WMO RA VI RCC Network

METEO FRANCE
Toujours un temps d'avance

GLOBAL CLIMATE BULLETIN
n°188 – february 2015

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I. DESCRIPTION OF THE CLIMATE SYSTEM (DECEMBER 2014)

I.1.OCEANIC ANALYSIS

I.1.a Global analysis

In the Pacific ocean

In the equatorial waveguide :

surface : weak generalized warm anomaly. Little change of

subsurface : the warm Kelvin wave which started in October, ends his crossed and reaches the South American coast

ENSO : el Niño 3.4 Index above the threshold of +0.5°C since October, reaches +0.9°C in December. it starts decreasing at the end of the month. El Nino 1+2 index comes back around 0. Conclusion : Weak El Nino, meanly in the center part of the Pacific. beginning decay at the end of the month.

Northern Hemisphere :

Still strong warm anomaly along the coast of North America.
Cold anomaly around 40°N, extended during the month.
Elsewhere : warm anomaly of SST.

Southern Hemisphere :

Cold anomaly around 20°S from New Caledonia and New-Zealand to the South American coast where a substantial cooling occurred during the month.
Elsewhere : warm anomaly of SST.

maritime continent :

weak warm anomaly

In the Indian Ocean :

neutral or weak warm anomaly. More pronounced warm anomaly eastward of Madagascar.

<u>In the Atlantic</u> :

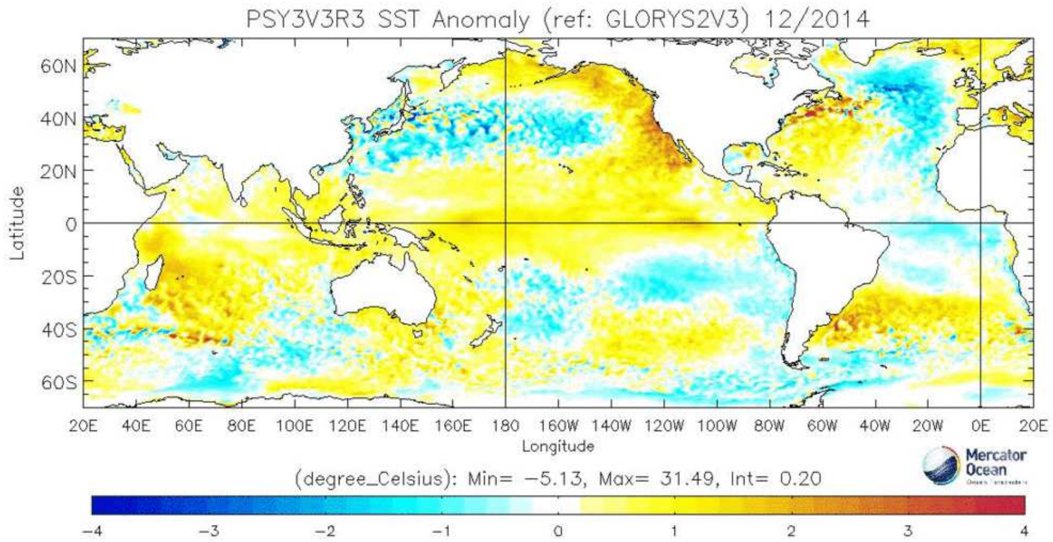
In the equatorial waveguide : Cold anomaly

In the tropics : generally neutral or slightly weak cold anomaly.

Northern Hemisphere :

warm anomaly from the coast of North America to Bermuda.
Cold anomaly in the center of the basin, extended to the Portuguese and Morocco coast during the month.
warm anomaly on the seas around Europe including Mediterranean and Baltic seas.

Southern Hemisphere : warm anomaly in the south of the tropic, more pronounced eastward of Argentina



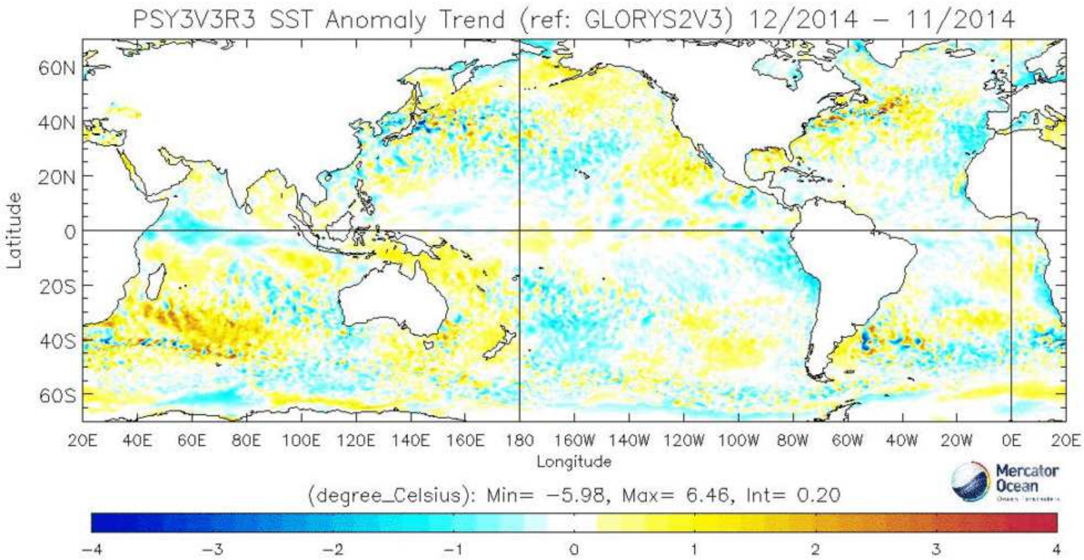


fig.I.1.1: top : SSTs Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

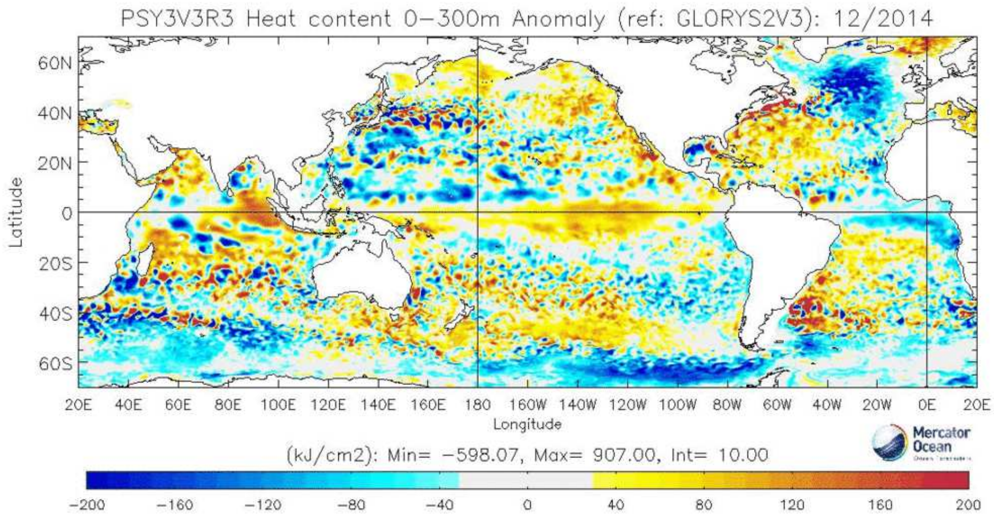


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2009) http://bcg.mercator-ocean.fr/

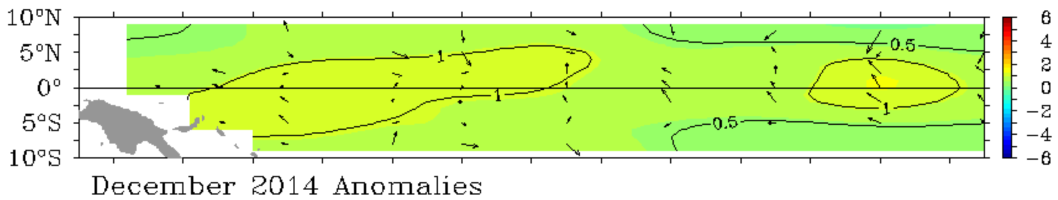


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON. http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html

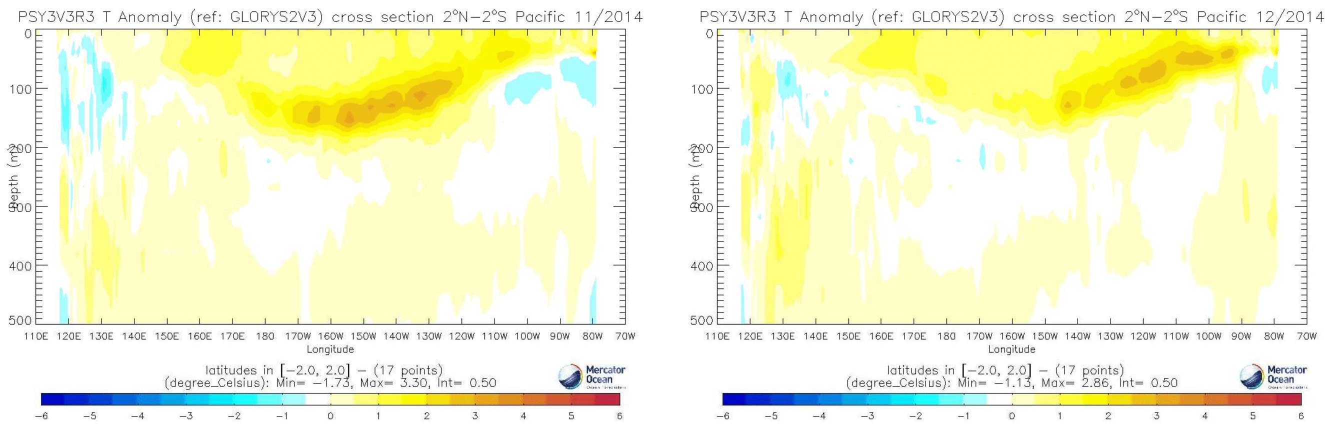


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), http://bcg.mercator-ocean.fr

<u>In the equatorial waveguide (fig. 4 and 5)</u> : a Kelvin wave is clearly visible, consistent with the current weak El Nino.

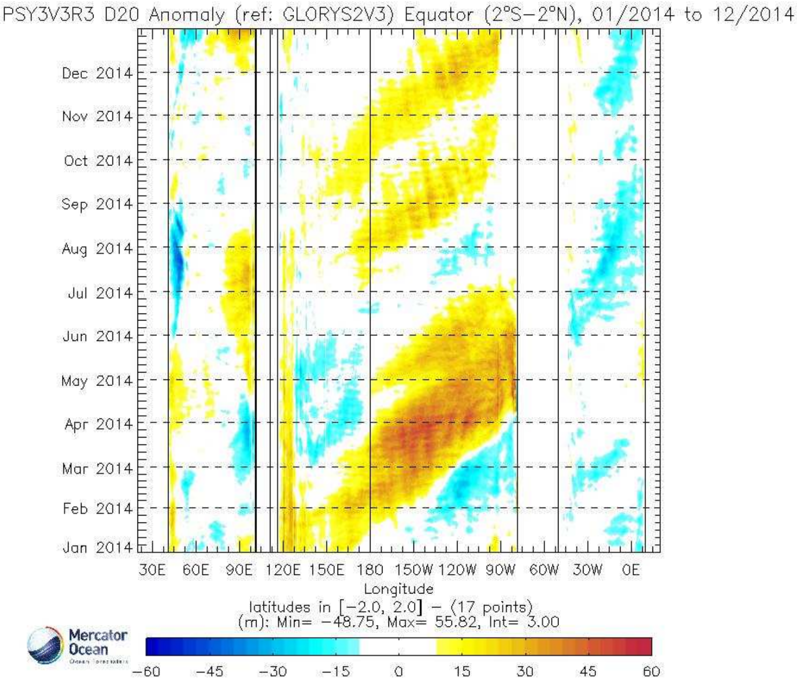
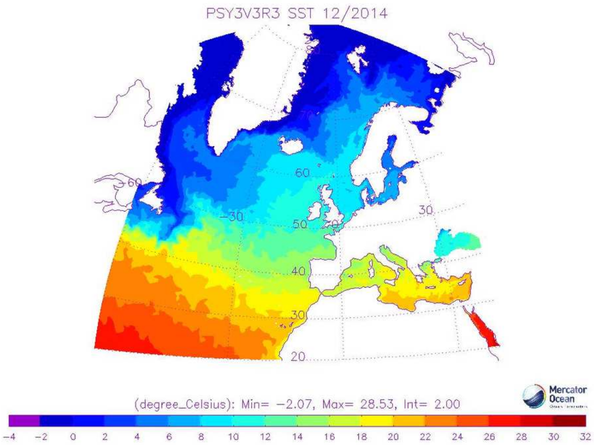


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period http://bcg.mercator-ocean.fr/

<u>Sea surface temperature near Europe :</u>

Almost all sea surfaces near Europe are still warmer than normal, especially the Arctic Sea, the North Sea, the Baltic Sea, the Mediterranean and the Biscay, but anomalies became weaker in the North Sea and the western Mediterranean. The negative anomaly over the central North Atlantic, which persisted for many months without affecting Europe now extended south-eastwards just close to

Iberia.



