Seasonal Outlook for Summer Season
(12/05/2010 - MJJ)

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

I.1. OCEANIC FORECAST

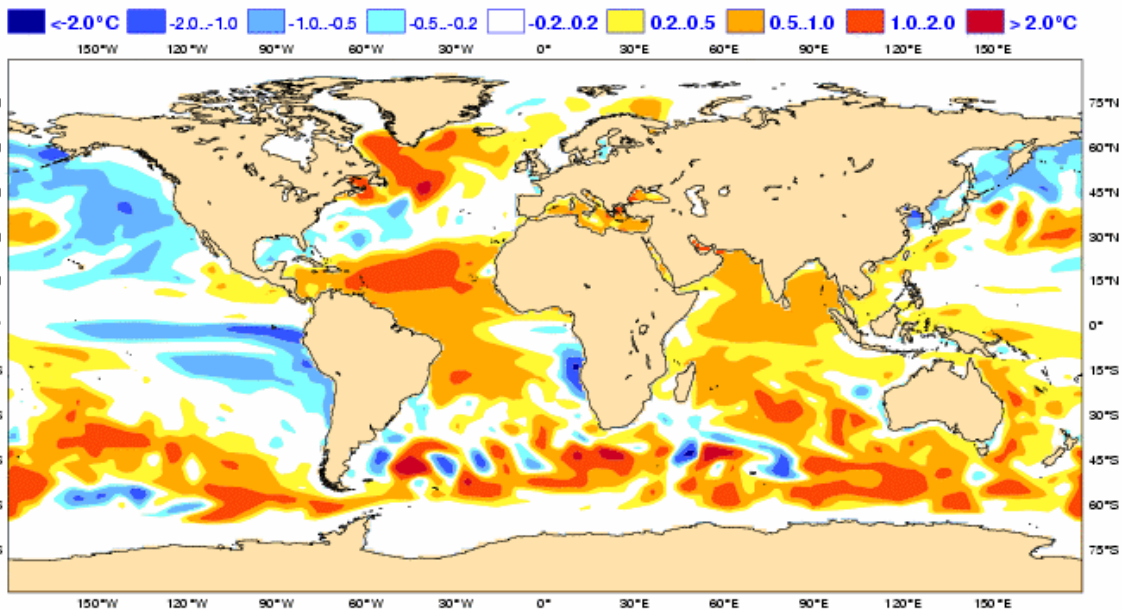### I.1.a Sea Surface Temperature (SST)

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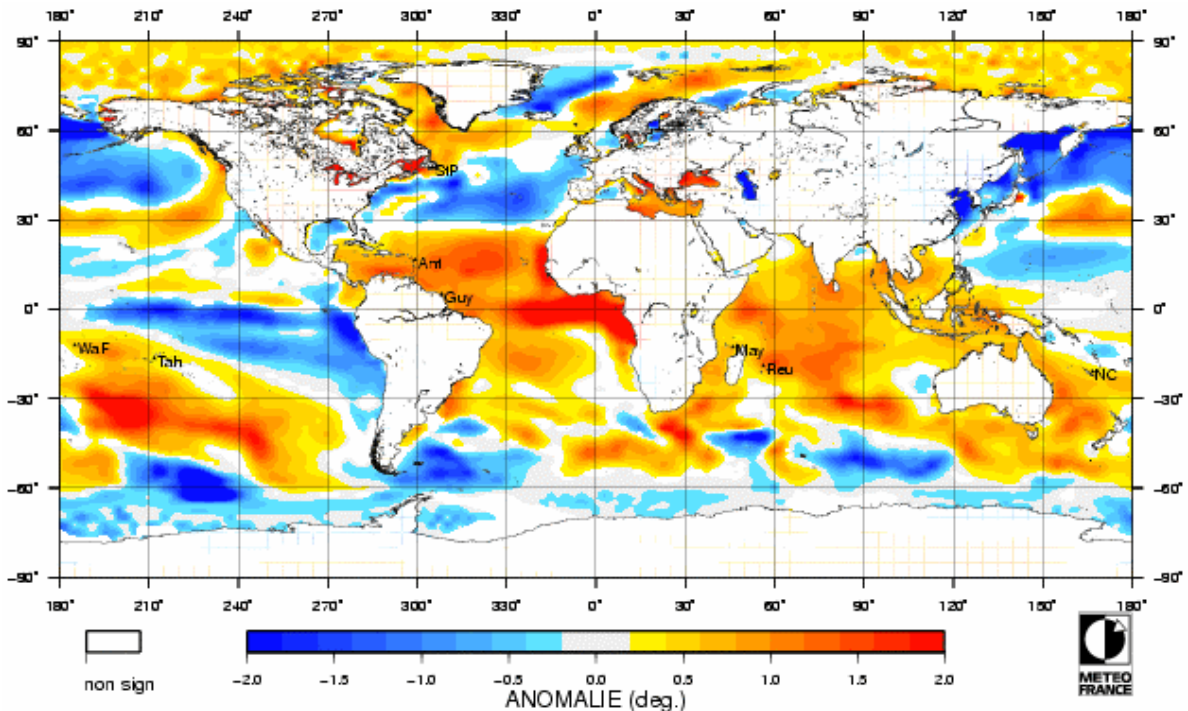

fig.2:   SST Forecasted anomaly (in °C) from Météo-France valid for May-June-July, (issued in April). http://dpnet.meteo.fr/DCLIM/dev/

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 (which should contribute to El Niño decay).

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 there is only slight change in the forecasted SSTs patterns. 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.

I.1.b ENSO forecasts :

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

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 May-June-July, the spread of the models has increased (with respect of previous forecasts) from –1,1°C up to +0,5°C in relationship with the decay of the Niño associated to a return to "Normal" condition during the May-June-July period.
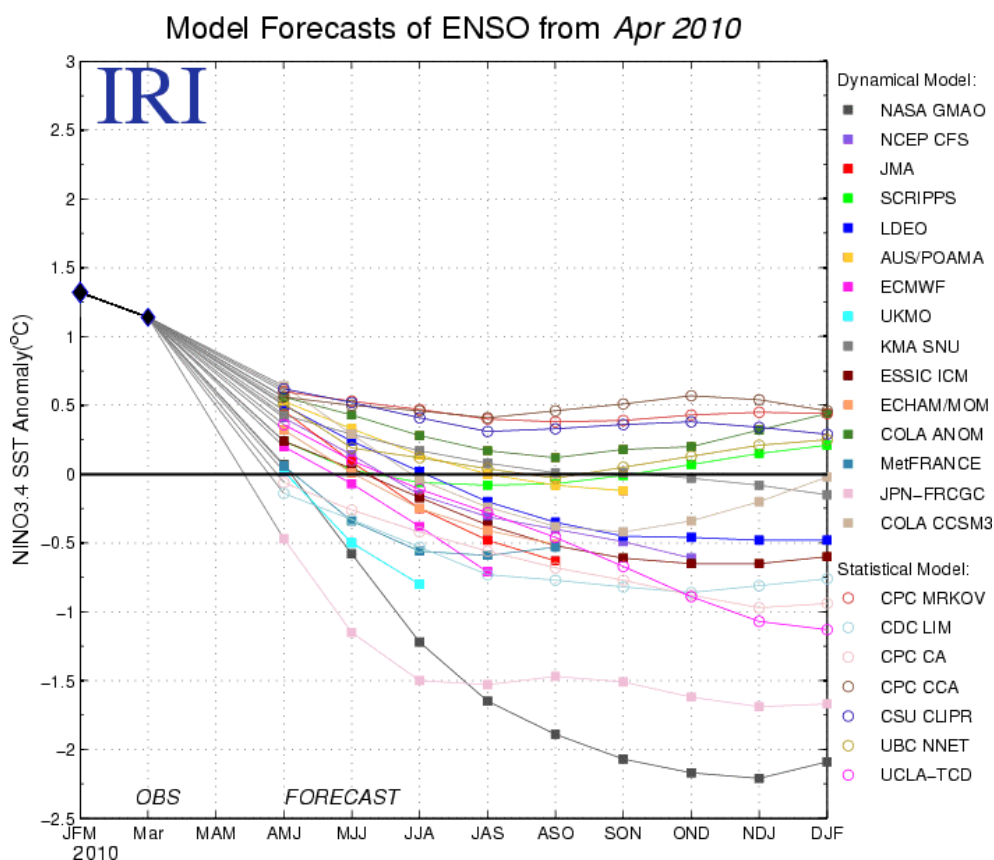
fig.3:   Prévisions probabiliste d'anomalies de SST dans la zone Niño-3.4 (120° à 165°W)
            synthèse produite en avril par l'IRI :
            http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html

The following table give 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	-0.45	-0.50	-0.50	-0,50	-0,55	-0,75	-0,75	-0,70	-0,65
« El Niño » Value	0.45	0.45	0.45	0,45	0,50	0,70	0,75	0,70	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 coolling in the Equatorial Pacific (which can lead to Niña condition at fall) while the Météo-France model stay in neutral conditions (slightly negative).

