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METEO FRANCE
Toujours un temps d'avance

GLOBAL CLIMATE BULLETIN
n°186 - DECEMBER 2014

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I. DESCRIPTION OF THE CLIMATE SYSTEM (OCTOBER 2014)

I.1.OCEANIC ANALYSIS

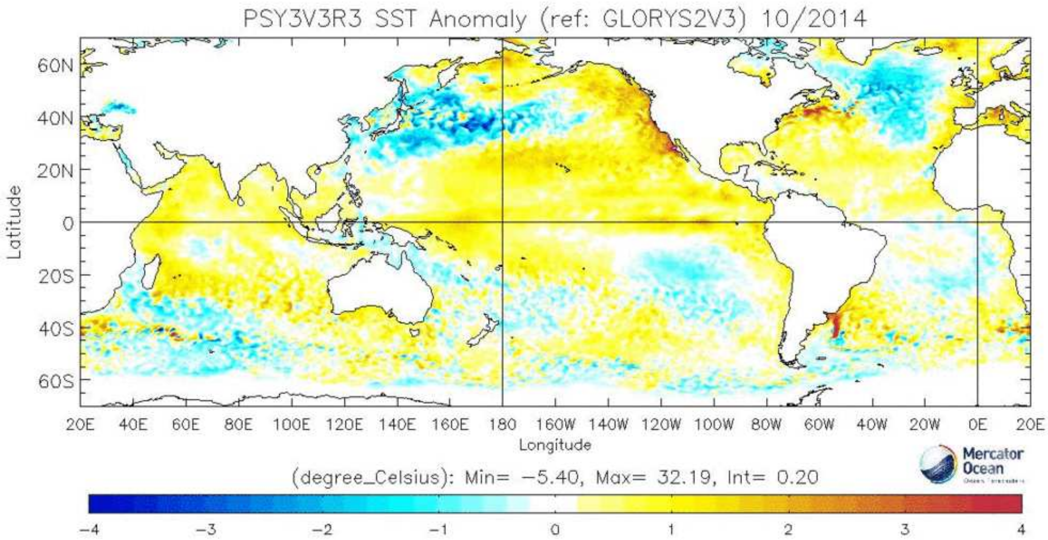
I.1.a Global analysis

At the surface (fig. 1) :

In the equatorial waveguide, slight warming in the Eastern Pacific, in link with the circulation of a warm Kelvin wave in subsurface (fig. 2). In October SST the anomaly pattern in the equatorial Pacific doesn't really look like an El Nino situation, with positive anomalies all along the equator. In the Indian Ocean a slight warming in the western part. No clear evolution in the Atlantic Ocean.

In the tropics, little evolution. Still warmer than normal conditions in the Northern Pacific and in the Northern Atlantic. In the Southern hemisphere, still warm anomalies from Australia to Madagascar.

In the sub-tropics and mid latitudes, persistent strong anomaly structures in the Northern Pacific (with reinforcement of the cold anomaly in the Western part), and a reinforcement of the cold anomaly in central North Atlantic.



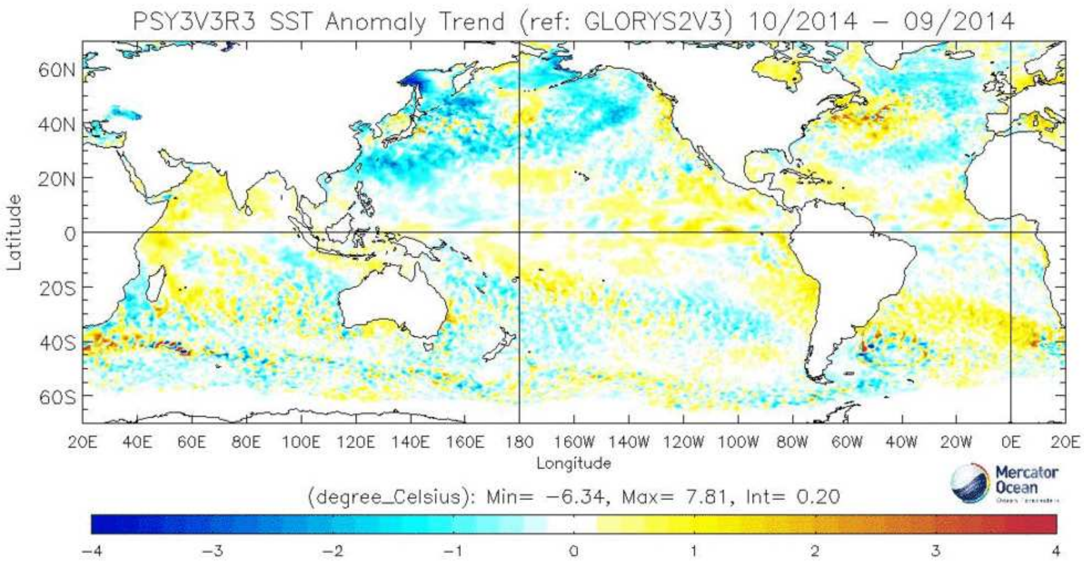


fig.I.1.1: top : SSTs Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

In subsurface (fig. 2) :

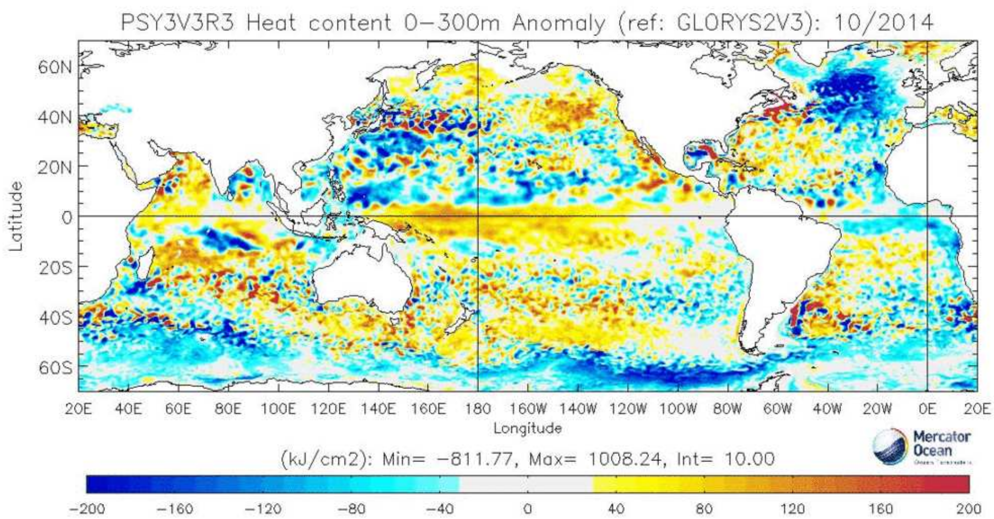


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2009) http://bcg.mercator-ocean.fr/

I.1.b Pacific Basin

Most of the Northern Hemisphere shows a positive anomaly; a negative one is visible in the western part of the Northern basin.
SST anomaly field shows two maximum in the equatorial Pacific : one in the Eastern part, another close to the dateline. Trace of a kelvin wave propagation in sub-surface.
SOI (-0.6, stable) is consistent with the development of an El Niño and consistent with the trade wind anomalies.
In the Niño boxes (4, 3.4, 3 et 1+2 ; see definition in Annex) the monthly averages are respectively 0.6°C, 0.5°C, 0.7°C to 0.7°C from West to East

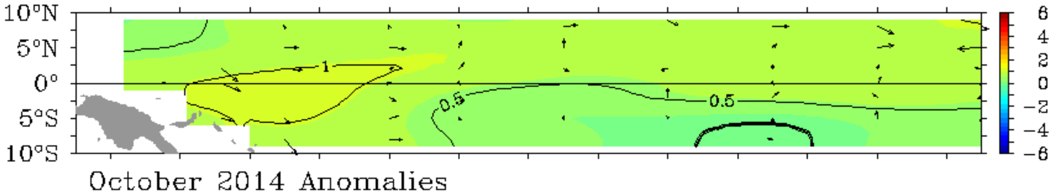


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON.
http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html

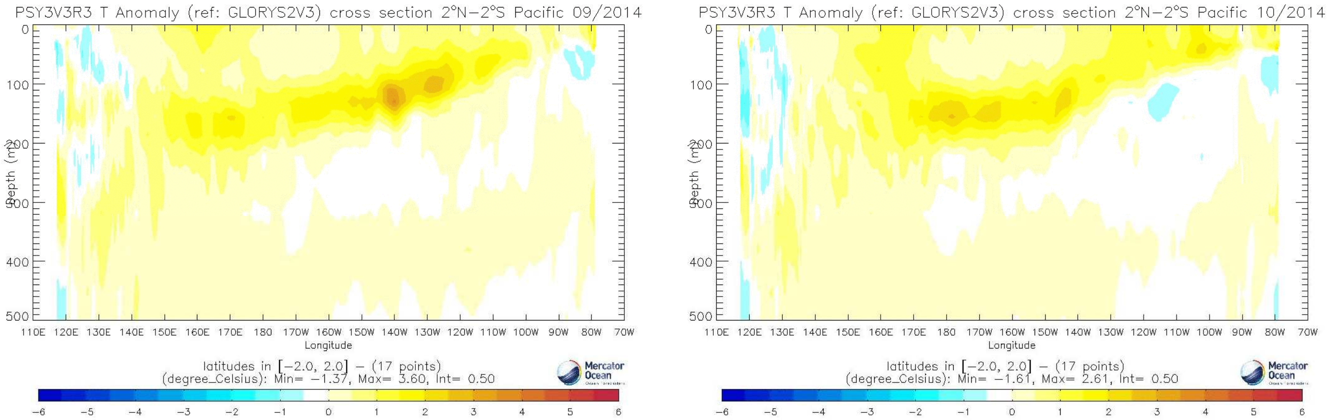


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), http://bcg.mercator-ocean.fr

<u>In the equatorial waveguide (fig. 4 and 5)</u> : a Kelvin wave clearly visible, consistent with a reactivation of El Nino in the next months.

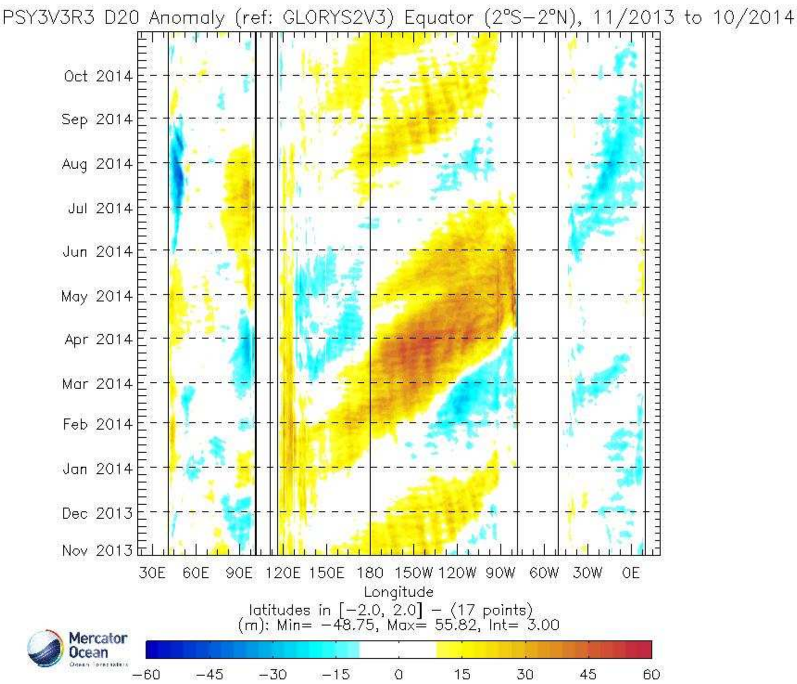


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period http://bcg.mercator-ocean.fr/

I.1.c Atlantic Basin

Northern Tropical Atlantic : globally warmer than normal (cf TNA box)
Equatorial waveguide : slightly negative anomaly in the central part, neutral or slightly positive in the Guinean Gulf.
The Southern Tropical Atlantic : slight positive anomaly in the Eastern part, close to the African coast (Angola).
The TASI index is positive.

Sea surface temperature near Europe :

Still negative SST anomalies in the European Arctic (sea ice east of Svalbard). Between Svalbard and the Scandinavian continent slightly higher than normal cooling from August to September, leading to near-normal or locally slightly negative anomalies in this area.
Near the western European coasts mainly positive anomalies from central Scandinavia to Iberia and even further to North Africa, even higher than in August. While over Scandinavia the warming is due to atmospheric high pressure influence, the warming near southern Europe seems to come from subtropical advection in connection with a low pressure anomaly west of Iberia.
To be noted the still high positive anomalies in the Baltic Sea and the above-normal subtropical warming in the Mediterranean.

