

VERIFICATION BULLETIN

NOVEMBER - DECEMBER-JANUARY 2021-2022

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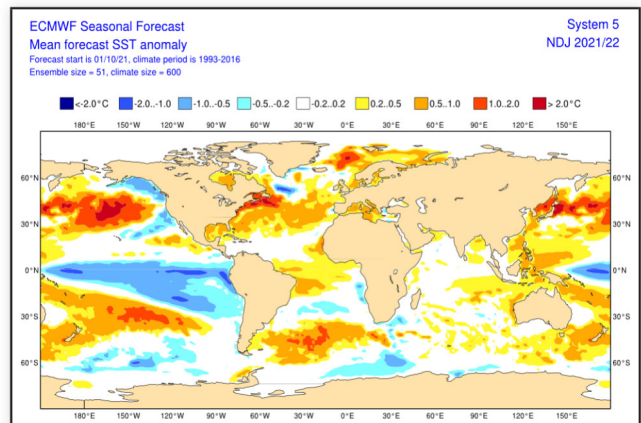
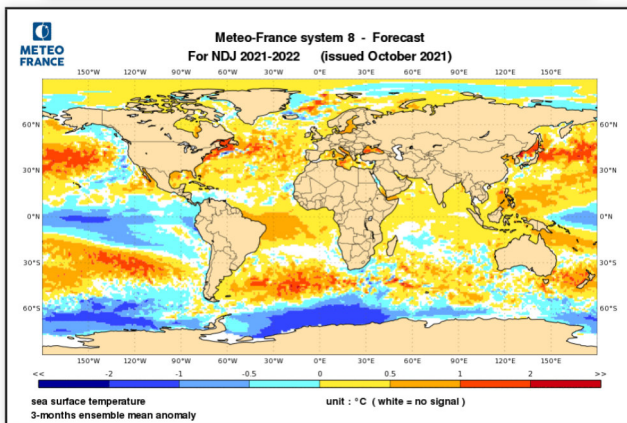
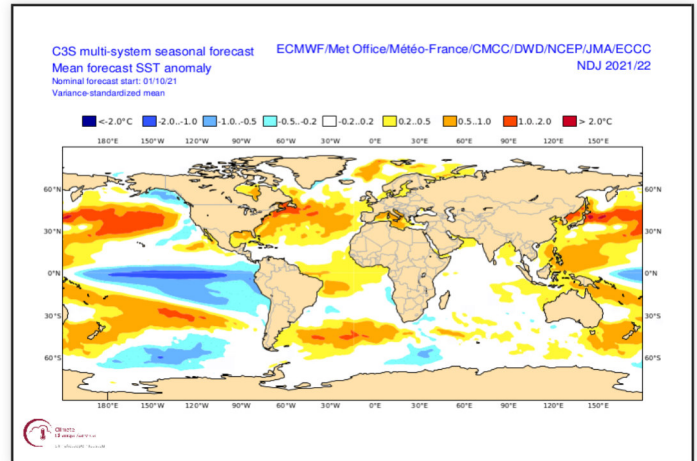
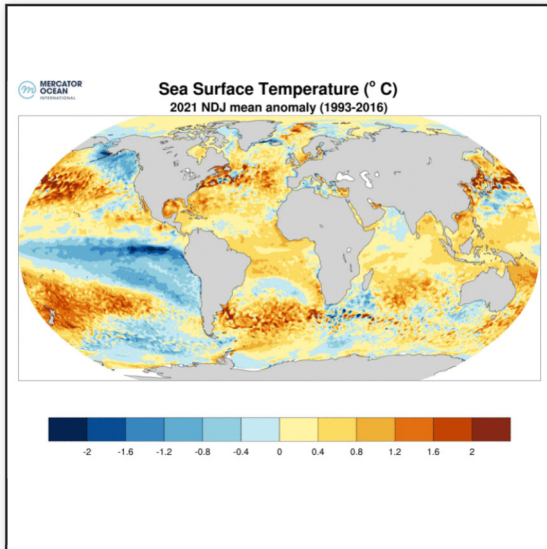
Introduction : Objective

- 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

In the tropics, the main anomalies are well forecasted. However in the Pacific Ocean, SST is not cold enough close to the South American coasts in MF-S8, and the coldest area is shifted westward.

At mid-latitudes, the main patterns are well forecasted. In the Gulf of Alaska, models are not cold enough.

