



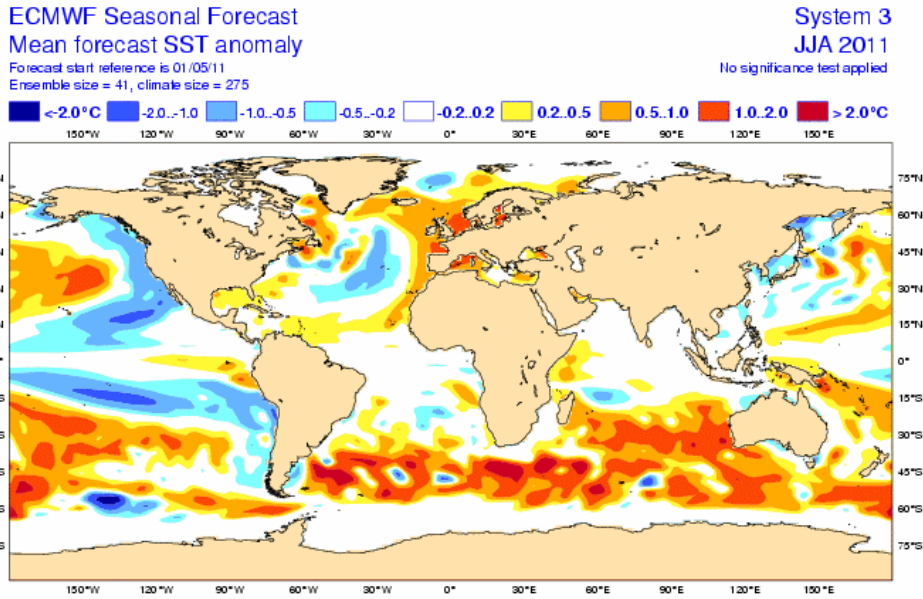
Seasonal Outlook for Summer Season
(24/05/2011 - JJA)

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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)



Forecast issue date: 15/05/2011

ECMWF

fig.1: SST Forecasted anomaly (in $^{\circ}\text{C}$) from ECMWF valid for JJA,
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

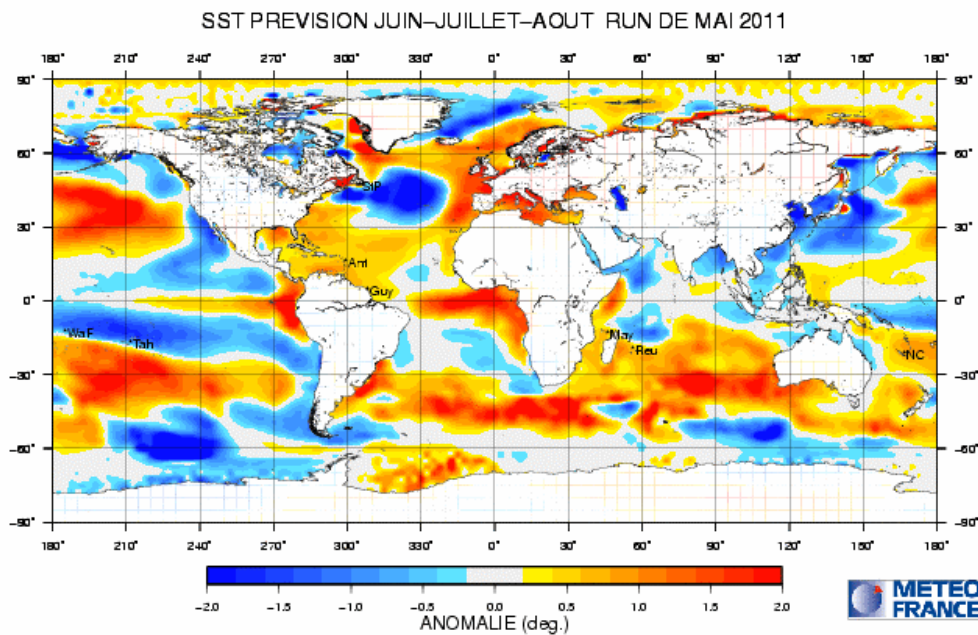


fig.2: SST Forecasted anomaly (in $^{\circ}\text{C}$) from Météo-France valid for JJA (issued in May).
<http://elaboration.seasonal.meteo.fr/fr/content/prevision-arpege>

In the Pacific the two models show similar patterns excepted some slight differences close to Alaska. Interestingly, the Meteo-France model develops a coastal event on the most Eastern part on the equatorial Pacific. It's not the case of ECWMF model even if one can see some traces in its forecasts.

Over the Indian Ocean, the 2 models forecast above normal temperature on the Western part of the Indian oceanic basin and especially in the region of GHACOF.

In the Atlantic there is quite large differences in the SSTs patterns. In the Guinean Gulf and along the Western coast of South Africa the Météo-France model indicate a “warm” scenario while the ECMWF show close to normal conditions. So the Meteo-France model shows contrasted SSTs between the equatorial conditions and both Northern and Southern hemisphere which lead to a specific response in terms of African monsoon circulation.

The 2 models show a good persistence of SSTs pattern all along the targeted period.

Interestingly, (see maps on T2m at the end of this document), over the equatorial Atlantic, both models forecasts above normal conditions for the T2m parameter which means that even if the anomaly is weak in ECMWF, it is on the positive side. Last, the UK Met Office model (see also T2m) show the same kind of temperature scenario for the Guinean Gulf and the is especially well reflected in the Euro-Sip Forecast (see next maps).

Last, all models are developing a “Horse Shoes” pattern over the North Atlantic sector clearly reflected in Euro-Sip forecast.

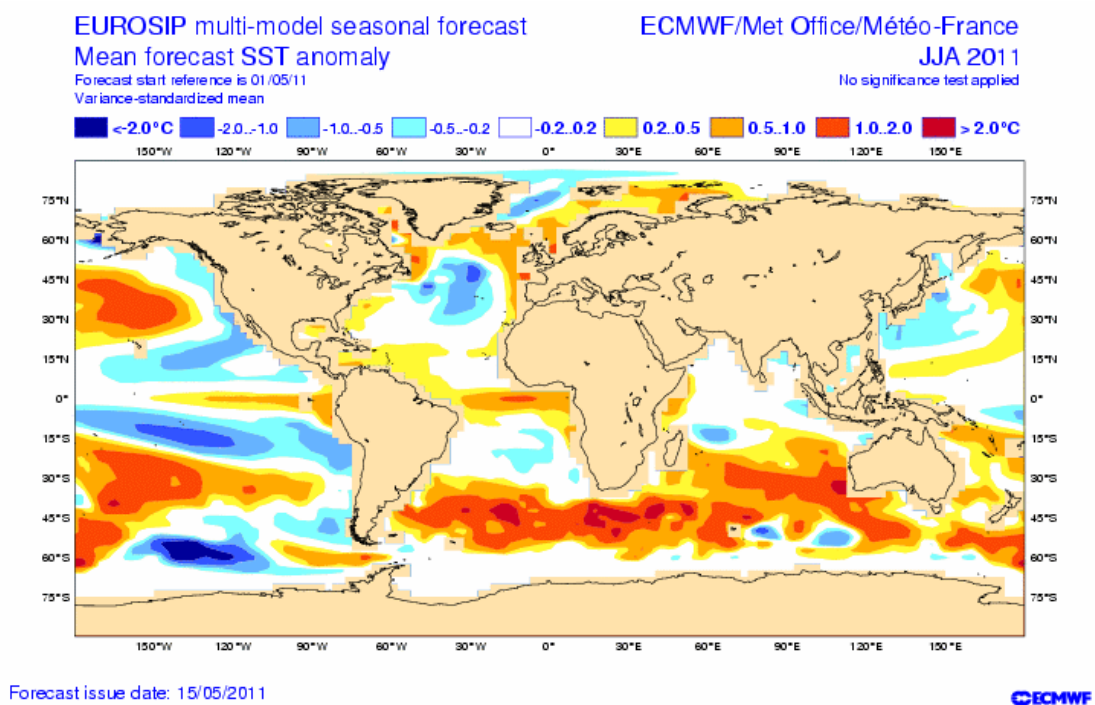


fig.3: SST Forecasted anomaly (in °C) from Euro-SIP valid for JJA (issued in May).

I.1.b ENSO forecasts :

Forecasted Phase: return to a « neutral » condition for JJA and JAS

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 is still quite large (with respect of previous forecasts) from $-0,8^{\circ}\text{C}$ up to $+0,7^{\circ}\text{C}$ in relationship with a return to “Normal” condition during the summer period and the spring barrier of predictability. As an illustration, one can notice that some models are forecasting conditions (Niño already by the end of summer) while a few ones forecast a return to Niña conditions.

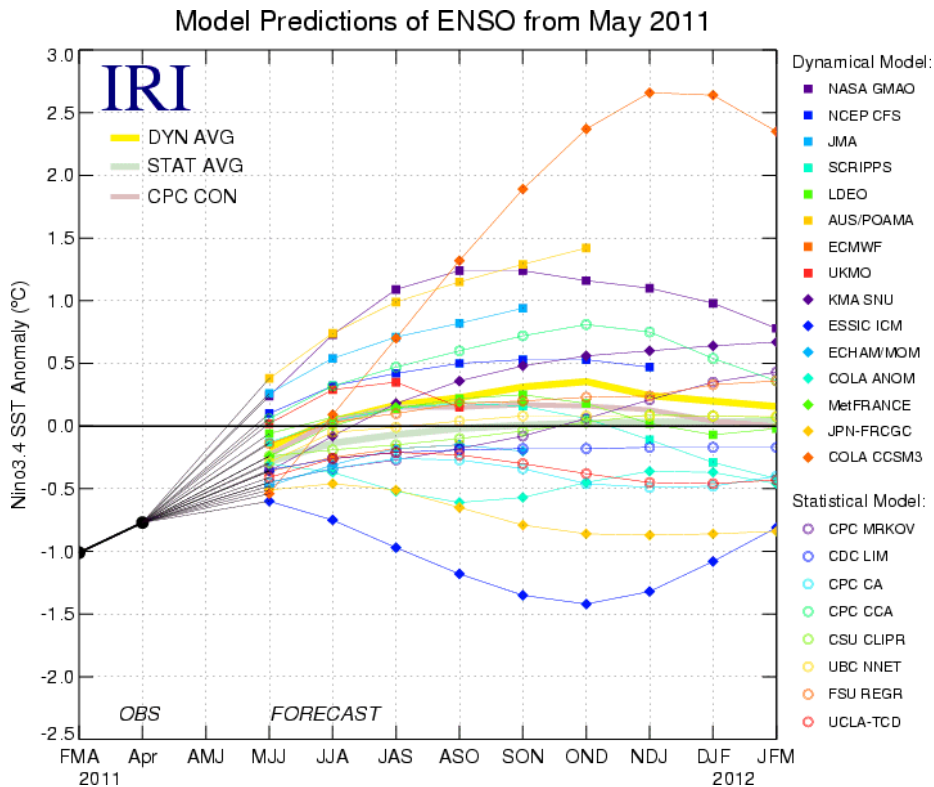


fig.4: SST Forecasts in the Niño-3.4 boxe (120° à 165°W) synthesis provided in May by IRI : http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html

In Figure 5 (next page), 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 both models are returning to close to normal conditions for the targeted period. Meteo-France model shows higher values in the Niño 3 and Niño 1+2 (not shown) in relationship with the coastal event developed on the Eastern part of the equatorial Pacific.

