GLOBAL CLIMATE BULLETIN

n°220 – October 2017

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I. DESCRIPTION OF THE CLIMATE SYSTEM (August 2017)

I.1.Oceanic analysis

Over the Pacific ocean :

- On the surface equatorial rail, SST cooling east of the dateline, more pronounced between the dateline and 110° W. The Nino 3.4 index fell sharply to -0.1 ° C, the Nino 1.2 (extreme east) index continued to decline. It is negative at -0.5 ° C.
- In subsurface and on the equatorial rail, consequent cooling towards 145° W which does not seem related to the propagation of a Kelvin wave. The heat content anomalies of the first 300 meters are negative on the whole rail at the end of August.
- ENSO phase: neutral for now but ... (see forecast)

Over the Maritime Continent :

- East of Borneo, warmer than normal conditions. In the west, from normal to colder (especially south of Sumatra / Java).

Over the Indian Ocean :

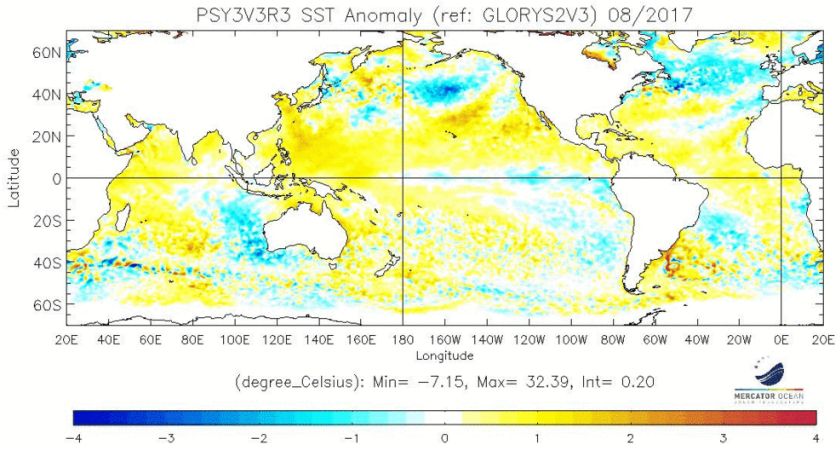
- On the equatorial rail, little change compared to July : warm anomalies in the west and normal conditions in the east. The DMI index rose a little more : it is at +0.7. Furthermore, in the subsurface, the heat content increased on the west and decreased on the east (not shown here).
- Gulfs of Arabia and Bengal have seen their positive anomalies of SST strengthen.
- In the southern hemisphere, maintaining the gradient between the west (warm) and the east (cold).

Over the Atlantic:

- in the Gulf of Guinea, net warming in SST, especially on and south of the equatorial rail.
- the tropical part of the ocean is generally warmer than normal.
- North of 40° N, SST anomalies are very negative, and these anomalies tended to strengthen in August. However, an area of positive SST anomalies is present in northeastern Iceland.

Over the Mediterranean:

- SST anomalies decreasing, but still generally higher than normal over the whole basin.



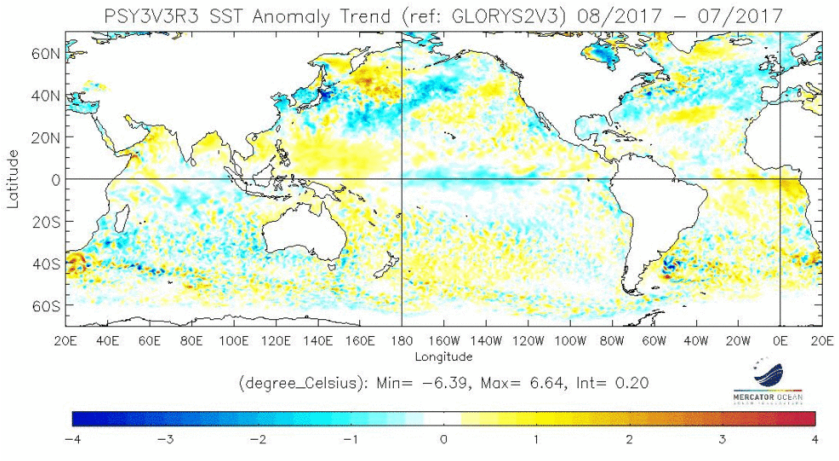


fig.I.1.1: top : SST Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2013).

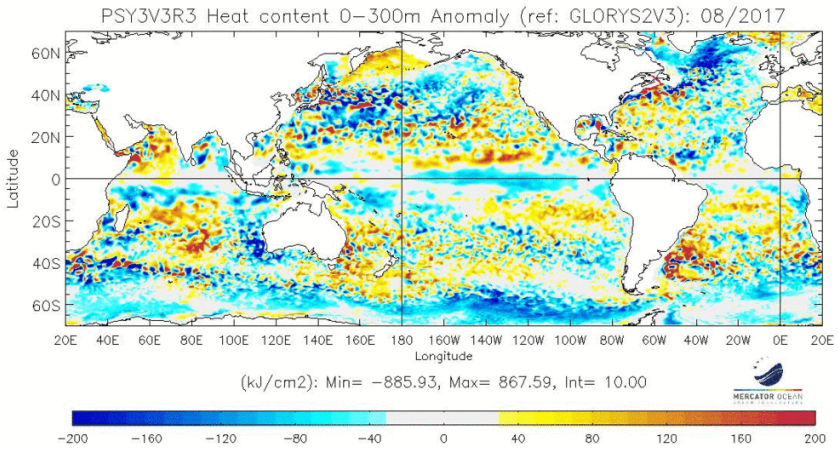


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2013)

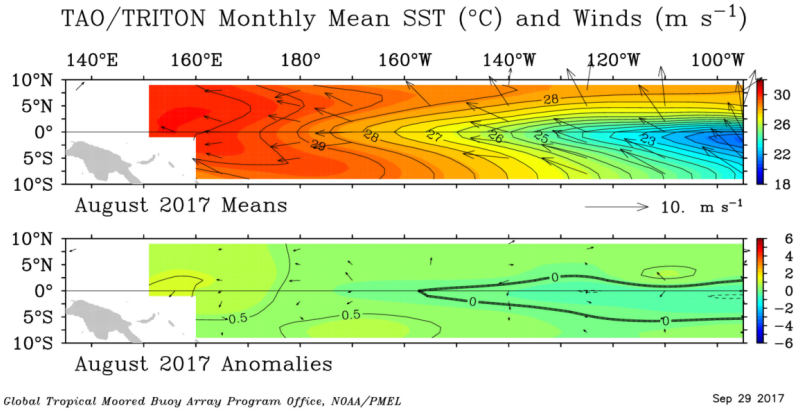


fig.I.1.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON.http: //www.pmel.noaa.gov/tao/drupal/assorted_plots/images/sst_wind_mon.png

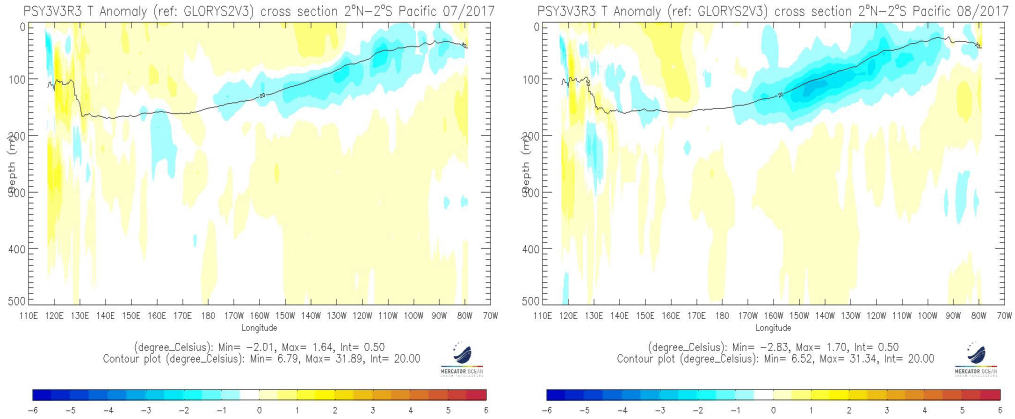


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month)

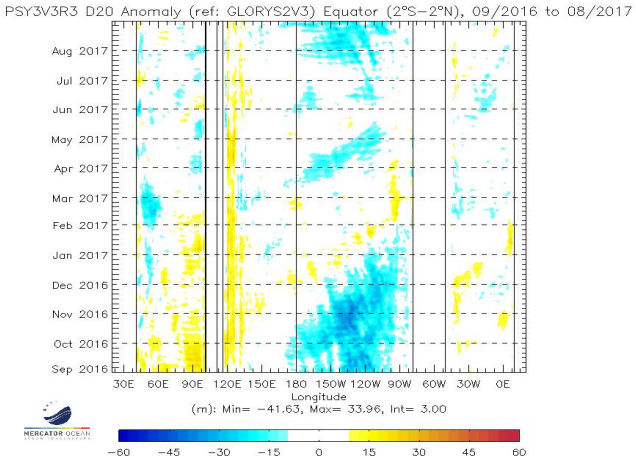


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period

<u>Sea surface temperature near Europe :</u>

European Arctic Sea and North Sea: Continuously warmer than normal in most parts north of Iceland or 60°N except some small areas near Svalbard close to the freezing line and an area close to the Scandinavian continent, which was normal to below normal and colder than July.

Baltic Sea: again colder than normal, anomalies became once again steadily stronger since May.

Cold blob south of Greenland/Iceland: The cold area intensified and extended in the east and in the south. In the east it reached up to the European continent, in the south beyond 40°N. In contrast, it has weakened in the north; areas close to Iceland had close-to-normal SST or only slightly below.

Subtropical East Atlantic: Whereas much of the subtropical North Atlantic was still warm, some traces of cooling reached the area west of Iberia.

Mediterranean: Almost the whole basin still warmer than normal, but anomalies decreased considerably in the eastern Mediterranean. SST did not change much in absolute values, but were only slightly above normal in the eastern basin, and even below normal in the Aegean Sea.

Black Sea: Mainly colder than normal in the west and warmer in the east, but not much change compared to July.

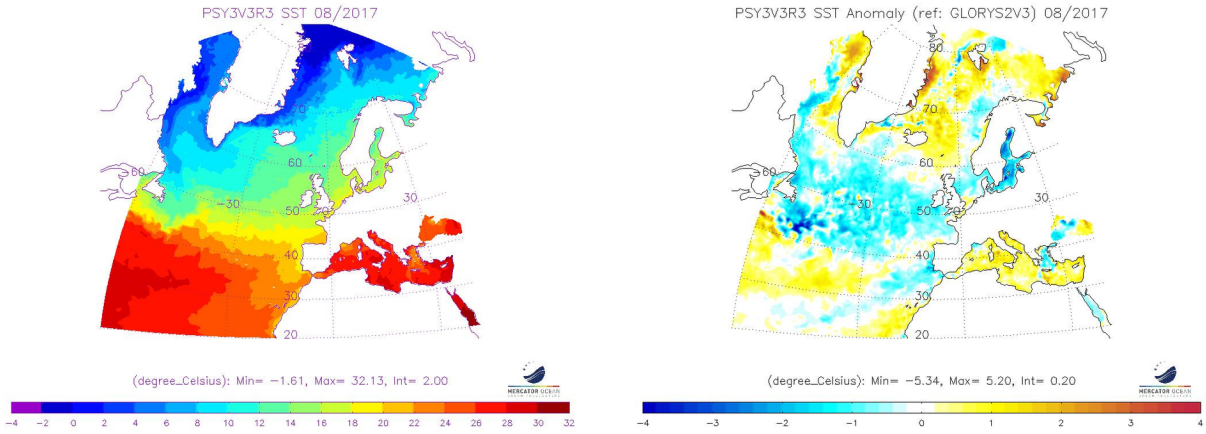


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2013).

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) :

- configuration of downward motion anomalies over the east part of tropical Pacific, consistent with the SST anomalies (a sign of some ocean-atmosphere coupling).
- Elsewhere, there is little signal except in Africa : a rather upward motion anomalies configuration (linked to a rather active monsoon this year), particularly to the south of the Cape Verde Islands (a privileged place for convective cluster formation eventually degenerating into tropical storms and / or hurricanes further west on the North Atlantic Tropical Basin). Hurricane IRMA that hit the Caribbean in early September had its source at this location in late August.

