Prévision saisonnière

WMO RA VI RCC Network

METEO FRANCE

GLOBAL CLIMATE BULLETIN

n°231 – September 2018

Table of Contents

I. DESCRIPTION OF THE CLIMATE SYSTEM (July 2018)

I.1.Oceanic analysis

Over the Pacific Ocean :

- Along the equator, the surface warming observed for several months, marked a laying in July on almost all the equator railway. The trend is even sharply downward towards 120 ° W. Only the extreme of the rail has warmed, the cold water that remained there is now limited to the immediate vicinity of the South American coast. Niño index 3.4: about + 0.3 ° C.
  In subsurface, weak positive anomalies on all the basin.
- In the northern hemisphere, strong cooling in the center of the basin and to a lesser extent on the extreme north in the Bering Sea and around Aleutian Islands. Still warm anomalies in Eastern Tropic despite a cooling trend. No clear PDO pattern (see https://www.ncdc.noaa.gov/teleconnections/pdo/)
- In the southern hemisphere, Still cold anomalies in Eastern Tropic and weak warm anomalies in the South-West.

Over the Maritime Continent :

- cold anomalies, more marked to the west.

Over the Indian Ocean :

- in the Northern hemisphere, neutral to slightly cold conditions.
- In the southern hemisphere, cold anomalies on the East and weak warm anomalies on the West.
- DMI slightly positive (source : MERCATOR-Ocean)

Over the Atlantic:

- In the North Atlantic, very strong cold anomaly from Canada to Island and Labrador. Continued warming in the vicinity of Europe where the ocean has become significantly warmer than normal in July. In the tropics, still cold anomalies. TNA index is slightly below zero.
- along the equator, weak warm conditions in the Gulf of Guinea, weak cold conditions in the Western side. TASI is still negative (around -1 °C)
- in the southern basin, no clear structures.

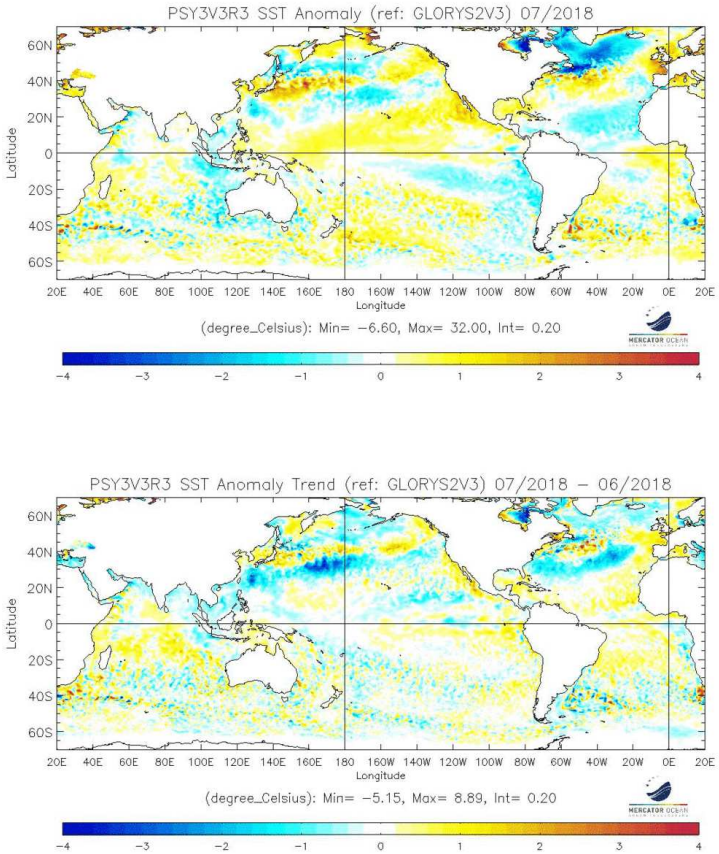


fig.I.1.1: top : SST Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2013).

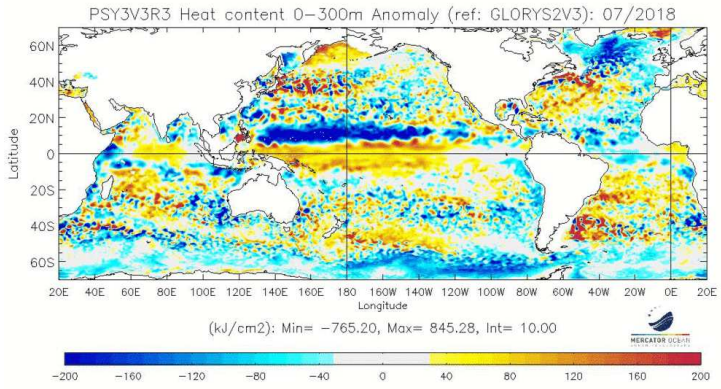


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2013)

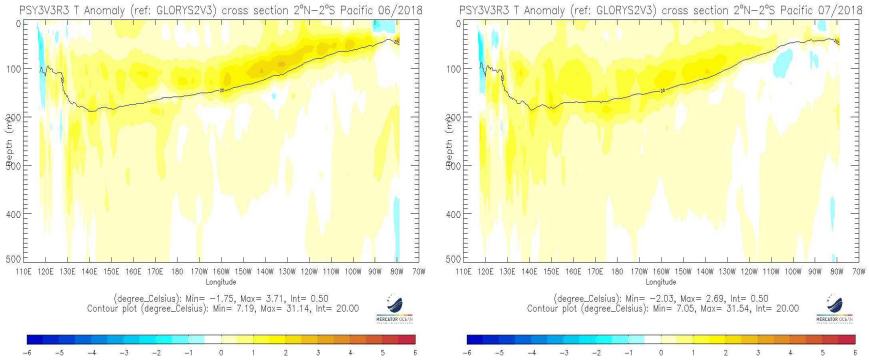


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month)

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

Sea surface temperature near Europe :

European Arctic Sea: Still mostly warmer than normal, particularly north of Svalbard and near Greenland as before, but also now a strong positive anomaly on the White Sea east of Kola Peninsula. Cold anomaly close to northern Norway has weakened after warming along the west Norwegian coast due to atmospheric warming from the south.

North Sea: still warmer than normal, anomalies have further increased except near southern Scandinavia.

Baltic Sea: warmer than normal over the entire basin, locally strong anomalies. Particularly much warming since last month in the northern part of the basin, due to atmospheric warming within high pressure influence over Scandinavia.

Cold blob south of Greenland/Iceland: Rather the same extension as last month, but intensity has increased slightly at the surface, still intense in the subsurface.

Subtropical East Atlantic: colder than normal near Portugal and Gibraltar, but very warm near the Biscay. Above-normal sea surface warming in both regions, so the cold anomaly became weaker and the Biscay warmth stronger. The subsurface remained cooler than normal.

Mediterranean: mainly still warmer than normal except a few cold traces in the central part of the basin. Anomalies became

higher in the western Mediterranean but lower in central and eastern parts. The subsurface remained warmer than normal, too.

Black Sea: still warmer than normal, but anomalies became weaker, particularly in the east.

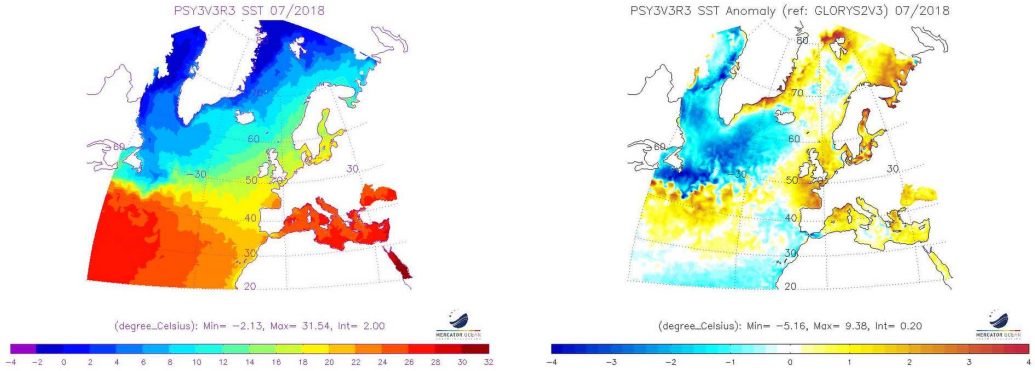


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2013).

I.2. ATMOSPHERE

I.2.a General Circulation

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

- upward motion anomaly on Western Pacific and downward motion anomalies over Indian Ocean and over the Caribbean. No link with the SST anomalies. The MJO contribution is overriding the western Pacific.

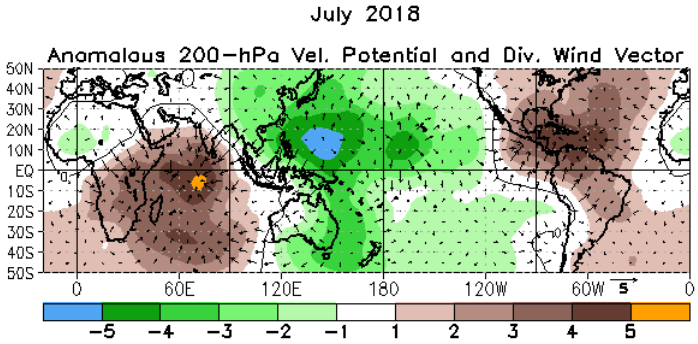


fig.I.2.1.a: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

SOI :

- SOI remains neutral at +0.2 (NOAA Standardized SOI: https://www.ncdc.noaa.gov/teleconnections/enso/indicators/soi/).
MJO (fig. I.2.1.b)

- Active MJO during the last 2/3 of July over the Maritime Continent and Western Pacific. (green curve).

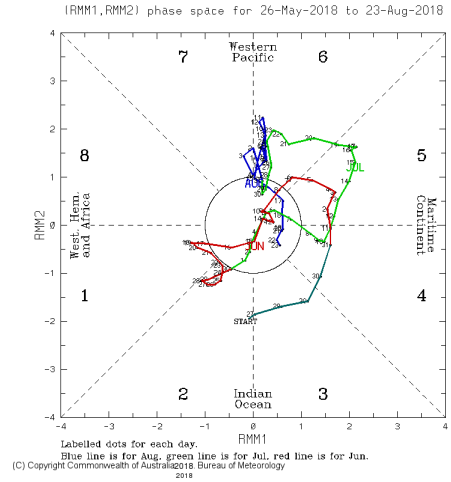


fig.I.2.1.b: indices MJO http://www.bom.gov.au/climate/mjo/

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

- no significant anomalies in the inter-tropical band.

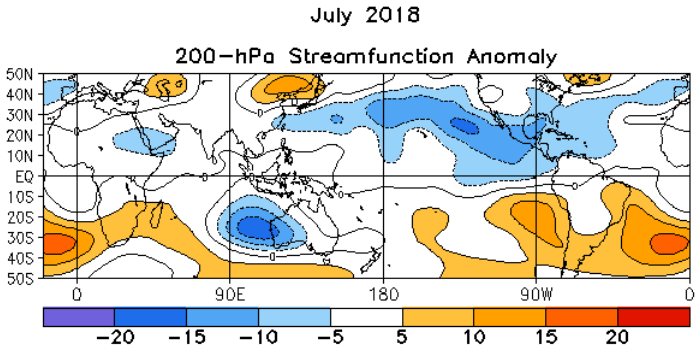


fig.I.2.2: Stream Function Anomalies at 200 hPa.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

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

- strong positive anomaly over the Gulf of Alaska and around Newfoundland.
- very strong positive anomaly over Scandinavia.