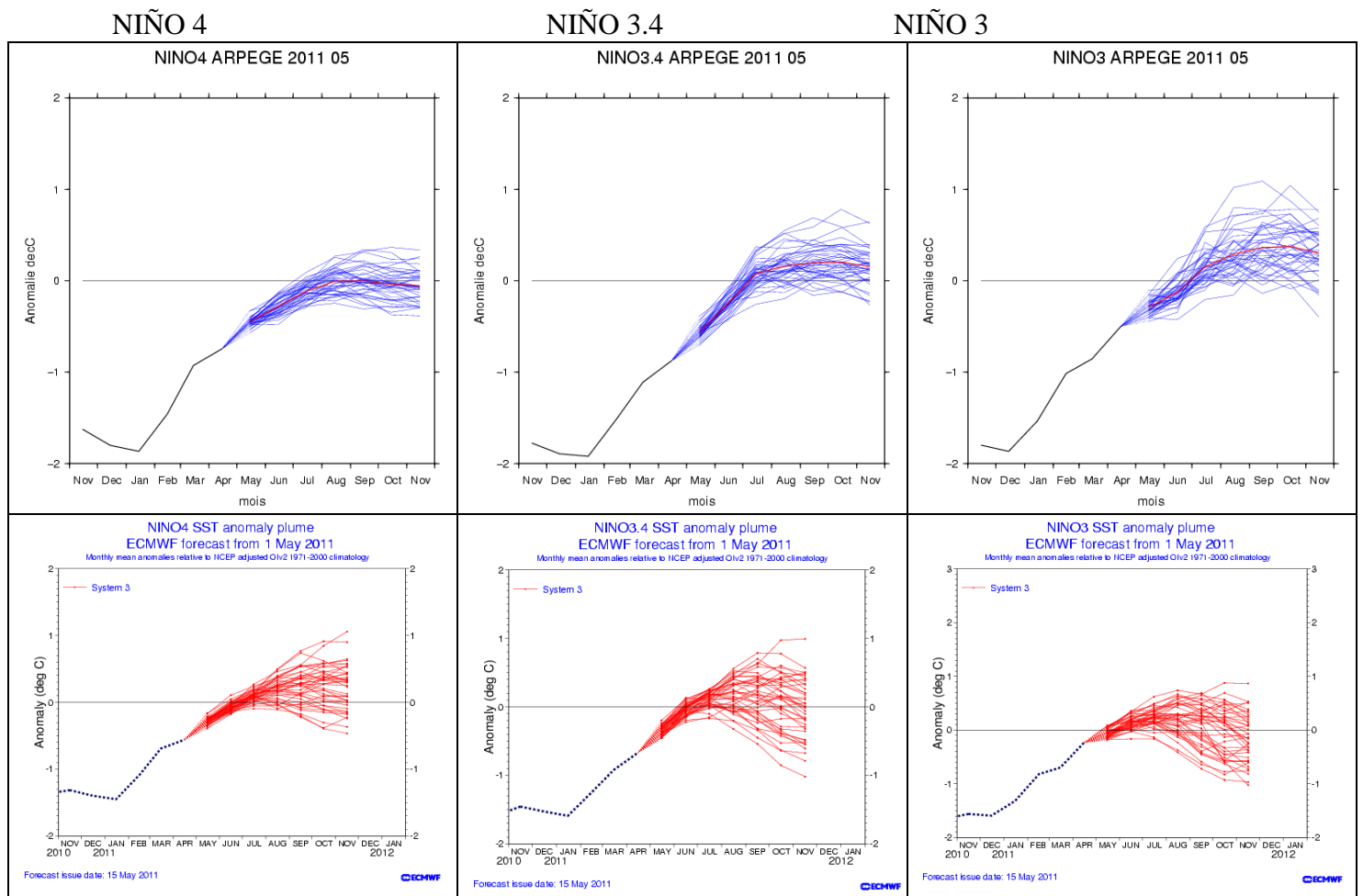


fig.5: SSTs anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (bottom), issued in May 2010, plumes correspond to 41 membres and monthly means. (<http://www.ecmwf.int/>)

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

I.1.c Tropical Atlantic forecasts :

Forecasted Phase: warmer than normal conditions in the Tropical Atlantic but negative value for TASI indicating some inter-hemispheric gradient

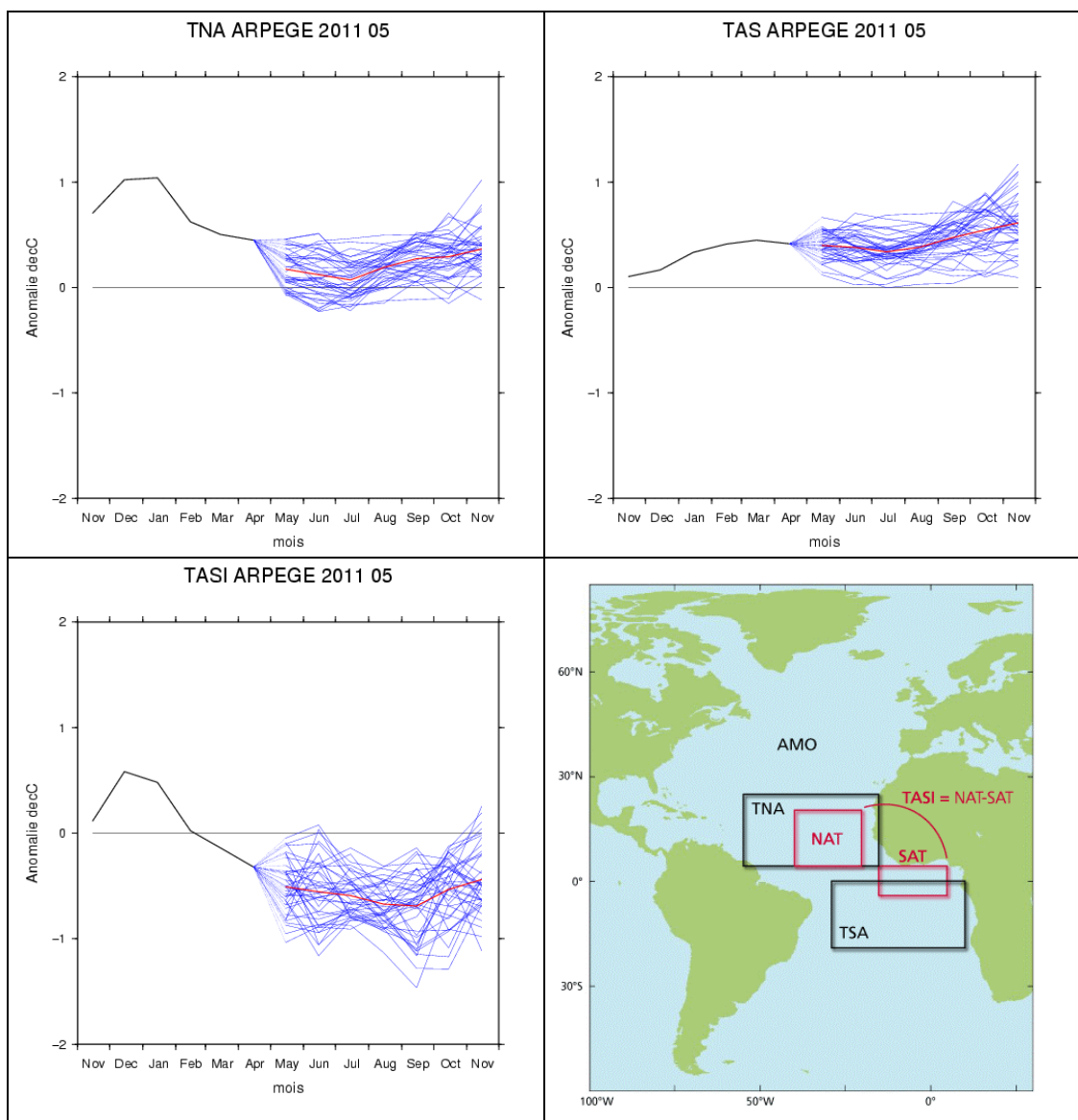


fig.6: SSTs anomaly forecasts in the Tropical Atlantic boxes from Météo-France, issued in May 2011, plumes correspond to 41 members and monthly means.

The Plumes confirm that all members are forecasting warmer than normal conditions in the Tropical Atlantic both in the North and in the South. A negative value of TASI is forecasted all over the period, corresponding to a warmer temperature in the Southern Tropics with respect of the temperature in the Northern tropics. The difference seems to be related with the specific pattern already pointed out over the Northern tropics. This could lead to a strengthening of the inter-hemispheric gradient. However, the TASI indice 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: Close to normal conditions in the Indian Ocean

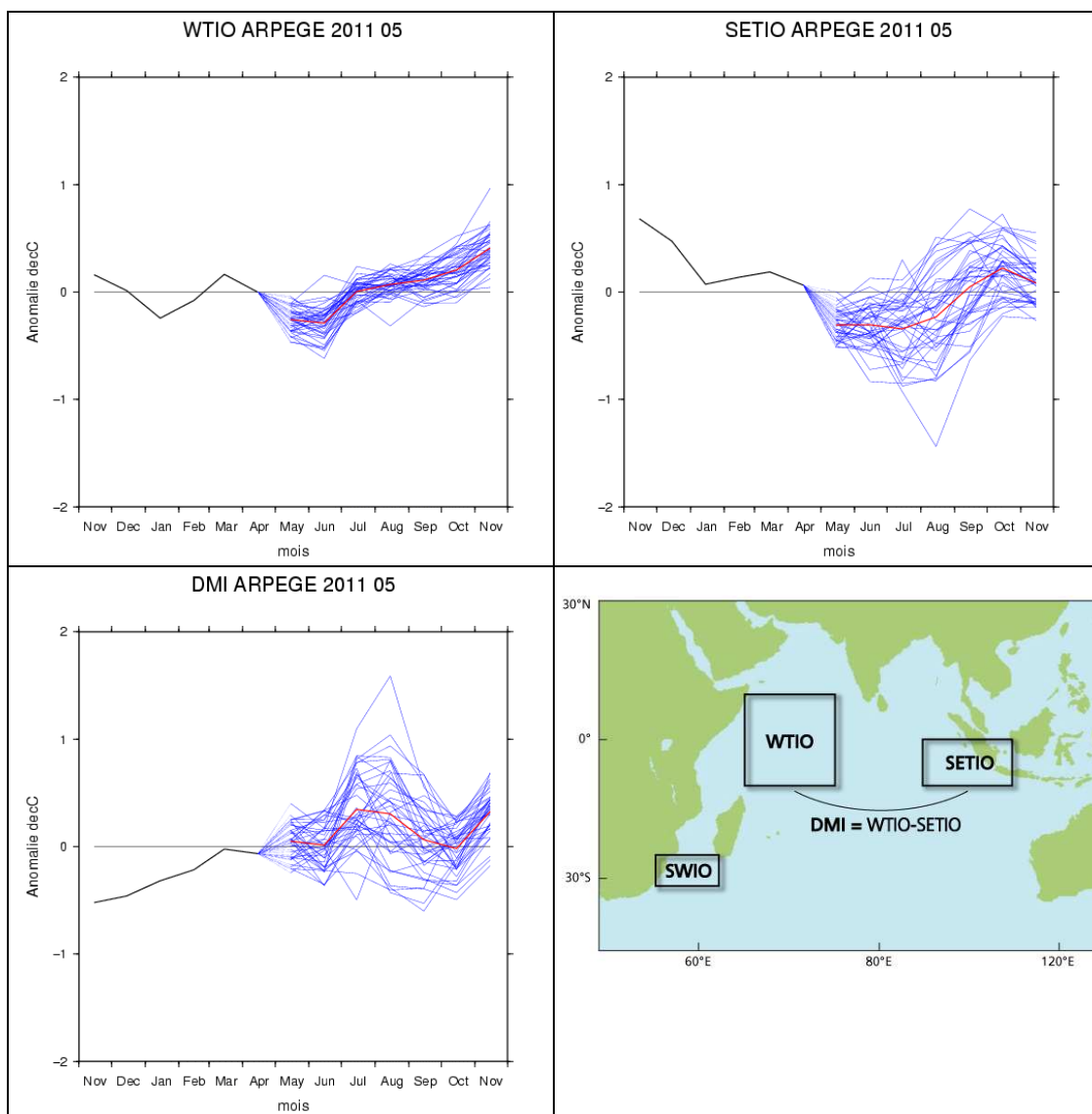


fig.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France, issued in May 2011, plumes correspond to 41 membres and monthly means.

