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SEASONAL OUTLOOK FOR WINTER 2022-23 OVER EUROPE

28th session of the South East European Climate Outlook Forum (SEECOF-28)
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El Nino / Southern Oscillation (SOI).

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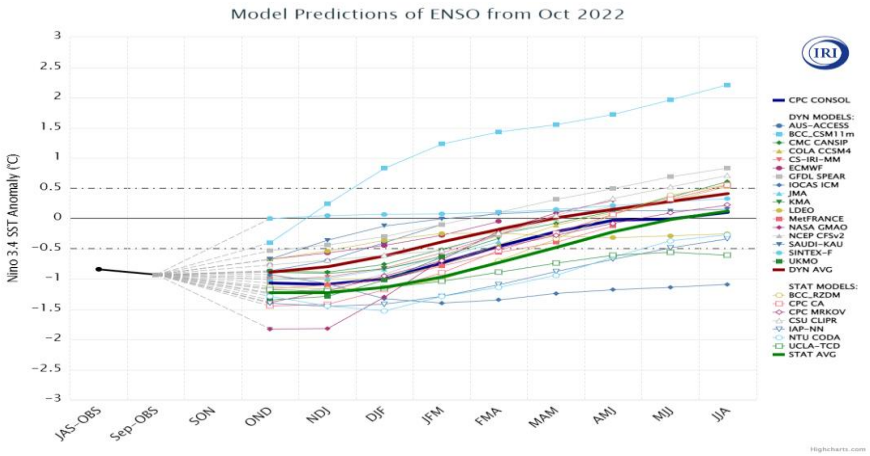
The IRI/CPC probabilistic ENSO forecast.

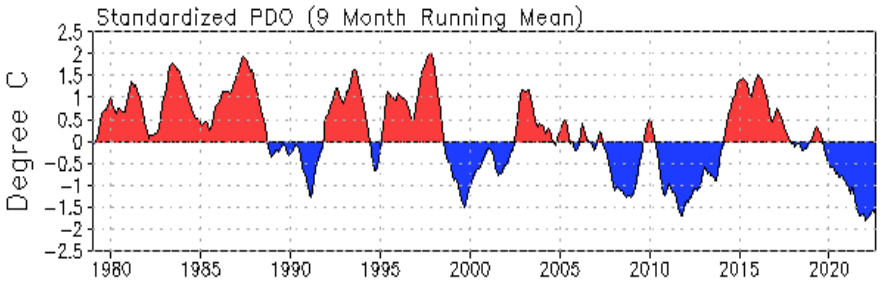
Nino 3.4 forecasts (120˚-170˚W, 5˚S-5˚N)



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

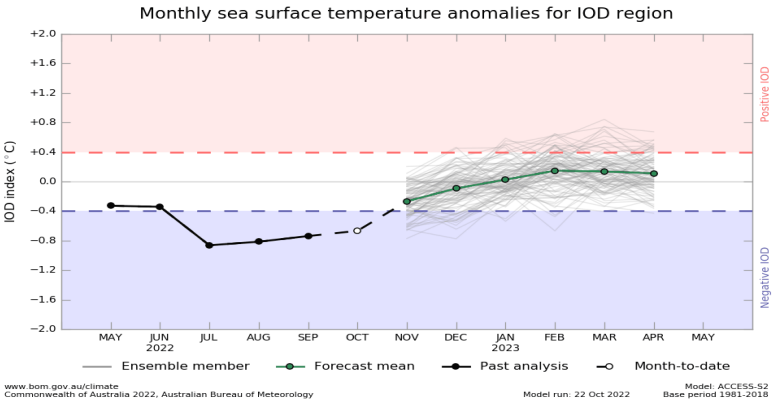
Most of models predict **La Nina for the winter 2022-23** (December-February). According to the CPC/IRI Consensus Probabilistic Forecast the probabilities for La Nina, neutral and El Nino conditions (using -0.5C and 0.5C thresholds) over the coming DJF 2022-23 season are: 72%, 28% and 0%.

The conventional SST-based PDO.



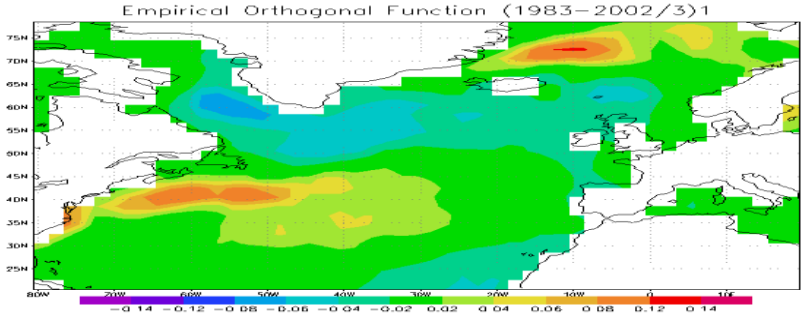
https://www.cpc.ncep.noaa.gov/products/GODAS/ocean_briefing.shtml

The Indian Ocean Dipole (IOD).



http://www.bom.gov.au/?ref=hdr

North Atlantic
SST: First Empirical Orthogonal Function.



