

Météo-France Seasonal Forecast Bulletin

AUGUST - SEPTEMBER - OCTOBER 2019

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General synthesis : ASO 2019

- **Rather good agreement between models in the tropics** for the coming 3 months and to a lesser extent for North Atlantic and Europe.
- **El Nino** is slowly disappearing, but atmospheric remnants still appear in the models regarding Velocity Potential at 200 hPa (Walker circulation) in the tropics (both Indian and Pacific Oceans). Anyway, no extra-tropical connections are visible towards North Atlantic and Europe.
- **Highly positive IOD**
- For Europe, mixture of zonal and blocking circulations; leading to **drier** and **warmer** than normal conditions for **western and central Europe** and **wetter** than normal conditions for **south-eastern Europe**.

Oceanic analysis of June 2019 : SST anomalies

Current situation : slow return to Niño neutral conditions.

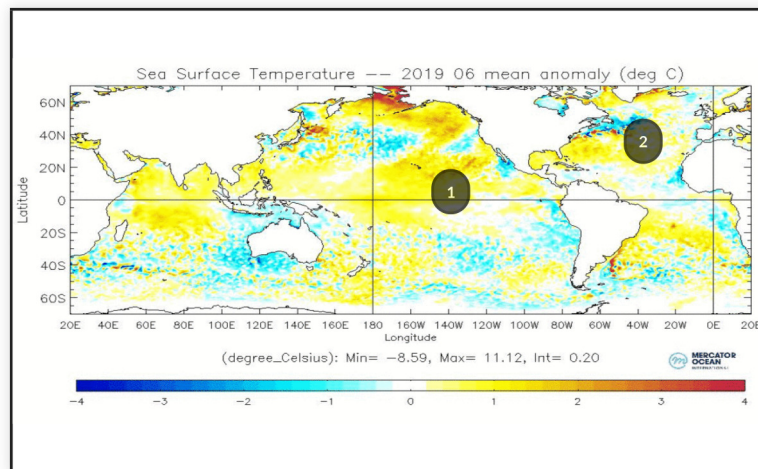
JUNE NINO3.4 INDEX : +0.7 °C (Mercator Ocean PSYV4R2 analysis)

JUNE IOD INDEX : +0.6 °C (Mercator Ocean PSYV4R2 analysis)

LASTEST WEEKLY NINO3.4 TREND : no change

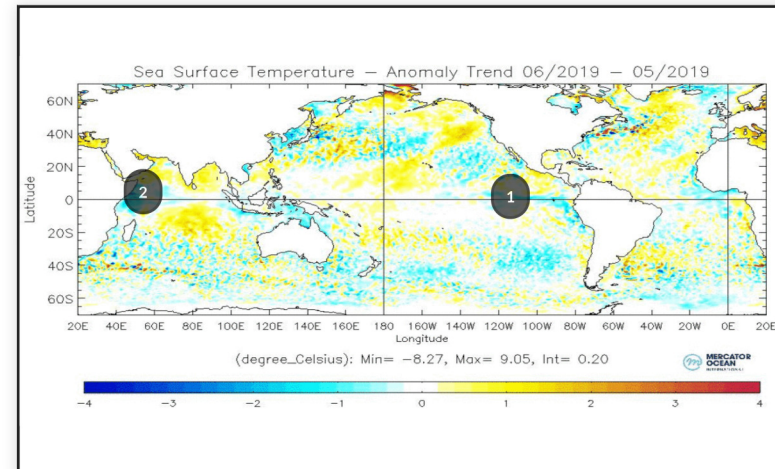
LASTEST WEEKLY IOD TREND : no significant trend (but sharp decrease in late June /early July).
(BOM value : <http://www.bom.gov.au/climate/enso/indices.shtml>)

PDO : slightly positive over 12-month running average (JMA : http://ds.data.jma.go.jp/tcc/tcc/products/el_nino/decadal/pdo.html)



1- Weakening El Niño conditions

2- Still a NAO+ like pattern (cold/warm/cold).



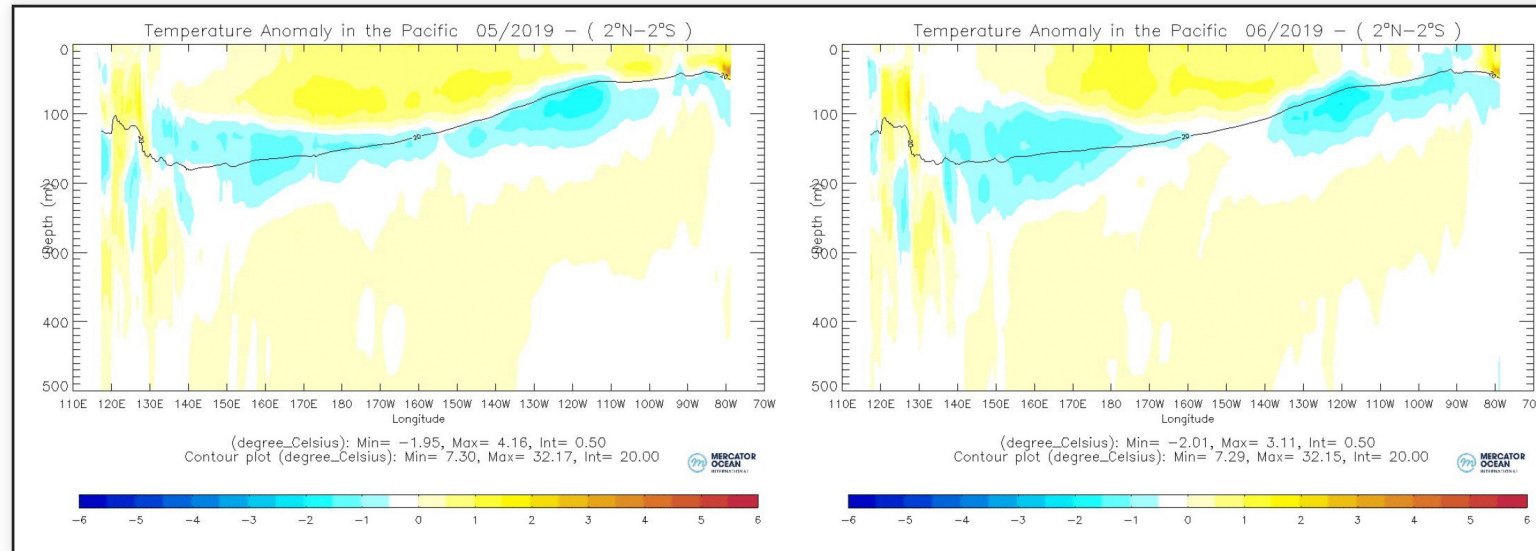
1- Further cooling along the Equator

2- Strong cooling off the Somalian coasts => decrease of IOD

SST Anomalies and trend with the previous month (c) Mercator-Ocean

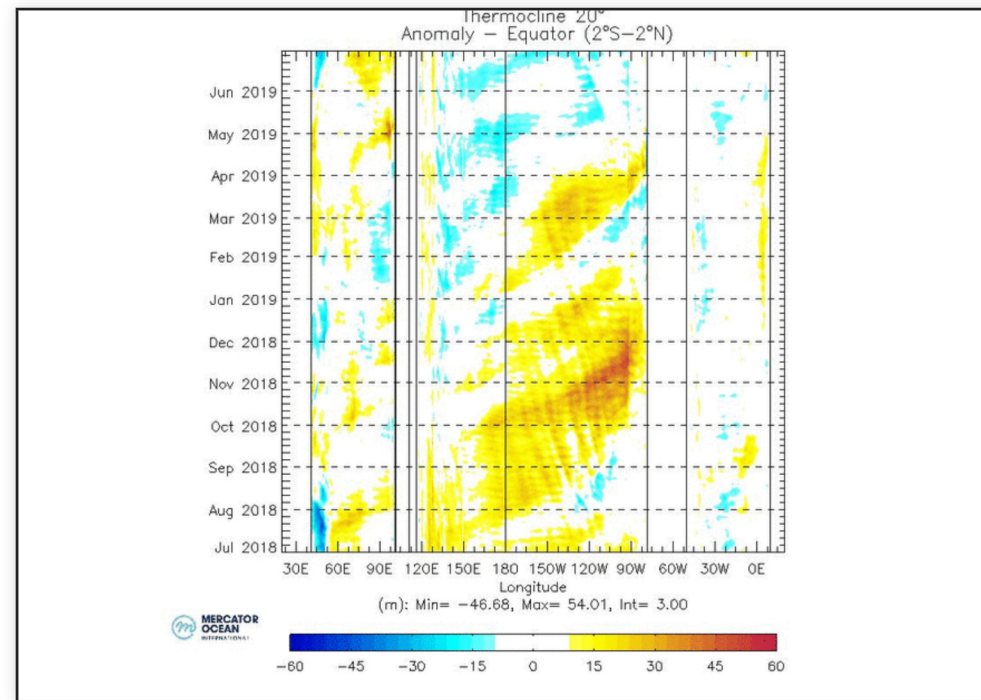
Oceanic analysis of June 2019 : vertical section

Surface cooling on the eastern side of the basin



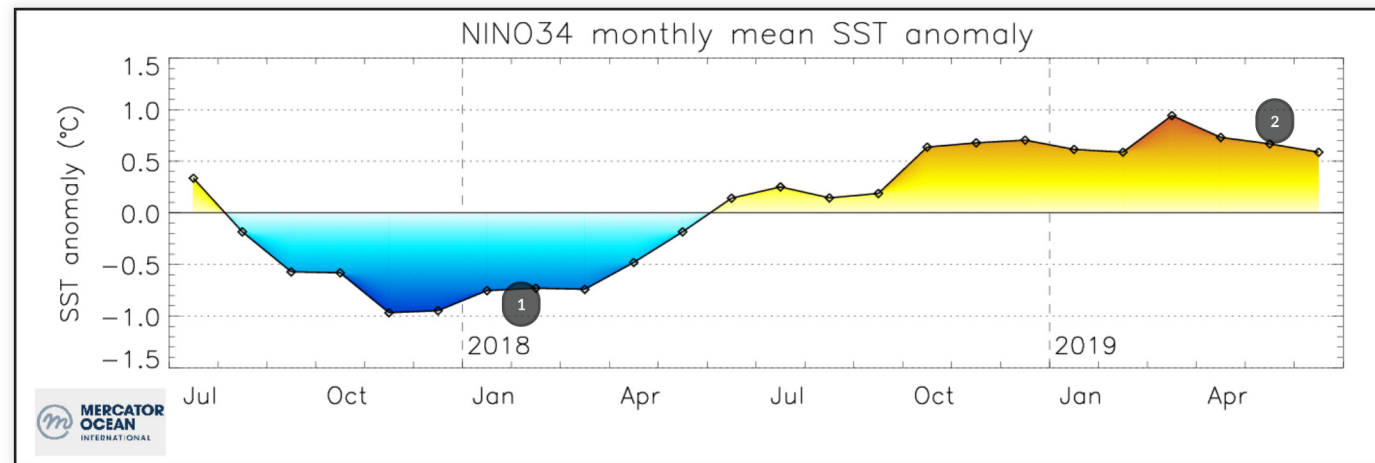
Ocean temperature anomalies in the first 500 meters of the equatorial Pacific basin, monthly average. (c) Mercator-Ocean

Oceanic analysis of June 2019 : Hovmöller diagram of the 20°C isotherm



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Evolution of the anomalies of depth of the thermocline (m) (materialized by the 20 °C isotherm) (c) Mercator-Ocean

