

VERIFICATION BULLETIN

JULY - AUGUST - SEPTEMBER 2022

Table of Content

1. Introduction	
1. Objective	3
2. Oceans	
1. surface temperature anomalies	4
2. ENSO	5
3. tropical Atlantic and Indian Ocean index	6
4. North Atlantic SST	7
3. Atmospheric circulation	
1. Global teleconnection	8
2. 500hPa Geopotential height	9
3. Modes of variability	10
4. Modes verification	11
5. Summer SLP weather regimes	12
4. Climatic parameters	
1. temperature on the globe	13
2. temperature over Europe	14
3. Precipitations over the globe	15
4. Precipitations over Europe	16
5. General summary	
1. for the period JAS 2022	17

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.

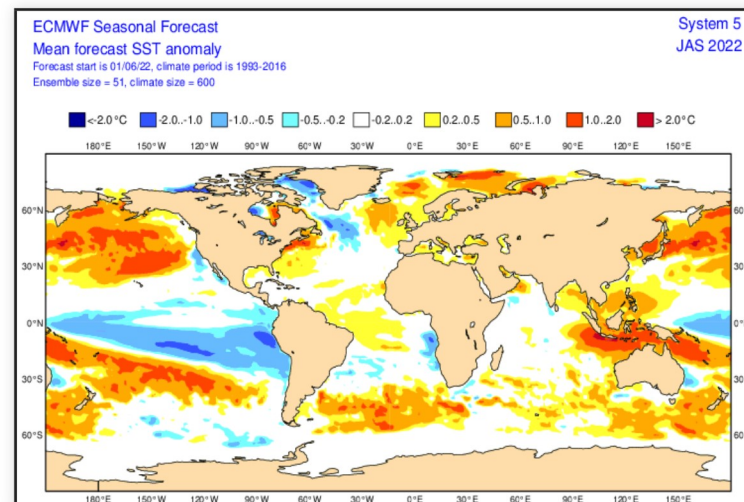
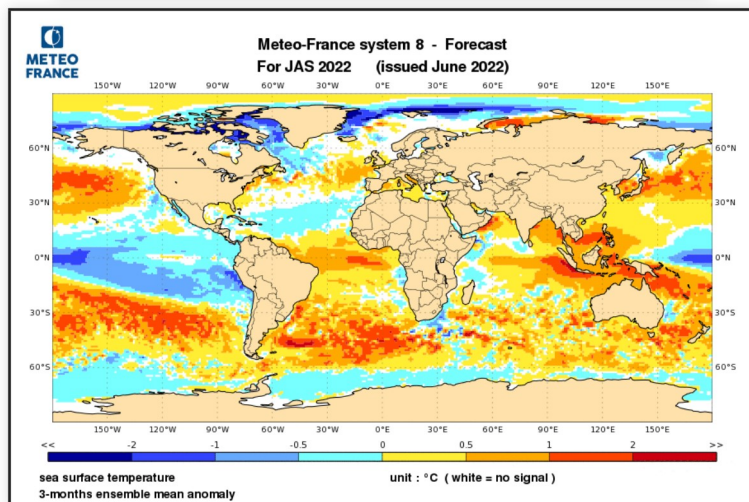
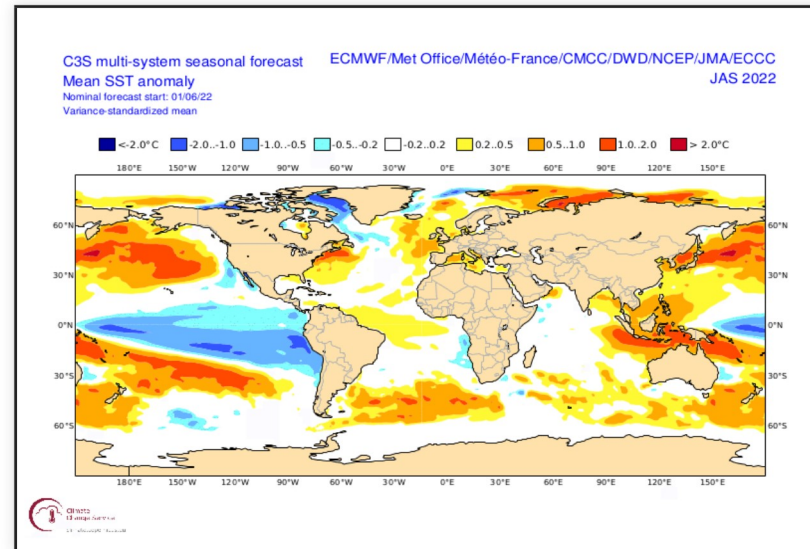
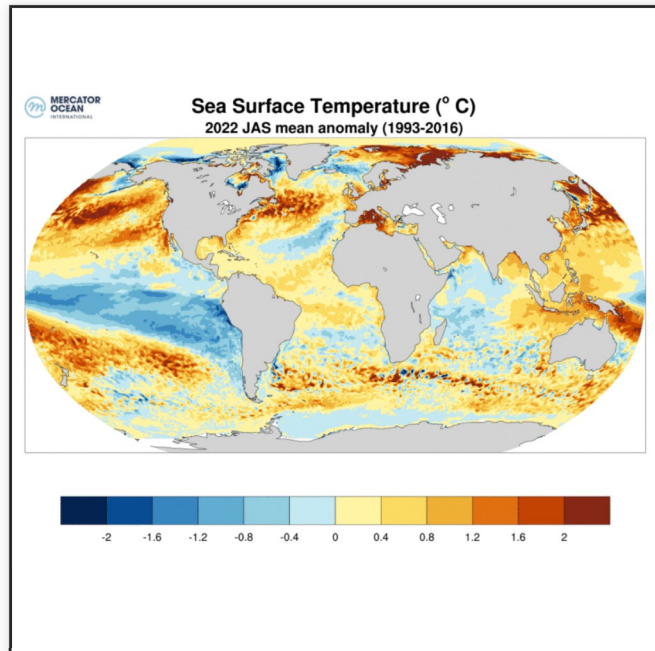
Oceans : surface temperature anomalies

In the Pacific Ocean, the main anomalies, related to "La Niña" and PDO-, are well predicted by both models, both in location and intensity.

In the Indian Ocean, the East/West gradient of SST has been well predicted.

From the South Atlantic to the Equator, the two models did not agree. The multi-model proposal is close to the analysis. In the North Atlantic, the warm/cold dipole is seen by MF-S8 (but not by ECMWF) but not strong enough.

The same is true in the Mediterranean with the strong positive anomaly over the west of the basin.

