Annex

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Assessment of the SEECOF-26 Climate Outlook for Slovenia for winter season 2021/22

SEECOF-26 Climate Outlook for Slovenia for winter season 2021/22

The consensus statement of SEECOF-26 climate outlook for the 2021/22 winter season emphasized the typical atmospheric response to La Niña event over the tropics and also over North America with a strong negative PNA for all dynamical models. The models were in less agreement in the response over North Atlantic and over the MedCOF domain, some models suggesting a dominant NAO+ circulation and other suggesting blocking as the most frequent regime. A tendency of higher than normal geopotential was suggested by most models over Central Europe and Mediterranean Sea, with areas of low surface pressures over Southern MedCOF domain.

The consensus was, that winter temperature was likely to be near or above-normal in most of the SEECOF region (zone 2 in Figure 1), whereas Pannonia Plain, western Balkans, western parts of Turkey, Israel, Jordan, along the coasts of the Adriatic, Ionian, Aegean and Mediterranean Seas with belonging hinterland were forecasted to observe above-normal winter temperature (zone 1 in Figure 1). For Slovenia, the probabilities for below-, near- and above-normal temperature relative to the period 1981/82–2010/11 were estimated to be 20, 30 and 50 %.

For winter precipitation totals the consensus was that it was likely to be below- or near-normal in Greece, southern and western parts of Turkey, Israel and Jordan, along the coasts of Ionian, southern coasts of the Aegean Sea and Eastern Mediterranean (zone 1 in Figure 2), while in rest of the SEECOF region (zone 2 in Figure 2) uncertainty was high: probabilities for below, near- or above-average conditions were approximately equal. For Slovenia that meant equal probabilities for below-, near- and above-normal precipitation (33 %).

It was noted that sub-seasonal developments might occur so regular updates to the forecast were strongly recommended. 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 1981/82–2010/11. Due to the climate warming, trend anomalies are affected by the selected reference period.

