

Republic Hydrometeorological Service of Serbia

Kneza Viseslava 66

11000 Belgrade

Republic of Serbia



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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

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- ❖ **2020 was 3rd warmest for Curpija and Negotin**
- ❖ **Averagely rainy in most of Serbia, very rainy and extremely rainy in the south, southwest, southeast and certain central parts of the country**
- ❖ **For the first time Kikinda didn't observe any snow cover; record low number of days with snow cover in Loznica, Negotin and Zajecar; Record late occurrence of snow cover in Belgrade**
- ❖ **Summer of 2020 ranks as the 2nd wettest for Serbia in the last 70 years**
- ❖ **The dries April for Veliko Gradiste and Crni Vrh; wettest August for Sjenca; driest September for Zlatibor; driest November for Kursumlija; warmest December for Banatski Karlovac and Kopaonik**

Air temperature

With the mean air temperature of 11.7°C, the year of 2020 ranks as the 7th warmest for Serbia in the period from 1951 up to date. Belgrade observed mean air temperature of 13.9°C, making the year of 2020 the 9th warmest for Belgrade in the period from 1888.

Mean air temperature ranged from 10.6°C in Pozega to 13.9°C in Belgrade, and on the mountains from 5.0°C at Kopaonik to 8.8°C at Zlatibor (Appendix, Figure 2).

Departure of the mean annual air temperature relative to the 1981-2010 base period ranged from 0.9°C in Zajecar, Krusevac, Sjenica and Pozega to 1.8°C in Negotin and 1.4°C in Belgrade (Appendix, Figure 3). Based on the percentile distribution¹, 2020 was in very warm category in most of Serbia, and extremely warm category in Negotin, Kursumlija, Cuprija, Dimitrovgrad and Kopaonik (Appendix, Figure 4).

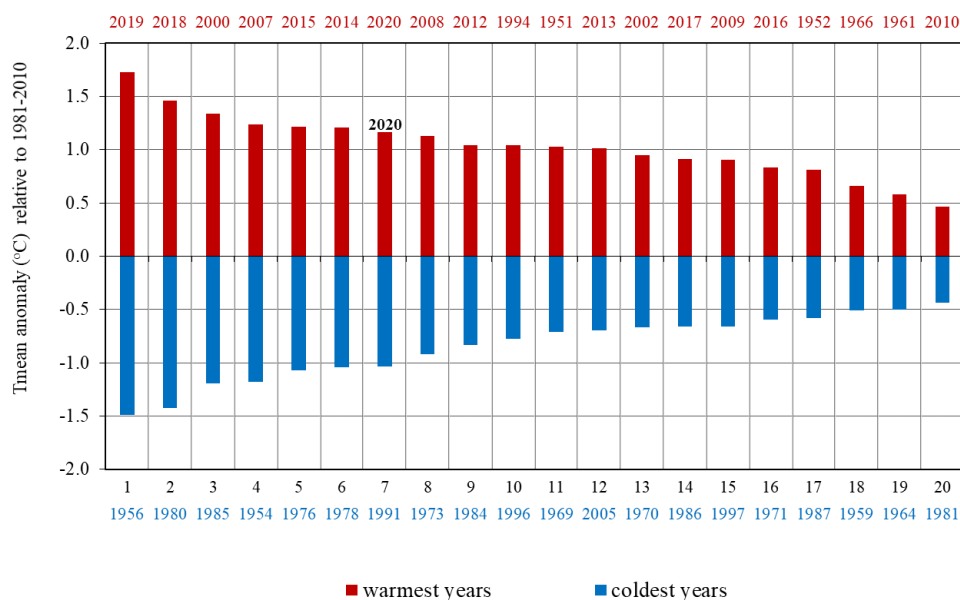


Figure 1. Rank of the warmest and coldest years for Serbia for the 1951-2020 period

¹ **n**- 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

In Serbia, 9 out of 10 warmest years were registered after 2000 (1951-2020 period), and in Belgrade 14 out of 15 warmest years (1888-2020 period).

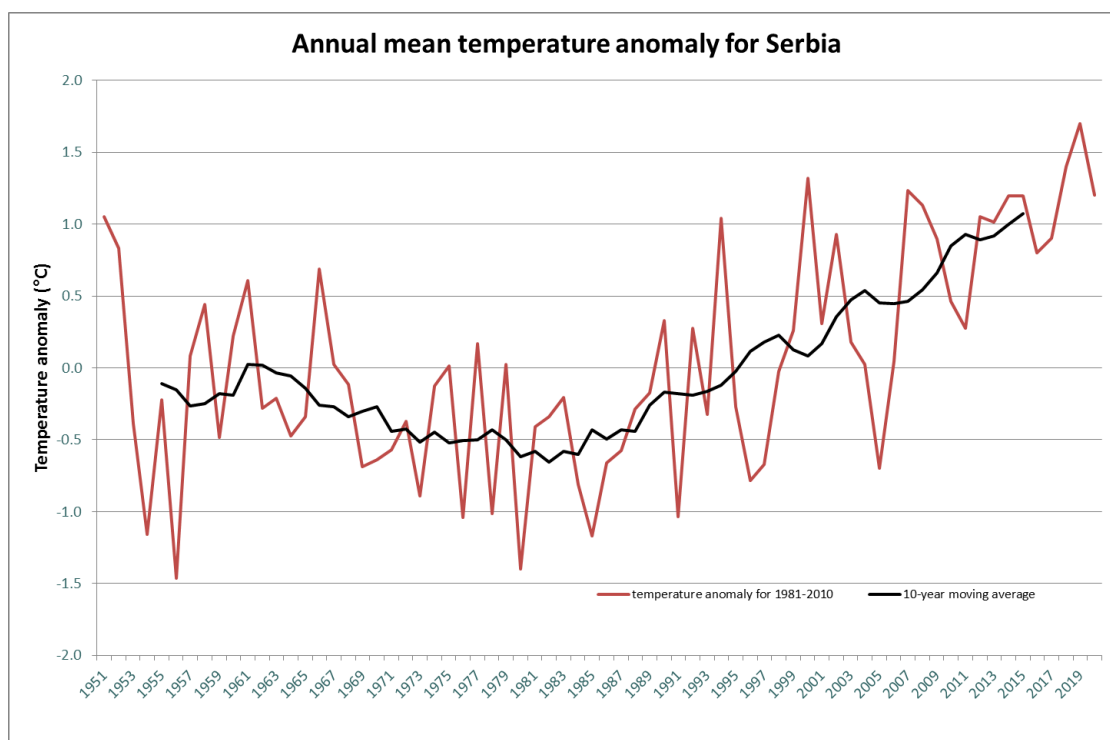


Figure 2. Trend of the mean annual air temperature anomaly for Serbia, 1951-2020 period

In 2020, the highest daily air temperature of 36.9°C was measured in Cuprija on August 31. The highest number of tropical days², total of 63 days, was observed in Negotin. Most of Serbia registered between 3 and 19 tropical days above the average for the 1981-2010 base period. Belgrade observed 48 tropical days which is 11 days above the average.

Belgrade recorded 32 tropical nights³, which is 15 nights above the average. Negotin and Zrenjanin observed 14 and 11 tropical nights, respectively. Elsewhere, fewer than 7 tropical nights were observed. Tropical nights were not recorded in the southwest and southeast of Serbia.

In 2020, the lowest daily air temperature of -20.8°C was measured in Sjenica on January 8. Most of Serbia didn't see any days with severe frost⁴. For the first time, days with severe frost were not recorded at Crni Vrh and Kursumlija. On the mountains their number ranged from 2 at Zlatibor to 15 days at Kopaonik. Pozega recorded 4 days, Zajecar and Dimitrovgrad recorded 3 days and Leskovac recorded 1 day with severe frost. Number of days with severe frost was below the average in the entire country, from 3 in Belgrade to 24 days at Kopaonik.

In 2020, number of ice days⁵ in Serbia ranged from 1 in Smederevska Palanka, Dimitrovgrad and Vranje to 7 days in Zrenjanin and Kikinda, and in the upland from 19 days at Zlatibor to

² Tropical day is defined as the day with the maximum daily air temperature of 30 °C and more

³ Tropical night is defined as the night with the minimum daily air temperature of 20 °C and more

⁴ Day with severe frost is defined as the day with the minimum daily air temperature of -10 °C and less

⁵ Ice day is defined as the day with maximum air temperature below 0 °C

39 days at Crni Vrh. In the entire country, number of ice days was from 12 to 36 days below the average for the 1981-2010 base period.

Number of frost days⁶ ranged from 30 in Belgrade to 95 in Pozega, and on the mountains from 97 at Zlatibor to 154 at Kopaonik. Number of frost days was 11 to 35 days below the average.

Based on the analysis of the mean minimum and mean maximum air temperature in Serbia, 2020 ranks as the 5th warmest in the period from 1981 (Figure 3).

