SEASONAL FORECAST OVER NORTH AFRICA
JJA 2025

ACCCOF-19

Online Session, May,30th,2025

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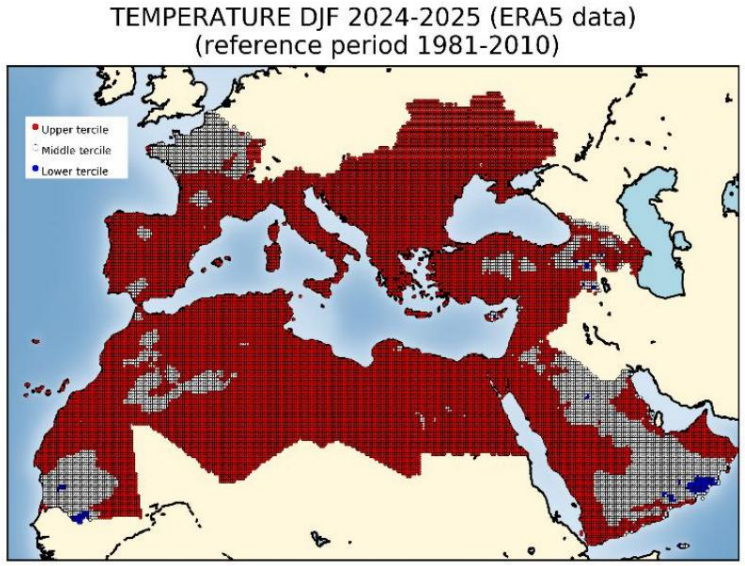
Direction Générale de la Météorologie

VERIFICATION

• *Assessment DJF2024/2025 Forecast*



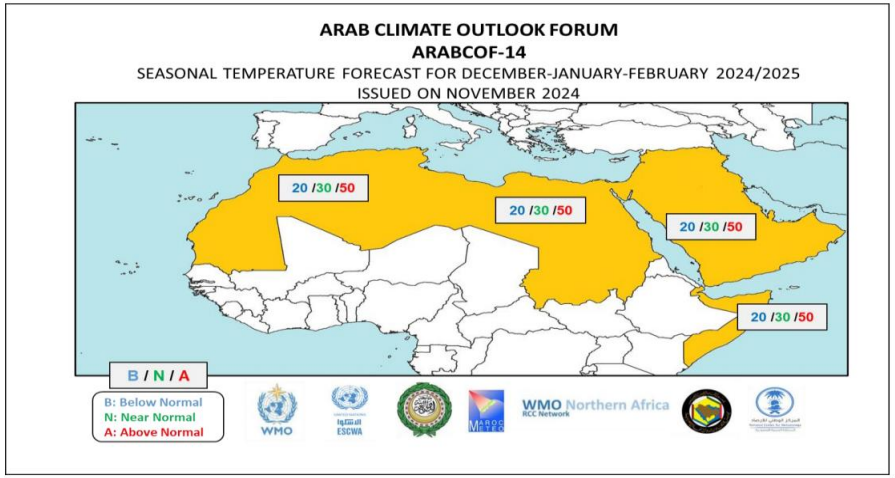
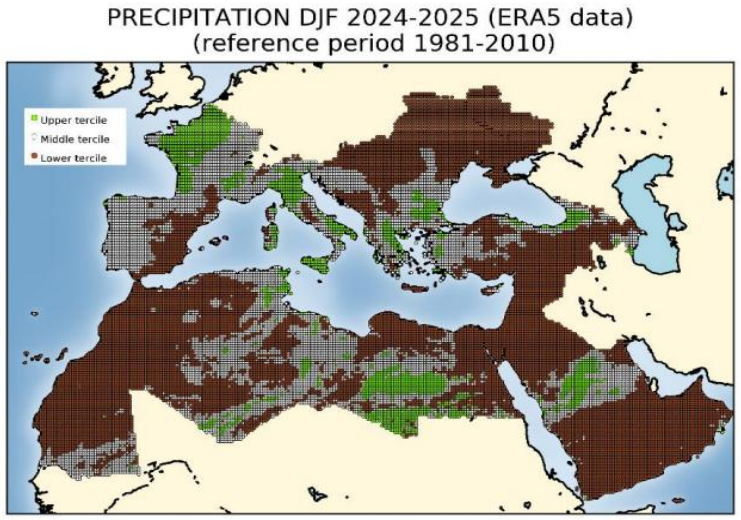


Figure 1: Seasonal forecast of mean temperature for DJF 2024/2025



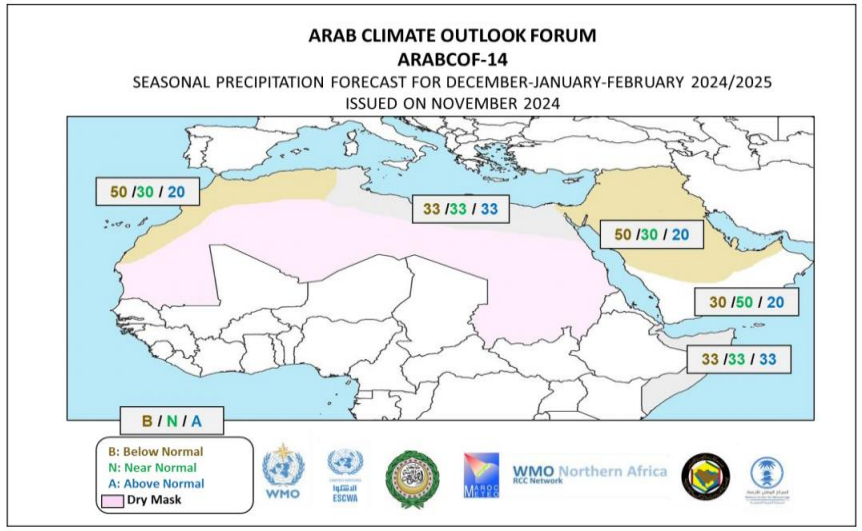


Figure 2: Seasonal forecast of precipitation for DJF 2024/2025

SEASONAL FORECAST PROCESS

SUBJECTIVE FORECAST

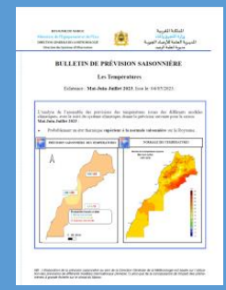
DYNAMICAL &STATISTICAL MODELS

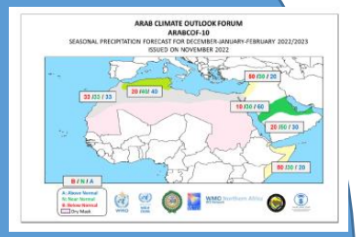
CLIMATE DRIVERS

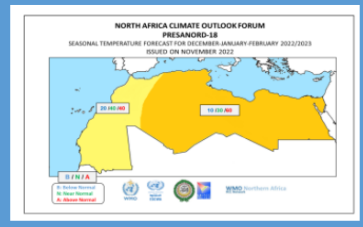
CURRENT CONDITIONS

A set of regular products:

