

# Météo-France Seasonal Forecast Bulletin

OCTOBER - NOVEMBER - DECEMBRE 2020

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## General synthesis : OND 2020

### A) Oceanic forecast :

- **ENSO : La Niña phase foreseen.** Its intensity should be weak to moderate.
- **IOD** : negative situation.

### B) Atmospheric circulation :

- classical response to "La Niña" in the tropics (upward motion anomaly over the Eastern Indian Ocean and Maritime Continent, downward motion anomaly over Central Pacific).
- over the North Atlantic and Europe : all the models predict high field values over the Atlantic with more or less extension towards Europe. They are less in agreement with the positioning of low relative values further north, generally towards Scandinavia.

### C) Most likely conditions :

- Wet conditions from India in Southeast Asia to the Maritime Continent and Australia, as well as over northern South America.
- **over Europe** : weak warm signal. Drier than normal in the southwestern part of Europe. Wet probabilities over Scandinavia

|                                                  |
|--------------------------------------------------|
| <b>Next bulletin : scheduled on October 20th</b> |
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## Oceanic analysis of August 2020 : SST anomalies

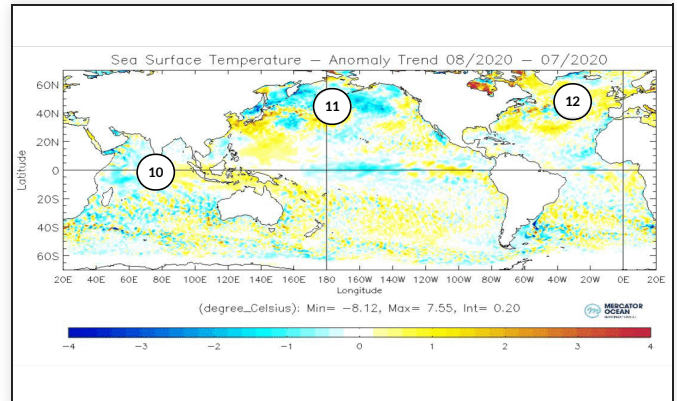
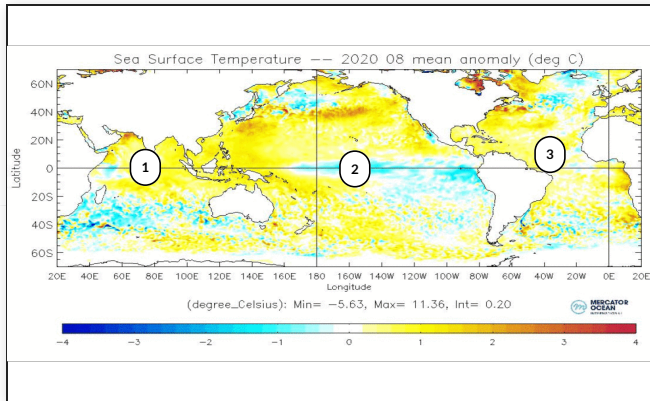
### Current ENSO situation : entering in La Nina conditions (Just below the threshold in August).

In the Pacific : the cooling along the equator in the center of the basin leads to cold conditions below the La Nina threshold in the Nino3.4 box.

Little change in the Southern hemisphere. Despite a marked cooling over the northernmost part of the basin, the northern hemisphere remains warmer than normal.

The Atlantic remains globally warmer than normal in the tropics and up to mid-latitudes. To note, the upwelling along the coasts from Portugal to West Africa, with a strong cooling on a very thin coastal strip. In the North Atlantic, the pattern and the trend are complex.

The Indian Ocean is still warmer than normal north of 20°S. The IOD gradient turned negative in August.

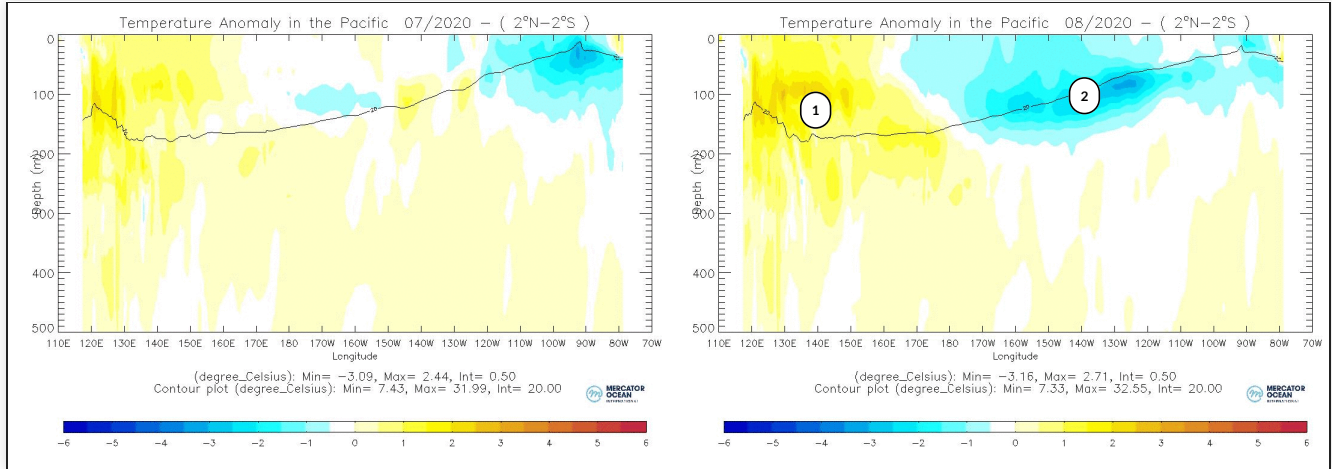


SST Anomalies and trend with the previous month (c) Mercator-Ocean

- 1 - warm Indian Ocean
- 2 - LA Nina cold anomaly
- 3 - warmer than normal
- 10 - strengthening of the east-west gradient
- 11 - strong cooling
- 12 - complex structure of anomalies and trend

## Oceanic analysis of August 2020 : Pacific vertical section

In subsurface, strong cooling in eastern and central part, and significant warming in the western part. The result is a strong east-west contrast.

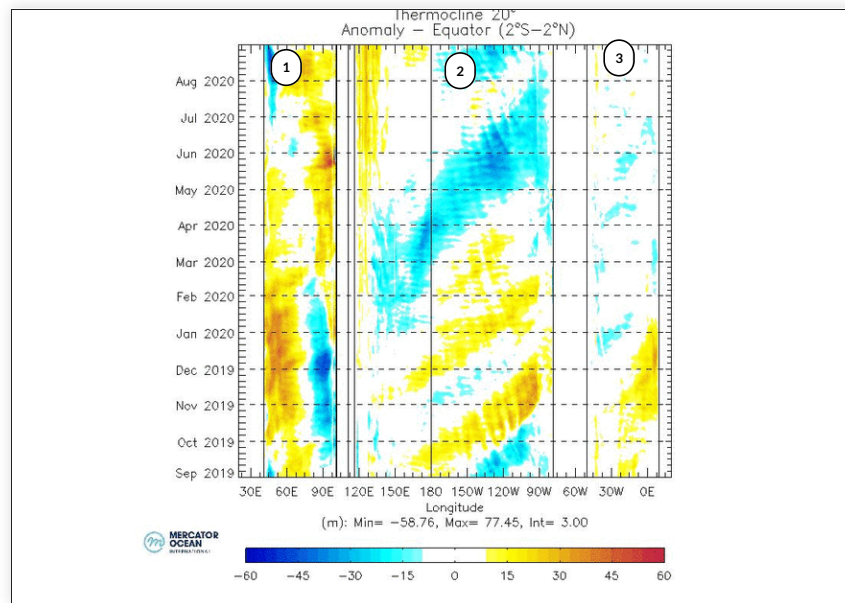


Ocean temperature anomalies in the first 500 meters of the equatorial Pacific basin, monthly average. (c) Mercator-Ocean

- 1 - warming in the West
- 2 - Cooling in the East

## Oceanic analysis of August 2020 : Hovmüller diagram of the 20°C isotherm

In the Pacific, appearance of the cold subsurface anomaly in the center of the basin during the month of August.



Evolution of the anomalies of depth of the thermocline (m) (materialized by the 20 °C isotherm) (c) Mercator-Ocean

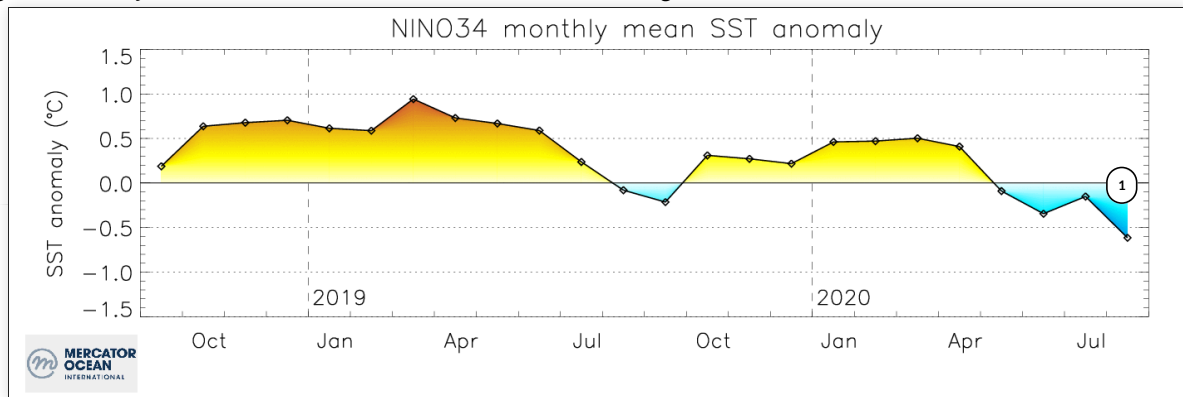
- 1 - strengthening of the east-west gradient (
- 2 - appearance of the cold subsurface anomaly in the center of the basin during the month of August
- 3 - no signal in the Atlantic

## Oceanic analysis of August 2020 : Pacific Ocean - Nino3.4 index history

**Nino3.4 index issued from Mercator Ocean PSYV4R2 analysis : -0.6 °C**

(see BOM site for weekly values : [http://www.bom.gov.au/climate/enso/monitoring/nino3\\_4.png](http://www.bom.gov.au/climate/enso/monitoring/nino3_4.png) )

