GLOBAL CLIMATE BULLETIN
n°202 – April 2016

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I. DESCRIPTION OF THE CLIMATE SYSTEM (FEBRUARY 2016)

I.1.OCEANIC ANALYSIS

I.1.a Global analysis

In the Pacific ocean :

Further cooling surface in the area of Niño (Figures I.1.1). Value of the anomaly of SST in the Niño 3.4 region: 2.5 ° C. Niño declining phase.
Subsurface significant strengthening of the negative temperature anomaly and eastward progression. The positive temperature anomaly deflates (Figures I.1.4, I.1.5).

On the Continent Maritime:
clear cooling, especially in the South China Sea (fig I.1.1)

In the Indian Ocean :
Tropical Indian Ocean always warmer than normal, but tend to almost widespread cooling, including the SWIO area. The DMI index is negative in February (-0.4 ° C ~ see http://stateoftheocean.osmc.noaa.gov/sur/ind/dmi.php) up compared to January.

In the Atlantic:
Between 30 ° N and 30 ° S, a slight cooling trend.
Continued strong cold anomaly over the center of the North Atlantic, but slight warming of the western half of the anomaly.

In the Mediterraen :
Persistent generalized warm anomaly.

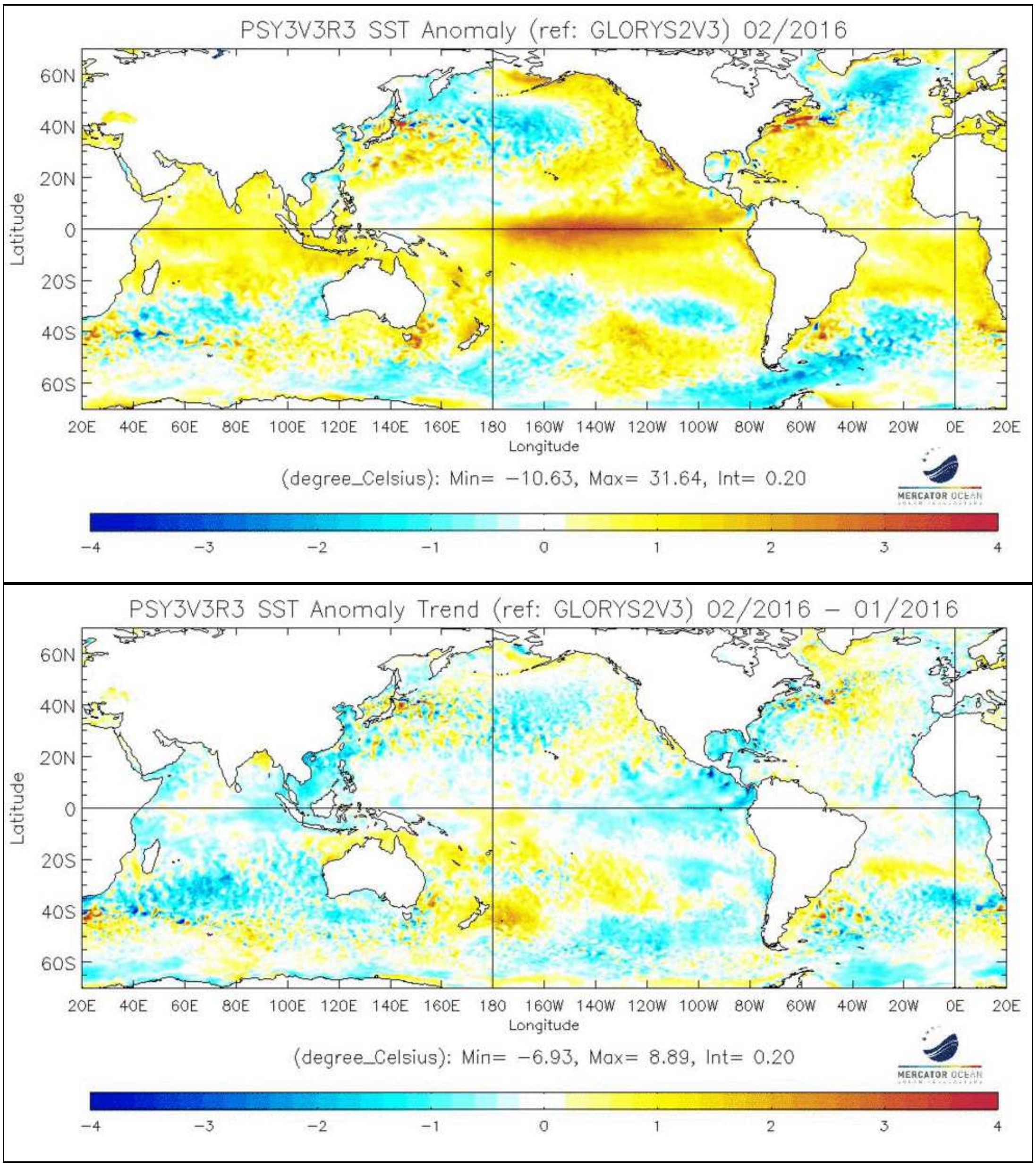


fig.I.1.1: top : SSTs Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

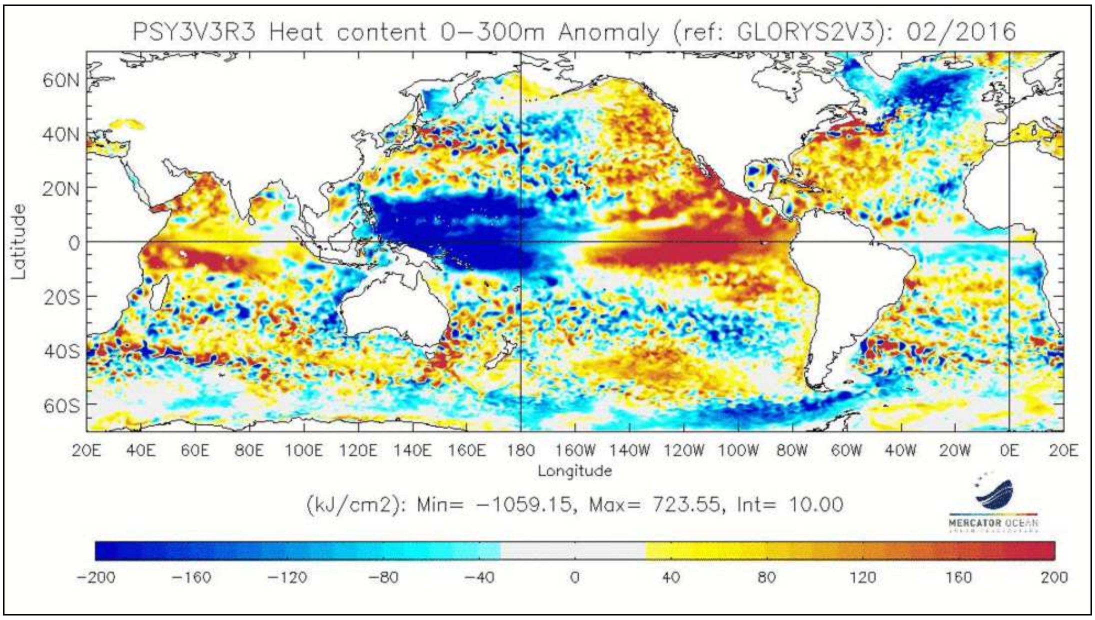


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2009)

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

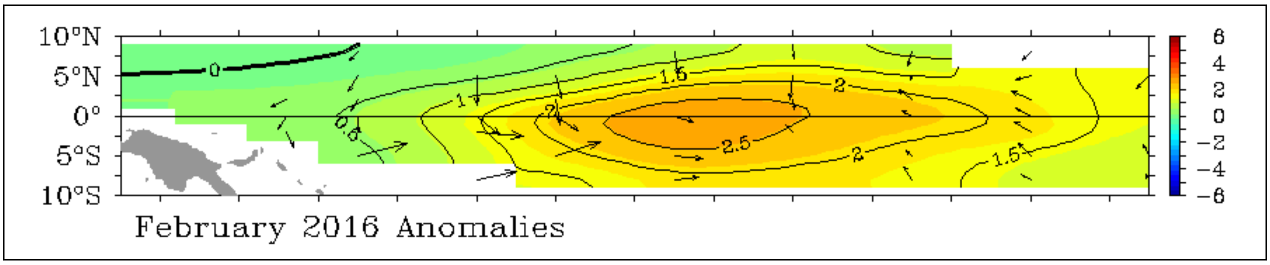


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON.

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

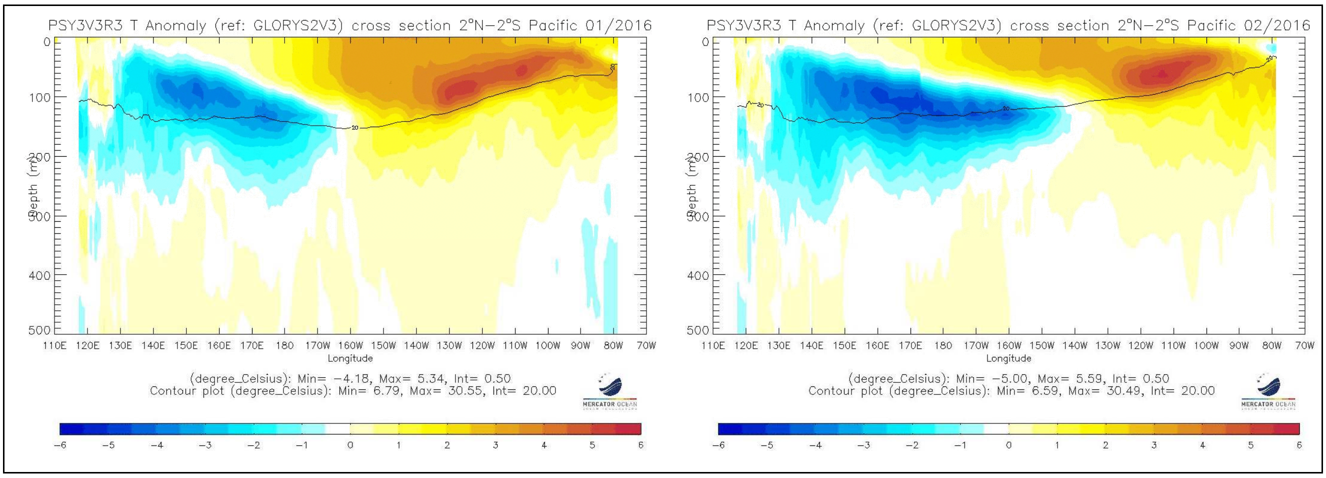


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), http://bcg.mercator-ocean.fr

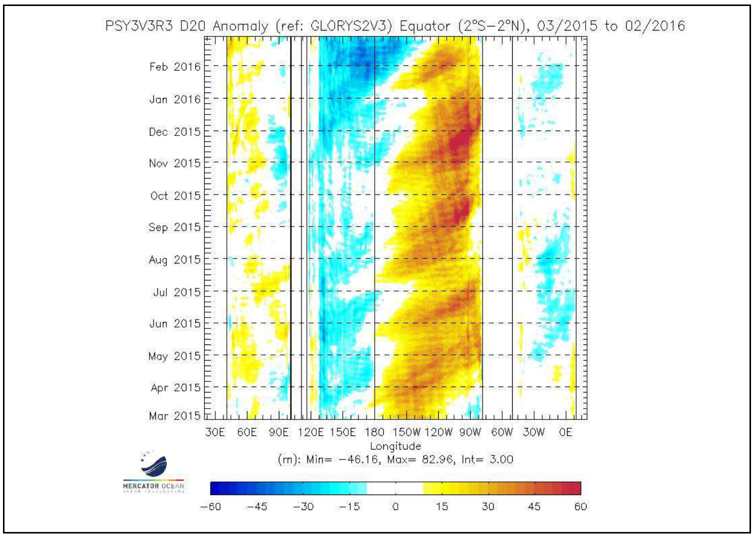


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period http://bcg.mercator-ocean.fr/

I.1.b Near Europe

Once again above-normal SST on all sea surfaces near Europe except the ongoing cold anomaly in the North Atlantic south of Iceland and west of Ireland. Warm anomalies decreased slightly near the western half of Europe.

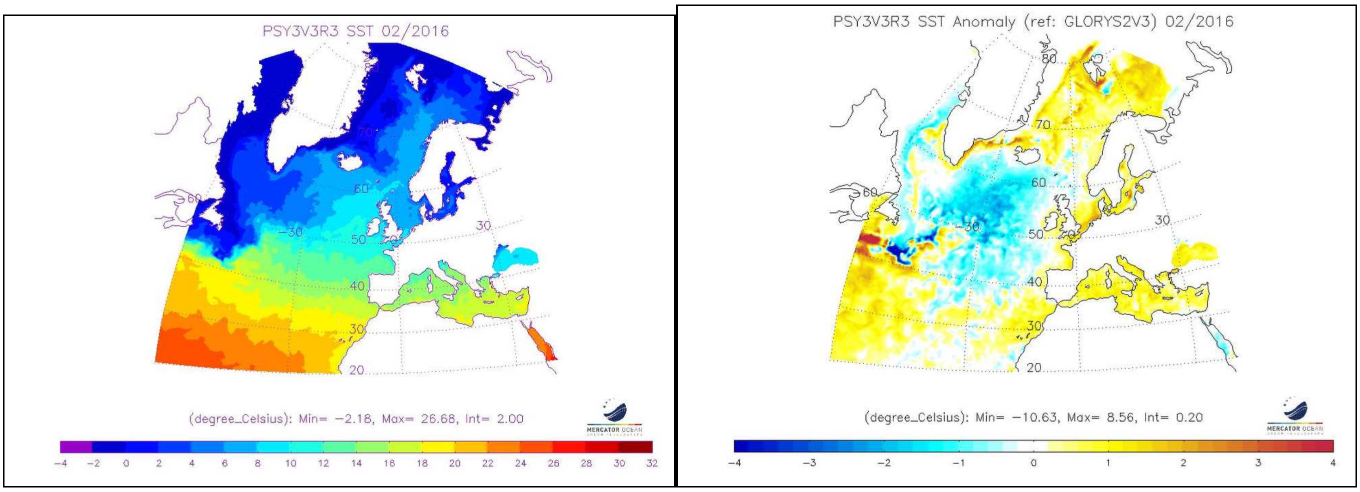


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

I.2.ATMOSPHÈRE

I.2.a General Circulation

Strong Ocean-Atmosphere coupling.