- National bulletin
- RCC NORAF Outlook
- PRESANORD, MEDCOF and ARABCOF Outlooks



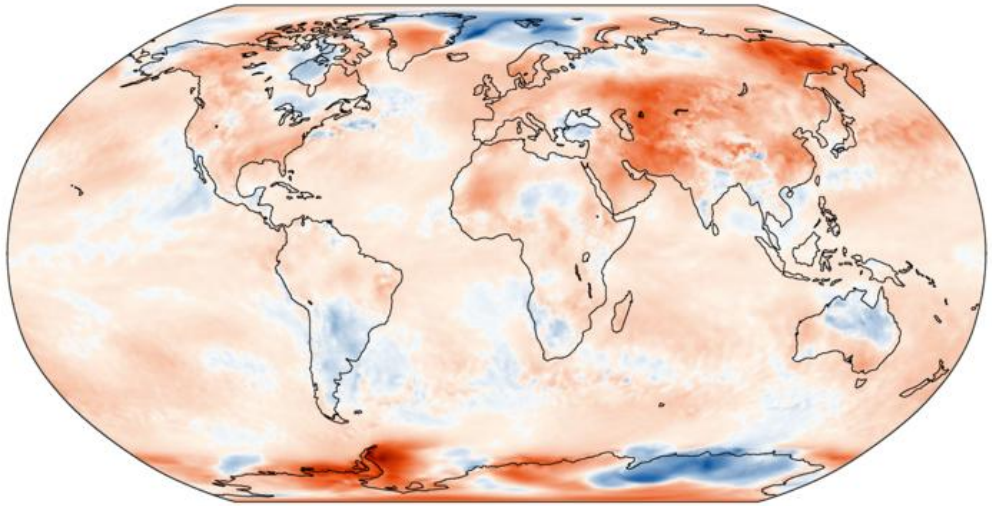


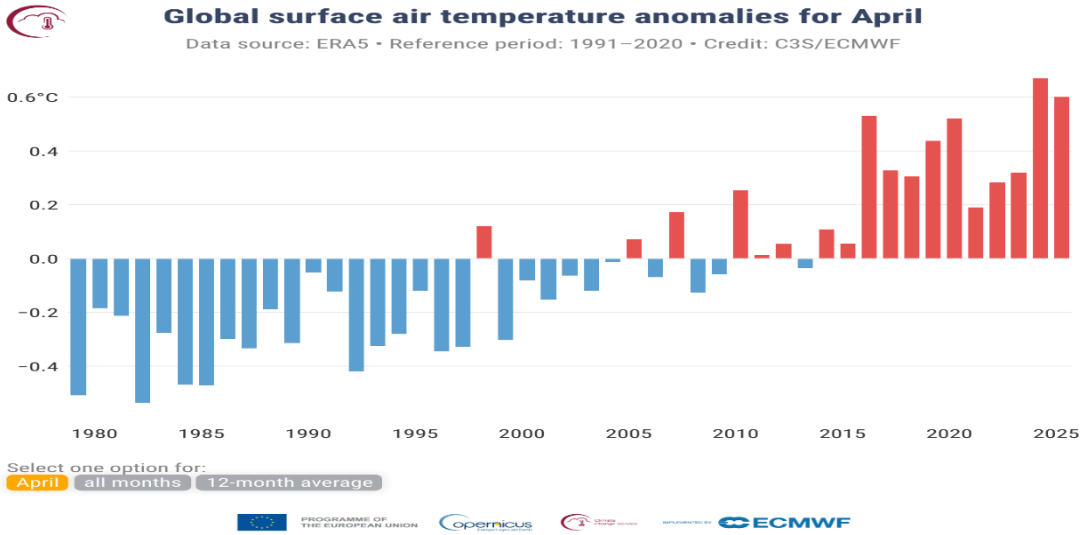


Collaboration UK METOFFICE (WISER MENA) → **OBJECTIVE** → **Promoting Application of climate information into different sectors**

CURRENT CONDITIONS

- *Temperature in April 2024*





(Data: ERA5. Reference period: 1991-2020. Credit: C3S/ECMWF)

Globally, April 2025 was:

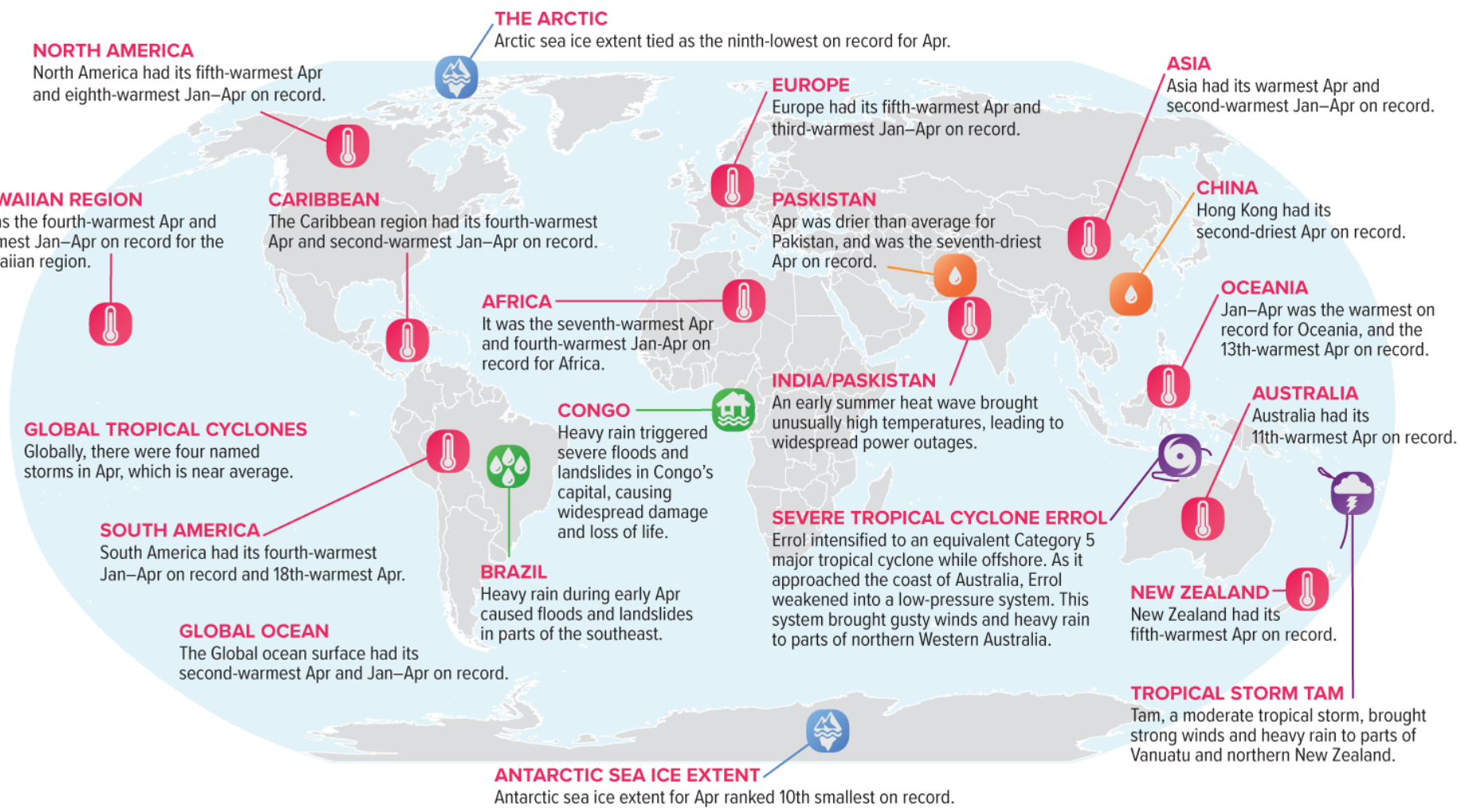
•the second-warmest April, with an average ERA5 surface air temperature of 14.96°C, 0.60°C above th 1991-2020 average for April.