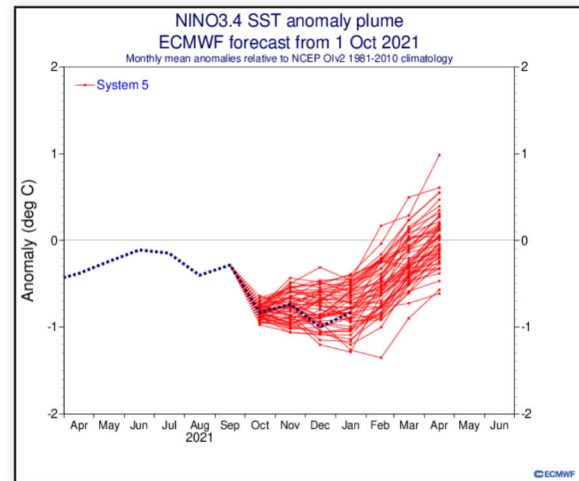
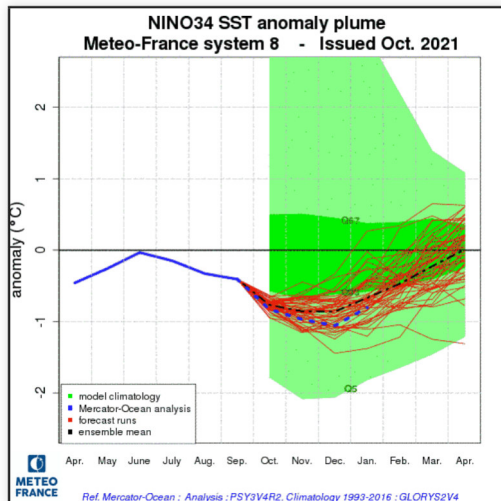


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S7 (bottom left) and SEAS5 (bottom right)

Oceans : ENSO

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

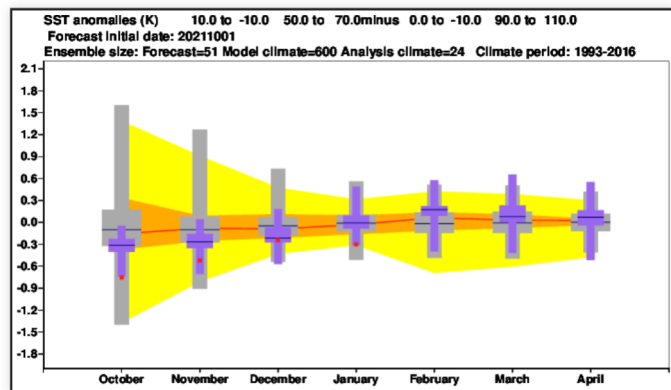
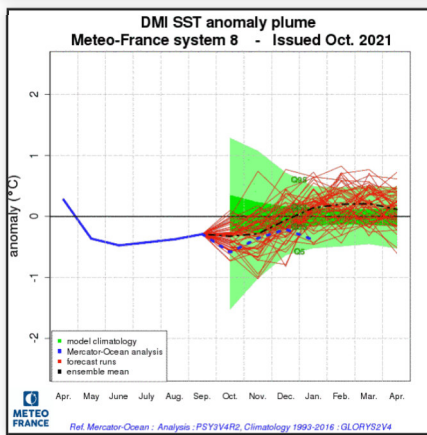
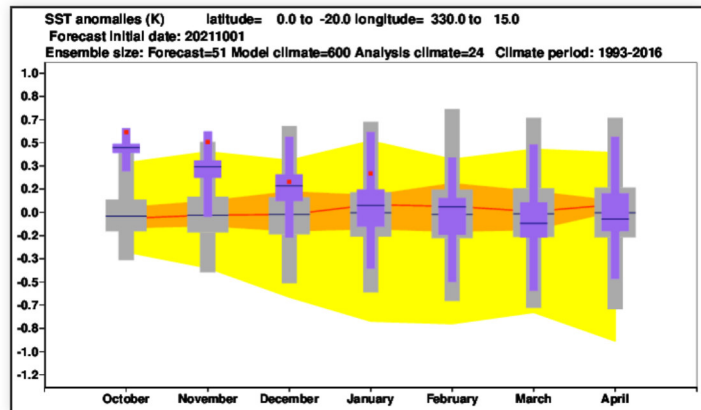
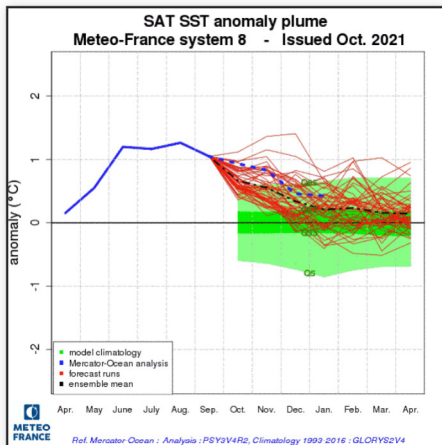
Very good forecast for the two models.



Oceans : tropical Atlantic and Indian Ocean index

SAT : The negative trend was well anticipated, but models tend to decrease too rapidly

