



VERIFICATION BULLETIN

JUNE - JULY - AUGUST 2025



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Introduction : Objective

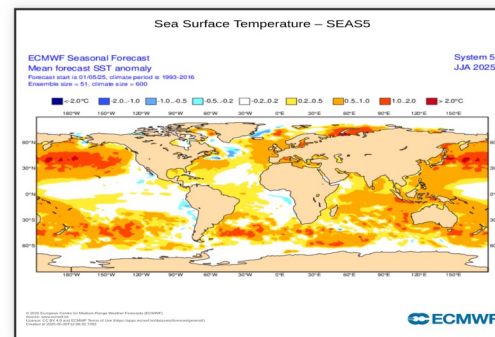
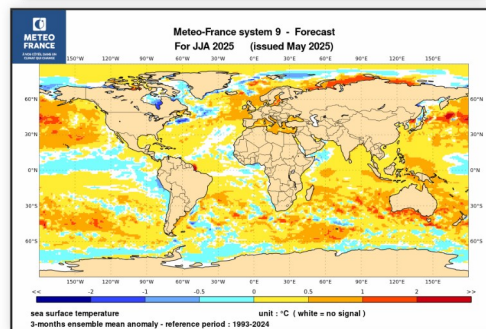
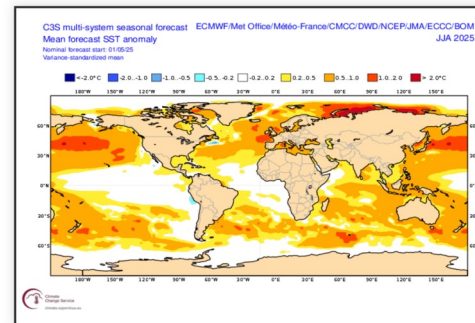
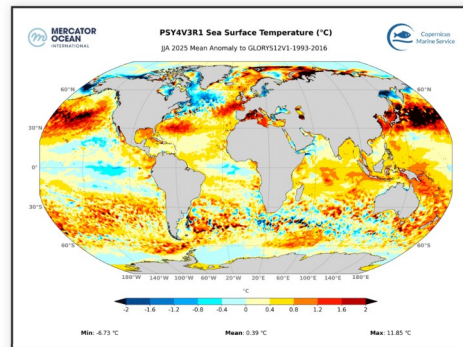
- The objective of the Seasonal Verification Bulletin is to present an evaluation of the main elements highlighted in the Seasonal Forecast Bulletin : oceanic forcings, large scale circulation patterns, and a focus on temperature and precipitation forecast over Northern Atlantic, Europe and the Mediterranean 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 whereas the weak cold equatorial anomaly hasn't been predicted by MF9. In the far north we can notice that the strong cold coastal anomaly was forecasted by no model.

In the Indian Ocean the weak positive anomaly was well anticipated.

In the Atlantic Ocean, the weak cold anomaly around equator was underestimated by all models, as well as the strong cold anomaly in the Labrador current.

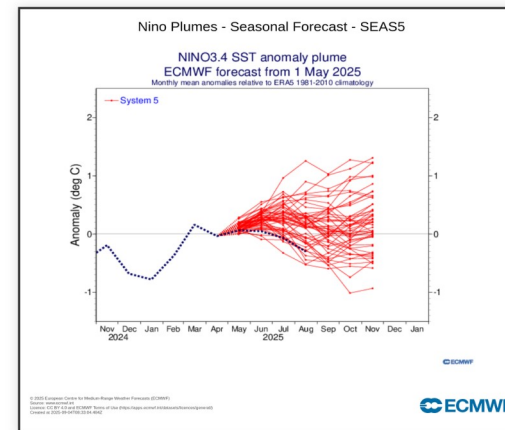
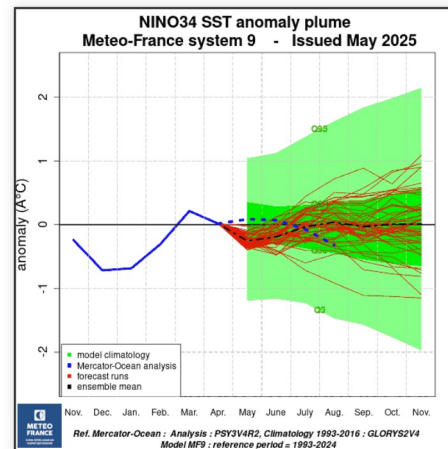


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S8 (bottom left) and SEAS5 (bottom right)

Oceans : ENSO

CAUTION : reference analyses differ between MF-S9 (Mercator-Ocean 1993-2024) and ECMWF-SEAS5 (NCEP 1981-2010).

