WMO RA VI
RCC Network

METEO FRANCE

GLOBAL CLIMATE BULLETIN

n°228 – June 2018

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I. DESCRIPTION OF THE CLIMATE SYSTEM (April 2018)

I.1.Oceanic analysis

Over the Pacific ocean :

Still a "La Niña" pattern :

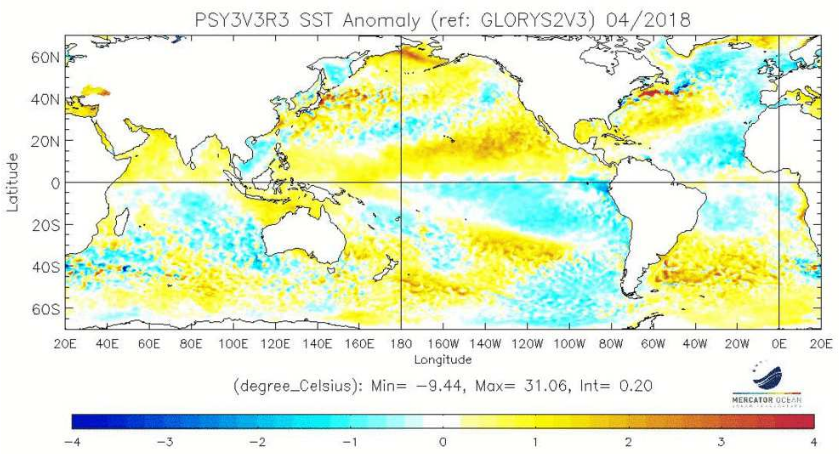
- Along the equator, little change in SSTs with negative anomalies east of the date line (Niño 3.4 index of -0.3℃, warming since March) and warm anomalies to the west (GLORYS 1992-2009, MERCATOR-Océan). In sub-surface, the cold anomaly (Eastern Pacific) has reduced in April (see fig. I.I.4).
- In the northern hemisphere, mainly positive anomalies. No clear PDO pattern visible, althought the index remains negative (-0.8 for this month, see https://www.ncdc.noaa.gov/teleconnections/pdo/)
- In the southern hemisphere, warm anomalies remaining in the Western part of the basin, especially around New Zealand. And a large negative anomaly in the Eastern sub-tropics.

Over the Indian Ocean :

- warm anomalies (<1℃) in the Northern hemisphere. To the South (up to 20°S), still a contrast between a warm western part and a cool eastern part of the basin.
- DMI close to zero (source : MERCATOR-Ocean)

Over the Atlantic:

- In the North Atlantic, warm anomalies to the West, and cold anomalies to the East. SSTs remain colder than normal off the western coast of Africa. Positive anomalies over the north-eastern arctic part of the basin.
- along the equator, neutral conditions (positive trend between March and April).



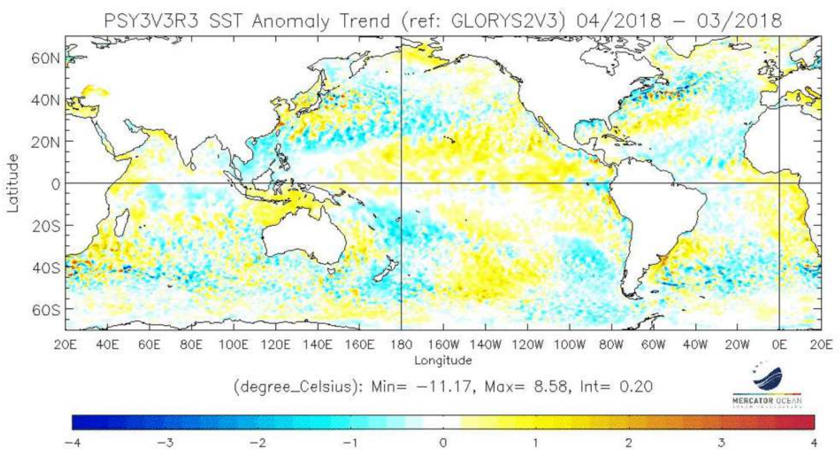


fig.I.1.1: top : SST Anomalies (℃) . Bottom : SST tendency (current – previous month), (reference Glorys 1992-2013).

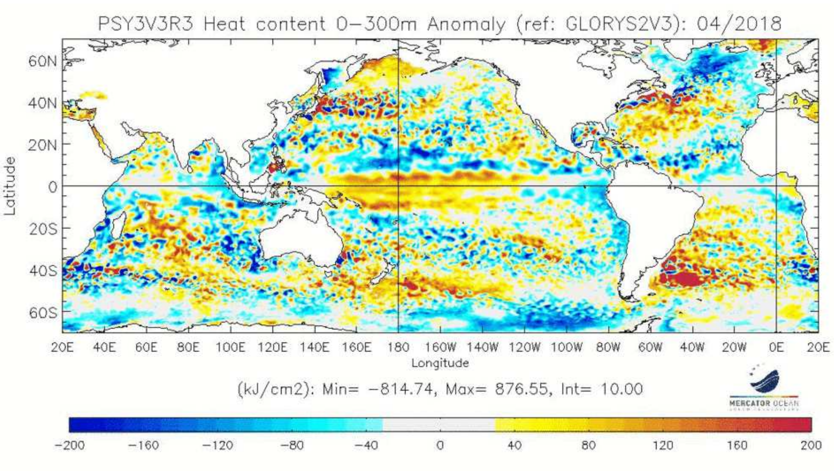


fig.I.1.2: map of Heat Content Anomalies (first 300m, kJ/cm2, reference Glorys 1992-2013)

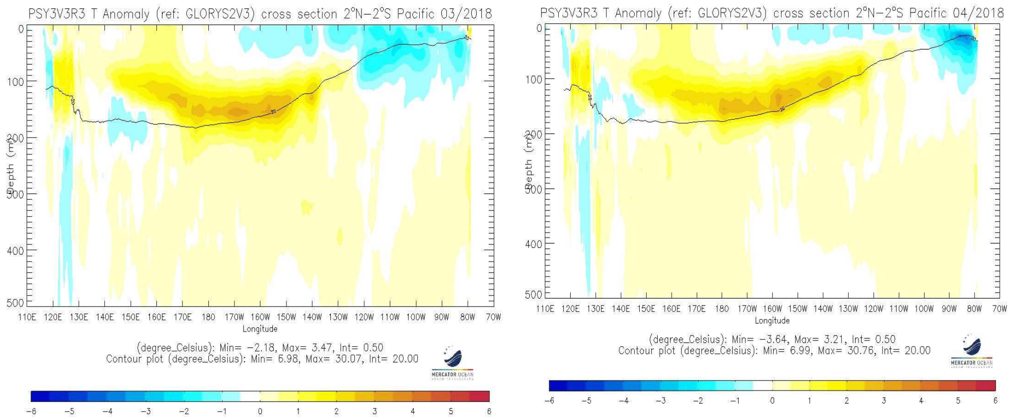


fig.I.1.4: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (previous and current month)

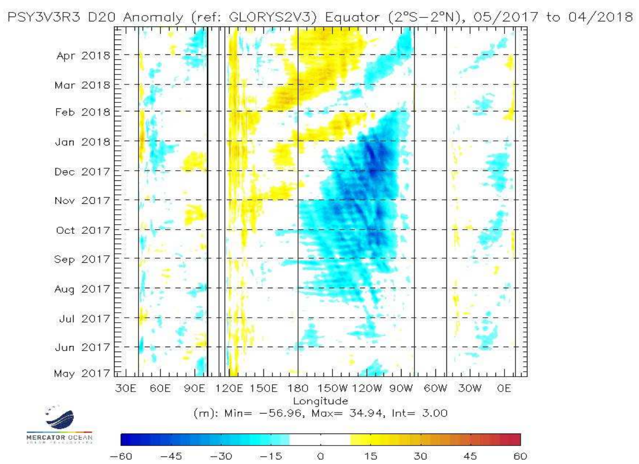


fig.I.1.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20℃ isotherm) along the equator for all oceanic basins over a 6 month period

Sea surface temperature near Europe :

European Arctic Sea: Still mostly warmer than normal, not much change compared to March.

North Sea: Still colder than normal, no significant change.

Baltic Sea: northern and eastern parts still frozen, in central parts below normal, in the south mostly above normal with decreasing anomalies compared to February and March.

Cold blob south of Greenland/Iceland: Still persisting, no significant change

Subtropical East Atlantic: Still colder than normal close to Iberia/Biscay, cooling continued to extend further offshore, also slightly in the subsurface, but this extension seems to be independent to the tropical anomalies.

Mediterranean: mainly warmer than normal with highest anomalies in the east and slightly increased anomalies, only the westernmost part close to southeastern Spain was colder.

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

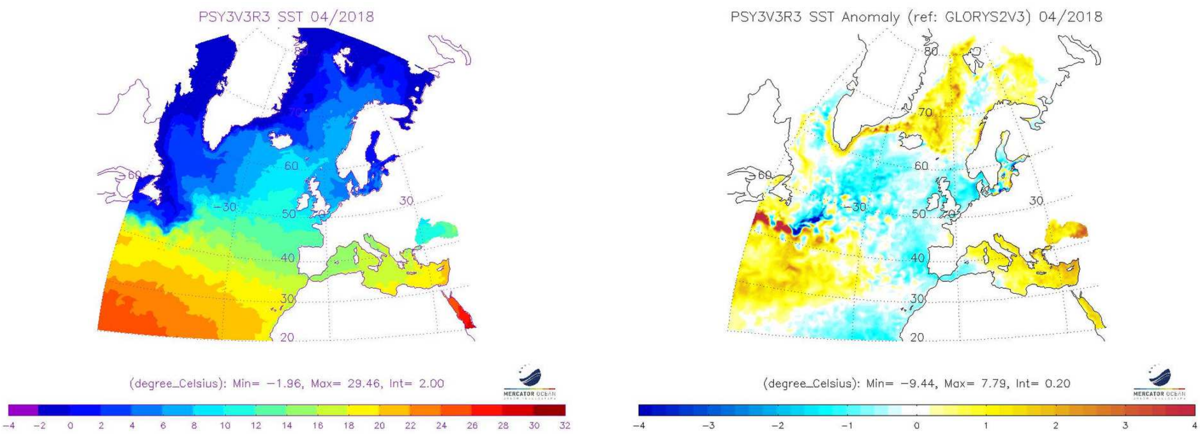


fig.I.1.6 : Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2013).

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) :

- no typical "La Niña" response in April around the equatorial Pacific. Anomalies look like MJO impacts (MJO was active in April).
- the main anomaly dipole concerned Africa (upward anomaly motion) and the Maritime Continent (Downward anomaly motion), consistent with MJO in phases 7,8,1,2 and 3.

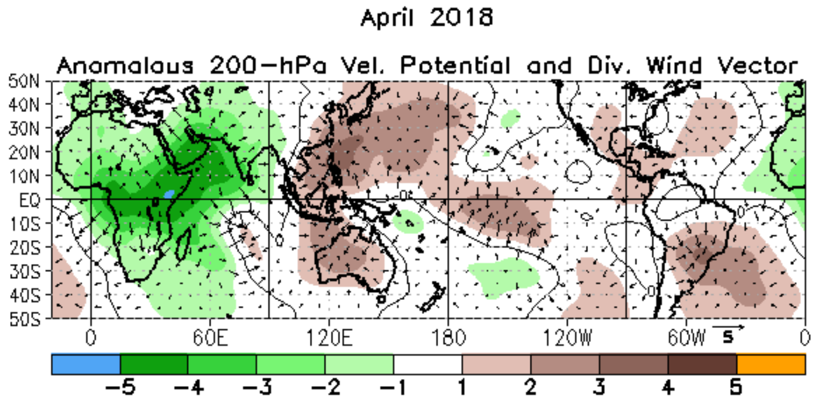


fig.I.2.1.a: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly). http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

SOI :

- SOI index lower than in March, close to neutrality at +0.5 (NOAA Standardized SOI: https://www.ncdc.noaa.gov/teleconnections/enso/indicators/soi/).

MJO (fig. I.2.1.b)

- Active MJO all along the month in phases 7, 8, 1, 2 and 3

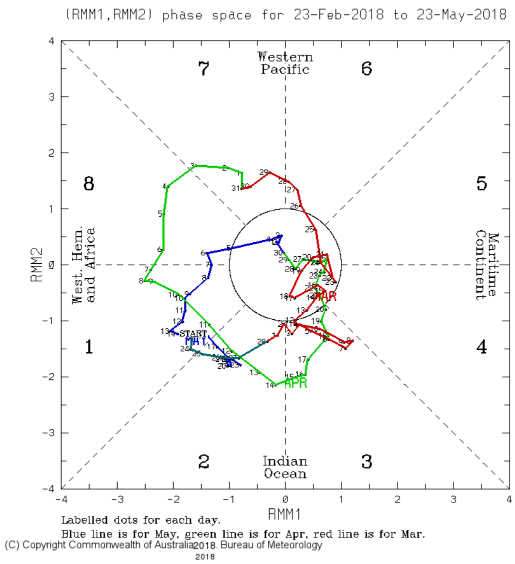


fig.I.2.1.b: indices MJO http://www.bom.gov.au/climate/mjo/

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

- Cyclonic anomalies over the eastern Pacific (on both sides of the equator), very similar to the ones observed in Feb. and March, and consistent with La Niña composites. Consequently, the positive anaomly that spreads up to SW of the USA could be originated from La Niña.
- Anaywhere else, no noticable anomalies in the inter-tropical area..