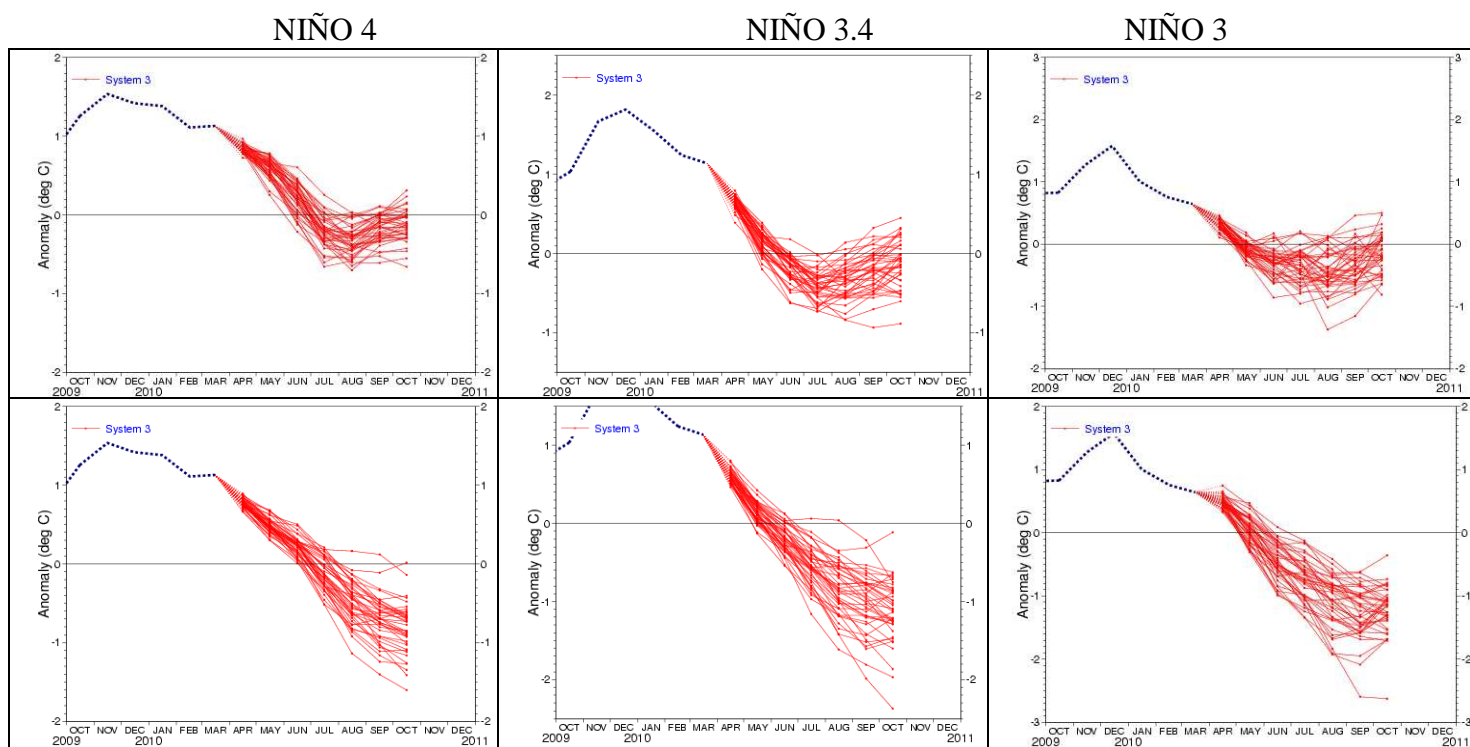NIÑO 4   NIÑO 3.4   NIÑO 3

fig.4:   SSTs anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (bottom), issued in Avril 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 seams to appear later ; some models (like the ECMWF) indicating some possibilities of La Niña event.

I.1.c Tropical Atlantic forecasts :

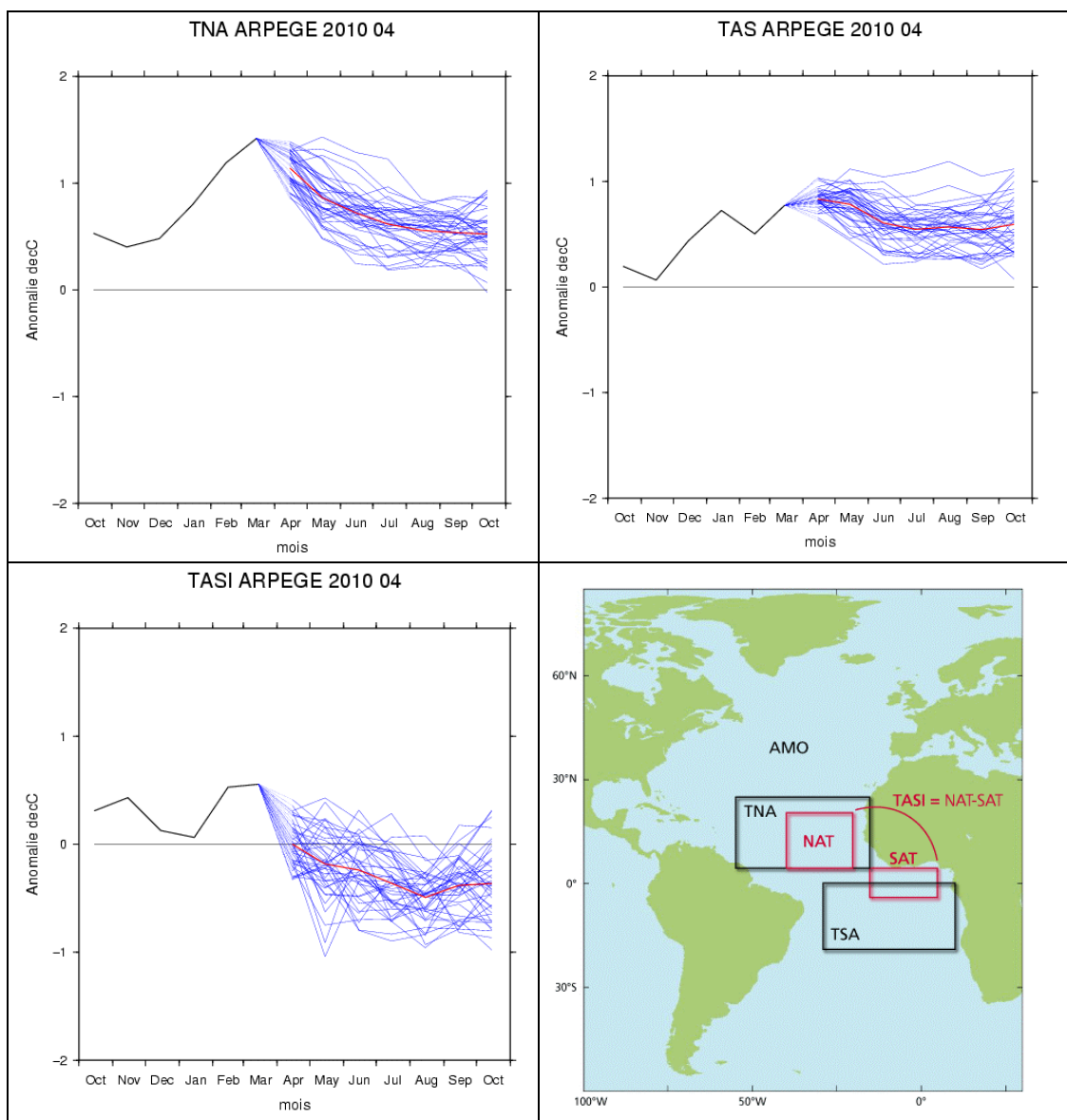## Forecasted Phase: warmer than normal conditions in the Tropical Atlantic

