



North EurAsia Climate Centre



SEASONAL OUTLOOK FOR WINTER 2025-2026 OVER EUROPE

*34th session of the South East European Climate Outlook Forum (SEECOF-34)
Step2
22-29 November 2025*

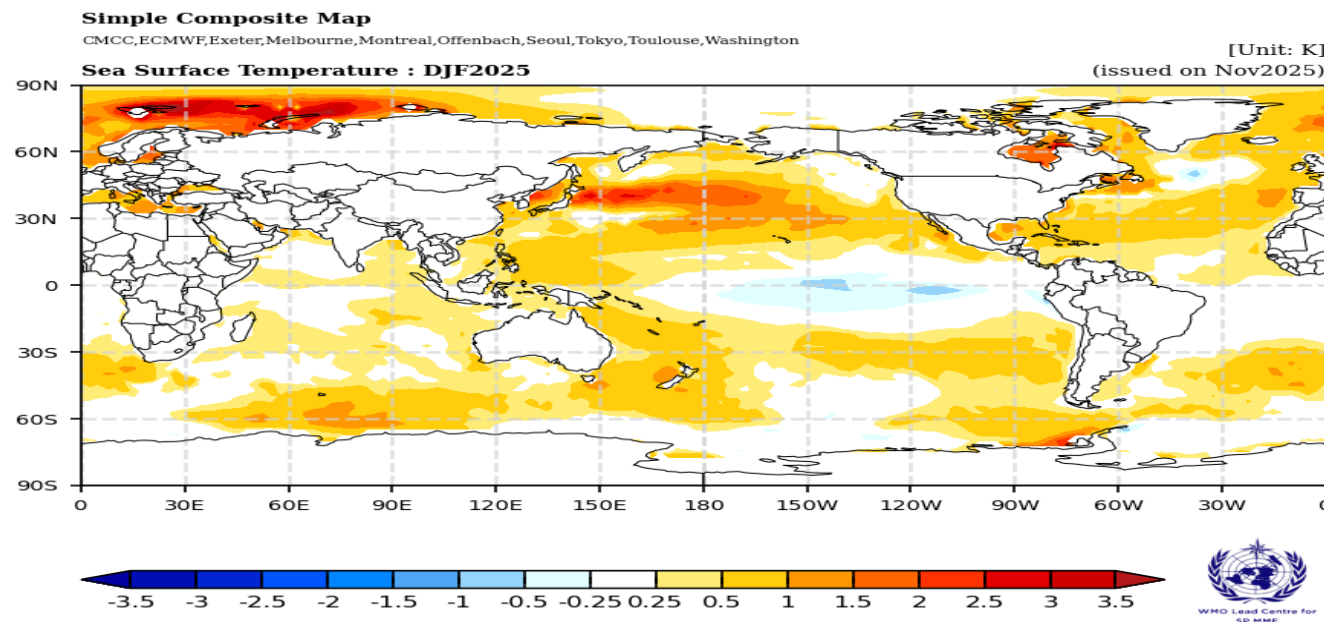
Sumerova K., Nabokova E., Kulikova I., Khan V.

email for contact: sum-ksusha@yandex.ru

<https://seakc.meteoinfo.ru/en/>

Sea surface temperature anomalies (SSTA) forecast

LC MMELRF-WMO Lead Centre for MME LRF

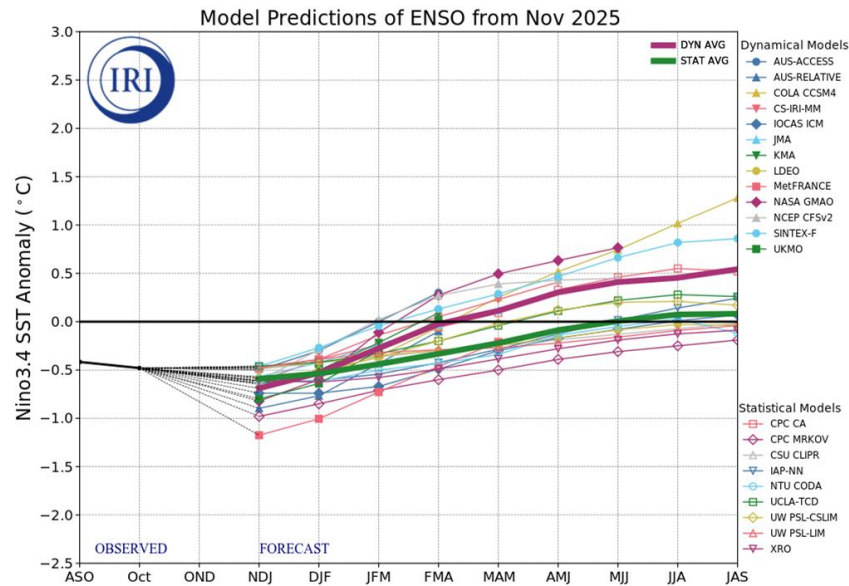


The forecasts of various centers are in good agreement with each other.

- **Indian ocean:** weak **positive sea surface temperature (SST)** anomalies are forecasted for the western half of the ocean. According to the Australian Bureau of Meteorology, a neutral Indian Ocean Dipole (IOD) phase is expected during the winter of 2025–2026.
- **Pacific ocean:** in the equatorial latitudes, **negative SST anomalies** are forecasted in the central part. **Positive SST** anomalies are expected across most of the northern half of the ocean, excluding the equatorial region.
- **North Atlantic:** most models predict **positive SST anomalies** across most of the ocean basin. The most significant **positive anomalies** are expected in the western and northern parts of the ocean, excluding the area south of Greenland, where SST is forecasted to be near or slightly below normal.

El Nino / Southern Oscillation (SOI), IOD and PDO

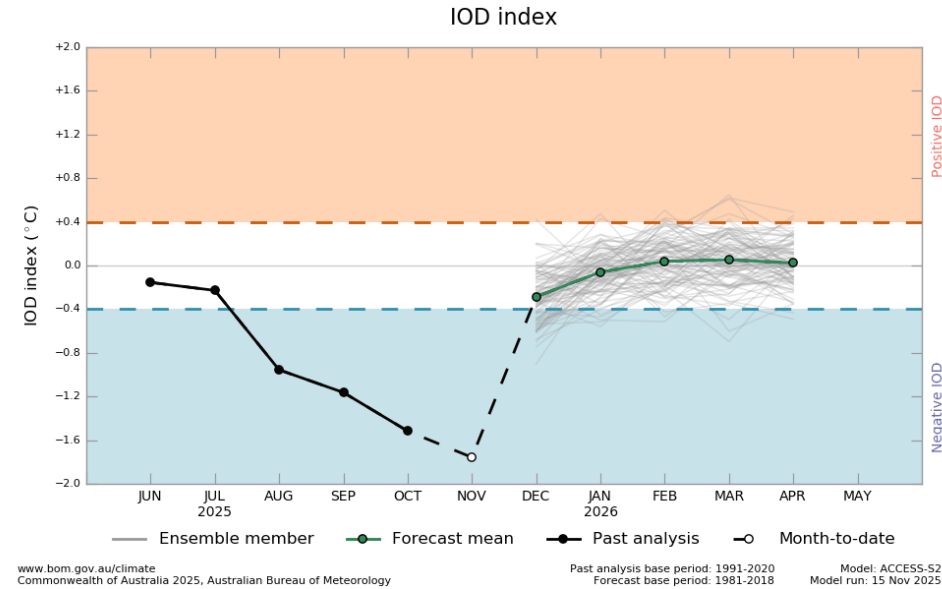
The IRI/CPC probabilistic ENSO forecast. Nino 3.4 forecasts (120°-170°W, 5°S-5°N)



<http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>

According to the most hydrodynamic and statistical models, conditions favorable for the onset of a La Niña event are predicted for the winter 2025-26 (December-February). According to the CPC/IRI Consensus Probabilistic Forecast the probabilities for La Nina, neutral and El Nino conditions (using -0.5C and 0.5C thresholds) over the coming winter season are: 56%, 43% and 1%.

The Indian Ocean Dipole (IOD)

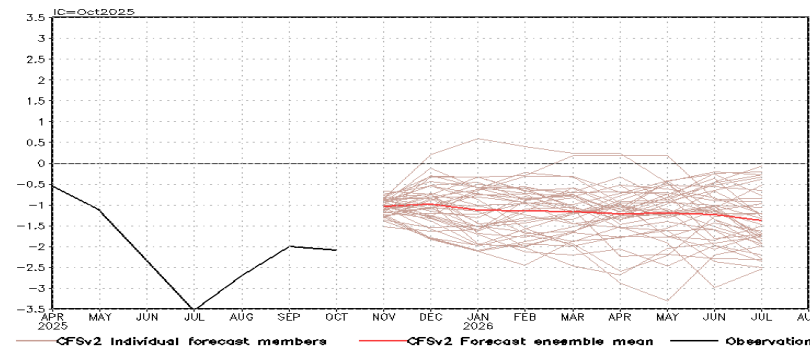


Australian Bureau predicts transition to neutral phase of IOD in the winter season.

