WMO RA VI
RCC Network

METEO FRANCE
Toujours un temps d'avance

GLOBAL CLIMATE BULLETIN
n°191 – May 2015

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I. DESCRIPTION OF THE CLIMATE SYSTEM (MARCH 2015)

I.1. Oceanic analysis

March conditions analysis :

In the Pacific ocean
In the equatorial waveguide **:**

surface: positive SST anomaly in west central basin with a maximum on the International Date Line. Negative SST anomaly over the west extreme, near Indonesia and Papoua with further cooling during March. Conditions close to neutrality in the eastern basin.
subsurface: Further substantial warming in the centre of the basin without significant movement during March. Cooling in the western part of the basin

ENSO : Niño 3.4 index stable, close to + 0.6 ° C in March, just above the Nino threshold. Increase of Niño1 + 2 index up to +0.1°C.

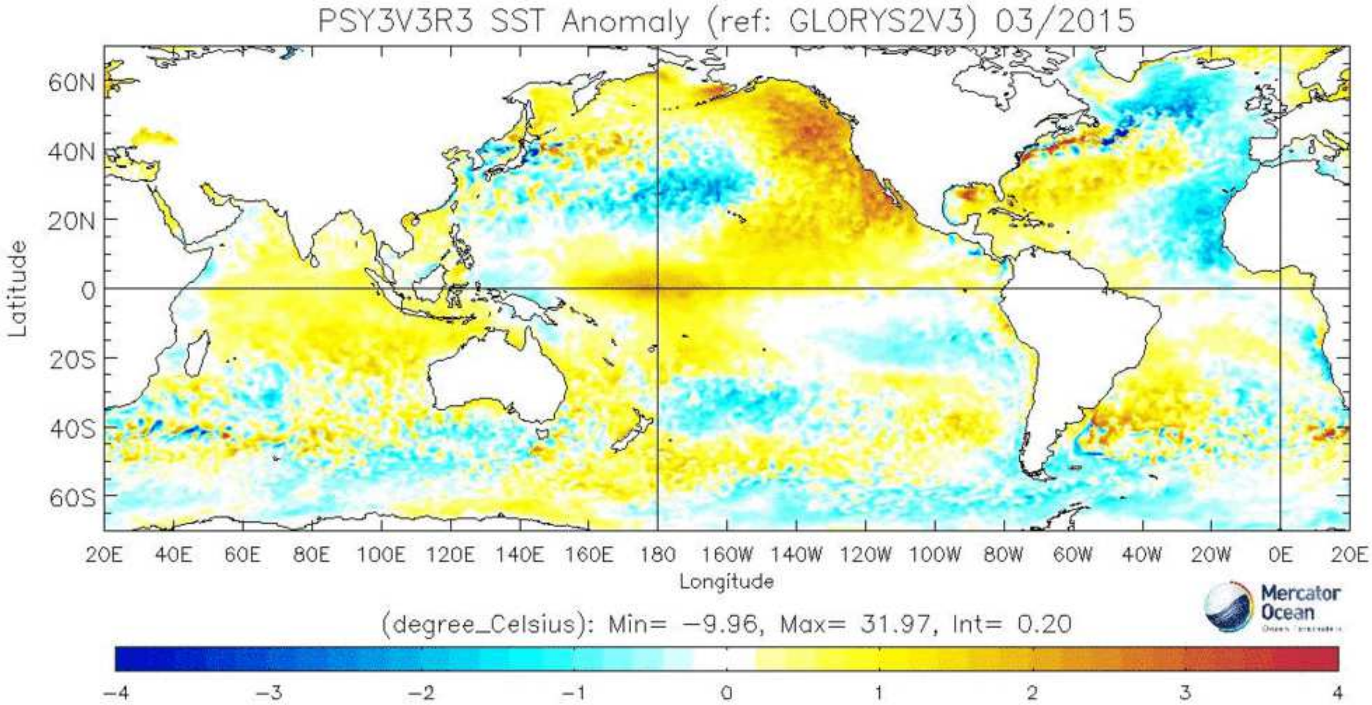
In the northern hemisphere: still a quite strong positive PDO structure (NOAA index : +1.3), with very strong warm anomaly along North America coast.

In the southern hemisphere: warm anomaly west of Polynesia, from equator to 20°S. Cold anomaly further south. General cooling trend, except nearby New-Zealand and South America coast.

In the Indian Ocean :
Persistent warm anomaly over much of the basin down to 20°S. Back to an IOD index near to 0 in March.

In the Atlantic :

Quite strong warm anomaly from Gulf of Mexico to the Sargasso Sea with further warming in March. Also a warm anomaly along the South America coast. Cooling trend elsewhere with strong negative anomaly in cold horseshoe structure from Newfoundland to the British coast and off West Africa. Neutral conditions on the equator and in South Atlantic which continued to cool sharply in March.



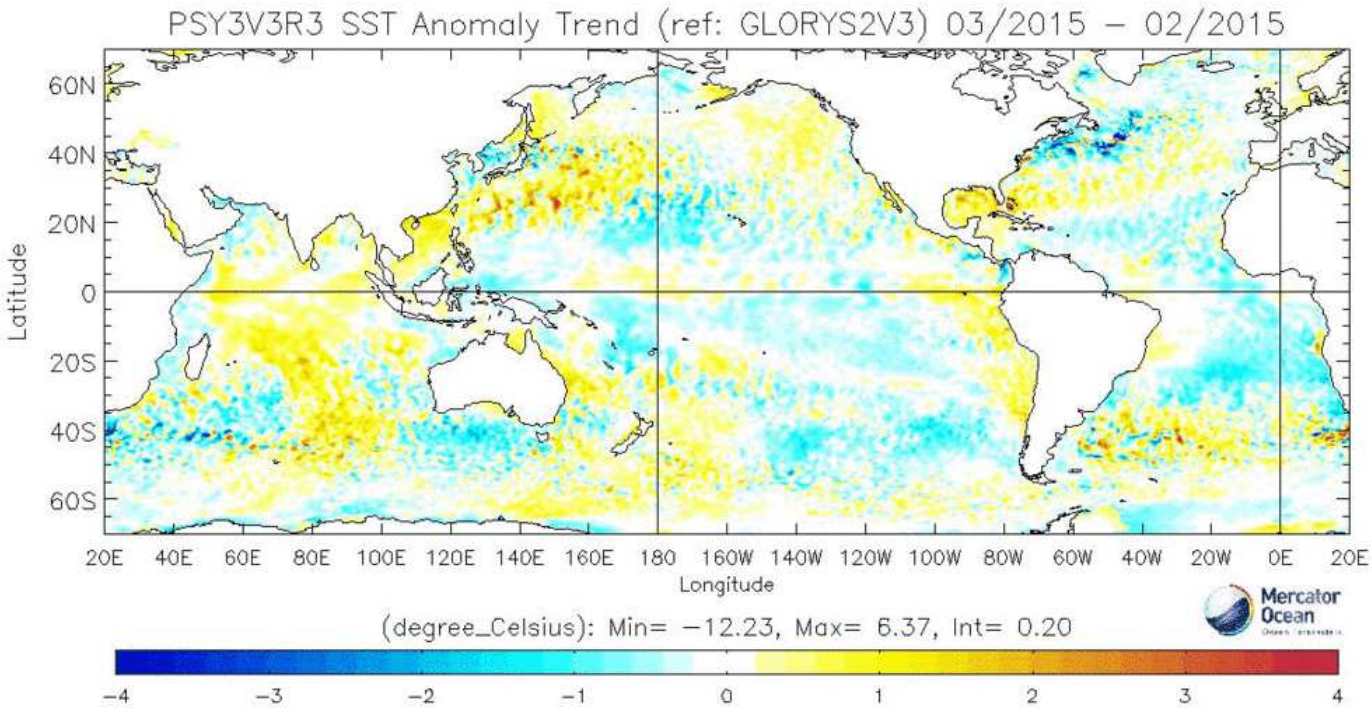


fig.I.1.1: top : SSTs Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

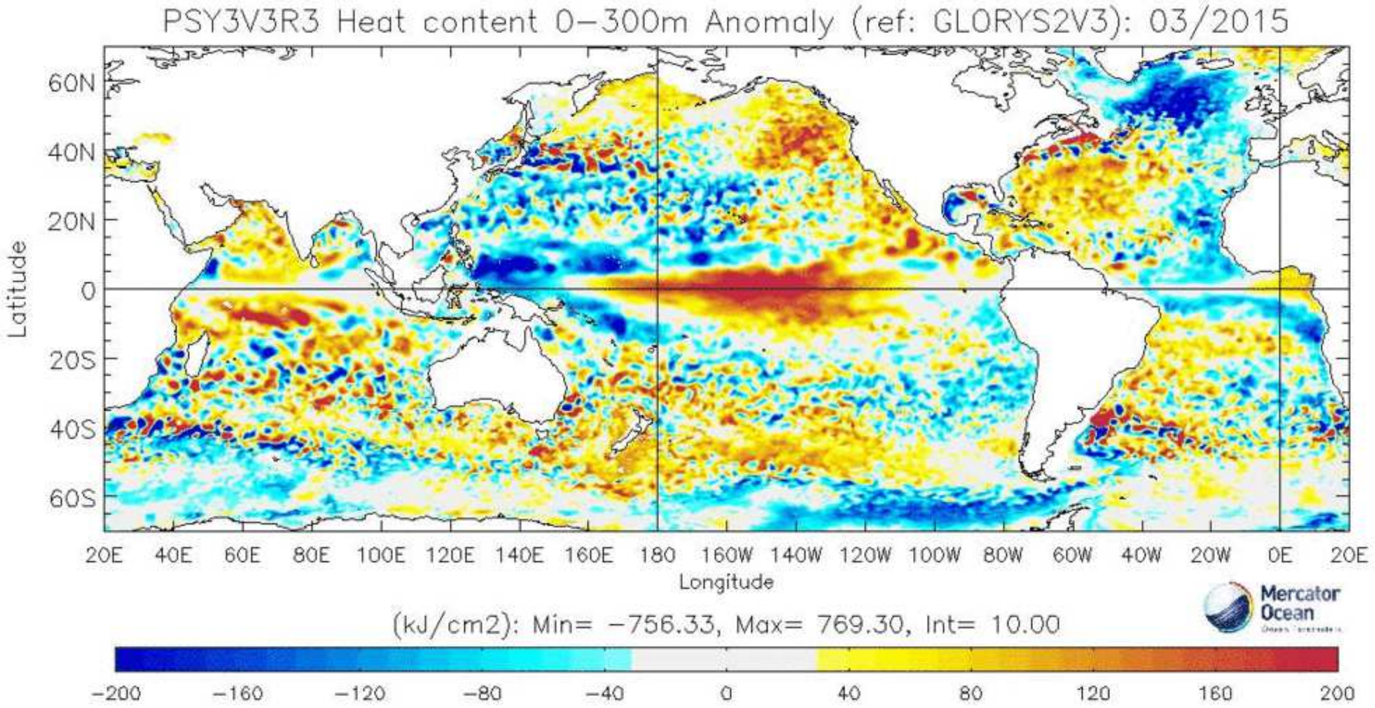


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2009)

http://bcg.mercator-ocean.fr/

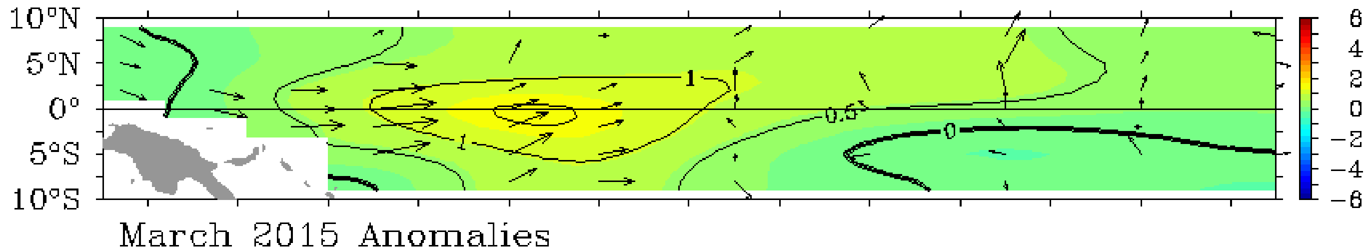


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON.

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

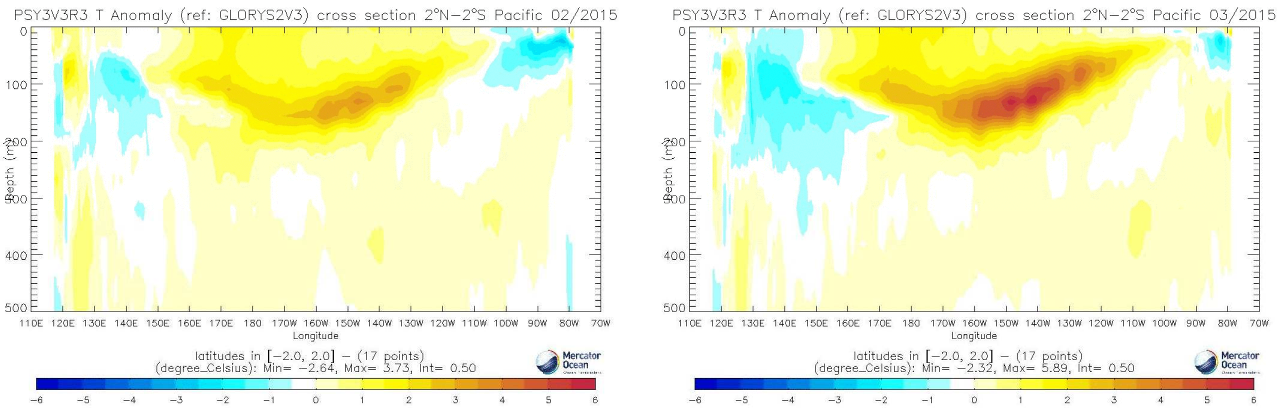


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), http://bcg.mercator-ocean.fr

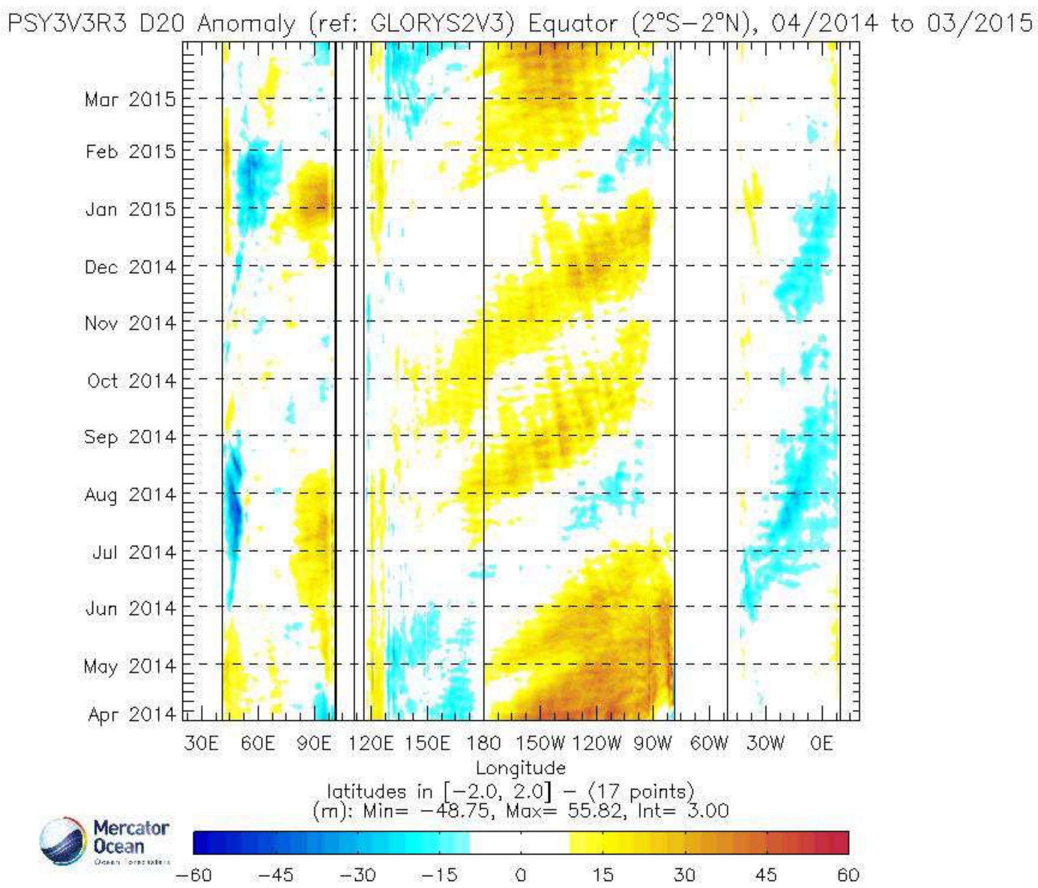
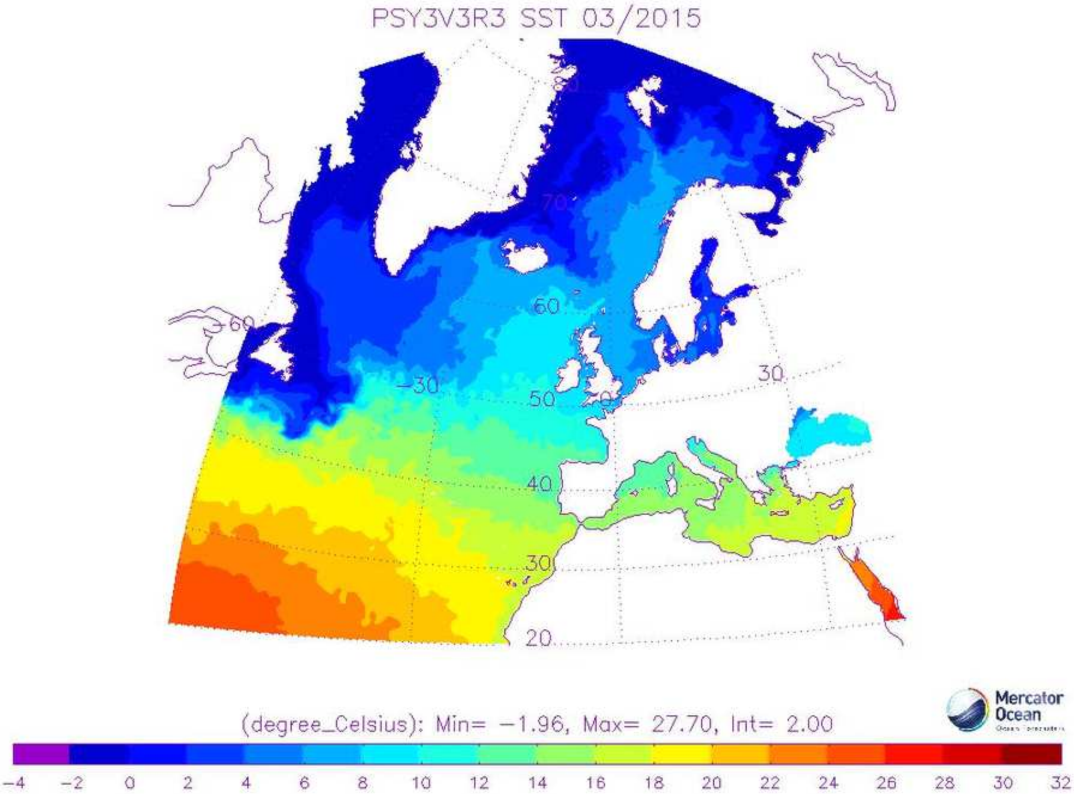


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period http://bcg.mercator-ocean.fr/

Sea surface temperature near Europe :

Generally not much change of SST anomalies from February to March 2015 near Europe. Still colder than normal in the eastern Atlantic from South Greenland / Iceland to Iberia / West Africa and in the Western Mediterranean. Still warmer than normal in the Arctic Sea, North Sea, Baltic Sea, Black Sea and Eastern Mediterranean basin. Since there is only little change also in absolute SST at that time of season, this points to quite stable oceanic conditions in this area.



