WMO RA VI RCC Network

METEO FRANCE
Toujours un temps d'avance

GLOBAL CLIMATE BULLETIN
n°211 – January 2017

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DESCRIPTION OF THE CLIMATE SYSTEM (NOVEMBER 2016)

OCEANIC ANALYSIS

I.1.a Global analysis

In the Pacific ocean and around the Maritime Continent :

Along the equator and at the surface: Visible Niña structure (slight reinforcement to the east of 180 °). Average monthly anomaly of -0.6 ° C in the Niño 3.4 zone: below the La Niña threshold.
In subsurface, the warming started in October on the western part of the basin (from Nvelle-Guinea to around 150/130 ° W) continues in November: it will probably contribute to the death of La Niña in the coming months. Arrival of cooling on the coasts of South America and Central America (between 15 ° S and 15 ° N). This is in accordance with the normal chronology of the phenomenon. Overall, the heat content is negative from longitude 180 ° to the Ecuadorian coast.
On the North Pacific: positive PDO (+0.53 according to NOAA http://www.ncdc.noaa.gov/teleconnections/pdo/) which is strengthening following the cooling of the northeast Pacific in November.

In the Indian Ocean :

Continued decrease in East - West contrast, but the IOD remains in the negative phase (DMI = -0.2 in November according to MERCATOR - Ocean). Upholding of negative SST anomalies from southern Australia to the Chagos archipelago. Heat content is always important along Sumatra and Java.

In the Atlantic:

Warming of the centre of the North Atlantic between 30 ° N and 55 ° N. The negative anomaly of SST of the North Atlantic is still present, although weakening in November in its southern part.
Persistence of slight positive anomalies of SST on the tropical and equatorial Atlantic, as well as the Caribbean region.

In the Mediterranean:

Overall positive SST anomalies ; Slight cooling on the western part of the basin.

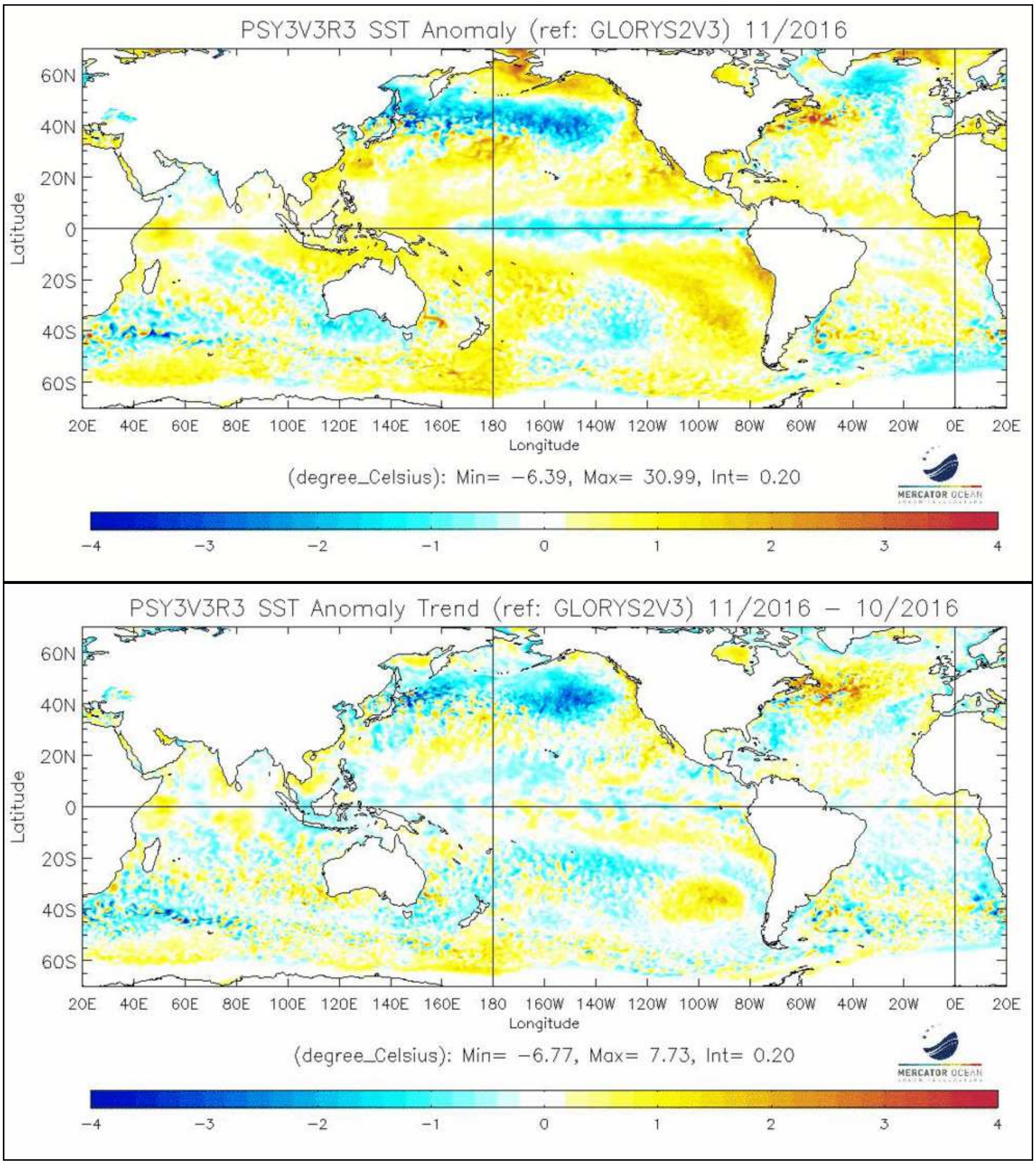


fig.I.1.1: top : SSTs Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

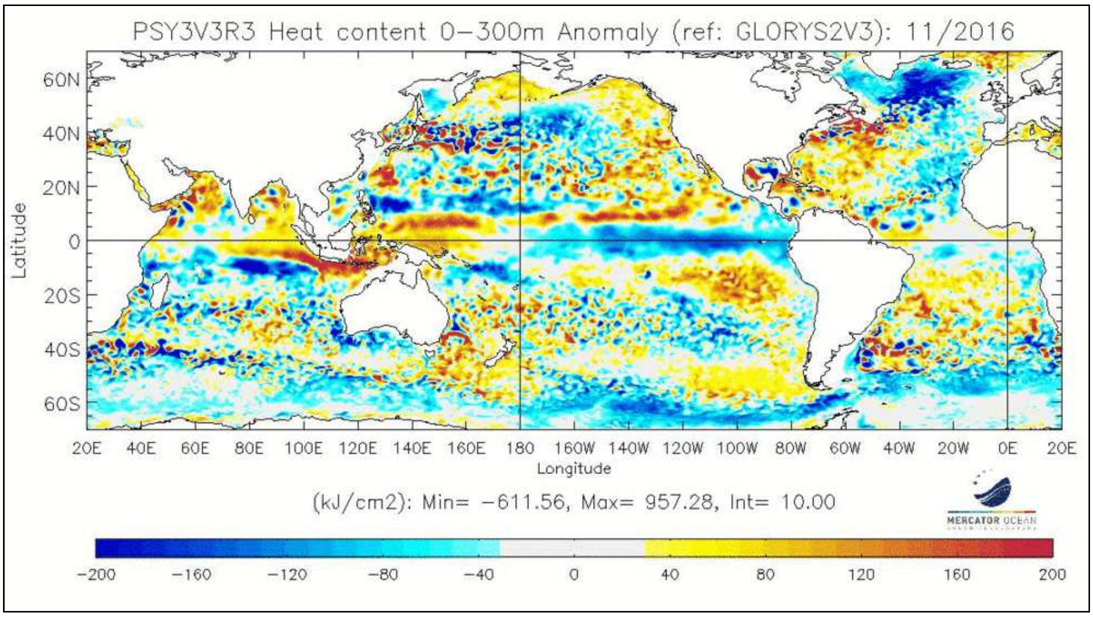


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2009)

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

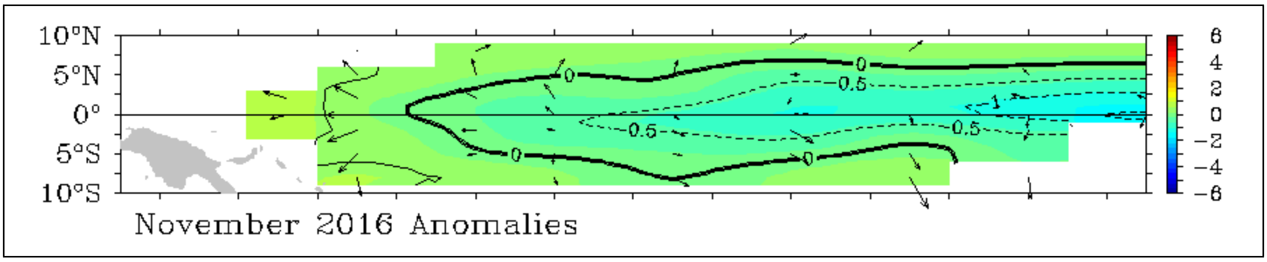


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON.

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

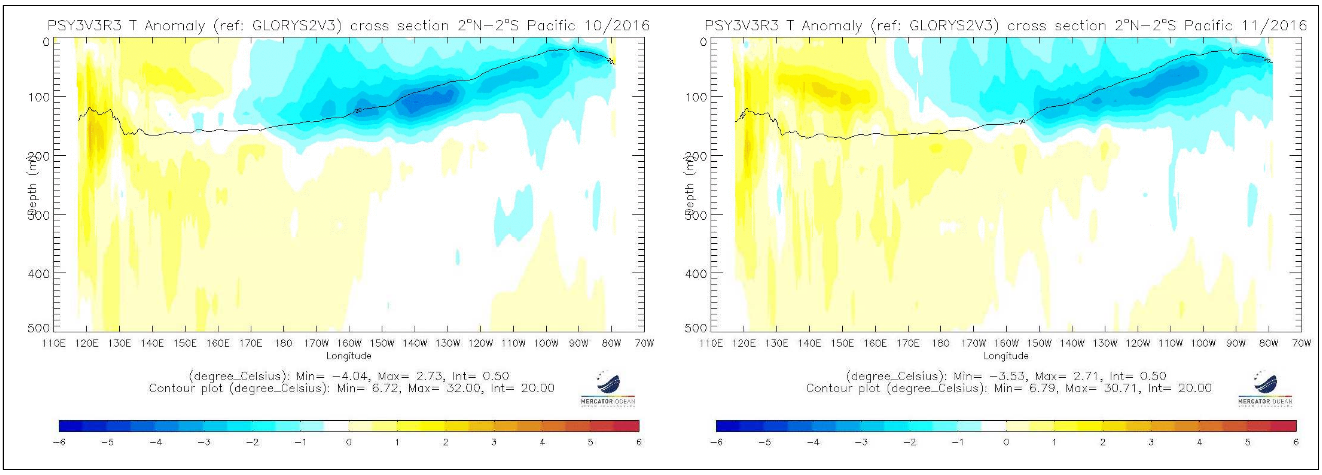


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month), http://bcg.mercator-ocean.fr

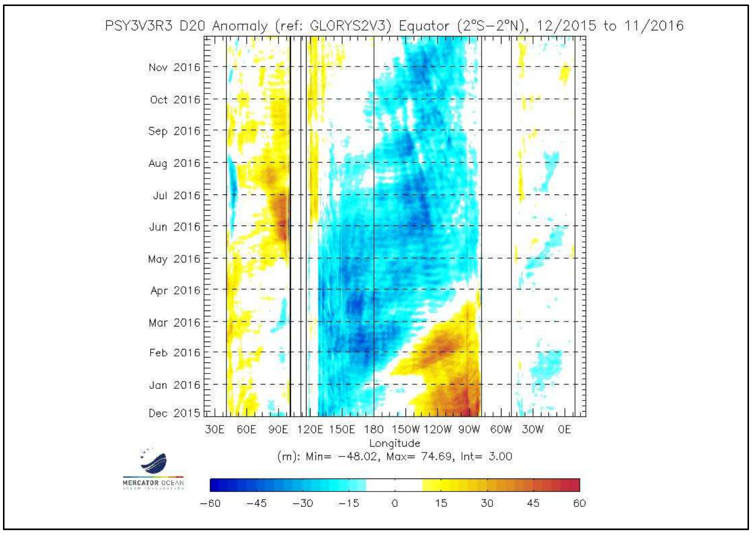


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period http://bcg.mercator-ocean.fr/

I.1.b Sea surface temperature Near Europe

The SST anomalies north of Iceland and eastern of Greenland increased compared to October, especially around Svalbard because no sea ice had been developed. The SST anomalies in the Baltic Sea decreased in comparison to October. Colder-than-normal SST anomalies occurred in the central North Atlantic (an area from Iceland, Ireland and Newfoundland) but increased compared to October.

The Mediterranean Sea was also warmer than normal (like in October) except some parts of the Aegean and Black Sea.

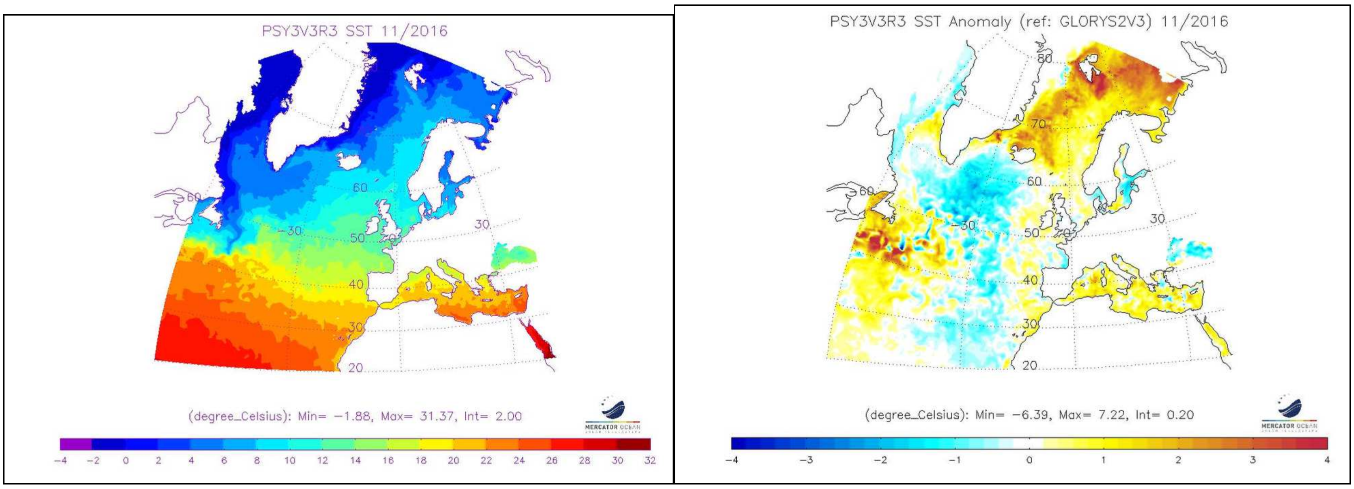


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

ATMOSPHERE

I.1.c General Circulation

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

Anomalies of downward motion on the eastern Pacific basin (compatible Niña), and of upward motion further west (from the maritime continent to New Zealand, also compatible Niña). Anomalies on the Indian Ocean side are consistent with the (still) negative phase of IOD. The anomalies in the Atlantic and in Africa may be related to the strong activity of the MJO in November in these regions (see below).

SOI :

Negative value in November (-0.1 standardized, see https://www.ncdc.noaa.gov/teleconnections/enso/indicators/soi/), which reflects a low-intensity Niña (we should have a positive SOI for a strong Niña). The trade winds are reinforced in the western Pacific (see http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/sumgif/cac_mon.gif). Overall, this Niña has low impacts on the Pacific atmospheric circulation.