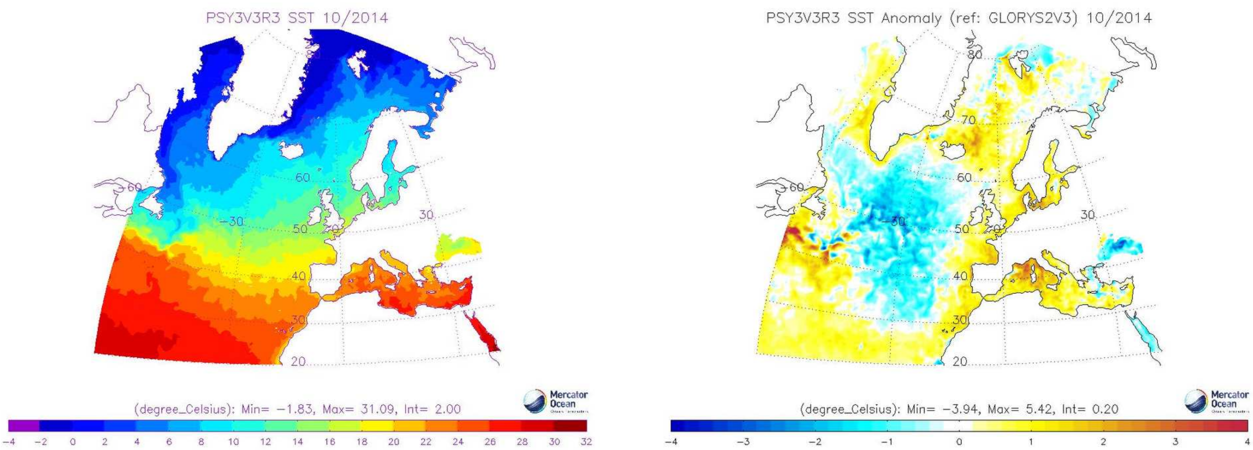


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

I.1.d Indian Basin

Southern Tropical Indian Ocean : warmer than normal conditions over most of the basin.
Equatorial waveguide : a positive gradient from east to west, so the DMI is now positive.
Northern Tropical Indian Ocean : warmer than normal

I.2. ATMOSPHERE

I.2.a General Circulation

Velocity Potential Anomaly field in the high troposphere (fig. 1.2.1 – insight into Hadley-Walker circulation anomalies) :

Globally the anomaly field looks quite complicated. Weak MJO activity in October.

On the Pacific : 2 regions of upward motion anomaly, one in the Eastern part (~10°N), one in the Western part (~10°S). And we notice a downward motion anomaly over the maritime continent. This is almost consistent with SST anomaly pattern.
On the Atlantic : like in September, a convergent circulation anomaly (downward motion anomaly) in the Northern hemisphere, close to South America. It is probably linked to the divergent circulation anomaly in the Eastern Pacific.
On the Indian Ocean : globally upward motion anomaly in the equatorial region, and a strong one in the Arabian Sea.

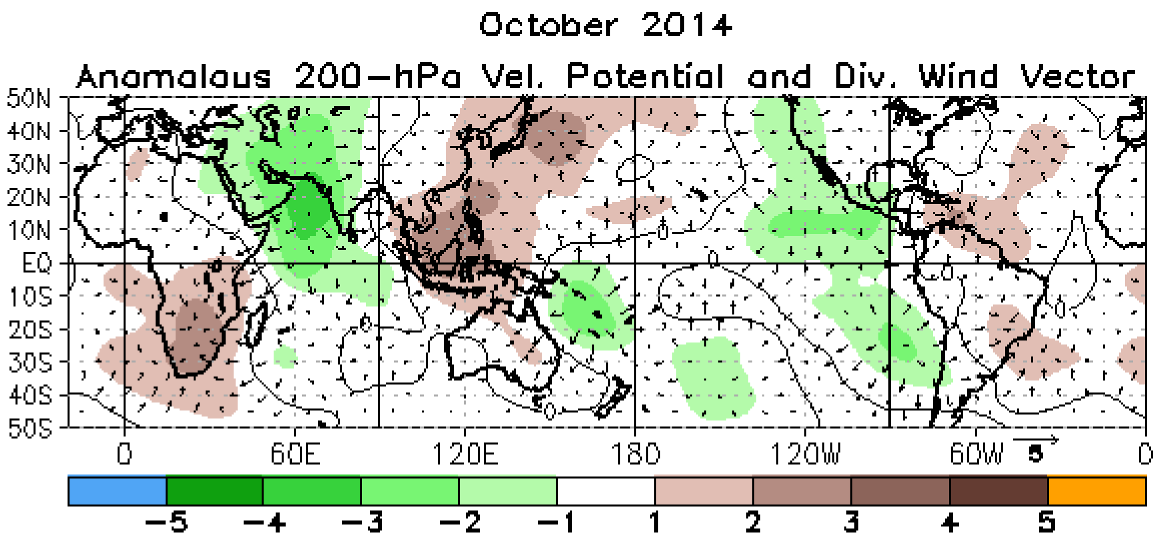


fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

Stream Function anomalies in the high troposphere (fig. 1.2.2 – insight into teleconnection patterns tropically forced) :
Very weak anomalies in the tropics, this is not really a surprise considering the velocity potential anomaly field. The only trace of teleconnexion could be detected from Caribbean region up to Northern Atlantic region.

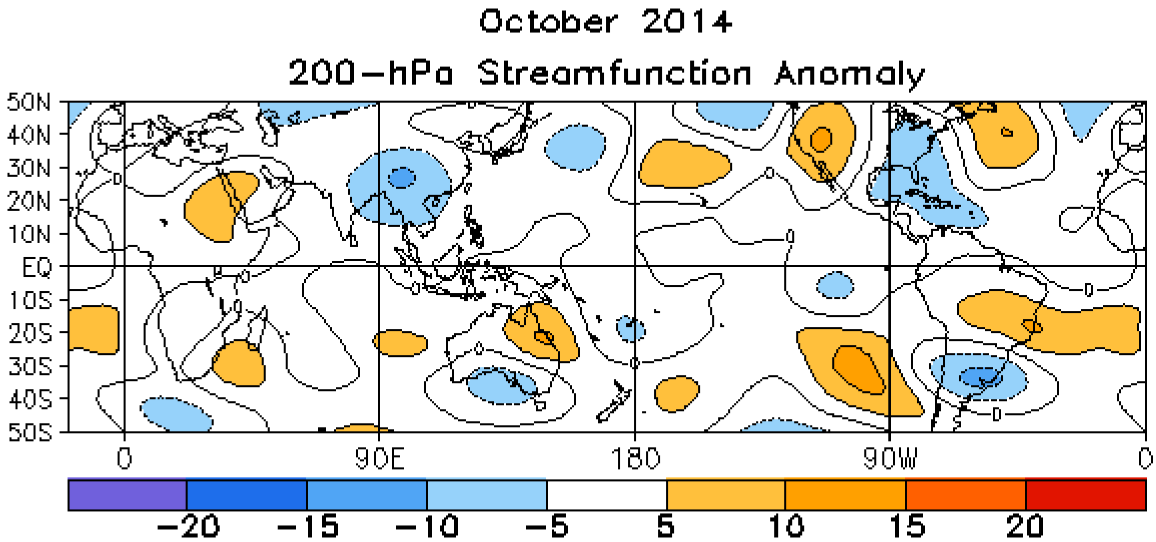


fig.I.2.2: Stream Function Anomalies at 200 hPa.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

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

The main Z500 anomalies above 30°N are very likely due to high latitude circulation. The dipole in Northern Atlantic (+ near New Foundland, - South of Iceland) could be partly resulting from the teleconnexion discussed in the previous paragraph.

The main active modes (N. hemisphere) are EA (positive), SAND (positive), PNA (positive), polar Eurasia (neg..) and NAO (neg.)

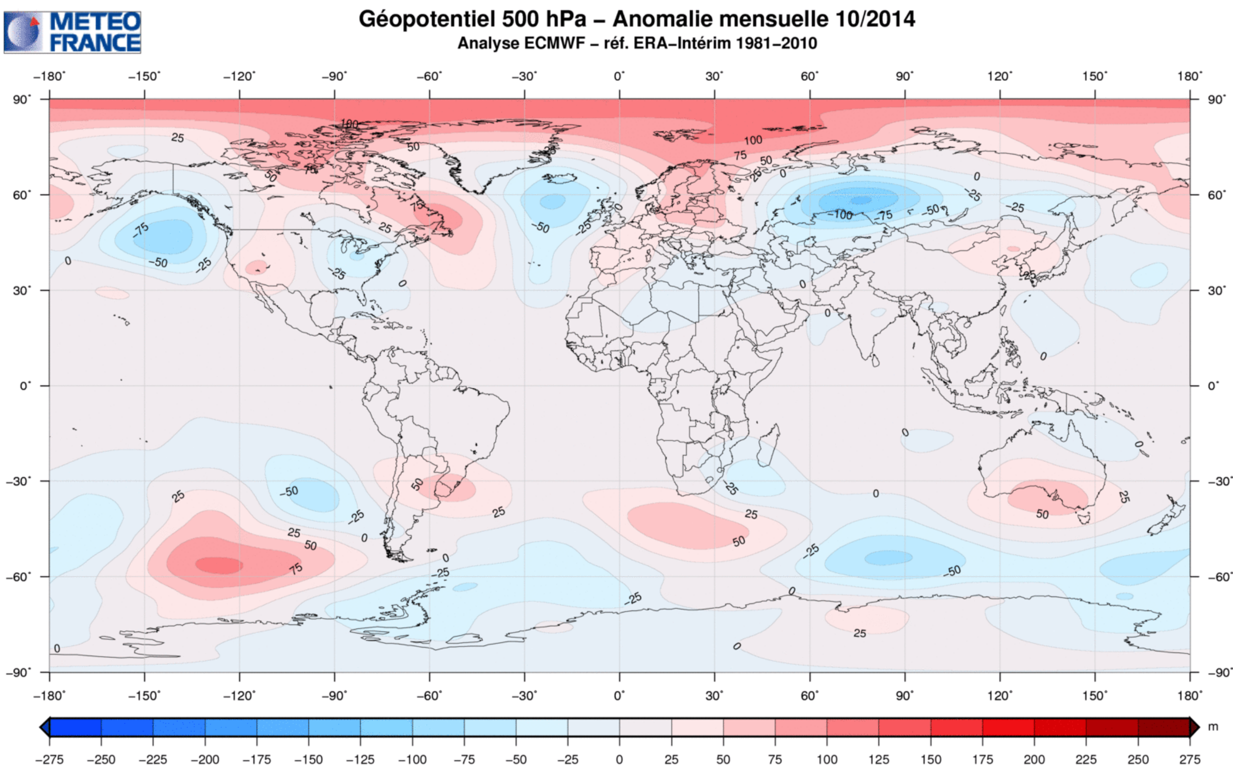


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
OCT 14	**-0.9**	**1.0**	**-0.3**	**-0.7**	**1.1**	**---**	**-0.4**	**1.1**	**-1.0**
SEP 14	1.7	0.2	-1.2	0.2	0.8	---	0.5	1.1	1.1
AUG 14	-2.3	0.8	-0.8	-1.0	1.3	---	-1.7	-0.6	1.6
JUL 14	0.2	0.6	-1.6	0.3	0.5	---	-0.3	1.6	-0.9
JUN 14	-0.7	-1.0	-0.3	-0.7	-1.4	---	0.0	0.2	-0.0
MAY 14	-0.8	0.4	-0.9	0.8	-0.6	---	-1.4	-0.5	1.0

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

The SLP pattern (mean and anomaly) over North Atlantic / Europe has a structure of 4 pressure centres: the Icelandic low (between southern Greenland and Iceland) and the corresponding Azores high over the western North Atlantic, but in contrast to it high pressure over northern Europe and another low pressure centre west of Iberia (all visible near surface and in 500 hPa). Such a structure cannot be explained by just one of the standard patterns, but is rather a mixture of several contributions. While the NAO (with +1.7 the largest contribution) explains the two pressure centres in the western North Atlantic and the resulting enhanced zonal flow, the other two pressure centres can be better explained by the SCAND pattern (+1.1). In addition we have negative SLP anomalies in the Arctic (trapping the cold air in the Arctic region) with cannot be explained neither by NAO nor by SCAND, but by the POLEUR pattern (+1.1 as well).

The result of this quite complex pattern is a redirection of the enhanced zonal flow over the North Atlantic towards the north before reaching Europe, which means that the Scandinavian high has a blocking effect. The Scandinavian high causes subsidence especially over a large area over northwestern and northern Europe and temporarily also the mid-latitudes, while many other parts of Europe are affected by warm air advection: the redirection of the Atlantic flow to the north and subtropical advection in middle and lower latitudes.

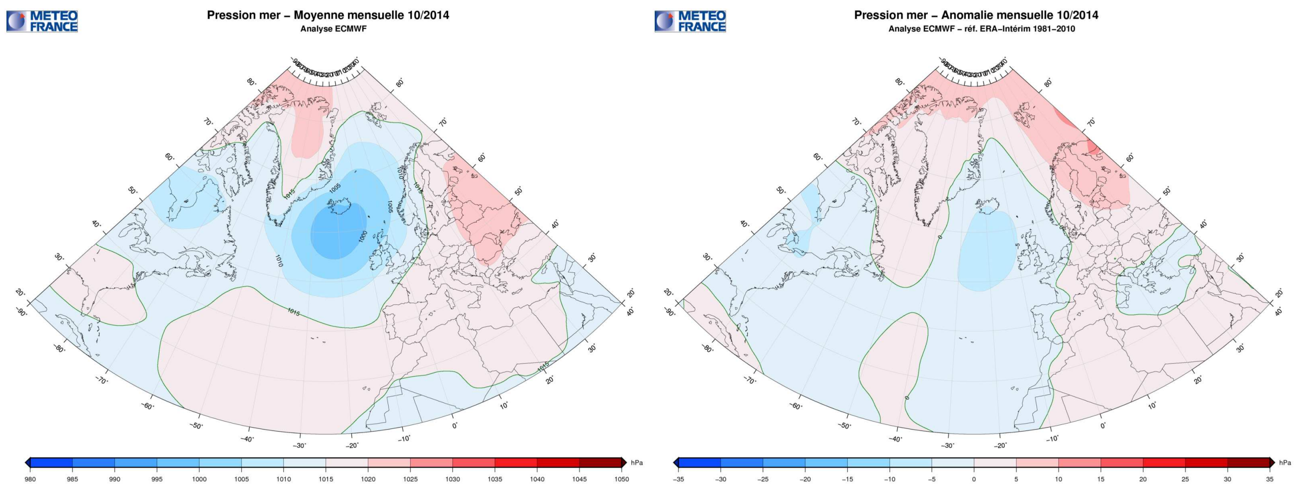


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (left) and 1981-2010 anomalies (right).

