VERIFICATION BULLETIN

JUNE - JULY - AUGUST 2019

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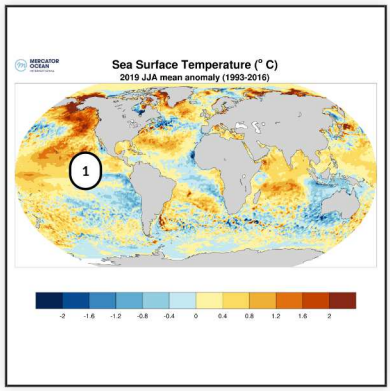
Introduction : Objective

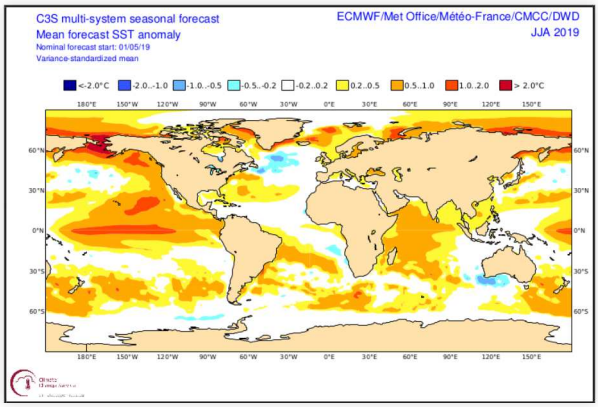
- **The objective of the Seasonal Verification Bulletin is to present an evaluation of the main elements highlighted in the Seasonal Forecast Bulletin : oceanic forcings, large scale circulation patterns, and a focus on temperature and precipitation forecast over Northern Atlantic, Europe and the Mediterranean 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.**

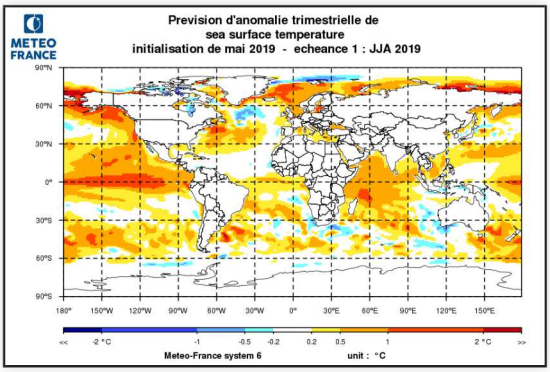
Oceans : surface temperature anomalies

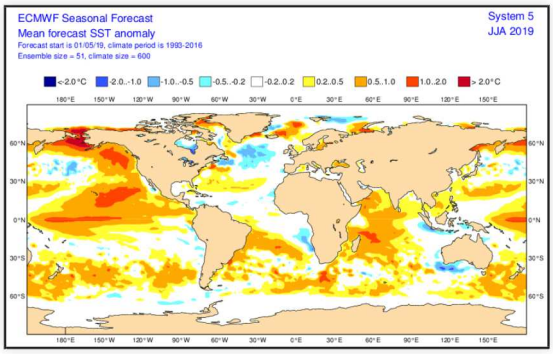
The models have correctly predicted the SST in North Pacific with a positive PDO pattern and in the Indian Ocean with a positive IOD pattern

In the eastern part of the pacific basin negative anomaly was observed while positive anomaly was expected. The end of El Nino phenomenon has not been anticipated. In North Atlantic forecast is not good (see further)









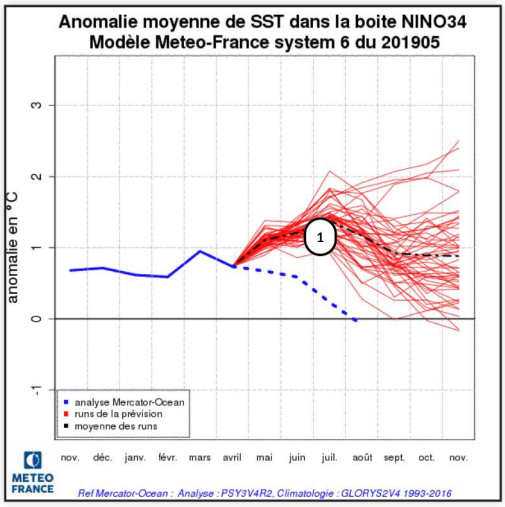
SST anomalies in the analysis from Mercator (top left), C3S multi-models (top right), MF6 (bottom left) and SEAS5 (bottom right)

