



VERIFICATION BULLETIN

APRIL - MAY - JUNE 2025



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Introduction : Objective

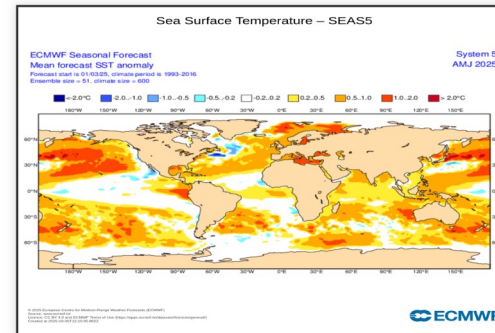
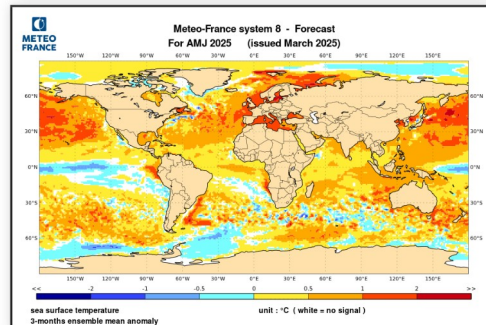
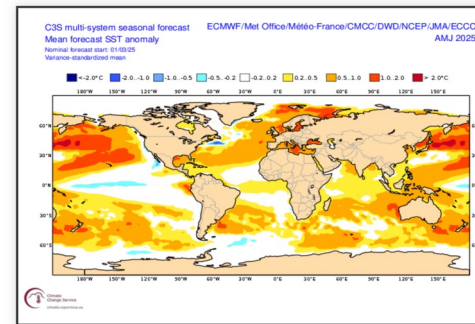
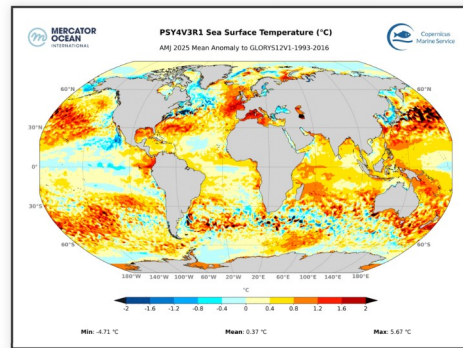
- The objective of the Seasonal Verification Bulletin is to present an evaluation of the main elements highlighted in the Seasonal Forecast Bulletin : oceanic forcings, large scale circulation patterns, and a focus on temperature and precipitation forecast over Northern Atlantic, Europe and the Mediterranean Basin.
- The aim is not to evaluate the mean skill of Seasonal Forecast models, for which scores are calculated over the whole hindcast period, but to enhance the knowledge of the behavior of models for advanced users (as National Meteorological Services), in parallel with an assessment of expertised forecast. This approach meets the need of many users, who want to know the recent real-time performances of forecasts, for specific events.
- Thanks to Mercator-Ocean and DWD (RCC-Climate Monitoring node for Europe) for providing products and analysis on the monitoring part.

Oceans : surface temperature anomalies

In the Pacific Ocean, the PDO- pattern was correctly predicted by the models. The weak anomaly in the equatorial zone is too pronounced with MF-S8.

The western part of the Indian Ocean is a bit warmer than it was forecasted by models, except SEAS5.

In the Atlantic Ocean, the main anomalies are generally well seen by the models. The strong warm anomaly over west Mediterranean Sea and the bay of Biscay was well predicted by MF8.

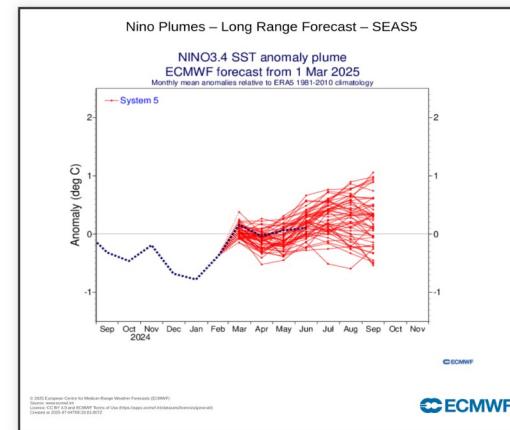
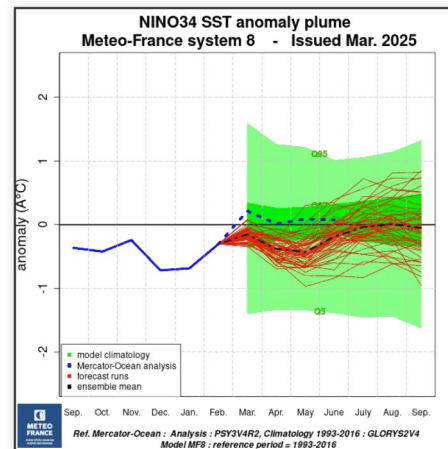


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S8 (bottom left) and SEAS5 (bottom right)

Oceans : ENSO

CAUTION : reference analyses differ between MF-S8 (Mercator-Ocean 1993-2016) and ECMWF-SEAS5 (NCEP 1981-2010).