Oceanic analysis of June 2019 : History of Nino3.4



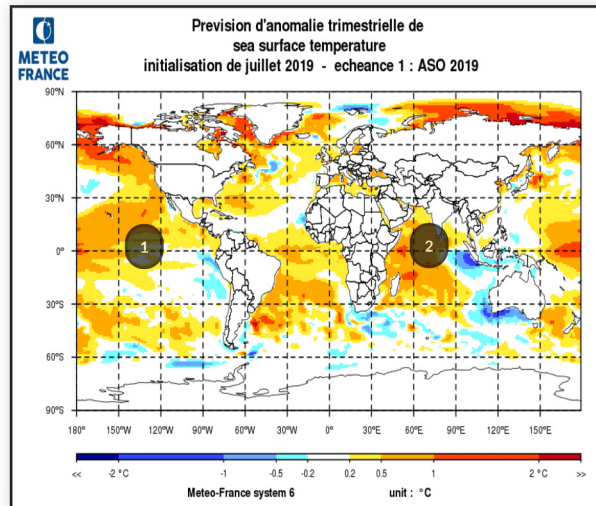
1- La Nina event of winter 2017-2018

2- slow return to neutral conditions

Evolution of SST in the NINO3.4 box

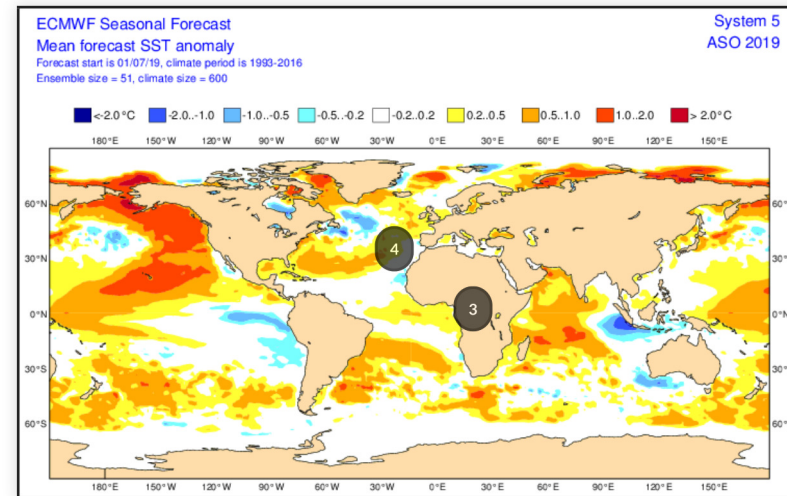
Oceanic forecast : SST anomaly

Return to neutral conditions along the Equatorial Pacific (end of El Niño). Good agreement between models, ECMWF being most extreme regarding SST cooling. Highly positive IOD (Indian Ocean Dipole).



1- Positive PDO and neutral Niño conditions forecast by both models

2- Strongly positive IOD



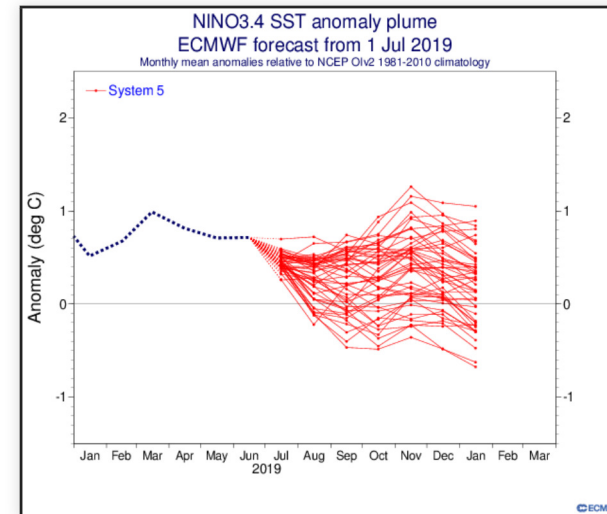
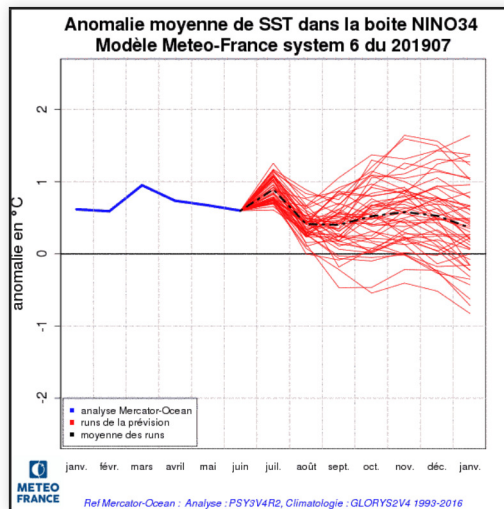
3- warm anomaly in the Gulf of Guinea

4- Still a cold/warm/cold pattern, some differences between models concerning the strength of the anomalies

Oceanic forecast : NINO3.4 Plume diagrams

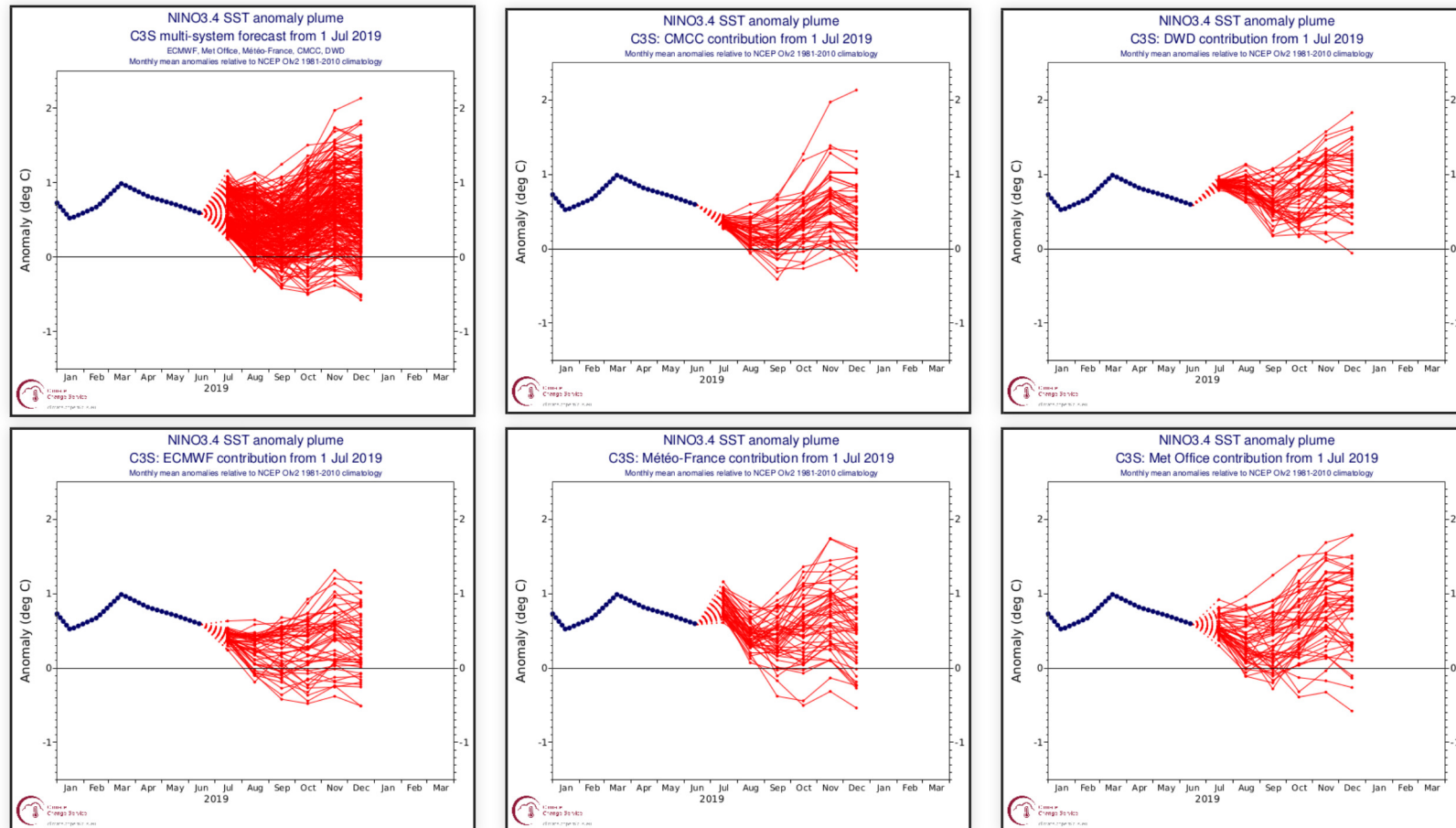
Forecasted Phase : return to neutral conditions

The anomaly decreases slightly on average over the next few months, though with increasing spread among the forecasts.



Oceanic forecast : C3S Nino3.4 re-scaled plume diagrams

Large spread in the Multi-Model's plume, but the July current values seem to favour the lower part of the distribution. Neutral conditions therefore most likely for the coming months.

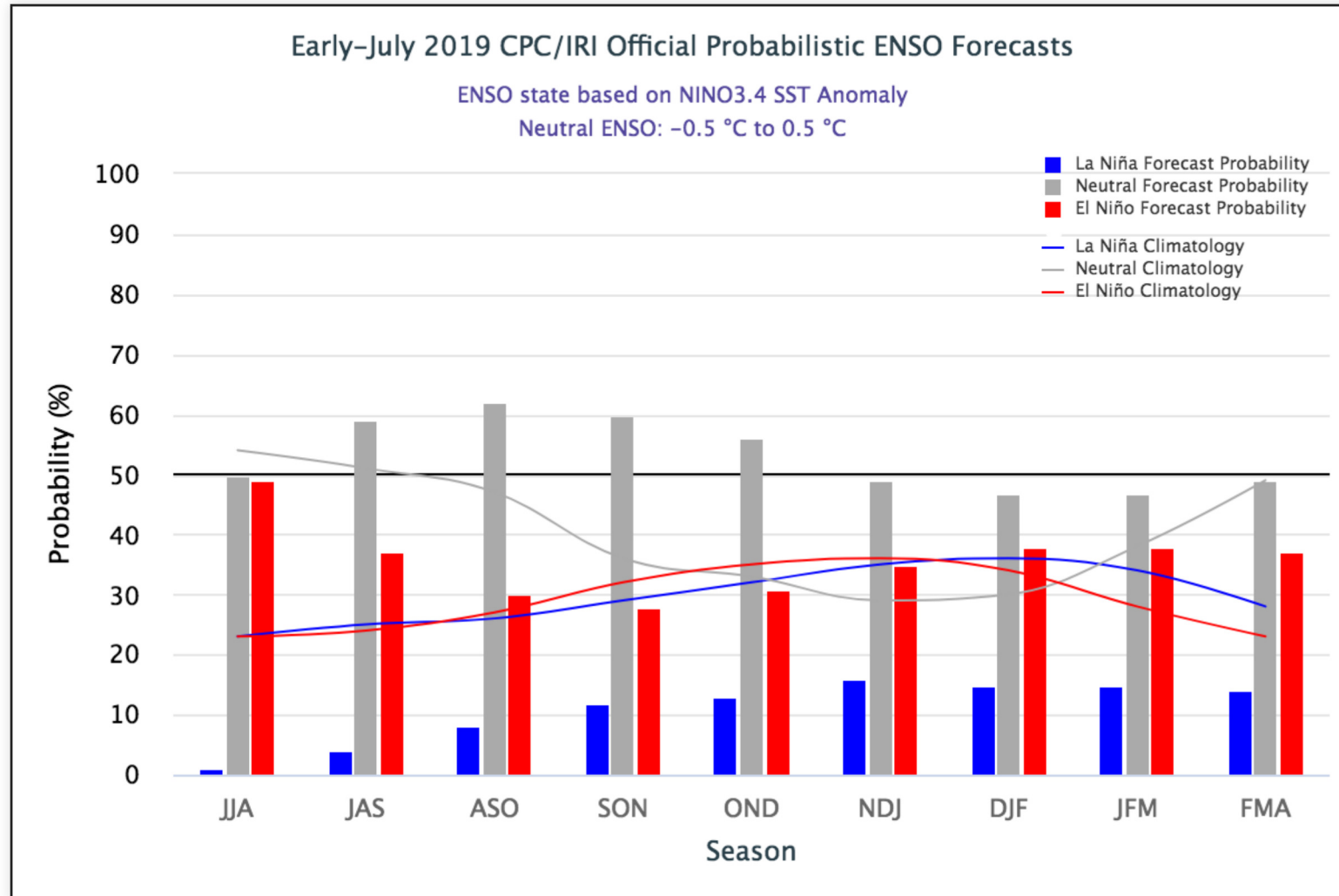


C3S plume diagrams re-scaled from the variance of observations for the period 1981-2010. https://climate.copernicus.eu/charts/c3s_seasonal/