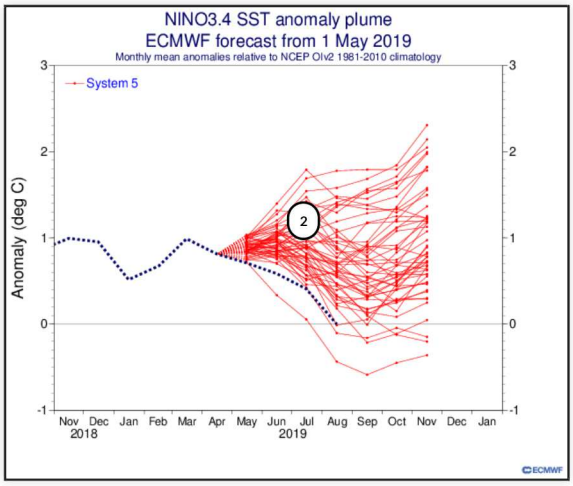
1 - Negative anomaly observed while it was expected positive

Oceans : ENSO

CAUTION : reference analysis differ between MF-S6 (Mercator-Ocean 1993-2016) and SEAS5 (NCEP 1981-2010).

Drop of the anomaly in the El Niño box Nino3.4 was not predicted by MF6 model and was too weak with SEAS5 model.

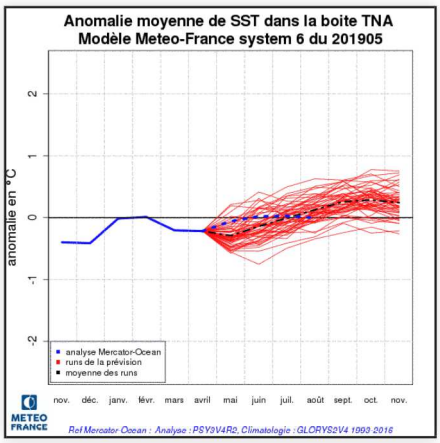


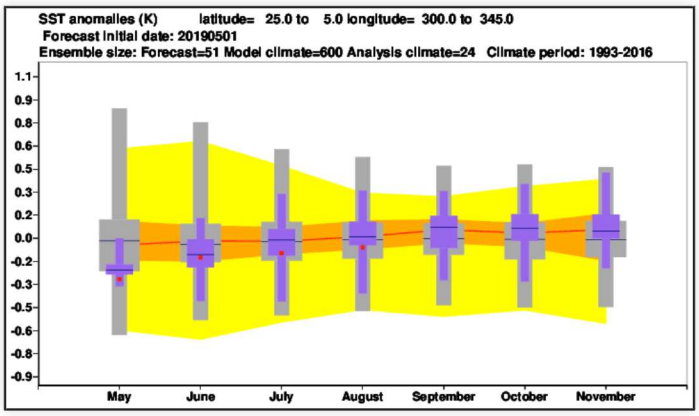


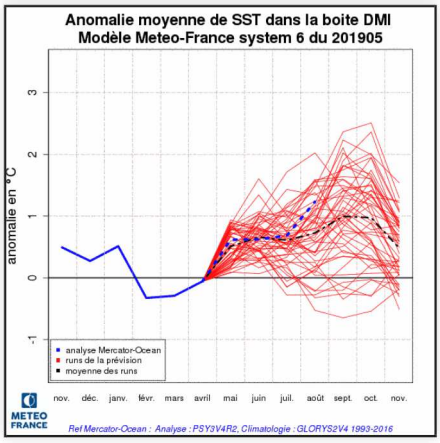
1 - plume entirely above observation
2 - observation at the low limit of the plume

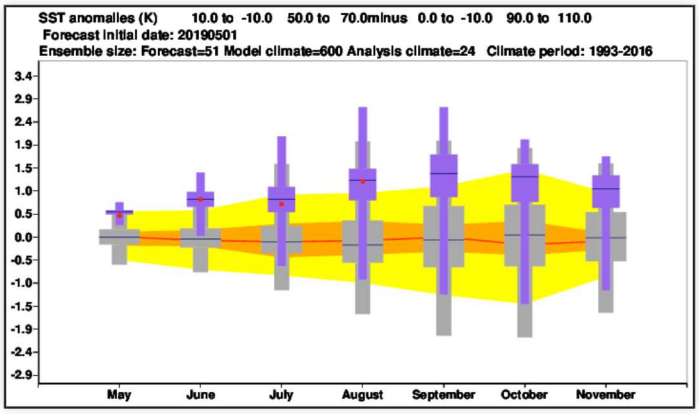
Oceans : tropical Atlantic and Indian Ocean index

TNA and DMI were well predicted by both models. The increase of DMI is very well forecasted by models.



