GLOBAL CLIMATE BULLETIN

n°230 – August 2018

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I. DESCRIPTION OF THE CLIMATE SYSTEM (June 2018)

I.1.Oceanic analysis

Over the Pacific Ocean :

Neutral pattern :

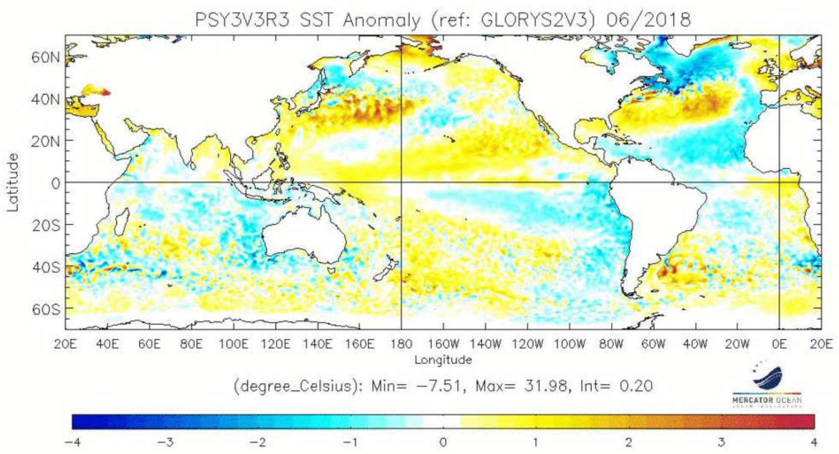
- Along the Equator, SST warming continues. Anomalies are now positive off the Peruvian coast. Nino3.4 : about +0.3 °C . In subsurface, positive anomalies all along the basin (maximum in the East), corresponding to the lowering of thermocline.
- In the northern hemisphere, still positive anomalies in the tropics. No clear PDO pattern visible, despite a negative index value (-1 for this month, see https://www.ncdc.noaa.gov/teleconnections/pdo/)
- In the southern hemisphere, warm anomalies in the Western part of the basin, and a large negative anomaly in the Eastern sub-tropics.

Over the Indian Ocean :

- in the Northern hemisphere, neutral conditions. To the South (up to 20°S), still a significant contrast between western and eastern parts.
- DMI slightly above zero (source : MERCATOR-Ocean)

Over the Atlantic:

- In the North Atlantic, the horseshoe-like pattern is still clearly visible, despite a warming trend around the Brtish Isles. In the tropics, TNA index is stable around -0.8 °C
- along the equator, weak warm conditions in the Gulf of Guinea (warming trend, SAT about +0.5 °C), neutral conditions in the Western side. TASI is still very negative (-1.2 °C)
- in the southern basin, anomalies are weaker than in the Northern hemisphere. Still positive anomalies close to the African coasts.



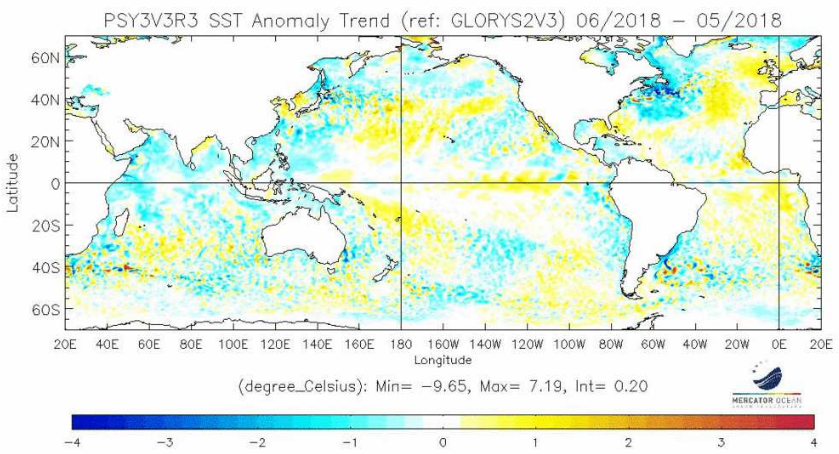


fig.I.1.1: top : SST Anomalies (°C) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2013).

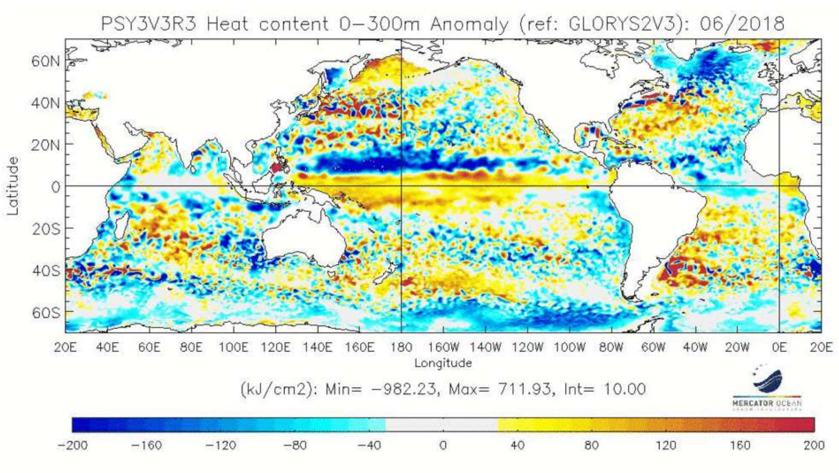


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2013)

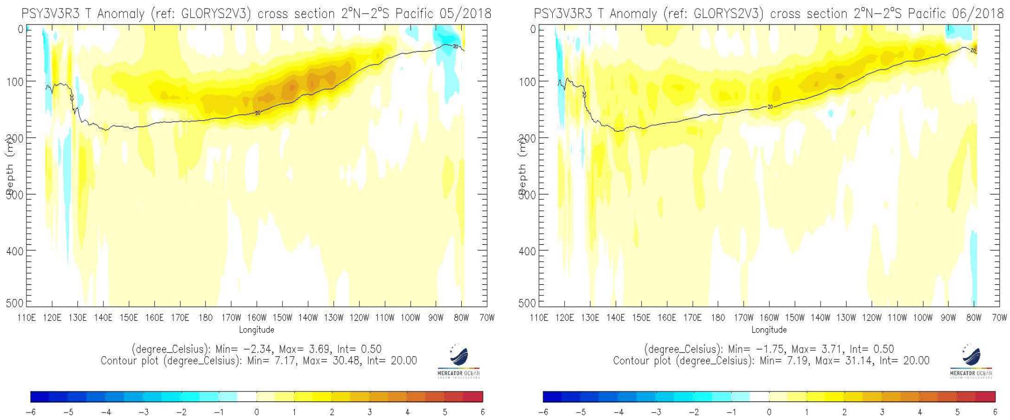


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month)

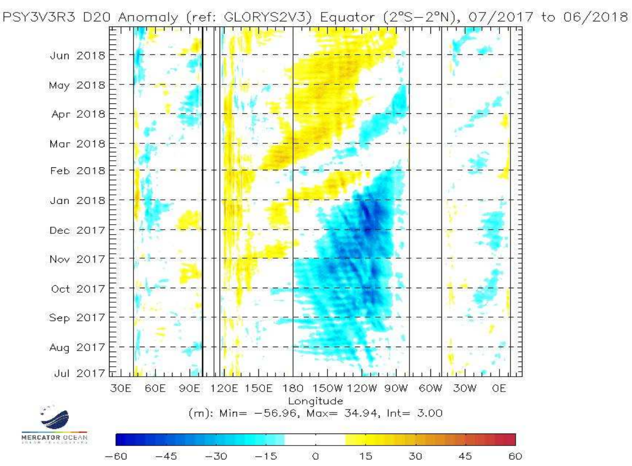


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20℃ isotherm) along the equator for all oceanic basins over a 6 month period

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

European Arctic Sea: Still mostly warmer than normal, particularly north of Svalbard and near Greenland (sea ice has melted). An area of cold anomalies has increased close to northern Norway since last month, consistent with atmospheric cooling (c. section I.2.c).

North Sea: warmer than normal, anomalies increased since last month, consistent with atmospheric warming in Europe.

Baltic Sea: much warmer than normal in the south, colder in the north, similar to last month. Again very consistent with air temperature anomalies. Last remnants of sea ice have melted completely.

Cold blob south of Greenland/Iceland: Extension is almost the same as last month, but intensity has become weaker in the east and stronger in the west. This means a warming of the extratropical East Atlantic took place, extending to Ireland/UK. Subsurface sea temperatures were still colder than normal in the East Atlantic, instead the warming was again rather consistent to the atmosphere, so the warming of the European continent should also have warmed the East Atlantic sea surface.

Subtropical East Atlantic: colder than normal near Portugal and Gibraltar. No significant change to last month. Also visible in the subsurface.

Mediterranean: warmer than normal except the westernmost part near Gibraltar. Anomalies were highest in the eastern basin and in the Adriatic Sea. Compared to last month, anomalies increased in the western basin, but decreased in the eastern basin, which means the western part saw a stronger development of warming than the east. Nevertheless highest anomalies were above +2℃ in t he east.

Black Sea: warmer than normal particularly in the east, slightly decreased anomalies.

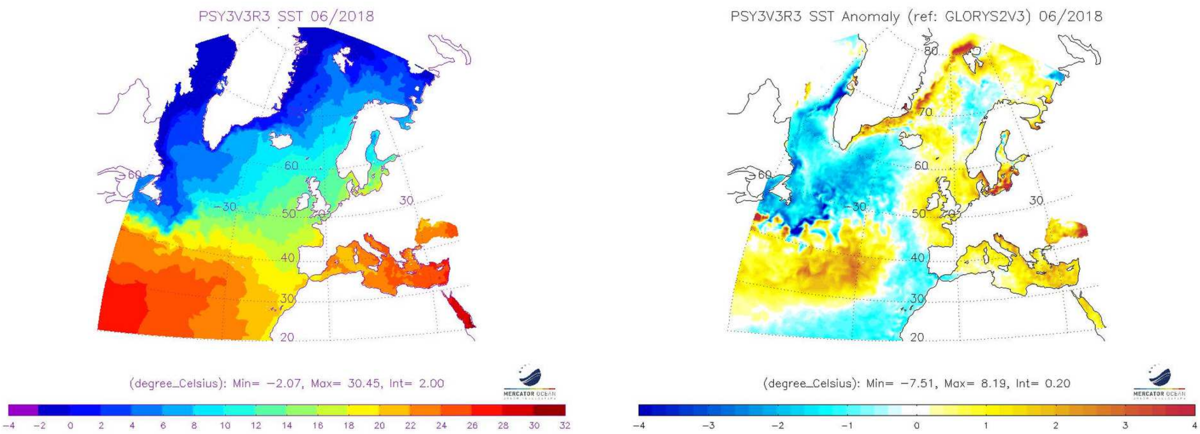


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2013).

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) :

- globally anomalies are weak, without large scale patterns. Compared to May, still a upward motion anomaly over Africa, and a downward motion anomaly over the North-Eastern part of South America.

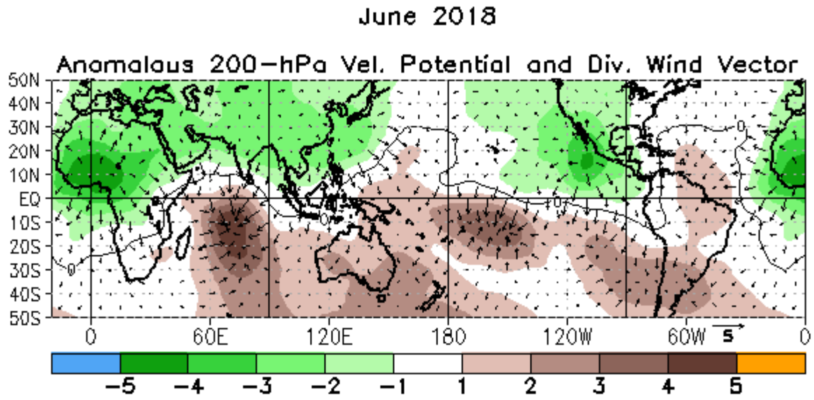


fig.I.2.1.a: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly). http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

SOI :

- SOI remains neutral at -0.1 (NOAA Standardized SOI: https://www.ncdc.noaa.gov/teleconnections/enso/indicators/soi/).

MJO (fig. I.2.1.b)

- Active MJO at the beginning and at the end of the month, in phases 5 and 6, then 1and 2 (green curve).

