

Annex

Country: Slovenia

Institute: Slovenian Environment Agency

Name: Renato Bertalanič

E-mail: Renato.Bertalanic@gov.si

Assessment of the SEECOF-19 Climate Outlook for Slovenia for the summer season 2018

SEECOF-19 Climate Outlook for Slovenia for the summer season 2018

The consensus statement of SEECOF-19 for the 2018 summer season emphasized the returning of El Niño–Southern Oscillation (ENSO) from negative value in April to neutral conditions through the summer 2018 from the majority of models, likely decreasing of North Atlantic Oscillation (NAO) from positive value during April to neutral state during late summer, most likely persisting of above average sea surface temperature of the eastern Mediterranean and Black Sea, likely positive phase of the East Atlantic Teleconnection Pattern in June and July, predicted neutral phase of Indian Ocean Dipole (IOD) in summer, still close to neutral Tropical Northern Atlantic Index (TNA) and expected below normal values of Tropical Atlantic SST Index (TASI) during summer.

The consensus for thermal conditions was that above normal temperature anomalies would likely dominate the whole SEECOF region in summer 2018. Probability for the above average temperature would increase from northern–northeastern parts towards western and southern parts of the region. Probability for above normal temperature would be lower in eastern Balkan Peninsula, Ukraine, along the coasts of the Aegean and Black Sea, most of Turkey and south Caucasus region (zone 1, Figure 1). Probability for above average temperature would be the highest for the Pannonia Plain, Central and Western Balkans, most of the Greece, along the coasts of Adriatic, Ionian and Eastern Mediterranean Sea with belonging coasts and Israel (zone 2, Figure 1) For Slovenia the probabilistic forecast for the tercile categories of anomalies for mean temperature, relative to the period 1981–2010, was 10 % for below-, 20 % for near- and 70 % for above-average conditions. The generalized relatively high warm signal was probably partly due to the background climatic warming trend.

Precipitation uncertainties are generally larger than for temperature. Drivers like TASI and TNA suggested drier than normal summer in northern part of the SEECOF domain, along the coasts of Black Sea and in the south Caucasus. Summer precipitation sums in most of the SEECOF region were likely to be below-average (zone 1, Figure 2). The exception would be the coasts of the Adriatic, Ionian and Aegean Sea with belonging coasts and hinterland, south of the Balkan Peninsula and continental part of Turkey with approximately equal probabilities for below-, near- or above normal-averages(zone 2, Figure 2). It was noted that certain parts of the countries, particularly mountain regions, may observe near- or above- normal summer

precipitation due to the episodes of enhanced convection accompanied by heavy precipitation. For Slovenia that means that higher than normal precipitation conditions in eastern and mountains region in the north to north-west were most probable (45 % for below, 35 % for near- and 20 % for above-average conditions) and that there was no signal for western Slovenia (probabilities for below-, near- and above-average conditions were approximately equal).

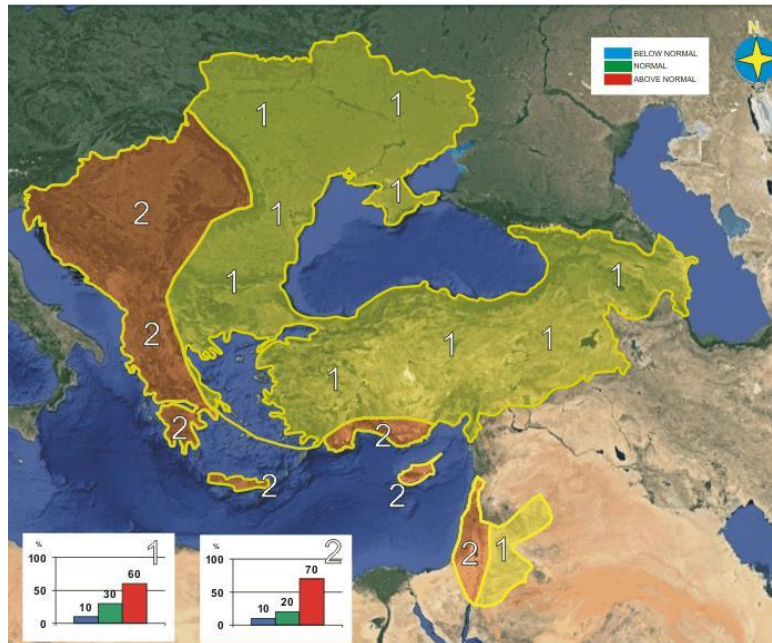


Figure 1. Graphical presentation of the summer 2018 temperature outlook

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.