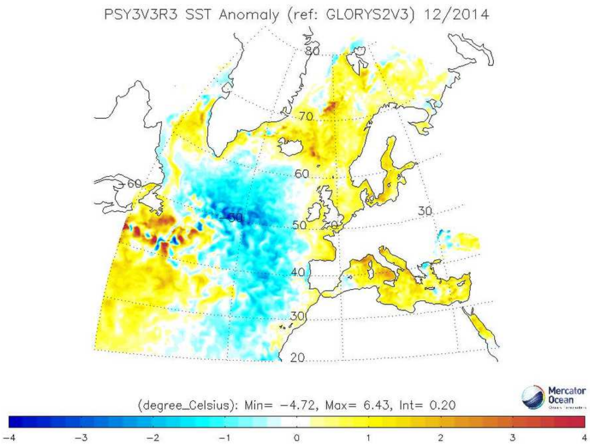


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

I.2. ATMOSPHERE

I.1.b General Circulation

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

Strong upward motion core west of the Continent Maritime linked with the MJO activity at the beginning and the end of the month in sector 4 and 5. Weak upward motion in the center of the Pacific Ocean (170°W, 10°S)

Vast downward motion anomaly over the Atlantic Ocean and Africa with the main core over Lesser Antilles.

The downward motion signal continues over the Atlantic Ocean since many month and is probably a Nino feedback.

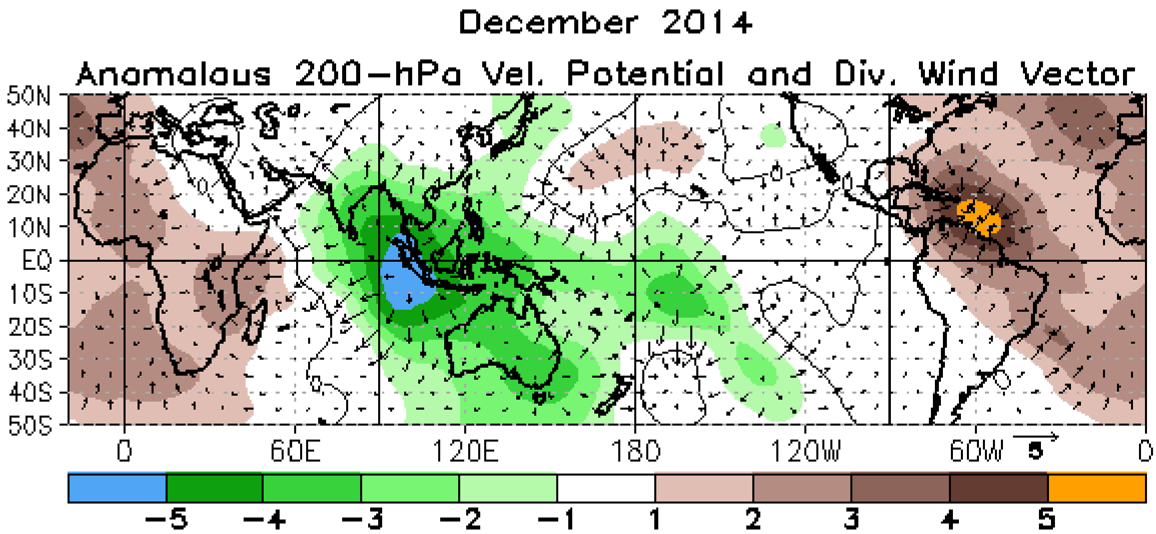


fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

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

In the Atlantic Ocean, the strong downward motion anomaly over the Antilles generated a teleconnection with cyclonic anomalies in the tropic and anticyclonic anomalies in the mid-latitudes.

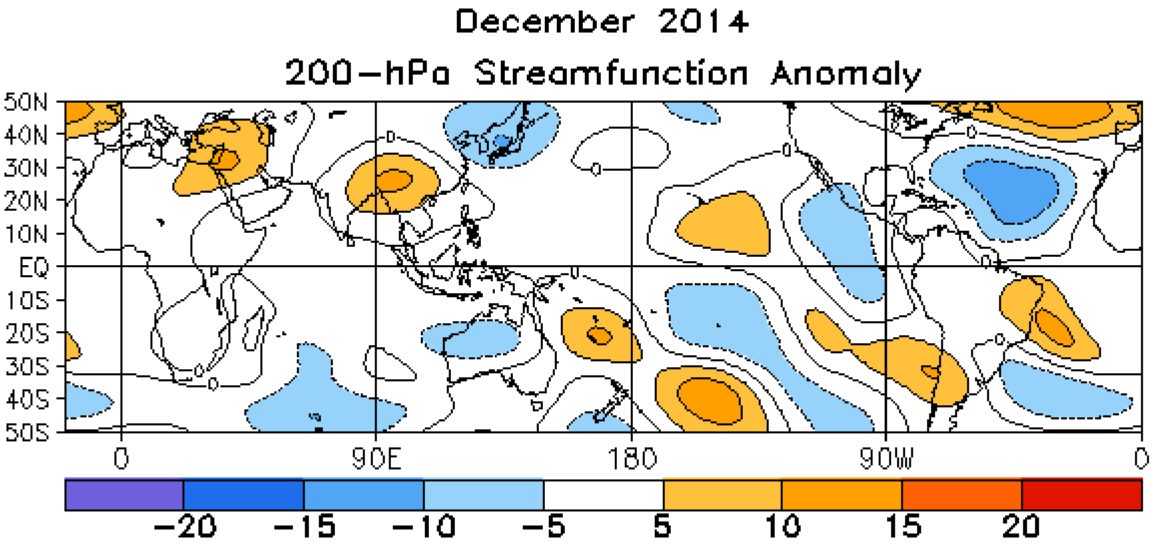


fig.I.2.2: Stream Function Anomalies at 200 hPa.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

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

In the north Atlantic :

Consistent with previous fields, weak low in the tropics, very strong high anomaly around 45°N, low over Iceland.

Elsewhere :

Strong high geopotentiel anomaly in the nordeast of Siberia. Low anomaly between Japan and Corea.

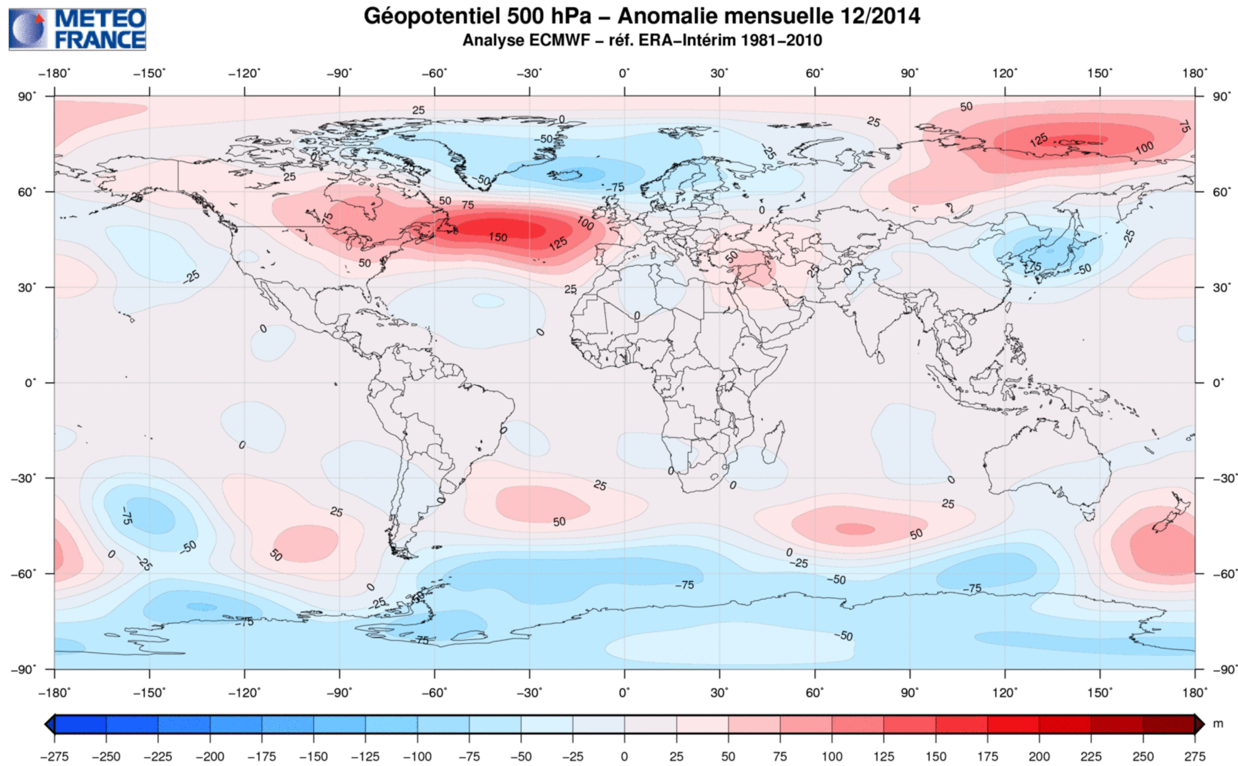


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

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 :

Both much deeper Icelandic Low and much stronger Azores High as a result of an enhanced positive NAO mode resulting in a strong west wind flow across the North Atlantic and continuing over Europe. The NAO is the most dominating mode this month since the other patterns have relatively weak contributions. However, there is also an extension of the Azores High to the north and west, which cannot be explained completely by NAO, but a slightly negative mode of EA.

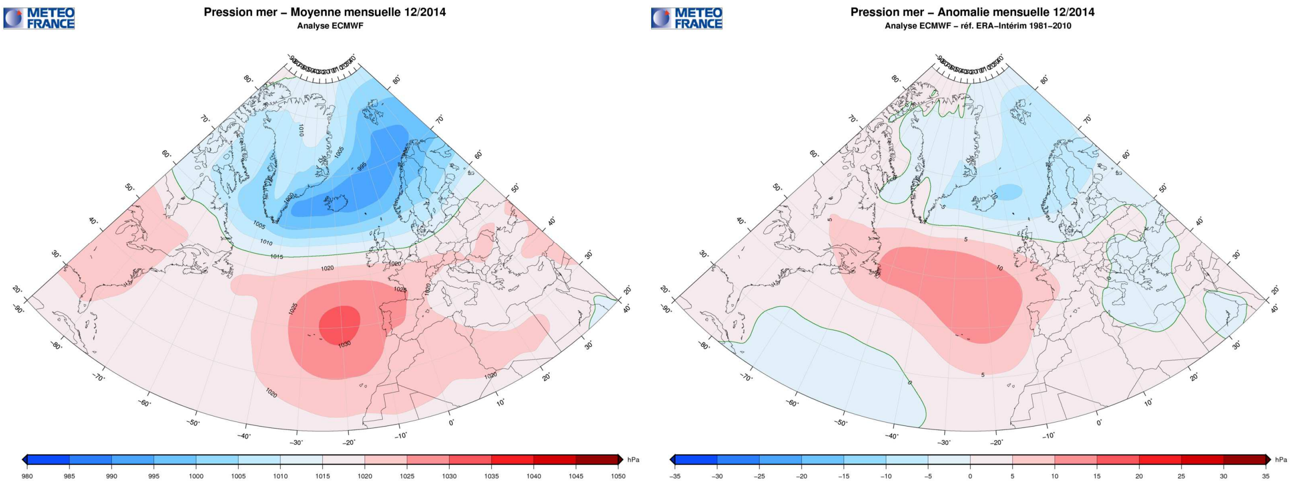


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (left) and 1981-2010 anomalies (right).

Circulation indices: NAO and AO

In contrast to November 2014, a clearly positive NAO phase over quite a long period (3 weeks) in December 2014. That phase ended just soon after Christmas. The AO, too, shows a similarly long positive phase, though within the standard deviation. Since NAO was the most dominating pattern in December, much of the AO variability came from NAO that month.