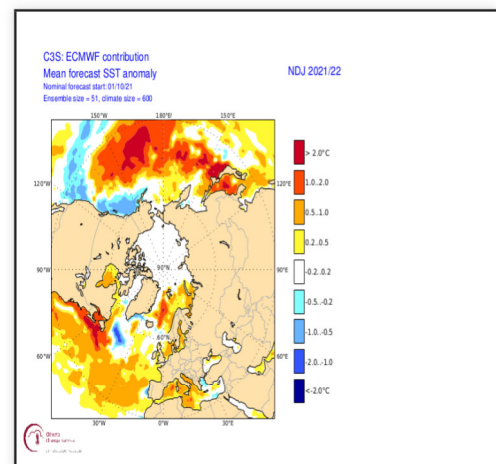
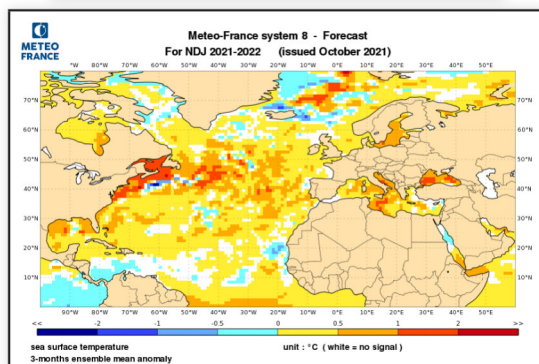
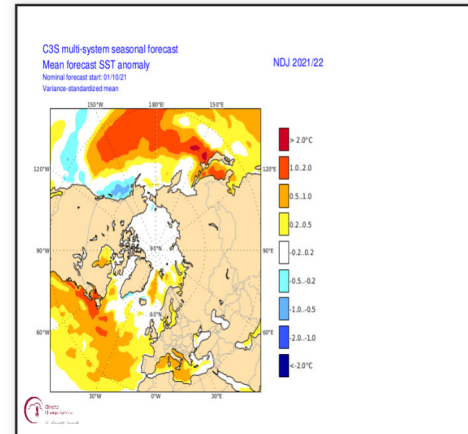
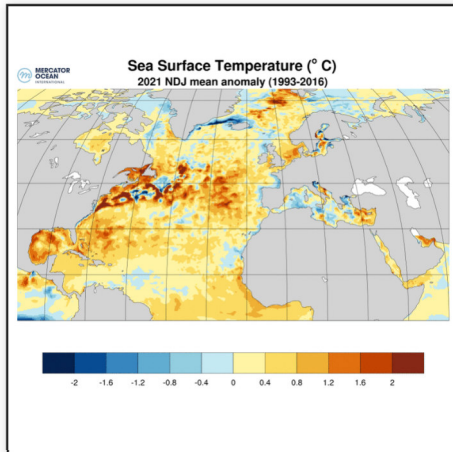
DMI : good forecasts of a return to "close to normal" conditions



Oceans : North Atlantic SST

The strong positive anomaly in the western part of the Ocean (close to North America) is correctly forecasted, as well as the warm anomaly extending from Florida to Spain.

The models didn't forecast the cold anomalies in the Mediterranean Sea.

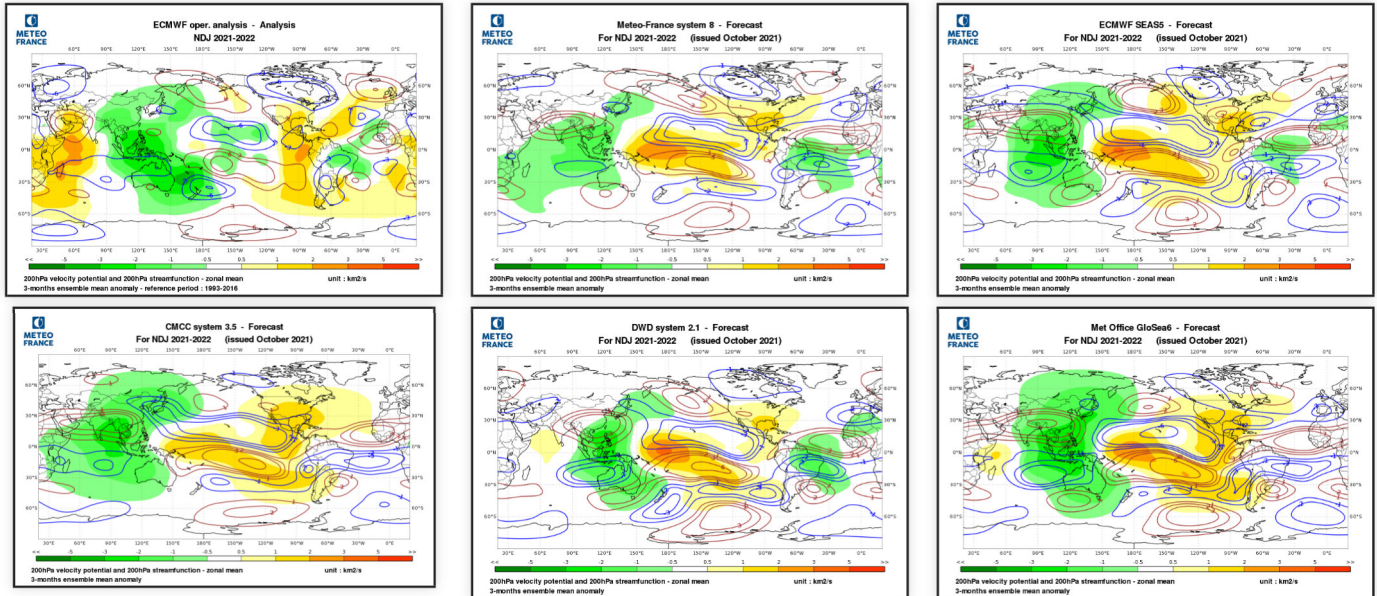


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S7 (bottom left) and ECMWF SEAS5 (bottom right)

Atmospheric circulation : Global teleconnection

VP : relatively good forecast for all the models. The main upward anomaly centred on the Maritime Continent was generally well forecasted. Anyway, it was located too far west. The second significant upward anomaly over Amazonia was present in 3 models out of 5. The downward motion anomaly over Central Pacific didn't occur, despite a good consistency between models to forecast it. This is probably due to a very active MJO in December in sector 6 and 7.

