

VERIFICATION BULLETIN

MARCH - APRIL - MAY 2020

Table of Content

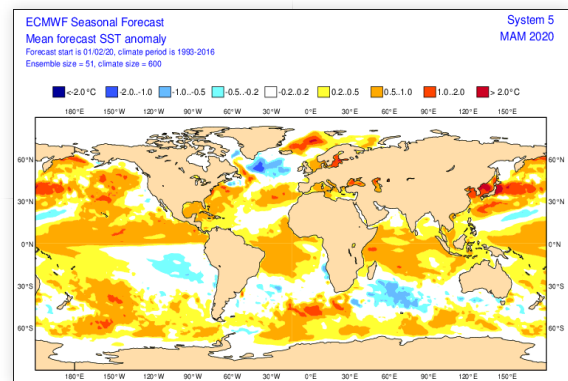
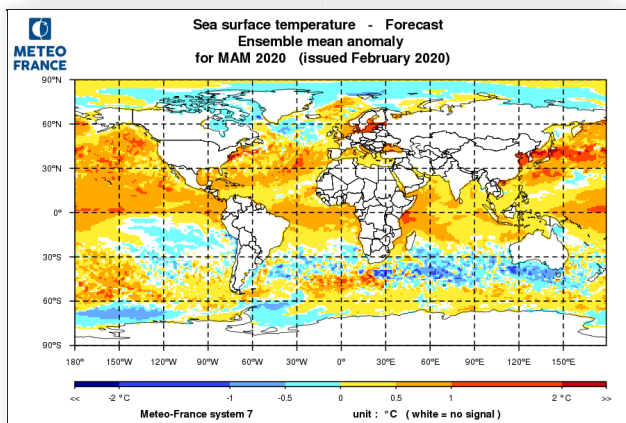
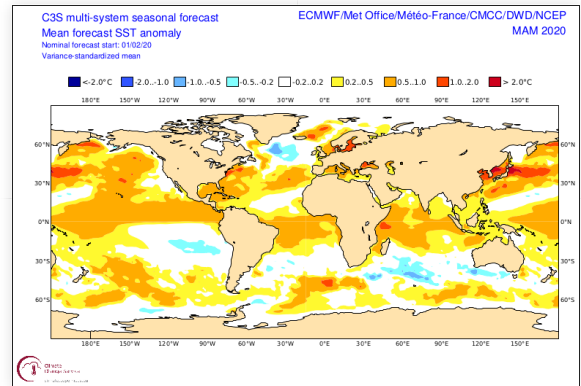
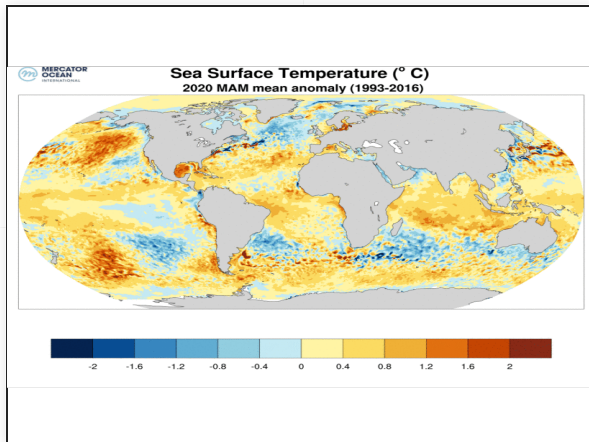
1. Introduction	
1. Objective	3
2. Oceans	
1. surface temperature anomalies	4
2. ENSO	5
3. tropical Atlantic and Indian Ocean index	6
3. Atmospheric circulation	
1. Global teleconnection	7
2. 500hPa Geopotential height	8
3. Modes verification	9
4. Summer SLP weather regimes	10
5. Winter SLP weather regimes	11
4. Climatic parameters	
1. temperature on the globe	12
2. temperature over Europe	13
3. Precipitations over the globe	14
4. Precipitations over Europe	15
5. General summary	
1. for the period FMA 2020	16

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 main SST patterns were very well captured.

