

VERIFICATION BULLETIN

JANUARY - FEBRUARY - MARCH 2020

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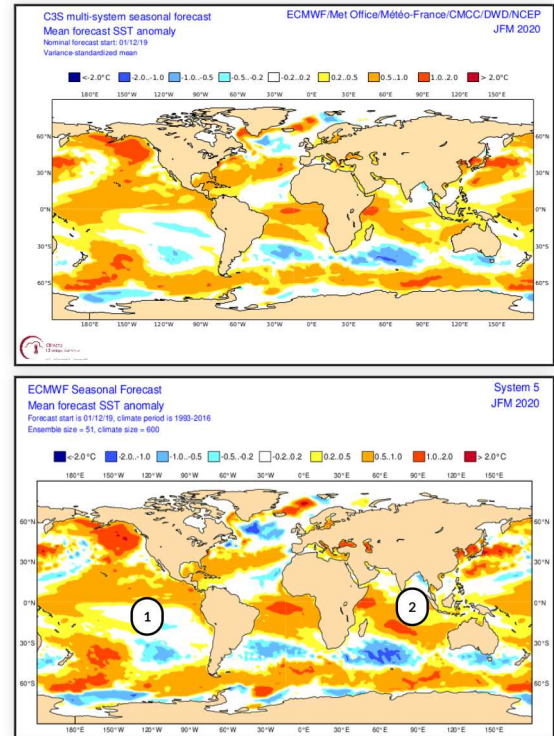
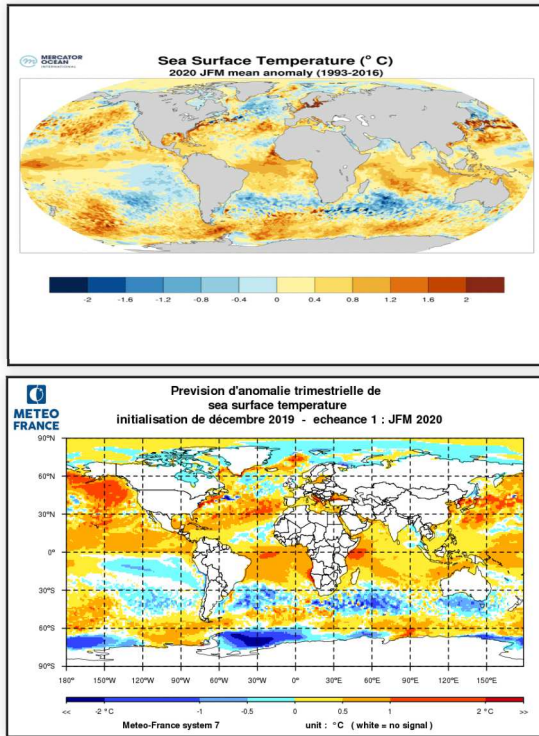
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Introduction : Objective

- 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

The models captured the SST patterns very well in all the oceans.



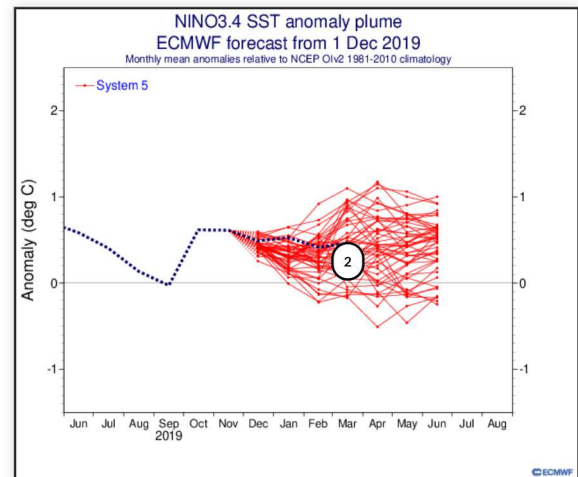
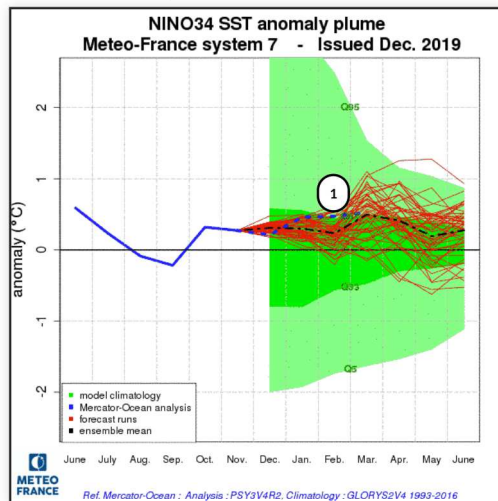
SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S7 (bottom left) and SEAS5 (bottom right)

- 1 - The expected cold anomaly was insufficiently strong.
- 2 - ECMWF-SEAS5 was a little bit better than MF7 in the Indian Ocean

Oceans : ENSO

CAUTION : reference analysis differ between MF-S7 (Mercator-Ocean 1993-2016) and SEAS5 (NCEP 1981-2010).