Data by the Bureau of Meteorology of the Australian Government
<http://www.bom.gov.au/?ref=hdr>

The Pacific ocean (PDO)

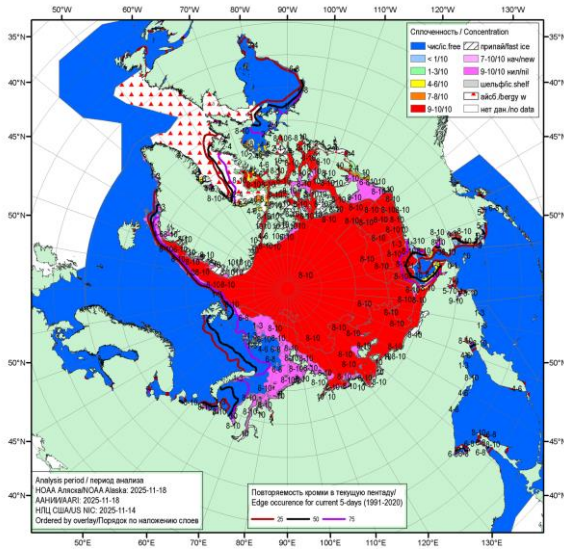
standardized PDO index



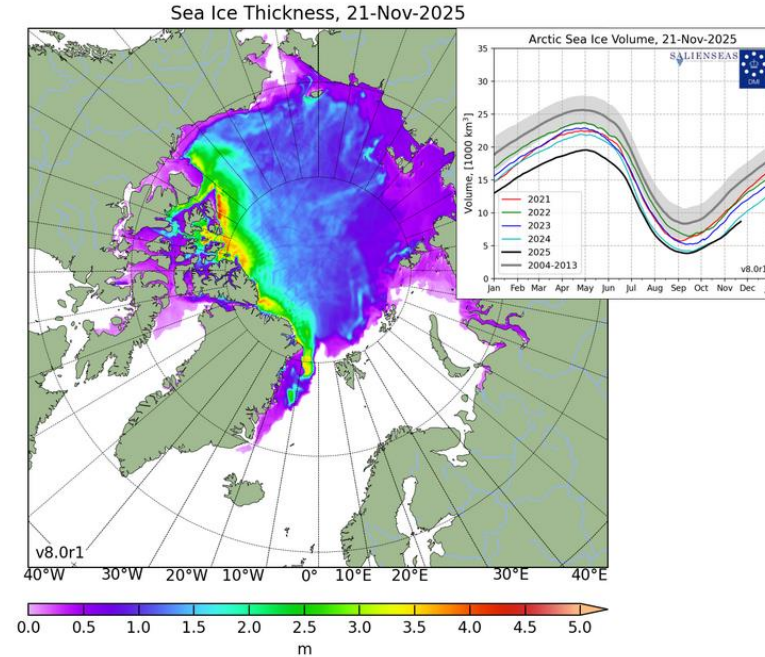
According to the CFSv2 prediction, the negative phase of PDO will continue through July 2026.

https://www.cpc.ncep.noaa.gov/products/GODAS/ocean_briefing.shtml The forecast is issued in November 2025

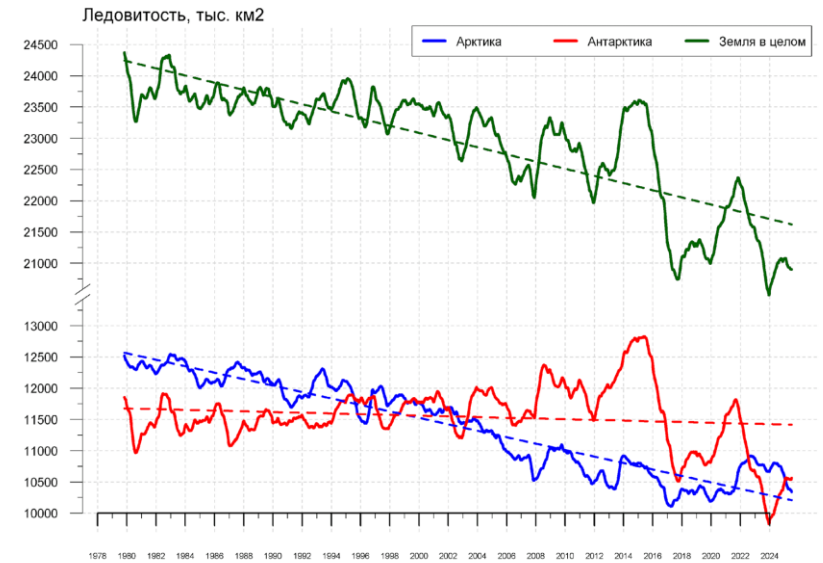
Sea ice extent in the Arctic region



Overview ice map of the Arctic Region for 11/14/2025 – 11/18/2025 (color scheme for general cohesion) based on the ice analysis of NOVA Alaska (04/29/2025), AARI (04/29/2025), National Ice Center of the USA (04/25/2025) and the repeatability of the edge for the nearest pentad for the period 1991-2020. according to observations of SSMR-SSM/I-SMS (NASATEAM algorithm).



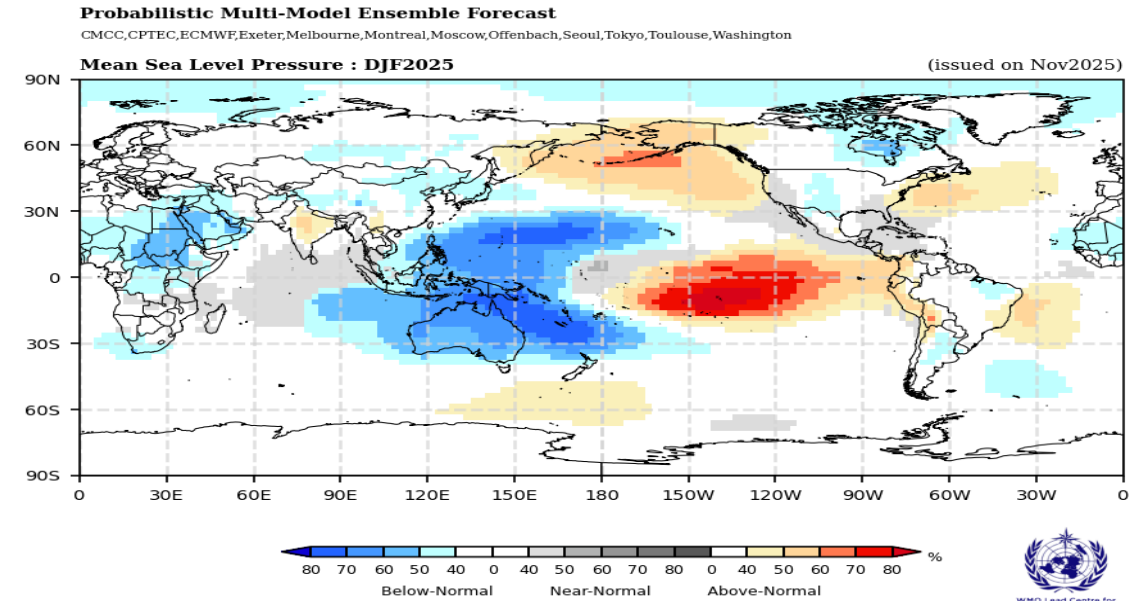
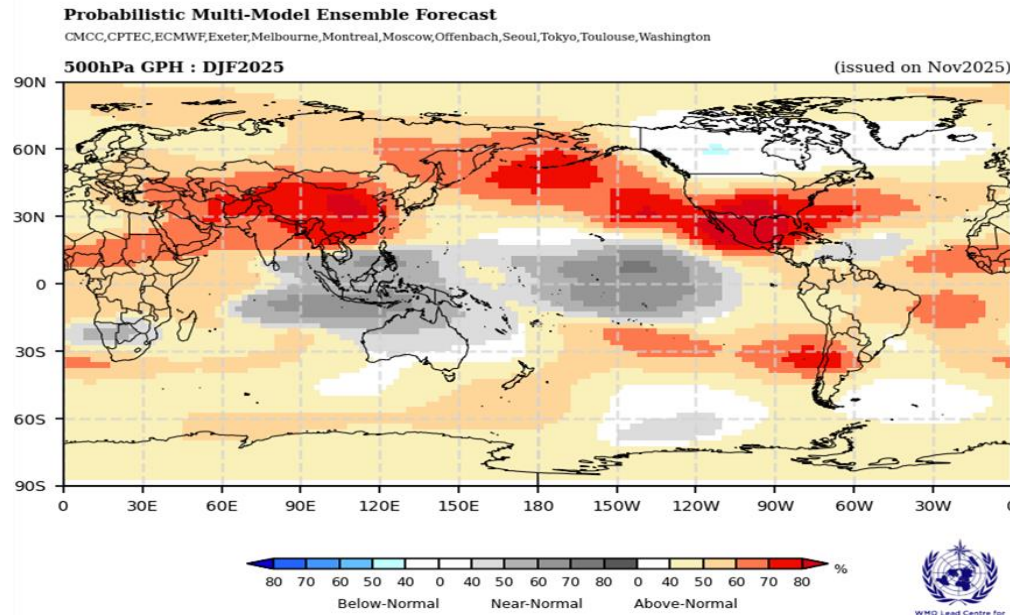
Sea ice thickness for 11/21/2025 and seasonal variation of sea ice volume in the Arctic based on calculations of the weighted average ice thickness of the joint sea ice-ocean model HYCOM/CICE of the Danish Meteorological Institute.