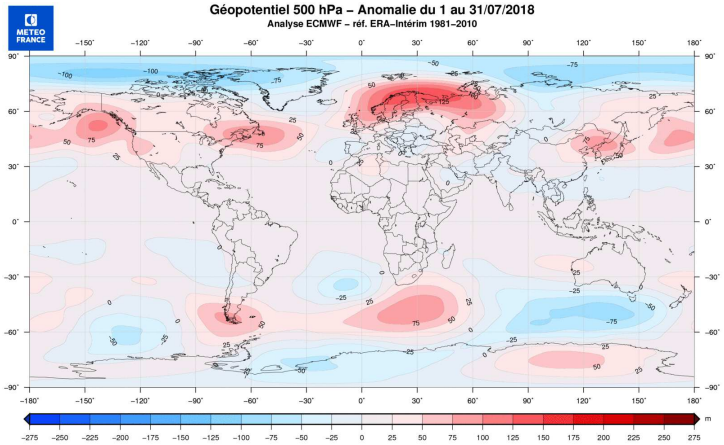


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
JUL 18	1.4	2.4	-0.8	-0.2	-0.8	---	-2.2	2.3	-0.1
JUN 18	1.4	-0.5	-0.4	0.1	0.7	---	-0.2	-0.8	-0.9
MAY18	2.0	-0.1	-0.2	-1.0	-1.1	---	-1.4	1.7	-0.3
APR 18	1.2	1.1	-0.7	-0.2	-1.1	---	0.5	0.3	-1.3
MAR 18	-1.4	-0.6	0.8	0.3	-1.2	---	4.0	-0.8	0.1
FEB 18	1.3	-1.4	0.4	0.2	-1.7	2.2	-1.4	0.4	-2.2
JAN 18	1.2	0.6	0.4	0.7	-0.1	-0.3	-1.6	0.4	-1.5
DEC 17	0.7	-0.5	0.3	---	0.6	1.0	-1.6	-0.5	-2.0
NOV 17	-0.1	0.1	0.7	0.4	-2.0	---	-1.2	-0.1	-2.2
OCT 17	0.7	0.6	0.7	-0.6	-0.3	---	0.0	0.3	-1.2
SEP 17	-0.5	1.6	-1.2	-0.5	-0.3	---	-2.5	0.5	-1.7

Evolution of the main atmospheric indices for the Northern Hemisphere for the last 11 months. (see http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/table3.shtml for the most recent 13 months).

Sea level pressure and circulation types over Europe

Over the North Atlantic quite a strong zonal component with both Icelandic Low and Azores High more intense than normal. NAO index is unchanged compared to last month (+1.4) and the positive phase has a long duration since April. This pattern also extended to the East Atlantic, building up a strong EA+ component (+2.4). Typical for EA+ is an extension of the Azores High into Europe, which was the case this July.

The other main pattern over Europe is an intense high pressure zone extending from the North Sea over Scandinavia to north-western Russia. Large contributions to this quite extensive pattern came from EATL/WRUS- and SCAND+ phases. There was a similar constellation already in May 2018, but in July even stronger.

All this together caused large areas of high pressure influence over large parts of Europe with widespread subsidence and long periods of undisturbed solar radiation causing warm and dry conditions, though with local thunderstorms. Advection effects took place in western Europe, when the westerly Atlantic flow was redirected to the north over and near to Norway due to the blocking of the North European High, but also over eastern Europe, especially Baltic states, there was some advection due to easterly flow south of that High.

Southern half of Europe had negative monthly SLP anomalies, especially the Balkan Peninsula had a long duration of low pressure influence.

Météo France weather type classification shows a dominance of two types (Atlantic ridge and Scandinavian blocking) for July, which are both anticyclonic especially over northern parts of Europe. Atlantic ridge situations occurred mainly in the first half of the month, Scandinavian blocking particularly on later days of July.

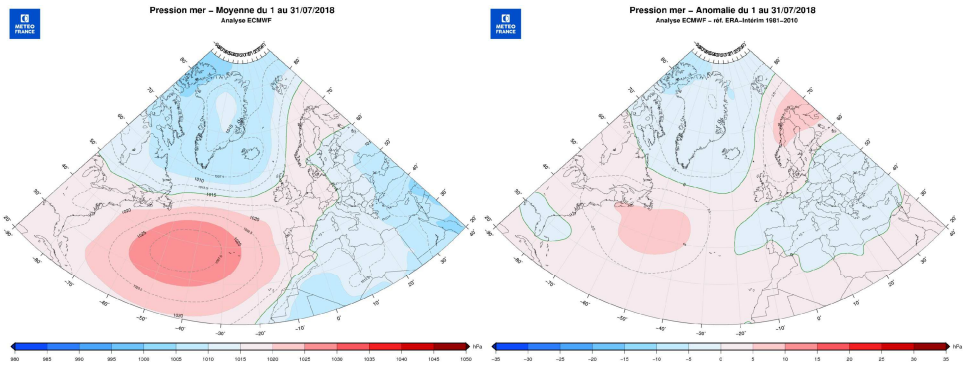


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (top) and 1981-2010 anomalies (bottom).

Circulation indices: NAO and AO

NAO was in a positive phase almost the whole month, but with two distinct peaks, one in the first and one in the second half. Peak values exceeded +1.5, so the Atlantic flow was quite significant.

AO, too, was in a positive phase almost the whole month; there was little intrusion of cold polar air into middle latitudes, particularly not in Europe.

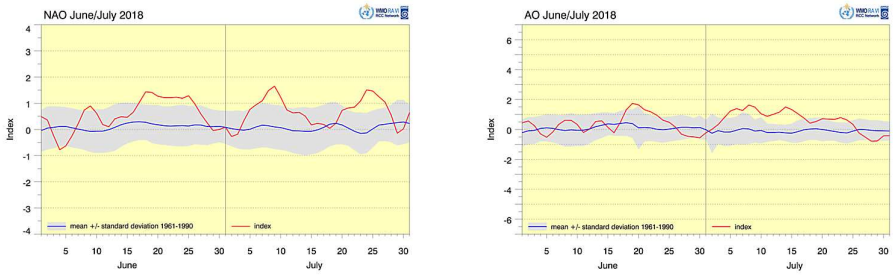


fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

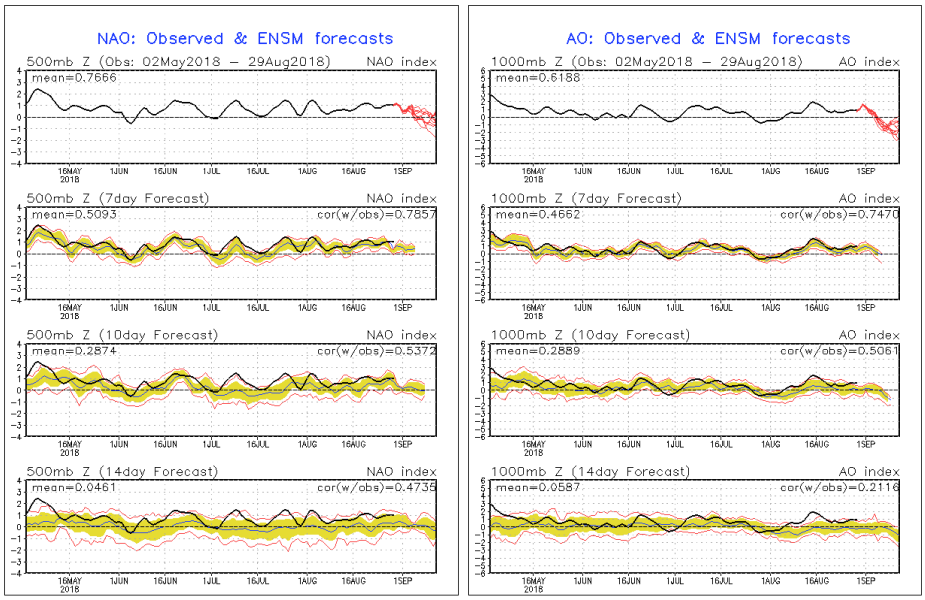


fig. I.2.5a: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices for the last 4 months and forecasts for the following weeks. Source: NOAA CPC, http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

- In connection with the MJO and upward motion anomaly, more rainy than normal over Maritime Continent and western Pacific.
- dry over Central America and the Caribbean area.
- Over Europe, dry in the North especially from Scandinavia to Germany, wet in the Central Europe and Balkans.

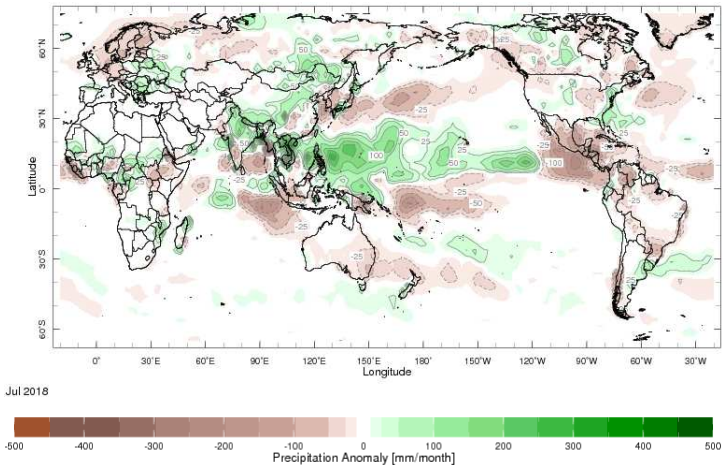


fig.I.2.6: Rainfall Anomalies (mm) (departure to the 1979-2000 normal).
Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

Precipitation anomalies in Europe:

Once again very dry conditions over western, central and northern Europe due to widespread high pressure influence, though with local thunderstorms. Highest deficits in Benelux countries, large parts of Germany, southern Sweden, Estonia, Czech Rupublic, Austria, Switzerland, with partly extreme drought conditions. Water restrictions were in force in several countries. Monthly totals were below the 10th percentile in much of northern and central Europe. The dryness also caused several large wildfires, especially in central Sweden and in Greece. In Sweden it was the worst drought in 74 years. Wet conditions prevailed in parts of eastern and south-eastern Europe, northwest Turkey and northern Spain, with locally heavy convective precipitation causing local flooding, consistent with low pressure anomalies in these areas.

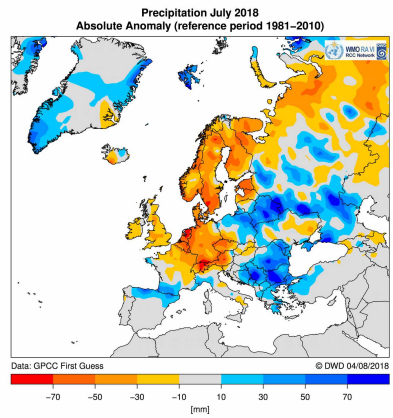
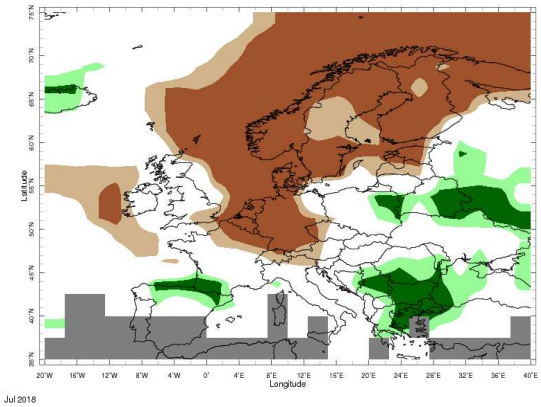


fig.I.2.7.a : Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm.