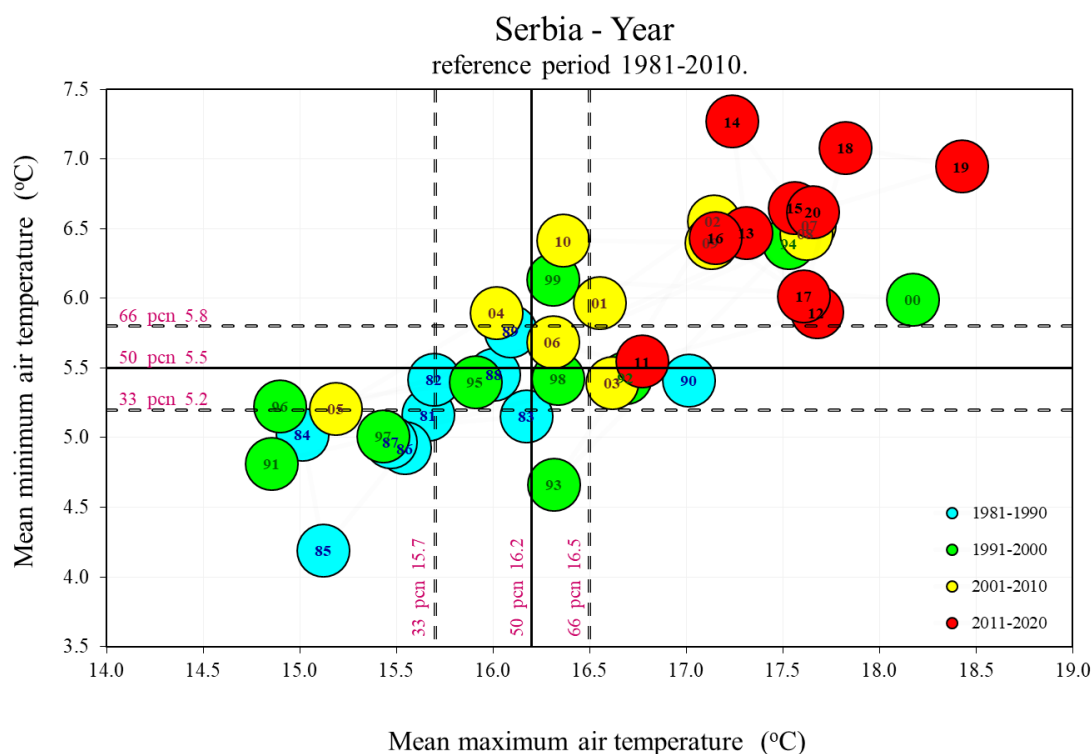
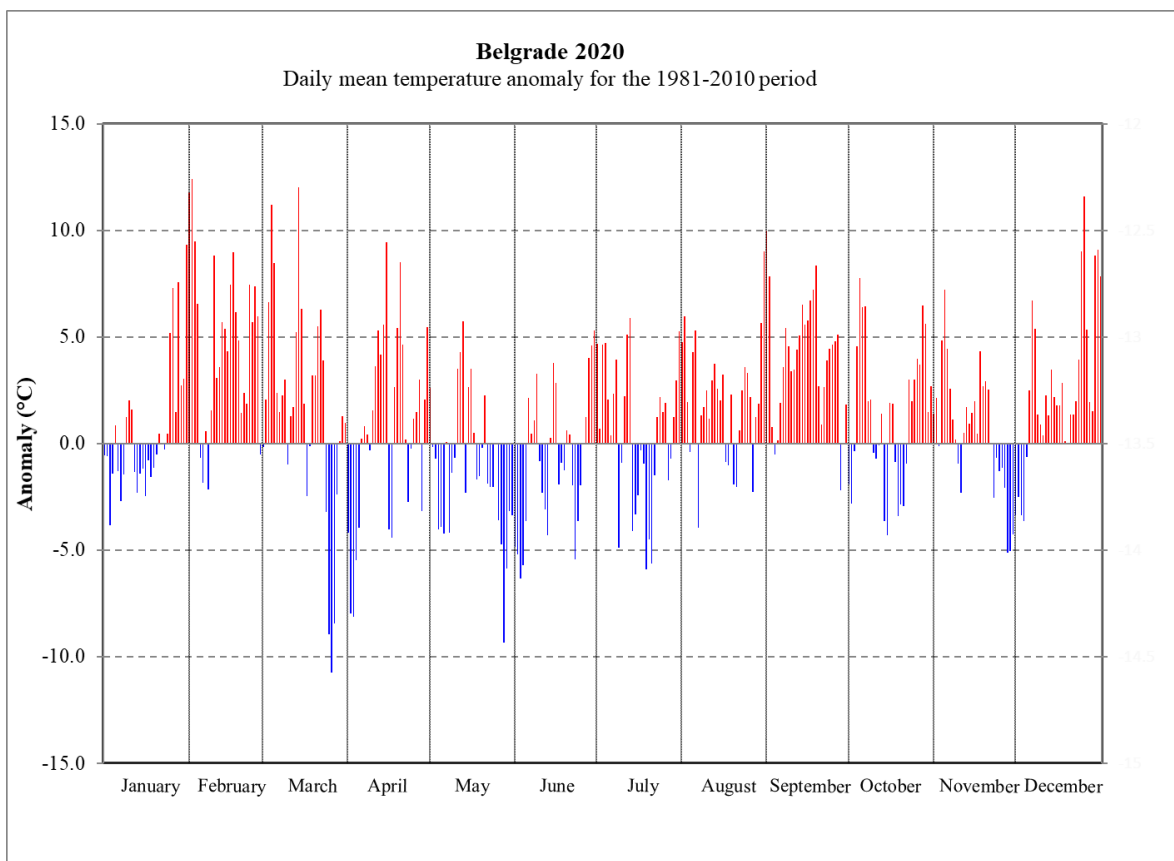


Figure 3. Mean minimum and mean maximum air temperature and their accompanying terciles for Serbia for the 1981-2020 period

⁶ Frost day is defined as the day with minimum air temperature below 0 °C



Слика 4. Figure 4. Daily departure of the mean air temperature from the normal 1981-2010 for Belgrade

Precipitation

The year of 2020 was averagely rainy in most of Serbia, and very rainy and extremely rainy in the south, southwest, southeast and certain central parts of the country. It was dry in Valjevo and Kikinda. Precipitation sums ranged from 472.6 mm in Kikinda to 881.2 mm in Kraljevo, and on the mountains from 781.1 mm at Crni Vrh to 1274.0 mm at Kopaonik. Percentage of the precipitation sums relative to the 1981-2010 normal ranged from 85% in Kikinda to 138% in Krusevac.

Number of rainy days, with the precipitation sum of 0.1 mm and above, ranged from 112 in Sombor to 140 in Cuprija, and in the upland from 143 at Zlatibor to 160 days at Kopaonik.

Number of days with precipitation sum of 20 mm and above ranged from 1 in Kikinda to 13 in Krusevac and Pozega, and on the mountains from 5 at Crni Vrh to 14 days at Zlatibor. Kraljevo observed 3 days with precipitation sums of 50 mm and above, Sjenica and Kopaonik recorded 2 days and Banatski Karlovac, Loznica, Belgrade, Kragujevac, Smederevska Palanka, Krusevac, Nis, Dimitrovgrad and Zlatibor registered 1 day.

The highest daily precipitation sum of 86.6 mm was observed at Kopaonik on August 7, thereby breaking the previous August record for Kopaonik.

For the first time snow cover wasn't observed in Kikinda. Record low number of days with snow cover was in Loznica, Negotin and Zajecar. The latest occurrence of snow cover ever was observed in Belgrade. Number of days with snow cover ranged from 1 in Zrenjanin to 29 in Pozega, and in the upland from 70 days in Sjenica to 133 at Kopaonik. The highest snow depth of 91 cm was recorded at Kopaonik on February 29. In the lowland, the highest snow depth of 37 cm was registered in Kursumlija on March 25.

