GLOBAL CLIMATE BULLETIN
n°196 – October 2015

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I. DESCRIPTION OF THE CLIMATE SYSTEM (AUGUST 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 positive SST anomalies in the central basin has strengthened during August.The Nino3.4 index value monthly mean reaches +1.9°C, this El Nino event could be qualified as "strong". The anomaly values are particularly high between 130 and 170° W (higher than +2.5°C). The Nino1+2 index value monthly mean has slighly decreased, to reach +2.0°C in August.

- Sub-surface : from July to August, enhancing of the strong contrast between East (warm anomalies) and West (cold anomalies)

El Niño monitoring: Niño 3.4 index up to 1.9 °C in August (monthly mean), corresponding to a strong El Niño event.

Elsewhere:
In the northern hemisphere: despite a cooling in the Gulf of Alaska, the positive PDO structure remains strong, with strong positive anomalies along the North American coast and strong cold anomalies northwest of the basin and along Asian coast.
In the southern hemisphere: enhancing of the cold anomaly pattern over Indonesia and along the SPCZ

In the Indian Ocean :

The East-West gradient has enhanced from July to August, as measured by DMI (now notably positive, see for instance stateoftheocean.osmc.noaa.gov/sur/ind/dmi.php)

In the Atlantic Ocean:

Cold anomaly south of the equator near the coast of Africa, extends along the equator across the basin to South America and the Caribbean. In the North Atlantic, strong cold anomaly from Canada to Scandinavia. Strengthening of the warm anomaly from Bermuda to southern Europe and Morocco.

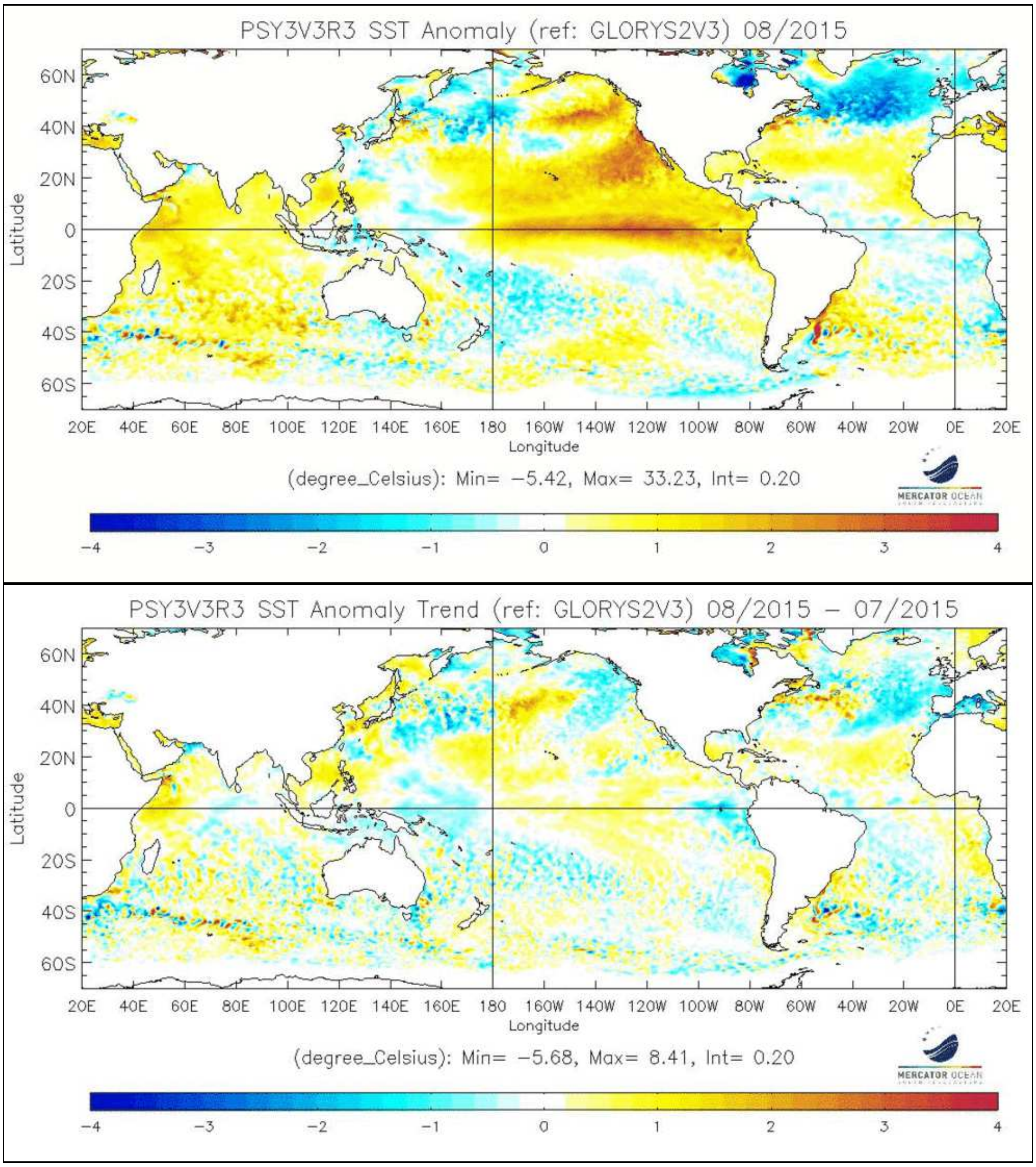


fig.I.1.1: top : SSTs Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2013). www.mercator-ocean.fr

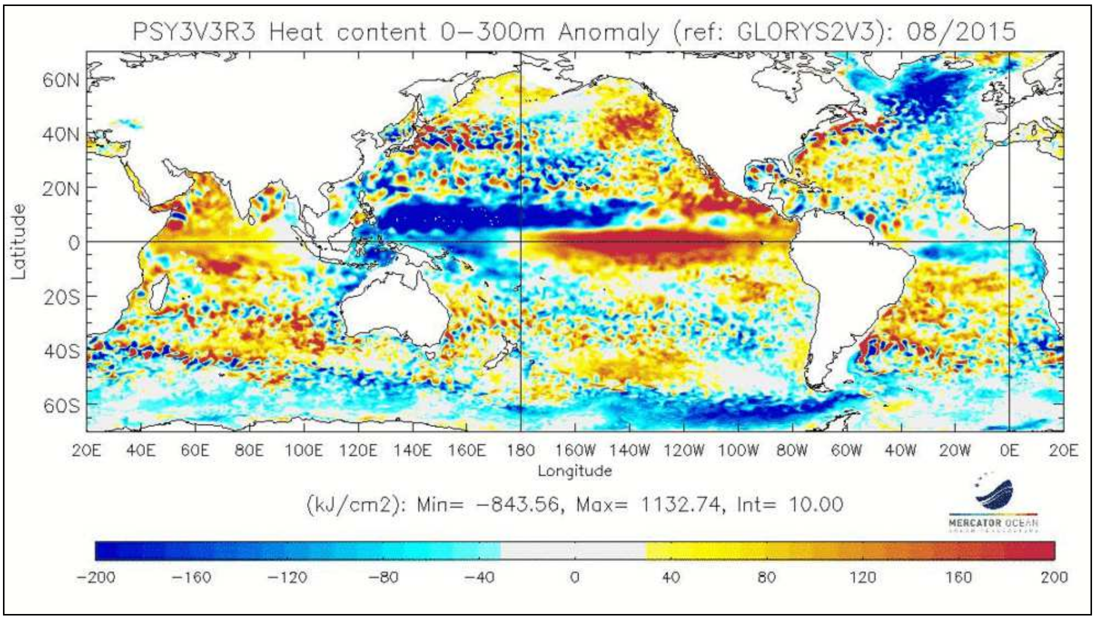


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2013)

www.mercator-ocean.fr

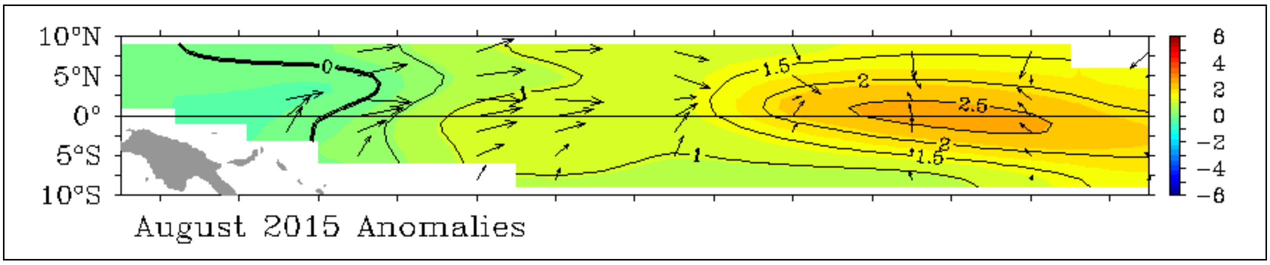


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON.

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

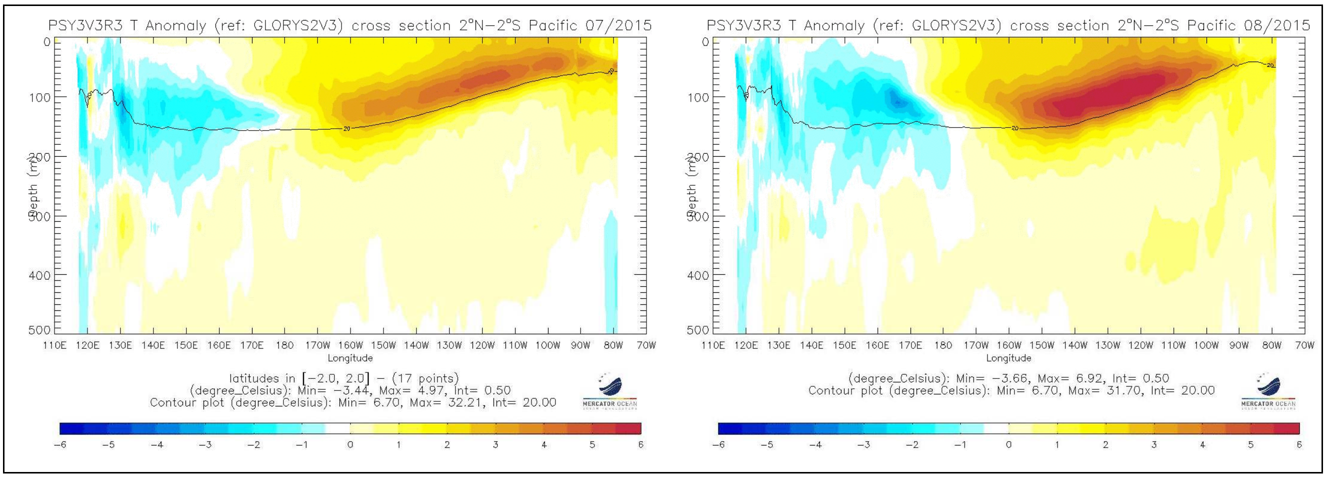


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), www.mercator-ocean.fr

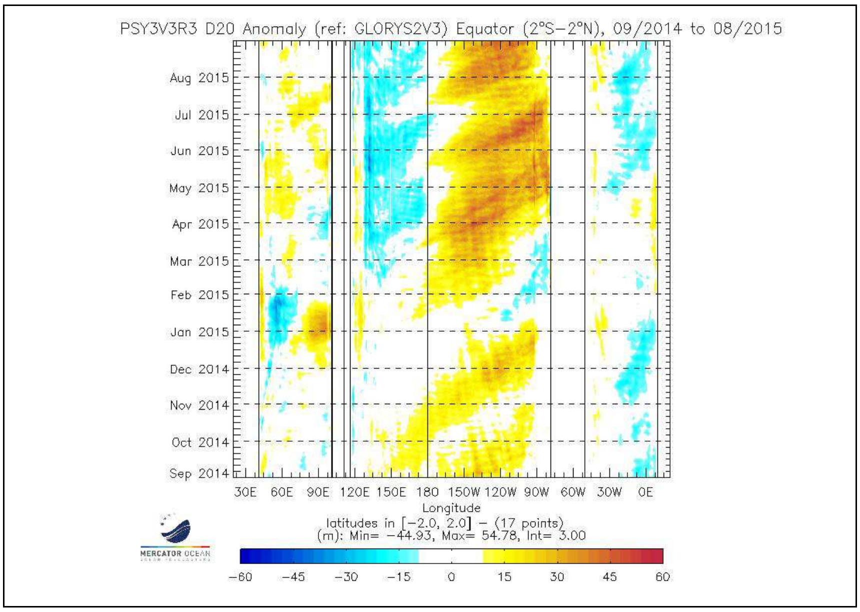


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period www.mercator-ocean.fr

I.1.b Sea surface temperature near Europe

Arctic Sea still warmer than normal, except around Svalbard, anomalies even greater than in July, apart from that no significant change.

Still a large area of negative anomalies in the North Atlantic from Iceland/Greenland to the subtropics and also in the North Sea and partly in the Baltic Sea without much change.

Positive anomalies in the subtropical North Atlantic (up to the Biscay) and in the western Mediterranean became smaller compared to July. In contrast, increasing positive anomalies over the eastern Mediterranean / Adriatic Sea.

