GLOBAL CLIMATE BULLETIN
n°190 – April 2015

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I. DESCRIPTION OF THE CLIMATE SYSTEM (FEBRUARY 2015)

I.1. Oceanic analysis

February conditions analysis :

In the Pacific ocean

In the equatorial waveguide :

surface : positive SST anomaly almost the whole (except on the extreme east of the basin). Warming trend around the International Date Line, and cooling over extreme west and east of the rail.

subsurface : significant warming in the center of the basin and cooling from both sides. Consistent with the crossing of a beautiful Kelvin wave (probably the result of the MJO shot occurring during the first half of January).

Niño 3.4 index stable, threshold neighbor + 0.6 ° C in February. Drop Niño 3 and Niño1 + 2 indexes. Negative value in the box Niño 1 + 2 (-0.6 ° C). Conclusion: ocean conditions close to the threshold Niño in February.

Strengthening the structure of the positive PDO (PDO + switches since early 2014).

Surface warming from southeast of Polynesia to the Fiji Islands and Vanuatu.

Maritime continent :

Slight cooling in February, except south of Java, where the Indian Ocean is warming.

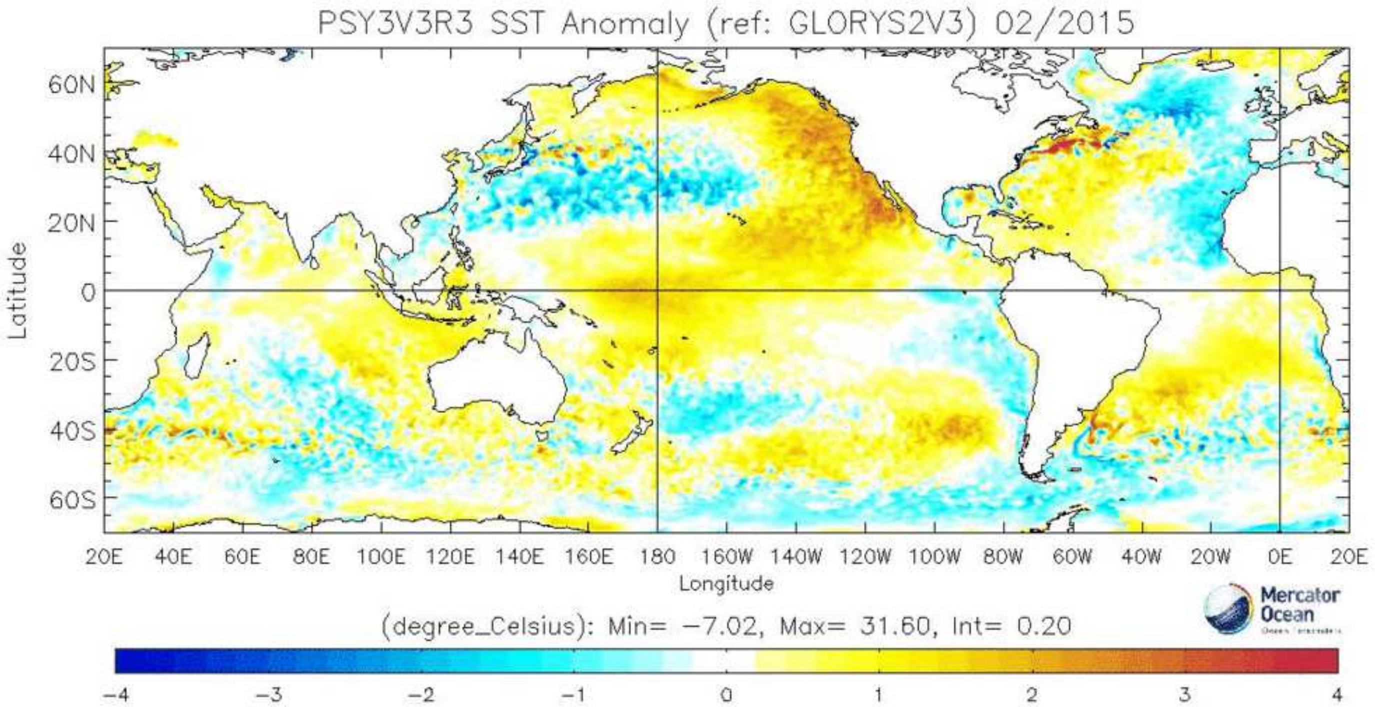
In the Indian Ocean :

Significant cooling in the southern part. On the equatorial rail, very slight cooling in the east and warming in the west: but the DMI remains strongly negative (DMI = -0.7).

In the Atlantic :

Little change in the North Atlantic (slight cooling over Sargasso Sea). Conservation of cold horseshoe structure.

Significant cooling in the South Atlantic.



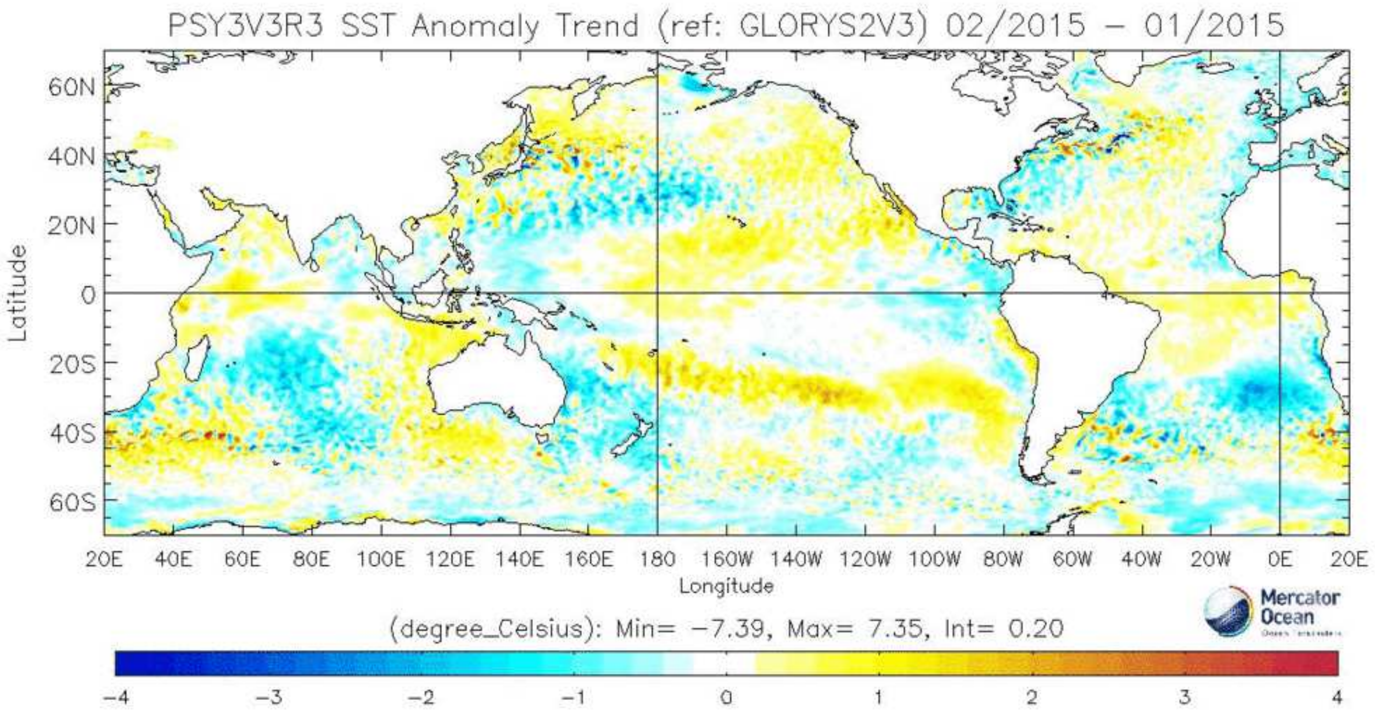


fig.I.1.1: top : SSTs Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

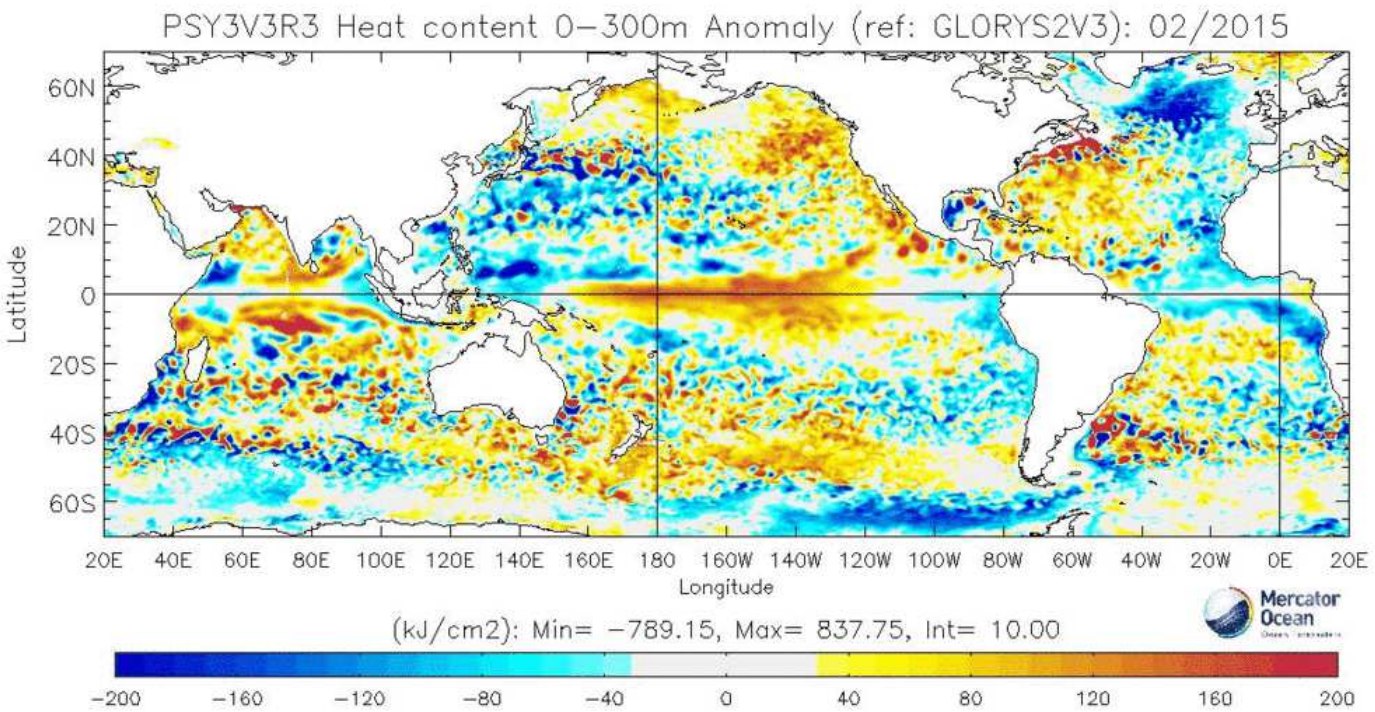


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2009) http://bcg.mercator-ocean.fr/

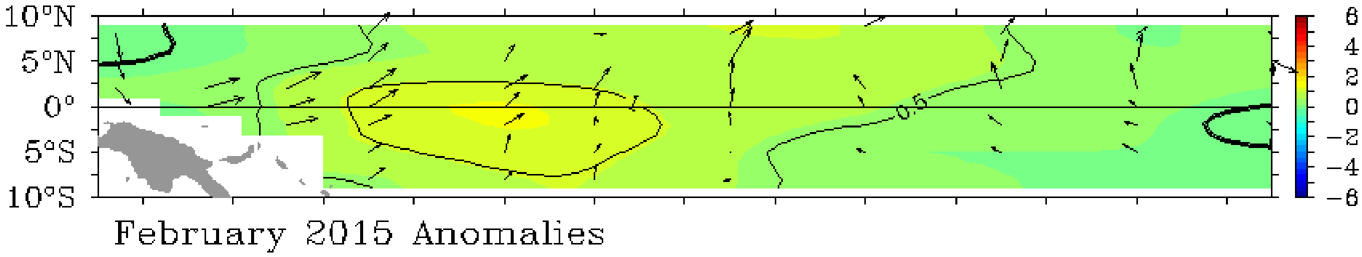


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON. http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html

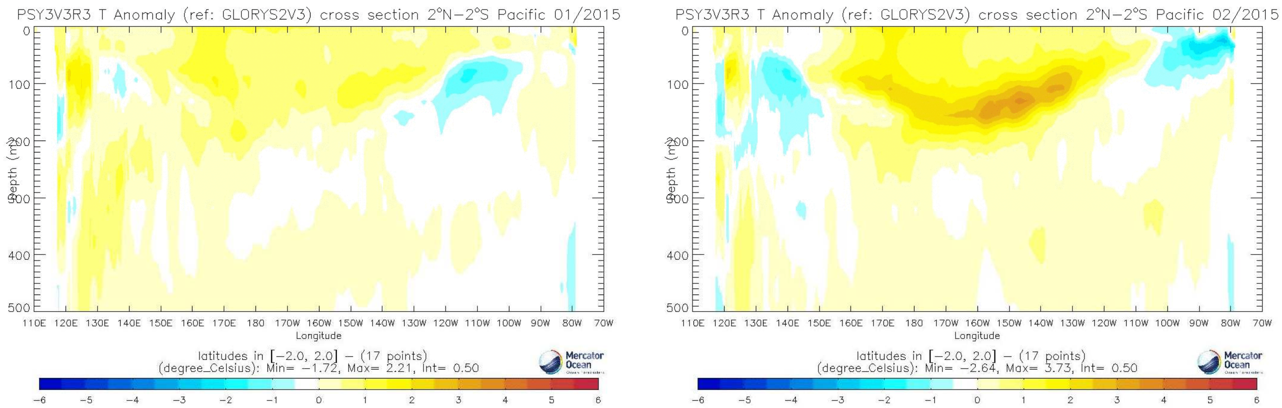


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), http://bcg.mercator-ocean.fr

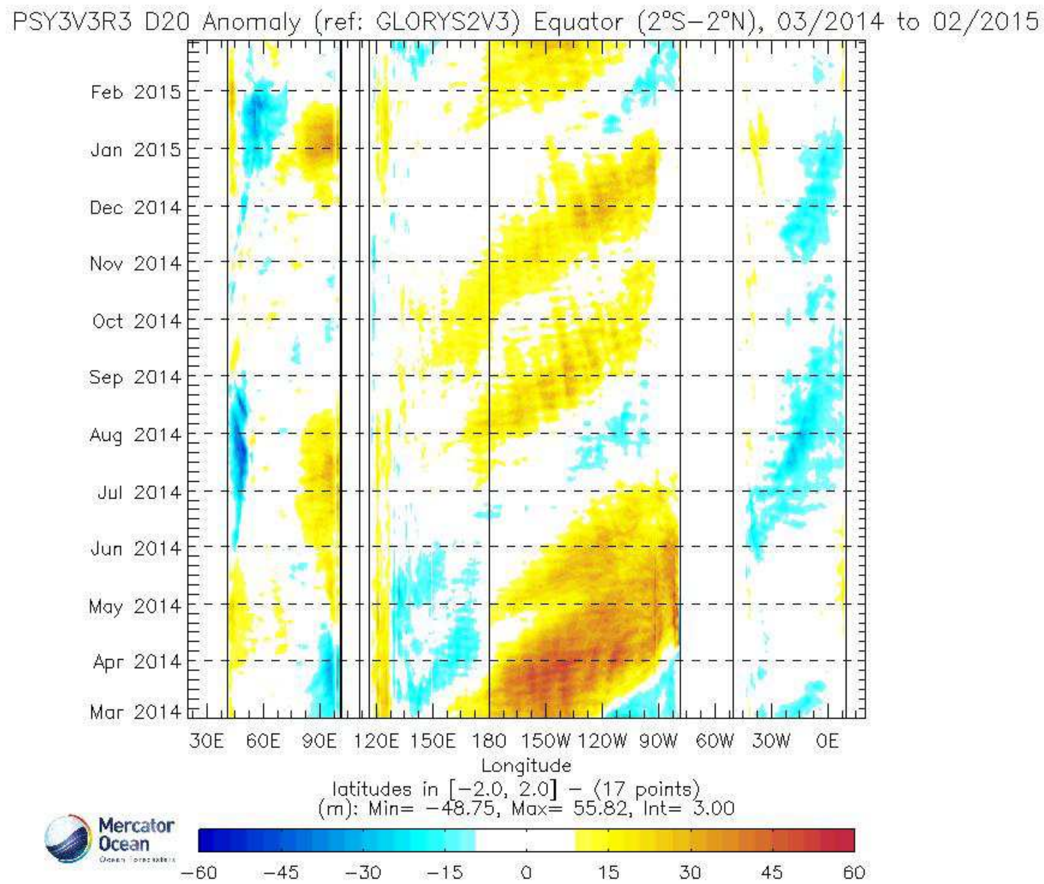
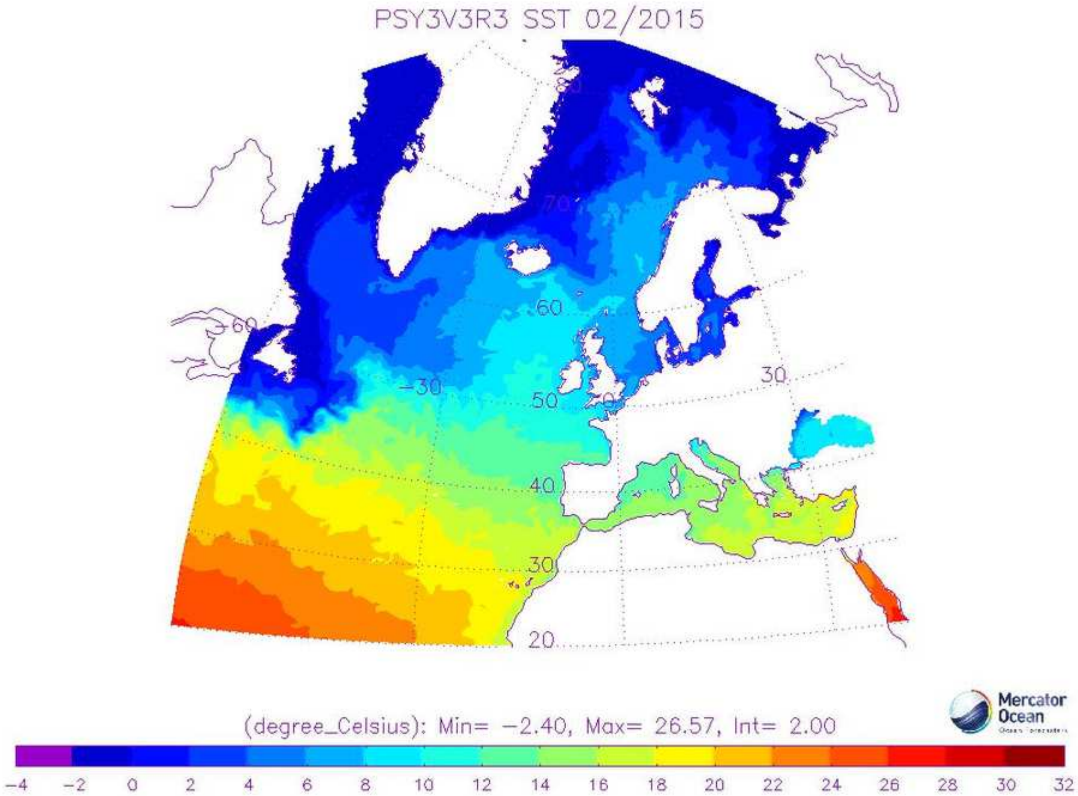


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period http://bcg.mercator-ocean.fr/

Sea surface temperature near Europe :

Generally anomalies became lower in February near Europe compared to January. Still warmer than normal in the Arctic Sea and especially in the Baltic Sea (with sea ice only in the northern part). In contrast to January, North Sea has cooled to normal temperatures.

