GLOBAL CLIMATE BULLETIN
n°205 – July 2016

Table of Contents

I. DESCRIPTION OF THE CLIMATE SYSTEM (MAY 2016)

I.1.OCEANIC ANALYSIS

I.1.a Global analysis

In the Pacific ocean :
El Niño disappearing (Figures I.1.1) in the Niño 3.4 region: SST decreasing to around 0.5°C in May, even drawing close to 0°C at the end of the month, which corresponds to the start date of the seasonal models. See http://www.cpc.ncep.noaa.gov/products/GODAS/ocean_briefing_new/wkly_nino...
At the surface, the cold anomaly has reached the 160W line along the equator, whereas warm anomalies persist on both sides, in the tropical regions (but the overall tendency is a cooling).

The subsurface cool anomaly is now widespread along the whole basin (figures I.1.4).

Over the north Pacific, positive PDO pattern maintaining itself.

Maritime continent :
Still a warm anomaly, without any clear tendency.

In the Indian Ocean :
Warm anomalies maintaining across most of the basin, with the exception of the area off the Somalian coast which is undergoing an important cooling (SST anomalies approaching 0°C in may).
DMI decreasing and becoming slightly negative by the end of the month.
(http://www.cpc.ncep.noaa.gov/products/GODAS/ocean_briefing_new/wkly_dmi.gif)

In the Atlantic:
In the equatorial waveguide, cooling tendency emerging, but the Guinea Gulf remains warmer than normal.
In the Northern hemisphere, persistent warm anomaly from Gulf of Mexico to the Sargasso Sea. And still a strong negative anomaly (cold horseshoe pattern) from Newfoundland to the British coast and extending off West Africa coast, but associated with a slight warming tendency.

In the Mediterraen :
warm anomalies over the eastern basin, but back to normal or even negative departures in the western basin (north-westerly flow prevailing in the second part of the month).

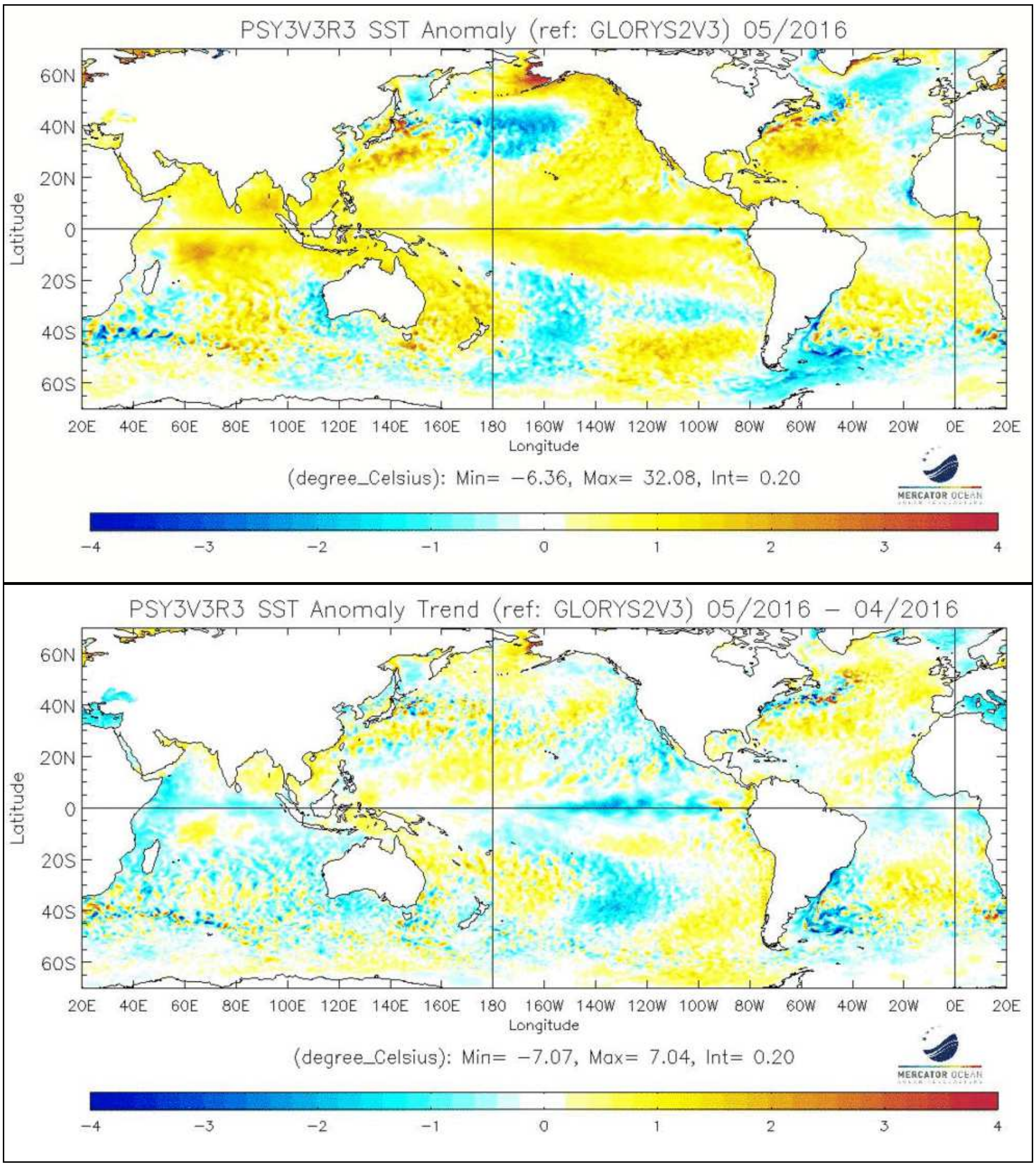


fig.I.1.1: top : SSTs Anomalies (℃) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

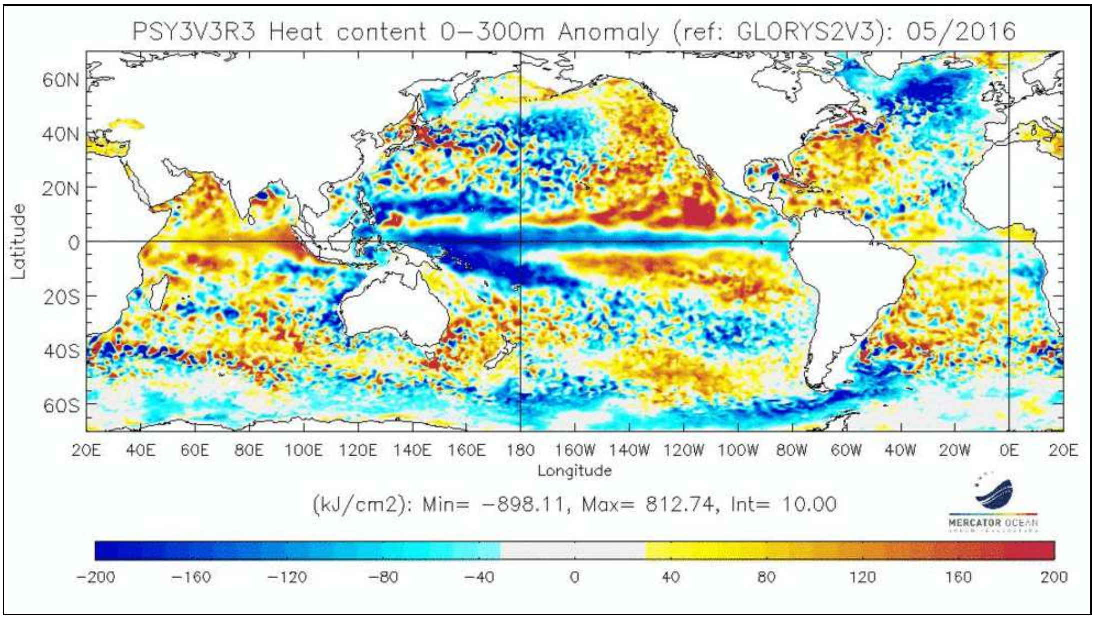


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2009)
http://bcg.mercator-ocean.fr/

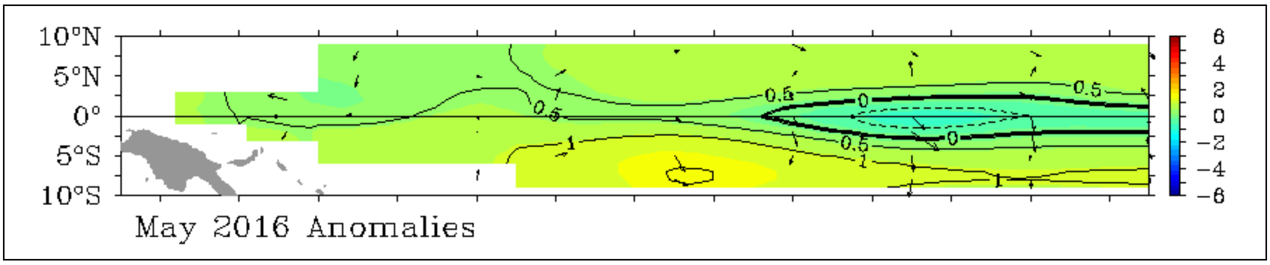


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON.
http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html

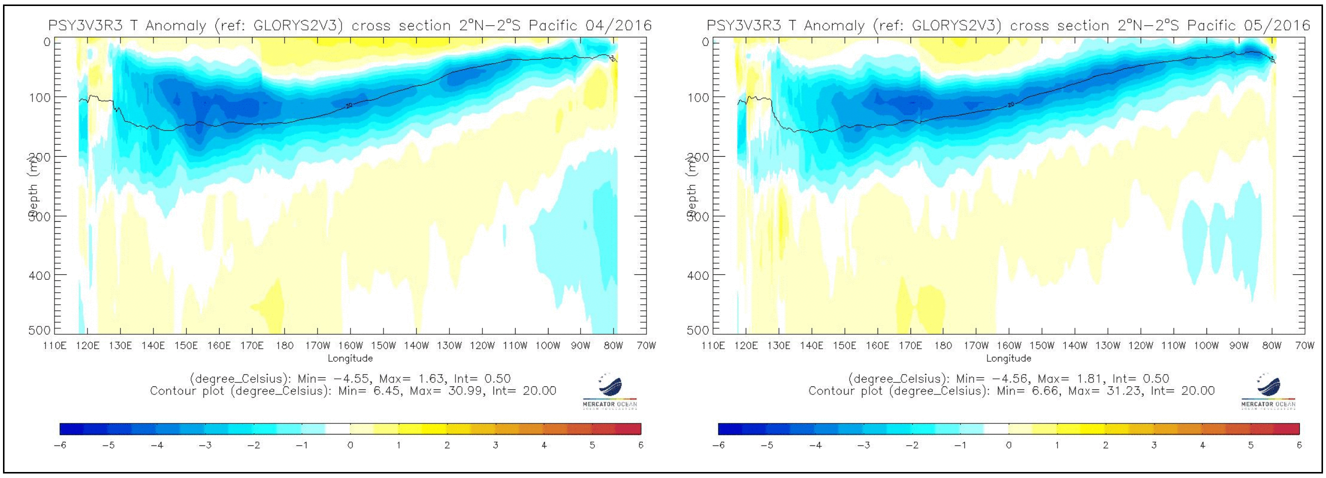


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), http://bcg.mercator-ocean.fr

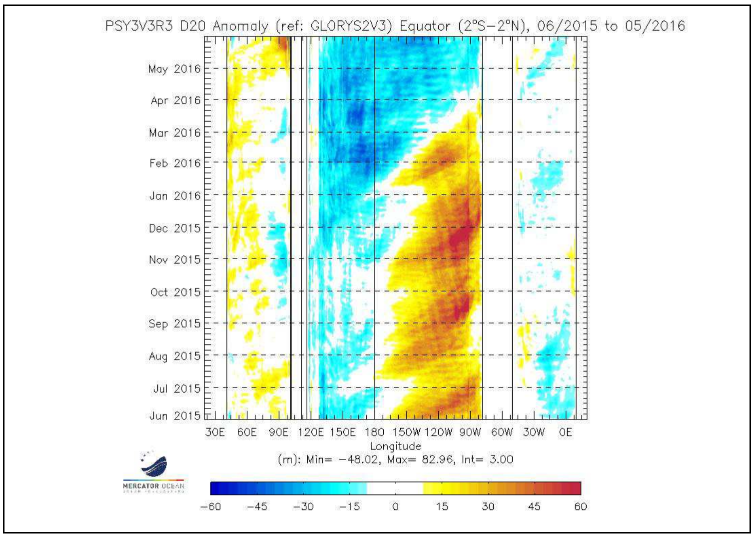


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20℃ isotherm) along the equator for all oceanic basins over a 6 month period http://bcg.mercator-ocean.fr/

I.1.b Sea surface temperature Near Europe

Still well above-normal temperature in the Arctic Sea, no significant change.

The southern Baltic Sea has warmed considerably, resulting in anomalies between +3 and +4°C.

The cold anomaly in the North Atlantic south of Iceland extended a little bit to the northeast closer the Scandinavia, while it has weakened in its southern part. As a result, SST is close to normal or only slightly cooler close to all European Atlantic coasts.

The Mediterranean Sea and the Black Sea warmed less than in the seasonal cycle from April to May. Thus, anomalies decreased. They are only slightly positive in the eastern basin and the Black Sea and became even negative in parts of the western basin and in the Adriatic Sea.