Circulation indices: NAO and AO

After a clearly negative NAO mode in August, there was a switch to mainly positive NAO mode conditions starting in the beginning of September. The NAO peaked twice, the first time in the middle of September and the second time at the end of the month. However, only during the second peak, we also had a westerly weather type over Europe.
NAO data for October 2014 show that the positive NAO mode of September did not continue further, so it was not a very stable situation.
The AO index did not follow the NAO variations during September 2014 except at the end of the month. This means only at the end of the month the NAO variations are reflected by variations of the whole northern hemisphere, while the rest of the month the pattern was very special for the Atlantic-Europe area.

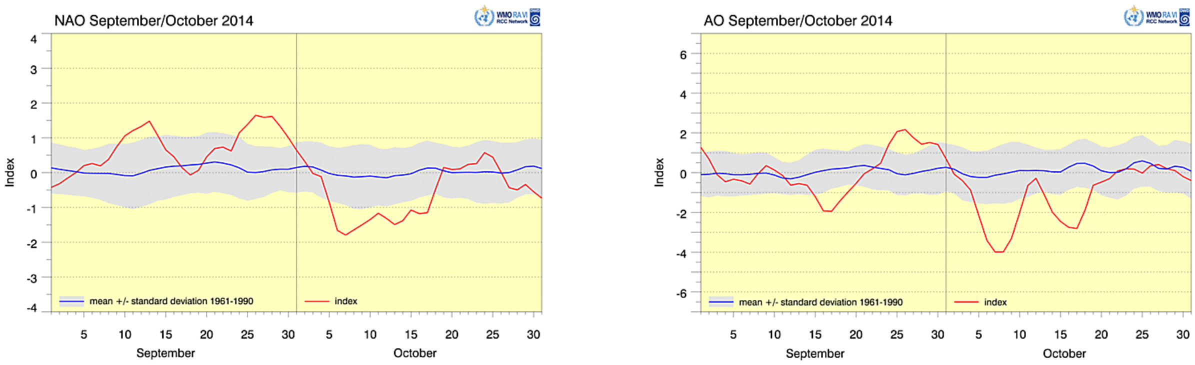


fig.I.2.5: North Atlantic Oscillation (NAO, upper graph) and Arctic Oscillation (AO, lower graph) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

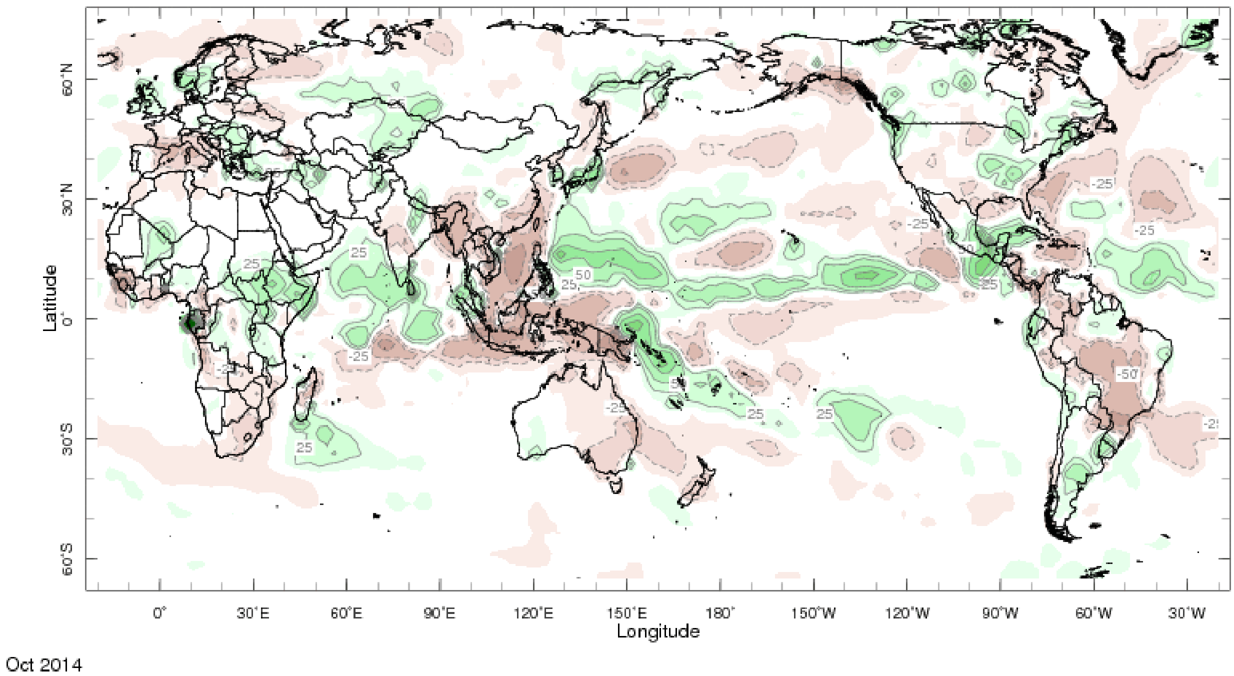


fig.I.2.4: Rainfall Anomalies (mm) (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

Intertropical zones (including sub-tropics) : good consistency with the Velocity Potential anomalies, with strong positive anomaly along the equatorial Pacific and the equatorial Indian Ocean. In contrast, drier than normal conditions over the maritime continent. Drier than normal condition over the Caribbean region.. Drier than normal in coastal regions of West Africa and wetter in inland areas.

Mid-latitudes : mostly drier than normal over Northern Europe, and wetter than normal over Southern Europe.

Precipitation anomalies in Europe:

September 2014 was a month of very extremely contrasting precipitation anomalies in Europe. While it was very dry over large parts of western / northwestern / northern / eastern Europe due to the extended high pressure zone (the UK especially experienced its driest September since 1910), it was very wet particularly over parts of the Balkan Peninsula, around the Black Sea and in western Iberia. Dry areas were largely below the 10th percentile and wet areas above the 90th percentile. The wet areas were related to notable low pressure systems, and the warm water surfaces in southern Europe favoured convective developments due to an increased thermal instability and increased water vapour content.

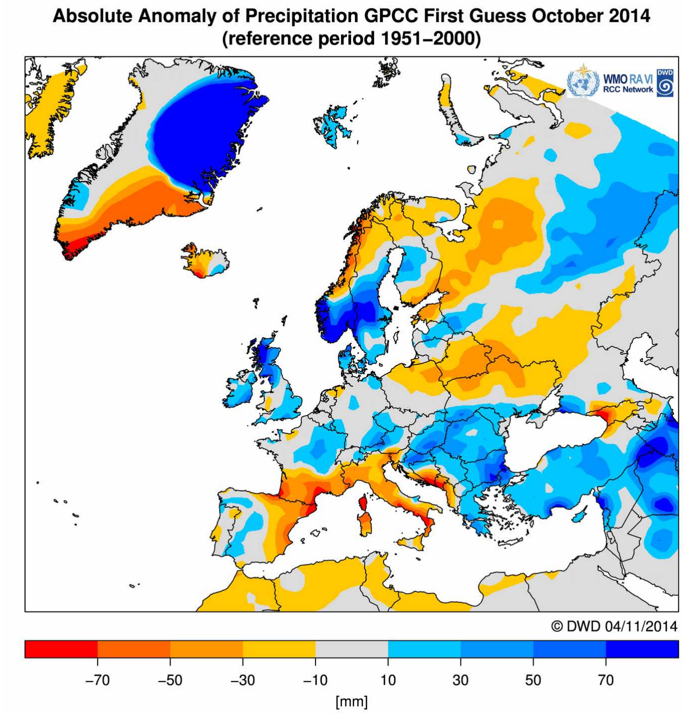


fig.I.2.5: Left: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm. Right: Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

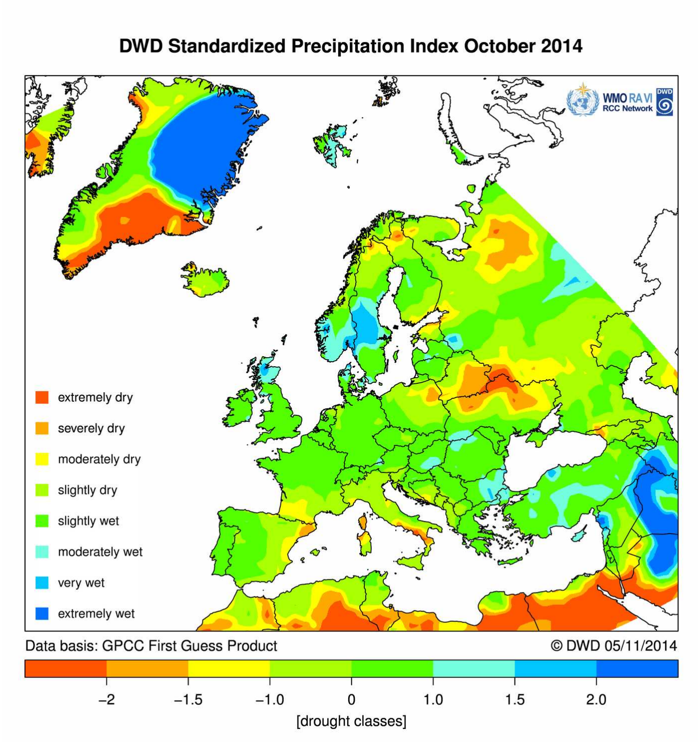


fig. I.2.5a: Standardized Precipitation Index with DWD modification (DWD-SPI), http://www.dwd.de/rcc-cm .

Subregion	Absolute anomaly	Relative of 1951-2000 normal	SPI DWD Drought Index
Northern Europe	-34.8 mm	57.5 %	-0.846
Southern Europe	+13.0 mm	139.3 %	+0,277

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.

I.2.c Temperature

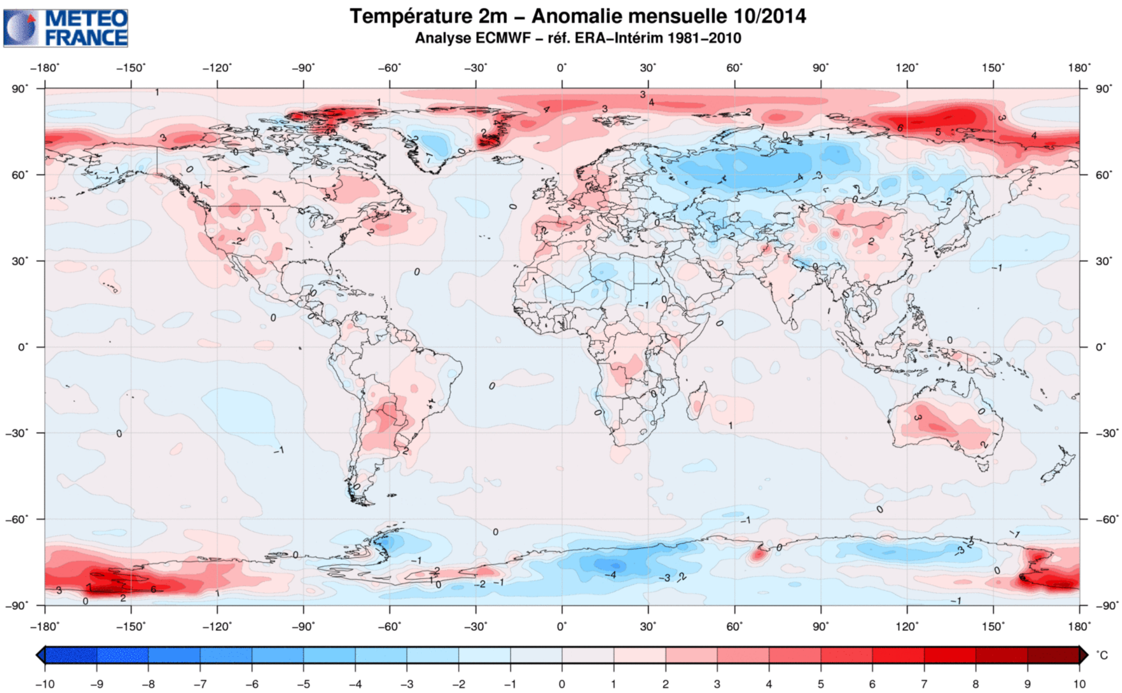


fig.I.2.6: Temperature Anomalies (°C) (Meteo-France)

Globally positive anomaly over Europe, North America, China and Australia. Vast negative anomaly over Russia.

Temperature anomalies in Europe:

Most of Europe was warmer than normal in September 2014, many areas even more than +1 K, again due to high pressure in the north and warm air advection in the west and south, and partly also in central Europe. There were a few areas in southern Europe, which were slightly colder than normal, related to much rain and cloudiness by low pressure influence.

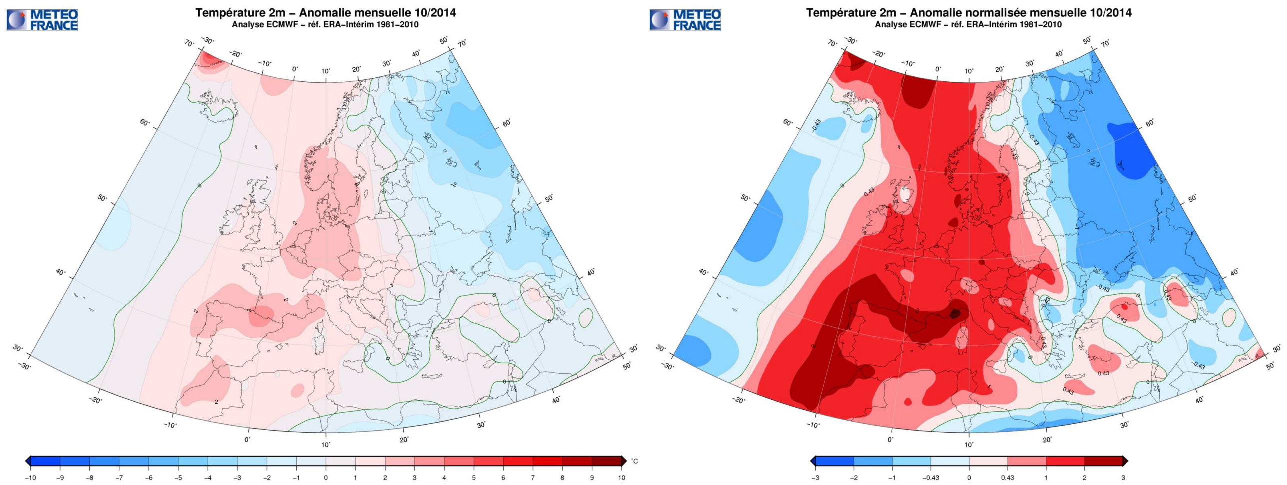


fig.I.2.7: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

Subregion	Anomaly
Northern Europe	+1.7°C
Southern Europe	+1.3°C

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.

