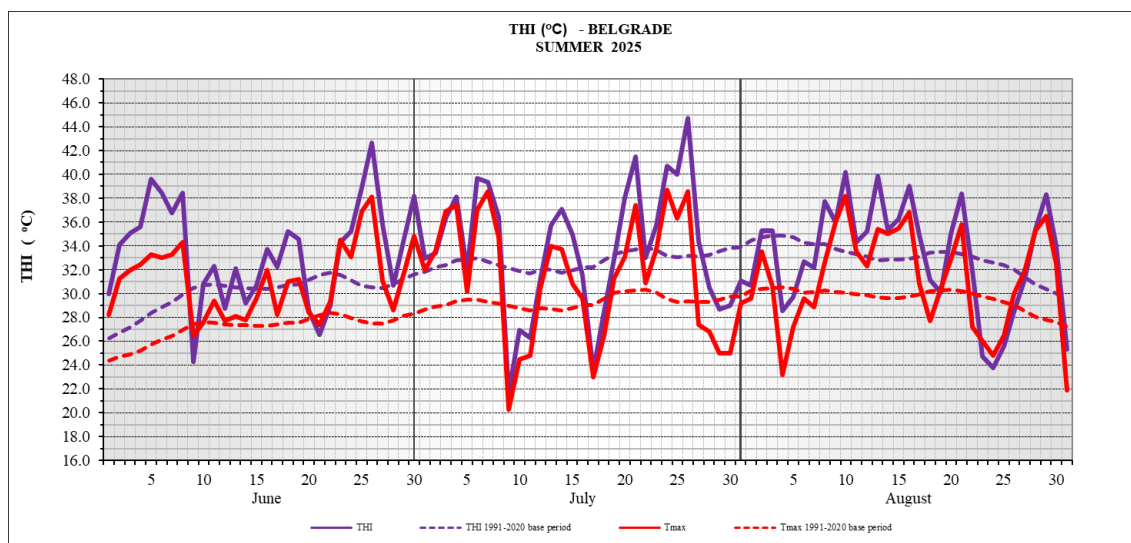


Figure13.

⁶ Temperature Humidity Index (THI) is a measure of the subjective feeling of heat, or a measure of relative discomfort due to prolonged exposure of the human body to extreme heat and humidity. It indicates the likelihood of heat stroke, sunstroke, or other acute symptoms of body stress

Heat waves and cold waves during summer 2025

In summer, there were 5 heat waves ⁷ (*Table 1*) lasting from 2 to 8 June across entire Serbia apart from Palic, second and third heat wave were registered from 23 June to 8 July in parts of central, eastern and southern Serbia, the fourth lasted from 20 to 27 July in the eastern, southern and parts of central Serbia, and the fifth in the period from 8 to 16 August in certain parts of central and southern Serbia. Two cold waves⁸ were recorded from 12 to 16 June in Veliko Gradiste and Cuprija, as well as from 23 to 29 August in Zajecar.

Table 1.

[illegible]

⁷ Heat wave is, according to the percentile method, is a period during which maximum daily air temperature is in the warm and very warm categories for 5 consecutive days or longer

⁸ Cold wave, according to the percentile method, is a period of minimum five days with minimum daily air temperature is in the very cold and extremely cold categories

Precipitation

Summer 2025 was **the 4th driest** (Figure 14) for Serbia in the period since 1951. Summer 2025 was **the driest on record** for **Negotin** (Figure 15) since 1941.

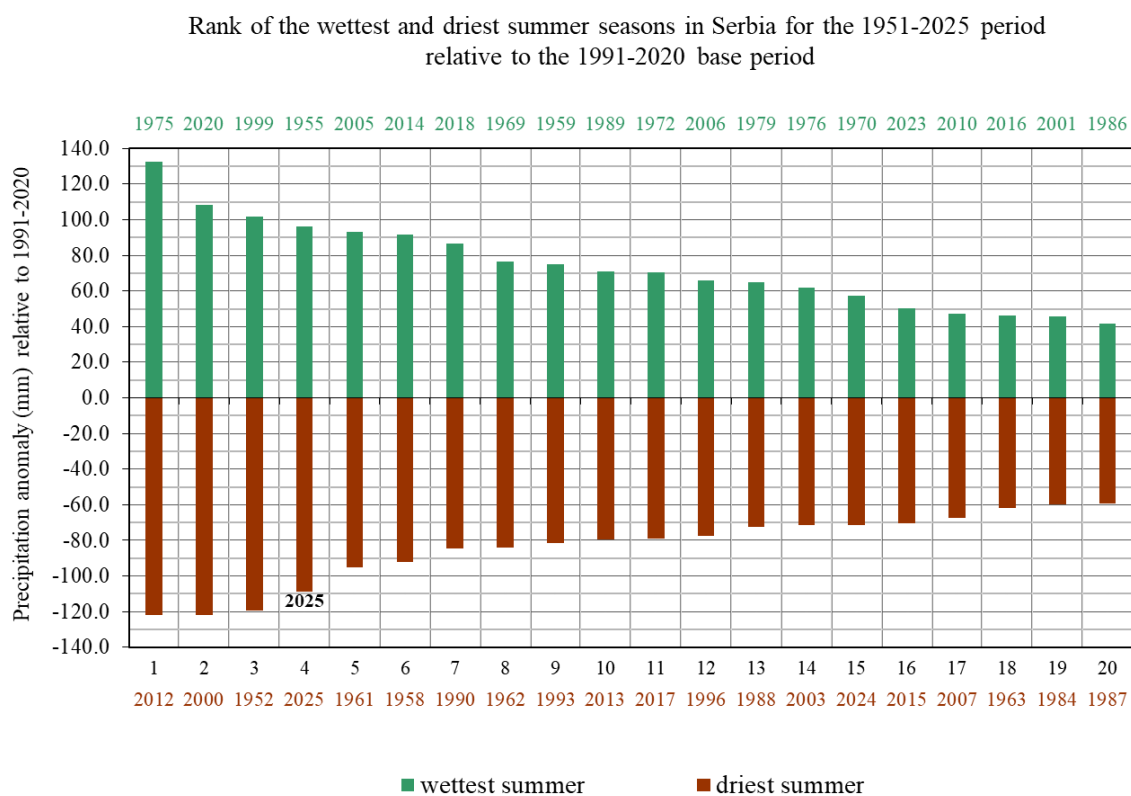


Figure 14.

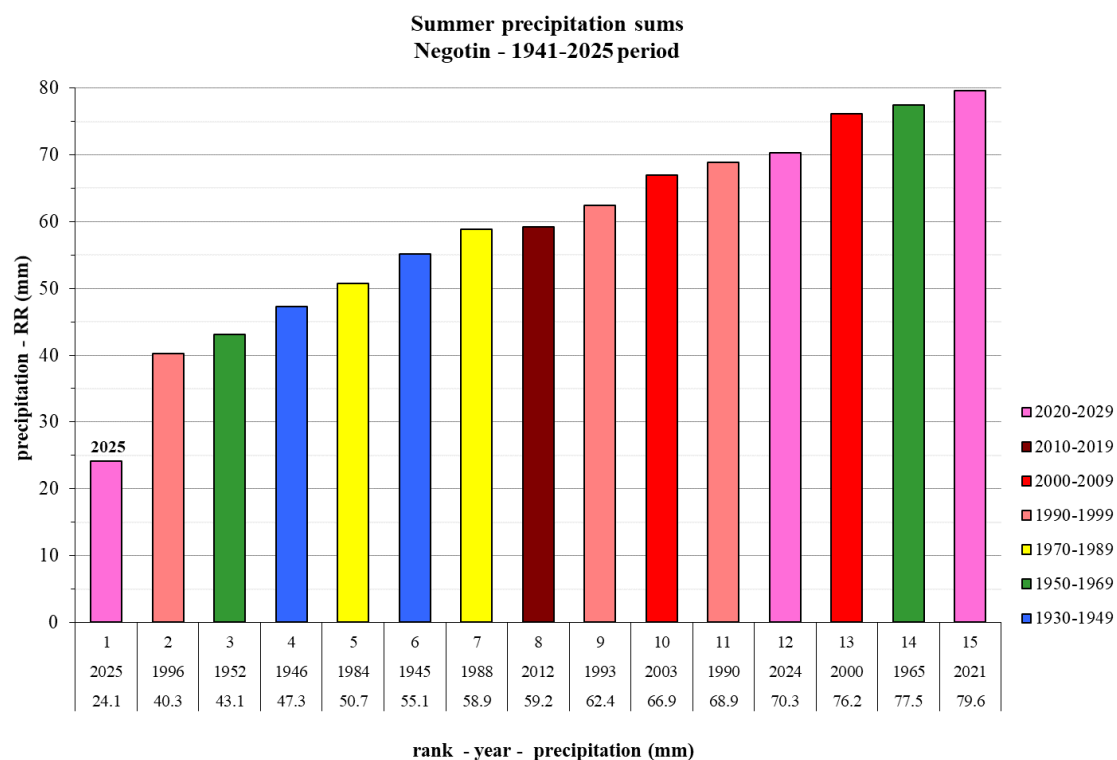


Figure 15.

Summer precipitation totals in Serbia (Figure 16) ranged from од 24,1 mm in **Negotin** (Figure 15) (thereby **breaking the minimum summer precipitation record** of 40,3 mm from 1996) to 179,9 mm in Loznica. Precipitation sums compared to the normal (Figure 17) ranged from 15% in Negotin to 84% in Dimitrovgrad.

Based on the percentile method (Figure 18) summer precipitation sums were in the following categories: dry and extremely dry in most of Serbia, dry category in Loznica, Smederevska Palanka, Krusevac, Zajecar, Sjenica and Zlatibor, and normal category in Veliko Gradiste adn Dimitrovgrad.

Summer precipitation sums based on the tercile method (Figure 19) was in the dry category across entire Serbia.

