



# North EurAsia Climate Centre



## The main features of large-scale atmospheric circulation in the Northern Hemisphere for the winter 2023-2024

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# Atmospheric circulation

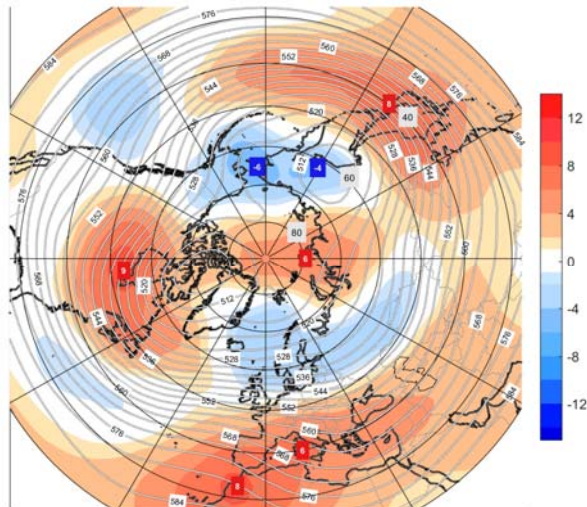
## Seasonal the 500 hPa geopotential height and MSLP anomalies (ERA5 reanalysis, based on a 1991-2020 mean)

### In the troposphere:

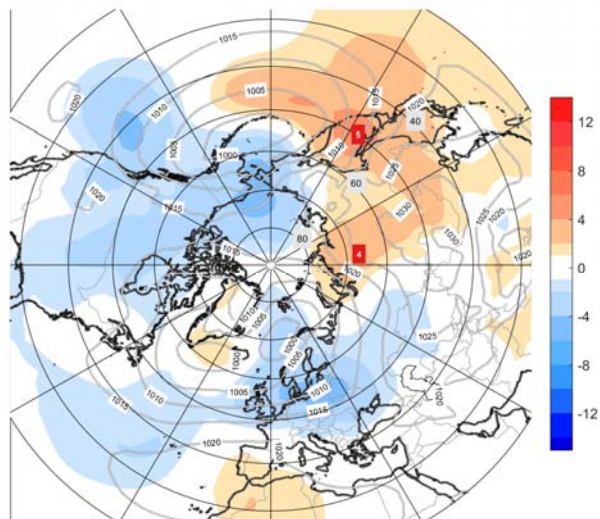
- The circumpolar cyclone was weakened and deformed as a result of intense anticyclones in the Northern Hemisphere;
- One cyclone center was located above Baffin Island, which corresponds to the normal. The cyclonic activity was displaced to the south - to the central regions of temperate latitudes of the Atlantic Ocean. The second cyclone center was formed in the Siberian trough of the cyclone;
- In December and January, the influence of anticyclone crests from northwestern Africa and the east Atlantic was predominant in Western Europe and the Mediterranean;
- In December, the northeast Atlantic, Northern Europe and the European territory of Russia, excluding the northern regions, were influenced by the trough of the circumpolar cyclone. In January, the influence of anticyclones from Africa to Europe expanded, the trough of the circumpolar cyclone shifted slightly to the east, affecting the entire European territory, the Urals, western Siberia and northern Kazakhstan. In February, the predominant influence on most of Europe was anticyclones. The influence of these anticyclones spread north - to the pole.

### At sea level:

- The position and intensity of the Icelandic low was close to normal. The Azores maximum was shifted east from its usual position - to northwest Africa and the Iberian Peninsula. For most of the season, the northern and eastern parts of Europe, European territory of Russia and the north of the Urals were influenced by the troughs of the Icelandic low;
- In December the polar anticyclones were the most intense.

