MEDCOF-6

RCC-LRF inputs for the Forecasting Section

prepared by Météo-France

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I. SEASONAL FORECAST FROM DYNAMICAL MODELS

El Niño is now in a rapidly decaying phase. The coupling with atmospheric response would significantly decrease in the coming weeks and months. Seasonal models are suggesting an evolution towards oceanic la Niña conditions which could occur as soon as the month of July (potentially June, considering Nino3.4 index).
The atmospheric response is consistent with La Nina over the Indian and Pacific basin, the dispersion is higher over the Atlantic basin and a fortiori over Europe.

I.1.OCEANIC FORECASTS

I.1.a Sea surface temperature (SST)

Atlantic Ocean: in the tropics, the cold bias of CFS (NCEP model) has disappeared. Anyway, there are still some noticeable differences between models. Especially in Northern Atlantic, CFS is less cold than the others, and close to Europe and Africa, its anomalies are even positive (negative with the other models). We are more confident in MF or ECMWF forecast, than in CFS or even EUROSIP (that integrates CFS signal).

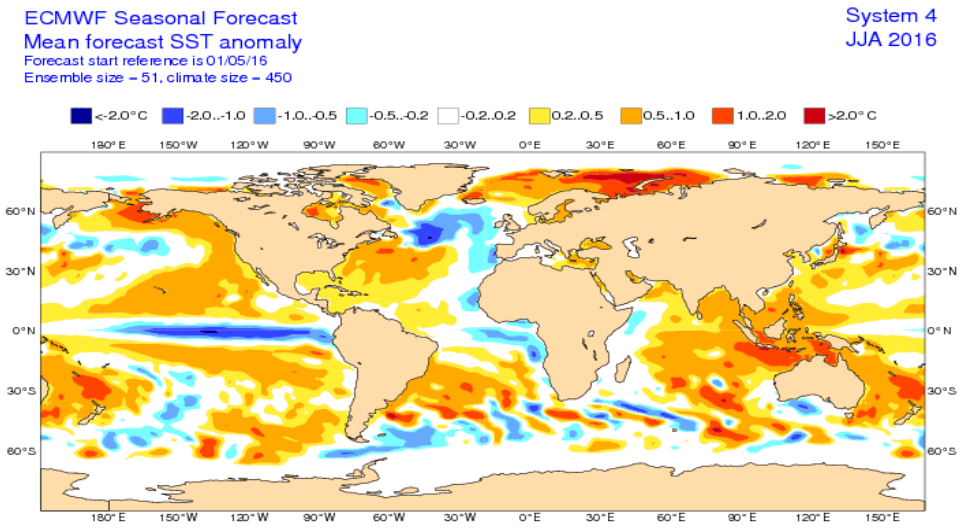


fig.II.1.1: SST anomaly forecast from ECMWF

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

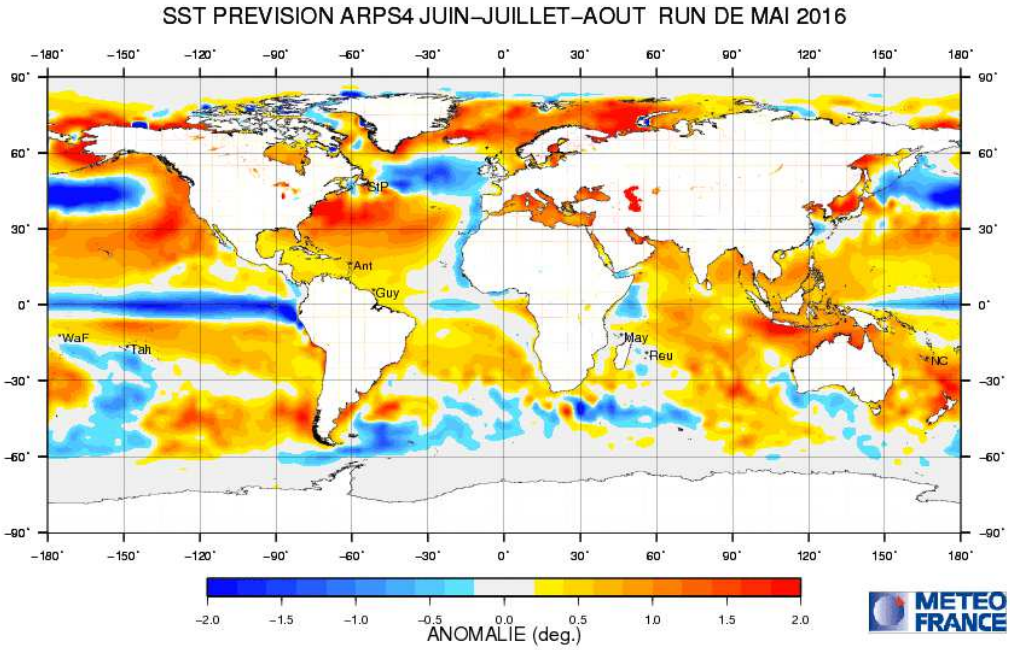


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).