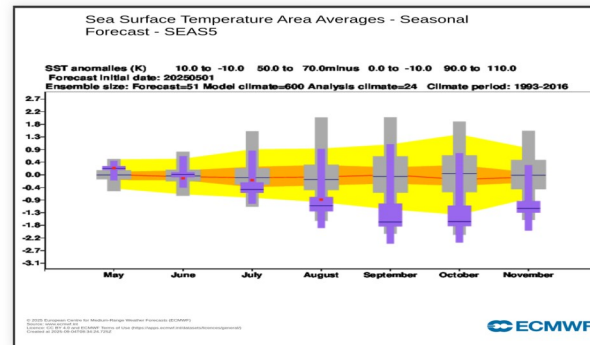
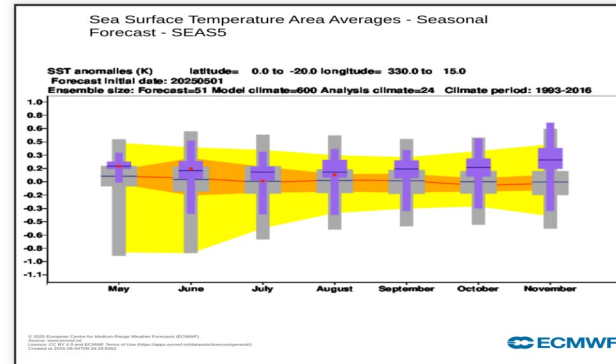
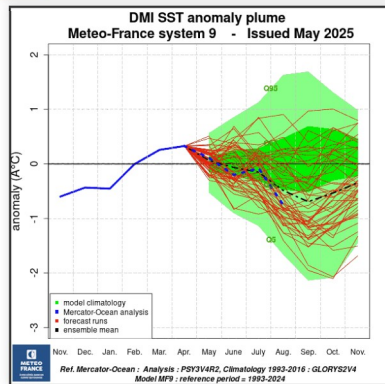
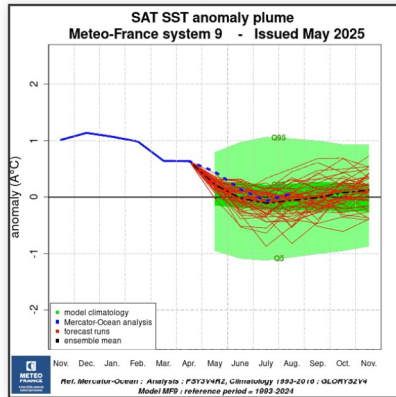
Neutral phase of ENSO well forecasted by the coldest runs of SEAS5, MF9 was really too cold at the beginning.



Oceans : tropical Atlantic and Indian Ocean index

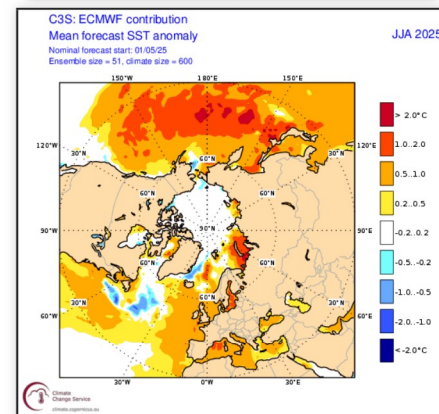
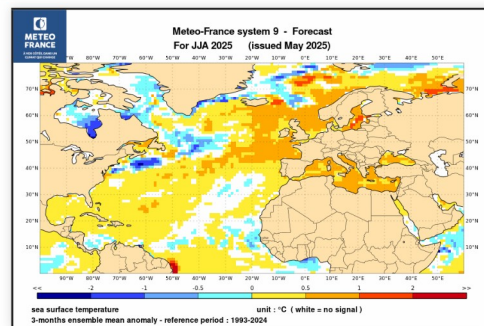
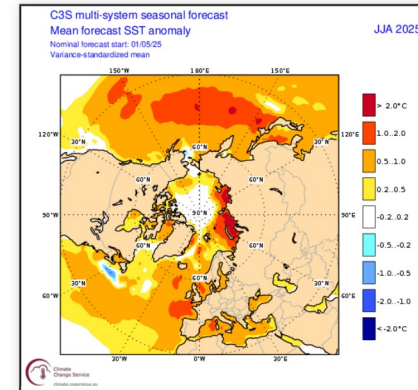
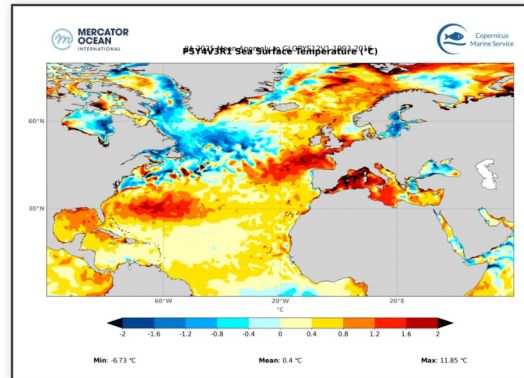
SAT : Neutral conditions well anticipated by SEAS5, and by the warmest runs of MF9.

