

VERIFICATION BULLETIN

OCTOBER - NOVEMBER - DECEMBER 2022

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Introduction : Objective

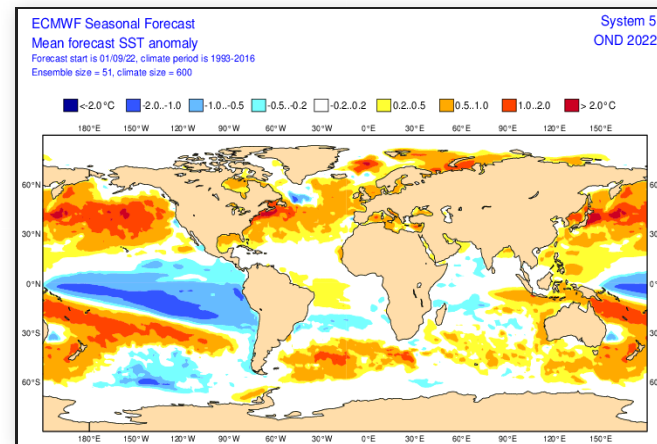
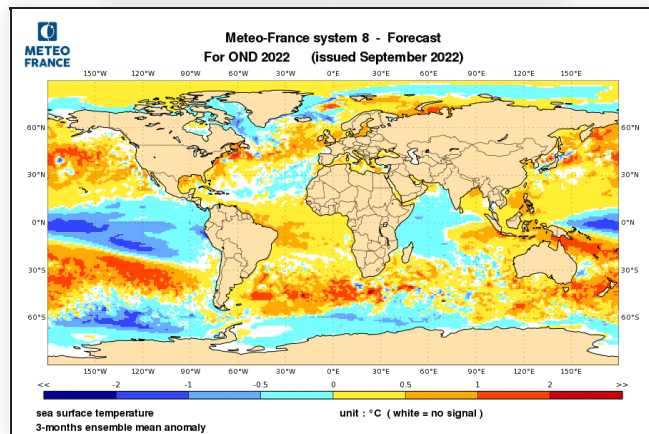
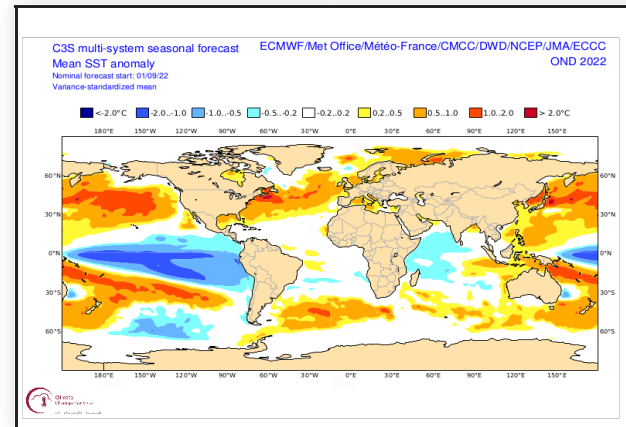
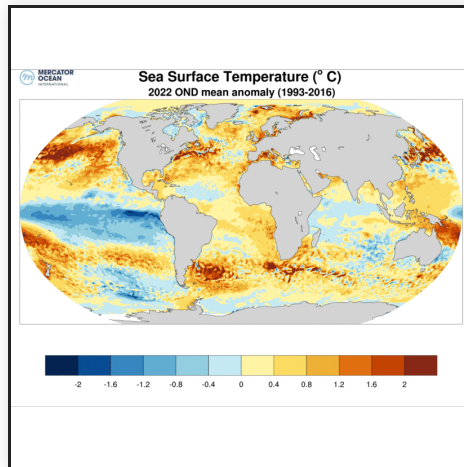
- The objective of the Seasonal Verification Bulletin is to present an evaluation of the main elements highlighted in the Seasonal Forecast Bulletin : oceanic forcings, large scale circulation patterns, and a focus on temperature and precipitation forecast over Northern Atlantic, Europe and the Mediterranean 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 "La Niña" pattern has been well predicted by the models. Similarly, the PDO- pattern is also seen by the models, even if the cold anomaly along the US coast is very weak.

In the Indian Ocean, the negative phase of the IOD is also seen by both models.

In the Atlantic, MF8 closer to the reanalysis in the tropical zone. In the northern hemisphere, some differences on the positions of the anomalies.

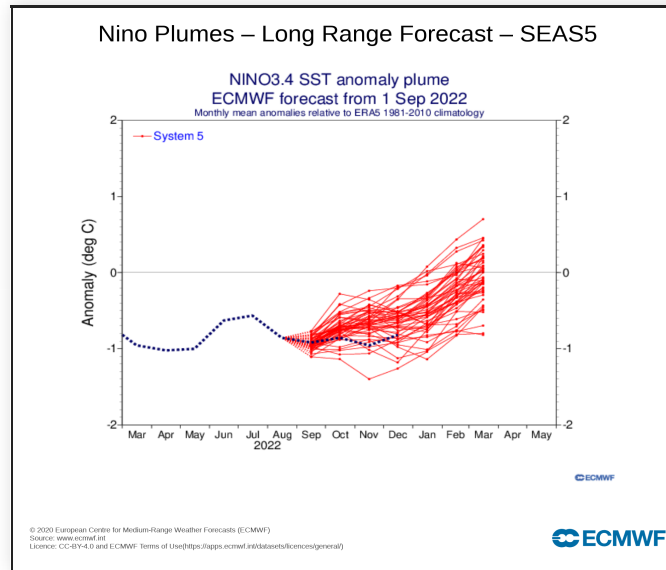
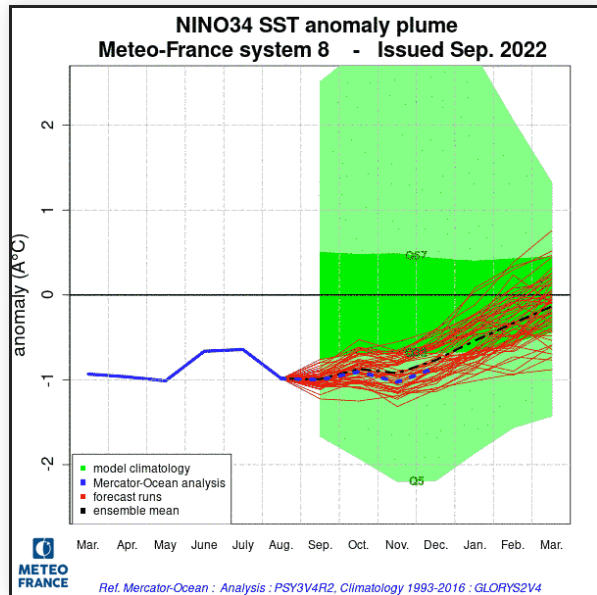


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S8 (bottom left) and SEAS5 (bottom right)