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

Few changes in structures anomalies. On the central Pacific (upward motion anomaly), they remain highly correlated with SST anomalies (the ocean-atmosphere coupling is always present). Strongly anomalous subsidence on the Maritime Continent. The activity of the MJO on February probably strengthened this anomaly on the Maritime Continent but also the Central Pacific (downstream / upstream of the passage of the MJO). Persistent subsidence anomaly nucleus of northern South America.

standardized SOI index still negative in February: -2.0 (same value as in February 1998).

(Https://www.ncdc.noaa.gov/teleconnections/enso/indicators/soi/)

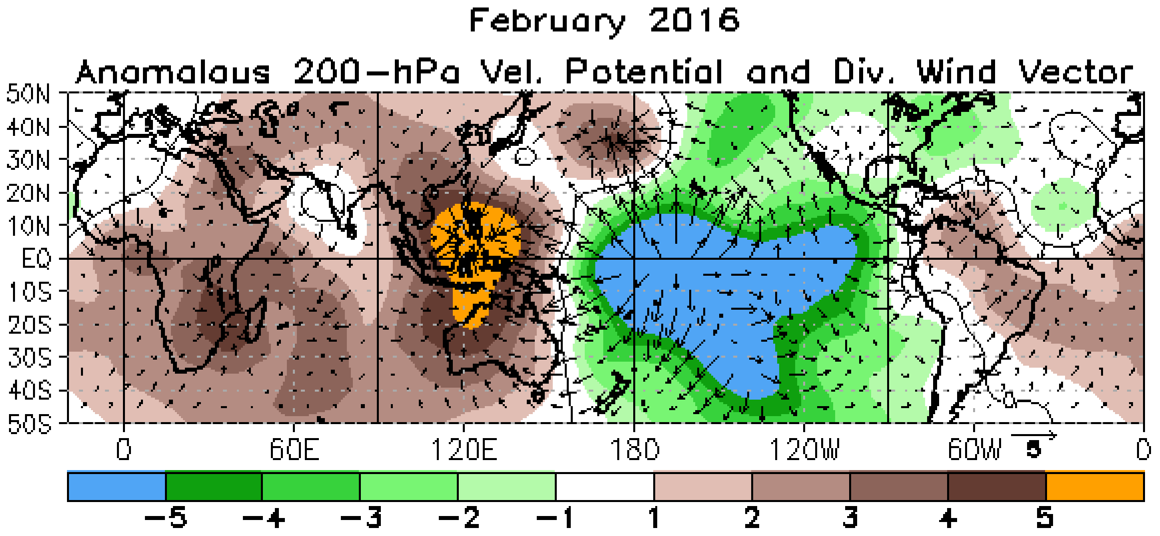


fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).

http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

MJO (fig. I.2.b):

MJO was active in quarter 4 to 7 during February.

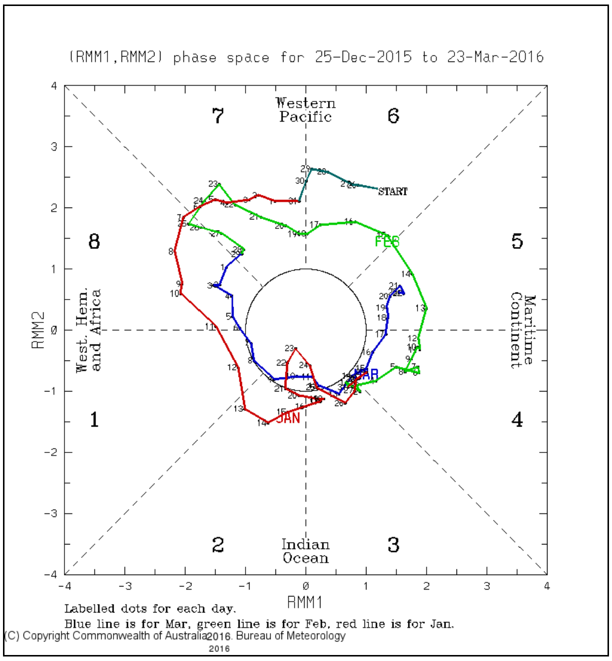


fig.I.2.b: indices MJO http://cawcr.gov.au/staff/mwheeler/maproom/RMM/phase.Last90days.gif

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

The February stream function structures can not be classically related to abnormalities velocity potential. No teleconnection towards the middle latitudes are visible.

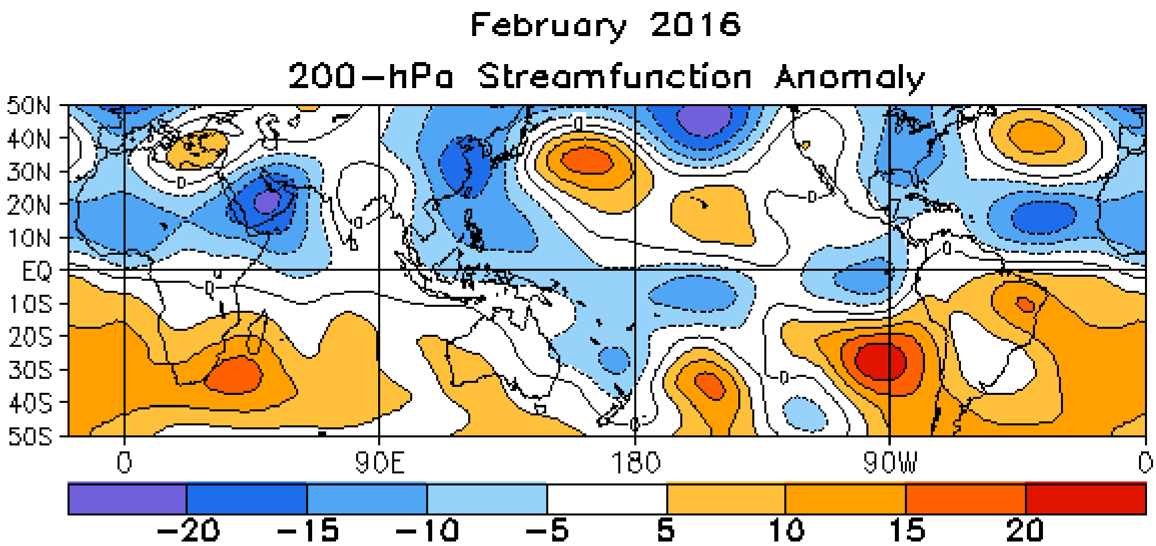


fig.I.2.2: Stream Function Anomalies at 200 hPa.

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

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

Structure of PNA positive in February (1.7 index). WP mode active well (1.3). EA and positive NAO phase (1.9 and 1.3 resp.). Strong negative phase of EATL/WRUS (-2.4).

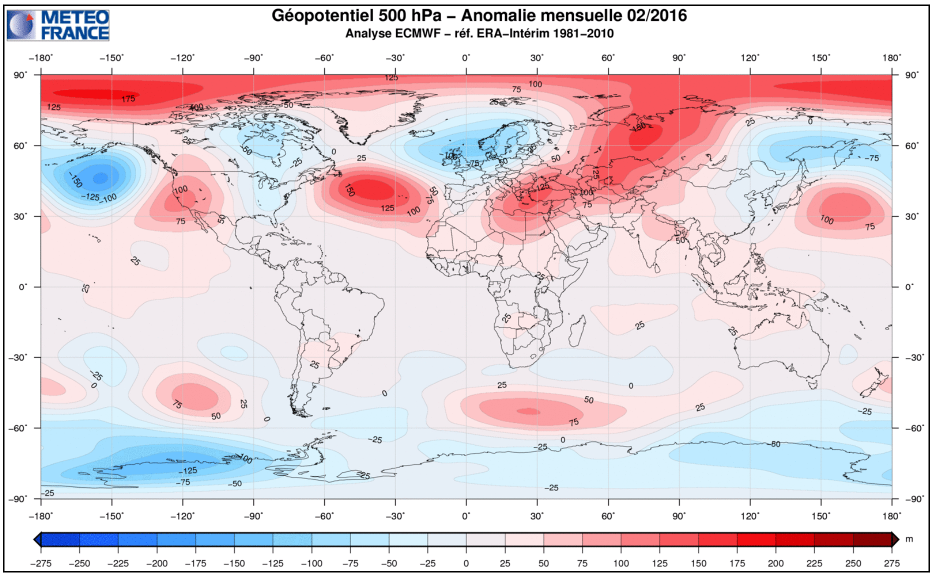


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
FEB 16	**1.4**	**1.9**	**1.6**	**0.2**	**1.7**	**0.2**	**-2.4**	**-0.5**	**-2.3**
JAN 16	-0.4	1.0	1.0	-0.4	1.9	-0.3	-0.5	-0.7	-2.6
DEC 15	2.0	3.1	0.6	---	0.5	0.0	1.3	0.1	0.6
NOV 15	1.7	1.6	0.8	-0.9	-0.2	---	0.6	-0.4	-0.7
OCT 15	1.0	0.2	-0.8	0.3	2.1	---	0.6	0.6	-0.5
SEP 15	-0.5	0.2	-1.4	-1.4	-0.8	---	-1.7	1.1	-0.1

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

Zonal circulation over the North Atlantic with a quite intense Azores High and also a slightly-above-normal Icelandic Low. Both pressure centres are located quite near to Europe, so both a positive NAO (+1.4) and EA (+1.9) mode are active. 19 days out of 29 in February (around two thirds) were classified as NAO+ by MF, most of the rest (7 days, mostly in the last week of February) was Atlantic ridge (and trough over western Europe, extending far to the south).

A second low pressure core of SLP can be identified close to Scandinavia with its cyclonic anomaly extending much over northern Europe, but also further to the south. SCAND pattern, however, is quite weak (-0.5). In southwestern Iberia, anticyclonic influence dominated.

Over Europe, this zonal flow is blocked by a very intense Russian High and mild air is deflected to northeastern Europe. Together with low SLP / low geopotential over northwestern Europe, this forms a very intense negative EA/WR pattern (-2.4).

The POLEUR pattern is still in a strong negative phase (-2.3), similarly like in January. It explains the ongoing positive geopotential anomaly in the Arctic region. Stratospheric effects might have contributed to this. There was a sudden stratospheric warming at the beginning of February, which was outstanding on the 10hPa level, but not in the lower stratosphere. A second even more outstanding stratospheric warming occurred also, but it was already in March.

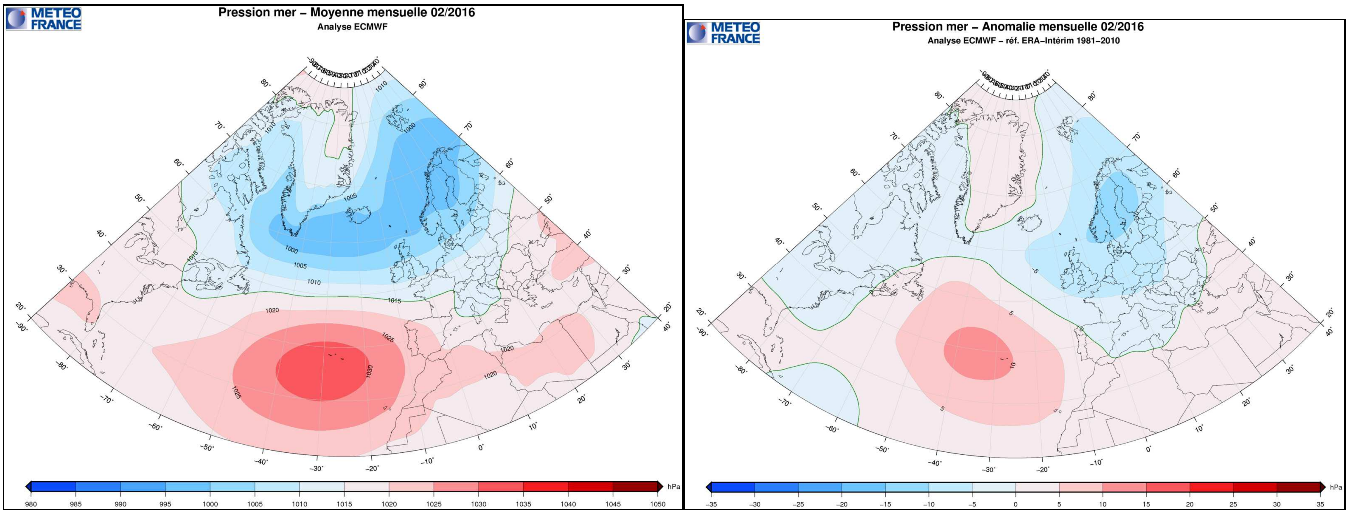


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (top) and 1981-2010 anomalies (bottom).

Circulation indices: NAO and AO

NAO was in a positive phase throughout the month. Duration of this positive phase was from late January to mid-March, showing a quite stable situation. AO oscillated more or less around zero and so it did not follow NAO; the North Atlantic pattern and its persistency were different from the rest of the northern hemisphere.

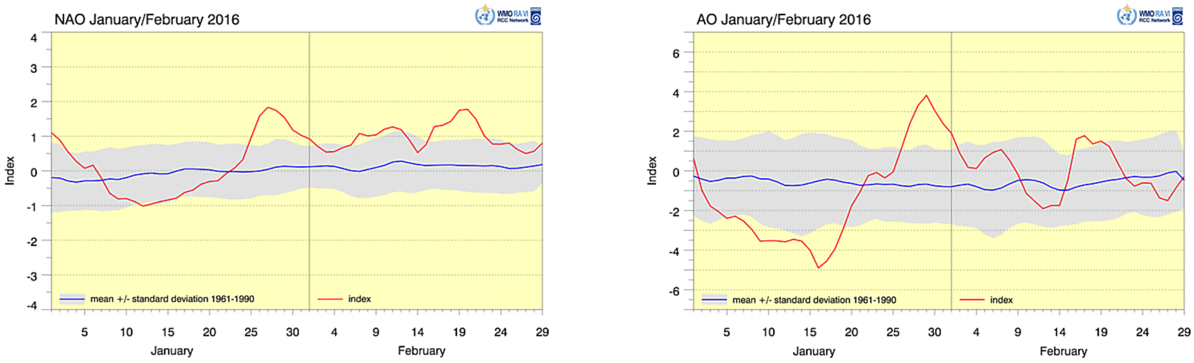


fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

Distribution corresponding to the expected Niño impacts (except Java, Borneo, and Ecuador). Positive anomaly in Europe (NAO effect +).