SF : the teleconnexion toward North America (PNA- pattern) was relatively well forecasted, despite a westward shift (in link with the shift in PV200). Over the Atlantic, the teleconnexions from tropics to mid-latitudes is not clear in the analysis. It seems that it was exaggerated in the models

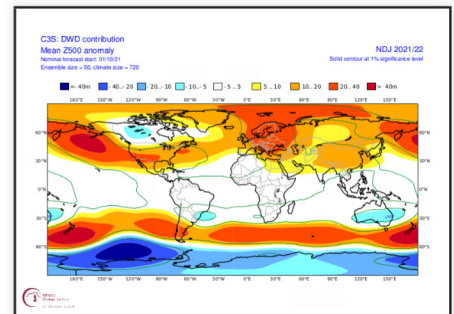
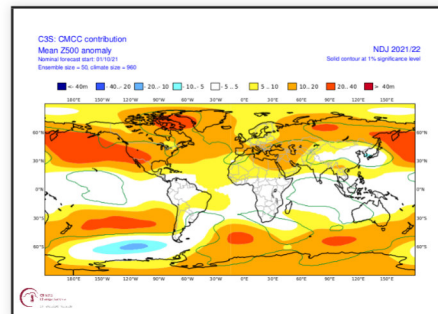
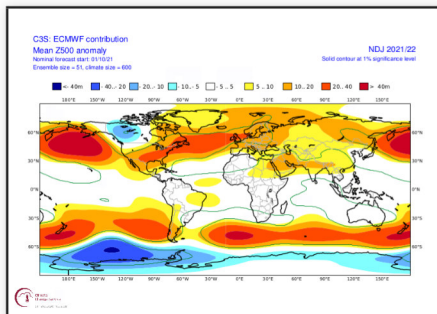
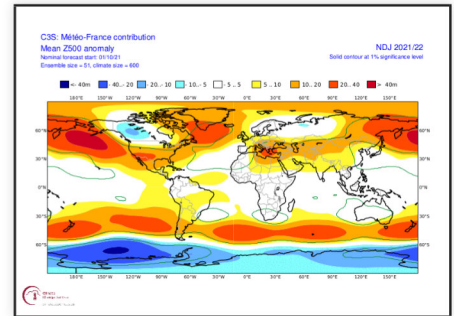
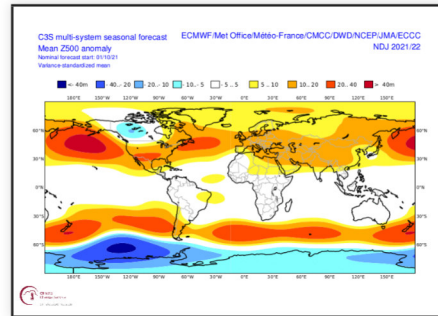
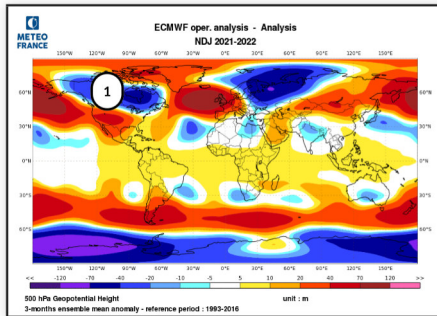


ECMWF analysis, MF-S7, ECMWF-SEAS5, CMCC, DWD and JMA 200hPa velocity potential anomalies (color range, green : ascending, orange: subsiding) and stream function anomalies (isolines, red: anticyclonic in the northern hemisphere, blue: cyclonic in the northern hemisphere).

Atmospheric circulation : 500hPa Geopotential height

On analysis, PNA- pattern linked to La Nina. It has been forecasted by a majority of models.

Over North Atlantic and Europe, the dipole between the positive anomaly over the Ocean and Western Europe and the negative anomaly centered on Scandinavia was not predicted. Note that several models suggested a positive anomaly over Northern Atlantic (Atlantic Ridge pattern), but less extended on western Europe.

