GLOBAL CLIMATE BULLETIN
n°203 – may 2016

Table of Contents

I. DESCRIPTION OF THE CLIMATE SYSTEM (MARCH 2016)

I.1.OCEANIC ANALYSIS

I.1.a Global analysis

In the Pacific ocean :
El Niño conditions rapidly weakening (Figures I.1.1, I.1.4) especially in the in the Niño 3.4 region: SST anomalies decreasing to 2.0°C in march (and even to 1.4°C during the last week of the month), compared to 2.5°C in february.
Subsurface cooling strengthening and spreading rapidly eastward. At the end of them month, the subsurface negative anomalies nearly reached the south american coastline (figures 1.1.5).

Positive anomalies are now confined to a very shallow layer less than 50 meters thick.

Over the north Pacific, positive PDO pattern strenghtening.

On the Continent Maritime:
South China Sea still cooling (Fig I.1.1), while SST are increasing again south of the equator.

In the Indian Ocean :
Tropical Indian Ocean still warmer than normal, but without clear tendancy pattern (warming and cooling areas coexist). The DMI index is slightly negative in March (-0.1 ° C ~ see http://stateoftheocean.osmc.noaa.gov/sur/ind/dmi.php) slowly rising compared to February.

In the Atlantic:
Widespread cooling on the eastern side from the british Isles to Senegal, certainly due to atmospheric forcing (north winds prevailing over western Europe in march).

Continued strong cold anomaly over center North Atlantic, and positive anomalie maintaining itself from the Carribean to Bermuda and south of Newfoundland.

Over tropical south Atlantic ocean, significant cooling, bringing SST back to near normal values.

In the Mediterraen :
Cooling over the western half of the basin (northerly circulation type) bringing SST back to near normal values.

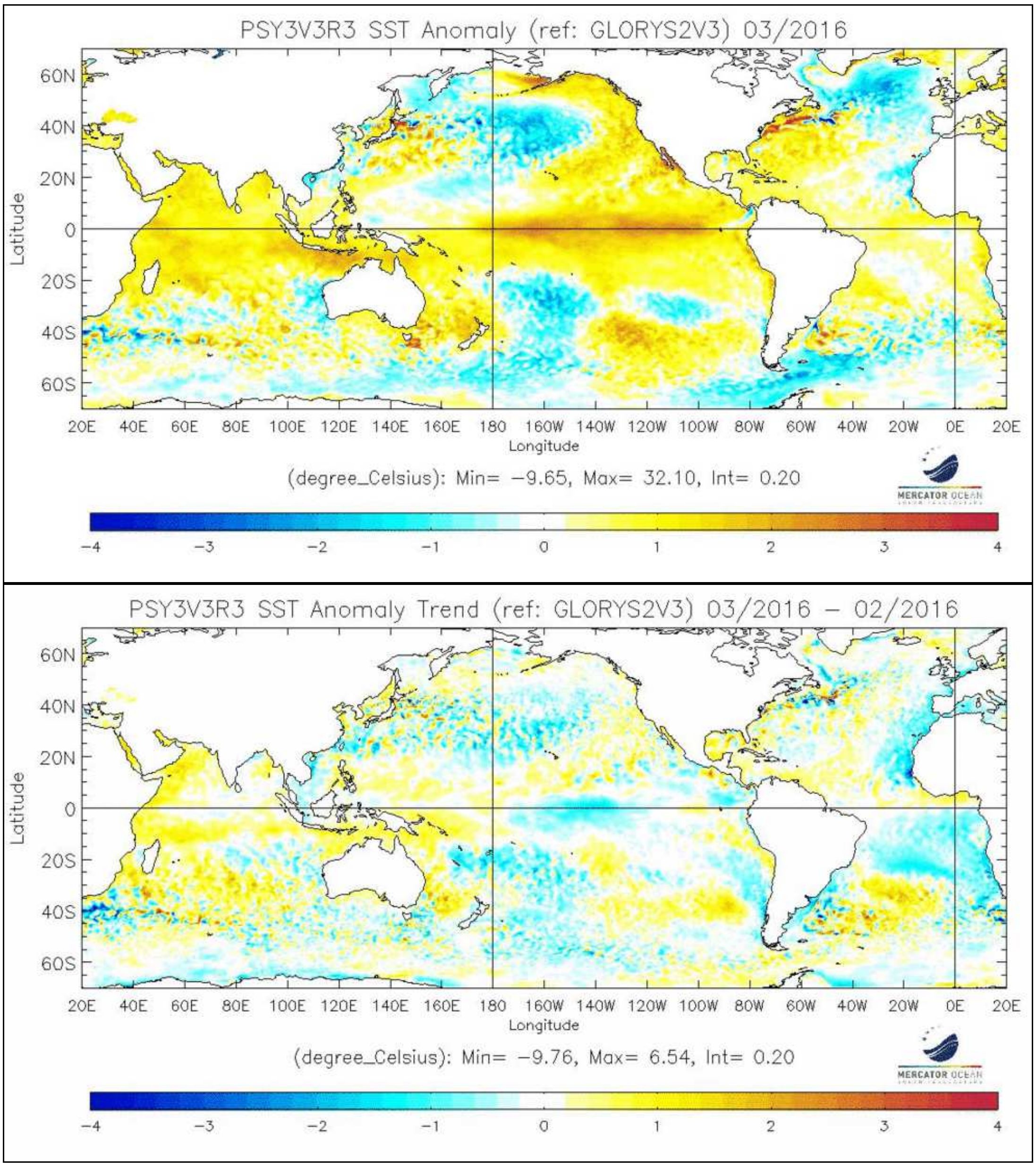


fig.I.1.1: top : SSTs Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

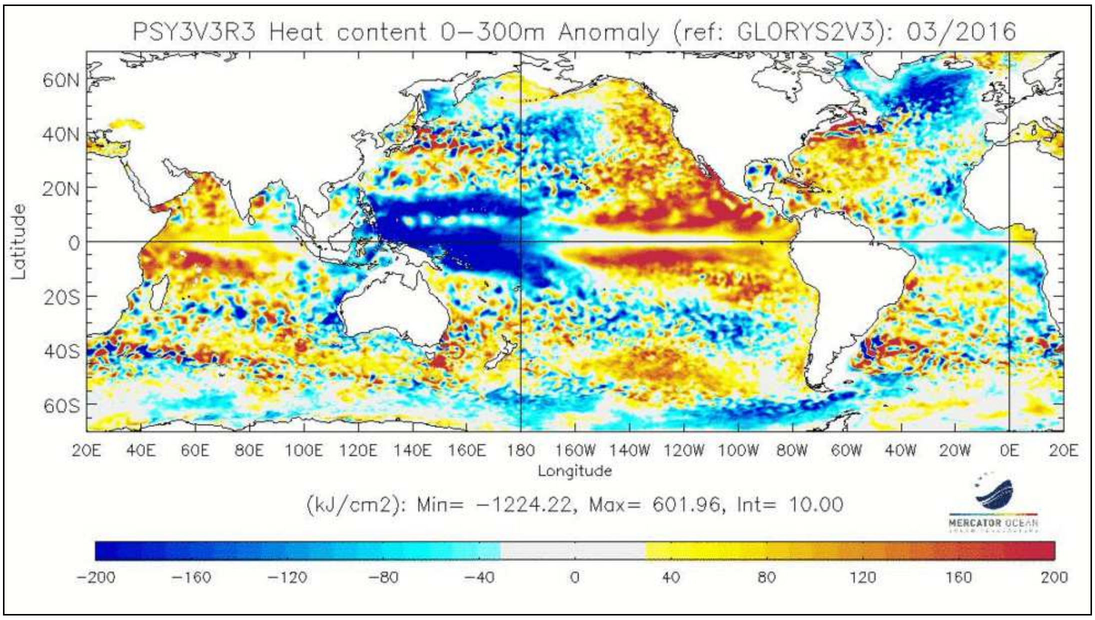


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2009)

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

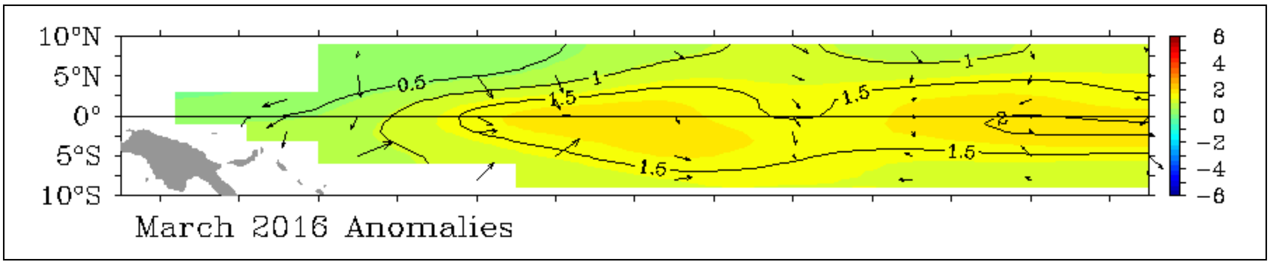


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON.

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

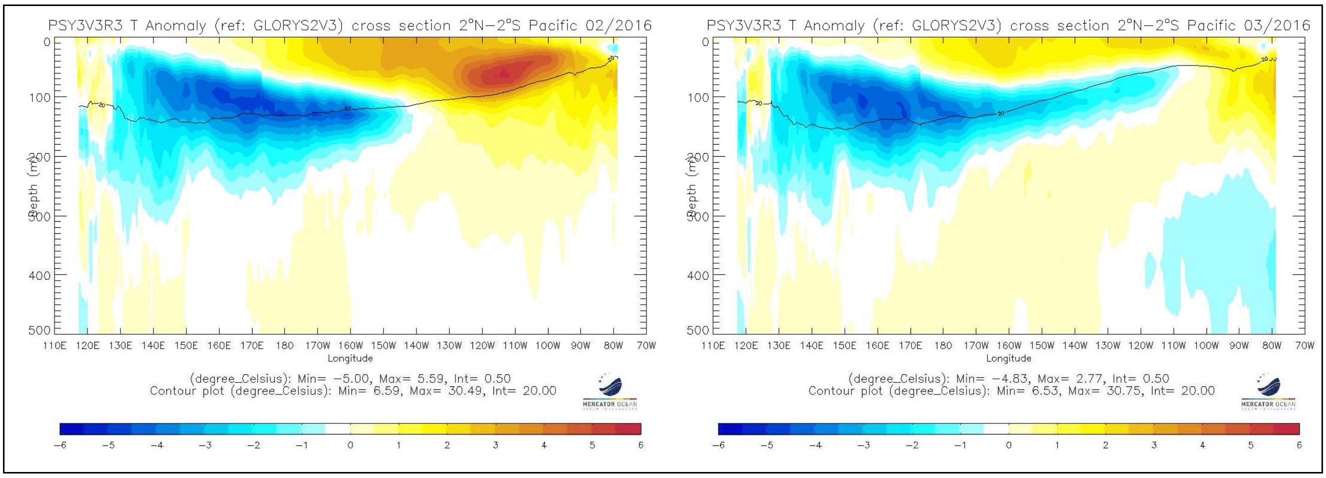


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), http://bcg.mercator-ocean.fr

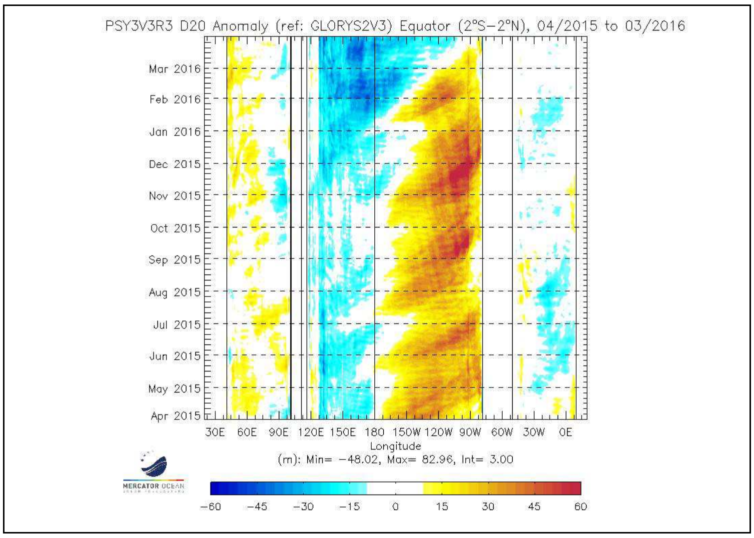


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period http://bcg.mercator-ocean.fr/

I.1.b Sea surface temperature Near Europe

Generally a cooling (relative to the season) can be found on sea surfaces near to western Europe, while other SST anomalies near Europe remained largely unchanged compared to the previous month.

Arctic Sea, North Sea, Baltic Sea: still warmer than normal, no significant change

North Atlantic from Iceland to 40°N: still persistent cold anomaly, but cooling extended further eastward close to western Europe, resulting in around-normal temperatures near Ireland/UK and in the Gulf of Biscay, and even colder-than-normal temperatures near the western coast of Iberia.

Mediterranean and Black Sea: cooling in the western Mediterranean, temperatures are close-to-normal now; other areas: no significant change, still warmer than normal.

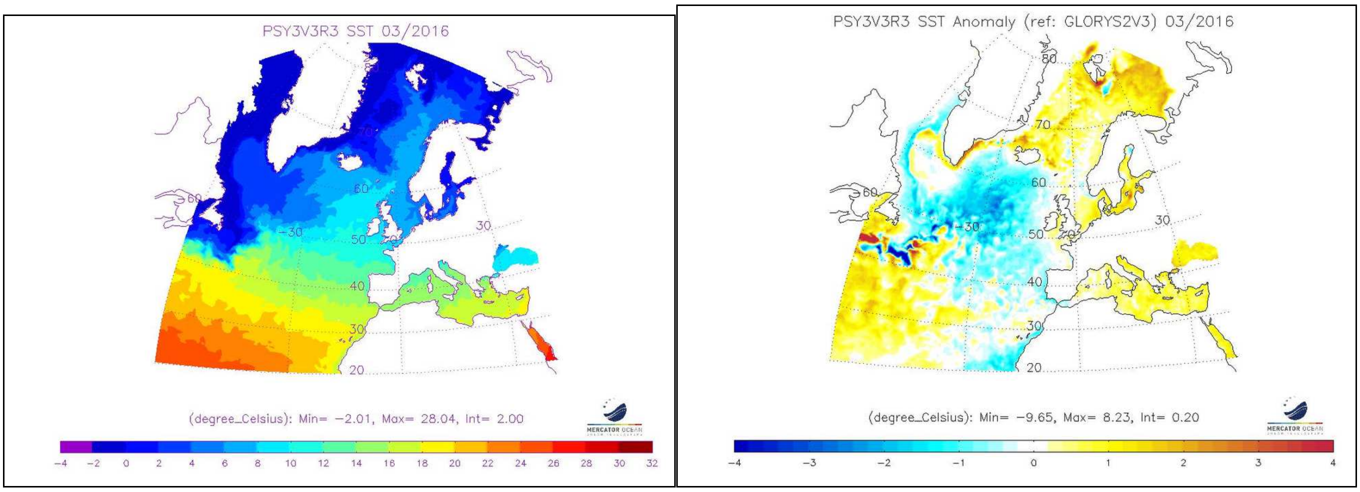


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

I.2.ATMOSPHÈRE

I.2.a General Circulation

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

Typical El Niño patterns still present but sharply weakening : ascent anomalies now confined near the equator and around the dateline. Over the Maritime Continent, the large area of anomalous subsidence has retrieved to the north, due to active MJO in the southern part between the 12th and the 24th (see figure 1.2.1.b).