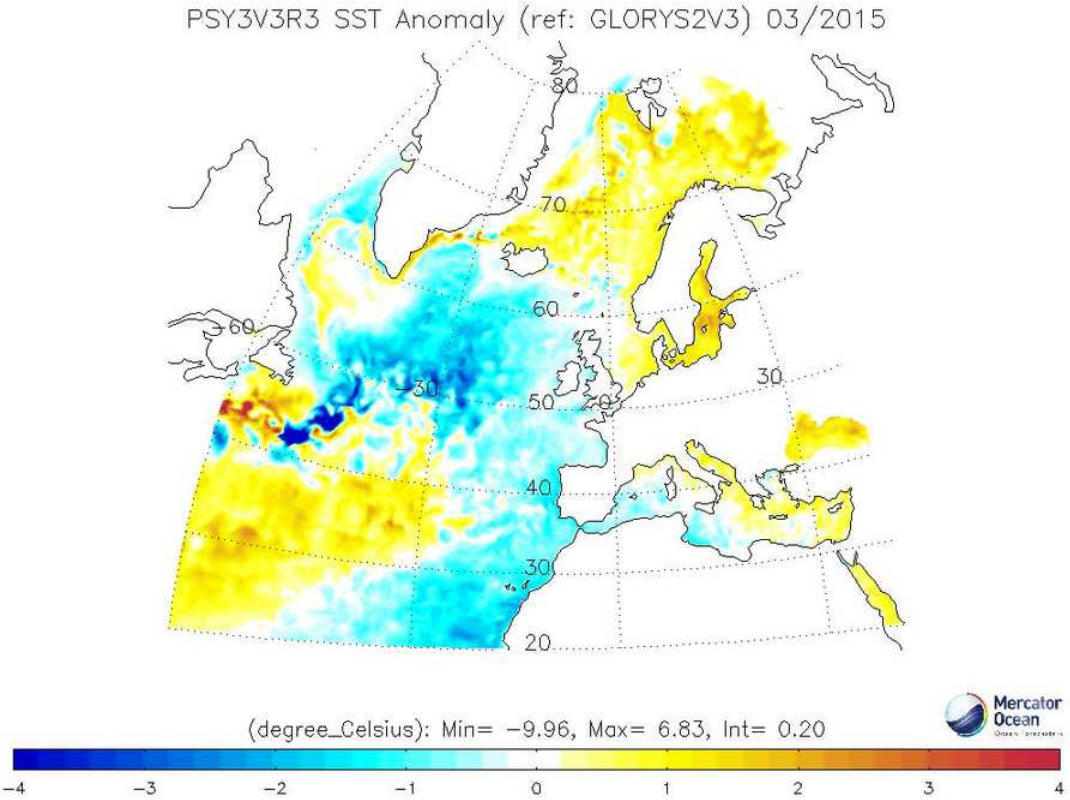


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

I.2. ATMOSPHERE

I.2.a General Circulation

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

Over Pacific, strong upward motion core on the international date line, linked with the SST and enforced by a remarkable episode of MJO during March. Strong downward motion anomaly over the Maritime Continent, South-eastern Asia and the Indian Ocean

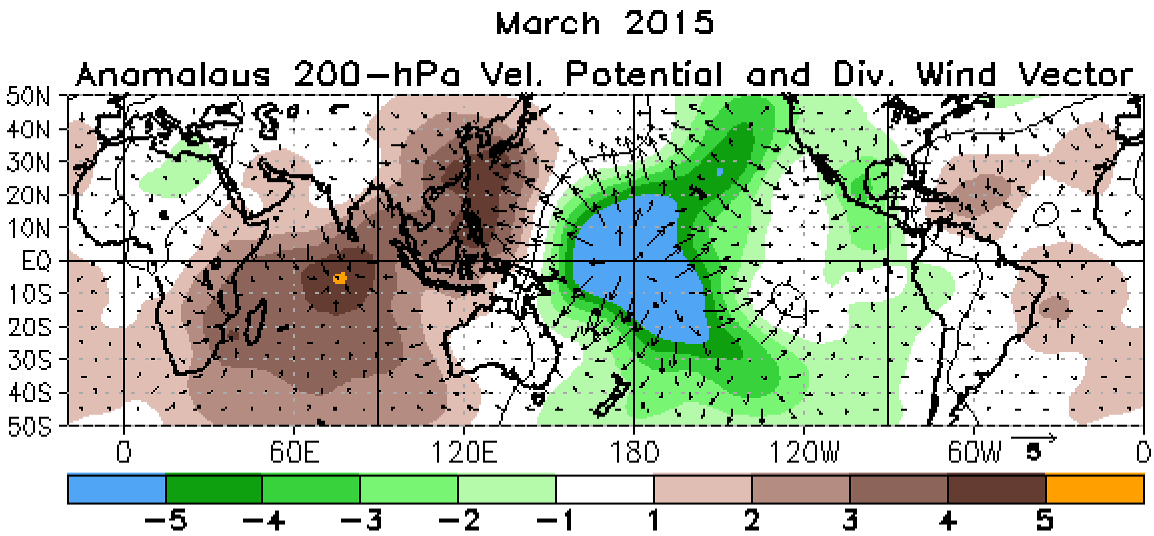


fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

- MJO (fig. I.2.b)

Remarkable episode of MJO with particularly high values in mid-month.

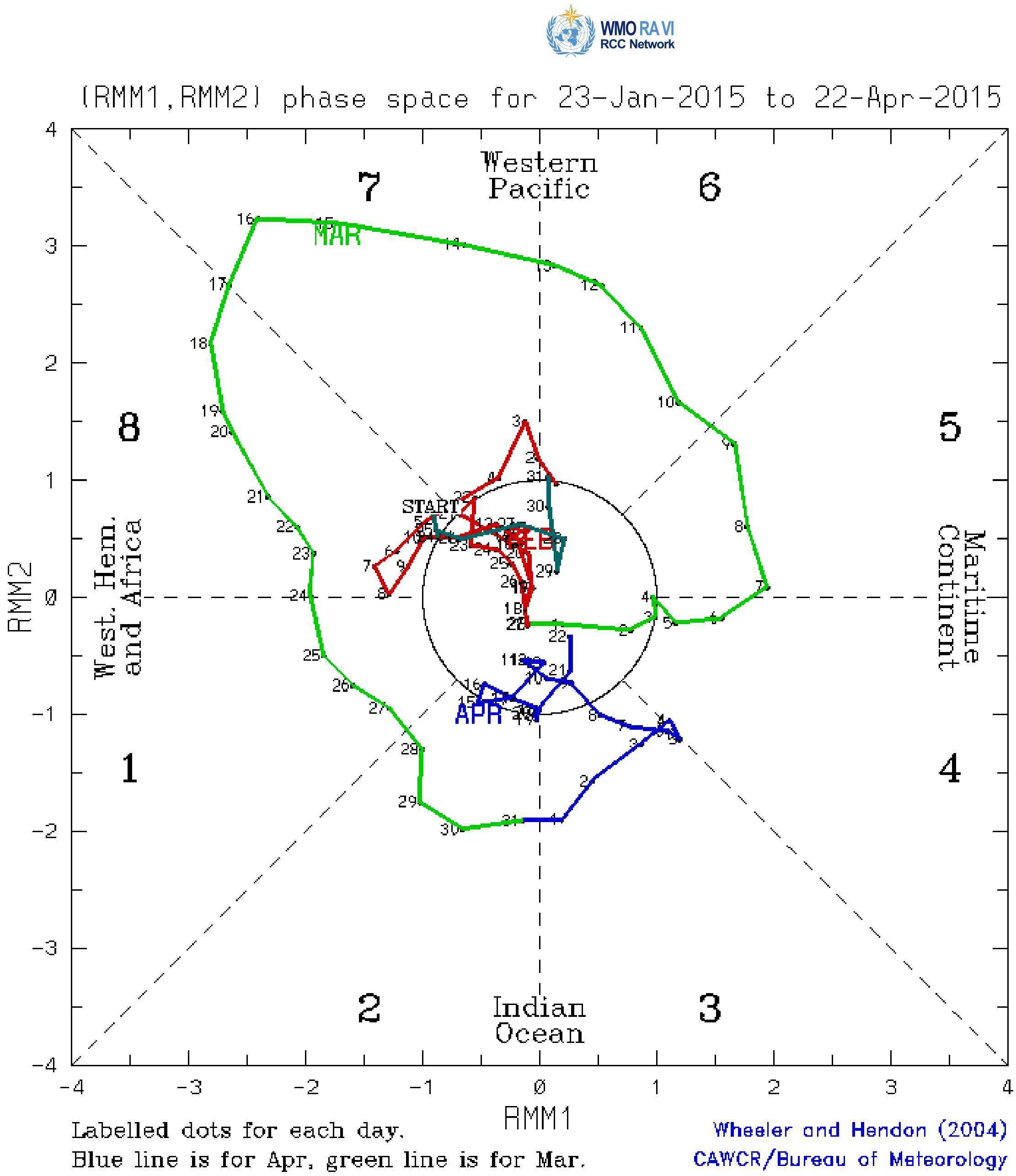


fig.I.2.b: indices MJO http://cawcr.gov.au/staff/mwheeler/maproom/RMM/phase.Last90days.gif

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

No coherent structure of stream function in average during March.

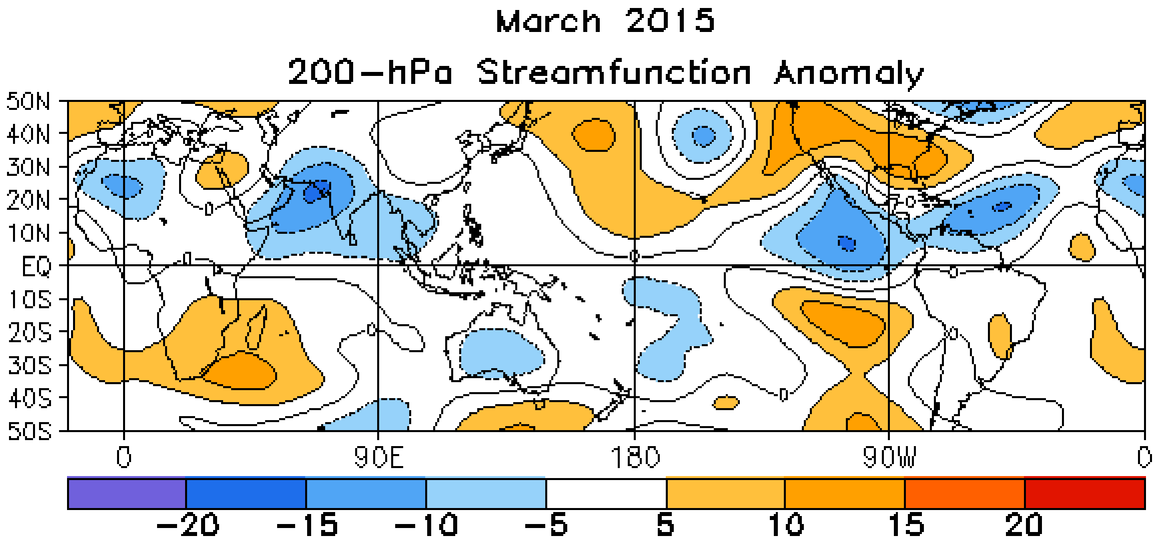


fig.I.2.2: Stream Function Anomalies at 200 hPa.

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 north hemisphere : strong low geopotential anomaly centred on Labrador, surrounded by a belt of high geopotential, with a maximum on the west coast of North America, extending across the USA to Florida and across the Atlantic to Europe and an other maximum on West Russia. Positive values of AO, NOA, EA and PNA index. Weather regimes of March are mainly NAO+ and Scandinavian blocking.

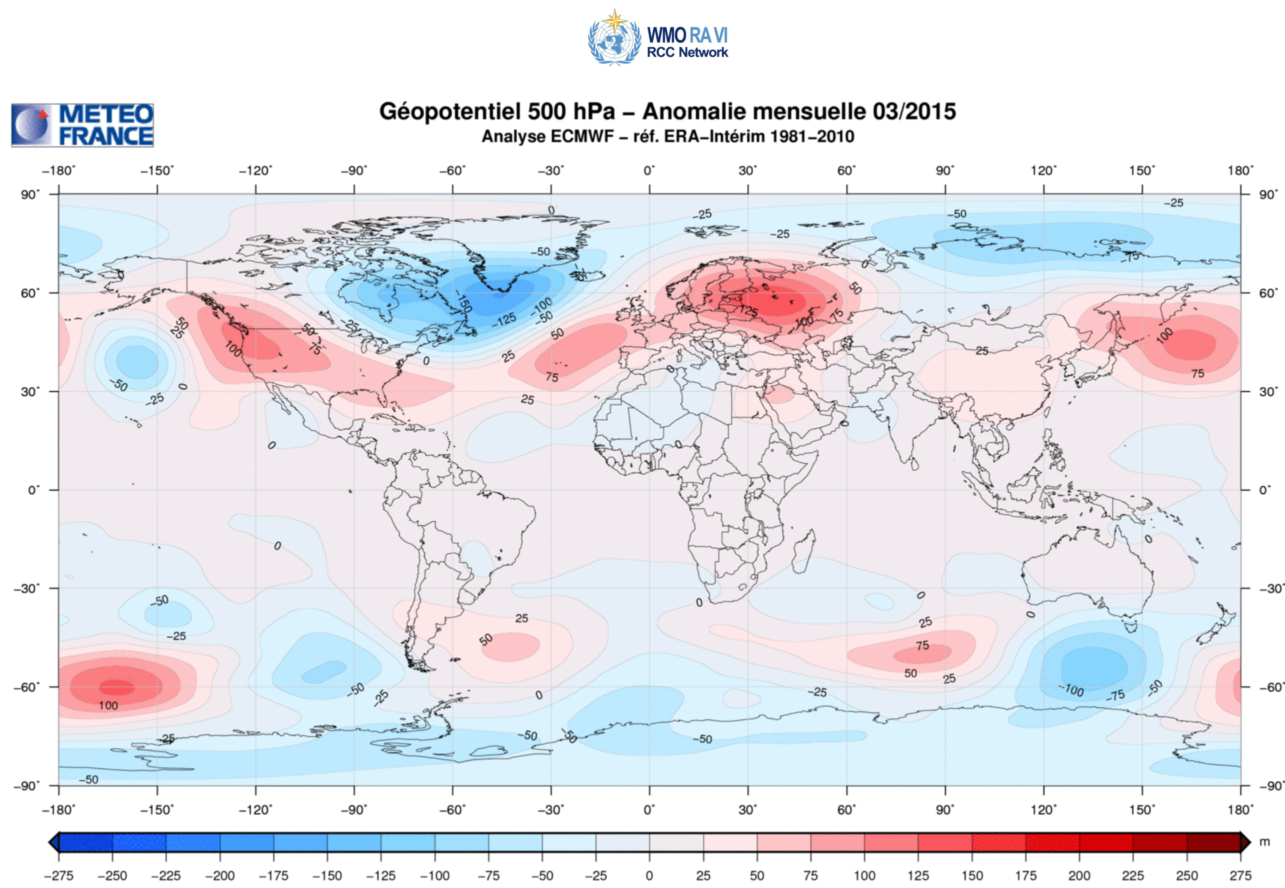


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
MAR15	1.1	1.2	0.4	1.1	-0.5	---	0.3	0.4	0.7
FEB 15	1.1	0.0	-1.4	1.2	0.5	0.7	-0.9	-0.4	2.1
JAN 15	1.6	1.1	-0.2	1.3	0.1	0.4	-0.2	-0.2	0
DEC 14	1.6	-0.6	-0.1	---	0.4	-0.2	-0.4	-0.4	-0.9
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

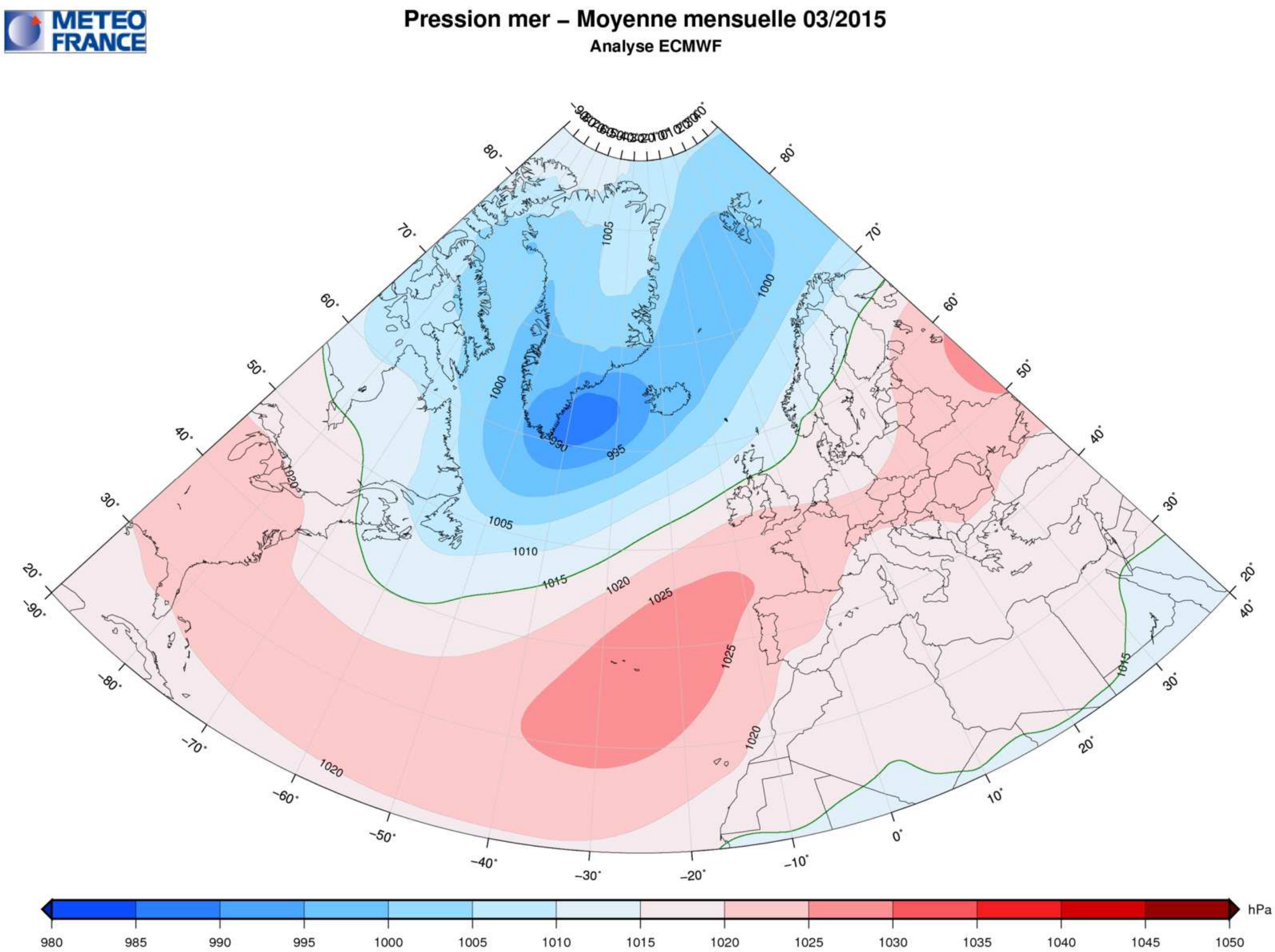
Evolution of the main atmospheric indices for the Northern Hemisphere for the last 6 months : http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/table3.shtml

Sea level pressure and circulation types over Europe

Continuation of a long-lasting positive NAO mode, with same index value like in February (+1.1), resulting again in more-intense-than-normal Icelandic Low and Azores High. In addition, a regeneration of a positive EA mode (+1.2, after 0.0 in February) of similar intensity. EA seems to contribute to the increase of intensity of a high pressure bridge over Europe, but does not really explain the high geopotential and SLP over West Russia. It might be explained partly by the patterns POLEUR (+0.7) and SCAND (+0.4), but contributions of each are quite weak.