http://elaboration.seasonal.meteo.fr

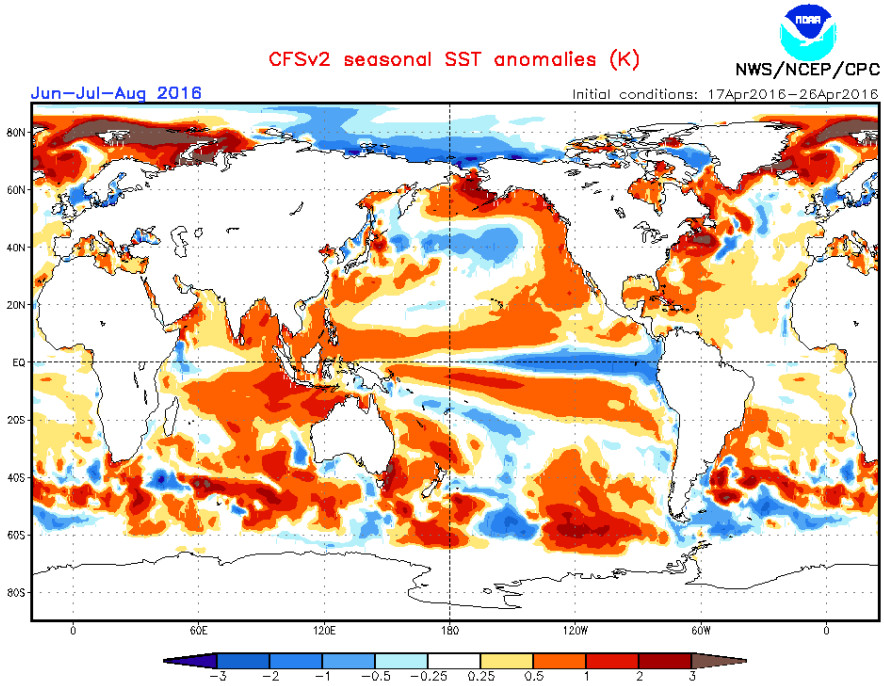


fig.II.1.3: SST anomaly forecast from NCEP.

http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/imagesInd1/glbSSTSeaInd1.gif