The negative anomaly in the Nino3.4 box crossed the Nina threshold in August



Evolution of SST in the NINO3.4 box (c) Mercator-Ocean

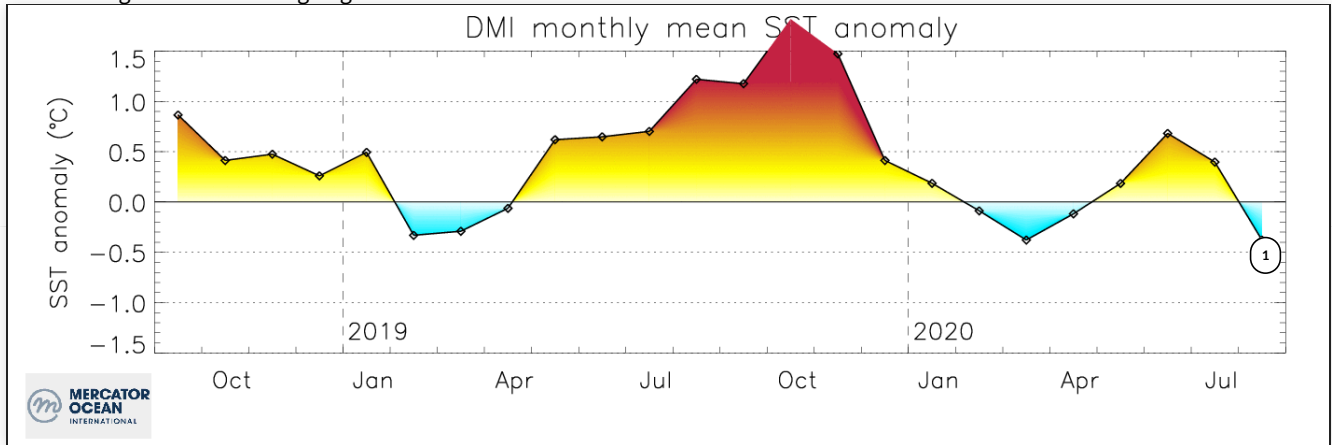
1 - Negative anomaly below the Nina threshold

## Oceanic analysis of August 2020 : Indien Ocean - DMI index history

**DMI Index issued from Mercator Ocean PSYV4R2 analysis : -0.4°C**

(see BOM site for weekly values : <http://www.bom.gov.au/climate/enso/monitoring/iod1.png>)

Return to negative value during August



Evolution of SST in the DMI box (c) Mercator-Ocean

1 - Return to negative phase

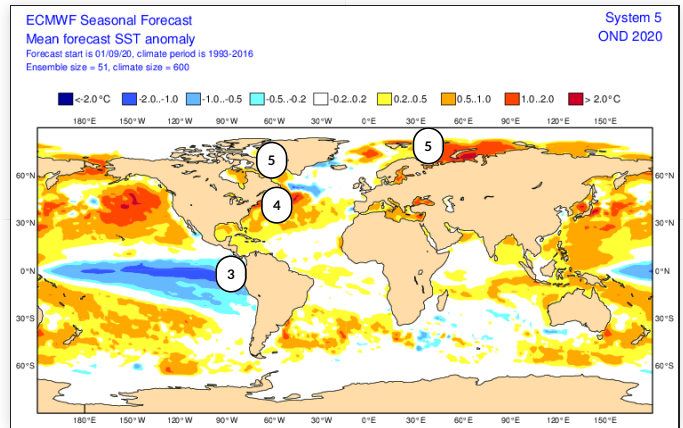
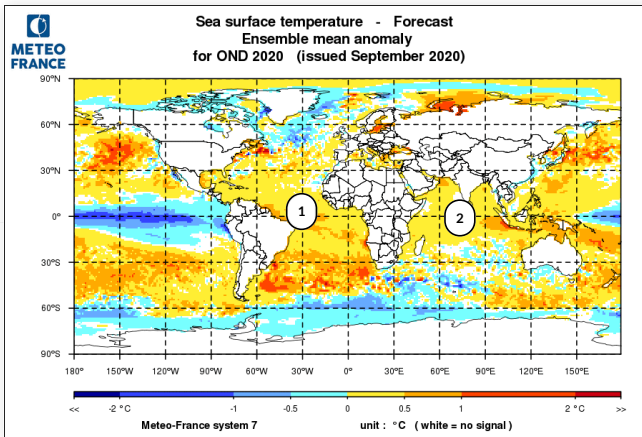
## Oceanic forecast : SST anomaly

Good agreement between MF-S7 and ECMWF-SEAS5. Same anomaly patterns, little differences in intensity.

In the Pacific Ocean : ECMWF-SEAS5 is a little colder near the American coast

In the Indian Ocean : along the equator, the West-East gradient (IOD) is similar in both models.

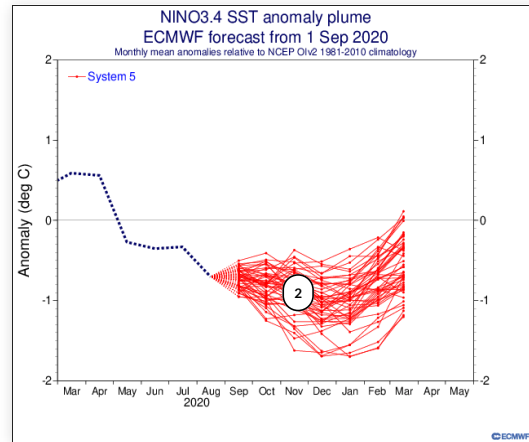
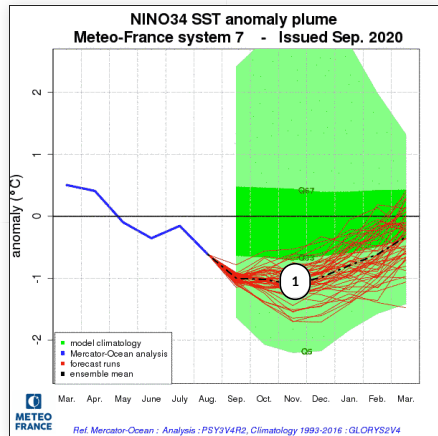
In the Atlantic Ocean : Along the equator, MF-S7 is a little warmer near South American coast. At the other hand, ECMWF-SEAS5 is warmer in the northern hemisphere, between Greenland and Canada and in the Arctic (and therefore closer to the observations of the last months).



- 1 - warmer than normal
- 2 - West-East gradient : negative DMI
- 3 - A little colder than MF-S7
- 4 - warmer than MF-S7
- 5 - closer to the last months observation than MF-S7
- 5 - closer to the last months observation than MF-S7

## Oceanic forecast : NINO3.4 Plume diagrams

Good consistency of the two models for a weak to moderate La Nina event scenario.

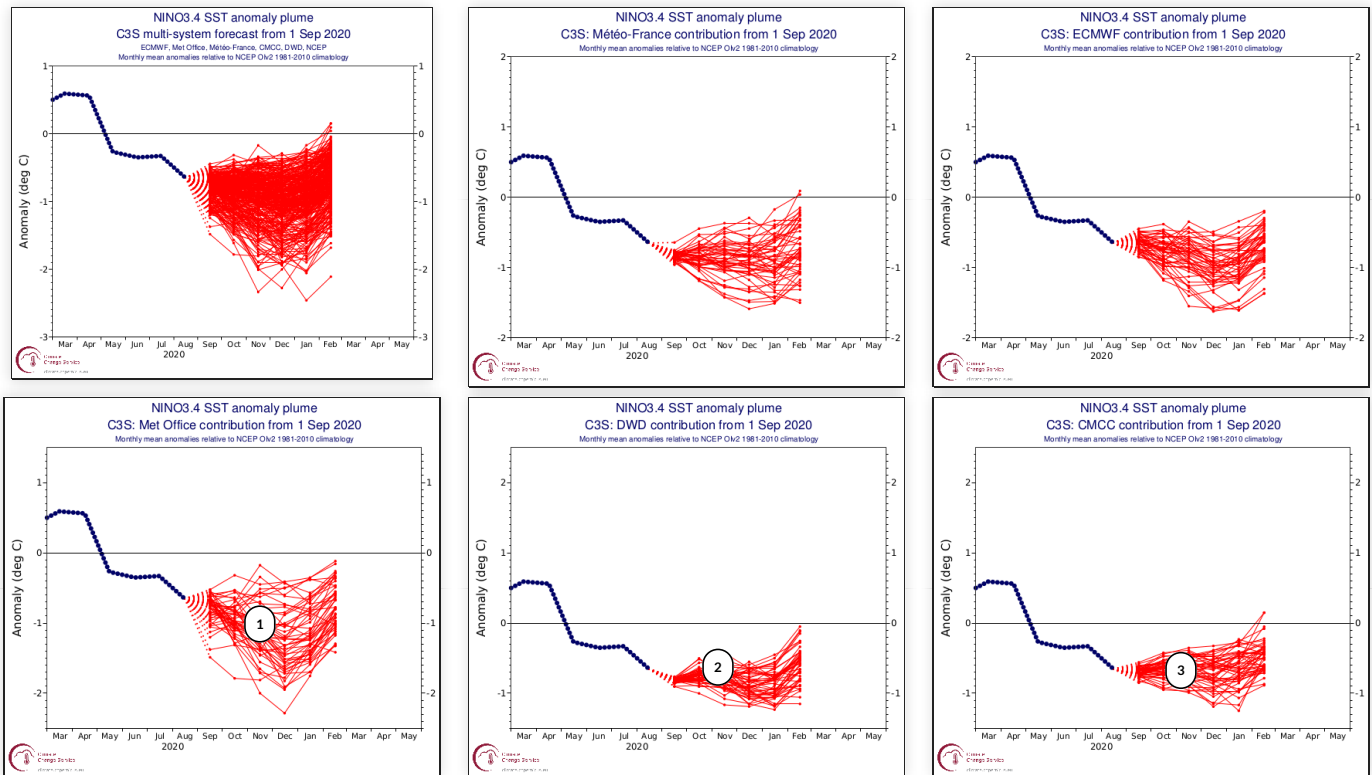


1 - Little dispersion of runs between -0.5°C et -1.5°C  
2 - same signal with a little more spread

## Oceanic forecast : C3S Nino3.4 re-scaled plume diagrams

Good agreement, the simulations foreseen a negative anomaly around  $-1^{\circ}\text{C}$ .