Oceans : ENSO

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

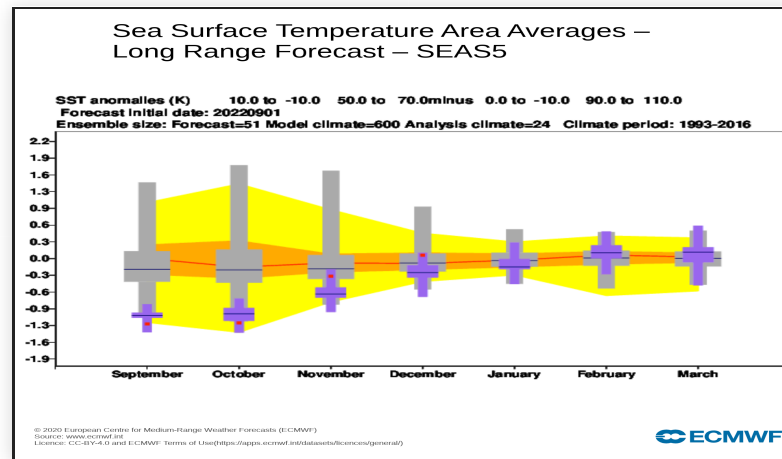
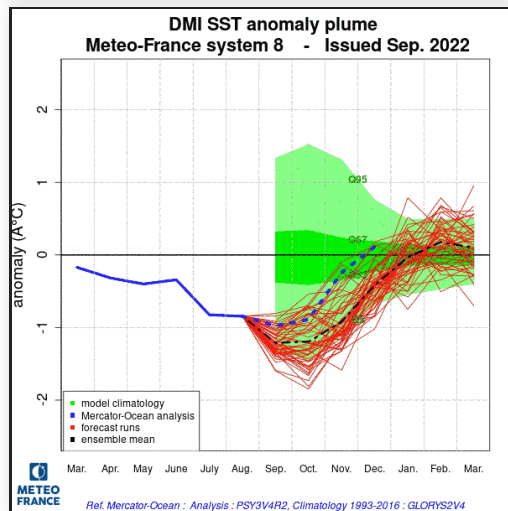
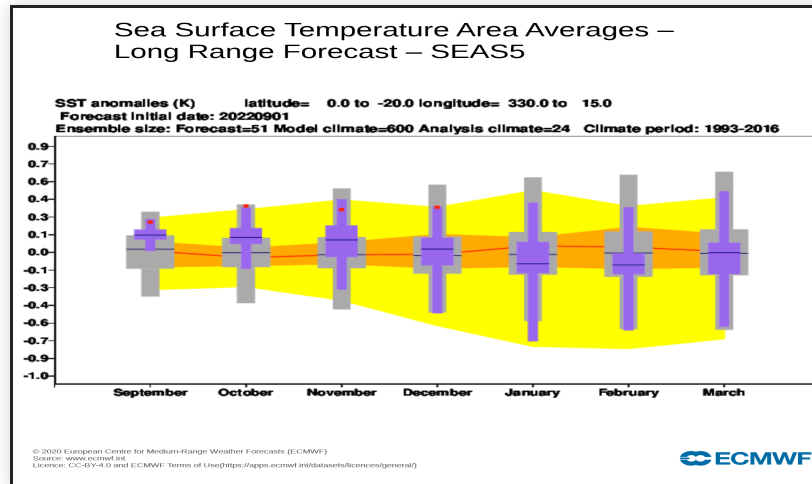
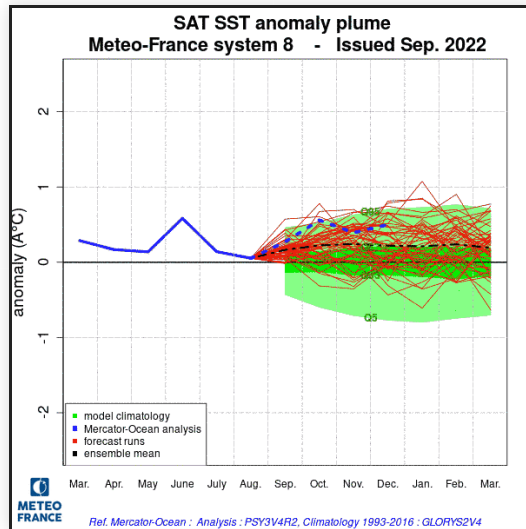
Very good forecast for MF8, while ECMWF is a bit too hot.



Oceans : tropical Atlantic and Indian Ocean index

SAT : Both MF8 and ECMWF are too cold for the analysis.

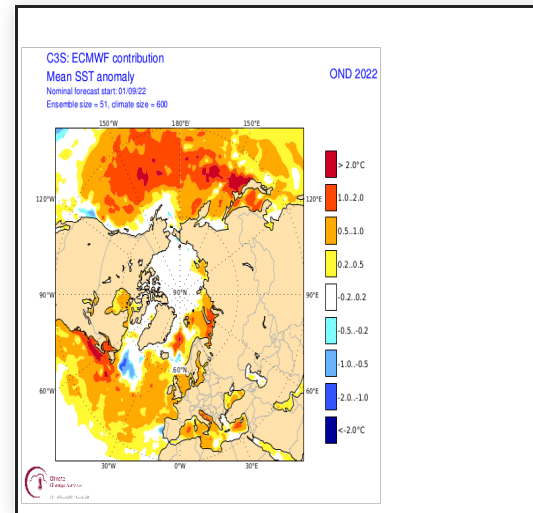
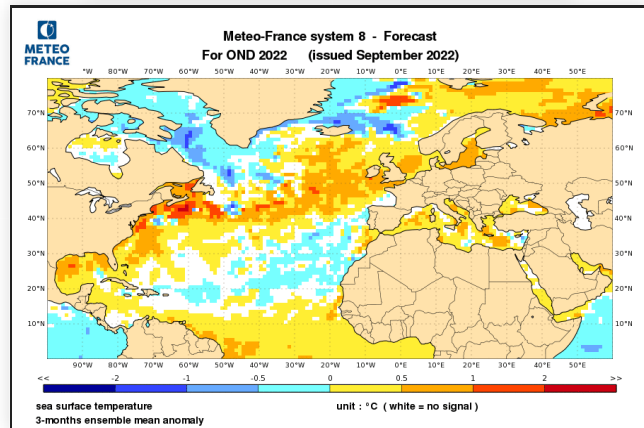
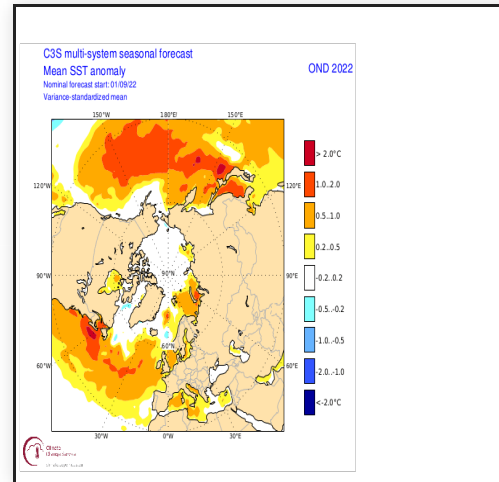
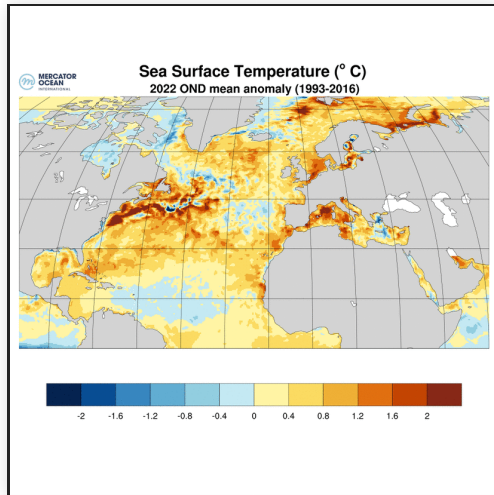
DMI : MF8 amplified the signal too much and brought up the index too late. ECMWF is better, especially in intensity.



