GLOBAL CLIMATE BULLETIN
n°181 - JULY 2014

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I. DESCRIPTION OF THE CLIMATE SYSTEM (MAY 2014)

I.1. OCEANIC ANALYSIS

I.1.a Global Analysis

At the Surface (fig. 1) :

In the equatorial waveguide, warming East to the dateline in the Pacific and particularly close to Peru. Little evolution elsewhere, globally a warming in the Indian Ocean and in the Eastern Atlantic along the African coast (Southern Hemisphere).

In the tropics, some cooling in the Pacific (tropics N. and S., East to the dateline), some warming in Tropical North Atlantic (especially in the vicinity of West Africa) and Northern Indian Ocean.

In the sub-tropics and mid latitudes, we notice a reinforcement of the anomaly structures in the Northern Pacific .

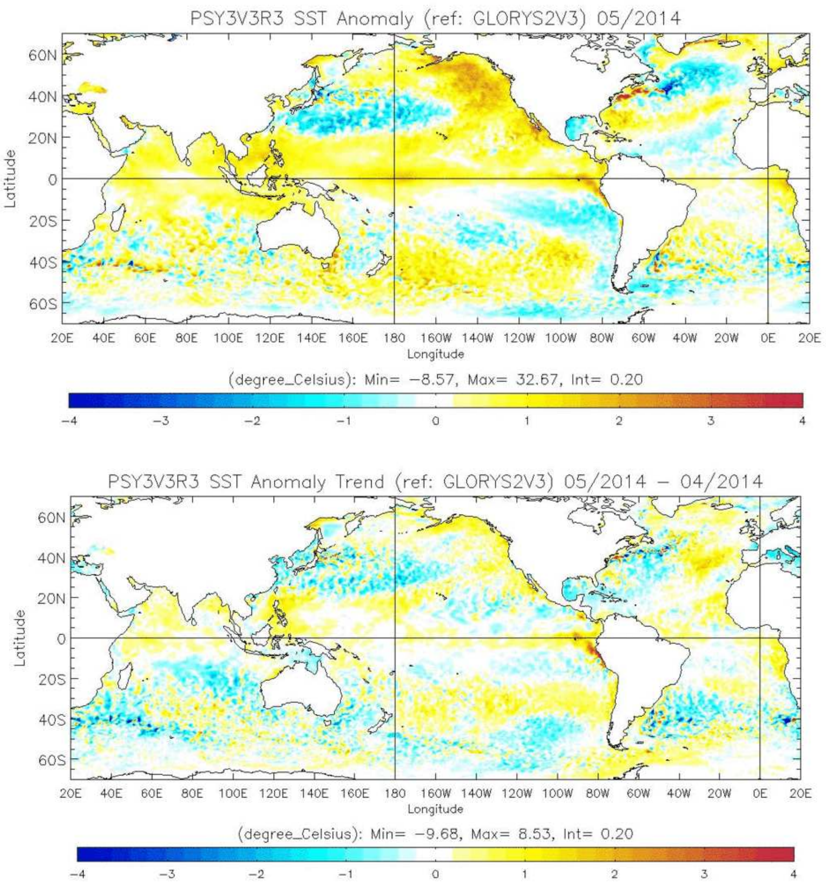


fig.1: top : SSTs Anomalies (°C) (reference Glorys 1993-2009); bottom : SST tendency (current – previous month) http://bcg.mercator-ocean.fr/

In subsurface (fig.2) :

In the Pacific : in the equatorial band (10°N-10°S), strong positive heat content anomalies in the Central Pacific along the Equator and negative anomaly in the most western part. Little traces of the persistent positive anomalies in the Western part off equator (in the Northern hemisphere between 10°N and 20°N). In the SPCZ region a negative anomaly extends South-East in the Tropics.

In the Atlantic : neutral conditions in the equatorial waveguide and a weak positive anomaly in the Guinean Gulf. In the Topical North Atlantic, negative anomalies from West Africa to the Northern coast of South America (North Hemisphere) and from Angola to the Equator South Hemisphere).

In the Indian Ocean : complex anomaly field, no clear signal.

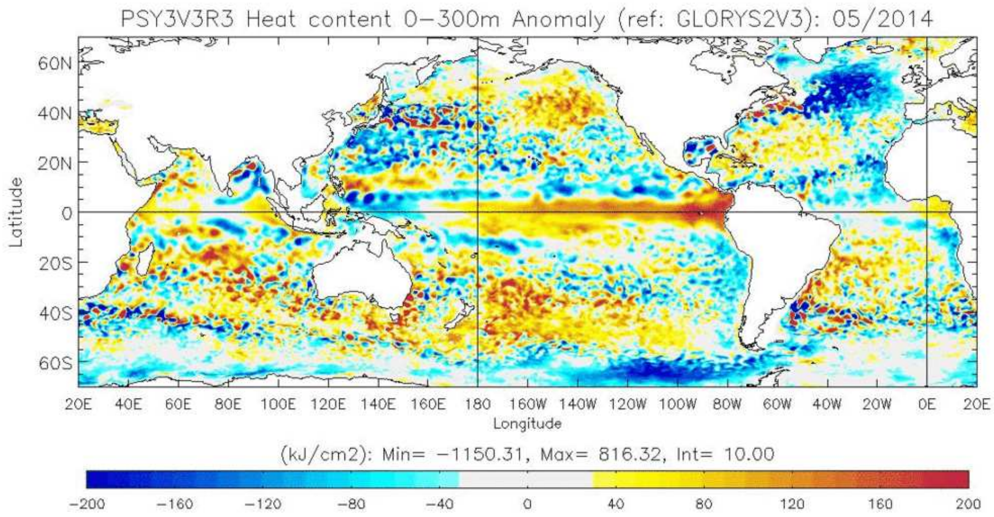


fig.2: map of Heat Content Anomalies (first 300m) (in kJ/cm²). (reference Glorys 1992-2009)
http://bcg.mercator-ocean.fr/

I.1.b Pacific Basin (fig. 3, 4 and 5)

Most of the Northern Hemisphere shows a positive anomaly; a negative one is visible in the Eastern Southern part.

SST anomaly field shows two maximum in the equatorial Pacific: the warmest in close Peru, the second close to the dateline. The absence of real East-West anomaly gradient could explain that trade wind anomalies are very low (they were Westerly in April in the western part of the basin).

The positive SOI (0.5) seems not consistent with the development of an El Niño but is consistent regarding the location of negative SST anomaly close to Tahiti and positive SST anomaly in the vicinity of Northern Australia.

In the Niño boxes (4, 3.4, 3 et 1+2 ; see definition in Annex) the monthly averages are respectively 0.8°C, 0.4°C, 0.6°C to 1.3°C from West to East

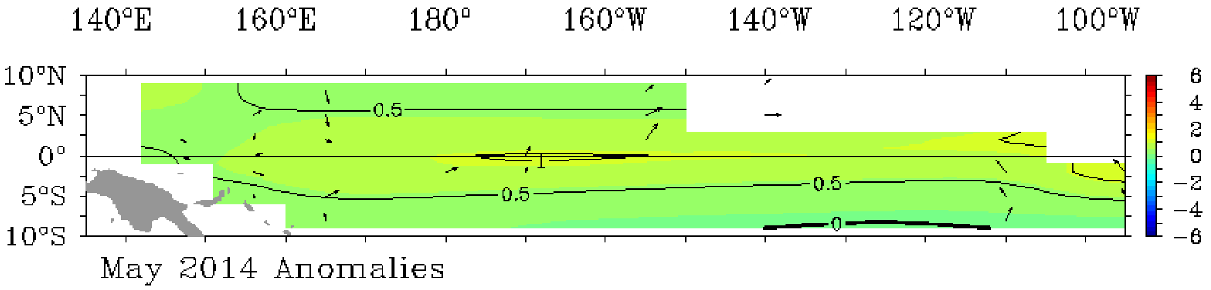


fig.3: SST and Wind anomalies over the Equatorial Pacific from TAO/TRITON. [**http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html**](http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html)

<u>In the equatorial waveguide (fig. 4 and 5)</u> : no trace of Kelvin wave this month, so a relativly stable situation under the surface, with a strong positive anomaly on the Eastern side and a negative anomaly in the Eastern part. The thermocline slope is consistent with a El Nino situation.

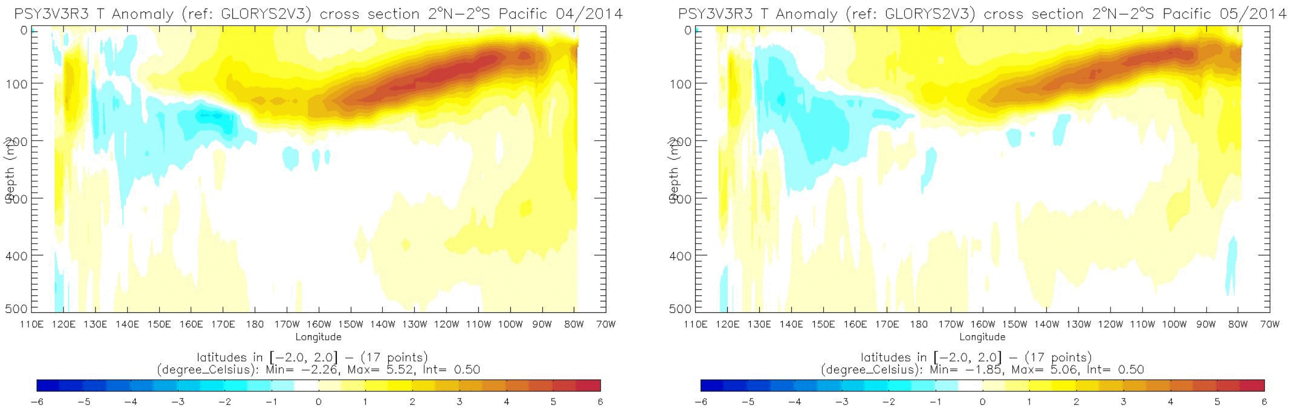


fig.4: Oceanic temperature anomaly in the first *500 metres* in the Equatorial Pacific, in previous month (left) and current month (right) [**http://bcg.mercator-ocean.fr/**](http://bcg.mercator-ocean.fr/)

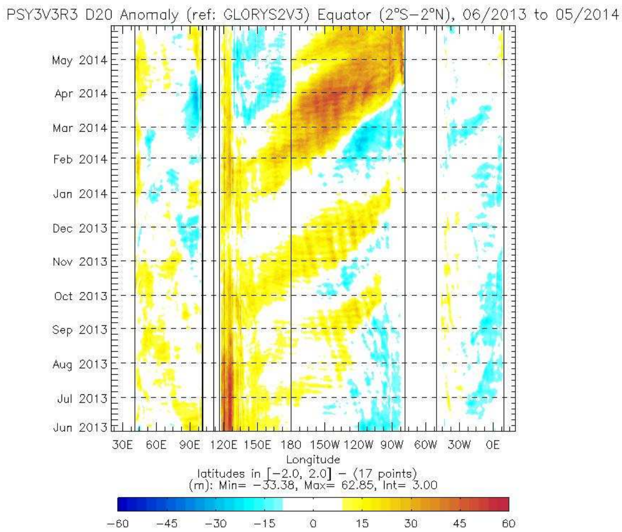


fig.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 24 month period. [**http://bcg.mercator-ocean.fr/**](http://bcg.mercator-ocean.fr/)

I.1.c Atlantic Basin

Northern Tropical Atlantic: cooler than normal.
Equatorial waveguide: a positive anomaly in the Guinean Gulf. No trace of the cold tongue; the SAT index is still positive.
The Southern Tropical Atlantic: Close to normal to the exception of the regions close to the African continent (close to Namibia/Angola; negative anomaly).

The TASI index is negative.

Sea Surface Temperature near Europe:
From April to May, less than the usual seasonal warming near the western European Atlantic coasts, in the North Sea and the western Mediterranean.

Sea surfaces near northern Europe including most of the European part of the Arctic Sea are still warmer than normal in May, and also the eastern Mediterranean and the Black Sea. Parts of the western Mediterranean and the Adriatic Sea are slightly colder than or near normal.

I.1.d Indian Basin

Southern Tropical Indian Ocean: warmer than normal conditions over most of the basin but with a cooling trend.
Equatorial waveguide: close to normal conditions in the central part, the DMI is slightly positive (the WTIO and SETIO boxes are both warmer than normal).
Northern Tropical Indian Ocean: mostly positive anomaly and warming tendency

I.2. ATMOSPHERE

I.2.a Atmosphere: General Circulation

Velocity Potential Anomaly field in the high troposphere (fig. 6 – insight into Hadley-Walker circulation anomalies) :

The MJO Index was significant during the first half of the month (mostly phase 8 and 1). It could explain the main patterns of May velocity potential anomaly field.

On the Pacific: Strong Divergent circulation anomaly (upward anomaly motion) in the Eastern part, around 10°N. This anomaly was quite persistent during the whole month, probably explained by the vicinity of the warmest SST anomaly and the MJO activity (witch favours upward motion in this area in phase 8 and 1).
On the Atlantic: Divergent circulation anomaly (upward anomaly motion) over Guinean Gulf. It is consistent with SST anomalies and MJO activity. This anomaly is probably linked to the convergent circulation anomaly (downward anomaly motion) in the Northern tropics, as shown by the divergent wind vectors.
On the Indian Ocean : weak anomalies.

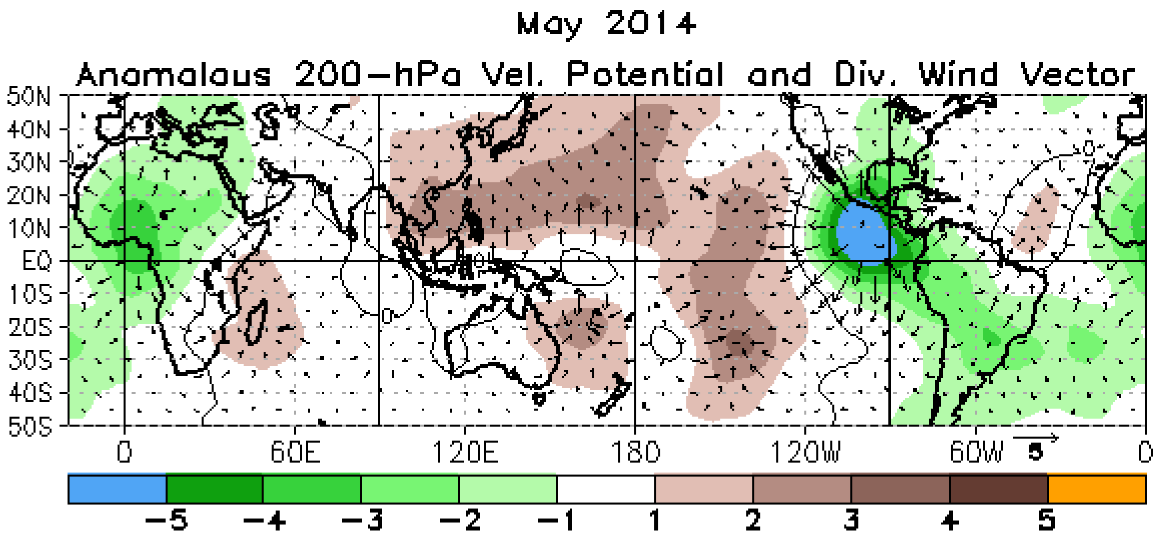


fig.6: Velocity Potential Anomalies at 200 hPa and associated divergent circulation.
Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

Stream Function anomalies in the high troposphere (fig. 7 – insight into teleconnection patterns tropically forced) :
very weak signal in the inter-tropical band. The main patterns are high in latitude, linked to mid-latitude circulation..