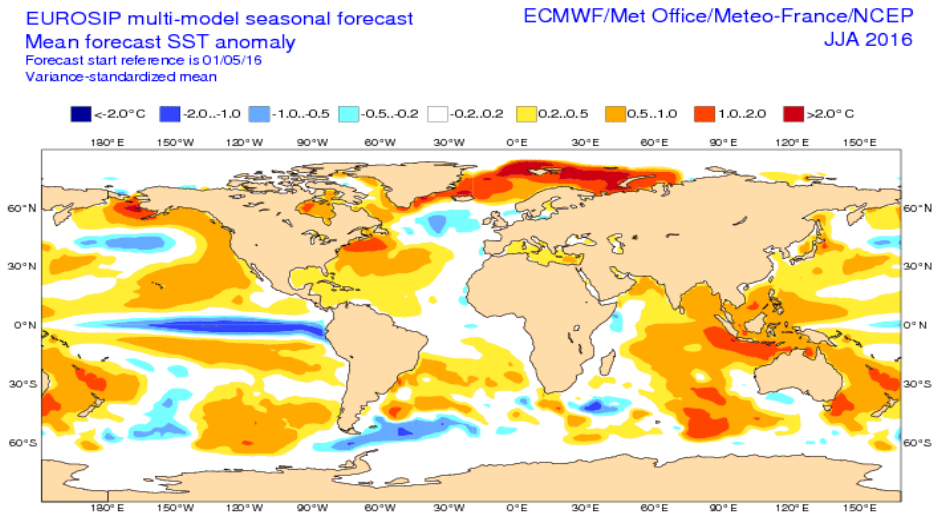


fig.II.1.4: SST Forecasted anomaly from Euro-SIP

I.1.b Atlantic Ocean forecasts

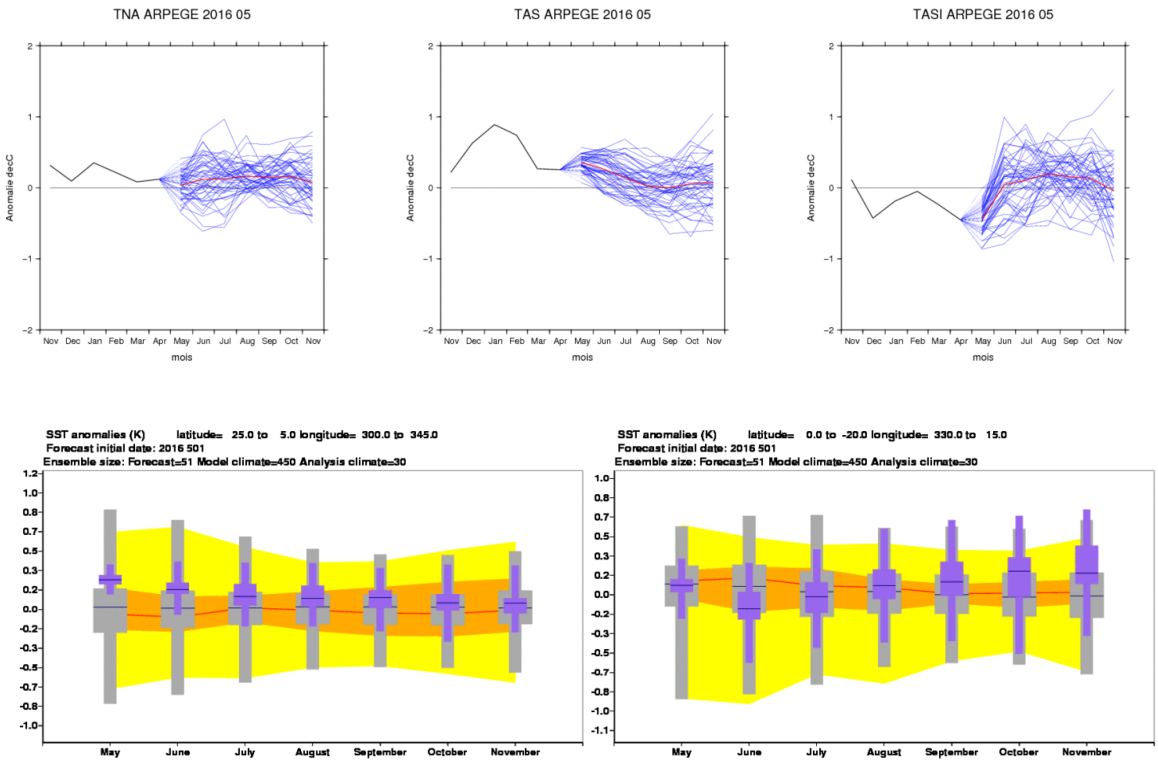


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

I.2.GENERAL CIRCULATION FORECAST

I.2.a Global forecast

Velocity potential anomaly field (cf. fig. II.2.1 – insight into Hadley-Walker circulation anomalies) and **Stream Function anomaly field** (cf. fig. II.2.1 – insight into teleconnection patterns tropically forced):

According to the rapid evolution of oceanic conditions in equatorial Pacific (toward La Nina conditions), MF, ECMWF and JMA forecasts exhibit a dipole of upward/downward anomaly motion between Indian Ocean and Western Pacific. This pattern is consistent with a La Nina, probably reinforced by warmer than normal SST in the Indian Ocean. One can note that there are some differences between models concerning the position and the strength of the Indian pole (upward anomaly), and they are in good agreement for the west Pacific pole (downward anomaly).
Anywhere else (especially over the Atlantic), there are significant differences in terms of velocity potential anomalies. Anyway the main signal is positive (downward motion anomaly) in the western part of the Atlantic tropics.

Looking at streamfunction anomaly fields, the signal seems to be trapped in the tropics for the Northern hemisphere. In other words, no trace of teleconnection toward mid-latitudes in the Northern hemisphere. However, the main poles (over Africa, Indian Ocean, Asia, Australia, and Western Pacific) are consistent and could reinforce the confidence in the forecast for these regions.

For the MEDCOF region, we are rather confident in the “anticyclonic” anomaly over North Africa and west of the Iberian Peninsula.

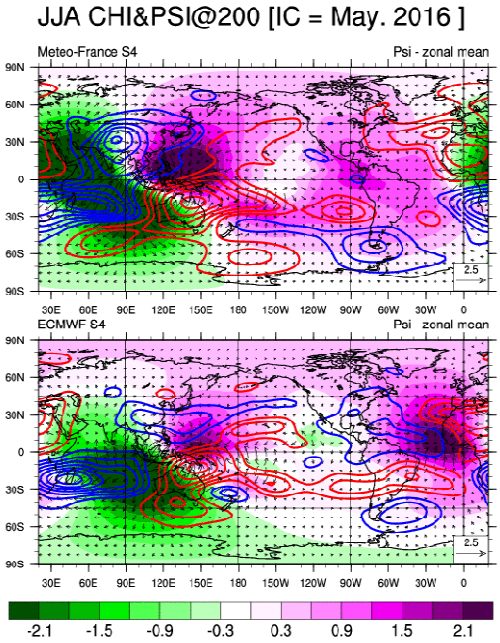


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

I.2.b North hemisphere forecast and Europe

Geopotential height anomalies (fig. II.2.2 – insight into mid-latitude general circulation anomalies):

In northern hemisphere mid-latitudes, large spread in GPC forecasts. Also a large spread within EUROSIP, as illustrated below with MF and ECMWF.
Over North Atlantic and Europe, no dominant circulation pattern for JJA. The only consistent signal between some models and consistent with streamfunction maps is a positive anomaly in subtropics (around 30°N West of Iberian peninsula) and a negative anomaly to the north of it. It corresponds to a positive phase of the East Atlantic variability mode. Note that this mode has been positive for more than 6 months.
However in terms of weather regime, MF and ECMWF are very different.

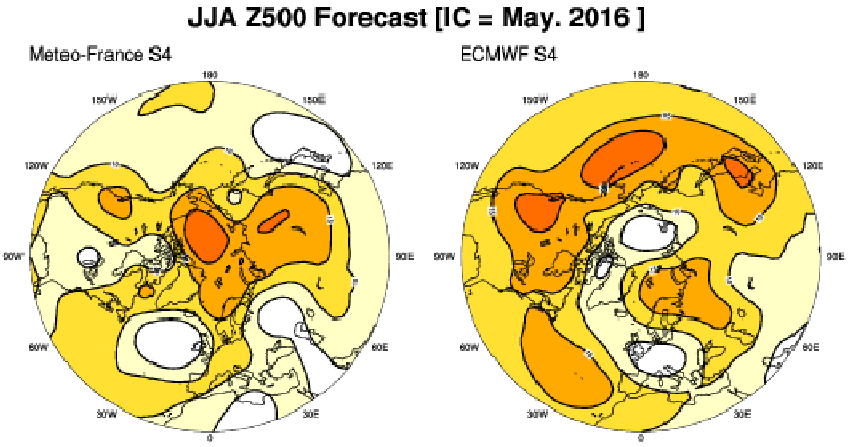


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right).