fig.5: **SSTs anomaly forecasts in the Tropical Atlantic boxes from Météo-France, issued in Avril 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
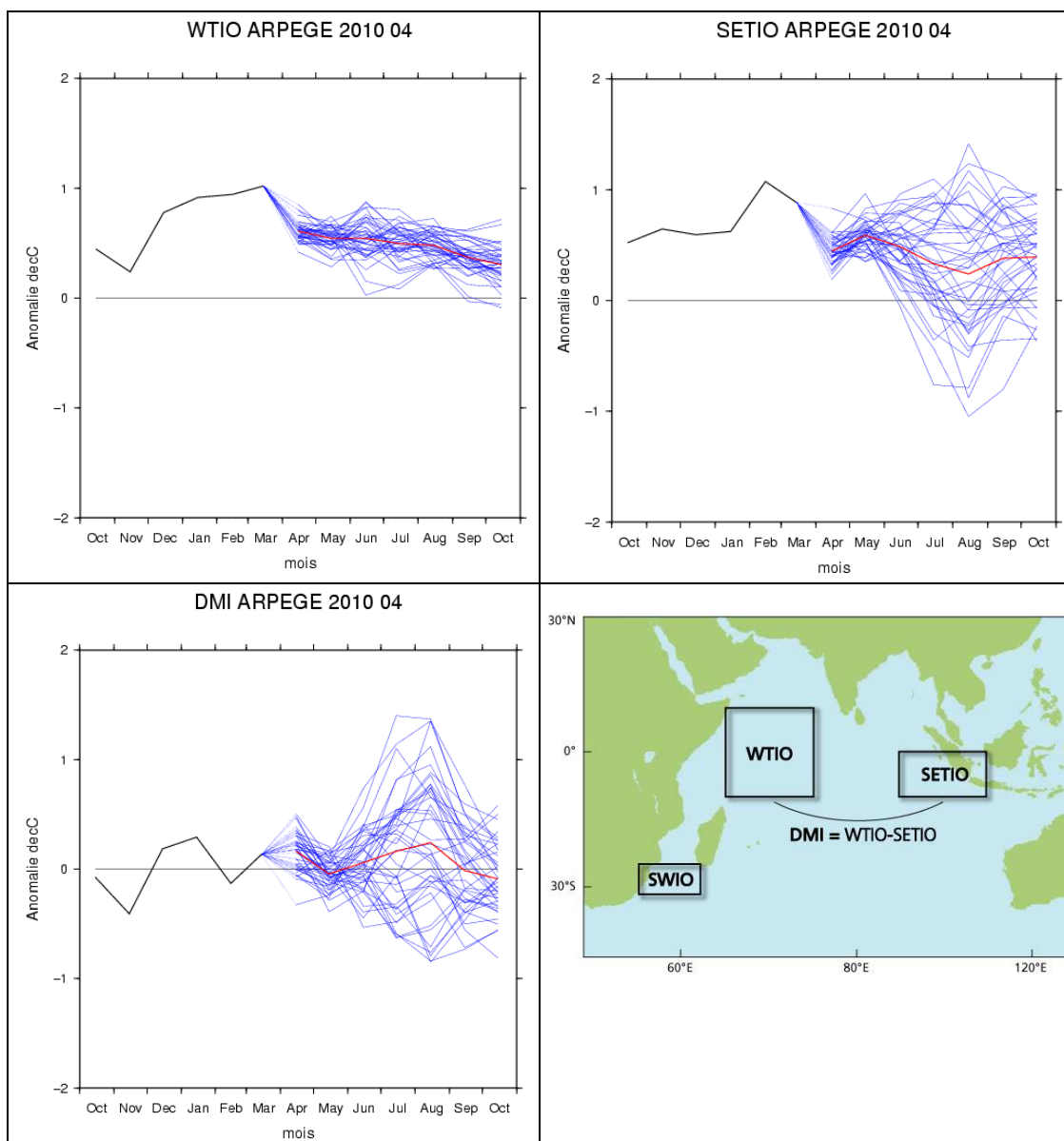

fig.6:   SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France, issued in Avril 2010, plumes correspond to 41 membres and monthly means.

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 show a good consistency among all members of the ensemble during all the period. The DMI shows a large uncertainty during the summer season and a mean value close to zero.

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.
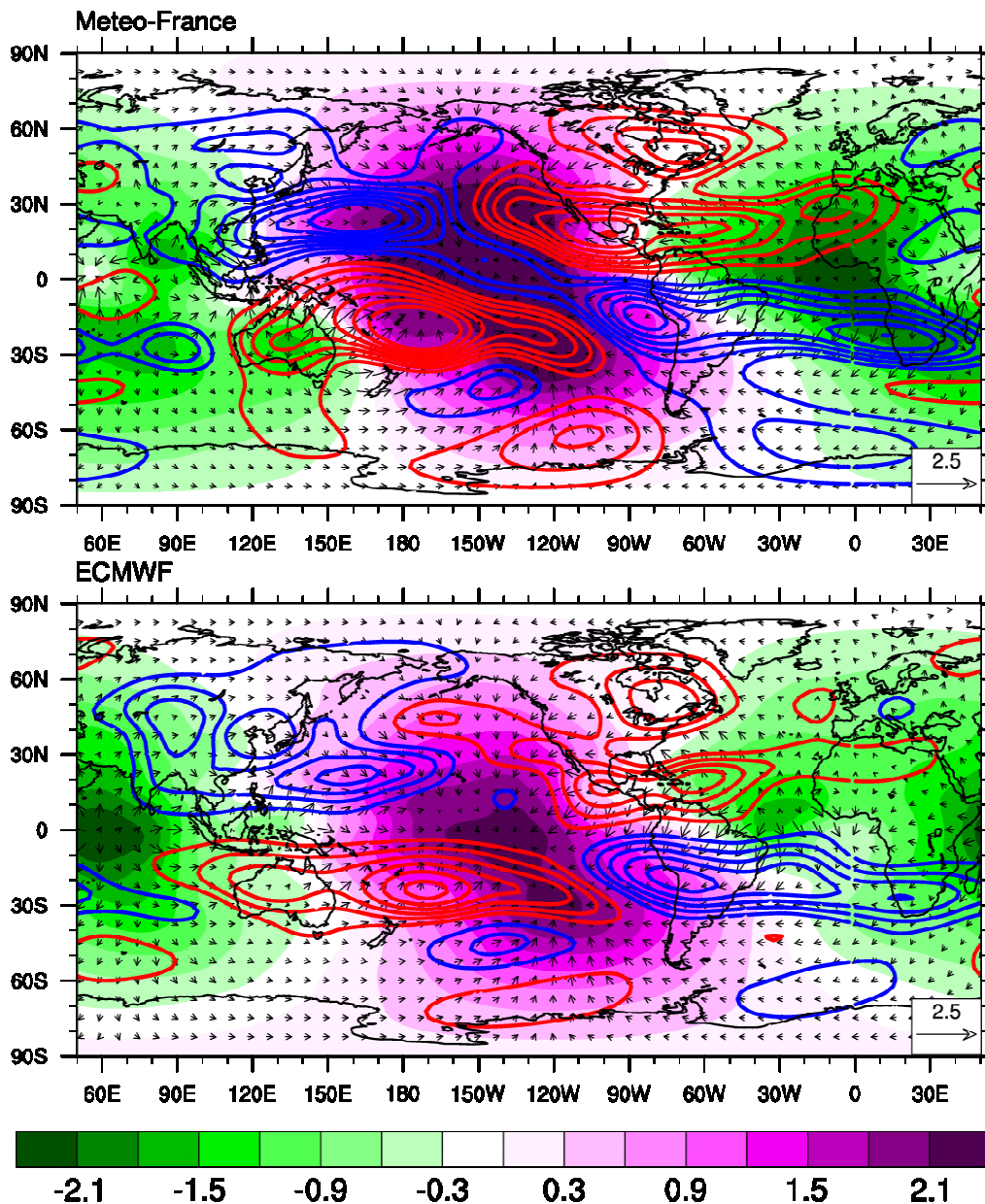

fig.7:   Forecasted anomalies of Velocity Potential (colors) and Stream Function (isolines) at 200 hPa for May-June-July 2010 from Météo-France (top) and ECMWF (bottom), issued in April 2010.
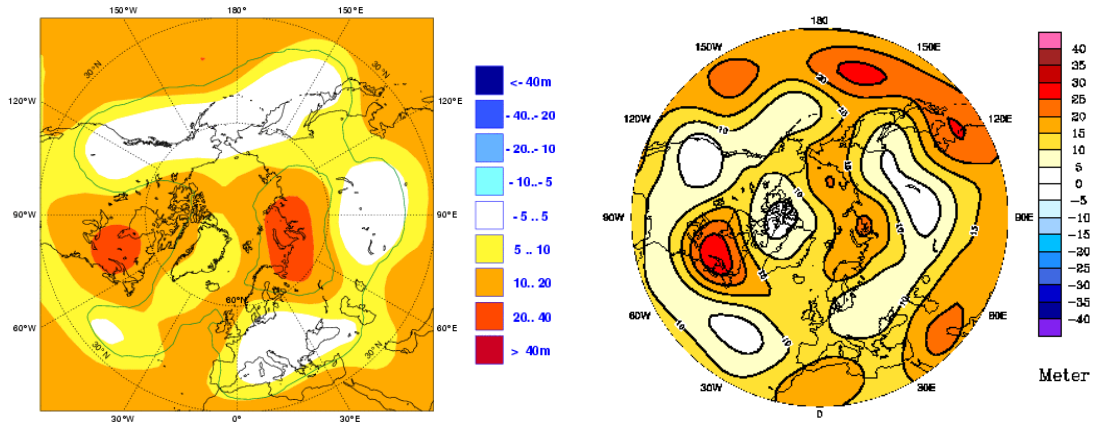
I.2.b Over North Hemisphere

fig.8: Geopotential Anomaly forecasts at 500 hPa for May-June-July 2010 from ECMWF (left) and Météo-France (right) issued in April 2010.