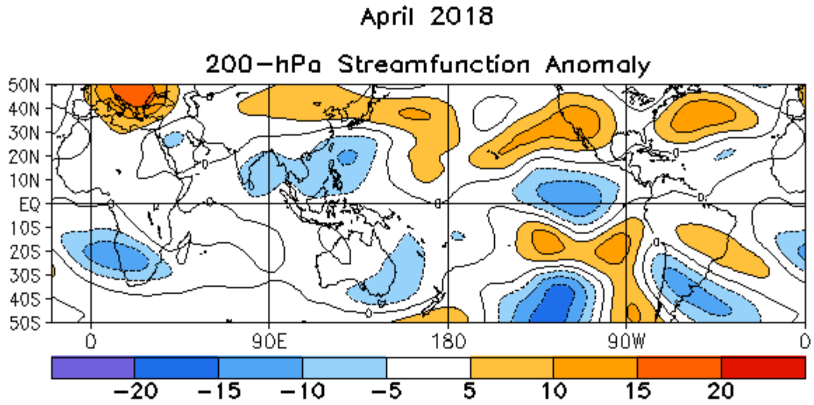


fig.I.2.2: Stream Function Anomalies at 200 hPa.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

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

- over Northern Atlantic and Europe, anomalys project on the positive phases of NAO and EA (East Atlantic). Active perturbations have concerned essentially Western Europe.
- on the North-American continent, anomaly dipole between the SW (+) and NE (-) : therefore, the atmospheric circulation had a significant North component during the month avec Canad and the USA.

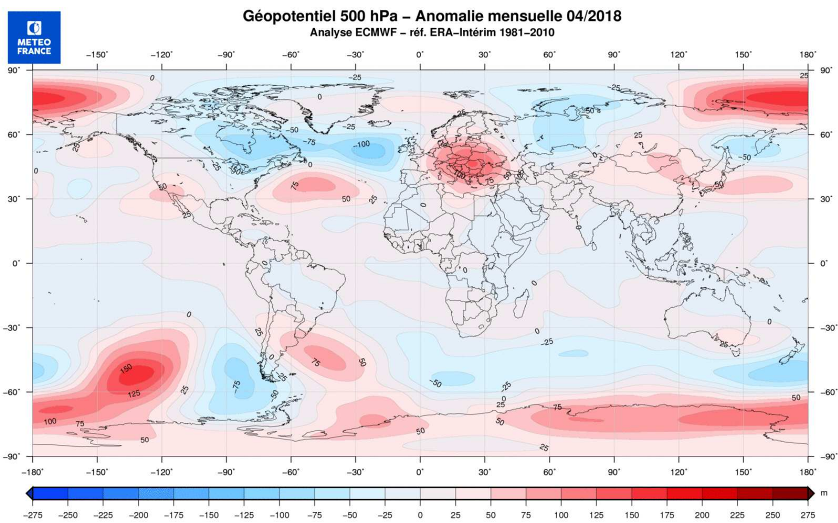


fig.I.2.3: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
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 8 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 more intense than normal, resulting in a positive NAO phase (fig. I.2.4). The Icelandic Low also was extended to the south, which is typical for a positive EA phase. Thus the position of the North Atlantic frontal zone was located relatively far in the south affecting especially Iberia, the western Mediterranean and parts of northwest Africa with cool and moist air.

The second main pattern over Europe was a large and intense high pressure anomaly with its core located over Italy and southeastern Europe. It did not contribute much to EATL/WRUS and SCAND patterns because the anomaly was located further to the west and south. Nevertheless it affected particularly southeastern and central Europe but also adjacent areas by warming due to subsidence and periods of high sunshine duration. Especially Central Europe and central Mediterranean parts were also influenced by warming due to southerly advection of subtropical air masses.

Hess-Brezowsky weather types in April 2018 were mainly southerly, westerly or high pressure over Central Europe. Northerly or north-westerly types, which often produce cold spells in April, were missing at all.

Météo France weather type classification shows a clear dominance of the types Atlantic Trough and Blocking for April 2018, which corresponds to low pressure over the North Atlantic and high pressure over various parts over the European continent. This is in sharp contrast to March 2018 which was mainly a cold month in Europe and had very different circulation patterns.

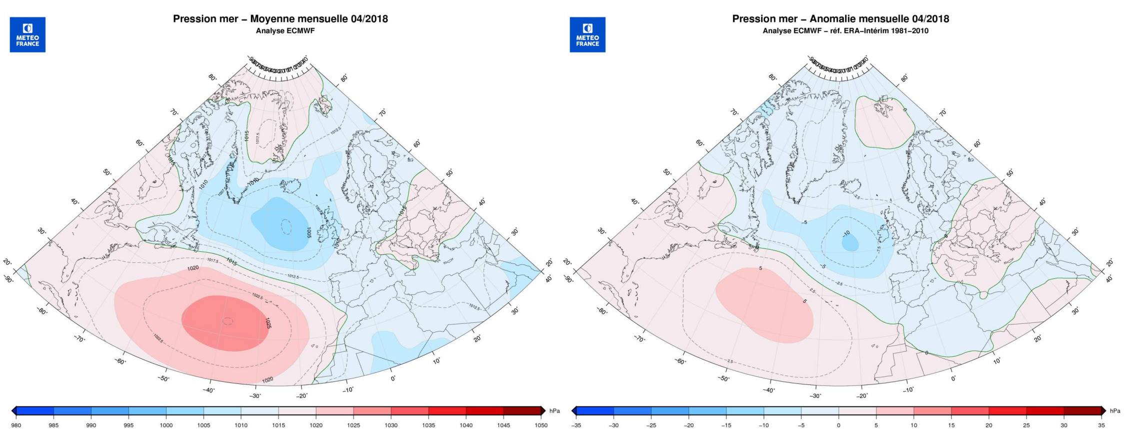


fig.I.2.4: Mean sea level pressure in the RA VI Region (Europe) (top) and 1981-2010 anomalies (bottom).

Circulation indices: NAO and AO

NAO+ was active during nearly the whole month except the beginning and a short interruption in the middle of the month (fig. I.2.5). Arctic Oscillation (AO) started with a negative phase in early April, but changed gradually to a positive phase until the end of the month, when north-hemispheric circulation was getting more zonal. The AO- pattern in early April could have had an effect on enhanced meridionalisation in the northern hemisphere, considering strong geopotential anomalies in many parts of the northern middle latitudes, while tropical teleconnection was probably low in Europe.

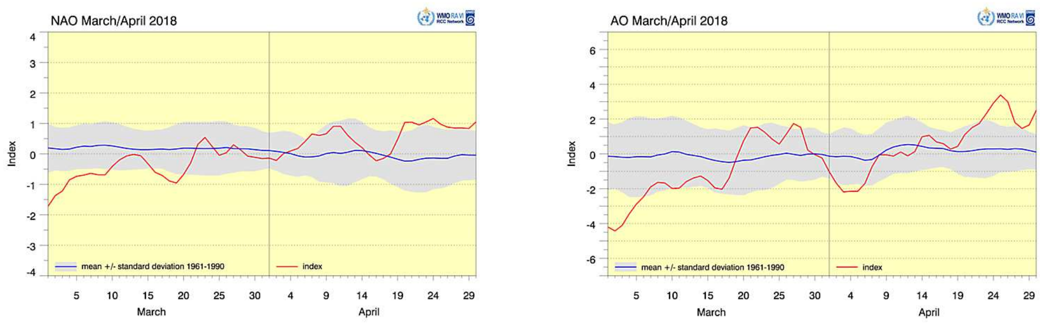


fig.I.2.5: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm , data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

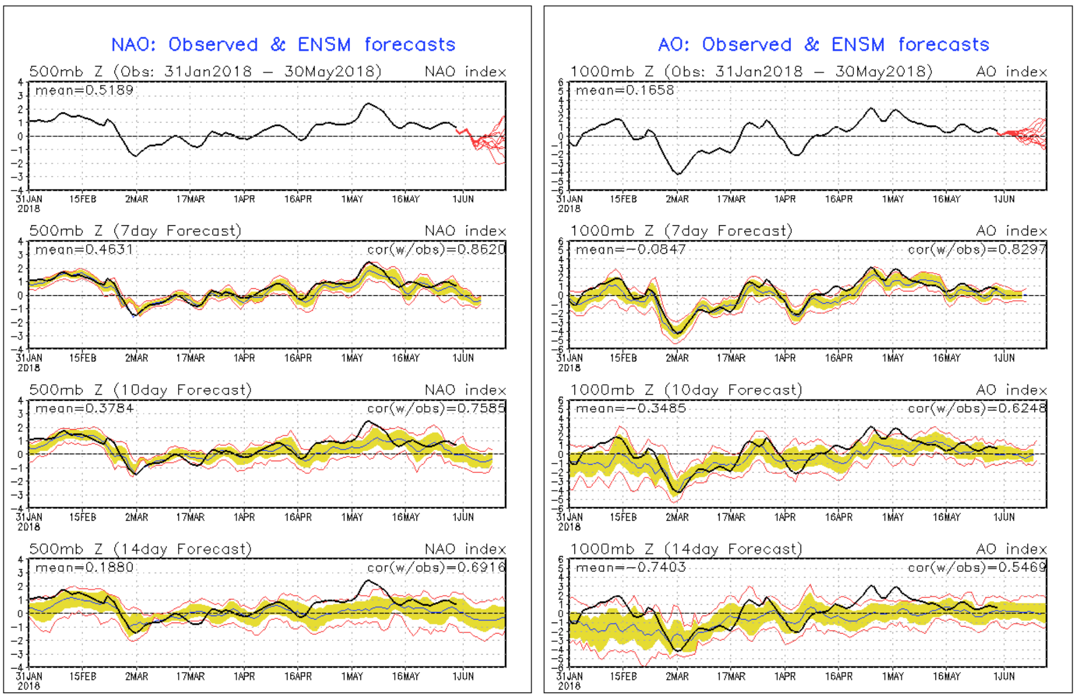


fig. I.2.5a: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices for the last 4 months and forecasts for the following weeks. Source: NOAA CPC, http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

I.2.b Precipitation

- In the equatorial band, quite consistent response to La Niña. Anyway, compared to March, there are significant differences over the Maritime Continent, where MJO had strongly weakened convection.
- strong positive anomaly over the Indian Basin (cf negative VP200 anomalies).
- strong contrast over Africa, with deficit of precipitations around the Gulf of Guinea.
- over Europe, strong West-East contrast, consistent with Z500 anomalies.

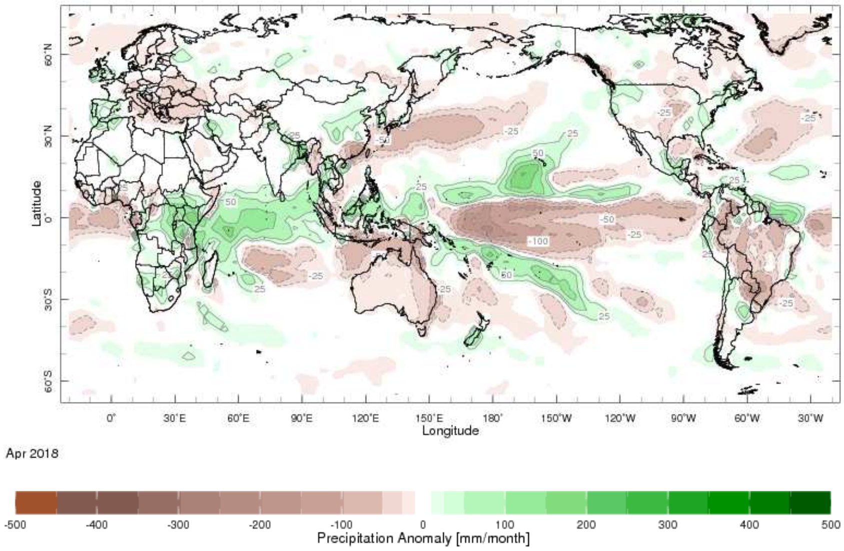


fig.I.2.6: Rainfall Anomalies (mm) (departure to the 1979-2000 normal).
Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/Anomaly.html

Precipitation anomalies in Europe:

There was a sharp contrast in precipitation totals and anomalies between western and south-eastern Europe. Exposed locations especially at the western coast of Iberia and in the Pyrenees received monthly totals of above 150mm (locally above the 90th percentile), while places near the western and northern Black Sea coast, but also in central and southern Italy, Greece, Turkey and eastern Syria were very dry with less than 10mm (below 10th percentile), locally there were severe or even extreme drought conditions.

This precipitation contrast is well correlated to the EA+ pattern, further north the above-normal precipitation over southern UK / Ireland also to NAO+. The dry zone over south-eastern Europe and Turkey is well correlated to the high pressure zone with subsidence over the same area. Some heavy precipitation in western Russia came from occasional troughs in this area (making up a monthly negative geopotential anomaly), partly triggered by AO- especially at the beginning of the month.

