

## **Annex**

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### **Assessment of the SEECOF-30 Climate Outlook for Slovenia for the winter season 2023/24**

#### **SEECOF-30 Climate Outlook for Slovenia for the winter season 2023/24**

The consensus statement of SEECOF-30 climate outlook for the 2023/24 winter season emphasized moderate to intense El Niño conditions, positive Indian Ocean Dipole and positive anomalies over most of Atlantic Ocean in observed sea surface temperature as well as in forecast for the next three months. In the atmosphere, models have been showing cyclonic anomalies over northwestern Europe, and anticyclonic anomalies over northwestern Africa and parts of Mediterranean Sea. Diagnostic of upper levels showed tendency to a weaker than normal Stratospheric Polar Vortex, which would favour negative NAO phase for late winter, in agreement with El Niño impacts.

The consensus was, that winter temperature was likely to be near or above-normal in most of the SEECOF region (zone 1 in Figure 1) and above-normal in Jordan, Israel, southern parts of Turkey, along the coasts of the Ionian, Aegean, Central and Eastern Mediterranean Seas with belonging hinterland (zone 2 in Figure 1). For Slovenia, the probabilities for below-, near- and above-normal temperature were estimated to be 10, 30 and 60 % for western part of the country, and 20, 30 and 50 % for eastern part.

For winter precipitation totals the consensus was that it would likely to be above-normal in the most of the SEECOF region (zone 1 in Figure 2), while in the south of Greece, Turkey, Israel, Jordan, along the coasts of Ionian, southern coasts of the Aegean, southern and eastern coasts of the Black Sea due to high uncertainty there was no clear signal (zone 2 in Figure 2). The probabilities for below, near- or above-average conditions were approximately equal there. For Slovenia that meant probabilities of 20, 30 and 50 % for below-, near- and above-normal precipitation.

It was noted that sub-seasonal developments might have occurred and, in addition, local factors (for example SST in the smaller basins of the region) might have shaped 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.

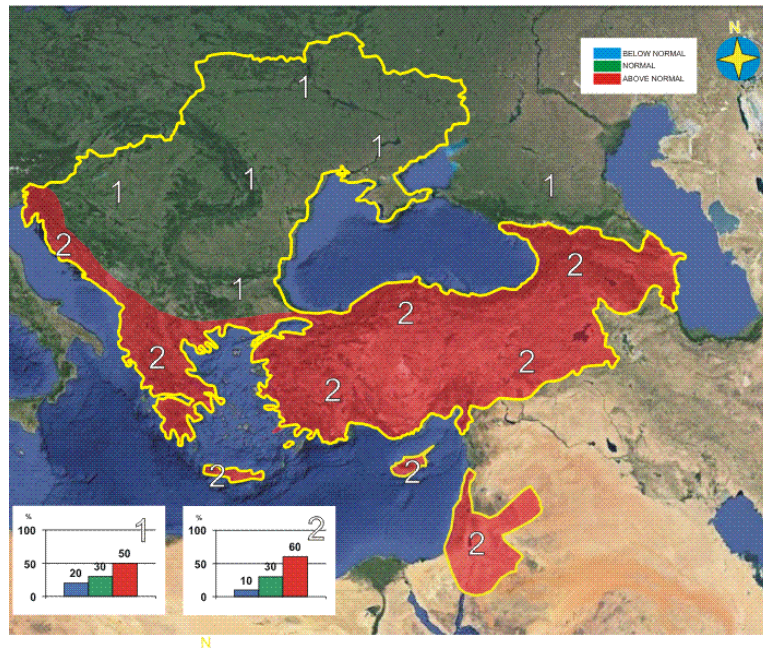


Figure 1. Graphical presentation of the winter 2023/24 temperature outlook, relative to the period 1981–2010