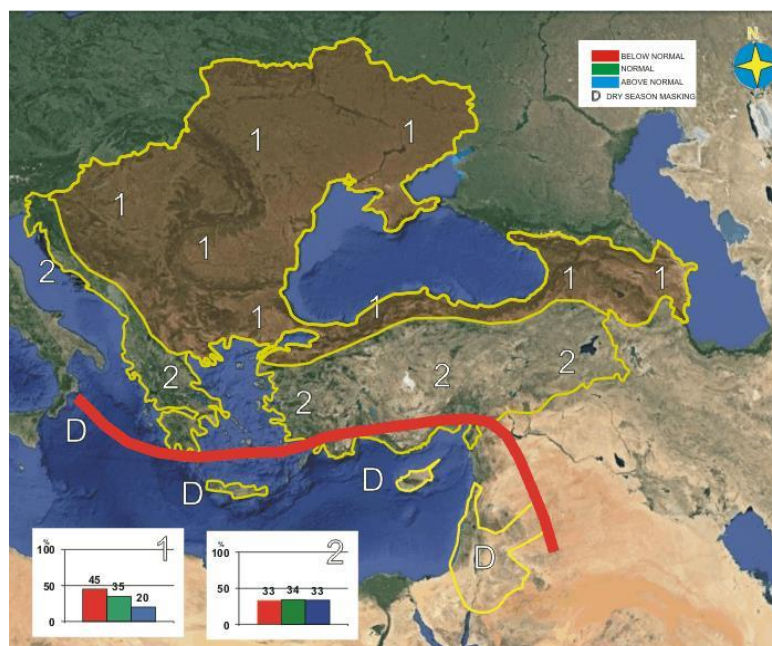


Figure 2. Graphical presentation of the summer 2018 precipitation outlook

Analysis of the summer season 2018

Average air temperature in Slovenia in summer 2018 was above the multi-annual average of the 30-year period 1981–2010 for the whole country (Figure 3). Corresponding air temperature anomalies for summer 2018 (months June, July and August) were between 1.0 °C to 2.5 °C, average anomaly was 1.6 °C (surface weighted average value). Anomalies were largest in the western, north and north-eastern parts of the country (above 1.5 °C) and the smallest in the south-east and mountainous regions (below 1.5 °C).

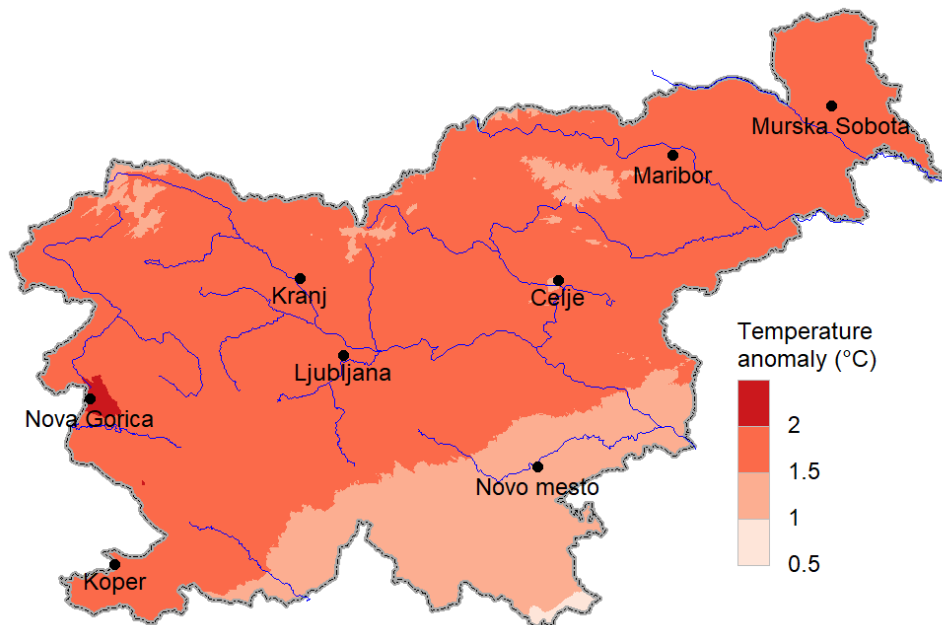


Figure 3. Mean air temperature anomaly in Slovenia in summer 2018, relative to the 1981–2010 average. Data are from 30–31 meteorological stations.