The cold anomaly in the East Atlantic hast extended to the Biscay and the western and central Mediterranean. Eastern parts of the Mediterranean and Black Sea still warmer than normal.


PSY3V3R3 SST 02/2015
(degree_Celsius): Min= −2.40, Max= 26.57, Int= 2.00
Mercator Ocean
−4 −2 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32

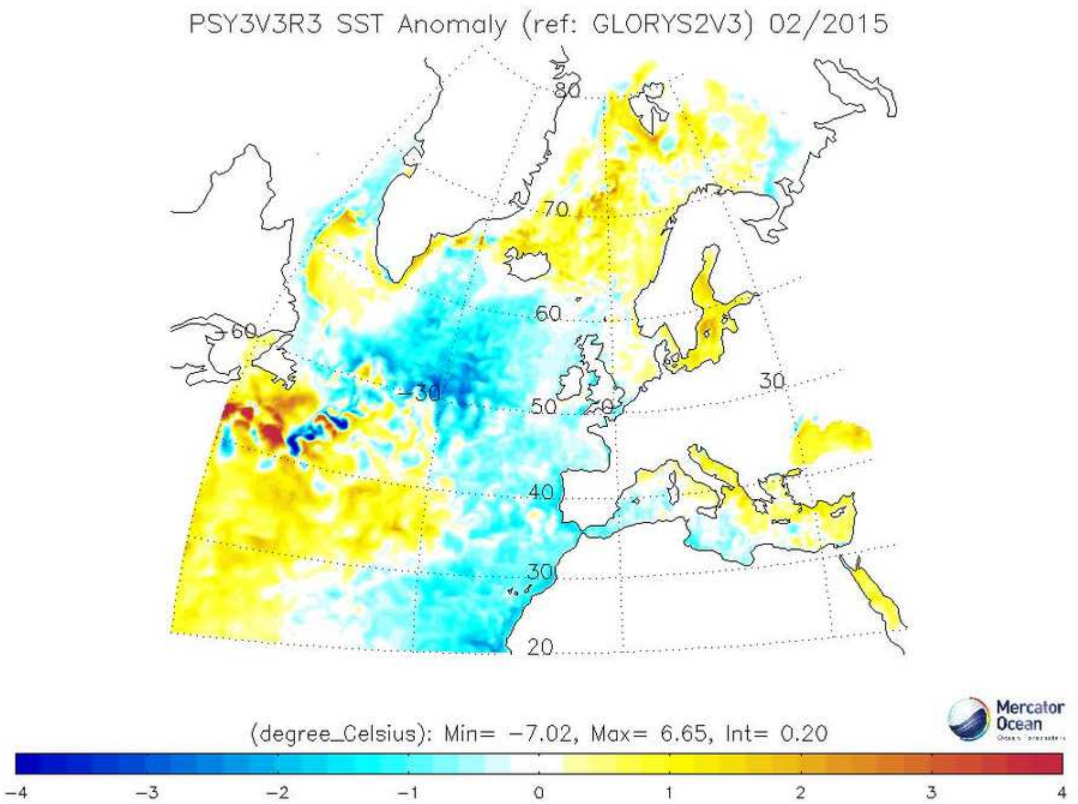

PSY3V3R3 SST Anomaly (ref: GLORYS2V3) 02/2015
(degree_Celsius): Min= −7.02, Max= 6.65, Int= 0.20
Mercator Ocean
−4 −3 −2 −1 0 1 2 3 4

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, the structures are not consistent with the SST anomalies (except south of Japan). Traces of the low activity of the MJO in February ??? Over Atlantic, the structures are consistent over the Sargasso Sea but not on the TNA area. Over Indian ocean, a little more consistency.

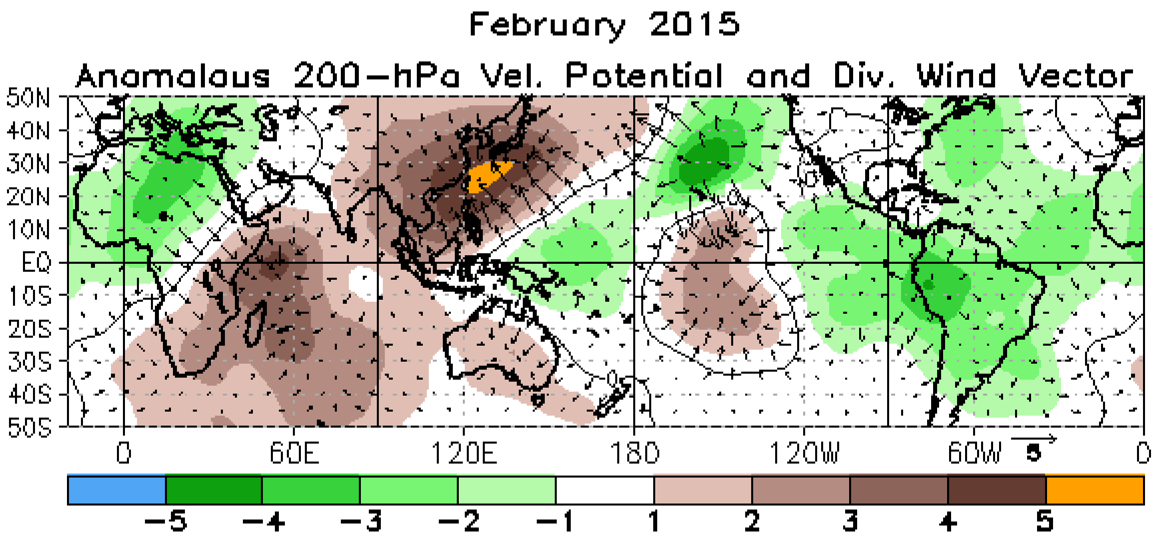


fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly). http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

- MJO (fig. I.2.b)

Weakly active over the Pacific in the first decade of February.

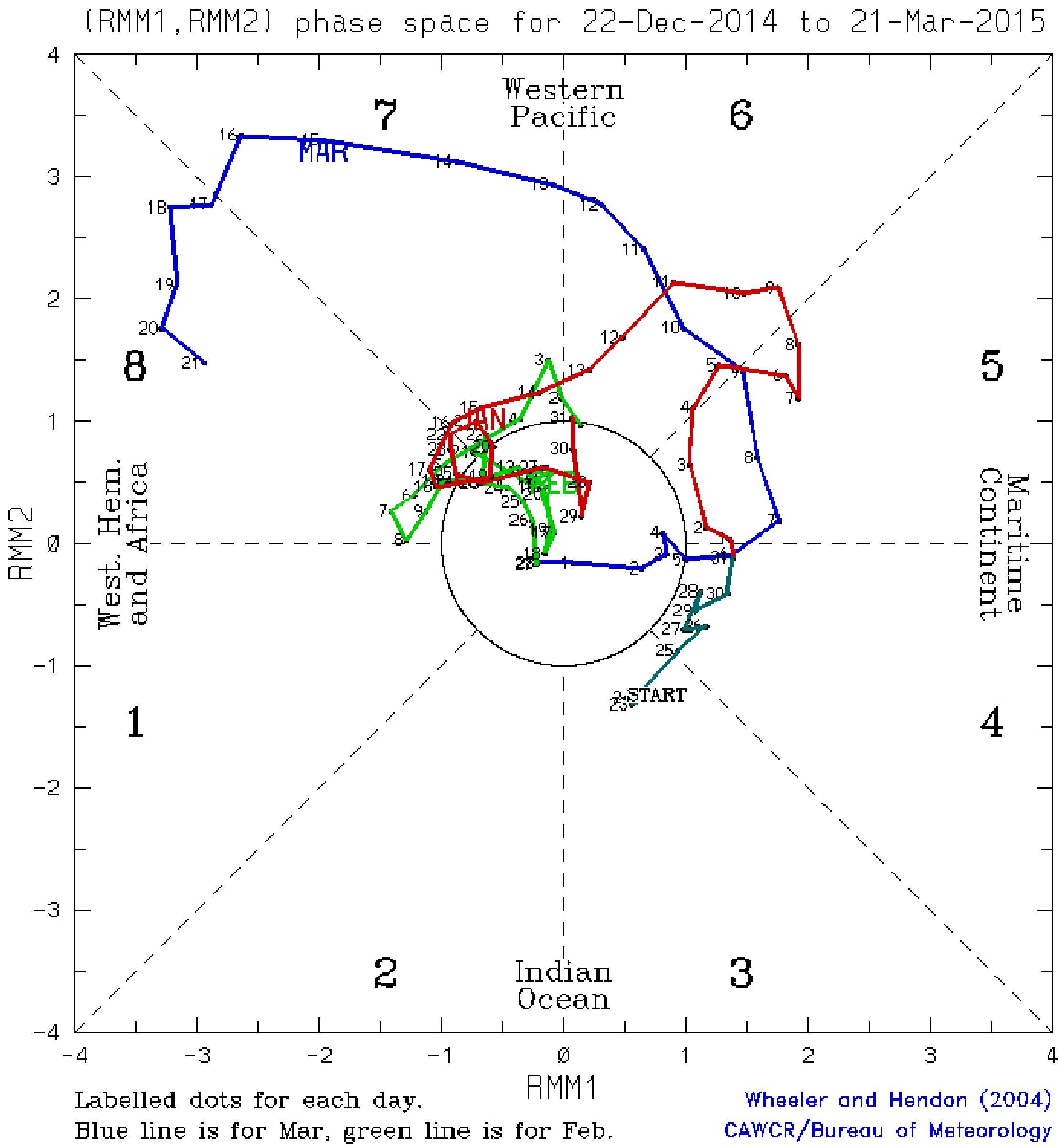


fig.I.2.b: indices MJO http://cawcr.gov.au/staff/mwheeler/maproom/RMM/phase.Last90days.gif

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

On the northern hemisphere, it seems to produce some interactions between tropical structures and the structures of the middle latitudes. Reactivating the ITCZ 10 ° N-140 ° W by Rossby waves traveling in the JOST ???

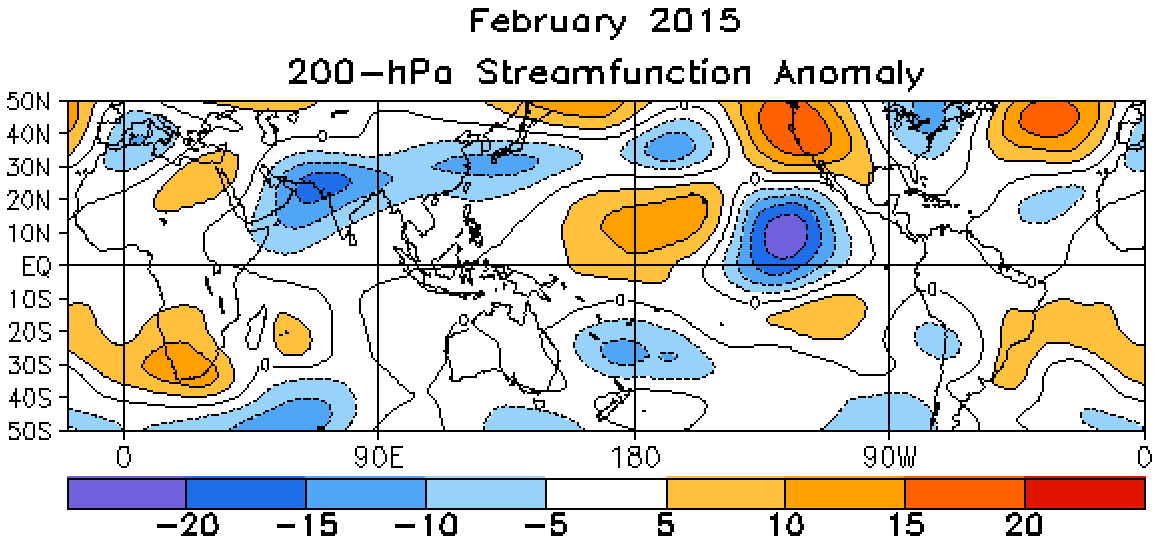


fig.I.2.2: Stream Function Anomalies at 200 hPa.

http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

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

Wide area of HGP from Kamchatka to Alaska extending along the West Coast of the USA, bordered to the south by a minimum (north of Hawaii). Area of LGP from North Pole until Florida. HGP on the North Atlantic, and LGP in the Western Mediterranean. AO, NAO and PNA positive phases.

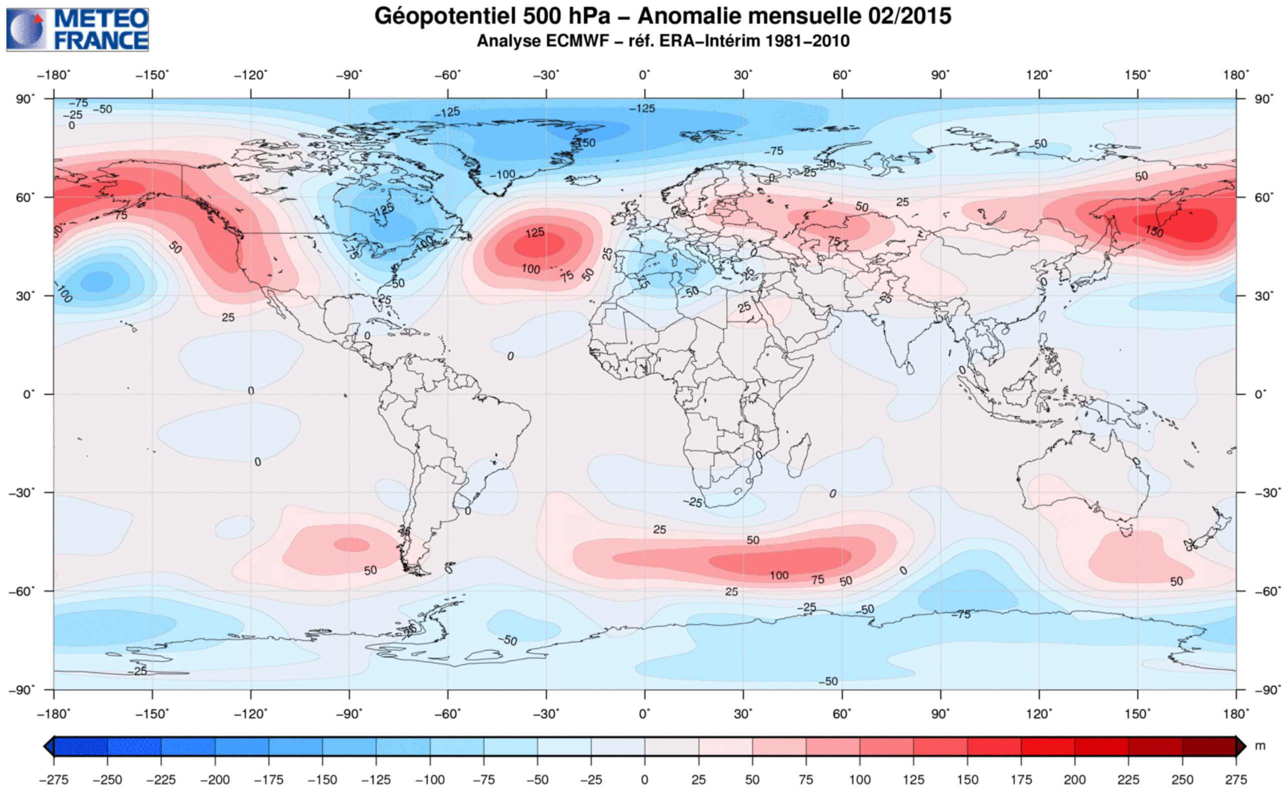


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
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

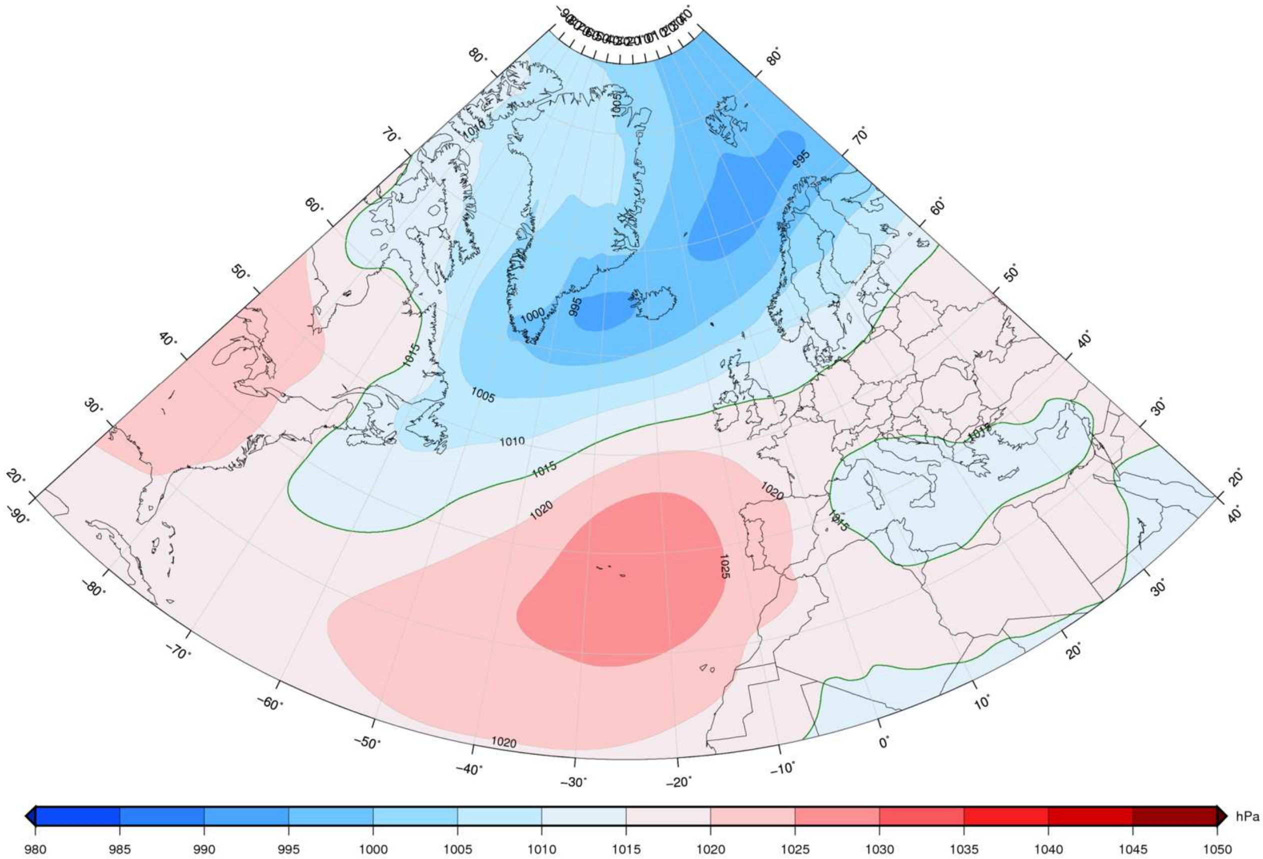
Sea level pressure and circulation types over Europe

Similar to December 2014 and January 2015, also February 2015 was characterized by more intense Icelandic Low and Azores High pressure centres resulting in a continuation of the positive NAO mode. SLP anomalies over the North Atlantic are smaller this February compared to January 2015, so the NAO index also was lower. No contribution of EA this time, but a highly positive POLEUR mode points to a quite strong polar vortex (negative SLP anomalies much extended to polar regions).