Since the Azores High was much extended to the north, Atlantic air masses often moved over middle and northern Scandinavia, causing stormy gusts, mild and humid weather conditions.

To be noted the negative anomaly over the western/central Mediterranean both in 500 hPa geopotential and SLP, reflecting several low pressure systems over this area.



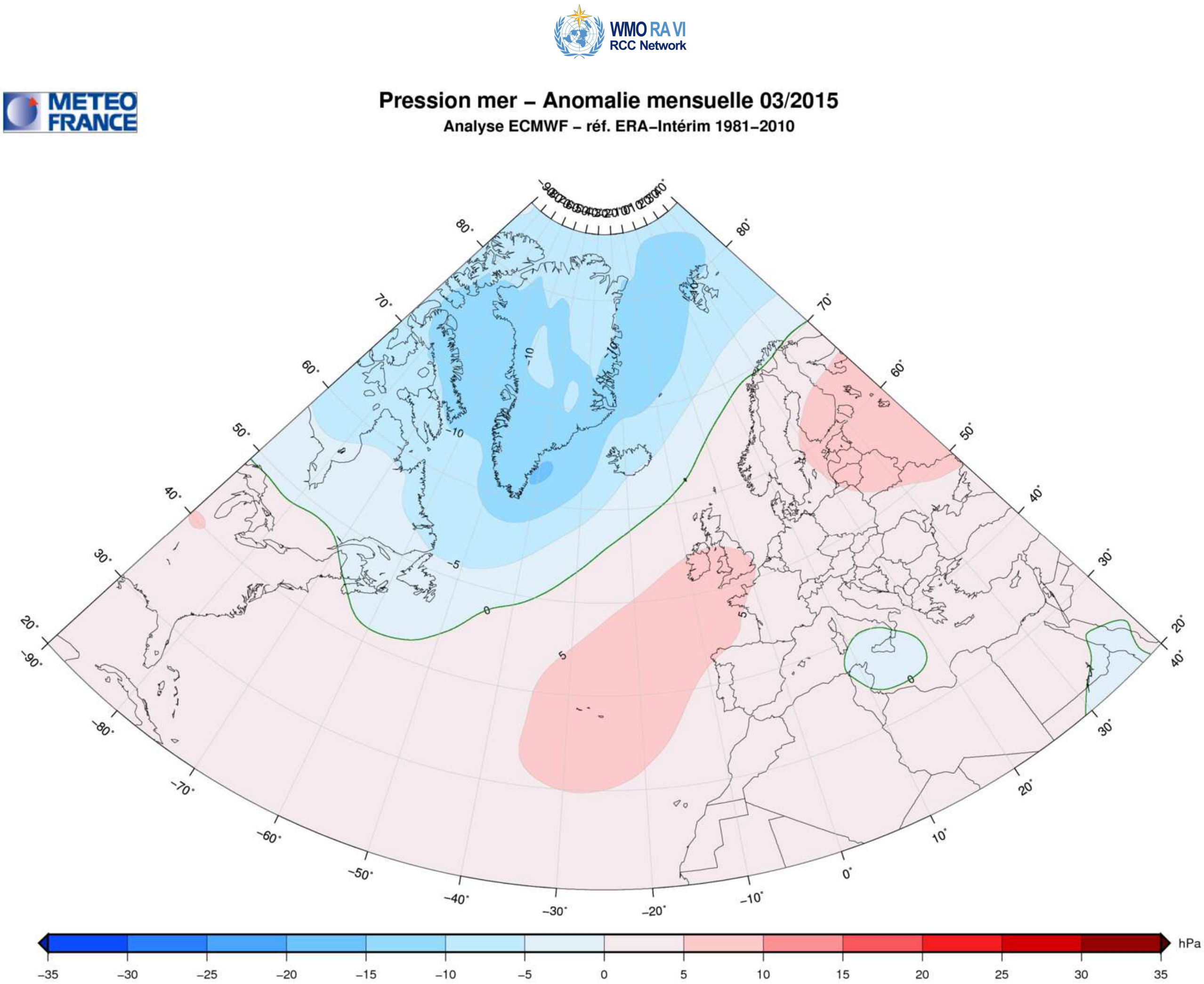


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (top) and 1981-2010 anomalies (bottom).

Circulation indices: NAO and AO

The positive NAO mode continued during the whole month and was most intense at the beginning and particularly at the end. Only in the middle of the month it was close to zero. At that time, the NAO+ regime was interrupted by short-term periods of Scandinavian blocking and Atlantic ridge afterwards.

Similarly AO was highest at the beginning and the end of the month, but interrupted by close-to-zero or even slightly negative values in mid-March. That was the time when circulation became more meridional for a short period and a large high pressure system developed over Scandinavia and moved to West Russia afterwards, while troughs with colder air advanced southward over the Atlantic and over Eastern Europe and the Mediterranean region.

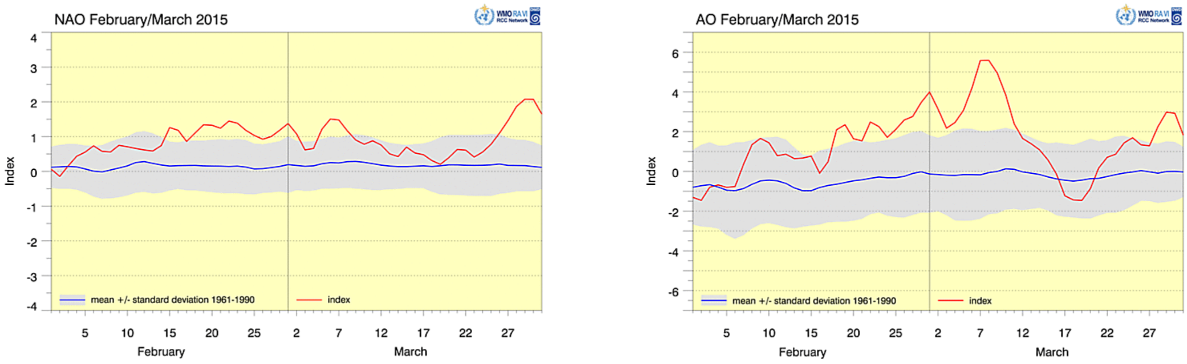


fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC:
http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

fig. I.2.5a: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices for the last 4 months and forecasts for the following weeks. Source: NOAA CPC,
http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

In the Pacific, the Maritime Continent and the Indian Ocean, precipitation anomalies associated with convection anomalies. Persistent drought in Brazil and southern Africa. Rather dry anomaly on the United States and wet on Mexico

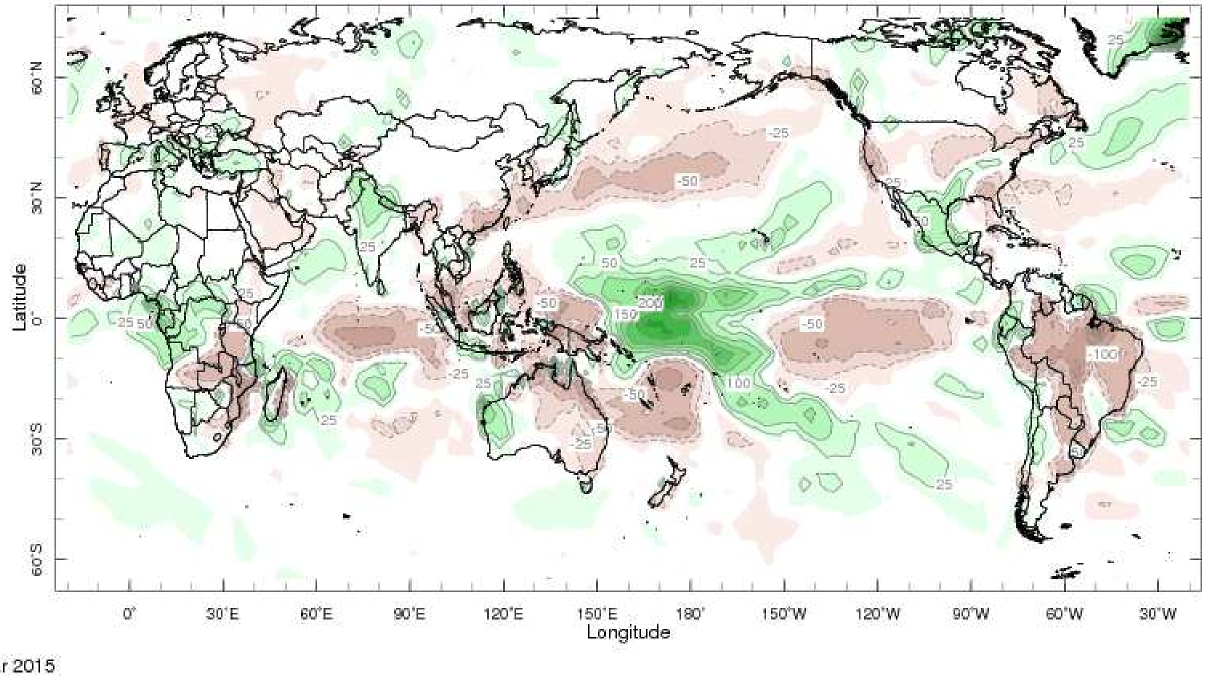


fig.I.2.4: Rainfall Anomalies (mm) (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

Precipitation anomalies in Europe:

Over Europe excess precipitation in the Mediterranean and western Black Sea region, due to some troughs and low pressure systems especially in the middle of the month, and due to positive SST anomalies in eastern parts. Wetter than normal also in parts of northern Europe (SE Greenland, Iceland, Scotland, parts of Scandinavia, in line with moving low pressure systems over this area during NAO+ conditions. Dry anomaly in the Atlantic regions: Portugal, western Spain, France, Ireland, England, and in Russia too (partly extremely dry), corresponding well with average positions of high pressure systems.

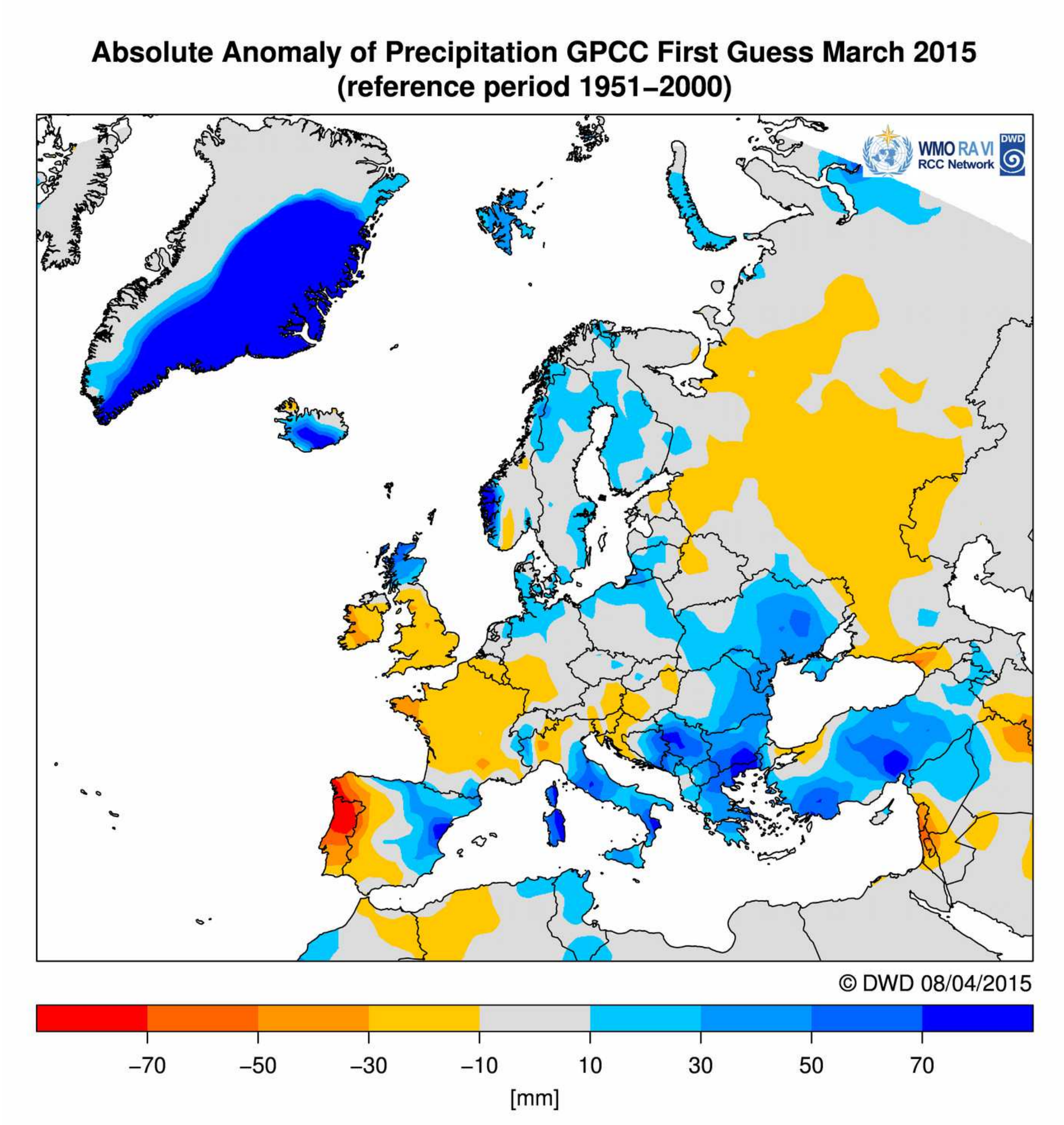


fig.I.2.5: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

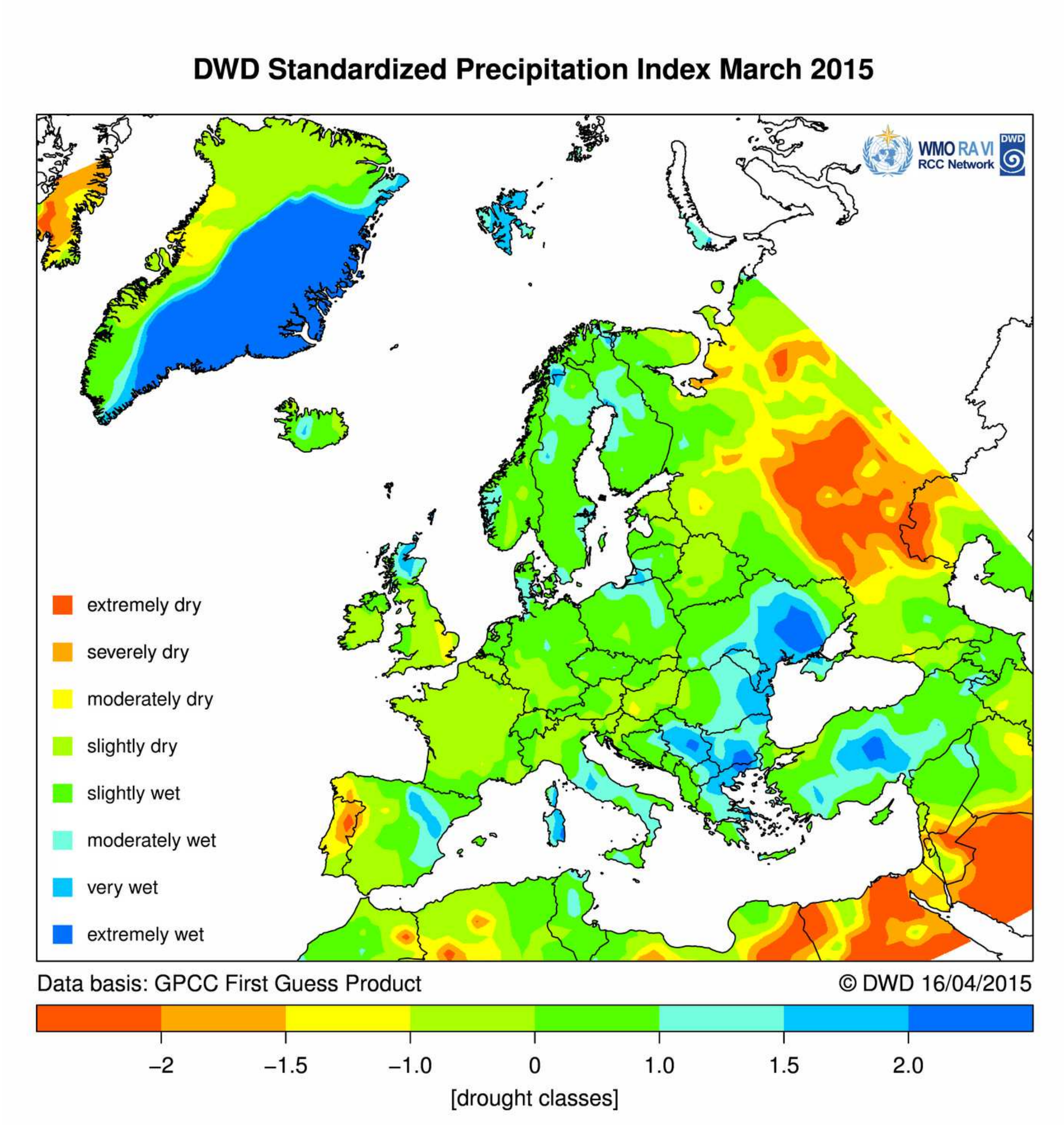


fig. I.2.5a: Standardized Precipitation Index with DWD modification (DWD-SPI), http://www.dwd.de/rcc-cm .