Over the Atlantic, the area of anomalous subsidence has drifted from Venezuela to the Carribean.

Standardized SOI has increased to -0.1 in March, which shows some decoupling between the ocean and the atmosphere. (https://www.ncdc.noaa.gov/teleconnections/enso/indicators/soi/)

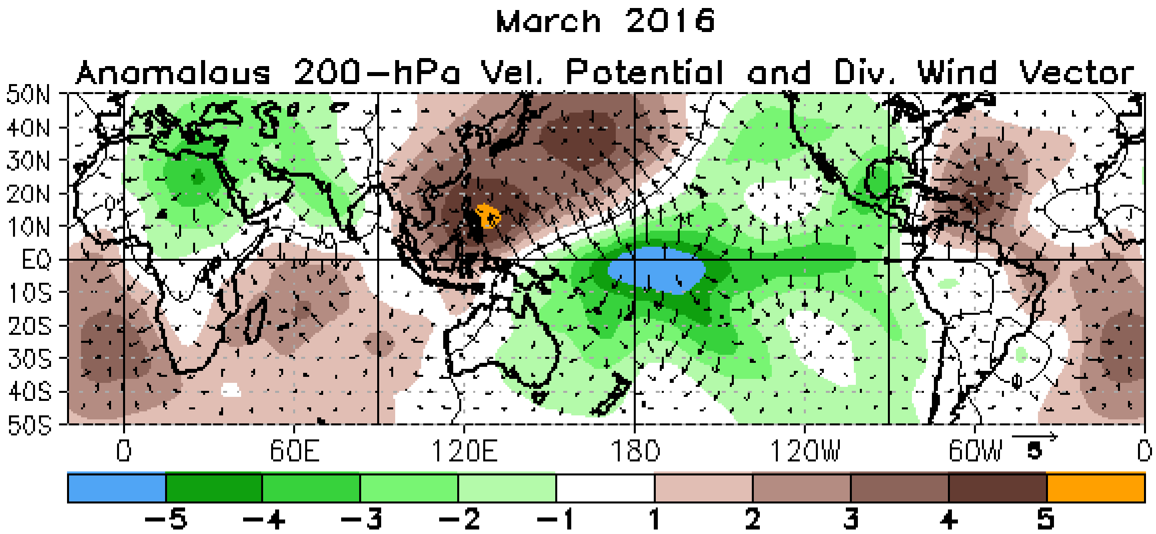


fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

MJO (fig. I.2.b):

As mentioned above, MJO was active in quarter 4 and 5 (Maritime continent mainly) during March.

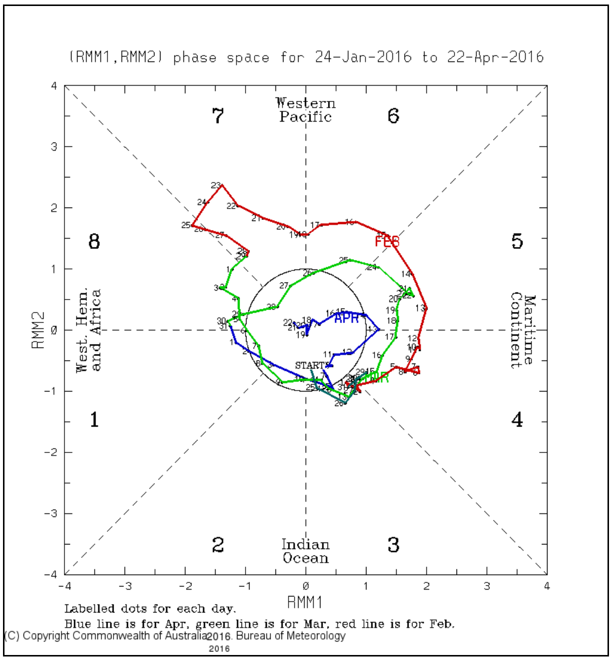


fig.I.2.b: indices MJO http://cawcr.gov.au/staff/mwheeler/maproom/RMM/phase.Last90days.gif

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

The March stream function structures are somehow consistent with velocity potential anomalies over the tropical Pacific.

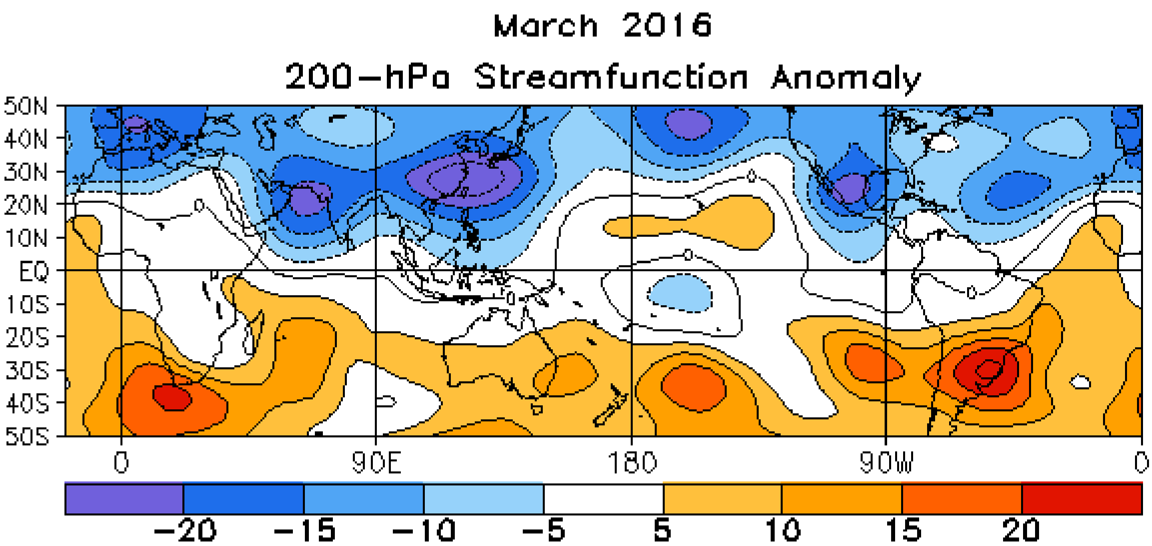


fig.I.2.2: Stream Function Anomalies at 200 hPa.

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

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

Over the northern hemisphere, no weather regime or teleconnection pattern clearly defined. However, a significant positive anomaly has been present from Iceland to Scandinavia, while a negative one covered much of western Europe and of the Mediterranean (north winds prevailing). Over the north Pacific, the positive PNA pattern has faded but a strong negative anomaly remains over the Aleoutians.

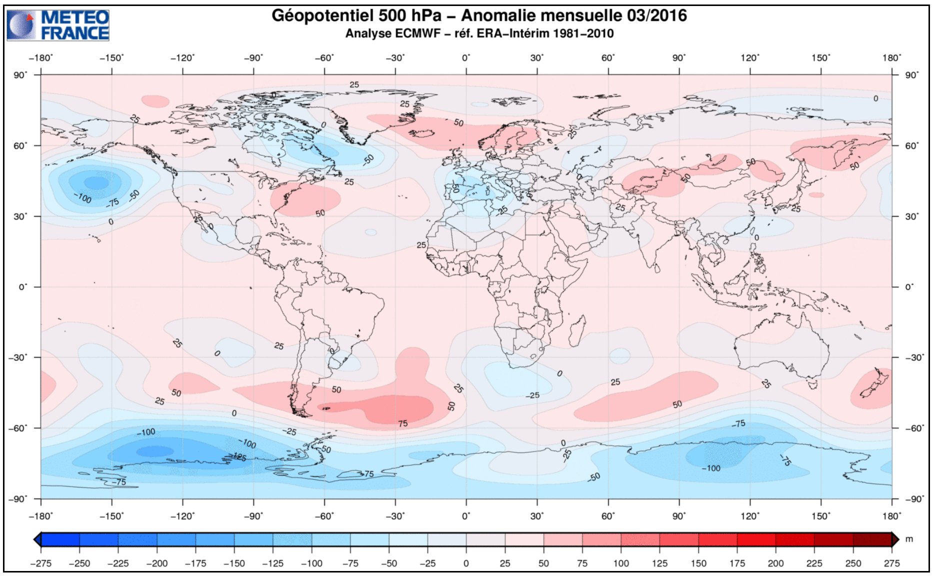


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
MAR 16	**0.4**	**0.7**	**-0.2**	**0.2**	**0.4**	**---**	**0.3**	**-0.2**	**-0.2**
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
AUG 15	-1.1	1.1	-1.5	-0.3	0.1	---	-0.4	0.9	0.1
JUL 15	-3.1	0.2	0.8	0.2	0.3	---	2.0	-1.1	0.4
JUN 15	0.2	1.1	-0.0	1.7	-0.1	---	-0.8	-1.5	-0.2
MAY 15	0.2	0.7	2.1	0.5	-0.1	---	-1.5	-2.1	0.5

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

Although NAO and EA patterns have weakened very much from February to March, SLP pattern still shows a zonal component over the North Atlantic, which is also reaching Europe. Both Icelandic Low and Azores High were slightly more intense than normal near surface. This means that an enhanced near surface zonal flow should have reached Western Europe in March. Since this flow crossed the negative SST anomaly over the North Atlantic south of Iceland, cooling air was advected to western Europe.

Apart from that, as mentioned above, teleconnection indices were quite close to zero and thus hardly any characteristic patterns can be identified. Mean SLP does not show much spatial variability within Europe except western parts. However, anomaly patterns of 500 hPa geopotential (higher geopotential over Scandinavia, lower over the western Mediterranean can also be seen for SLP. Areas of lifting air can be found in western Europa and over the Balkan region, when looking at omega (vertical velocity) fields of numerical analyses.

There were also changes of circulation types during the month. The German Grosswetterlagen weather types classification (GWL) shows a trough over Central Europe for the first days of the month, than it changed to anticyclonic types, and the last week of the month to west cyclonic types. Similarly, MeteoFrance weather types also show these three main types: Ridge over Atlantic (= trough over Central Europe) at the beginning, then change to blocking High (anticyclonic over Central Europe), and finally to NAO+ (western types) in the last week.

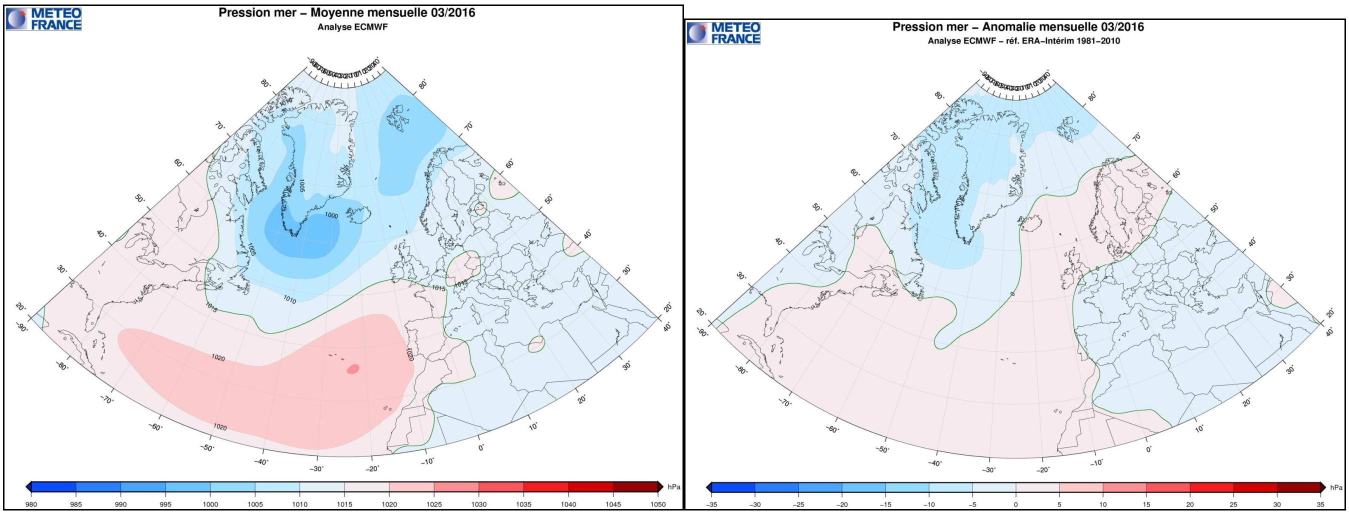


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (top) and 1981-2010 anomalies (bottom).

Circulation indices: NAO and AO

NAO changed during month of March: in the first third of the month, NAO was always positive (like in whole February) with index values around +1, but this did not have much influence on Europe because of the ridge-trough pattern over the East Atlantic and the continent. During anticyclonic blocking, NAO weakened to around normal conditions, and intensified again to positive values a little but became the dominant pattern at the end of the month.

AO index was negative at the beginning of the month, then oscillated around zero before coming to positive values at the end of month. This means that an air mass exchange between the Arctic region and middle latitudes took place mostly at the beginning of the month; therefore Arctic air came to Europe especially during trough situation over Central Europe.

