

Annex

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Assessment of the SEECOF-25 Climate Outlook for Slovenia for the summer season 2021

SEECOF-25 Climate Outlook for Slovenia for the summer season 2021

The consensus statement of SEECOF-25 climate outlook for the 2021 summer season emphasized the weakening of winter La Niña event during previous months and its progress toward neutral conditions. This situation was expected to continue during summer season. Positive SST anomalies appeared over Atlantic Ocean, south of Greenland, and negative ones over North Sea. Within this general context, higher than normal pressures were expected over large parts of Central Europe, and lower than normal over parts of Northern Africa and Middle East.

The consensus was, that in almost all SEECOF region (Zone 1 and 2 in Figure 1) summer temperature was likely to be above-normal, with the probability increasing from the north-western to the south-eastern and eastern parts of the region. For Slovenia, the probabilities for below-, near- and above-normal temperature were estimated to be 20, 30 and 50 %.

For precipitation the uncertainty was high for the most of the SEECOF region where probabilities for below-, near- or above-average conditions are approximately equal (Zone 2 in Figure 2). Below-normal summer precipitation sums were predicted for the Pannonia Plain, western parts of Balkan Peninsula (Zones 1 in Figure 2), as well as for South Caucasus region and continental parts of Turkey (Zone 3 in Figure 2). For Slovenia that meant probabilities of 50, 30 and 20 % for below-, near- and above-normal precipitation.

It was noted that certain parts of the countries, particularly mountain regions might receive near- or above-normal summer precipitation totals due to the episodes of enhanced convection accompanied by heavy precipitation. Due to dry season masking, it was not possible to forecast summer precipitation totals along the eastern coasts of Eastern Mediterranean, Crete, Israel and Jordan.

Figures 1 and 2 show the probabilistic consensus forecast for tercile categories of anomalies of seasonal temperature and precipitation, relative to the period 1981–2010.