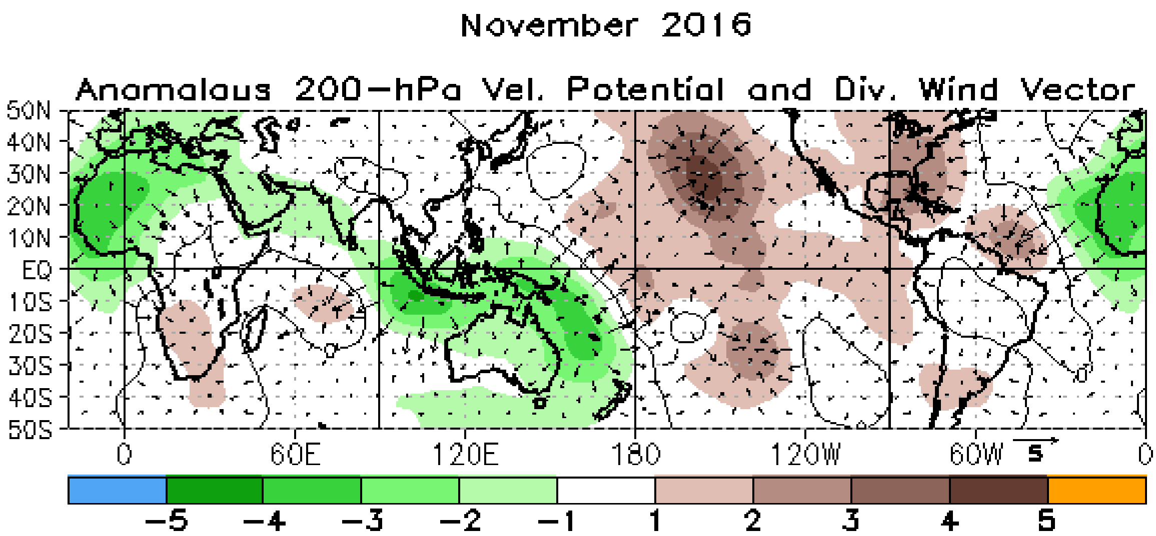


fig.I.2.1: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).

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

MJO (fig. I.2.1.b)

Strong activity of the MJO (almost one round of the globe in November), in particular cadrants 7 and 8 (from the western Pacific to Africa).

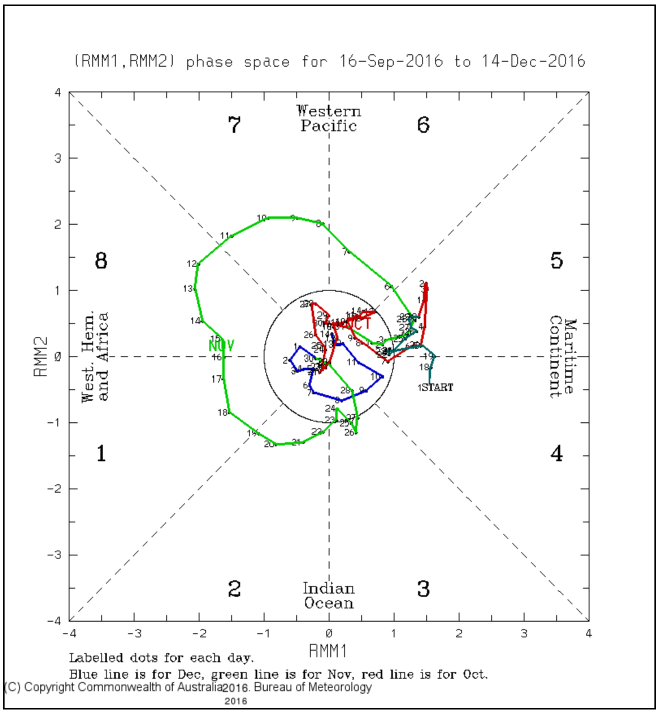


fig.I.2.b: MJO index http://cawcr.gov.au/staff/mwheeler/maproom/RMM/phase.Last90days.gif

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

Anomalies mainly related to the extratropical dynamics. No visible teleconnections from the tropics to extratropical latitudes.

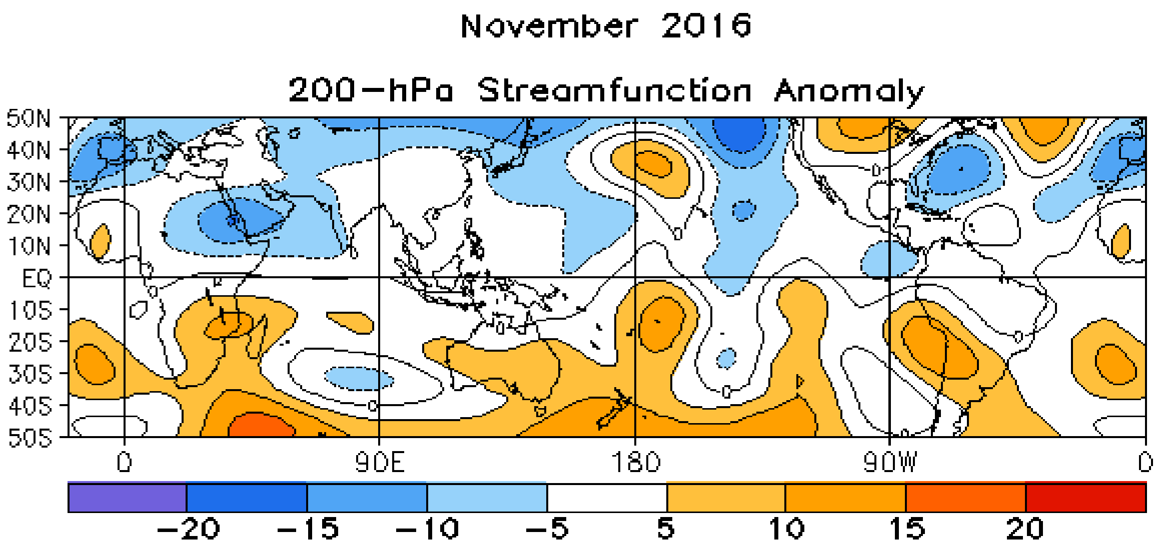


fig.I.2.2: Stream Function Anomalies at 200 hPa.

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

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

Positive anomalies on Canada, North Atlantic (Atlantic ridge, 210% Atl dorsal regime in November) and the eastern half of the Arctic: PNA = +1.4 (PNA should be negative in Niña...), NA0 = -0.3 not very active, EA = -0.4 (innovation because was positive for months).

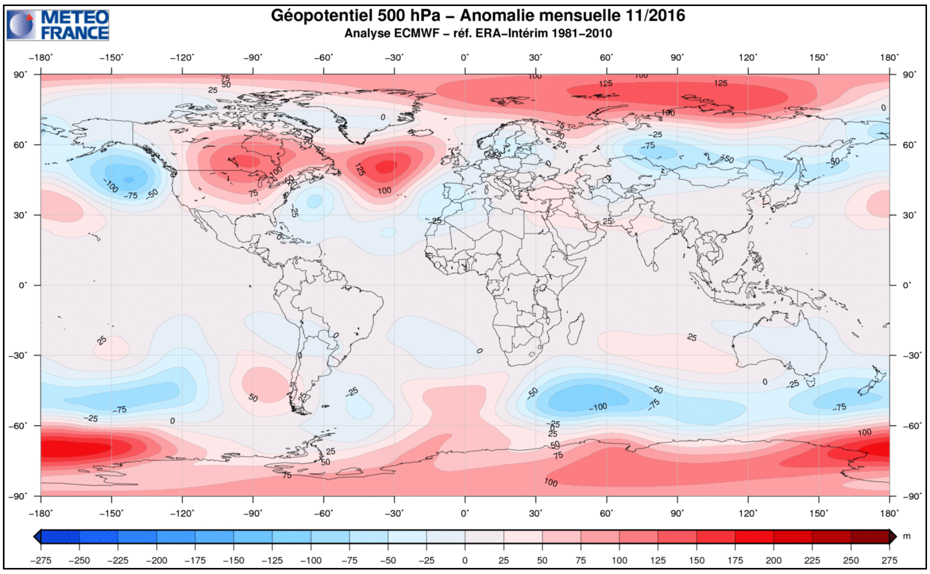


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
NOV 16	-0,3	-0,4	1,0	-1,4	1,4	---	-0,9	-0,1	-2,8
OCT 16	1.0	0.4	0.5	-0.8	1.5	---	-1.3	1.1	-2.9
SEP 16	0.7	3.5	-1.8	-1.4	0.1	---	0.1	-1.0	-1.3
AUG 16	-2.2	2.1	-0.4	-0.4	-0.9	---	-3.3	-0.4	2.4
JUL 16	-1.7	1.8	-1.4	-0.4	0.5	---	-1.0	-0.7	-0.2
JUN 16	-0.1	0.4	-0.6	1.3	-0.6	---	-1.9	-1.0	-1.1

Evolution of the main atmospheric indices for the Northern Hemisphere for the last 6 months :

http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/table3.shtml

Sea level pressure and circulation types over Europe

Both centres of action, the Islandic low and Azores high, were well developed but shifted to the north-west. A second high pressure area occurred in south-eastern Europe with a core pressure above 1030 hPa in Kazakhstan.

Negative pressure anomalies were found in in south-western (below -2 hPa in Spain) and north-western Europe (below -4 hPa in northern Greenland). The positive anomalies in the central North Atlantic showed values of more than 10 hPa. The second area with positive anomalies around the Kara Sea showed values of more than 12 hPa.

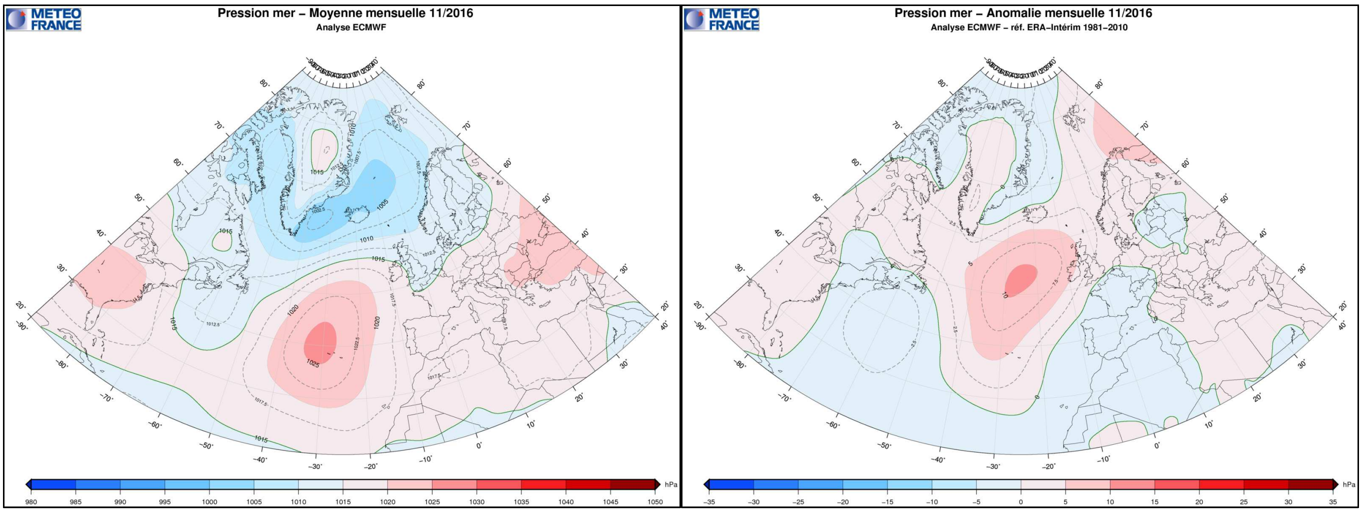


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (left) and 1981-2010 anomalies (right).

Circulation indices: NAO and AO

The NAO was during most of the month in a negative phase. The intense positive phase from 12 to 16 November reflects the situation when low pressure was established over Iceland and high pressure over the Azores.

The AO index in November had a similar shape like the NAO except the beginning of the month. Therefore both indices showed small negative values.

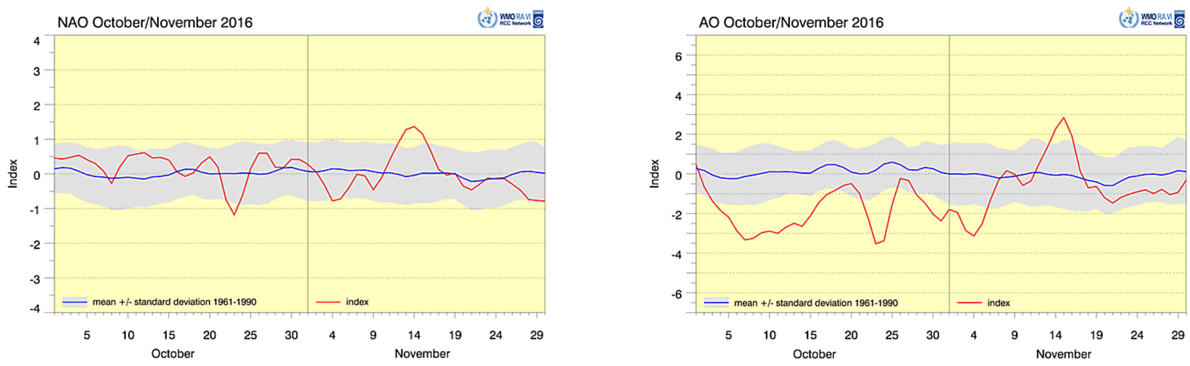
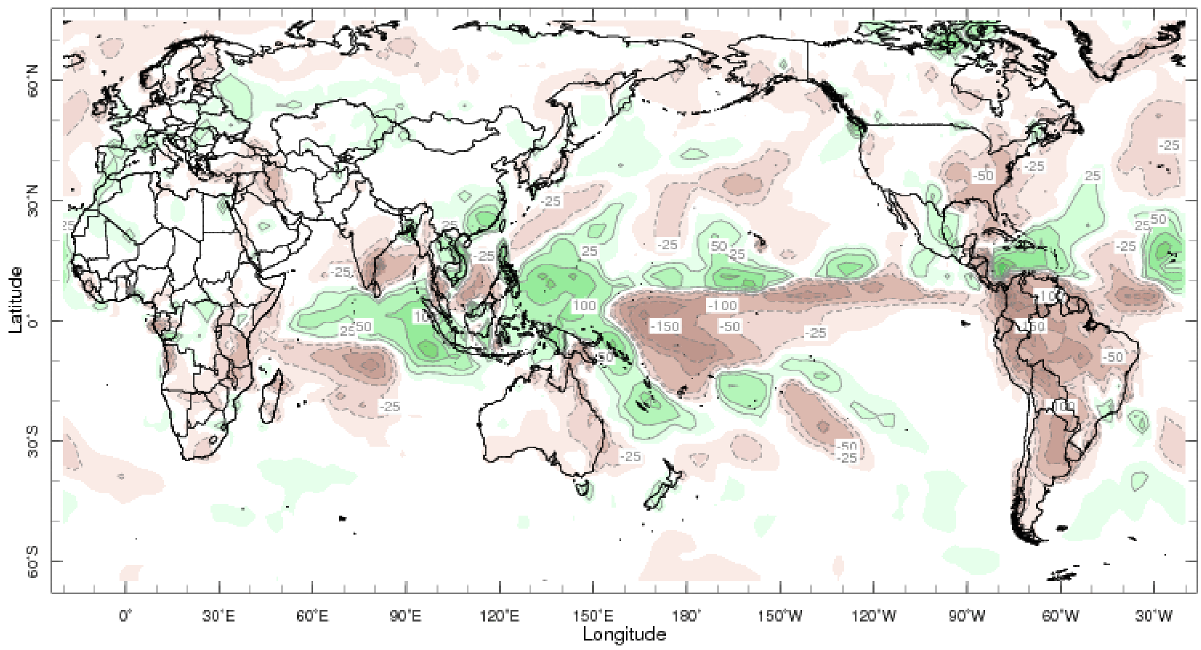


fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.1.d Precipitation

Apart from the Pacific and the South American coasts, Niña impacts are missing.