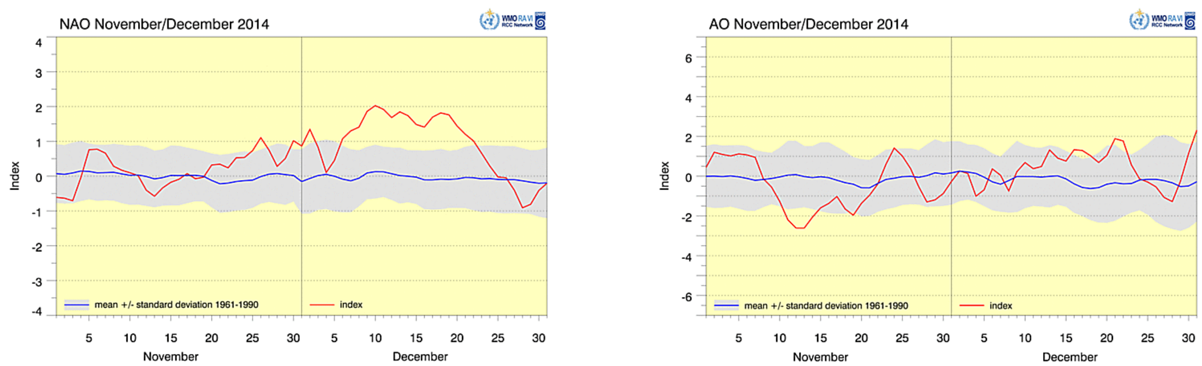


fig.I.2.5: North Atlantic Oscillation (NAO, upper graph) and Arctic Oscillation (AO, lower graph) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.1.c Precipitation

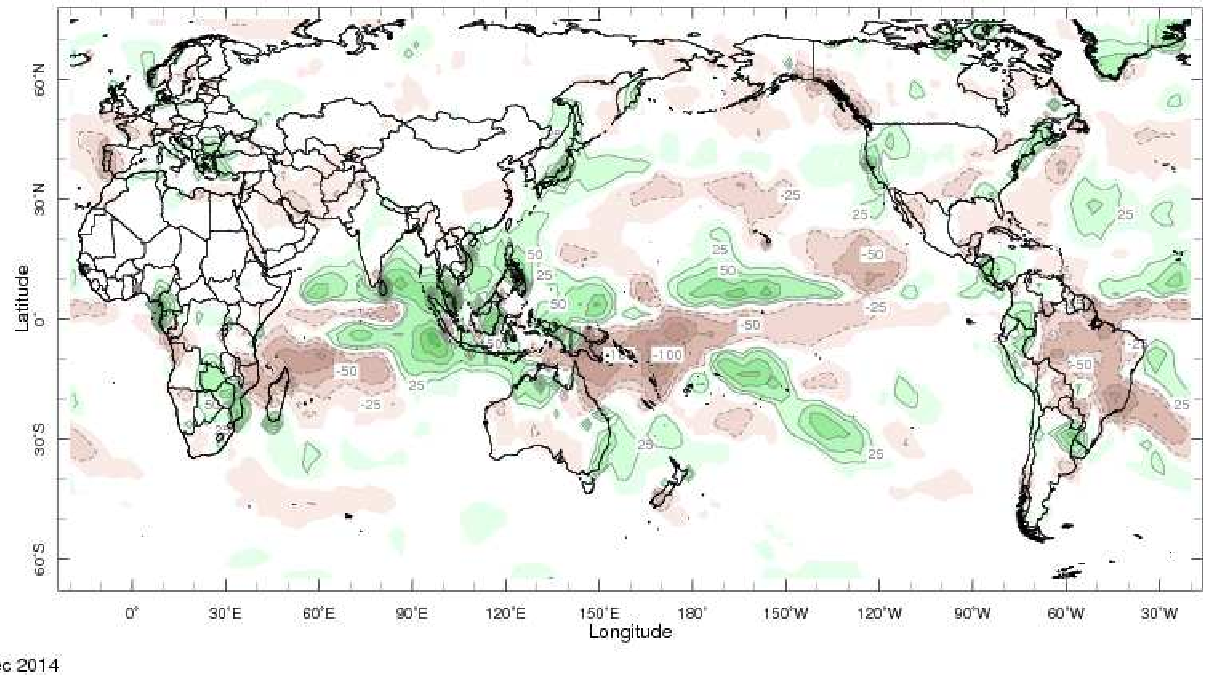


fig.I.2.4: Rainfall Anomalies (mm) (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

On Europe :

Dry anomaly over west and southwest of Europe, strong over the Portugal.
Wet anomaly over southeast of Europe.
Locally wet anomaly over the north of Europe.

Elsewhere :

In link with the anomaly of convection, wet anomaly on the Maritime Continent. In contrast, drier than normal conditions on west Pacific, south of the equator.

The south American continent is share in two parts, in a consistent pattern of the El Nino situation, with a dry anomaly in Brazil and a wet anomalie in Colombia, Equator and Peru

Precipitation anomalies in Europe:

Quite dry in western and southwestern Europe due to influence of the Azores High. Wet in northern Central Europe, Russia, but also in Scotland and west coasts of Norway. Low pressure systems coming from the Atlantic often had a relatively northerly track for that season, affecting Scotland and Norway instead of Central Europe. Very much precipitation over the eastern and southern Balkan Peninsula and western Turkey due to strong and long-lasting low pressure systems over that area.

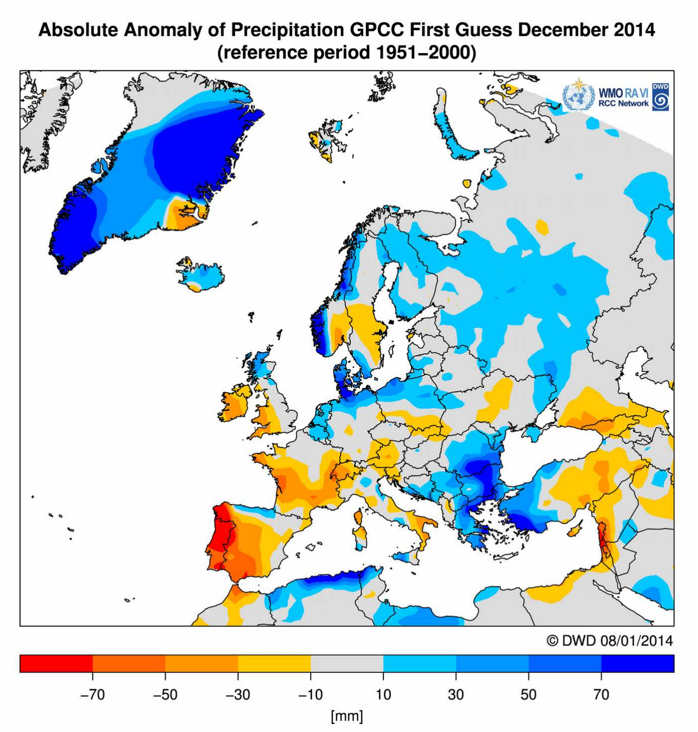


fig.I.2.5: Left: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm. Right: Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

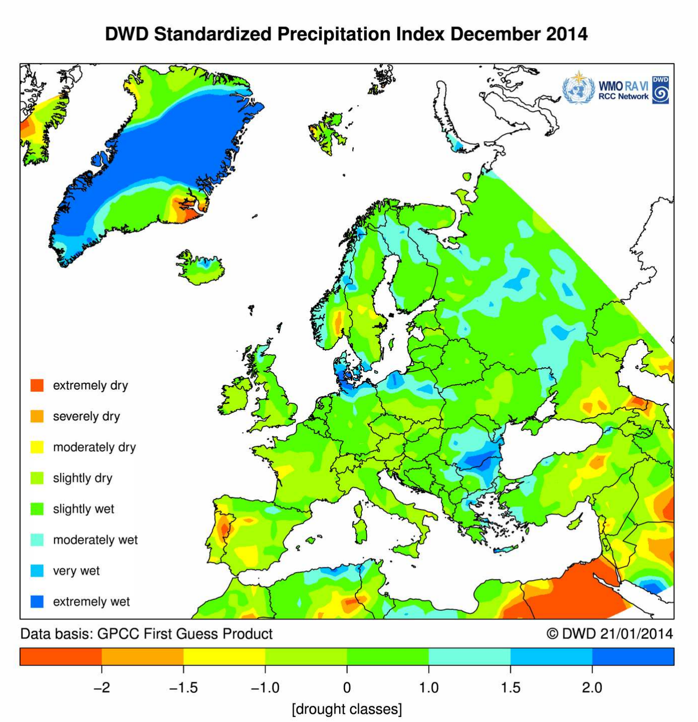


fig. I.2.5a: Standardized Precipitation Index with DWD modification (DWD-SPI), http://www.dwd.de/rcc-cm .

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	+10.1 mm	111.7 %	+0.480
Southern Europe	+0.9 mm	104.6 %	+0.165

I.1.d Temperature

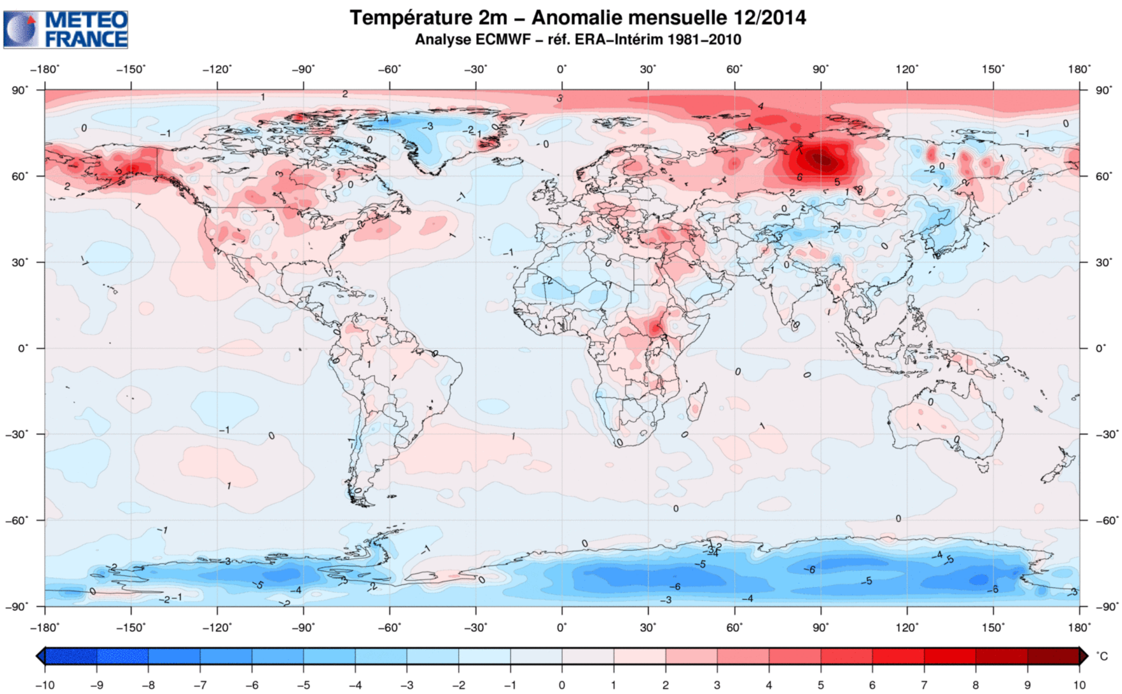


fig.I.2.6: Temperature Anomalies (°C) (Meteo-France)

<u>On Europe</u> :

In december, warm anomaly except on the Hiberique Peninsula.

<u>Elsewhere :</u>

Vast warm anomaly over the North America.
Warm anomaly over the Russia and the Siberia. Very strong in the center of the Siberia.
Globaly cold anomaly over China.
Cold anomaly over the west Africa. Warm anomaly over the east and the Middle East.

Temperature anomalies in Europe:

Mostly warmer than normal due to prevailing mild westerly airflow. Colder than normal in southwestern Europe, probably mainly due to radiative cooling.