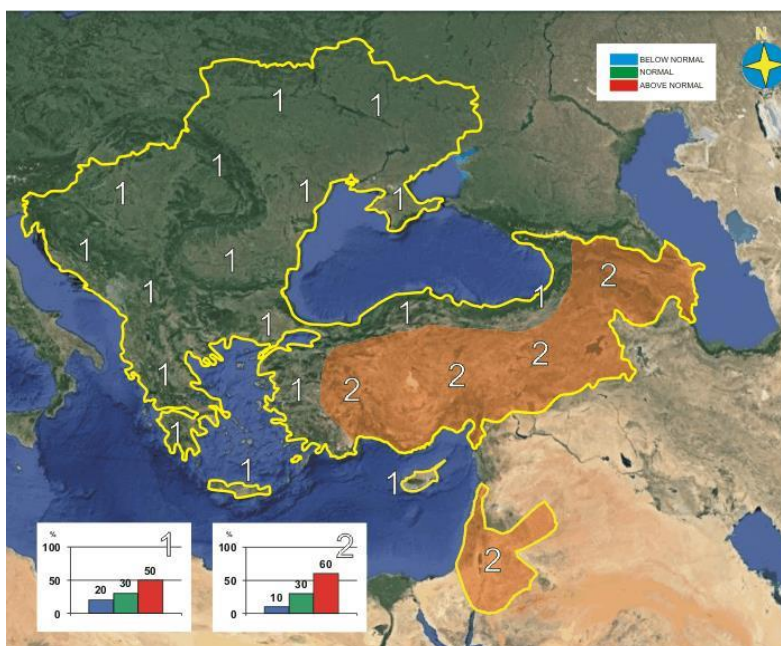


Figure 1. Graphical presentation of the summer 2021 temperature outlook

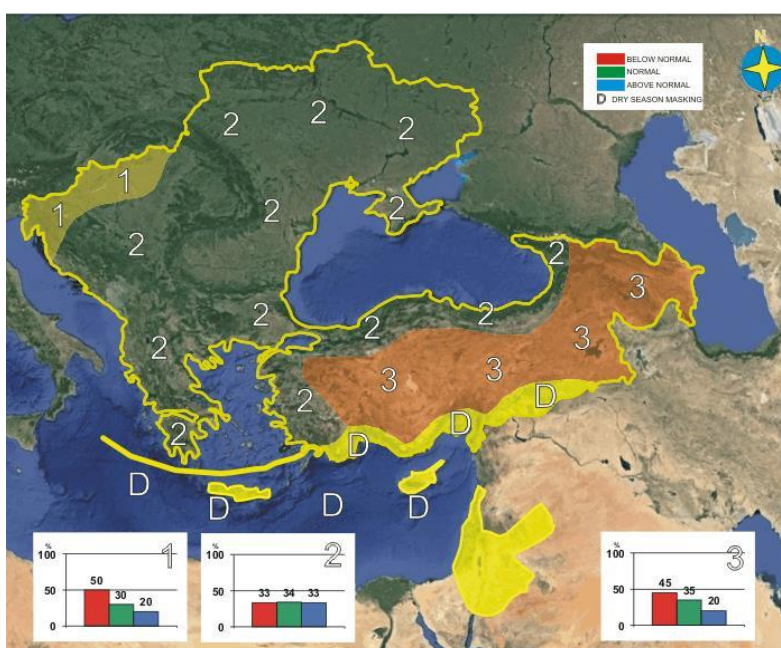


Figure 2. Graphical presentation of the summer 2021 precipitation outlook

Analysis of the summer season 2021

Average air temperature in Slovenia in summer 2021 was above the average of the 30-year period 1981–2010 in whole country (Figure 3). Corresponding air temperature anomalies for summer 2021 (months June, July and August) were between 1.1 °C and 2.9 °C, average anomaly was 1.8 °C (surface weighted average value). In the major part of the country the anomalies were between 1.5 °C and 2.0 °C, in the central to central-north and central-east of Slovenia were the anomalies above 2.0 °C, and in parts of south and north-west Slovenia between 1.0 and 1.5 °C.

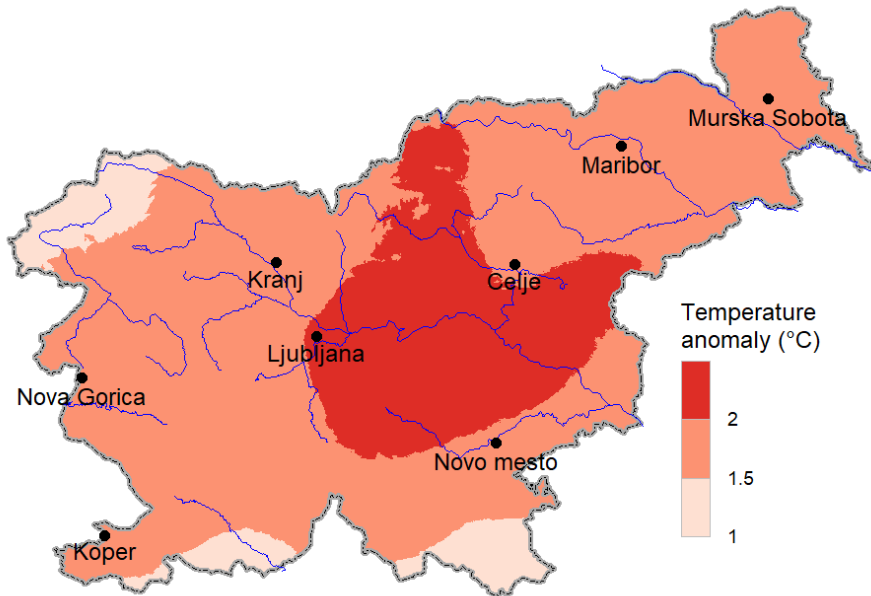


Figure 3. Mean air temperature anomaly in Slovenia in summer 2021, relative to the 1981–2010 average. Data are from 35 meteorological stations.

According to tercile ranks, thermal conditions in Slovenia in summer 2021 were above normal in the whole country (Figure 4).

