MEDCOF-10 Climate Bulletin (2nd DRAFT)
RCC-LRF inputs for the Forecasting Section
prepared by Météo-France

II. SEASONAL FORECAST FROM DYNAMICAL MODELS

II.1. OCEANIC FORECASTS

The La Niña phenomenon is ending, and weak positive anomalies will take place in the equatorial Eastern Pacific in the next 3 months.

II.1.a Sea surface temperature (SST, figure II.1.1 to II.1.4)

- Pacific Ocean: Return to neutral conditions expected along the equator (some postive anomlies expected but still weak). Persisting cold anomaly forecast over the southern tropical basin, and warm anomaly over the northern tropical basin. Northern Pacific globally forecast warmer than normal, especially in the Bering region and over the western half of the basin. No significant PDO structure over the period.
- Indian Ocean: Neutral conditions forecast in the northern hemisphere. The DMI should therefore remain close to zero (see figure II.1.7.). In the tropical southern hemisphere, good agreement between models, suggesting a warmer than normal south-western basin and a colder than normal south-eastern basin.
- Atlantic Ocean: Most models forecast cooler than normal SSTs over the Tropical Atlantic. Several models suggest a warm area extending along the equator. Neutral or cooler than normal conditions expected off the western coasts of Africa. TASI index may stay negative.
- Mediterranean Sea : Warmer than normal..

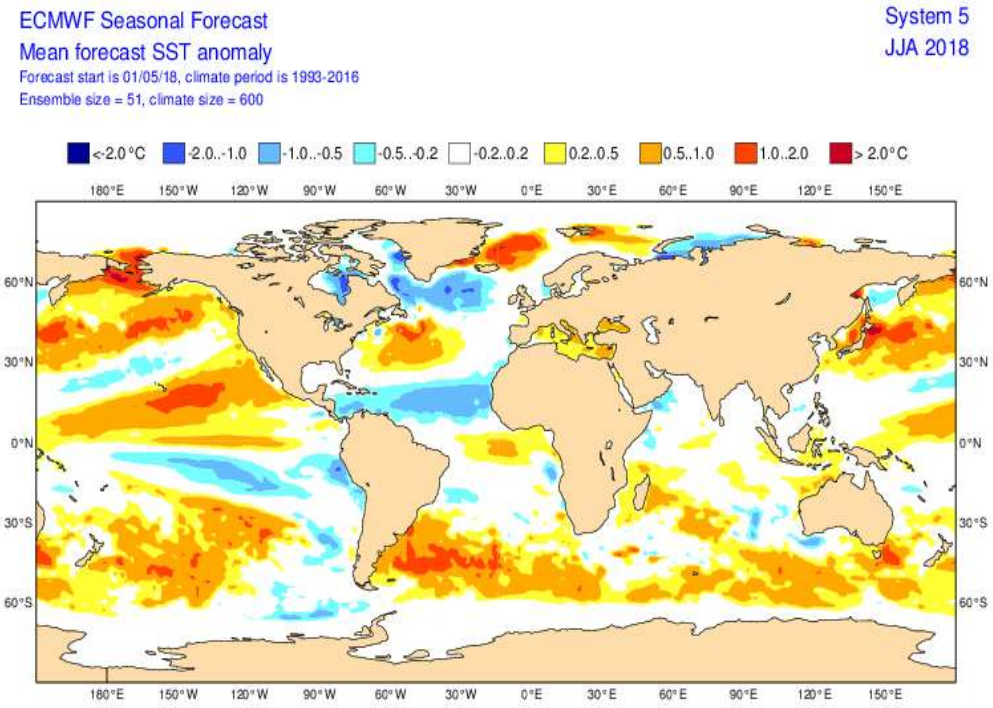


fig.II.1.1: SST anomaly forecast from ECMWF

http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

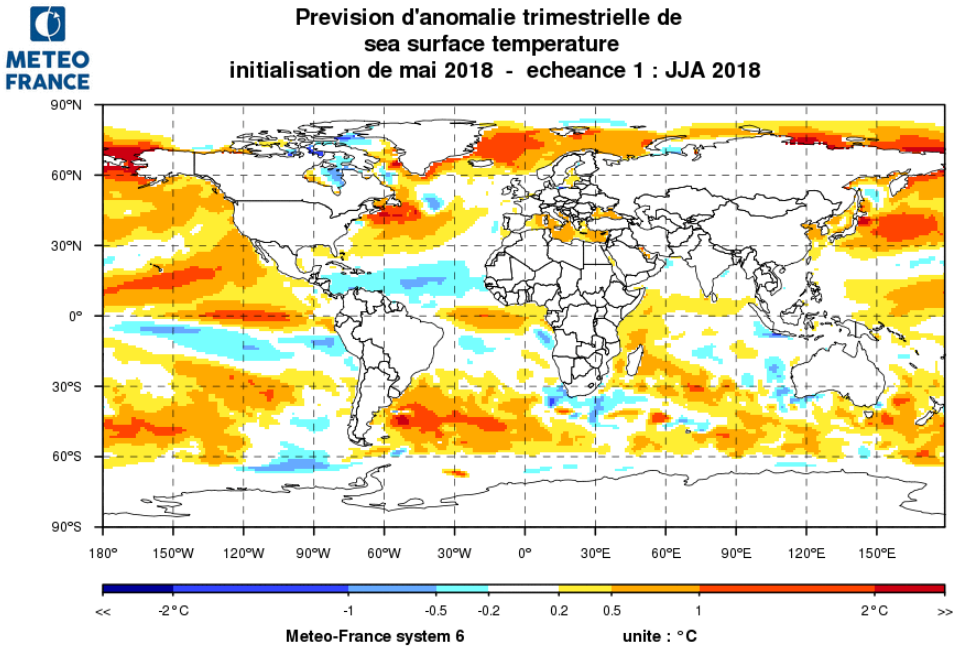


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).