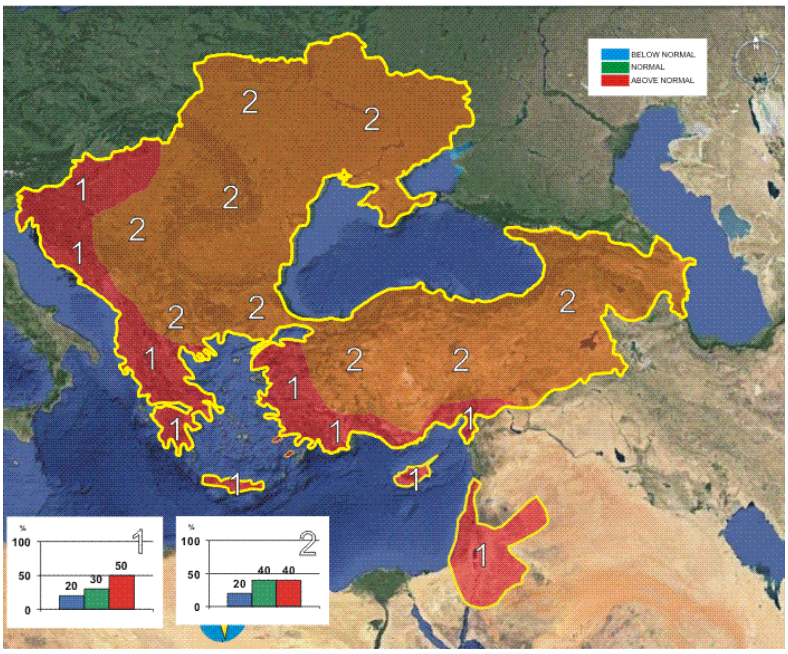

Figure 1. Graphical presentation of the winter 2021/22 temperature outlook

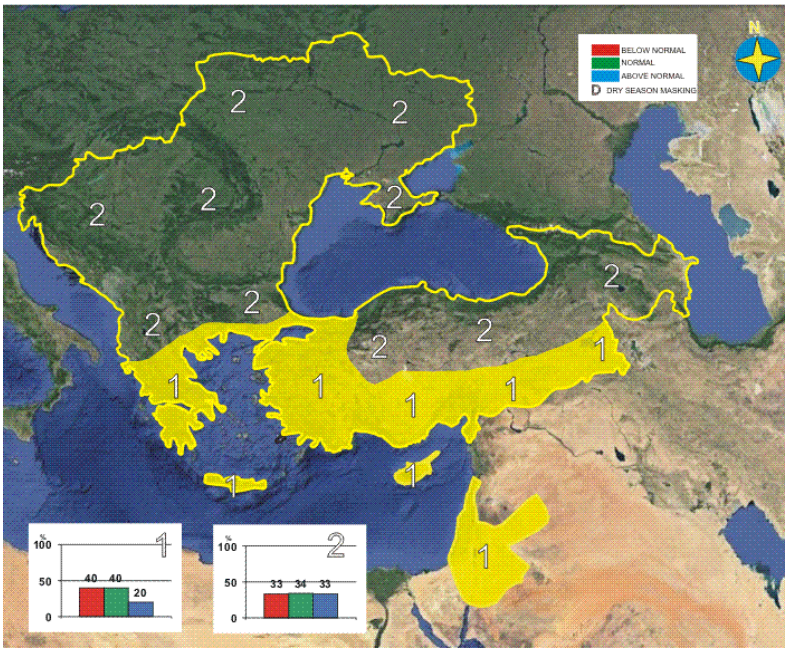

Figure 2. Graphical presentation of the winter 2021/22 precipitation outlook

Analysis of the winter season 2021/22

Average air temperature in Slovenia in winter 2021/22 was above the average of the 30-year period 1981/82–2010/11 in whole country (Figure 3). Corresponding air temperature anomalies for winter 2021/22 (months December, January and February) were between 0.2 °C and 2.4 °C, average anomaly was 1.7 °C (surface weighted average value). Temperature anomaly was the largest in eastern Slovenia (over 2 °C) with negative gradient towards north west of the country (around 0.5 °C).

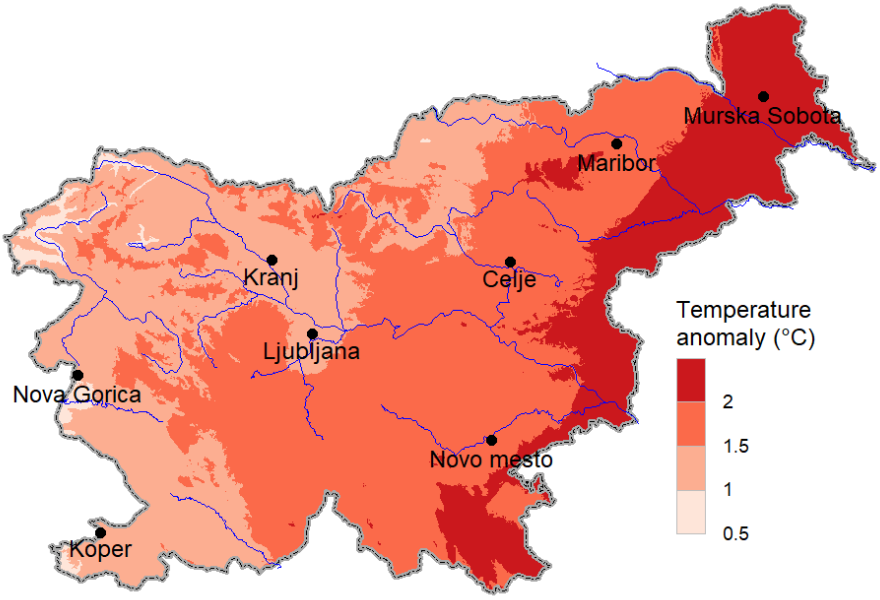

Figure 3. Mean air temperature anomaly in Slovenia in winter 2021/22, relative to the 1981/82–2010/11 average. Data are from 35 meteorological stations.

According to tercile ranks, thermal conditions in Slovenia in winter 2021/22 were above normal in whole country, except for the small area in the north-west (Figure 4).