### Expected Phase for the next three months : La Niña weak to moderate

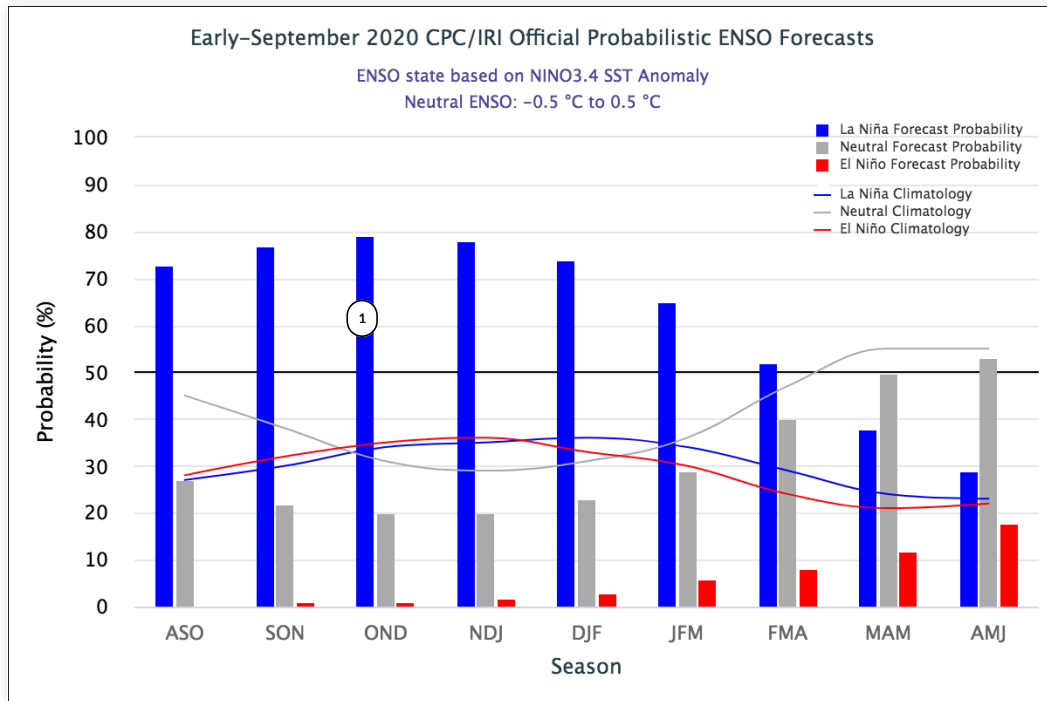


C3S plume diagrams re-scaled from the variance of observations for the period 1981-2010.

- 1 - Met Office model has the larger spread
- 2 - the DWD model is very little dispersed
- 3 - the CMCC model is very little dispersed

## Oceanic forecast : Synthesis from IRI

La Niña is very likely for OND 2020 with a near 80% probability.

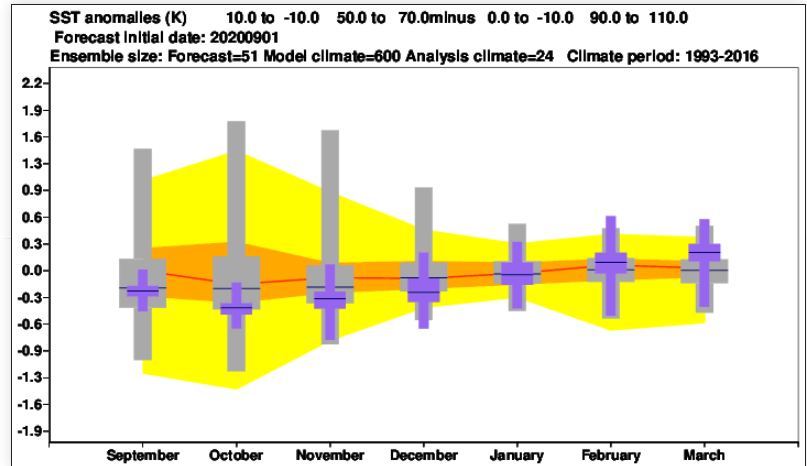
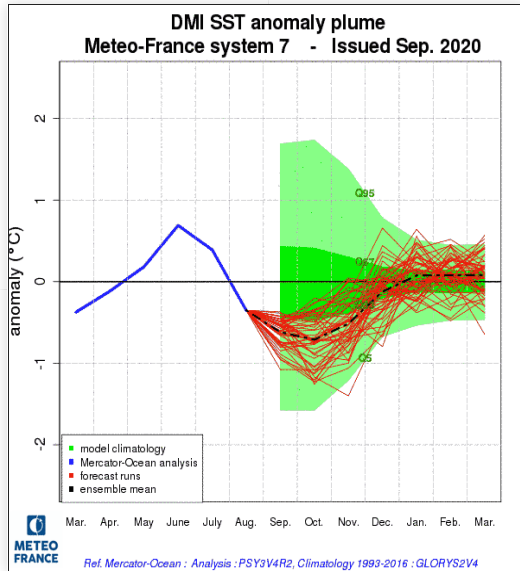


Probability of Niño, Niña, and neutral phases for the next 8 quarters. source <http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>

1 - La Nina forecast is very likely

## Oceanic forecast : Indian ocean - DMI evolution

The two models are in very good agreement: with the strong warm anomalies in the vicinity of the Maritime Continent, the DMI is forecast negative for the next months with a return to neutrality at the end of the year.

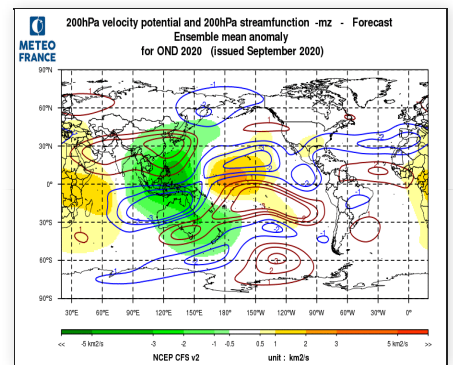
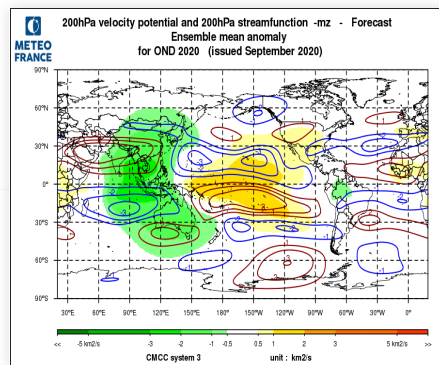
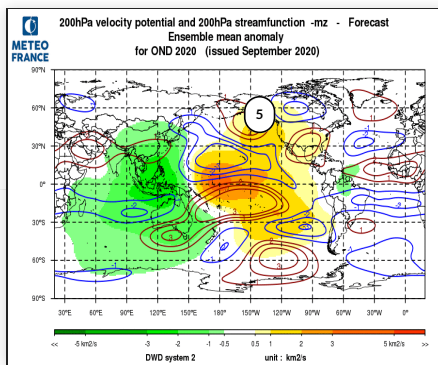
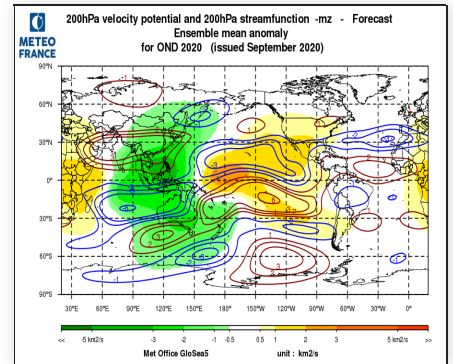
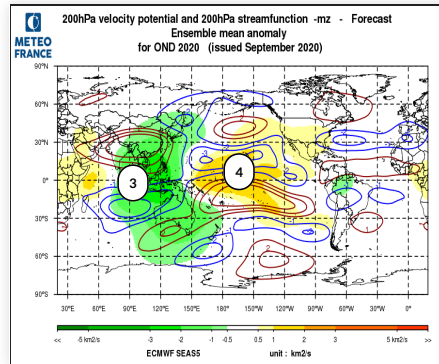
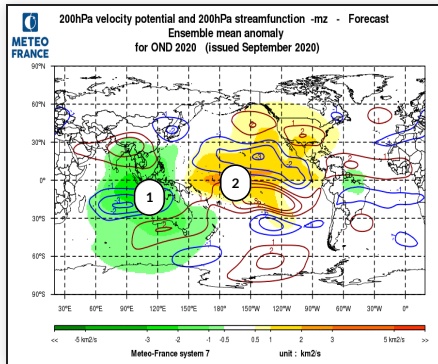


DMI index : analysis, forecasts and model climatology with MF7 on the right and SEAS5 on the left

## Atmospheric circulation forecasts : velocity potentiel and stream function at 200hPa

Velocity Potential : the models are in very good agreement. both with regard to the principle dipole in the Pacific-Indian zone, and for a secondary dipole in the America-Atlantic-Africa zone.

Streamfunction : the models agree remarkably well on the structure of the field, although the intensity and extent of the teleconnections vary from one model to another.

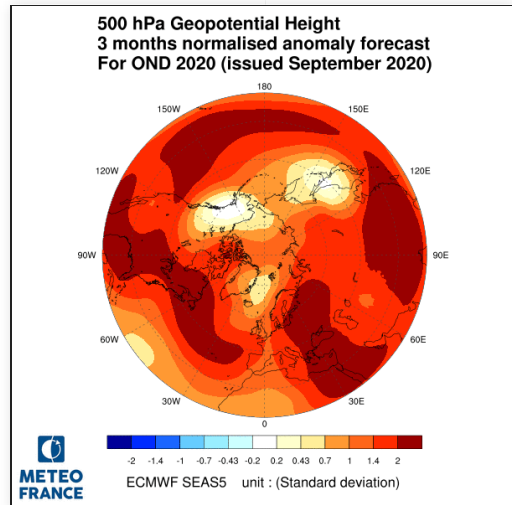
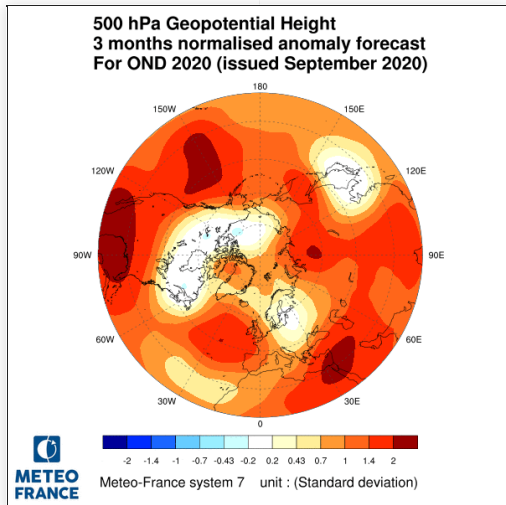


MF7, SEASS, UKMO, DWD, CMCC and NCEP 200hPa velocity potential anomalies (color range, green : ascending, orange: subsidence) and stream function anomalies (isolines, red: anticyclonic in the northern hemisphere, blue: cyclonic in the northern hemisphere).