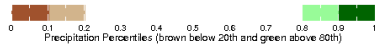


fig.I.2.7.b : Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

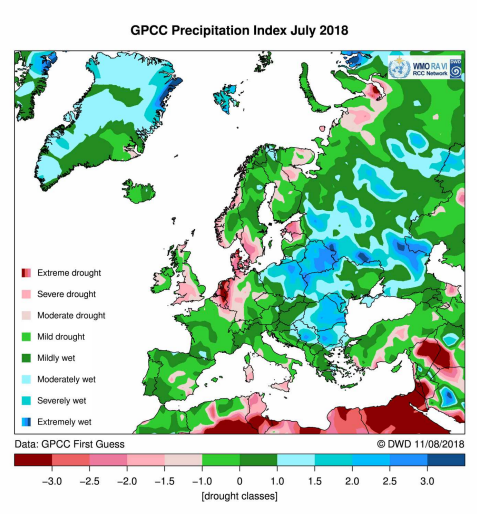


fig. I.2.8: GPCC Precipitation Index, http://www.dwd.de/rcc-cm .

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	- 22.4 mm	- 0.444
Southern Europe	+ 2.9 mm	+ 0.026

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

- over Europe, temperature was well over normal on a large Nord-western part of the continent. Some exceptions : Iberian peninsula quite significantly below normal and Eastern Mediterranean Basin around normal.
- strong positive anomaly over Middle-East, form Black Sea to Caspian Sea and Aral Sea.
- colder than normal over Central Siberia and from Canada's Great North to Greenland.

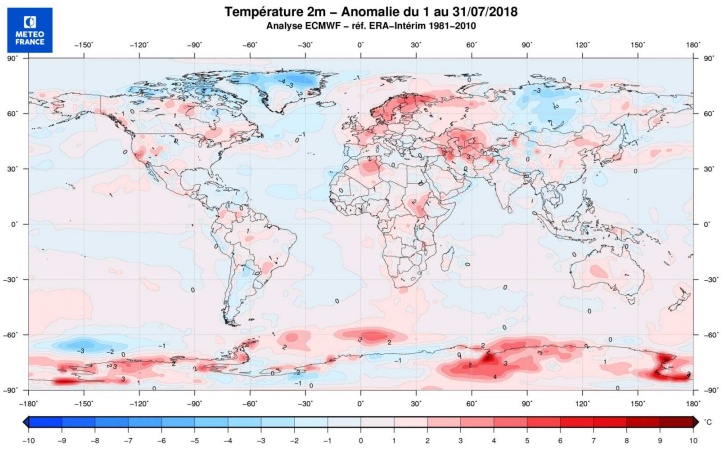


fig.I.2.9: Temperature Anomalies (°C) (Meteo-France)

Temperature anomalies in Europe:

Warmer than normal over much of Europe, highest anomalies over Scandinavia (up to above +6°C) and daily maxima exceeding 30°C over several days, even in the north, but also in large parts of western Europe, consistent with high pressure influence and blocking of the North European High. Long sunshine duration contributed significantly to above-normal temperatures; Netherlands and Denmark reported the sunniest July on record. Parts of southern Europe including the Mediterranean region were colder than normal due to cyclonic influence with frequent convective events including local downbursts etc.

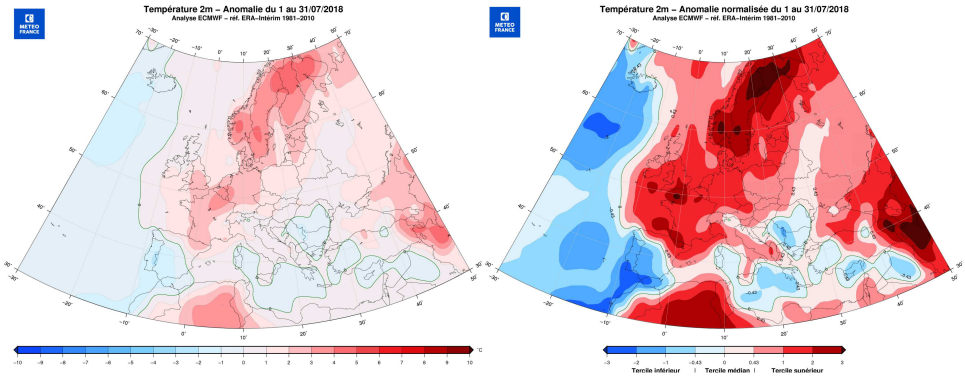


fig.I.2.10: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

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	+ 2.9 °C
Southern Europe	+ 1.7 °C

I.2.d Sea ice

- In the Arctic : largely in deficit.
- In Antarctica : slightly in deficit in July.

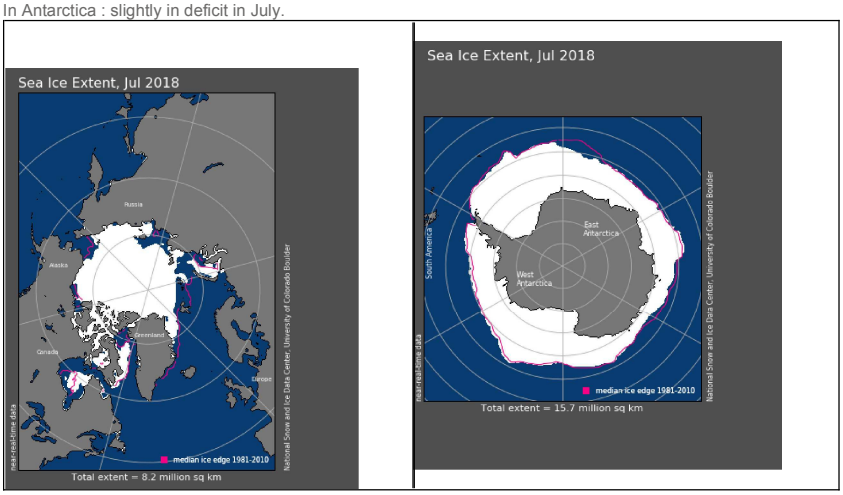


fig.I.2.11: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

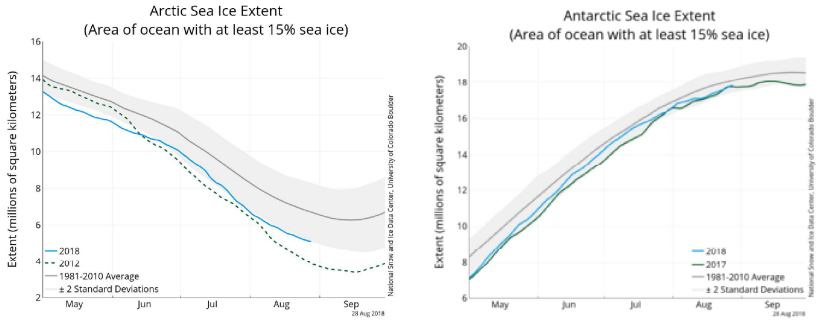
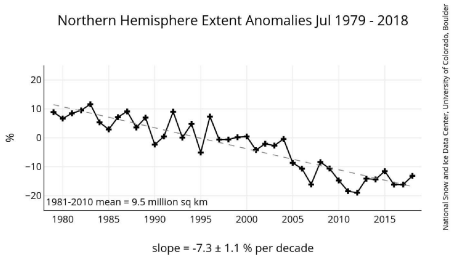


fig. I.2.12 : Sea-Ice extension evolution from NSIDC. https://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png



Monthly Sea Ice Extent Anomaly Graph in Arctic for the month of analysis.
http://nsidc.org/data/seaice_index/images/n_plot_hires.png

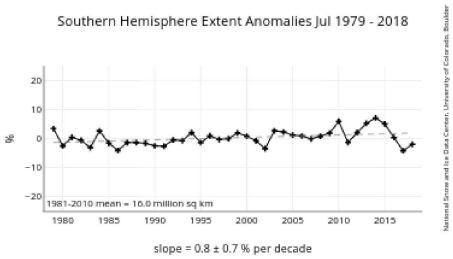


fig 1.2.13 : Monthly Sea Ice Extent Anomaly Graph in Antarctic for the month of analysis
(http://nsidc.org/data/seaice_index/)

II. SEASONAL FORECAST FROM DYNAMICAL MODELS

In Central Pacific, the current SST warming along the Equator is expected to continue during the fall and then capped from December. A weak to moderate El Niño event should occur during autumn.

NB : In this bulletin, the new MF-S6 model is used for illustrations. But please note that the EUROSIP system, shown in this bulletin, still uses the MF-S5 outputs - viewable on http://seasonal.meteo.fr/fr/content/ARP5 -.

II.1. OCEANIC FORECASTS

II.1.a Sea surface temperature (SST, figure II.1.1 to II.1.4)

Models are in very good agreement for the SST of SON forecast.

- Pacific Ocean: Warm anomaly expected along the Equator, with a maximum between +1 and +2°C in the center of the basin. The warm anomaly continues in the Eastern Tropic. In the North, the horseshoes structure of weak PDO+ type should reform, with hot anomalies very near the American Coast and cold anomalies in the center-east of the basin. The anomaly structure is less organised near Japan.
  To the south, cool anomalies should gradually be limited to a small eastern part of the basin.
- Indian Ocean: the surface warming should affect all the ocean. Only the extreme south-east of the basin will maintain cold anomalies on average for the next quarter. Slight East-West contrast, leading to a positive DMI for thez next 3-month. (see BOM summary here : http://www.bom.gov.au/climate/model-summary/#tabs=Indian-Ocean).
- Atlantic Ocean:
  - northern Atlantic : maintaining the tripolar structure -cold-hot-cold - described in the analysis. Near the European Coast, NCEP and UKMO models seem more consistent with the warming observed during the summer, while CEP5 and MF6 models continue to predict cold anomalies. In the Tropics, CEP5 and MF6 are colder than EUROSIP, UKMO and NCEP. In all cases, SST form the western coast of Africa to the Caribbean are rather unfavourable to cyclonic activity.
  - equatorial Atlantic : warm signal over the Gulf of Guinea
- Mediterranean Sea : in continuity with previous forecasts, warmer than normal expected especially to the East.