Over the European continent, much cyclonic activity again over Scandinavia and the Mediterranean, but high pressure bridge over middle latitudes. Possibly some contribution of negative EATL/WRUS pattern (cyclonic in western/southwestern Europe, anticyclonic over Russia, better to be seen in 500 hPa than near surface).

Pression mer – Moyenne mensuelle 02/2015

Analyse ECMWF



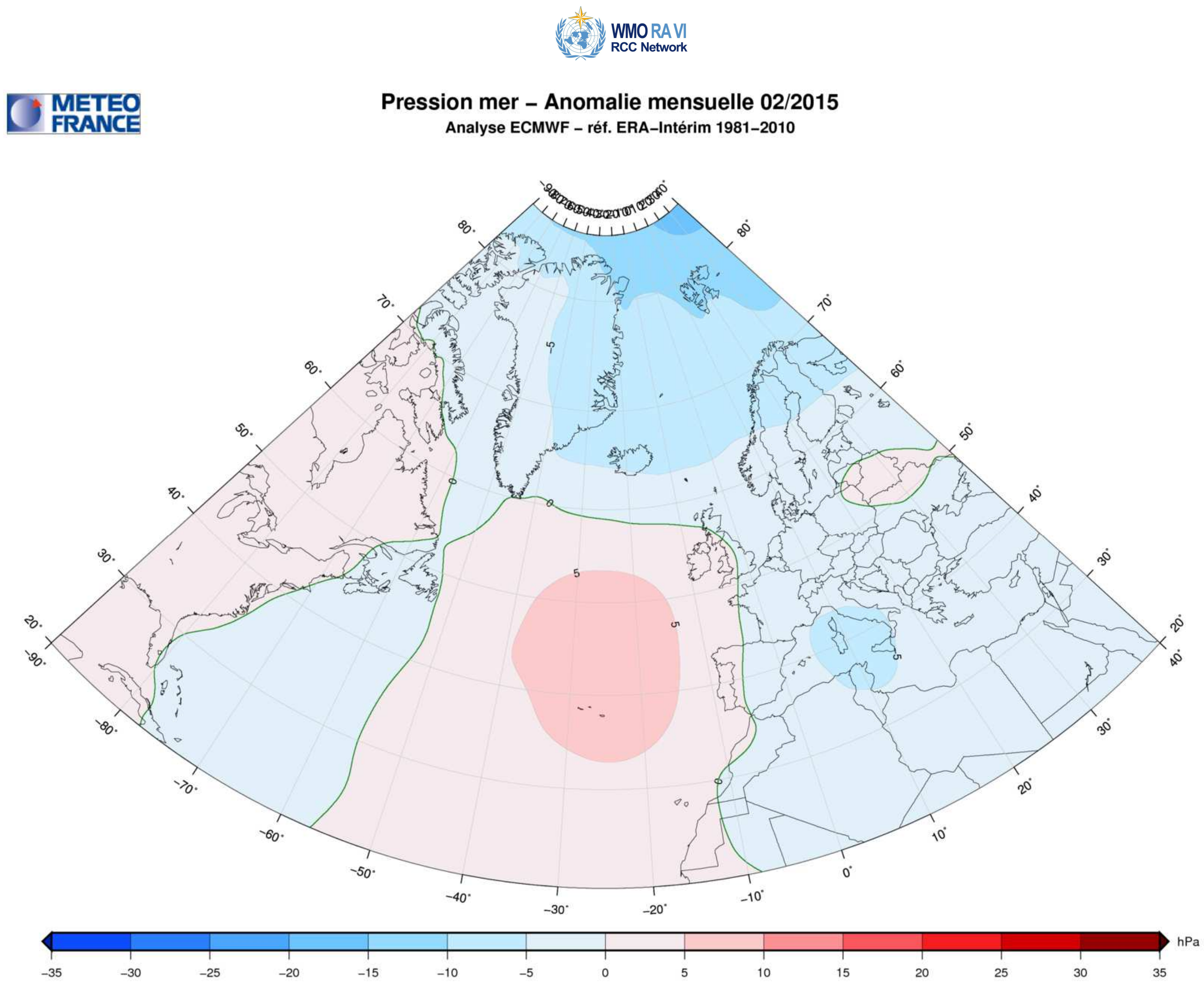


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (top) and 1981-2010 anomalies (bottom).

Circulation indices: NAO and AO

Both NAO and AO positive mode throughout the whole month except the beginning, and both intensifying in the second half of February 2015 and continuing also in the first half of March, so not much meridional air mass exchange, unusual for that time of season. Very high persistency of circulation patterns, no sign of change to be seen.

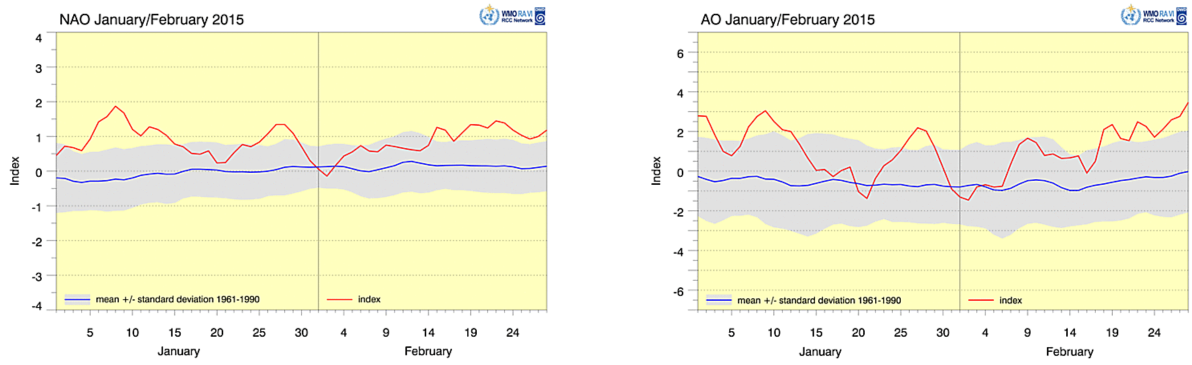


fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC:
http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

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

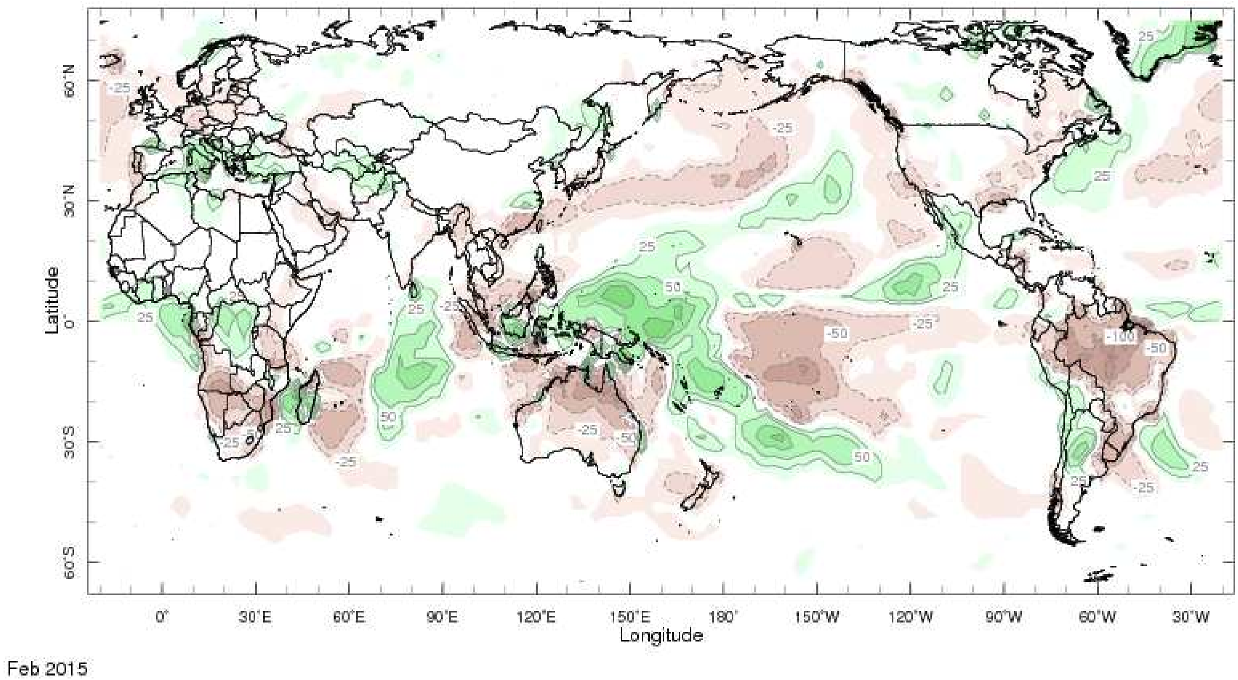


fig.I.2.4: Rainfall Anomalies (mm) (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

Precipitation anomalies in Europe:

Mainly wet especially over northwestern Europe and the Mediterranean region, but very dry over much of the middle latitudes, reflecting mainly the SLP pattern. Portugal and southern Spain also quite dry due to influence of the Azores High.

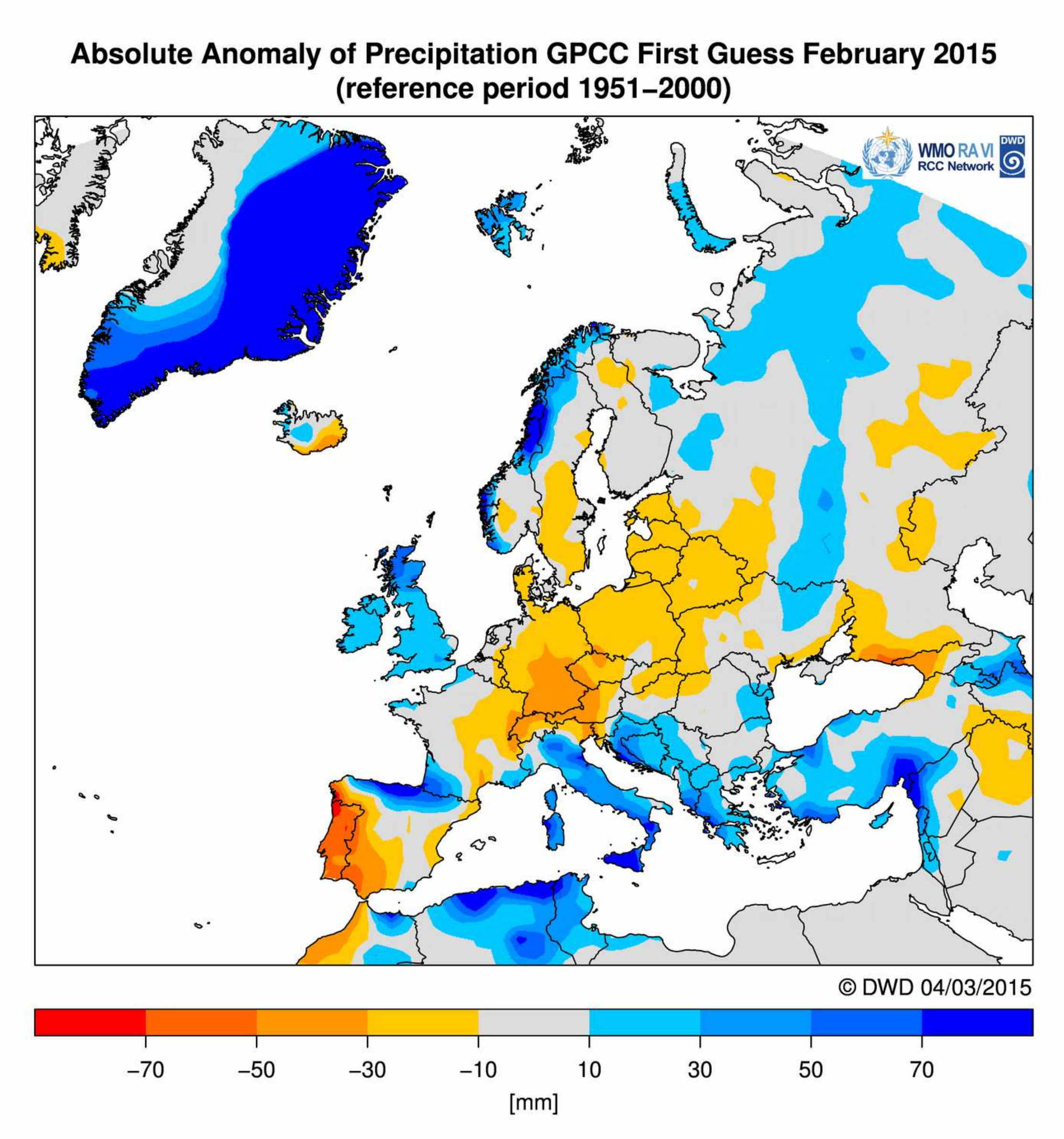


fig.I.2.5: Left: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm. Right: Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

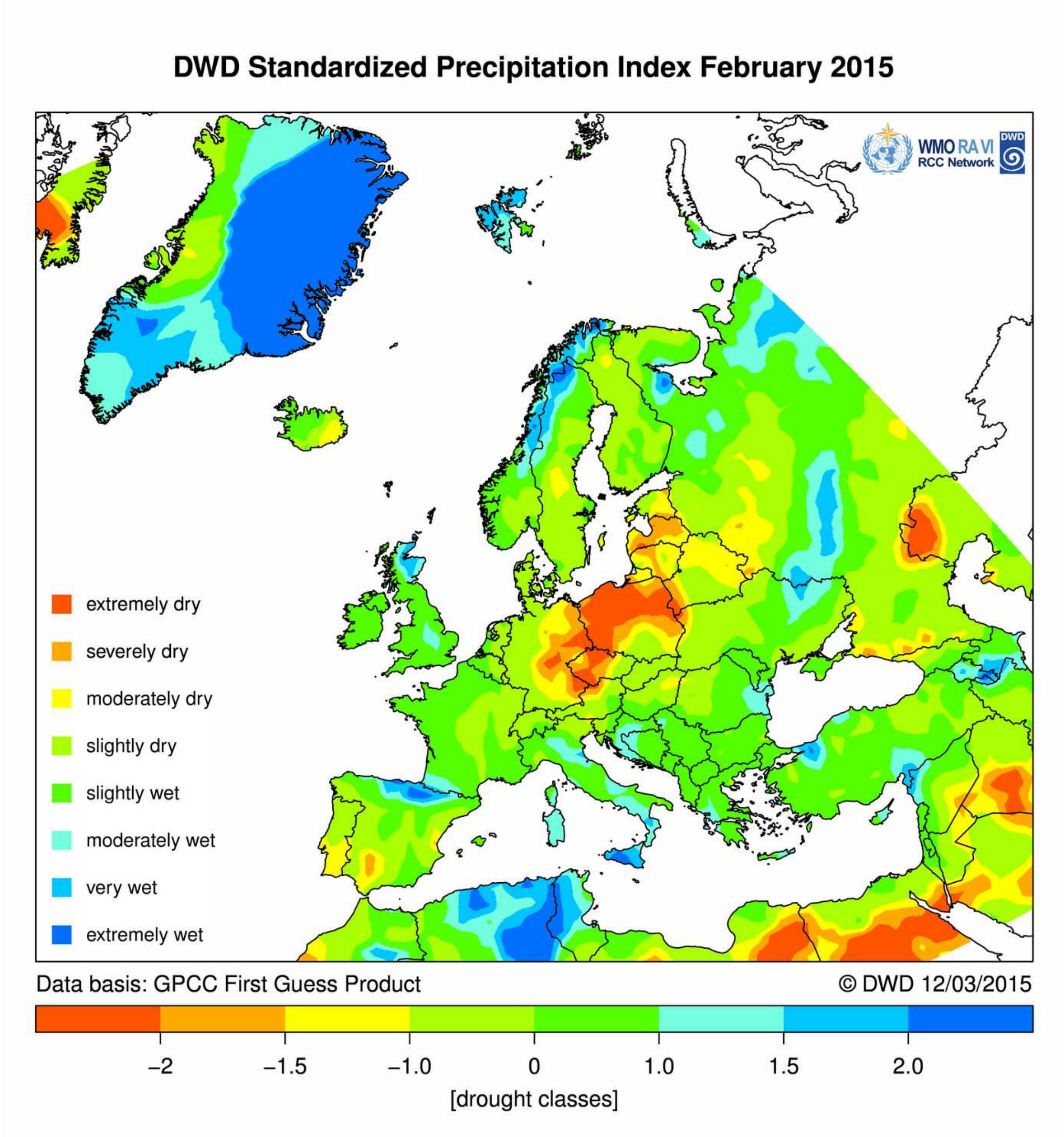


fig. I.2.5a: Standardized Precipitation Index with DWD modification (DWD-SPI), http://www.dwd.de/rcc-cm .

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	- 0.5 mm	82.0 %	+ 0.076
Southern Europe	+ 11.5 mm	120.8 %	+ 0.011

I.2.c Temperature

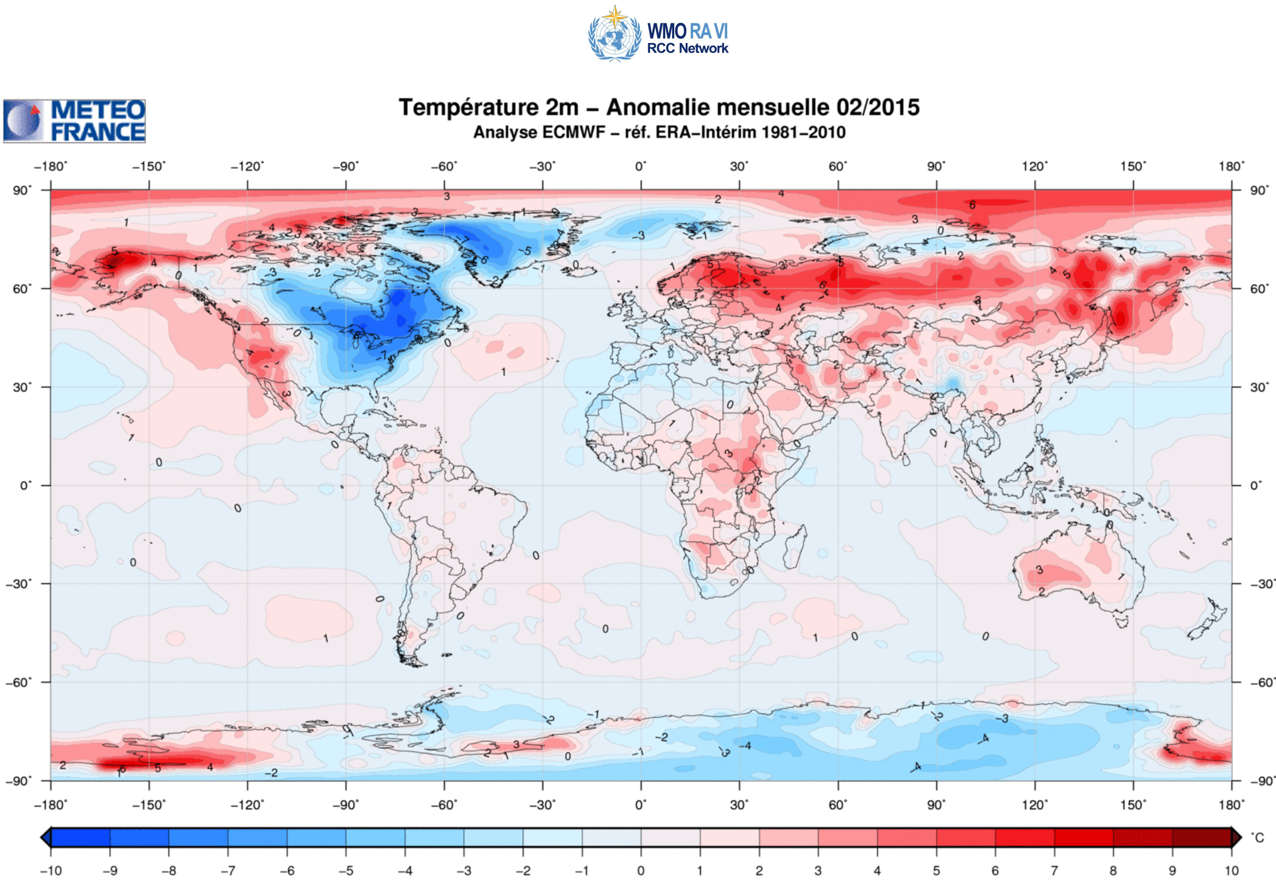
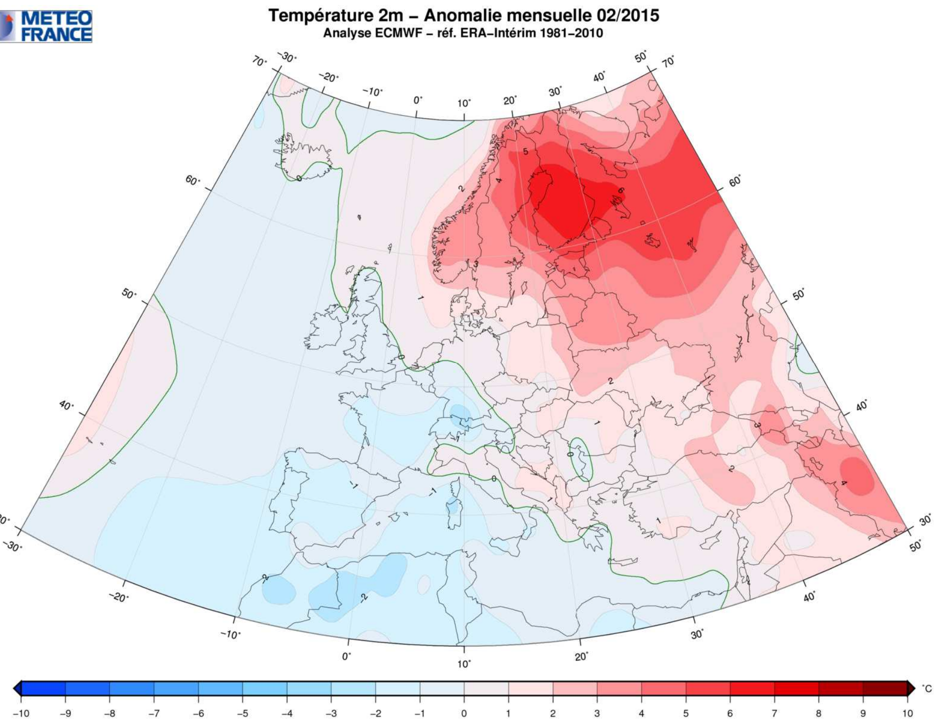


fig.I.2.6: Temperature Anomalies (°C) (Meteo-France)