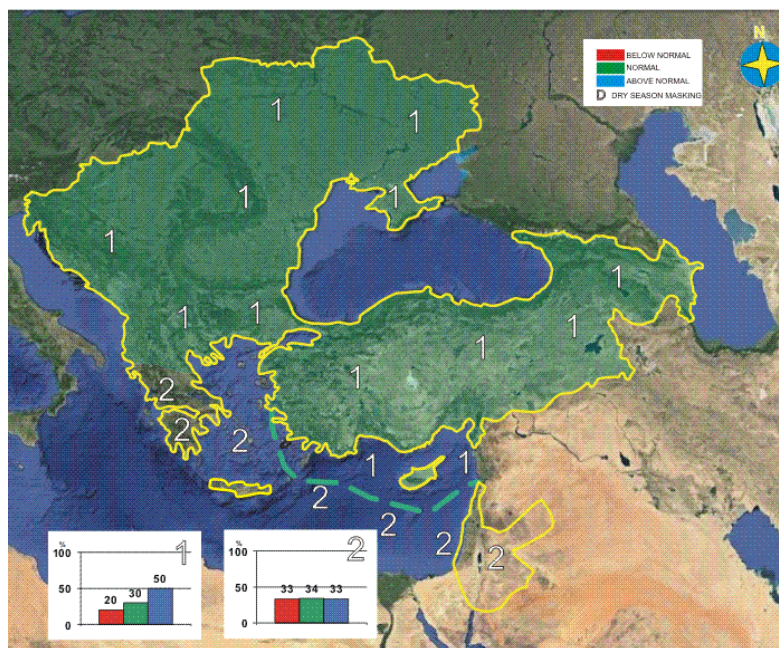


Figure 2. Graphical presentation of the winter 2023/24 precipitation outlook, relative to the period 1981–2010

### Analysis of the winter season 2023/24 in Slovenia

The winter 2023/24 was the warmest on record since at least 1950. Average air temperature was above the average of the 30-year period 1991–2020 in the whole country (Figure 3). Corresponding air temperature anomalies for winter 2023/24 (months December, January and February) were between 1.6 °C and 4.2 °C, average anomaly was 3.2 °C (surface weighted average value). The anomalies were largest at the south east and in Pohorje Mountains west of Maribor, and smallest in west of the country.

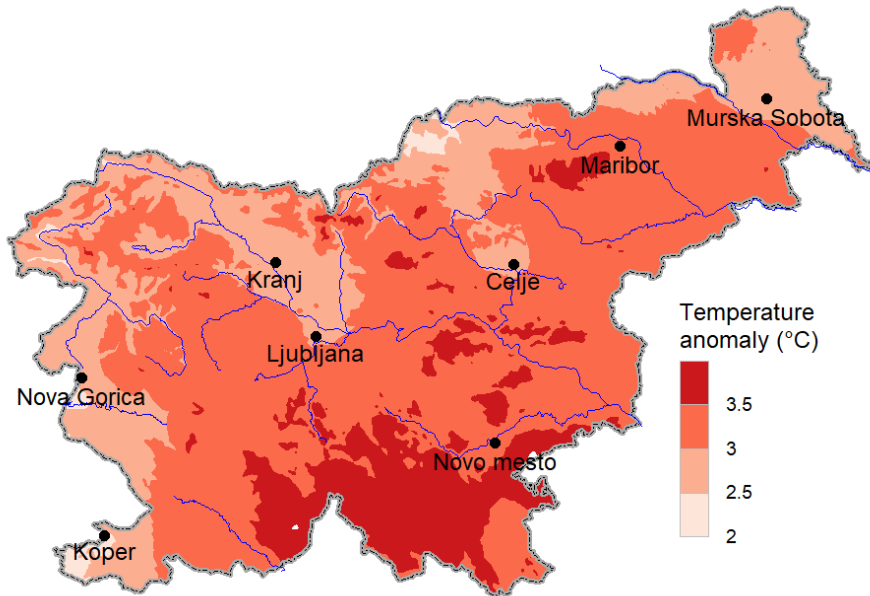


Figure 3. Mean air temperature anomaly in Slovenia in winter 2023/24, relative to the 1991/92–2020/21 average. Data are from 96 meteorological stations.

According to tercile ranks, thermal conditions in Slovenia in winter 2023/24 were above normal in the whole country (Figure 4).