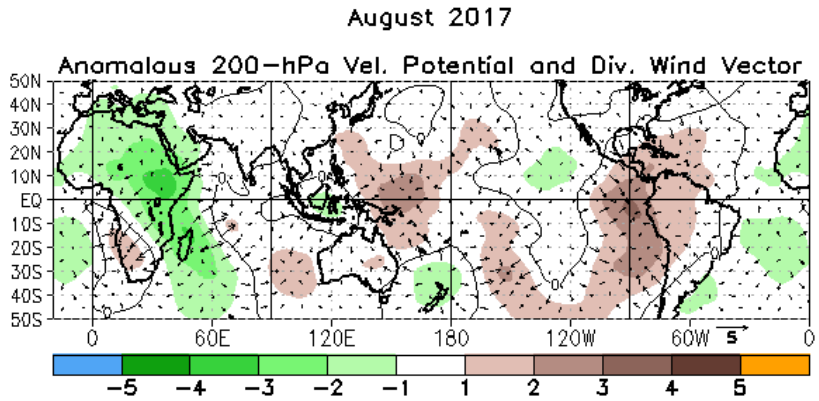


fig.I.2.1.a: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly). http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

SOI :

- the SOI index was positive in August at +0.5 and decreased slightly (+0.8 in July). See NOAA Standardized SOI: https://www.ncdc.noaa.gov/teleconnections/enso/indicators/soi/ . This is consistent with ocean temperatures colder than normal on the Pacific Tropical East.

MJO (fig. I.2.1.b)

- No activity, except at the end of August when a weak activity in the Indian Ocean is detected (quadrants 2

and 3).

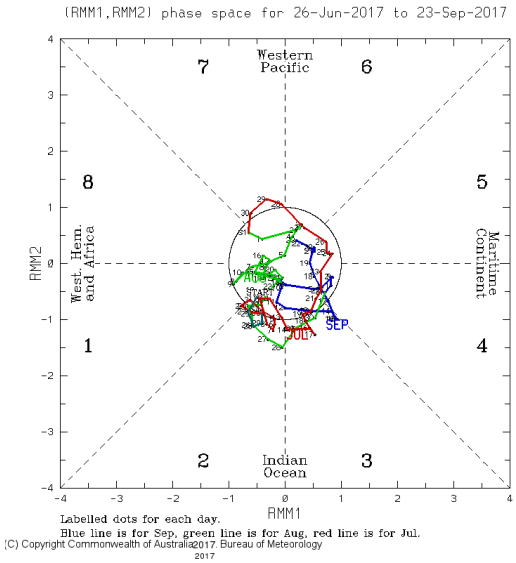


fig.I.2.1.b: indices MJO http://www.bom.gov.au/climate/mjo/

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

- There are no traces of tropical forcing towards midlatitudes. Stream function anomalies are related to extra-tropical activity.

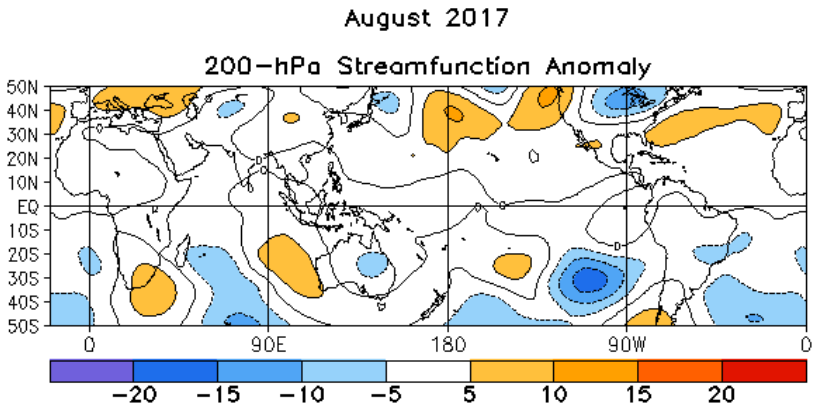


fig.I.2.2: Stream Function Anomalies at 200 hPa.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

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

- Wide zone of positive geopotential anomaly extending from the Balearic Islands to the west of Russia. To the north of this area, a negative geopotential anomaly from southern Iceland to northern Norway.
- This configuration is projected onto NAO- (-1,5) and EA + (+2,0). It brought warm temperatures than normal over France (especially on the Southeast and Corsica which experienced a heat wave spell) and overall precipitation below normal (a more pronounced deficit on the South-East of France).

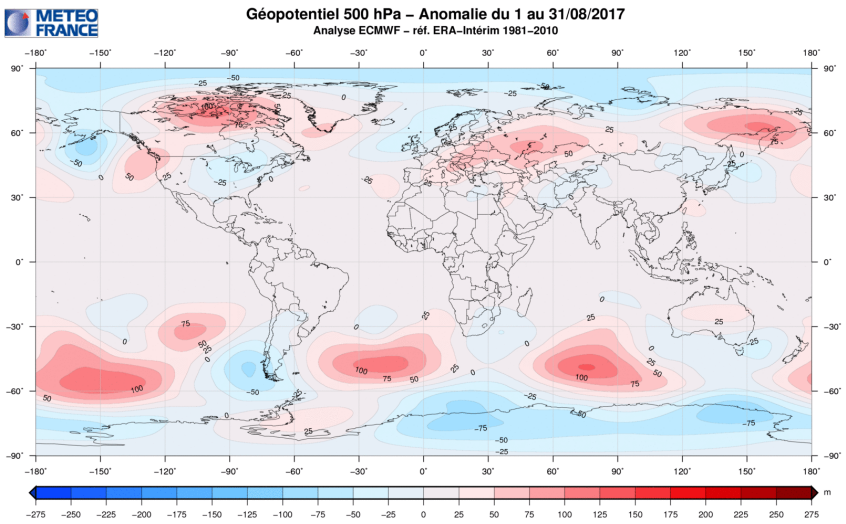


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
AUG 17	-1.5	2.0	1.4	-1.6	0.2	---	-2.9	-1.6	1.8
JUL 17	1.3	1.8	0.5	0.0	1.3	---	-0.6	0.0	-0.1
JUN 17	0.4	2.0	-0.8	0.5	1.2	---	0.3	-1.4	-0.1
MAY 17	-1.7	0.5	0.7	-0.7	-0.2	---	1.5	0.9	0.5
APR 17	1.7	-0.6	-0.4	1.0	0.1	---	0.7	-1.5	-1.4
MAR 17	0.4	1.0	-2.1	-1.0	-0.0	---	-1.0	-1.0	0.7

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

Like the previous two summer months, also August was characterized by a strong zonal pattern especially over the East Atlantic. Consequently, an EA pattern persisted all the summer with quasi constant intensity (+2). On the other hand the gradient was weaker in the western North Atlantic, near surface as well as in the upper atmosphere, causing a switch to negative NAO.

Remarkable for this month was an extension of that pattern far into Europe and even Russia with extended low pressure over northern Europe and high pressure over middle latitudes, contributing to both quite strong negative SCAND (-1.6) and EATL/WRUS (-2.9) patterns. Since low pressure extended also far into the Arctic region, POLEUR pattern also was quite intense (+1.8).

MF weather type classification shows different weather types contributing this month, but most dominant were NAO- (13 days) and Atlantic Trough (10 days). Hess/Brezowsky classification of DWD shows mostly southwesterly cyclonic and westerly types, but also troughs over Western or Central Europe, and even 5 days of high pressure over Central Europe.

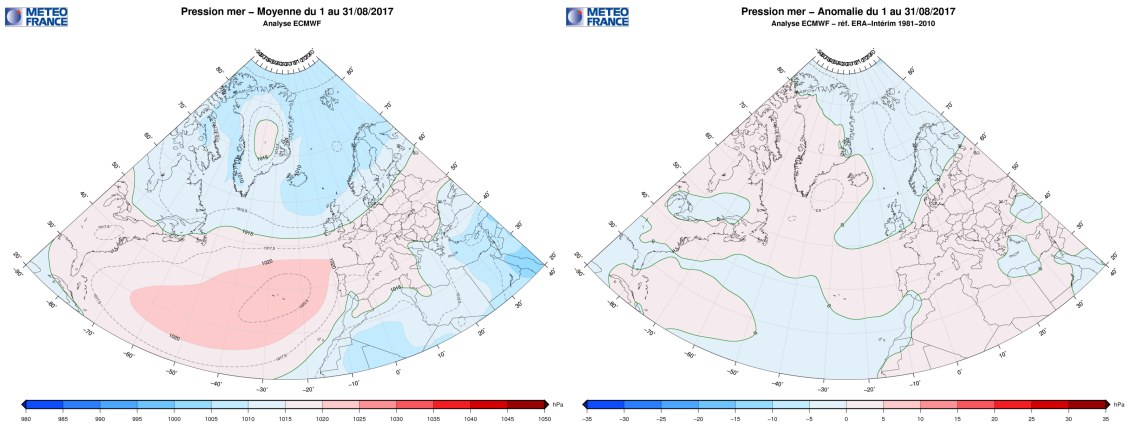


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (top) and 1981-2010 anomalies (bottom).

Circulation indices: NAO and AO

The NAO- pattern persisted almost the whole month, just the last week there was a switch to a slight positive phase.

AO oscillated around normal and thus did not follow NAO except the last week, when the same switch to the positive phase can be identified. As can be seen from geopotential height anomalies, the pattern over East Atlantic / Europe can be seen as a part of an intense large wave structure, which is averaged out in the hemispheric mean.

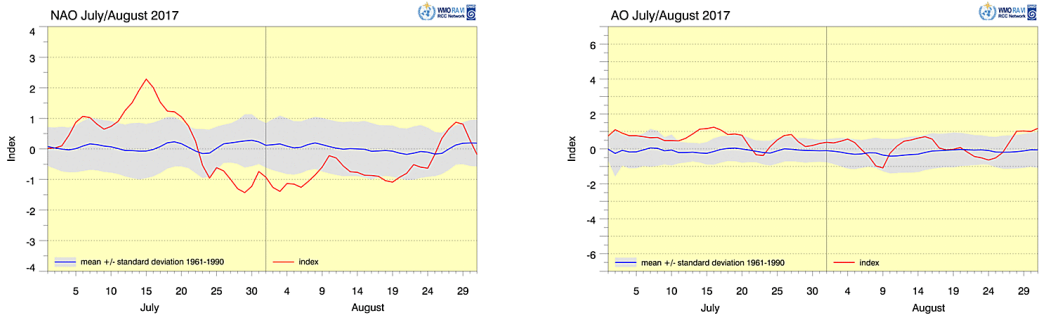


fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

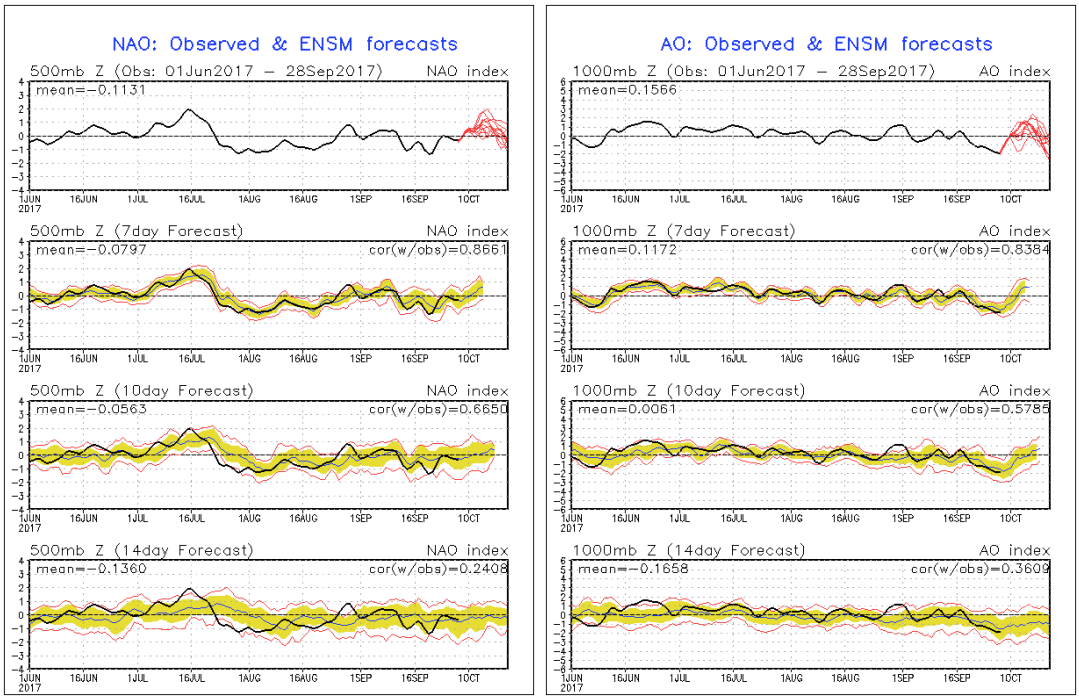


fig. I.2.5a: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices for the last 4 months and forecasts for the following weeks. Source: NOAA CPC, http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

- In relation to the above-mentioned velocity potential anomalies, deficit over the Equatorial Pacific ocean.
- Deficit over northern South America.
- African monsoon surplus in its northern part, and deficit near the Guinean golf coast. Consistent with the large scale (see velocity potential).
- Indian monsoon in excess too.