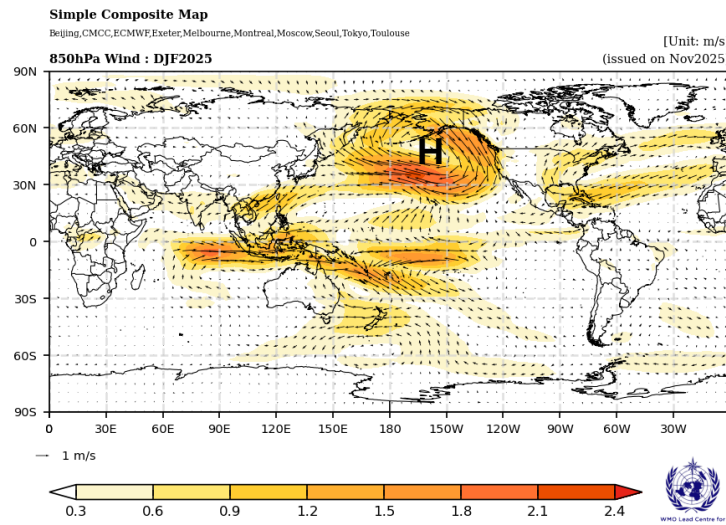
The 365 days daily window-smoothed values of the ice cover for the Arctic, Antarctic and the Earth from 10/26/1978 to 11/14/2020 based on SSMR-SSM / I-SSMIS Russian Arctic and Antarctic Research Institute (AARI)) <http://www.aari.ru/>

- The picture on the left side shows the position of sea ice edge in the Arctic region for 11/14/2025-11/18/2025. The deviations occurred in the Kara Sea;
- The figure and the graph in the center illustrate the low Arctic ice volume;
- The right-hand graph shows a decrease in sea ice extent. Over the past spring and summer months, the ice extent has been close to the average.;
- The melting sea ice in turn promotes cloud development in the marginal ice zones and enhances downwelling longwave radiation at the surface toward the end of the season. A positive cloud feedback emerges. In midlatitudes, the more zonally tracking cyclones give stormier, cloudier, wetter, and cooler summers in most of northern Europe and around the Sea of Okhotsk. Farther south, the region from the Mediterranean Sea to East Asia experiences significant surface warming, possibly linked to changes in the jet stream. (Knudsen E.M.; Orsolini, Y.J., Furevik T., Kevin E.H. Observed anomalous atmospheric patterns in summers of unusual Arctic sea ice melt, 2015. <https://doi.org/10.1002/2014JD022608>)

Probabilistic multi-model ensemble forecasts of H-500 and MSLP



Deterministic multi-model ensemble wind forecasts at the level 850 hPa.

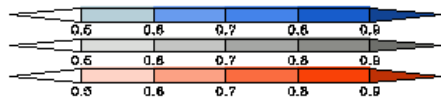
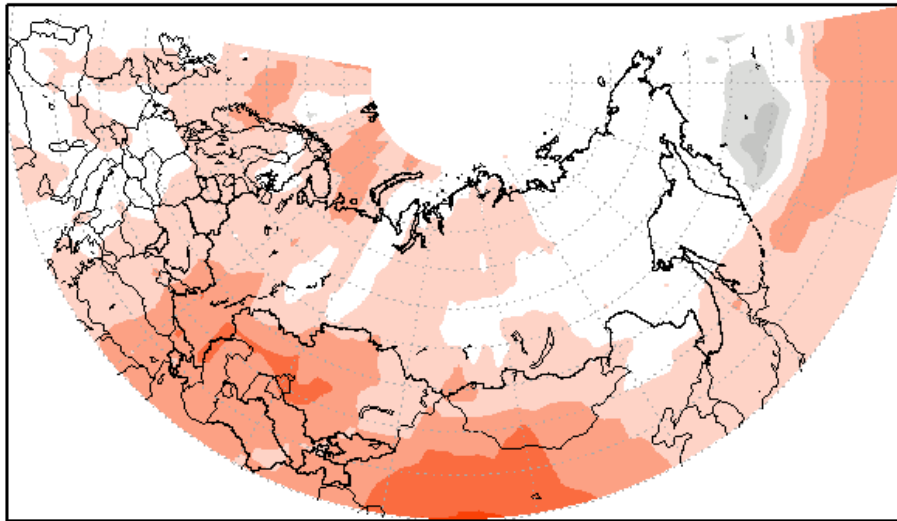


- The multi-model forecast shows significant uncertainty over most of Europe. However, the highest confidence (50-60% probability) is for positive H-500 anomalies to develop over southeastern Europe and the southern part of the European Russia (ETR).
- According to the 850 hPa wind forecast, anticyclonic winds are expected to prevail the northern Pacific Ocean.
- The probabilistic forecast of surface pressure anomalies contains inherent uncertainty.

Composite probabilities of categorical forecast outcomes for H-500 and MSLP seasonal anomalies.

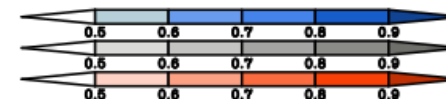
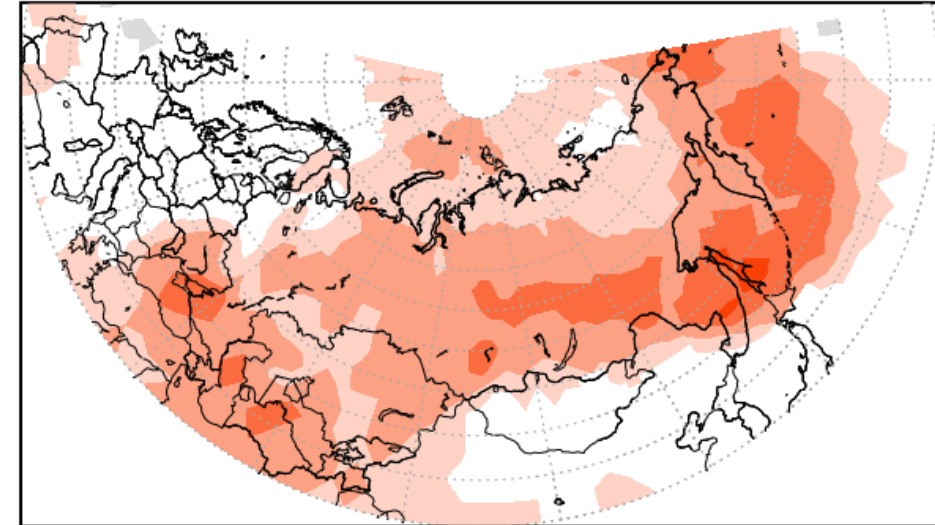
Producer: HMC (SL-AV) and MGO model.