DMI : DMI becomes negative, as expected .



Oceans : North Atlantic SST

The strong warm anomalies in the vicinity of Europe were more or less well predicted by models, particularly SEAS5, but the cold anomalies over the Black Sea, Aegean Sea, and the Baltic Sea was not anticipated. Moreover, they underestimated the warm anomaly around 30°N, and the cold anomaly south of Greenland.

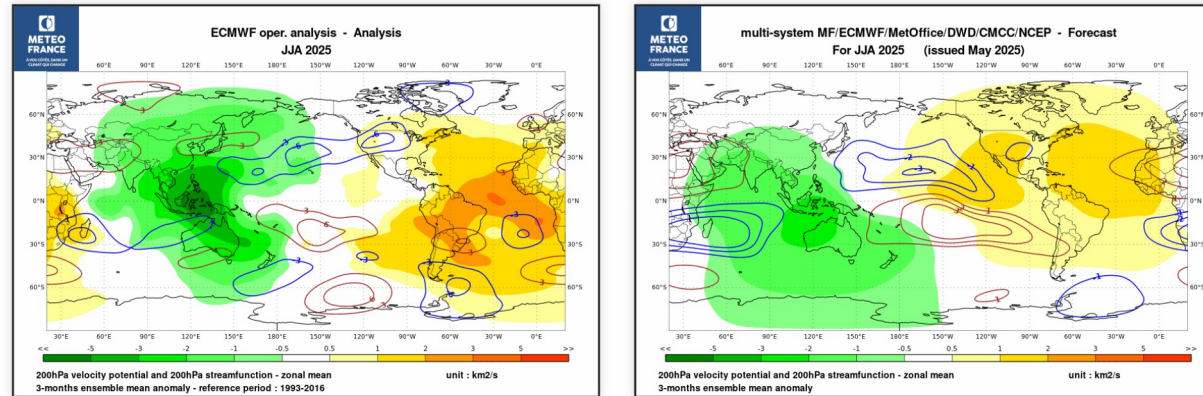


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S8 (bottom left) and ECMWF SEAS5 (bottom right)

Atmospheric circulation : Global teleconnection

VP : The ascending anomaly over Maritime continent was well predicted but located a bit too west, as well the descending anomaly over Atlantic Ocean. Descending anomaly over south of Africa hasn't been anticipated.

SF : The Pacific Ocean dipole and Indian Ocean dipole are lightly visible on reanalysis, but without African extension and no teleconnections.

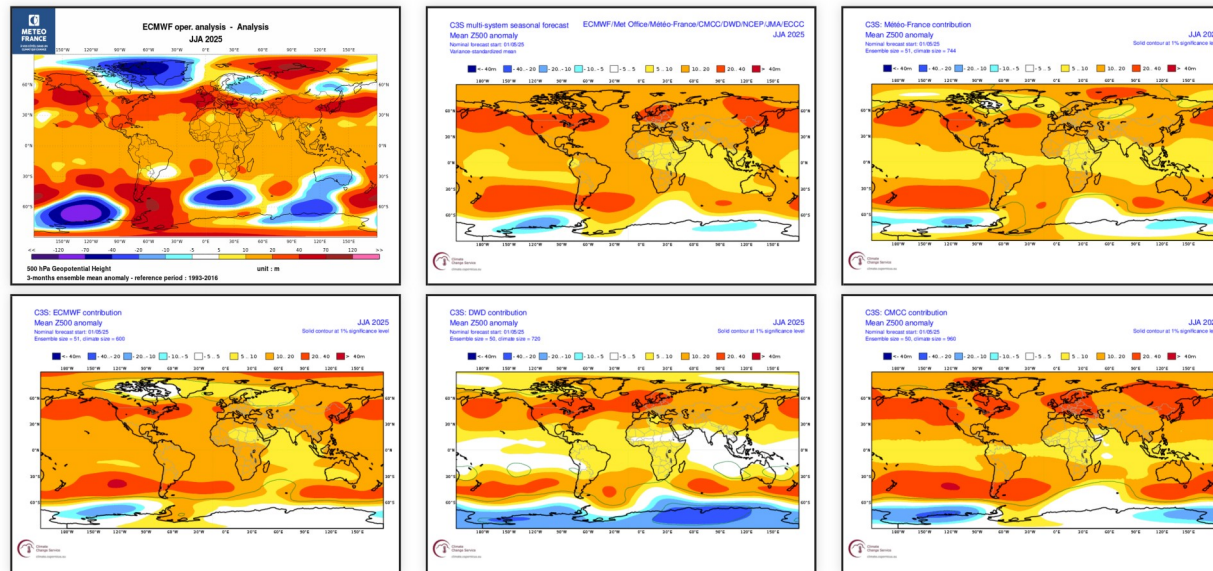


ECMWF analysis (left) and multi-model (right) for 200hPa velocity potential anomalies (color green : ascending, orange: subsidence) and stream function anomalies (isolines, red: anticyclonic in the northern hemisphere, blue: cyclonic in the northern hemisphere).