Oceanic forecast : Synthesis from IRI

Return to neutral conditions very likely (up to 60 %)

According to the BOM, conditions as of mid-July are already neutral (<http://www.bom.gov.au/climate/enso/index.shtml>)



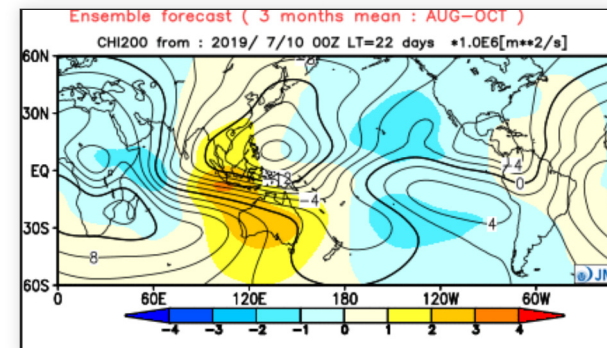
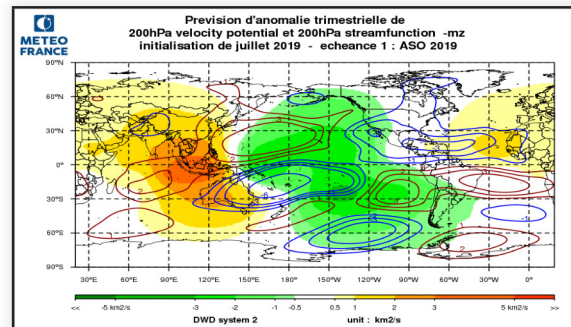
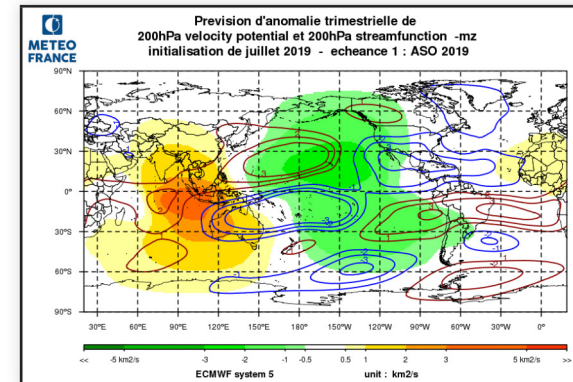
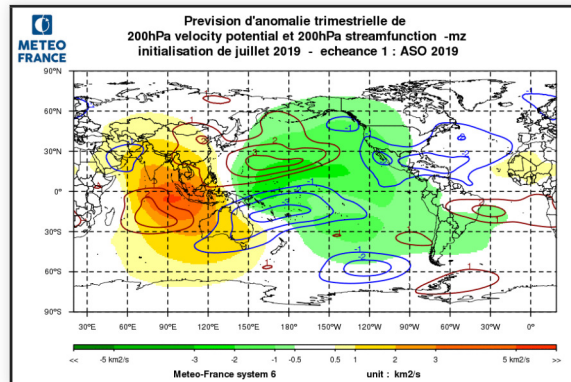
Probability of Niño, Niña, and neutral phases for the next 8 quarters. source <http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>

Drivers : undefined

Atmospheric circulation forecasts : velocity potentiel and stream function at 200hPa

Velocity Potential : good agreement between models; still a Niño-like pattern with upward motion anomalies over the whole Pacific and subsiding anomalies over the Maritime Continent and the eastern half of the Indian Ocean (including Indian subcontinent).

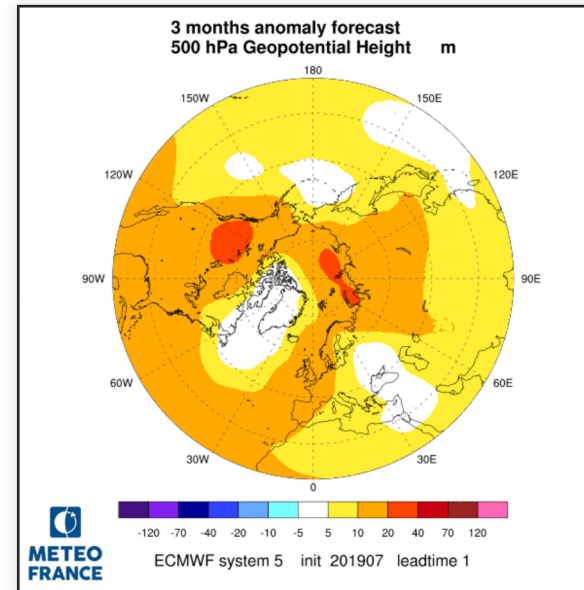
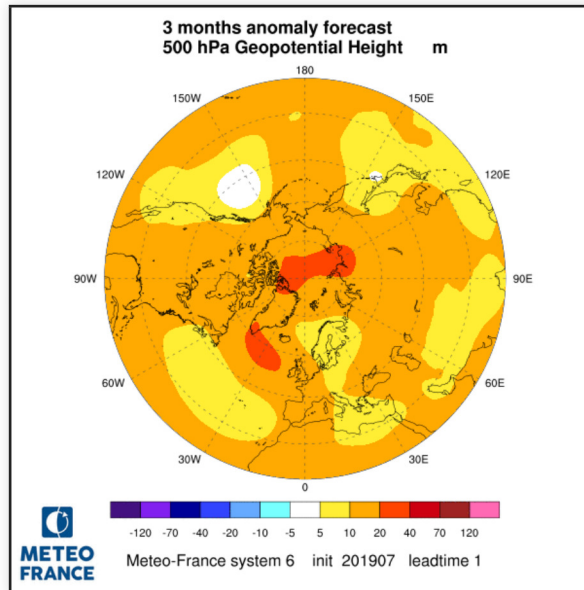
Streamfunction : no connection with Atlantic mid-latitudes



MF6, SEAS5, DWD and JMA 200hPa velocity potential anomalies (color range, green (except JMA, blue) : ascending, orange: subsidence) and stream function anomalies (isolines, red: anticyclonic in the northern hemisphere, blue: cyclonic in the northern hemisphere), except for JMA.

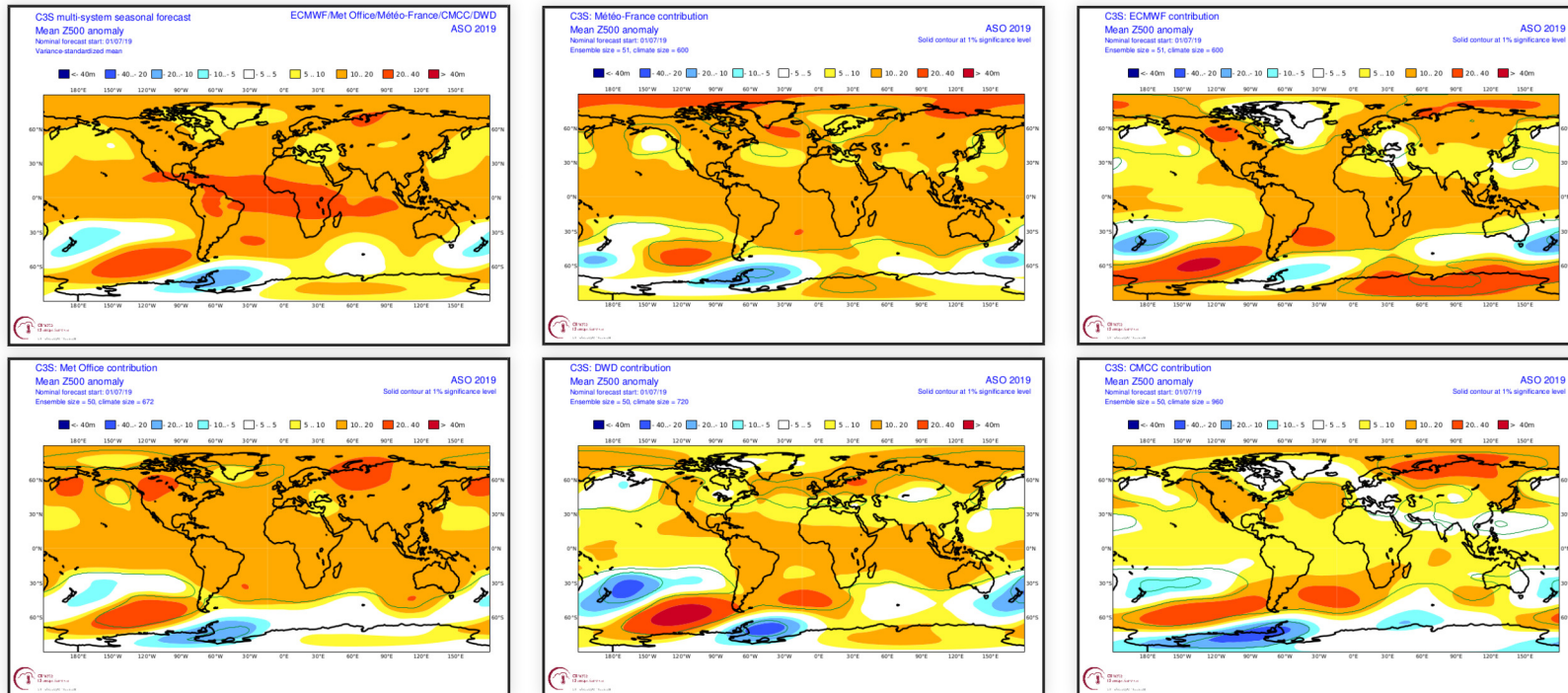
Atmospheric circulation forecasts : 500 hPa Geopotential anomalies

High differences between MF and ECMWF over the Atlantic Ocean. Over Europe, differences are not that high : blocking-like pattern over north-western Europe and cyclonic anomalies for south-eastern Europe.