I.2.d Sea ice

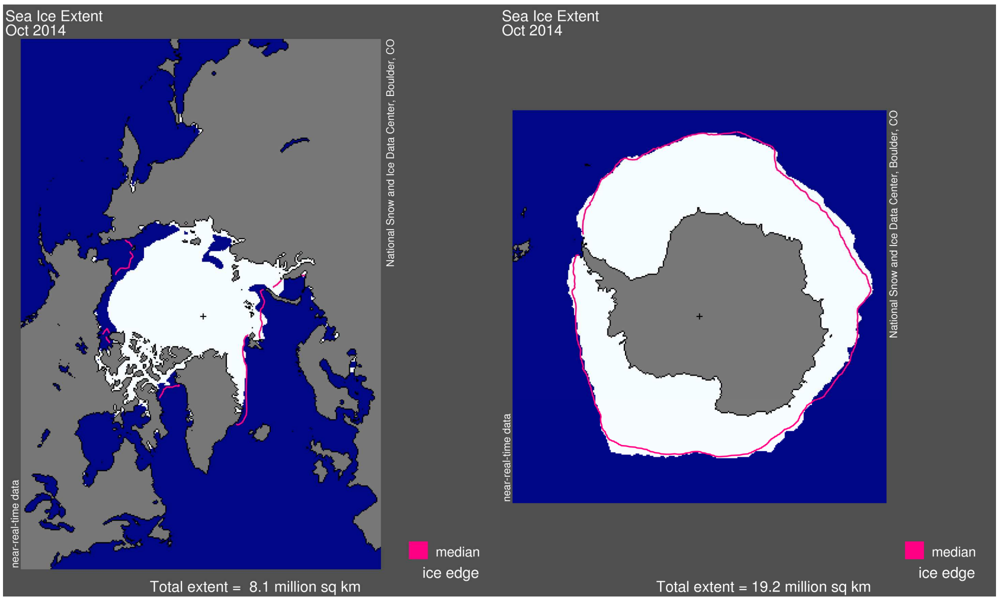


fig.I.2.6: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

In Arctic (fig. 1.2.6 and 1.2.7 - left) : well below normal sea-ice extension (negative anomaly close to 2 standard deviation), mainly link to the deficit on the Pacific side.
In Antarctic (fig. 1.2.6 and 1.2.7 - right) : well above normal sea-ice extension anomaly with some large regional modulation.

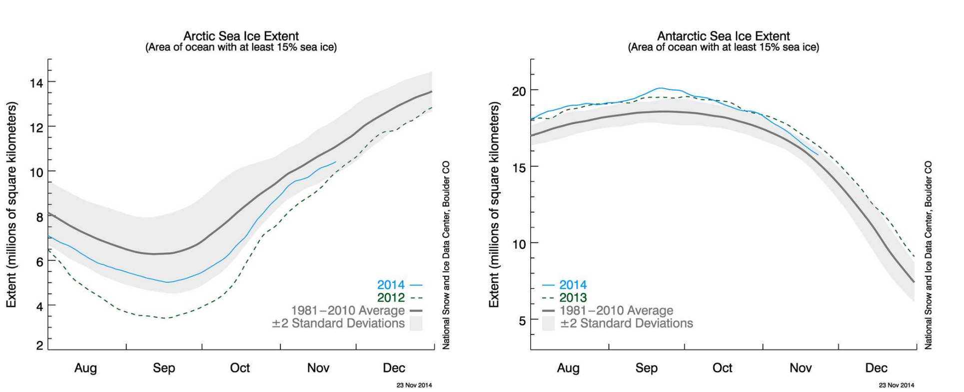


fig. I.2.7 : Sea-Ice extension evolution from NSIDC.
http://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png

II. SEASONAL FORECASTS FOR DJF FROM DYNAMICAL MODELS

II.1.OCEANIC FORECASTS

II.1.a Sea surface temperature (SST)

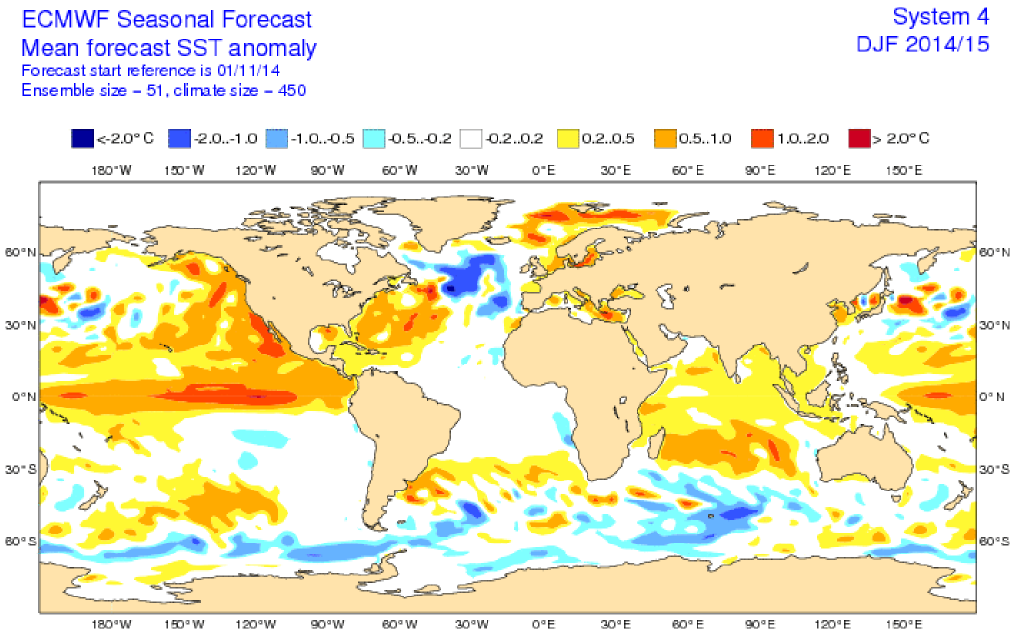


fig.II.1.1: SST anomaly forecast from ECMWF
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

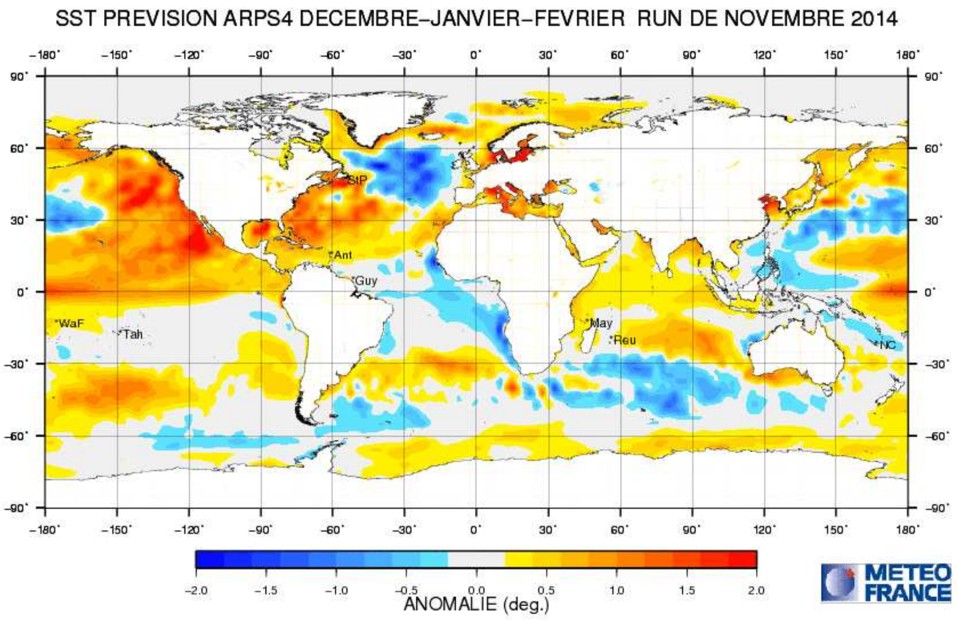


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).
http://elaboration.seasonal.meteo.fr

For the 2 individual models :

Whatever the differences in the post-processing of the anomalies (including reference period for the hindcast ; 81-2010 for ECMWF and 91-2010 for MF system 4), fairly consistent SST forecasts, over both hemispheres.

Pacific : warmer than normal conditions in the central equatorial waveguide. The positive anomaly extends beyond the dateline in both models. Negative anomalies in the Western Tropics in MF (probably linked to hindcast issues). Positive anomalies over the Half Eastern North Pacific and negative in the North Western Pacific in both models.

Atlantic : equatorial waveguide slightly negative in MF, no visible signal in ECMWF. Negative anomalies in the North-Eastern tropics in both models. Persistent colder than normal conditions in the Central Northern mid-latitudes. Still warmer than normal conditions in the Baltic sea and in the Mediterranean Sea.

Indian Ocean : Warmer than normal conditions especially in the Southern hemisphere. IOD close to zero.

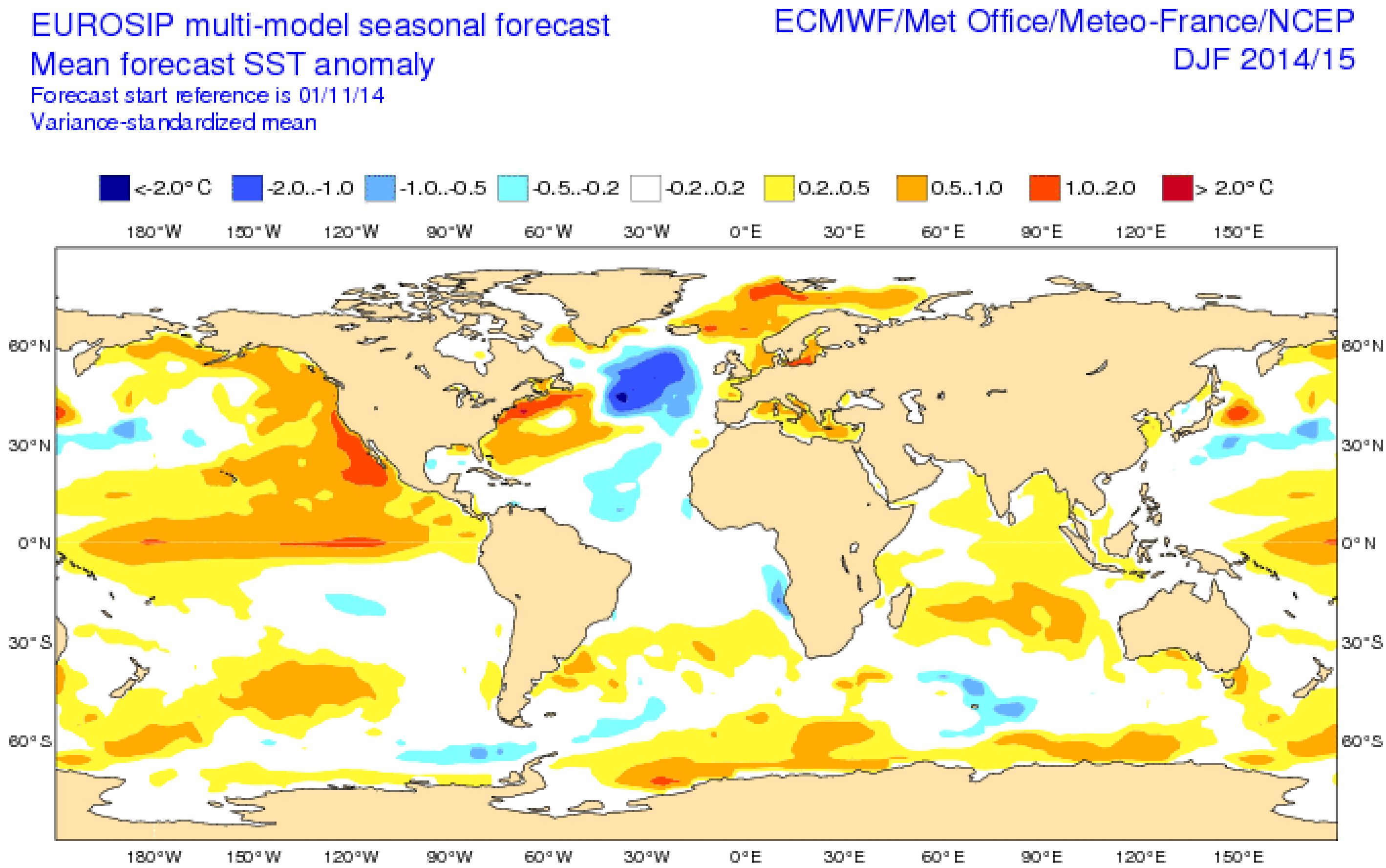


fig.II.1.3: SST Forecasted anomaly from Euro-SIP

In Euro-SIP :

The same comments than for the individual models.