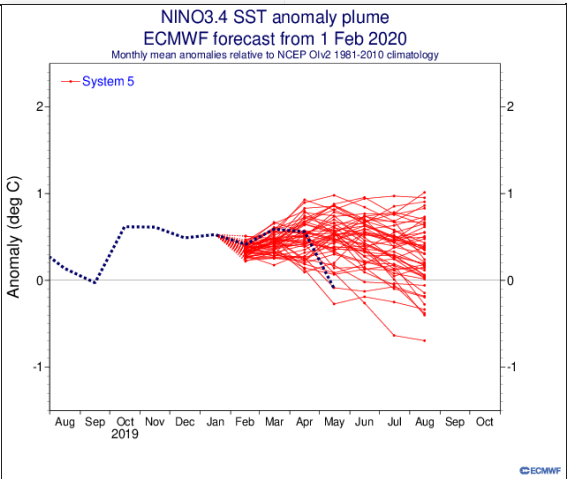
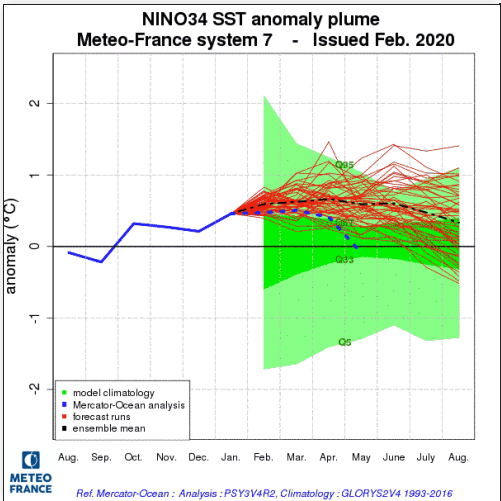


SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF-S7 (bottom left) and SEASS (bottom right)

Oceans : ENSO

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

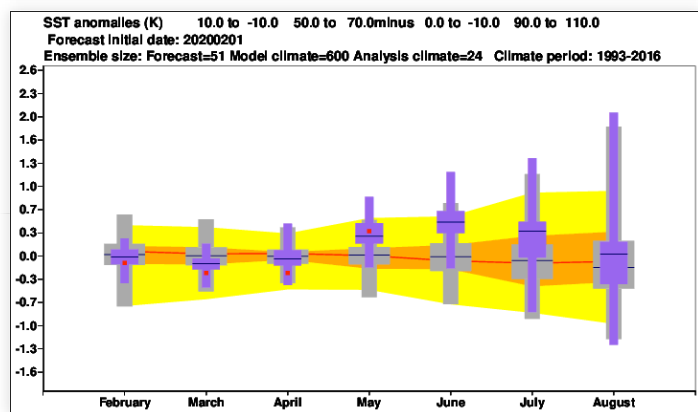
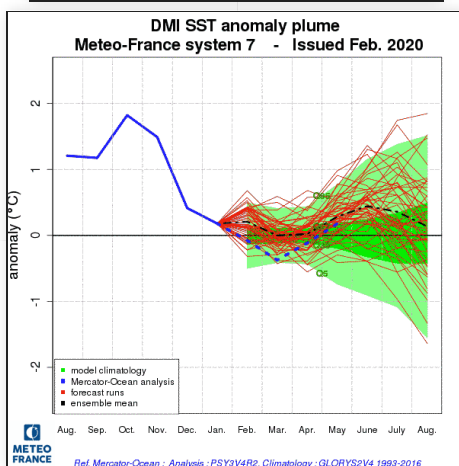
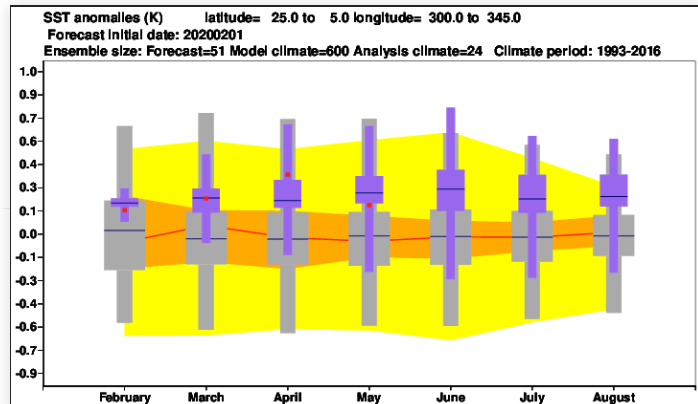
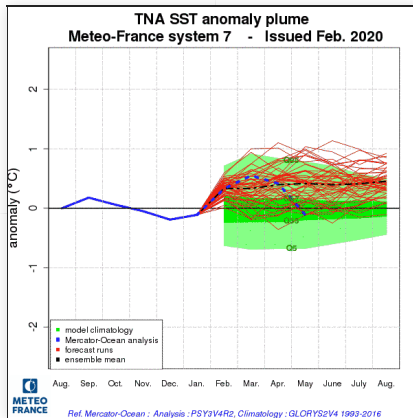
The sudden decrease in May, was not anticipated by the models



Oceans : tropical Atlantic and Indian Ocean index

Both models had very similar forecasts :

