GLOBAL CLIMATE BULLETIN
n°194 – August 2015

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I. DESCRIPTION OF THE CLIMATE SYSTEM (JUNE 2015)

OCEANIC ANALYSIS

I.1.a Global analysis

In the Pacific ocean :

All along **the equatorial waveguide** on the surface (fig.I.1.1, I.1.2 and I.1.3): Positive SST anomalies in the central and eastern basin with a maximum near the South American coasts. Temperature trends have not been very important for the last month with mainly the continuation of the increase near the 120 W.

In **the equatorial waveguide** in the subsurface (fig.I.1.4 and I.1.5): strong contrast between the West of the basin (cold anomaly) and the East (warm anomaly). This contrast was reinforced in June in connection with the arrival of a Kelvin wave off the South American coast. (Fig I.1.c)

Niño monitoring : Niño 3.4 index up to 1.3 °C in June in monthly mean (up to +1.7 in mid july), corresponding to a moderate El Niño event. Max increase was observed in the Niño 3 box while Niño 4 index down slightly and Niño 1+2 index didn't change very much.

Elsewhere:

In the northern hemisphere: remaining of the structure of the positive PDO (NOAA index ~ 0.6), with strong positive anomalies along the North American coast.

In the southern hemisphere: cold anomaly along the SPCZ.

In the Indian Ocean :

Persistent warm anomaly over much of the basin. The DMI index is slightly positive (~ 0.3)

In the Atlantic:

Neutral or cool anomalie on the equatorial waveguide surface and mainly a cooling trend in the West, near the Guinea Gulf.

In the North Atlantic, the horseshoe pattern from Labrador to Ireland, West Africa coast and Caribbeansea is always present.

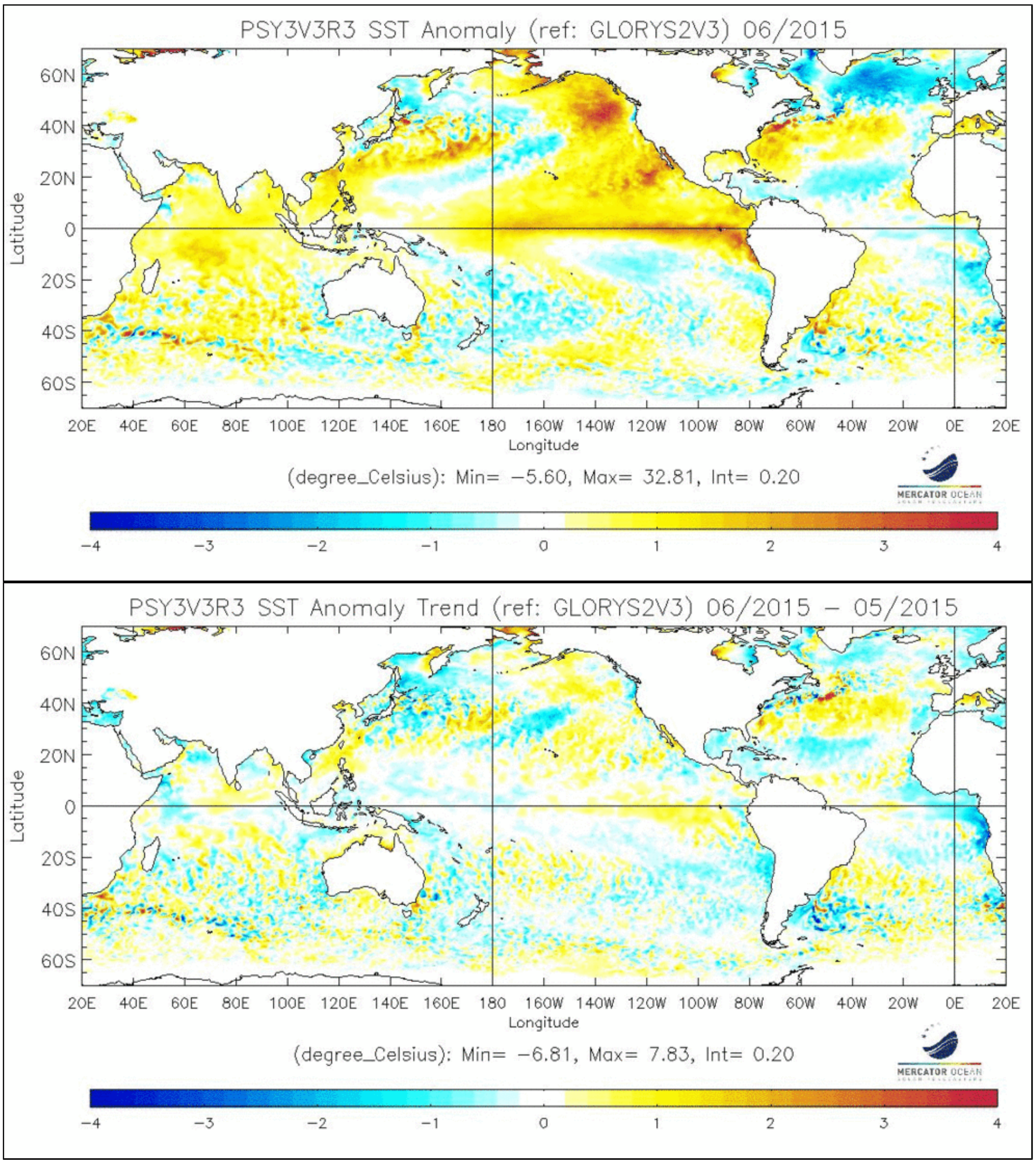

fig.I.1.1: top : SSTs Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

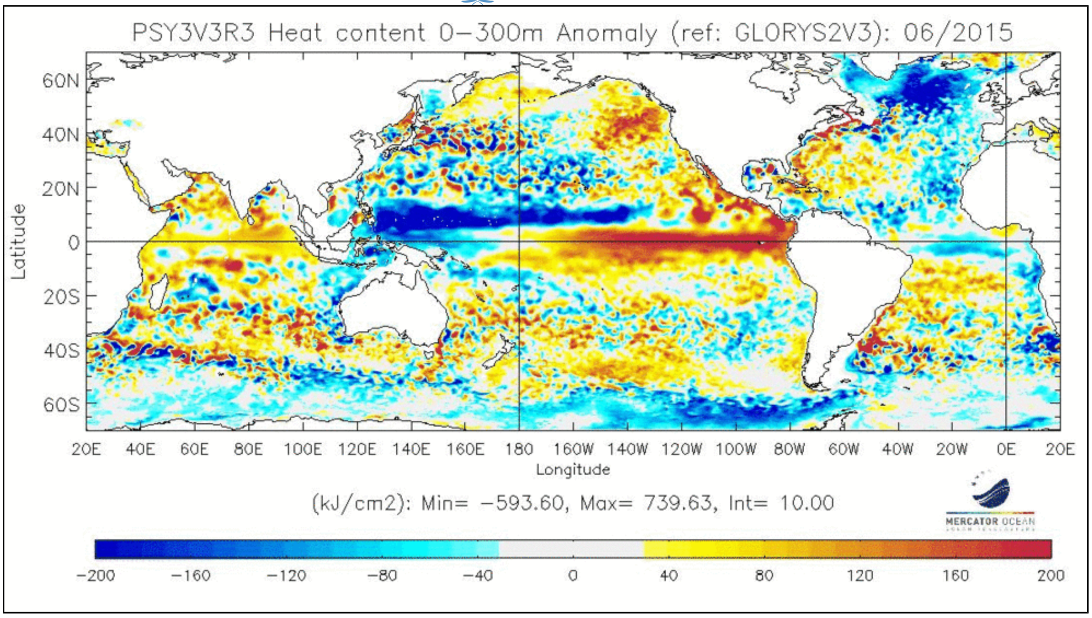

fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2009) http://bcg.mercator-ocean.fr/

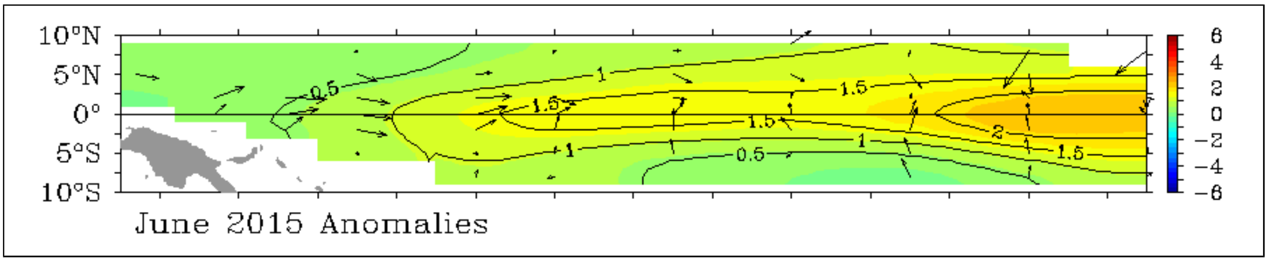

fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON. http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html

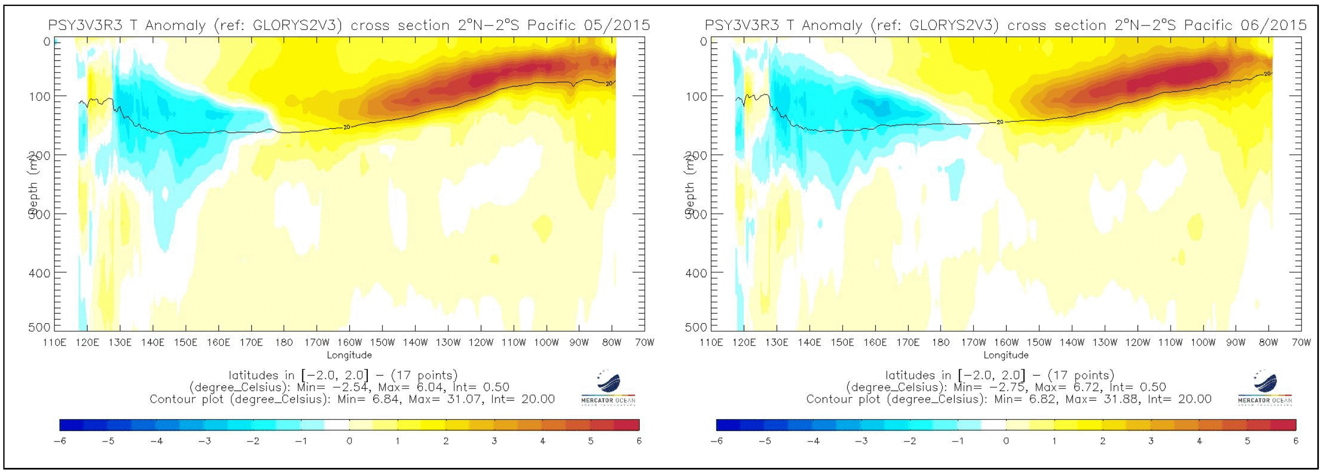

fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), http://bcg.mercator-ocean.fr

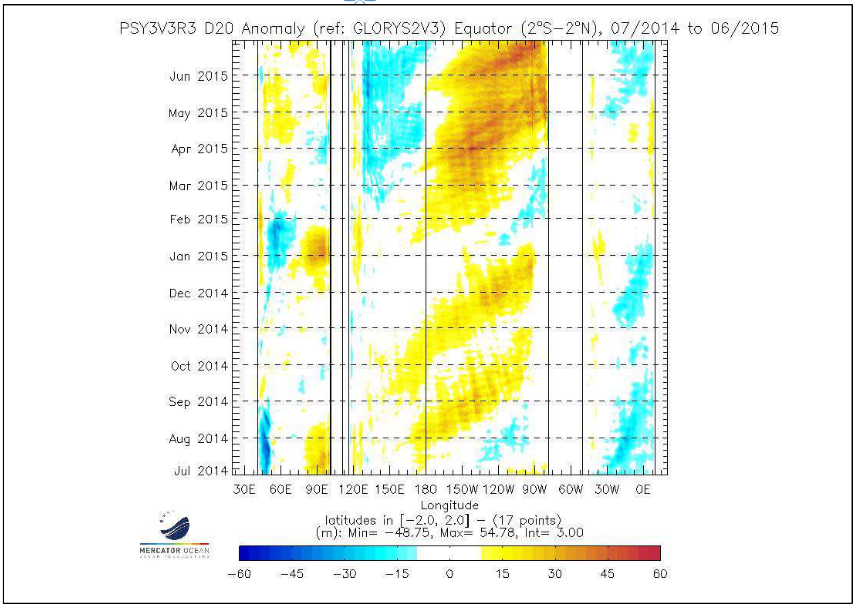

fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period http://bcg.mercator-ocean.fr/

I.1.b Sea surface temperature near Europe

Arctic Sea still warmer than normal, no significant change to the previous month.

Large parts of the north-eastern North Atlantic (between Greenland/Iceland and around 50°N) still colder than normal. Cold anomalies propagated even further to the east, so almost the whole North Sea and Baltic Sea was colder than normal. This propagation was already to be seen in May and continued in June.

Central North Atlantic mainly warmer than normal, but some cooling near Iberia / North Africa led to partly negative anomalies near Portugal.

Western Mediterranean heated up further, positive anomalies became greater, especially near Corsica/Sardinia. On the other hand, the Eastern Mediterranean became cooler relative to normal. (Note: in July the Mediterranean heated further up to temperatures partly above 28°C!). Black Sea still warmer than normal.

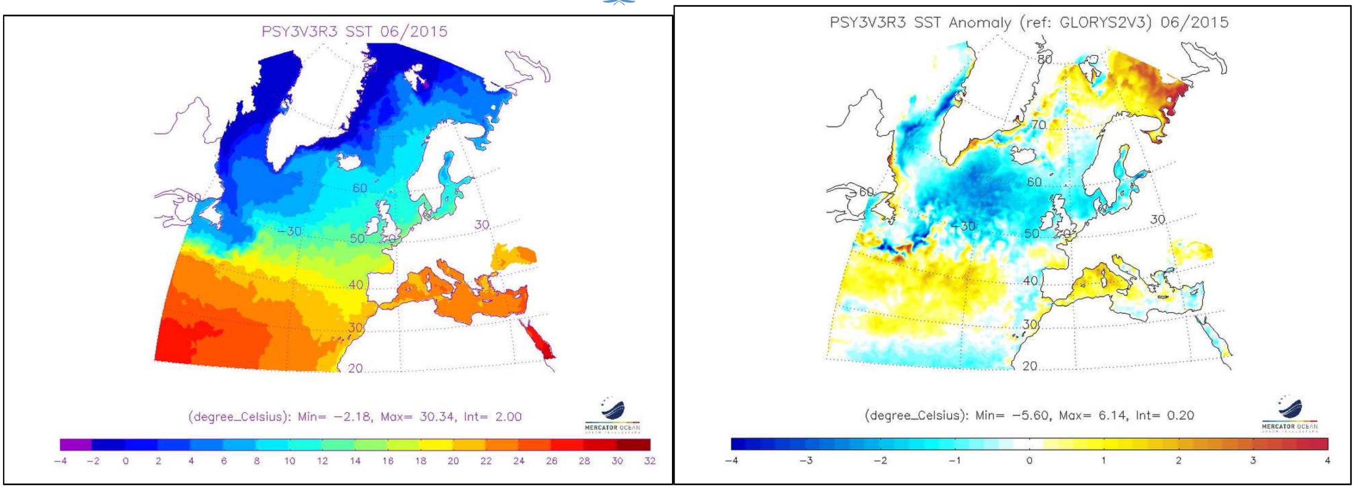

fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

ATMOSPHÈRE

I.1.c General Circulation

Velocity Potential Anomaly field in the high troposphere (fig. 1.2.1 – insight into Hadley-Walker circulation anomalies) : Over the equatorial Pacific Ocean, a persistent significant upward motion anomaly extends far to the east of the international date line, linked with the SST anomalies.