Tripol is the main mode of SST variability in the North Atlantic. The distribution of ATPO corresponds to the positive phase of the tripole, which is closely related to the positive phase of NAO.

Arctic sea ice extent.
Arctic and Antarctic Research Institute (AARI), Russia

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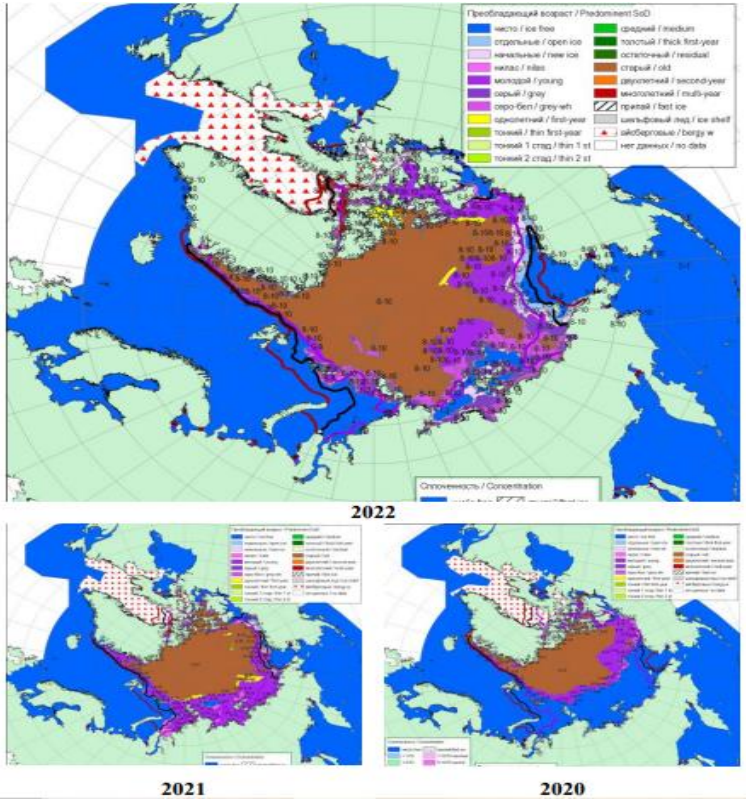
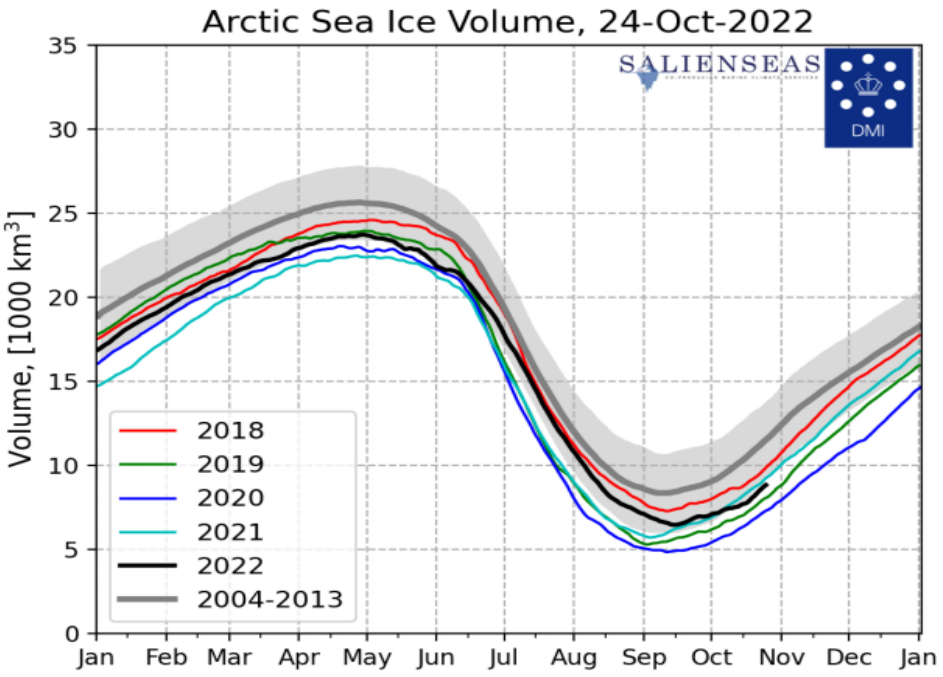


Overview ice map of the Arctic Ocean from 20.10 to 25.10.2022 and similar periods 2020-2021 based on ice analysis of AARI, SRC "Planeta", Canadian Ice Service and the US National Ice Data Center.