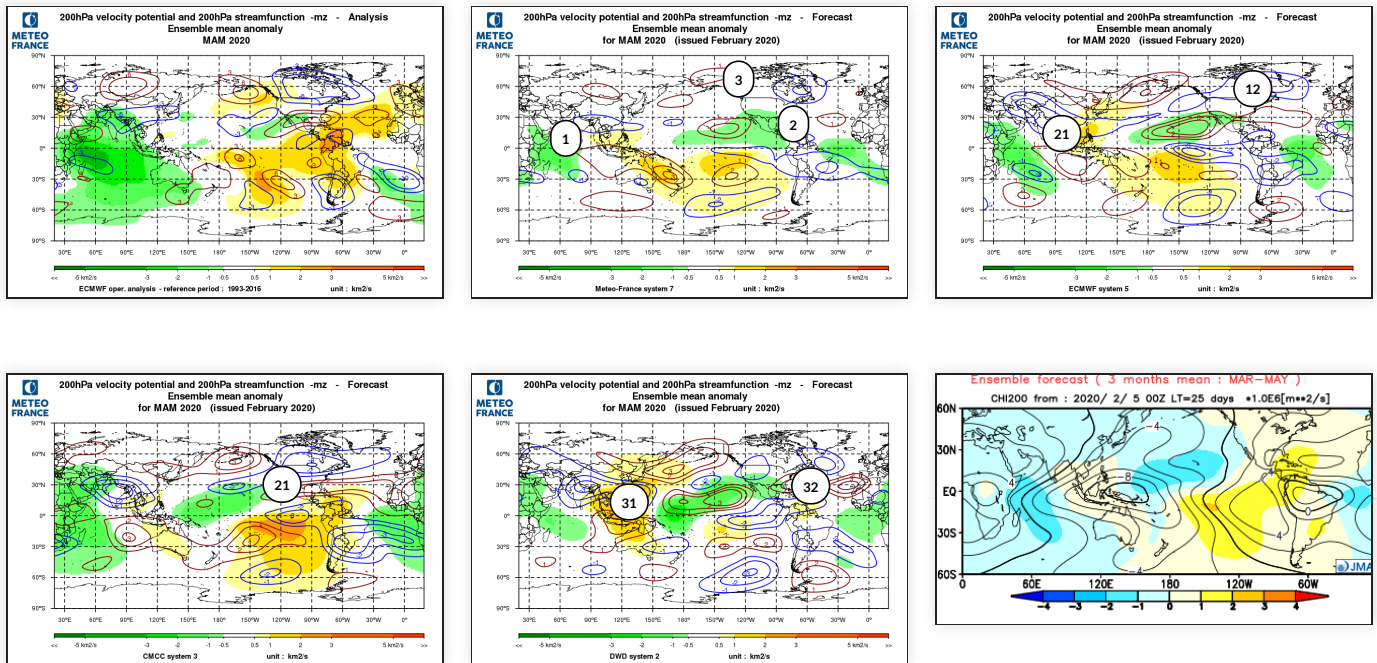
- TNA : The sudden decrease in May had not been anticipated by the models. The values remain in the panache however
- DMI : The sign of evolution is well predicted, even if the March minimum is a little underestimated



Atmospheric circulation : Global teleconnection

P 200hPa : The upward motion area on the Indian Ocean has been underestimated by the models. Likewise, the downward motion anomaly area on the South Pacific was generally underestimated and its extension over Central America and the Atlantic was envisaged by none of the models.

SF 200 hPa : The quadrupole on the eastern Pacific and North America was considered by most of the models, although sometimes too weak.