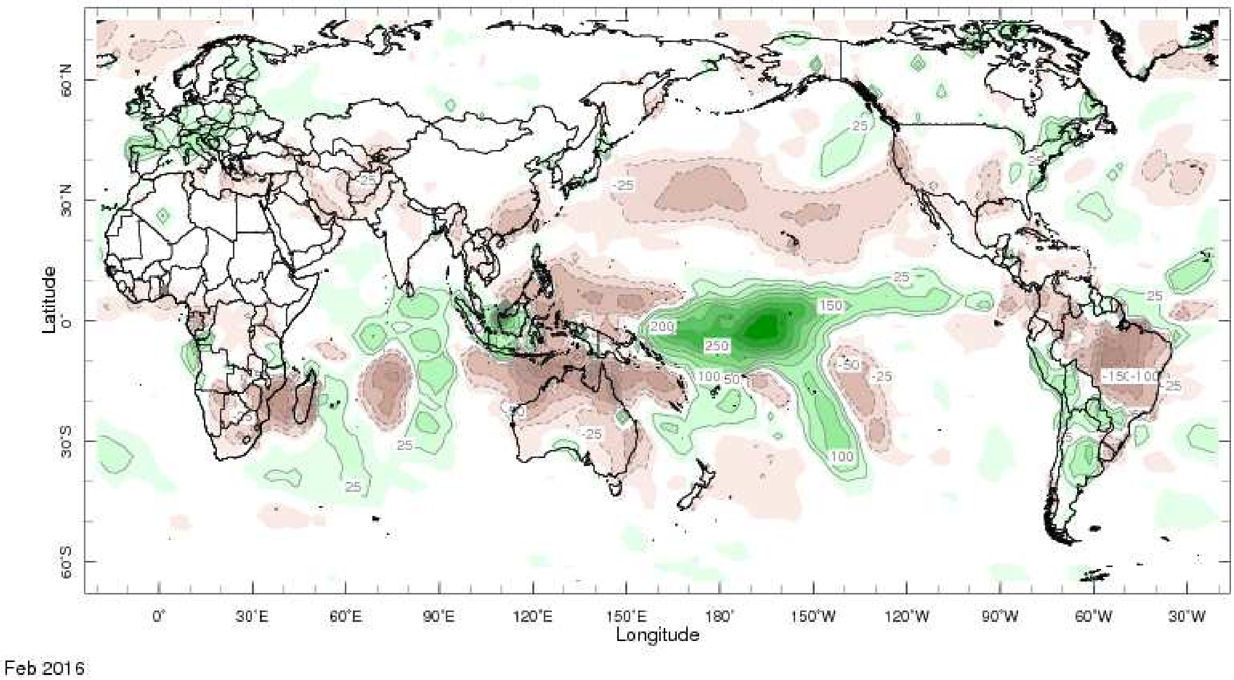


fig.I.2.4: Rainfall Anomalies (mm) (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

Precipitation anomalies in Europe:

Most of Europe was very wet in February, mostly due to cyclonic westerly patterns in the first half of the month and troughs extending far to the south in late February. Particularly rich of precipitation were northern Iberia and the southern Alpine region / northern Adriatic region. These regions were located in areas of strong vertical lifting and were also influenced by topographic effects (upwind at mountains, moisture uptake from water surface). A few small dry regions can be attributed to anticyclonic influence (SE Greenland/west Iceland/Svalbard, southern Portugal/Spain, Middle East/eastern Turkey/Georgia).

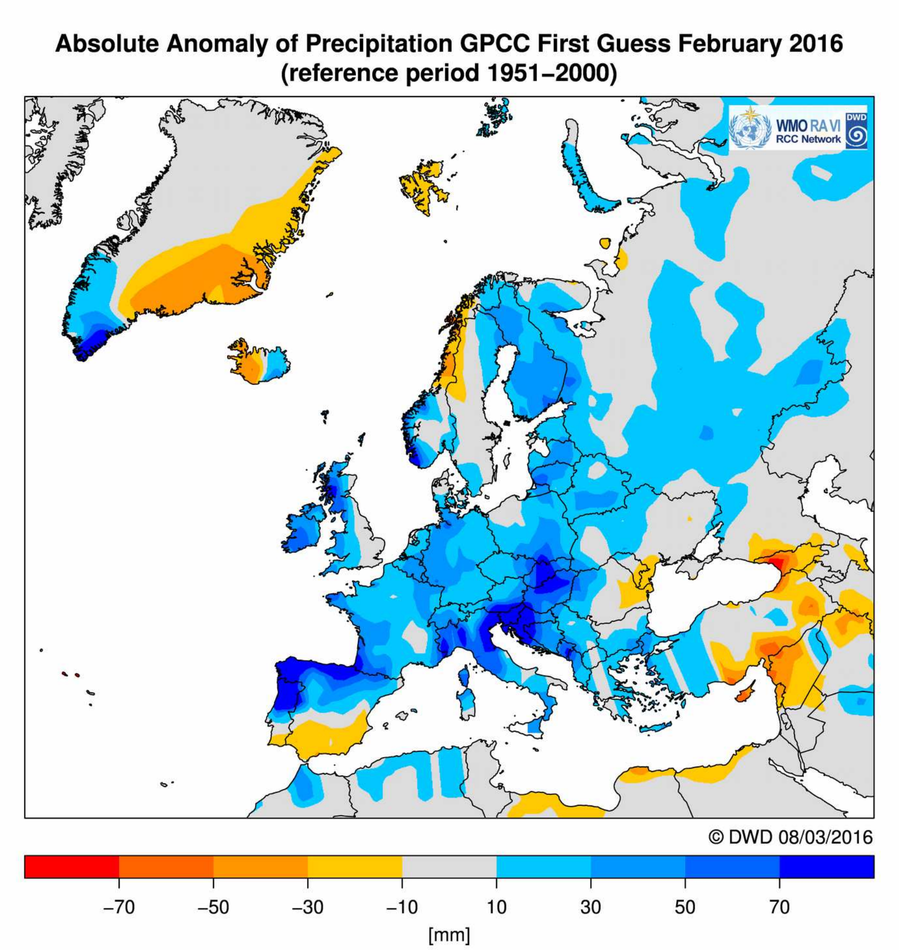


fig.I.2.5: Left: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm. Right: Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

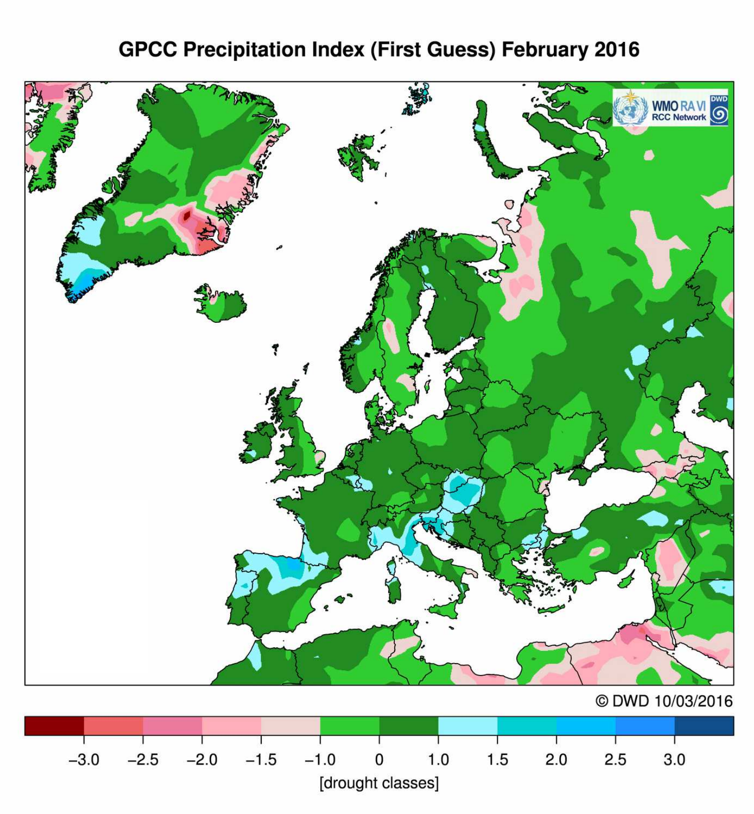


fig. I.2.5a: GPCP Precipitation Index http://www.dwd.de/rcc-cm .

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	GPCP Drought Index
Northern Europe	+23.0 mm	+0.101
Southern Europe	+18.1 mm	+0.419

Please note: new drought index since January 2016. The GPCC drought index, which also considers evaporation in addition to precipitation replaces the former SPI-DWD.

Box data for this new index are not available at the moment, but will be provided in future.

I.2.c Temperature

South America and Africa have experienced unusually hot month of February (record in South America). Asia and Alaska also flirt with the hot records. See http://www.ncdc.noaa.gov/sotc/service/global/extremes/201602.gif

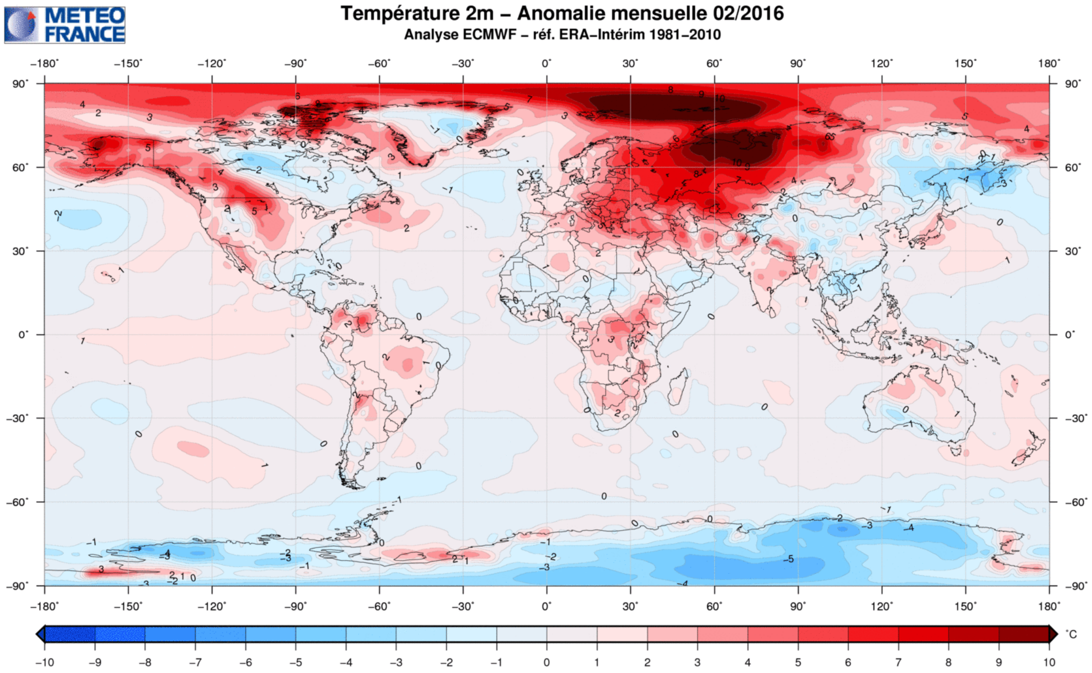


fig.I.2.8: Temperature Anomalies (°C) (Meteo-France)

Temperature anomalies in Europe:

Warmer than normal in almost whole Europe, especially in the east, mainly due to dominating westerly flow with mild air and deflected to the north particularly in the eastern parts. In the east, additional warming due to subsidence in the intense high pressure area.

Parts of western Europe were colder than normal or have weaker anomalies than eastern Europe; this came especially from Atlantic ridge / trough western Europe situations, when cold air from the north moved very far to the south over western Europe.

Cold anomaly over the North Atlantic very similar to SST anomaly suggests enhanced air-sea interaction over there.

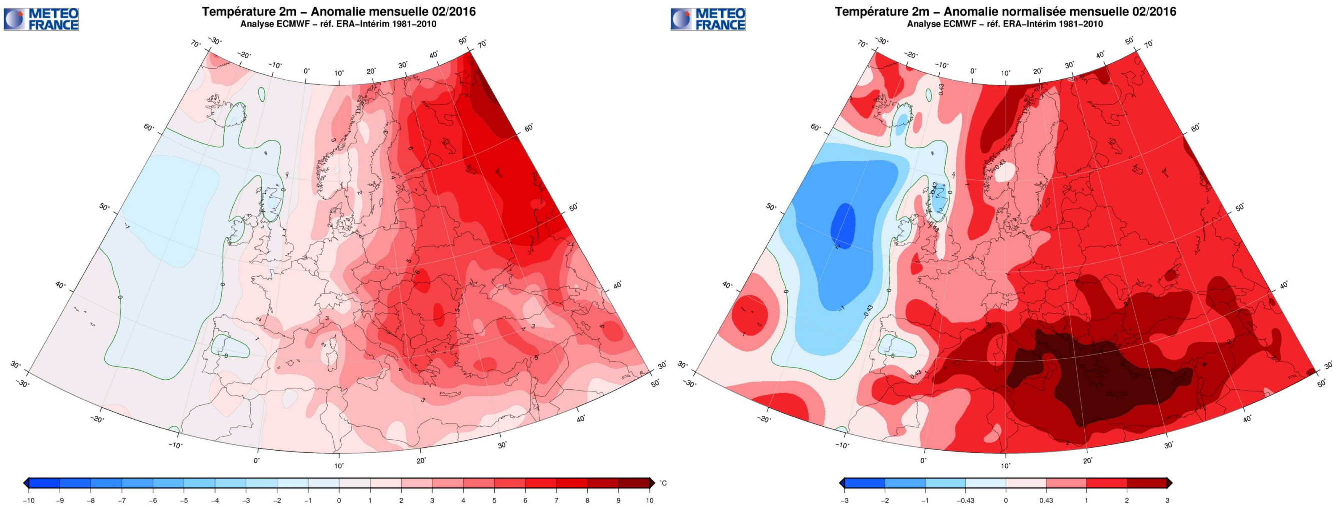


fig.I.2.9: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

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	+2.7°C

I.2.d Sea ice

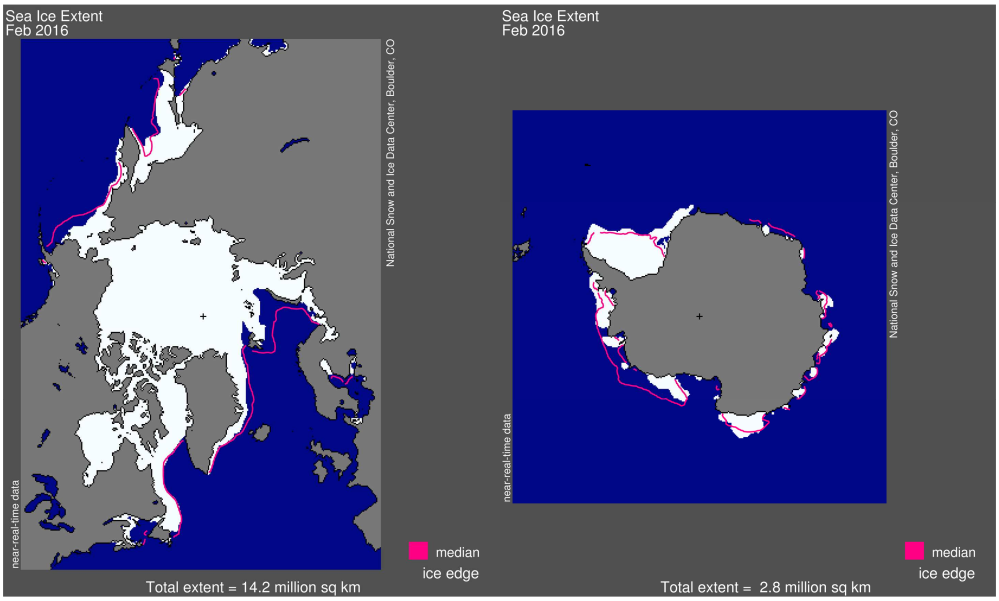


fig.I.2.15: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

In Arctic (fig. 1.2.15 and 1.2.16 - left): Persistent large deficit (> -2 std). February 2016 having experienced the smallest February extension of sea ice since at least 1979.