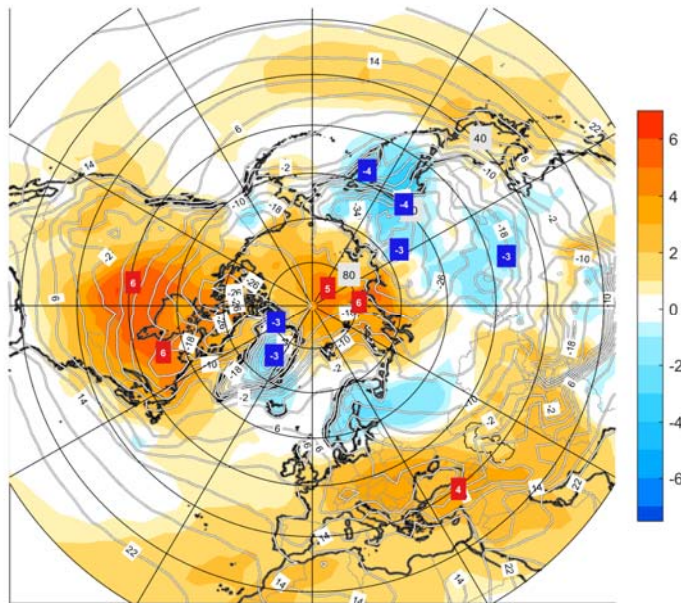


H500 dam anomalies (norms 1991-2020). DJF 2023.



MSLP hPa anomalies (norms 1991-2020). DJF 2023.

# Temperature

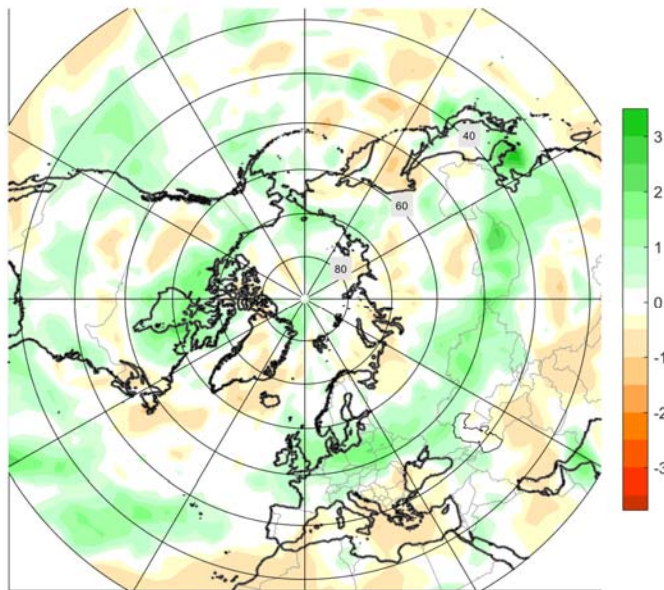


T2M deg anomalies (norms 1991-2020). DJF 2023.

**Seasonal temperature 2m anomalies  
(ERA5 reanalysis, based on a 1991-2020 mean)**

- Over the land surface, air temperatures for the season were much-above-average in Europe, southern parts of European Russia, most of Central Asia, excluding northwest Kazakhstan, where temperatures were normal;
- The most positive temperature anomalies were observed in the northern Urals, Taimyr, Novaya Zemlya and the Arctic islands of Russia ;
- Near-average to below-average temperatures were in northern areas of Europe and stretched from Scandinavia to northwestern areas of Russia ;
- In the first part of December, the periods with below normal temperature were observed in the north and in the center areas of the European Russia and the Volga Region;
- In the first half of January, in the northwestern and central regions of European Russia, the periods with below normal temperature were observed, with anomalies on some days in the northwest up to 28°C below the climatic normal. In St. Petersburg on January 4, the absolute minimum temperature for this date was updated, the new value is -25.3 °C;
- Near-average and below-average winter temperatures also covered large parts of the south of Eastern Siberia, excluding Transbaikalia, also in Yakutia, excluding the extreme northwest of the region, large parts of the Russian Far East, excluding the east of Chukotka, Amur Region, Primorsky Krai and the south of Khabarovsk Krai.