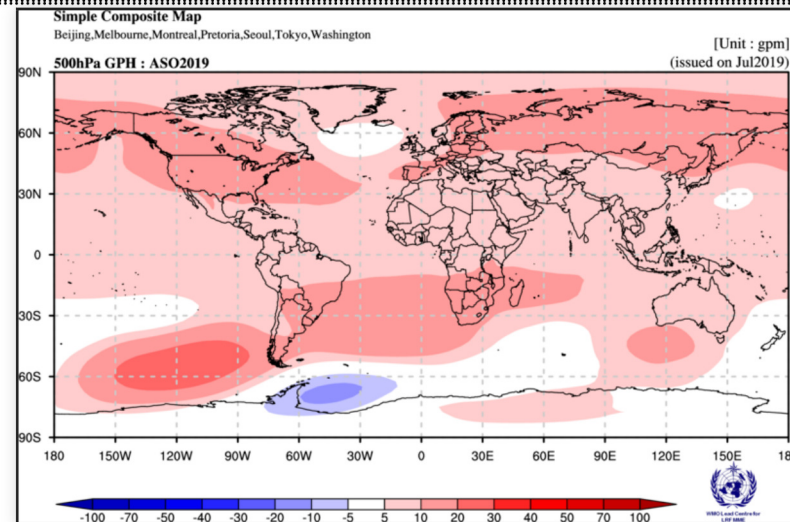
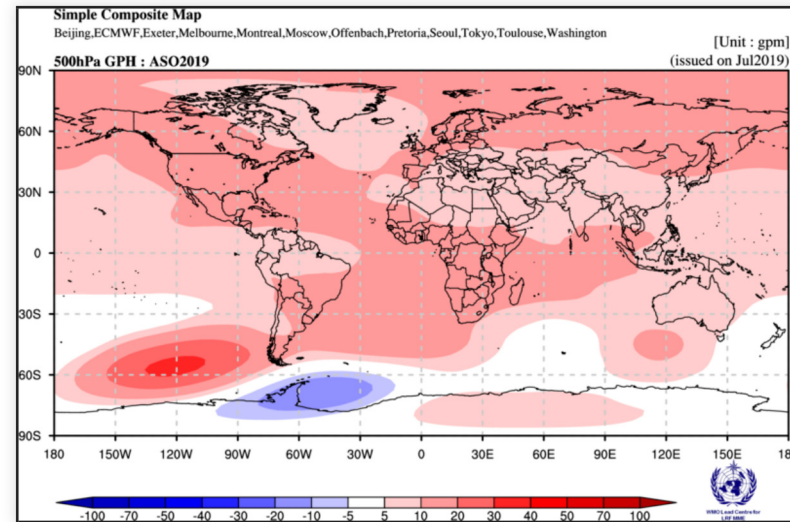
Atmospheric circulation forecasts : Z500 anomalies in C3S models

Met Office and CMCC (but with lower geop. heights) resembling ECMWF; DWD more like MF. Ensemble mean closer to MetOf/ECMWF pattern (but the difference over Europe is not that important).

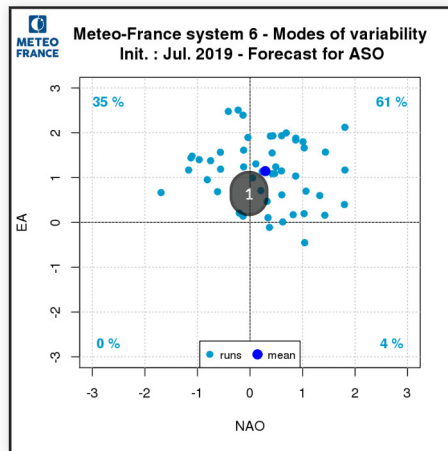


Atmospheric circulation forecasts : Z500 anomalies multi-systems

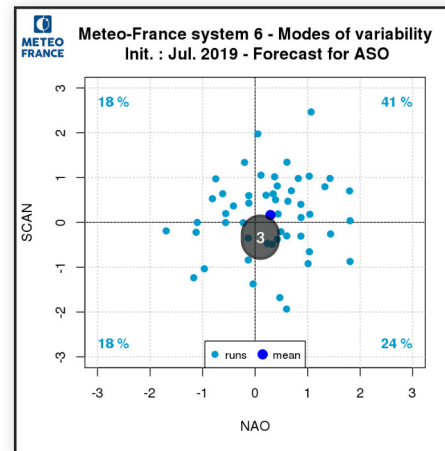
Quite similar to C3S mean when including all models (top image). When looking at all models but C3S, the picture is quite different with a more zonal pattern over Europe and north Atlantic.



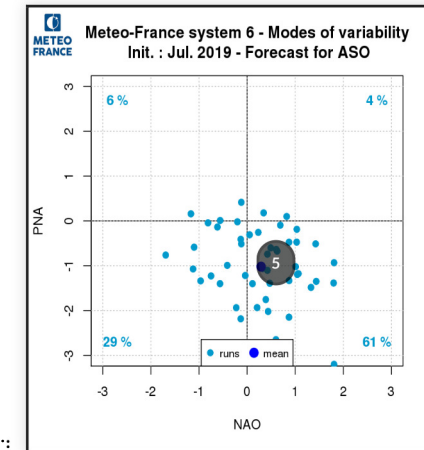
Modes of variability : forecast



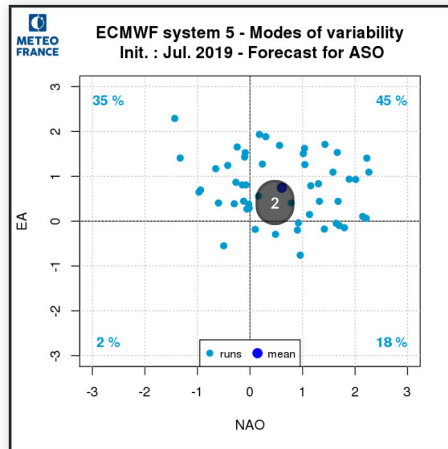
1- Positive EA mode (associated with atlantic low pattern).



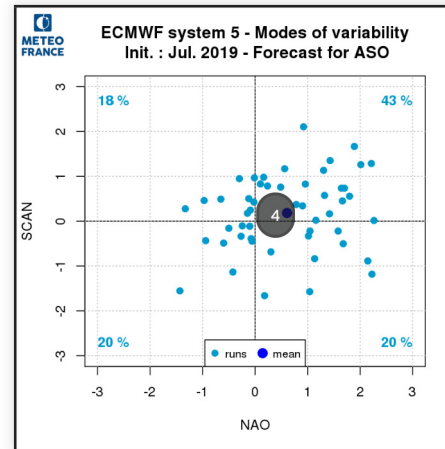
3- NAO not significant (ensemble mean close to zero).



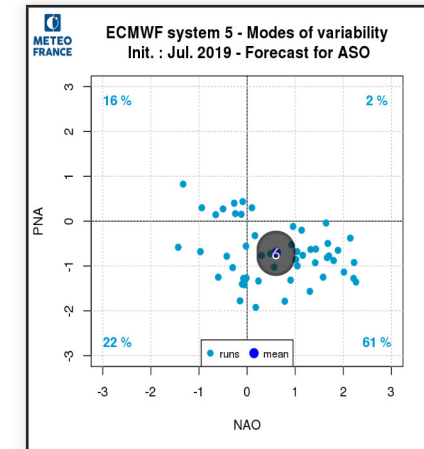
5- Strongly negative PNA



2- Slightly positive NAO and EA



4- SCAND not significant in both models



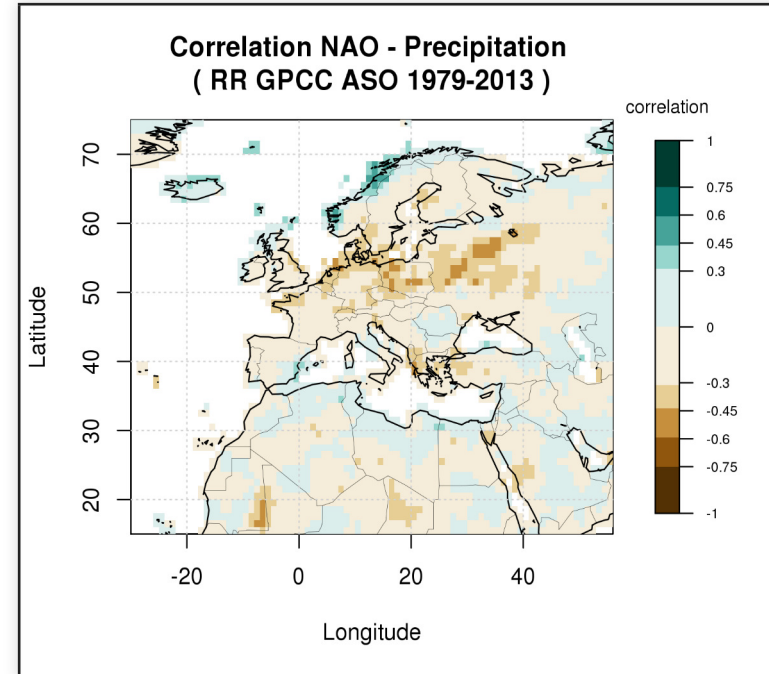
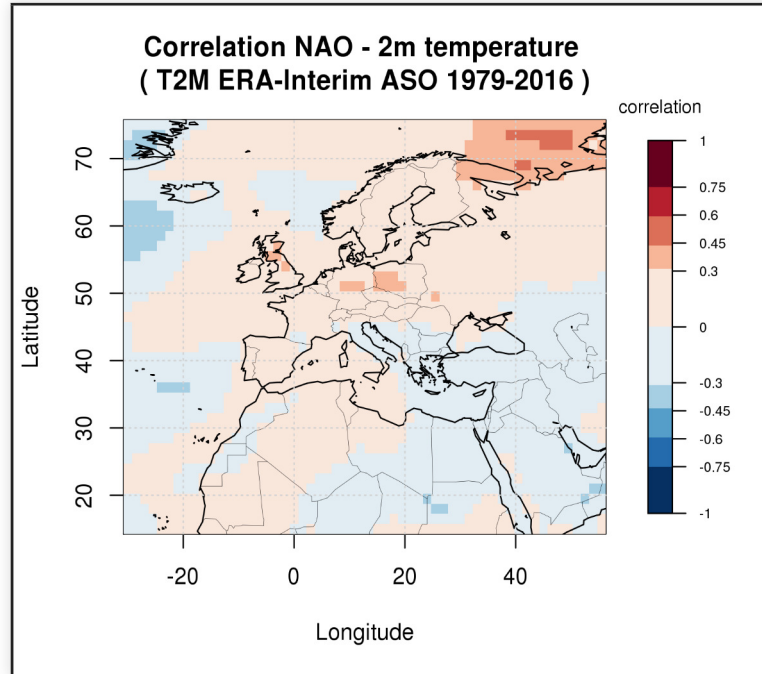
6- Negative PNA

[see the modes of variability patterns](#)