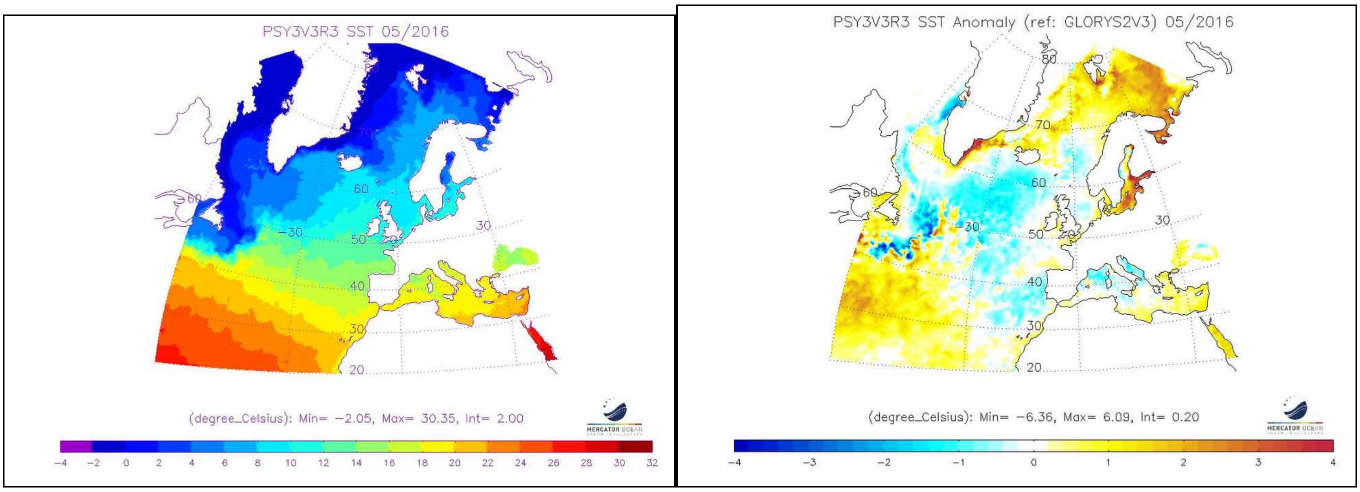


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

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) :

Typical El Niño patterns have almost completely disappeared in may in response to the SSTs. Over the western Pacific and the Indian ocean, these patterns are reserved to those observed in April. They seem largely driven by the MJO which has been somehow active in the Indian Ocean in may. Over the eastern Pacific and the tropical Atlantic though, El-Niño remnants are still visible.

Standardized SOI rose to +0.4 in May, in good agreement with the end of El Nino. (https://www.ncdc.noaa.gov/teleconnections/enso/indicators/soi/)

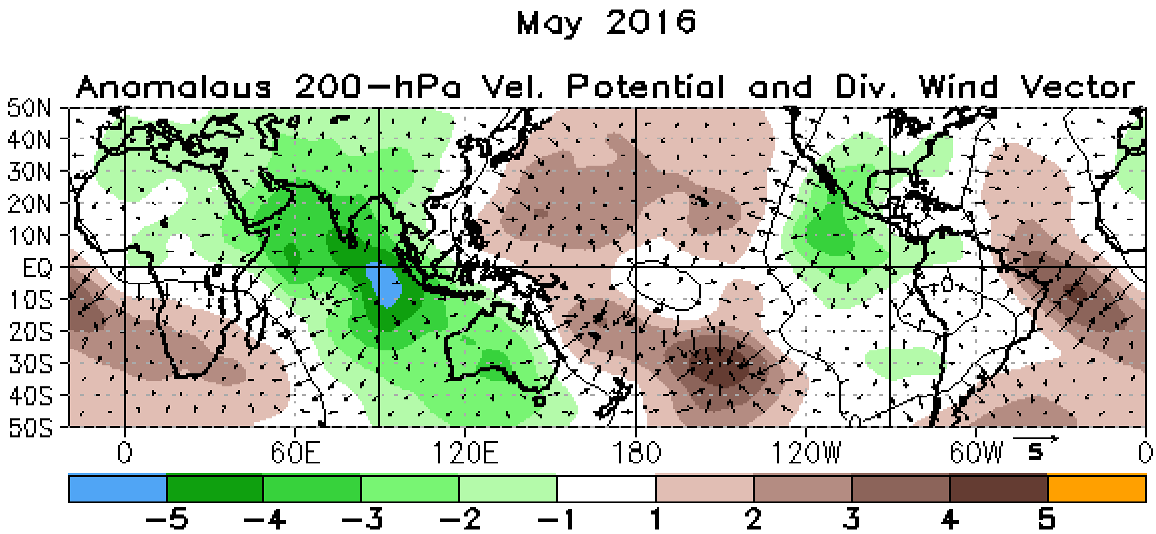


fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

MJO (fig. I.2.b):

Moderate MJO activity, mainly over the Indian Ocean (areas 2 to 4).

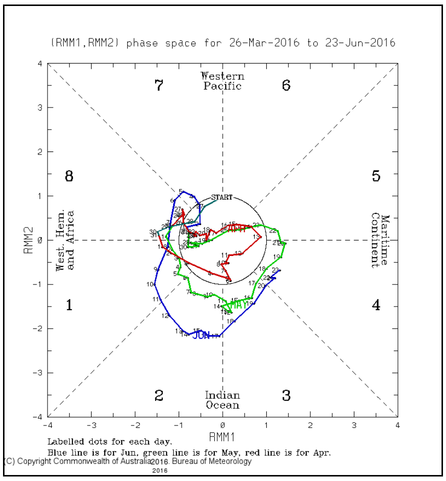


fig.I.2.b: indices MJO http://cawcr.gov.au/staff/mwheeler/maproom/RMM/phase.Last90days.gif

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

As expected, El Niño signature has vanished in may, with a reversed pattern compared to april over the tropical Pacific (probably due to the MJO effect)

Over the Atlantic, there is trough/ridge succession which is probably not of a tropical origin but rather due to a southern location of the Azores high (see next paragraph for dominant European weather regimes in may).

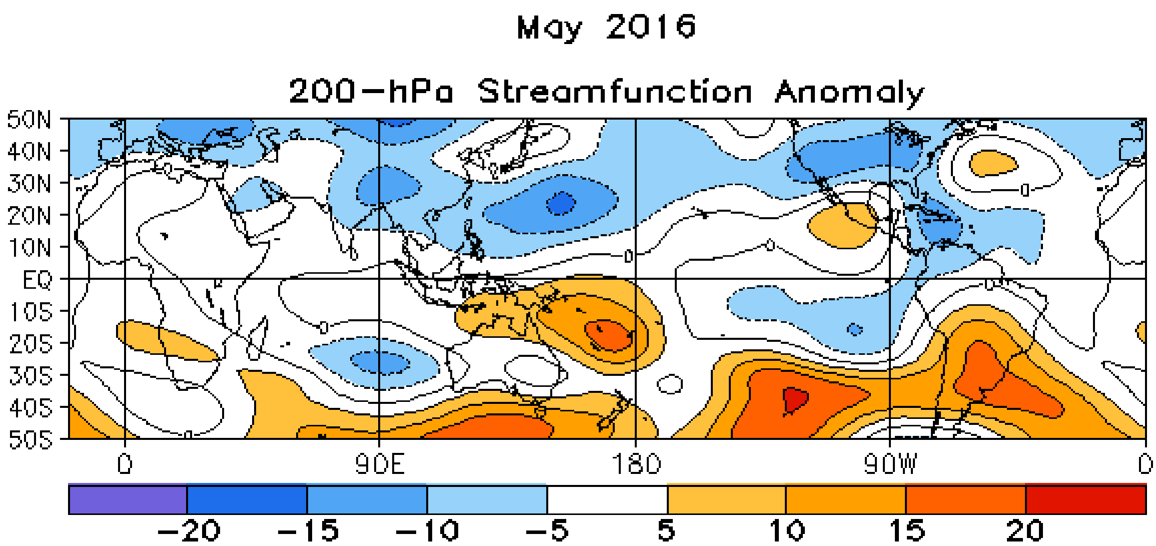


fig.I.2.2: Stream Function Anomalies at 200 hPa.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

Geopotential height at 500 hPa (fig. 1.2.3 – insight into mid-latitude general circulation):

Around the north Pacific, the PNA pattern has disappeared with the index even becoming negative in may ftp://ftp.cpc.ncep.noaa.gov/wd52dg/data/indices/tele_index.nh). Anyway, this pattern is usually not very prominent in summer.

Over northern Atlantic and Eurasia, Scandinavian blocking and negative NAO dominated this month, which is not in good agreement with the MJO phases observed this month, at least for NAO-. The MJO intensity though has remained moderate.

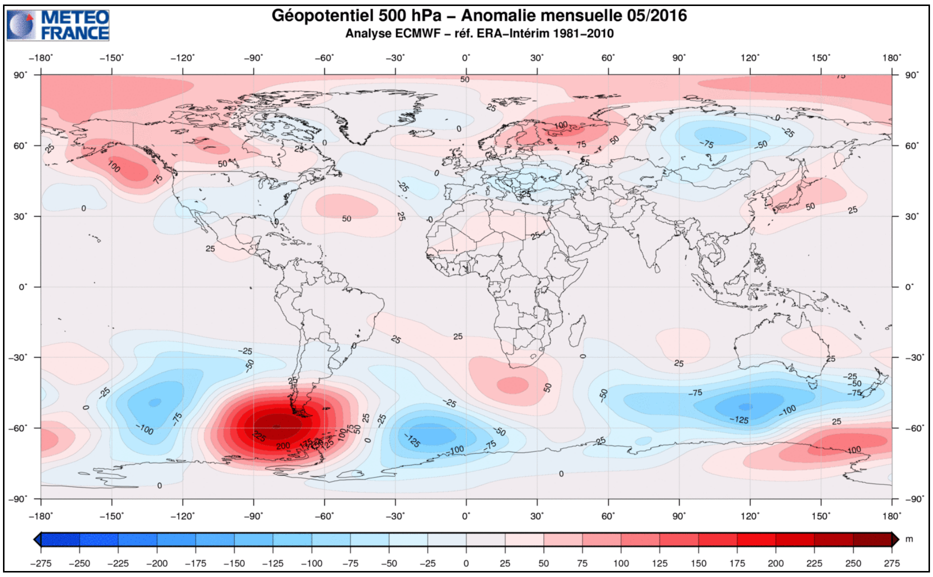


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
MAY 16	-0.7	0.2	0.6	0.1	-0.9	---	-2.0	1.0	-0.4
APR 16	0.3	1.0	-0.3	1.5	0.6	---	-0.5	-0.1	-1.6
MAR 16	0.4	0.7	-0.2	0.2	0.4	---	0.3	-0.2	-0.2
FEB 16	1.3	1.9	1.6	0.2	1.7	0.2	-2.4	-0.5	-2.3
JAN 16	-0.4	1.0	1.0	-0.3	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

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 :

The Azores High was slightly more intense than normal, but had a smaller extension to the north and also to the east. The Icelandic Low (usually weak at this time of year) moved slightly southwards. This caused a slightly negative NAO phase. The Atlantic westerly flow was therefore shifted more to the south and high pressure influence in southwestern Europe decreased.

Even more important for most of Europe was a high pressure pattern in northern Europe (positive SCAND pattern, causing Scandinavian blocking) and low pressure over middle and subtropical latitudes. This dipole is reflected by a quite intense negative EA/WR pattern (-2.0) because high pressure extended from Scandinavia far into northwestern Russia.

During the month, the weather pattern changed considerably. The month started with high pressure over northern and central Europe, but weakening. In the middle of the month, cold polar air moved to Europe during a NAO- phase (Ice Saints!). In the last third of the month, a southwesterly flow developed, leading warm and moist air to Europe. The pattern became very cyclonic then with a large cut-off low, causing heavy precipitation over much of Europe.

Nevertheless, Scandinavian blocking was the dominating large-scale feature during this month (on 13 days of that month according to the MF classification).

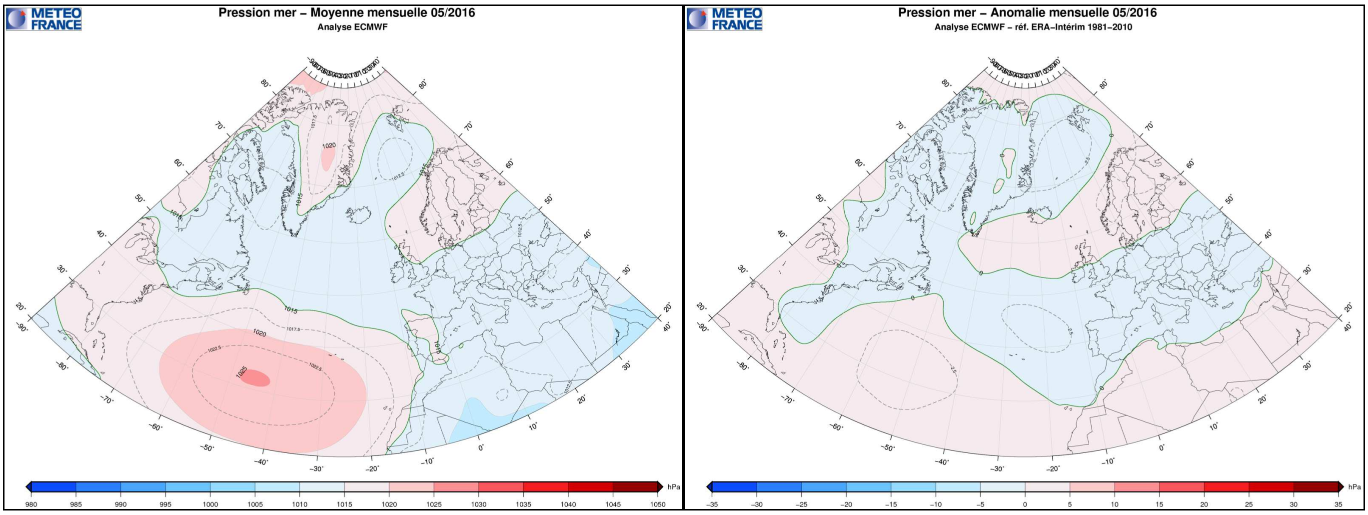


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (left) and 1981-2010 anomalies (right).

<u>Circulation indices: NAO and AO</u>

The NAO- phase peaked after the first third of the month and weakened afterwards. At the beginning and the end of the month, NAO index was close to zero.

AO had a positive peak at the beginning of the second half of the month, when Arctic air retreated after the cold spell in Europe (and NAO- weakened the same time).