Strong subsidence anomaly on the tropical Atlantic and to a lesser intensity on the Indian Ocean, Africa up to the Mediterranean sea

The SOI is negative in June (-0.6), which abounds in the direction of ocean-atmosphere coupling (consistent with El Niño). Other atmospheric components also show an ocean-atmosphere coupling: weakening of the trade winds in the equatorial Pacific waveguide (and even a shift to westerly winds between 135 ° W and 170 ° W), excess rainfall in the center of the tropical Pacific Ocean (see precipitation map below).

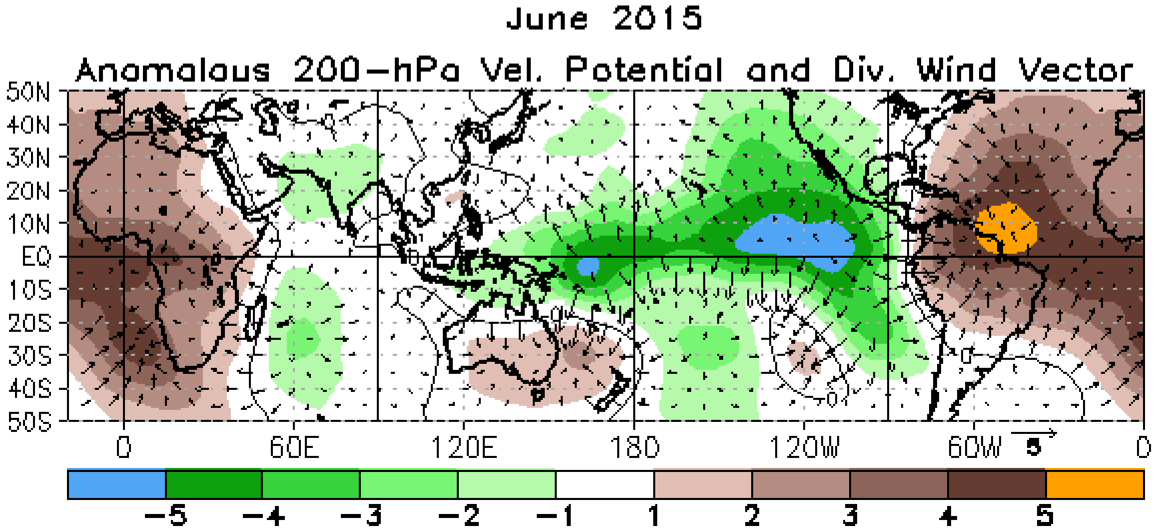

fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).

http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

MJO (fig. I.2.b):

The MJO has been very active in June, mainly at the end of the month in close relation with SST anomalies on the Central Pacific.

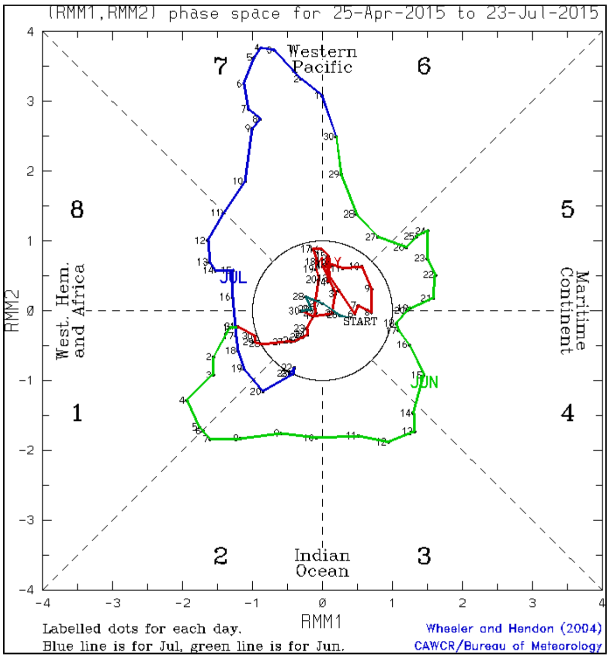

fig.I.2.b: indices MJO http://cawcr.gov.au/staff/mwheeler/maproom/RMM/phase.Last90days.gif

Stream Function anomalies in the high troposphere (fig. 1.2.2 – insight into teleconnection patterns tropically forced) : In connection with the strong signal of the MJO, few detectable structures this month, with the exception of the American continent with a positive / negative dipole between Central America and Brazil.

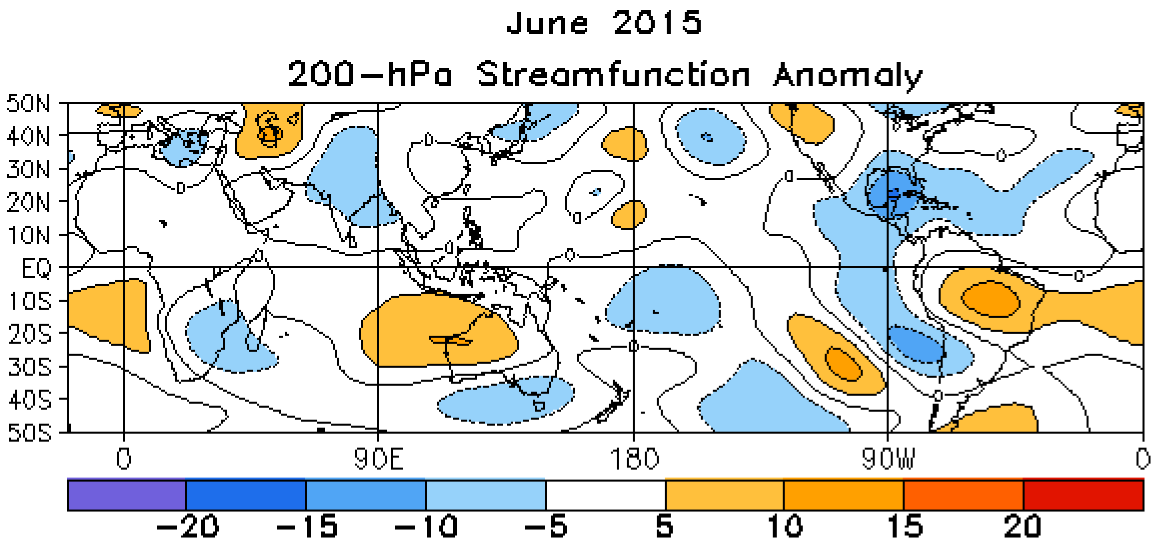

fig.I.2.2: Stream Function Anomalies at 200 hPa.

http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

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

On North America, the anomalies remain marked by the influence of the PDO (strong contrast between West and East part of the continent) without currently PNA pattern (index -0,2). On Europe, high values from Western Europe to Siberia and minimum in North Scandinavia.

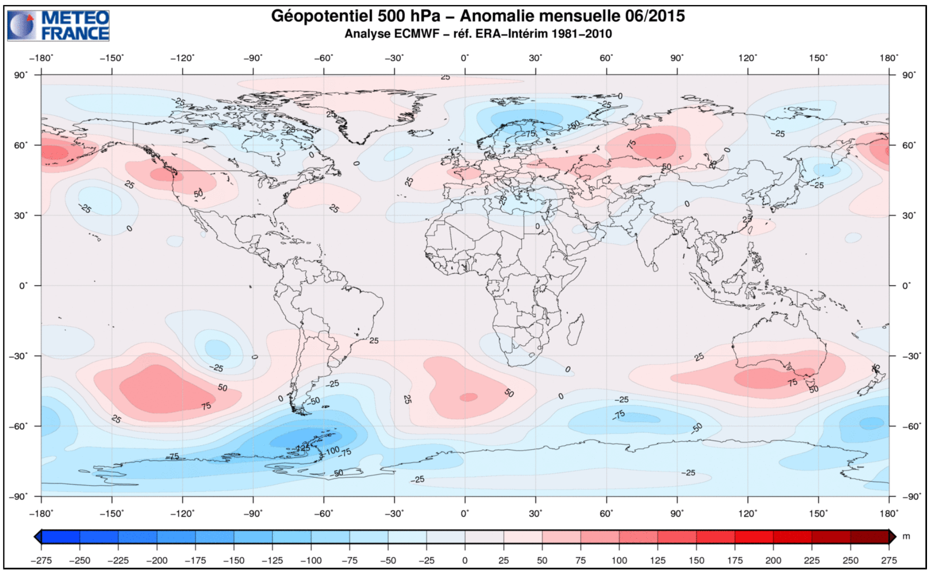

fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
MAY 15	0.2	0.7	2.1	0.5	-0.1	---	-1.5	-2.1	0.5
APR 15	0.6	0.9	1.2	-0.4	-0.4	---	1.1	-1.5	-0.9
MAR 15	1.1	1.2	0.4	1.1	-0.5	---	0.3	0.4	0.7
FEB 15	1.1	0.0	-1.4	1.2	0.5	0.7	-0.9	-0.4	2.1
JAN 15	1.6	1.1	-0.2	1.3	0.1	0.4	-0.2	-0.2	0.0
DEC 14	1.6	-0.6	-0.1	---	0.4	-0.2	-0.4	-0.4	-0.9

Evolution of the main atmospheric indices for the Northern Hemisphere for the last 6 months : http://www.cp-c.ncep.noaa.gov/products/CDB/Extratropics/table3.shtml

Sea level pressure and circulation types over Europe : Lower-than-normal SLP over northern Scandinavia and higher-than-normal SLP over Greenland favors cold air advection from the Arctic to northern Europe. North of the Azores High, relatively cool and moist air over the North Atlantic was additionally advected to northern Europe. On the other hand, the Azores High was much extended to the European continent, causing mostly warming by subsidence and dryness.

Once again, the SCAND and EA patterns were the most dominant ones for Europe. Both the low pressure over Scandinavia and the high pressure over much of the rest of Europe can be explained by a negative Scandinavia pattern (SCAND -1.5). This pattern is in a clearly negative phase since April 2015 with its peak value in May 2015. The advection over the North Atlantic can be explained by a positive phase of the East Atlantic pattern (EA +1.1), which is in place since March 2015. So both patterns have a certain persistency.

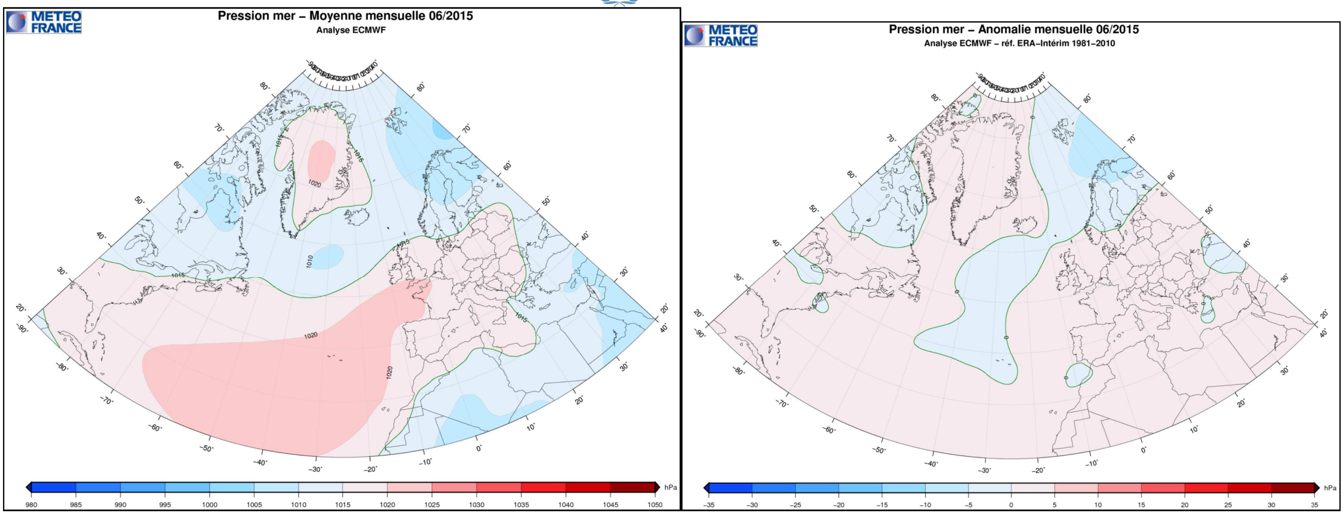

fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (top) and 1981-2010 anomalies (bottom).

<u>Circulation indices: NAO and AO :</u> NAO oscillated more or less around zero during June 2015, resulting in a monthly index mean of +0.2. Therefore, no active NAO mode can be detected this month. (Note: In July 2015, a significantly negative NAO phase started!).

AO was mainly positive during the first two thirds of June 2015, and switched to a slightly negative phase afterwards. This caused a hemispherically more meridional pattern, including the start of building up a significant high pressure ridge over Iberia and Western Europe, which was also the start of a formation of a longer heat wave in Europe. (The heat wave started end of June in Iberia and had its highest temperatures in western Europe up to now at the beginning of July.)