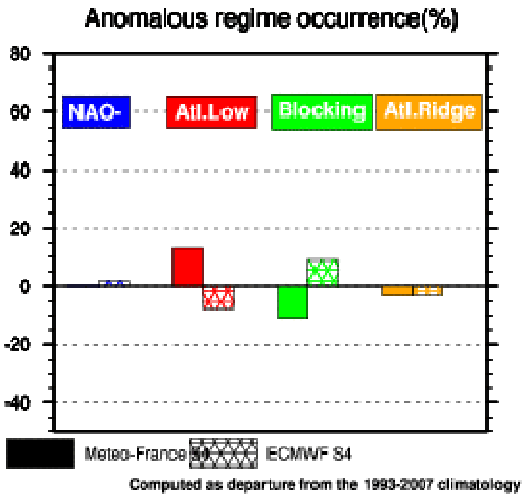


fig.II.2.3: North Atlantic Regime occurrence anomalies from Météo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

I.3. IMPACT: TEMPERATURE FORECASTS

Over Europe, the cold oceanic influence should be still important in the very western regions: from the British Isles (especially Ireland) to Portugal (weaker influence). Elsewhere, an East Atlantic like circulation should lead to an enhanced probability of positive anomalies. However, due to the large uncertainty concerning the position of circulation anomalies, this signal should be taken with caution: it is more probable over Mediterranean regions and Eastern Europe.

I.3.a ECMWF

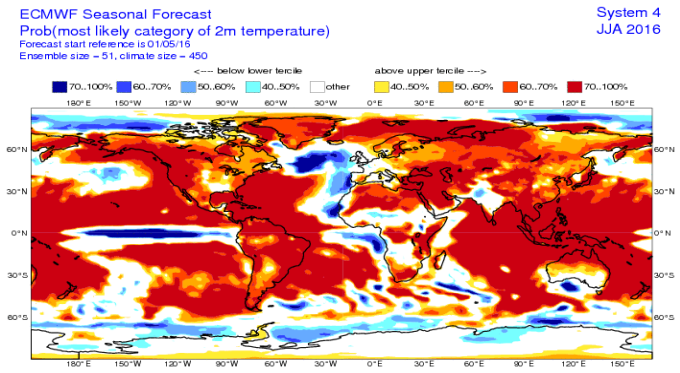


fig.II.3.1: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

I.3.b Météo-France

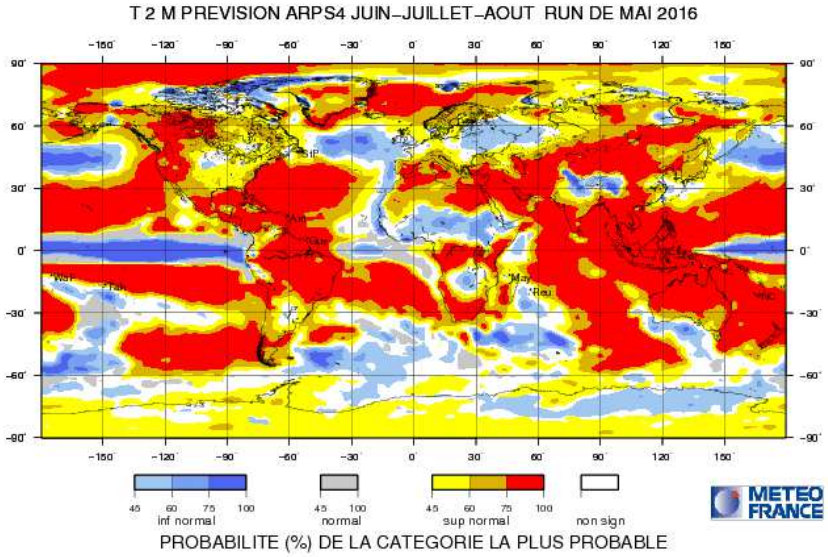


fig.II.3.2: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

I.3.c Japan Meteorological Agency (JMA)