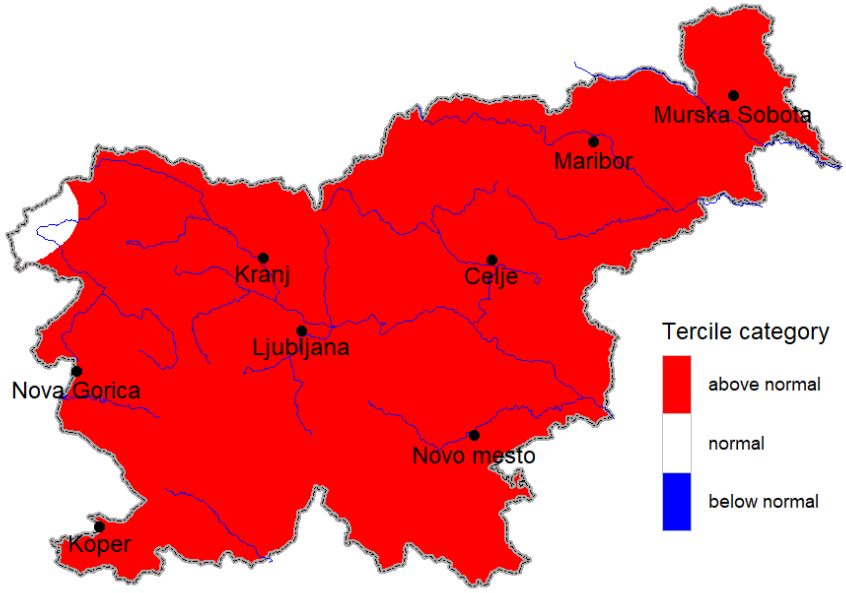

Figure 4. Mean air temperature tercile category of anomaly in Slovenia in winter 2021/22, relative to the period 1981/82–2010/11. Data are from 33 meteorological stations.

Precipitation index in Slovenia in winter 2021/22 was below average in almost whole country, except for the small area in the north east with above-normal index (Figure 5). Precipitation index was within the range from 35 % to 122 %, with surface weighted average value of 74 %.

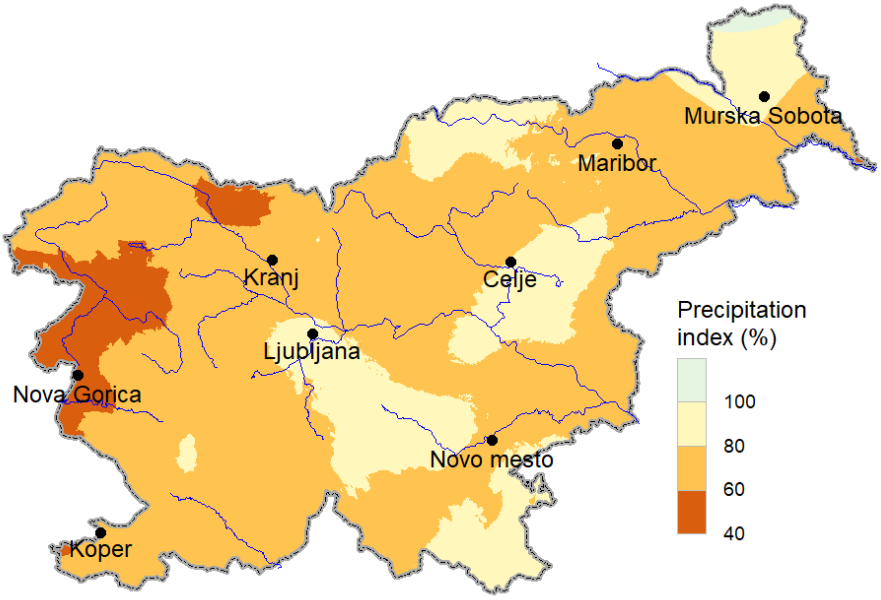

Figure 5. Precipitation index in Slovenia in winter 2021/22, relative to the 1981/82–2010/11 average. Data are from 156–158 meteorological stations.

According to this, the precipitation was within the first tercile (below-normal) in major part of Slovenia (80 % of meteorological stations), within the second tercile (normal) in parts of south west, central and north east of the country (20 % of all stations) and within the third tercile (above-normal) at one weather station (Figure 6).