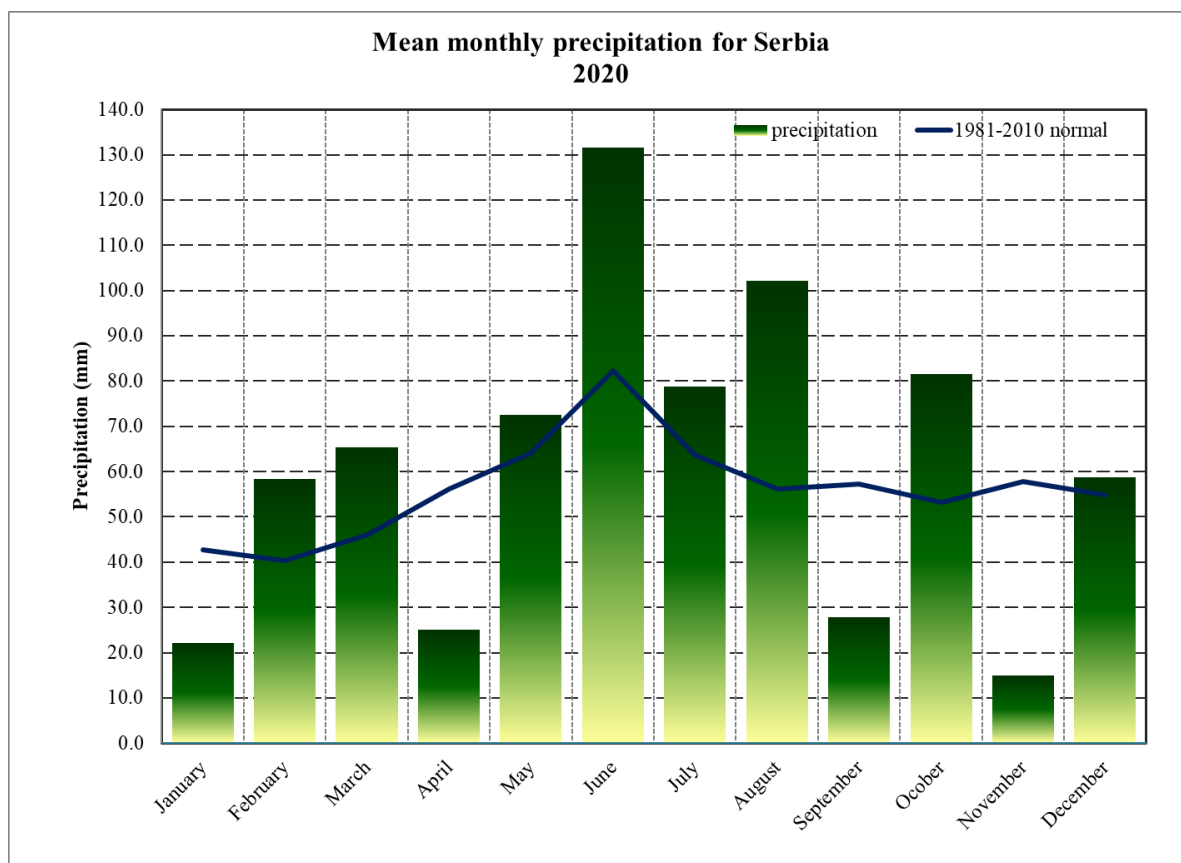


Figure 5. Mean monthly precipitation sums for Serbia

Heat waves and cold waves

There were't any cold waves⁷ observed during winter 2019/2020. Heat wave⁸ was recorded across most of Serbia, lasting from 31 January to 4 February, apart from the northern and mountainous parts of the country.

In spring 2020, heat wave was recorded in Banatski Karlovac, lasting from April 9 to 13, and in Dimitrovgrad from May 13 to 17. Cold wave was recorded in Kikinda (March 31 to April 5), Belgrade (March 31 to April 4) as well in summer in the period from April 6 to 10 in Pozega and Sjenica.

In summer 2020, heat wave was observed only in Dimitrovgrad, lasting from August 28 to September 1.

In autumn 2020, two heat waves were registered, the first one was observed across the entire country in September, and the second one was observed at Kopaonik in November. The most intense heat wave, with the total duration of 14 days from September 5 to 18, was recorded in Negotin. In the period from September 9 to 17, heat wave was registered in the north of the country, Belgrade and Veliko Gradiste. In Smederevska Palanka, Cuprija and Leskovac, heat wave lasted from September 10 to 14, in Banatski Karlovac and Vranje from September 10 to 17. Heat wave, with the duration of 7 days, was recorded in Loznica in the period from September 11 to 17, and in Valjevo from September 12 to 17. Kopaonik observed 5-day heat wave, from November 8 to 12. Serbia didn't experience any cold waves during autumn.

In December 2020, heat wave was recorded at 6 meteorological stations. The onset of the heat wave at Kopaonik was registered on December 14 lasting until December 19, whilst heat wave in Banatski Karlovac, Veliko Gradiste, Krusevac, Dimitrovgrad and Leskovac began on December 28 and lasted until the beginning of January 2021.

Monthly and seasonal summary of the climatological characteristics and record values of temperature and precipitation registered in 2020

January – averagely warm. 11th driest January for Serbia in the period from 1951 to 2020. 4th driest January for Crni Vrh and Negotin. Snow cover was not observed in the north, most of south, parts of eastern and southwestern Serbia. Record-breaking number of bright days was observed in Sombor and Zlatibor. Lowest number of cloudy days for January for Belgrade since the record-keeping began. Record-breaking number of insolation hours in Kursumlija since the record-keeping began.

⁷ Cold wave, based on the percentile method, is defined as the period during which the minimum daily air temperature falls under the very cold and extremely cold category for 5 consecutive days and longer

⁸ Heat wave, based on the percentile method, is defined as the period during which the maximum daily temperature falls under the category of very warm and extremely warm for 5 consecutive days and longer

February - 9th warmest for Serbia in the period from 1951 to 2020, 4th warmest for Palic in the period from 1945 to 2020. Kopaonik observed record-breaking daily air temperature. 15th wettest February for Serbia in the period from 1951 to 2020. 2nd wettest February for Valjevo. 5-day heat wave was observed.

March – averagely warm, 14th wettest for Serbia. Very rainy and extremely rainy in the southeast and parts of eastern and southern Serbia. Record-breaking daily and monthly precipitations sums were observed in Dimitrovgrad.

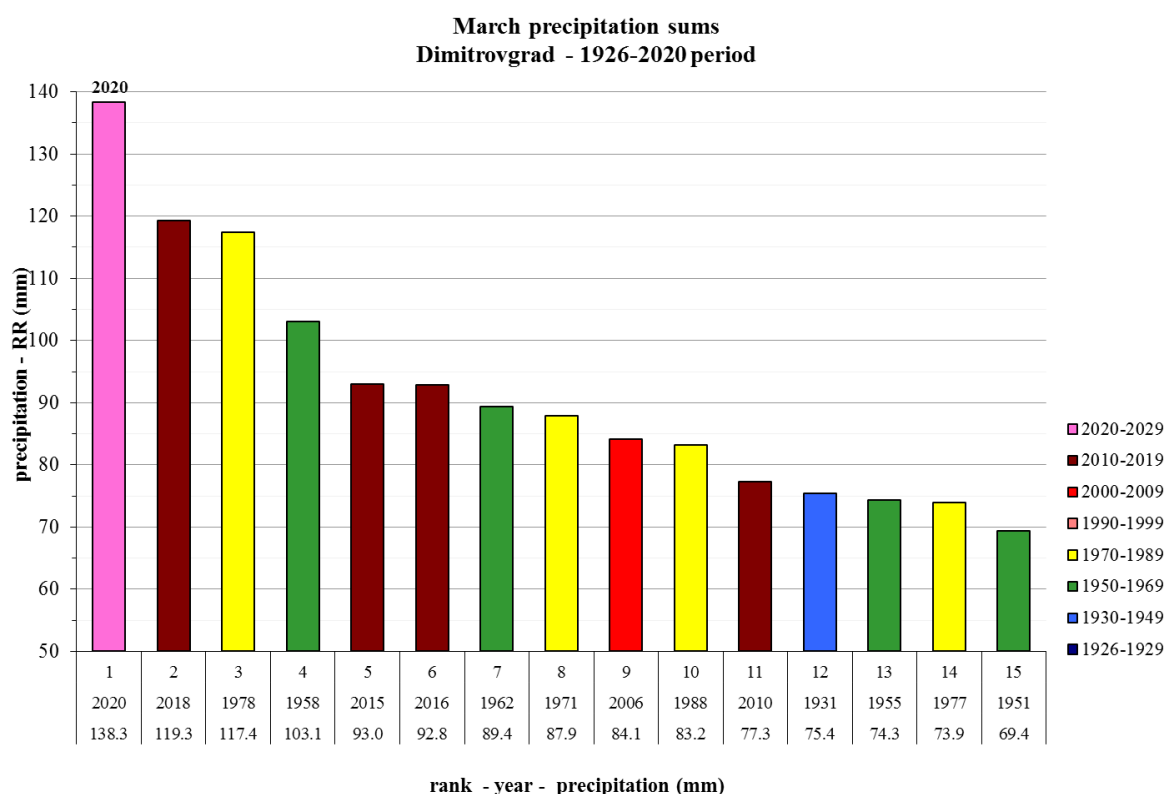


Figure 6. Wettest March in Dimitrovgrad for 1926-2020 period

April – warm in Belgrade, Banatski Karlovac and Crni Vrh, elsewhere mean April air temperature within the multiannual average. 6th driest April for Serbia in the period from 1951 to 2020, and driest on record for Crni Vrh and Veliko Gradiste. Kikinda observed record-breaking minimum air temperature for April. Cold wave was recorded in Kikinda, Belgrade, Pozega and Sjenica. Banatski Karlovac recorded 5-day heat wave.