In Antarctic (fig. 1.2.15 and 1.2.16 - right): Value lower than normal, but the outer envelope (+ 2 / -2 std).

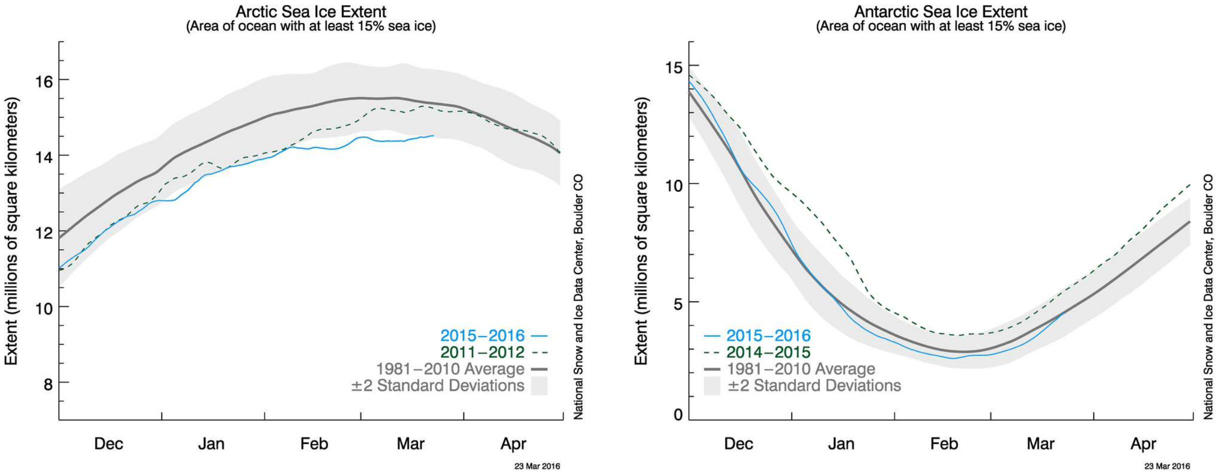


fig. I.2.16 : Sea-Ice extension evolution from NSIDC.
http://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png

II. SEASONAL FORECAST FROM DYNAMICAL MODELS

II.1.OCEANIC FORECASTS

El Niño will return to rapid decay phase, but it could continue to constrain the global climate system for a while (until the end of spring?). Models of seasonal forecasts are starting to offer differences, particularly in the Pacific Ocean as well for as the atmosphere. The rate of decay of the phenomenon appears different depending on the model, and therefore the ocean-atmosphere decoupling is not offered at the same speed either.

II.1.a Sea surface temperature (SST)

Pacific Ocean: the positive anomaly over the rail equatorial surface (El Niño) should be considerably planed. Some models even offer the appearance of a negative anomaly (Arpege 5 system coherent on this with ECMWF). The precise location of these anomalies in the equatorial rail reminds Eckman pumping. On either side of the rail, there is the maintenance of structures PDO+ and Niño.

Indian Ocean: Remaining of the generalized warm anomaly.

Atlantic Ocean : On the tropical Atlantic (North and South) models keep warm anomalies. The NCEP maintains a cold tongue very marked on the equatorial ; and the average EUROSIP is unreliable in this area (the other models do not develop such an anomaly). The models agree with the persistence of cold anomalies in the North Atlantic, although it tends to be reabsorbed (compared to seasonal forecasts from last month). They also agree to a zone of strong positive anomalies Bermuda to Newfoundland.

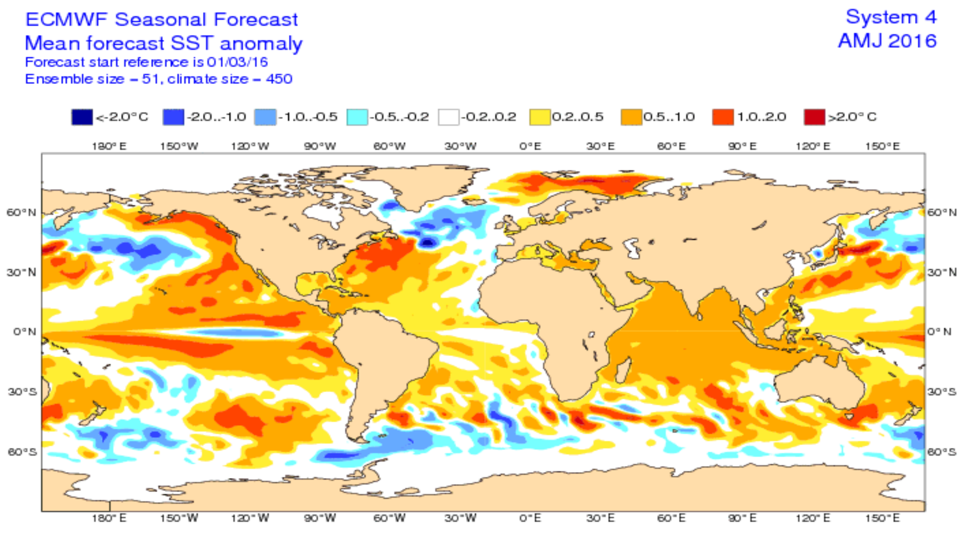


fig.II.1.1: SST anomaly forecast from ECMWF

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

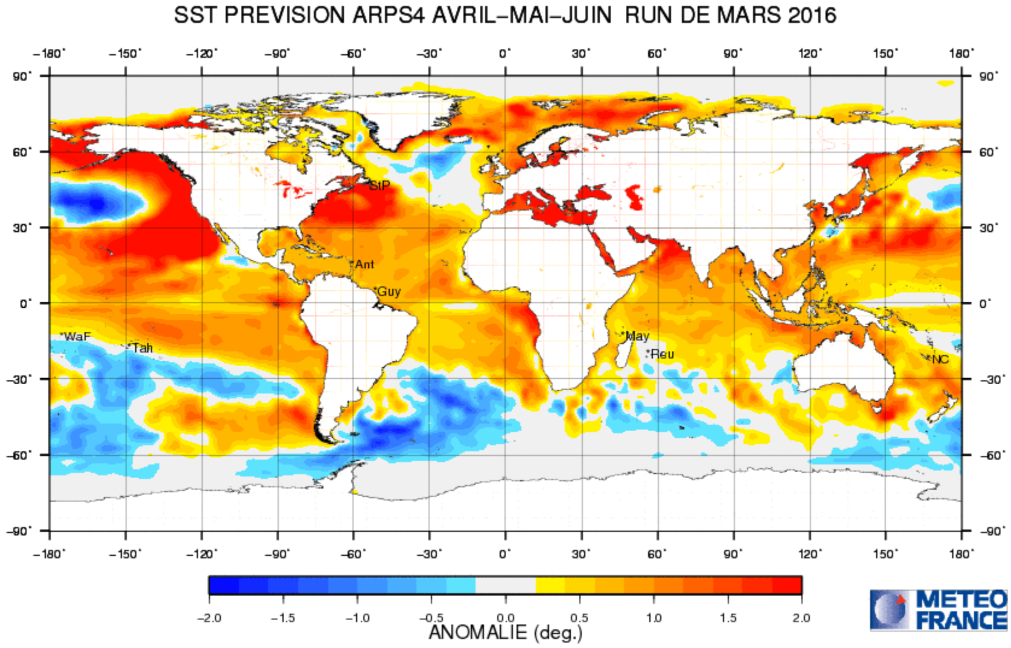


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).

http://elaboration.seasonal.meteo.fr

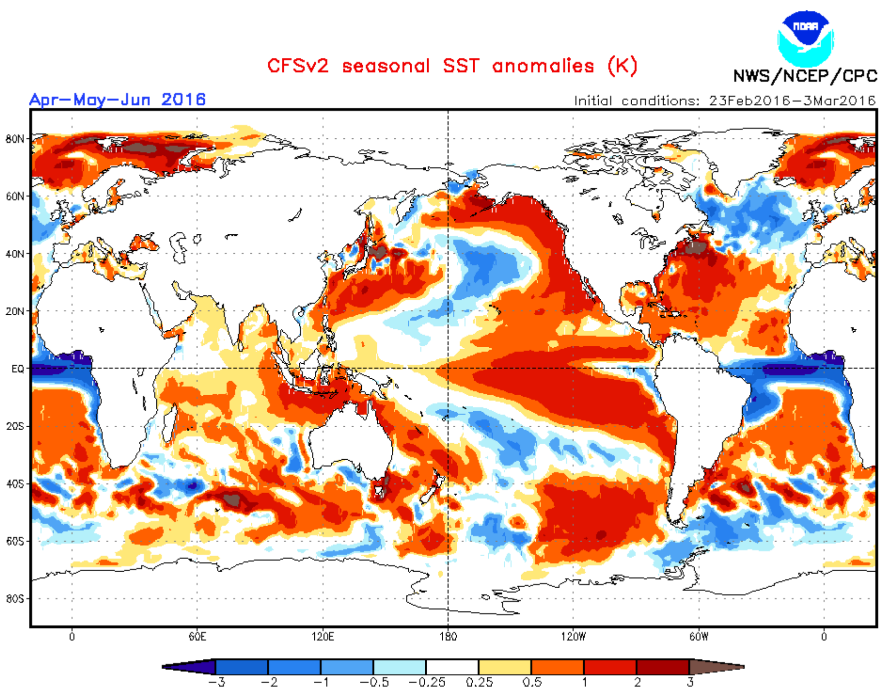


fig.II.1.3: SST anomaly forecast from NCEP.

http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/imagesInd1/glbSSTSeaInd1.gif

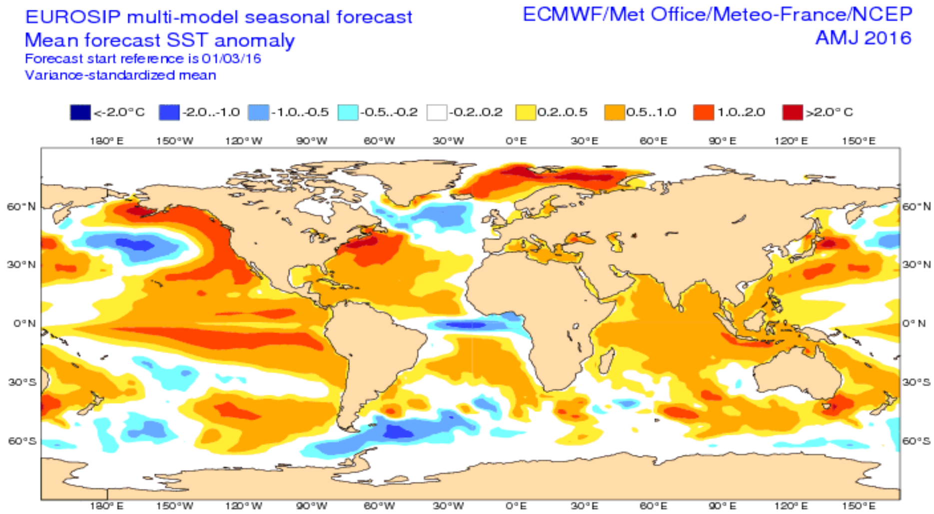
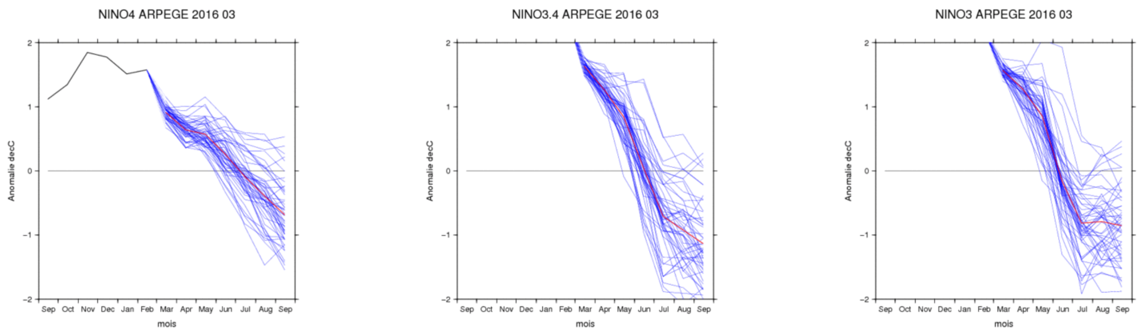


fig.II.1.4: SST Forecasted anomaly from Euro-SIP

II.1.b ENSO forecast

Forecast Phase: fast decreasing of El Niño

The models are both very close and quite consistent with each other in predicting the evolution of El Niño. The SST anomaly in the Niño3.4 box should fall rapidly over the next few months. The overall averages offer an anomaly close to 0 or slightly negative for the beginning of the northern summer.