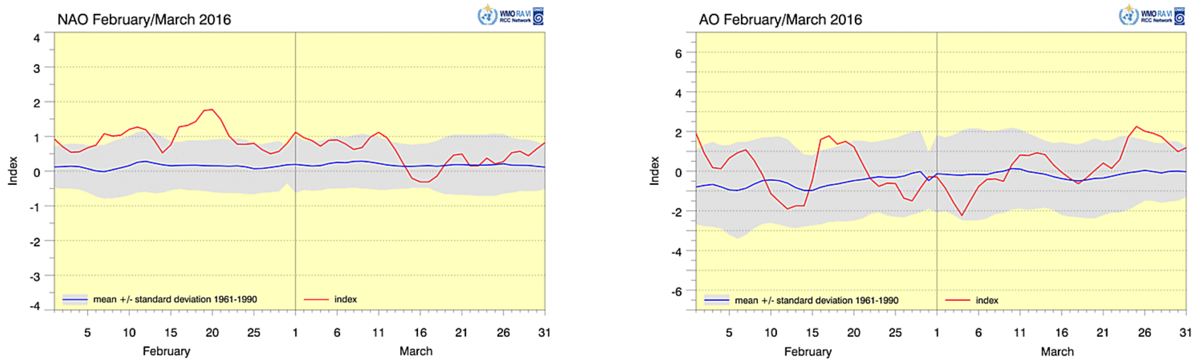
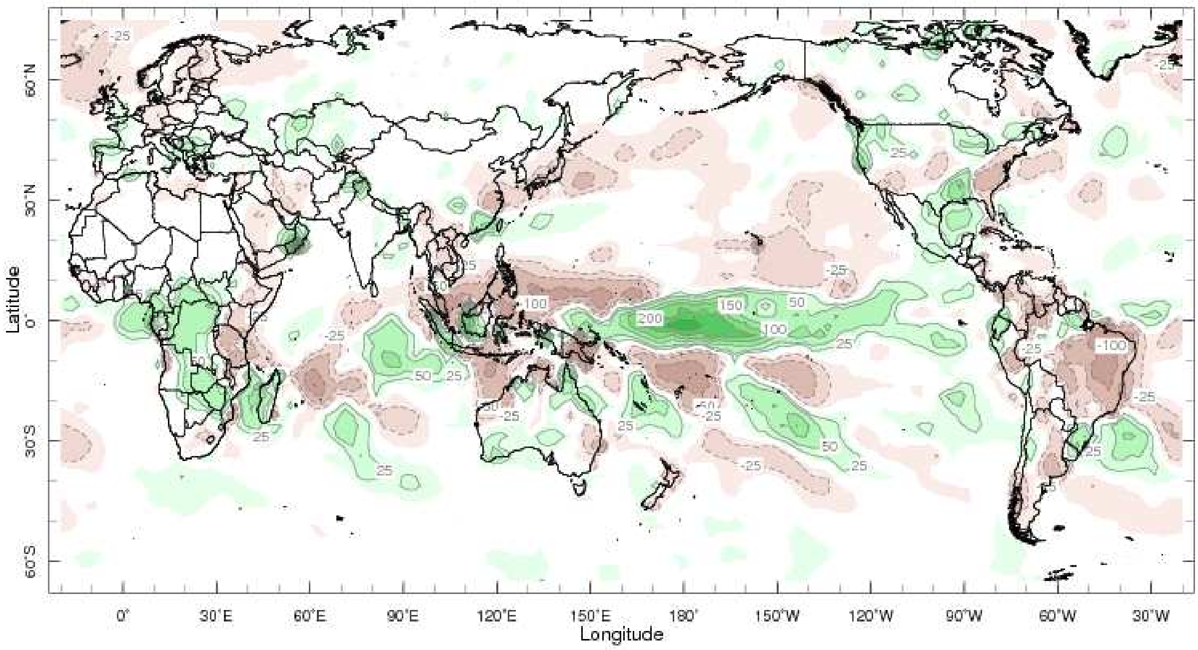


fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

El Niño effects weakening but still visible over the tropical Pacific ocean and over the Maritime continent (except for the MJO active zone, in the southermost region), and even over Brasil. By contrast, rainfall does not correspond to what is expected during an El niño event over South Africa, Australia, and Argentina.

Over Europe, dry conditions to the north, wet to the south (over regions exposed to the north-westerly flux) and also over northern Africa, southern Italy, and Balkans.



Mar 2016

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:

Above-normal precipitation over western Europe (England, western France, northern Spain), particularly due to heavy rainfall events around 8-9 March and at the end of the month, consistent to weather patterns described above. Also several storms over the central Mediterranean and the Balkans caused partly extremely intense precipitation, und furthermore some quasi-stationary systems caused above-normal precipitation over parts of Eastern Europe.

Most of northern and central Europe had below-normal precipitation (in northeastern Europe even drought conditions), profiting from the anticylclonic patterns around the middle of the month, when there was only very little rain during around two weeks.

Southern Spain was much influenced by the Azores High, therefore also below-normal precipitation there, but no drought conditions.

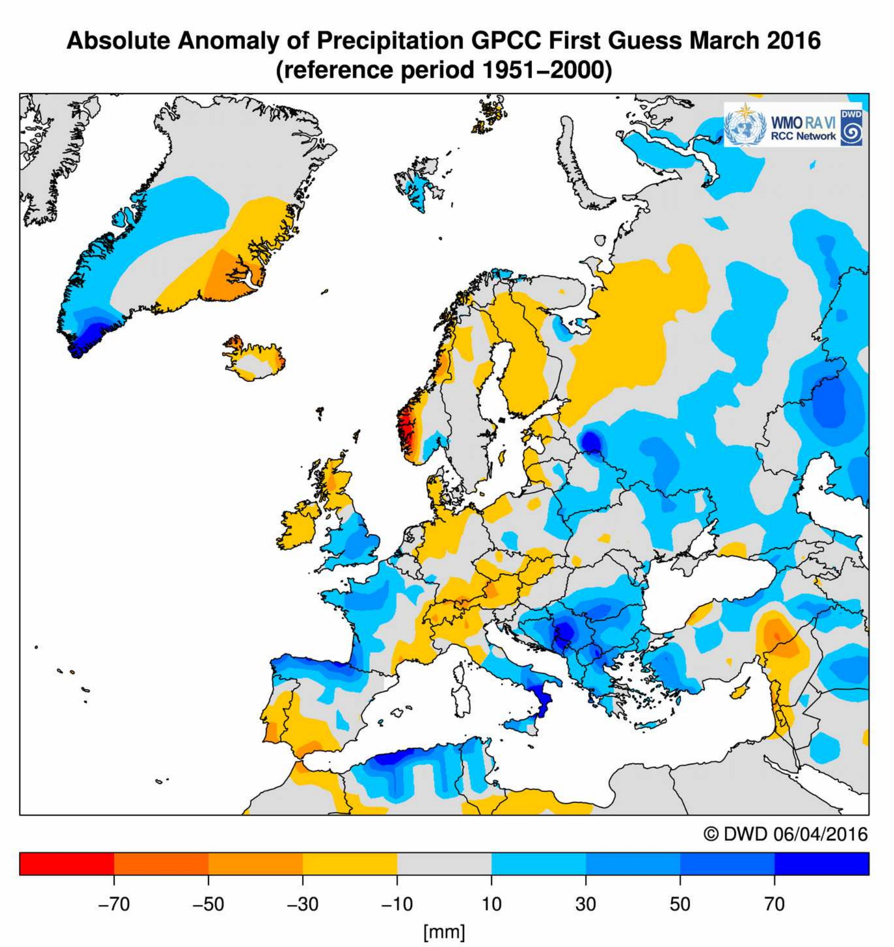


fig.I.2.5: Left: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm. Right: Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

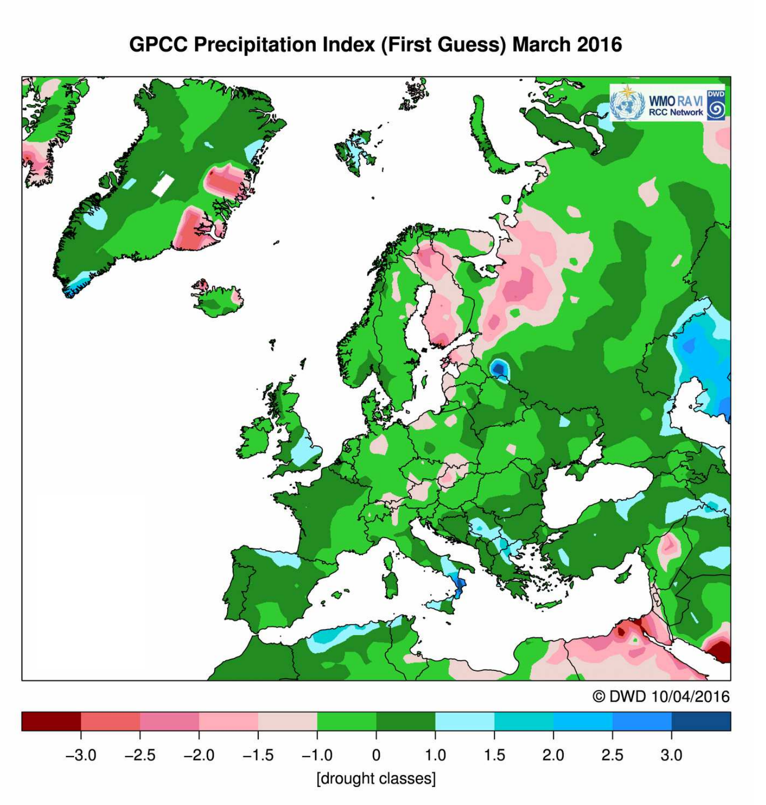


fig. I.2.5a: GPCP Precipitation Index http://www.dwd.de/rcc-cm .

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	-7.2 mm	-0.486

Southern Europe	+9.8 mm	+0.216

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

Widespread positive anomalies, particularly over the Arctic. Few exceptions over the continents in the northern hemisphere : Western Europe, West Africa, Quebec. March 2016 is the warmest since 1880 (1.22°C above 20th century mean, which is also the highest departure for any month since 1880 according to NOAA).

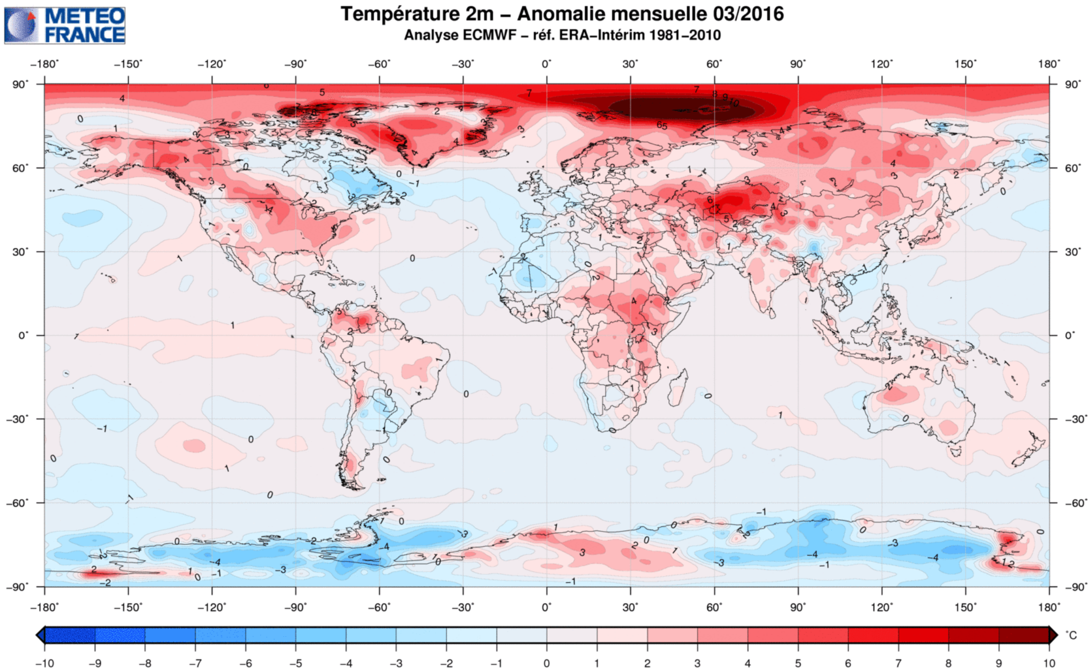


fig.I.2.8: Temperature Anomalies (°C) (Meteo-France)

Temperature anomalies in Europe:

Colder than normal especially over Western Europe and parts of Central Europe. Much of this cooling should have occurred during the first ten days of the month, when much of Arctic air moved over western and central Europe far to the south during the Atlantic ridge – Central European trough situation. However, additional cooling came also during the blocking episode when cold air from northern Russia moved south of the Scandinavian blocking High to central western Europe, and also at the end of the month, when relatively cold air moved over the Atlantic to western Europe.

Northern and eastern Europe were clearly warmer than normal. Northern Europe saw warm air advection especially during the blocking episode in the middle of the month when relatively warm air moved over the Atlantic northward and then to Scandinavia. Another situation of mild air advection came at the end of the month when there was another blocking ridge over eastern Central Europe, and mild air moved west of this ridge to Scandinavia. Parts of Northern Scandinavia, especially in Sweden near the northern Baltic Sea had record high daily temperature maxima for March of 13-15°C. Eastern Europe, particularly southern parts and the Middle East, was often in a southerly flow of warm air.

