

Annex

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Assessment of the SEECOF-20 Climate Outlook for Slovenia for the winter season 2018/19

SEECOF-20 Climate Outlook for Slovenia for the winter season 2018/19

The consensus statement of SEECOF-20 climate outlook for the 2018/19 winter season emphasized the weak El Niño conditions in terms of SST indices in the tropical Pacific at the beginning of the season. The latest ENSO predictions indicated that a moderate El Niño event would continue throughout the winter. Some influence of El Niño on general circulation at mid latitudes was expected by the canonical response of positive PNA and the potential teleconnection up to the Atlantic Ocean. Most dynamical models and drivers suggested that El Niño conditions would favour negative North Atlantic Oscillation (NAO).

The consensus was that in the next winter normal and above normal thermal anomalies were likely to dominate mainly in the southern part of the SEECOF region (zone 2 in Figure 1). There were equal probabilities for below, near or above normal temperatures in the rest of the SEECOF area (zone 1 in Figure 1). For Slovenia, therefore no clear signal for temperature was evident.

The main feature for precipitation was a north to south gradient favouring wetter-than-normal conditions over southern part of SEECOF region. Wetter-than-normal conditions would prevail on southernmost of the Balkan Peninsula, along the coasts of the Adriatic Sea, Ionian Sea and Eastern Mediterranean (zone 2 in Figure 2). For Slovenia that meant that higher than normal precipitation conditions in western two thirds of the country were most probable (25 % for below, 30 % for near- and 50 % for above-average conditions) and for the eastern areas normal to higher than normal precipitation were favoured (20 % for below, 40 % for near- and 40 % for above-average conditions).

In addition, local factors (for example SST in the smaller basins of the region) might shape local variability at a regional level.

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 winter 2018/19 temperature outlook



Figure 2. Graphical presentation of the winter 2018/19 precipitation outlook

Analysis of the winter season 2018/19

Average air temperature in Slovenia in winter 2018/19 was above the multi-annual average of the 30-year period 1981–2010 in the whole country (Figure 3). Corresponding air temperature anomalies for winter 2018/19 (months December, January and February) were between 0.0 °C to 1.9 °C, average anomaly was 1.3 °C (surface weighted average value). Anomalies were largest in the central to north-eastern parts of the country (above 1.5 °C) and smallest in the south-west and the Alps (below 1.0 °C).

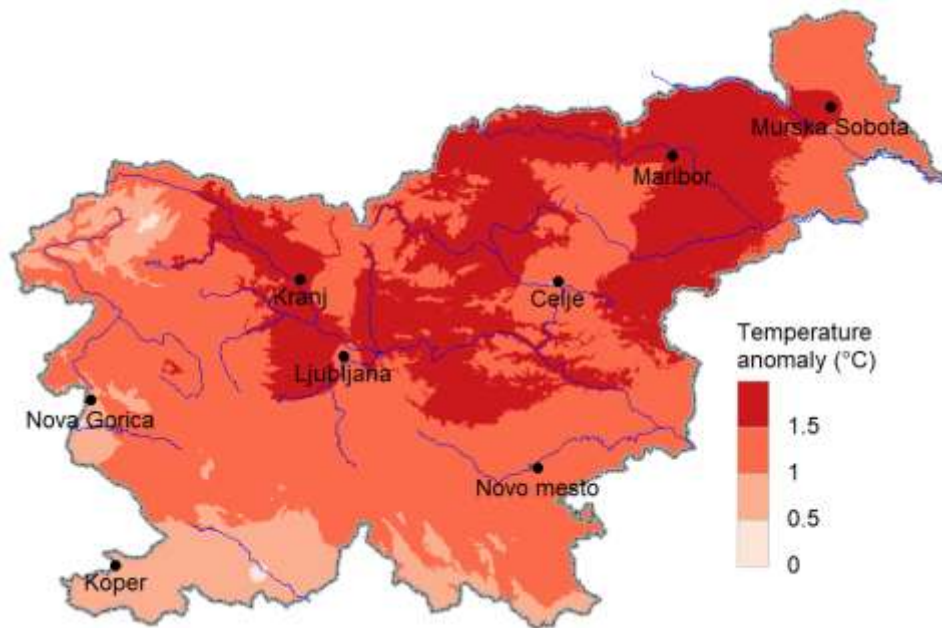


Figure 3. Mean air temperature anomaly in Slovenia in winter 2018/19, relative to the 1981–2010 average. Data are from 33–34 meteorological stations.