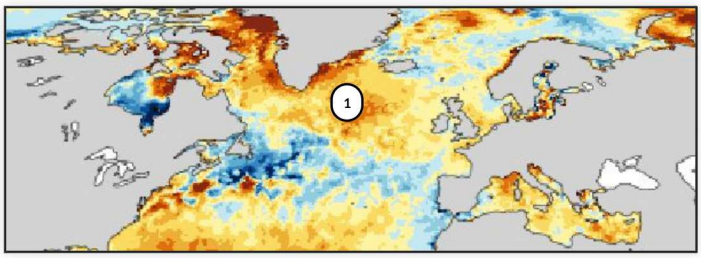


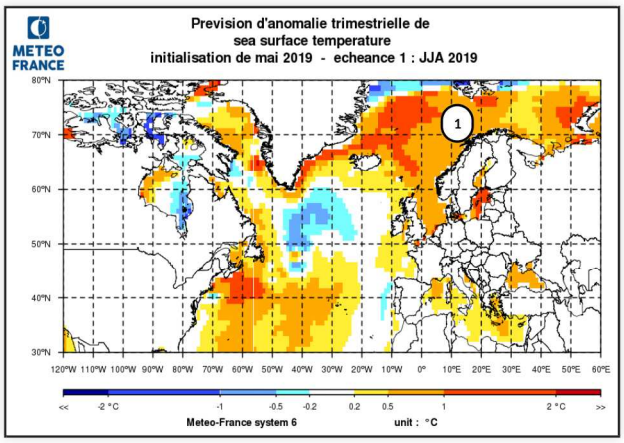


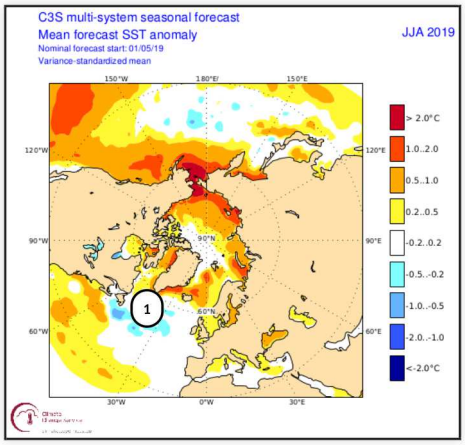


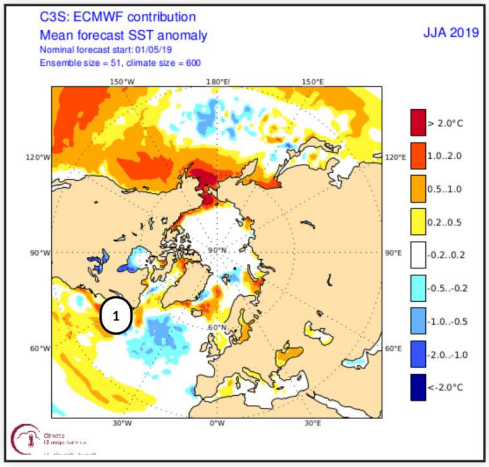
Oceans : North Atlantic SST

Not very good forecast with unplanned positive anomaly in southwestern Icleand









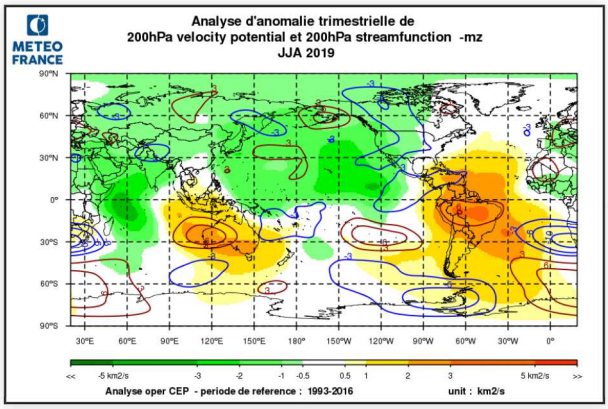
SST anomalies in the analysis from Mercator (top left), MF6 (top right), C3S multi-models (bottom left) and SEAS5 (bottom right)

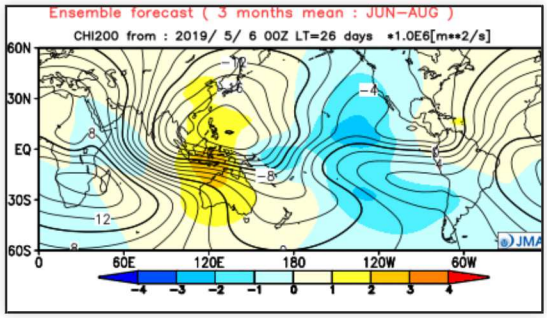
1 - this warm anomaly wasn't predicted by models
1 - Norwegian sea predicted too hot
1 - the cold anomaly was predicted too far north and not extended enough eastward.
1 - Cold anomaly better forecasted by SEAS5 in this area

