WMO RA VI RCC Network

METEO FRANCE
Toujours un temps d'avance

GLOBAL CLIMATE BULLETIN
n°187 – January 2015

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I. DESCRIPTION OF THE CLIMATE SYSTEM (NOVEMBER 2014)

I.1.OCEANIC ANALYSIS

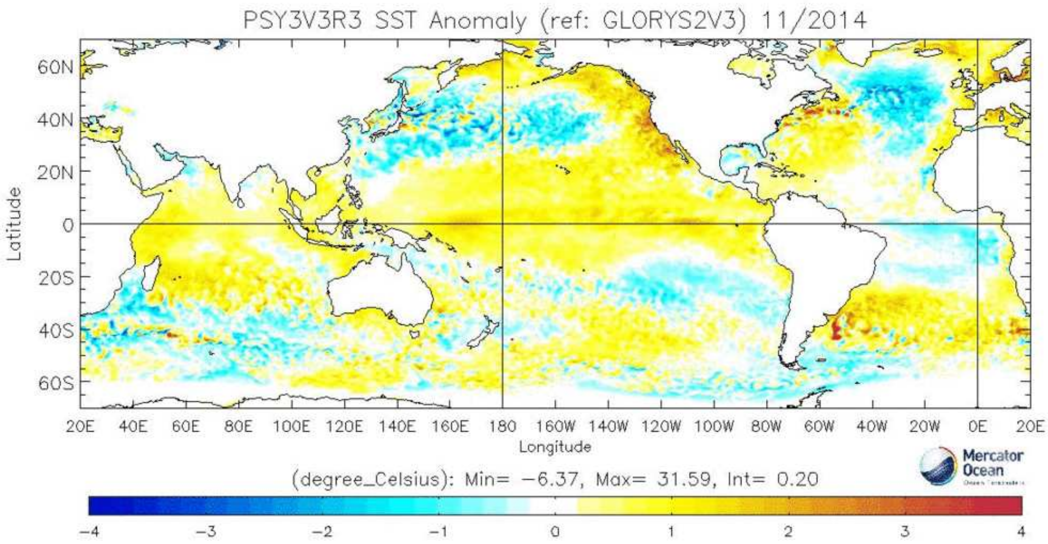
I.1.a Global analysis

<u>At the surface (fig. 1) :</u>

In the equatorial waveguide, slight warming in the Eastern and Central Pacific, in link with the circulation of a warm Kelvin wave in subsurface (fig. 2). In November the SST anomaly pattern in the equatorial Pacific still doesn't really look like an El Nino situation, with positive anomalies all along the equator. In the Indian Ocean no clear evolution, still warmer than normal. In the Atlantic Ocean a slight reinforcement of the cold anomaly.

In the tropics, some evolution. Still warmer than normal conditions in the Northern Pacific, but the anomaly is decreasing. In the Northern Atlantic, the warm anomaly is now limited to the Western part. In the Southern hemisphere, still warm anomalies from Australia to Madagascar, but weaker than last month.

In the sub-tropics and mid latitudes, persistent strong anomaly structures in the Northern Pacific (with an extension of the cold anomaly in the Southern part). We still have the same anomaly pattern in North Atlantic.



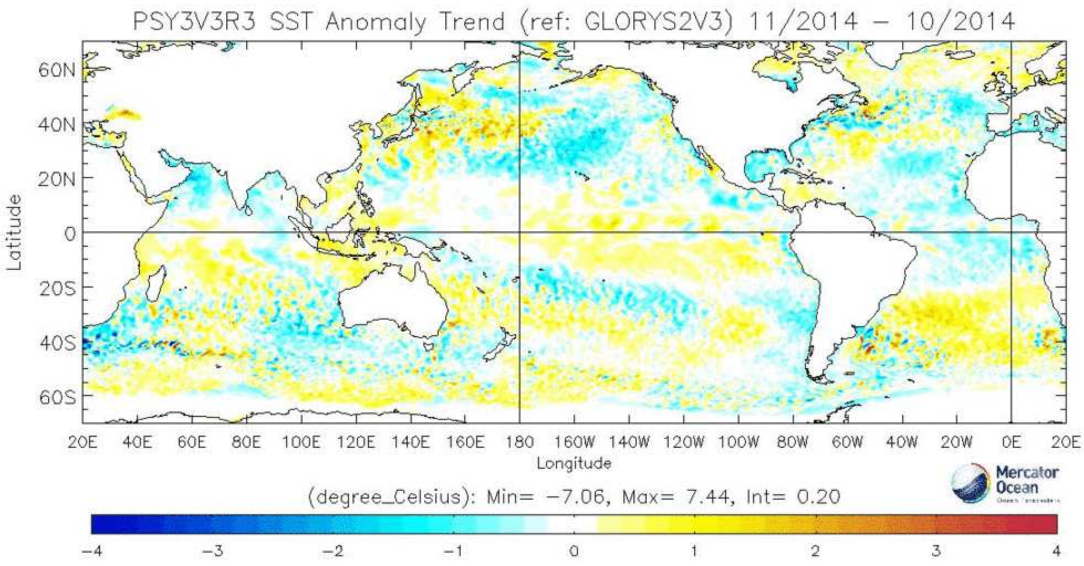


fig.I.1.1: top : SSTs Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

<u>In subsurface (fig. 2) :</u>

In the Pacific : in the equatorial band (10°N-10°S), strong positive heat content anomalies in Central Pacific along the Equator and neutral conditions in the very eastern part. Persistent negative anomalies in the Northern hemisphere between 10°N and 20°N).
In the Atlantic : cool conditions in the equatorial waveguide. In the Tropical North Atlantic, globally negative anomalies from West Africa to the Northern coast of South America (North Hemisphere). Positive anomalies in the Tropical South Atlantic (globally, except close to the Angola's coast).
In the Indian Ocean : globally warmer than normal in the equatorial waveguide. Complex anomaly field in Southern hemisphere.

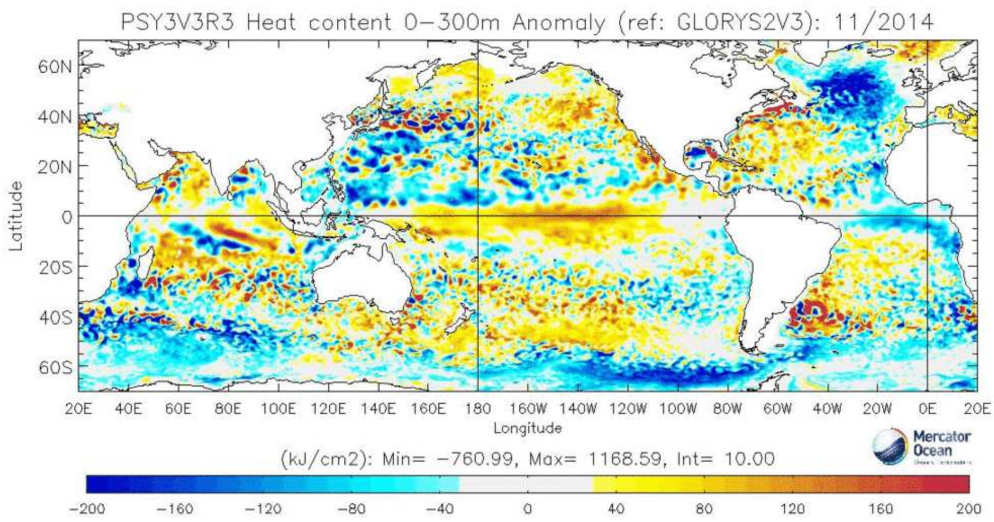


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2009) http://bcg.mercator-ocean.fr/

I.1.b Pacific Basin

Most of the Northern Hemisphere shows a positive SST anomaly; a negative one is visible in the western part of the Northern basin.
SST anomaly field still 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 (-0.9, http://www.cpc.ncep.noaa.gov/data/indices/soi) is consistent with the development of an El Niño.
In the Niño boxes (4, 3.4, 3 et 1+2 ; see definition in Annex) the monthly averages are respectively 0.9°C, 0.8°C, 0.9°C to 0.7°C from West to East

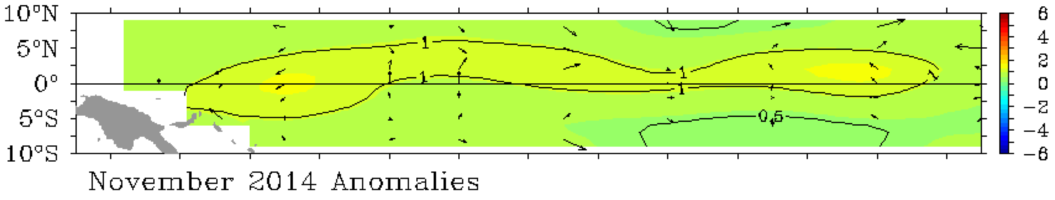


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON.
http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html

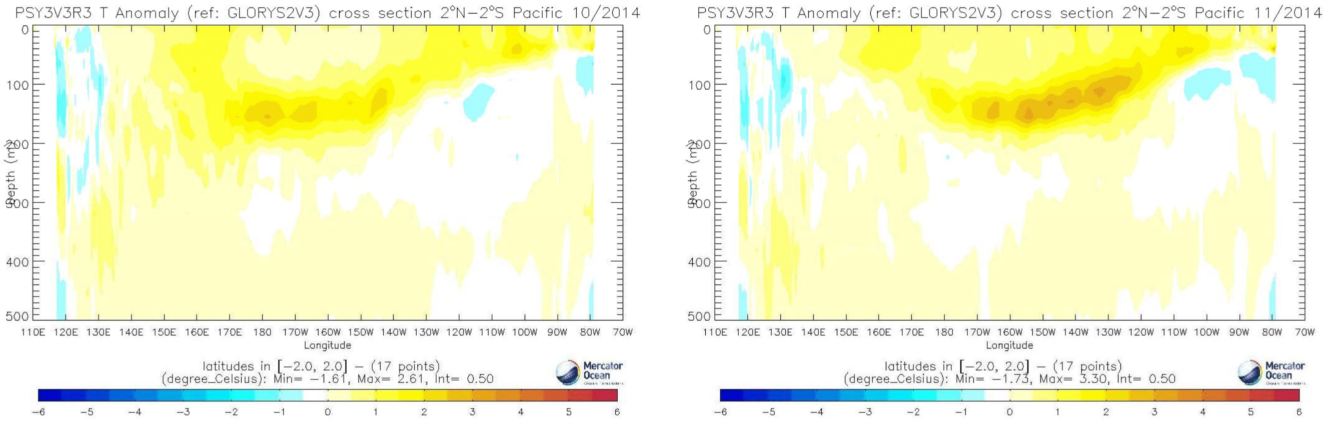


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), http://bcg.mercator-ocean.fr

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

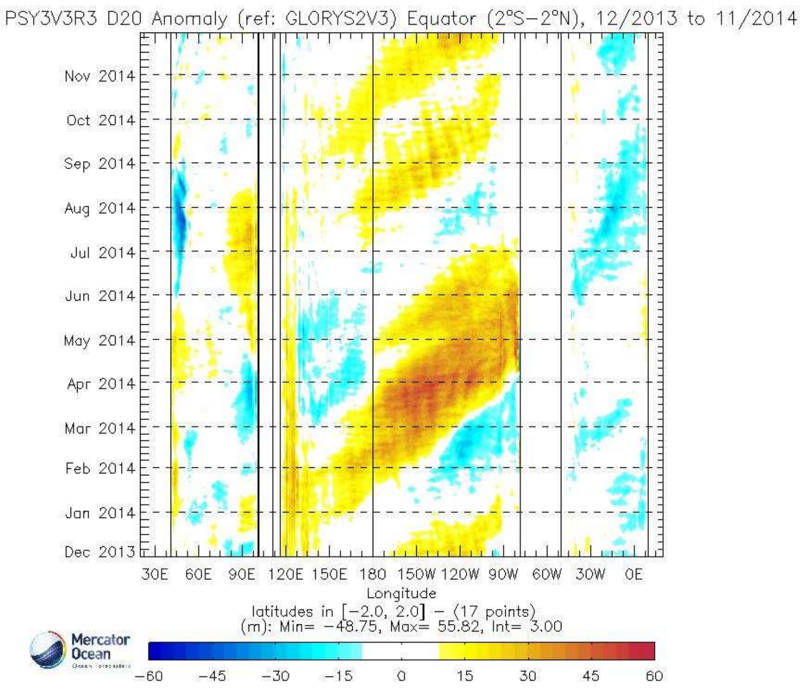


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period http://bcg.mercator-ocean.fr/

I.1.c Atlantic Basin

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

Sea surface temperature near Europe :

Still warmer than normal SST in the northern latitudes (north auf Iceland) and on all water surfaces near the European coasts, except the Aegean Sea and some parts of eastern Europe (coasts of northern Russia, parts of the Black Sea), which were colder due to some cold atmospheric outbreaks over eastern Europe advancing quite far to the south. Though, anomalies on the western Mediterranean and the Biscay were not as high as in October, as the cold anomaly over the central North Atlantic extended to the east.