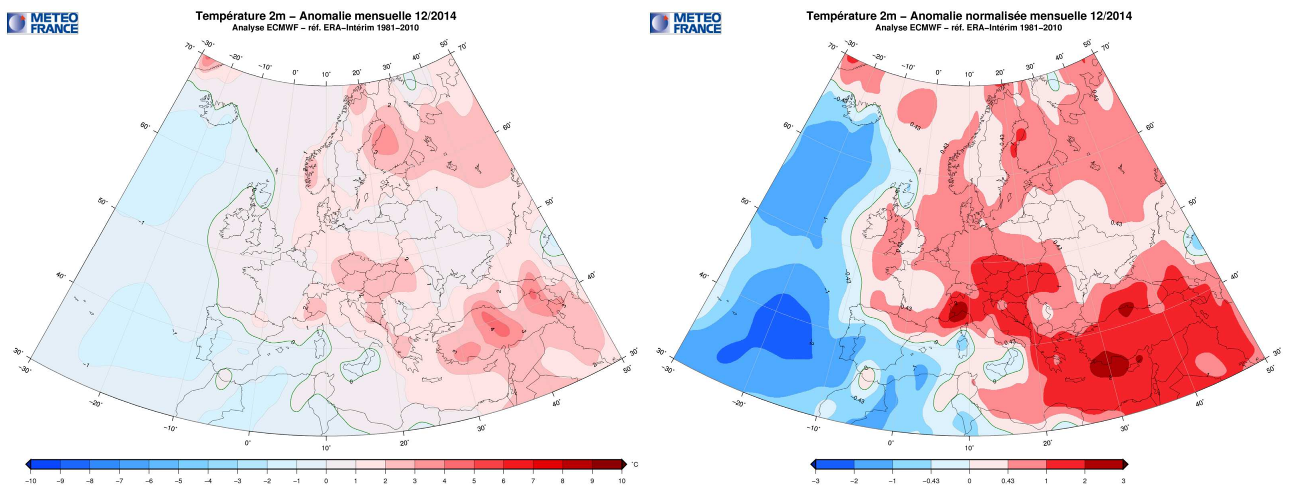


fig.I.2.7: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

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	+1.4 °C
Southern Europe	+1.1 °C

I.1.e Sea ice

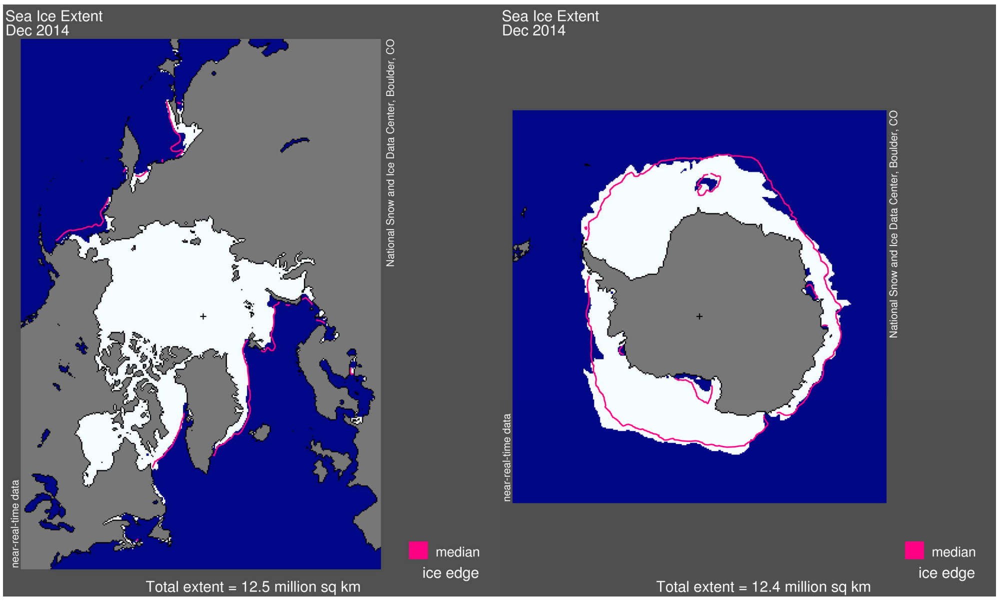


fig.I.2.6: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

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.

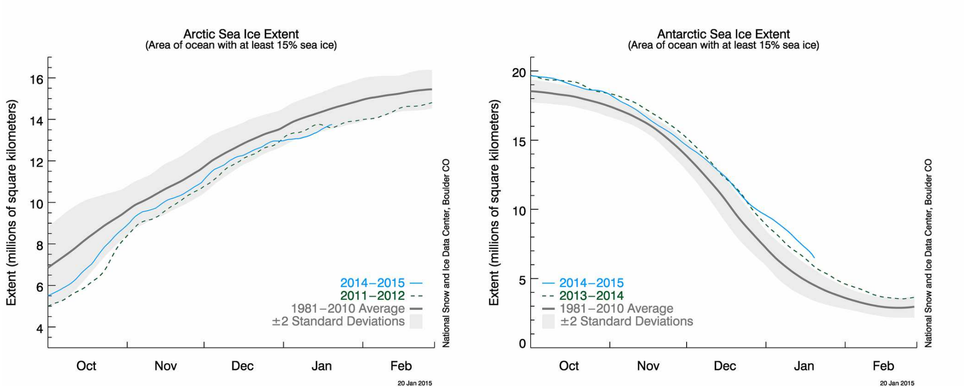


fig. I.2.7 : Sea-Ice extension evolution from NSIDC.
http://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png

II. SEASONAL FORECASTS FOR JFM FROM DYNAMICAL MODELS

II.1.OCEANIC FORECASTS

I.1.f Sea surface temperature (SST)

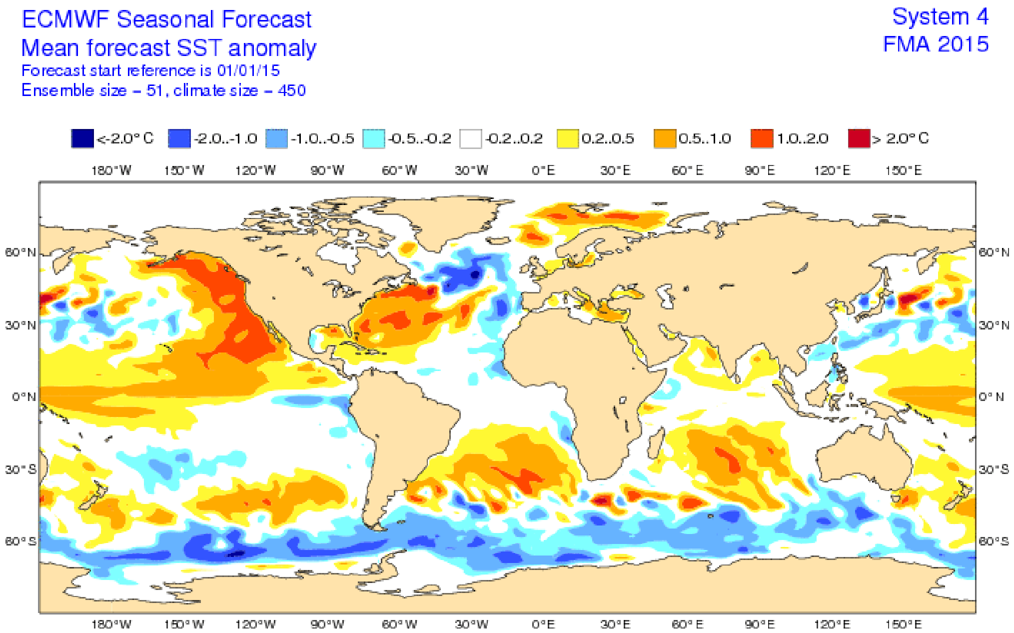


fig.II.1.1: SST anomaly forecast from ECMWF
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

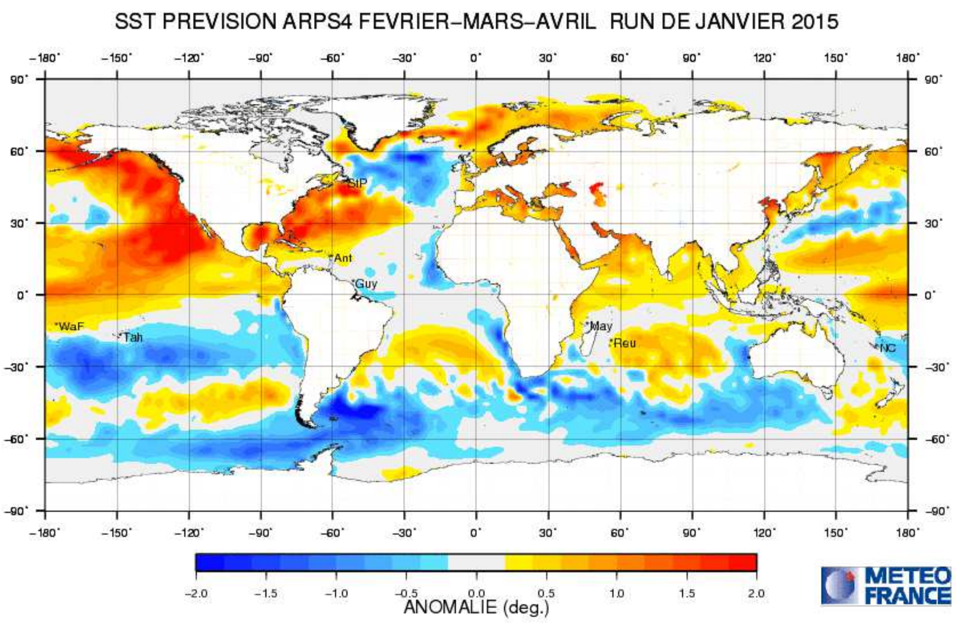


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).
http://elaboration.seasonal.meteo.fr

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.

The forecast for FMA maintain a great continuity with the analysis of december.

In the Pacific equatorial waveguide : cooling trend in the eastern part, where negative anomalies are now provided by ECMWF for the next 3 months.

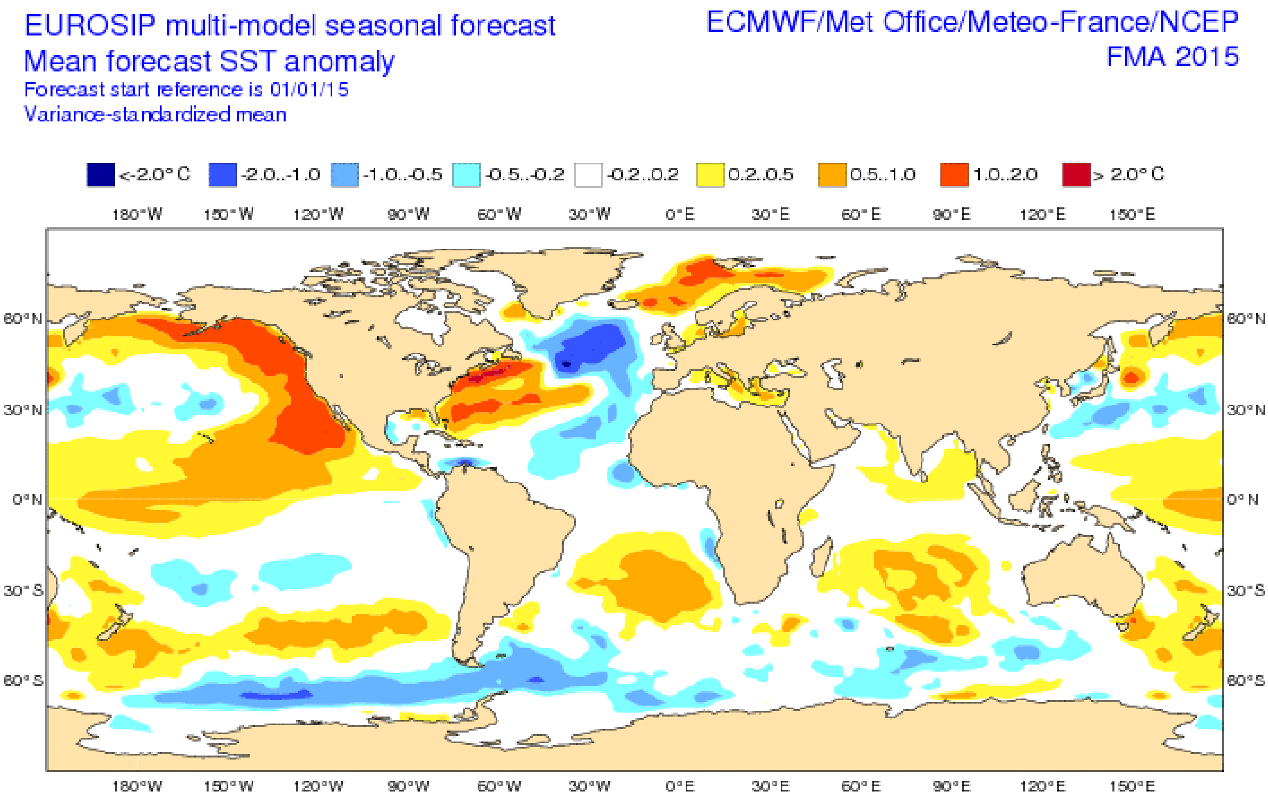


fig.II.1.3: SST Forecasted anomaly from Euro-SIP

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.