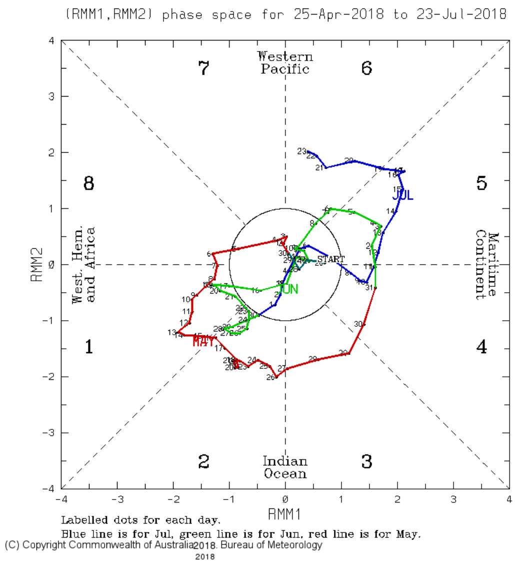


fig.I.2.1.b: indices MJO http://www.bom.gov.au/climate/mjo/

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

- weak anomalies in the inter-tropical band. Over Africa/South Atlantic, an anticyclonic anomaly dipole is visible, consistent with the persistent upward motion anomaly (see VP200)
- no trace of teleconnexion up to the mid-latitudes.

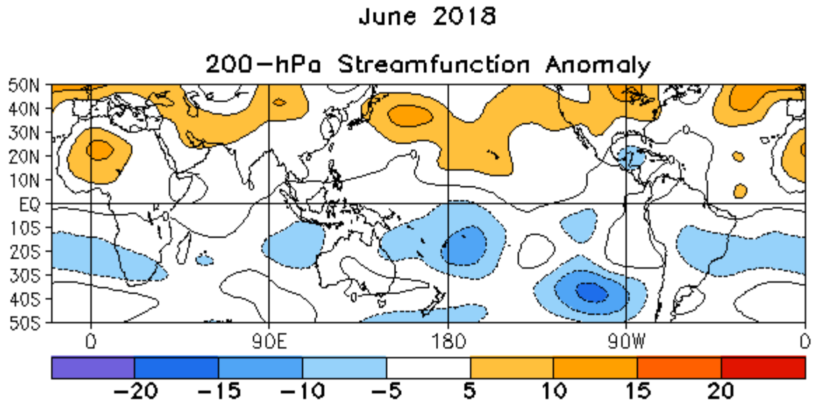


fig.I.2.2: Stream Function Anomalies at 200 hPa.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

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

- North-South dipole over Western Europe, with positive anomalies centered over the British Isles and negative anomalies all along the Mediterranean basin. Dominant modes : NAO+ and EA-
- strong positive anomaly over Siberia.

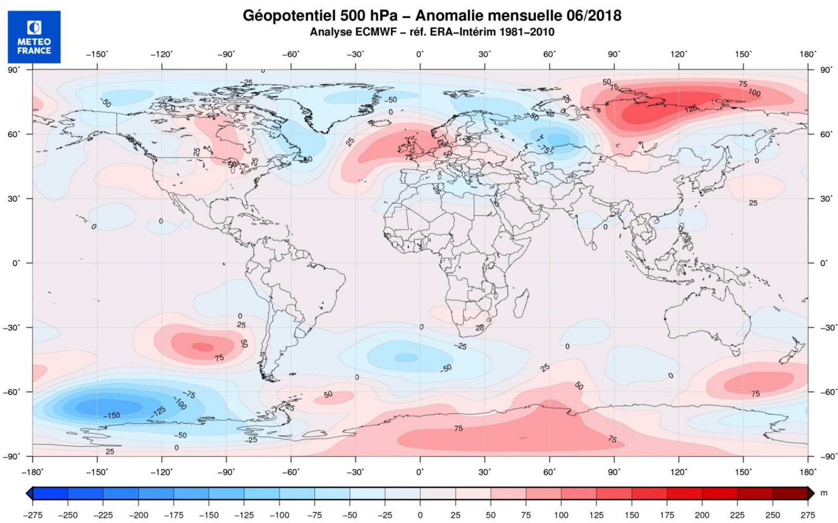


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
JUNE 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 9 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

Both Icelandic Low and Azores High were still more intense than normal (fig. I.2.4), so the positive NAO phase continued from April and May. However, the circulation pattern was very meridional in June, resulting in a large extension of the Azores High to western and central Europe, temporarily even to southern parts of northern Europe. Together with lower pressure over the Mediterranean, (near surface and also in the upper atmosphere) this formed a weak EA- dipole. Low pressure over northern Scandinavia contributed to a weak SCAND- pattern. Although EA- was relatively weak (-0.5), it had much impact on monthly weather with high pressure influence in northern Europe and low pressure influence in the south. Consequently the MF circulation classification shows a high domination of the Atlantic Ridge type (on 18 days, summer regime).

Given that pattern, advection came mainly from the east, from the warm continent in June. Hess/Brezowsky weather types were mostly with easterly and northerly directions, one week with westerly directions (but mainly anticyclonic) in the middle of the month, but no southerly types, which means warm air advection from the south was largely missing and did not contribute to the temperature this June.

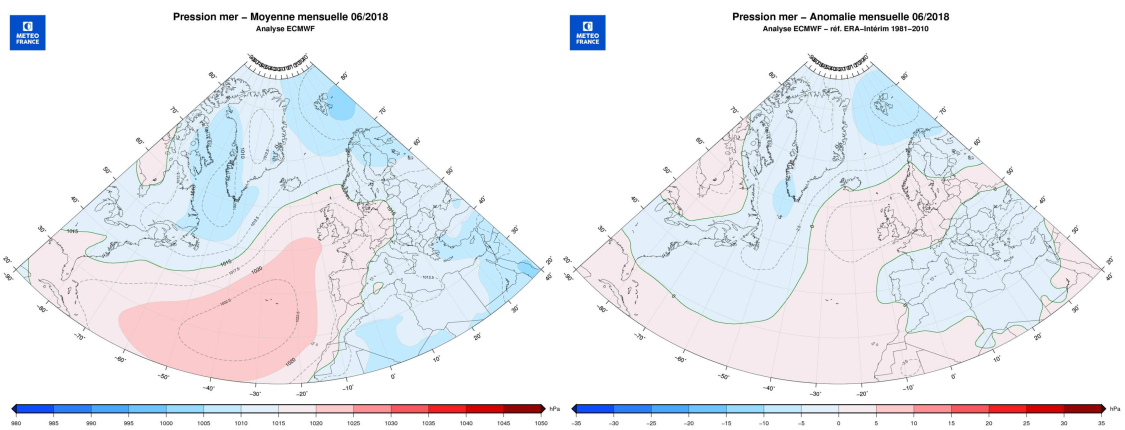


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (top) and 1981-2010 anomalies (bottom).

Circulation indices: NAO and AO

NAO was in a positive phase most of the month, especially in the second half, but did not have much impact in Europe. AO, too, had a significant positive phase in the second half of the month, but oscillated around zero during the rest of the time. Arctic influence was mostly weak in Europe except in northern parts of Scandinavia and northwest Russia.

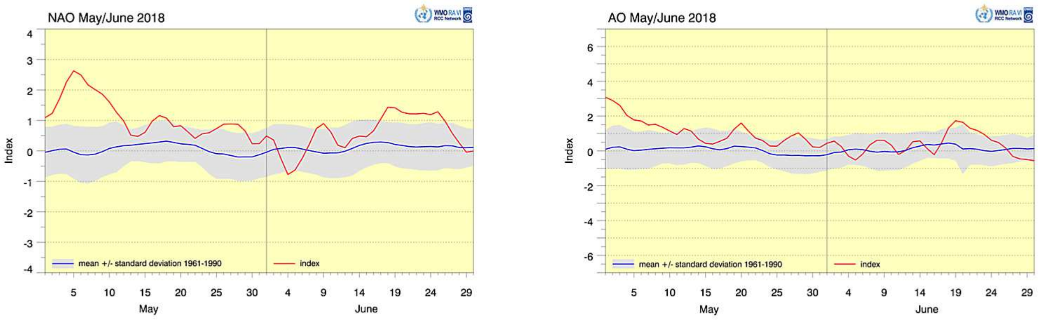


fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

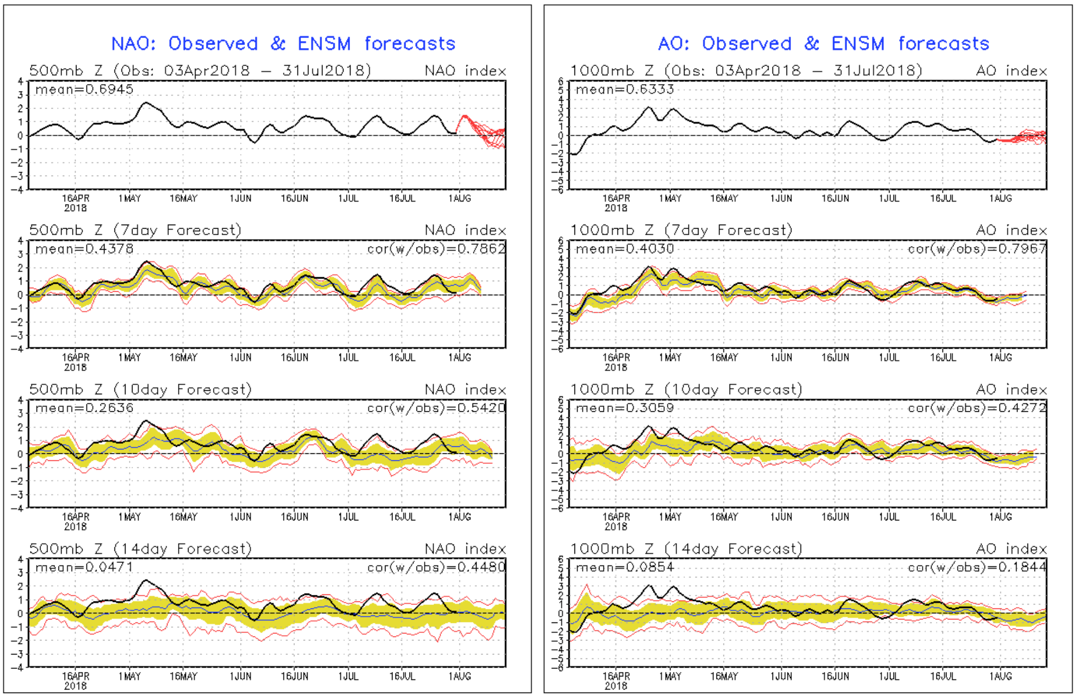


fig. I.2.5a: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices for the last 4 months and forecasts for the following weeks. Source: NOAA CPC, http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

- Over Europe, wet in the South (Mediterranean basin, Balkans), dry in the North (Scandinavia, Baltic states)
- Over Africa, wet conditions North of the equator
- globally dry over the Maritime Continent and over Western Pacific (Equatorial zone and South tropics)
- still dry over Northern Brazil and dry conditions over the Carribean region.

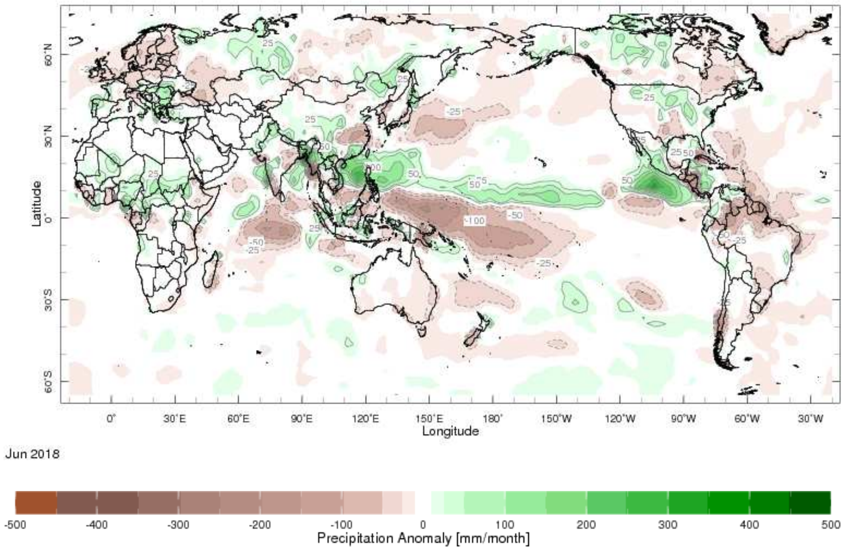


fig.I.2.6: Rainfall Anomalies (mm) (departure to the 1979-2000 normal).
Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

Precipitation anomalies in Europe:

Very dry zone from Ireland to Baltic countries including southern Scandinavia, consistent with high pressure influence. There was hardly any precipitation over much of the area except very localised thunderstorms. Water restrictions were in force, e.g. in Ireland, England and some French departments. Agriculture suffered from considerable losses. According to GPCC precipitation index, parts of Ireland, England and Benelux countries had a severe or extreme drought over larger areas, but this was also the case for places e.g. in northeastern Germany, Poland and Baltic countries. Also large parts of southwestern Russia were dry.

In contrast very wet particularly in northern Iberia / western France (especially in the first half of the month during cut-off low passages), and over the Balkan Peninsula / southern Italy / Turkey (first due to isolated thunderstorms, later due to extended large-scale cyclonic influence). Also northern Scandinavia / northern Russia received above-normal precipitation under cyclonic influence.