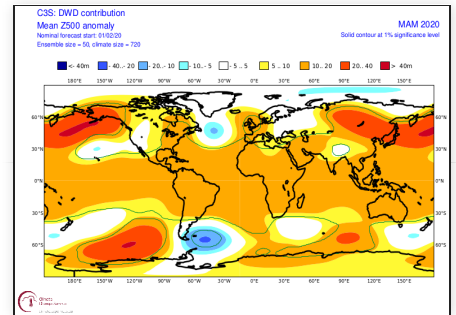
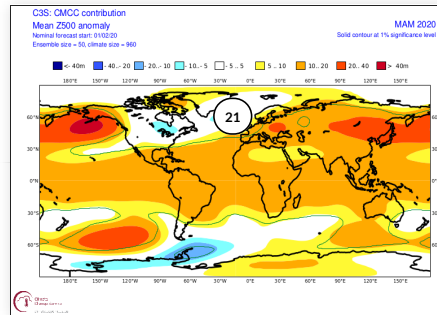
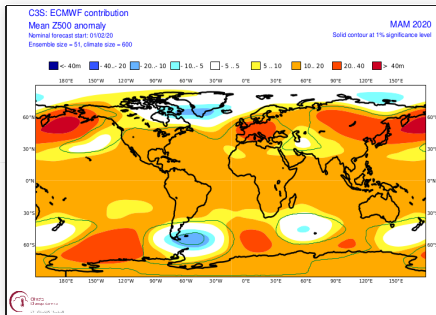
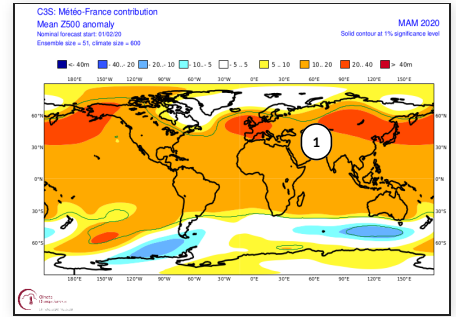
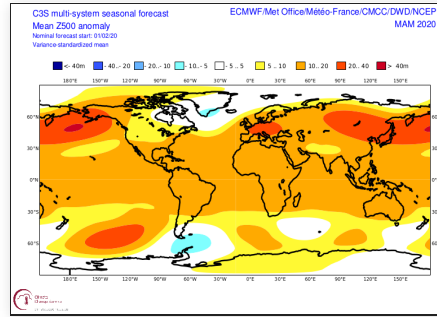
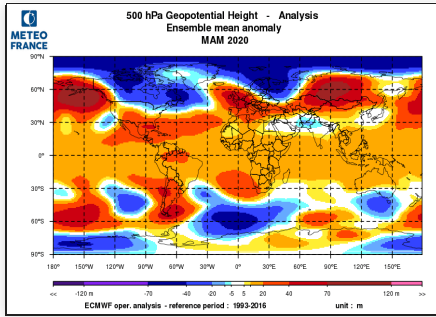


ECMWF analysis, MF-S7, ECMWF-SEAS5, CMCC, DWD and JMA 200hPa velocity potential anomalies (color range, green : ascending, orange: subsidence) and stream function anomalies (isolines, red: anticyclonic in the northern hemisphere, blue: cyclonic in the northern hemisphere).

- 1 - VP : anomaly of upward motion zone too small and too weak
- 2 - VP : bad forecast
- 3 - SF : too weak quadrupole
- 12 - SF : Quite well suggested quadrupole
- 21 - bad forecasts for the Indian Ocean and Maritime Continent.
- 21 - CMCC made the best forecast especially over Eastern Pacific and America
- 31 - Confused forecasts for the Indian Ocean, Maritime Continent and the eastern Pacific.
- 32 - Much better pattern on the Atlantic

Atmospheric circulation : 500hPa Geopotential height

For the northern hemisphere, the general pattern was well anticipated by the models. Multi-model synthesis is relevant.



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

1 - Relative low anomaly not present.

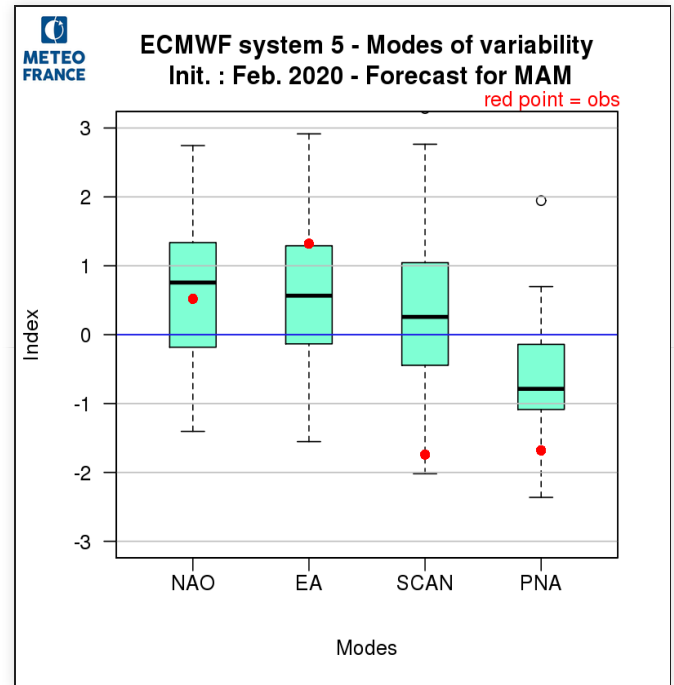
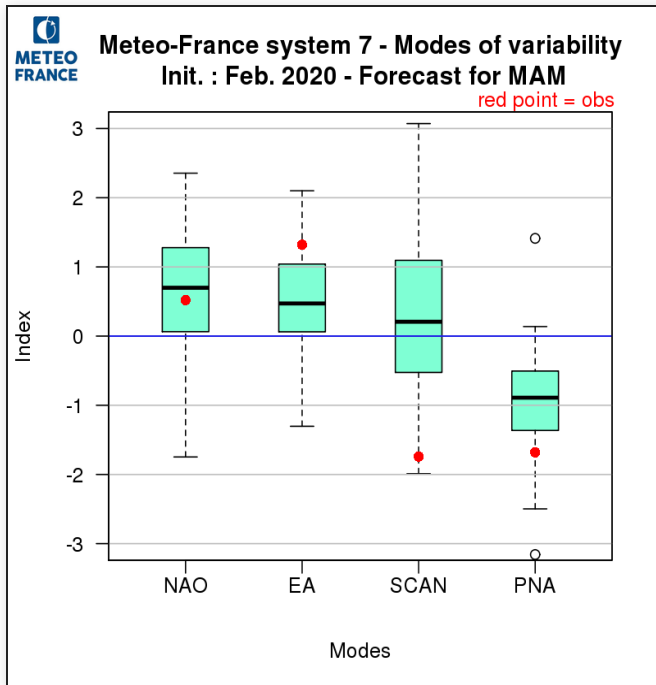
21 - Despite the good forecast of 200 hPa fields, the forecast at 500 is disappointing