Composite probabilities of categorical forecast outcomes for
H500 seasonal anomalies (dm). Producer: SLAV+MGO
Forecast period: December January February 2025/2026



Below normal
Near normal
Above normal

Composite probabilities of categorical forecast outcomes for
H500 seasonal anomalies (dm). Model: INM
Forecast period: December January February 2025/2026

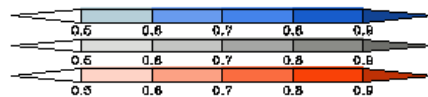
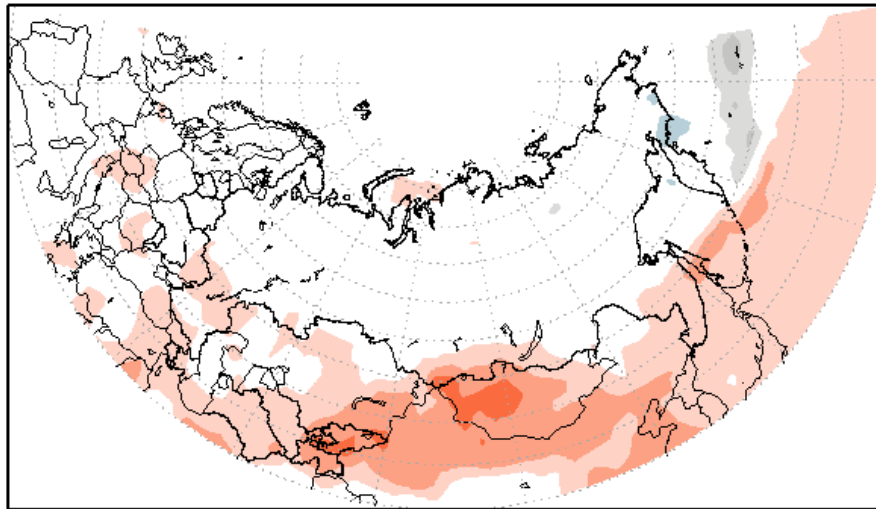


Below normal
Near normal
Above normal

- According to the forecasts of SL-AV and MGO models, the geopotential in the middle troposphere is predicted to be above normal over south of Europe and European Russia, probability 60-70%.
- There is some uncertainty in the MSLP forecast. A signal of below normal MPSL anomalies is in Scandinavia and in places in northeast Europe, on the Kola Peninsula, west of European Russia with a probability of 60-80%. The positive MPSL anomalies are expected on the Iberian Peninsula, probability 60-70%.

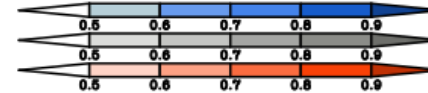
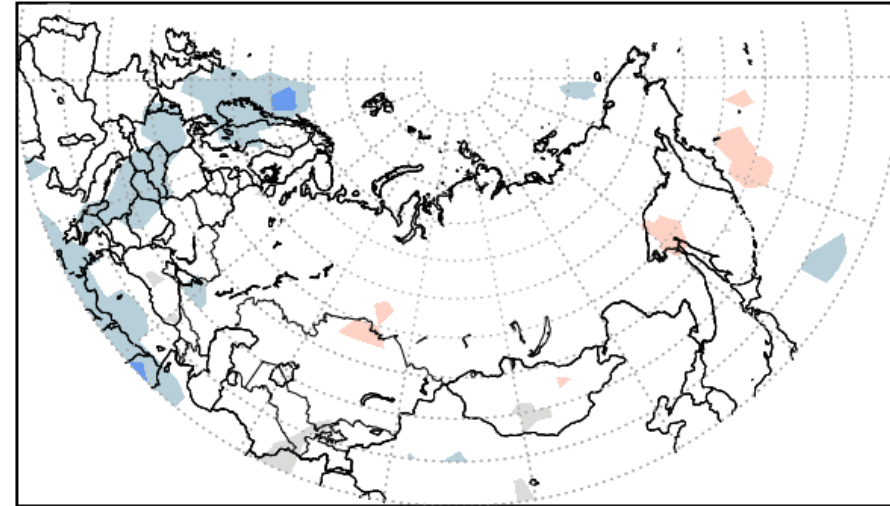
Composite probabilities of categorical forecast of Institute of Numerical Mathematics RAS (INM)

Composite probabilities of categorical forecast outcomes for
mslp seasonal anomalies (mb). Producer: SLAV+MG0
Forecast period: December January February 2025/2026



Below normal
Near normal
Above normal

Composite probabilities of categorical forecast outcomes for
mslp seasonal anomalies (mb). Model: INM
Forecast period: December January February 2025/2026



Below normal
Near normal
Above normal

- According to the forecasts of INM models, the geopotential in the middle troposphere is predicted to be above normal over most of Europe and in European Russia, with high probabilities 90% in the Iberian Peninsula, southeast of Europe and southern European Russia.
- In the MSLP anomaly about normal is predicted in northern part of Europe. A signal of below normal MSLP anomalies is in places in southeast Europe, with a probability of 70-80%.

Teleconnection indices

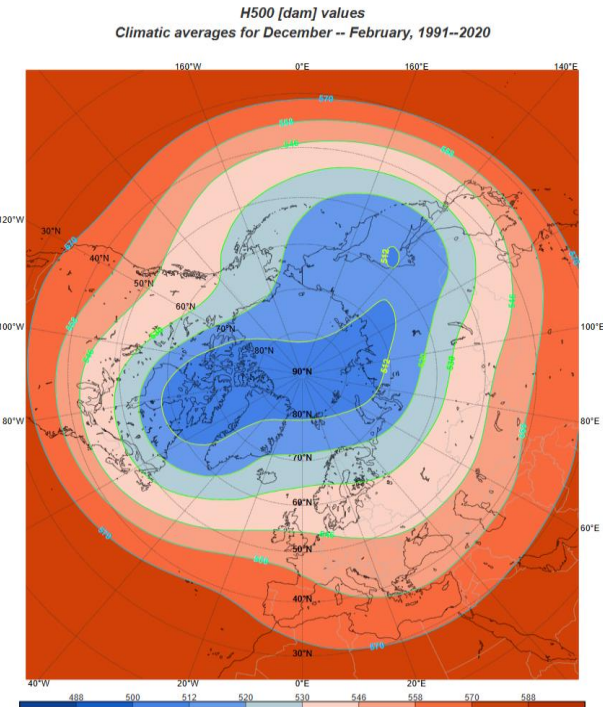
Table.1. Indices oscillation forecasts.
 Data from Hydrometeorological centre of Russia (SL-AV).

INDEX	DECEMBER-FEBRUARY 2025-2026			
	DECEMBER	JANUARY	FEBRUAR Y	DECEMBER- FEBRUARY
EA	0,65	-0,04	0,12	0,34
WA	0,29	0,64	-0,33	0,21
EU	0,15	0,79	0,74	0,79
WP	0,89	1,66	0,91	1,34
PNA	-0,70	-0,29	-0,50	-0,56
NAO	-0,71	-0,24	0,11	-0,30
POL	0,72	-0,33	0,51	0,44
SHI	0,28	1,14	1,61	1,58
AOS	-0,35	0,69	-0,25	0,43

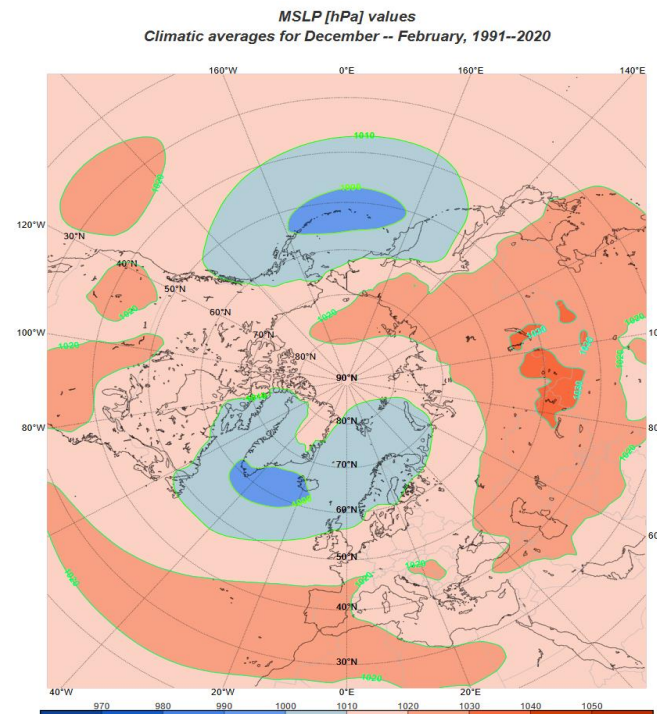
- West Atlantic (**WA**), Eurasian (**EU**), West Pacific (**WP**), Pacific-North American (**PNA**) oscillations (Wallace J. M., Gutzler D.S. Teleconnections in the geopotential height field during the Northern Hemisphere winter. – Mon. Wea. Rev., 1981, vol. 109, pp. 784-812).
- North Atlantic (**NAO**), Polar (**POL**) and Artic (**AO**) oscillations (Climate Prediction Centre of USA).