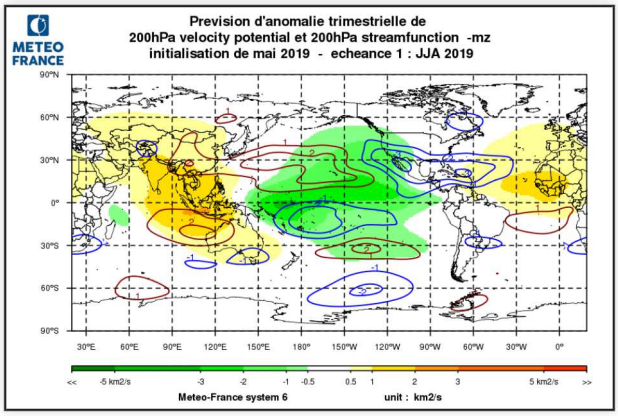
Atmospheric circulation : Global teleconnection

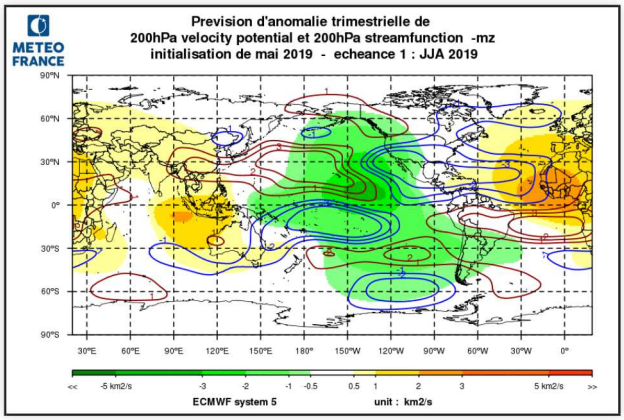
VP 200hPa : The forecast is quite good on the Indian and Pacific zone. The second wave on America, Atlantic and Africa is on the other hand rather badly anticipated (opposite phase).

FC 200 hPa : The field analyzed is, as usual, less structured than in the forecasts