Nov 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:

Northern Europe was relatively dry due to the cold temperatures. Southern Europe was wetter than normal at some locations extremely wet. Spain registered locally more than 300% of the normal monthly precipitation. In southern France (Cévennes) during 3 days a precipitation total at station Villefort of 490.2 mm was measured (217.6 mm only on 21st). On the 22nd of November 2016 a daily precipitation of 583.0

mm/24h at station Fiorino (Northern Italy, 290 m asl; this daily amount had a return period of more than 300 years) was observed.

In Croatia and Montenegro monthly precipitation totals of more than 400 mm were recorded. In Turkey at several stations monthly precipitation records were broken with totals of more than 200 mm.

The Norwegian Arctic stations also reported new precipitation records. Hornsund (77.0°N, 15.5°E) received the highest monthly precipitation amount with 158.3 mm (no normal yet available). Svalbard airport received 58 mm, which is 387% of normal, and the wettest November since the start of the measurements in 1975. Ny-Ålesund measured 153.4 mm (465% of normal) and also the highest daily precipitation of the Arctic stations with 86.8 mm on the 8th of November. It is the highest November daily precipitation ever recorded since measurements began in 1974.

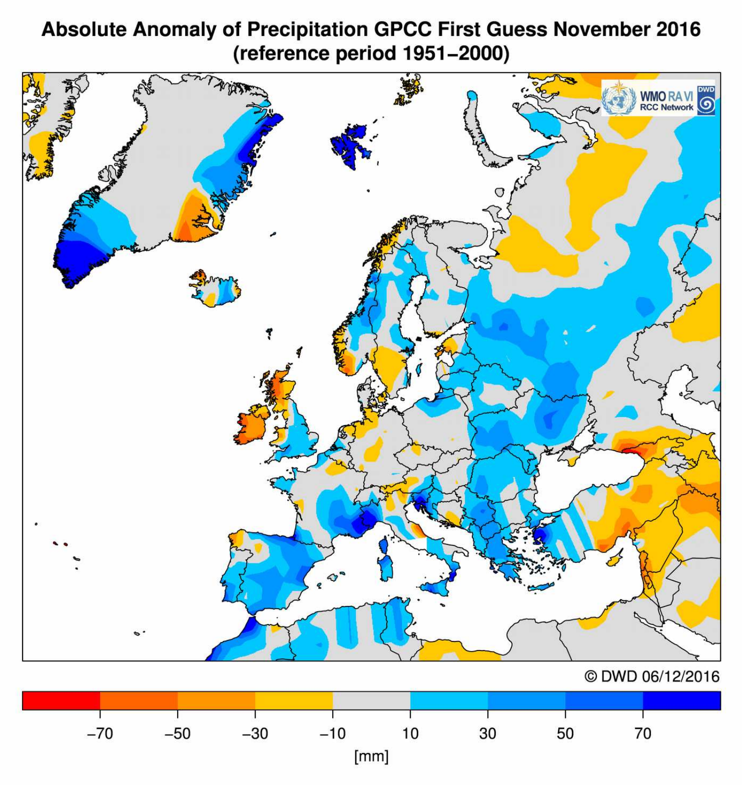


fig.I.2.7: Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm.

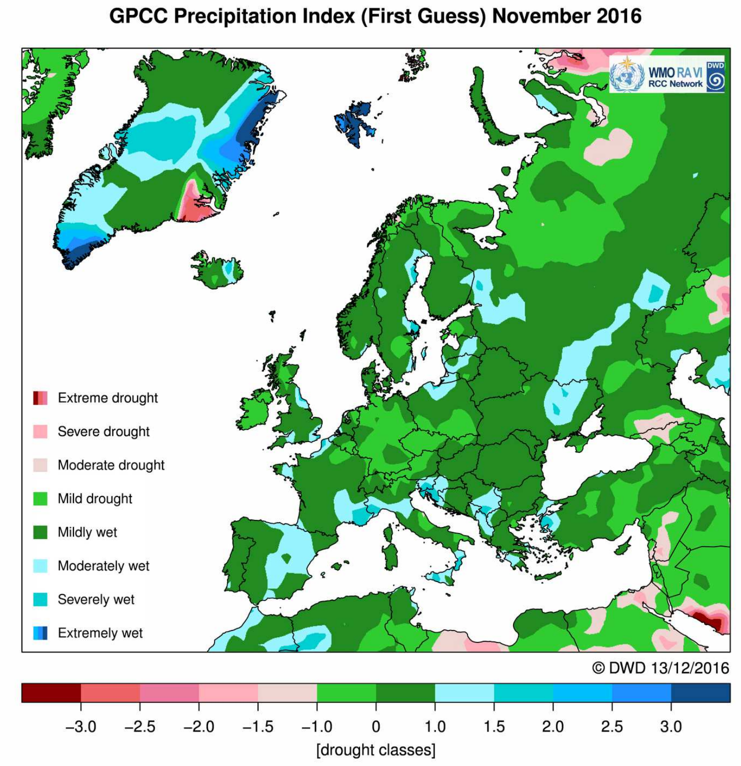


fig. I.2.8: GPCP Precipitation Index http://www.dwd.de/rcc-cm .

"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	GPCC Drought Index
Northern Europe	Not Available	Not Available
Southern Europe	Not Available	Not Available

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.1.e Temperature

Very warm in Canada, cold in Siberia. Note the outstanding positive anomalies on the Arctic (linked to a late freeze-see below).

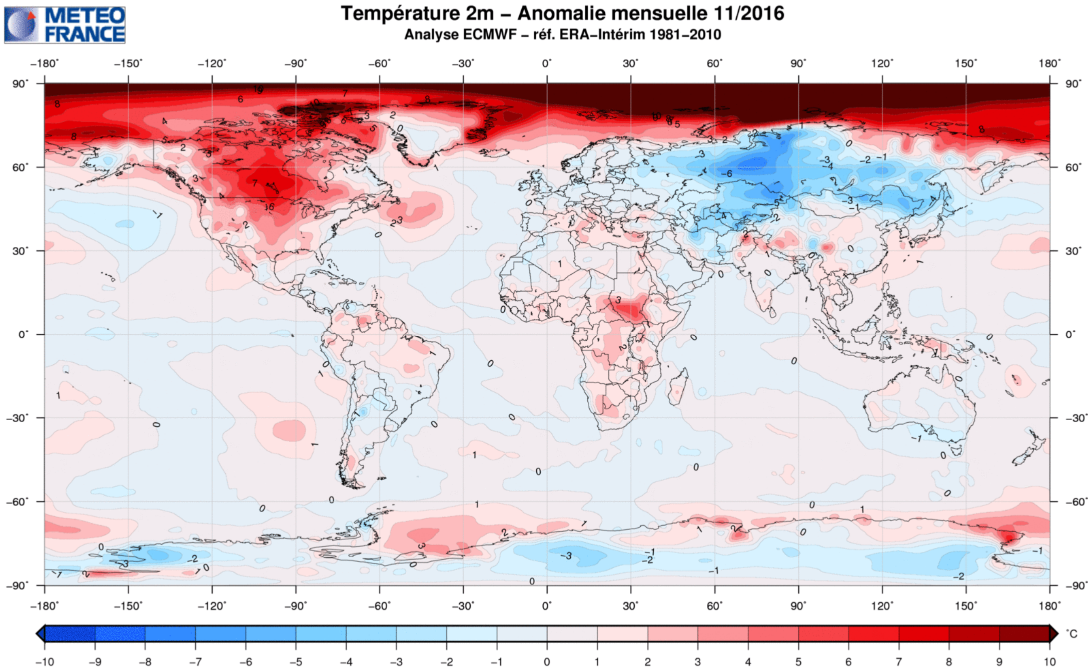


fig.I.2.9: Temperature Anomalies (°C) (Meteo-France)

“Temperature anomalies in Europe:

Most of northern Europe and especially eastern Europe were colder than normal. The lowest monthly mean temperature anomalies were observed in the European part of Russia with new daily minimum temperature records for November. Station Folldal-Fredheim (Norway) registered a minimum temperature of -33.5°C on the 8th of November.

The Arctic was again extremely warm. Svalbard airport reported a new average temperature record of -0.7°C (9.6°C above normal and 1.2°C above the old November record from 2009) this November is the 72nd consecutive months of positive anomalies. Ny-Ålesund had a mean temperature of -1.7 ° C (8.3°C above normal, and 1.1°C above the previous record from 1993). Temperature at the Wiese-Island (Russia) with a monthly mean of -4.3°C showed the highest deviation from normal with +16.8°C.

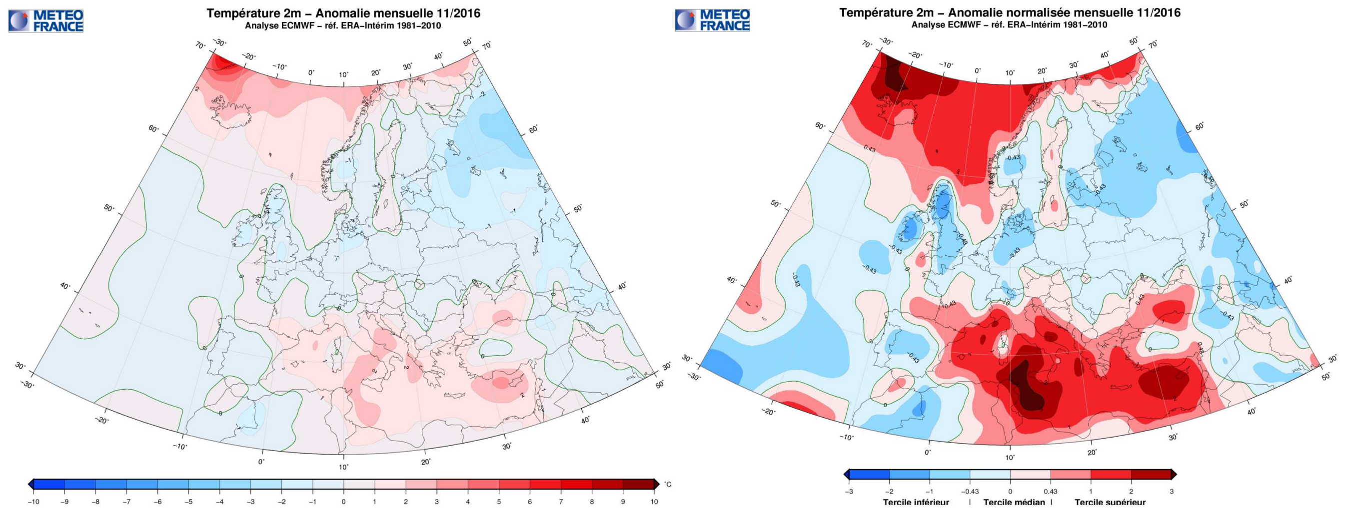


fig.I.2.10: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

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	Not Available
Southern Europe	Not Available

I.1.f Sea ice

This month of November 2016 is likely to remain in the memories of climatologists. Simultaneously the Arctic and Antarctic experienced their month of November of less ice extent since the beginning of the satellite measurements (1978-1979). And from far away. The situation is totally unprecedented and deserves to be monitored very closely. Globally, in November, planet Earth experienced a low record of sea-ice extension since the beginning of satellite measurements (late 1970s).

In the Arctic (fig. 1.2.11 and 1.2.12 - left) :Deficit of extension in record for a month of November (3.2 standard deviation!). In particular, Sea of Barents, Sea of Kara and Sea of Tchouktches. See http://nsidc.org/arcticseaicenews/files/1999/12/monthly_ice_11_NH.png.
In the Antarctic (fig. 1.2.11 and 1.2.12 - right) : The deficit of extension is dramatically record for a month of November (5.7 standard deviation!). See http://nsidc.org/arcticseaicenews/files/1999/12/monthly_ice_11_SH.png

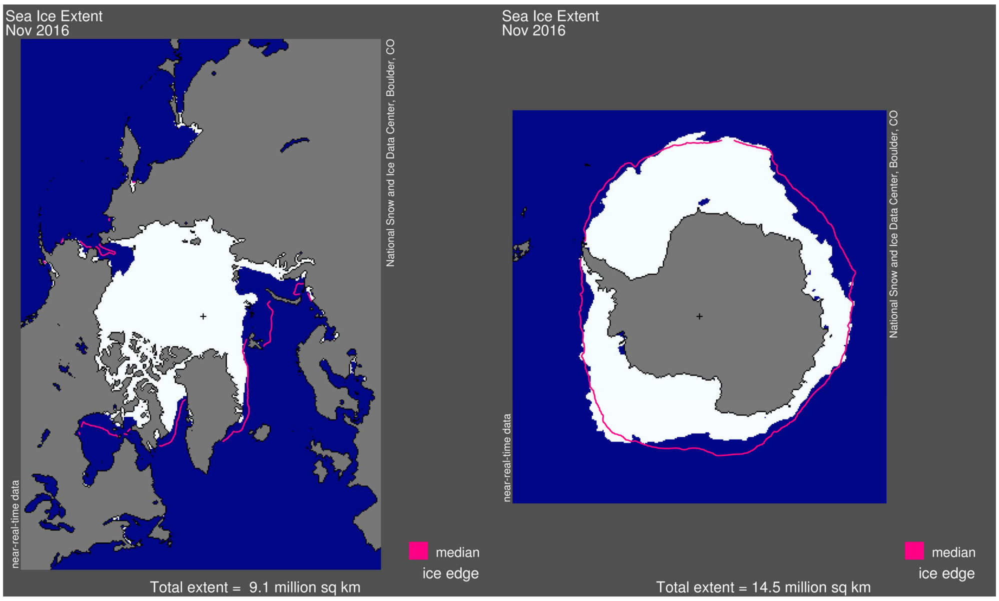


fig.I.2.11: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

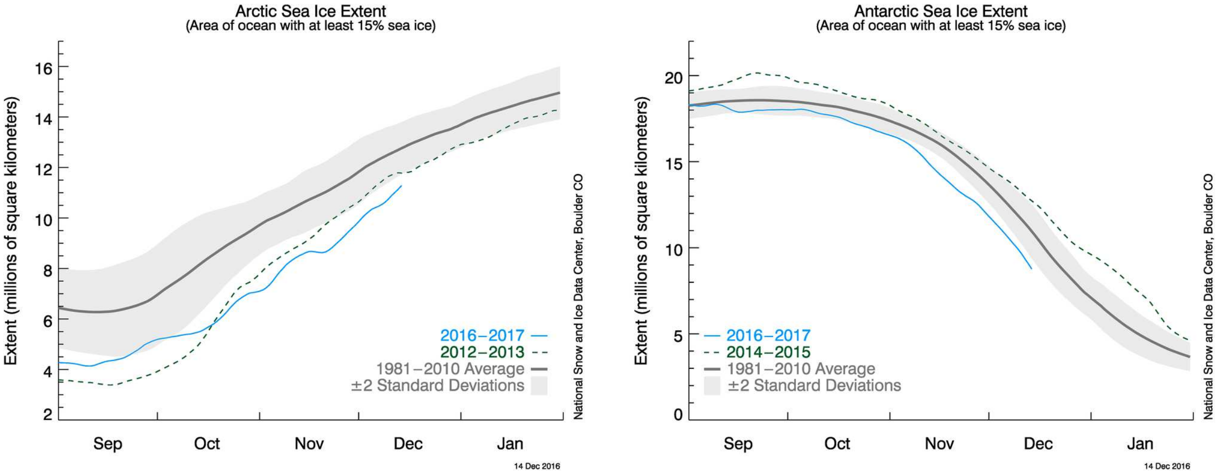


fig. I.2.12 : Sea-Ice extension evolution from NSIDC.