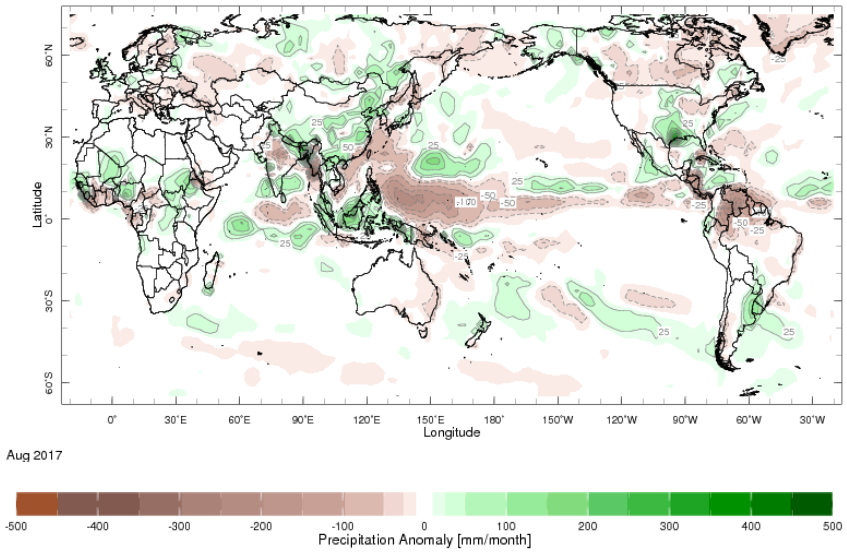


fig.I.2.6: Rainfall Anomalies (mm) (departure to the 1979-2000 normal).
Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

Precipitation anomalies in Europe:

Large precipitation surpluses especially over northwestern and northern Europe, consistent to cyclonic anomalies caused by EA+, SCAND- and EATL/WRUS- patterns, depending on location. Also typical for dominating NAO- and Atlantic Trough patterns according to MF weather type classification because they show cyclonic anomalies for these patterns. Parts of central Europe were often rainy, mostly convective with thunderstorms, since cyclonic influence extended temporally also to that area. Parts of Spain also had above-normal precipitation when Atlantic troughs extended partly far to the south.

In contrast, a large area from southern France over Italy, the Balkans to eastern Europe were mainly dry with local drought, largely consistent with surface high pressure zone, but also local convective rain.

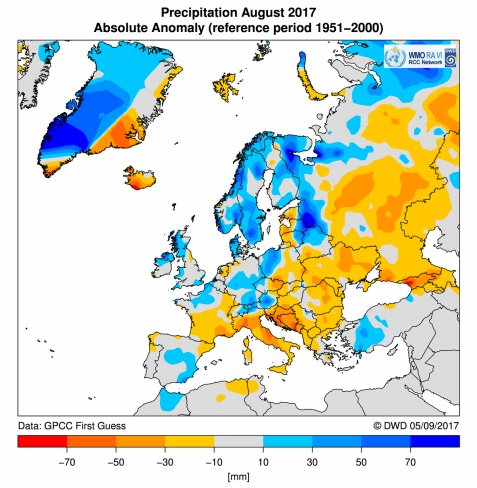


fig.I.2.7.a : Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm.

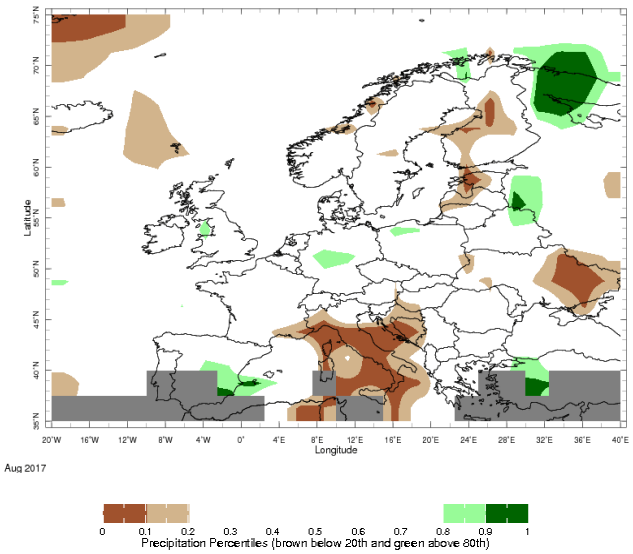


fig.I.2.7.b : Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

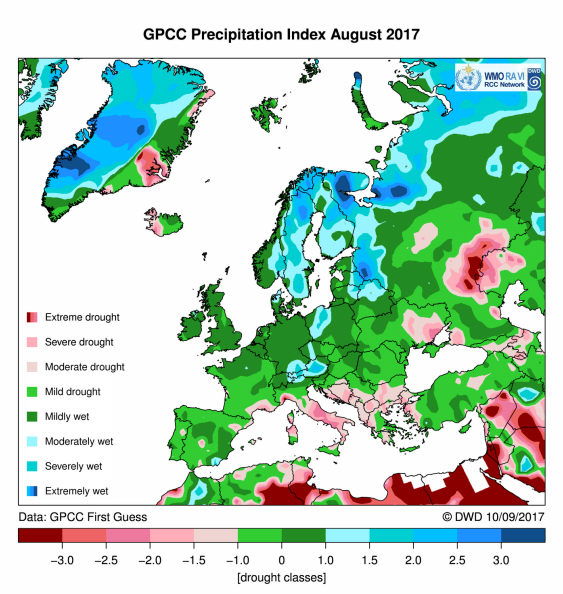


fig. I.2.8: GPCC Precipitation Index, http://www.dwd.de/rcc-cm .

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	+ 12.6 mm	+ 0.769
Southern Europe	- 9.8 mm	- 0.491

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

- According to the Copernicus analysis August 2017 is the 2nd warmest August recorded worldwide (global anomaly of +0.48°C against to +0.62°C in August 2016).
- On the Eurasian continent, we find the meridian gradient already indicated in geopotential.

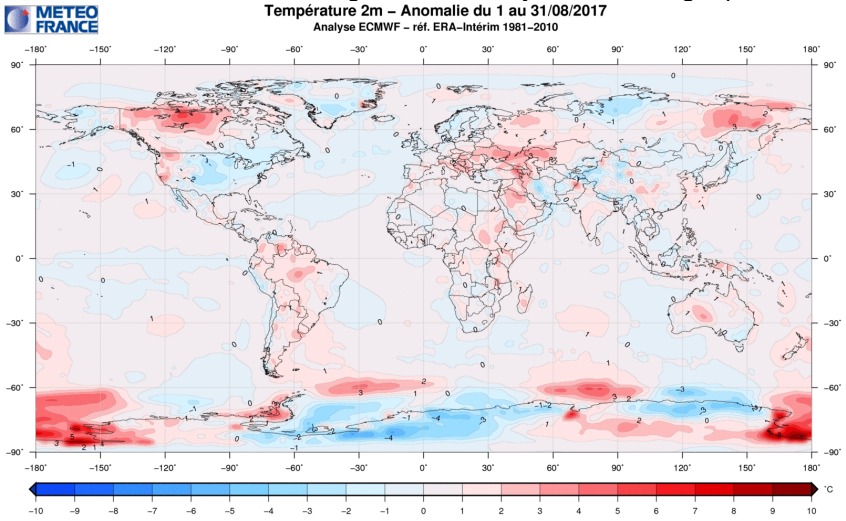


fig.I.2.9: Temperature Anomalies (°C) (Meteo-France)

Temperature anomalies in Europe:

East Atlantic was mainly colder than normal due to a relatively high number of Atlantic / western Europe trough patterns. Otherwise quite a clear border between colder air over northern Europe and warmer air south of it, reflecting the geopotential / SLP distribution and resulting frontal zone.

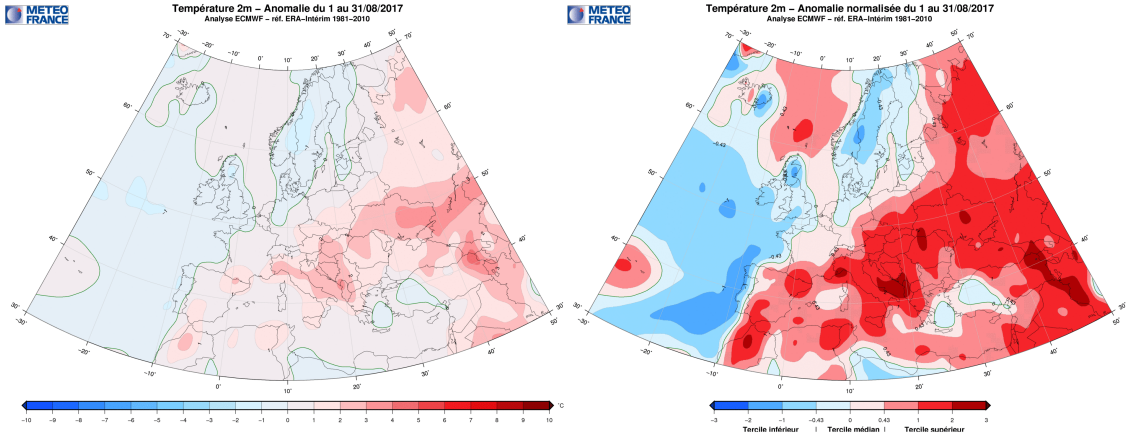


fig.I.2.10: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

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	+ 0.8 °C
Southern Europe	+ 2.0 °C

I.2.d Sea ice

- In the Arctic, the ice extent remains very below 1981-2010 normal.
- In the Antarctica the deficit is also still very important.

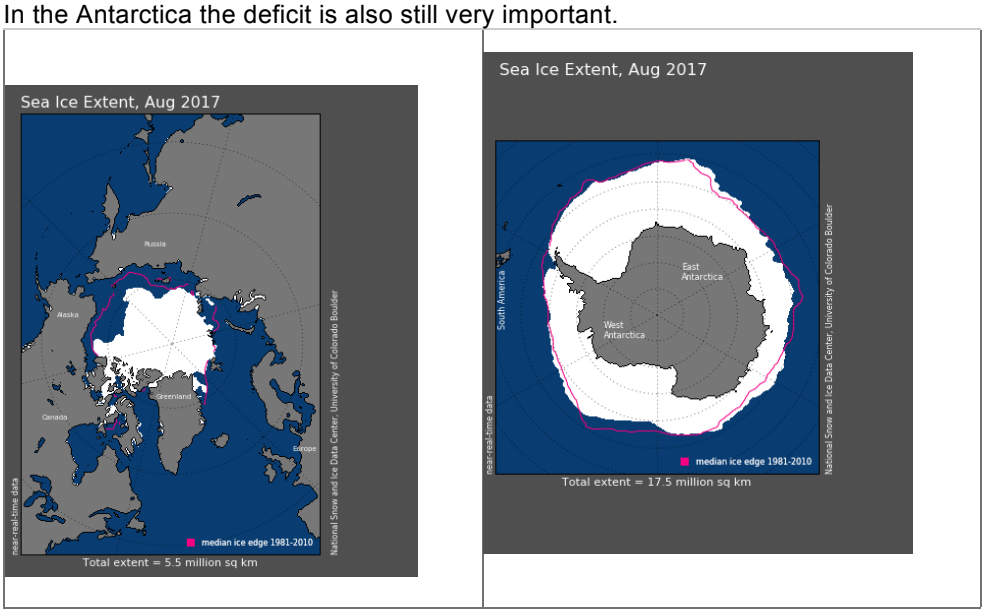


fig.I.2.11: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

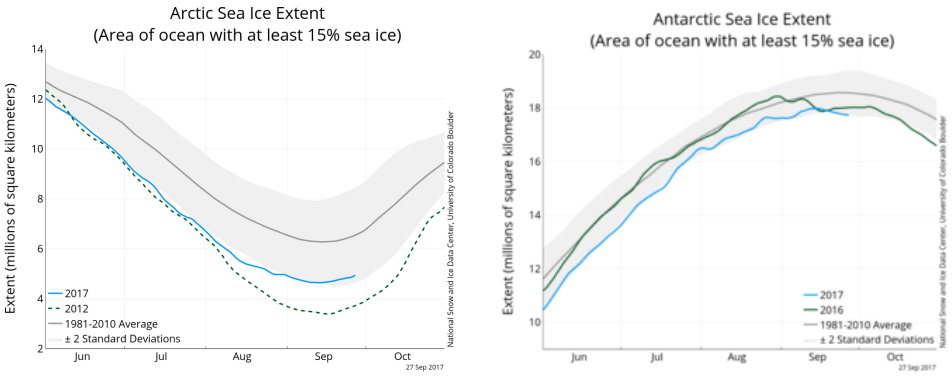
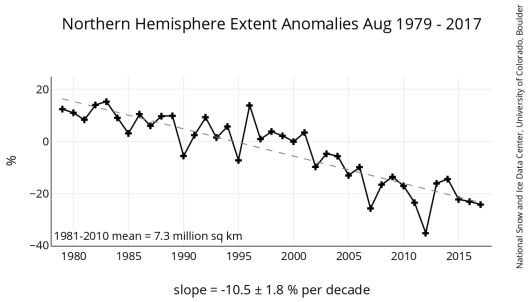


fig. I.2.12 : Sea-Ice extension evolution from NSIDC. https://nsidc.org/data/seaice_index/images /daily_images/N_stddev_timeseries.png



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

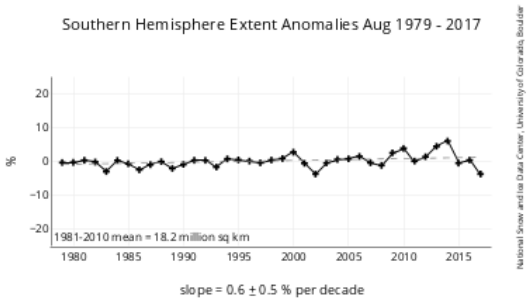


fig 1.2.13 : Monthly Sea Ice Extent Anomaly Graph in Antarctic for the month of analysis (http://nsidc.org/data/seaice_index/)

II. SEASONAL FORECAST FROM DYNAMICAL MODELS

II.1. OCEANIC FORECASTS

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

EUROSIP models compound are in very good agreement.