Modes of variability : NAO impacts

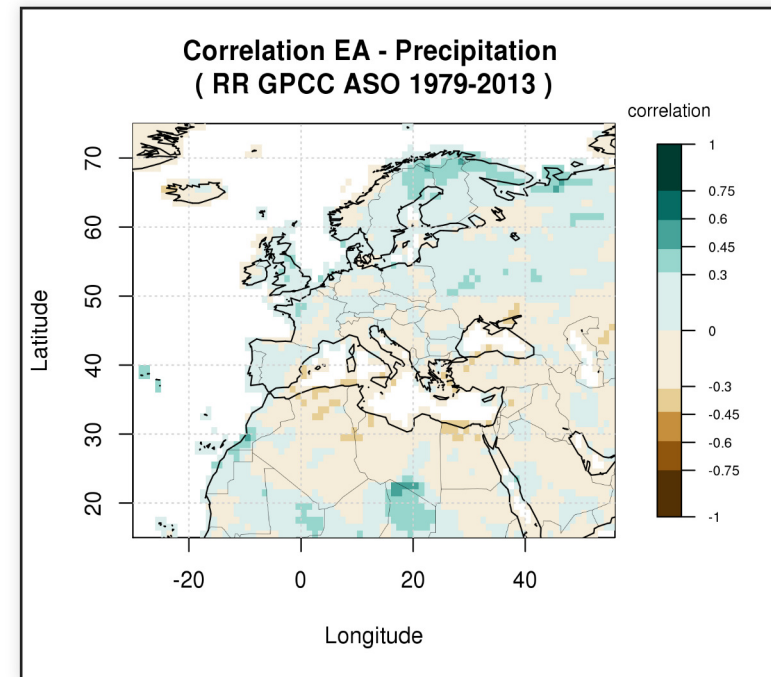
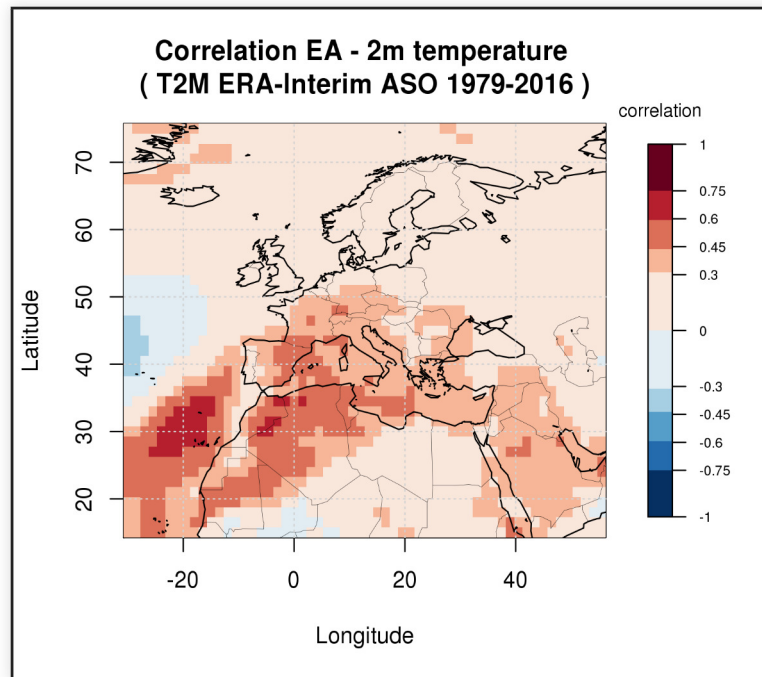
The forecast of modes of variability is more robust than the weather regimes forecast.

EA+ and NAO+ mode should slightly be favoured.



Modes of variability : East Atlantic impacts

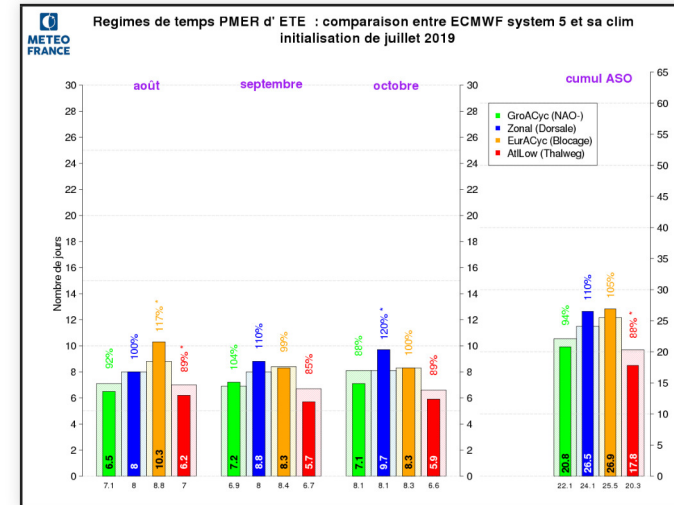
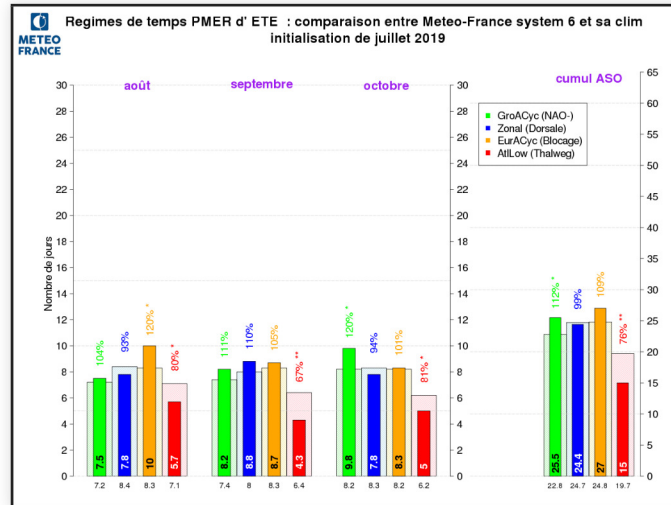
EA+ and NAO+ mode should slightly be favoured.



Weather regimes : summer MSLP

In consistence with 500 hPa anomalies, ECMWF favors zonal and blocking regimes, when MF favors Greenland Anticyclone and Blocking regimes; most models being closer to ECMWF (see Z500 anomalies), we will rely on ECMWF rather than MF S6.

Surprisingly the "atlantic low" regime is clearly forecast to be less frequent than normal by both models whereas the EA+ mode is favoured by these models.



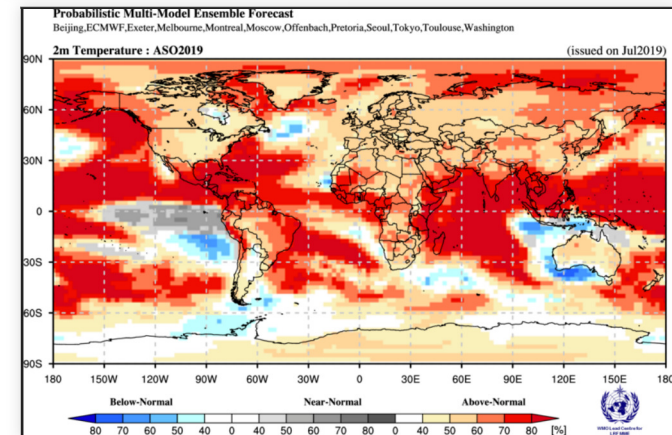
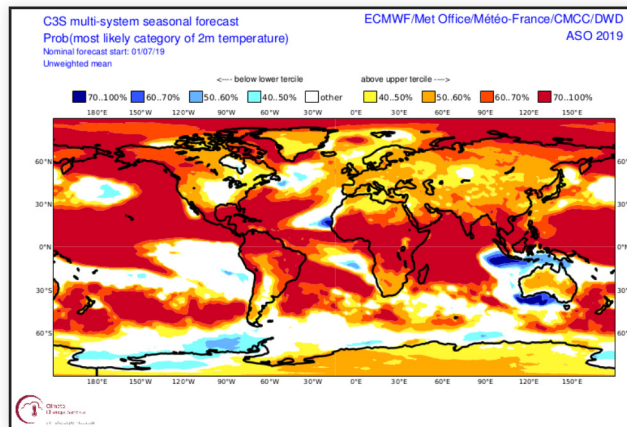
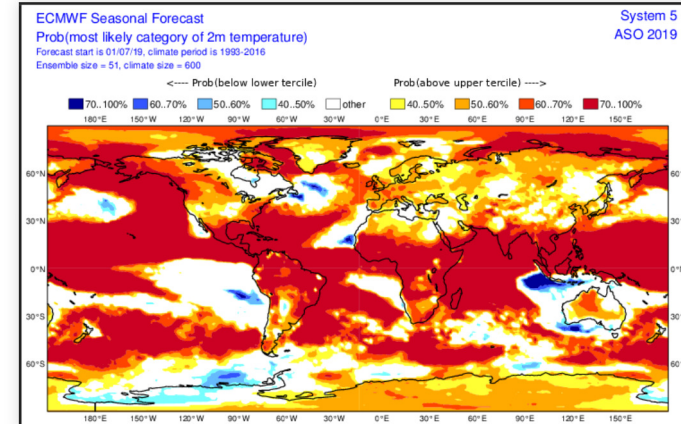
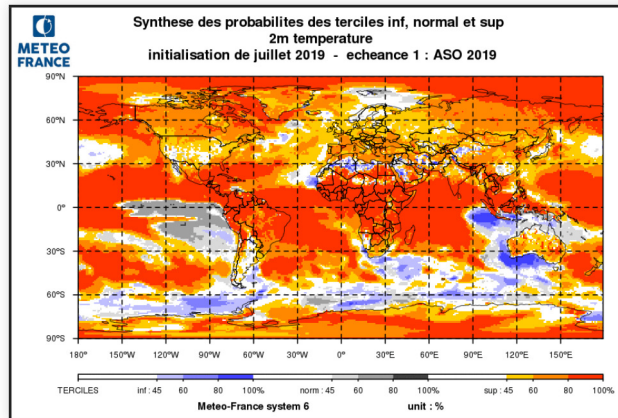
Frequency of SLP weather regimes, compared to model's own climatology, for the next three months and aggregation over the entire quarter, for MF6 (left) and SEAS5 (right).

[See the summer weather regime patterns](#)

Forecast of climatic parameters : Temperature

Widespread warm signal over continents with the exceptions of central US and to a lesser extent Central Asia.

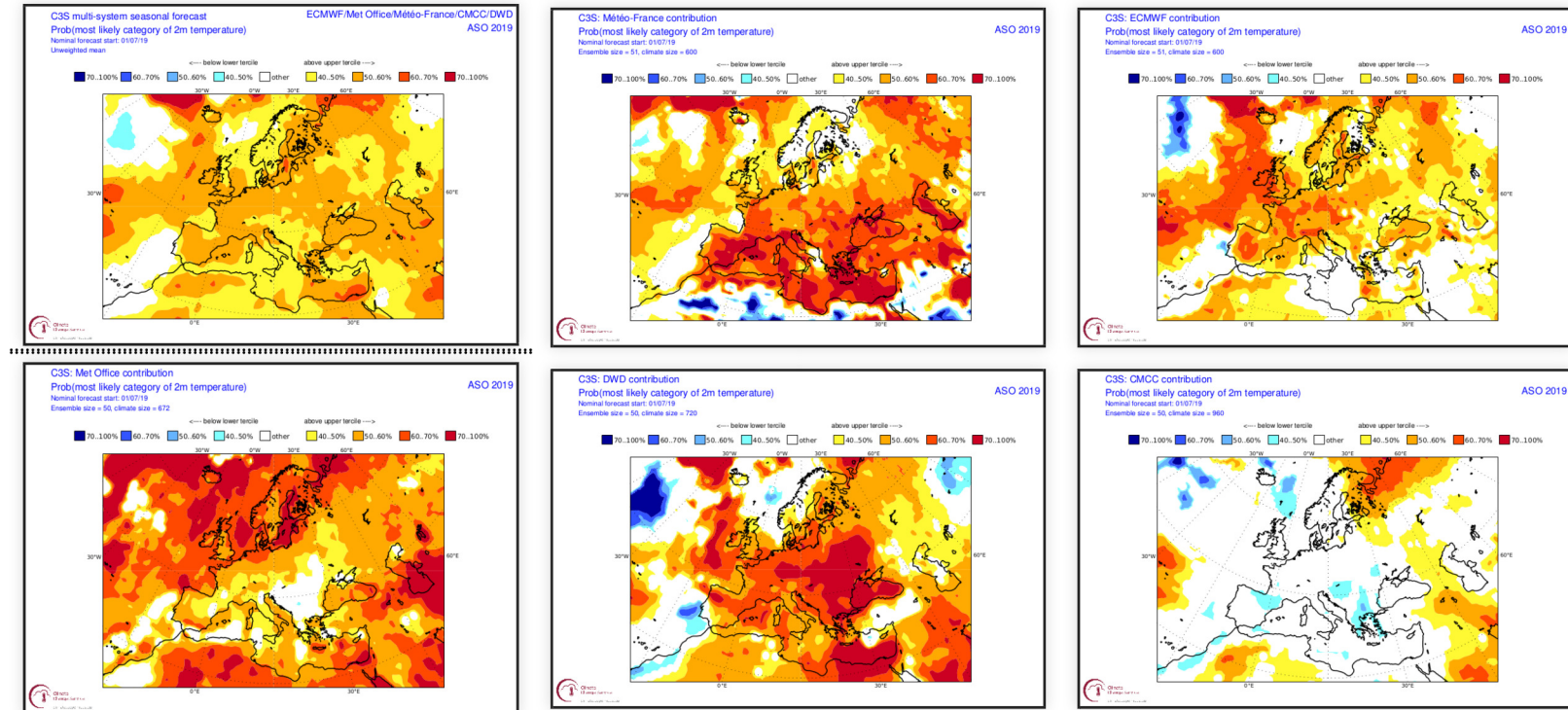
For Europe, positive anomalies forecast by all ensembles mean.