Number of days with precipitation, recorded during summer, ranged from 11 days in Vranje to 20 days in Banatski Karlovac, Zajecar, Sjenica and Zlatibor and Kopaonik. The recorded number of days with precipitation was below the average across the entire country, up to 5 days below in Zajecar to 18 days below in Sjenica (Figure 20).

The maximum daily precipitation sum of 61,5 mm was registered in Loznica on August 18.

In the [appendix](#) are graphs showing 15 driest years since the record-keeping began for the stations: Banatski Karlovac, Crni Vrh, Zrenjanin, Nis, Kopaonik and Belgrade.

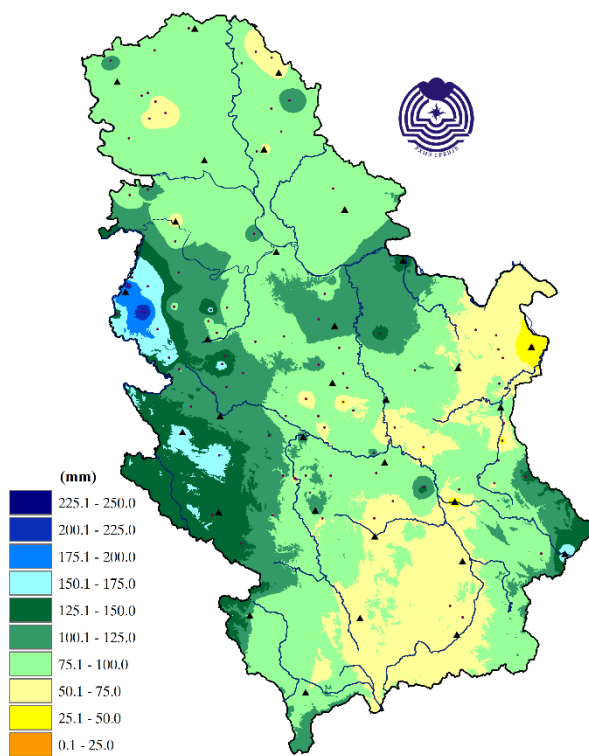


Figure 16. Spatial distribution of summer precipitation sums based on data from 28 principal, 22 climatological and 72 rain gauge stations

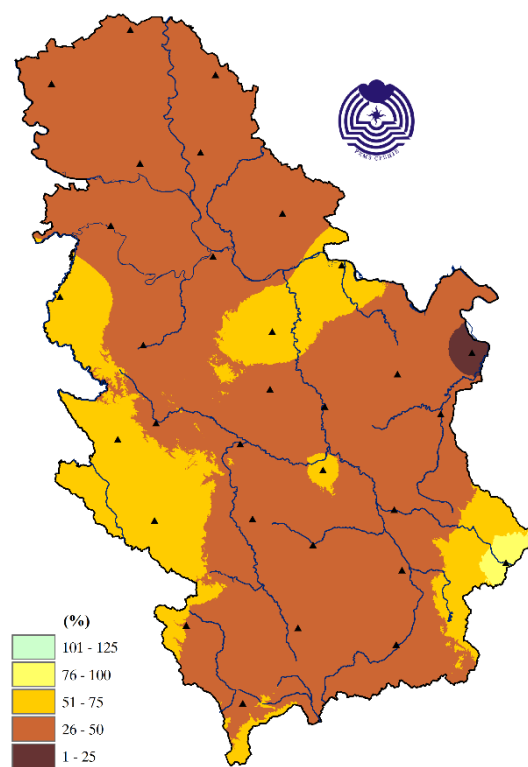


Figure 17. Spatial distribution of summer precipitation sums in percentage of normal

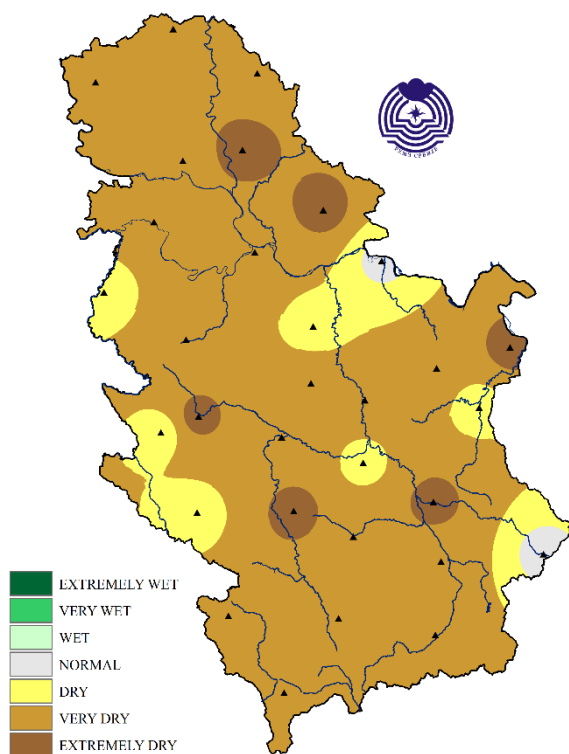


Figure 18. Summer precipitation sums according to the percentile method

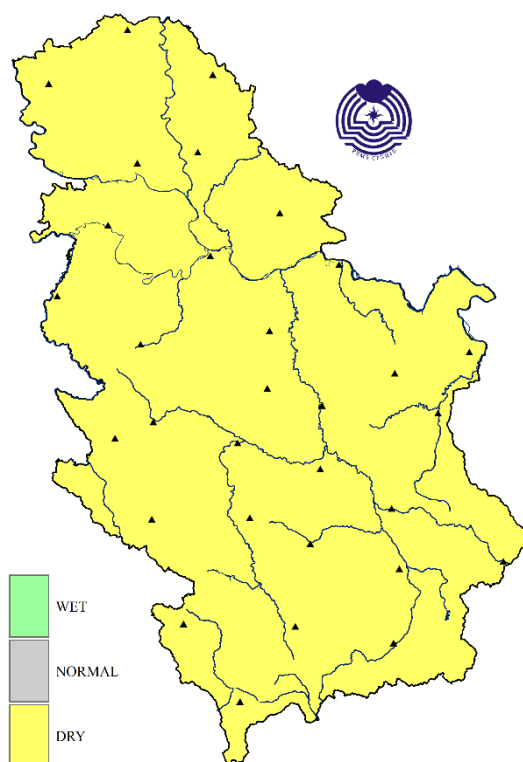


Figure 19. Summer precipitation sums according to the tercile method

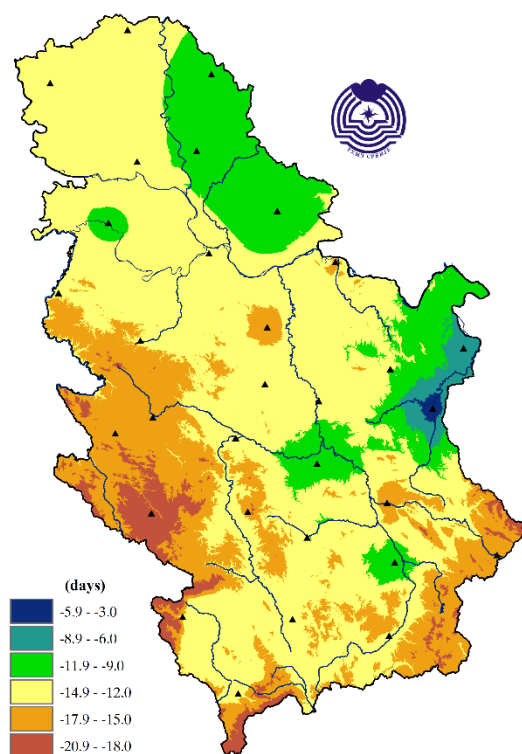


Figure 20. Deviation of number of days with precipitation of 0.1 mm and more from the normal

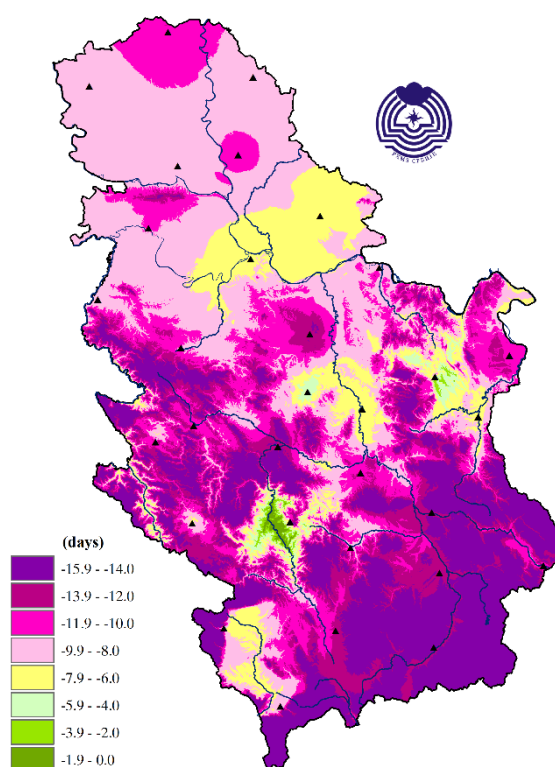


Figure 21. Deviation of number of days with thunder from the normal

Number of days with precipitation in summer ranged from 6 days in Krusevac and Vranje to 17 days in Sjenica. Deviation of the number of thunder days was below the average in the entire country, from 5 days in Kragujevac to 15 days below the average in Vranje (*Figure 21*). **The minimum number of thunder days was exceeded in Negotin with 8 days** (previous record was 9 days, 2024), **Pozega with 12 days** (the previous record was 13 days, 1993 and 2011), **Palic with 9 days** (previous record 10 days, 2015) and **Kopaonik with 9 days** (previous record 12 days, 1958 and 2012) and equaled in Krusevac 6 days (as well as in 2012) and Zrenjanin 10 days (as well as in 2000).