Daily estimates of the seasonal variation of the sea ice volume in the Arctic Ocean from 14.01.2004 to 24.10.2022.
Data from DMI North Atlantic - Arctic Ocean model HYCOM-CICE - http://ocean.dmi.dk/models/hycom.uk.php

According to the AARI, following features highlighted in the Arctic sea ice extent:

- Arctic sea ice reaches its minimum annual extent on September 18, 2022.
- The 2022 minimum is the tenth lowest record in the nearly 43-year satellite observations. The last 15 years are the lowest fifteen sea ice extents in the satellite record.

http://www.aari.ru/

General circulation

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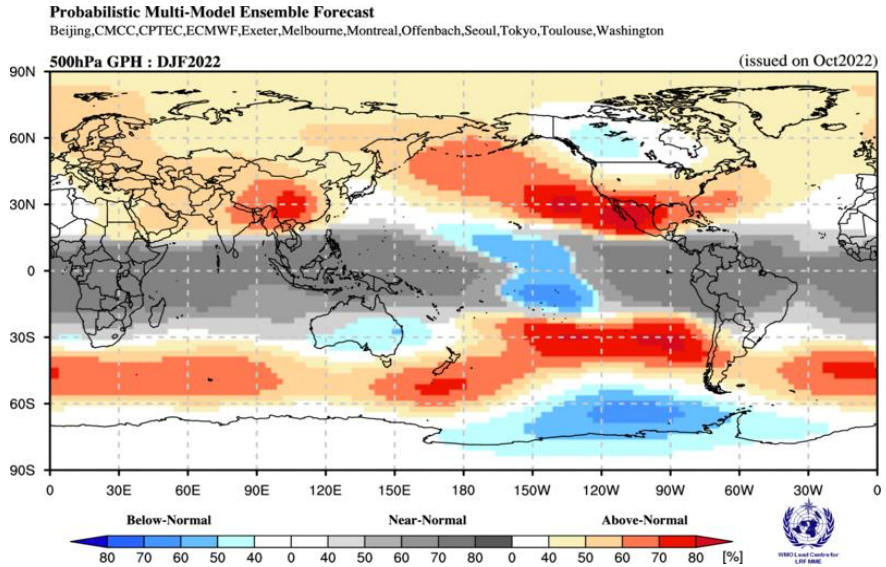
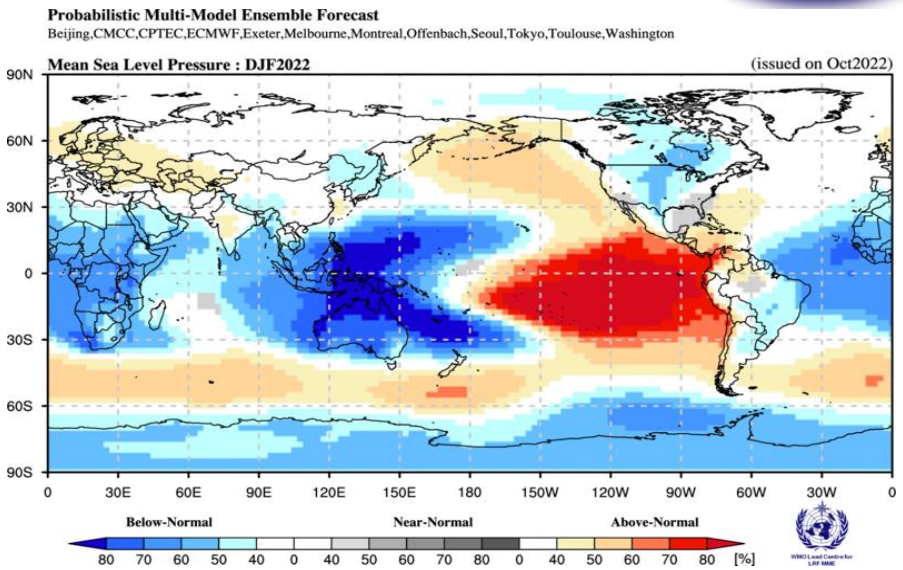
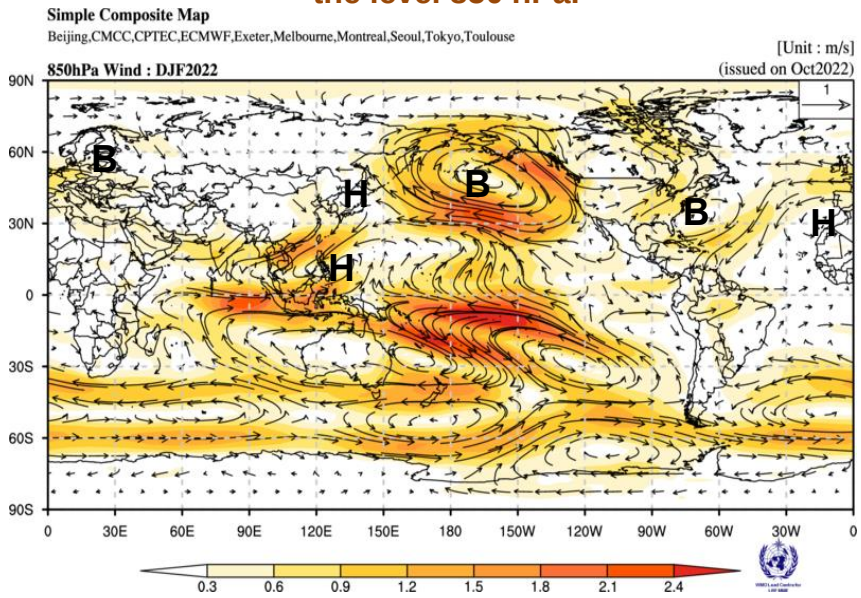
Probabilistic multi-model ensemble forecasts of H-500 and MSLP





