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I. DESCRIPTION OF THE CLIMATE SYSTEM (AUGUST 2013)

I.1. OCEANIC ANALYSIS

I.1.a Global Analysis

At the Surface (fig. 1) :
Only little evolutions in the Tropics.
For the Pacific : In the equatorial waveguide close to neutral conditions excepted in the most western (and the maritime continent) and eastern part of the basin (respectively positive/negative anomaly). Note the Southward extension of the positive anomaly along the SPCZ. ENSO is in a neutral phase. Little evolutions everywhere in the Tropics to the exception of a warming in the vicinity of the coastal area of Peru (weakening of the costal upwelling). Some noticeable positive anomalies in the mid-latitudes of the Northern hemisphere.

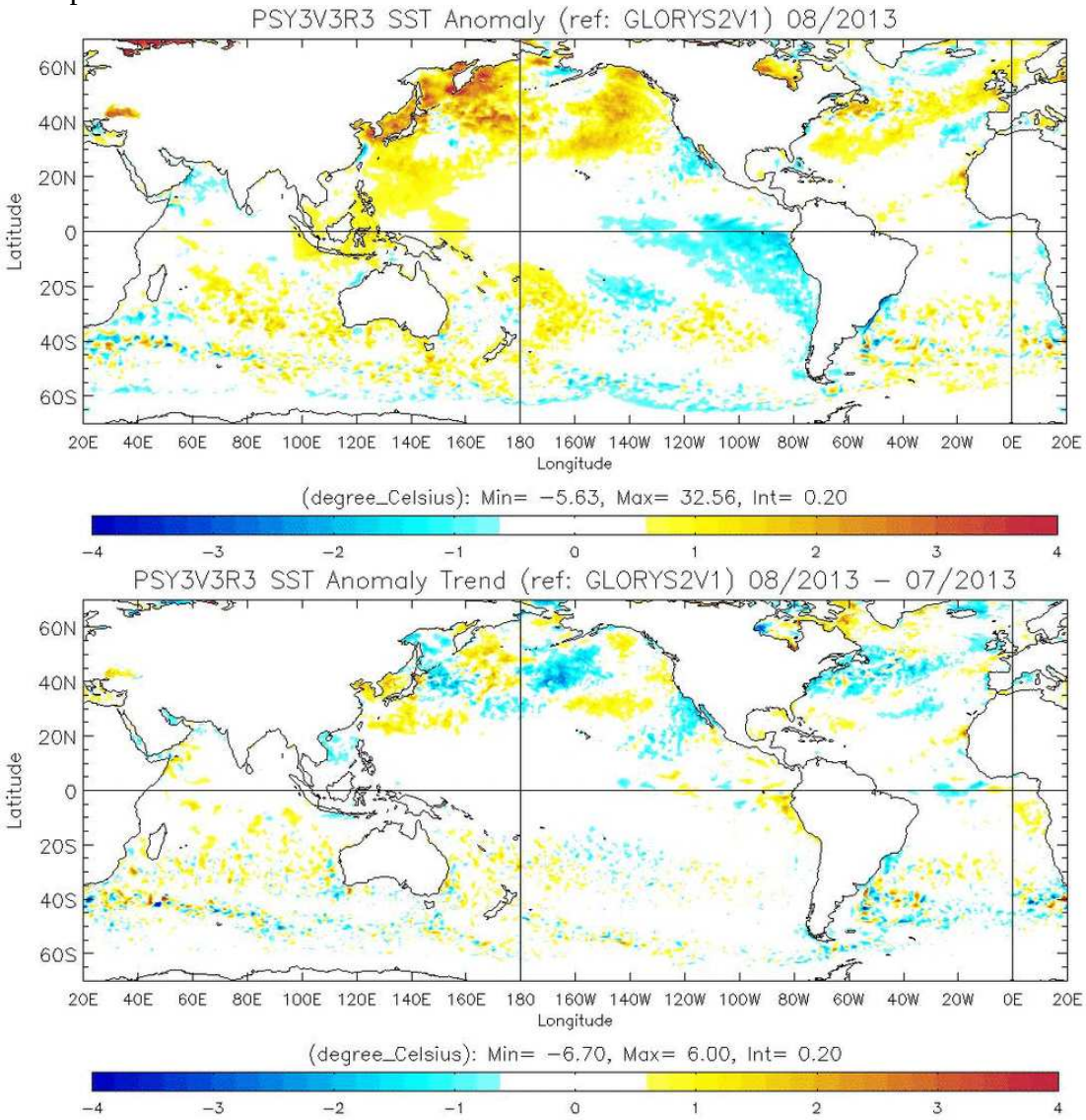


fig.1: top : SSTs Anomalies (°C) (reference Glorys 1993-2009); bottom : SST tendency (current – previous month) http://bcg.mercator-ocean.fr/

For the Atlantic : little evolution in the Tropics ; the North Tropical Atlantic remains slightly warmer than normal while the Southern Tropical Atlantic is close to Normal. Little evolutions in the Guinean Gulf. In the mid-latitudes of Northern hemisphere some cooling Close to New Foundland.
In the Indian Ocean : Little evolutions. The current conditions remain warmer on the Eastern side. Consistently the DMI is clearly on the negative side but it is evolving close to neutral conditions.
In subsurface (fig.2) :
In the Pacific : in the equatorial band (10°N-10°S), heat content anomalies mostly positive West to the dateline, East to this limit the landscape is less homogeneous. Note the strong positive anomalies in the Western part off equator (in the Northern hemisphere between 10°N and 20°N) consistently with the surface signal. In the SPCZ region positive anomaly extends South-East toward mid-latitudes. In the mid/high latitudes of the Northern hemisphere, little consistency with the surface signal.
In the Atlantic : in the equatorial waveguide little anomalies to the exception of positive anomalies in the Guinean Gulf. Persistence of slight positive anomaly in the tropical northern part and positive anomalies in the Southern tropics (excepted close to the African continent – negative anomalies).
In the Indian Ocean : In the equatorial waveguide the signal is not fully consistent with the negative phase of IOD. Some consistency with SSTs, especially in the Southern Hemisphere West to Australia and in the vicinity of the maritime continent.

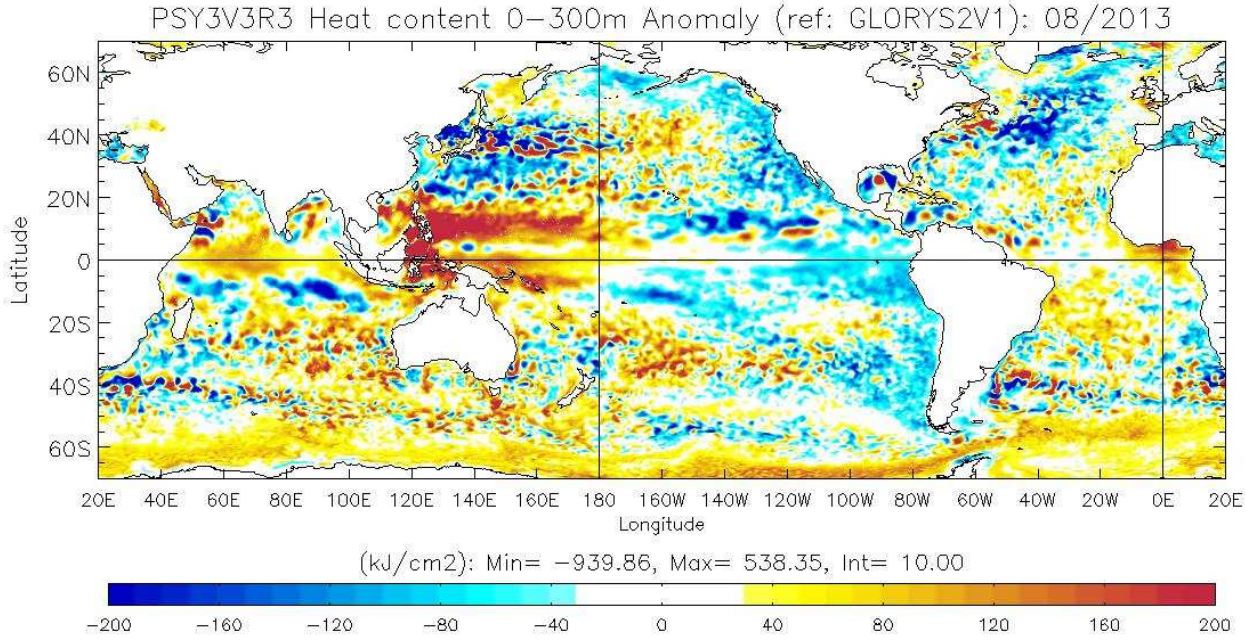


fig.2: map of Heat Content Anomalies (first 300m) (in kJ/cm²). (reference 1950-2008) http://bcg.mercator-ocean.fr/

I.1.b Pacific Basin (fig. 3, 4 and 5)

A dipole pattern is visible with positive anomalies west to the date line, close to normal in the Central and negative anomaly in the most Eastern part. Little trade wind anomalies over most of the basin. However, some anomalies on the most western side likely related to the large scale convection anomaly in the vicinity of the maritime continent and Australia (likely related to SST forcing). The SOI is slightly positive (+0.2) consistently with the dipole pattern and the little trade wind anomalies across the basin.

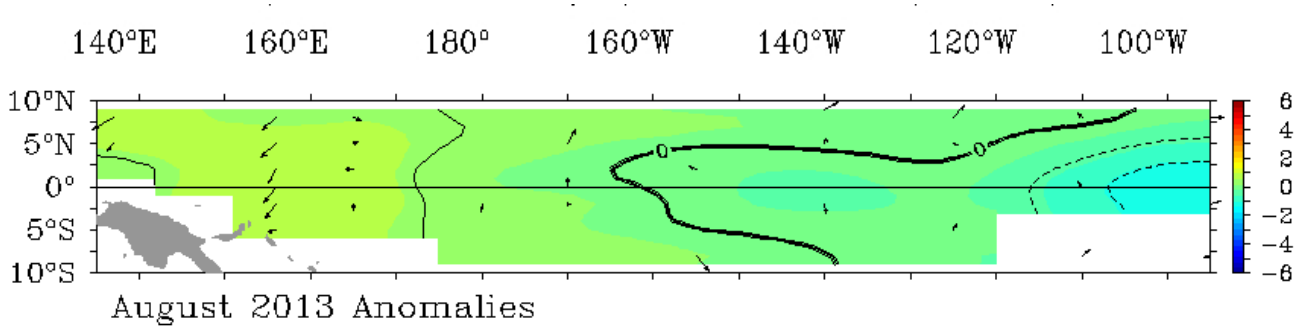


fig.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON. http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html

In the Niño boxes (4, 3.4, 3 et 1+2 ; see definition in Annex) the SST anomalies illustrate the pattern already presented on fig. 3. The monthly averages are respectively 0,0°C, -0,3°C, -0,6°C and -1,0°C from West to East (slight decrease on negative anomalies on Eastern part).

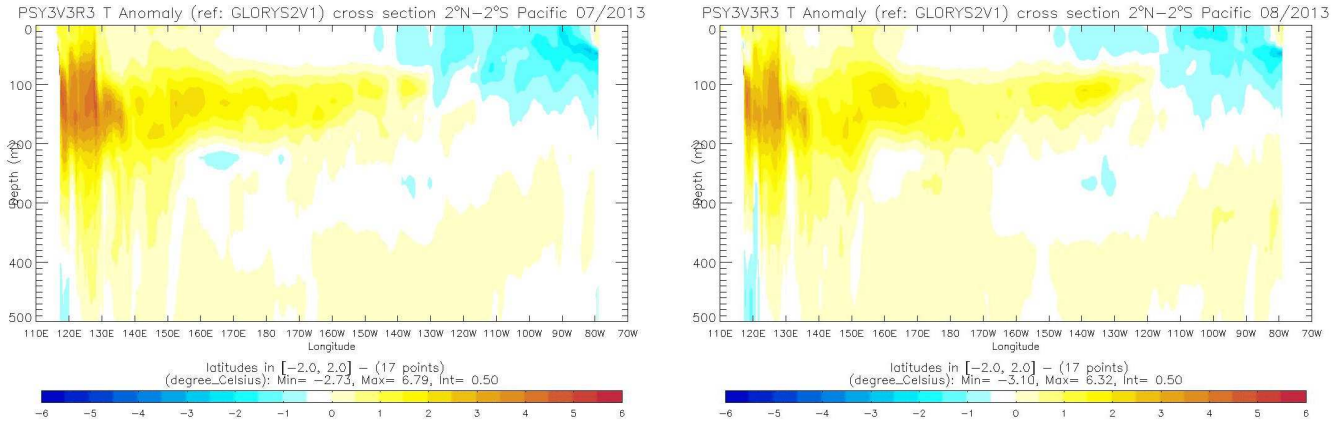


fig.4: Oceanic temperature anomaly in the first *500 metres* in the Equatorial Pacific, in previous month (left) and current month (right) http://bcg.mercator-ocean.fr/

In the equatorial waveguide (fig. 4) : still traces of propagation of Kelvin waves under the surface (warmer than normal around 150m) in August from the Western part and across the basin in the lower layers (around or below 150m). To be quoted the relative discharge of the warm reservoir on the most western part (consistently with the Kelvin wave propagation).
The thermocline structure (fig. 5) : some little traces of wave propagation signal of positive anomalies as already pointed out in the previous comment.

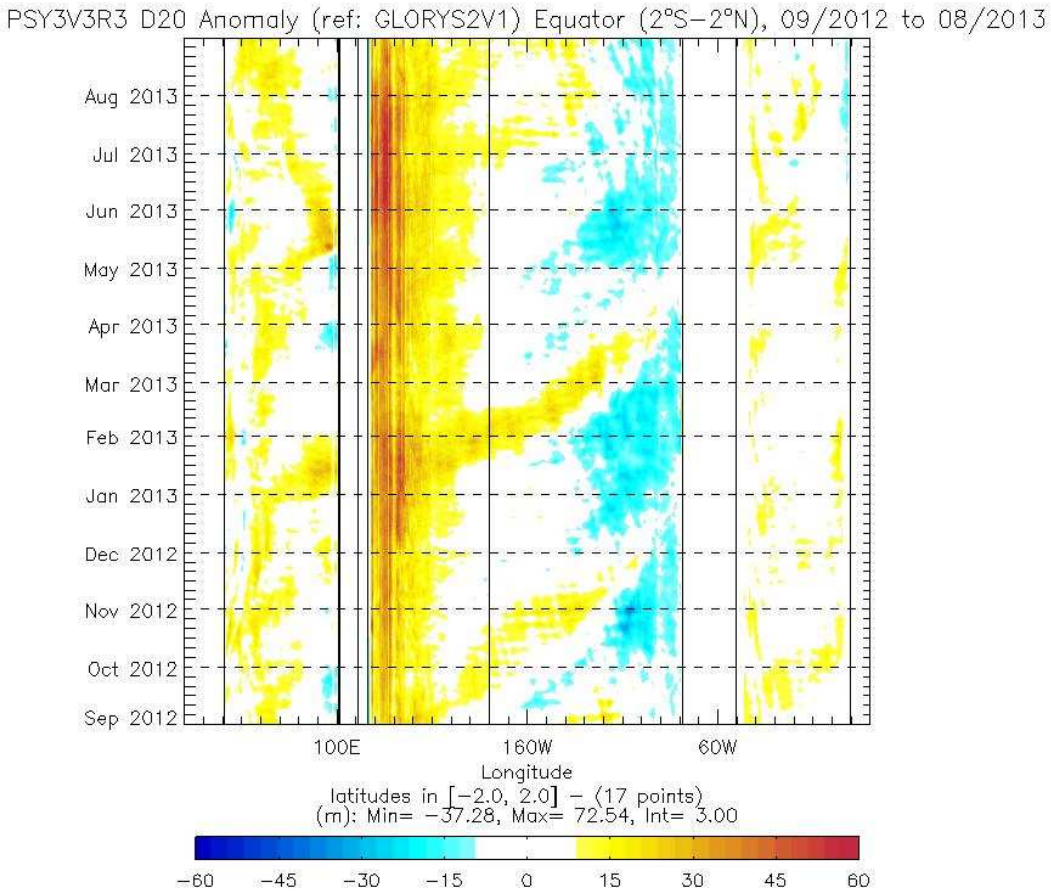


fig.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 24 month period. http://bcg.mercator-ocean.fr/

I.1.c Atlantic Basin

Northern Tropical Atlantic : slightly warmer than normal and little evolutions.
Equatorial waveguide : weak signal, without wave propagation trace.
The Southern Tropical Atlantic : weak signal elsewhere.