- A negative **NAO** phase in December typically means a weakening of the Azores High and the Icelandic Low. This weakens the westerly wind flow, allowing cold air from the north and east to penetrate into Central and Southern Europe.
- **EA** index is positive (+0.65) in December and slightly negative (-0.04) in January.
- A negative **PNA** can influence global atmospheric circulation by promoting the formation of "blocking" high-pressure systems over the Atlantic, which indirectly supports the negative NAO scenario and cold intrusion into Europe.
- January brings a dramatic reversal: as the **POL** turns negative and the **NAO** signal fades, the pattern flips to a milder and more unsettled regime.
- In February return to a colder pattern, supported by a positive **POL** and negative **PNA**, though likely less severe than in December.

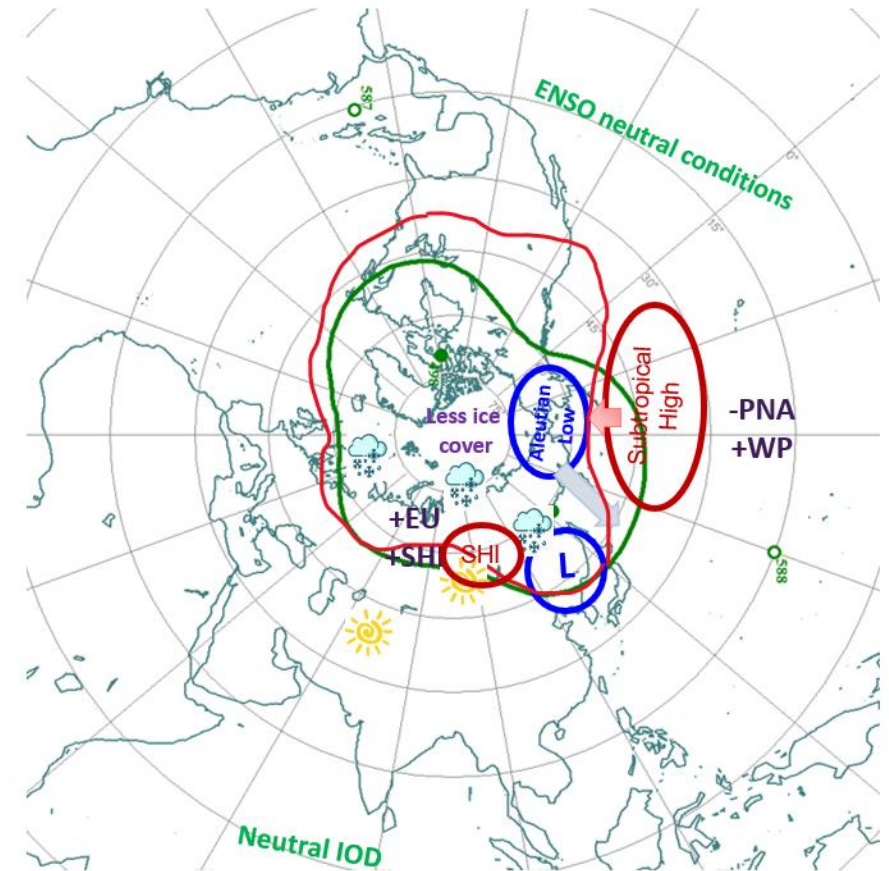
General circulation scheme for the winter season 2025-26 in The Northern Hemisphere



Mean H-500 for the winter season
(norms 1991-2020), ERA5



Mean atmospheric pressure for the winter
season (norms 1991-2020), ERA5



- Planetary high-altitude frontal zonal (climate)
- Planetary high-altitude frontal zonal (forecast)

The symbols/notations on the diagram
are taken from open sources on the
internet.

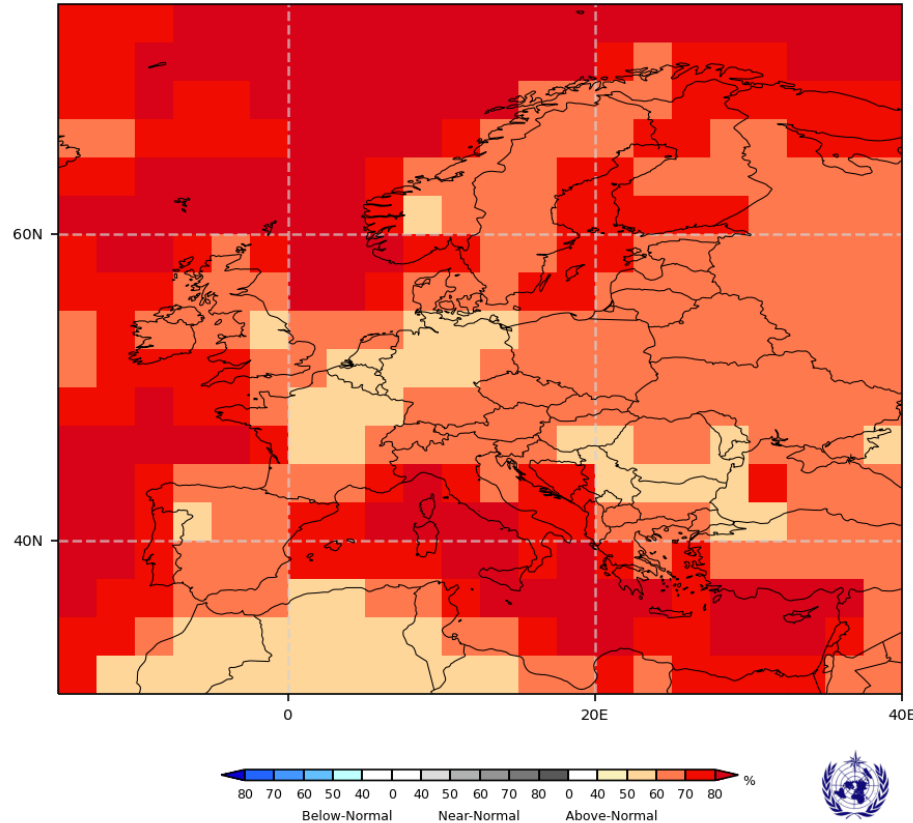
Temperature anomalies forecast

Probabilistic Multi-Model Ensemble Forecast

CMCC, CPTEC, ECMWF, Exeter, Melbourne, Montreal, Moscow, Offenbach, Seoul, Tokyo, Toulouse, Washington

2m Temperature : DJF2025

(issued on Nov2025)



According to the probabilistic multi-ensemble forecast, positive temperature anomalies are expected over most of Europe, with high probabilities 60-80% over most of South Europe.

<https://www.wmolc.org/>

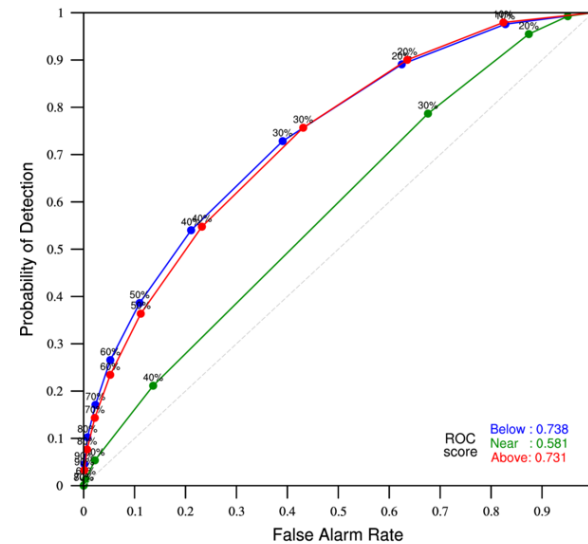
The estimation of tercile-based categorical probabilities (Global)

ROC Curve and Score

Beijing, CMCC, CPTEC, ECMWF, Exeter, Melbourne, Montreal, Moscow, Offenbach, Seoul, Tokyo, Toulouse, Washington
Lat : -90-90, Lon : 0-360

2m Temperature : JJA

(Hindcast Periods : 1993 - 2009)

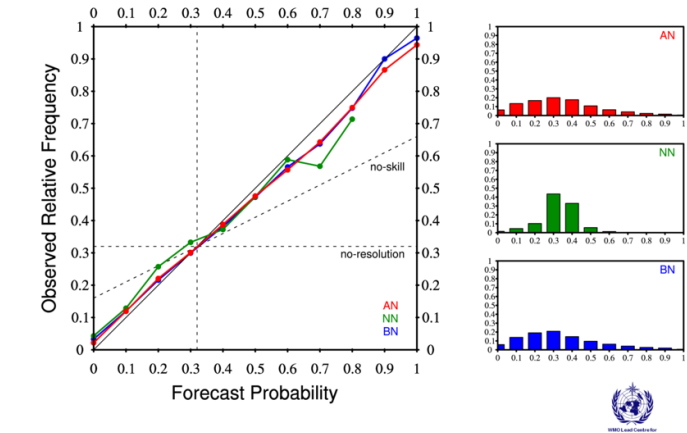


Reliability Diagram

Beijing, CMCC, CPTEC, ECMWF, Exeter, Melbourne, Montreal, Moscow, Offenbach, Seoul, Tokyo, Toulouse, Washington
Lat : -90-90, Lon : 0-360