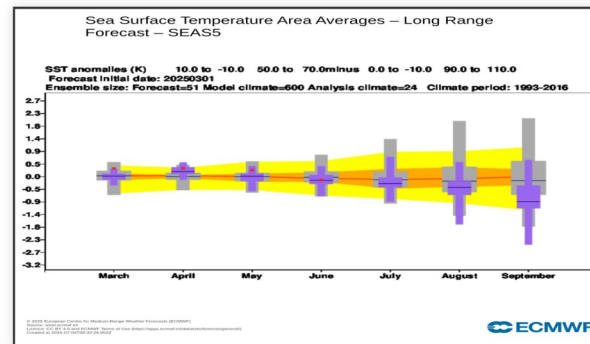
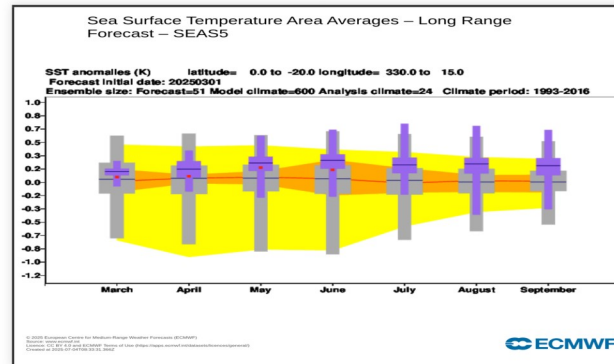
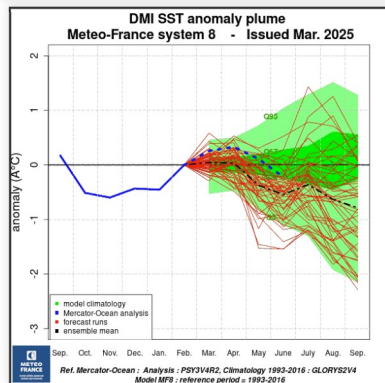
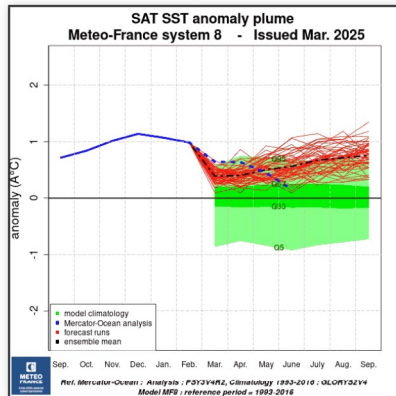
The negative phase of ENSO has subsided faster than the models predicted, particularly MF-S8, which was too cold.



Oceans : tropical Atlantic and Indian Ocean index

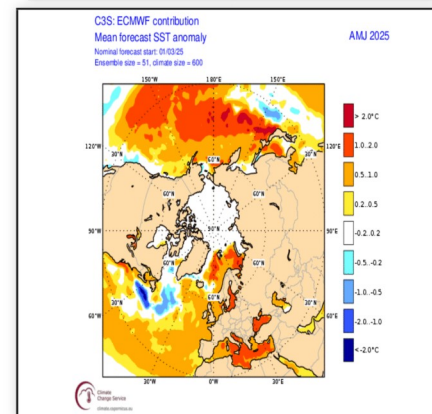
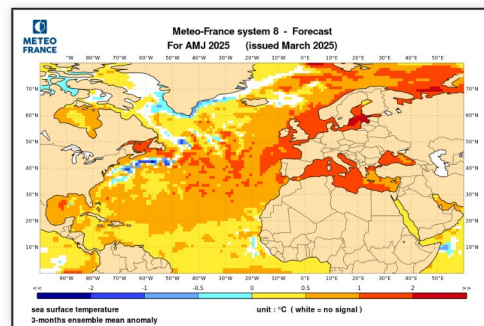
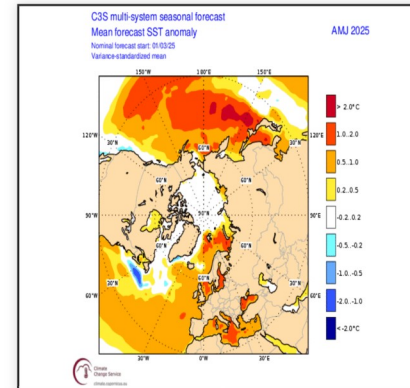
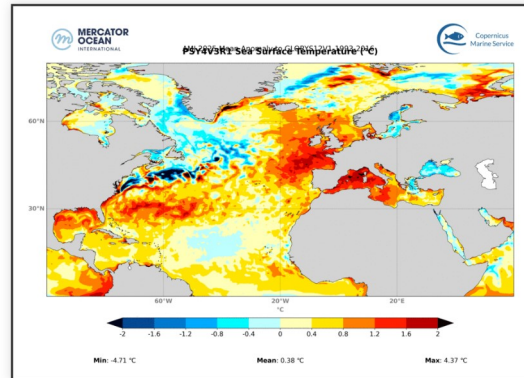
SAT : Good forecast for SEAS5. MF8 war too cold at first, and then only few runs has predicted the cooling during june.

