GLOBAL CLIMATE BULLETIN
n°197 – November 2015

Table of Contents

I. DESCRIPTION OF THE CLIMATE SYSTEM (SEPTEMBER 2015)

I.1.OCEANIC ANALYSIS

I.1.a Global analysis

In the Pacific ocean :
All along the equatorial waveguide :
- Surface (fig.I.1.1, I.1.2 and I.1.3): The strong El Nino event is now well installed. Strong warm anomaly along the equator from the International Date Line to the South American coasts. The SST anomaly was heavily reinforced in September, with a slight warming on the equator east of 150W, a little more strong between 110W and 90W but a cooling north of 2N east of 120W. In September, the Nino3.4 index value monthly mean reaches +2.1°C, and the Nino1+2 index is close to 2 ° C.
- Sub-surface : the Kevin wave started in August in the middle of the basin reached the vicinity of the South American coasts in late September. it brought additional sub-surface heat with the diving of the 20°C isotherm eastward. The 0-300m heat content of September also marks this wave with a negative trend in the basin center and a positive trend eastward.

El Niño monitoring: Niño 3.4 index reaches 2.1 °C in September (monthly mean), corresponding to a strong El Niño event.

Elsewhere:
In the northern hemisphere: the positive structure of the PDO remainds despite the negative SST trend south of the Gulf of Alaska. The anomalies are particularly strong and little change between Hawaii and California.
In the southern hemisphere: enhancing of the cold anomaly pattern over Indonesia and along the SPCZ.

In the Indian Ocean :
Generalized warm anomaly, stronger along the African coast and Arabian. The DMI index is positive around +1°C (http://now notably positive, see for instance stateoftheocean.osmc.noaa.gov/sur/ind/dmi.php)

In the Atlantic:
Low cold anomaly on the equator and up to 30S. Warm anomaly along the coast of Brazil and in the South Atlantic.
Warm anomaly in the north intertropical aera and along the US coasts.
In the North Atlantic, strong cold anomaly from Labrador to Europe.

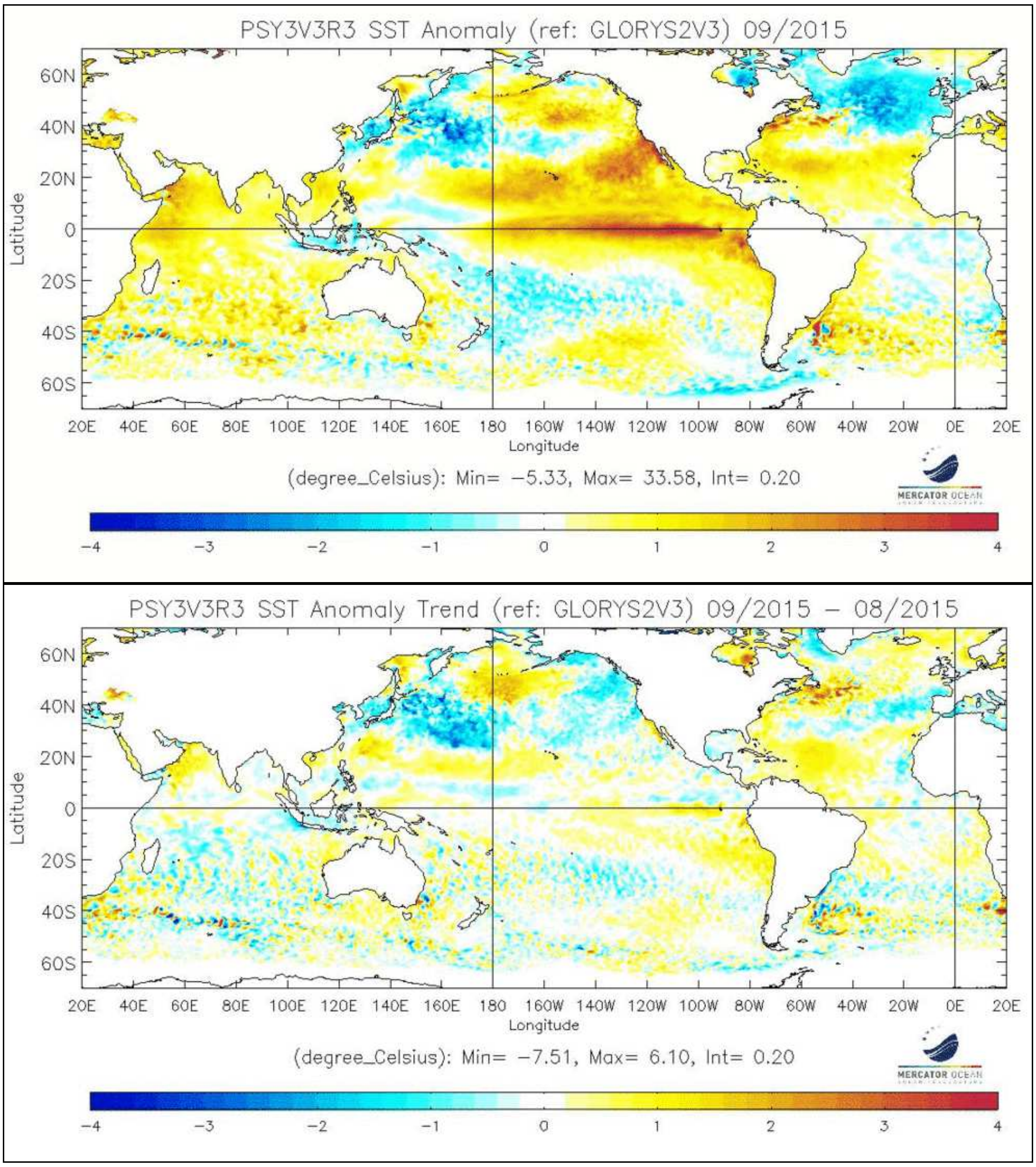


fig.I.1.1: top : SSTs Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2013). www.mercator-ocean.fr

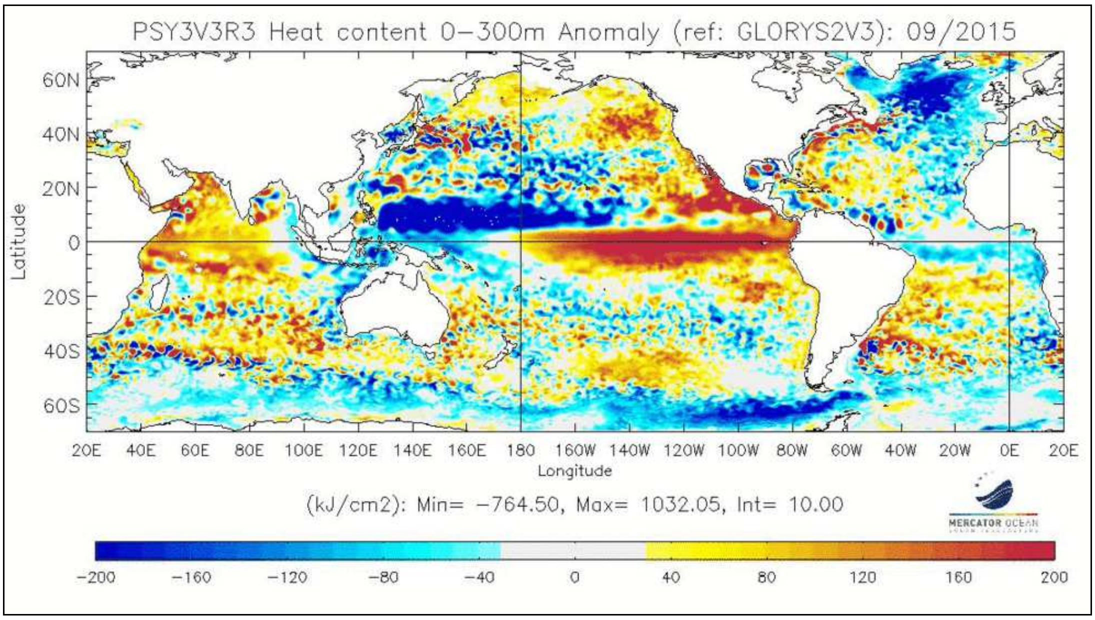


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2013)

www.mercator-ocean.fr

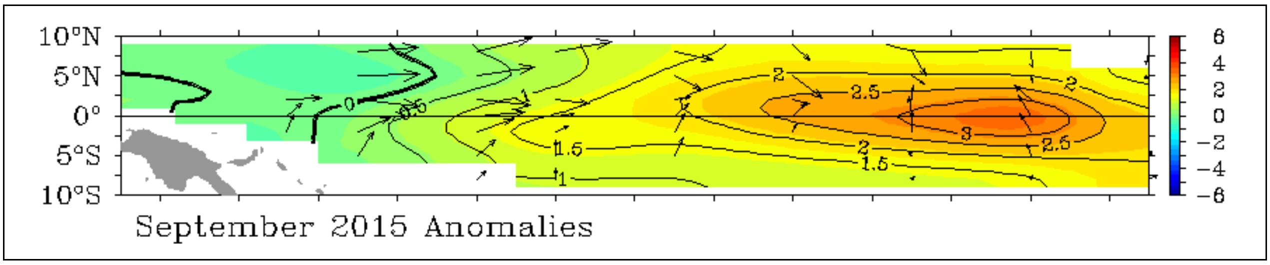


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON.

http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html

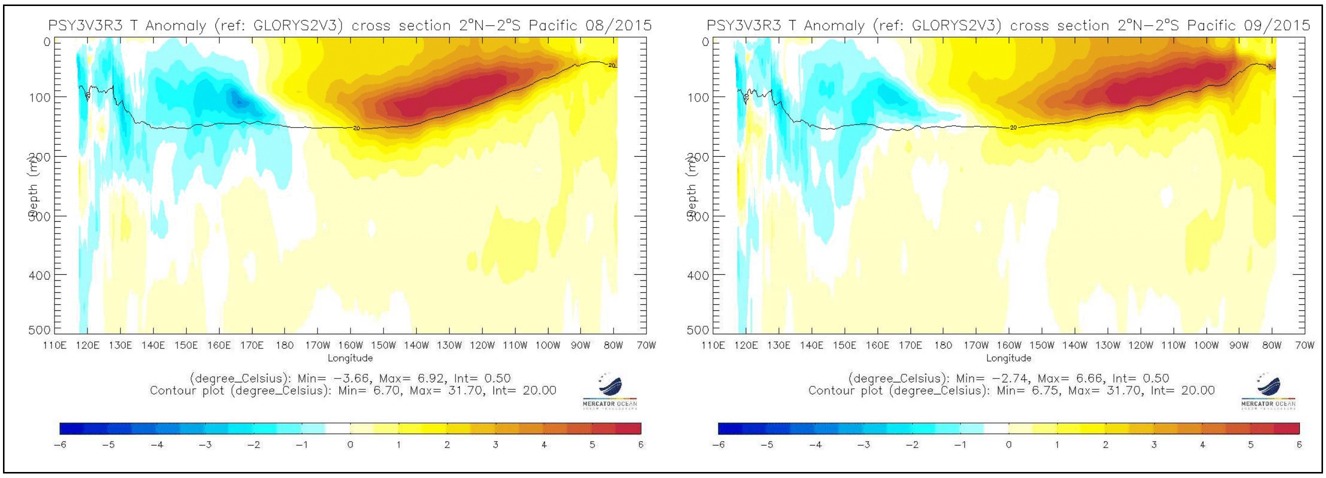


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), www.mercator-ocean.fr

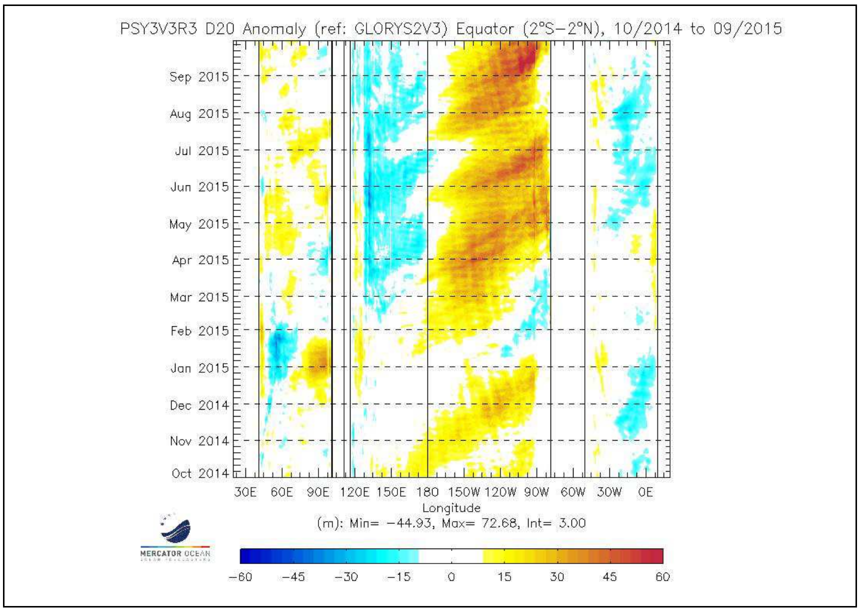
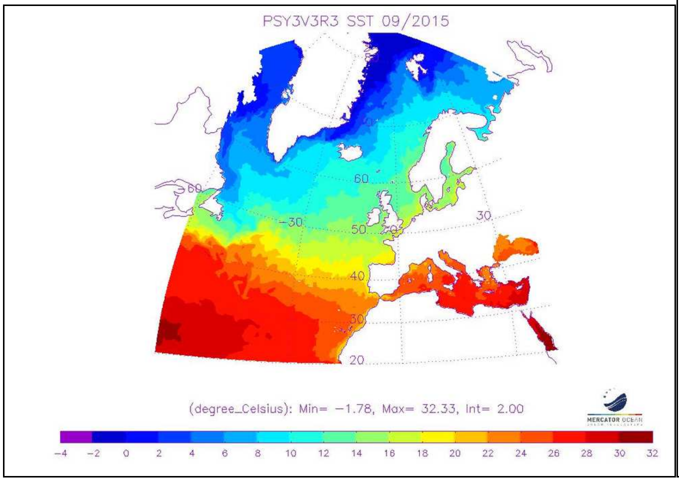