I.1.g ENSO forecast :

Forecasted phase: weak El Niño phase for JFM

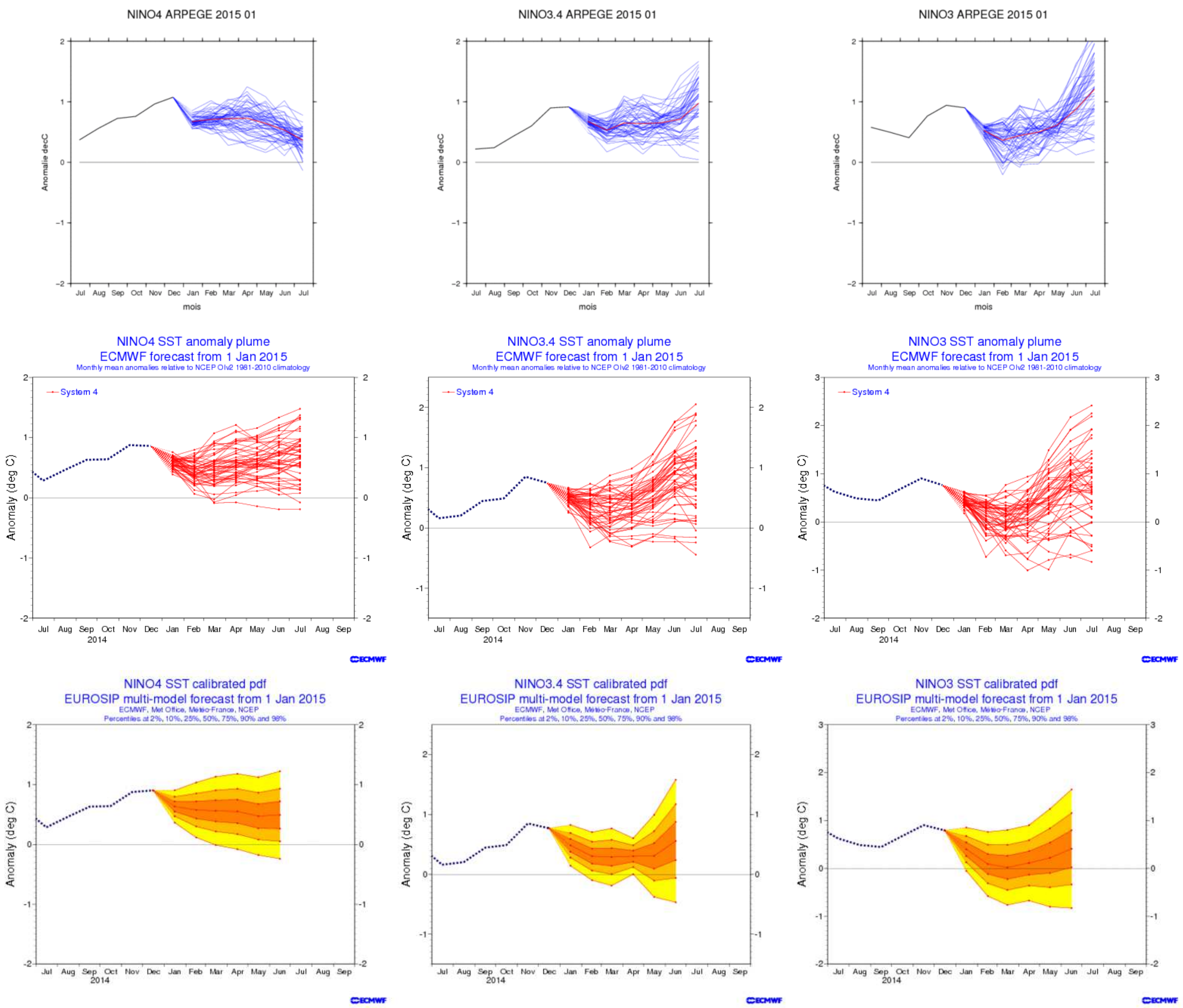


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions – (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

Due to the good models consistency In the center of the equatorial Pacific Ocean, the EUROSIP plume diagram for Nino3.4 box is little dispersed for the next 3 months.

The anomaly in Nino3.4 box is expected to decrease until February, then it should stabilies slightly below the threshold of +0.5°C.

Conclusion : the weak El Nino will probably end during February. From March, neutral conditions slightly warmer than normal.

I.1.h Atlantic Ocean forecast

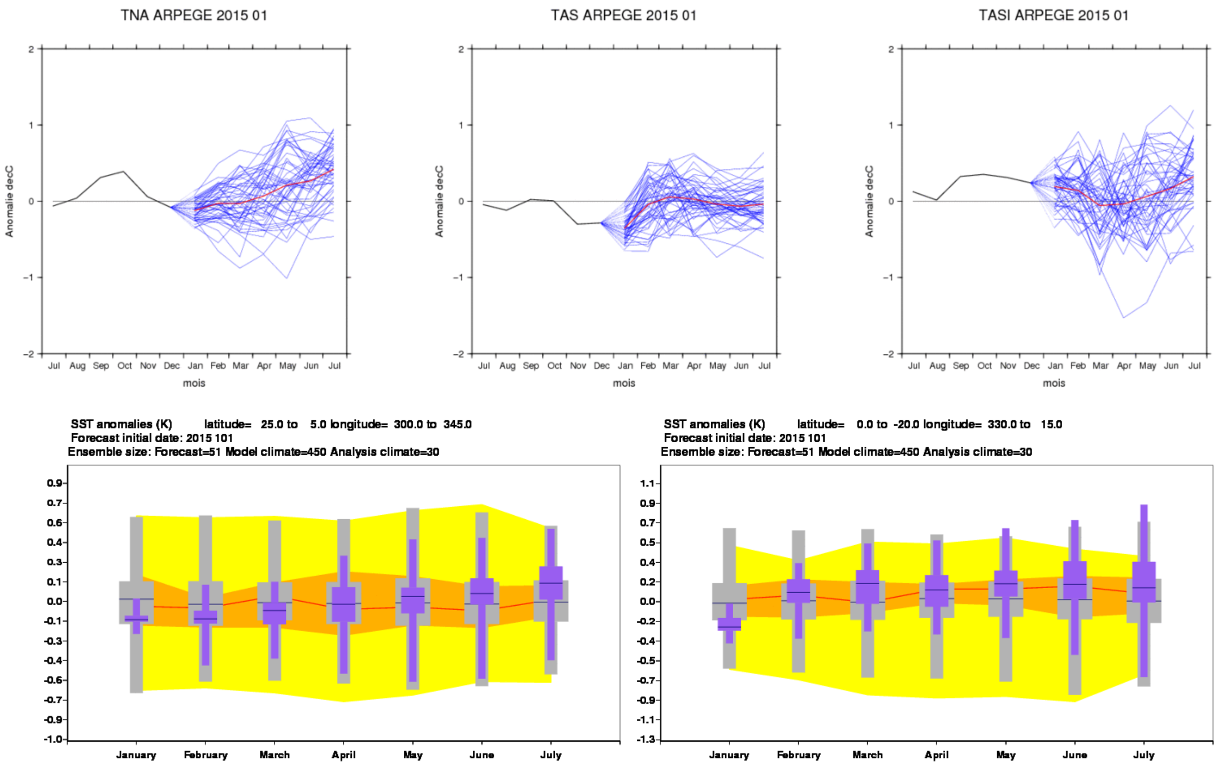
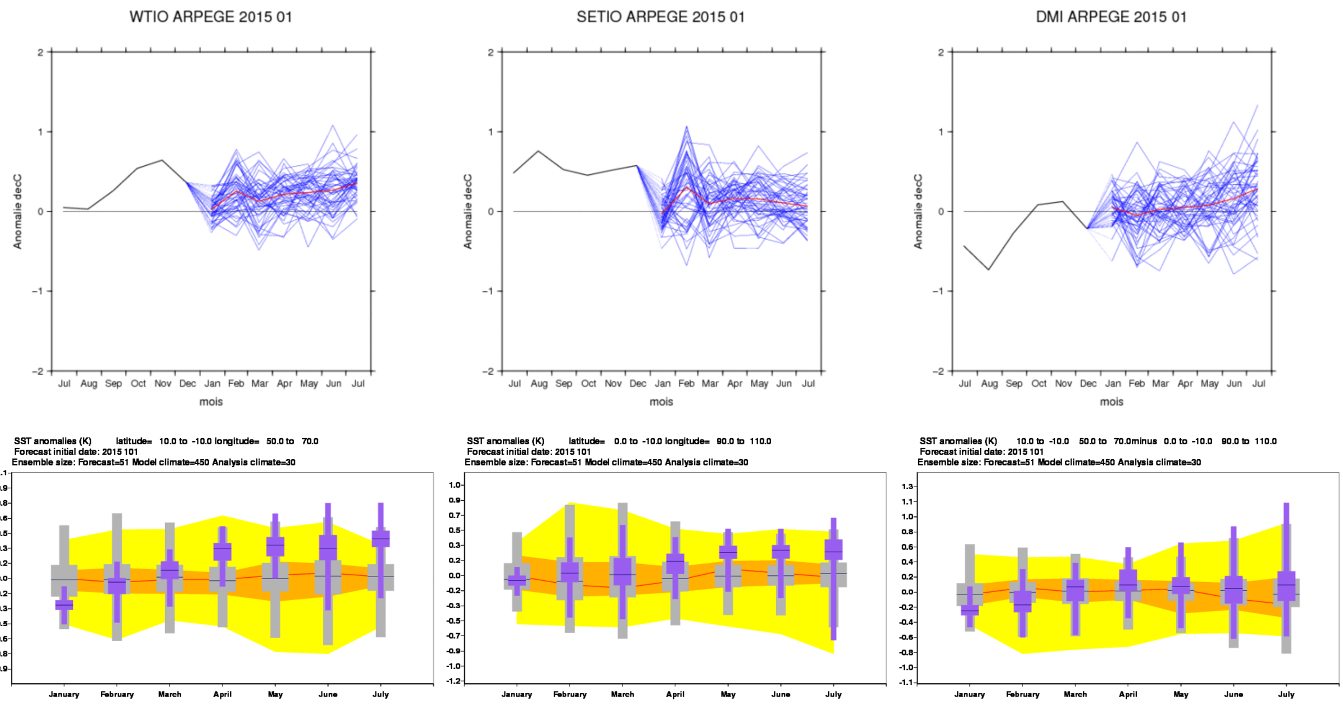