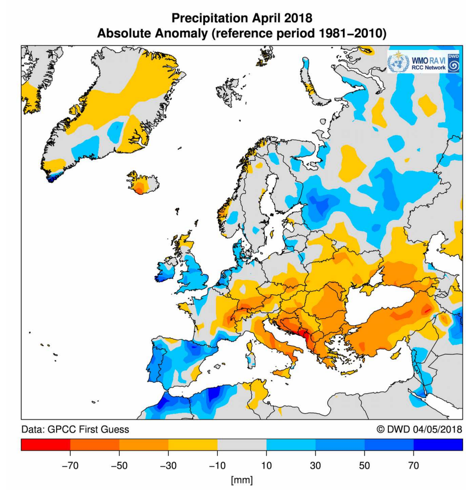


fig.I.2.7.a : Absolute anomaly (1951-2000 reference) of precipitation in the RA VI Region (Europe), data from GPCC (Global Precipitation Climatology Centre), http://www.dwd.de/rcc-cm.

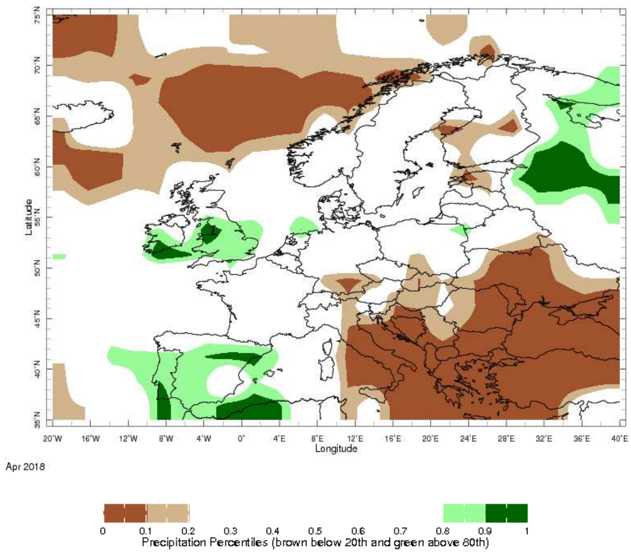


fig.I.2.7.b : Percentiles of precipitation, 1981-2010 reference. Data from NOAA Climate Prediction Center, http://iridl.ldeo.columbia.edu/maproom/Global/Precipitation/Percentiles.html

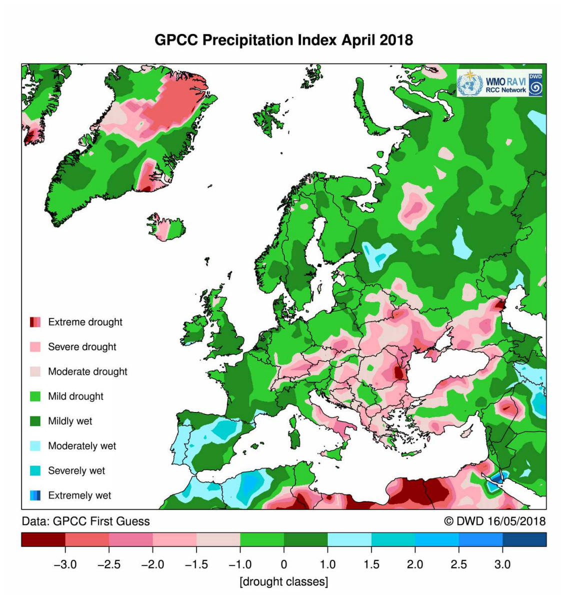


fig. I.2.8: GPCC Precipitation Index, http://www.dwd.de/rcc-cm .

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	+ 2.0 mm	- 0.272
Southern Europe	- 11.9 mm	- 0.473

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

- large positive anomaly over the European continent (up to +5℃)
- large negative anomaly over the USA and Canada (up to -5℃)

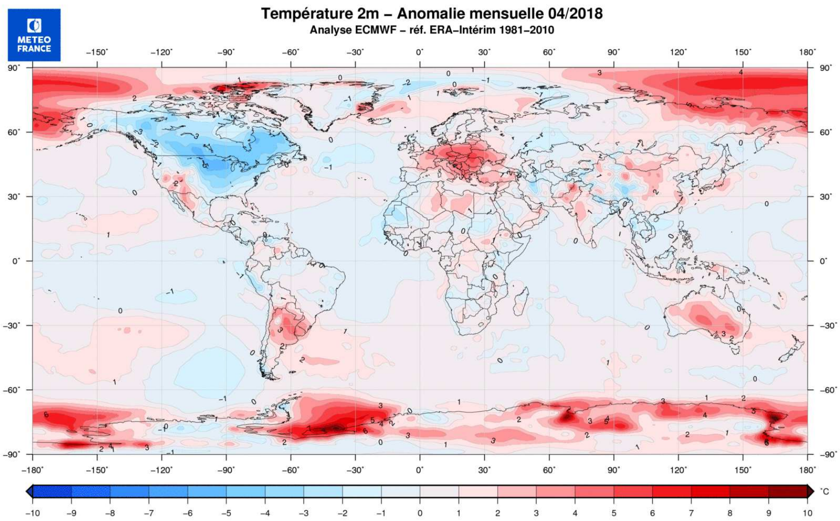


fig.I.2.9: Temperature Anomalies (℃) (Meteo-France)

Temperature anomalies in Europe:

April was an extremely warm month over much of Europe except some parts in the west, north and east, which were around or slightly below normal. Highest anomalies occurred in Czech Republic and southwestern Ukraine / northern Romania up to above +5℃ (1981-2010 reference). Som e countries or stations reported the warmest or one of the three warmest Aprils since at least 1901, e.g. warmest April in Germany, Hungary, Slovenia, third warmest in France. In regions of highest anomalies the warming was particularly due to extreme warm spells with high pressure influence and long sunshine duration, further to the west more to subtropical warm air advection.

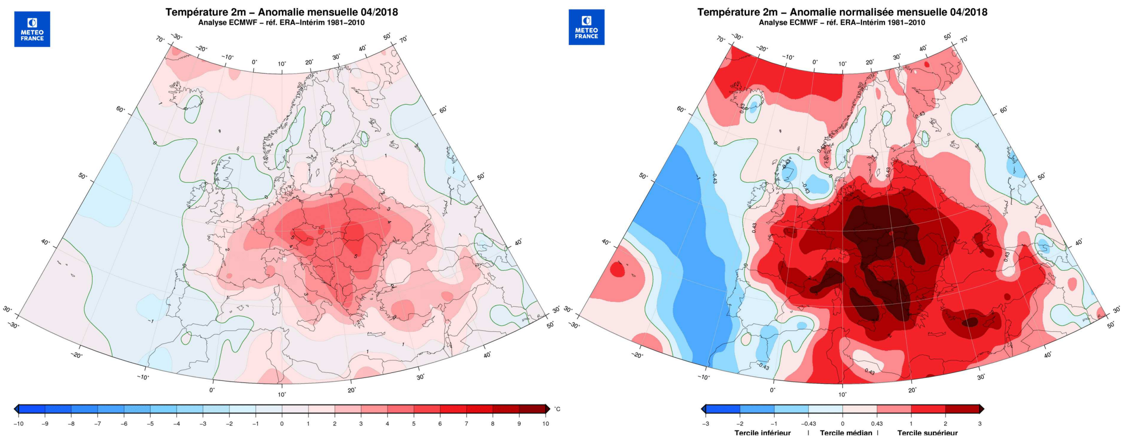


fig.I.2.10: Left graph: Absolute anomaly of temperature in the RA VI Region (Europe). Right graph: Standardized temperature anomalies

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	+ 2.3 ℃
Southern Europe	+ 2.8 ℃

I.2.d Sea ice

- In the Arctic : remaining close to record-low extent (2nd lowest, behind 2016). Record low for the Bering Sea.
- In Antarctica the deficit is still important, less than -2 SD

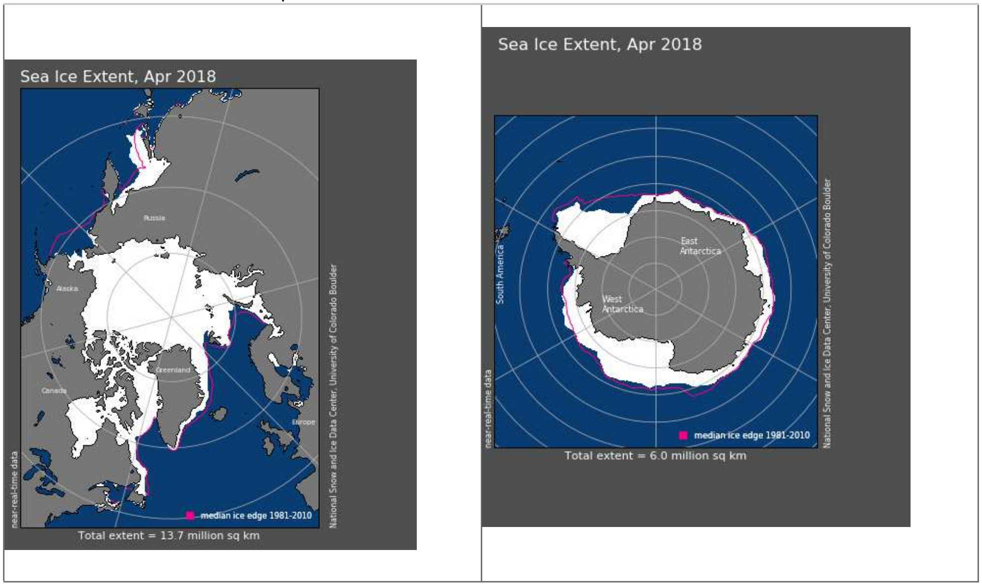


fig.I.2.11: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

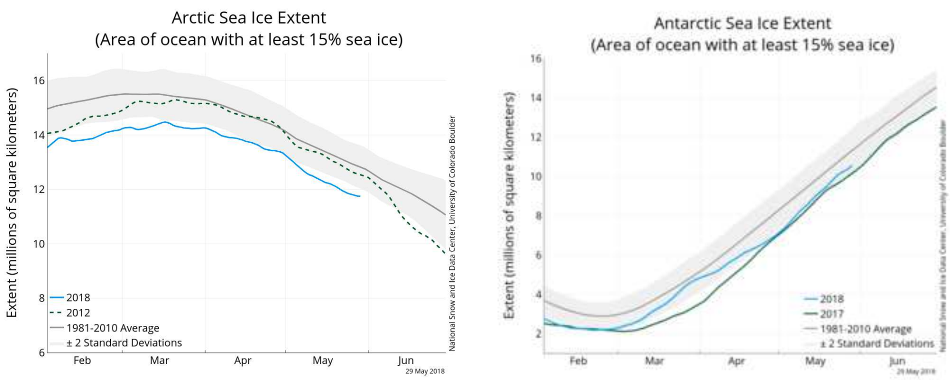
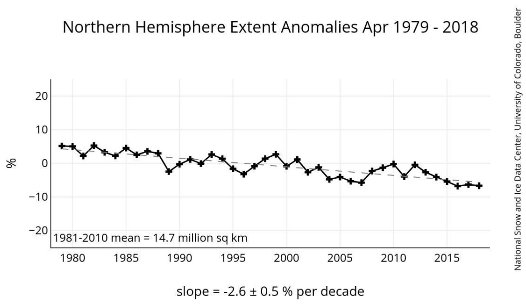


fig. I.2.12 : Sea-Ice extension evolution from NSIDC. https://nsidc.org/data/seaice_index/images/daily_images /N_stddev_timeseries.png



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

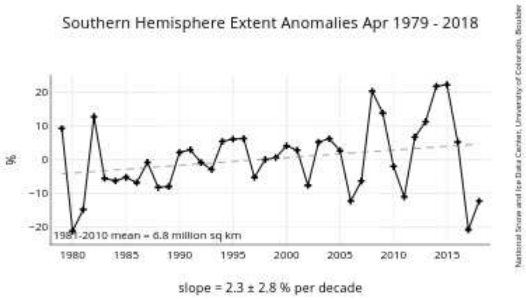


fig 1.2.13 : Monthly Sea Ice Extent Anomaly Graph in Antarctic for the month of analysis (http://nsidc.org/data/seaice_index/)

II. SEASONAL FORECAST FROM DYNAMICAL MODELS

The La Niña phenomenon is ending, and weak positive anomalies will take place in the equatorail eastern Pacific in the next 3 months.

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 forcasts (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: Return to neutral conditions expected along the equator (some postive anomlies expected but still weak). Persisting cold anomaly forecast over the southern tropical basin, and warm anomaly over the northern tropical basin. Northern Pacific globally forecast warmer than normal, especially in the Bering region and over the western half of the basin. No significant PDO structure over the period.
- Indian Ocean: Neutral conditions forecast in the northern hemisphere. The DMI should therefore remain close to zero (see figure II.1.7.). In the tropical southern hemisphere, good agreement between models, suggesting a warmer than normal south-western basin and a colder than normal south-eastern basin.
- Atlantic Ocean: Most models forecast cooler than normal SSTs over the Tropical Atlantic. Several models suggest a warm area extending along the equator. Neutral or cooler than normal conditions expected off the western coasts of Africa. TASI index may stay negative.
- Mediterranean Sea : Warmer than normal..