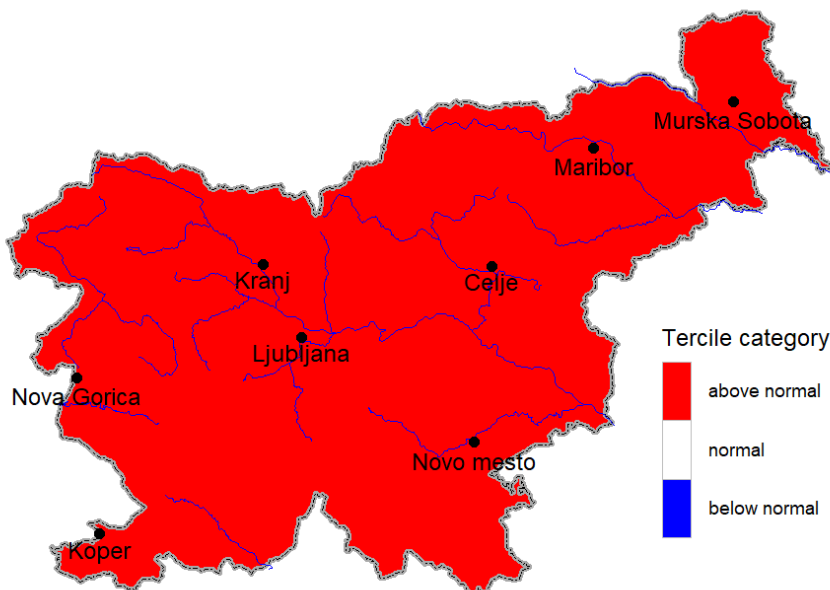


Figure 4. Mean air temperature tercile category of anomaly in Slovenia in summer 2021, relative to the period 1981–2010. Data are from 35 meteorological stations.

Precipitation in summer is usually very heterogeneous due to its convective nature. Precipitation index in Slovenia in summer 2021 was below average in almost the whole country (Figure 5). Precipitation index was within the range from 44 % to 101 %, with surface weighted average value of 71 %. Summer 2021 has been among the eight driest since 1961.

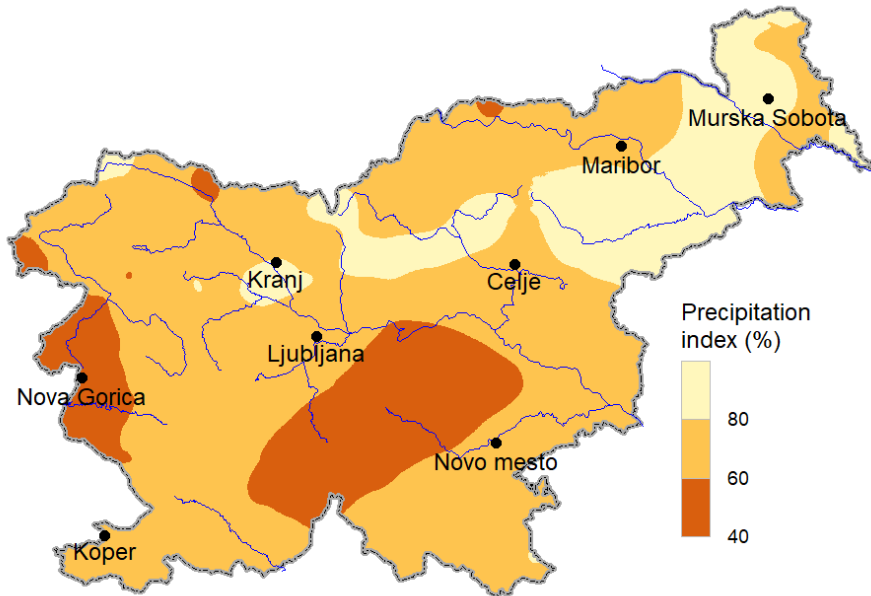


Figure 5. Precipitation index in Slovenia in summer 2021, relative to the 1981–2010 average. Data are from 154–158 meteorological stations.