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period www.mercator-ocean.fr

I.1.b Sea surface temperature near Europe



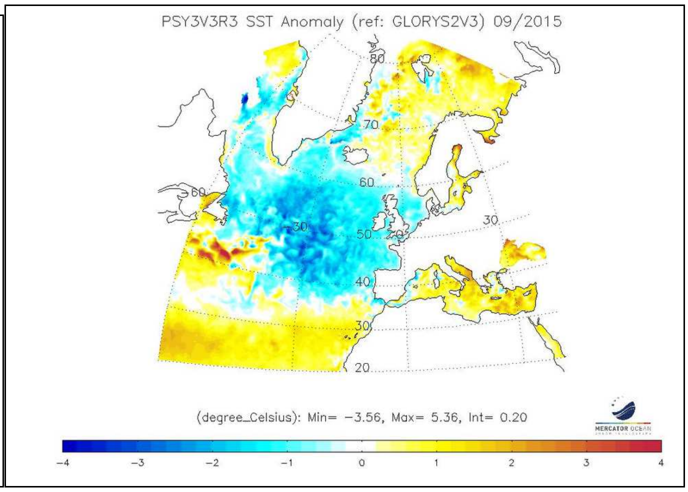


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2013). www.mercator-ocean.fr

I.2.ATMOSPHÈRE

I.2.a General Circulation

Velocity Potential Anomaly field in the high troposphere (fig. 1.2.1 – insight into Hadley-Walker circulation anomalies) :
the 2 pattern wave remained very stable throughout the month, with a more intense dipole on the Pacific linked with ocean-atmosphere coupling due to El Nino. Large area of high upward motion anomaly on central and eastern Pacific, associated with positive SST anomalies.Conversely, large area of strong downward motion anomaly on the Southeast Asia, the Maritime Continent and Australia. Weaker downward motion anomaly area on the Caribbean and northern South America, and more diffuse upward motion anomaly on Africa favor a fairly marked activity of the monsoon.
Negative SOI index in September (-1.6), which abounds in the direction of ocean-atmosphere coupling (consistent with El Niño).

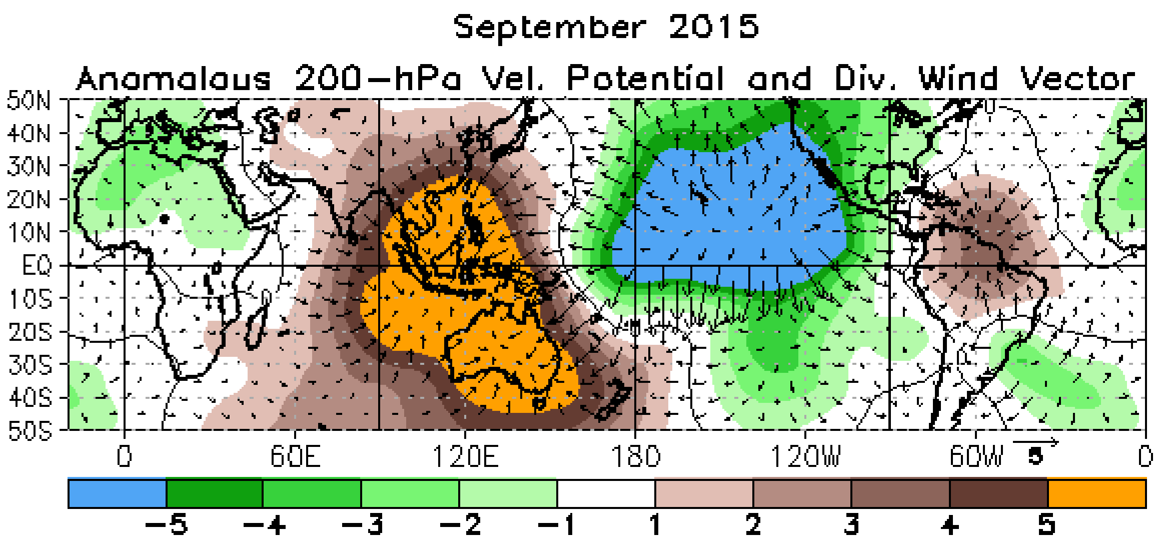


fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).

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

MJO (fig. I.2.b):
No significant MJO activity in September

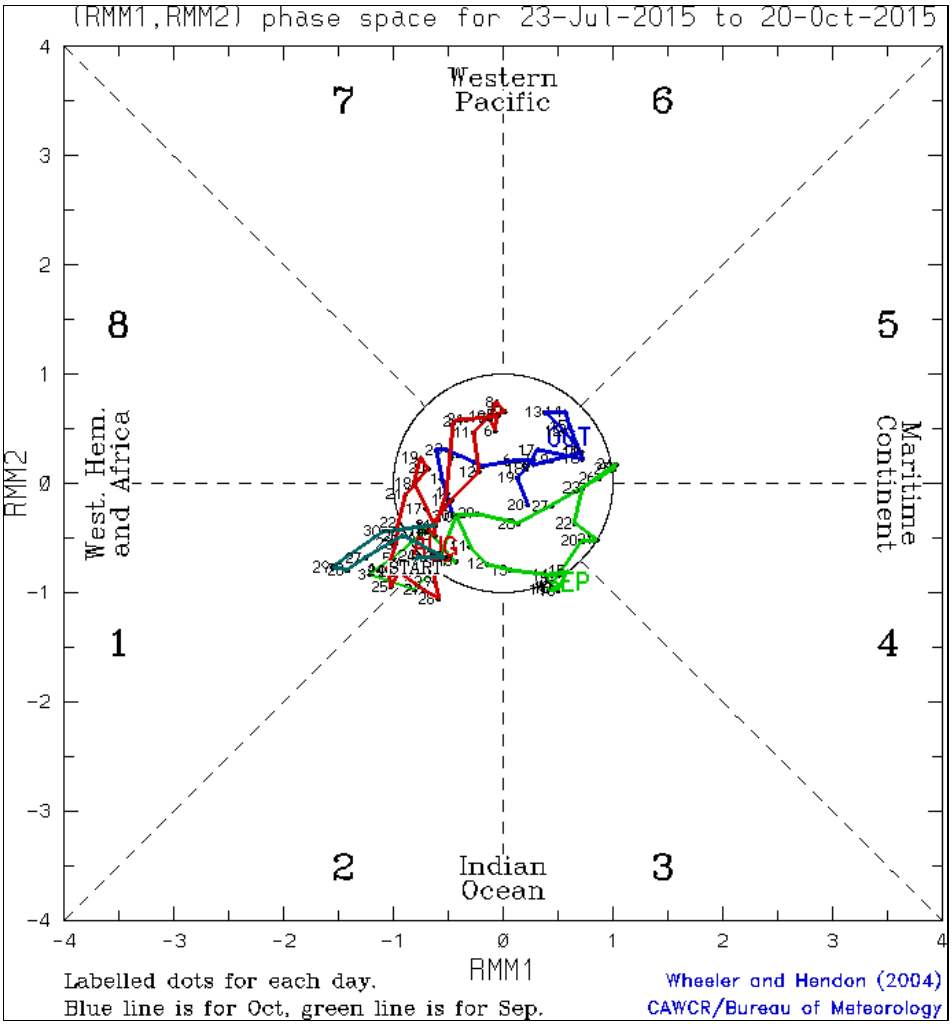


fig.I.2.b: indices MJO http://cawcr.gov.au/staff/mwheeler/maproom/RMM/phase.Last90days.gif

Stream Function anomalies in the high troposphere (fig. 1.2.2 – insight into teleconnection patterns tropically forced) :The response of the stream function in velocity potential anomalies is pretty consistent this month, with 3 dipoles meet the three main upward and downward motion anomalies. There is a trace of weak teleconnection to the middle latitudes of the Pacific.

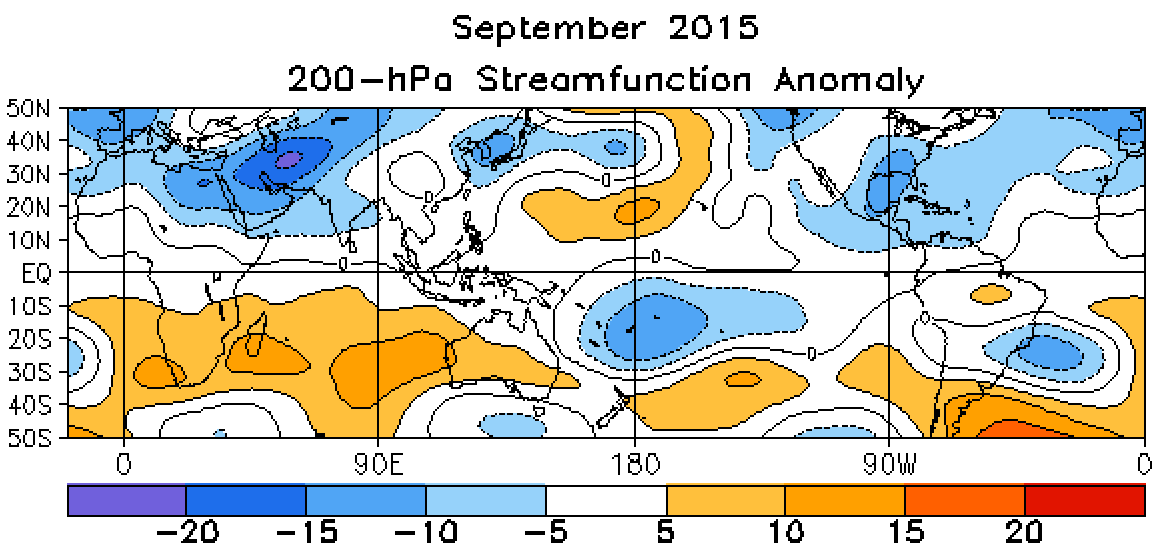


fig.I.2.2: Stream Function Anomalies at 200 hPa.

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

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

In the northern hemisphere : in continuity of August, large positive anomaly from the Greenland Sea to Scandinavia and Russia to the Caucasus. The Western Europe has experienced a negative anomaly.
As the month before, the North America anomaly structure is atypical in a positive ENSO/PDO. With a positive anomaly on the Aleutians, a negative anomaly on western Canada and positive on Quebec.

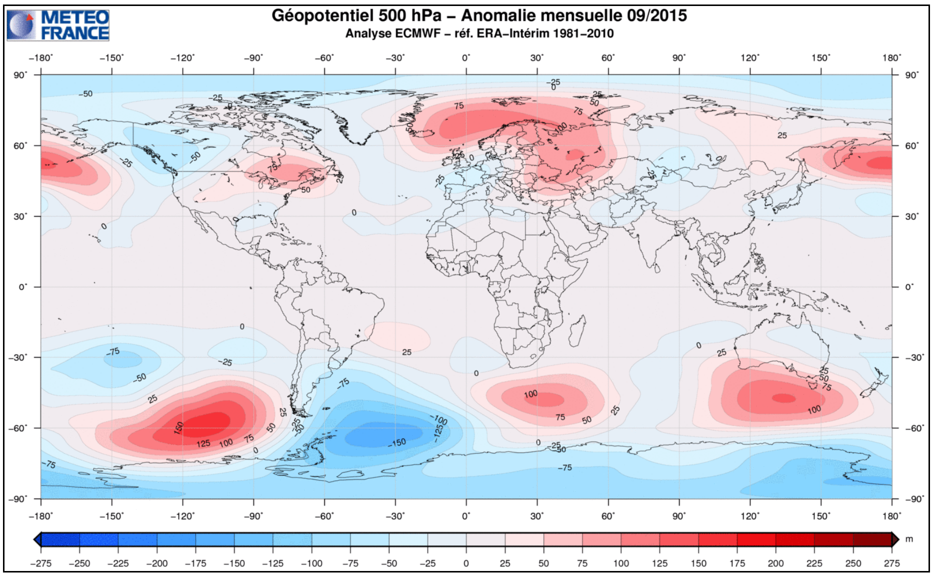


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

Sea level pressure and circulation types over Europe :

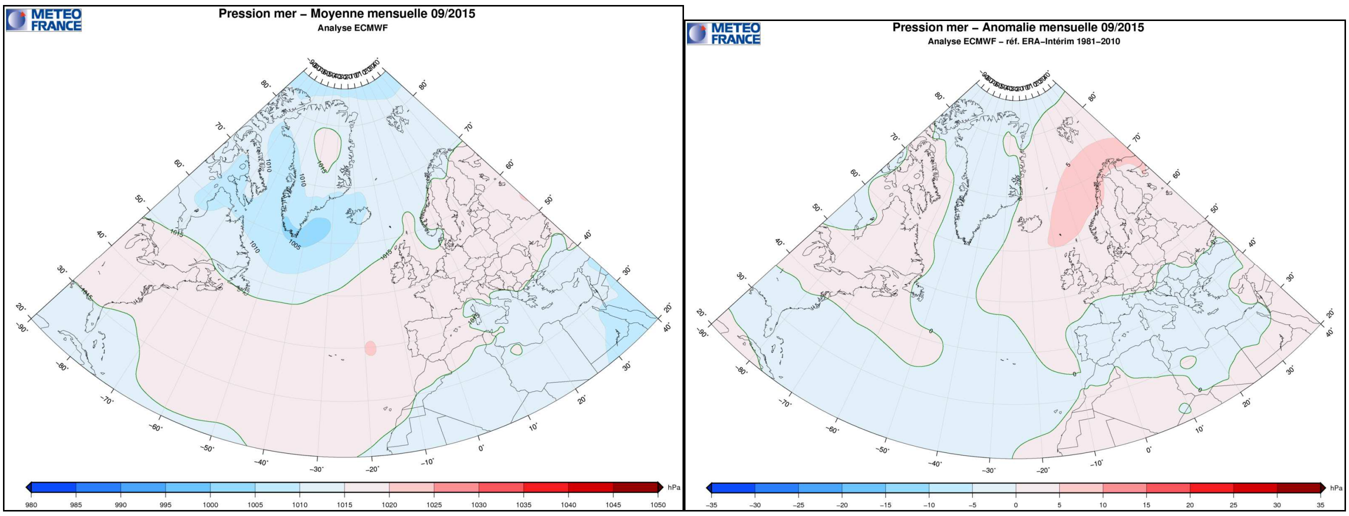
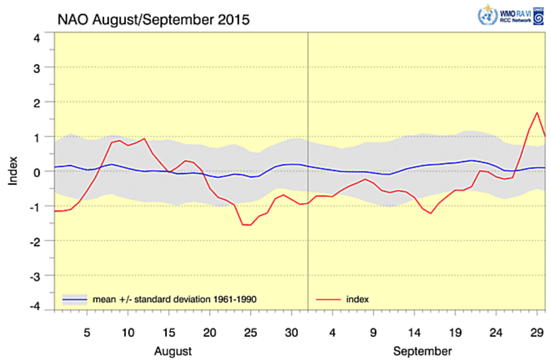


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (top) and 1981-2010 anomalies (bottom).