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	+ 5.5 mm	110.8 %	+ 0.432
Southern Europe	+ 8.8 mm	122.1 %	+ 0.345

I.2.c Temperature

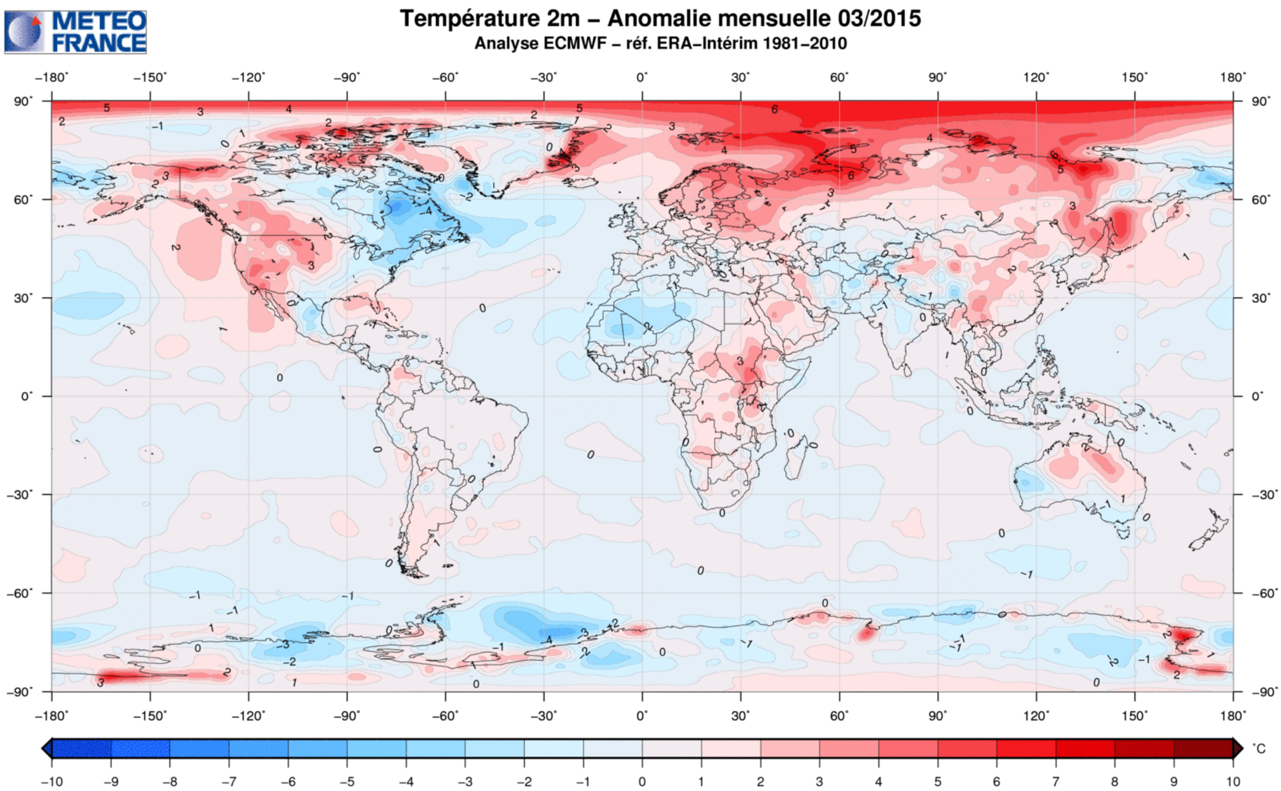
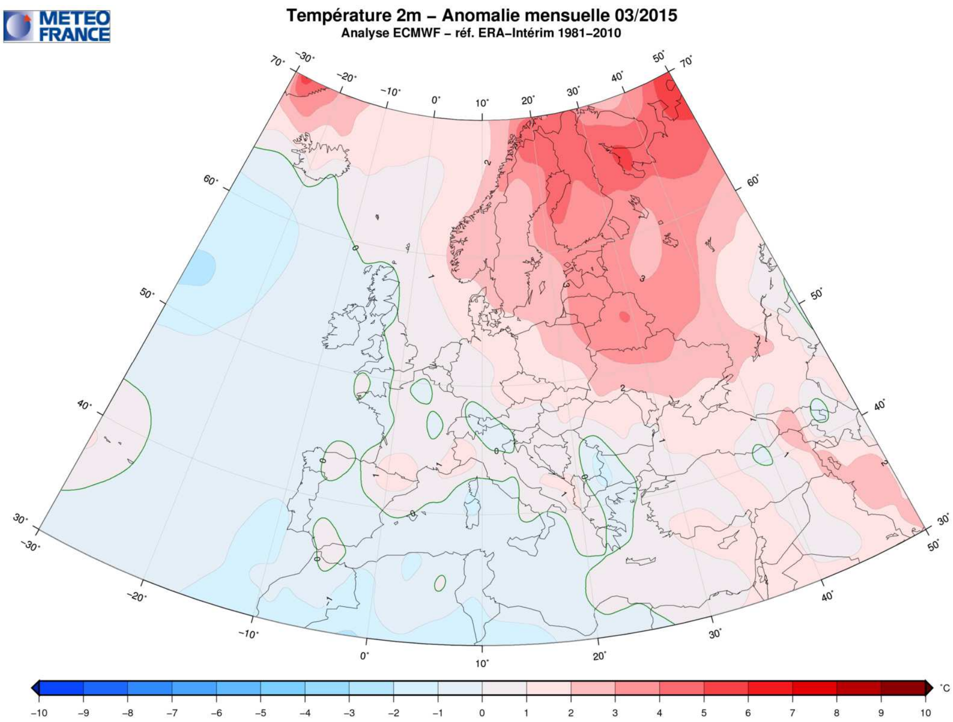


fig.I.2.6: Temperature Anomalies (°C) (Meteo-France)

Temperature anomalies in Europe:

Again very mild in northern and eastern Europe, partly due to Atlantic air masses flowing to northern Europe, and partly to strong high pressure influence. In the south-western half of Europe, partly warmer, partly colder than normal, but quite weak anomalies. Variations of different weather regimes caused changeable conditions of cold and warm air advection or high pressure influence and therefore much local variability and weak anomalies on monthly average.

Eastern North Atlantic colder than normal, consistent with negative SST anomalies and some cold troughs extending near Western Europe.



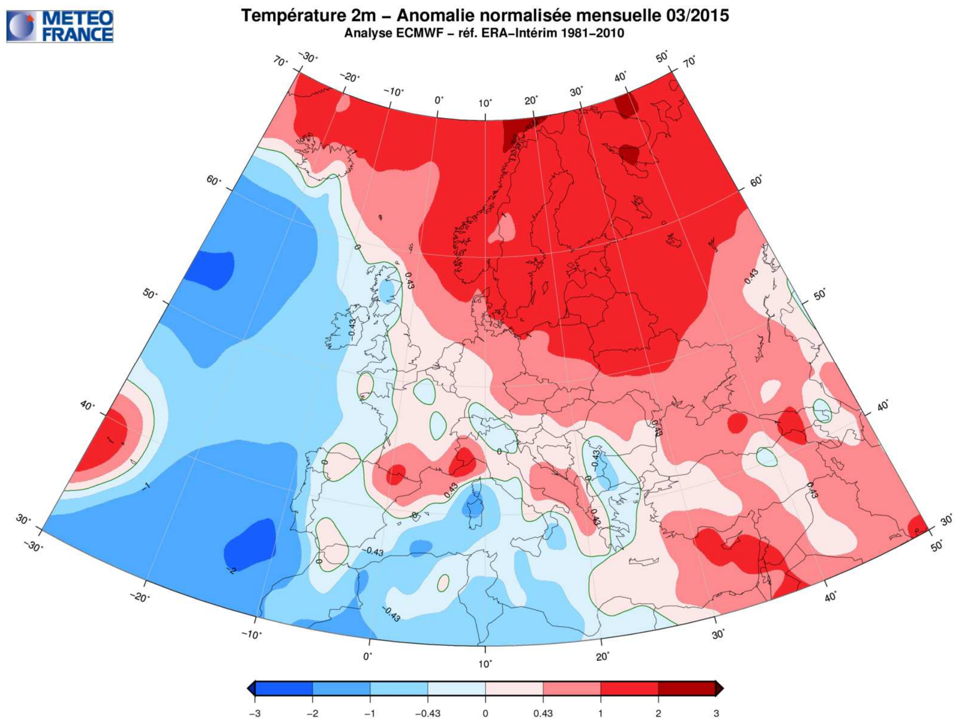


fig.I.2.7: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

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	+ 2.6 °C
Southern Europe	+ 0.9 °C

I.2.d Sea ice

In Arctic (fig. 1.2.6 and 1.2.7 - left) : Significant deficit (-2 std) persistent, mainly in the Pacific. It break a record of lower extension of ice in March.

In Antarctic (fig. 1.2.6 and 1.2.7 - right) : Large surplus (+2 std) persistent.

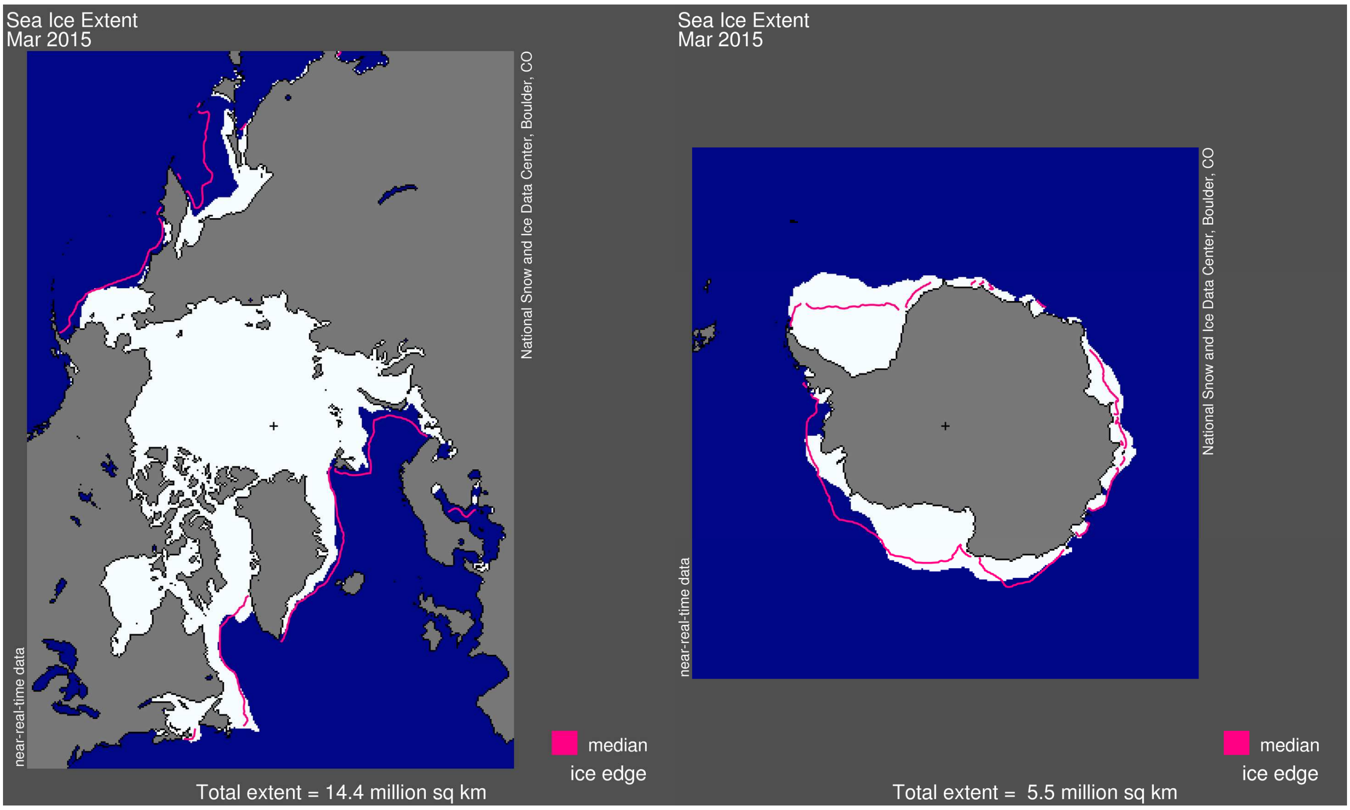


fig.I.2.6: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

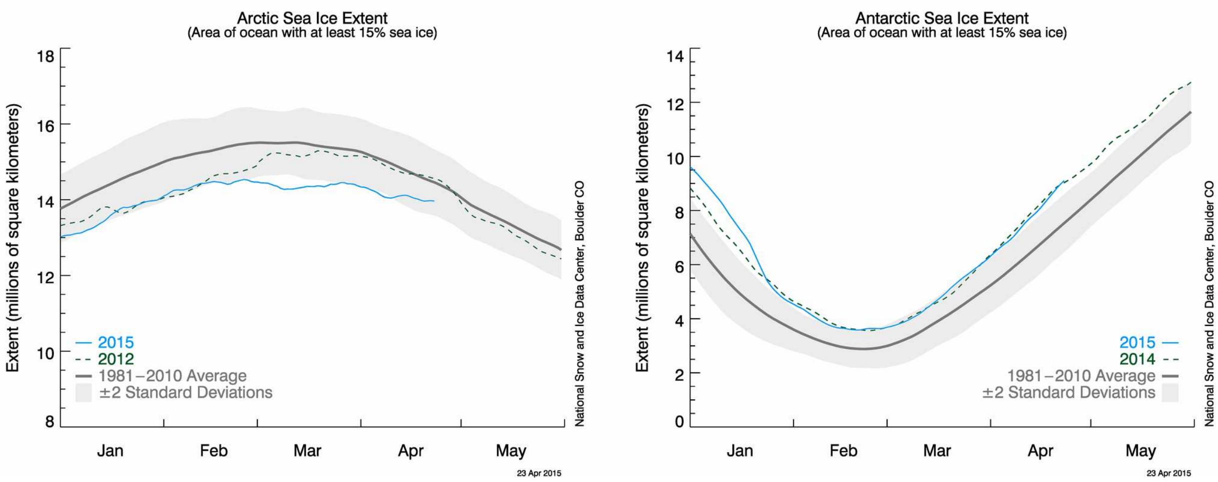


fig. I.2.7 : Sea-Ice extension evolution from NSIDC.

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

II. SEASONAL FORECAST FROM DYNAMICAL MODELS

II.1. OCEANIC FORECASTS

II.1.a Sea surface temperature (SST)

Very good overall consistency of structures anomalies between ARPEGE, CEP and NCEP.

In the Pacific : all models enhanced the warm anomaly of SST and move it eastward along the equator to the South America coast. Also large area of warm anomaly along the western coast of North America. Warm anomaly east of Asia and Australia.

Indian Ocean : generalized warm anomaly.

Atlantic Ocean : Fairly strong cold anomaly along the equator (with NCEP especially) and in all Guinea Gulf. Strong cold anomaly from Labrador to the British Isles and weaker along European and African coast to north tropic. Warm anomaly elsewhere (i.e. over western basin) especially in the south, off the Argentine coast and in the north from Mexico Gulf to the Sargasso Sea and the USA and Canada coast.

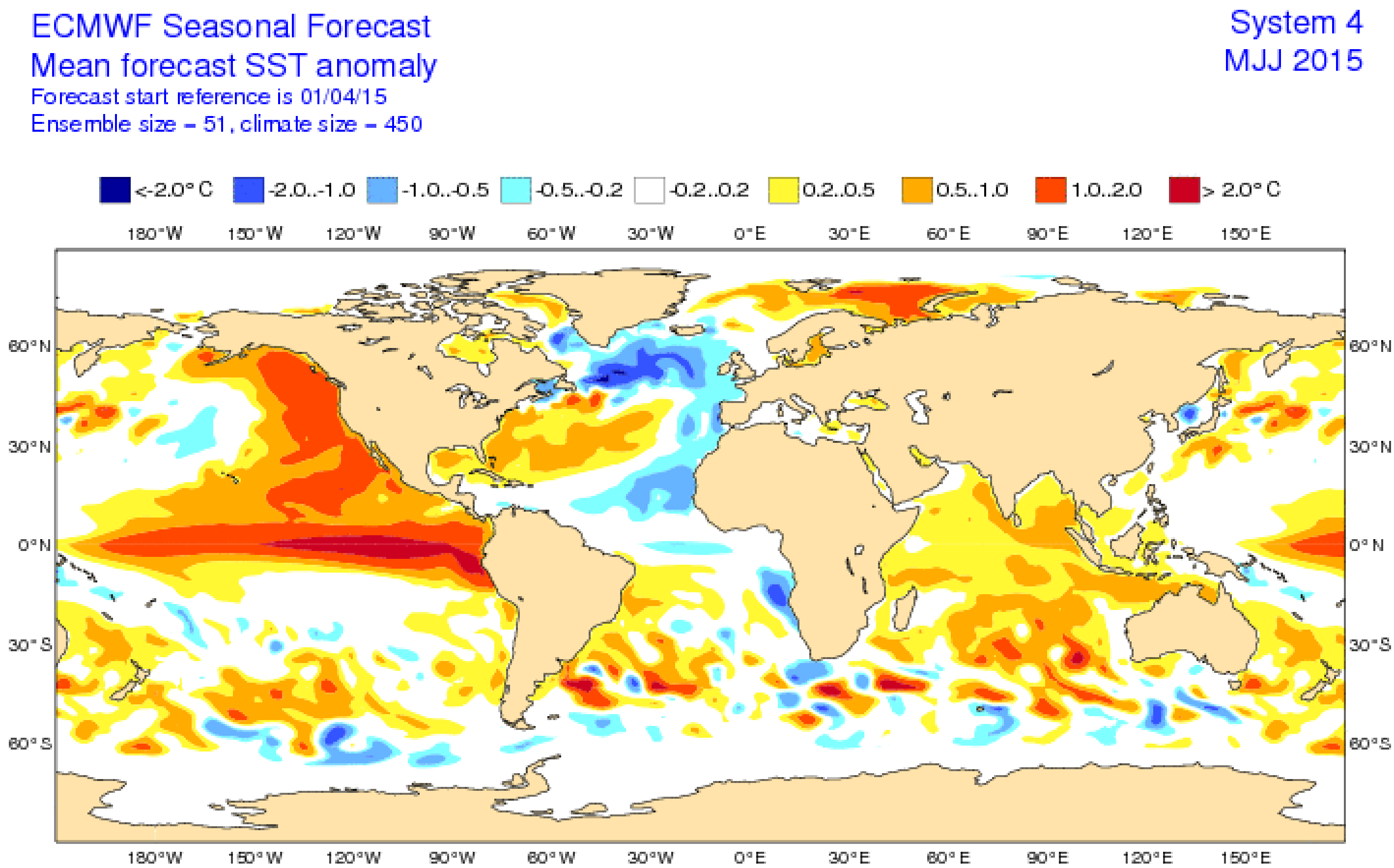


fig.II.1.1: SST anomaly forecast from ECMWF

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

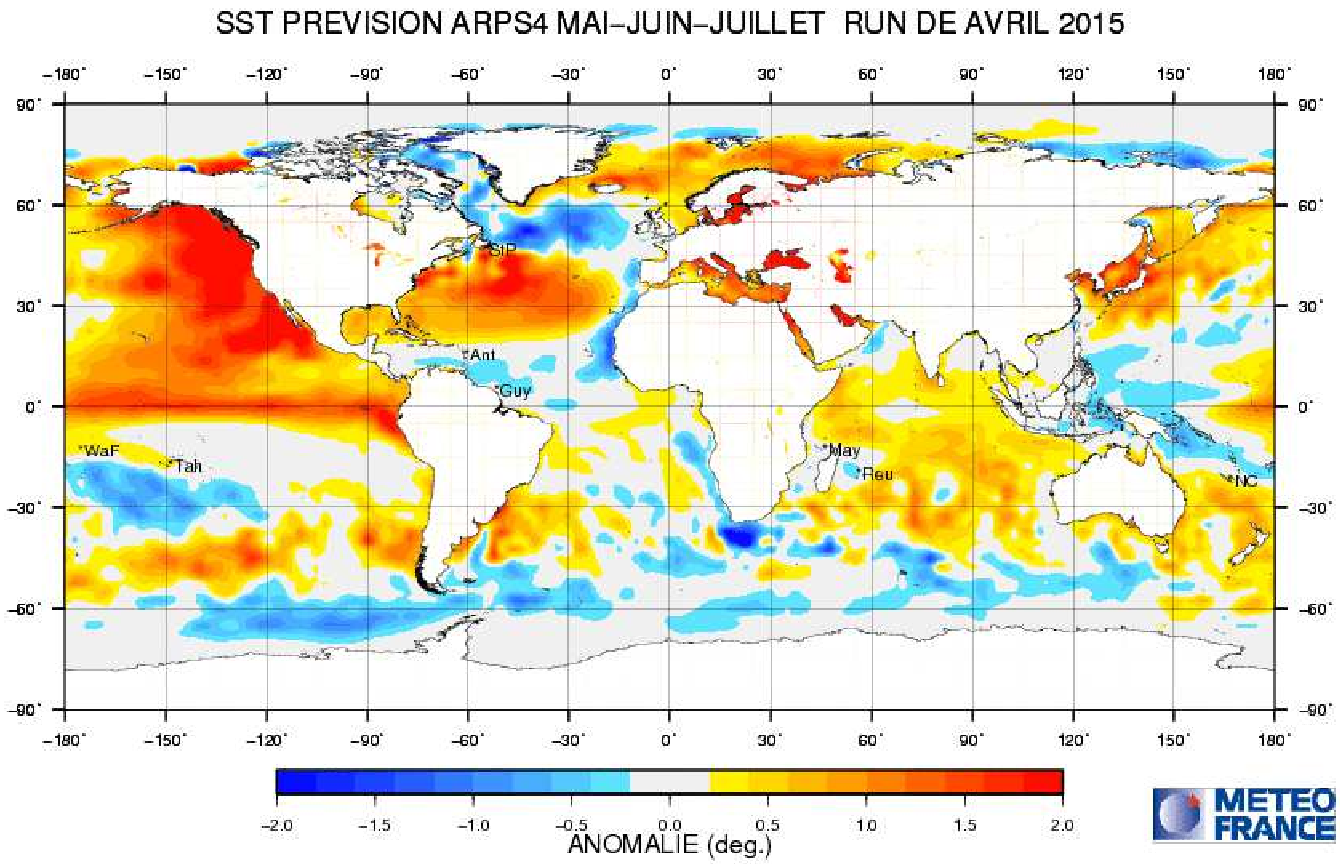


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).