2m temperature probability map from MF6 (top left), SEAS5 (top right), C3S multi-models (bottom left) and others multi-models (bottom right)

Forecast of climatic parameters : T2M probabilities in C3S models

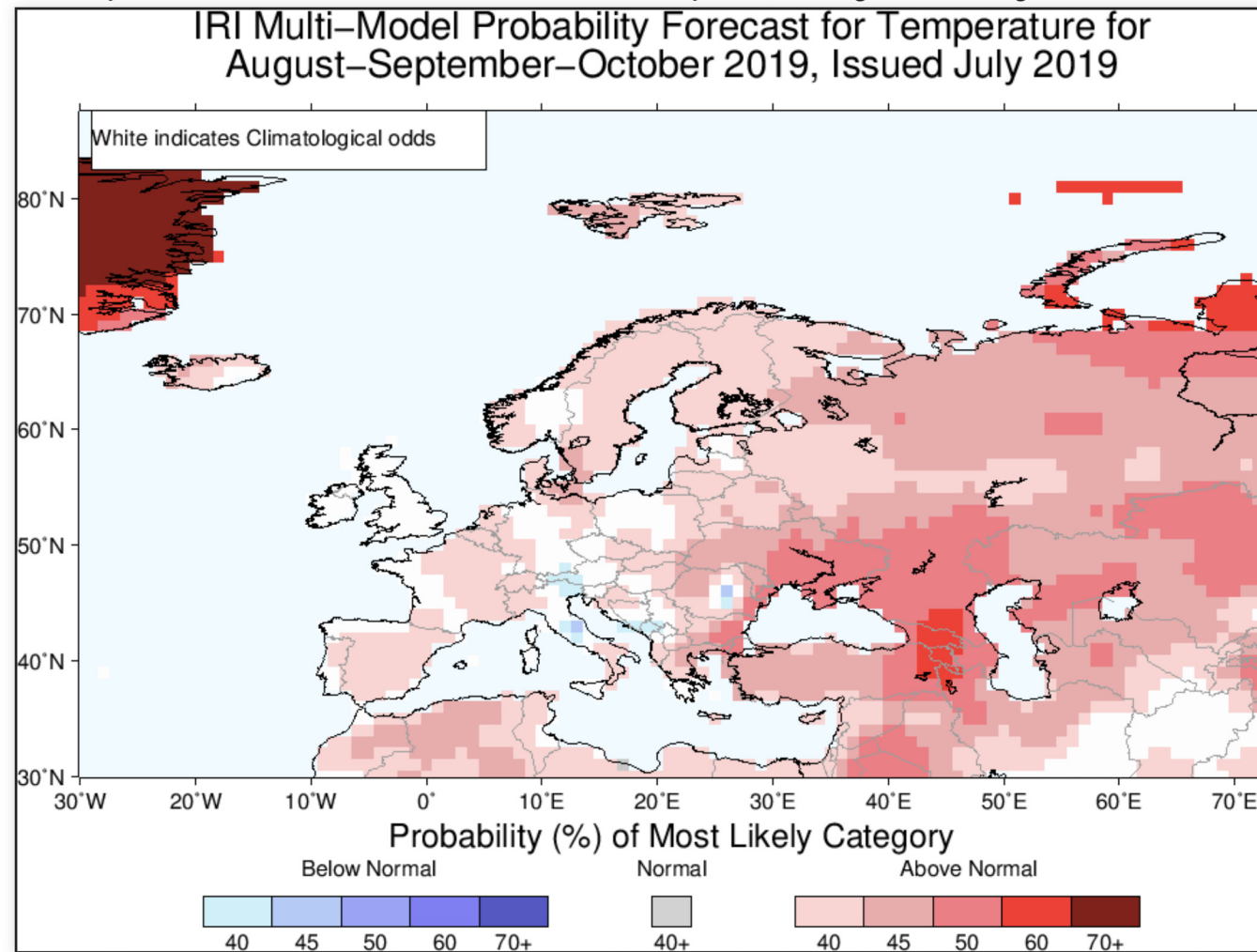
Rather good agreement between models : widespread warm signal over Europe. CMCC significantly colder than the others, which is consistent with its lower geopot. heights at 500 hPa. We will not give much credit to this scenario.



C3S multi-models probability map (top left) and MF6, ECMWF5, UKMO, DWD, CMCC models.

Forecast of climatic parameters : Température synthèse de l'IRI

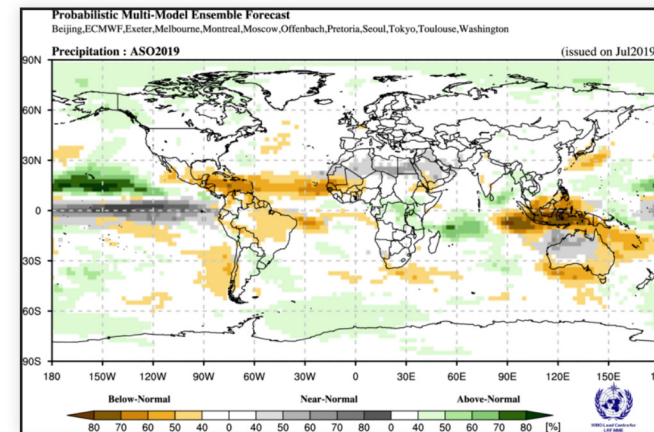
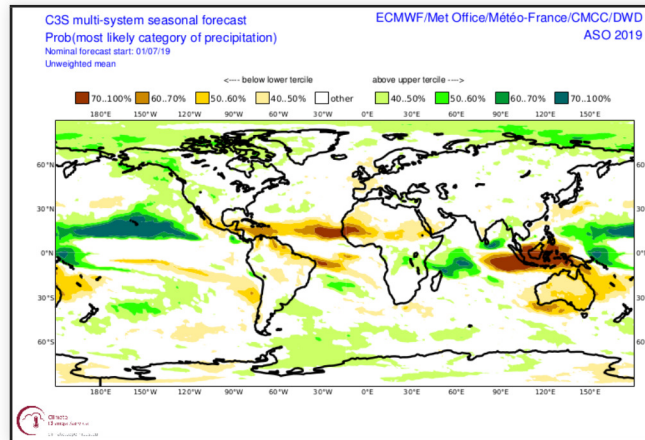
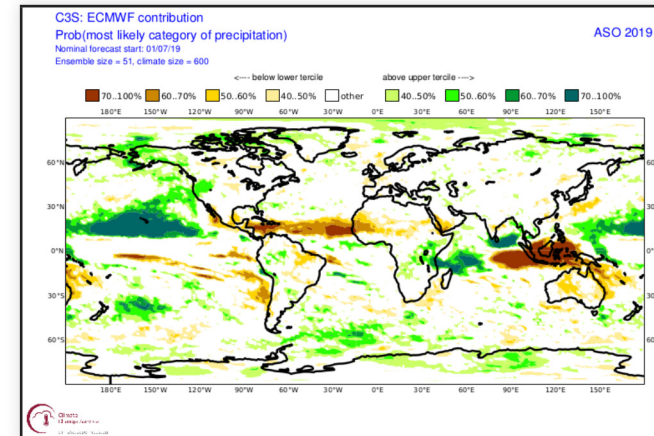
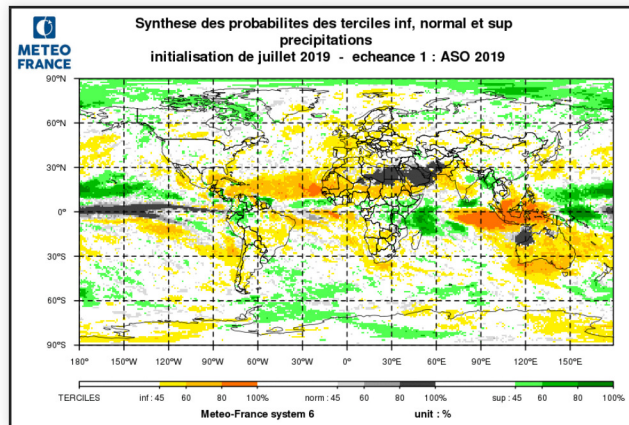
The multi-model synthesis of the IRI is consistent with other ensemble systems, although the warm signal is somehow weaker.



<https://iri.columbia.edu/our-expertise/climate/forecasts/>

Forecast of climatic parameters : Precipitation

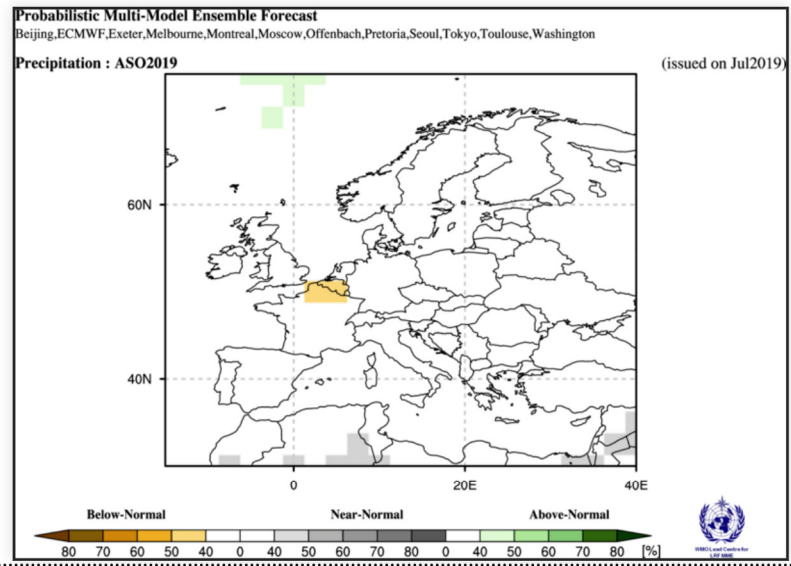
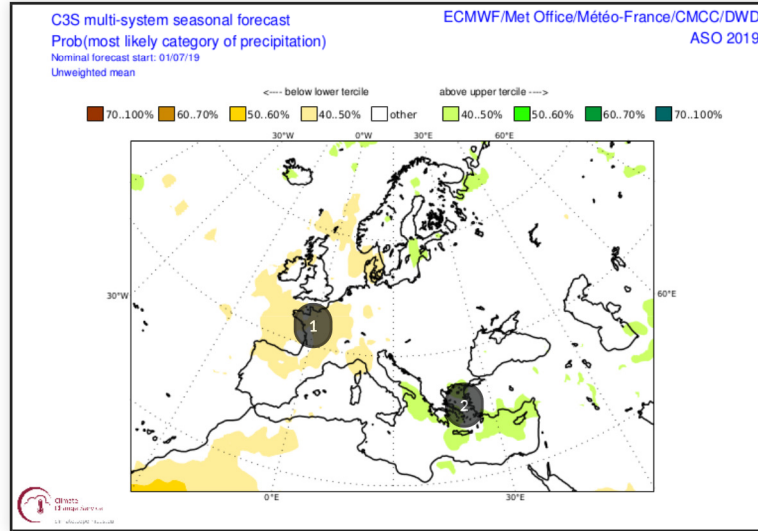
Pronounced dry anomaly over the Maritime Continent (consistent with PV200 anomalies and positive IOD). Also dry for tropical north Atlantic, from western Africa to the Caribbean (cool SSTs).