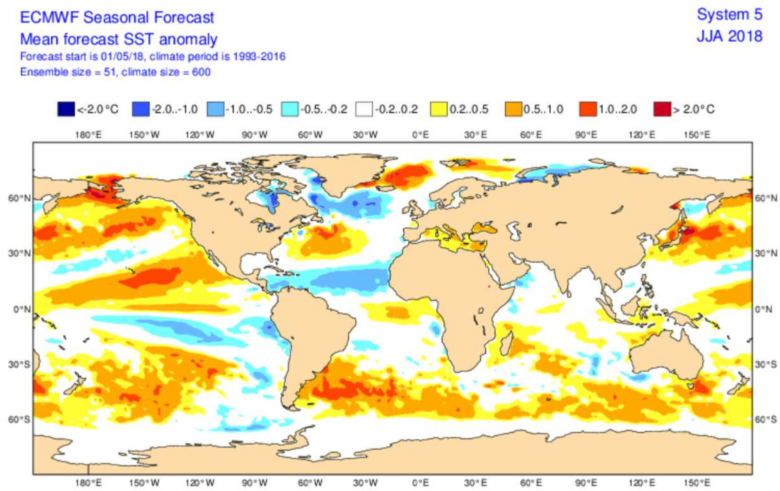


fig.II.1.1: SST anomaly forecast from ECMWF
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

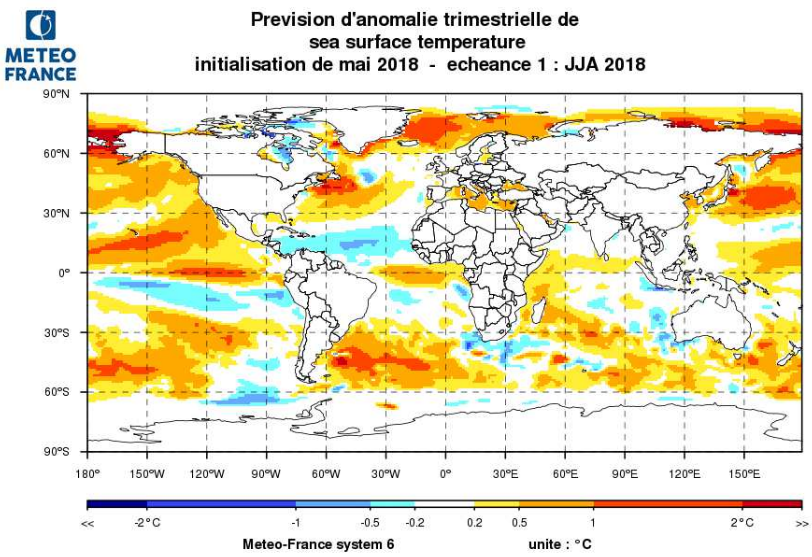


fig.II.1.2: SST Anomaly forecast from Meteo-France (recalibrated with respect of observation).
http://seasonal.meteo.fr

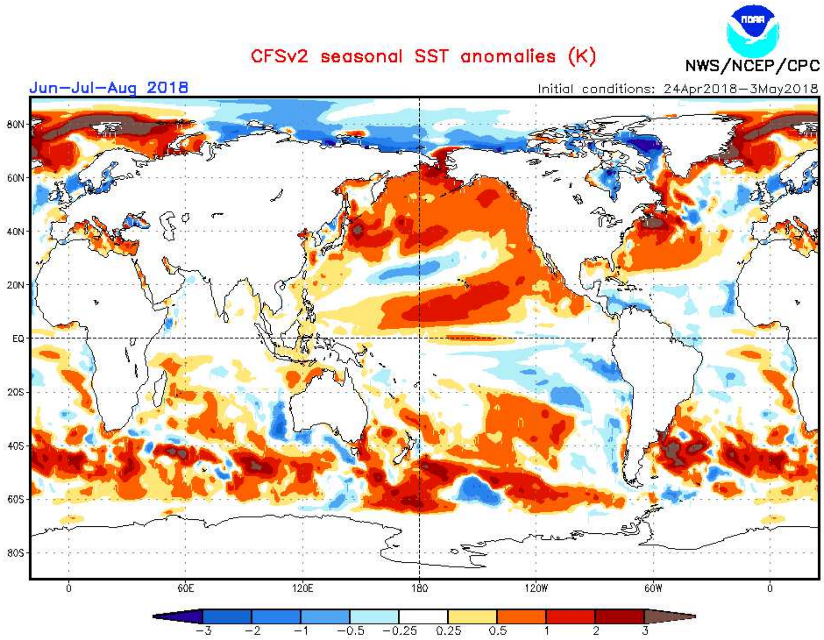


fig.II.1.3: SST Anomaly forecast from NCEP.
http://www.cpc.ncep.noaa.gov/products/people/wwang/cfsv2fcst/imagesInd1/glbSSTSeaInd1.gif

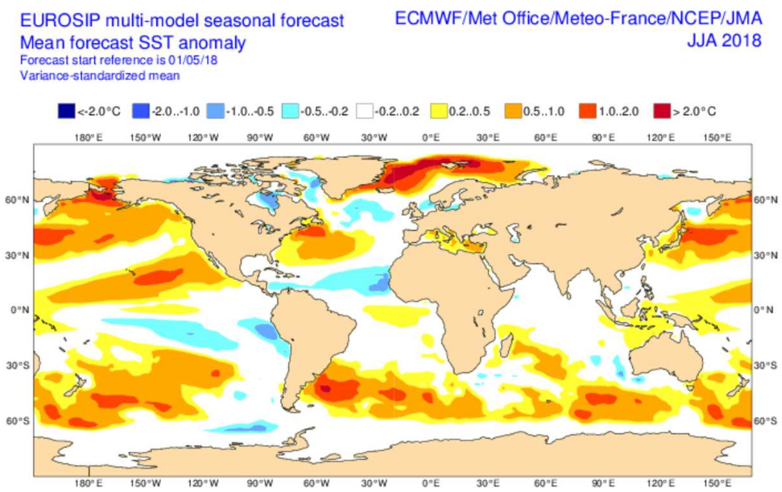


fig.II.1.4: SST Forecasted anomaly from Euro-SIP

II.1.b ENSO forecast :

***Forecast Phase*: neutral phase.** Note that there is a high probability for anomalies to be positive in the Nino3.4 box, but below 0.5℃ .

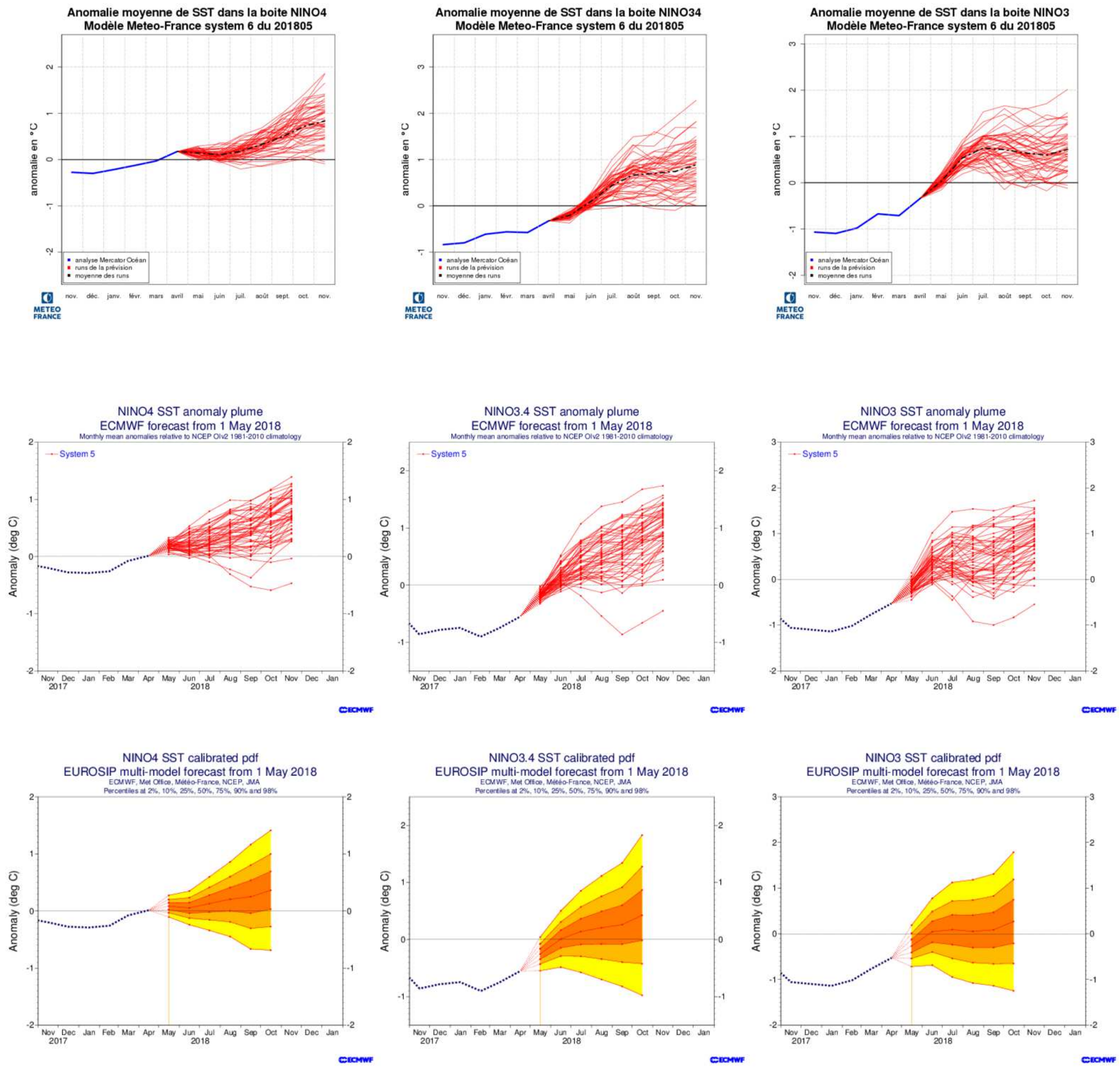
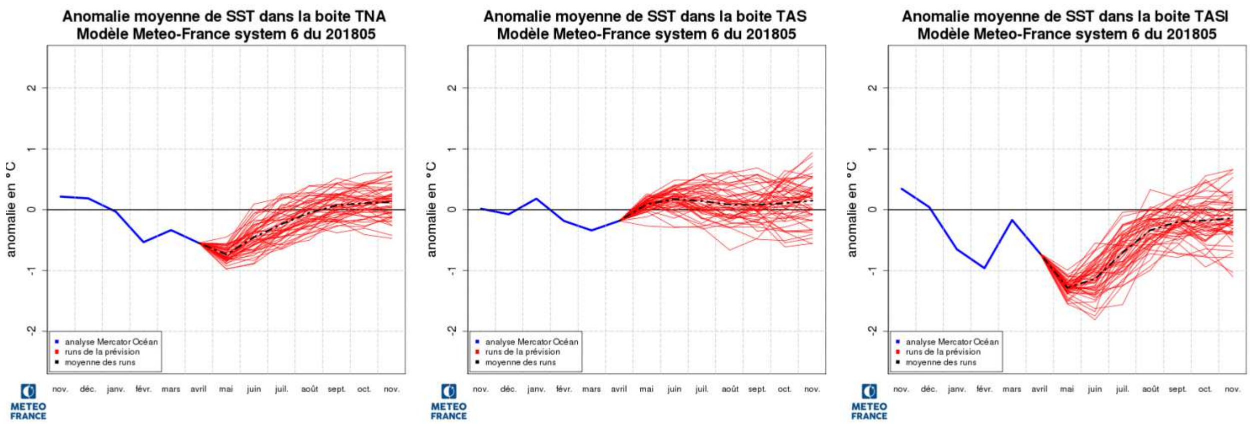


fig.II.1.5: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members -
and EUROSIP (bottom) – recalibrated distributions -
(http://seasonal.meteo.fr , http://www.ecmwf.int/)