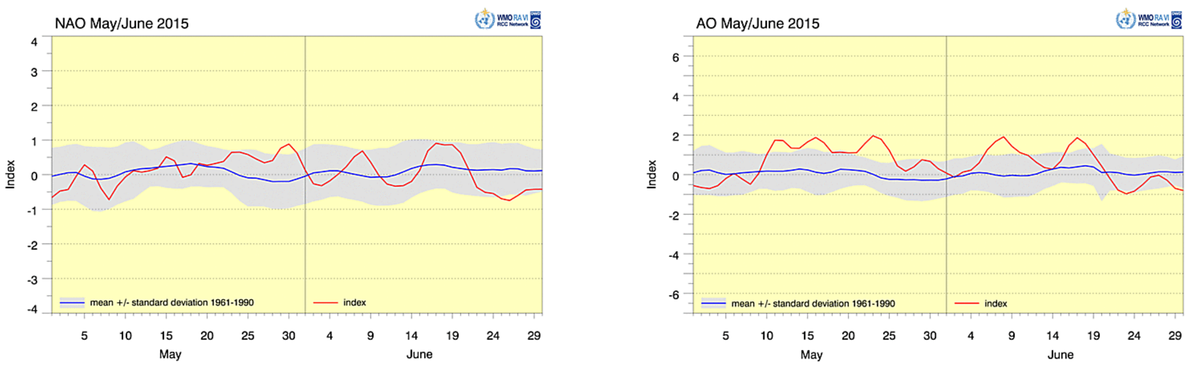

fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.1.d Precipitation

The trace of the El Niño event is clearly visible with an excess of precipitation on the tropical Pacific Ocean and a deficit on maritime continent and northern South America.

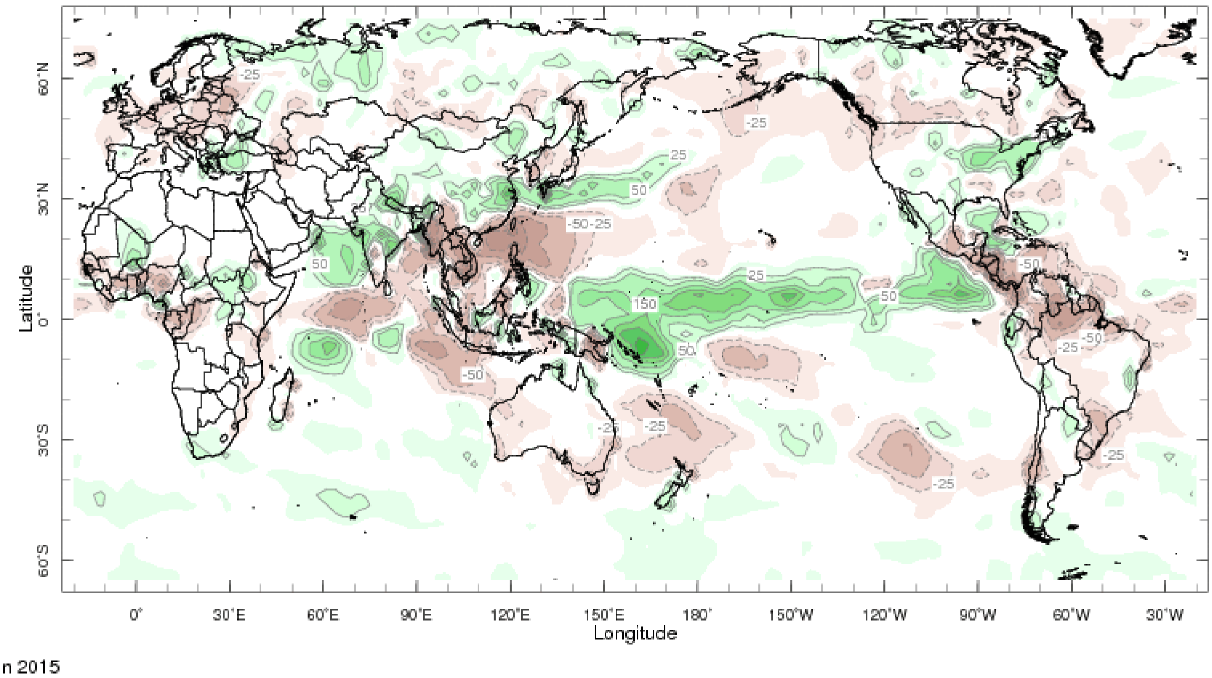

fig.I.2.4: Rainfall Anomalies (mm) (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall. http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

Precipitation anomalies in Europe:

Very dry in most of Europe reflecting the extended high pressure influence, particularly in western parts of eastern Europe with precipitation totals partly below the 10th percentile. Parts of northern Europe (Scotland, parts of Scandinavia and northern Russia) were wetter than normal due to low pressure systems. Some low pressure systems also affected temporarily southern Europe with much convective rain especially in northern Spain and Greece/Bulgaria/western Turkey (partly above 90th percentile).

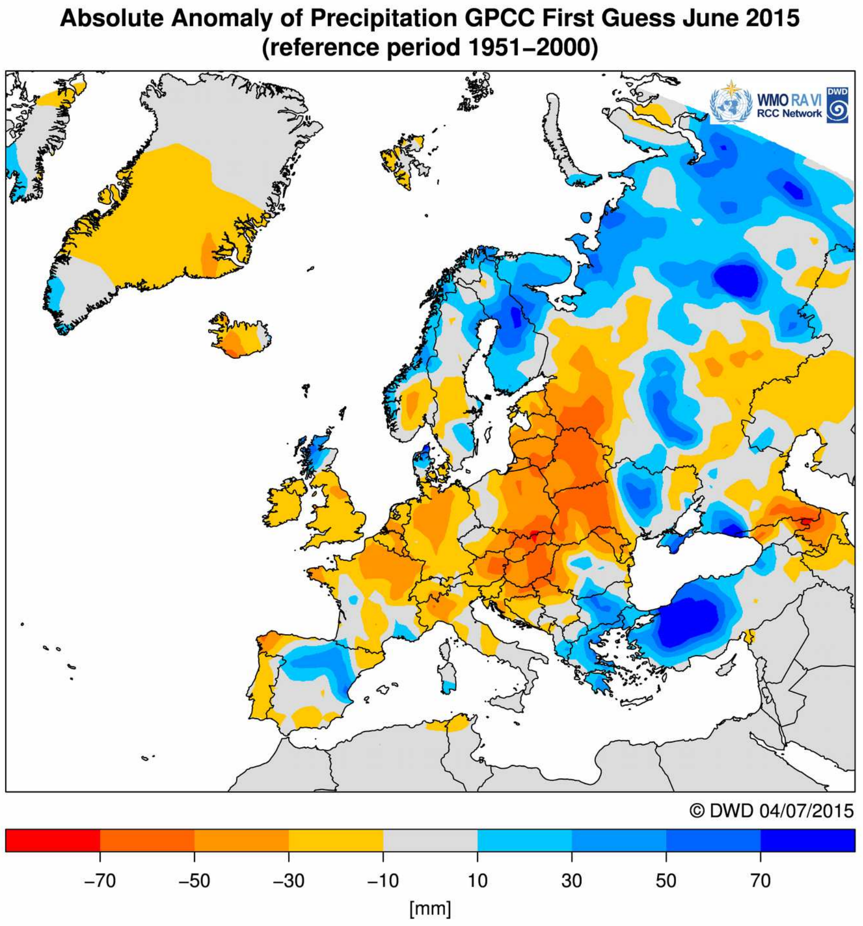

fig.I.2.5: Left: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm. Right: Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

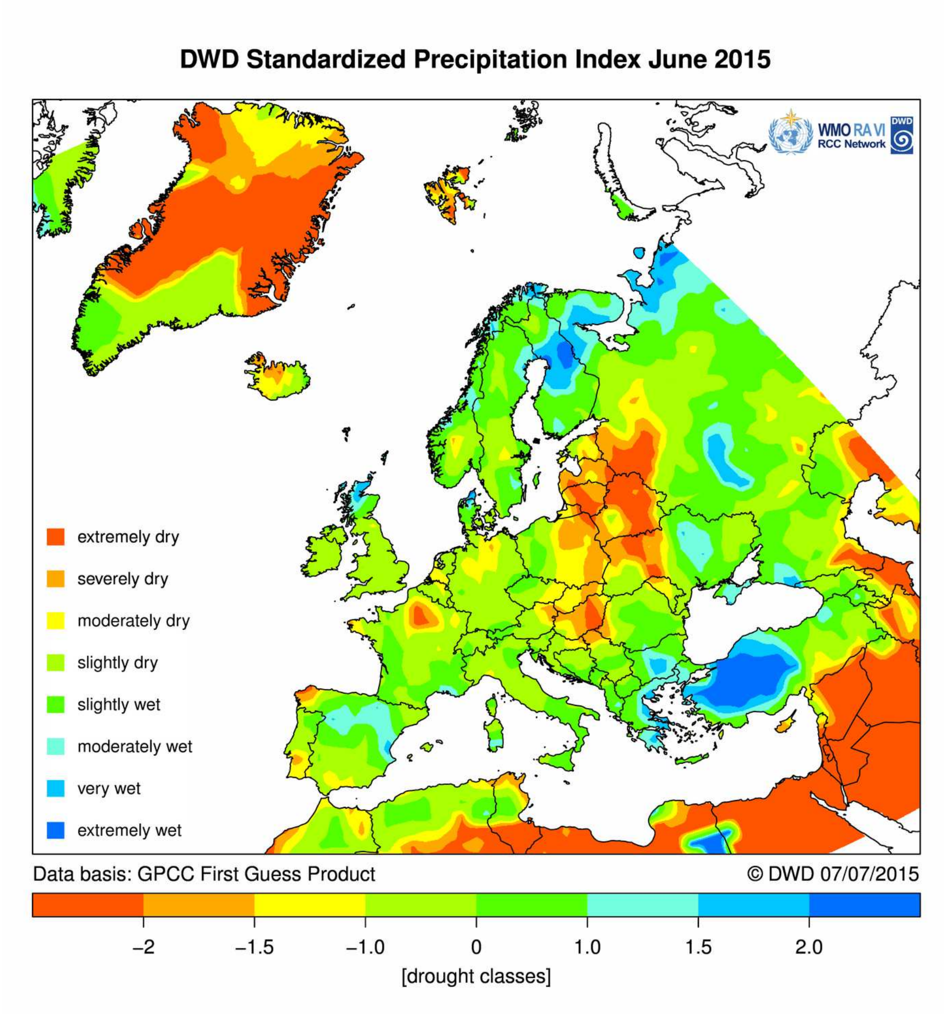

fig. I.2.5a: Standardized Precipitation Index with DWD modification (DWD-SPI), http://www.dwd.de/rcc-cm .

Monthly mean precipitation anomalies in European subregions. Subregions refer to ECMWF land boxes defined in Annex III.3. Anomalies are based on gridded data from GPCC First Guess Product, ftp://ftp-anon.dwd.de/pub/data/gpcc/PDF/GPCC_intro_products_2008.pdf, 1951-2000 reference.

Subregion	Absolute anomaly	SPI DWD Drought Index
Northern Europe	+16.9 mm	+0.548
Southern Europe	- 12.3 mm	- 0.399

I.1.e Temperature

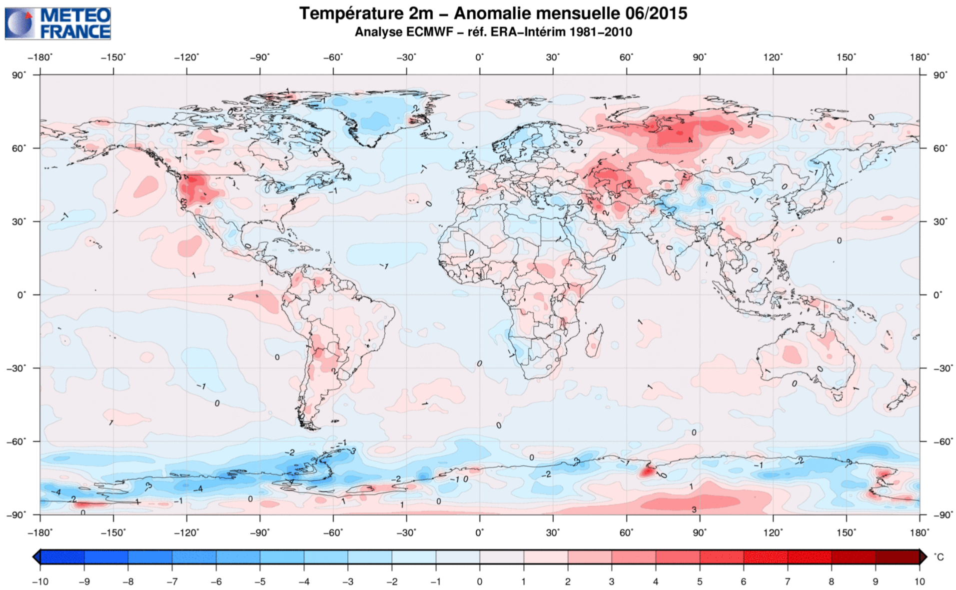

fig.I.2.8: Temperature Anomalies (°C) (Meteo-France)

Temperature anomalies in Europe:

June was colder than normal in almost whole Northern Europe and in southern and eastern parts of the Mediterranean, southeastern parts of the Balkan Peninsula and western Turkey / Middle East. On the other hand, a large area from Iberia to France, Central and Eastern Europe was warmer than normal. Especially in Iberia and France, some of this warming was due to the beginning heat wave at the end of June. The temperature distribution reflects the SLP distribution quite well (Low over Scandinavia, extended High over much of the rest of Europe).

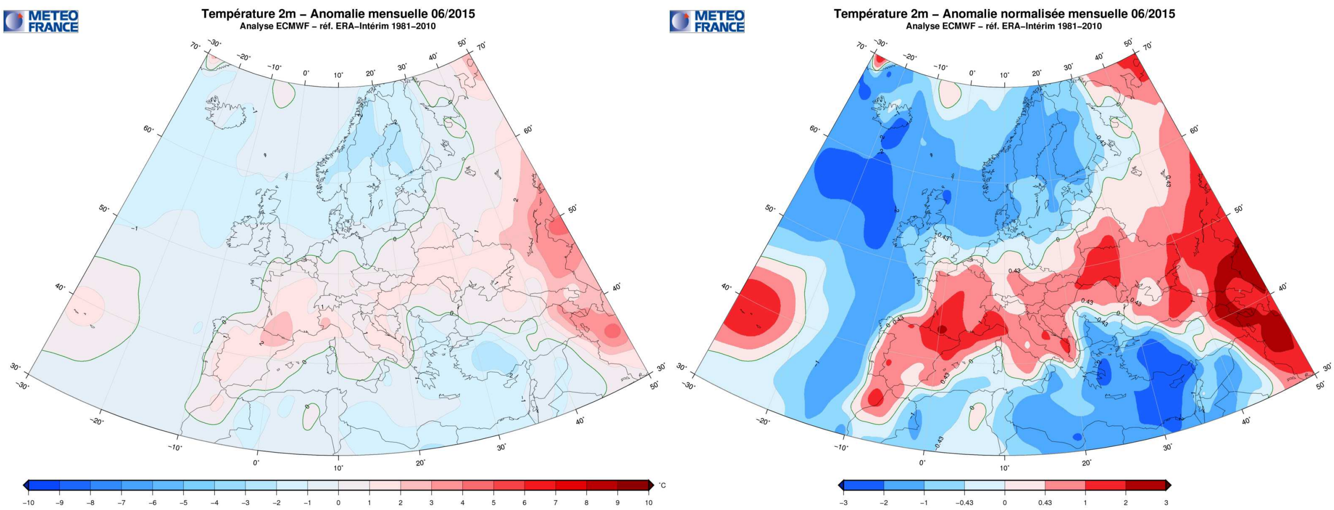

fig.I.2.9: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

Monthly mean temperature anomalies in European subregions: Subregions refer to ECMWF land boxes defined in Annex III.3. Anomalies are based on gridded CLIMAT data from DWD, http://www.dwd.de/rcc-cm, 1961-1990 reference.