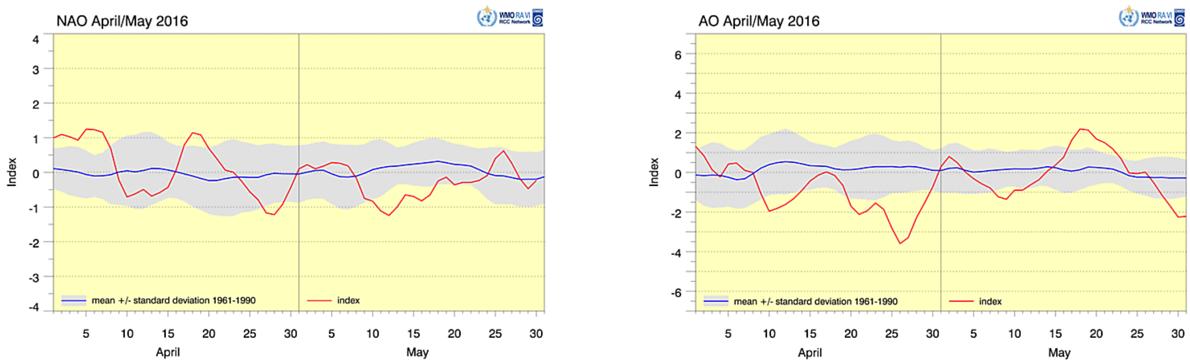


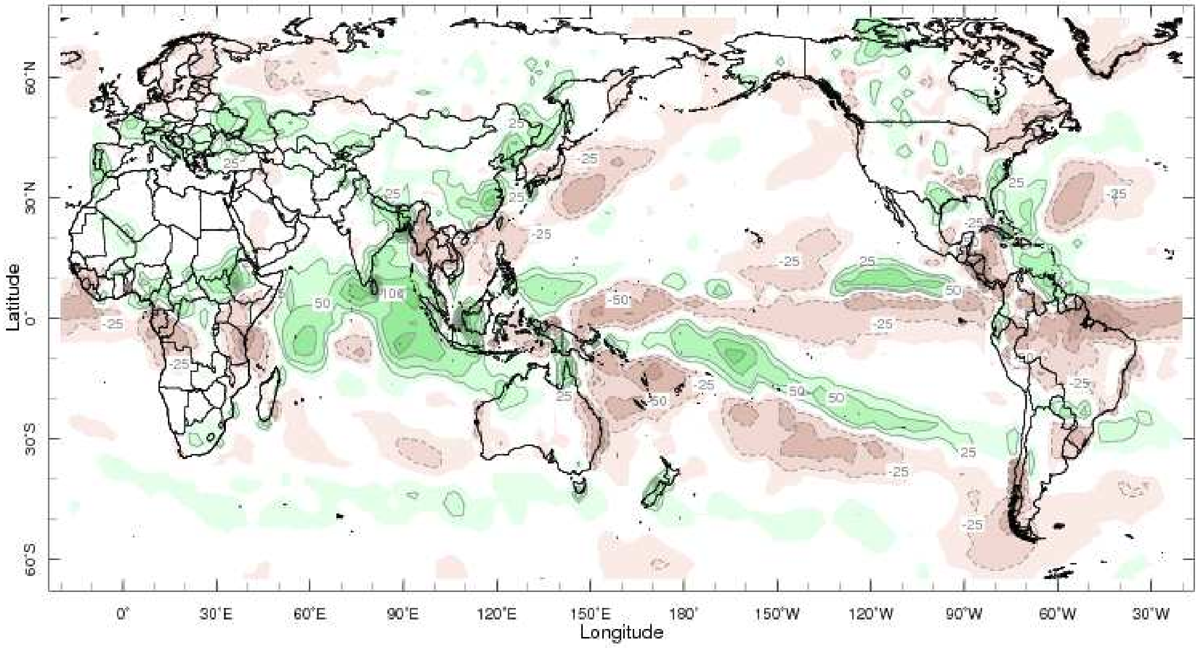
fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

MJO influence seemed to be prevailing this month with positive anomalies over the Indian ocean and eastern Africa. This positive anomaly even reached north western Australia, in agreement with the negative DMI.

Over equatorial Pacific, a dry anomaly developed, consistent with the onset of La Niña. Still a dry anomaly over western Africa (north to the gulf of Guinea), but somehow easing.

Over Brasil and the Carribean, same patterns as in april, with “El-Niño remaining” effects (cf 200 hPa velocity potential anomalies).



May 2016

fig.I.2.6: 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:

Clear dipole with mostly drier conditions in the north (dominating high pressure over Scandinavia and northwestern Russia, and partly also over Central Europe, except the last third of the month). Southern parts of Europe, and also France, the Alps, Ukraine/southwestern Russia were very wet (Atlantic troughs affected western Europe, later a cut-off low over Central Europe extended to a larger area). Much of the precipitation came from heavy convective events particularly at the end of May.

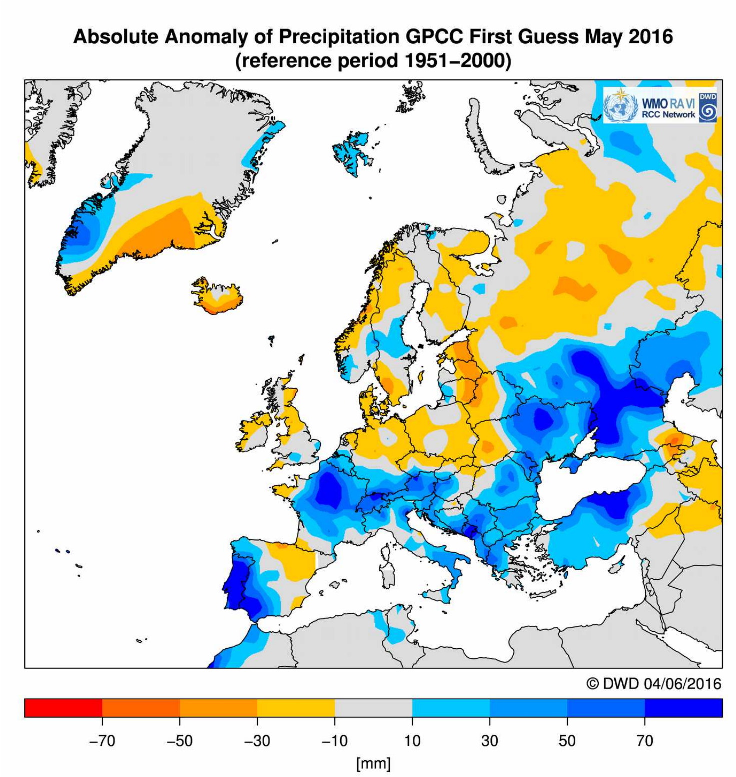


fig.I.2.7: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm.

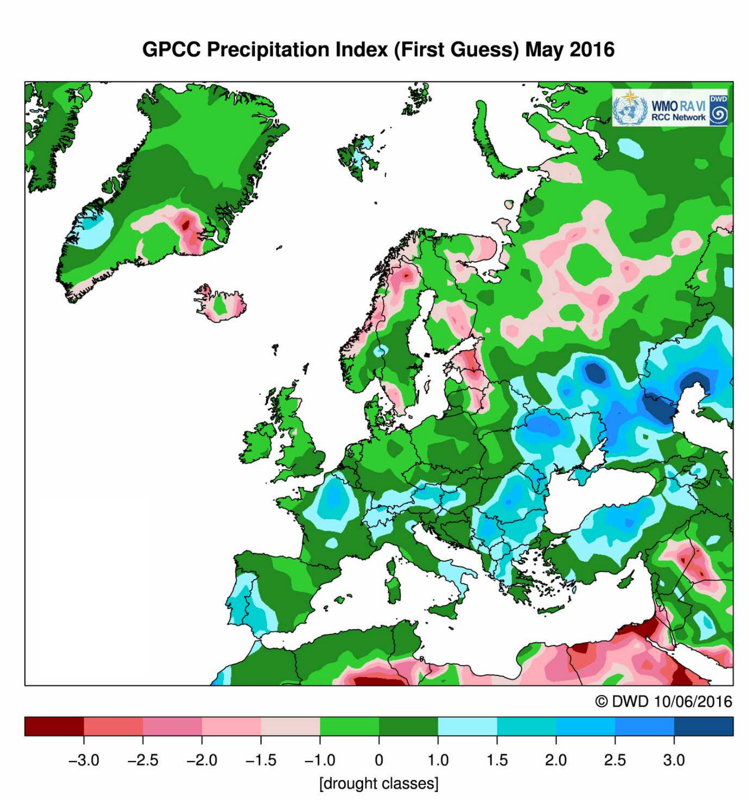


fig. I.2.8: GPCP Precipitation Index http://www.dwd.de/rcc-cm .

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	-8.9 mm	-0.462
Southern Europe	+18.6 mm	+0.790

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.

I.2.c Temperature

With El Niño finishing, the positive anomalies were not as widespread as in the previous months and tended to become less intense. However, may 2016 remained the warmest month on record over the world (3rd warmest for land, 1st warmest for oceans) according to NOAA. The Arctic remained particularly warm, except for parts of Greenland. Cool anomalies were observed over Siberia, U.S., and over Argentina (coolest may in 56 years), Paraguay, Uruguay.

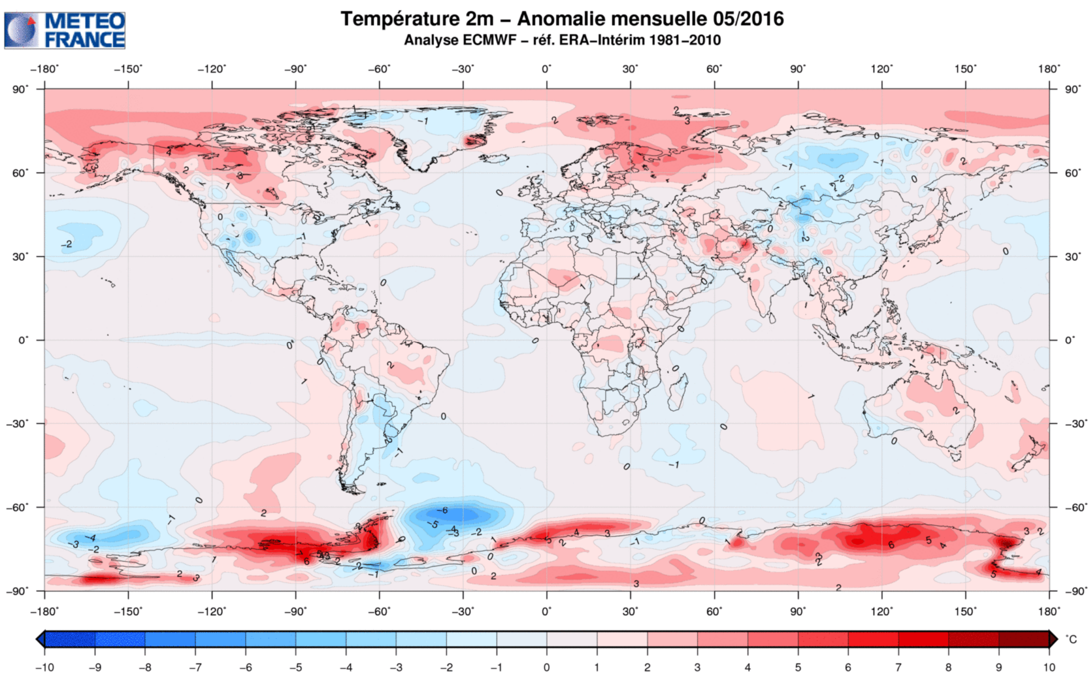


fig.I.2.9: Temperature Anomalies (°C) (Meteo-France)

Temperature anomalies in Europe:

Northern Europe was mainly warmer than normal, especially the northeast, reflecting the anticyclonic conditions particularly in 500 hPa.

Large parts of the southern half of Europe were colder than normal, partly due to the cold spell in the middle of the month, partly due to cooling after convective events.