DMI : The models slightly underestimated the DMI, but without consequence. It remains close to neutral.



Oceans : North Atlantic SST

The strong warm anomalies in the vicinity of Europe were well predicted by the models, particularly MF8, but the cold anomaly over Black Sea and the Baltic sea was not predicted.. Moreover they underestimated the warm anomaly around 30°N, and the cold anomaly over the Labrador Sea.

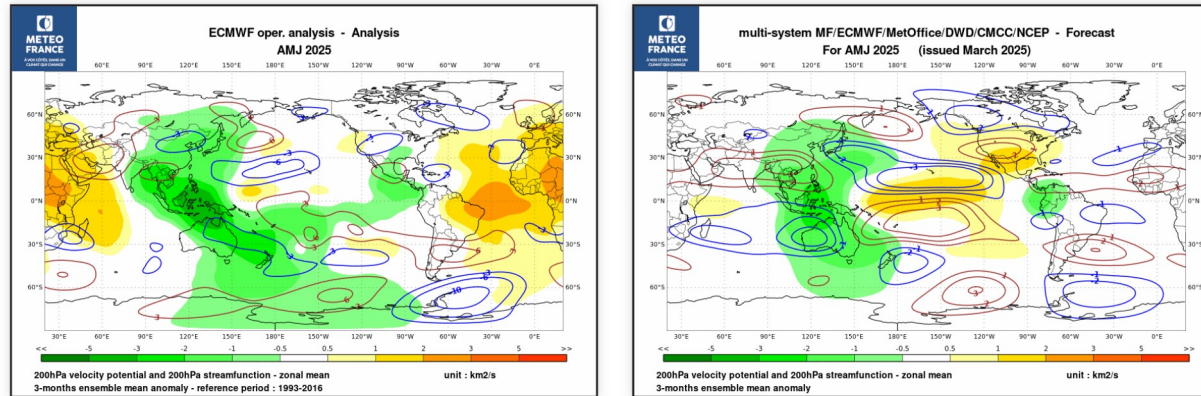


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S8 (bottom left) and ECMWF SEAS5 (bottom right)

Atmospheric circulation : Global teleconnection

VP : The main difference between the multisystem and reanalysis is the zone of downdraft that stretches from Brasil to Africa and all over the Atlantic Ocean and Europe.

SF : The Pacific Ocean dipole is lightly visible on reanalysis, but without teleconnections. On the other hand, the Indian Ocean dipole do not appear in the analysis. The pattern over Europe has not been well forecasted.

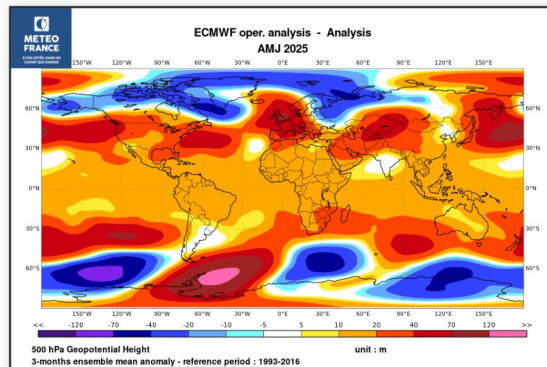


ECMWF analysis (left) and multi-model (right) for 200hPa velocity potential anomalies (color green : ascending, orange: subsidence) and stream function anomalies (isolines, red: anticyclonic in the northern hemisphere, blue: cyclonic in the northern hemisphere).

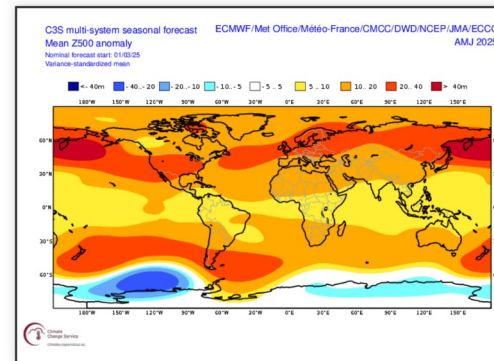
Atmospheric circulation : Atmospheric circulation

Southern Hemisphere : Anomalies positions were well forecasted but they are stronger in the analysis..

Northern Hemisphere : The low anomaly from Alaska to Greenland and Scandinavia hasn't been anticipated. Towards Europe, we find the same differences as for the stream functions.