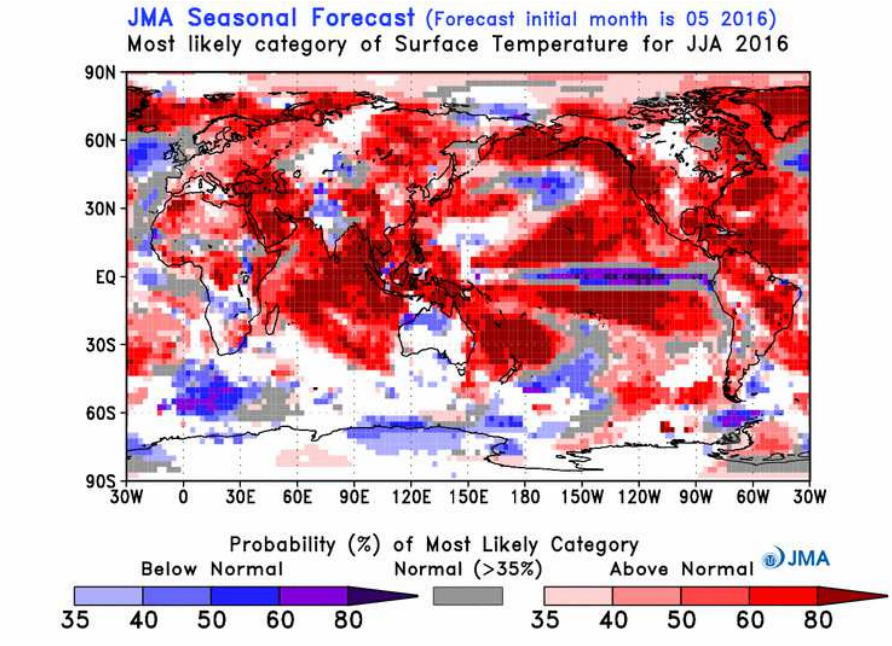


fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.php

I.3.d EUROSIP

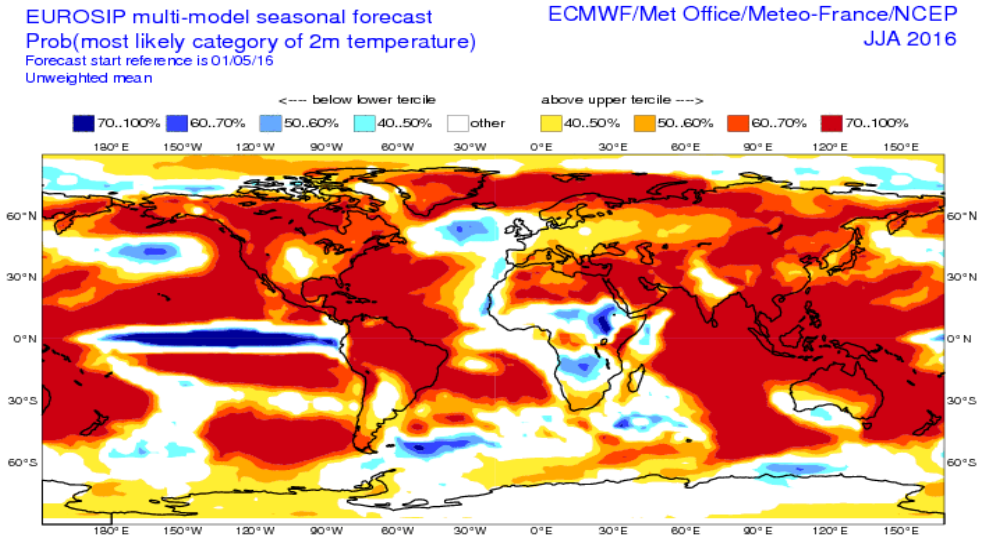


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/

I.4. IMPACT : PRECIPITATION FORECAST

Over the MEDCOF region, a drier than normal signal is forecasted by several models over the Iberian Peninsula, this is in accordance with the main probable scenario in terms of circulation. Elsewhere, no clear signal emerges.

I.4.a ECMWF

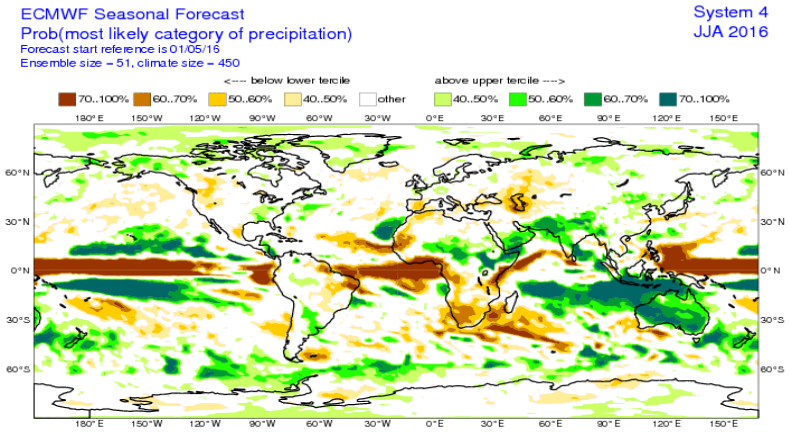


fig.II.4.1: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

I.4.b Météo-France

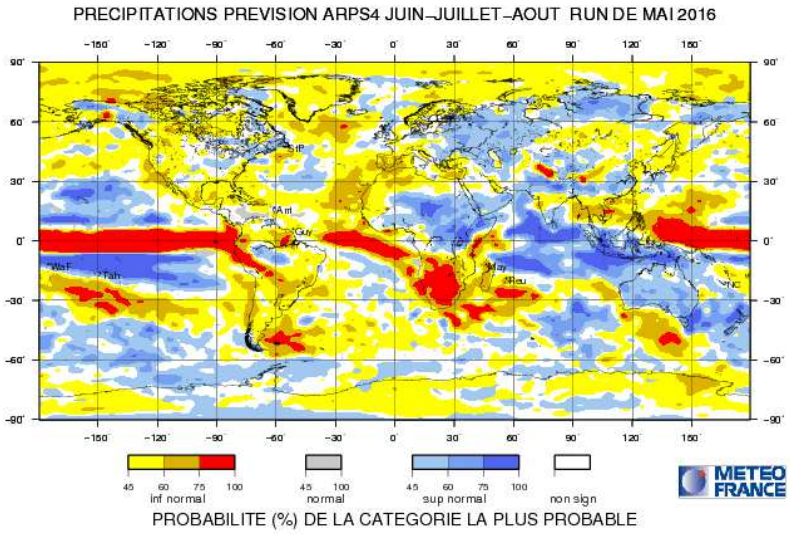


fig.II.4.2: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

I.4.c Japan Meteorological Agency (JMA)