- 1 - VP : large area of upward motion anomaly
- 2 - VP : large downward motion anomaly
- 3 - SF : anticyclonic circulation anomalies at 200hPa on each side of the equator
- 4 - SF : cyclonic circulation anomalies at 200hPa on each side of the equator
- 5 - teleconnection to mid-latitudes

## Atmospheric circulation forecasts : 500 hPa Geopotential anomalies

big divergence between the two models on Canada and Europe

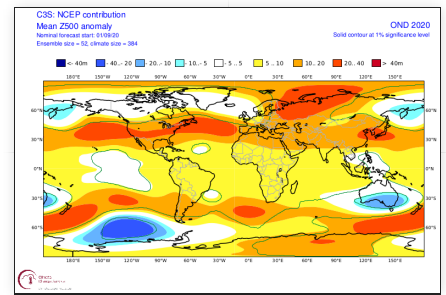
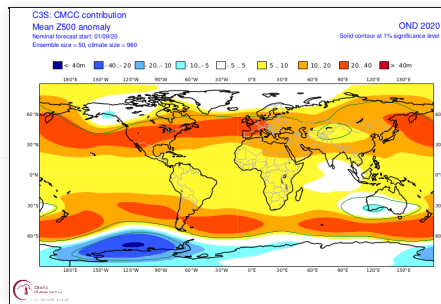
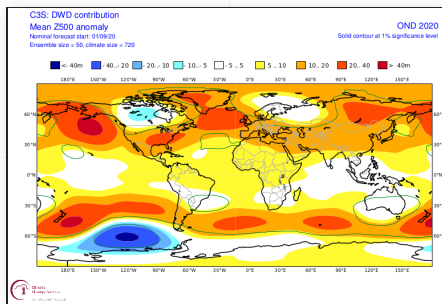
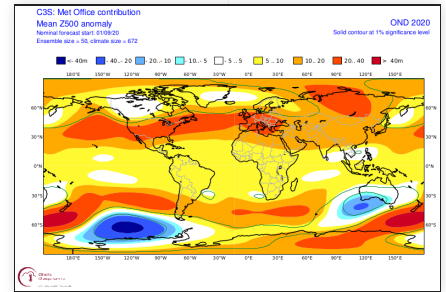
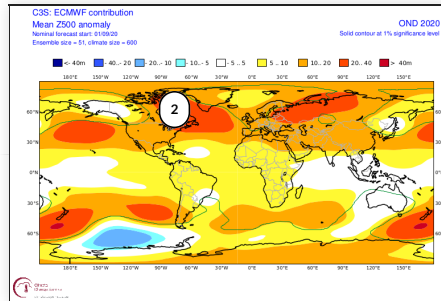
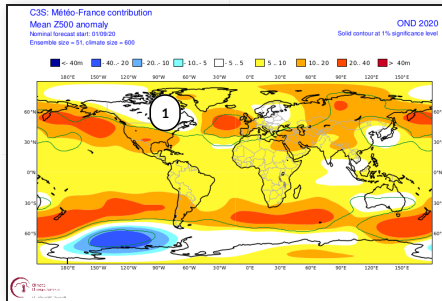


polar projection of MF7 and SEAS5 500hPa geopotential height anomalies.

## Atmospheric circulation forecasts : Z500 anomalies in C3S models

MF-S7 and ECMWF-SEAS5 have the most extreme forecasts over Canada. The other models are close in this area.

In Europe, ECMWF-SEAS5 has an atypical scenario. The other models agree for high values on the western part and a weak field on the northeast, the precise positioning of which can vary little from one model to another.

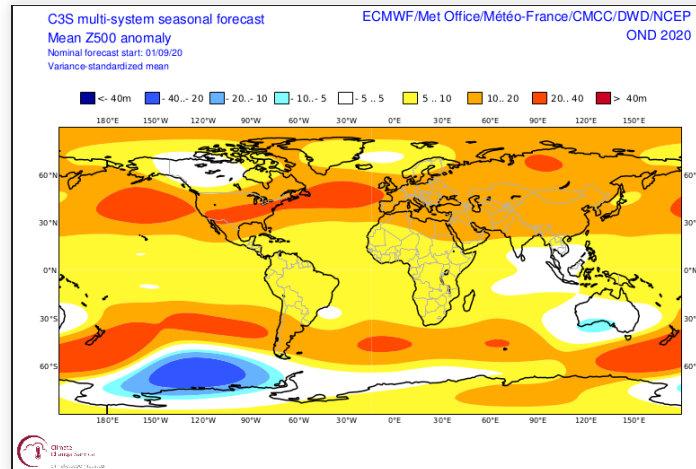


MF-S7, SEAS5, UKMO, DWD, CMCC and NCEP 500hPa geopotential height anomalies.

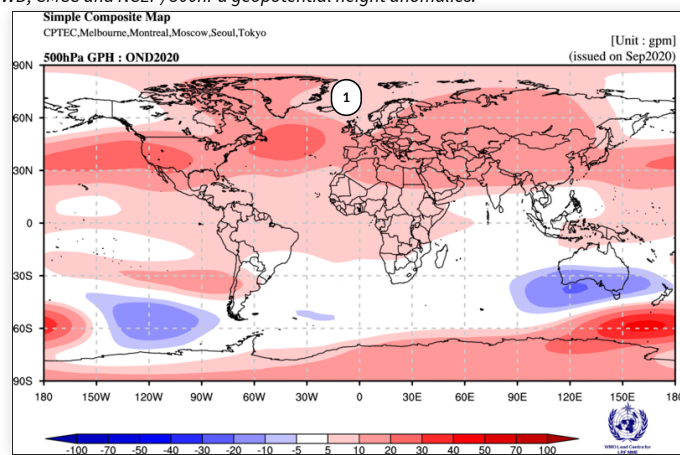
- 1 - large low values area
- 2 - High values area

## Atmospheric circulation forecasts : Z500 anomalies multi-systems

The two multi-models are very close on the North Atlantic and Europe. The high mean values predicted over the Atlantic between 40 ° N and 50 ° N extend towards Europe and the relative low values further north extend towards Scandinavia.



C3S multi-models (MF-S7, SEAS5, UKMO, DWD, CMCC and NCEP) 500hPa geopotential height anomalies.

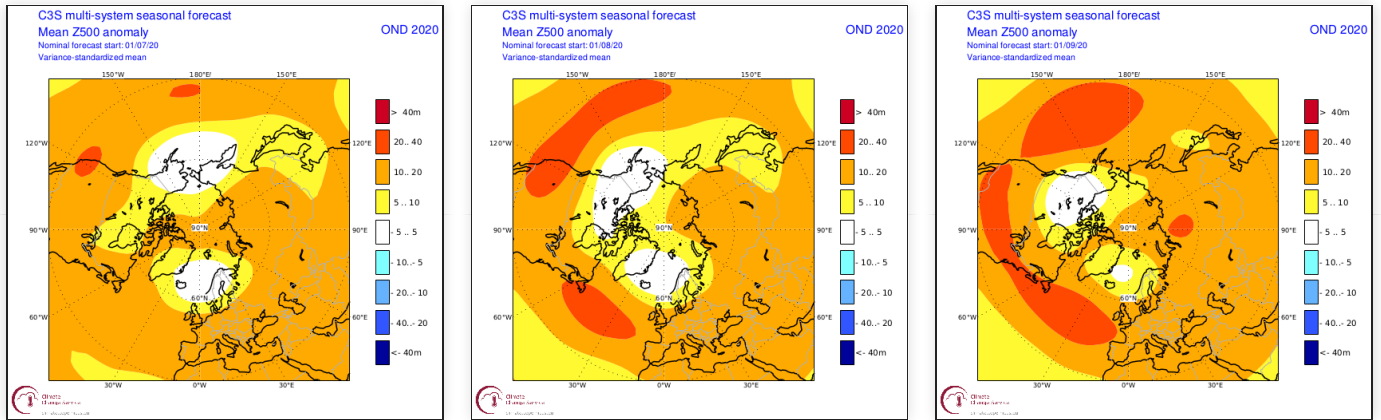


Others models of WMO multi-models 500hPa geopotential height anomalies.

1 - Forecast close to the C3S multimodel

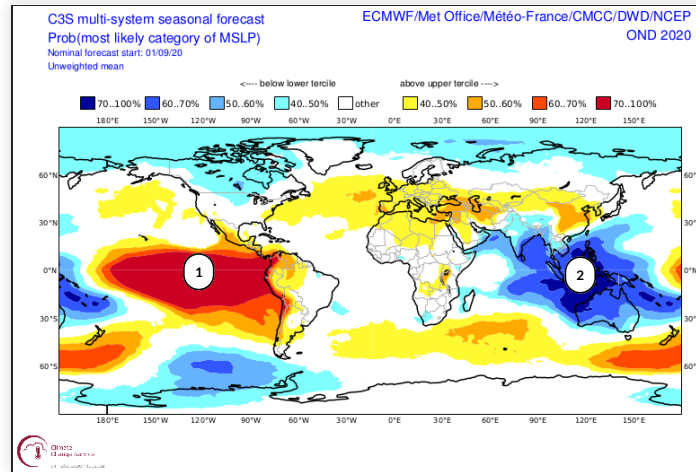
## Atmospheric circulation forecasts : Normalised MSLP

The C3S multi-model has good stability of its Z500 forecast for the OND quarter. It maintains its pattern and gradually strengthening it.

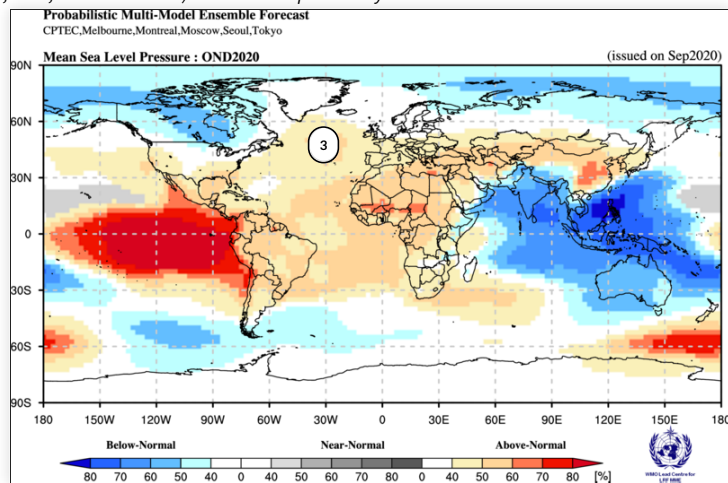


## Atmospheric circulation forecasts : MSLP probabilities multi-systems

Fairly good agreement between the two multi-models. High field likely over Europe, especially on the Atlantic side. Fairly strong probability also in the Middle East



C3S multi-models (MF-S7, SEAS5, UKMO, DWD, CMCC and NCEP) MSLP terciles probability.