II.1.b ENSO forecast :

Forecasted phase: weak El Niño phase for DJF

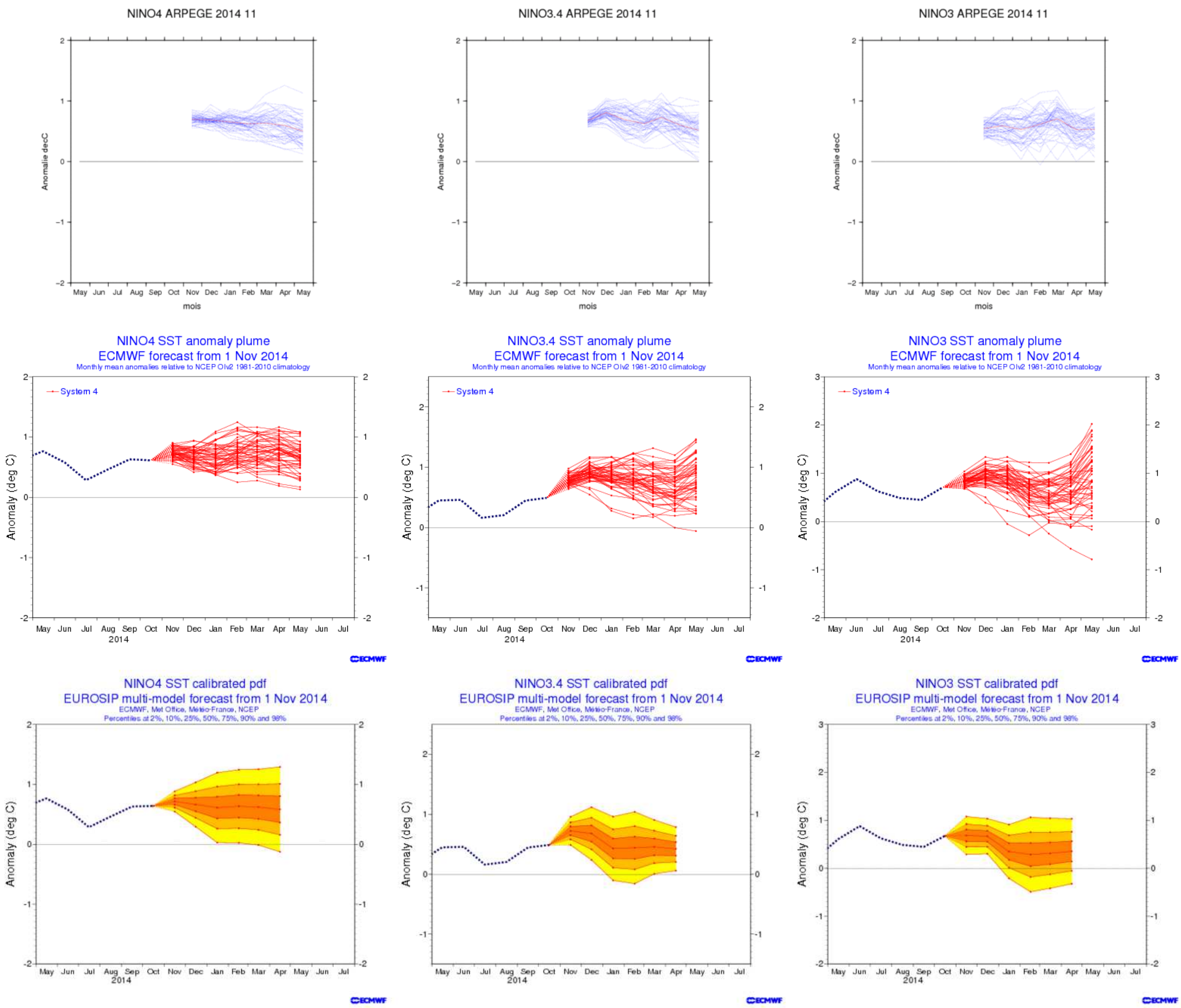


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

Plumes from Météo-France and ECMWF for the 3 Niño boxes (see definition in Annex – fig. II.1.5) : Good consistency for the next season, with increasing SST anomalies, rather in the Central Pacific. The maximum in Nino3.4 box is expected at the end of the year, with a very weak probability to exeed +1°C.

II.1.c Atlantic Ocean forecast

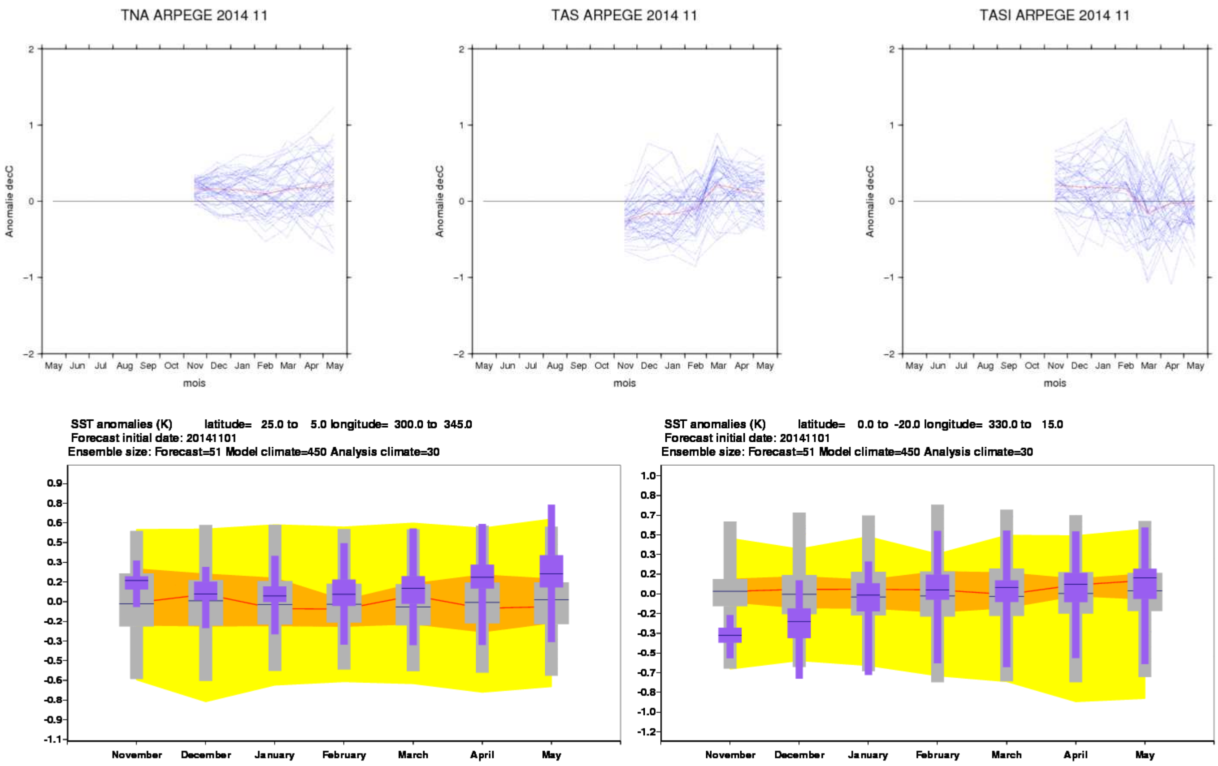


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

Poor consistency between the 2 models over the targeted period.
North Tropical Atlantic : positive
South Tropical Atlantic : negative
TASI : in positive
Guinean Gulf : close to 0 in MF.

II.1.d Indian ocean forecasts

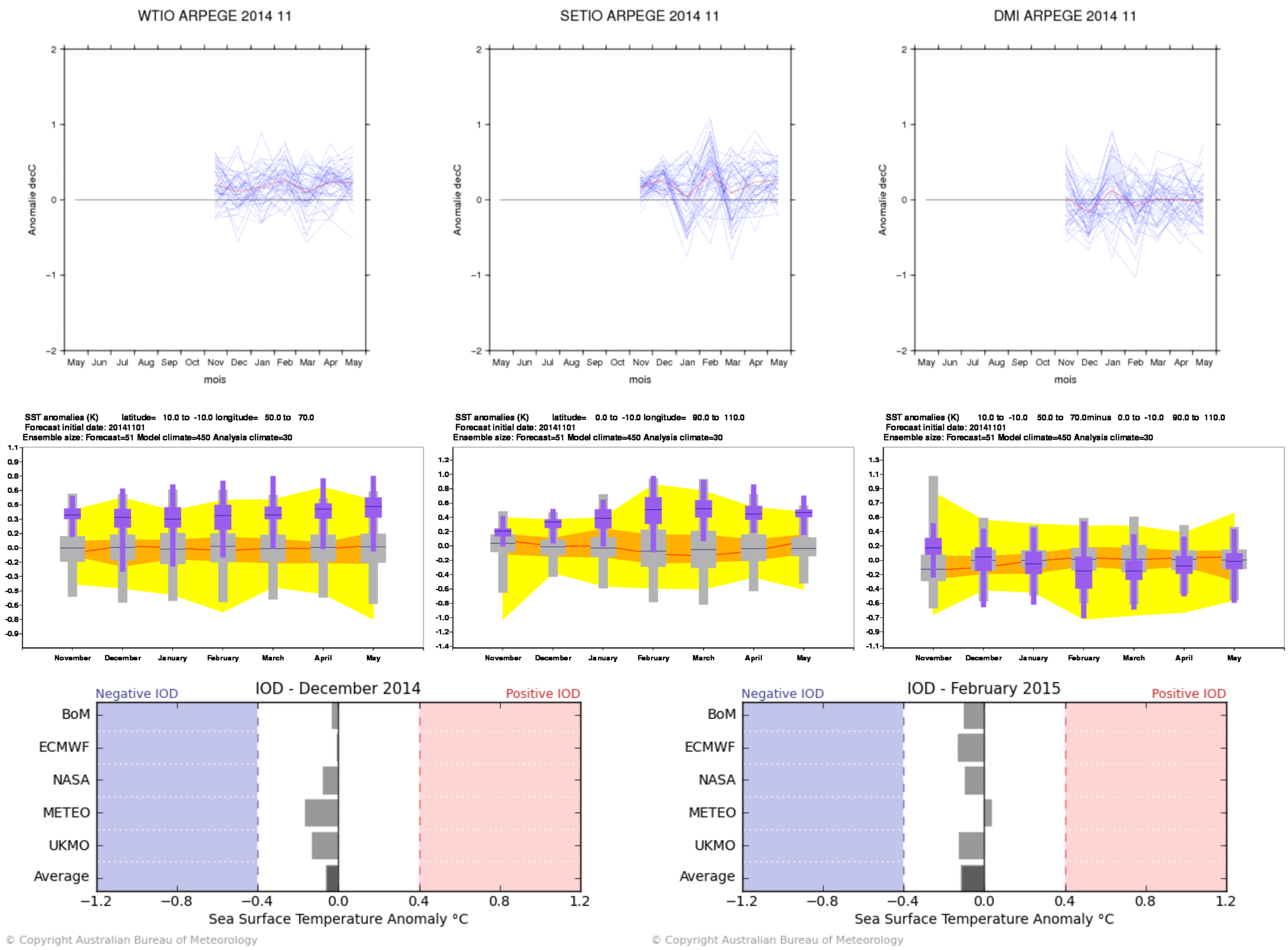


fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

DMI (IOD) : close to neutral

II.2.GENERAL CIRCULATION FORECAST

II.2.a Global forecast

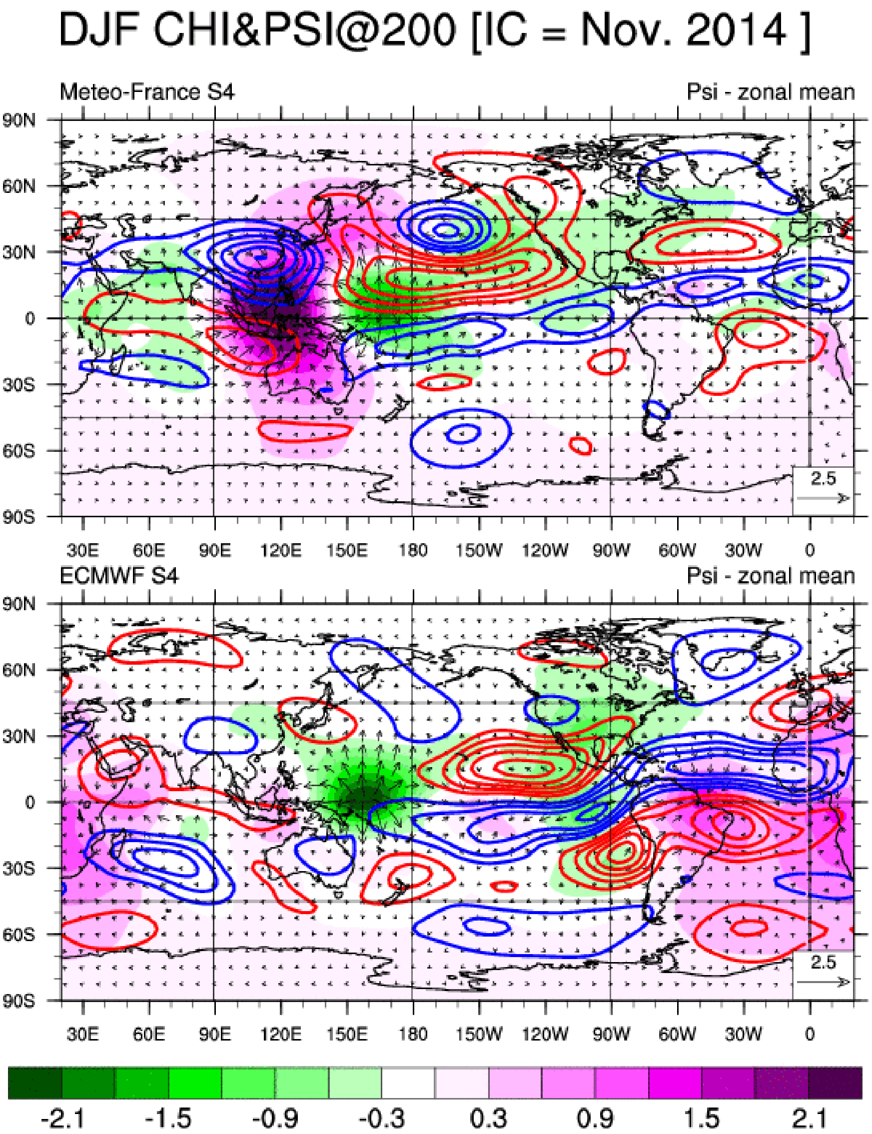


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

<u>Velocity potential anomaly field (cf. fig. II.2.1 – insight into Hadley-Walker circulation anomalies) :</u>
Some noticeable differences between the models. MF forecast for DJF is close to the October situation in the tropics.
Over the Pacific, 2 upward anomaly poles, on each side of the basin. The strongest one is the Western side, west of the dateline, which is not very consistent with an El Nino evolution. The western upward motion anomaly is probably linked to the downward motion anomaly over the maritime continent (strong anomaly with MF).
Over the Atlantic, quite consistent response with convergent circulation anomaly (downward anomaly motion) close to the Equator, close to South America. This could be a response to El Niño.
Over the Indian Ocean : contradictory signal.