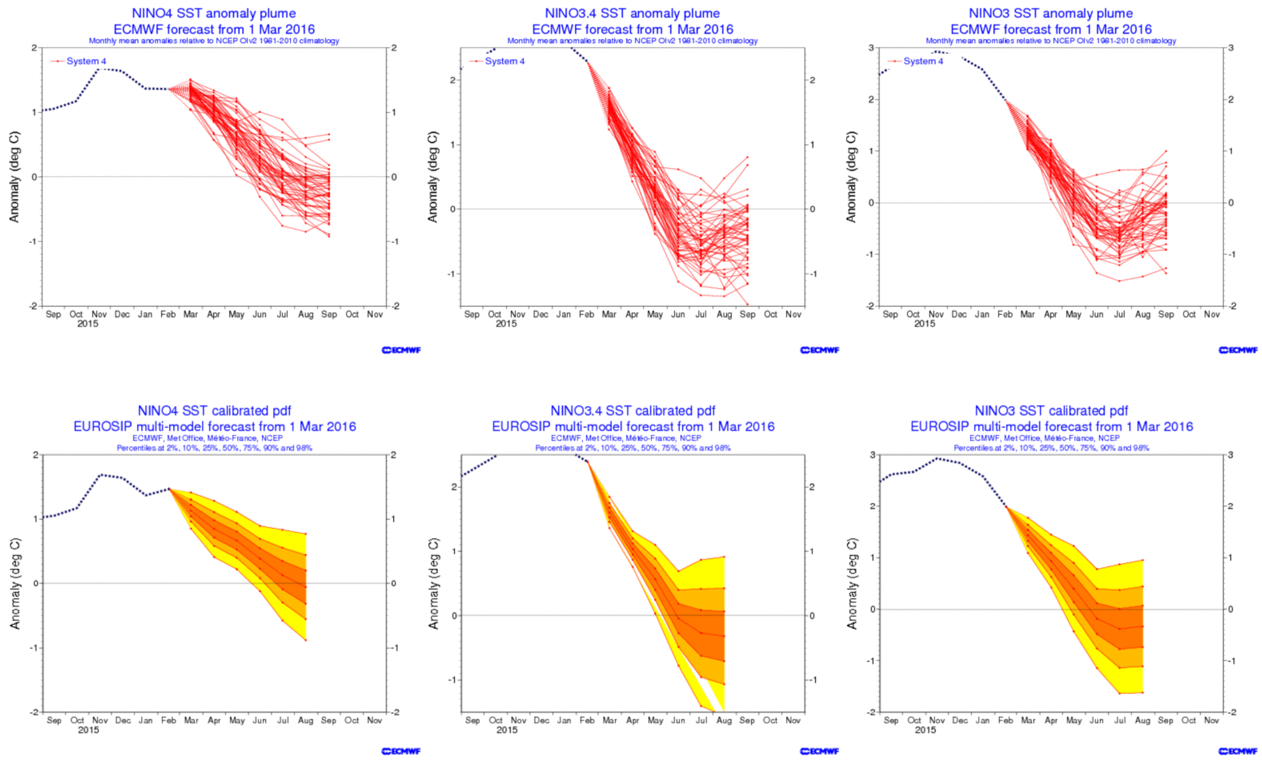
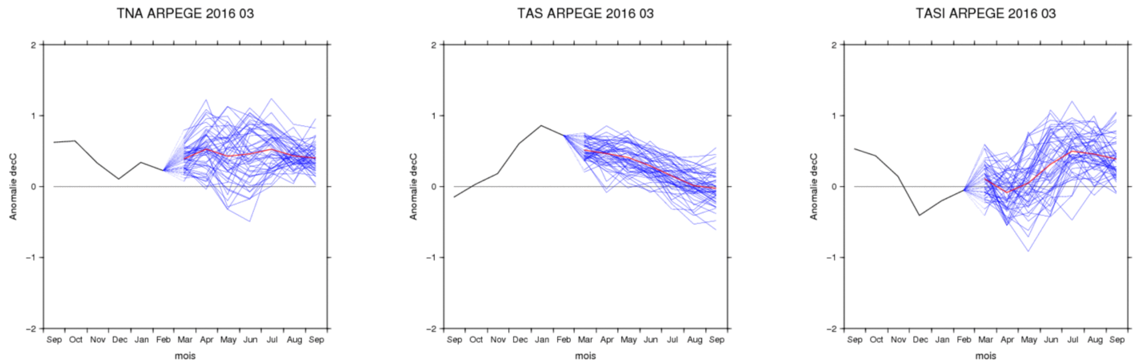


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

II.1.c Atlantic ocean forecasts



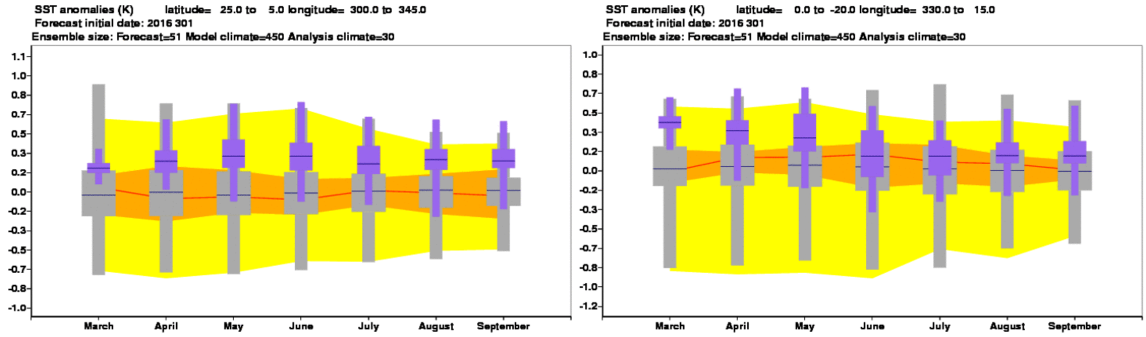
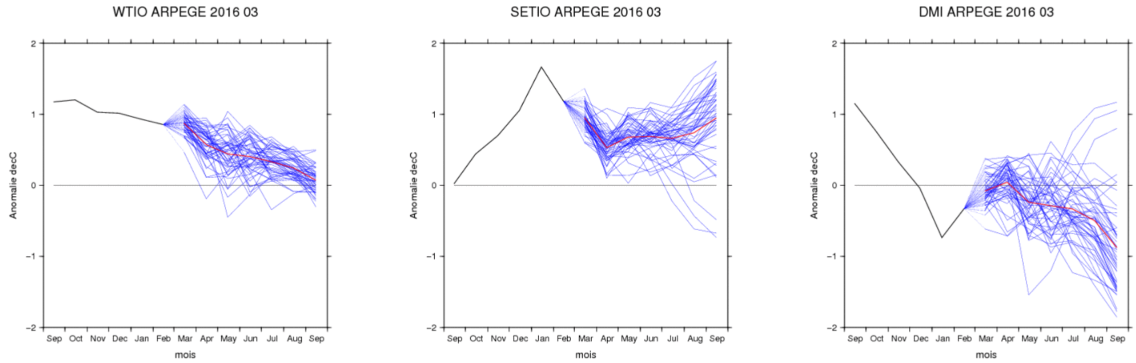
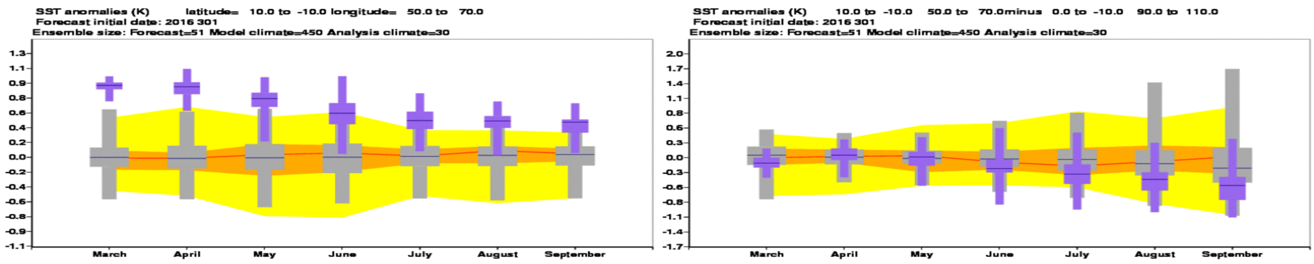


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.1.d Indian ocean forecasts





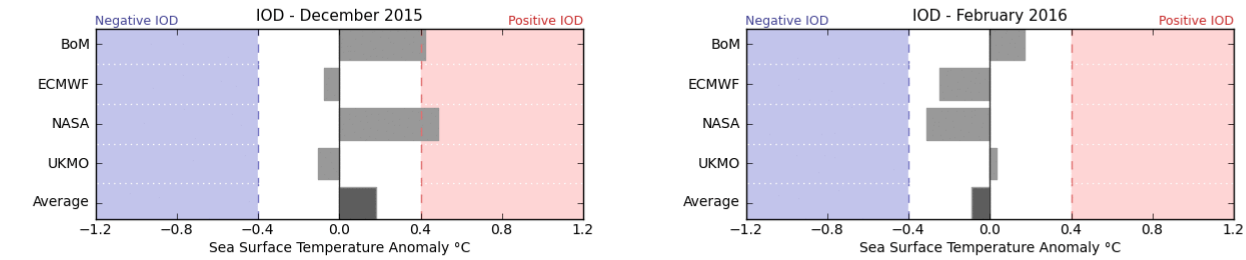


fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.2. GENERAL CIRCULATION FORECAST

II.2.a Global forecast

Velocity potential anomaly field (cf. fig. II.2.1 – insight into Hadley-Walker circulation anomalies) and **Stream Function anomaly field** (cf. fig. II.2.1 – insight into teleconnection patterns tropically forced):

The models begin to diverge, even they suggest a kind of dynamic ENSO: Arpege seems to maintain a strong coupling with upward motion and subsidence anomalies much more marked than in ECMWF. On the Atlantic and Indian, are important differences between ECMWF and Arpege. Current function abnormalities are more trapped in the tropical zone with ECMWF. A vagueness PNA+ structure still appears to be continuing in the simulations. On Atlantic Northeast and Europe, no agreement between the models and / or weak signals.

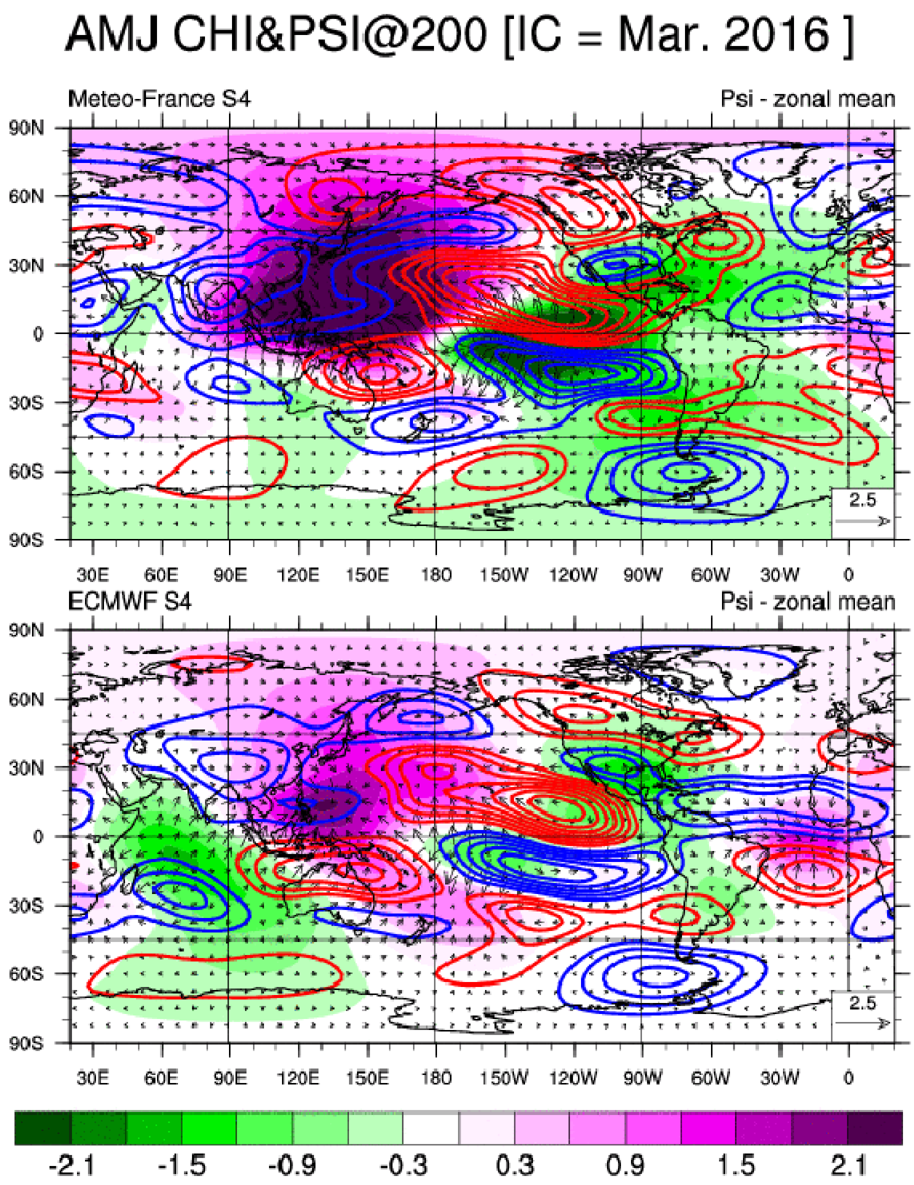


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

II.2.b North hemisphere forecast and Europe

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

The models are somewhat consistent on the Pacific and Alaska with a PNA+ structure.

By against the Atlantic and Europe, they diverge frankly. No usable signal on the anomalous regime occurrence prediction.

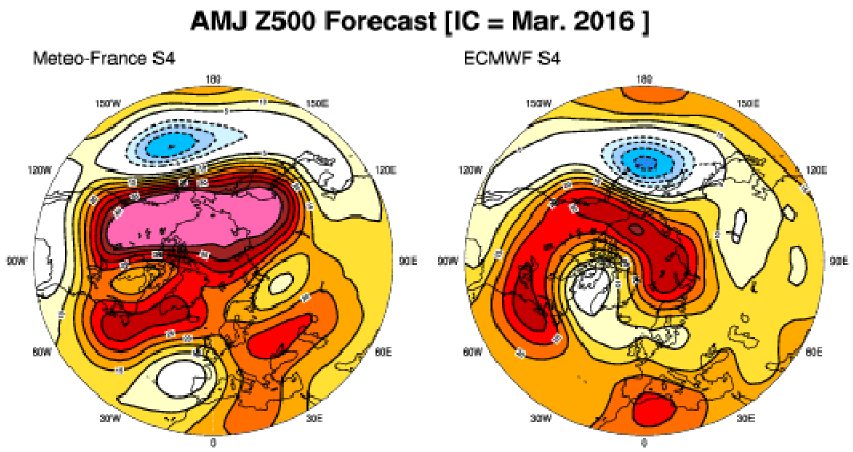


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right).