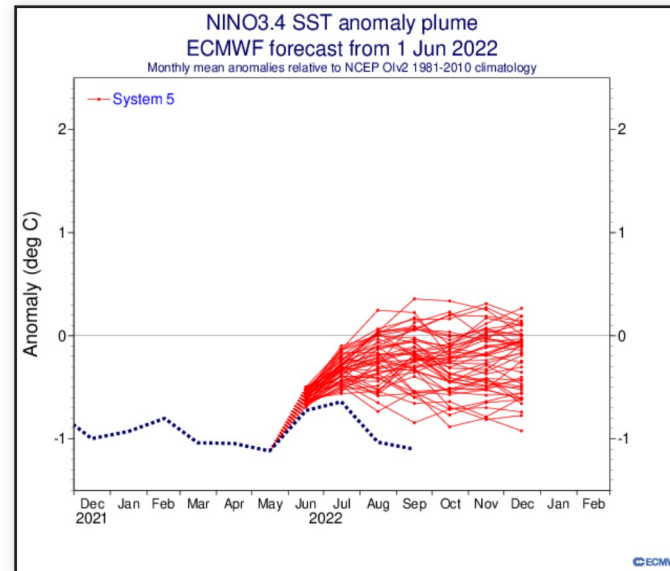
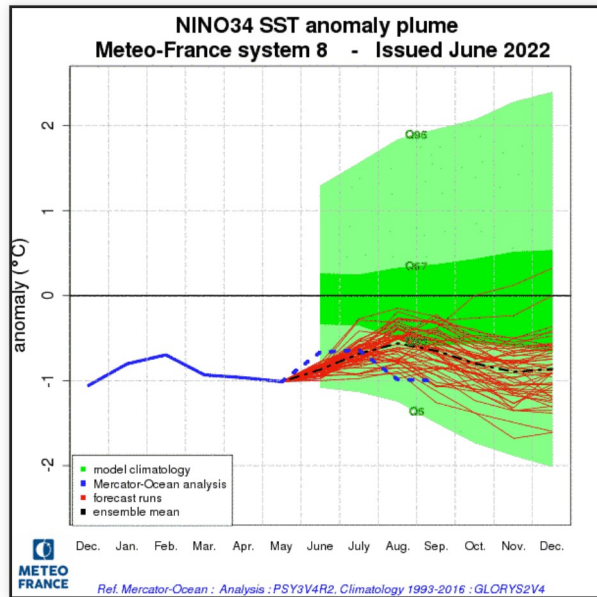


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S8 (bottom left) and SEAS5 (bottom right)

Oceans : ENSO

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

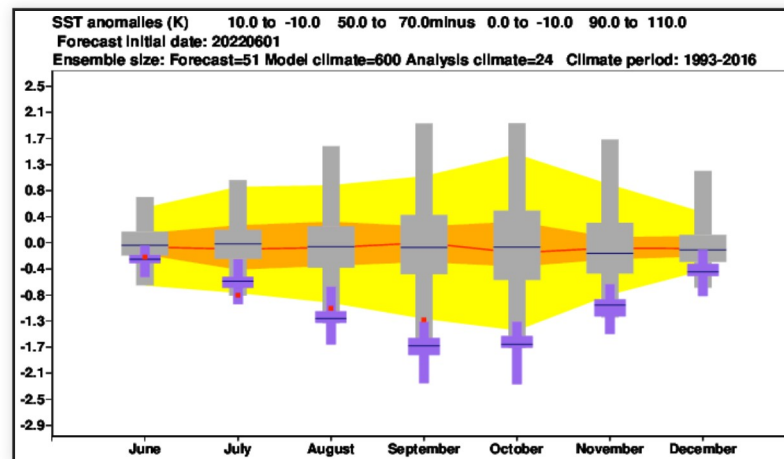
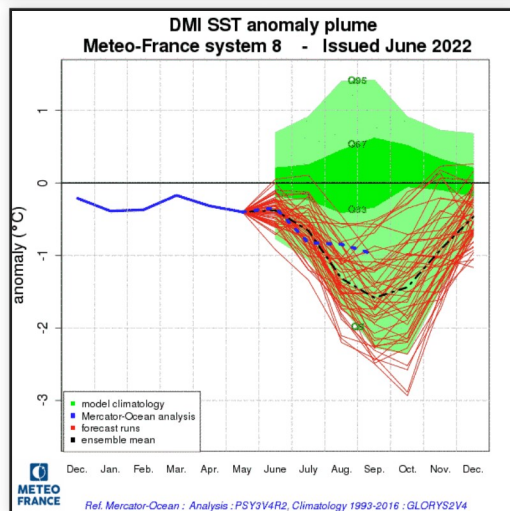
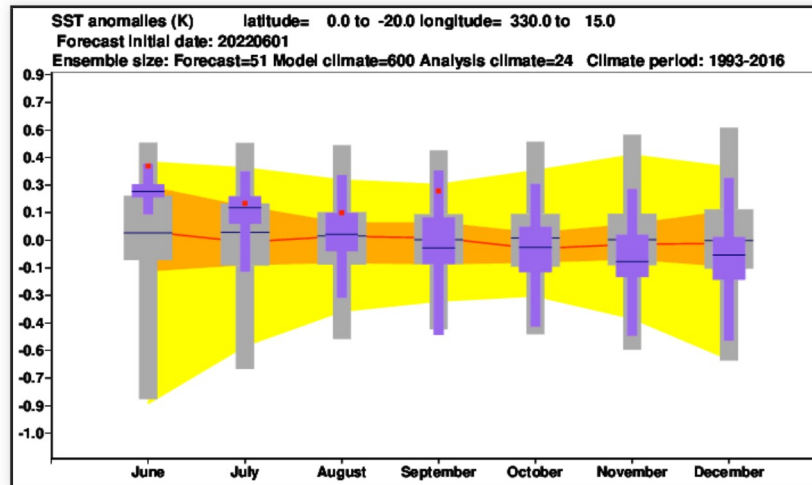
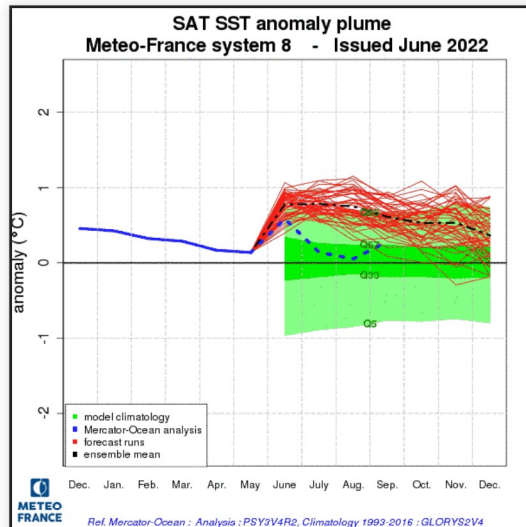
MF-S8 is closer to the analysis while ECMWF warms up too much.



Oceans : tropical Atlantic and Indian Ocean index

SAT: MF-S8 is clearly too hot, while ECMWF is closer to the analysis.