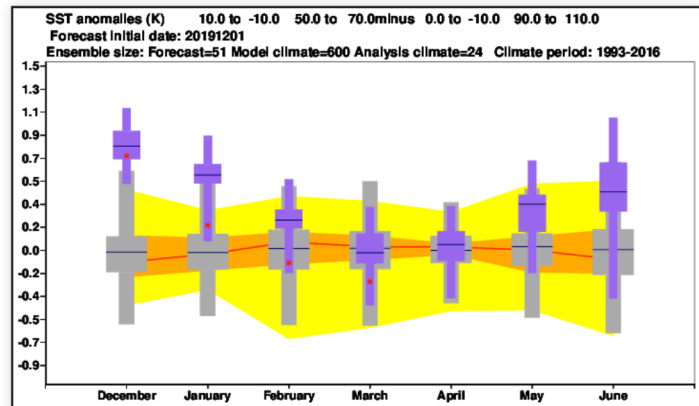
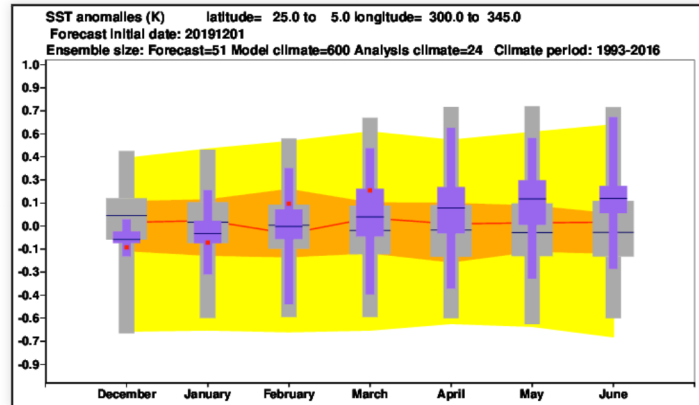
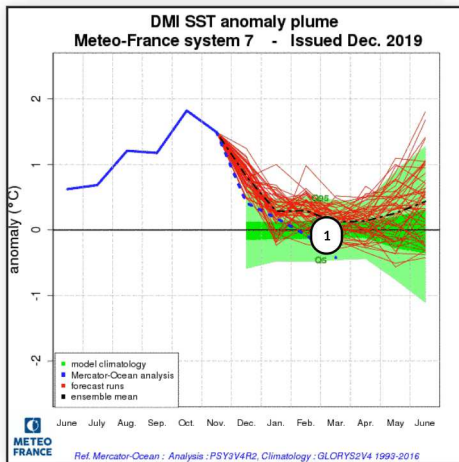
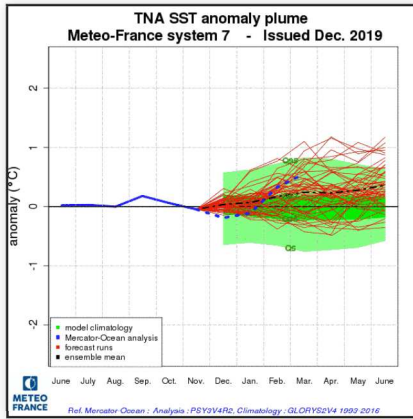
In both models, a majority of the runs forecasted a slightly colder anomaly than what happened, but without influence on the good choice of the neutral phase.



- 1 - Good forecasts, close to analysis
- 2 - Hot anomaly underestimated by most SEAS5 runs

Oceans : tropical Atlantic and Indian Ocean index

Both models had very similar forecasts.