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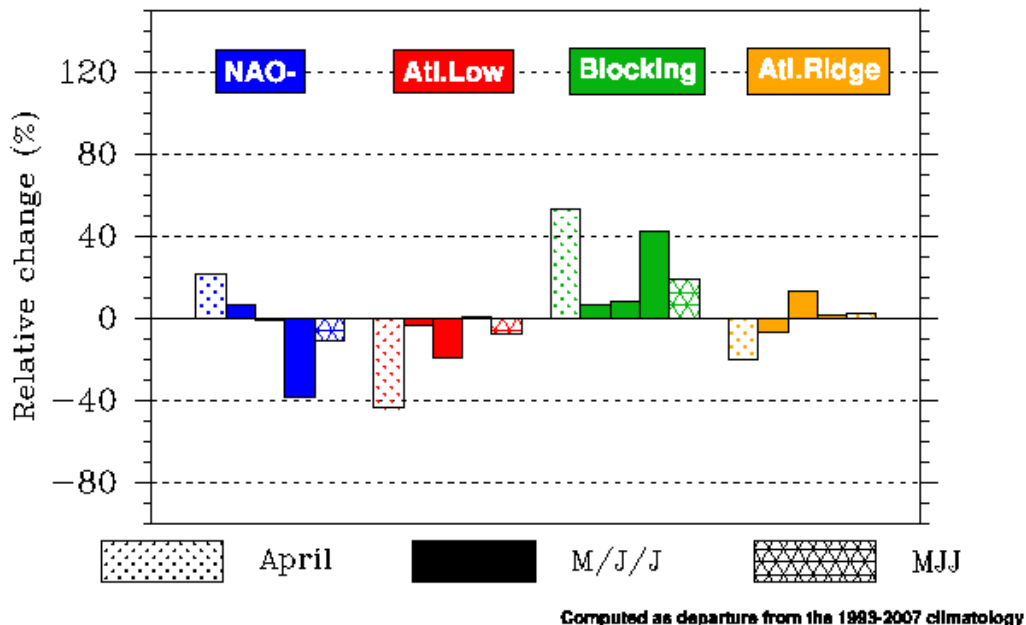

fig.9: North Atlantic Regime occurrence from Meteo-France for May-June-July 2010: the barre represent for each regime the frequency anomaly (in %) with respect of the climatological frequency.

The Z500 anomaly from Météo-France (fig. 6) mainly corresponds to the climate trend within the hindcast. So in term of regime classification, one notice a distribution quite close to the climatological one. The June increase in Blocking regime cannot be interpreted at this stage and should be dicusssed in the next update of the forecasts. ECMWF regime distribution (not shown) is also close from the climatology.

I.3. IMPACT : TEMPERATURE FORECASTS
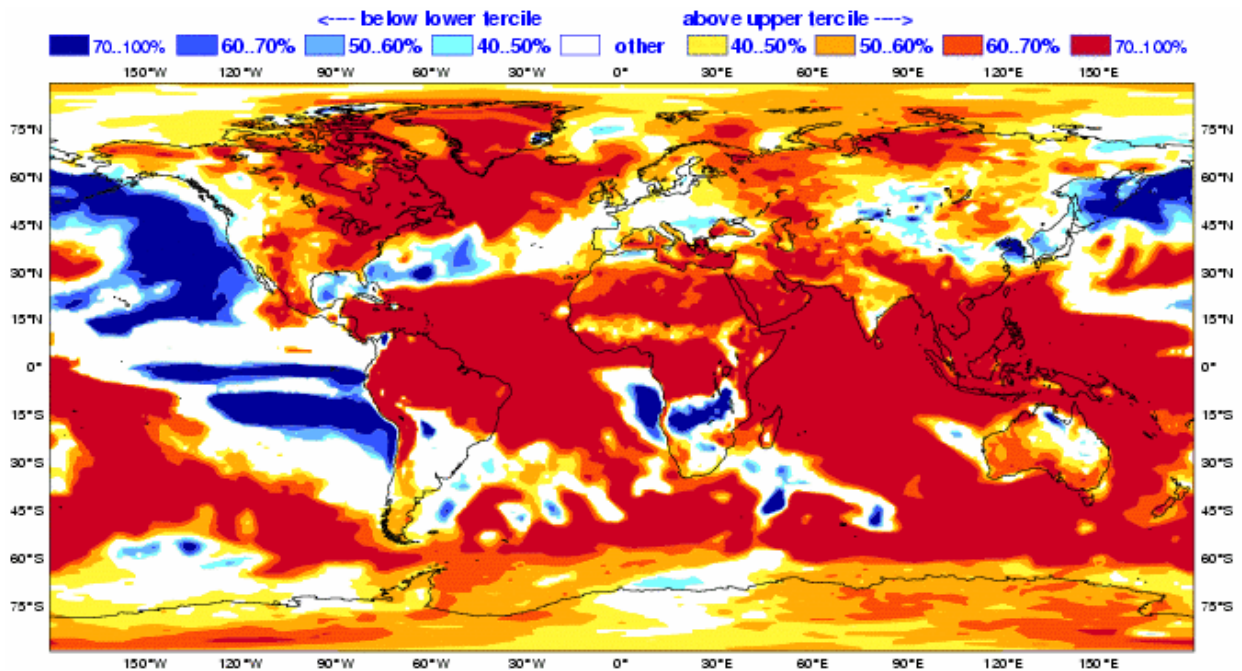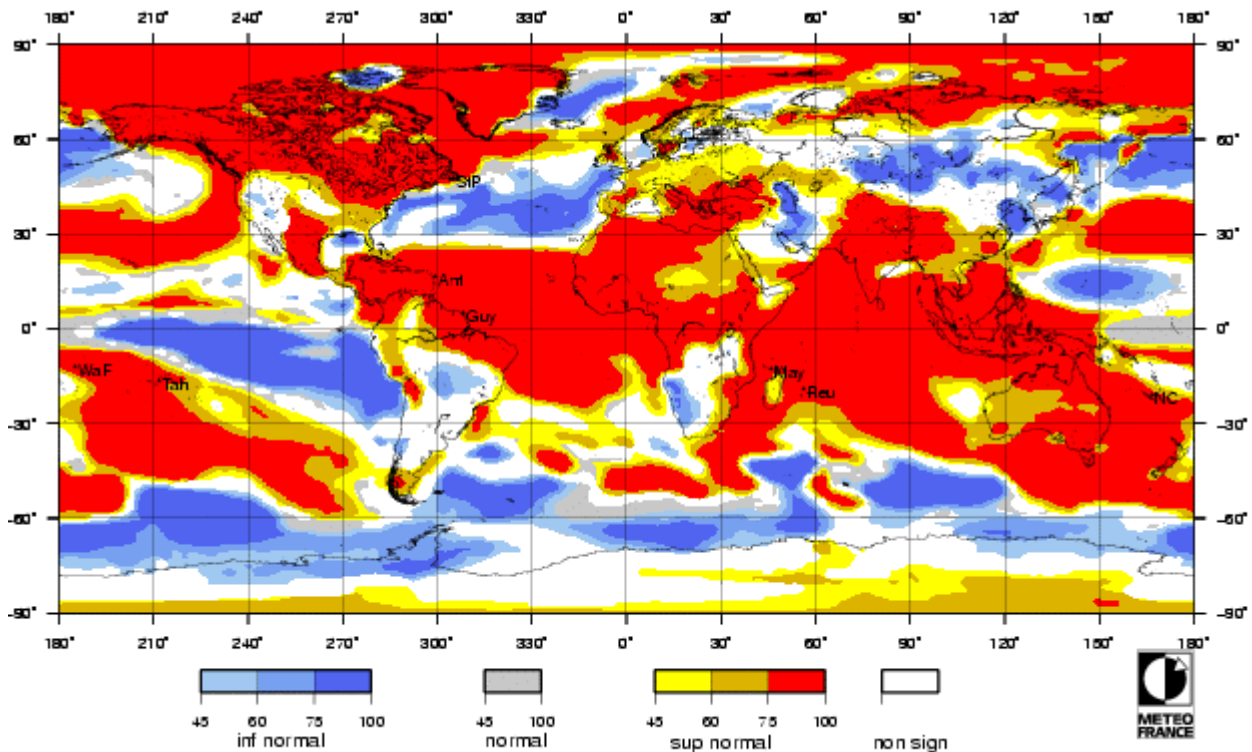
I.3.a ECMWF

fig.10: Probabilistic forecasts for T2m from ECMWF for May-June-July, issued in April 2010. Most likely Catégory. (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 METEO-France

fig.11: Probabilistic forecasts for T2m from Météo-France for May-June-July, issued in April 2010. 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)