Atmospheric circulation : 500hPa Geopotential height

Southern Hemisphere : Negative anomalies over south Pacific Ocean, South of Africa and south of Australia was underestimated by all models, and not forecasted by SEAS5.

Northern Hemisphere : Positives anomalies from Canada to Europe and central Asia were well forecasted by all models. Negative anomalies over Greenland and Baltic Sea were suggested only by SEAS5 and MF9. Negative anomaly over Japan was anticipated by no model.

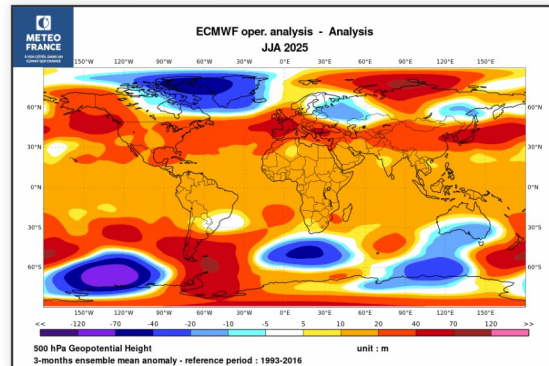


ECMWF analysis, C3S multi-system, MF-S8, ECMWF-SEAS5, CMCC and DWD 500hPa geopotential height anomalies.

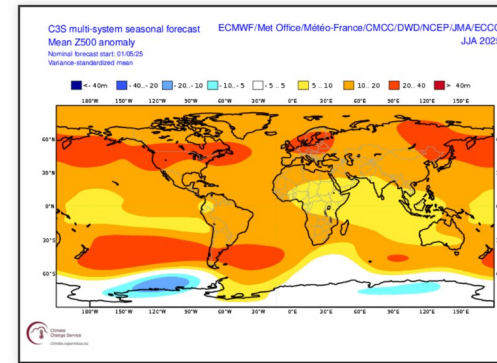
Atmospheric circulation : Atmospheric circulation

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

Northern Hemisphere : Only positive anomalies were anticipated.

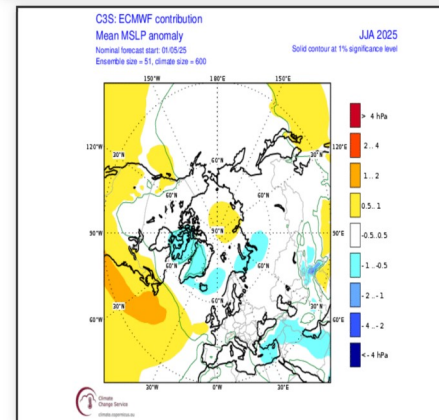
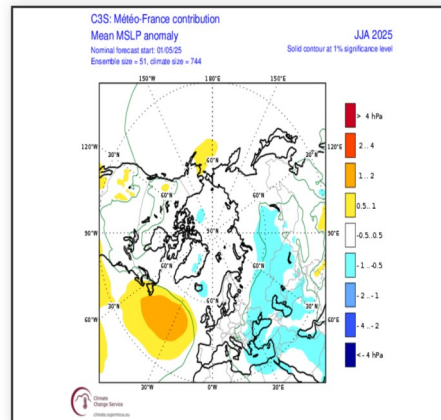
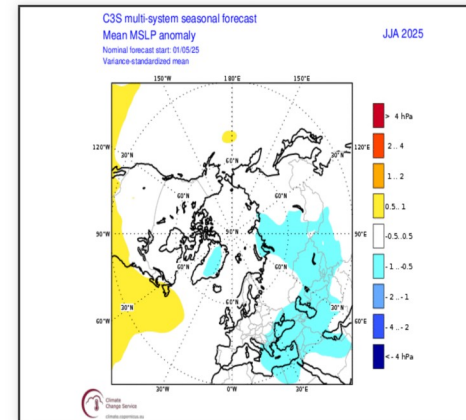
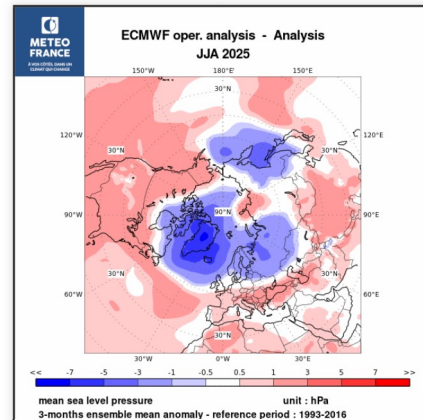


ECMWF analysis and C3S multi-system for 500hPa geopotential height anomalies.