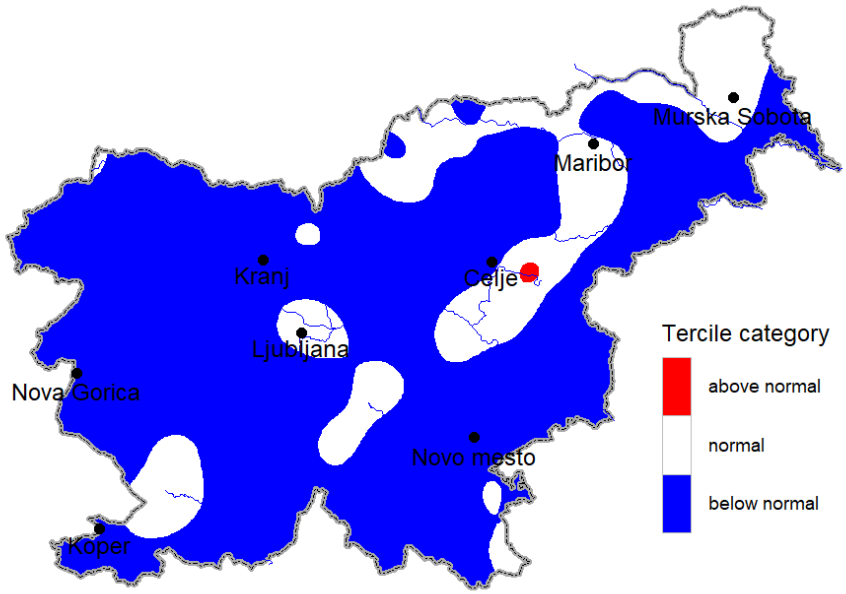

Figure 6. Precipitation tercile category of anomaly in Slovenia in winter 2021/22, relative to the period 1981/82–2010/11. Data are from 153 meteorological stations.

Winter 2021/22 was amongst the 12 warmest since 1961. Since 2001 there have been 13 winters with positive and nine with negative temperature anomaly, but negative anomalies have been much smaller than positive (Figure 7). The record as the warmest winter still holds the winter

2006/7 with anomaly of 3.6 °C. Linear winter temperature trend in the period 1961/62–2021/22 of 0.4 °C/decade is statistically significant. Last winter is amongst 13 driest since 1961. The record as the driest winter holds winter 1974/75 with precipitation index 30 %. Average winter precipitation index has been growing since the nineties of the previous century. There have been 11 winters with below-average precipitation index since 2001 and the same number of winters with above average value (Figure 8).

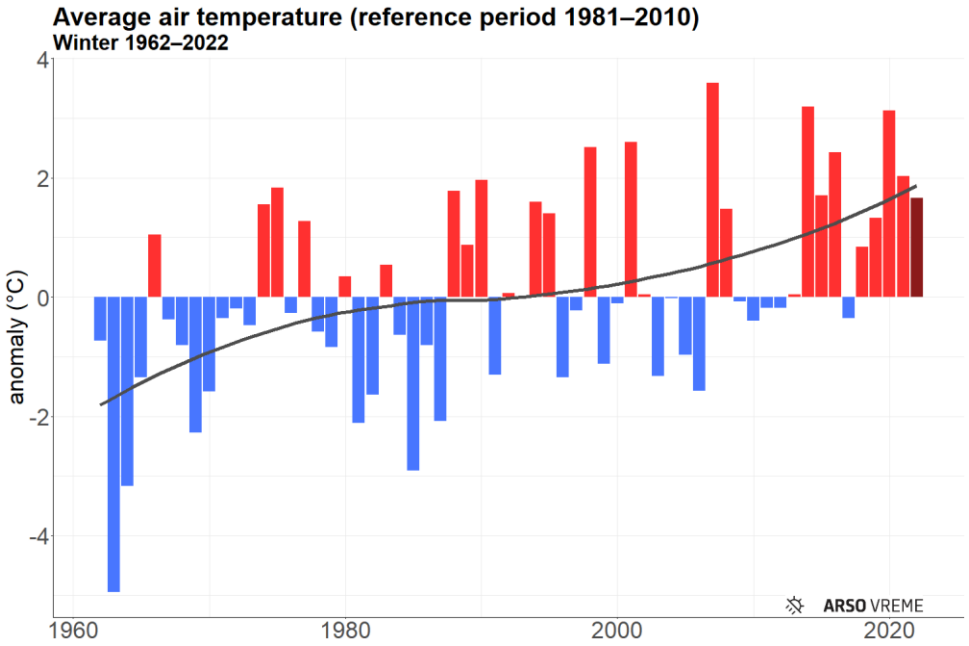

Figure 7. Winter mean air temperature anomaly in Slovenia in the period 1961/62–2021/22, relative to the 1981/82–2010/11 average. Winter 2021/22 is marked with dark red colour.