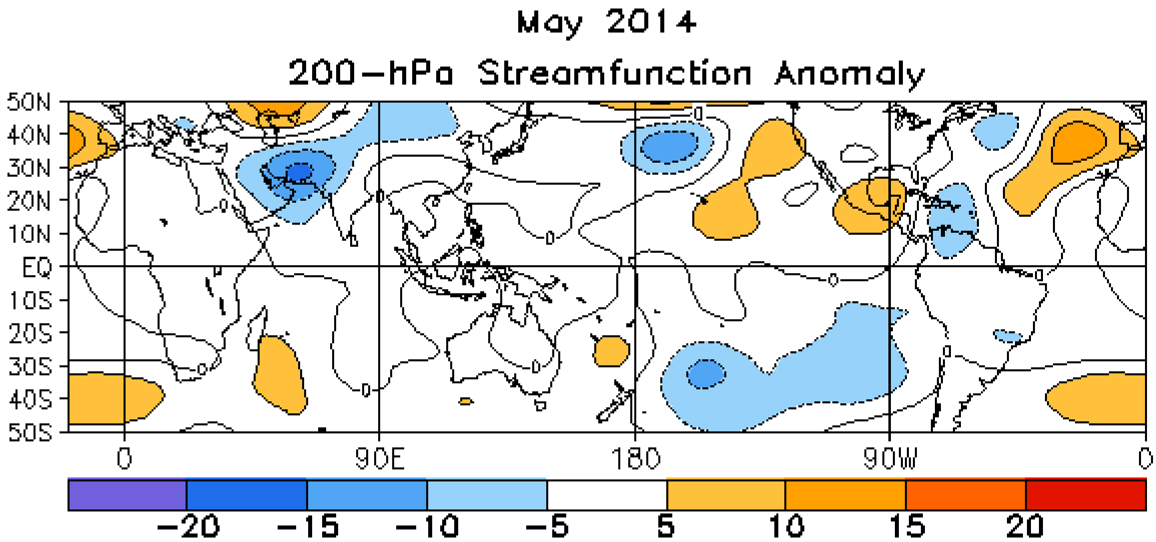


fig.7: Stream Function Anomalies at 200 hPa.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

Geopotential height at 500 hPa (fig. 8 – insight into mid-latitude general circulation) :

Consistently with the previous analysis, no anomalies coming from the Tropics. The negative PNA-like pattern in the Northern Pacific could not be interpreted as a teleconnexion from the tropics. To be quoted the persistent negative phase over the West Pacific (WP pattern -0.9).

Relevant for Europe and Eurasia, a positive anomaly over the Ural mountains, linked to negative EATL/WRUS. The Polar Eurasia (POLEUR) patterns is still relatively high (+1.0), due to a still relatively strong polar vortex.

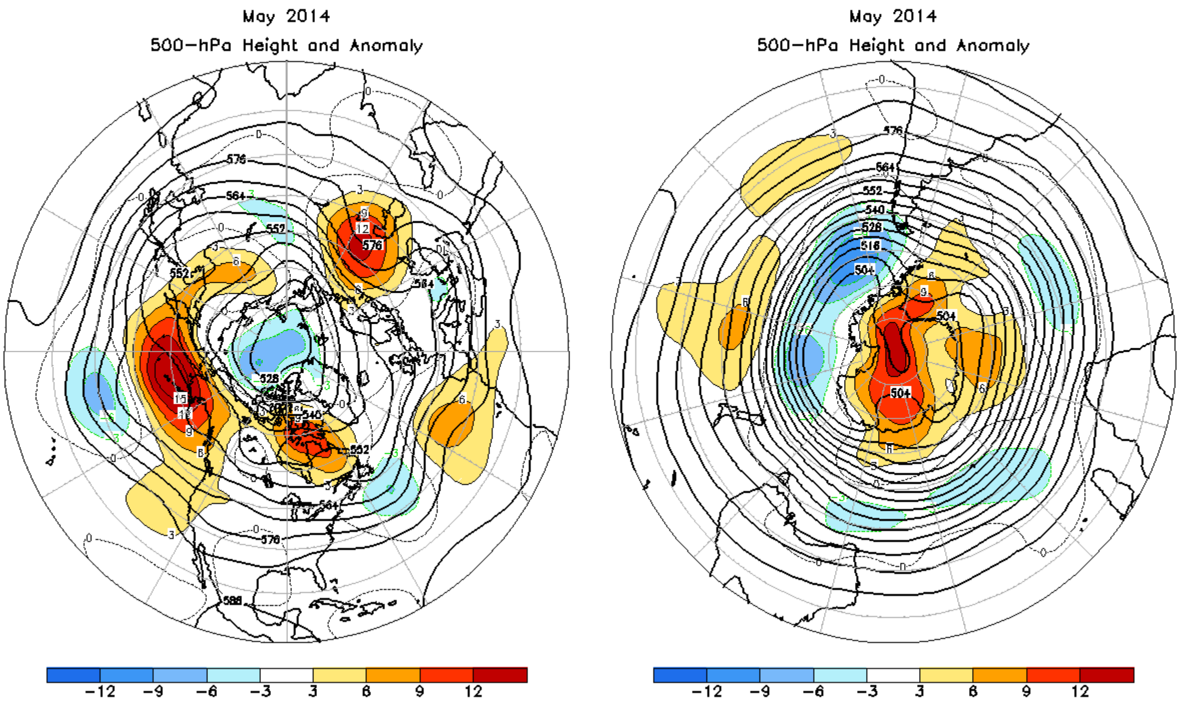


fig.8: Anomalies of Geopotential height at 500hPa (left North Hemisphere http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/fige9.shtml, and right South Hemisphere http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/fige15.shtml)

Evolution of the main atmospheric indices for the Northern Hemisphere for the last 6 months :

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
MAY 14	**-0.8**	**0.4**	**-0.9**	**0.8**	**-0.6**	**---**	**-1.4**	**-0.5**	**1.0**
APR 14	0.2	0.5	-1.4	0.1	0.0	---	1.2	-0.7	1.0
MAR 14	0.4	0.9	-0.4	1.2	0.5	---	-0.1	-0.5	0.0
FEB 14	1.1	2.2	-1.4	0.3	-1.6	0.3	-1.9	1.1	-1.9
JAN 14	-0.2	1.4	0.5	1.1	0.6	1.6	-1.3	1.7	-0.8
DEC 13	0.8	1.2	-2.0	---	-1.2	1.8	-0.4	-0.7	-0.8

http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/table3.shtml

Sea level pressure and circulation over Europe

Both Icelandic Low and Azores High are stronger than normal. This is not consistent to the negative NAO, which is probably due to a high pressure anomaly over southern Greenland and the southern Arctic Sea. Over the European continent, anomalies are generally weak.

Monthly mean SLP shows a high pressure zone over western and southwestern Europe (extension of Azores High), resulting in a blocking of the westerly flow from the North Atlantic. In fact there were very few westerly circulation types over Central Europe. Another high pressure zone over northern Europe blocks the cold air from the polar vortex. Nevertheless, some cold polar outbreaks led to cut-off processes and intense lows (both at the surface and the middle/higher atmosphere) causing two heavy weather episodes over the Balkan Peninsula (14/15 May) and Western/Central Europe (18-28 May).

I.2.b Precipitation

Intertropical zones (including sub-tropics) : good consistency with the Velocity Potential anomalies : along the equatorial waveguide (+) in the Pacific, in contrast with tropics S and N (-); dipole between Eastern Pacific (+) vs Northern South America an Caribbean region (-); West Africa and Gulf of Guinea (globally +)

Mid-latitudes: mostly drier than normal over the Eastern part of the North-American continent

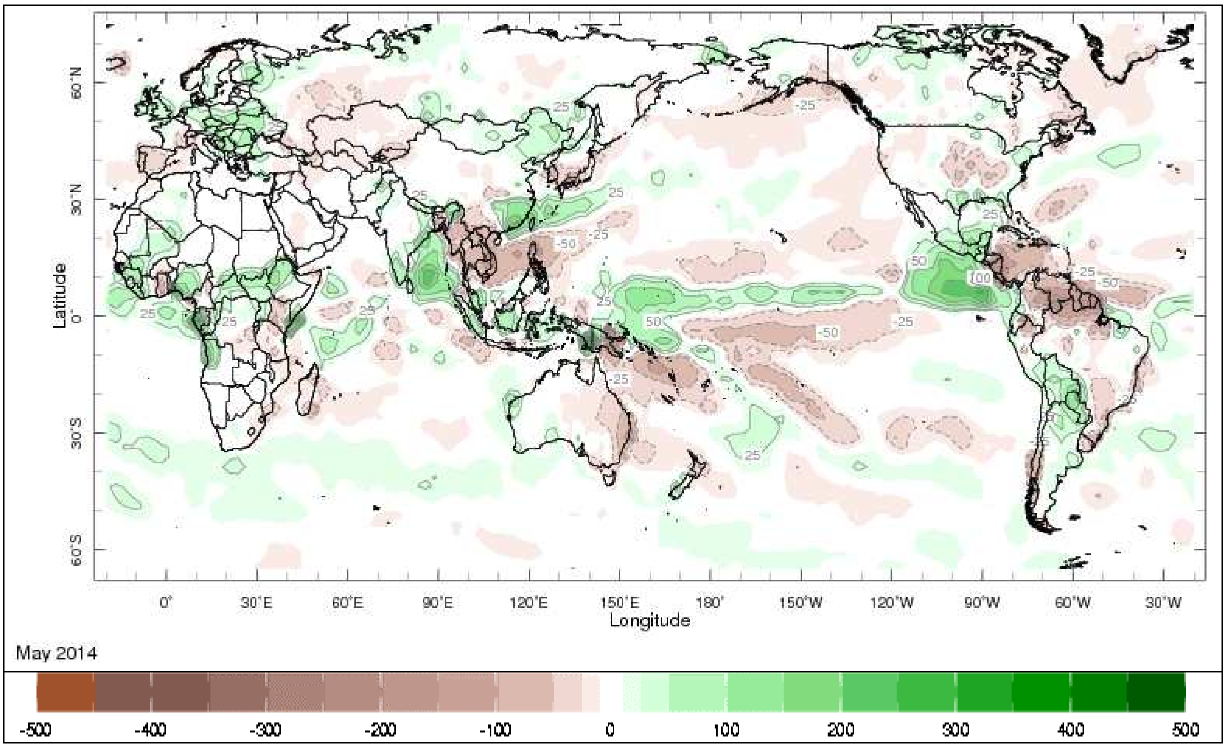


fig.9: Rainfall Anomalies (in mm) (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/

Rainfall anomalies in Europe: Wetter-than-normal areas over large parts of Europe mostly due to heavy precipitation episodes coming from cut-off processes originating from the polar region. Partly above the 90th percentile, especially over southeastern and northwestern Europe. Drier than normal over southwestern Europe (below 10th percentile) and Russia, this is consistent with high pressure / geopotential.

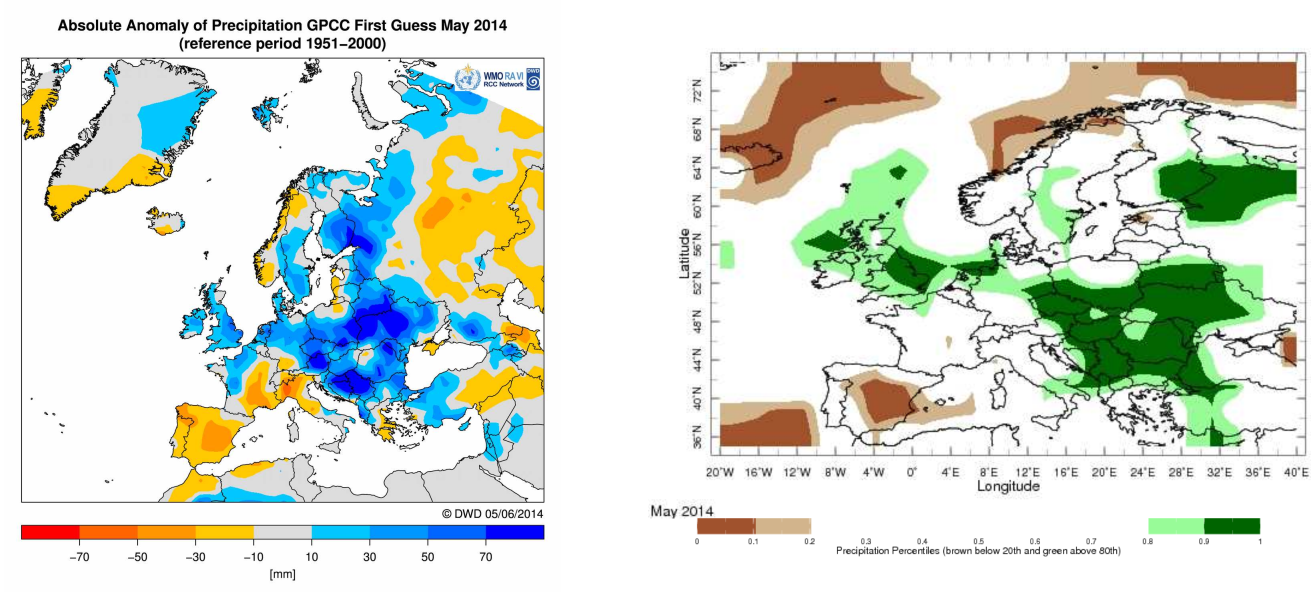


fig.10: Left: Absolute anomaly of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre – reference 1951-2000), http://www.dwd.de/rcc-cm. Right: Percentiles of precipitation. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

I.2.cTemperature

Strong warm anomalies over the Western façade of Russia and along the western coast of North America (including Alaska).

Some positive anomaly over Brazil consistent (like in April) and over Australia.

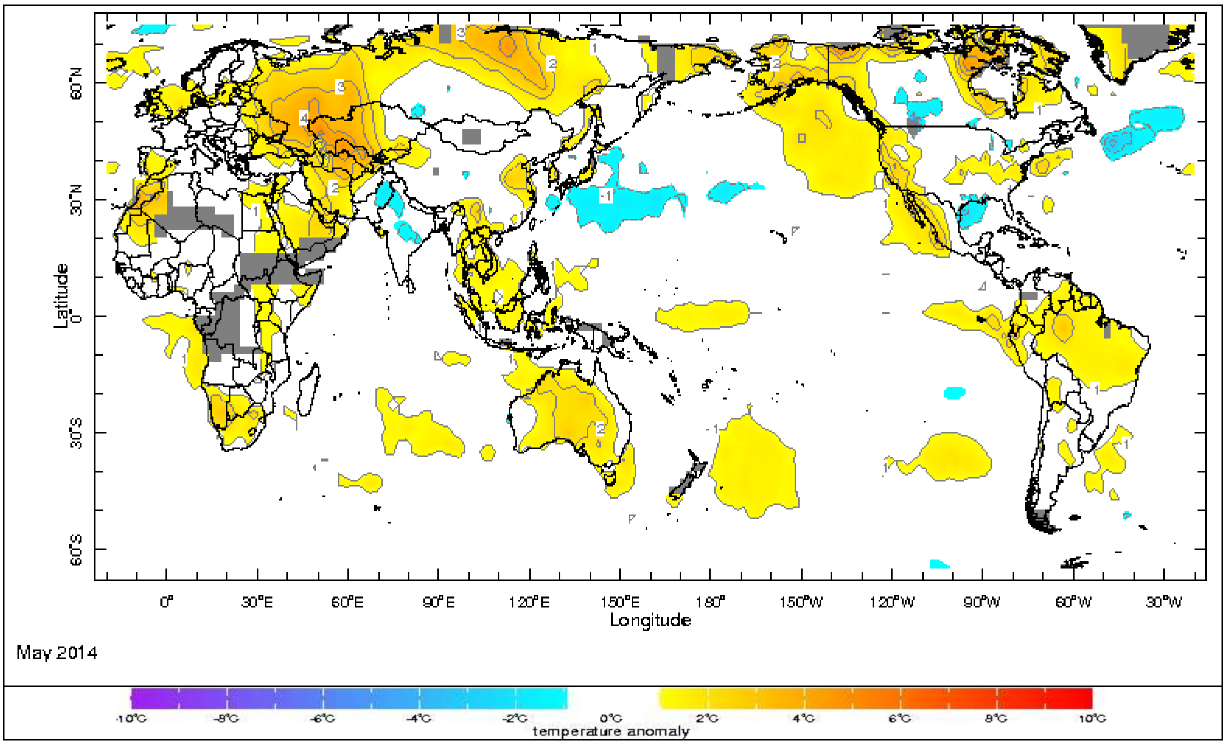


fig.11: Temperature Anomalies (in °C) (departure to the 1979-2000 normal)
http://iridl.ldeo.columbia.edu/maproom/.Global/.Atm_Temp/Anomaly.html

Temperature anomalies in Europe:

May 2014 was warmer than normal especially in the Arctic region, in most of northern and eastern Europe and the Middle East and over the Iberian Peninsula. The highest positive anomalies of more than +3K were reached or exceeded in the eastern parts of Europe, exceeding the 90th percentile there.