The Plumes confirm that all members are forecasting close to 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 and one can notice the progressive warming on the western part of the basin. 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 General atmospheric circulation in the low troposphere (see figure 8) is clearly related and consistent with the Geopotential Heigh (see figure 9). Over West and Central part of Europe, the meridionnal wind shows positive anomalies (excepted over Spain) which indicate more meridionnal circulation. Consistently the zonal wind shows negative anomalies indicating a weakened zonal circulation. This is the trace of a “blocked” circulation over the Eastern part of the North Atlantic sector

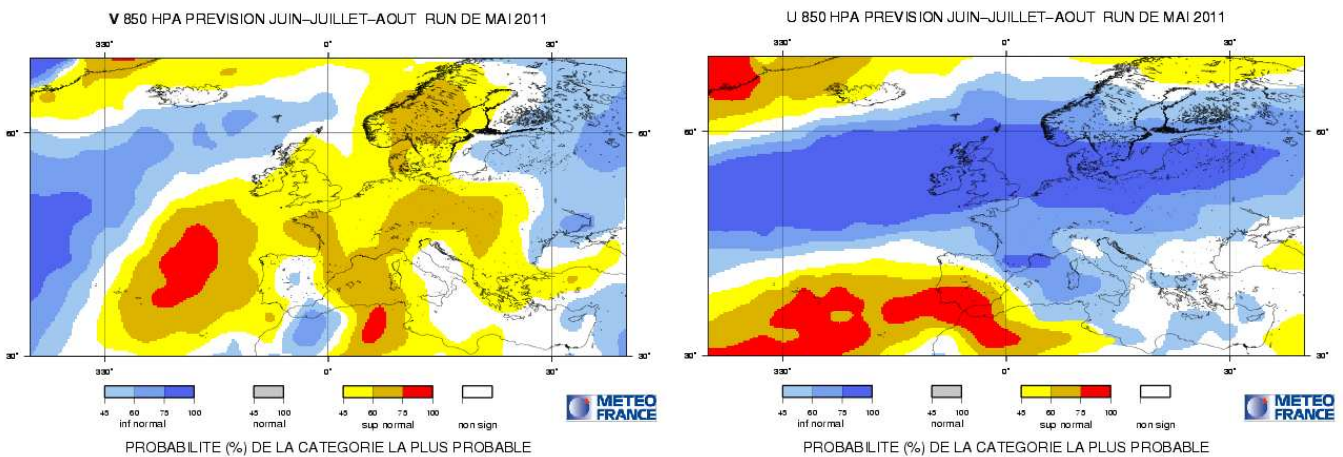


fig.8: Forecasted anomalies of meridionnal (left) and zonal (right) wind at 850 hPa for JJA from Météo-France issued in May.

I.2.b Over North Hemisphere

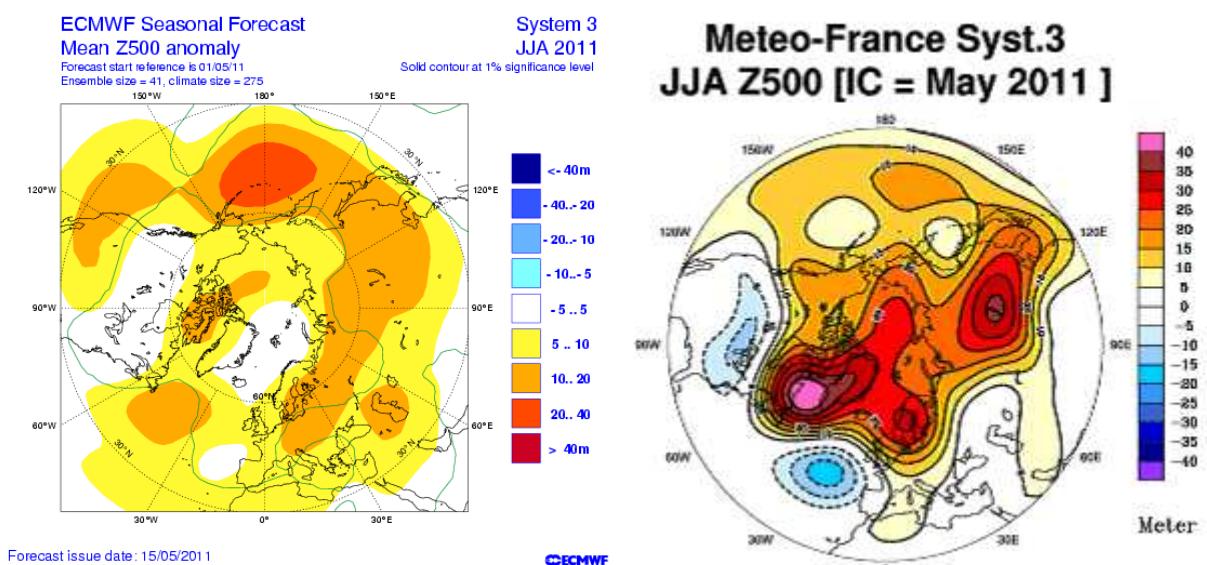


fig.9: Geopotential Anomaly forecasts at 500 hPa for June-July-August 2010 from ECMWF (left) and Météo-France (right) issued in May 2010.

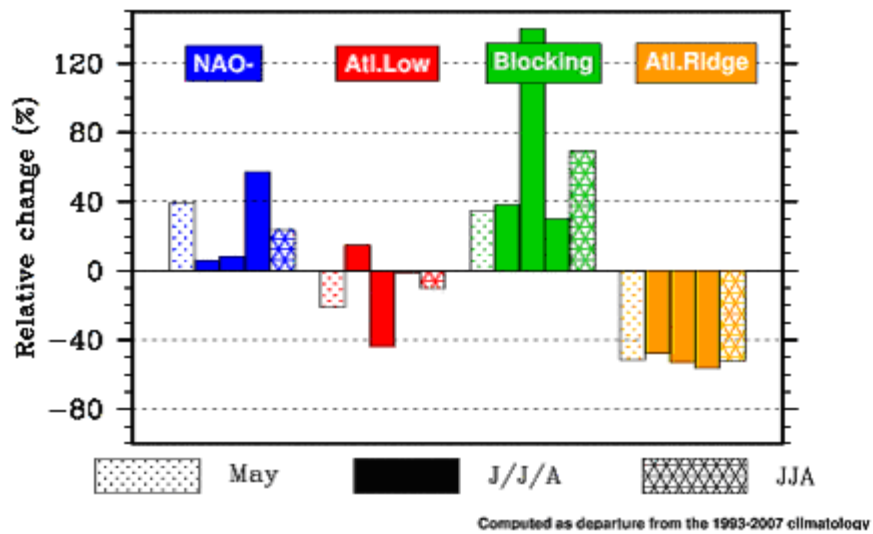
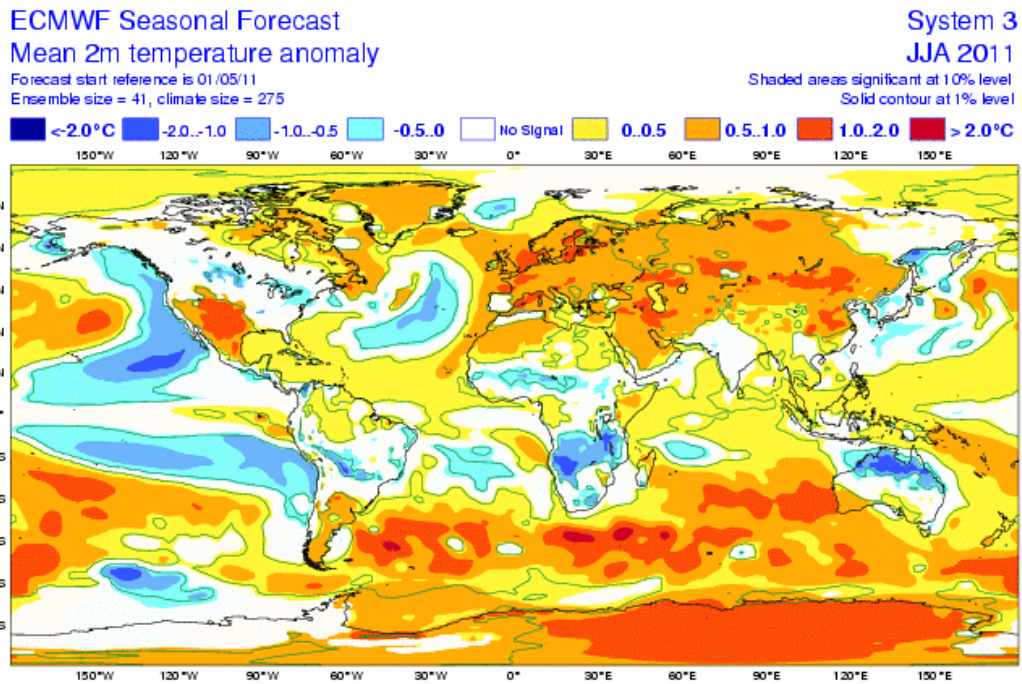


fig.10: North Atlantic Regime occurrence from Meteo-France for JJA: the barre represent for each regime the frequency anomaly (in %) with respect of the climatological frequency.

The Meteo-France model shows a very active Scandinavian mode in response to the SST “Horse Shoes” pattern over the North Atlantic. In ECMWF model, the response is different giving a projection on the West Russia/ East Atlantic mode. However, Above normal conditions in Geopotential Height at 500hPa are present in all forecasts over the central part of Europe.