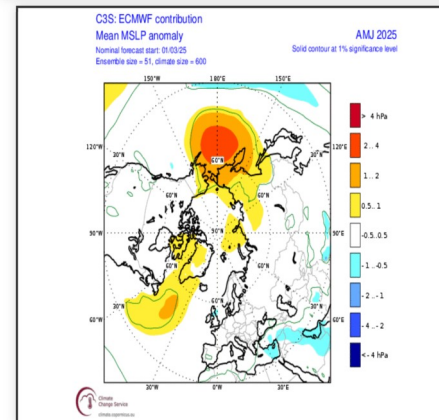
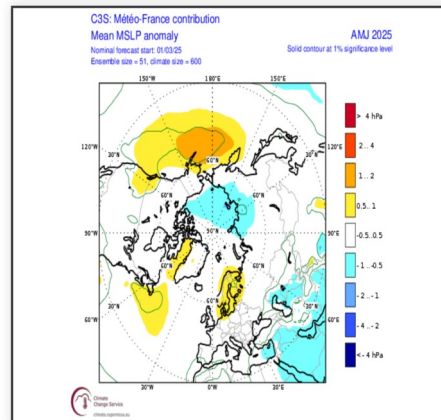
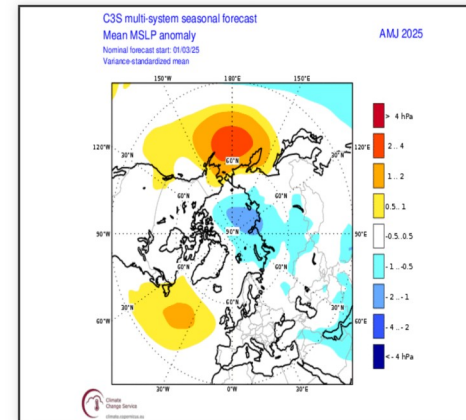
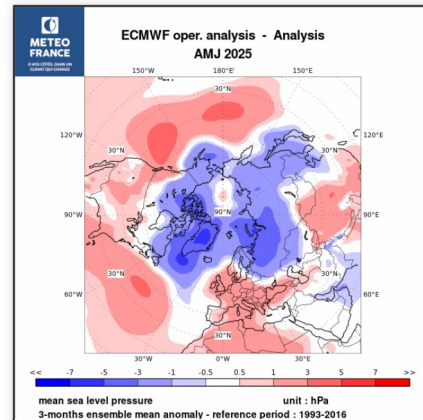


ECMWF analysis and C3S multi-system for 500hPa geopotential height anomalies.



Atmospheric circulation : MSLP

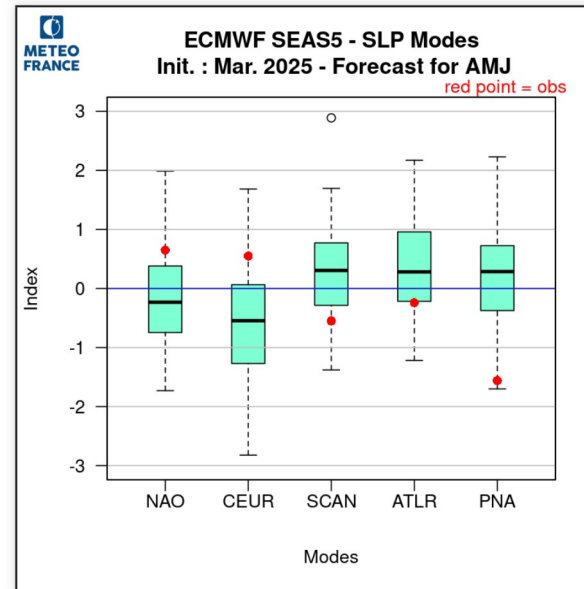
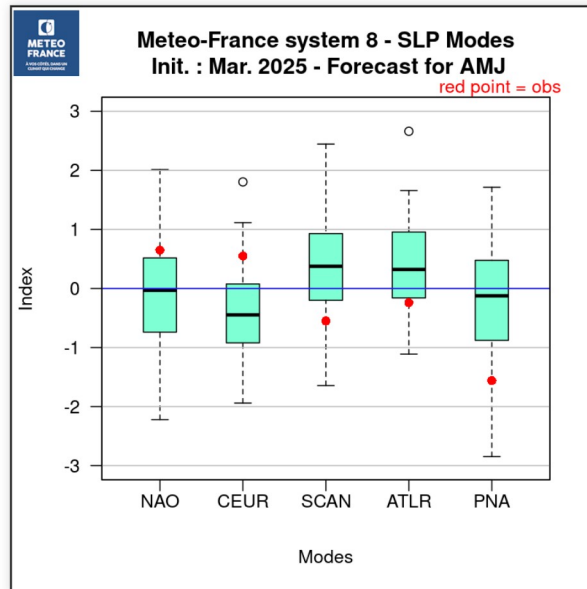
The negative anomaly over Alaska and Greenland was not foreseen. Over Europe, the observed pattern is poorly anticipated by most models.