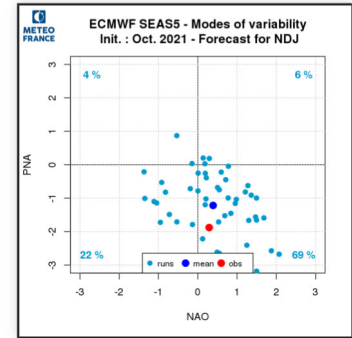
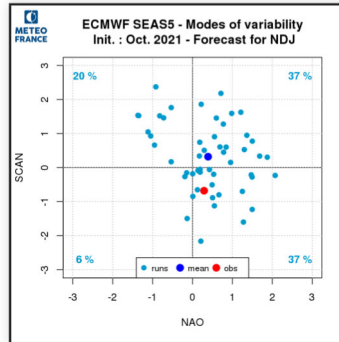
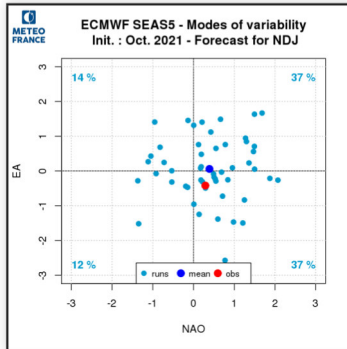
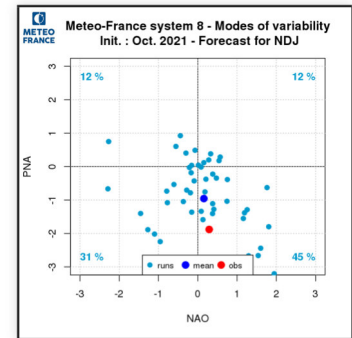
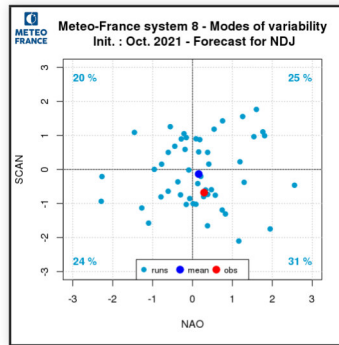
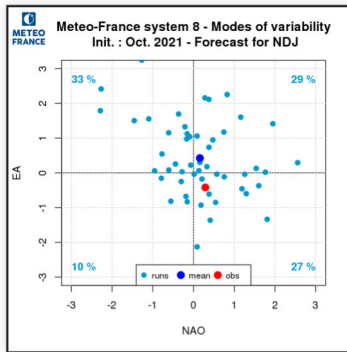


ECMWF analysis, C3S multi-system, MF-S7, ECMWF-SEAS5, CMCC and DWD 500hPa geopotential height anomalies.

1 - Look like PNA -

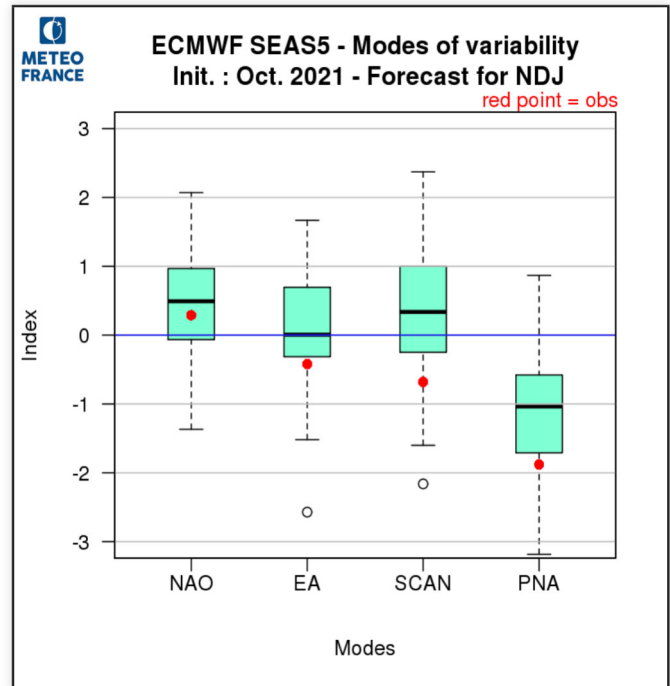
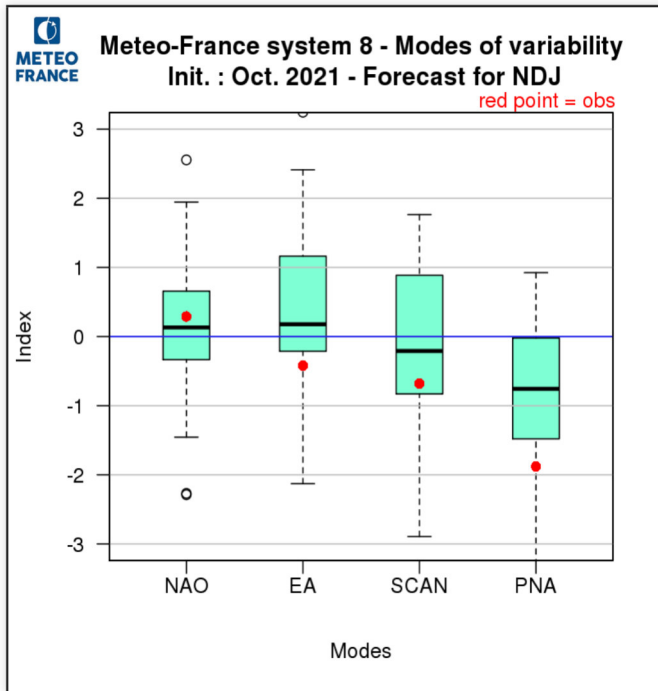
Atmospheric circulation : Modes of variability

