Seasonal Outlook for Summer Season

(17/05/2010 JJA)

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I. SEASONAL FORECASTS FOR JUNE JULY AUGUST FROM GLOBAL CIRCULATION MODELS

I.1. OCEANIC FORECAST

I.1.a Sea Surface Temperature (SST)

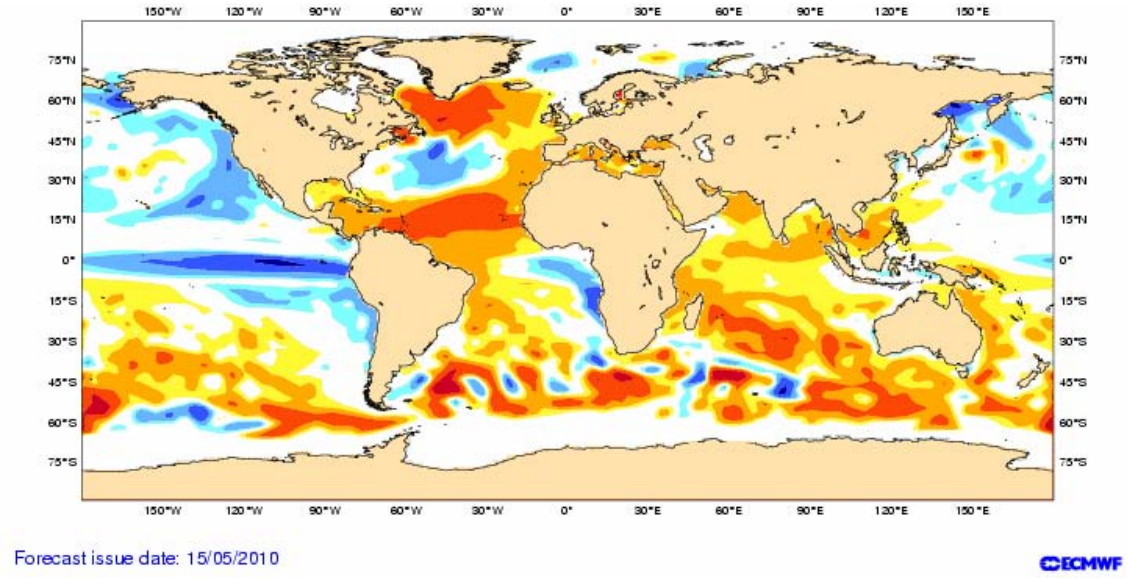


fig.1: SST **Forecasted anomaly (in °C) from ECMWF valid for JuneJulyAugust, (issued in May)**.
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

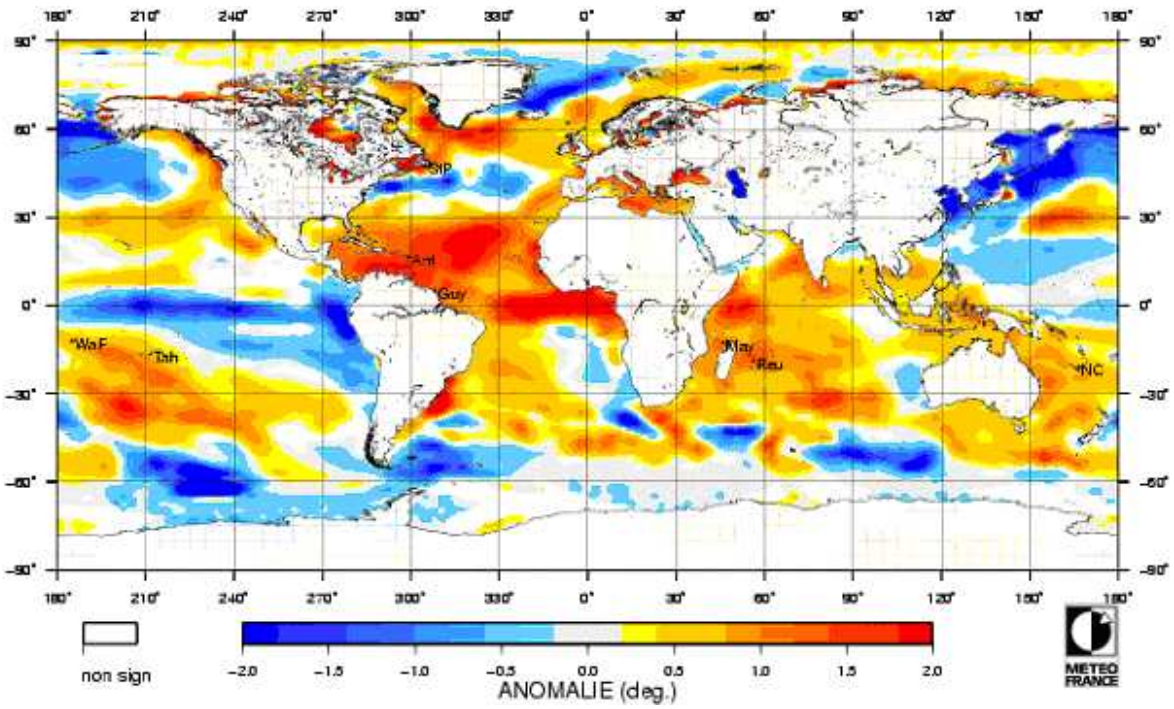


Fig.2: SST **Forecasted anomaly (in °C) from MétéoFrance valid for JuneJulyAugust, (issued in May)**. http://dpnet.meteo.fr/DCLIM/dev/

In the Pacific the two models show similar patterns excepted in the region South to Alaska. Negative Anomalies in the Eastern South Pacific are increasing with a situation colder than Normal well established in the forecasts (which should confirm the end of El Niño). Over the Indian Ocean, the 2 models forecast above normal temperature North to 30° South leading to a « warm » Indian Ocean for the summer season. In North Atlantic the Tropical North Atlantic SSTs should be above normal (very consistent signal). In the Guinean Gulf and along the Western coast of South Africa

the Météo-France model indicate a “warm” scenario while the ECMWF show slight negative anomalies and a strengthened Benguela current. Over these last regions, the ECMWF forecast seems to be more realistic than the Météo-France one. The main change into the forecasts is over the whole North Atlantic basin where the 2 models develop a “Horse shoes” pattern. This new development is important because of its relationship with Blocking regimes over the North Atlantic this phase is favorable to blocking regime occurrence).

I.1.b ENSO forecasts :

Forecasted Phase: return to a « neutral » situation » for June-July-August

The IRI draws a synthesis of several models (including coupled and statistical) and give a wide view on the ENSO forecast. The figure below give monthly SSTs ensemble means in the Niño3.4 box. For June-July-August, the spread of the models has increased (with respect of previous forecasts) from –1,4°C up to +0,3°C in relationship with the decay of the Niño associated to a return to “Normal” condition during the June-July-August period.

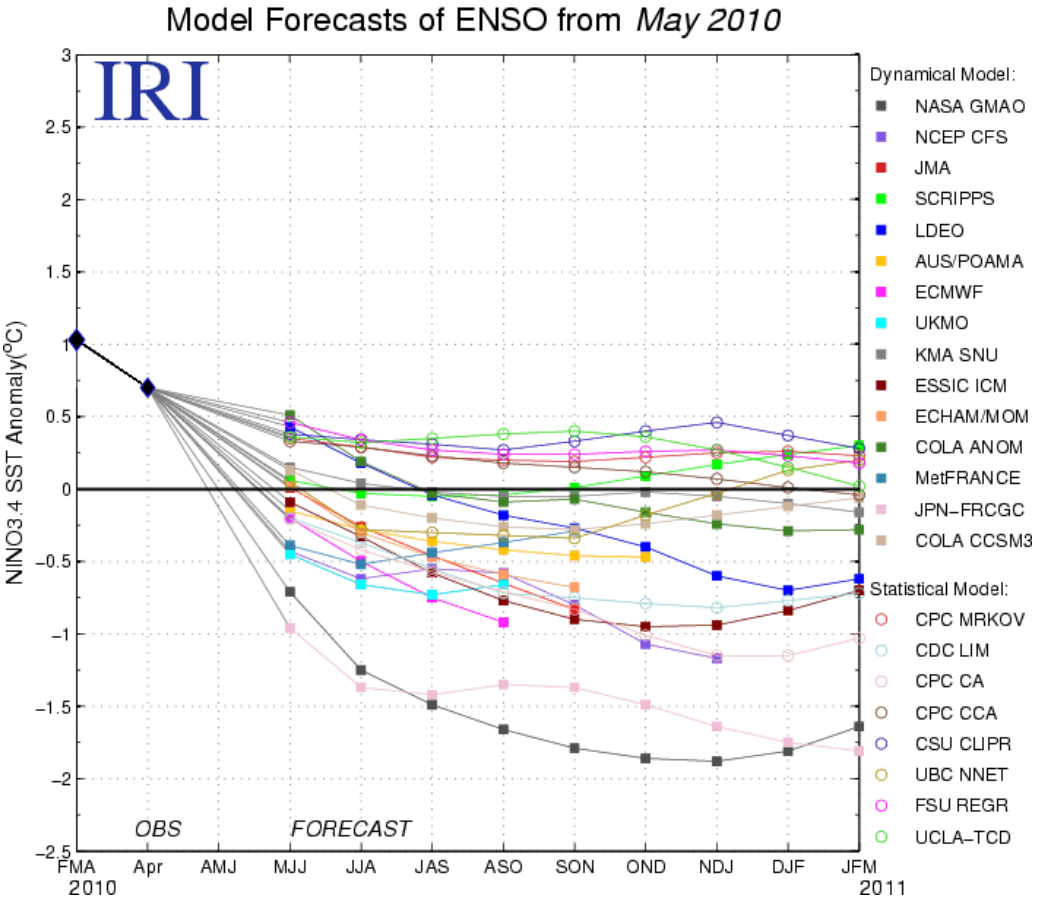


Fig.3: **SST Forecasts in the Niño3.4 boxe (120° à 165°W) synthesis provided in May by IRI** : http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html