Analysis and multi-system C3S forecast MSLP anomalies (top), Mf-S8 and ECMWF-SEAS5 MSLP anomalies (bottom)

Atmospheric circulation : Verification SLP Modes

It seems that no mode has been correctly predicted by SEAS5. MF8 was a bit better with neutral NAO and negative PNA.

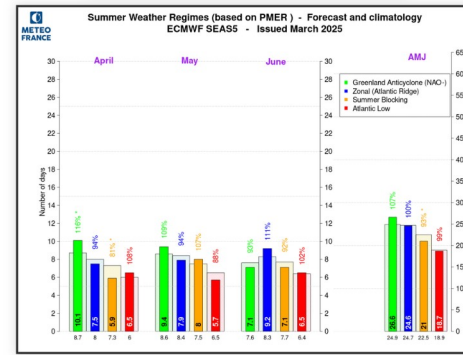
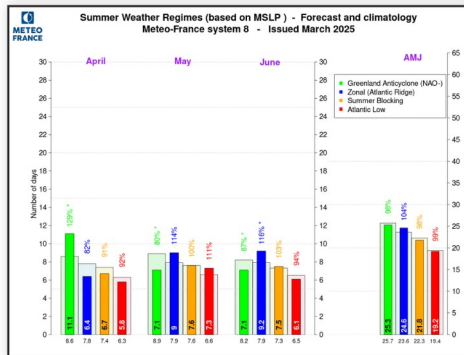
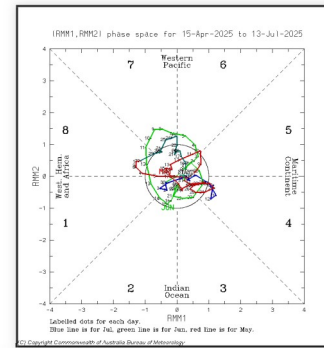
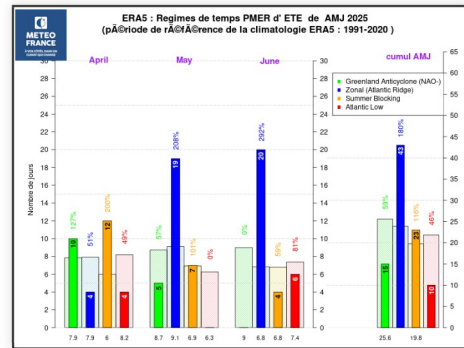


SLP modes of variability : MF-S8 and ECMWF-S5 forecasts -- red point = ERA5 reanalysis

Atmospheric circulation : Summer SLP weather regimes

In the analysis, zonal is over-represented while Atlantic low and Greenland anticyclone is under-represented.

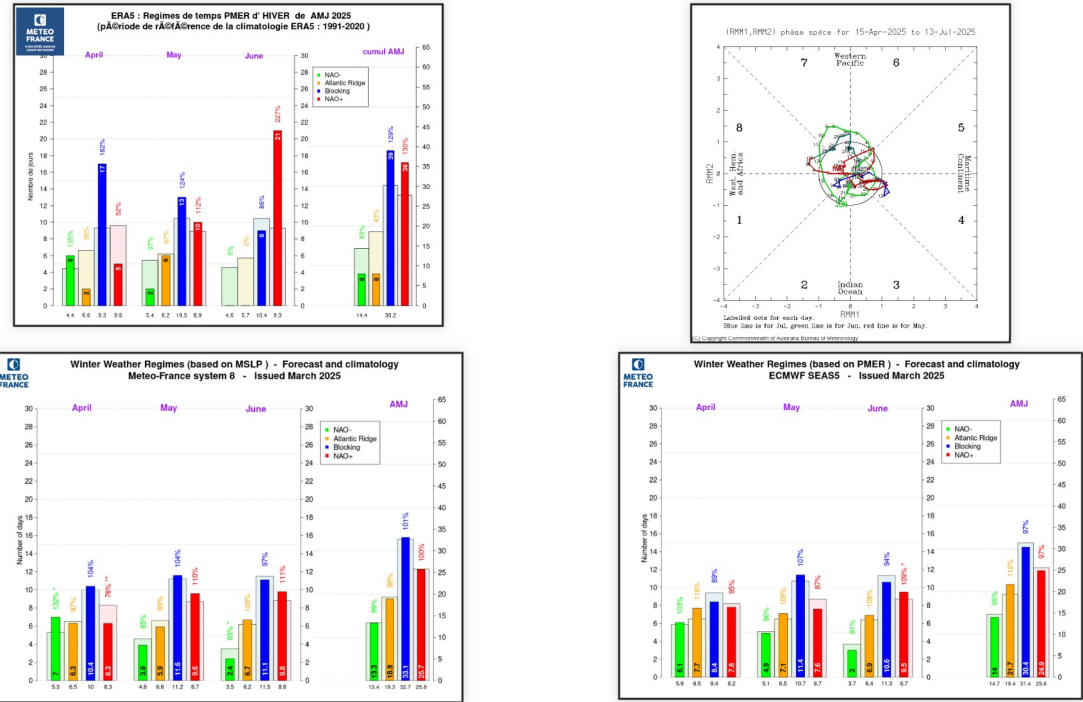
This signal wasn't forecasted by models which where close to their climatology.



weather regime : ECMWF analysis top left, MF8 and ECMWF forecasts at the bottom. MJO phase top right

Atmospheric circulation : Winter SLP weather regimes

The Blocking regime largely dominates the two first months, and both models are a bit closer to the analysis.