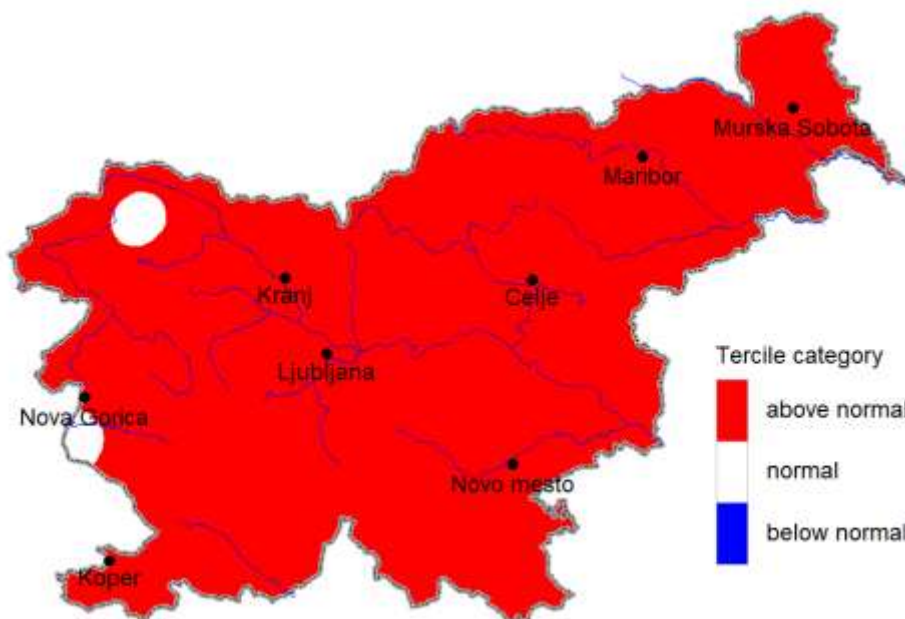


Figure 4. Mean air temperature tercile category of anomaly in Slovenia in winter 2018/19, relative to the period 1981–2010. Data are from 29 meteorological stations.

According to tercile ranks, thermal conditions in Slovenia in winter 2018/19 were above normal in the whole country, except in the Alps where normal conditions prevailed (Figure 4).

Precipitation index in Slovenia in winter 2018/19 was below average in central, eastern and north-eastern parts, above average in small region on the north-west and around average in parts of western Slovenia (Figure 5). The precipitation index in northeast Slovenia was below 60 %, in some parts even below 40 %. Precipitation index was within the range from 30 % to 115 %, average precipitation index was 68 % (surface weighted average value).