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



According to the multi-model forecast, a positive H-500 and MSLP anomalies are forecasted over most of Europe.

Due to the 850 hPa wind forecast, there is an anticyclon over western and central parts of Europe with the prevailed easterly winds in the south eastern Europe. ➡ The cold Arctic air is likely to intrude to the eastern part of European Russia and possibly move on till Transcaucasia.

https://www.wmolc.org/

The forecast is issued in October 2022

General circulation

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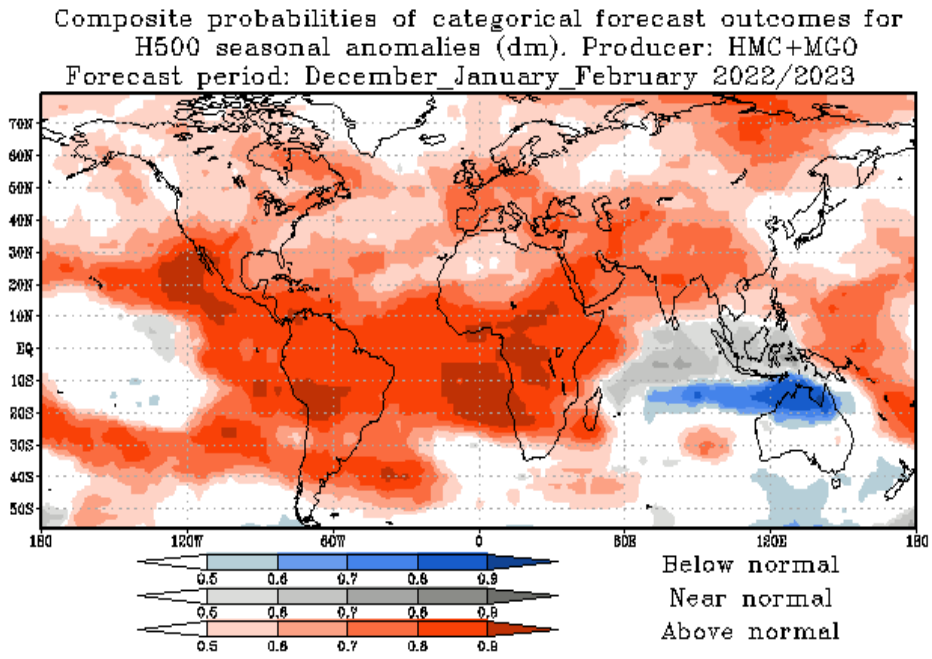
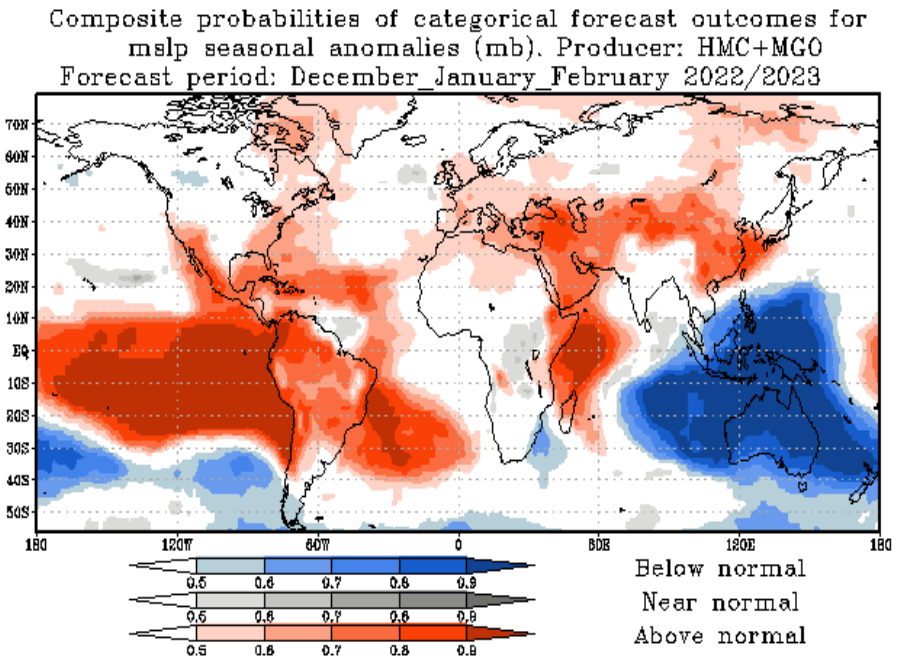
Composite probabilities of categorical forecast outcomes for H-500 and MSLP seasonal anomalies.
Producer: HMC (SL-AV) and MGO model.