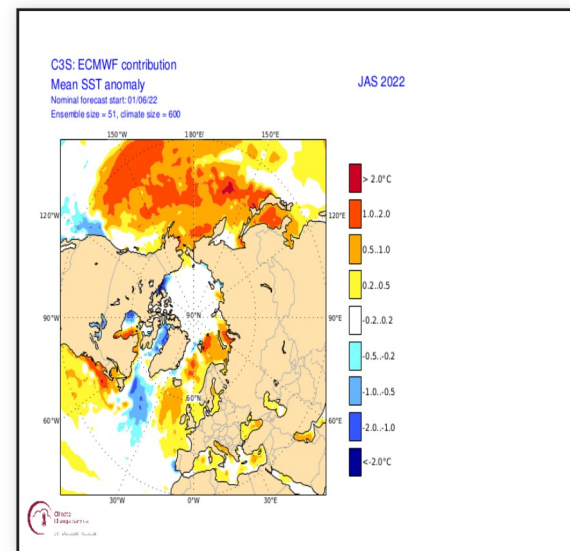
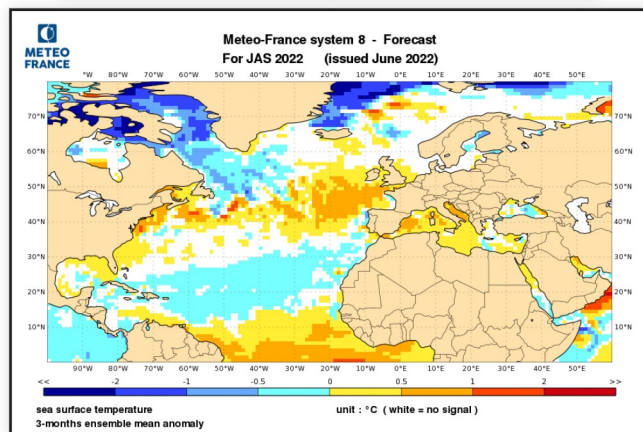
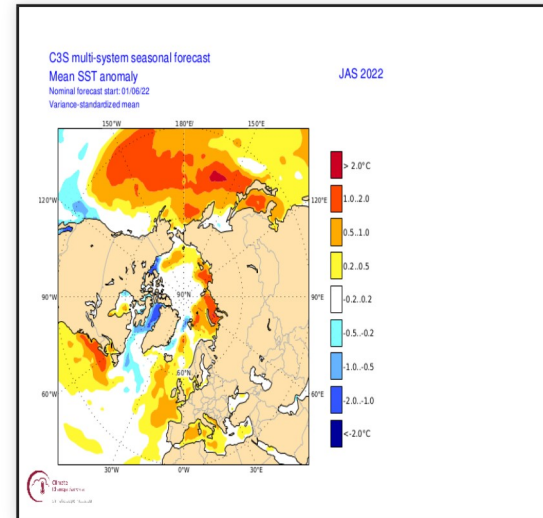
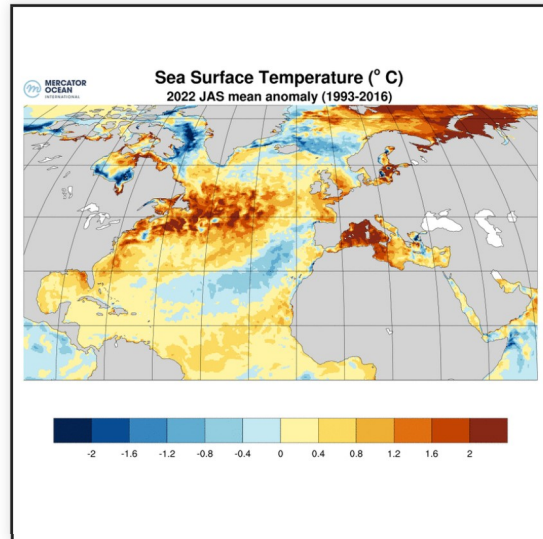
DMI : DMI : les tendances sont bonnes pour les deux modèles.



Oceans : North Atlantic SST

In the North Atlantic, MF-S8 is closer to the analysis than ECMWF in the zoning of anomalies, except for the cold anomaly south of Greenland, which is much weaker in the analysis.

In the same way, in the Mediterranean, MF-S8 has well seen the warm anomaly over the western part of the basin, even if it is much more marked in the analysis.

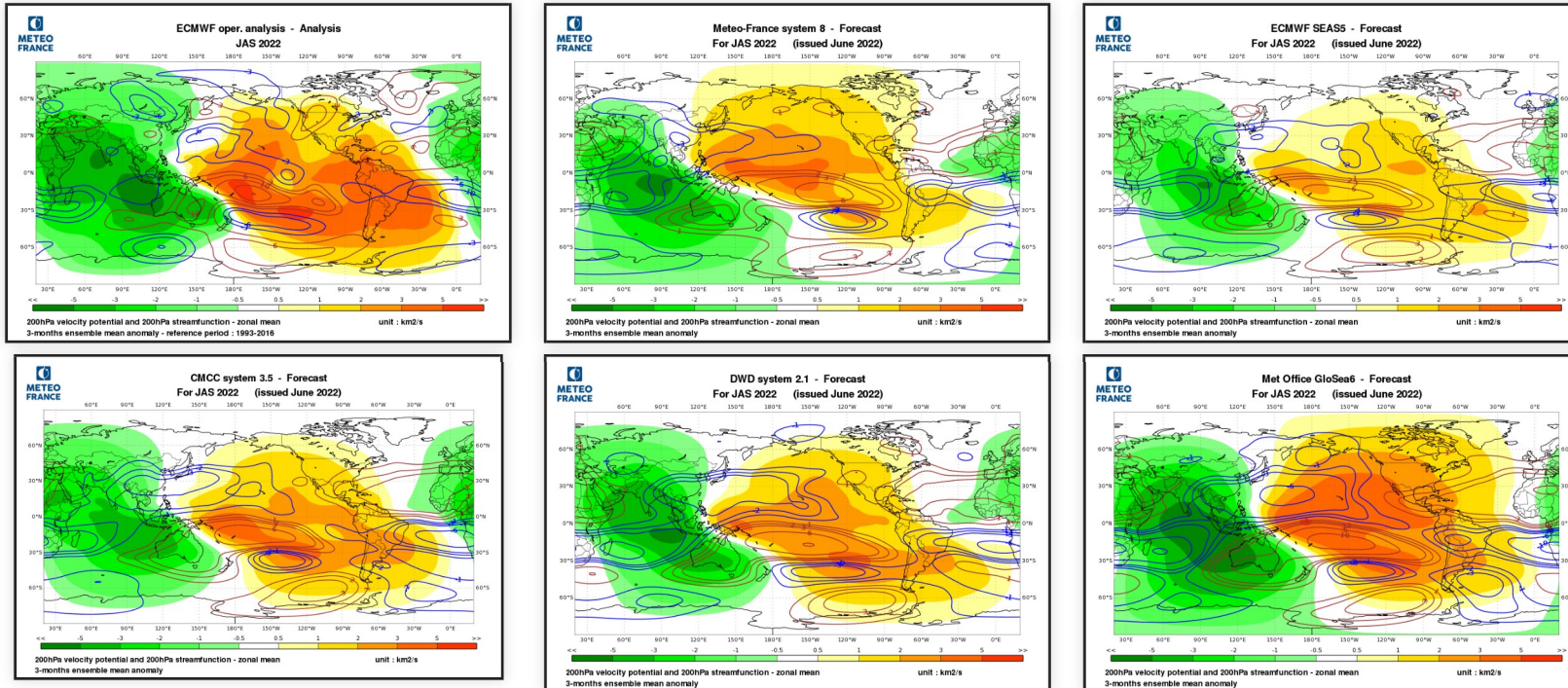


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S8 (bottom left) and ECMWF SEAS5 (bottom right)

Atmospheric circulation : Global teleconnection

VP : The analysis shows a large-scale dipole: downward motion anomaly over the Pacific and the Americas and upward motion anomaly over the Maritime Continent, the Indian Ocean, Asia, Africa and Europe. This pattern, linked to the "La Niña" phase and the negative phase of the IOD, has been very well predicted by all models.