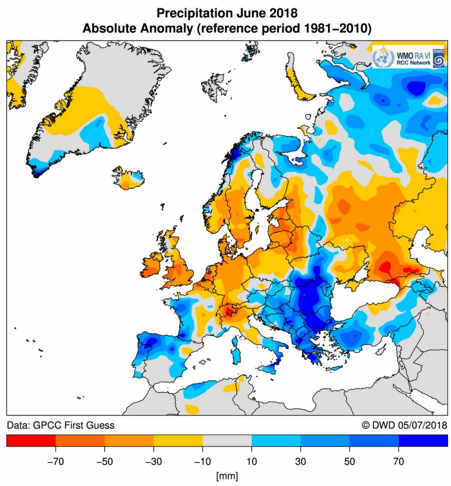


fig.I.2.7.a : Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm.

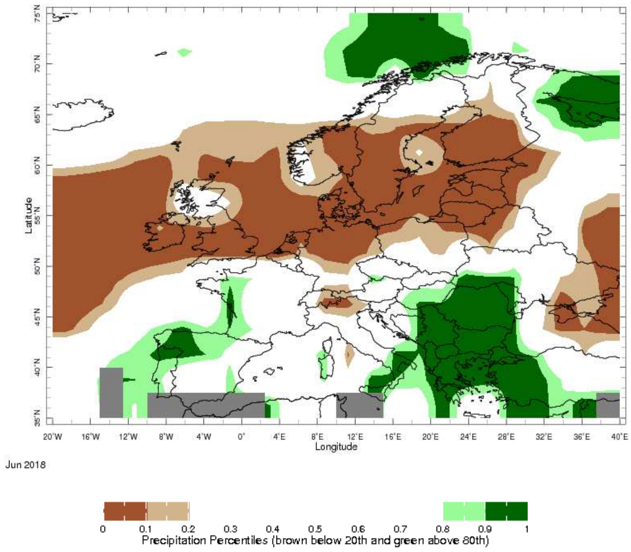


fig.I.2.7.b : Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

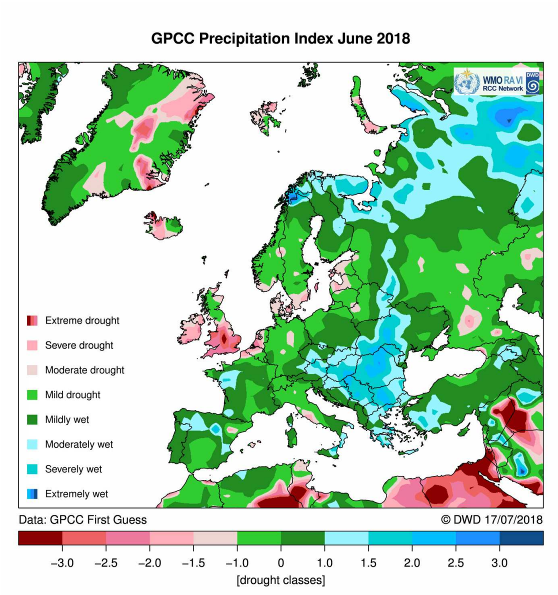


fig. I.2.8: GPCC Precipitation Index, http://www.dwd.de/rcc-cm .

<u>Monthly mean precipitation anomalies in European subregions</u>. 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	- 25.7 mm	- 0.696
Southern Europe	+ 18.0 mm	+ 0.590

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, warmer then normal over the continent. Some exceptions : Iberian peninsula (and globally the Mediterranean Basin) and North of Scandinavia.
- very strong positive anomaly over Siberia (up to +8 ℃), linked to the blocking (see Z500)
- continuing cold anomalies over Quebec and Greenland
- colder than normal over Morocco and Western Algeria.

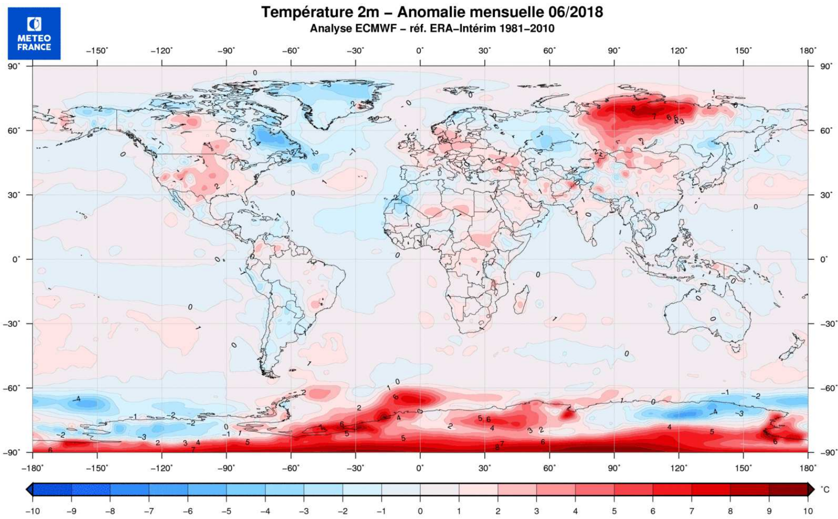


fig.I.2.9: Temperature Anomalies (℃) (Meteo-France)

Temperature anomalies in Europe:

Mostly warmer than normal in Europe, but anomalies were less extreme than in April and May due to missing southerly advection. Highest anomalies(> +2℃) over southern Scandinavia, northeast Germany and Poland, consistent with high pressure anomalies, and close to the Black Sea. Positive anomalies extended even over sea surfaces (North Sea, East Atlantic, c. SST analysis above). Colder than normal over northern Scandinavia / northern Russia (Arctic air masses) and parts of southern Europe (often cooling after heavy precipitation).

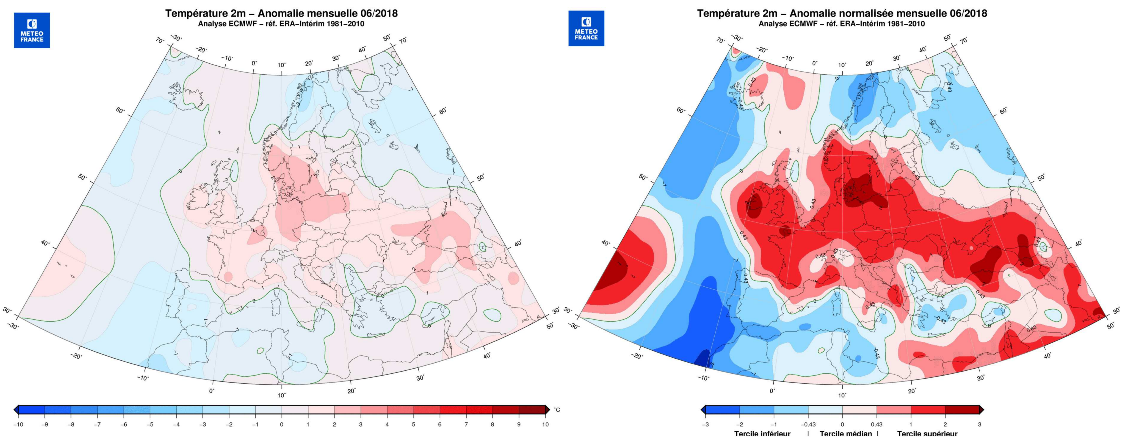


fig.I.2.10: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

Monthly mean temperature anomalies in European subregions: Subregions refer to ECMWF land boxes defined in Annex III.3. Anomalies are based on gridded CLIMAT data from DWD, http://www.dwd.de/rcc-cm, 1961-1990 reference.

Subregion	Anomaly
Northern Europe	+ 1.3 ℃
Southern Europe	+ 1.5 ℃

I.2.d Sea ice

- In the Arctic : largely in deficit, comparable to 2017.
- In Antarctica : the deficit is still important, close to 2017.

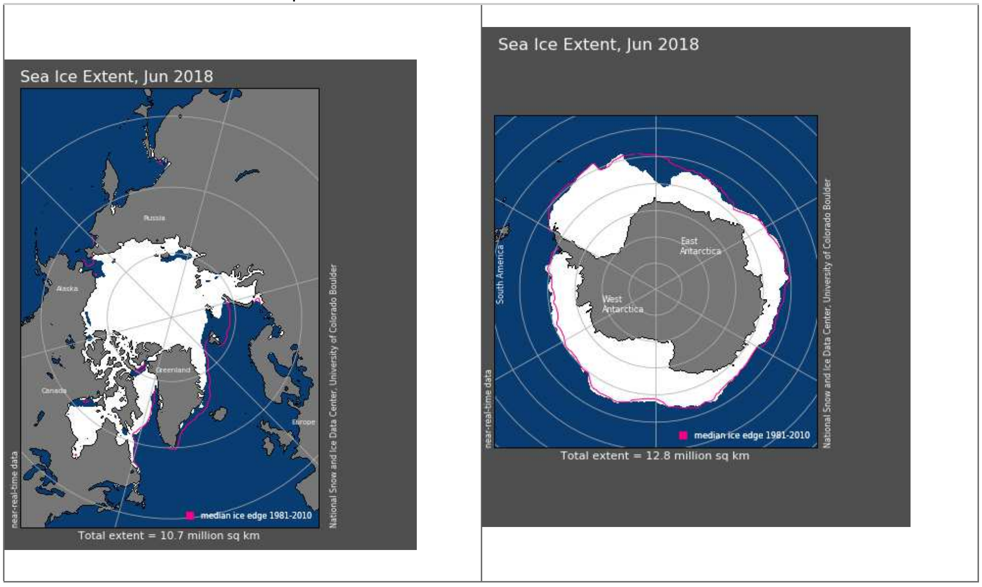


fig.I.2.11: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

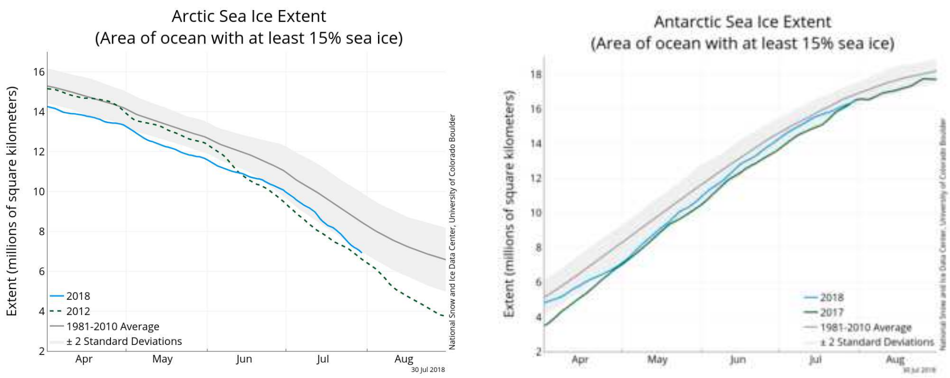
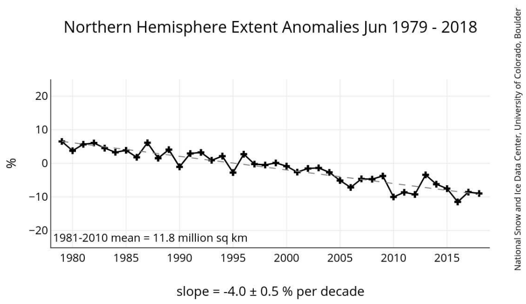


fig. I.2.12 : Sea-Ice extension evolution from NSIDC. https://nsidc.org/data/seaice_index/images/daily_images /N_stddev_timeseries.png



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

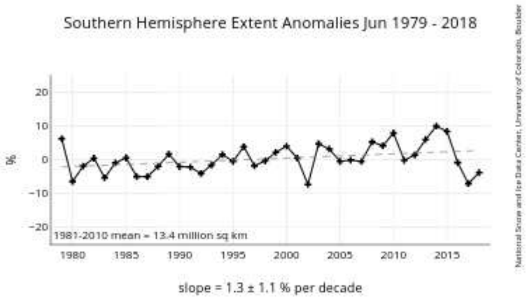


fig 1.2.13 : Monthly Sea Ice Extent Anomaly Graph in Antarctic for the month of analysis (http://nsidc.org/data/seaice_index/)

II. SEASONAL FORECAST FROM DYNAMICAL MODELS

In the Central Pacific, rapid warm SST anomaly development along the Equator. HTe warming trend observed these last months may continue. An El Niño event would sep up as early as next autumn.

NB : In this bulletin, the new MF-S6 model is used for illustrations (instead of MF-S5). But please note that the Eurosip system shown in this bulletin still uses the MF-S5 outputs, which may differ from the MF-S6 forecasts (see http://seasonal.meteo.fr/fr/content/ARP5 for more details).

II.1. OCEANIC FORECASTS

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

- Pacific Ocean: Models in good agreement for ASO. Warming along the Equator, leading to widespread warmer than normal conditions. To the south, the cool anomalies should decrease in strength. Warm anomalies persisting to the north.
- Indian Ocean: Most models suggest ongoing neutral conditions in the northern basin along with a weakly positive DMI. (see BOM summary here : http://www.bom.gov.au/climate/model-summary/#tabs=Indian-Ocean). In the southern tropical basin, warmer to the West, cooler to the East, off the Australian coast.
- Atlantic Ocean:
  - northern Atlantic : models in good agreement with a persisting horseshoe pattern. The cool anomaly should therfore persist from the western coast of Africa to the Carribean.
  - equatorial Atlantic : warm signal over the Gulf of Guinea
- Mediterranean Sea : Warmer than normal especially to the East.