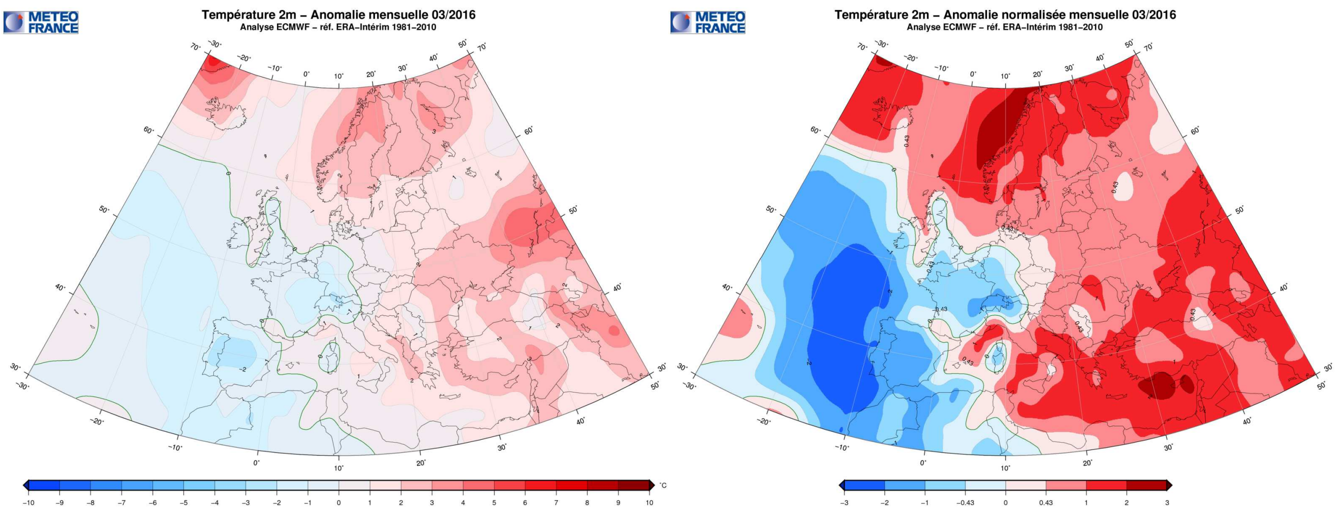


fig.I.2.9: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

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	+1.9°C
Southern Europe	+0.9°C

I.2.d Sea ice

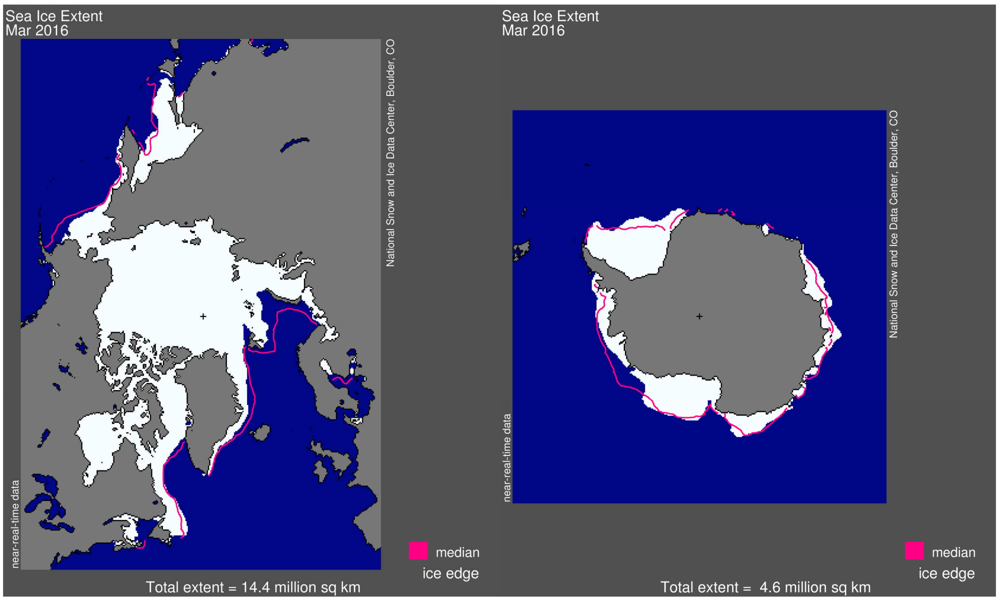
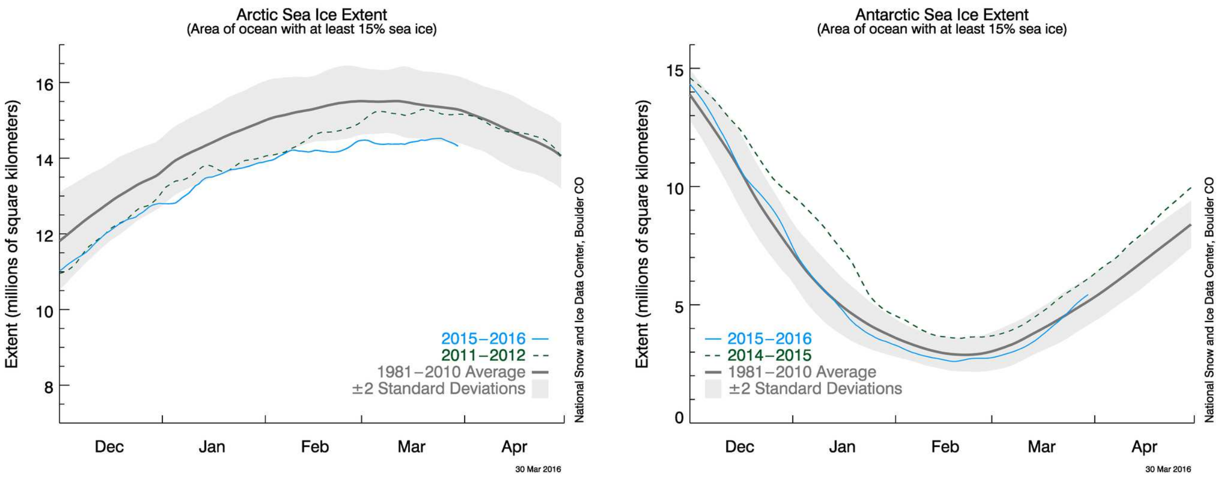


fig.I.2.15: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

In the Arctic (fig. 1.2.6 and 1.2.7 - left) : Persistent large deficit (= -2 std). Close to smallest extent on record since 1979.
In the Antarctic (fig. 1.2.6 and 1.2.7 - right) : Back to near-normal



values.

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

El Niño is now in a rapidly decaying phase. The coupling with atmospheric response will significantly decrease in the coming weeks and months. Seasonal models are suggesting an evolution towards oceanic la Niña conditions which could occur as soon as the month of July. Higher incertainty remains regarding the atmospheric response for the may-july period.

II.1.OCEANIC FORECASTS

II.1.a Sea surface temperature (SST)

Pacific Ocean: Along the equator, models are in good agreement and suggest that a negative SST anomaly should rapidly spread westward up to the dateline. Positive SST anomalies are forecast to maintain on both sides of this "cold pool", somehow weakening though. Over the Niño 3.4 box, la Niña thresholds could be reached at the end of the may-july period (see median value of the Eurosip Niño 3.4 plume, figure II.1.5). Over north Pacific, positive PDO is forecast to maintain itself. Over south Pacific, warm anomalies should prevail, but an area of colder waters should persist along the ZCPS.

Indian Ocean: Wamer than normal over the whole basin, with forecast negative IOD (higher departures over the Maritime continent).

Atlantic Ocean : cold bias of CFS (NCEP model) still contaminating SST anomalies over equatorial Atlantic (should be fixed for the next run). Regardless of this problem, models are developing cold anomalies over the eastern sides of the basin, in both hemispheres. Over the central and north Atlantic, a tripole-like pattern is forecast, with strong positive anomalies from Bermuda to south Newfoundland and between Iceland and Spitzberg, and with the long-lasting cold blob over central Atlantic. This configuration is rather typical of a NAO positive atmospheric forcing.

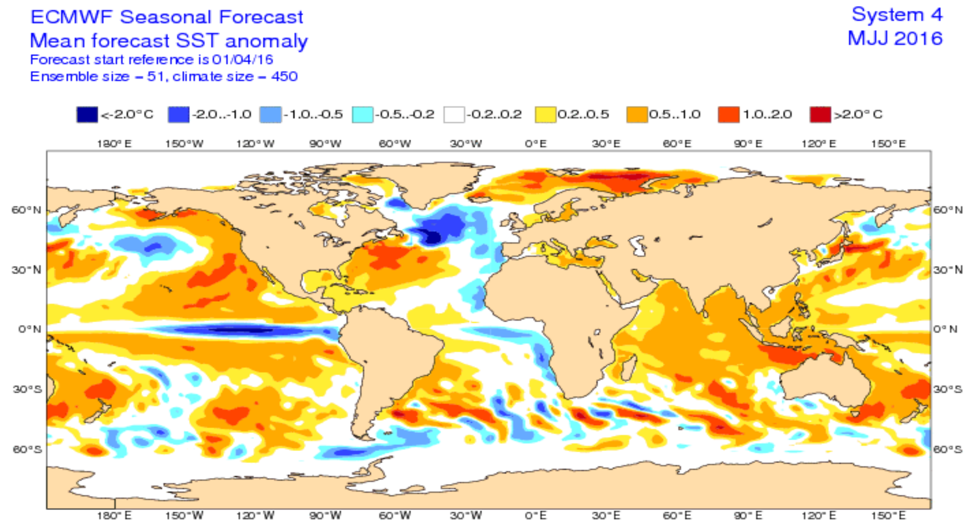


fig.II.1.1: SST anomaly forecast from ECMWF

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

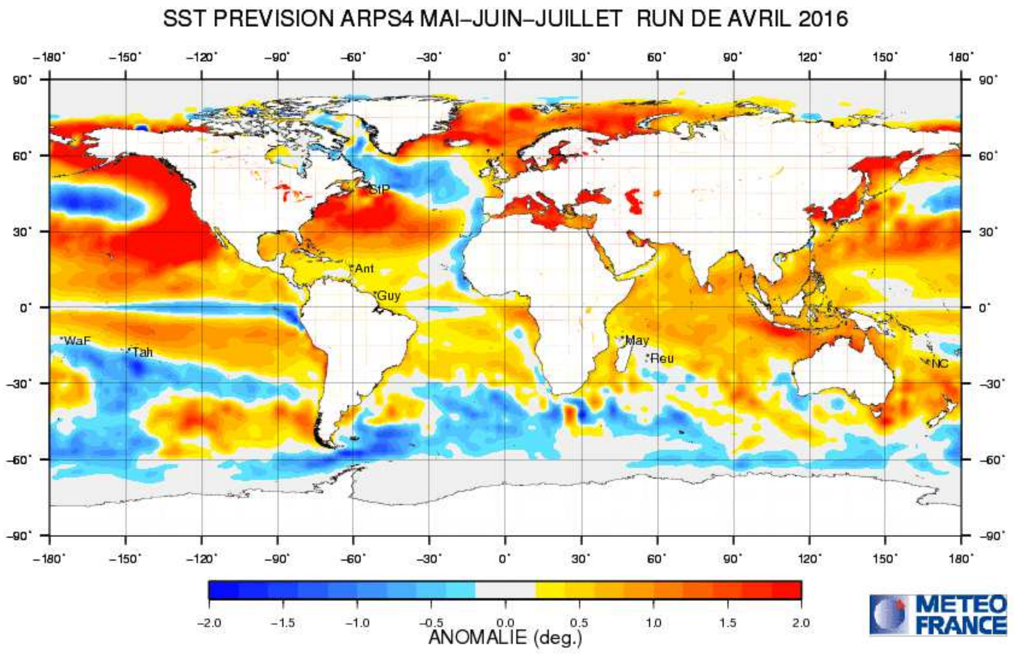


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).

http://elaboration.seasonal.meteo.fr

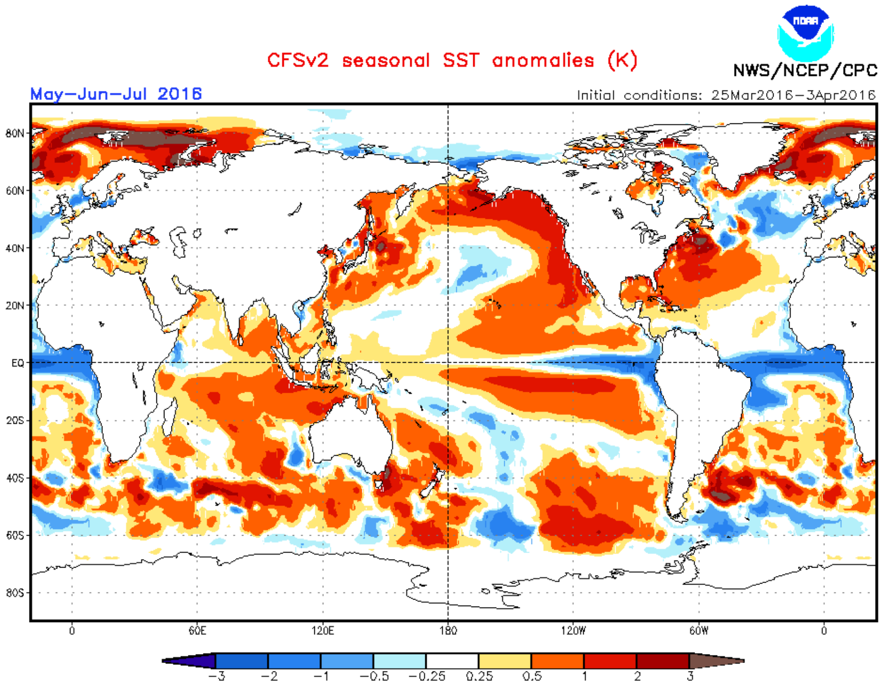


fig.II.1.3: SST anomaly forecast from NCEP.

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

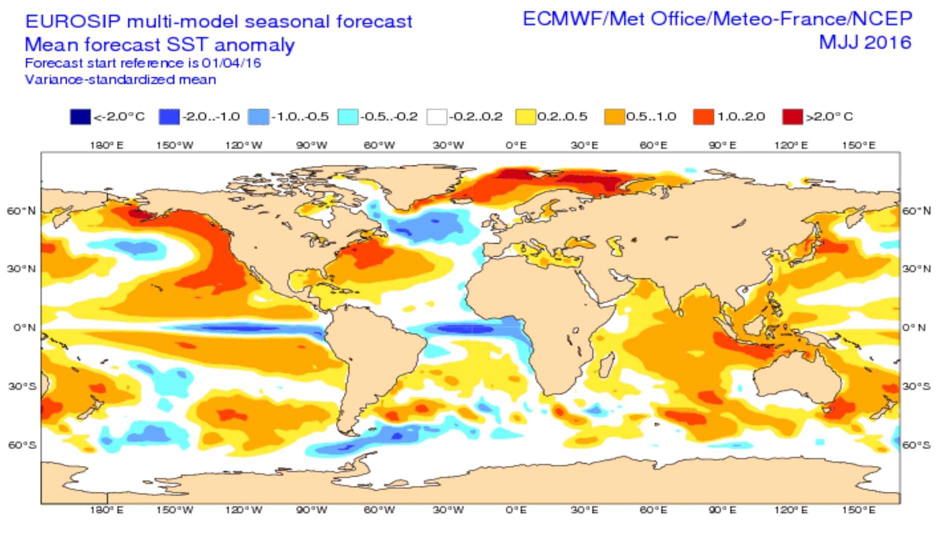


fig.II.1.4: SST Forecasted anomaly from Euro-SIP

II.1.b ENSO forecast

Forecast Phase: El Niño decreasing rapidly. La Niña odds increasing for the second half of the year.

Models in rather good agreement for a rapid decrease of the tropical Pacific SST in the Niño 3.4 region for the next 3 months, with values becoming negative as soon as the month of june and that could reach Niña thresholds in july. See for example the IRI ENSO forecast issued this month (figure II.1.4) and the plumes from ARPEGE, ECMWF, and EUROSIP (figures II.1.5). Dispersion of the models increases significantly after July, but in its monthly oceanic bulletin, NCEP indicates that the anomalous depth of the 20°C isotherm over the Tropical Pacific (between 5°N and 5°S) has become strongly negative in march (3rd lowest value since 1979, see http://www.cpc.ncep.noaa.gov/products/GODAS/ocean_briefing_gif/global_oc...) which is suggesting high probability of an upcoming la Niña event.