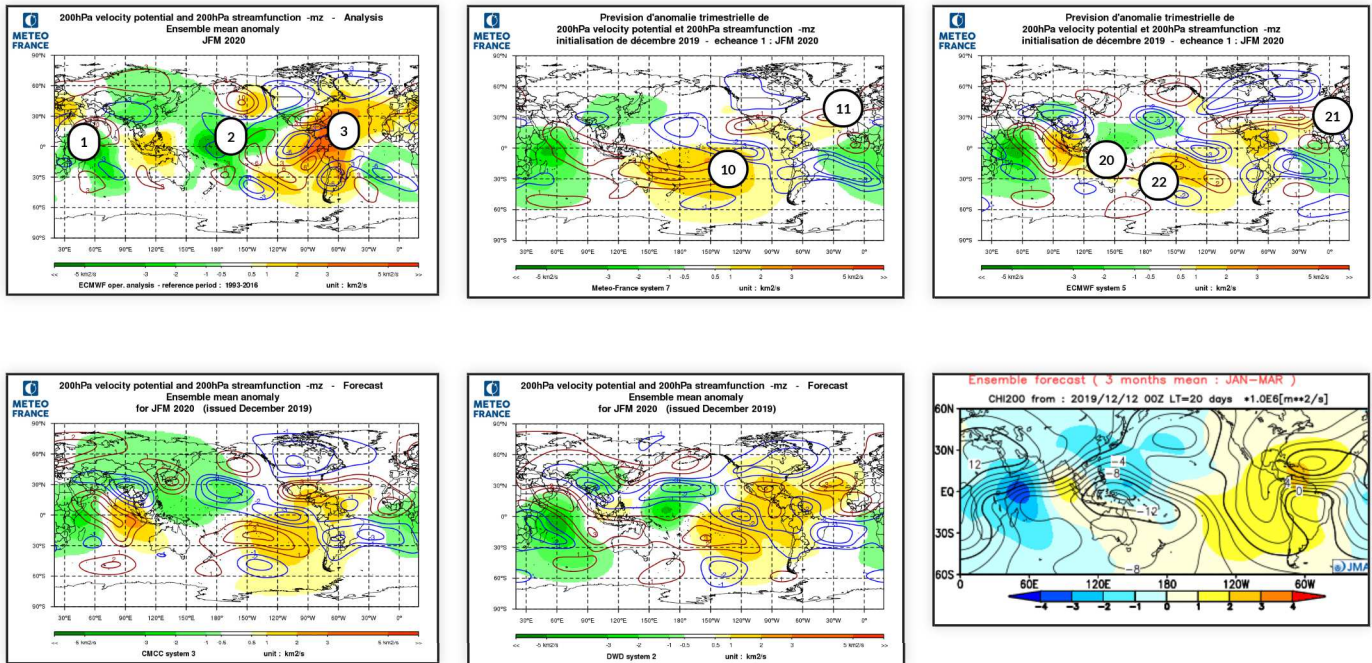


1 - The fall was well anticipated, although slightly insufficient.

Atmospheric circulation : Global teleconnection

VP 200hPa : The Indian Ocean dipole was generally well positioned. The forecast was more difficult on the Pacific Ocean. The Central America subsidence anomaly pole was only anticipated by a few models. MF7 was not very successful on this forecast while ECMWF, DWD and JMA were rather good.

SF 200 hPa : The SF kernels were generally quite well predicted except by MF7 which was not successful for SF either.



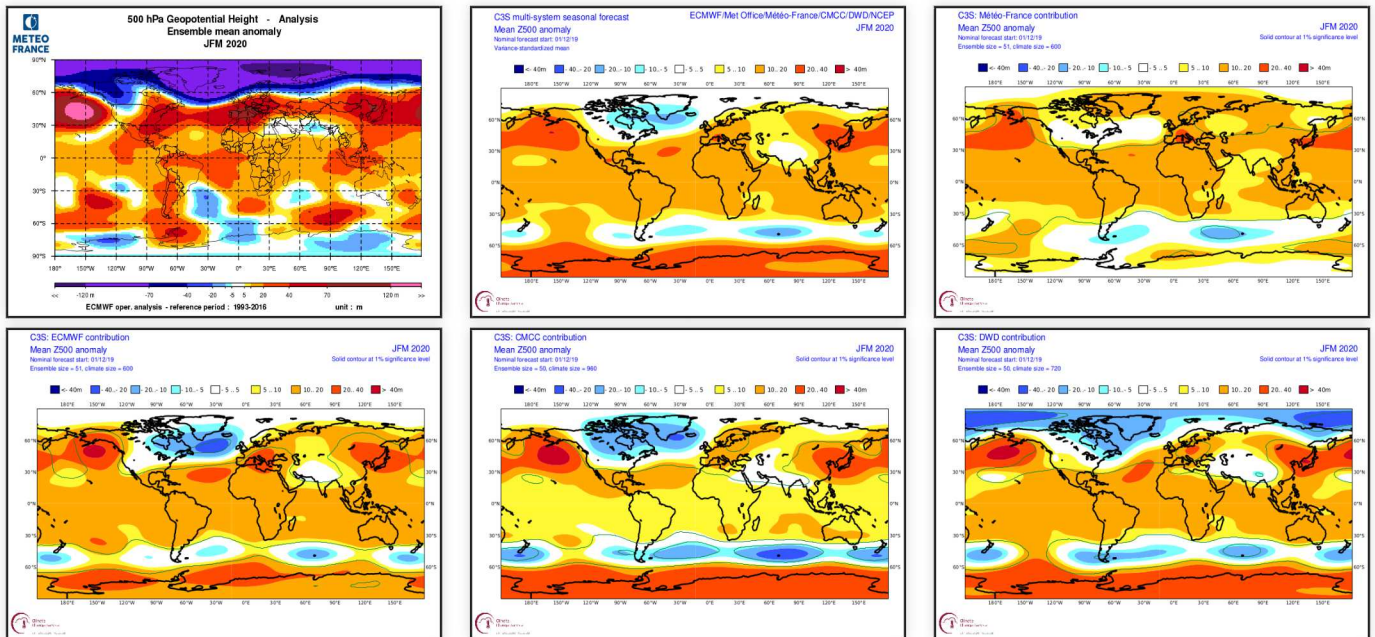
ECMWF analysis, MF-S7, ECMWF-SEAS5, CMCC, DWD and JMA 200hPa velocity potential anomalies (color range, green : ascending, orange: subsidence) and stream function anomalies (isolines, red: anticyclonic in the northern hemisphere, blue: cyclonic in the northern hemisphere).