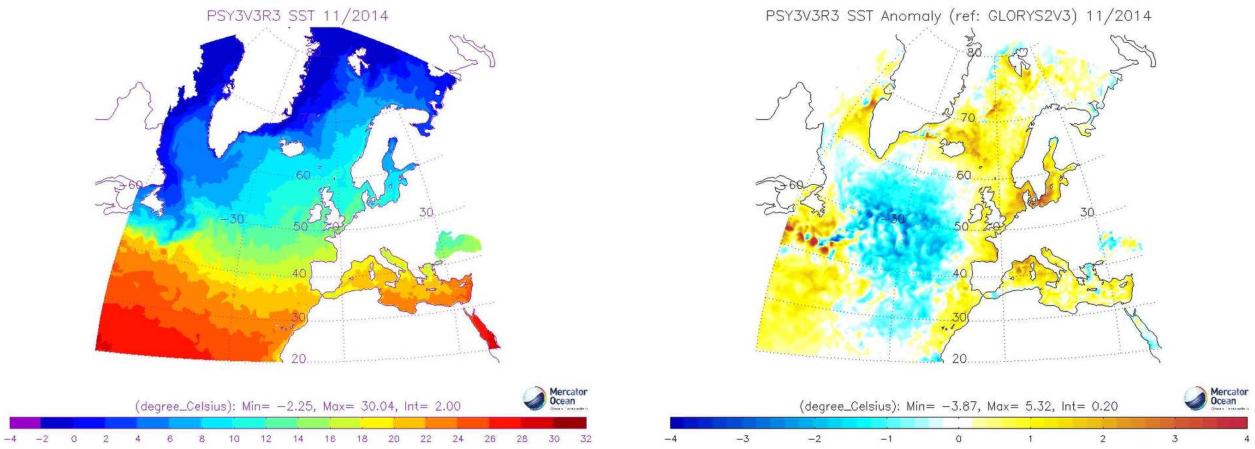


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

I.1.d Indian Basin

Southern Tropical Indian Ocean : warmer than normal conditions over most of the basin.
Equatorial waveguide : a positive anomaly all along the equator, the DMI is neutral.
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. The MJO became active in the second half of November in sector 3 and 4.

On the Pacific : weak anomalies in the Pacific. This is almost consistent with the SST anomaly pattern, which doesn't show any significant gradient along the equator. We notice the same very weak upward motion anomalies than in October, in the Western part (West to the dateline) and in the Eastern part close to Central America. This pattern almost corresponds to a Niño response.
On the Atlantic : like in September an October, there is a large convergent circulation anomaly (downward motion anomaly) in the tropics, in the Northern hemisphere. The Western part is probably linked to the divergent circulation anomaly in the Eastern Pacific. The North-Eastern part is likely more linked to the negative SST anomaly. And the equatorial part is a typical Niño impact.
On the Indian Ocean : relatively strong et vast upward motion anomaly, clearly related to MJO .

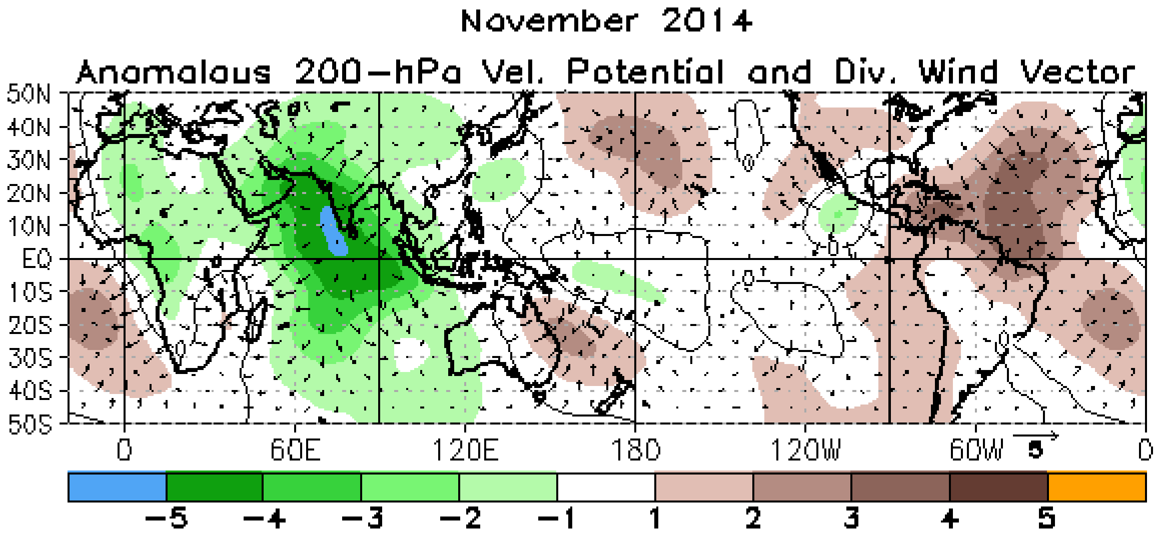


fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

Stream Function anomalies in the high troposphere (fig. 1.2.2 – insight into teleconnection patterns tropically forced) :
Very weak anomalies in the tropics. No evident trace of teleconnexion from tropics to mid-latitudes.

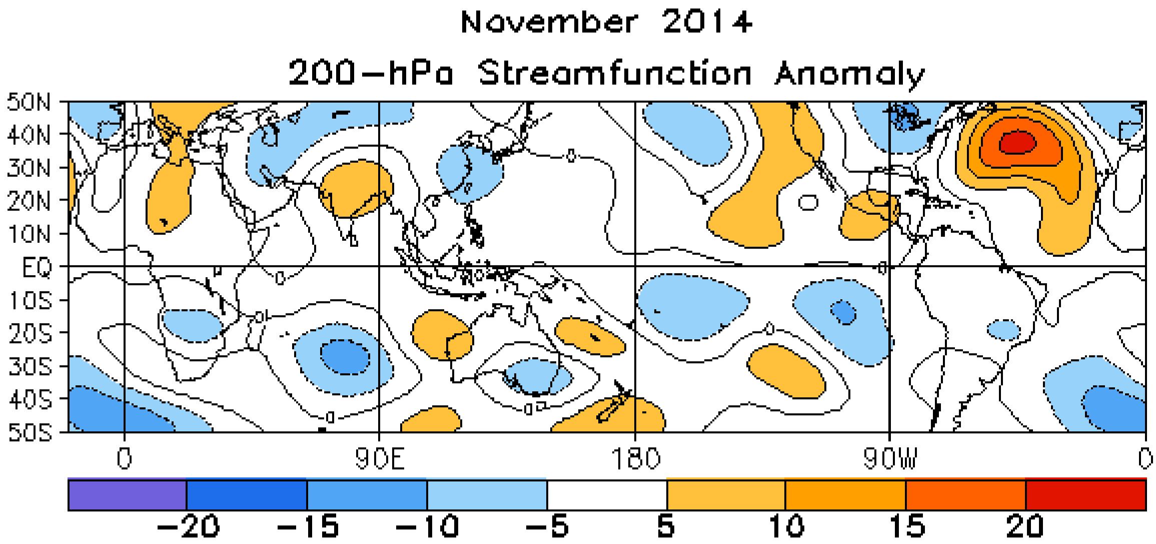


fig.I.2.2: Stream Function Anomalies at 200 hPa.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

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. Anomalies are globally strong in the Northern hemisphere, with clear traces of blocking periods in the Alaska region and over Scandinavia.

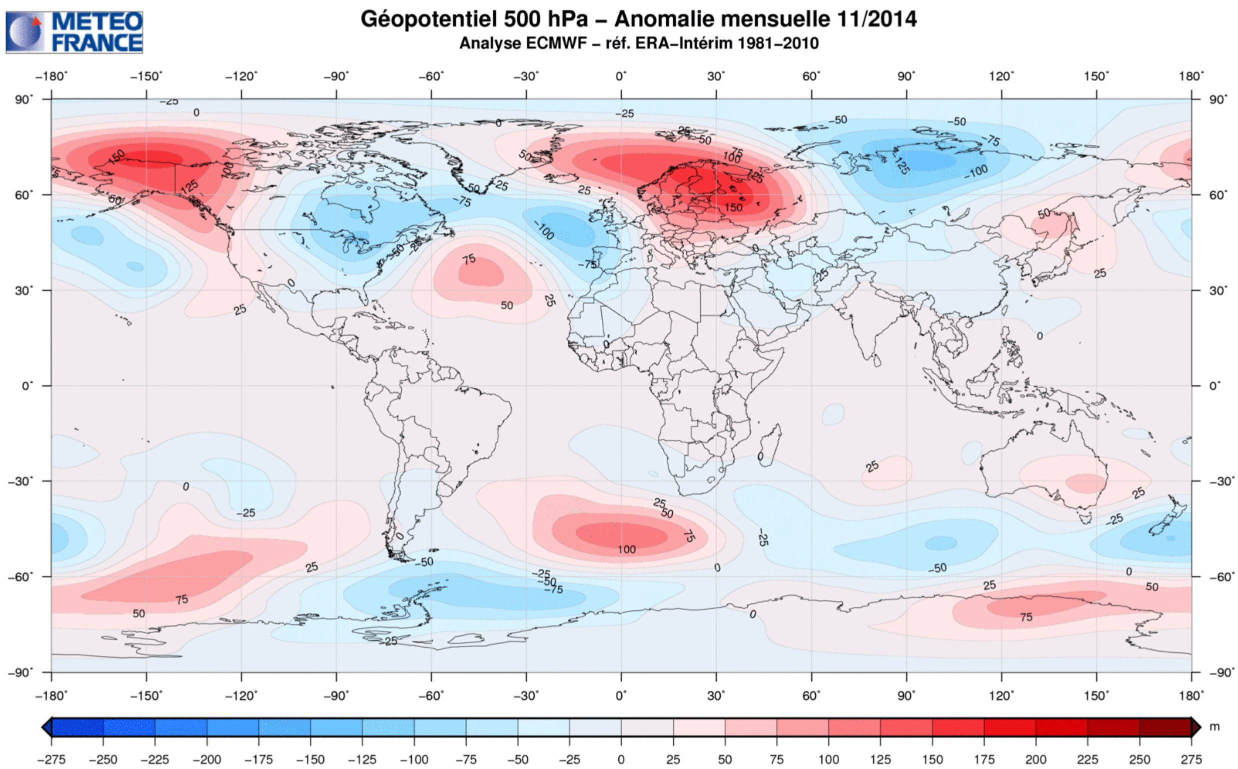


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
NOV 14	**0.6**	**0.4**	**0.1**	**3.2**	**0.6**	**---**	**1.3**	**1.8**	**1.8**
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

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 Icelandic Low was deeper than normal and also the Azores High slightly stronger resulting in a stronger than normal westerly flow over the North Atlantic and slightly positive phases of NAO and EA. On the other hand, a very pronounced meridional constellation occurred over Europe. Low pressure disturbances extended far to southwestern Europe, inducing intense lows particularly over the western Mediterranean and a flow of warm subtropical air from south to north, whereas a huge and more intense than normal blocking high established over western parts of eastern Europe. Both, the low pressure over southwestern Europe and the blocking high anomaly extending also over Scandinavia are very consistent with a positive SCAND pattern phase, which was one of the dominating patterns for Europe (SCAND index +1.8). POLEUR pattern index has the same high value, indicating a strong polar vortex at the same time.

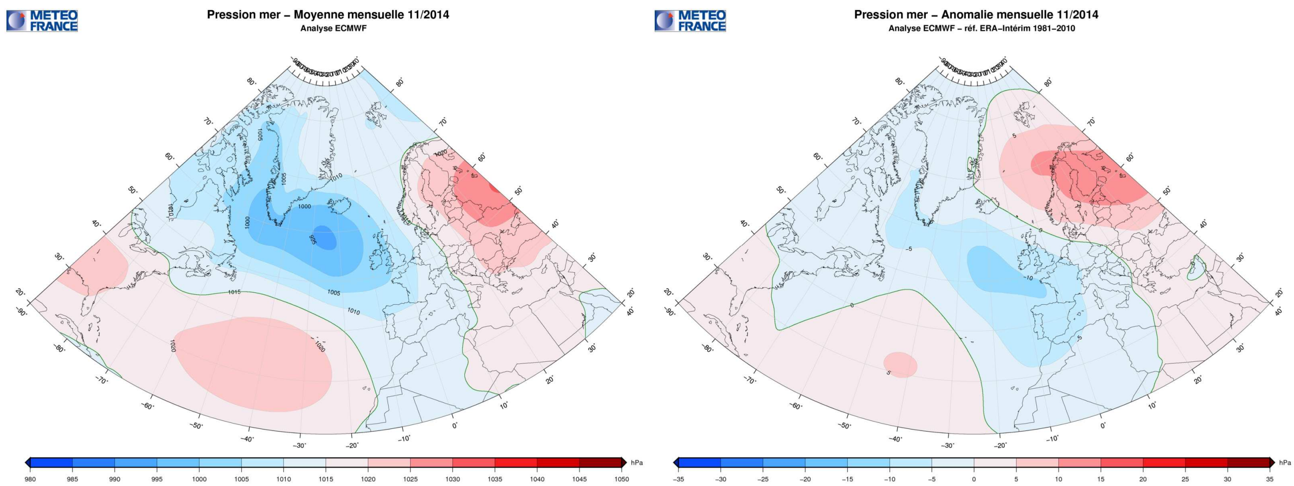


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (left) and 1981-2010 anomalies (right).