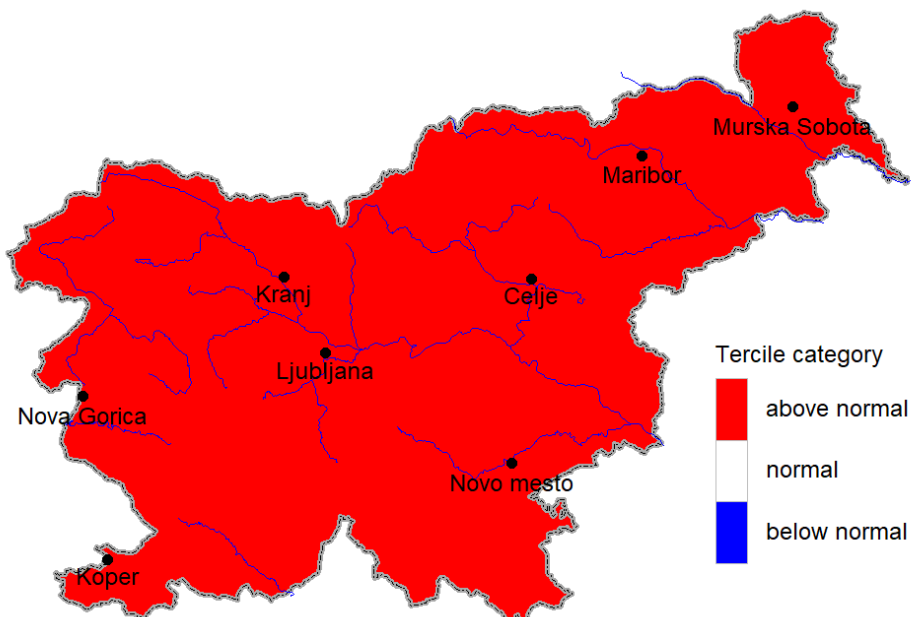


Figure 4. Mean air temperature tercile category of anomaly in Slovenia in summer 2018, relative to the period 1981–2010. Data are from 30 meteorological stations.

According to tercile ranks, thermal conditions in Slovenia in summer 2018 were above normal, relative to the period 1981–2010, in the whole country (Figure 4).

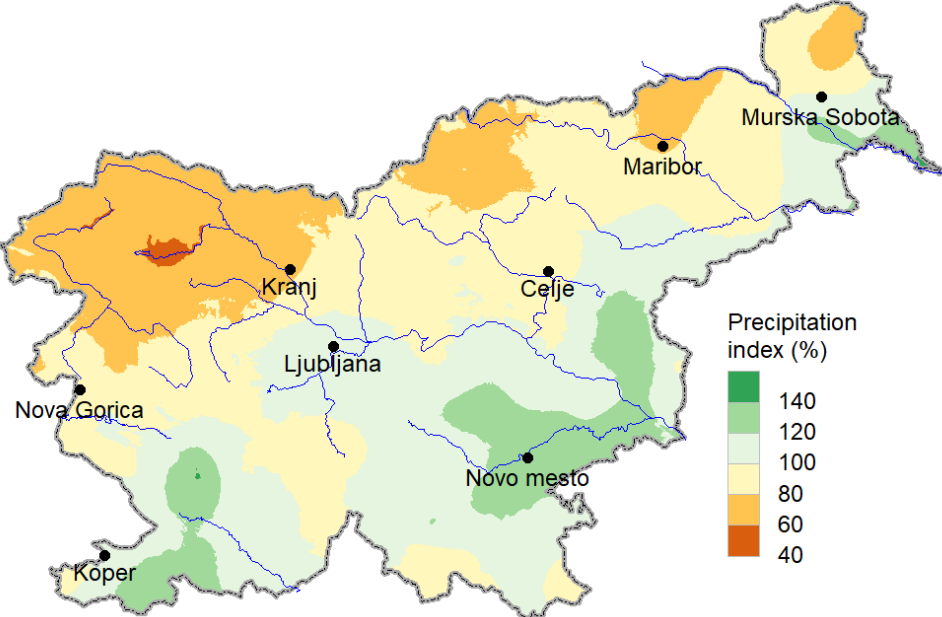


Figure 5. Precipitation index in Slovenia in summer 2018, relative to the 1981–2010 average. Data are from 156–162 meteorological stations.