Met Office : More likely 2m temperature tercile categories May/Jun/Jul
Issued : April 2010

cold more likely | cold or average more likely | average more likely | warm or average more likely | warm more likely
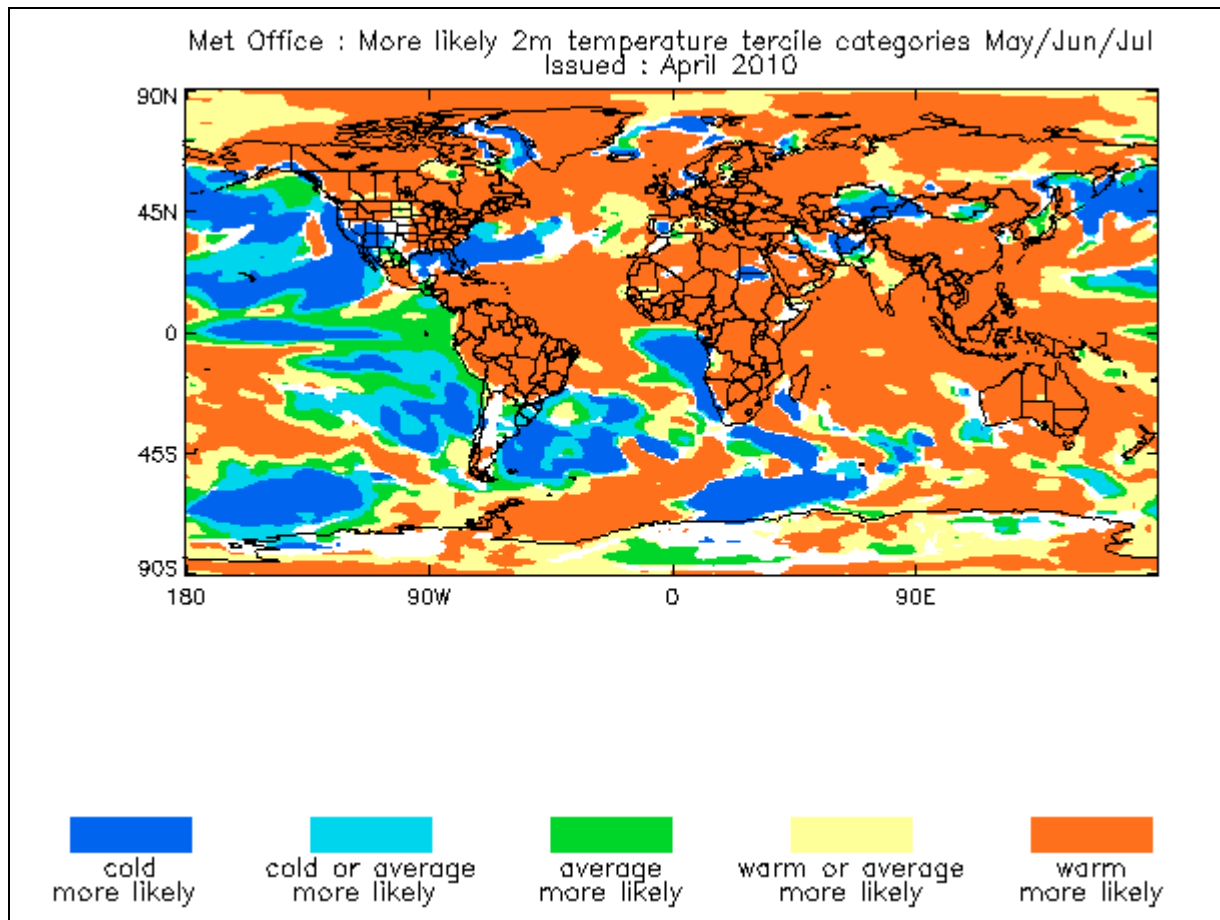
fig.12:   Probabilistic forecasts for T2m from UK Met Office for May-June-July, issued in April 2010. Most likely Category. (5 Categories – see caption – white zones correspond to No signal).   http://www.metoffice.gov.uk/science.specialist/easonl/category/

Composite probabilities of categorical forecast outcomes for
T2m seasonal anomalies. Producer: HMC+MGO
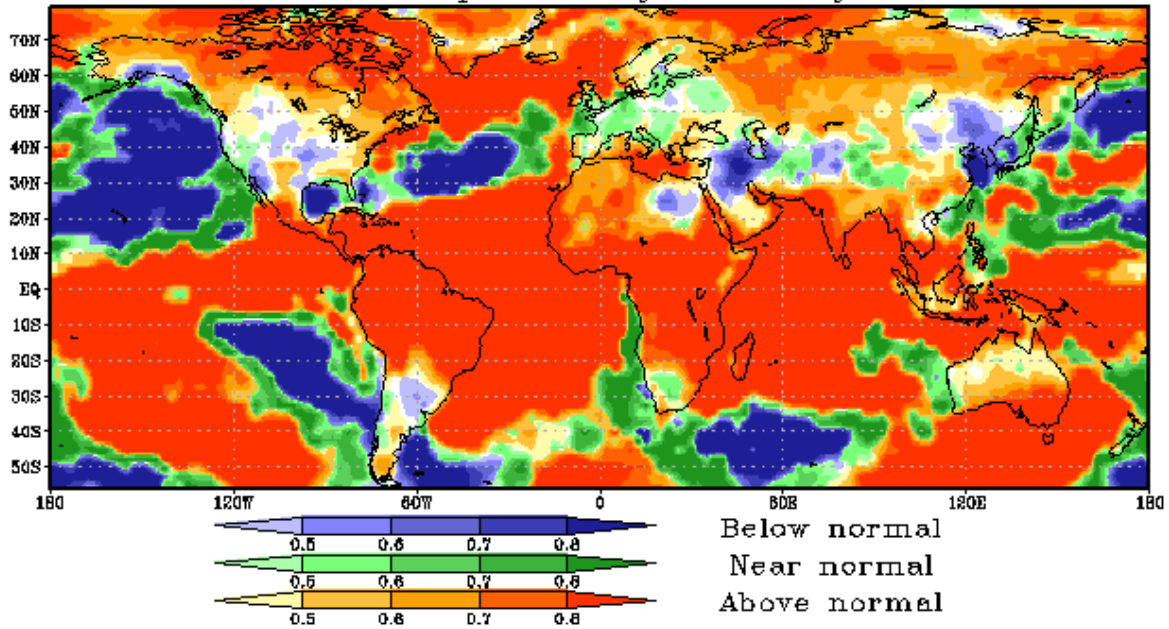Forecast period: May–June–July 2010

fig.13:   **Probabilistic forecasts for precipitation from HMC for May-June-July, issued in April 2010. Most likely Category. (3 Categories, Normal, Below and Above normal – White zones correspond to No signal).**
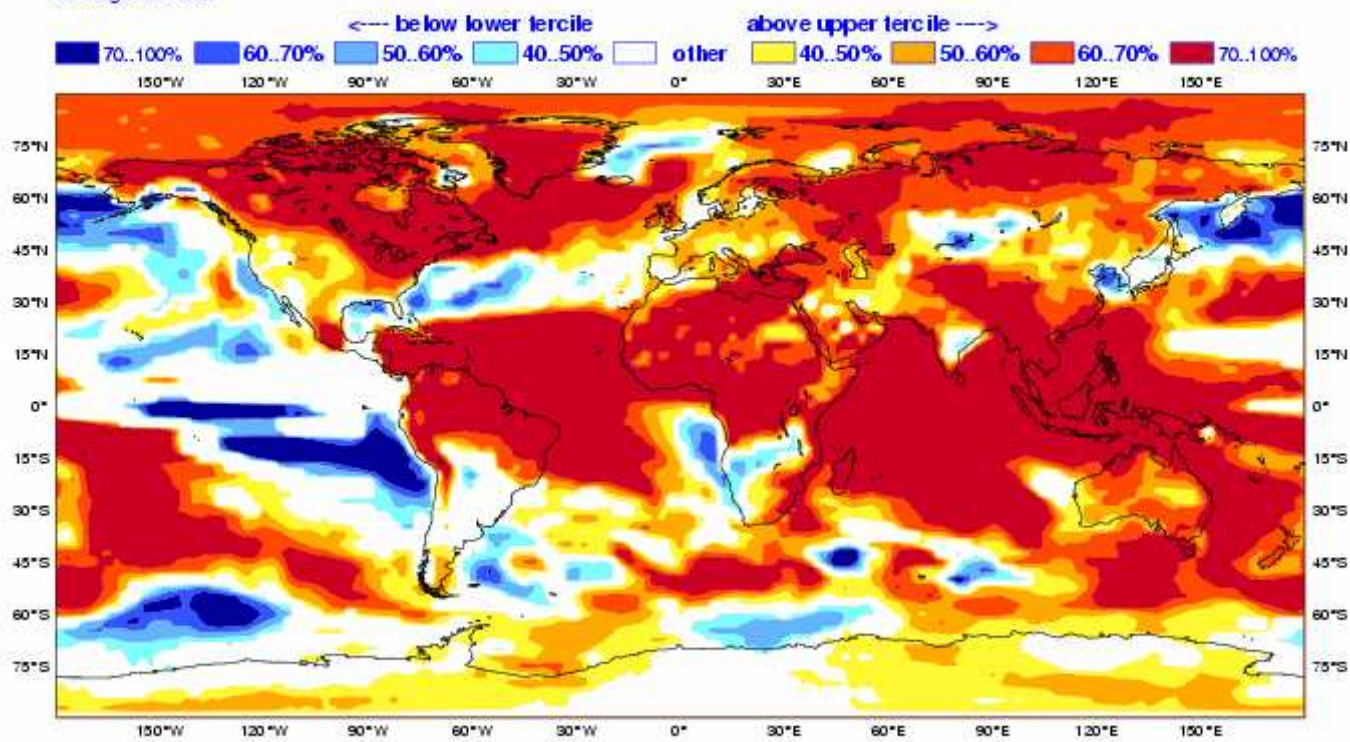
I.3.e Euro-SIP

fig.14: Multi-Model Probabilistic forecasts for T2m from EuroSip for May-June-July, issued in April 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/