In the other parts of Europe, temperature was near normal. Over the Balkan Peninsula, however, monthly means were partly below the 10th percentile. Especially during the heavy rains in this region, cold polar air coming from the north was included in the circulation of the low pressure system over this area.

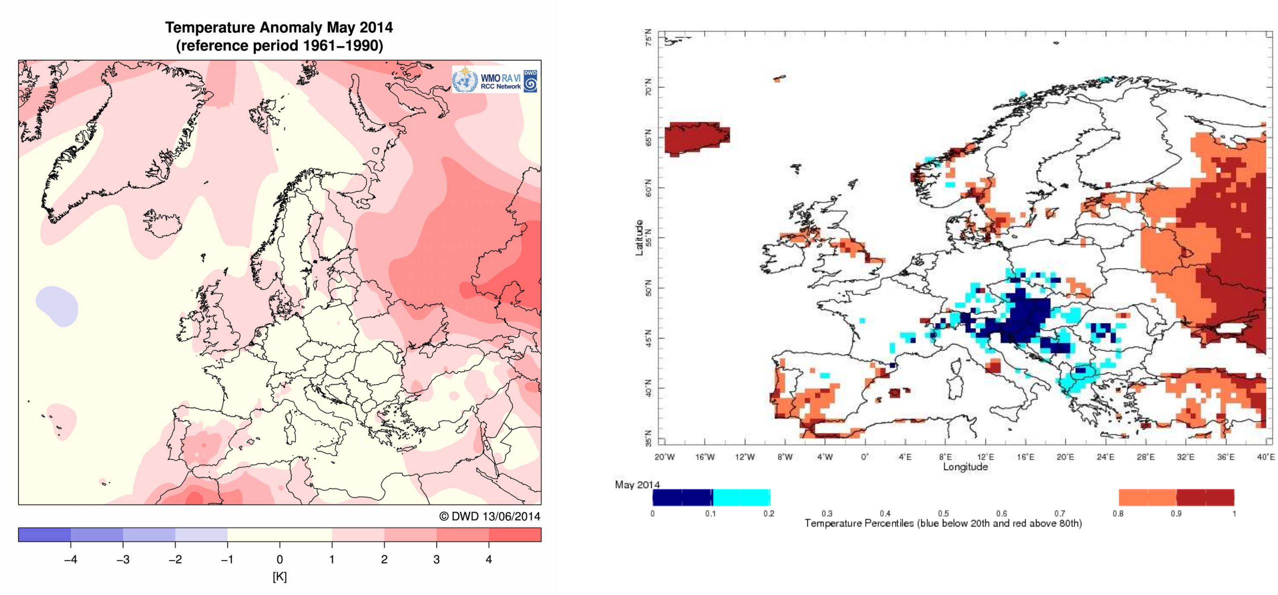


fig.12: left : Absolute anomaly of temperature in the RA VI Region (Europe), data from Deutscher Wetterdienst (DWD); http://www.dwd.de/rcc-cm . Right : Percentiles of temperature. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Atm_Temp/Percentiles.html .

I.2.d Sea Ice

In Arctic (fig. 11 - left) : well below normal sea-ice extension (negative anomaly close to 2 standard deviation).

In Antarctic (fig. 11 - right) : well above normal sea-ice extension anomaly (on record) with some large regional modulation.

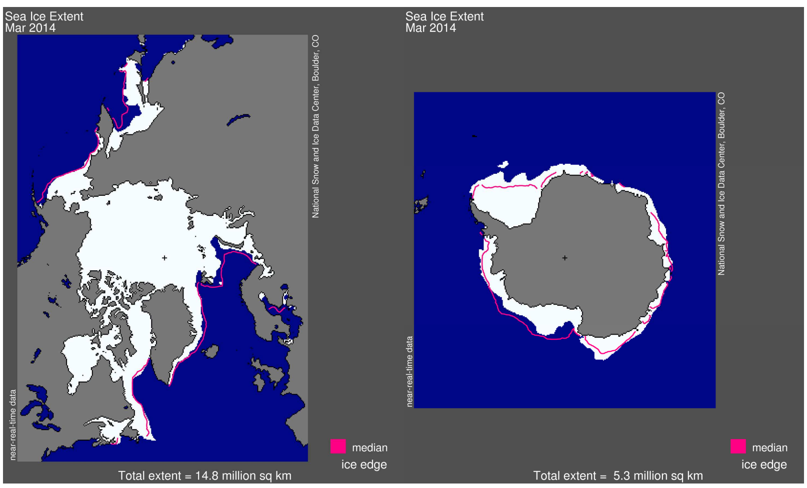


fig.13: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

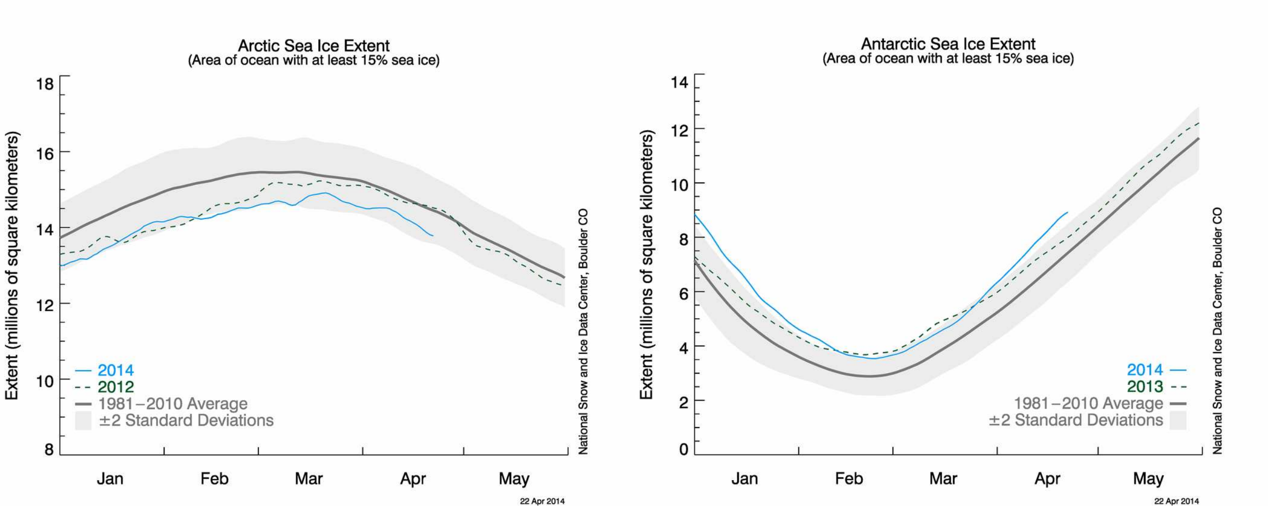


fig. 9bis : Sea-Ice extension evolution from NSIDC
http://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png

II. SEASONAL FORECASTS FOR JAS FROM DYNAMICAL MODELS

II.1. OCEANIC FORECASTS

II.1.a Sea Surface Temperature (SST)

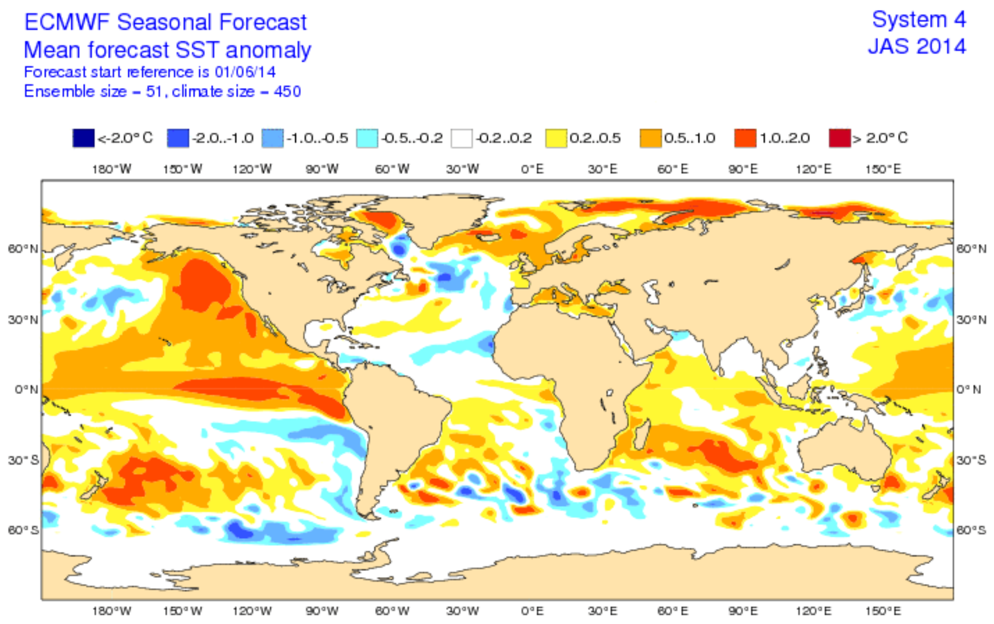


fig.14: SST anomaly forecast (in °C) from ECMWF.
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

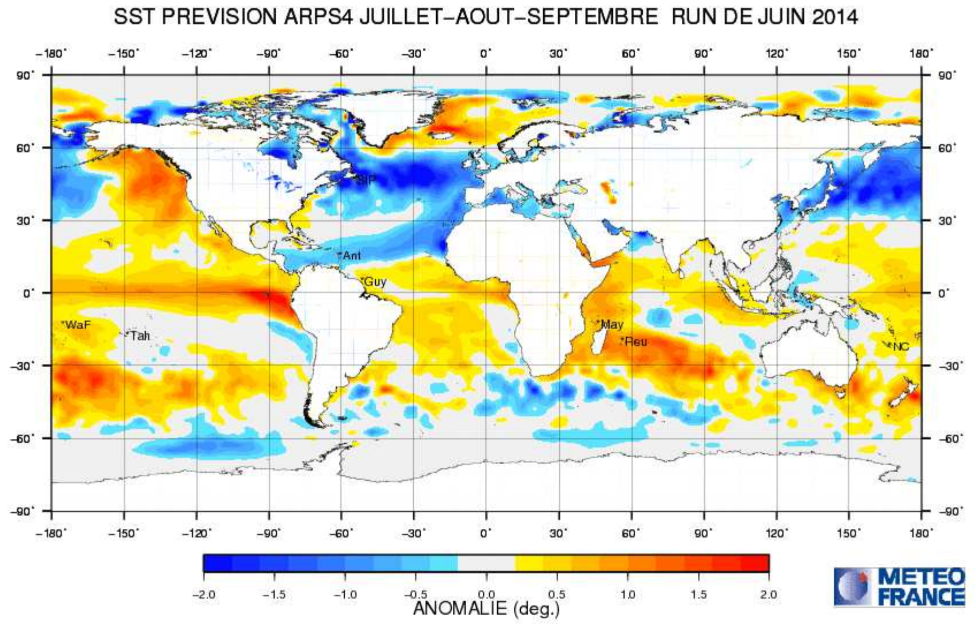


fig.15: SST Anomaly forecast (in°C - recalibrated with respect of observation) from Météo-France.
http://elaboration.seasonal.meteo.fr/

<u>For the 2 individual models</u> :
Whatever the differences in the post-processing of the anomalies (including reference period for the hindcast ; 81-2010 for ECMWF and 91-2010 for MF system 4), fairly consistent SST forecasts (taking into account the hindcast period differences), over both Hemispheres.
Pacific : Clear warmer than normal conditions in the equatorial waveguide. ECMWF seems to be warmer than MF East to the dateline. The positive anomaly extends up to the dateline in both models. Negative anomalies in the Western Tropics in MF. The differences between MF and ECMWF can be at least partly related to hindcast issues. Positive anomalies over the Half Eastern North Pacific in both models and negative in MF in the North Western Pacific.
Atlantic : equatorial waveguide warmer than normal in the Guinean Gulf (close to neutral outside) in both models. Some consistency for negative anomalies in the Northern hemisphere on the eastern side extending to East (up to Caribbean region in MF). Colder than normal conditions in the Northern mid-latitudes.
Indian Ocean : Warmer than normal conditions more or less everywhere. IOD close to 0.

<u>In Euro-SIP</u> :
Some robust patterns appear in the tropics everywhere to the exception of the Atlantic. More or less the same comments than for the individual models.
Pacific : The positive anomaly in the equatorial waveguide region from the most Eastern part up to the dateline. Quite consistent patterns in the subtropics and the mid-latitudes of both hemispheres.
Atlantic : close to neutral over the Equatorial waveguide. Colder than normal conditions Close to West Africa.
Indian Ocean : Warmer than normal conditions over a large portion of the basin.

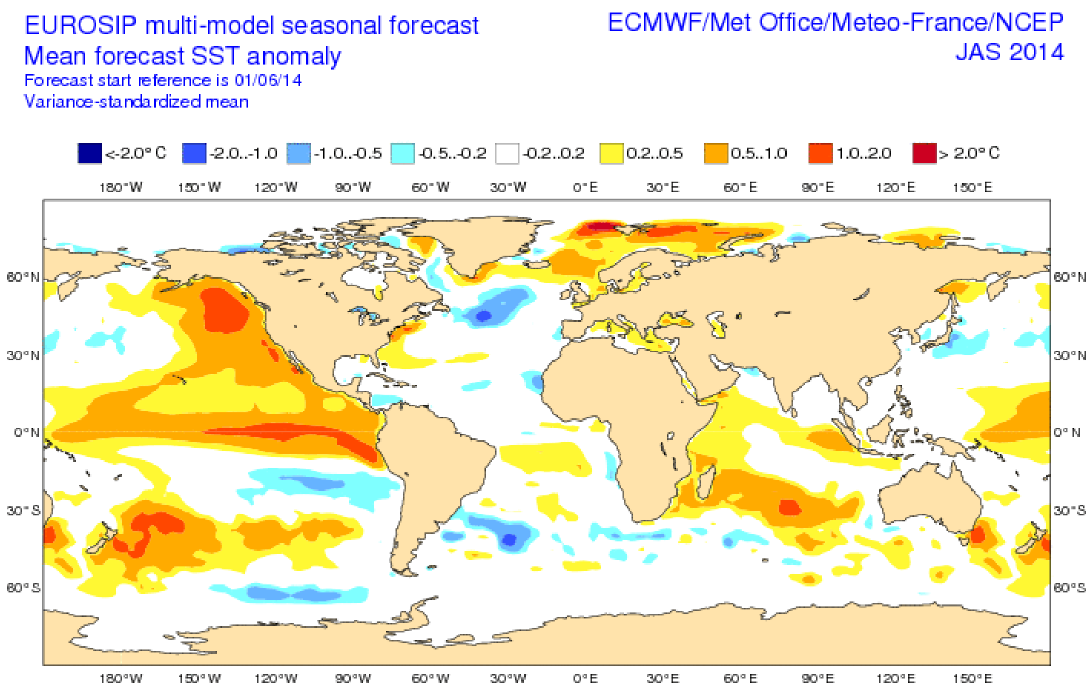


fig.16: SST Forecasted anomaly (in °C) from Euro-SIP. http://www.ecmwf.int/

II.1.b ENSO Forecast :

Forecasted Phase : slightly positive phase for JAS

Plumes from Météo-France and ECMWF for the 3 Niño boxes (see definition in Annex – fig. II.1.5) : they extend around the 0.5° value, with a positive trend during JAS. Most of them are reaching the Niño threshold at the end of the period and go beyond after (except for MF). In both models and on average, prevailing conditions slightly higher than Niño threshold for JAS. In both models the warming trend is positive but weak and the uncertainty is large. EuroSIP plumes : close to (slightly higher than) Niño threshold on average. The spread indicates a large uncertainty.