Atmospheric circulation : MSLP

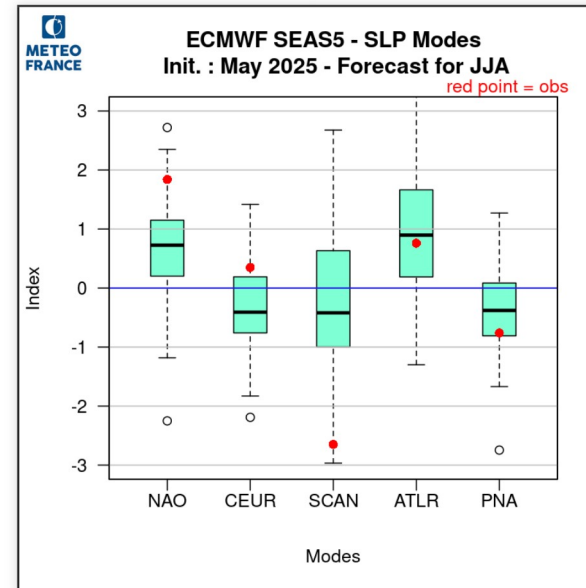
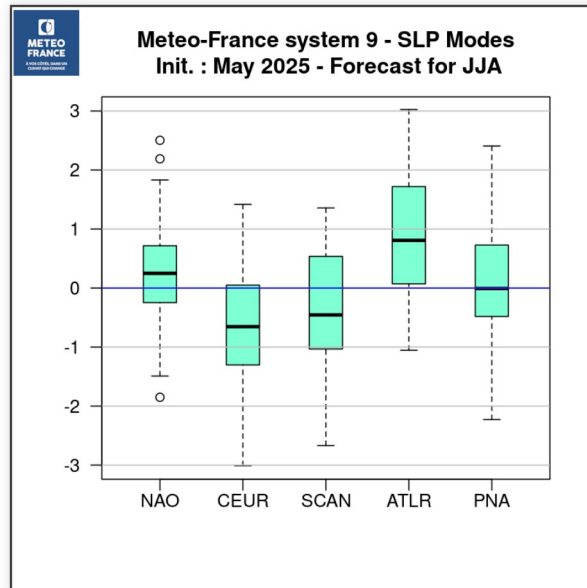
The anomalies from Greenland to Atlantic ocean were well predicted by all models particularly SEAS5. Elsewhere the anomalies patterns have not been forecasted at all.



Analysis and multi-system C3S forecast MSLP anomalies (top), M^F-S^B and ECMWF-SEAS5 MSLP anomalies (bottom)

Atmospheric circulation : Verification SLP Modes

All modes has been coorrectly predicted by both models, except positive CEUR. SEAS5 was à bit better with positive NAO and negative PNA.

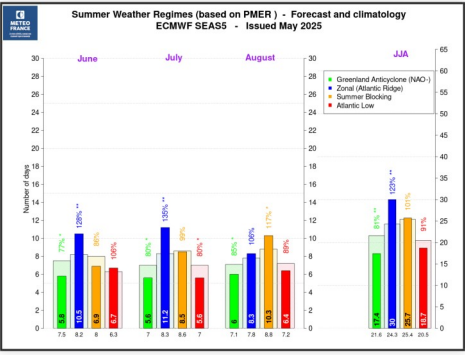
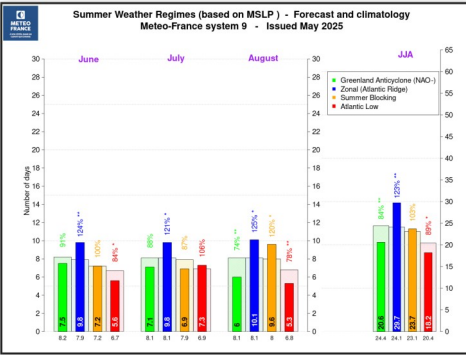
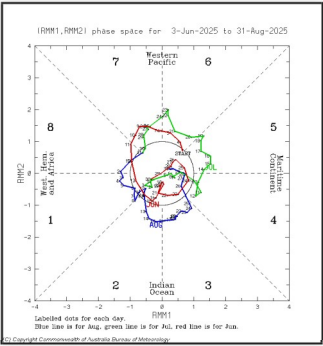
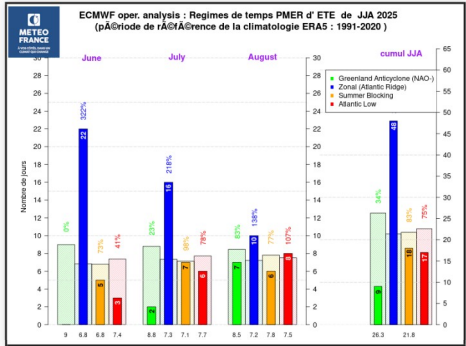


SLP modes of variability : MF-S8 and ECMWF-S5 forecasts -- red point = ERA5 reanalysis

Atmospheric circulation : Summer SLP weather regimes

In the analysis, zonal is over-represented while Greenland anticyclone is under-representated.