Stream Function anomaly field (cf. fig. 19 – insight into teleconnection patterns tropically forced) :
In ECMWF, the signal seems to be trapped in the tropics.
In MF, some traces of teleconnexion from the Pacific up to Western North America. Another one is visible in the Northern Atlantic, from Western tropics up to central North Atlantic. It is probably link to the downward motion anomaly located North-East of South America.
As a conclusion the predictability is globally low for this forecast. In the tropics (Pacific and Atlantic), some consistent signals (cf velocity potential anomaly) but quite week, due the week intensity of El Niño. In mid-latitudes, despite some trace of teleconnexion in the Northern Atlantic, the mean circulation is very uncertain

II.2.b North hemisphere forecast and Europe

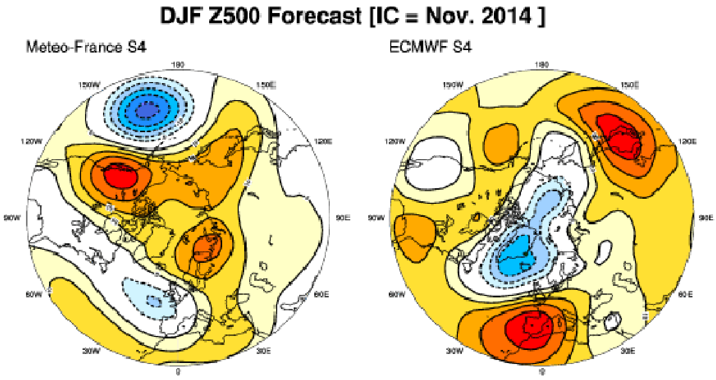


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip

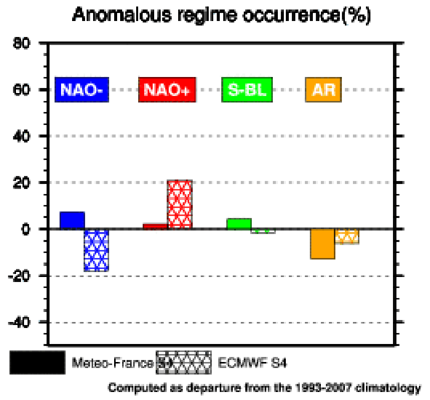


fig.II.2.3: North Atlantic Regime occurrence anomalies from Meteo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

Geopotential height anomalies (fig. II.2.3 – insight into mid-latitude general circulation anomalies) :
Major differences in the patterns. MF forecasts a kind of East Atlantic situation, ECMWF a NAO+ situation.

North Atlantic Circulation Regimes (fig. 21) :
The main anomalies are a deficit of Atlantic ridge in MF, and an increased number of NAO+ with ECMWF.

II.3. IMPACT : TEMPERATURE FORECASTS

II.3.a ECMWF

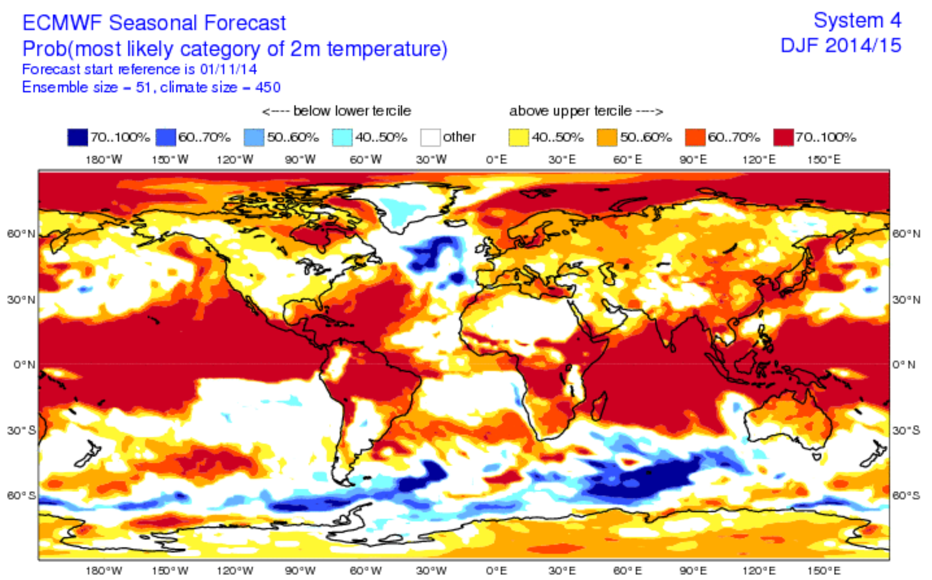


fig.II.3.1: Most likely category probability of T2m from ECMWF.

II.3.b Météo-France

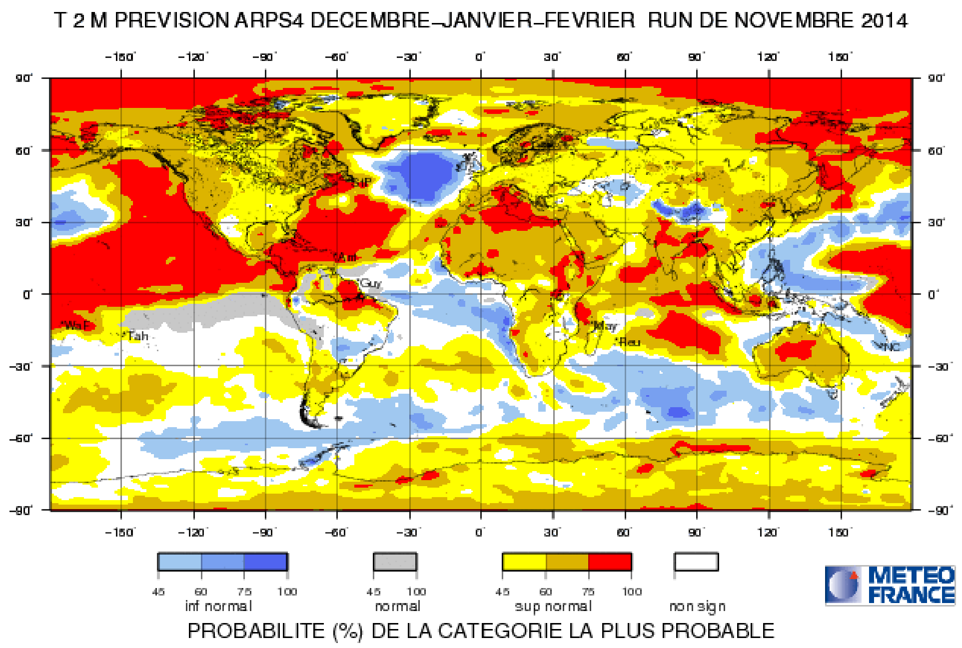


fig.II.3.2: Most likely category of T2m.

II.3.c Japan Meteorological Agency (JMA)

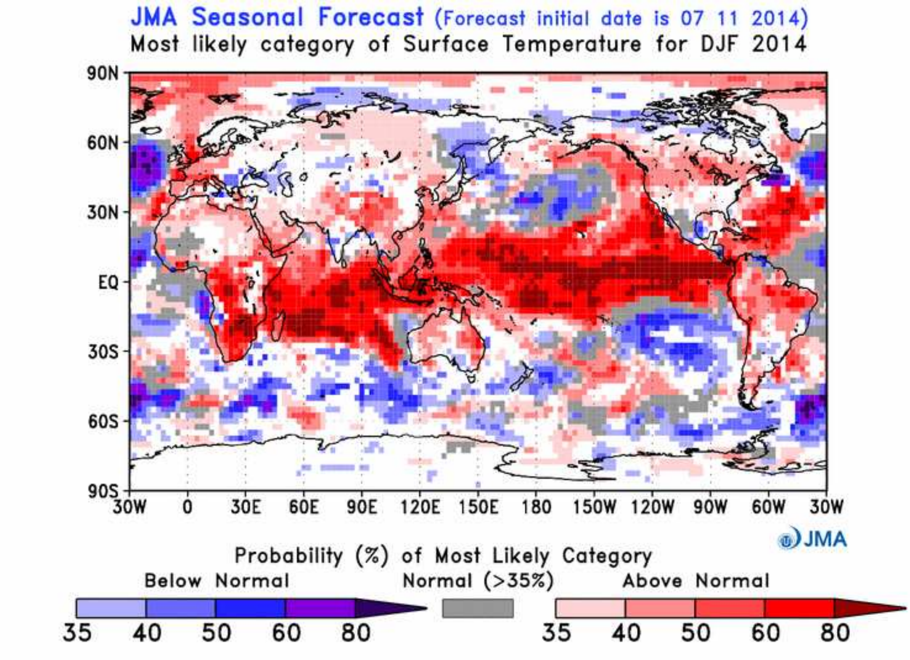


fig.II.3.5: Most likely category of T2m.

II.3.d Euro-SIP

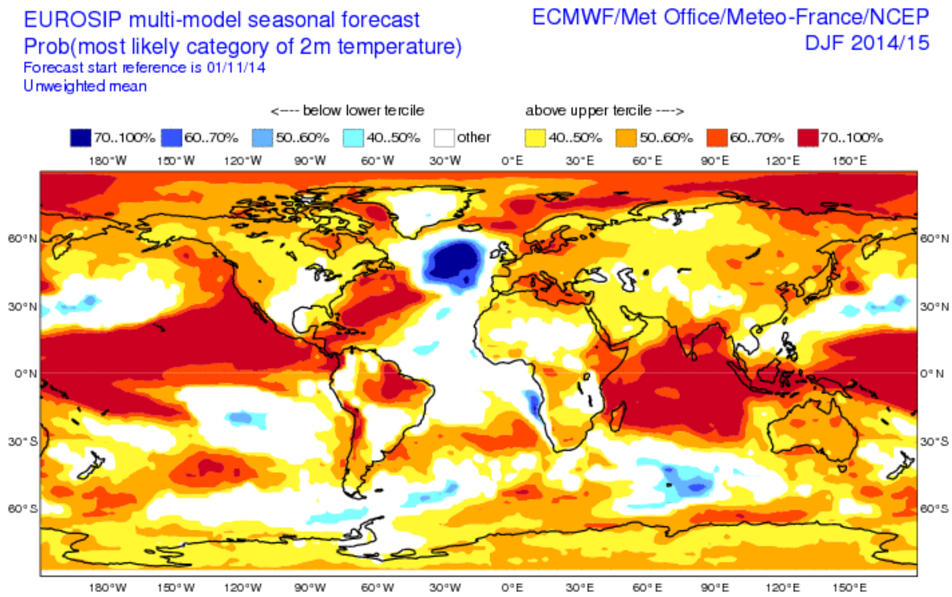


fig.II.3.7: Multi-Model Probabilistic forecasts for T2m from EuroSip

North-America : little enhanced probabilities for warm anomalies. Higher probabilities over the Western coast of USA.
Central-America : warmer than normal extending toward the North Caribbean
South-America : Some consistent signal over the North part of the continent : warmer than normal.
Australia : warmer than normal
Asia : Mostly Warmer than normal conditions everywhere. Warmer than normal conditions over most of the Indian sub-continent and South-East Asia.
Africa : Mostly warmer than normal over the North part of the continent
Europe : warmer than normal signal over most of the continent.

II.4.IMPACT : PRECIPITATION FORECAST

II.4.a ECMWF

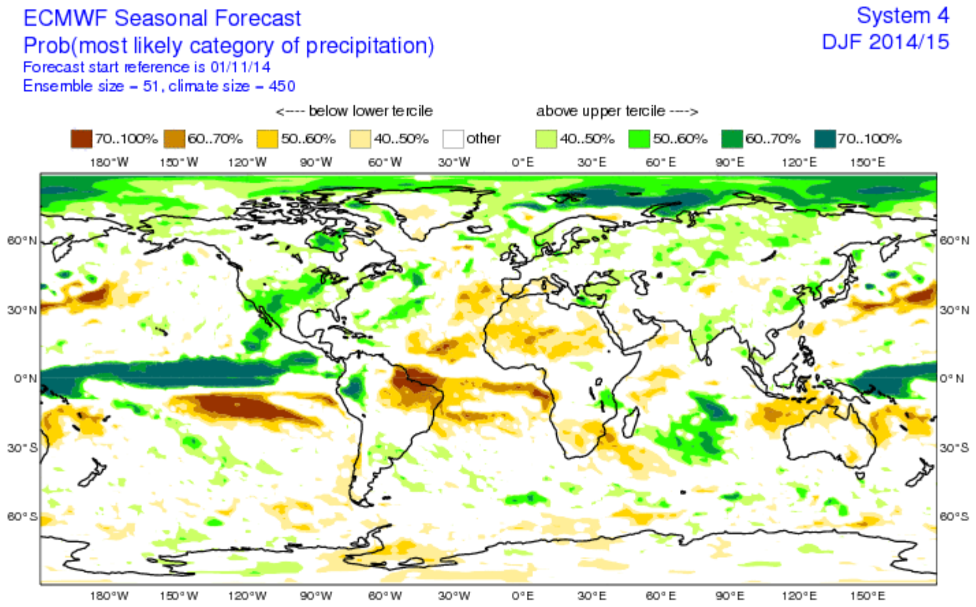


fig.II.4.1: Most likely category probability of rainfall from ECMWF.