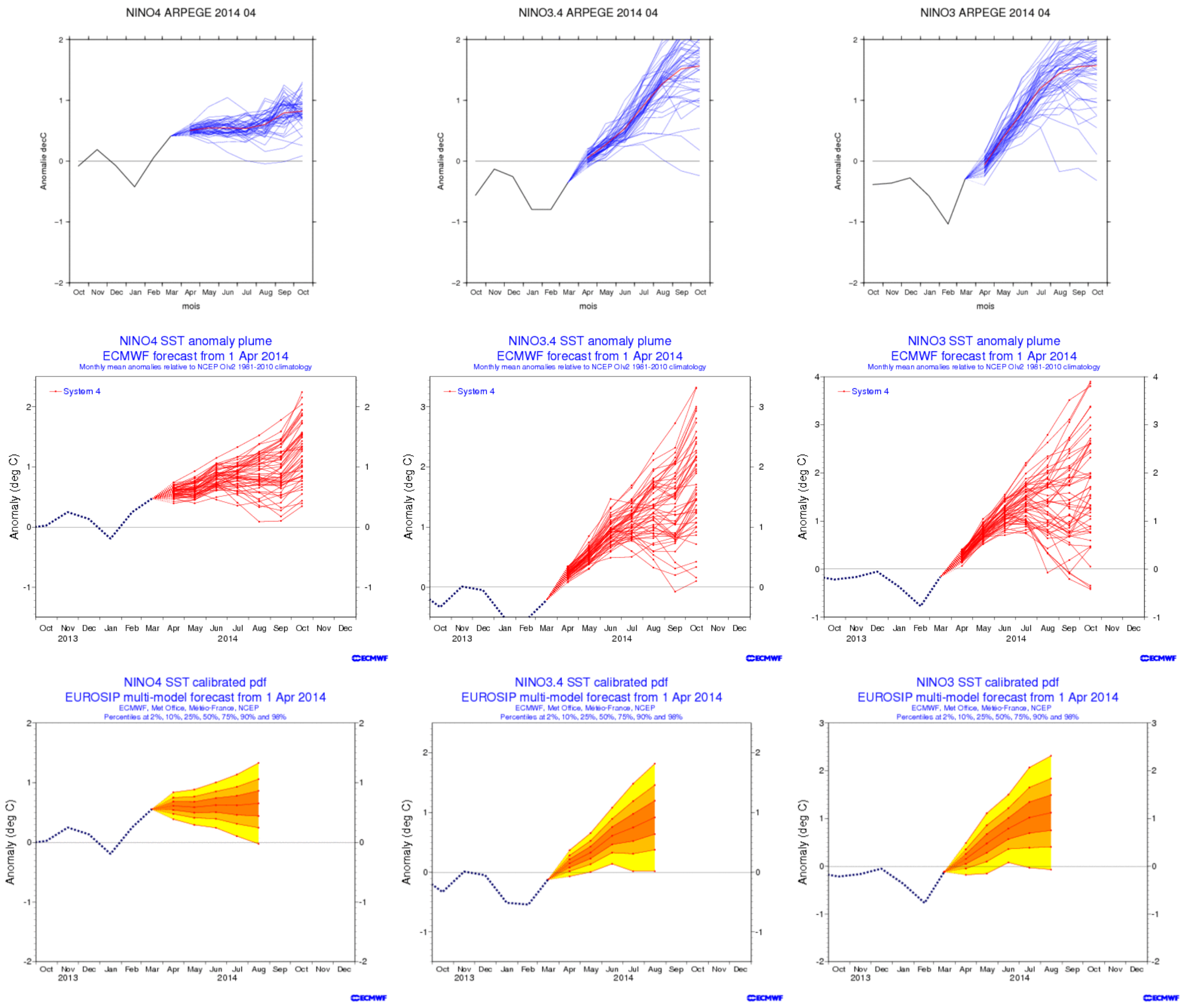


fig.17: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions. (http://www.ecmwf.int/)

II.1.c Atlantic Ocean forecasts:

Forecasted Phase: Below Normal in the Northern and Southern Tropics - TASI on the negative side returning to neutral

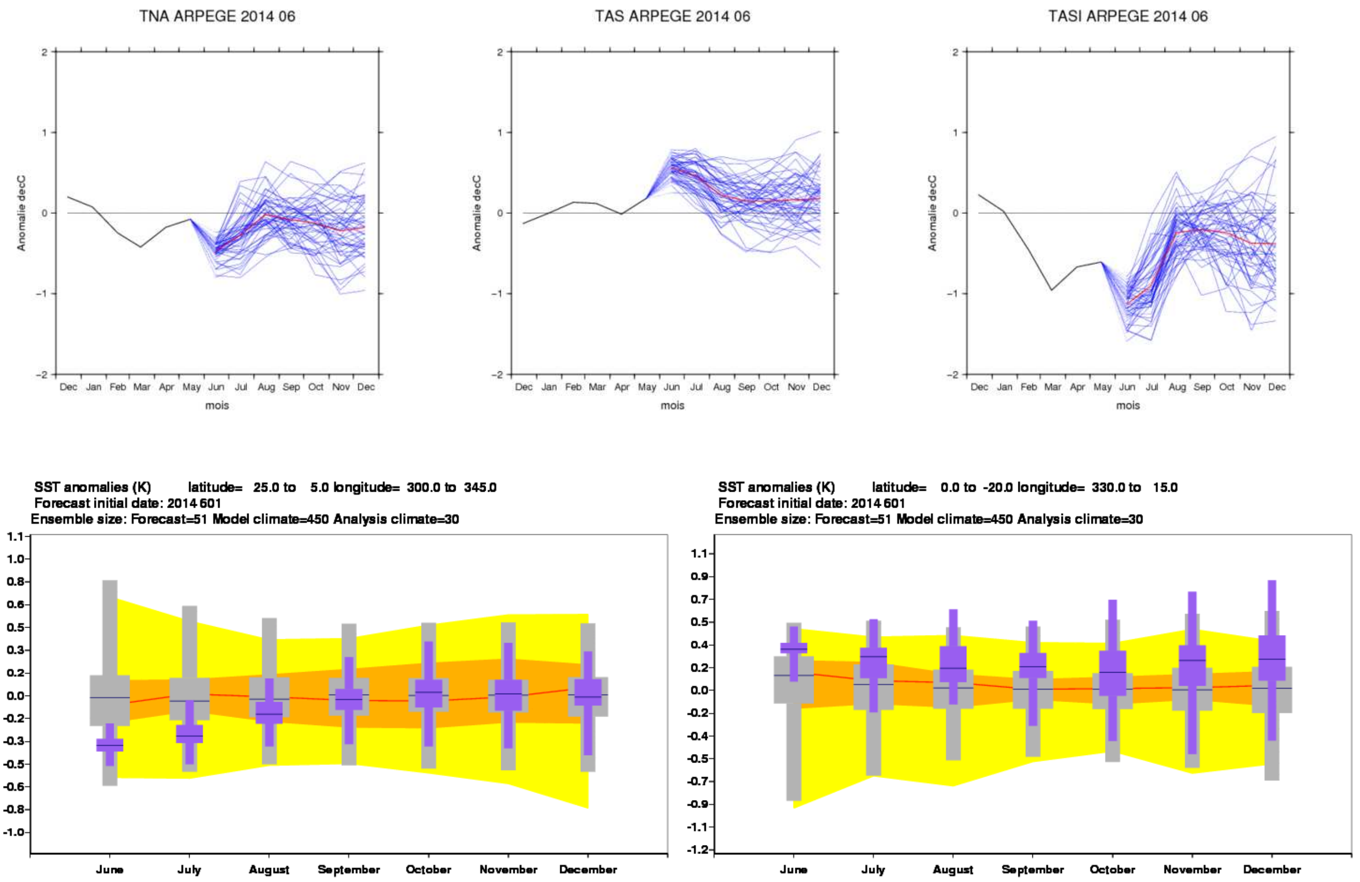


fig.18: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France (top) and ECMWF (bottom), plumes / climagrams correspond to 51 members and monthly means.

Consistent behaviour between the 2 models over the targeted period.

North Tropical Atlantic : Colder than normal conditions in both models with a progressive warming.
South Tropical Atlantic : Above Normal conditions in both models with some cooling up to August.
TASI : in MF, the TASI index is negative for JJA with a tendency to return to neutral conditions at the end of Summer/beginning of Fall.

Guinean Gulf : Above Normal in MF with a return to Neutral conditions at Fall.

II.1.d Indian Ocean forecasts :

Forecasted Phase: West and East positive
IOD close to 0

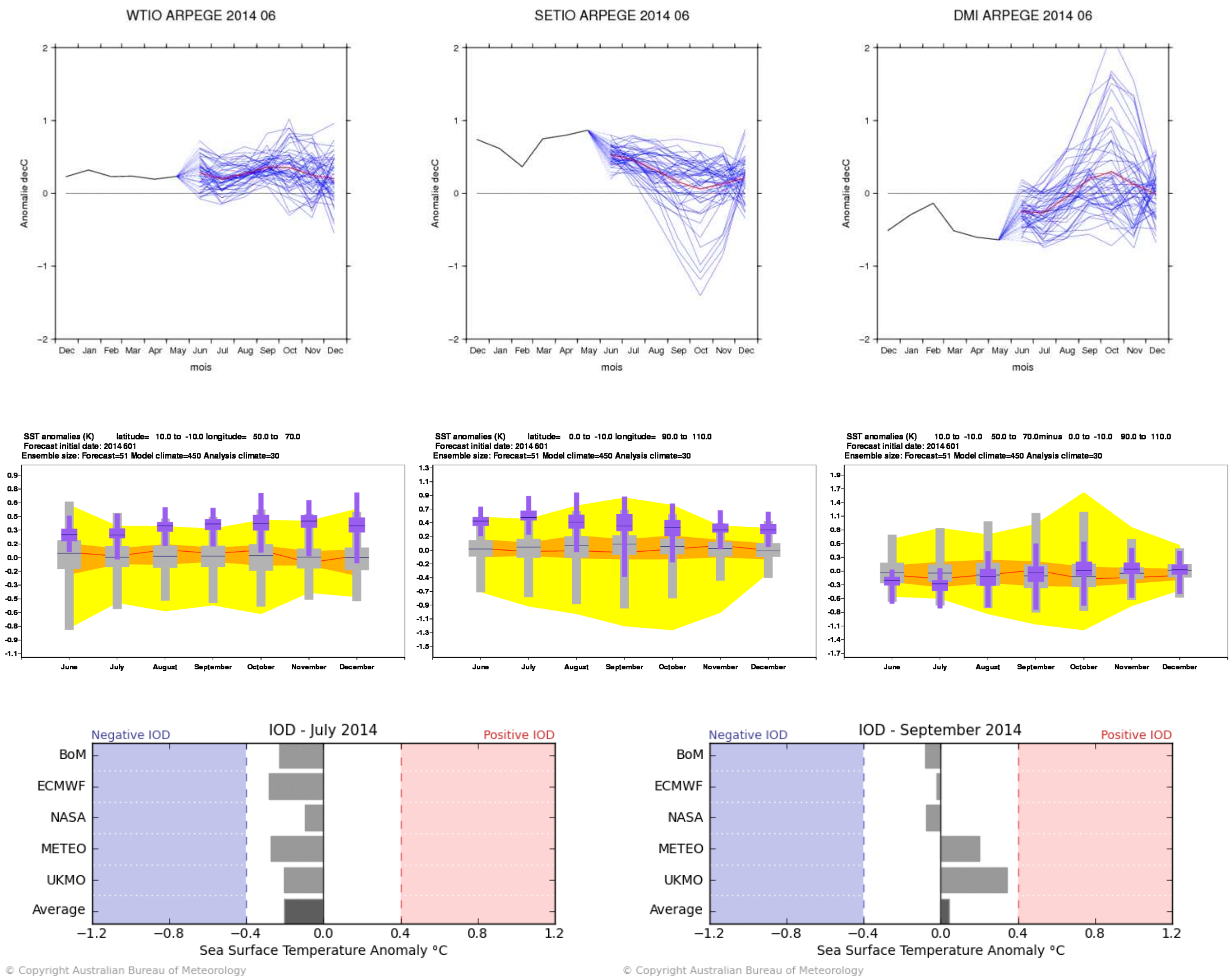


fig.19: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France (top), ECMWF (middle), plumes / climagrams correspond to 51 members and monthly means. Synthesis for IOD (bottom) for several GPCs from BoM http://www.bom.gov.au/climate/ahead/model-summary.shtml#tabs=Indian-Ocean

Quite consistent behaviour between the 2 models.

In WTIO : warmer than normal with a slight warming on time. Not too much uncertainty.
In SETIO : Above normal conditions. Quite large spread at Fall.
DMI (IOD) : becoming neutral or slightly positive. Large spread.

II.2. GENERAL CIRCULATION FORECAST

II.2.a Global Forecast

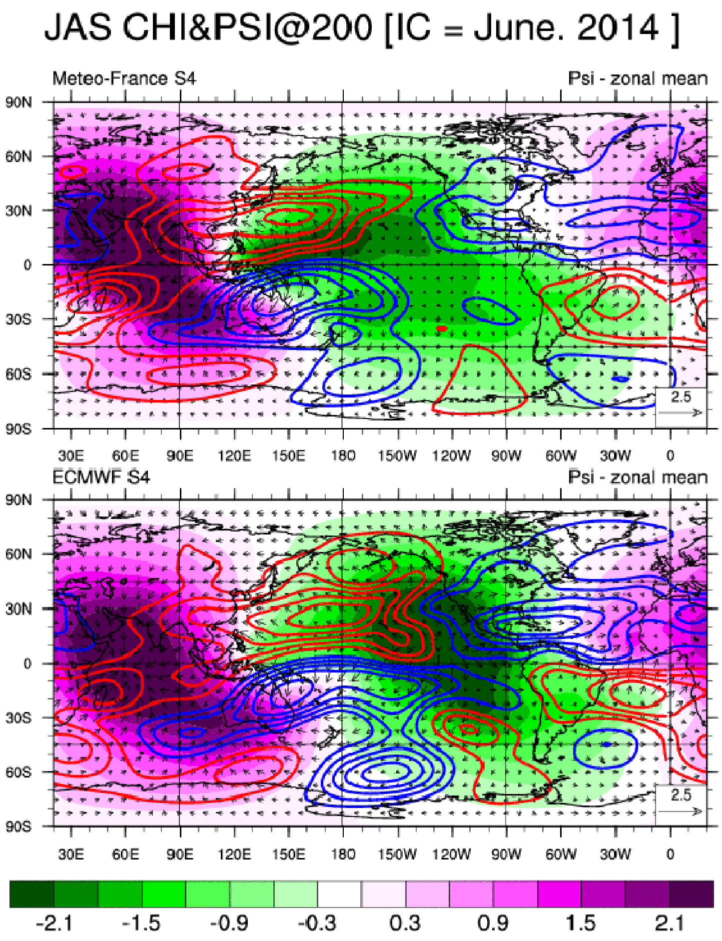


fig.20: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

Velocity potential anomaly field (cf. fig. 19 – insight into Hadley-Walker circulation anomalies) :

some consistency between the 2 models in the Tropical Indian Ocean and Atlantic, but also some large differences in the Central Pacific. Note that each model is very stable (same forecast than last month).
Over the Pacific, The divergent circulation anomaly is not very consistent between the two models. The strongest Large Scale Convection anomaly is close to the dateline in MF while it is moving far on the Eastern side in ECMWF. ECMWF response seems to be more consistent with the development of the Pacific warm event from the eastern part of the basin ; in addition the JMA forecast is more similar to ECMWF ones. The best solution is possibly the one from ECMWF as the warm event is primilarly developing in the Eastern part of the basin, with a moderate confidence due to the uncertainty concerning the development of El Nino (see SST forecast discussion).
Over the Atlantic, quite consistent response (Convergent circulation anomaly - downward anomaly motion) over the African continent North to the Equator with some extension over the Atlantic in the vicinity of the Equator. In JMA, the positive anomaly exists but weaker and more over the continent.

Over the Indian Ocean : A quite strong convergent circulation anomaly in both models over the Equatorial region and a large portion of the Tropical basins. To be quoted the positive anomaly over the Indian sub-continent (in relationship with a weakened monsoon circulation over the Indian regions). These responses are very consistent with the one from JMA.