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

SEASONAL FORECAST FROM DYNAMICAL MODELS

Note : the new ARPEGE System 5 model contributes now to the EUROSIP consensus.

I.2. OCEANIC FORECASTS

I.2.a Sea surface temperature (SST, figure II.1.1 to II.1.4)

- Pacific Ocean: models are generally in good agreement with the gradual return to a neutral state in the equatorial rail, with a more or less rapid chronology (CEPMMT a little faster than the others). During the boreal spring, or early summer, we should no longer talk about the Niña. SST anomalies weak in the rail.
- Indian Ocean: DMI index (differences between SSTs in the west and east of the tropical Indian Ocean) should return to positive or zero values, reflecting the end of the negative phase of IOD.
- Atlantic Ocean: For the North Atlantic, persistence of the negative anomaly of the central basin more or less foreseen by the models. The equatorial Atlantic should be warmer than normal (ARPEGE, ECMWF), suggesting the probable development of an Atlantic Niño (usually 12/18 months after its big brother in the Pacific). The tropical North Atlantic is expected to return to normal values (ARPEGE and NCEP, ECMWF still a little warm).

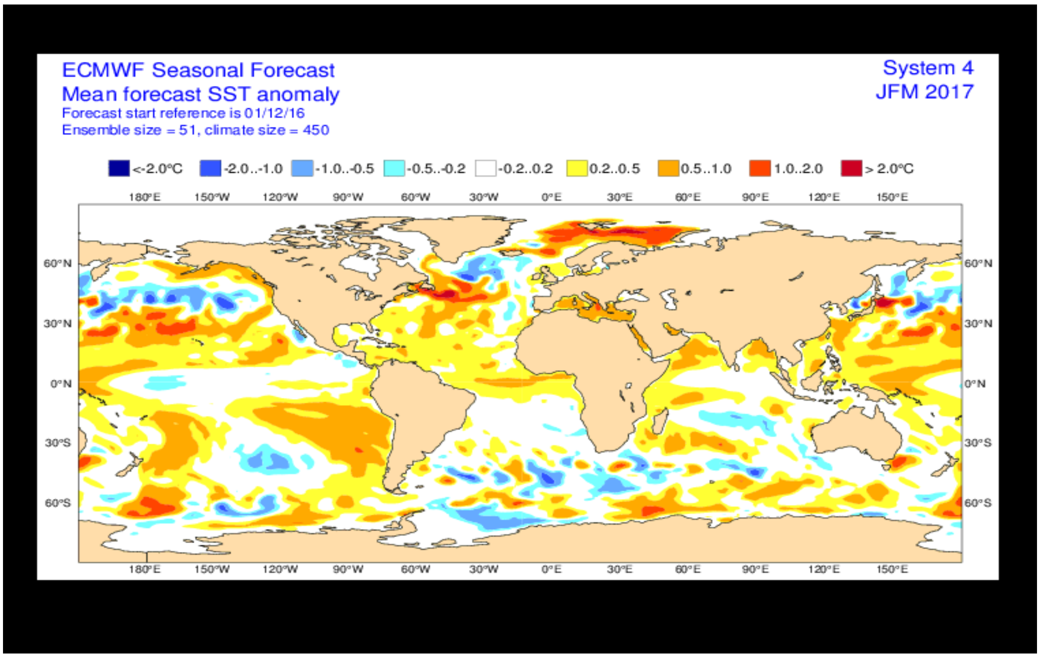


fig.II.1.1: SST anomaly forecast from ECMWF

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

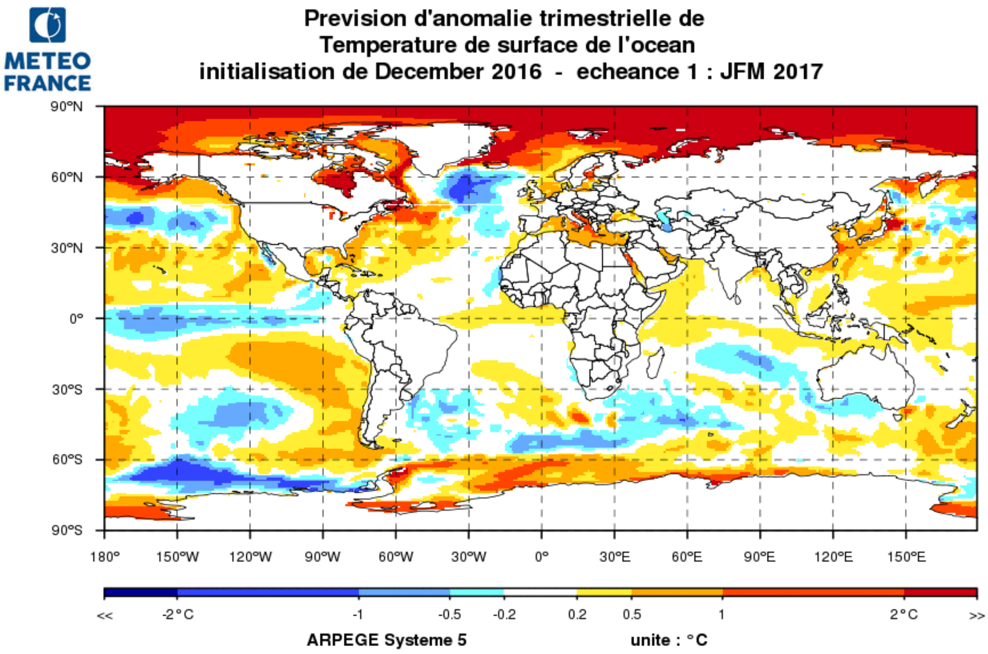


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).

http://elaboration.seasonal.meteo.fr

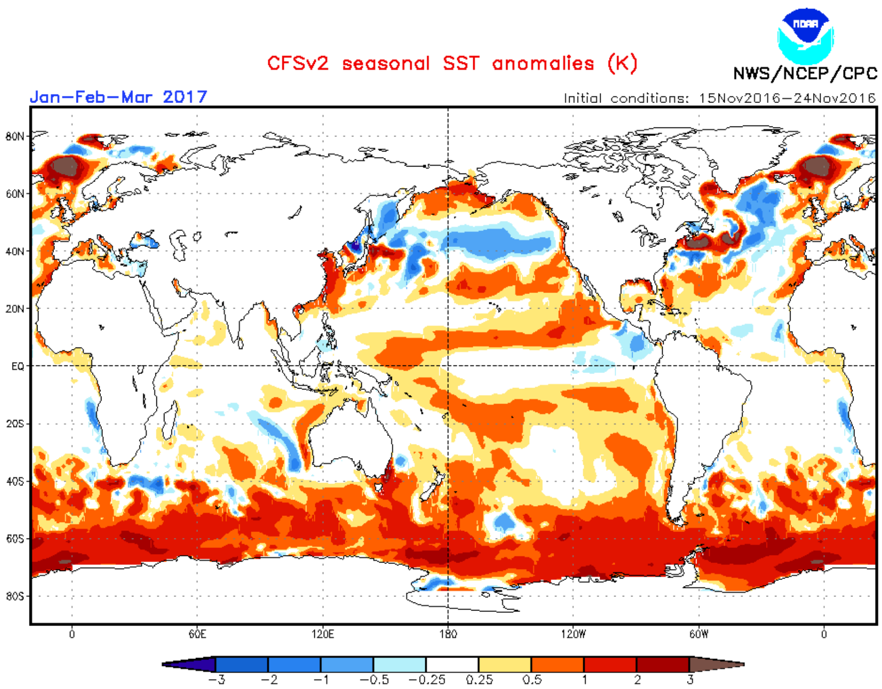


fig.II.1.3: SST anomaly forecast from NCEP.

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

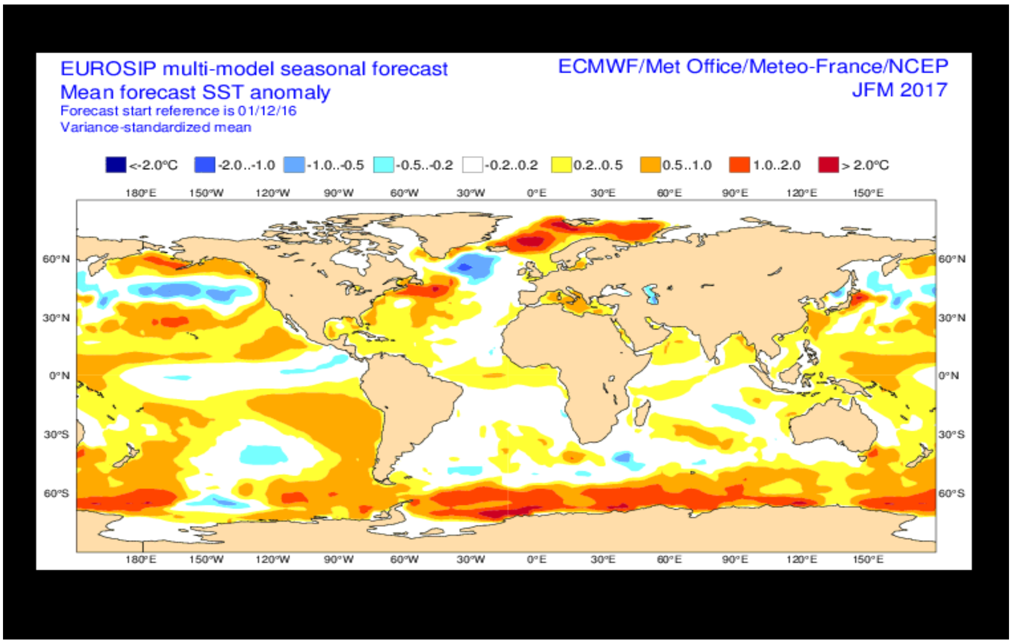


fig.II.1.4: SST Forecasted anomaly from Euro-SIP

I.2.b ENSO forecast :

Forecast Phase: *weak La Niña in evanescence.*

The trend over JFM 2017 is a gradual return to neutral conditions (Nino3.4> -0.5 ° C).

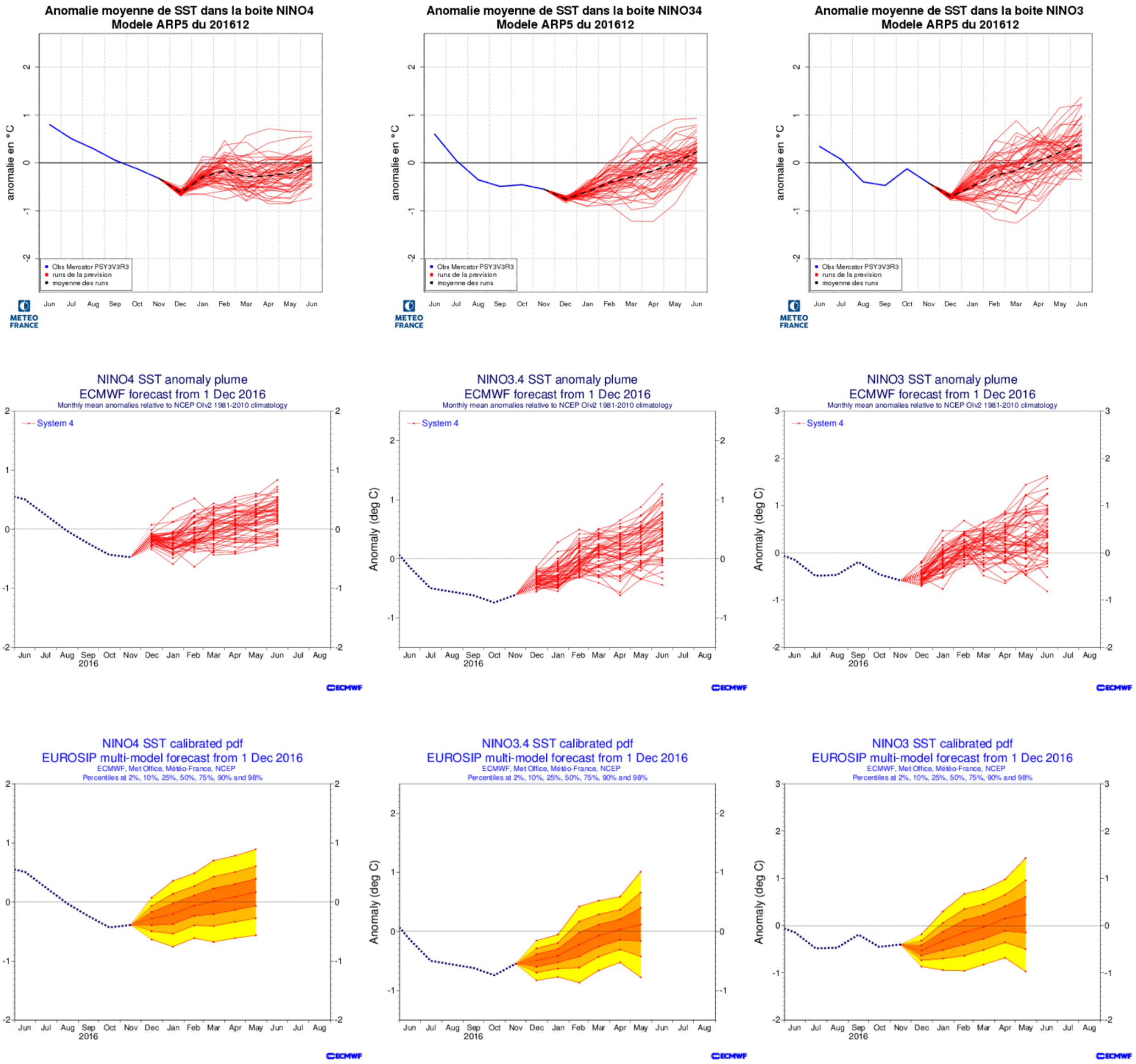


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - (http://elaboration.seasonal.meteo.fr , http://www.ecmwf.int/)