- Pacific Ocean: for these 5 models, continuation of the cooling on the equatorial rail, and this even to the west of the dateline. The MF model is a little colder than the others EUROSIP models. A move towards La Niña now seems more and more likely. This is also the point of view of the CPC / IRI forecasters (see http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.shtml). Dynamics now engaged since July is expected to increase in the coming months.
- Indian Ocean: the west / warm - east / cold gradient seems to be maintained around the equatorial rail. The DMI should remain positive but not reach the threshold of a positive IOD phase.
- Atlantic Ocean:
  - In the tropical area, forecasted warmer than normal conditions, although intensities vary from one model to another (CEP and UKMO warmer than MF / NCEP / JMA).
  - Further north, very vague consensus on maintaining the "cold blob". On the other hand, the consensus is stronger on a Greenland sea much warmer than normal.
- Mediterranean Sea : positive anomalies forecasted, rather on the western part of the basin.

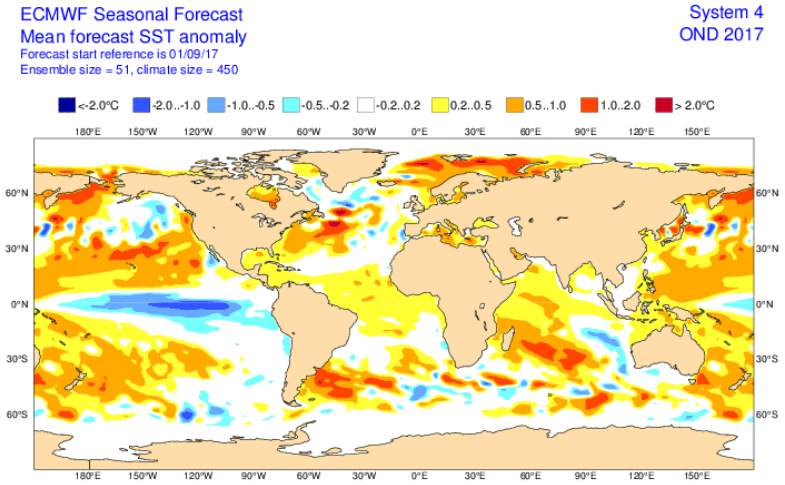


fig.II.1.1: SST anomaly forecast from ECMWF
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

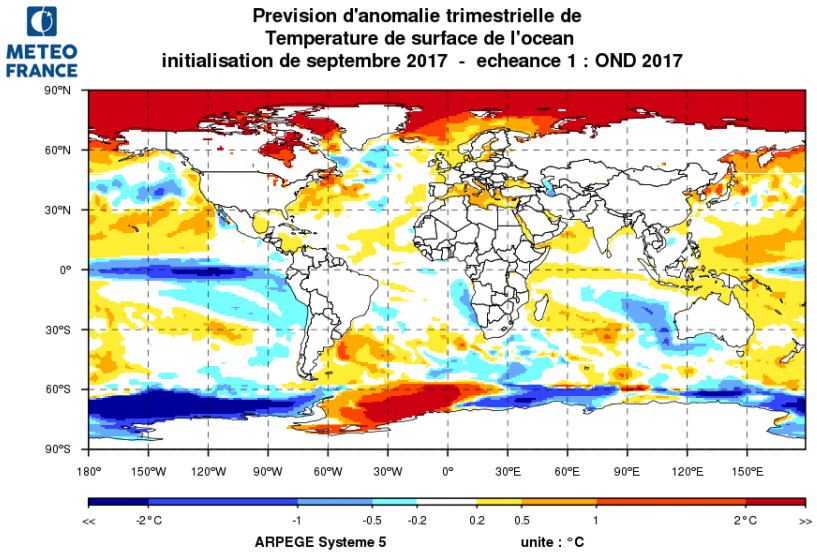


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation). http://seasonal.meteo.fr

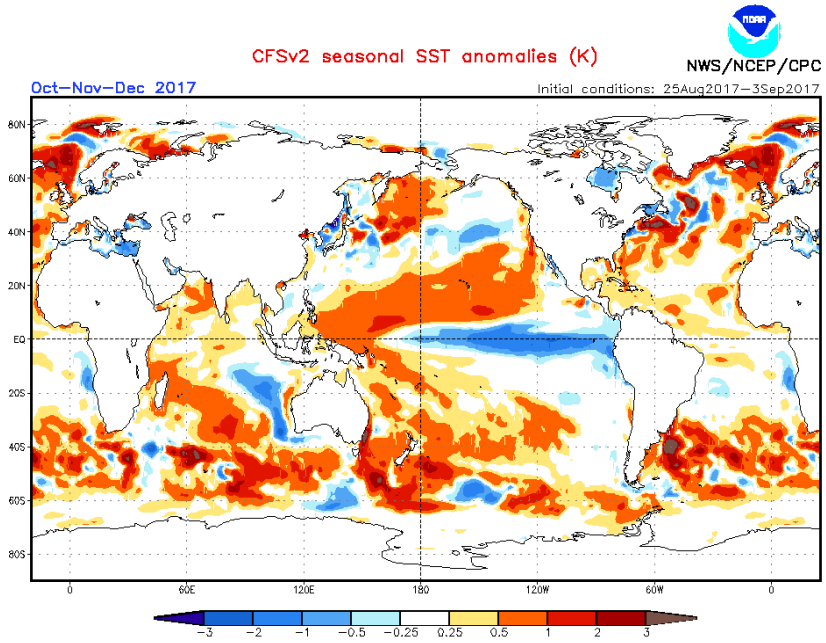


fig.II.1.3: SST Anomaly forecast from NCEP. http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/imagesInd1/glbSSTSeaInd1.gif

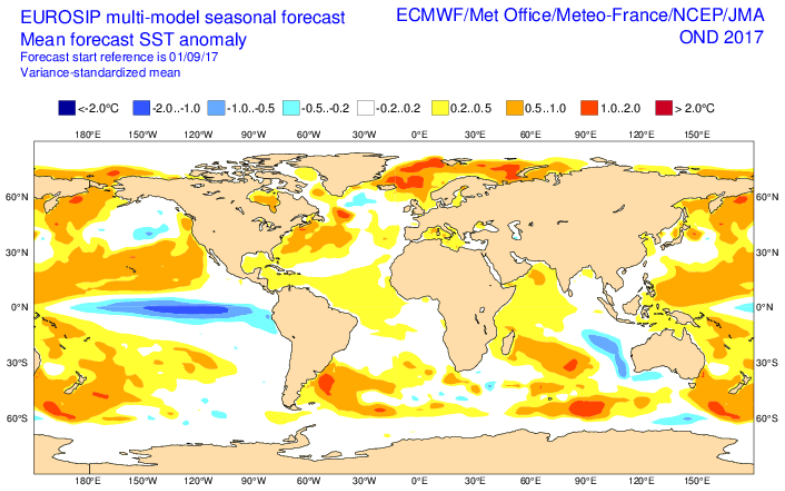
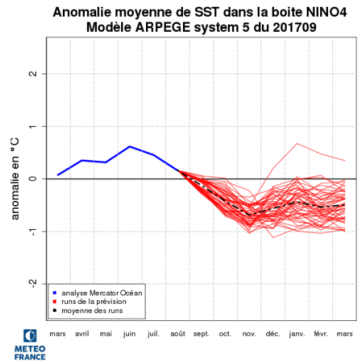


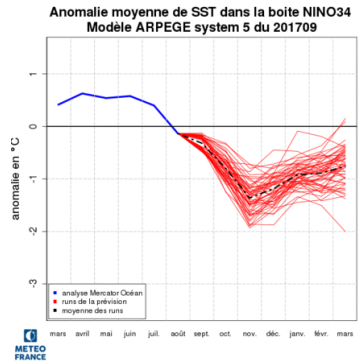
fig.II.1.4: SST Forecasted anomaly from Euro-SIP

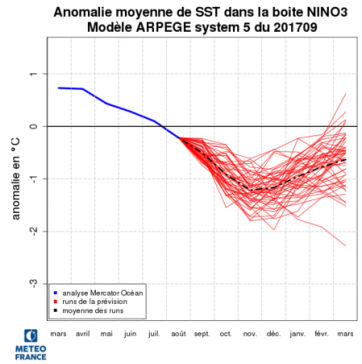
II.1.b ENSO forecast :

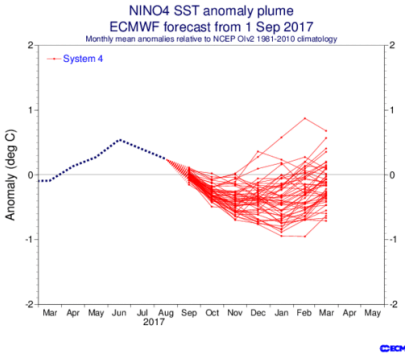
***Forecast Phase*: weak La Niña during the next three-month period.**

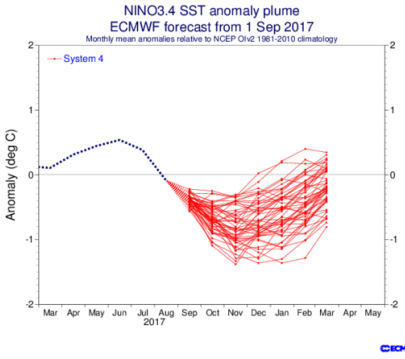
The EUROSIP models all foresee a continuation of the decline already begun. La Niña conditions appear to be the most likely for the OND quarter (75% of runs below the threshold -0.5 ° C in the Niño 3.4 region). But IRI's census http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/, which shows a fairly rapid evolution in forecasts within a month to a scenario colder, reveals that these EUROSIP models are among the coldest. Nevertheless, the average of all dynamic models gives an anomaly of -0.6 ° C for OND. The CPC / IRI is in "Niña Watch". It is therefore reasonable to opt for a weak La Niña scenario for the next 3 months.