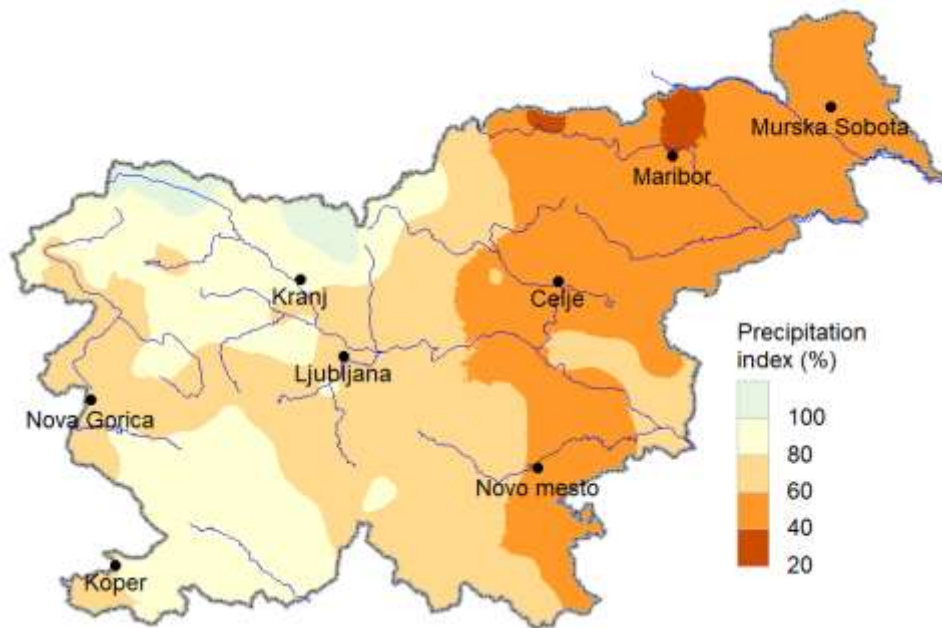


Figure 5. Precipitation index in Slovenia in winter 2018/19, relative to the 1981–2010 average. Data are from 163 meteorological stations.

According to this, the precipitation was within the third tercile (above-normal only in small parts of north Slovenia (2 out of the 161 stations), on 26 % of weather station, mostly in the west, was precipitation in the second (normal) tercile and on 73 % of weather stations, mostly in the two thirds of the east Slovenia, within first (below-normal) tercile (Figure 6).

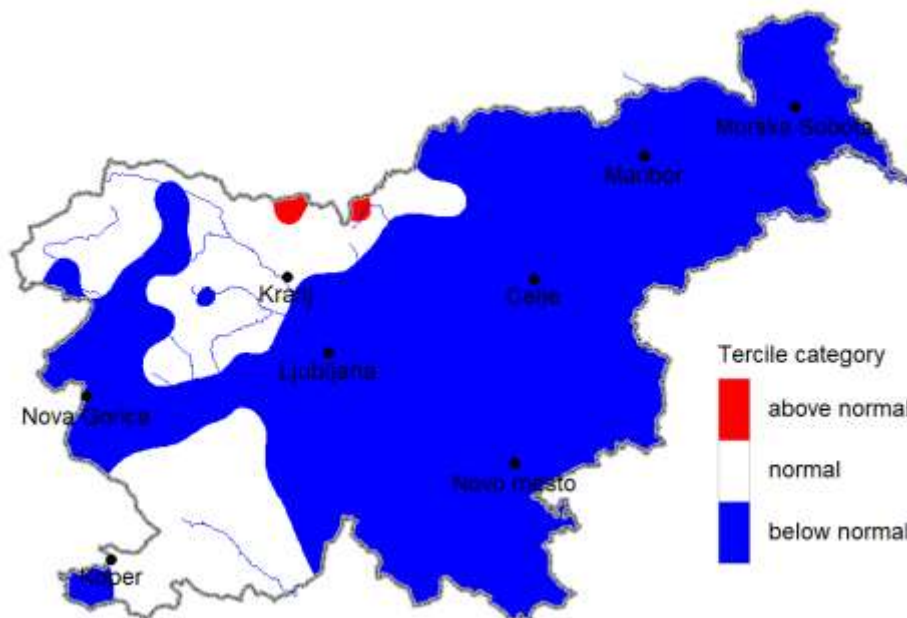


Figure 6. Precipitation tercile category of anomaly in Slovenia in winter 2018/19, relative to the period 1981–2010. Data are from 161 meteorological stations.

Since 2001 there have been 10 winters with positive temperature anomaly and 9 winters with negative anomaly, but negative anomalies have been smaller than positive (Figure 7). Winter

precipitation has been very variable in last years, but winters with above average precipitation prevailed (Figure 8).