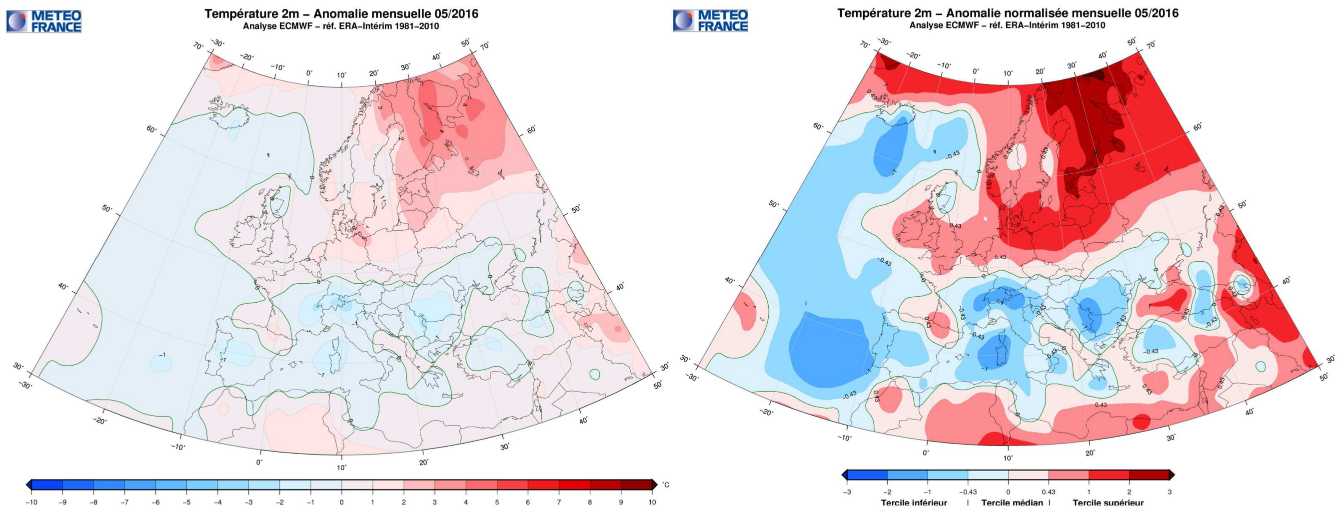


fig.I.2.10: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

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	+1.7℃
Southern Europe	+0.6℃

I.2.d Sea ice

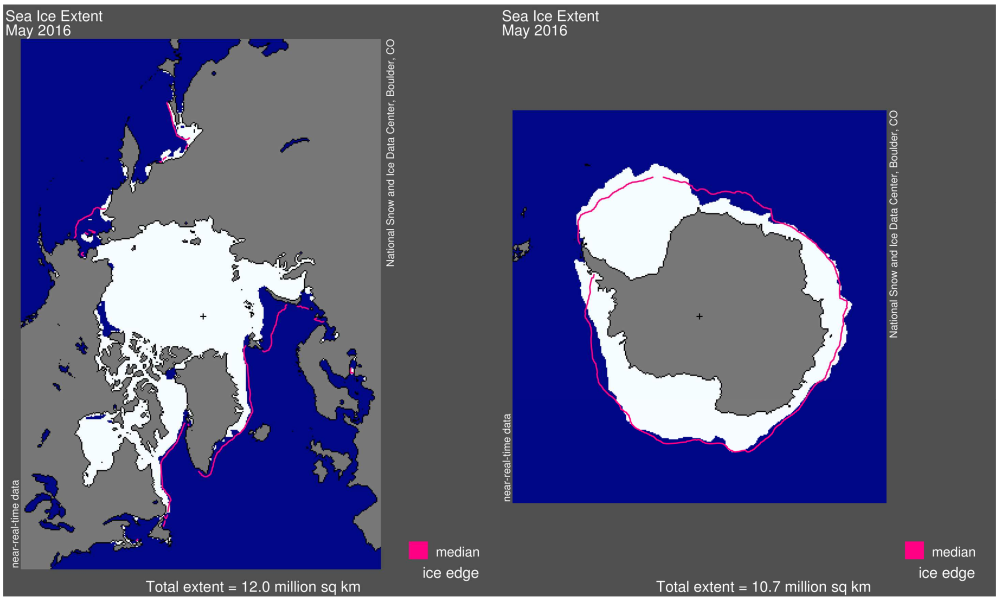


fig.I.2.11: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

In the Arctic (fig. 1.2.11 and 1.2.12 - left) : Record low (< -2 std).
In the Antarctic (fig. 1.2.11 and 1.2.12 - right) : below normal but within 2 std.

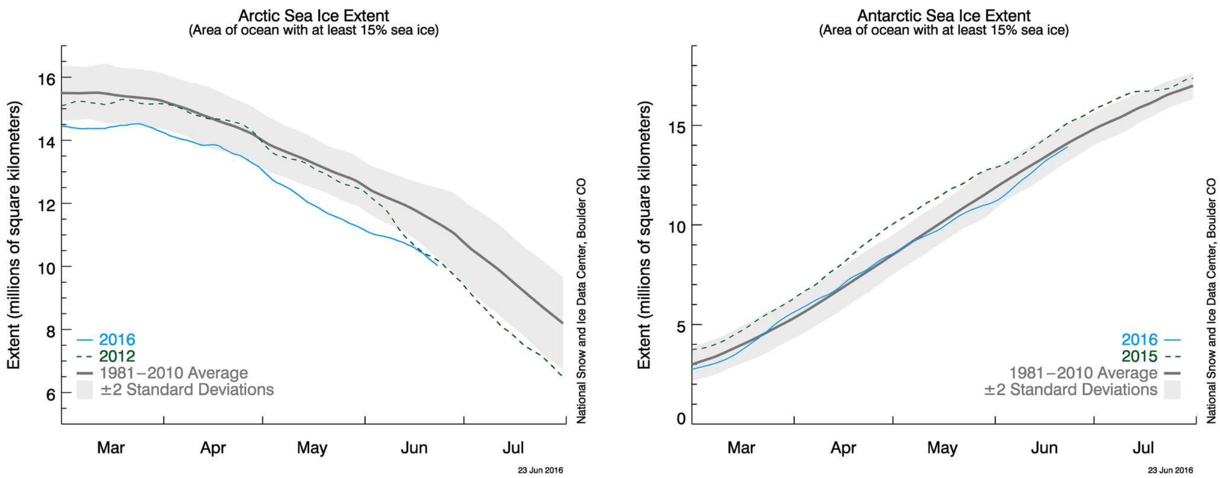


fig. I.2.12 : Sea-Ice extension evolution from NSIDC.
http://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png

II. SEASONAL FORECAST FROM DYNAMICAL MODELS

El Niño is now over ; evolution towards moderate La Niña conditions is very likely and should occur in the coming months. La Niña SST thresholds to be reached in the 3.4 region as soon as july.

Important notice : the new ARPEGE System 5 model is the one that contribute to the Eurosip consensus from this month onward. However, for technical reasons, the figures shown this month still originate from the former ARPEGE System 4.

II.1.OCEANIC FORECASTS

II.1.a Sea surface temperature (SST)

anomaly patterns for the next 3 months do not significantly differ from the previous forecast.

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 should maintain on both sides (North and South) with the PDO remaining in its positive phase. Over the Niño 3.4 box, la Niña threshold should be reached in July (see median value of the Eurosip Niño 3.4 plume, figure II.1.5).

Indian Ocean: Warm anomaly persisting or intensifying in the eastern basin, while a cold anomaly should be developing on the western side off the Somalian coast. ECMWF does not show such a cold anomaly, but the IOD should anyway become negative for the whole period.

Atlantic Ocean: for the north Atlantic, tripole "horseshoe-like" pattern with strong positive anomalies forecast between the Carribean and the Labrador Sea, and also over the Greenland Sea and Norway Sea (probably due to the early retreat of artic sea ice). The central Atlantic "cold blob" is still forecast to be there although a little less strong than in previous months, but it should be noticed that this is largely due to the CFS model which is by far not as cold as ARPEGE and ECMWF. Over the Gulf of Guinea the Eurosip signal is weak but models are in total disagreement over this area : ARPEGE goes for a negative anomaly, while ECMWF (and ARPEGE System 4) suggest a positive one, and CFS is rather neutral or slightly warmer than normal. ARPEGE S5 forecast is not in agreement with observed June SST so we do not give credit to its scenario. Therefore we will account for a warmer than normal Gulf of Guinea. The TASI index is then forecast to be in a negative phase over the period (fig I.1.6).

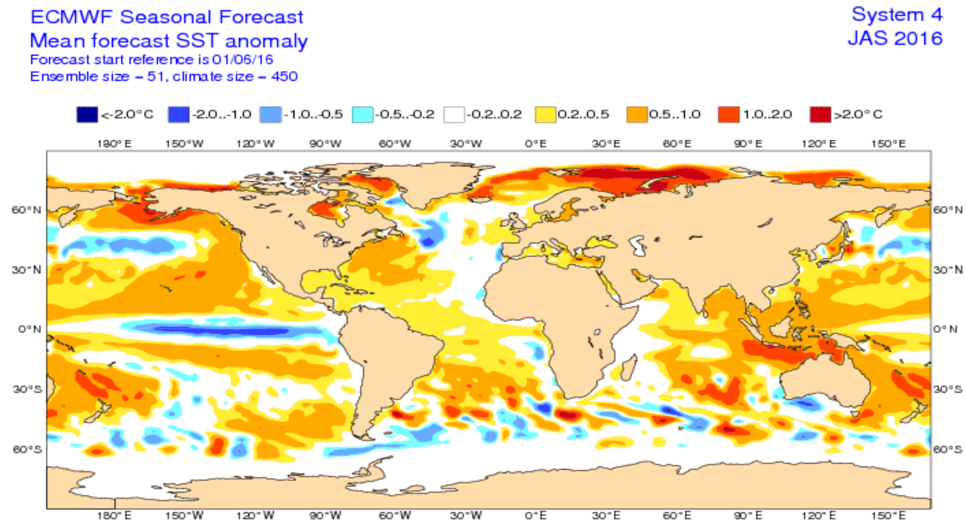


fig.II.1.1: SST anomaly forecast from ECMWF
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

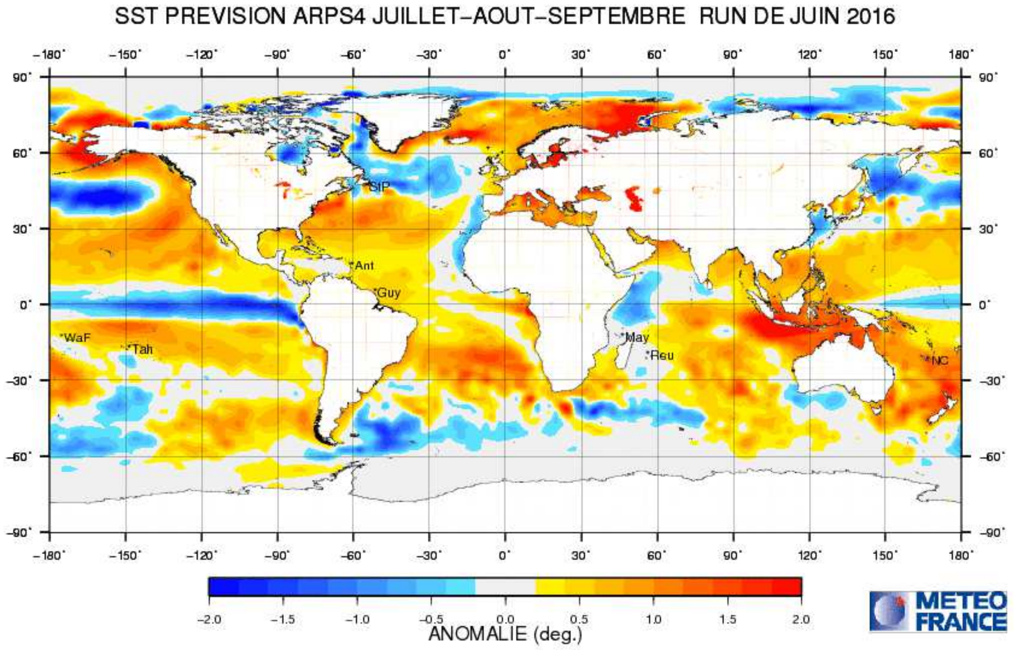


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).
http://elaboration.seasonal.meteo.fr

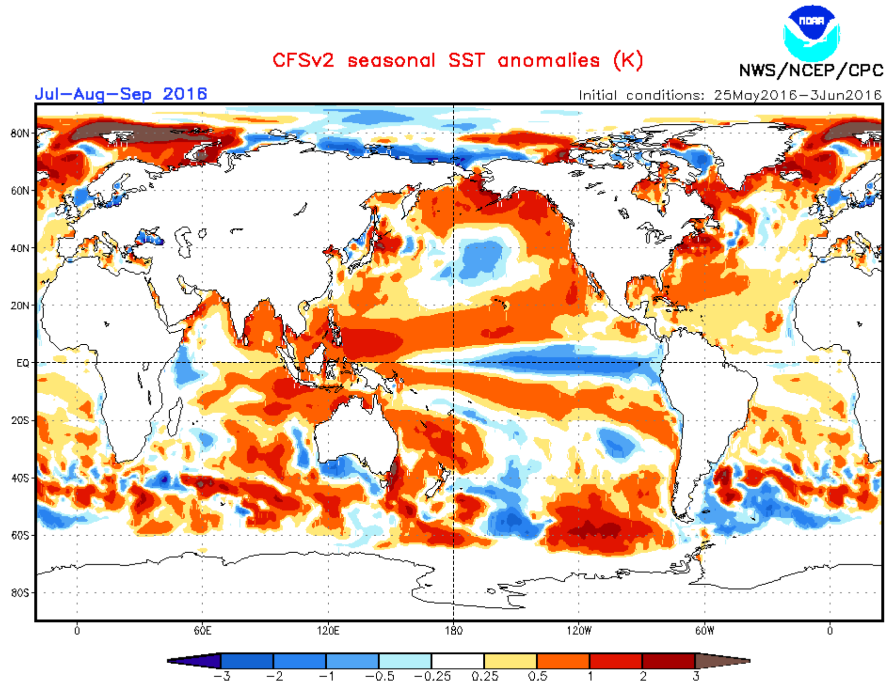


fig.II.1.3: SST anomaly forecast from NCEP.
http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/imagesInd1/glbSSTSeaInd1.gif

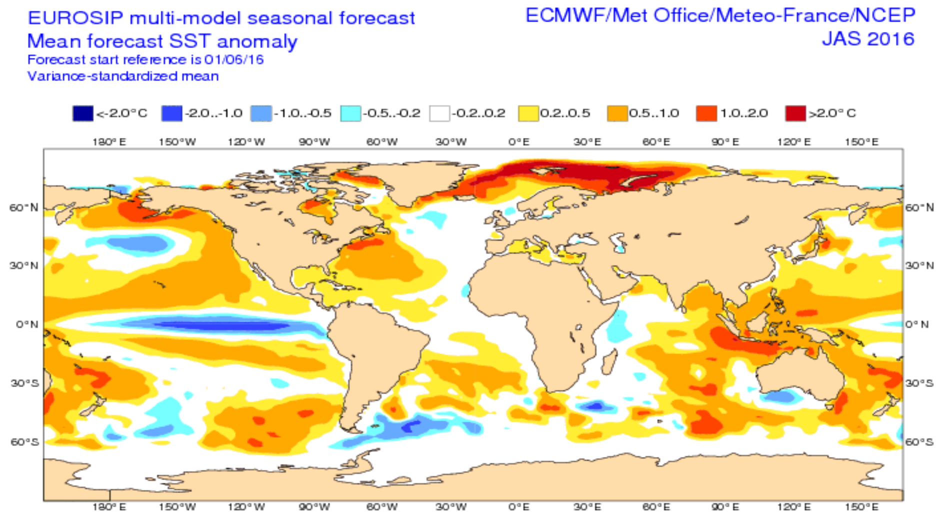


fig.II.1.4: SST Forecasted anomaly from Euro-SIP

II.1.b ENSO forecast

Forecast Phase: *high probability of La Niña (around 75% with EUROSIP) as from July.*

Models in good agreement for a further decrease of tropical Pacific SSs in the Niño 3.4 region for the next 3 months, with la Niña thresholds (-0.5°C) to be reached in July. These negative anomalies should persist for the whole period at around -0.5/-0.7°C which would account for an event of moderate intensity. Statistically, La Niña events occuring along with a positive PDO phase (which should be the case this year) only have mitigated effects (cf http://www.nature.com/articles/srep06651#f4).

