

VERIFICATION BULLETIN

DECEMBER - JANUARY - FEBRUARY 2021-2022

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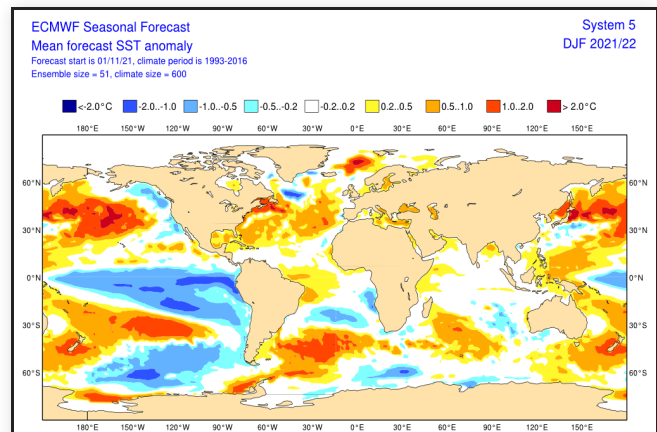
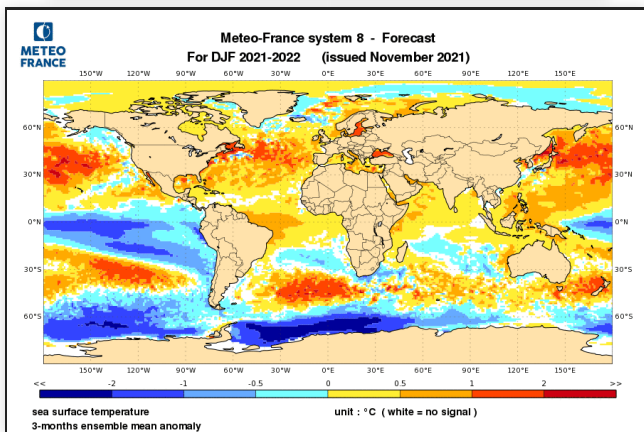
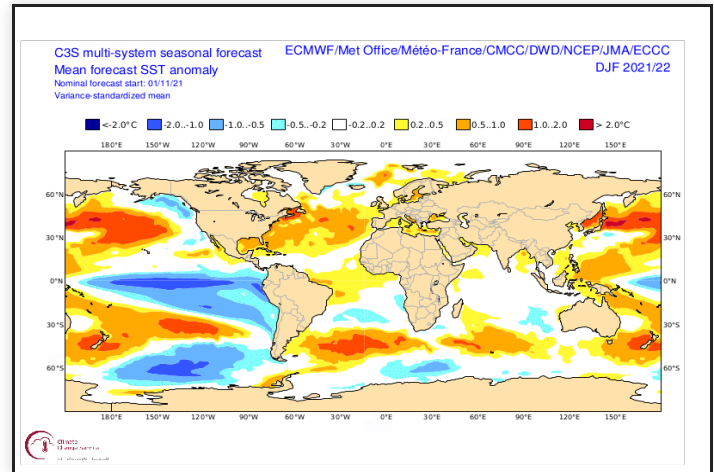
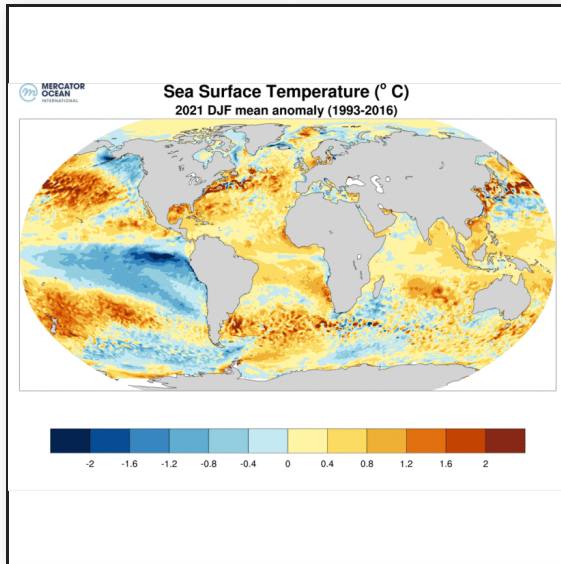
Introduction : Objective

- 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

However, in the Pacific, the area of coldest SST is too far from the South American coast with MF-S8. In the Indian Ocean, the east of the basin is too cold.

At mid-latitudes, the main patterns are well predicted

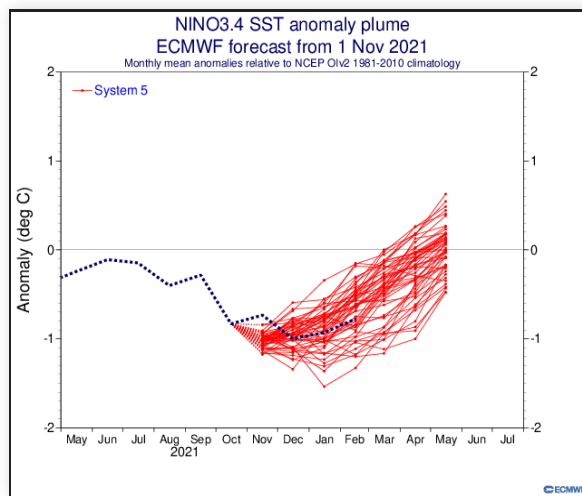
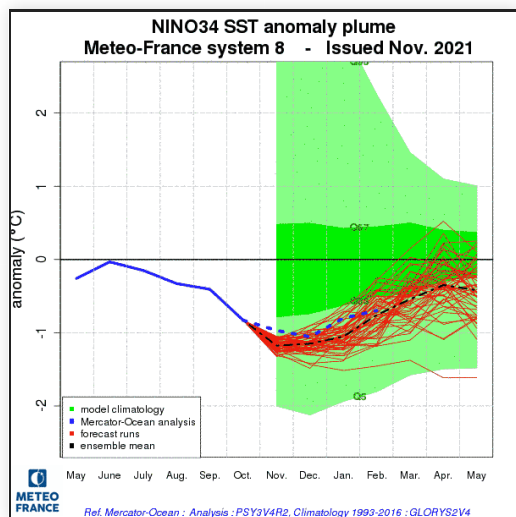