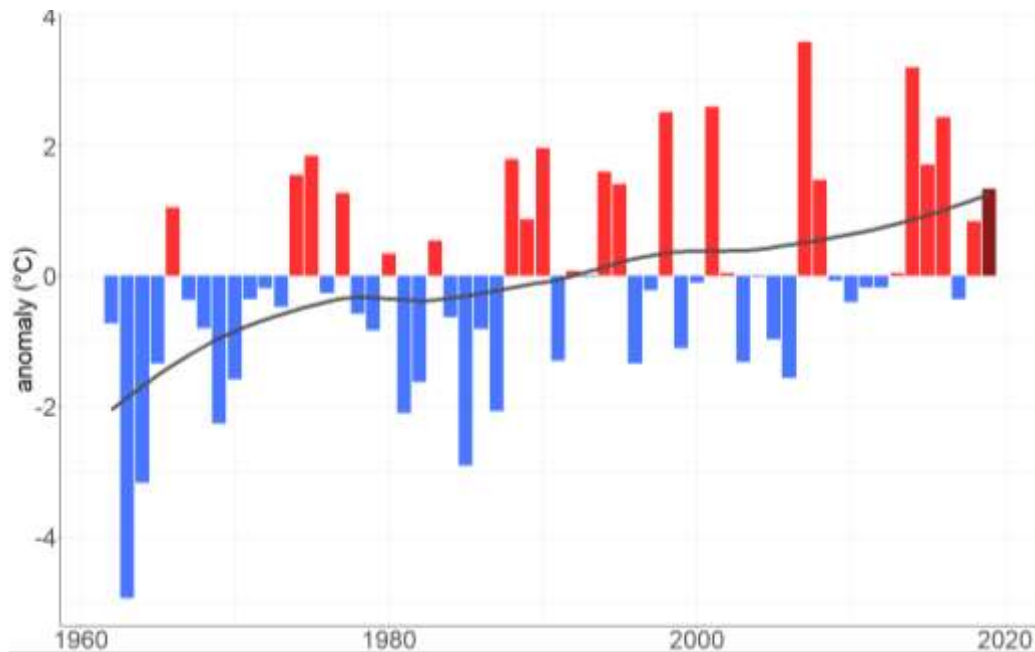


Figure 7. Winter mean air temperature anomaly in Slovenia in the period 1961/62–2018/19, relative to the 1981–2010 average

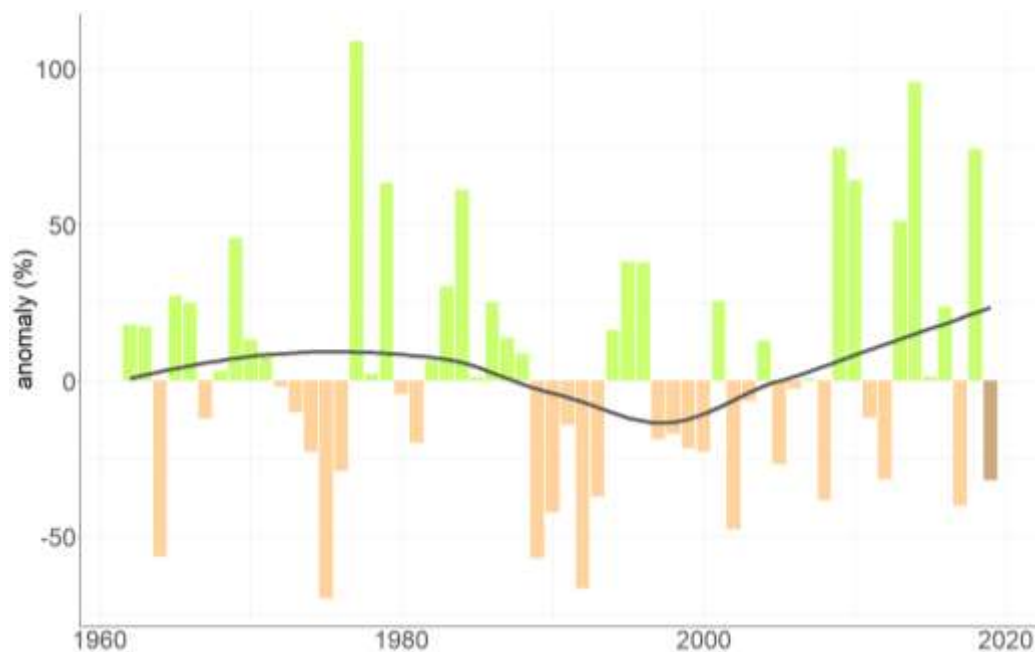


Figure 8. Winter precipitation anomaly in Slovenia in the period 1961/62–2018/19, relative to the 1981–2010 average

Average air temperature in *December 2018* was above the multi-annual average of the 30-year period 1981–2010 in whole Slovenia but the south-west. Air temperature anomalies were between $-0.3\text{ }^{\circ}\text{C}$ to $1.9\text{ }^{\circ}\text{C}$ (Figure 9), average anomaly was $0.9\text{ }^{\circ}\text{C}$ (surface weighted average value). According to tercile ranks, thermal conditions in Slovenia were above-normal in the

most parts of Slovenia, except in the Alps, in small parts of west and south-west and in parts of north-east.