http://seasonal.meteo.fr

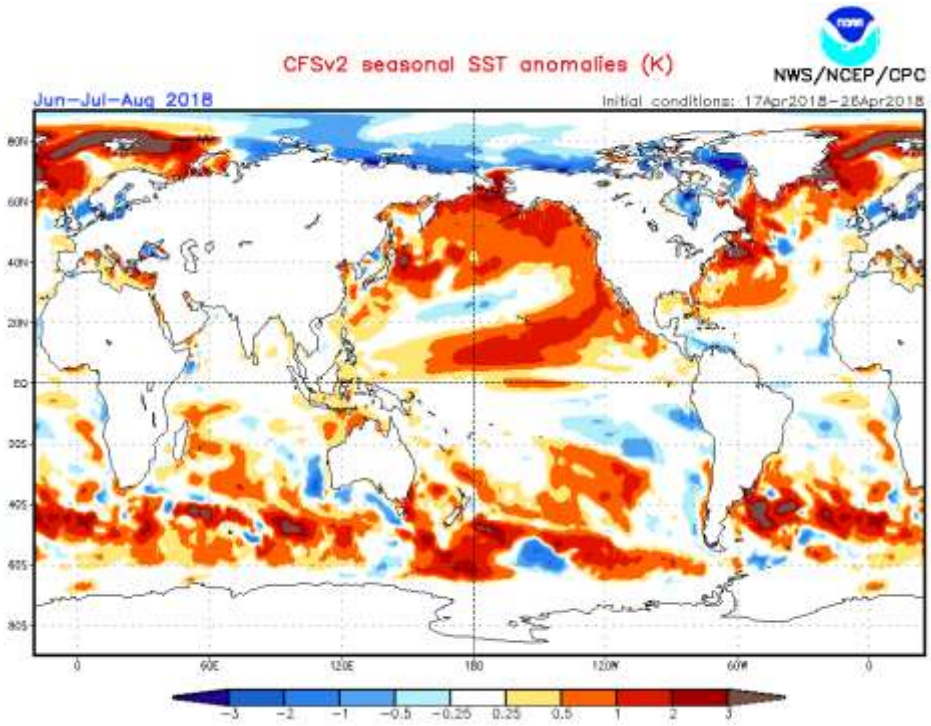


fig.II.1.3: SST Anomaly forecast from NCEP.
http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/imagesInd1/glbSSTSeaInd1.gif

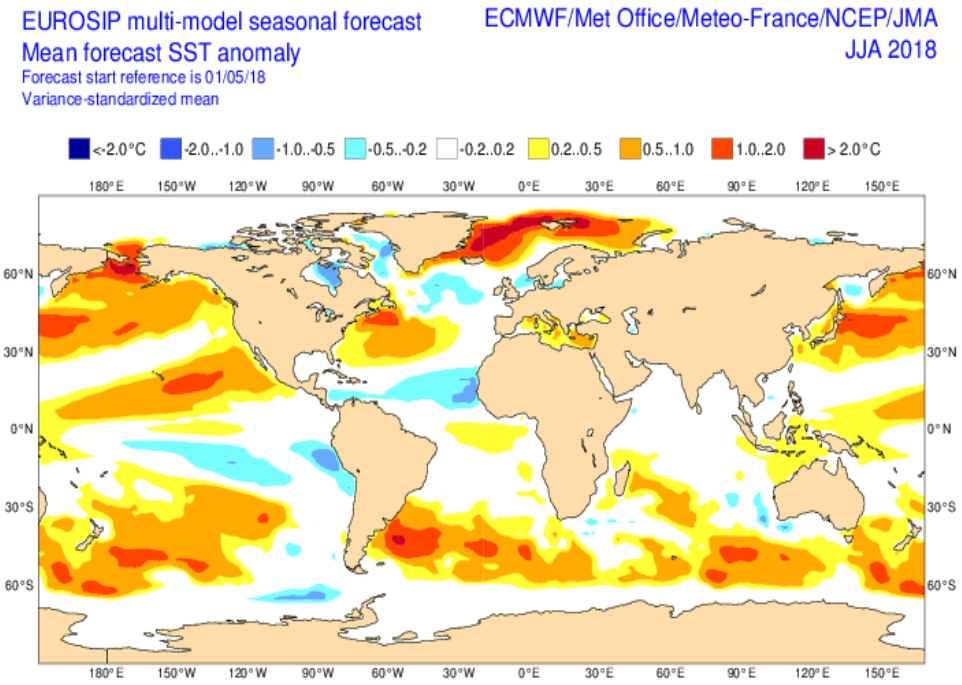


fig.II.1.4: SST Forecasted anomaly from Euro-SIP

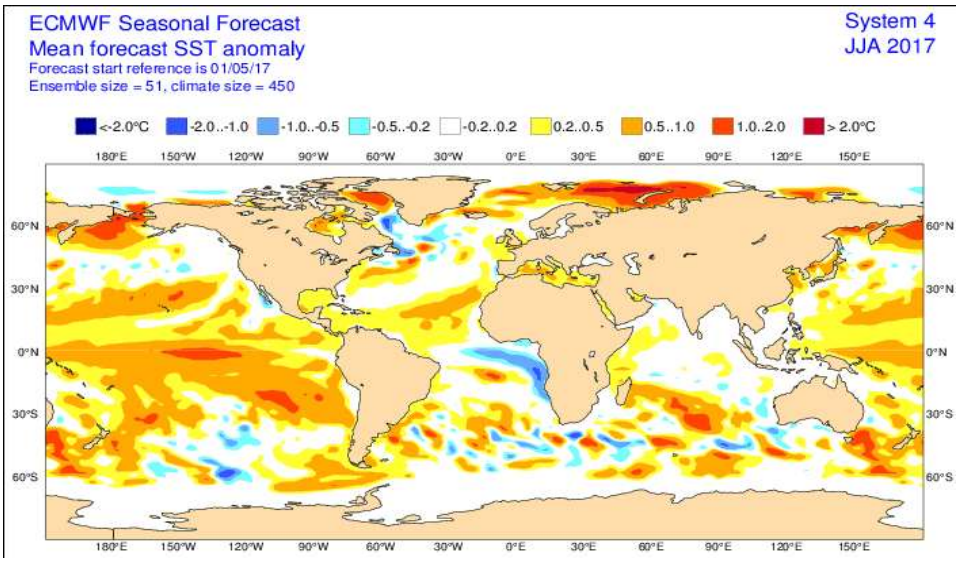


fig.II.1.1: SST anomaly forecast from ECMWF

http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

II.1.b ENSO forecast :

Forecast Phase: **neutral phase.** Note that there is a high probability for anomalies to be positive in the Nino3.4 box, but below 0.5°C.