I.2.c Atlantic ocean forecasts

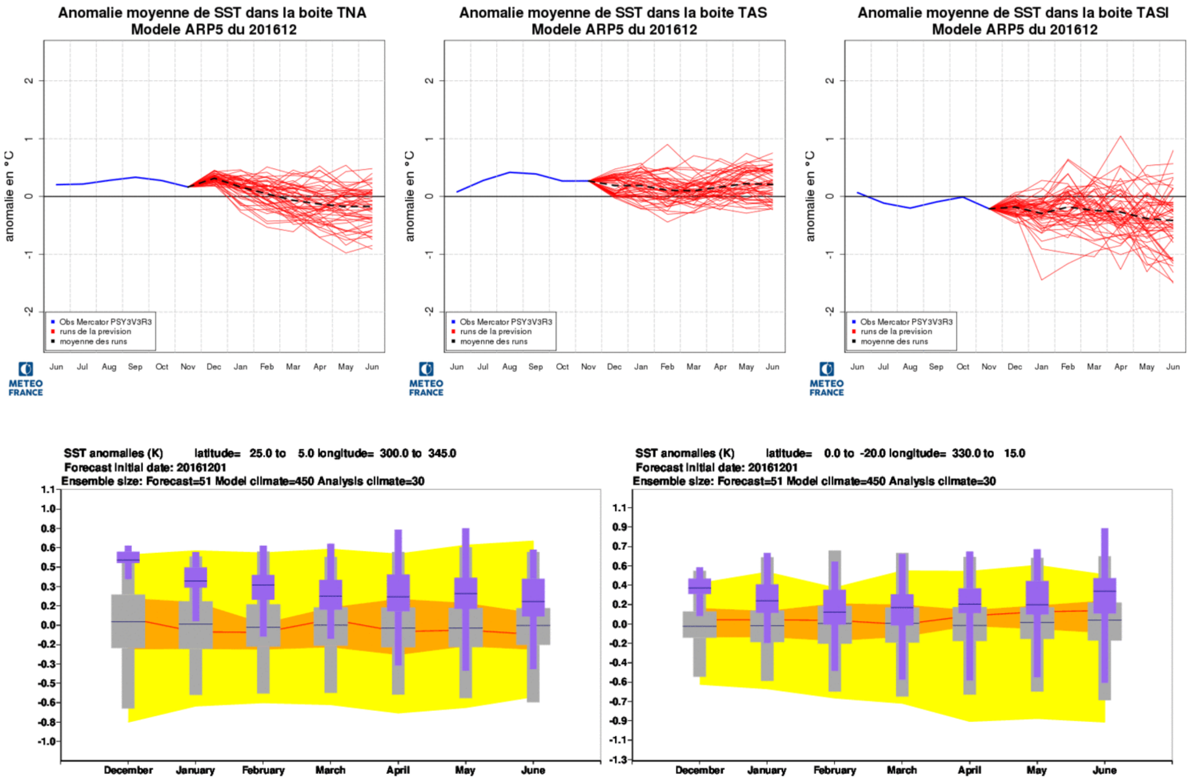
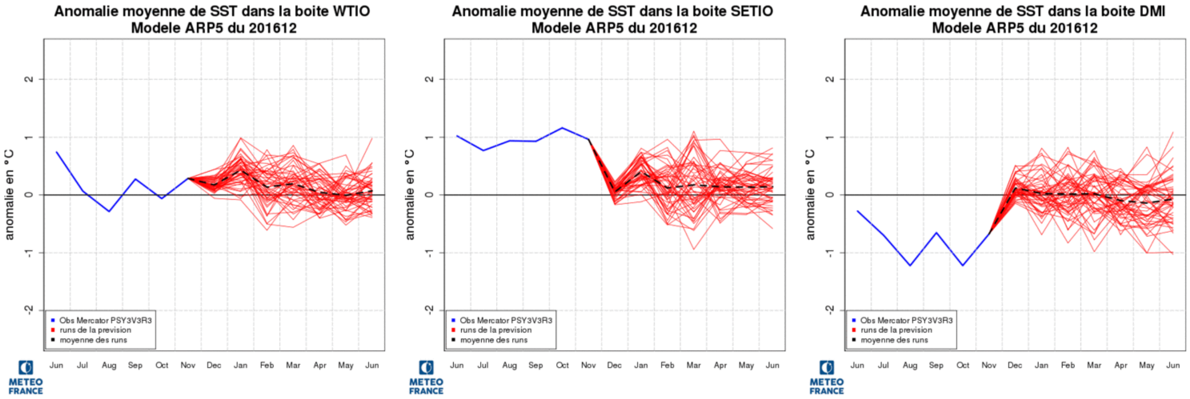


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

I.2.d Indian ocean forecasts



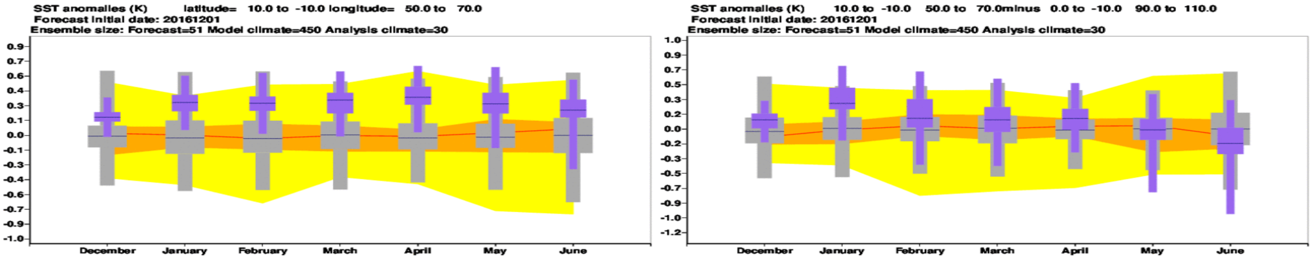


fig.II.1.7: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

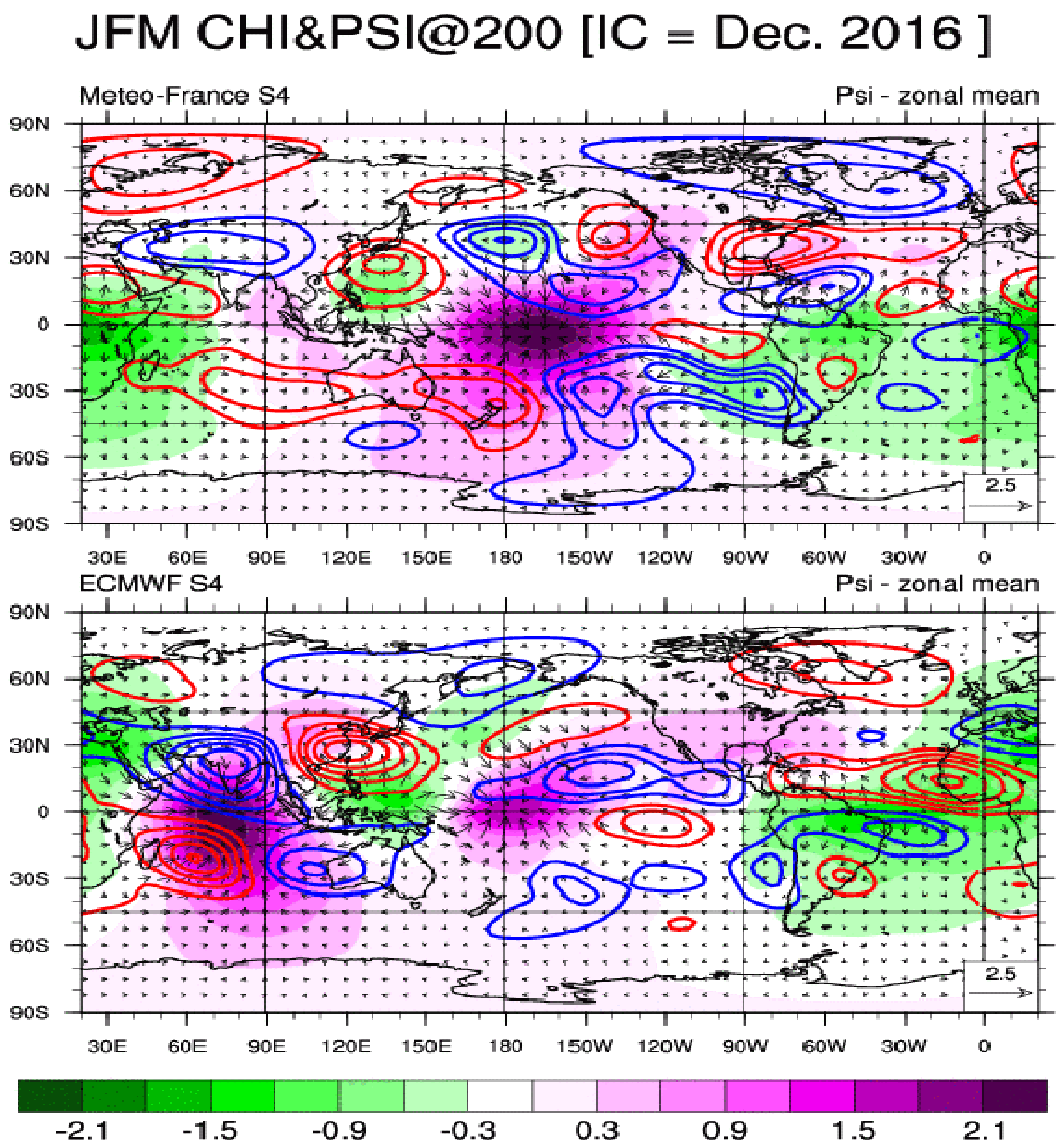
I.3. GENERAL CIRCULATION FORECAST

I.3.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):

Velocity potential : ARPEGE and CEPMMT very coherent on the Atlantic and the Pacific (ARPEGE still does not propose the small anomaly of upward motion present in CEPMMT in the north of New Guinea), but not on the Indian (CEPMMT seems to react strongly to the anomalies of SST present in its prediction on the center of this ocean). Answer rather type the Nina, otherwise. The JMA model has exactly the same pattern as CEPMMT. The response on the Atlantic could be the consequence of the positive anomalies of SST on the equatorial ocean (Nino Atlantic in the course of development?).

Stream Function anomaly : answer is slight. ARPEGE and CEPMMT often diverge: ARPEGE proposes a vague response style PNA-, which does not propose CEPMMT. On the North American continent, the North Atlantic and the Mediterranean, these two models diverge significantly. The JMA model is based on the same structures as ECMWF. On the tropical Atlantic, there is a consensus between the three models (impacts of the Atlantic Nino?). But the teleconnections to the highest latitudes are very weak and not positioned in the same places ...


JFM CHI&PSI@200 [IC = Dec. 2016]
Meteo-France S4
Psi - zonal mean
90N
60N
30N
0
30S
60S
90S
2.5
30E
60E
90E
120E
150E
180
150W
120W
90W
60W
30W
0
ECMWF S4
Psi - zonal mean
-2.1
-1.5
-0.9
-0.3
0.3
0.9
1.5
2.1

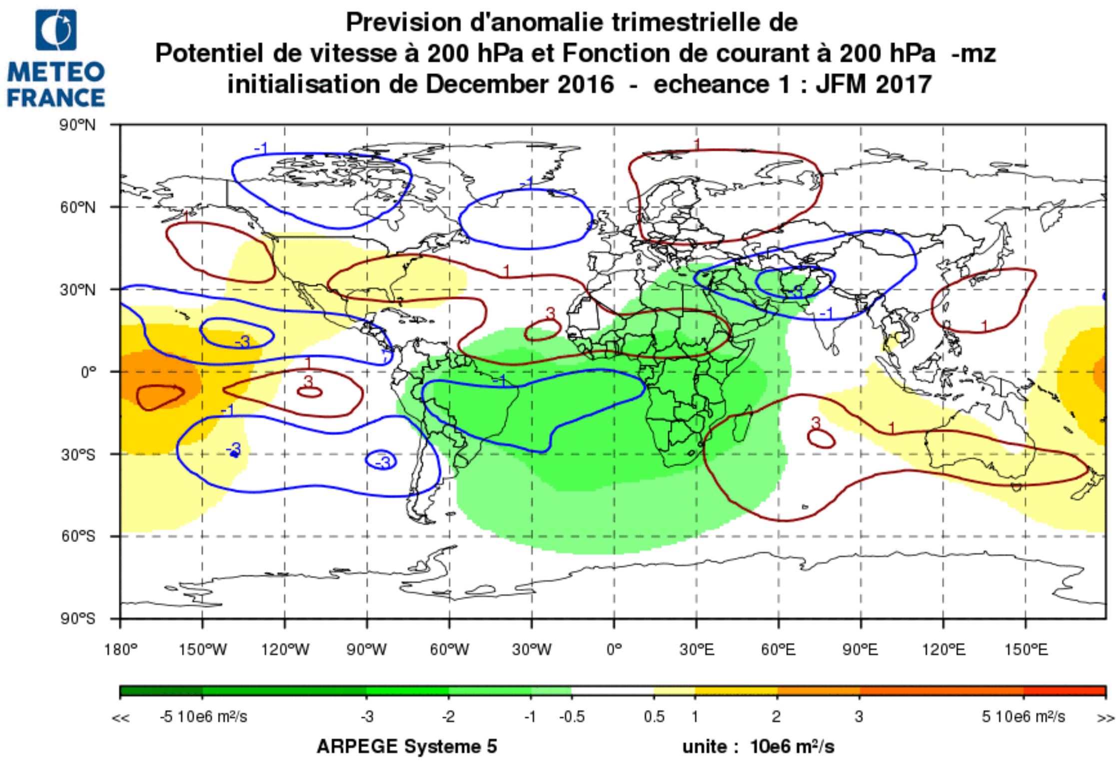


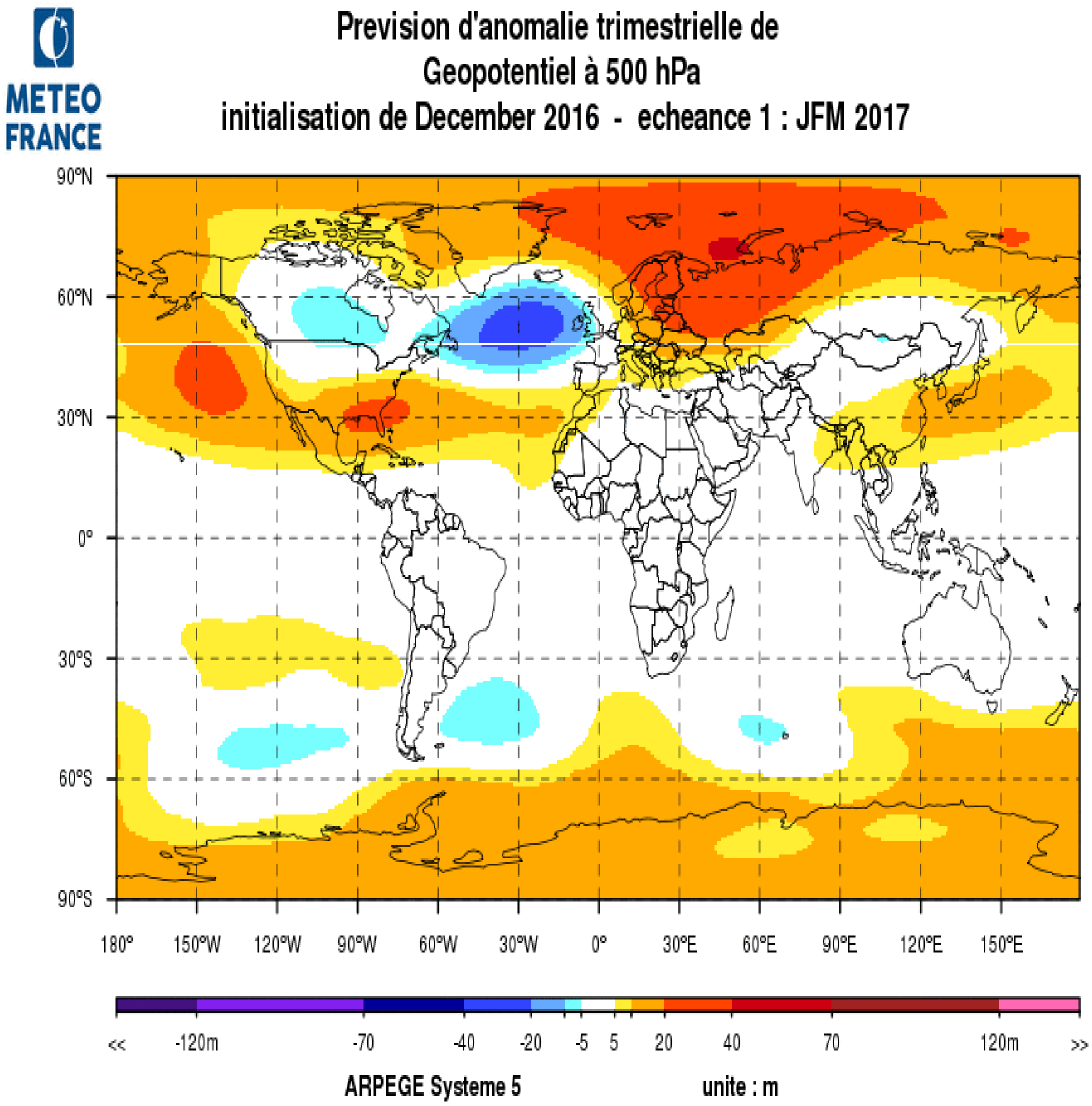
fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and yellow positive anomaly) and Stream Function anomaly ψ (isolines – red positive and blue negative in NH) at 200 hPa by Météo-France ARPEGE-S5.