May – cold in the north, west and northeast of Serbia, elsewhere average air temperature. Record-breaking maximum air temperature for May was registered in Kraljevo, Nis, Leskovac and Kursumlija. Heat wave was observed in Dimitrovgrad, with the total duration of 5 days. Very rainy May in Smederevska Palanka, rainy in central Serbia, parts of western, eastern and northeastern Serbia, dry on Palic.

June - averagely warm in most of Serbia, warm in Kikinda and Negotin. 5th wettest June for Serbia, 2nd wettest for Kragujevac, Nis, Kopaonik and Zlatibor. Historical daily precipitation

maximum for June was surpassed in Kragujevac and Nis. On Zlatibor, maximum number of days with precipitation higher than 20 mm for June was exceeded.

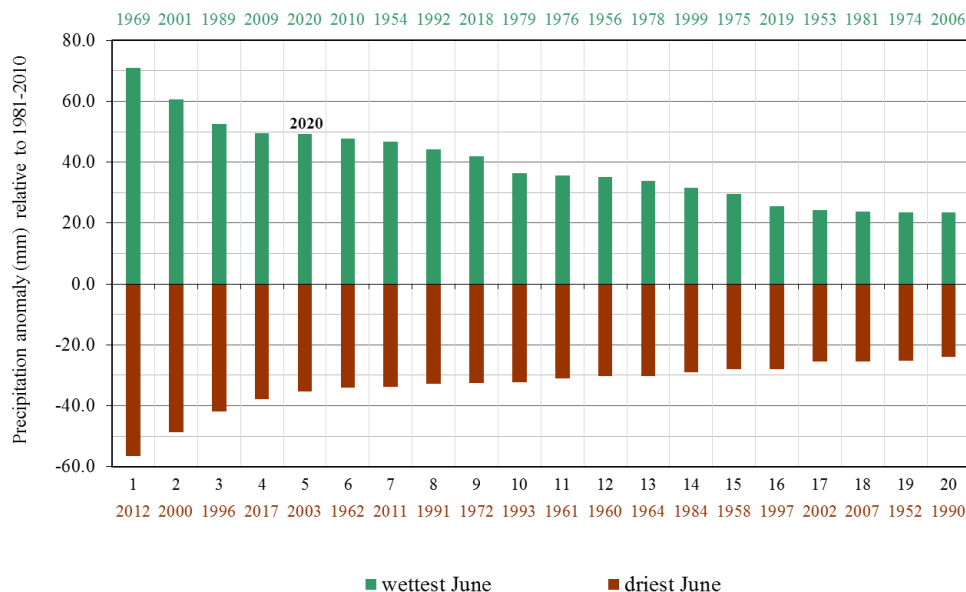


Figure 7. Rank of the wettest and driest June for Serbia for the 1951-2020 period

July – averagely warm and averagely rainy in most of Serbia. 3rd wettest for Krusevac with monthly precipitation totals of 187,5 mm.

August – 7th wettest for Serbia, with the above-average air temperature across most of the country. Wettest on record August for Sjenica. Daily precipitation sums were exceeded in Sombor, Banatski Karlvoac, Sjenica and Kopaonik. Very rainy and extremely rainy was in the southwest and south.

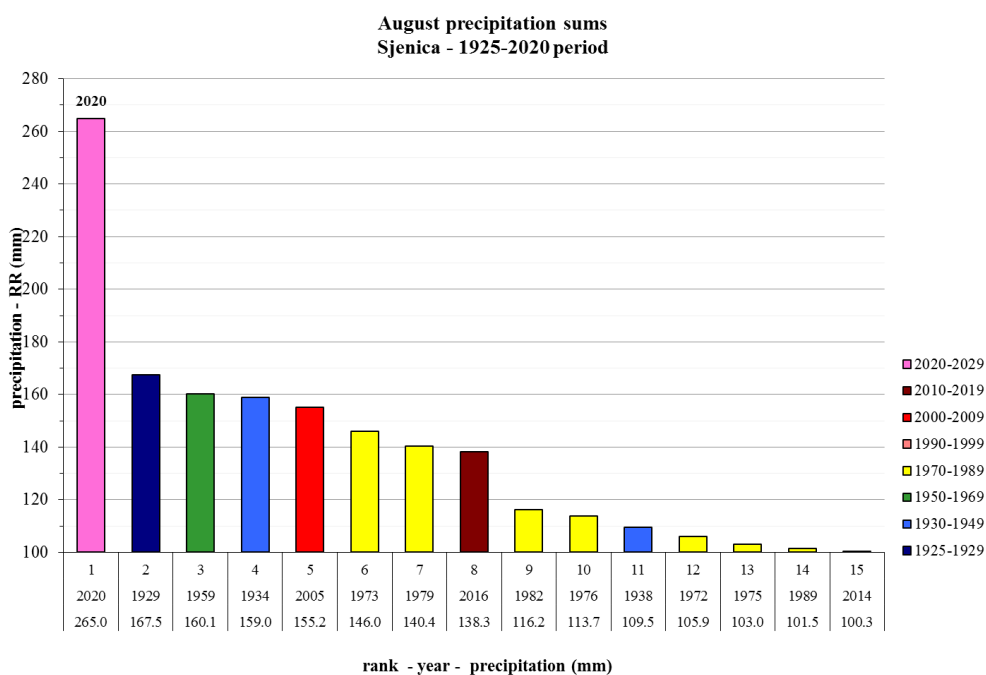


Figure 8. Wettest August in Sjenica for 1925-2020 period

September – 7th warmest for Serbia, 4th warmest for Kikinda, and 9th warmest for Belgrade. 2nd driest September for Zlatibor. Heat wave was observed across most of Serbia, the most intensive one was registered in Negotin.

October – warm and rainy in most of Serbia. Sombor observed record-breaking maximum daily air temperature for October. The 3rd wettest October for Kopaonik and 8th wettest for Zrenjanin.

November – 4th driest for Serbia. The driest on record for Kursumlija, 2nd driest for Vranje and Sjenica. Averagely warm November across most of Serbia. Heat wave was registered at Kopaonik. Sremska Mitrovica experienced record low number of insolation hours.

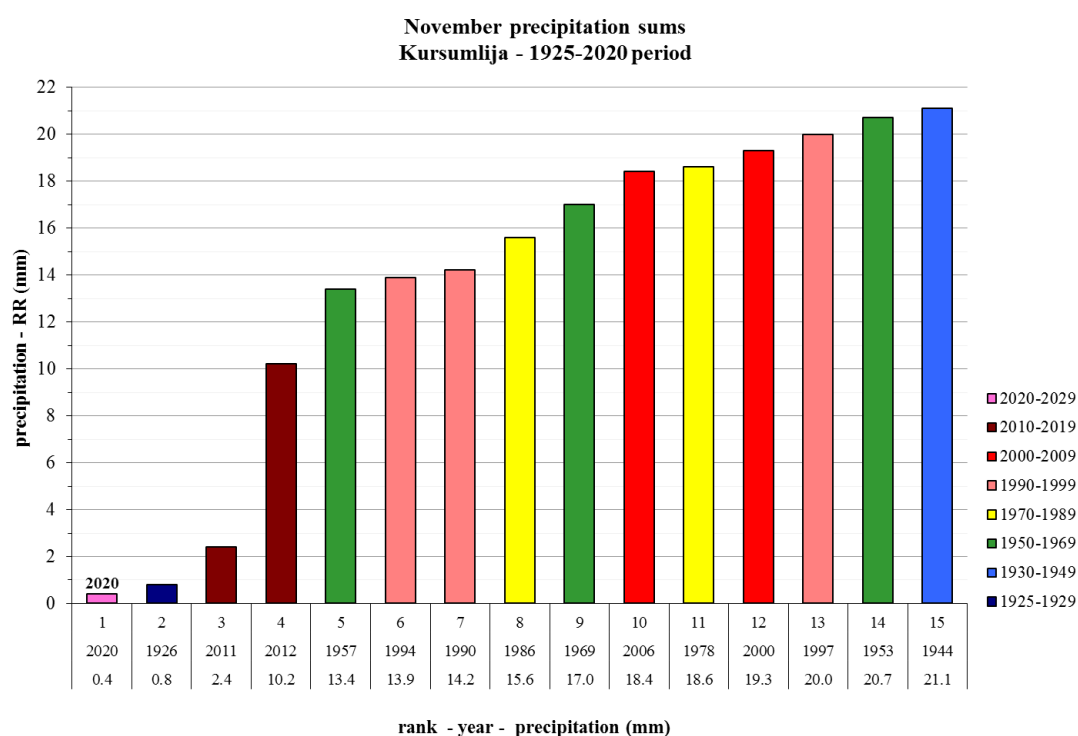


Figure 9. Driest November for Kursumlija for 1925-2020 period

December – 2nd warmest for Serbia, warmest on record for Banatski Karlovac and Kopaonik. 7th wettest December for Sjenica. Heat wave was observed at 6 meteorological stations. More than half of meteorological station observed record low number of frost days.