http://elaboration.seasonal.meteo.fr

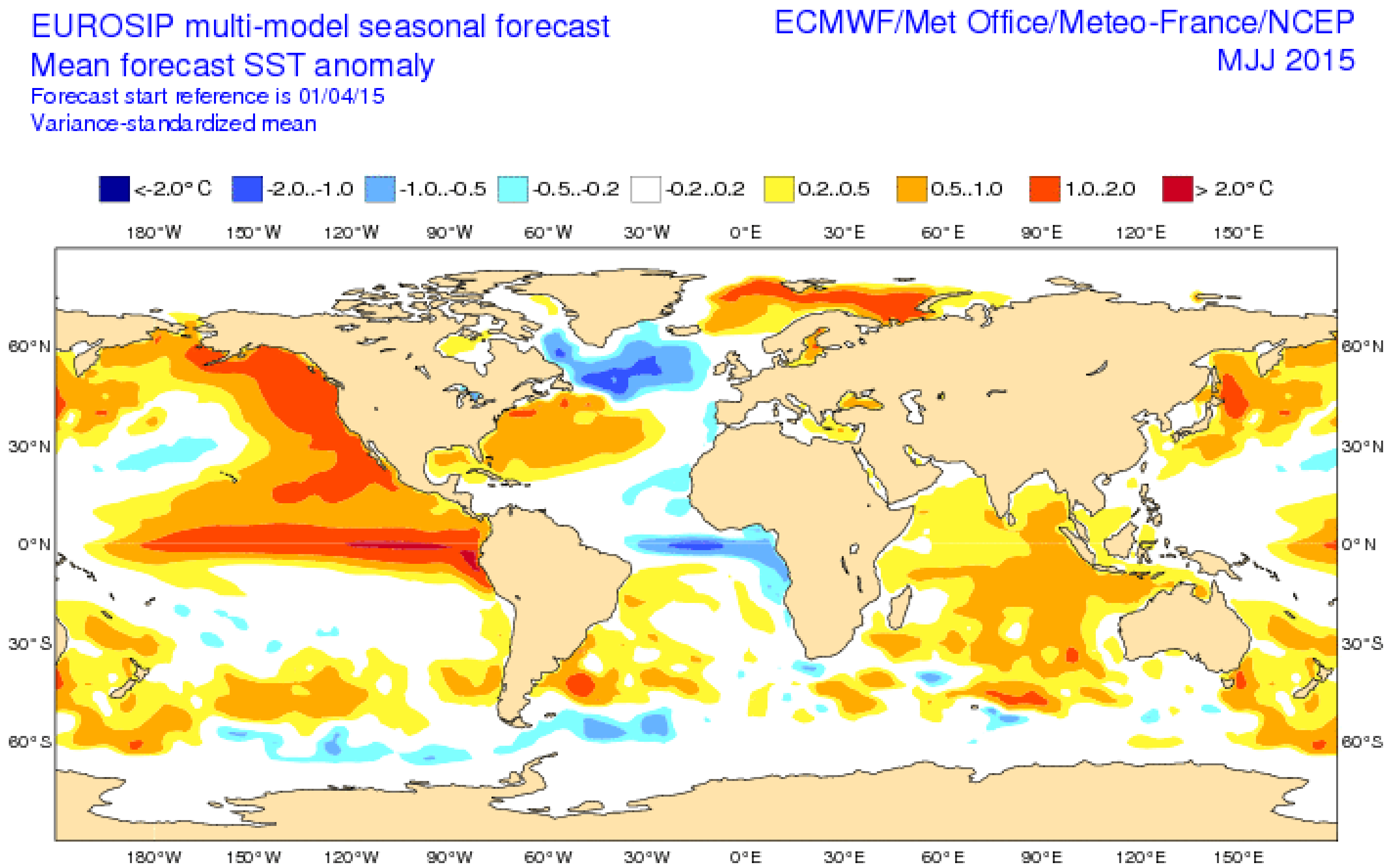


fig.II.1.3: SST Forecasted anomaly from Euro-SIP

II.1.b ENSO forecast :

For next months, most dynamic models develop an el Niño. The IRI considers this probability to more than 80%. The value in the Niño 3.4 box in March is slightly over the threshold (+0.6°C). The warming started in April and enhanced by the models for the next months and its eastward shift, leads to confirm the outset of an el Niño phenomenon. The probability that it amplifies and continues beyond the summer is strong enough, but runs dispersion become significant from July. The intensity of the phenomenon at this time is difficult to forecast. Given the uncertainty of the forecast in the spring, an attenuation of the phenomenon before winter, remains even possible, as what happened in 2014.

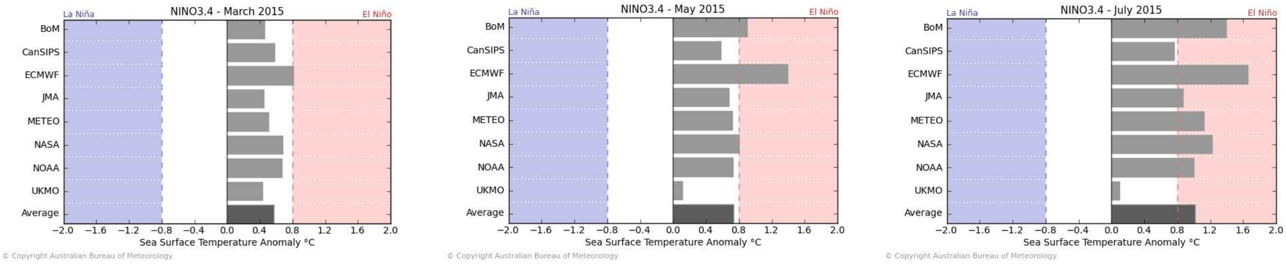


fig.II.1.4: Synthesis of Niño 3.4 forecasts (120° to 165°W) by IRI : http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html

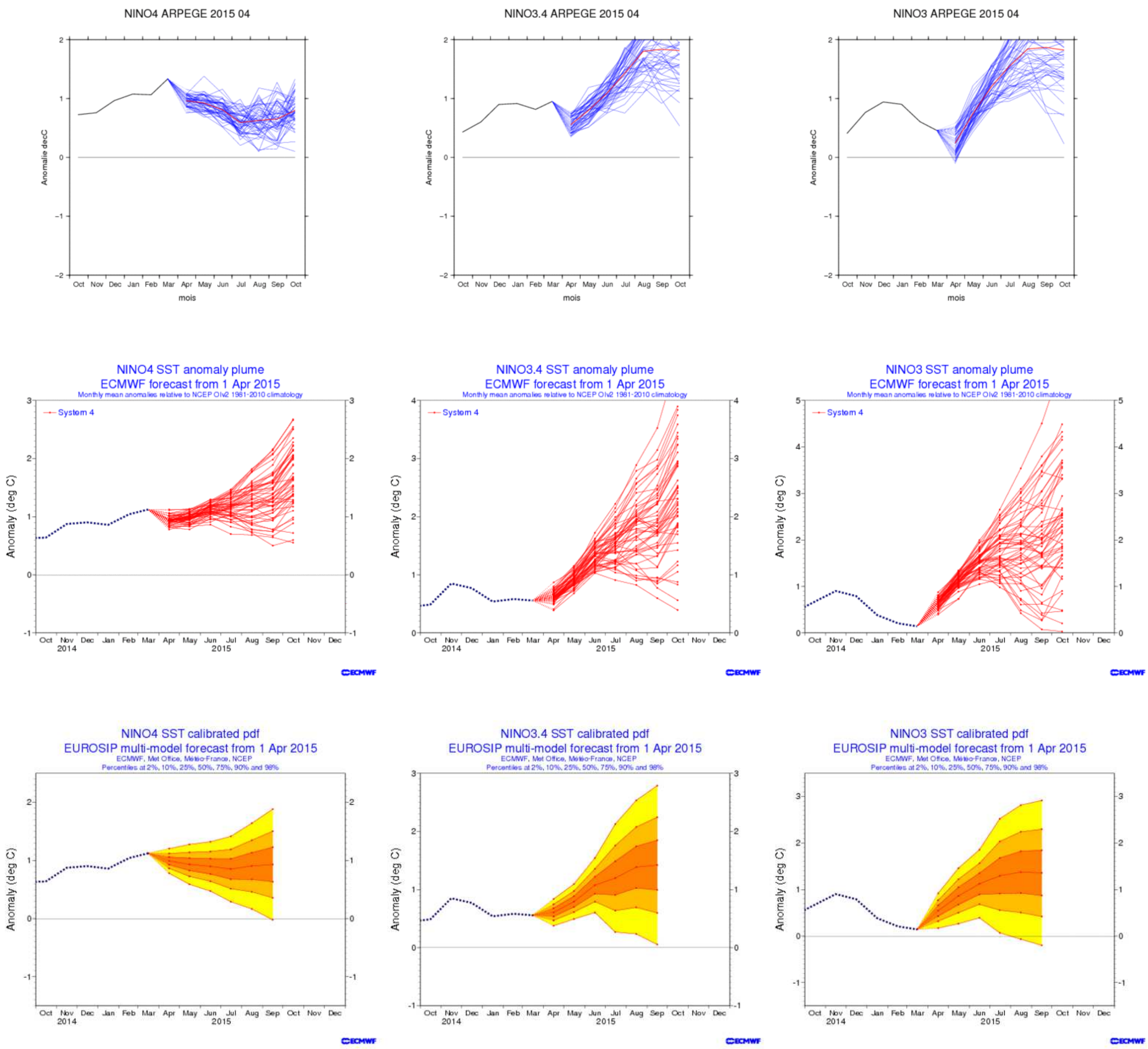


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

I.1.c Atlantic ocean forecasts

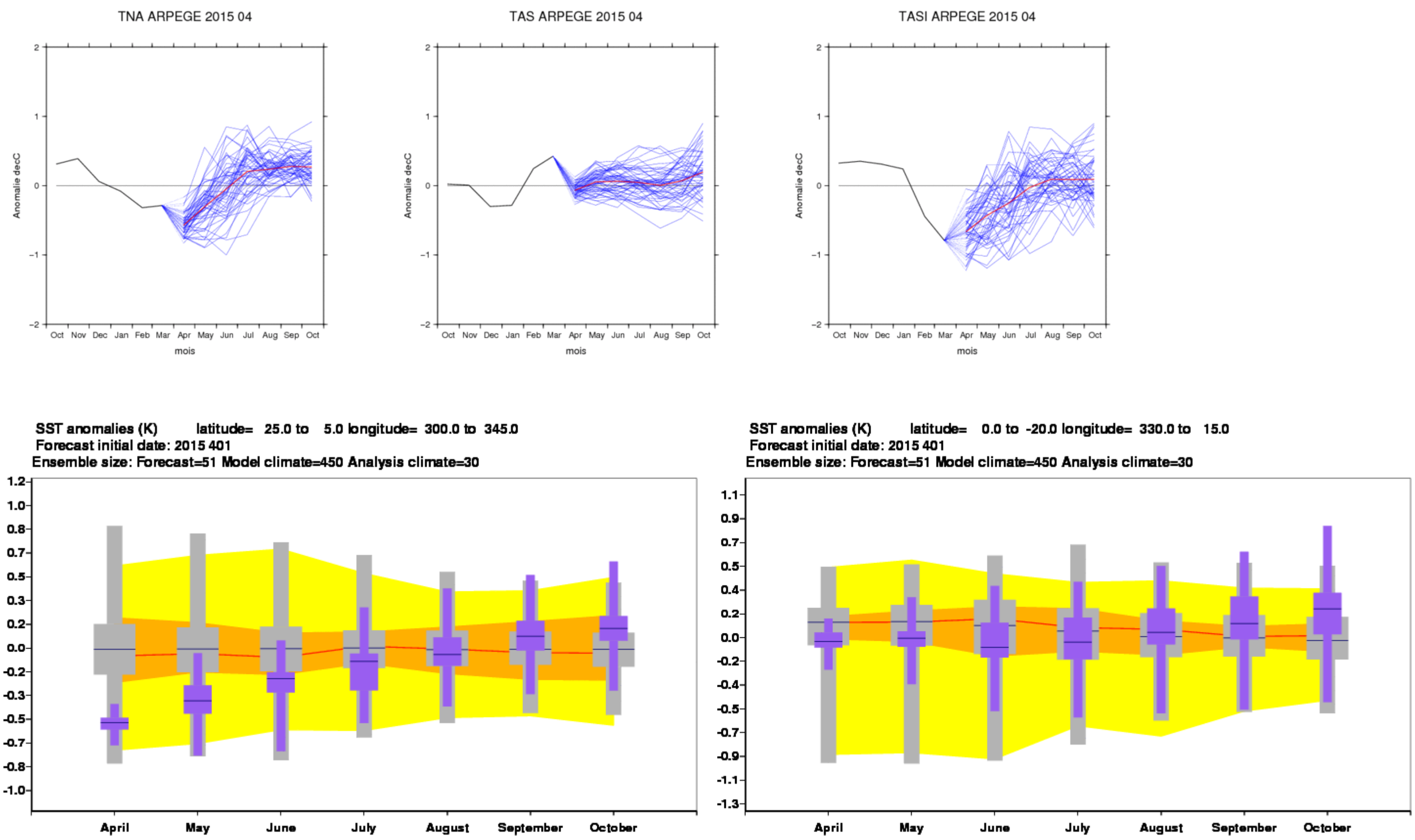
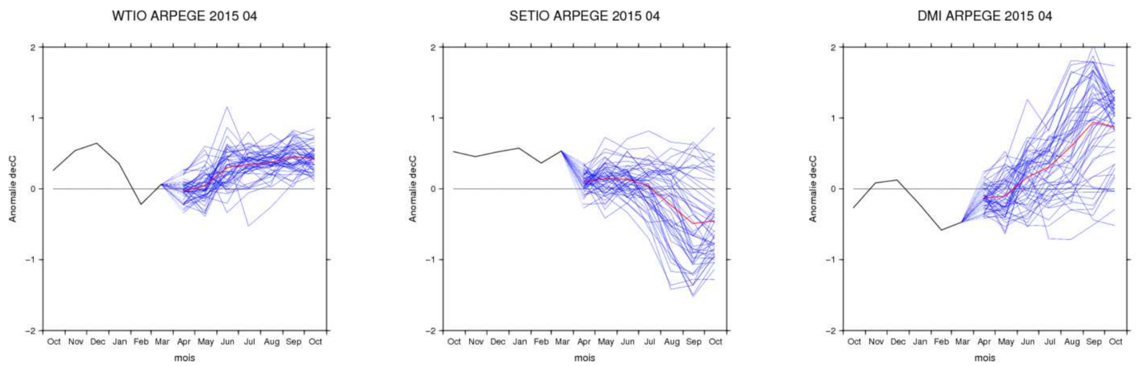


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

I.1.d Indian ocean forecasts



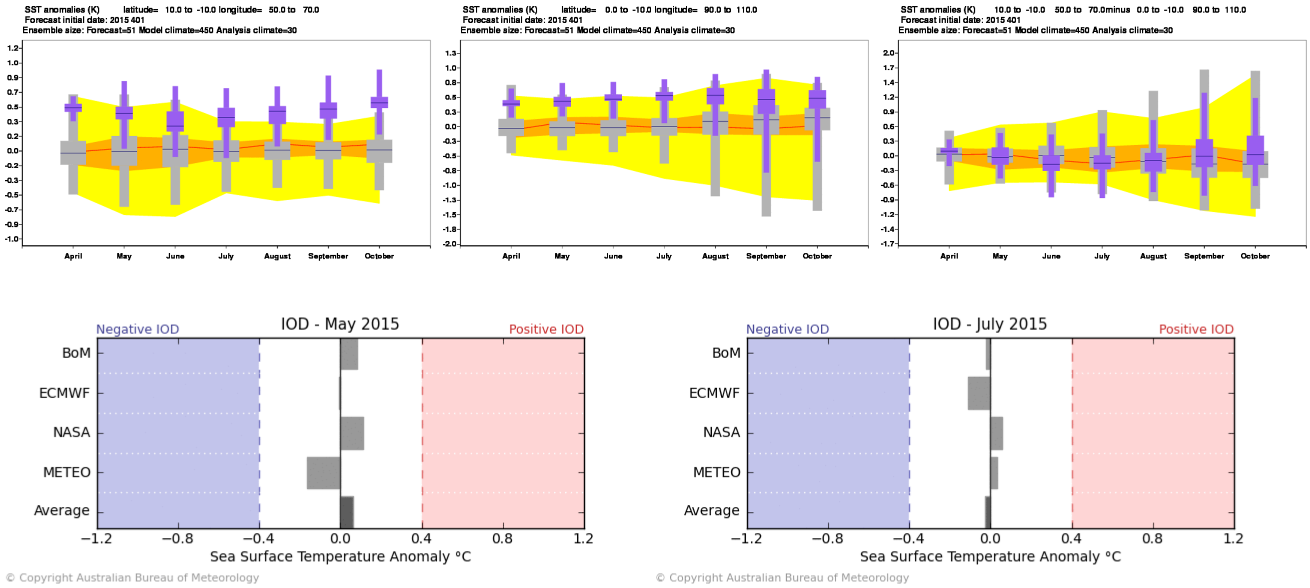


fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.2. GENERAL CIRCULATION FORECAST

II.2.a Global forecast

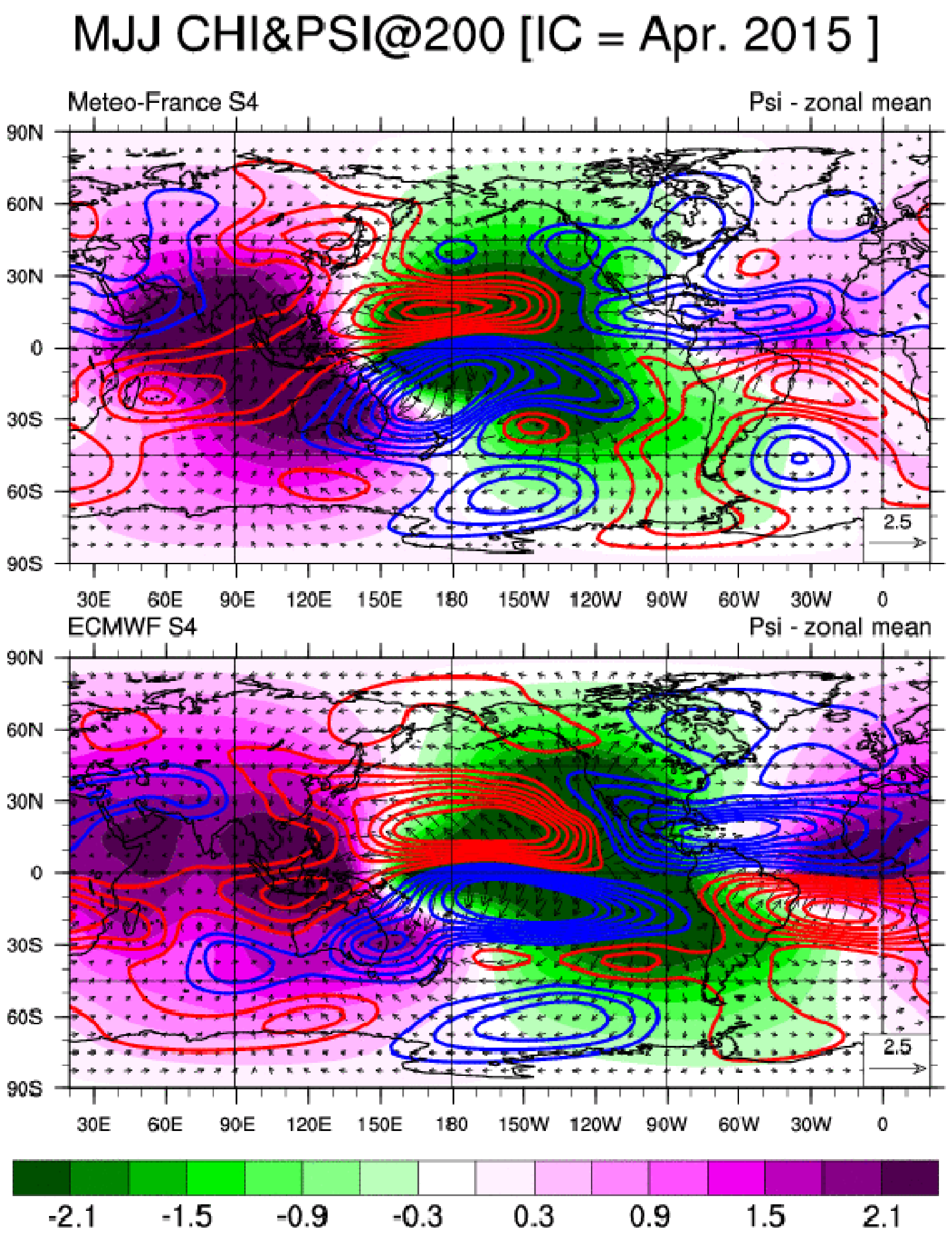


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

Fairly good consistency between models. MF has a Pacific maximum of activity farther west than CEP and a stronger dipole with Indian Ocean. CEP forecasts a maximum eastward and enhances a dipole with the Atlantic Ocean. JMA forecasts no activity over Atlantic.