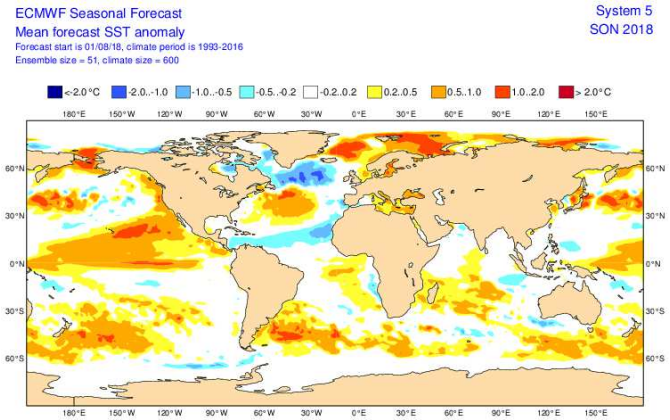


fig.II.1.1: SST anomaly forecast from ECMWF
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

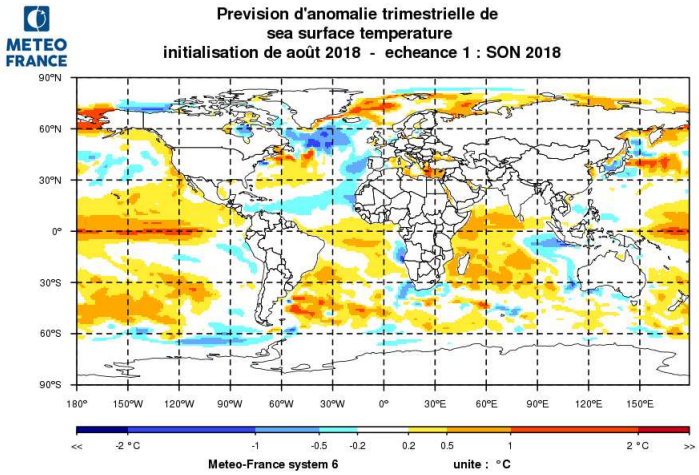


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).
http://seasonal.meteo.fr

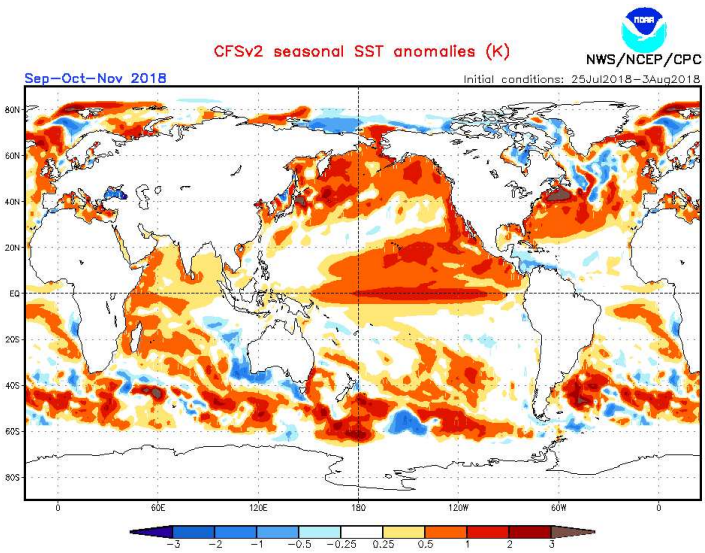


fig.II.1.3: SST Anomaly forecast from NCEP.
http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/imagesInd1/glbSSTSeaInd1.gif

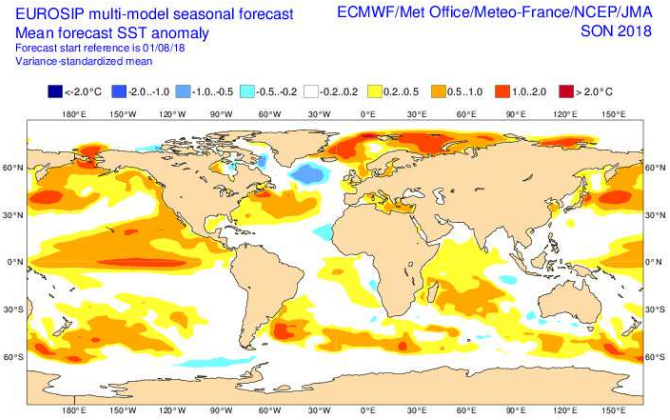
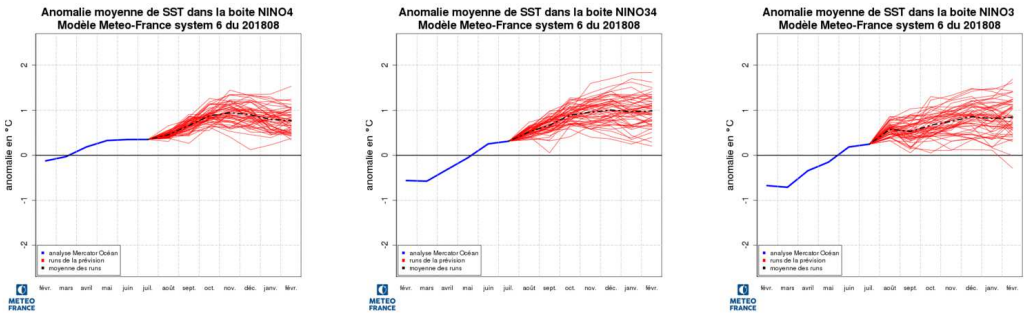


fig.II.1.4: SST Forecasted anomaly from Euro-SIP

II.1.b ENSO forecast :

***Forecast Phase*: beginning of a positive phase during SON**. The warming would continue to a maximum of around +1°C at the end of the year. The event probability is around 70% in the IRI synthesis. The strongest anomalies should be located in the center of basin. In a first time SST near South American Coast should stay around normal then increase at the end of the year.



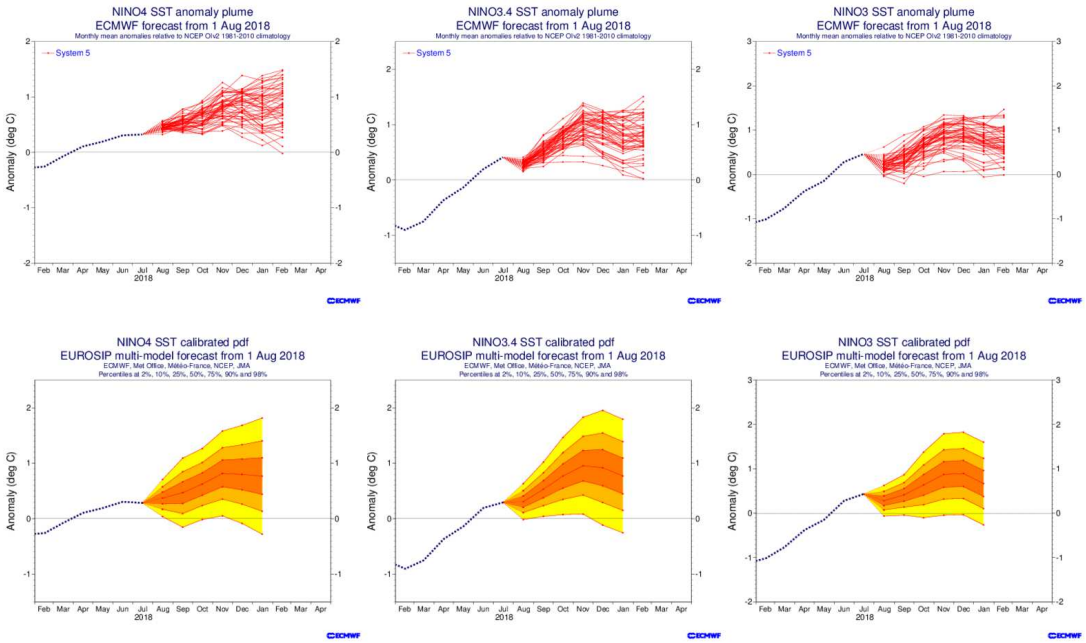


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members -
and EUROSIP (bottom) – recalibrated distributions -
(http://seasonal.meteo.fr , http://www.ecmwf.int/)

I.1.c Atlantic ocean forecasts

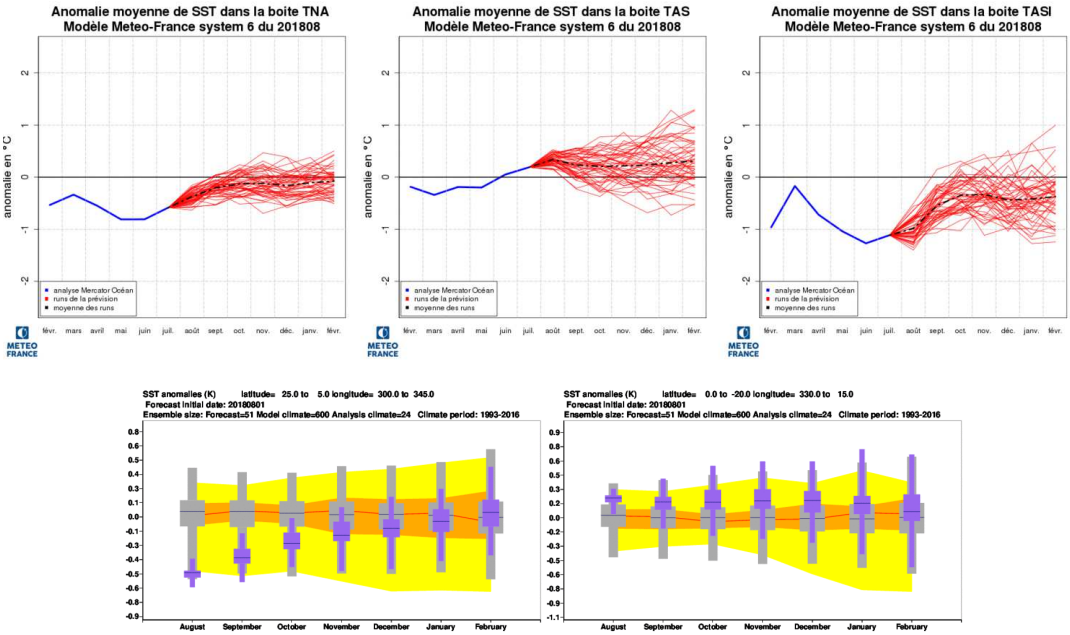


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

I.1.d Indian ocean forecasts

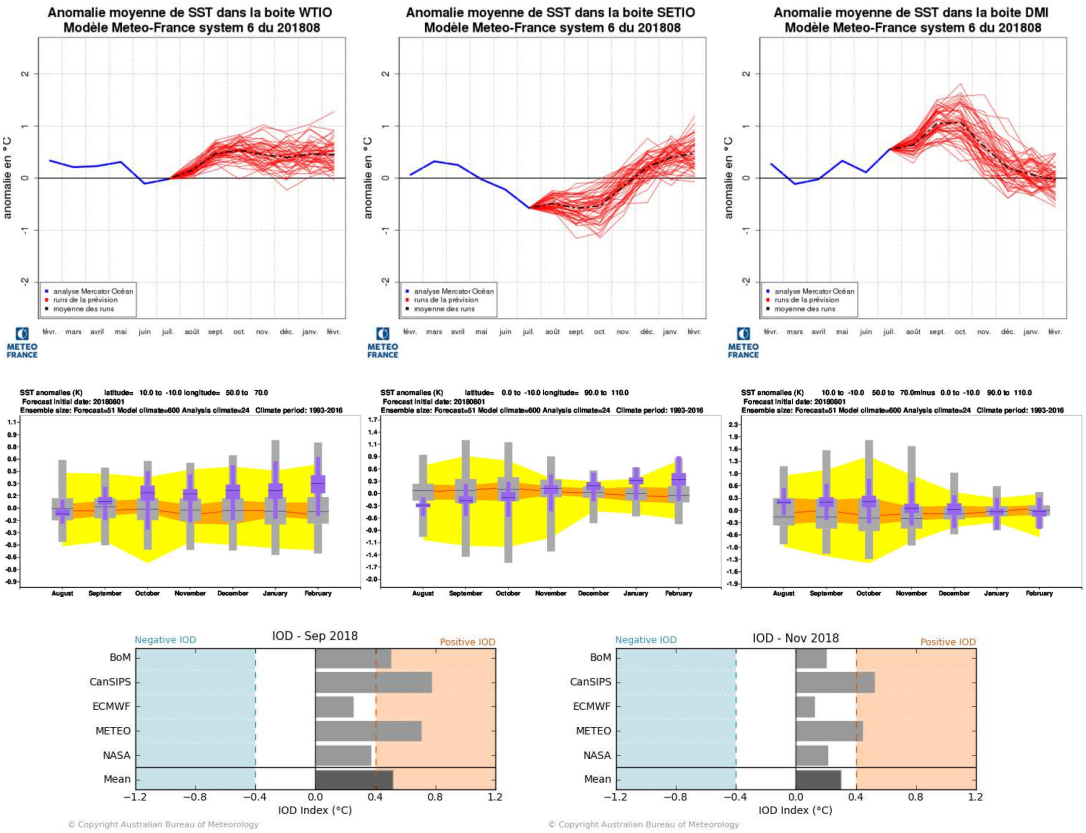


fig.II.1.7: SST anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.2. GENERAL CIRCULATION FORECAST

II.2.a Velocity potential anomaly field and Stream Function anomaly field at 200 hPa

The atmospheric reaction predicted by the models is classic, fairly clear but moderate.