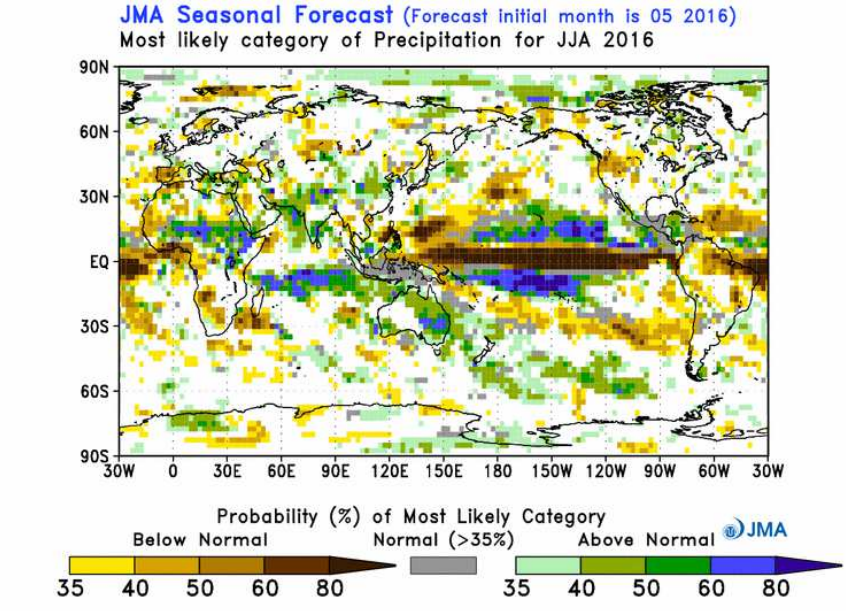


fig.II.4.5: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.php

I.4.d EUROSIP

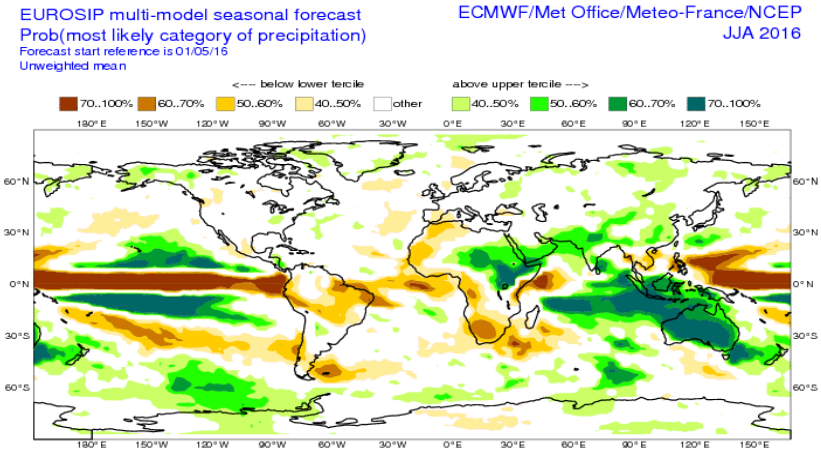


fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/

I.5. REGIONAL TEMPERATURES and PRECIPITATIONS

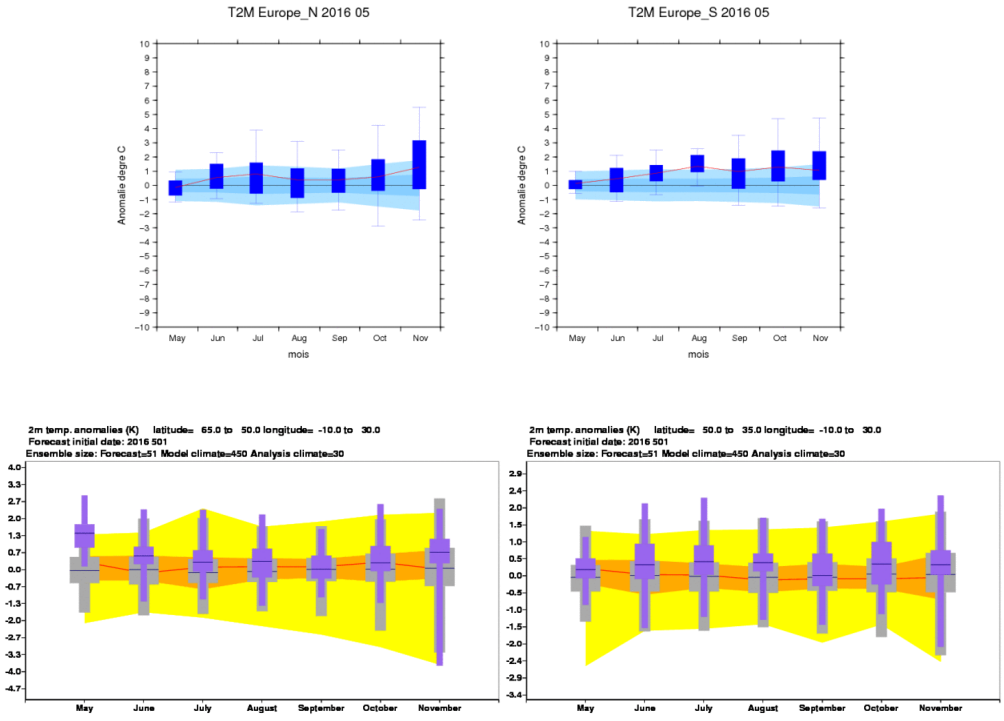


fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

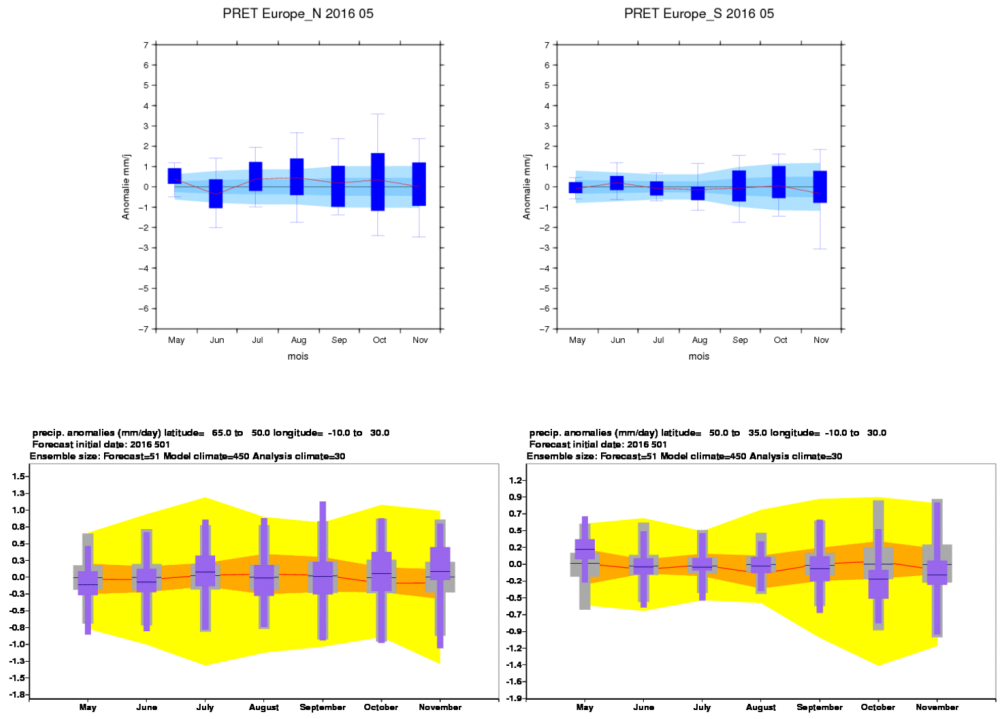