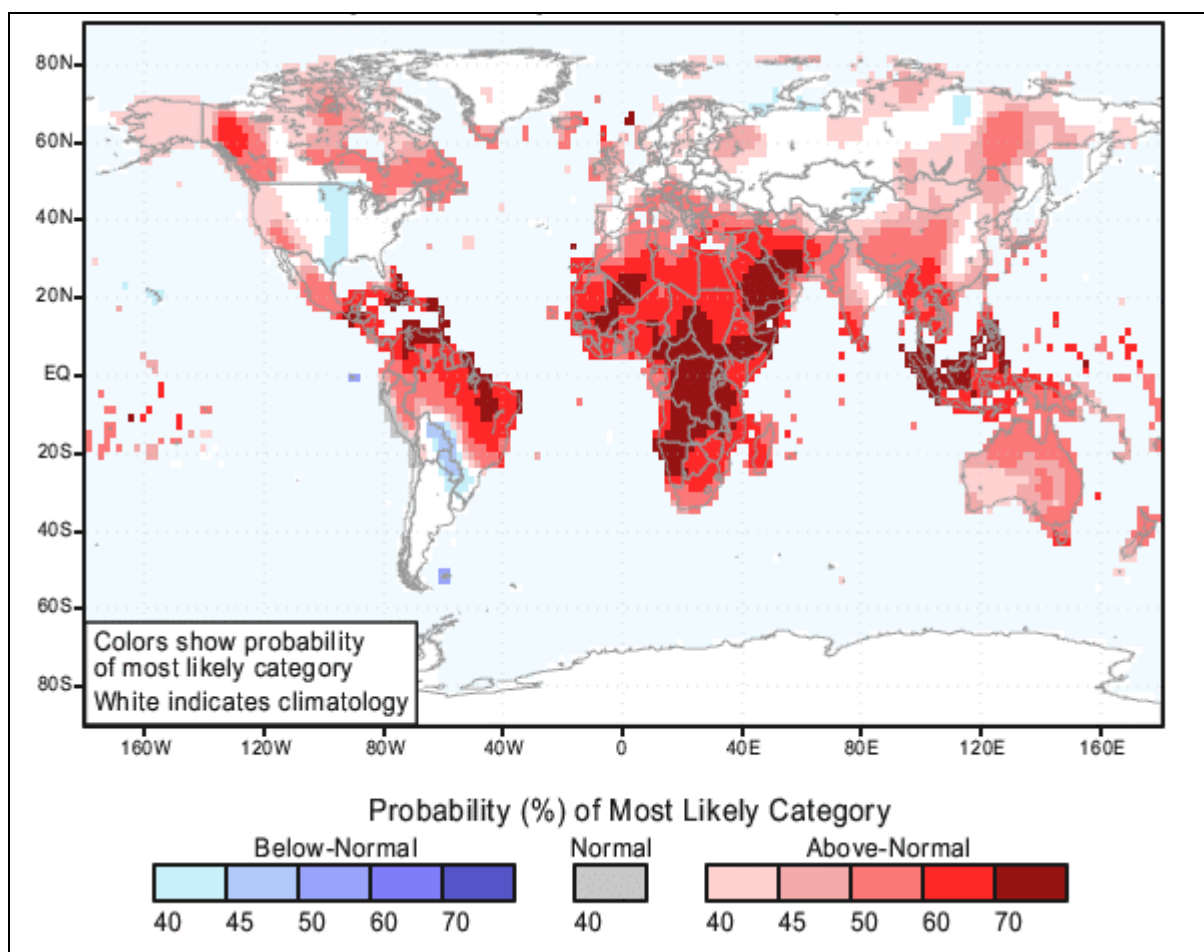## I.3.f International Research Institut (IRI)

fig.15: Multi-Model Probabilistic forecasts for T2m from IRI for May-June-July, issued in April 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
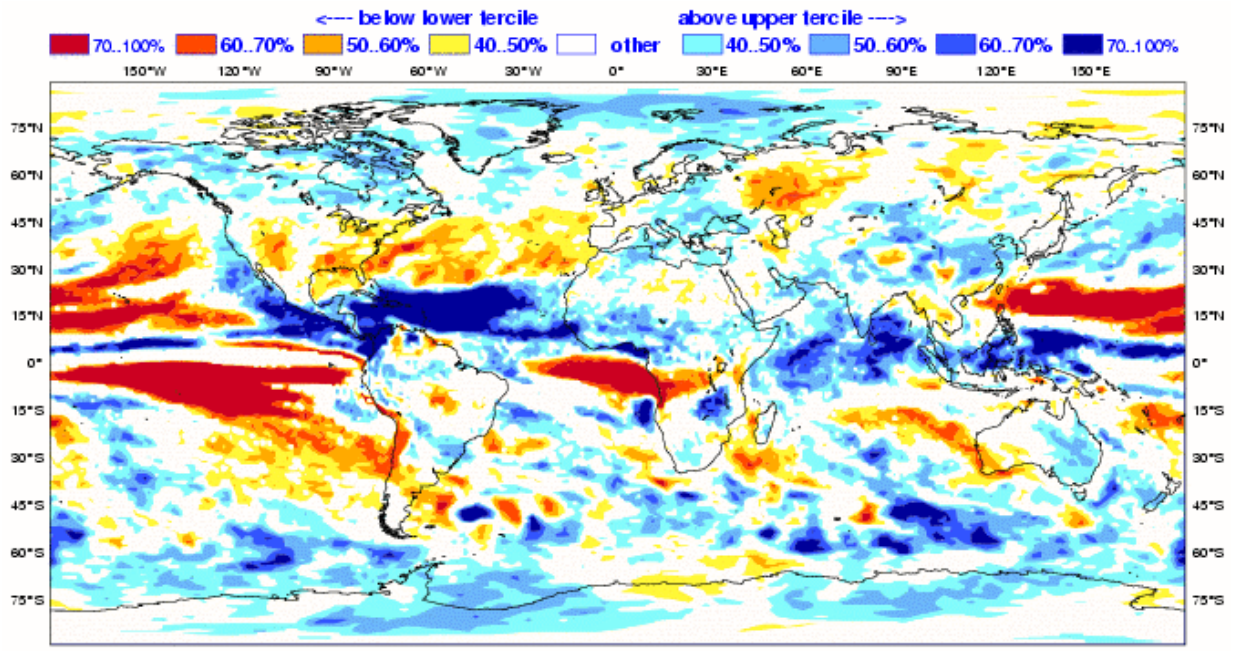
I.4.a ECMWF

fig.16: Probabilistic forecasts for precipitation from ECMWF for May-June-July, issued in April 2010. Most likely Catégory. (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/
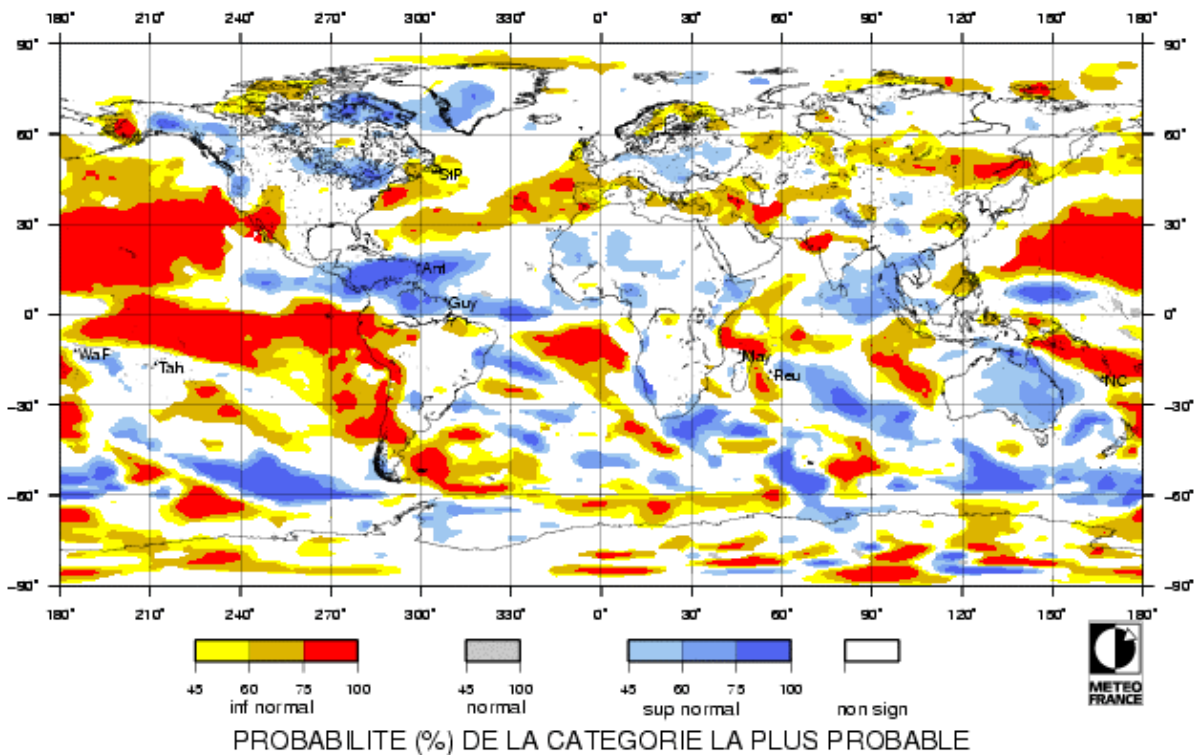
I.4.b Météo-France

fig.17: Probabilistic forecasts for precipitation from Météo-France for May-June-July, issued in April 2010. Most likely Catégory. (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)