I.1.c Atlantic ocean forecasts



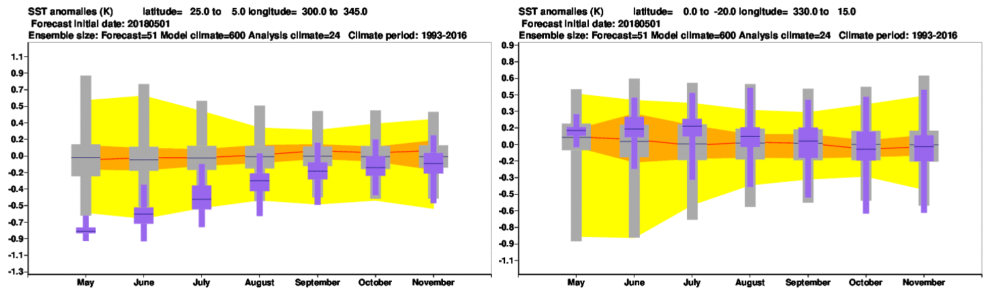


fig.II.1.6: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

I.1.d Indian ocean forecasts

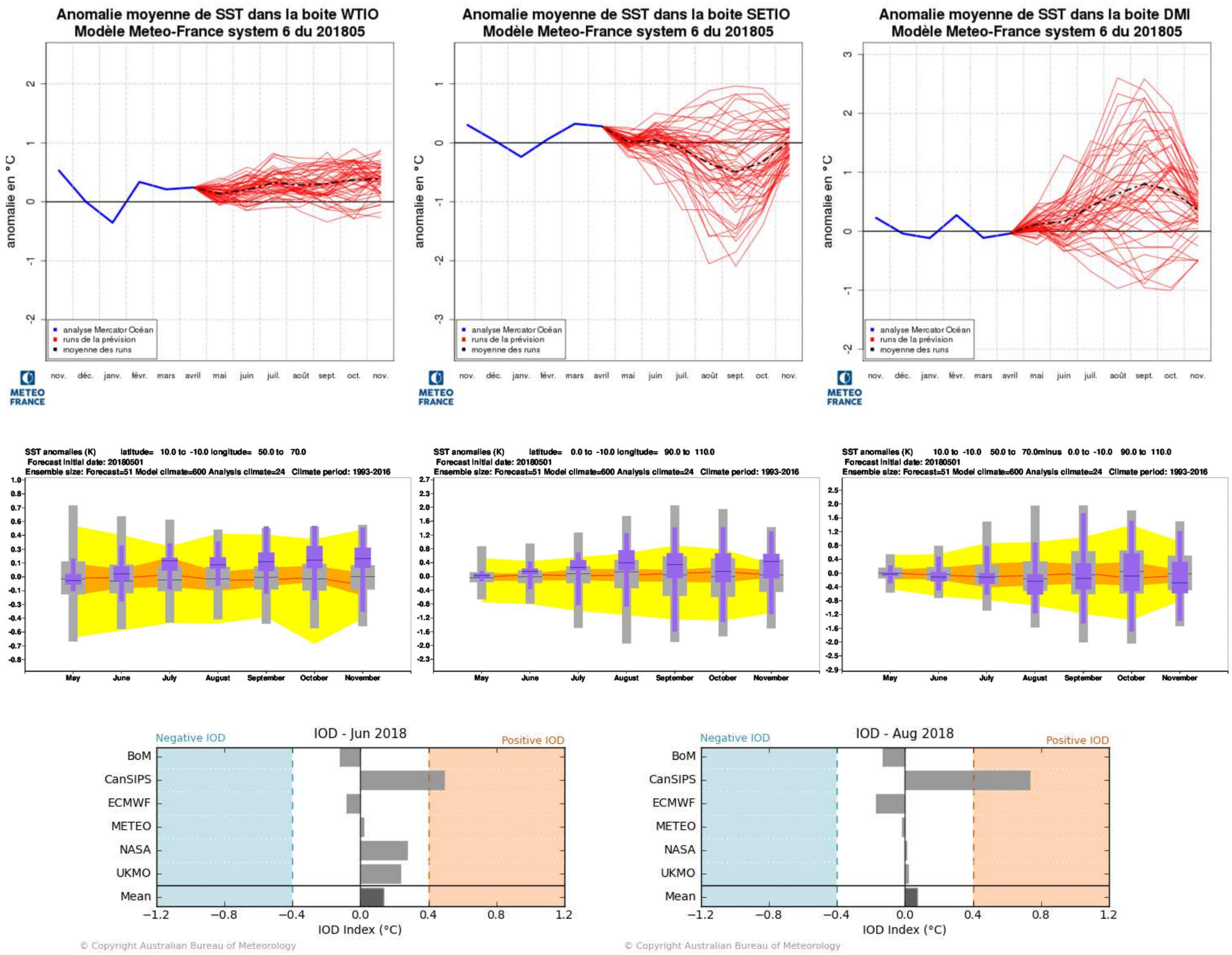


fig.II.1.7: SST anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, plumes / climagrams correspond to ensemble members and monthly means.

II.2. GENERAL CIRCULATION FORECAST

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

- Velocity potential : SST anomalies in the Equatorial Pacific may evolve significantly compared to current situation (becoming positive in the Nino3.4 box), so one can expect noticeable modifications in the VP200 anomaly field. In MF6 and ECMWF5, there are effectively new elements, like the negative anomaly (upward motion anomaly) on the Eastern equatorial Pacific, and the positive anomaly on the the Central/West Pacific (mainly South of the equator) : they are consistent with SST evolution. On the North tropical Atlantic, the negative SST anomaly may lead to the positive VP200 anomaly (strong with ECMWF5). Anywhere else, some similar patterns in the 2 models, without any clear link with SST anomalies.So globally, there is quite a good confidence in the large scale circulation in the tropics.
- Stream fonction : the only noticeable signal is located around Eastern Pacific-Western Atlantic, with a quadripole of anomalies. It could be a consequence of the SST anomalies in both Eastern Pacific and Noth Tropical Atlantic (consistency with the Gill model response). So one can consider these elements with good confidence, they lead to enhancement of the pressure field between the Azores and the Carribean region (so stronger trade winds).

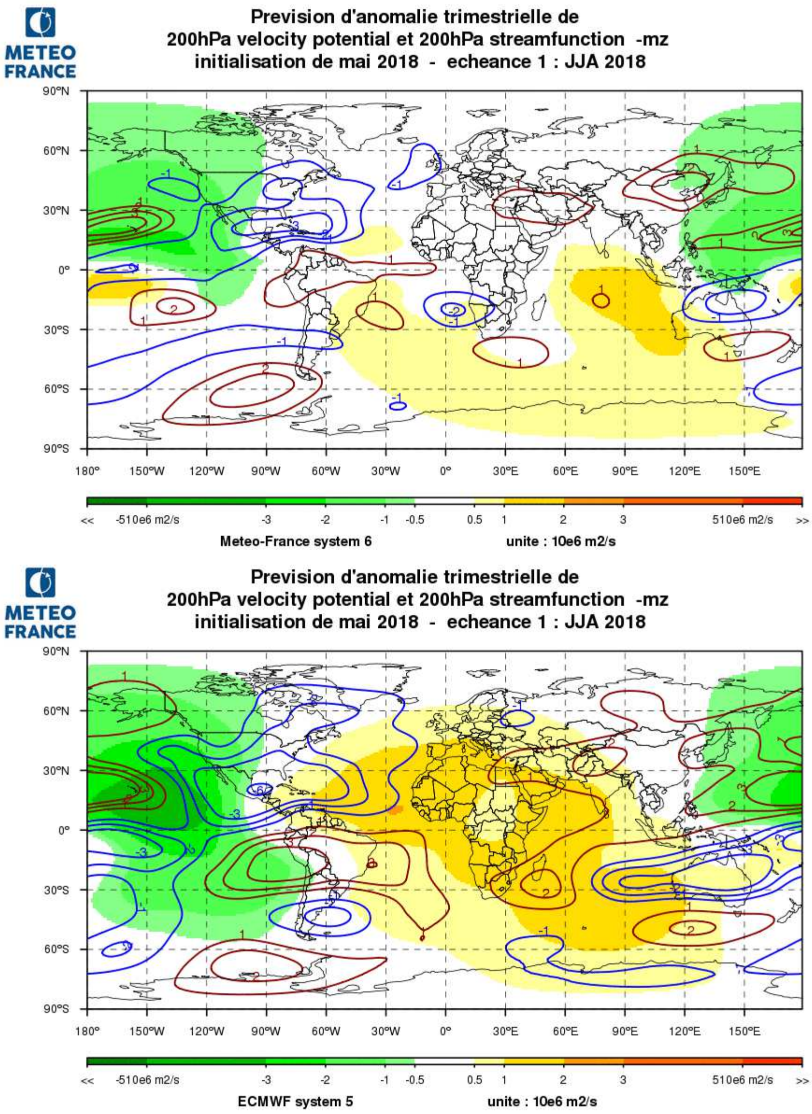


fig.II.2.a: Velocity Potential anomaly field χ (shaded area – green negative anomaly and yellow positive anomaly), associated with Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa by Météo-France (top) and ECMWF (bottom).
http://seasonal.meteo.fr

II.2.b Geopotential height anomalies

MF-S6 Z500 raw anomalies (figure II.2.b.1) show positive anomalies over the whole northern hemisphere. Normalized anomalies could be easier to interpret (see seasonal.meteo.fr).

Over North Atlantic and Europe, MF6 and ECMWF5 forecast a positive phase of NAO (this is clear with ECMWF5, less with MF6). Over the Mediterranean Basin, the 2 models propose a West (+) / East (-) contrast, but this is not something confirmed by a majority of GPC.

Globally, the spread in GPC's forecast is very high. The positive NAO signal seems to be the only large scale feature that emerge from the multi-model combination.

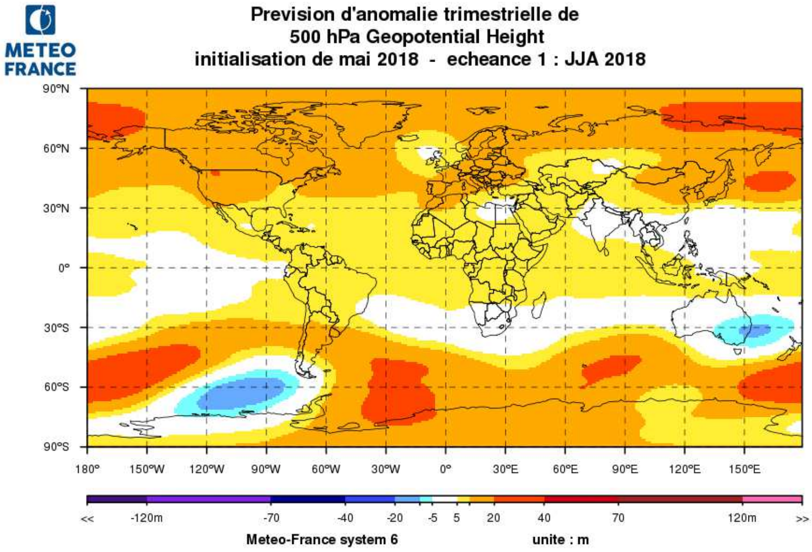


fig.II.2.b.1: Anomalies of Geopotential Height at 500 hPa from Météo-France.
http://seasonal.meteo.fr

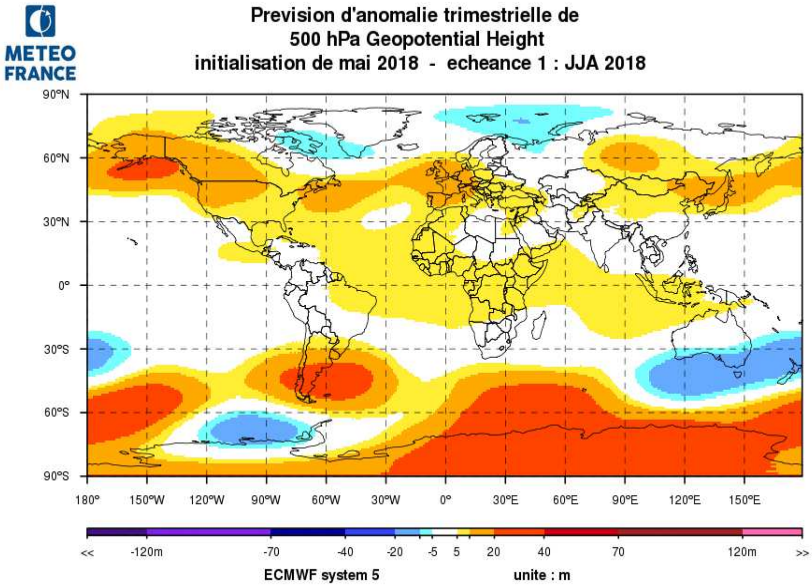


fig.II.2.b.2: Anomalies of Geopotential Height at 500 hPa from ECMWF.
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast

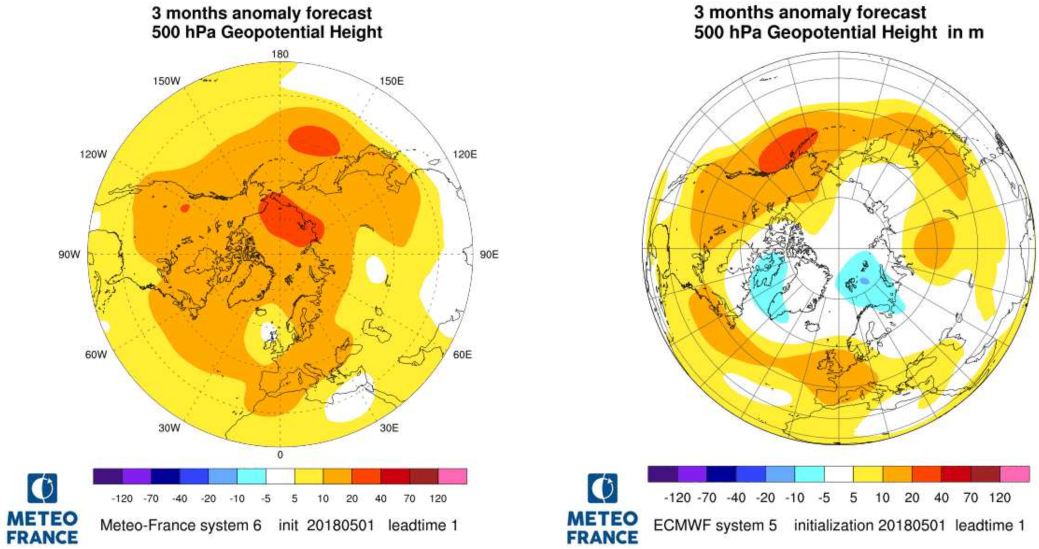


fig.II.2.b.3: Anomalies of Geopotential Height at 500 hPa from Météo-France.
http://seasonal.meteo.fr

II.2.c. modes of variability

MF-S6 and ECMWF-S5 are clearly in favour of positive NAO and EA modes.