Circulation indices: NAO and AO :



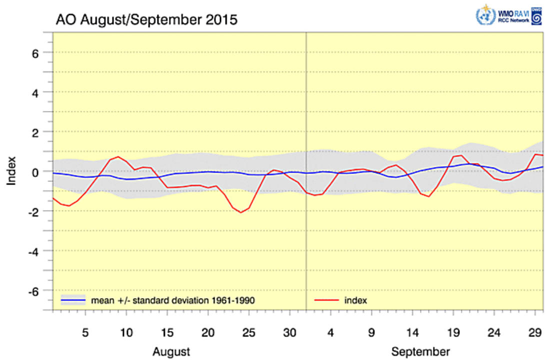
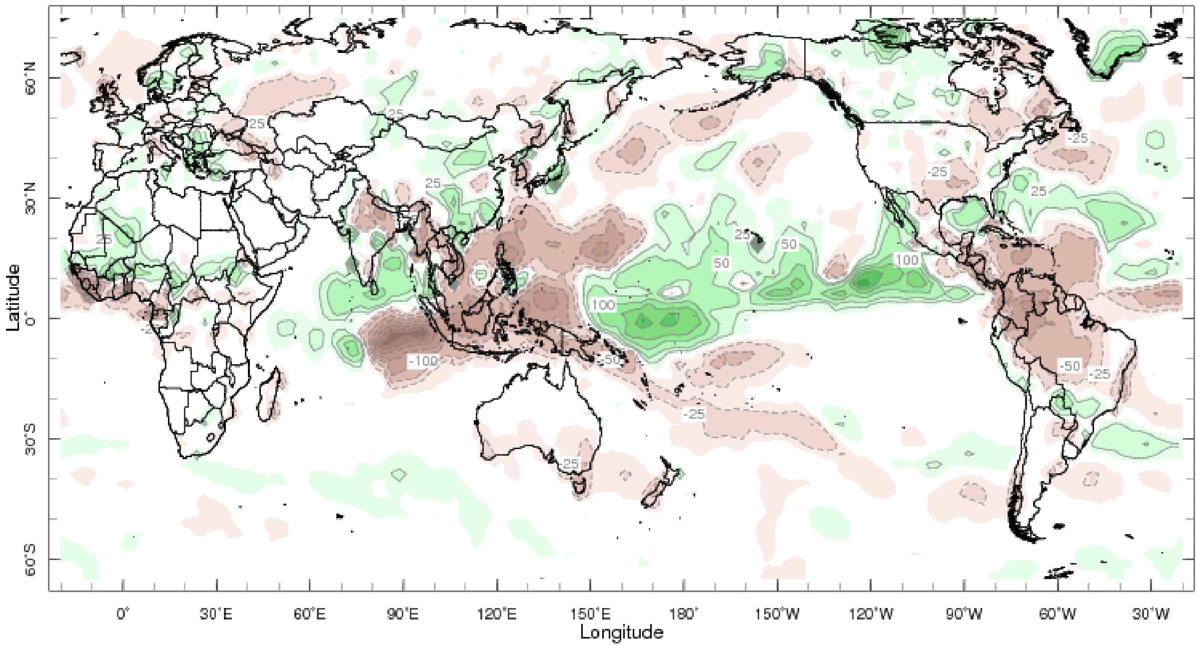


fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

The strongest anomalies in September are those conventionally expected in the Niño current phase, with a surplus of precipitation over the central and eastern equatorial Pacific and marked deficit on the Maritime Continent, and Central America, the Caribbean, northern South America.
The African monsoon was rather surplus in its northern part, but below normal along the Gulf of Guinea coast.



Sep 2015

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:

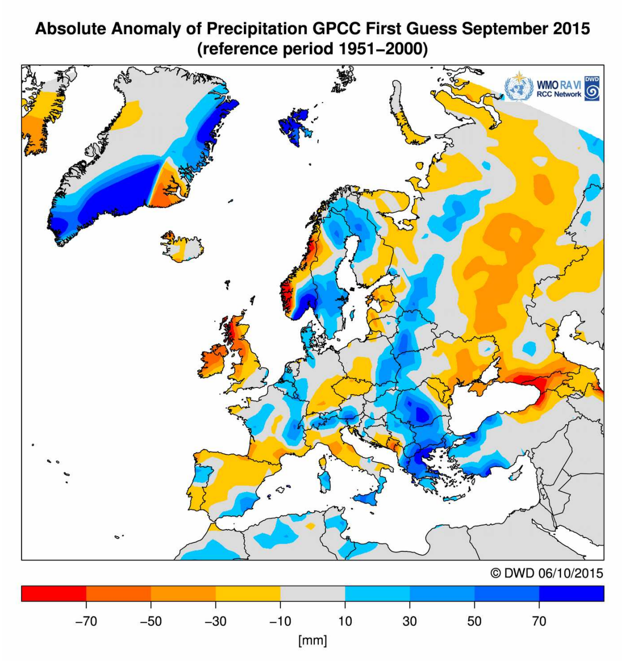


fig.I.2.5: Left: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm. Right: Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

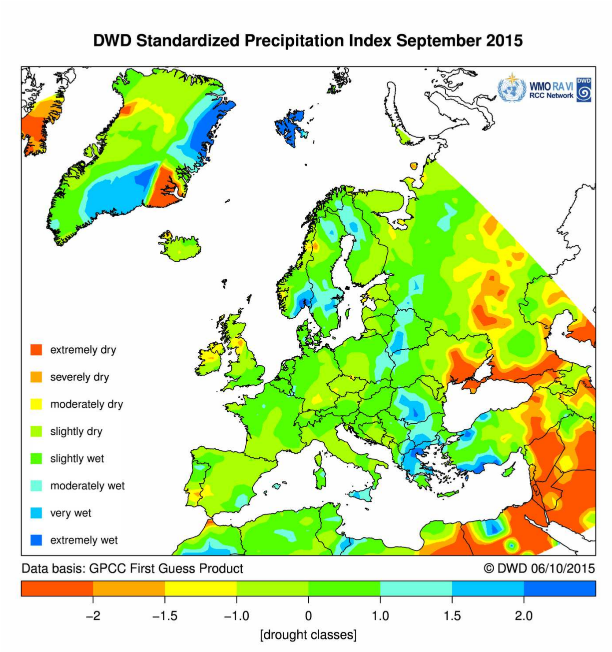


fig. I.2.5a: Standardized Precipitation Index with DWD modification (DWD-SPI), http://www.dwd.de/rcc-cm .

I.2.c Temperature

Consistant with geopotential, warm anomaly on Eastern Europe and Scandinavia, cold anomaly on western Europe.
Warm anomaly in the northern two-thirds of South America. Warm anomaly over a large part of the United States and eastern Canada. Cold anomaly on Alaska and western Canada.

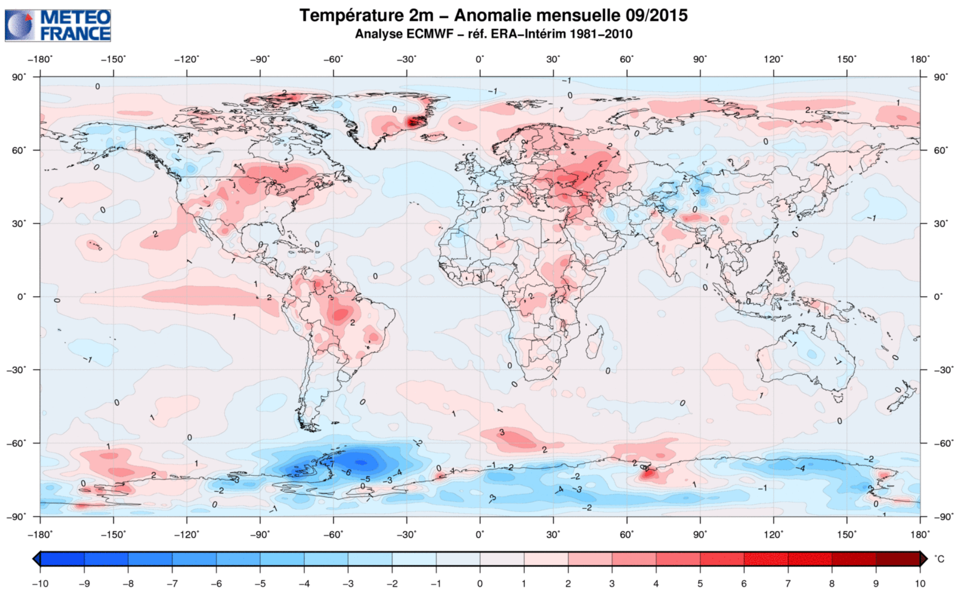


fig.I.2.8: Temperature Anomalies (°C) (Meteo-France)

Temperature anomalies in Europe:

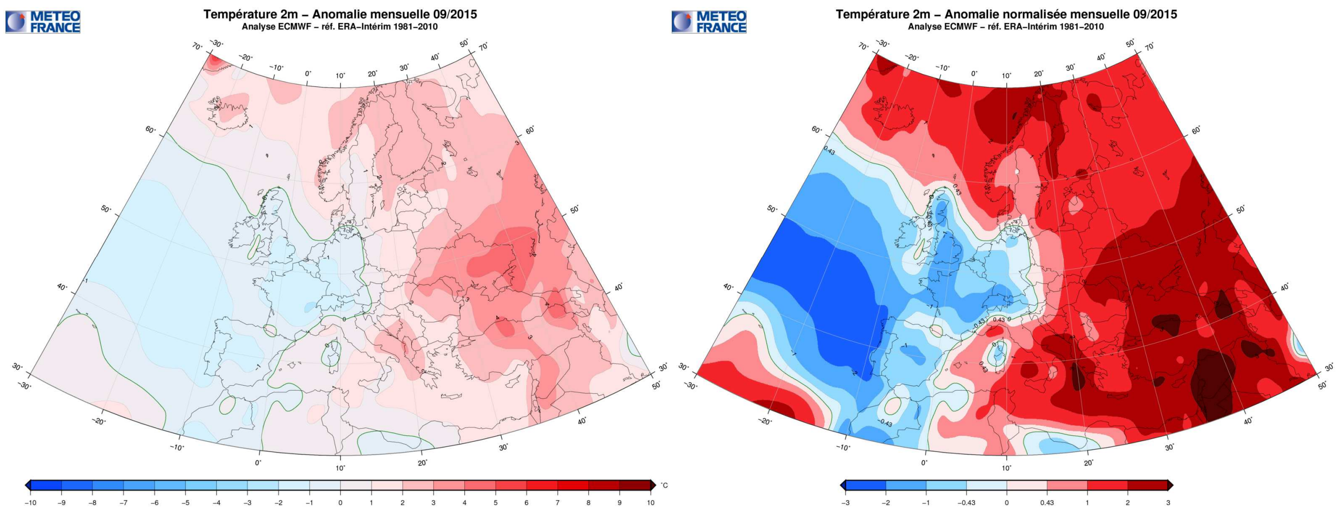


fig.I.2.9: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

I.2.d Sea ice

In Arctic (fig. 1.2.6 and 1.2.7 - left) : persistent significant deficit (~ -2 std), Northeast and Northwest passages opened in September.
In Antarctic (fig. 1.2.6 and 1.2.7 - right) : near normal values.