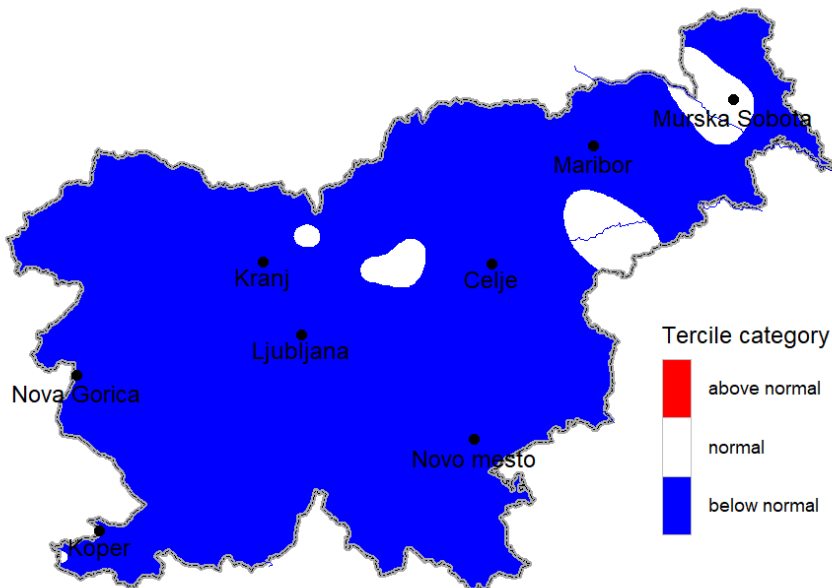


Figure 6. Precipitation tercile category of anomaly in Slovenia in summer 2021, relative to the period 1981–2010. Data are from 154 meteorological stations.

According to this, the precipitation was within the first tercile (below-normal) in major part of Slovenia (94 % of meteorological stations) and within the second tercile (normal) only in a few points (6 % of all stations) (Figure 6).

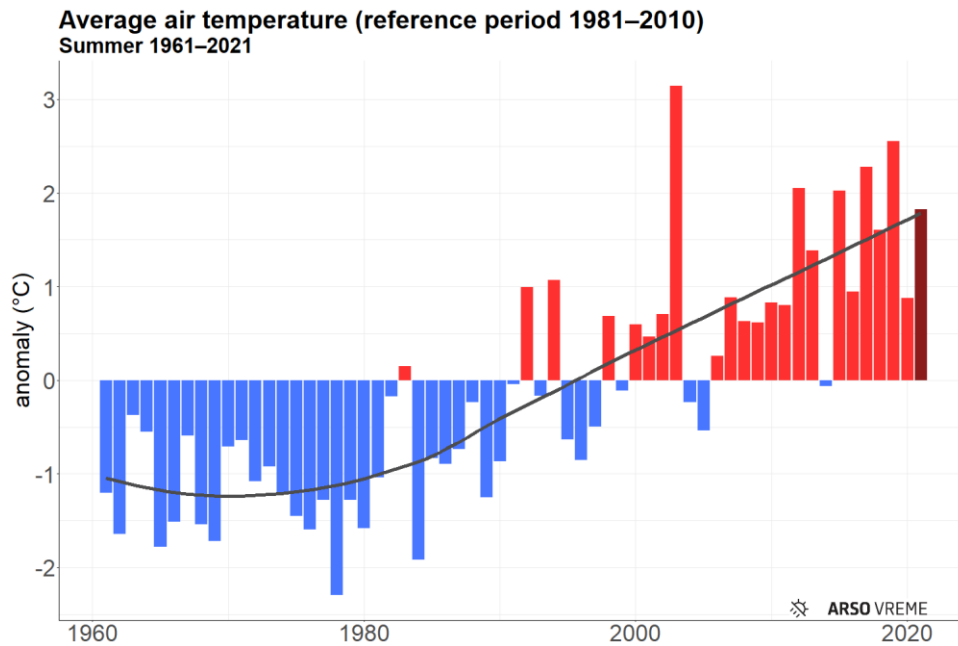


Figure 7. Summer mean air temperature anomaly in Slovenia in the period 1961–2021, relative to the 1981–2010 average. Summer 2021 is marked with dark red colour.