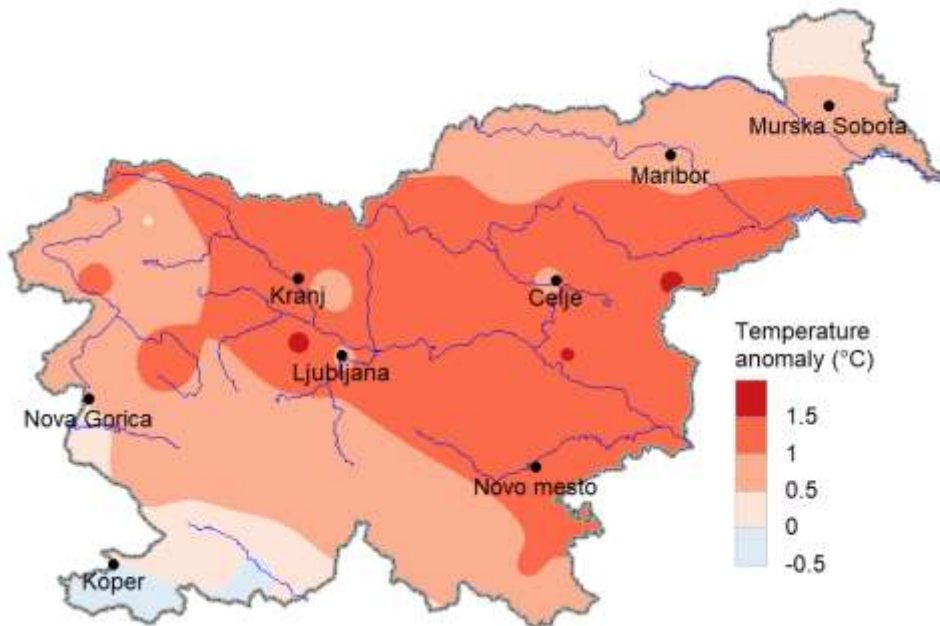


Figure 9. Mean air temperature anomaly in Slovenia in December 2018, relative to the 1981–2010 average. Data are from 33 meteorological stations.

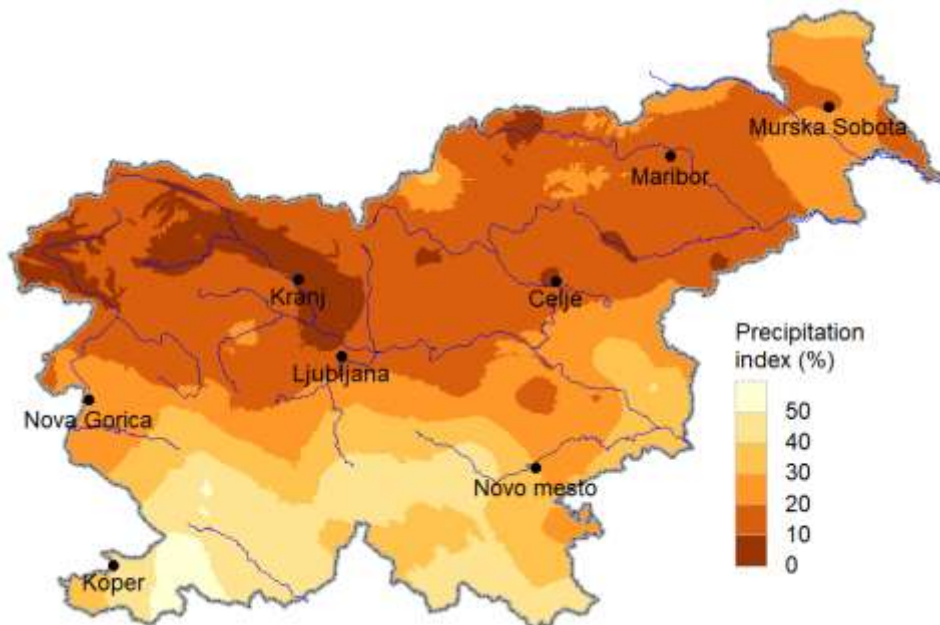


Figure 10. Precipitation index in Slovenia in December 2018, relative to the 1981–2010 average. Data are from 163 meteorological stations.