Stream Function anomaly field (cf. fig. 19 – insight into teleconnection patterns tropically forced) :

quite good consistency in the Tropical Atlantic and over the Indian Ocean and Western Pacific (between 90°E and the dateline). The interpretation of these patterns in the Northern Hemisphere could not be directly related to teleconnection patterns as most of the anomalies seems to be trapped within the sub-tropical regions. Like last month, the JMA forecast over the Central Pacific is more similar to ECMWF rather than MF in relationship with the differences into the atmospheric response over the Pacific (see Velocity Potential field discussion).

As a conclusion **the predictability** likely exists in the vicinity of the Pacific basin, over the Indian Ocean (especially within the sub-tropical and tropical regions) and in the Tropics in the vicinity of the Atlantic sector. Over mid-latitudes regions of the Northern Hemisphere, one could consider that the signal is poorly influenced by the Tropics to the possible exception of the Eastern façade of USA. For the Western façade of Europe and North Africa, one can infer some (little) predictability in the vicinity of the Mediterranean basin, but very low over the Northern regions likely more influenced by the internal dynamics of the atmosphere.

II.2.b North hemisphere forecast and Europe

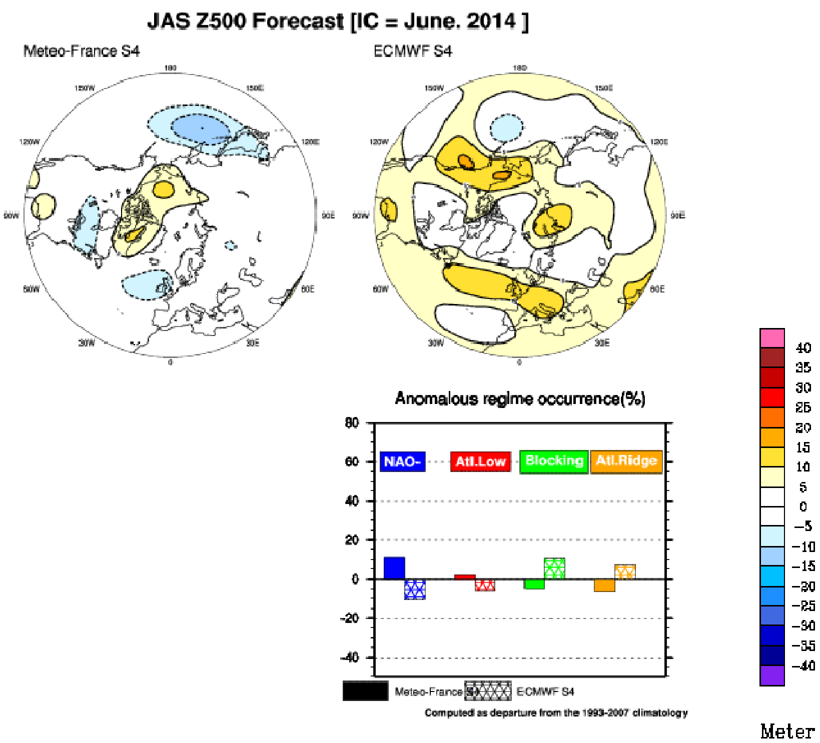


fig.21: Anomalies of Geopotential Height (top) at 500 hPa from Meteo-France (left) and ECMWF (right). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip and North Atlantic Regime occurrence anomalies (bottom) from Météo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

Geopotential height anomalies (fig. 20 – insight into mid-latitude general circulation anomalies) : Very low anomaly signal, with no clear consistency.

North Atlantic Circulation Regimes (fig. 20) :
As a consequence, no consistency in the regime forecasts.

II.3. IMPACT : TEMPERATURE FORECASTS

II.3.a ECMWF

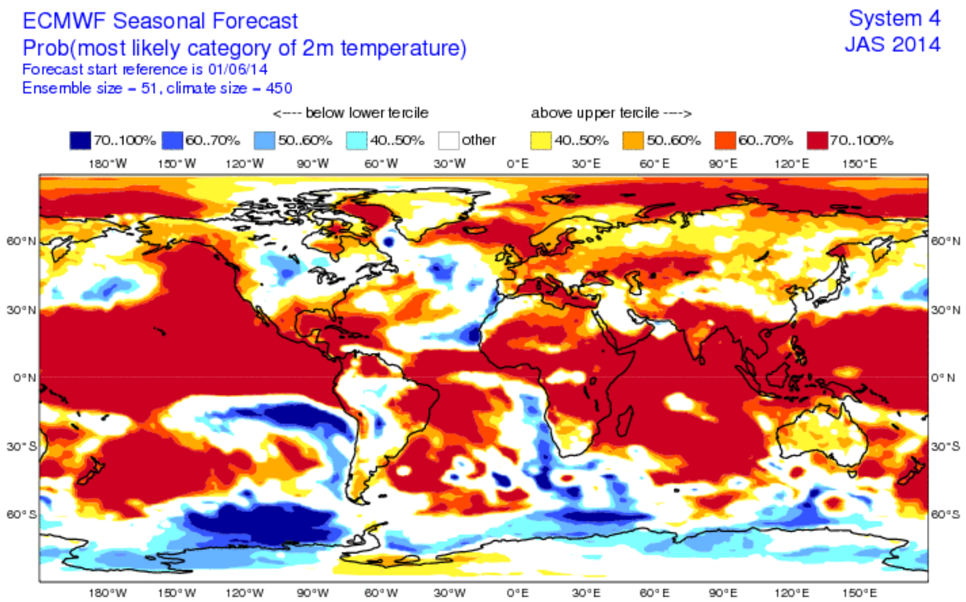


fig.22: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

II.3.b Météo-France

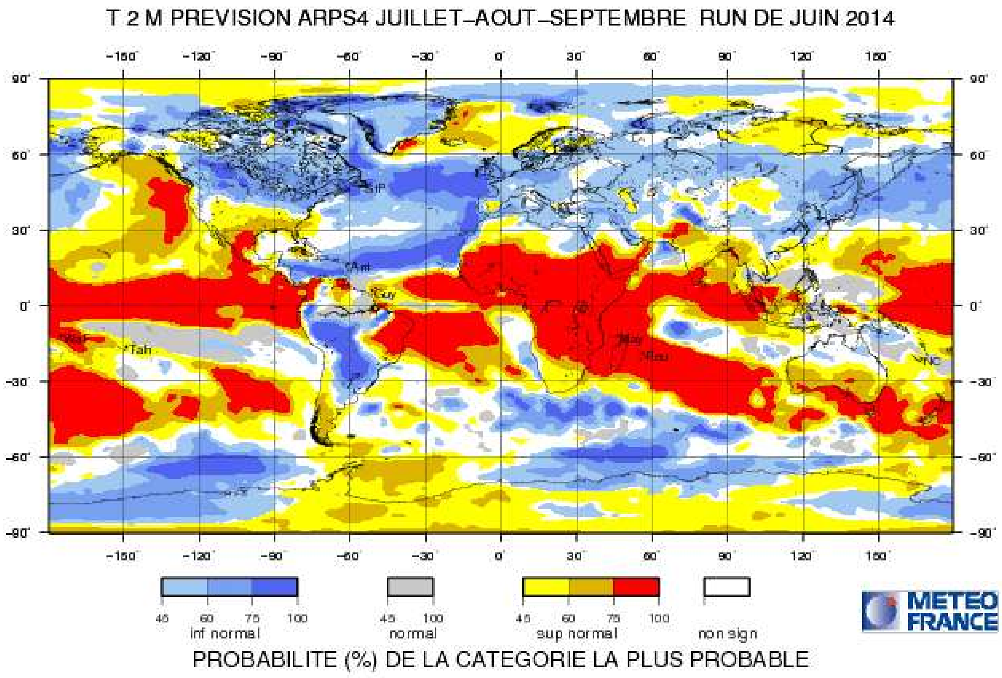


fig.23: Most likely category of T2m from Meteo-France. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.3.c Met Office (UKMO)

Not available

fig.24: Most likely category of T2m Anomaly from UK Met Office. https://www.wmolc.org/

II.3.d Climate Prediction Centre (CPC)

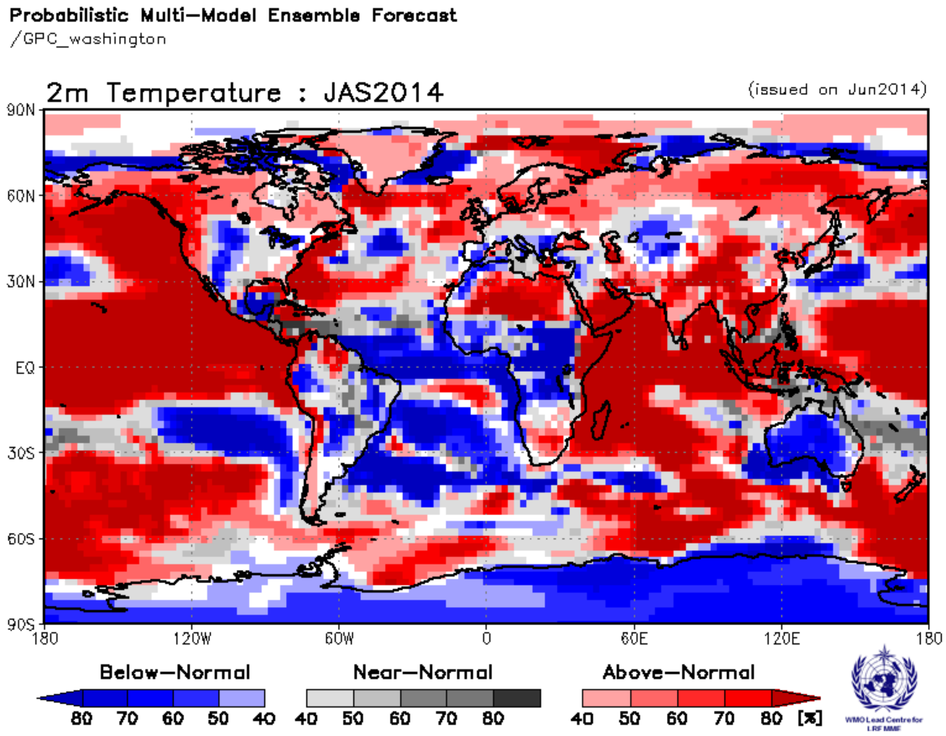


fig.25: **Most likely category of T2m Anomaly from CPC.** **https://www.wmolc.org/**

II.3.e Japan Meteorological Agency (JMA)

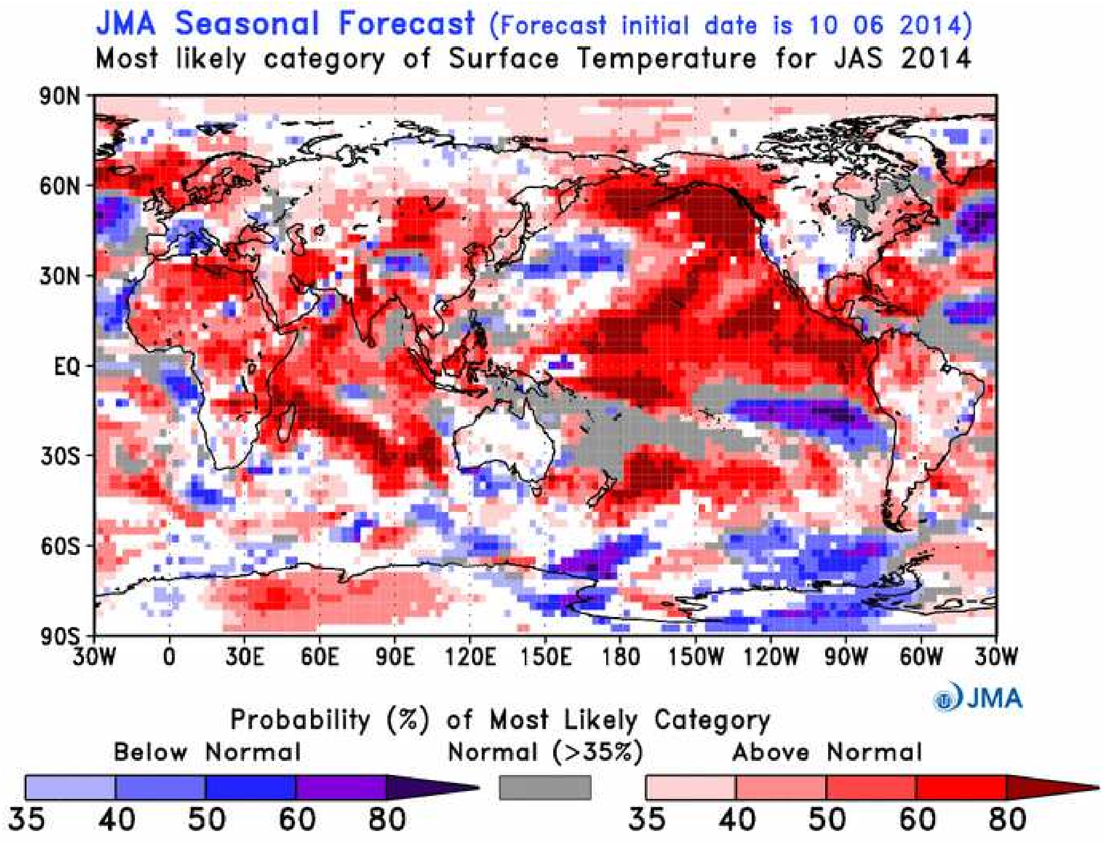


fig.26: **Most likely category of T2m from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.** **http://ds.data.jma.go.jp/tcc/tcc/products/model/**

II.3.f Lead Centre on Multi Model Ensemble (LCMME)

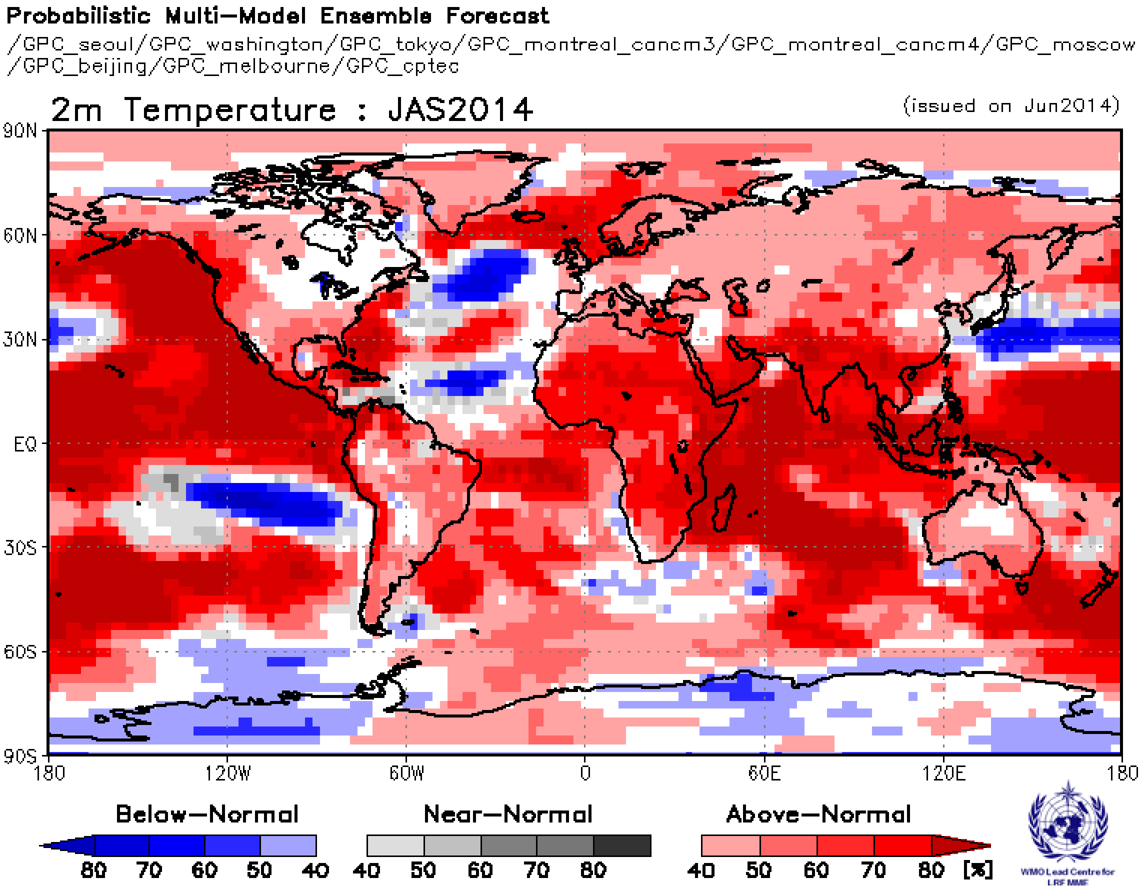


fig.27: MME most likely category of T2m from LC-MME. The MME composition corresponds to the GPCs not used in EuroSIP https://www.wmolc.org/