I.1.d Indian Basin

Southern Tropical Indian Ocean : Still slightly warmer than normal between Australia and the maritime continent. Close to normal elsewhere
Equatorial waveguide : weak dipole pattern, the DMI is on the negative side.
Northern Tropical Indian Ocean : close to normal more or less everywhere.

I.2. ATMOSPHERE

I.2.a Atmosphere : General Circulation

Velocity Potential Anomaly field in the high troposphere (fig. 6 – insight into Hadley-Walker circulation anomalies) : quite fragmented cells likely partly related to the intraseasonal variability and MJO activity (in the Tropics) and only a little related to SST forcing.
The MJO was mostly active during the last 10 days of the month (Phase 8 – negative anomaly over the Eastern Pacific – and 1)
On the Pacific : Divergent circulation anomalies (upward anomaly motion) in the vicinity of the Maritime Continent (likely related to the persistence of the SST forcing) and convergent circulation anomaly

(downward motion anomaly) on the central Pacific in relationship with the Divergent circulation anomaly close to 130°W and North to the Equator. In addition, the Divergent circulation anomalies in the South-Eastern Sub-Tropics seems to be more related to mid-latitude activity.

On the Atlantic : Convergent circulation anomalies (downward anomaly motion) over the Southern Tropical Atlantic (especially close to the Greenwich meridian). This pattern is favouring a northward shift of the ITCZ (over Sahelian regions). In the Northern hemisphere, to be quoted the negative anomaly (Divergent Circulation anomaly) over the Chad and Sudan region.

On the Indian Ocean : Convergent circulation anomalies (downward anomaly motion) over most of the basin. Consistent with the IOD (negative side) and the MJO activity.

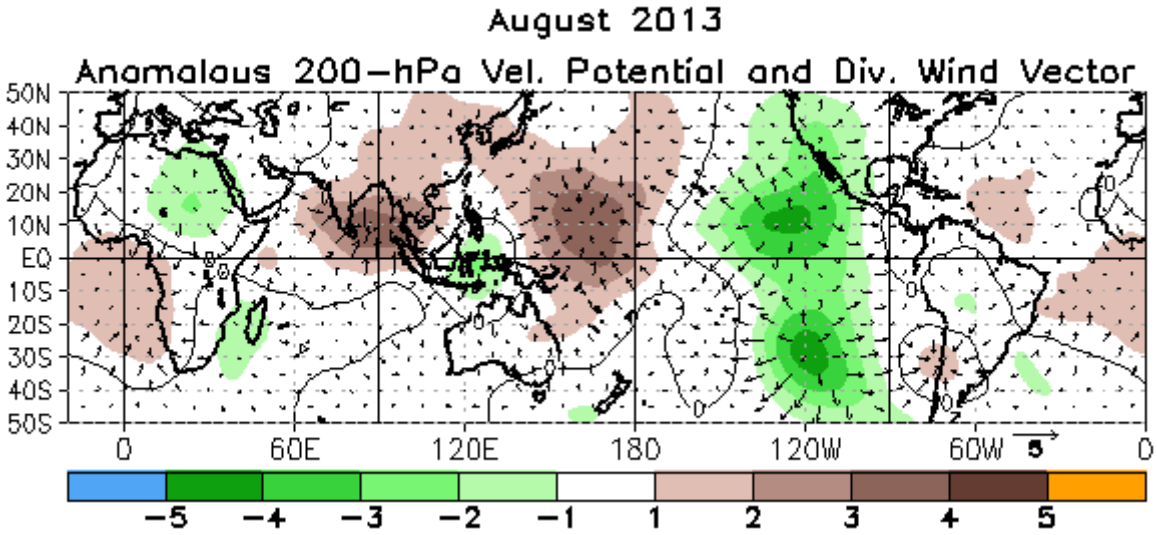


fig.6: Velocity Potential Anomalies at 200 hPa and associated divergent circulation. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

Stream Function anomalies in the high troposphere (fig. 7 – insight into teleconnection patterns tropically forced) : on average weak signal in the intertropical band. The strongest related to the large scale convection (on North-Eastern tropical Pacific) had some modest impact onto the stream function anomaly field without any propagation beyond the Tropics. In the Southern hemisphere the strong anomalies are likely related to Mid-Latitude activity, poorly influenced by the Tropics.

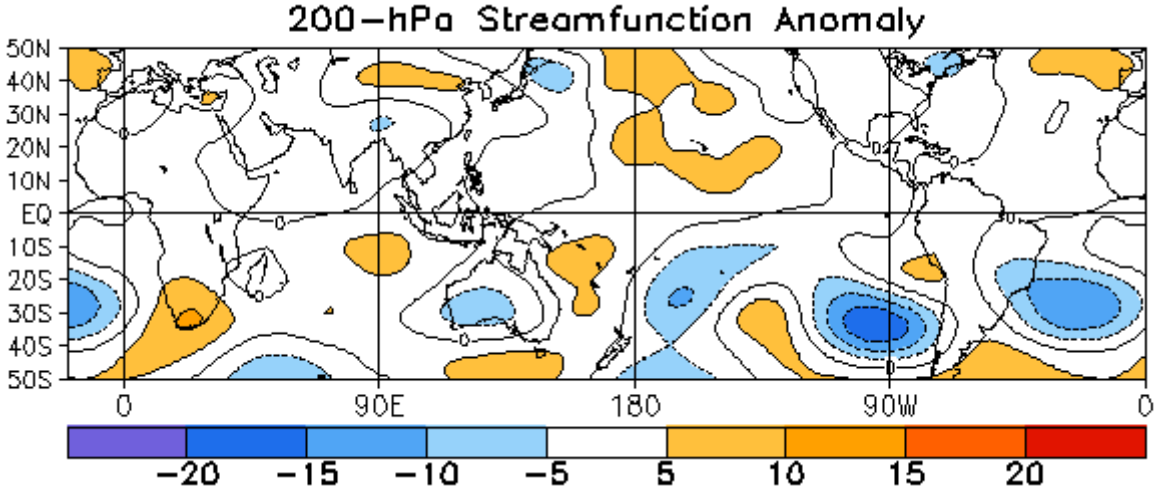


fig.7: Stream Function Anomalies at 200 hPa.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

Geopotential height at 500 hPa (fig. 8 – insight into mid-latitude general circulation) : Consistently with the previous analysis, there is only little anomalies coming from the Tropics. Some anomalies are observed in the mid/high latitudes of the North Pacific, across the Atlantic and over North-Eastern Europe and Siberia.
Consistently, there is only little activity in the atmospheric modes ; main active modes are found over the Pacific : East-North Pacific (-1.1) ; over Europe : the NAO (+1.1), the East Atlantic/West Russia (-1.9) and the Scandinavian (-0.8).

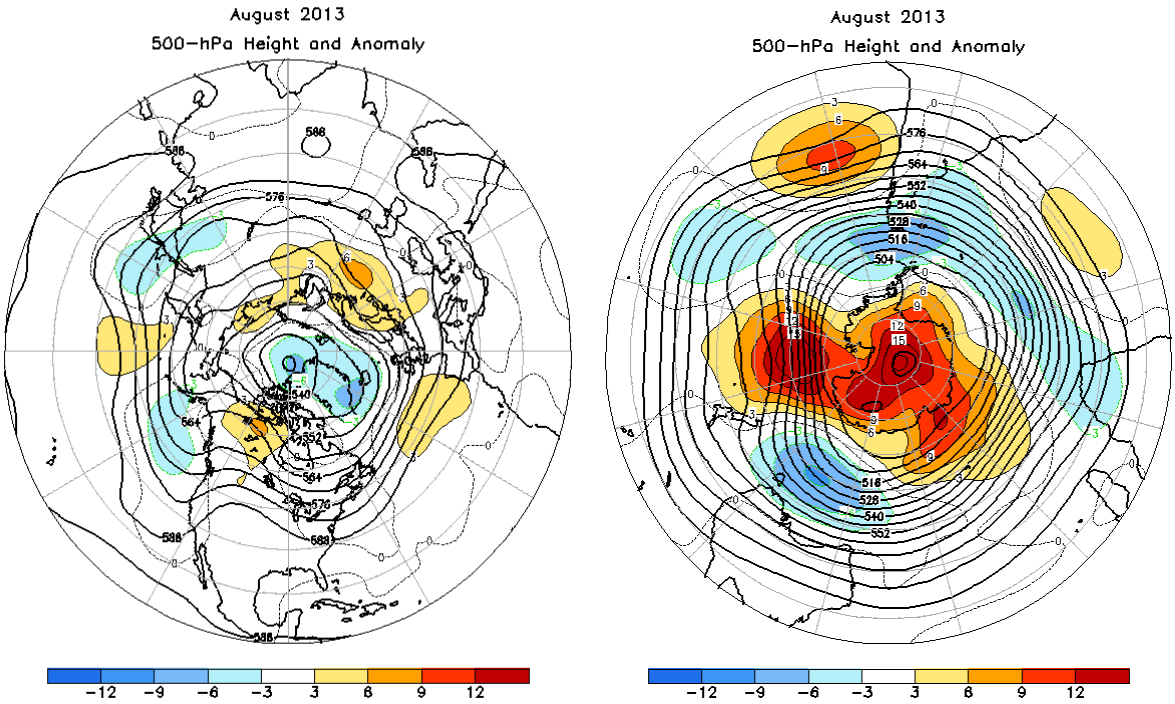


fig.8: Anomalies of Geopotential height at 500hPa (left North Hemisphere http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/fige9.shtml, and right South Hemisphere http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/fige15.shtml)

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

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
AUG 13	**1.1**	**0.3**	**-0.2**	**-1.1**	**-0.1**	**---**	**-1.9**	**-0.8**	**0.0**
JUL 13	0.7	0.6	-0.9	0.9	-0.7	---	-0.2	0.0	-0.3
JUN 13	0.8	0.7	-0.5	1.7	-0.4	---	-2.3	0.3	0.0
MAY 13	0.6	0.1	-1.1	-0.3	-0.2	---	-2.1	0.5	0.0
APR 13	0.6	1.3	-1.9	1.2	-1.8	---	0.4	-1.1	-1.6
MAR 13	-2.1	-0.2	0.6	0.7	-0.3	---	2.3	-0.6	-1.9

http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/table3.shtml

I.2.b Precipitation

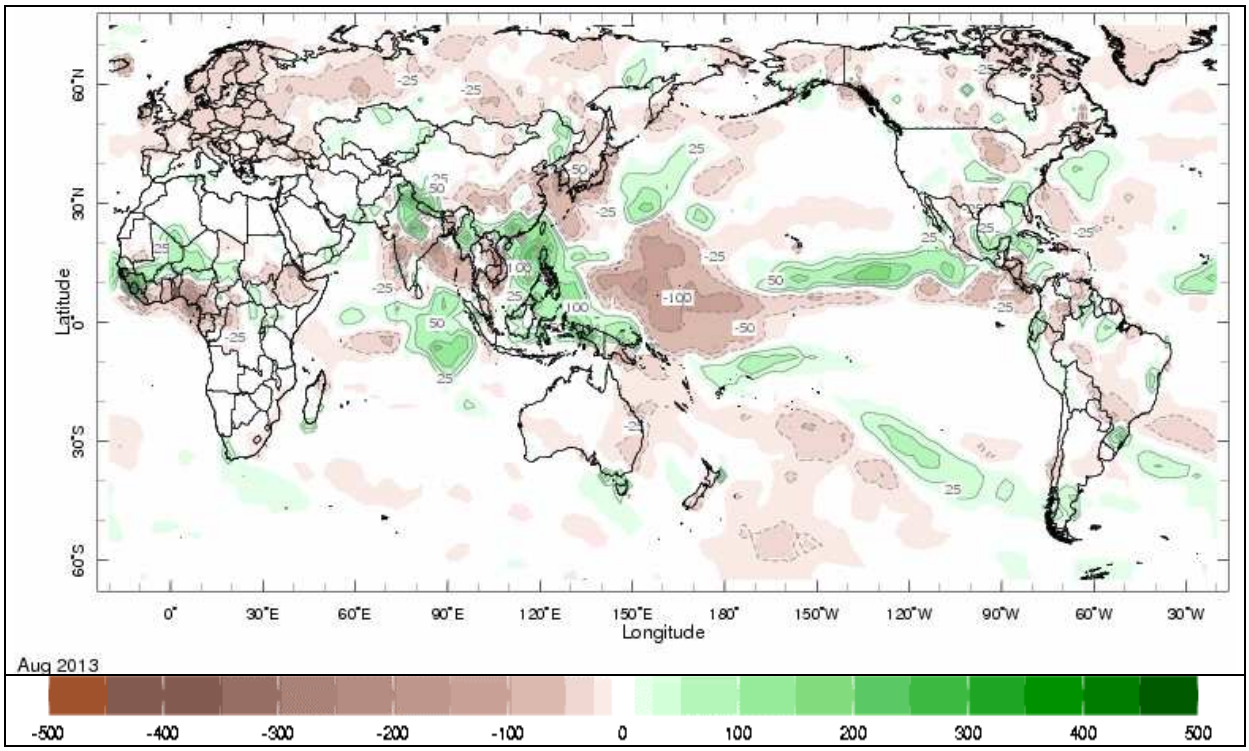


fig.9: Rainfall Anomalies (in mm) (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/

Most of the rainfall patterns in the Topics are consistent with the Velocity Potential anomaly field.

Pacific : good consistency in the vicinity of the maritime continent (positive anomaly), on the Pacific West to the date line (negative anomaly) and on the Eastern side (positive anomaly North to the equator).

Atlantic/Africa : negative anomaly over part of the Basil and the Caribbean, Some drier than normal conditions close to the Guinean Gulf in relationship with wetter than normal conditions over the Sahelian regions (positive phase of the Sahelian dipole).

Indian Ocean : Clear patterns of negative anomalies consistent with the velocity potential field over the Indian sub-continent and the Great Horn of Africa.

Australia : Some dry conditions over the Eastern side.

North America : Some traces of drier than normal conditions over Canada and a tripole like-pattern across the half eastern part of US (mostly dry/wet/dry from North to South).

Europe : mostly drier than normal over Europe, especially Central Europe extending toward Scandinavian and Eastern regions ; consistently with Geopotential height anomalies at 500hPa..