According to the forecasts of SL-AV and MGO models, the geopotential in the middle troposphere is predicted to be above normal over most of Europe, probability 50-80%.

There is some uncertainty in the MSLP forecast, except south eastern Europe, there is a strong signal of positive MSLP anomalies during the winter season 2022-2023, with probabilities 70-90%.

Teleconnection indices

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

INDEX	DECEMBER-JANUARY 2022-23			
	DECEMBER	JANUARY	FEBRUARY	DECEMBER-FEBRUARY
EA	-0,25	0,70	-0,04	-0,05
WA	0,92	0,67	0,42	0,94
EU	-0,34	0,39	-0,43	-0,23
WP	-0,16	-0,79	0,34	-0,21
PNA	0,84	1,19	1,04	1,31
NAO	0,38	0,92	-0,17	0,71
POL	-0,06	-0,22	-0,70	-0,27
SHI	2,16	1,90	-0,08	2,45

- 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).

- **NAO** is expected to in the positive phase. It means zonal atmospheric processes prevail over the territory of Northern Europe and the northern part of European Russia, moreover the Azores high is likely to strengthen and to spread over the southern part of Europe;
- The positive phase of the **WA** index is accompanied by a weakening of the jet stream in the west of the North Atlantic, as well as an increasing of the Azores maximum and a weakening of the Icelandic minimum;

General circulation

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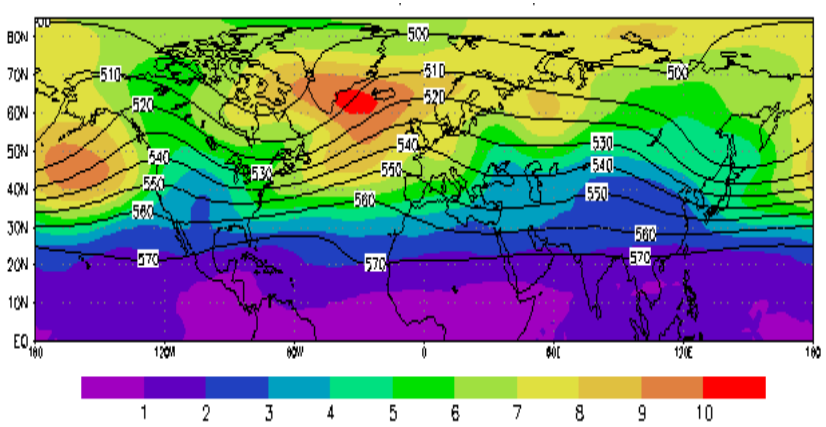
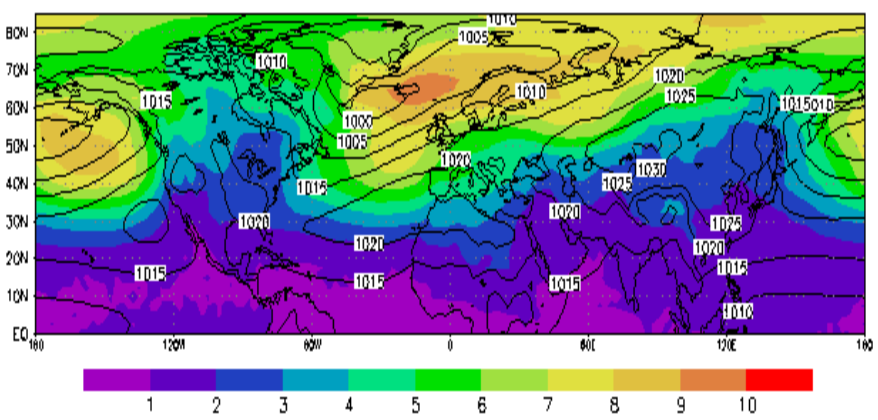
Climate