December 2018 was dry. Precipitation index was below average in whole country (Figure 10). Precipitation index was within the range from 3 % to 60 %, its average value was 24 %

(surface weighted average value). Precipitation index was within the first (below-normal) tercile, compared with the period 1981–2010.

Average air temperature in *January 2019* was above the multi-annual average of the 30-year period 1981–2010 in east Slovenia and below average in the west and in the Alps. Anomalies were between $-3.8\text{ }^{\circ}\text{C}$ and $1.0\text{ }^{\circ}\text{C}$ (Figure 11), their average value was $-0.1\text{ }^{\circ}\text{C}$ (surface weighted average value). According to tercile ranks, thermal conditions in Slovenia were above normal in the north of the country, below normal in the Alps and normal tercile elsewhere.

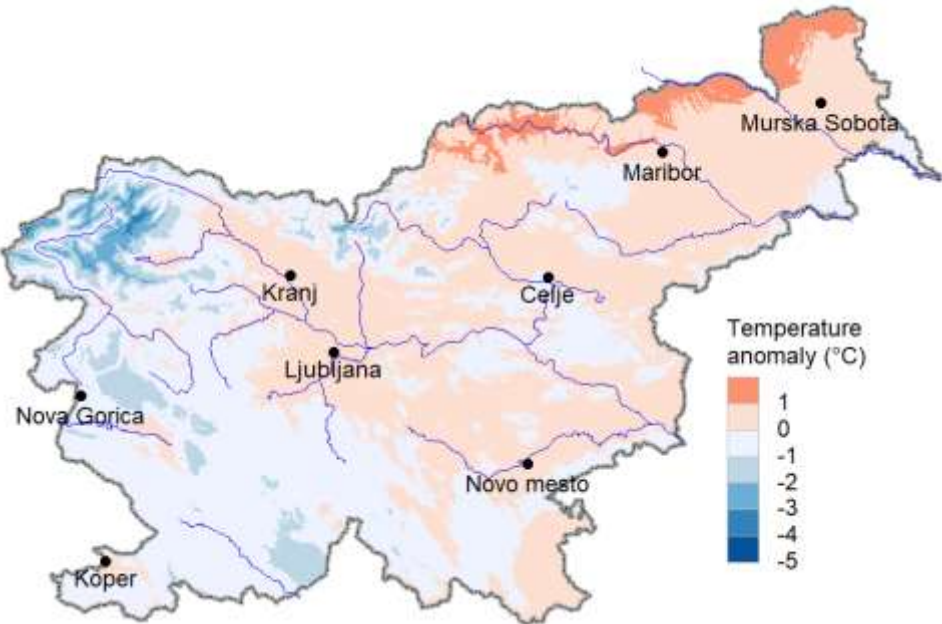


Figure 11. Mean air temperature anomaly in Slovenia in January 2019, relative to the 1981–2010 average. Data are from 34 meteorological stations.