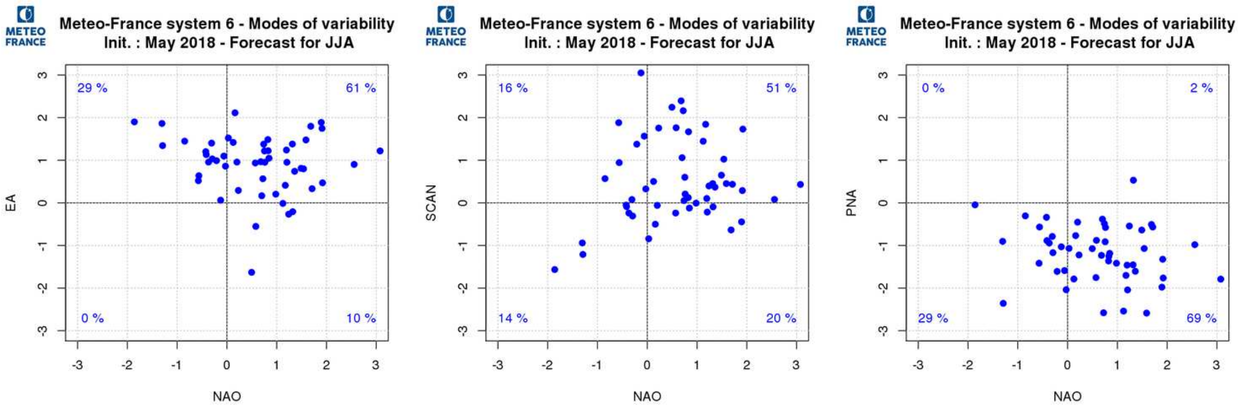


fig.II.2.c.1 : modes of variability forcasts over the Northern hemisphere with Meteo-France MF-S6

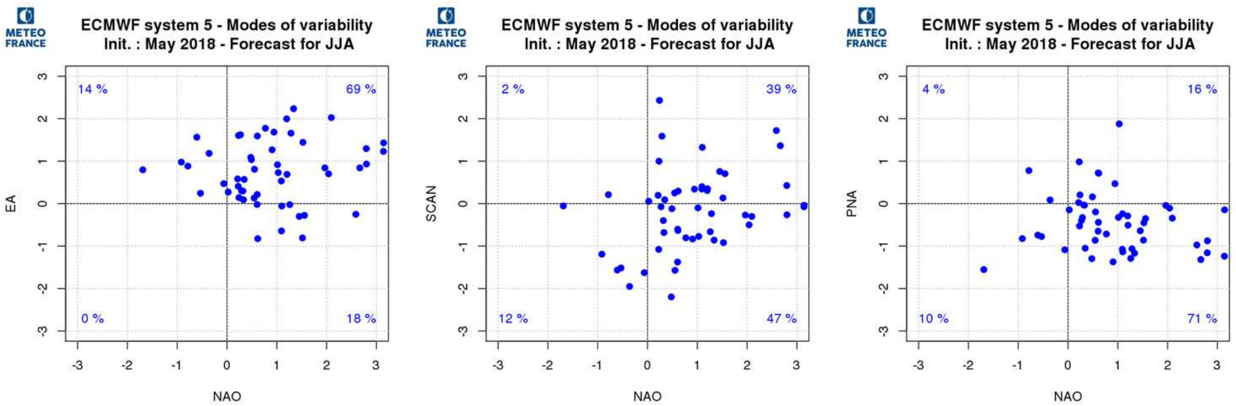


fig.II.2.c.2 : modes of variability forcasts over the Northern hemisphere with ECMWF-S5

II.2.d. weather regimes

MF-S6 and ECMWF-S5 show enhanced chances of "Atlantic Ridge" and "Atlantic Low" (consistent with positive NAO and postive EA modes)

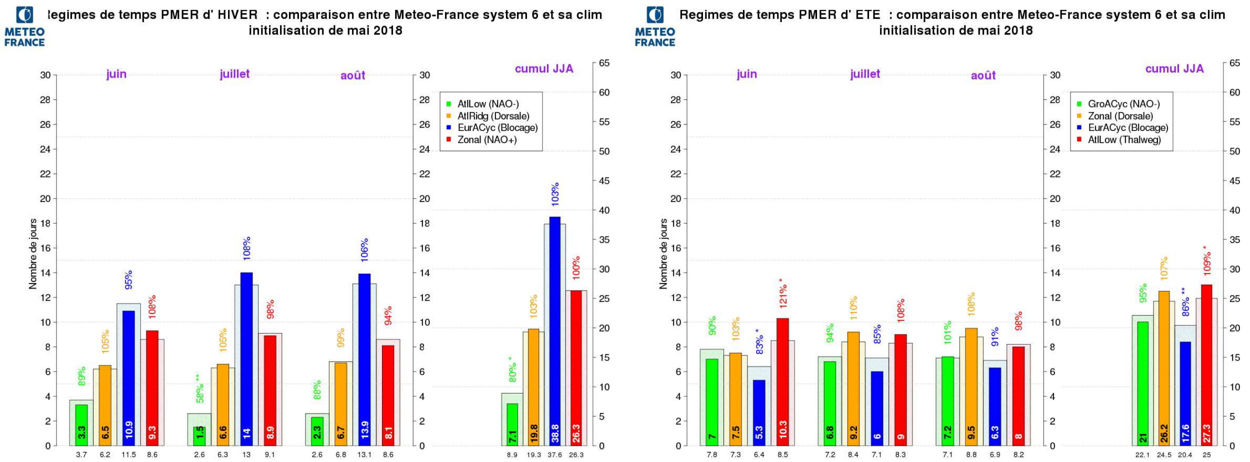


fig.II.2.d.1: North Atlantic Regime occurrence anomalies from Meteo-France MF-S6 : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.
Left : winter regimes; Right : summer regimes

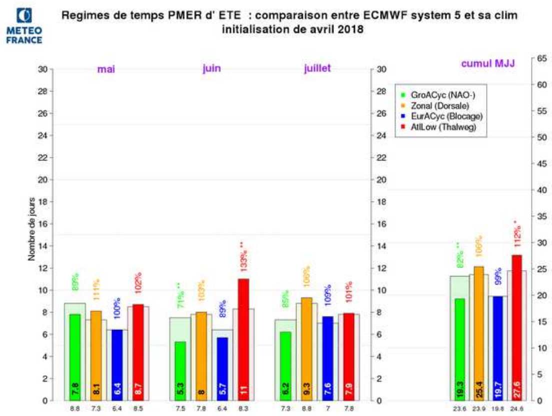


fig.II.2.d.2 : North Atlantic Summer Regime occurrence anomalies from ECMWF-S5 : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes

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

MF-S6 and ECMWF-S5 both favour warmer than normal conditions over most regions of Europe, with probabilities higher than 60% for the higher tercile over southern Europe (twice the climatological probabilities). Over Northern Europe, forecast are more contrasted.

Most of the GPC confirm the warm signal over Southern Europe.

Elsewhere on continental regions, the only areas where the warm signal is not forecasted by a majority of models are the Indian subcontinent, Australia, North of South America and Carribean region, East of Canada.

II.3.a Météo-France

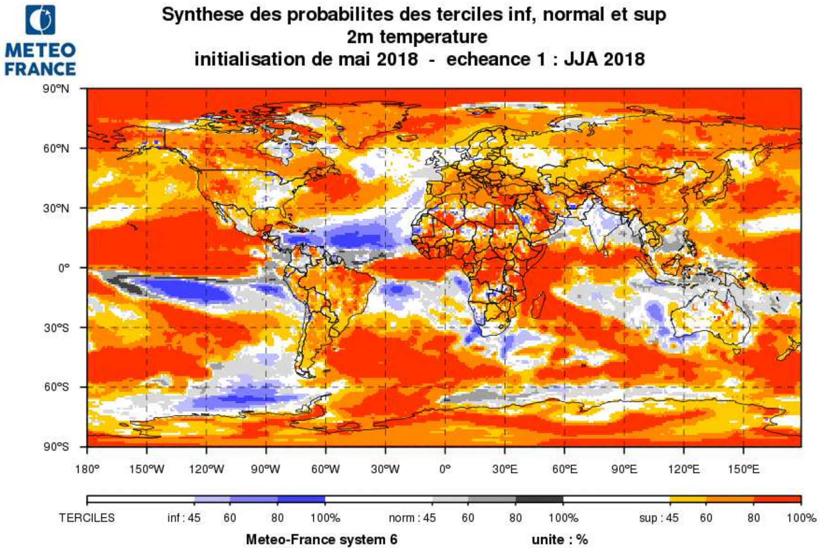


fig.II.3.1: Most likely category of T2m. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://seasonal.meteo.fr/

II.3.b ECMWF

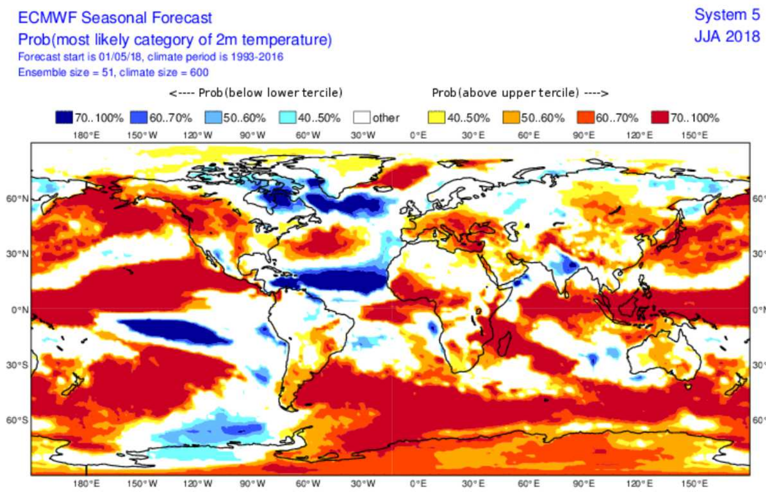


fig.II.3.2: Most likely category probability of T2m from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_ran...">http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seaso...

II.3.c Japan Meteorological Agency (JMA)

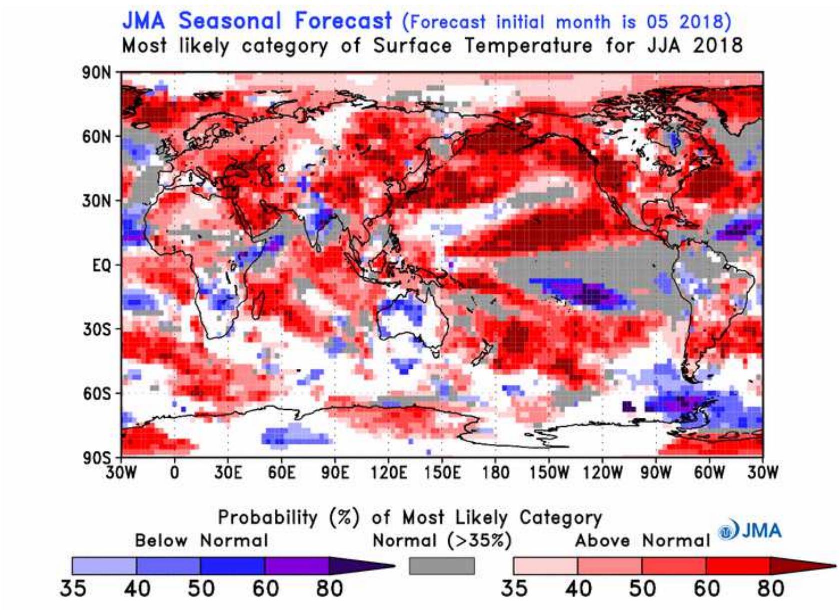


fig.II.3.3: Most likely category of T2m. Categories are Above, Below and Close to Normal.
White zones correspond to No Signal.
http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst...">http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst...