Circulation indices: NAO and AO

NAO did not show large fluctuations in most of November except at the end of the month, when a clear tendency to a positive mode began. This resulted in a slightly positive NAO index of +0.6 on monthly average.
AO had a short negative phase around the middle of November, which was only a weak fluctuation in NAO. Likely, significant contributions to the negative AO phase came from other parts of the northern hemisphere, since geopotential anomalies were generally strong over the whole hemisphere. Monthly average of November AO was -0.5, much weaker than in October.

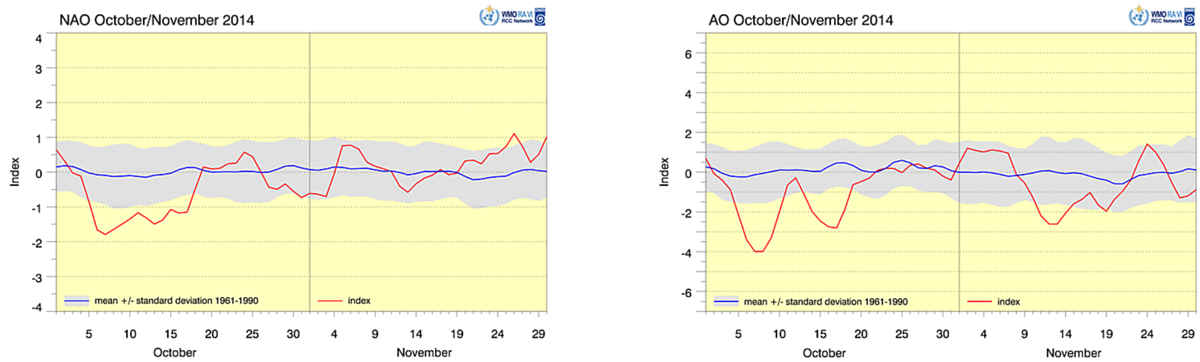


fig.I.2.5: North Atlantic Oscillation (NAO, upper graph) and Arctic Oscillation (AO, lower graph) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

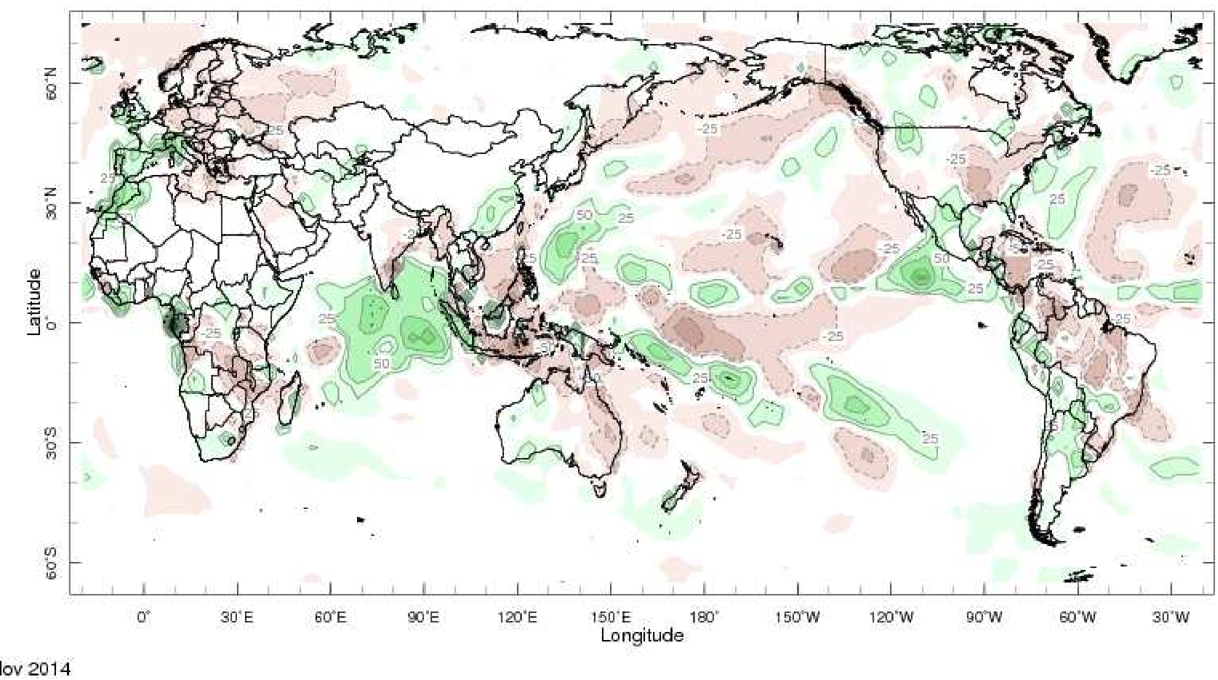


fig.I.2.4: Rainfall Anomalies (mm) (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

Intertropical zones (including sub-tropics) : patchy anomaly map over inter-tropical Pacific, consistent with velocity potential field. Over the Indian Ocean good consistency with the Velocity Potential anomalies, with strong positive anomaly along the equatorial. In contrast, drier than normal conditions over the maritime continent. Drier than normal condition over the Caribbean region up to Brazil, incontrast with South-Western art of the continent.

Mid-latitudes : we notice a strong East-West contrast over Europe.

Precipitation anomalies in Europe:

Much higher-than-normal precipitation over western/south-western Europe and the western Mediterranean, particularly heavy precipitation over southern France / northern Italy with severe flooding. In contrast, much drier than normal over most of eastern, central and northern Europe. These anomalies reflect very well the mean pressure distributions over Europe related to the positive SCAND phase.

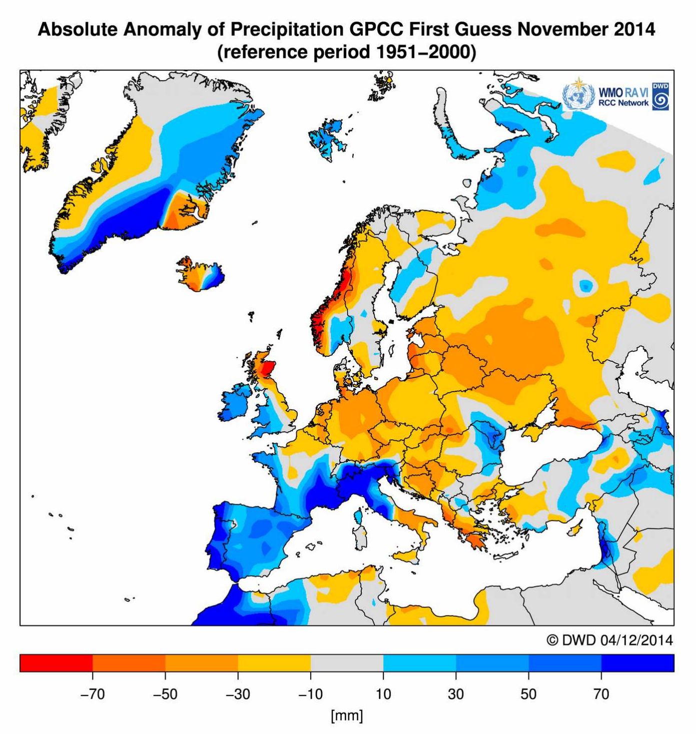


fig.I.2.5: Left: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm. Right: Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

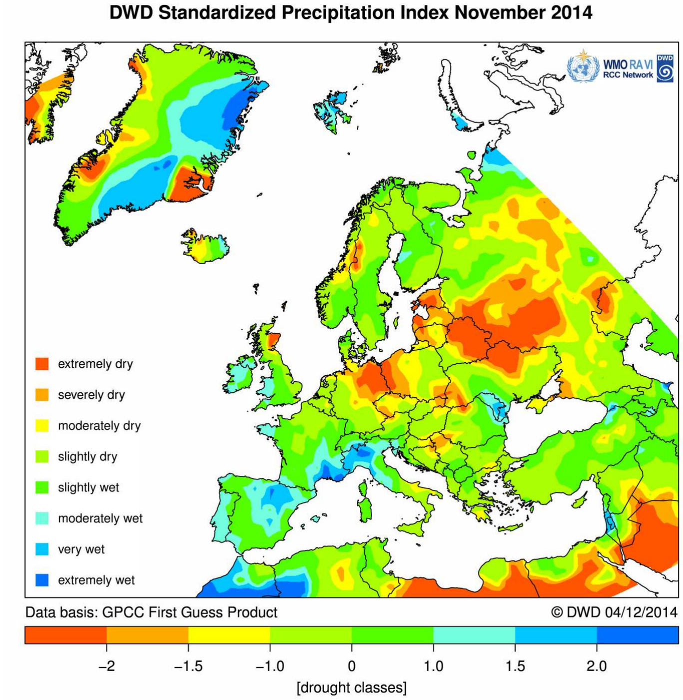


fig. I.2.5a: Standardized Precipitation Index with DWD modification (DWD-SPI), http://www.dwd.de/rcc-cm .

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	Relative of 1951-2000 normal	SPI DWD Drought Index
Northern Europe	-19.1 mm	70.6 %	-0.631
Southern Europe	+14.5 mm	114.7 %	+0.181

I.2.c Temperature

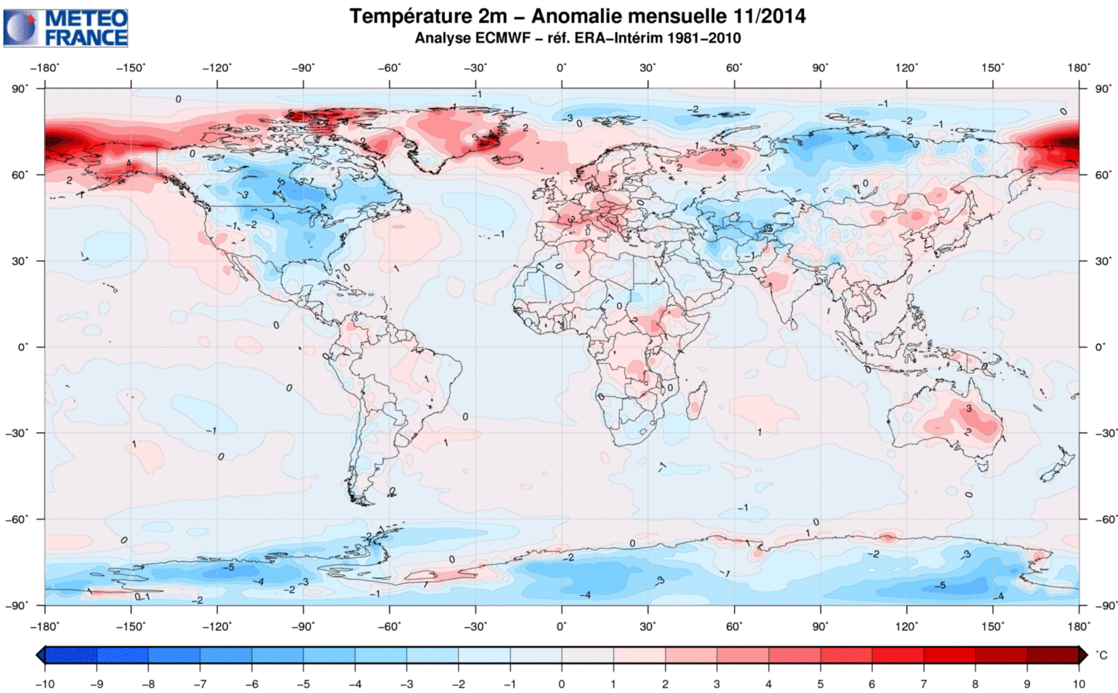


fig.I.2.6: Temperature Anomalies (°C) (Meteo-France)

Consistent with the geopotential anomaly field, strong anomalies in temperature. Globally positive anomaly over Europe and vast negative anomaly over Russia.. Strong contrast over North America, result of the blocking period.

Temperature anomalies in Europe:

Large positive anomalies over most of Europe reflecting the strong subtropical airflow reaching far to the north, consistent to the geopotential anomalies. Negative anomalies especially in southern parts of eastern Europe; east of the European high pressure zone, cold air moved quite far to the south.