Oceans : North Atlantic SST

The plot of the warm anomaly between Canada and Europe differs between the models and the analysis. However, the observed and predicted values are consistent.

In the Mediterranean, a strong east/west gradient is still visible, which is not apparent in the forecasts

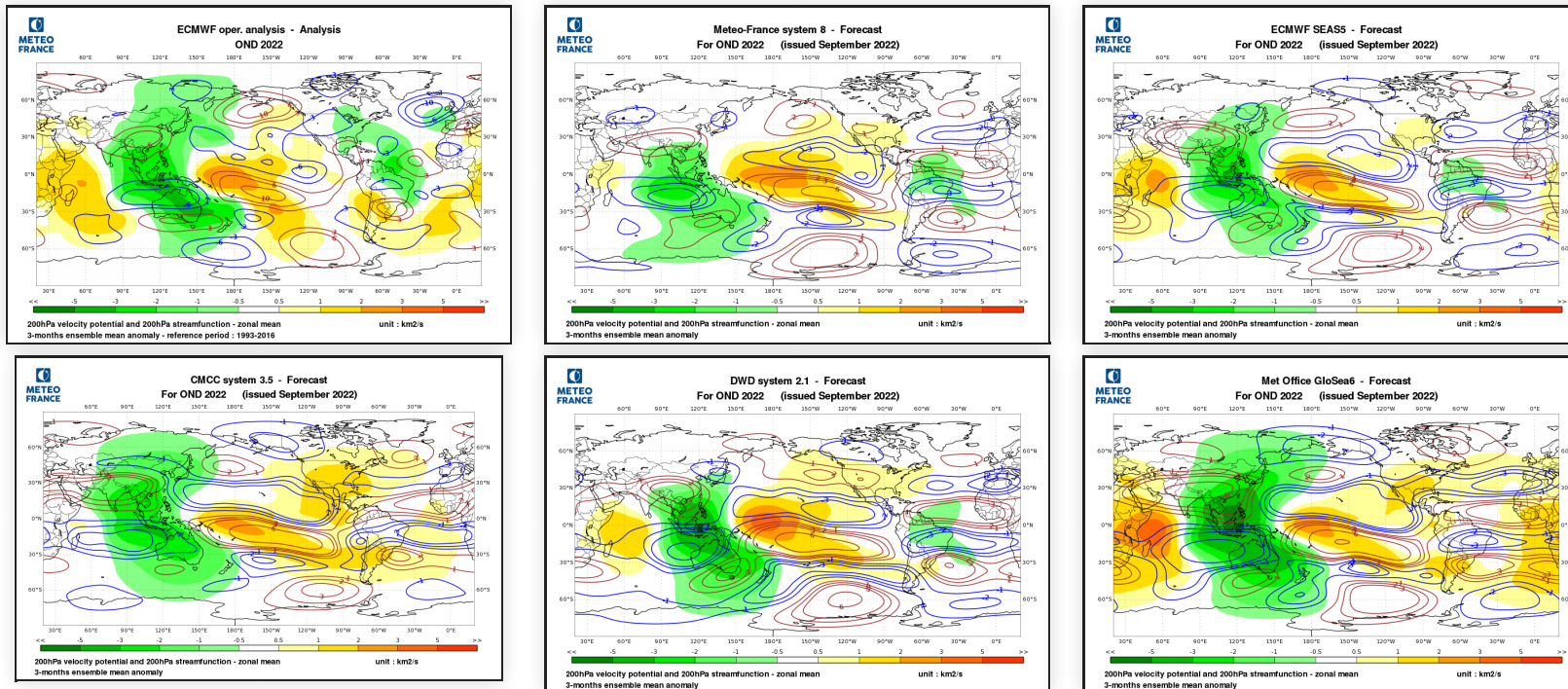


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S8 (bottom left) and ECMWF SEAS5 (bottom right)

Atmospheric circulation : Global teleconnection

VP : The analysis shows a large-scale tripole: downward motion anomaly over the Pacific/upward motion anomaly over the Maritime Continent, related to "la Niña", and upward motion anomaly over the Maritime Continent/downward motion anomaly over the western Indian Ocean, related to the negative phase of the IOD. The models globally reproduce these patterns.

SF : The dipoles on the Pacific and Atlantic Oceans as well as on the Maritime Continent are well seen. Teleconnections are generally well planned. However, when arriving over Europe, the models differ from the analysis. The latter shows a strong cyclonic curve off Europe, not at all anticipated by the models.