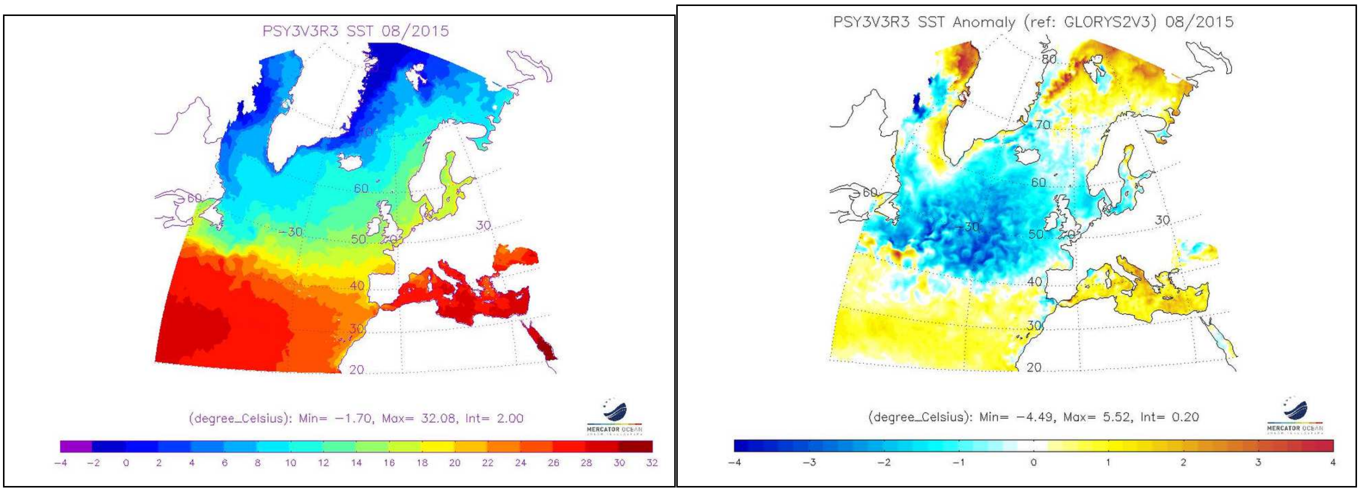


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe)
and anomaly (reference Glorys 1992-2013). www.mercator-ocean.fr

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) :

Wave 2 pattern. The ocean-atmosphere coupling is well developed due to the current El Nino event. Vast upward motion anomaly area over Central-East Pacific linked to warm SST anomalies, extending south to Argentina and north to California. Vast downward motion anomaly area over Maritime Continent linked with cold SST anomalies, extending over East Indian Ocean to Australia in the South and China and India in the north.

An interesting subsidence anomaly is visible around the Caribbean, classical during an El Nino event.

The SOI is negative in August (-1.4), which abounds in the direction of ocean-atmosphere coupling (consistent with El Niño).

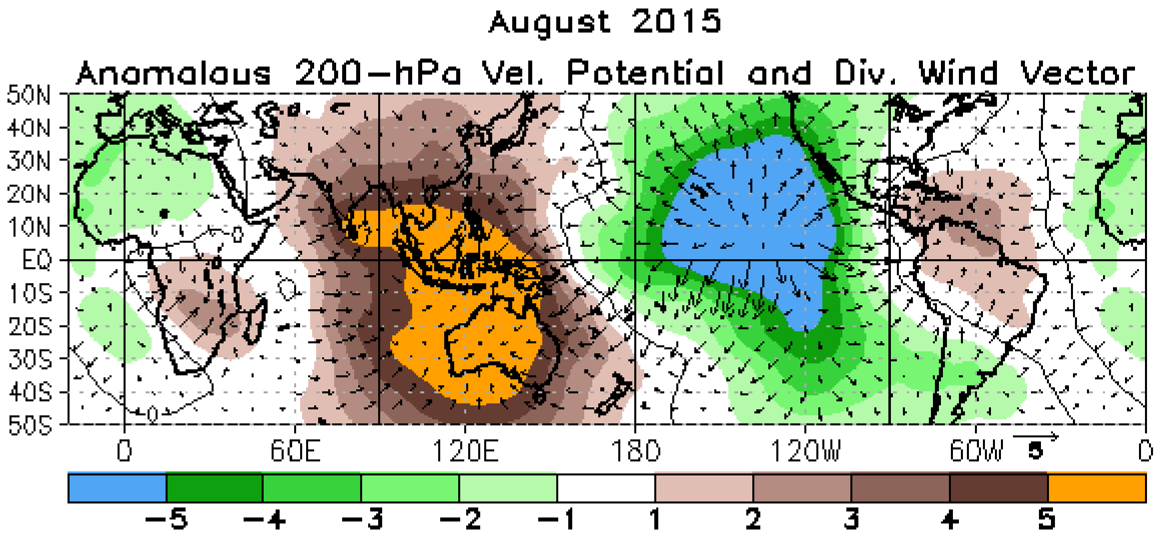


fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).

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

MJO (fig. I.2.b):

The MJO had been weak in August.

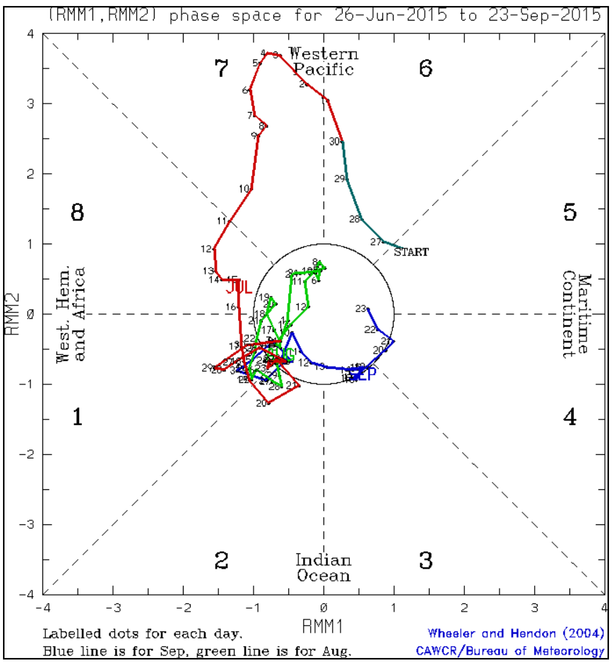


fig.I.2.b: indices MJO http://cawcr.gov.au/staff/mwheeler/maproom/RMM/phase.Last90days.gif

Stream Function anomalies in the high troposphere (fig. 1.2.2 – insight into teleconnection patterns tropically forced) :

In south Asia and Indian Ocean area, the atmosphere remains stable with strong cyclonic response to the downward anomaly motion over the Maritime Continent. Over the very Eastern Pacific (+ Gulf of Mexico and South Peru), also a cyclonic anomaly probably due to the subsidence anomaly over the Caribbean.

Curiously, we can't see any clear structure in the Central Pacific (neither in the NH nor in the SH), corresponding to the main El Nino forcing.

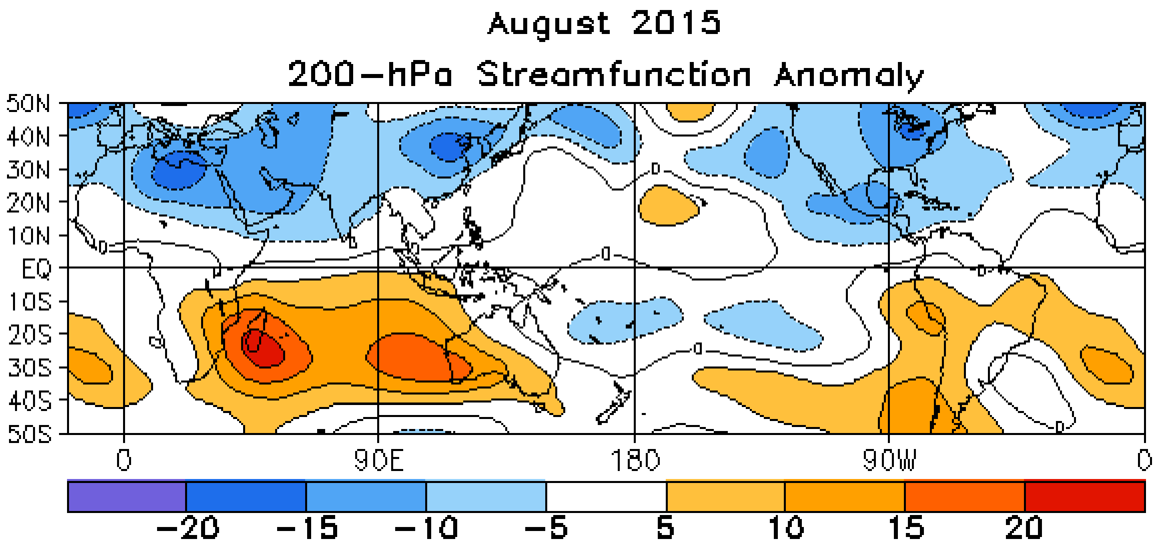


fig.I.2.2: Stream Function Anomalies at 200 hPa.

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 hemisphere, strong anomaly dipole with a negative anomaly over North Atlantic and positive anomaly over Scandinavia.

There is another strong negative anomaly area over Russia.

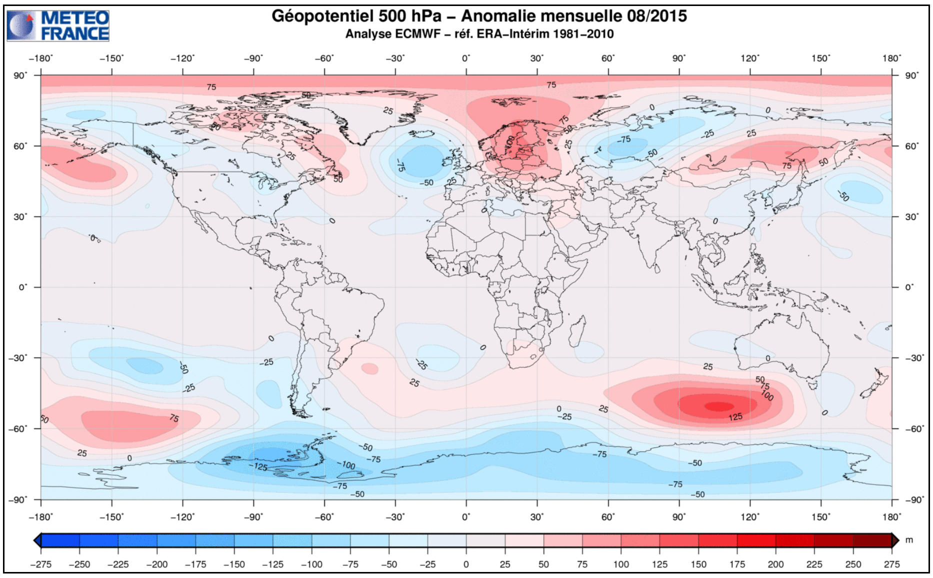


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
AUG 15	-1.1	1.1	-1.5	-0.3	0.1	---	-0.4	0.9	0.1
JUL 15	-3.1	0.2	0.8	0.2	0.3	---	2.0	-1.1	0.4
JUN 15	0.2	1.1	-0.0	1.7	-0.1	---	-0.8	-1.5	-0.2
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

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

Sea level pressure and circulation types over Europe :

Anomalous high pressure over Scandinavia, therefore a switch from a negative SCAND phase lasting from April to July 2015 to a positive phase in August. 24 out of 31 days in August had a Scandinavian blocking situation, around three times as normal. The Icelandic low was more intense than normal, but the Greenland high and its anomaly weakened compared to July, thus the negative NAO phase weakened also from the exceptional low value of -3.1 in July to -1.1 in August. Long-lasting, but relatively weak positive phase of EA intensified and probably contributed to the anomalies of the Icelandic low.

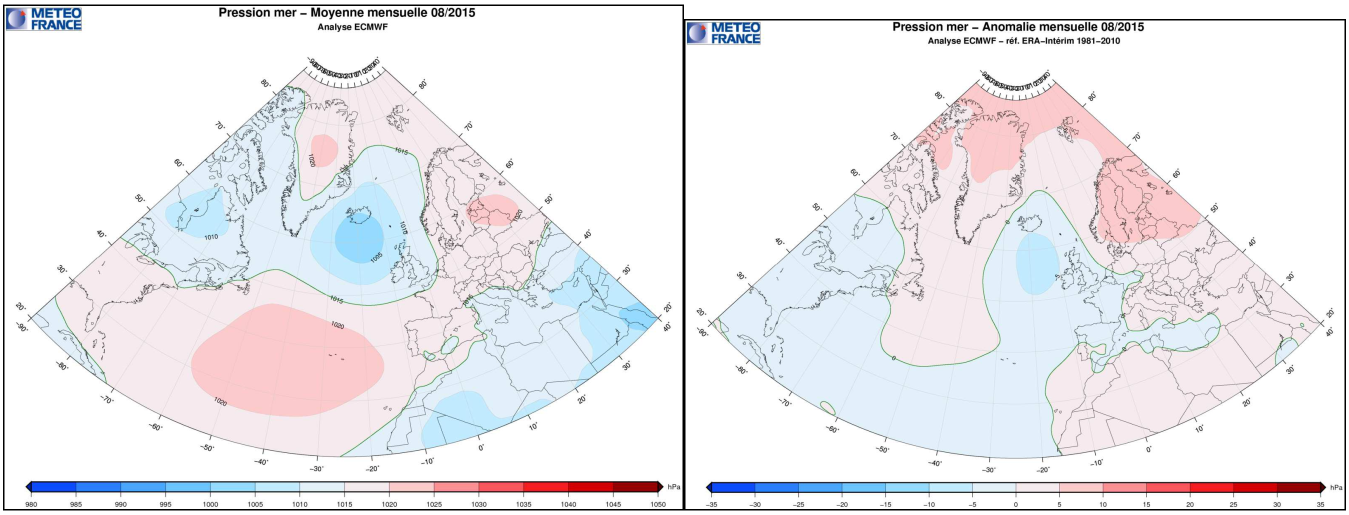


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (top) and 1981-2010 anomalies (bottom).