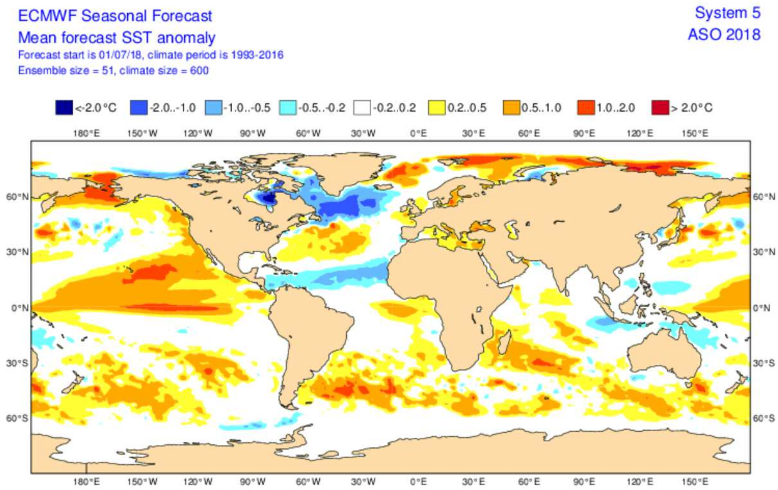


fig.II.1.1: SST anomaly forecast from ECMWF
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

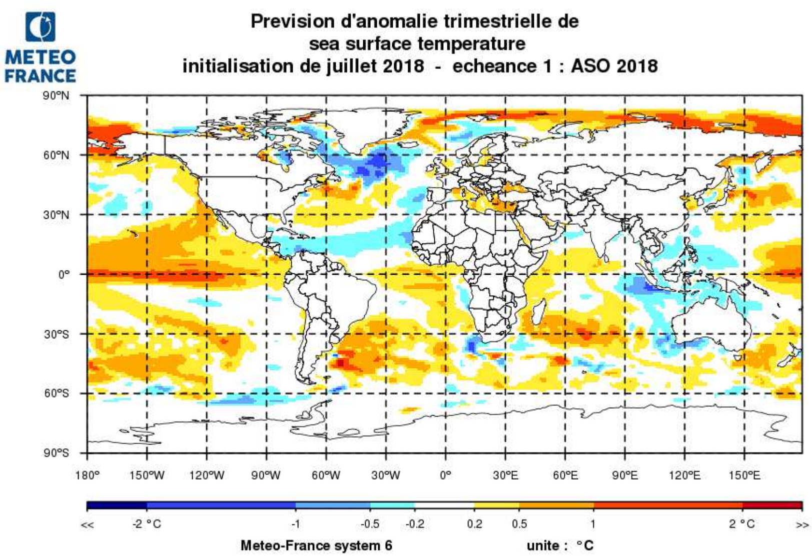


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).
http://seasonal.meteo.fr

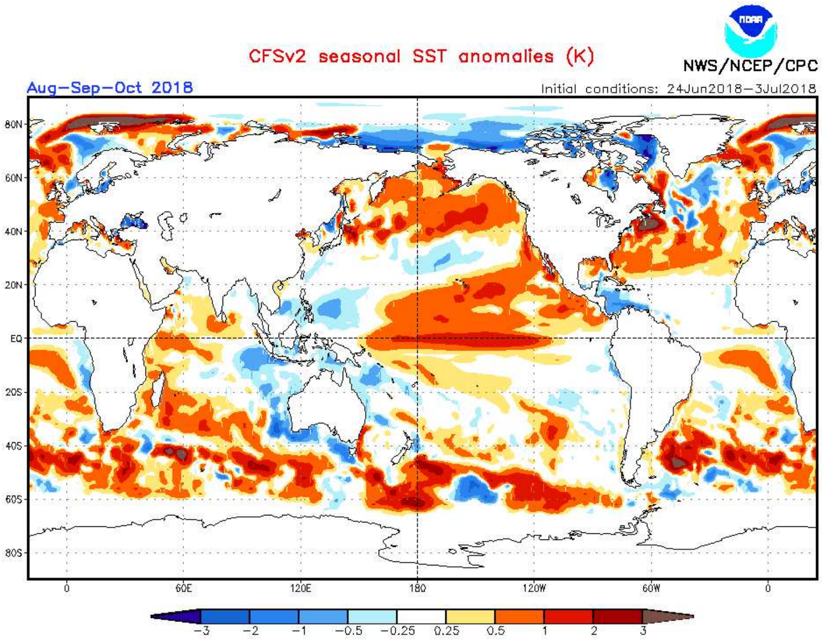


fig.II.1.3: SST Anomaly forecast from NCEP.
http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/imagesInd1/glbSSTSeaInd1.gif

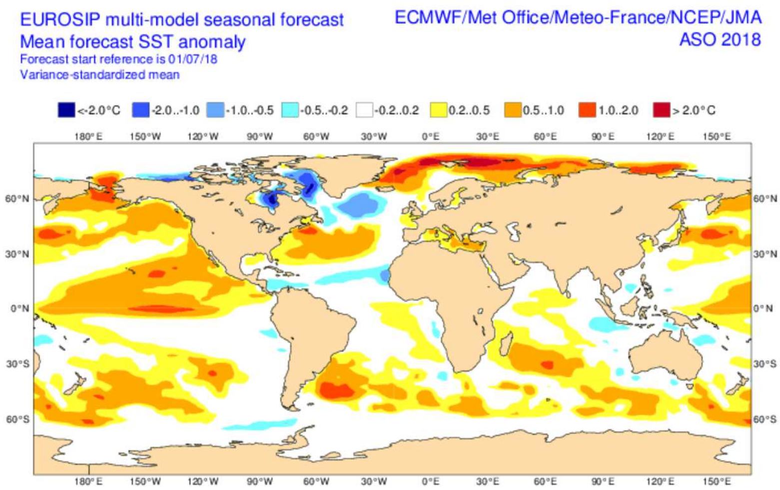


fig.II.1.4: SST Forecasted anomaly from Euro-SIP

II.1.b ENSO forecast :

***Forecast Phase*: neutral to positive phase for ASO**, then the warming trend would continue.

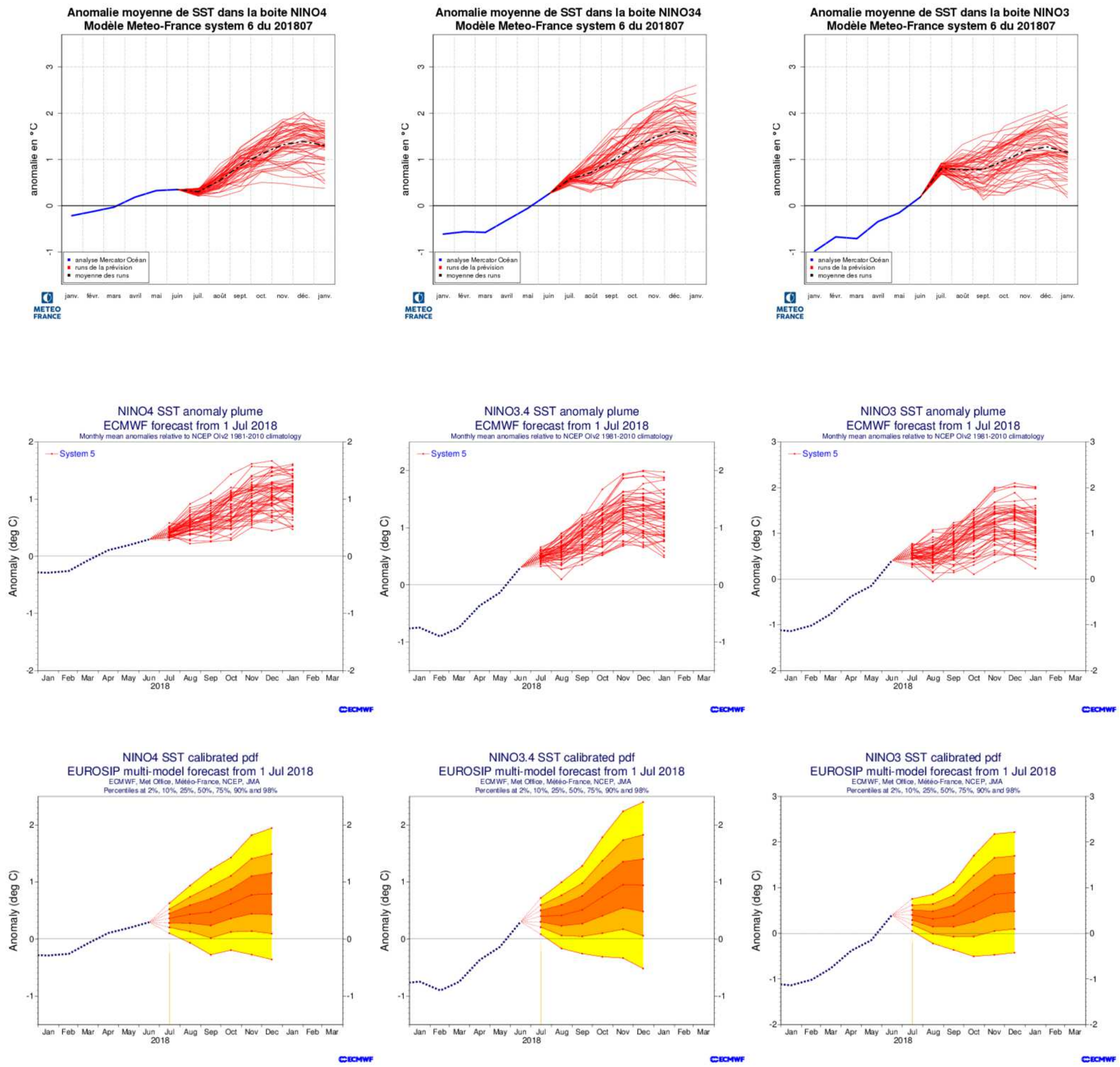
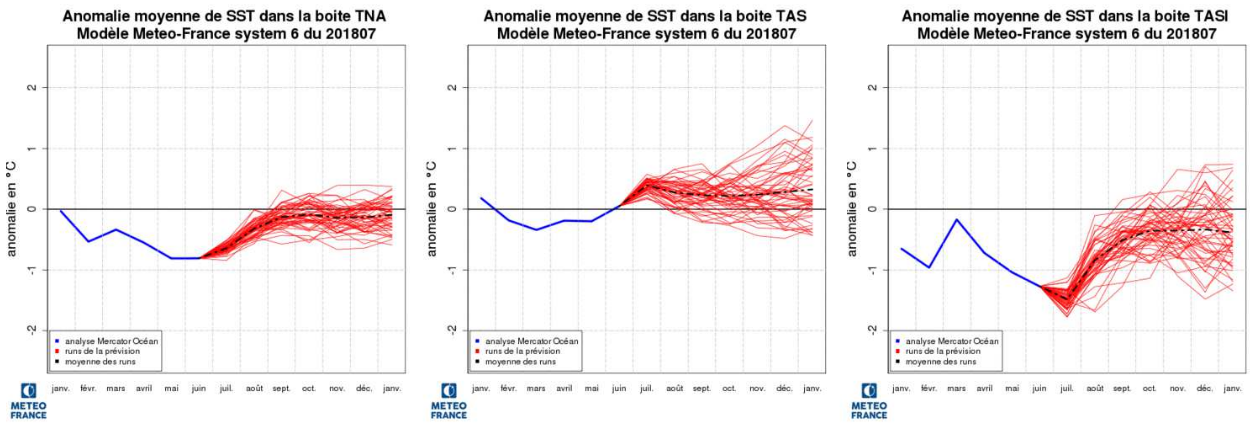


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members -
and EUROSIP (bottom) – recalibrated distributions -
(http://seasonal.meteo.fr , http://www.ecmwf.int/)