II.3.d EUROSIP

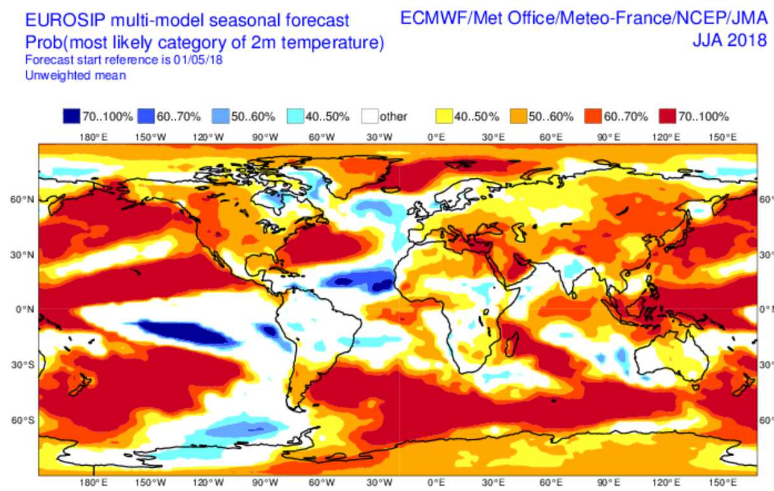


fig.II.3.4: Multi-Model Probabilistic forecasts for T2m from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).
www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2...">http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/euros...">www.ecmwf.int/products/forecasts/d/charts/seasonal/f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

II.4. IMPACT : PRECIPITATION FORECAST

- inter-tropical regions :
  - For the Pacific basin, wet to the north (incl. Hawai), dry to the south, in agreement with SST anomalies.
  - For the Atlantic : over the Carribean region, enhanced dry signal, consistent with cooler than normal SSTs and velocity potential anomalies.
  - For the Indian Ocean,no clear signal, large uncertainty..
  - Over Africa, drier than normal conditions expected to the west (impact of negative SST anomalies?), and wetter than normal conditions for the eastern countries (Ethiopia, Sudan).
- Mid-latitudes :
  - dry signal over Europe (except Sandinavia)
  - humid for Alaska and dry for south-western US

II.4.a Météo-France

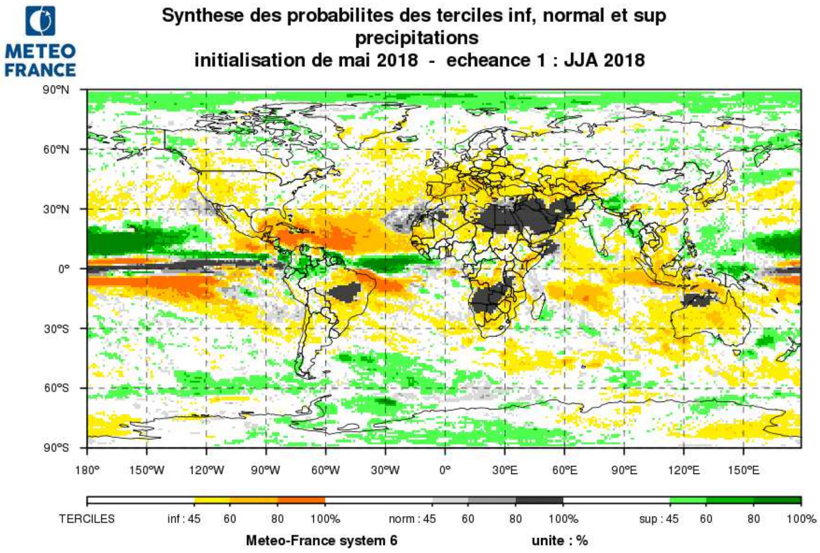


fig.II.4.1: Most likely category of Rainfall. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://seasonal.meteo.fr/">http://seasonal.meteo.fr/

II.4.b ECMWF

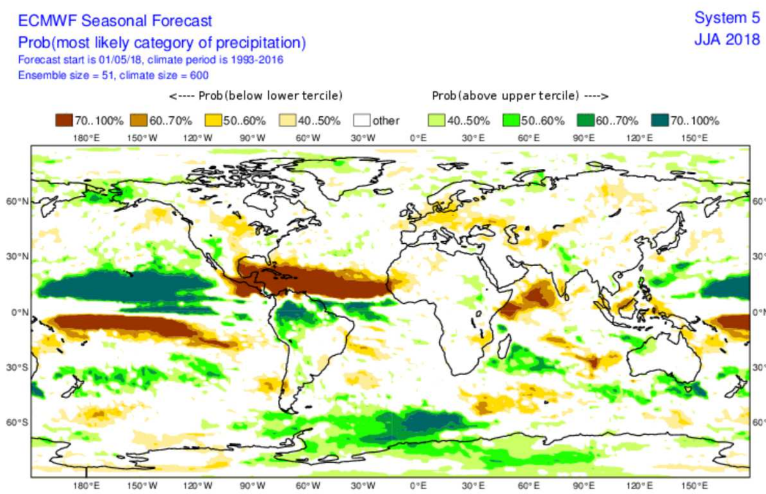


fig.II.4.2: Most likely category probability of rainfall from ECMWF. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal). www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_ran...">http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seaso...">www.ecmwf.int/products/forecasts/d/charts/seasonal/f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

II.4.c Japan Meteorological Agency (JMA)

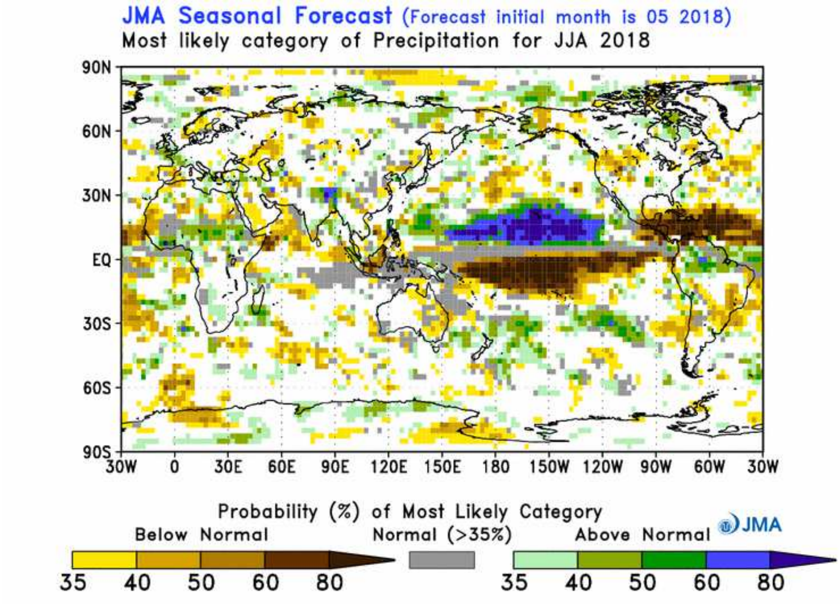


fig.II.4.3: Most likely category of Rainfall from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.
http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst...">http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/3-mon/fcst/fcst...

II.4.d EUROSIP

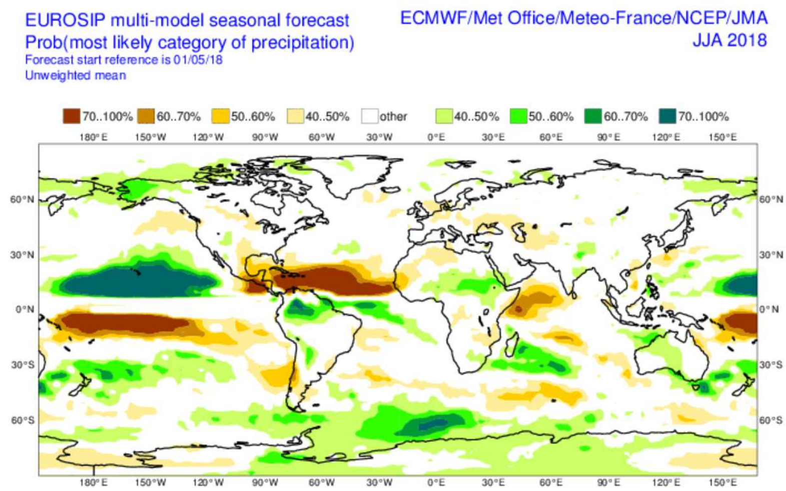


fig.II.4.4: Multi-Model Probabilistic forecasts for precipitation from EUROSIP (2 Categories, Below and Above normal – White zones correspond to No signal).
www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2...">http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/euros...">www.ecmwf.int/products/forecasts/d/charts/seasonal/fo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

II.5. REGIONAL TEMPERATURES and PRECIPITATION

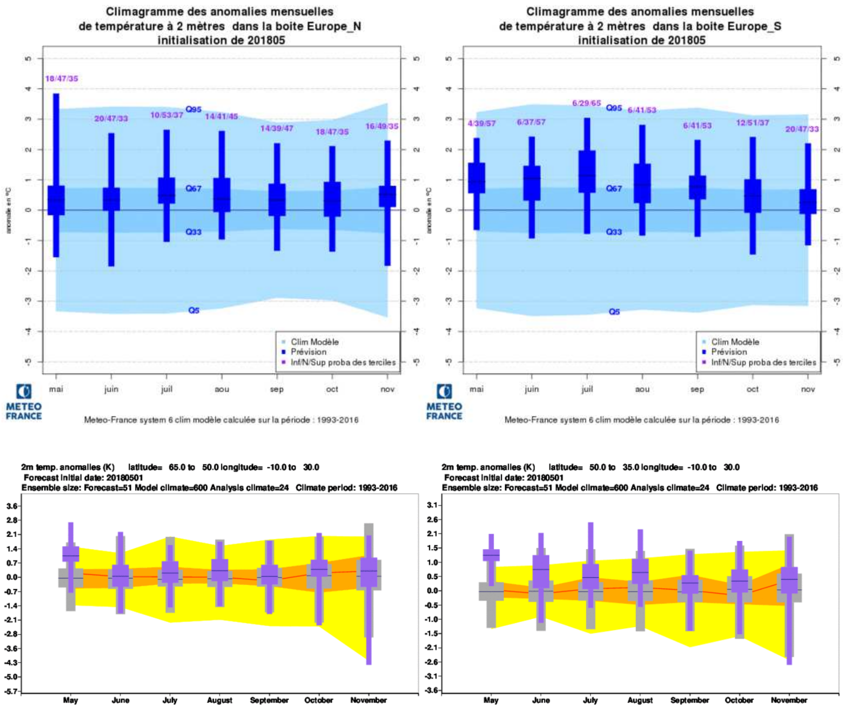


fig.II.5.1 : Climagrams for Temperature in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

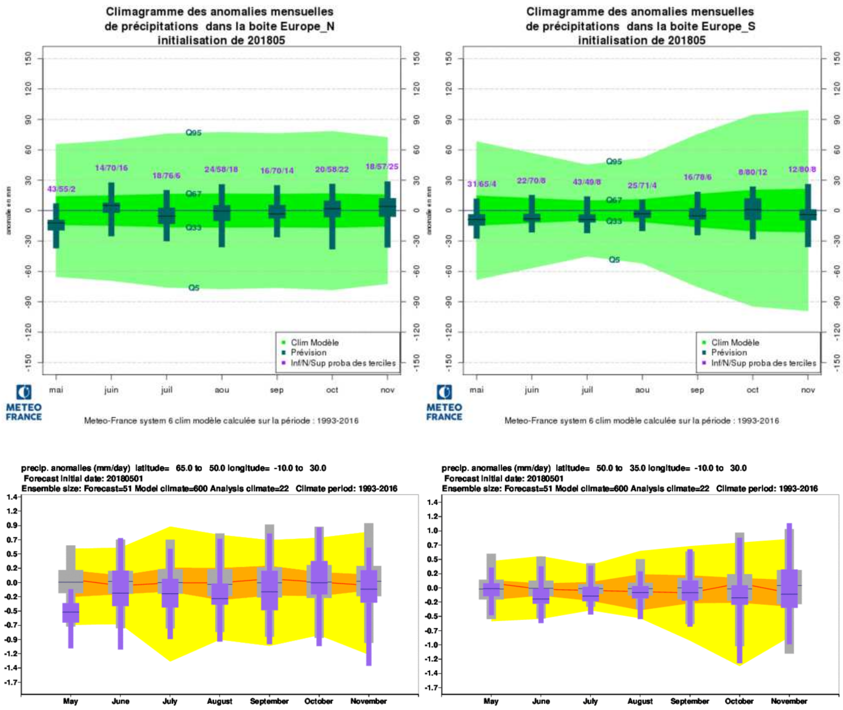


fig.II.5.2 : Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom).