2m Temperature : JJA

(Hindcast Periods : 1993 - 2009)

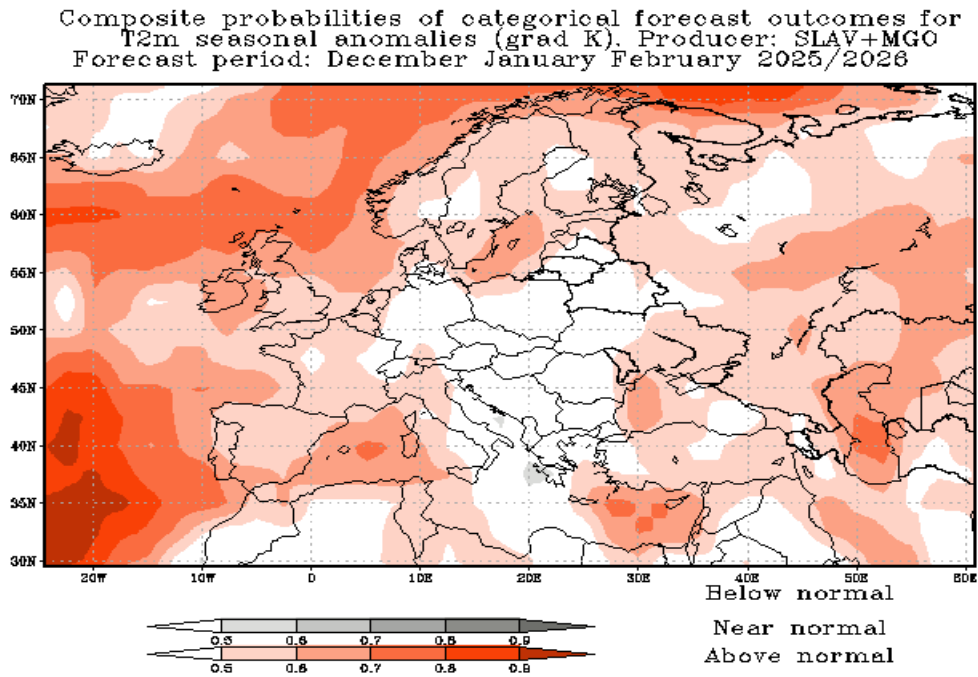


Forecast quality scores are slightly higher than climate

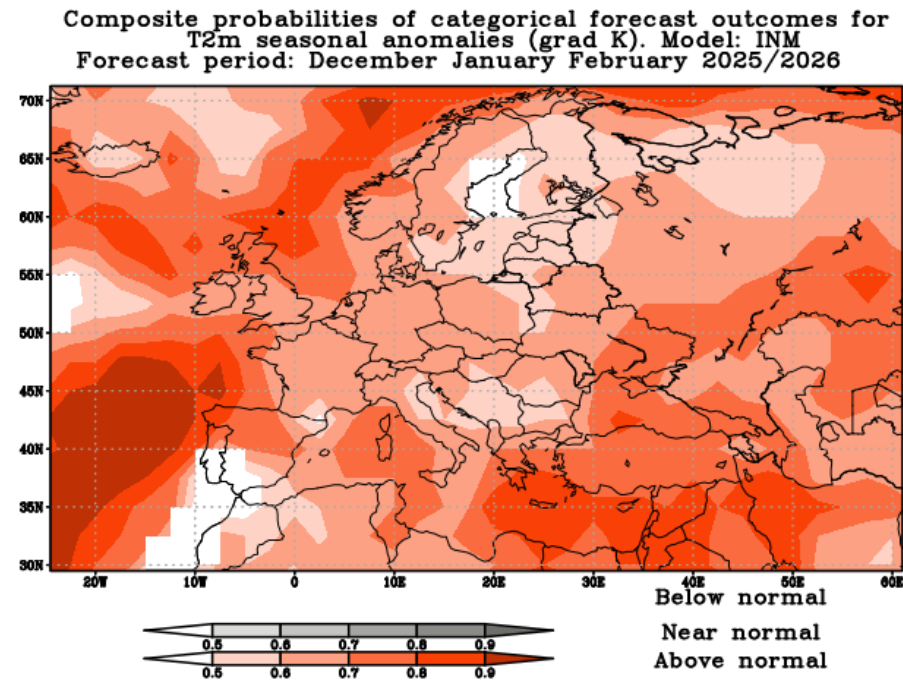
The forecast is issued in November 2025

Temperature forecast

Composite probabilities of categorical forecast outcomes for T2m seasonal anomalies.
 Producer: HMC (SL-AV) and MGO model, and INM model.



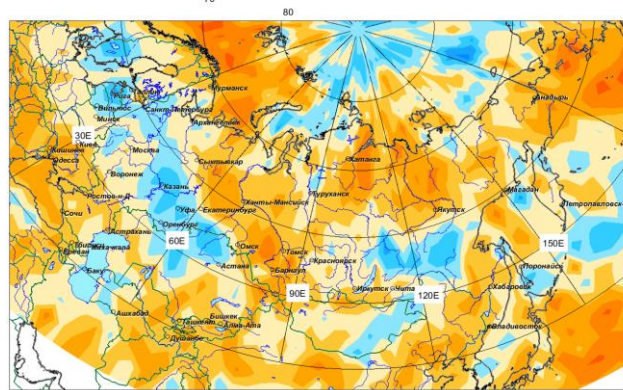
From the SL-AV and MGO model forecasts, there is some uncertainty in Central Europe. The positive temperature anomalies are expected in northeastern, western and southern Europe, with high probabilities of 60-80%.



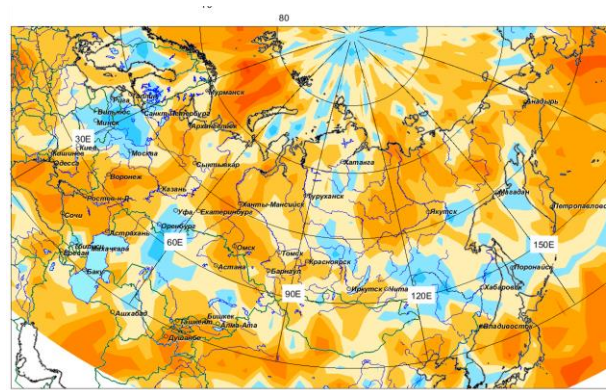
According to the forecasts of INM model, the positive temperature anomalies are expected over most of Europe, with probabilities 80-90%.

Temperature forecast

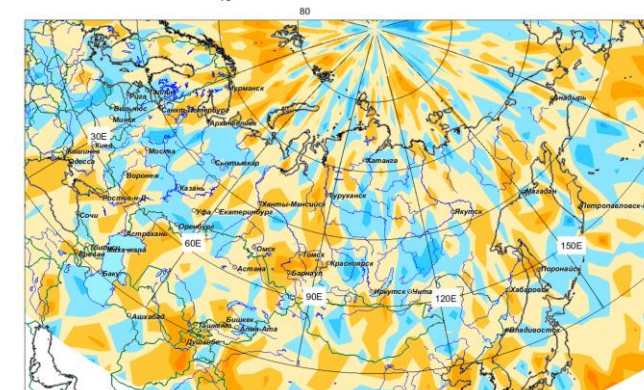
ROC of probabilistic T2M forecasts (top SL-AV, bottom MGO model).



t2m. ROC above. jja (хиндкасты Гидрометцентр)



t2m. ROC below. jja (хиндкасты Гидрометцентр)

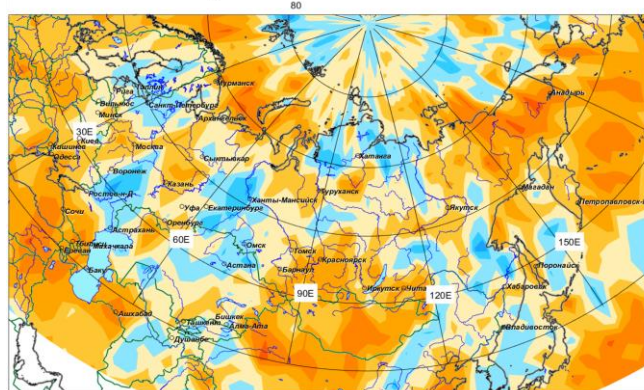


t2m. ROC norm. jja (хиндкасты Гидрометцентр)