II.4.b Météo-France

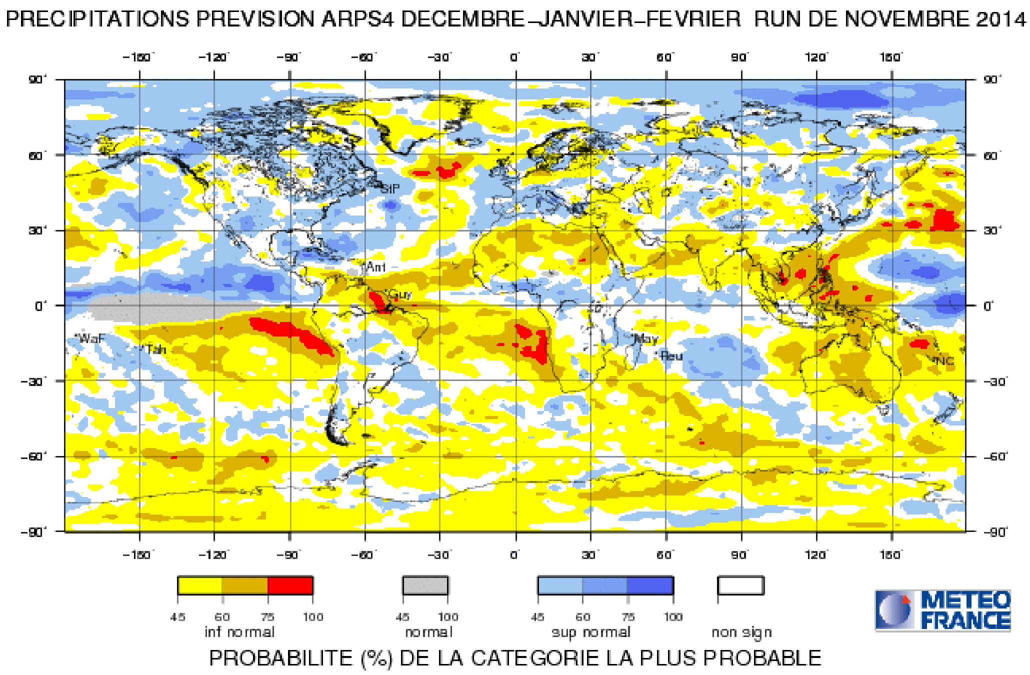


fig.II.4.2: Most likely category of Rainfall.

II.4.c Japan Meteorological Agency (JMA)

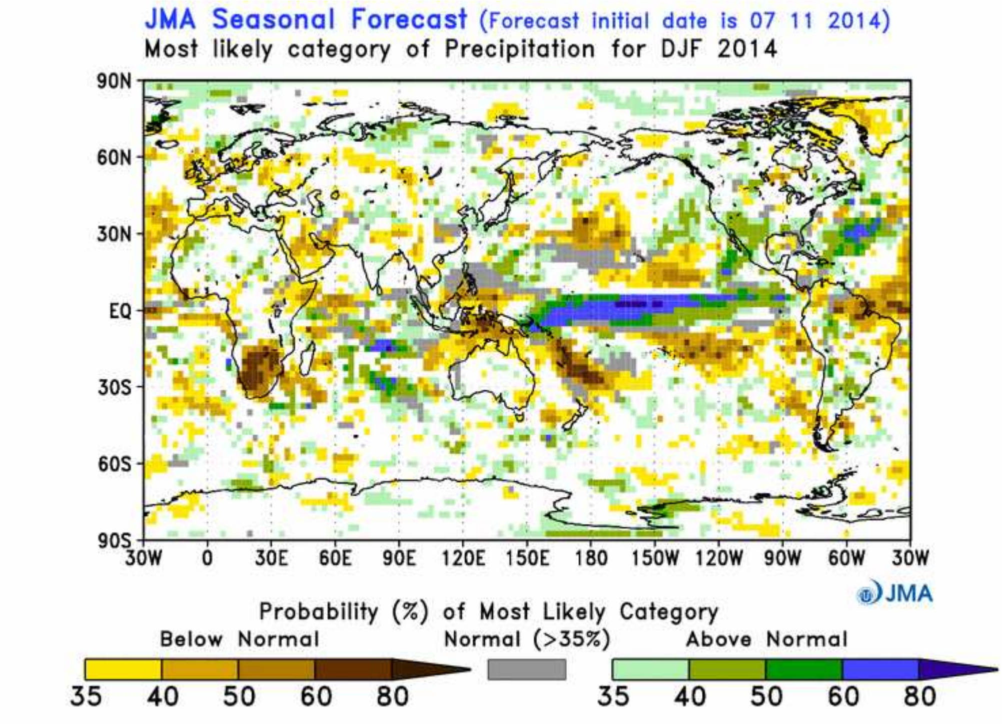


fig.II.4.5: Most likely category of Rainfall from JMA.

II.4.d Euro-SIP

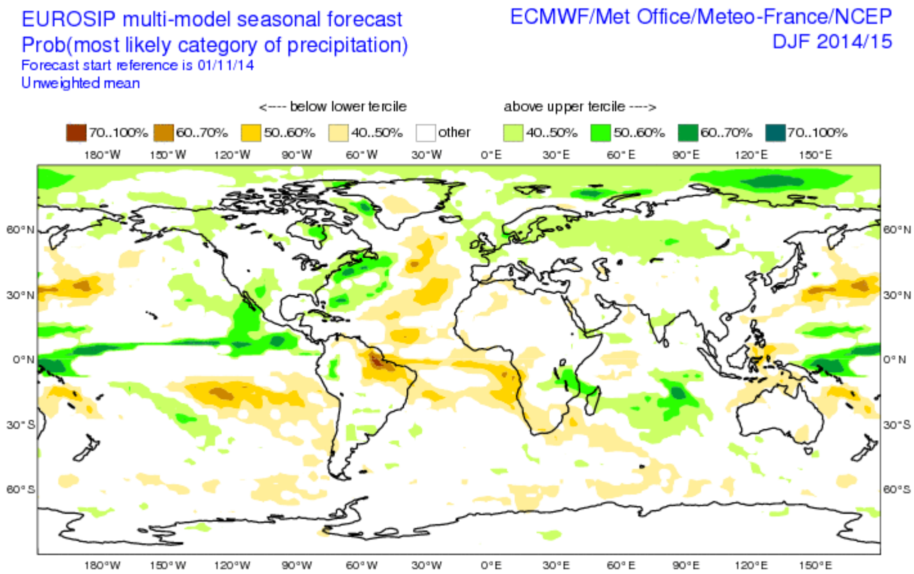


fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EuroSip

In the Tropics : some consistent signal over the Atlantic : enhanced probabilities for a dry scenario. Wet scenario across the Equatorial Pacific and over a large portion of South-America (South Brazil, Argentina, Bolivia) and Central America (Western part). Enhanced probabilities for dry scenario over the Northern coastal areas of South America. Uncertainty over the Maritime continent and Australia (likely dry, but no signal in Eurosip).

For Europe : no signal.

II.5. REGIONAL TEMPERATURES

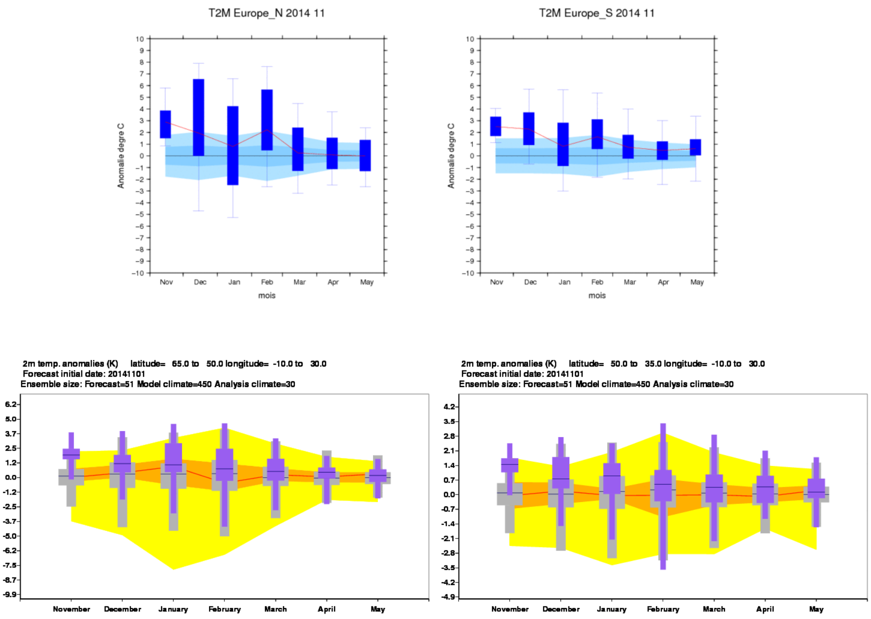


fig.II.5.1 : Climagrams for Temperaturel in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

Good consistency between the two models (see discussion on Geopotential Height).
For Northern Europe : warm signal.
For Southern Europe : warm signal.

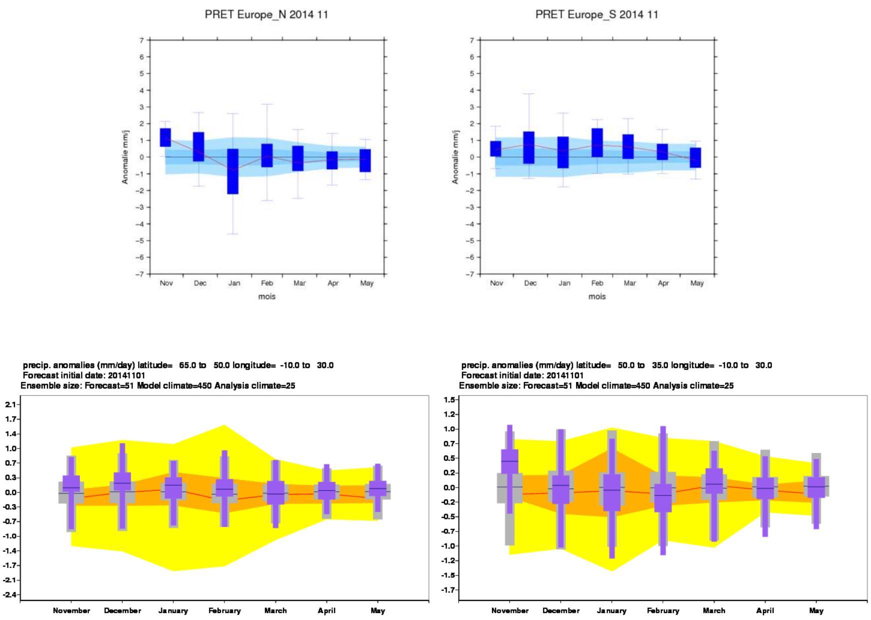


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

No consistency between models.

II.6. MODEL'S CONSISTENCY

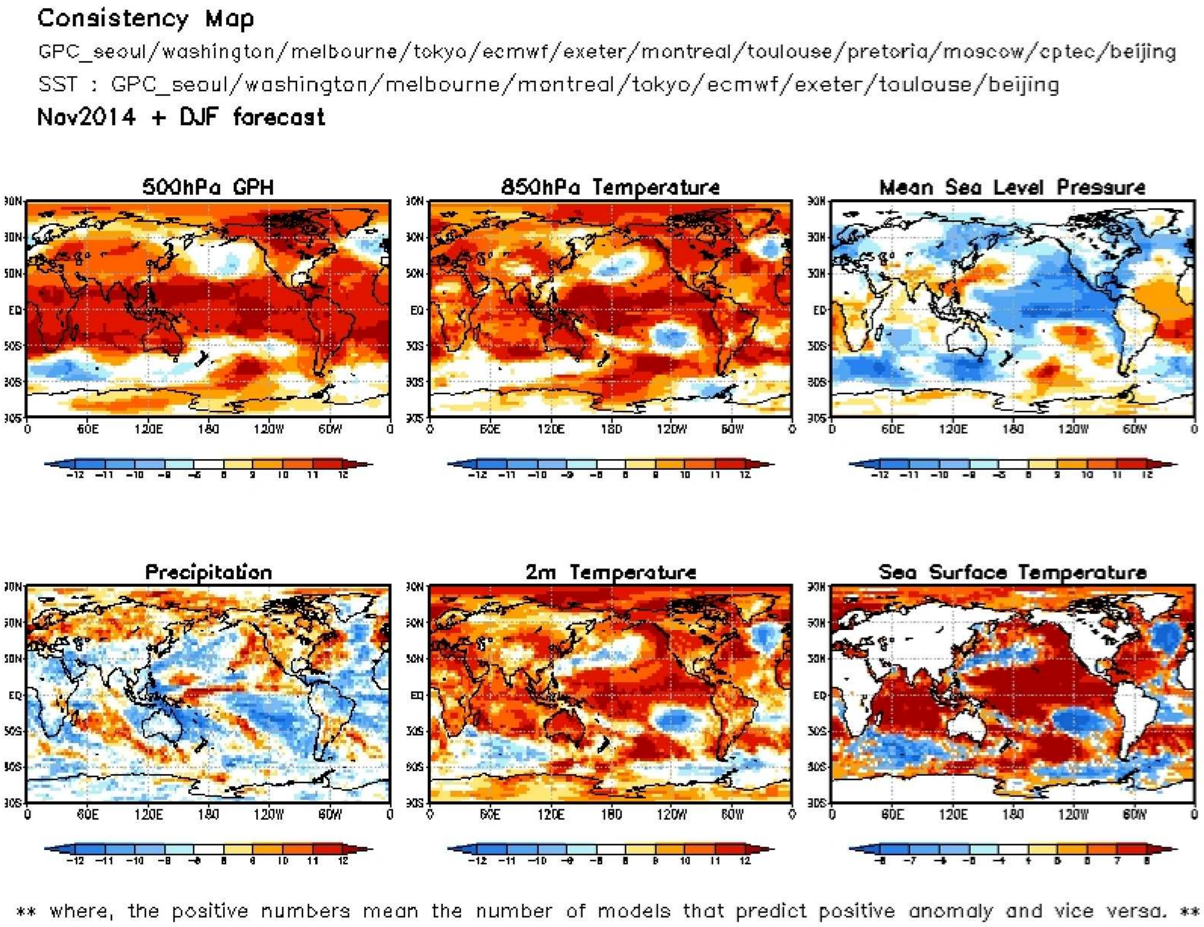


fig.II.6.1 : GPCs Consistency maps from LC-MME http://www.wmolc.org/

For SST : globally good consistency, even in mid-latitudes regions.
For Z500 : in the Northern Hemisphere, consistency for a East Atlantic mode pattern. Good consistency for positive anomaly over Central Europe and North America.
For T2m : globally good consistency, even in mid-latitudes regions.
For Precipitation : confirmation of the main EUROSIP signals. For Europe, enhanced probability of wet anomalies.