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S8 (bottom left) and SEAS5 (bottom right)

Oceans : ENSO

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

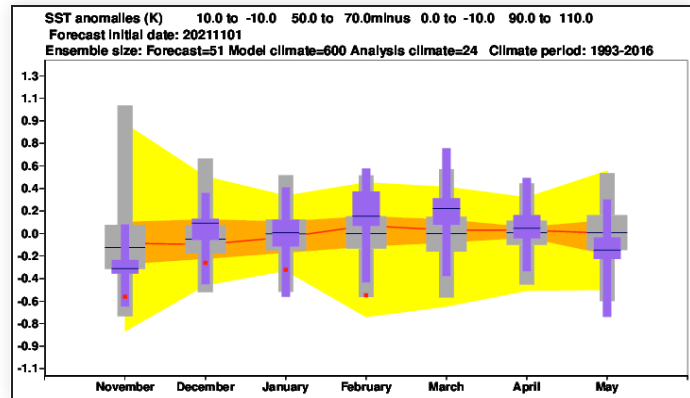
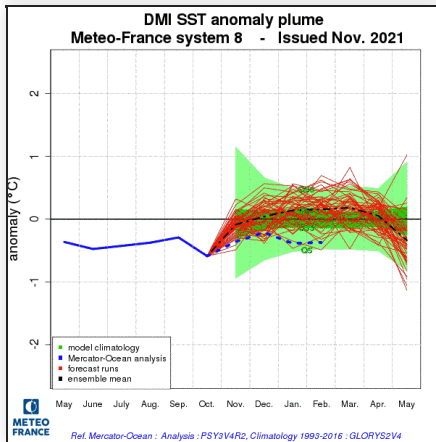
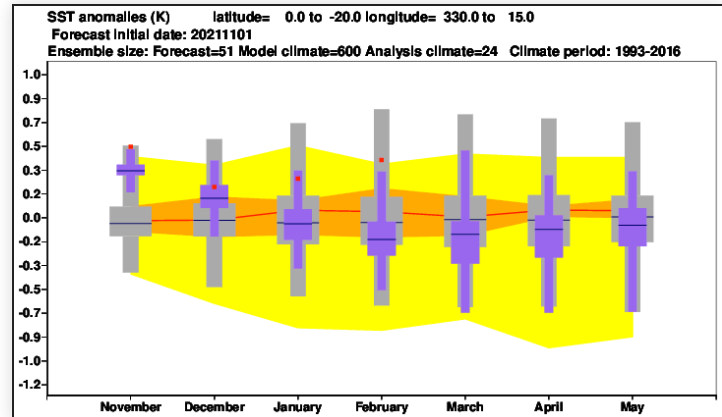
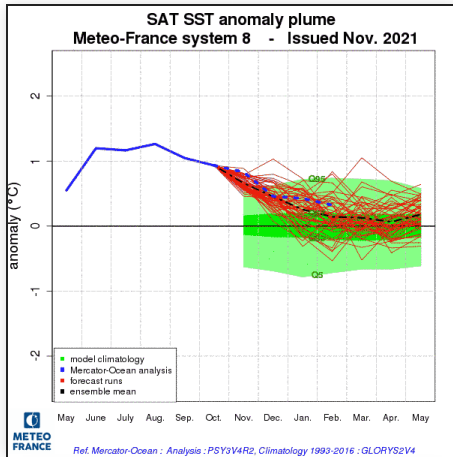
Very good forecast for the two models.