- Velocity potential : two waves structure. Downward motion anomaly from Eastern Indian Ocean to South-eastern Asia to Australia. It is stronger in MF6. Upward motion anomaly over Pacific Ocean. It is stronger in ECMWF5. Relative upward motion anomaly over Africa, stronger in MF6. And relative downward motion anomaly over Caribbean, stronger in ECMWF5.
- Stream function : consistent with starting El Nino, anomalies structures are close in the 3 models. the intensity of the kernels is fairly weak, only ECMWF5 has little stronger kernels over Pacific Ocean and Central America, with a weak teleconnection to Canada.

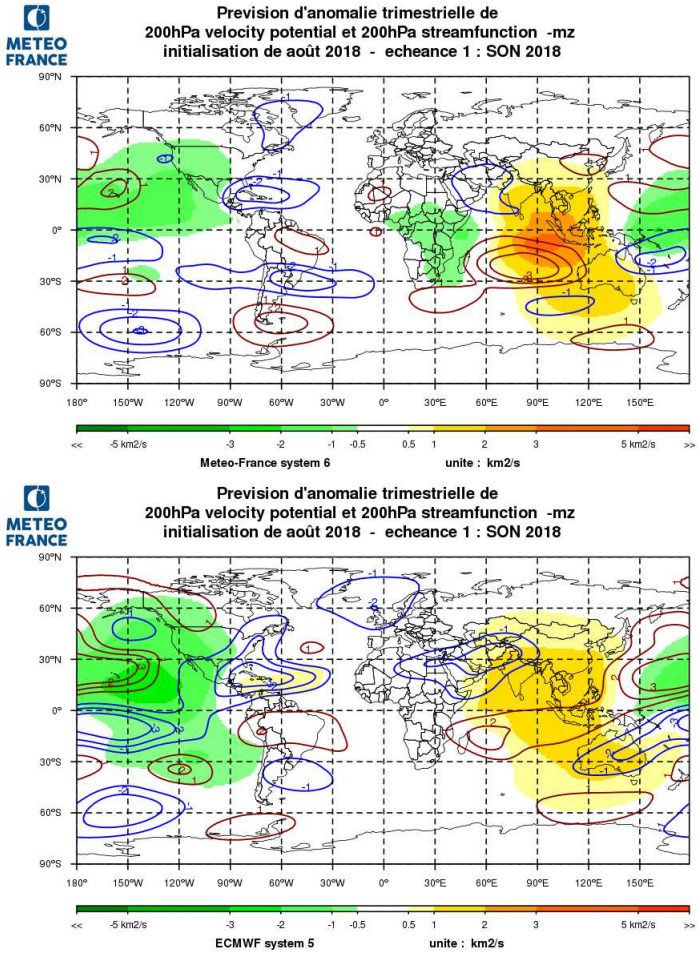


fig.II.2.a: Velocity Potential anomaly field χ (shaded area – green negative anomaly and yellow positive anomaly), associated with Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).
http://seasonal.meteo.fr

II.2.b Geopotential height anomalies

Total disagreement between ECMWF5 and MF6 this month on the Near Atlantic and Western Europe. ECMWF seasonal forecast is inconsistent with the last ECMWF monthly forecast (20th of August) and the GPCC's composite (see below). The high values around the pole from Eastern Europe to Northern Siberia and to Canada are forecasted in a majority of models and seem then more robust. We would then prefer the GPCC's composite that is in the continuity of the analysis.

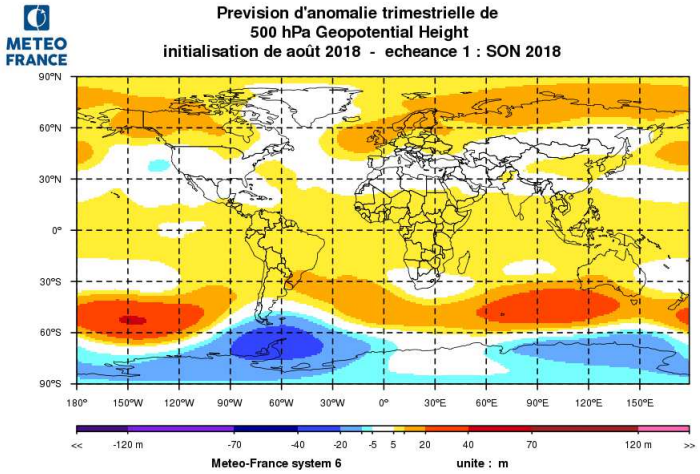


fig.II.2.b.1: Anomalies of Geopotential Height at 500 hPa from Météo-France.

http://seasonal.meteo.fr

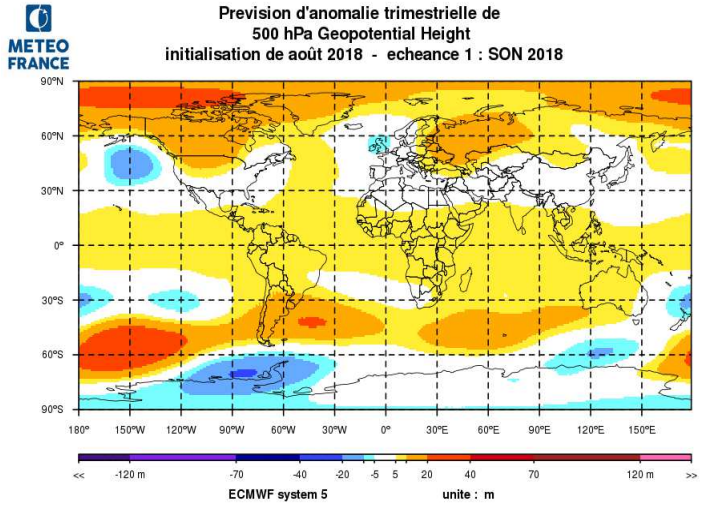


fig.II.2.b.2: Anomalies of Geopotential Height at 500 hPa from ECMWF.
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast

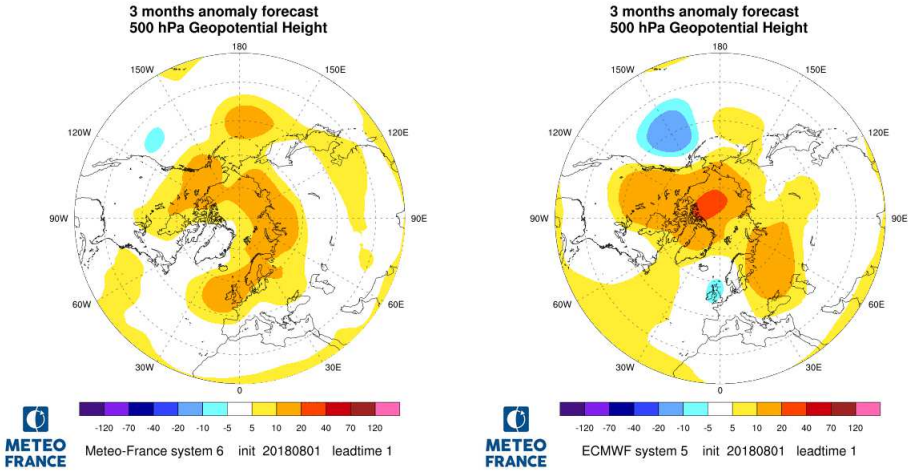


fig.II.2.b.3: Anomalies of Geopotential Height at 500 hPa from Météo-France.
http://seasonal.meteo.fr

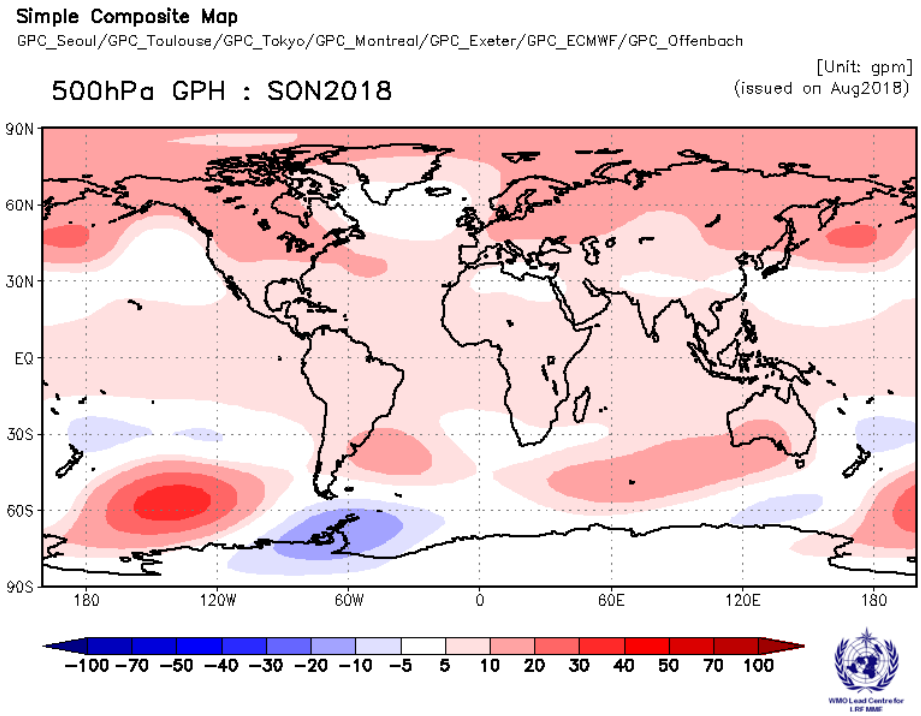


fig.II.2.3.a : Anomalies de géopotentiel à 500 hPa prévues par MF à gauche et ECMWF à droite

II.2.c. modes of variability

Due to MF-S6 and ECMWF-S5 differences over North Atlantic and Europe, the mode of variability of the 2 models are inconsistent. We will choose the MF-S6/composite option of positive NAO mode.