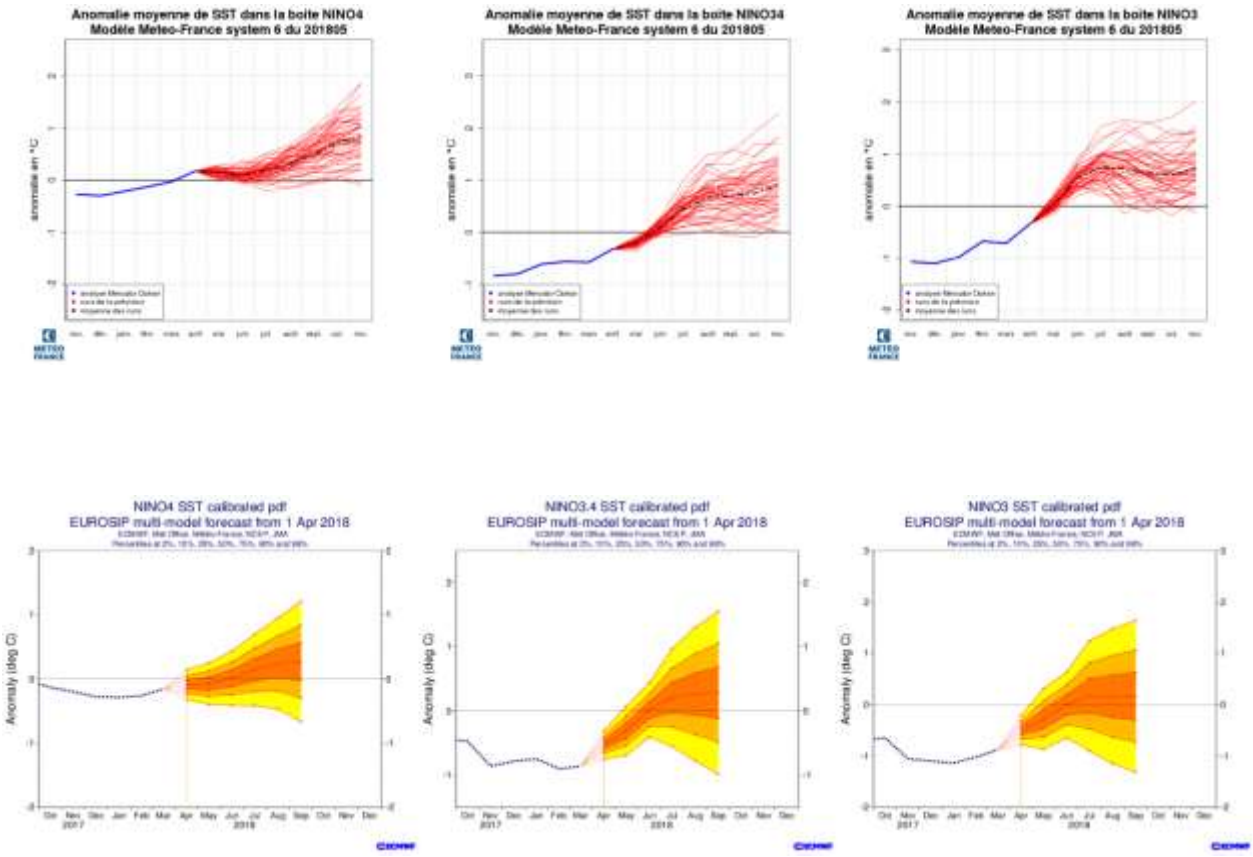
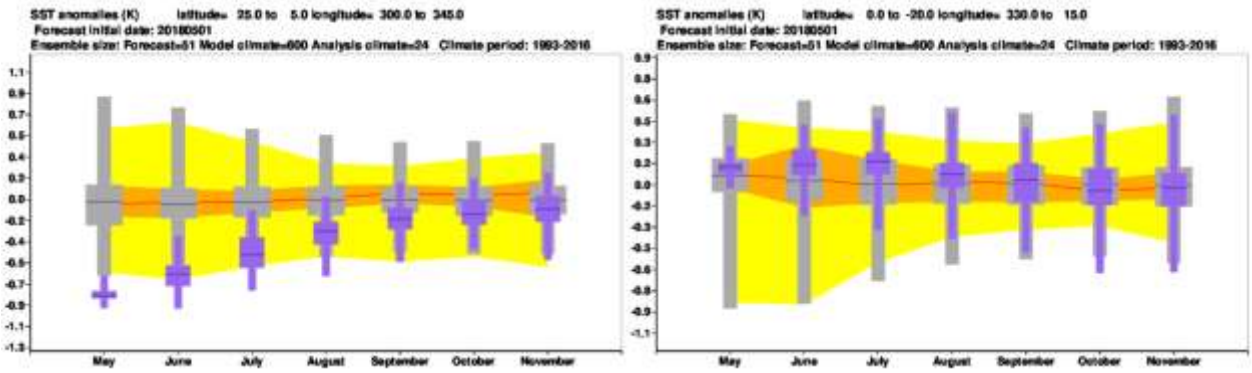


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EUROSIP (bottom) – recalibrated distributions - (http://seasonal.meteo.fr , http://www.ecmwf.int/)

I.1.c Atlantic ocean forecasts

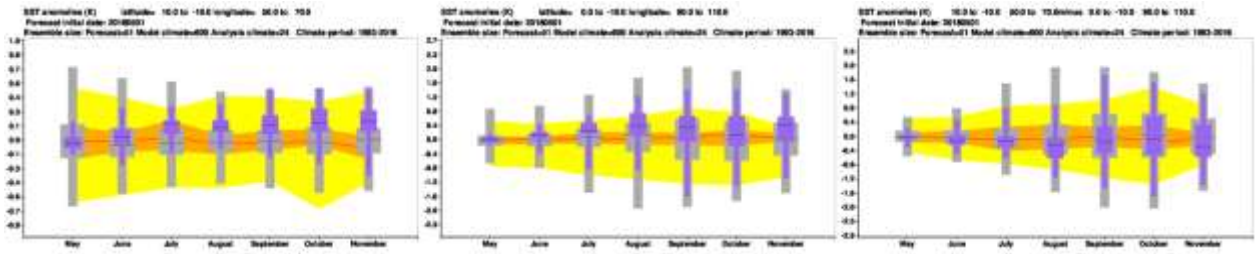
fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.



Forecast Phase: **neutral phase.** Note that there is a high probability for anomalies to be positive in the Nino3.4 box, but below 0.5°C.

I.1.d Indian ocean forecasts

fig.II.1.7: SST anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.



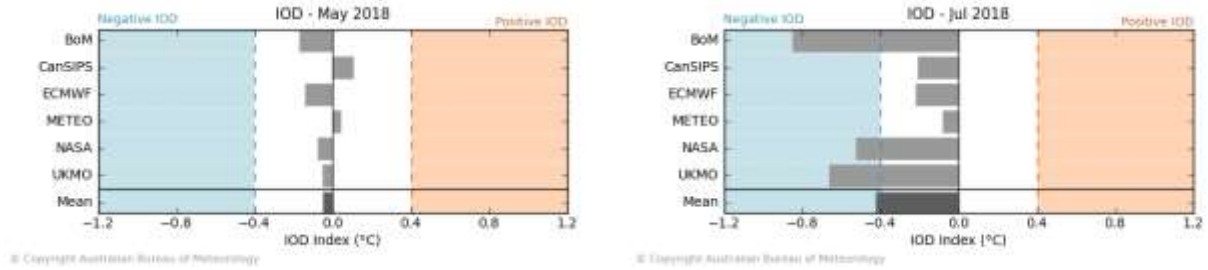


fig.II.1.7: SST anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.2. GENERAL CIRCULATION FORECAST

II.2.a Velocity potential anomaly field and Stream Function anomaly field

- Velocity potential : SST anomalies in the Equatorial Pacific may evolve significantly compared to current situation (becoming positive in the Nino3.4 box), so one can expect noticeable modifications in the VP200 anomaly field. In MF6 and ECMWF5, there are effectively new elements, like the negative anomaly (upward motion anomaly) on the Eastern equatorial Pacific, and the positive anomaly on the the Central/West Pacific (mainly South of the equator) : they are consistent with SST evolution. On the North tropical Atlantic, the negative SST anomaly may lead to the positive VP200 anomaly (strong with ECMWF5). Anywhere else, some similar patterns in the 2 models, without any clear link with SST anomalies.So globally, there is quite a good confidence in the large scale circulation in the tropics.
- Stream fonction : the only noticeable signal is located around Eastern Pacific-Western Atlantic, with a quadripole of anomalies. It could be a consequence of the SST anomalies in both Eastern Pacific and Noth Tropical Atlantic (consistency with the Gill model response). So one can consider these elements with good confidence, they lead to enhancement of the pressure field between the Azores and the Carribean region (so stronger trade winds).