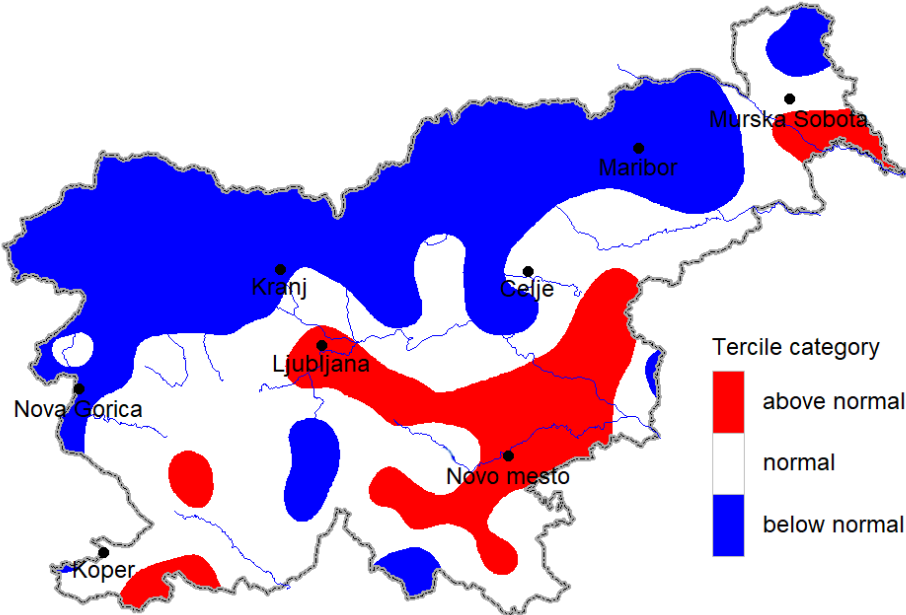


Figure 6. Precipitation tercile category of anomaly in Slovenia in summer 2018, relative to the period 1981–2010. Data are from 156 meteorological stations.

Precipitation index in Slovenia in summer 2018, relative to the period 1981–2010, was below average in northern and north-western parts, above average in south-eastern and south-western parts of the country and average elsewhere (Figure 5). The precipitation index in south-eastern and south-western parts of Slovenia was above 120 %, but it reached the lowest

values (below 60 %) in some parts of the north-west. Precipitation index was within the range from 50 % to 155 %, average precipitation index was 97 % (surface weighted average value).

According to this, the precipitation was within the third tercile (above-normal) in south-eastern and south-western parts of the country, relative to 1981–2010 period (19 % of the stations), on 49 % of weather station in north and north-east was precipitation in the first (below-normal) tercile and on 32 % of remaining weather stations within second (normal) tercile (Figure 6).

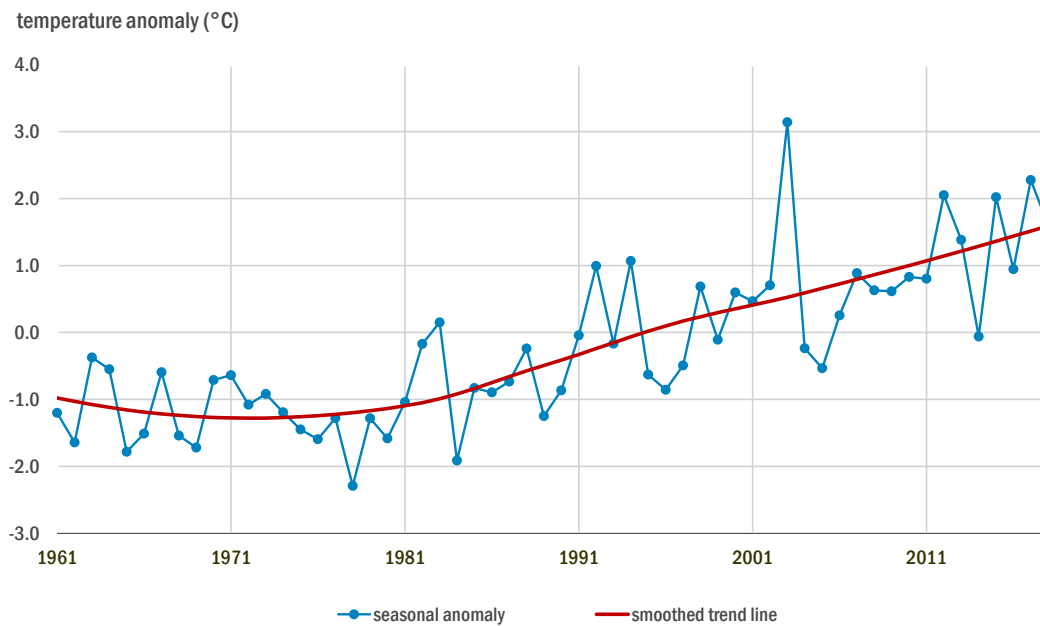


Figure 7. Summer mean air temperature anomaly in Slovenia in the period 1961–2018, relative to the 1981–2010 average