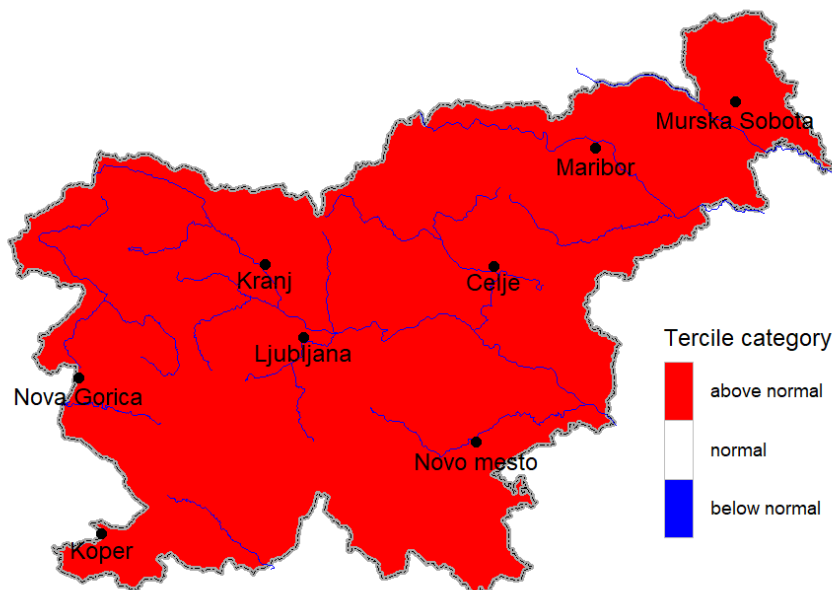


Figure 4. Mean air temperature tercile category of anomaly in Slovenia in winter 2023/24, relative to the period 1991/92–2020/21. Data are from 96 meteorological stations.

Precipitation index in Slovenia in winter 2023/24 was above average in the whole country but small areas at the south-east, where it was around average (Figure 5). Precipitation index was within the range from 82 % to 261 %, with surface weighted average value of 139 %. Winter 2023/24 has been the 15<sup>th</sup> wettest since the season 1950/51.

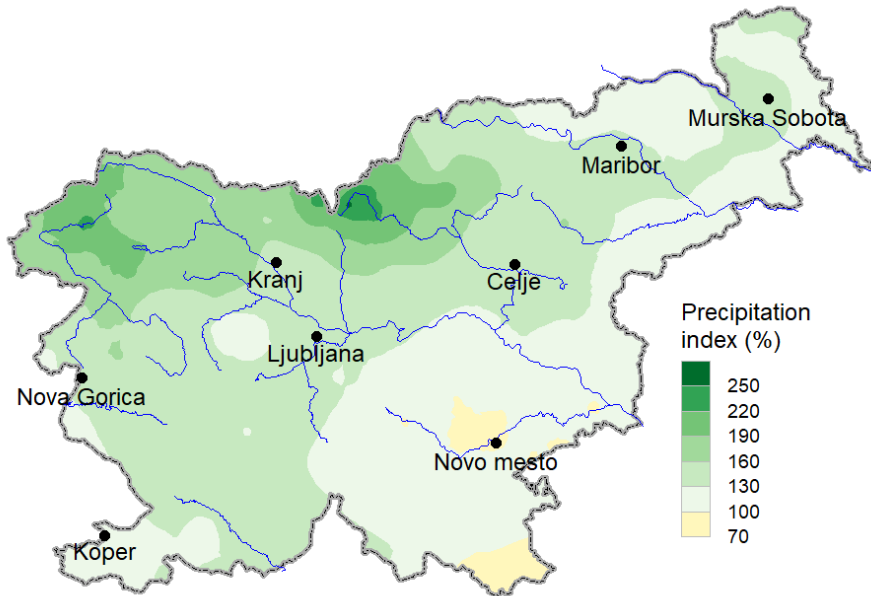


Figure 5. Precipitation index in Slovenia in winter 2023/24, relative to the 1991/92–2010/2011 average. Data are from 220 meteorological stations.