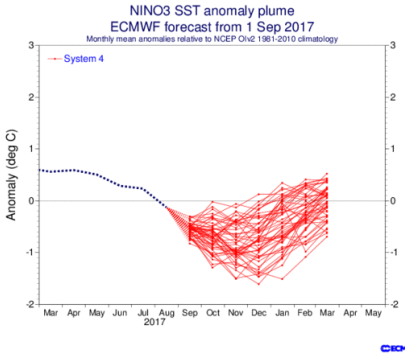












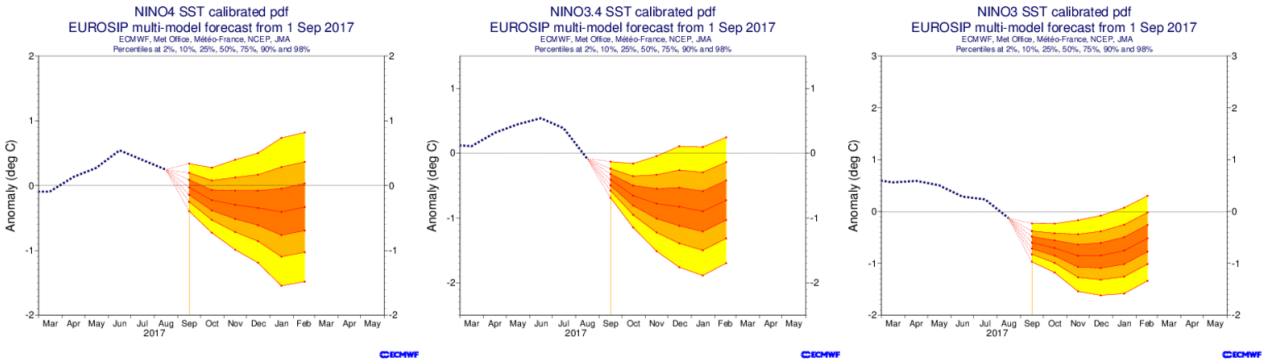


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members -
and EUROSIP (bottom) – recalibrated distributions -
(http://seasonal.meteo.fr , http://www.ecmwf.int/)

I.1.c Atlantic ocean forecasts

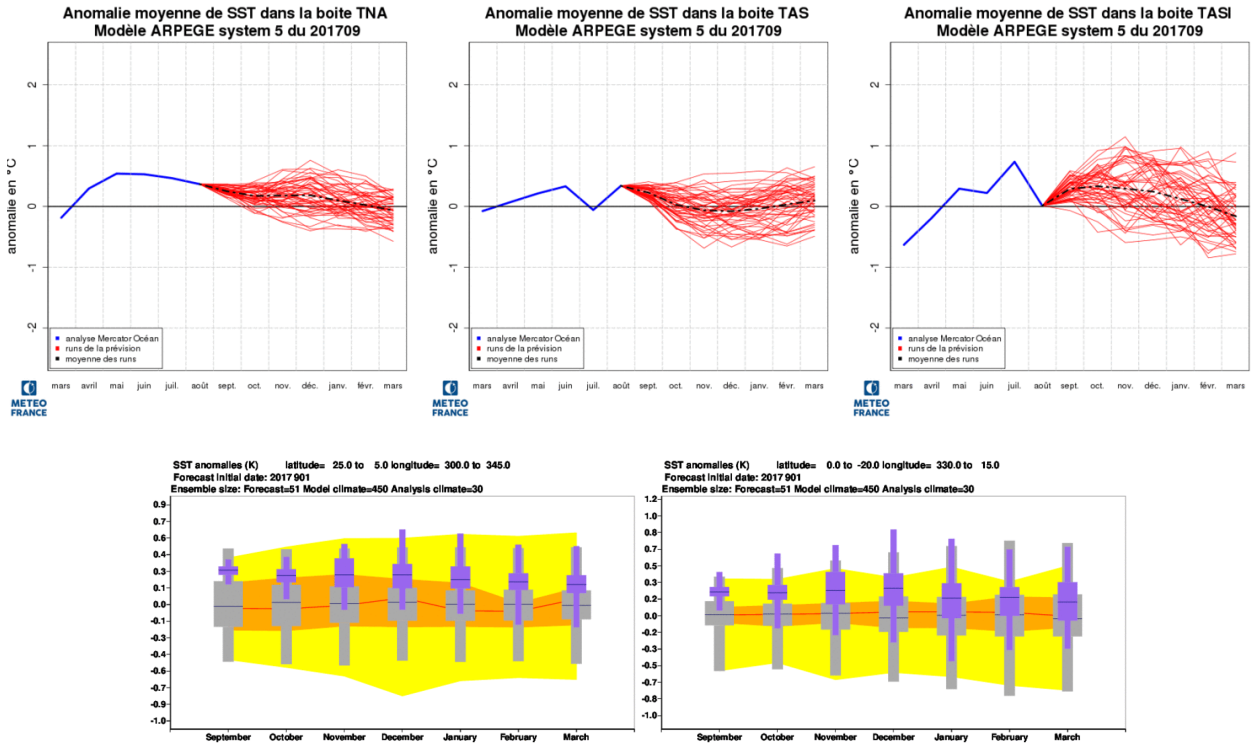


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

I.1.d Indian ocean forecasts

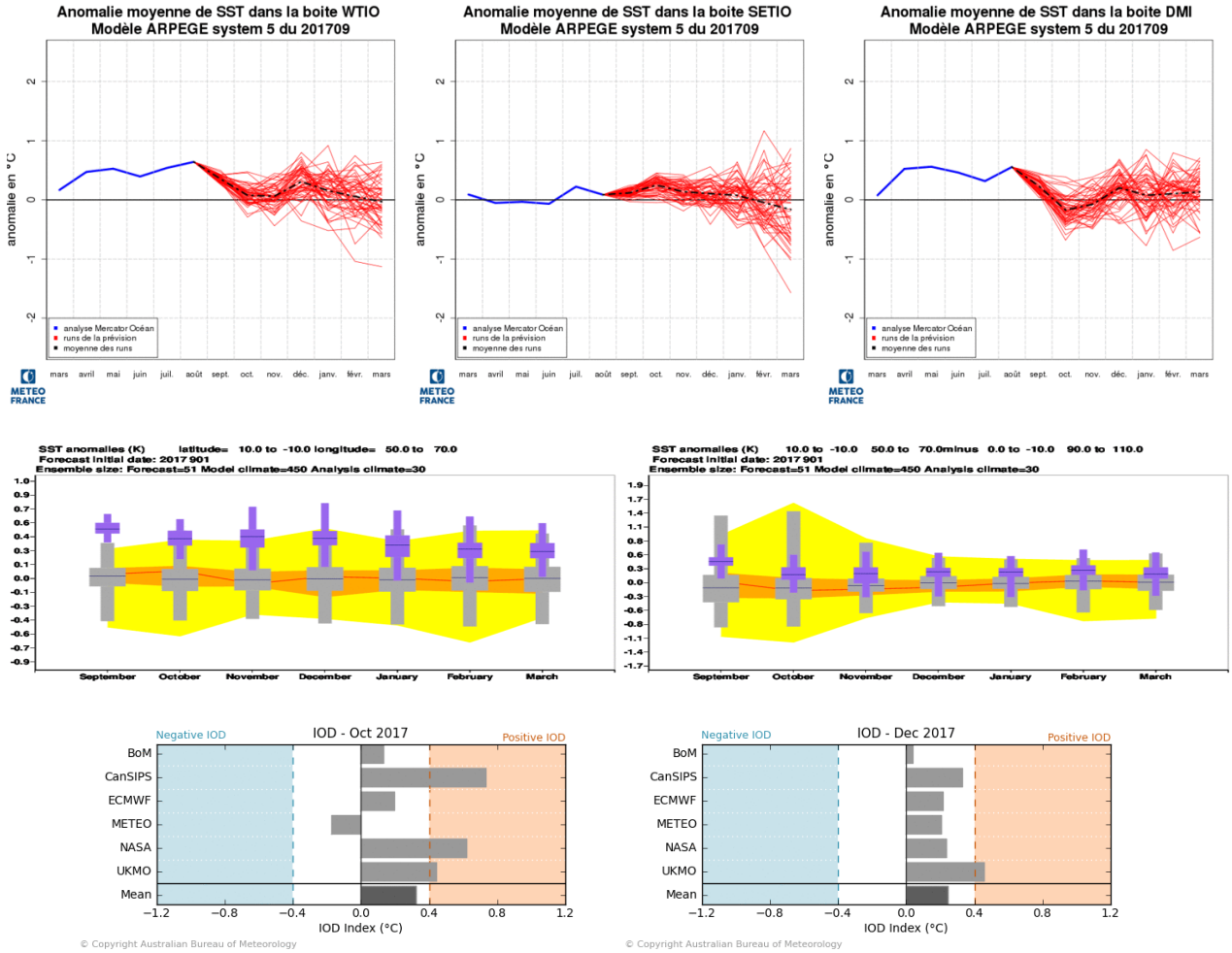


fig.II.1.7: SST anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.2. GENERAL CIRCULATION FORECAST

II.2.a Velocity potential anomaly field and Stream Function anomaly field

- Velocity potential :
  MF, CEP and JMA rather in consensus over the maritime continent (MC) and the Pacific, with a bipolar structure (upward motion anomalie over CM and downward motion anomalie over the Pacific). This structure is Niña-consistent. On the other hand, there is no consensus between the models over Latin America or Africa (JMA is isolated).

- Stream Function : weak cores, but in the northern half of the western hemisphere there is a small consensus (especially between MF and CEP) to propose a cyclonic anomaly to the Gulf of Alaska / Aleutians, a large cyclonic anomaly from dateline to Mexico extending then to Florida, the Azores and to the Iberian Peninsula. To the north of this anomaly, the three models propose an anticyclonic anomaly centered more or less towards Newfoundland. Further to the east, an anticyclonic anomaly over West-Russia with MF, but shifted towards the west (over Ukraine-Belarus-Poland) with CEP. JMA offers something else about this last part of the globe.

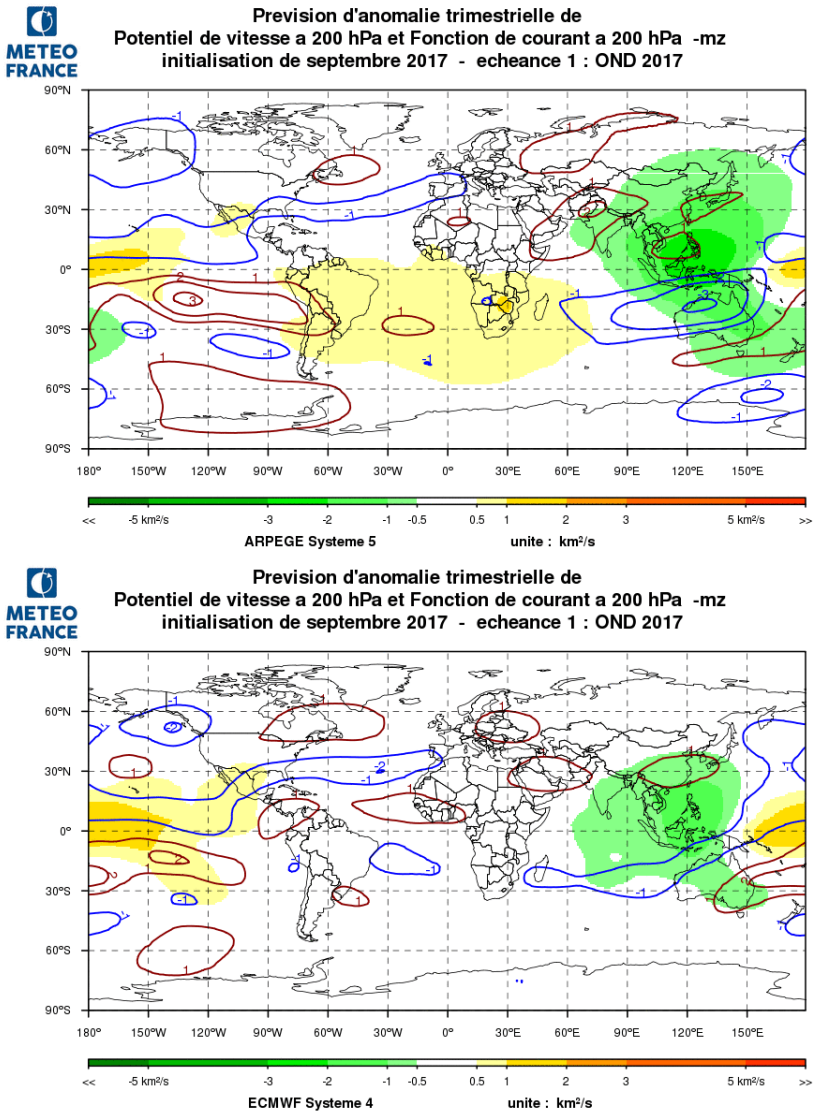
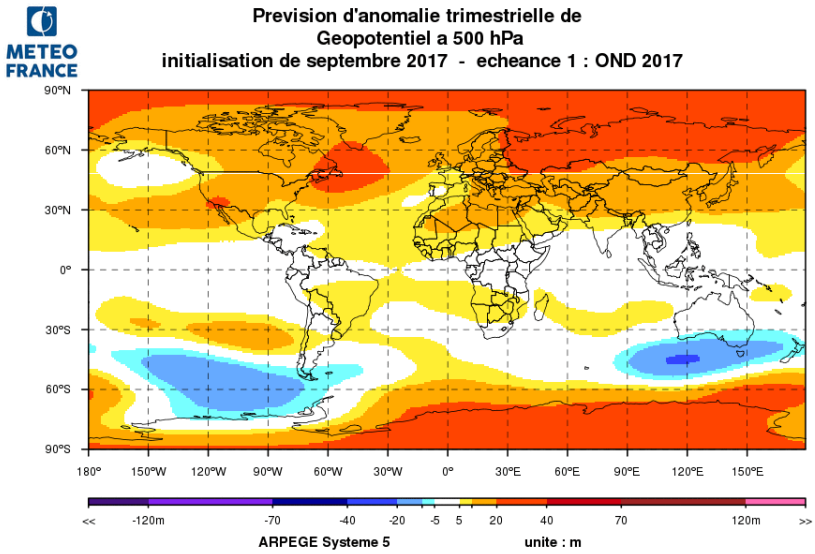


fig.II.2.1: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly),
associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ
(isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).
http://seasonal.meteo.fr

II.2.b Geopotential height anomalies

At the northern hemisphere scale, as for several months, a broad context of positive anomalies of GP. There is a consensus for the low anomaly (relative to the context, even negative) present towards the Gulf of Alaska.