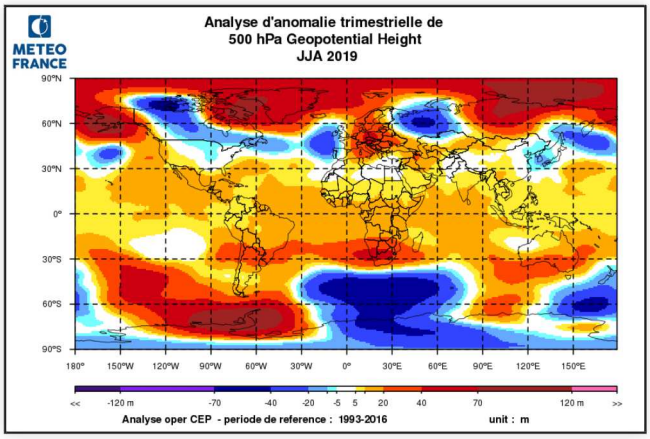


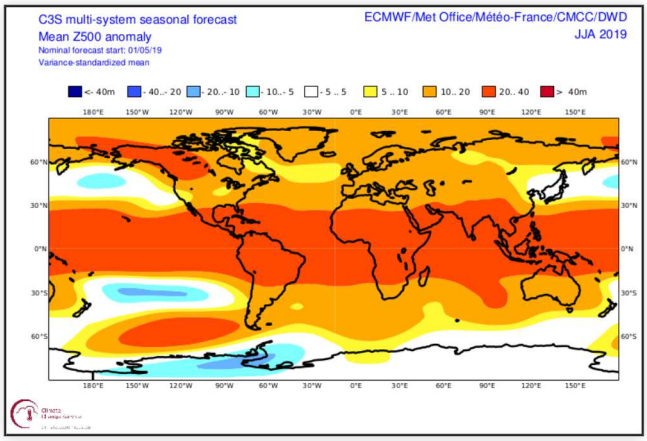


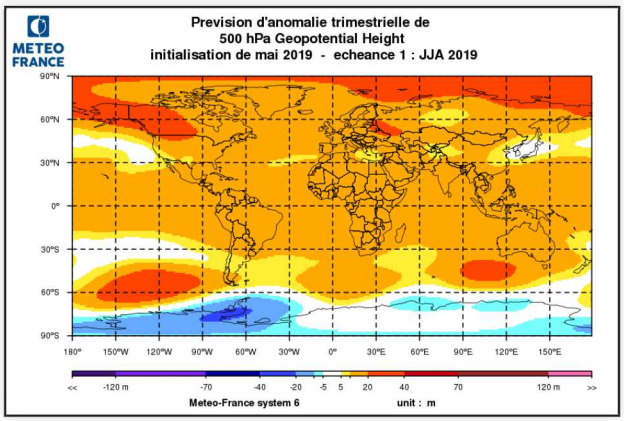


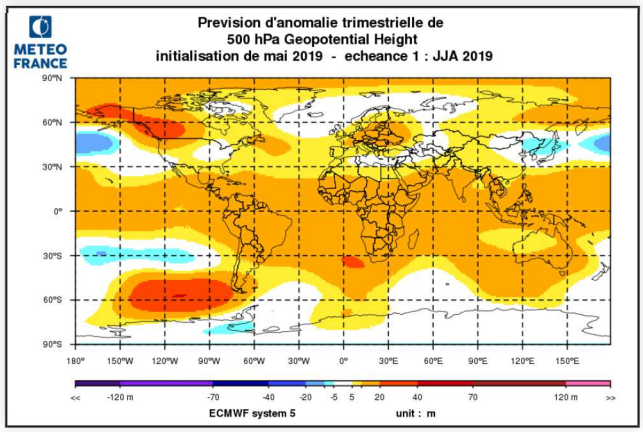
Atmospheric circulation : 500hPa Geopotential height

The fields provided are logically smoother than the analysis.
On the Atlantic the negative anomaly analysed from Quebec to British Isles was well suggested by C3S multi-system but not by MF6 or ECMWF. On Europe and Asia ECMWF has a better prediction of observed structure. On the North Pacific the forecasts are pretty good while there are disappointed on North America.
In the southern hemisphere, neither model comes close to reality.



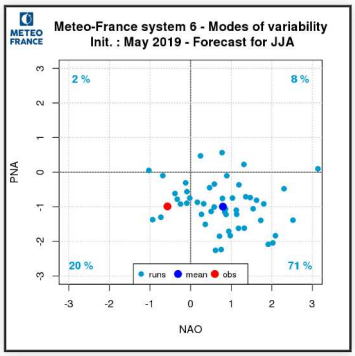


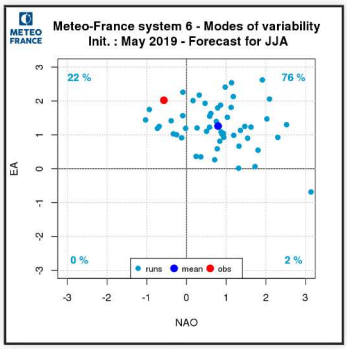


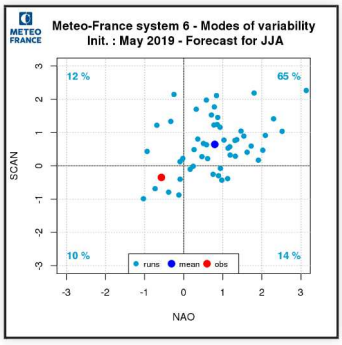


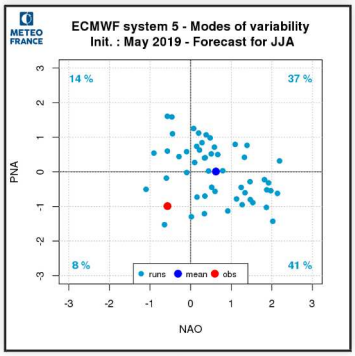
Atmospheric circulation : Modes of variability

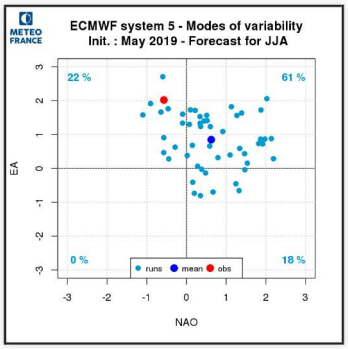
The very marked negative phase of NAO mode was neither forecast by MF6 nor by SEAS5. SCAN was expected positive while it was negative.
Good forecast for EA mode.