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

Models forecast a vast upward motion area over Pacific. MF sets the maximum upward motion near the International Date Line and a strong downward motion area over the Indian Ocean. CEP sets the maximum eastward and a strong downward motion area over the Atlantic Ocean. JMA forecasts a upward motion area in the East part of Pacific and a strong downward motion area over the East of Indian Ocean.

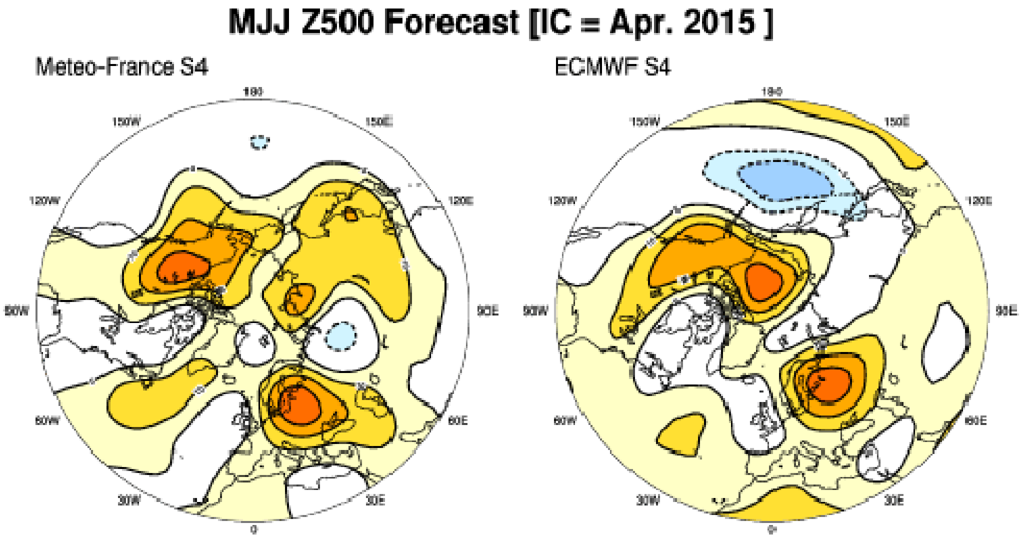
Stream Function anomaly field (cf. fig. 19 – insight into teleconnection patterns tropically forced) :

Unlike previous months, no teleconnection is forecasted this month. The stream function response seems to be trapped between 40°N and 40°S. The core positions are coherent but CEP forecasts more activity over Atlantic.

II.2.b North hemisphere forecast and Europe

Geopotential height anomalies (fig. 20 – insight into mid-latitude general circulation anomalies) :

Anomalies are weak. MF and CEP forecasts a high geopotential area on West Russia and an other one from Canada to Alaska and North Pole. This promotes more Scandinavian blocking weather regime than normal.



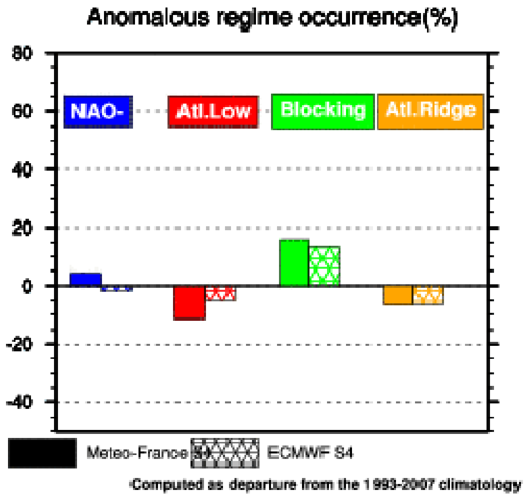


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip

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

II.3. IMPACT: TEMPERATURE FORECASTS

II.3.a ECMWF

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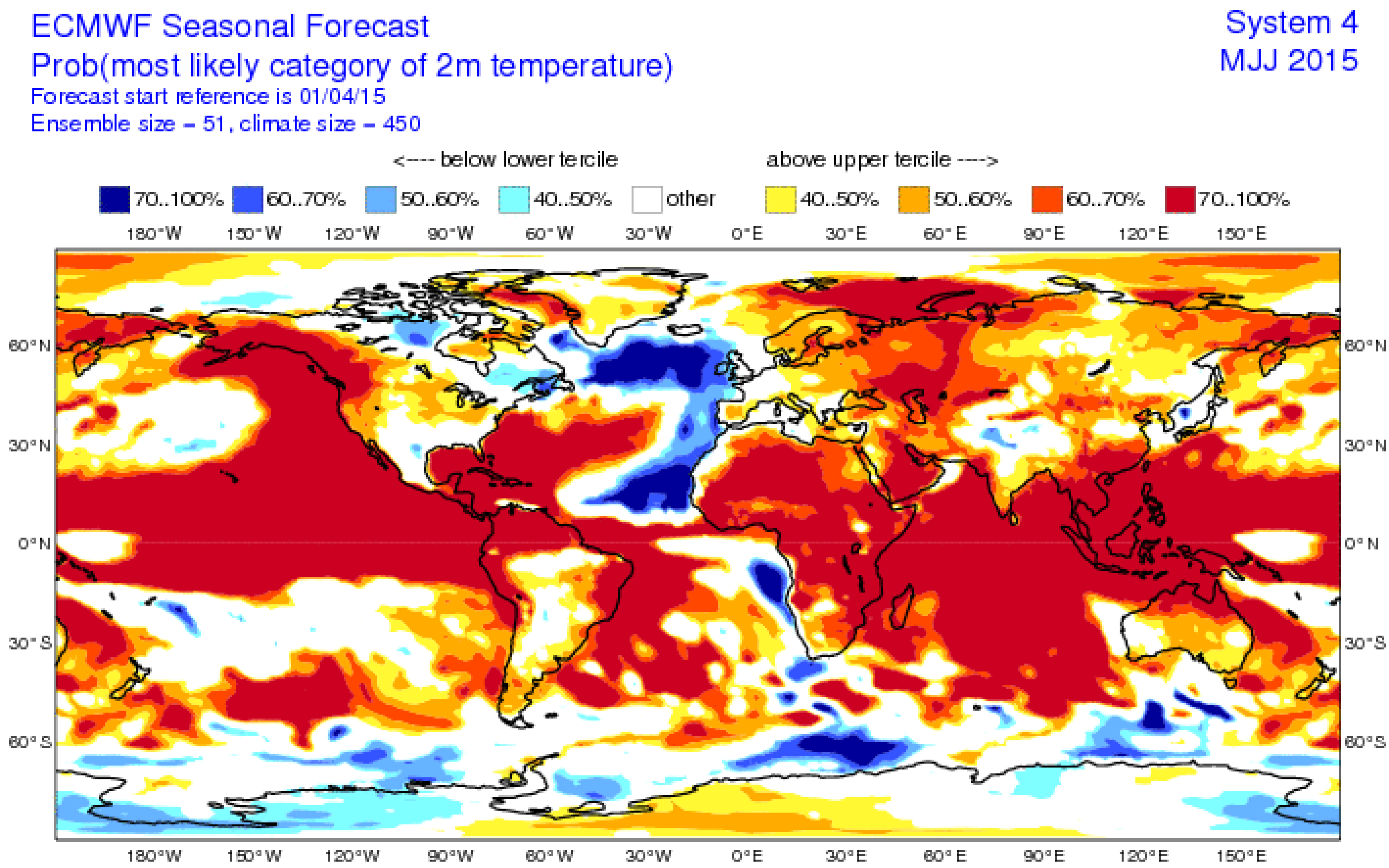

fig.II.3.1: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).

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

II.3.b Météo-France

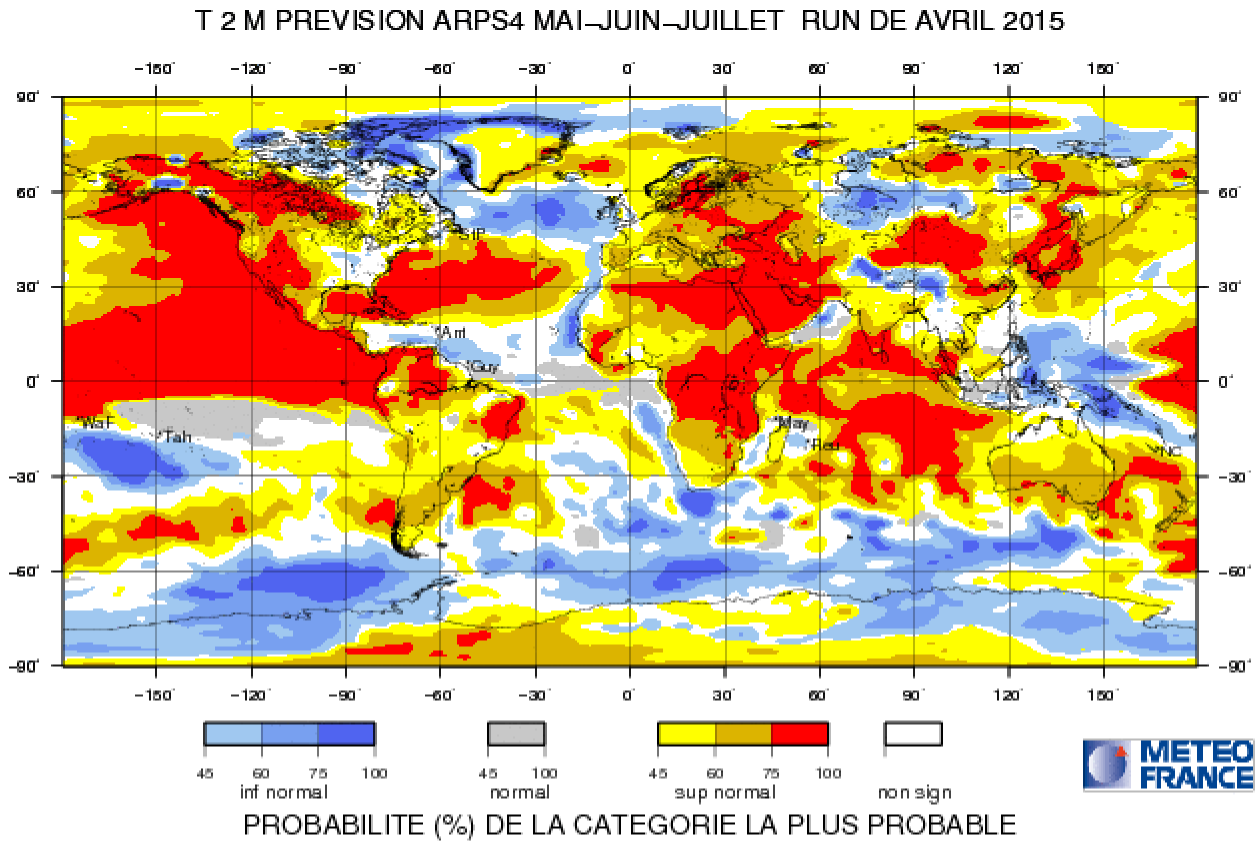

fig.II.3.2: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.3.e Japan Meteorological Agency (JMA)

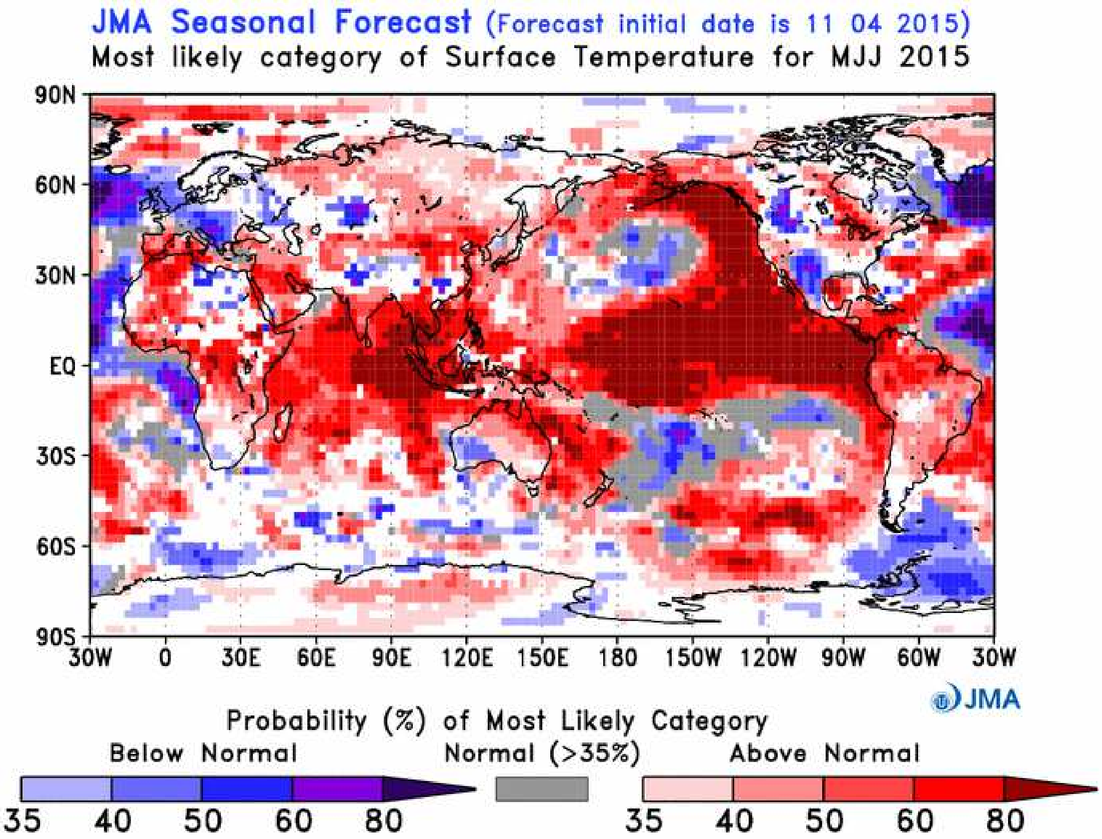

fig.II.3.5: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.

http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.php

II.3.g EUROSIP

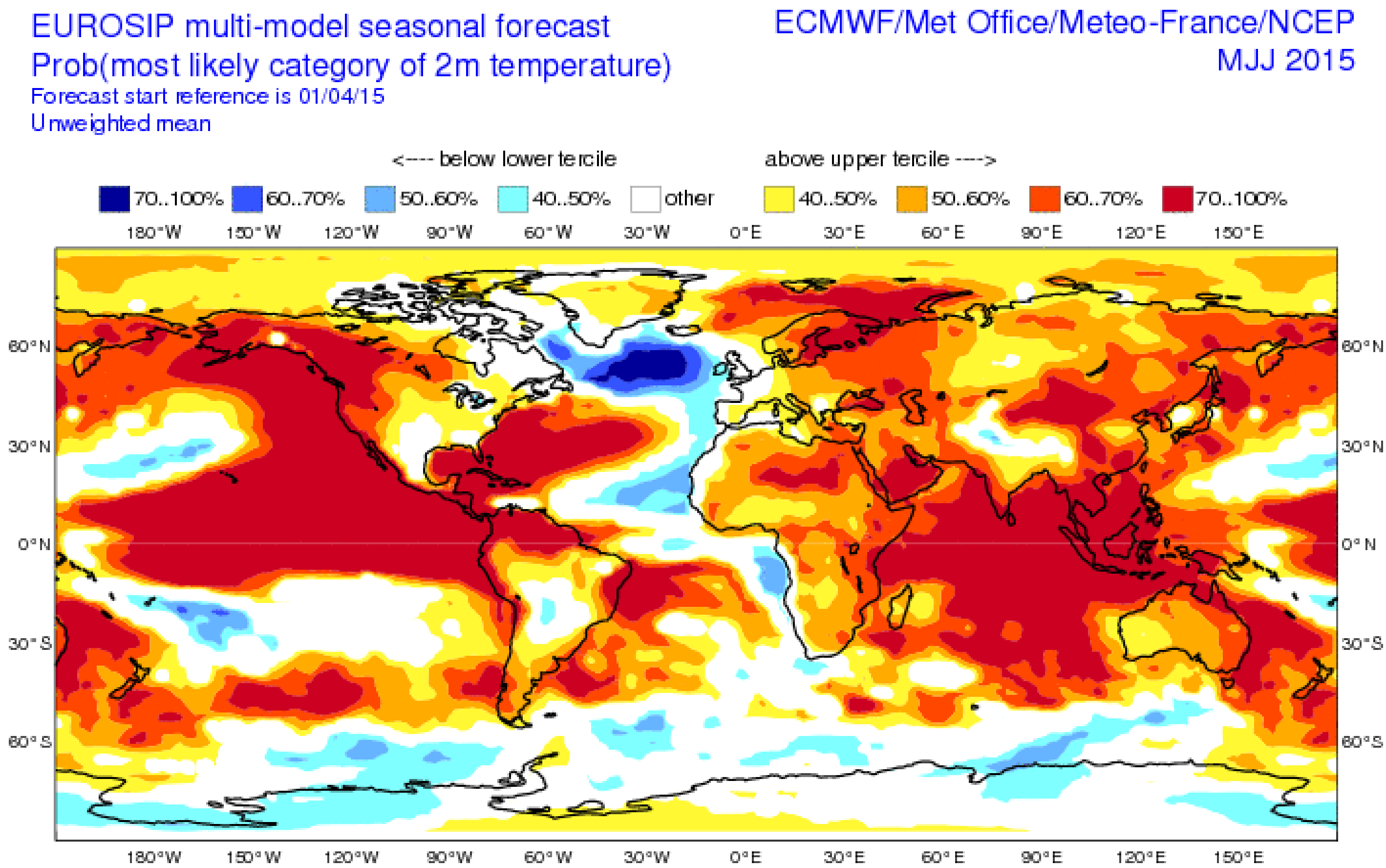

fig.II.3.7: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).

http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

Enhanced probability of warm anomaly over the greater part of the globe. Exceptions are : East part of North America, from Mexico to the Great Lakes and West of Greenland, Central South America, the Himalayan region, and Western Europe.