I.2.cTemperature

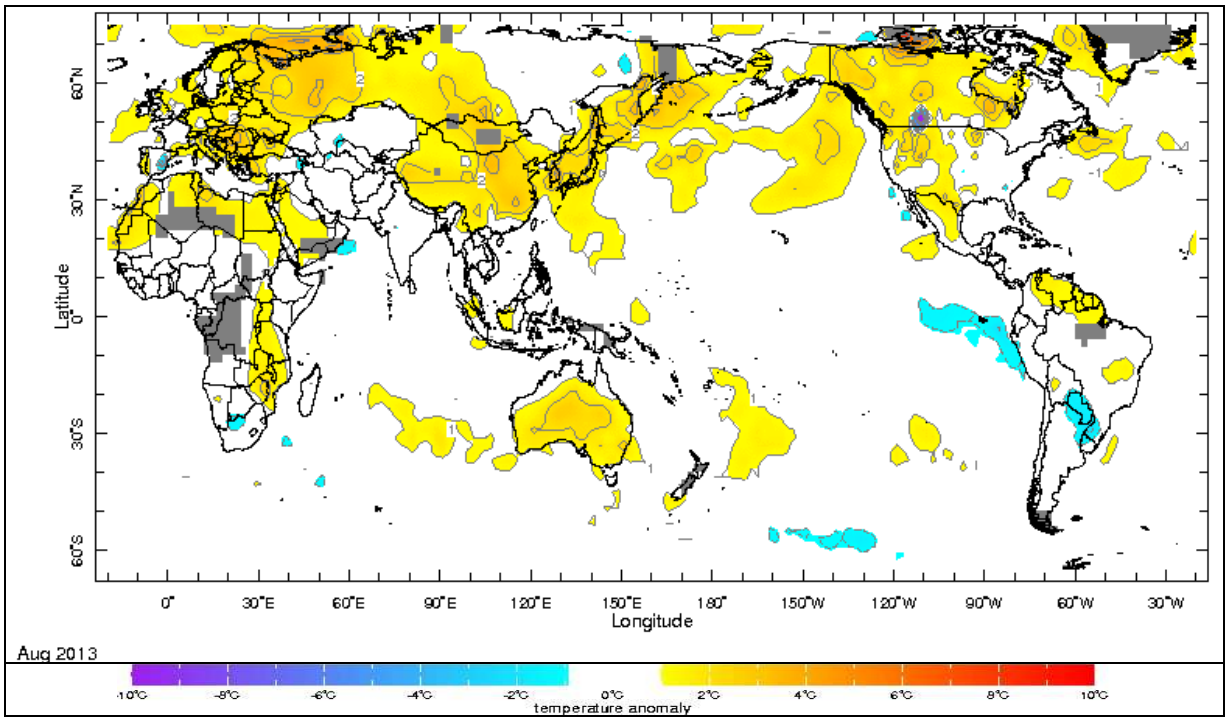


fig.10: Temperature Anomalies (in °C) (departure to the 1979-2000 normal)
http://iridl.ldeo.columbia.edu/maproom/.Global/.Atm_Temp/Anomaly.html

North-America : Positive anomalies on the Western side of USA and a large portion of Canada to the exception of the Eastern part).
South-America : little anomalies to the exception of the most North-Eastern part (positive) and in the vicinity of Paraguay (negative).
Australia : Warmer than normal conditions over most of the continent.
Asia : Warm anomaly over China and Mongolia and along the eastern coast.
Africa : Warmer than normal conditions over Northern Africa extending over toward the Arabic Peninsula.
Europe : Warmer than normal conditions over most of European regions to the exception of France and Spain.

I.2.d Sea Ice

In Arctic (fig. 11 - left) : well below normal sea-ice extension (negative anomaly close to 2 standard deviation) but less than the previous year (which was in the record).
In Antarctic (fig. 11 - right) : well above normal sea-ice extension anomaly (on the record) with some large regional modulation.

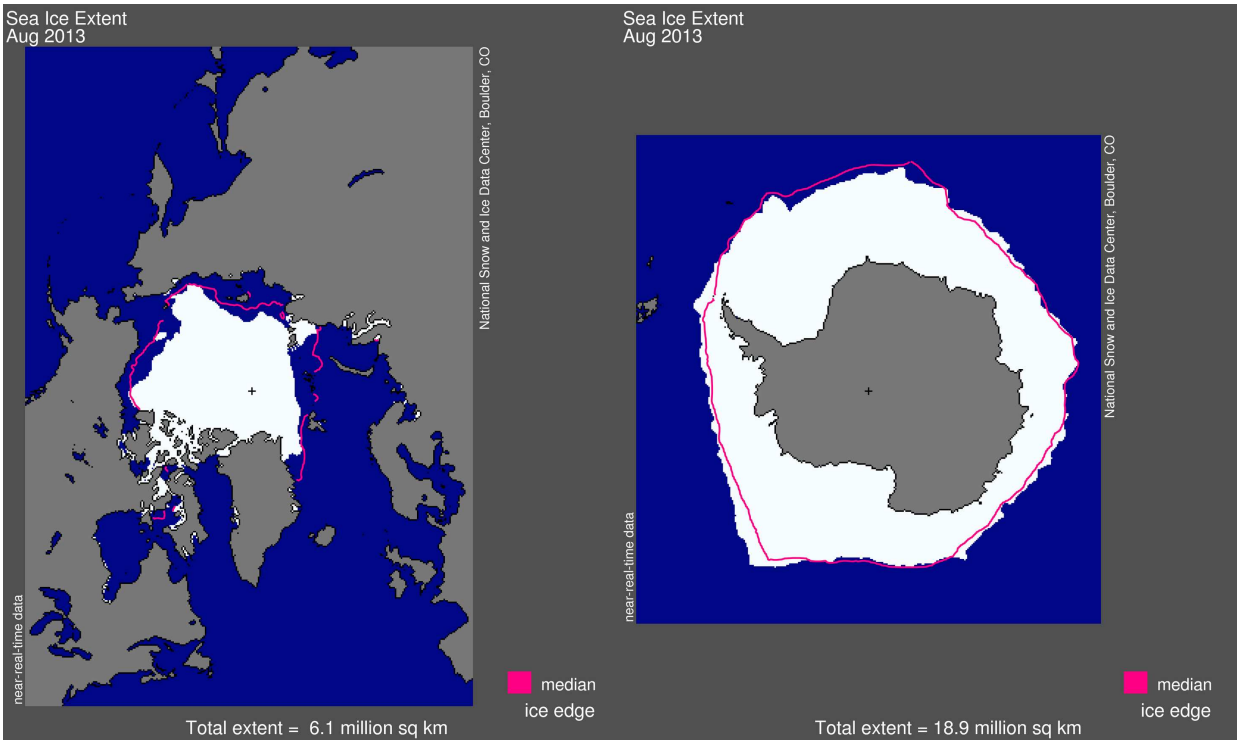


fig.11: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

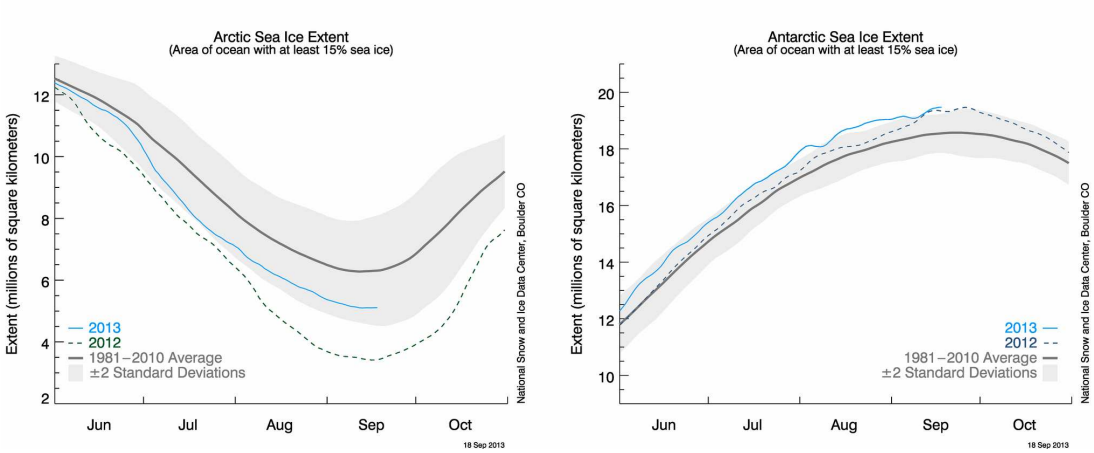


fig. 9bis : Sea-Ice extension evolution from NSIDC
http://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png

II.SEASONAL FORECASTS FOR OND FROM DYNAMICAL MODELS

II.1. OCEANIC FORECASTS

II.1.a Sea Surface Température (SST)

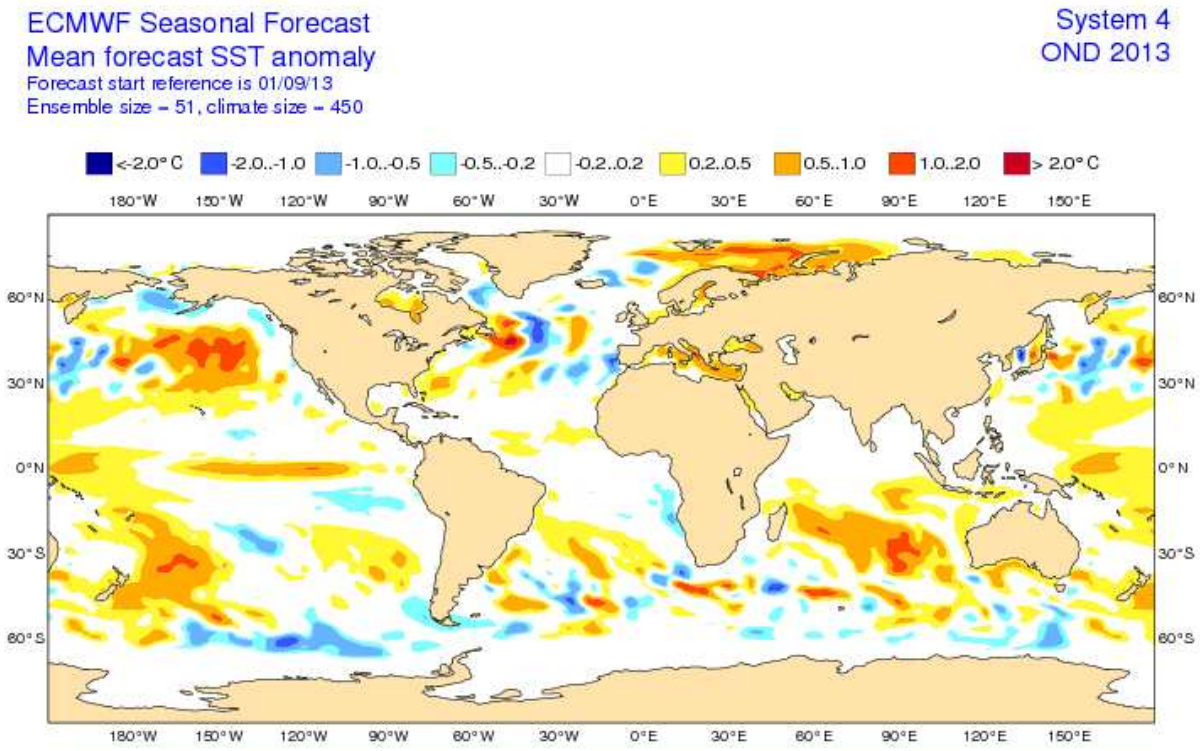


fig.12: SST anomaly forecast (in °C) from ECMWF for OND, issued in September.
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

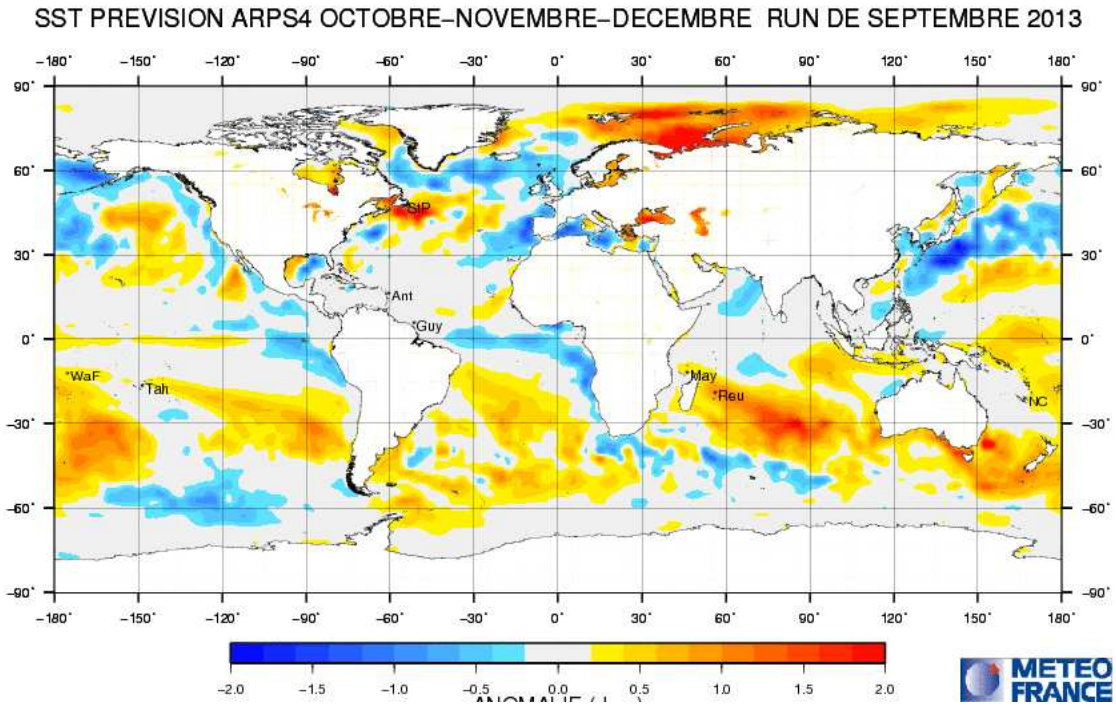


fig.13: SST Anomaly forecast (recalibrated with respect of observation) from Météo-France for OND, issued in September. http://elaboration.seasonal.meteo.fr/

For the 2 individual models :
Whatever the differences in the post-processing of the anomalies (including reference period for the hindcast ; 81-2010 for ECMWF and 91-2010 for MF system 4), the forecasts are quite consistent elsewhere when taking into account the hindcast period differences.
Pacific : consistent signal in both models for a weakening of the positive anomaly in the vicinity of the maritime continent. Some traces of warming in the Central Pacific and weakening of the negative anomaly in the most eastern part. Persistence of the positive anomaly over the SPCZ regions.
Atlantic : in both model consistency in the Tropics and mid-latitudes (both South and North). There are more differences in the equatorial wave guide (mostly colder than normal in MF – not fully explain by the hindcast issue). The ECMWF solution seems to be more realistic.
Indian Ocean : consistent forecast in both models. Persistence of a weak West-East contrast which maintain the IOD on the negative side.

In Euro-SIP :
Some robust patterns appear in the tropics and across the Pacific.
Pacific : Equatorial waveguide : very consistent with MF and ECMWF across the basin (respectively positive anomaly West to the date line, weak positive anomaly in the Central part).
The Western positive anomaly extends along the SPCZ regions. Quite consistent patterns in the sub-tropics and the mid-latitudes of both hemispheres.
Atlantic : Weak signal over the Tropics (both South and North). Little consistency over the North Atlantic sector while there is some consistent signal (warmer than normal) over the Southern part (sub-tropics and mid-latitudes).
Indian Ocean : weak signal over a large portion of the basin to the exception of warmer than normal conditions on the Southern and South-Eastern sides, especially close to the maritime continent.