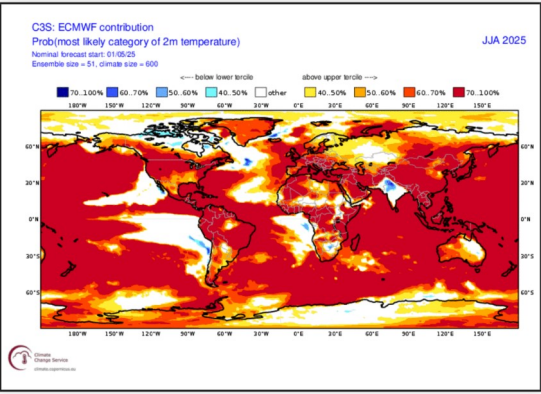
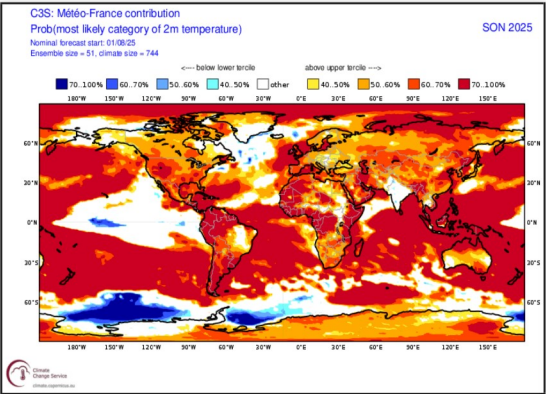
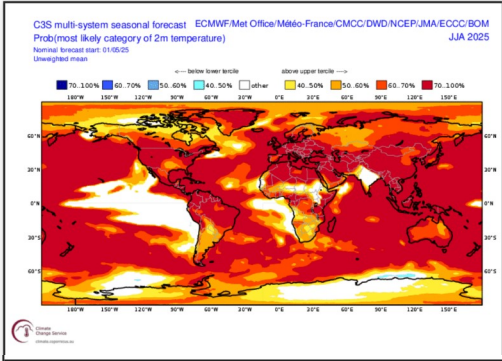
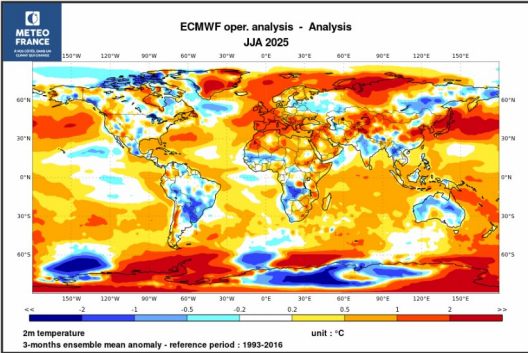
This signal was well forecasted both models.



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

Climatic parameters : temperature on the globe

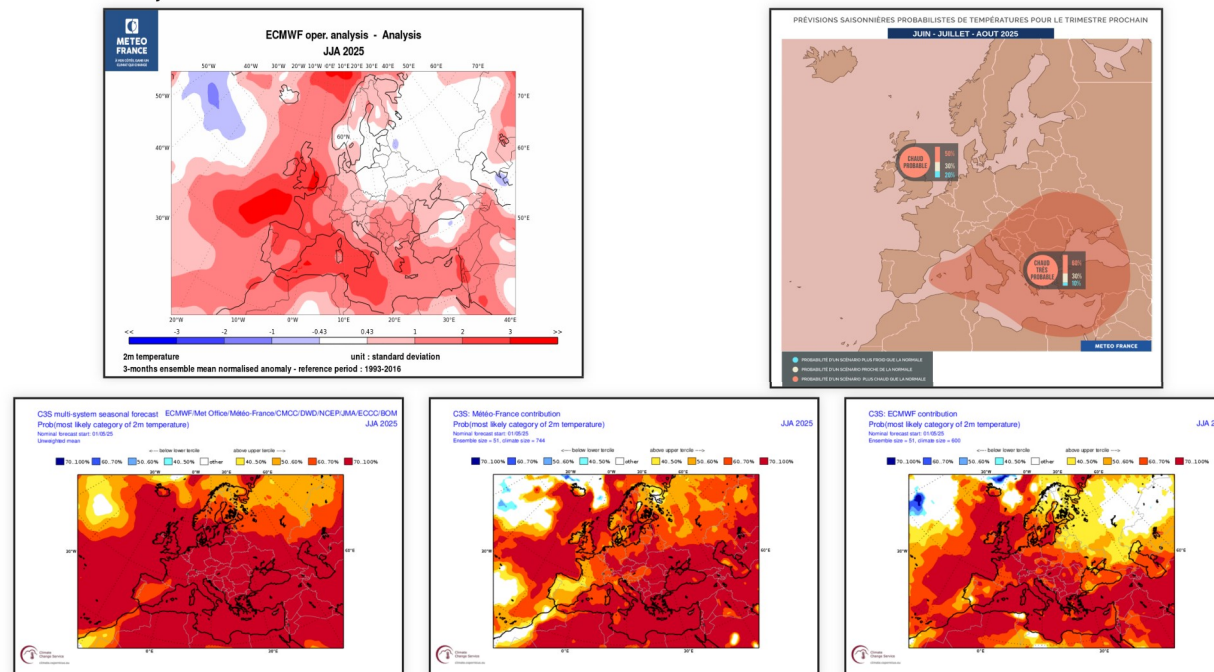
Warm anomalies dominate.
Some cold anomlies hasn't been predicted at all, over North and South America, from China to Australia, and over estern Russia.