•1.51°C warmer than an estimate of the pre-industrial average for 1850-1900

Selected Significant Climate Anomalies and Events: April 2025

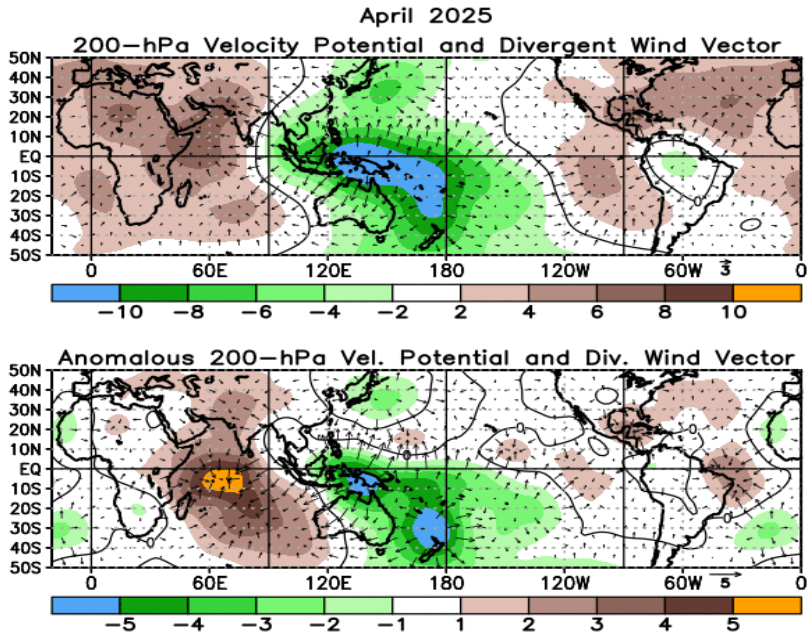
GLOBAL AVERAGE TEMPERATURE

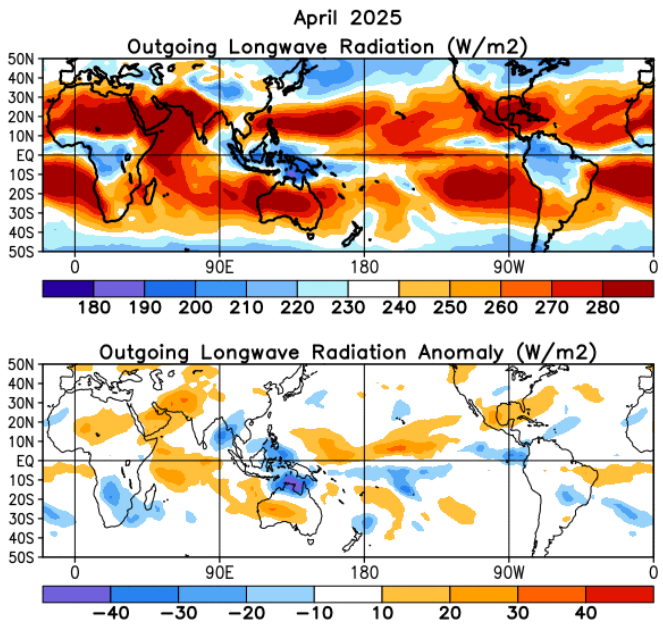
Average global surface temperature was the second warmest for Apr and Jan–Apr since global records began in 1850.



Please note: Material provided in this map was compiled from NOAA's State of the Climate Reports. For more information please visit: https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/

• Convective activity in April 2024



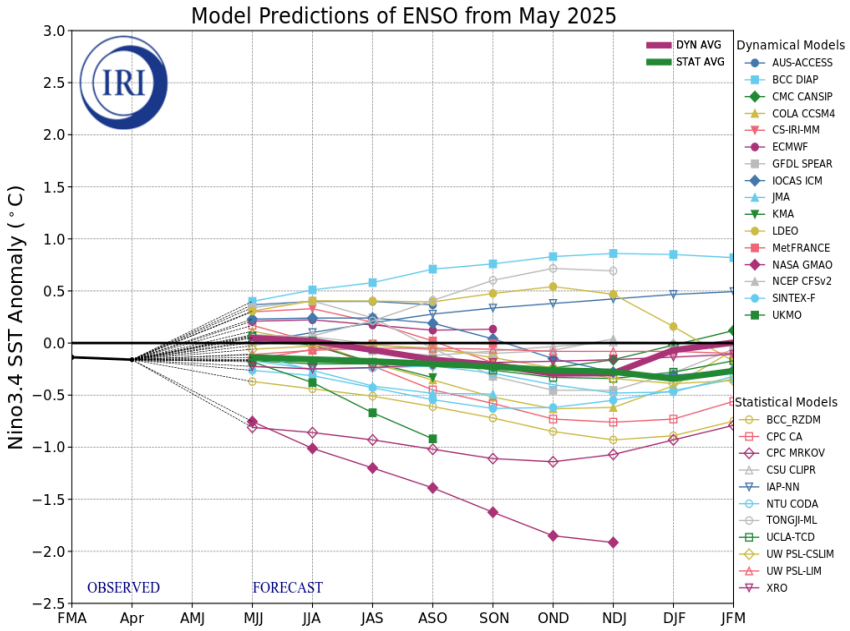


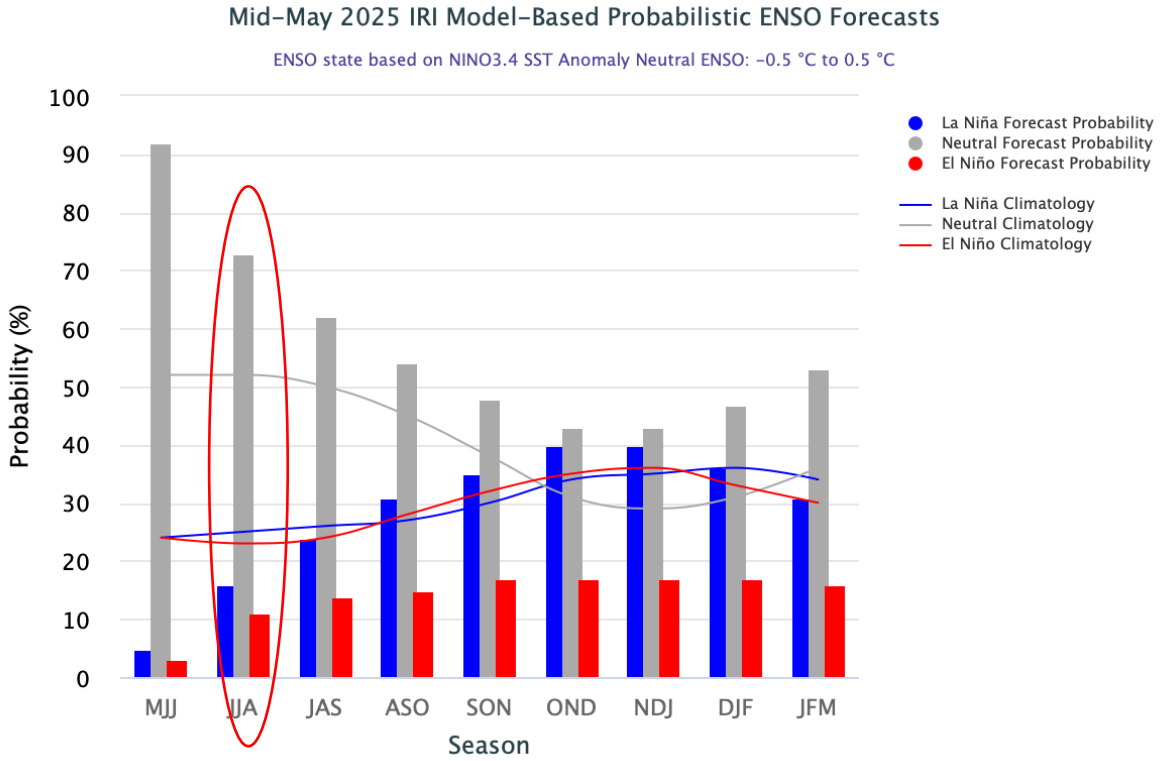
[Climate Prediction Center - Outlooks (noaa.gov)]