The following table gives mean SST values generally accepted for the three ENSO classes: El Niño, La Niña, and neutral. These values depend upon the season, and conditions are considered as neutral when values fall between 2 of the 3 categories. In the last line of the Table moving averages are given from the multi-models forecasts. The mean forecast is thus to return to neutral conditions in the Pacific

SEASON	*AMJ*	*MJJ*	*JJA*	*JAS*	*ASO*	*SON*	*OND*	*NDJ*	*DJF*

« La Niña » value « El Niño » Value	-0.45 0.45	-0.50 0.45	-0.50 0.45	-0,50 0,45	-0,55 0,50	-0,75 0,70	-0,75 0,75	-0,70 0,70	-0,65 0,65
Average from models	0,3	0	-0,2	-0,3	-0,4	-0,4	-0,4	-0,4	-0,4

In Figure 14, models output from ECMWF (bottom) and Météo-France (top) are given for the three NINO boxes. Results corroborate what has been presented above ; In details, the ECMWF model forecast a rapid cooling in the Equatorial Pacific (which can lead to Niña condition at fall) while the Météo-France model stay in neutral conditions (slightly negative).

NIÑO 4 NIÑO 3.4 NIÑO 3

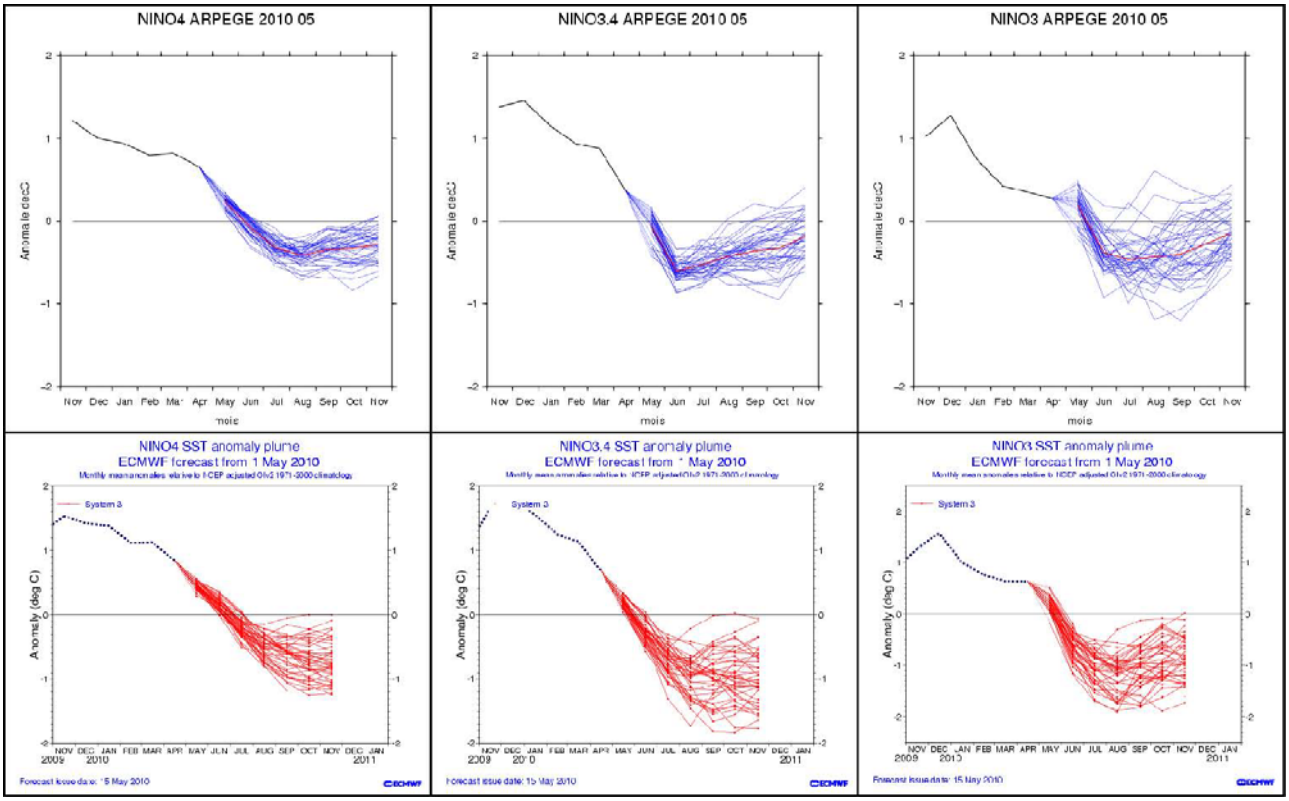


fig.4: **SST**s **anomaly forecasts in the Niño boxes from MétéoFrance (top) and ECMWF (bottom), issued in May 2010, plumes correspond to 41 membres and monthly means**. (**http://www.ecmwf.int/**)

As a conclusion, the ensemble of models (dynamical and statistical as well) give a strong probability of SSTs conditions close to «Neutral» for the summer period; some divergence seaming to appear later.

I.1.c Tropical Atlantic forecasts:

Forecasted Phase: warmer than normal conditions in the Tropical Atlantic

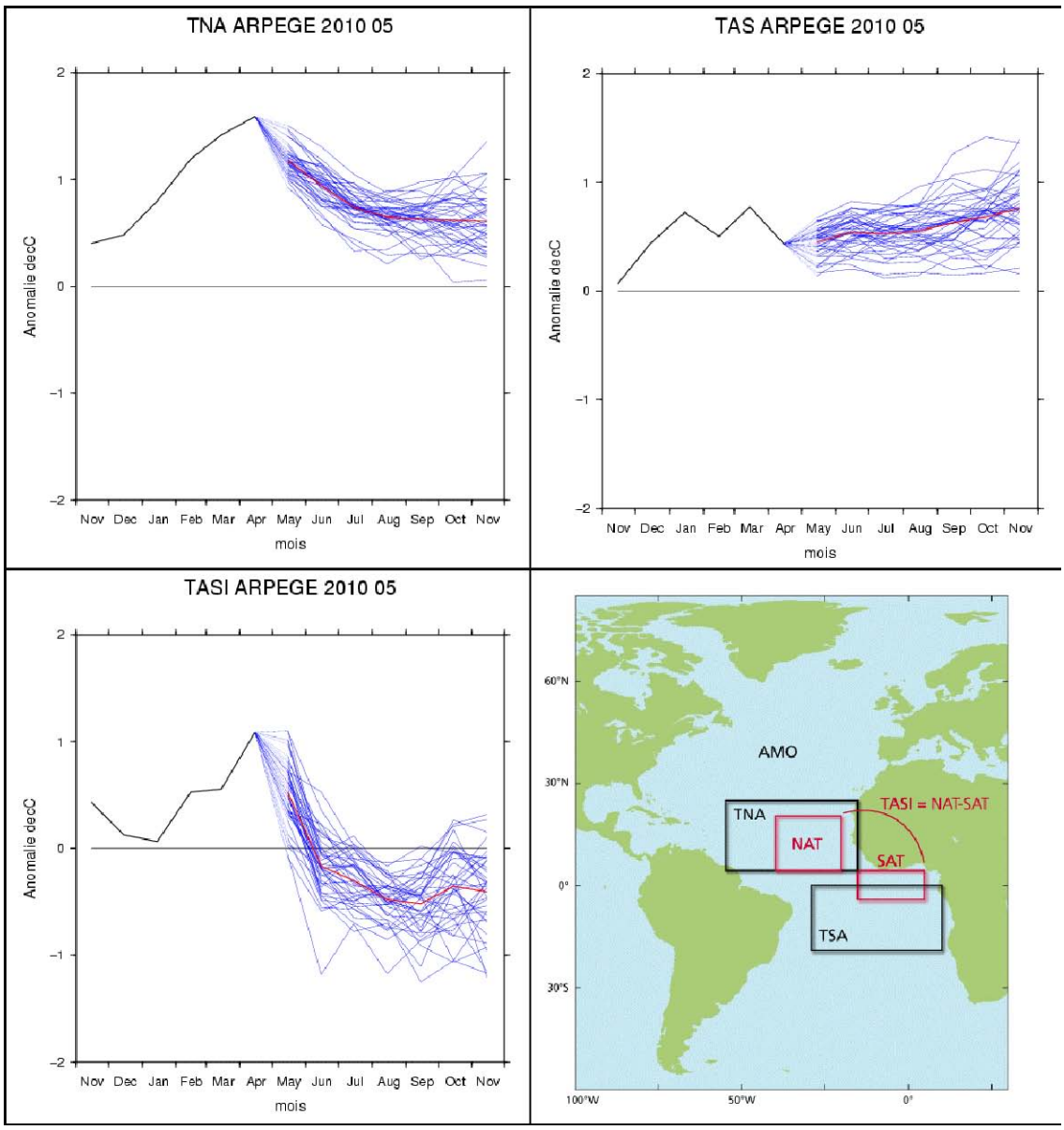


fig.5: **SSTs anomaly forecasts in the Tropical Atlantic boxes from MétéoFrance, issued in May 2010, plumes correspond to 41 membres and monthly means**.