I.3.b Northern hemisphere and Europe forecast

<u>Geopotential height anomalies</u> (fig. II.2.2 and II.2.3 – insight into mid-latitude general circulation anomalies) :

ARPEGE, CEP and JMA models agree to predict a positive Z500 anomaly on the Arctic basin with a weakened polar vortex. On the other hand, for the North Atlantic and Western Europe, the models diverge. Teleconnection from the tropical Atlantic not clear over Europe in Z500. On the North Atlantic, CEP seems to favor an EA- type circulation and especially Atlantic dorsal regimes (with an AO-phase and very low advantage to NAO-), ARPEGE proposes EA + (and also tends towards the NAO +), the JMA favors an average meridian circulation of the Atlantic dorsal type with a nice minimum on France (and also AO-).

The inspection of the Z500 forecasts of the 8 GPCs available on the date of realisation of this bulletin does not reveal a massive consensus but there is still a majority of the models (6/8) which proposes rather a circulation type EA + / NAO +. Moreover, on this set of models, most also develop a structure of PNA- (which is compatible with an ENSO-) relayed by the mode EA + on the Atlantic (probably forcing due to the equatorial warm Atlantic). This configuration seems credible.


METEO FRANCE
Prevision d'anomalie trimestrielle de
Geopotentiel à 500 hPa
initialisation de December 2016 - echeance 1 : JFM 2017
90°N
60°N
30°N
0°
30°S
60°S
90°S
180° 150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
<< -120m -70 -40 -20 -5 5 20 40 70 120m >>
ARPEGE Systeme 5
unite : m

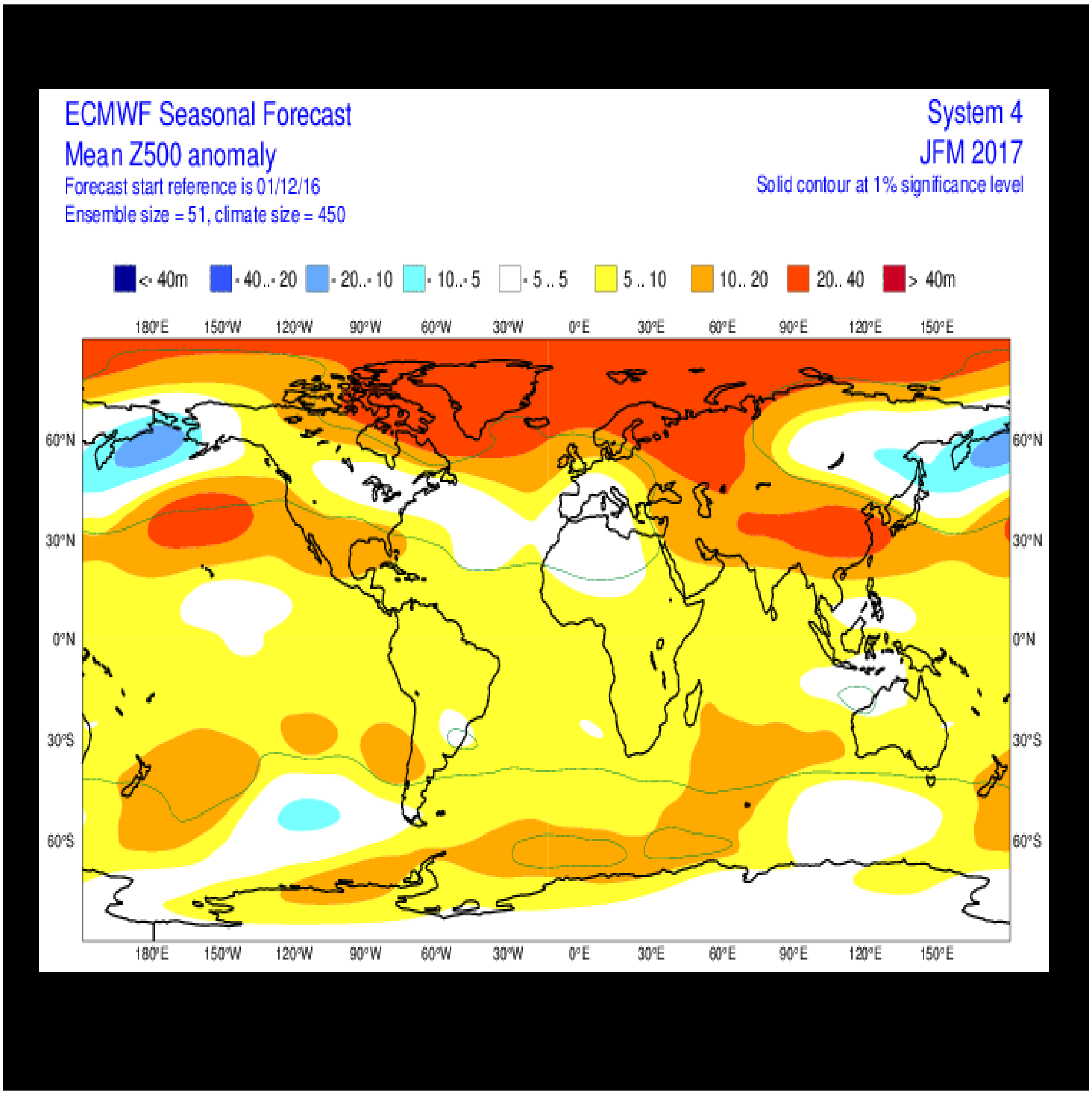
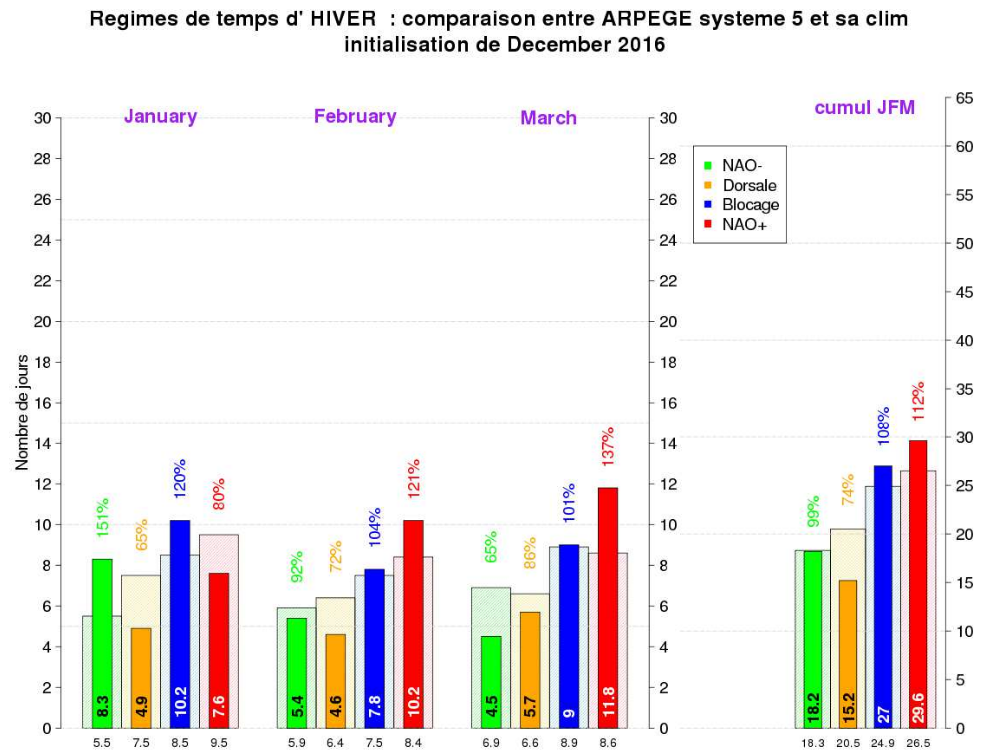


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France (top) and ECMWF (bottom).



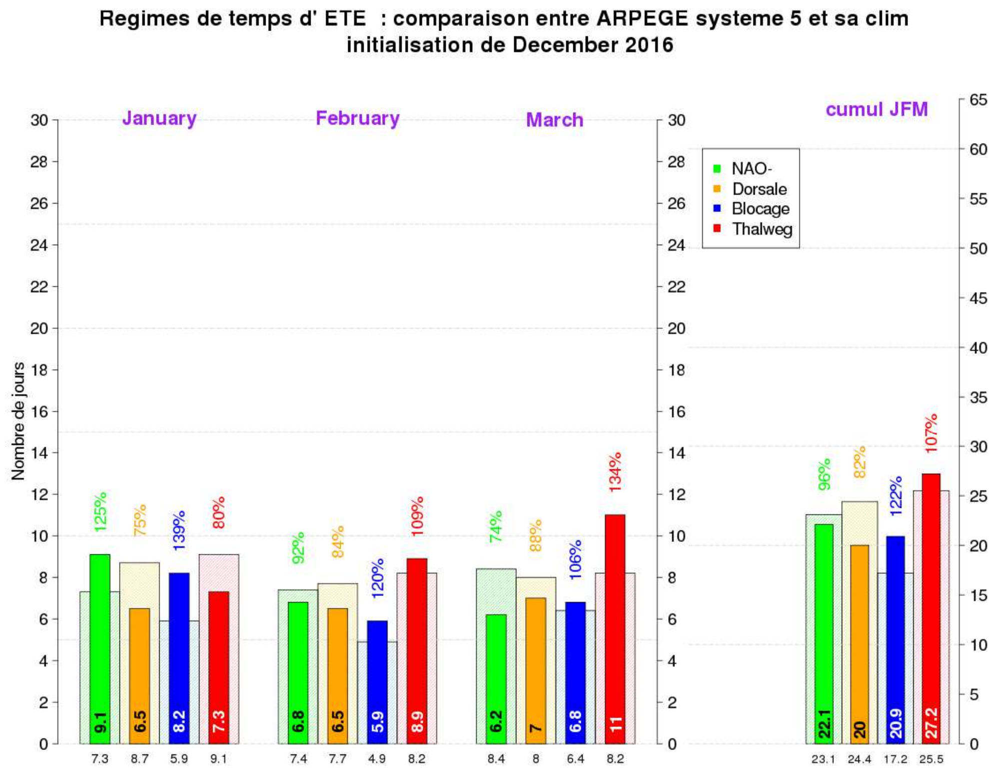


fig.II.2.3: North Atlantic Regime occurrence anomalies from Meteo-France ARPEGE-S5 : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes (winter regimes at the top, summer regimes at the bottom).

I.4. IMPACT: TEMPERATURE FORECASTS (FIGURE II.3.1 TO II.3.4)

For Europe, T2M forecasts are fairly consensual. Warm signal on the east of the Mediterranean. Conditions a little less warm on the western continent.