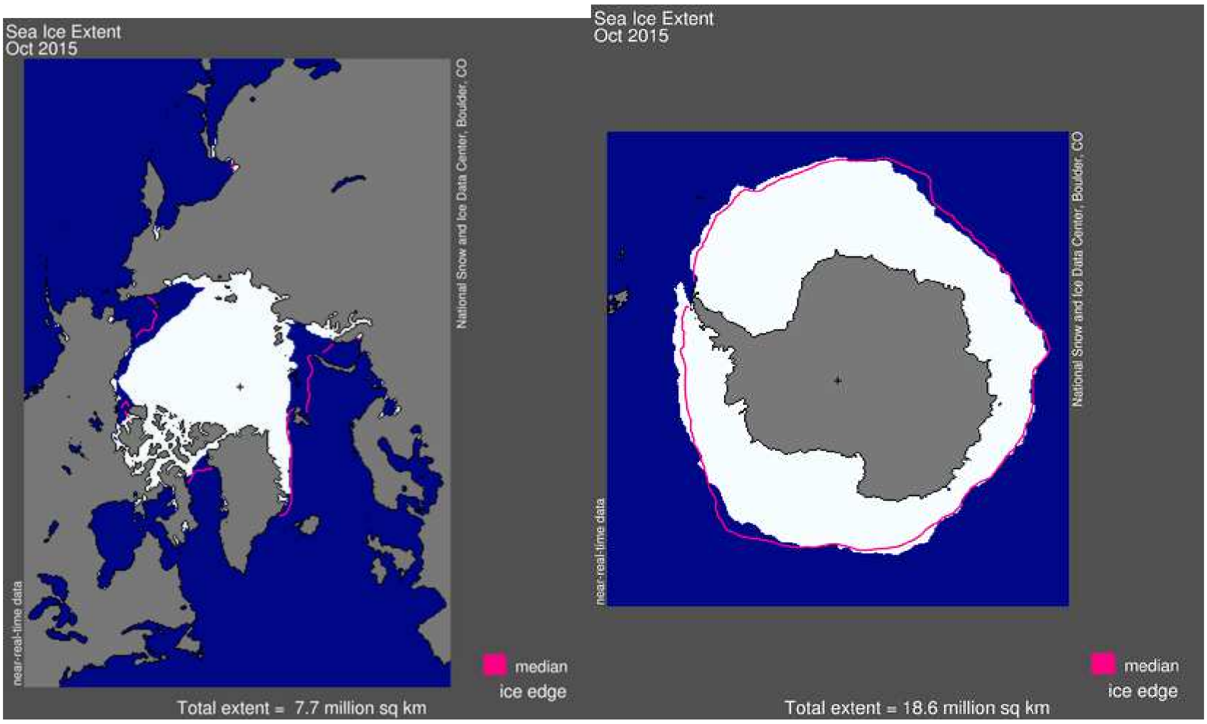


fig.I.2.15: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). [http:/ /nsidc.org/data/seaice_index/](http://nsidc.org/data/seaice_index/)

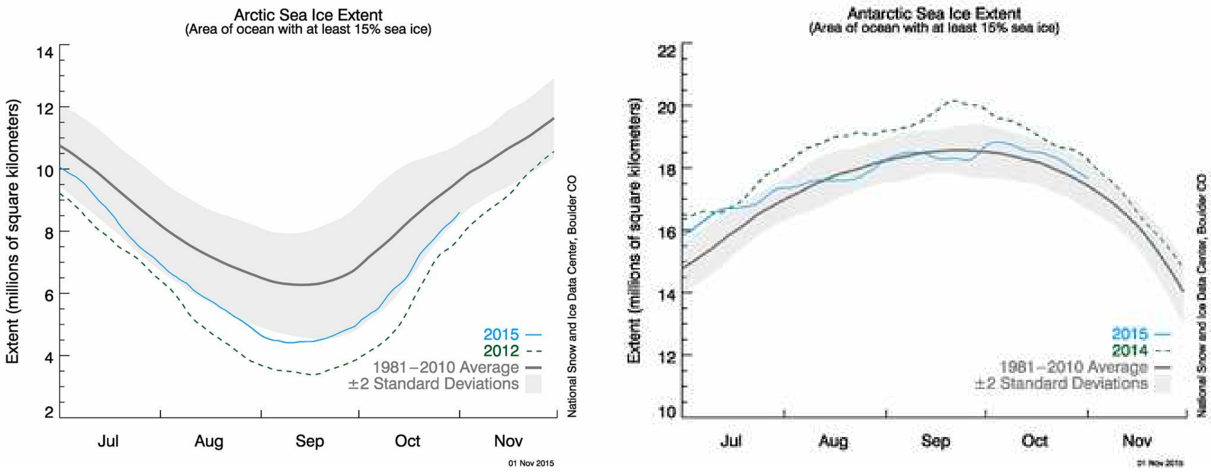


fig. I.2.16 : Sea-Ice extension evolution from NSIDC.

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

II. SEASONAL FORECAST FROM DYNAMICAL MODELS

The global climate system is strongly influenced by the current El Nino event. In that condition, the predictability is significantly strengthened in the tropical area. All seasonal forecast models are very close, particularly EUROSIP models. The anomaly patterns are very consistent both for the ocean and for the atmosphere in the tropical area.

II.1.OCEANIC FORECASTS

II.1.a Sea surface temperature (SST)

Pacific Ocean: the warm anomaly will continue to strengthen in central and eastern Equatorial Waveguide. The large area of warm anomaly will also persist along the western coast of North America to the Bering Strait, due to the positive PDO phase. Persistance of the cold anomaly in the Southern Hemisphere, from the Solomon Islands to New Zealand south one hand, and with an extension towards the east until about 90W on the other hand.

Indian Ocean: Remaining of the generalized warm anomaly, particularly strong in the south of the Tropic of Capricorn.

Atlantic Ocean: As in previous months, the tropical Atlantic is the only area where models diverge significantly with a very clear difference between ECMWF and ARP on one hand, which provide warm anomalies, and NCEP on the other hand which provides a very significant cold anomaly . The EUROSIP average is rather negative but unreliable in this area. The models agree on the persistence of strong cold anomaly on the North Atlantic and of warm anomaly from Caribbean and American coasts to Africa.

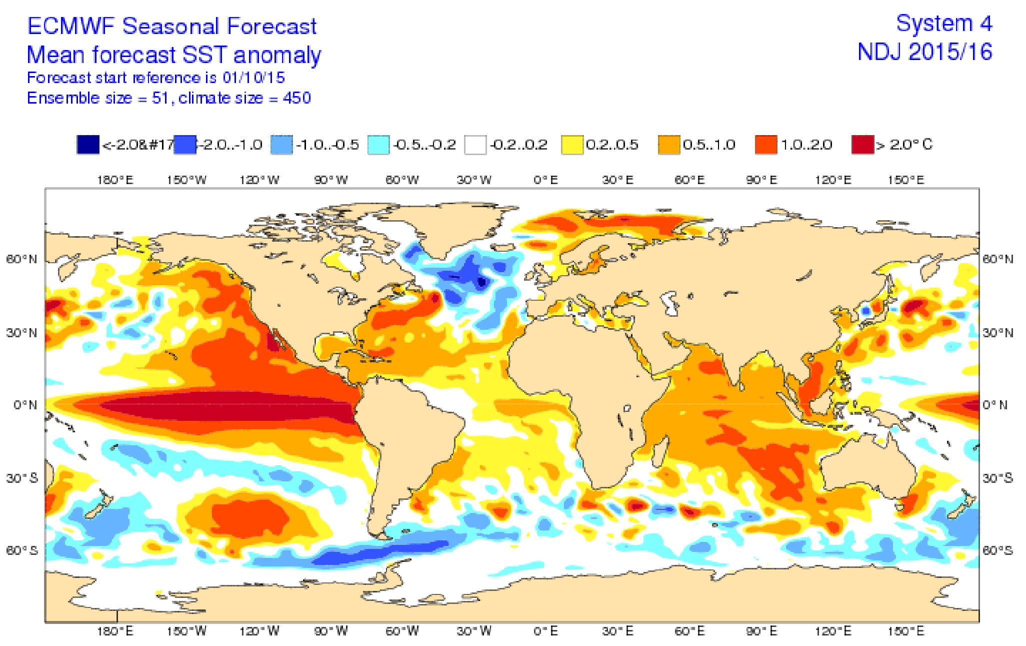


fig.II.1.1: SST anomaly forecast from ECMWF

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

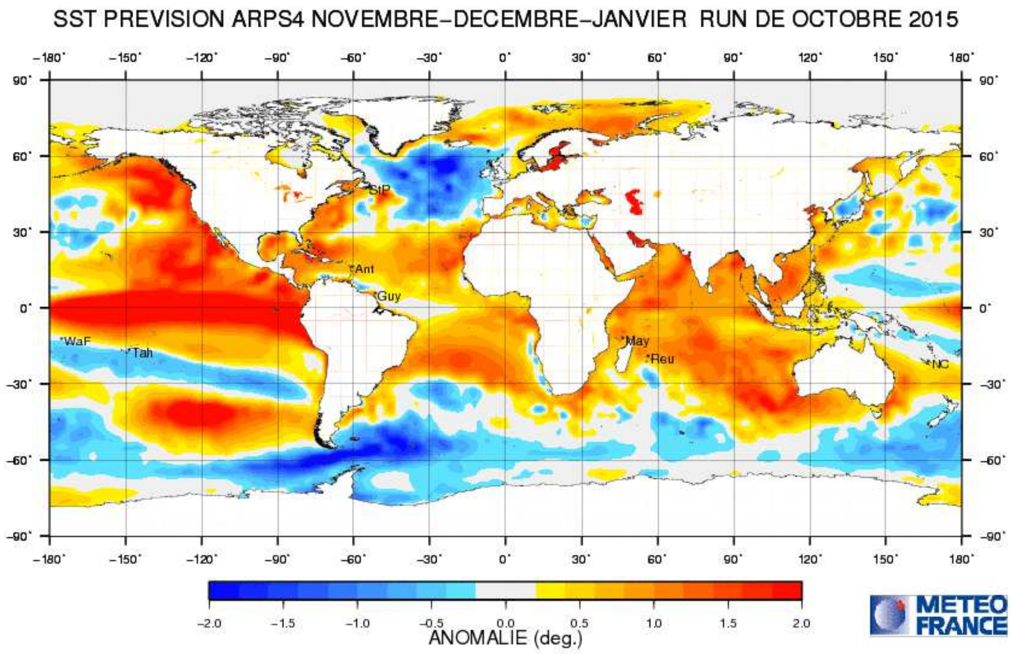


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).

http://elaboration.seasonal.meteo.fr

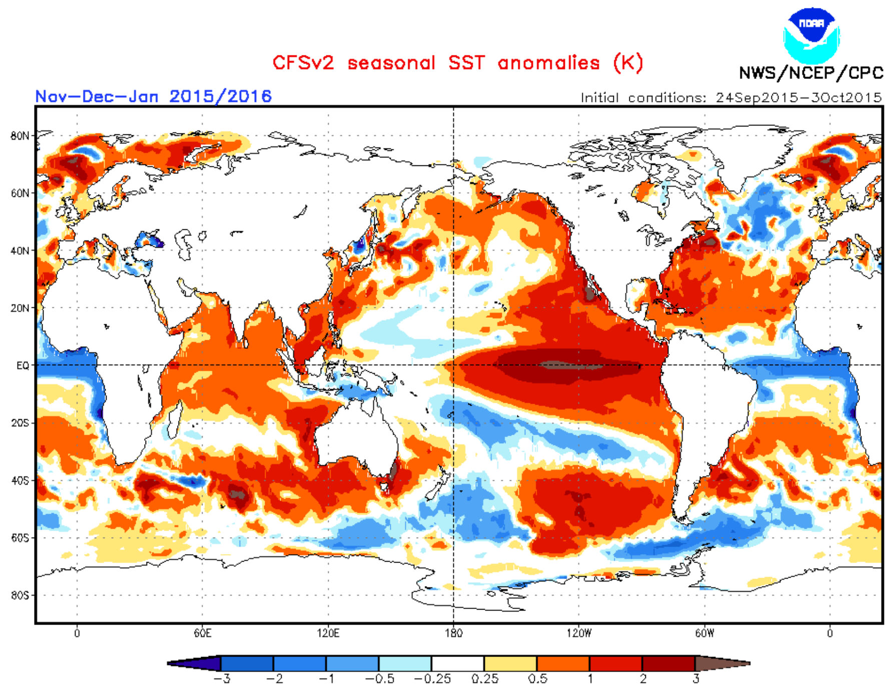


fig.II.1.3: SST anomaly forecast from NCEP.

http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/imagesInd1/glbSSTSeaInd1.gif

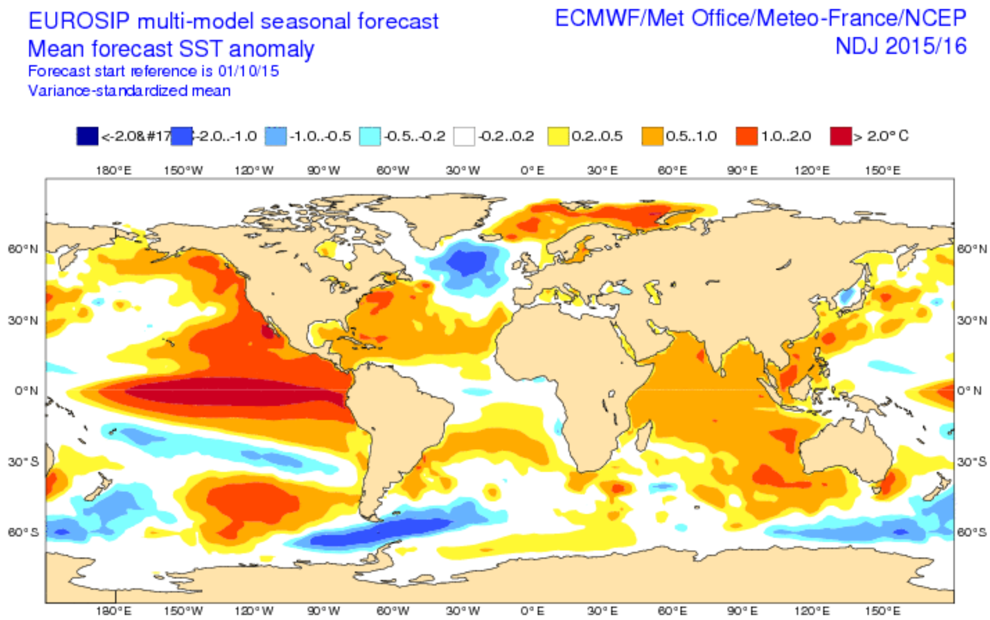
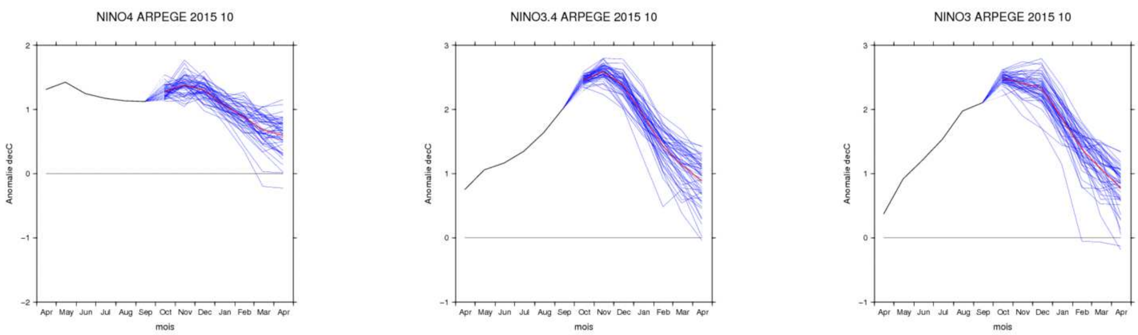


fig.II.1.4: SST Forecasted anomaly from Euro-SIP

II.1.b ENSO forecast :

Forecast Phase: Strong to very strong El Niño event

Models are both very low scattered and very consistent in the El Nino event forecast. The SST anomaly in Niño3.4 box should follow a classic path and reach its maximum in November, remain constant in December, and start decreasing in January. The average maximum value on a quarter (according to the ONI) should be close to the event record for 1997/1998 (+ 2.3 ° C) but probably slightly lower. http://www.cpc.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml .



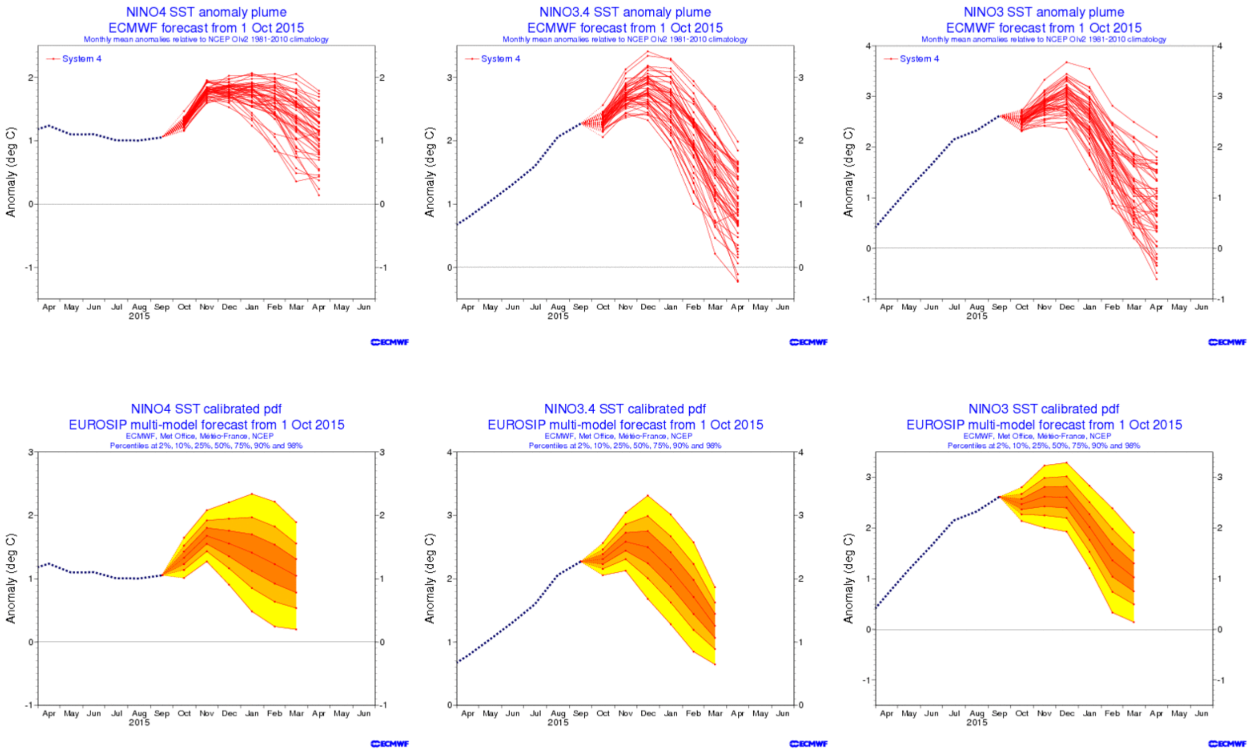
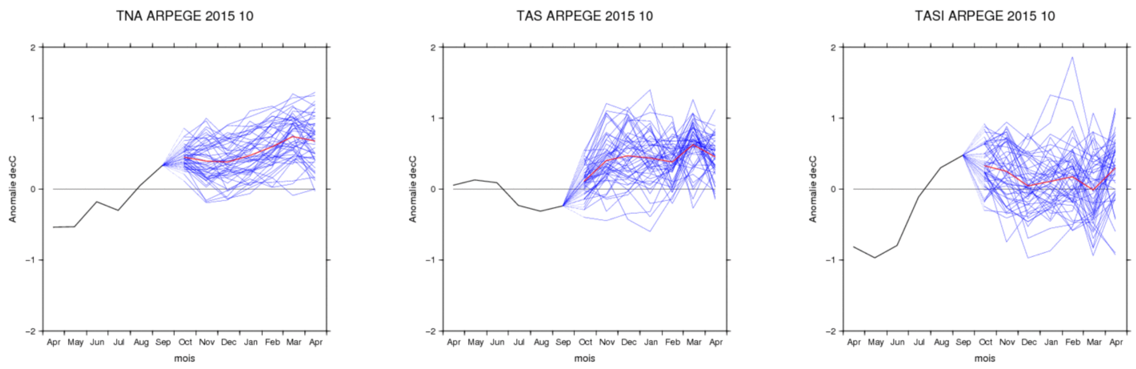


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

II.1.c Atlantic ocean forecasts



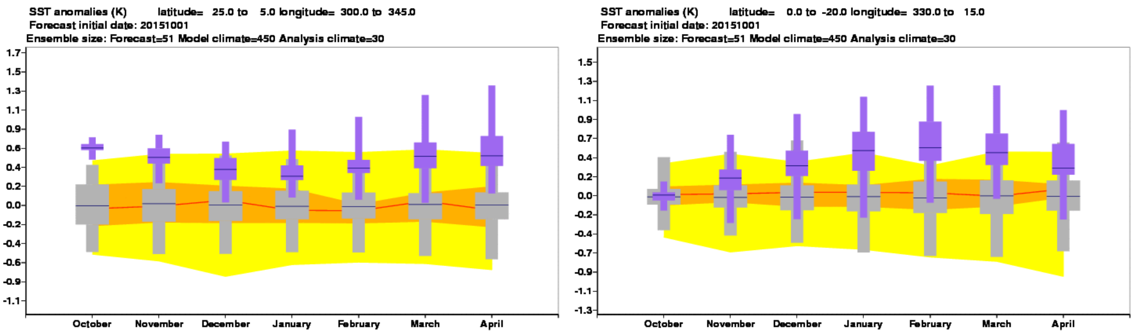
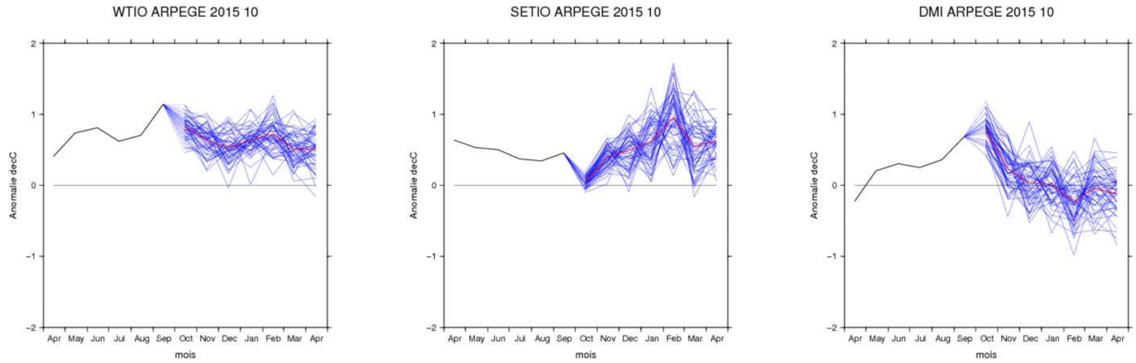
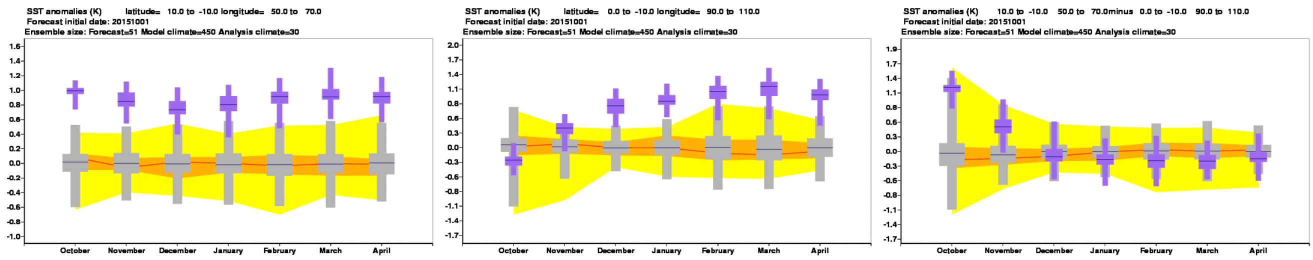


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.1.d Indian ocean forecasts





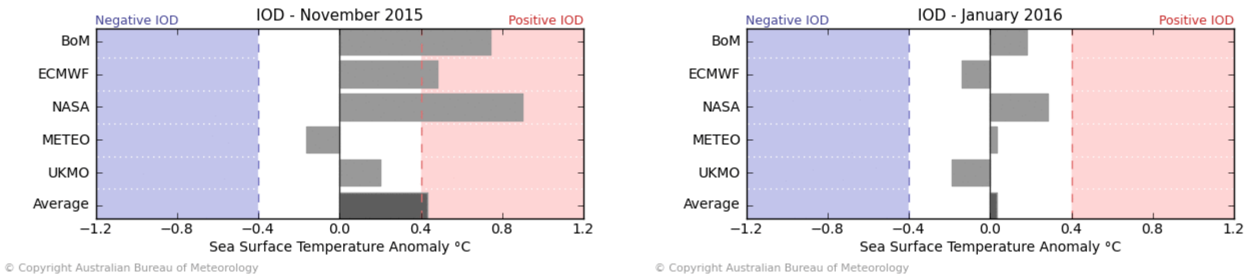


fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.2. GENERAL CIRCULATION FORECAST

II.2.a Global forecast

Velocity potential anomaly field (cf. fig. II.2.1 – insight into Hadley-Walker circulation anomalies): structure of wave 2, with a very strong downward anomaly area on Maritime Continent and a vaste upward motion area on central and eastern Pacific Ocean. MF and JMA favor an upward motion core on central equatorial Pacific while ECMWF favors a core further east. The second upward motion area on the Indian Ocean is also stronger in ECMWF.

Stream Function anomaly field (cf. fig. II.2.1 – insight into teleconnection patterns tropically forced): The models are close in the intertropical belt, however at higher latitudes small positioning or intensity differences of cores can change the look of the field with consequences on forecasts. The teleconnection from Pacific to Canada is better built in MF and JMA and less clear in ECMWF. On the North Atlantic, the average cyclonic anomaly in ECMWF is significantly higher than for MF with consequences in terms of forecasted weather regime.

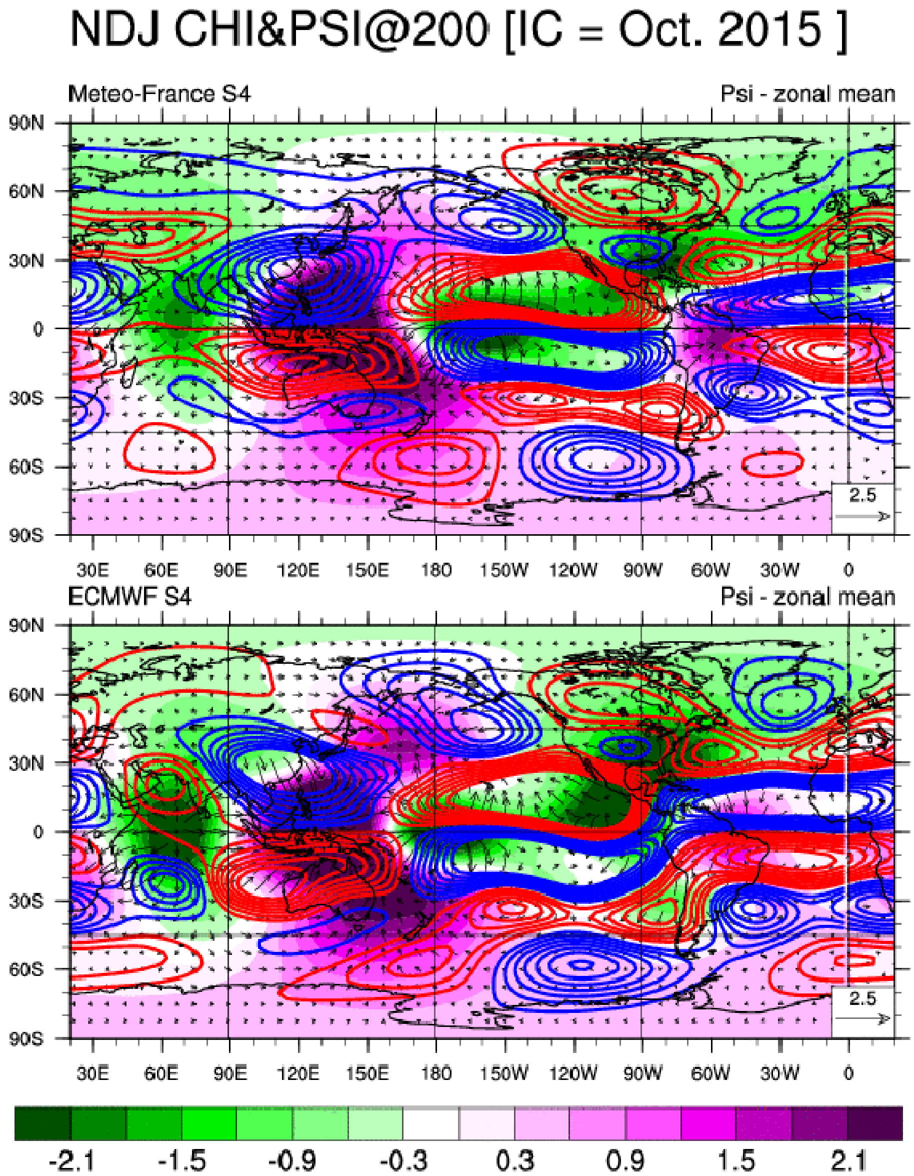


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

II.2.b North hemisphere forecast and Europe

Geopotential height anomalies (fig. 20 – insight into mid-latitude general circulation anomalies) :
With some good will, we can find most geopotential anomaly kernels on both models. But the differences in intensity and position are important. Thus the patterns on the Pacific are very different. On America, geopotential high centered near the Hudson Bay and geopotential low centered over the southern United States are much stronger in ARP. Conversely, the negative anomalies in the North Atlantic and positive on Algeria are much stronger in ECMWF.
Consequently, forecasted regime occurences with Arpege and ECMWF are opposed in the sign of the NAO.