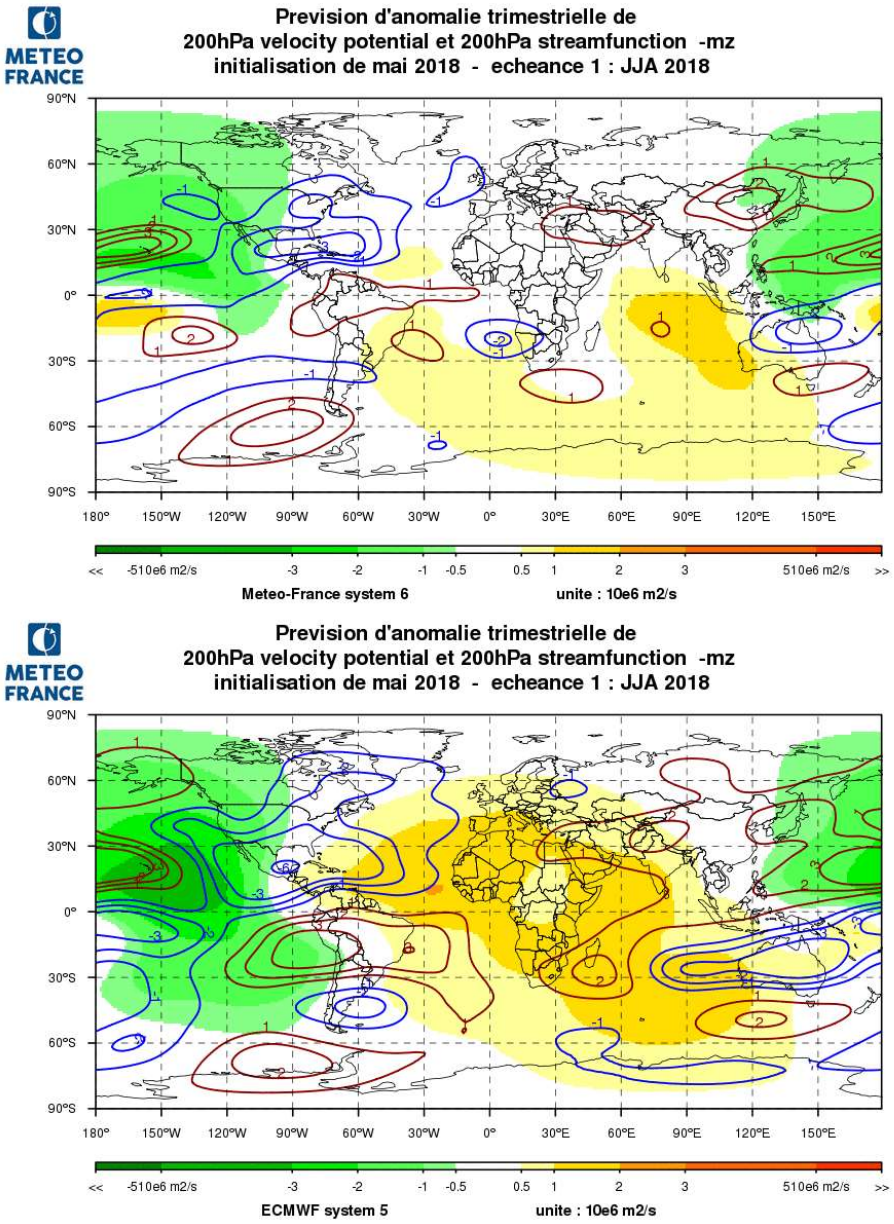


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fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

II.2.b Geopotential height anomalies

MF-S6 Z500 raw anomalies (figure II.2.b.1) show positive anomalies over the whole northern hemisphere. Normalized anomalies could be easier to interpret (see seasonal.meteo.fr).

Over North Atlantic and Europe, MF6 and ECMWF5 forecast a positive phase of NAO (this is clear with ECMWF5, less with MF6). Over the Mediterranean Basin, the 2 models propose a West (+) / East (-) contrast, but this is not something confirmed by a majority of GPC.

Globally, the spread in GPC's forecast is very high. The positive NAO signal seems to be the only large scale feature that emerge from the multi-model combination.

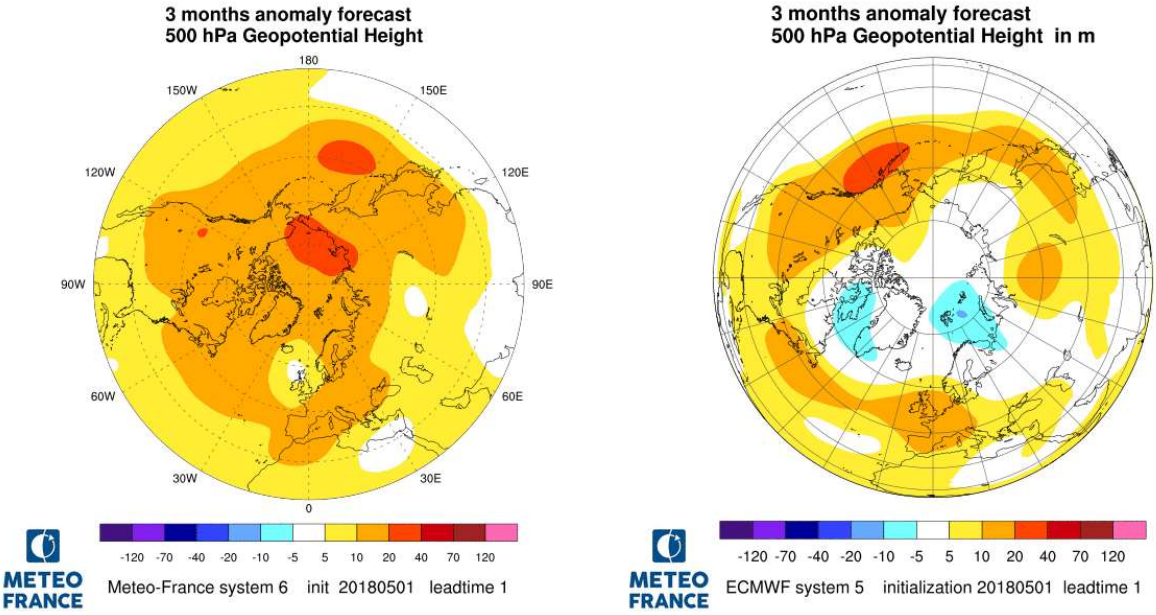


fig.II.2.b.3: Anomalies of Geopotential Height at 500 hPa from Météo-France. http://seasonal.meteo.fr

II.2.c. modes of variability

MF-S6 and ECMWF-S5 are clearly in favour of positive NAO and EA modes.