Over Europe, the consensus disappears (consistent with what has been said above regarding forecasted potential velocity and stream function anomalies).



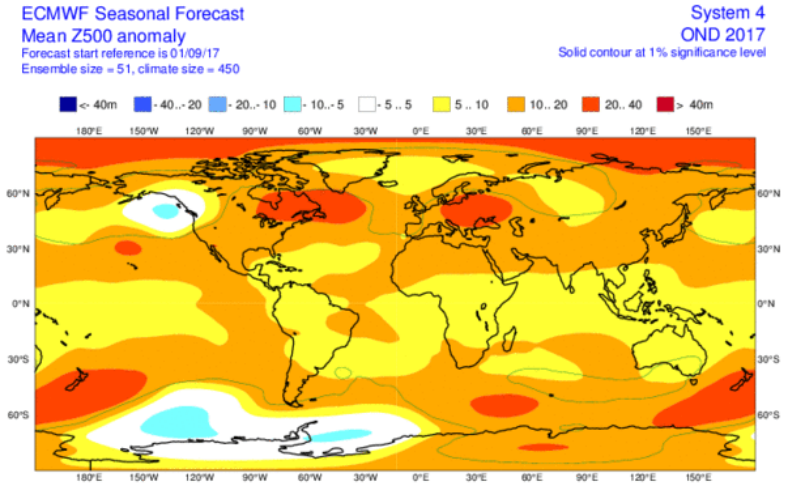


fig.II.2.2: Anomalies of Geopotential Height at 500 hPa from Météo-France and ECMWF.
http://seasonal.meteo.fr http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast

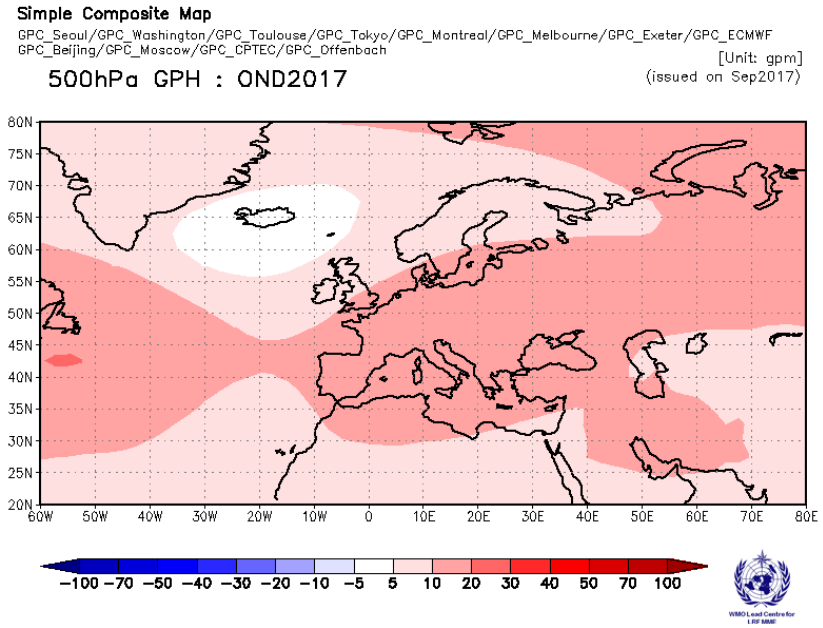


Fig II.2.3 : 500 mb geopotential height anomaly from 9 GPCs (out of EUROSIP)

II.2.c. modes of variability

MF S5 model forecasts only.

The positive phase of the EA mode is widely privilegied, the positive phase of the NAO mode also.

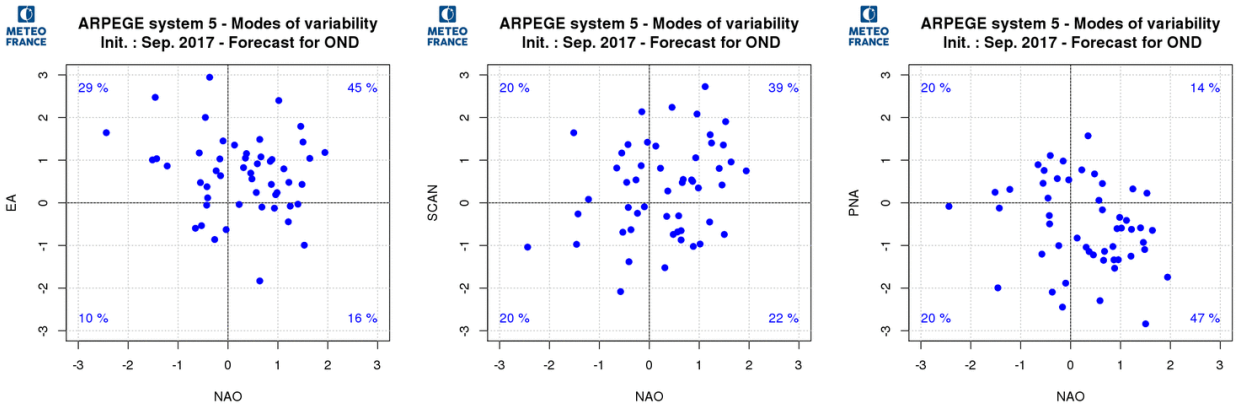


fig.II.2.4 : modes of variability forcasts over the Northern hemisphere with Meteo-France ARPEGE-S5

II.2.d. weather regimes

MF S5 model forecasts only.

A slight positive anomaly of blocking regime occurrence for winter regime.

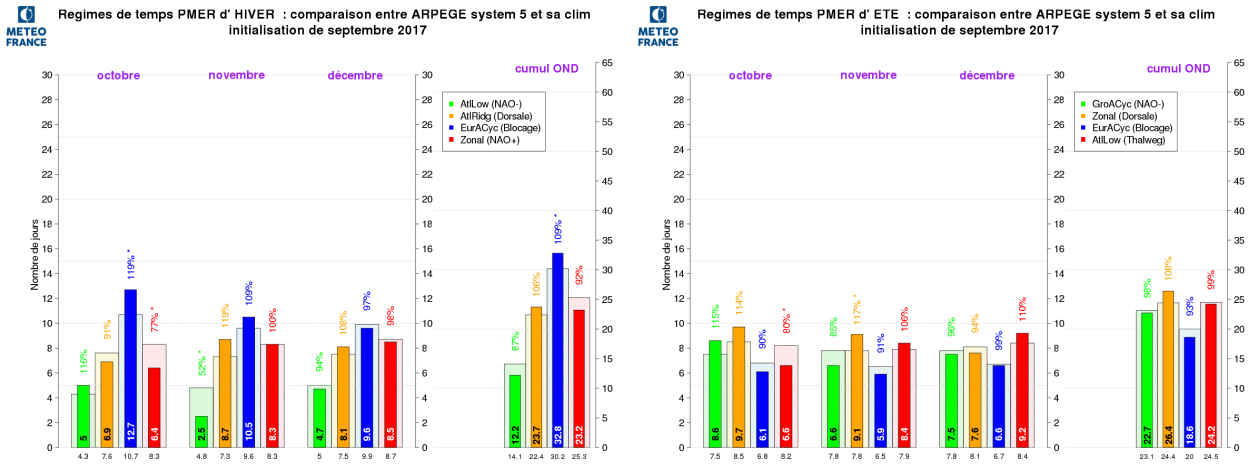


fig.II.2.5: North Atlantic Regime occurrence anomalies from Meteo-France ARPEGE-S5 : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

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

Widespread warm signal, especially in the northern hemisphere. Over the continents, this warm signal is less strong (except on the north of South America).

Over Europe, the probabilities for the upper tercile are 50 to 60% (EUROSIP).

II.3.a Météo-France

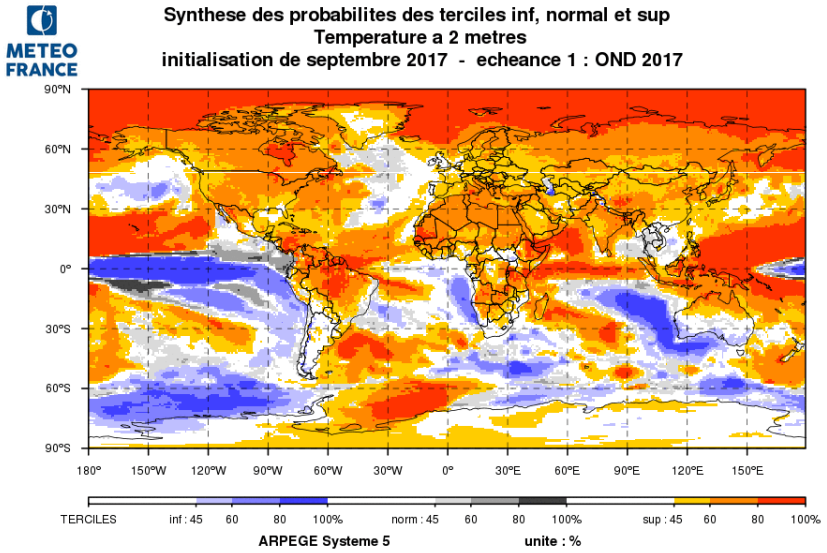


fig.II.3.1: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://seasonal.meteo.fr/

II.3.b ECMWF

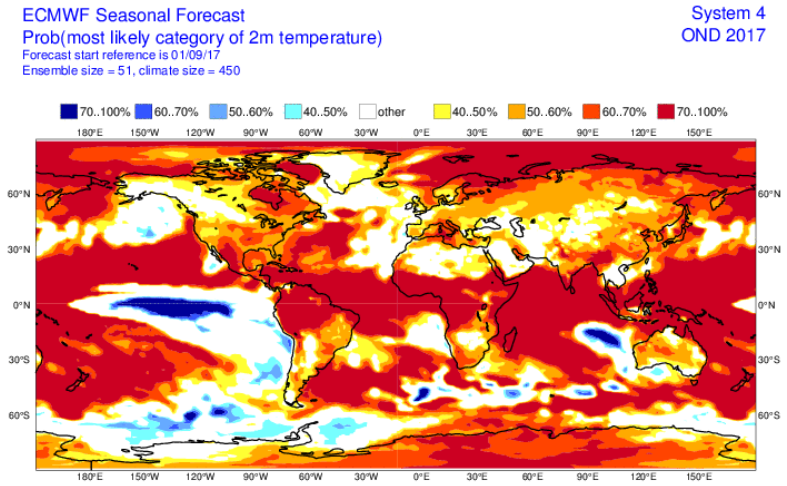


fig.II.3.2: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seaso...