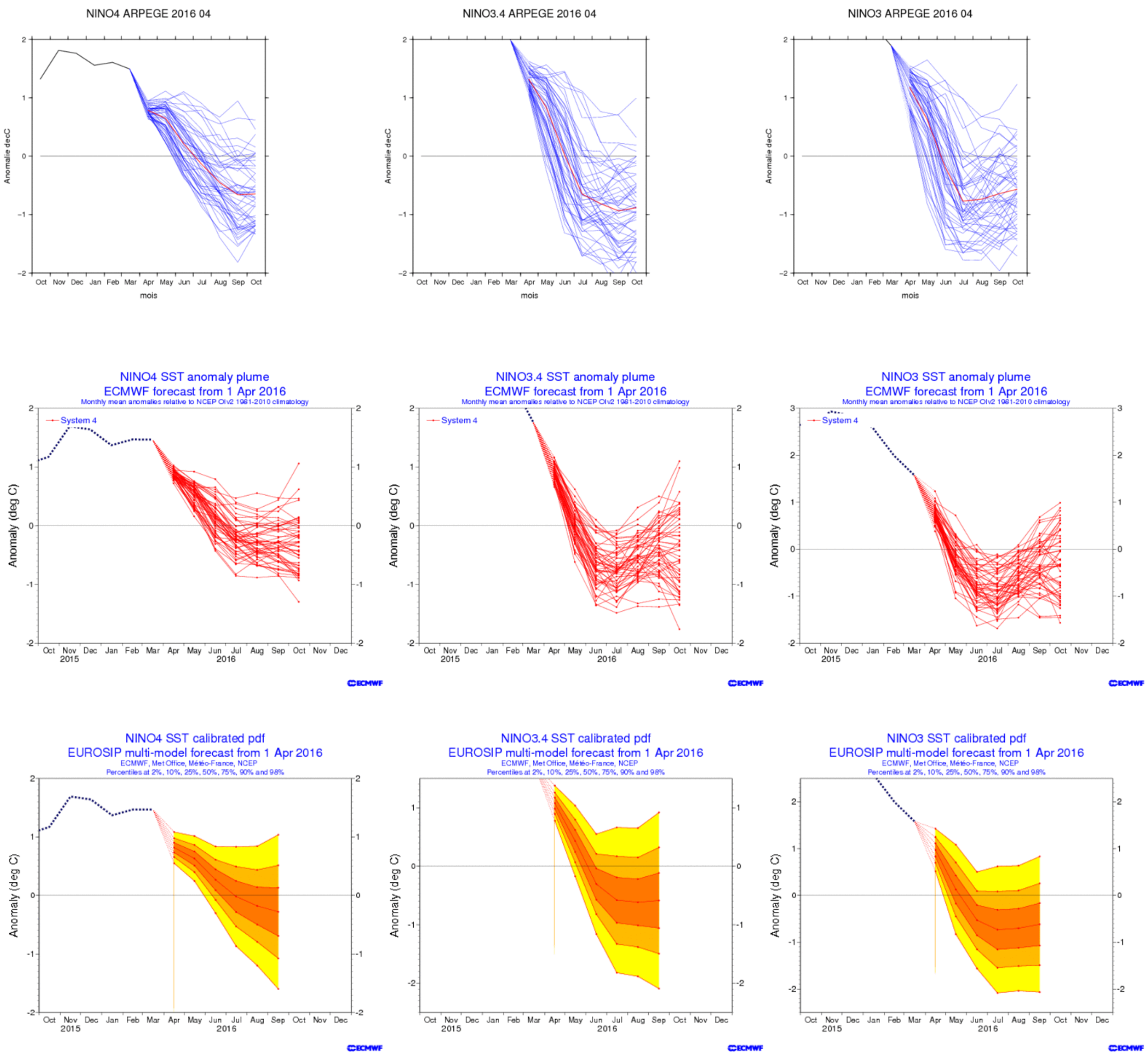


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

II.1.c Atlantic ocean forecasts

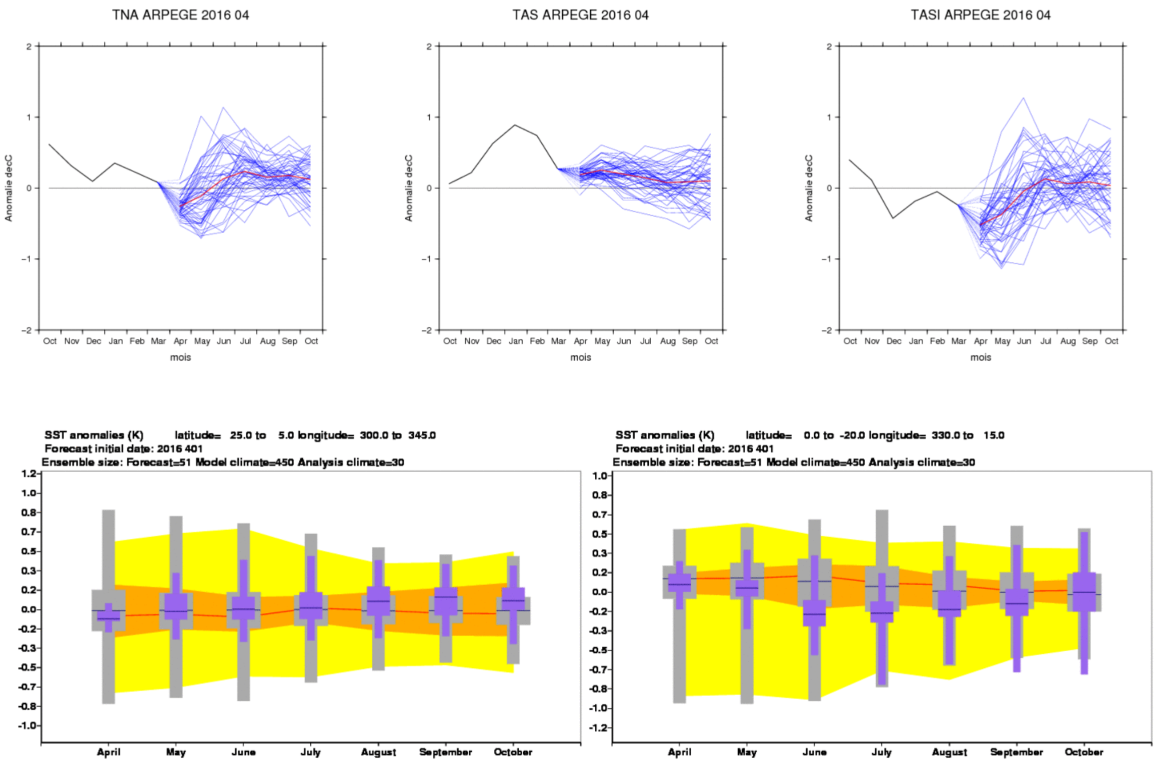


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.1.d Indian ocean forecasts

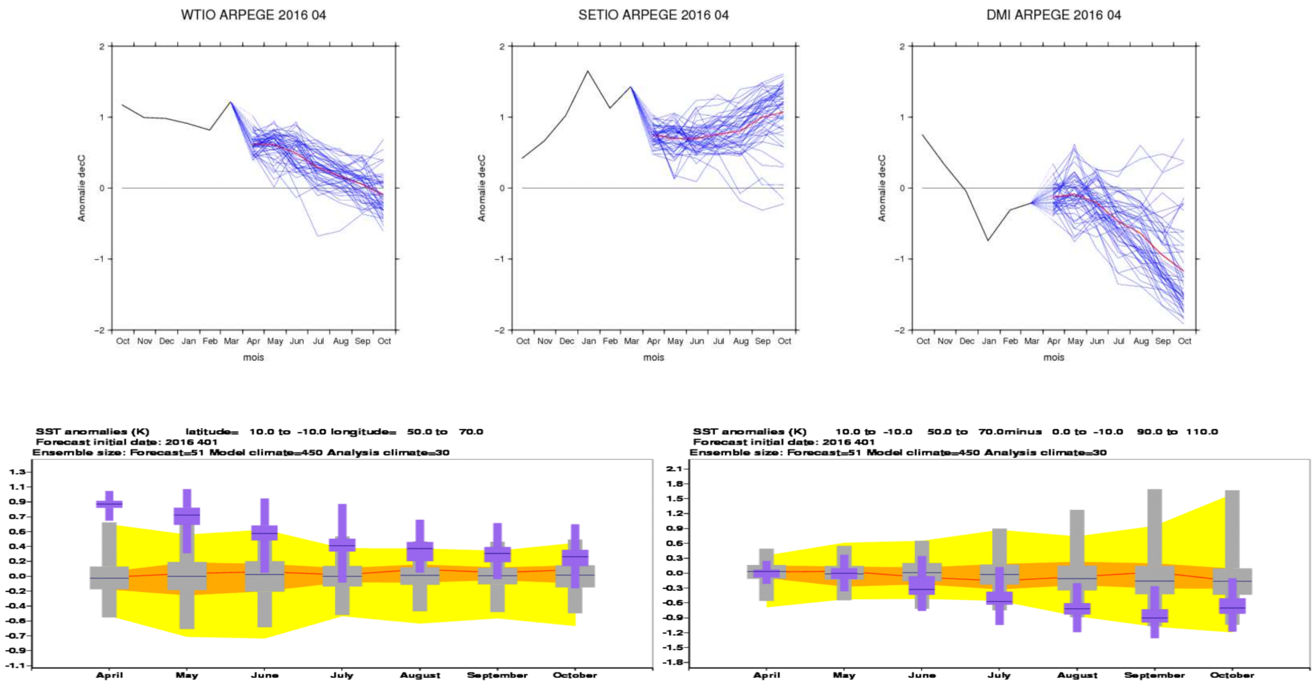


fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

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):

Atmospheric response to El Niño continues to decay according to ARP S5 and Eurosip. Models are in good agreement in forecasting a large area of divergence over the Indian Ocean (influence on the Indian Monsoon ?) , and a large area of convergence over tropical west Pacific. Over eastern tropical Pacific, weak negative to the north, no agreement between models to the south. Over tropical Atlantic, a significant anomaly of subsidence is forecast. No clear connections with mid-latitudes.

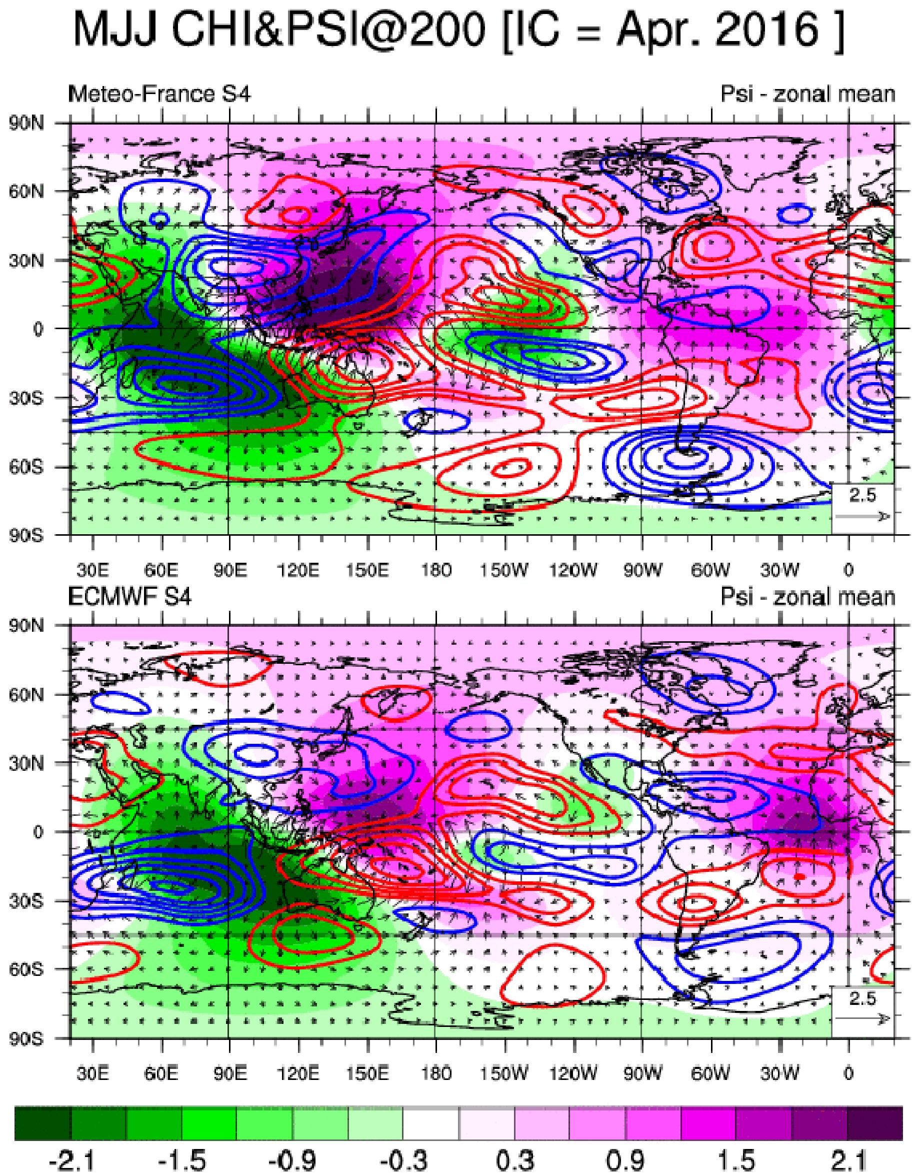


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

II.2.b North hemisphere forecast and Europe

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

ARPEGE S4 and ECMWF in desagreeement. ARPEGE S5 closer to ECMWF scenario, as well as Eurosip. Its difficult though to see a dominant circulation pattern for the period. A positive anomaly seems likely over the western Mediterranean inculding Spain, while a negative anomaly could be prevent over the eastern basin. Therefore, the atlantic storm track could be confined between the british Isles and Iceland, probably linked with the cold SST area.

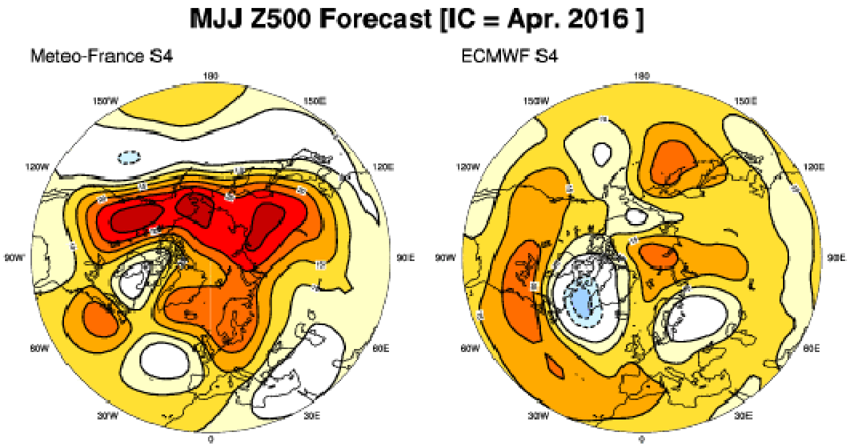


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right).