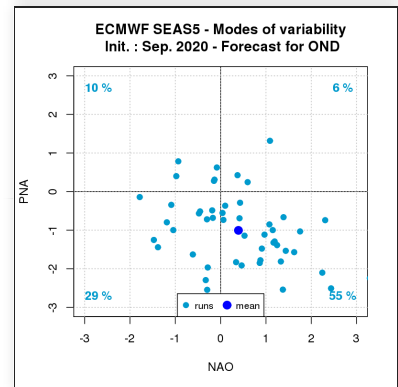
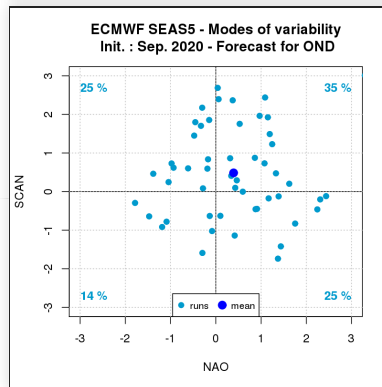
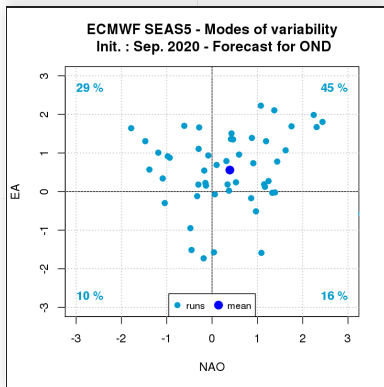
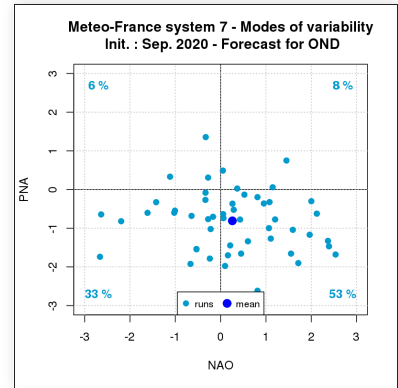
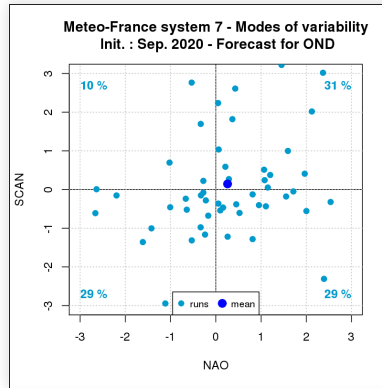
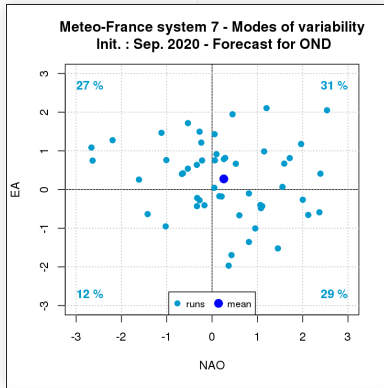


Others models of WMO multi-models MSLP terciles probability.

- 1 - High probable values related with La Nina situation
- 2 - low probable values related to IOD and La Nina
- 3 - high probable values. Possible link with a teleconnection from the Pacific.

## Modes of variability : forecast

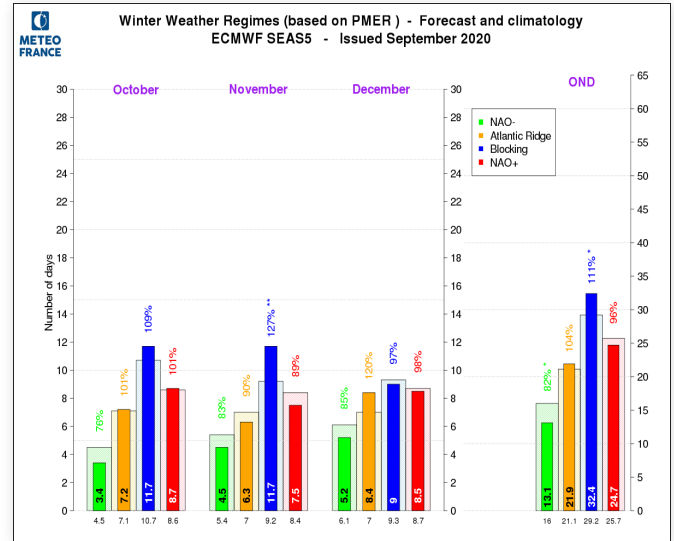
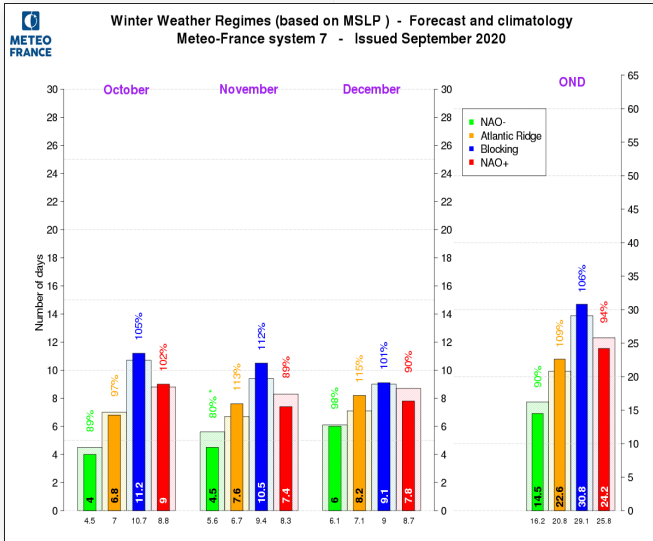
As usual, EA and NAO + modes are favored (weakly). The geopotential field at 500hPa does not clearly show this trend, which is probably linked to climate change.



[see the modes of variability patterns](#)

## Weather regimes : winter MSLP

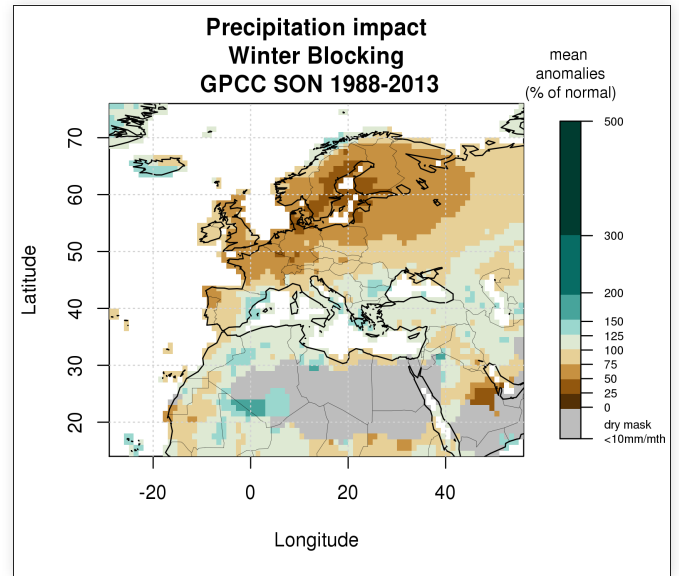
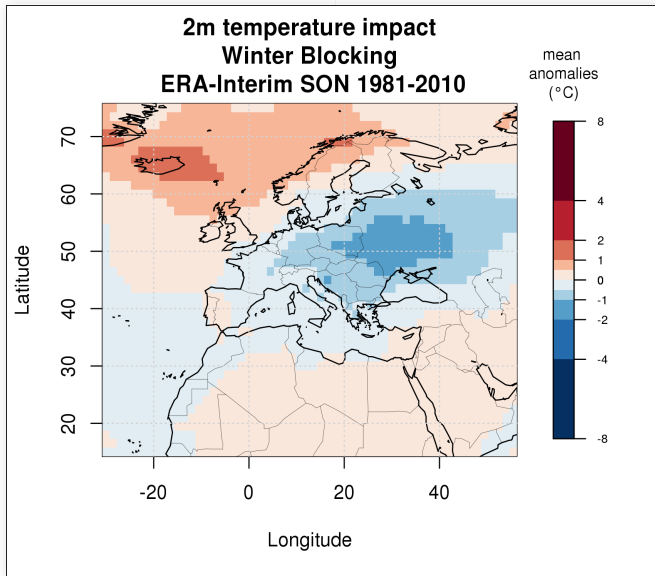
The oceanic regimes (NAO+ and NAO-) are disadvantaged in favor of the Winter Blocking Regime and the Atlantic Ridge.



Frequency of SLP weather regimes, compared to model's own climatology, for the next three months and aggregation over the entire quarter, for MF-S7 (left) and SEAS5 (right).

## Weather regimes : Impacts

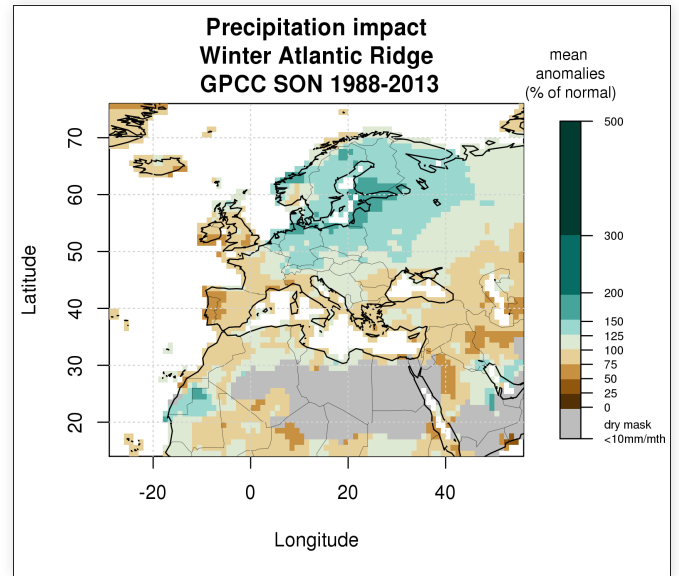
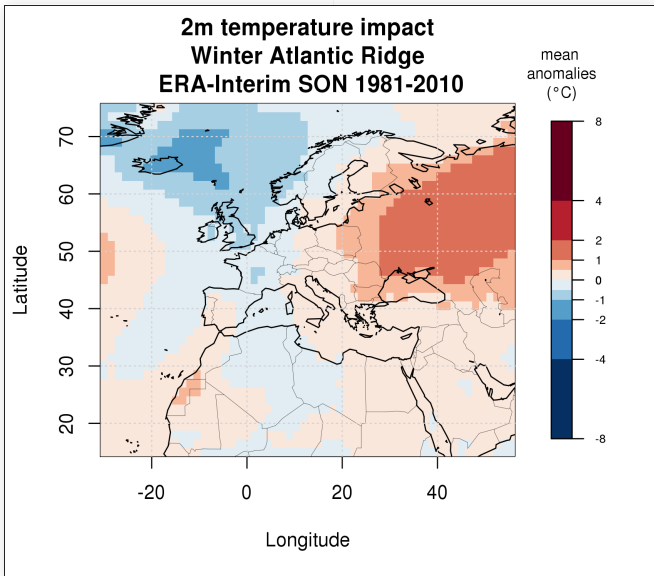
Winter Blocking weather regime is favored