Consistent transition to Neutral conditions

CLIMATE DRIVERS

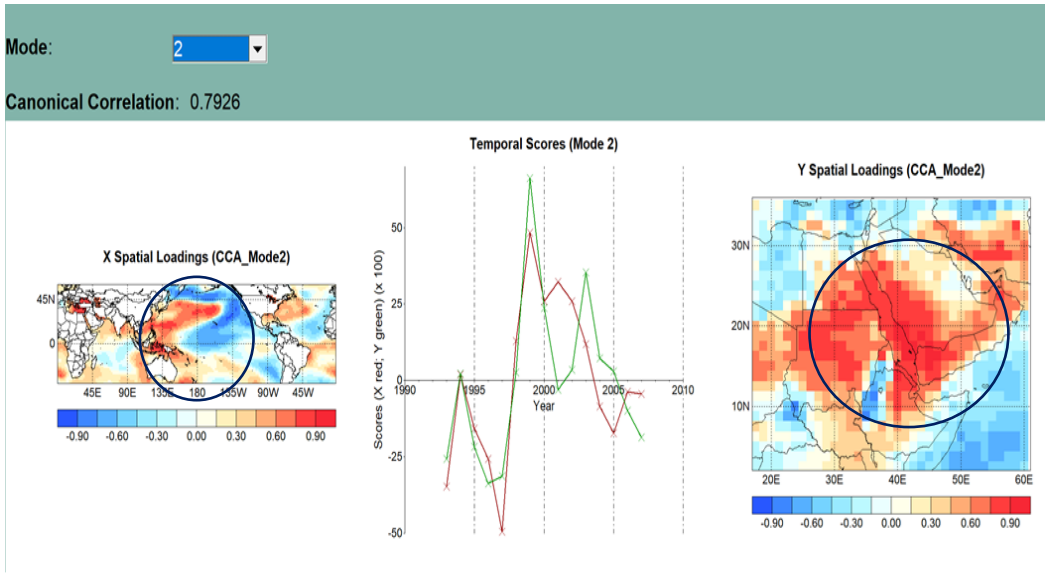
• *ENSO prediction*

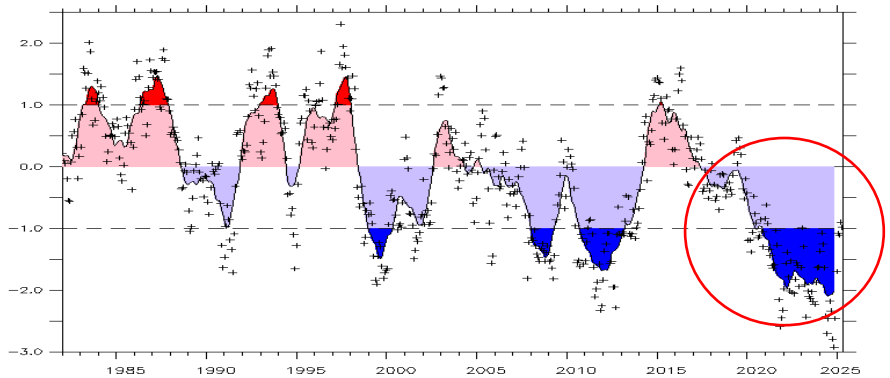




- ENSO-neutral conditions are favored to persist through the Northern Hemisphere summer 2025, with a 74% probability during June–August, and remain likely with over a 50% chance through August–October 2025.

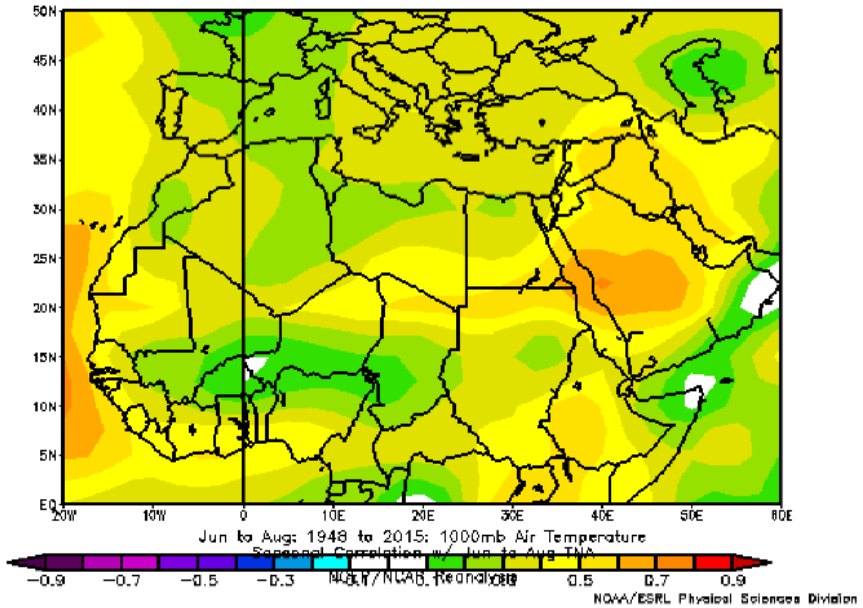
• Pacific Decadal Oscillation



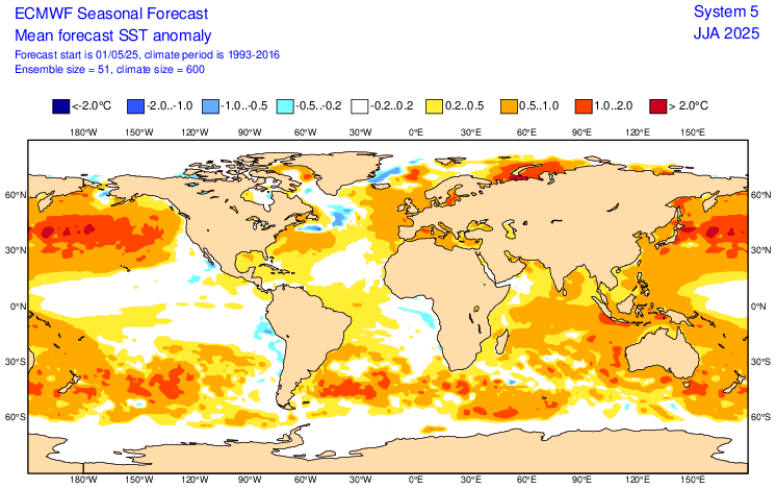


- CCA results show a strong correlation (~0.8) between SSTs and precipitation over the Arabian Peninsula and southern Egypt, highlighting that negative PDO phases are linked to above-normal rainfall in these regions.
- consistent with dynamical model outputs, confirming that Pacific decadal variability plays a key role in shaping summer precipitation patterns

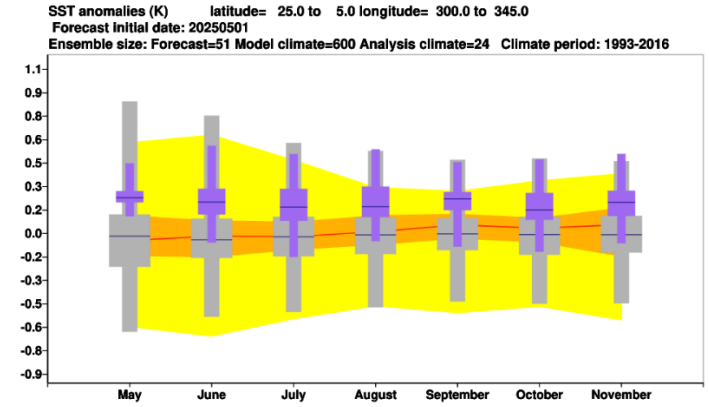
• Tropical North Atlantic



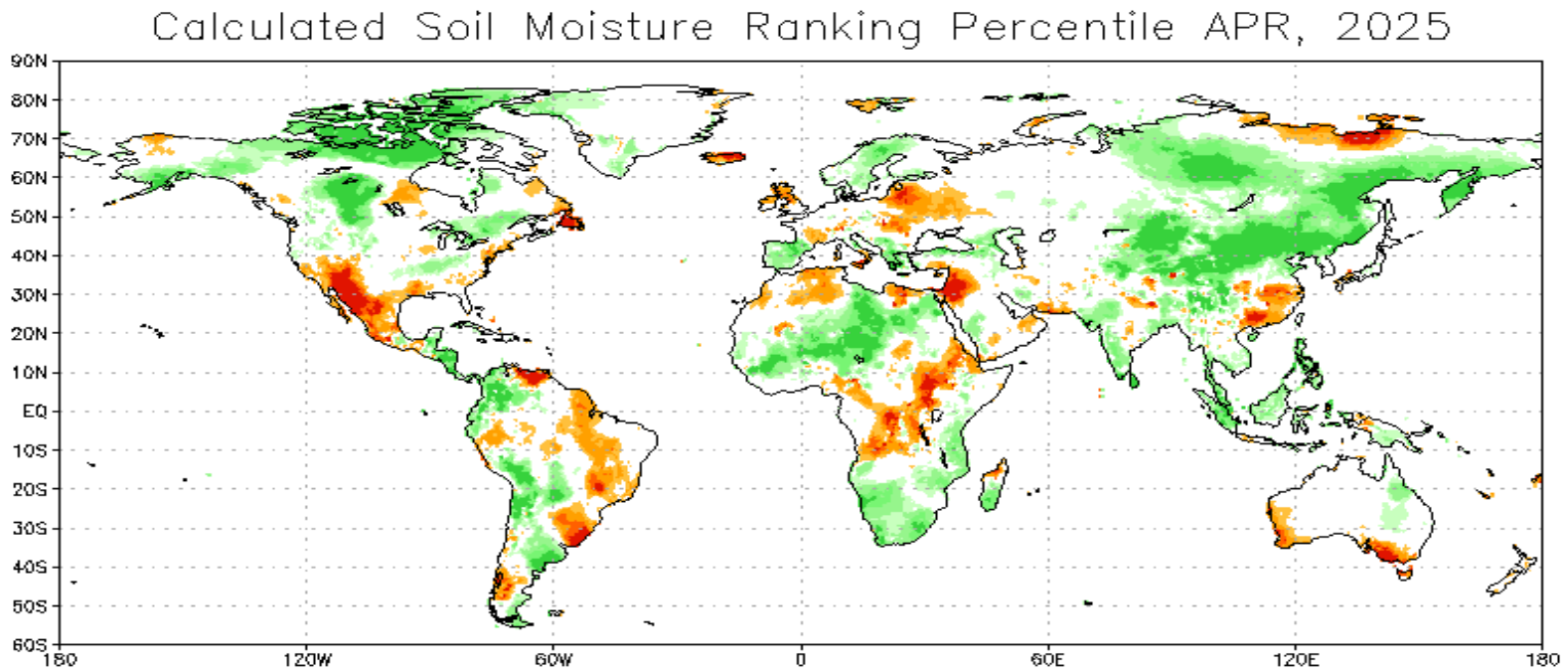
The Tropical North Atlantic index shows a positive link with temperature for JJA over Western and South-eastern of the North African domain.