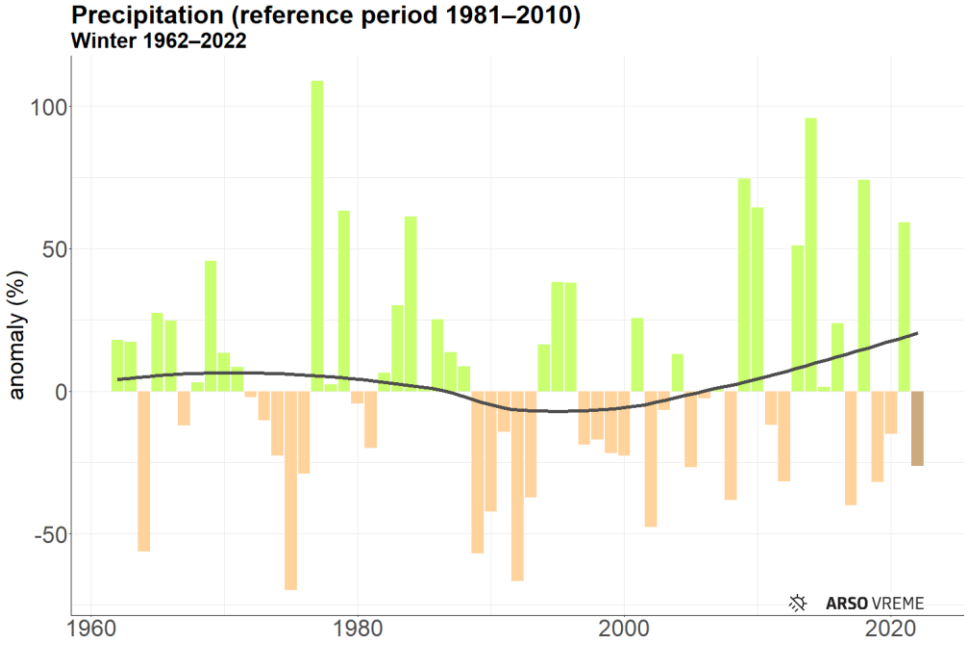

Figure 8. Winter precipitation anomaly in Slovenia in the period 1961/62–2021/22, relative to the 1981/82–2010/11 average. Winter 2021/22 is marked with dark brown colour.

December 2021 had the smallest temperature anomaly of all winter 2021/22 months. Average air temperature was above the average of the 30-year period 1981–2010 in most of the country, except for some lower areas in north and north-west. Air temperature anomalies were between –1.0 °C and 2.4 °C (Figure 9), average anomaly was 0.9 °C (surface weighted average value). According to tercile ranks, thermal conditions in Slovenia were above-normal in southern, eastern and north-eastern parts of the country and normal elsewhere.

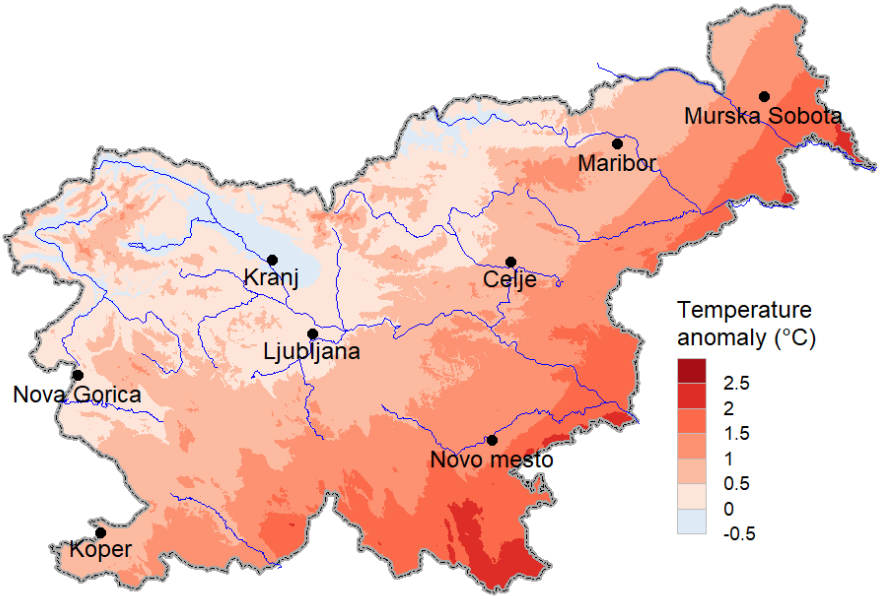

Figure 9. Mean air temperature anomaly in Slovenia in December 2021, relative to the 1981–2010 average. Data are from 35 meteorological stations.