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



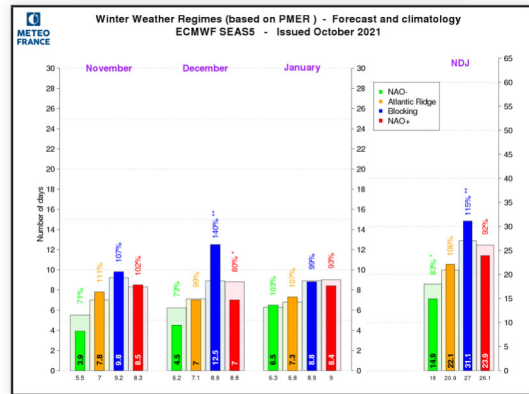
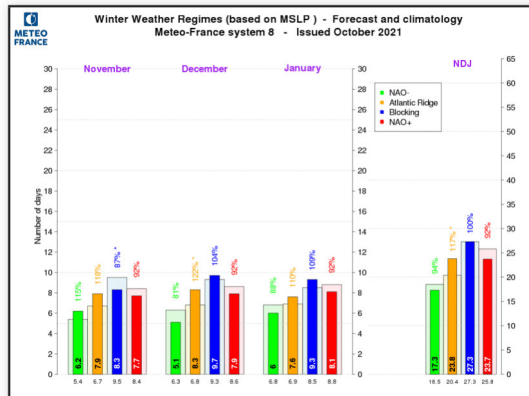
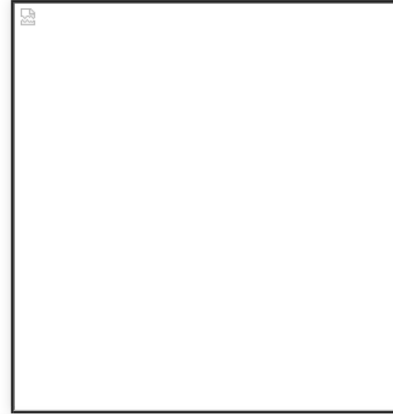
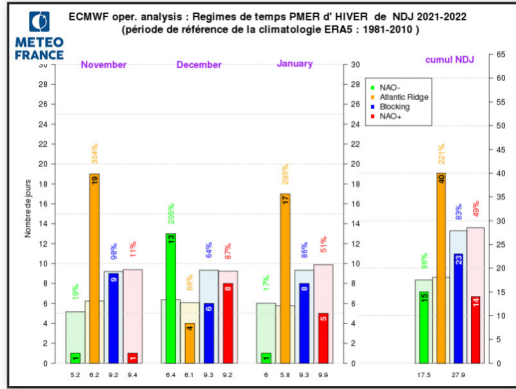
Atmospheric circulation : Modes verification

Same observation as for the previous slide



Atmospheric circulation : Winter SLP weather regimes

Over the quarter, the AR regime was dominant to the detriment of the Blocking and NAO+ regimes. Only MF-S8 slightly emphasized the AR regime.