The SSTs over TNA region is expected to be above average for JJA 2025, which could favor above normal conditions over Southern Morocco, Western Mauritania, Southerr Libya and Southern Egypt.



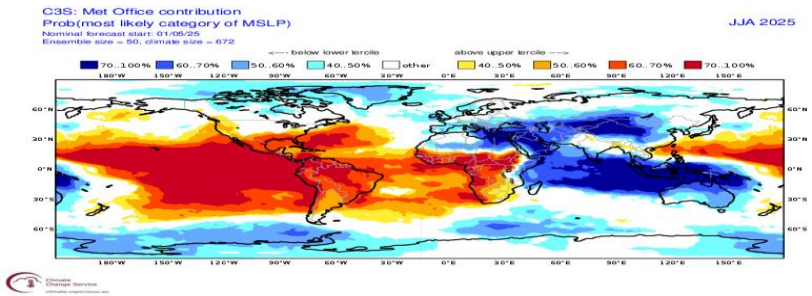
• *Soil Moisture*

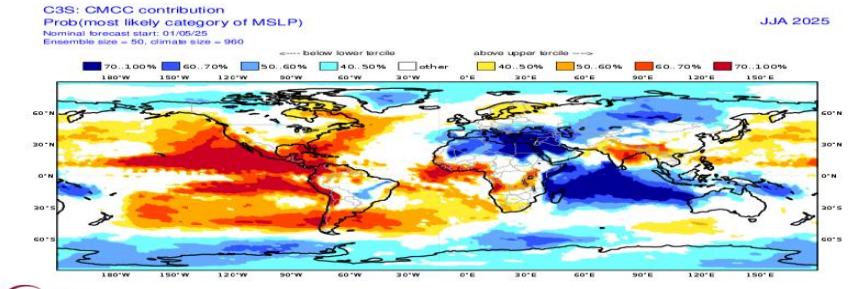


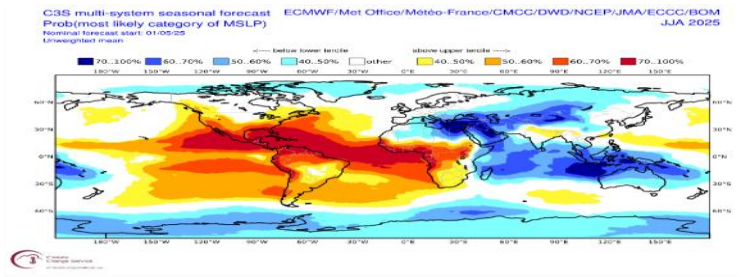
- Soil moisture is an important driver for Mediterranean summers.Studies have argued that dry soil moisture conditions prior to summer may enhance the likelihood of hot extremes, especially over the Mediterranean region.
- In April 2025, **northern Algeria and Tunisia** experienced **dry soil conditions**, whichwhen combined with **forecasted warm conditions for JJA 2025** and the region's typical summer dryness—raise concern for **heat extremes and elevated wildfire risk**.

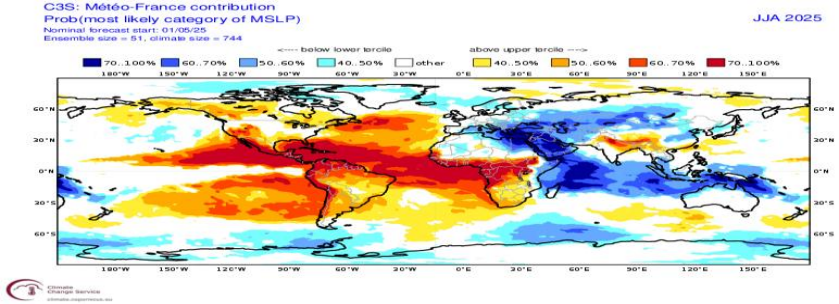
DYNAMICAL OUTPUTS

• Dynamical Circulation







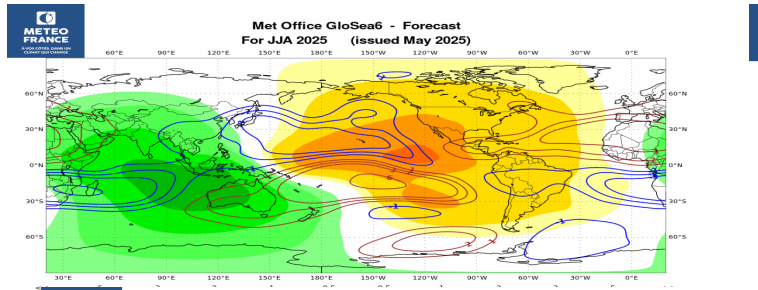


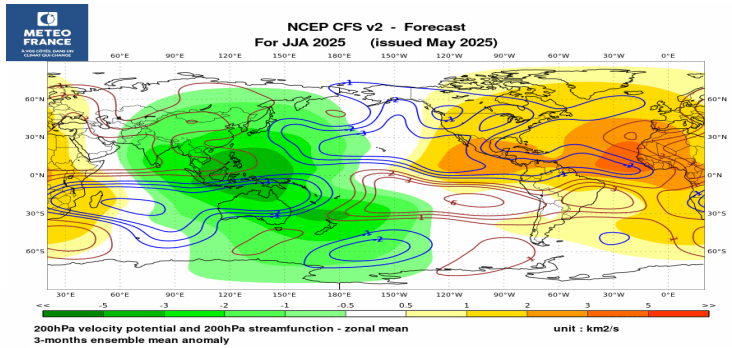
➢ *SLP:*

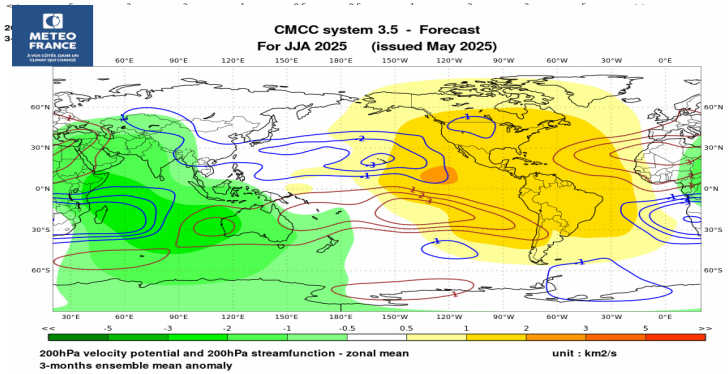
- A set of climate models shows a consistent signal of below-normal sea level pressure over the eastern part of the domain, reflecting an anomalous dynamical circulation pattern.