SF : The dipoles around the equator over the Pacific and Atlantic Oceans were well seen by all models. The teleconnections towards North America and Greenland, very visible in the analysis, are sketched by some models. The pattern over the Mediterranean basin is also fairly well represented by the models. ECMWF is the only one to position a cyclonic anomaly over Europe.

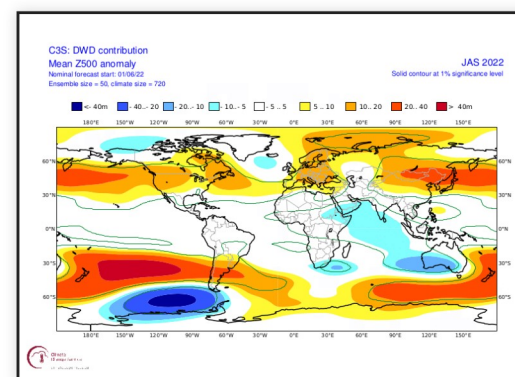
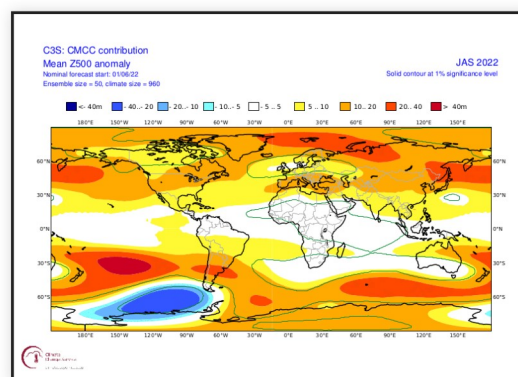
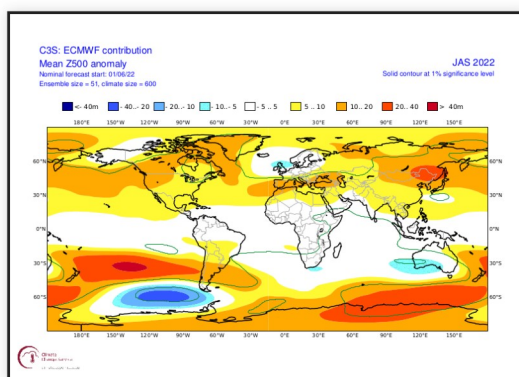
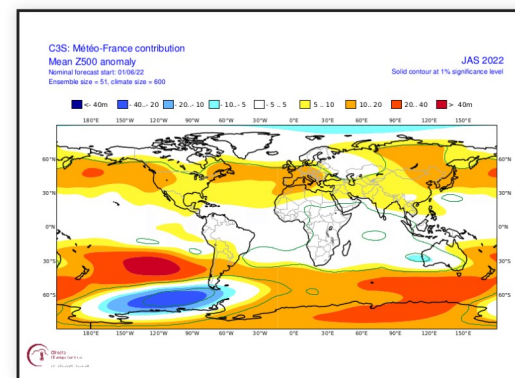
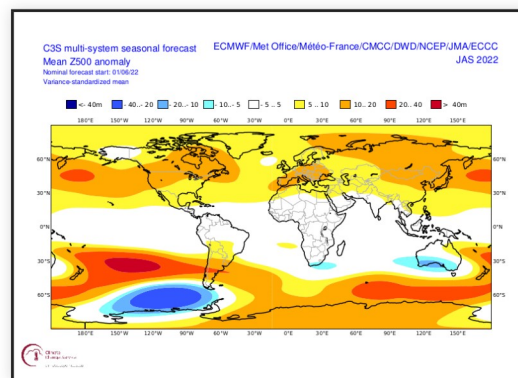
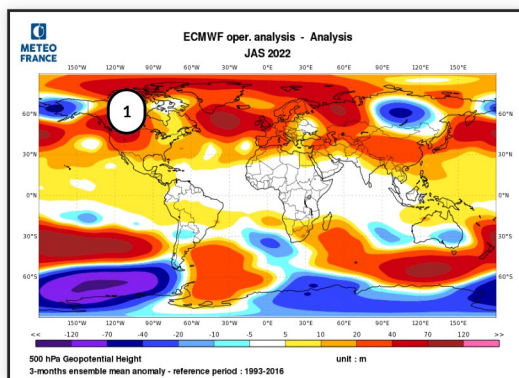


ECMWF analysis, MF-S8, ECMWF-SEAS5, CMCC, DWD and JMA 200hPa velocity potential anomalies (color range, green : ascending, orange: subsidence) and stream function anomalies (isolines, red: anticyclonic in the northern hemisphere, blue: cyclonic in the northern hemisphere).

Atmospheric circulation : 500hPa Geopotential height

In North America, the PNA- pattern forecasted by all the models, linked to "La Niña", is present in the analysis.

From North America to Europe, the multi-model is quite close to the analysis: a positive anomaly from Canada to southern Greenland, another positive anomaly over Europe, and two weaker anomalies across Europe. Only the negative anomaly over eastern Asia was not predicted. MF-S8 is approaching multi-model while ECMWF is proposing a negative anomaly over Western Europe.



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

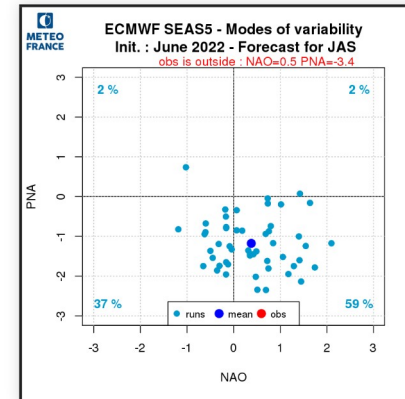
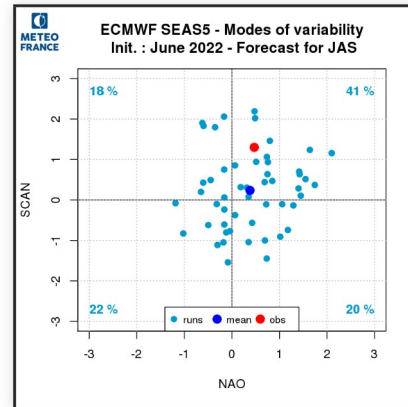
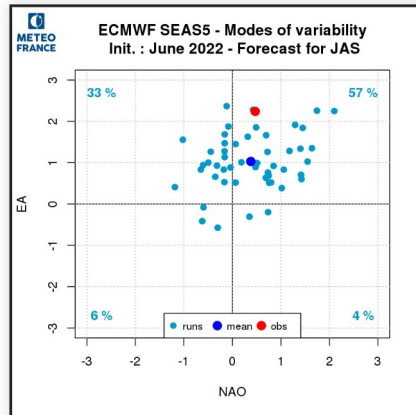
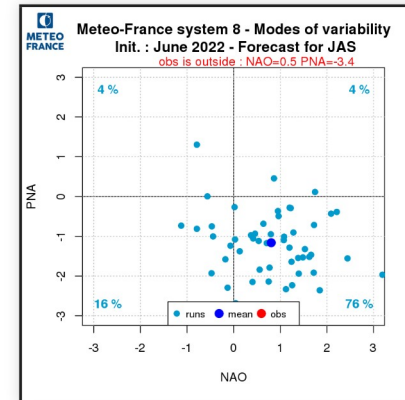
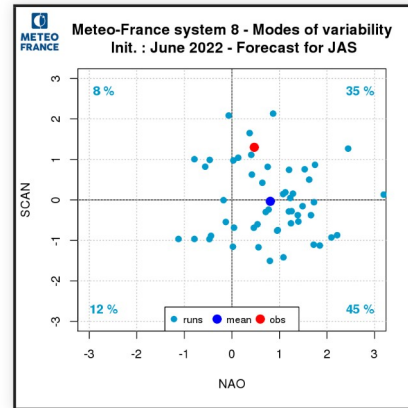
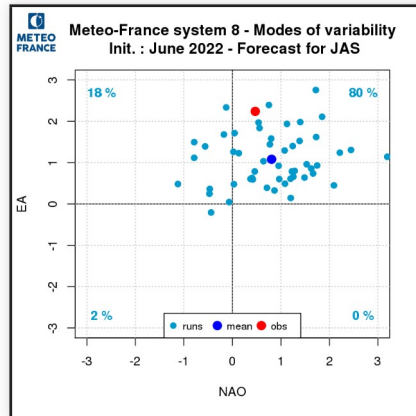
1 - Look like PNA -