Oceans : tropical Atlantic and Indian Ocean index

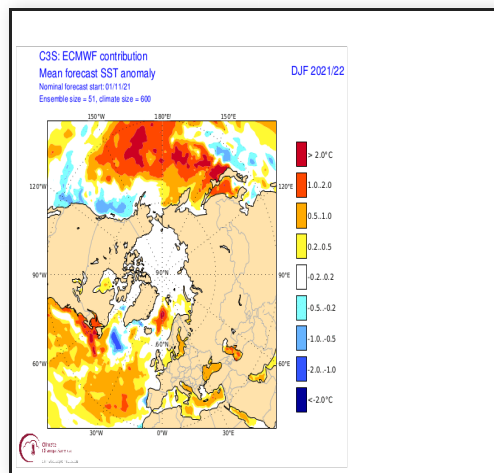
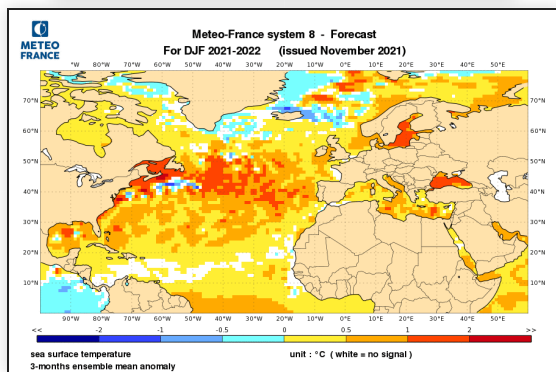
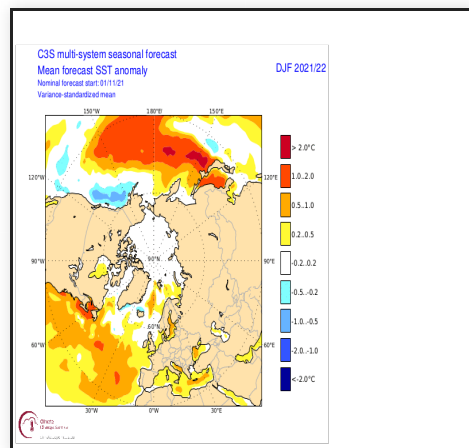
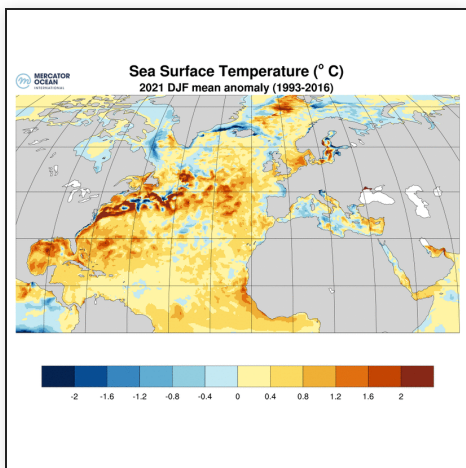
SAT : The negative trend was well anticipated, but the DMI index is not maintained in the hot tercile

DMI : the positive trend is too strong with both models.



Oceans : North Atlantic SST

The main patterns are well forecasted, excepted in the Mediterranean Sea. Both models are too warm.

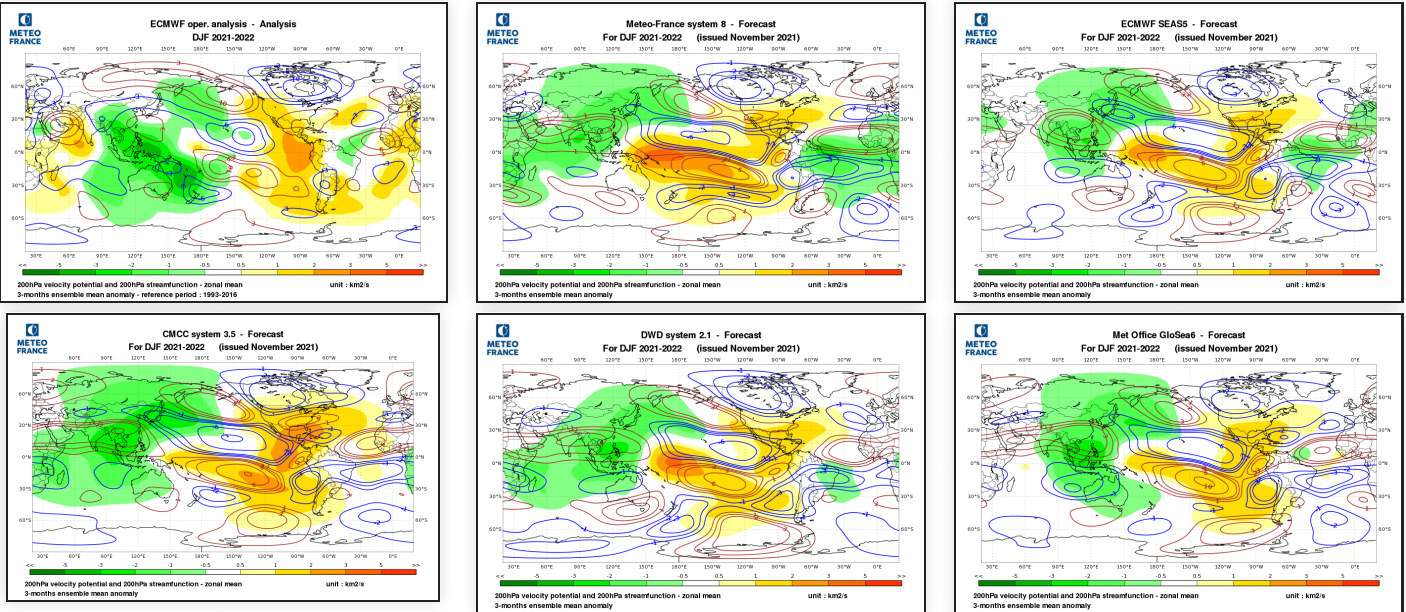


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S8 (bottom left) and ECMWF SEAS5 (bottom right)

Atmospheric circulation : Global teleconnection

VP : The effects of the "La Niña" phenomenon are clearly visible: an up[^]ward anomaly near the Maritime Continent and a downward anomaly over the Pacific Ocean. However, this pattern is too much to the West, in line with an MJO in 6th 7th sectors in December. The upward anomaly on the Western Equatorial Atlantic est well forecasted by hte models.

SF : the teleconnexion toward North America (PNA- pattern) was well forecasted. Over the Atlantic, the teleconnexions from tropics to mid-latitudes are visible in the analysis. On Europe and the mediterranean basin, MF-S8 is closer to the analys than ECM-WF.