I.3. IMPACT : TEMPERATURE FORECASTS

I.3.a ECMWF



Forecast issue date: 15/05/2011

ECMWF

fig.11: Probabilistic forecasts for T2m from ECMWF for JJA issued in May. 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 METEO-France

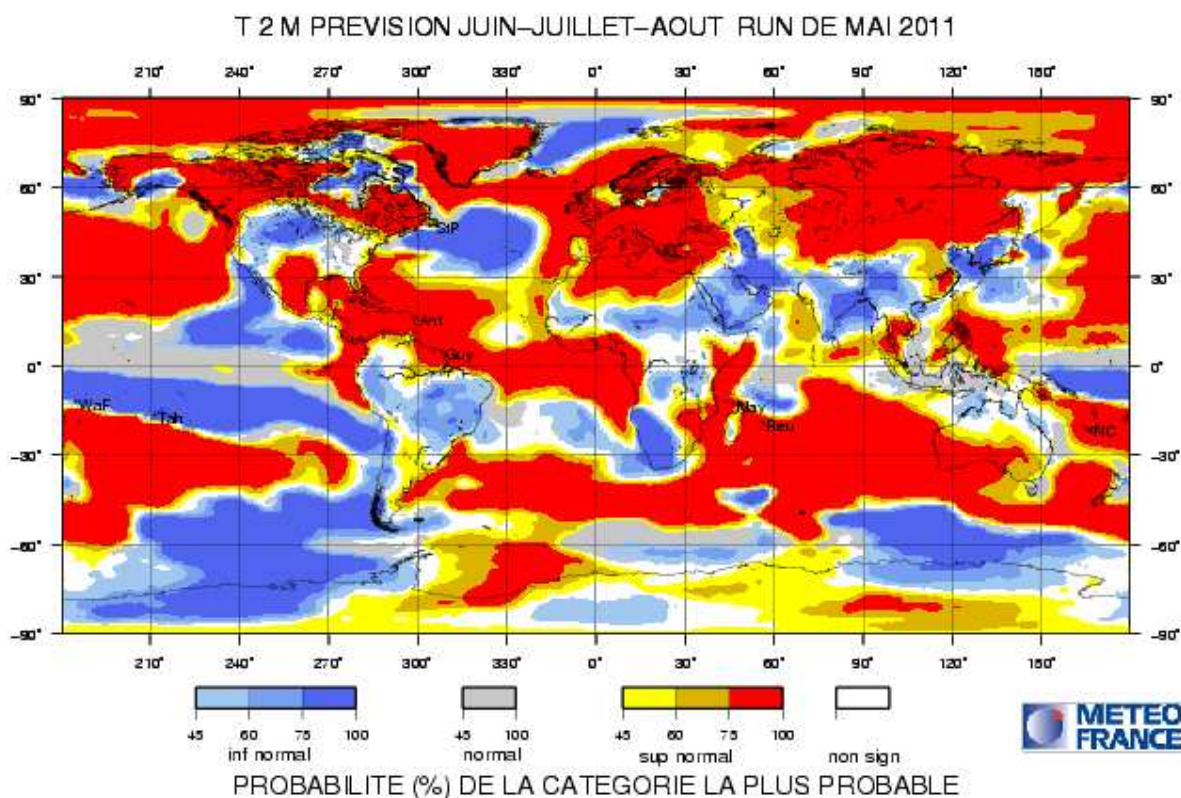


fig.12: Probabilistic forecasts for T2m from Météo-France for June-July-August, issued in May. Most likely Category. (3 Categories, Normal, Below and Above normal – White zones correspond to No signal). <http://elaboration.seasonal.meteo.fr/fr/content/prevision-arpege>

I.3.c Met Office (UKMO)

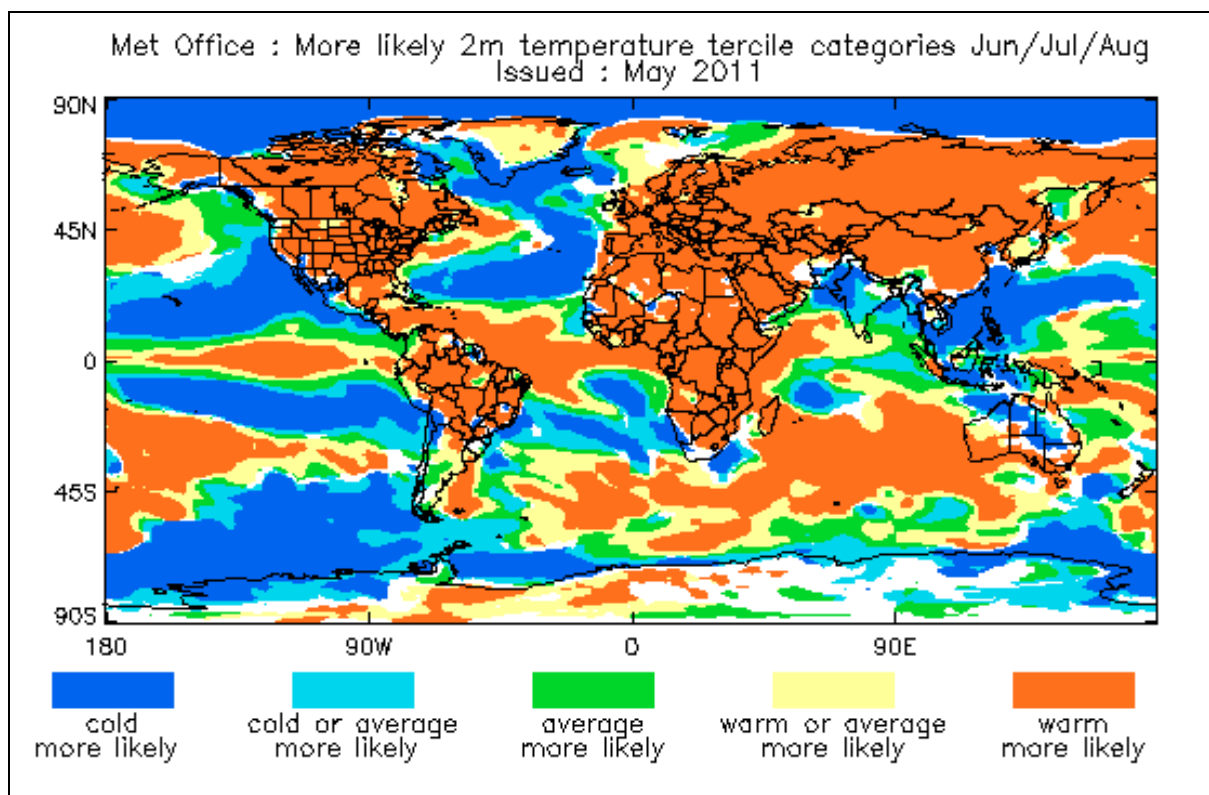


fig.13: Probabilistic forecasts for T2m from UK Met Office for June-July-August, issued in May. Most likely Category. (5 Categories – see caption – white zones correspond to No signal). <http://www.metoffice.gov.uk/science.specialist/easonl/category/>

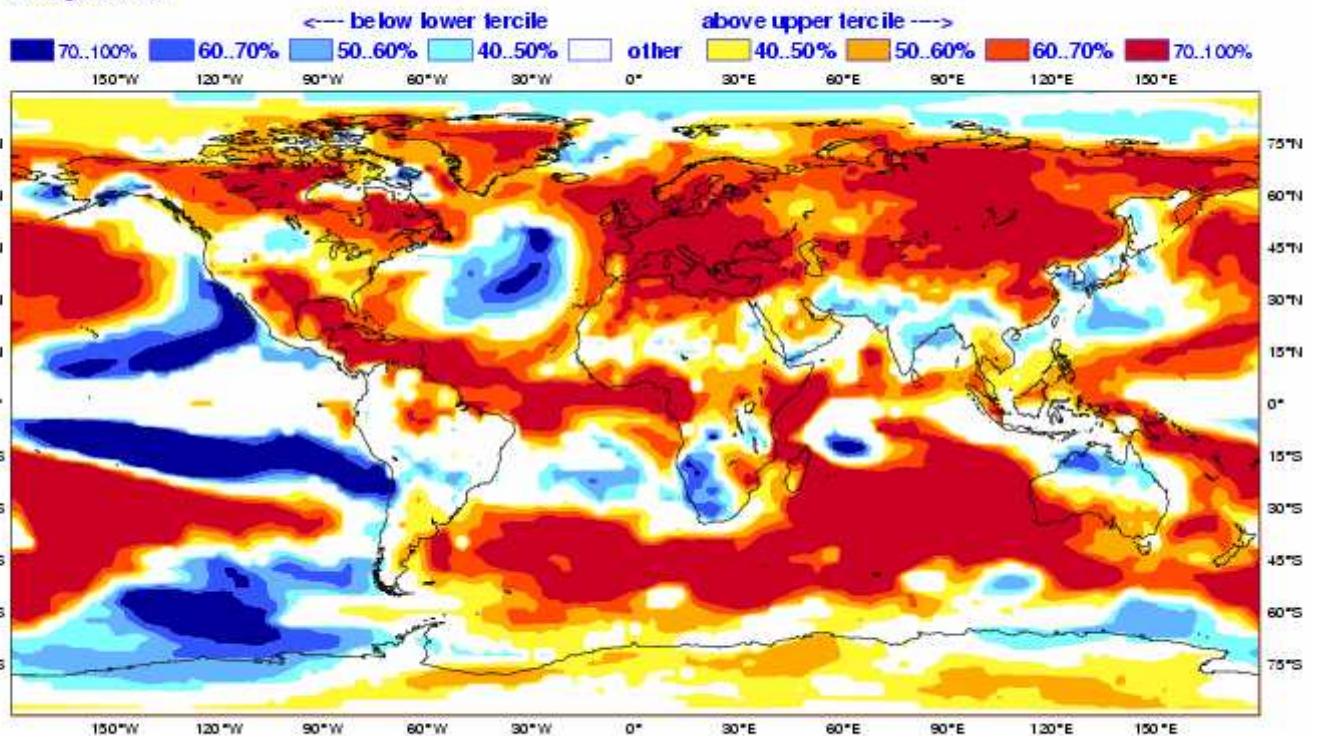
I.3.d Hydromet Centre of Russia (HMC)

fig.14: Probabilistic forecasts for precipitation from HMC for June-July-August, issued in May 2010. Most likely Category. (3 Categories, Normal, Below and Above normal – White zones correspond to No signal).

I.3.e Euro-SIP

EUROSIP multi-model seasonal forecast
 Prob(most likely category of 2m temperature)
 Forecast start reference is 01/05/11
 Unweighted mean

ECMWF/Met Office/Météo-France
 JJA 2011
 No significance test applied



Forecast issue date: 15/05/2011

CECM

fig.15: Multi-Model Probabilistic forecasts for T2m from EuroSip for June-July-August. (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/

Because of the convergent scenarios in the 3 models for temperature, the Euro-SIP forecast is a good synthesis of the forecasts for JJA. The “Above normal” scenario all over the SEECOF region is clearly privileged by Euro-SIP in a consistent way with the geopotential Height anomalies and associated Atmospheric General Circulation.