Subregion	Anomaly
Northern Europe	-0.4°C
Southern Europe	+1.7°C

I.1.f Sea ice

In Arctic (fig. 1.2.6 and 1.2.7 - left) : persistent significant deficit (~ -2 std), mainly in the Pacific and in the Barents Sea. It is the lowest third value of the last 30 years.
In Antarctic (fig. 1.2.6 and 1.2.7 - right) : Large surplus (+2 std) persistent.

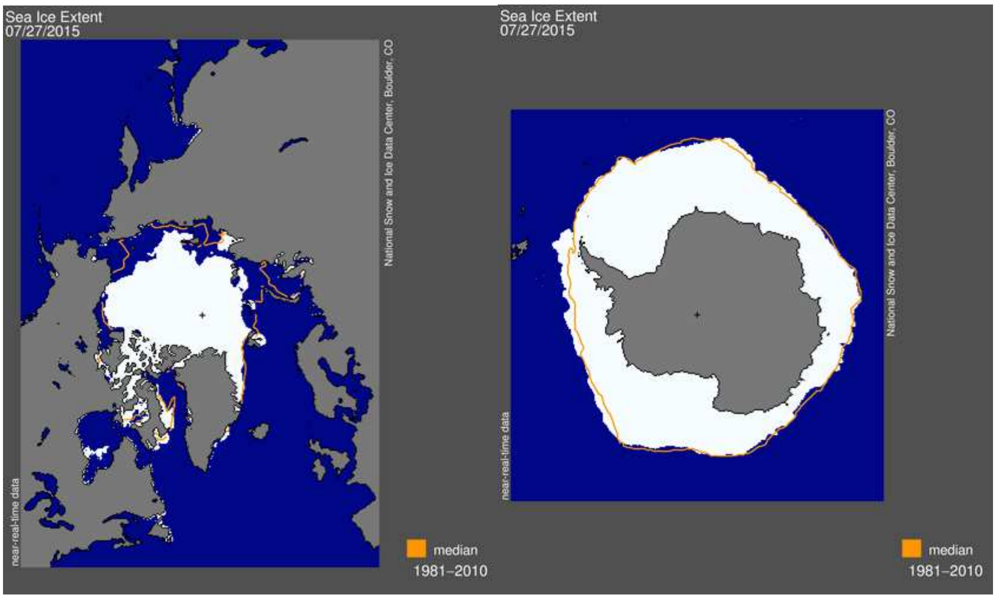

fig.I.2.15: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http:/ /nsidc.org/data/seaice_index/

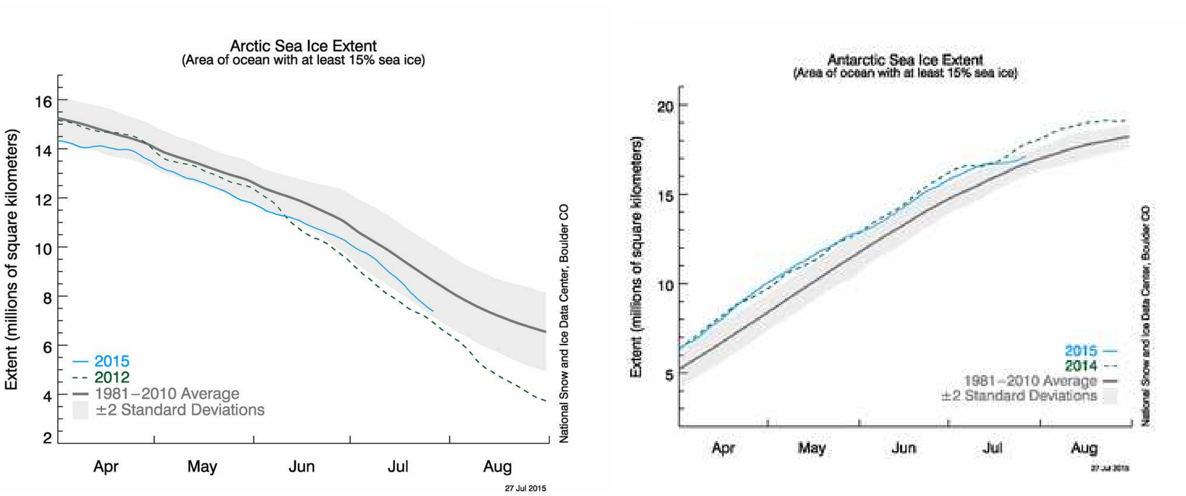

fig. I.2.16 : Sea-Ice extension evolution from NSIDC.

http://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png

II. SEASONAL FORECAST FROM DYNAMICAL MODELS

OCEANIC FORECASTS

II.1.a Sea surface temperature (SST)

Very good overall consistency of structures anomalies between Arpege (MF Model), ECMWF, UKMO and NCEP.

Pacific Ocean: all models predict a strengthening of the surface warm anomaly in the Equatorial Waveguide up to +2°C (or more : +3°C with NCEP) . Also large area of warm anomaly along the western coast of North America.

Indian Ocean: Remaining of the generalized warm anomaly.

Atlantic Ocean: A few differences from one model to another. In the Equatorial area, cold anomaly rather marked along the equator in NCEP to the Gulf of Guinea, less or not marked with others models.

In the Northern Hemisphere cold anomaly marked Labrador to British Isles (probably the remains of NAO + circulation that occurs over several months). Warm anomaly in the southwest of the Tropical Atlantic (extension along the US coast). Cold anomaly from African Coast to the Carribean Sea with Arpege (maybe in relation with the using of a shorter hindcast 1993-2012)

Mediterranean Sea : should keep warm anomalies.

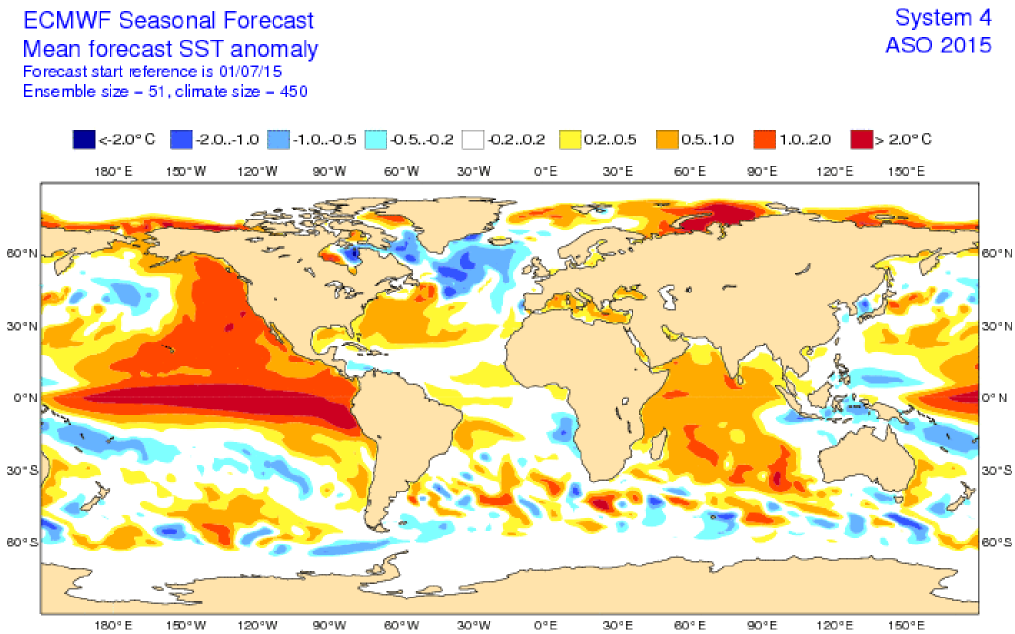

fig.II.1.1: SST anomaly forecast from ECMWF

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

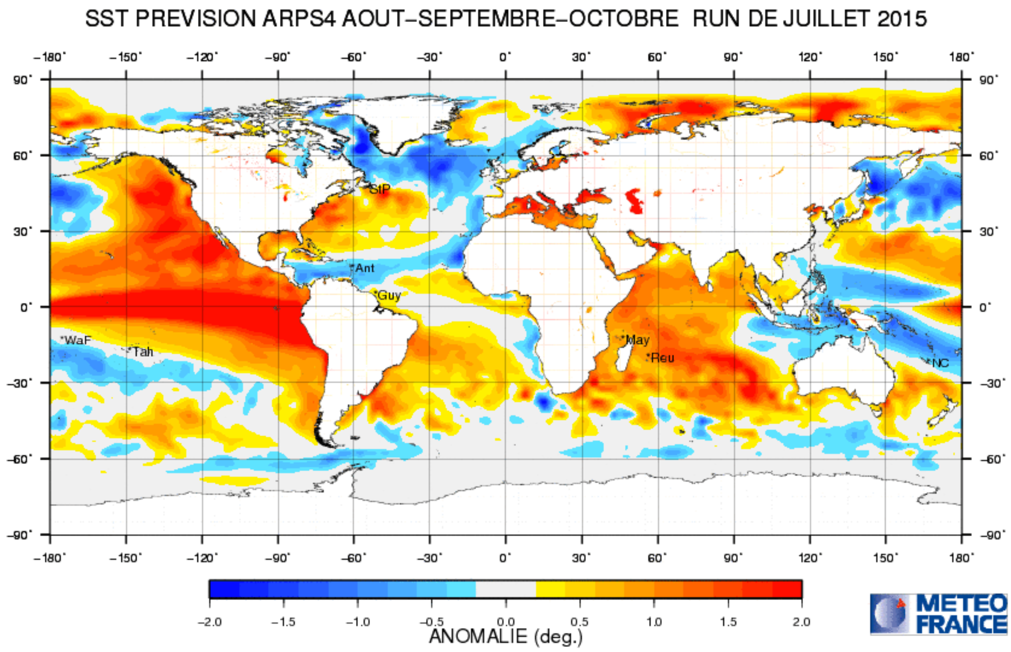

fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation). [http://elaboration.-seasonal.meteo.fr](http://elaboration.seasonal.meteo.fr)

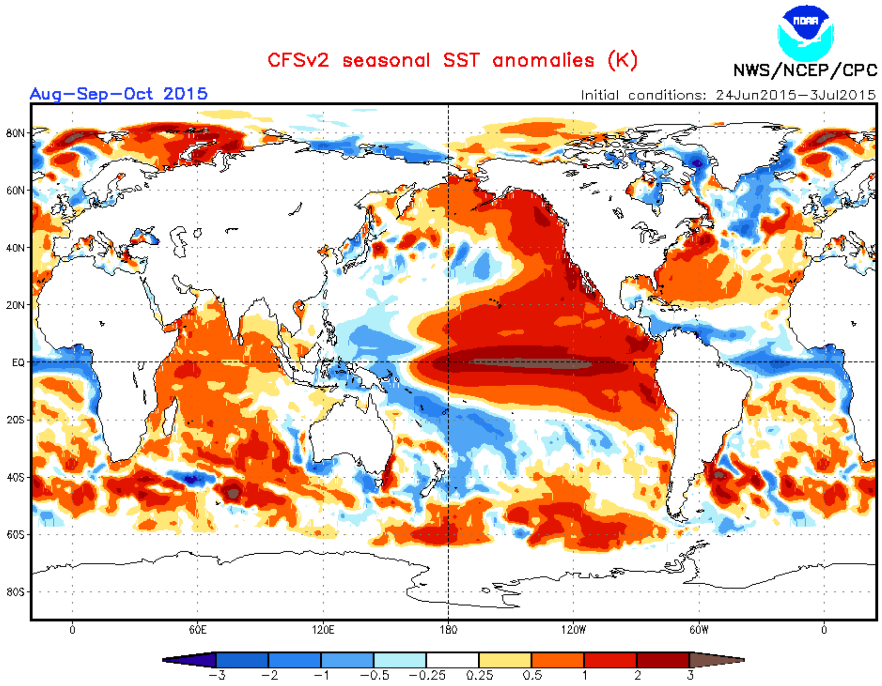

fig.II.1.3: SST anomaly forecast from NCEP. http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/imagesInd1/glbSSTSeaInd1.gif

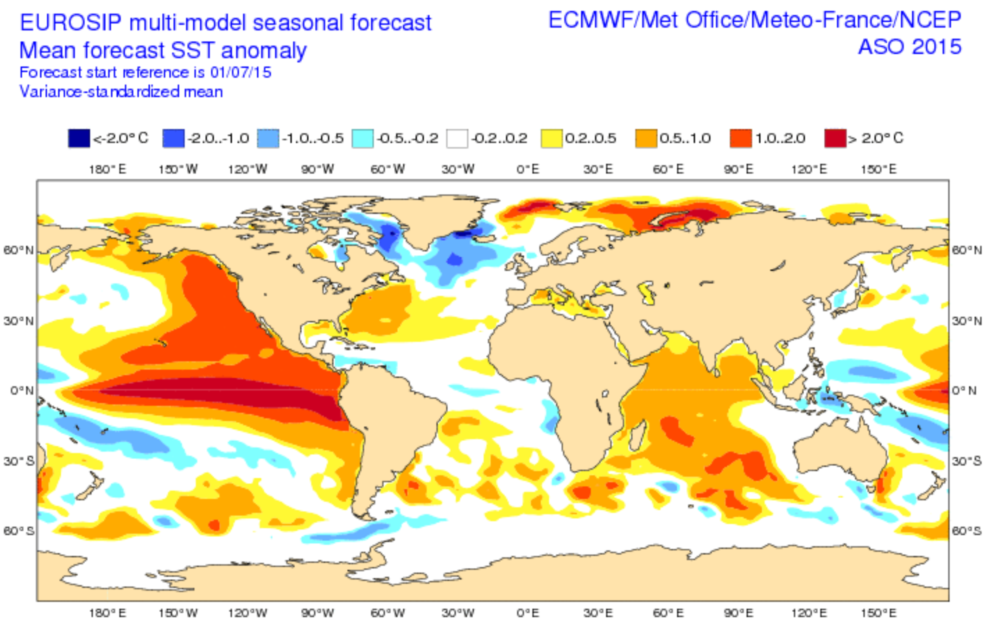

fig.II.1.4: SST Forecasted anomaly from Euro-SIP

II.1.b ENSO forecast : *Strong "El Niño"*

For the next 3 months, all the analyzed models announce the strengthening of the phenomenon El Niño this autumn with a continuous increase until September at least (plateau in October with ARP). Three quarter of the models plan that we shall reach a level of strong intensity over the period ASO : Niño 3.4 index upper than +2 for the average of the physical models and close to 2.5 for the EUROSIP ensemble.