Atmospheric circulation : Modes of variability

Both models underestimated the index values for all modes except the NAO mode.

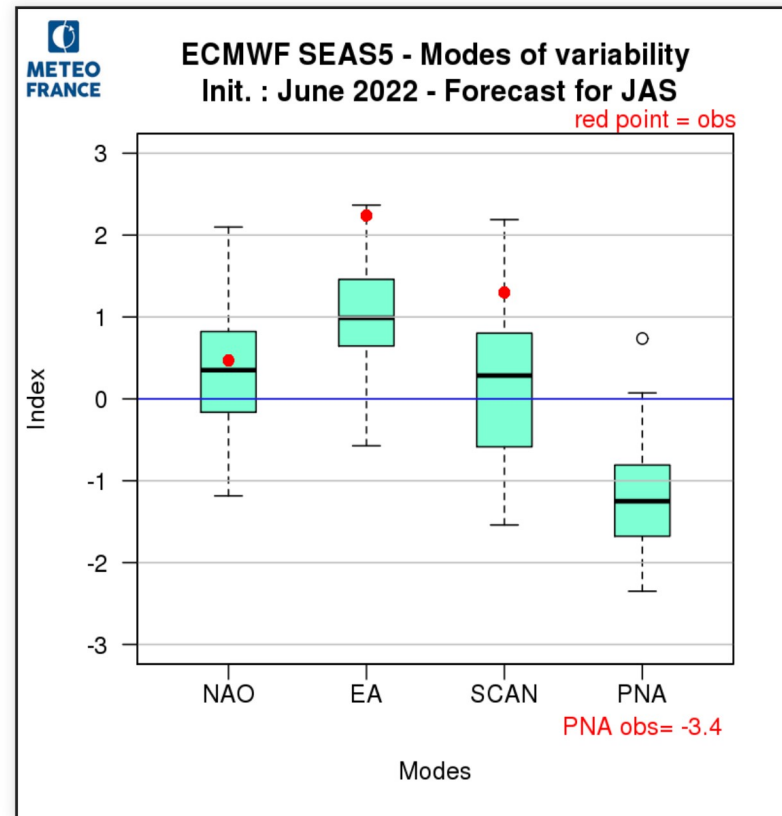
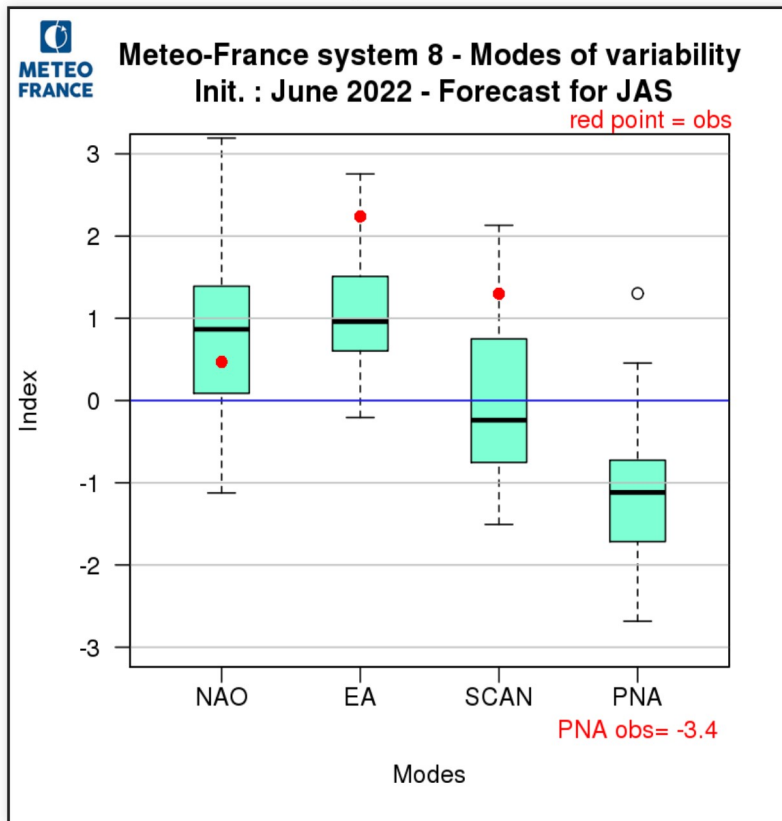
However, the trends were correct with PNA- (very strong index at analysis, less than -3), NAO+ and EA- modes.

For the SCAN mode, the models were close to neutral while the index is clearly positive on analysis.