I.4.a ECMWF

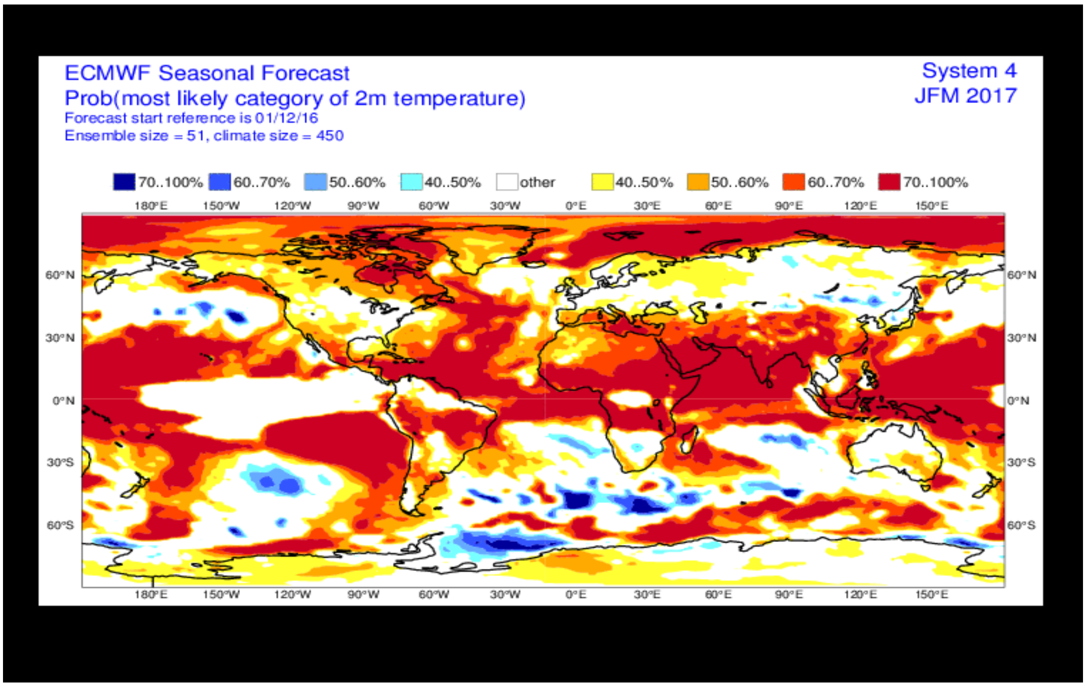


fig.II.3.1: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

I.4.b Météo-France

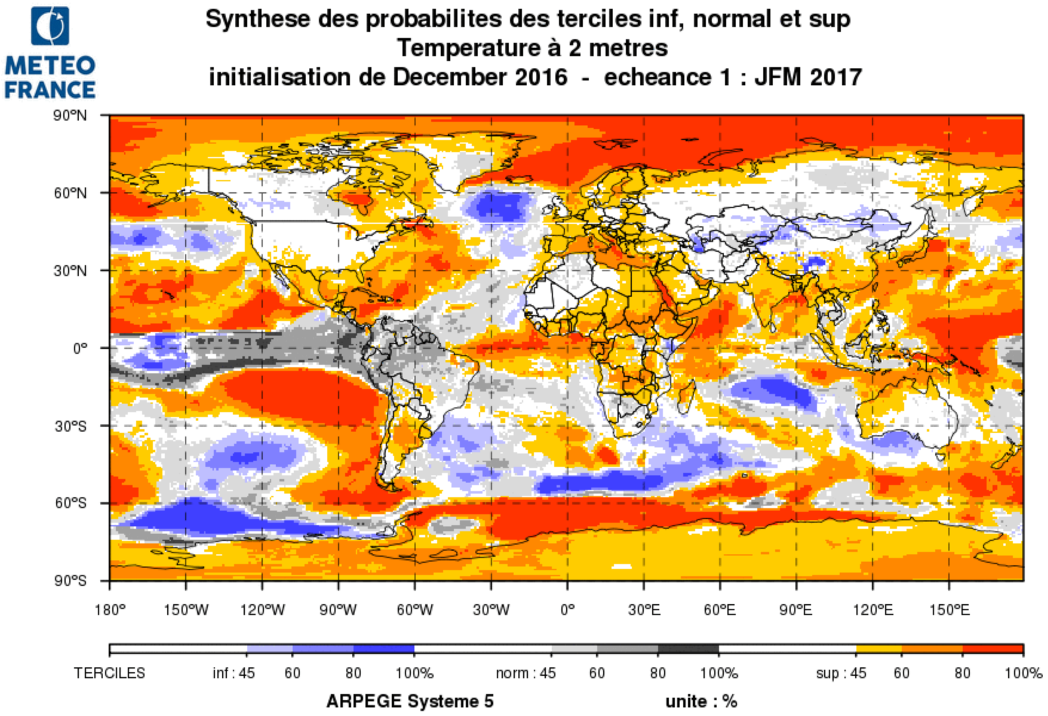


fig.II.3.2: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

I.4.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

I.4.d EUROSIP

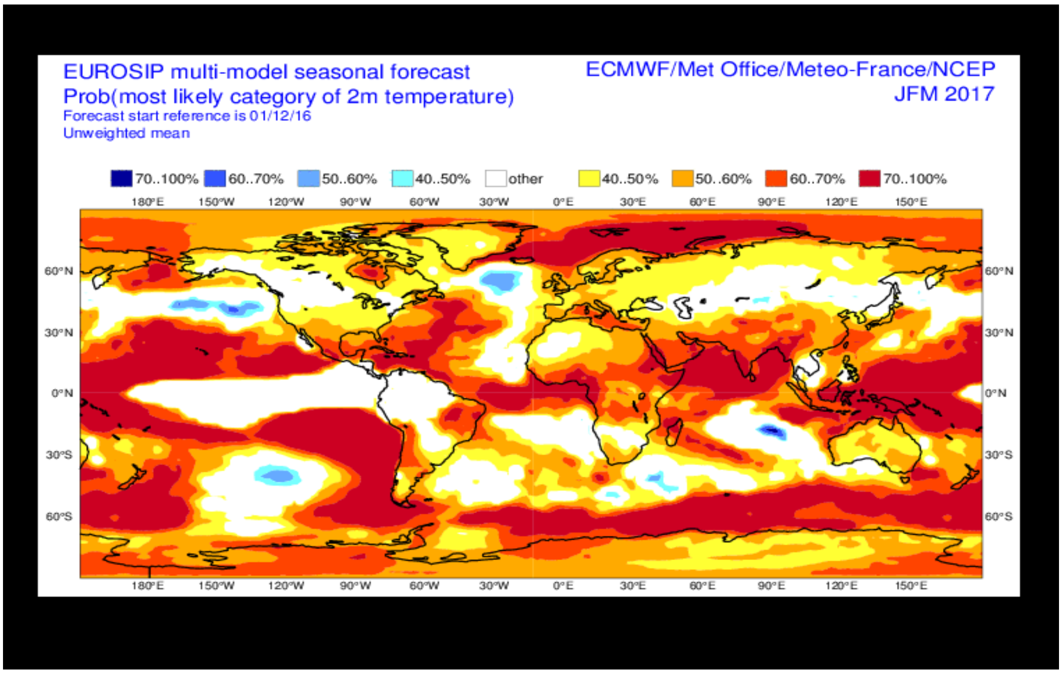


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).

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

I.5. IMPACT : PRECIPITATION FORECAST

Over Europe, no consensus.