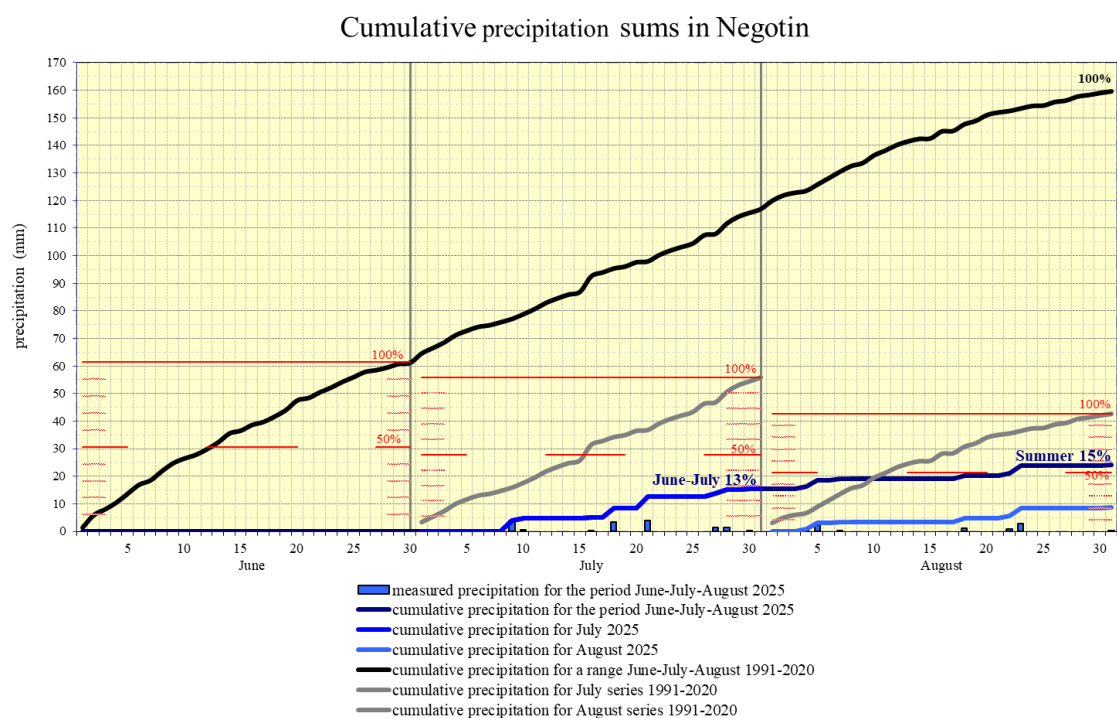


Figure 22.

In the [appendix](#) are graphs showing cumulative precipitation sums for the stations: Belgrade, Novi Sad, Nis, Vranje and Loznica.

Sunshine duration (insolation)

In summer, insolation values (*Figure 21*) ranged from 855,3 hours in Sjenica to 1053,3 hours in Novi Sad. Kikinda observed **1049,0 insolation hours** thereby breaking the previous record of 1046,7 set in summer 2012.

Compared to the normal for the 1991-2020 base period sunshine duration ranged from 107% in Smederevska Palanka to 139% in Pozega (*Figure 22*).

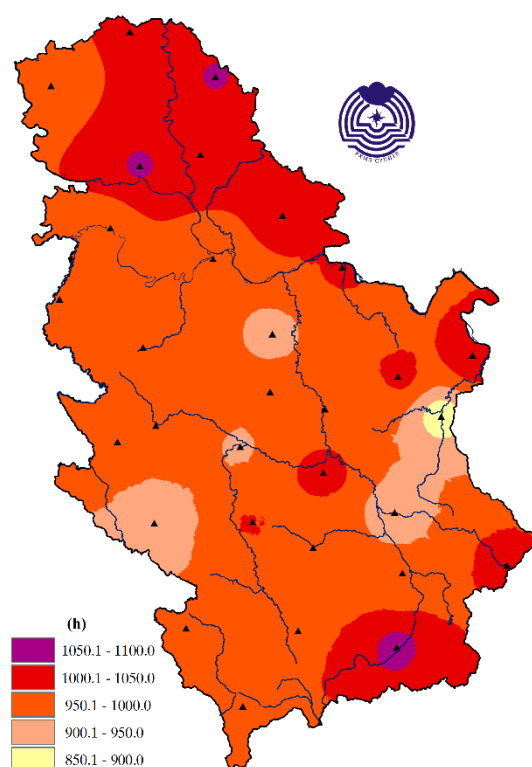


Figure 23. Insolation in hours

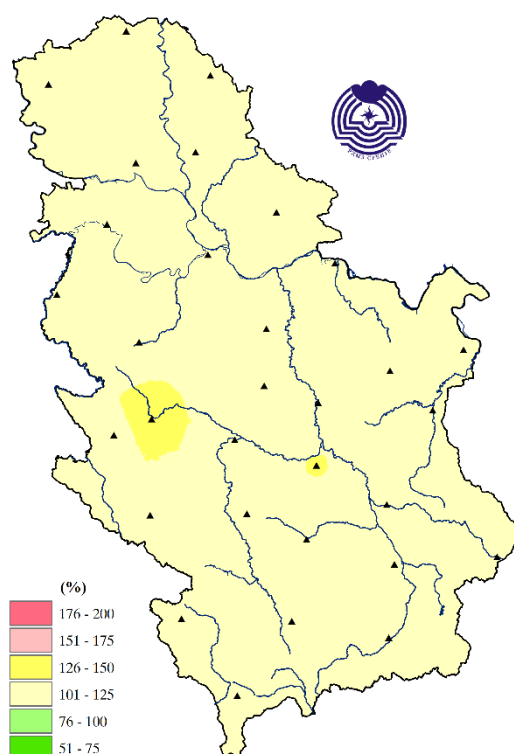


Figure 24. Insolation in percentage of normal

Analysis of the summer season 2025 for Serbia compared to the 1961-1990 base period

Temperature

Departure of the mean air temperature from the normal, during summer, for the 1961-1990 base period, ranged from +2,8 °C in Sremska Mitrovica and Pozega to +4,5 °C in Cuprija and Nis, and on the mountains from +3,5 °C in Sjenica to +4,3 °C at Kopaonik (*Figure 23*).

Based on the percentile method, mean summer air temperature in entire Serbia was in the extremely warm category (*Figure 24*).

Based on the tercile method, mean summer air temperature was in the warm category in entire Serbia.

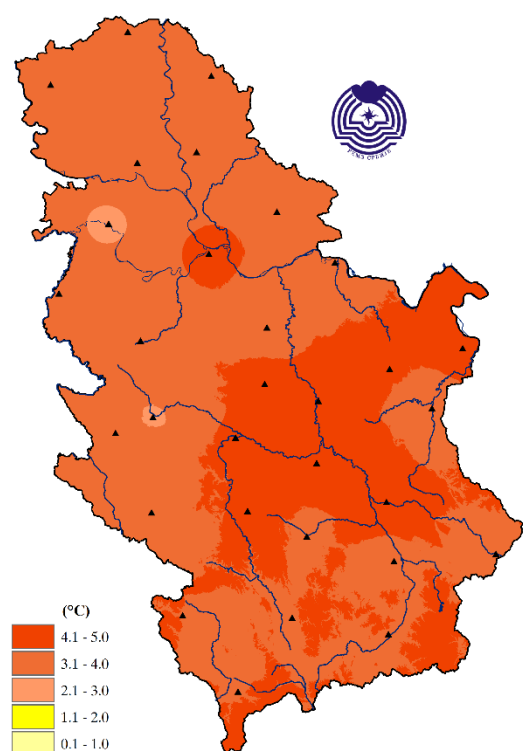


Figure 25. Spatial distribution of mean summer air temperature anomaly from the 1961-1990 normal

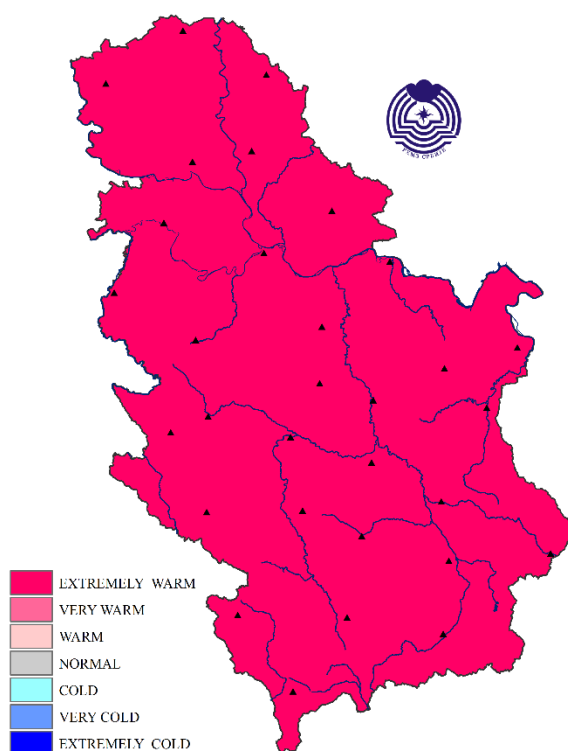


Figure 26. Spatial distribution of mean summer air temperature according to the percentile method

Precipitation

Summer precipitation sums compared to the normal for the 1961-1990 base period ranged from 16% in Negotin to 81% in Dimitrovgrad (*Figure 25*).

Based on the percentile method, summer precipitation sums were in the following categories: extremely dry and very dry in most of Serbia, dry category in Loznica, Smederevska Palanka, Krusevac and Sjenica, and normal category in Veliko Gradiste and Dimitrovgrad (*Figure 26*).