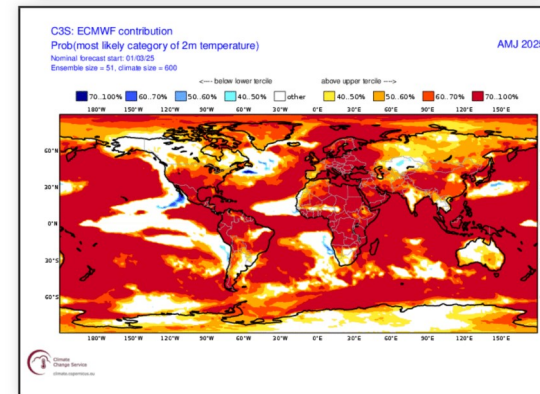
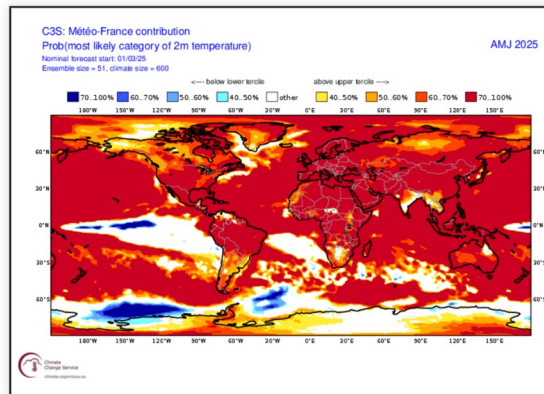
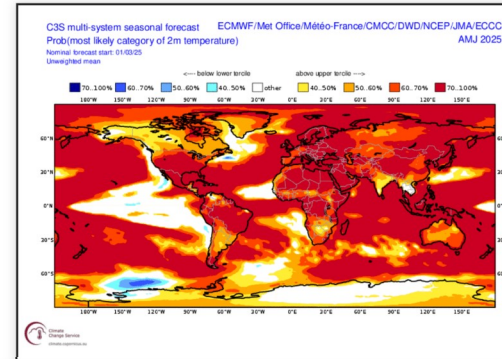
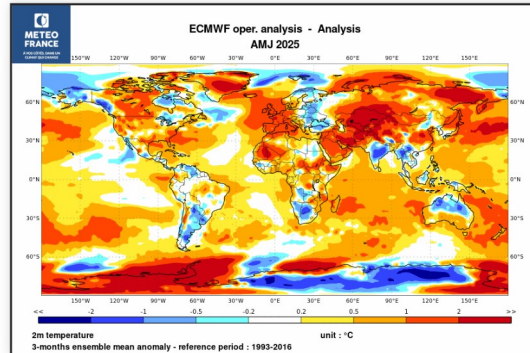


weather regime : ECMWF analysis top left, MF8 and ECMWF forecasts at the bottom. MJO phase top right

Climatic parameters : temperature on the globe

Warm anomalies dominate.

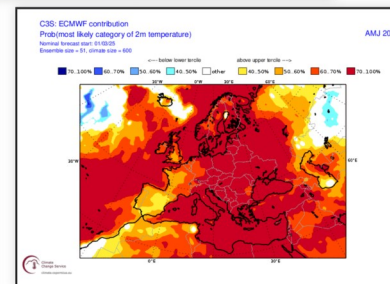
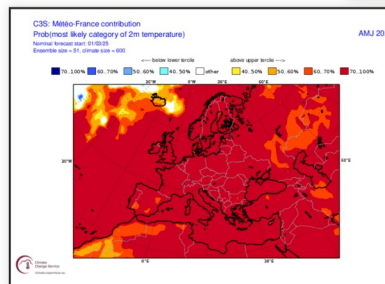
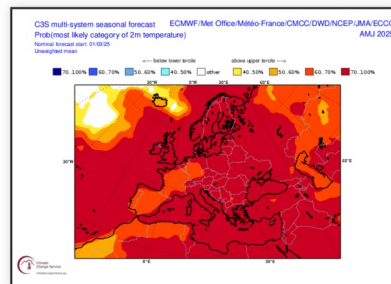
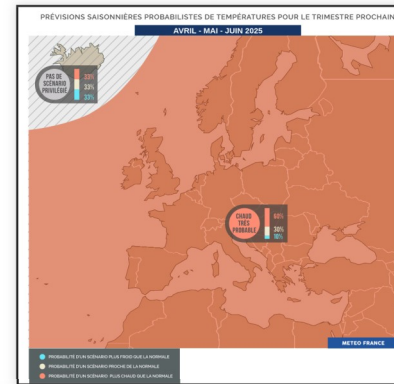
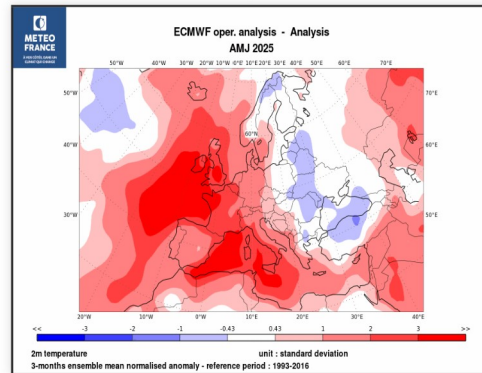
Forecasts for Asia and Africa are quite good, a bit too warm. On the other hand, they are logically poor for eastern Europe and North America.