II.7. “EXTREME” SCENARIOS

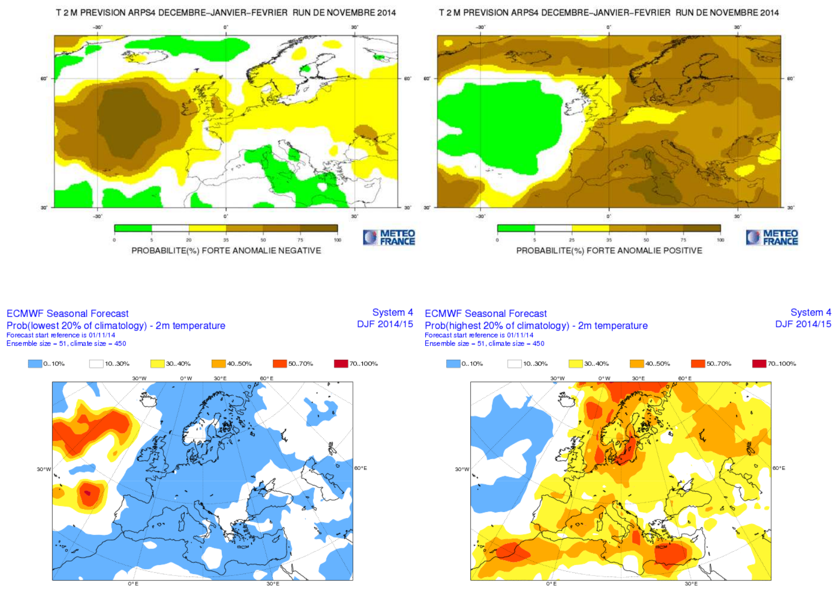


fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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

The 2 models agree to enhanced probability of "extreme" above normal conditions over Europe (especially MF).

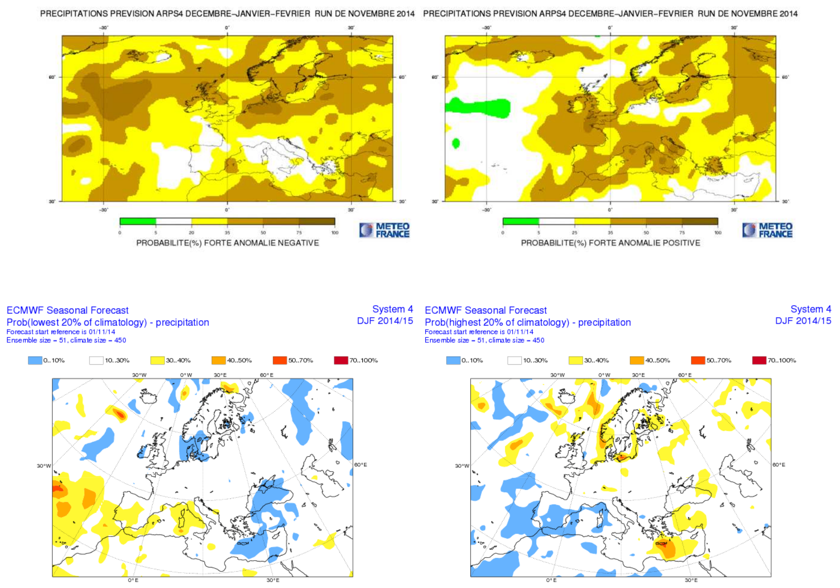


fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

No consistency.

II.8. DISCUSSION AND SUMMARY

II.8.a Forecast over Europe

Over the Northern hemisphere, some models show possible teleconnections from Tropics to mid-latitude in the Atlantic basin. Unfortunately they strongly differ in the mean circulation structure close to Europe. Even if the NAO+ scenario is privileged by a majority of models, this signal is to be taken with cautious.

Over Europe, the different scenarios lead to a warmer than normal situation (with probably a contribution of climate change) in all Europe. Concerning precipitation, the uncertainty is greater.

Obviously, some downscaled information could detail these scenarios for specific countries or subregions.

II.8.b Tropical cyclone activity

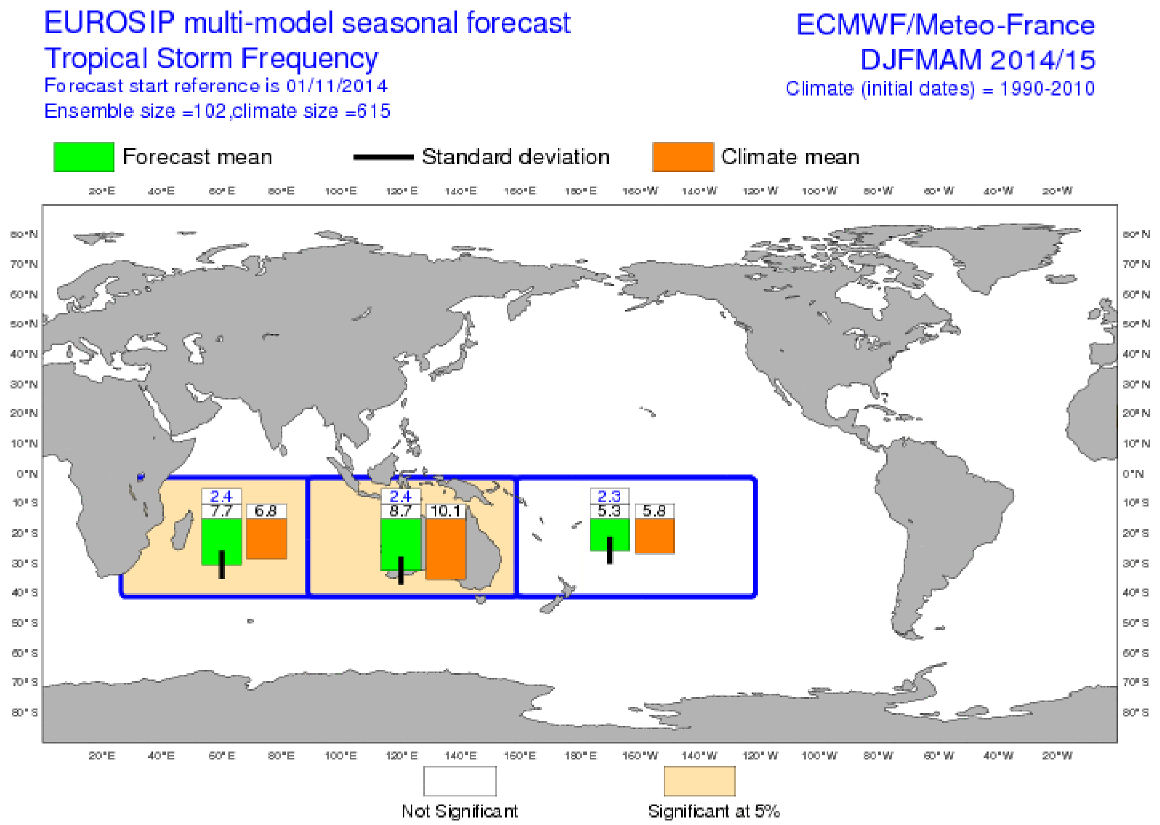


fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF). For the Tropical Cyclone season and in relationship with the SSTs scenarios, Euro-Sip forecasts indicate

For the Tropical Cyclone season and in relationship with the SSTs scenarios, Euro-Sip forecasts indicate below normal activity in Australian region and above normal activity in the Western Indian Ocean.

Synthesis of Temperature forecasts for December-January-February 2014-2015 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

Synthesis of Rainfall forecasts for December-January-February 2014-2015 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	No privileged scenario	RR Above normal (Wet)	No privileged scenario	No privileged scenario	RR Below normal (Dry)
ECMWF	No privileged scenario	RR Below normal (Dry)	No privileged scenario	No privileged scenario	RR Above normal (Wet)
JMA	No privileged scenario	No privileged scenario	No privileged scenario	No privileged scenario	No privileged scenario
synthesis	No privileged scenario	No privileged scenario	No privileged scenario	No privileged scenario	No privileged scenario
Eurosip	No privileged scenario	No privileged scenario	No privileged scenario	No privileged scenario	No privileged scenario
privileged scenario by RCC-LRF node	*no privileged scenario*	*no privileged scenario*	*no privileged scenario*	*no privileged scenario*	*no privileged scenario*

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

III. ANNEX

III.1. SEASONAL FORECASTS

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

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

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

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

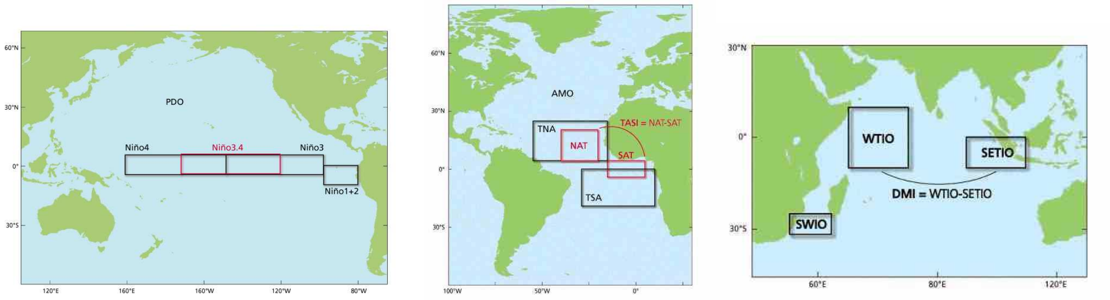
III.2. « NINO », SOI INDICES AND OCEANIC BOXES

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

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

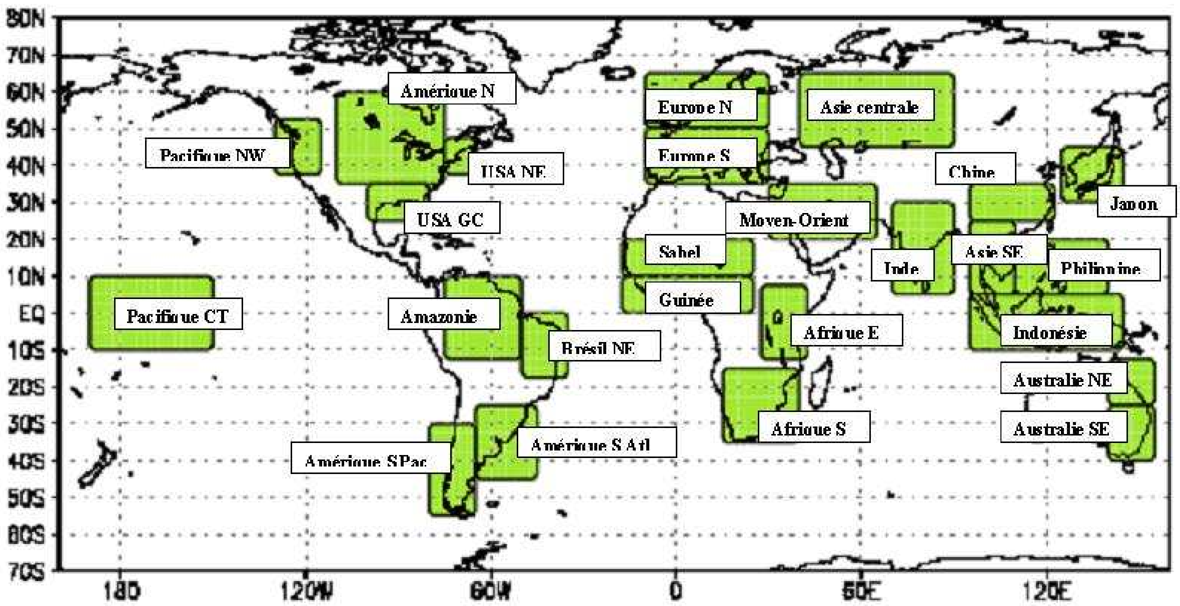
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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

Oceanic boxes used in this bulletin :



III.3.LAND BOXES

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



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).