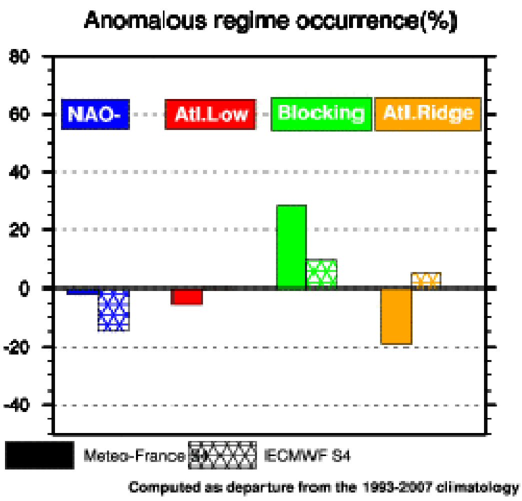


fig.II.2.3: North Atlantic Regime occurrence anomalies from Météo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

II.3. IMPACT: TEMPERATURE FORECASTS

Widespread warm anomalies forecast all over the world. Few exception over maritime areas (oftent associated with negative SST anomalies, equatorial Pacific, central Atlantic), and very few over continents : Quebec (where models do not score that bad for temperature and for this period), west Africa, from Senegal to Marocco, and over Argentina/Uruguay.

Over Europe, the British Isles (especially Ireland), should experience cooler-than-normal conditions, with the storm track remaining close. On the other hand warmer than normal temperatures should occur from north Africa to Spain. Elsewhere, no clear signal appears, with no agreement between models.

II.3.a ECMWF

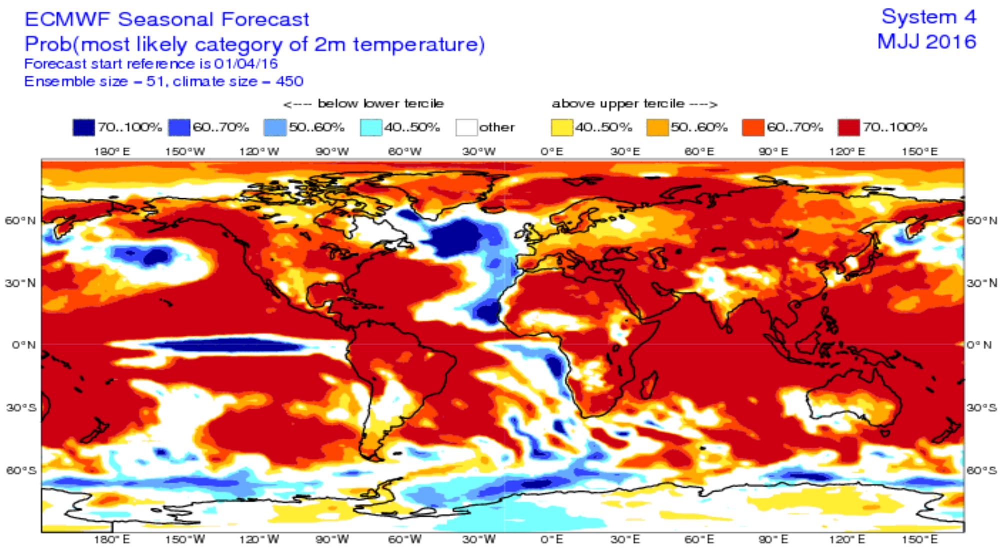


fig.II.3.1: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.3.b Météo-France

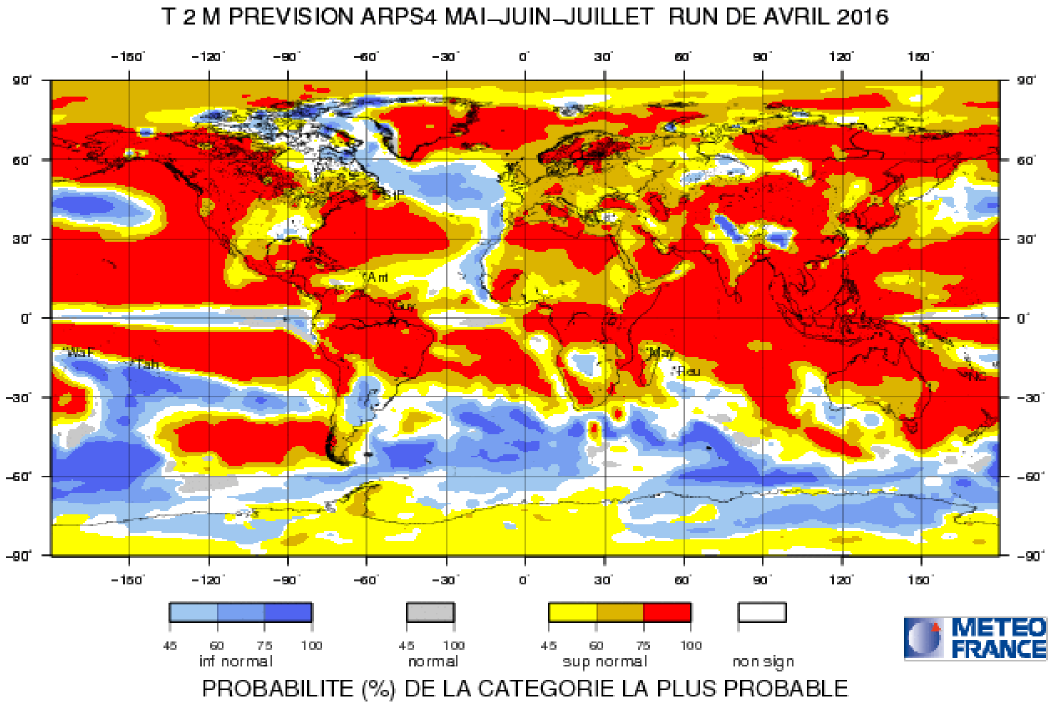


fig.II.3.2: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.3.c Japan Meteorological Agency (JMA)

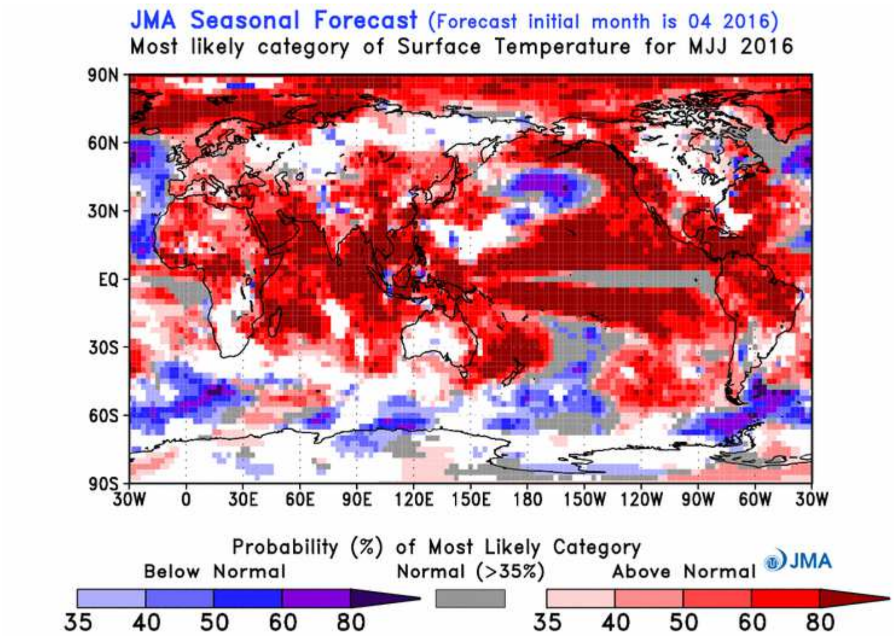


fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.php

II.3.d EUROSIP

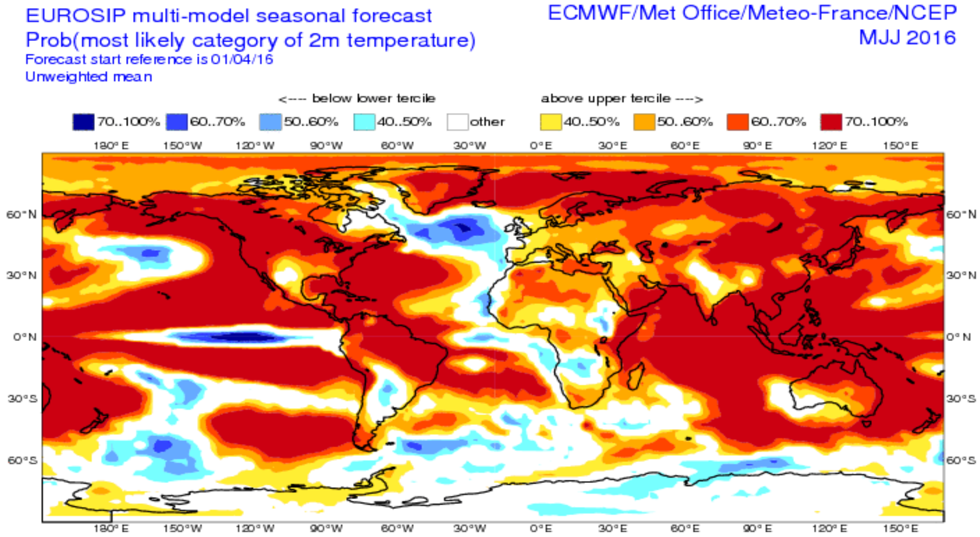


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).

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

II.4. IMPACT : PRECIPITATION FORECAST

Over the Pacific, associated with the decay of El Niño and the emergence of a cold anomaly along the equator, a dry anomaly is forecast to develop between 5°N and 5°S. Positive rainfall anomalies should persist on both sides (see velocity potential anomalies, figure II.2. 1).

Over the nortern Indian ocean, south Indonesia, and western Australia, above average rainfall seems likely (see SST anomalies and divergence anomalies at 200 hPa). What about the indian monsoon ? Conversely rainfall should be below average over northern Indonesia, Philippines, Vietnam (see convergence anomalies at 200 hPa). Below rainfall also likely over western Africa (anomalous SST ?); monsoon rainfall being kept further east.

Over Europe, drier than normal conditions likely for the western mediterranean (Spain included), but we are talking about the usually dry period for this region ! For central Europe down to Turkey, a slight wet signal appears. Elsewhere, no clear signal emerges, except for the western british isles (mostly Ireland) that could be wetter than normal !

II.4.a ECMWF

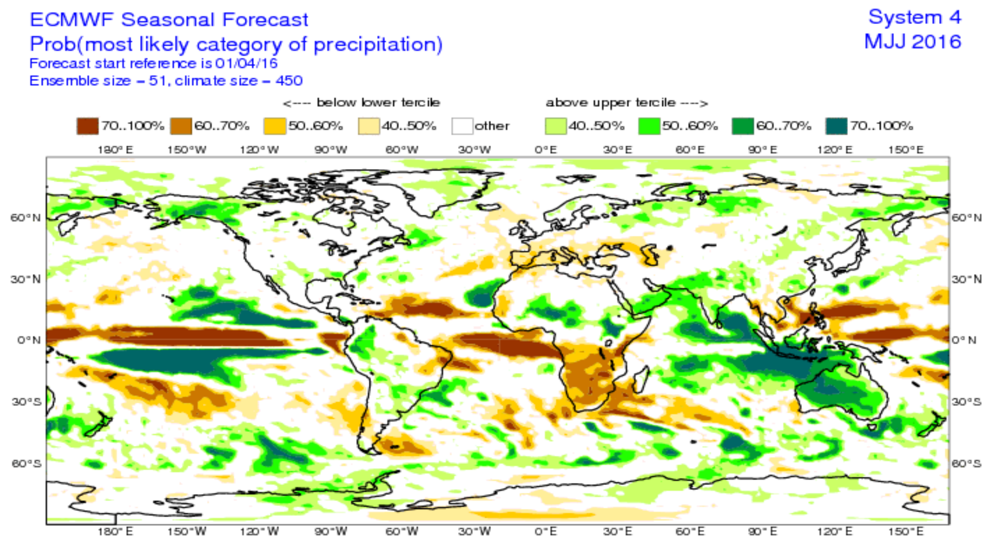


fig.II.4.1: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.4.b Météo-France

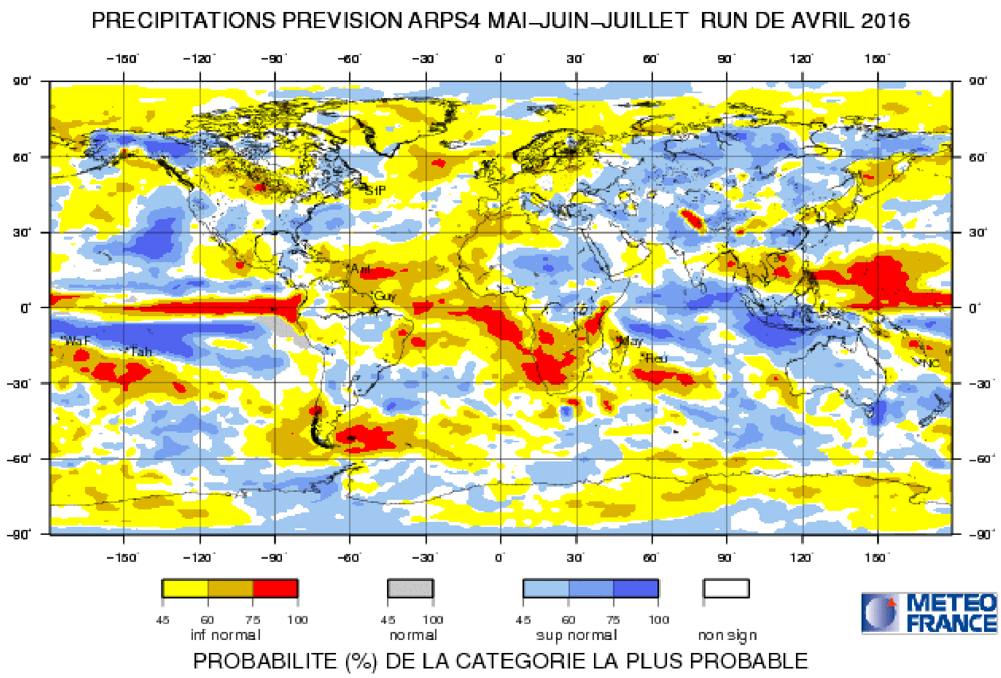


fig.II.4.2: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.4.c Japan Meteorological Agency (JMA)