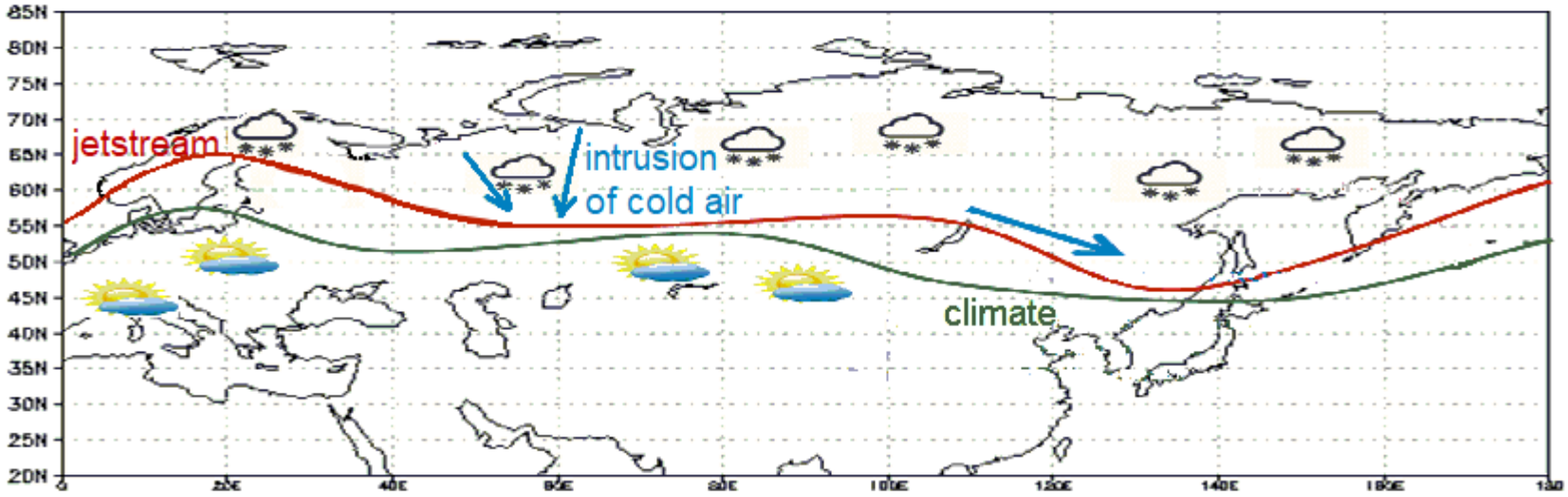
Mean H-500 (shading) and standard deviations (isolines, dm) for the winter season. (norms 1981-2010)



Mean atmospheric pressure (shading) and standard deviations (isolines, hPa) for the winter season. (norms 1981-2010)