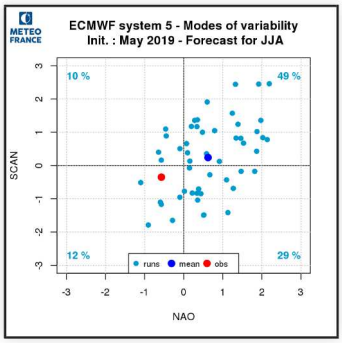






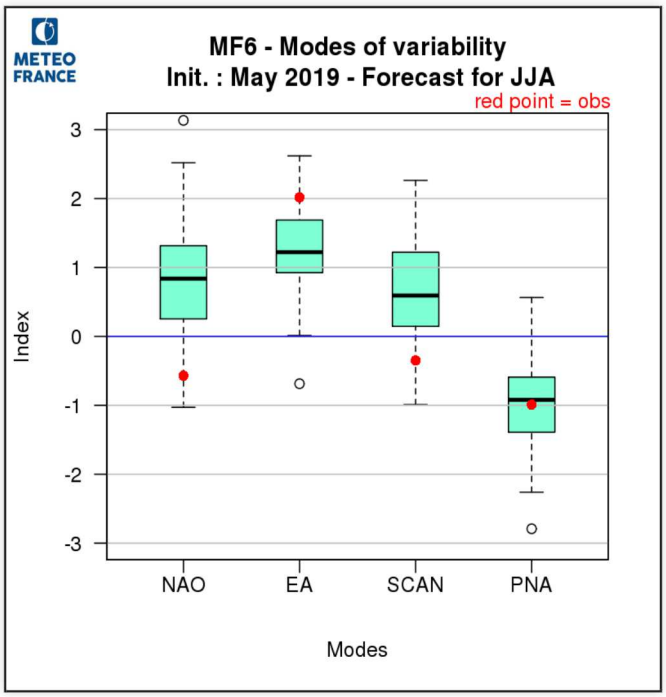


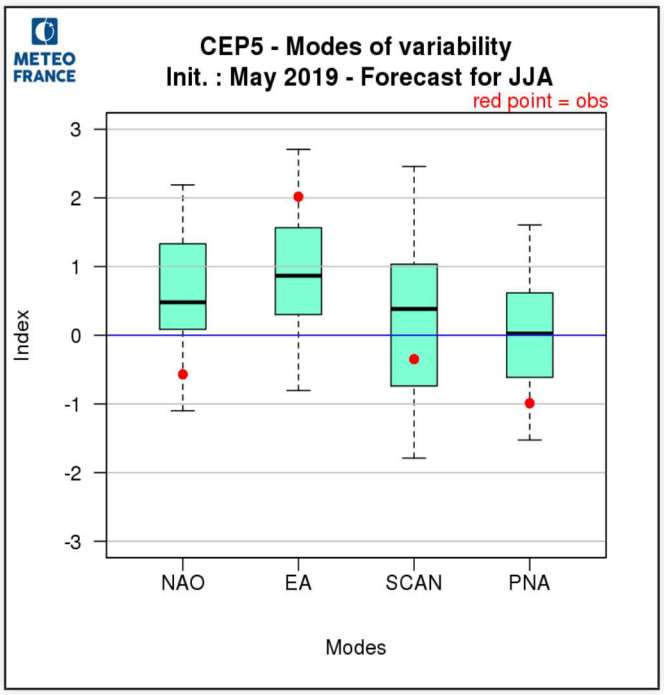




Atmospheric circulation : Modes verification

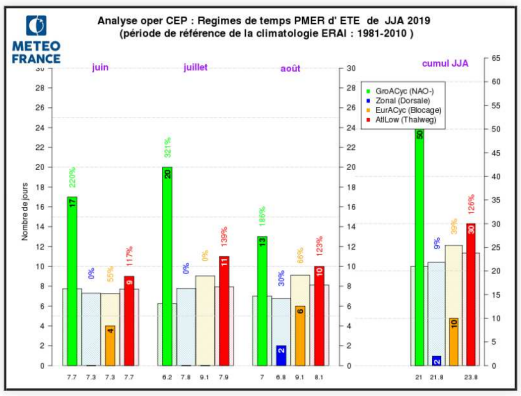
MF6 and SEAS5 were unable to predict the negative phase of NAO mode