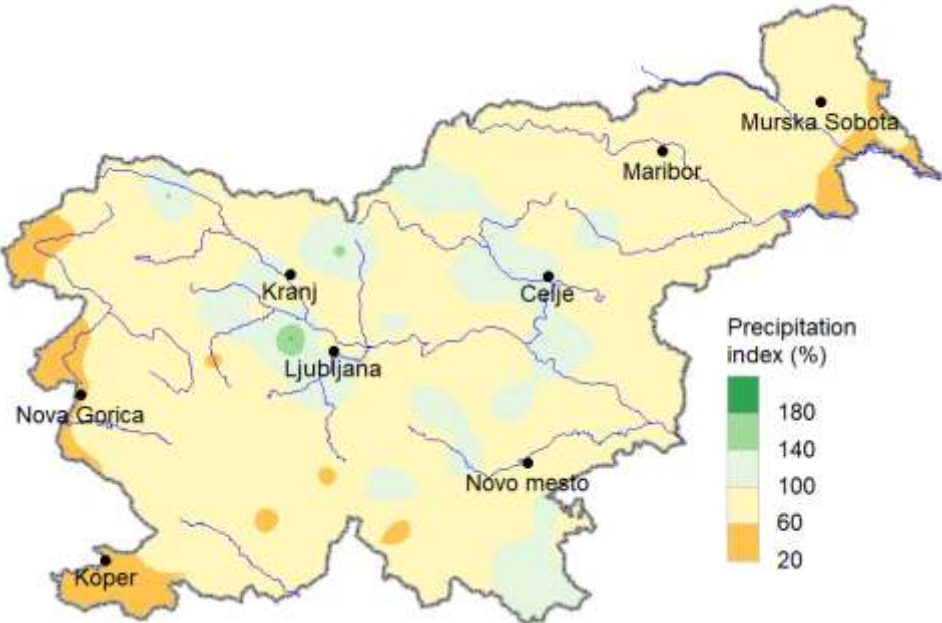


Figure 12. Precipitation index in Slovenia in January 2019, relative to the 1981–2010 average. Data are from 163 meteorological stations.

Precipitation index in *January 2019* was around 100 %, relative to the period 1981–2010, in the greater part of the country, except in the west and southwest, where below normal precipitation conditions prevailed (Figure 12). The precipitation index was within the range from 38 % to 155 %, its average value was 85 % (surface weighted average value). The precipitation index was within the second (normal) tercile in the most part of the country, except in the west and south west, where it was in the first (below normal) tercile. Some stations reported about precipitation within third (above normal) tercile (6 stations of 161).

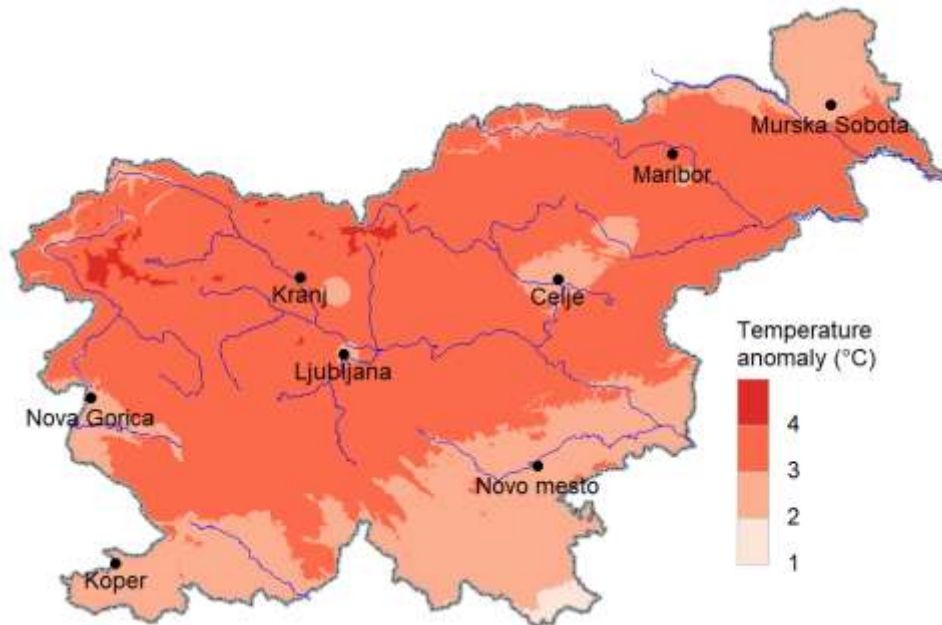


Figure 13. Mean air temperature anomaly in Slovenia in February 2019, relative to the 1981–2010 average. Data are from 34 meteorological stations.