- 1 - VP : Cell over the Indian Ocean: upward motion anomaly on the west and downward on the east
- 2 - VP : upward motion anomaly
- 3 - VP: Strong downward motion anomaly
- 10 - Poor forecast over the Pacific
- 11 - too soft on the Atlantic and America
- 20 - Good VP forecast
- 21 - Good SF patterns
- 22 - VP : poor forecast for the southwest Pacific

Atmospheric circulation : 500hPa Geopotential height

For the northern hemisphere, the general pattern was well anticipated, in particular by the C3S multi-model. With low values over northern India, high values from Japan to the Gulf of Alaska and an extremely marked NAO + configuration over the North Atlantic.

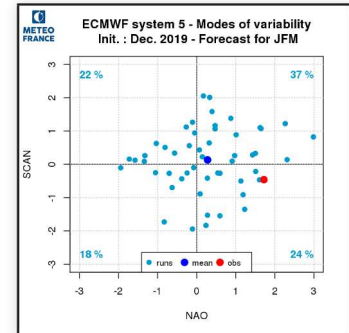
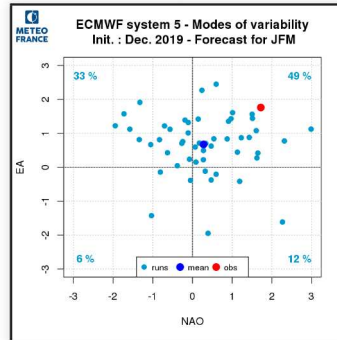
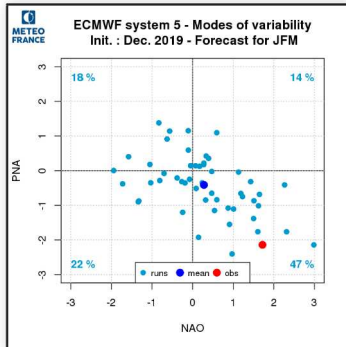
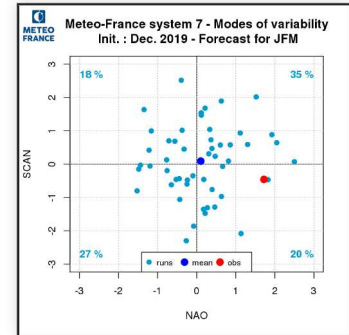
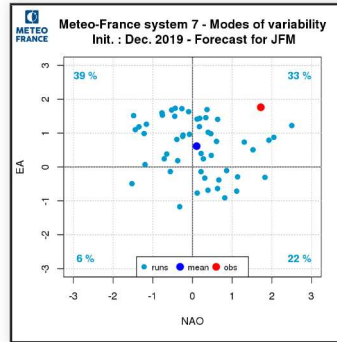
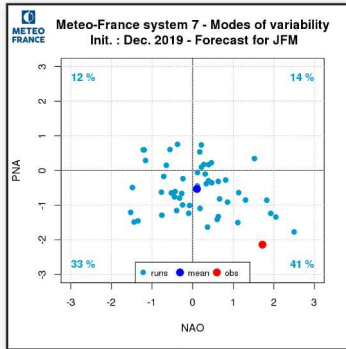
As for the fields at 200hPa, MF7 was not very efficient for this forecast.