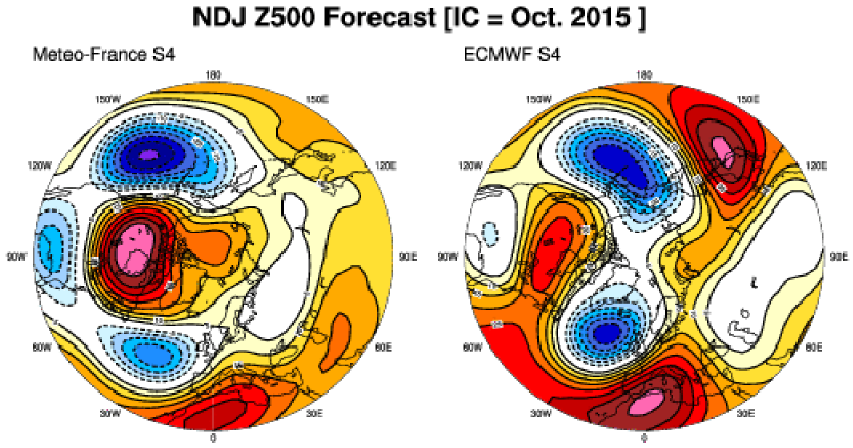


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right).

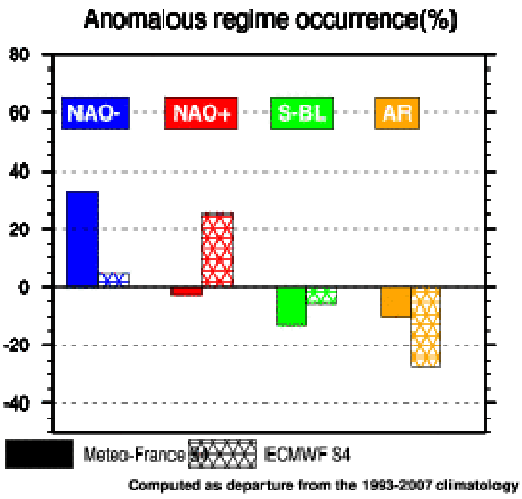


fig.II.2.3: North Atlantic Regime occurrence anomalies from Météo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

II.3. IMPACT: TEMPERATURE FORECASTS

Besides global warming, the ENSO+ and PDO+ context and Indian Ocean SST anomalies are favorable to enhanced probability of global warm anomaly. The few exceptions are on sea areas where surface temperatures are provided below normal, and on land : Greenland, Mexico and the southern United States, Argentina.
On Europe, a "warmer than normal" signal is most likely, except the British Isles.

II.3.a ECMWF

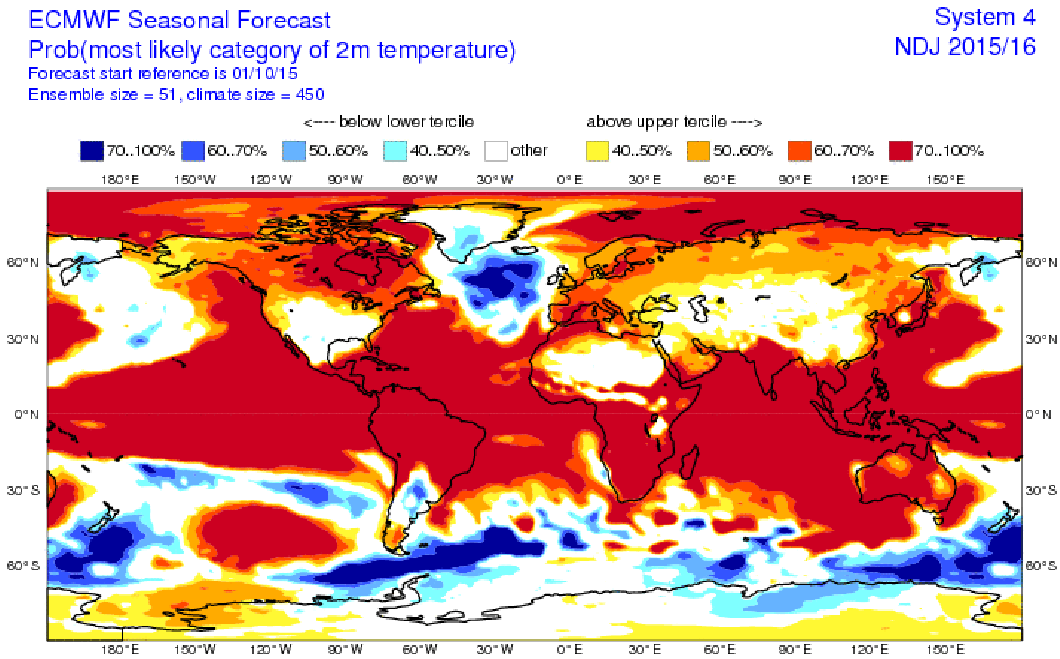


fig.II.3.1: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.3.b Météo-France

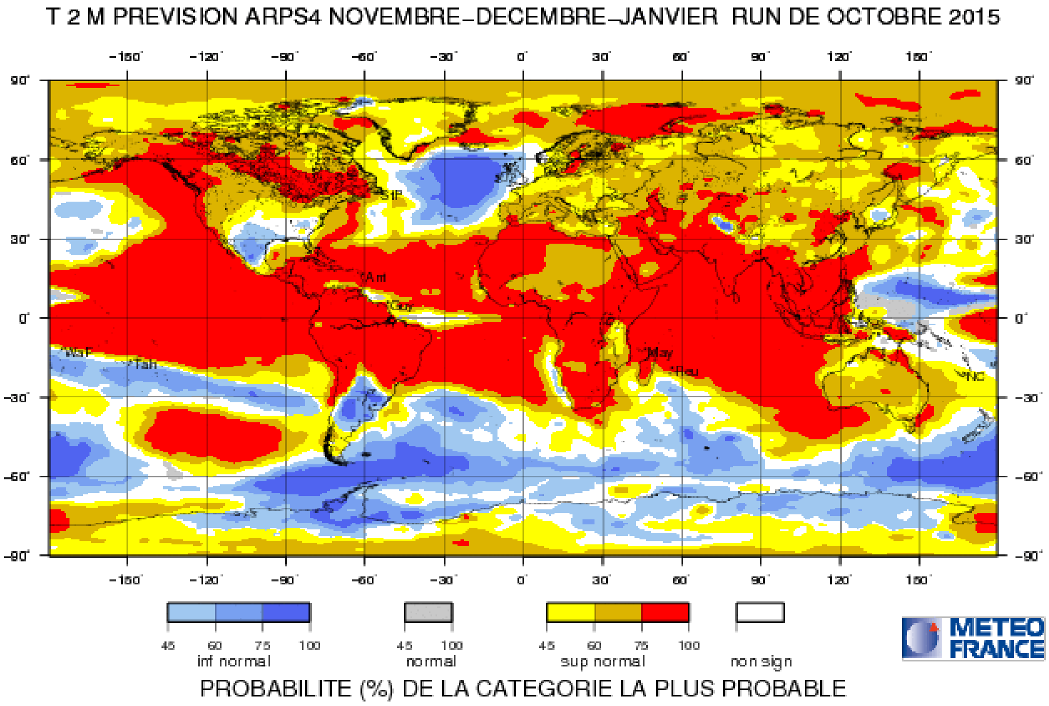


fig.II.3.2: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.3.c Japan Meteorological Agency (JMA)

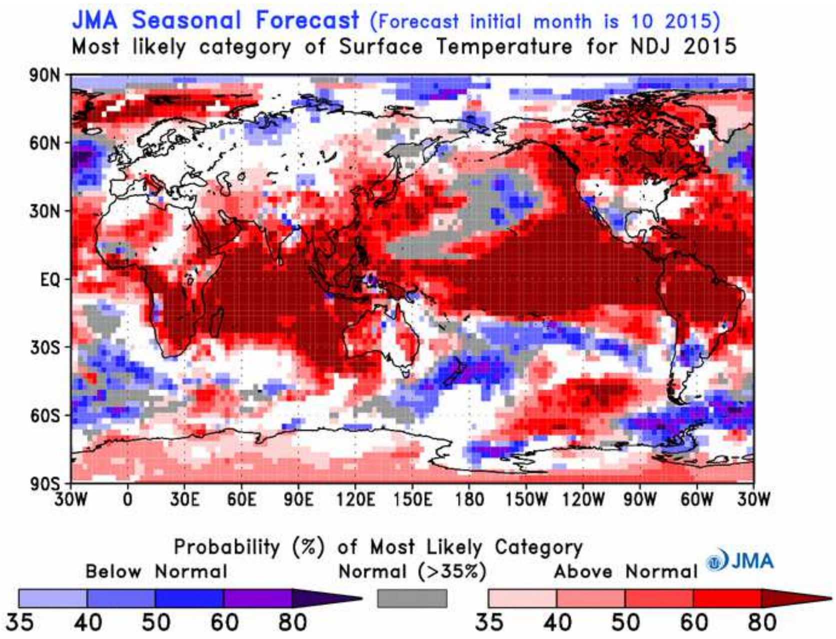


fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.3.d EUROSIP

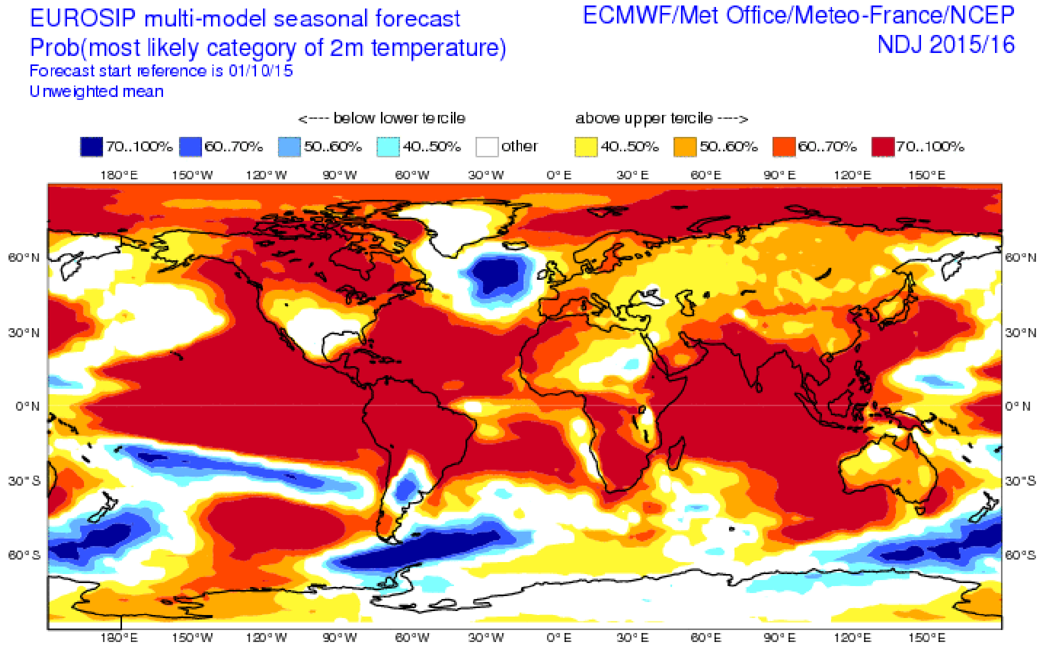


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).

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

II.4. IMPACT : PRECIPITATION FORECAST

There is a large contribution of the El Nino event to the forecasted anomalies distribution. Enhanced probability of excess precipitation in central and eastern equatorial Pacific extending to the coasts of Peru and Ecuador, and northward to Mexico and South of USA. The same in southern Brazil, Uruguay, and northern Argentina. Also on the Horn of Africa, the Great Lakes region and much of the Indian Ocean. Also enhanced probability of excess precipitation in Central Asia and China, and even very strong over eastern China, the Koreas and Japan.

Conversely, dry anomaly is expected on the Caribbean and northern South America, as well as southern Africa. A rainfall deficit is also very likely from the Maritime Continent up to Polynesia.

For Europe, a north-south gradient in the forecast seems to appear with an enhanced probability of dry anomaly on North Africa and the Mediterranean Sea and an enhanced probability of wet anomaly in the northwest of Europe. The boundary between these two areas is blurred and varies from one model to another.