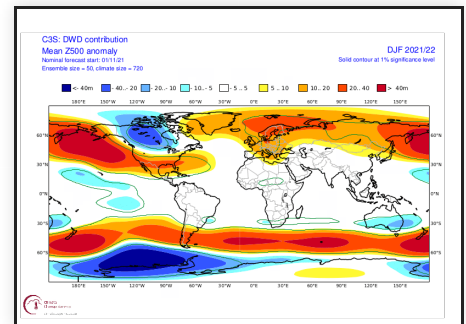
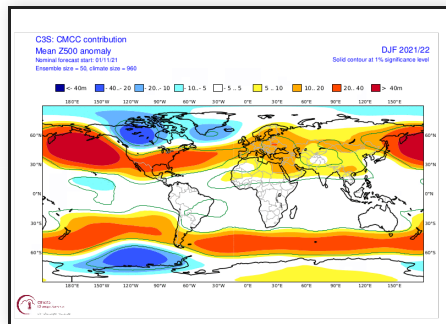
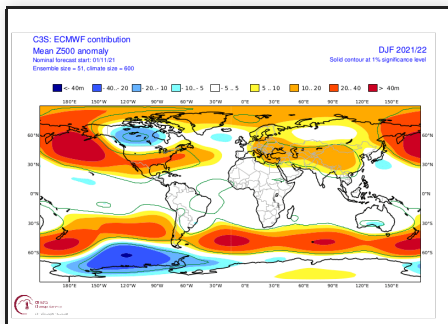
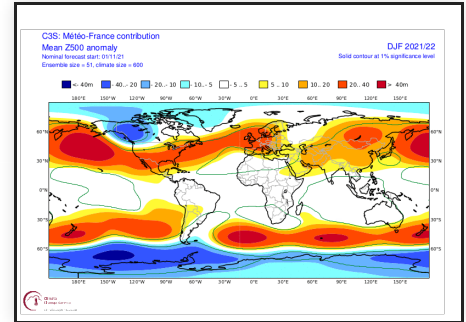
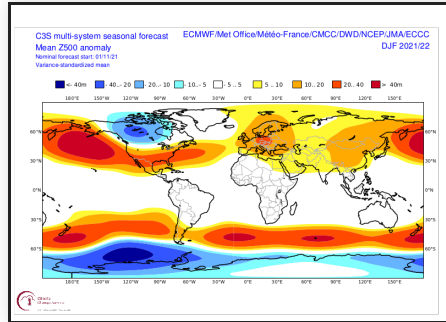
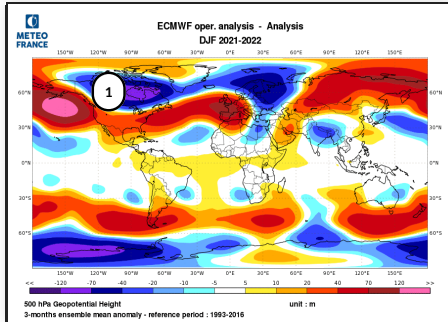


ECMWF analysis, MF-S8, ECMWF-SEAS5, CMCC, DWD and JMA 200hPa velocity potential anomalies (color range, green : ascending, orange: subsidence) and stream function anomalies (isolines, red: anticyclonic in the northern hemisphere, blue: cyclonic in the northern hemisphere).

Atmospheric circulation : 500hPa Geopotential height

North America : The PNA- pattern linked to La Nina was well forecasted by all models.

The area stretching from the United States to Europe has been well planned. On the other hand, the marked negative anomaly over northern Scandinavia was not seen. Only MF-S8 barely sketched it.

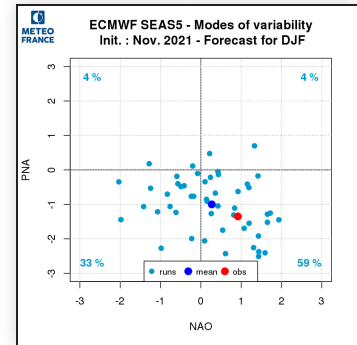
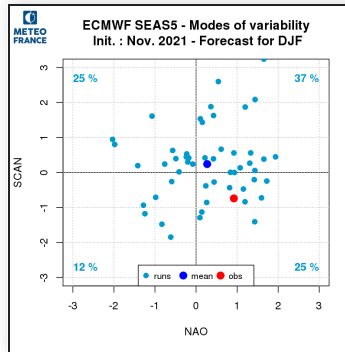
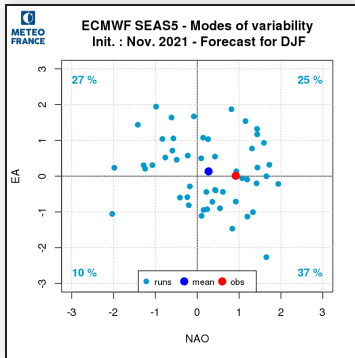
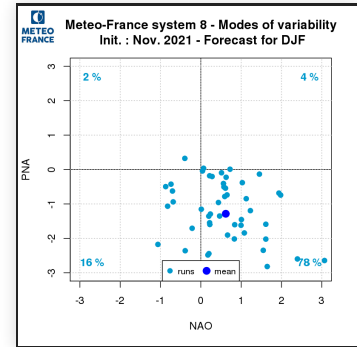
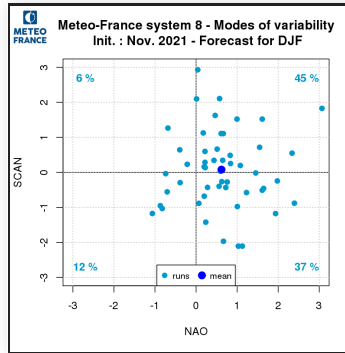
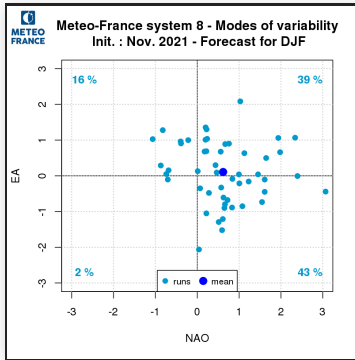


ECMWF analysis, C3S multi-system, MF-S8, ECMWF-SEASS, CMCC and DWD 500hPa geopotential height anomalies.