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

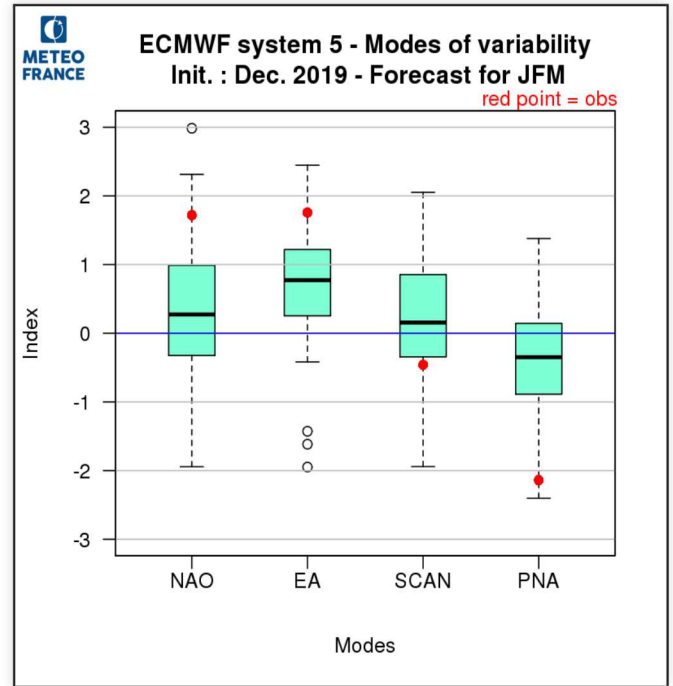
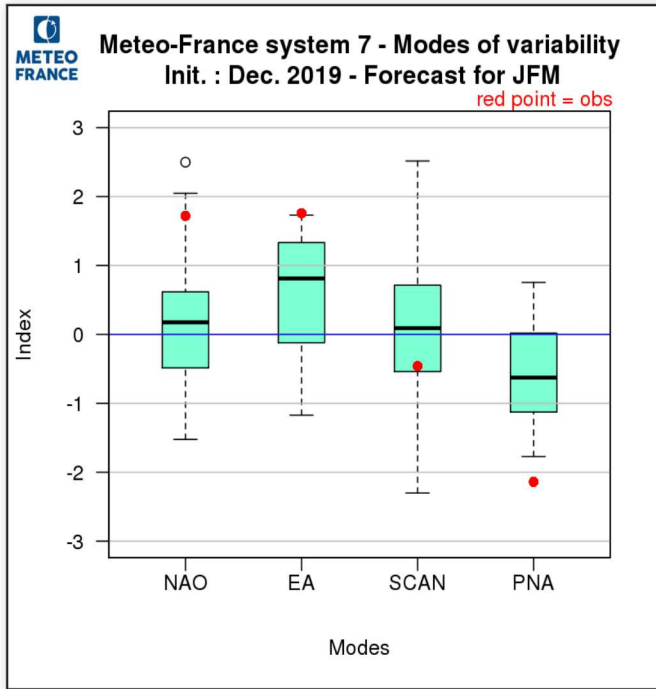
Atmospheric circulation : Modes of variability

The trend suggested by both models for the NAO, EA and PNA modes was good but of weak intensity compared to the very high values observed. The forecast of the SCAN mode was conventionally faulty.



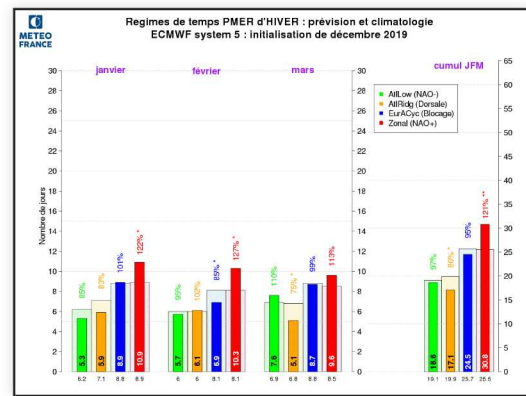
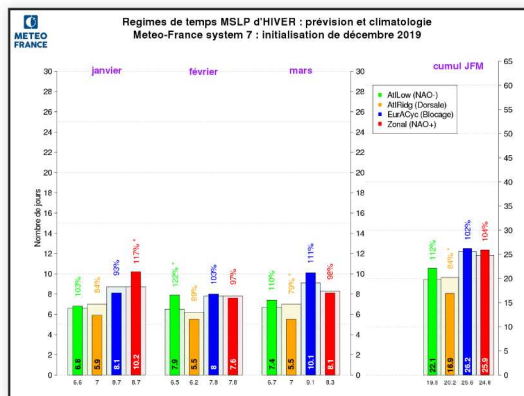
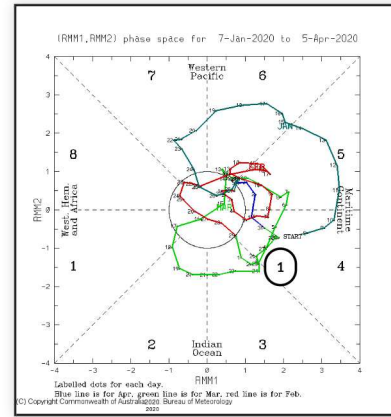
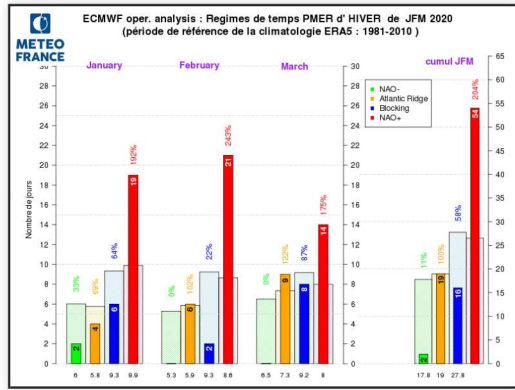
Atmospheric circulation : Modes verification

Same remark as for the slide above.