I.1.c Atlantic ocean forecasts



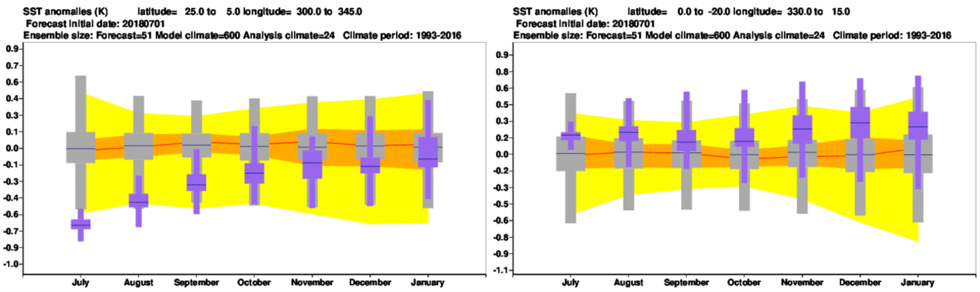


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

I.1.d Indian ocean forecasts

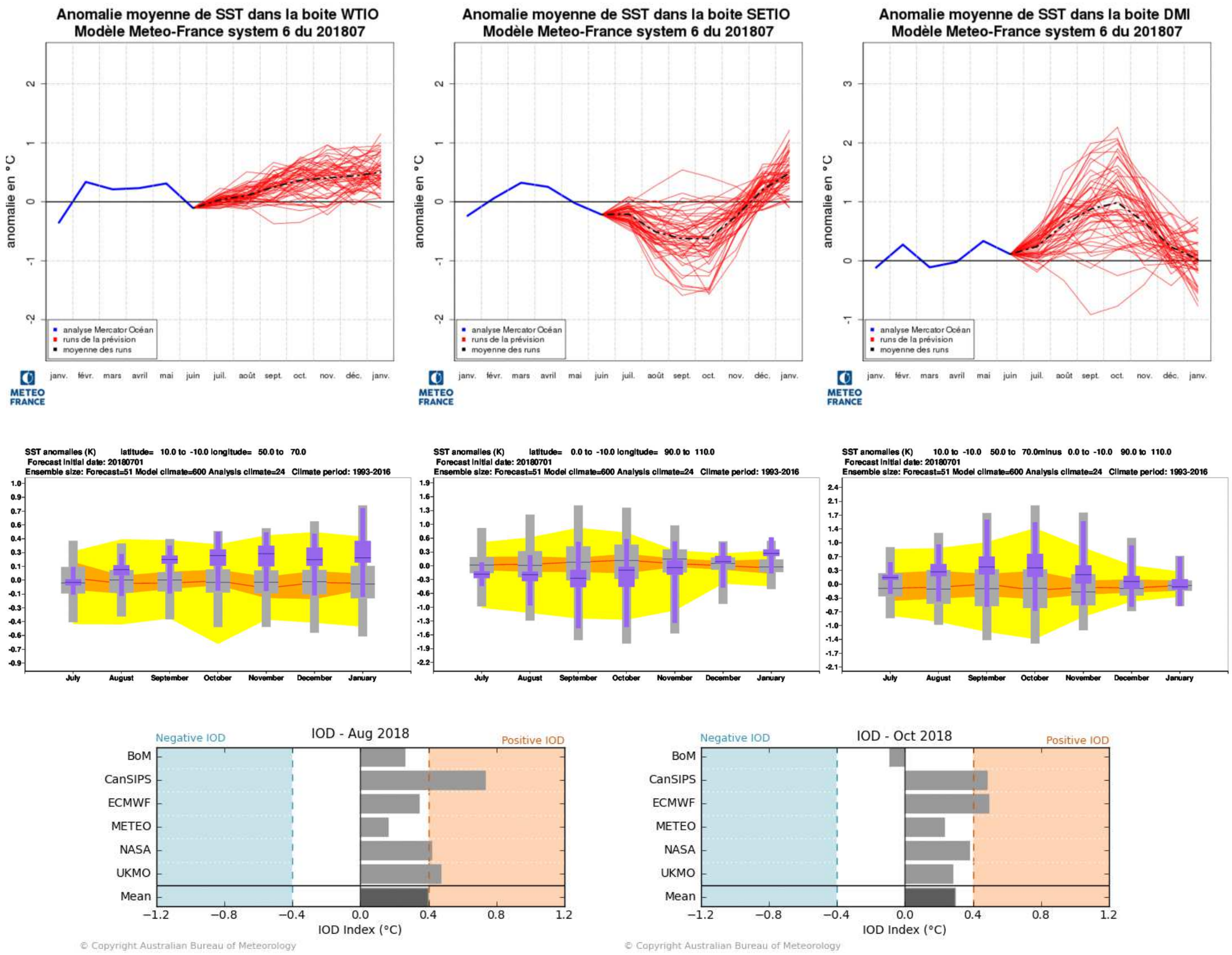


fig.II.1.7: SST anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.2. GENERAL CIRCULATION FORECAST

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

- Velocity potential : models in good agreement over the Pacific and the Indian Ocean, with an atmospheric response resembling that of an El Niño situation : negative anomalies over the tropical Pacific, and positive (subsidence) anomalies over the Eastern Indian. Over the Atlantic, no anomaly. Over Africa, JMA is the only model to forecast a upward motion anomaly, MF6 and ECMWF5 are neutral.
- Stream function : rather strong signal over the Pacific and Western Atlantic, consistent with VP200 anomalies : a typical quadripole, but the signal is mainly trapped in the tropics. Over the Western part of the Indian Basin, a cyclonic circulation dipole is forecasted, consistent with the downward motion anomaly in VP200 : it could possibly influence the circulation over Middle East and up to the Mediterranean Basin.

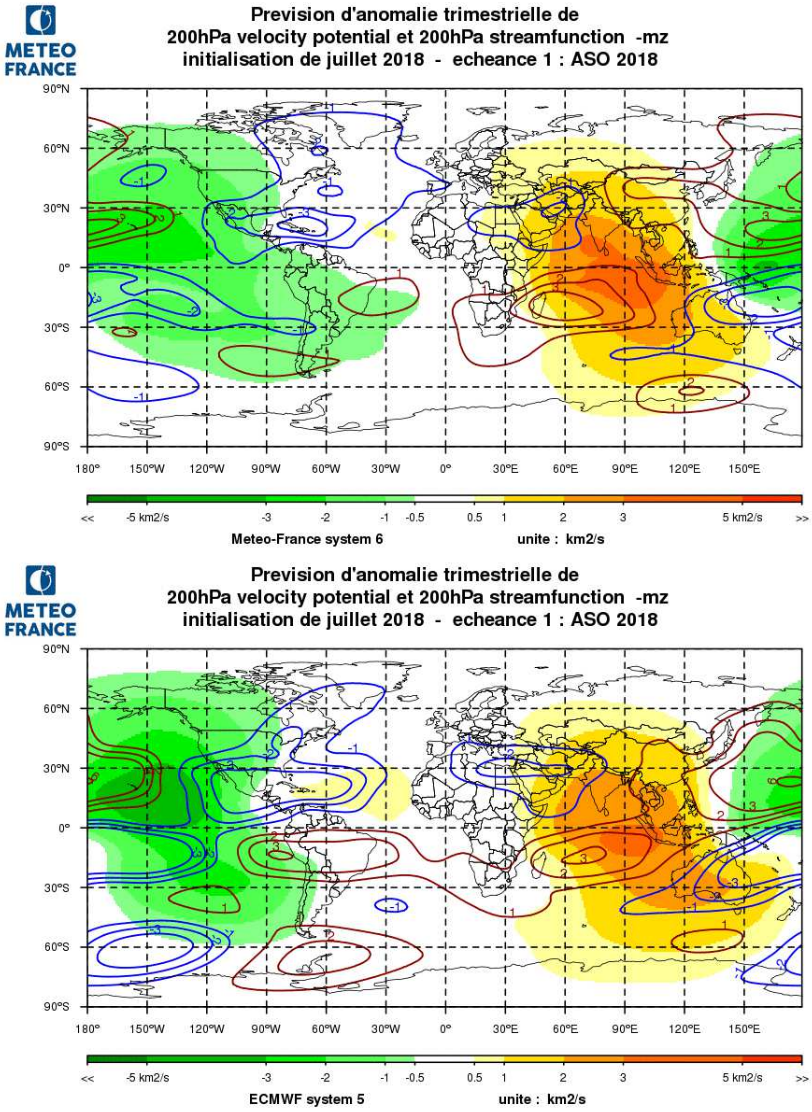


fig.II.2.a: Velocity Potential anomaly field χ (shaded area – green negative anomaly and yellow positive anomaly), associated with Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).
http://seasonal.meteo.fr

II.2.b Geopotential height anomalies

Models in rather good agreement. Positive geopotential heights anomalies are forecasted from Canada to Scandinavia, which is very similar to a "summer" NAO-positive mode, combined with a blocking pattern over Central and Eastern Europe. Lower geopotential heights would then affect southern Europe, especially around the Mediterranean.

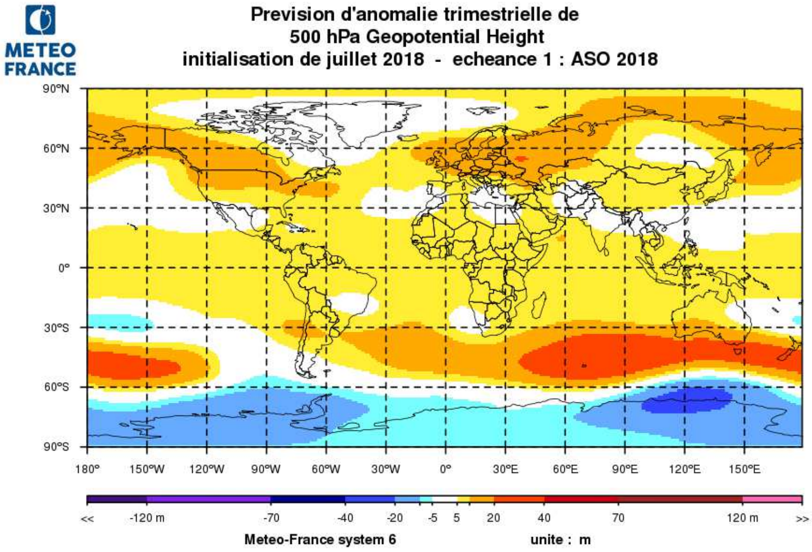


fig.II.2.b.1: Anomalies of Geopotential Height at 500 hPa from Météo-France.
http://seasonal.meteo.fr

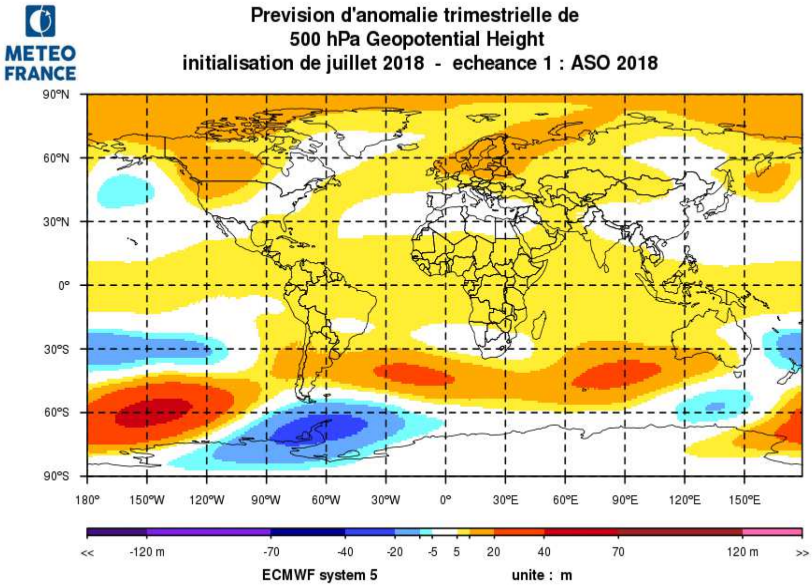


fig.II.2.b.2: Anomalies of Geopotential Height at 500 hPa from ECMWF.
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast

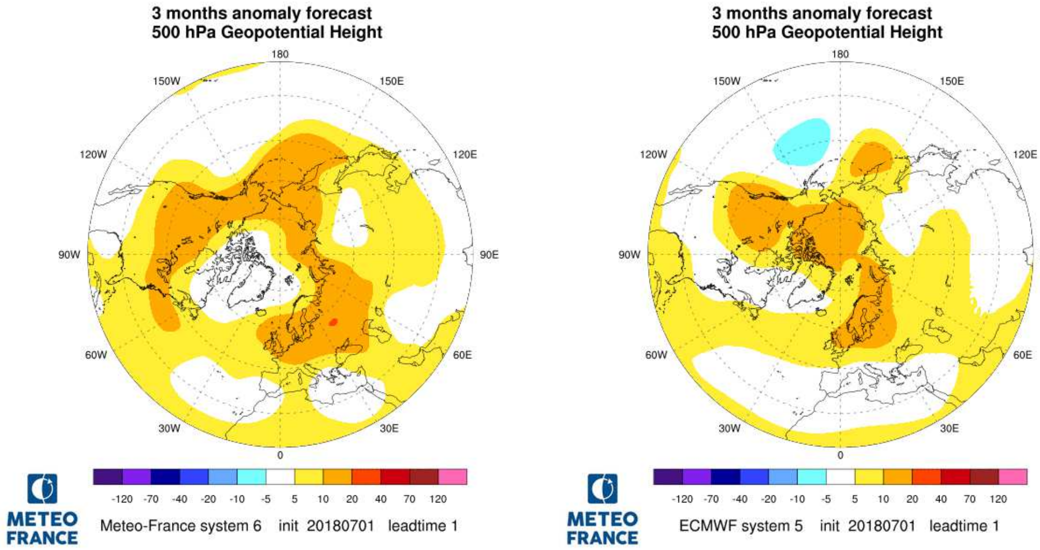


fig.II.2.b.3: Anomalies of Geopotential Height at 500 hPa from Météo-France.
http://seasonal.meteo.fr

II.2.c. modes of variability

MF-S6 and ECMWF-S5 are clearly in favor of positive NAO and SCAN modes, and with less magnitude a positive EA.