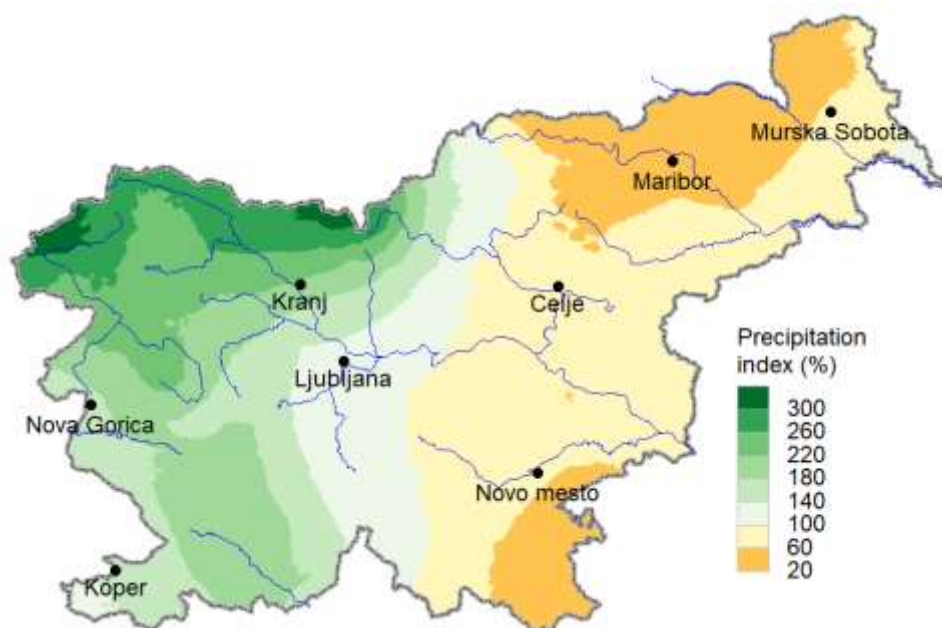


Figure 14. Precipitation index in Slovenia in February 2019, relative to the 1981–2010 average. Data are from 163 meteorological stations.

February 2019 was very warm, especially at the end of the month, when there were quite a few February temperature records in the northeast. Air temperature anomalies were between 2.1 °C to 4.3 °C (Figure 13), the average anomaly was 3.1 °C (surface weighted average value). According to tercile ranks, thermal conditions in Slovenia were above in whole country.

Precipitation index in *February 2019* was above average in the west of the country, below average in the east and around normal between (Figure 14). The major part of precipitation in February fell in the first three days of the month. Especially west part of the country received uncommon high precipitation for February. Precipitation index was within the range from 30 % to 360 %, its average value was 129 % (surface weighted average value). In the western half of the country precipitation was within the third (above average) tercile, in east it was within first (below-normal) tercile and within normal tercile in the central Slovenia and parts of south-east.

The summary for winter 2018/19 and monthly (December, January and February) temperature and precipitation conditions can be found in the Table 1.

Table 1. The summary for winter 2018/19 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
December 2018	–0.3 to 1.9 °C	0.9 °C	3 to 60 %	24 %
January 2019	–3.8 to 1.0 °C	–0.1 °C	38 to 155 %	85 %
February 2019	2.1 to 4.3 °C	3.1 °C	30 to 360 %	129 %
Winter 2018/19	0.0 to 1.9 °C	1.3 °C	30 to 115 %	68 %

High Impact Events

Highlights for the winter 2018/19 in Slovenia:

- Temperature above average (among the 14 warmest since 1961),
- Precipitation below average (among the 10 driest since 1961), snow cover below average,
- Very warm February (among 8 to 10 warmest since 1961), with record-breaking temperature in the northeast on the last day of the month,
- Very dry December (among 5 driest since 1961).

Verification of the SEECOF-20 Climate Outlook in Slovenia for winter season 2018/19

In the table 2 a verification summary of the SEECOF-20 climate outlook for the winter season 2018/19 (DJF) can be found. The climatological reference period is 1981–2010.

Table 2. SEECOF-20 climate outlook verification summary for Slovenia for winter 2018/19

Country	Seasonal temperature (DJF)		Seasonal precipitation (DJF)	
	Observed	SEECOF-20 climate outlook for temperature	Observed	SEECOF-20 climate outlook for precipitation
SLOVENIA	warmer than normal, normal in the Alps	no clear signal	drier than normal in the east, central Slovenia and parts of the west, normal in parts of the west, wetter than normal on some stations only	wetter than normal in the west, normal or wetter than normal in the east

Users' Perception of the SEECOF-20 Outlook

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