II.3.g Euro-SIP

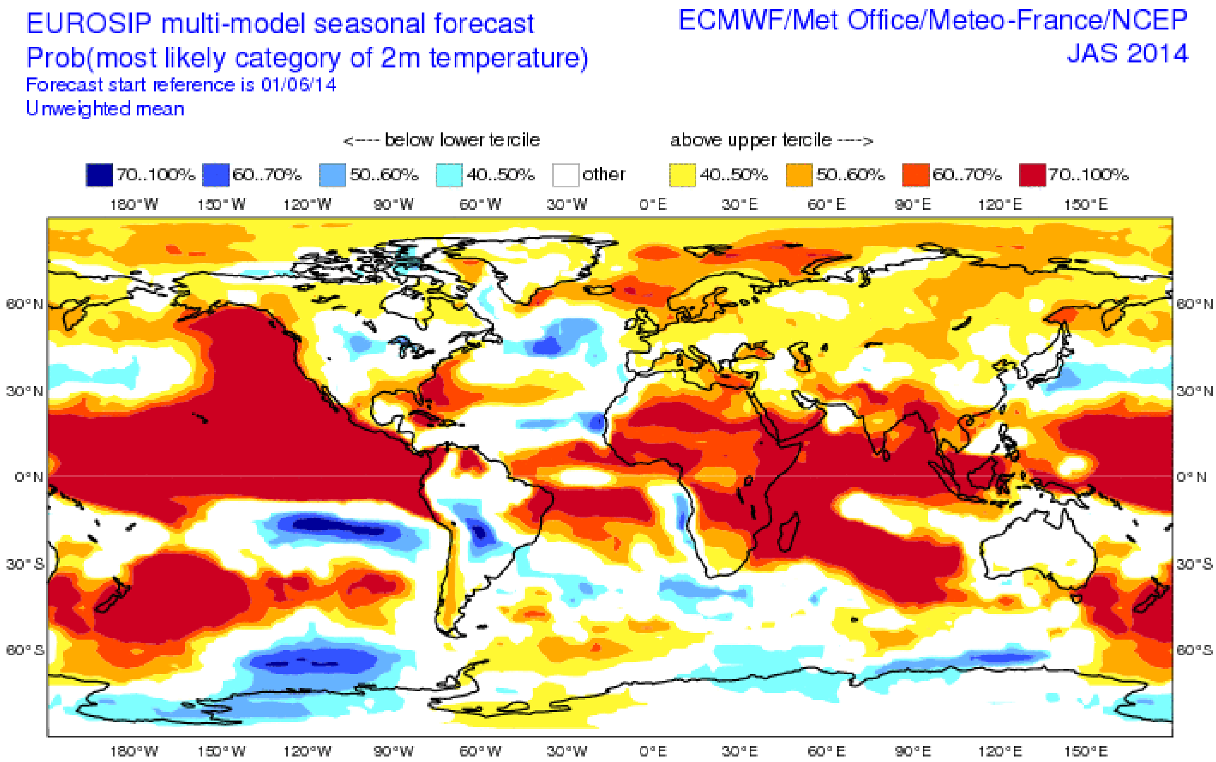


fig.28: Multi-Model Probabilistic forecasts for T2m from EuroSip.
(2 Categories, Below and Above normal – White zones correspond to No signal and Normal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

North-America : enhanced probabilities for warm anomalies over the Western coast of USA.
Central-America : globally warmer than normal extending toward the North Caribbean.

South-America : Some consistent signal over the North-Western coastal part of the continent (warmer than normal) and the Northern regions (on the Atlantic and Nordeste – warmer than normal).
Australia : little signal across the continent.
Asia : Mostly Warmer than normal conditions everywhere. Warmer than normal conditions over most of the Indian sub-continent (likely in relationship with a weak monsoon) and South-East Asia.
Africa : Mostly warmer than normal over most of the continent ; especially the North-Eastern part and along the Eastern coast.
Europe : no clear signal over most of the continent. The weak warm signal is likely related to the climate warming trend.

II.4. IMPACT : PRECIPITATION FORECAST

II.4.a ECMWF

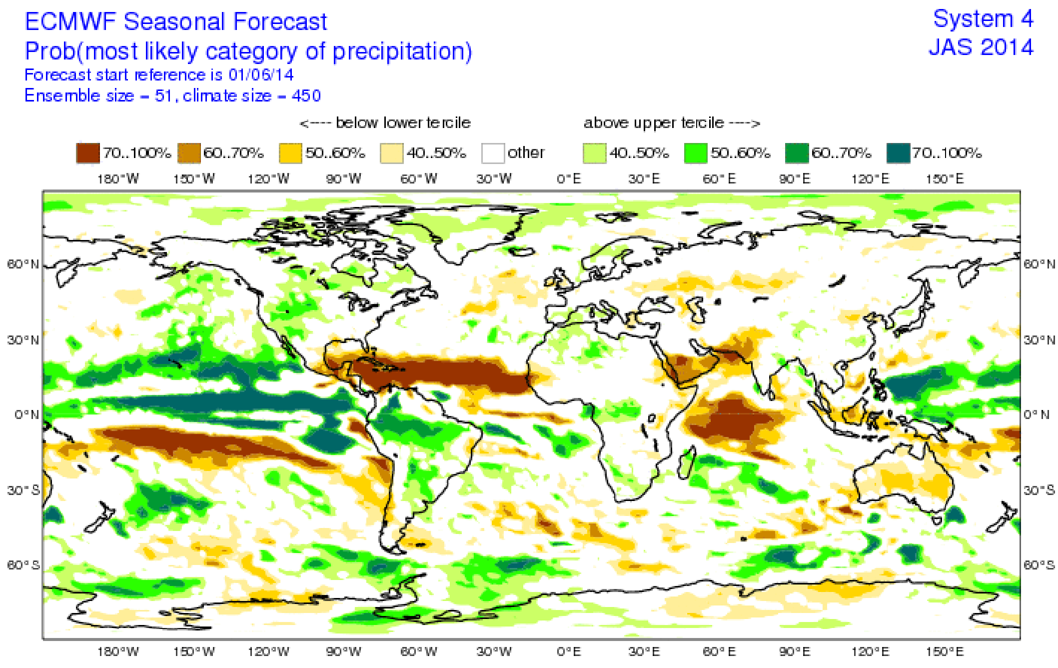


fig.29: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/charts/seasonal_charts_s2/

II.4.b Météo-France

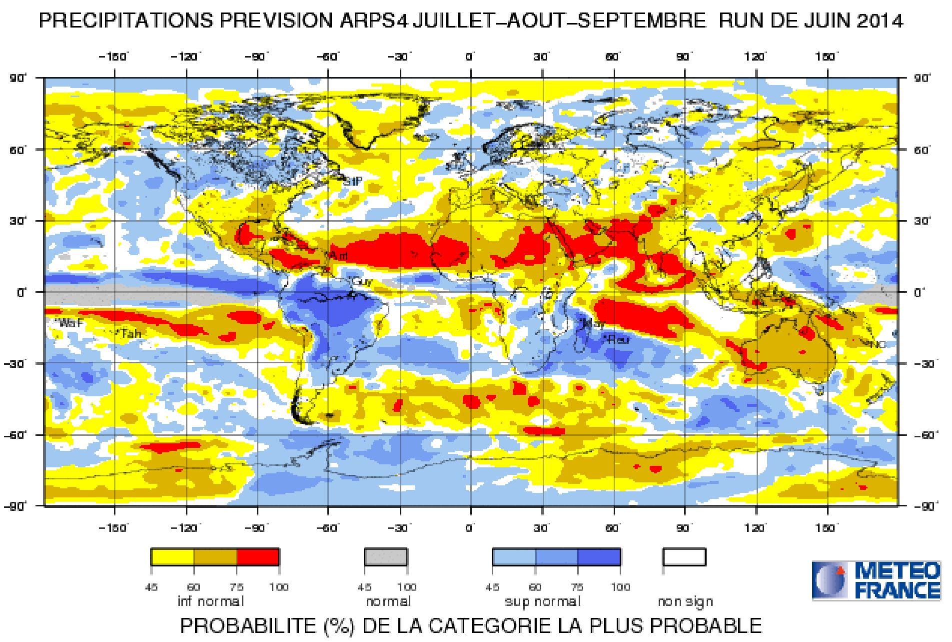


fig.30: Most likely category of Rainfall from Meteo-France. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.4.c Met office (UKMO)

Not available

fig.31: **Category probabilities of Rainfall from UK Met Office.** https://www.wmolc.org/

II.4.d Climate Prediction Centre (CPC)

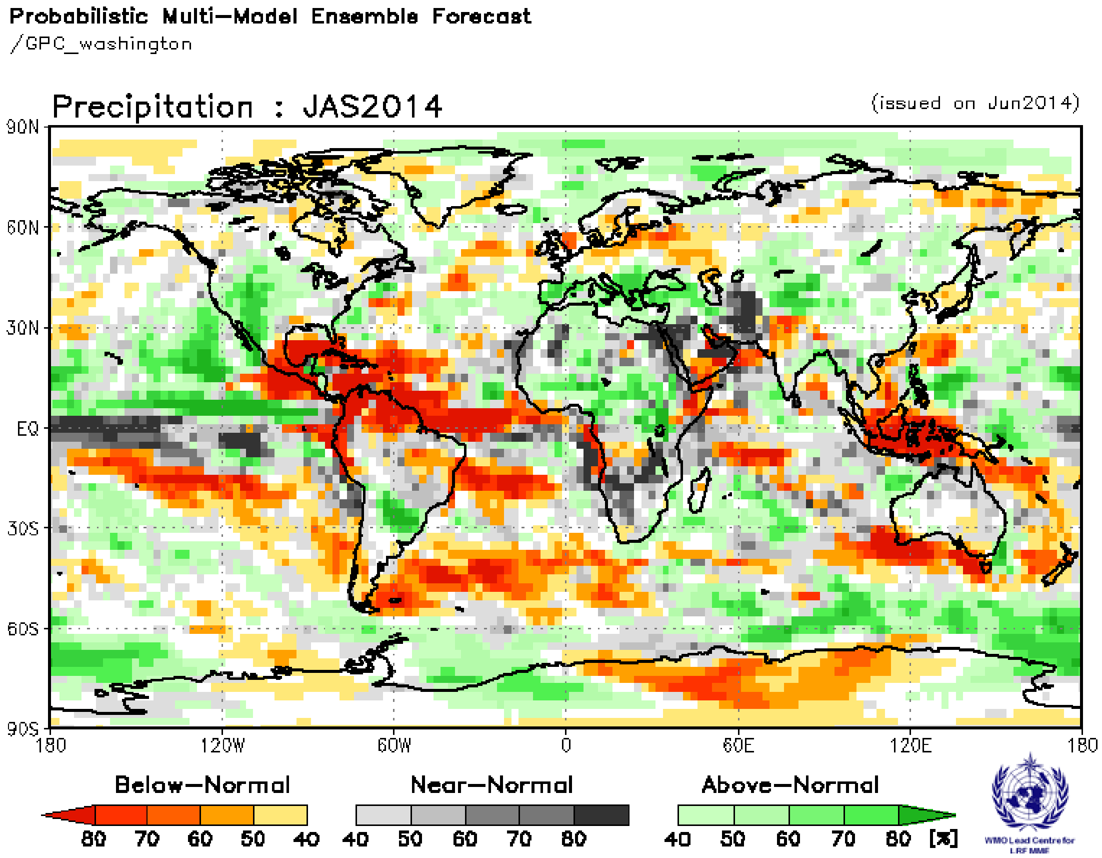


fig.32: **Most likely category of Rainfall from CPC.** https://www.wmolc.org/

II.4.e Japan Meteorological Agency (JMA)

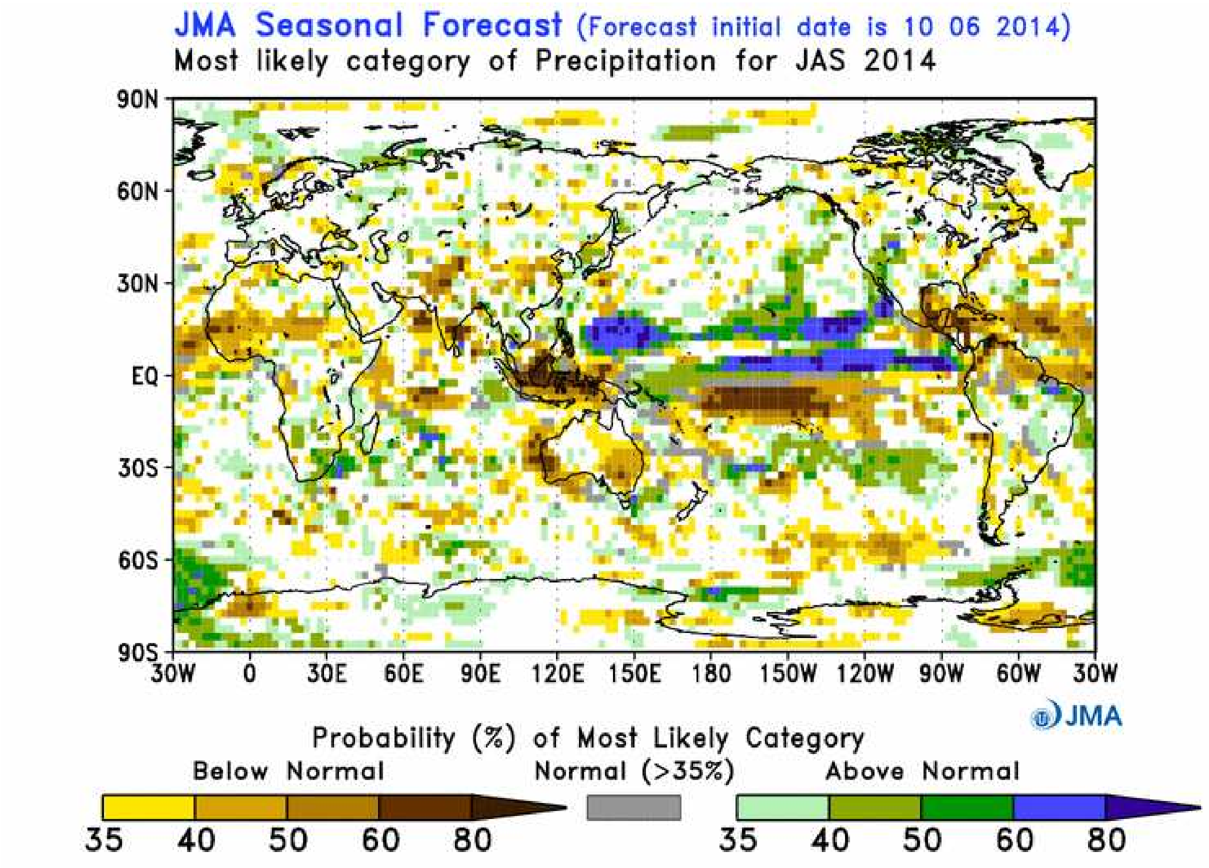


fig.33: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/

II.4.f Lead Centre on Multi Model Ensemble (LCMME)