Met Office : More likely precipitation tercile categories May/Jun/Jul
Issued : April 2010

wet more likely | wet or average more likely | average more likely | dry or average more likely | dry more likely
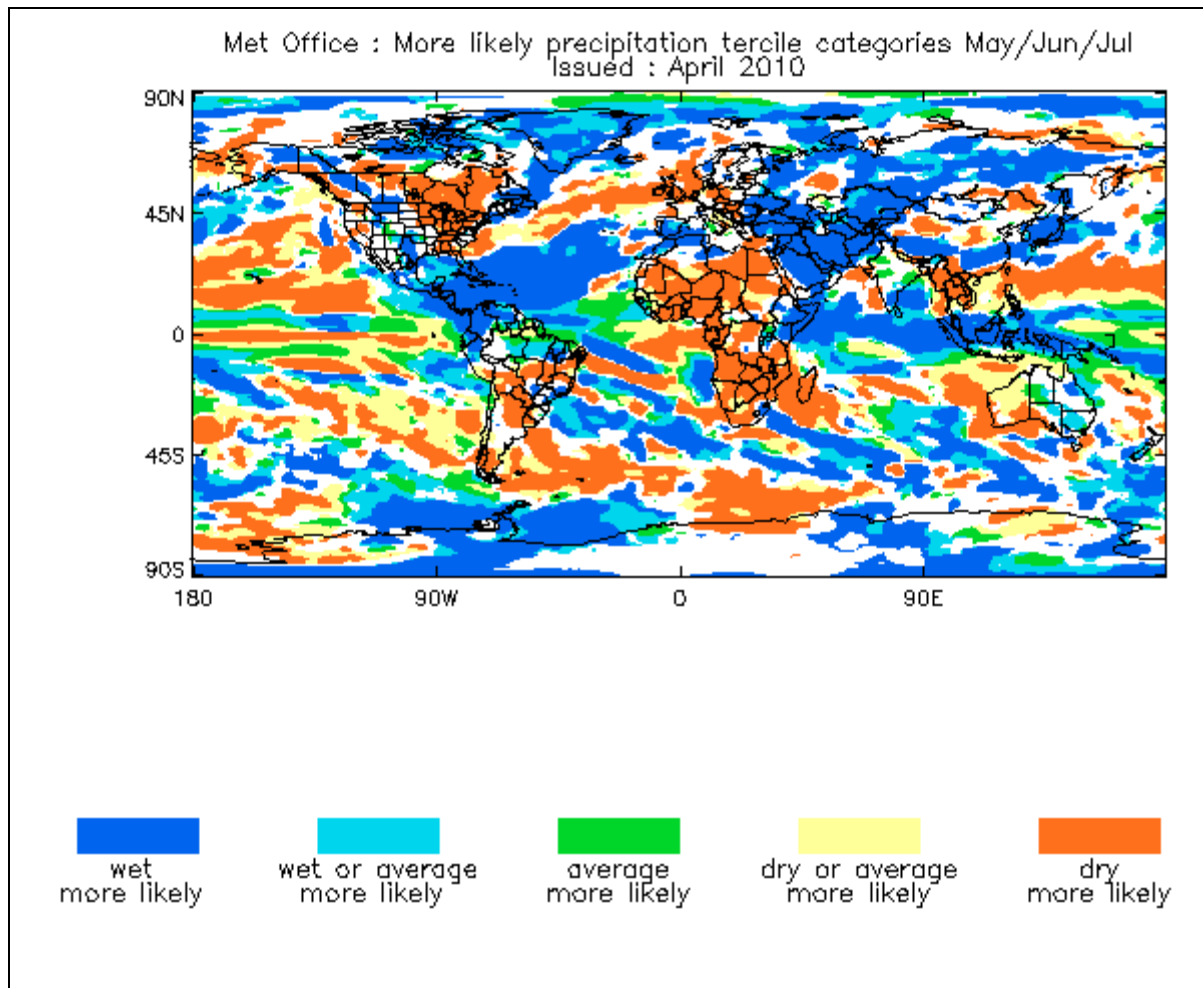
fig.18:   **Probabilistic forecasts for T2m from UK Met Office for May-June-July, issued in April 2010. Most likely Catégory. (5 Categories – see caption – white zones correspond to No signal). http://www.metoffice.gov.uk/science/specialist/sasonal/category/**
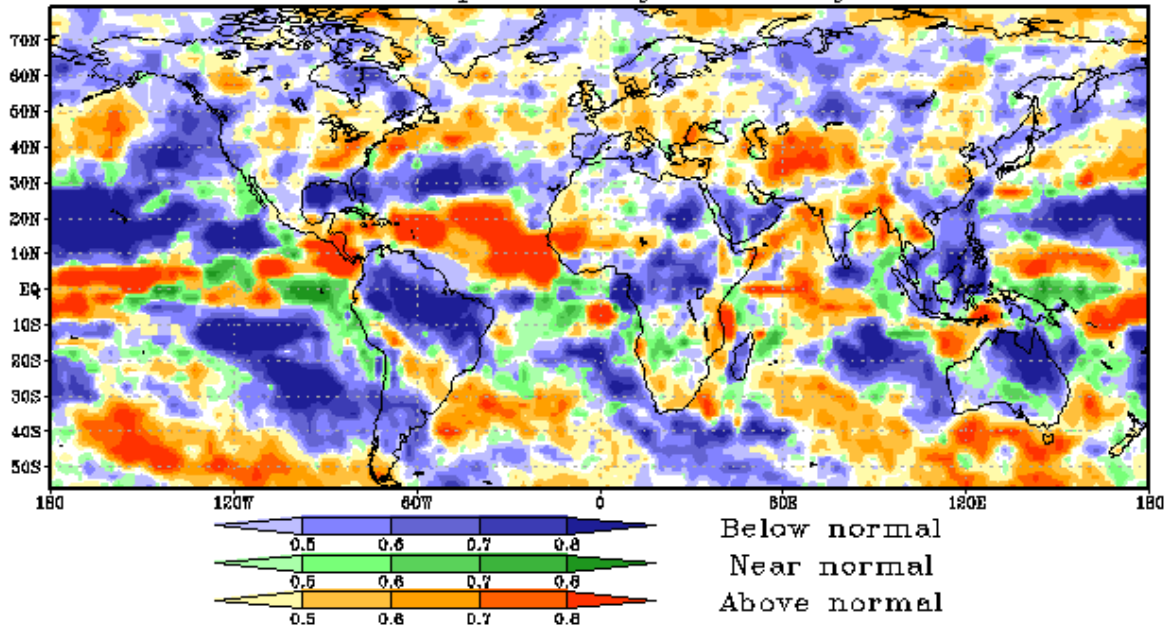
I.4.d HydromMet Centre of Russia (HMC)

fig.19:   Probabilistic forecasts for precipitation from HMC for May-June-July, issued in April 2010. Most likely Category. (3 Categories, Normal, Below and Above normal – White zones correspond to No signal).
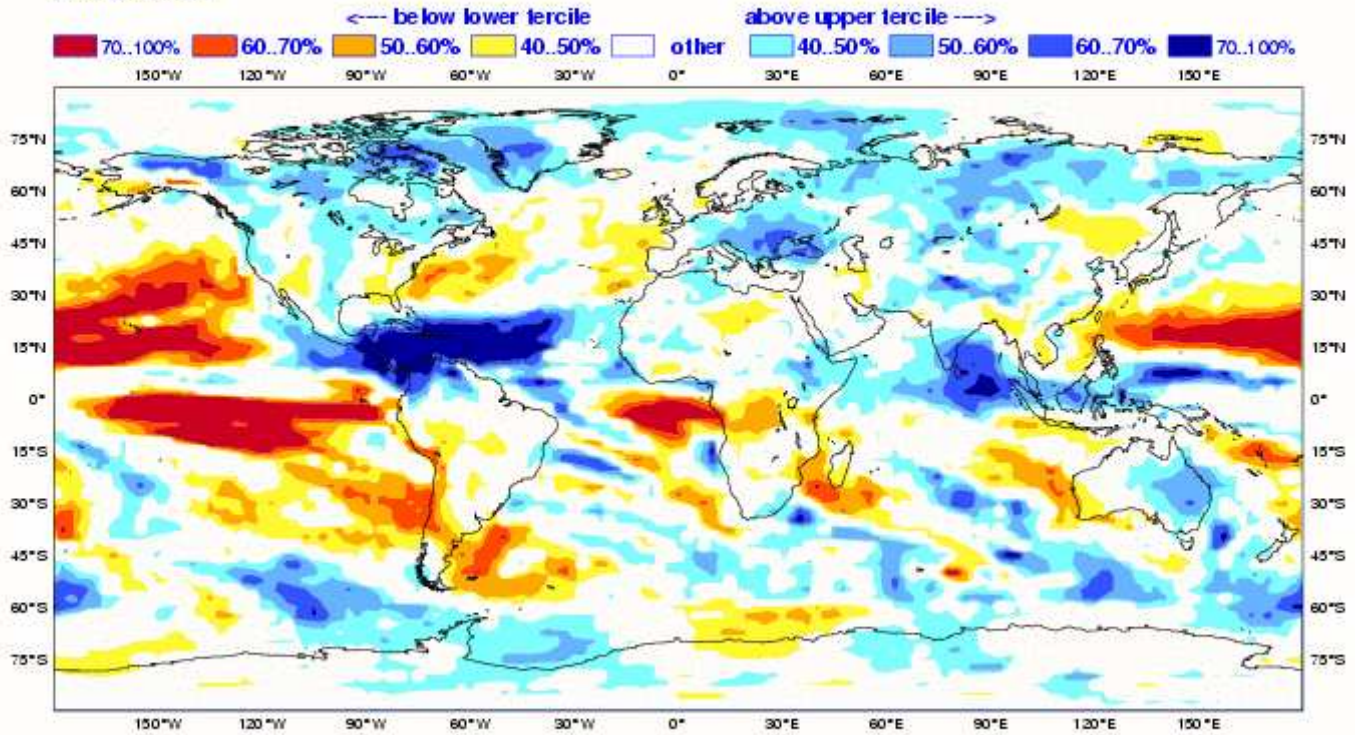
I.4.e Euro-SIP

fig.20: Multi-Model Probabilistic forecasts for precipitation from EuroSip for may-june-july, issued in April 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/