The Plumes confirm that all members are forecasting warmer than normal conditions in the Tropical Atlantic both in the North and in the South. The negative value of TASI must be interpreted with caution because of the likely positive bias of Météo-France forecast in the Guinean Gulf.

I.1.d Indian Ocean forecasts :

Forecasted Phase: Warmer than normal conditions in the Indian Ocean

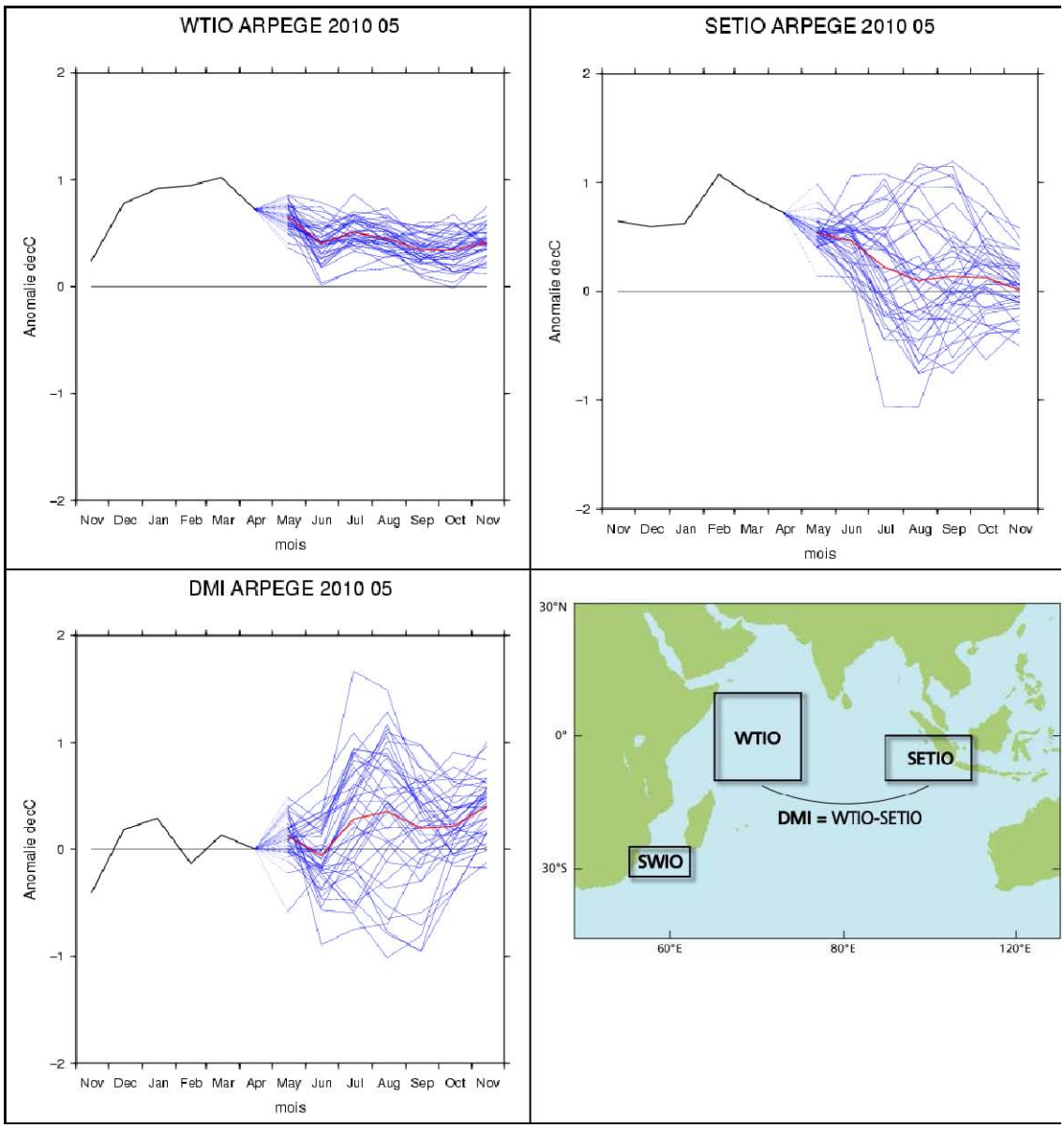


fig.6: **SSTs anomaly forecasts in the Indian Ocean boxes from MétéoFrance, issued in May 2010, plumes correspond to 41 membres and monthly means**.

The Plumes confirm that all members are forecasting warmer than normal conditions in the Indian Ocean with a larger uncertainty in the eastern part of the basin. The western part shows a good consistency among all members of the ensemble during all the period. The DMI shows a large uncertainty during the summer season. However the mean value, close to zero at the beginning, moves toward positive values during the period with a decrease into uncertainty at the end.

I.2. GENERAL CIRCULATION FORECASTS

I.2.a Global Forecasts

The divergent circulation (in color in the figure below) forecasted by the 2 models shows a strong convergence anomaly (in Pink) over the Central Pacific. Associated to this pattern, there is a divergence anomaly (in green) located West in the Indian Ocean in ECMWF while it is located over the Guiean Gulf in Météo-France. As already discussed, the ECMWF pattern is likely to be more realistic, because of the SSTs forecast. Associated to these anomalies, on can remark some teleconnection patterns on the Forecasted Stream Function Anomaly (in isoline ; blue negative and red positive) ; notably over North Africa and the Mediterranean basin.

fig.7: **Forecasted anomalies of Velocity Potential (colors) and Stream Function (isolines) at 200 hPa for JuneJulyAugust 2010 from MétéoFrance (top) and ECMWF (bottom), issued in May 2010.**

I.2.b Over North Hemisphere

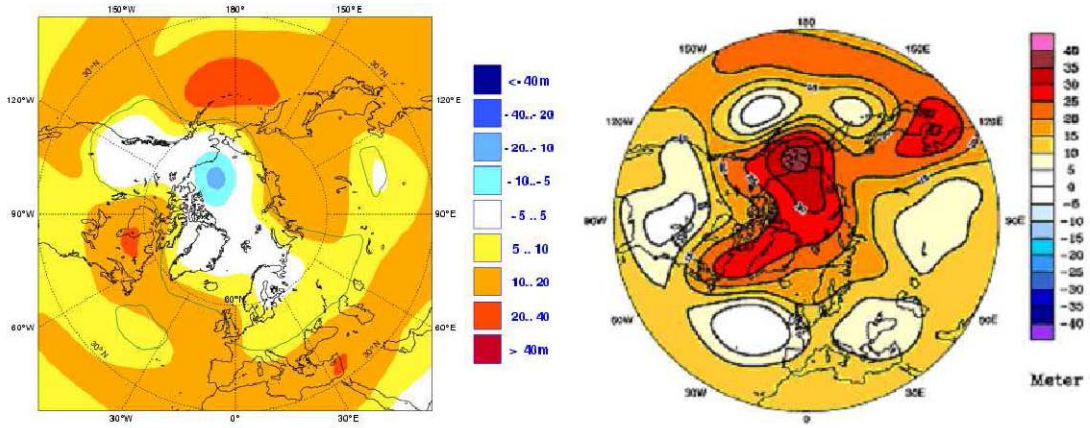


fig.8: **Geopotential Anomaly forecasts at 500 hPa for JuneJulyAugust 2010 from ECMWF (left) and MétéoFrance (right) issued in May 2010.**

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

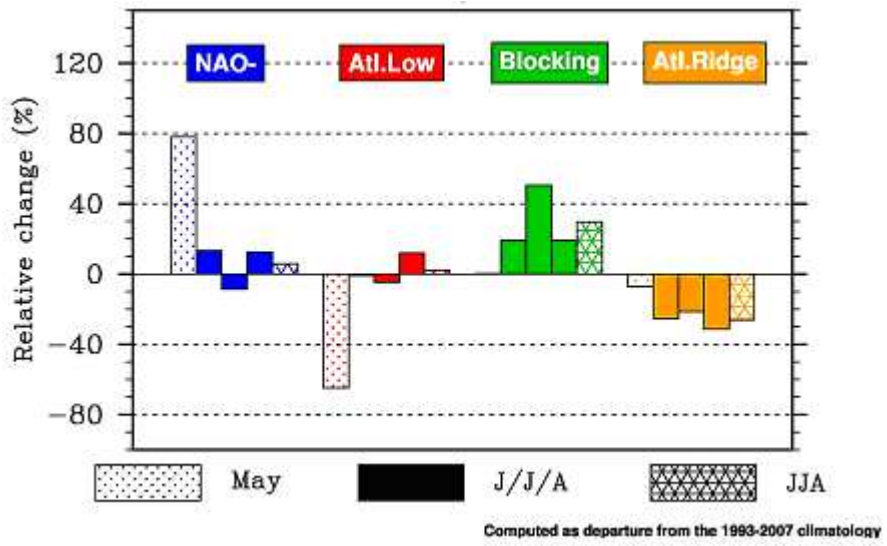


fig.9: **North Atlantic Regime occurrence from MeteoFrance for JuneJulyAugust 2010: the barre represent for each regime the frequency anomaly (in %) with respect of the climatological frequency.**

Consistently with the development of the "horse shoes" pattern over the North Atlantic, the Meteo-France model shows an increased occurrence of Blocking Regimes which is roughly compensated by a decrease in the occurrence of Atlantic Ridge regimes. If both regimes lead to increased temperature over the European Atlantic regions, they have a different impact over the South East European regions.