Atmospheric circulation : Modes verification

Good forecast of NAO.

EA and PNA modes : the sign was expected but the values were underestimated.

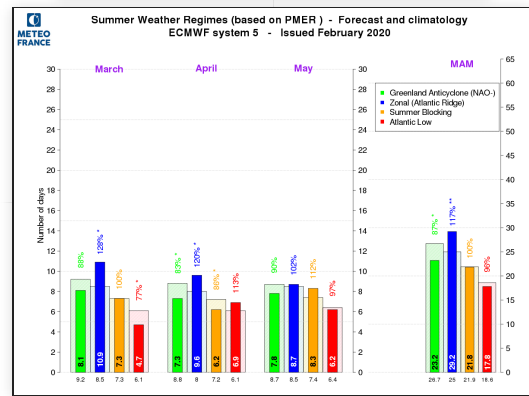
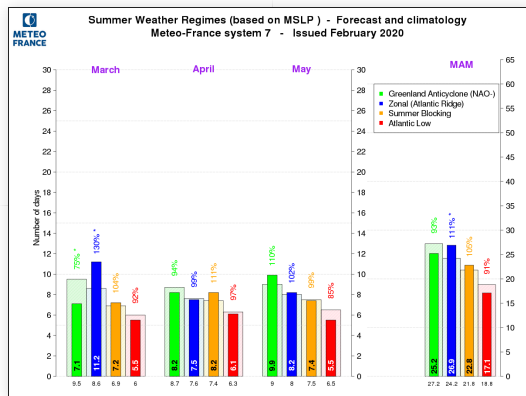
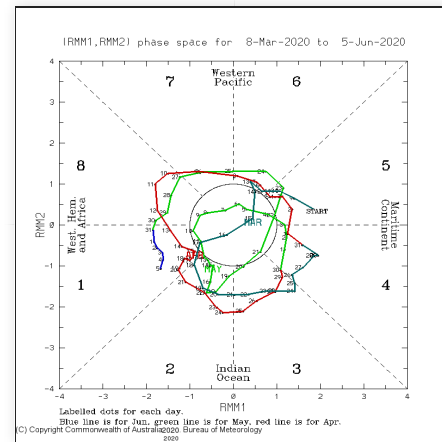
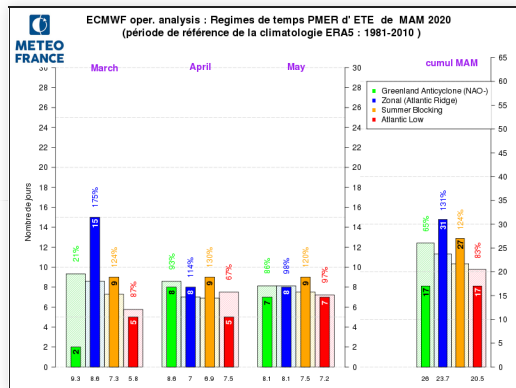
The strong negative SCAN was not foreseen.



Atmospheric circulation : Summer SLP weather regimes

Transition quarter between winter and summer.