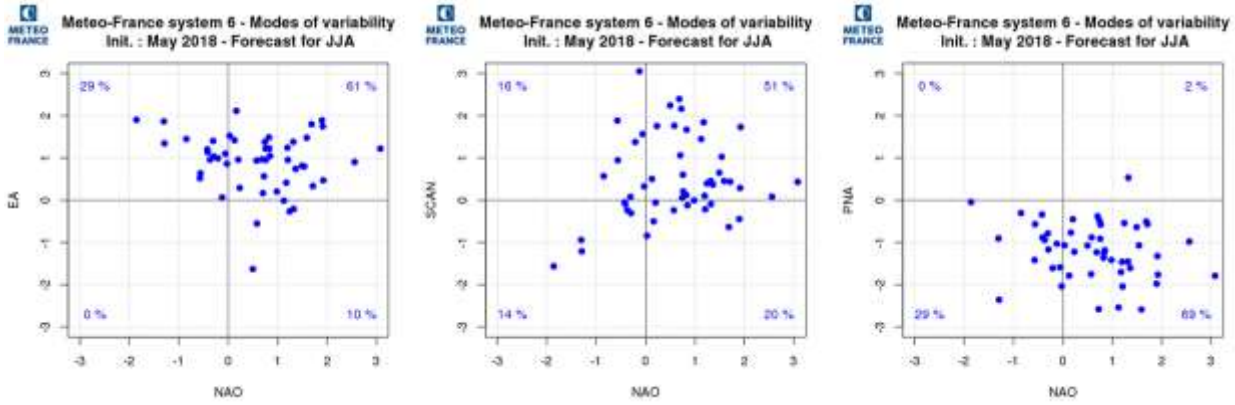


fig.II.2.c.1 : modes of variability forcasts over the Northern hemisphere with Meteo-France MF-S6

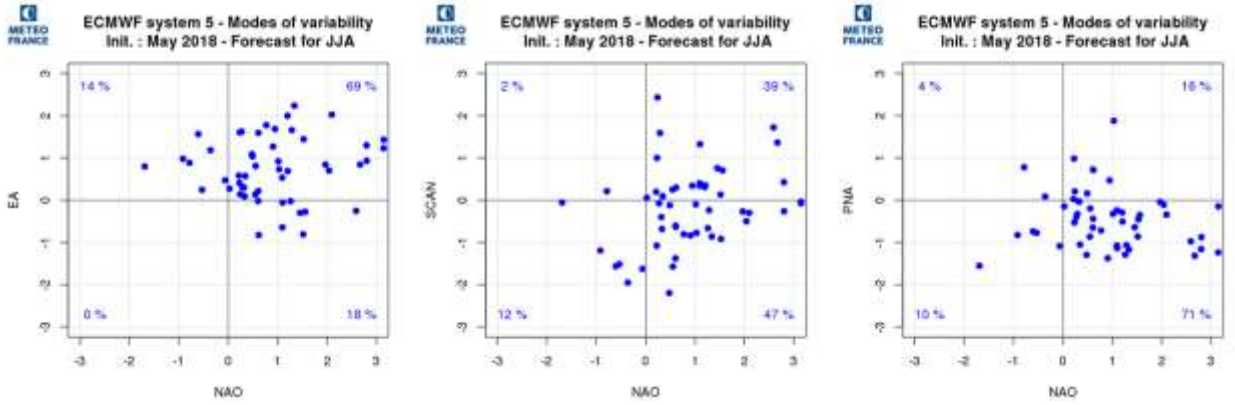


fig.II.2.c.2 : modes of variability forcasts over the Northern hemisphere with ECMWF-S5

II.3. IMPACT: TEMPERATURE FORECASTS (figure II.3.1 to II.3.4)

MF-S6 and ECMWF-S5 both favour warmer than normal conditions over most regions of Europe, with probabilities higher than 60% for the higher tercile over southern Europe (twice the climatological probabilities). Over Northern Europe, forecast are more contrasted.
Most of the GPC confirm the warm signal over Southern Europe.

Elsewhere on continental regions, the only areas where the warm signal is not forecasted by a majority of models are the Indian subcontinent, Australia, North of South America and Carribean region, East of Canada.

II.3.a Météo-France

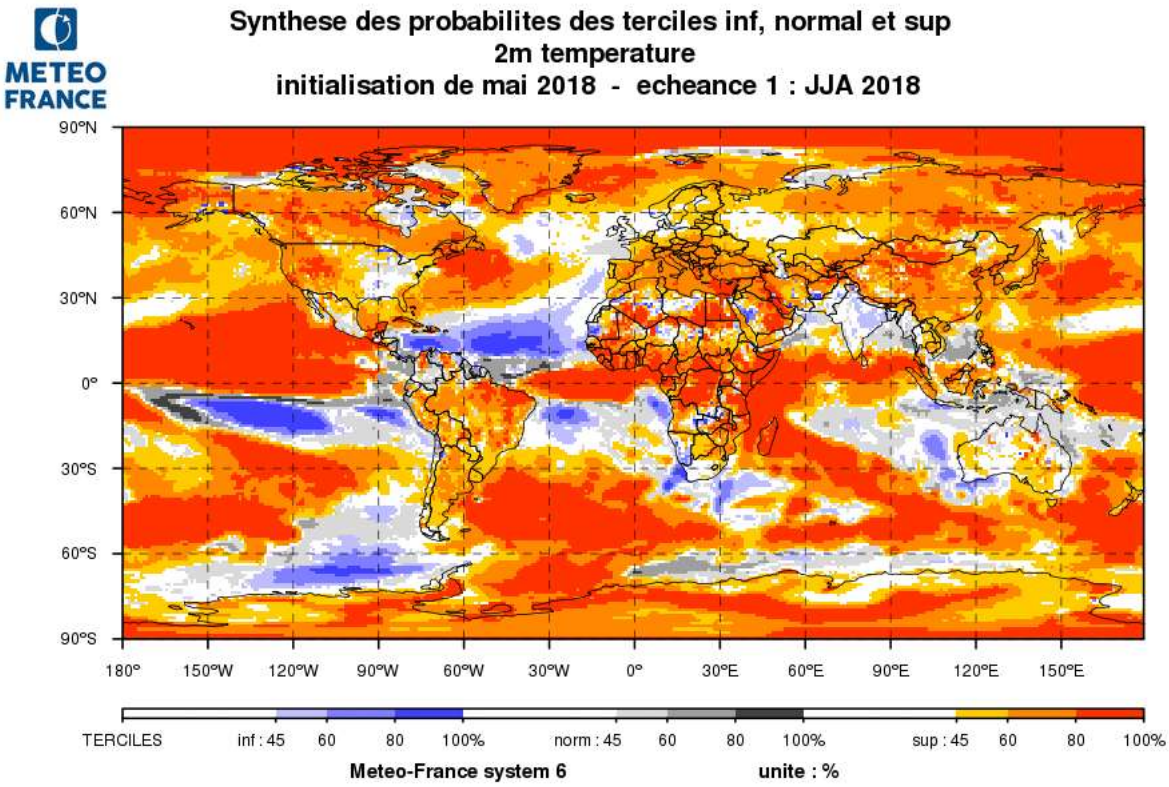


fig.II.3.1: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://seasonal.meteo.fr/