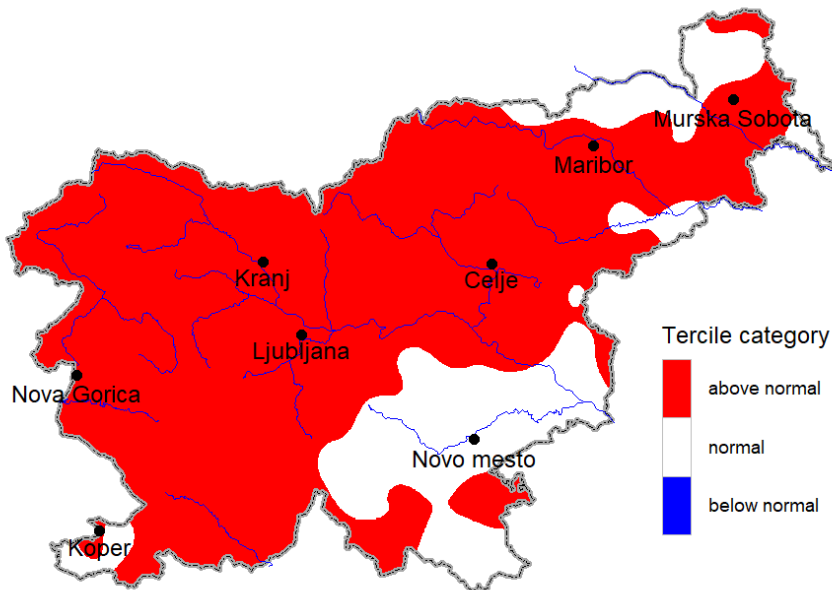


Figure 6. Precipitation tercile category of anomaly in Slovenia in winter 2023/24, relative to the period 1991/92–2020/21. Data are from 220 meteorological stations.

According to this, the precipitation was within the third tercile (above-normal) in major part of Slovenia, especially in the west and central north (80 % of the meteorological stations), while in the south-east, parts of the north-east and at the coast it was within the second tercile (normal) (Figure 6).

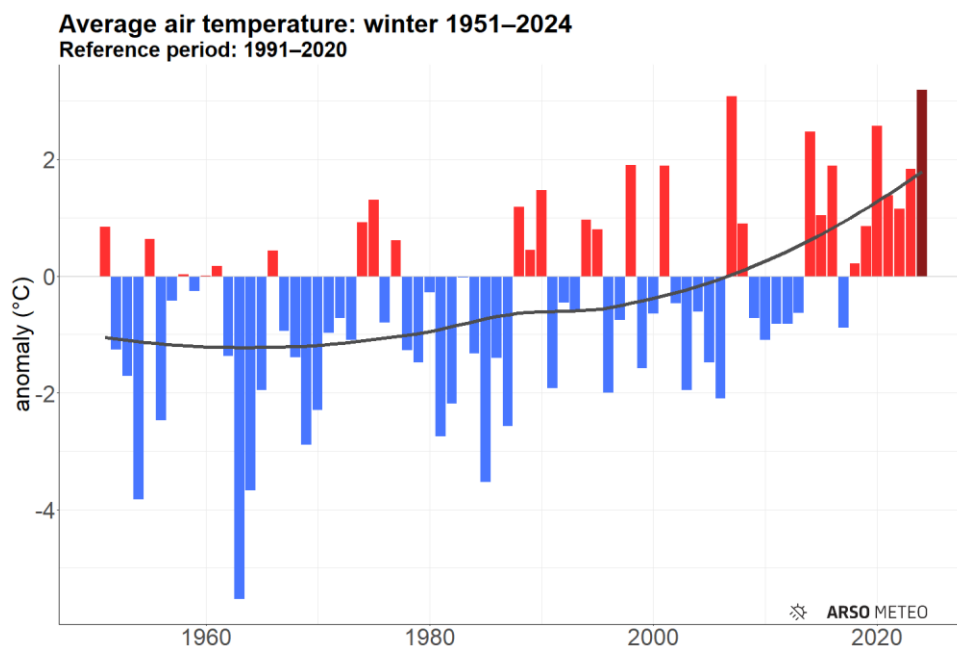


Figure 7. Winter mean air temperature anomaly in Slovenia in the period 1950/51–2023/24, relative to the 1991/92–2020/21 average. Winter 2023/24 is marked with dark red colour.