Circulation indices: NAO and AO :

NAO had a positive phase during the first half of August, but switched to a negative phase again towards the end of the month. AO follows more or less the NAO pattern, showing that this was a hemispheric anomaly also.

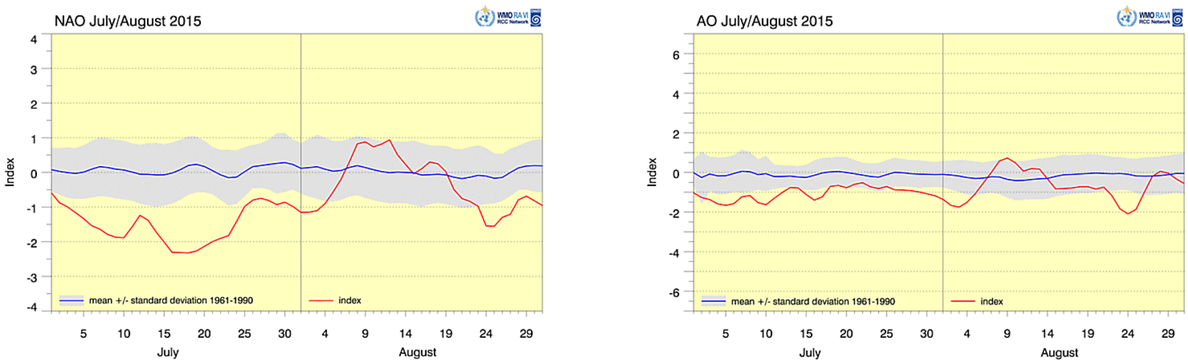


fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

The strongest anomalies are linked with the El Niño event with an excess of precipitation on eastern tropical Pacific Ocean and a deficit on maritime continent southeastern Asia and Southern India as well as Central America and northern South America, and coastal regions of the Gulf of Guinea.

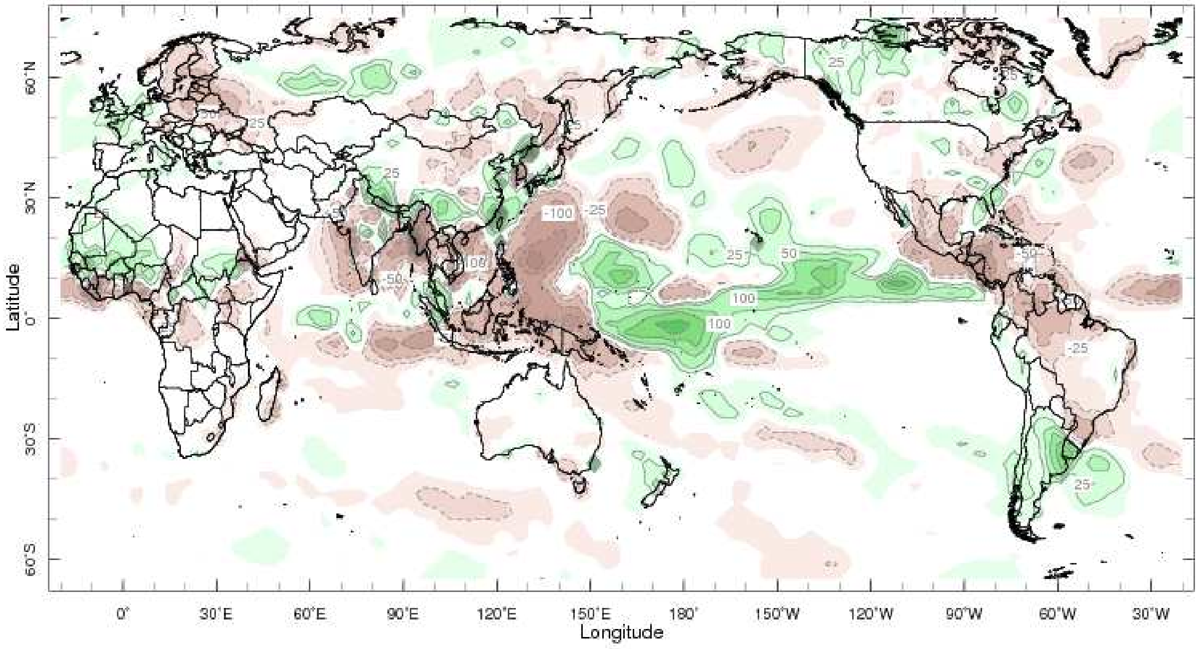


fig.I.2.4: Rainfall Anomalies (mm) (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall.

http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

Precipitation anomalies in Europe:

A large area from eastern Scandinavia and the Baltic countries over eastern central Europe to southern parts of Eastern Europe was very dry due to extended high pressure influence. Precipitation was below the 10th percentile and much of that area was classified as extremely dry.

On the other hand, troughs over the North Atlantic affected several parts of Western Europe, especially western France, but also Belgium, Luxembourg, the Netherlands, southern UK and northwestern Germany. Partly the 90th percentile was exceeded. Another low pressure area affected parts of northern European Russia with anomalous rain.

Some local anomalously heavy convective rain due to warm water of the Mediterranean.

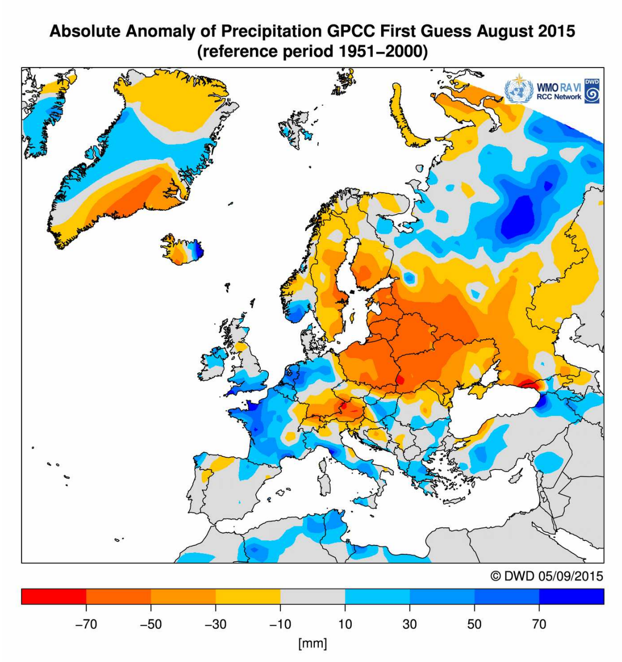


fig.I.2.5: Left: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm. Right: Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

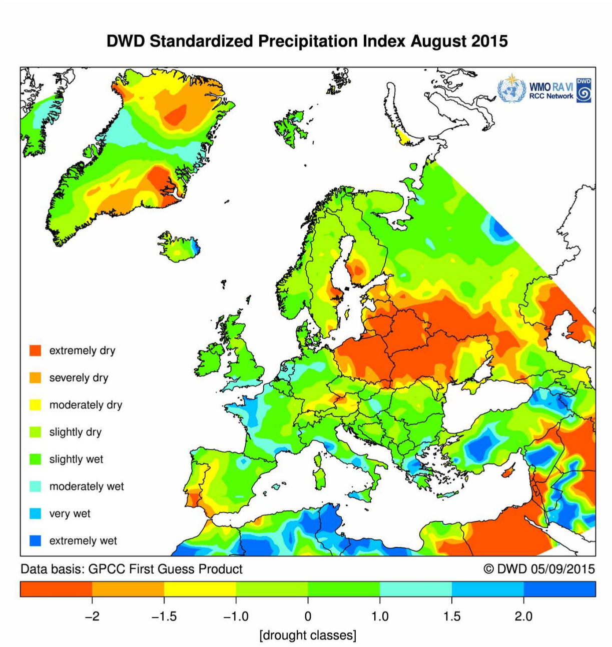


fig. I.2.5a: Standardized Precipitation Index with DWD modification (DWD-SPI), http://www.dwd.de/rcc-cm .

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	- 18.0 mm	-0.722
Southern Europe	+ 3.2 mm	+ 0.147

I.2.c Temperature

Warm anomaly over Europe, cold anomaly over the western half of Russia.

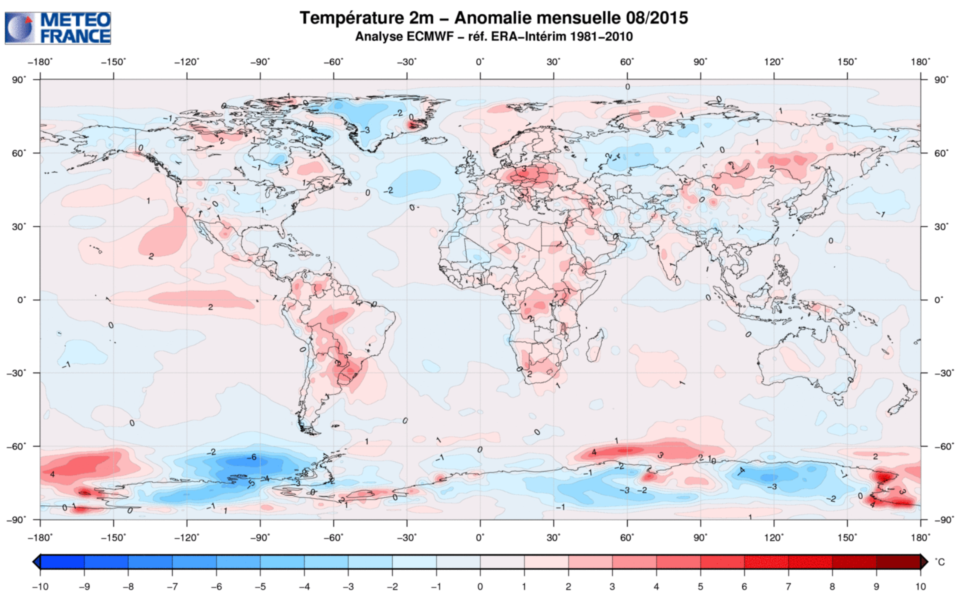


fig.I.2.8: Temperature Anomalies (°C) (Meteo-France)

Temperature anomalies in Europe:

Europe was warmer than normal except westernmost and easternmost areas and some places in the Mediterranean region. This was mainly due to the meridional trough-ridge blocking pattern with the ridge centred over eastern Central Europe. The highest positive anomalies over Poland and surroundings can be explained by a combined forcing of warm air advection, high pressure subsidence and much incoming surface radiation.

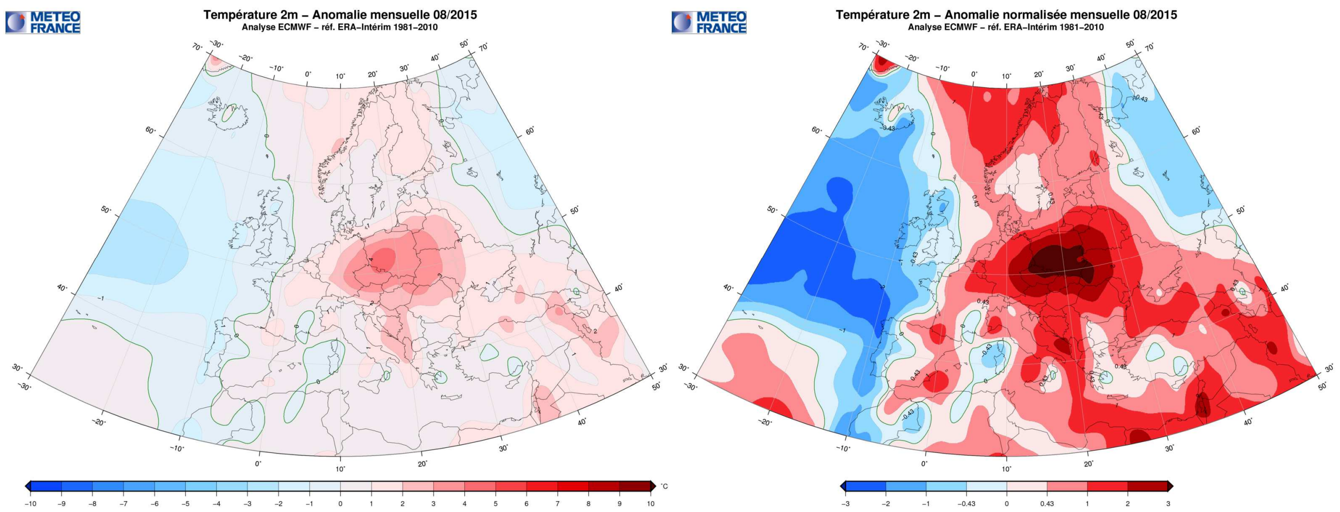


fig.I.2.9: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

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	+ 1.8 °C
Southern Europe	+ 0.8 °C

I.2.d 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.

In Antarctic (fig. 1.2.6 and 1.2.7 - right) near normal values.