I.3.f International Research Institut (IRI)

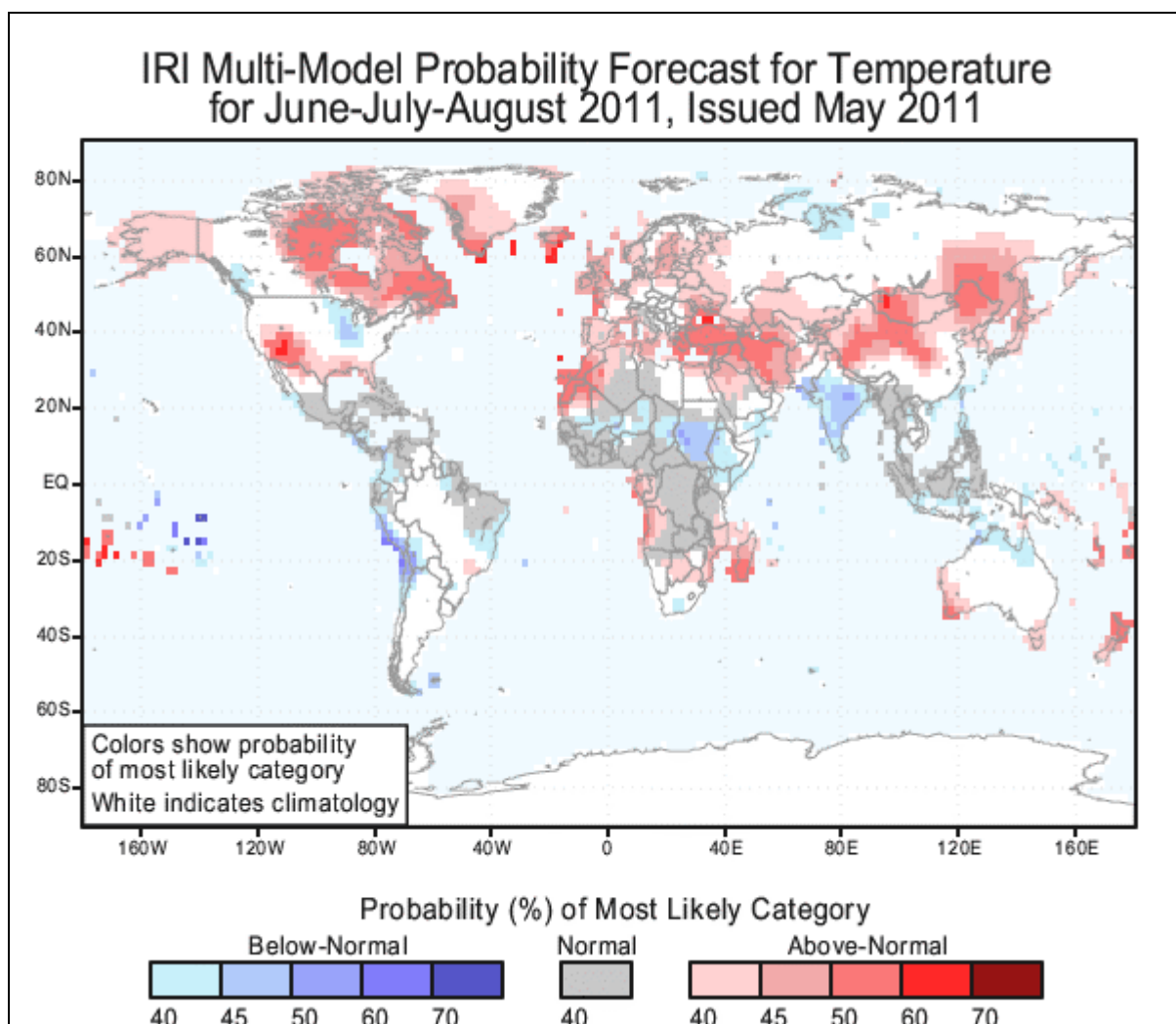
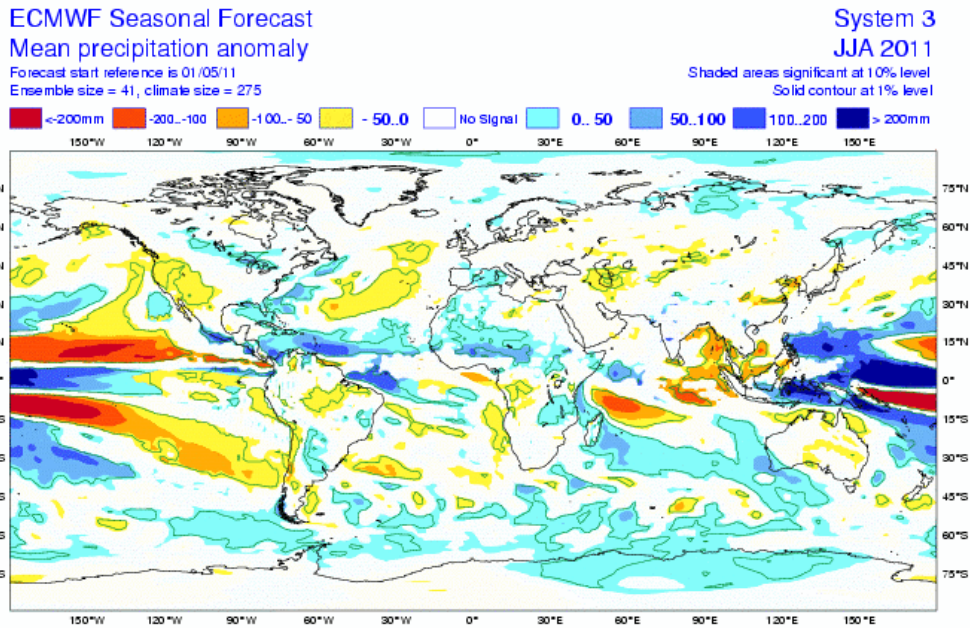


fig.16: Multi-Model Probabilistic forecasts for T2m from IRI for June-July-August, issued in May. (3 Categories, Normal, Below and Above normal - White zones correspond to No signal).
http://iri.columbia.edu/climate/forecast/net_asmt/

I.4. IMPACT : PRECIPITATION FORECASTS

I.4.a ECMWF



Forecast issue date: 15/05/2011



fig.17: Probabilistic forecasts for precipitation from ECMWF for JJA issued in May. 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 Météo-France

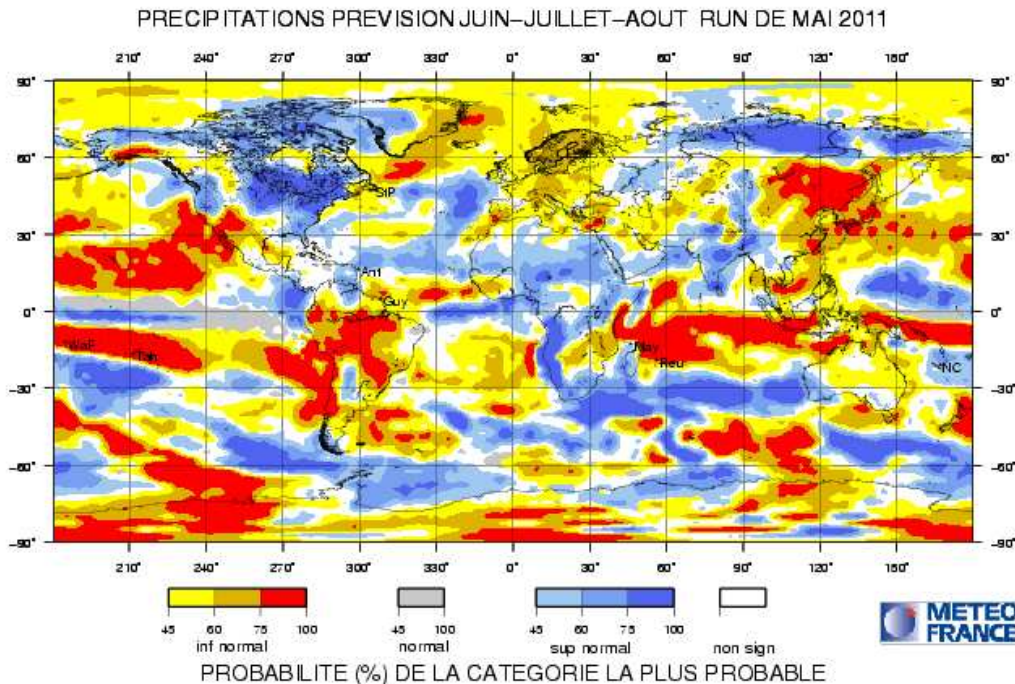


fig.18: Probabilistic forecasts for precipitation from Météo-France for June-July-August, issued in May 2010. Most likely Category. (3 Categories, Normal, Below and Above normal – White zones correspond to No signal).
<http://elaboration.seasonal.meteo.fr/fr/content/prevision-arpege>

I.4.c Met office (UKMO)

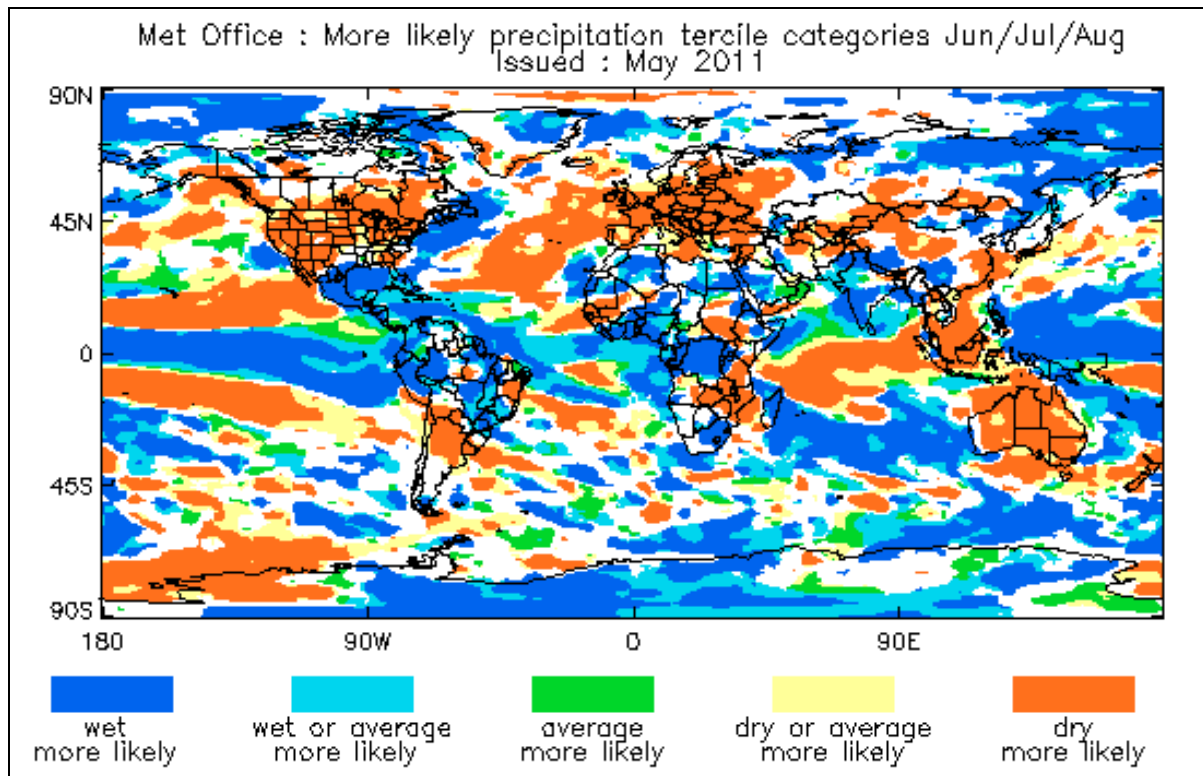


fig.19: Probabilistic forecasts for T2m from UK Met Office for June-July-August. Most likely Category. (5 Categories - see caption - white zones correspond to No signal).
<http://www.metoffice.gov.uk/science/specialist/sasonal/category/>

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

fig.20: Probabilistic forecasts for precipitation from HMC for JJA, issued in May 2010. Most likely Category. (3 Categories, Normal, Below and Above normal - White zones correspond to No signal).