II.3.b ECMWF

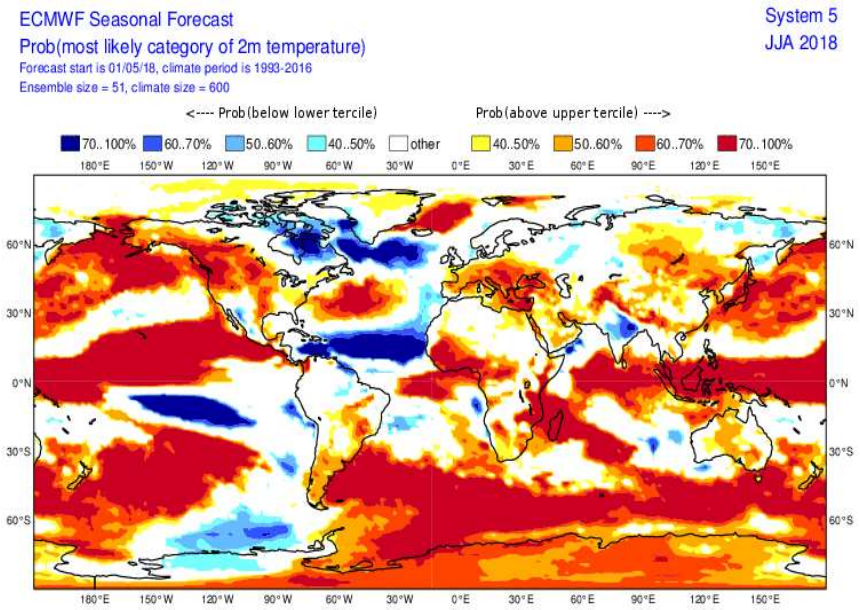


fig.II.3.2: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).

www.ecmwf.int

II.3.c Japan Meteorological Agency (JMA)

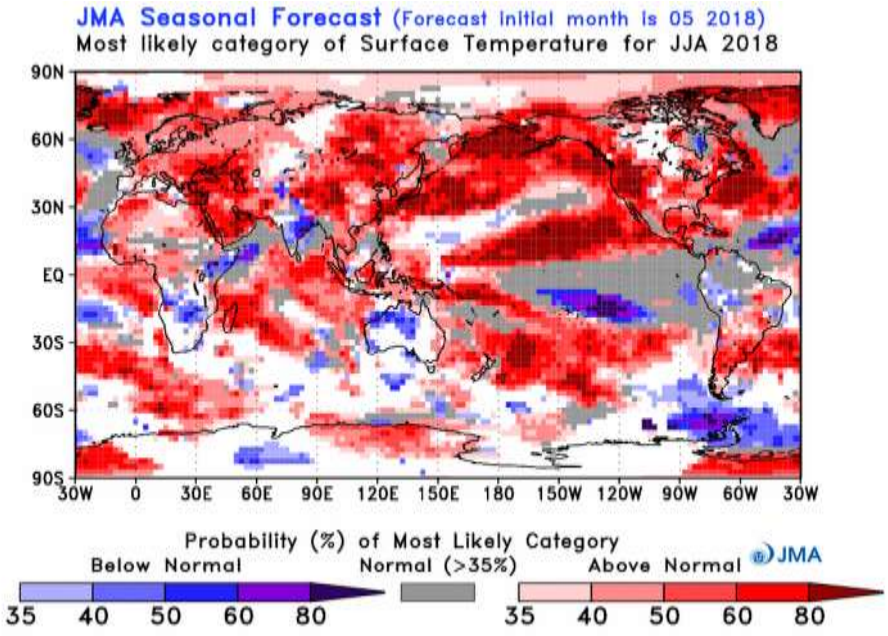


fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.

http://ds.data.jma.go.jp

II.3.d EUROSIP

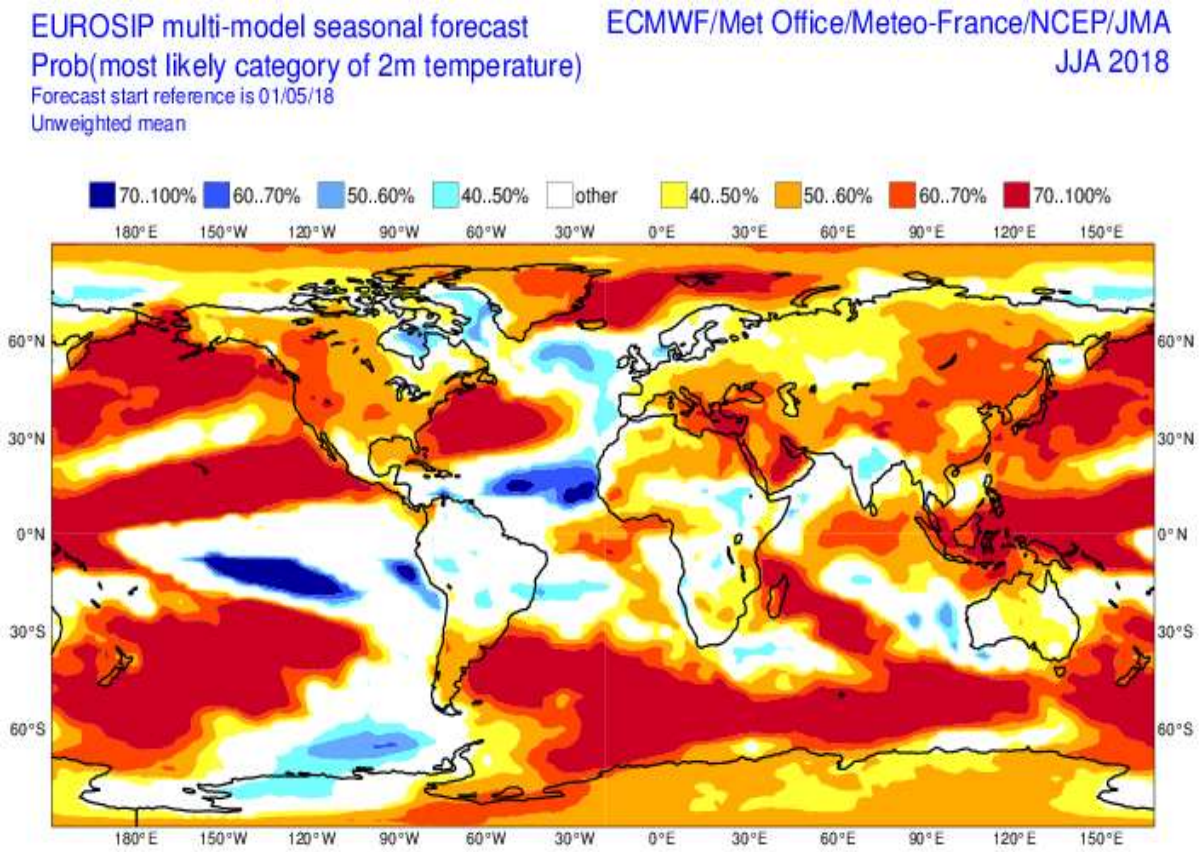


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal –
White zones correspond to No signal and Normal).