Temperature anomalies in Europe:

Extremely mild in northeastern Europe – little impact of cold polar air outbreaks, consistent to highly positive AO. In contrast colder than normal in the west and south, consistent with negative geopotential anomalies.



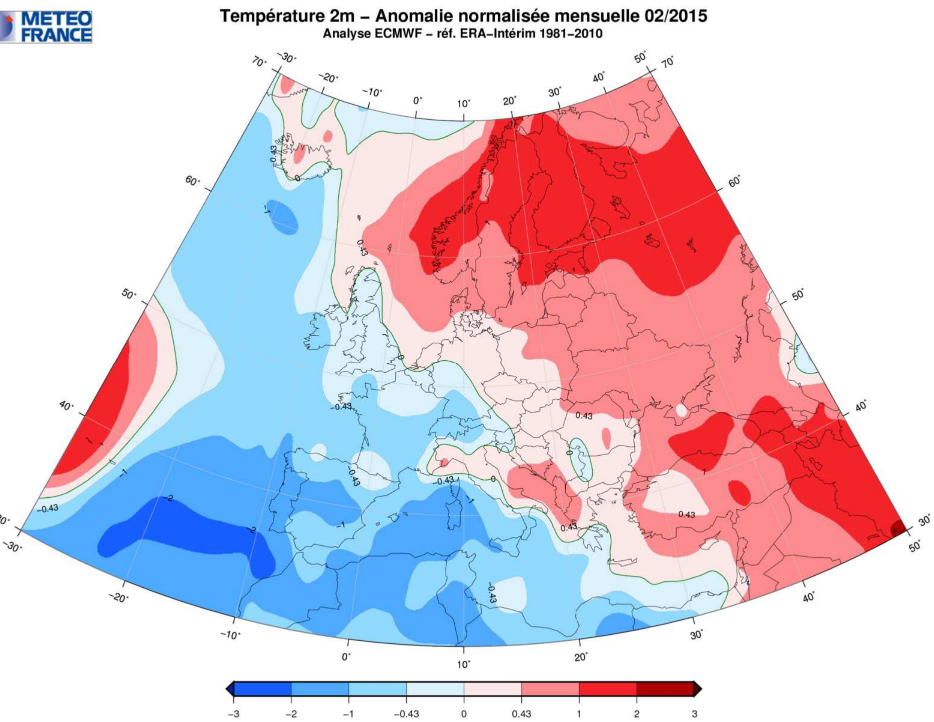


fig.I.2.7: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

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	+ 2.7 °C
Southern Europe	- 0.1 °C

I.2.d Sea ice

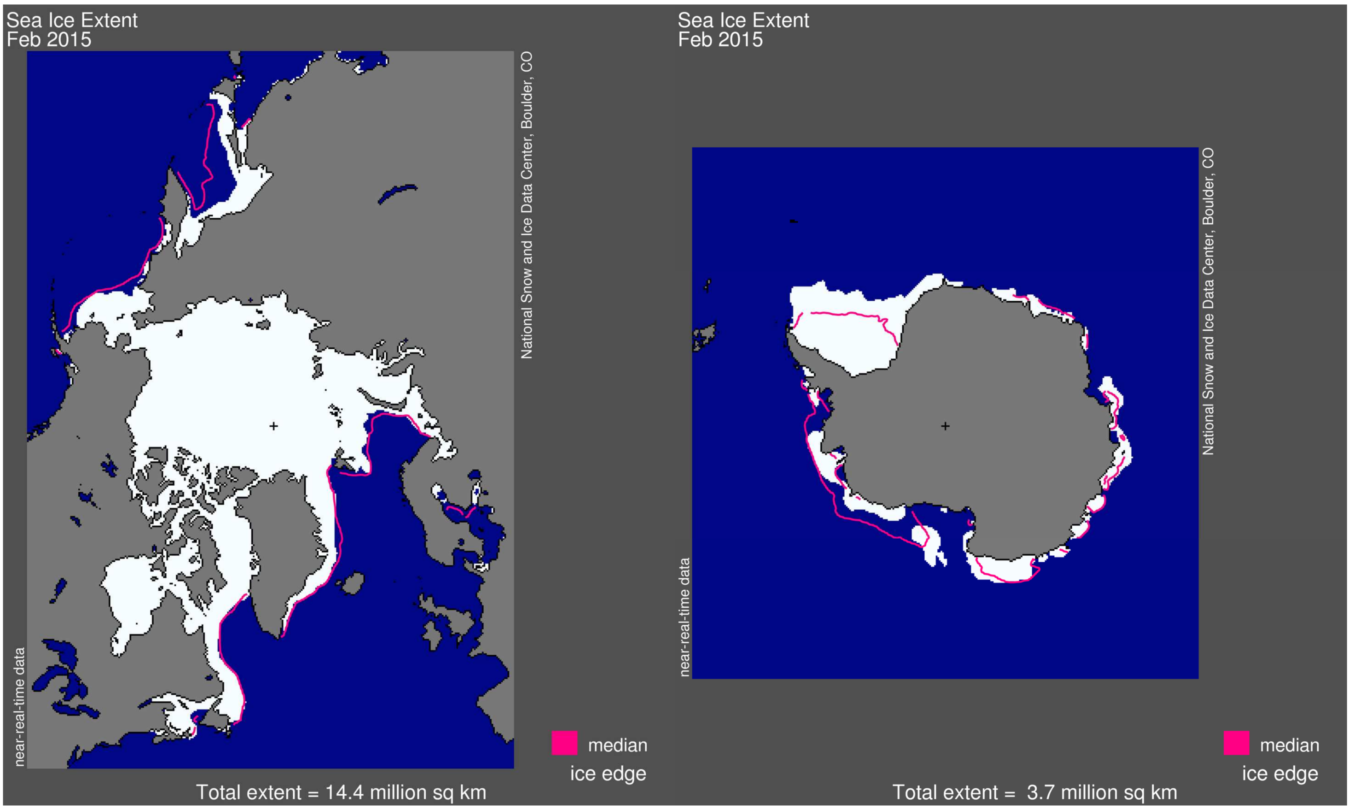


fig.I.2.6: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

In Arctic (fig. 1.2.6 and 1.2.7 - left) : Significant deficit (-2 std) persistent, mainly in the Pacific. It is in the records years of lower extension of ice in late winter.
In Antarctic (fig. 1.2.6 and 1.2.7 - right) : Large surplus (+2 std) persistent.

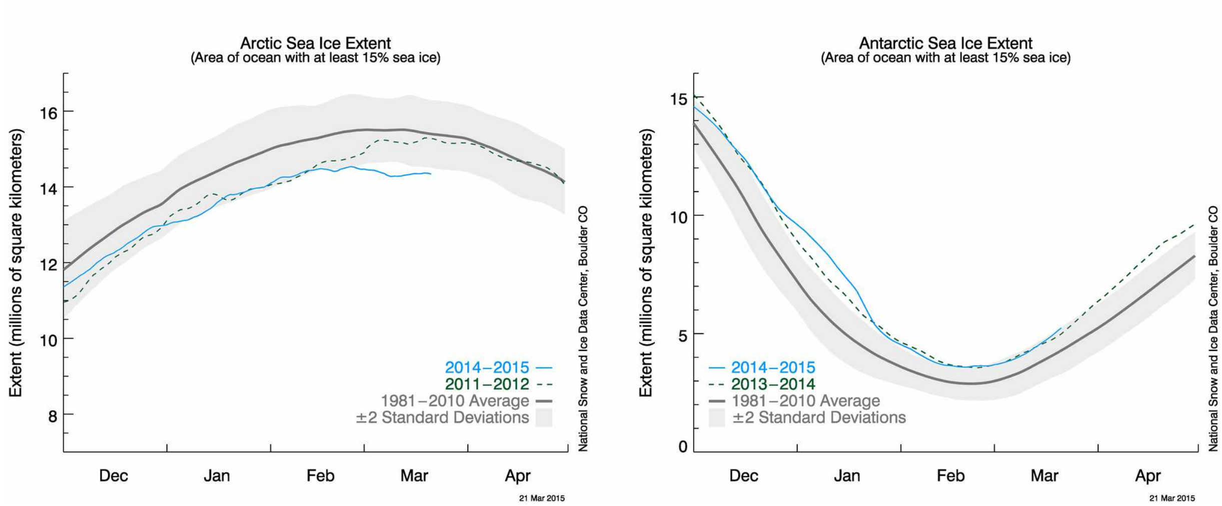


fig. I.2.7 : Sea-Ice extension evolution from NSIDC.
http://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png

II. SEASONAL FORECAST FROM DYNAMICAL MODELS

II.1. OCEANIC FORECASTS

II.1.a Sea surface temperature (SST)

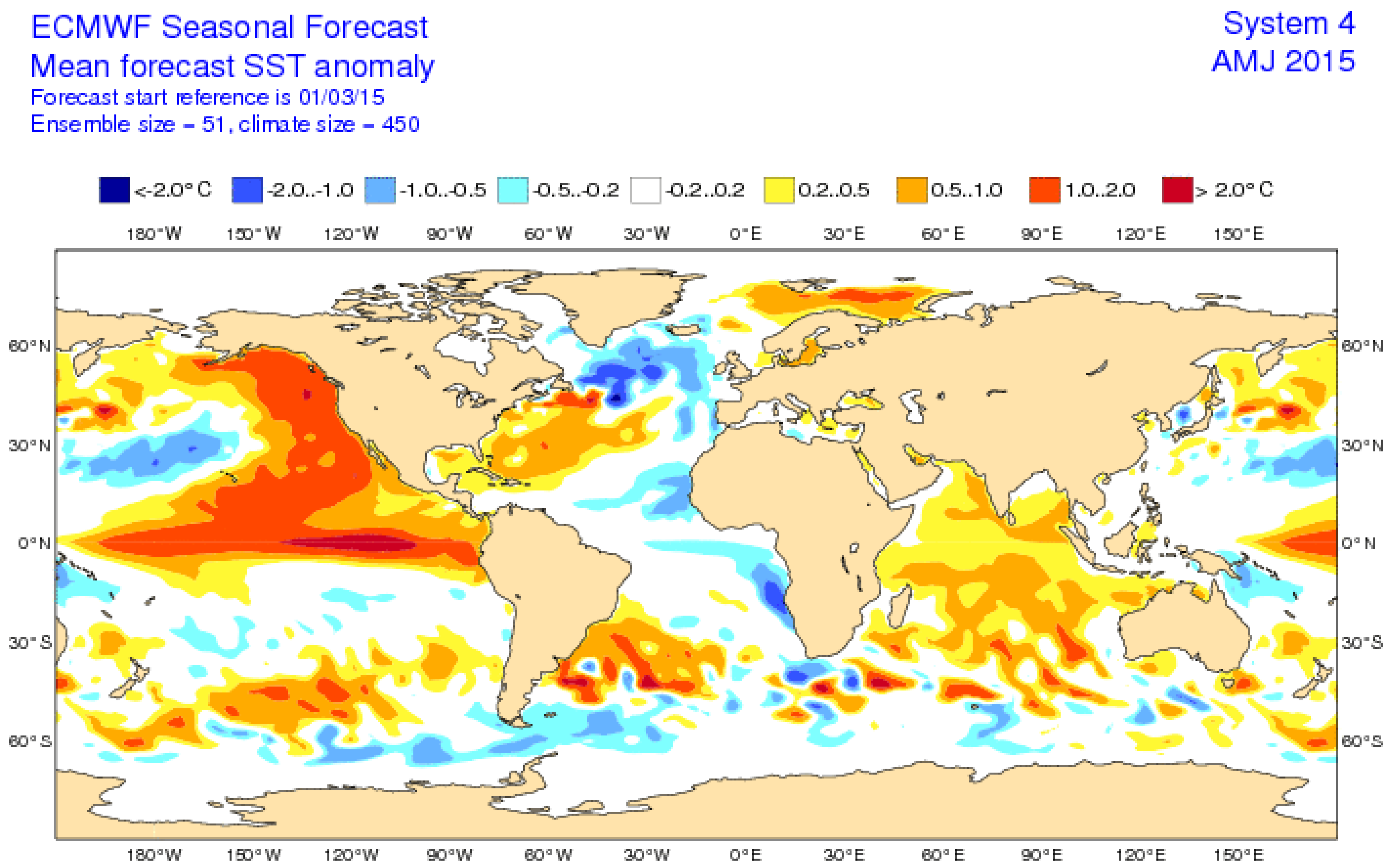


fig.II.1.1: SST anomaly forecast from ECMWF

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

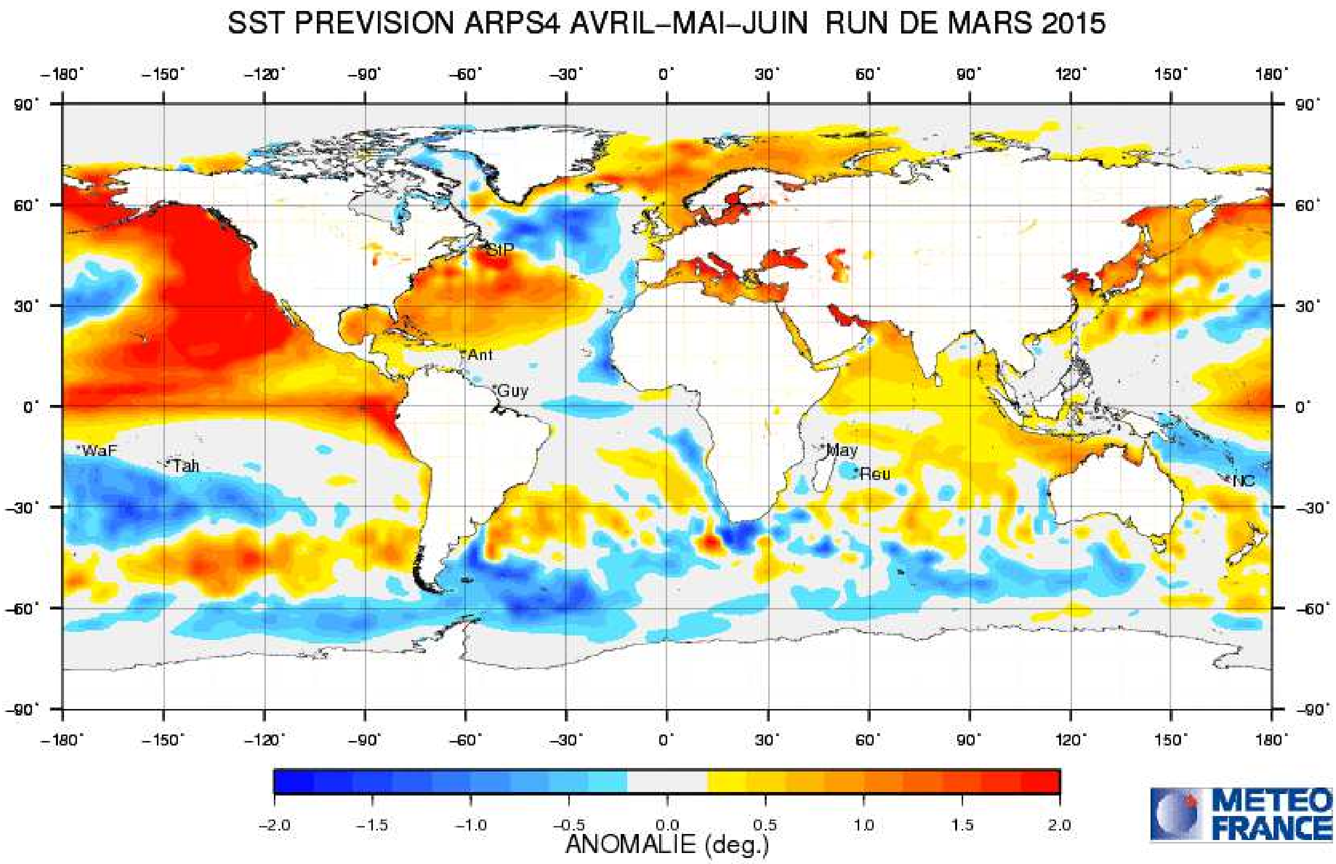


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).
http://elaboration.seasonal.meteo.fr

Very good overall consistency of structures anomalies between ARPEGE, CEP and NCEP. However, in the equatorial Pacific waveguide ARPEGE shows the strongest SST anomalies between the Galapagos and the South American continent (as if El Niño had already arrived), while CEP provides a more central position, Modoki? (around 120 ° W). In general, the timeline for the development of a Niño seems premature and fast. In addition, the spring predictability barrier arrives, so that the caution on anticipating the development of a Niño this year, although the oceanic Pacific context is favorable (positive phase of the PDO).