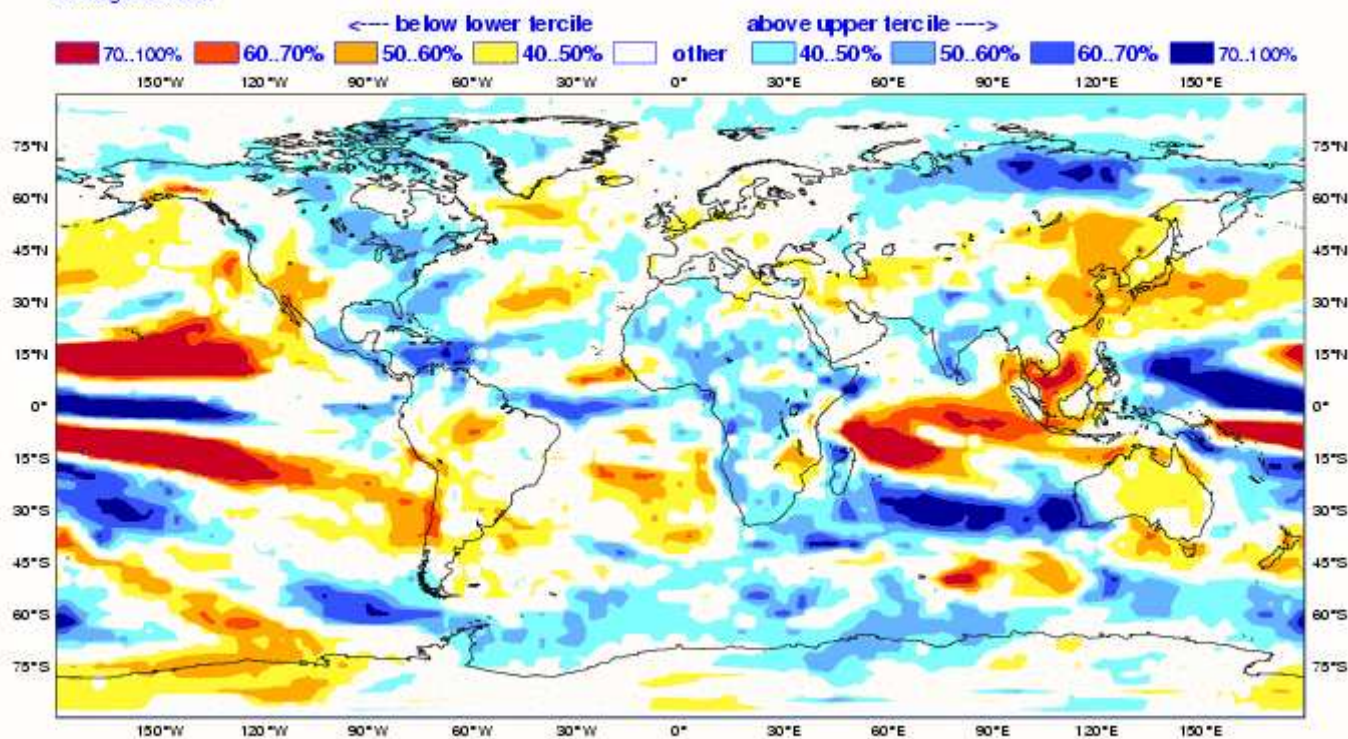
I.4.e Euro-SIP

EUROSIP multi-model seasonal forecast
Prob(most likely category of precipitation)

Forecast start reference is 01/05/11
Unweighted mean

ECMWF/Met Office/Météo-France
JJA 2011

No significance test applied



Forecast issue date: 15/05/2011

CECM

fig.21: Multi-Model Probabilistic forecasts for precipitation from EuroSip for June-July-August. (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/

Because of the different between on one hand Météo-France and UK Met Office models and on the other hand ECMWF model, there is no signal on most of the SEECOF region, excepted on the extreme East with slightly enhanced probabilities of a dry scenario.

Interestingly, the NCEP model (CFS – not shown) show a solution close to the ECMWF model (namely wet conditions on the western part of the Mediterranean basin and no signal elsewhere).

I.4.f International Research Institute (IRI)

IRI Multi-Model Probability Forecast for Precipitation for June-July-August 2011, Issued May 2011

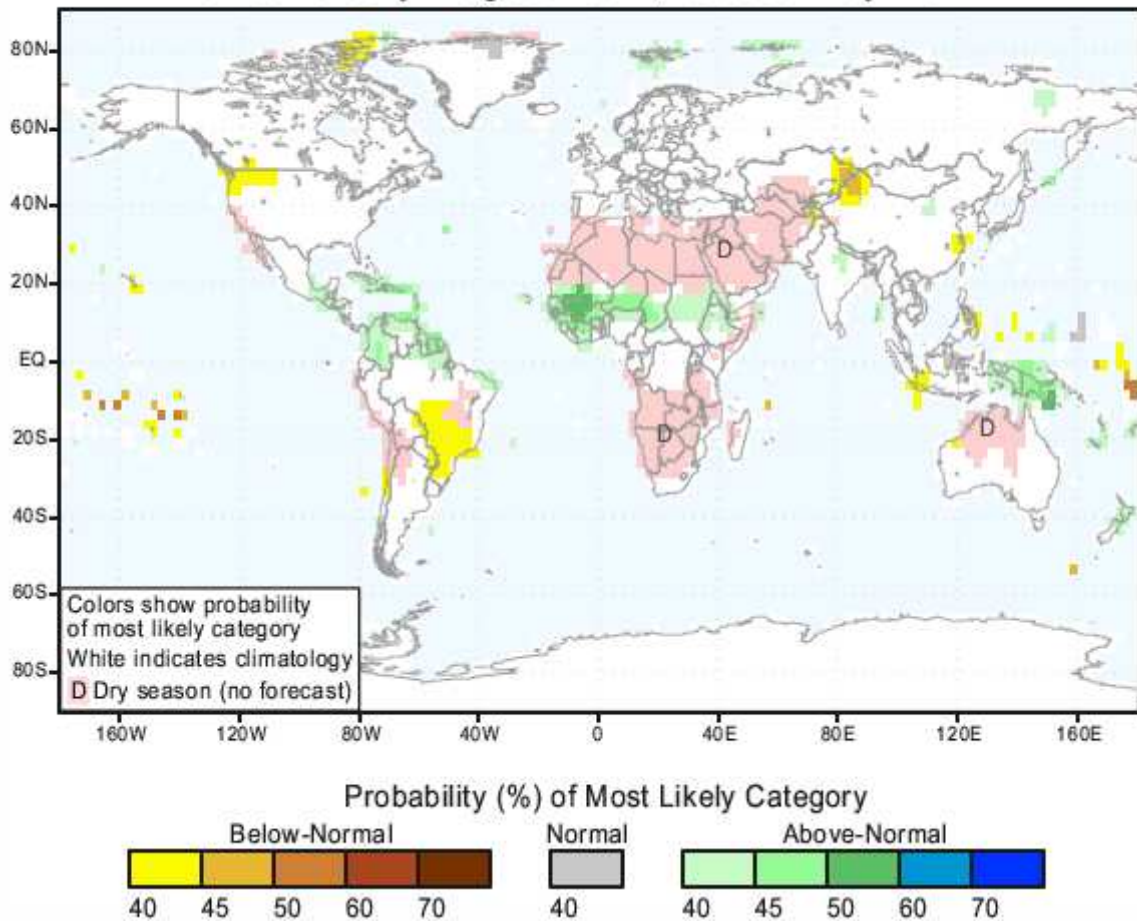
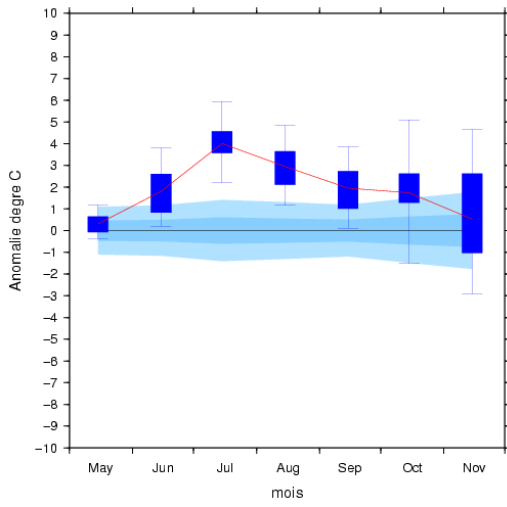


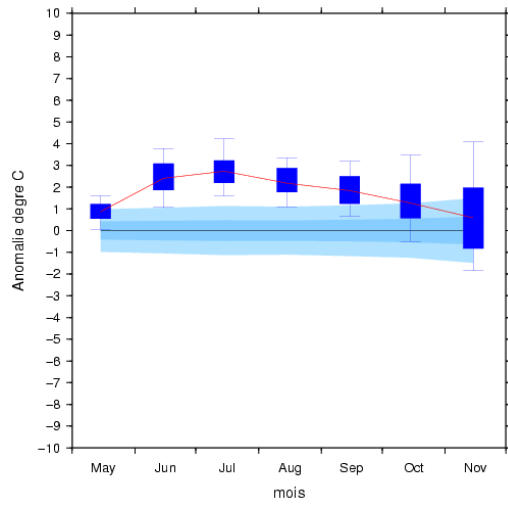
fig.22: Multi-Model Probabilistic forecasts for precipitation from IRI for June-July-August, issued in May. (3 Categories, Normal, Below and Above normal - White zones correspond to No signal). http://iri.columbia.edu/climate/forecast/net_asmt/

I.5. REGIONAL TEMPERATURE

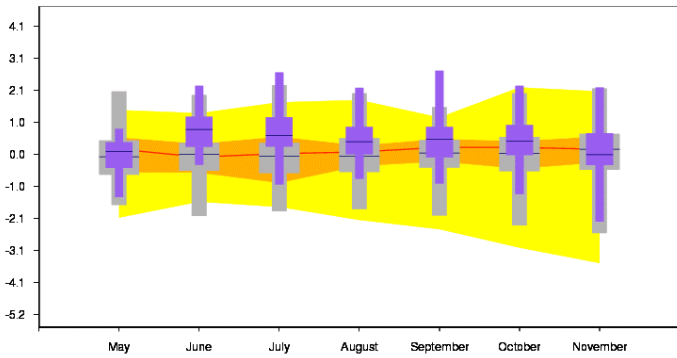
T2M Europe_N 2011 05



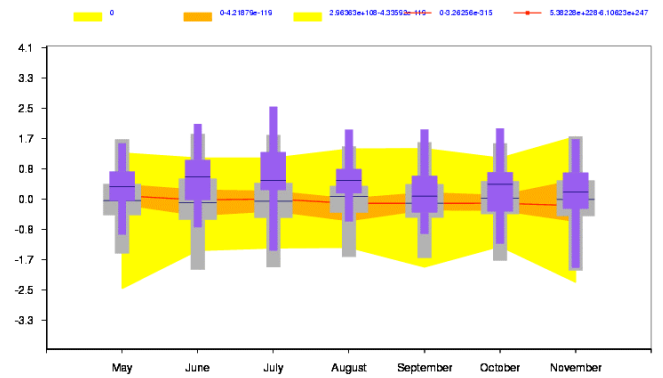
T2M Europe_S 2011 05



2m temp. anomalies (K) latitude= 65.0 to 50.0 longitude= -10.0 to 30.0
 Forecast initial date: 2011 501
 Ensemble size: Forecast=41 Model climate=275 Analysis climate=25