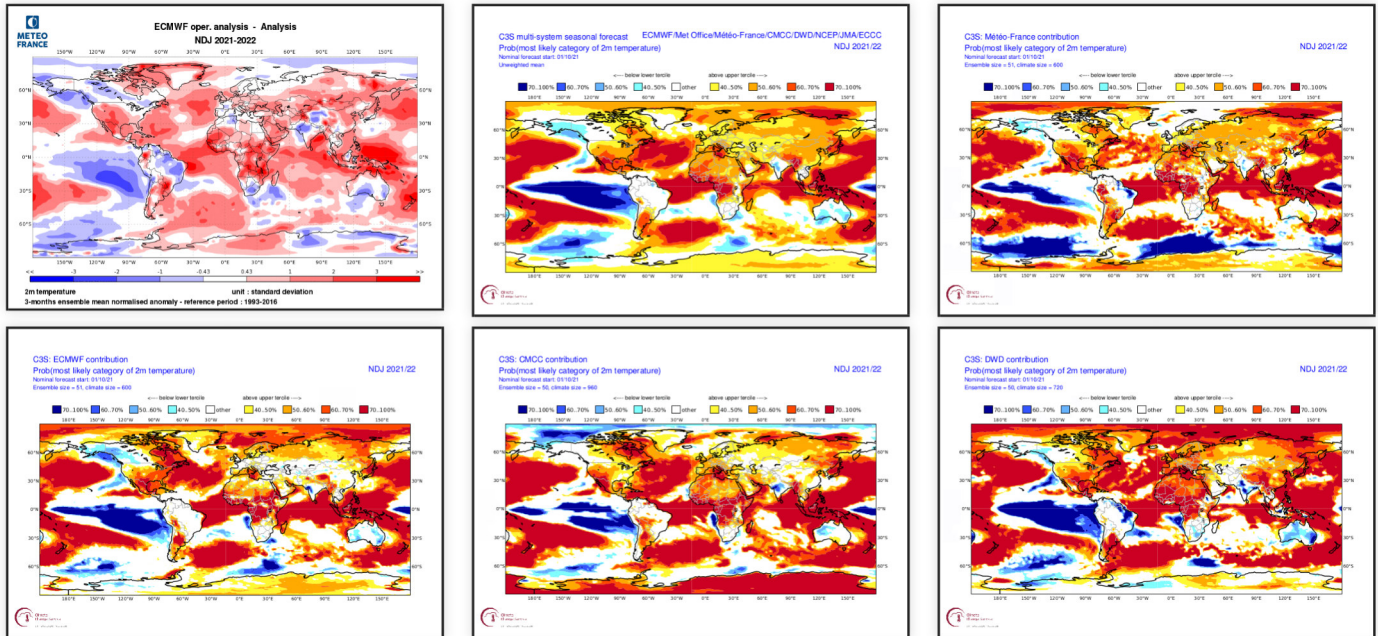


weather regime : ECMWF analysis top left, MFT and ECMWF forecasts at the bottom. MJO phase top right

Climatic parameters : temperature on the globe

The main anomalies in the tropics were correctly forecasted.

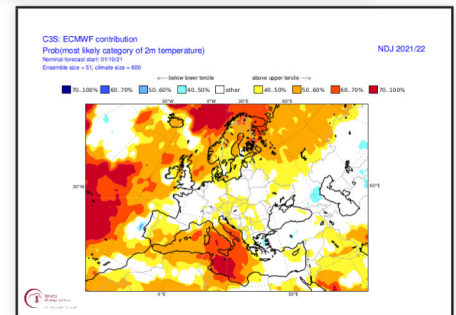
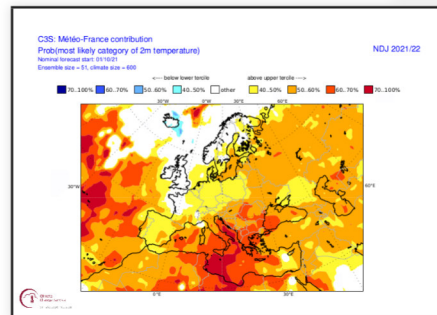
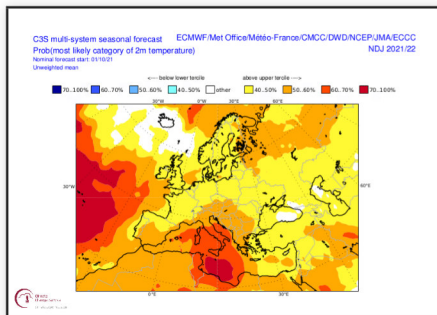
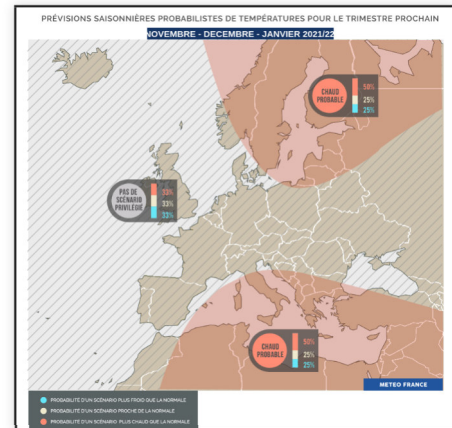
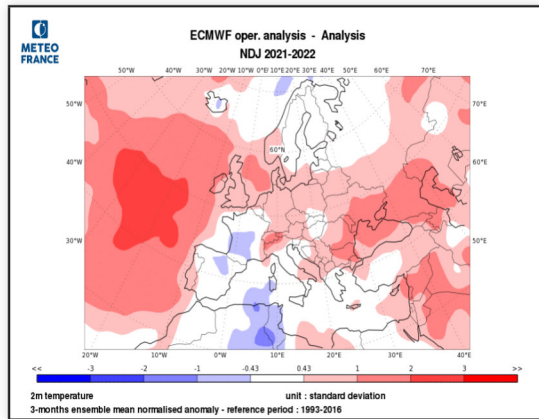
In mid-latitudes, the forecasts were also globally correct over the continents at large scale. Over Europe there was less consensus between models.



ECMWF analysis top left, forecast for multi-model top center and forecast for MF-S7 top right, ECMWF-SEASS, CMCC, DWD on the bottom line.

Climatic parameters : temperature over Europe

The forecast (from models and synthesis map) was not correct over Europe. The regions with the highest probabilities of "warmer than normal" scenario (Scandinavia, Mediterranean Sea) actually experienced normal conditions.