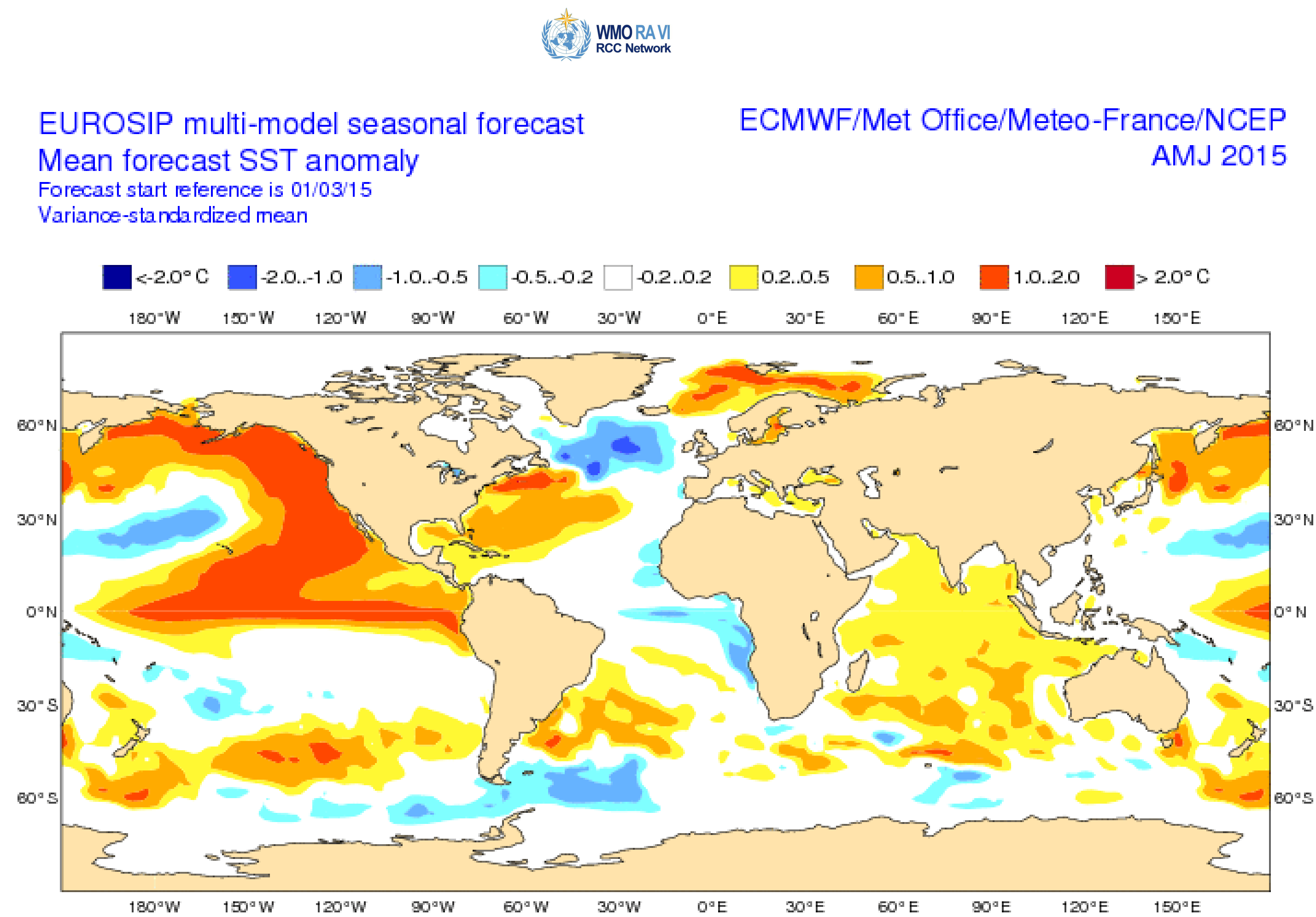


fig.II.1.3: SST Forecasted anomaly from Euro-SIP

II.1.b ENSO forecast :

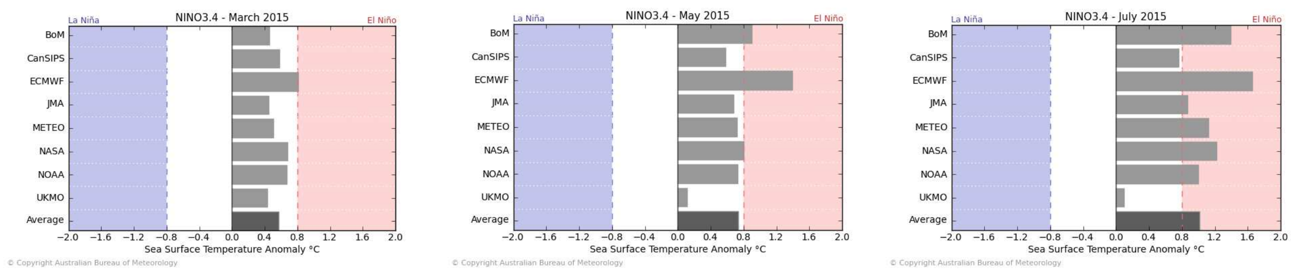


fig.II.1.4: Synthesis of Niño 3.4 forecasts (120° to 165°W) by IRI :

http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html

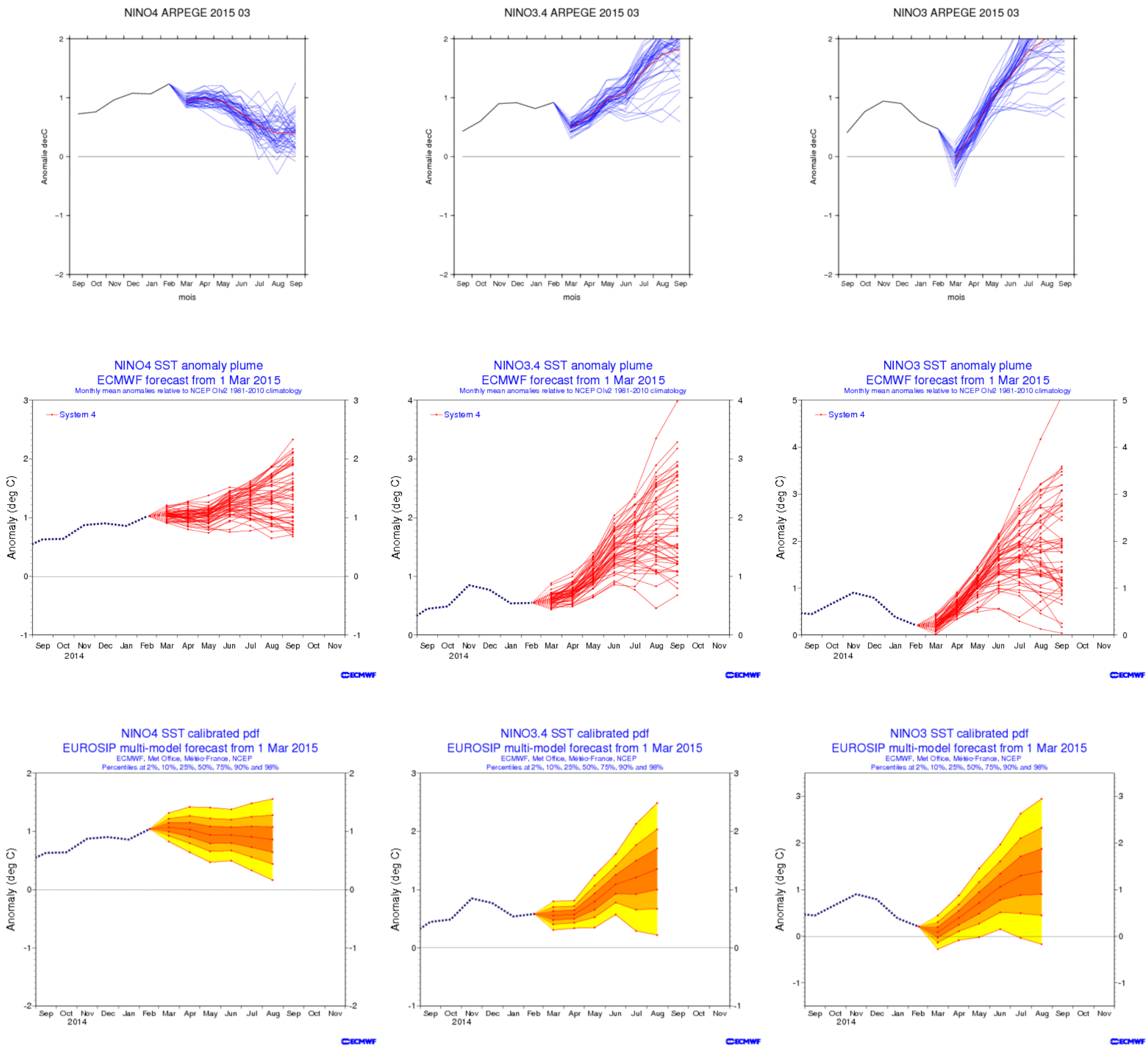


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

The EUROSIP plume diagram in Niño3.4 box shows a significant spread in the next quarter.

The anomaly in the box Niño3.4 expected to remain in positive values, but with a significant dispersion. Possible beginning of a warming in the quarter.

Phase scheduled for AMJ : starting an El Niño event to watch.

I.1.c Atlantic ocean forecasts

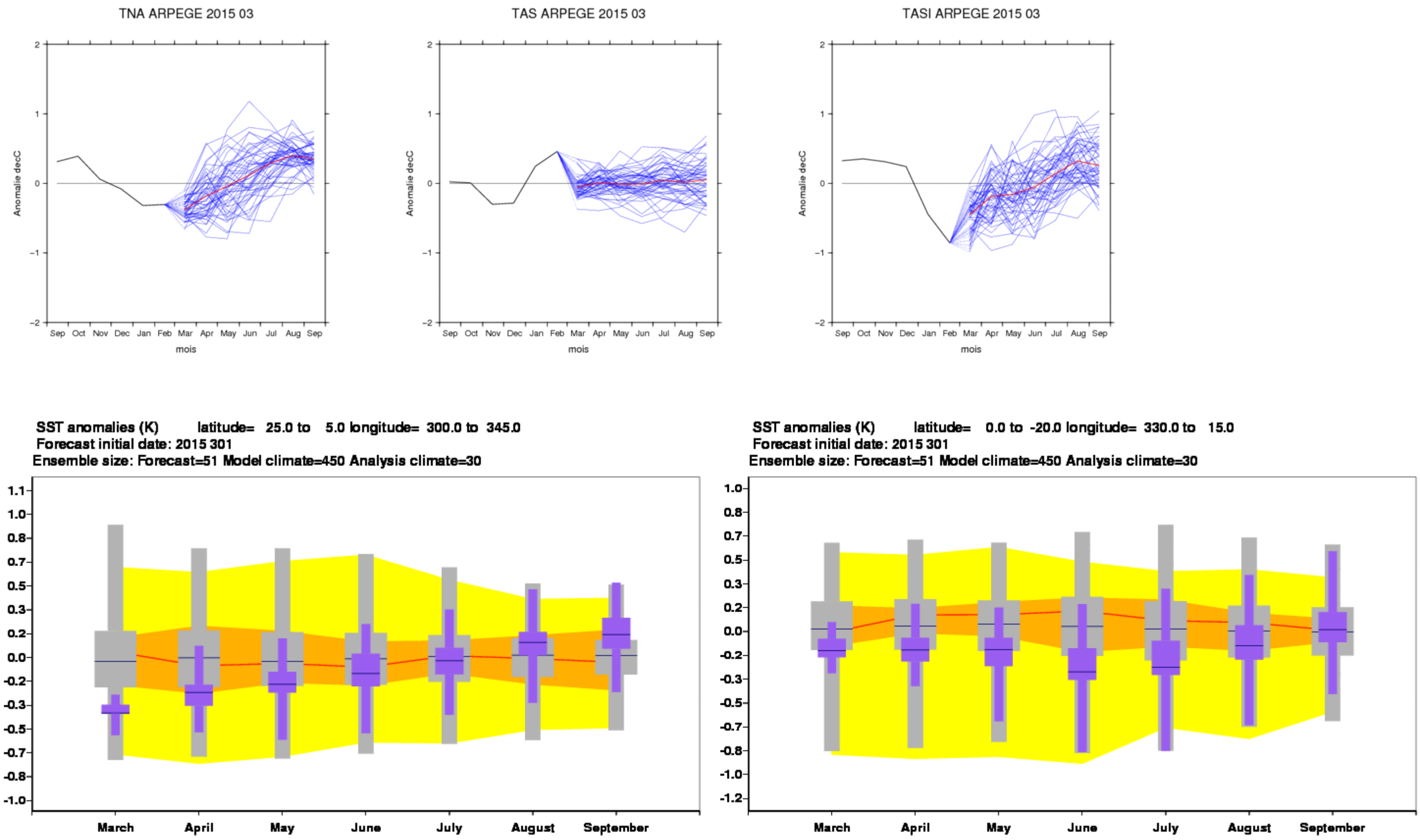
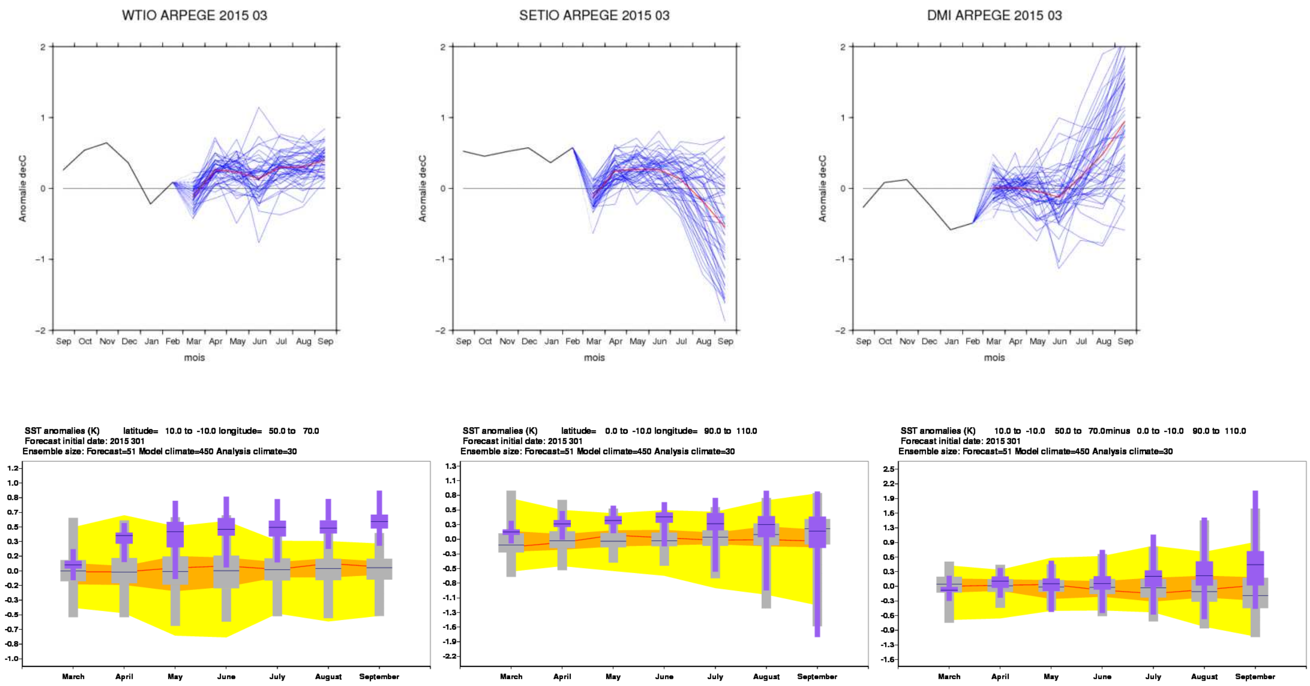
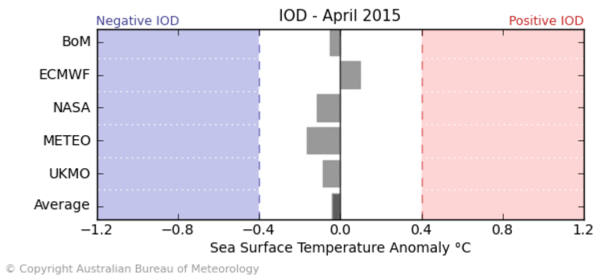


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

I.1.d Indian ocean forecasts





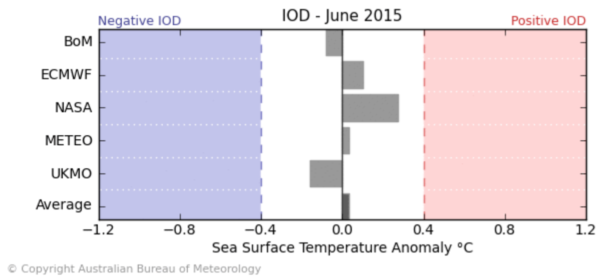


fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

DMI (IOD) : negative becoming positive or neutral

II.2. GENERAL CIRCULATION FORECAST

II.2.a Global forecast

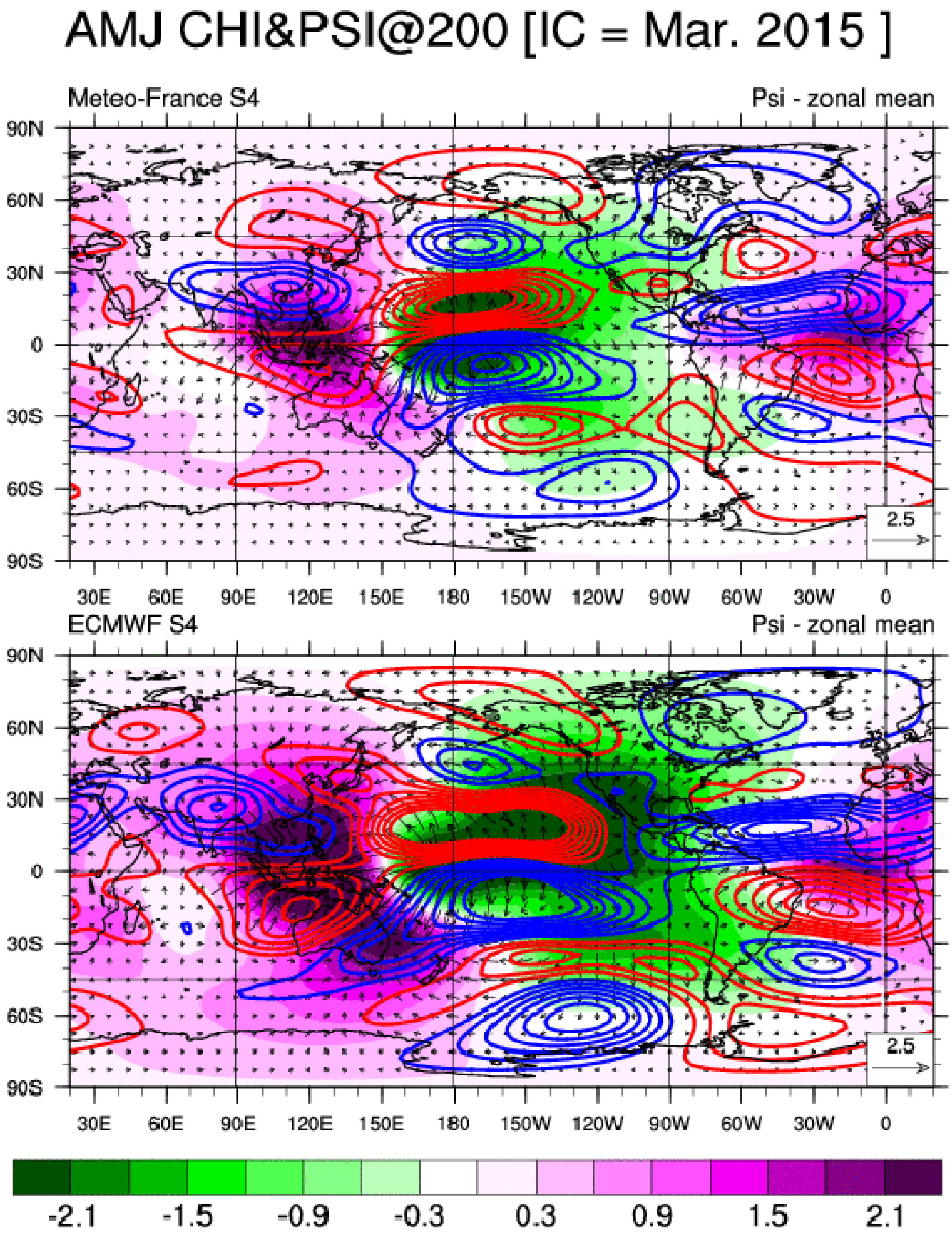


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

Very good consistency between CEP and ARPEGE models.