On Europe : the negative SST anomaly over the Atlantic seems to cool the temperature over Western Europe and keep it near to normal. Warm anomaly is forecasted further east.

II.4. IMPACT : PRECIPITATION FORECAST

II.4.a ECMWF

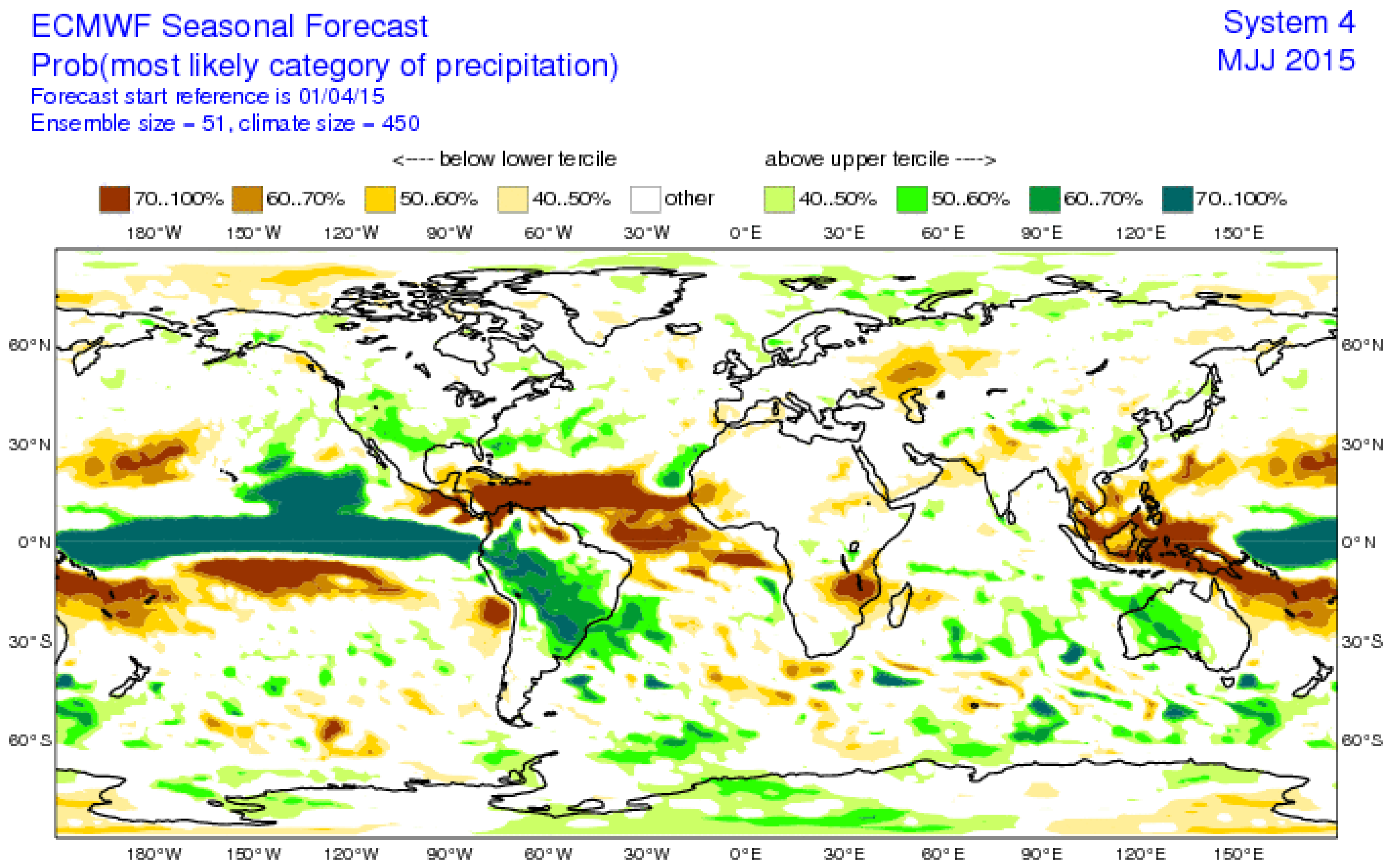

fig.II.4.1: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).

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

II.4.b Météo-France

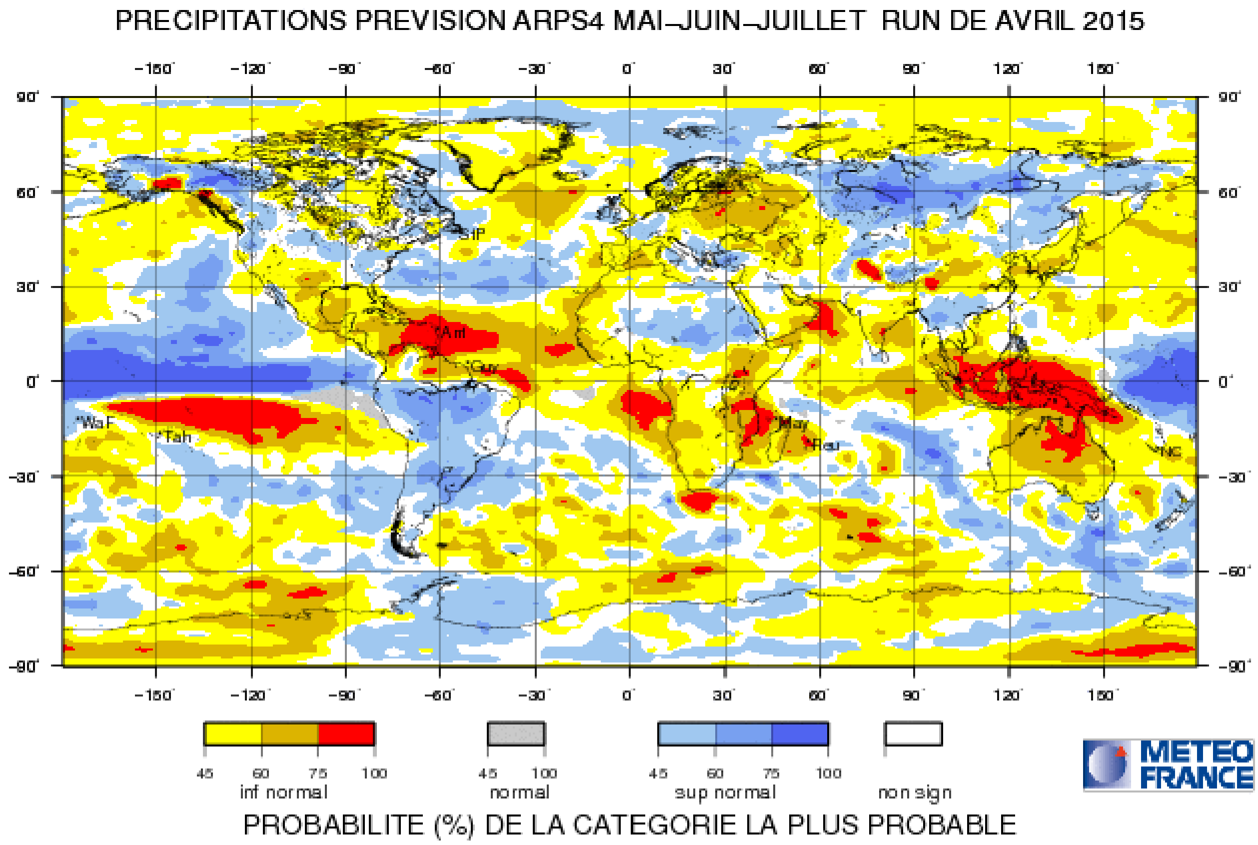

fig.II.4.2: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.4.e Japan Meteorological Agency (JMA)

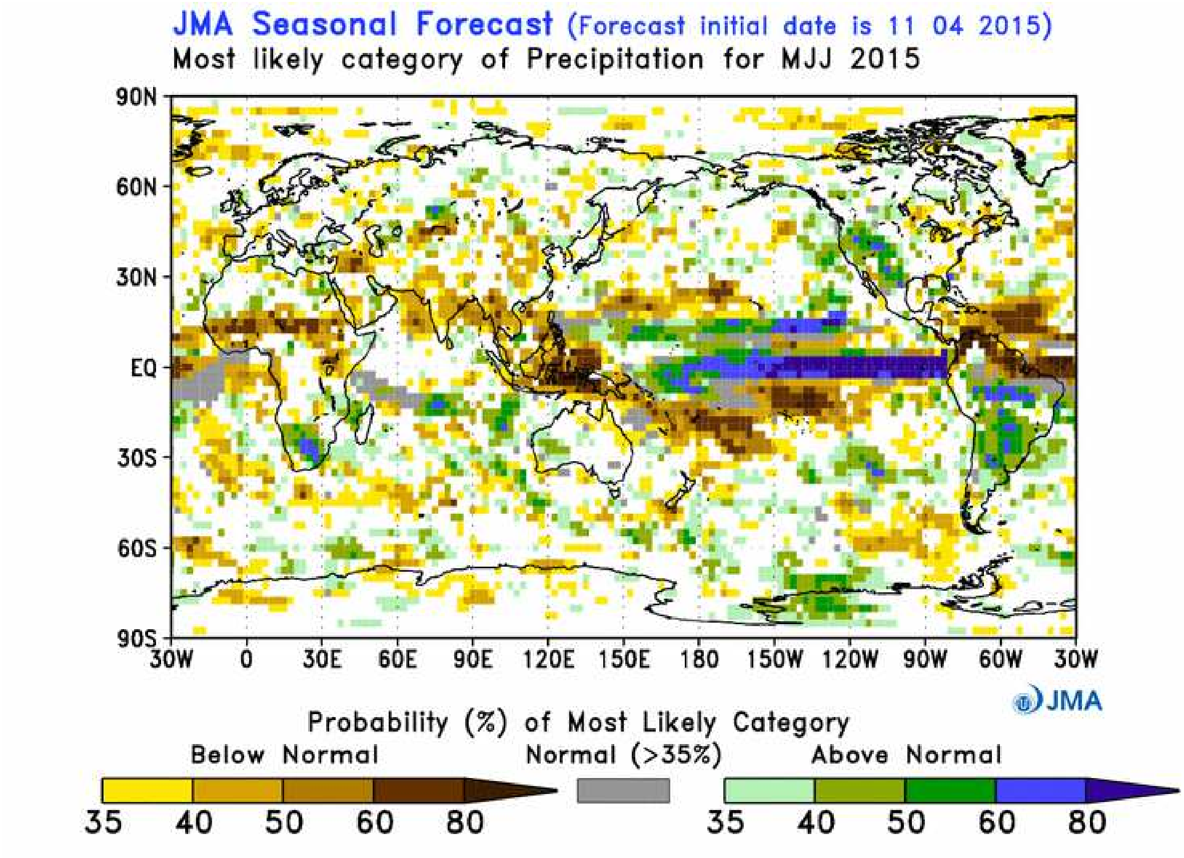

fig.II.4.5: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.

http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.php

II.4.g EUROSIP

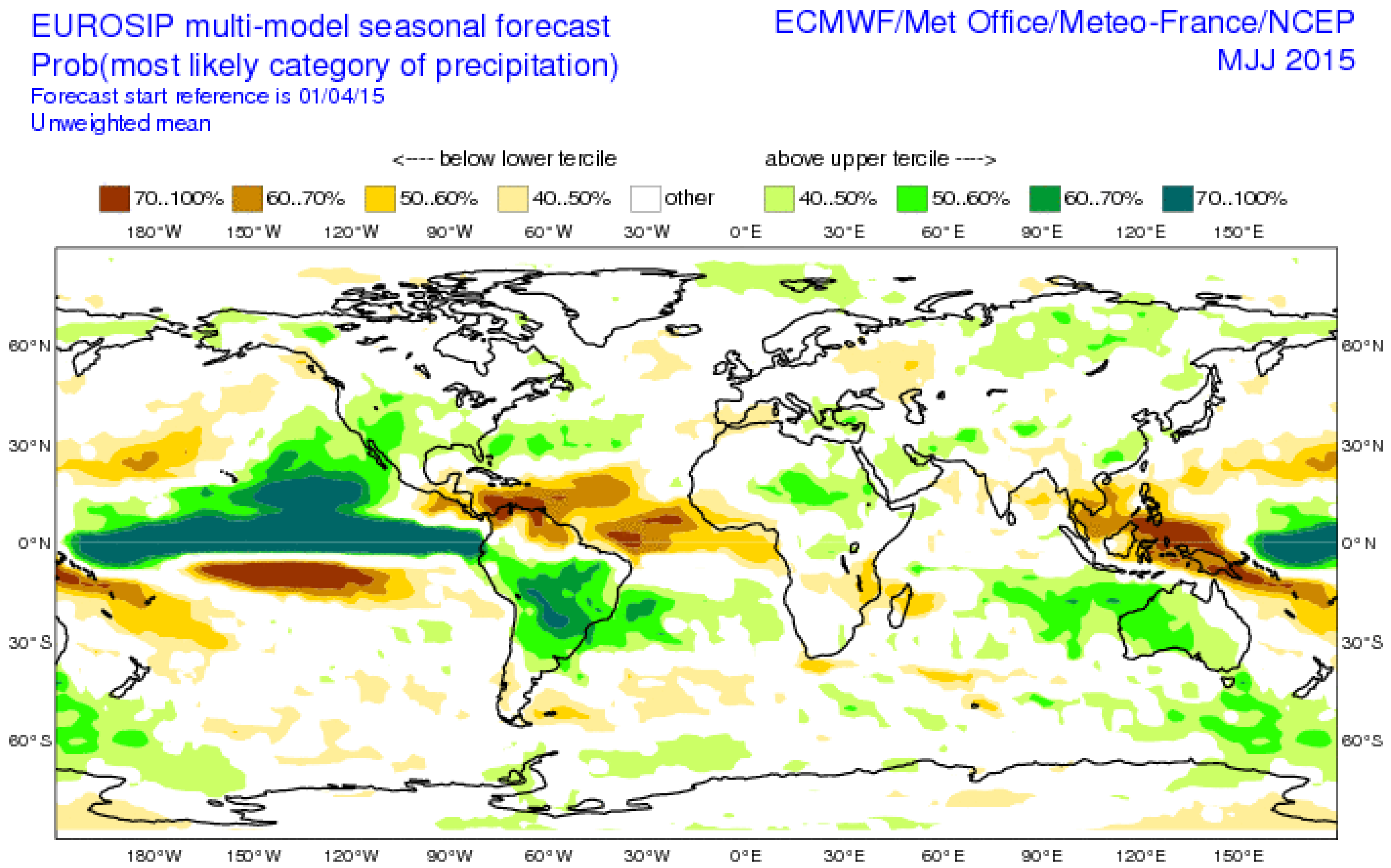

fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).

http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

linked with SST anomalies, enhanced probability for a dry anomaly over Atlantic between the equator and 20°N, enhanced probability for a wet anomaly over Pacific from equator to USA coast. Enhanced probability for a dry anomaly over Maritime Continent.

Enhanced probability for a wet anomaly over USA, the main part of South America and Australia.