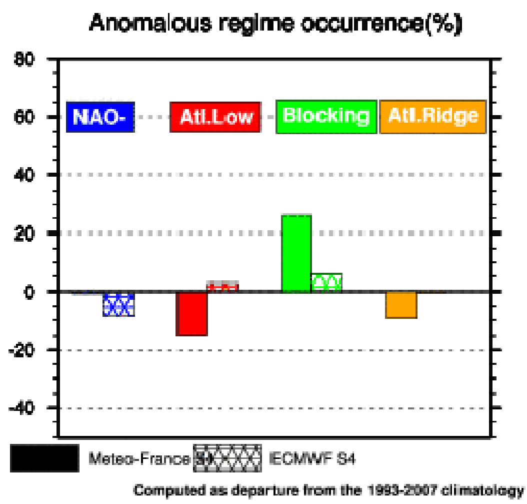


fig.II.2.3: North Atlantic Regime occurrence anomalies from Météo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

II.3. IMPACT: TEMPERATURE FORECASTS

In a favorable global context with warm anomalies over most of the globe, areas where hot is unlikely exception they relate to ocean areas where surface temperatures are expected below normal, and some exceptions on the continents: Mexico and the southern United States, Argentina, southwest of Australia.

On Europe, a "warmer than normal" scenario is likely. The signal is however weaker than the previous month both probability and intensity.

II.3.a ECMWF

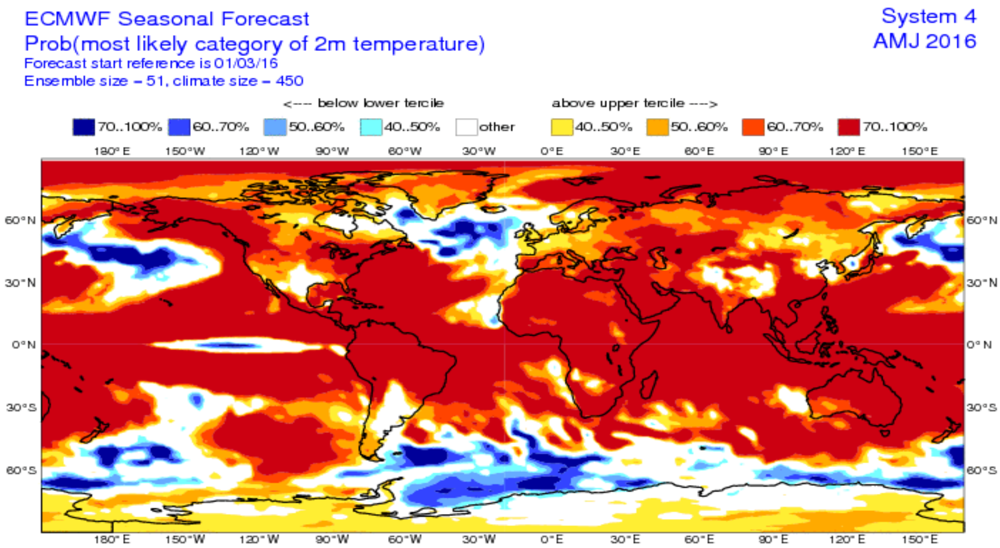


fig.II.3.1: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.3.b Météo-France

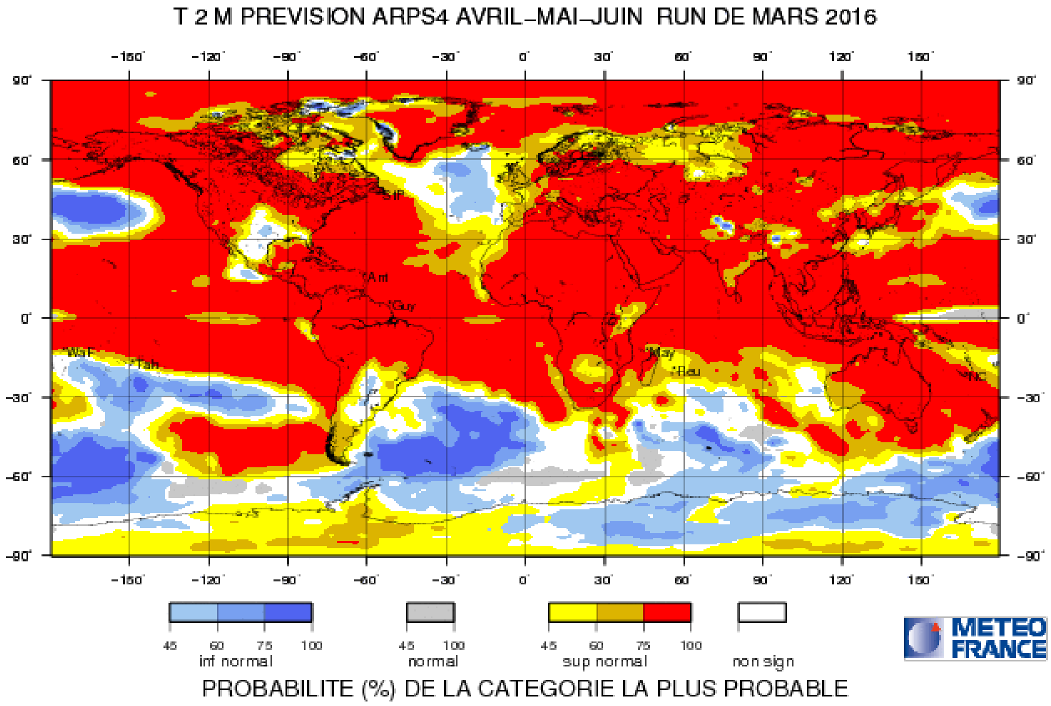


fig.II.3.2: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.3.c Japan Meteorological Agency (JMA)

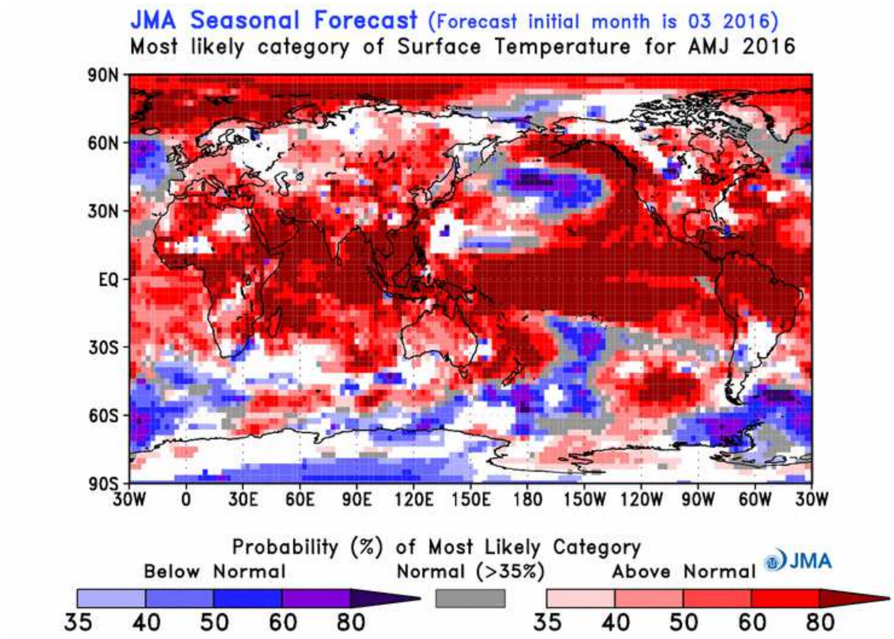


fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.php

II.3.d EUROSIP

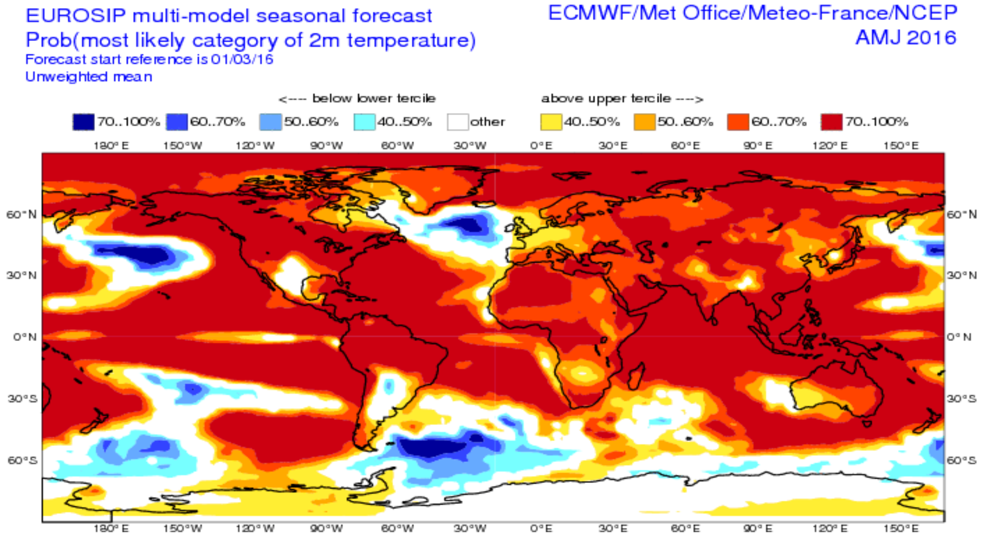


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).

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

II.4. IMPACT : PRECIPITATION FORECAST

El Niño continue to contribute greatly to the distribution of rainfall in the forecast models. The excess rainfall area of the central Pacific is expected to continue with a very high probability to the Gulf of Mexico, south of the United States and Bermuda in the north and south of South America on the other . It is surrounded by area high probability of below normal rainfall over the northeast of Brazil, the Indochinese Peninsula in Hawaii, and east of New Guinea south of Polynesia. Excess rainfall is likely over the Indian Ocean, the Horn of Africa to the south of Indonesia, Western Australia to Tasmania. While Southern Africa should rather be in deficit rainfall. Northern Maghreb is expected to experience drier conditions than normal.

For Europe:

No precipitation scenario, if it is a low tendency to drier than normal in the Mediterranean regions.

II.4.a ECMWF

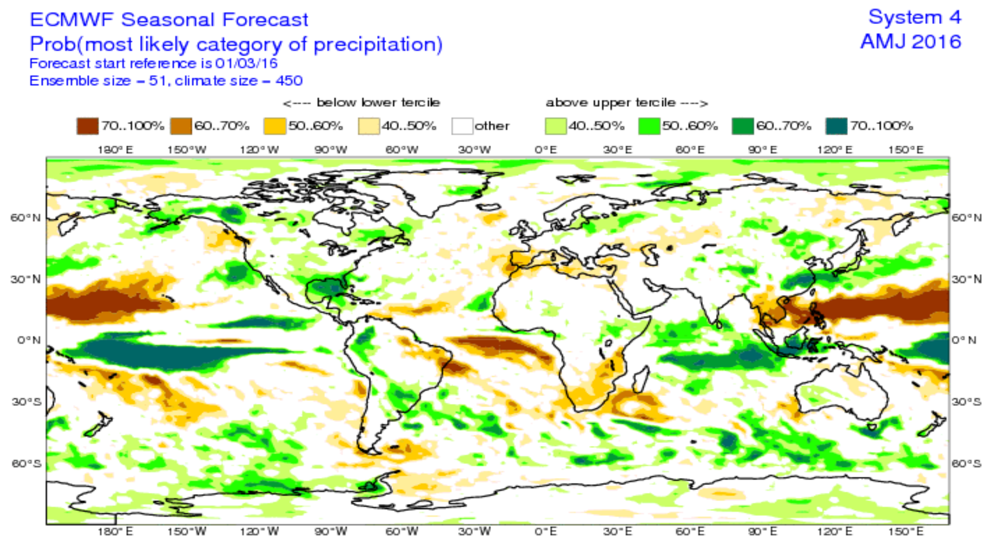


fig.II.4.1: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.4.b Météo-France

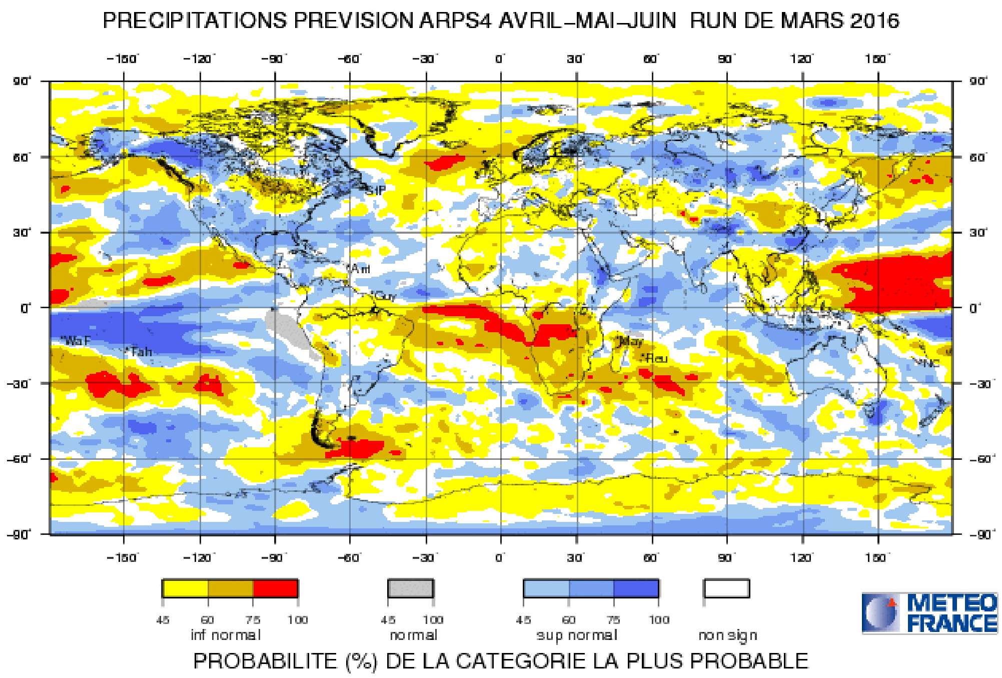


fig.II.4.2: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.4.c Japan Meteorological Agency (JMA)