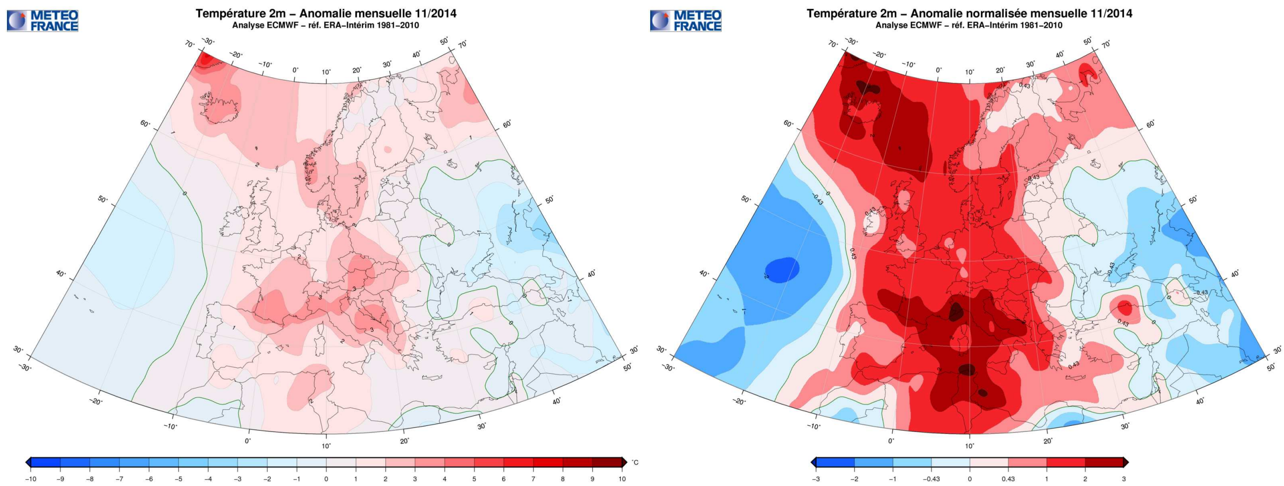


fig.I.2.7: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

I.2.d Sea ice

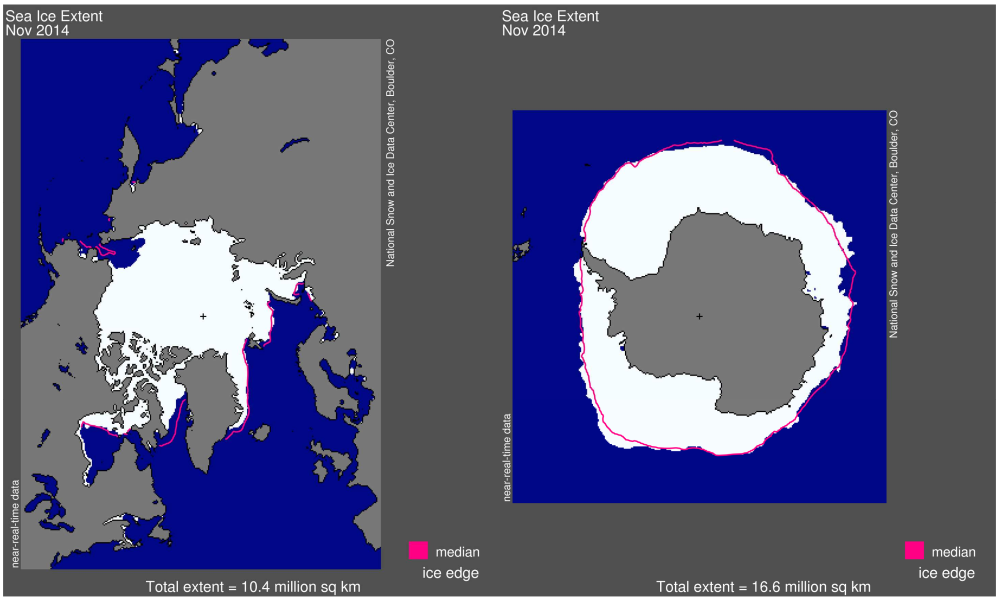


fig.I.2.6: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

In Arctic (fig. 1.2.6 and 1.2.7 - left) : below normal sea-ice, mainly link to the deficit on the Pacific side.
In Antarctic (fig. 1.2.6 and 1.2.7 - right) : close to normal sea-ice extension.

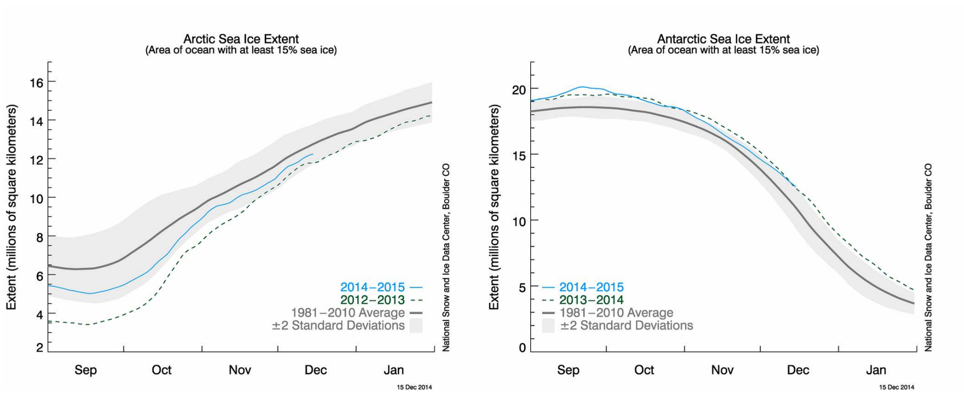


fig. I.2.7 : Sea-Ice extension evolution from NSIDC.
http://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png

II. SEASONAL FORECASTS FOR JFM FROM DYNAMICAL MODELS

II.1.OCEANIC FORECASTS

II.1.a Sea surface temperature (SST)

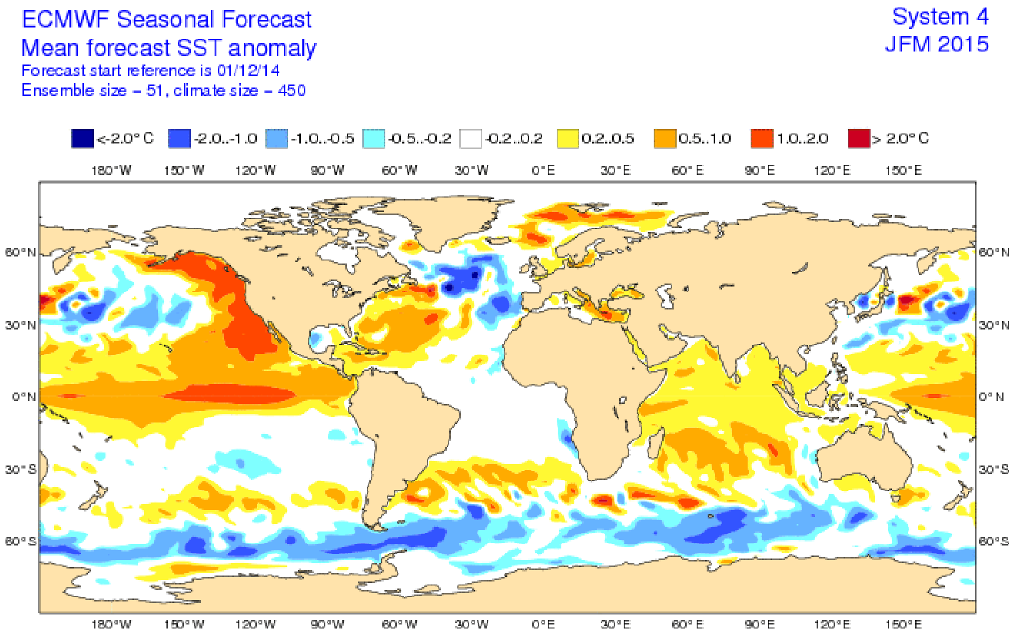


fig.II.1.1: SST anomaly forecast from ECMWF
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

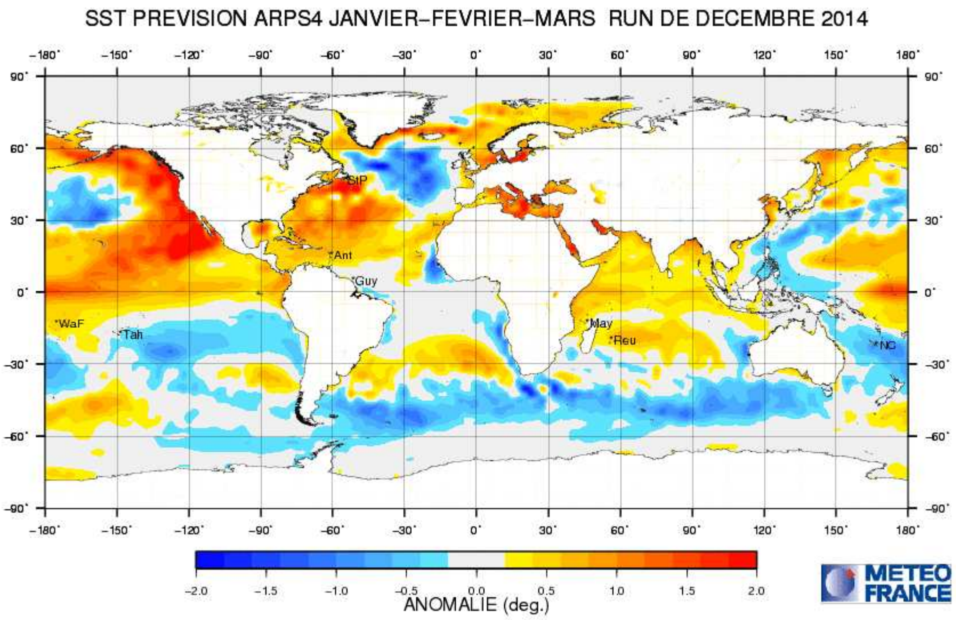


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).
http://elaboration.seasonal.meteo.fr

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 (some differences between MF and ECMWF on the position of the maximum). The positive anomaly extends beyond the dateline in both models. Negative anomalies in the Western Tropics in MF (probably linked to hindcast issues). Strong positive anomalies over the Eastern North Pacific (American coasts) and negative in the North Western and Central Pacific in both models (positive PDO pattern).

Atlantic : neutral conditions in the equatorial waveguide. Positive anomalies in the North-Western tropics in both models, less consistency in the North-Eastern part. 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 should be close to zero.

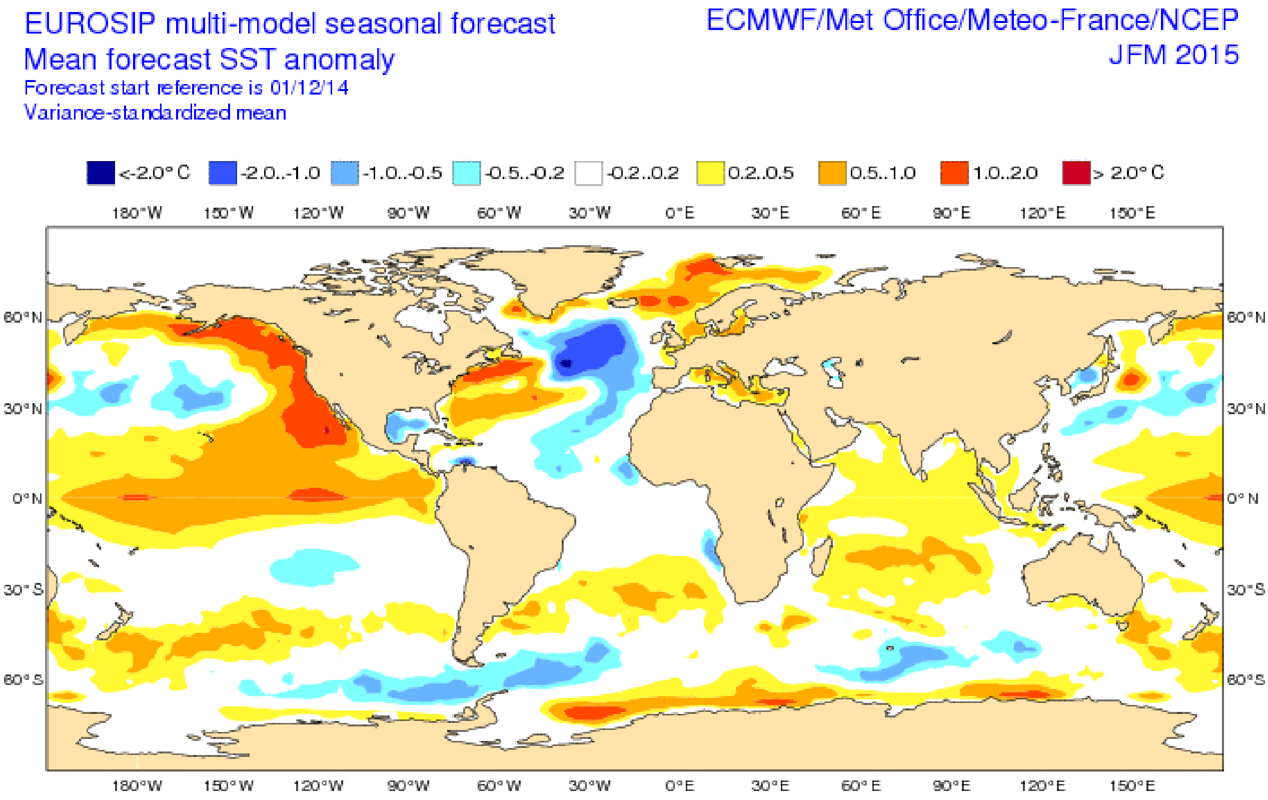


fig.II.1.3: SST Forecasted anomaly from Euro-SIP

In Euro-SIP :
The same comments than for the individual models. Concerning the El Nino development, EUROSIP shows a intermediate solution, with to maximum of positive anomaly.