precipitation probability map from MF6 (top left), SEAS5 (top right), C3S multi-models (bottom left) and others multi-models (bottom right)

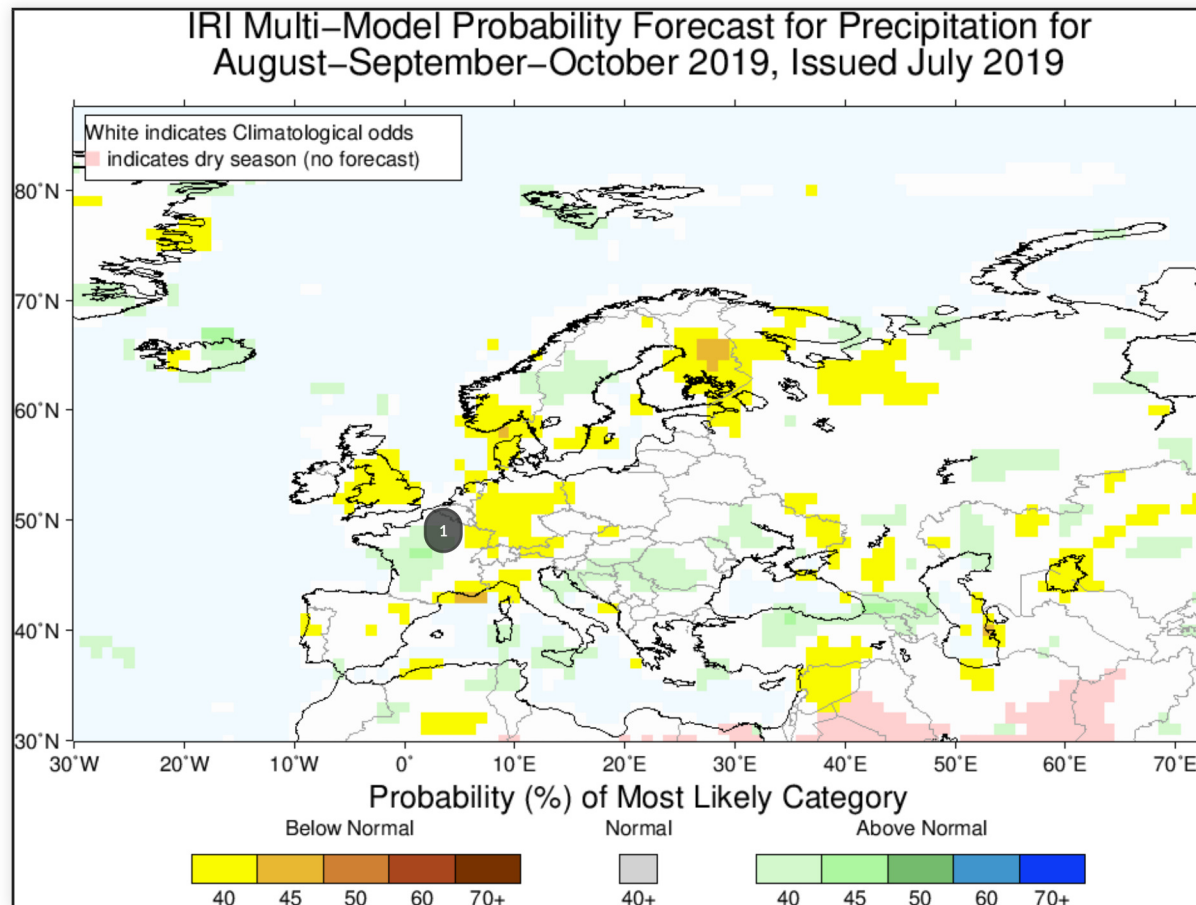
Forecast of climatic parameters : precipitation probabilities - zoom over Europe

In consistence with 500 hPa geop. height anomalies, most models suggest a dry signal for western Europe (blocking pattern) and a wet signal continuing for SE Europe. Of note is that models outside C3S suggest a more "zonal" pattern which results in almost no signal for precipitation over Europe.



multi-models probability map : C3S on the left; WMO on the right.

Forecast of climatic parameters : IRI precipitation synthesis



1- Difficult to explain in terms of atmospheric circulation.

<https://iri.columbia.edu/our-expertise/climate/forecasts/>

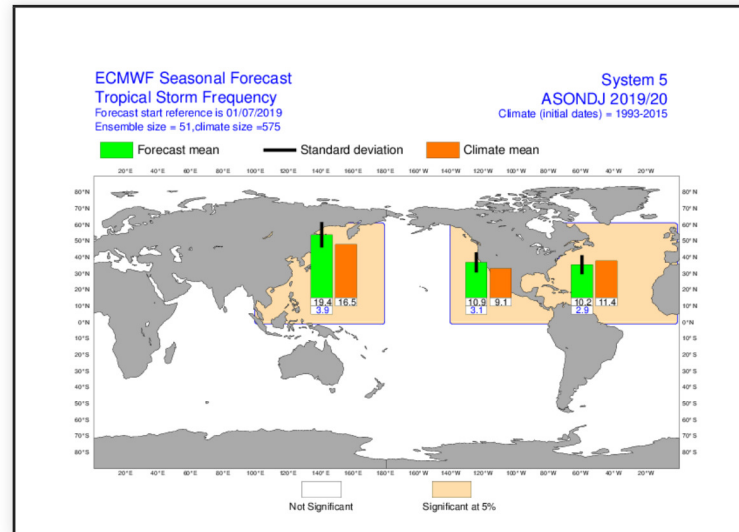
Forecast of climatic parameters : Tropical Storm Frequency

For the Atlantic : ECMWF forecasts tropical storm frequency below average.

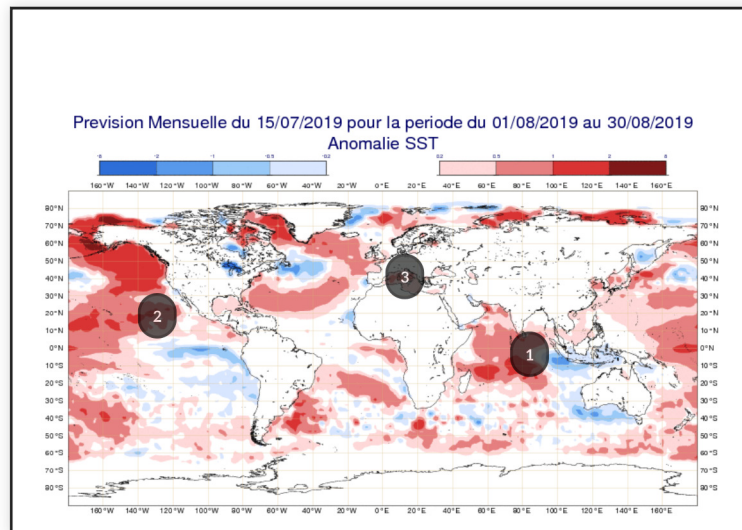
Nevertheless NOAA's CPC is predicting that a near-normal Atlantic hurricane season is most likely this year.(<https://www.nhc.noaa.gov/>).

MF6 forecats also normal hurricane season on the lesser antilles (<http://www.meteofrance.gp/>)

For the Pacific : Hurricane season to be well above normal (widespread SST positive anomalies and upward velocities over the basin).



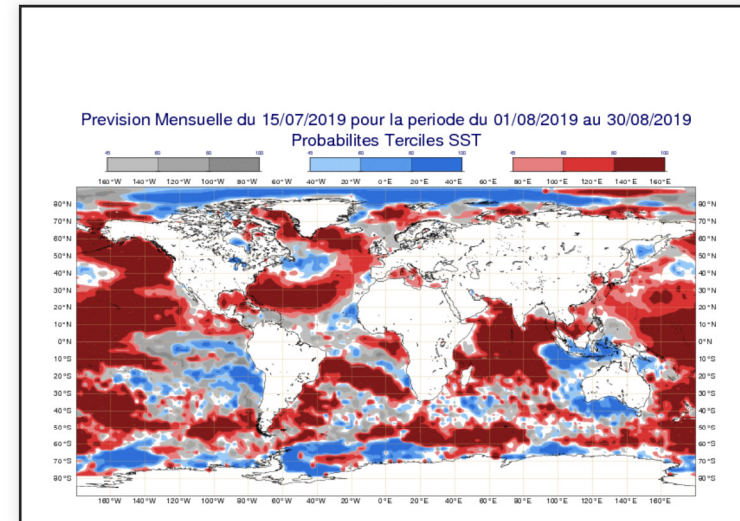
Monthly forecast of 20190715 : SST



1- Positive IOD

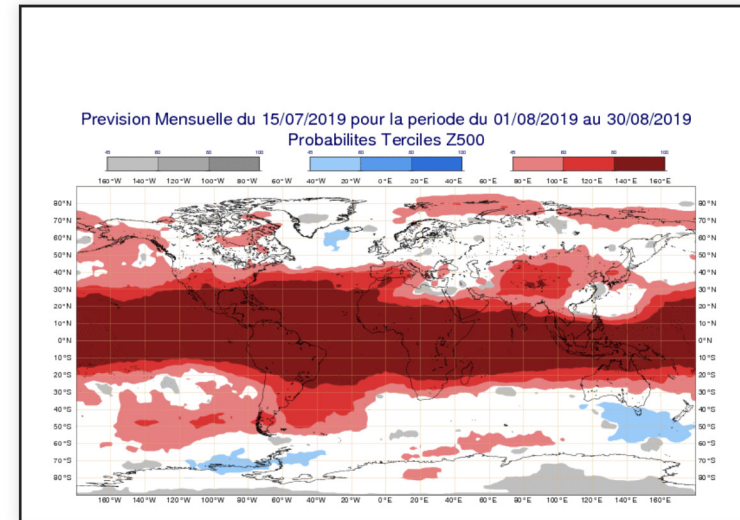
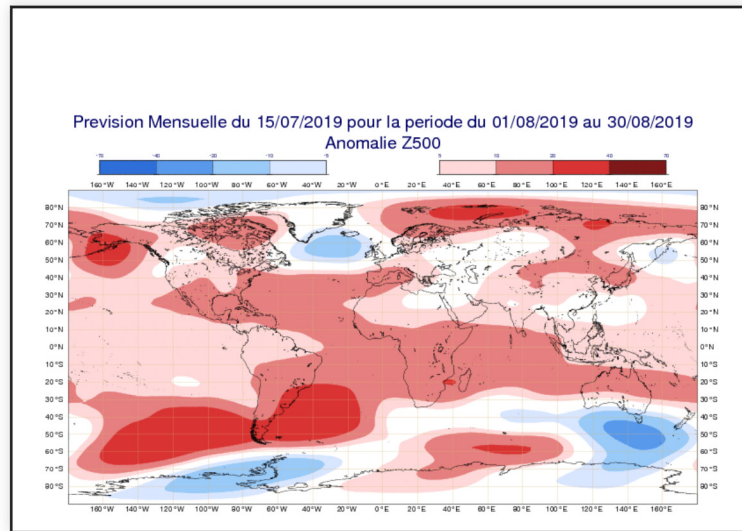
2- Cooling of the eastern Equatorial Pacific + positive PDO