1 - Look like PNA -

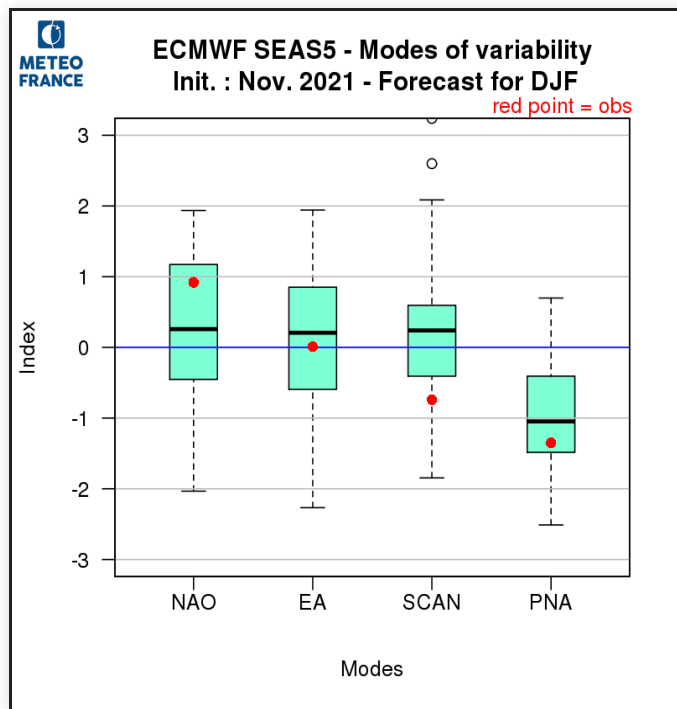
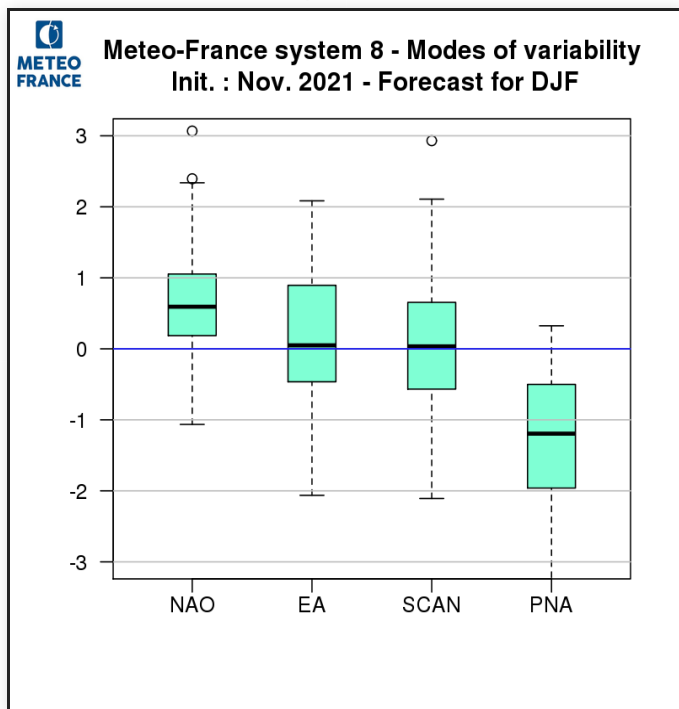
Atmospheric circulation : Modes of variability

Both models predicted a PNA-. The negative SCAN was not predicted..



Atmospheric circulation : Modes verification

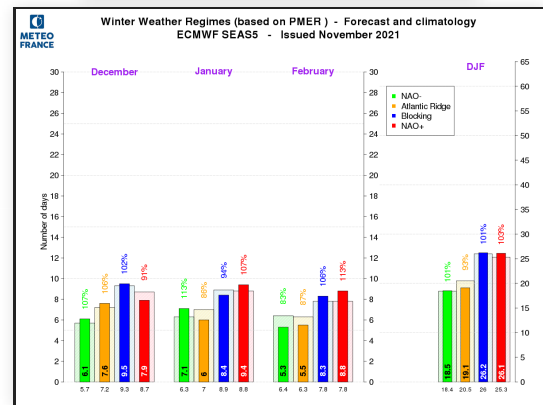
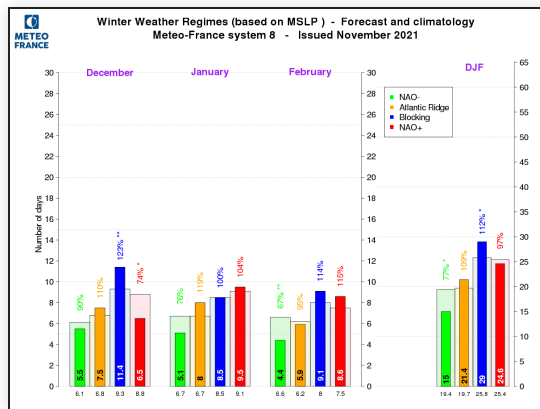
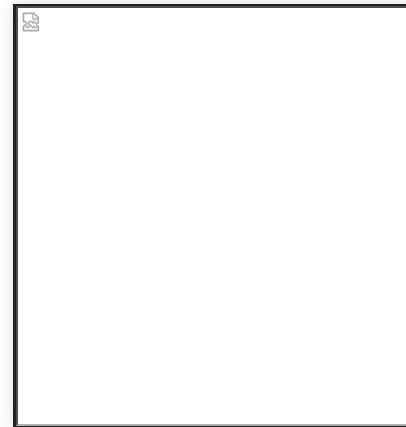
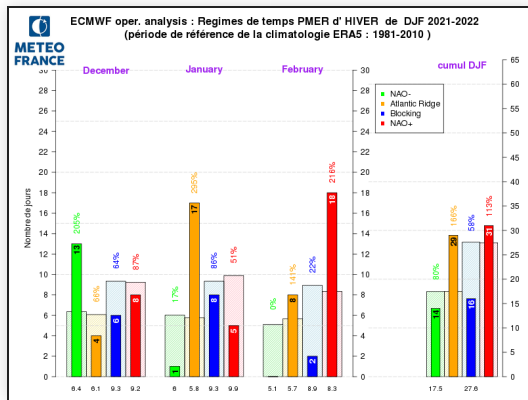
Same observation as for the previous slide