General circulation scheme for the winter season 2022-2023



Temperature forecast

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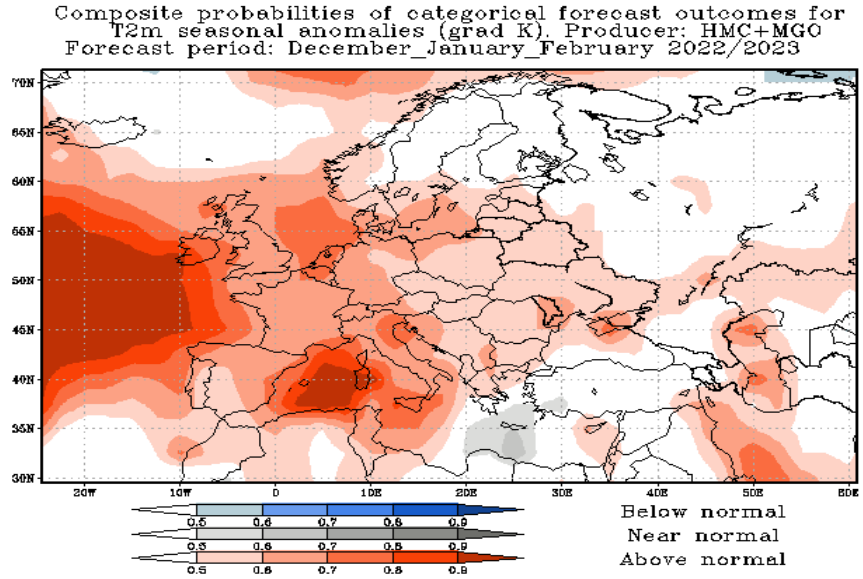
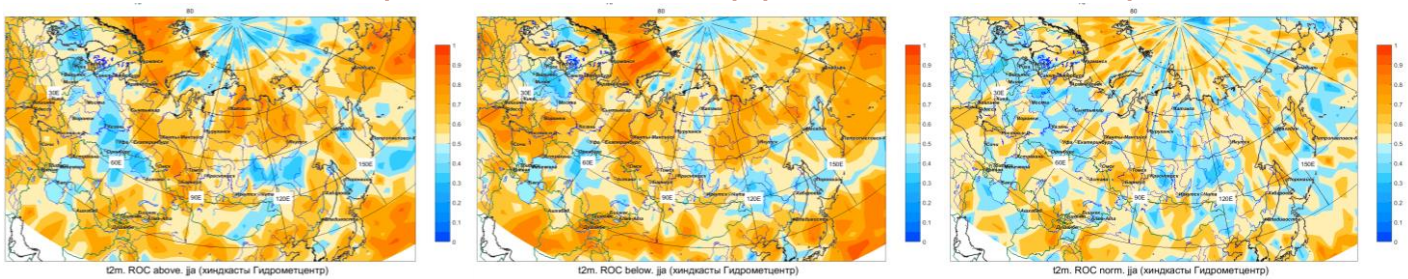
Composite probabilities of categorical forecast outcomes for T2m seasonal anomalies.
Producer: HMC (SL-AV) and MGO model.

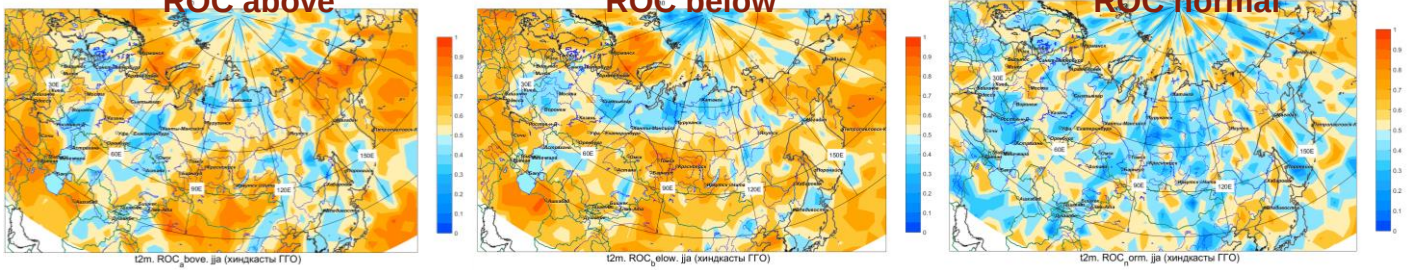


According to the forecasts of SL-AV and MGO models the positive temperature anomalies are expected over most of the Europe, with high probabilities 70-80% in the western part of Europe.

ROC of probabilisticT2M forecasts (top SL-AV, bottom MGO model).