legende

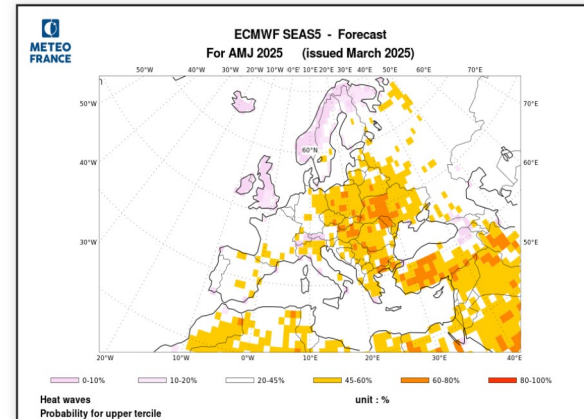
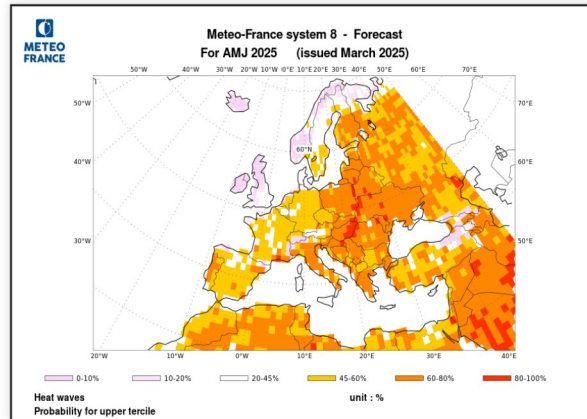
Climatic parameters : temperature over Europe

Warm anomalies over maritime areas were well forecast. Over continental Europe, warm anomalies dominate overall and have been anticipated. However, near-normal or colder conditions over the eastern part of Europe and west Russia were not seen by no model.



ECMWF analysis top left, synthetic forecast map top right. Forecast for multi-system, MF-S8 and SEAS5 on the bottom line.

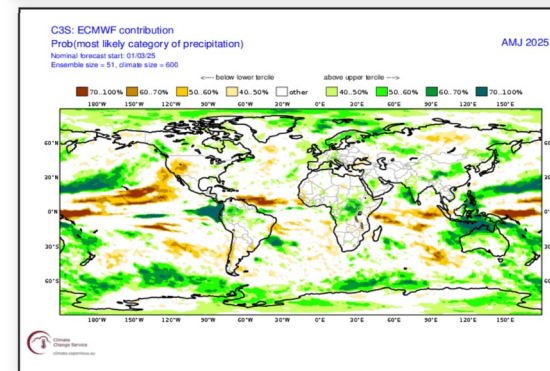
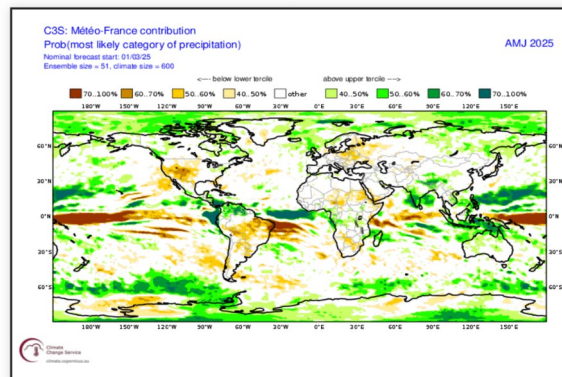
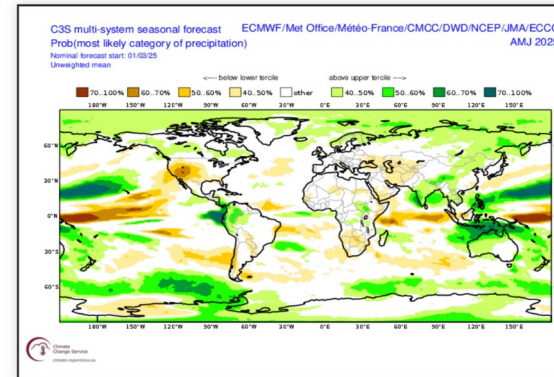
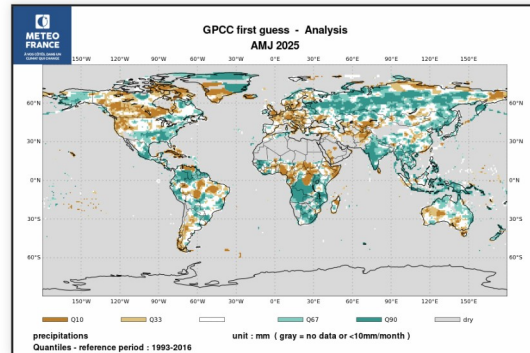
Climatic parameters : Temperatures - Heat wave