Further, in spite of a more important dispersal of the models, the continuation of a strong event El Niño in the beginning of winter becomes now very likely.

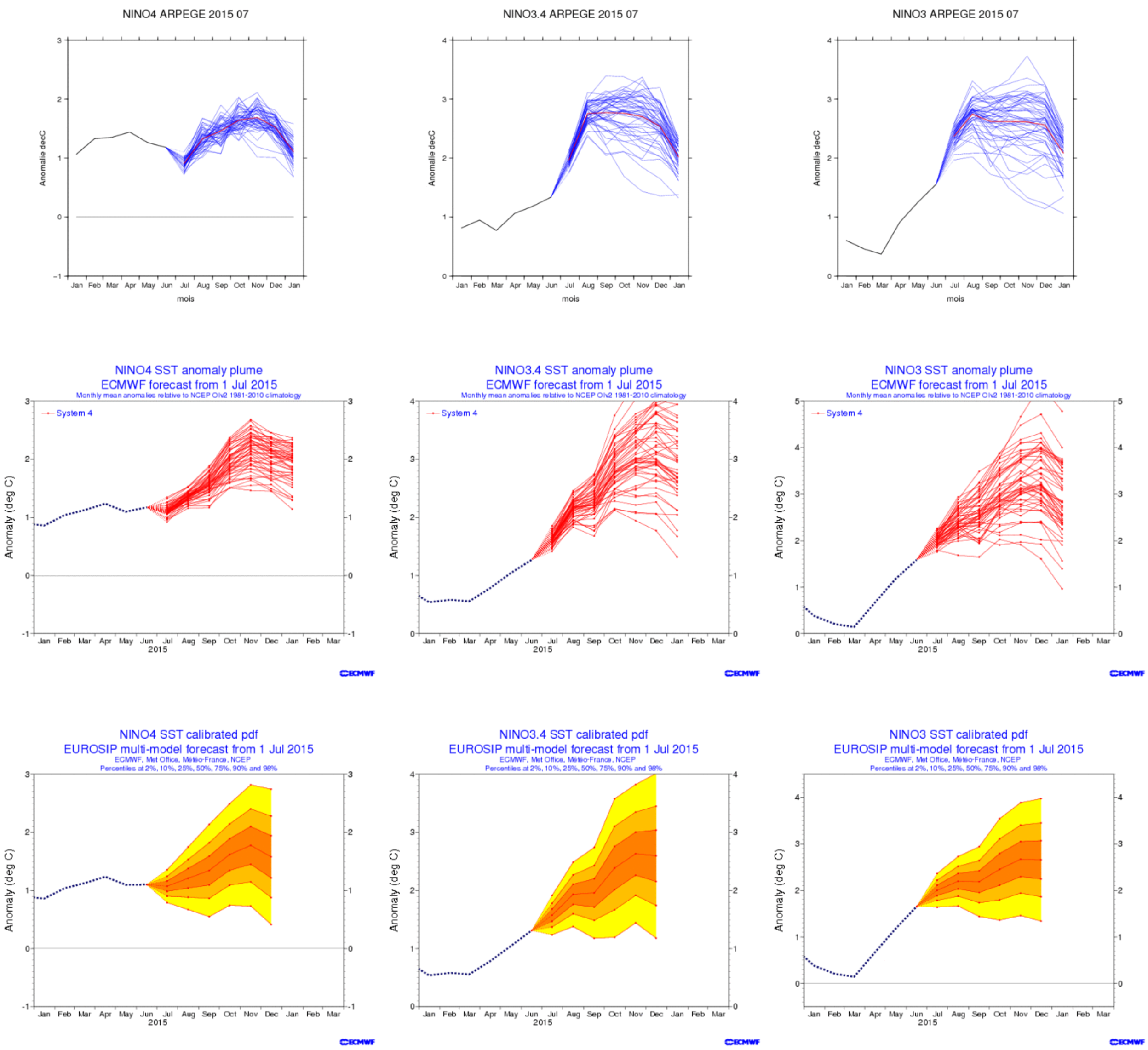

fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

II.1.c Atlantic ocean forecasts

Not much evolution expected from the Atlantic indices

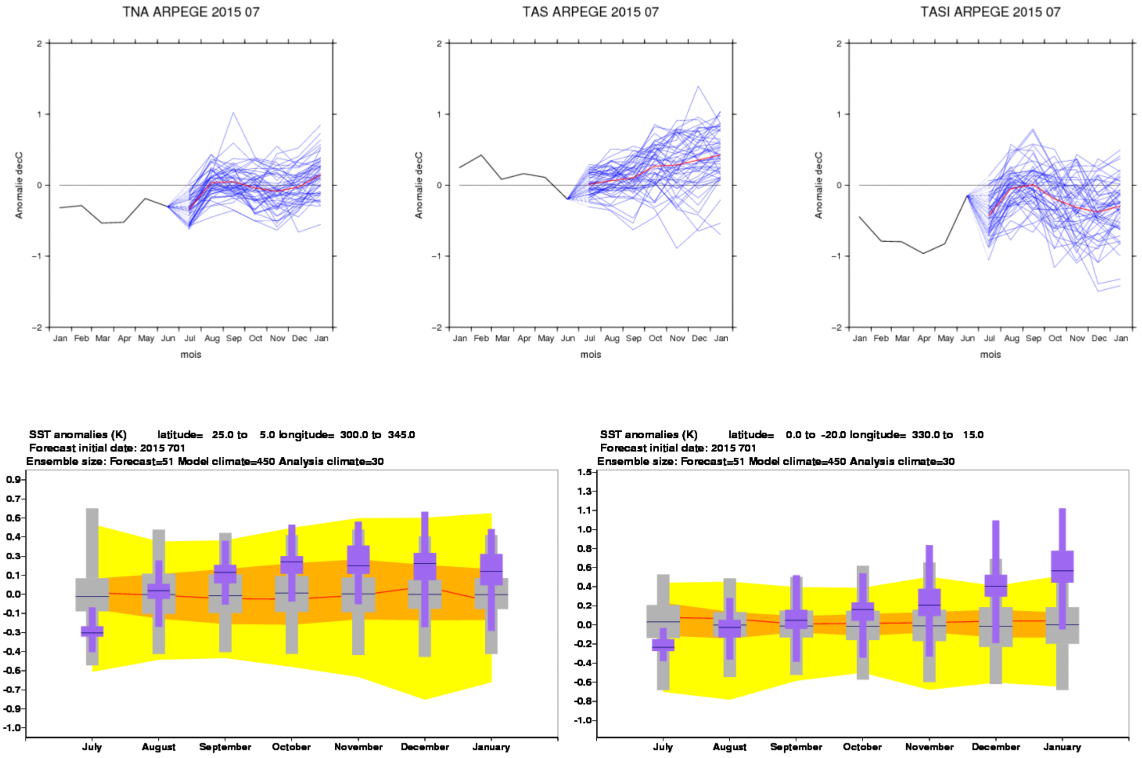

fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.1.d Indian ocean forecasts

Increase of the DMI index expected in connection with the strengthening of the Niño.

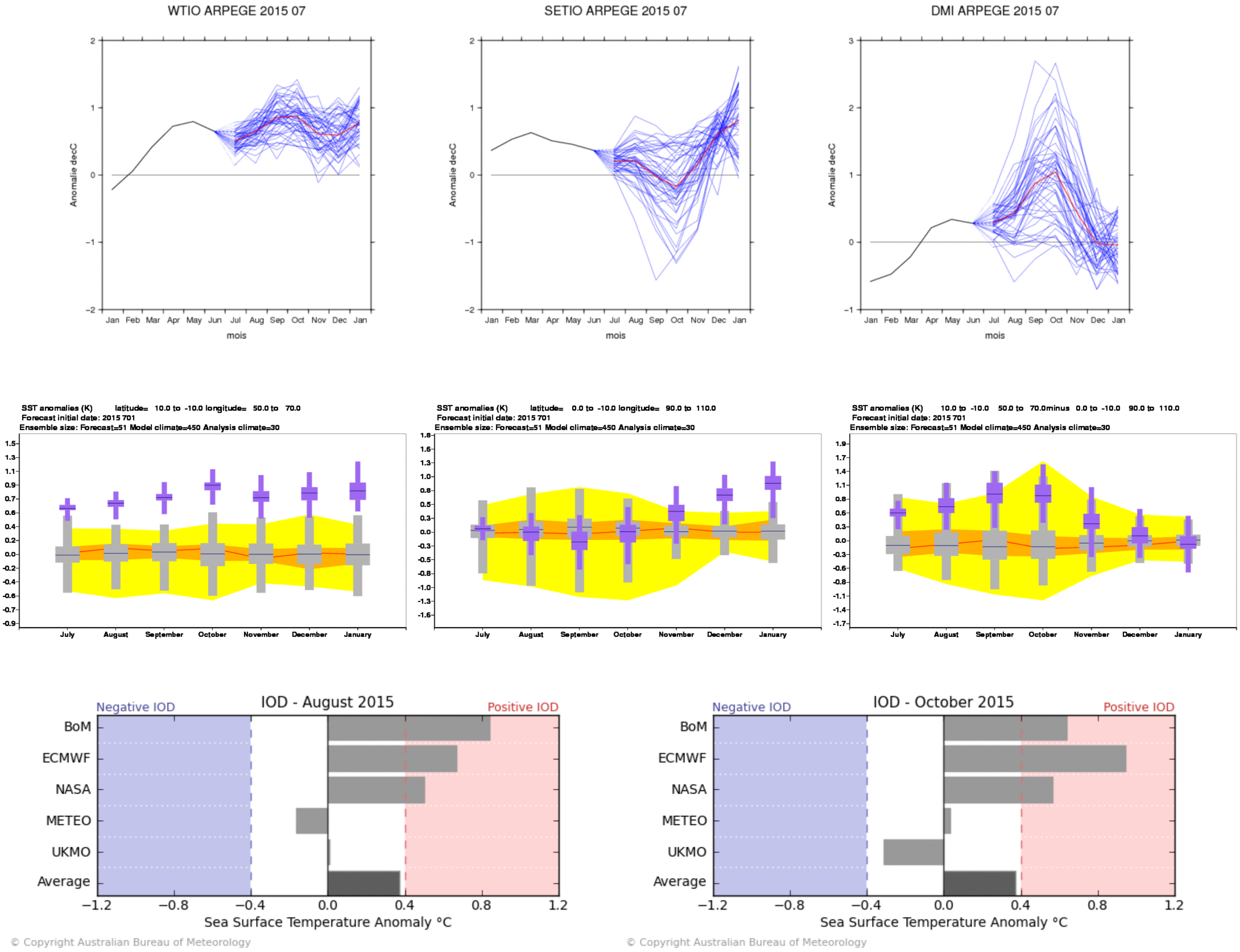

fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

GENERAL CIRCULATION FORECAST

II.1.e Global forecast

Very good consistency between ARPEGE models, ECMWF and JMA. They all provide a strong anomaly of the circulation linked to the oceanic anomalies of the equatorial Pacific.

Velocity potential anomaly field (cf. fig. II.2.1 – insight into Hadley-Walker circulation anomalies): structure of wave 1, with thus a very strong dipole of anomalies: Upward on Pacific Ocean and America continent; subsidence from Australia and Asia to India and in the lesser degree West of Africa and Europe.

Stream Function anomaly field (cf. fig. II.2.1 – insight into teleconnection patterns tropically forced): Very good agreement between ARPEGE and ECMWF, ECMWF The models suggest teleconnexions beginning to extend tropical zones towards the moderate latitudes of the north hemisphere both over the Pacific and North America and over the Middle East and the Eastern Europe

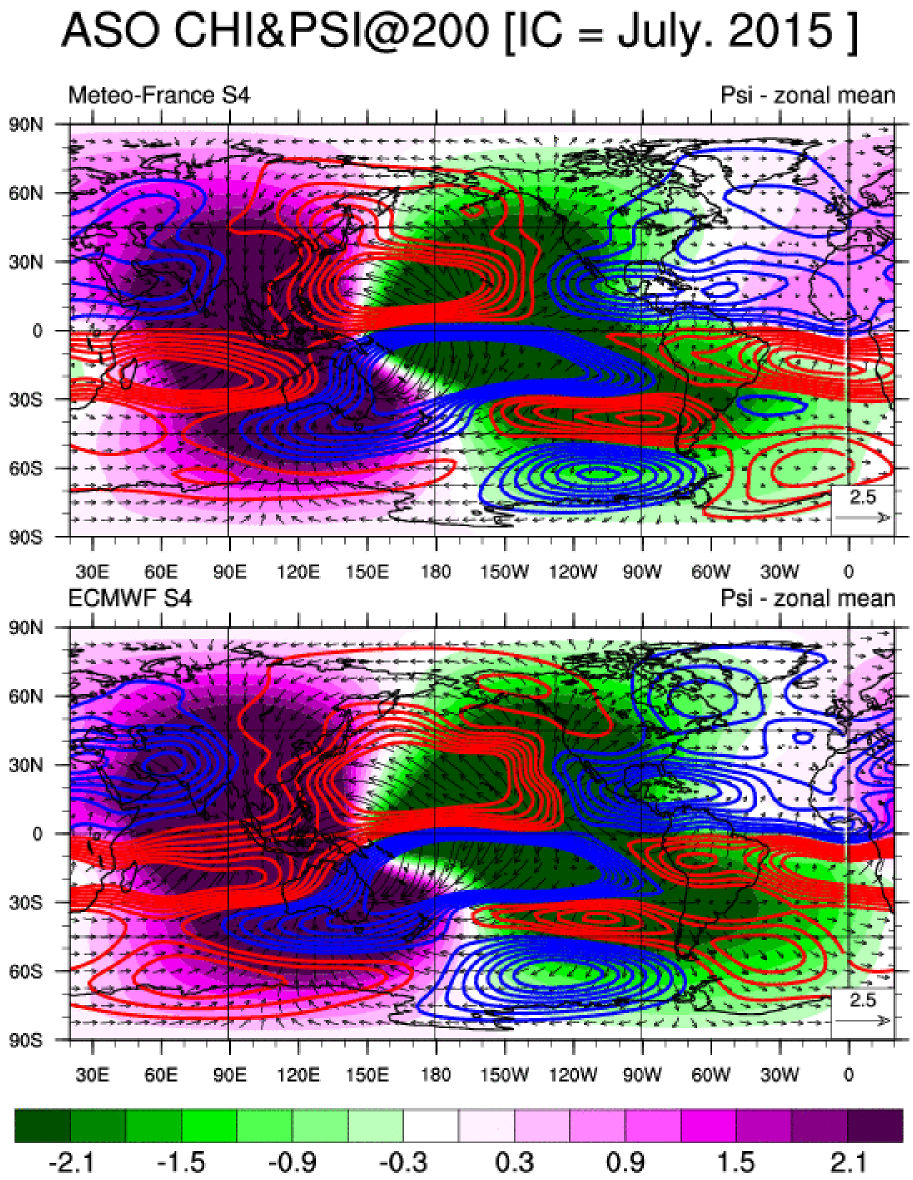

fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

II.1.f North hemisphere forecast and Europe

Geopotential height anomalies (fig. 20 – insight into mid-latitude general circulation anomalies) : Z500 anomalies are fairly consistent between CEP and Arpege on Europe with high value on the North Sea and a minimum from Eastern Mediterranee to West Portugal (less marked) . On the other hand, the forecasts differ significantly in the East Coast of North America (labrador Sea). Regime occurences with Arpege and CEP are remarkably close with the predominance of "blocking situation" to the detriment of the other three regimes.