ROC above ROC below ROC normal



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Precipitation forecast

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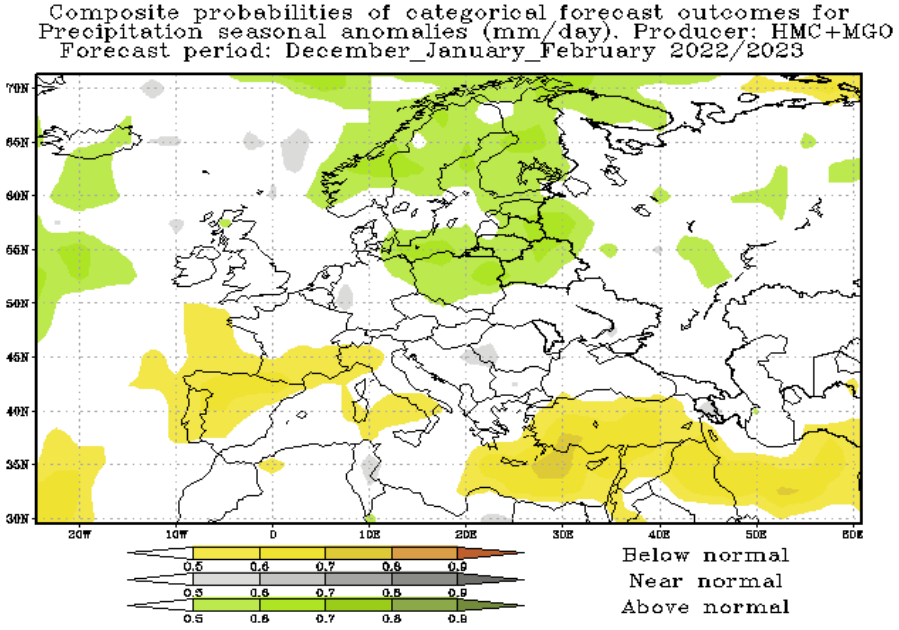
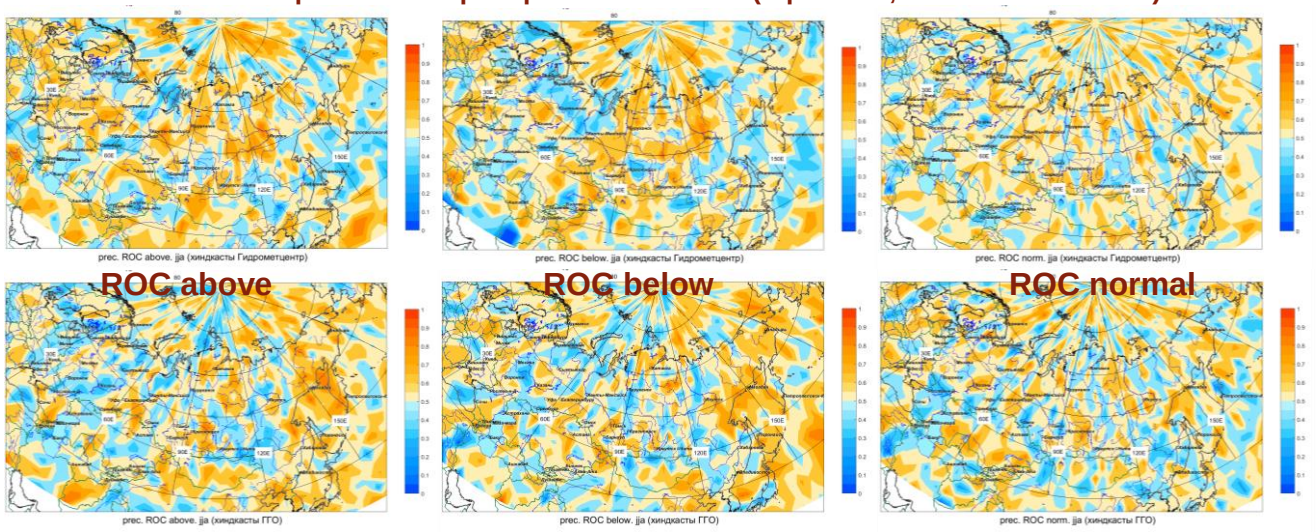
Composite probabilities of categorical forecast outcomes for precipitation seasonal anomalies. Producer: HMC (SL-AV) and MGO model.



From Sl-AV and MGO model forecasts. Precipitation above normal is seen in northern Europe and below normal in the southern Europe, with probabilities 50-60%.

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



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Summary

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- Most of models predict **La Nina for the winter 2022-23** (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 DJF 2021-22 season are: 72%, 28% and 0%.
- According to the forecasts of the Hydrometeorological Center of Russia, the prevalence of circulation regimes associated with the positive phases of NAO oscillation is expected to in the coming winter 2022-2023. Due to the positive phase of **NAO** during winter, the zonal atmospheric processes is likely to prevail over the northern territory of Europe. In the case of the positive phase of **NAO** index, the Azores high is likely to strengthen and to spread over the southern part of Europe.
- According to the forecasts of SL-AV and MGO models, the positive temperature anomalies are expected to in the most part of Europe, the probabilities are 55-70%, exluding the eastern part of European Russia.
- As for precipitation there are many uncertainties in the forecasts. Precipitation above normal is forecasted in the north of Europe and dry conditions is likely to in the south part of Europe, probabilities 50%.

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Thank you very much ☺

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