Based on the tercile method, precipitation sums were in the dry category across the entire country.

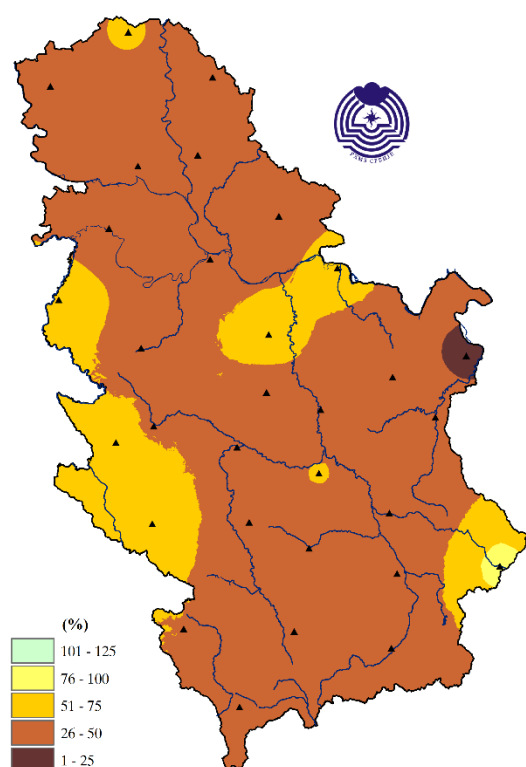


Figure 27. Spatial distribution of spring precipitation sums in percentage of the 1961-1990 normal

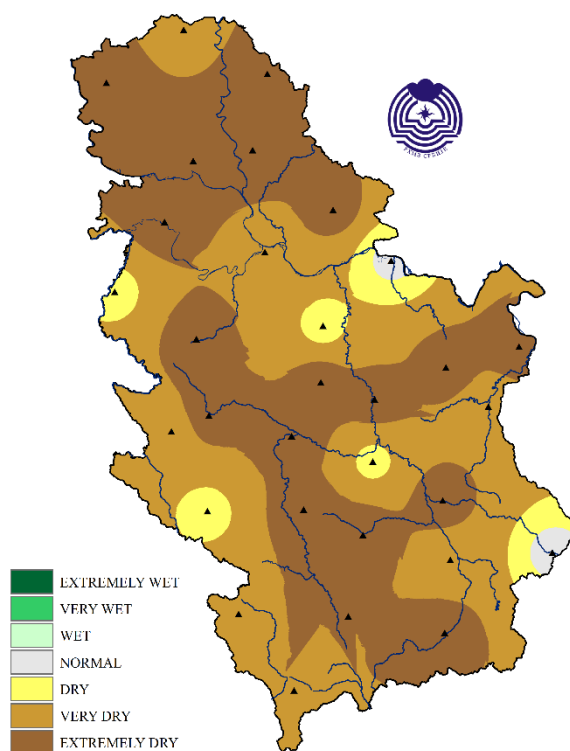


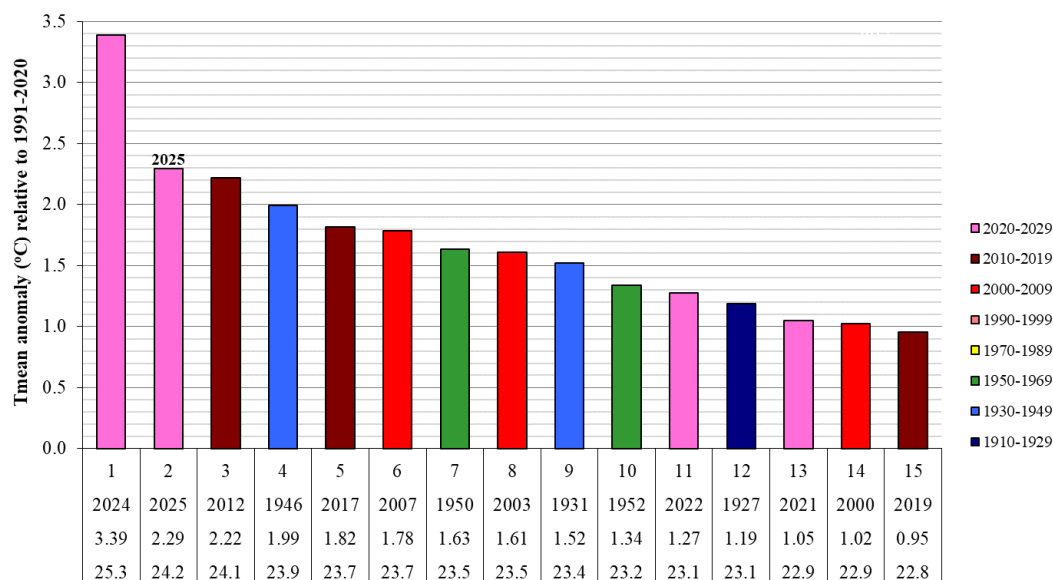
Figure 28. Summer precipitation sums according to the percentile method

Note: Climatological analysis of the meteorological elements is conducted based on the preliminary data obtained from the 28 main meteorological stations

APPENDIX

Mean air temperature

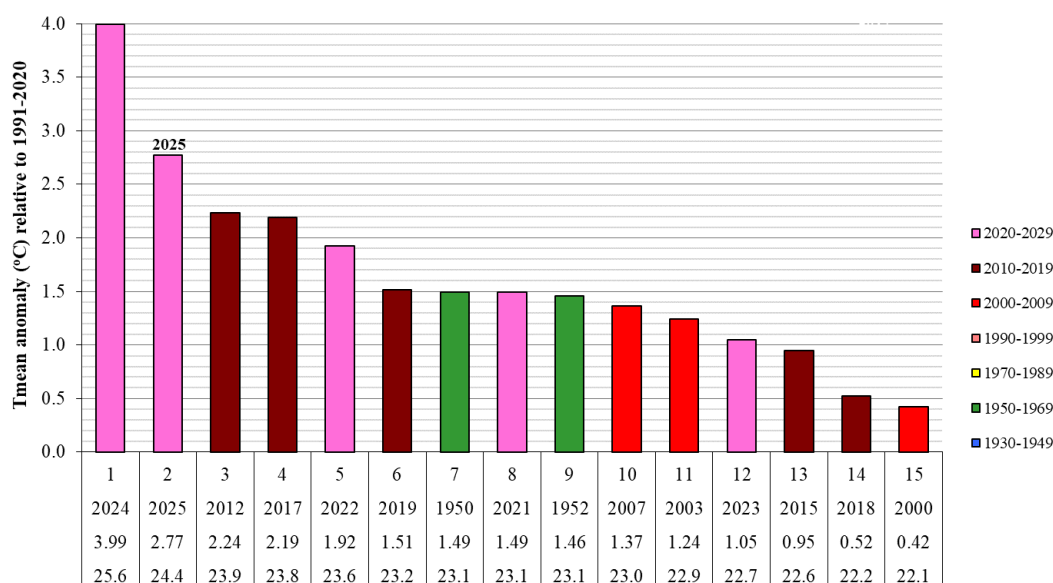
Anomaly of mean seasonal temperature relative to 1991-2020 base period
Kragujevac - 1925-2025 period



ranking - year - Tmean anomaly (°C) relative to 1991-2020 - Tmean

Appendix 1. Редослед најтоплијих лета у Крагујевцу

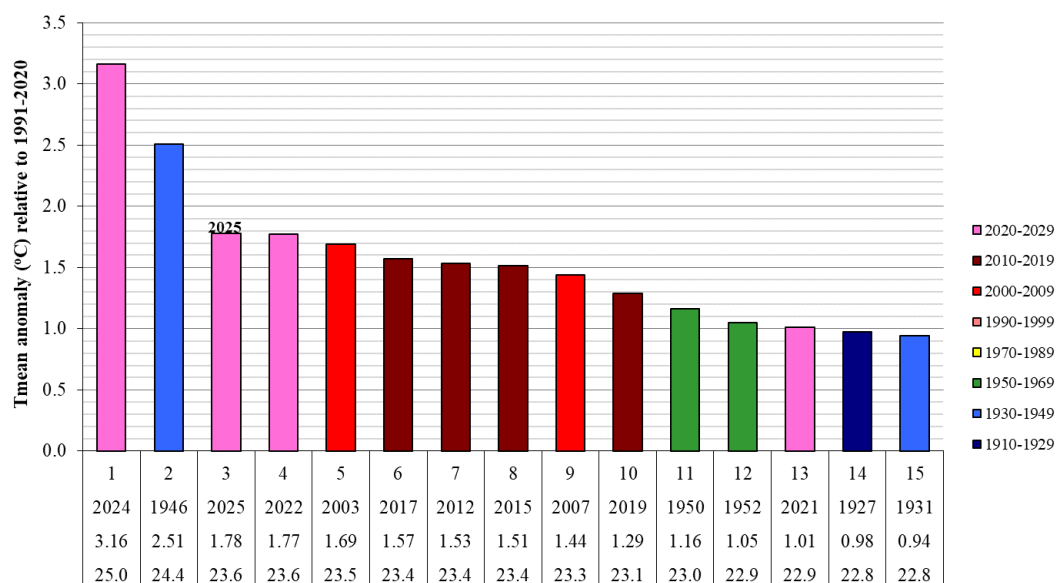
Anomaly of mean seasonal temperature relative to 1991-2020 base period
Cuprija - 1948-2025 period