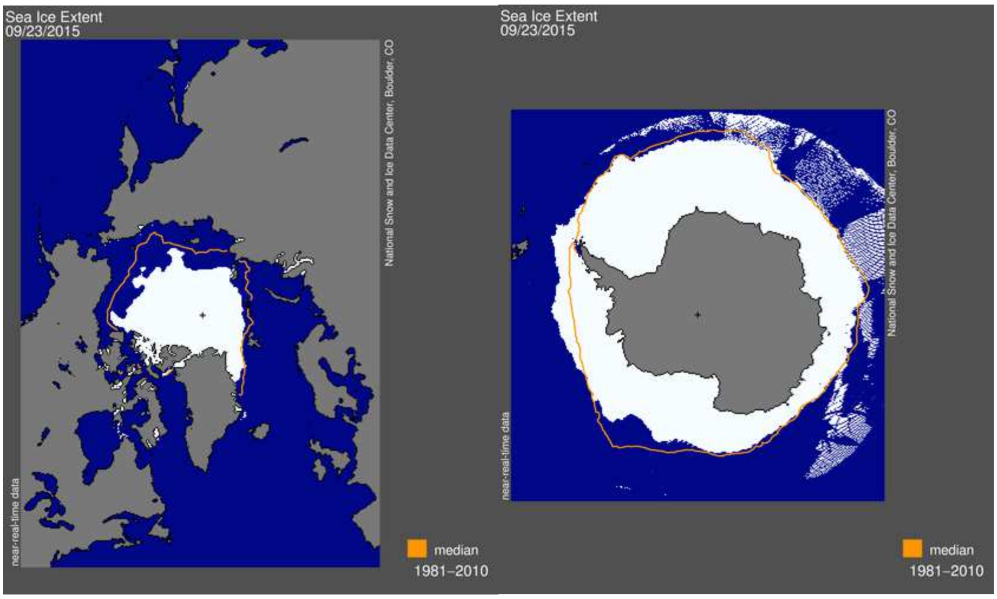


fig.I.2.15: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). [http:/ /nsidc.org/data/seaice_index/](http://nsidc.org/data/seaice_index/)

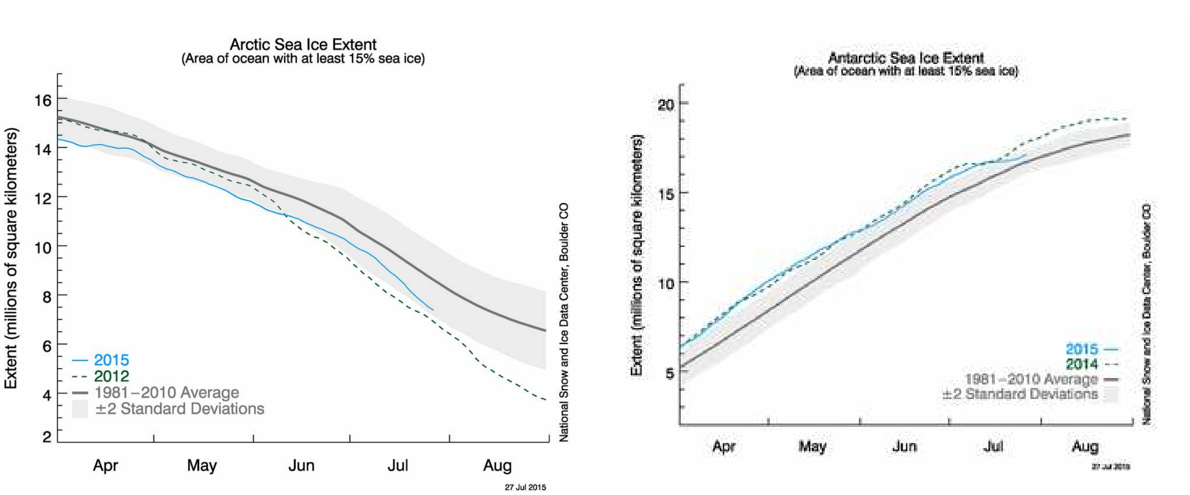


fig. I.2.16 : Sea-Ice extension evolution from NSIDC.

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. All seasonal forecast models are very close, particularly EUROSIP models. The anomaly patterns are very consistent both for the ocean and for the atmosphere.

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 Alaska, due to the positive PDO phase.

Persistence of the cold anomaly on western waveguide with extension south to New Zealand on the one hand and towards the center of the South Pacific on the other hand.

Indian Ocean: Remaining of the generalized warm anomaly, the DMI should remain positive.

Atlantic Ocean: Fairly clear differences between models along the equator. The EUROSIP mean is thus unreliable in this area. Models are consistent in the north Atlantic where they remain a cold SST anomaly and in western basin up to the Gulf of Mexico where a warm anomaly remains.

Mediterranean Sea: toward a close to normal situation.

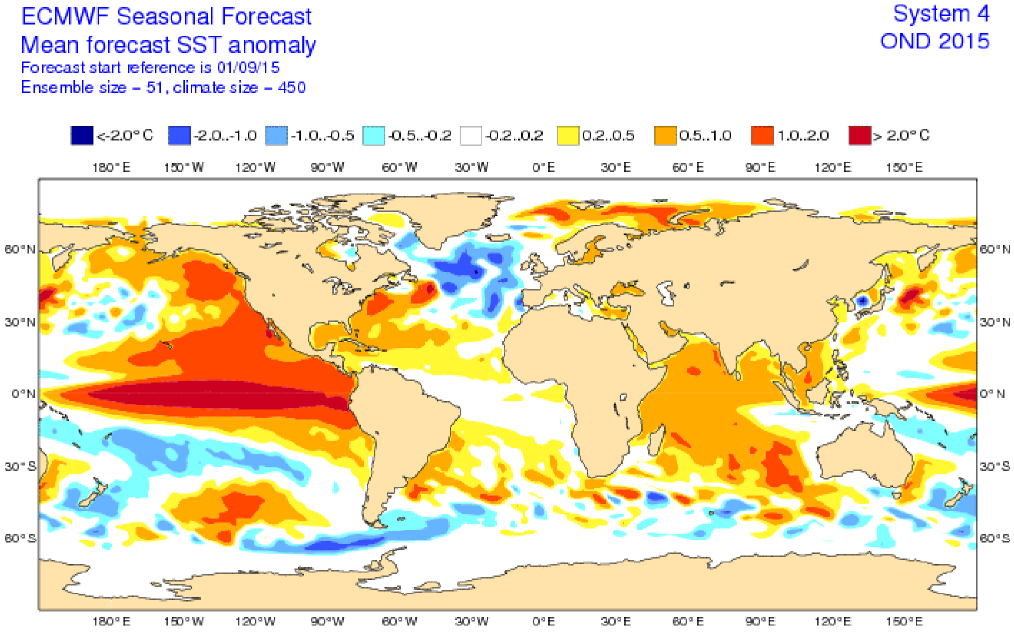


fig.II.1.1: SST anomaly forecast from ECMWF

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

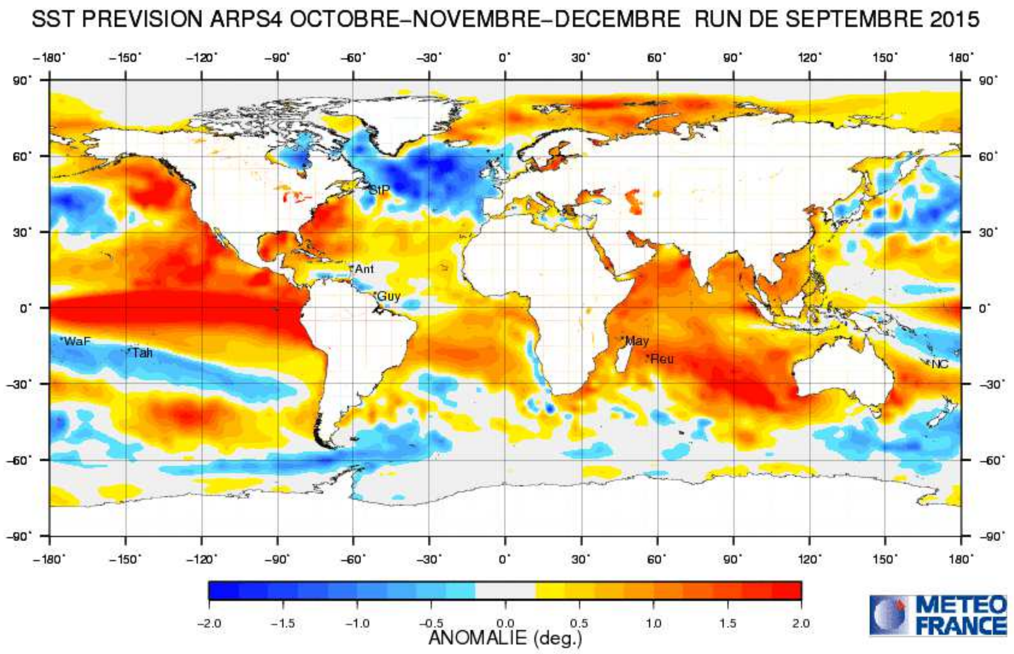


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).

http://elaboration.seasonal.meteo.fr

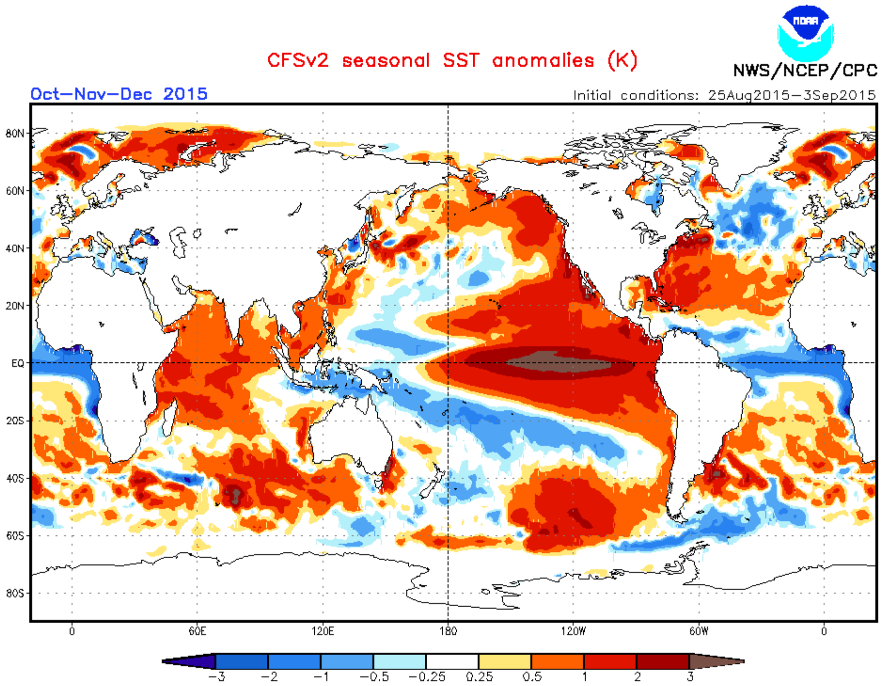


fig.II.1.3: SST anomaly forecast from NCEP.

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

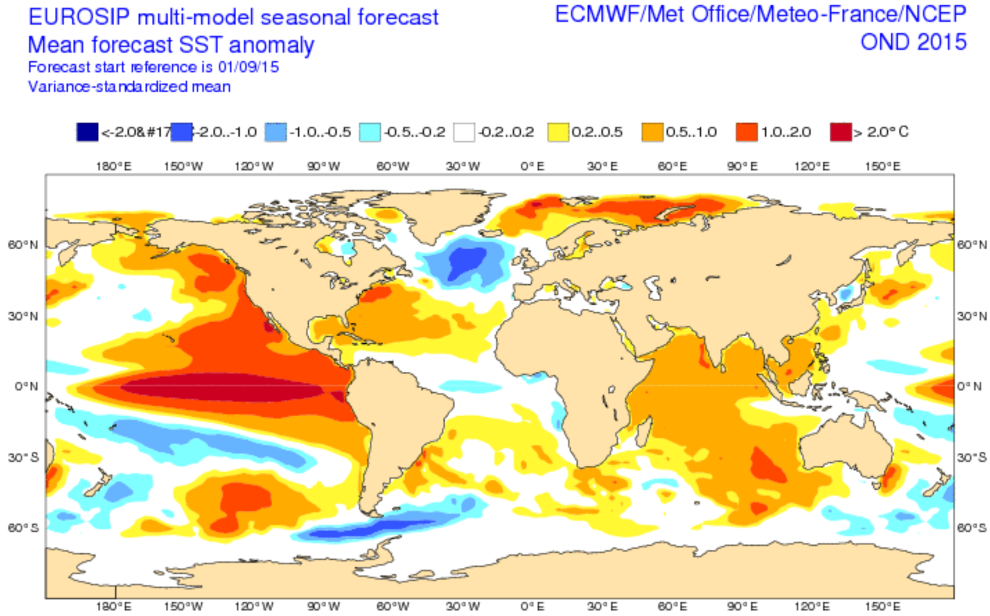


fig.II.1.4: SST Forecasted anomaly from Euro-SIP

II.1.b ENSO forecast :

Forecasted Phase: Strong to very strong El Niño event

For the next 3 months, all the analyzed models announce the strengthening of El Niño, with a continuous increase until December wih ECMWF and a stabilization in October with ARP. All models forecast that Niño 3.4 index will reach a very strong level intensity (> 2°C) over the period OND, and for some, the median in higher than 2.5°C.