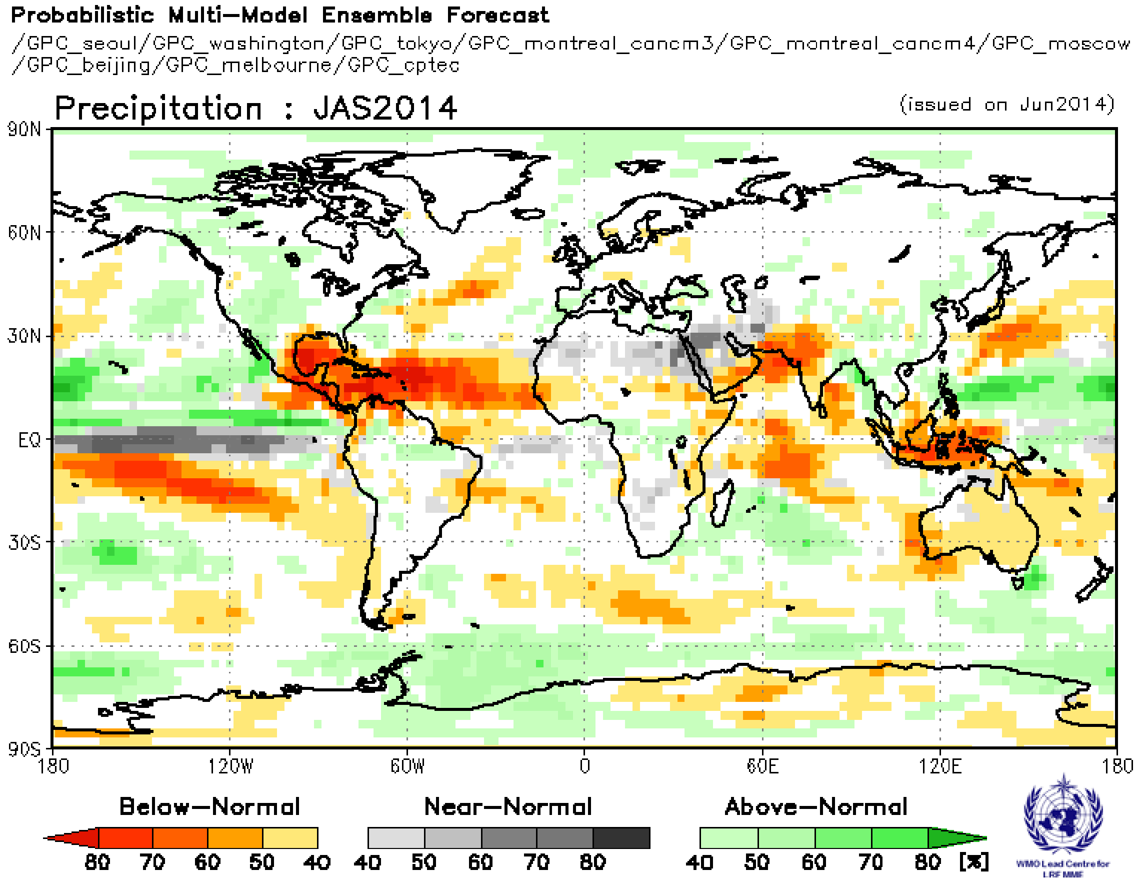


fig.34: **MME most likely category of Rainfall from LC-MME. The MME composition corresponds to the GPCs not used in EuroSIP. https://www.wmolc.org/**

II.4.g Euro-SIP

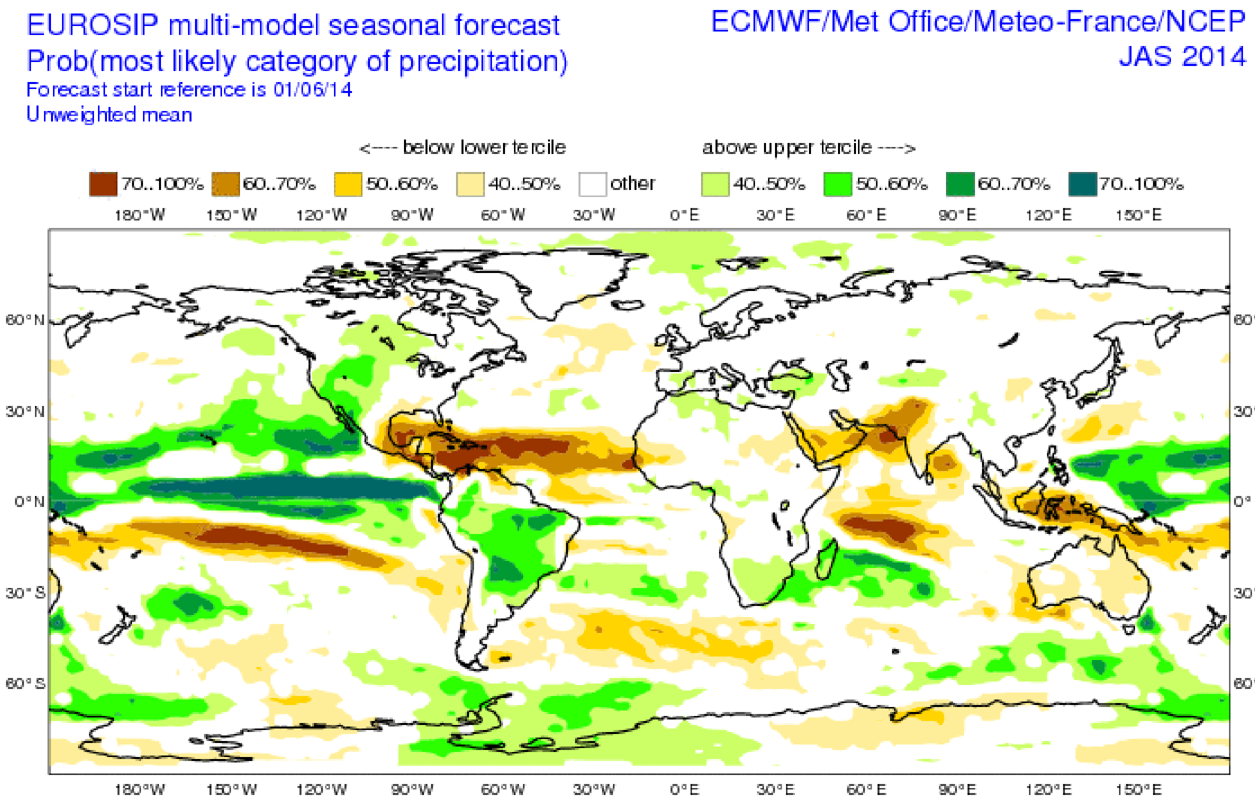


fig.35: Multi-Model Probabilistic forecasts for precipitation from EuroSip. (2 Categories, Below and Above normal – White zones correspond to No signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

In the Tropics : some consistent signal. Enhanced probabilities for wet scenarios across the Equatorial Pacific, over a large portion of South-America (Brazil, Argentina, Bolivia, …) and part of USA (Western side and the Rocky). Enhanced probabilities for dry scenario over the Northern coastal areas of South America extending across the Caribbean and Central America, over most of the Maritime continent and the Western façade of West Africa. Also to be quoted Dry scenarios over part of most the Indian sub-continent consistently with the atmospheric response of the models over the Indian Ocean (weakened monsoon circulation).
For Europe : No signal.

II.5. REGIONAL TEMPERATURES

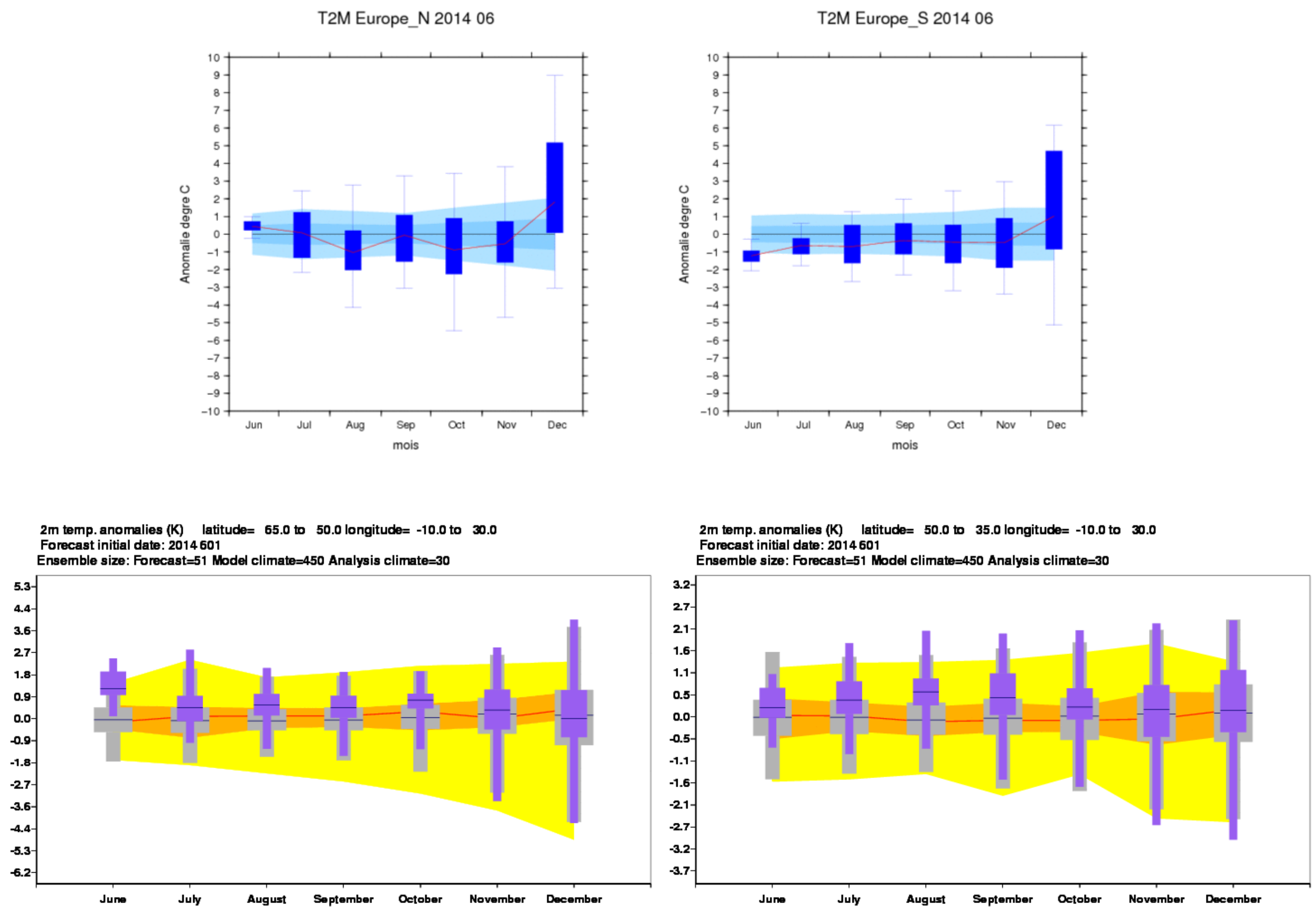


fig.36: Climagrams for T2m in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom - idem).

No consistency between the two models. The general circulation is certainly one of the reasons (see discussion on Geopotential Height), the length of the hindcast period could also partly explain the differences.

For Northern Europe : weak and contradictory signal between MF and ECMWF..

For Southern Europe : Continuous warming in MF (but mostly Below Normal for JAS). In ECMWF, above normal conditions kept along the entire period.

In Météo-France climagrams, the distributions of area averages are displayed for the seasonal forecast (dark blue boxes and wiskers), and the climate reference on the 29-year hindcast period (blue and light blue bands). The limits of the boxes (ensemble forecast) and blue band (climate reference) correspond to the upper and lower terciles. The limits of the wiskers (ensemble forecast) and light blue band (climate reference) correspond to the mean + 1 standard deviation and the mean – 1 standard deviation. The red line corresponds to the ensemble mean.

REGIONAL PRECIPITATIONS

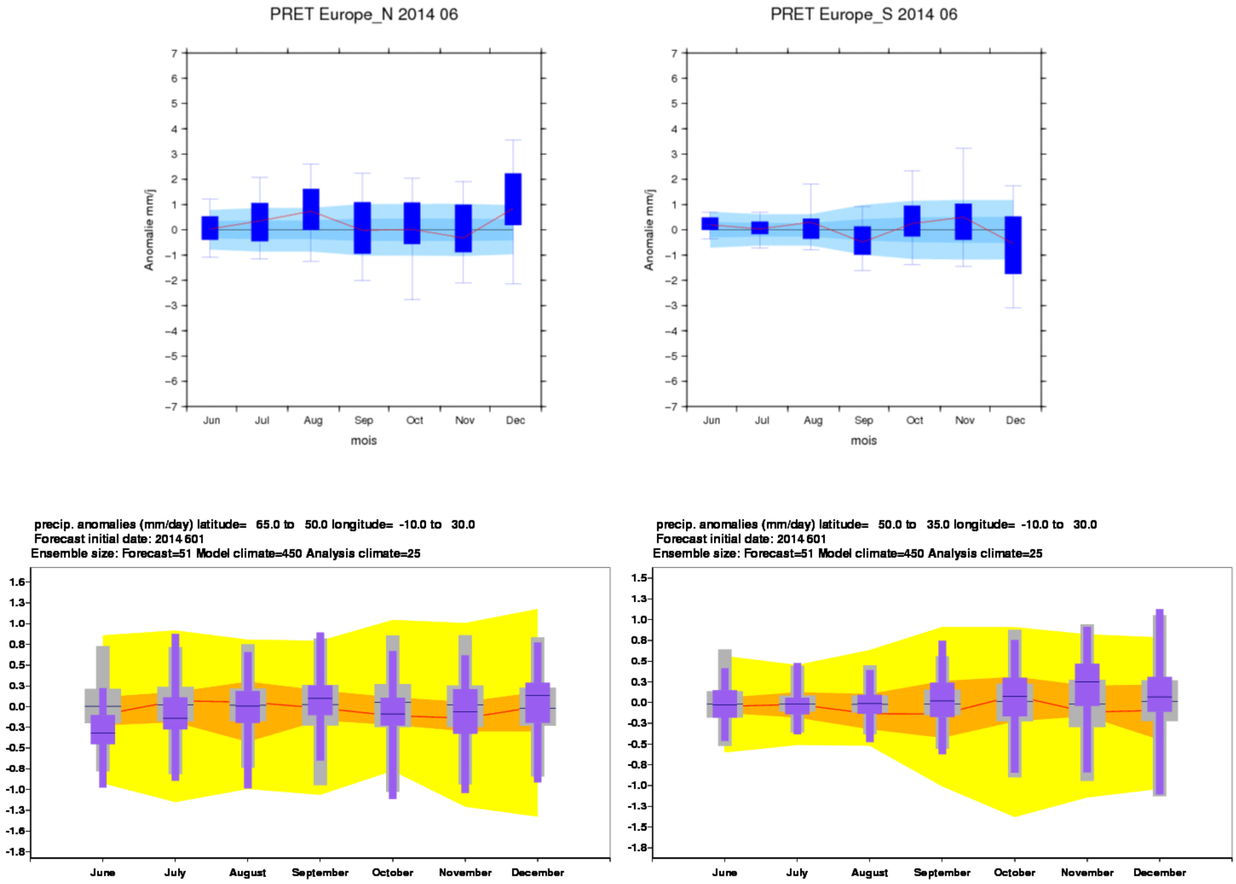


fig.37: Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom - idem).

No significant signal in the models.

In Météo-France climagrams, the distributions of area averages are displayed for the seasonal forecast (dark blue boxes and wiskers), and the climate reference on the 29-year hindcast period (blue and light blue bands). The limits of the boxes (ensemble forecast) and blue band (climate reference) correspond to the upper and lower terciles. The limits of the wiskers (ensemble forecast) and light blue band (climate reference) correspond to the mean + 1 standard deviation and the mean – 1 standard deviation. The red line corresponds to the ensemble mean.