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

I.1.i Indian ocean forecasts



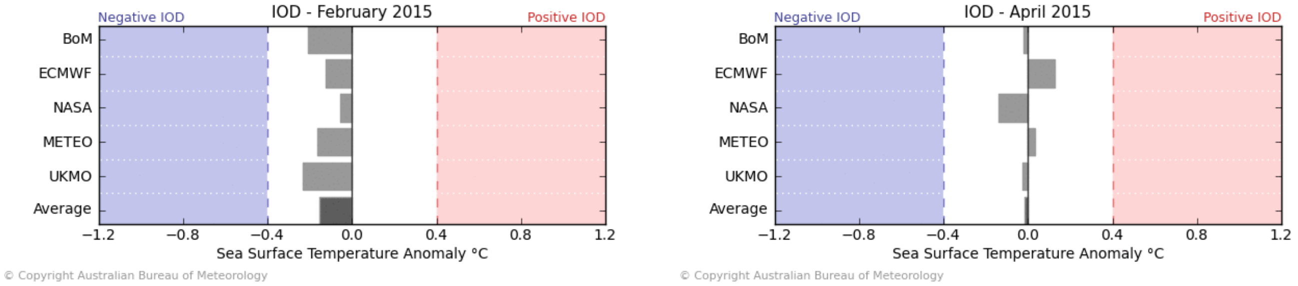


fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

DMI (IOD) : close to neutral

II.2.GENERAL CIRCULATION FORECAST

I.1.j Global forecast

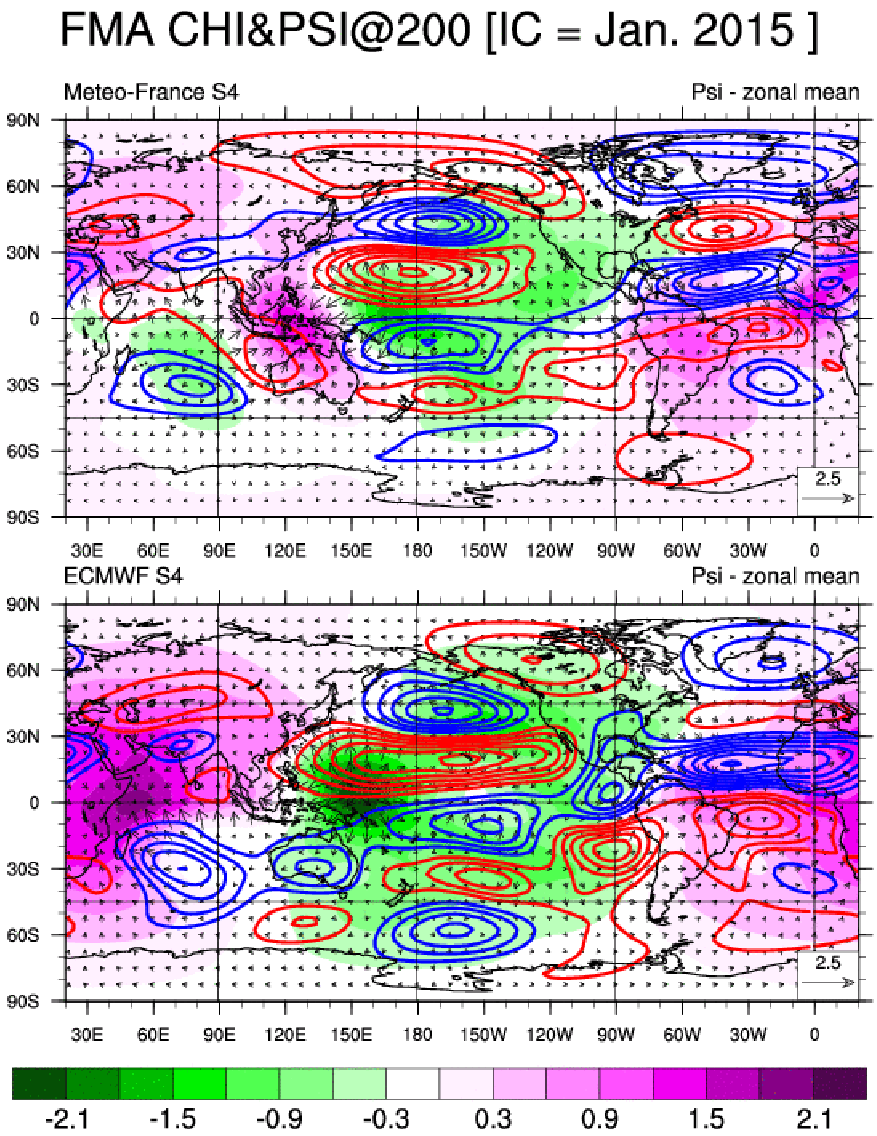


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

<u>Velocity potential anomaly field (cf. fig. II.2.1 – insight into Hadley-Walker circulation anomalies) :</u>

Good consistency Over the Pacific and Altantic Oceans, but big difference in the forecasted intensity of phenomena over Indian Ocean and Maritime Continent.

In line with previous months, wide upward motion area forecasted over the Pacific with with maximum intensity over western bassin.
Conversely, downward motion aera forecasted on the Atlantic, on South America and Africa.

<u>Stream Function anomaly field (cf. fig. 19 – insight into teleconnection patterns tropically forced) :</u>

In the Pacific Ocean, teleconnection patterns of PNA type, onto Alaska and western Canada.

In the Atlantic, teleconnection to the mid-latitudes with a cyclonic anomaly aera in the intertropical belt, an anticyclonic anomaly aera between 30°N and 45°N, and a cyclonic anomaly aera further north.

Quite good consistency between the models ECMWF and MF on Europe

I.1.k North hemisphere forecast and Europe

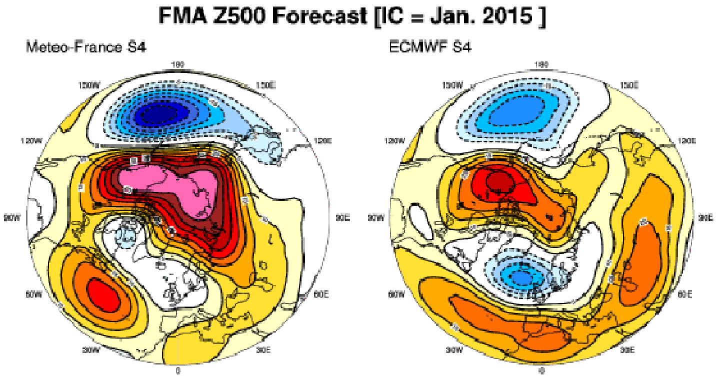


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip

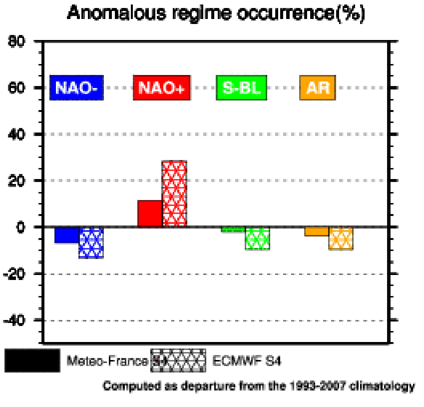


fig.II.2.3: North Atlantic Regime occurrence anomalies from Meteo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

Geopotential height anomalies (fig. II.2.2 – insight into mid-latitude general circulation anomalies) :

Fairly good consistency in the positioning of structure anomalies of Z500 between ECMWF and MF models.

However, anomaly intensities are quite different especially on Europe where ECMWF provides a much stronger gradient, with a stronger low geopotentiel anomaly between Ireland and Iceland, and a stronger high geopotentiel anomaly on southern Europe.

North Atlantic Circulation Regimes (fig. II.2.3) :
Forecasted regime occurrence anomalies are quite consistent between ECMWF and MF models. However, the NAO+ tendancy is stronger in ECMWF due to stronger gradient of geopotentiel over the near Atlantic.

II.3. IMPACT : TEMPERATURE FORECASTS

I.1.l ECMWF

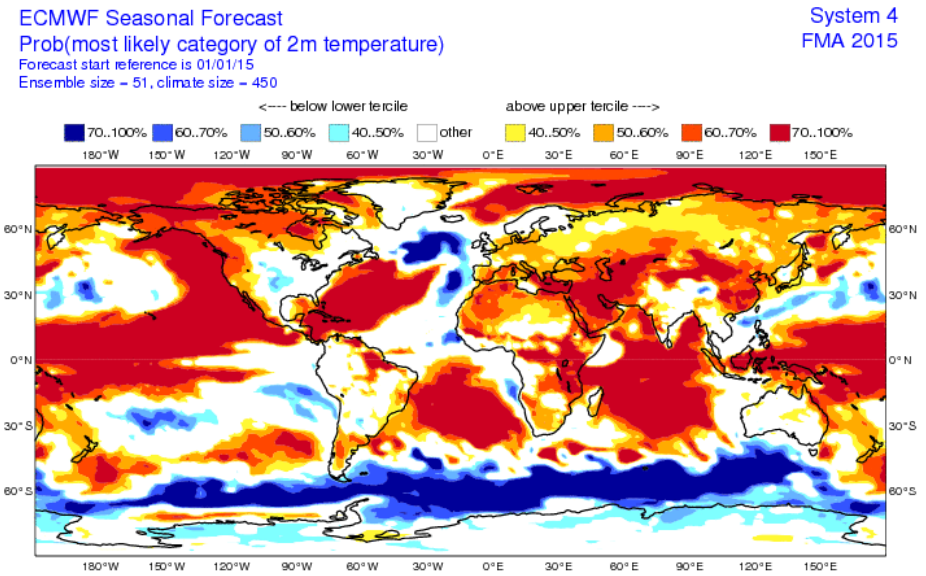


fig.II.3.1: Most likely category probability of T2m from ECMWF.

I.1.m Météo-France

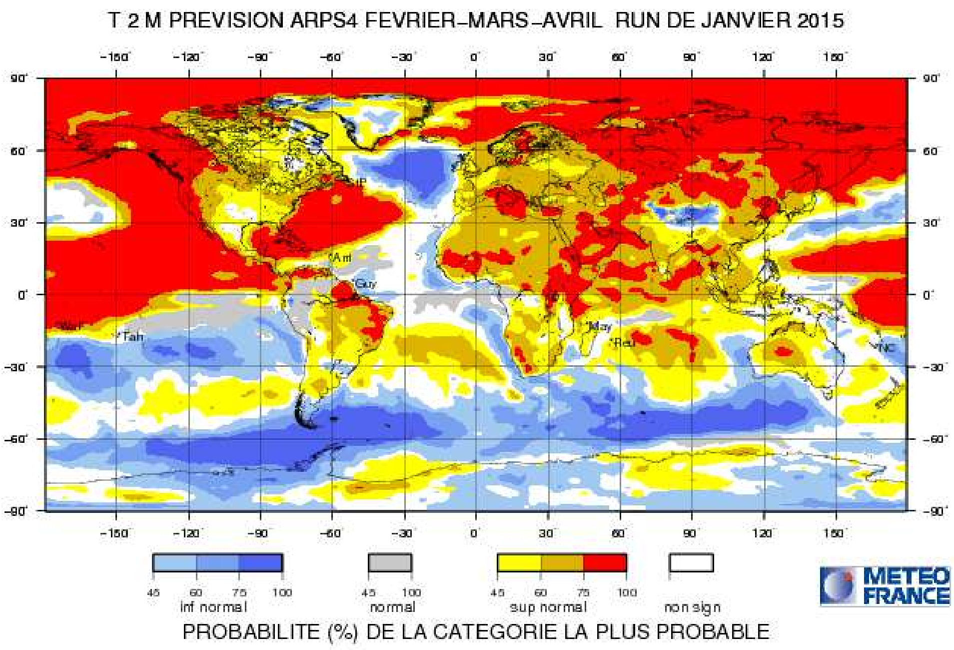


fig.II.3.2: Most likely category of T2m.

I.1.n Japan Meteorological Agency (JMA)

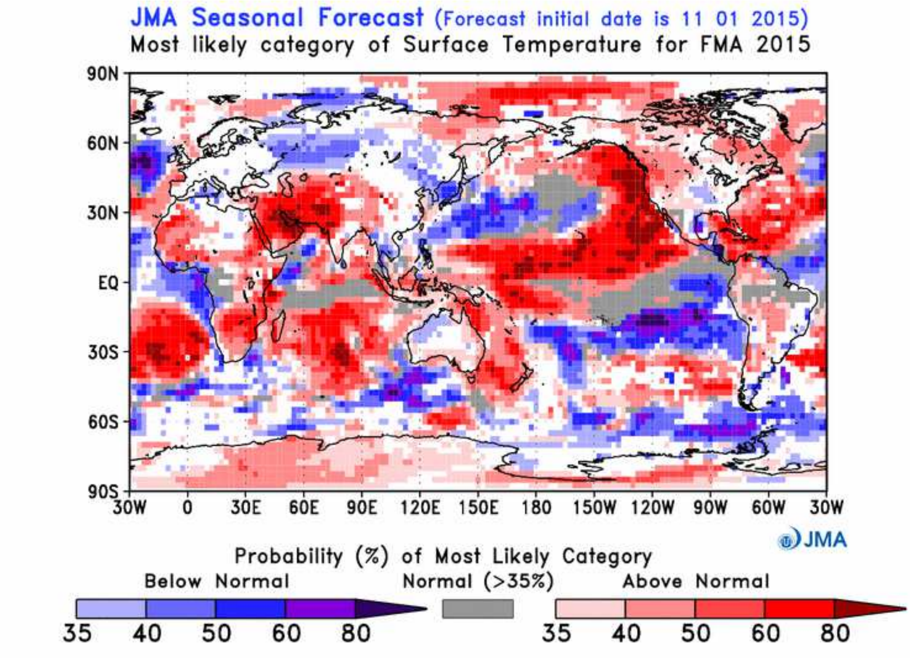


fig.II.3.5: Most likely category of T2m.