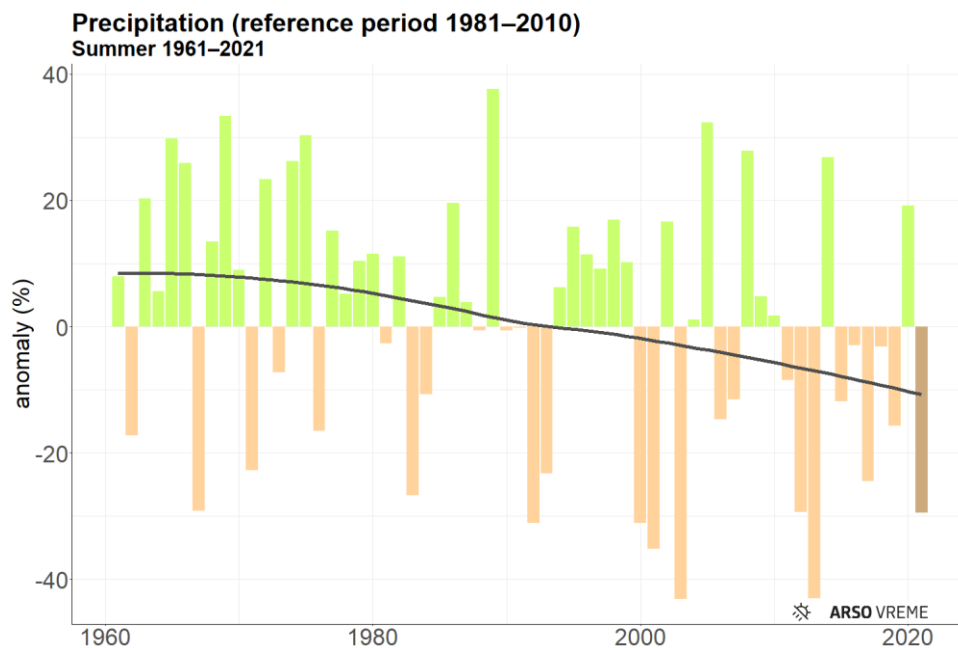


Figure 8. Summer precipitation anomaly in Slovenia in the period 1961–2021, relative to the 1981–2010 average. Summer 2021 is marked with dark brown colour.

Since 2001 there have been 18 summers with positive and only three with negative temperature anomaly, but negative anomalies have been much smaller than positive (Figure 7). The record as the warmest summer still holds the summer 2003. Linear summer temperature trend in the period 1961–2021 of 0.5 °C/decade is statistically significant. Summer precipitation index has statistically significant negative trend of approximately –4%/decade. There have been 13 summers with below-average precipitation index since 2001 (Figure 8).

June 2021 was very hot. Average air temperature was well above the average of the 30-year period 1981–2010 in whole country. Air temperature anomalies were between 2.3 °C and 4.3 °C (Figure 9), average anomaly was 3.4 °C (surface weighted average value). It has been the third warmest June since at least 1950. According to tercile ranks, thermal conditions in Slovenia were above-normal everywhere.

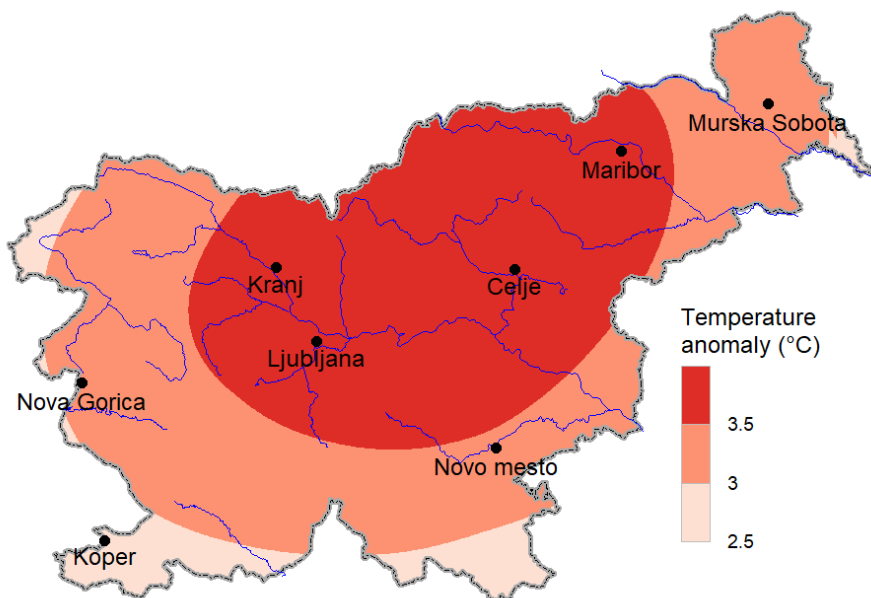


Figure 9. Mean air temperature anomaly in Slovenia in June 2021, relative to the 1981–2010 average. Data are from 35 meteorological stations.

June 2021 was very dry. It has been among the eight driest Junes since at least 1950. Precipitation index was below average everywhere (Figure 10). It was within the range from 2 % to 76 %, its average value was 24 % (surface weighted average value). Precipitation index was within first (below normal) tercile everywhere.