Atmospheric circulation : Winter SLP weather regimes

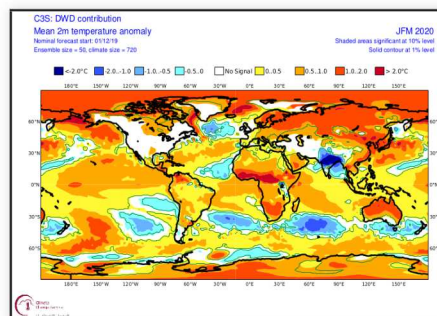
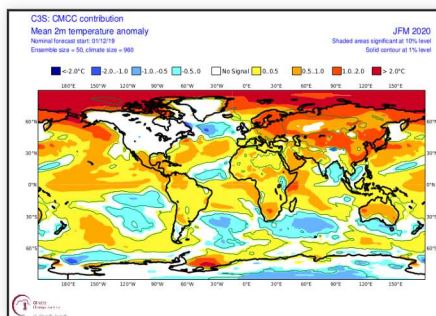
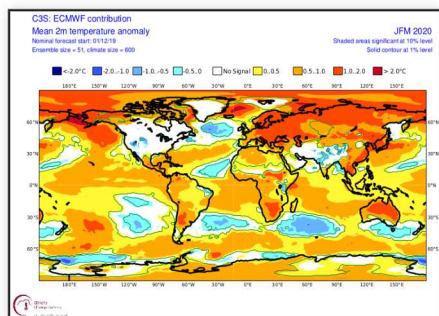
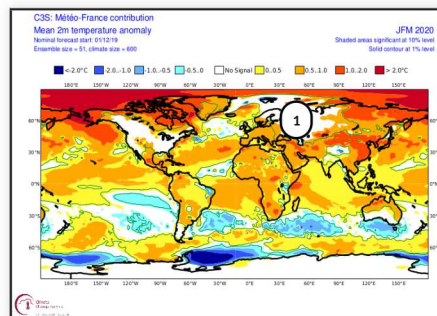
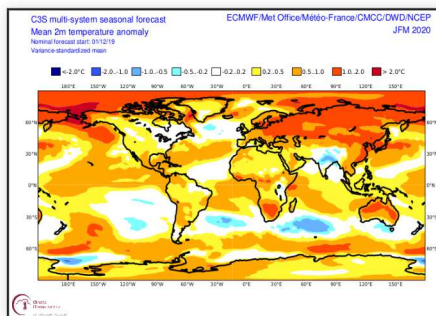
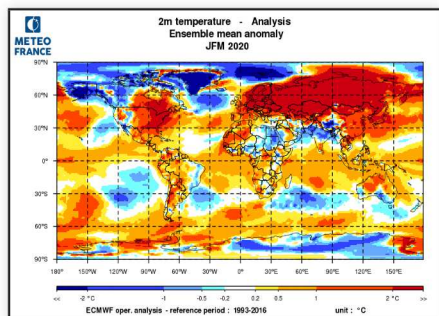
Very large excess of NAO+ and practically no NAO- in the analysis. Not surprisingly, ECMWF has better predicted this trend than MF7



1 - Sectors 2 to 5 were the most frequented. The expected effect in sectors 3 and 4 is a surplus of NAO+

Climatic parameters : temperature on the globe

The forecast was generally very good all over the world, except in North America where no model had predicted the scenario that occurred