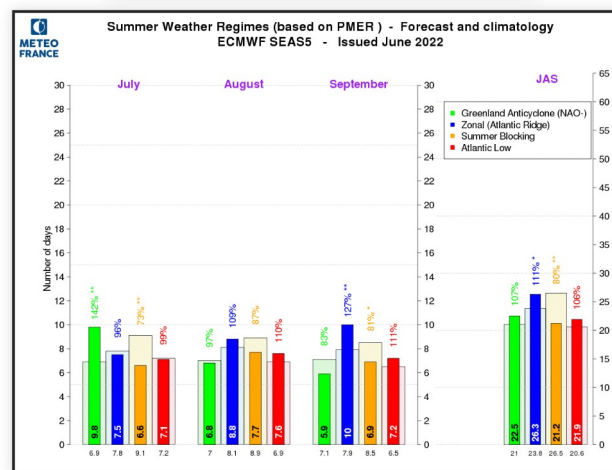
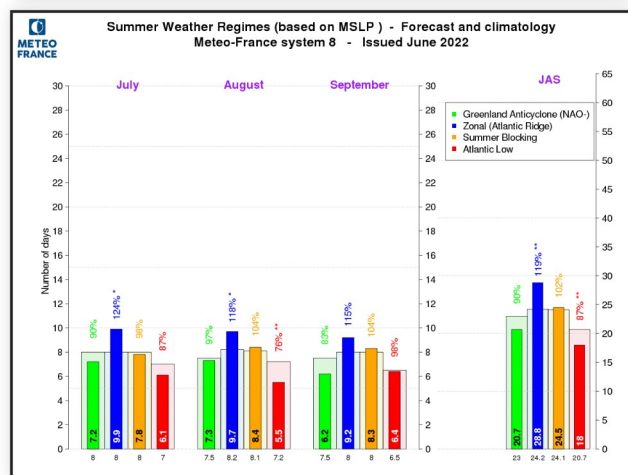
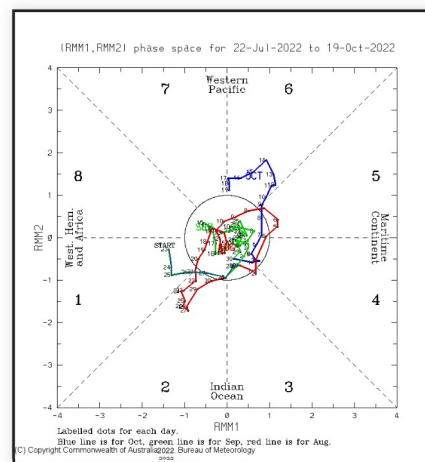
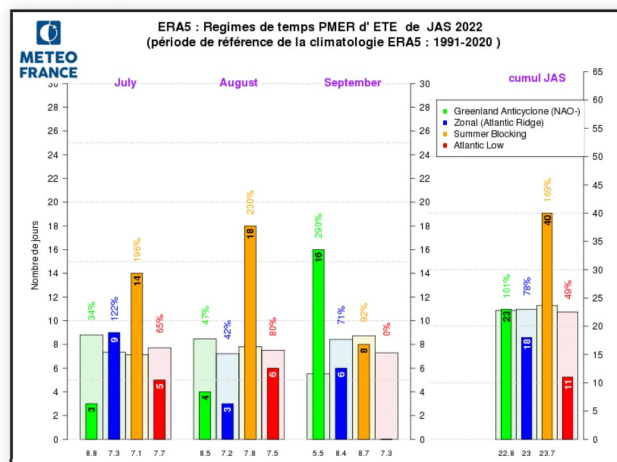
Atmospheric circulation : Modes verification

Same observation as for the previous slide



Atmospheric circulation : Summer SLP weather regimes

Because of the months of July and August, the "Summer Blocking" regime clearly dominates over the quarter, which was not suggested by any model

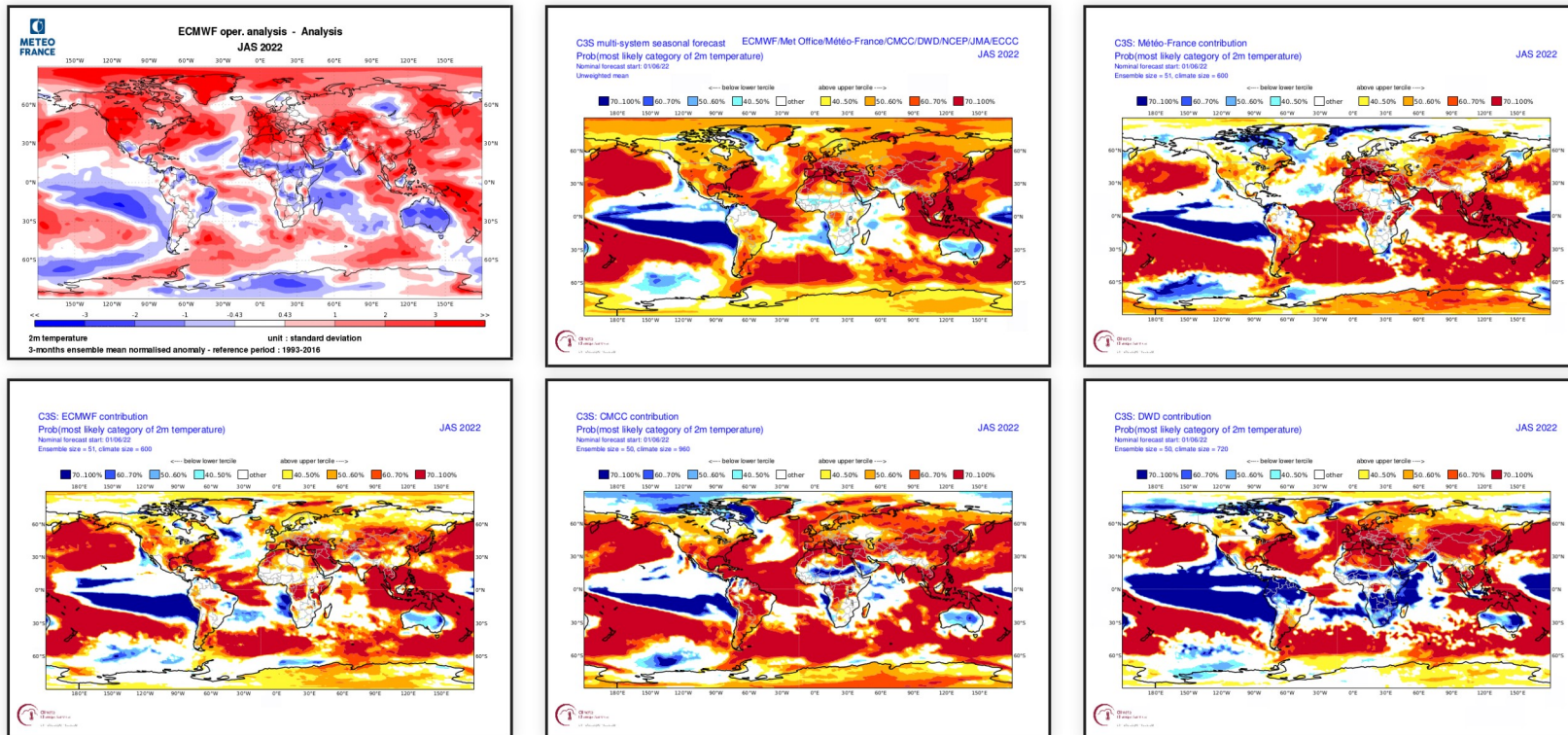


weather regime : ECMWF analysis top left, MF8 and ECMWF forecasts at the bottom. MJO phase top right

Climatic parameters : temperature on the globe

In North America, the pattern of warm anomaly was underestimated.