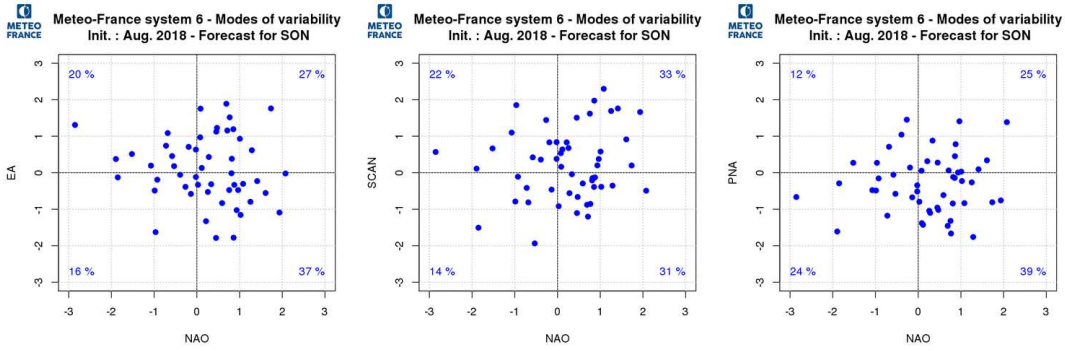


fig.II.2.c.1 : modes of variability forecasts over the Northern hemisphere with Meteo-France MF-S6

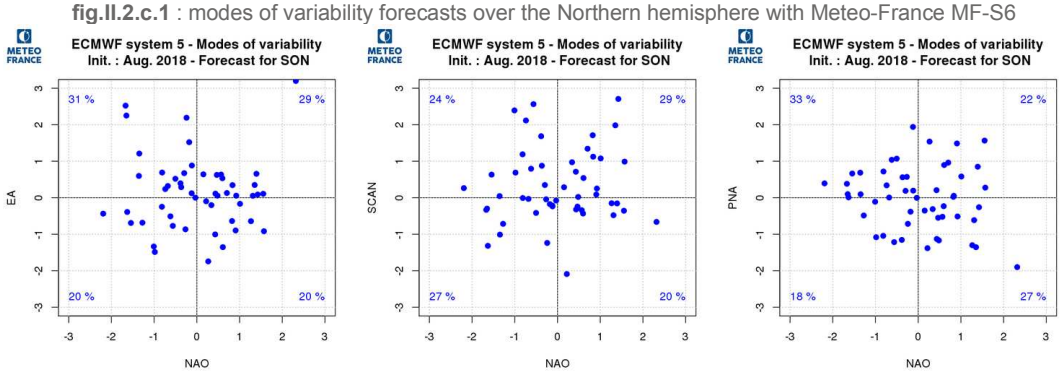


fig.II.2.c.2 : modes of variability forecasts over the Northern hemisphere with ECMWF-S5

II.2.d. weather regimes

Same remark as before.

No pattern of regimes matches the situation forecasted in the composite above.

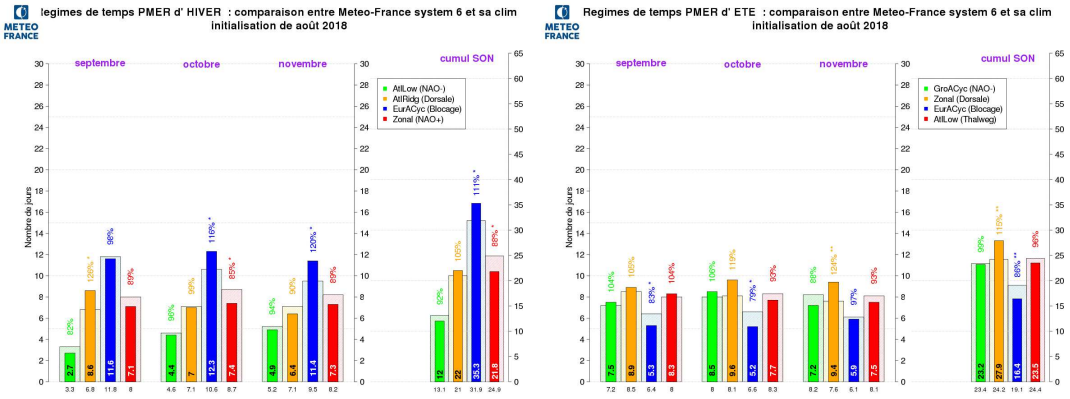


fig.II.2.d.1: North Atlantic Regime occurrence anomalies from Meteo-France MF-S6 : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.
Left : winter regimes; Right : summer regimes

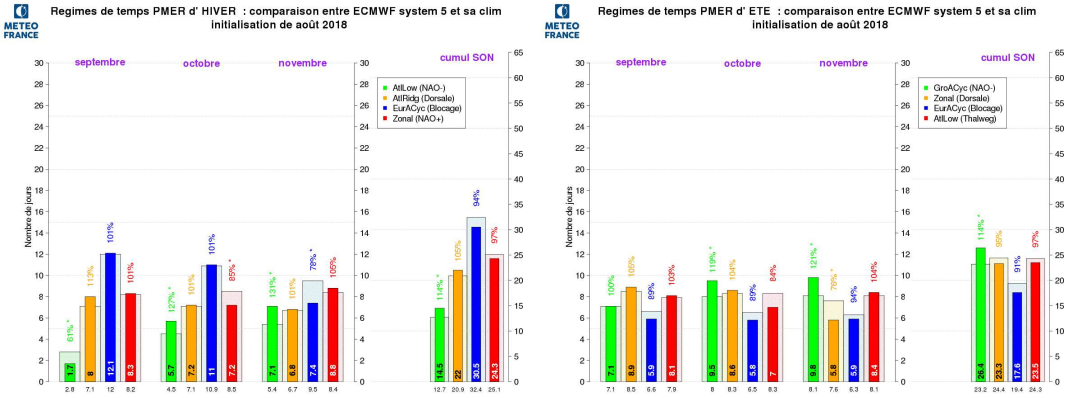


fig.II.2.d.2 : North Atlantic Summer Regime occurrence anomalies from ECMWF-S5 : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes
Left : winter regimes; Right : summer regimes

II.3. IMPACT : TEMPERATURE FORECASTS (figure II.3.1 to II.3.4)

Over Europe, few signal in MF-S6 temperature that seems not consistent with the large scale situation. The other models and multi-models forecast a warmer than normal 3-month period, especially on the North, except on the Iberian Peninsula. That is consistent with the positive NAO mode option selected before.

Elsewhere, warm signal is overwhelming over continents. Amazonian and Himalayan regions are the only areas where a neutral signal is expected.

II.3.a Météo-France

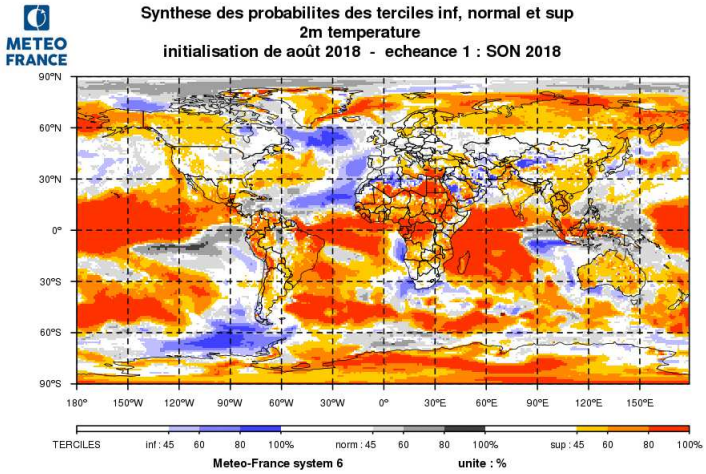


fig.II.3.1: Most likely category of T2m. Categories are Above, Below and Close to Normal.
White zones correspond to No Signal. http://seasonal.meteo.fr/

II.3.b ECMWF

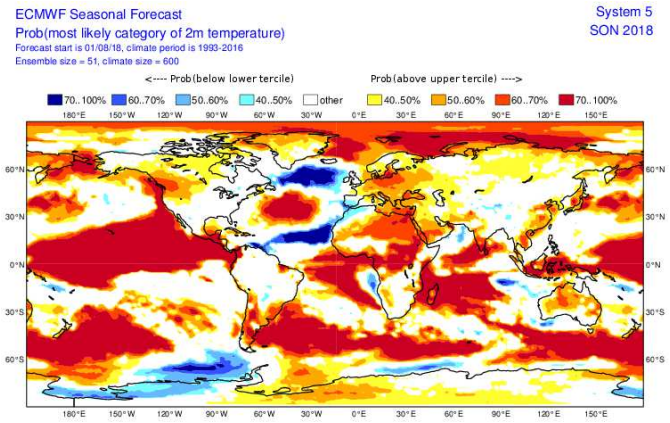


fig.II.3.2: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seaso...

II.3.c Japan Meteorological Agency (JMA)

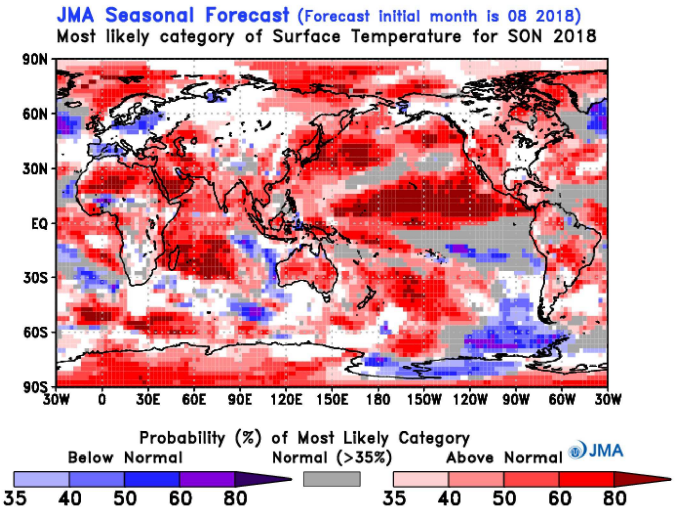


fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.
http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.3.d EUROSIP

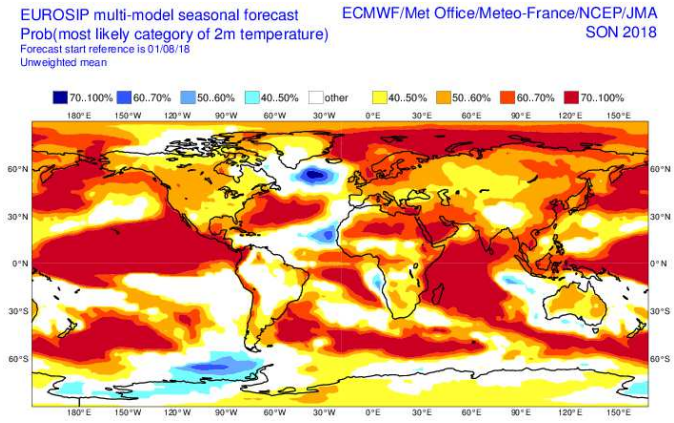


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

II.3.e GPCC's composite

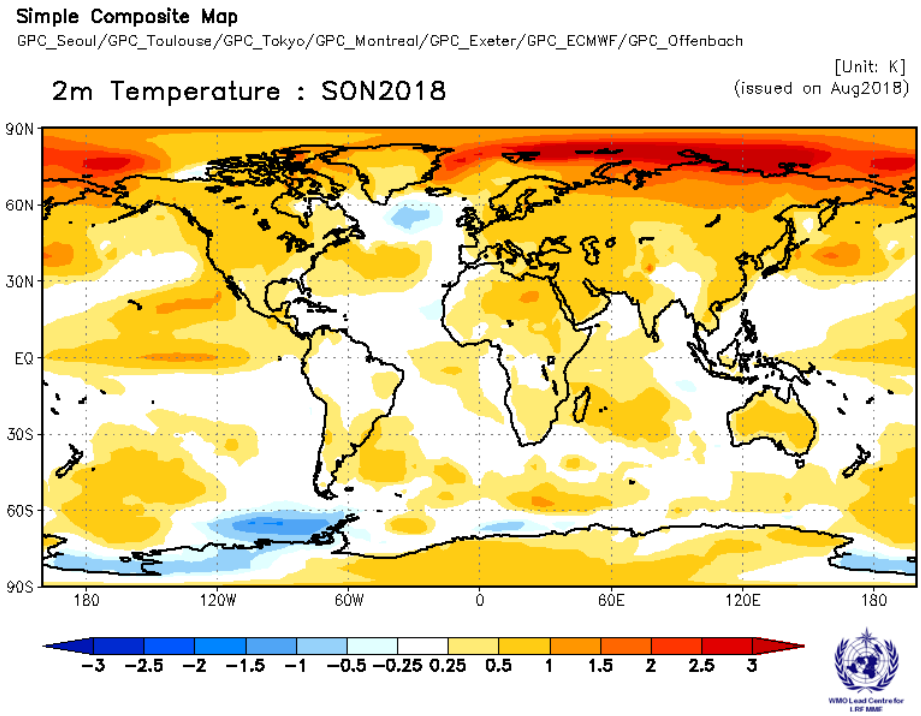


fig.II.3.1.c : Prévision multi-modèles probabiliste d'anomalies de température à 2m

II.4. IMPACT : PRECIPITATION FORECAST

- Very few signal in the mid-latitudes. A drier than normal scenario over Central Europe would be consistent with the large scale choose.
- inter-tropical regions : we begin to see in models a typical pattern of precipitation related to an El Nino phenomenon. Wet on Pacific and Western Indian Ocean, dry on Maritime Continent and Australia. Consistent with SST anomalies, dry conditions continue on North Tropical Atlantic. Note the wet conditions forecast on the coast of the Gulf of Guinea.