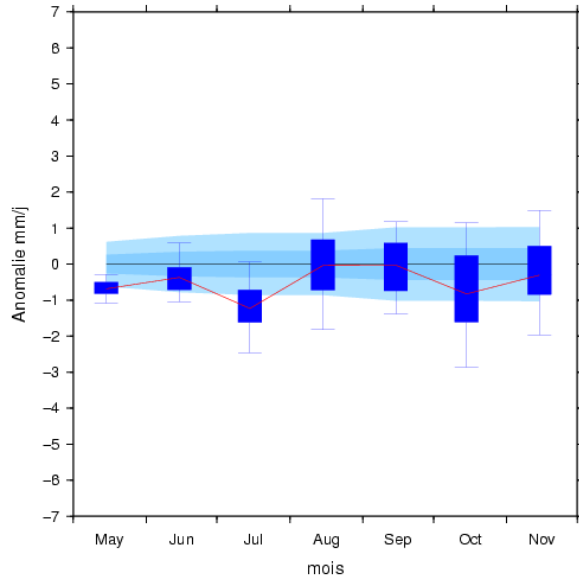


2m temp. anomalies (K) latitude= 50.0 to 35.0 longitude= -10.0 to 30.0
 Forecast initial date: 2011 501
 Ensemble size: Forecast=41 Model climate=275 Analysis climate=25

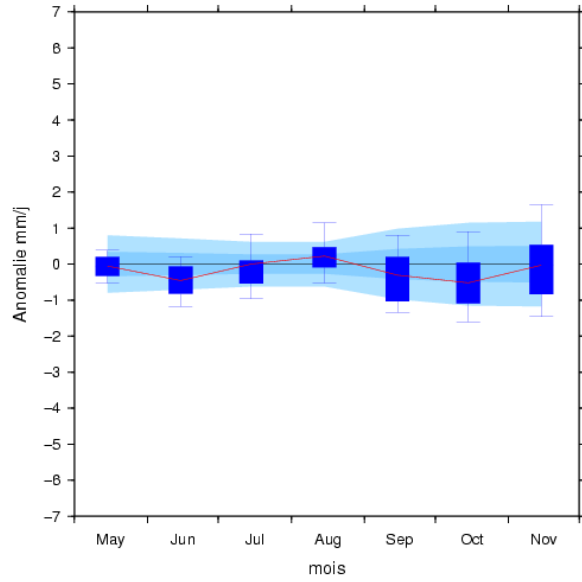


I.6. REGIONAL PRECIPITATION

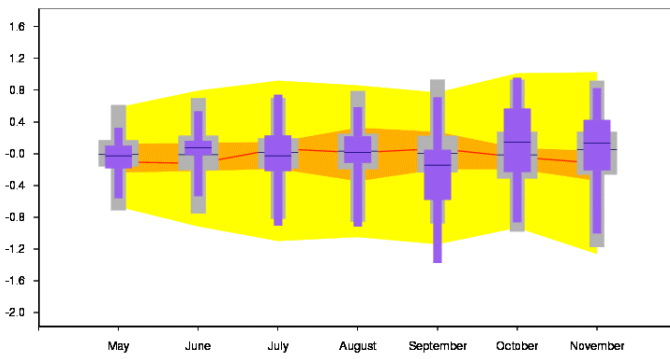
PRET Europe_N 2011 05



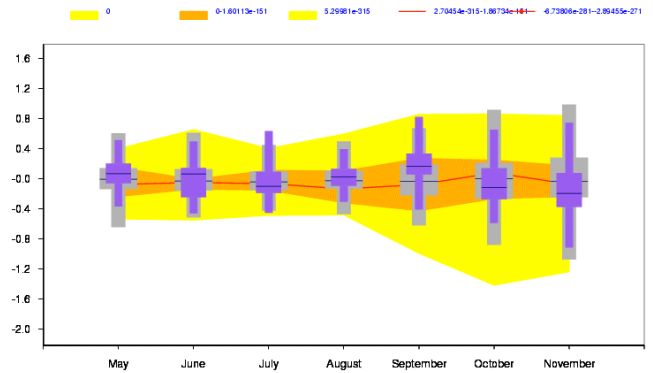
PRET Europe_S 2011 05



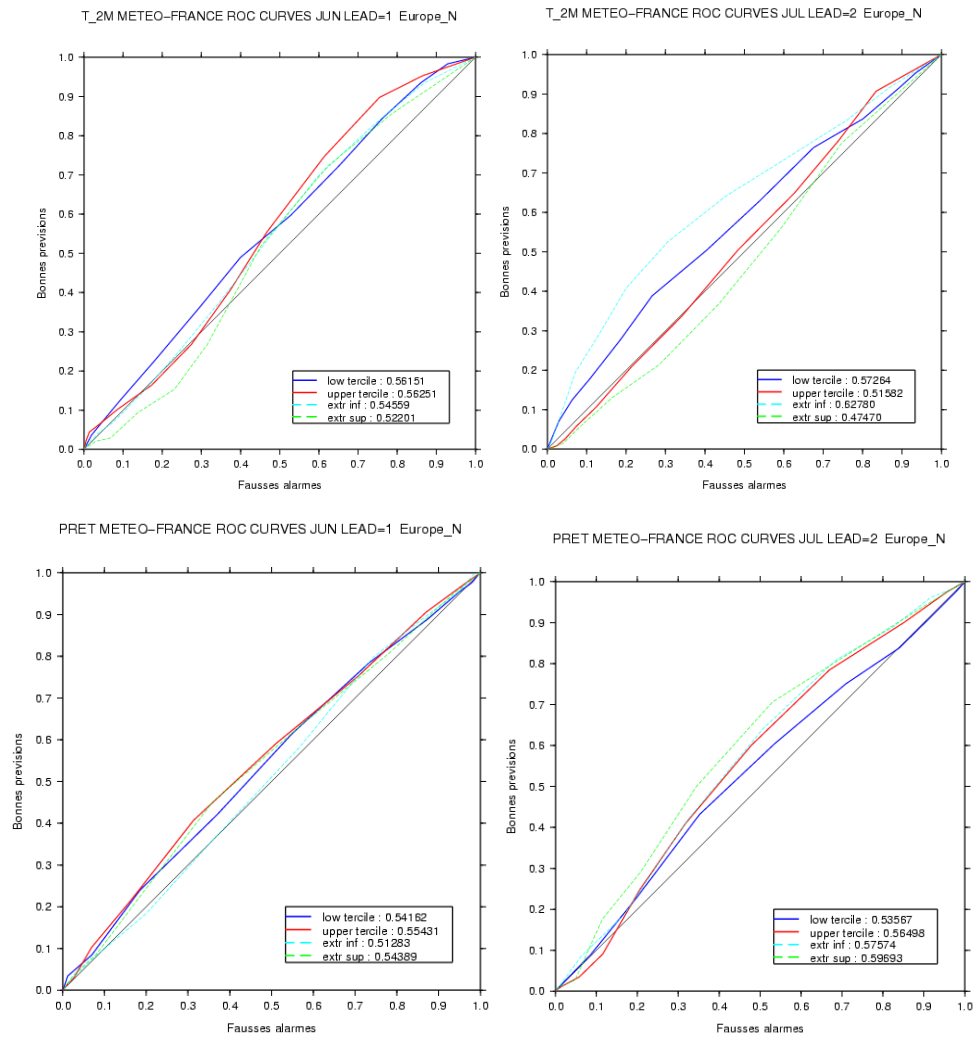
precip. anomalies (mm/day) latitude= 65.0 to 50.0 longitude= -10.0 to 30.0
Forecast initial date: 2011 501
Ensemble size: Forecast=41 Model climate=275 Analysis climate=25



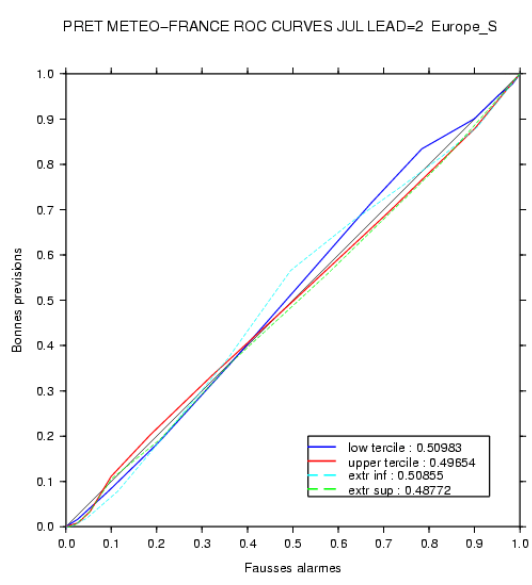
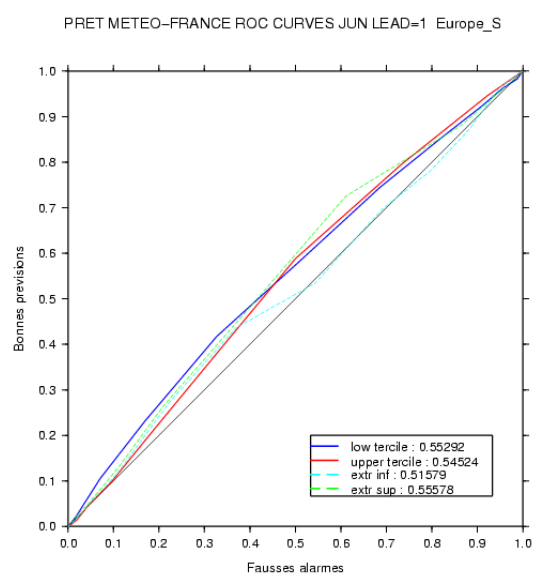
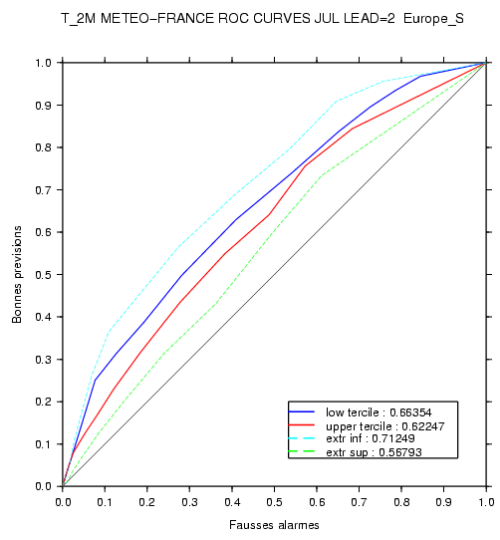
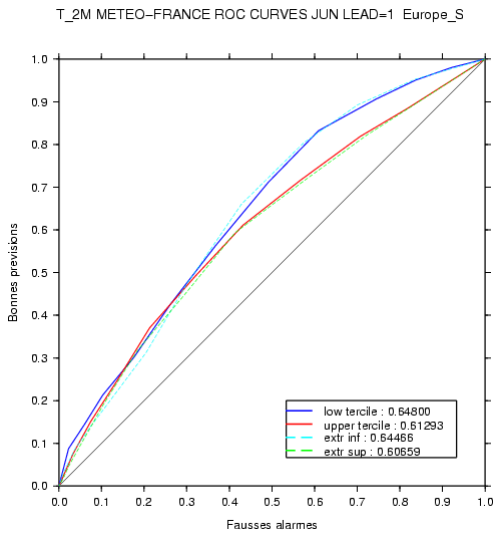
precip. anomalies (mm/day) latitude= 50.0 to 35.0 longitude= -10.0 to 30.0
Forecast initial date: 2011 501
Ensemble size: Forecast=41 Model climate=275 Analysis climate=25



I.7. MONTHLY ROC SCORES FOR JJA



Roc scores for the Northern Europe box for June (left) and July(right) and for temperature (top) and precipitation (bottom).