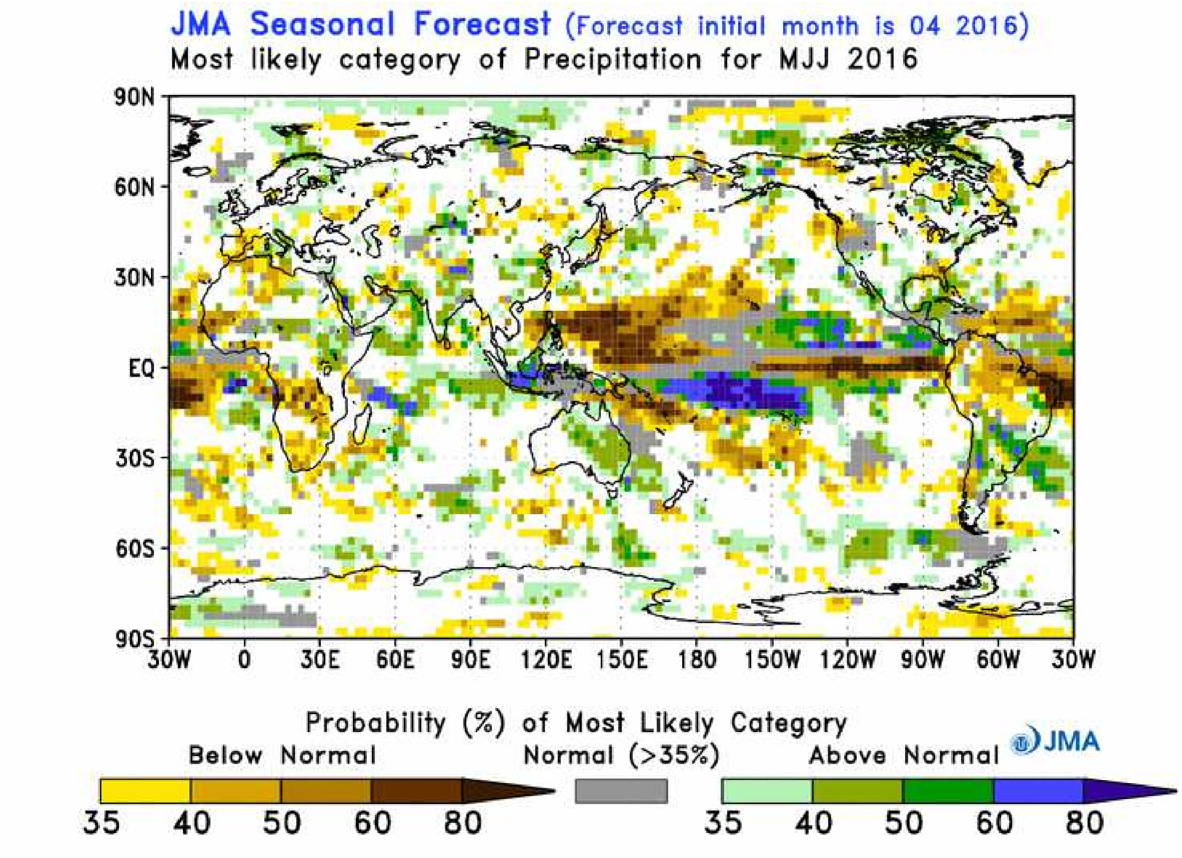


fig.II.4.5: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.php

II.4.d EUROSIP

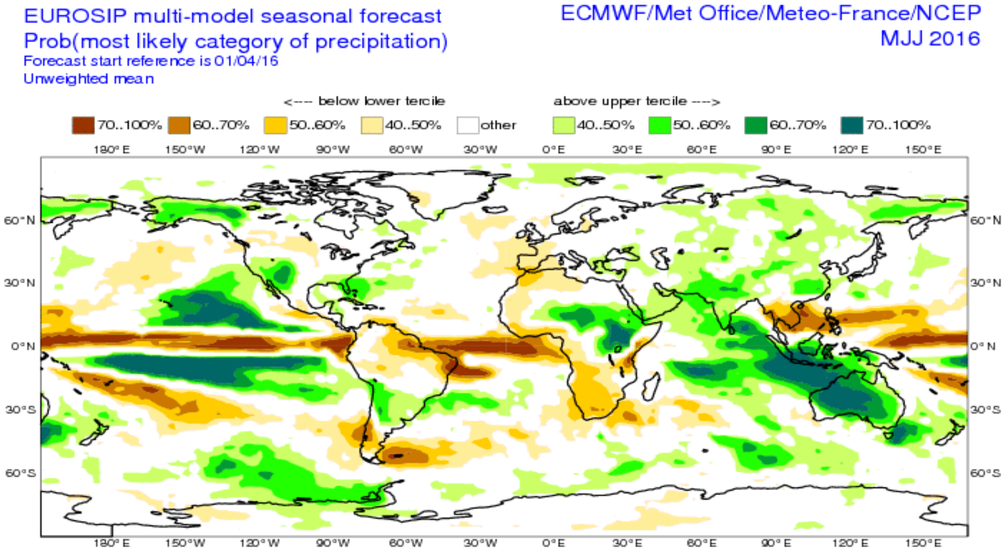


fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).

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

II.5. REGIONAL TEMPERATURES and PRECIPITATIONS

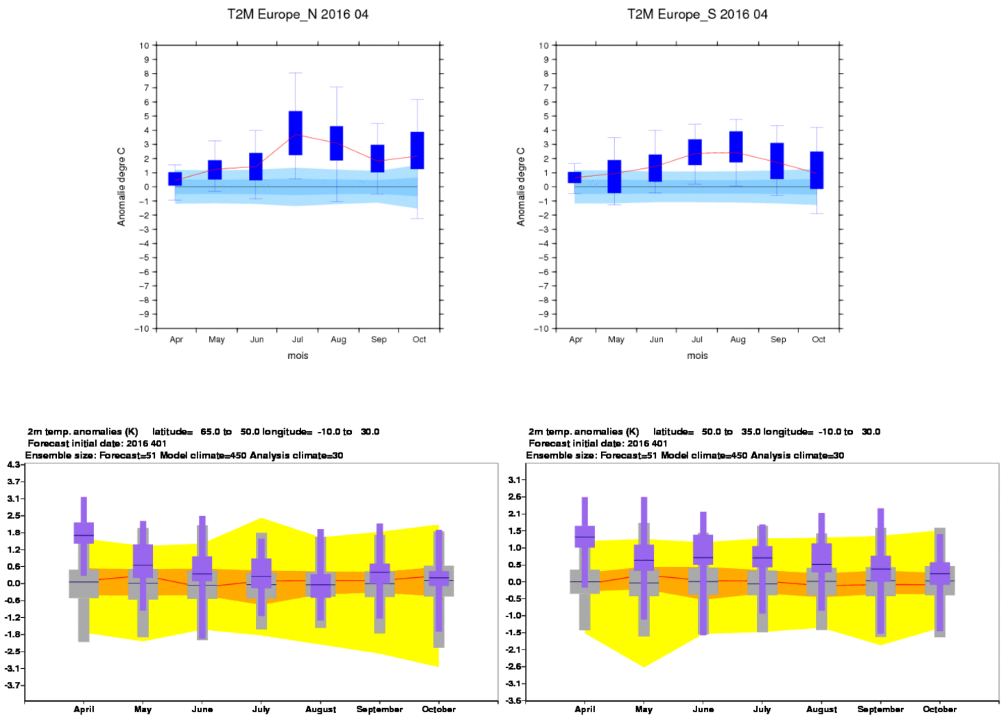


fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

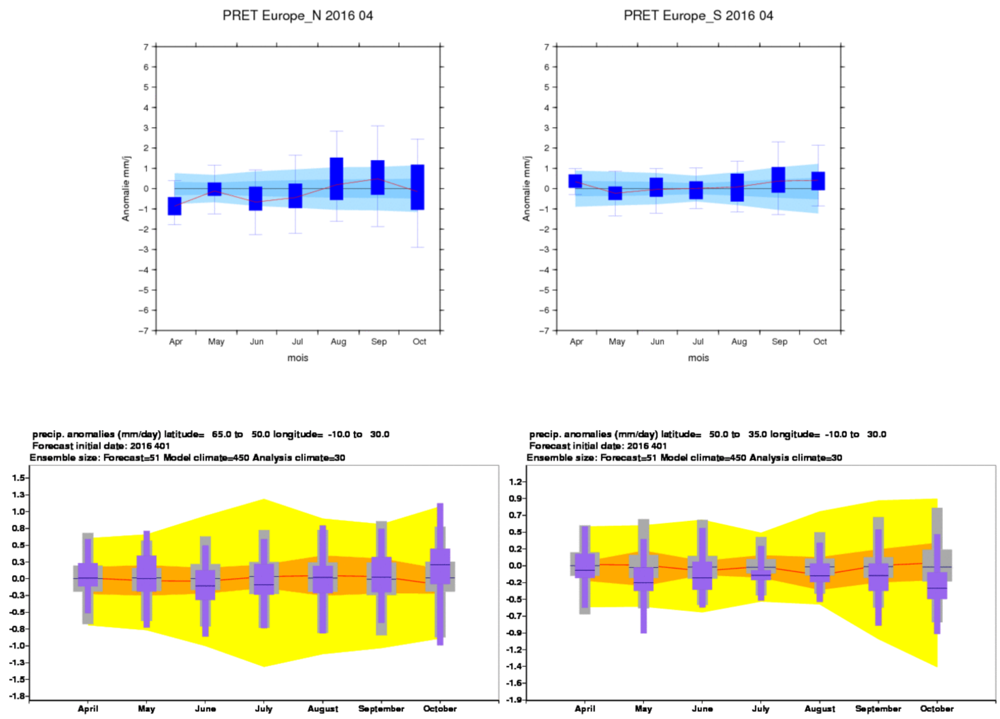


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

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

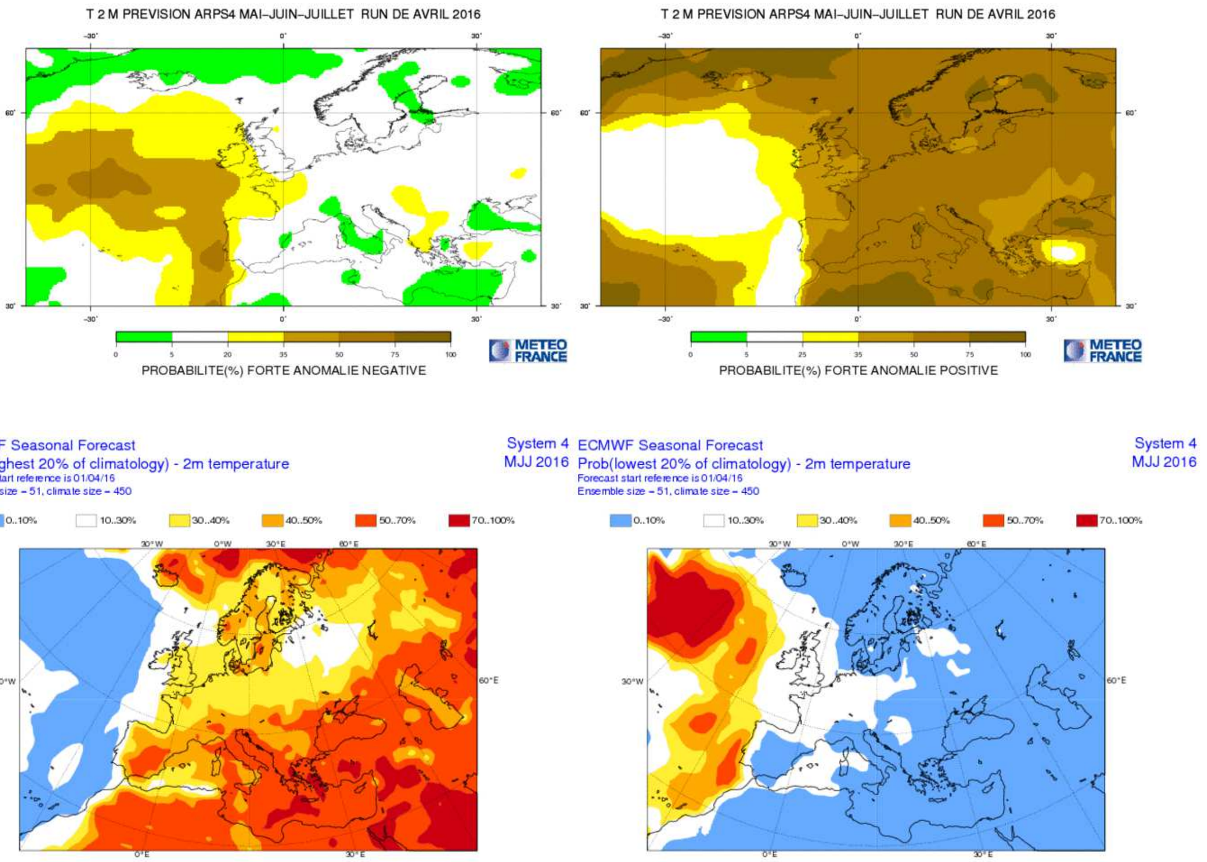


fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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