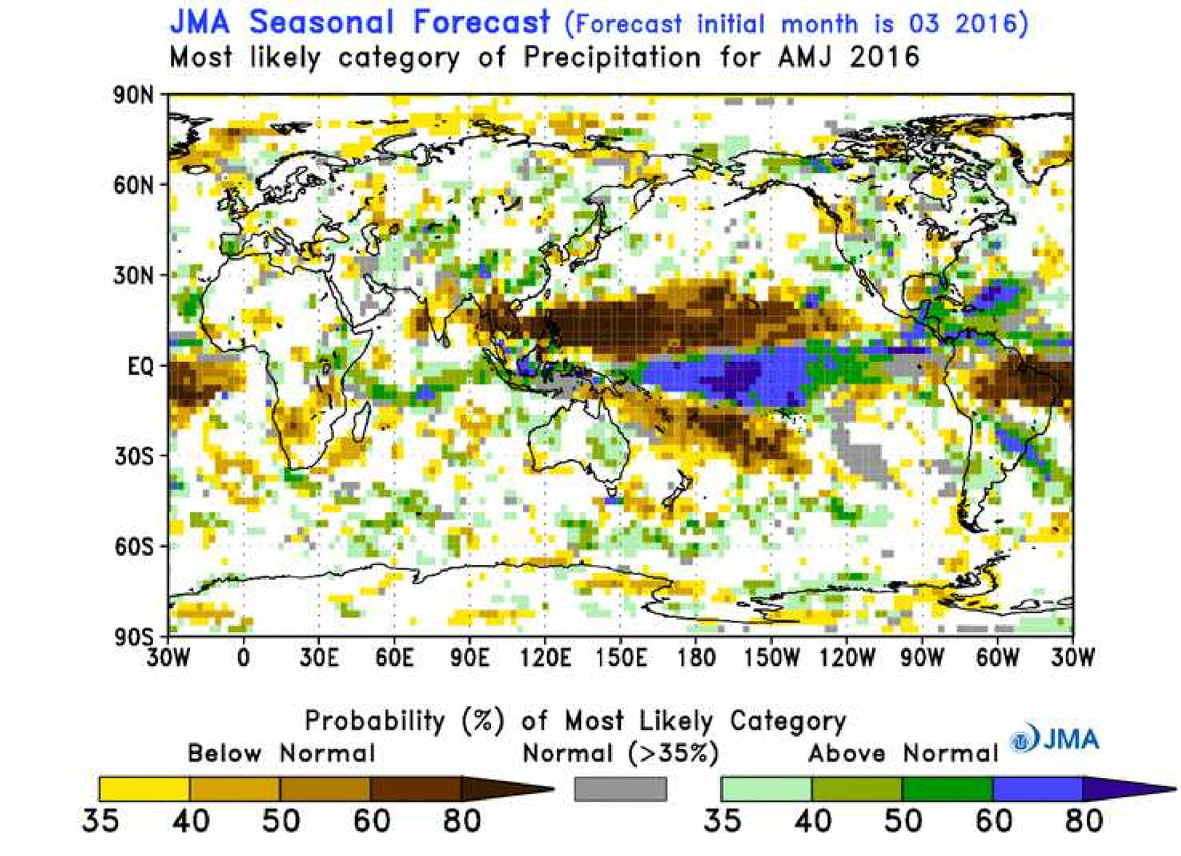


fig.II.4.5: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.php

II.4.d EUROSIP

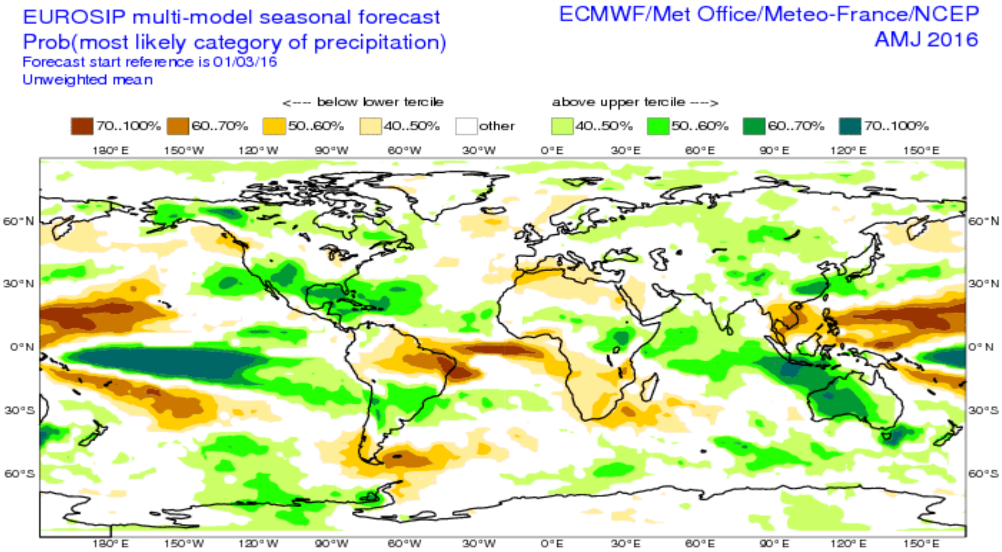


fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).

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

II.5. REGIONAL TEMPERATURES and PRECIPITATIONS

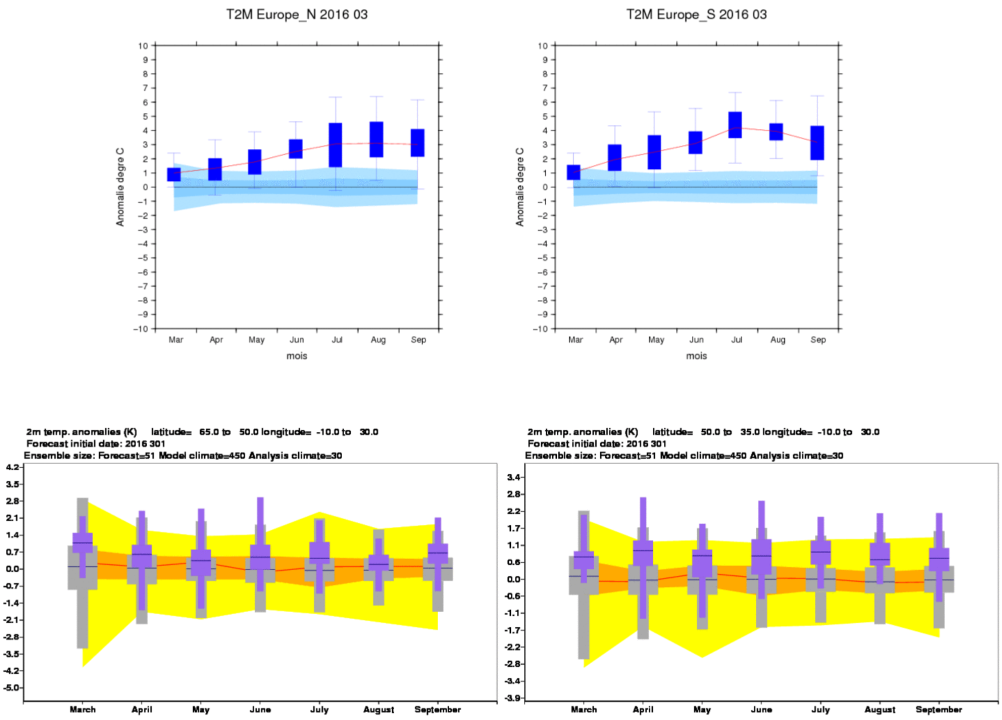


fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

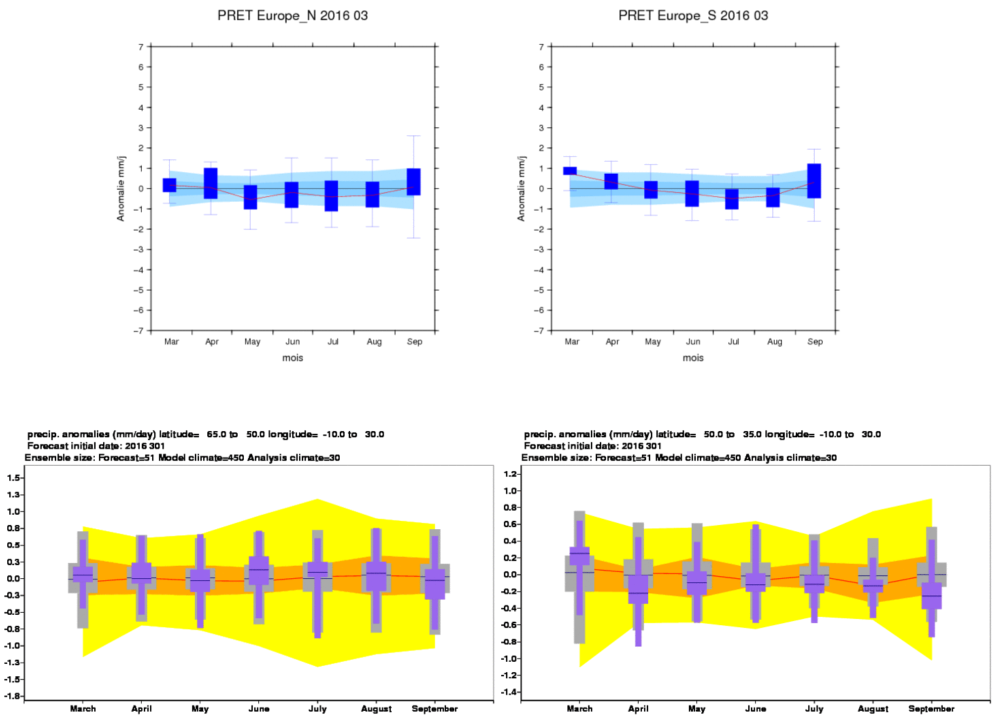


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

II.6. MODEL'S CONSISTENCY

Not available

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

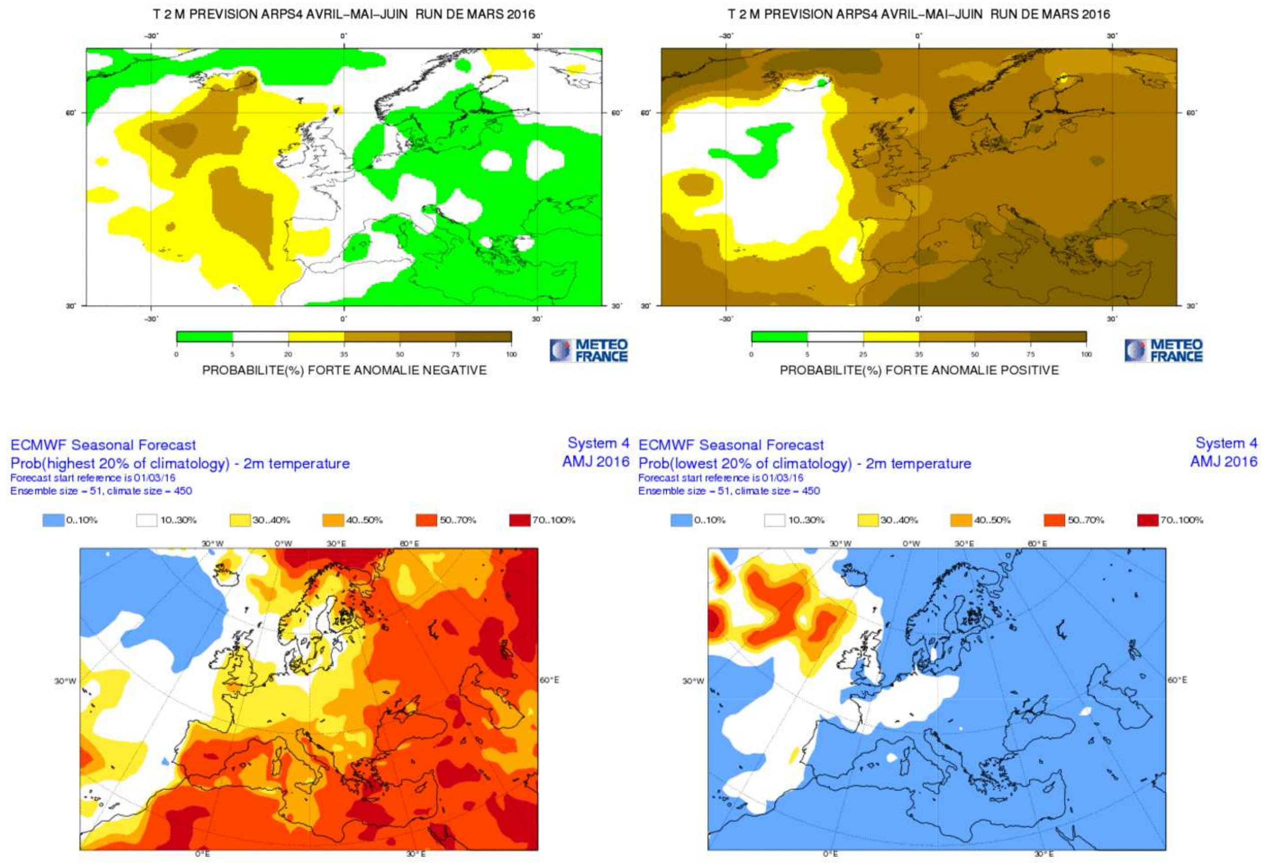


fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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