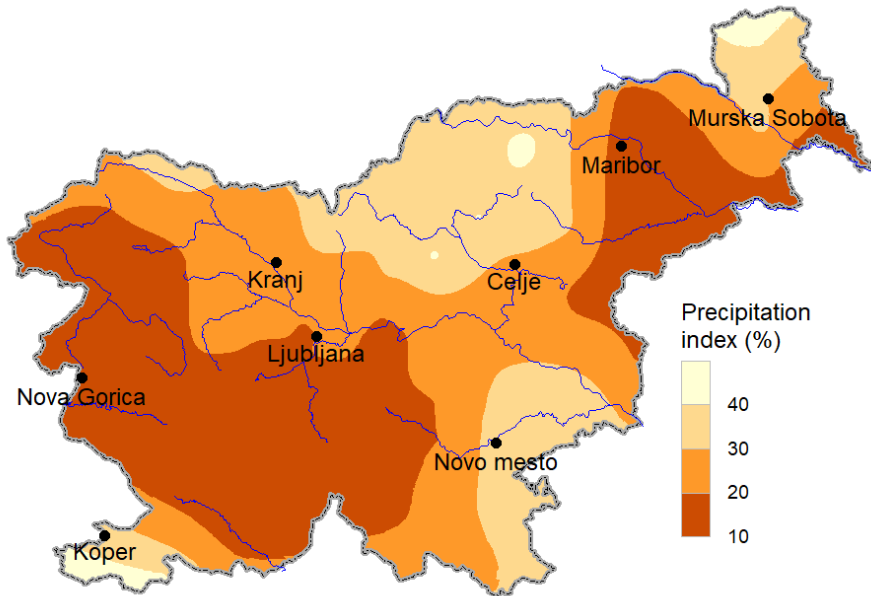


Figure 10. Precipitation index in Slovenia in June 2021, relative to the 1981–2010 average. Data are from 158 meteorological stations.

Average air temperature in *July 2021* was above the multi-annual average of the 30-year period 1981–2010 in whole Slovenia. Anomalies were between 1.0 °C and 2.7 °C (Figure 11), their average value was 1.9 °C (surface weighted average value). According to tercile ranks, thermal conditions in Slovenia were above normal everywhere.

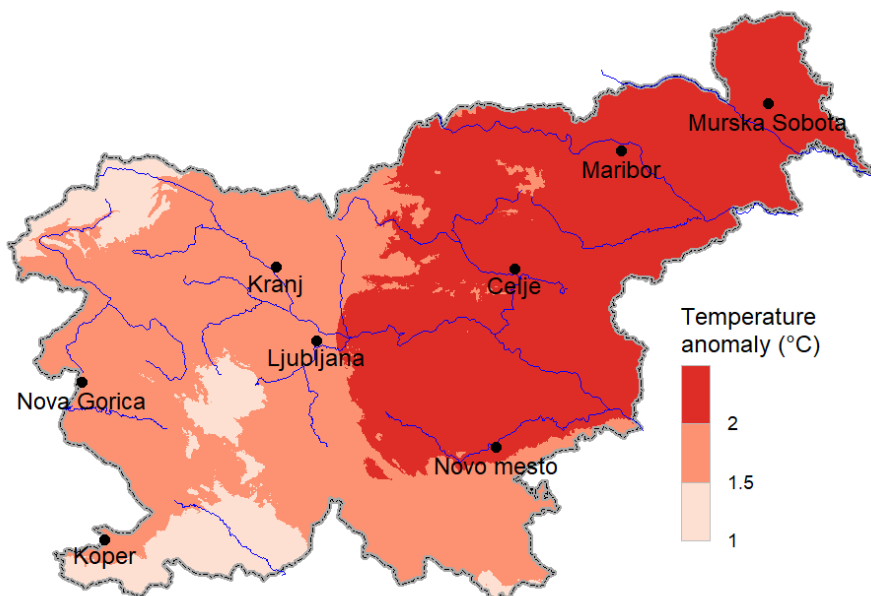


Figure 11. Mean air temperature anomaly in Slovenia in July 2021, relative to the 1981–2010 average. Data are from 35 meteorological stations.