I.3. IMPACT : TEMPERATURE FORECASTS

I.3.a ECMWF

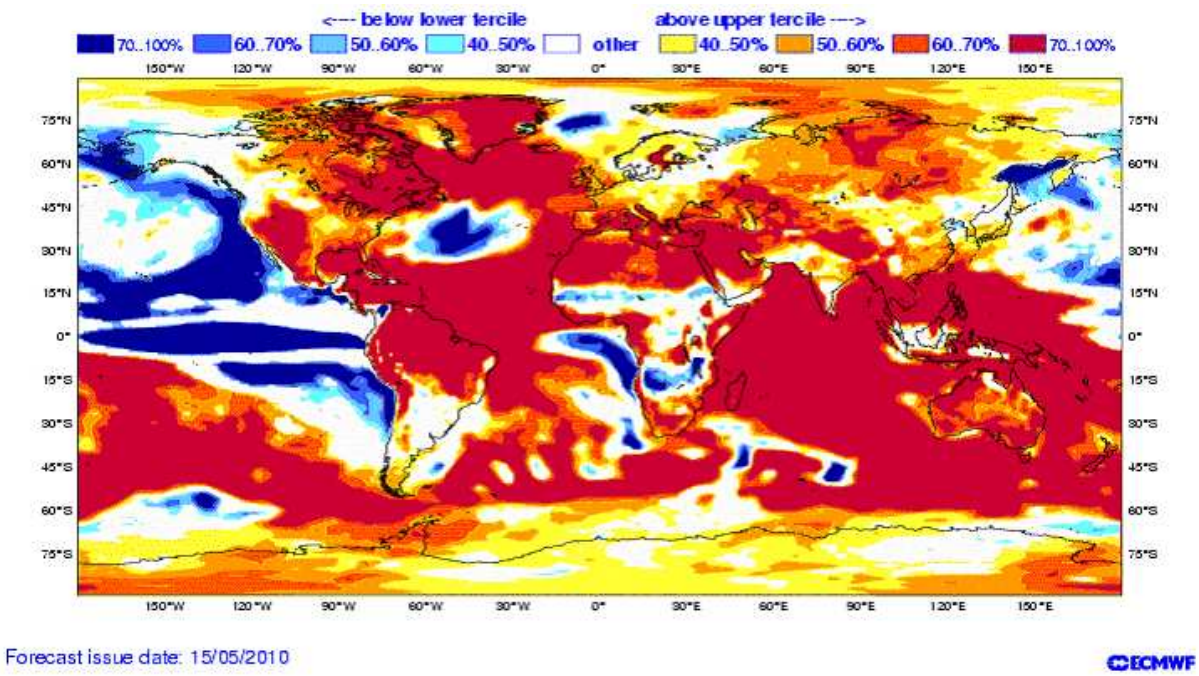


fig.10: **Probabilistic forecasts for T2m from ECMWF for JuneJulyAugust, issued in May 2010. Most likely Category. (2 categories, Below and Above normal – white zones correspond to "Other")**
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

I.3.b METEOFrance

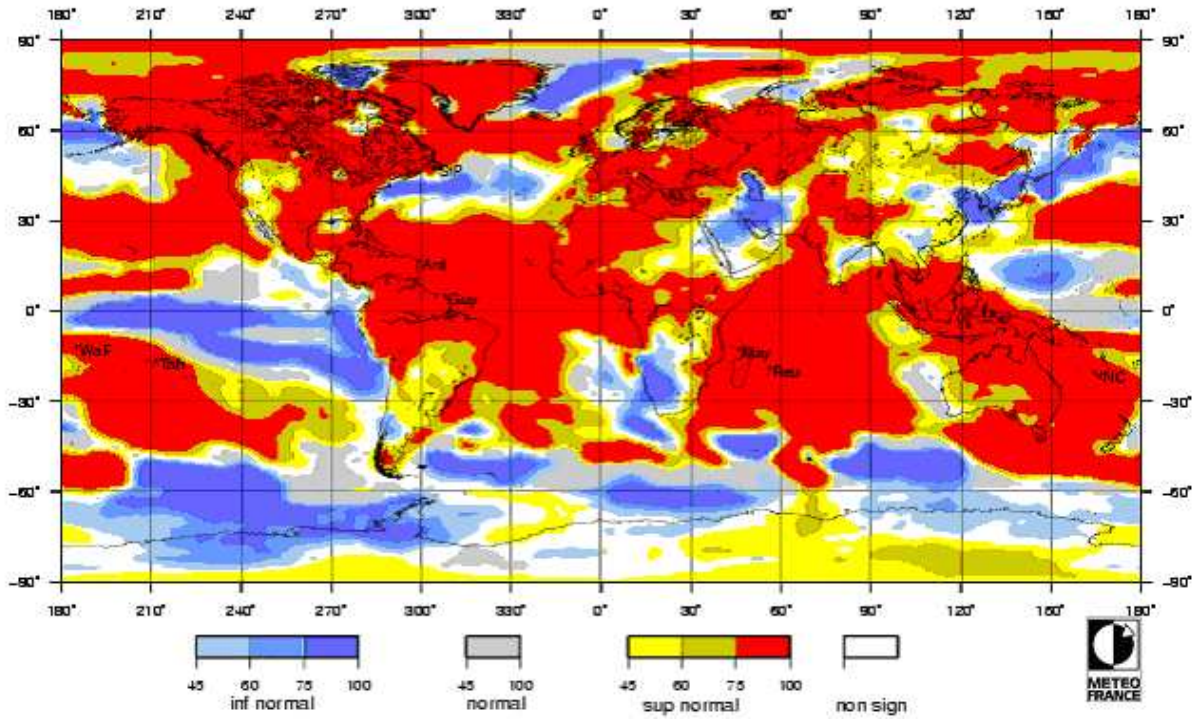


fig.11: **Probabilistic forecasts for T2m from MétéoFrance for JuneJulyAugust, issued in May2010. Most likely Category. (3 Categories, Normal, Below and Above normal – White zones correspond to No signal). http://dpnet.meteo.fr/DCLIM/dev/**

I.3.c Met Office (UKMO)

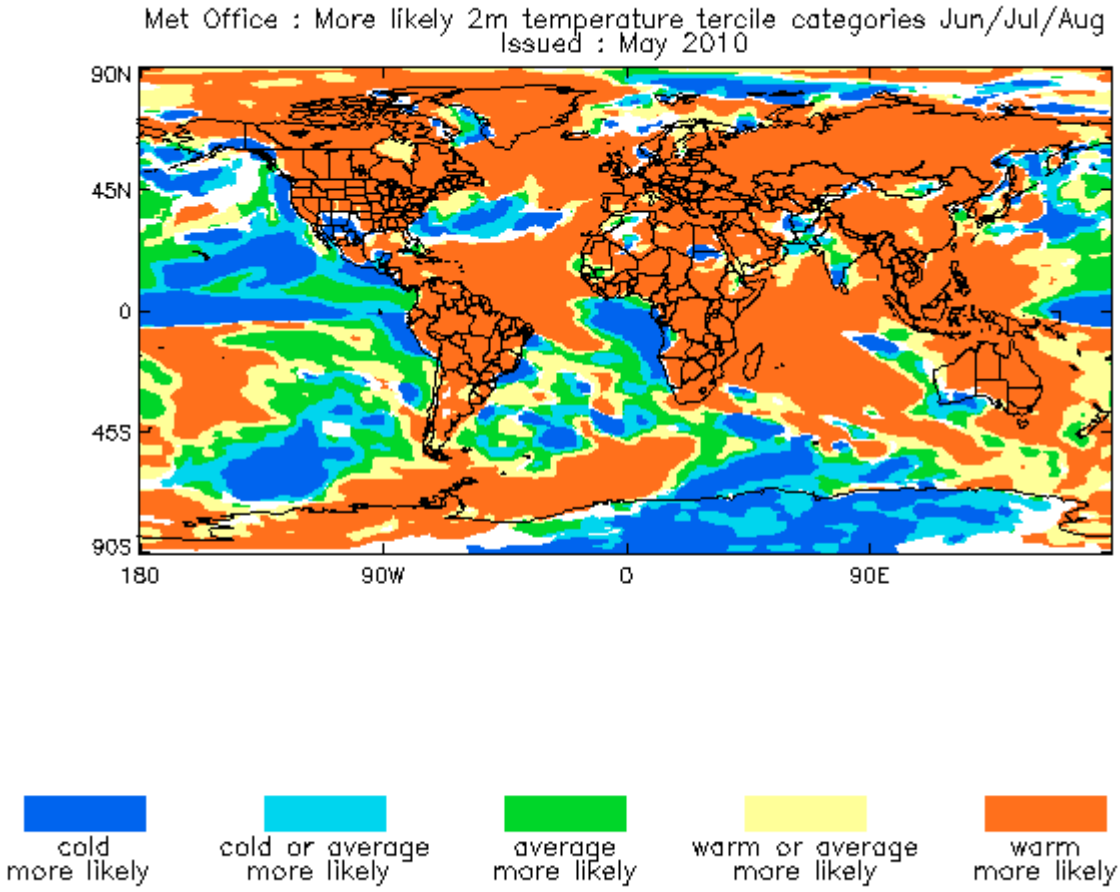


fig.12: **Probabilistic forecasts for T2m from UK Met Office for JuneJulyAugust, issued in May 2010. Most likely Category. (5 Categories – see caption – white zones correspond to No signal). http://www.metoffice.gov.uk/science.specialist/easonl/category/**