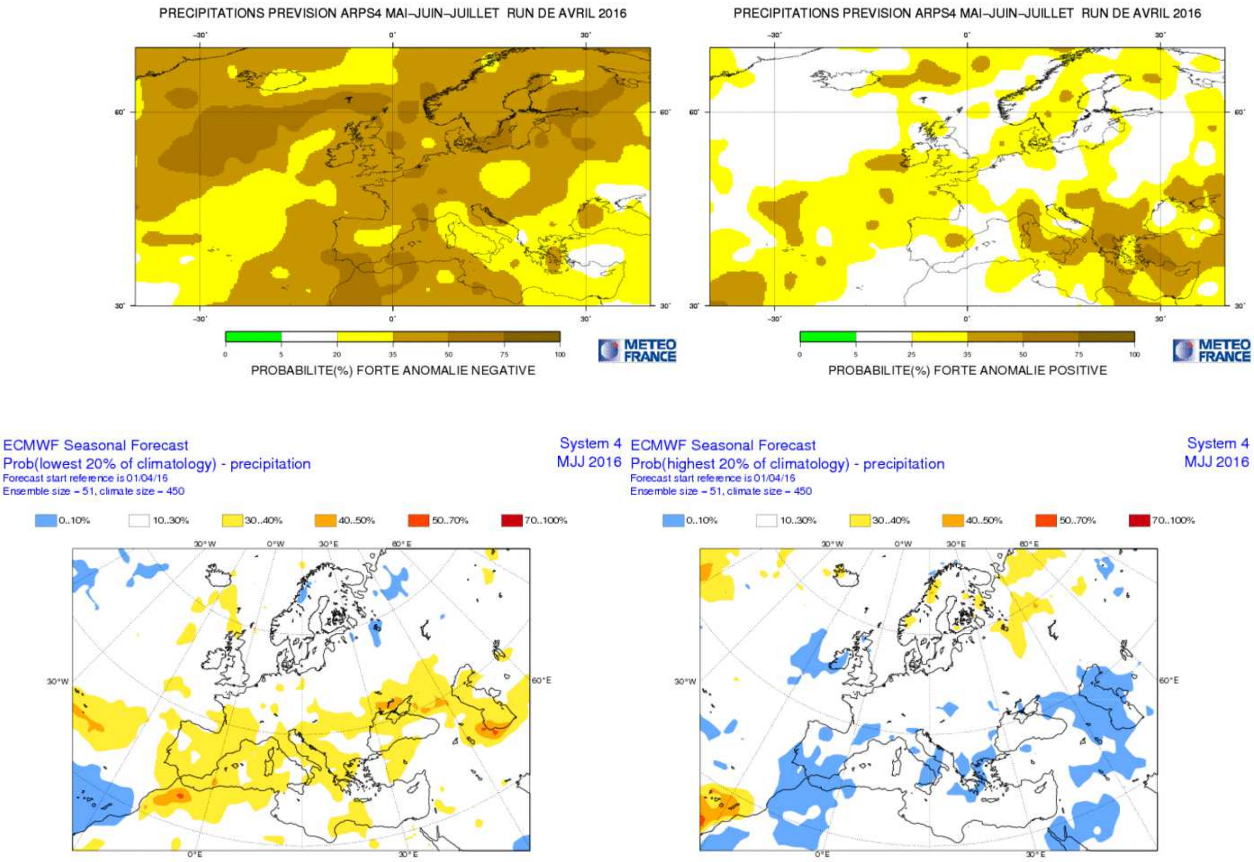


fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

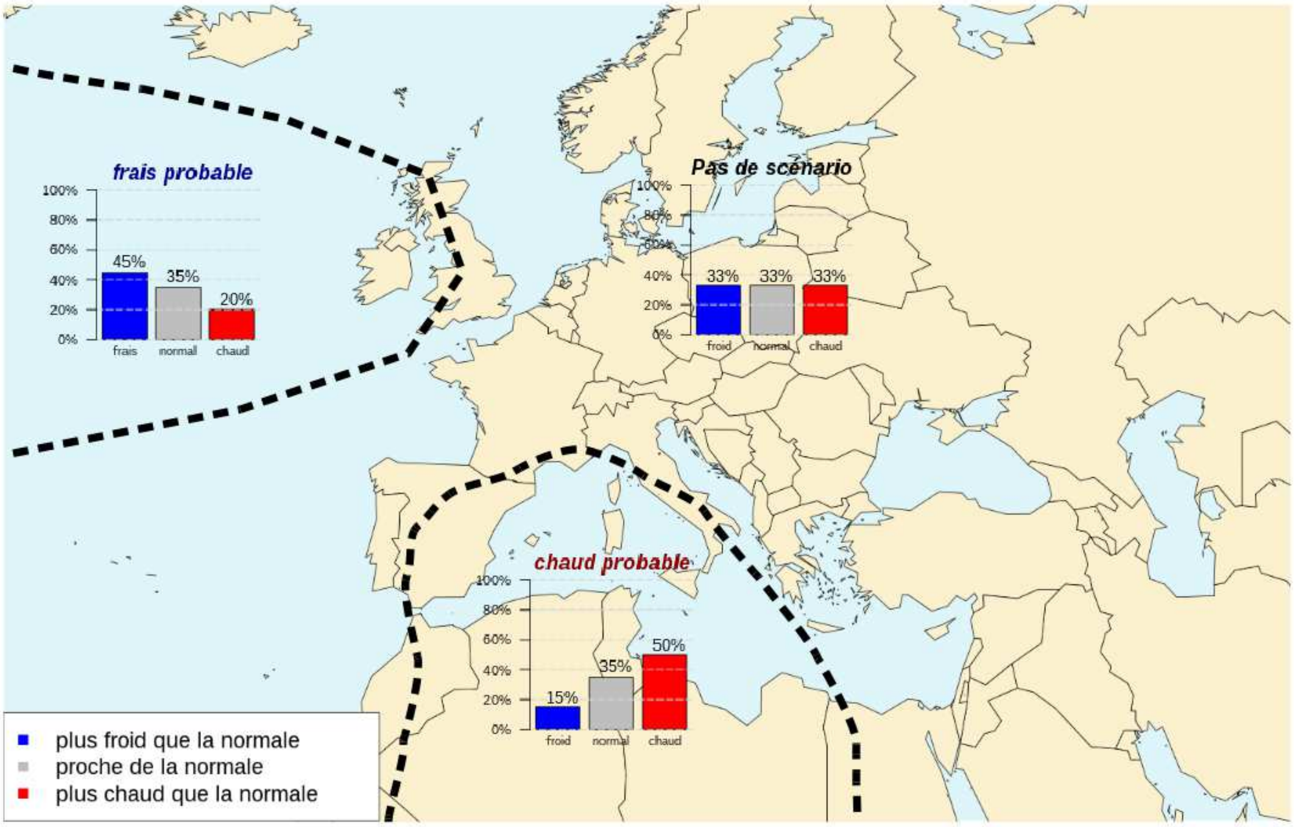
II.8. DISCUSSION AND SUMMARY

II.8.a Forecast over Europe

Temperatures: Slight cool signal for the british Isles (mostly Ireland), and moderate signal for warmer than normal conditions for north Africa and Spain; lower warm signal for french mediterranean regions.

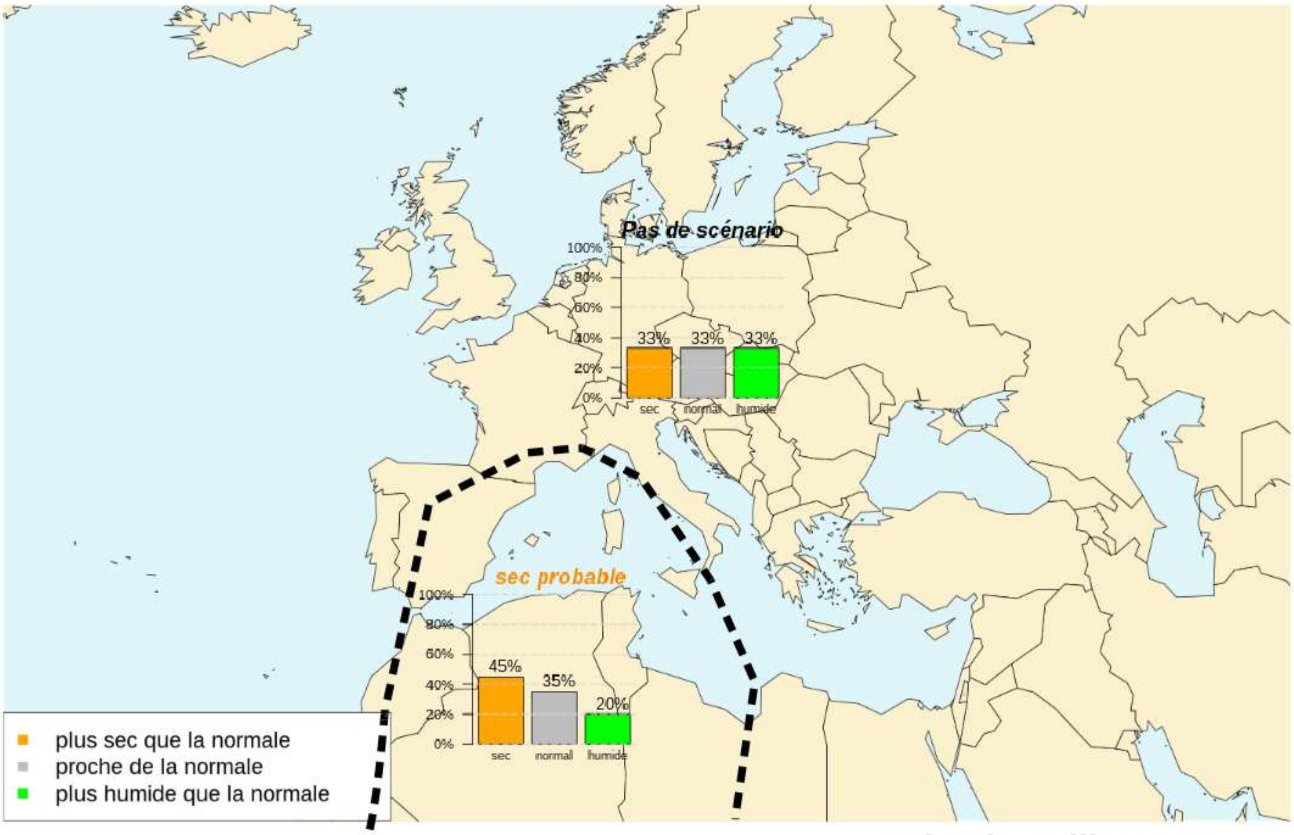
Precipitation: No scenario, except for the Mediterranean regions where a small dry signal seems to be emerging, in a continuation of last month forecast.

Prévisions saisonnières probabilistes de températures pour le trimestre prochain



Mai-Juin-Juillet 2016

Prévisions saisonnières probabilistes de précipitations pour le trimestre prochain



Mai-Juin-Juillet 2016

II.8.b Tropical cyclone activity

Normal or slightly below normal activity over the Atlantic, sup normal over Pacific Northeast and lower than normal over the Pacific Northwest.

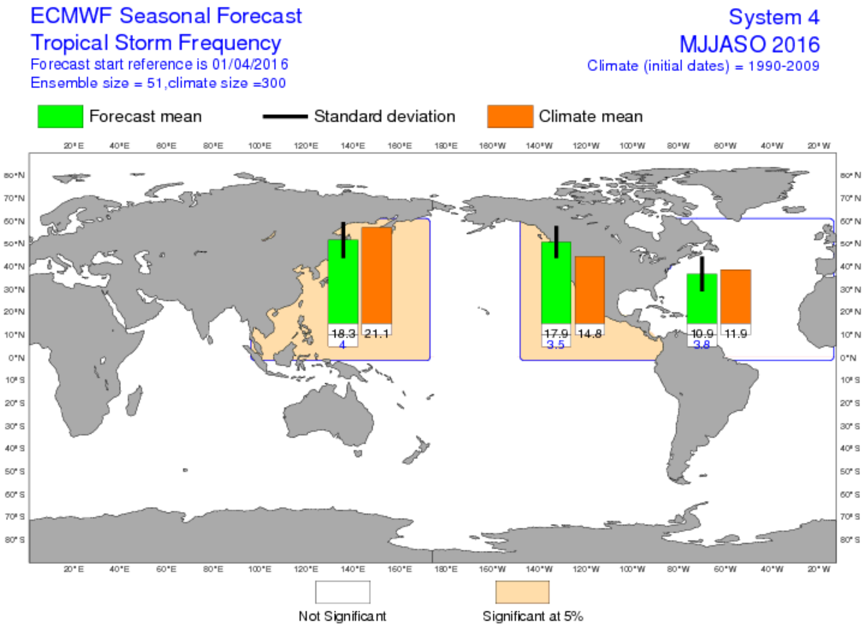


fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).

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.

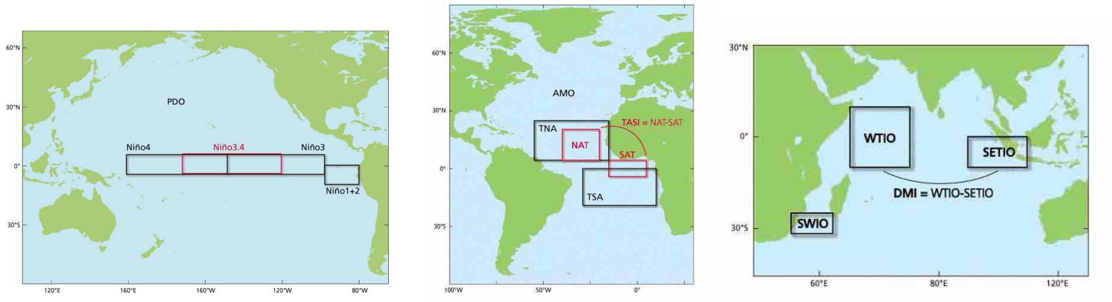
II.10. « NINO », SOI INDICES AND OCEANIC BOXES

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).

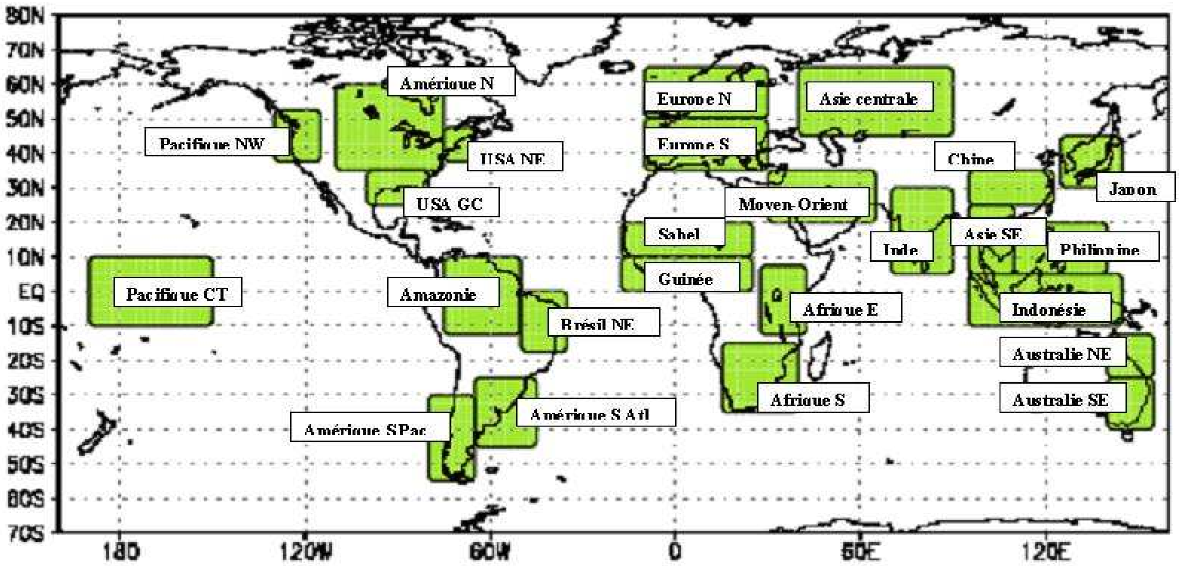
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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