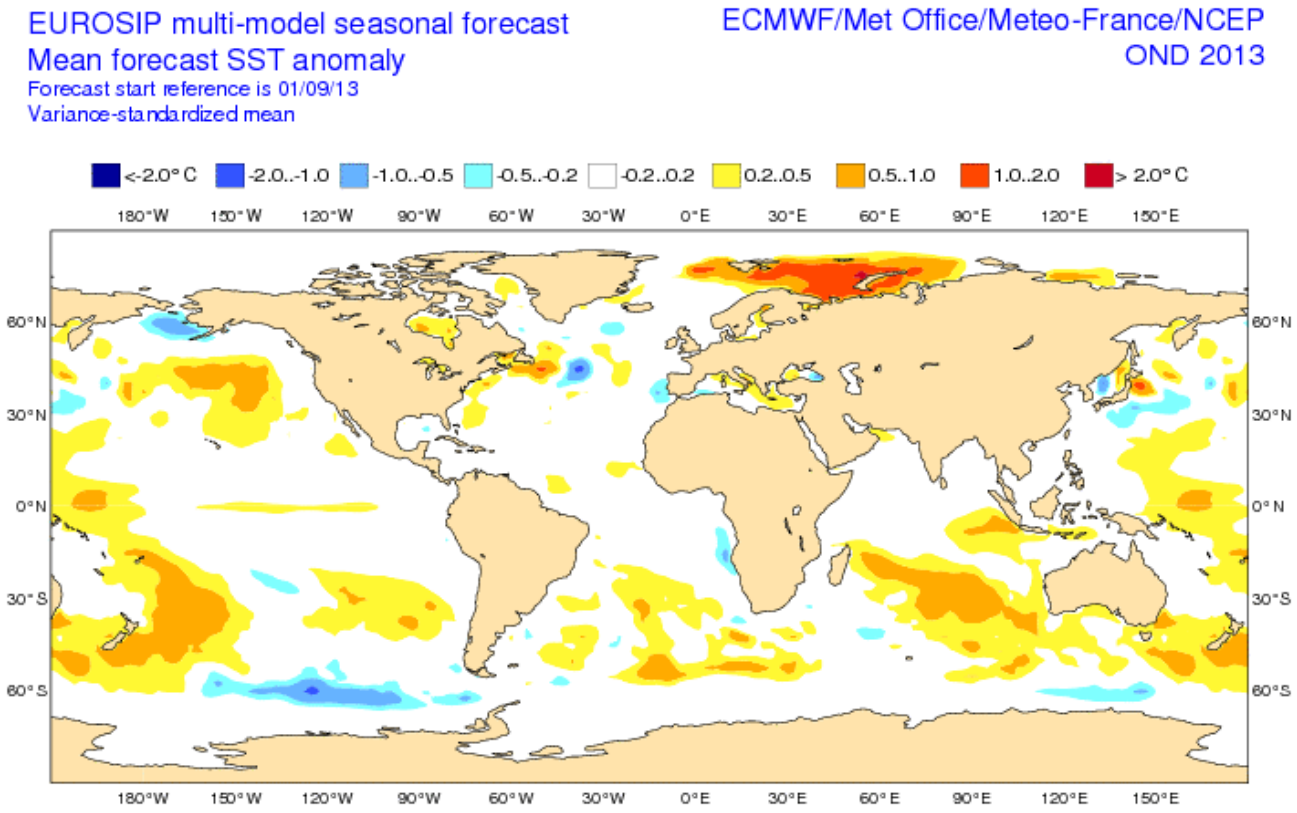


fig.14: SST Forecasted anomaly (in °C) from Euro-SIP for OND, issued in September.

II.1.b ENSO Forecast :

Forecasted Phase for OND : neutral

For OND : the majority of the models indicate close to neutral conditions for the targeted period despite some are close to both Niña and Niño thresholds (trace of a large uncertainty). Most of the dynamical models show a tendency to a slight warming on time and warmer conditions with respect of statistical models.

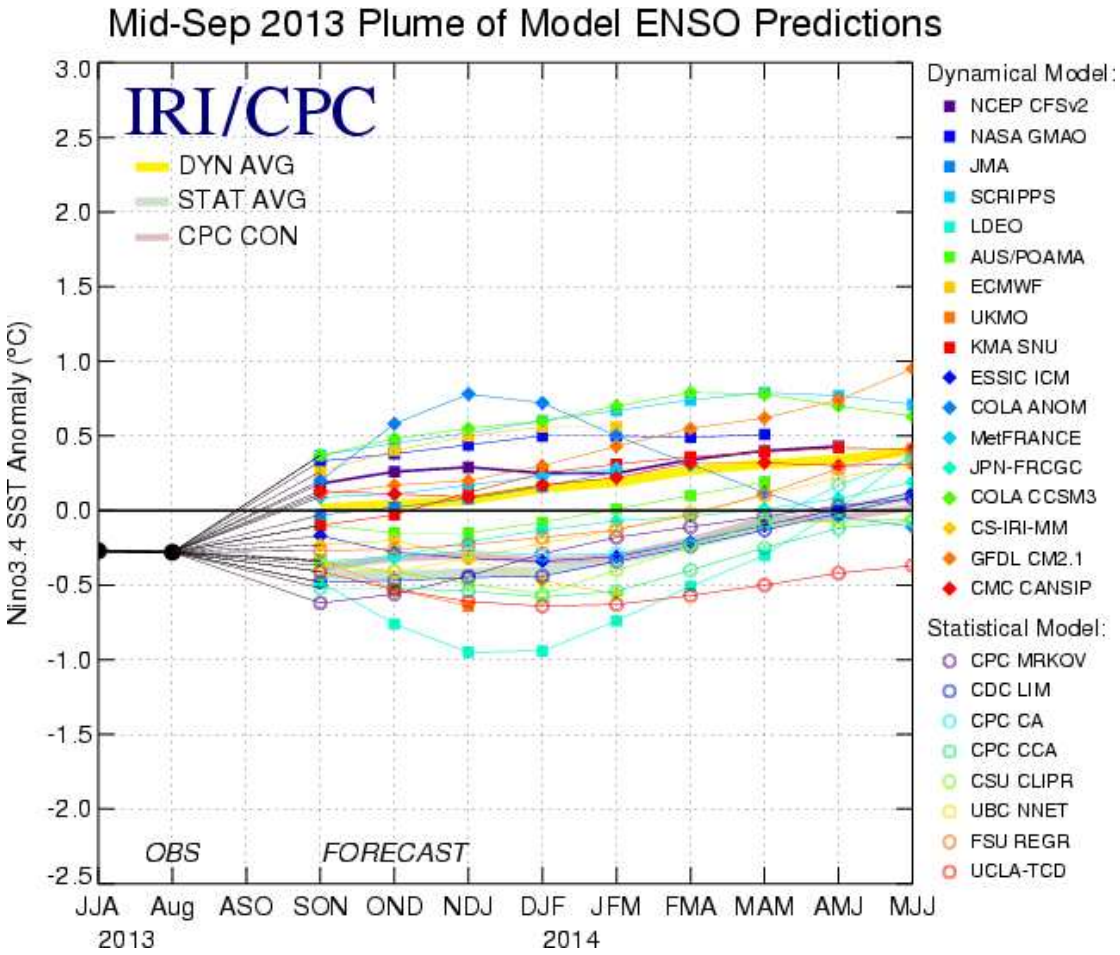


fig.15: Synthesis of Niño 3.4 forecasts (120° to 165°W) issued in September by IRI : http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html

Plumes from Météo-France and ECMWF for the 3 Niño boxes (see definition in Annex – fig. 16) :
In both models and on average, the prevailing conditions are in the normal range for OND. Both models are indicating a progressive warming. One can notice that also in both models the spread dramatically increasing from the Centre up to the East of the basin and in time. Some members are moving close to La Niña conditions while someothers are moving beyond El Niño threshold. In EuroSIP Plumes, close to normal conditions on average and quite large spread indicating a quite large uncertainty.
To be quoted for both models the behaviour with a quick jump in September toward warmer conditions (with respect of observation) ; more important when moving toward Eastern side of the Pacific (rapid warming or modeling issue ?).

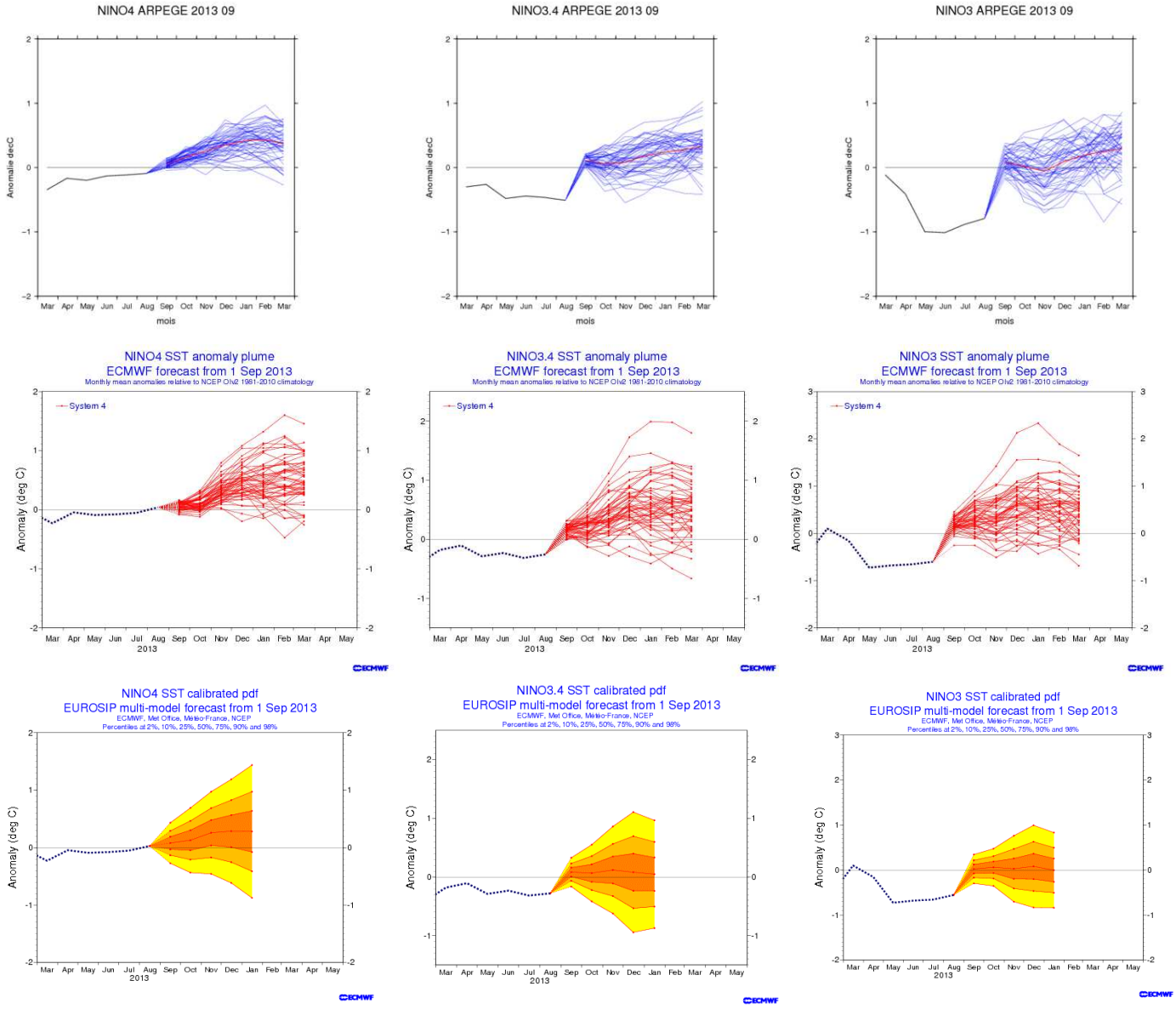


fig.16: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - issued in September (http://www.ecmwf.int/)

II.1.c Atlantic Ocean forecasts :

Forecasted Phase: *close to normal in both Tropics*

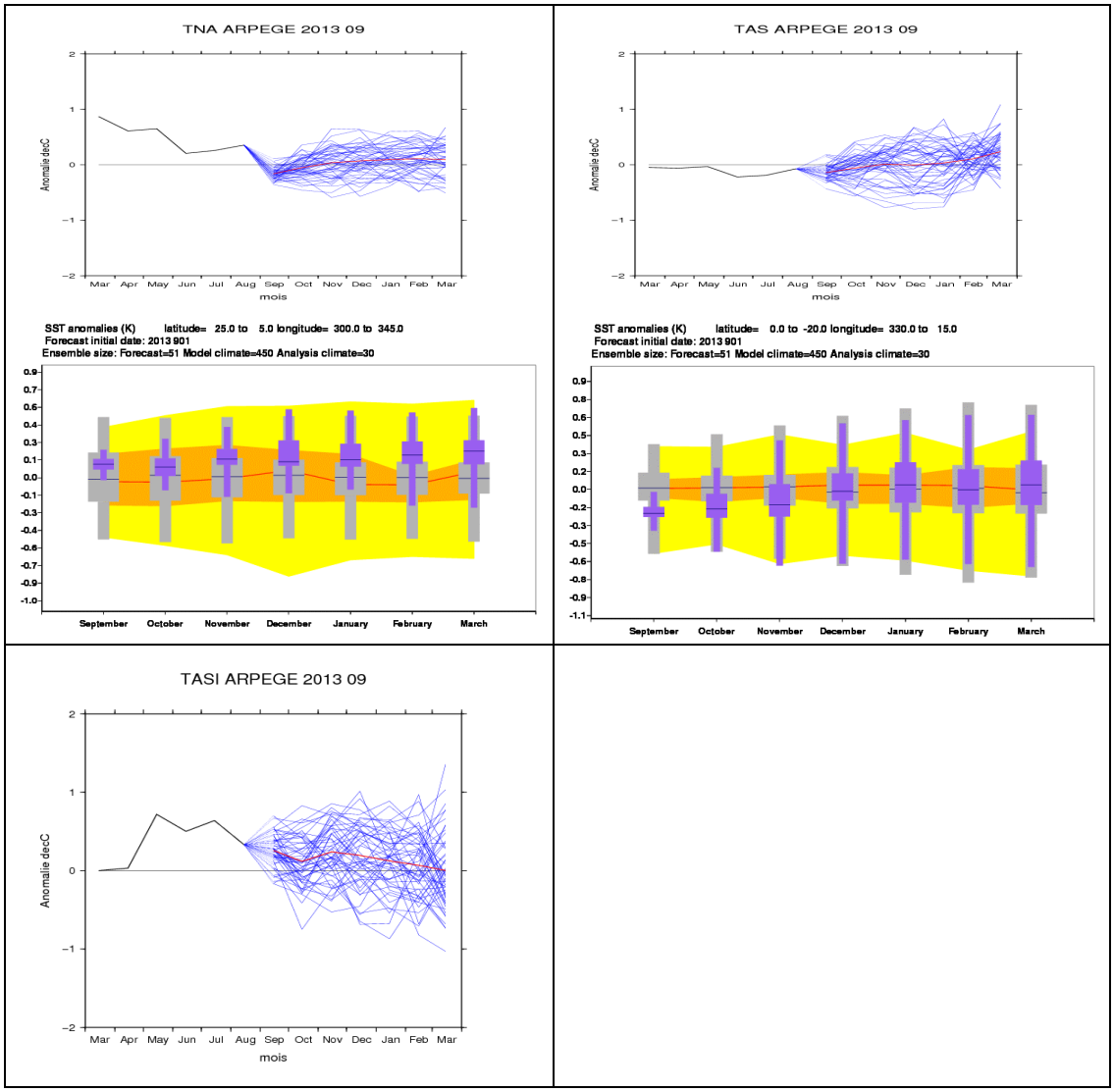


fig.17: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, issued in September, plumes / climagrams correspond to 51 members and monthly means.