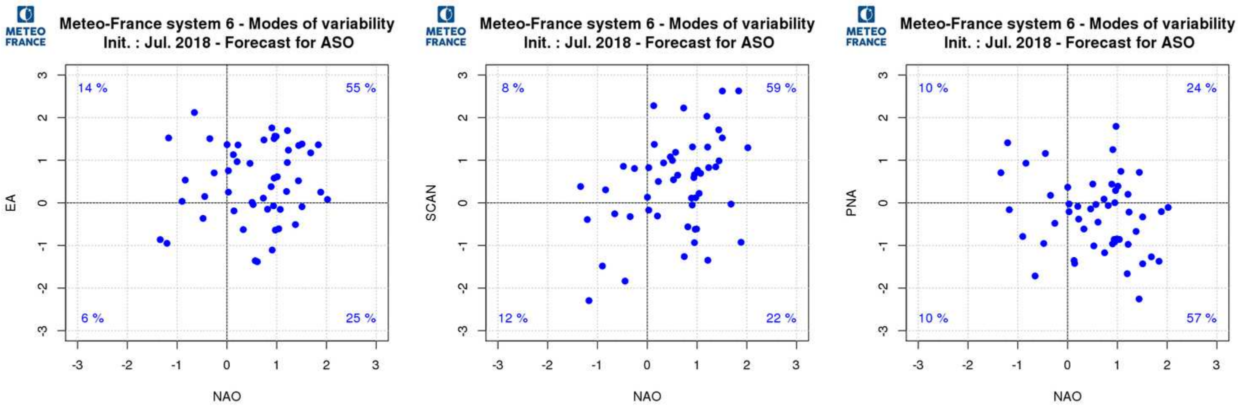


fig.II.2.c.1 : modes of variability forcasts over the Northern hemisphere with Meteo-France MF-S6

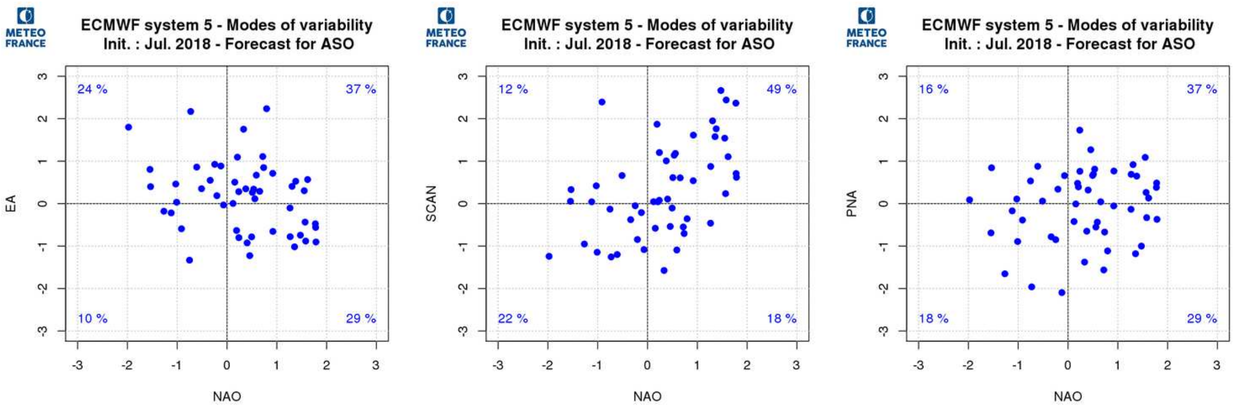


fig.II.2.c.2 : modes of variability forecasts over the Northern hemisphere with ECMWF-S5

II.2.d. weather regimes

MF-S6 and ECMWF-S5 show enhanced chances of winter-type "blocking" regime.

The SST anomalies observed in June and ASO 2018 in the North Atlantic tend to favor blocking regimes in the following weeks (Guemas et al., 2009).

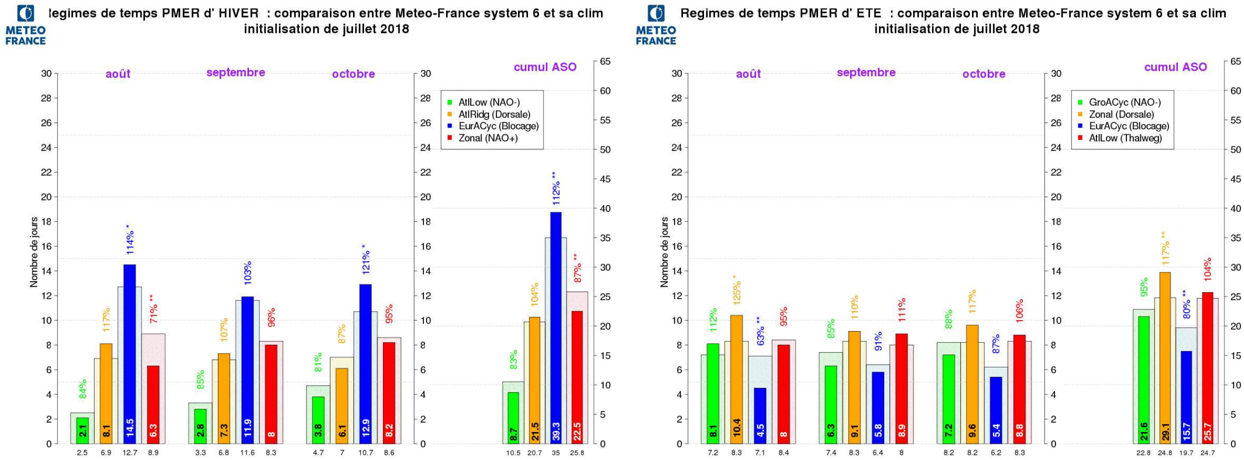


fig.II.2.d.1: North Atlantic Regime occurrence anomalies from Meteo-France MF-S6 : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.
Left : winter regimes; Right : summer regimes

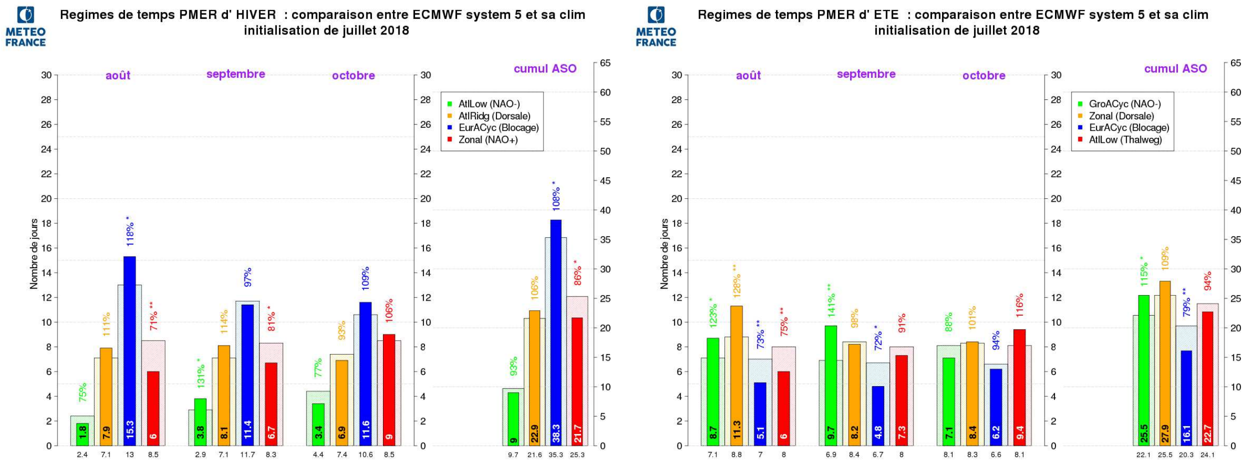


fig.II.2.d.2 : North Atlantic Summer Regime occurrence anomalies from ECMWF-S5 : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes
Left : winter regimes; Right : summer regimes

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

The NAO+/SCAN+ combination is favoured by a majority of models. It would lead to warm conditions over Northern Europe and Scandinavia. Like in June, close to normal conditions over the Atlantic facade.

Elsewhere, over continents, warm signal is overwhelming, particularly over eastern Europe, Middle East, western Canada and US. No warm signal or cool signal areas restricted to western Australia, Amazon region, Central Siberia, and Quebec.

II.3.a Météo-France

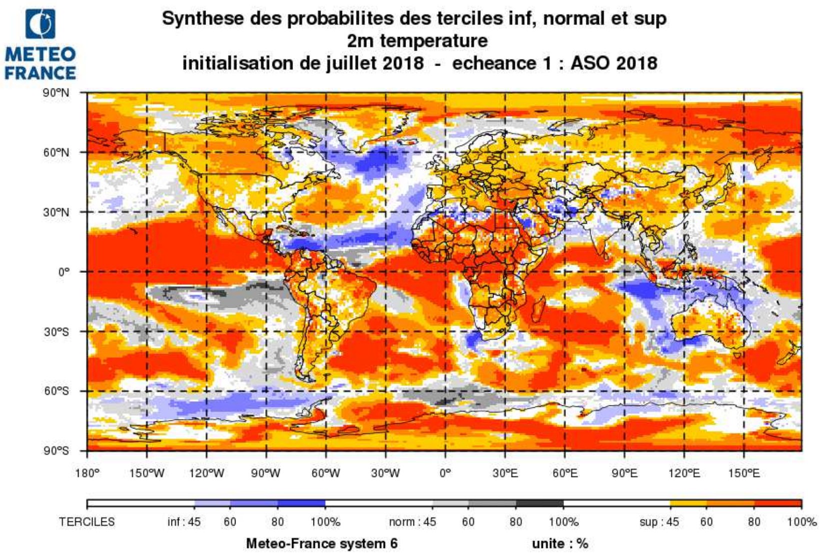


fig.II.3.1: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://seasonal.meteo.fr/

II.3.b ECMWF

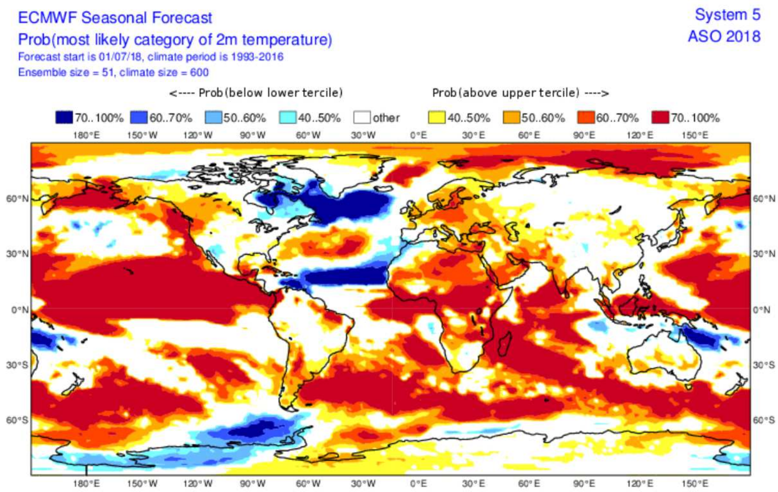


fig.II.3.2: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seaso...