I.1.o Euro-SIP

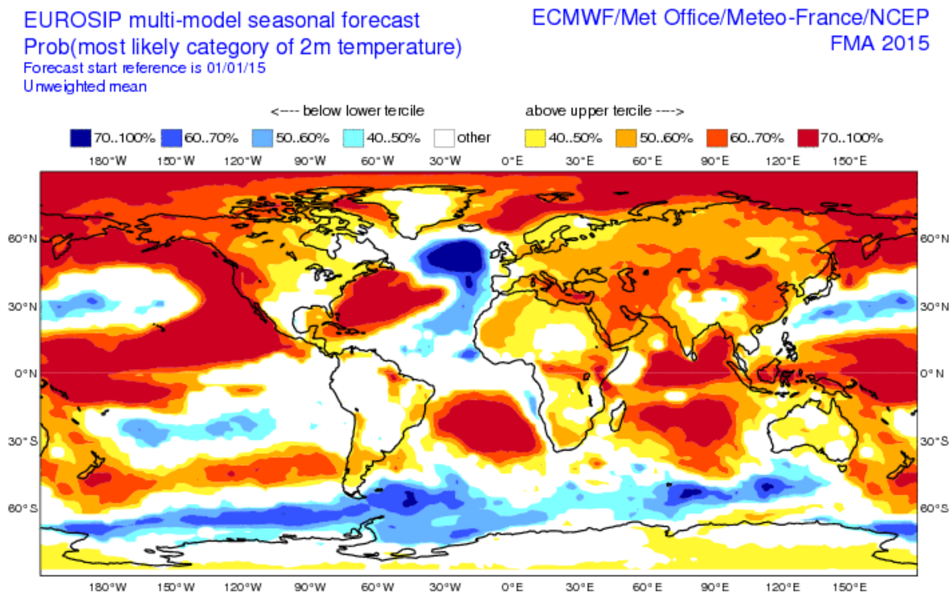


fig.II.3.7: Multi-Model Probabilistic forecasts for T2m from EuroSip

On Europe : still an Atlantic Ocean influence enhanced.
On Western Europe : near normal or little warmer than normal.
On Estern Europe : enhanced probabilities for warm anomalies.

On Asia : enhanced probabilities for warm anomalies.

On Africa : slightly enhanced probabilities for warm anomalies.

On the Indian Ocean, on Maritime Continent and Western Pacific Ocean : enhanced probabilities for warm anomalies.

On western North America : enhanced probabilities for warm anomalies.

II.4.IMPACT : PRECIPITATION FORECAST

I.1.p ECMWF

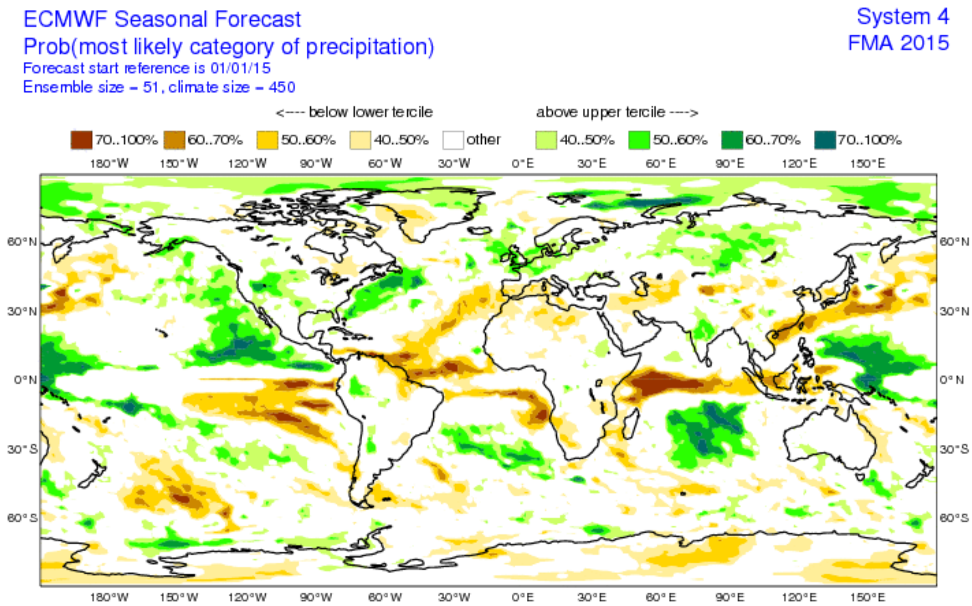


fig.II.4.1: Most likely category probability of rainfall from ECMWF.

I.1.q Météo-France

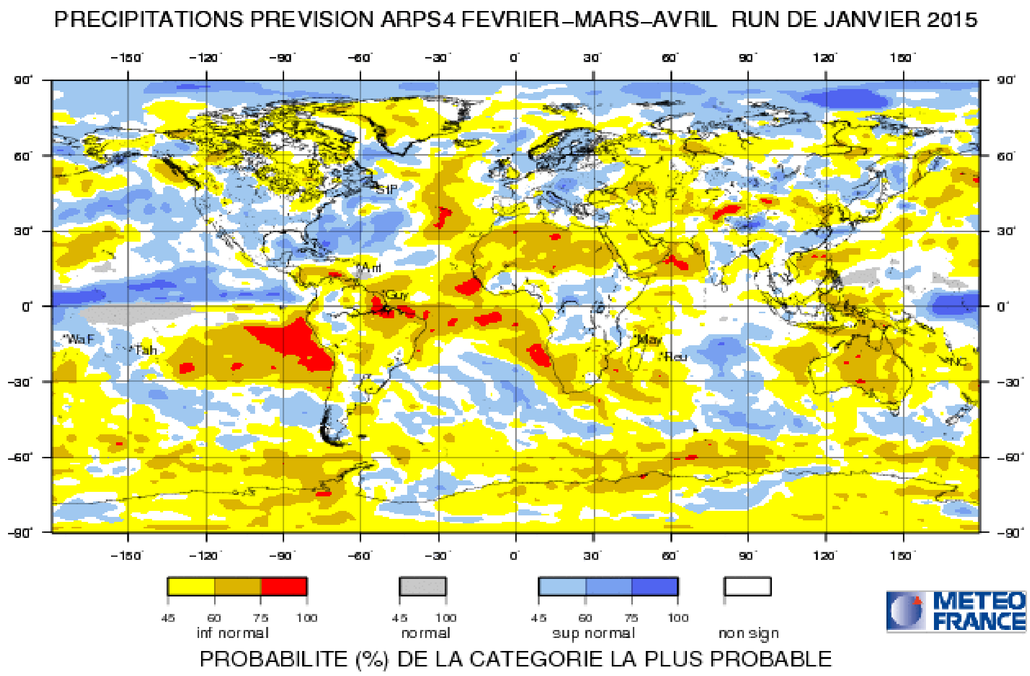


fig.II.4.2: Most likely category of Rainfall.

I.1.r Japan Meteorological Agency (JMA)

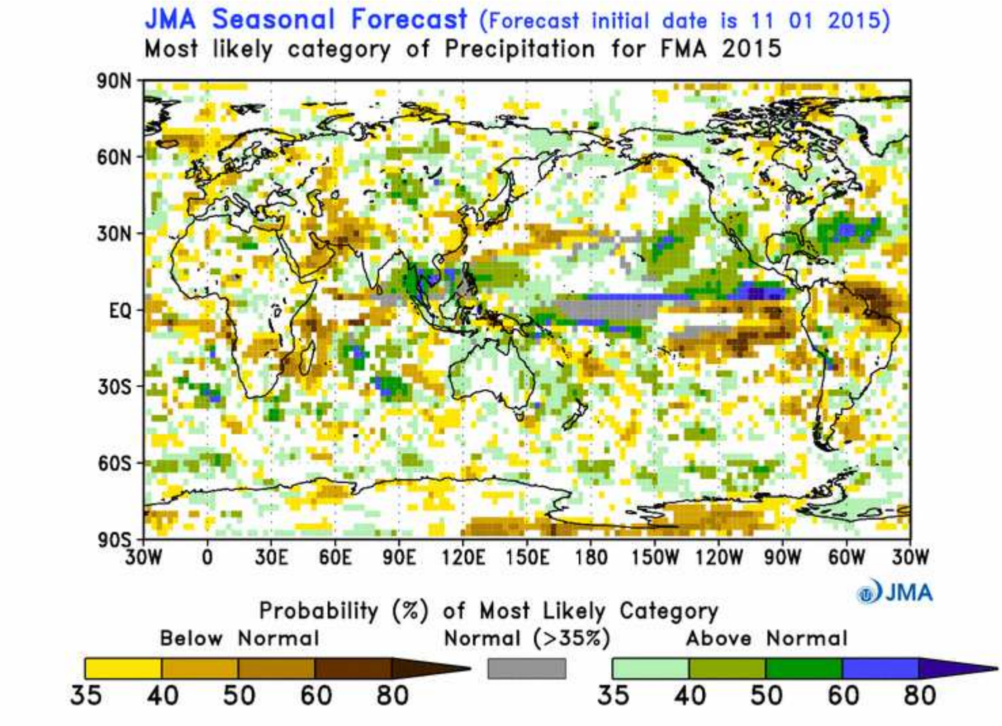


fig.II.4.5: Most likely category of Rainfall from JMA.

I.1.s Euro-SIP

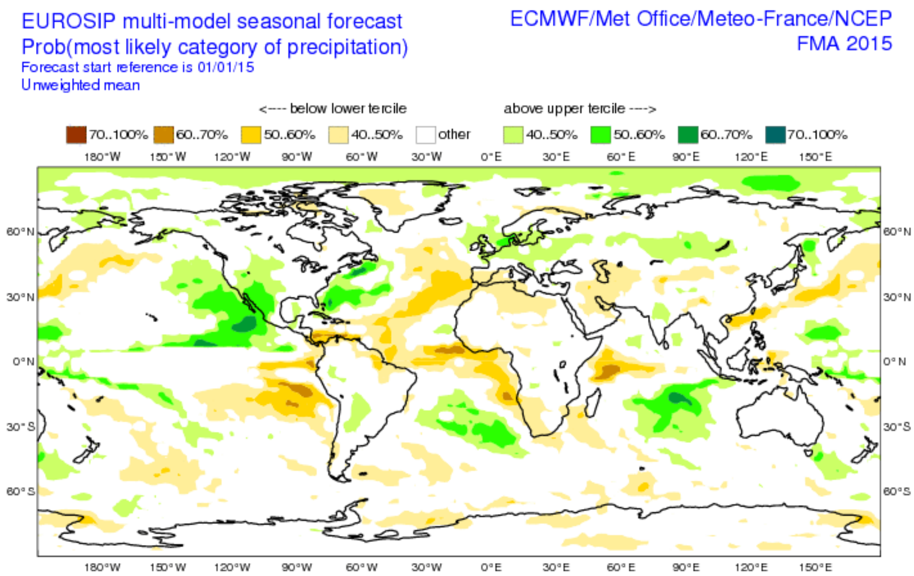


fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EuroSip

Anomaly are generaly weak.

On Europe : enhanced probabilities for a dry scenario on southwest of Europe, enhanced probabilities for a wet scenario on Northern and Estern Europe.This contrast is stronger in ECMWF forecast than in MF forecast.

On North America : enhanced probabilities for a wet scenario on western USA and Mexico

On South America : very weak signal. A little El Nino ending influence with a little wet signal on the west part and a little dry signal on the est part.

II.5. REGIONAL TEMPERATURES

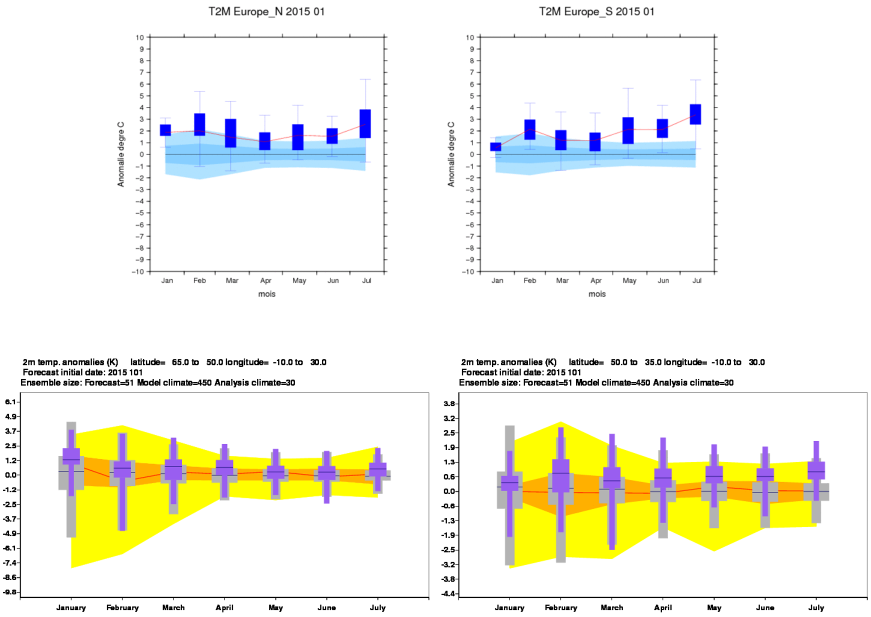
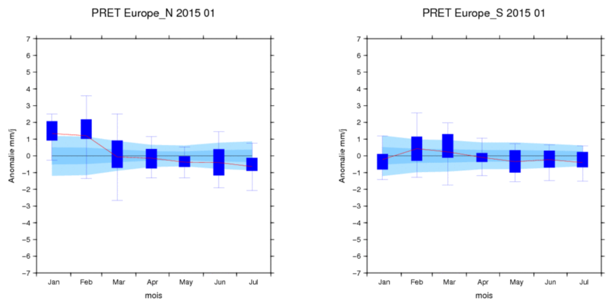


fig.II.5.1 : Climagrams for Temperaturel in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