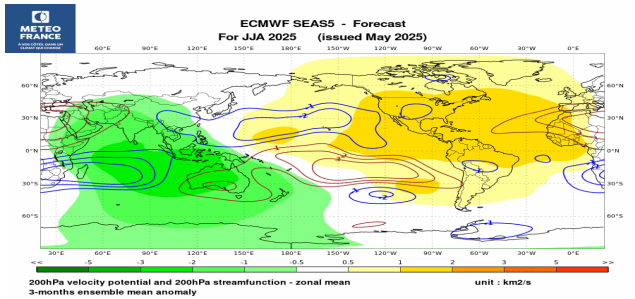
- Reflects a possible above normal precipitation over , Southern Egypt,EAF

• Dynamical Circulation





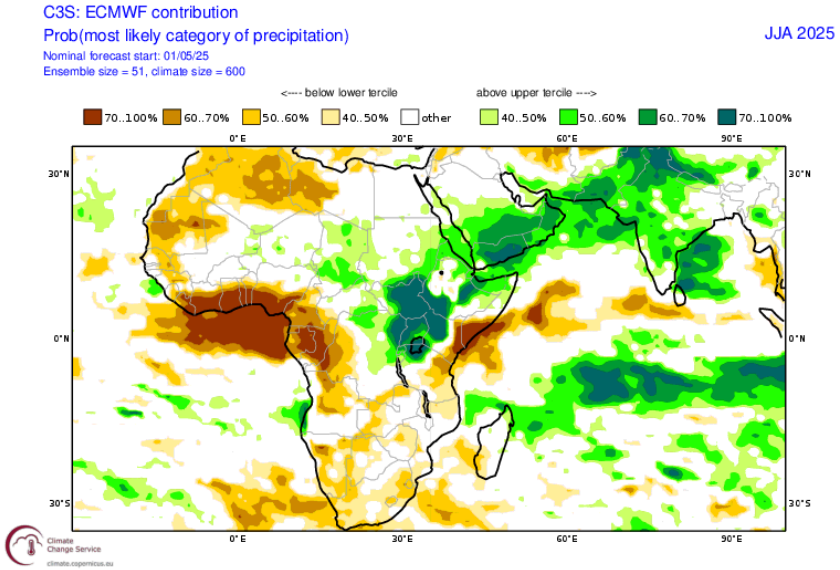


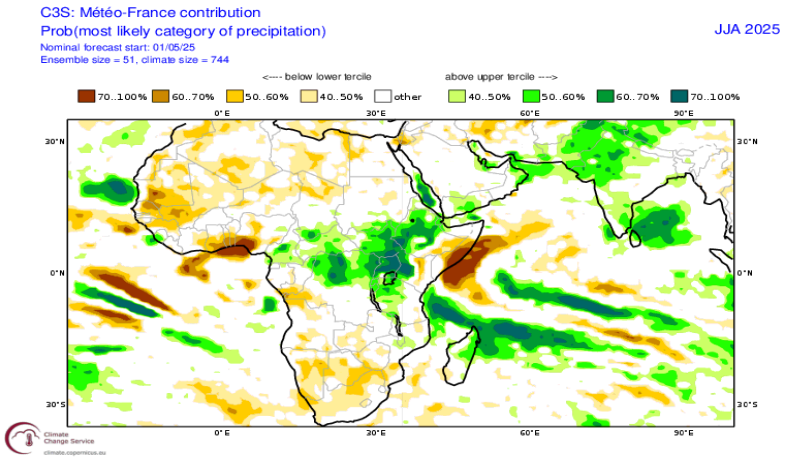


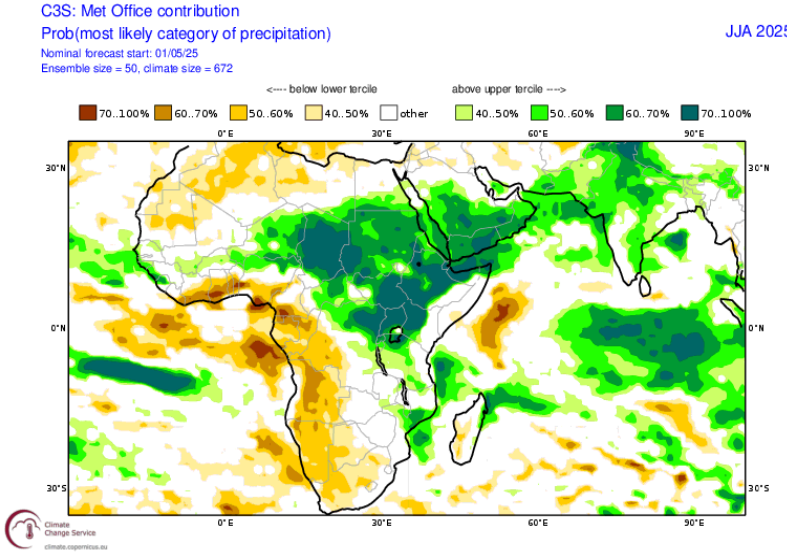
- *Potential velocity & streamfunction:*

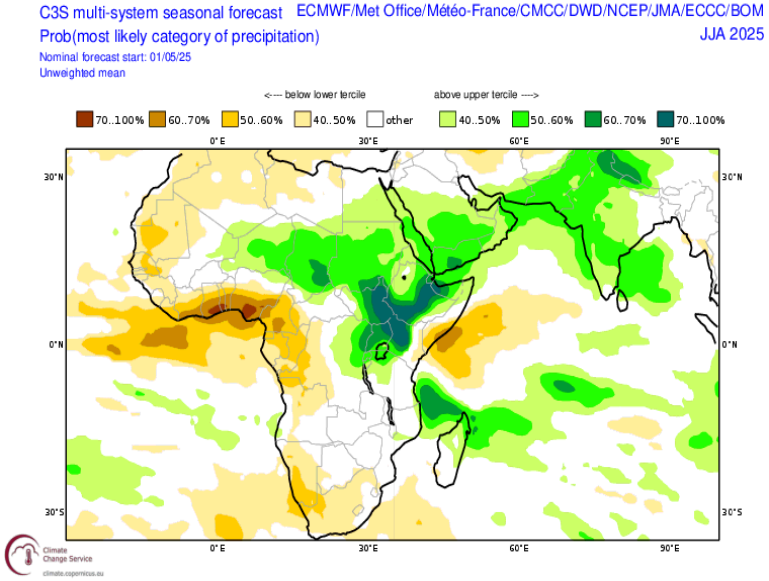
•Climate models show **consistent upper-level divergence over East of the domain**
•Coupled with **below-normal sea level pressure**
•Indicates **strong potential for enhanced convective activity**
•This dynamical setup may significantly influence **summer precipitation patterns** in these regions