II.1.b ENSO forecast :

Forecasted phase: weak El Niño phase for JFM

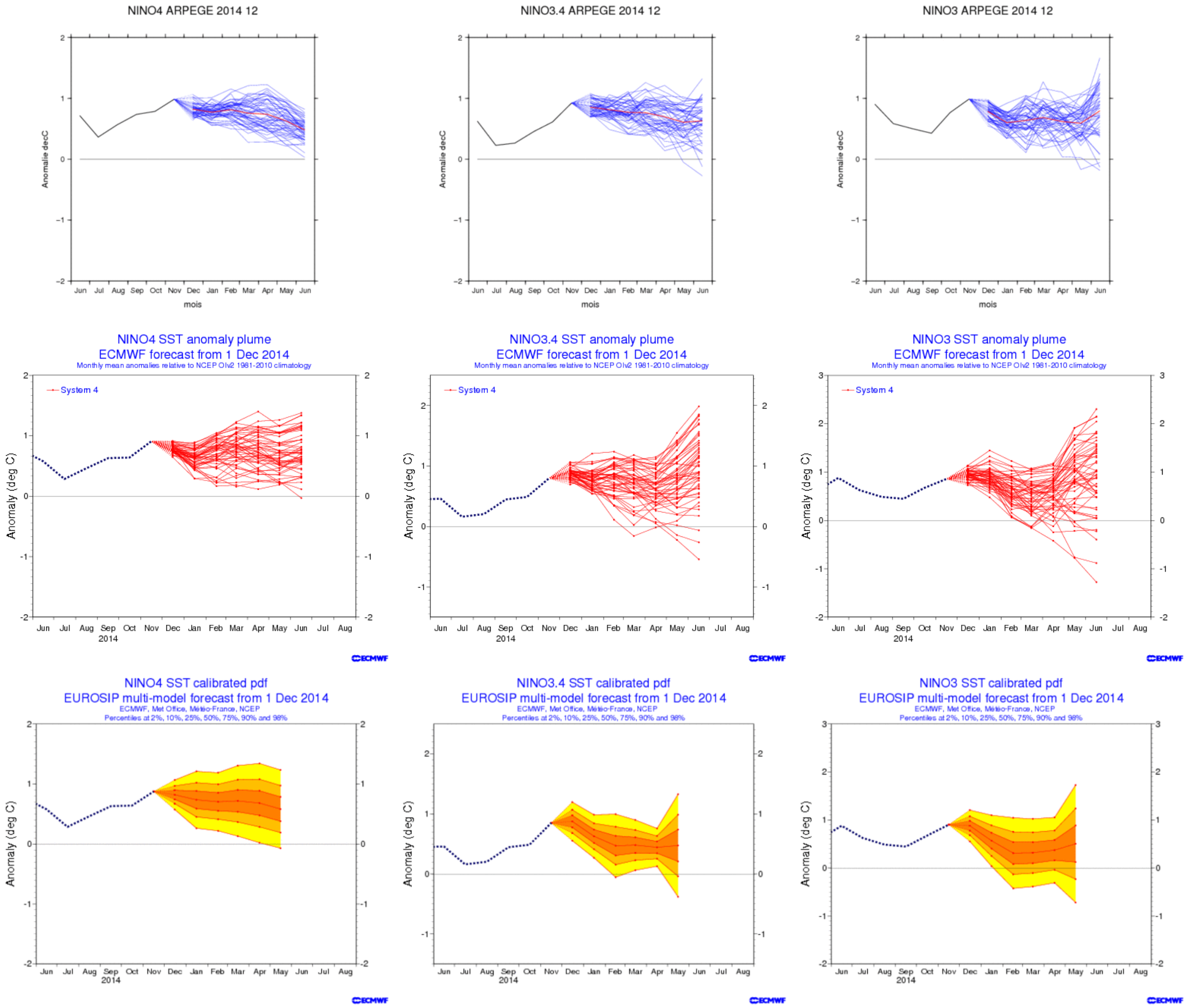


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions – (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

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 probability to exceed +1°C during the next season is very weak.

II.1.c Atlantic Ocean forecast

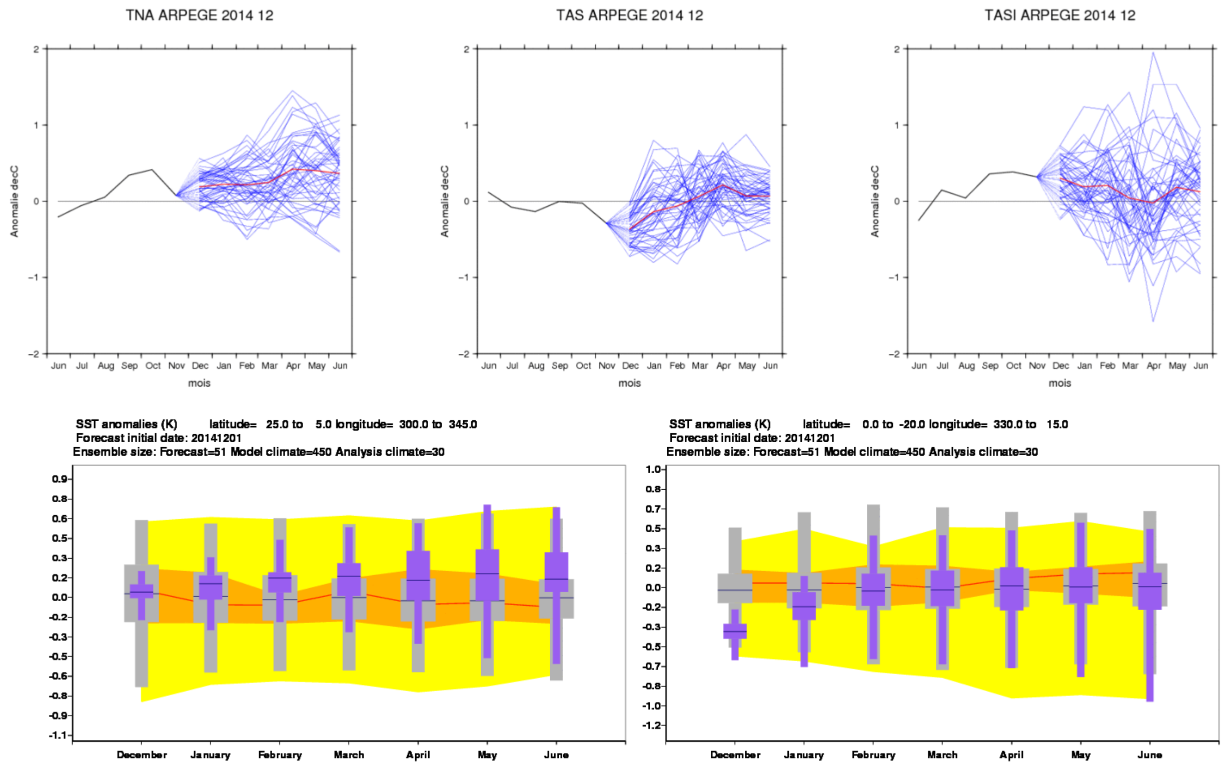


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

Good consistency between the 2 models.
North Tropical Atlantic : positive
South Tropical Atlantic : negative, but with a positive trend.
TASI : positive
Guinean Gulf : close to 0.