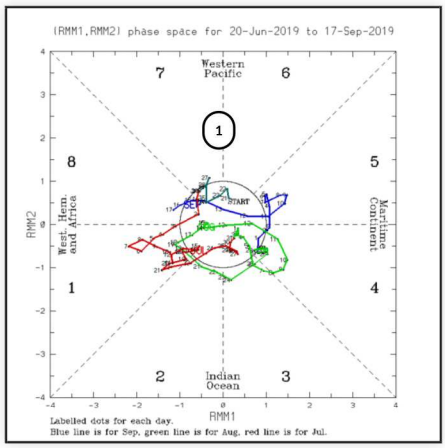


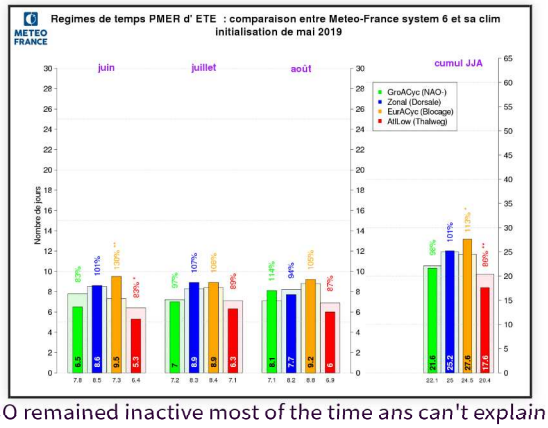


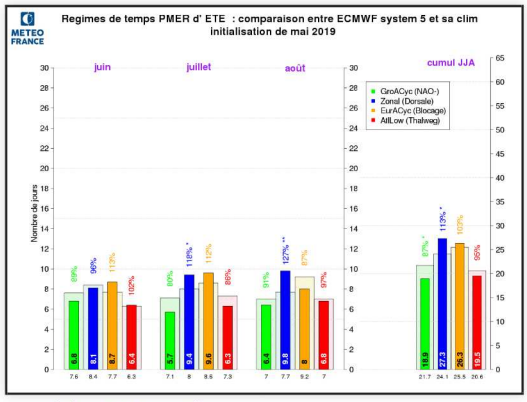
Atmospheric circulation : Summer SLP weather regimes

MF6 and SEAS5 were unable to predict the pre-eminence of the NAO- summer weather regime





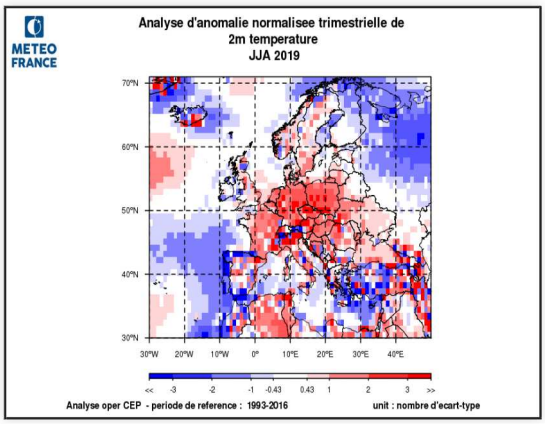


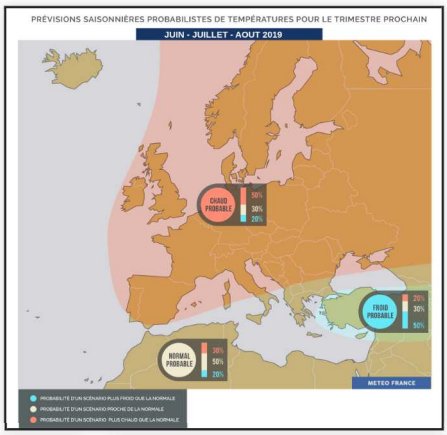


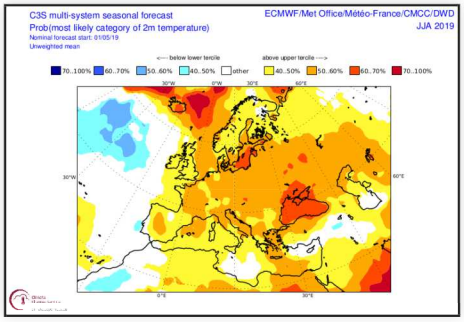
1 - MJO remained inactive most of the time ans can't explain the predominance of the NAO - regime

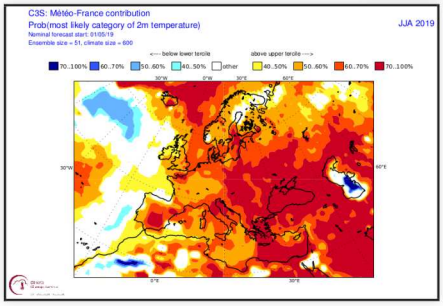
Climatic parameters over Europe : temperature

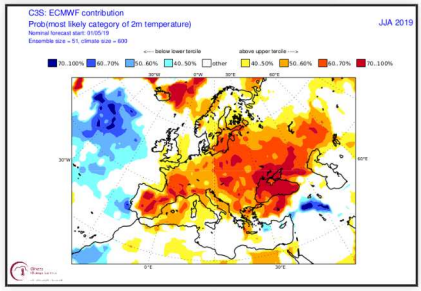
Warmer than normal conditions over a large part of Europe fairly weel forecasted by the models. Colder conditions from Finland to Russia were not well anticipated.
The summary map added value to Turkey by providing colder conditions than normal.