I.5.a ECMWF

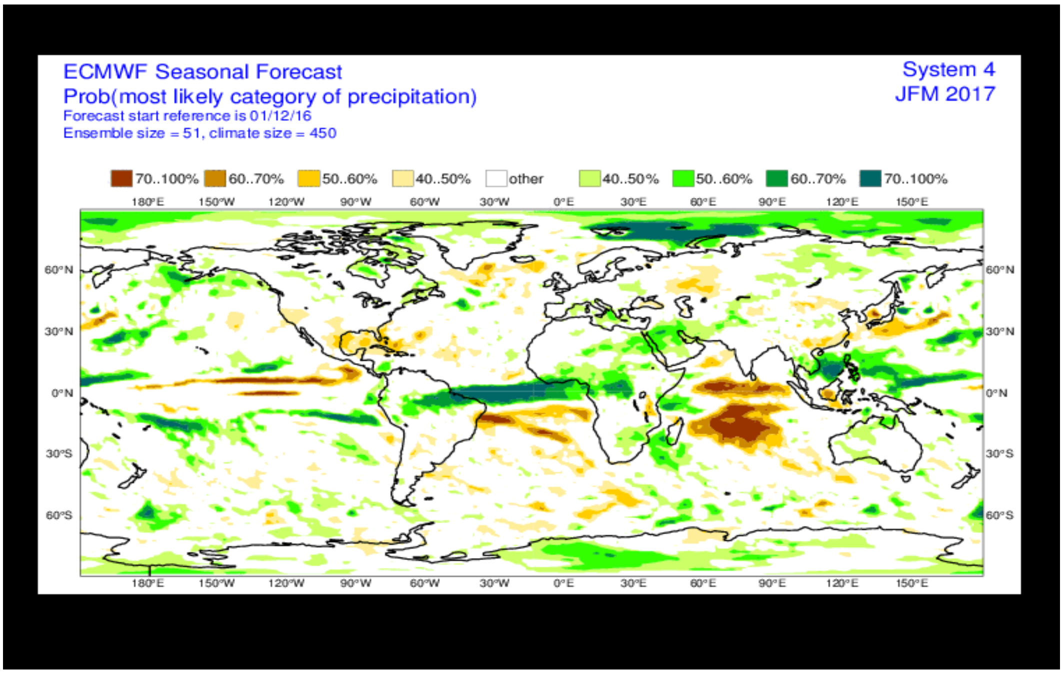


fig.II.4.1: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/

I.5.b Météo-France

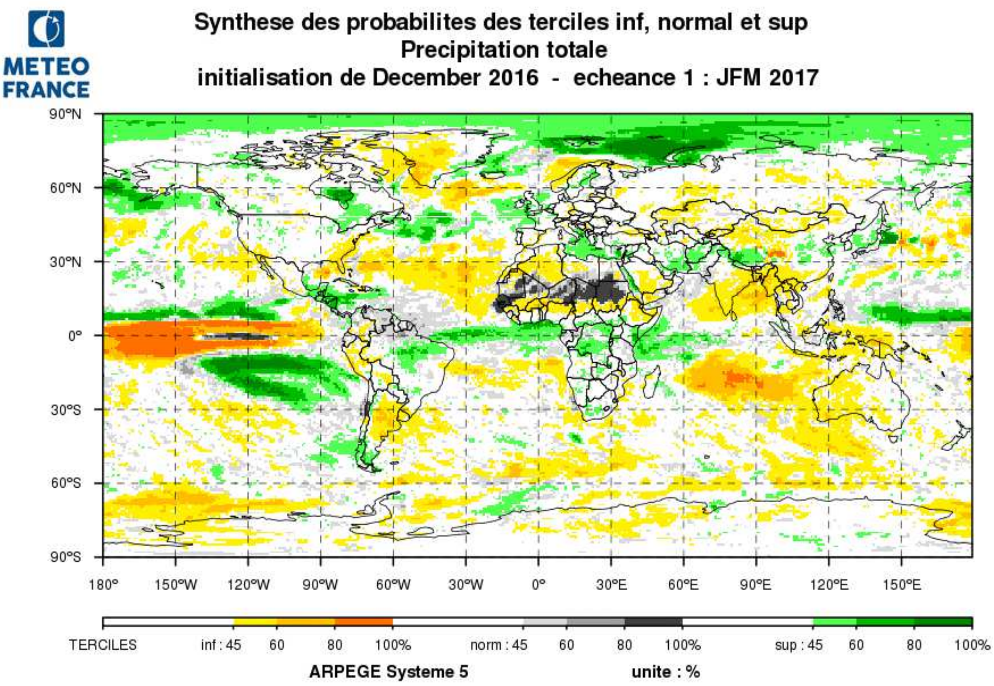


fig.II.4.2: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

I.5.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

I.5.d EUROSIP

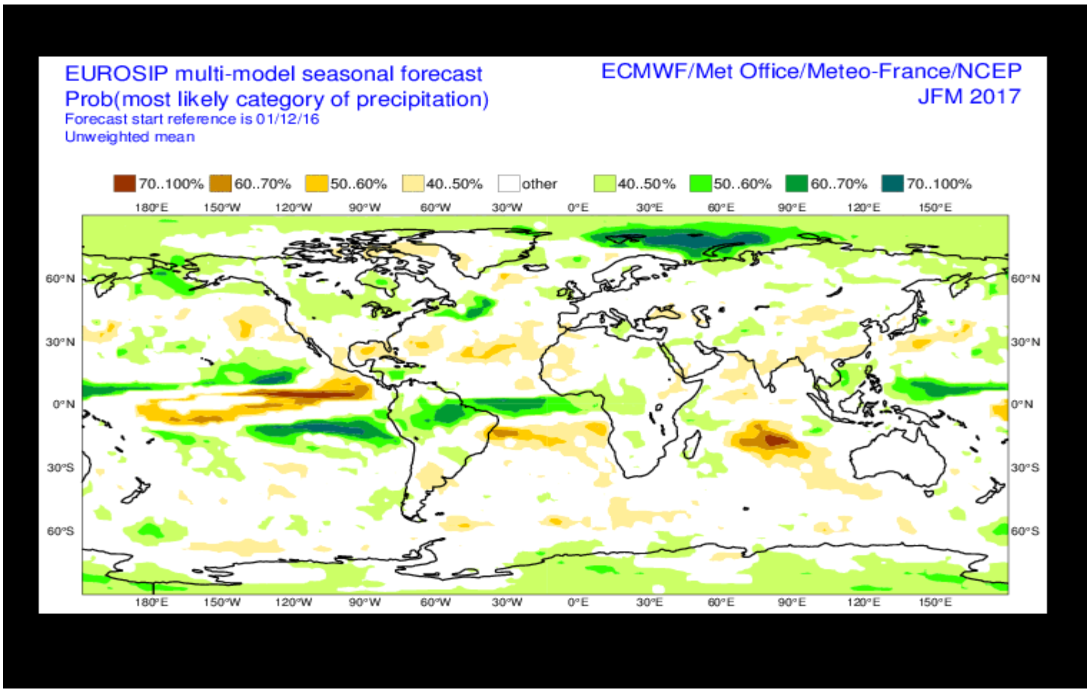


fig.II.4.7: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/

I.6. REGIONAL TEMPERATURES AND PRECIPITATIONS

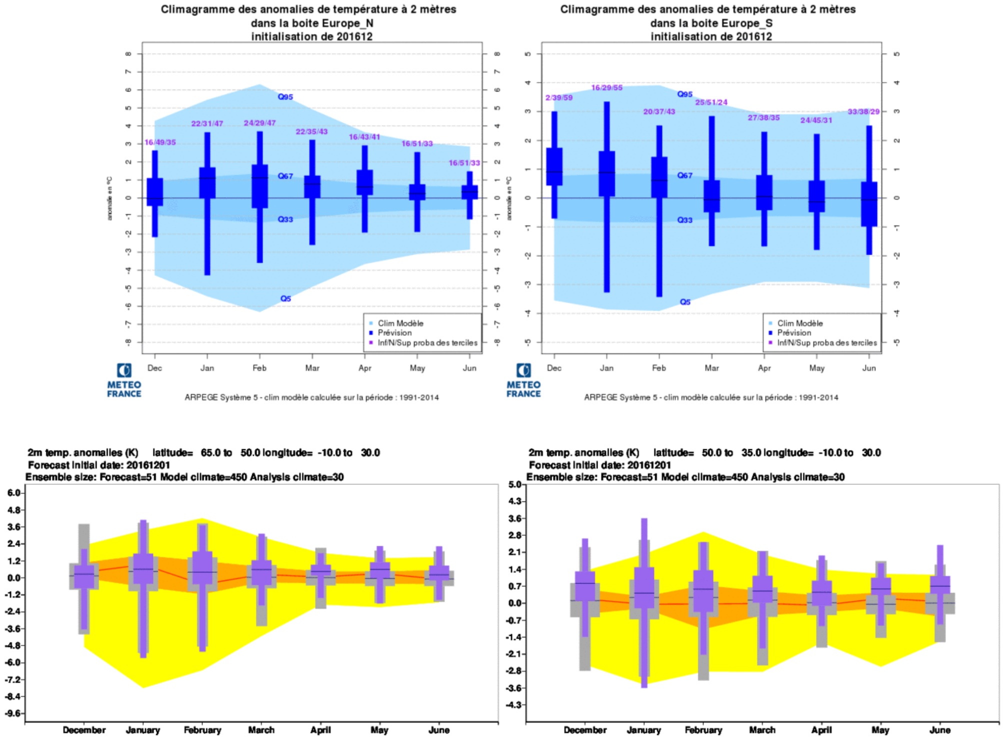


fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

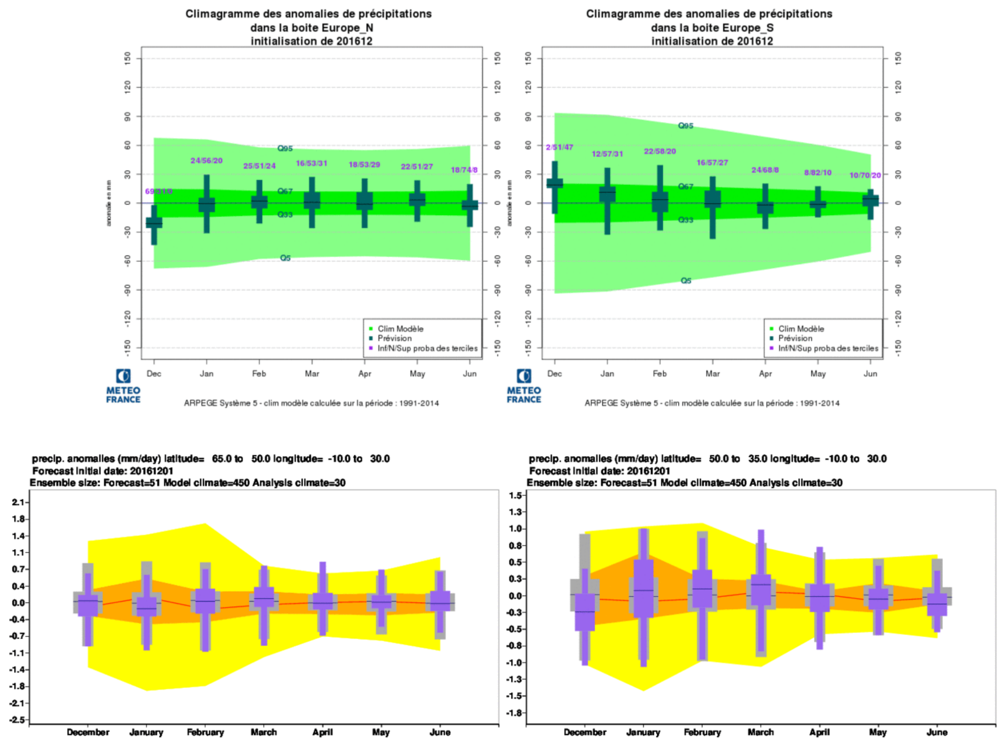


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

I.7. MODEL'S CONSISTENCY

Not available

I.8. "EXTREME" SCENARIOS

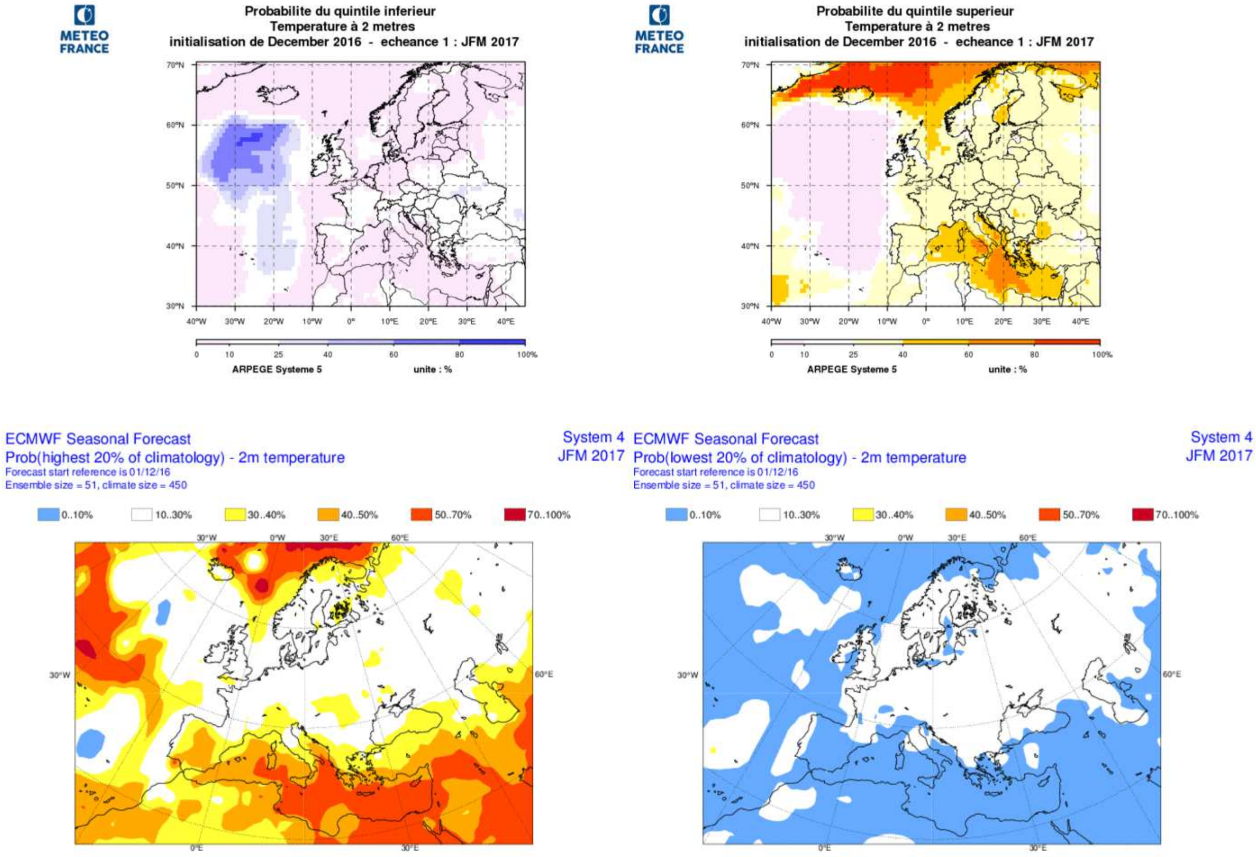


fig.II.7.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - lowest ~20% of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

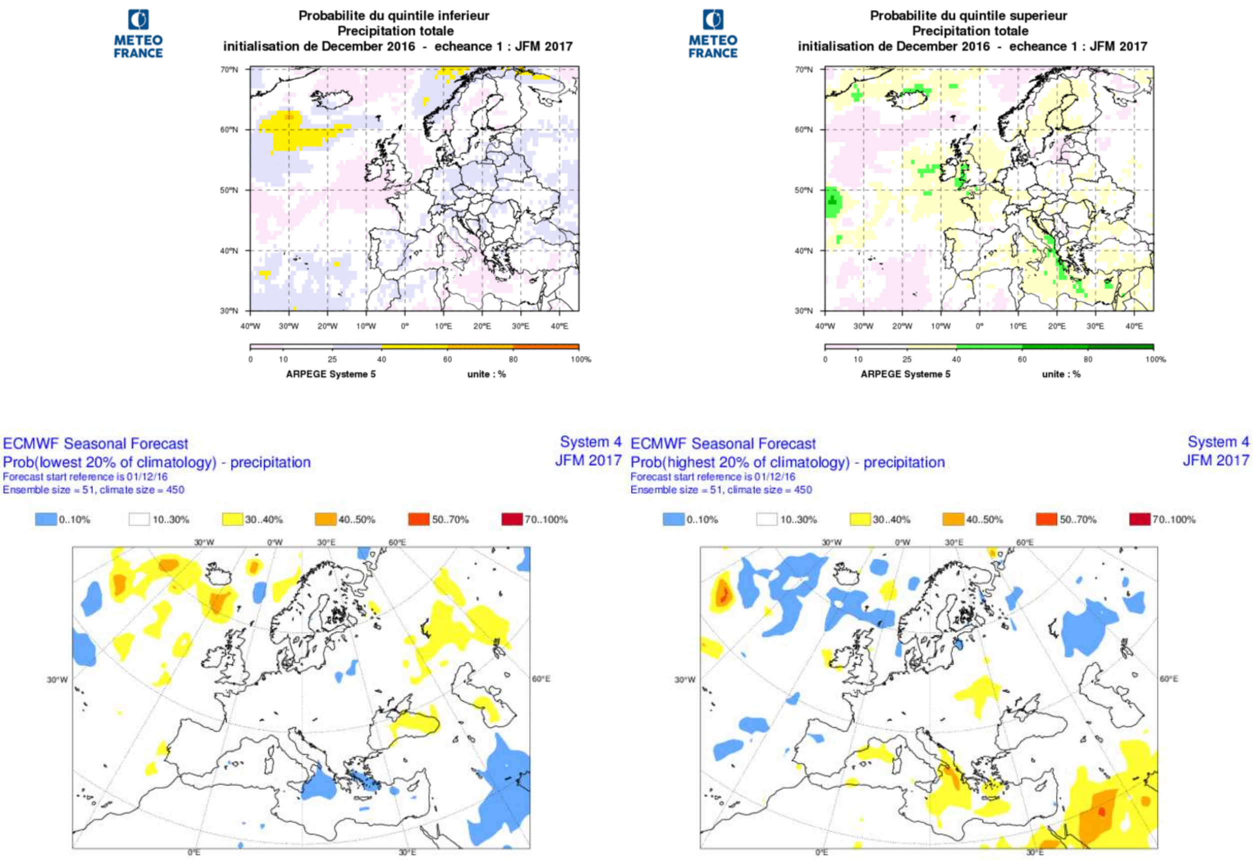


fig.II.7.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

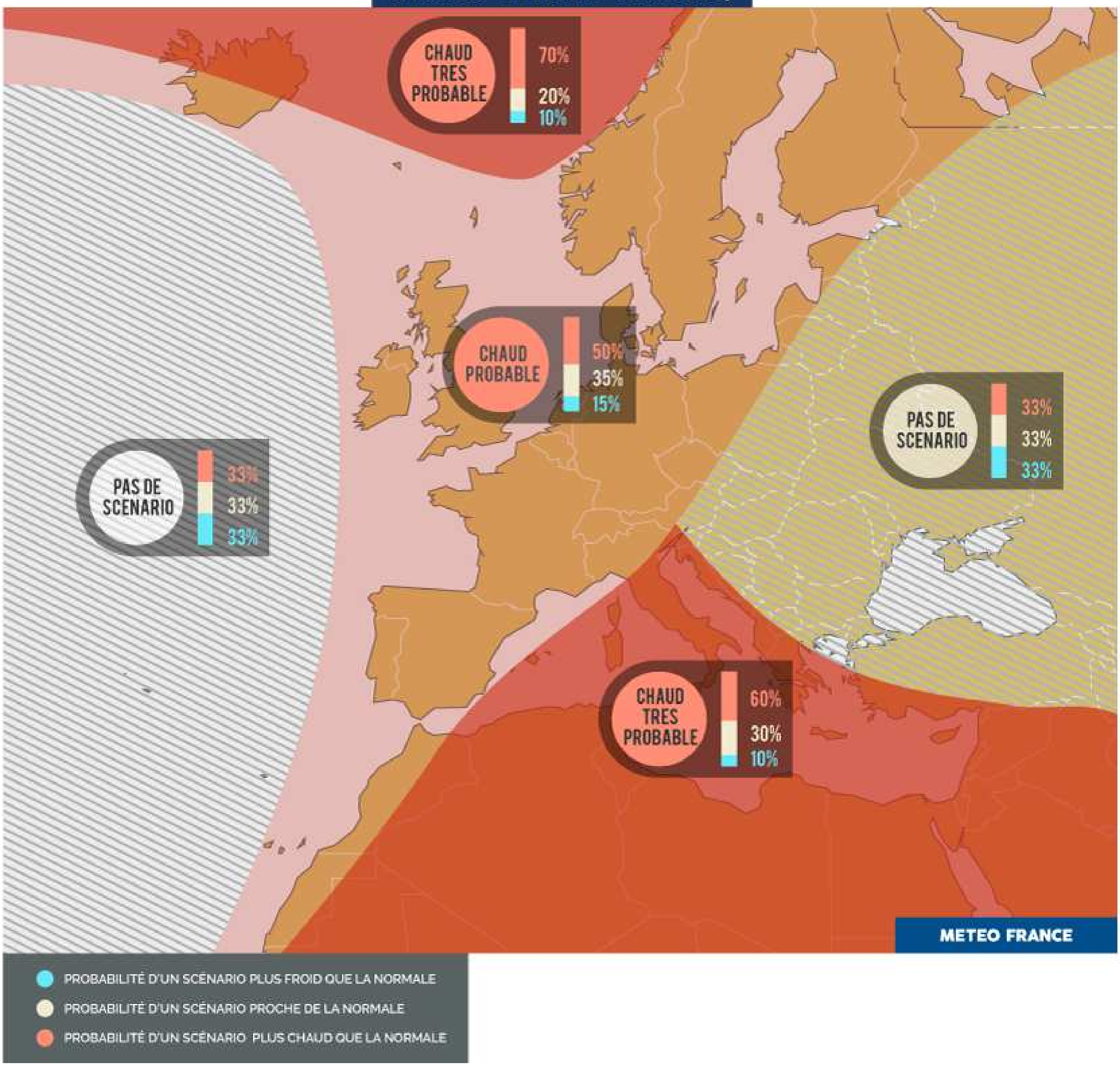
I.9. DISCUSSION AND SUMMARY

I.9.a Forecast over Europe

Temperatures: Gradation from weakly warm on western Europe, towards warmer over the Mediterranean basin.

PRÉVISIONS SAISONNIÈRES PROBABILISTES DE TEMPÉRATURES POUR LE TRIMESTRE PROCHAIN

JANVIER - FÉVRIER - MARS 2017



Precipitation : No privileged scenario.

I.9.b Tropical cyclone activity

Below-normal activity expected on the South-West Indian Ocean (Réunion, Mayotte), in agreement with the downward motion anomaly.

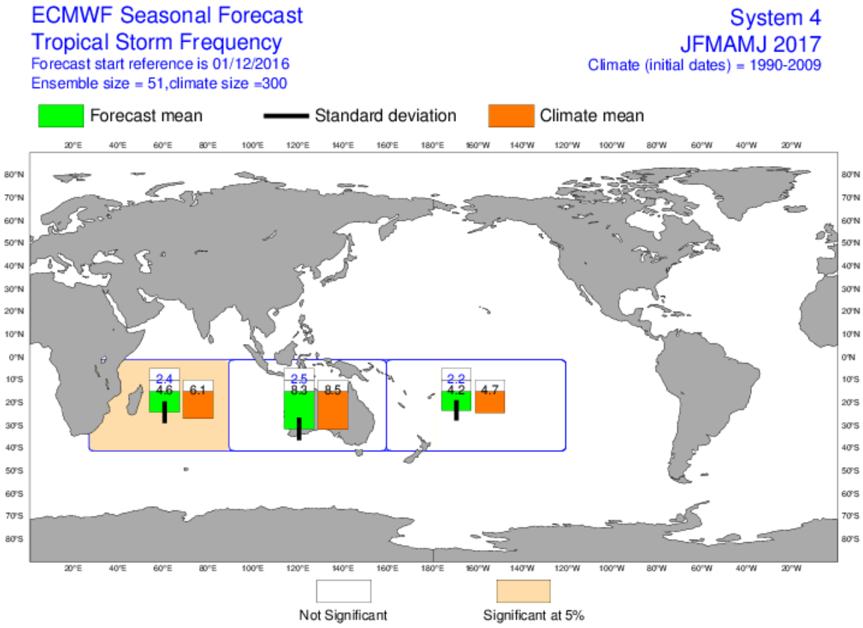


fig.II.8.1: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).

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

ANNEX

I.10. 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.

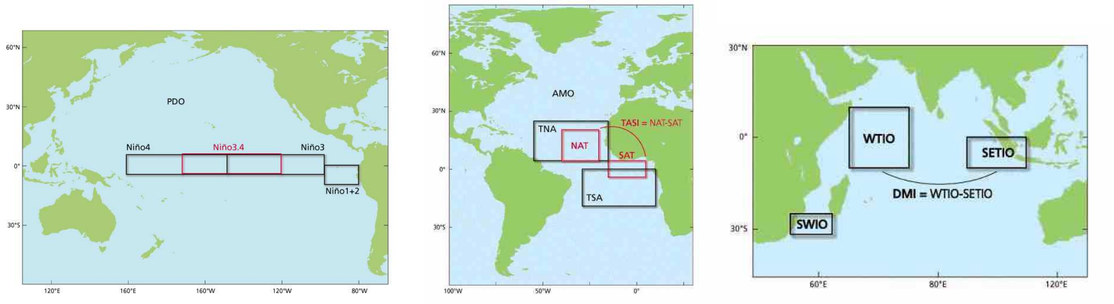
I.11. « NINO », SOI INDICES AND OCEANIC BOXES

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).

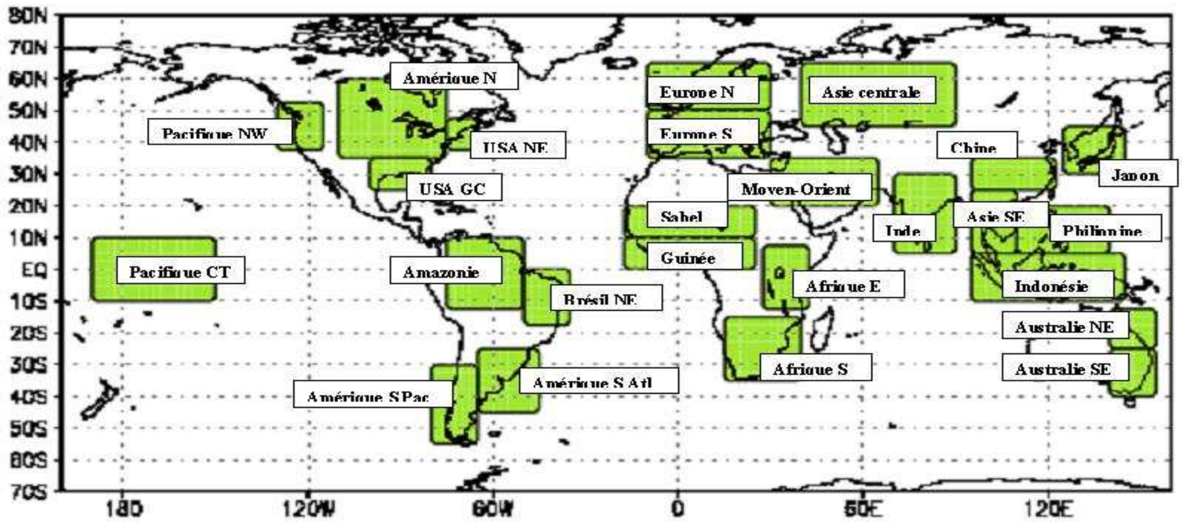
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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



I.12. 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.



I.13. 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).