- # PRECIPITATION

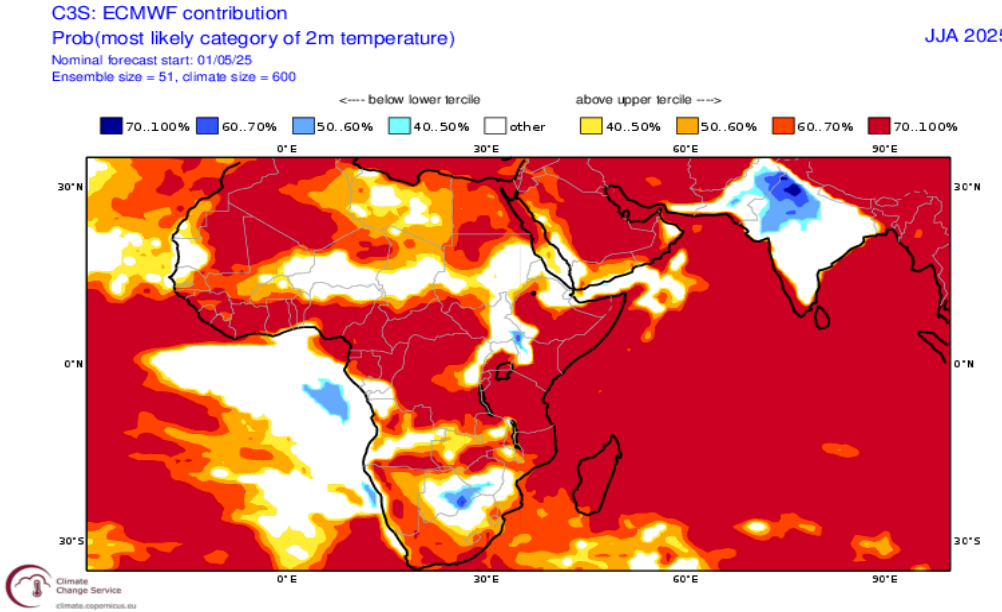


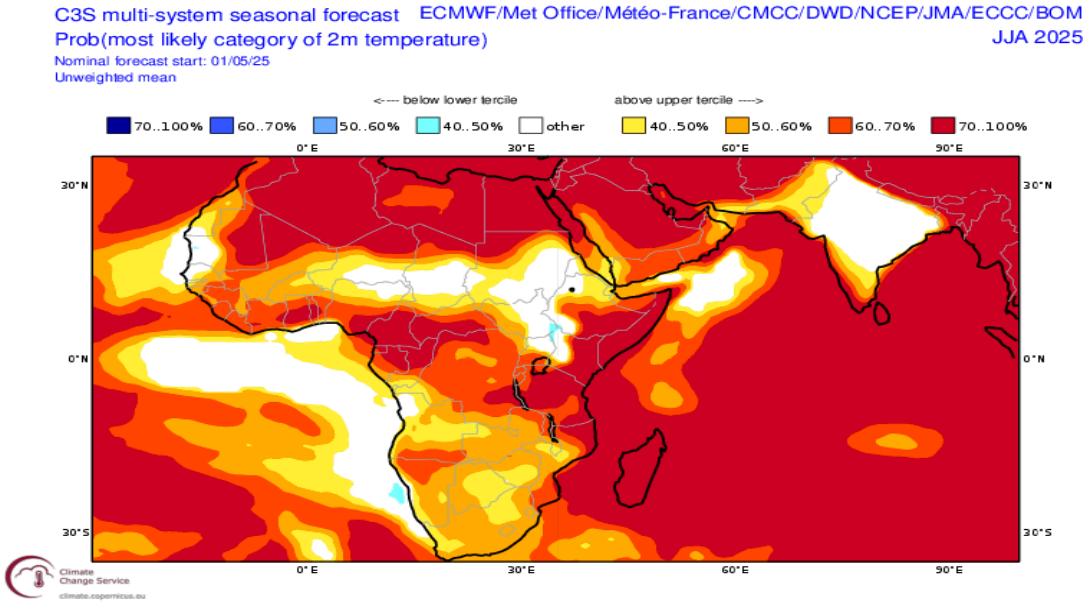






TEMPERATURE

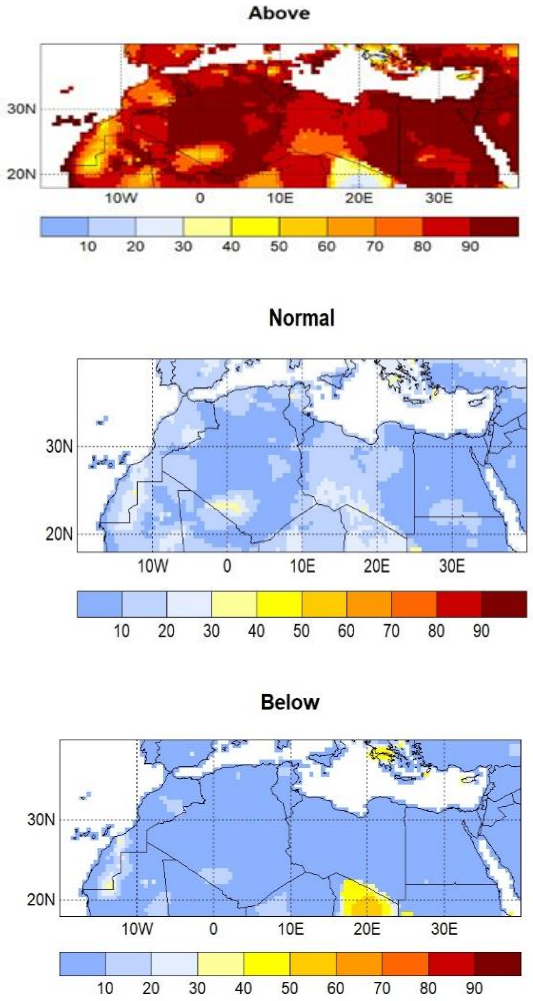




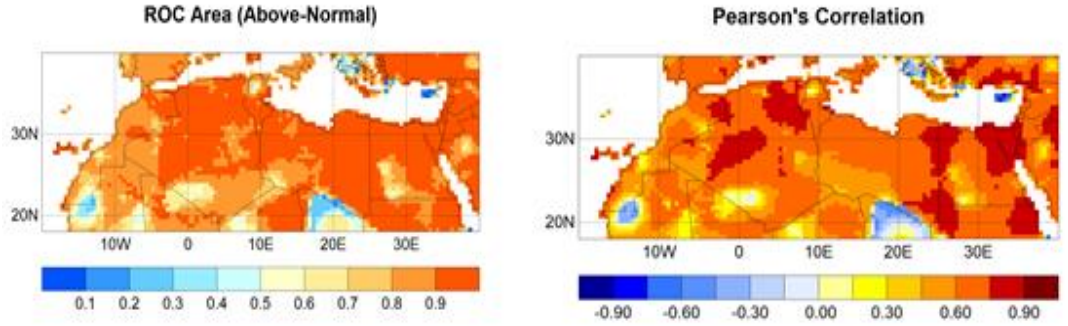
- According to C3S and ECMWF, temperatures during June, July, and August (JJA) 2025 are generally forecasted to be above average across the entire Arab region.
- There is a higher likelihood, exceeding 70%, of experiencing warmer temperatures over almost all North Africa countries.
- Exceptions may occur in the southwestern parts of the region, where near-normal temperatures are possible.

• Statistical Forecast

➢ **Statistical forecasts of 2m temperature**

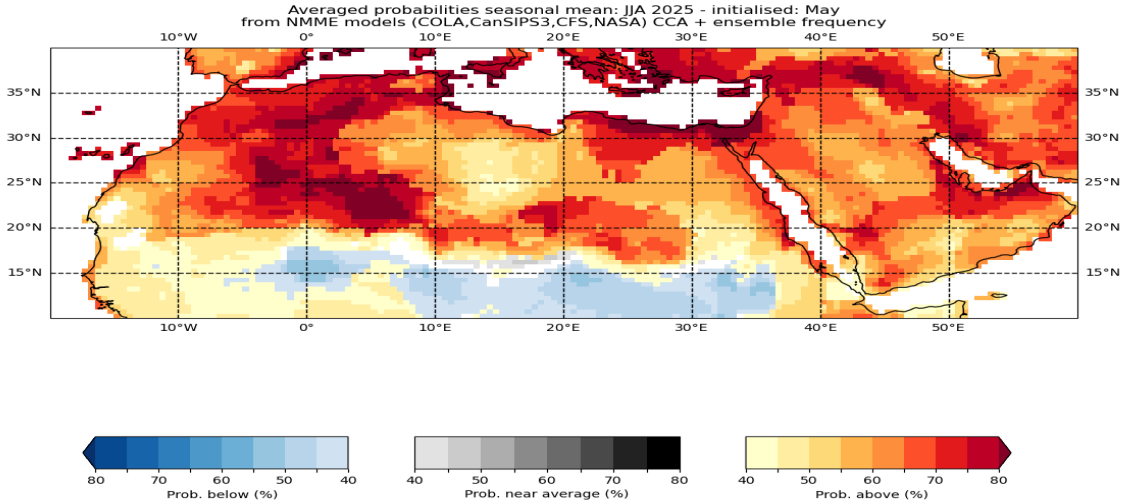


- Statistical forecasts of 2m temperature anomalies are produced by Canonical Correlation Analysis method using as predictors North Atlantic April SST (NOAA NCDC ERSST version4) and as predictand North Africa T2m (CPC /GHCN_CAMS).
- Statistical forecast is represented by probabilities of 3 categories above normal, normal and below normal.