ranking - year - Tmean anomaly (°C) relative to 1991-2020 - Tmean

Appendix 2. Rank of the warmest summers in Cuprija

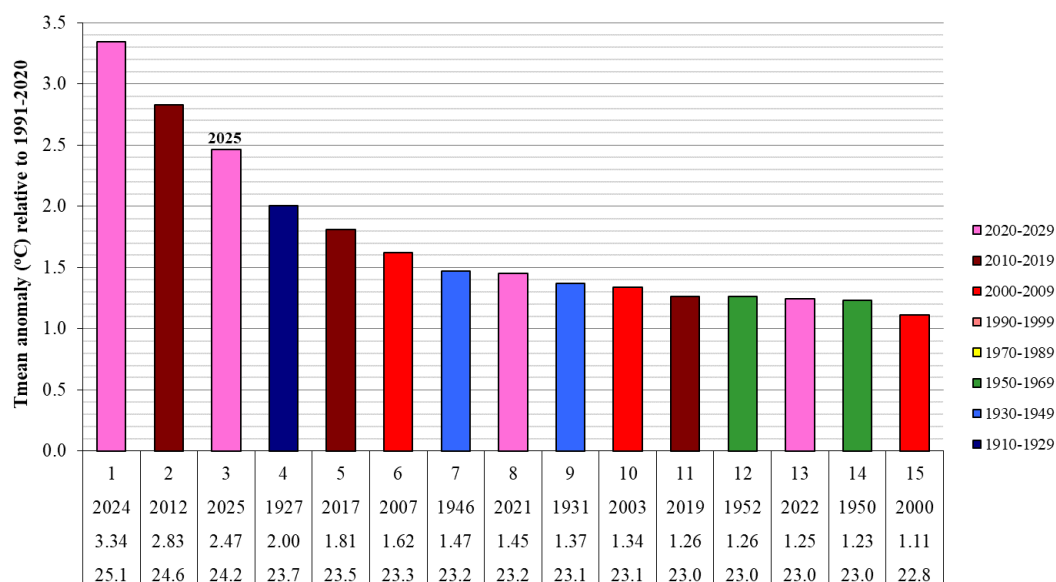
**Anomaly of mean seasonal temperature relative to 1991-2020 base period
Veliko Gradiste - 1926-2025 period**



ranking - year - Tmean anomaly (°C) relative to 1991-2020 - Tmean

Appendix 3. Rank of the warmest summers in Veliko Gradiste

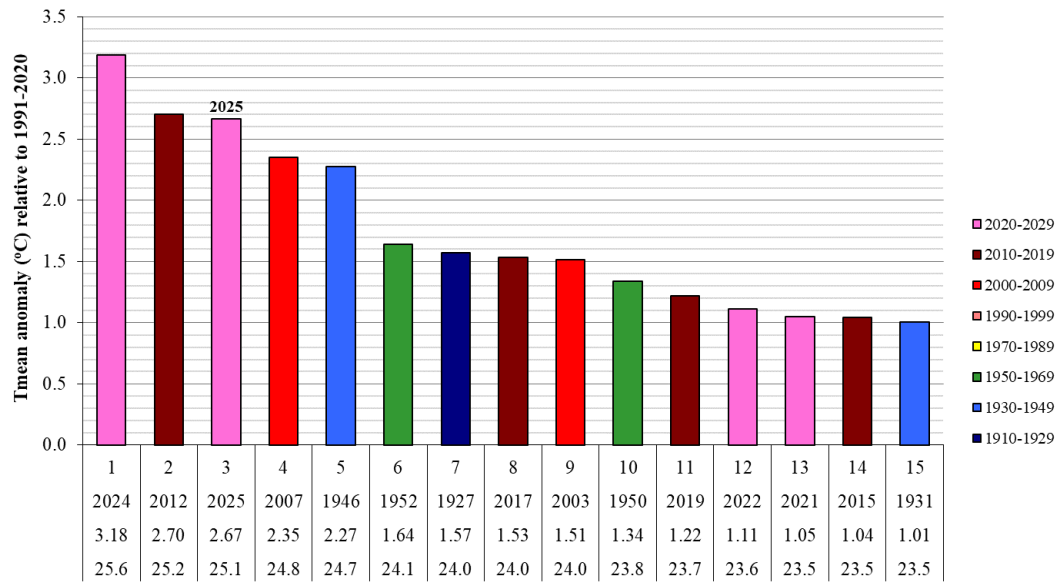
**Anomaly of mean seasonal temperature relative to 1991-2020 base period
Kraljevo - 1926-2025 period**



ranking - year - Tmean anomaly (°C) relative to 1991-2020 - Tmean

Appendix 4. Rank of the warmest summers in Kraljevo

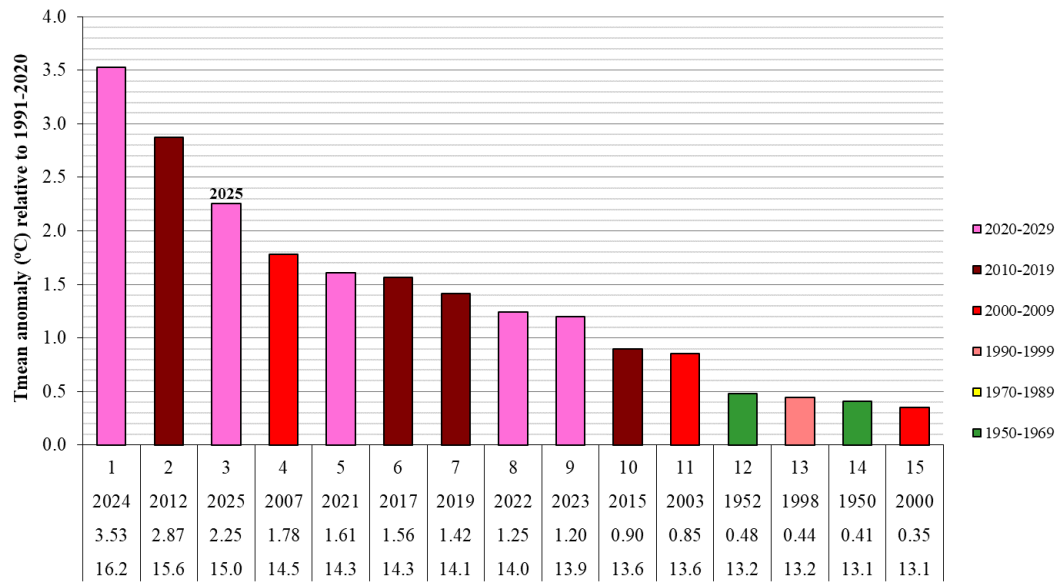
**Anomaly of mean seasonal temperature relative to 1991-2020 base period
Nis - 1925-2025 period**



ranking - year - Tmean anomaly (°C) relative to 1991-2020 - Tmean

Appendix 5. Rank of the warmest summers in Nis

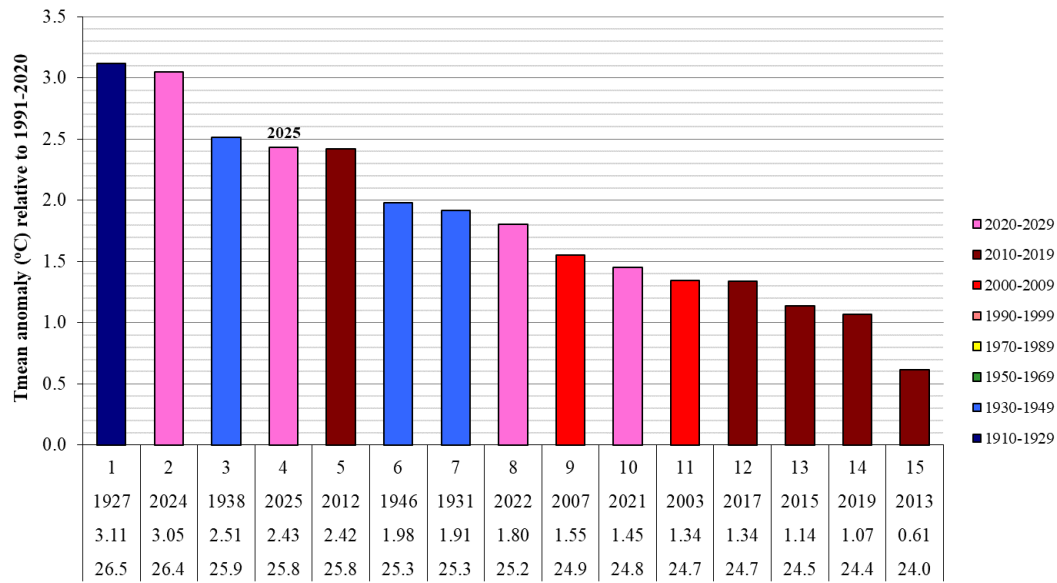
**Anomaly of mean seasonal temperature relative to 1991-2020 base period
Kopaonik - 1950-2025 period**



ranking - year - Tmean anomaly (°C) relative to 1991-2020 - Tmean

Appendix 6. Rank of the warmest summers in Kopaonik

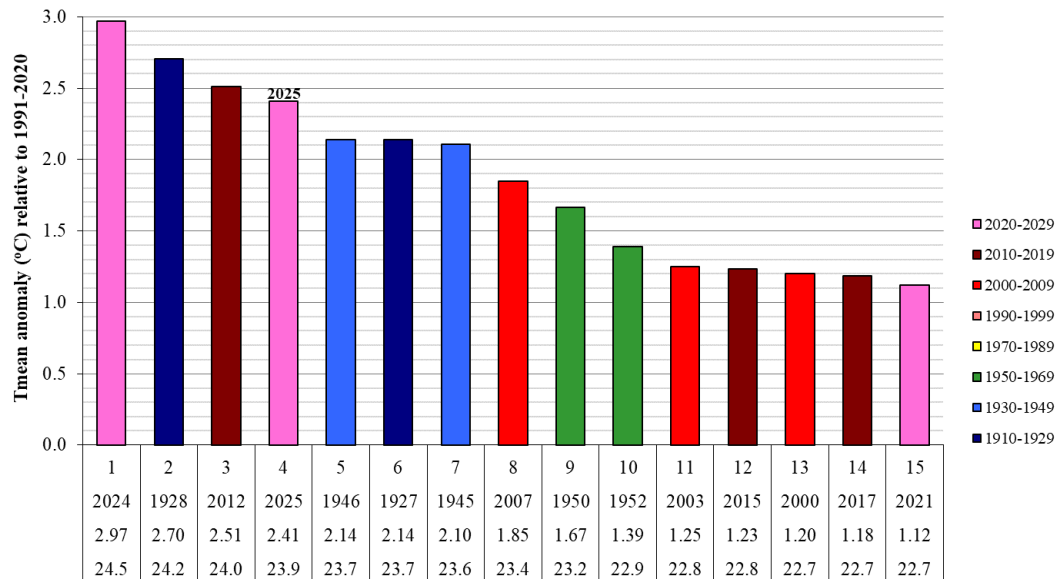
**Anomaly of mean seasonal temperature relative to 1991-2020 base period
Negotin - 1927-2025 period**