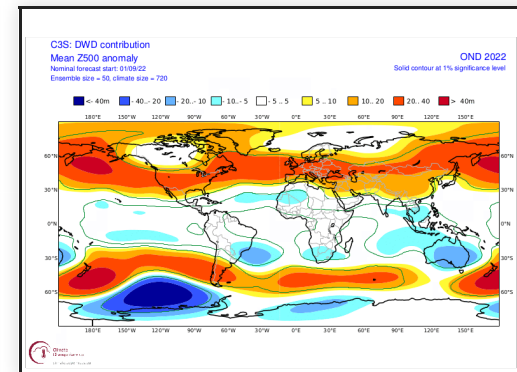
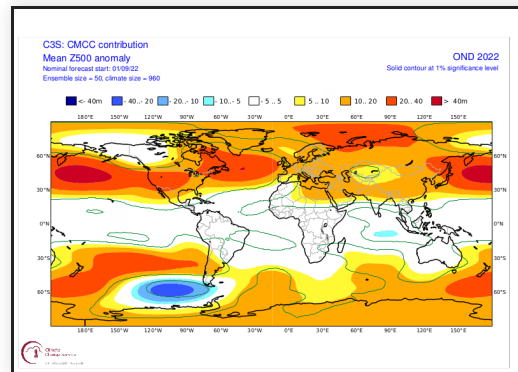
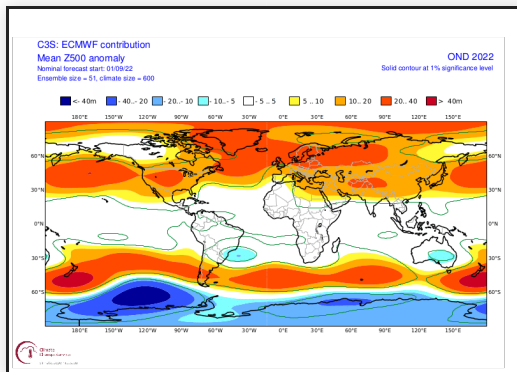
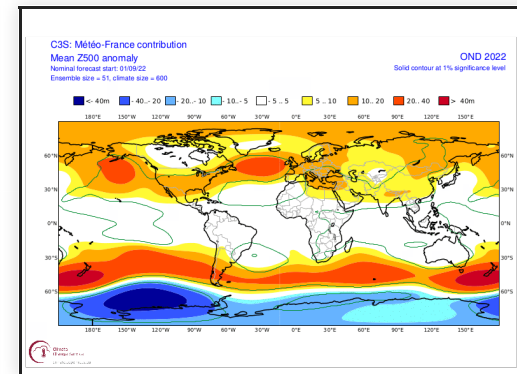
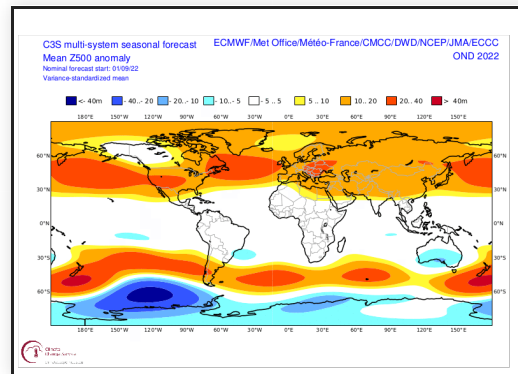
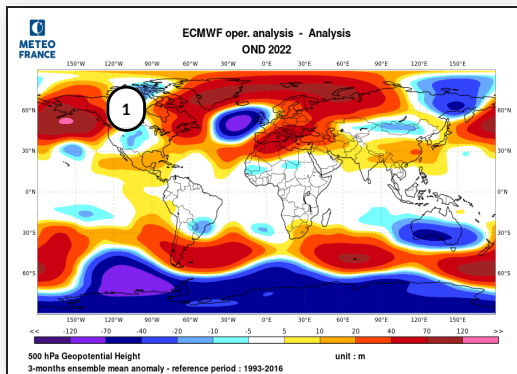


ECMWF analysis, MF-S8, ECMWF-SEAS5, CMCC, DWD and JMA 200hPa velocity potential anomalies (color range, green : ascending, orange: subsidence) and stream function anomalies (isolines, red: anticyclonic in the northern hemisphere, blue: cyclonic in the northern hemisphere).

Atmospheric circulation : 500hPa Geopotential height

South hemisphere : the main structures are well predicted

North hemisphere : the PNA- pattern is shifted to the northeast in the analysis. In the North Atlantic, the very strong negative anomaly in Z500 is not at all.



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

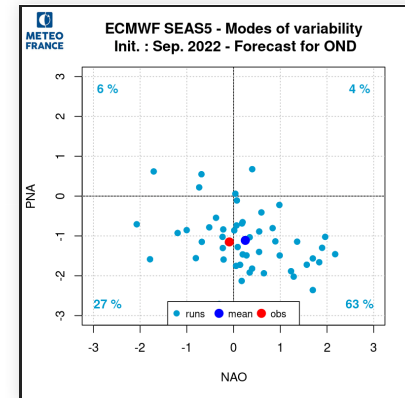
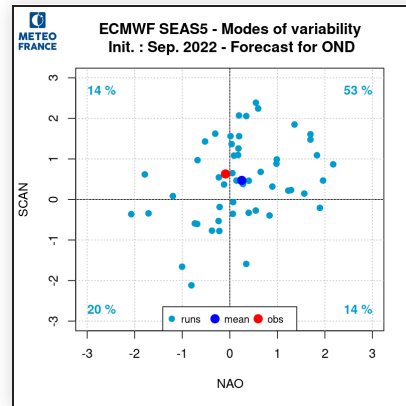
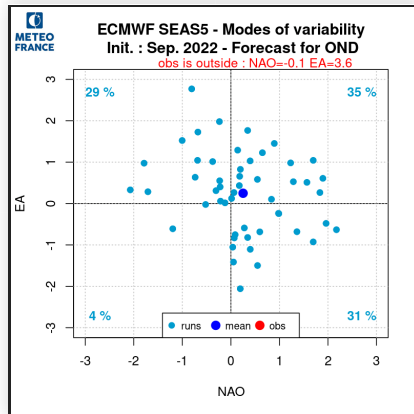
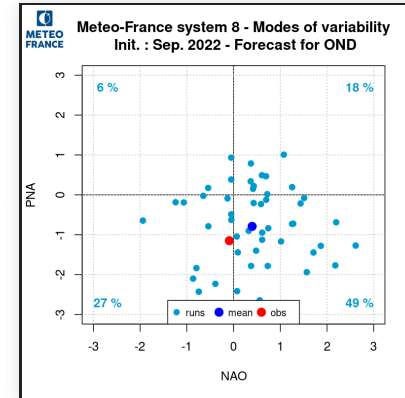
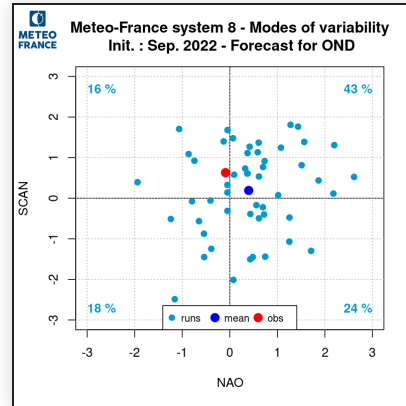
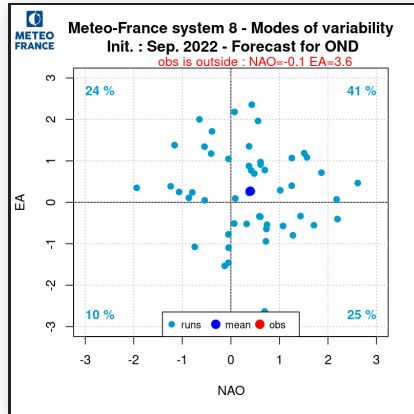
1 - Look like PNA -

Atmospheric circulation : Modes of variability

Forecasts for NAO and SCAN modes are close to the analysis.