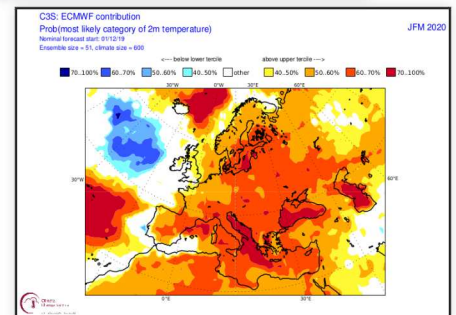
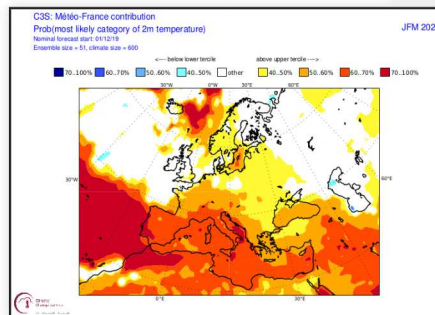
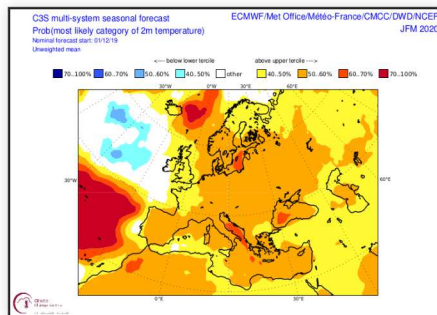
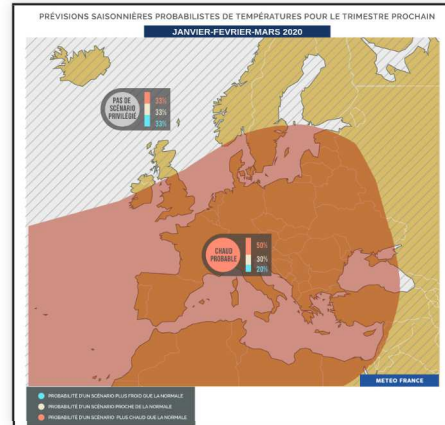
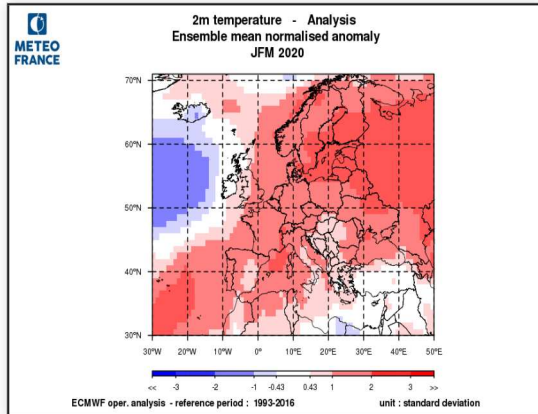


ECMWF analysis top left, forecast for multi-model top center and forecast for MF-S7 top right, ECMWF-SEAS5, CMCC, DWD on the bottom line.

1 - MF7 was not good on this area.

Climatic parameters : temperature over Europe

Good temperature forecast for Europe. The models (and particularly MF7) did not clearly extend the high probability of warm anomaly to Eastern Europe. Consequently, the summary remained cautious in this area.



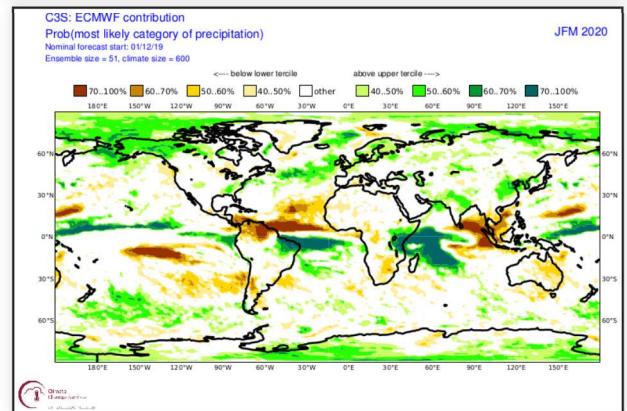
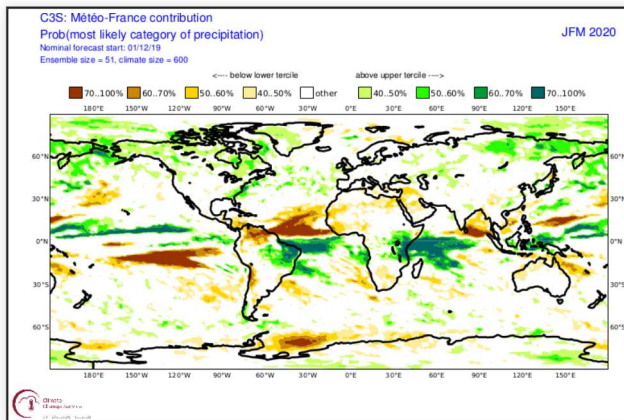
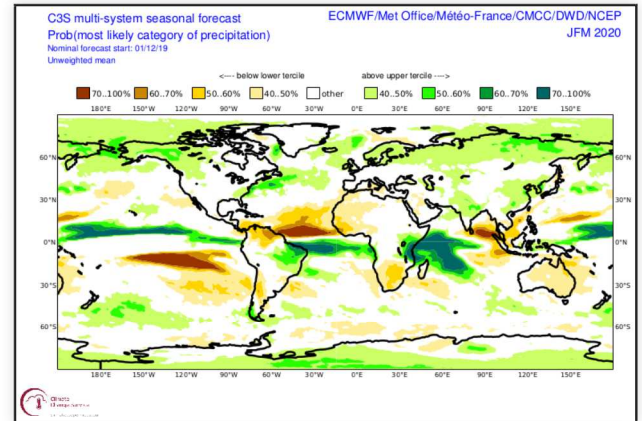
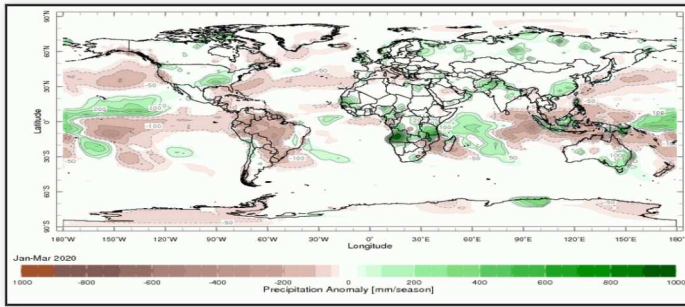
ECMWF analysis top left, synthetic forecast map top right. Forecast for multi-system, MF-S7 and SEAS5 on the bottom line.