I.3.d HydromMet Centre of Russia (HMC)

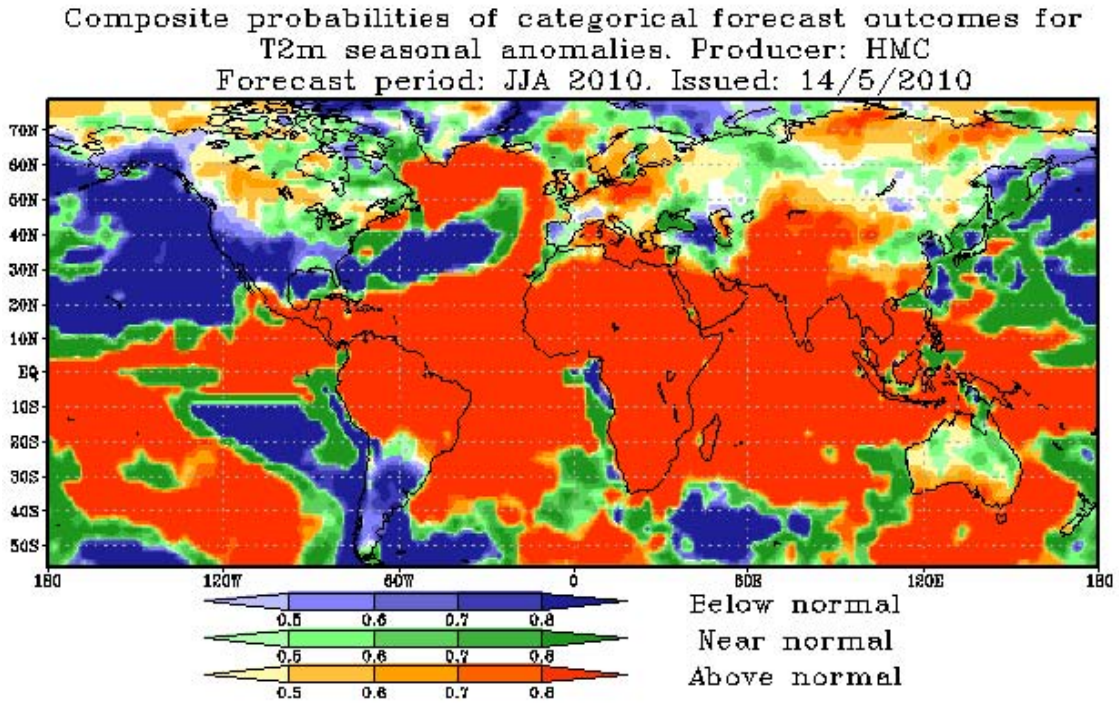


fig.13: **Probabilistic forecasts for precipitation from HMC for JuneJulyAugust, issued in May 2010. Most likely Category. (3 Categories, Normal, Below and Above normal – White zones correspond to No signal)**.

I.3.e EuroSIP

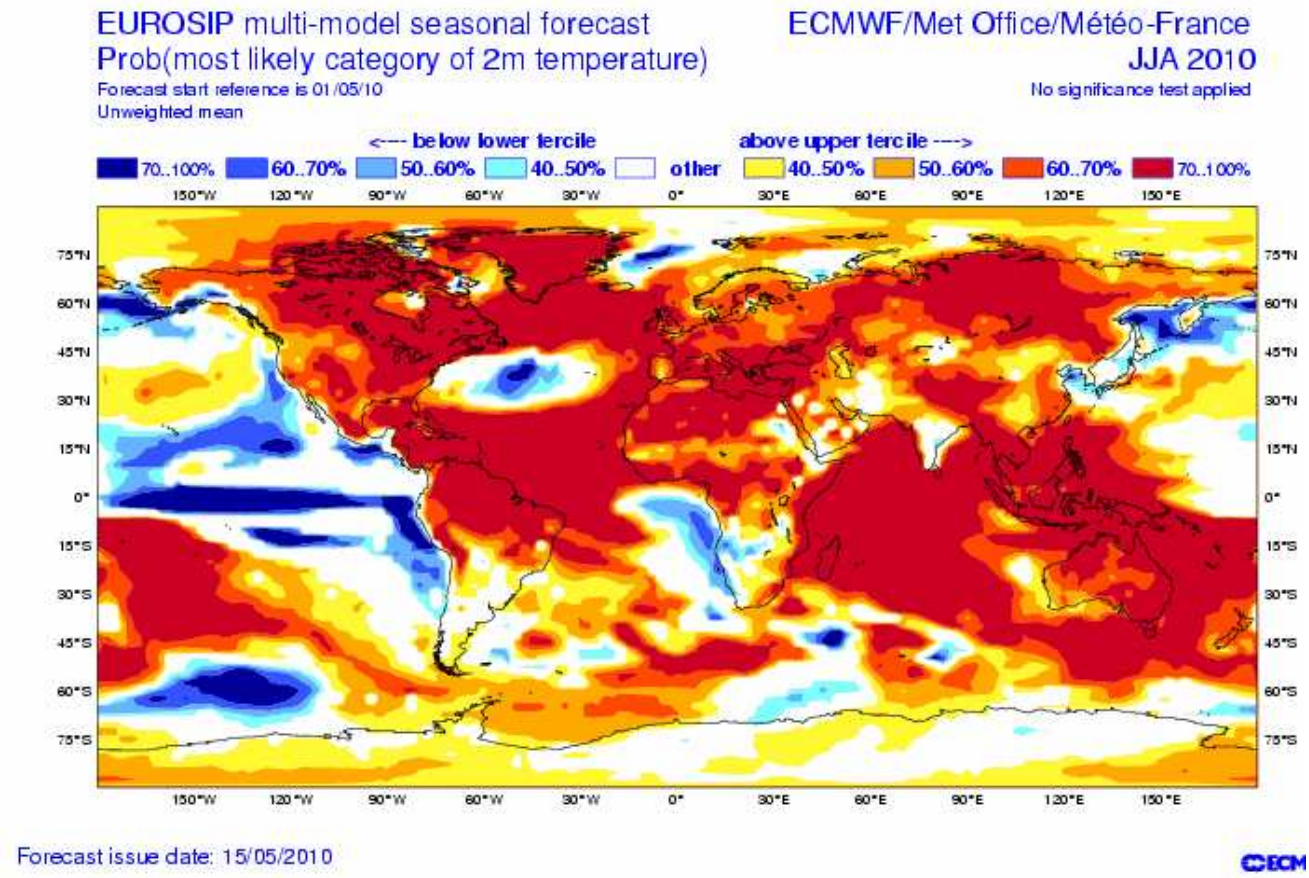


fig.14: **MultiModel Probabilistic forecasts for T2m from EuroSip for JuneJulyAugust, issued in May 2010. (2 Categories, Below and Above normal – White zones correspond to No signal)**.

http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

I.3.f International Research Institute (IRI)