II.4.a Météo-France

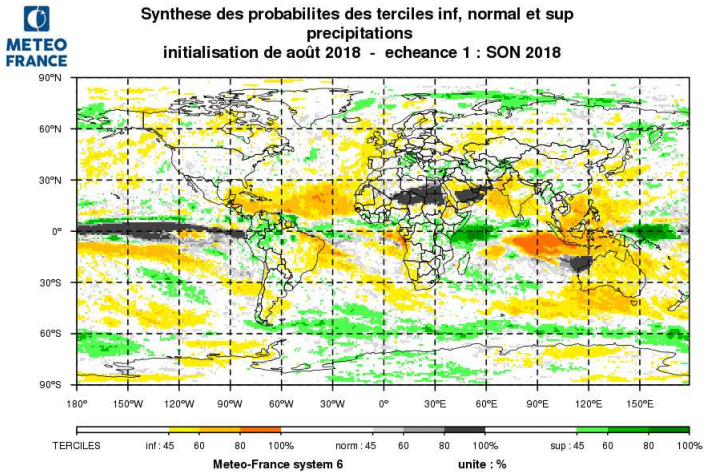


fig.II.4.1: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://seasonal.meteo.fr/

II.4.b ECMWF

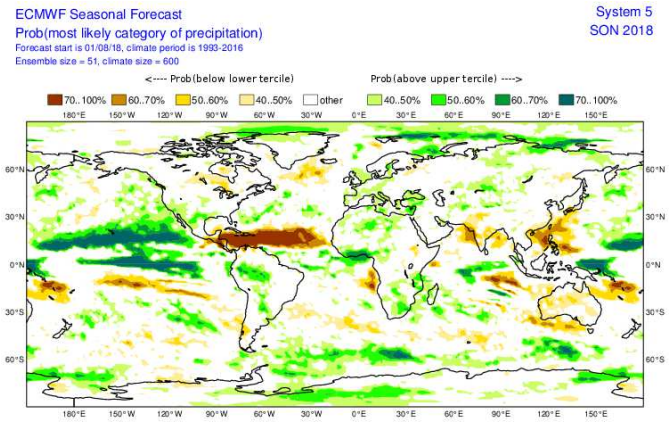


fig.II.4.2: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

II.4.c Japan Meteorological Agency (JMA)

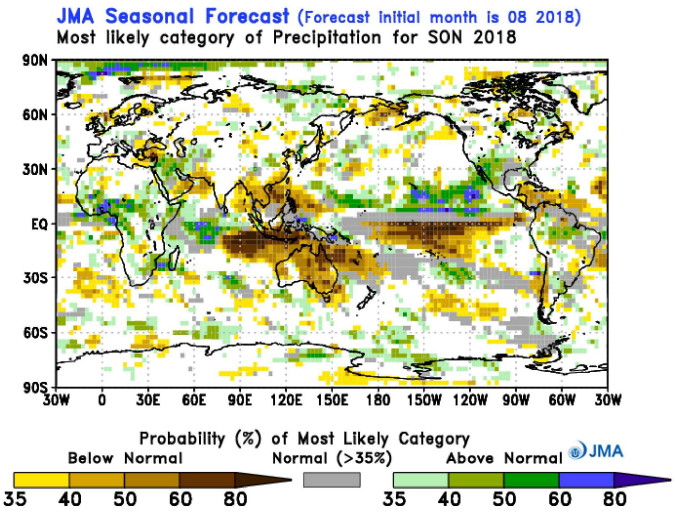


fig.II.4.3: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.
http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.4.d EUROSIP

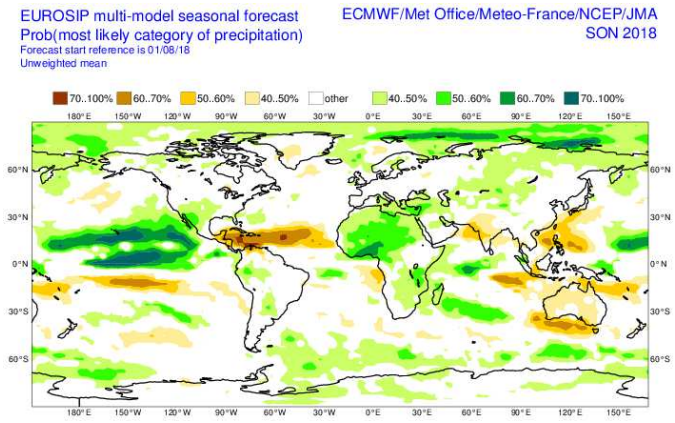


fig.II.4.4: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

II.4.e GPCC's Composite

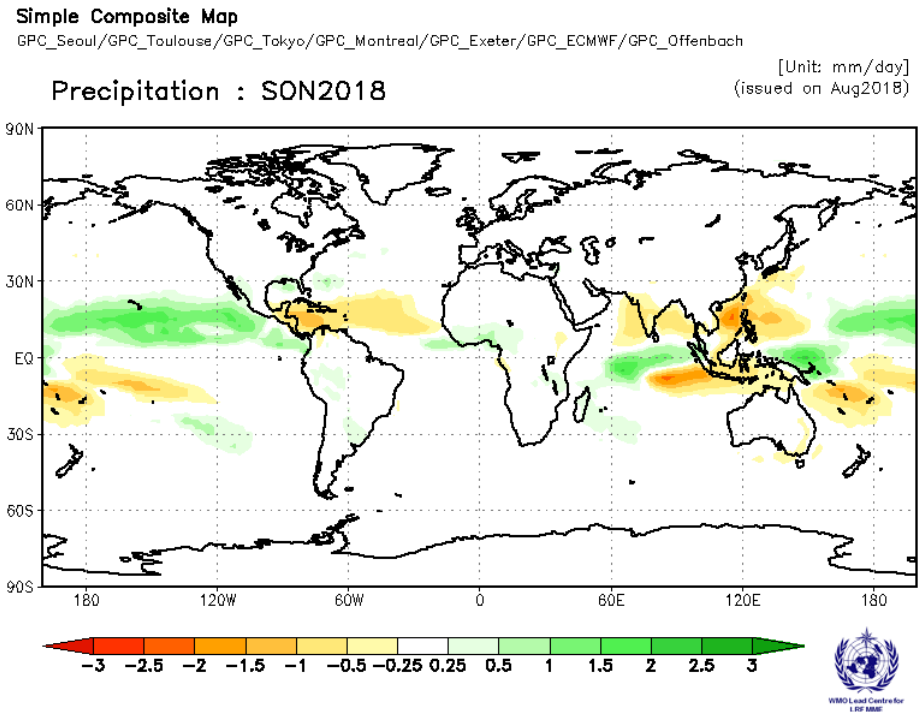


fig.II.3.2.c: Prévisions probabilistes de précipitations d'EUROSIP pour la période
(2 catégories, au-dessus et au-dessous de la normale – les zones blanches correspondent à un signal neutre ou pas significatif)