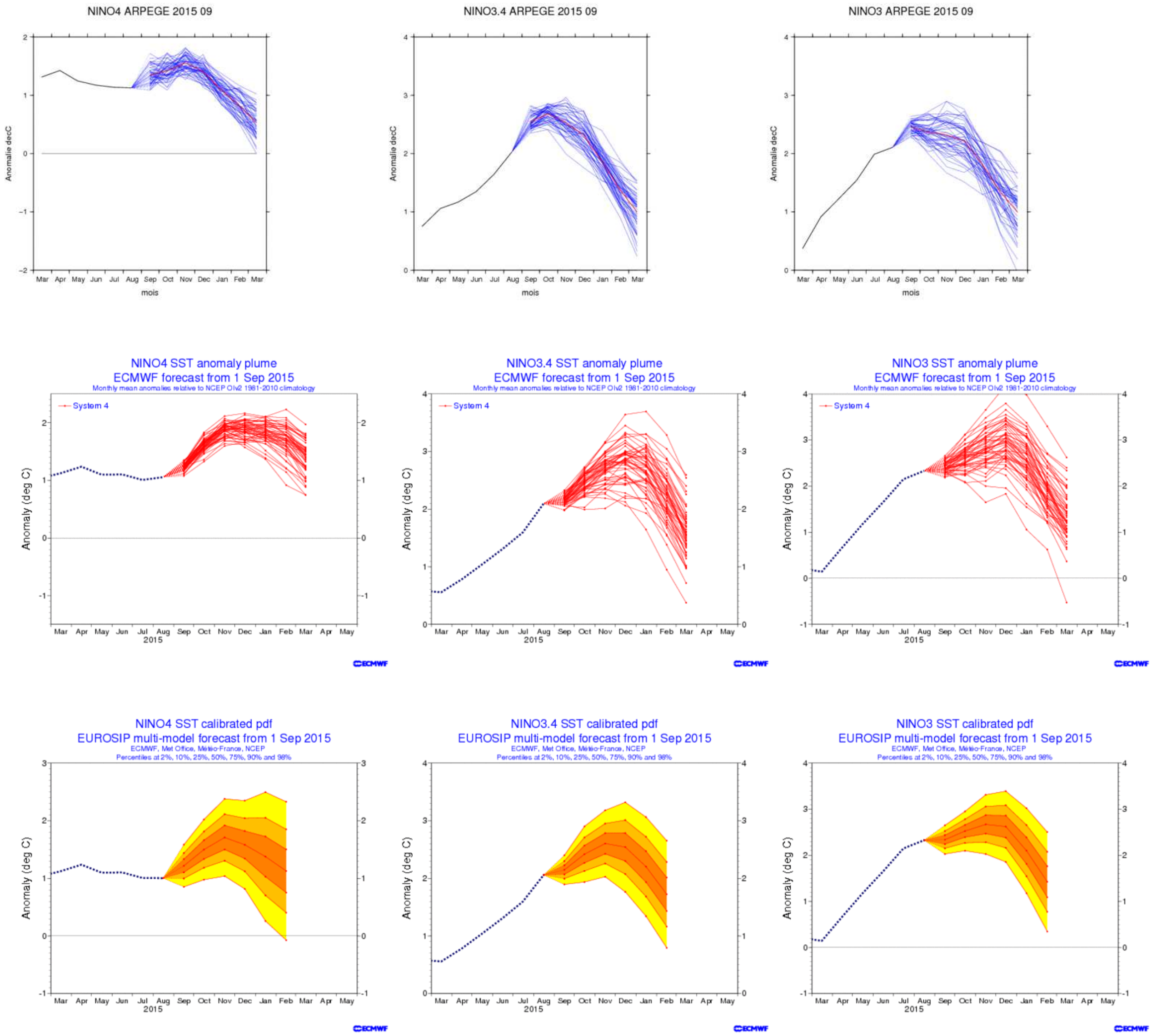


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

II.1.c Atlantic ocean forecasts

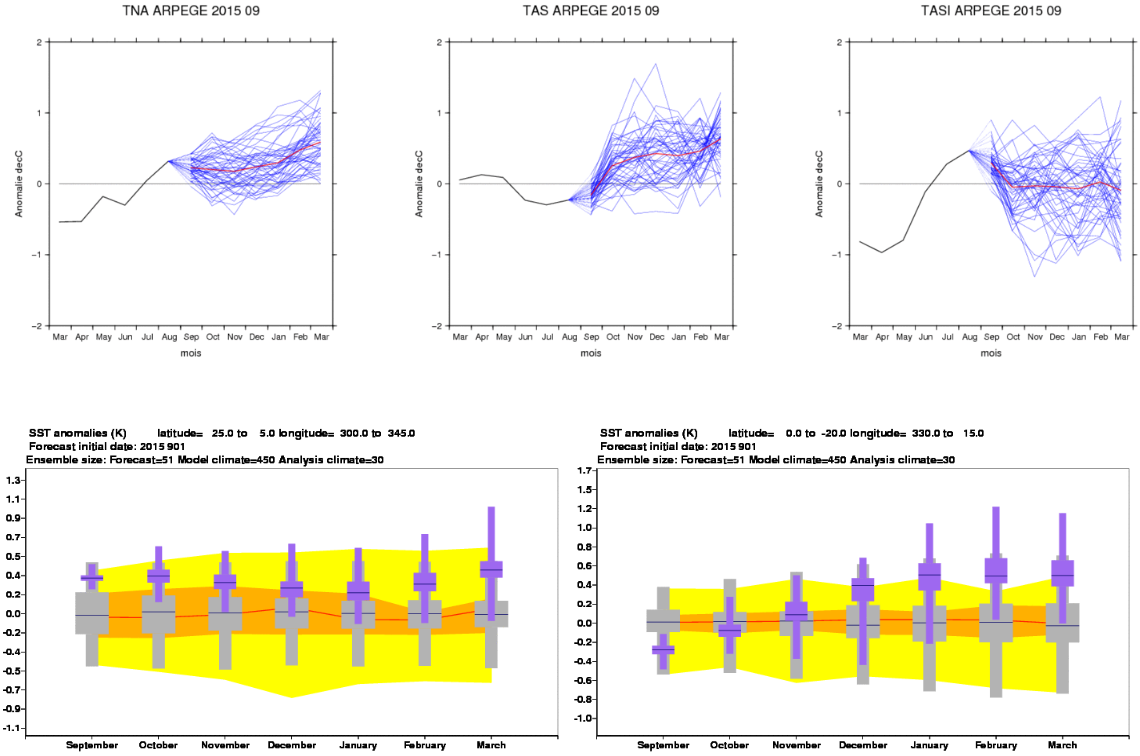
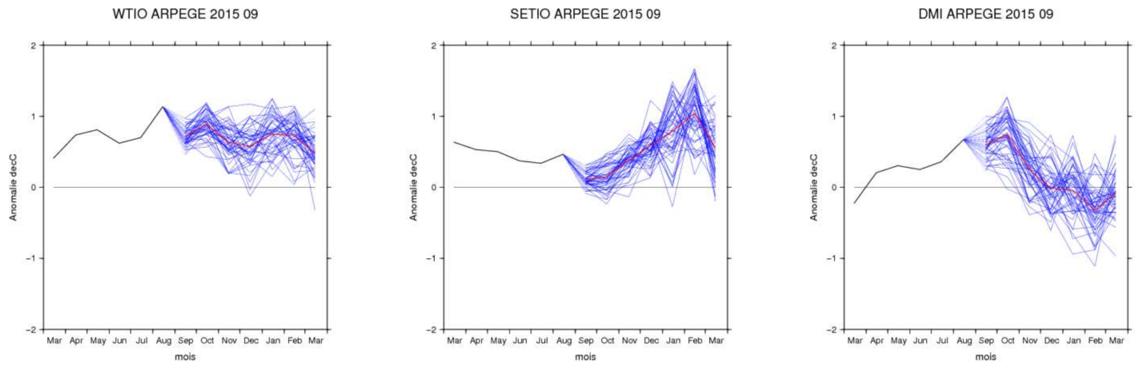


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.1.d Indian ocean forecasts



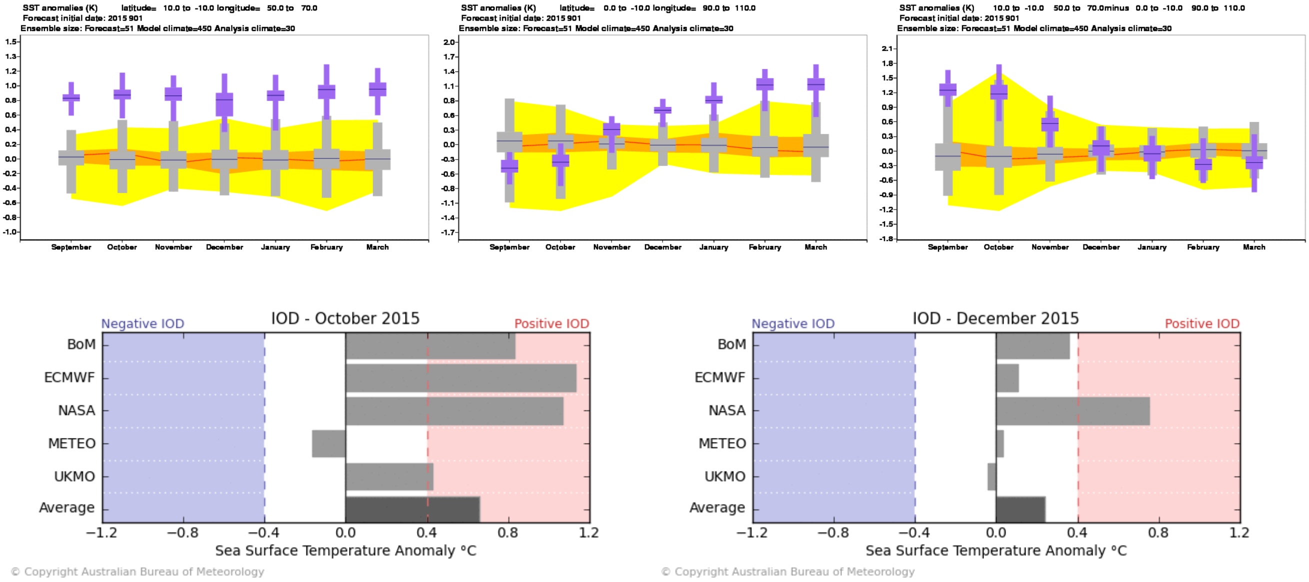


fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

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 dipole of anomalies in the Pacific Ocean. Upward motion anomaly on a large central-eastern part of Pacific Ocean extending northward up to North America and southward to Argentina; downward motion anomaly from Australia to Asia across Western Pacific Ocean and Maritime Continent. The two other anomaly poles, like in the August analysis, are located around the Caribbean (+) and in the Western Indian Ocean (-).

Stream Function anomaly field (cf. fig. II.2.1 – insight into teleconnection patterns tropically forced): Very good consistency between ARPEGE, ECMWF and JMA in the intertropical latitudes with a pair of anticyclonic anomaly cores in the high troposphere, over the Pacific upward motion anomaly area and on both sides (East and West) cyclonic anomaly cores in high troposphere over the Maritime Continent/East Indian Ocean and Atlantic ocean. A PNA teleconnexion is present in ARP, ECMWF and JMA, classical response to El Nino forcing. And a NAO teleconnexion pattern is also visible in the 3 models.

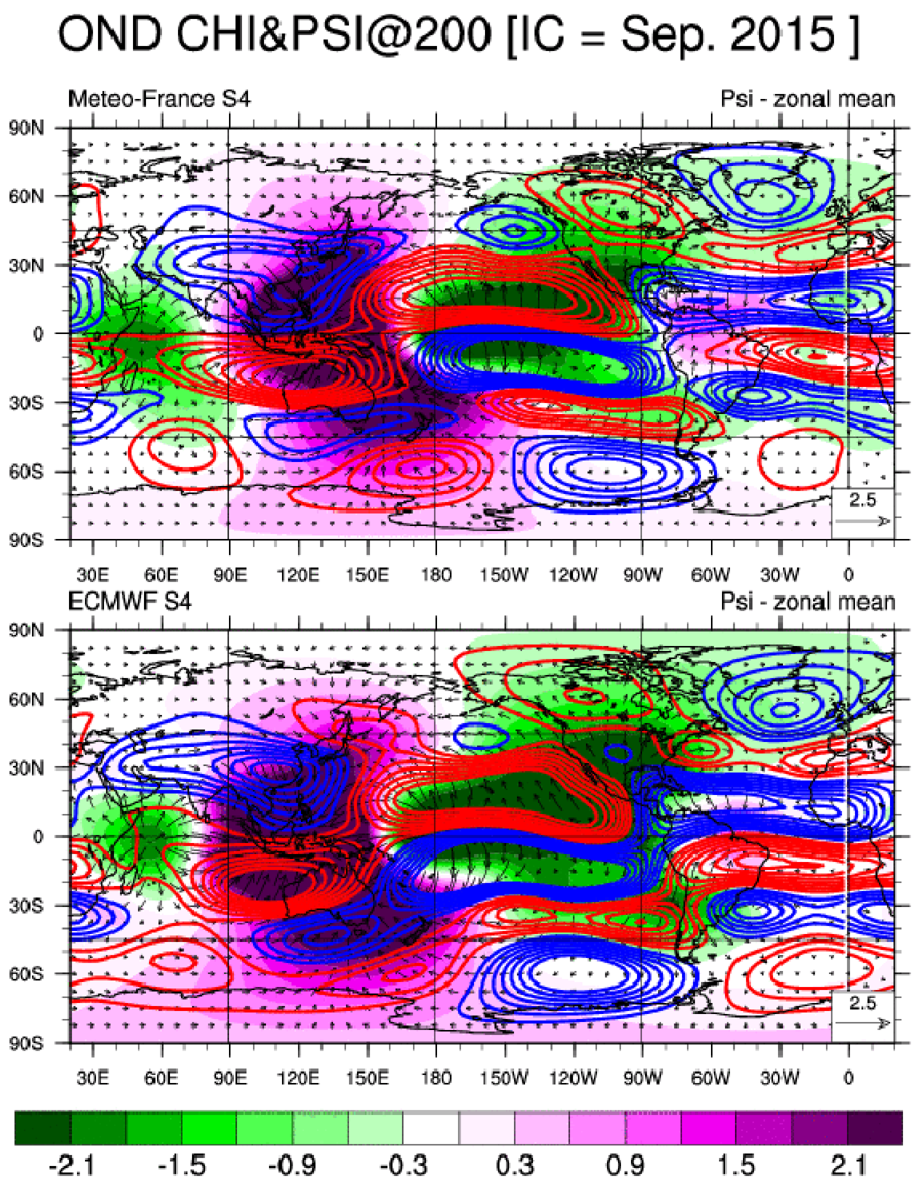


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

II.2.b North hemisphere forecast and Europe

Geopotential height anomalies (fig. 20 – insight into mid-latitude general circulation anomalies) : the Z500 cyclonic anomaly southward of Greenland is very consistent between ECMWF and ARPEGE. The anticyclonic anomaly over Europe seems also to be robust; differences are very limited for such a lead-time.