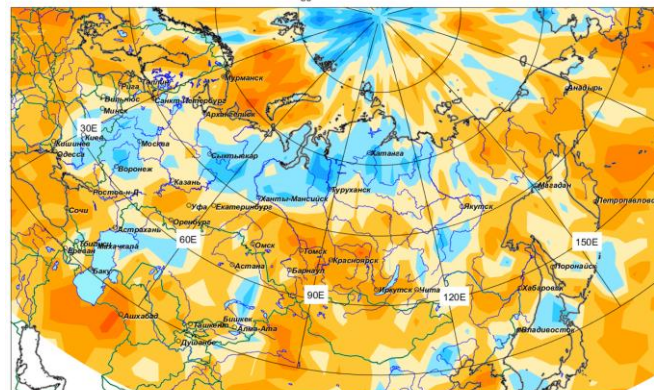
ROC above

ROC below

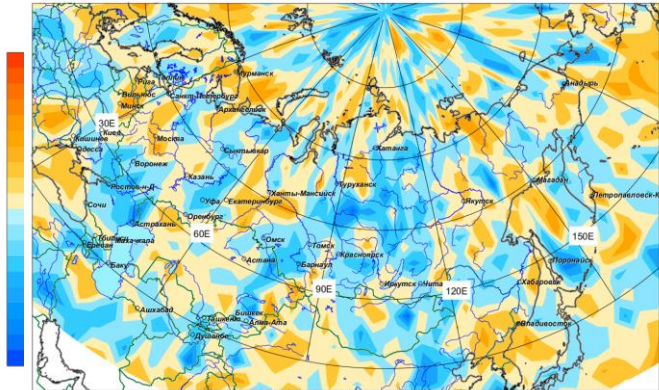
ROC normal



t2m. ROC_above. jja (хиндкасты ГГО)



t2m. ROC_below. jja (хиндкасты ГГО)



t2m. ROC_norm. jja (хиндкасты ГГО)

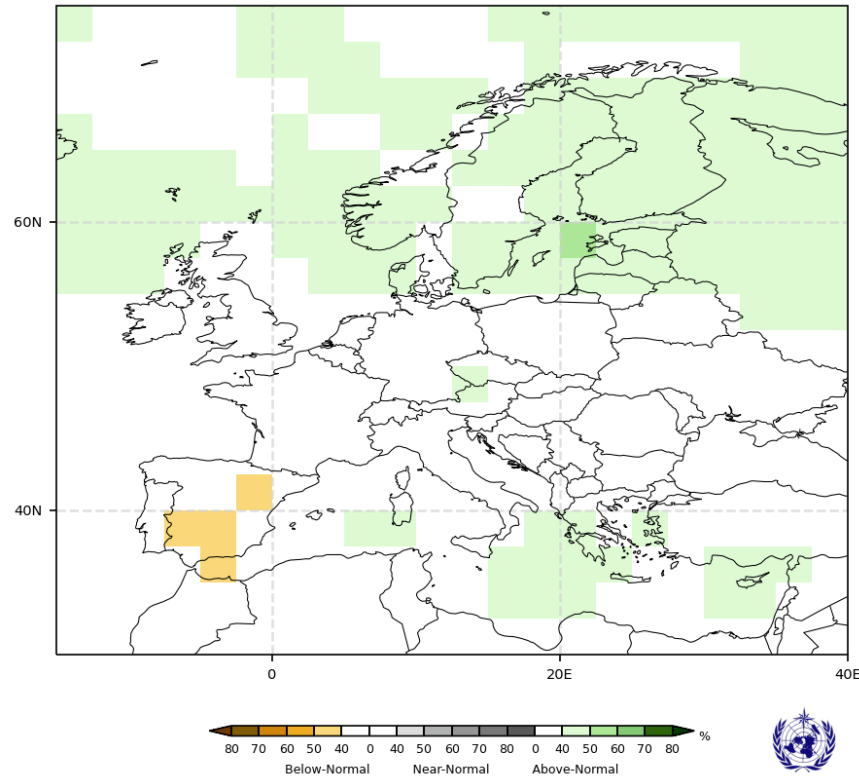
Precipitation forecast

Probabilistic Multi-Model Ensemble Forecast

CMCC, CPTEC, ECMWF, Exeter, Melbourne, Montreal, Moscow, Offenbach, Seoul, Tokyo, Toulouse, Washington

Precipitation : DJF2025

(issued on Nov2025)



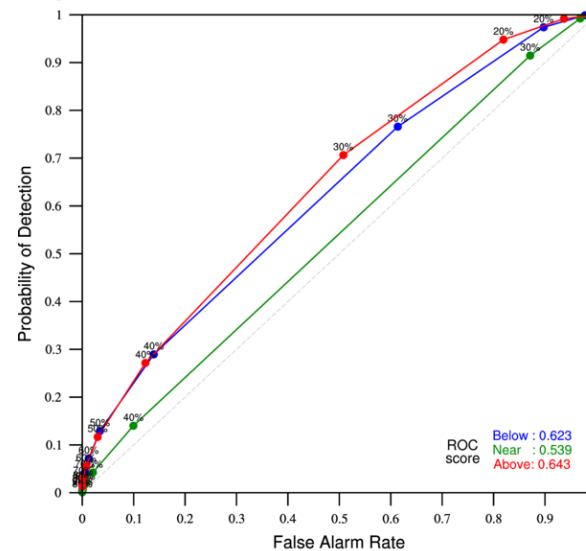
The estimation of tercile-based categorical probabilities (Global)

ROC Curve and Score

Beijing, CMCC, CPTEC, ECMWF, Exeter, Melbourne, Montreal, Moscow, Offenbach, Seoul, Tokyo, Toulouse, Washington
Lat : -90~90, Lon : 0~360

Precipitation : JJA

(Hindcast Periods : 1993 - 2009)

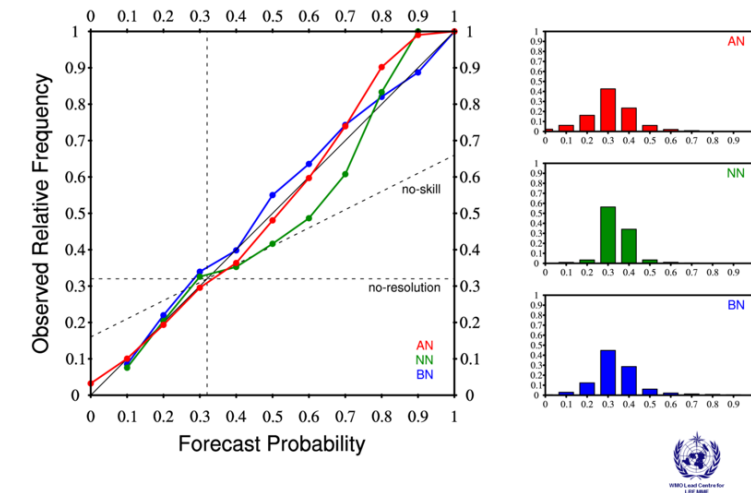


Reliability Diagram

Beijing, CMCC, CPTEC, ECMWF, Exeter, Melbourne, Montreal, Moscow, Offenbach, Seoul, Tokyo, Toulouse, Washington
Lat : -90~90, Lon : 0~360

Precipitation : JJA

(Hindcast Periods : 1993 - 2009)



According to the probabilistic multi-model ensemble forecast, there is a 50-60% probability of above-average precipitation in some areas of the eastern Mediterranean.

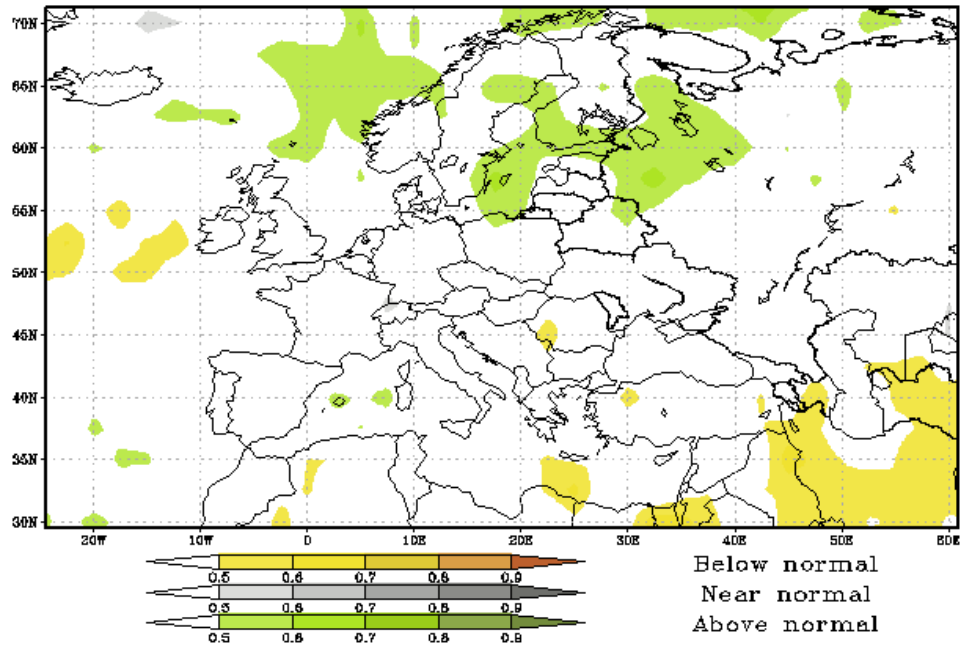
Forecast quality scores are approaching climate ones.