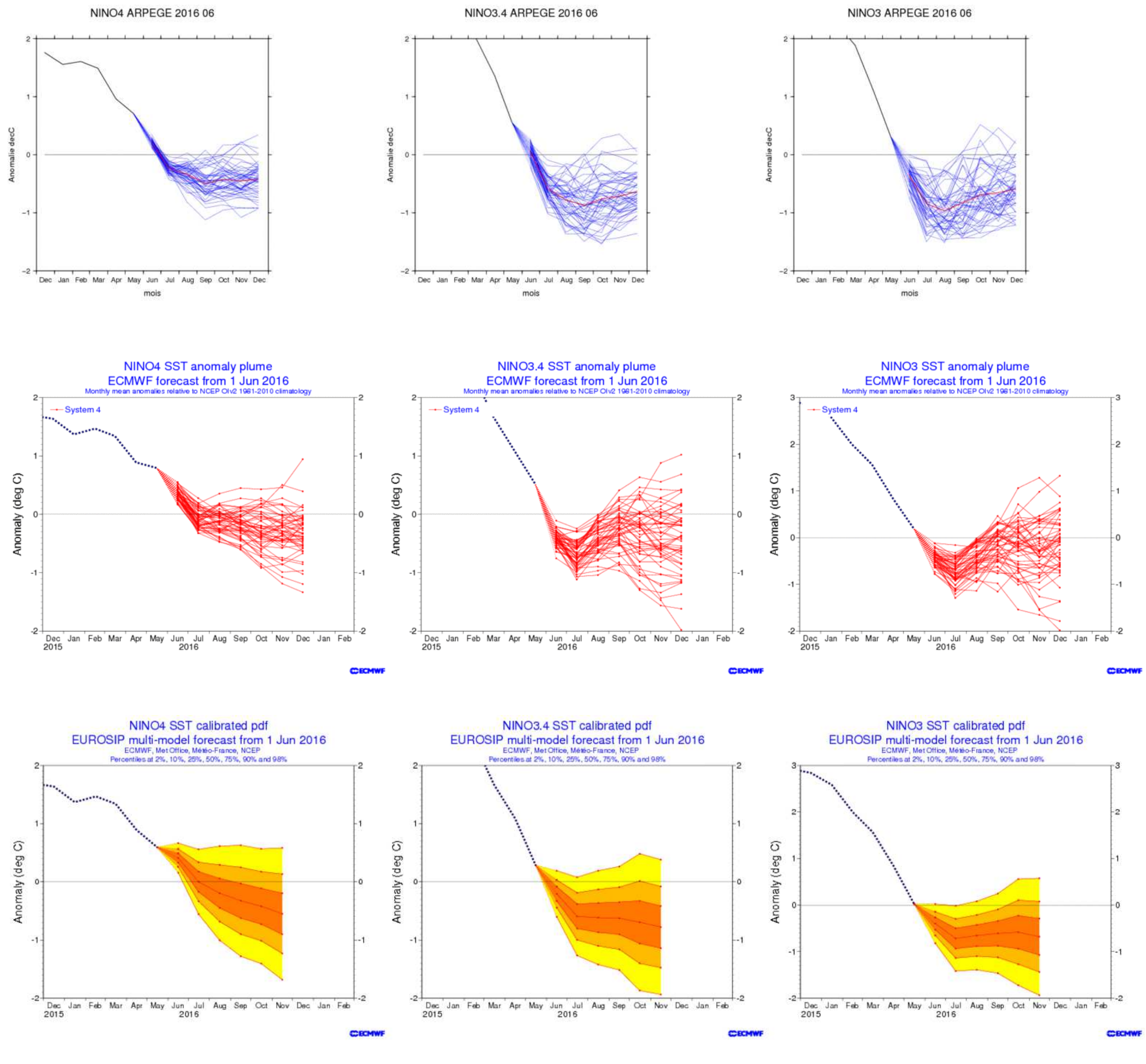


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

II.1.c Atlantic ocean forecasts

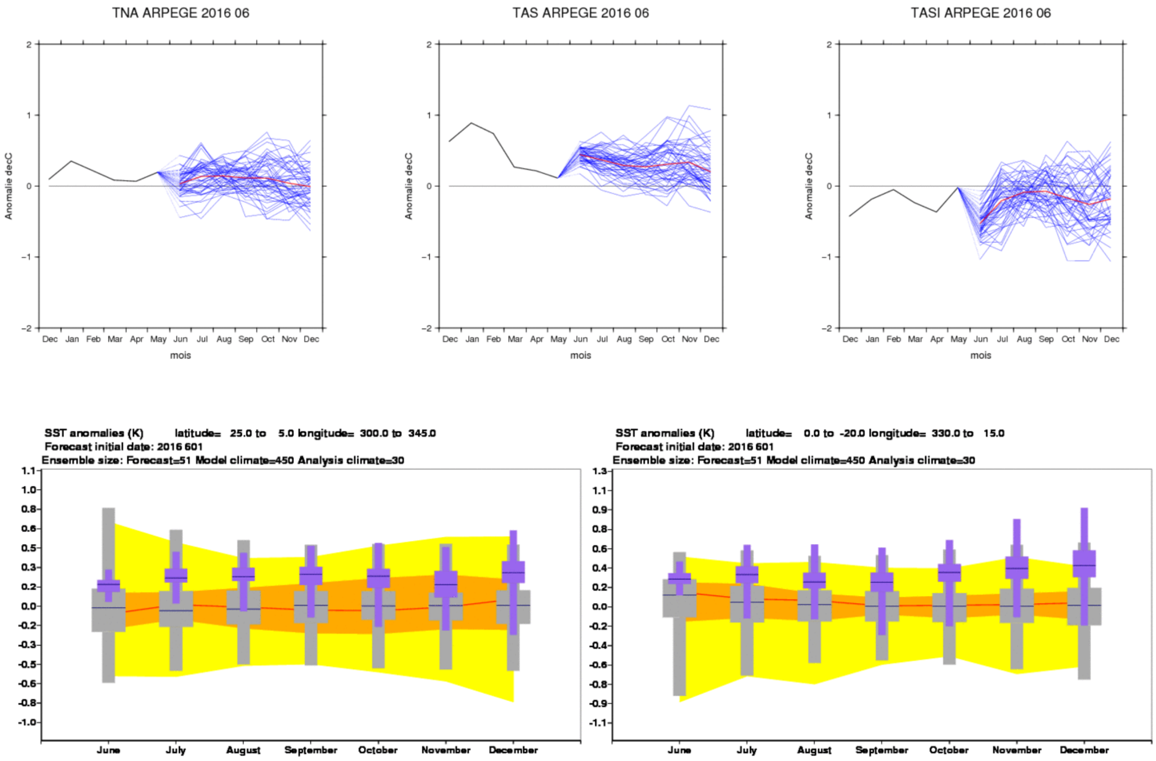
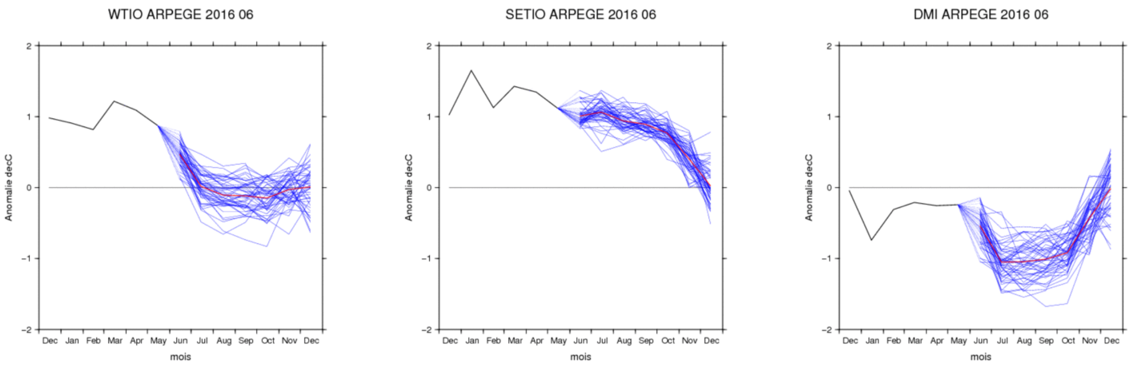
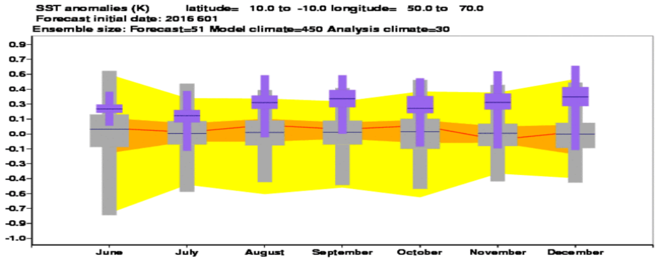


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.1.d Indian ocean forecasts





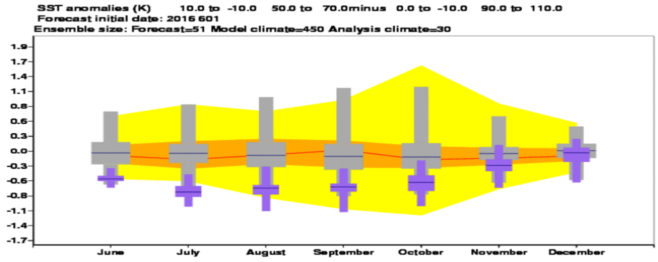


fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

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):

According to the rapid evolution of oceanic conditions in equatorial Pacific (toward La Nina conditions), MF, ECMWF and JMA forecasts exhibit a dipole of upward/downward anomaly motion between Indian Ocean and Western Pacific. This pattern is consistent with a La Nina, probably reinforced by warmer than normal SST in the Indian Ocean and the DMI becoming negative.

Over the Atlantic, there some differences between models, but they all agree on a anomalous subsidence area in the tropical basin (ARPEGE being the most extreme, maybe because of its strong negative SST anomalies)

Looking at streamfunction anomaly fields, the signal seems to be trapped in the tropics for the Northern hemisphere. In other words, no trace of teleconnection toward mid-latitudes in the Northern hemisphere. However, the main poles are consistent with a positive anomalie over subsaharian Africa and a negative one over south-east Asia.

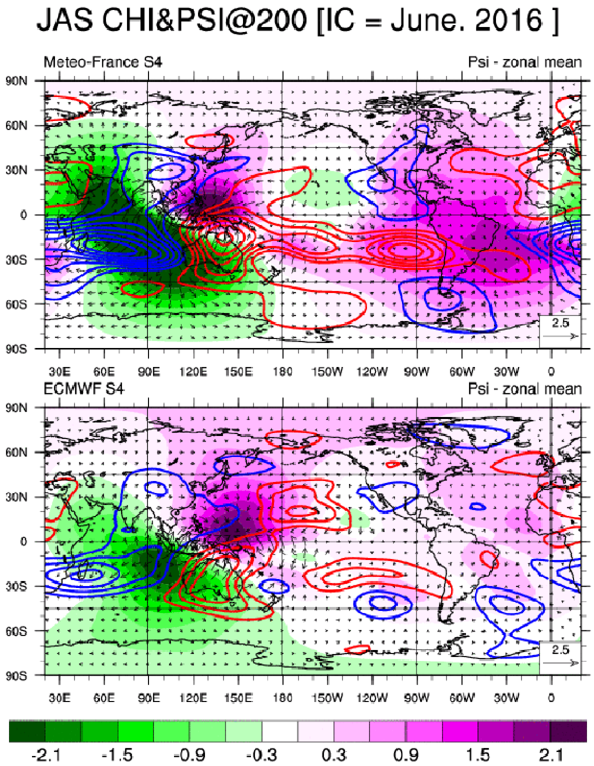


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).

II.2.b North hemisphere forecast and Europe

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

In northern hemisphere mid-latitudes, large spread in GPC forecasts. Also a large spread within EUROSIP, as illustrated below with MF and ECMWF (even though the map shown here is not the one from ARPEGE System 5).

ARPEGE S5 and JMA stand for a rather rapid zonal flow over western Europe, whereas Met-Office and ECMWF suggest a more anticyclonic configuration with positive Z500 anomalies around the British Isles. And the CFS is clearly in favor of a Scandinavian Blocking regime ! It is therefore very difficult to pick-up the most likely configuration. It is noteworthy though that the ECMWF infraseasonal forecast also favors the blocking regime for the month of July.

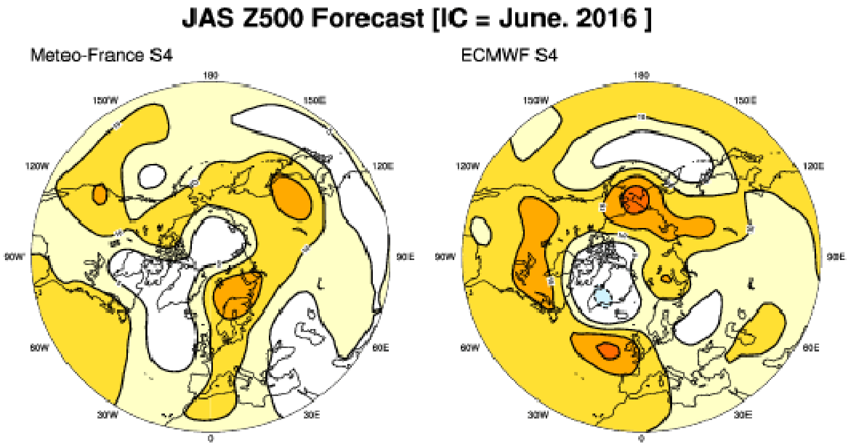


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (left) and ECMWF (right).