North Tropical Atlantic : starting with slightly warmer than normal conditions in ECMWF and slightly colder than normal in MF, the evolution are quite comparable. So taking into account the difference in hindcast periods it could be reasonably consistent (and with a reasonable spread).
South Tropical Atlantic : Slightly colder than normal conditions in both models, it evolves then toward close to normal conditions.
The inter-hemispheric SST gradient is consistent between the two models and slightly positive.
TASI : the TASI index is slightly positive for OND for MF. However the spread is large.

II.1.d Indian Ocean forecasts :

Forecasted Phase: *IOD on the negative side*

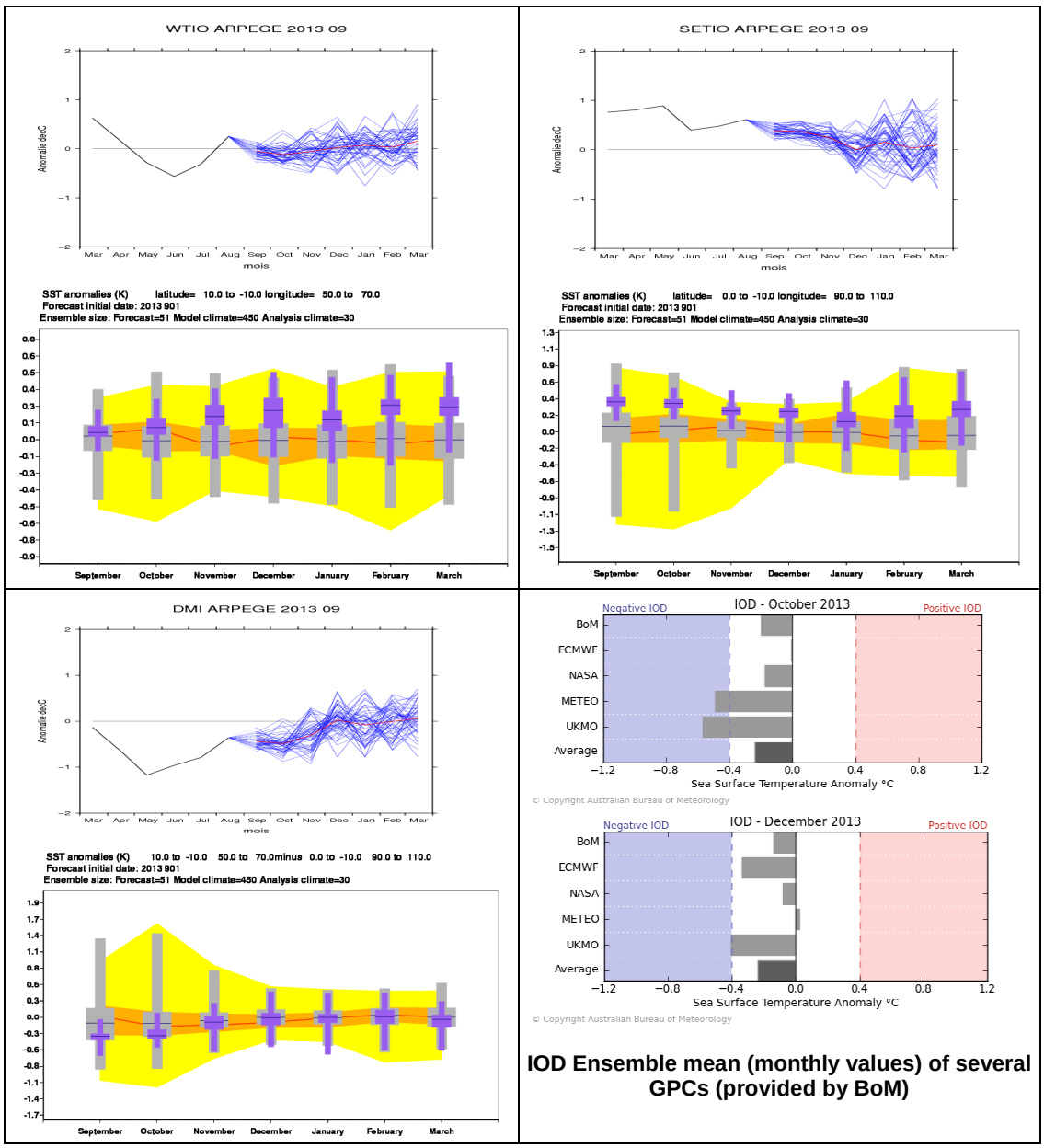


fig.18: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France and ECMWF, issued in September, plumes / climagrams correspond to 51 members and monthly means.

In WTIO : Consistent signal in both models in terms of evolutions with a progressive warming ; both models with reasonable spread and stable conditions along the whole period.

In SETIO : Above normal conditions in both models (consistently with the SSTs behaviour in the vicinity of the maritime continent) and progressive decrease of the anomaly. Consistent signal and little spread in both models.

DMI (IOD) : On the negative side of the IOD for both models (in relationship with SETIO evolutions) and little spread in both models. This tendency is confirmed by other models.

II.2. GENERAL CIRCULATION FORECAST

II.2.a Global Forecast

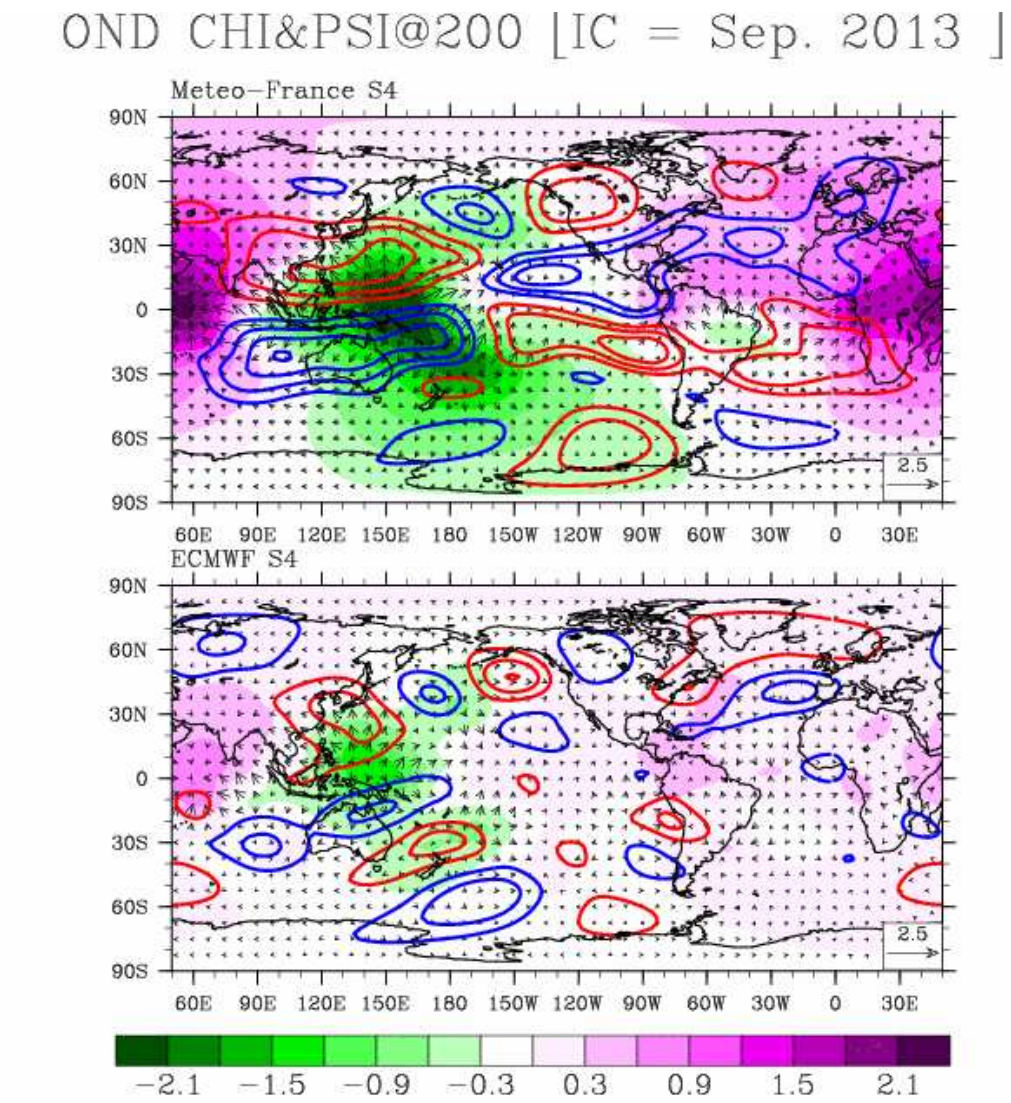


fig.19: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa for OND, issued in September by Météo-France (top) and ECMWF (bottom).

Velocity potential anomaly field (cf. fig. 19 – insight into Hadley-Walker circulation anomalies) :
in the Tropics : atmospheric patterns quite consistent in the Tropics but MF show a larger response with respect to ECMWF's one. Some (but weak) Tropics/Mid-Latitudes linkage in the Northern Hemisphere with a quite large uncertainty in the location.
Over the Pacific : Good consistency between the 2 models on both the Western and Eastern parts ; negative anomaly over the maritime continent and the warm pool and positive anomaly close to Central America. Consequently Divergent circulation anomaly (upward motion) over the Western Tropics extending mainly along the SCPZ. On the Eastern part of the basin convergent circulation anomaly (downward anomaly motion). The MF response (vs ECMWF) is stronger on both sides.
Over Indian Ocean : Consistent signal in both models with Divergent circulation anomaly (extension from the Western Pacific cell) on the most eastern part and enhanced Convergent circulation anomaly close to the Equator on the Western part ; this later anomaly extending then across Africa in MF up to the Guinean Gulf (with little traces also in ECMWF). This pattern is consistent with the negative IOD.

Over Atlantic : Little signal in ECMWF (to the exception of a weak signal starting over the Gulf of Mexico) while in MF there are Convergent circulation (downward motion) anomalies across Northern Tropics. These differences are likely related to the differences in SST scenarios.

Stream Function anomaly field (cf. fig. 19 – insight into teleconnection patterns tropically forced) :
In both models, over the Pacific the atmospheric response is quite consistent in both hemispheres ; the differences being related to the differences in the intensity of the response (see above discussion) and possibly also to the difference of resolution.
Over the Pacific there is some traces of signal propagation from the Western enhanced divergent circulation toward Alaska. However, the patterns are weaker and smaller in ECMWF (possibly influence of the resolution ?) leading to differences in terms of impact over the North American continent. The Eastern dipole (related to the convergent circulation anomaly) quite conspicuous in MF seems to strengthen the atmospheric response across North America but only in MF.
Over the North Atlantic and despite some model differences already quoted over the Pacific there is some consistency with a negative/positive dipole between the sub-tropics/high latitudes. To be quoted in ECMWF some possible (but weak) connection with the Tropics. However it's seems difficult to infer the atmospheric response related from a Tropical forcing ; likely some signal is coming from the polar vortex. As a conclusion the predictability is still limited over Europe and more generally over mid-latitudes regions. One can infer some predictability in the Tropics over the Western Pacific, the Indian Ocean, Central America and the Northern part of South America and possibly East Africa and close to the Guinean Gulf..

II.2.b North hemisphere forecast and Europe

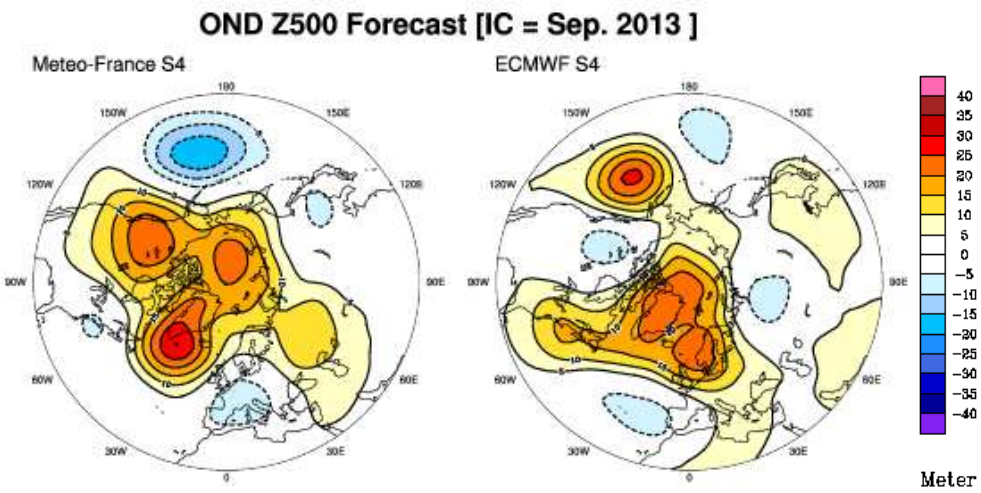


fig.20: Anomalies of Geopotential Height at 500 hPa for OND, issued in September, from Meteo-France (left) and ECMWF (right). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip

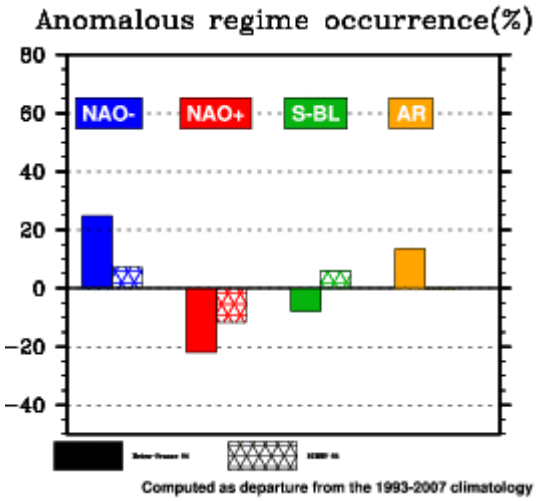


fig.21: North Atlantic Regime occurrence anomalies from Météo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

Geopotential height anomalies (fig. 20 – insight into mid-latitude general circulation anomalies) :
As seen on the Stream Function anomalies, there is a consistent signal in Stream Function Anomalies over North Atlantic. However, most of the signal in the Geopotential Heigh seems to come from the Polar Vortex. So it's difficult to attribute these anomalies to tropical forcing sources. The differences between the two models can likely be related to the model uncertainty.
North Atlantic Circulation Regimes (fig. 21) : As a consequence, there is some consistent signal in the regimes forecast ; exceedance of NAO – circulations counterbalanced by a deficit of NAO + regimes. However, because of the transition period (fall), the impact of such circulations is difficult to infer as it could be very different with respect of the time occurrence (beginning or end of the period).
General atmospheric circulation in MF in the low troposphere (see fig. 22) : the zonal and meridionnal circulation over Europe show a weak but consistent signal with respect of the exceedance of NAO – situations.