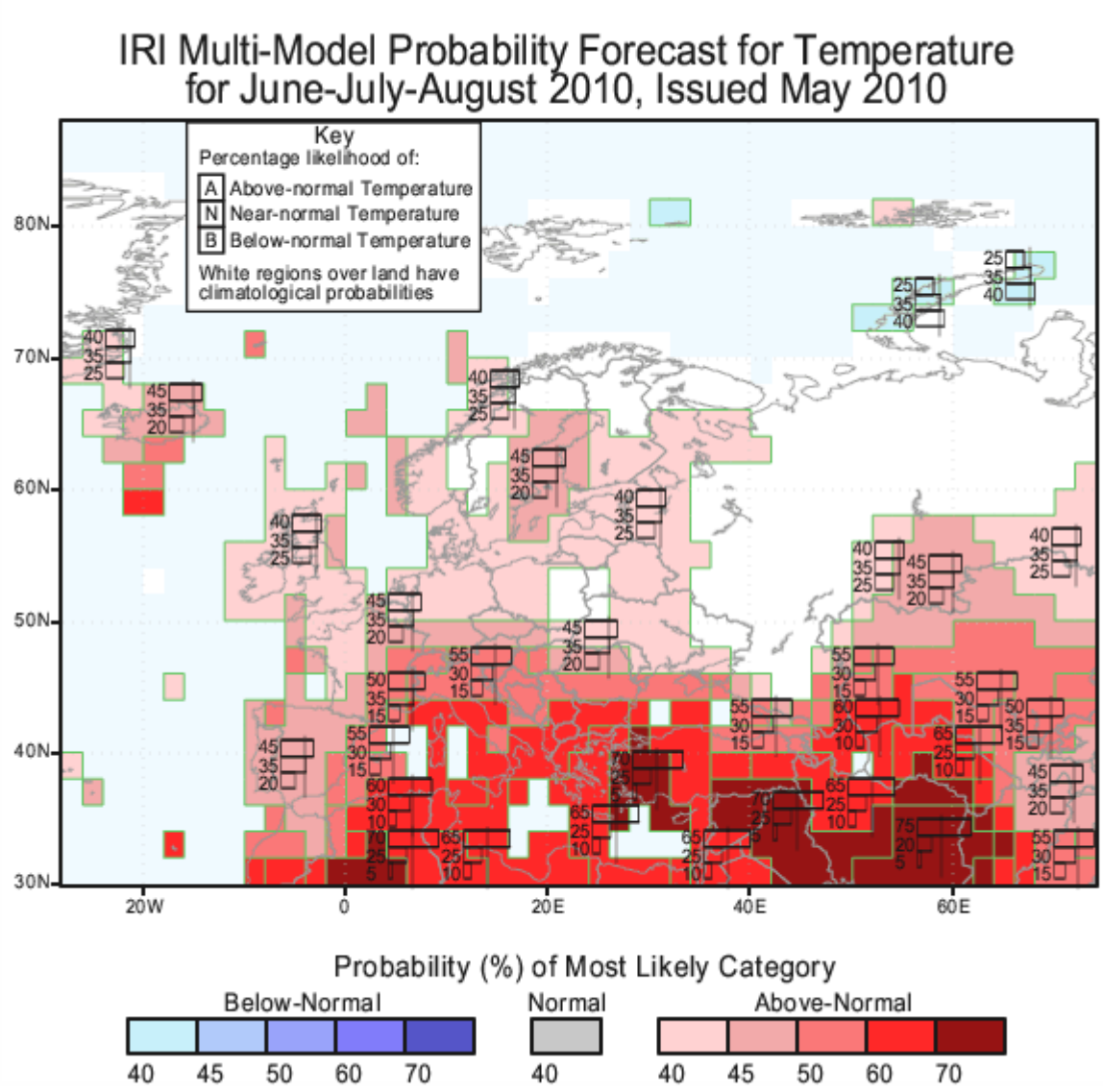


fig.15: **MultiModel Probabilistic forecasts for T2m from IRI for JuneJulyAugust, issued in May 2010. (3 Categories, Normal, Below and Above normal – White zones correspond to No signal)**. **http://iri.columbia.edu/climate/forecast/net_asmt/**

I.4. IMPACT : PRECIPITATION FORECASTS

I.4.a ECMWF

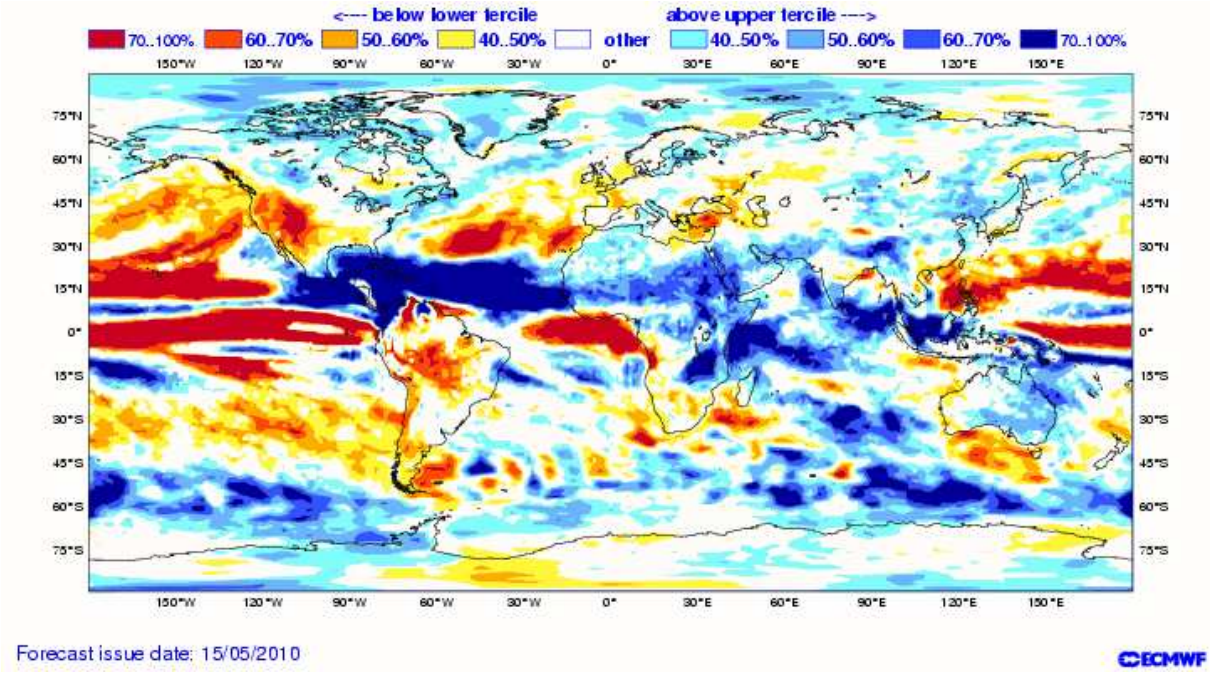


fig.16: **Probabilistic forecasts for precipitation from ECMWF for JuneJulyAugust, issued in May 2010.**

Most likely Category. (2 categories, Below and Above normal – white zones correspond to Other"). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/charts/seasonal_charts_s2/

I.4.b MétéoFrance

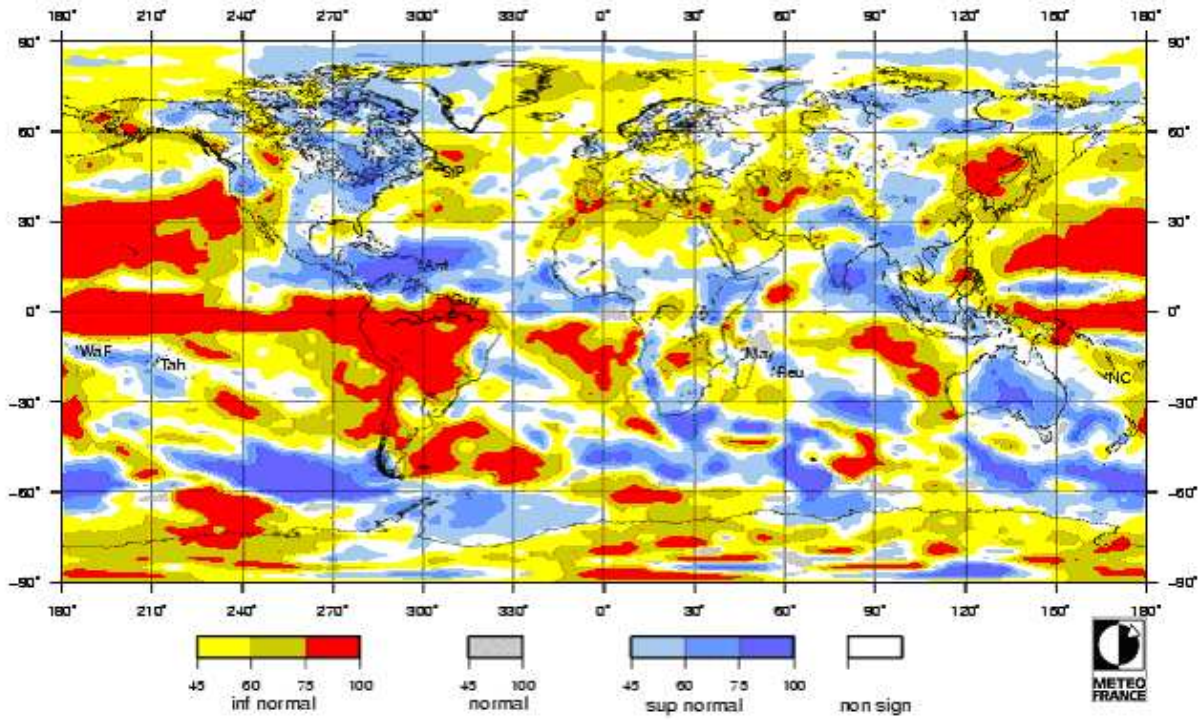


fig.17: **Probabilistic forecasts for precipitation from MétéoFrance for JuneJulyAugust, issued in May 2010. Most likely Category. (3 Categories, Normal, Below and Above normal – White zones correspond to No signal).** http://dpnet.meteo.fr/DCLIM/dev/

I.4.c Met office (UKMO)