II.4. IMPACT : PRECIPITATION FORECAST

- inter-tropical regions :
  - For the Pacific basin, wet to the north (incl. Hawai), dry to the south, in agreement with SST anomalies.
  - For the Atlantic : over the Carribean region, enhanced dry signal, consistent with cooler than normal SSTs and velocity potential anomalies.
  - For the Indian Ocean,no clear signal, large uncertainty..
  - Over Africa, drier than normal conditions expected to the west (impact of negative SST anomalies?), and wetter than normal conditions for the eastern countries (Ethiopia, Sudan).
- Mid-latitudes :
  - dry signal over Europe (except Sandinavia)
  - humid for Alaska and dry for south-western US

II.4.a Météo-France

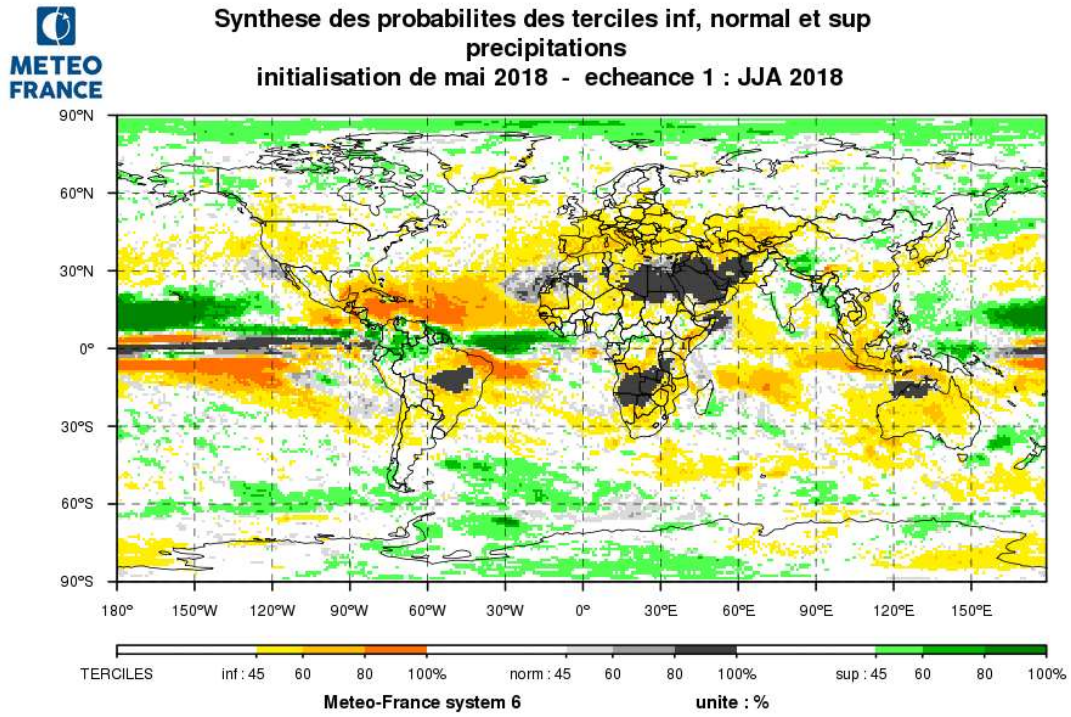


fig.II.4.1: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://seasonal.meteo.fr/

II.4.b ECMWF

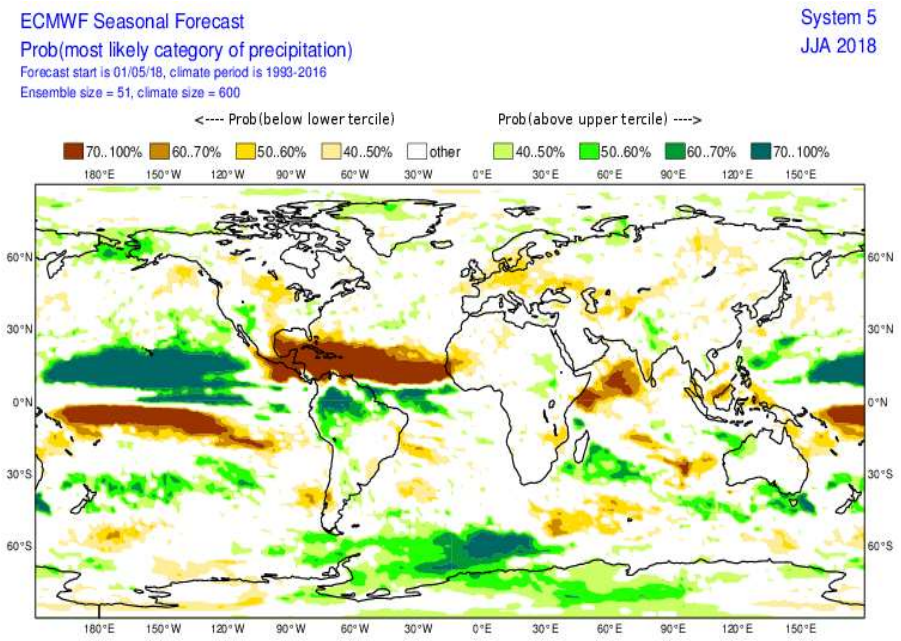


fig.II.4.2: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).

www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.4.c Japan Meteorological Agency (JMA)

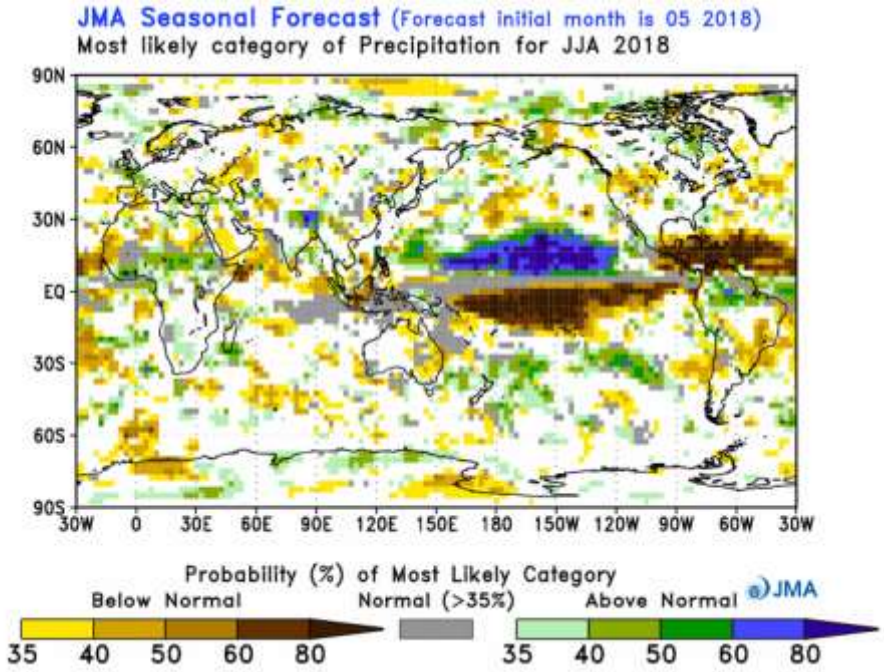


fig.II.4.3: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.