# Precipitation



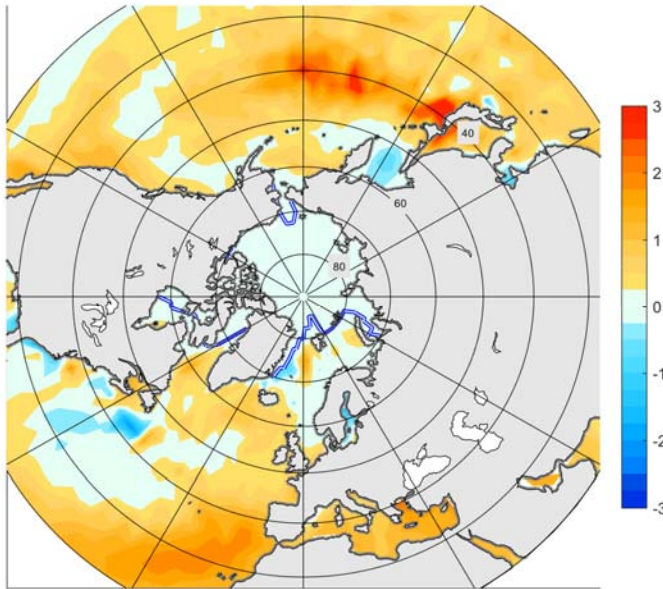
PREC sigma anomalies (norms 1991-2020). DJF 2023.

**Precipitation anomalies  
(ERA5 reanalysis, based on a 1991-2020 mean)**

- Precipitation was around normal in the Iberian Peninsula and France. Deficit of precipitation was observed in Italy, the Balkan Peninsula and the south of Eastern Europe;
- In the north of the European part of Russia and the extreme northern regions of the Urals, in some places in northwestern Siberia and some areas of the Taymir, was drier than normal;
- A lot of precipitation fell in the center and southern half of the the European part of Russia, Kazakhstan, excluding the southwest, south of Western Siberia, Mongolia, in places in the south of Eastern Siberia, northeast of Yakutia and west of Chukotka;
- Winter season was drier than normal in the southern parts of Eastern Siberia on the border with Mongolia, on Sakhalin and Kamchatka, in places in the south of Khabarovsk Krai, coastal areas of Magadan Oblast;



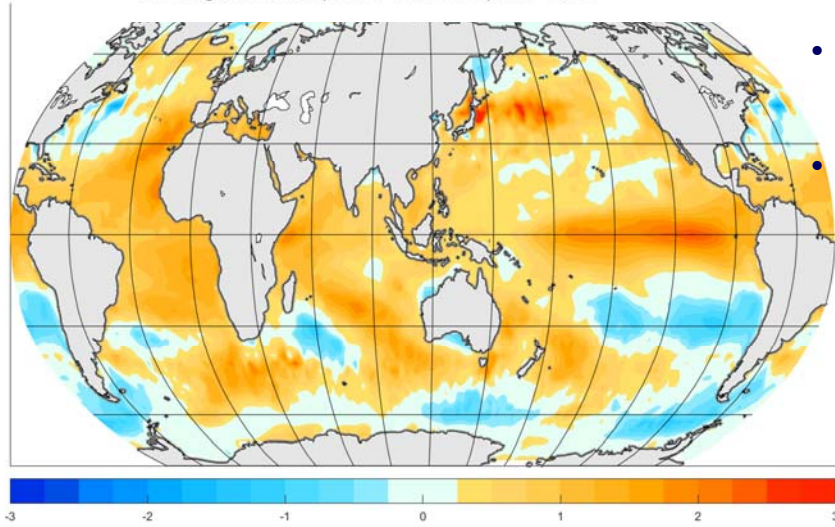
# SST in Northern Hemisphere



SST deg anomalies (norms 1991-2020). DJF 2023.