II.1.d Indian ocean forecasts

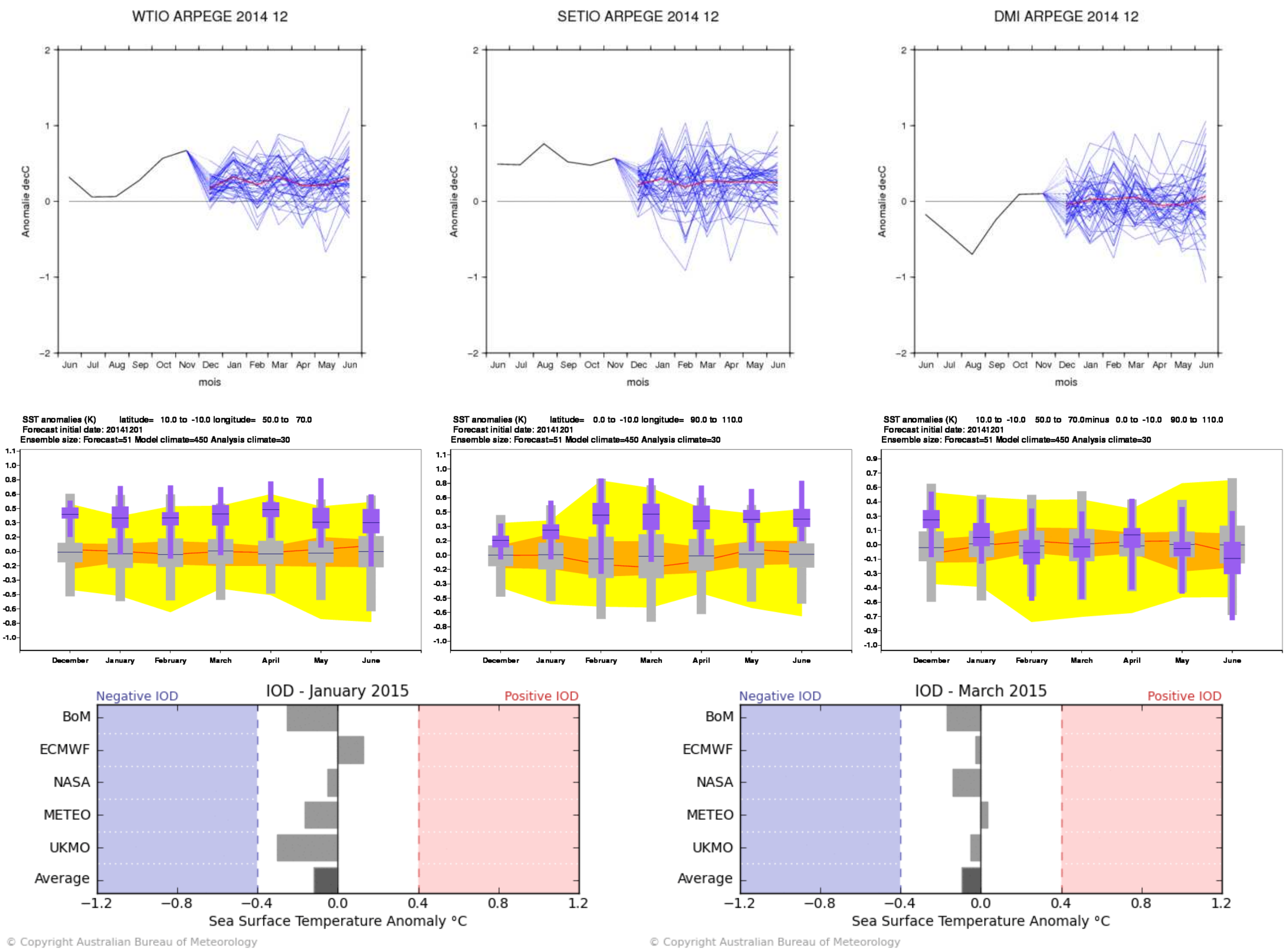


fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

DMI (IOD) : close to neutral

II.2.GENERAL CIRCULATION FORECAST

II.2.a Global forecast

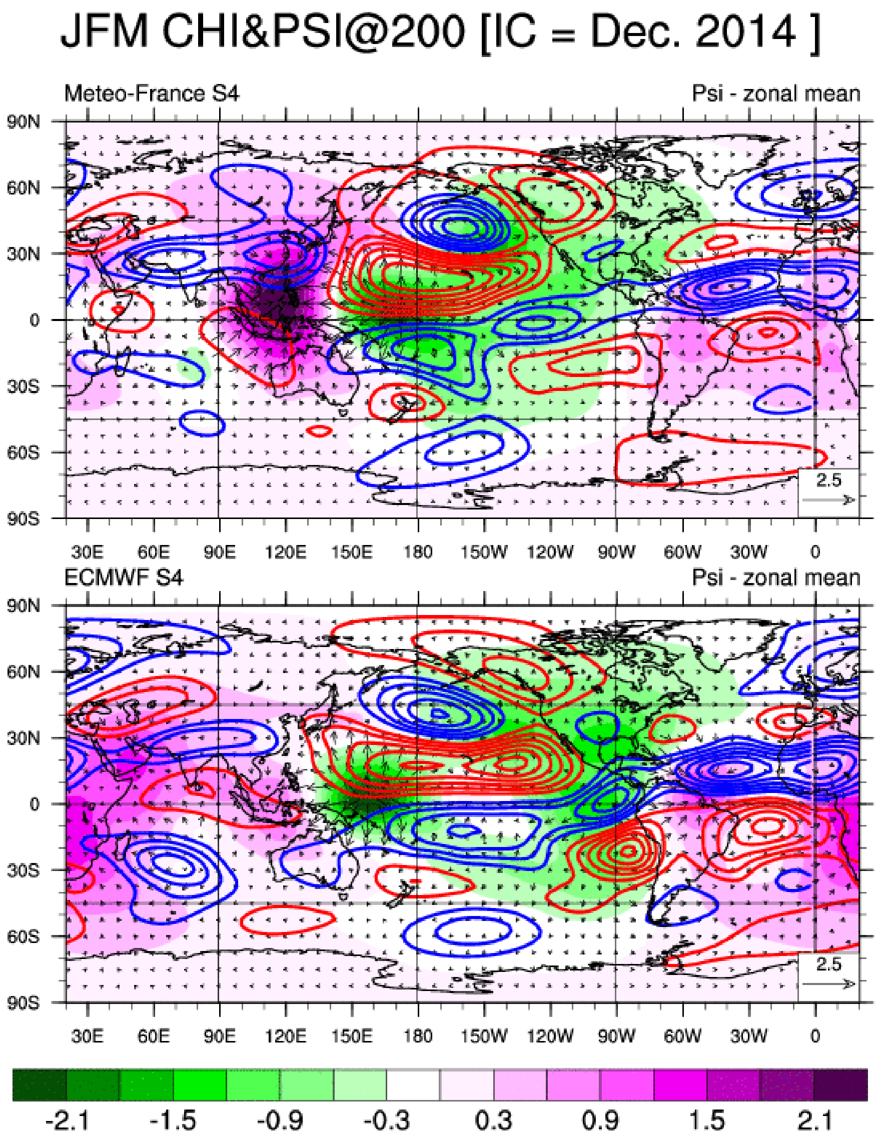


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

Velocity potential anomaly field (cf. fig. II.2.1 – insight into Hadley-Walker circulation anomalies) :
Very good consistency between the models.
Over the Pacific, 2 upward anomaly poles. The strongest one is the Western side, west of the dateline, consistent with the SST anomaly. It is associated with a downward anomaly over the maritime continent (stronger in MF than in ECMWF). The Eastern upward anomaly is weak in MF, stronger in ECMWF : this is consistent with SST anomalies.
Over the Atlantic, quite consistent response with convergent circulation anomaly (downward anomaly motion) on the Equator, close to South America, with a Northward extension. This could be a response to the El Niño forcing. This anomaly is present in the analysis.
Over the Indian Ocean, globally positive anomalies (downward motion anomalies), but low consistency in the intensity.

Stream Function anomaly field (cf. fig. 19 – insight into teleconnection patterns tropically forced) :
Some interesting teleconnexion patterns in the models, with a good consistency.
A trace of teleconnexion from the Pacific up to Western North America linked to the velocity potential anomaly close to the dateline. Another one is visible (especially in MF) in the Northern Atlantic, from Western tropics up to Europe. It is probably linked to the persistent downward motion anomaly located North-East of South America.
We also notice a very good consistency in the anomaly patterns from Europe to India.
As a conclusion the predictability seems globally good for this forecast. In the tropics (Pacific and Atlantic), some consistent signals (cf velocity potential anomaly). In mid-latitudes, tropical forcing should partly explain the very good consistency in circulation anomalies.

II.2.b North hemisphere forecast and Europe

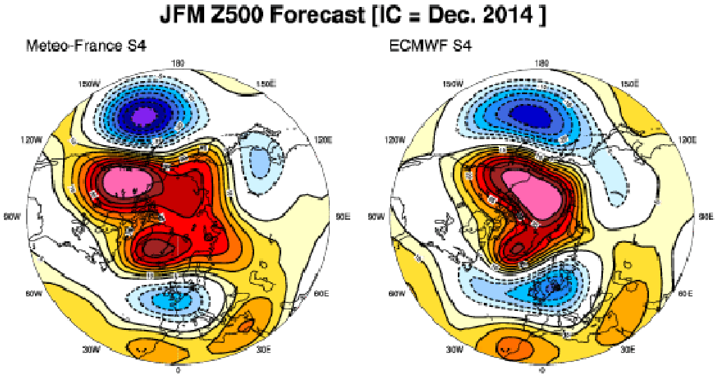


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip

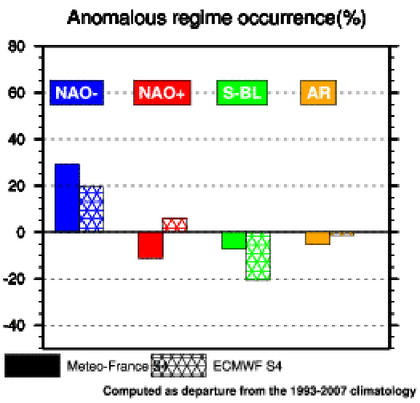


fig.II.2.3: North Atlantic Regime occurrence anomalies from Meteo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

Geopotential height anomalies (fig. II.2.3 – insight into mid-latitude general circulation anomalies) :
Strong consistency all over the northern hemisphere. Over North Atlantic basin, negative phase of NAO is forecasted by MF and ECMWF.

North Atlantic Circulation Regimes (fig. 21) :
Consensus for an increased number of NAO- and a deficit of Scandinavian blocking.

II.3. IMPACT : TEMPERATURE FORECASTS

II.3.a ECMWF

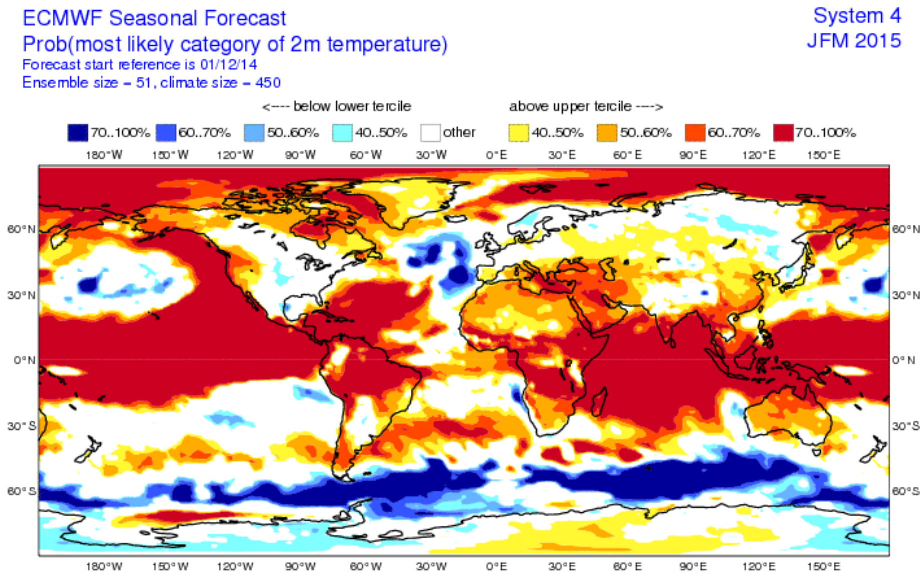


fig.II.3.1: Most likely category probability of T2m from ECMWF.

II.3.b Météo-France

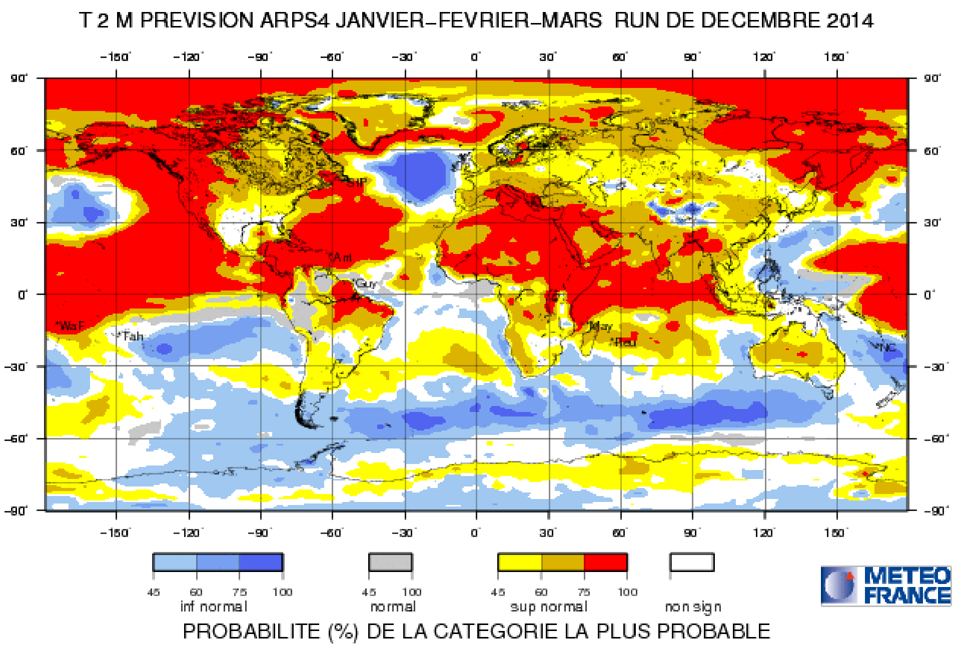


fig.II.3.2: Most likely category of T2m.

II.3.c Japan Meteorological Agency (JMA)

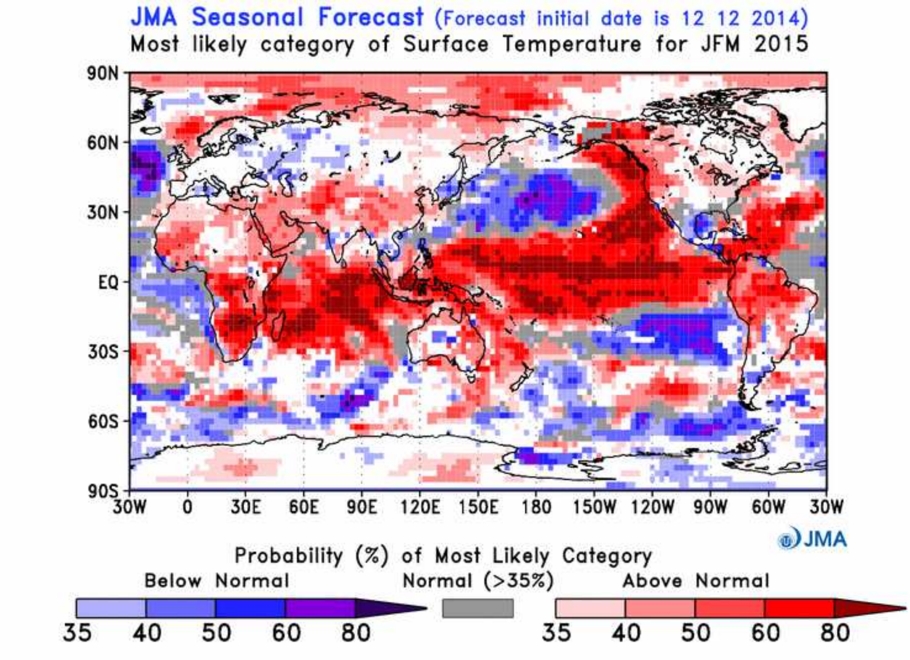


fig.II.3.5: Most likely category of T2m.