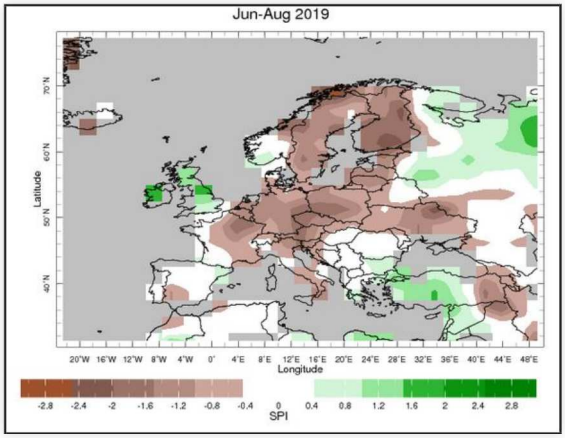


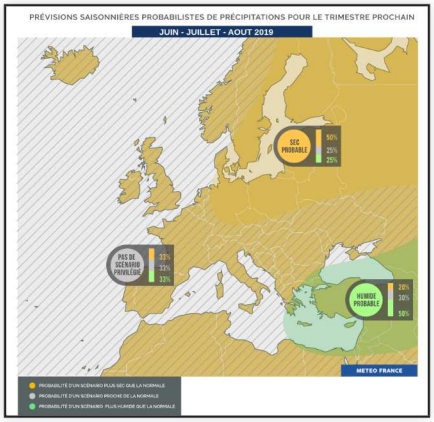


Climatic parameters over Europe : Precipitations

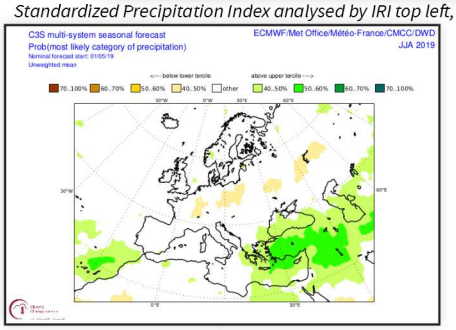
The contrast between wetter than normal southeastern Europe and drier than normal Continental Europe was well predicted.

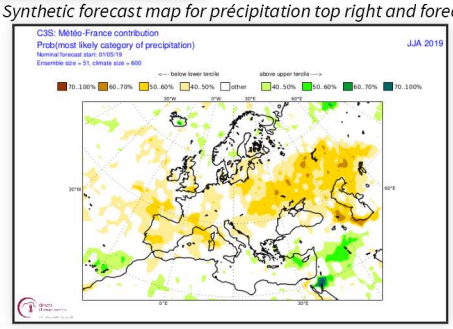
The excess of precipitation on the British Islands had not been forecasted.

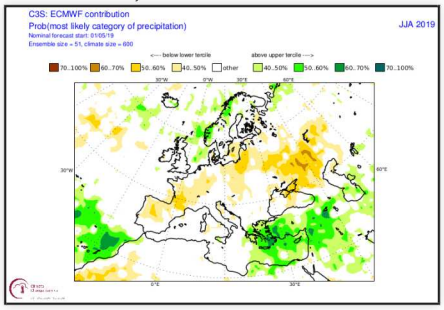




Standardized Precipitation Index analysed by IRI top left, Synthetic forecast map for précipitation top right and forecast for multi-model,MF6 and SEAS5 on the bottom line.







General summary : for the period JJA 2019

1) **Oceans :**

The models have correctly predicted the SST in North Pacific with a positive PDO pattern and in the Indian Ocean with a positive IOD pattern
Models didn't forecast the end of El Nino and didn't have well planned anomalies structures on the North Atlantic

2) **Large scale atmospheric circulation :**

VP 200hPa : The forecast is quite good on the Indian and Pacific zone. The second wave on America, Atlantic and Africa is badly anticipated.
FC 200 hPa : The field analyzed is less structured than forecasted.

Z500 : rather well predicted by ECMWF from Europe to Asia and Pacific but not good on the Atlantic and North of United States.

NAO- mode of variability predominance was not forecasted.

3) **Climatic parameters over Europe :**

The structure of temperature and precipitation anomalies were rather well anticipated especially with ECMWF, in line with a better Z500 forecast. The poor forecast of the NAO phase didn't have any influence on the climatic parameters which were well forecasted.