http://ds.data.jma.go.jp

II.4.d EUROSIP

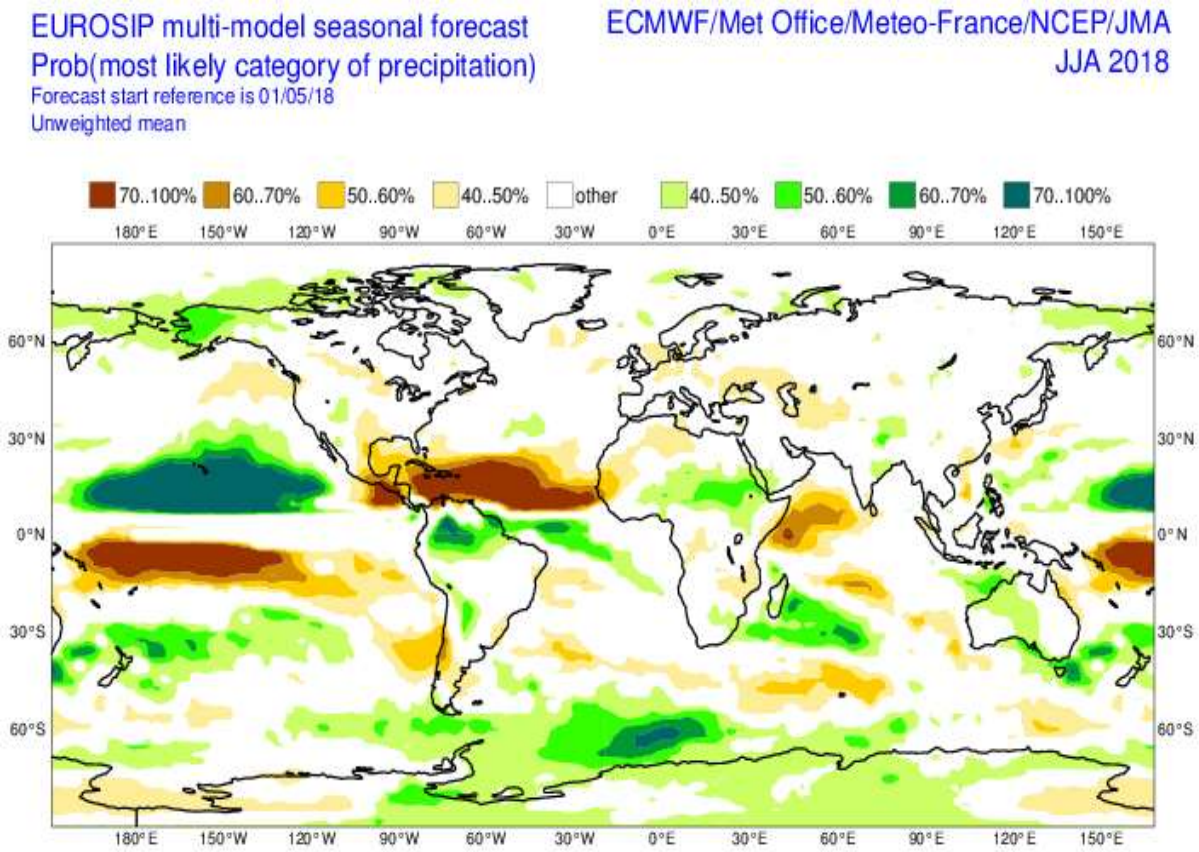


fig.II.4.4: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).

www.ecmwf.int

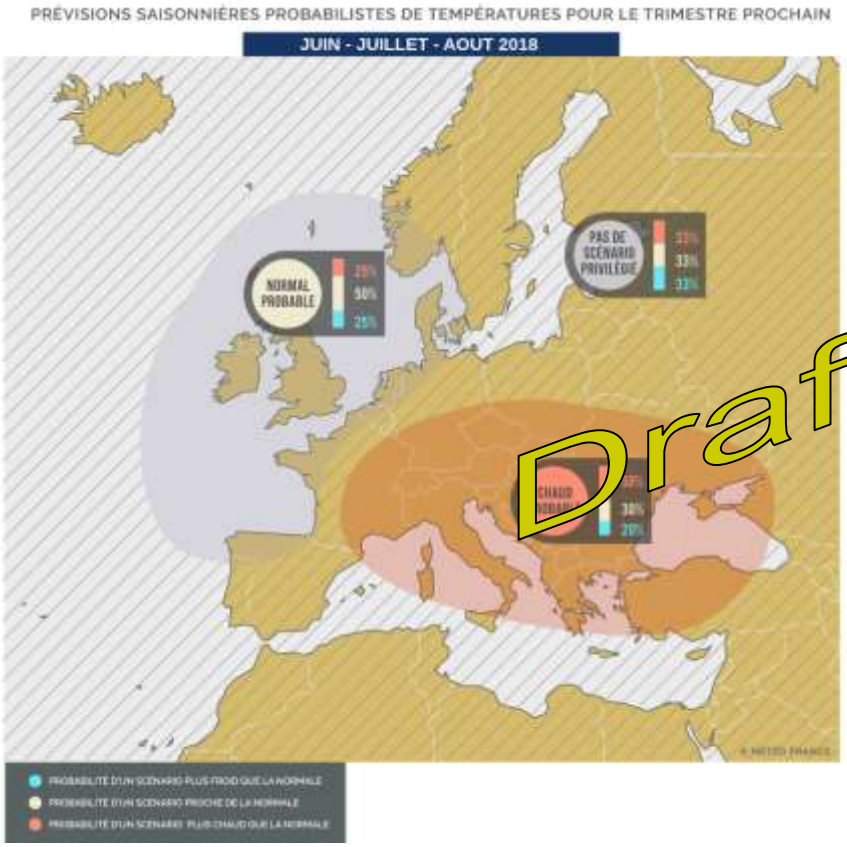
II.7. DISCUSSION AND SUMMARY

II.7.a Forecast over Europe

Low predictability. The "La Niña" event is over. Despite a robust signal in the tropical Atlantic (around the Carribean region), there is no trace of teleconnexion with mid-latitudes.

However, the models show a higher probability of postive NAO for the summer season. So we choose to rely on this signal and its impacts on the European climate.

Temperature : Warm signal over Europe (except Northern regions) , North of the Mediterranean and the Middle East. "Normal" signal, largely due to low SSTs, could affect the Atlantic seaboard.



Precipitations : Drier than normal conditions over continental Europe and North of the Mediterranean basin. No signal elsewhere.

PRÉVISIONS SAISONNIÈRES PROBABILISTES DE PRÉCIPITATIONS POUR LE TRIMESTRE PROCHAIN