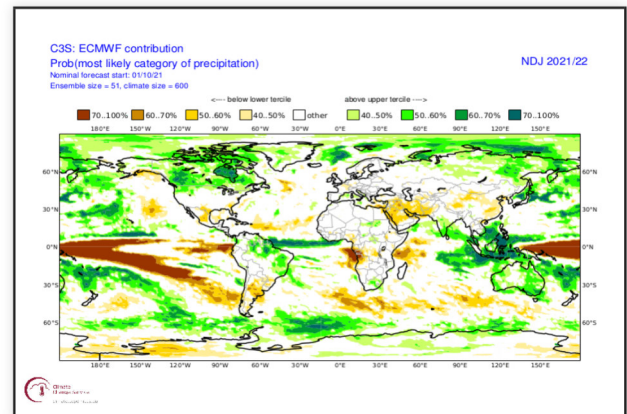
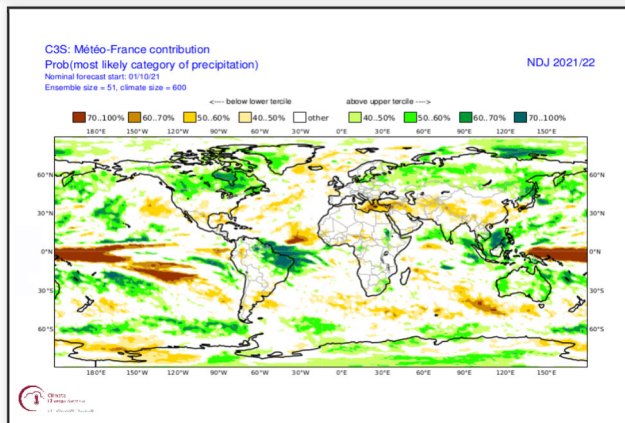
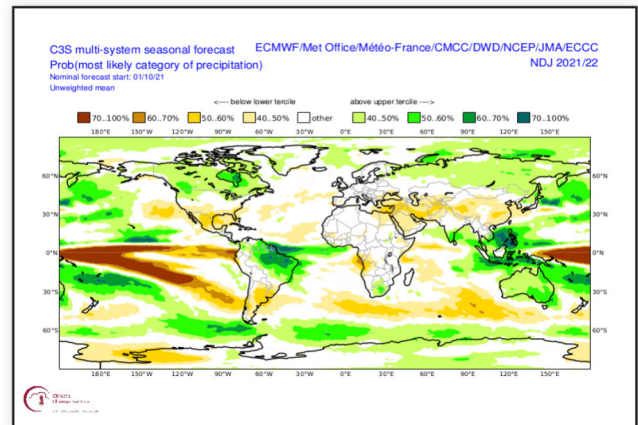
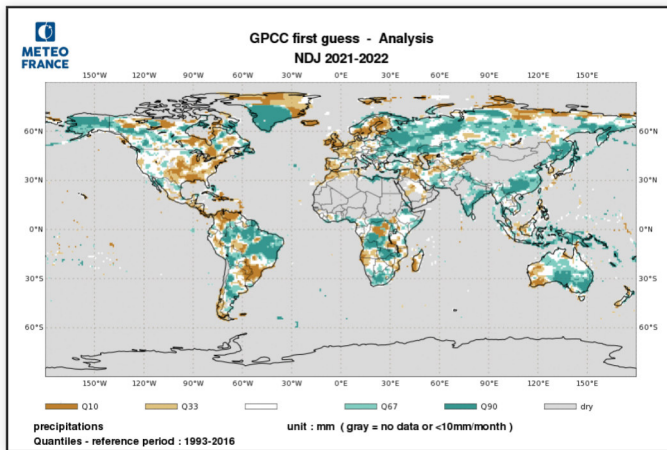


ECMWF analysis top left, synthetic forecast map top right. Forecast for multi-system, MF-S7 and SEAS5 on the bottom line.

Climatic parameters : Precipitations over the globe

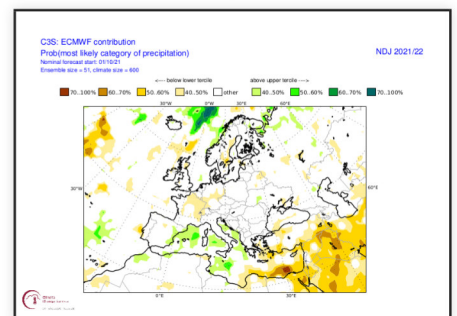
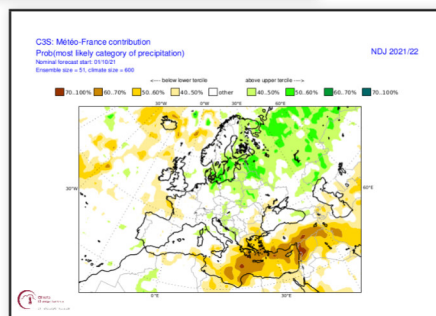
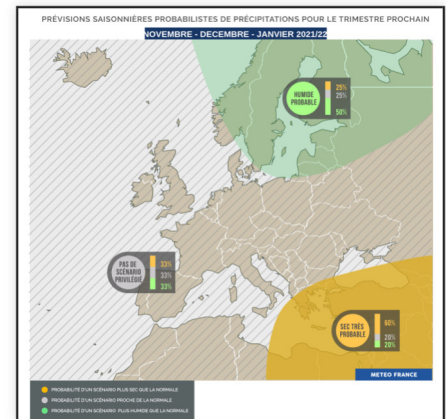
On the tropics, good forecast around Amazonia, Australia and the Maritime Continent.

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-S7 and SEAS5 on the bottom line.

The forecast, in link with a poor forecast of circulation, was not able to forecast this situation.



Precipitation anomalies analysed by IRI (top left). Synthetic forecast map for precipitation (top right) and forecast for multi-model, MF-S7 and SEAS5 (on the bottom line).