II.3.c Japan Meteorological Agency (JMA)

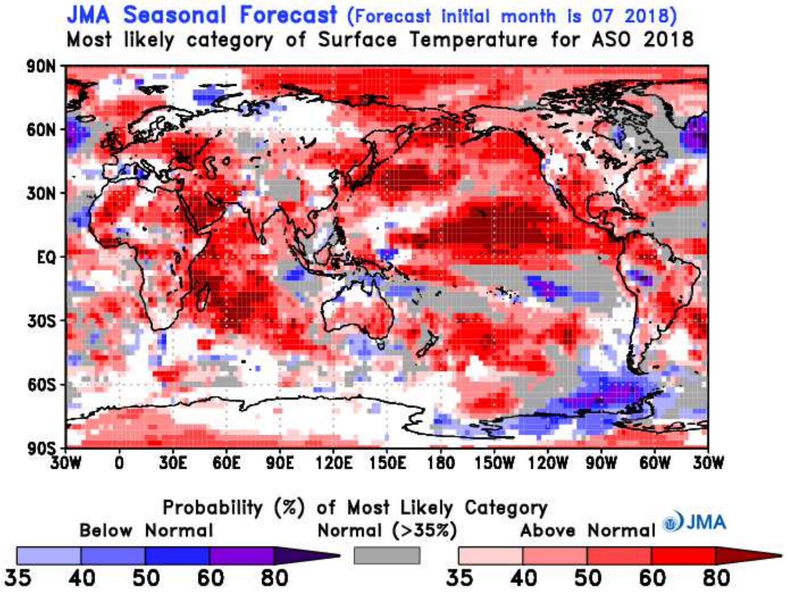


fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal.
White zones correspond to No Signal.
http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.3.d EUROSIP

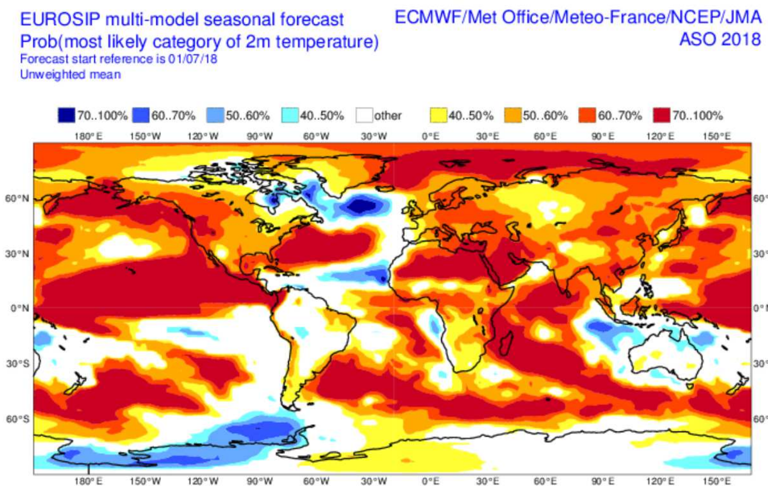


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

II.4. IMPACT : PRECIPITATION FORECAST

- inter-tropical regions :
  - For the Pacific basin, wet to the north, dry to the south, in agreement with SST anomalies.
  - For the Atlantic : enhanced dry signal, from Senegal/Guinea to eastern Caribbean, which is consistent with cooler than normal SSTs and velocity potential anomalies.
  - For the Indian Ocean and Maritime continent, dry signal dominating (except to the South-West of the Indian Ocean) but poor agreement between models does not bring much credit to this scenario.
  - Over Africa, SST conditions should not favor the northward penetration of the monsoon rains. Wet anomalies expected from the gulf of Guinea to Niger and Tchad, and dry anomalies over north-western Sahel (Mali and Senegal).
- Mid-latitudes :
  - dry conditions likely over northern and eastern Europe, up to western Russia, with the combination of blocking and NAO+ patterns (Atlantic fronts rejected more to the north). Somehow wetter than normal over southern Europe, in connection with lower geopotential heights.
  - wet signal for south-western US (see stream function anomalies); dry for north-western US and western Canada.

II.4.a Météo-France

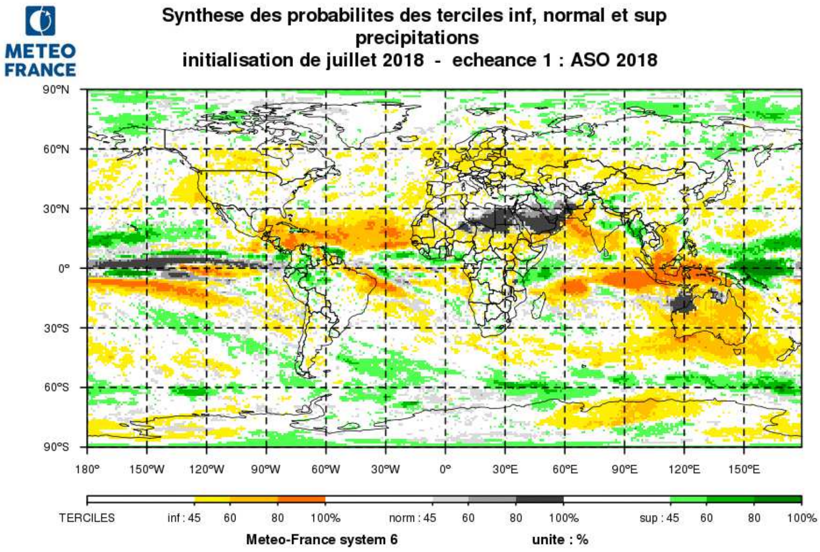


fig.II.4.1: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://seasonal.meteo.fr/

II.4.b ECMWF

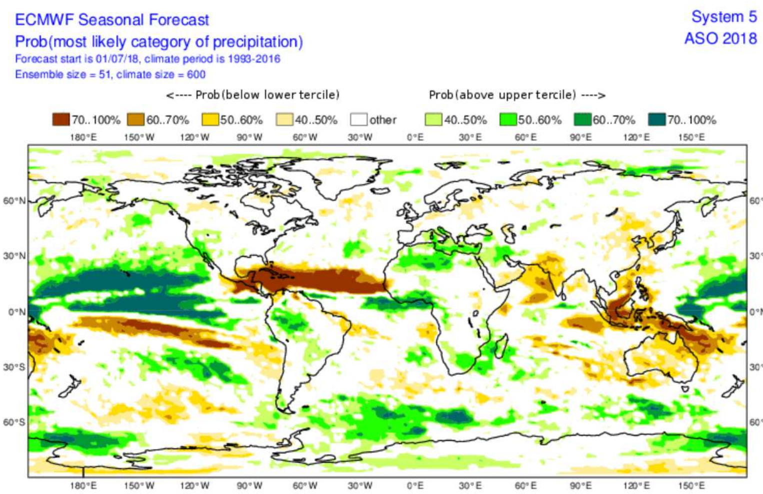


fig.II.4.2: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

II.4.c Japan Meteorological Agency (JMA)

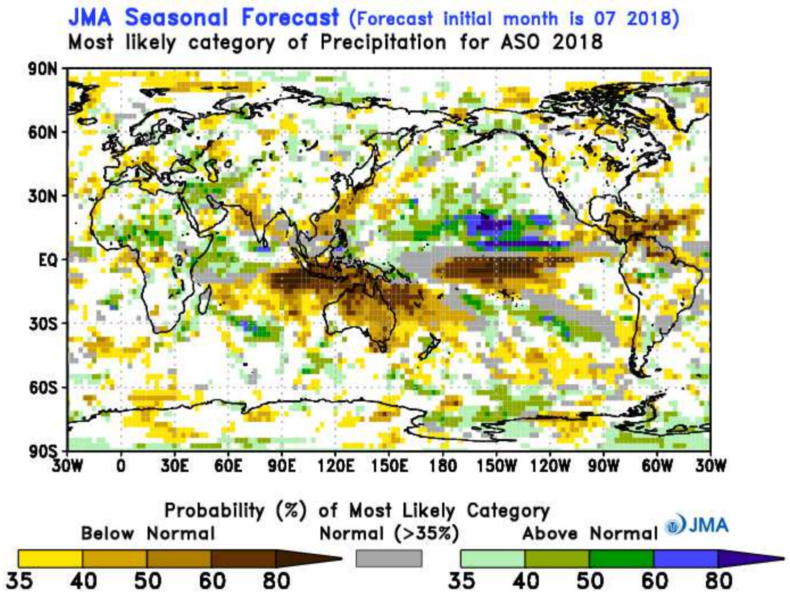


fig.II.4.3: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.
http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst_gl.php

II.4.d EUROSIP

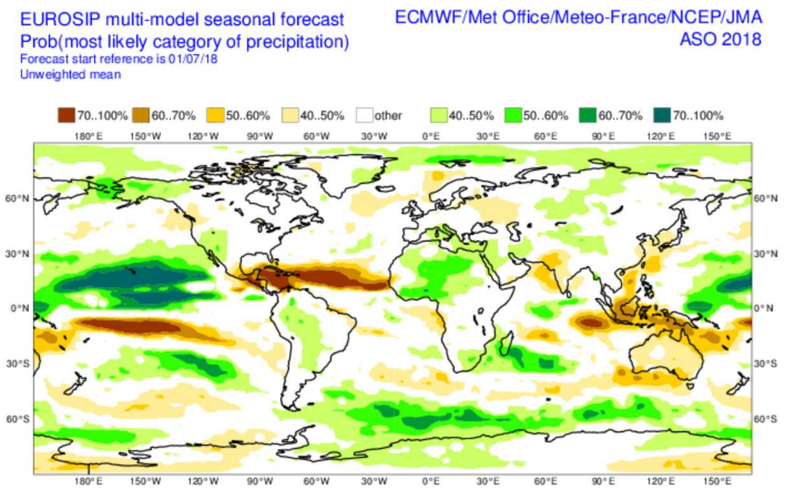


fig.II.4.4: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

II.5. REGIONAL TEMPERATURES and PRECIPITATION

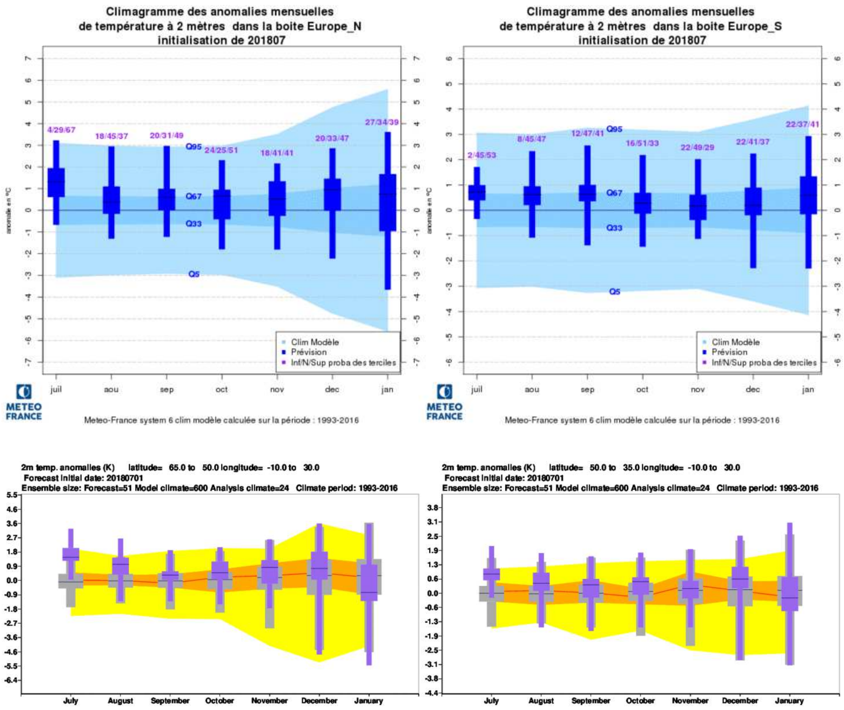


fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

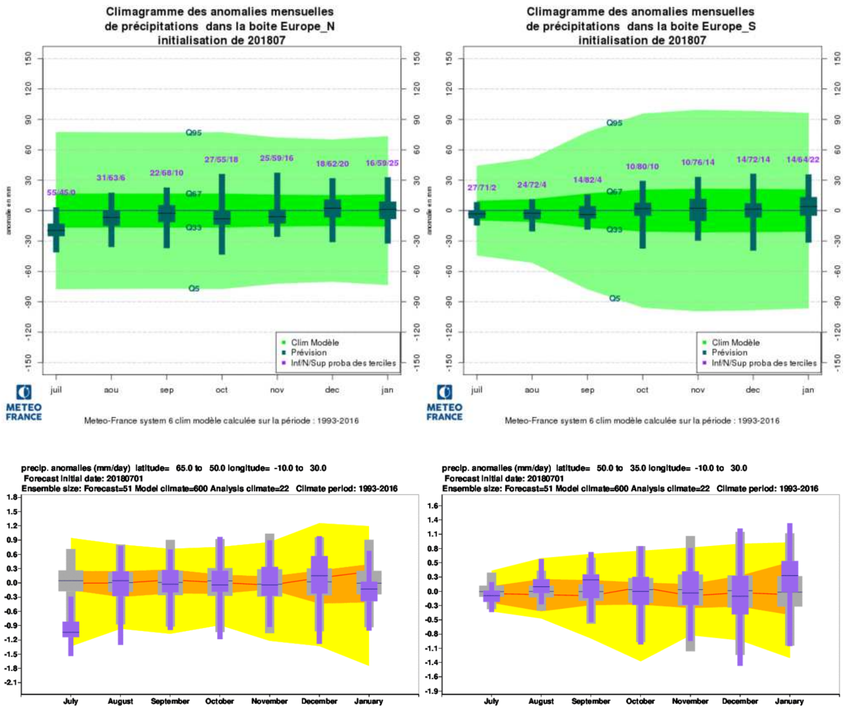


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

II.6. "EXTREME" SCENARIOS

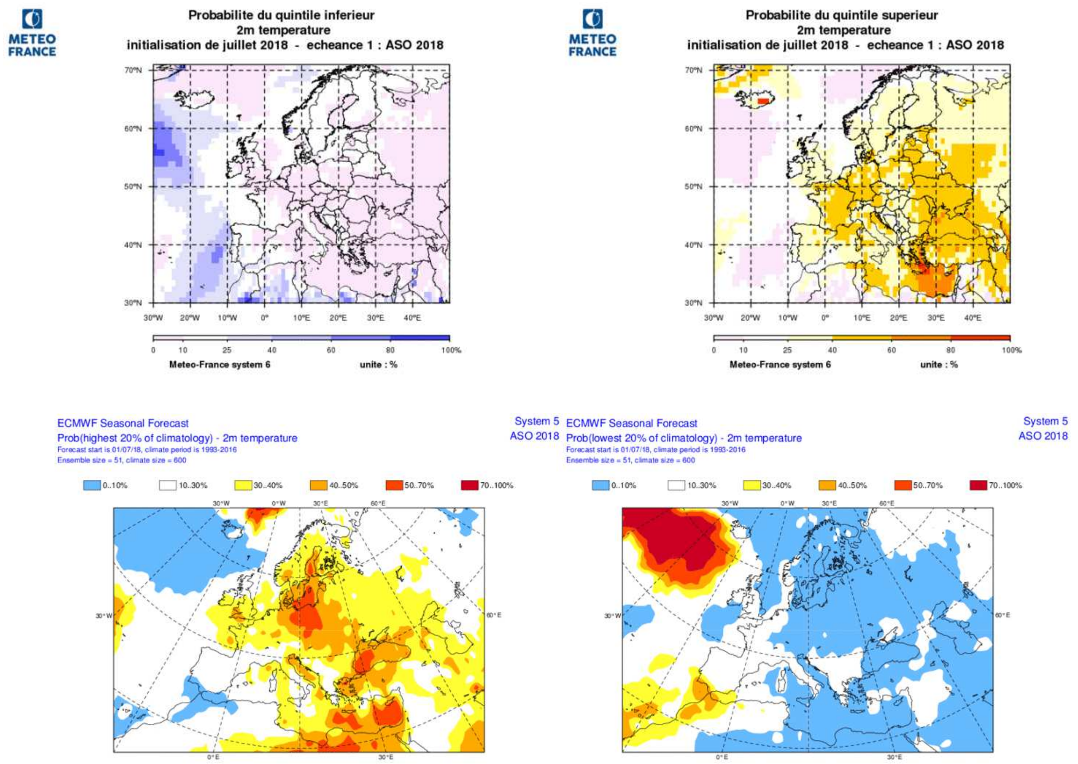


fig.II.6.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - highest ~20%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