The forecasts of UK, NCEP or JMA models are quite similar with a few differences : high value slighty further west for UK model or further East for JMA, minimum more pronounced in Mediterranean sea for NCEP

For once, predictability looks quite good for Europe.

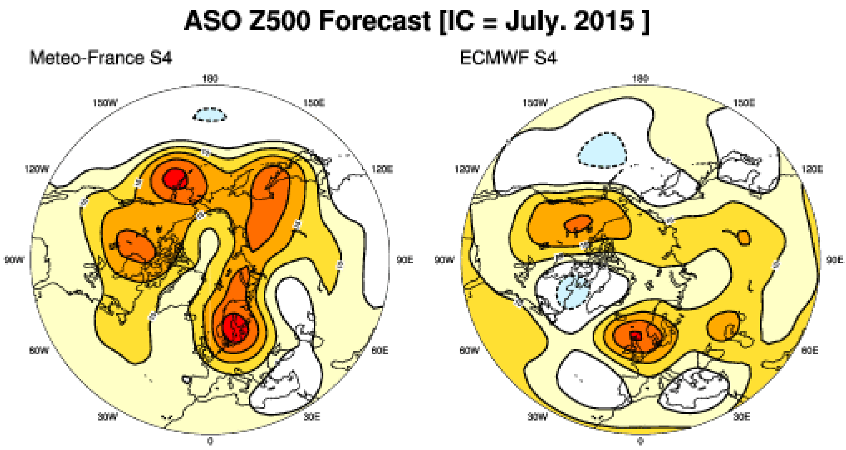

fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right).

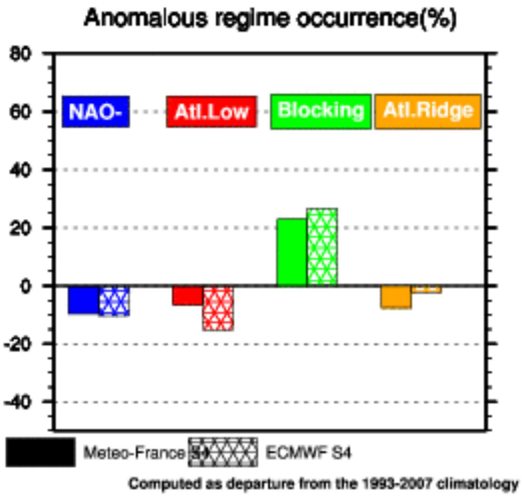

fig.II.2.3: North Atlantic Regime occurrence anomalies from Météo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

IMPACT: TEMPERATURE FORECASTS

Remaining of the context of enhanced probability of warm anomaly over most of the globe, thanks to the ENSO+ and PDO+. The few exceptions are Northern Labrador Sea and Irminger Sea (effect of SST), the center of South America, along the Benguela current, and from the Solomon Islands to French Polynesia (obs SST and forecasted) .

A signal " more warmly than the normal " is expected on Europe (especially Central and Eastern Europe), while normal temperatures are likely in Northern Europe from Scotland to Norway.

II.1.g ECMWF

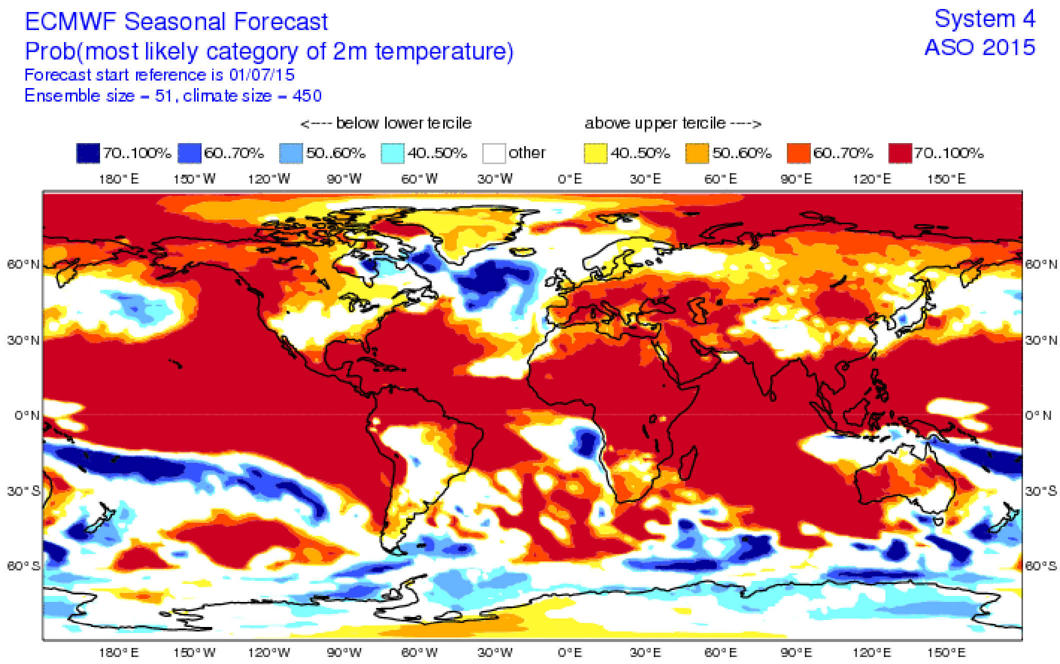

fig.II.3.1: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.1.h Météo-France

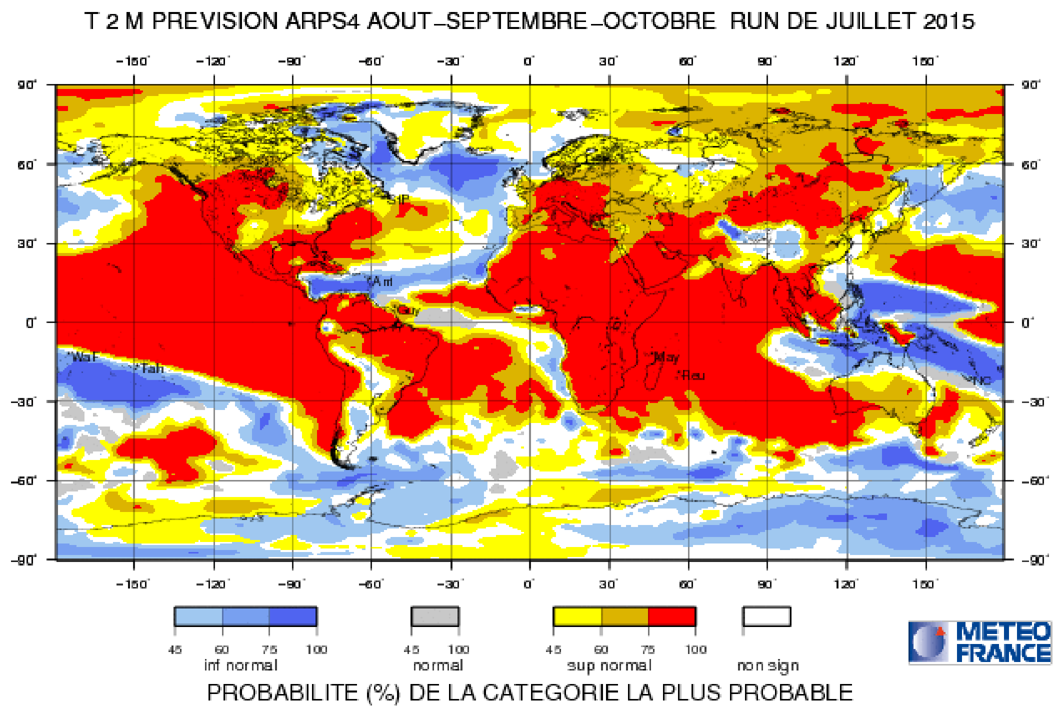

fig.II.3.2: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.1.i Japan Meteorological Agency (JMA)

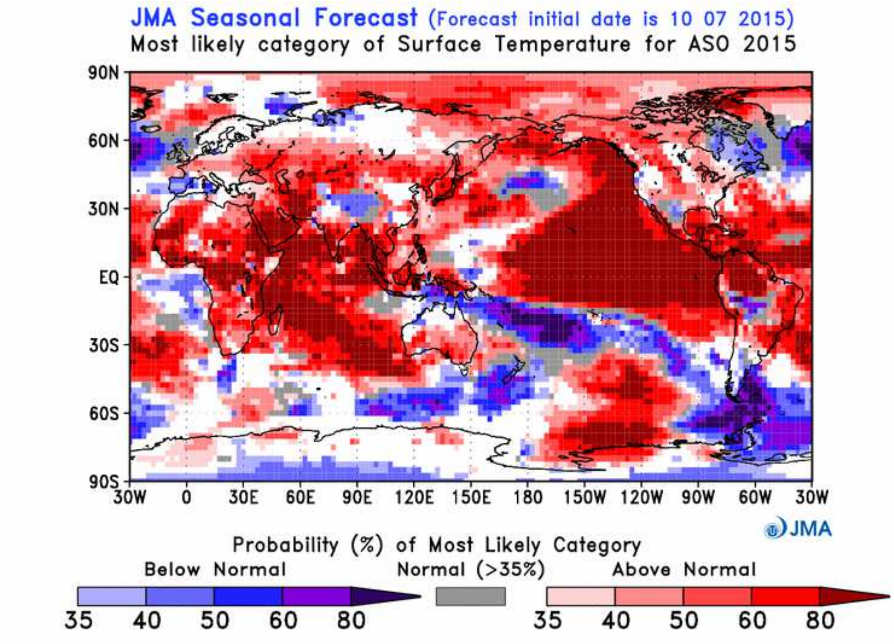

fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.1.j EUROSIP

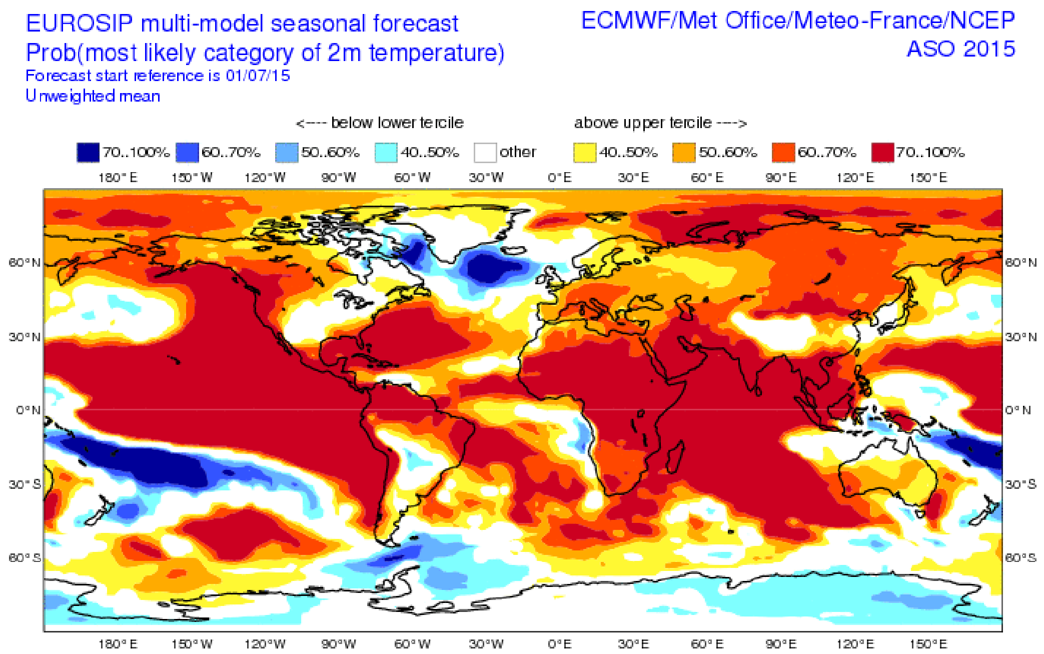

fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/fore-cast/eurosip/

IMPACT : PRECIPITATION FORECAST

In connection with the SST anomalies and Niño event, enhanced probability of excess precipitation in the Pacific north from Melanesia to South Americans coast and from Hawaii to the western United States, over a large part of South America and dry anomaly in the Atlantic between the equator and 30 ° N, on the north of South America, over maritime continent up to Cook Islands.

On Europe, a dry signal seems to take shape on the central part in the coherence with the predominance of blocking regime and on the contrary a wet signal on the Oriental Mediterranean Sea and the Middle East going on in a more tenuous way towards the Western Mediterranean Sea.

This signal finds itself particularly on CEP and Arpege and in a lesser degree the NCEP and UKMO and thus on EUROSIP but not really with JPA model.