Consequently, regime occurrences with ARPEGE and ECMWF are very similar with a large predominance of "NAO+" to the detriment of "Atlantic Ridge" regimes.

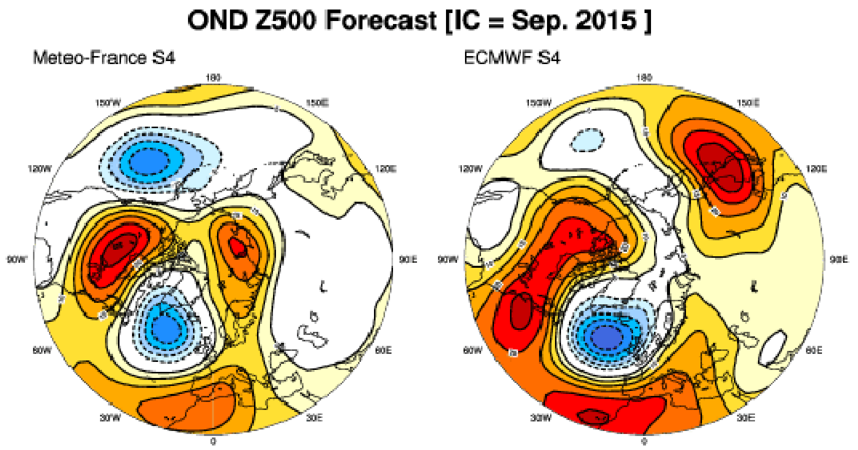


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right).

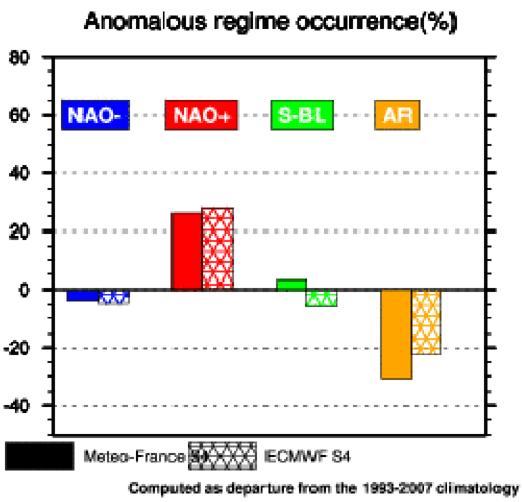


fig.II.2.3: North Atlantic Regime occurrence anomalies from Météo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

II.3. IMPACT: TEMPERATURE FORECASTS

The ENSO+ and PDO+ context is favourable to enhanced probability of global warm anomaly. The few exceptions are Northern Atlantic and north Pacific Ocean, from Solomon Islands to French Polynesia and New-Zeeland (SST effect). Few land areas are forecasted neutral or rather colder than normal. These anomalies can be linked with known consequences of El Nino event, notably Southern South-America and the South-Western part of the United States.

A signal “more warmly than normal " is expected on Europe.

II.3.a ECMWF

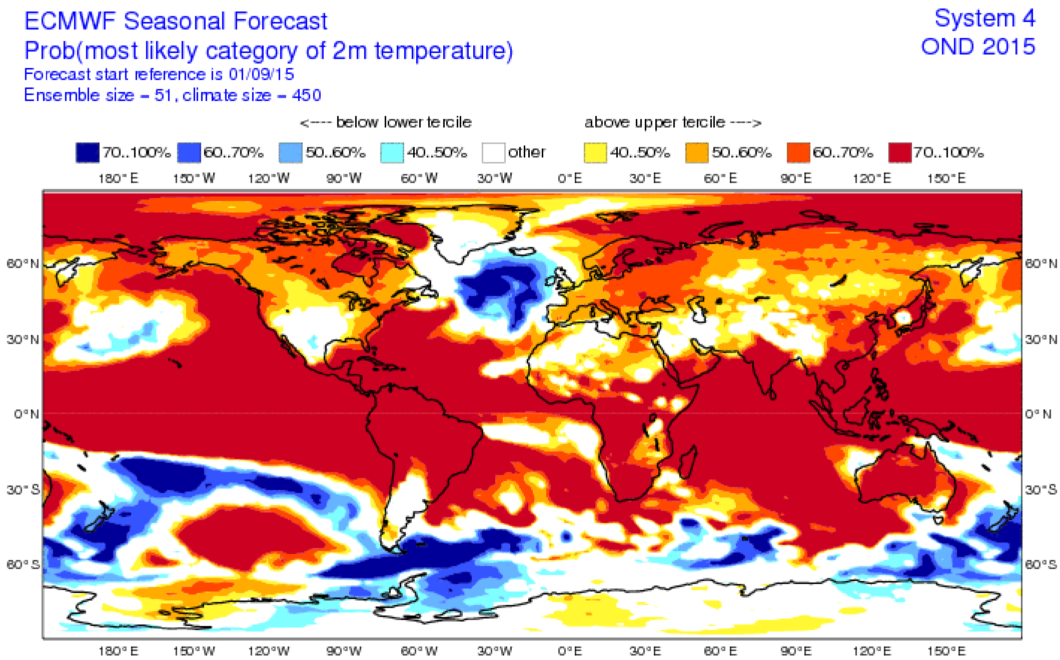


fig.II.3.1: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.3.b Météo-France

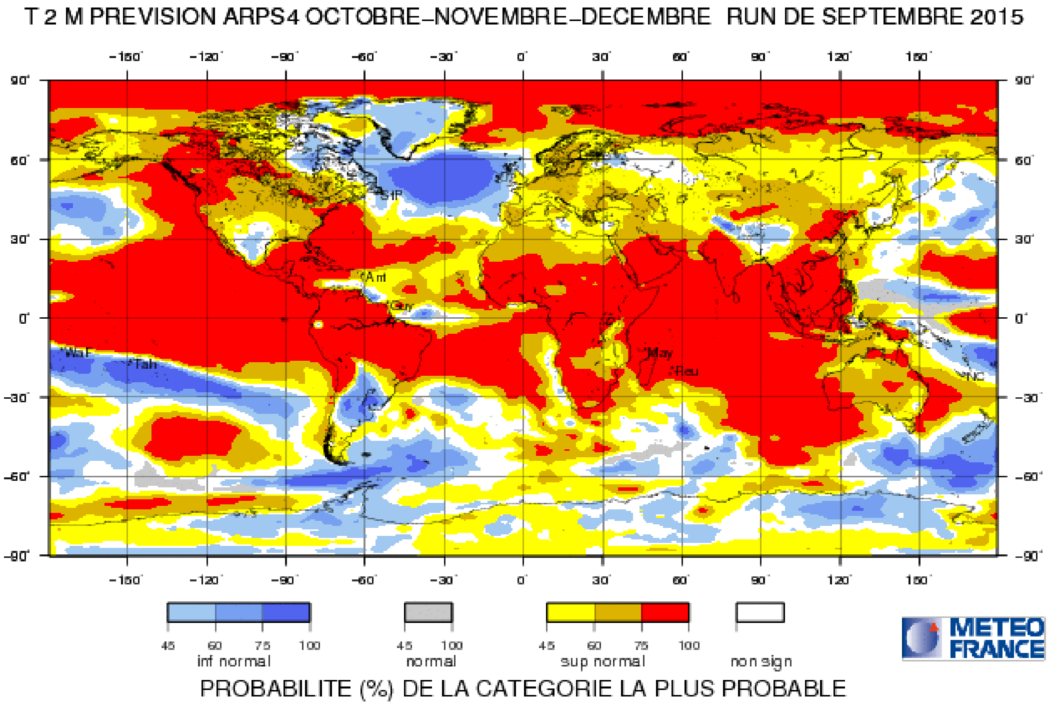


fig.II.3.2: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.3.c Japan Meteorological Agency (JMA)

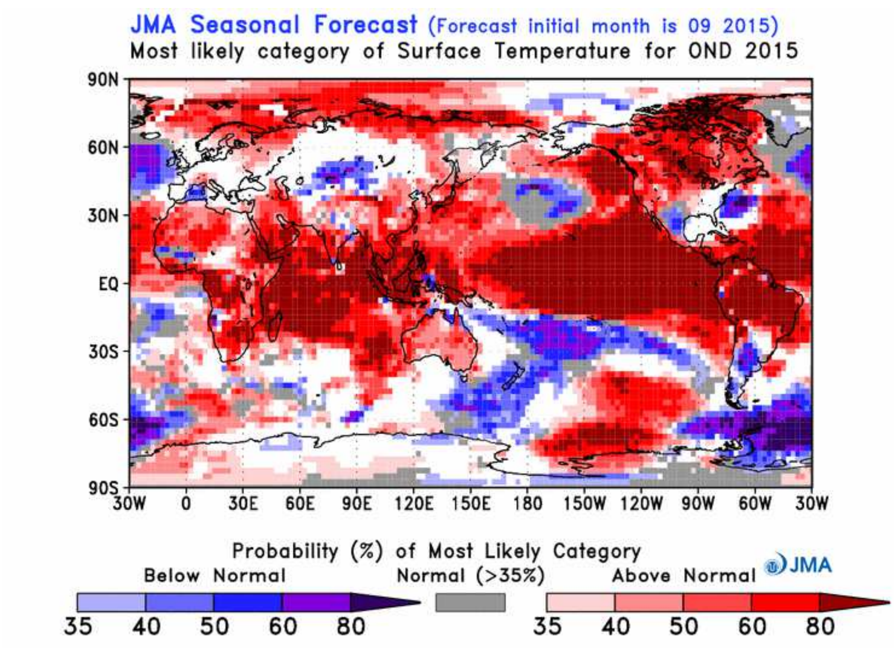


fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.3.d EUROSIP

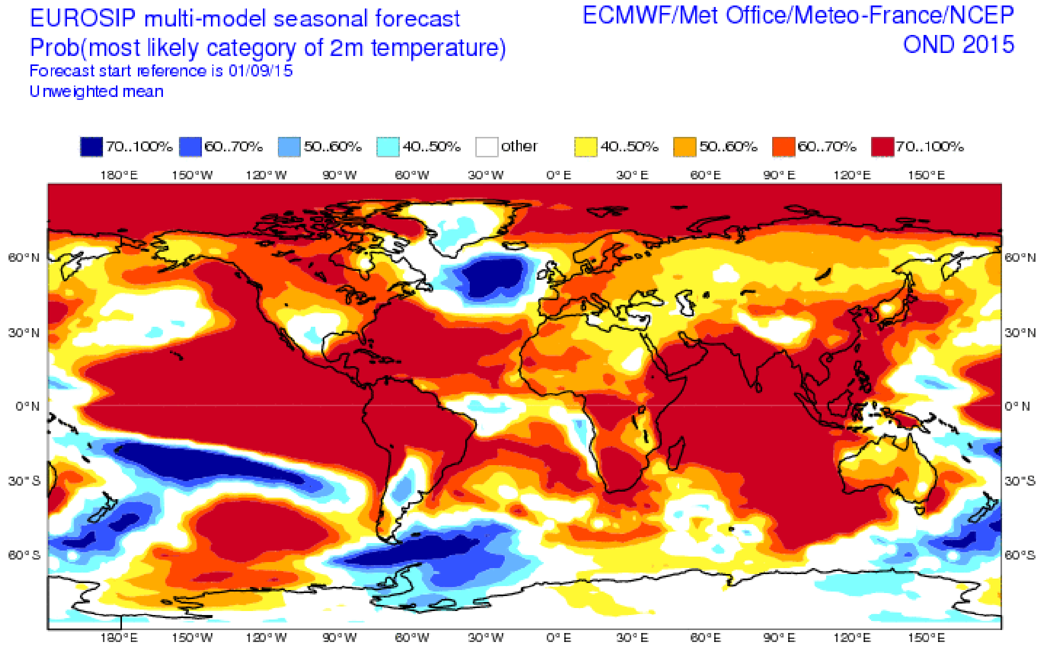


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).

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 extended northward to Mexico and South of USA. The same in southern Brazil and Argentina. Also in Eastern Africa, a large Western part of Indian Ocean and southeast of China. Conversely, dry anomalies are forecasted from the Equatorial Atlantic to the Gulf of Mexico and north of South America, as well as in India and over the Maritime Continent to the Cook Islands, and more weekly to New Zealand.

On Europe, there is a wet signal in the Northern part, and a dry signal over the Mediterranean Sea.