ranking - year - Tmean anomaly (°C) relative to 1991-2020 - Tmean

Appendix 7. Rank of the warmest summers in Negotin

**Anomaly of mean seasonal temperature relative to 1991-2020 base period
Vranje - 1926-2025 period**

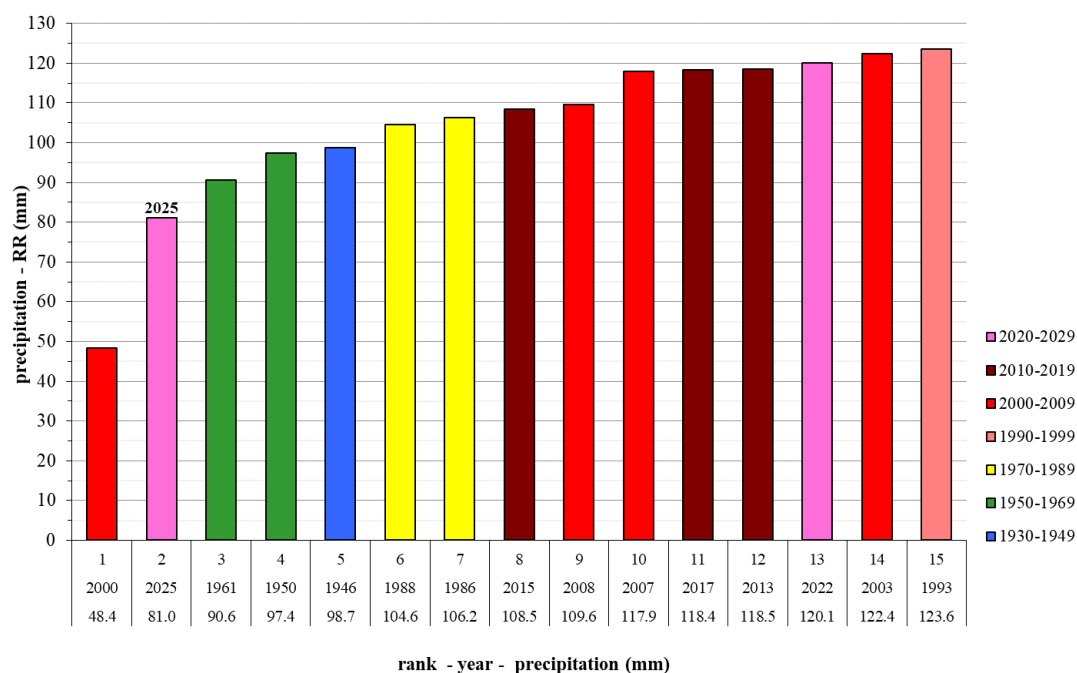


ranking - year - Tmean anomaly (°C) relative to 1991-2020 - Tmean

Appendix 8. Rank of the warmest summers in Vranje

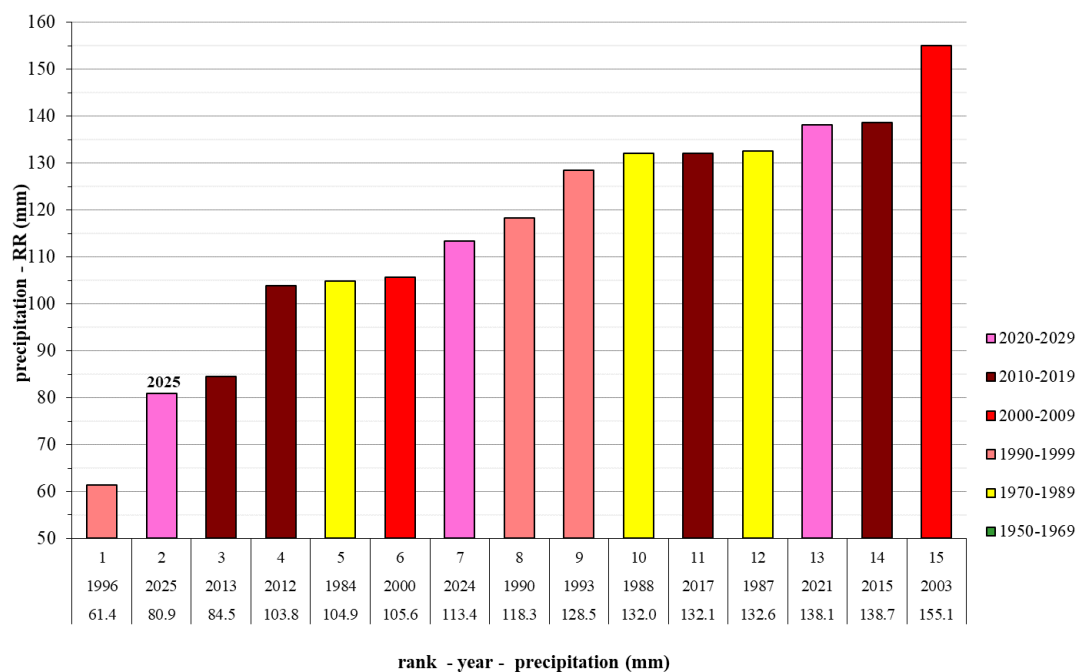
Precipitation

Summer precipitation sums
Banatski Karlovac - 1946-2025 period