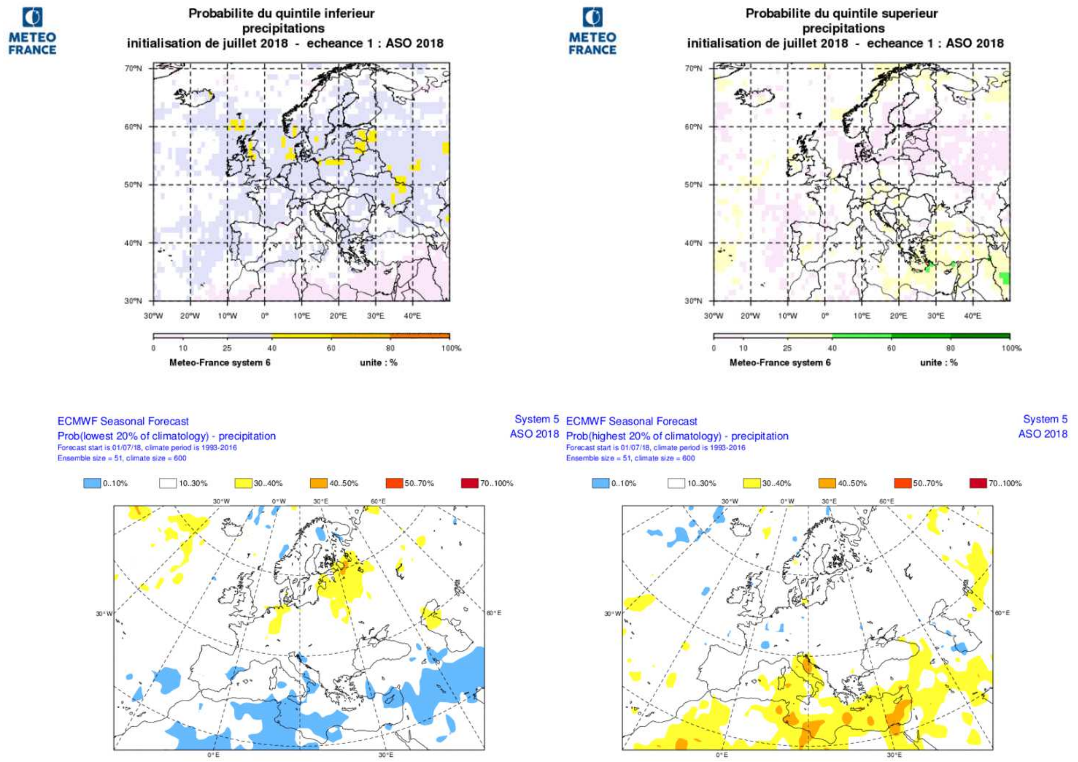


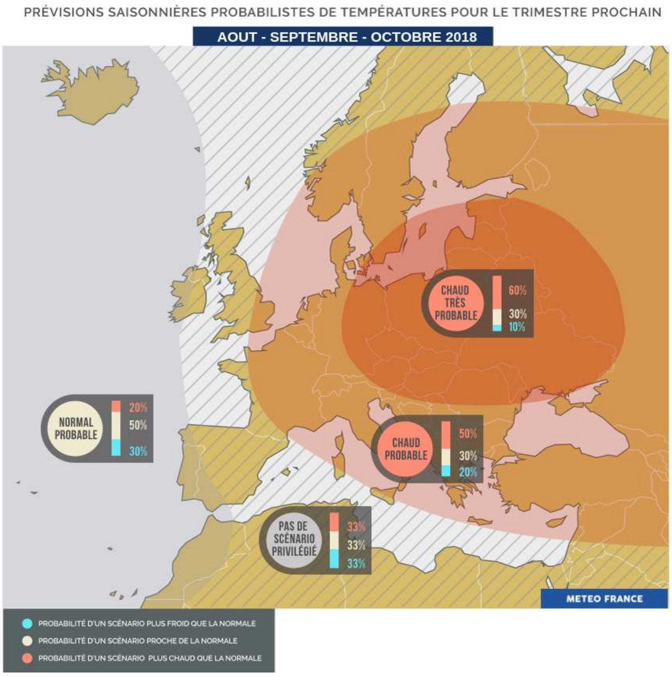
fig.II.6.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

II.7. DISCUSSION AND SUMMARY

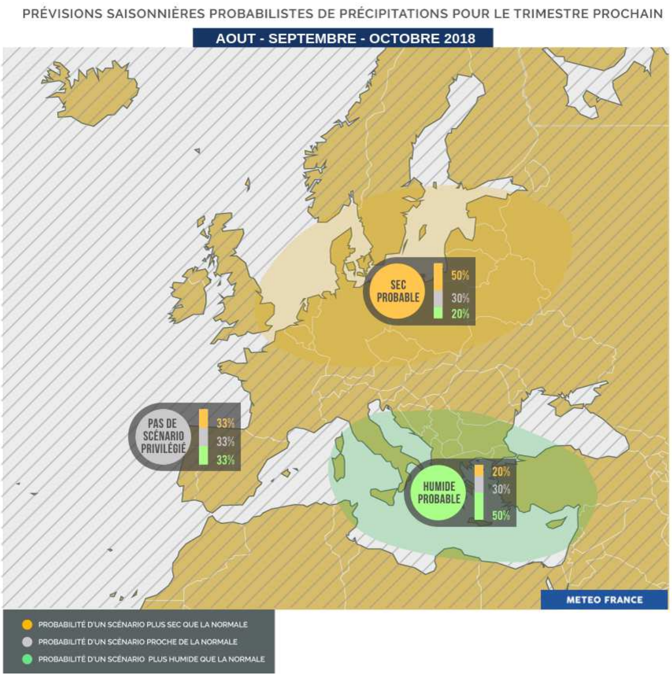
II.7.a Forecast over Europe

Despite of the lack of tropical teleconnexions (except a possible teleconnexions from the Indian Ocean over the Mediterranean Basin), there seems to be a rather good predictability over Europe for the coming months : anticyclonic circulation for northern Europe, more cyclonic for southern Europe.

Temperature : We rely on summer NAO/SCAN positive composites, which would bring warmer than normal conditions north of 45N, spreading eastward down to the Black Sea. Elsewhere no prominent signal (but cooler than normal conditions are very unlikely), except for Ireland and Portugal where temperatures could draw near normal (negative SST anomalies).



Precipitations : Drier than normal conditions over northern Europe. Wetter to the south, with enhanced deep convection from Italy to the Balkans and Greece.



II.7.b Tropical cyclone activity

North Atlantic : in connection with lower than normal SSTs (and enhanced subsidence), significantly fewer than normal hurricanes are forecast by most models : especially those evolving from African easterly waves.

North Pacific : slightly higher than normal activity over North-East Pacific.

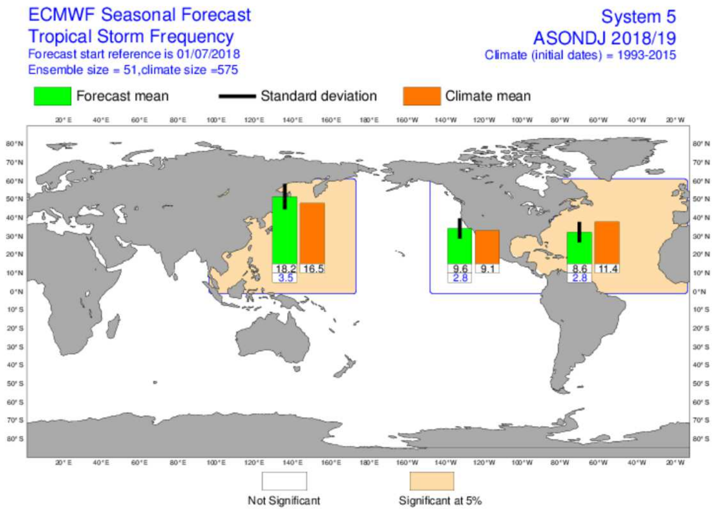


fig.II.7.1 : Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmtrop/trop_euro /eurosip_tropical_storm_frequency/

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 whe re the SST warming is developing first at the surface (especially for coastal events).

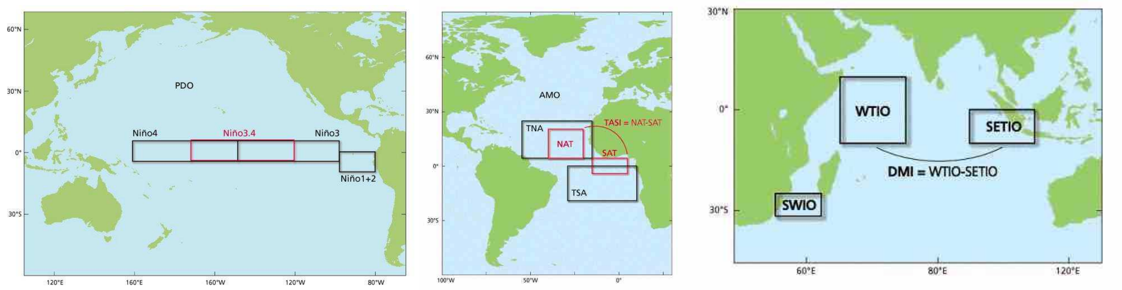
- Niño 3 : 5°S/5°N 90W-150W ; it is the region wher e the interanual variability of SST is the greatest.

- Niño 4 : 5°S/5°N 160E- 150W ; it is the region wh ere 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).

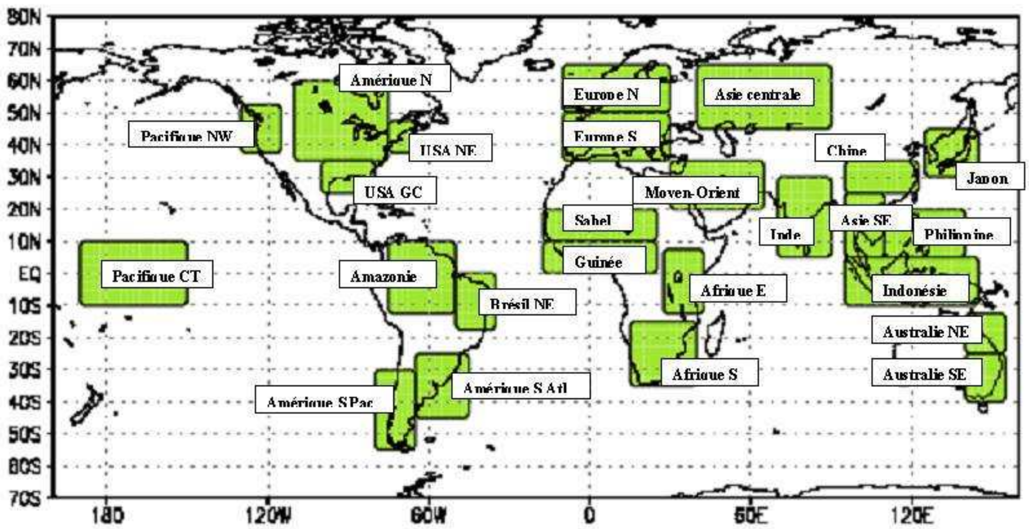
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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