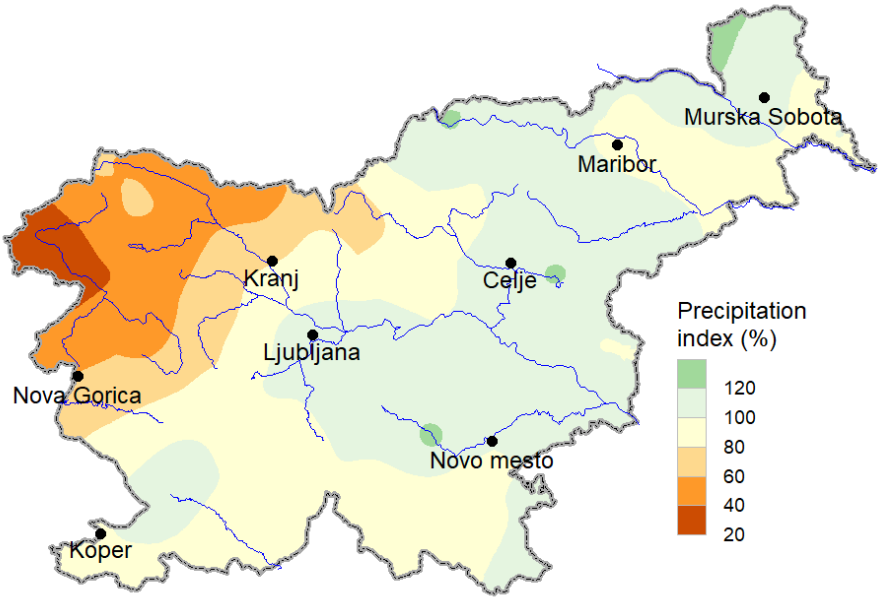

Figure 10. Precipitation index in Slovenia in December 2021, relative to the 1981–2010 average. Data are from 157 meteorological stations.

December 2021 was dry in the north-western and southern parts of the country, elsewhere the precipitation index was normal or above-normal (Figure 10). It was within the range from 32 % to 139 %, its average value was 92 % (surface weighted average value). Precipitation index was within second (normal) tercile everywhere but in the north west, where it was within first tercile (below-average), and the small area in the north-east, where it was above-normal.

Average air temperature in *January 2022* was above the multi-annual average of the 30-year period 1981–2010 in whole Slovenia. Anomalies were between –0.2 °C and 2.3 °C (Figure 11), their average value was 1.3 °C (surface weighted average value). According to tercile ranks, thermal conditions in Slovenia were above normal everywhere but in parts of central, north-west and south-west Slovenia where they were within second (normal) tercile.

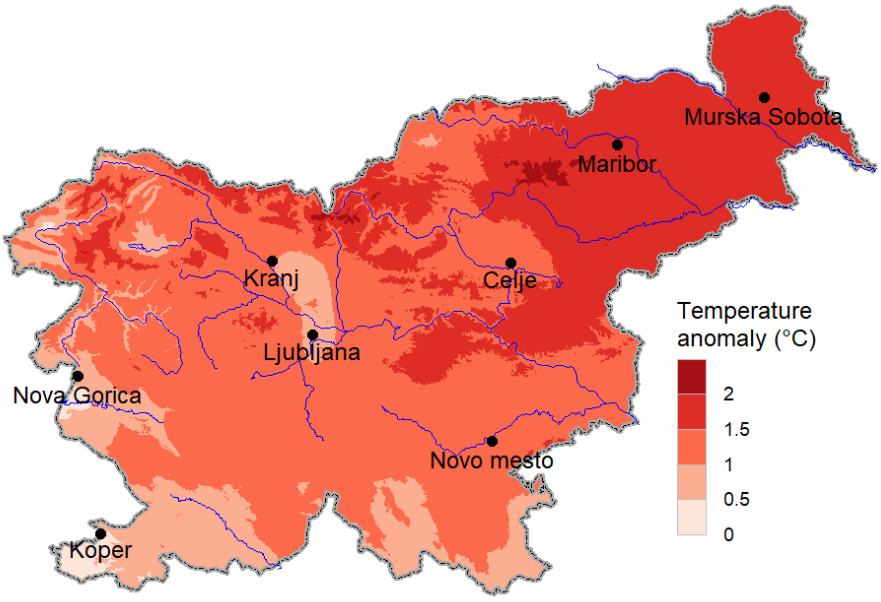

Figure 11. Mean air temperature anomaly in Slovenia in January 2022, relative to the 1981–2010 average. Data are from 35 meteorological stations.