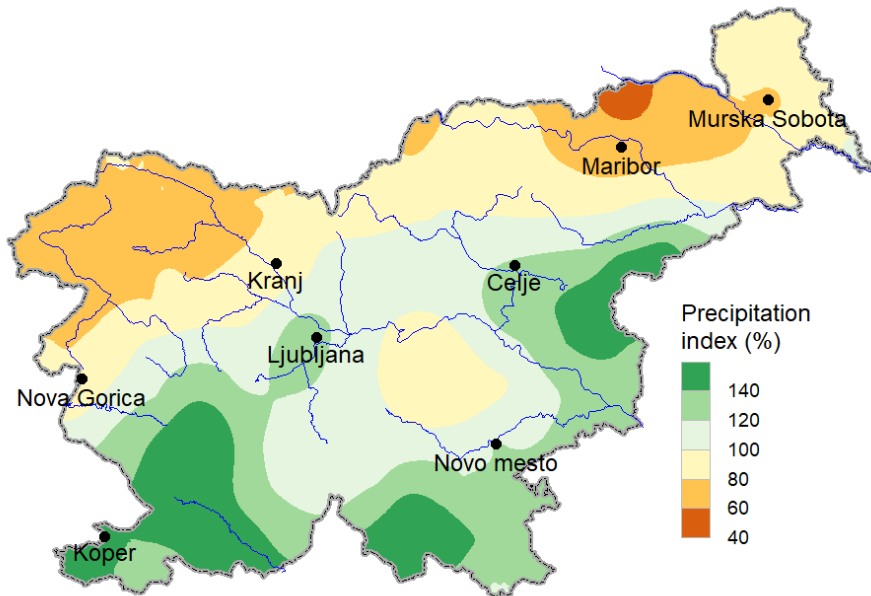


Figure 12. Precipitation index in Slovenia in July 2021, relative to the 1981–2010 average. Data are from 158 meteorological stations.

July 2021 was normal to dry in the northern half and normal to wet in the southern half of the country (Figure 12). The precipitation index was within the range from 48 % to 184 %, its average value was 106 % (surface weighted average value). The precipitation index was within the first (below-normal) tercile in some parts of north-west and north-east, above-normal in parts of south-west and south-east and normal elsewhere.

August 2021 temperature was mostly average. Air temperature anomalies were between -0.6 °C and 1.0 °C (Figure 13), the average anomaly was 0.2 °C (surface weighted average value). According to tercile ranks, thermal conditions in Slovenia were above-normal in the south of the country (except the south-east area) and in parts of central-north. They were in the second (normal) tercile elsewhere.

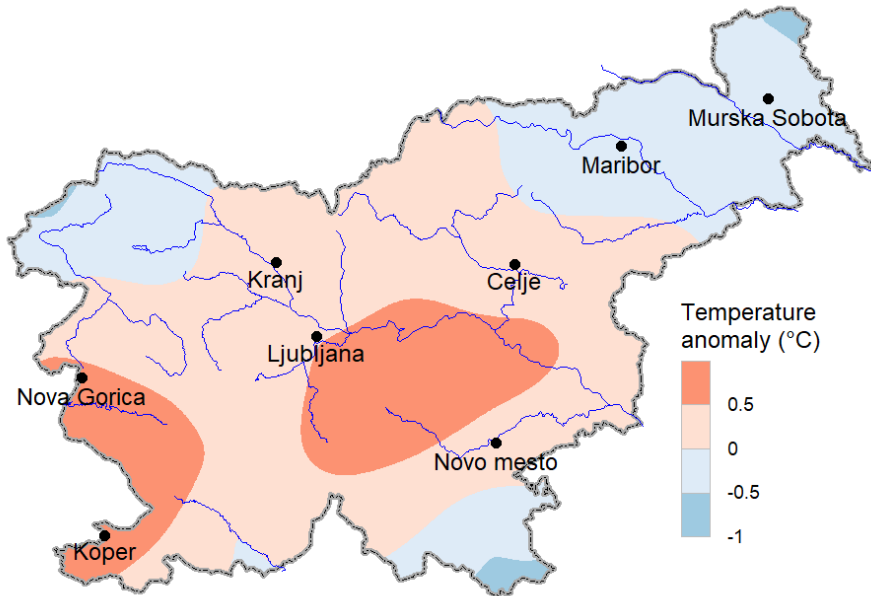


Figure 13. Mean air temperature anomaly in Slovenia in August 2021, relative to the 1981–2010 average. Data are from 35 meteorological stations.