II.4.aECMWF

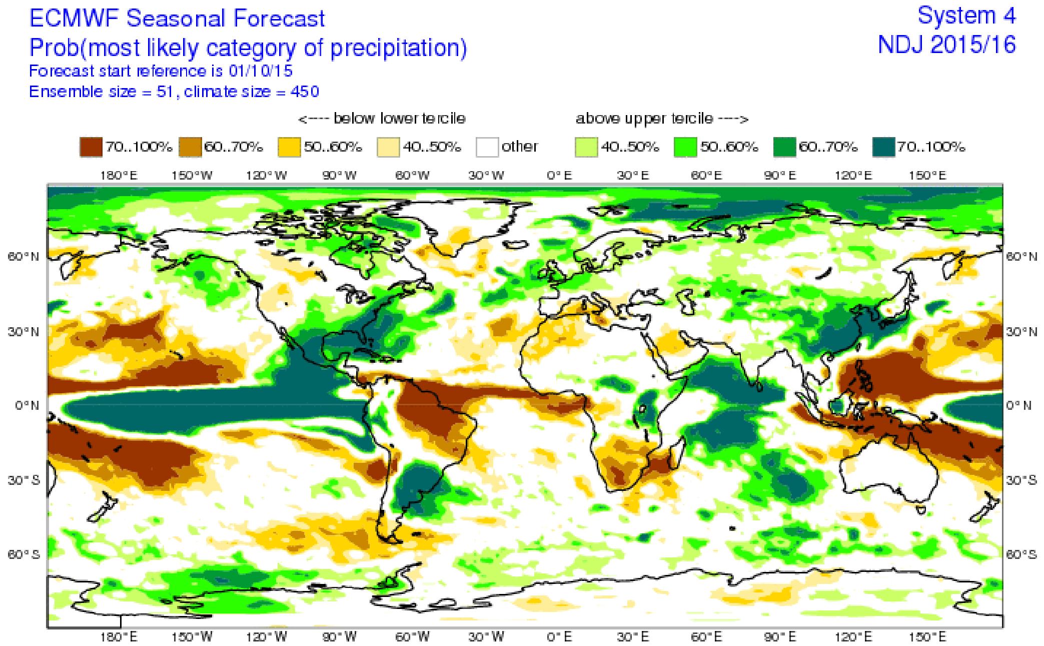


fig.II.4.1: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.4.b Météo-France

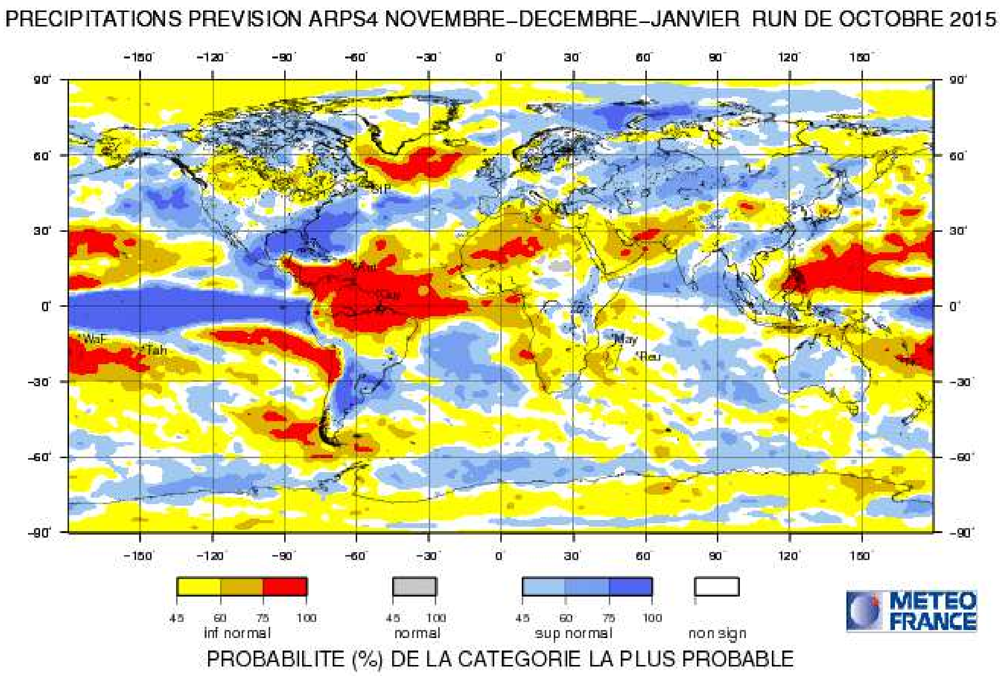


fig.II.4.2: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.4.c Japan Meteorological Agency (JMA)

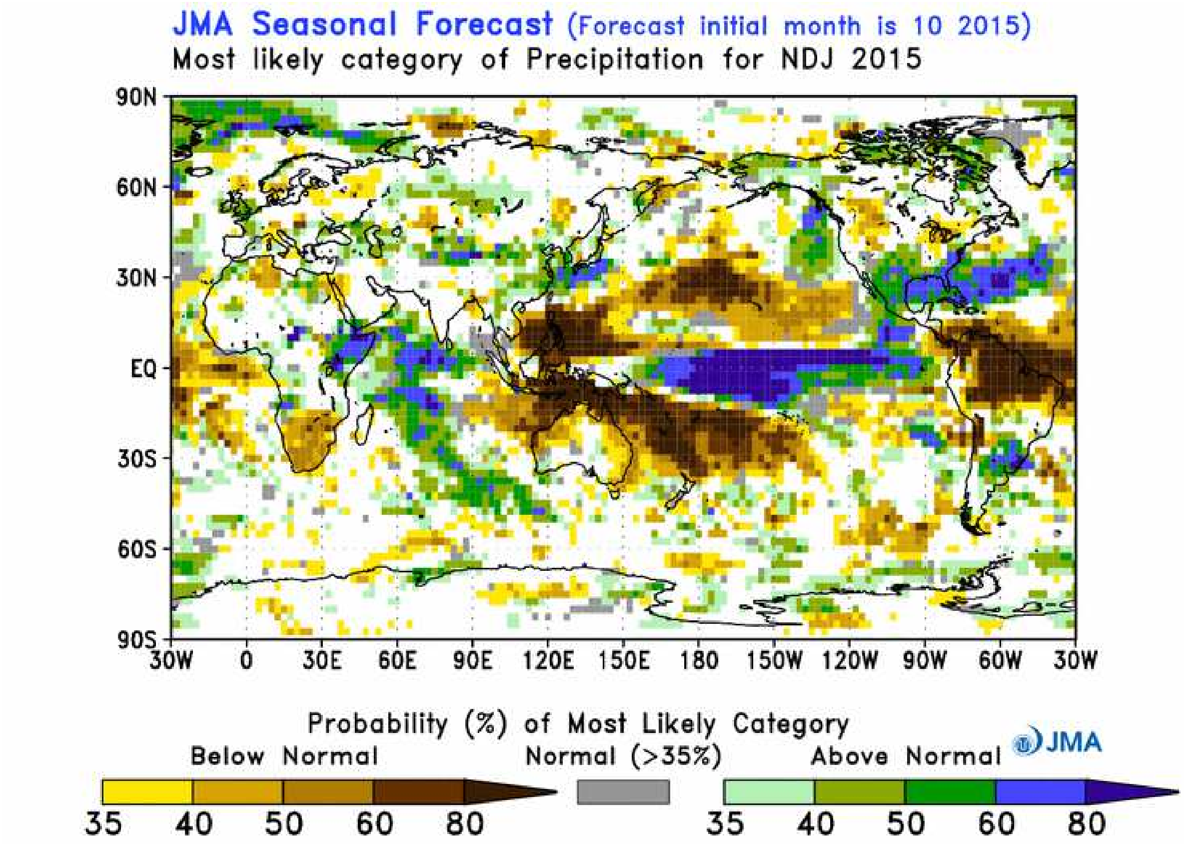


fig.II.4.5: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.4.d EUROSIP

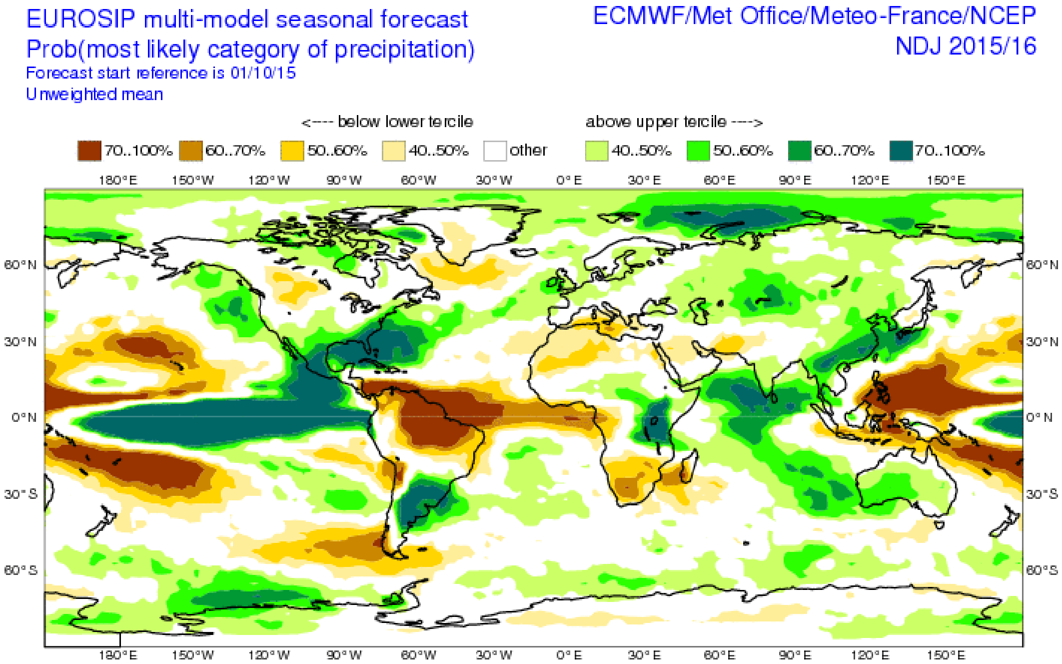
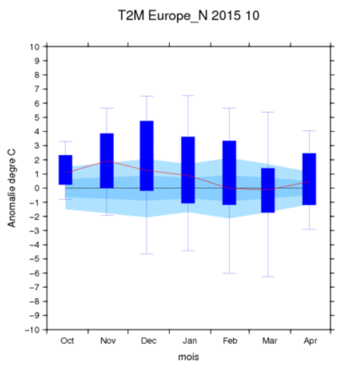
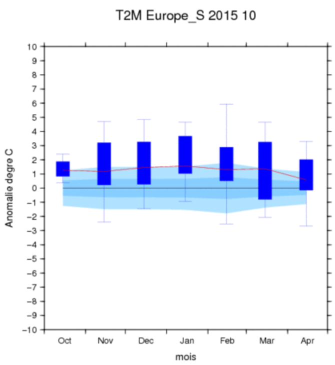


fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).