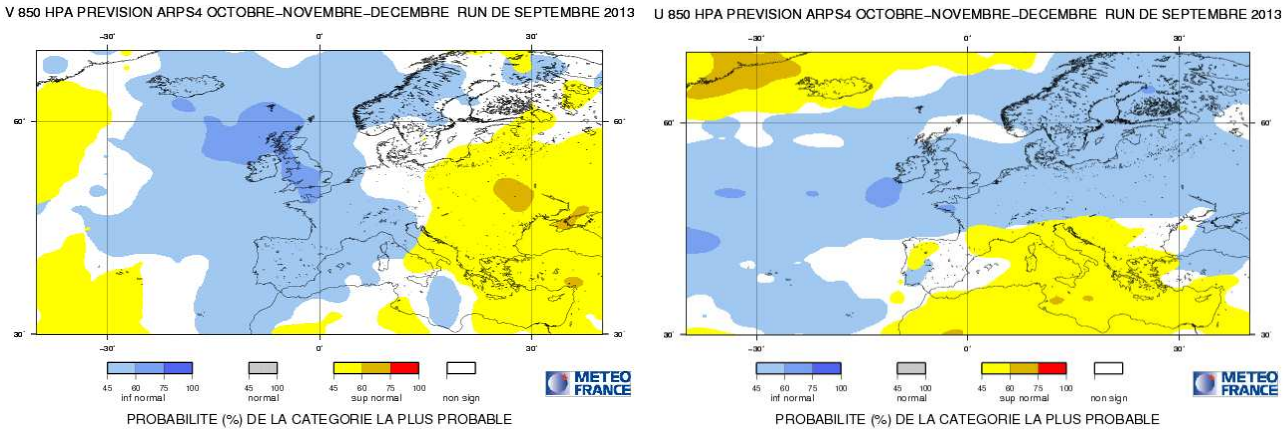


fig.22: Most likely category for the meridional (left) and zonal (right) wind at 850 hPa for OND, issued in September from Météo-France.

II.3. IMPACT : TEMPERATURE FORECASTS

II.3.a ECMWF

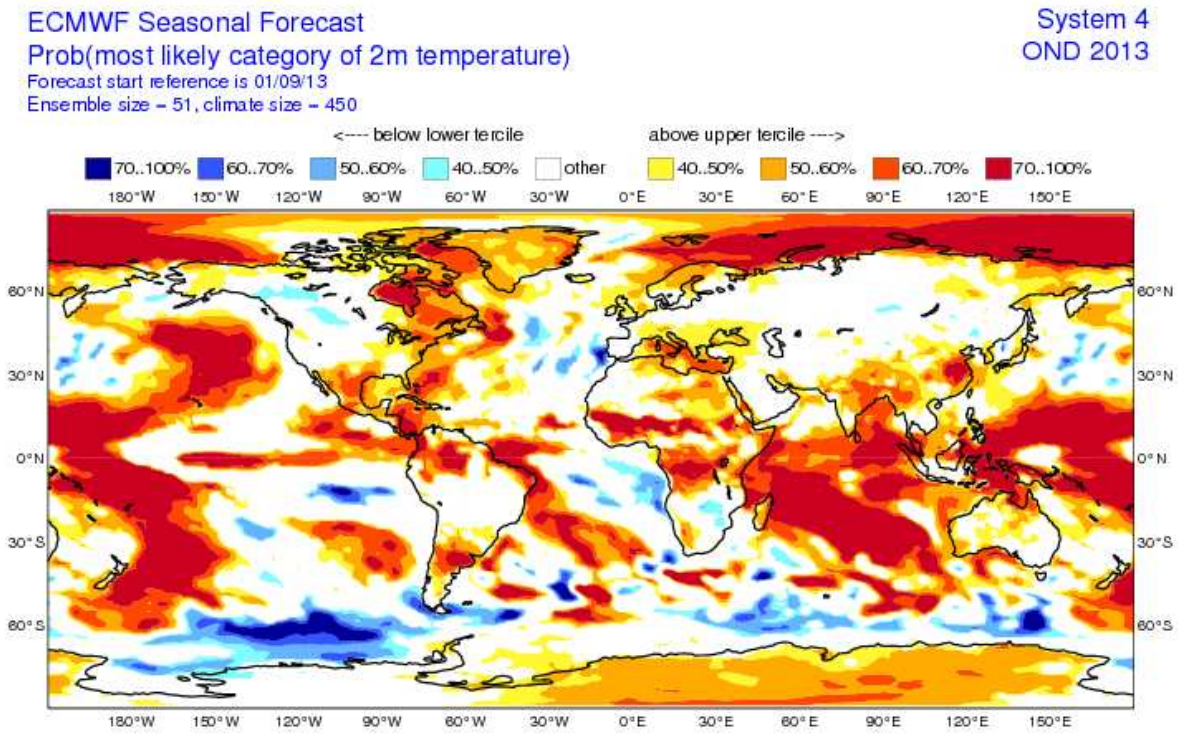


fig.23: Most likely category probability of T2m from ECMWF for OND, issued in September. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

II.3.b Météo-France

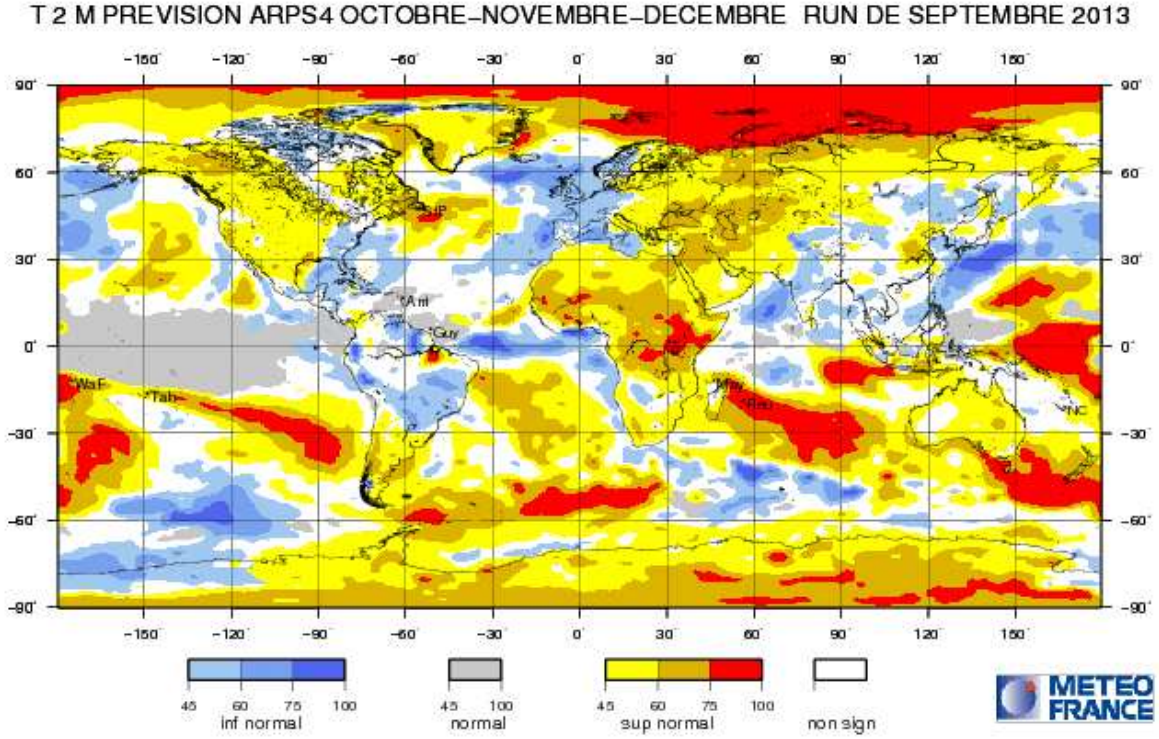


fig.24: Most likely category of T2m for OND, issued in September. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.3.c Met Office (UKMO)

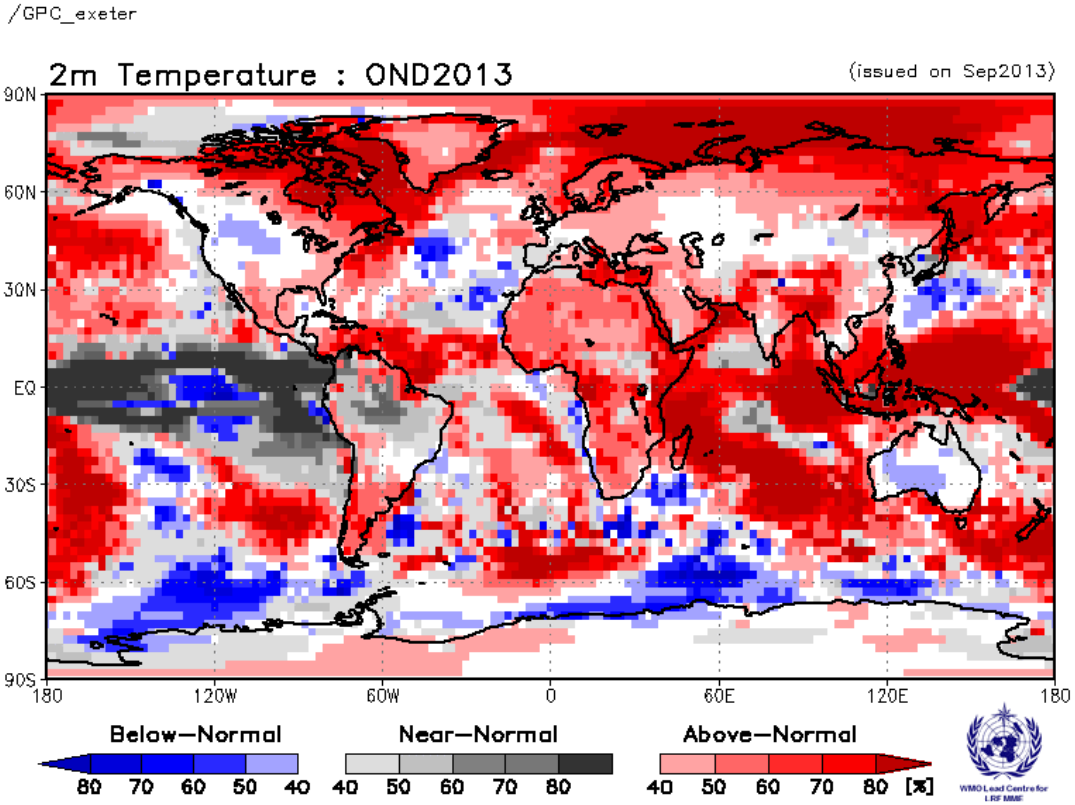


fig.25: Most likely category of T2m Anomaly for OND, issued in September from UK Met Office. https://www.wmolc.org/

II.3.d Climate Prediction Centre (CPC)

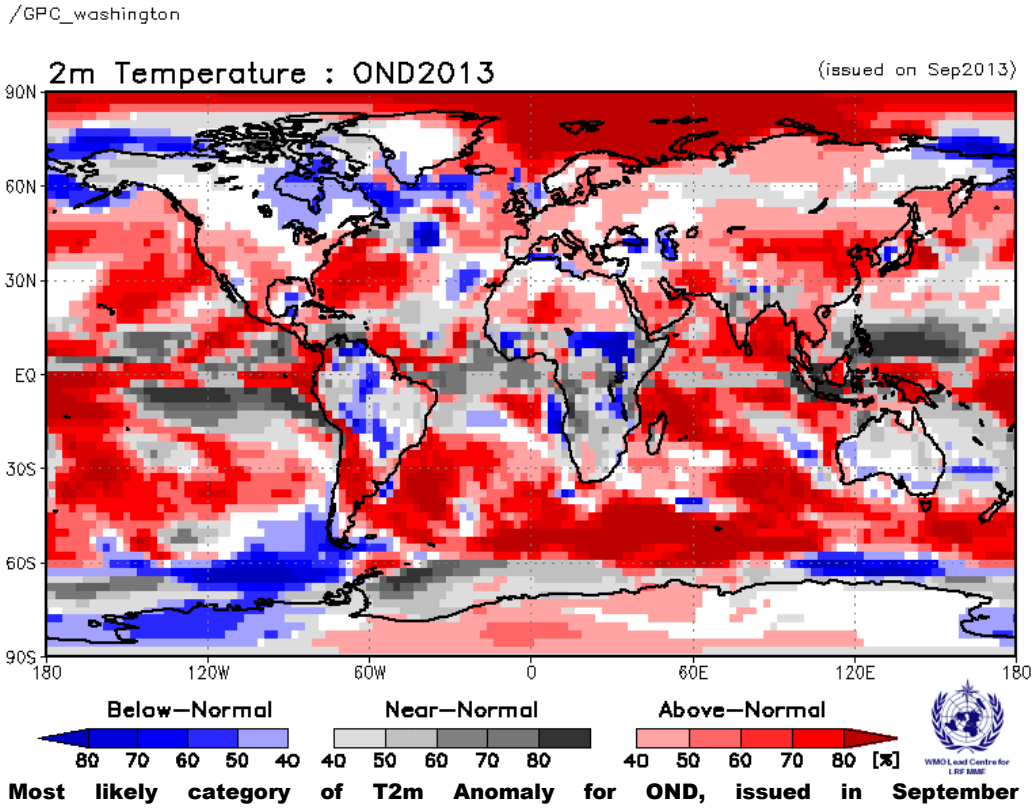


fig.26: Most likely category of T2m Anomaly for OND, issued in September from CPC. https://www.wmolc.org/

II.3.e Japan Meteorological Agency (JMA)

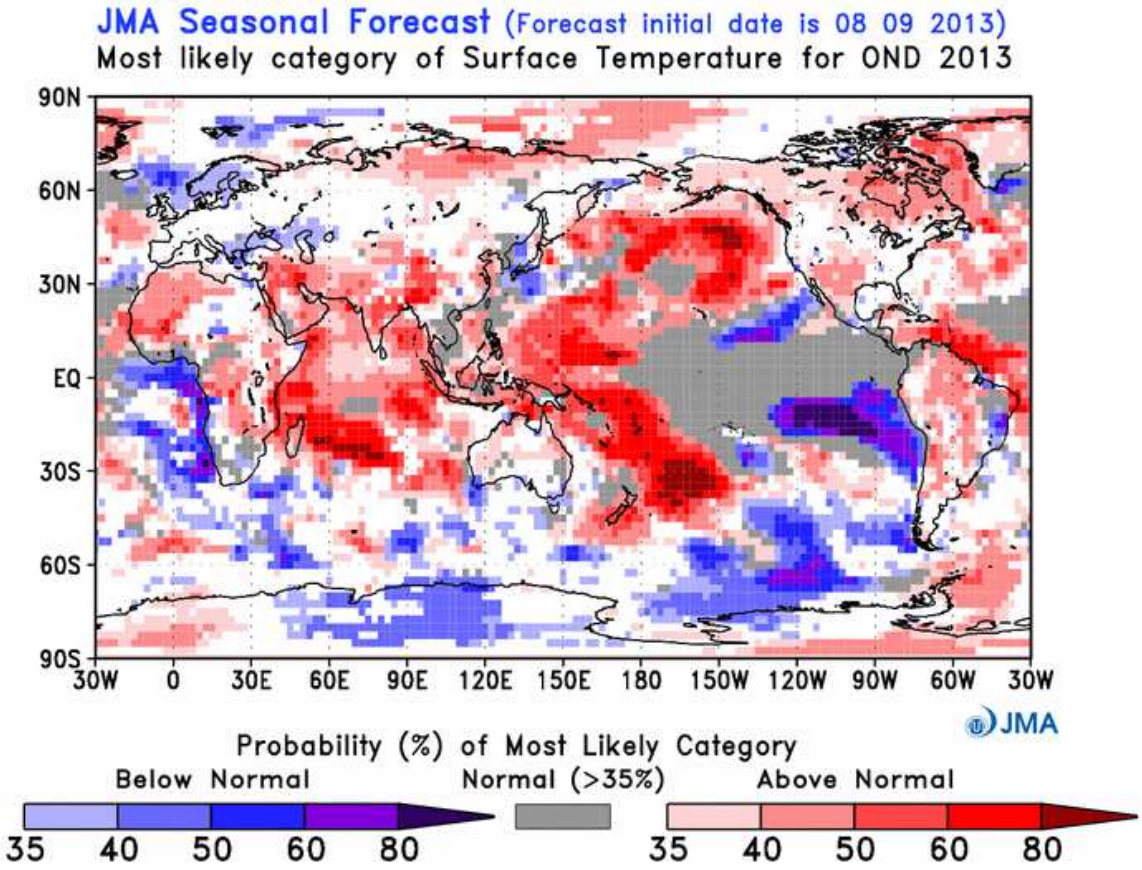


fig.27: Most likely category of T2m for OND, issued in September. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/