II.1.kECMWF

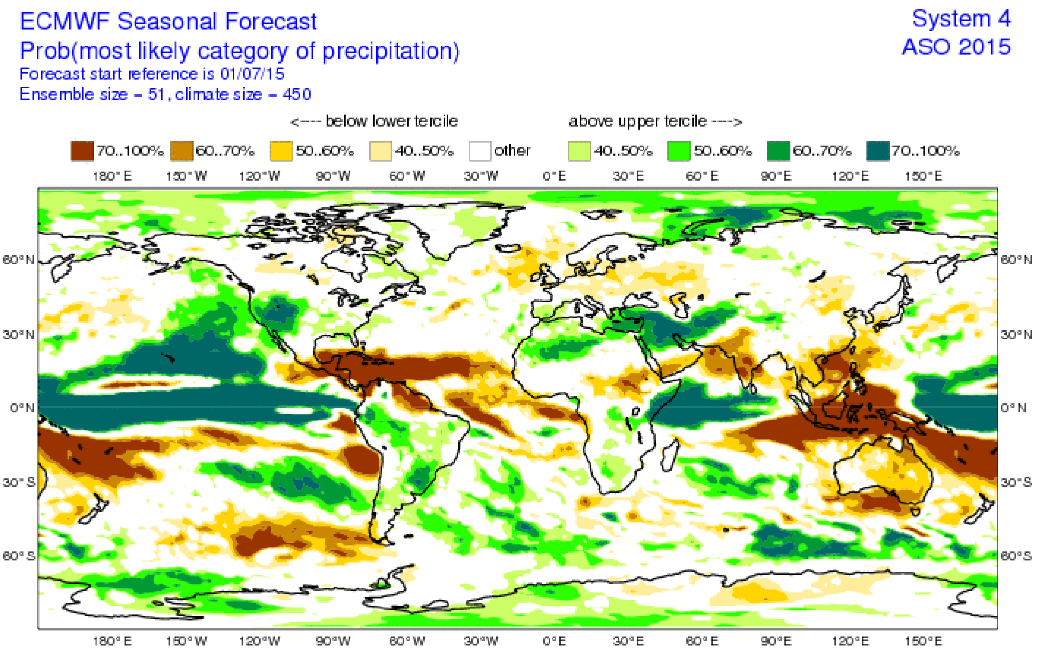

fig.II.4.1: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.1.I Météo-France

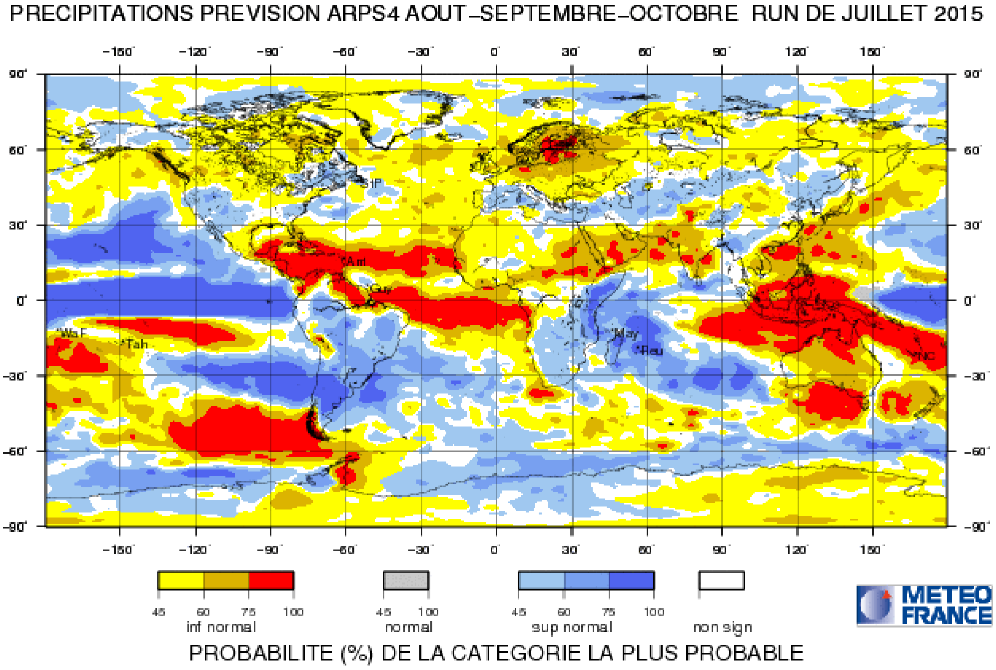

fig.II.4.2: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.1.m Japan Meteorological Agency (JMA)

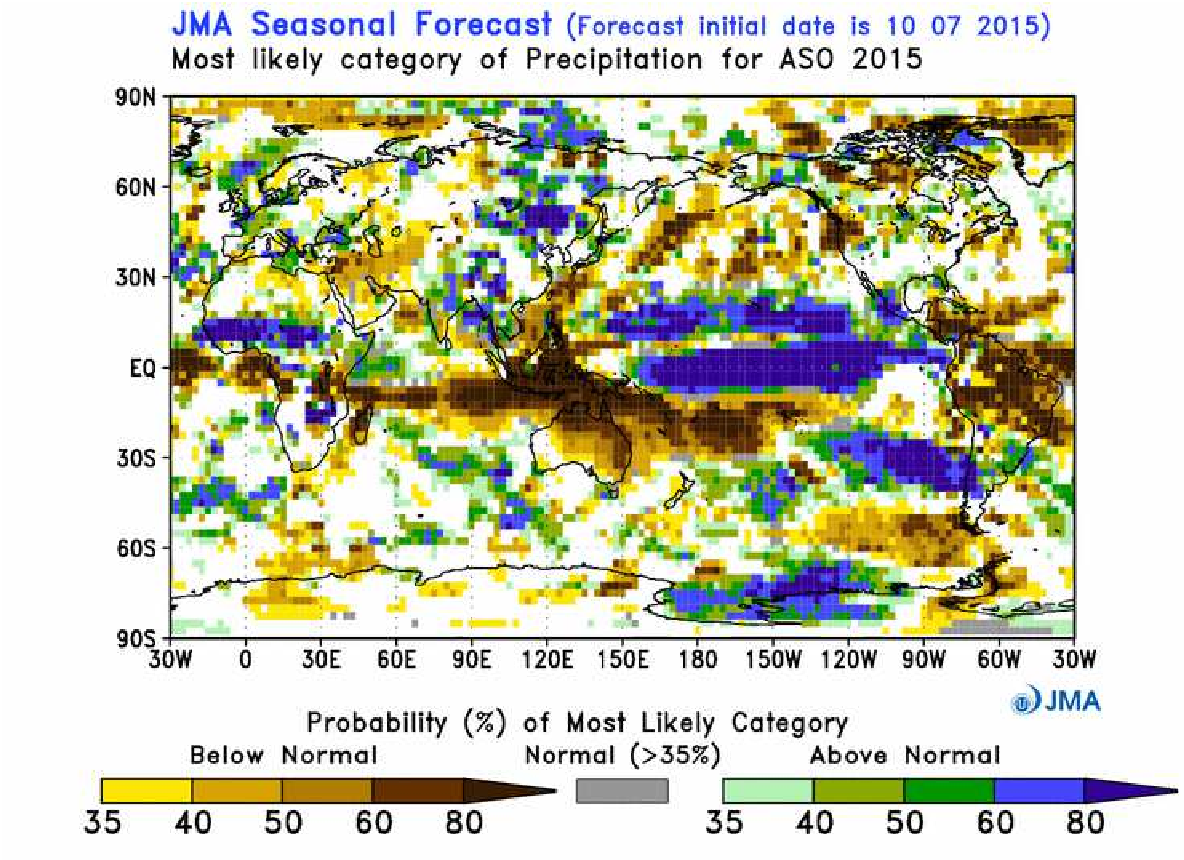

fig.II.4.5: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.1.n EUROSIP

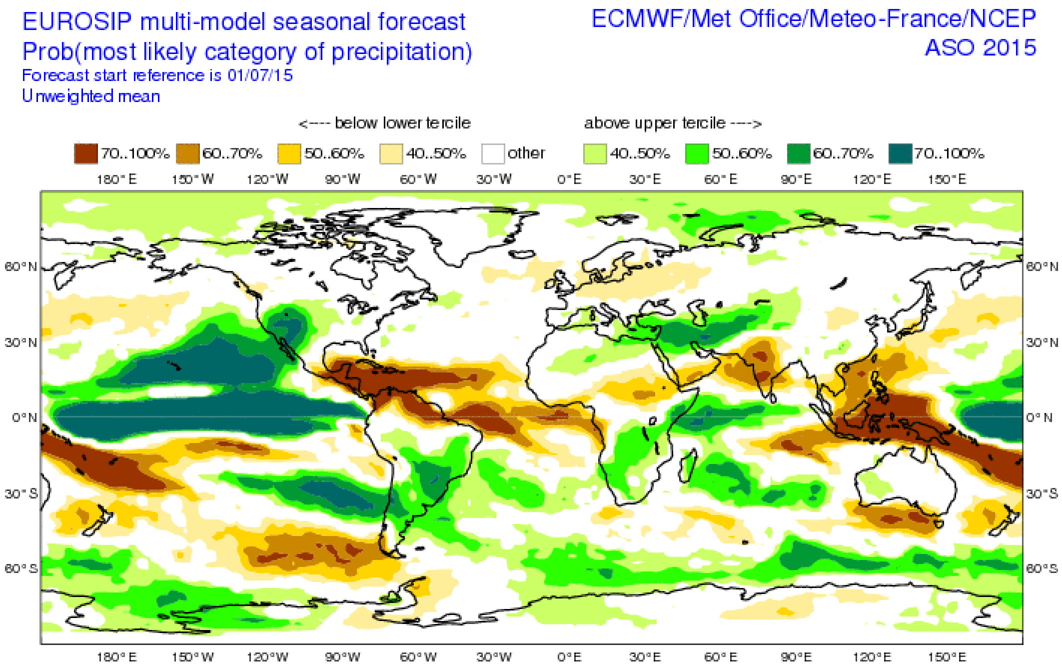

fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).

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

REGIONAL TEMPERATURES AND PRECIPITATIONS

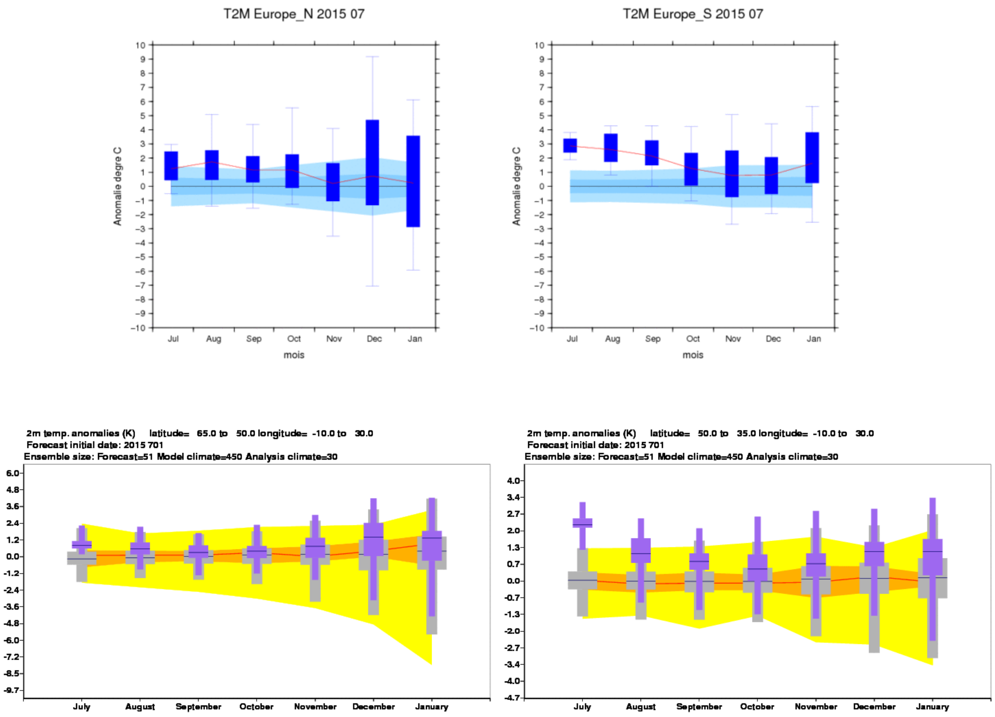

fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

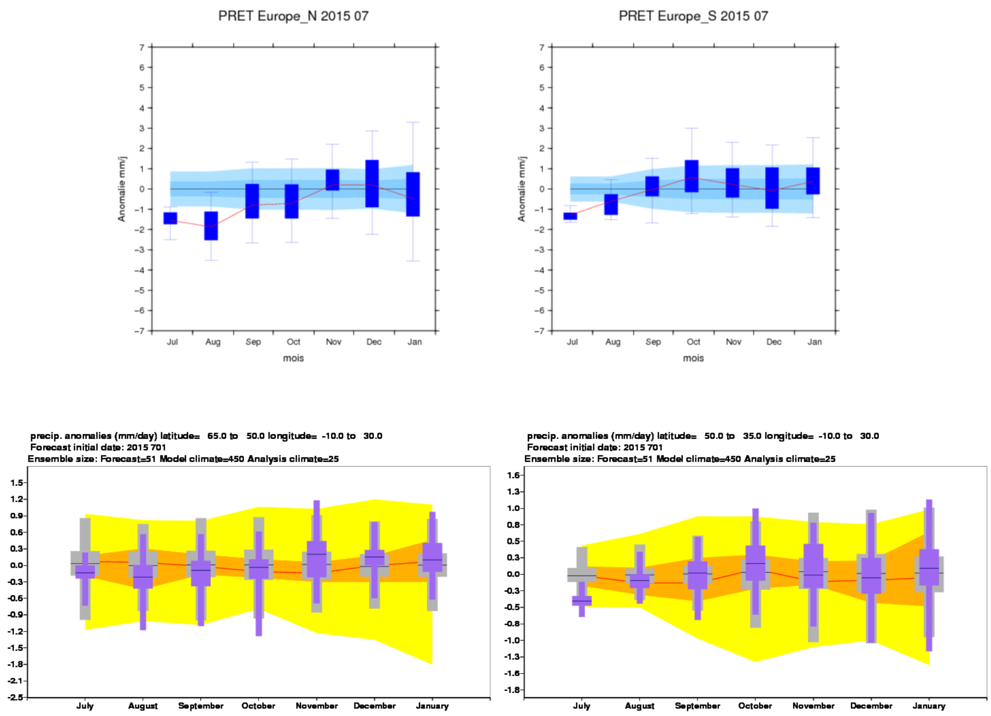

fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

MODEL'S CONSISTENCY : NOT AVAILABLE

Not available

fig.II.6.1 : GPCs Consistency maps from LC-MME http://www.wmolc.org/

For SST :

For Z500 :

For T2m :

For Precipitation :