II.3.d Euro-SIP

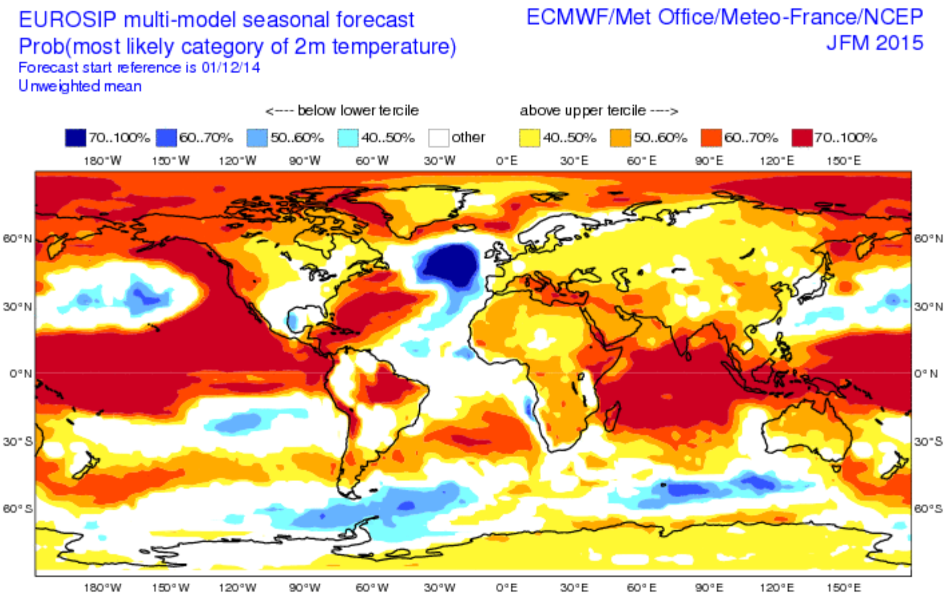


fig.II.3.7: Multi-Model Probabilistic forecasts for T2m from EuroSip

North-America : enhanced probabilities for warm anomalies over the Western part of USA and Alaska.
Central-America : warmer than normal extending toward the Caribbean.
South-America : Some consistent warm signal over Brazil and along the Pacific coast.
Australia : warmer than normal
Asia : Mostly Warmer than normal conditions everywhere. Warmer than normal conditions over most of the Indian sub-continent, South-East Asia and the maritime continent.
Africa : Mostly warmer than normal.
Europe : normal or warmer than normal, depending on the model. A strong warm signal on the Mediterranean basin.

II.4.IMPACT : PRECIPITATION FORECAST

II.4.a ECMWF

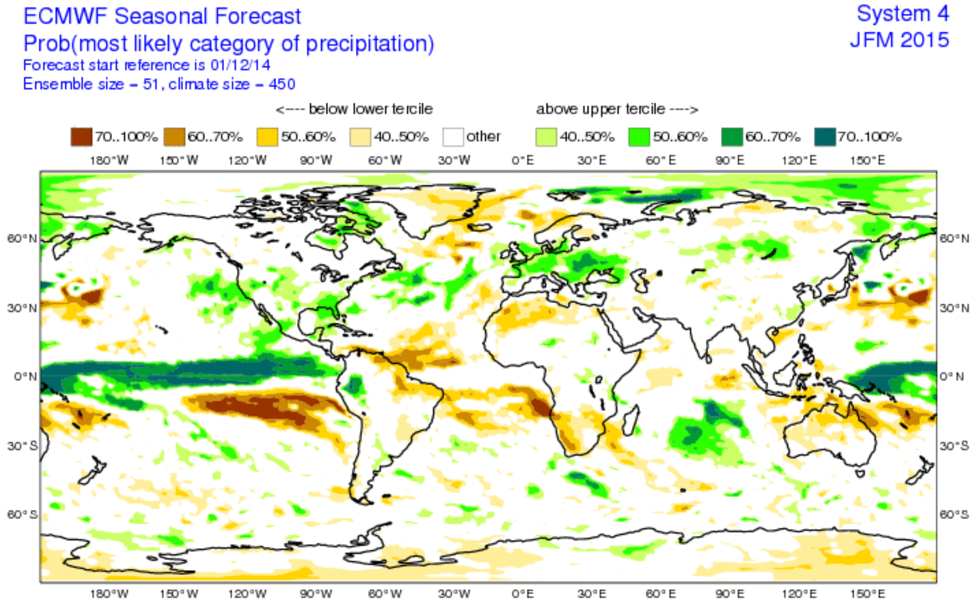


fig.II.4.1: Most likely category probability of rainfall from ECMWF.

II.4.b Météo-France

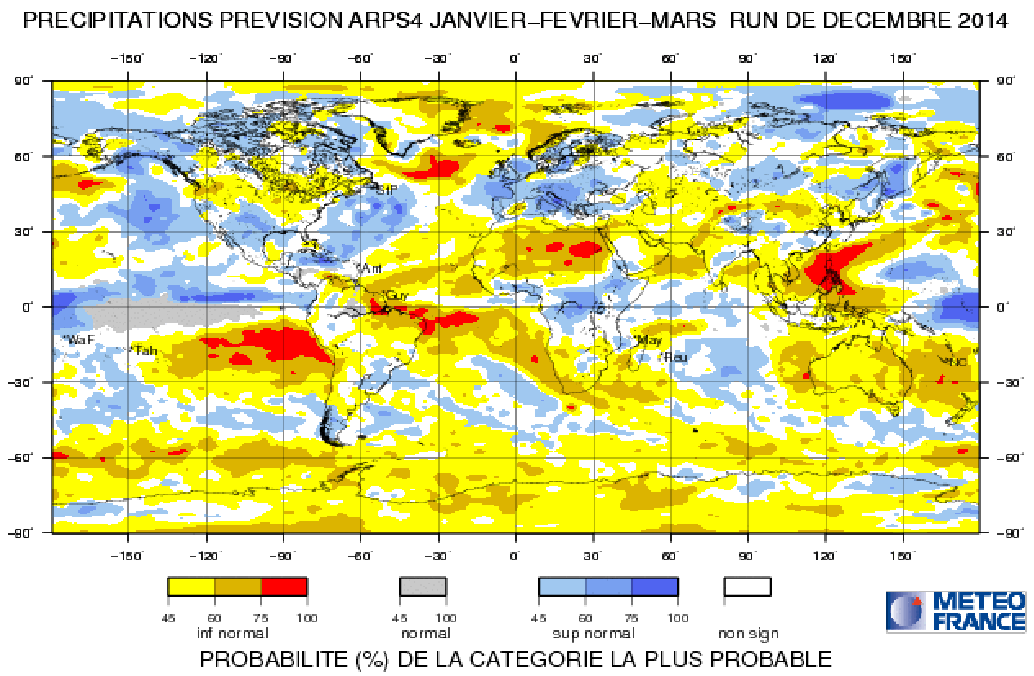


fig.II.4.2: Most likely category of Rainfall.

II.4.c Japan Meteorological Agency (JMA)

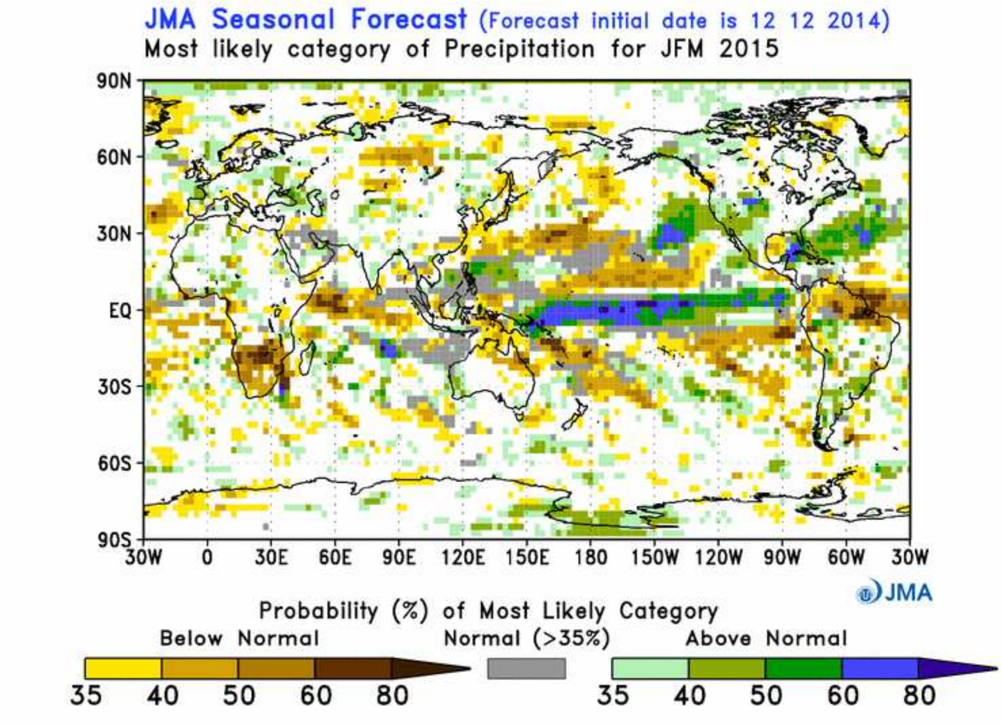


fig.II.4.5: Most likely category of Rainfall from JMA.

II.4.d Euro-SIP

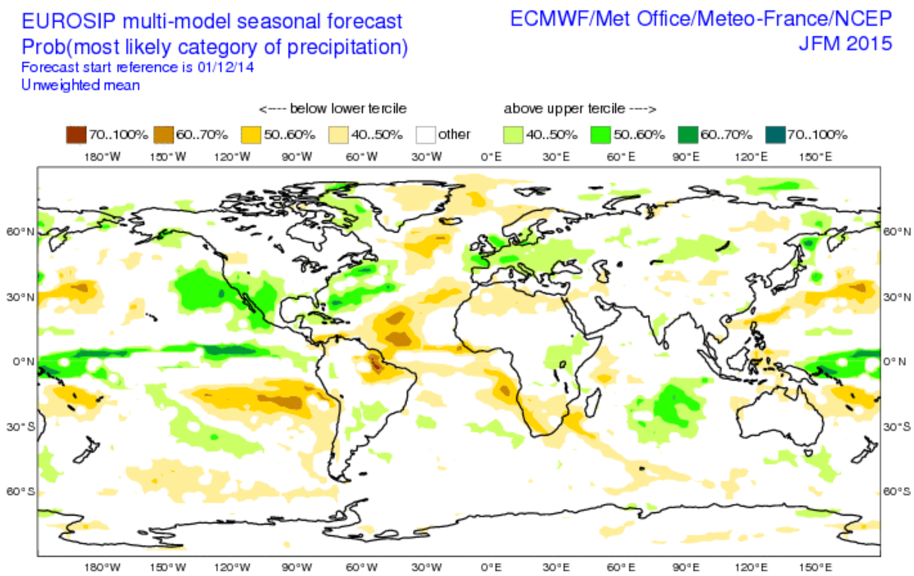


fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EuroSip

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 (Argentina, Bolivia, Peru) and Central America (Western part). Enhanced probabilities for dry scenario over Brazil, the Maritime continent, Australia (despite no signal in Eurosip) and Southern Africa.
For Europe : Wetter than normal.

II.5. REGIONAL TEMPERATURES

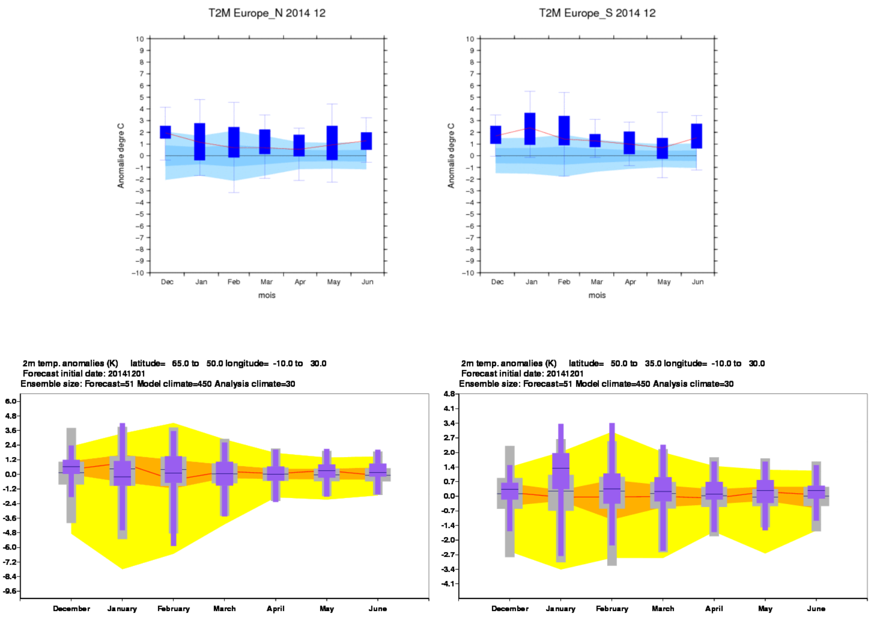


fig.II.5.1 : Climagrams for Temperaturel in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

For Northern Europe : close to normal or warm signal.
For Southern Europe : close to normal or warm signal.