legende

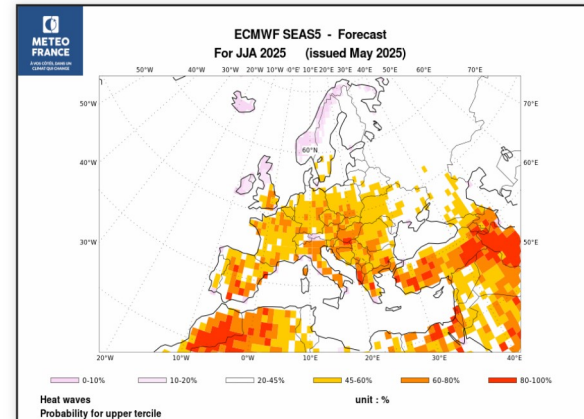
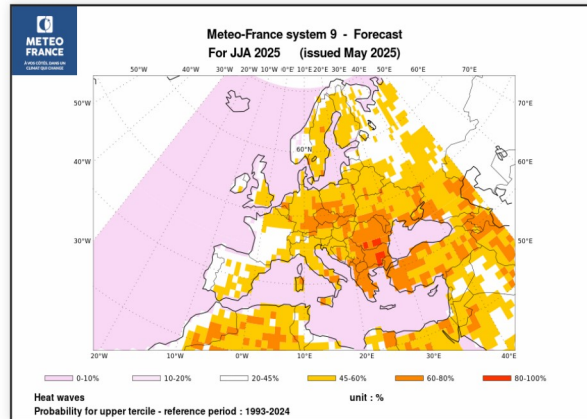
Climatic parameters : temperature over Europe

Warm anomalies over Western Europe and Mediterranean Sea were well forecasted. Cold anomaly over west of Iceland as well as near normal conditions over eastern Europe has been predicted too. However, near-normal or colder conditions over Black sea and Turkey was not seen by all models.



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

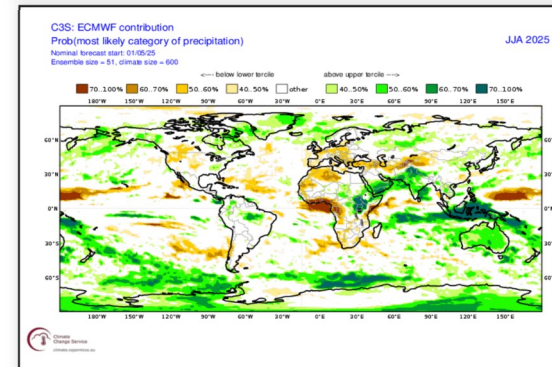
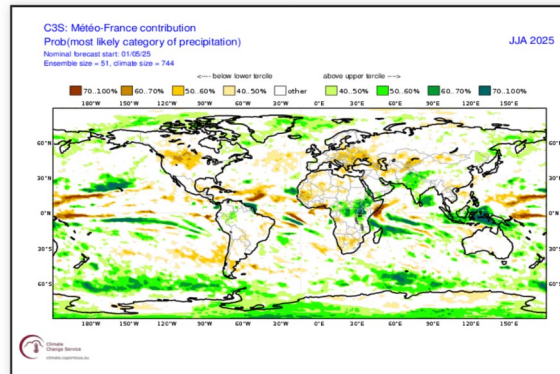
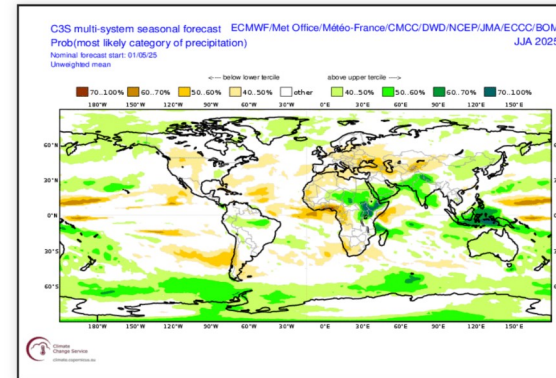
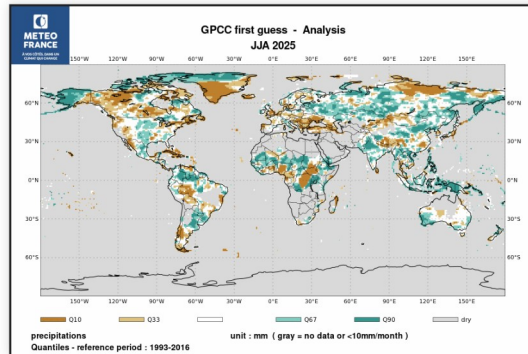
Climatic parameters : Temperatures - Heat wave