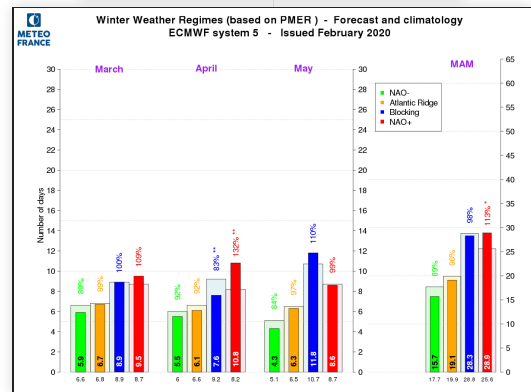
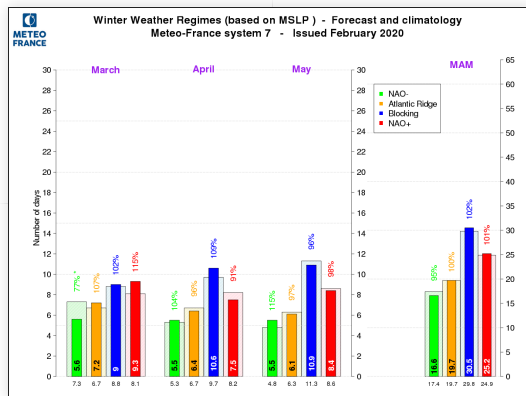
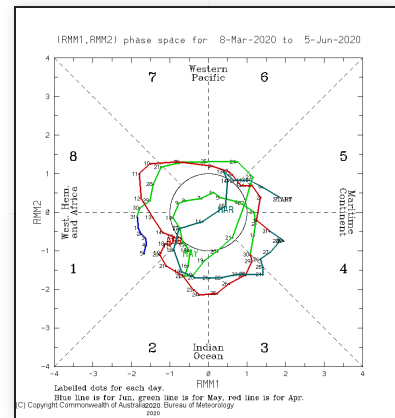
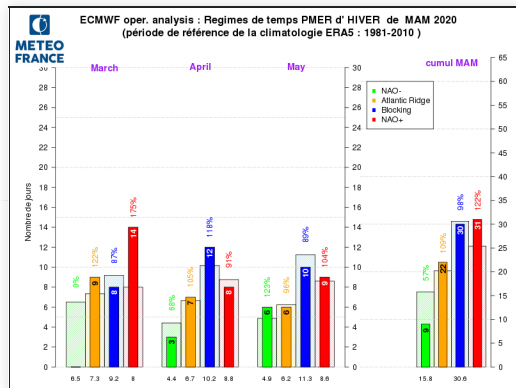
With the summer weather regimes, the good trend is outlined by the 2 models but with very weak values.



Atmospheric circulation : Winter SLP weather regimes

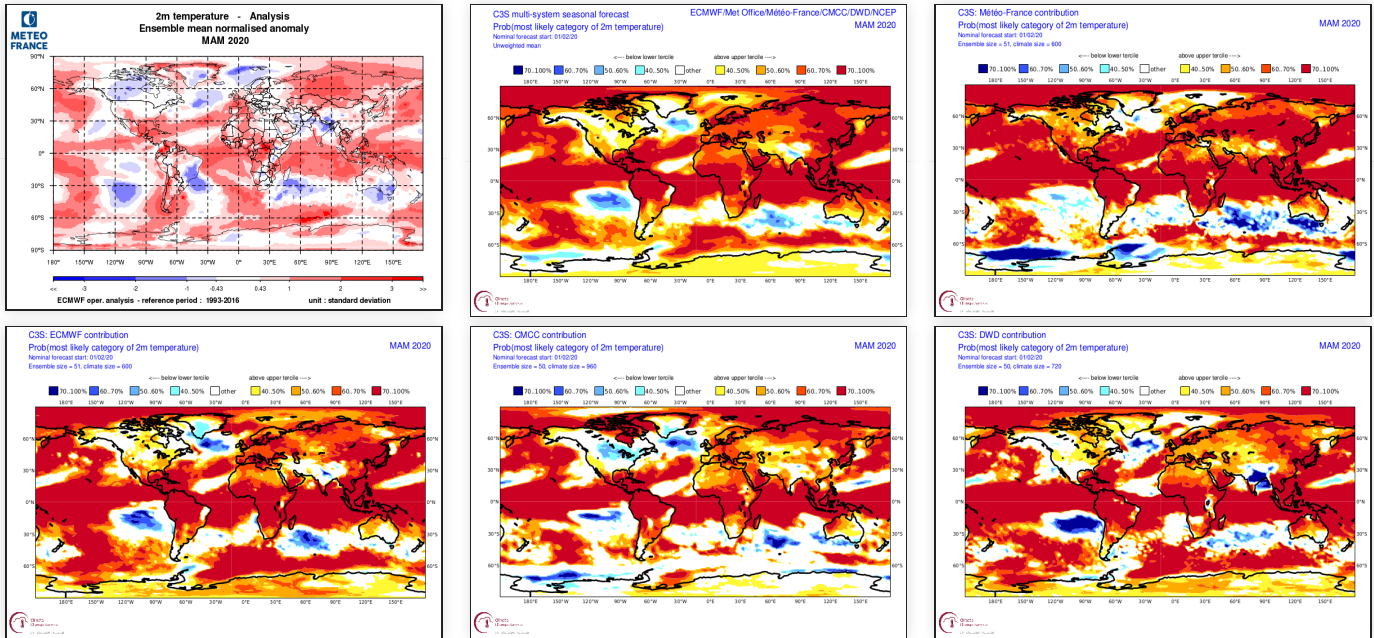
Transition quarter between winter and summer.