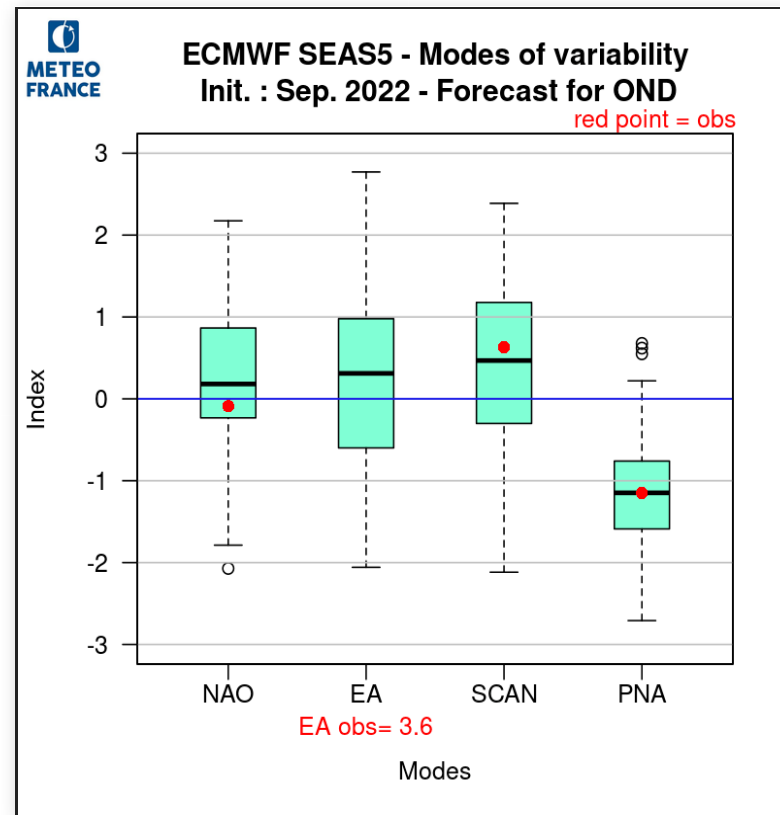
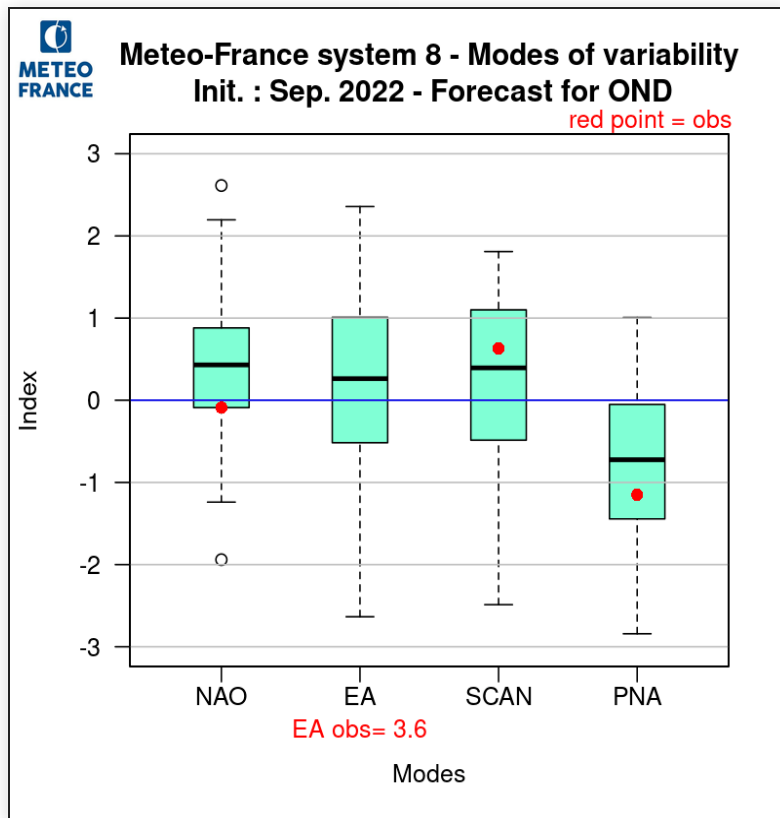
The PNA- phase is well predicted by the models.

On the other hand, the very high value for the EA mode (+3.6) is not at all anticipated by the models.



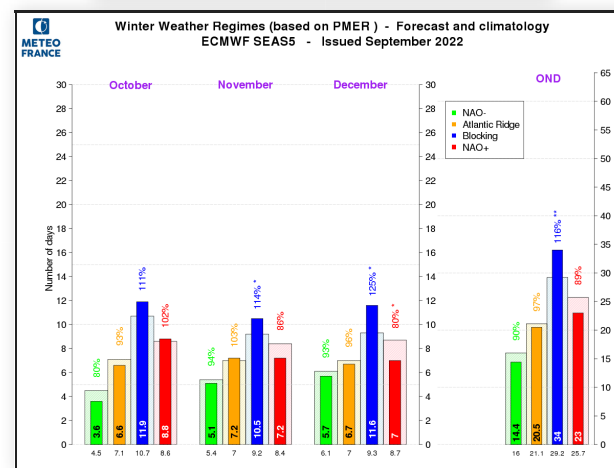
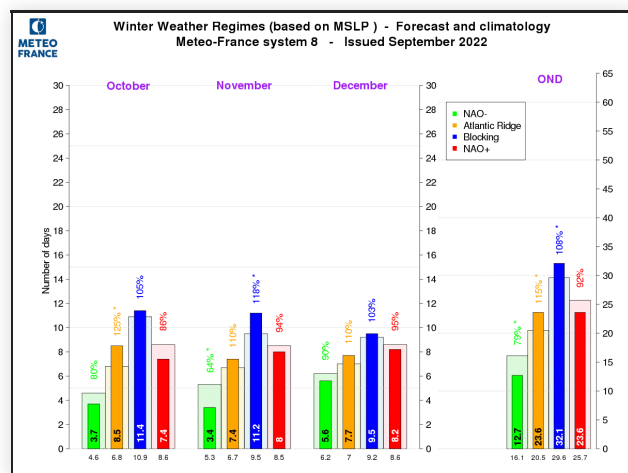
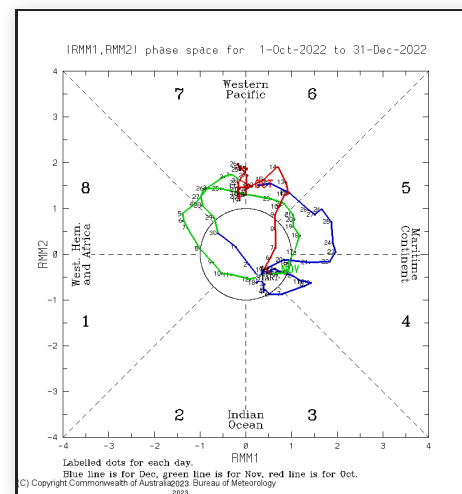
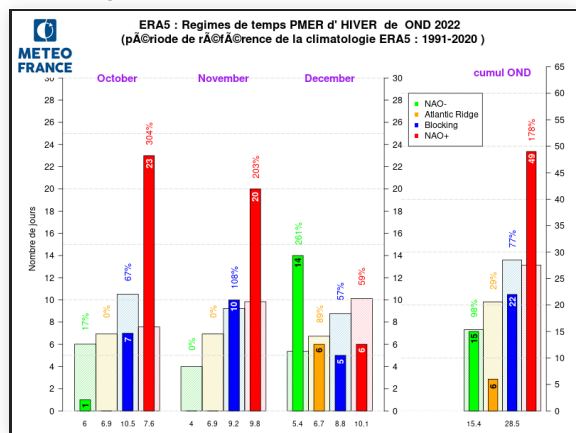
Atmospheric circulation : Modes verification