Atmospheric circulation : Winter SLP weather regimes

Strong interseasonal variability but, over the quarter, the AR regime, and a little less the NAO+ regime, at the expense of the blocking.

Neither MF-S8 nor ECM-WF planned this distribution

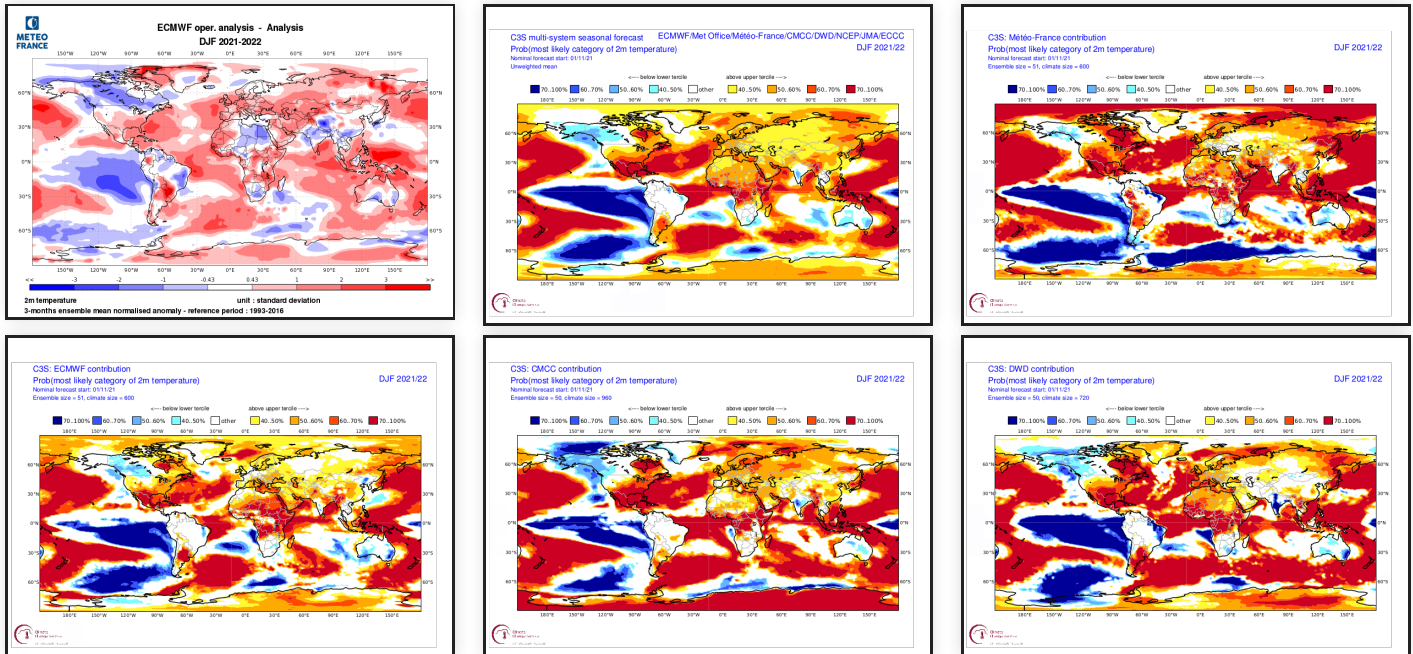


weather regime : ECMWF analysis top left, MF8 and ECMWF forecasts at the bottom. MJO phase top right

Climatic parameters : temperature on the globe

The main anomalies in the equatorial areas were correctly forecasted.