II.3.f Lead Centre on Multi Model Ensemble (LCMME)

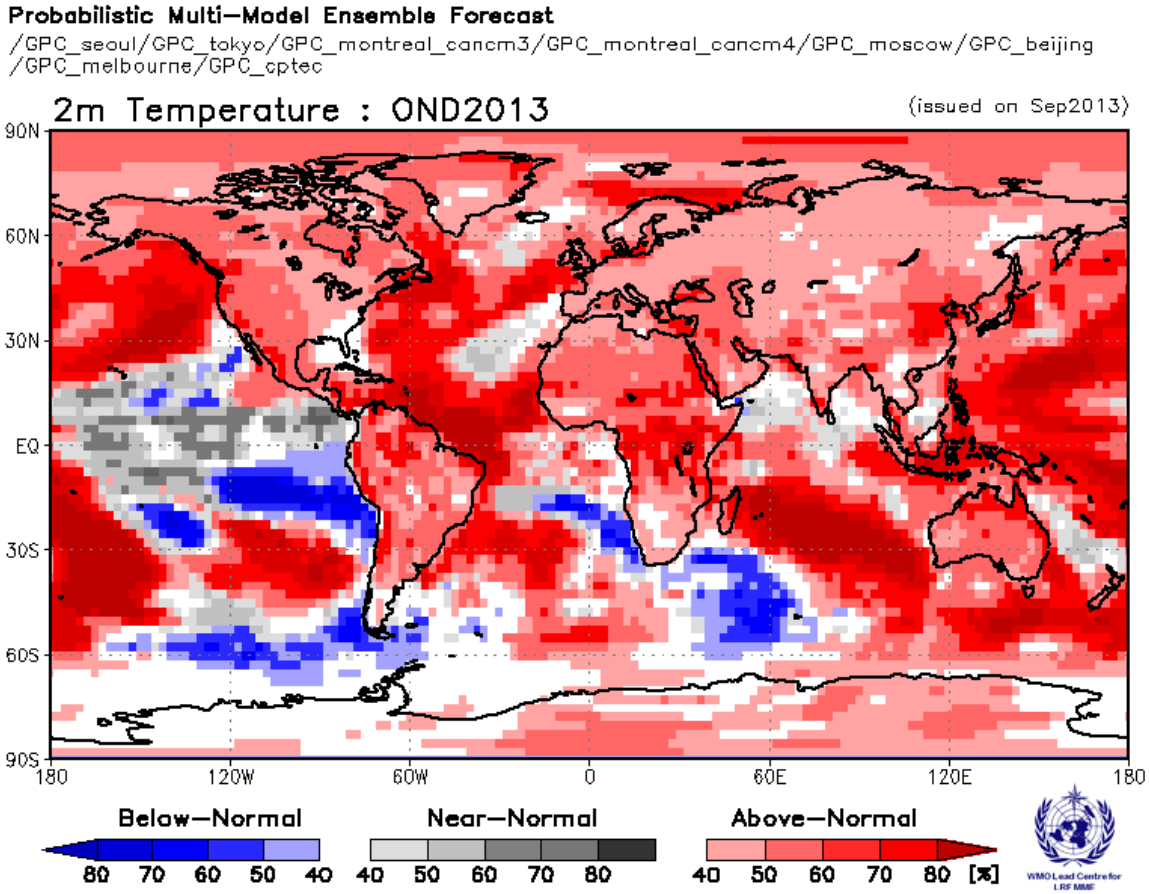


fig.28: MME most likely category of T2m for OND, issued in September from LC-MME. The MME composition corresponds to the GPCs not used in EuroSIP https://www.wmolc.org/

II.3.g Euro-SIP

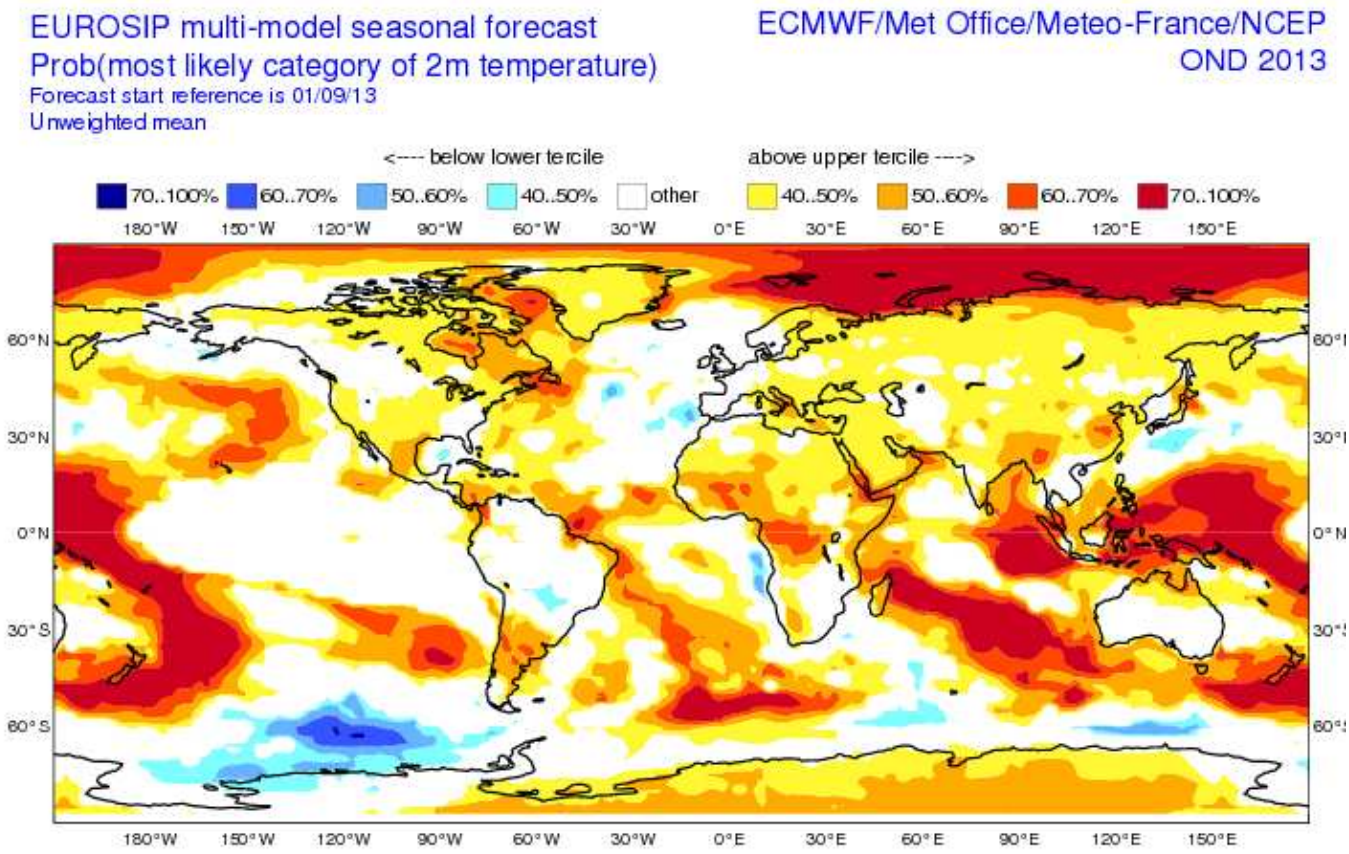


fig.29: Multi-Model Probabilistic forecasts for T2m from EuroSip for OND, issued in September. (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).

http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

North-America : enhanced probabilities North to the Great Lakes and from the Great Lakes up to Mexico. Same signal over part of Central America and the Caribbean.
South-America : Some consistent signal over the southern part of the continent (warmer than normal).
Australia : traces of warmer than normal over the Northern coastal part of the continent.
Asia : Mostly Warmer than normal conditions more or less everywhere with a very strong probability in the vicinity of the maritime continent.
Africa : Warmer than normal conditions over a large portion of the continent (especially North to the equator).
Europe : Warmer than normal conditions over the most Eastern regions including the Eastern Mediterranean basin.

II.4. IMPACT : PRECIPITATION FORECAST

II.4.a ECMWF

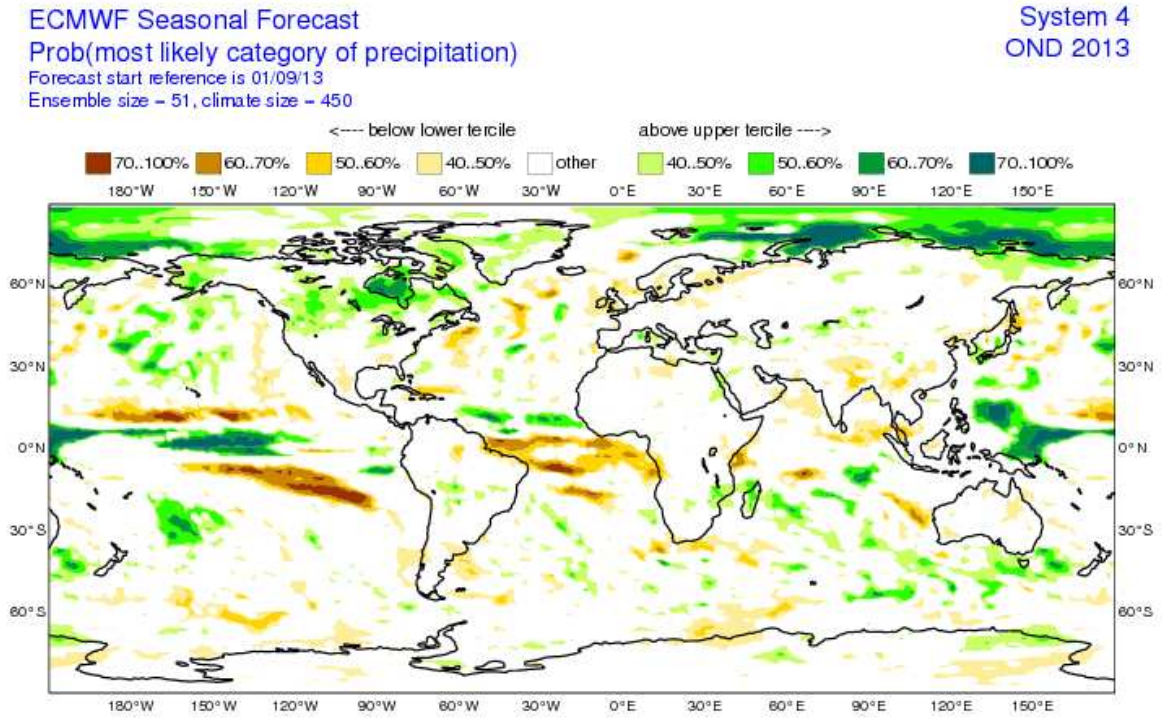


fig.30: Most likely category probability of rainfall from ECMWF for OND, issued in September. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/charts/seasonal_charts_s2/

II.4.b Météo-France

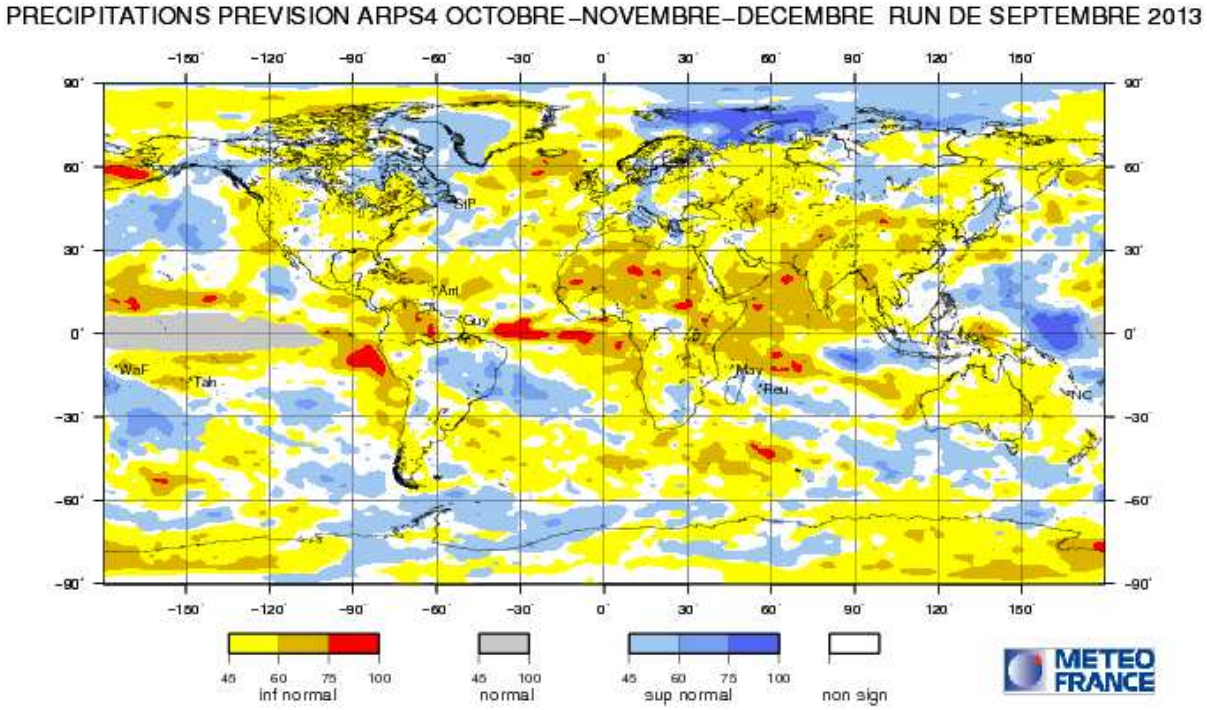


fig.31: Most likely category of Rainfall for OND, issued in September. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.4.c Met office (UKMO)

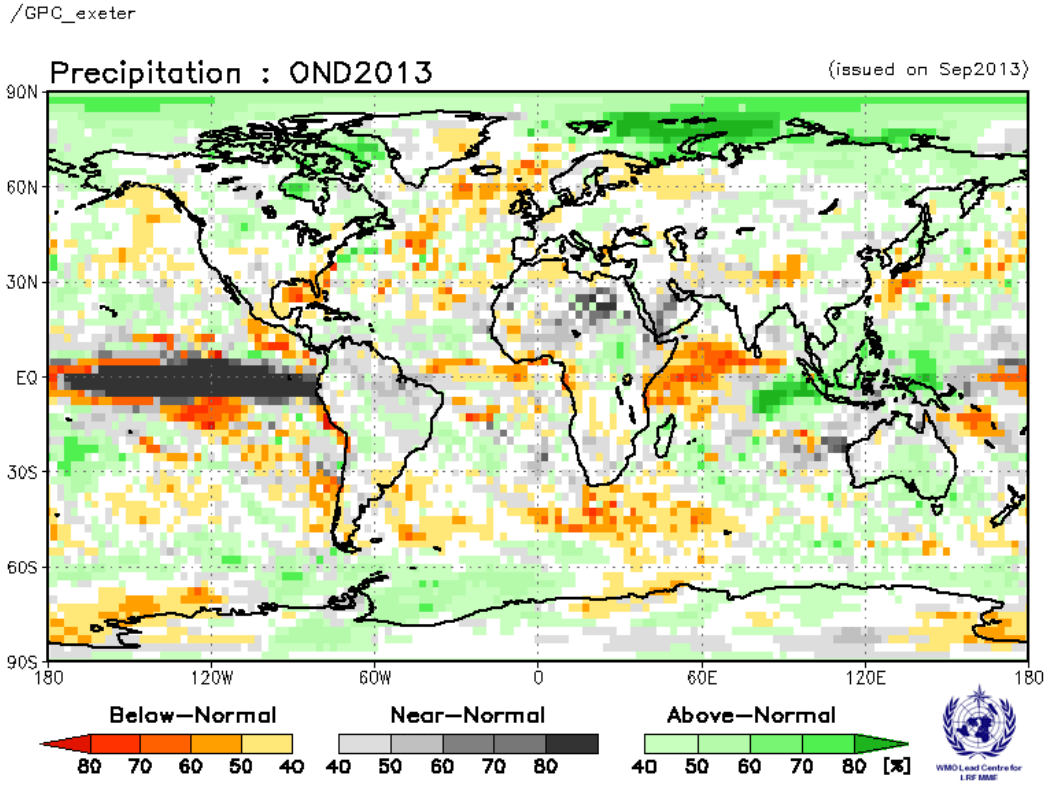


fig.32: Most likely category of T2m Anomaly for OND, issued in September from UK Met Office. https://www.wmolc.org/