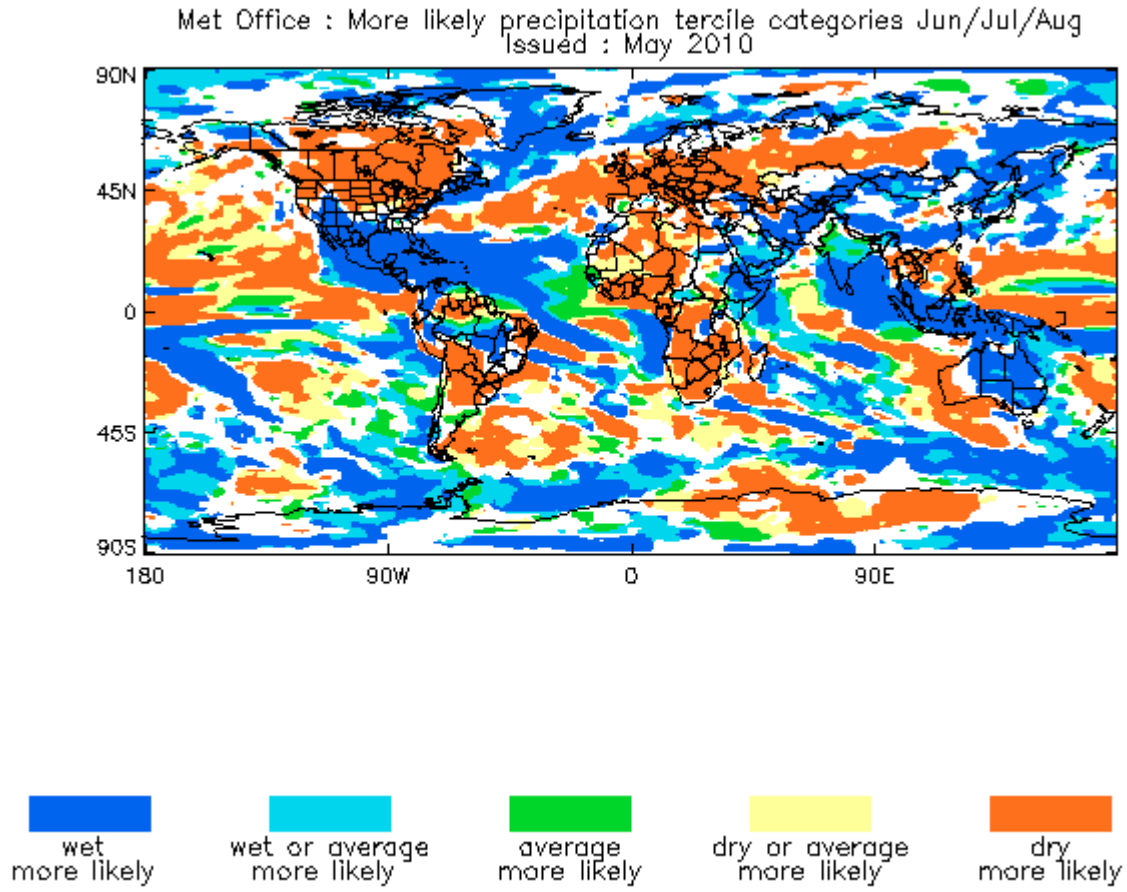


fig.18: **Probabilistic forecasts for T2m from UK Met Office for JuneJulyAugust, issued in May 2010. Most likely Category. (5 Categories – see caption – white zones correspond to No signal).** http://www.metoffice.gov.uk/science/specialist/sasonal/category/

I.4.d HydromMet Centre of Russia (HMC)

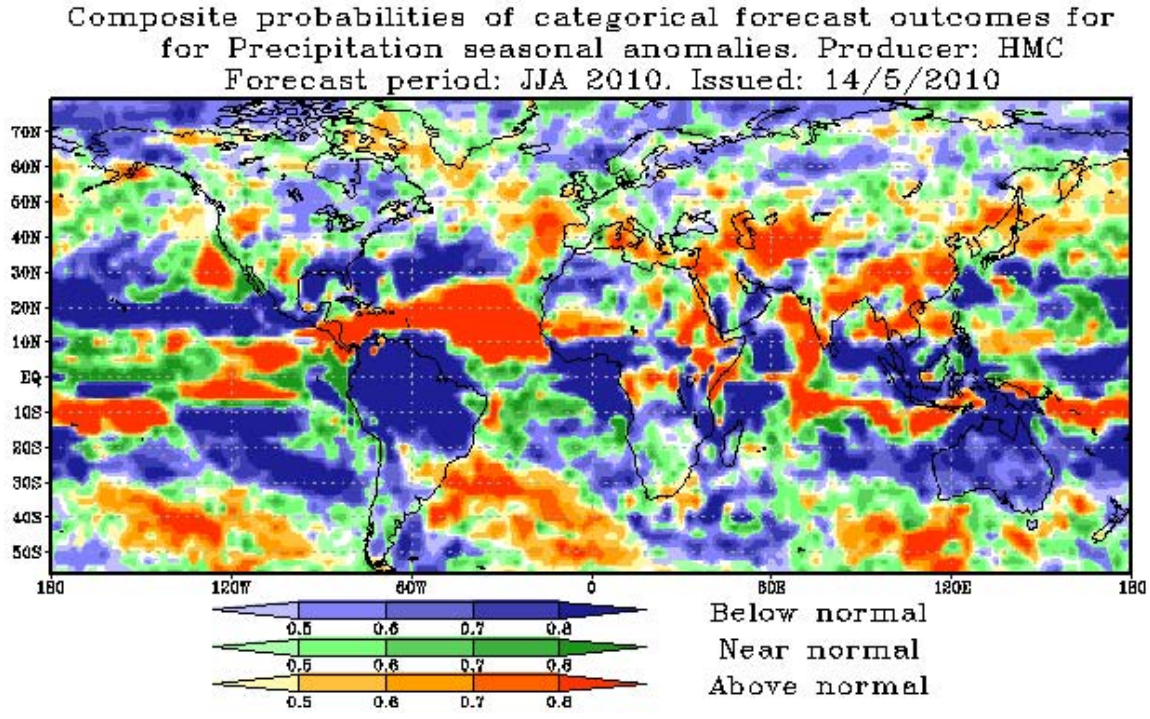


fig.19: **Probabilistic forecasts for precipitation from HMC for JuneJulyAugust, issued in May 2010. Most likely Category. (3 Categories,**

Normal, **Below** and **Above normal** – **White zones correspond** to **No signal)**.

I.4.e EuroSIP

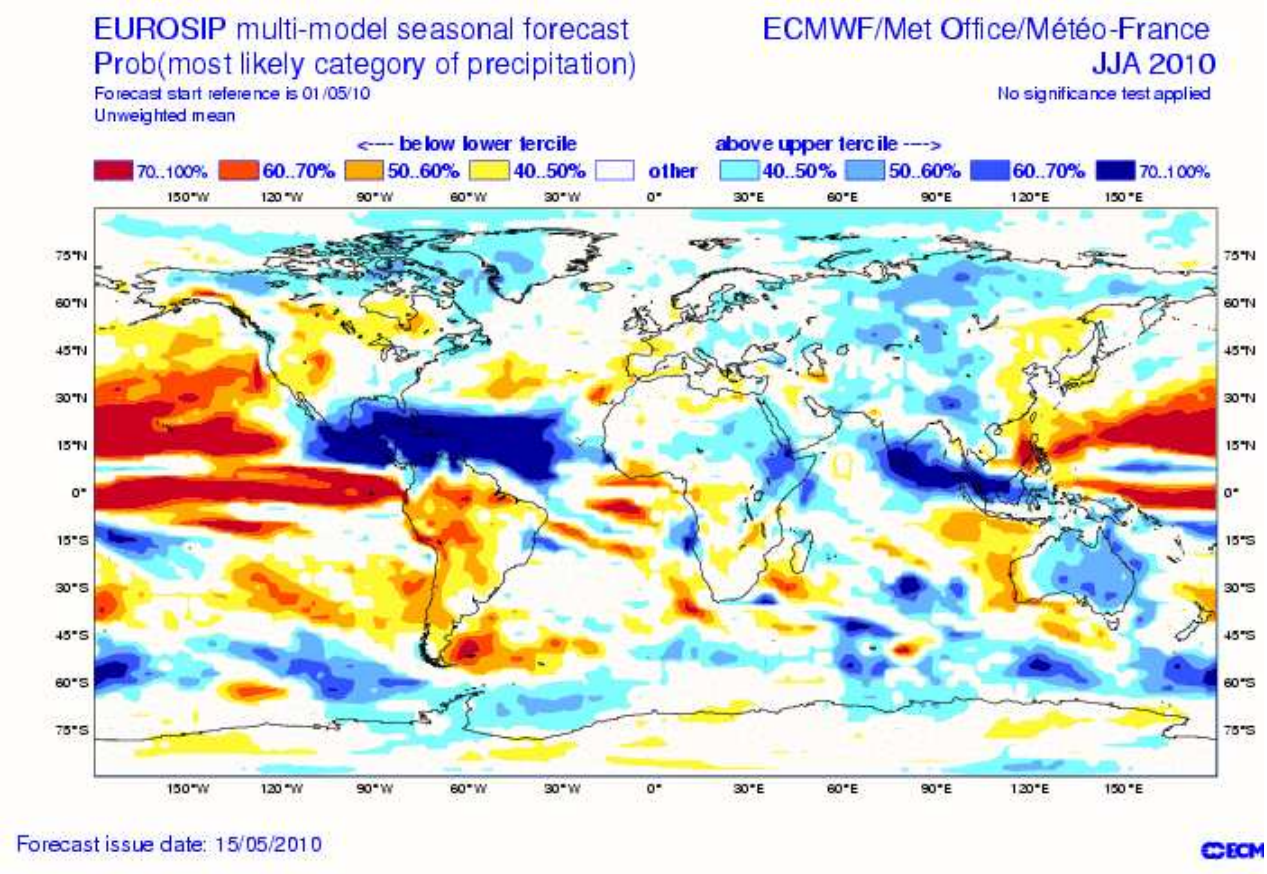


fig.20: **MultiModel Probabilistic forecasts for precipitation from EuroSip for JuneJulyAugust**, **issued in May 2010**. **(2 Categories**, **Below and Above normal – White zones correspond to No signal)**.