Climatic parameters : Precipitations over the globe

In the inter-tropical zones, the wet signal forecast by the models over the Maritime Continent, north Australia and India is confirmed by analysis, except South of Africa.

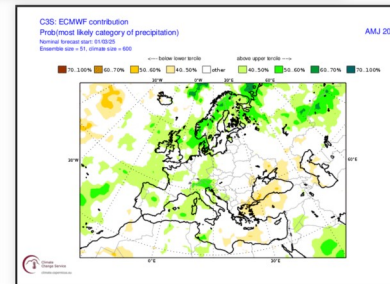
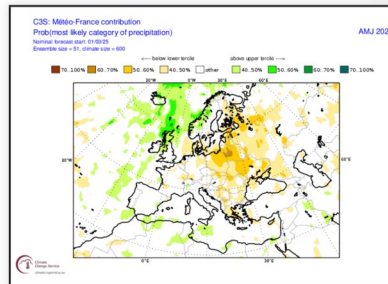
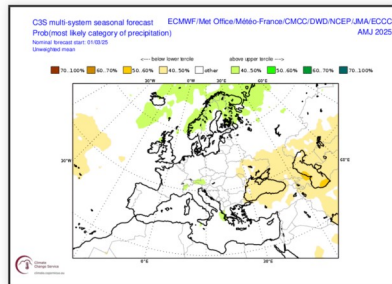
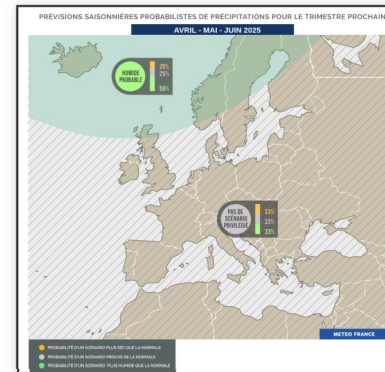
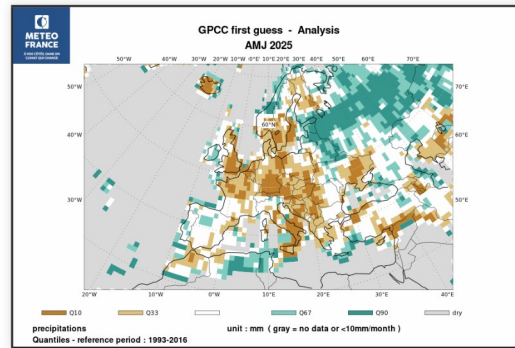
In the Northern Hemisphere, forecasts for western North America are not correct. The wet anomaly over Russia is suggested by the models, but positioned too far north.



Standardized Precipitation Index analysed by IRI top left, forecast for multi-model top right and MF-S8 and SEAS5 on the bottom line.

Climatic parameters : Precipitations over Europe

In line with the discrepancies between analysis and forecast of atmospheric circulation over Europe, the forecast wet anomaly is positioned too far north. Note that ECMWF suggested a weak signal over western Russia.



Precipitation anomalies analysed by IRI (top left). Synthetic forecast map for precipitation (top right) and forecast for multi-model, MF-S8 and SEAS5 (on the bottom line).

General summary : for the period AMJ 2025

1) Oceans :

The main SST anomalies predicted by the models are validated by analysis.

2) Large scale atmospheric circulation :

VP 200 hPa : Updrafts over the Maritime Continent were well forecast. On the other hand, downdrafts from Brasil to the Atlantic Ocean and Africa were not predicted.

SF 200 hPa : The models correctly anticipated the dipole over the western Pacific Ocean. However, the dipole forecast between the Indian and Atlantic Oceans was not reflected in the analysis.

Over Europe, the positive circulation anomaly over Great Britain was not forecast.

Z500 :In the Southern Hemisphere, anomalies around South America are correctly forecast.

In the Northern Hemisphere, the negative anomaly over Canada was not forecasted. The negative anomaly over western Russia was not anticipated either..

3) Climatic parameters over Europe :

Temperatures : The warmer-than-normal conditions forecast are confirmed by analysis over a very large part of Europe, except over the eastern part.

Precipitations : The zone with a wetter-than-normal scenario is found in the analysis, but in a more northerly position, due to the negative Z500 western Russia.