II.4.aECMWF

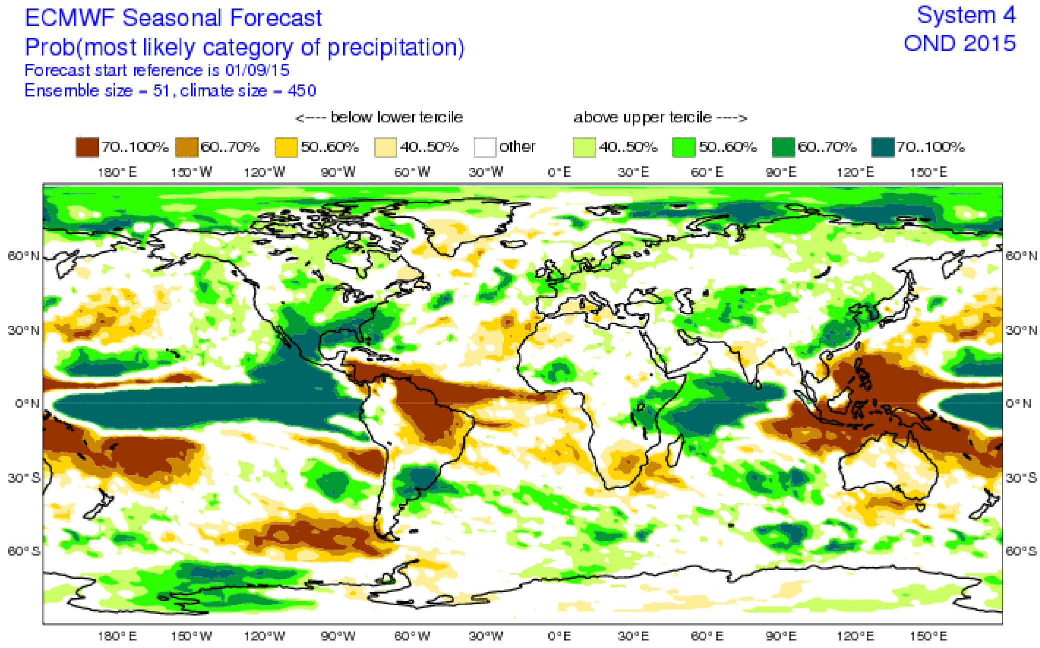


fig.II.4.1: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.4.b Météo-France

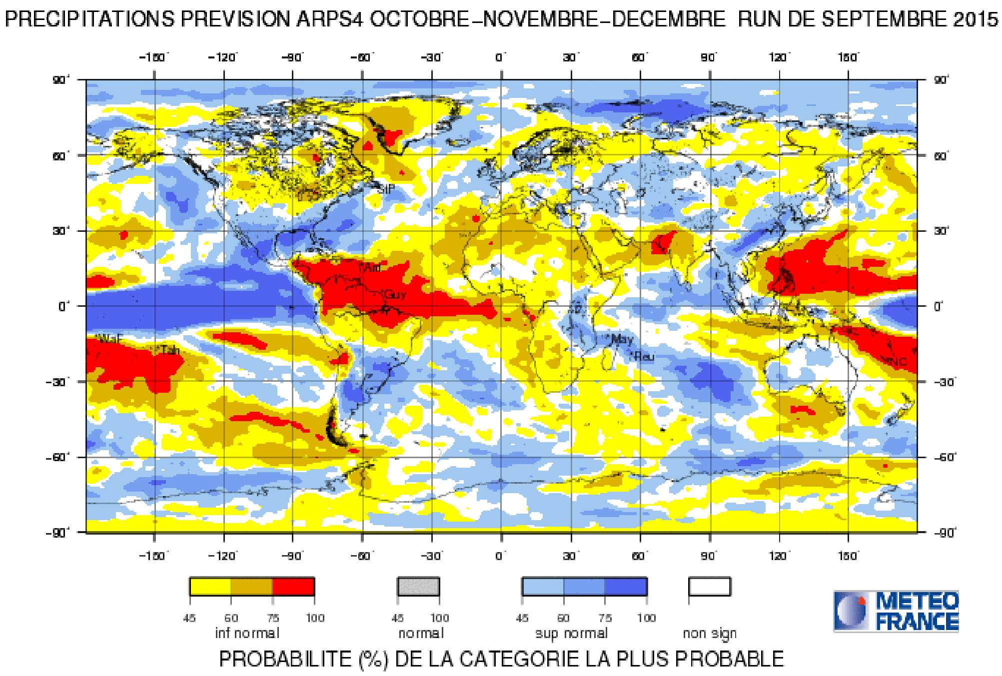


fig.II.4.2: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.4.c Japan Meteorological Agency (JMA)

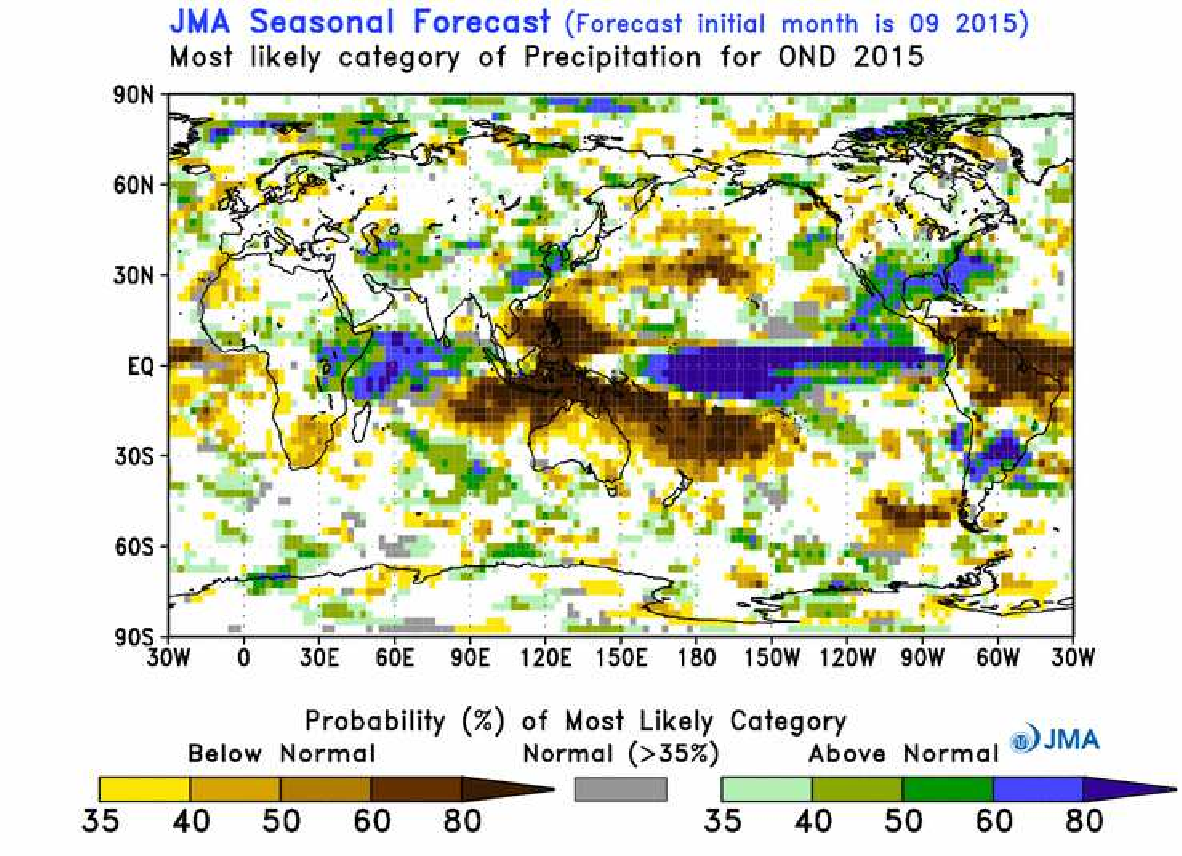


fig.II.4.5: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.4.d EUROSIP

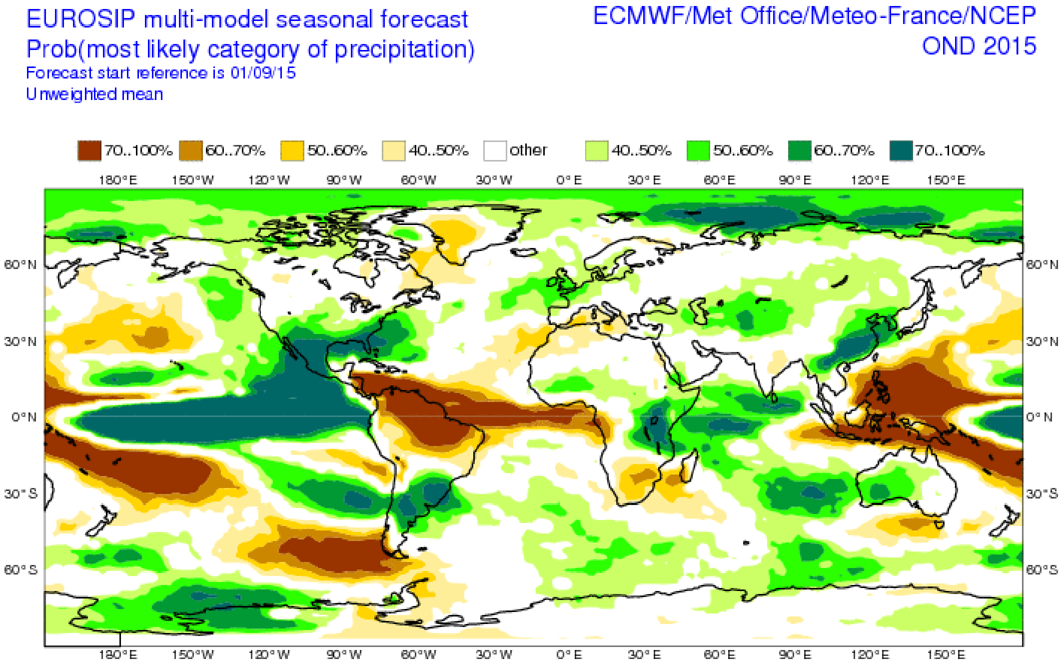
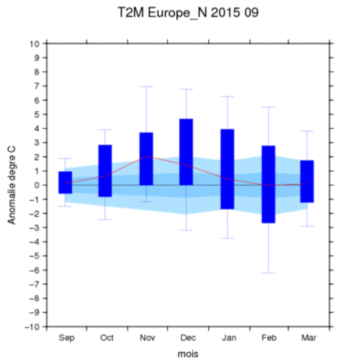
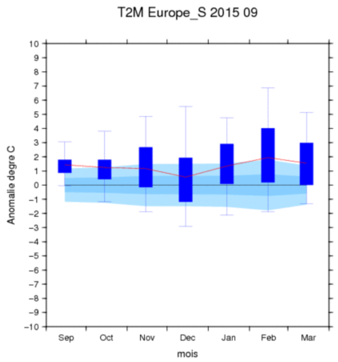


fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).