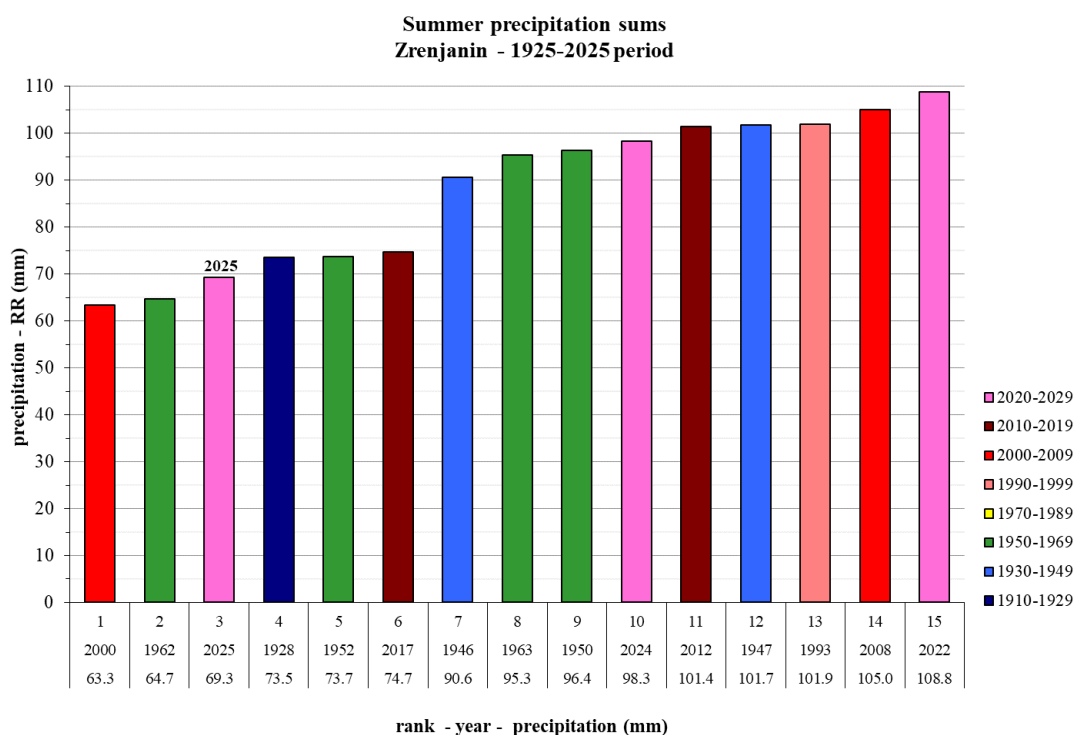


Appendix 9. Rank of the driest summers in Banatski Karlovac

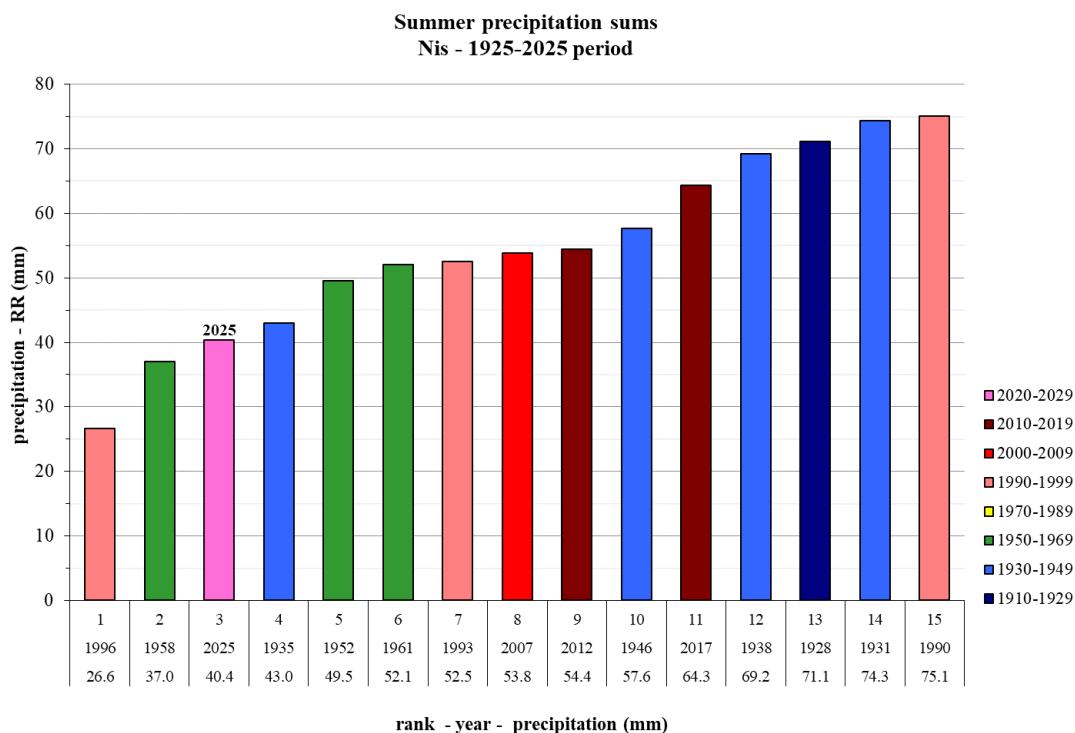
Summer precipitation sums
Crni Vrh - 1967-2025 period



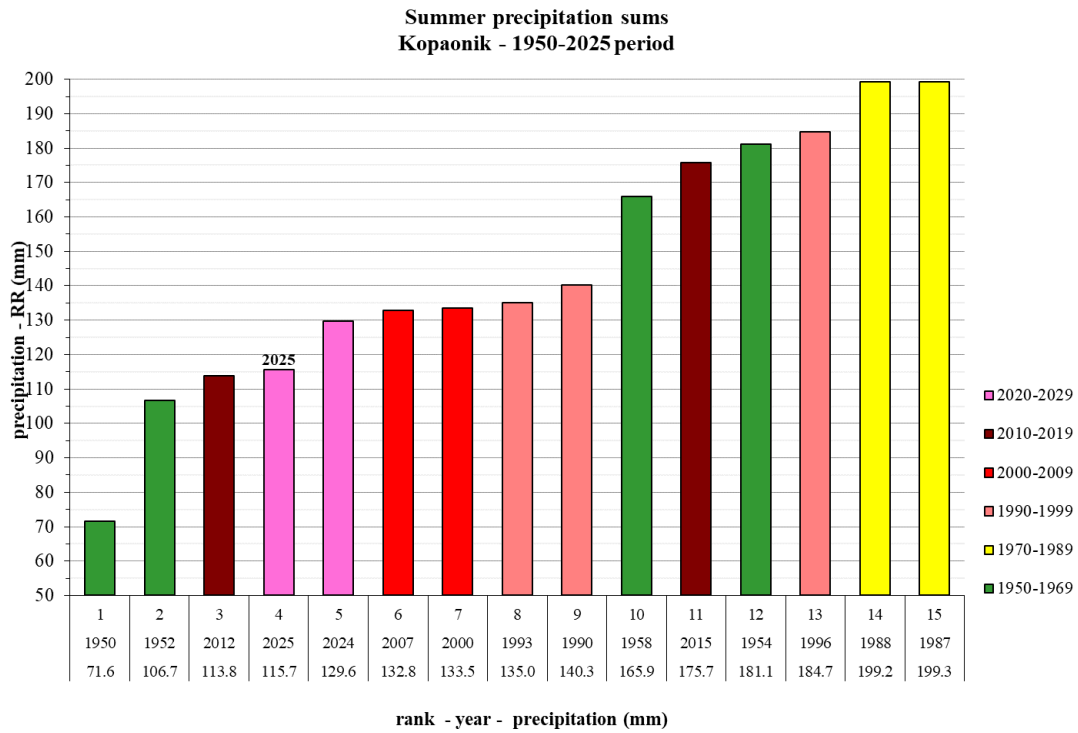
Appendix 10. Rank of the driest summers in Crni Vrh



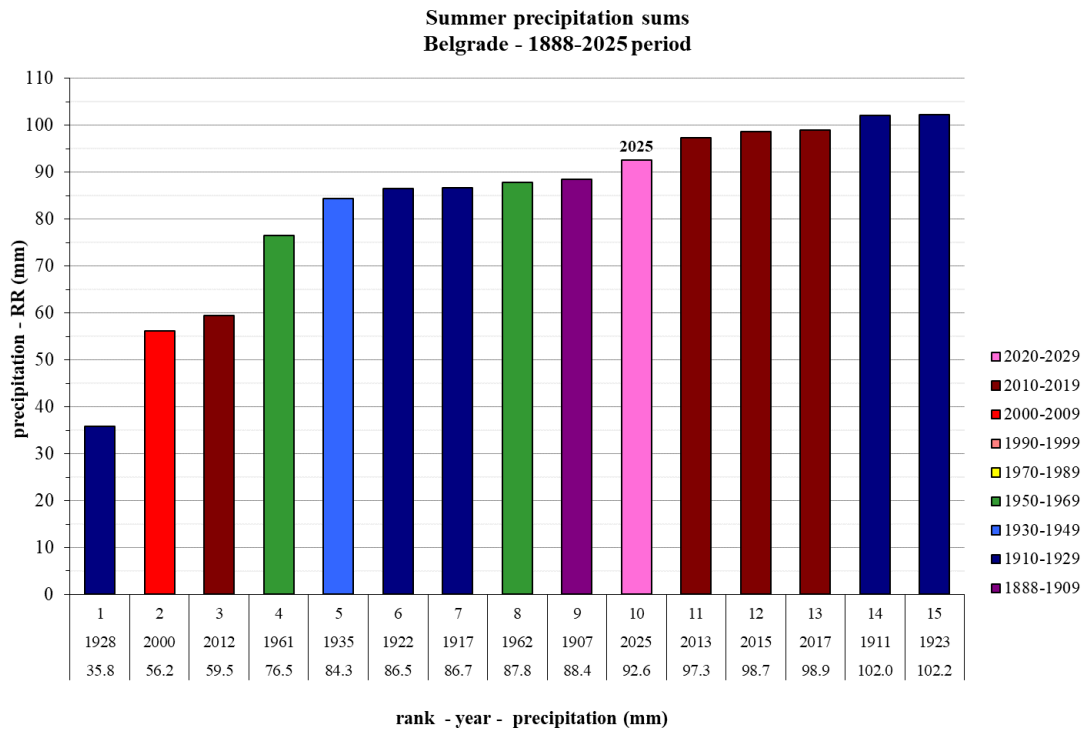
Appendix 11. Rank of the driest summers in Zrenjanin



Appendix 12. Rank of the driest summers in Nis



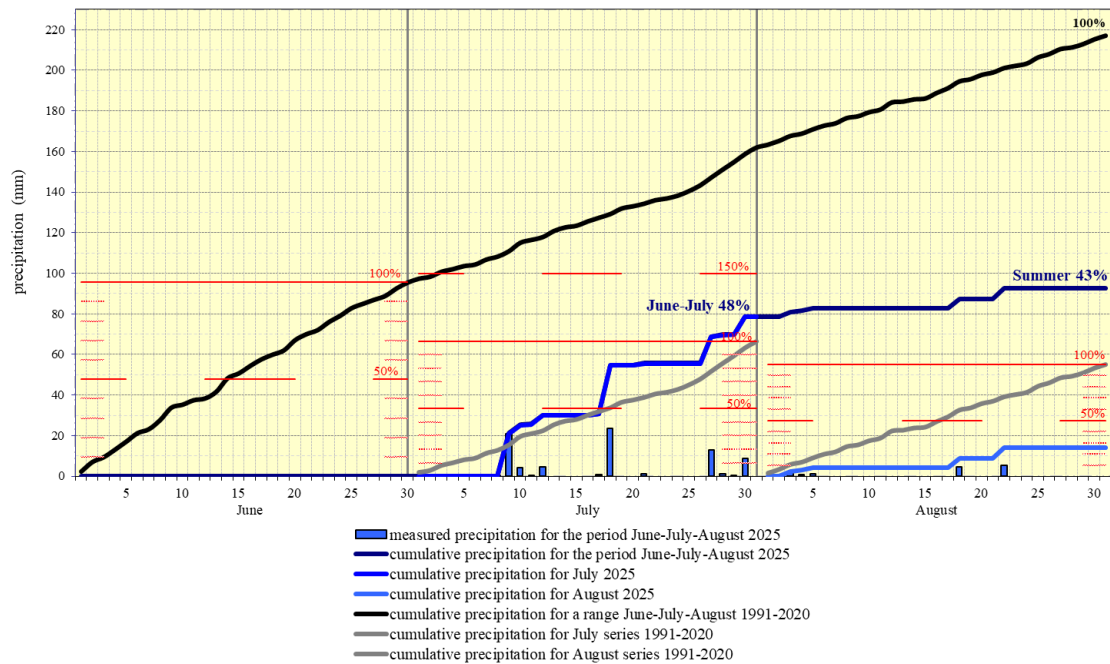
Appendix 13. Rank of the driest summers in Kopaonik