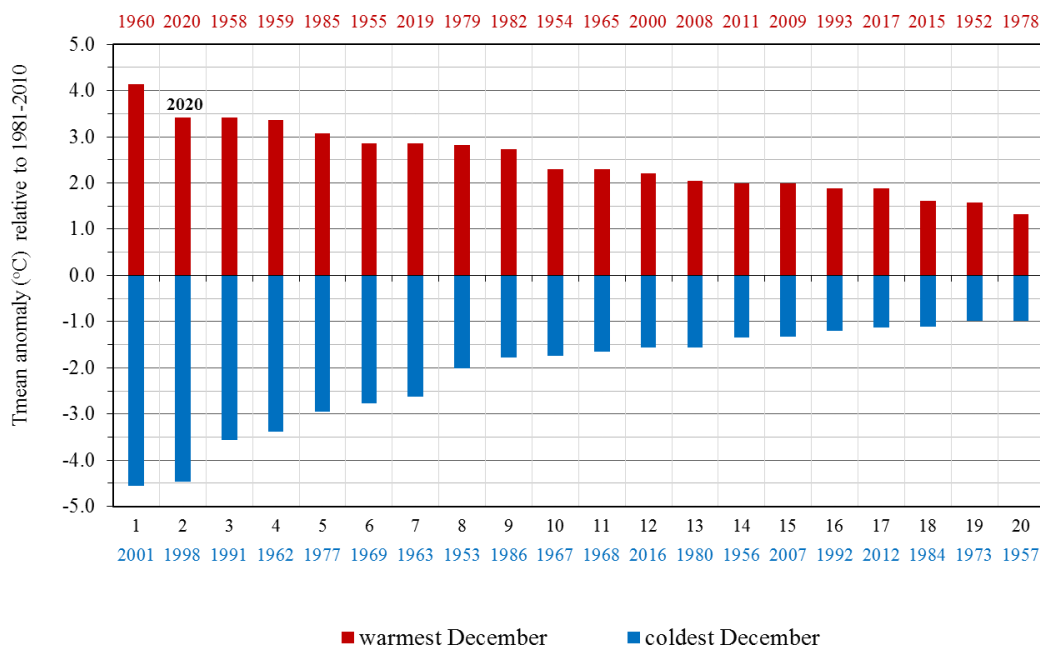


Figure 10. Rank of the warmest and coldest December for Serbia for the 1951-2020 period

Winter 2019/2020 – 5th warmest for Serbia since 1951, and 5th warmest for Belgrade since 1888. 2nd warmest for Negotin, 3rd warmest for Loznica, Cuprija, Zajecar and Crni Vrh. Based on the maximum air temperature, 2nd warmest winter for Serbia. Snow cover wasn't observed in Sombor, Zrenjanin, Banatski Karlovac and Palic, and for the first time Negotin and Kikinda didn't register any snow cover. The latest occurrence of snow cover ever was recorded in Belgrade. The number of ice days was significantly below the average, between 10 and 17 days. Kursumlija didn't see any ice days, and Dimitrovgrad observed minimum number of ice day. It was 5th driest winter in Negotin.

Spring 2020 – air temperature within the average. Precipitation sums above the average in the southeast, and below the average in the north of the country. Record-breaking daily spring air temperature was registered in Kursumlija, Nis, Kraljevo and Dimitrovgrad. Record low number of thunder days was observed in Zajecar and Dimitrovgrad. It was 6th wettest spring for Dimitrovgrad, 8th driest for Sombor since the record-keeping began.

Summer 2020 – 2nd wettest for Serbia in the last 70 years. Summer air temperature slightly above the average. The wettest summer for Nis and Kopaonik, 2nd wettest for Sjenica, Krusevac and Leskovac. Kopaonik and Sjenica observed record-breaking daily summer precipitation sums. Record-breaking number of days with precipitation of more than 20 mm was observed in Sjenica and Nis, and with more than 50 mm of precipitation in Kraljevo and Kopaonik.

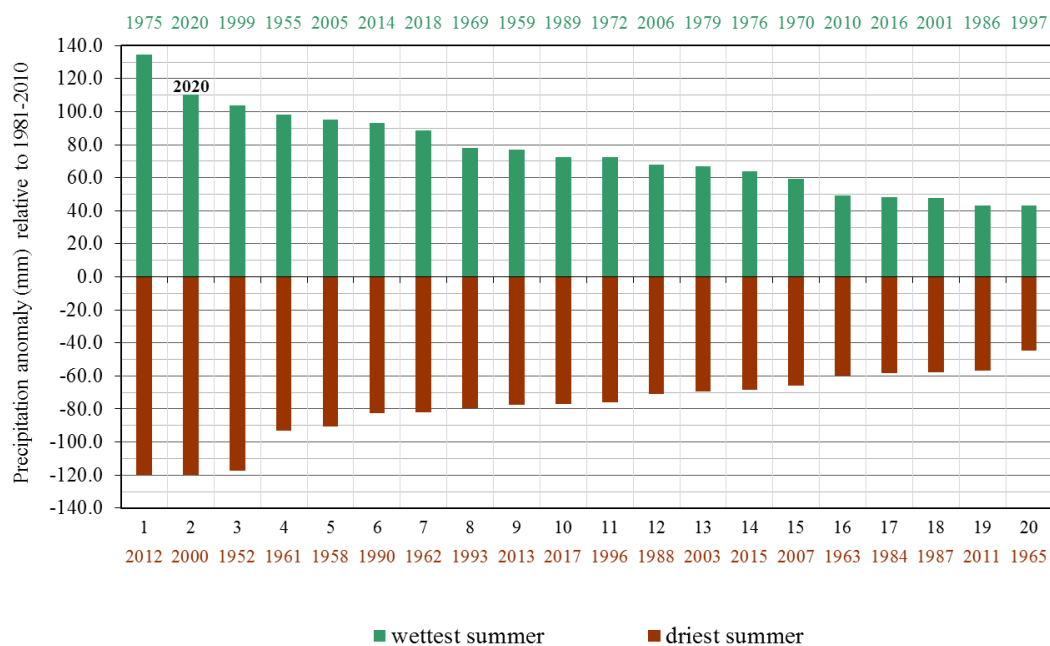


Figure 11. Rank of the wettest and driest Summer for Serbia for the 1951-2020 period

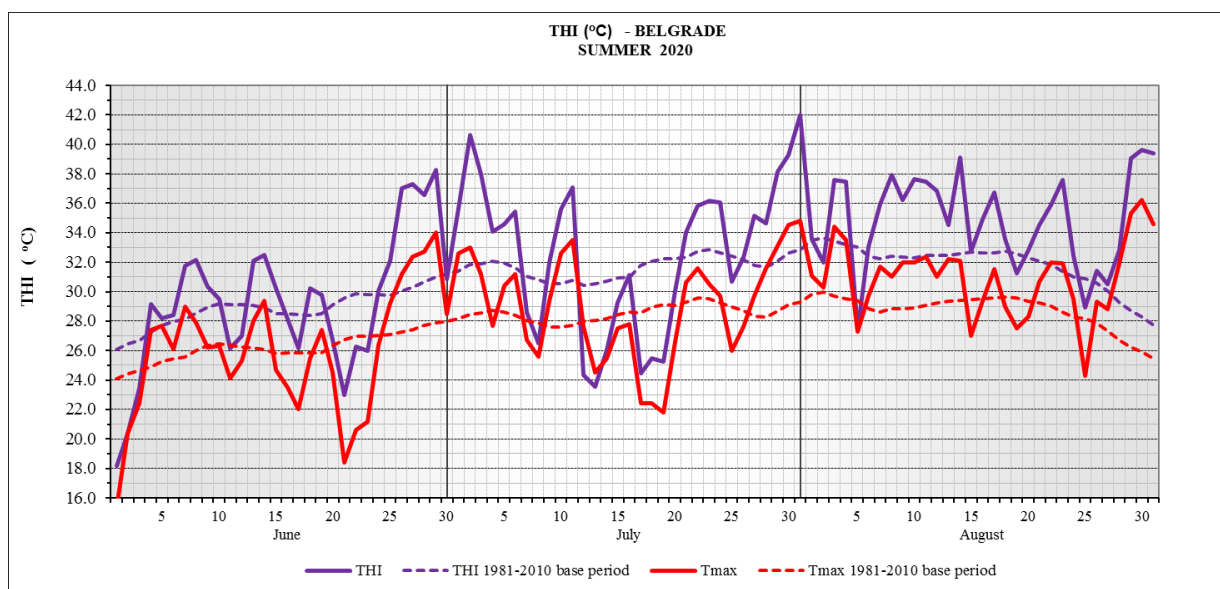


Figure 12. THI and maximum air temperature for Belgrade for summer 2020

Autumn 2020 – 11th warmest autumn for Serbia since 1951 up to date, 4th warmest for Kopaonik and Crni Vrh, 5th warmest for Negotin, 7th driest for Valjevo, Pozega and Zlatibor. In autumn 2020, two heat waves were observed. The first heat wave was observed across most of Serbia in September, whilst the second one was recorded at Kopaonik in November. Kragujevac and Nis observed record-breaking number of days with fog.