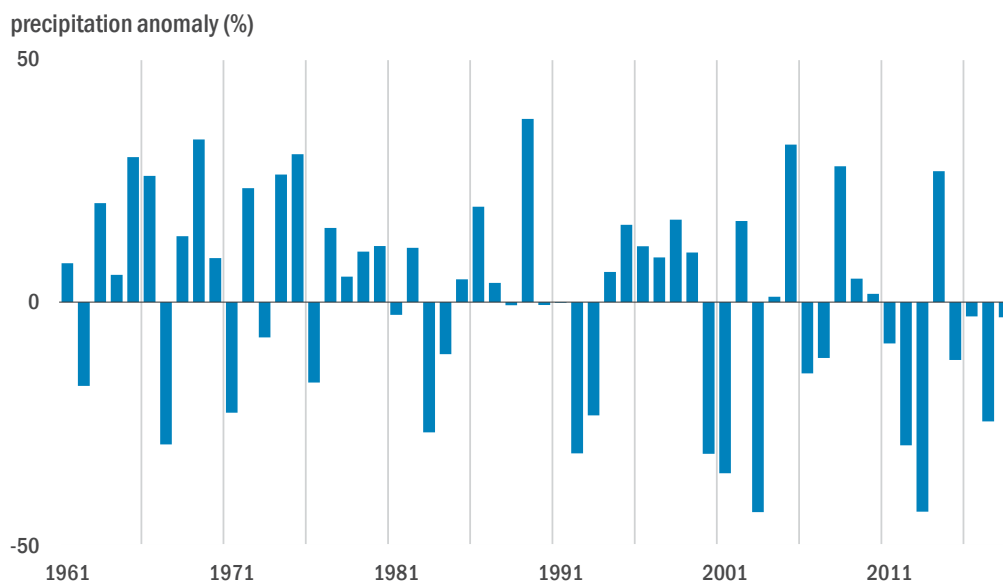


Figure 8. Summer precipitation anomaly in Slovenia in the period 1961–2018, relative to the 1981–2010 average

Temperature in Slovenia was on smoothed trend line for summer in the period 1961–2018 (Figure 7) and precipitation index for the whole country was near normal (Figure 8).

Average air temperature in *June 2018* was above the multi-annual average of the 30-year period 1981–2010 in whole Slovenia. Air temperature anomalies were between 1.0 °C to 2.5 °C (Figure 9), average anomaly was 1.6 °C (surface weighted average value). According to tercile ranks, thermal conditions in Slovenia were above-normal, relative to the period 1981–2010.

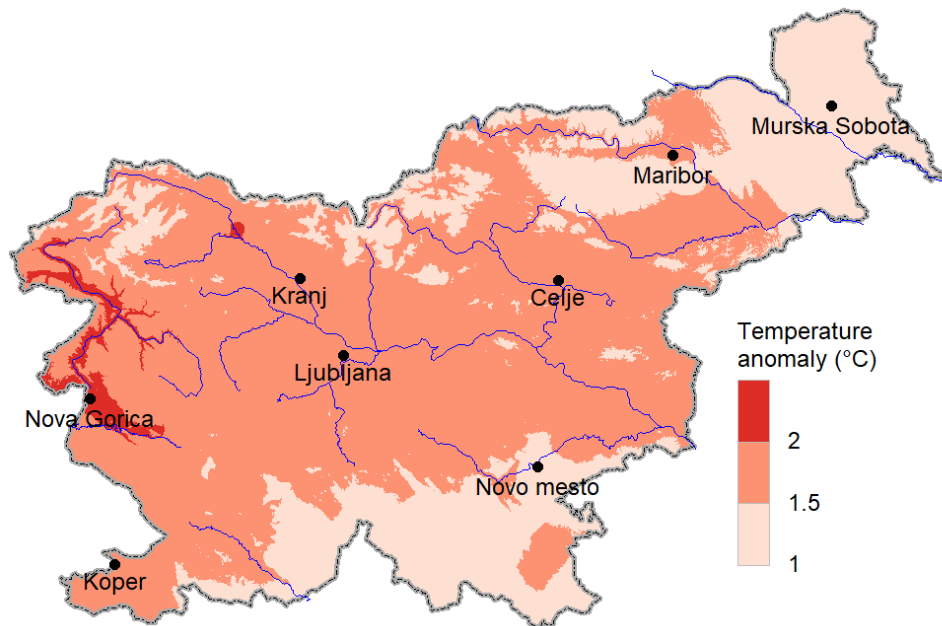


Figure 9. Mean air temperature anomaly in Slovenia in June 2018, relative to the 1981–2010 average. Data are from 30 meteorological stations.

Precipitation index in *June 2018*, relative to the period 1981–2010, was below average in the north and north-western part of the country and average to above average in south-eastern part (Figure 10). Precipitation index was within the range from 39 % to 197 %, its average value was 93 % (surface weighted average value). Precipitation index was within the first (below-normal) tercile, compared with the period 1981–2010, in the north-west (50 % of the stations), in the south-east in third (above-normal) tercile (24 % of the stations) and within second (normal) tercile between (26 % of the stations).