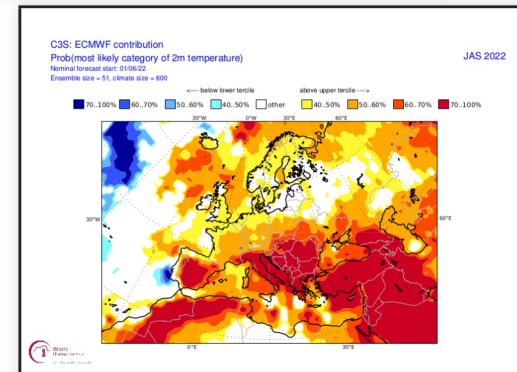
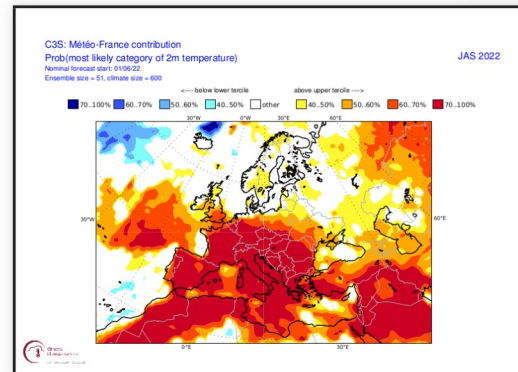
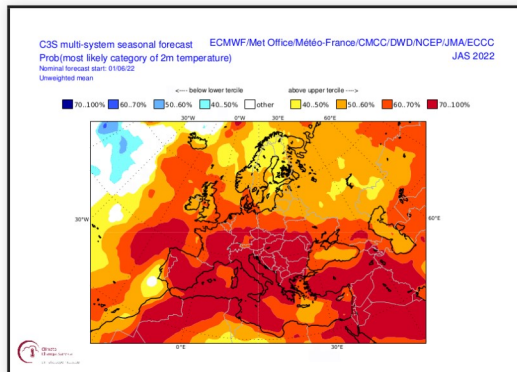
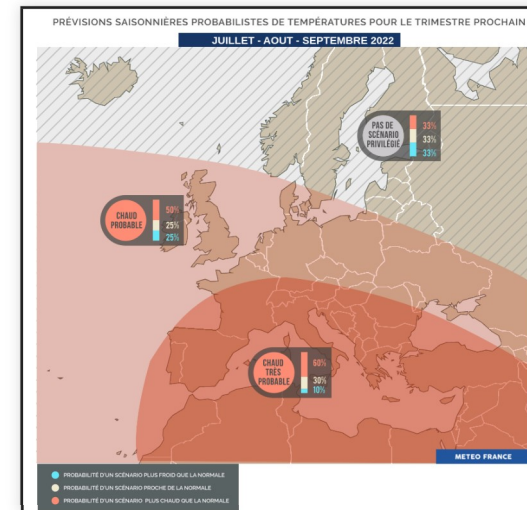
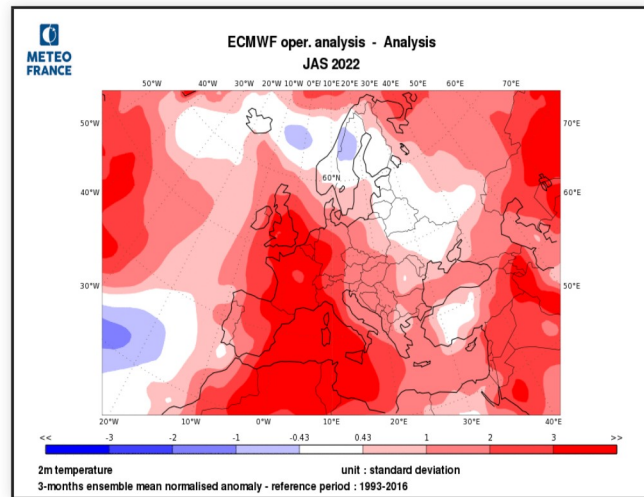
Most models, except ECMWF, predicted high probabilities of warm tercile over Western Europe and little or no signal over Western Russia, which is reflected in the analysis. On the other hand, the cold anomaly over eastern Russia has not been seen.



ECMWF analysis top left, forecast for multi-model top center and forecast for MF-S8 top right, ECMWF-SEAS5, CMCC, DWD on the bottom line.

Climatic parameters : temperature over Europe

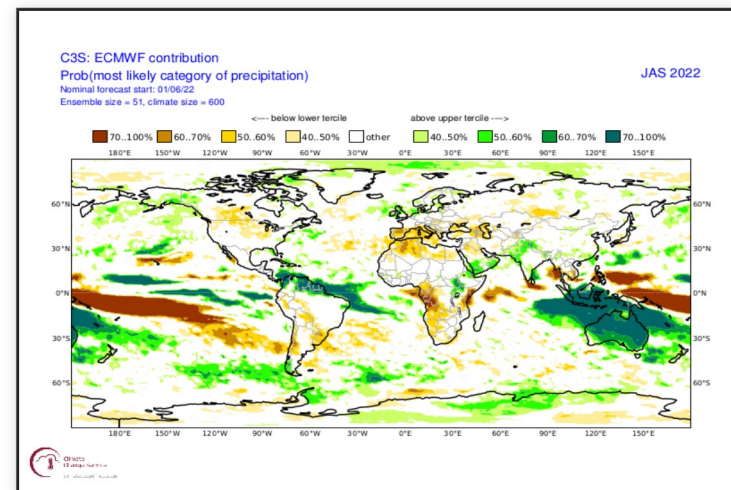
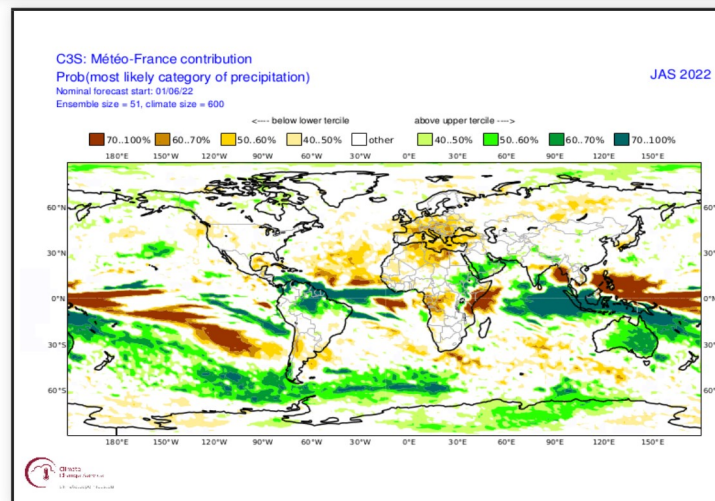
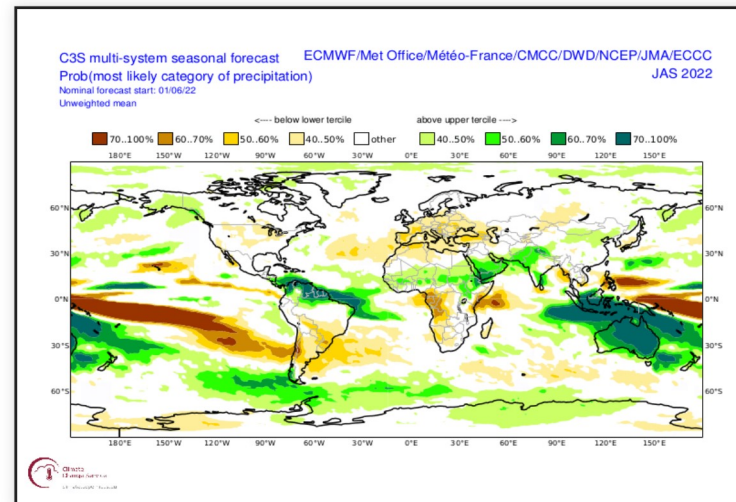
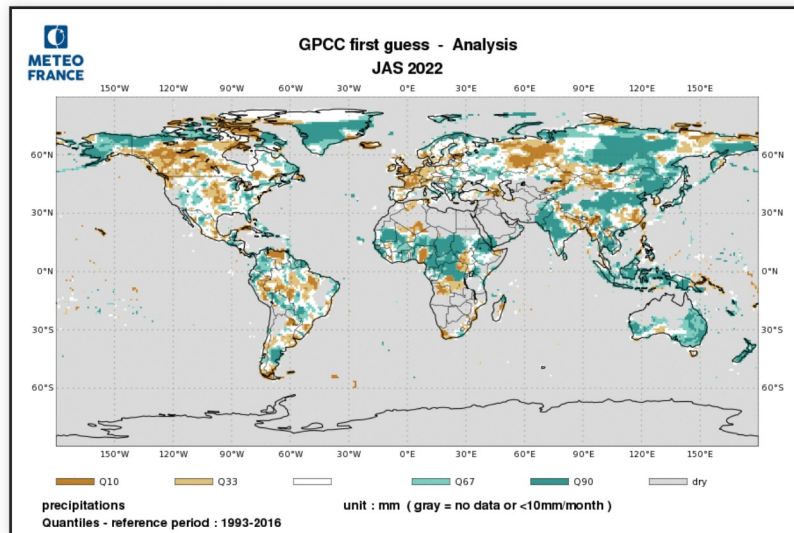
The warmer-than-normal scenario predicted is in good agreement with the analysis