Note: Climatological analysis of meteorological elements was carried out on the basis of preliminary data obtained from 28 main meteorological stations.

Appendix

Chart 1.

MEAN MONTHLY AND ANNUAL AIR TEMPERATURE (°C)													
station/month	January	February	March	April	May	June	July	August	September	October	November	December	Year
PALIC	-0.1	5.8	7.2	12.6	15.6	20.4	22.3	23.4	18.8	12.4	5.9	4.2	12.4
SOMBOR	0.2	6.0	7.2	12.2	15.9	20.4	22.1	23.0	18.7	12.2	6.2	4.1	12.4
NOVI SAD	0.4	6.2	7.8	12.9	16.0	20.7	22.4	23.2	19.0	13.0	6.5	5.1	12.8
ZRENJANIN	0.3	6.2	7.9	12.8	16.2	20.7	22.7	23.8	19.7	13.4	6.4	4.9	12.9
KIKINDA	-0.2	5.8	7.4	12.8	16.0	21.0	22.7	23.9	19.7	13.0	6.0	4.8	12.8
B.KARLOVAC	0.4	5.8	7.8	12.9	16.0	20.3	21.7	22.9	19.2	13.0	6.1	5.1	12.6
LOZNICA	1.5	6.7	8.2	12.5	15.9	20.1	22.3	23.0	18.9	13.0	6.8	5.2	12.8
S.MITROVICA	0.5	5.7	7.5	12.5	15.9	20.1	21.7	22.9	18.7	12.5	6.7	4.9	12.5
VALJEVO	1.1	6.0	7.9	12.3	15.6	20.1	22.3	23.1	19.4	12.9	6.8	5.5	12.7
BELGRADE	2.0	7.6	9.1	14.2	16.6	20.9	23.7	24.9	21.1	14.3	7.2	5.6	13.9
KRAGUJEVAC	1.3	6.2	7.8	11.8	15.7	19.9	22.0	22.7	18.9	13.2	6.4	5.7	12.6
S.PALANKA	0.9	6.1	7.9	12.5	15.9	20.1	22.0	22.9	19.0	13.1	6.4	5.1	12.7
V.GRADISTE	0.9	5.1	8.0	12.4	15.9	20.4	22.0	23.0	19.5	12.9	6.4	5.0	12.6
CRNI VRH	-1.6	1.3	2.3	7.8	10.3	14.3	16.8	18.1	15.0	9.3	3.4	-0.6	8.0
NEGOTIN	3.1	6.5	7.9	12.7	17.6	22.1	24.1	24.1	20.6	13.8	7.0	4.1	13.6
ZLATIBOR	-1.3	2.2	3.0	8.3	11.4	14.9	17.5	18.4	15.1	10.0	3.9	2.4	8.8
SJENICA	-4.9	0.8	2.6	7.0	11.3	14.4	16.5	16.9	13.6	8.4	3.4	1.8	7.6
POZEGA	-1.9	3.5	6.1	10.1	14.4	18.3	20.0	20.4	16.7	11.2	5.4	2.5	10.6
KRALJEVO	0.7	6.0	7.9	12.0	15.8	19.7	22.0	22.3	19.3	13.1	6.4	5.1	12.5
KOPAONIK	-2.9	-2.5	-1.3	3.0	7.2	10.1	13.0	13.9	10.8	5.7	2.9	-0.2	5.0
KURSUMLIJA	0.6	5.0	6.7	10.5	15.1	18.2	20.2	20.4	17.2	11.8	5.8	4.9	11.4
KRUSEVAC	0.6	5.7	7.7	11.7	15.9	19.7	21.5	21.9	18.8	13.0	6.3	5.2	12.3
CUPRIJA	1.0	5.7	7.9	12.3	16.0	20.2	22.4	22.9	19.4	13.1	6.4	5.1	12.7
NIS	1.0	6.0	8.2	12.4	16.3	19.8	22.2	22.7	20.2	13.4	6.1	5.9	12.9
LESKOVAC	0.4	5.3	7.5	11.6	15.9	19.4	21.7	21.6	18.5	12.2	5.5	5.5	12.1
ZAJECAR	1.0	5.6	6.9	10.9	16.0	19.9	21.7	21.5	17.9	12.3	6.3	3.3	11.9
DIMITROVGRAD	0.3	3.8	6.2	9.9	15.0	18.2	20.6	20.9	17.8	12.2	5.3	5.2	11.3
VRANJE	0.9	4.5	7.2	11.8	15.5	18.9	21.9	21.5	19.3	12.9	6.3	5.9	12.2

	extremely cold		very cold		cold		normal		warm		very warm		extremely warm
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Chart 2.

MONTHLY AND ANNUAL PRECIPITATION SUM (mm)													
station/month	January	February	March	April	May	June	July	August	September	October	November	December	Year
PALIC	13.0	49.5	56.9	2.8	28.4	107.4	94.4	51.4	29.2	66.9	24.4	30.6	554.9
SOMBOR	19.1	42.7	37.9	11.3	33.5	113.7	61.9	81.9	17.5	59.7	22.7	39.6	541.5
NOVI SAD	22.9	45.5	53.8	11.1	47.3	161.9	77.3	137.5	31.4	93.0	14.2	37.3	733.2
ZRENJANIN	20.1	38.6	35.1	9.8	51.3	110.9	57.7	91.3	25.0	110.6	10.2	47.4	608.0
KIKINDA	24.2	41.9	47.3	24.4	28.9	73.6	38.0	25.7	18.8	98.8	8.9	42.1	472.6
B.KARLOVAC	22.2	52.8	45.5	6.4	84.8	126.9	73.5	80.9	30.6	100.2	10.3	34.3	668.4
LOZNICA	40.6	82.3	47.3	17.9	75.3	208.8	58.5	108.3	33.2	67.5	42.9	78.7	861.3
S.MITROVICA	23.9	56.1	39.0	5.9	66.3	70.5	43.7	104.1	33.4	71.6	13.3	74.0	601.8
VALJEVO	24.0	106.8	32.0	18.4	88.7	170.8	64.7	59.3	9.3	48.4	20.8	53.8	697.0
BELGRADE	22.1	55.9	48.0	8.9	70.9	158.5	37.7	89.6	22.1	93.3	12.5	34.8	654.3
KRAGUJEVAC	23.3	47.6	55.7	17.8	72.9	192.9	61.6	74.0	21.5	89.3	14.7	43.9	715.2
S.PALANKA	21.2	64.8	43.5	9.3	94.9	104.7	142.4	94.0	25.7	79.0	14.4	30.5	724.4
V.GRADISTE	15.8	71.2	51.1	2.5	92.4	89.6	110.6	62.0	30.3	101.8	15.7	36.5	679.5
CRNI VRH	14.4	62.3	86.2	17.4	96.9	118.6	90.2	73.5	27.7	89.8	25.1	79.0	781.1
NEGOTIN	7.2	31.1	58.1	19.5	56.6	48.0	103.2	60.6	21.6	59.8	14.4	92.5	572.6
ZLATIBOR	33.4	89.6	72.6	46.5	78.8	237.2	90.5	138.6	16.7	81.7	29.0	74.5	989.1
SJENICA	25.2	37.1	54.0	42.1	67.4	112.9	74.4	265.0	52.8	80.6	7.5	95.7	914.7
POZEGA	23.2	76.1	59.8	22.0	99.0	137.3	84.8	154.1	9.9	64.4	16.6	60.8	808.0
KRALJEVO	36.4	58.1	88.6	36.9	84.4	147.3	127.7	117.7	7.5	101.9	18.5	56.2	881.2
KOPAONIK	47.1	90.5	72.7	54.8	155.5	210.3	101.9	221.6	67.5	148.6	11.8	91.7	1274.0
KURSUMLIJA	15.8	38.7	75.0	69.2	58.0	143.3	43.6	121.1	21.4	62.3	0.4	94.0	742.8
KRUSEVAC	19.0	37.8	92.0	41.6	103.1	130.8	187.5	74.3	15.4	85.2	11.3	67.6	865.6
CUPRIJA	17.8	67.5	67.9	23.1	81.1	68.5	54.5	86.7	49.1	83.1	17.3	62.1	678.7
NIS	17.5	42.1	71.5	21.0	67.0	186.7	78.6	78.9	14.9	89.1	2.8	60.9	731.0
LESKOVAC	14.2	64.4	98.4	46.8	69.6	115.7	48.3	119.5	29.8	59.4	5.0	44.2	715.3
ZAJECAR	10.0	56.2	85.5	21.2	61.6	158.8	93.8	98.2	19.1	47.1	20.6	80.0	752.1
DIMITROVGRAD	22.0	67.9	138.3	44.6	69.8	70.6	70.6	94.0	35.8	91.1	8.2	47.3	760.2
VRANJE	24.5	58.8	114.5	48.9	45.7	107.6	32.4	95.2	59.9	60.0	4.1	53.4	705.0