II.6. MODEL'S CONSISTENCY

II.6.a GPCs consistency maps

Not available

fig.38: ***GPCs Consistency maps from LC-MME*** http://www.wmolc.org/

II.7. "EXTREME" SCENARIOS

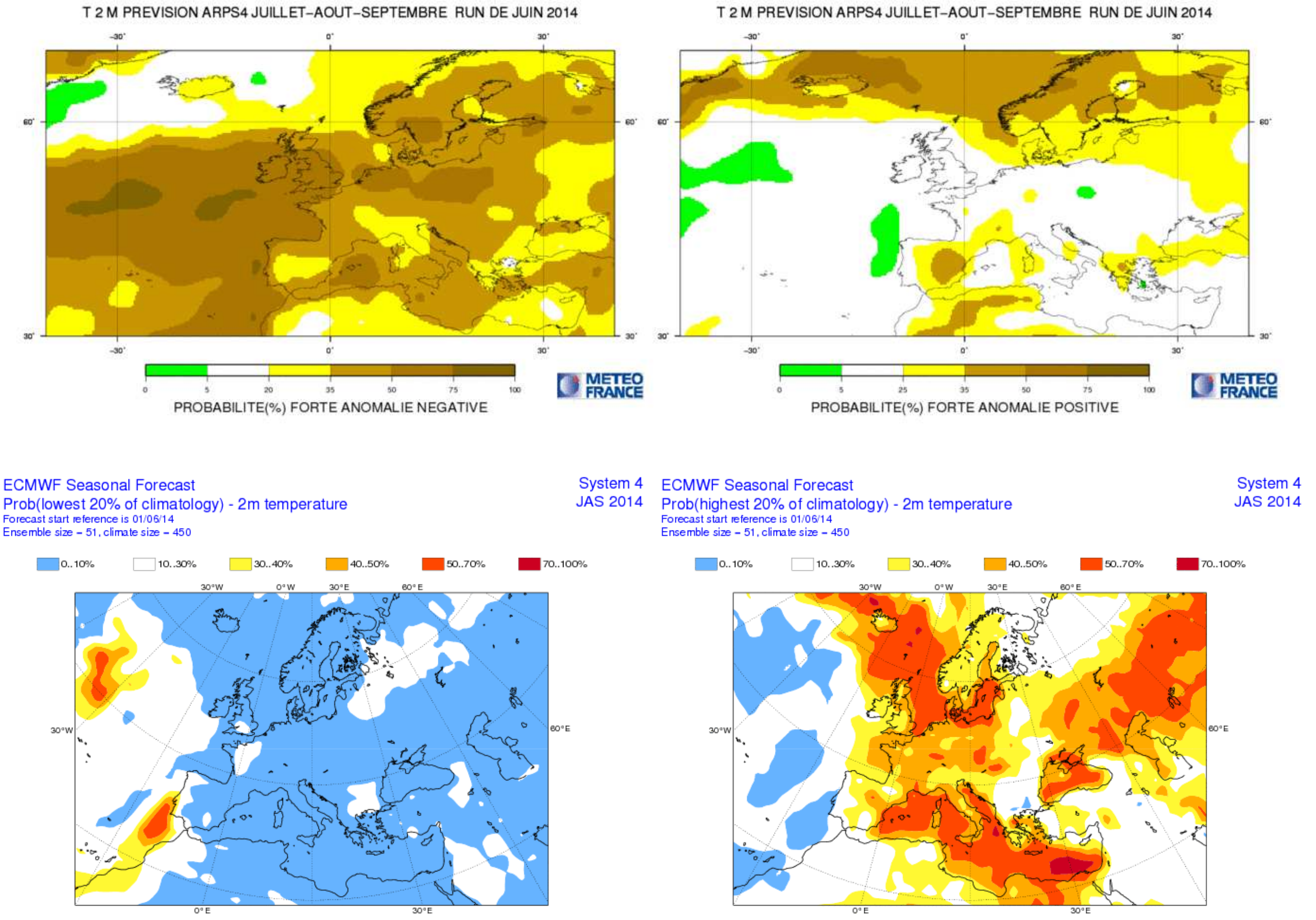


fig.39: Top : Probability of « extreme » above normal conditions from T2m for Meteo-France (left - highest ~15% of the distribution and right lowest ~15% of the distribution)

Bottom : idem from ECMWF (left - highest 20% of the distribution and right lowest 20% of the distribution).

In relationship with the differences in the Z500 forecasts, no consistency between the 2 models.

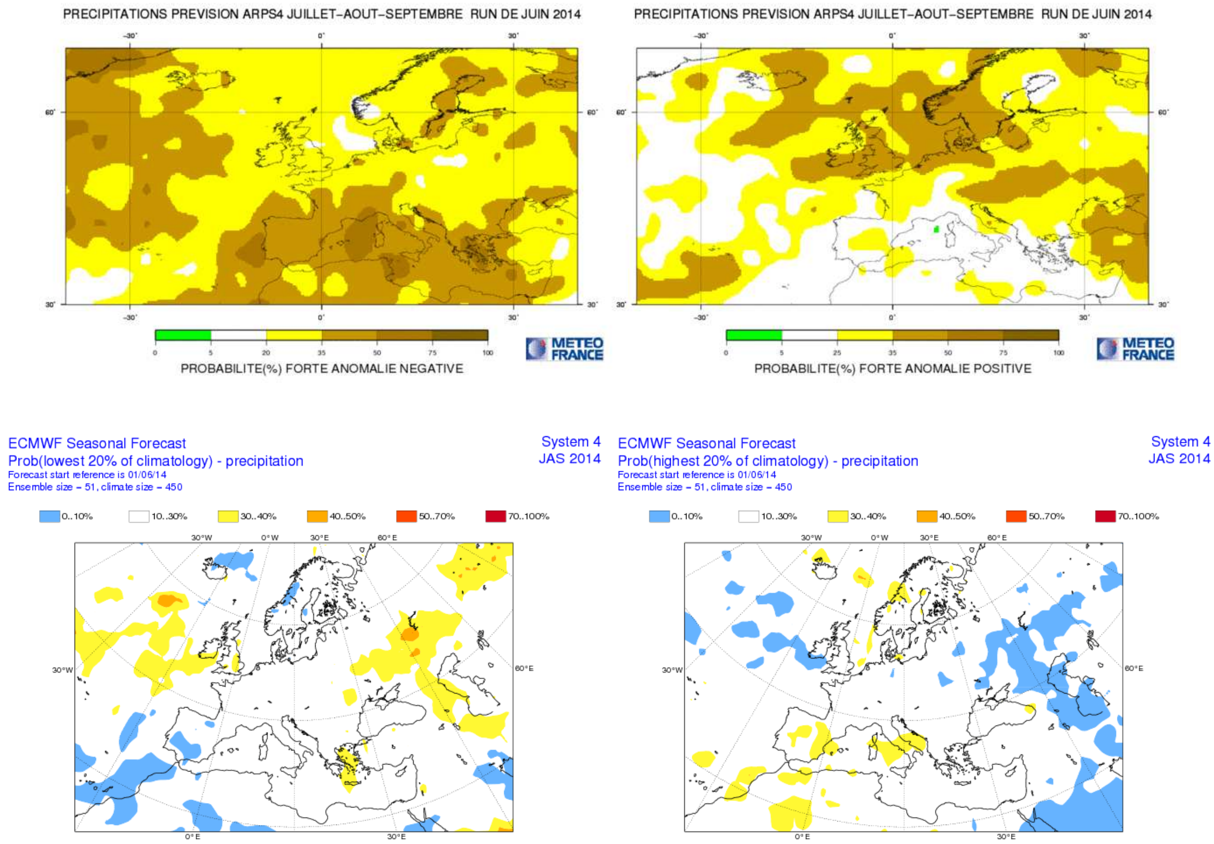


fig.40: Top : Probability of « extreme » above normal conditions for rainfall from Meteo-France (left - highest ~15% of the distribution and right lowest ~15% of the distribution)
Bottom : idem from ECMWF (left - highest 20% of the distribution and right lowest 20% of the distribution).).

In relationship with the current predictability and the model uncertainties, it seems difficult to use these extreme precipitation forecasts.

II.8. DISCUSSION AND SUMMARY

Forecast over Europe

For this forecast the major comment is about the **current predictability** in the climate system. The development of a warm event in the Pacific suggests some possible predictability, mostly located in the Tropics at this stage (Pacific, Indian Ocean and Atlantic).

The **EuroSIP** forecasts are likely a **good synthesis** of possible scenarios across the planet.

For rainfall, "No Privileged Scenario" covers most of the European continent and the Mediterranean basin

For temperature : no privileged scenario over Europe, despite a weak warm signal (see EUROSIP) over the European continent, likely related to the climate warming trend.

Obviously, some downscaled information could detail these scenarios for specific countries or sub-regions.

Tropical Cyclone activity

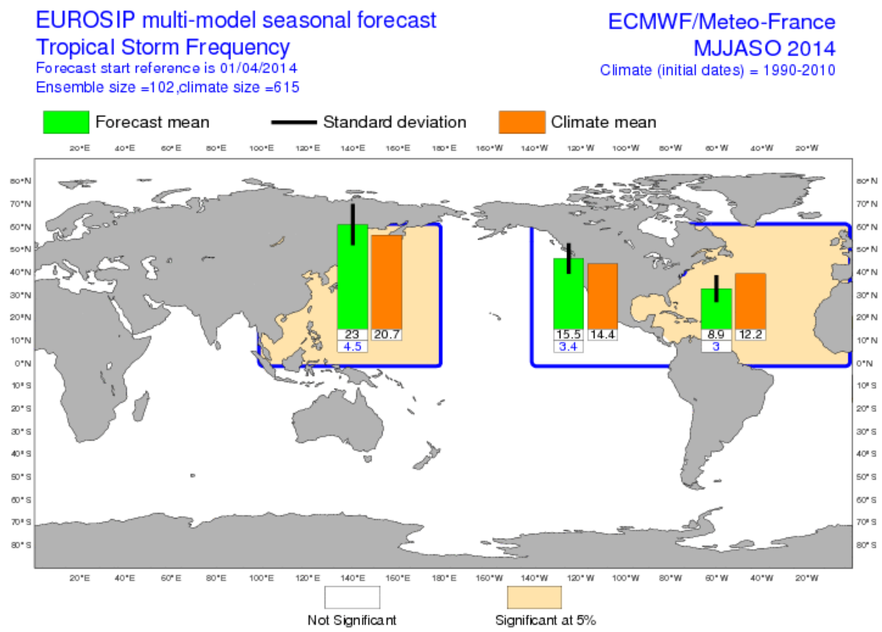


fig.41: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmtrop/trop_euro/eurosip_tropical_storm_frequency/

For the Tropical Cyclone season and in relationship with the SSTs scenarios, Euro-Sip forecasts indicate Below Normal Topical Cyclone activity over the Tropical North Atlantic (consistently with the development of the Pacific warm event) and above normal in the Pacific.

Synthesis of Temperature forecasts for July-August-September 2014 for European regions

Results are expressed with respect of 3 possible scenarios : « Above normal », « close to normal » and « Below normal ». The limits between each category is given by the corresponding tercile such that each scenario have the same climatological probability of occurrence (33,3%). If the forecast shows no specific signal (because of low predictability and/or divergent scenarios between several models), the cell is filled in grey and "No privileged scenario" is indicated.

MODELS	Northern Europe	Southern Europe	Central Europe	Eastern Europe	SEE Region
CEP					
MF					
Met Office Not available	no privileged	no privileged	no privileged	no privileged	no privileged
CPC					
JMA					
synthesis					
LC-MME					
Eurosip					
privileged scenario by RCC-LRF node	no privileged scenario	no privileged scenario	no privileged scenario	no privileged scenario	no privileged scenario

T Below normal (Cold) T close to normal T Above normal (Warm) No privileged scenario

Synthesis of Rainfall forecasts for July-August-September 2014 for European regions

Results are expressed with respect of 3 possible scenarios : « Above normal », « close to normal » and « Below normal ». The limits between each category is given by the corresponding tercile such that each scenario have the same climatological probability of occurrence (33,3%). If the forecast shows no specific signal (because of low predictability and/or divergent scenarios between several models), the cell is filled in grey and "No privileged scenario" is indicated.

MODELS	Northern Europe	Southern Europe	Central Europe	Eastern Europe	SEE Region
CEP					
MF					
Met Office Not available	no privileged	no privileged	no privileged	no privileged	no privileged
CPC					
JMA					
synthesis					
LC-MME					
Eurosip					
privileged scenario by RCC-LRF node	*no privileged scenario*	*no privileged scenario*	*no privileged scenario*	*no privileged scenario*	*no privileged scenario*

RR Below normal (Dry) | RR close to normal | RR Above normal (Wet) | No privileged scenario

III. ANNEX

III.1. SEASONAL FORECASTS

Presently several centres provide seasonal forecasts, especially those designated as Global Producing Centres by WMO (see http://www.wmo.int/pages/prog/wcp/wcasp/clips/producers_forecasts.html).
■ BoM, CMA, CPTEC, ECMWF, JMA, KMA, Météo-France, NCEP and UK Met Office have ocean/atmosphere coupled models. The other centres have atmospheric models which are forced by a SST evolution which is prescribed for the entire period of forecast.
■ LC-MME and Euro-SIP provide multi-model forecasts. Euro-Sip is presently composed using 4 models (ECMWF, Météo-France, NCEP and UK Met Office). LC-MME uses information coming from most of the GPCs ; providing deterministic and probabilistic combinations of several coupled and forced models.

Seasonal forecasts use the ensemble technique to sample uncertainty sources inherent to these forecasts. Several Atmospheric and/or oceanic initial states are used to perform several forecasts with slightly different initial state in order to sample the uncertainty related to imperfect knowledge of the initial state of the climate system. When possible, the model uncertainty is sampled using several models or several version of the same model. The horizontal resolution of the Global models is currently between 100 and 300km. This mean that only Large Scale feature make sense in the interpretation of the issued forecasts. Generally speaking, the temperature forecasts show better skills than rainfall forecasts. Then, it exists a natural weakness of the seasonal predictability in Spring (ref to North Hemisphere).

In order to better interpretate the results, it is recommended to look to verification maps and graphs which give some insight into the expected level of skill for a specific parameter, region and period. A set of scores is presented on the web-site of the Lead-Centre for Verification (see http://www.bom.gov.au/wmo/lrfvs/) ; scores are also available at the specific web site of each centres.

This bulletin collects all the information available the 21st of the current month preceding the forecasted 3-month period.

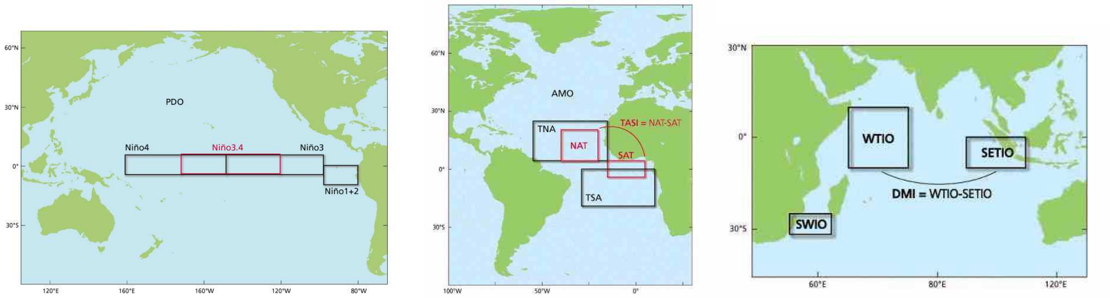
III.2. « NINO », SOI INDICES AND OCEANIC BOXES

El Niño and La Niña events primarily affect tropical regions and are monitored by following the SST evolution in specific area of the equatorial Pacific.

- Niño 1+2 : 0°/10°S 80W-90W ; it is the region where the SST warming is developing first at the surface (especially for coastal events).
- Niño 3 : 5°S/5°N 90W-150W ; it is the region where the interanual variability of SST is the greatest.
- Niño 4 : 5°S/5°N 160E- 150 W ; it is the region where SST evolution have the strongest relationship with evolution of convection over the equatorial Pacific.
- Niño 3.4 : 5°S/5°N 120W-170W ; it is a compromise between Niño 3 and Niño 4 boxes (SST variability and Rainfall impact).

Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea level pressure at Tahiti minus standardized sea level pressure at Darwin (see above figure). It represents the Walker (zonal) circulation and its modifications. Its sign is opposite to the SST anomaly meaning that when the SST is warmer (respectively colder) than normal (Niño respectively Niña event), the zonal circulation is weakened (respectively strengthened).

Oceanic boxes used in this bulletin :



III.3.LAND BOXES

Some forecasts correspond to box averaged values for some specific area over continental regions. These boxes are described in the following map and are common to ECMWF and Météo-France.