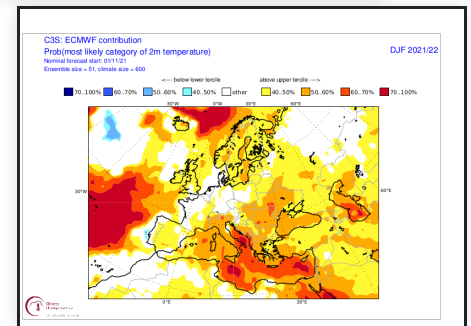
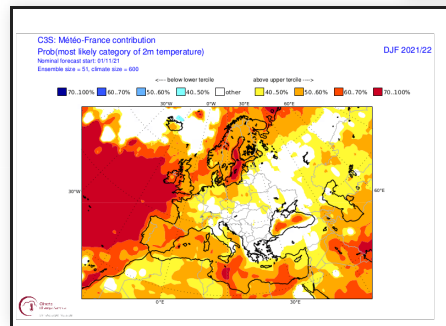
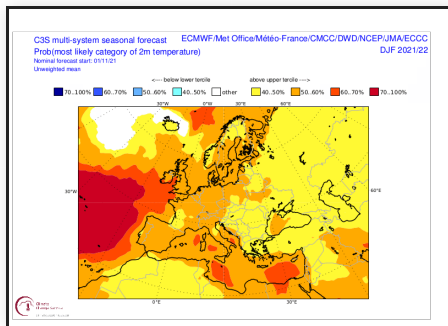
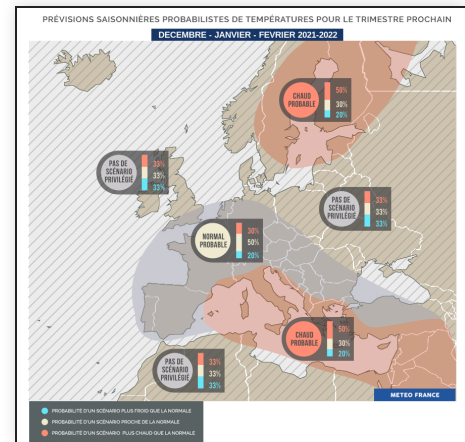
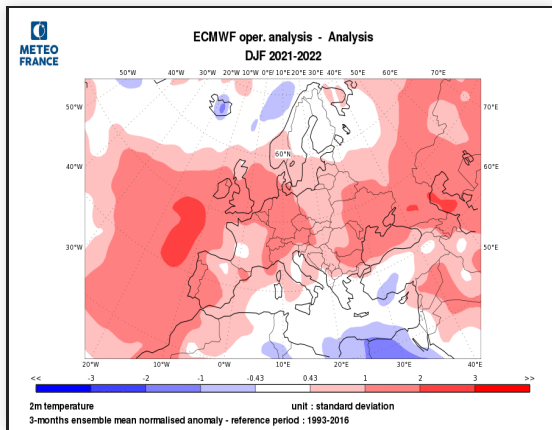
At the mid-latitudes, the models were not very good : too warm on Eastern Canada and too cold on Russia, for example.



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

Climatic parameters : temperature over Europe

The models, as well as the synthesis map, are quite far from the analysis : too warm on the mediterranean basin and Scandinavia, and not warm enough over Western Europe.

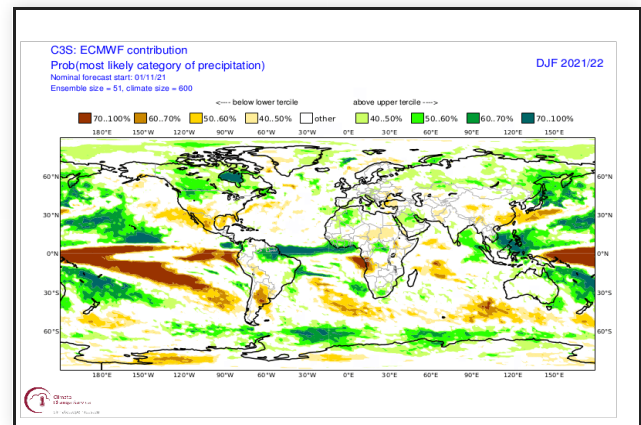
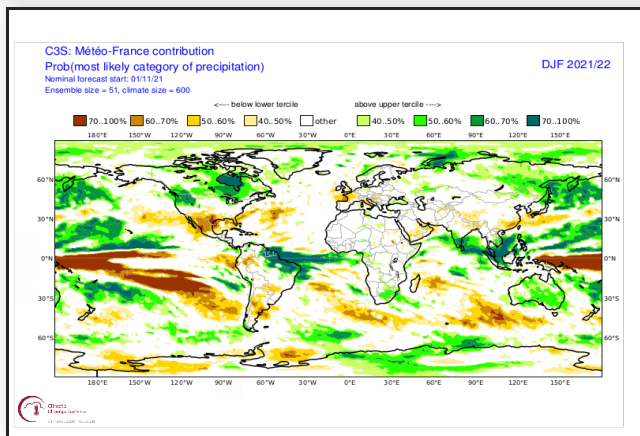
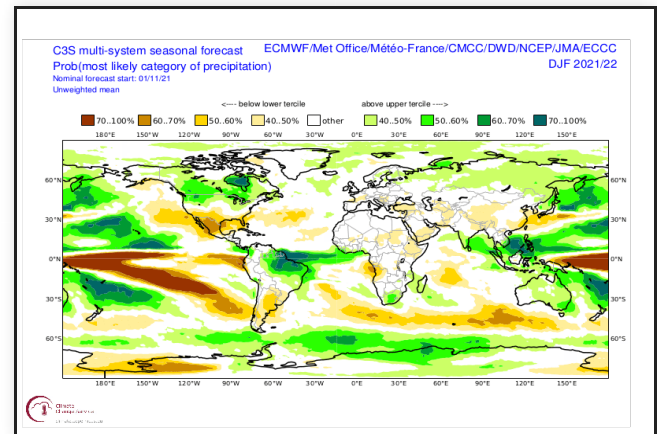
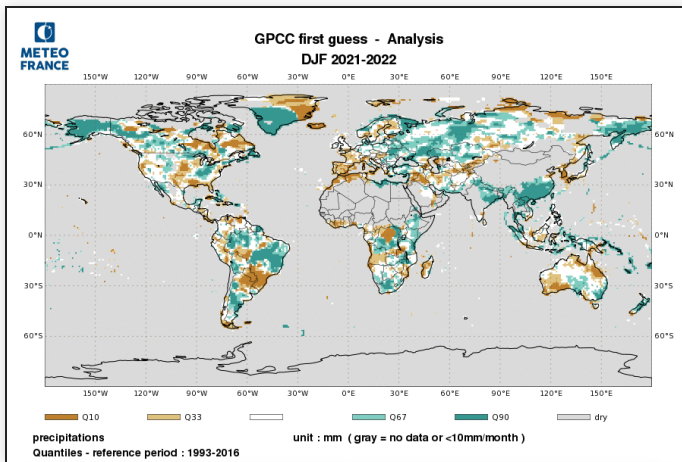