The forecast is issued in November 2025

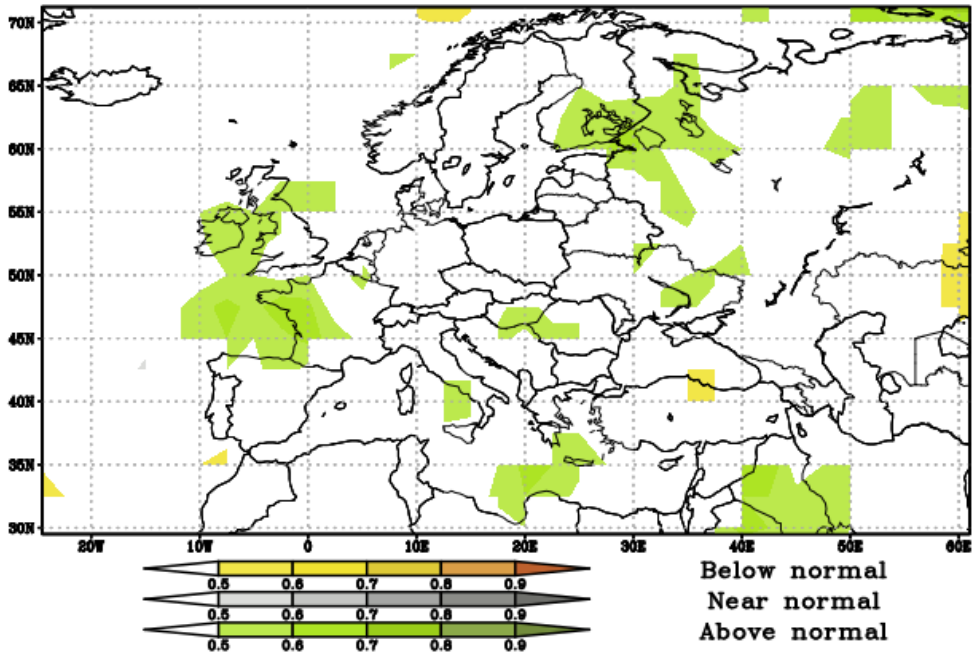
Precipitation forecast

Composite probabilities of categorical forecast outcomes for precipitation seasonal anomalies. Producer: HMC (SL-AV) and MGO model, and INM model.

Composite probabilities of categorical forecast outcomes for Precipitation seasonal anomalies (mm/day). Producer: SLAV+MGO
Forecast period: December January February 2025/2026



Composite probabilities of categorical forecast outcomes for Precipitation seasonal anomalies (mm/day). Model: INM
Forecast period: December January February 2025/2026

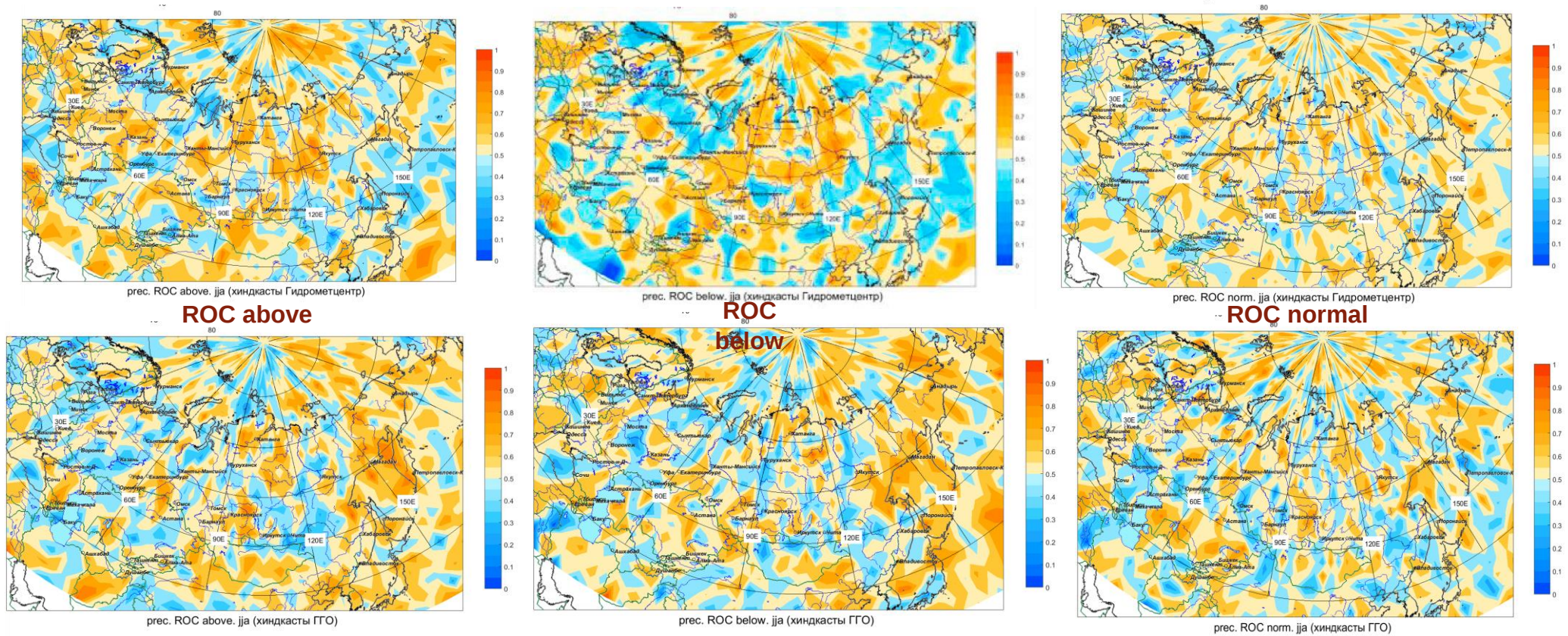


From the SL-AV and MGO model forecasts is mostly uncertain over southern Europe.

From the INM model forecasts, there is some uncertainty in precipitation field. In some areas of the South Europe, and France, and British Isles precipitation will be above average.

Precipitation forecast

ROC of probabilistic precipitation forecasts (top SL-AV, bottom MGO model).



Summary

- According to the most hydrodynamic and statistical models, the conditions are predicted to be favorable for the onset of a La Niña event for the winter 2025-26 (December-February). According to the CPC/IRI Consensus Probabilistic Forecast the probabilities for La Nina, neutral and El Nino conditions (using -0.5C and 0.5C thresholds) over the coming winter season are: 56%, 43% and 1%;
- In the North Atlantic, positive sea surface temperature (SST) anomalies are expected across most of the basin, with the most significant ones in the northern areas—specifically in the Norwegian, Barents, and Kara Seas. The reduction of ice cover in the Arctic seas, combined with these positive temperature anomalies, could lead to a weakening of zonal flow and an increase in the frequency of atmospheric blocking patterns over Northern Eurasia;
- According to the Hydrometcenter forecast, the 2025-2026 winter in Europe is expected to be dynamic, characterized by significant monthly shifts: December is projected to be dominated by a colder pattern, driven by a negative NAO, facilitating intrusions of cold air into Central and Southern Europe. January will likely see a major pattern reversal, turning milder and more unsettled as the NAO signal weakens and the POL turns negative. February is forecast to mark a return to colder conditions, supported by a positive POL and negative PNA, though likely less severe than the December cold spell. In summary, a winter of notable transitions is anticipated, unfolding in three distinct phases: a cold start, a mild mid-season, and a cold finish;
- The 2025-26 winter is predicted to be predominantly warmer than average over most of Europe. However, this overall mild pattern will be interrupted by distinct periods of cold air incursions;
- The precipitation forecasts have high uncertainty over southern Europe.

****The information in the bulletin is advisory in nature and should be applied to specific regions, taking into account the predictability of atmospheric processes, regional climatic features and the quality of modern hydrodynamic models.**

Thank you !



<https://seakc.meteoinfo.ru/en/>