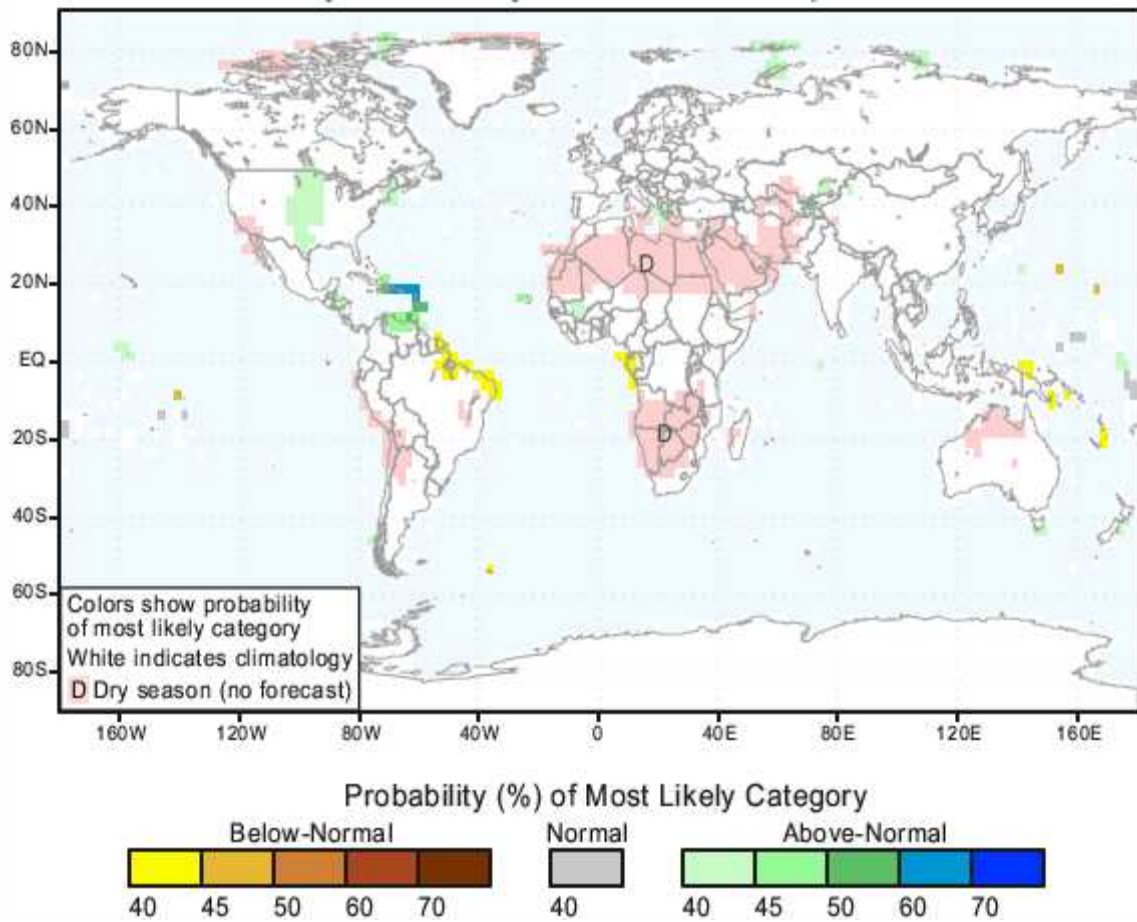## I.4.f International Research Institute (IRI)

fig.21:   Multi-Model Probabilistic forecasts for precipitation from IRI for May-June-July, issued in April 2010. (3 Categories, Normal, Below and Above normal – White zones correspond to No signal). http://iri.columbia.edu/climate/forecast/net_asmt/
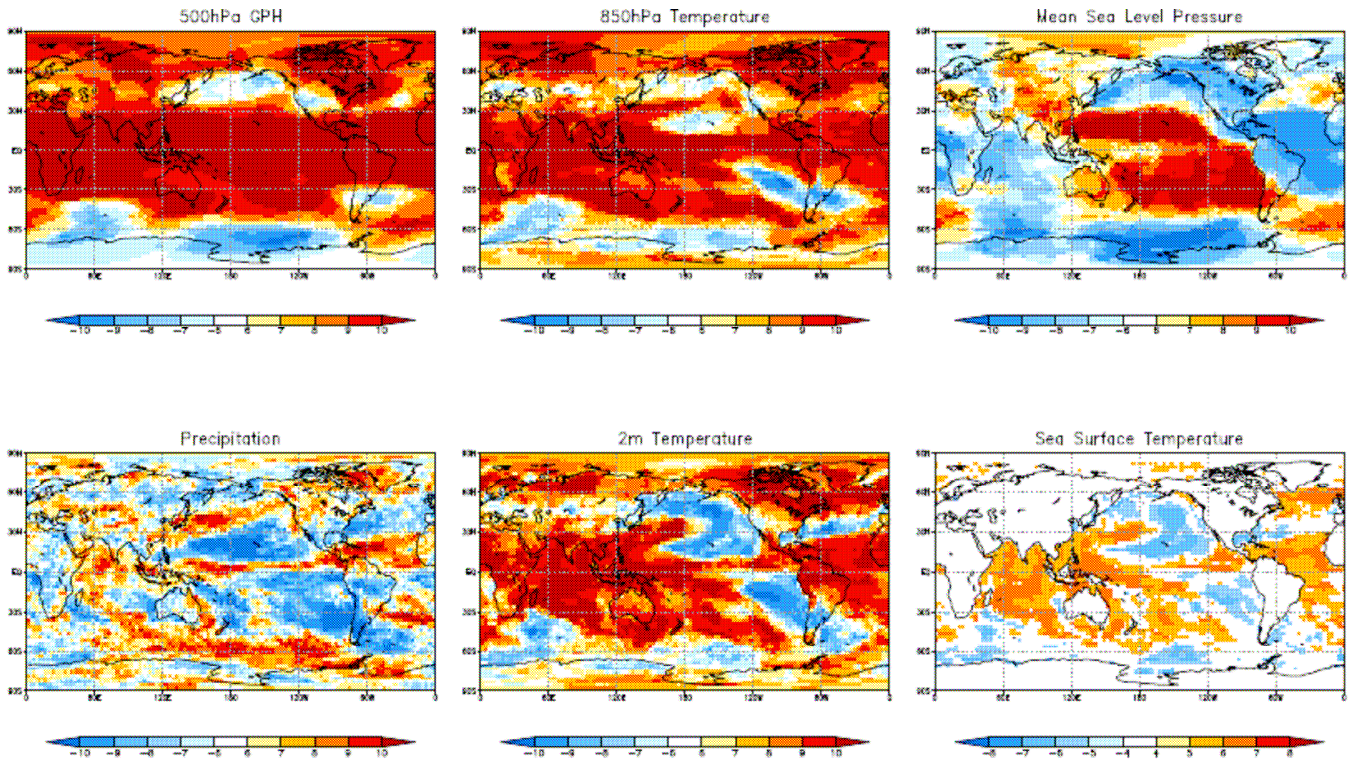
I.5. MODELS' CONSISTENCY

I.5.a GPCs consistency maps

GPC_seoul/washington/melbourne/montreal/beijing/moscow/ecmwf/exeter/toulouse/tokyo
SST : GPC_washington/seoul/melbourne/beijing/ecmwf/exeter/toulouse/tokyo
Apr2010 + MJJ forecast

** where, the positive numbers mean the number of models that predict positive anomaly and vice versa. **

fig.22:   GPCs Consistency maps from LC-MME http://www.wmolc.org/

I.6.DISCUSSION AND SYNTHESIS

SSTs Forecasts
Discussion on the decay of ENSO
Discussion on the North Atlantic both Tropics and Extra-Tropics

General Circulation Forecasts
Are teleconnection patterns will persists (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 scenarios taking into account existing vulnerabilities ?