Average air temperature in *July 2018* was also above the multi-annual average of the 30-year period 1981–2010. Anomalies were between 0.3 °C and 1.8 °C (Figure 11), their average value was 1.0 °C (surface weighted average value). Average temperature was decreasing from north-west to south-east. According to tercile ranks, thermal conditions in Slovenia were above-normal, relative to the period 1981–2010, for the whole country except for south-east where the conditions were within second (normal) tercile.

Precipitation index in *July 2018* was above 100 %, relative to the period 1981–2010, in south-eastern half of the country, while it was below 100 % in the north-western parts (Figure 12). Due to convective precipitation the index was very heterogeneous, its values were within the range from 26 % to 272 %, its average value was 106 % (surface weighted average value). In the north-west precipitation was within the first (below-normal) tercile (31 % of the stations),

compared with the period 1981–2010, in the south-east in third (above-normal) tercile (32 % of the stations) and within second (normal) tercile between (37 % of the stations).

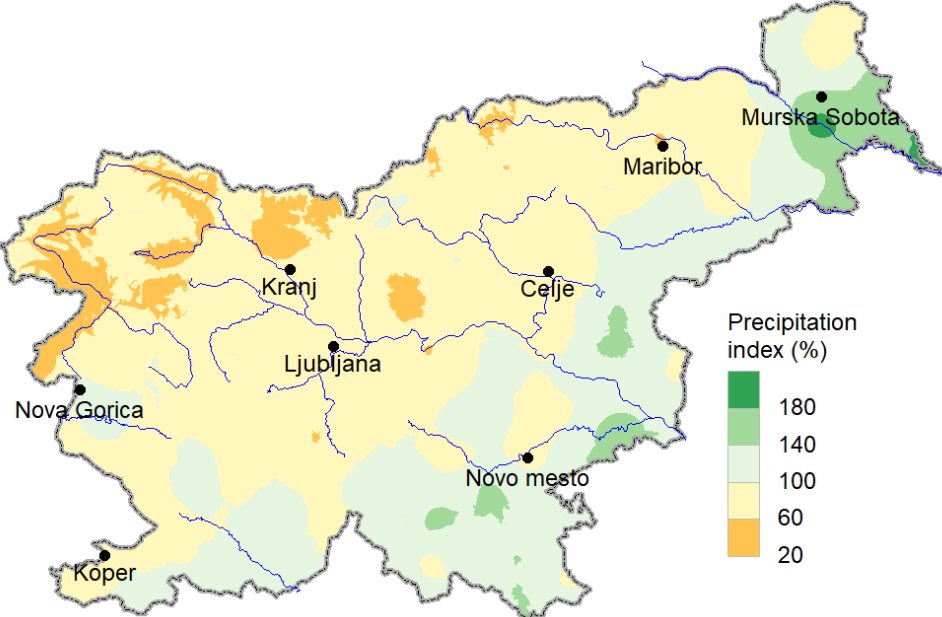


Figure 10. Precipitation index in Slovenia in June 2018, relative to the 1981–2010 average. Data are from 161 meteorological stations.

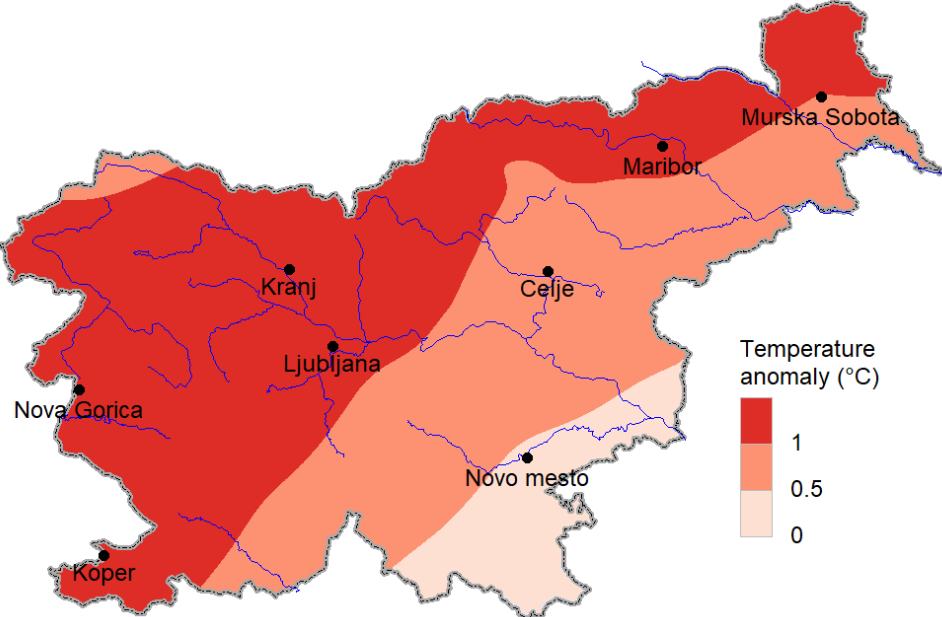


Figure 11. Mean air temperature anomaly in Slovenia in July 2018, relative to the 1981–2010 average. Data are from 31 meteorological stations.