A warm consistent signal in both models, even if runs are much more dispersed in MF than



ECMWF

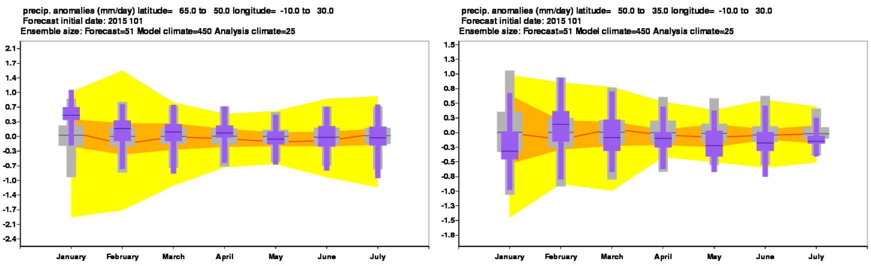


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

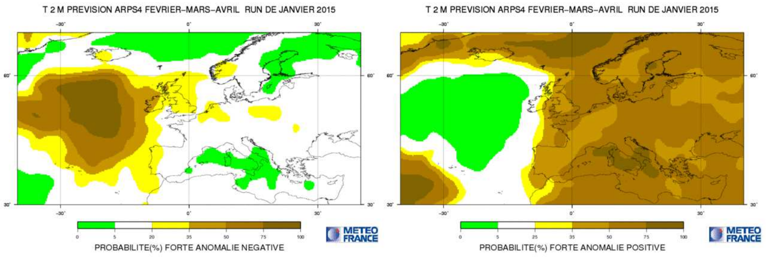
Wetter than normal in northern Europe.

II.6. MODEL'S CONSISTENCY

Not available

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

II.7. "EXTREME" SCENARIOS



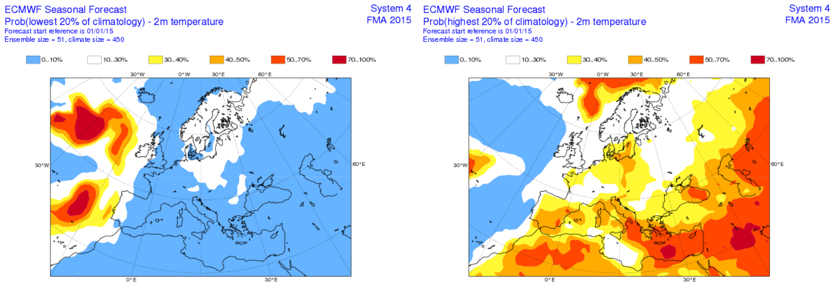


fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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

warmer than normal signal in both models, perhaps stronger in MF.

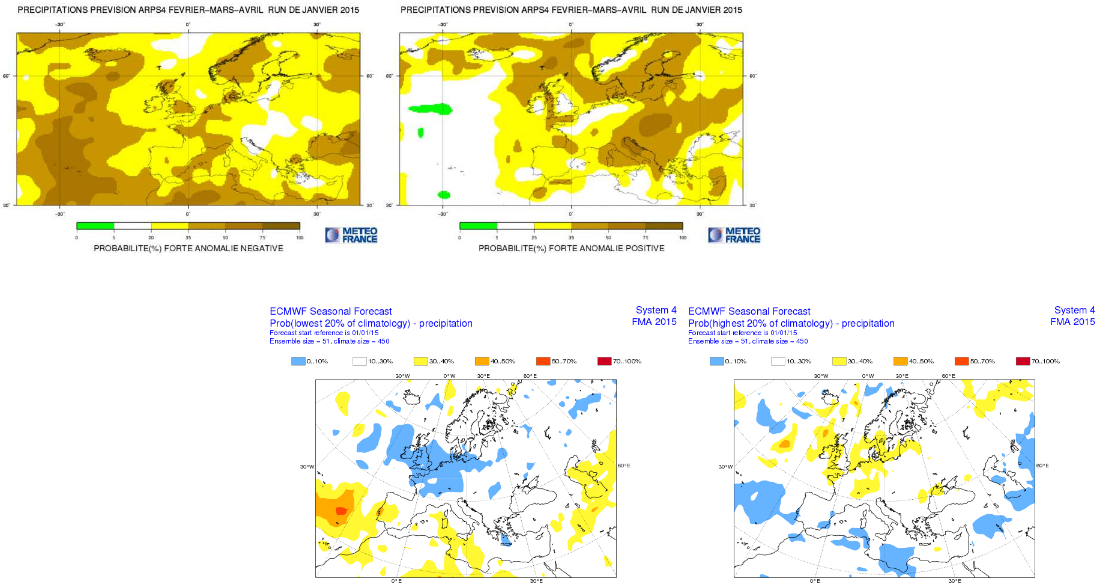


fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

No clear signal in MF. In ECMWF, clear wet signal in northern Europe, drier than normal in southern aera.

II.8. DISCUSSION AND SUMMARY

I.1.t Forecast over Europe

Over the Northern hemisphere, some models show teleconnections from tropics to mid-latitude in the Pacific and in the Atlantic Ocean. The mean circulation patterns are very consistent over the Atlantic Ocean. The NAO+ scenario is privileged by MF and ECMWF.

Over Europe, this scenario should lead to a normal or warmer than normal situation over Werstern Europe, and clearly warmer than normal over Estern Europe.

Concerning precipitation, a “wet” scenario is privileged on Northern Europe and a dry scenario on the Southern Europe.

I.1.u Tropical cyclone activity

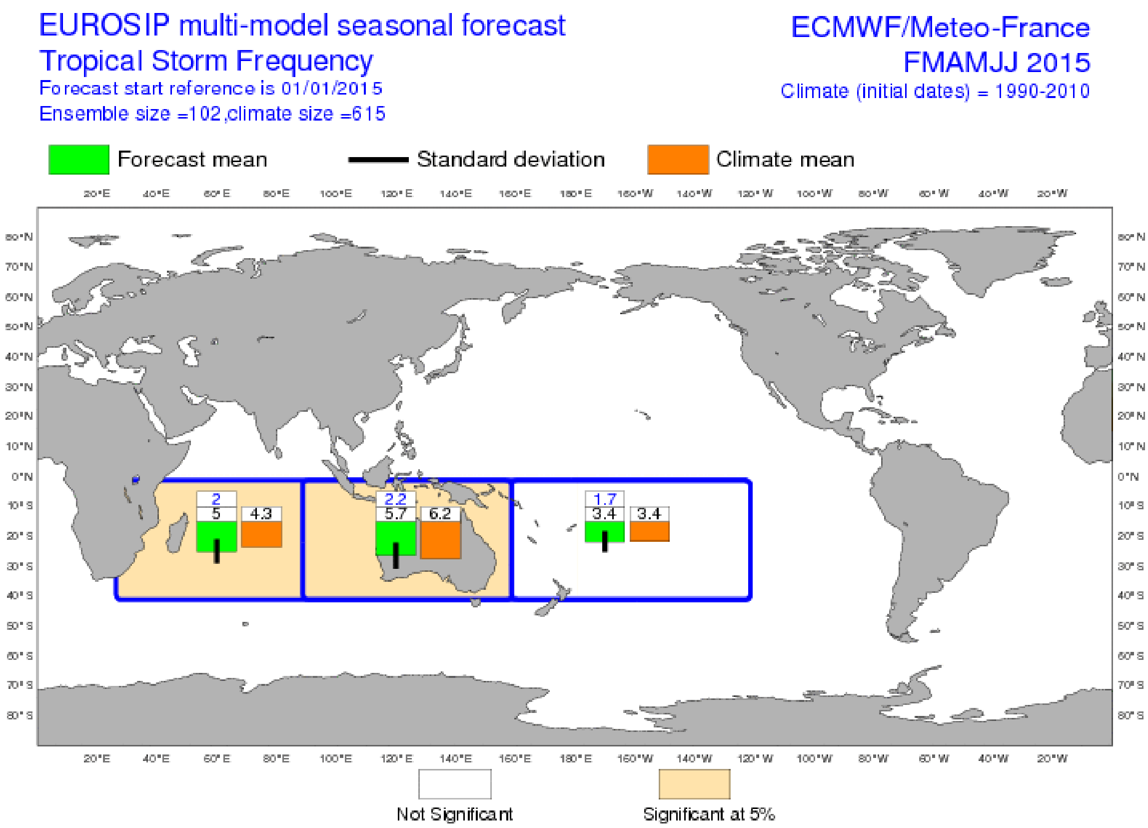


fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF). For the Tropical Cyclone season and in relationship with the SSTs scenarios, Euro-Sip forecasts indicate

For the next 6 months : tropical cyclone season forecast is significantly stronger than normal in western Indian Ocean and significantly weaker than normal in estern Indian Ocean.

WMO RA VI
RCC Network

Synthesis of Temperature forecasts for February-March-April 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 February-March-April 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*	*Above normal*	*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.

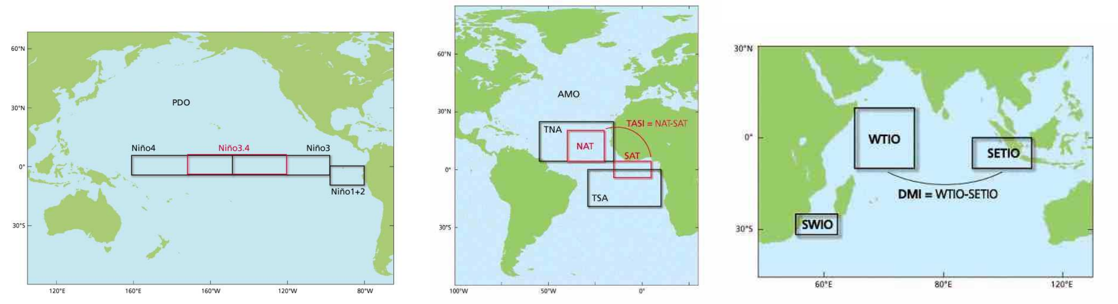
III.2. « NINO », SOI INDICES AND OCEANIC BOXES

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).

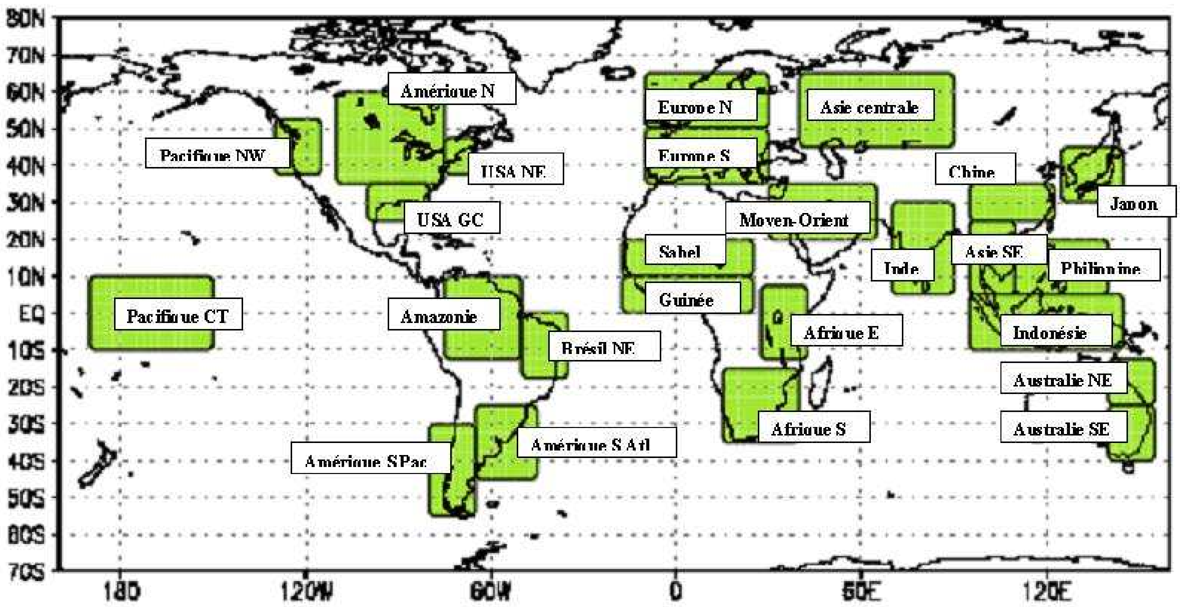
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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

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