Skill of statistical forecast using CCA method : pearson correlation(left) and ROC above area(right)

- **HYBRID TEMPERATURE FORECAST**

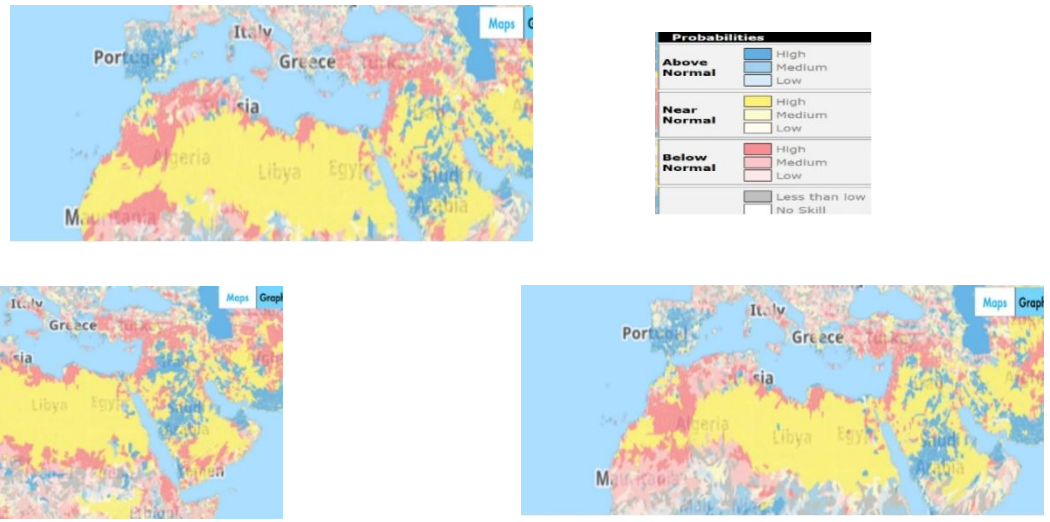


Thanks to A. Colman and N. Savage

- The methodology combines outputs from dynamical models with a statistical approach based on Canonical Correlation Analysis (CCA). This technique identifies linear combinations of observed and predicted fields (CCA modes) that maximize their correlation, thereby improving forecast skill.
- The maps below present the calibrated summer temperature forecast using CCA applied to multiple models, including COLA, CanSIPSv3, CFS, and NASA-GEOS.
- The results indicate a high probability of above-normal temperatures across the Arab region, particularly over northern areas such as northern Morocco, much of Algeria, northern Libya, and northern Egypt

•*Warning for specific areas in Arab Region*

➢ Soil Moisture Seasonal Forecast (June, July and August 2025)

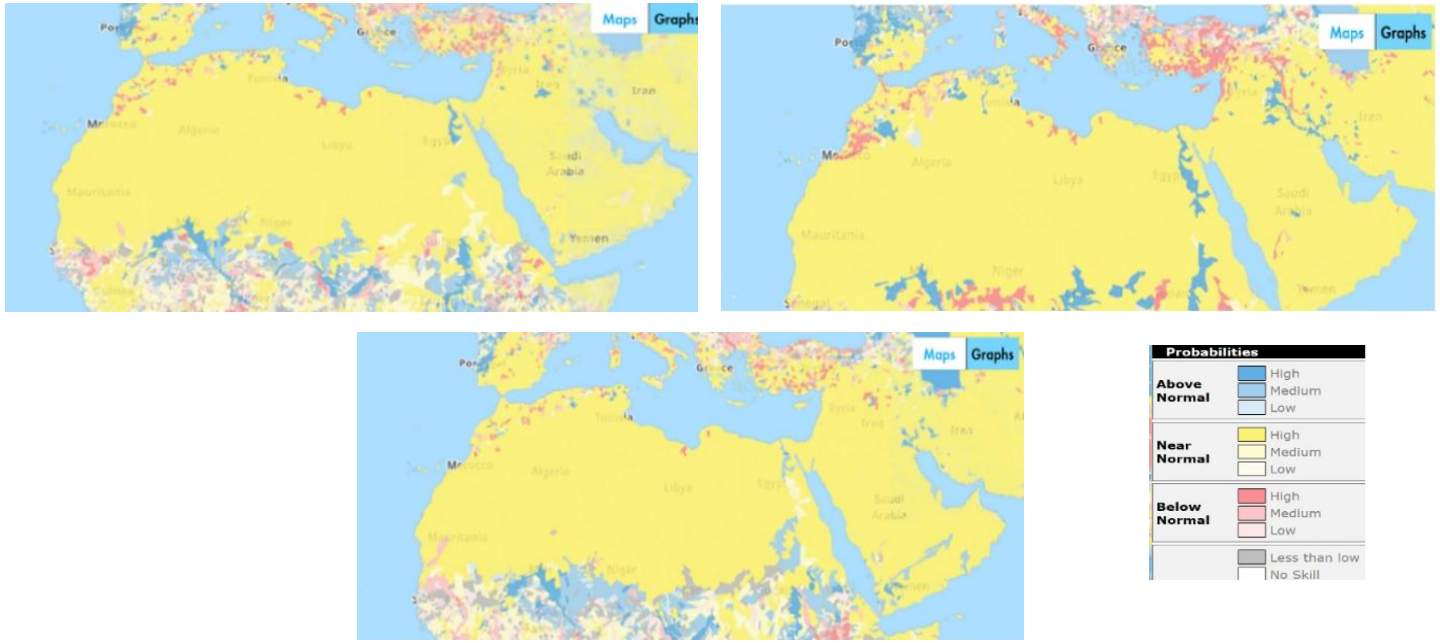


Soil moisture Seasonal Forecast by HYPE model for June, July,and August 2025

- Areas with no skill are shown in white and excluded from the soil moisture forecast analysis.
- High probability of below-normal soil moisture from June to August 2025 across northern Algeria, Tunisia, Libya, and Egypt.
- Dry conditions likely to increase the chance of hot temperature extremes
- Elevated fire risk expected over forested areas
- Enhanced monitoring and early preparedness measures are strongly recommended in these regions

•*Warning for specific areas in Arab Region*

➢ River Flow Seasonal Forecast (June, July and August 2025)



River Flow Seasonal Forecast (June, July and August 2025)

•Areas with no skill are shown in white and excluded from the river flow forecast maps.
•High probability of above-normal river flow predicted over the Nile River basin during June–August 2025.
•Special warnings are advised for Egypt, especially along the Nile basin, to mitigate possible heavy precipitation and flood hazards.

CONCLUSION

- **ENSO Outlook:** Transition to ENSO-neutral conditions expected during JJA 2025, with no strong El Niño or La Niña signal.
- **Atmospheric Patterns:** Likely below-normal sea level pressure and enhanced upper-level divergence over southeastern domain—favoring increased convective activity and possible heavy precipitation.
- Above-normal precipitation likely over the South Egypt, Sudan
- High probability of above-normal temperatures across most of North Africa, especially northern regions.
- Supported by both dynamical and statistical models.
- Dry conditions are likely from June to August 2025 in northern Algeria, Tunisia, Libya, and Egypt, which may increase the chances of heat extremes and wildfires in forested areas.
- Above-normal river flow is likely over the Nile Basin during June–August 2025, increasing the risk of heavy rainfall and flooding.

Summary from NA RCC-LRF

The analysis of current circulation, sea surface temperature, ENSO phenomenon and dynamical/statistical models outputs show for **June-July-August 2025**:

- **For Temperature:**
  - Probably above normal conditions over the most entire North Africa region.
- **For Precipitation :**
  - Probably above normal precipitation over Southern Egypt, Sudan. A dry mask is applied over North African region given that JJA is climatologically very dry season
- **Advisory warnings include:**

➢ Hot Extremes and Fire Risk: There is a potential for hot extrêmes over Northern Algeria, Tunisia and Egypt and an elevated risk of fires in the forested areas . Due to the inherent uncertainties in the forecasts, it is crucial to monitor the situation closely and prepare for these conditions accordingly.

➢ Heavy Precipitation and Flood Risk: There is a possibility of heavy precipitation over Southern Egypt, Sudan which could lead to flooding. It is recommended to take necessary precautions.

➢ We recommend close monitoring during June–July–August (JJA) 2025, including the use of subseasonal forecasts and statistical downscaling incorporating regional knowledge to better anticipate potential heatwaves, wildfires and flood risks.

THANK YOU VERY MUCH FOR YOUR ATTENTION