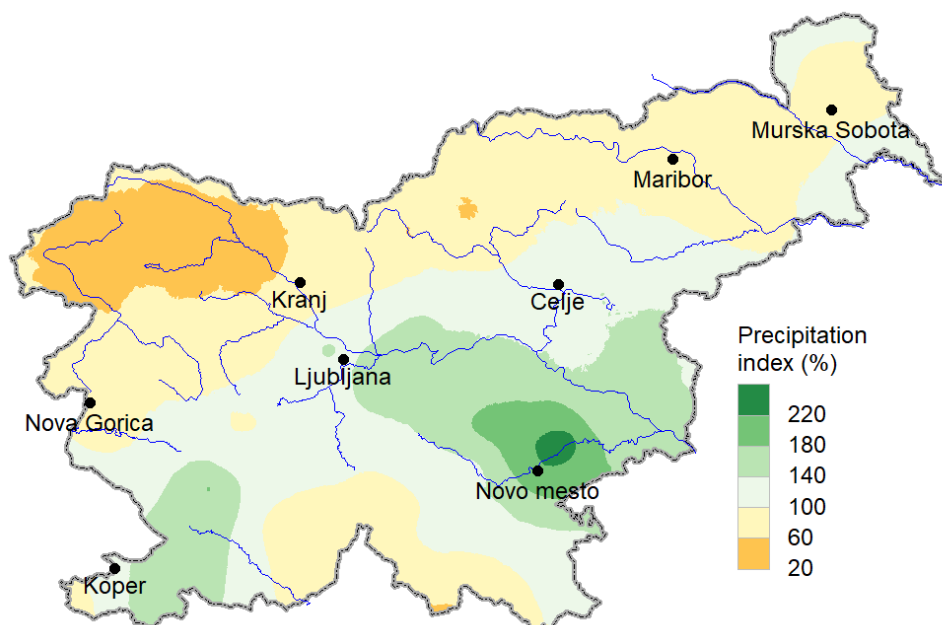


Figure 12. Precipitation index in Slovenia in July 2018, relative to the 1981–2010 average. Data are from 162 meteorological stations.

August 2018 was very warm. Air temperature anomalies were between 1.5 °C to 3.0 °C (Figure 13), the average anomaly was 2.3 °C (surface weighted average value). According to tercile ranks, thermal conditions in Slovenia were above normal, relative to the period 1981–2010, in the whole country.

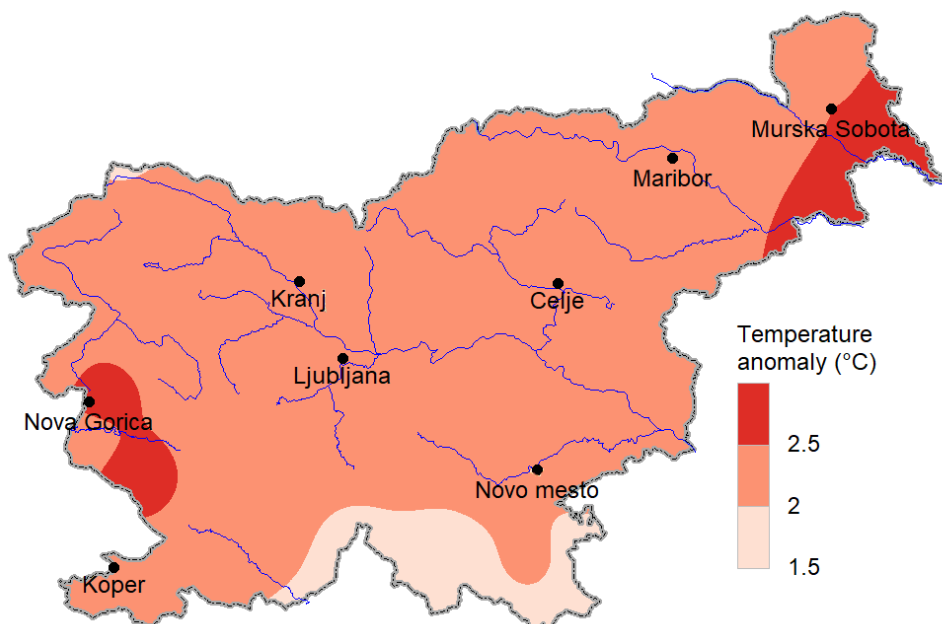


Figure 13. Mean air temperature anomaly in Slovenia in August 2018, relative to the 1981–2010 average. Data are from 31 meteorological stations.