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

Wide upward motion area forecasted over the Pacific with a maximum over western basin with ARPEGE (but no connection between atmosphere and ocean on the east part of the equatorial rail) and a maximum more central (and coupled with the ocean) for CEP. Core of strong subsidence over the Maritime Continent (stronger with CEP).
Downward motion area forecasted over the eastern tropical Atlantic (consistent with cold SST). This area is more extensive in the ARPEGE forecasts.

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

Generally, the response does not seems too trapped in the tropics and the Gill's model seems to be working quite well in response to diabatic heating present on the central Pacific.

In the North Pacific and the North American continent, PNA response but slightly shifted (max on Alaska should rather be on Canada).

On the Atlantic, a teleconnection is also forecasted with core of action's centers consistents with the SST anomalies.

Europe could be affected by an anticyclonic circulation anomaly. With the combination of a cyclonic anomaly from the Hudson Bay to North Sea, it should promote persistence of the positive phase of the NAO.

II.2.b North hemisphere forecast and Europe

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

Result of the analysis of chi and psi, fairly good agreement between the models this month on the Z500 Northern Hemisphere forecasted, even over Europe.

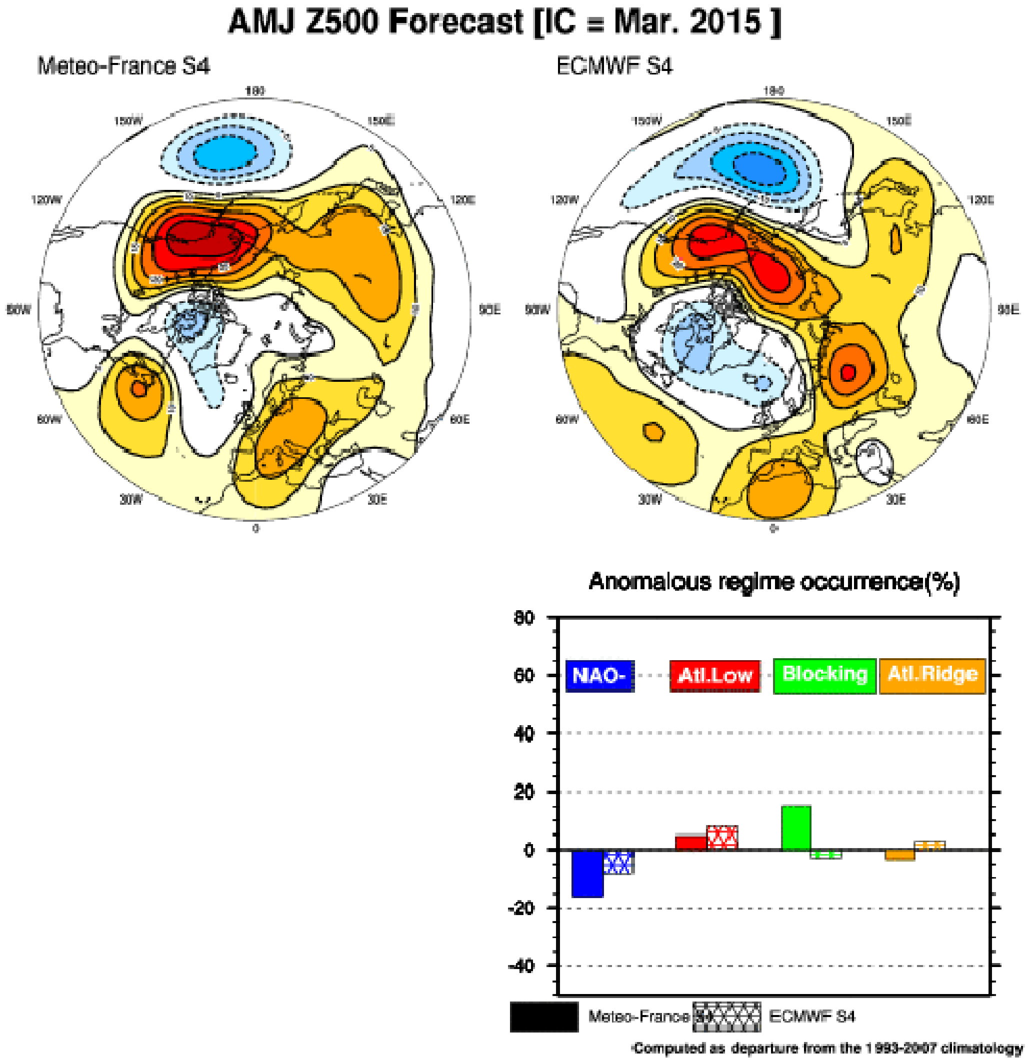


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip fig.II.2.3: North Atlantic Regime occurrence anomalies from Meteo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

North Atlantic Circulation Regimes (fig. 21) :

Good consistent of the forecasted regime occurrence. The models ARPEGE and CEP encourage the positive phase of the NAO. ARPEGE provides more Scandinavian blocking phase than normal.

II.3. IMPACT: TEMPERATURE FORECASTS

II.3.a ECMWF

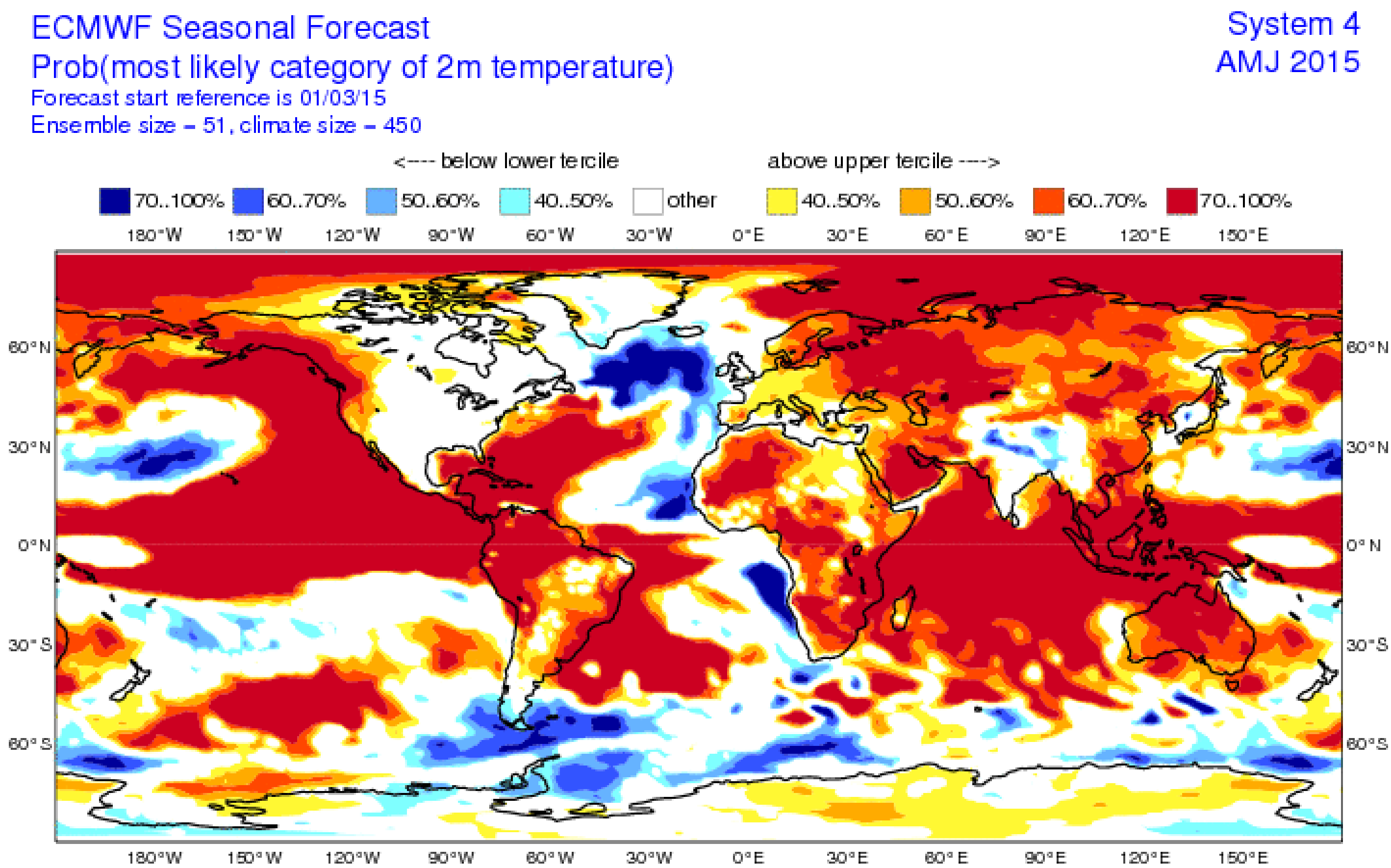


fig.II.3.1: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).

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

II.3.b Météo-France

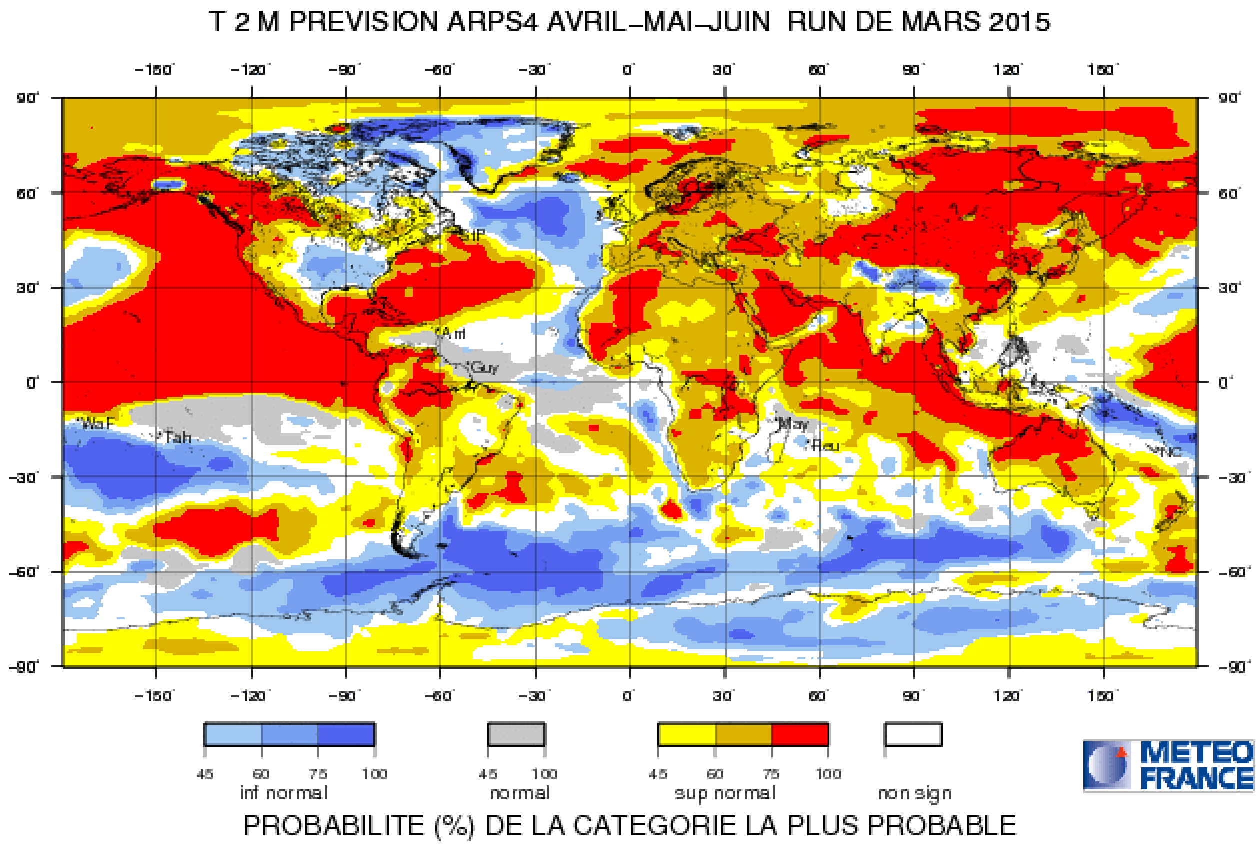


fig.II.3.2: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.3.e Japan Meteorological Agency (JMA)

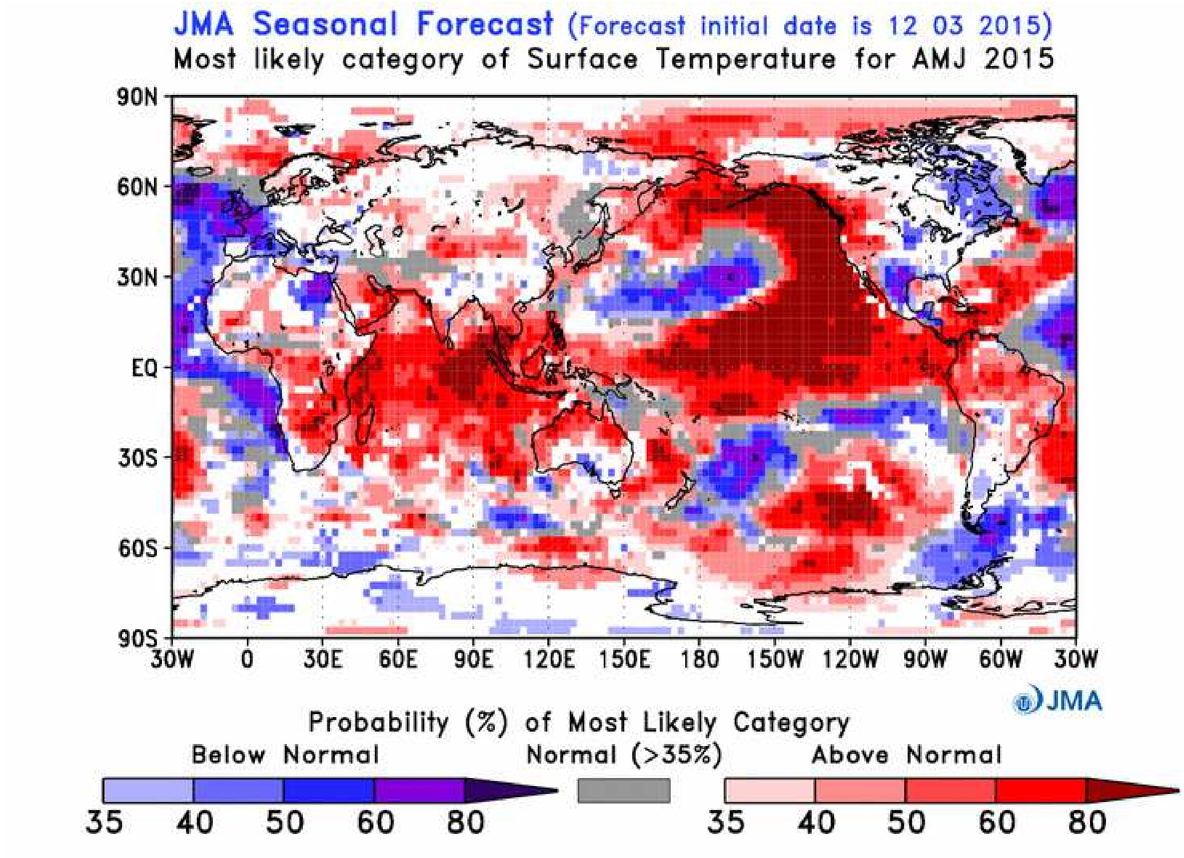


fig.II.3.5: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.

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

II.3.g EUROSIP

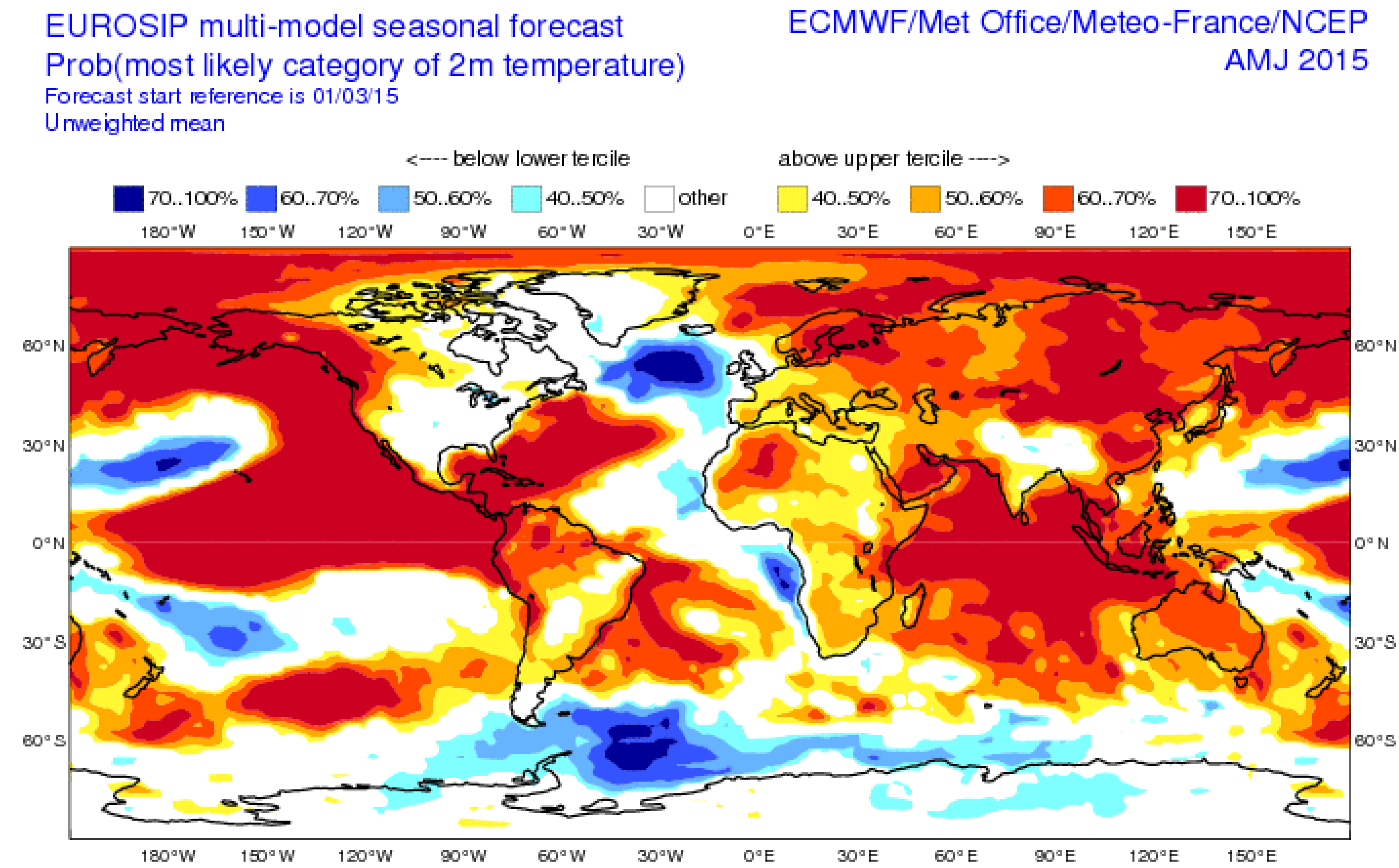


fig.II.3.7: Multi-Model Probabilistic forecasts for T2m from EuroSip (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).