Climatic parameters : Precipitations over the globe

In the inter-tropical zones, the wet signal forecast by the models over the Maritime Continent and India is confirmed by analysis. The dry anomaly over central Africa was not anticipated.

In the Northern Hemisphere, forecasts for America are correct. The wet anomaly over Russia is not suggested by the models.

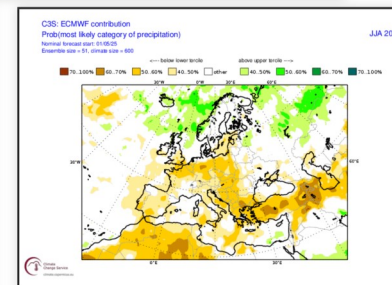
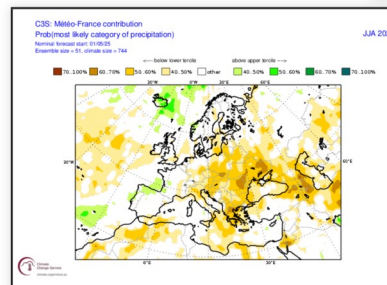
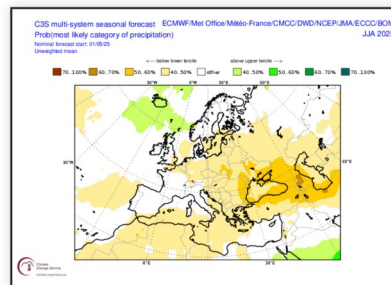
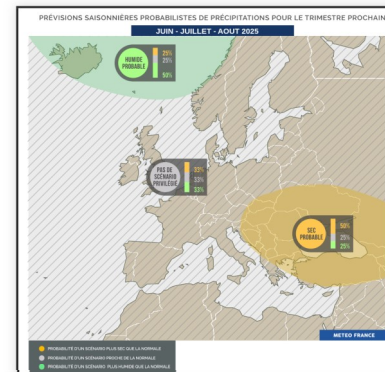
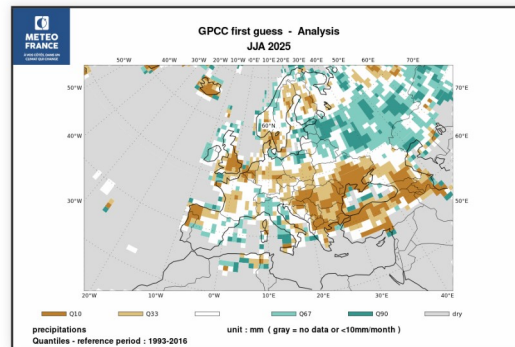


Standardized Precipitation Index analysed by IRI top left, forecast for multi-model top right and MF-S8 and SEAS5 on the bottom line.

Climatic parameters : Precipitations over Europe

The dry signal all around Black Sea was well predicted. Wet conditions from eastern Europe to western Russia was only forecasted by SEAS5.

Dry conditions over Iceland was anticipated by no model.



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 JJA 2025

1) Oceans :

The main SST anomalies predicted by the models are validated by analysis except the cold anomaly over Labrador Sea, which was underestimated by all models.

2) Large scale atmospheric circulation :

VP 200 hPa : Updrafts over the Maritime Continent and downdraft over Atlantic Ocean were well forecast but their positions were a bit too west.

SF 200 hPa : The models correctly anticipated the dipole over Pacific Ocean and Africa. However, there is not teleconnections in Northern Hemisphere

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

Z500 : In the Southern Hemisphere, anomalies are correctly forecasted.

In the Northern Hemisphere, only positive anomalies were well anticipated

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 observed precipitation anomalies were quite well forecasted.