http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

I.4.f International Research Institute (IRI)

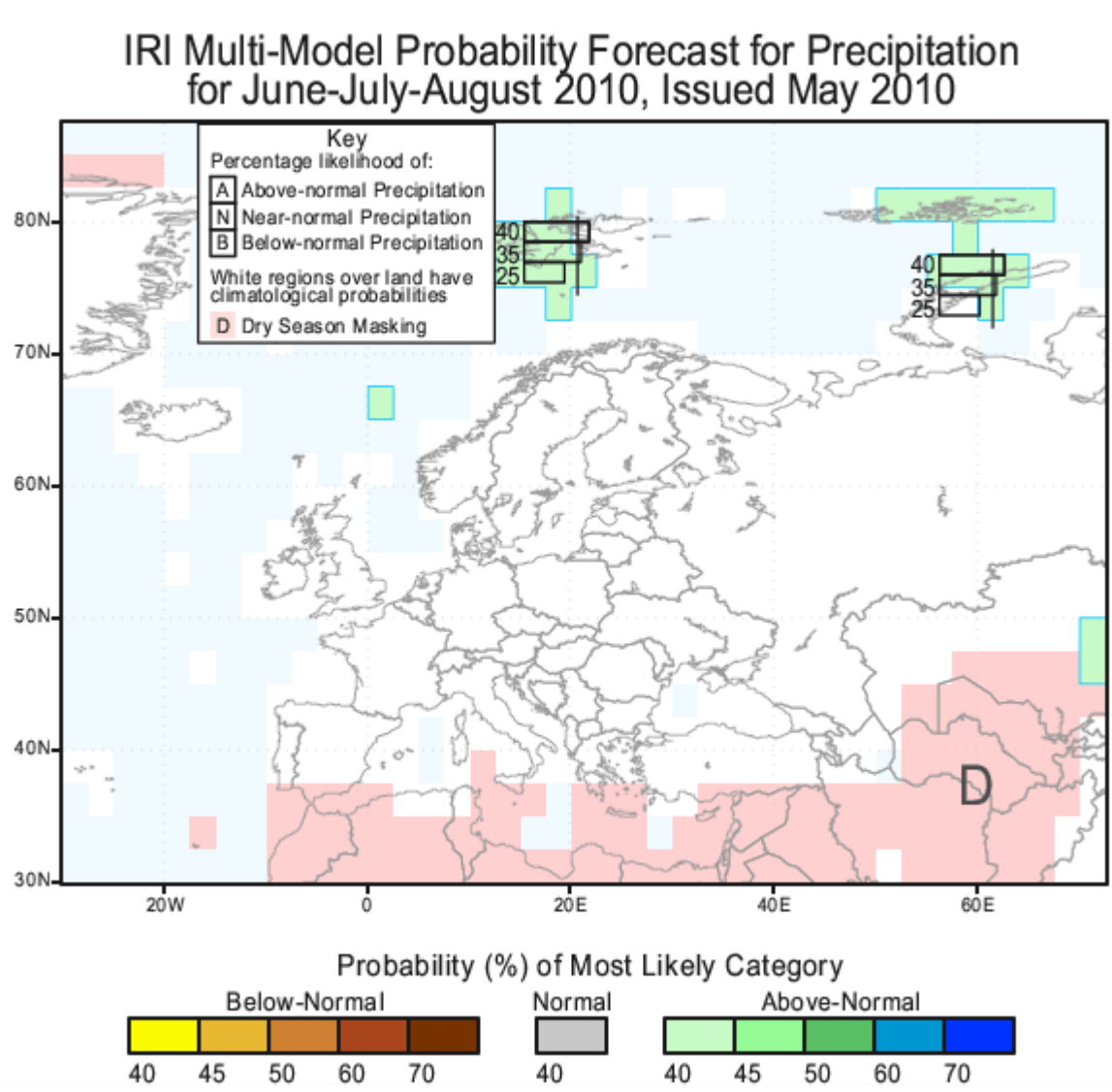
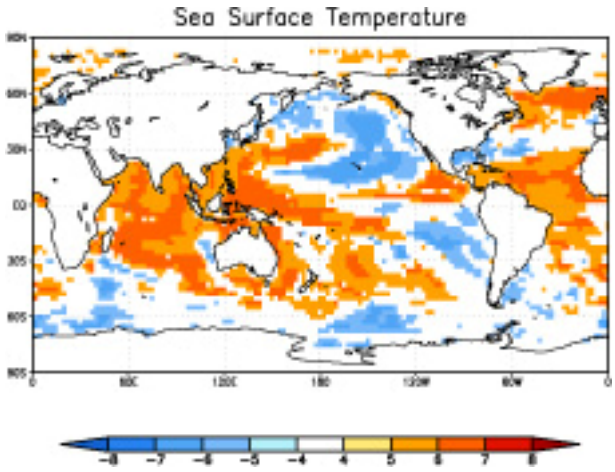


fig.21: **MultiModel Probabilistic forecasts for precipitation from IRI for JuneJulyAugust, issued in May 2010. (3 Categories, Normal, Below and Above normal – White zones correspond to No signal).** http://iri.columbia.edu/climate/forecast/net_asmt/

I.5. MODELS' CONSISTENCY

I.5.a GPCs consistency maps for MJJ

SST: GPC_washington/seoul/Melbourne/Beijing/ecmwf/Exeter/Toulouse/Tokyo



Precipitation, Temperature 2m:
GPC_seoul/washington/Melbourne/Montreal/Beijing/Moscow/ecmwf/Exeter/Toulouse/Tokyo

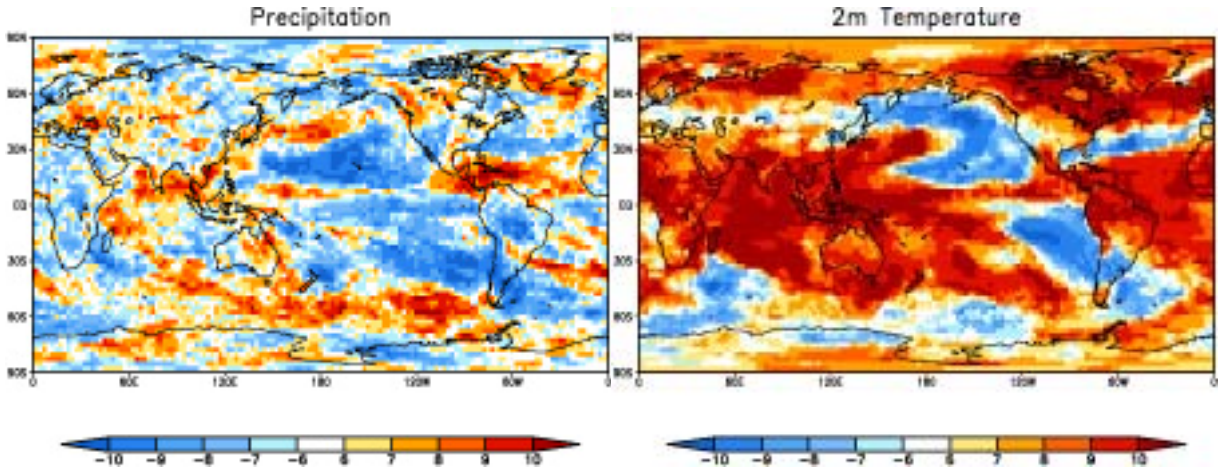


Fig.22: GPCs Consistency maps for MJJ from LCMME http://www.wmolc.org/, where the positive numbers mean the number of models that predict positive anomaly and vice versa.

I.6. DISCUSSION AND SYNTHESIS

SSTs Forecasts

Discussion on the decay of ENSO Discussion on the North Atlantic both Tropics and Extra-Tropics (notably see "horse shoes" pattern)

General Circulation Forecasts

Will teleconnection patterns persist (PNA, …) or new will appear ?
What's about North Circulation Regime over the North Atlantic?
Mediterranean connection?

Temperature and Precipitation forecast

Are impacts in term of temperature and precipitation significant?
What's about the climate trend signature?
Insight into more extreme scenarios?
What could be potential impacts of the expected tendencies taking into account existing vulnerabilities ?