II.6. "EXTREME" SCENARIOS

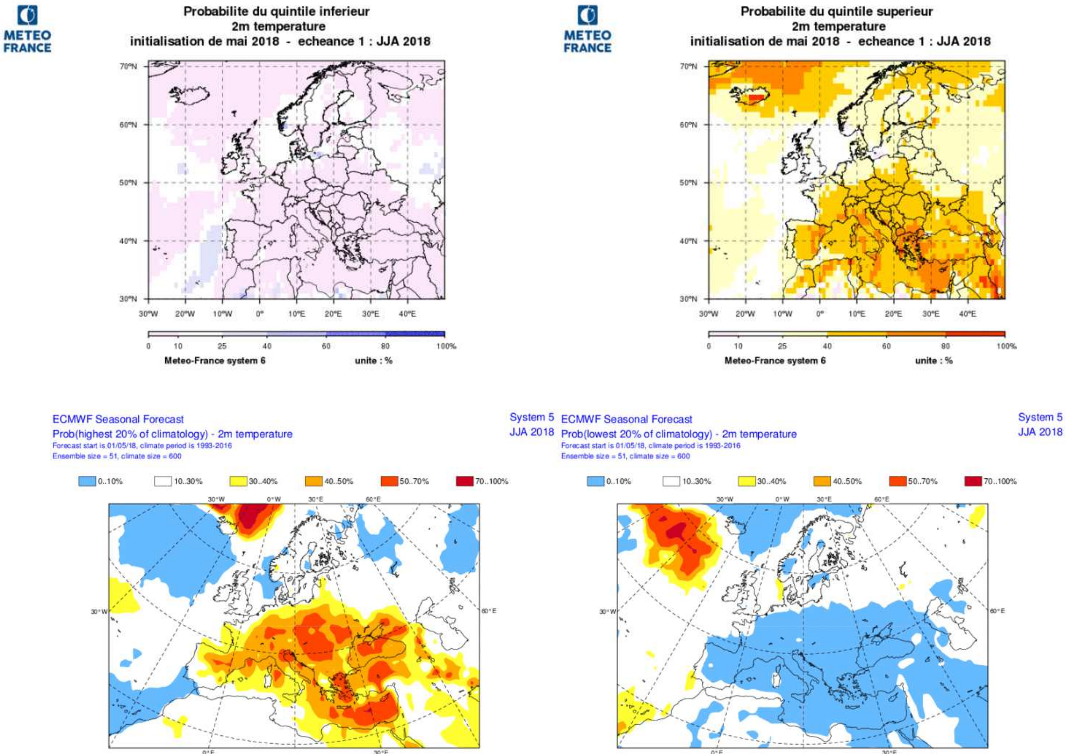


fig.II.6.1 : Top : Meteo-France T2m probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution). Bottom : ECMWF T2m probability of « extreme » below normal conditions (left - highest ~20%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

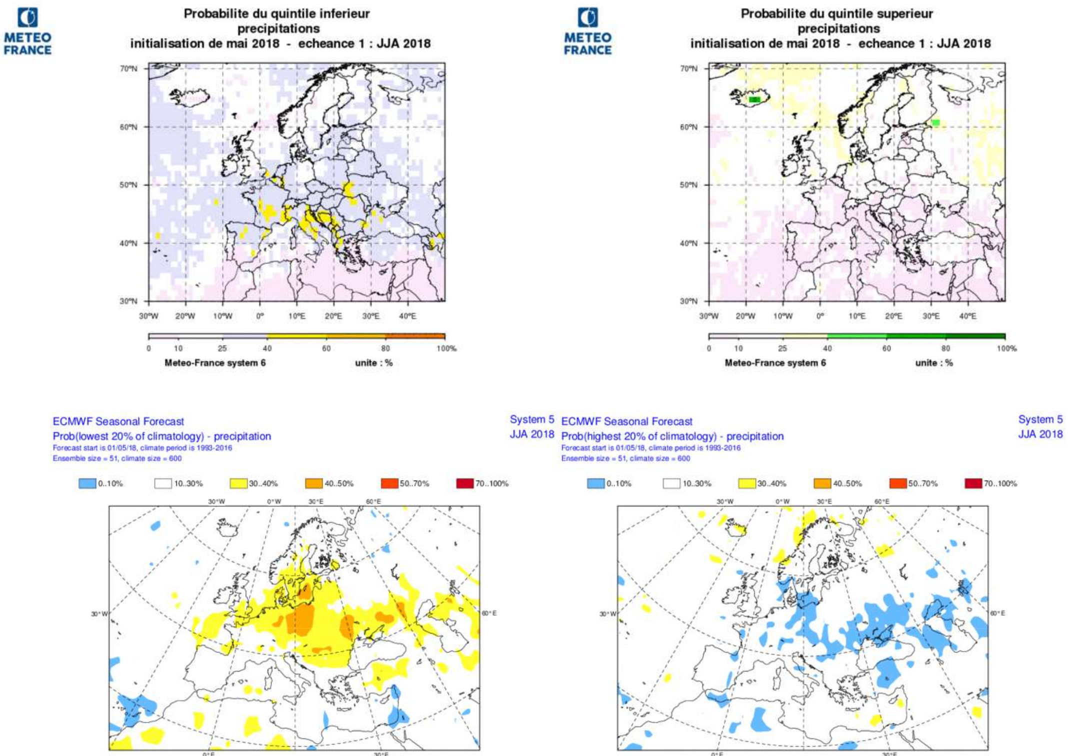


fig.II.6.2 : Top : Meteo-France rainfall probability of « extreme » below normal conditions (left - lowest ~15% of the distribution) and "extreme" above normal conditions (right - highest ~15% of the distribution).
Bottom : ECMWF rainfall probability of « extreme » below normal conditions (left - lowest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

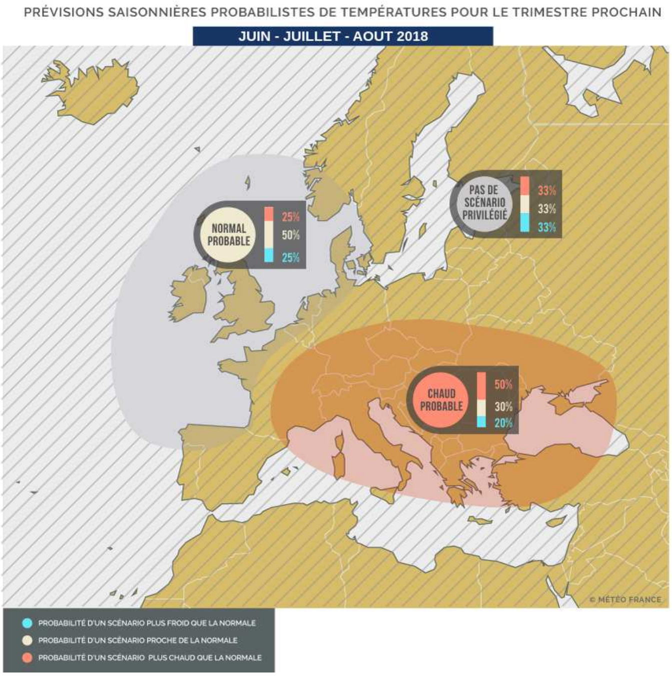
II.7. DISCUSSION AND SUMMARY

II.7.a Forecast over Europe

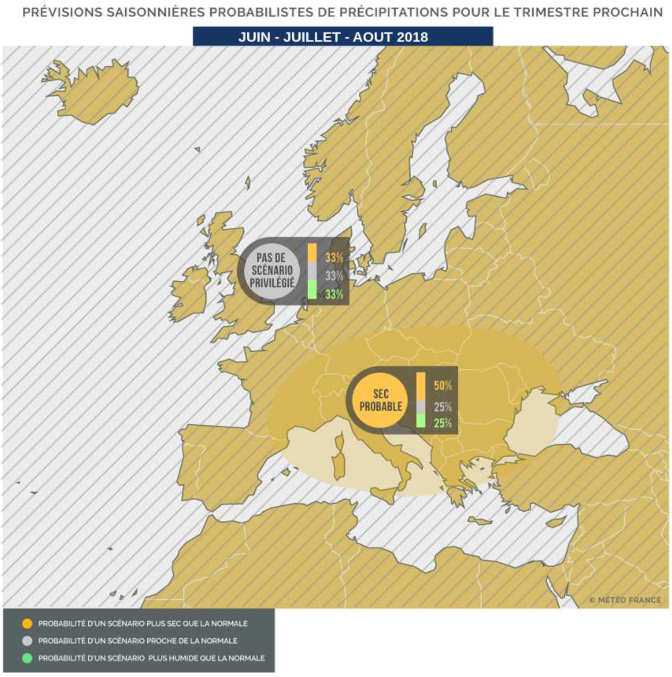
Low predictability. The "La Niña" event is over. Despite a robust signal in the tropical Atlantic (around the Carribean region), there is no trace of teleconnexion with mid-latitudes.

However, the models show a higher probability of postive NAO for the summer season. So we choose to rely on this signal and its impacts on the European climate.

Temperature : Warm signal over Europe (except Northern regions) , North of the Mediterranean and the Middle East. "Normal" signal, largely due to low SSTs, could affect the Atlantic seaboard.



Precipitations : Drier than normal conditions over continental Europe and North of the Mediterranean basin. No signal elsewhere.



II.7.b Tropical cyclone activity

North Atlantic : in connection with lower than normal SSTs, fewer than normal hurricanes are forecast by ECMWF-S5.

North Pacific : significantly higher than normal over North-East Pacific.

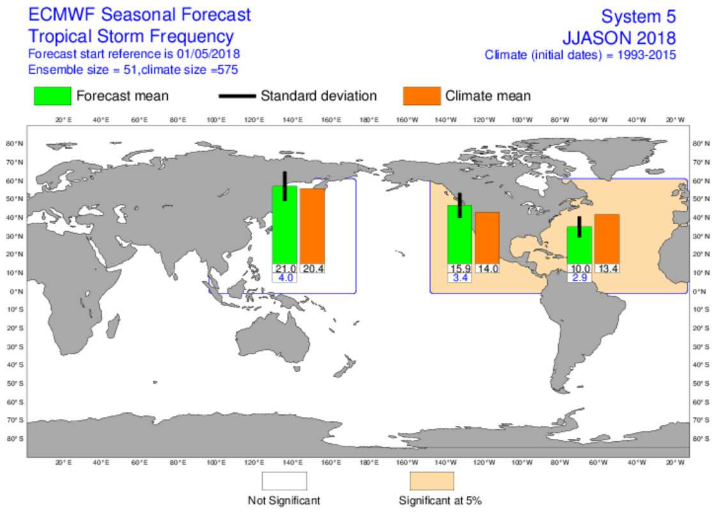


fig.II.7.1 : Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF). www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmtr...">http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/euros...">www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmtr...">http://www.ecmwf.int/produc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

III.1. Seasonal Forecasts

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

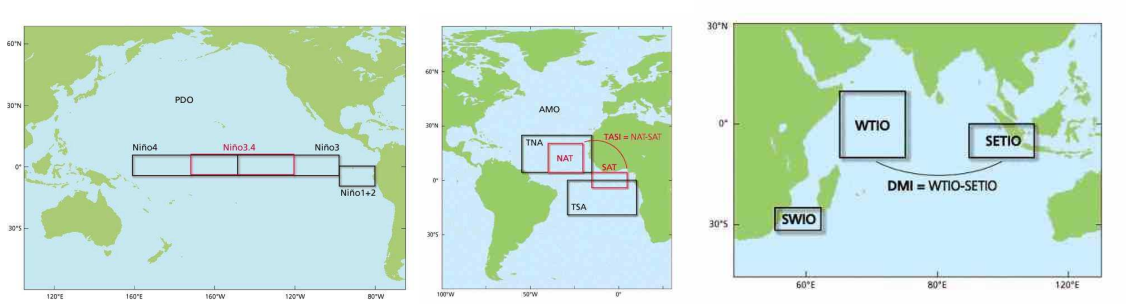
- Niño 3 : 5°S/5°N 90W-150W ; it is the region wher e the interanual variability of SST is the greatest.

- 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).

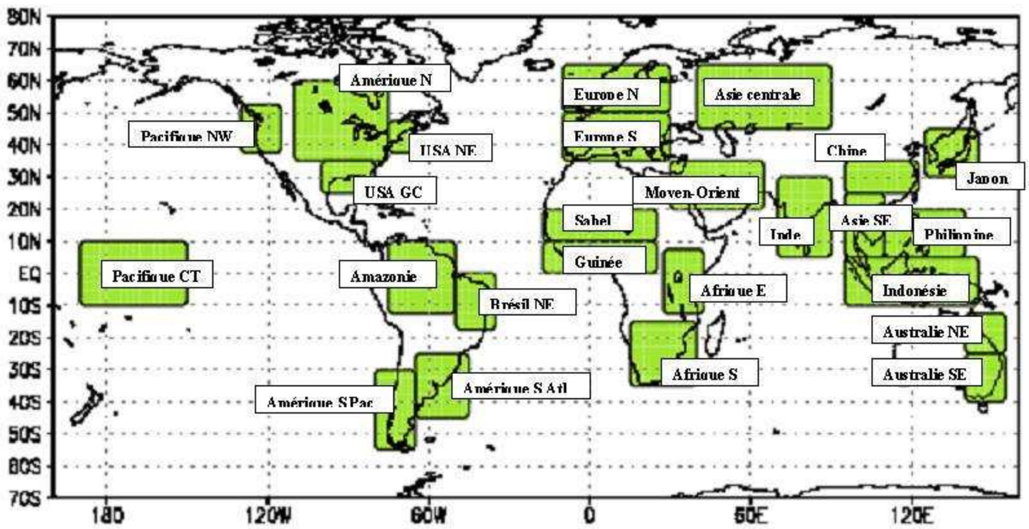
Associated to the oceanic « El Niño / La Niña » events, and taking into account the strong ocean/atmopshere coupling, the atmosphere shows also interanual variability associated to these events. It is monitored using the SOI (Southern Oscillation Index). This indice is calculated using standardized sea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