"EXTREME" SCENARIOS

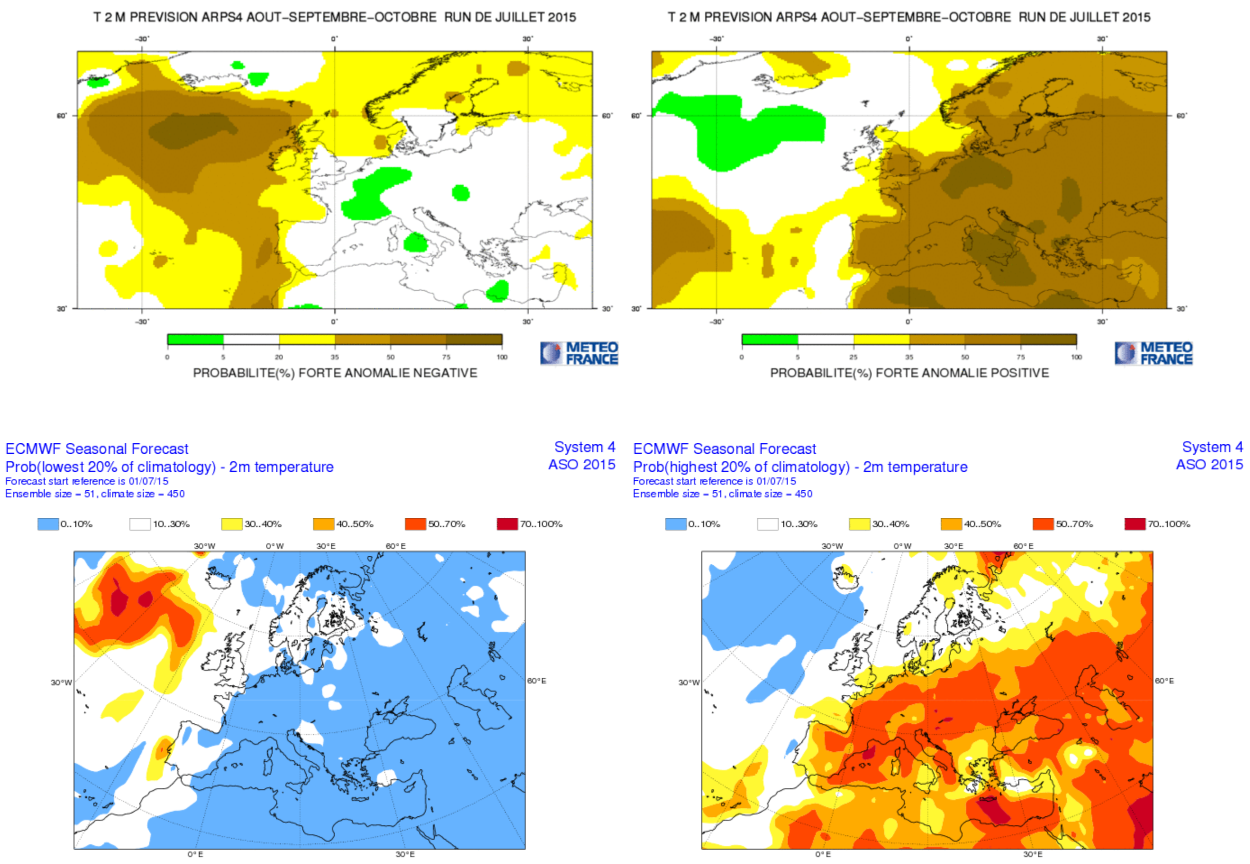

fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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

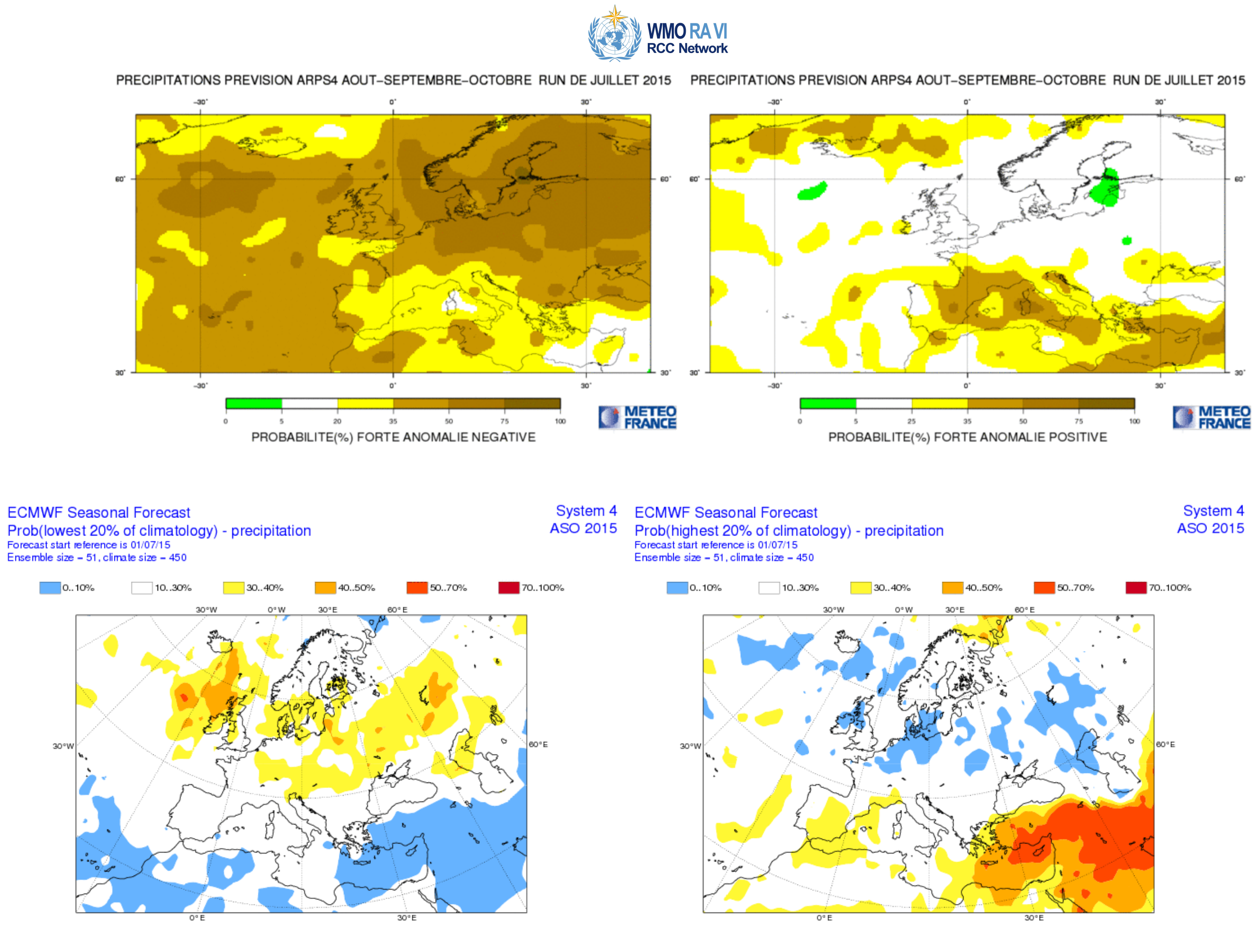

fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

DISCUSSION AND SUMMARY

II.1.o Forecast over Europe

Temperatures : More warmly than the normal signal on Europe (especially for the central part of Europe), except Northern Europe (from Scotland to Norway) where normal temperatures are likely.

Precipitation: Dry Signal on the Northern Europe and rather wet in the Mediterranean Sea, more likely on the Oriental Mediterranean Sea.

II.1.p Tropical cyclone activity

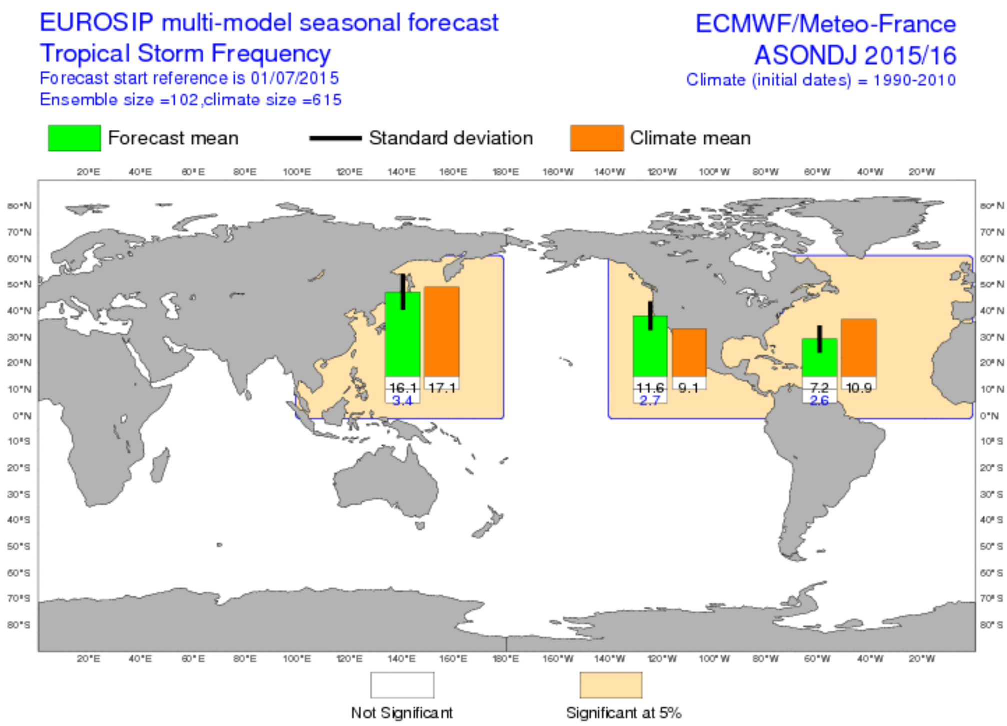

fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/

Consistent with the current El Niño phenomena, the hurricane season is expected significantly weaker than normal in the Atlantic and significantly stronger over the Pacific.

II.1.q Indian monsoon activity forecast

The development of El Nino conditions in the Pacific, builds large scale subsidence over southern Asia and disadvantage the activity of the monsoon. The temperature of the ocean unusually warm Indian is also an unfavorable factor. End of Indian monsoon less active than normal is likely.

II.8.d African monsoon activity forecast

The large scale subsidence is also enhanced on Africa and unfavorable for the end of the monsoon, most forecasts proposes a scenario drier than normal.

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WMO RA VI
RCC Network

Synthesis of Temperature forecasts for July-August-Septembre 2015 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
MF					
ECMWF					
JMA					
synthesis					
Eurosip					
privileged scenario by RCC-LRF node	*normal*	*above normal*	*above normal*	*above normal*	*above normal*

T Below normal (Cold)

T close to normal

T Above normal (Warm)

No privileged scenario

WMO RA VI
RCC Network

Synthesis of Rainfall forecasts for July-August-Septembre 2015 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
MF					
ECMWF					
JMA					
synthesis					
Eurosip					
privileged scenario by RCC-LRF node	***Below normal***	***Above normal***	***Below normal***	***Below normal***	***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.

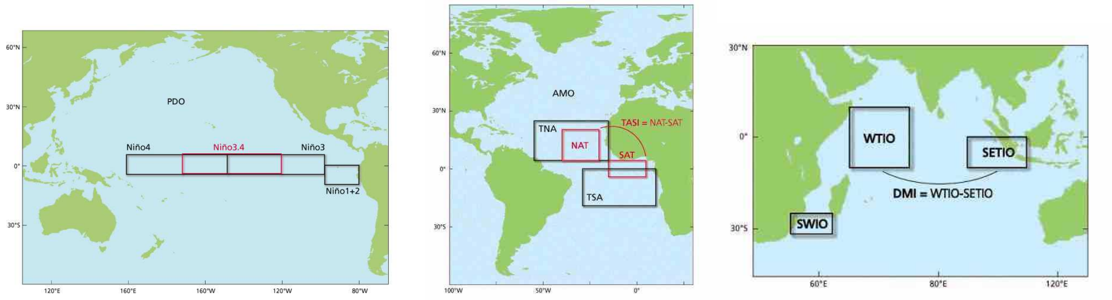
III.2. « NINO », SOI INDICES AND OCEANIC BOXES

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).

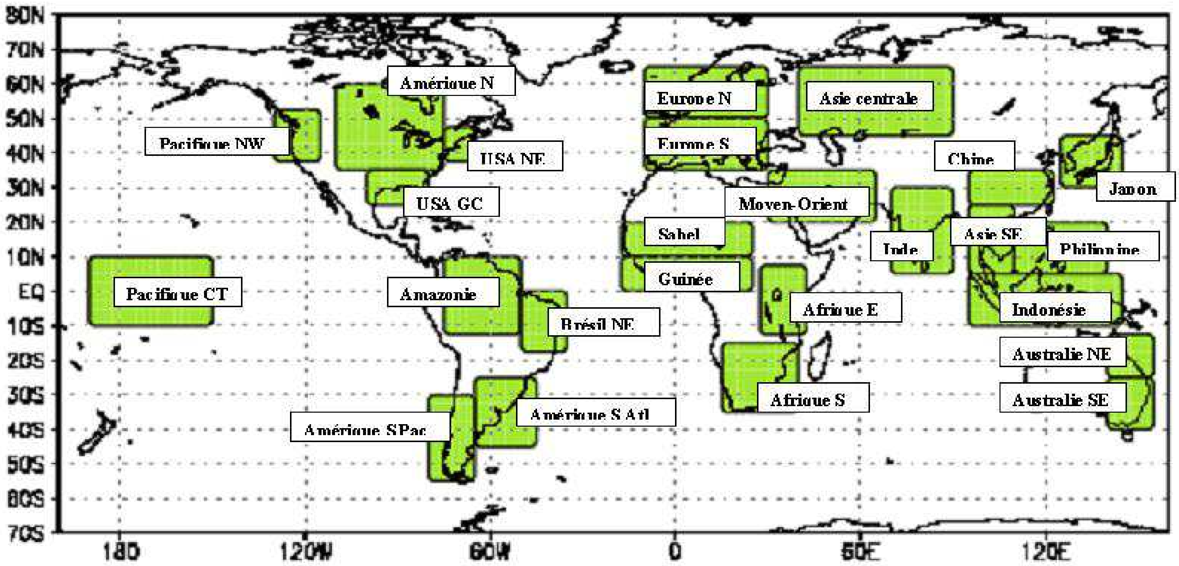
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea 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.



III.4. ACKNOWLEDGEMENT

This bulletin is edited by the RCC-LRF Node of the RCC Network in Toulouse for the RA VI. It is a joint effort of the RCC-Climate Monitoring Node (led by DWD) and the RCC-LRF Node (Co-Led by Météo-France).