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

I.6. "EXTREME" SCENARIOS

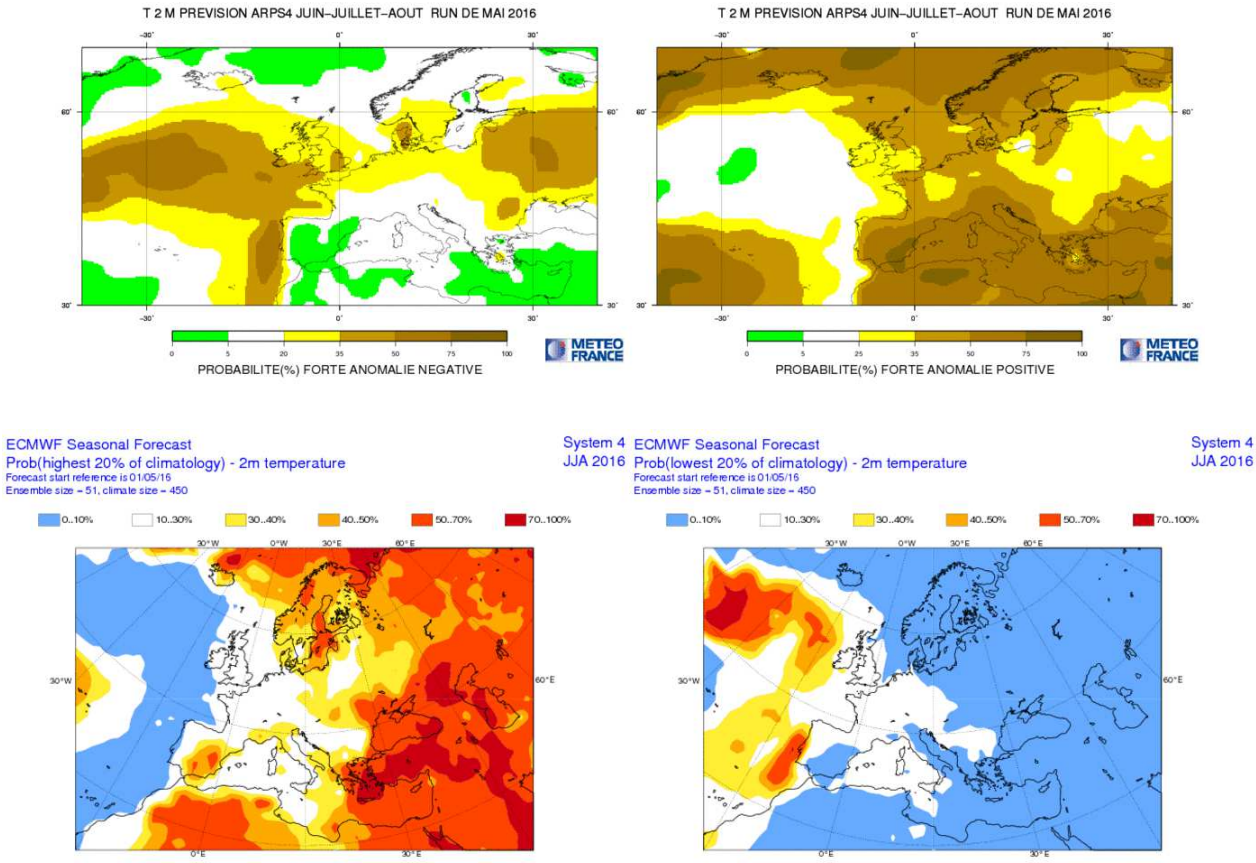
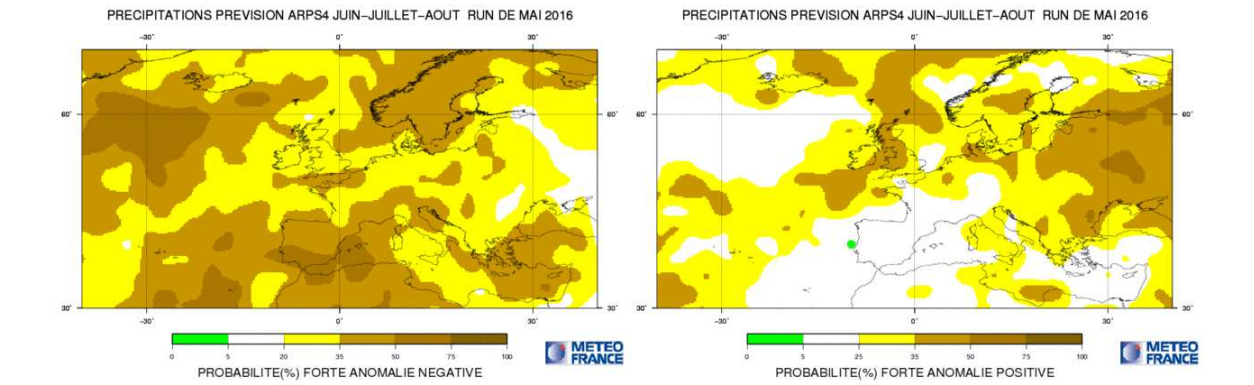


fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of the distribution) and "extreme" above normal conditions (right – highest ~20% of the distribution).



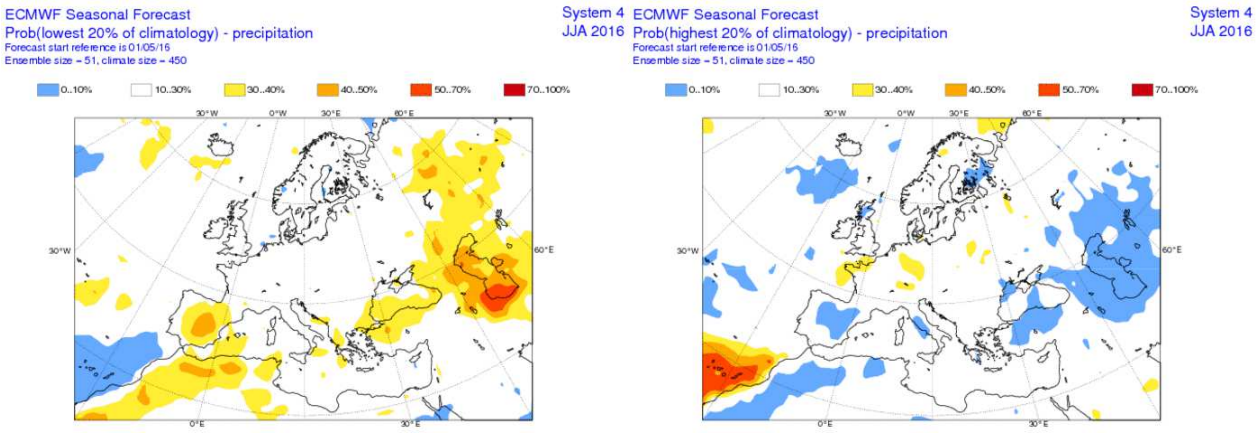


fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest ~20% of the distribution) and "extreme" above normal conditions (right – highest ~20% of the distribution).

I.7. DISCUSSION AND SUMMARY

Temperatures: slight cool signal for the Western part of the British Isles. Moderate signal for warmer than normal conditions for Southern and Eastern Europe.

Precipitation: no scenario, except for the Iberian Peninsula region where a small dry signal seems to be emerging, in a continuation of last month forecast.