January 2022 was the driest month of the last winter. The precipitation index was within the range from 9 % to 122 %, its average value was 54 % (surface weighted average value). Spatially it was the driest in the southern Slovenia, especially in the south-west, parts of eastern and central Slovenia (Figure 12). Precipitation was normal and above normal only in small parts of north-western and north-eastern Slovenia. The precipitation index was within the first (below-normal) tercile in central, southern and eastern Slovenia and within second (normal) tercile elsewhere.

February 2022 was the warmest 2021/22 winter month. Air temperature anomalies were between 1.0 °C and 3.6 °C (Figure 13), the average anomaly was 2.8 °C (surface weighted average value). Temperature anomaly was the largest in the east and north-east (over 3.0 °C) with negative gradient towards west (below 2.0 °C in north-west and south-west). According to tercile ranks, thermal conditions in Slovenia were above-normal almost everywhere.

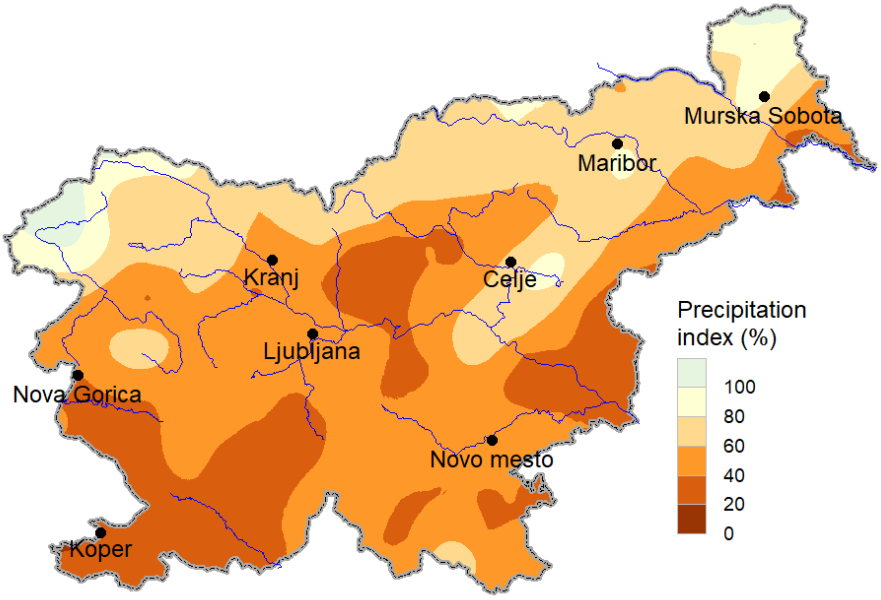

Figure 12. Precipitation index in Slovenia in January 2022, relative to the 1981–2010 average. Data are from 158 meteorological stations.

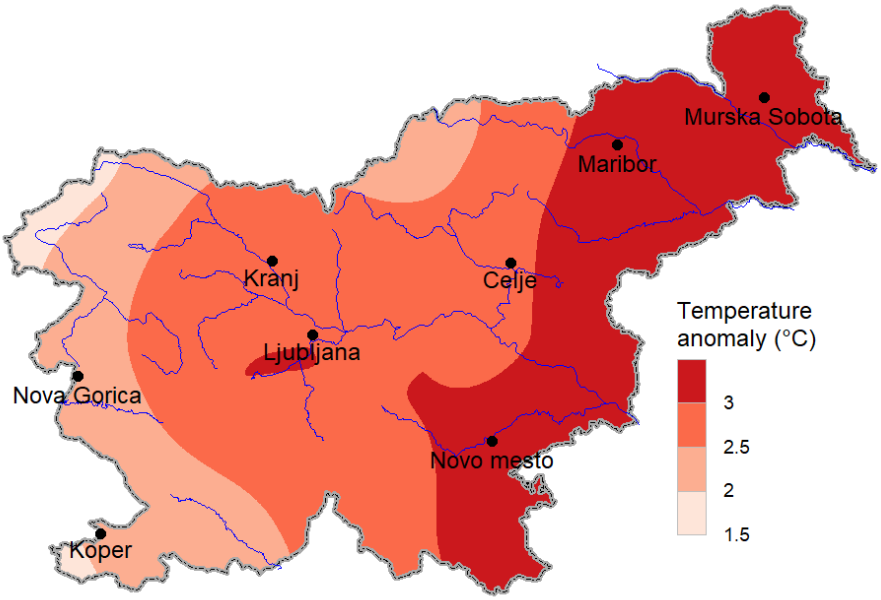

Figure 13. Mean air temperature anomaly in Slovenia in February 2022, relative to the 1981–2010 average. Data are from 35 meteorological stations.