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

II.5. REGIONAL TEMPERATURES and PRECIPITATIONS





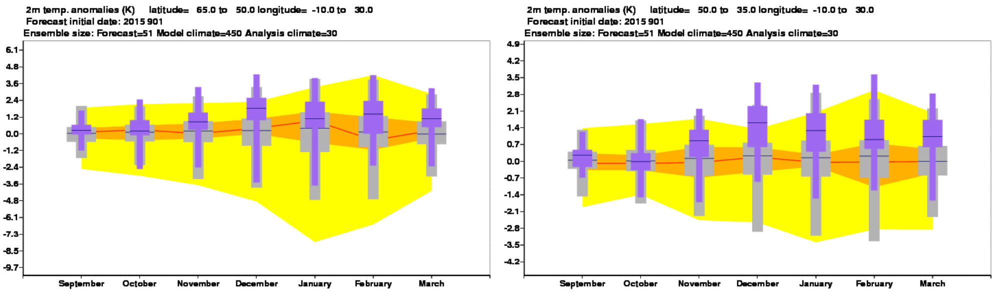


fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

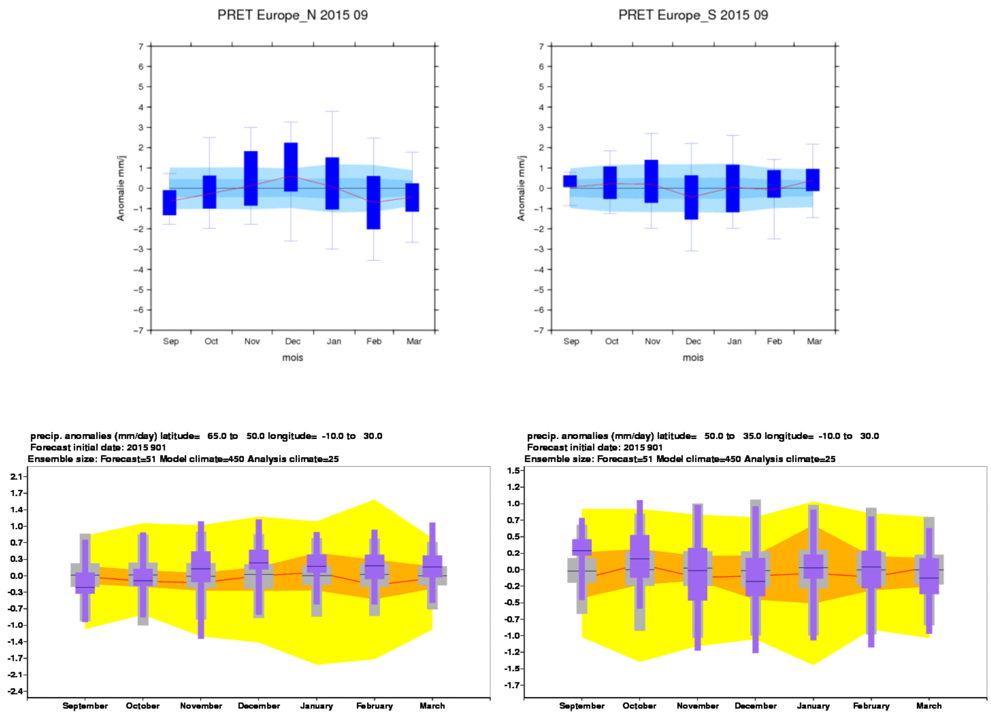


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

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

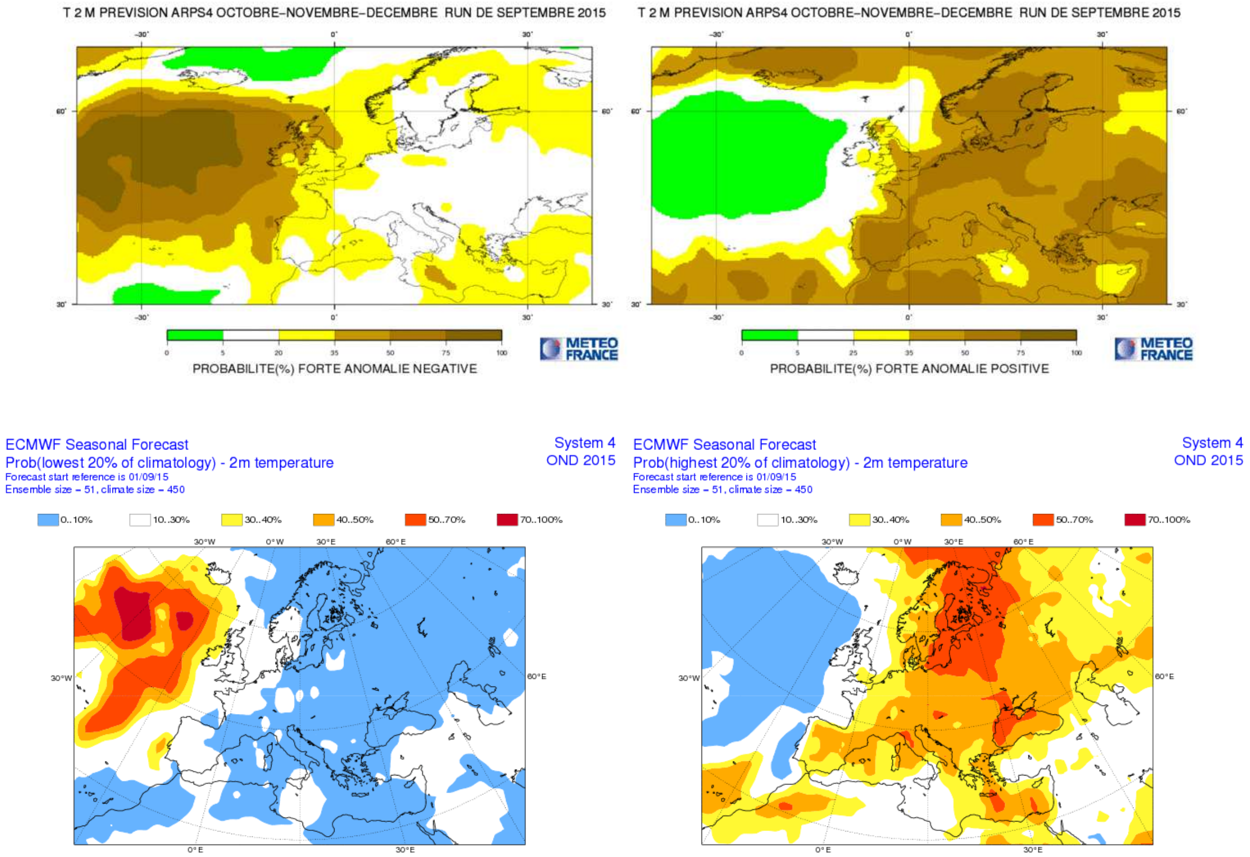
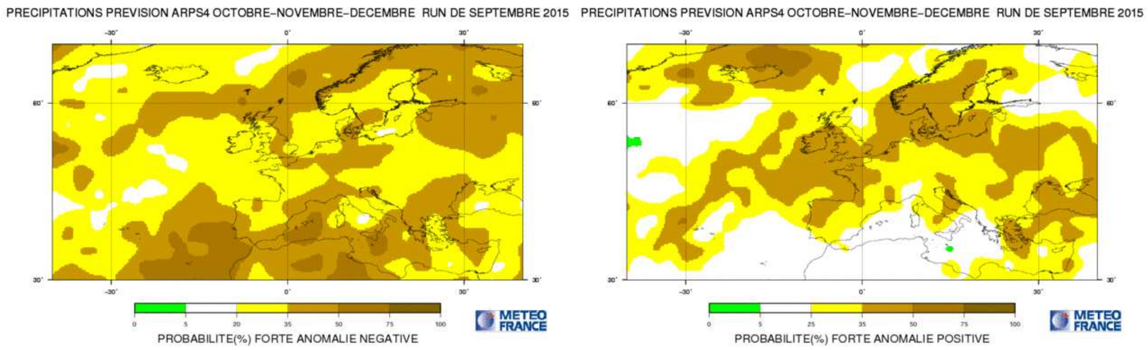
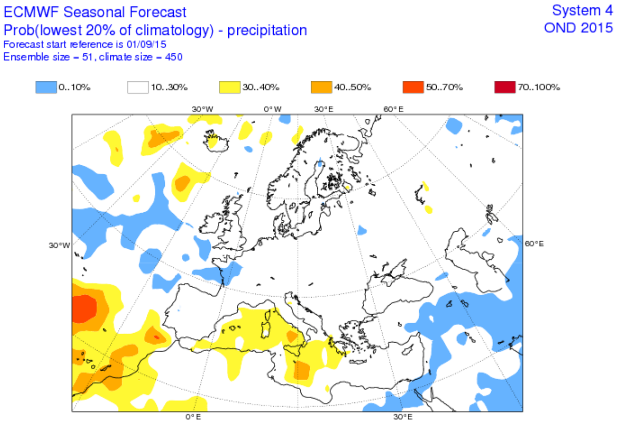


fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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





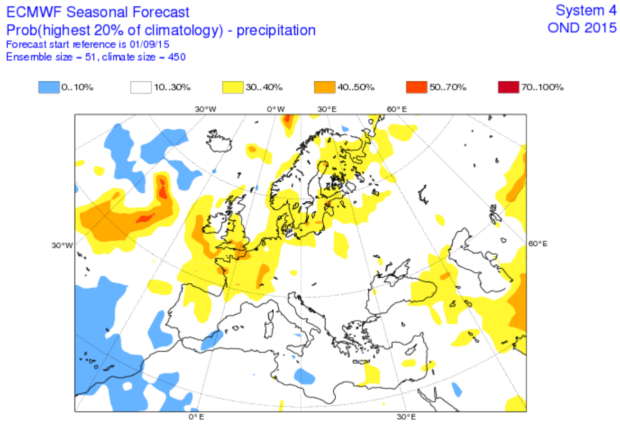


fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

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

II.8.b Tropical cyclone activity

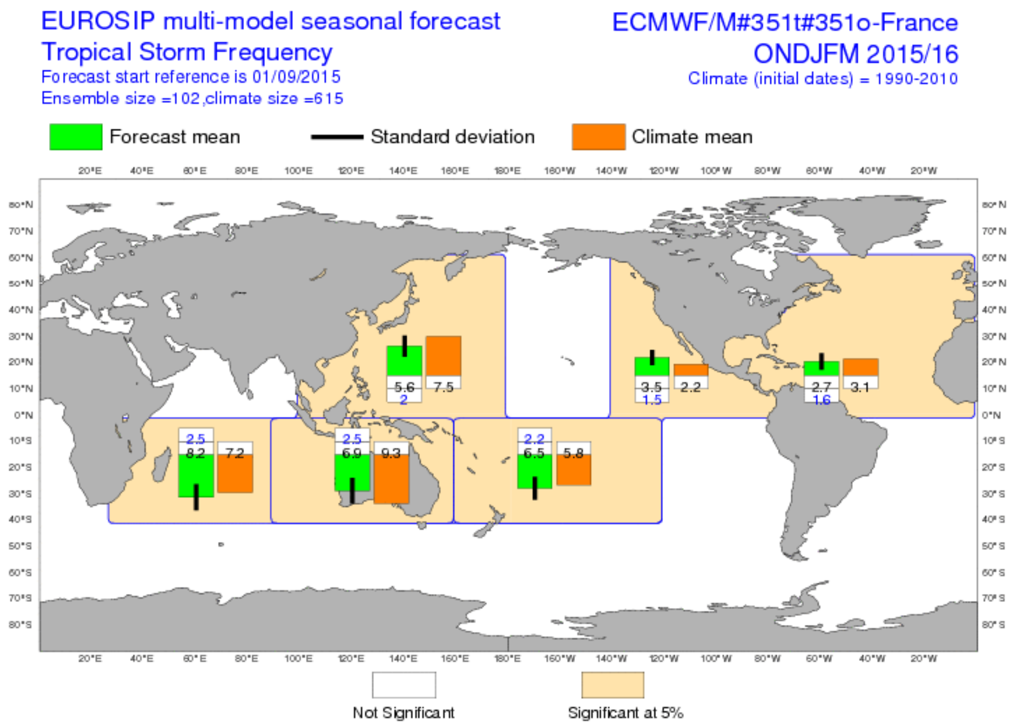


fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/

Consistent with the current El Niño phenomena, the hurricane season is expected significantly weaker than normal in the Atlantic and significantly stronger in Eastern Pacific and Eastern Indian Ocean. The hurricane season is expected significantly weaker than normal in Western Pacific.

WMO RA VI
RCC Network

Synthesis of Temperature forecasts for October-November-December 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	*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

WMO RA VI
RCC Network

Synthesis of Rainfall forecasts for October-November-December 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	***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.

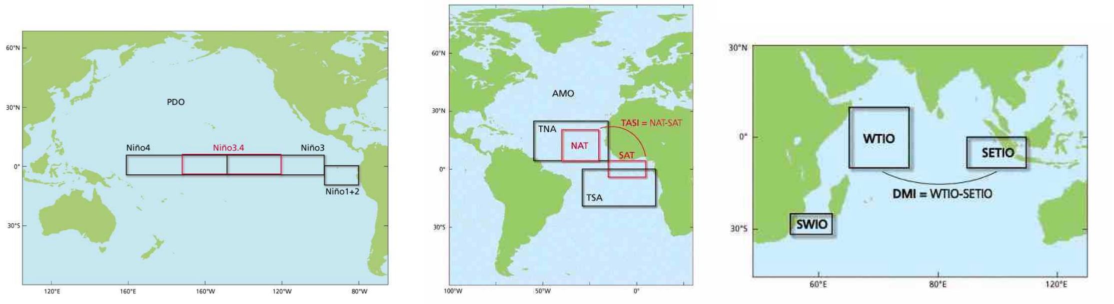
III.2. « NINO », SOI INDICES AND OCEANIC BOXES

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).

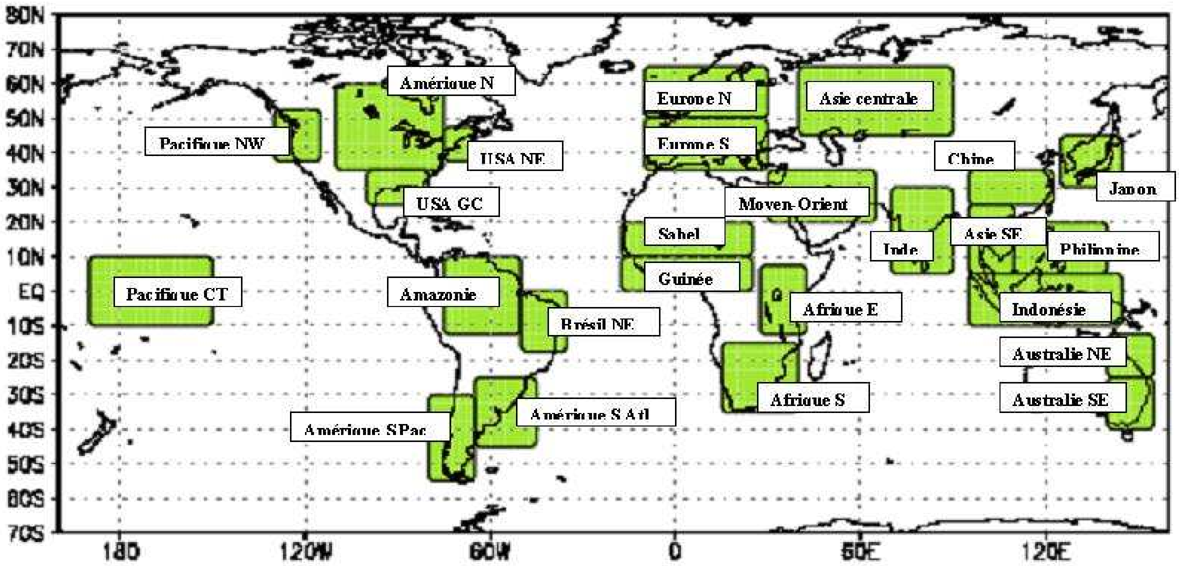
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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

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).