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

II.5. REGIONAL TEMPERATURES and PRECIPITATIONS





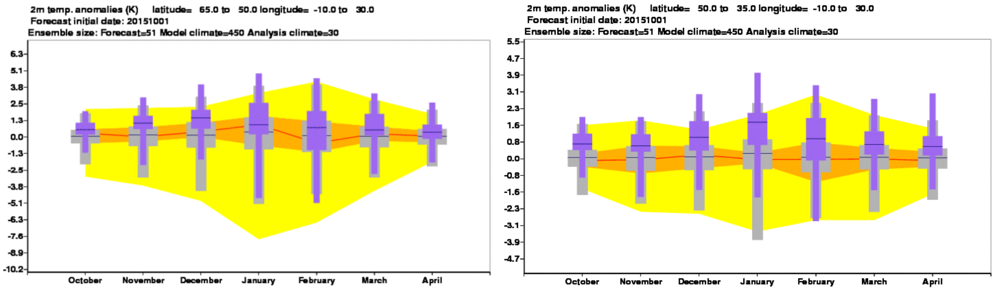


fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

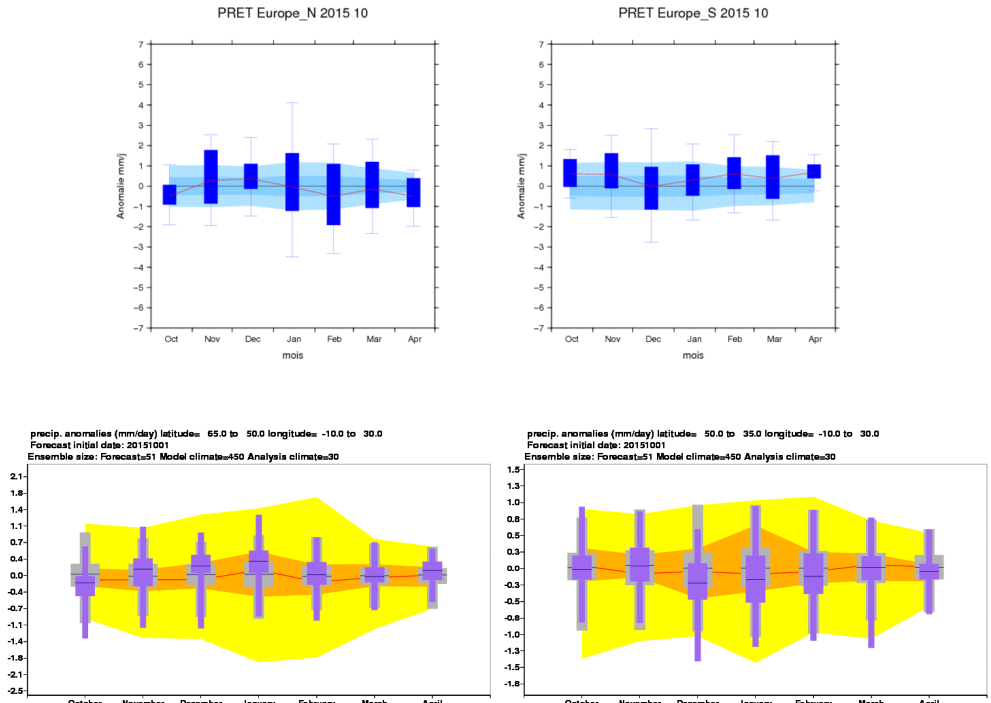


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

II.6. MODEL'S CONSISTENCY : NOT AVAILABLE

Not available

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

II.7. "EXTREME" SCENARIOS

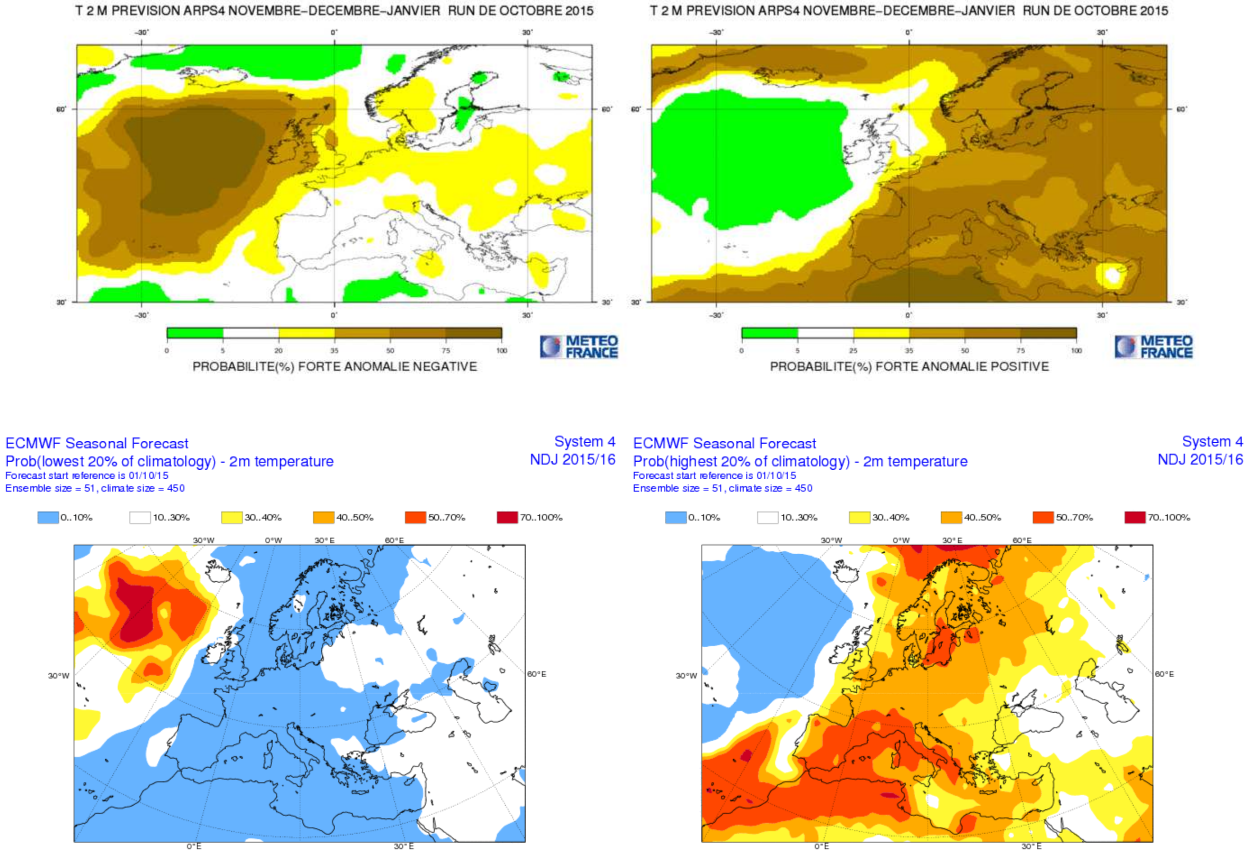
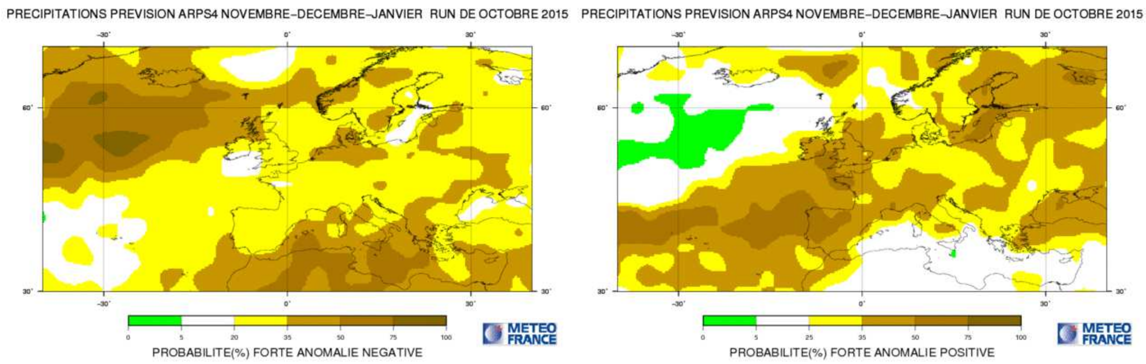
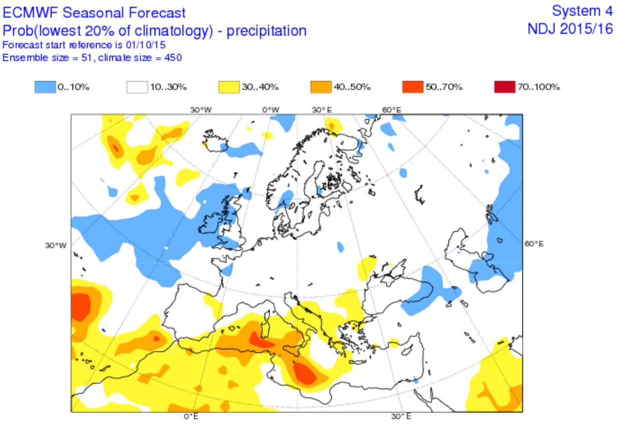


fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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





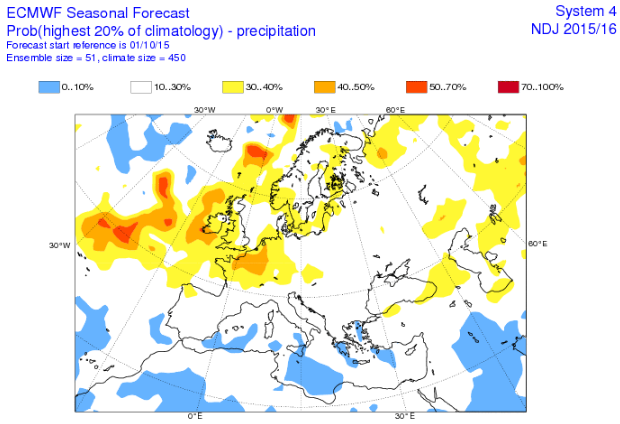


fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

II.8. DISCUSSION AND SUMMARY

II.8.a Forecast over Europe

Temperatures: More warmly than the normal signal on Europe, except British Iles where normal or less than normal temperatures are likely.

Precipitation: wet signal in the Northwestern part, dry signal over the Mediterranean Sea

II.8.b Tropical cyclone activity

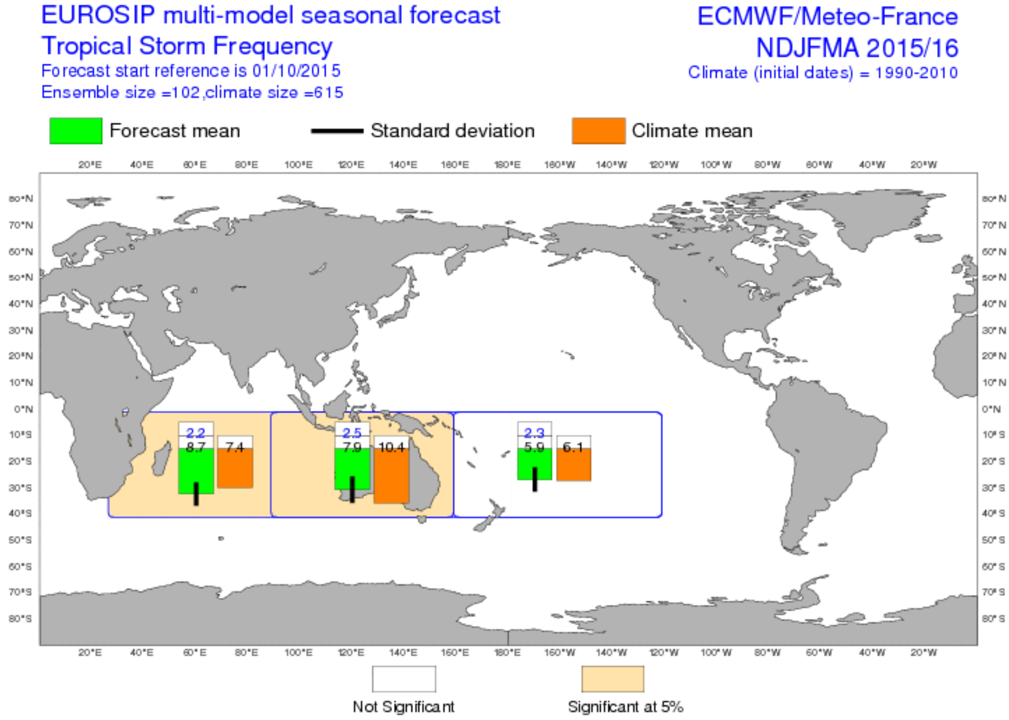


fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/

Consistent with the current El Niño phenomena, the hurricane season is expected significantly stronger than normal in the southwestern Indian Ocean and significantly weaker in the southeastern Indian Ocean Indian Ocean. In south Pacific, the hurricane season is expected stonger than normal in the Polynesian area and weaker than normal in the southwestern Pacific so the mean over the EUROSIP box is not significant and does not reflect the impact of a strong El Niño.

Synthesis of Temperature forecasts for November-December-January 2015-2016 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	*above normal*	*above normal*	*above normal*	*above normal*	*above normal*

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

Synthesis of Rainfall forecasts for November-December-January 2015-2016 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	Above normal	Below normal	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

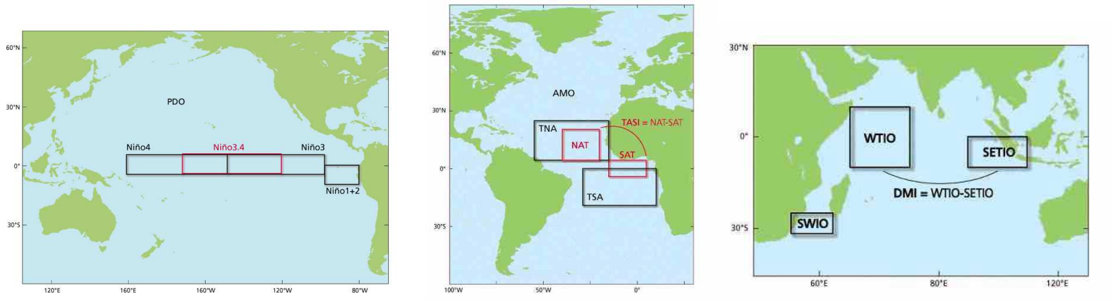
El Niño and La Niña events primarily affect tropical regions and are monitored by following the SST evolution in specific area of the equatorial Pacific.

- 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).

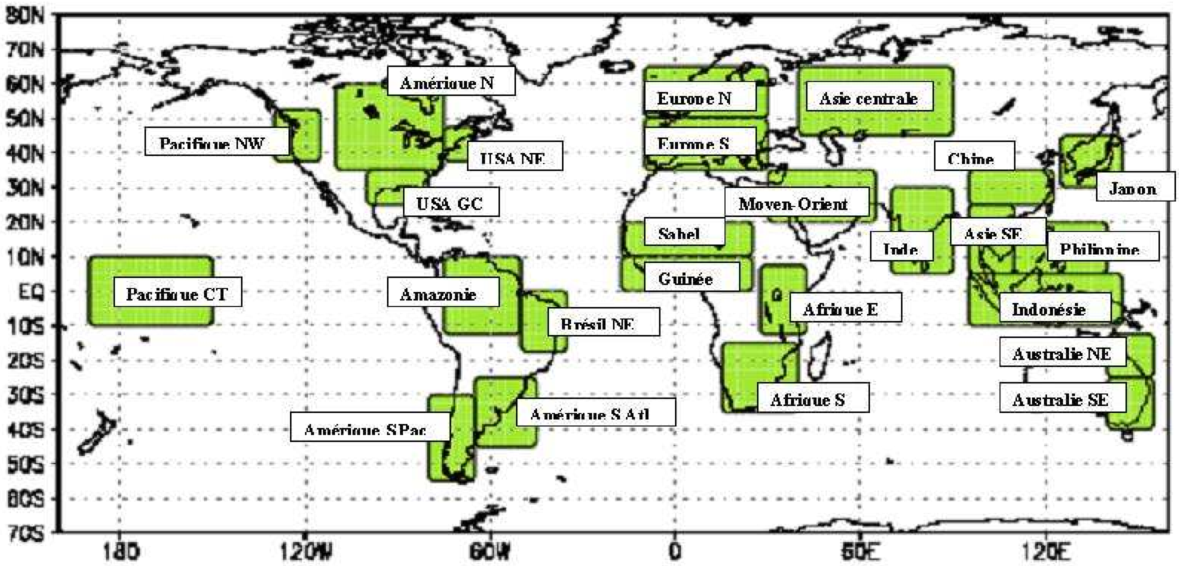
WMO RA VI
RCC Network

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).