*Impact of Summer Blocking weather regimes on temperature and precipitation. (ref ERA-interim 1981-2010)*

## Weather regimes : Impacts

Atlantic Ridge weather regime is a little favored



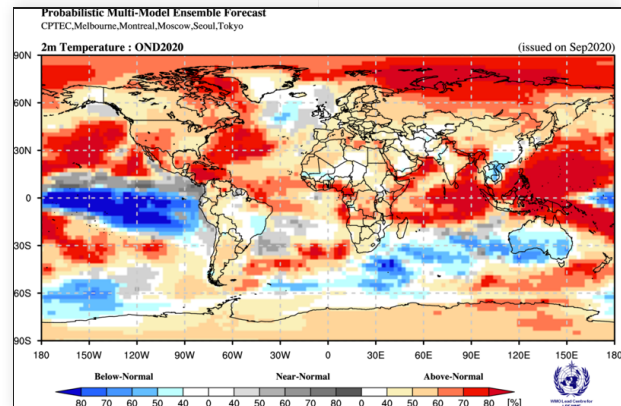
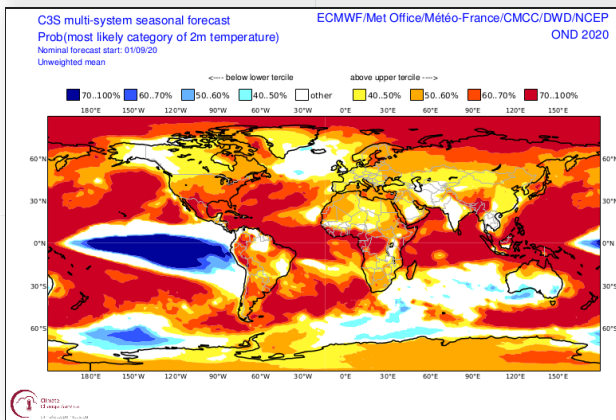
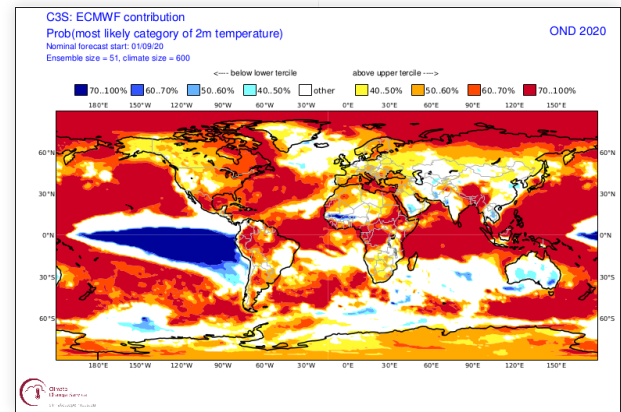
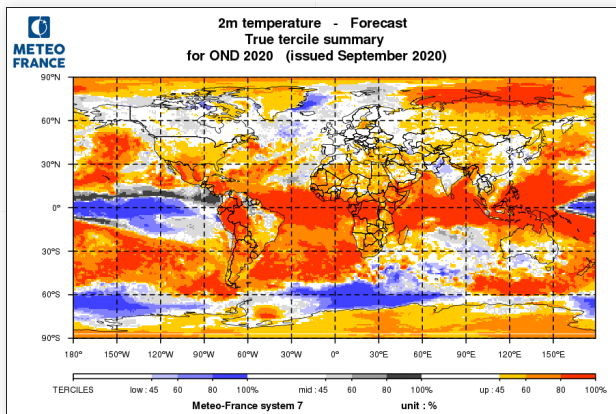
*Impact of Summer Blocking weather regimes on temperature and precipitation. (ref ERA-interim 1981-2010)*

## Forecast of climatic parameters : Temperature probabilities

The tropics are heavily impacted by the La Nina phenomenon.

Over Asia, the structure of the probable hot and cold anomalies is complex, however the models are in rather good agreement on their position.

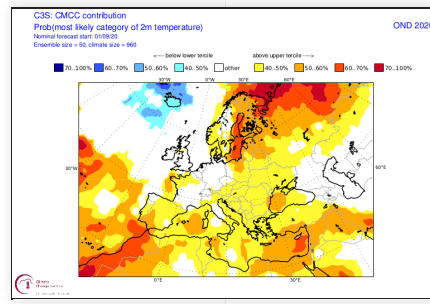
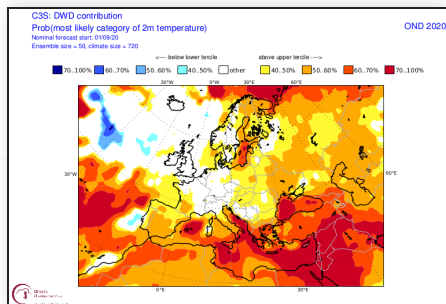
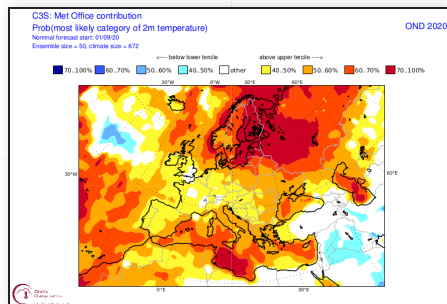
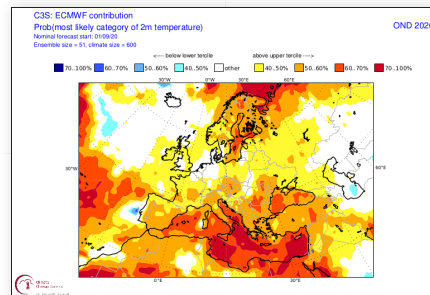
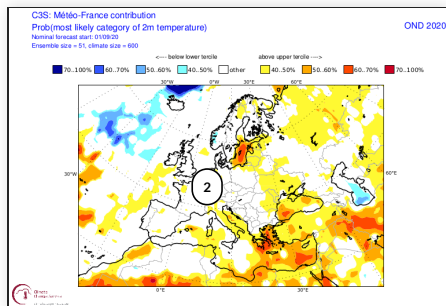
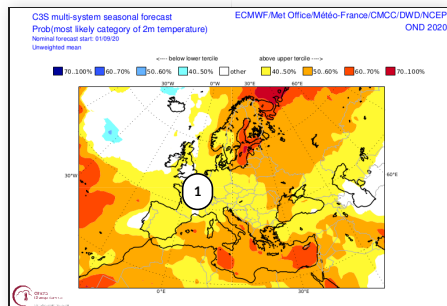
MF-S7 and ECMWF-SEAS5 have very different forecasts for Canada, due to their opposing options in large scale circulation in this area.



2m temperature probability map from MF-S7 (top left), ECMWF-SEAS5 (top right), C3S multi-models(bottom left) and others models of WMO multi-models (bottom right)

## Forecast of climatic parameters : T2M probabilities over Europe in C3S models

over Europe, a weak warm signal dominates in the multi-model which smooths out various models options. In MF-S7 in particular no scenario emerges.

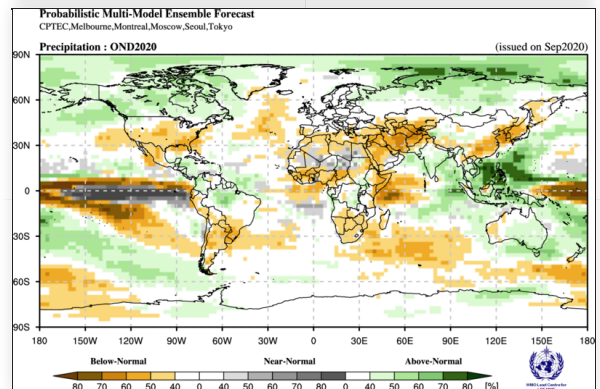
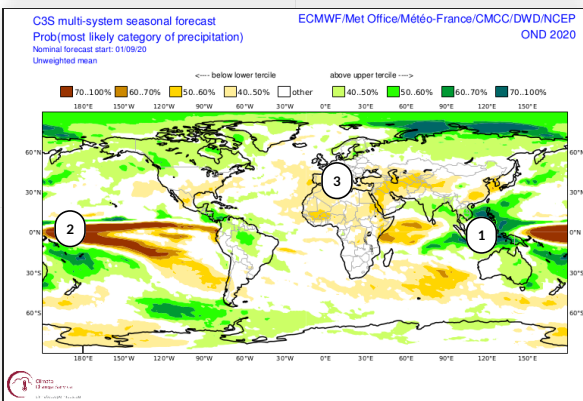
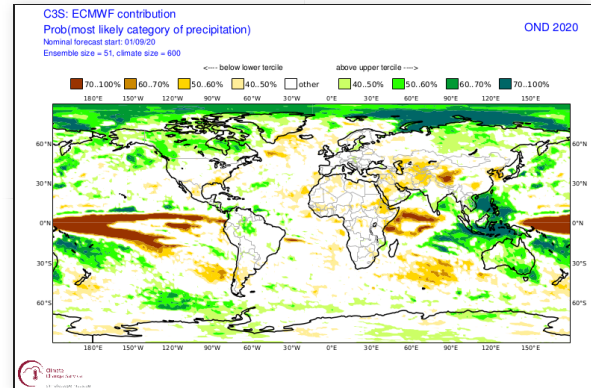
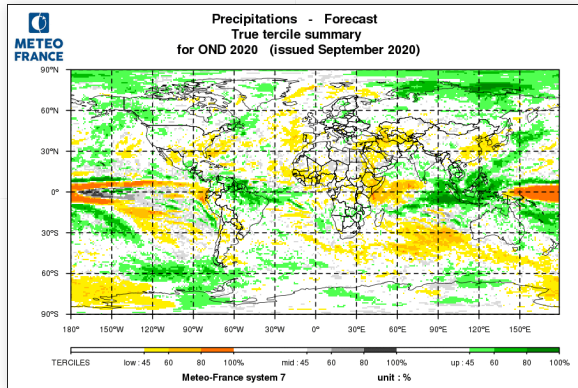


C3S multi-models probability map (top left) and MF-S7, ECMWF-SEAS5, UKMO (bottom left), DWD, CMCC models.