	extremely dry		very dry		dry		normal		wet		very wet		extremely wet
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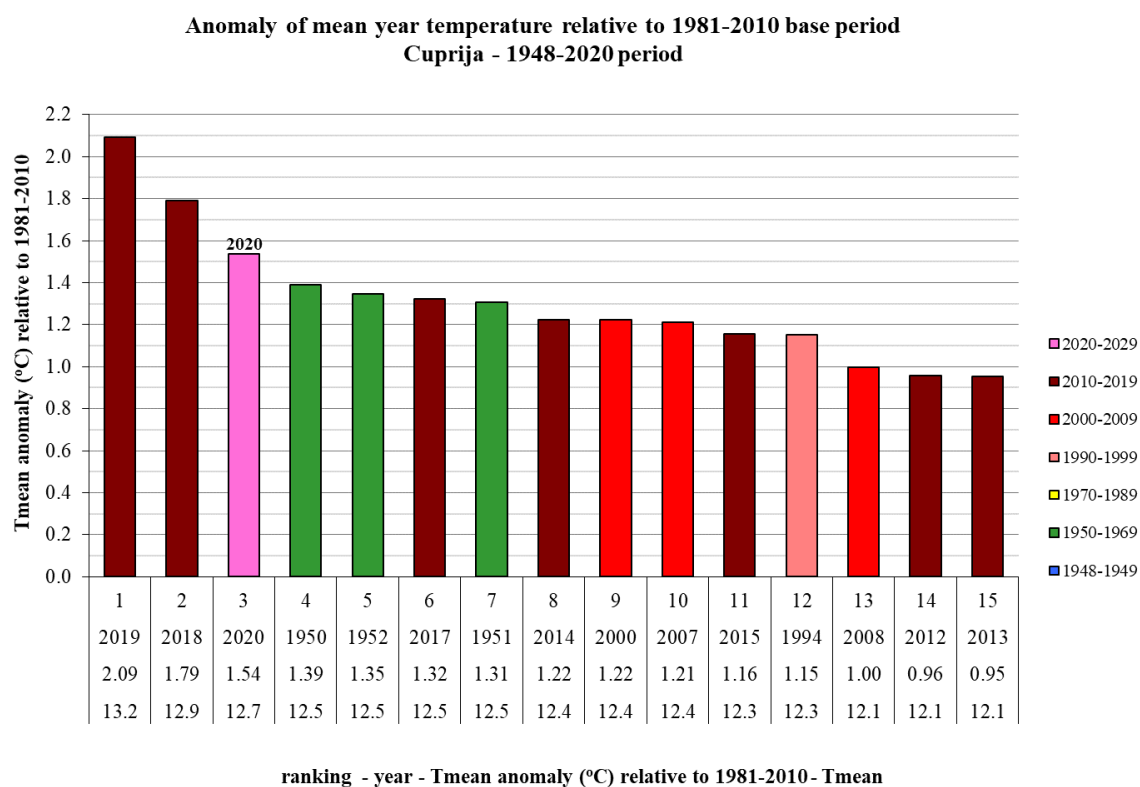


Figure 1. Rank of the 15 warmest years for Cuprija

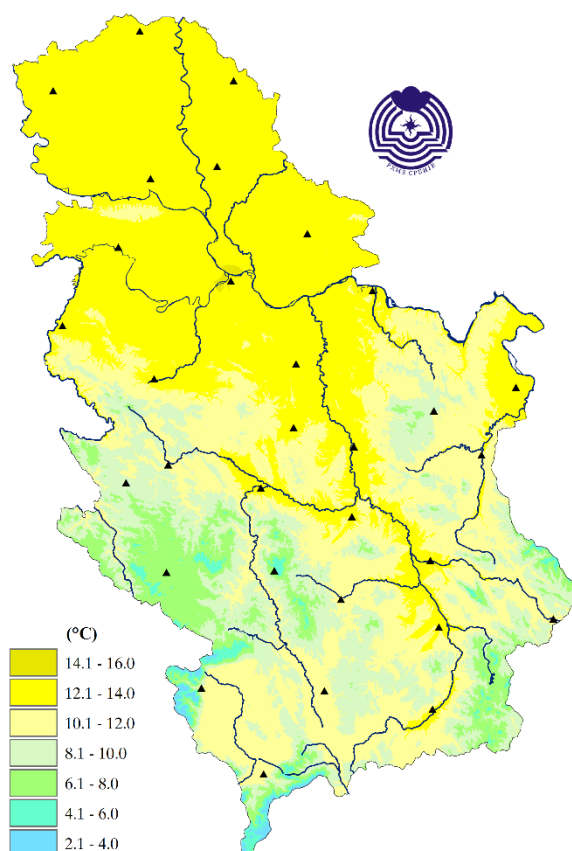


Figure 2. Spatial distribution of mean annual air temperature expressed in (°C)

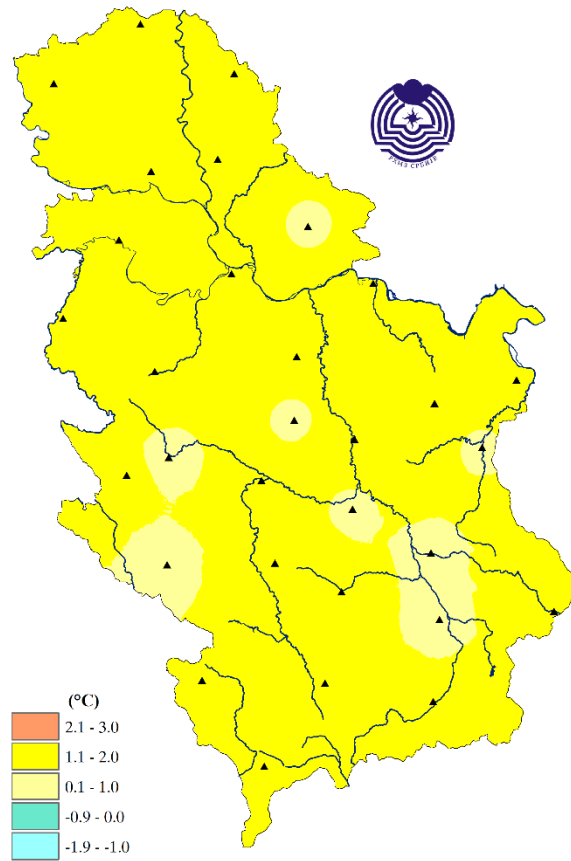


Figure 3. Spatial distribution of mean annual air temperature anomaly expressed in (°C)

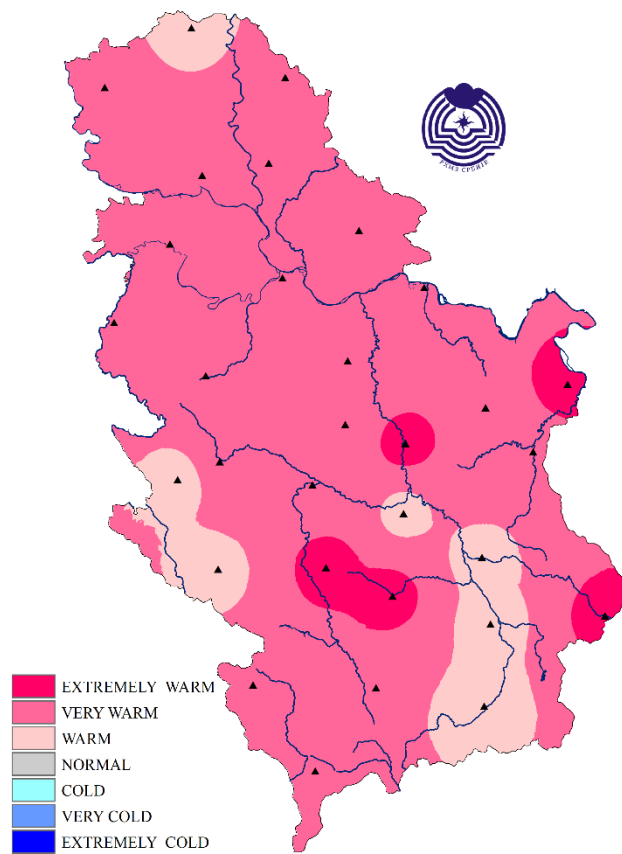


Figure 4. Spatial distribution of mean annual air temperature based on percentile method