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

On Europe : slightly increased probability of average temperature warmer than normal, with a gradient west / east (highest probability to the east and the west).

II.4. IMPACT : PRECIPITATION FORECAST

II.4.a ECMWF

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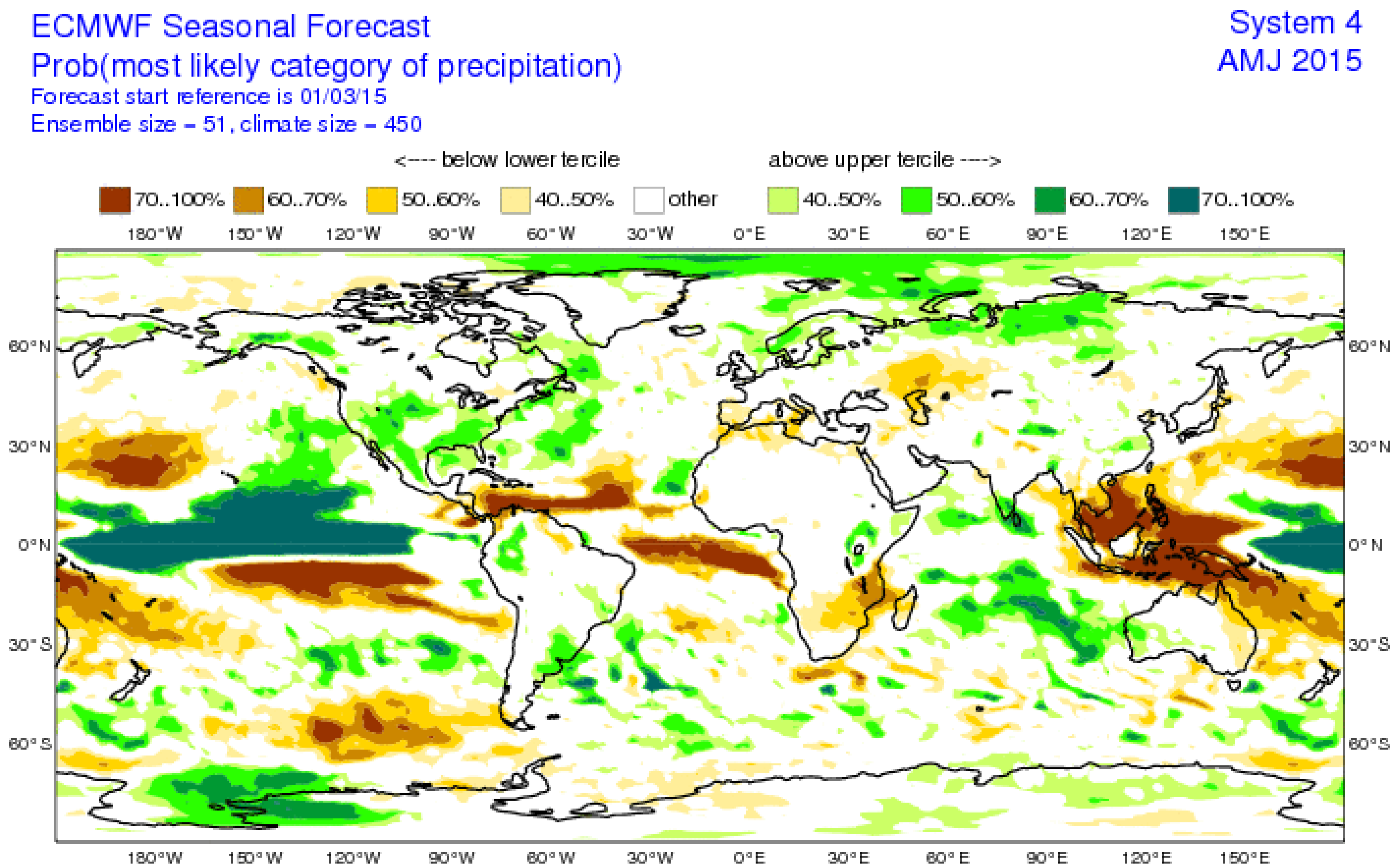

fig.II.4.1: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).

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

II.4.b Météo-France

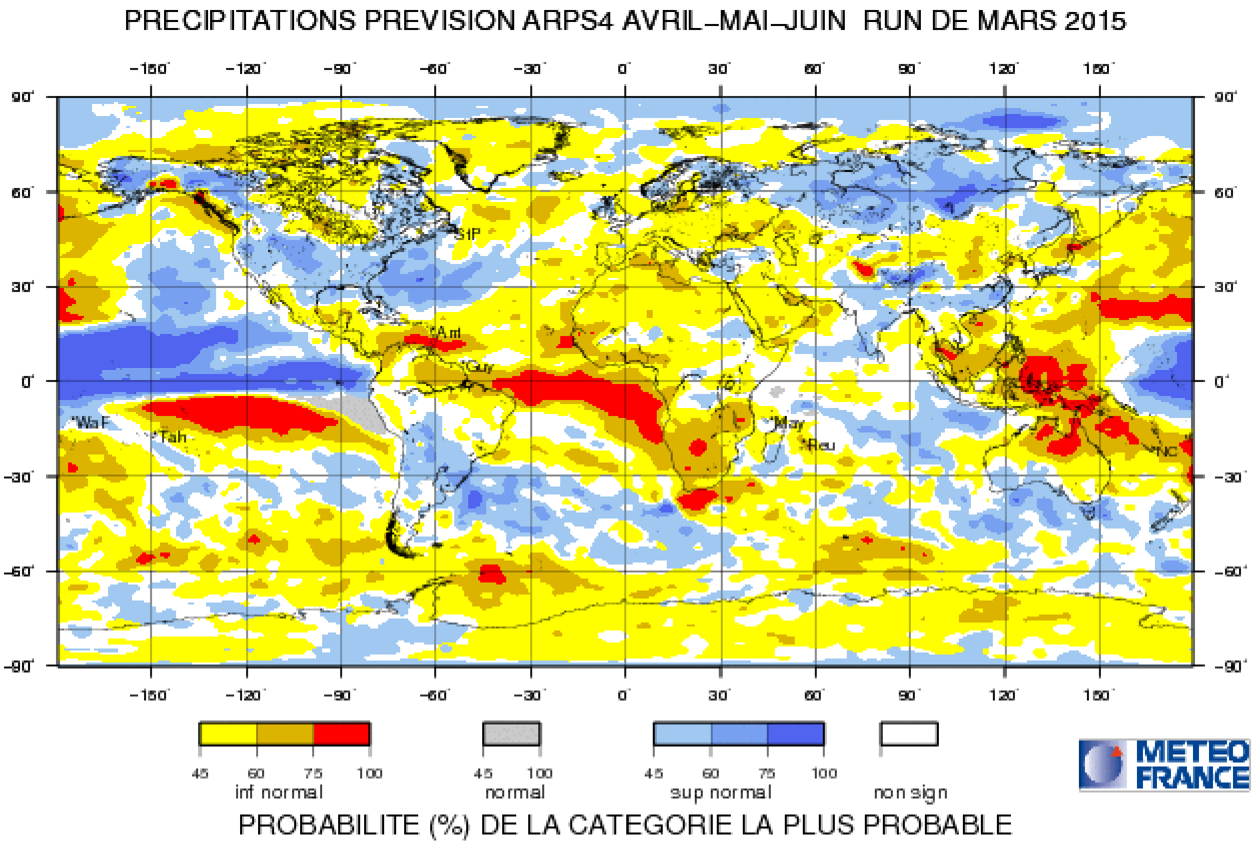

fig.II.4.2: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.4.e Japan Meteorological Agency (JMA)

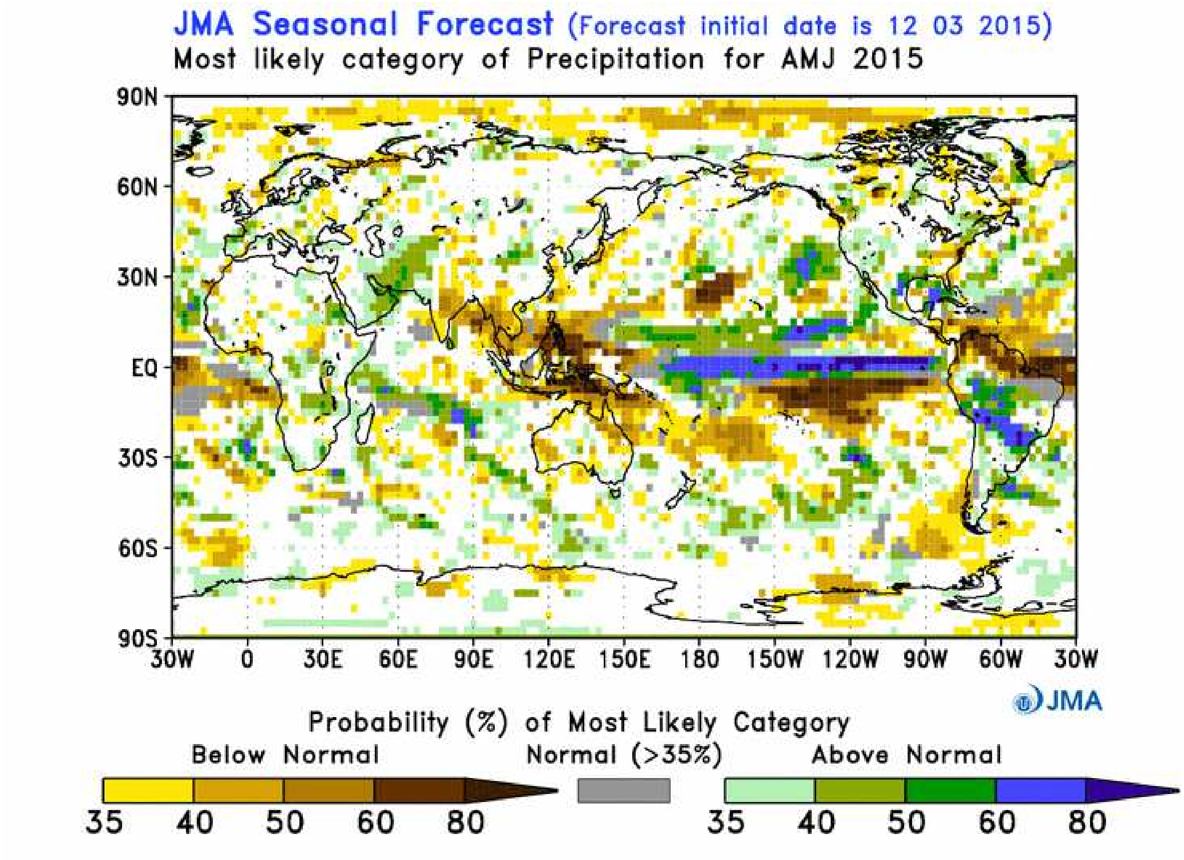

fig.II.4.5: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.

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

II.4.g EUROSIP

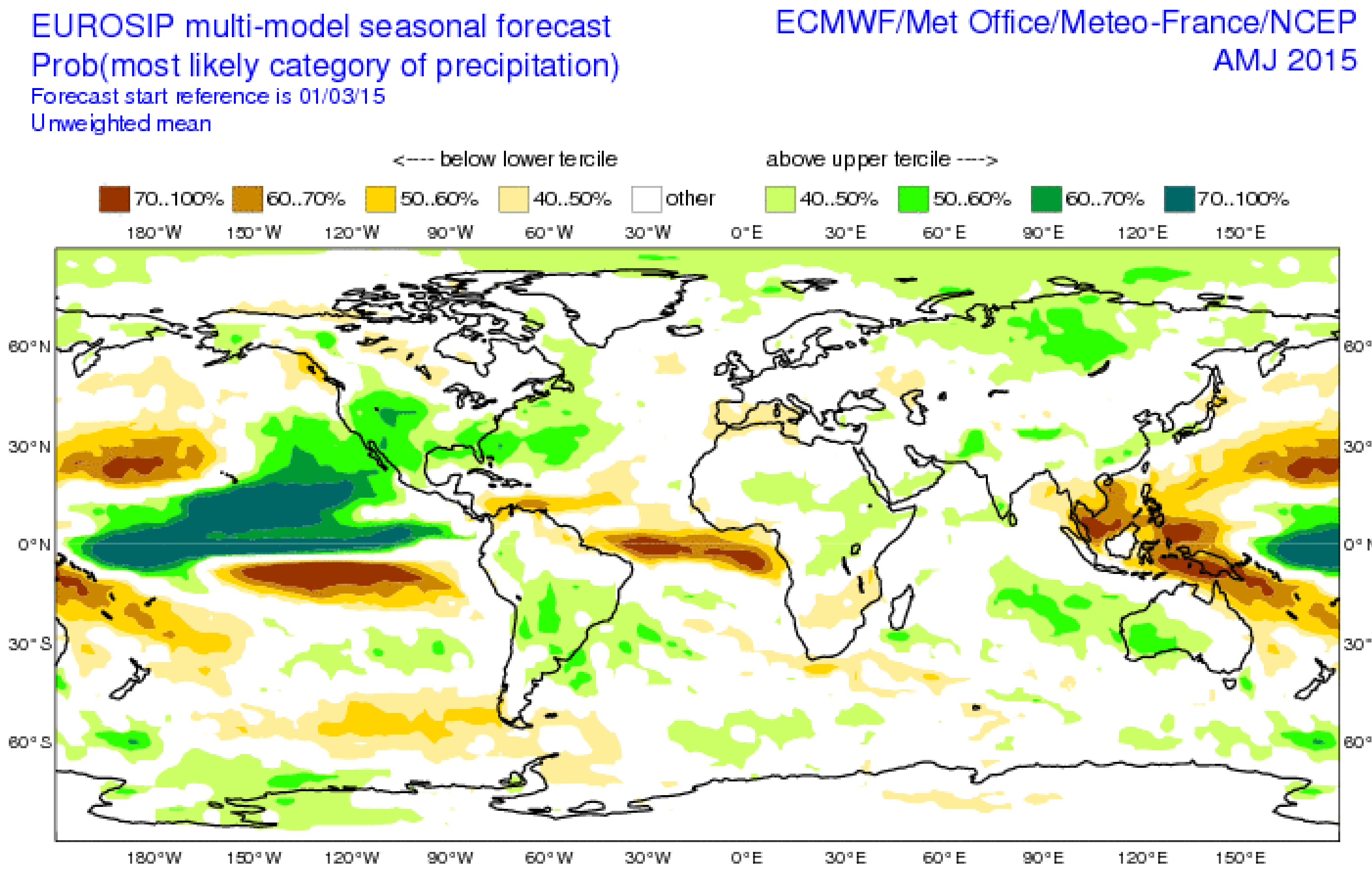

fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EuroSip (2 Categories, Below and Above normal – White zones correspond to No signal).

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

On Europe : enhanced probability for a drier scenario than normal over southern Europe and western Mediterranean. On northern Europe, it is rather the opposite. Consistent scenario with a rather positive phase of the NAO.