- 1 - weak warm signal
- 2 - no signal in MF-S7

## Forecast of climatic parameters : Precipitation

In the La Nina situation, the forecast in the tropics remains very similar to that of the previous months. Heavier than normal precipitation is likely from India in Southeast Asia to the Maritime Continent and Australia, as well as over northern South America.

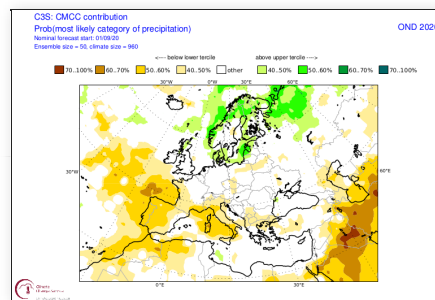
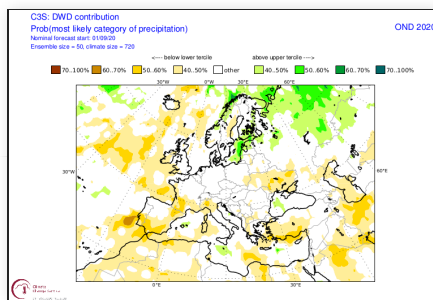
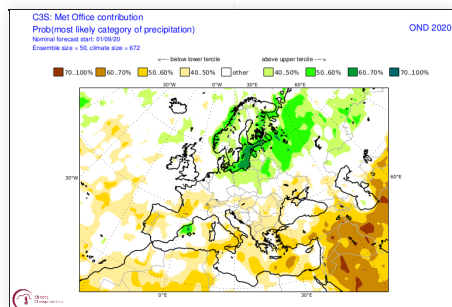
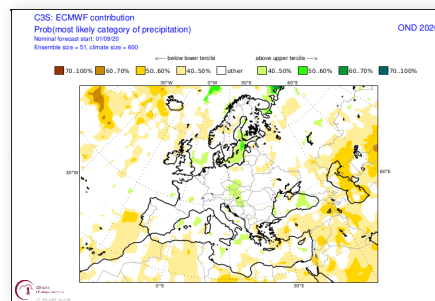
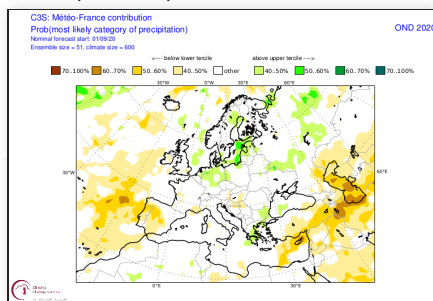
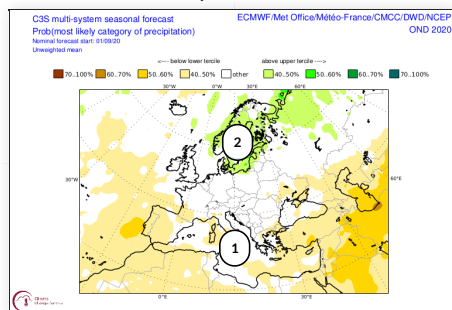


precipitation probability map from MF-S7 (top left), ECMWF-SEAS5 (top right), C3S multi-models (bottom left) and others models of WMO multi-models (bottom right)

- 1 - Strong wet signal (negative IOD)
- 2 - Dry signal linked to the Njina
- 3 - dry signal in a majority of models

## Forecast of climatic parameters : Precipitation probabilities over Europe in C3S models

The models continue to forecast increased precipitation over Scandinavia and deficit over the Mediterranean basin. We have moderate confidence in this pattern, which turned out to be simplistic in previous forecasts.

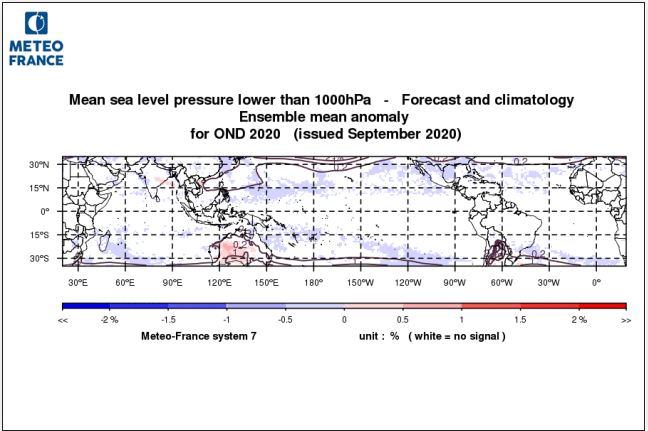
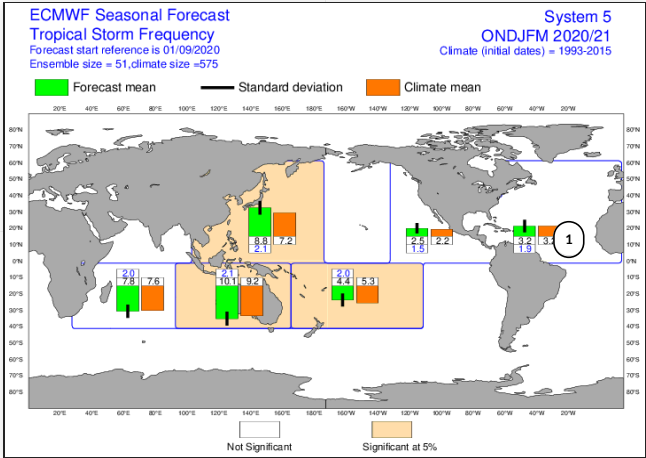


C3S multi-models probability map (top left) and MF-S7, SEAS5, UKMO, DWD, CMCC models.

- 1 - large-scale dry signal
- 2 - weak wet signal

Forecast of climatic parameters : Tropical Storm Frequency

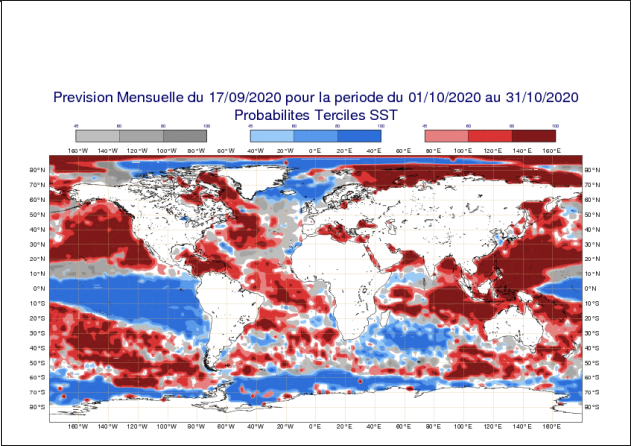
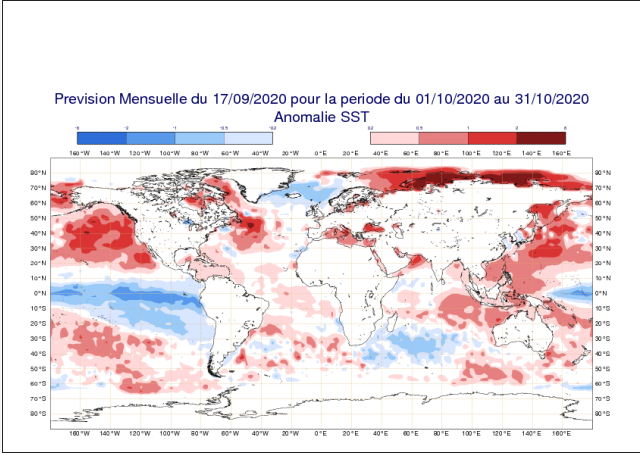
The La Nina situation is generally unfavorable to cyclonic activity in the central Pacific, but on the contrary, should strengthen it in the western part of the basin.



1 - close to normal

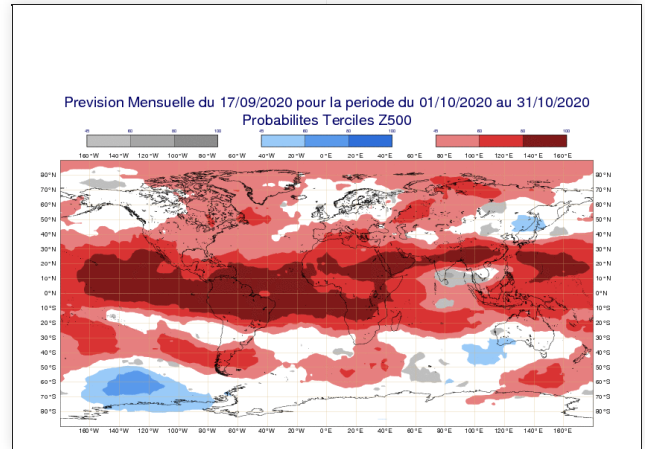
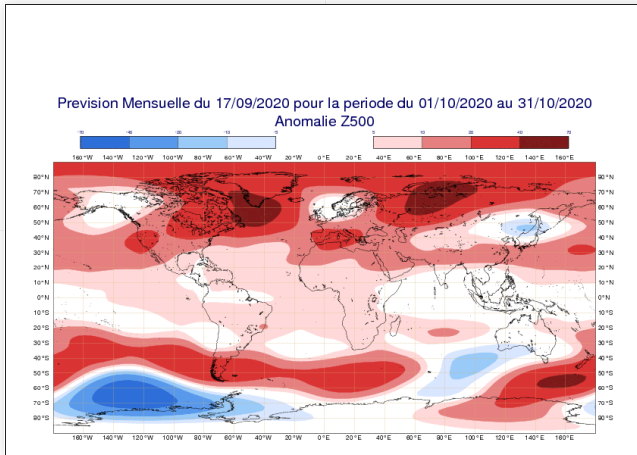
Monthly forecast of 20200917 : SST

In the tropics, the monthly forecast is very consistent with the seasonal forecast.