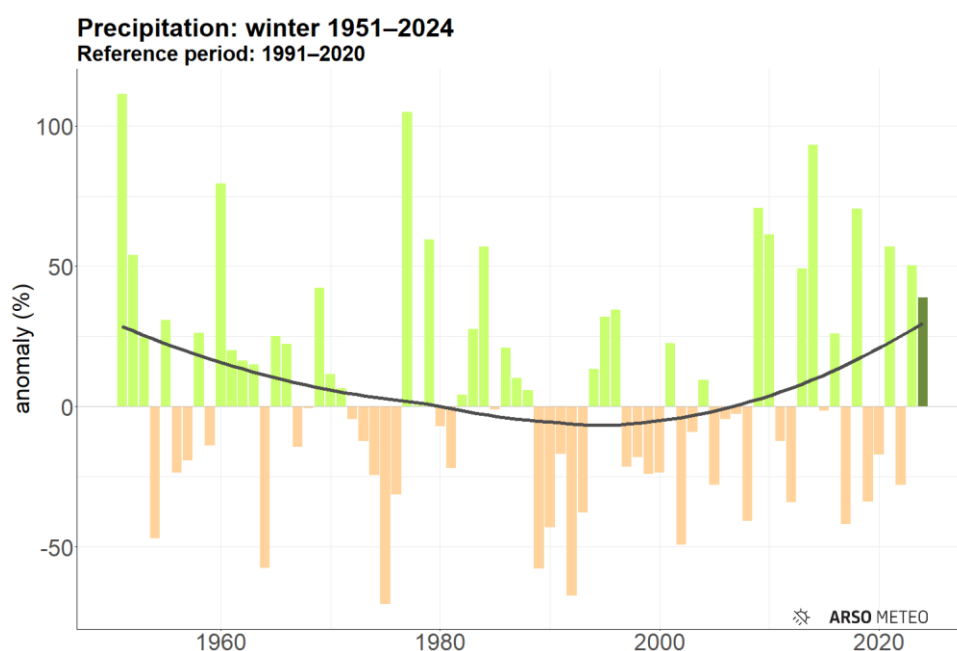


Figure 8. Winter precipitation anomaly in Slovenia in the period 1950/51–2023/24, relative to the 1991/92–2020/21 average. Winter 2023/24 is marked with dark brown colour.

Since 2001 there have been 12 winters with positive and 11 with negative temperature anomaly, but negative anomalies have been much smaller than positive (Figure 7). The winter 2023/24 is the seventh consecutive winter with the above-normal temperature. Linear winter temperature trend in the period 1950/51–2023/24 of 0.3 °C/decade is statistically significant. Winter precipitation index has statistically significant negative linear trend of approximately – 1 %/decade, but winter precipitation shows positive trend since the middle of nineties of the 20<sup>th</sup> century. There have been 11 winters with above-average precipitation index since 2001 (Figure 8).

The summary for winter 2023/24 and monthly (December, January and February) temperature and precipitation conditions can be found in the Table 1.

Table 1. The summary for winter 2023/24 temperature and precipitation in Slovenia

<b>SLOVENIA</b>	Temperature anomaly, relative to the period 1991–2020	Average temperature anomaly	Precipitation index, relative to the period 1991–2020	Average precipitation index
December 2023	1.1 to 4.1 °C	2.9 °C	43 to 379 %	144 %
January 2024	–0.1 to 2.2 °C	1.2 °C	25 to 217 %	187 %
February 2024	3.5 to 7.2 °C	5.5 °C	17 to 341 %	95 %
<b>Winter 2023/24</b>	<b>1.6 to 4.2 °C</b>	<b>3.2 °C</b>	<b>82 to 261 %</b>	<b>139 %</b>

## Highlights

Highlights for the winter 2023/24 in Slovenia:

- The warmest winter since at least the season 1950/51,
- The warmest December and February since at least 1950, 15<sup>th</sup> warmest January since 1950,
- Precipitation above average, the 15<sup>th</sup> wettest since 1950/51 season,
- Wet December, the 19<sup>th</sup> wettest since 1950/51, and January, the 11<sup>th</sup> wettest since 1950/51, February normal at the national level but wet in the west and dry to very dry at the east.

## Verification of the SEECOF-30 Climate Outlook in Slovenia for winter season 2023/24

In the table 2 a verification summary of the SEECOF-30 climate outlook for the winter season 2023/24 (DJF) can be found. The climatological reference period is 1991–2020.

Table 2. SEECOF-30 climate outlook verification summary for Slovenia for winter 2023/24

Country	Seasonal temperature (JJA)		Seasonal precipitation (JJA)	
	Observed	SEECOF-30 climate outlook for temperature	Observed	SEECOF-30 climate outlook for precipitation
<b>SLOVENIA</b>	warmer than normal	warmer than normal	wetter than normal in major part of Slovenia, especially in the west and central north, normal in the south-east, parts of the north-east and at the coast	wetter than normal

### **Users' Perception of the SEECOF-30 Outlook**

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