Precipitation index in *February 2021* was below average everywhere but in the small area in the south-east (Figure 14). Precipitation index was within the range from 25 % to 126 %, its average value was 66 % (surface weighted average value). The driest area was Slovenske gorice (in the north-eastern Slovenia). In the north-eastern and parts of south-western Slovenia precipitation was within the first (below-average) tercile and within second (normal) tercile elsewhere.

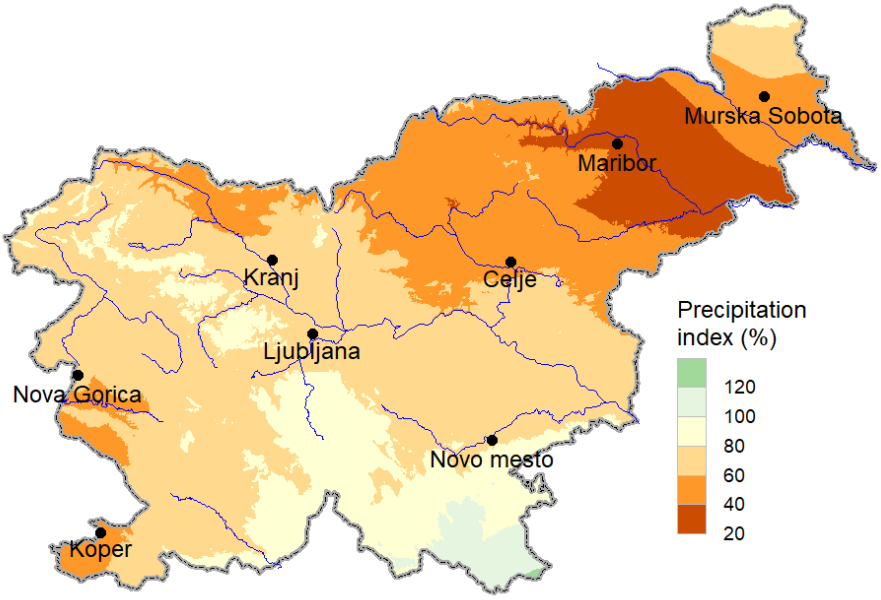

Figure 14. Precipitation index in Slovenia in February 2022, relative to the 1981–2010 average. Data are from 156 meteorological stations.

The summary for winter 2021/22 and monthly (December, January and February) temperature and precipitation conditions can be found in the Table 1.

Table 1. The summary for winter 2021/22 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 2021	–1.0 to 2.4 °C	0.9 °C	32 to 139 %	92 %
January 2022	–0.2 to 2.3 °C	1.3 °C	9 to 122 %	54 %
February 2022	1.0 to 3.6 °C	2.8 °C	25 to 126 %	66 %
Winter 2021/22	**0.2 to 2.4 °C**	**1.7 °C**	**35 to 122 %**	**74 %**

High Impact Events

Highlights for the winter 2021/22 in Slovenia:

- Temperature above average, the 12th warmest since 1961,
- Precipitation below average, the 13th driest since 1961.

Most noticeable high impact events: nothing particular.

Verification of the SEECOF-26 Climate Outlook in Slovenia for winter season 2021/22

In the table 2 a verification summary of the SEECOF-26 climate outlook for the winter season 2021/22 (DJF) can be found. The climatological reference period is 1981/82–2010/11.

Table 2. SEECOF-26 climate outlook verification summary for Slovenia for winter 2021/22

Country	Seasonal temperature (JJA)		Seasonal precipitation (JJA)	
	Observed	SEECOF-26 climate outlook for temperature	Observed	SEECOF-26 climate outlook for precipitation
SLOVENIA	warmer than normal	warmer than normal	mostly drier than normal	no signal

Users' Perception of the SEECOF-26 Outlook

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