II.5. REGIONAL TEMPERATURES and PRECIPITATIONS

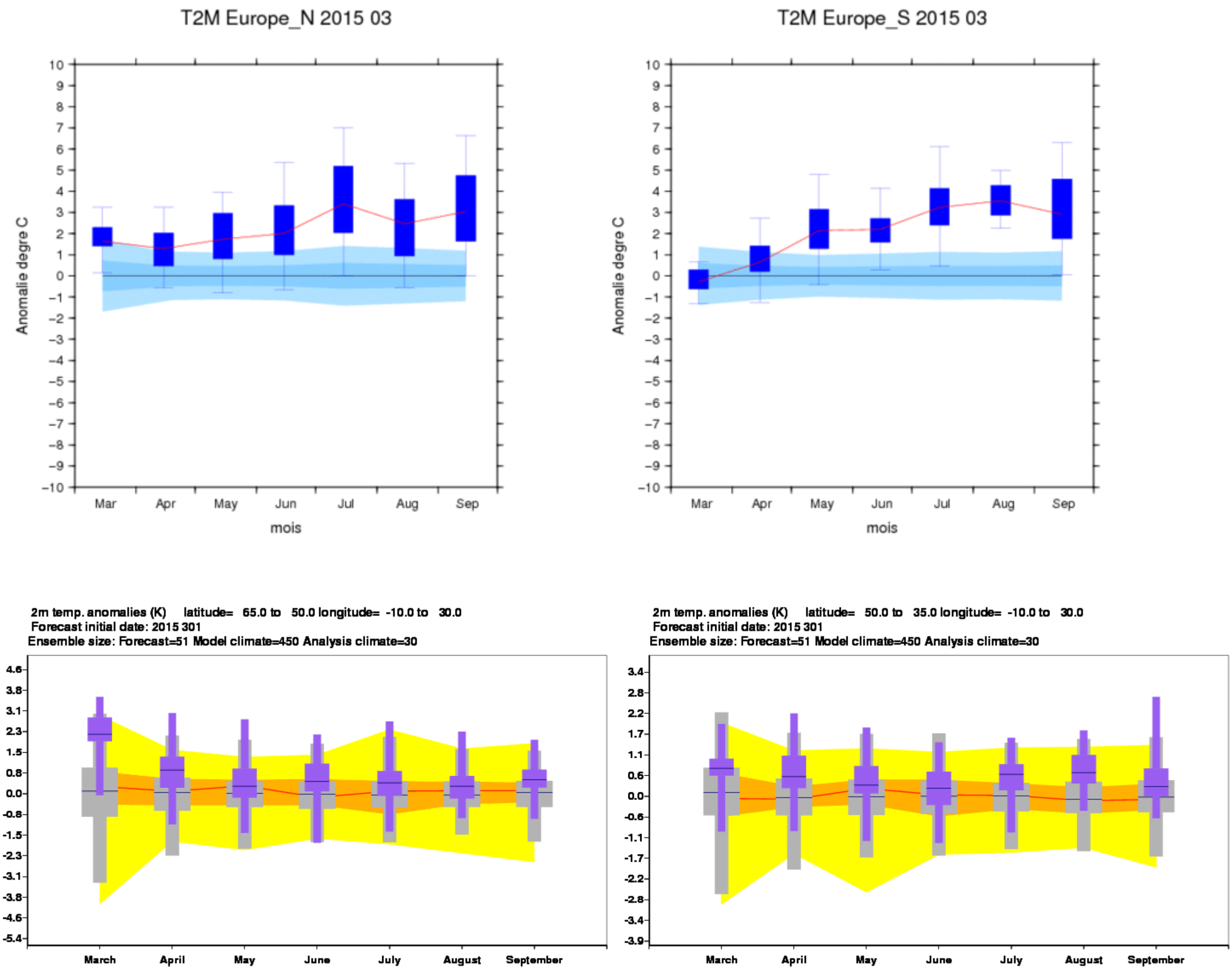

fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

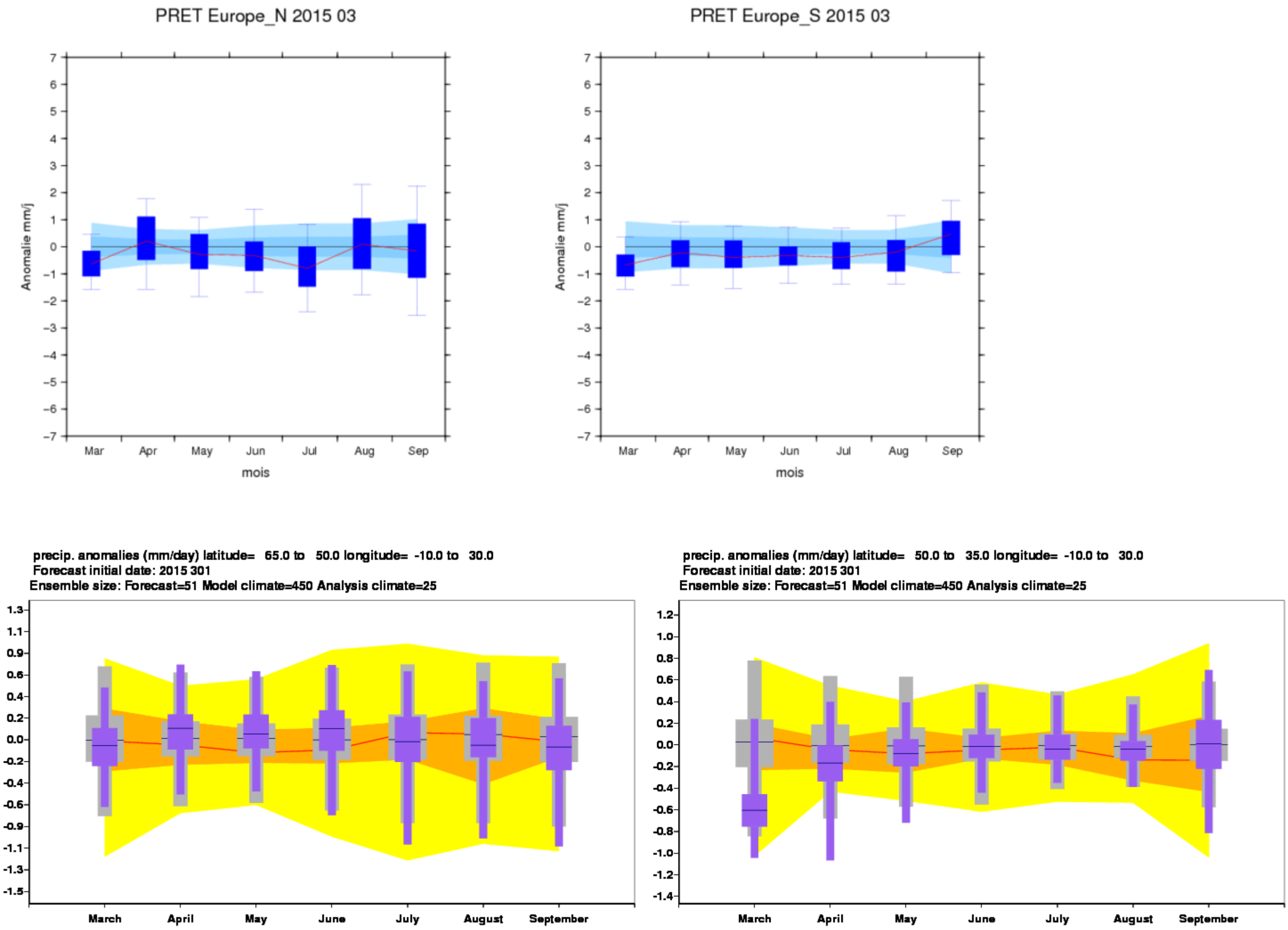

fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

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

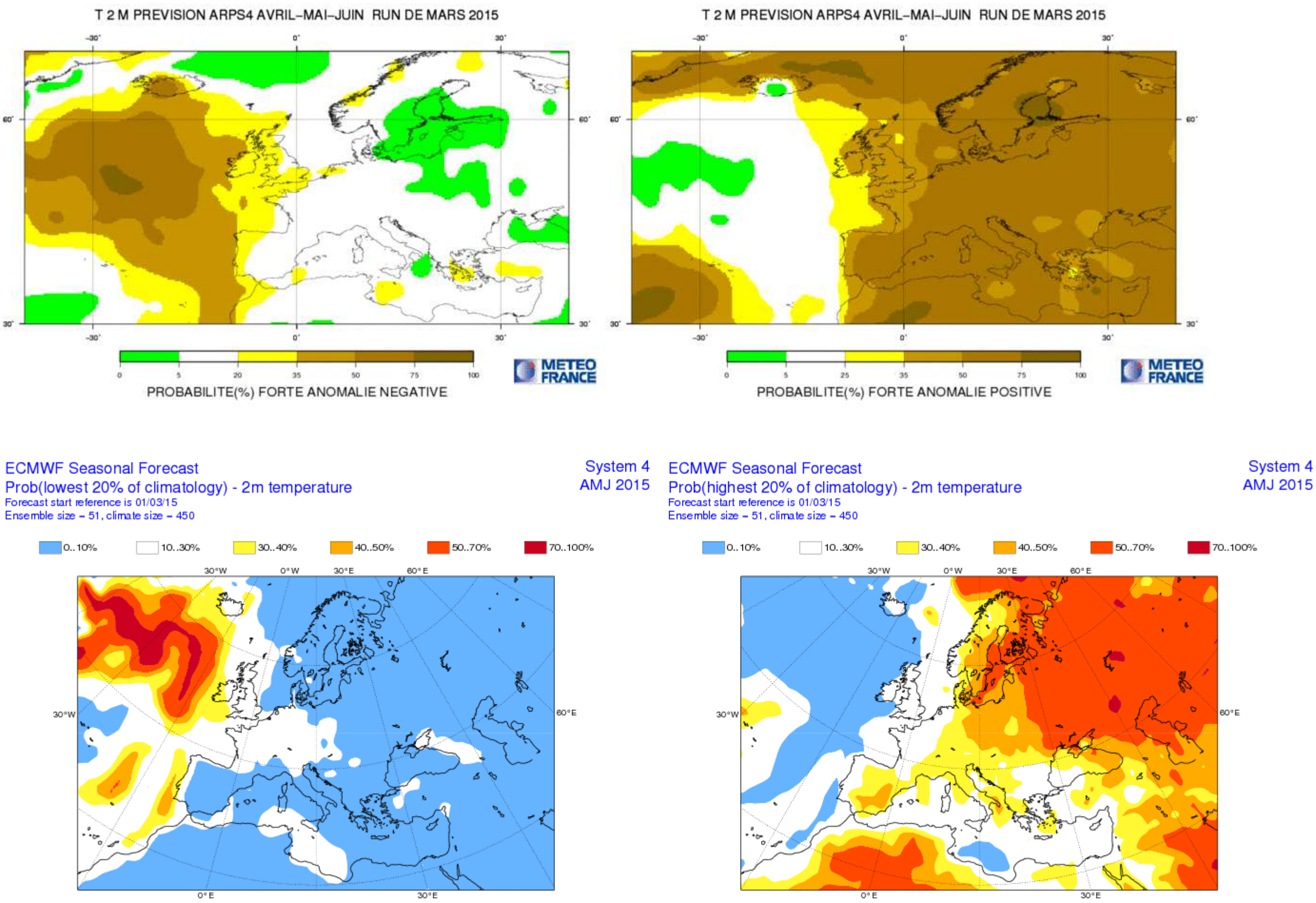

fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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

Higher than normal probability of extreme warm anomaly in Europe in MF. The warm signal is weaker in the European oceanic coast.

No clear signal in ECMWF in western Europe, higher than normal probability of warm anomaly in the North-Eastern part of Europe.

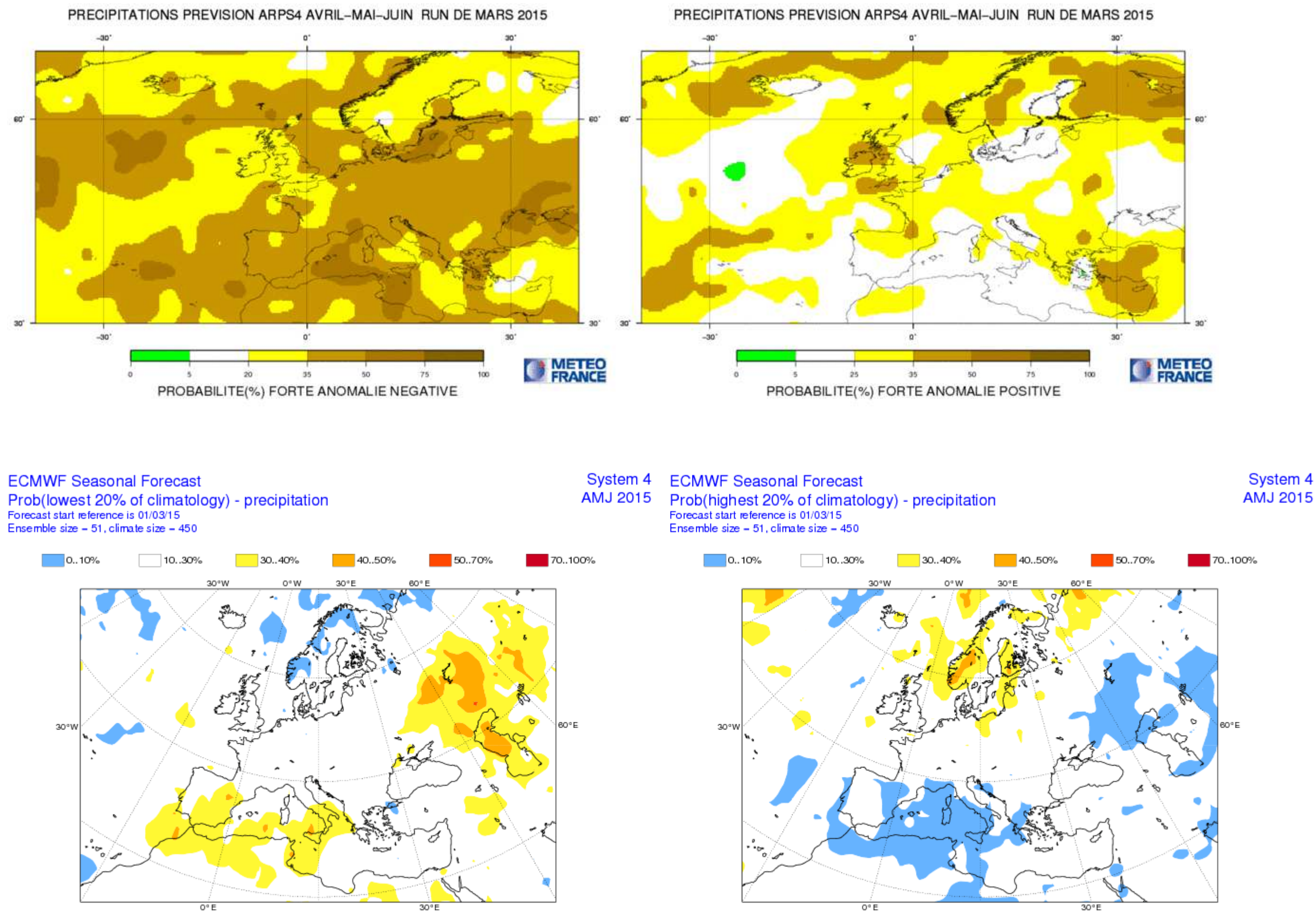

fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

A drier than normal signal in Mediterranean western in both models.

II.8. DISCUSSION AND SUMMARY

II.8.a Forecast over Europe

Over the Northern hemisphere, models suggest a continuation of the positive phase of the NAO, which would imply warmer conditions on Europe, drier conditions in southern Europe and wetter conditions in northern Europe.

II.8.b Tropical cyclone activity

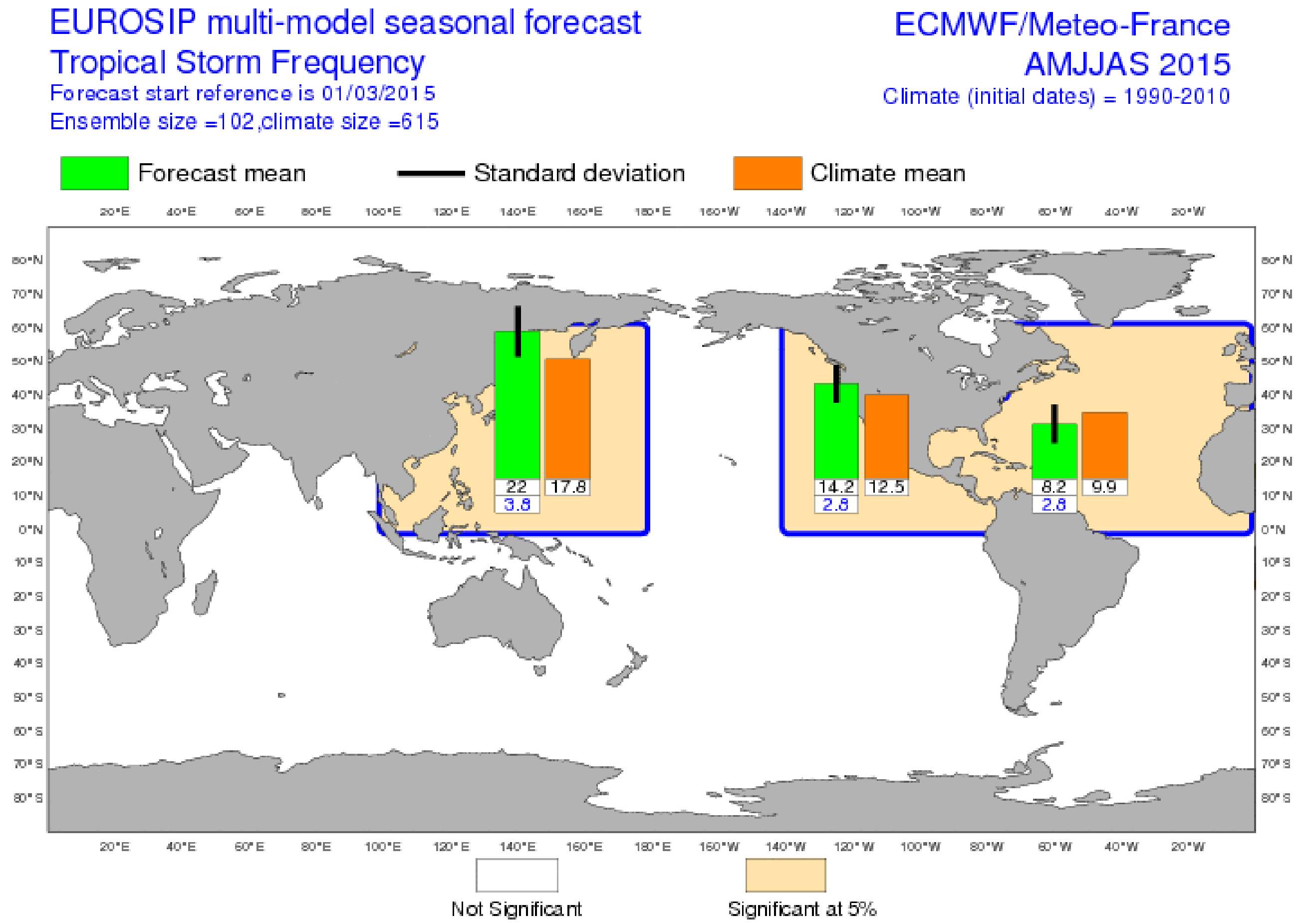

fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmtrop/trop_euro/eurosip_tropical_storm_frequency/

Hurricane season beginning weaker than normal over the Atlantic (consistent with cold SST on the TNA). On the north-east Pacific, hurricane season beginning stronger than normal (consistent with positive phase of the PDO). On the Pacific Northwest, higher than normal activity.

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RCC Network

Synthesis of Temperature forecasts for April-May-June 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 April-May-June 2015 for European regions

Results are expressed with respect of 3 possible scenarios : « Above normal », « close to normal » and « Below normal ». The limits between each category is given by the corresponding tercile such that each scenario have the same climatological probability of occurrence (33,3%). If the forecast shows no specific signal (because of low predictability and/or divergent scenarios between several models), the cell is filled in grey and "No privileged scenario" is indicated.

MODELS	Northern Europe	Southern Europe	Central Europe	Eastern Europe	SEE Region
MF					
ECMWF					
JMA					
synthesis					
Eurosip					
privileged scenario by RCC-LRF node	***Above normal***	***Below normal***	***no privileged scenario***	***no privileged scenario***	***no privileged scenario***

RR Below normal (Dry)

RR close to normal

RR Above normal (Wet)

No privileged scenario

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.

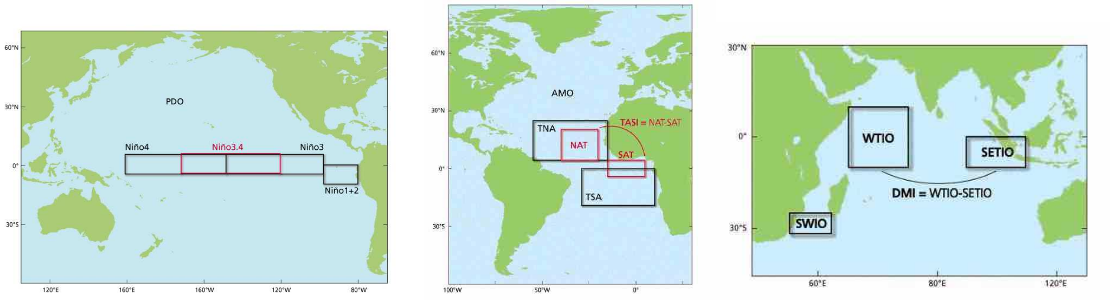
II.2. « NINO », SOI INDICES AND OCEANIC BOXES

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).

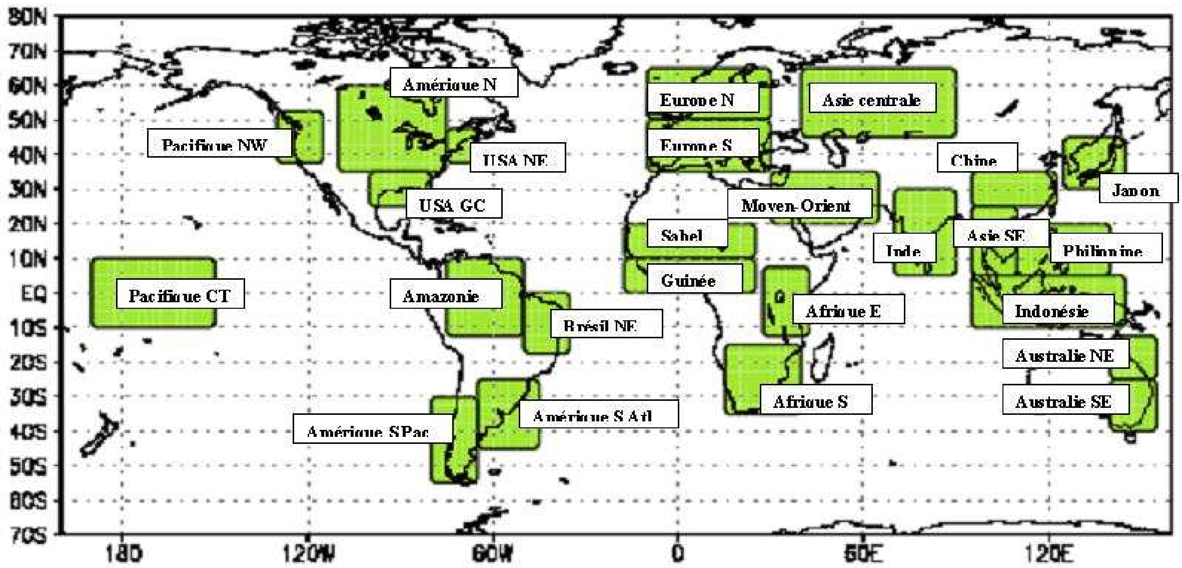
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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