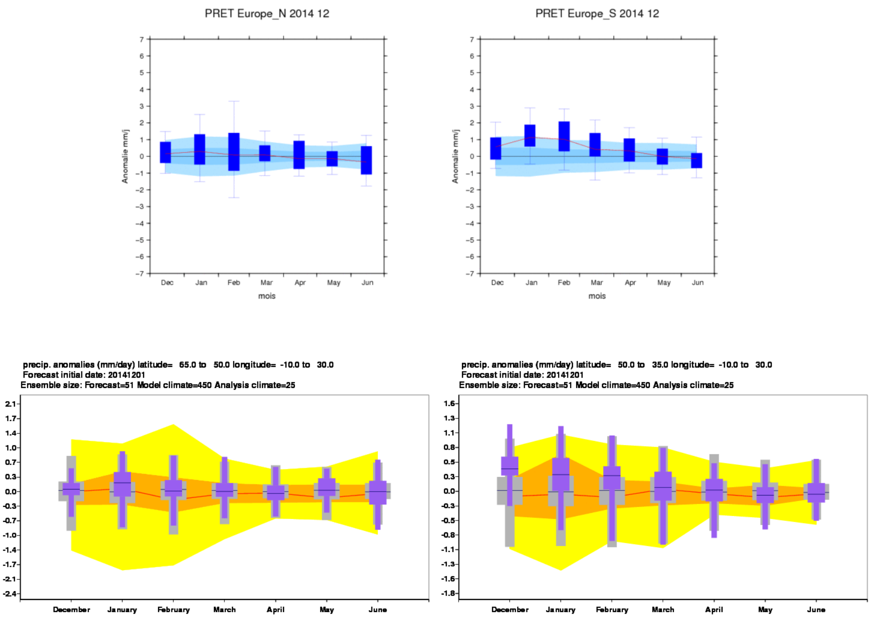


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

Globally wetter than normal (not clear on the climagrams, but clear on the maps).

II.6. MODEL'S CONSISTENCY

Not available

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

For SST :
For Z500 :
For T2m :
For Precipitation :

II.7. "EXTREME" SCENARIOS

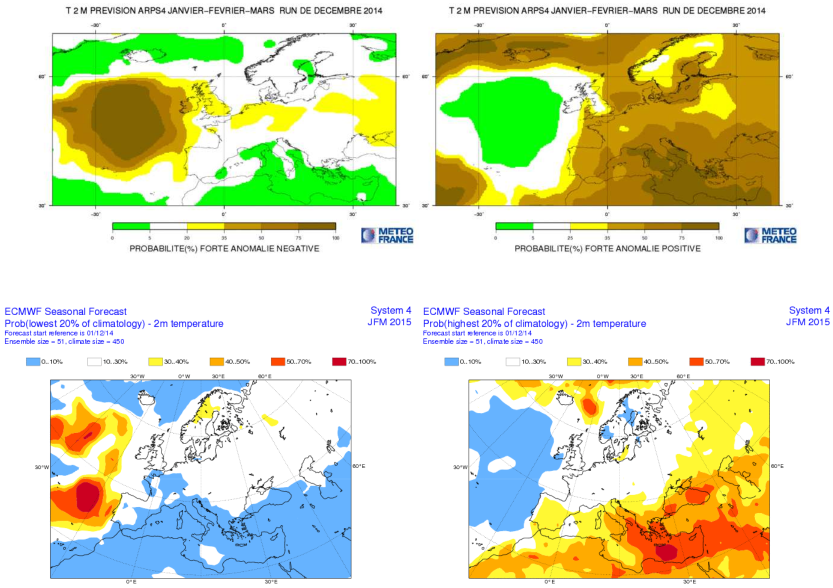


fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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

No consistency between the 2 models.

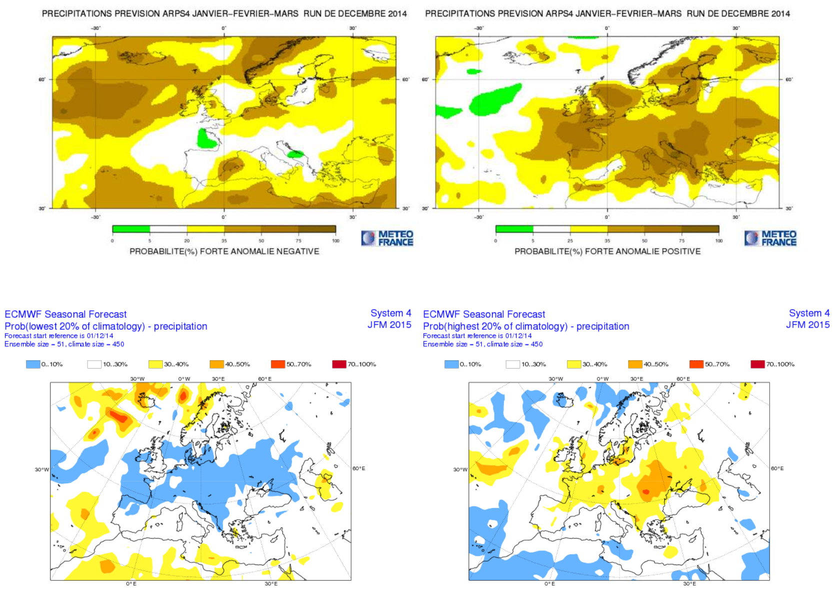


fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

The « very wet » scenario has an increased probability in the 2 models.

II.8. DISCUSSION AND SUMMARY

II.8.a Forecast over Europe

Over the Northern hemisphere, some models show teleconnections from tropics to mid-latitude in the Pacific and in the Atlantic basin. The mean circulation patterns are very consistent over the whole Northern hemisphere, including Europe. A NAO- scenario is strongly privileged by MF, ECMWF and by the EUROSIP multi-model.

Over Europe, this scenario should lead to a normal or warmer than normal situation over Europe, and a high probability of warm scenario over the Mediterranean basin. Concerning precipitation, the "wet" scenario is globally privileged.

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

II.8.b Tropical cyclone activity

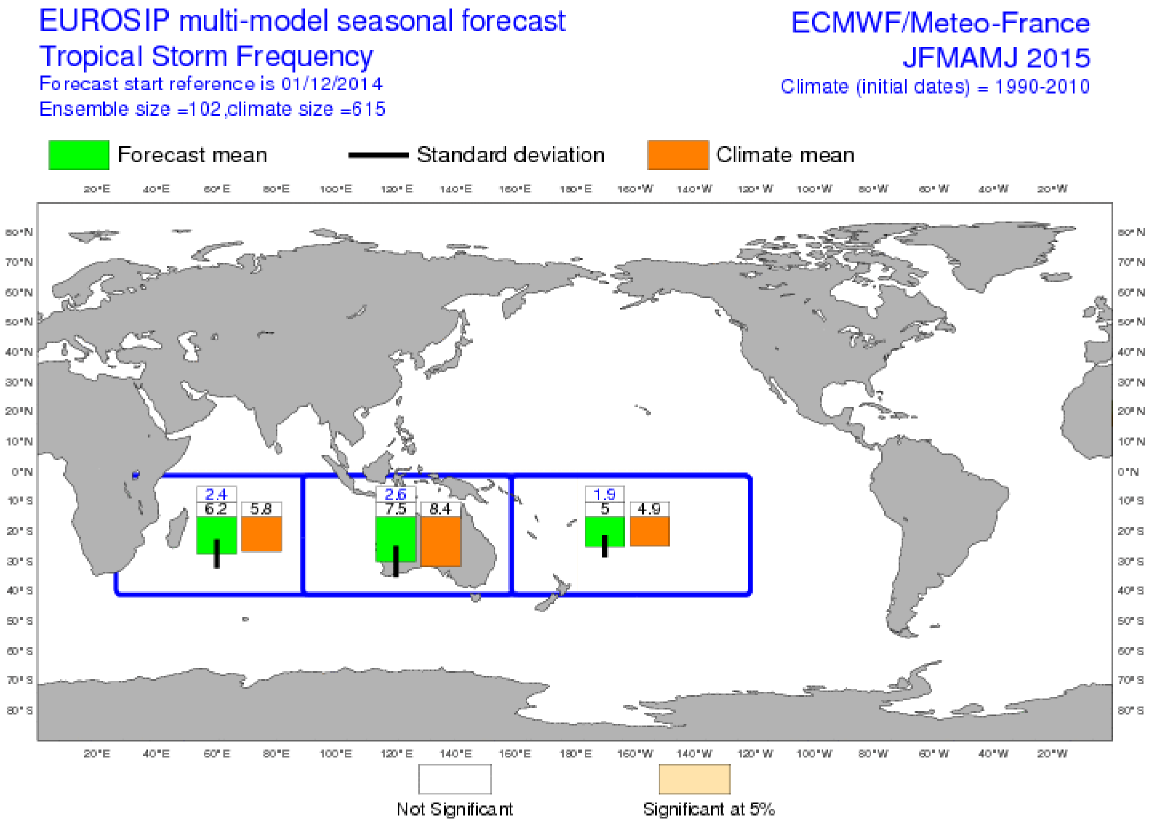


fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).
For the Tropical Cyclone season and in relationship with the SSTs scenarios, Euro-Sip forecasts indicate

For the Tropical Cyclone season and in relationship with the SSTs scenarios, Euro-Sip forecasts indicate (as last month) below normal activity in Australian region and above normal activity in the Western Indian Ocean. But this signal is no significant with this forecast.

WMO RA VI
RCC Network

Synthesis of Temperature forecasts for January-February-March 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	*no privileged scenario*	*above normal*	*no privileged scenario*	*no privileged scenario*	*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 January-February-March 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	*no privileged scenario*	*Above normal*	*Above normal*	*Above normal*	*no privileged scenario*

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

III. ANNEX

III.1. SEASONAL FORECASTS

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

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

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

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

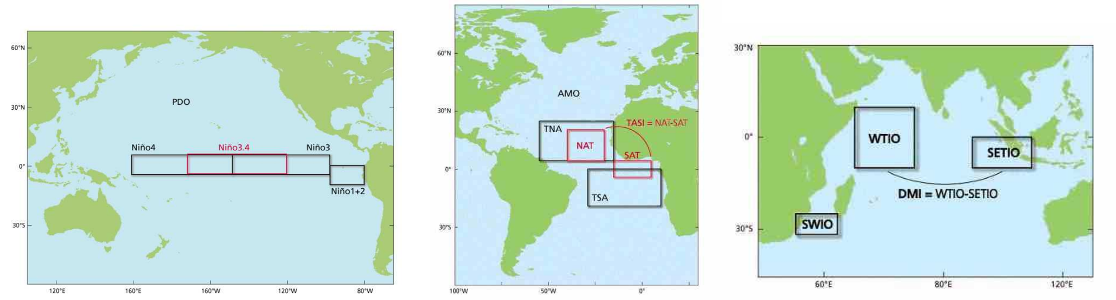
III.2. « NINO », SOI INDICES AND OCEANIC BOXES

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

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

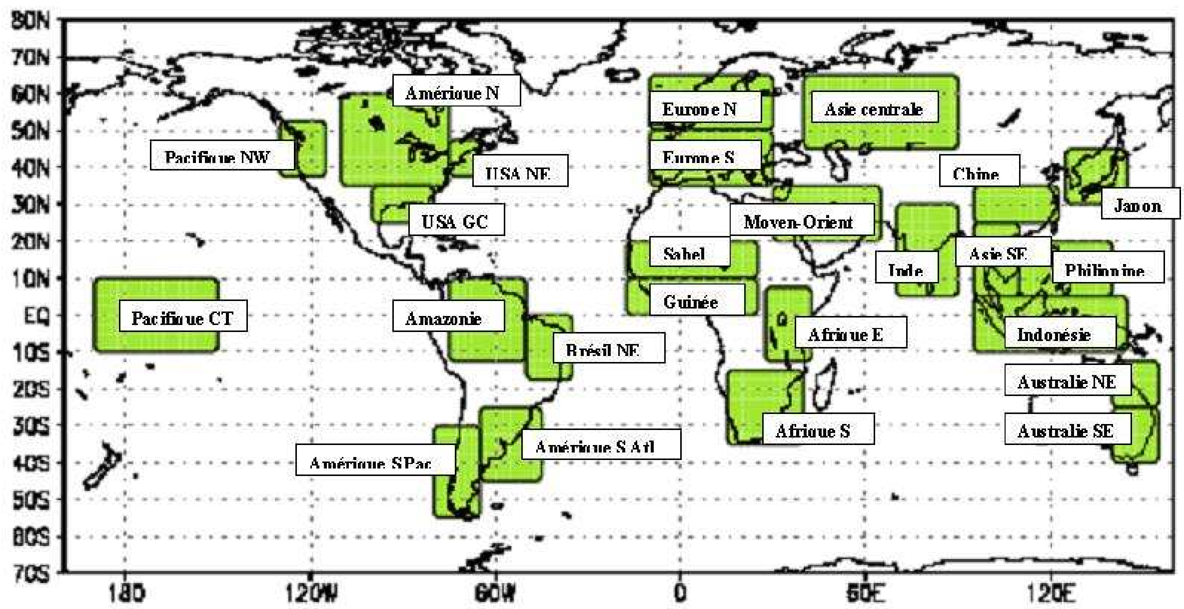
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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

Oceanic boxes used in this bulletin :



III.3.LAND BOXES

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



III.4. ACKNOWLEDGEMENT

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