II.3.c Japan Meteorological Agency (JMA)

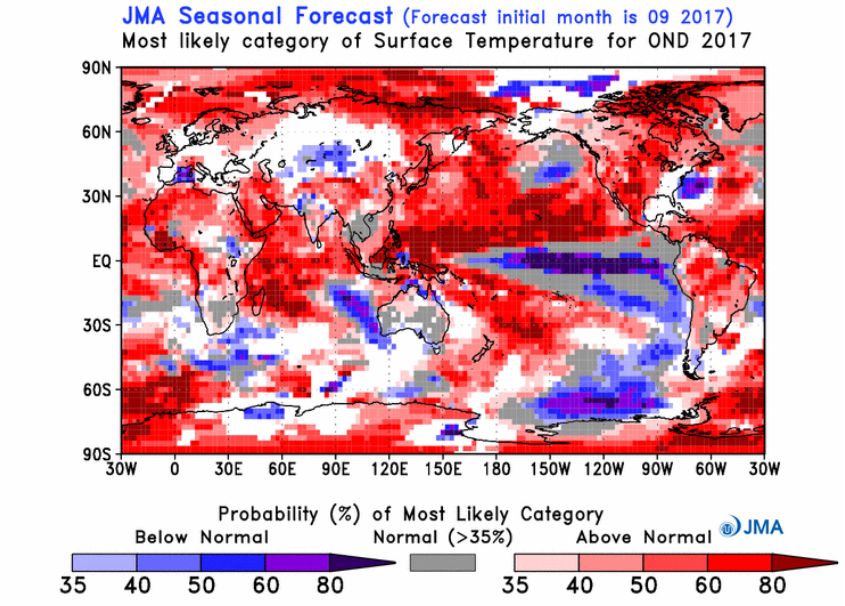


fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.
http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.3.d EUROSIP

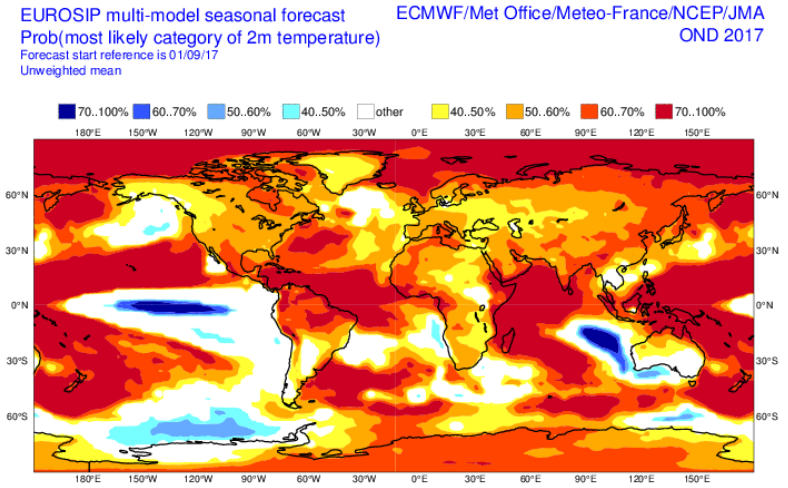


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EuroSip (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

II.4. IMPACT : PRECIPITATION FORECAST

- in the inter-tropical band, marked wet signal on the northeastern Continent Maritime (Pacific side) and dry over the central and eastern Pacific. In the Indian basin, dry signal on the southeast quarter (to be compared with SST colder than normal).
- Over Europe, there is no marked signal.

II.4.a Météo-France

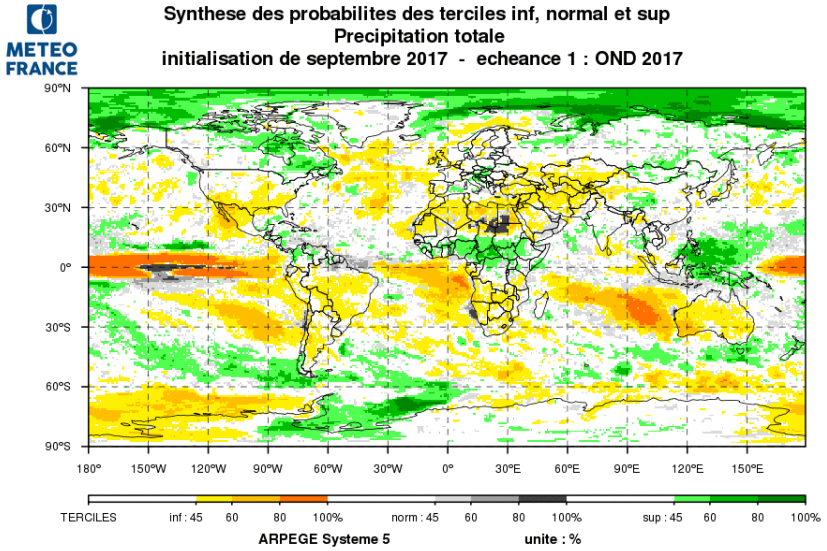


fig.II.4.1: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://seasonal.meteo.fr/

II.4.b ECMWF

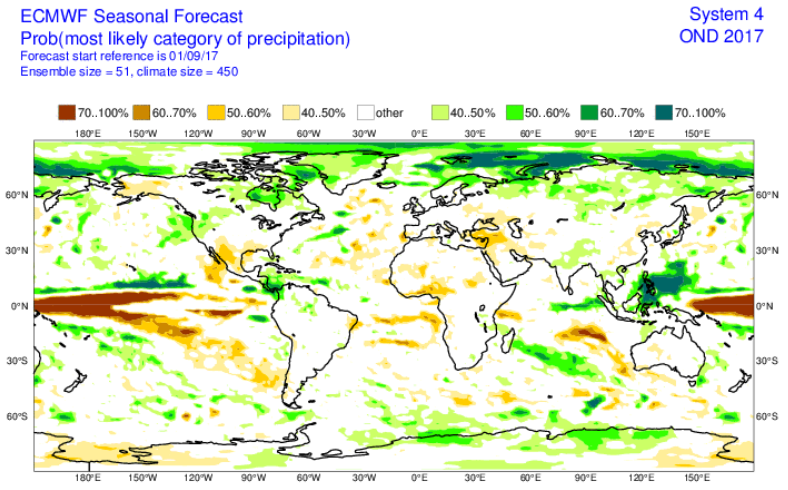


fig.II.4.2: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

II.4.c Japan Meteorological Agency (JMA)

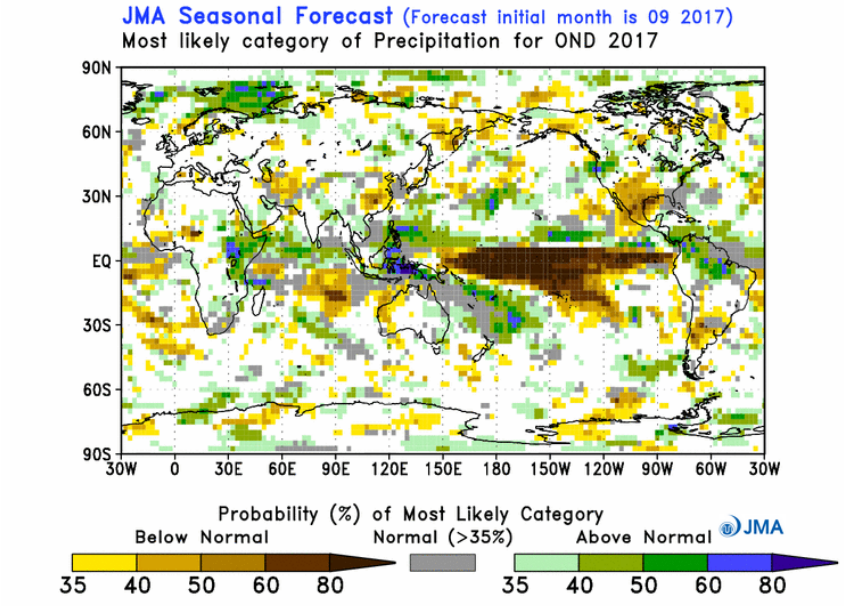


fig.II.4.3: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.
http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.4.d EUROSIP

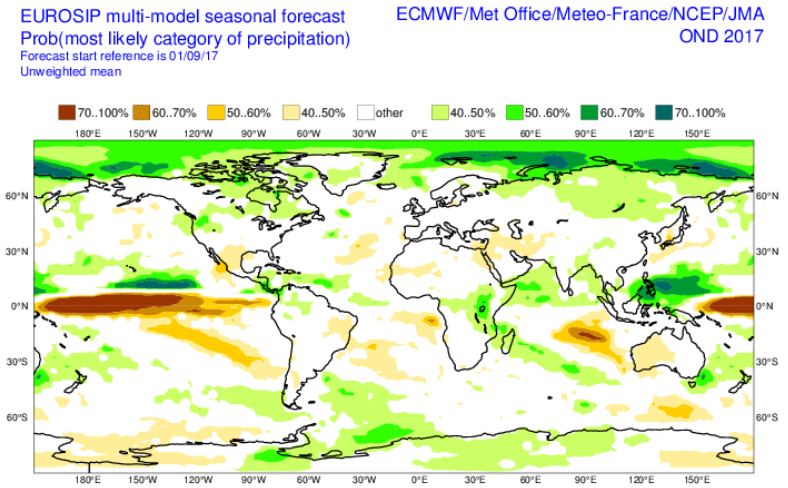


fig.II.4.4: Multi-Model Probabilistic forecasts for precipitation from EuroSip (2 Categories, Below and Above normal – White zones correspond to No signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