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

Climatic parameters : Precipitations over the globe

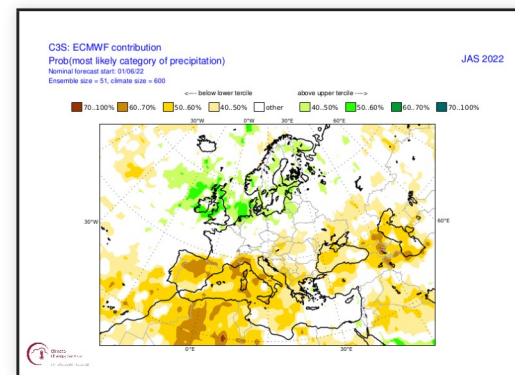
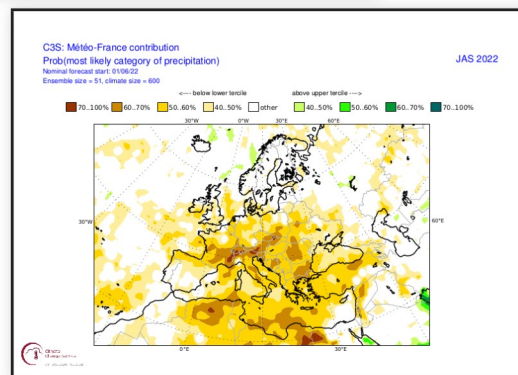
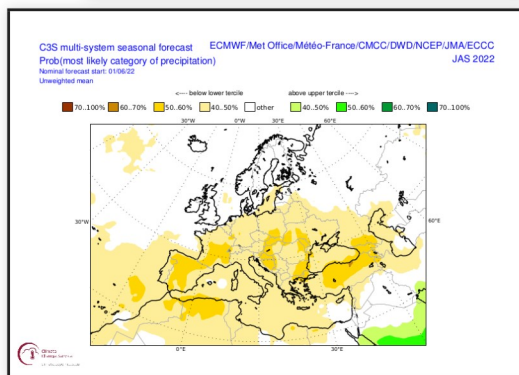
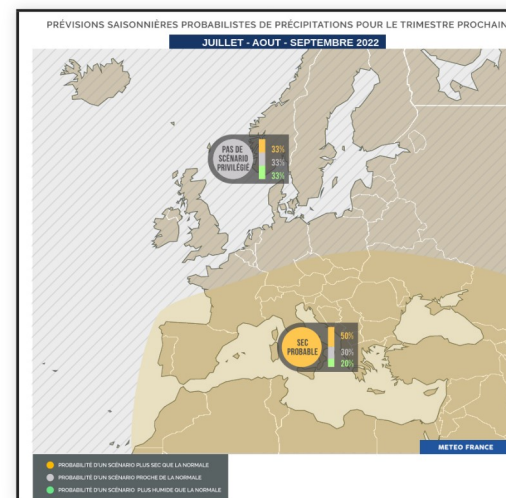
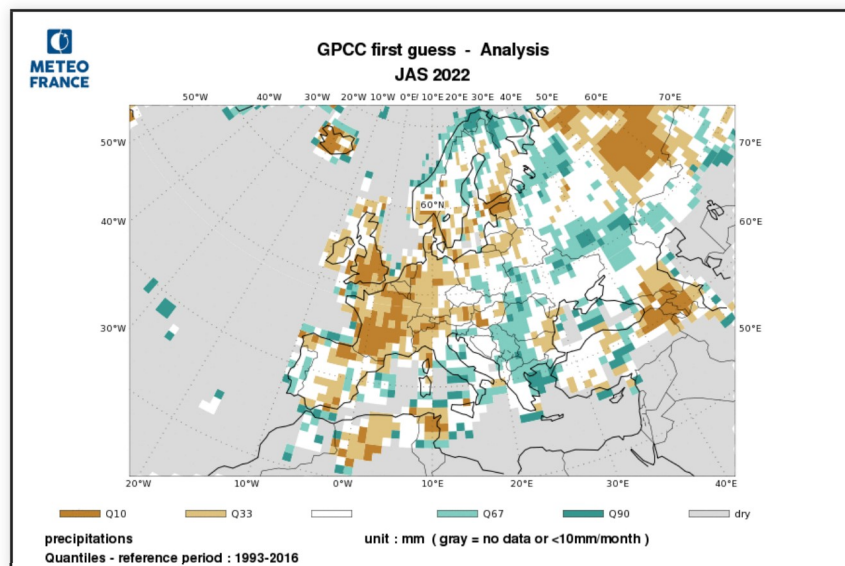
The forecast was good for the Maritime Continent and South Asia and, to a lesser extent, for North America.



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 models predicted a drier-than-normal scenario over much of Europe and the Mediterranean basin. The relative minima over western Russia resulted in a more southerly circulation. The dry signal is limited to western Europe, while a wetter signal stretches from the Adriatic Sea to Scandinavia.



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 JAS 2022

1) Oceans :

The main SST anomalies were well predicted in the Pacific and Indian Oceans, a little less in the Atlantic and Mediterranean.

2) Large scale atmospheric circulation :

VP 200 hPa : Very good forecasts for all models.

SF 200 hPa : In the equatorial zones, the dipoles have been well planned. The teleconnections towards the mid-latitudes of the northern hemisphere, which are clearly visible in the analysis, have not been anticipated by the models.

Z500 : The forecast is generally correct in the northern hemisphere, although a relative minimum in Z500 over western Russia has not been seen.

3) Climatic parameters over Europe :

Temperatures : The scenario considered, warmer than normal over Europe, proved to be close to the analysis.

Precipitations : The drier than normal scenario was expected over most of Europe. The relative minimum over western Russia resulted in a more meridian circulation, limiting the drier-than-normal area to western Europe, with the eastern part of the continent having a wetter signal.