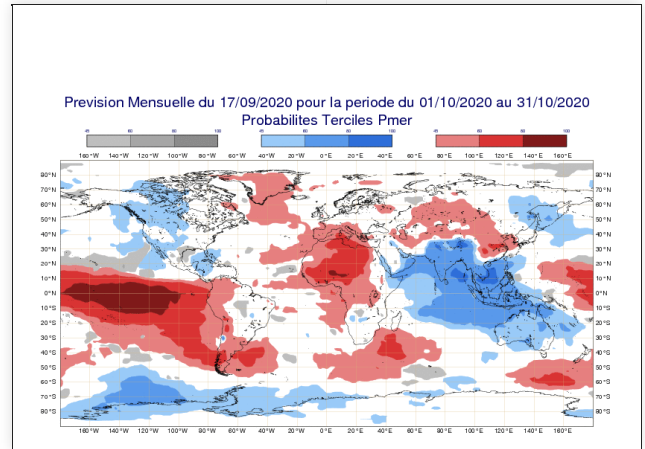
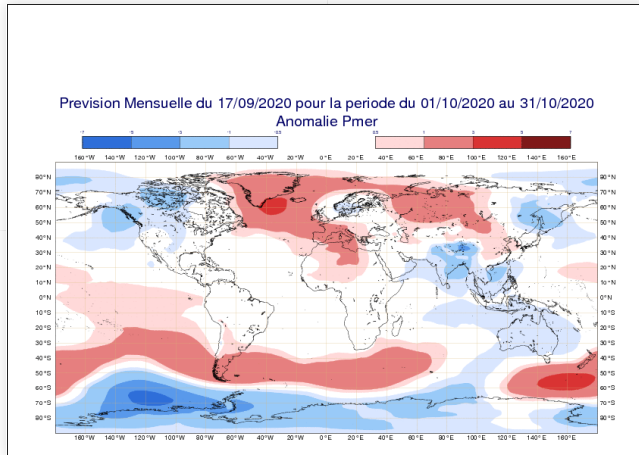
## Monthly forecast of 20200917 : Z500

The monthly forecast of the ECMWF has a field structure over the Atlantic which is logically closer to the seasonal forecast of the ECMWF than to the C3S multi-model.



## Monthly forecast of 20200917 : MSLP

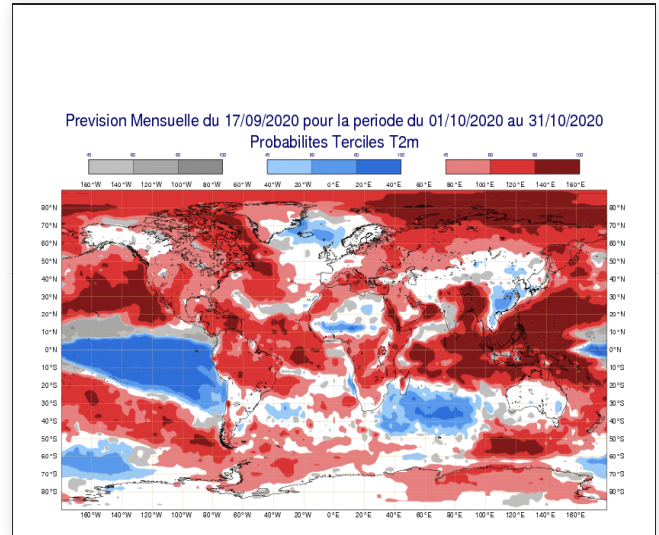
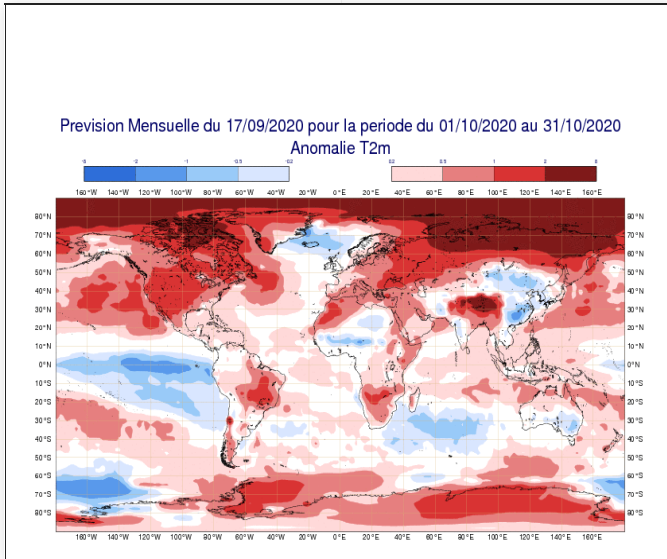
The strong values on the Atlantic extend over a large part of western and southern Europe. The weak field in northern Europe remains consistent with the seasonal forecast.



## Monthly forecast of 20200917 : temperature

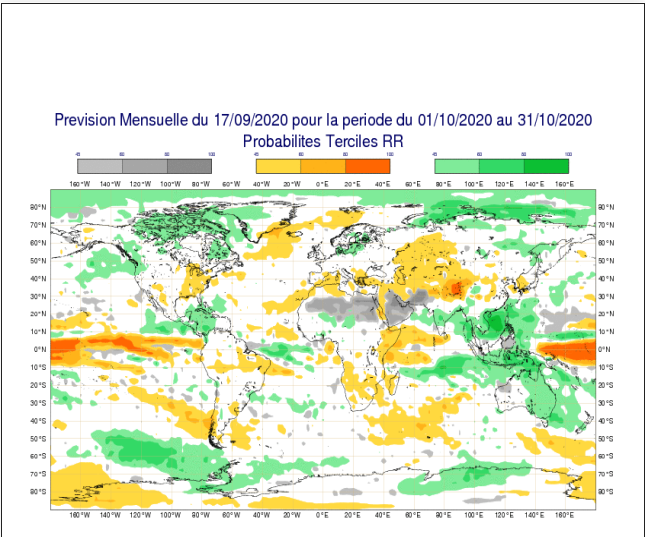
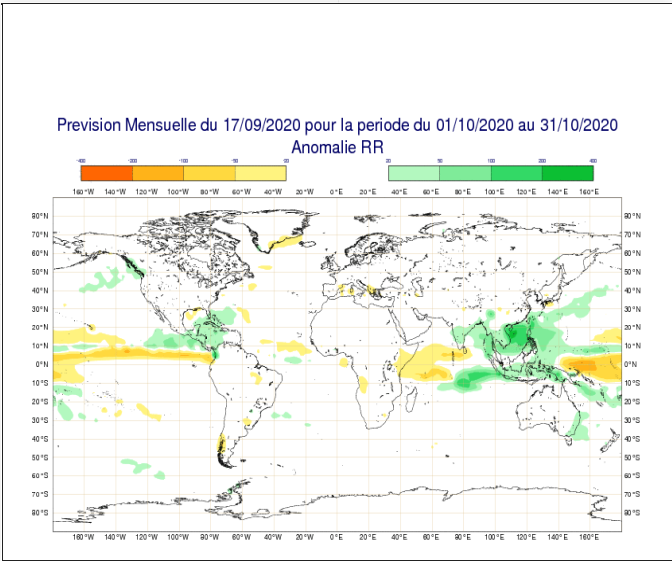
Weak signal over Europe.

Note the very strong anomalies expected at high latitudes of the northern hemisphere in connection with the extremely weak ice cover at the end of summer and its more difficult reconstitution.



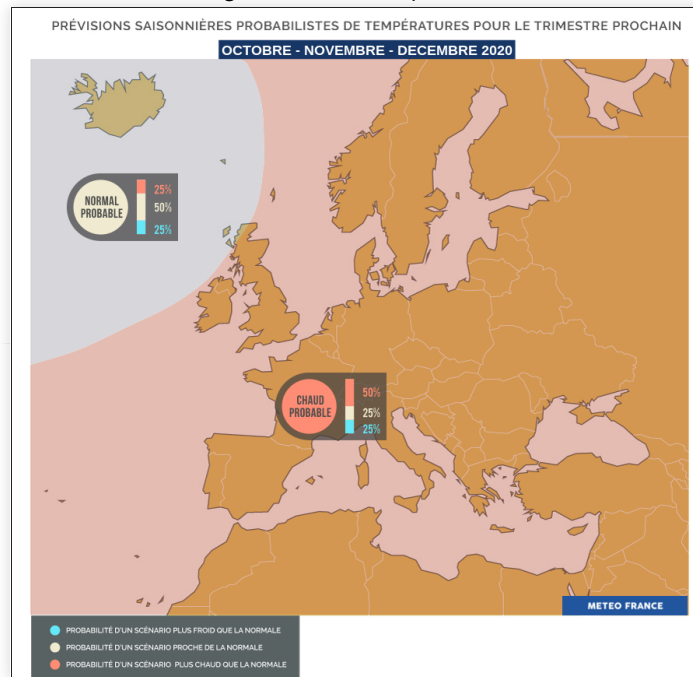
Monthly forecast of 20200917 : precipitation

No signal.



## Synthesis map for Europe : Temperature

The temperature signal is weak. Over northwestern Europe, the influence of a dominant northwest flow is expected to keep temperatures within normal. Elsewhere in Europe, a weak warm signal dominates, probably more related to climate change than to the general circulation which provides few determining elements for temperatures.

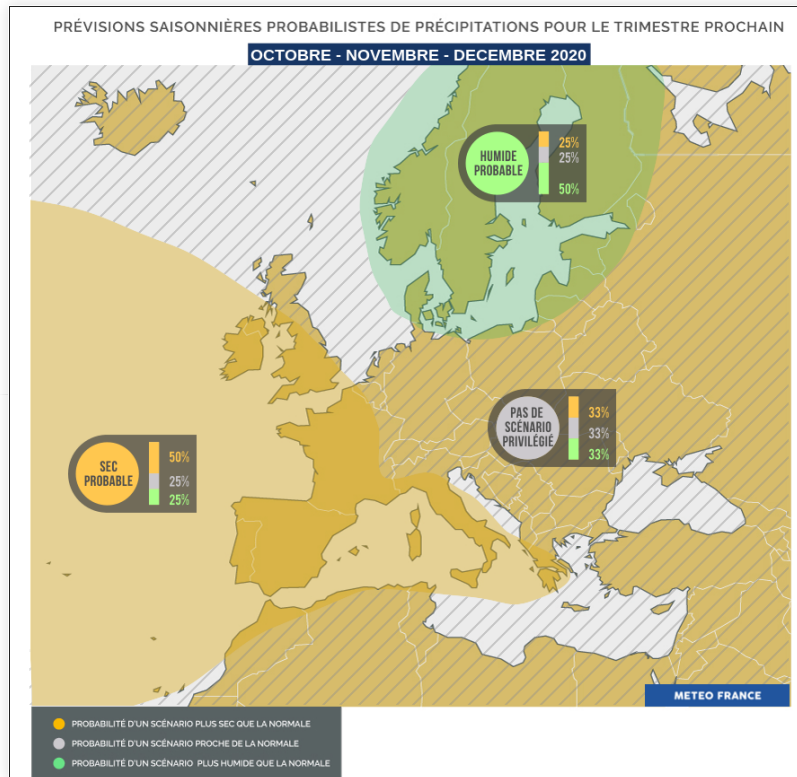


Synthesis map of probabilistic forecast for Europe. (c) Météo-France/DCSC/AVH

## Synthesis map for Europe : Precipitation

More frequent high pressure conditions likely over the west of the continent should reduce rainfall.

The weak pressure field expected over Scandinavia should increase precipitation.



Synthesis map of probabilistic forecast for Europe. (c) Météo-France/DCSC/AVH