Same observation as for the previous slide



Atmospheric circulation : Winter SLP weather regimes

October and November are very largely dominated by the NAO+ regime, while the main regime in December is NAO-. The models, in agreement with each other, are very far from the analysis.



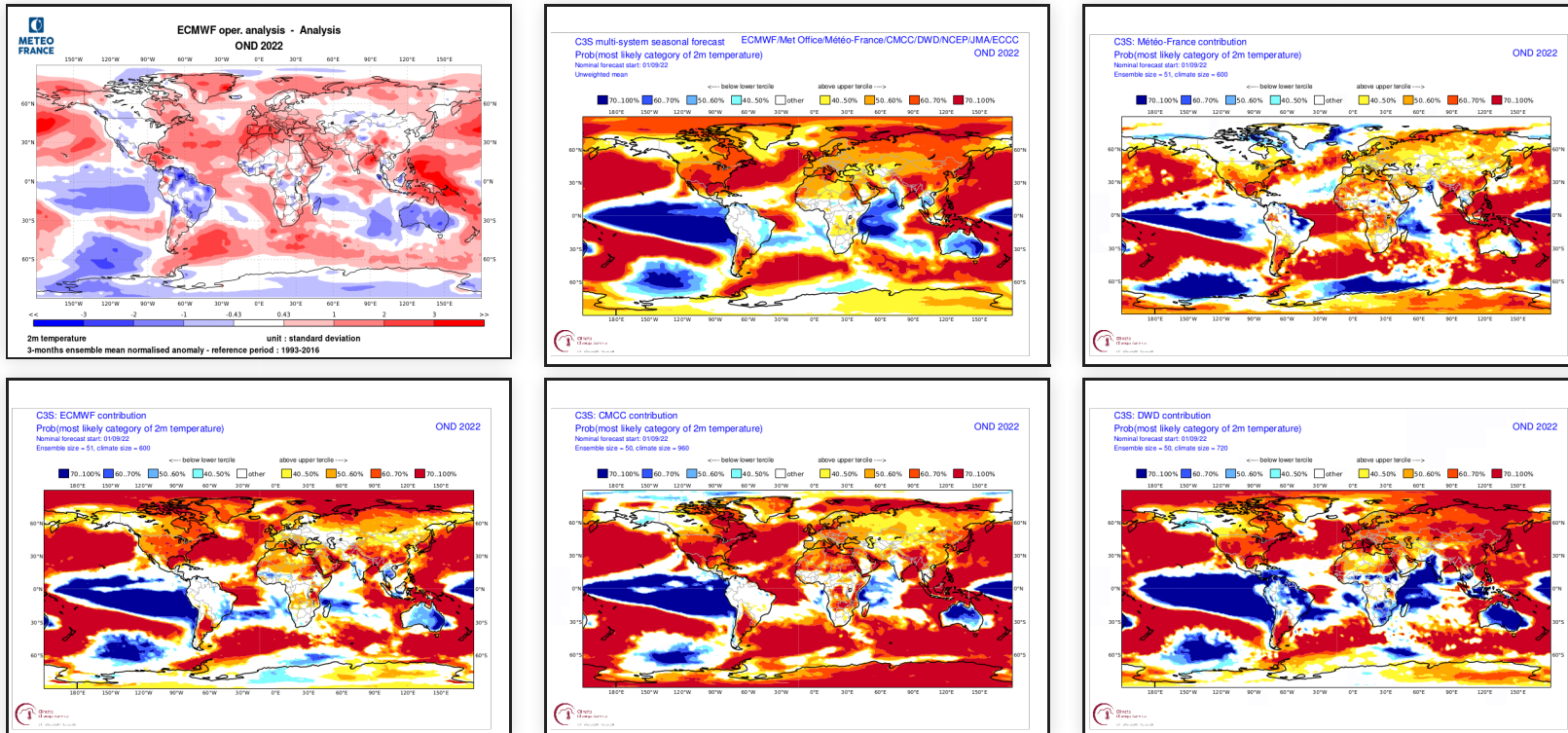
weather regime : ECMWF analysis top left, MF8 and ECMWF forecasts at the bottom. MJO phase top right

Climatic parameters : temperature on the globe

In North America, the observed warm anomalie from western Canad to Alaska is an area without a forecast signal. Elsewhere the warm signal emerges from the models while the temperatures are close to normal

In South America, the cold anomaly is not well predicted.