Appendix 14. Rank of the driest summers in Belgrade

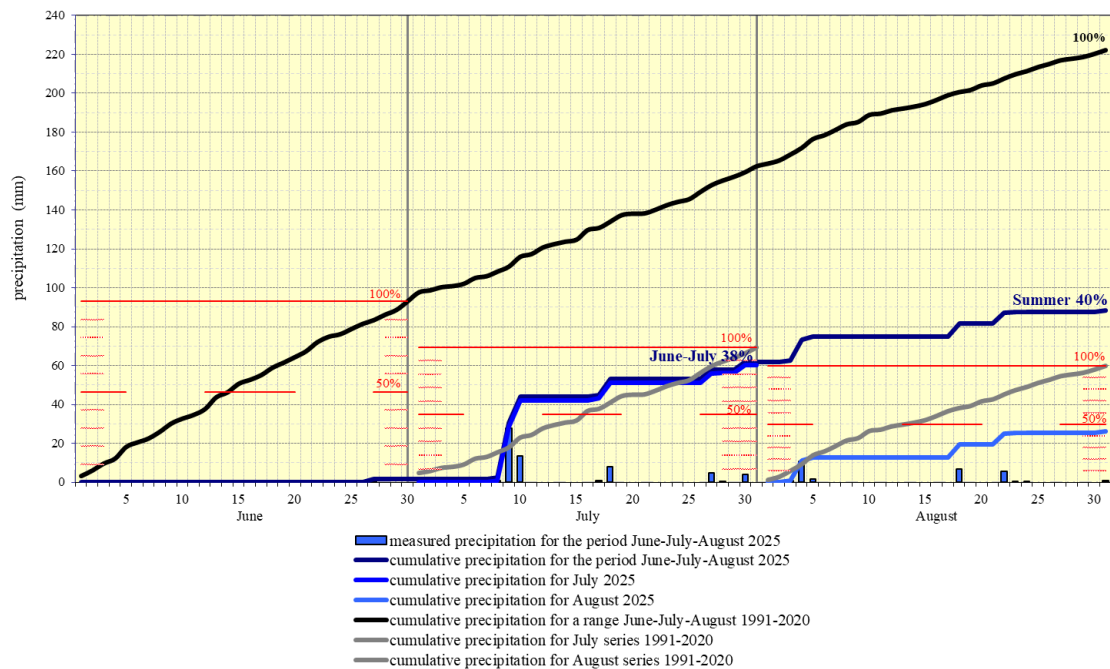
Cumulative precipitation June, July, August and summer

Cumulative precipitation sums in Belgrade



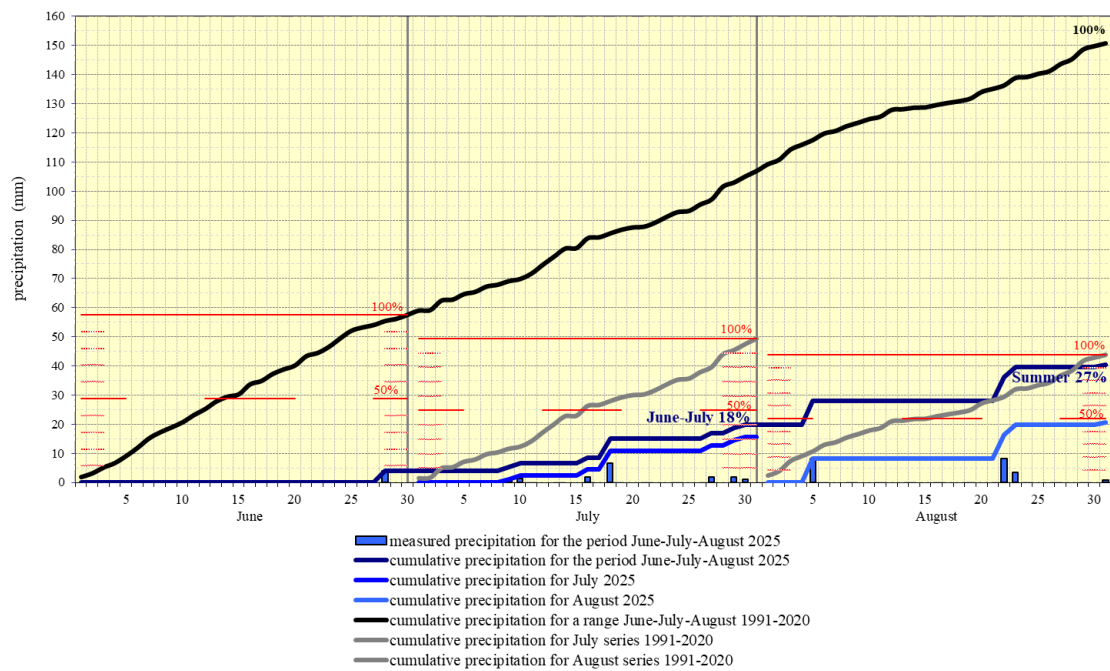
Appendix 15. Rank of the driest summers in Belgrade

Cumulative precipitation sums in Novi Sad



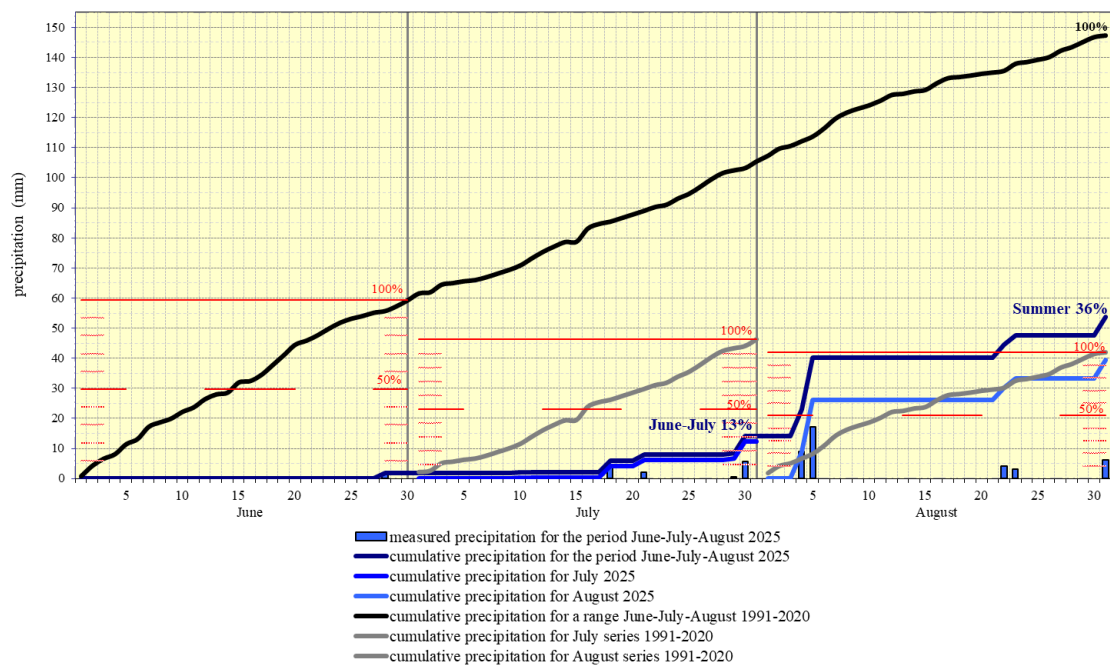
Appendix 16. Rank of the driest summers in Novi Sad

Cumulative precipitation sums in Nis



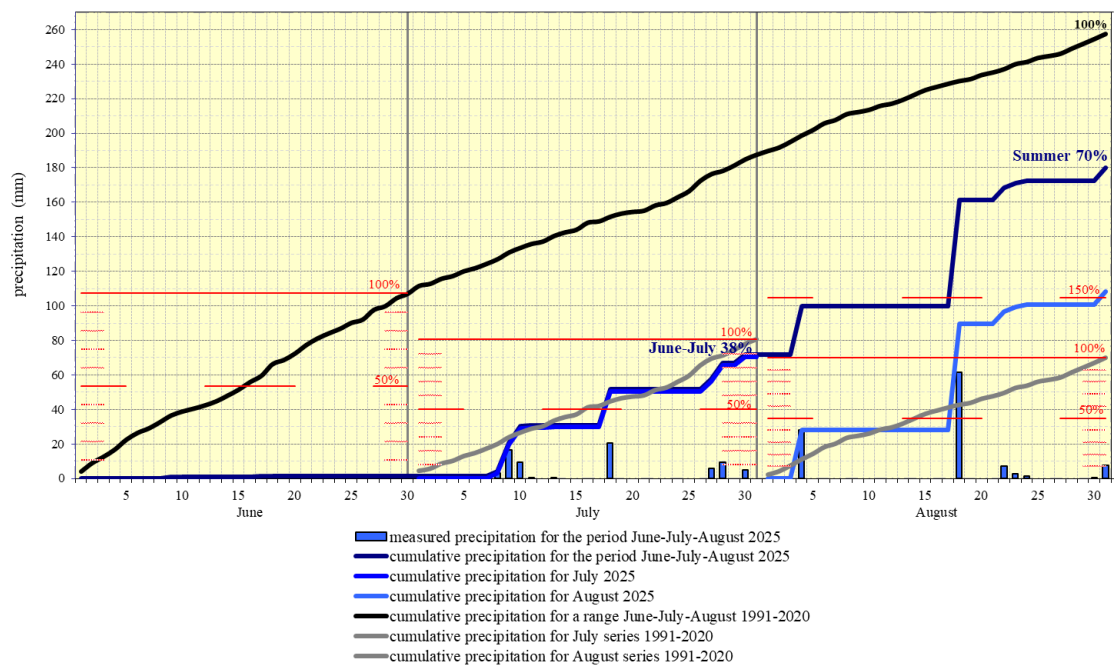
Appendix 17. Rank of the driest summers in Nis

Cumulative precipitation sums in Vranje



Appendix 18. Rank of the driest summers in Vranje

Cumulative precipitation sums in Loznica



Appendix 19. Rank of the driest summers in Loznica