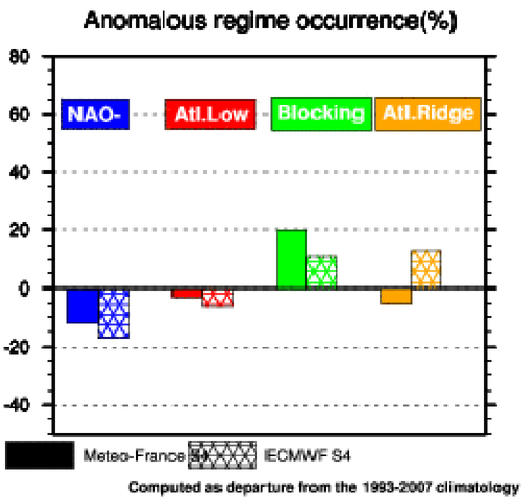


fig.II.2.3: North Atlantic Regime occurrence anomalies from Météo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

II.3. IMPACT: TEMPERATURE FORECASTS

Widespread warm anomalies forecast all over the world but less intense than in the previous months, with the ending of the El Niño phenomenon. Over continental areas, negative anomalies are forecast for inter-tropical African regions (ARPEGE, JMA, and CFS scenarios) and southern Australia (maybe in relation with negative SST anomalies). The warm signal does not appear over the recently colder than normal regions of Argentina - Uruguay - Paraguay.

Over Europe, there is no clear signal as we could expect with such a spread in Z500 scenarios. The only warmer than normal signal is located over northern Africa and Spain (Portugal not included) as was the case in the previous months. Another warm signal is appearing for the eastern scandinavian regions (blocking regime favored by some models). Nevetheless it must be pointed out that there is no signal of widespread, long lasting heat for western Europe for the period July to September. The month of July could particularly lack heat days north of 45N.

II.3.a ECMWF

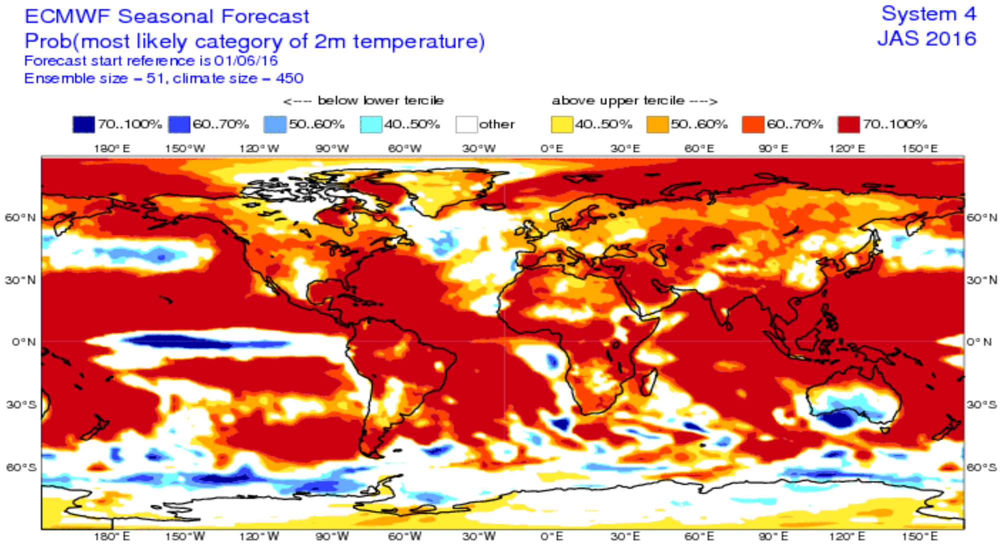


fig.II.3.1: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.3.b Météo-France

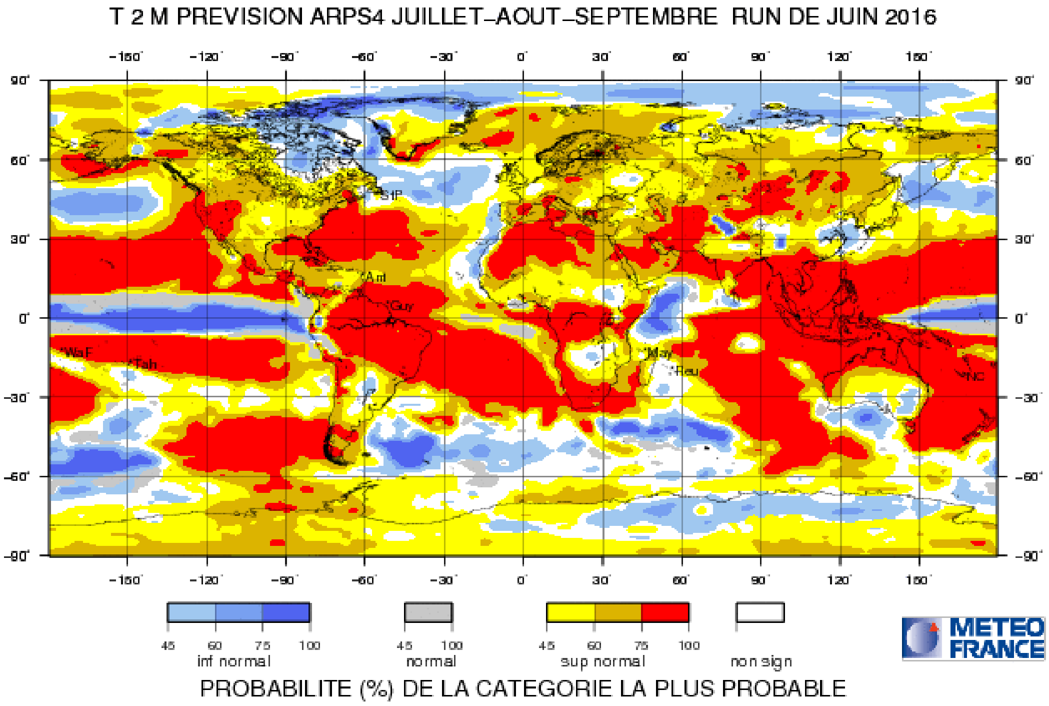


fig.II.3.2: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.3.c Japan Meteorological Agency (JMA)

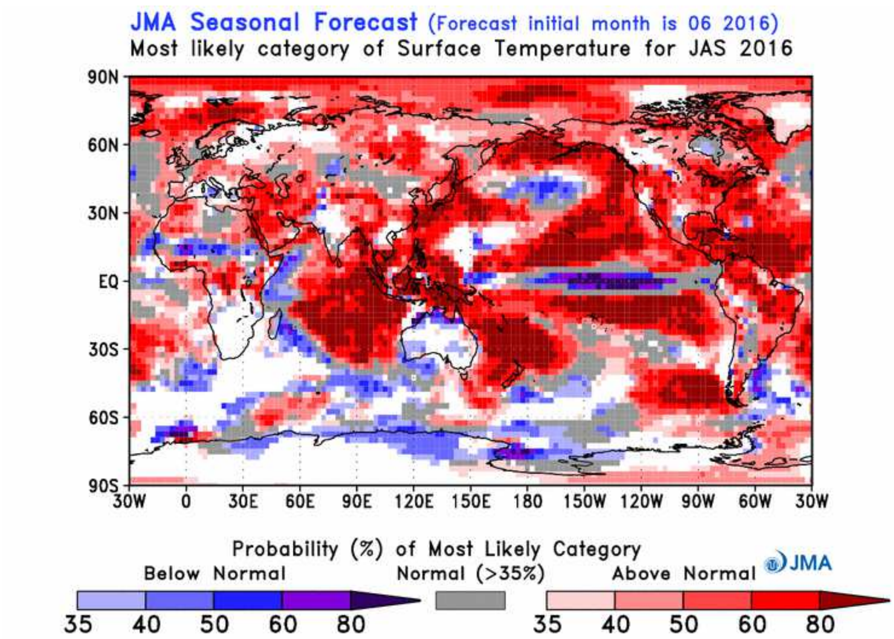


fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.php

II.3.d EUROSIP

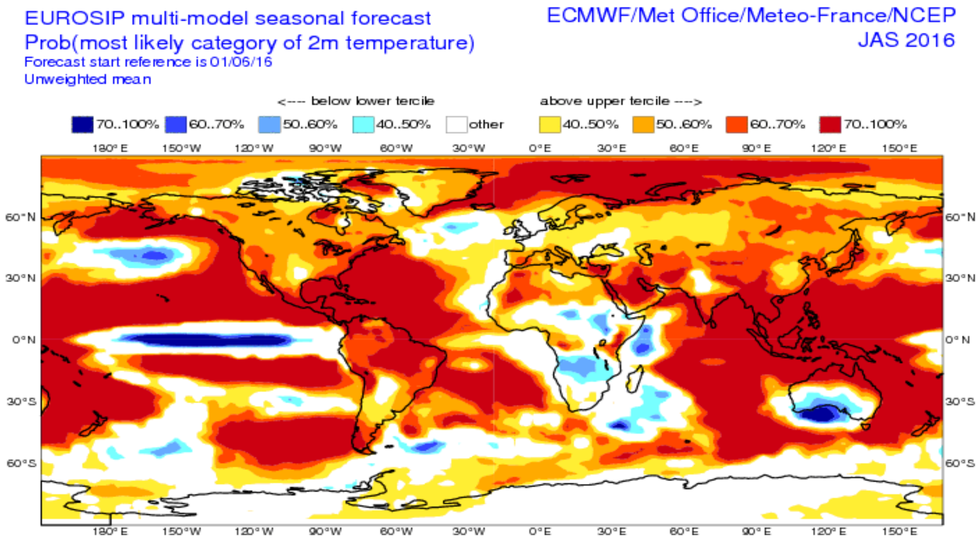


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/

II.4. IMPACT : PRECIPITATION FORECAST

Over the Pacific, associated with the spreading of a cold anomaly along the equator (La Niña onset), the dry anomaly is forecast to cover the whole basin between 5°N and 5°S. Positive rainfall anomalies should persist on both sides (see velocity potential anomalies). A dry area is forcast from Vanuatu to Fidji.

In connection with the 200 hPa velocity potential anomalies and the SST dipole over the Indian Ocean, wet conditions are forecast from Australia to Indonesia, India, the Arabian Sea (which is consisent with La Niña conditions) and up to eastern Africa (north of the equator), including Tchad. More to the west drier than normal conditions ar expected, between Burkina and Senegal. Besides, a warmer than normal Gulf of Guinea is not favorable to a very active African monsoon over Sahelian regions (but it is not the only factor affectinf this activity).

For Europe, there is no clear signal, except for Spain and the northern mediterranean basin which should be drier than normal (but it is the dry season there !).

II.4.a ECMWF

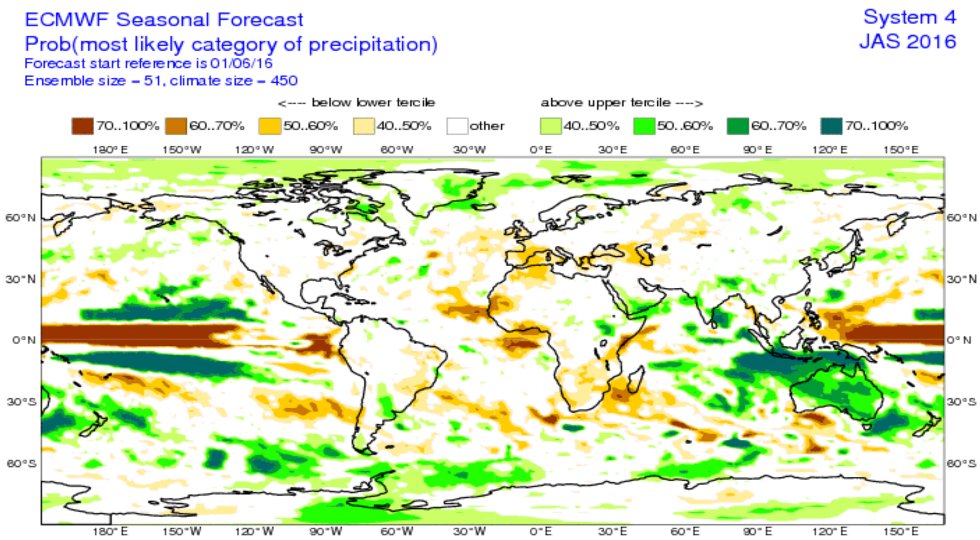


fig.II.4.1: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

II.4.b Météo-France

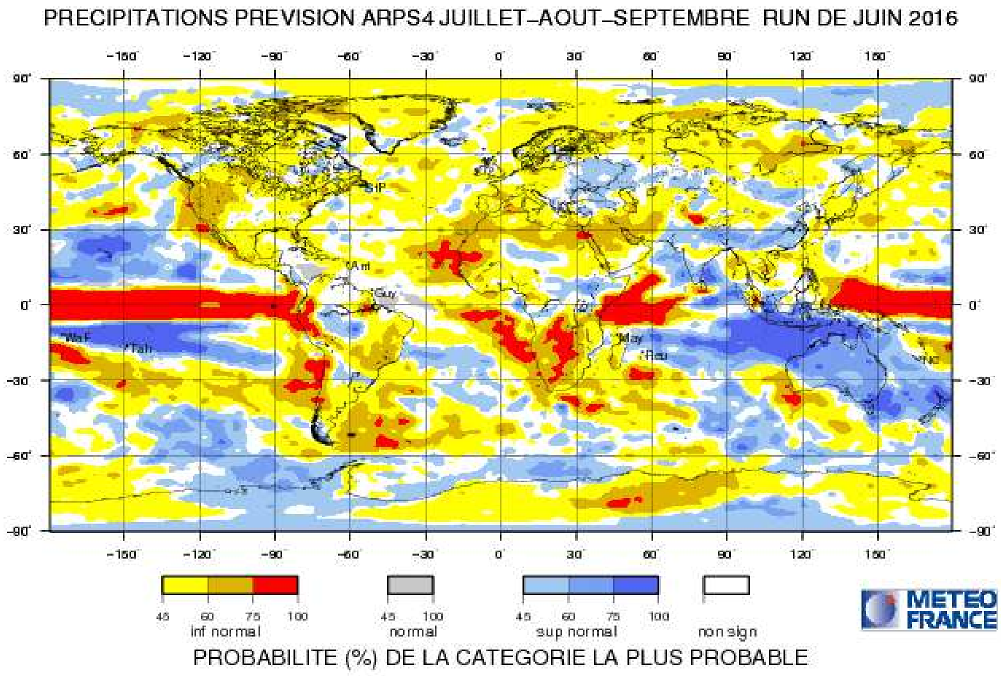


fig.II.4.2: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.4.c Japan Meteorological Agency (JMA)