Precipitation index in August 2018, relative to the period 1981–2010, was above average in the south-western part of the country and below average in eastern and north-western parts (Figure 14). Precipitation index was within the range from 37 % to 178 %, its average value

was 93 % (surface weighted average value). In the south-western and central parts of Slovenia precipitation was within the third (above average) tercile (16 % of the stations), compared with the period 1981–2010, in parts of north-west and north-east within first (below-normal) tercile (37 % of the stations) and within normal tercile elsewhere (47 % of the stations).

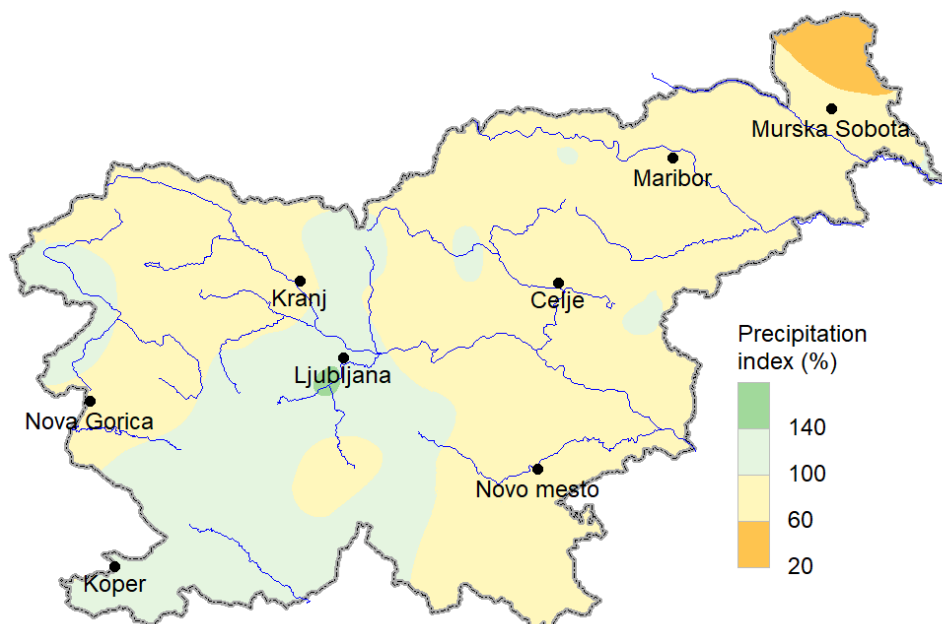


Figure 14. Precipitation index in Slovenia in August 2018, relative to the 1981–2010 average. Data are from 156 meteorological stations.

The summary for summer 2018 and monthly (June, July and August) temperature and precipitation conditions can be found in the Table 1.

Table 1. The summary for summer 2018 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 2018	1.0 to 2.5 °C	1.6 °C	39 to 197 %	93 %
July 2018	0.3 to 1.8 °C	1.0 °C	26 to 272 %	106 %
August 2018	1.5 to 3.0 °C	2.3 °C	39 to 178 %	93 %
Summer 2018	1.0 to 2.5 °C	1.6 °C	50 to 155 %	97 %

High Impact Events

Highlights for summer 2018 in Slovenia:

- Among the 5 warmest summers since 1961.
- August among 5 warmest since 1961.

- Precipitation normal for the whole country but wetter than normal in the south-east and central Slovenia and drier than normal in the north of the country.
- In 8 June thunderstorm with very large hail (up to 10 cm) damaged more than 1000 buildings and great number of vehicles in Bela Krajina (south-east of Slovenia).

Verification of the SEECOF-19 Climate Outlook in Slovenia for summer season 2018

In the table 2 a verification summary of the SEECOF-19 climate outlook for the summer season 2018 (DJF) can be found. The climatological reference period is 1981–2010.

Table 2. SEECOF-19 climate outlook verification summary for Slovenia for summer 2018

Country	Seasonal temperature (DJF)		Seasonal precipitation (DJF)	
	Observed	SEECOF-19 climate outlook for temperature	Observed	SEECOF-19 climate outlook for precipitation
SLOVENIA	warmer than normal	warmer than normal	drier than normal in the north, wetter than normal in the south-east and central Slovenia, normal between	drier than normal in the east, no clear signal in the west

Users' Perception of the SEECOF-19 Outlook

Slovenia Meteorological Service at the Slovenian Environment Agency at this moment doesn't provide seasonal outlook for the country.