II.5. REGIONAL TEMPERATURES and PRECIPITATION

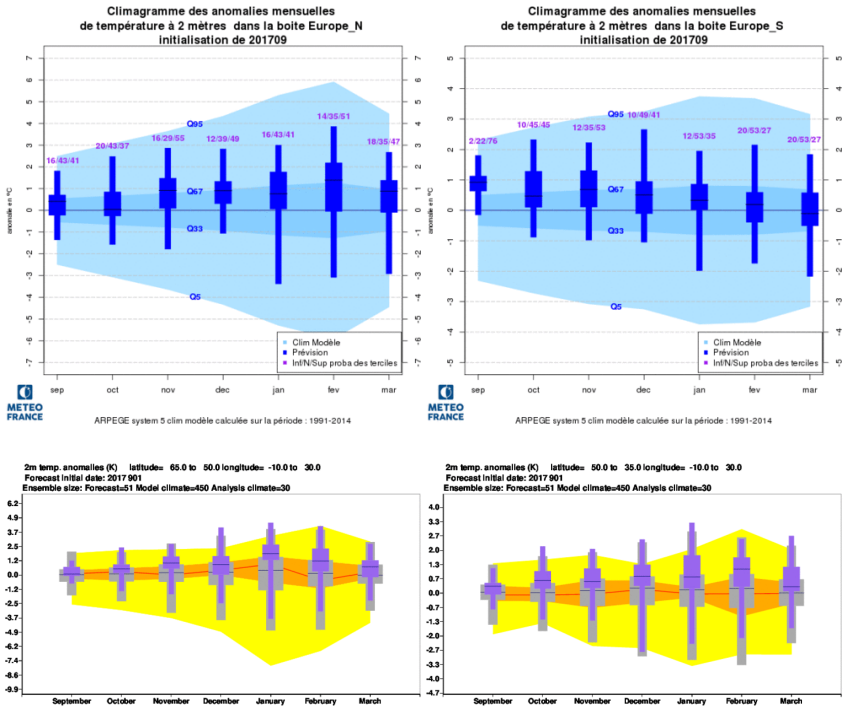


fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

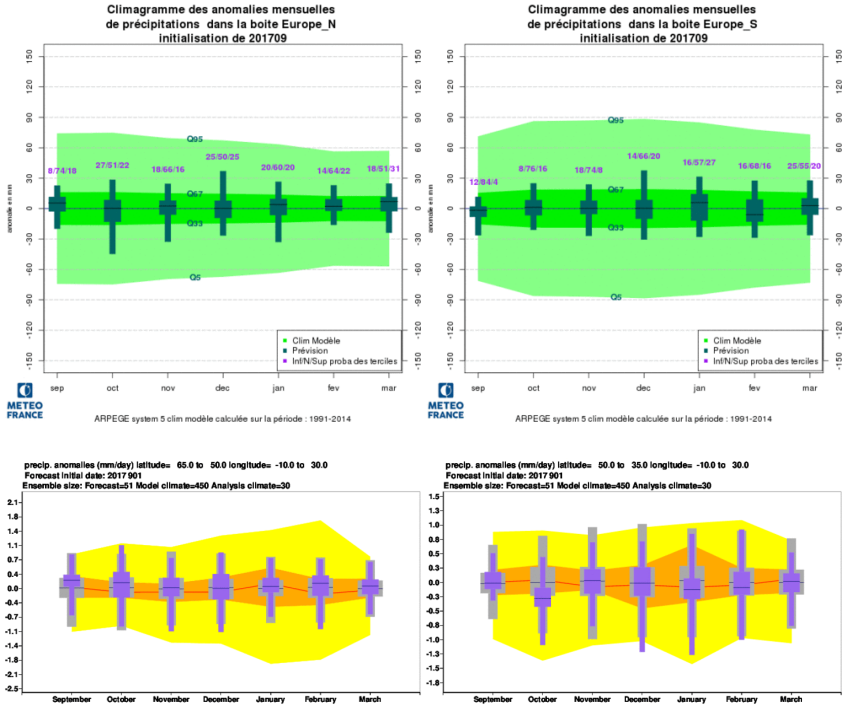


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

II.6. "EXTREME" SCENARIOS

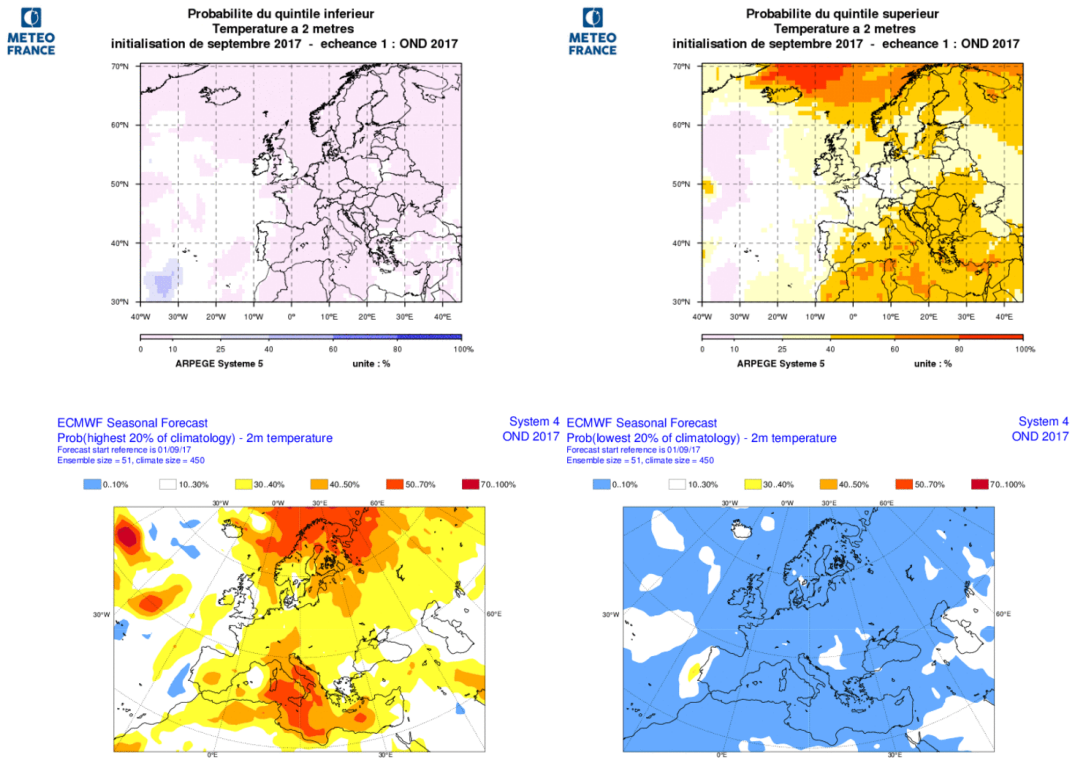


fig.II.6.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - highest ~20%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

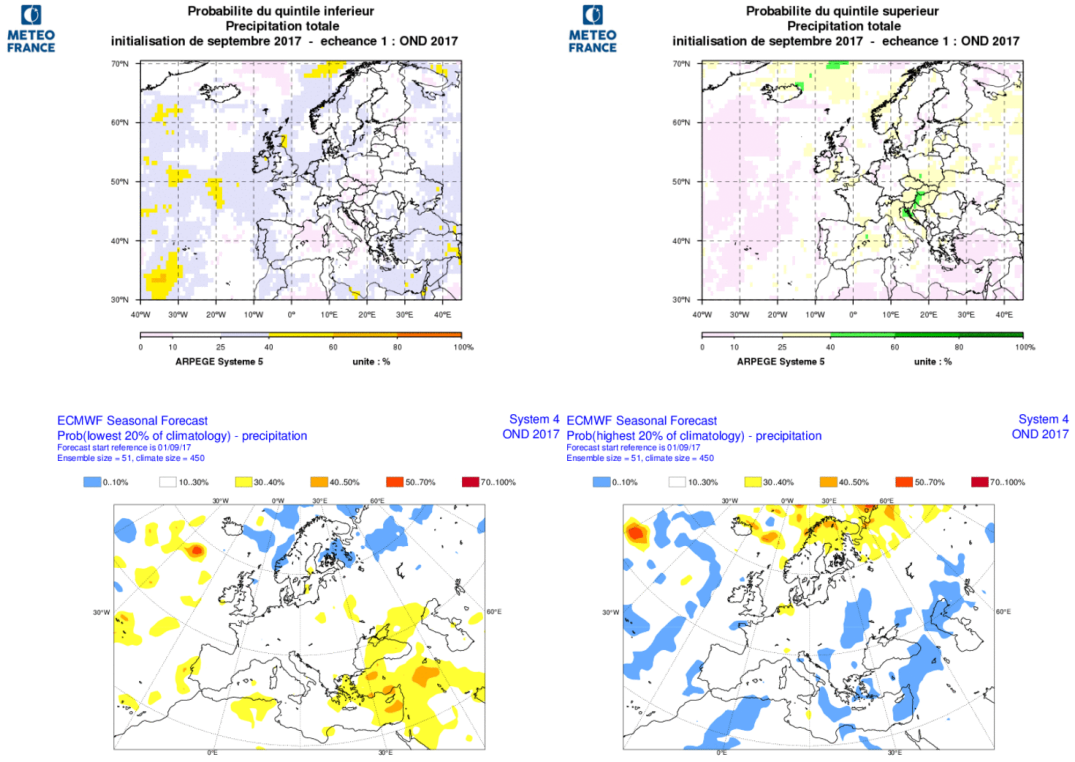


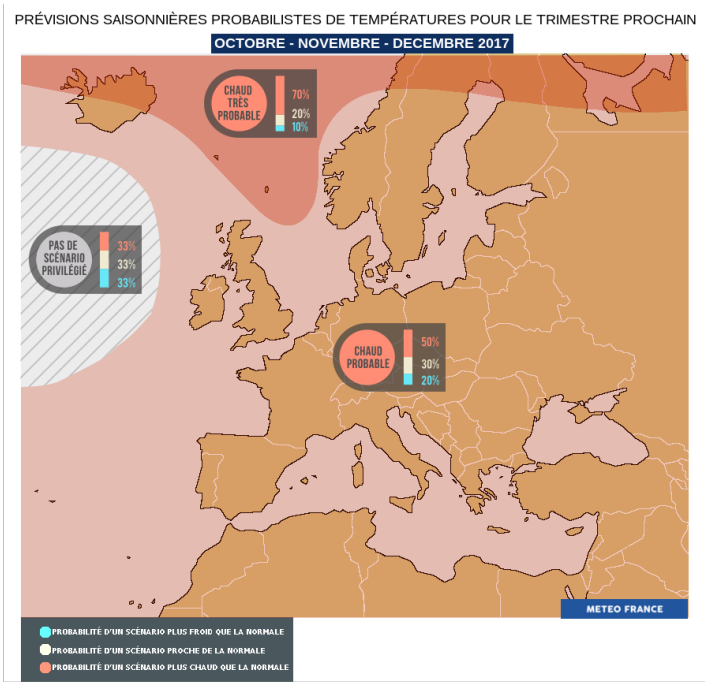
fig.II.6.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

II.7. DISCUSSION AND SUMMARY

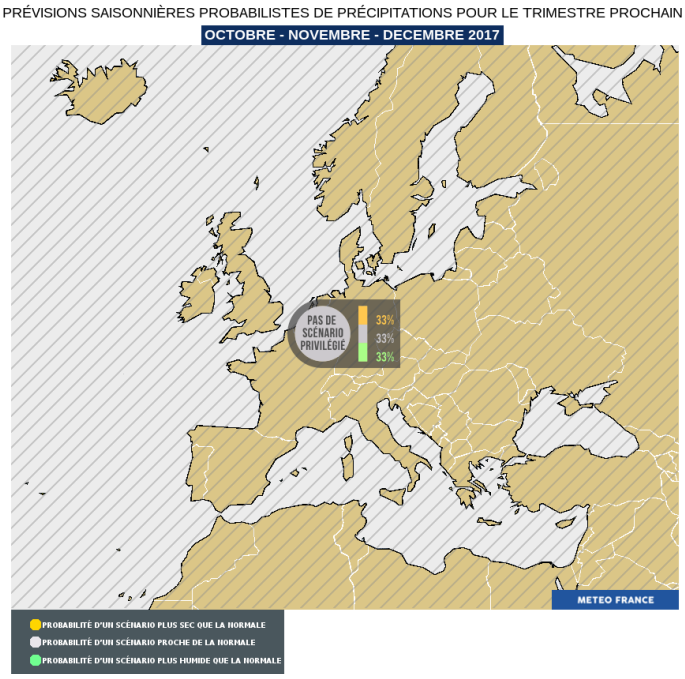
II.7.a Forecast over Europe

Weak predictability over Europe, especially without marked tropical forcing.

Temperatures: A warm scenario is privilegied, but with a relatively low probability. In the northern margin of the domain, the likelihood of a warm scenario appears to be higher (probably due to SST that are still much warmer than normal).



Precipitations: no scenario.



II.7.b Tropical cyclone activity

A priori lower-than-normal cyclonic activity in the South Pacific (consistent with a rather negative phase of ENSO). On the other hand, activity is expected to be stronger in the Pacific Northwest.

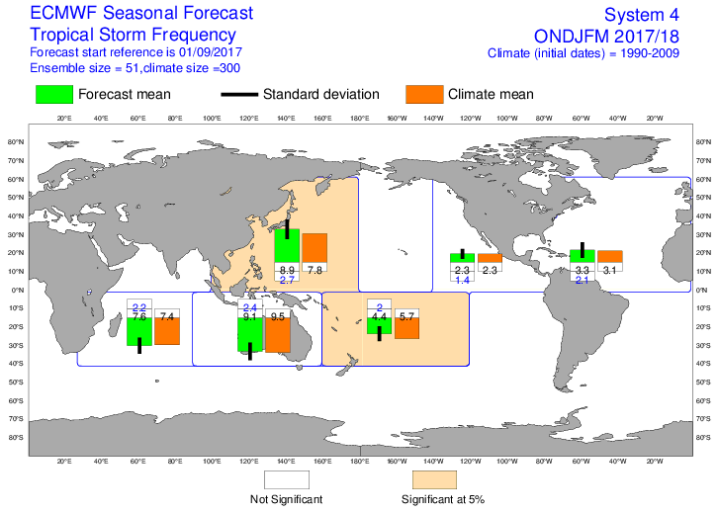


fig.II.7.1 : Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmtrop/trop_euro/eurosip_tropical_storm_frequency/

III.1. Seasonal Forecasts

Presently several 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 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 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.

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).

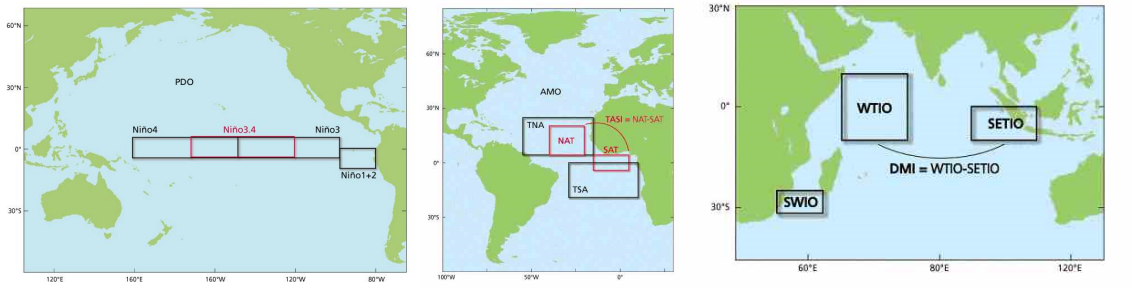
- Niño 3 : 5°S/5°N 90W-150W ; it is the region where the interanual variability of SST is the greatest.

- 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).

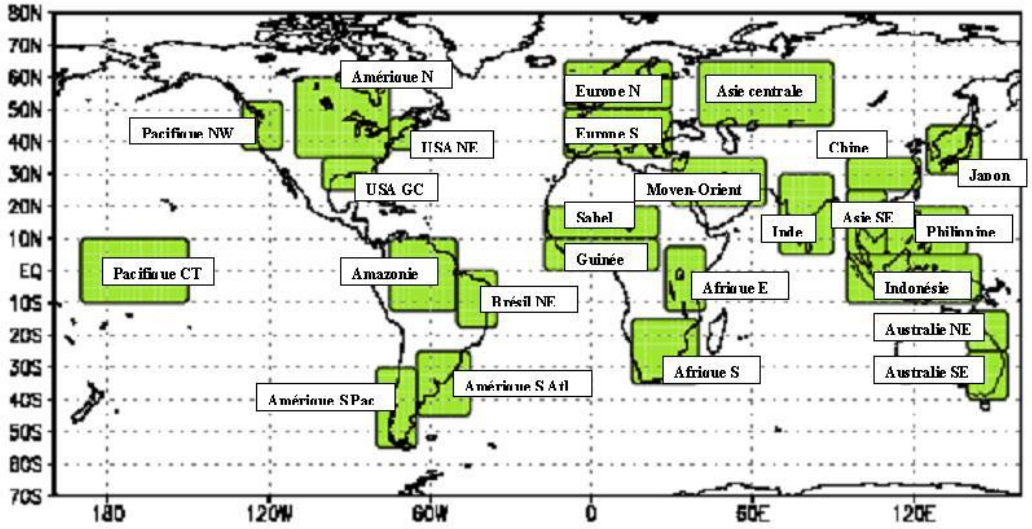
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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