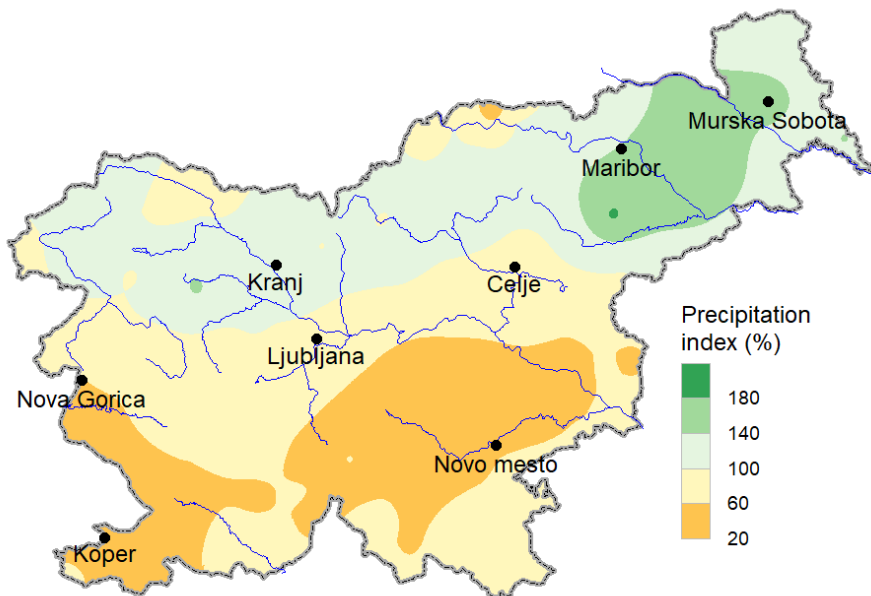


Figure 14. Precipitation index in Slovenia in August 2021, relative to the 1981–2010 average. Data are from 154 meteorological stations.

Precipitation index in *August 2021* was average to above average in the northern and below average to average in the southern half of the country, quite the opposite as it was in July (Figure 14). Precipitation index was within the range from 20 % to 200 %, its average value was 90 % (surface weighted average value). In the south precipitation was within the first (below-average) tercile, but within second (normal) and third (above-normal) tercile in the north.

The summary for summer 2021 and monthly (June, July and August) temperature and precipitation conditions can be found in Table 1.

Table 1. The summary for summer 2021 temperature and precipitation in Slovenia

SLOVENIA	Temperature anomaly, relative to the period 1981–2010	Average temperature anomaly	Precipitation index, relative to the period 1981–2010	Average precipitation index
June 2021	2.3 to 4.3 °C	3.4 °C	2 to 76 %	24 %
July 2021	1.0 to 2.7 °C	1.9 °C	48 to 184 %	106 %
August 2021	–0.6 to 1.0 °C	0.2 °C	20 to 200 %	90 %
Summer 2021	1.1 to 2.9 °C	1.8 °C	44 to 101 %	71 %

High Impact Events

Highlights for the summer 2021 in Slovenia:

- Temperature above average, the sixth warmest since 1961,
- Very hot June, the third warmest since at least 1950,
- 4–7 heat waves (5 in Ljubljana, the longest in June, 14 days),
- Precipitation below average, the eighth driest since 1961,
- Very dry June, the driest since at least 1950.

Most noticeable high impact events:

- Thunderstorms with downpour, hail and also severe wind gusts between 31 July and 1 August from north-west through central and central-east of Slovenia. Flooded objects, trees down, hail damage.
- Supercell thunderstorms with medium to large hail on 8 August from central to central-east of the country. Extensive damage in agriculture (especially hops), many vehicles and objects damaged.
- Severe thunderstorms with downpour, hail and severe wind gusts on 15 August in eastern Slovenia. Mostly flooded objects and wind damage on roofs, trees down. Station record wind gust of 33 m/s measured in Krško.

Verification of the SEECOF-25 Climate Outlook in Slovenia for summer season 2021

In the table 2 a verification summary of the SEECOF-25 climate outlook for the summer season 2021 (DJF) can be found. The climatological reference period is 1981–2010.

Table 2. SEECOF-25 climate outlook verification summary for Slovenia for summer 2021

Country	Seasonal temperature (JJA)		Seasonal precipitation (JJA)	
	Observed	SEECOF-25 climate outlook for temperature	Observed	SEECOF-25 climate outlook for precipitation
SLOVENIA	warmer than normal	warmer than normal	drier than normal	drier than normal

Users' Perception of the SEECOF-25 Outlook

Meteorological Service at the Slovenian Environment Agency for the time being doesn't provide seasonal outlook for the country.