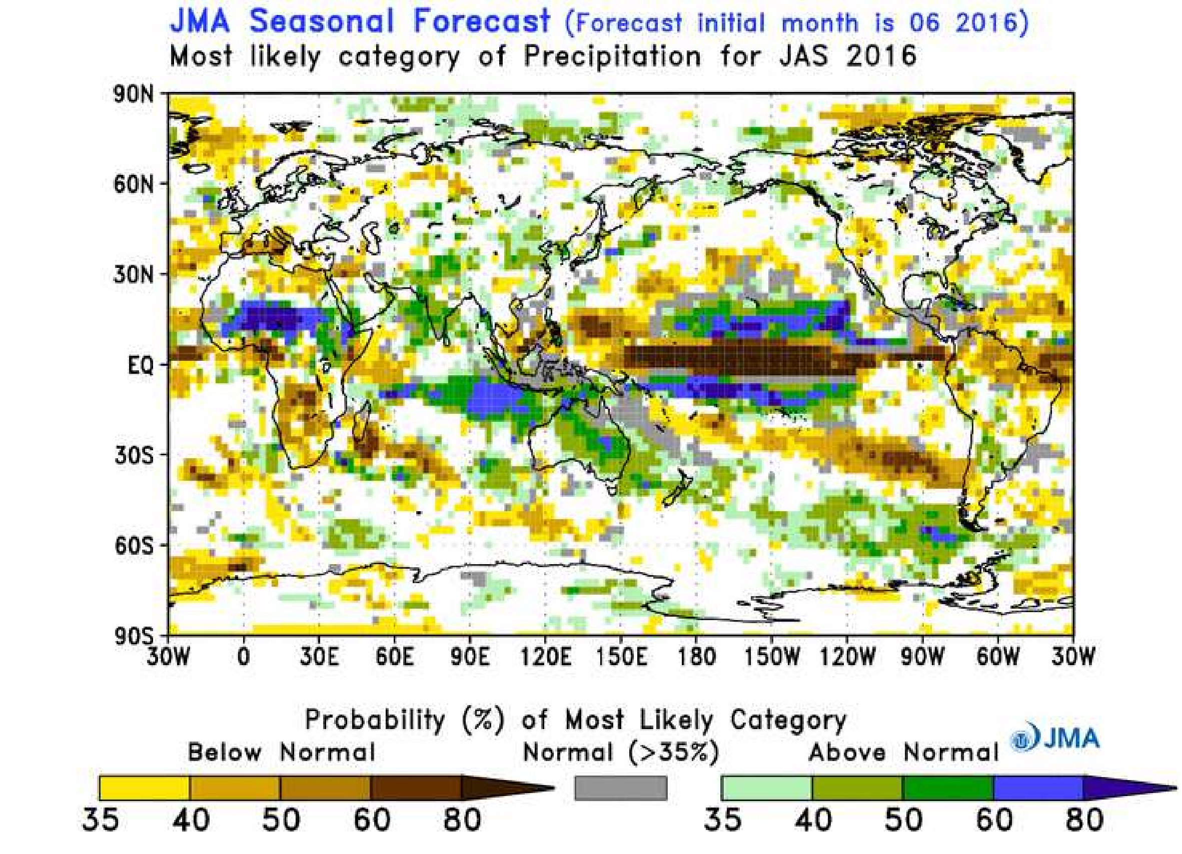


fig.II.4.5: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.php

II.4.d EUROSIP

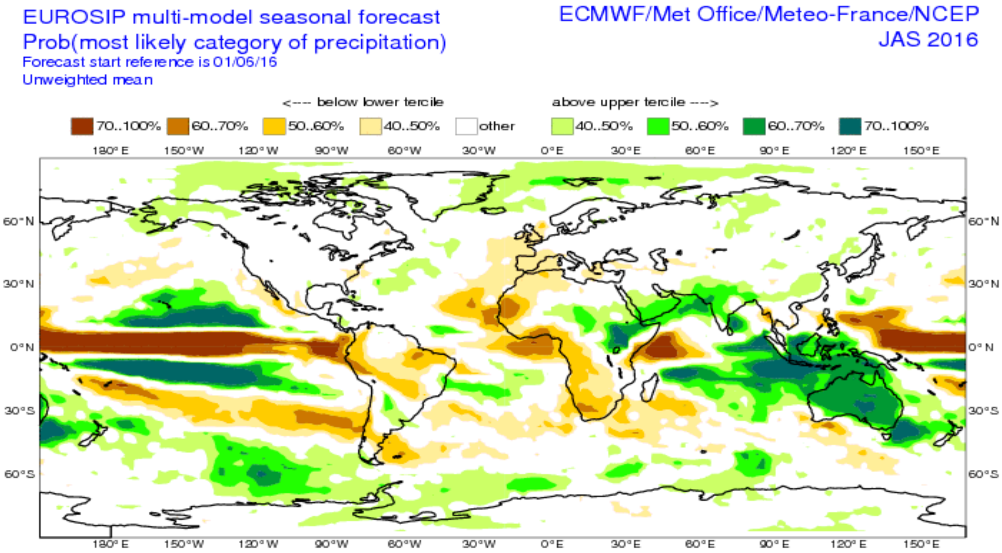


fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/

II.5. REGIONAL TEMPERATURES and PRECIPITATIONS

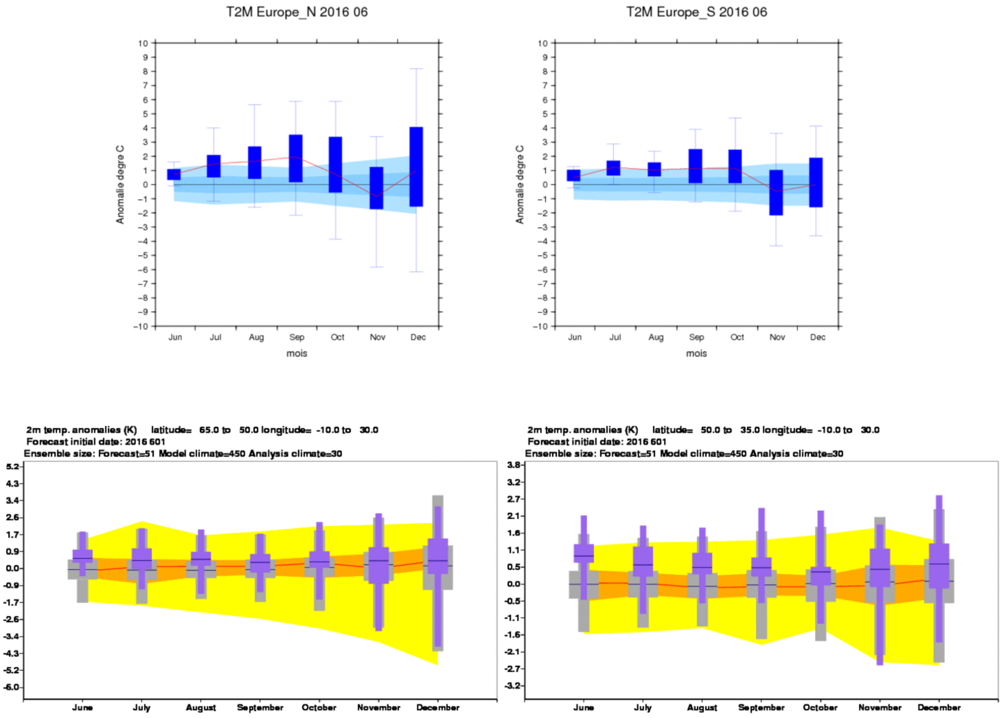


fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

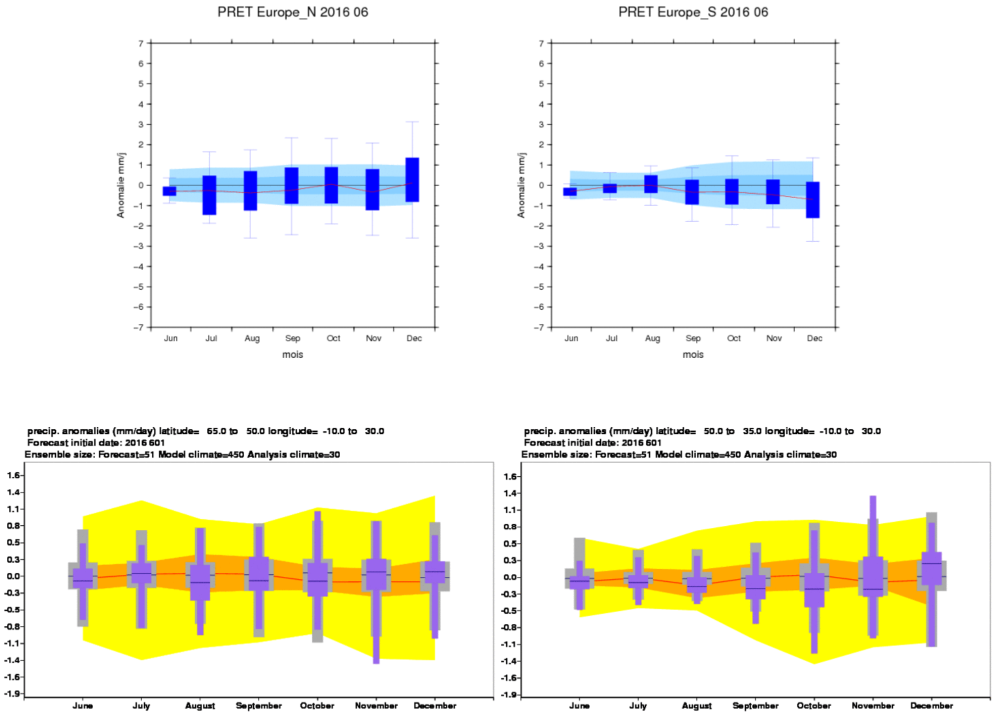


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

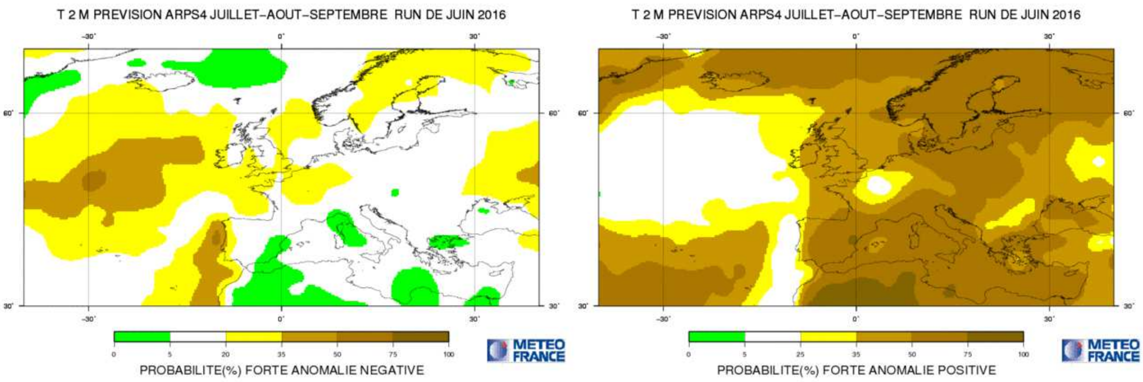
II.6. MODEL'S CONSISTENCY

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



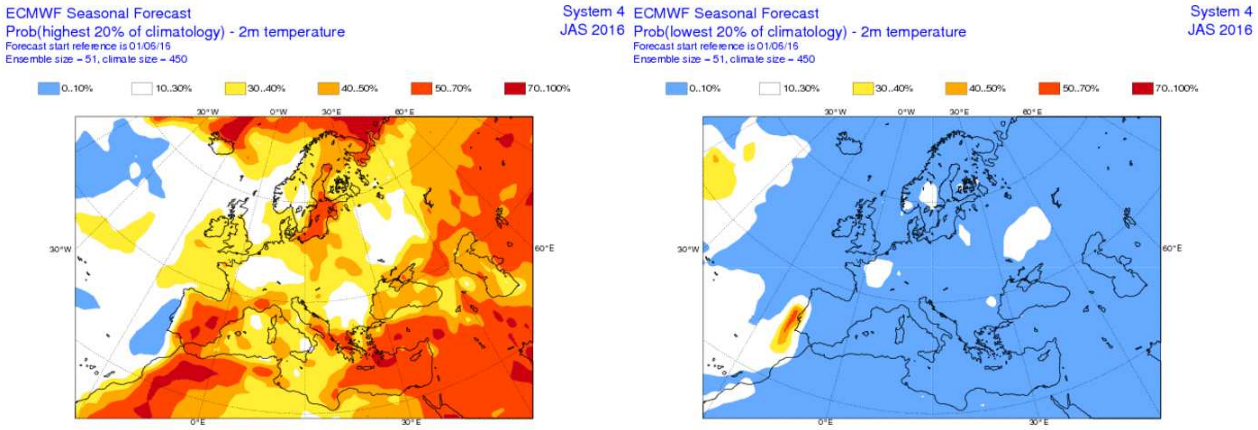


fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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