ECMWF analysis top left, synthetic forecast map top right. Forecast for multi-system, MF-S8 and SEAS5 on the bottom line.

Climatic parameters : Precipitations over the globe

On the tropics, good forecast around Amazonia and the Maritime Continent.

At mid-latitudes, the wet signal over Alaska and Russia was present in the forecasts.

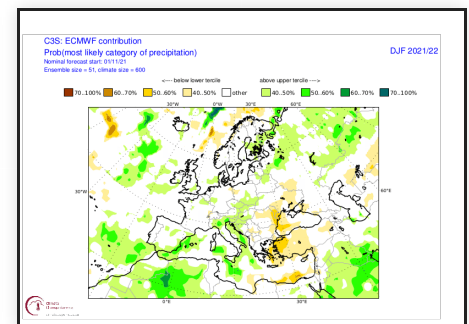
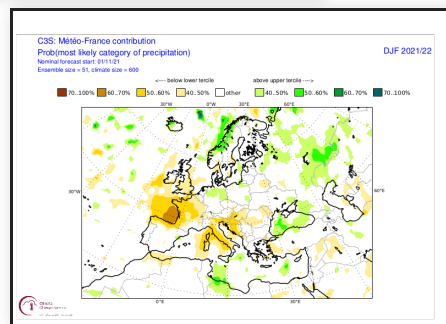
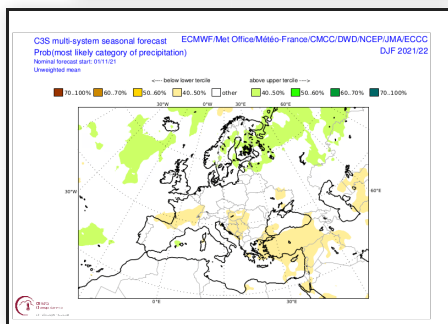
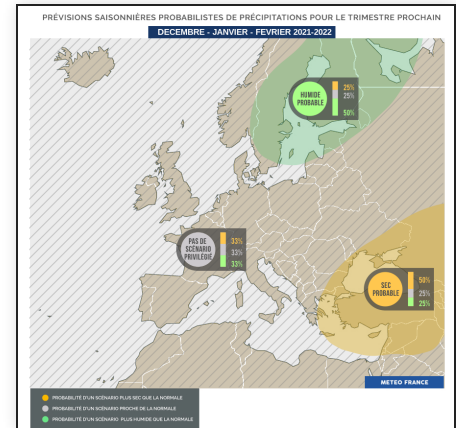
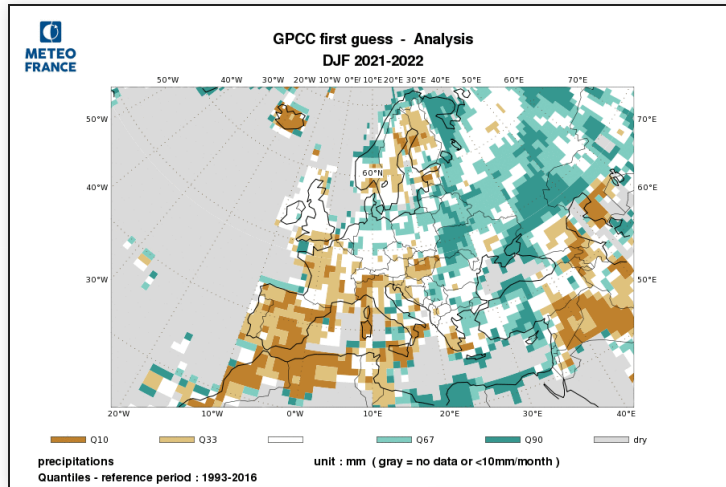


Standardized Precipitation Index analysed by IRI top left, forecast for multi-model top right and MF-S8 and SEAS5 on the bottom line.

Climatic parameters : Precipitations over Europe

Strong east-west contrast over Europe with very dry conditions on the western part.

The multi-model map, and the synthesis map based on it, did not give good predictions. The forecasts from the MF-S8 model were closer to 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 NOD 2021

1) Oceans :

The main anomalies were well predicted by the two models. ECM-WF was a little better for the "La Niña" cold anomaly

2) Large scale atmospheric circulation :

VP 200 hPa : The main patterns were quite well forecasted, but shifted to the west. This is probably due to the MJO, marked in December.

SF 200 hPa : The PNA- teleconnection was correctly forecasted.

Z500 : The PNA- pattern was well forecasted. The strong positive anomaly across the North Atlantic was more or less correctly predicted. MF-S8 is closest to analysis. But none of the models predicted the strong negative anomaly over Scandinavia, and therefore the good circulation.

3) Climatic parameters over Europe :

Temperatures : Poor forecast, in connection with a poor forecast of circulation

Precipitations : The models didn't forecast the strong contrast, dry on Western Europe and wet on Eastern Europe.