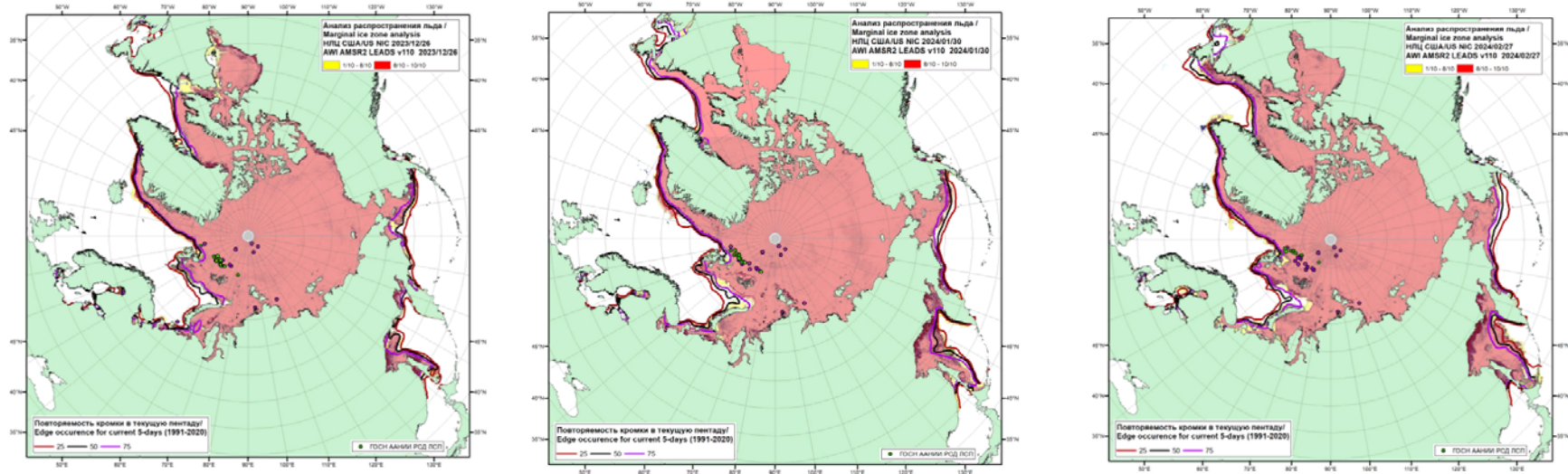
## SST:

- Positive anomalies SST were observed over much of the Pacific Ocean in the Northern Hemisphere. The highest positive anomalies SST were observed near the coast of Japan and in the center of temperate latitudes of the ocean (more than 2-3°);
- In the eastern part and tropical latitudes of the Atlantic Ocean, the SST anomalies were positive. The negative anomalies was observed in the northwestern part of the ocean and in the northern Gulf of Mexico;
- The positive anomalies of SST developed in the central and eastern parts of equatorial Pacific;
- The winter season a warm phase of El Niño was observed (data by CPC NOAA).



Seasonal SST anomalies  
(ERA5 reanalysis, based on a 1991-2020 mean)

## Sea ice extent in the Arctic region (data source: Russian Arctic and Antarctic Research Institute (AARI))



**Ice edge and areas of rarefied (<8/10) and cohesive (≥8/10) ice in the Arctic Ocean on a) 26.12.2023; б) 31.02.24; в) 03.05.24 based on the ice analysis of the US NIC, and edge repeatability from 21-25.04 for the period 1979-2017 according to SSMR-SSM/I-SSMIS observations (NASATEAM algorithm).**

- In December 2023, north Atlantic sea ice extent remained below average extent, which has been typical for the past decade;
- In January 2024, extent was low in the Barents Sea with open water extending offshore of the northwest tip of Novaya Zemlya, as well as in the Gulf of St. Lawrence. Elsewhere, the ice edge was near average for this time of year;
- During February, ice growth occurred primarily within the Sea of Okhotsk, the Bering Sea, and to a lesser extent in the Barents Sea. The ice cover was more expansive than average in the Sea of Okhotsk and below average in the Barents, Bering, and Labrador Seas. Elsewhere, the ice edge was near average for this time of year;
- On March 14, 2024, Arctic sea ice reached its maximum extent for the year. The date of the maximum this year was two days later than the 1981 to 2010 average date of March 12.

The National Snow and Ice Data Center (NSIDC) <https://nsidc.org/home> ,  
Russian Arctic and Antarctic Research Institute (AARI) <http://www.aari.ru/>

**Thank you very much 😊**