II.5. REGIONAL TEMPERATURES and PRECIPITATION

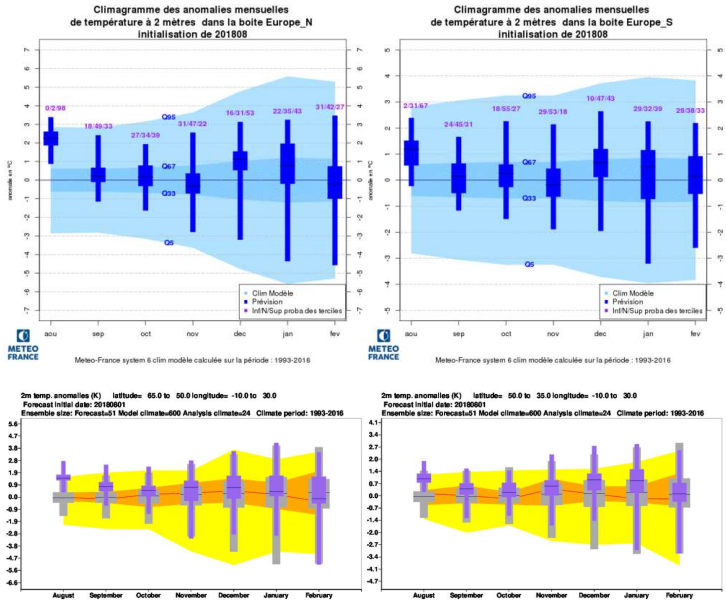


fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

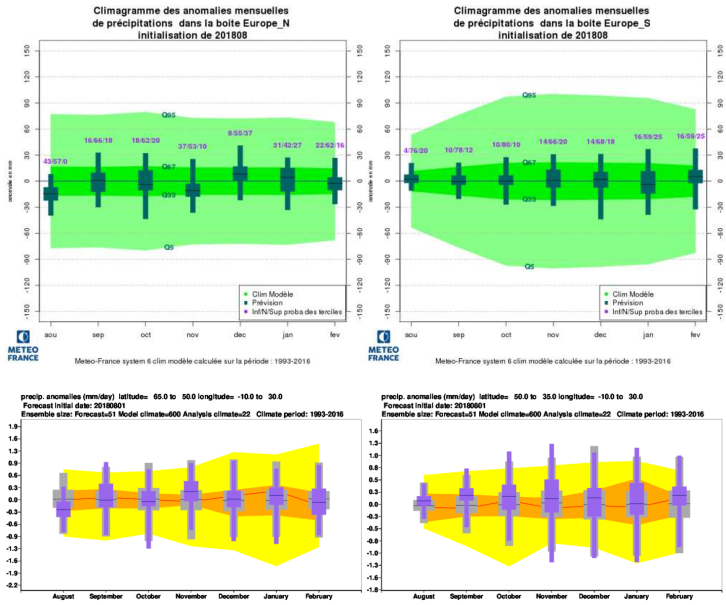


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

II.6. "EXTREME" SCENARIOS

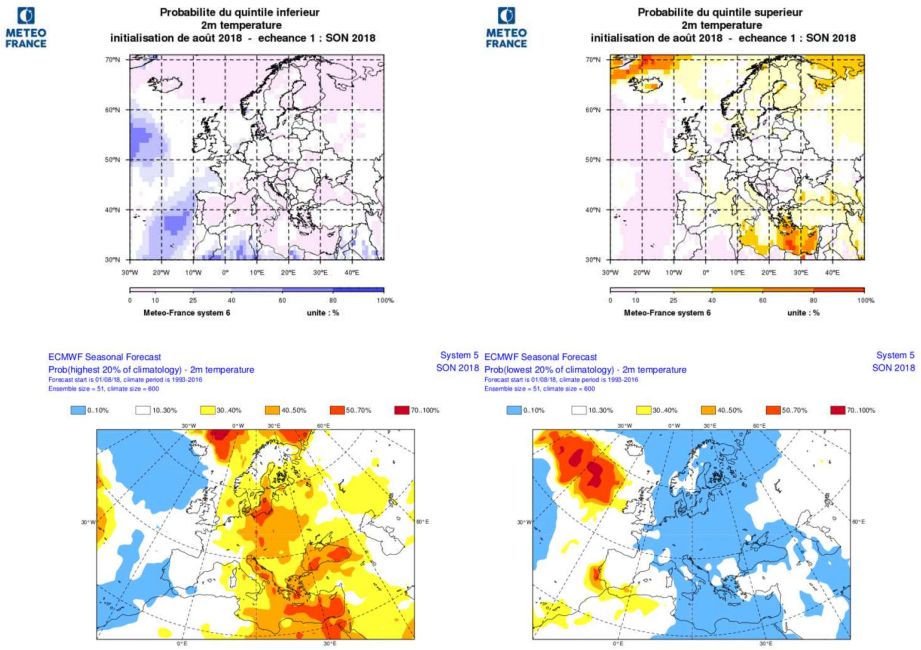


fig.II.6.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - highest ~20% of the distribution) and "extreme" above normal conditions (right – lowest ~20% of the distribution).

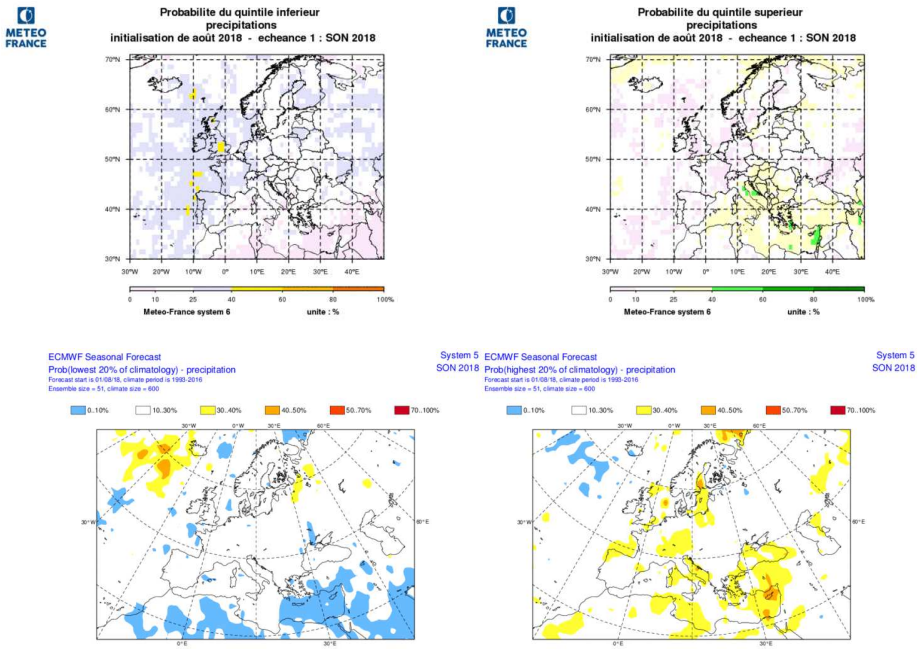


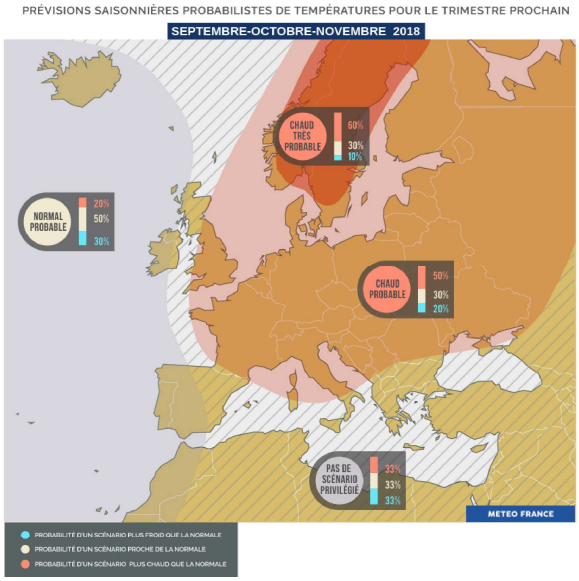
fig.II.6.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest ~20% of the distribution) and "extreme" above normal conditions (right – highest ~20% of the distribution).

II.7. DISCUSSION AND SUMMARY

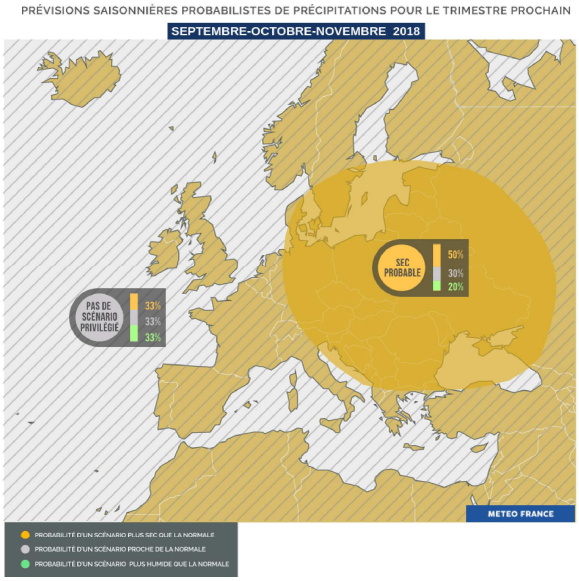
II.7.a Forecast over Europe

ECMWF5 forecast is outlier this month. The last monthly forecast rather fellows the GPCC's composite. MF-S6 is also more consistent with the composite. So we prefer this type of large scale scenario that is near of a positive NOA mode.

Temperature : models agree on a warmer than normal 3-month period over the main part of Europe, except on Iberian Peninsula and the extreme north-west. The positive NAO mode strengthen this probability over Scandinavia.



Precipitations : Consistent with positive NAO mode, drier than normal conditions over Central Europe.



II.7.b Tropical cyclone activity

North Atlantic : in connection with lower than normal SST, significantly lower than normal hurricane season activity are forecast by ECMWF-S5 model.

North Pacific : forecast activity near normal. However the current warming in the center of Pacific Ocean should modify the hurricane frequency and place of birth during the next months.

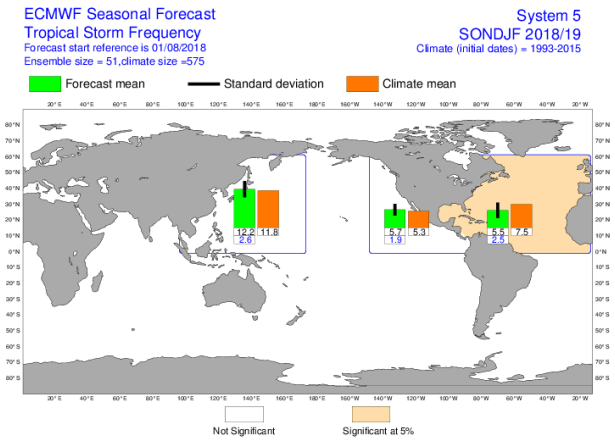


fig.II.7.1 : Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmtrop/trop_euro/eurosip_tropical_storm_frequency/

III.1. Seasonal Forecasts

Presently several centers provide seasonal forecasts, especially those designated as Global Producing Centers by WMO (see http://www.wmo.int/pages/prog/wcp/wcasp/clips/producers_forecasts.html).

- BoM, CMA, CPTEC, DWD, ECMWF, JMA, KMA, Météo-France, NCEP and UK Met Office have ocean/atmosphere coupled models. The other centers 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 5 models (ECMWF, MF, NCEP, UK Met Office and JMA). 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 interpret 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 centers.

This bulletin collects all the information available the 21st of the current month preceding the forecasted 3-month period.

III.2. « NINO », SOI indices and Oceanic boxes

El Niño and La Niña events primarily affect tropical regions and are monitored by following the SST evolution in specific area of the equatorial Pacific.

- Niño 1+2 : 0°/10°S 80W-90W ; it is the region where the SST warming is developing first at the surface (especially for coastal events).

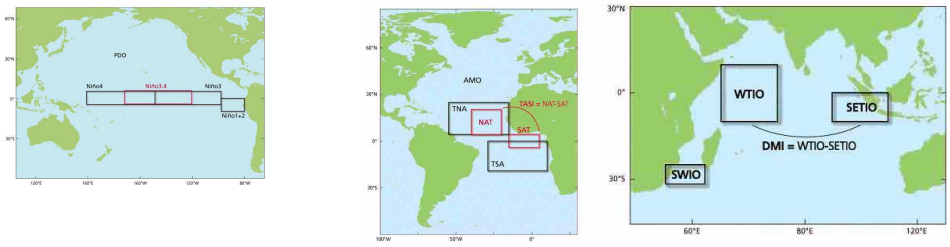
- Niño 3 : 5°S/5°N 90W-150W ; it is the region where the interanual variability of SST is the greatest.

- Niño 4 : 5°S/5°N 160E- 150W ; 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).

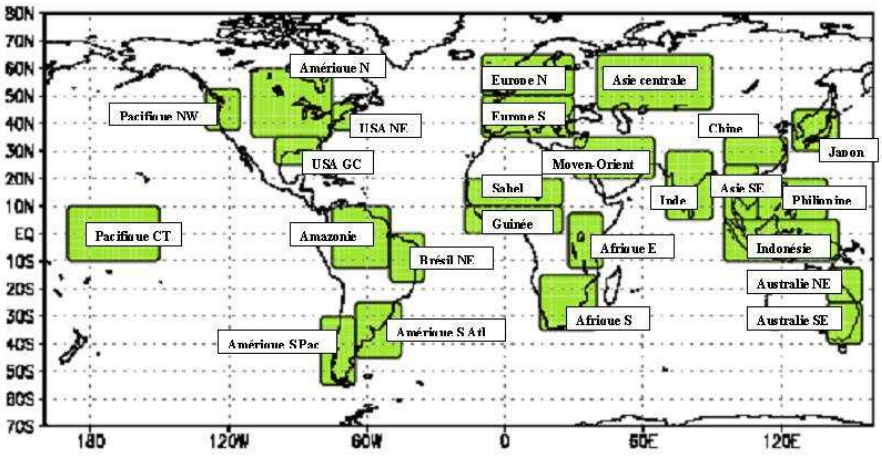
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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



III.3. Land Boxes

Some forecasts correspond to box averaged values for some specific area over continental regions. These boxes are described in the following map and are common to ECMWF and Météo-France.



III.4. Acknowledgement

This bulletin is edited by the RCC-LRF Node of the RCC Network in Toulouse for the RA VI. It is a joint effort of the RCC-Climate Monitoring Node (led by DWD) and the RCC-LRF Node (Co-Led by Météo-France).