3- Warm Mediterranean



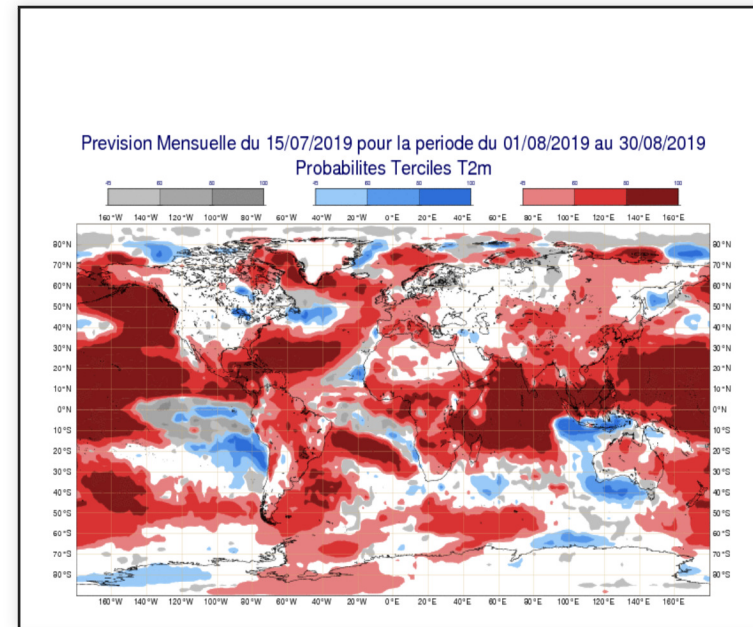
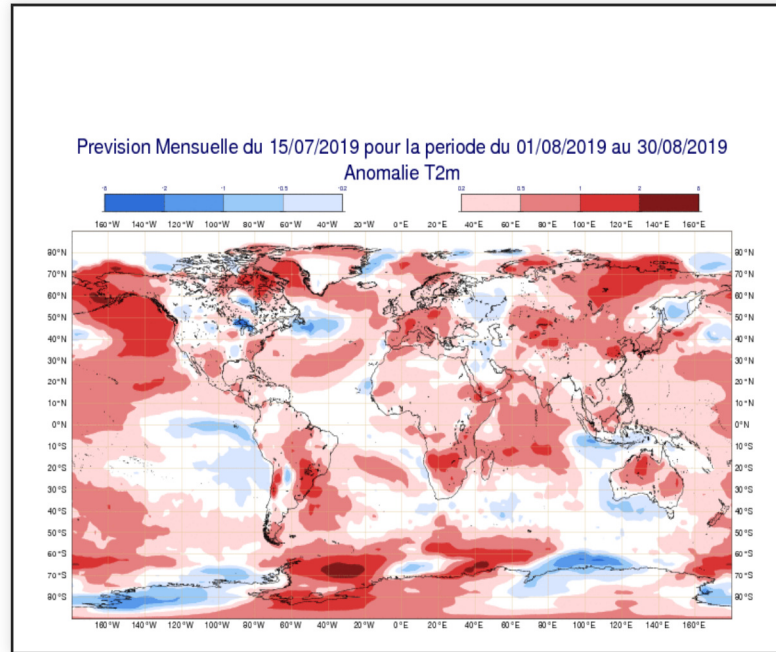
Monthly forecast of 20190715 : Z500

Zonal pattern, resembling non-C3S multi-model for ASO.

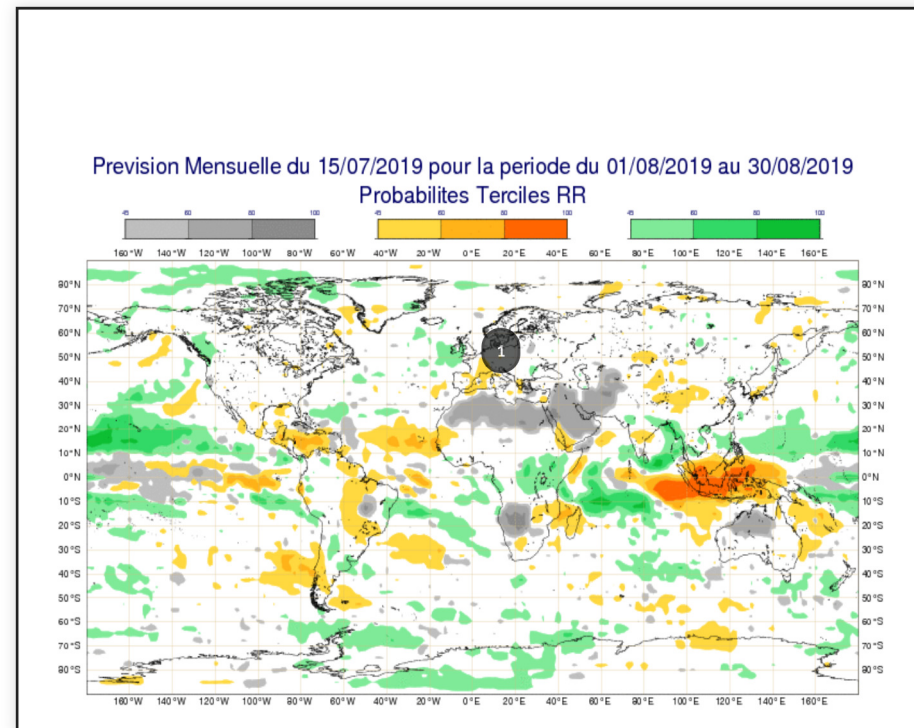
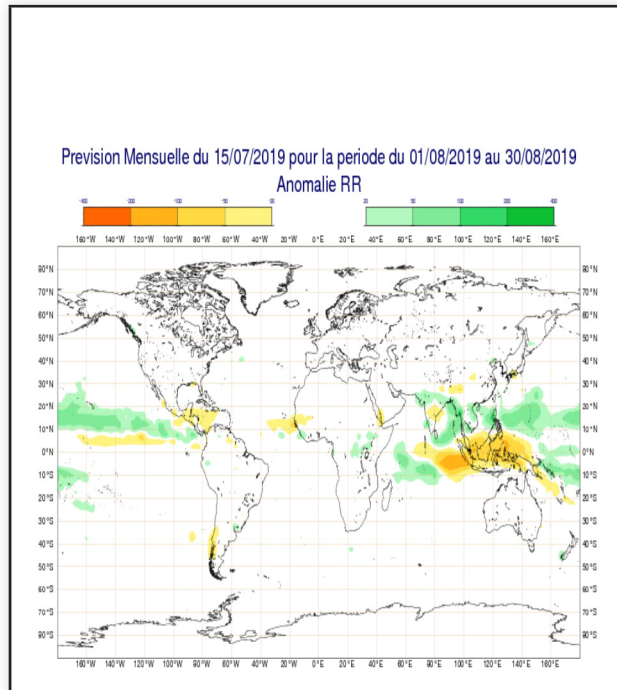


Monthly forecast of 20190715 : temperature

Warm signal for western Europe (except British Isles). Cool signal for south-eastern Europe.

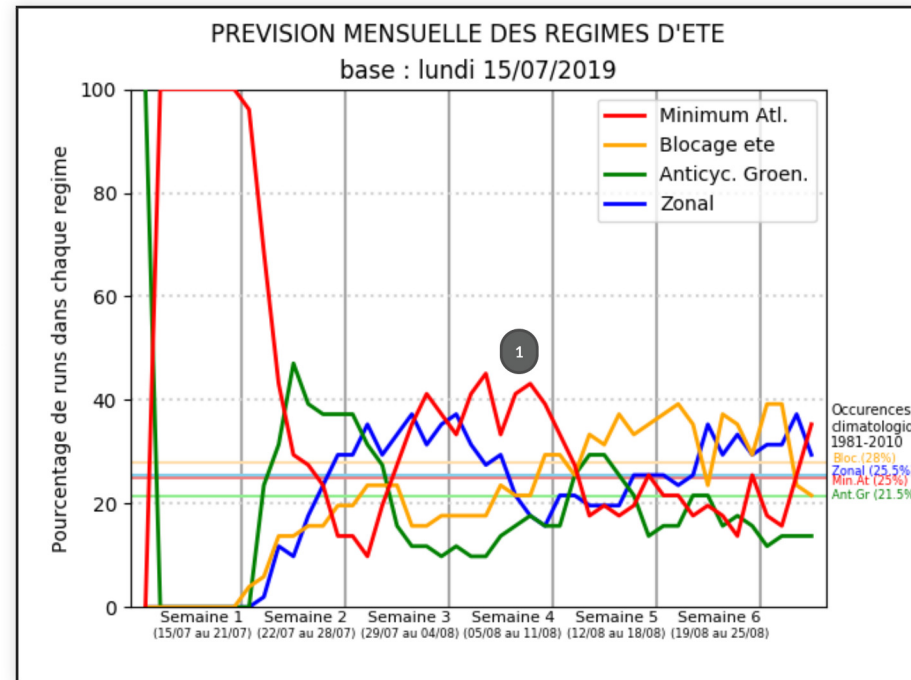


Monthly forecast of 20190715 : precipitation



1- In agreement with a zonal circulation, wet conditions expected for northern Europe, and dry conditions for southern Europe.

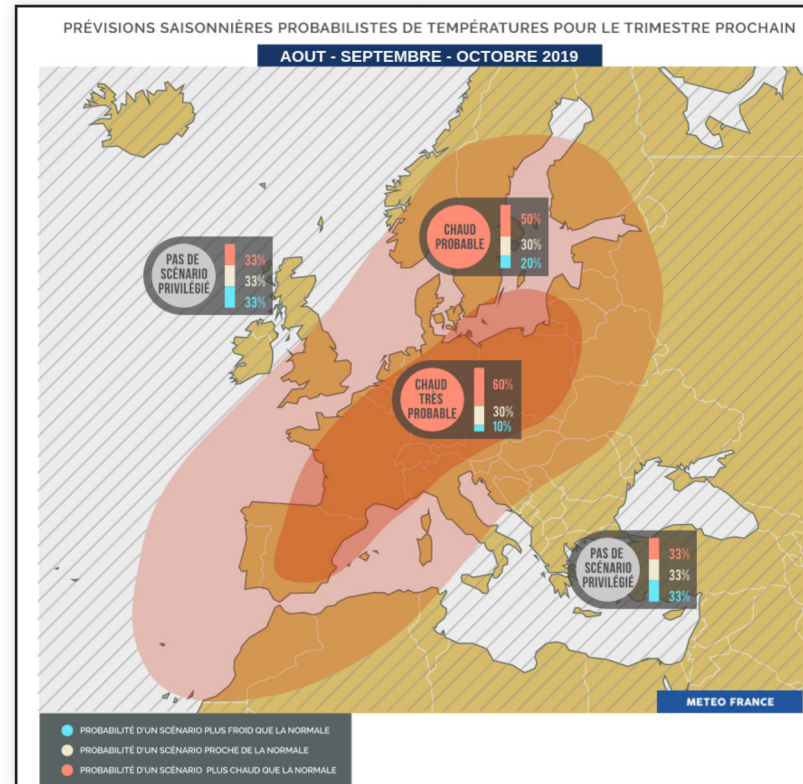
Monthly forecast of 20190715 : summer SLP weather regimes



1- Atlantic low and blocking favored during the month of August.

Synthesis map for Europe : Temperature

As mentioned in the previous slides a mixture of zonal and blocking pattern is most likely. Therefore we account for warmer than normal conditions for most of western and northern Europe, with the exception of NW British Isles and Scandinavia (oceanic cool flow prevailing). No scenario for SE Europe (but the expected wet conditions should prevent the region from being too warm during the period).



Synthesis map for Europe : Precipitation

Following C3S mean and with a mix of zonal and blocking patterns, drier than normal conditions are likely from Iberia towards northern Europe and wetter than normal conditions should once again prevail over South-Eastern Europe.