Climatic parameters : Precipitations over the globe

Very good forecast around the Indian Ocean : east of Africa, Madagascar, India, the Maritime Continent and North of Australia.

Wet trend well foreseen on Asia.

Less successful on Africa and America.

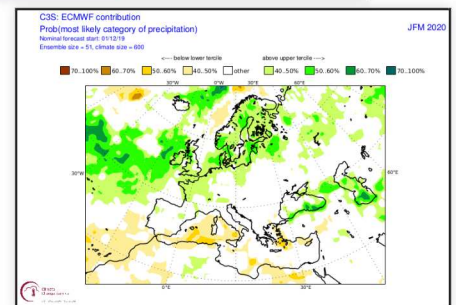
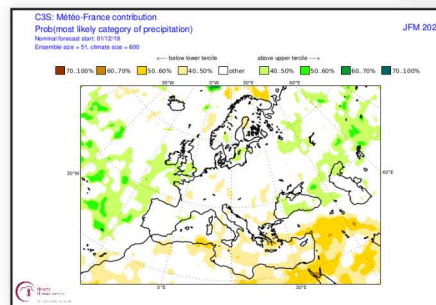
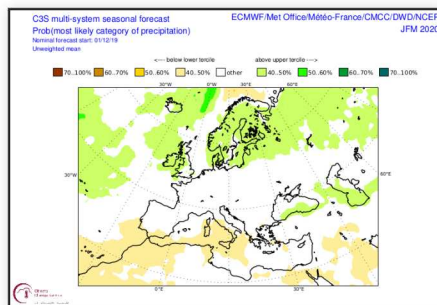
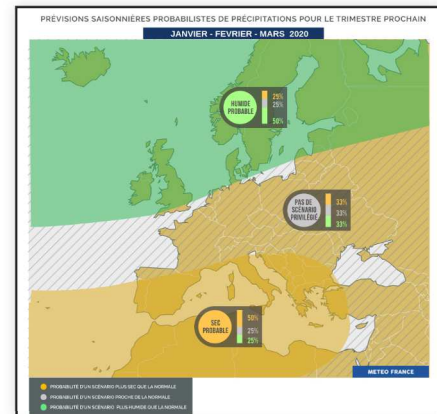
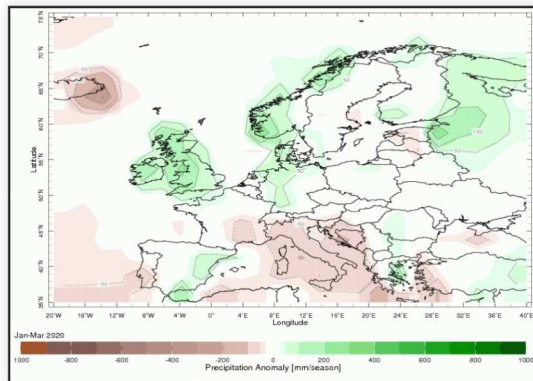


Standardized Precipitation Index analysed by IRI top left, forecast for multi-model top right and MF-S7 and SEAS5 on the bottom line.

Climatic parameters : Precipitations over Europe

Very good forecast for the gradient, wet to the north, dry in the Mediterranean.

The wet anomaly on the east coasts of Spain is linked to the Gloria storm which generated a very strong accumulation of precipitation in a few days at the end of January.



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).

General summary : for the period JFM 2020

1) Oceans :

SST patterns were generally very well captured by the models.

2) Large scale atmospheric circulation :

VP and SF 200hPa : The Indian Ocean dipole was generally well positioned. The forecast was more difficult on the Pacific Ocean. The Central America subsidence anomaly pole was only anticipated by a few models

Z500 : The general pattern of the northern hemisphere was well anticipated. With low values over northern India, high values from Japan to the Gulf of Alaska and an extremely marked NAO + configuration over the North Atlantic.

The trend for the NAO, EA and PNA modes was good but of weak intensity compared to the very high values observed.

3) Climatic parameters over Europe :

For temperature at large scale, very good forecast all over the world, except in North America where no model had predicted the scenario that occurred

Regarding precipitation, Very good forecast around the Indian Ocean : east of Africa, Madagascar, India, the Maritime Continent and North of Australia. Wet trend well foreseen on Asia. Less successful on Africa and America.

The synthesis maps were very relevant.