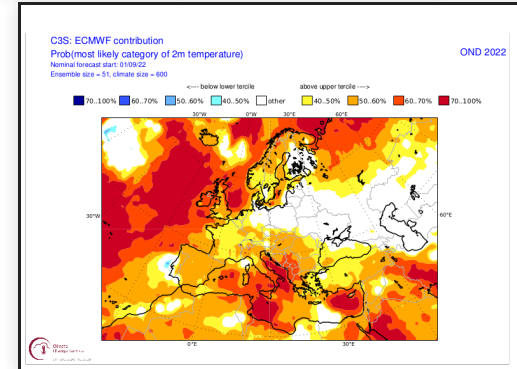
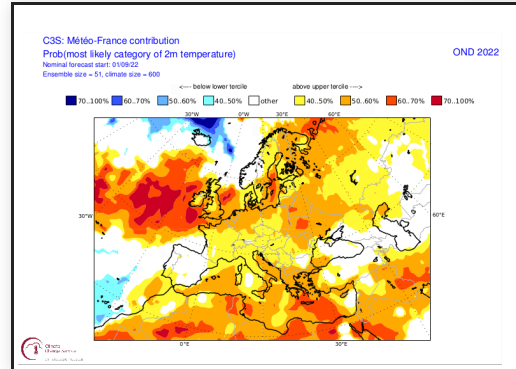
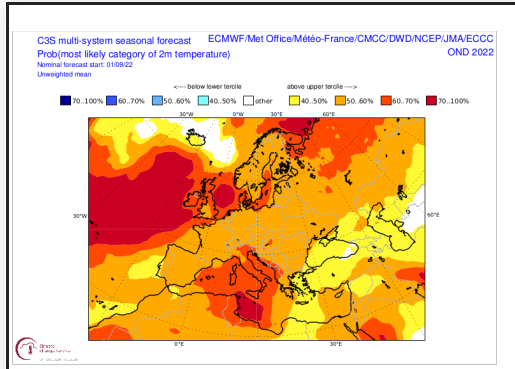
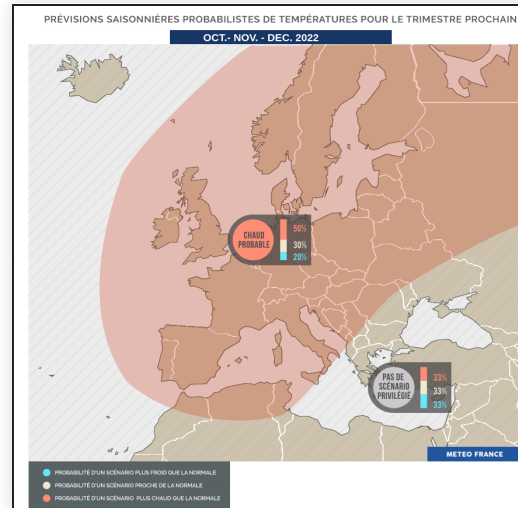
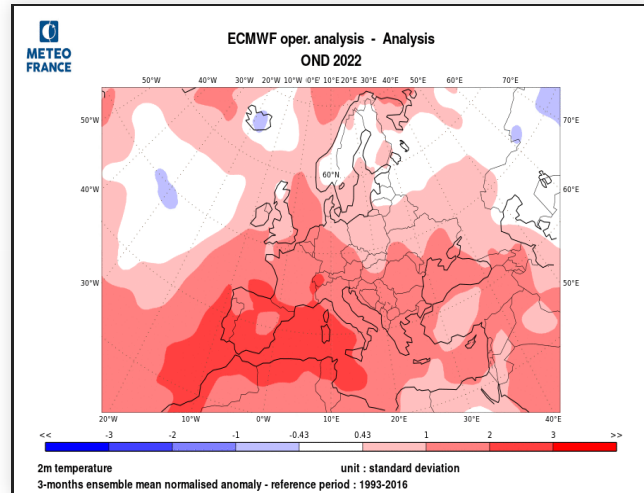
On Eurasia it is a warm signal that dominates in the forecasts while the analysis is in general close to the climatology



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

La forte anomalie chaude du Maghreb à la France, corrélée avec le mode EA+, se retrouve en partie sur la carte de synthèse, en particulier pour l'Europe de l'Ouest.



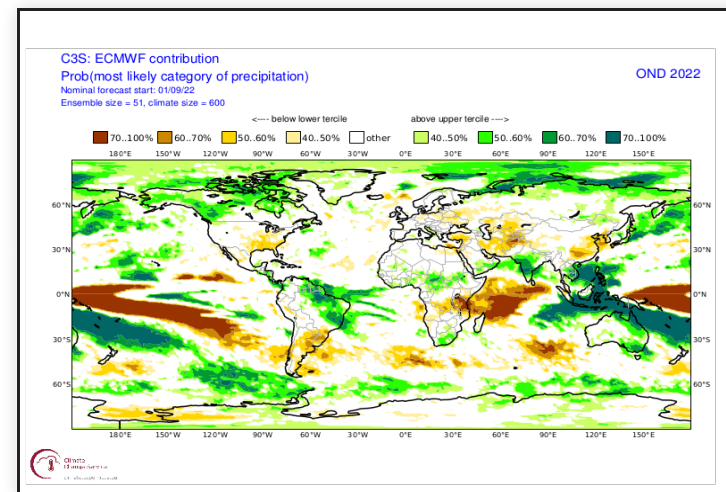
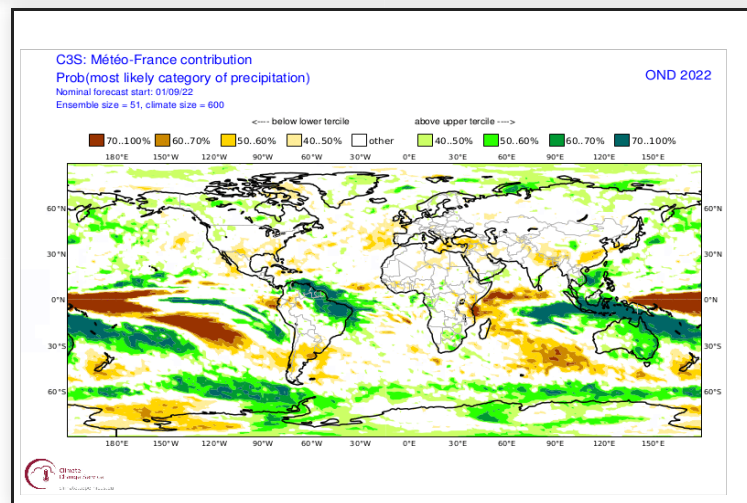
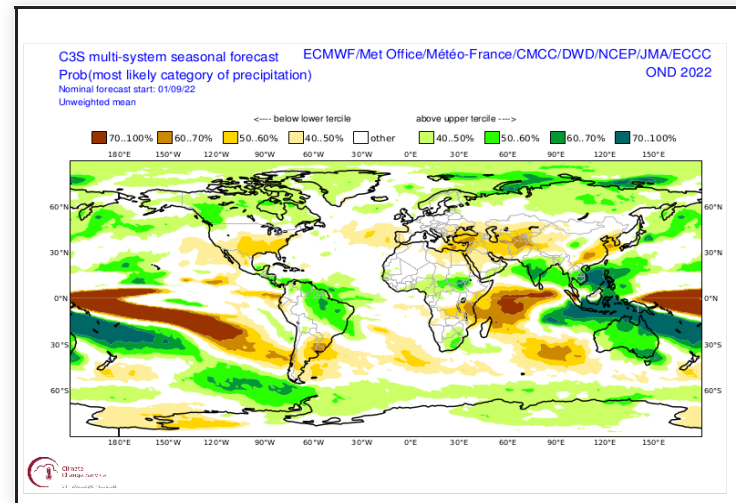
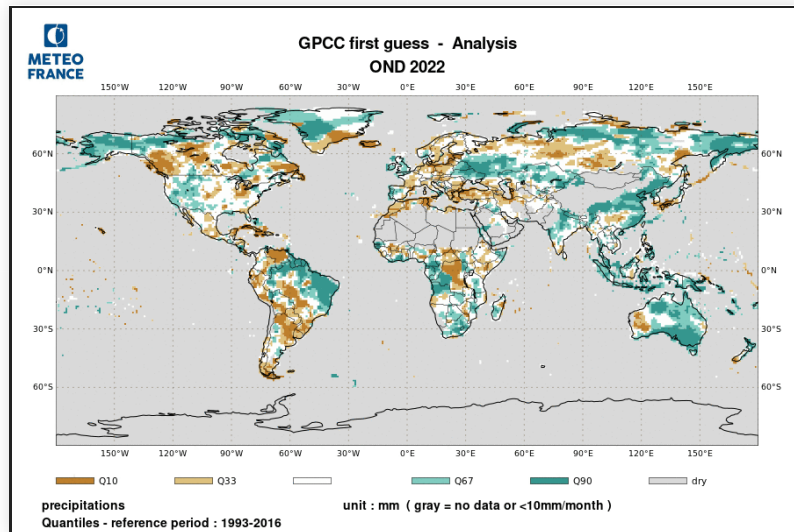
ECMWF analysis top left, synthetic forecast map top right. Forecast for multi-system, MF-S8 and SEAS5 on the bottom line.