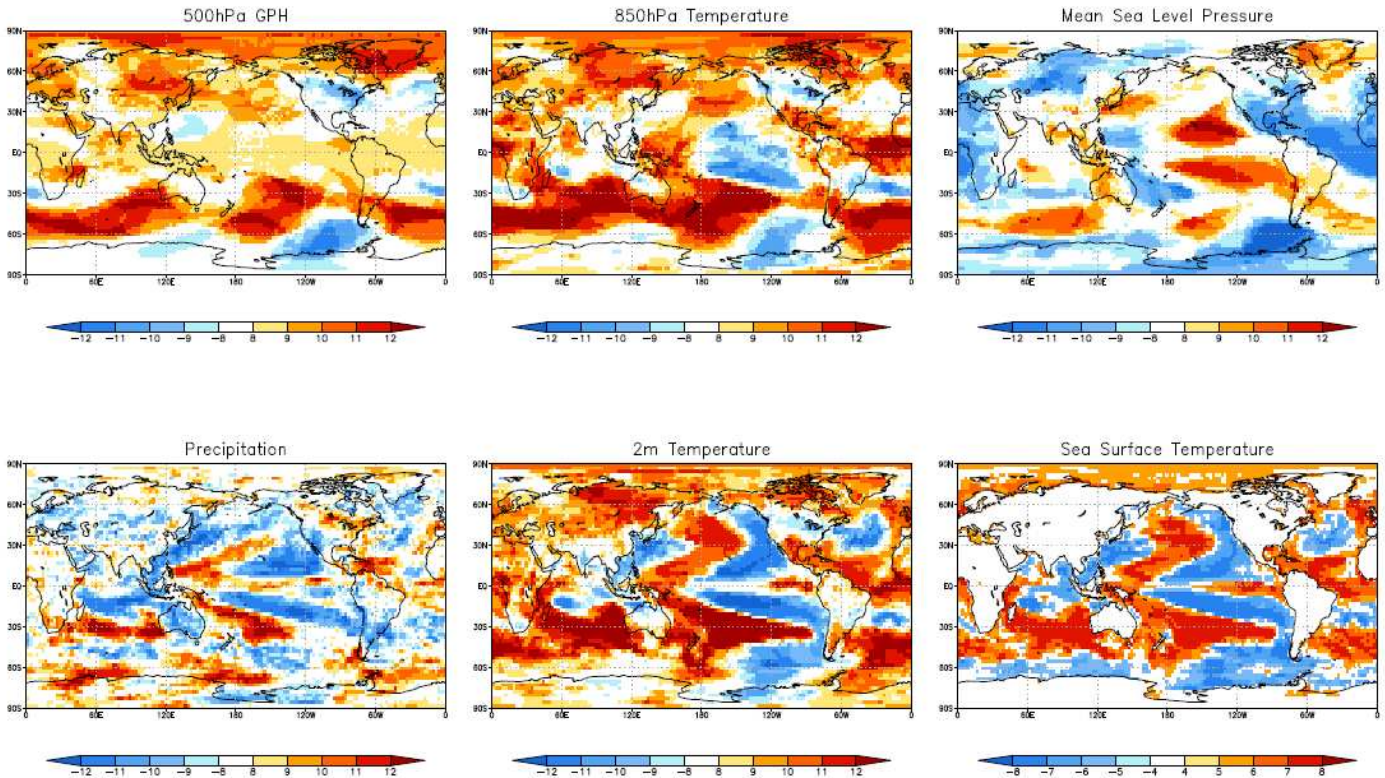


Roc scores for the Southern Europe box for June (left) and July(right) and for temperature (top) and precipitation (bottom).

There is no more skill for the months after July for the 2 regions ; the Roc being equal or less than 0.5

I.8. MODELS' CONSISTENCY

I.8.a GPCs consistency maps

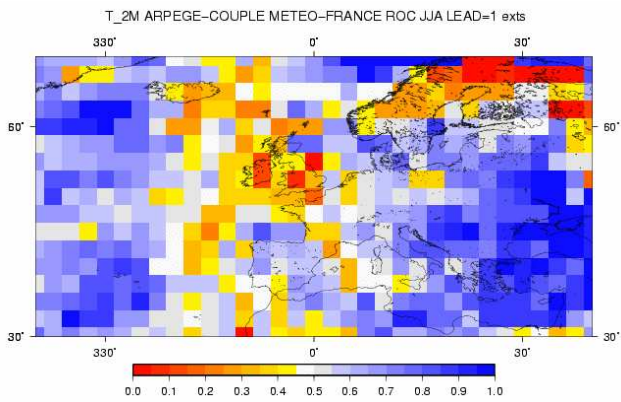
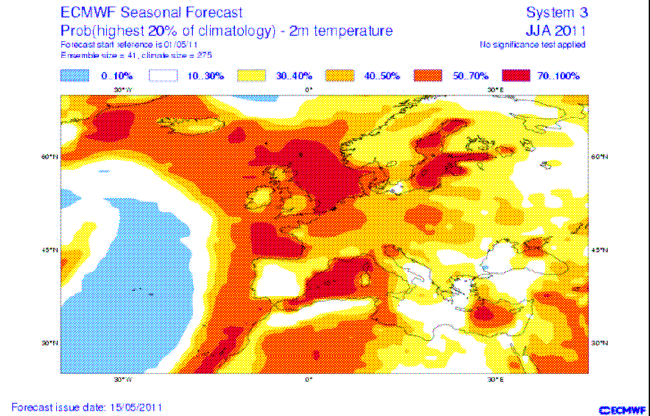
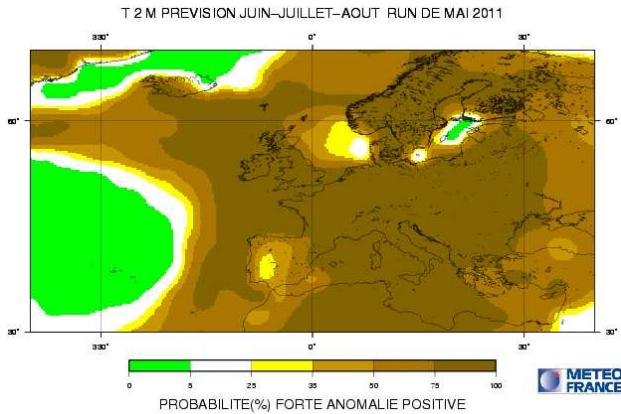


** where, the positive numbers mean the number of models that predict positive anomaly and vice versa. **
 GPC_seoul/washington/melbourne/montreal/beijing/moscow/ecmwf/exeter/toulouse/tokyo/pretoria/cptec
 SST : GPC_washington/seoul/melbourne/beijing/exeter/ecmwf/toulouse/tokyo
 May2011 + JJA forecast

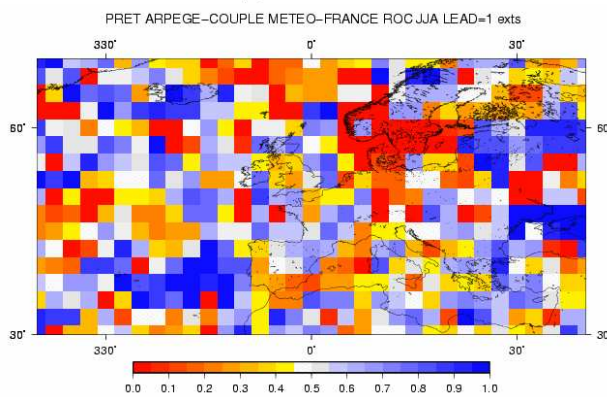
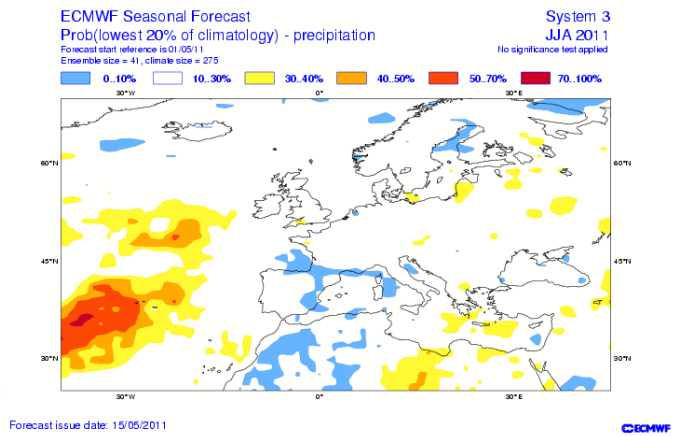
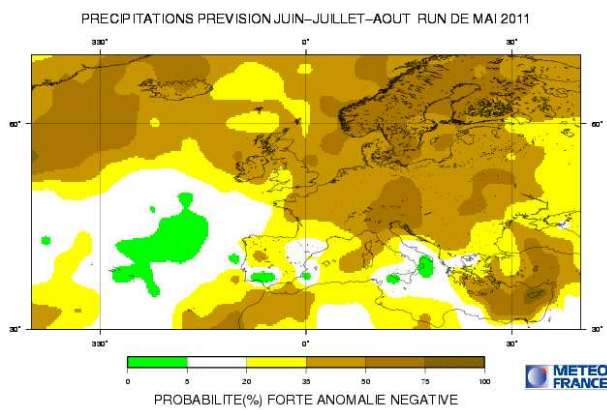
fig.23: GPCs Consistency maps from LC-MME <http://www.wmolc.org/>

Interestingly, the SST scenario over the North Atlantic Sector seems to be quite consistent within the GPCs' forecasts, especially the "Horse Shoes" pattern as already quoted for the Euro-Sip models. It appears some convergence on the T2m but more uncertainty for the precipitations even if some trace of "below normal" situations are visible close to the Black Sea region

I.9. "EXTREME" SCENARIOS



Probability of « extreme » above normal conditions for T2m for Meteo-France (left - highest ~15% of the distribution) and ECMWF (right - highest 20% of the distribution). ROC area for Meteo-France model for the same category.



Probability of « extreme » below normal conditions for rainfall for Meteo-France (left - lowest ~15% of the distribution) and ECMWF (right - lowest 20% of the distribution). ROC area for Meteo-France model for the same category.

I.10. DISCUSSION AND SYNTHESIS

SSTs Forecasts

Discussion on the Pacific SSTs

Discussion on the North Atlantic both Tropics and Extra-Tropics (especially paying attention to the “Horse Shoes” pattern”)

Discussion on the Indian Ocean (especially the Most Western part)

General Circulation Forecasts

Are teleconnection patterns exist ?

What’s about general Circulation over the North Atlantic ?

What are the main expected variability modes (and their expected impacts) ?

Mediterranean connection ?

Temperature and Precipitation forecast

Are impacts in term of temperature and precipitation significant ?

Is there any geographical differences in terms of impacts over the SEECOF region ?

How confident we are (probabilistic aspect) ?

What’s about the climate trend signature ?

Insight into more extreme scenarios (especially for temperature referring to the skill) ?

What could be potential impacts of the expected scenarios taking into account existing vulnerabilities ?