With the winter weather regimes, the good trend was forecasted by ECMWF but not by MF-S7 (no trend).



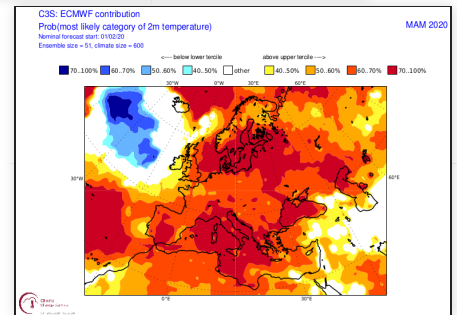
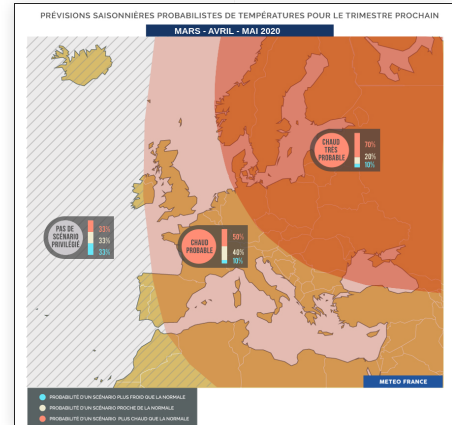
Climatic parameters : temperature on the globe

The cold anomalies that occurred during the quarter (Canada, Brazil, South Africa), although suggested in some models, were not sufficiently highlighted by the forecast. The anomaly over northern India was better seen.



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.

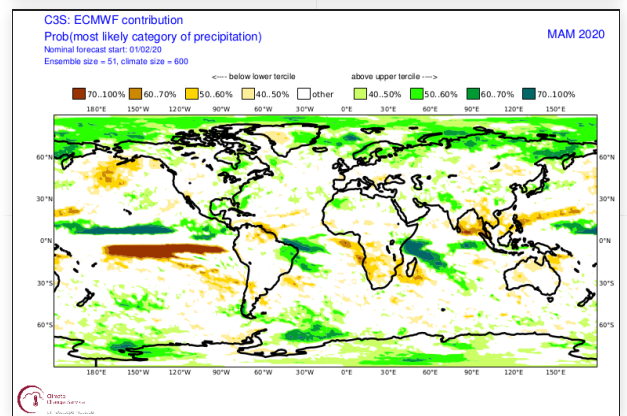
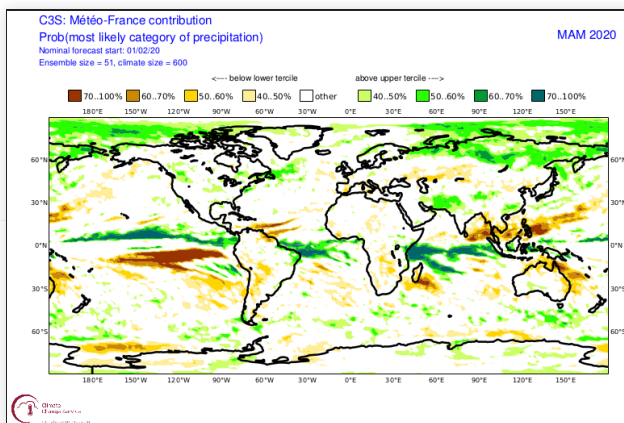
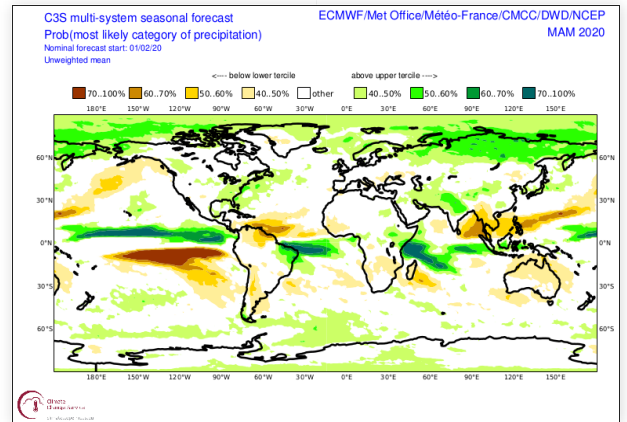
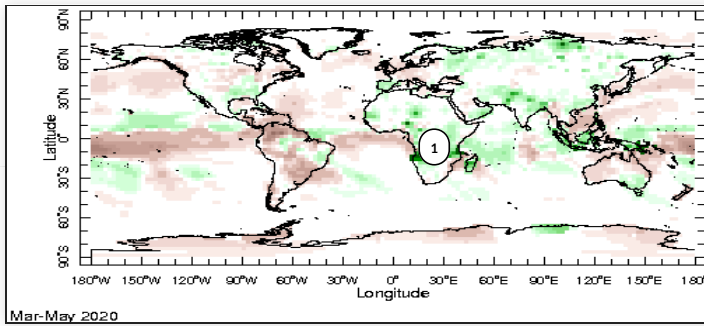
Warm anomalies were limited to western Europe and the Mediterranean, which is not expected by the models