Climatic parameters : Precipitations over the globe

In the tropics, the analysis is consistent with the effects of La Niña.

In North America, the problems with the positioning of the NAPL are reflected in the position of the precipitation anomalies.

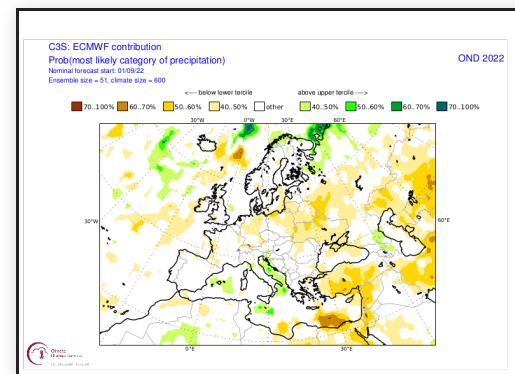
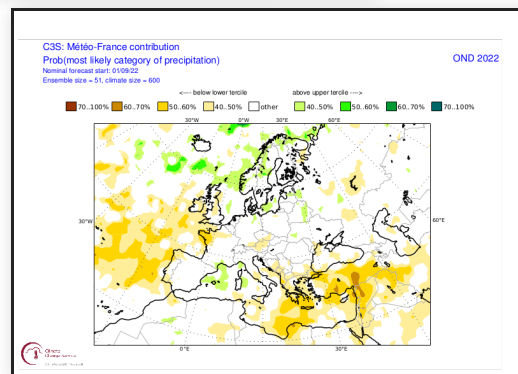
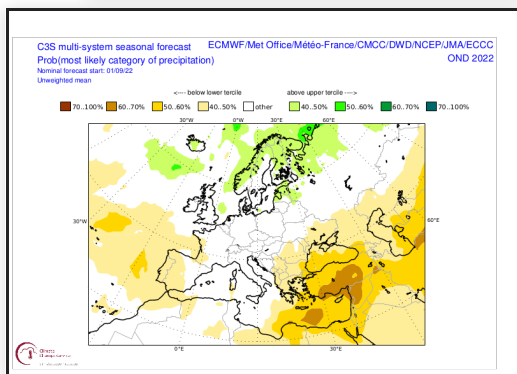
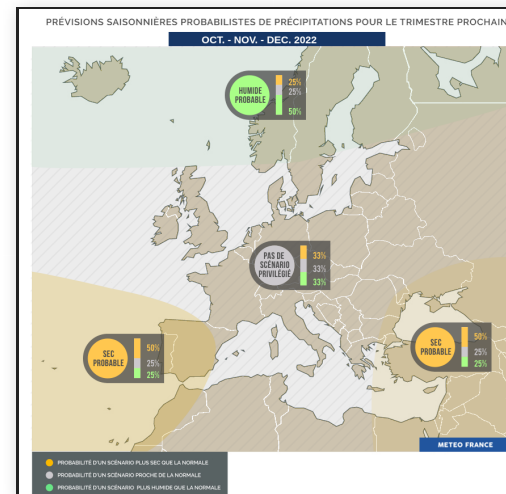
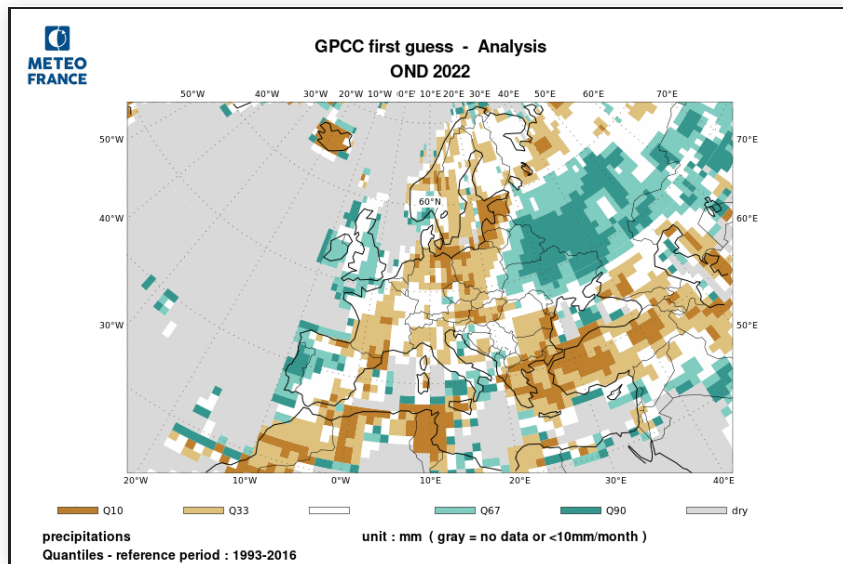
Strong contrast between Europe (globally dry) and the west of Russia (much more humid).



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 analysis corresponds well to the impact of the EA mode. With the exception of Turkey (dry conditions), the synthesis map is far from the analysis.



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 OND 2022

1) Oceans :

The main SST anomalies were well predicted by the models, except for the North Atlantic, in connection with the observed atmospheric circulation in this area.

2) Large scale atmospheric circulation :

VP 200 hPa : Good forecast

SF 200 hPa : In the equatorial zones, the dipoles have been well predicted. Teleconnections to mid-latitudes are correctly seen, except near Europe where the models did not anticipate the strong cyclonic anomaly.

Z500 : The forecast is not very good over North America, and bad off the European coast, with a very strong EA mode.

3) Climatic parameters over Europe :

Temperatures : The warmer-than-normal scenario is suitable for Western Europe, but it is too far north.

Precipitations : The forecasts are quite far from the observation, with the exception of Turkey.