On Europe : no scenario

II.5. REGIONAL TEMPERATURES and PRECIPITATIONS

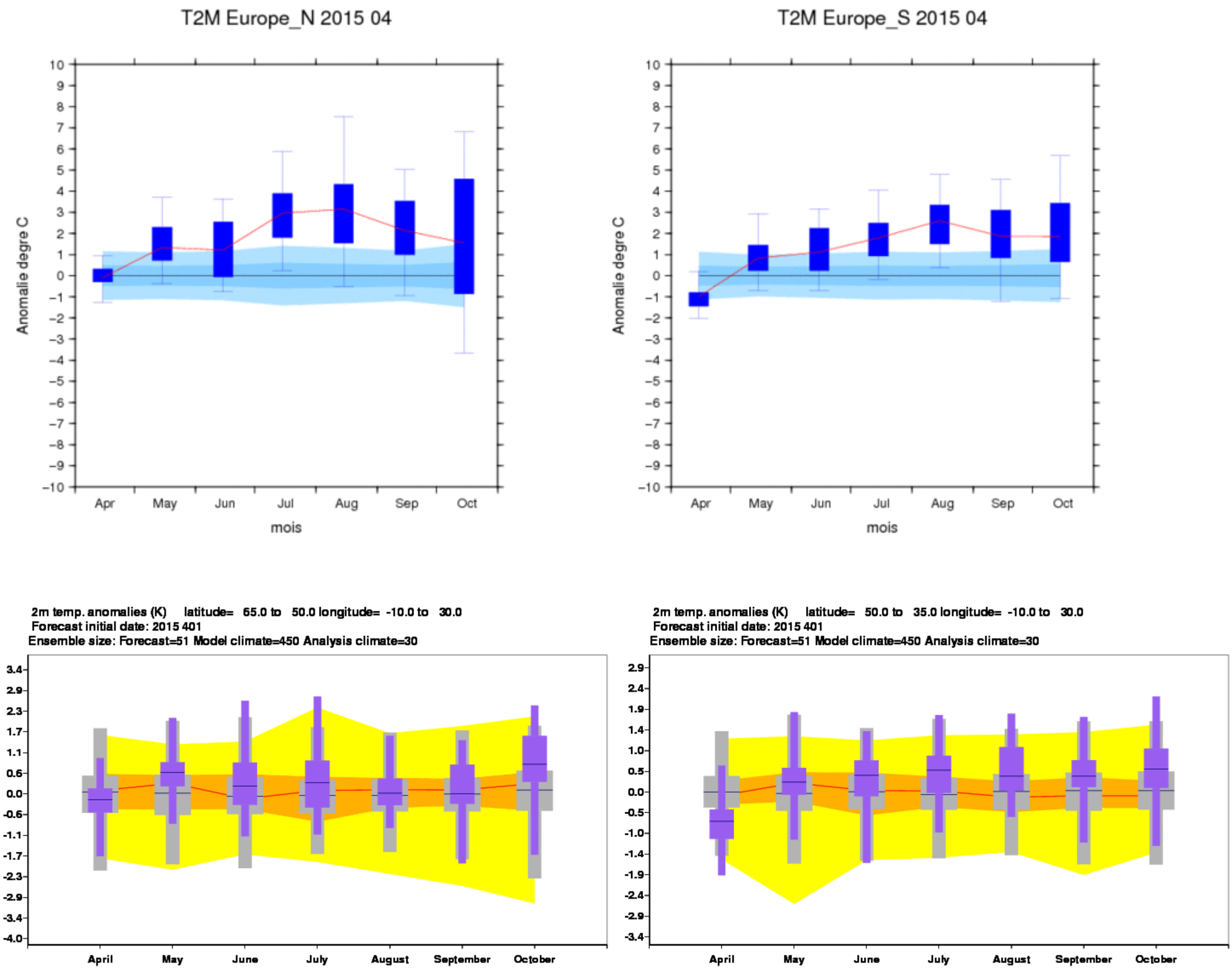

fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

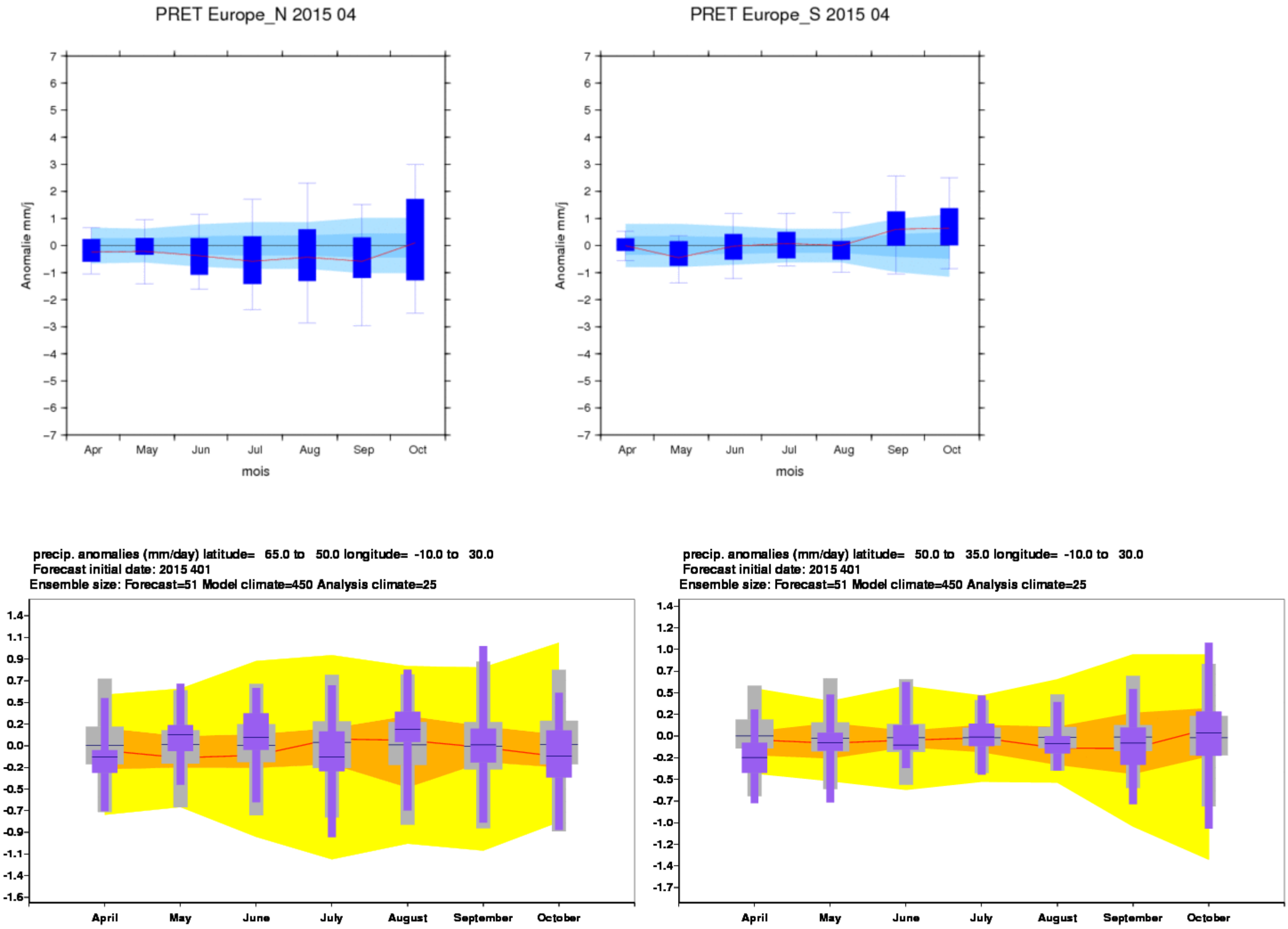

fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

II.6. MODEL'S CONSISTENCY

Not available this month.

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

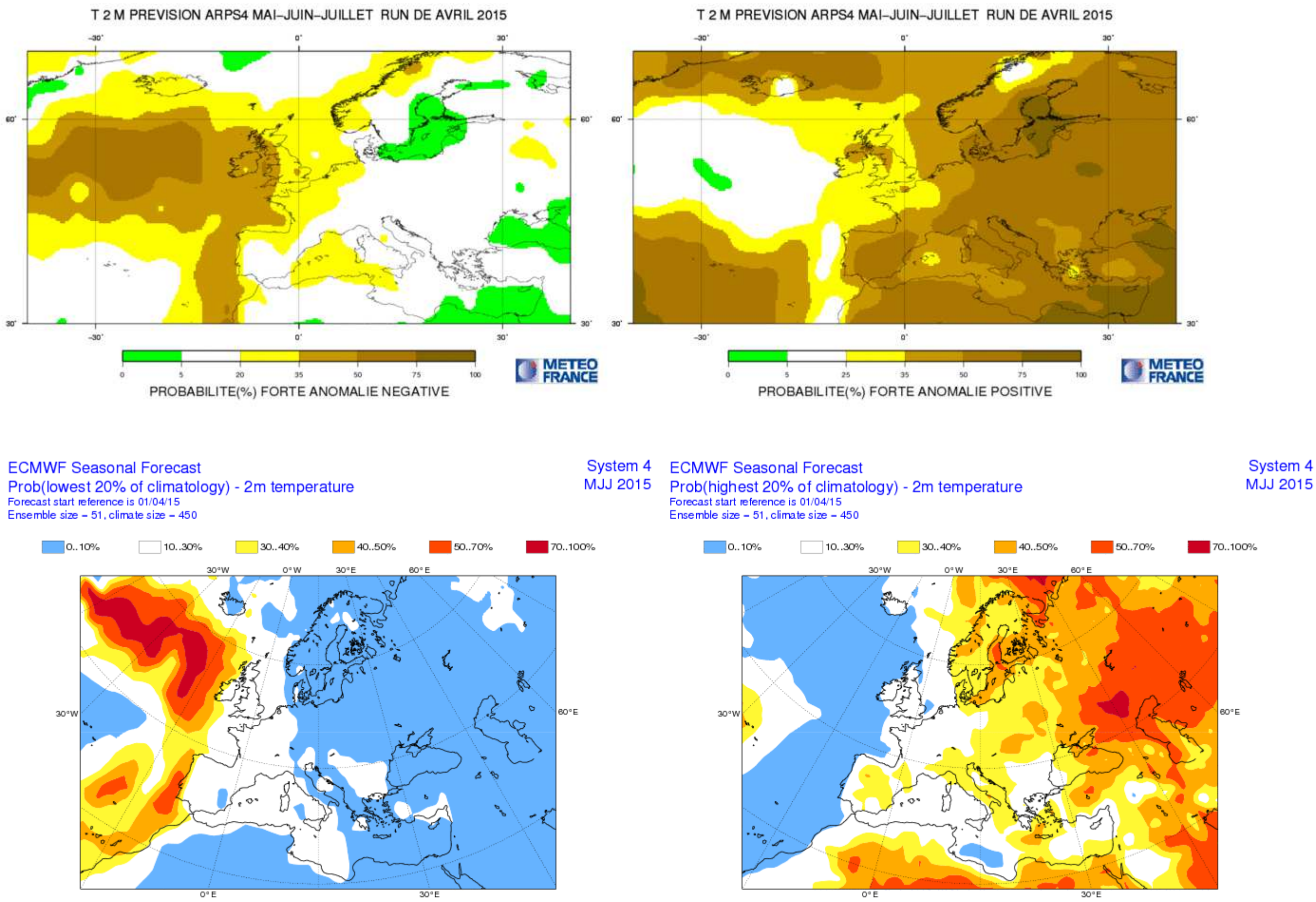

fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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

Clear influence of colder than normal Atlantic Ocean SST that could generate cold anomaly over Atlantic areas.

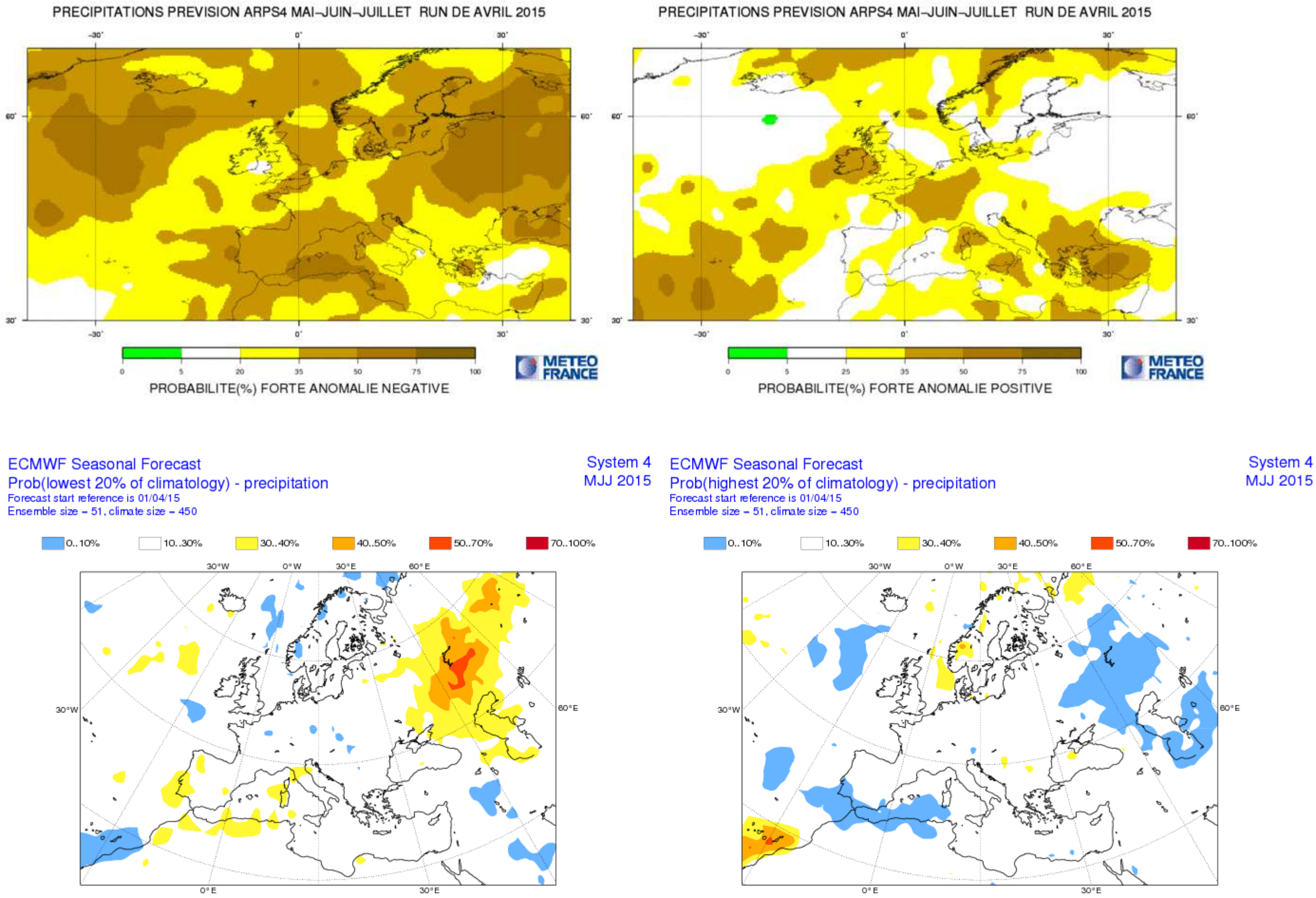

fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).

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

II.8. DISCUSSION AND SUMMARY

II.8.a Forecast over Europe

Warn anomaly forecast over Eastern Europe, no clear signal westerly.

No scenario for precipitations

II.8.b Tropical cyclone activity

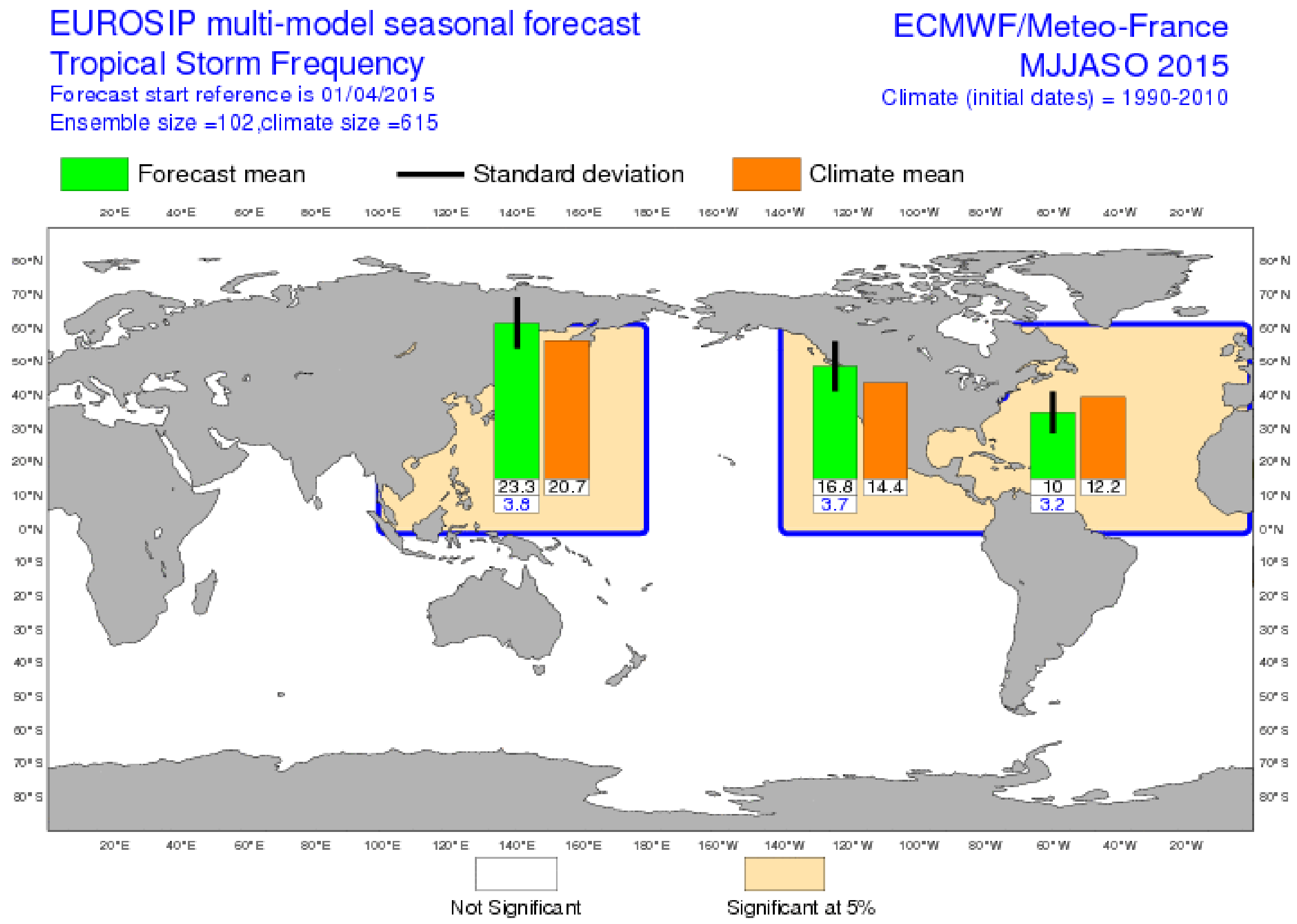

fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).

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

Forecasts are strongly linked with SST anomalies.

Hurricane season is forecasted significantly weaker than normal over the Atlantic and significantly stronger than normal over Pacific.

II.8.c Indian monsoon activity forecast

The development of El Nino conditions in the Pacific Ocean strengthens the downward motion over south Asia. SST warm anomaly over Indian Ocean is also an unfavorable factor. Accordingly a less active than normal Indian monsoon is likely.

II.8.d African monsoon activity forecast

The downward motion is also strengthened over Africa and most models forecast a drier than normal scenario. These are unfavourable factors. However some models (especially NCEP) predict the development of a tongue of cold water on Guinea Gulf. This is known to be a precursor of an earlier and more active than normal monsoon. The occurrence of the tongue of cold water should be monitored in the next mouths to choose one of these patterns.

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WMO RA VI
RCC Network

Synthesis of Temperature forecasts for May-June-July 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***	***no privileged scenario***	***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 May-June-July 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	(grey)	(grey)	(yellow)	(yellow)	(grey)
ECMWF	(grey)	(grey)	(grey)	(grey)	(grey)
JMA	(grey)	(grey)	(grey)	(grey)	(grey)
synthesis	(grey)	(grey)	(grey)	(grey)	(grey)
Eurosip	(grey)	(grey)	(grey)	(yellow)	(cyan)
privileged scenario by RCC-LRF node	*no privileged scenario*	*no privileged scenario*	*no privileged scenario*	*Below normal*	*no privileged scenario*

(yellow) RR Below normal (Dry) — (green) RR close to normal — (cyan) RR Above normal (Wet) — (grey) No privileged scenario

II. ANNEX

II.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.

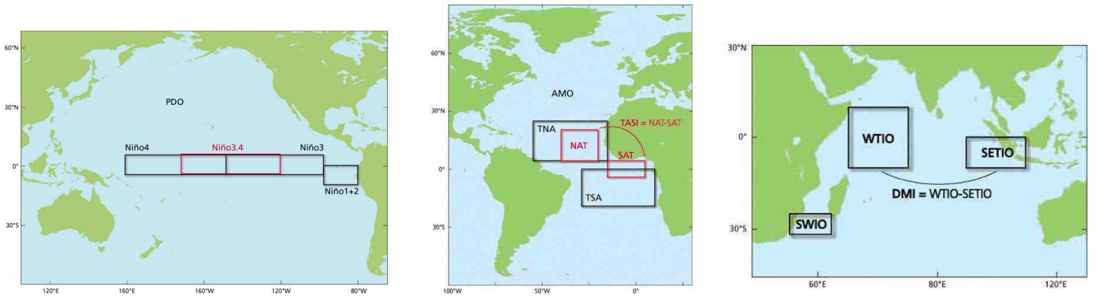
II.2. « NINO », SOI INDICES AND OCEANIC BOXES

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).

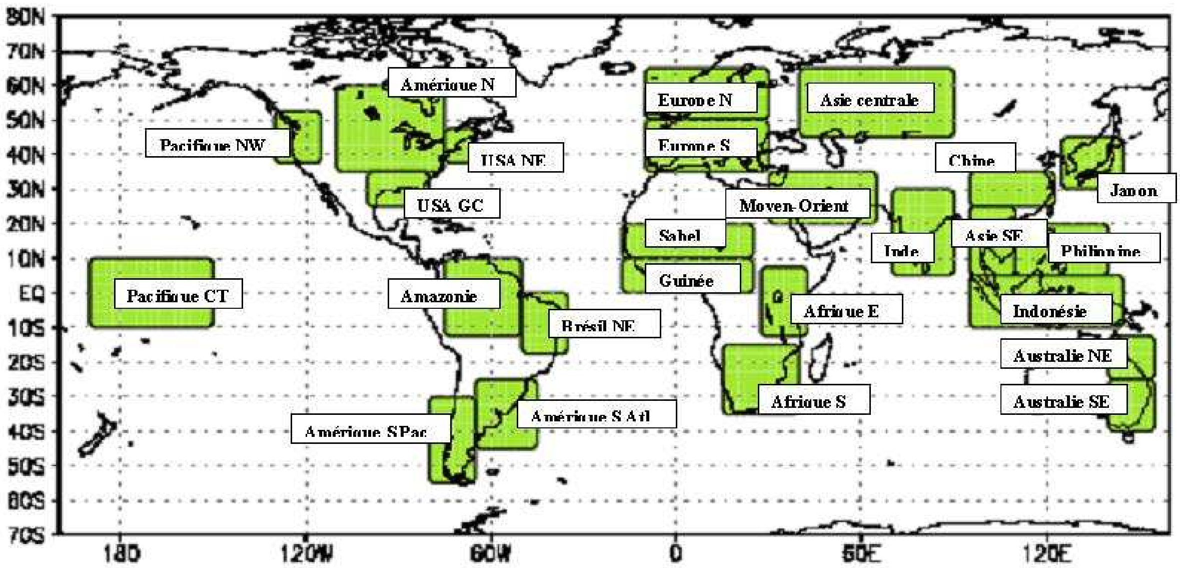
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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



II.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.



II.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).