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

Forecasts were generally good in the tropical strip with the exception of southern Africa, which was wetter than expected.

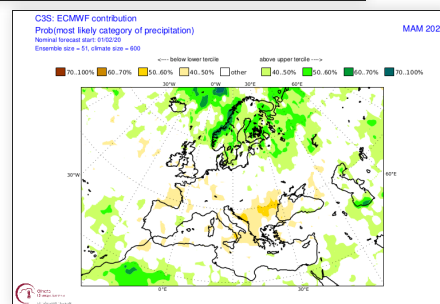
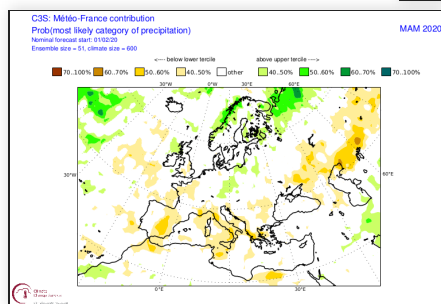
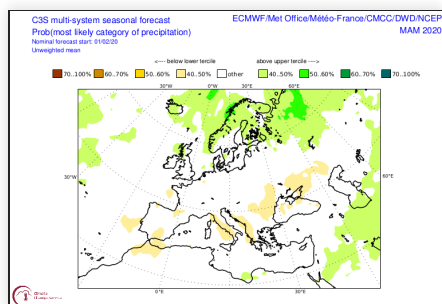
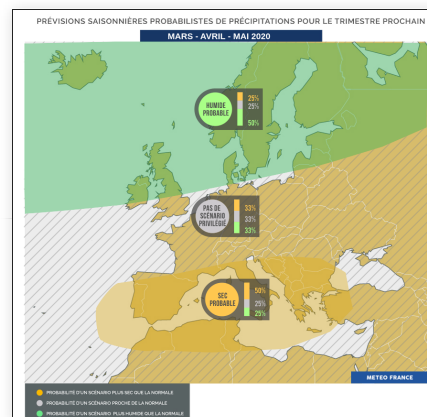
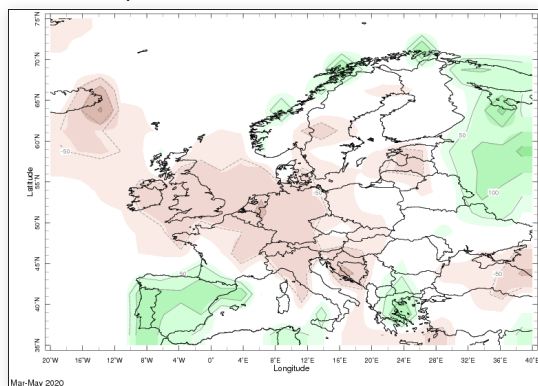


Standardized Precipitation Index analysed by IRI top left, forecast for multi-model top right and MF-S7 and SEAS5 on the bottom line.

1 - This rain anomaly was not expected

Climatic parameters : Precipitations over Europe

Bad forecast for this quarter



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 FMA 2020

1) Oceans :

SST patterns were generally very well captured by the models.

2) Large scale atmospheric circulation :

VP 200hPa : The kernel on the Indian Ocean and the one on the South Pacific has been underestimated. The pattern on Central America and the Atlantic was envisaged by none of the models.

SF 200 hPa : The quadrupole on the eastern Pacific and North America was considered by most of the models.

Z500 : For the northern hemisphere, the general pattern was well anticipated by the models. Multi-model synthesis is relevant. Bad forecast on southern hemisphere.

Good forecast of NAO mode of variability. The sign of EA and PNA modes was well anticipated.

3) Climatic parameters over Europe :

The forecast were not relevant for MAM quarter.