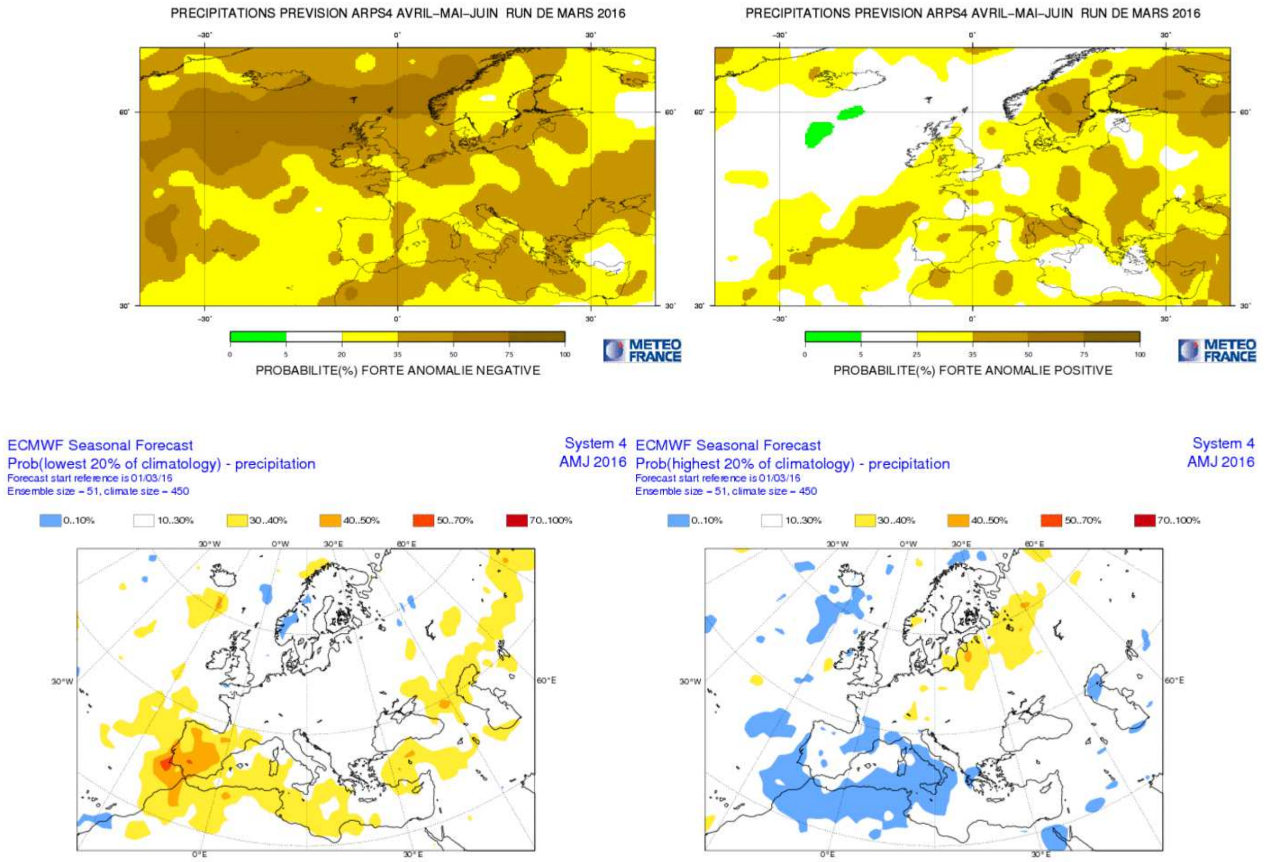


fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

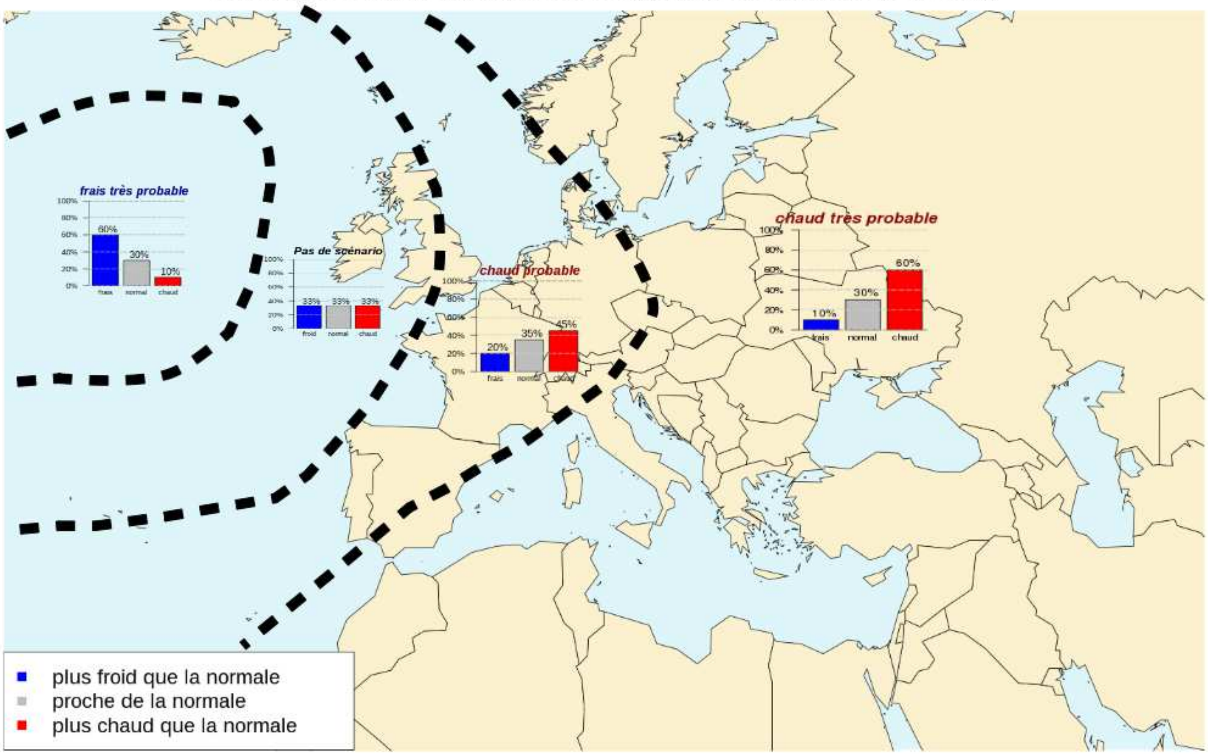
II.8. DISCUSSION AND SUMMARY

II.8.a Forecast over Europe

Temperatures: A warmer than normal scenario (but with relatively low probability) on the western part of Europe. Higher probability for a warmer than normal on the eastern part of Europe.

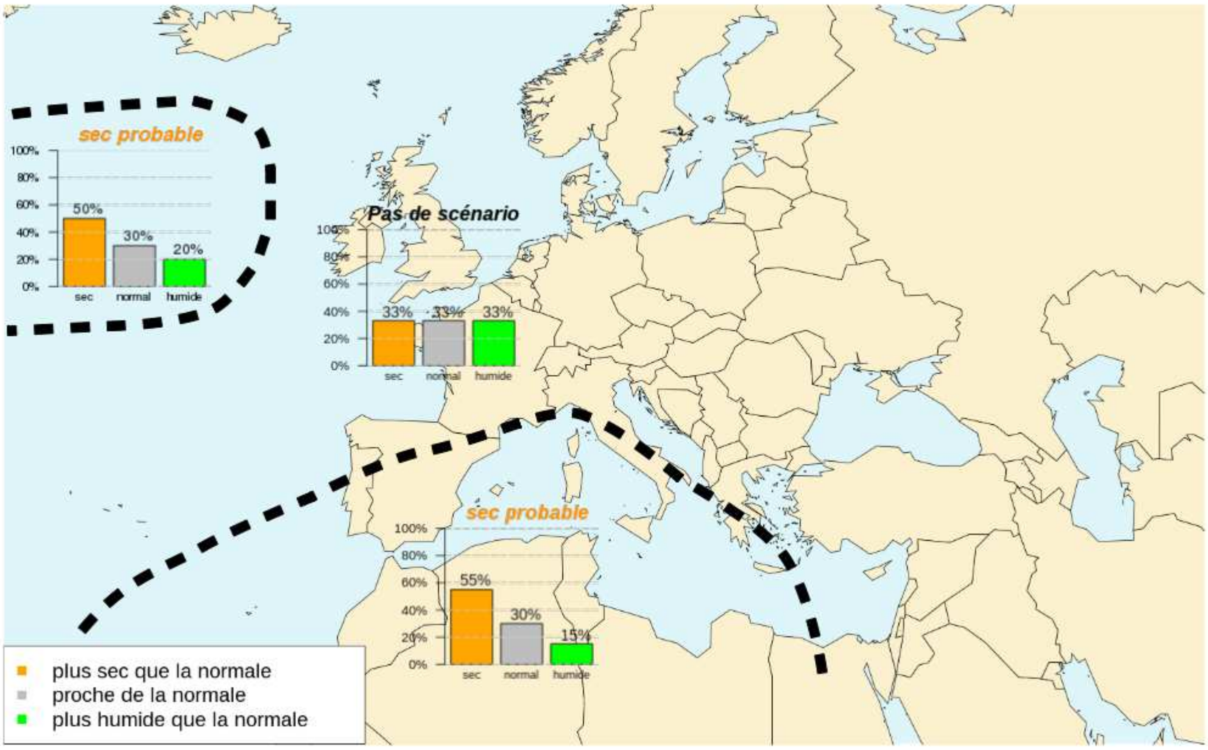
Precipitation: No scenario, except the Mediterranean regions where a small dry signal seems to be emerging.

Prévisions saisonnières probabilistes de températures pour le trimestre prochain



Avril-Mai-Juin 2016

Prévisions saisonnières probabilistes de précipitations pour le trimestre prochain



Avril-Mai-Juin 2016

II.8.b Tropical cyclone activity

Normal activity on the Atlantic, above than normal over Pacific Northeast and lower than normal over the Pacific Northwest.

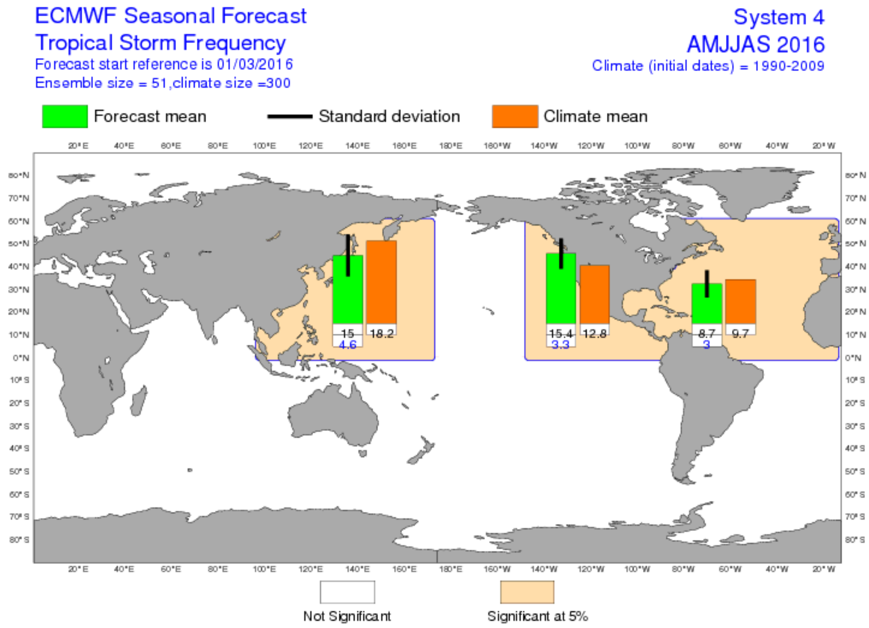


fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).

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

ANNEX

II.9. 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.

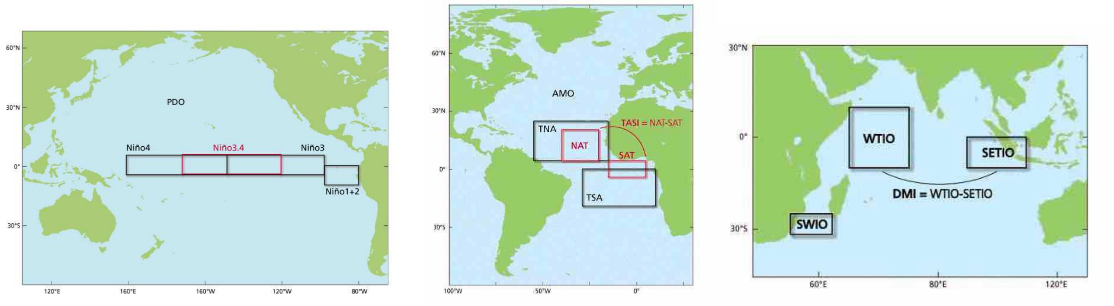
II.10. « NINO », SOI INDICES AND OCEANIC BOXES

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).

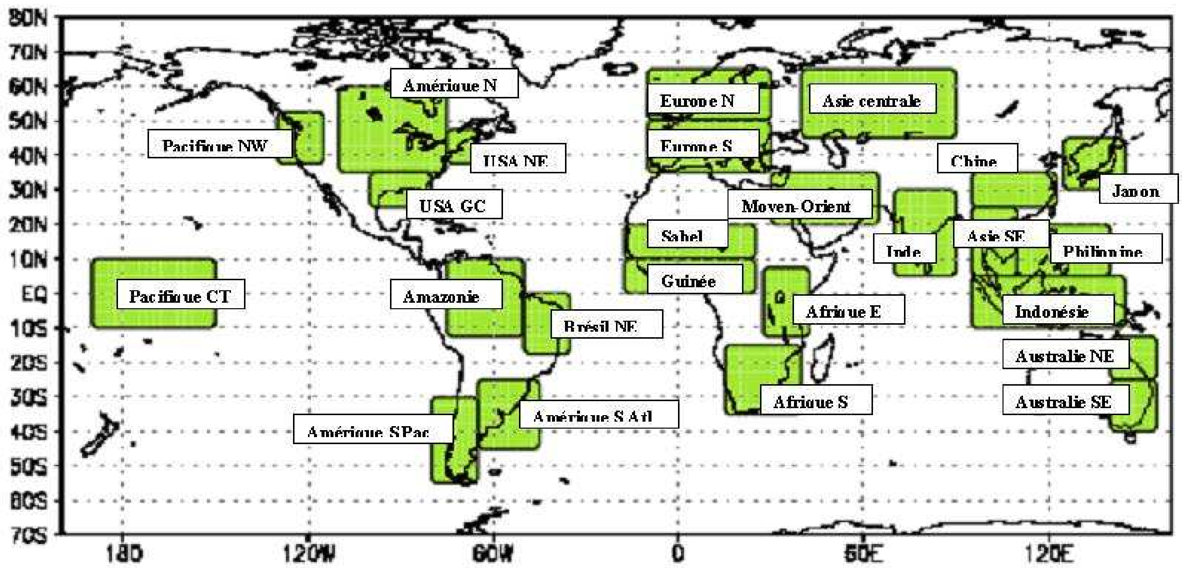
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea 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.11.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.12. 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).