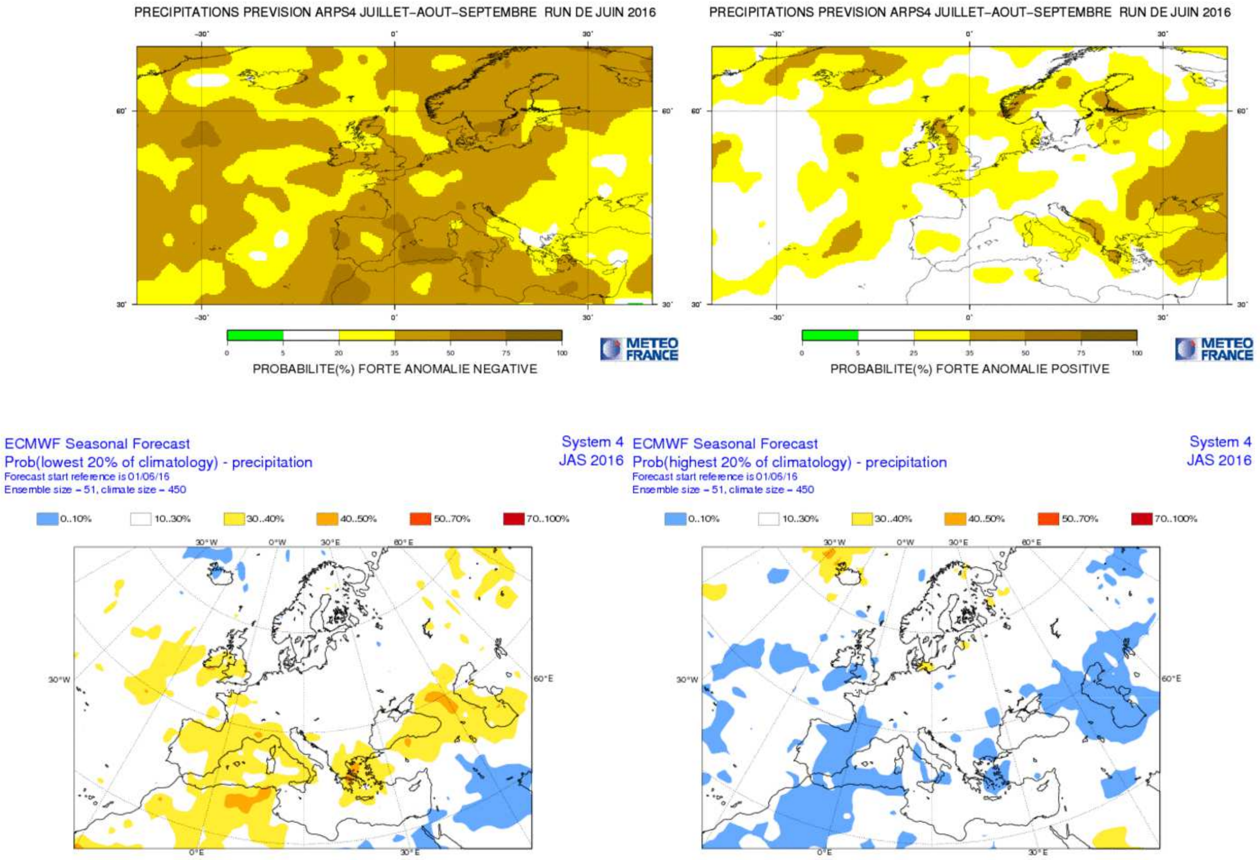


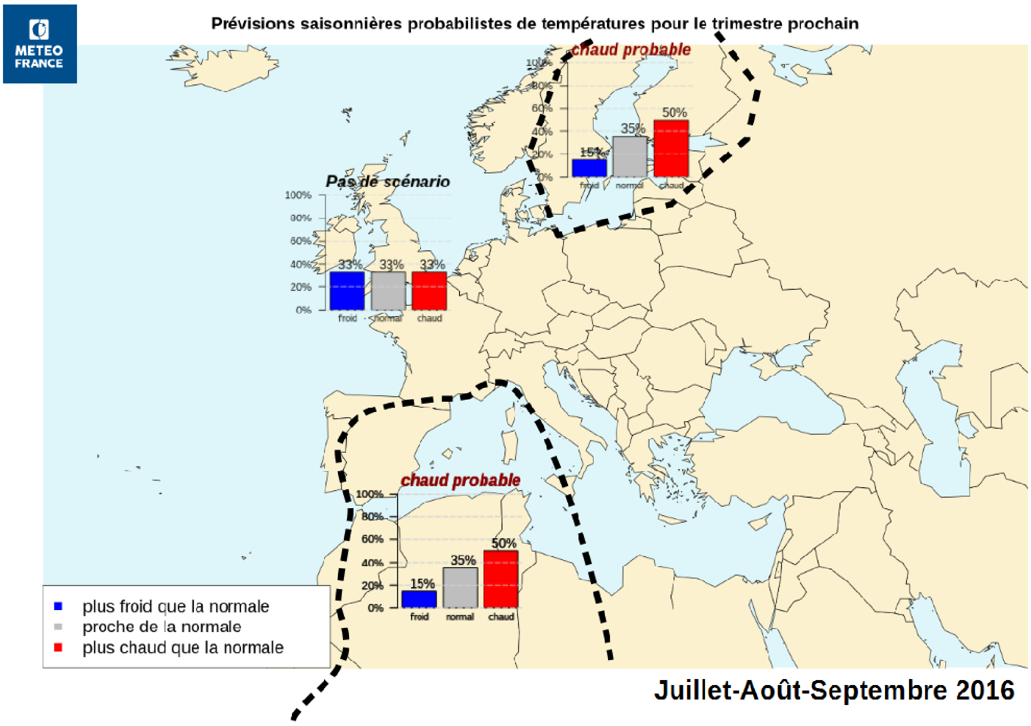
fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

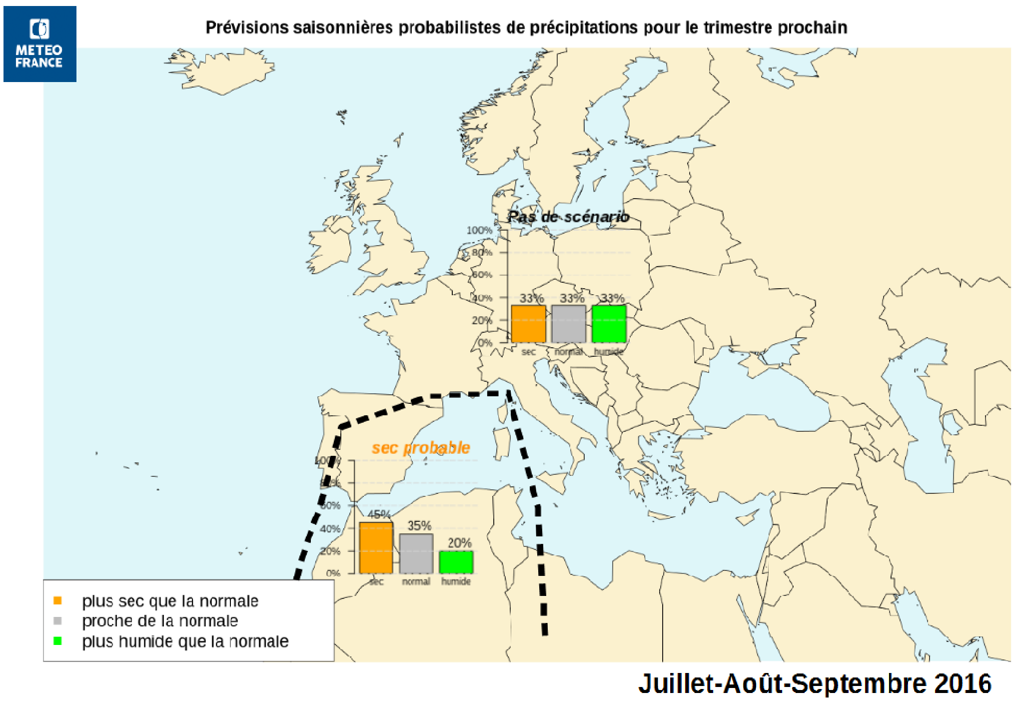
II.8. DISCUSSION AND SUMMARY

II.8.a Forecast over Europe

Temperatures: warmer than normal conditions likely for Spain and eastern Scandinavia (Finland, baltic states, Sweden).

Precipitation: no scenario, except for the Iberian Peninsula region where a small dry signal seems to be emerging, in a continuation of last month forecast.





II.8.b Tropical cyclone activity

Slightly above normal activity over Northeast Pacific. Close to normal for north-western Pacific, but Philippines could see less systems than usual (cf 200 hPa velocity potentiel and precip anomalies). For the north-Atlantic region, the season has started early with already 4 named systems (which is a record as of 27th june) but this does not mean that the season will be more intense than normal. Indeed, it is predicted to be near normal (see fig II.8.1 and [NHC predictions](#)). La Niña and Atlantic tropical SSTs are in favor of an above normal season but there many other factors influencing the activity.

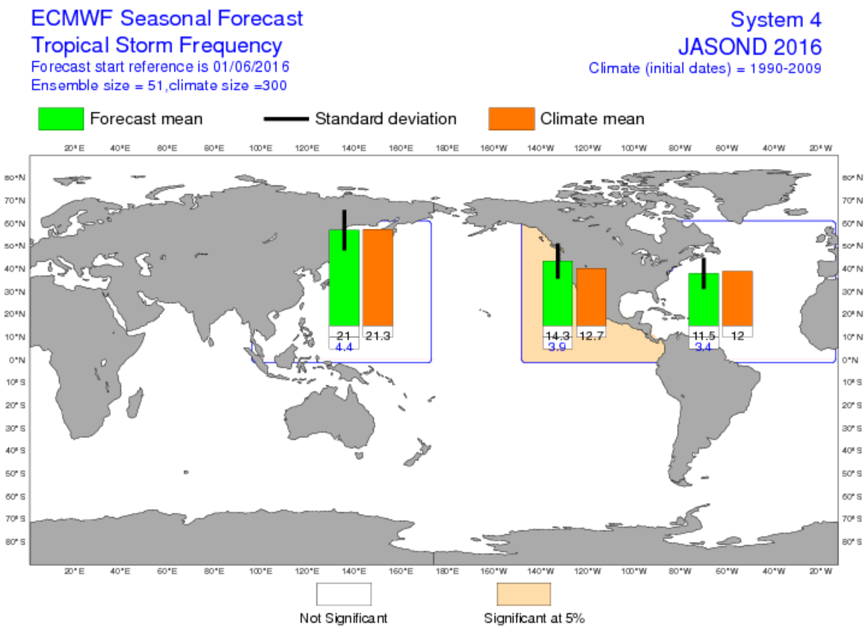


fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/

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.

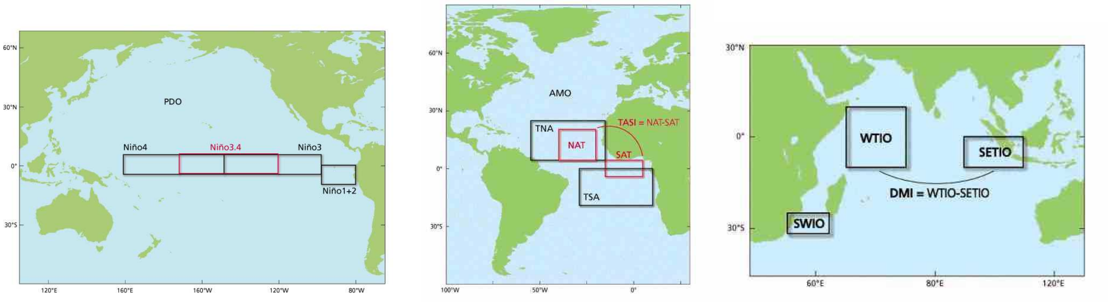
II.10. « NINO », SOI INDICES AND OCEANIC BOXES

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).

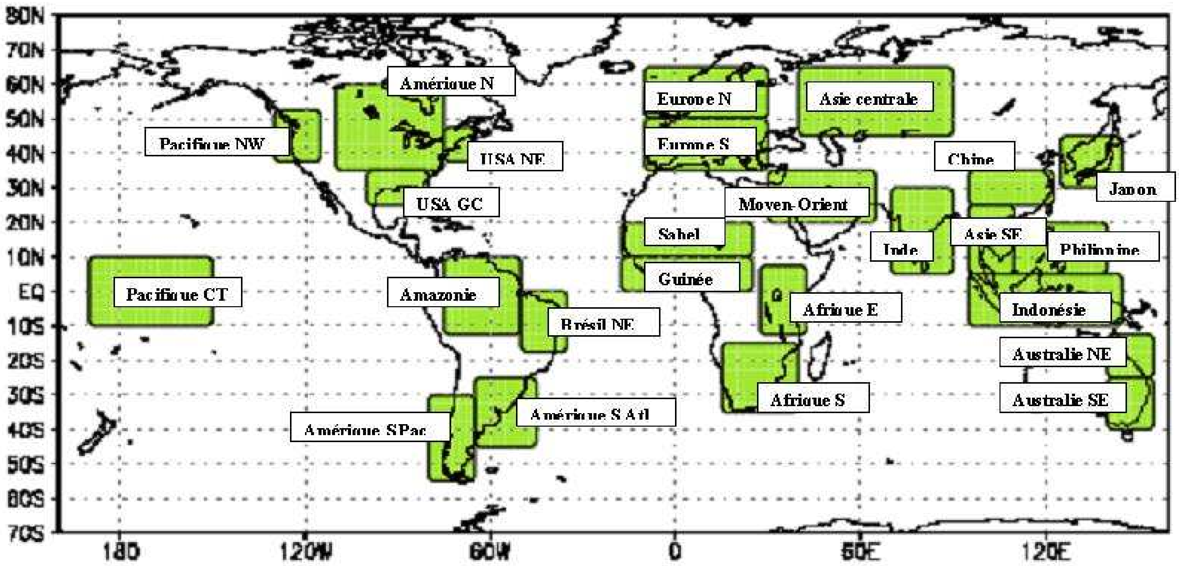
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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