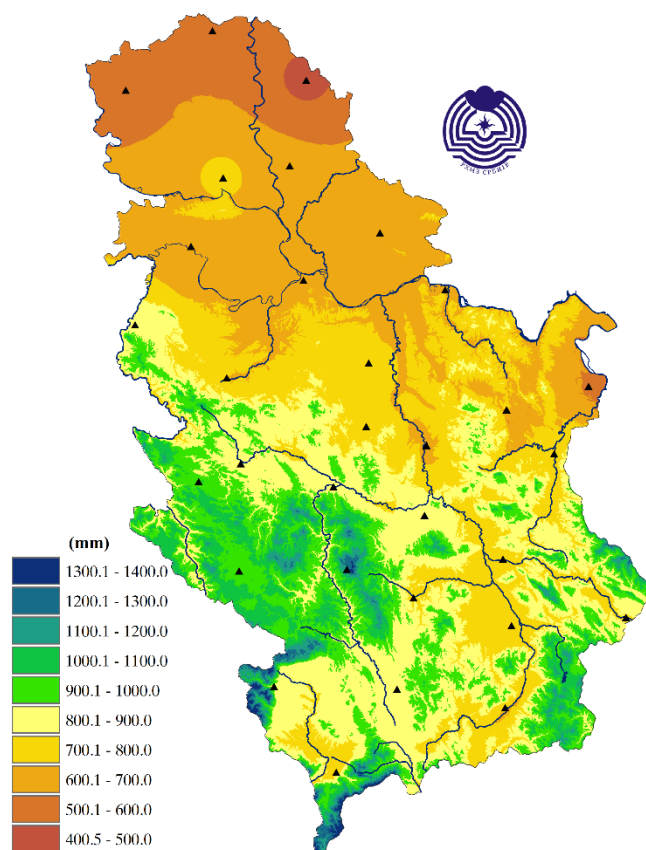


Figure 5. Spatial distribution of annual precipitation totals expressed in mm

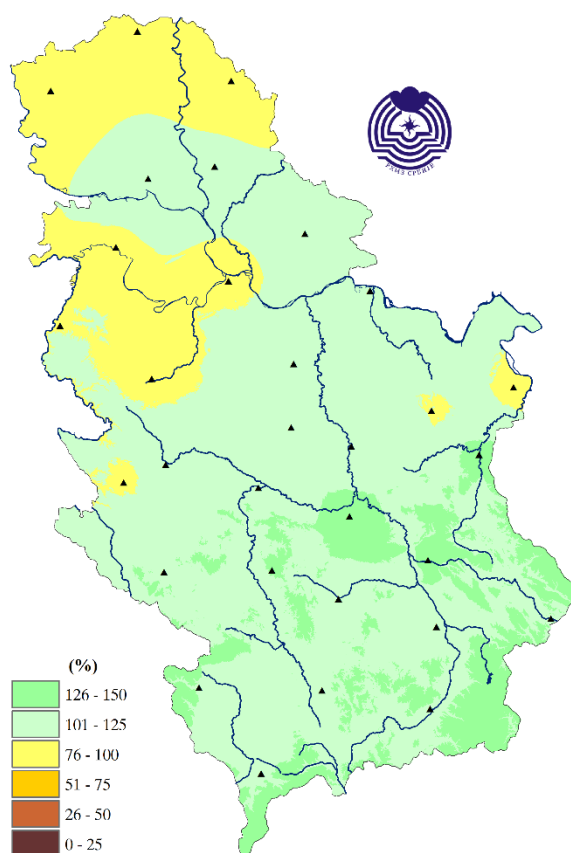


Figure 6. Spatial distribution of annual precipitation totals expressed in percentages of normal for the 1981-2010 base period

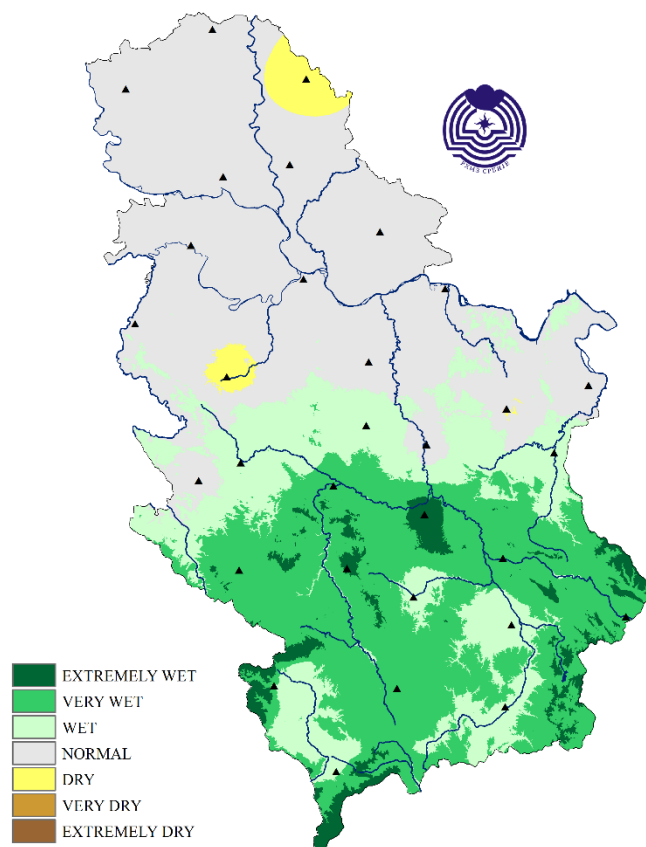


Figure 7. Spatial distribution on annual precipitation totals based on percentile method

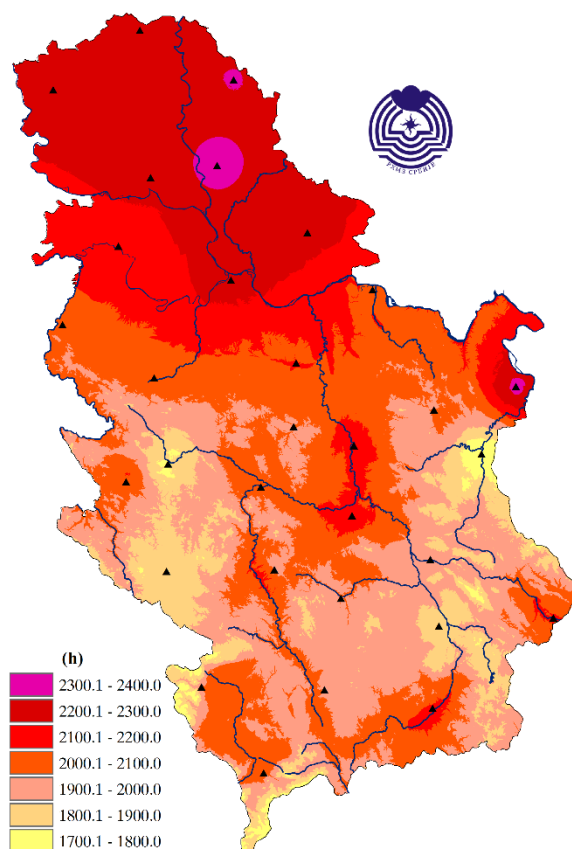


Figure 8. Insolation expressed in hours

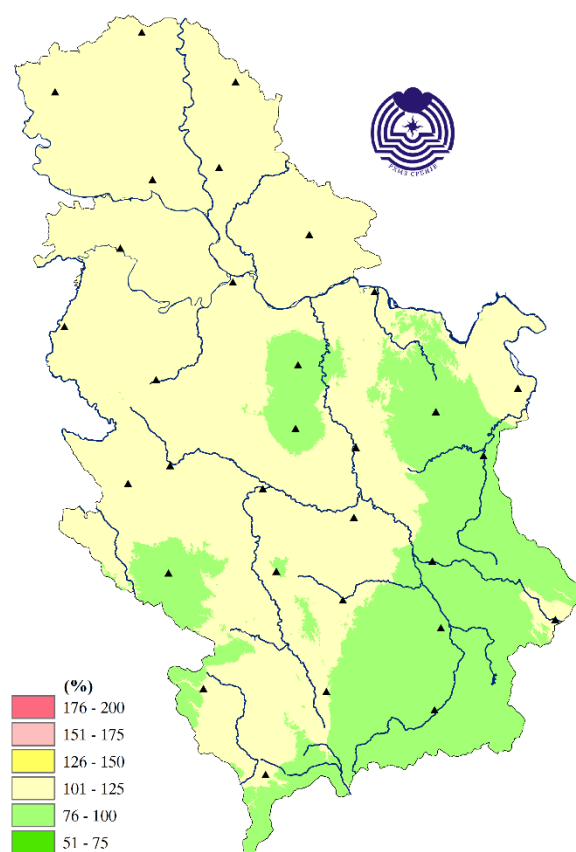


Figure 9. Insolation expressed in percentages of normal for the 1981-2010 base period