II.4.dClimate Prediction Centre (CPC)

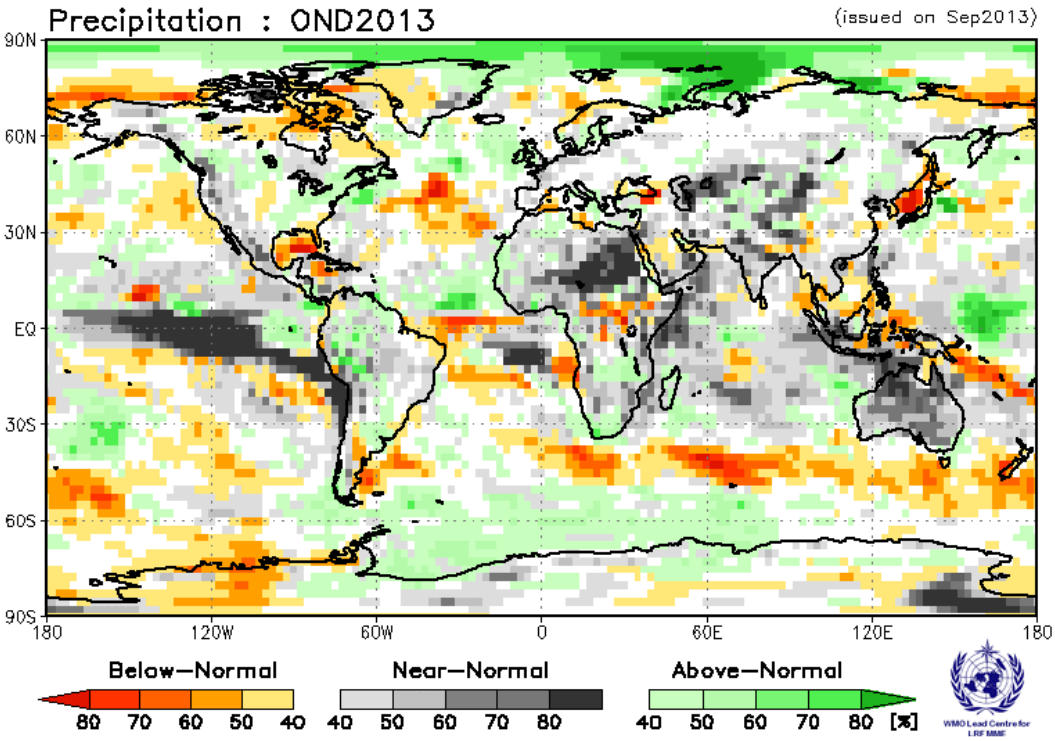


fig.33: Most likely category of Rainfall for OND, issued in September from CPC. https://www.wmolc.org/

II.4.e Japan Meteorological Agency (JMA)

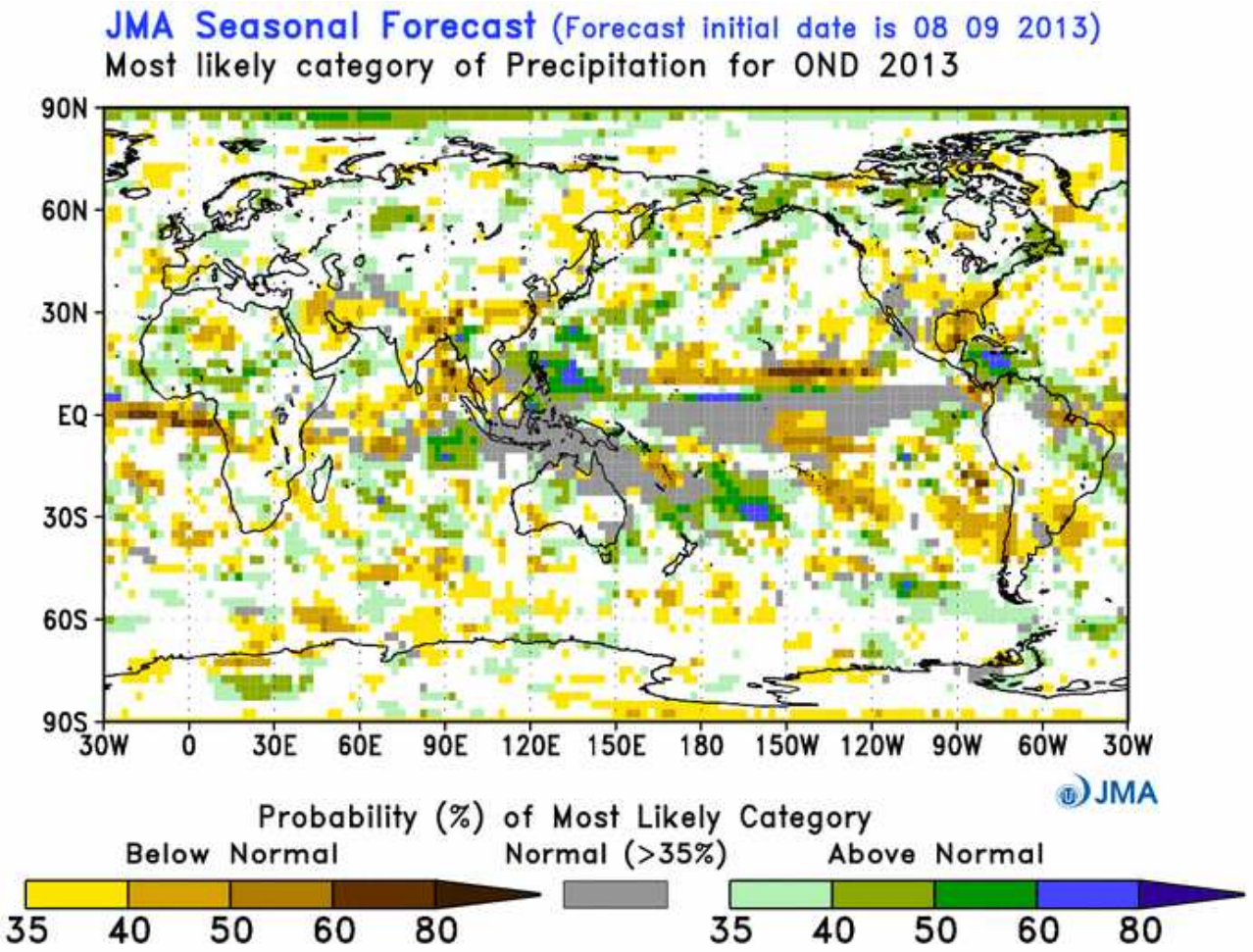


fig.34: Most likely category of Rainfall for OND, issued in September from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/

II.4.f Lead Centre on Multi Model Ensemble (LCMME)

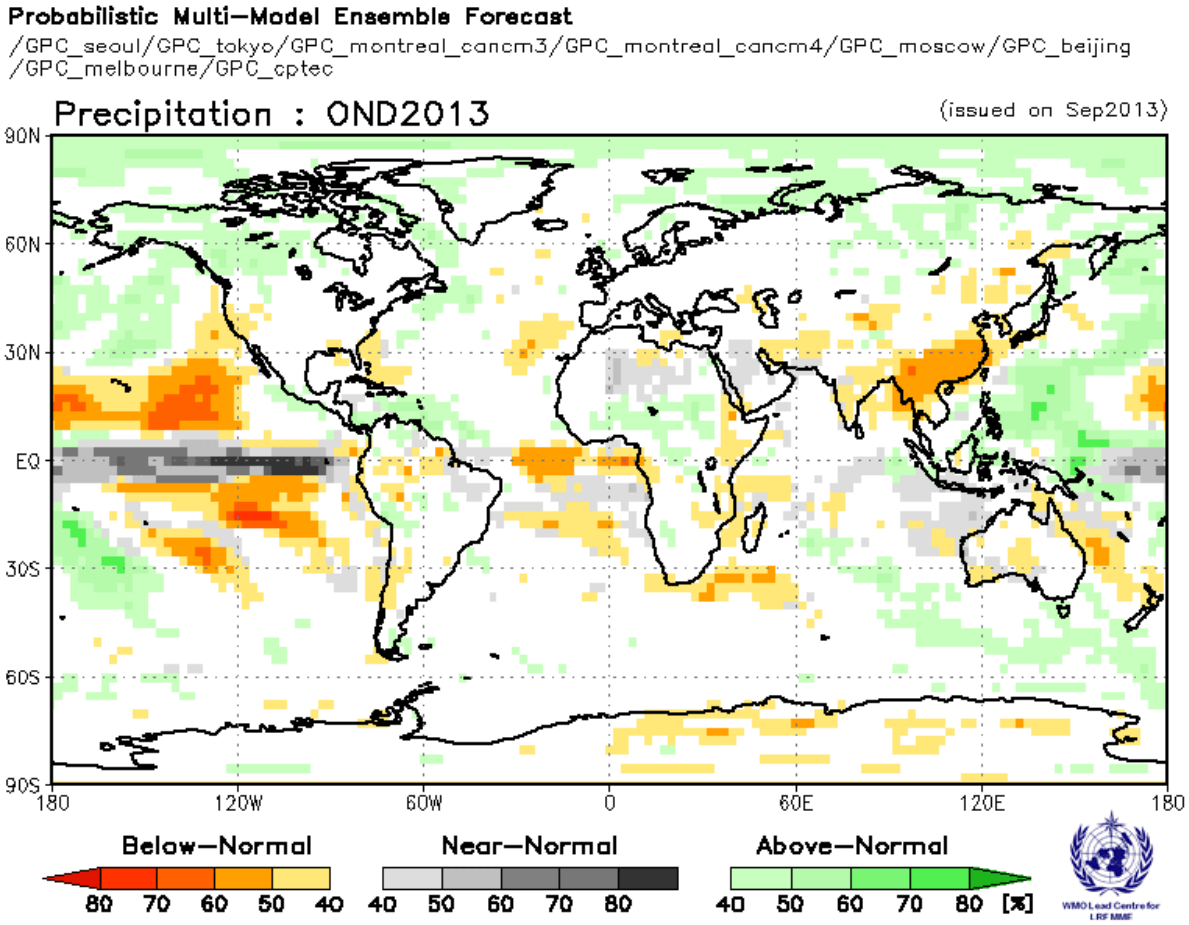


fig.35: **MME most likely category of Rainfall for OND, issued in September from LC-MME. The MME composition corresponds to the GPCs not used in EuroSIP. https://www.wmolc.org/**

II.4.g Euro-SIP

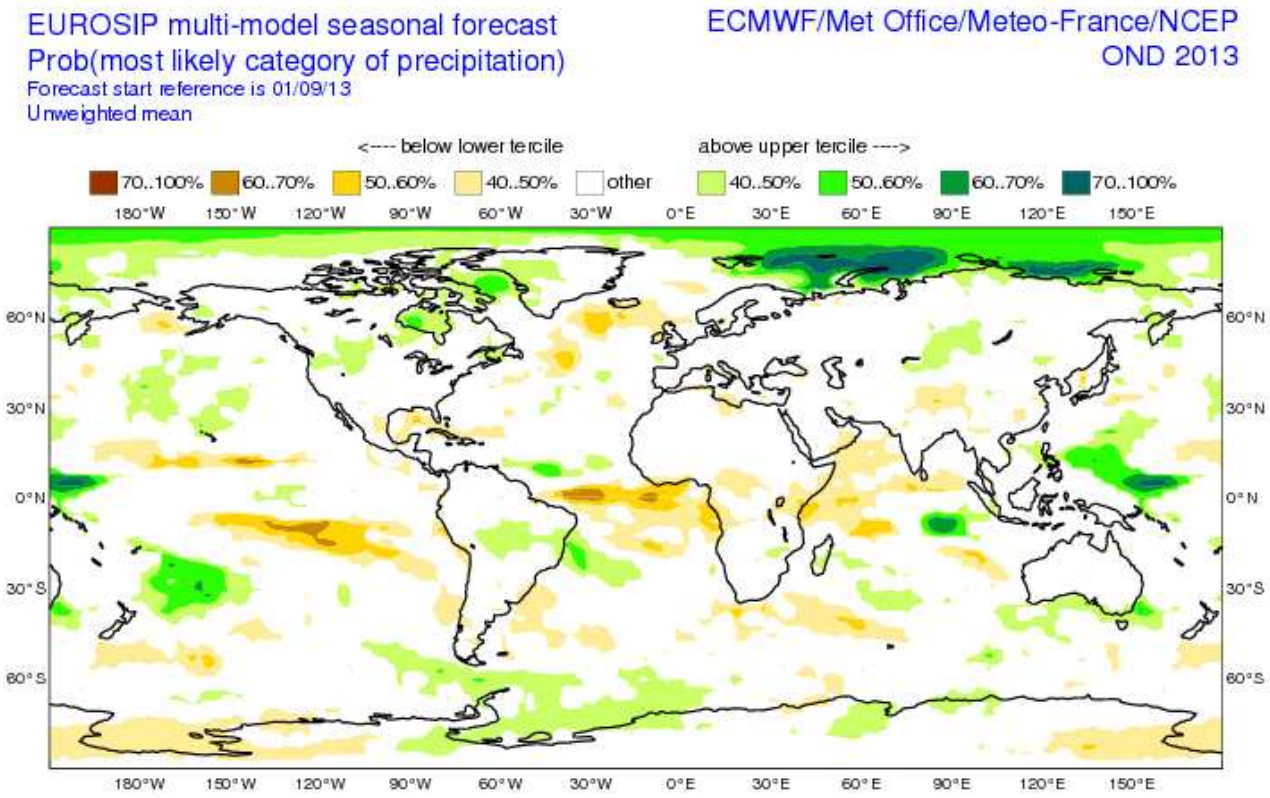


fig.36: Multi-Model Probabilistic forecasts for precipitation from EuroSip for OND, issued in September. (2 Categories, Below and Above normal – White zones correspond to No signal).

http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

A few consistent signal in the Tropics ; enhanced probabilities for wet scenarios in the vicinity of the warm pool, Brazil and Bolivia. Enhanced probabilities for dry scenarios over Eastern and Equatorial Africa and in the vicinity of the Guinean Gulf.

For Europe No signal more or less everywhere (and more generally for most of the mid latitude of Northern Hemisphere, consistently with discussion on predictability and teleconnections). To be quoted the weak signal for Dry scenario between Island and UK.

II.5. REGIONAL TEMPERATURES

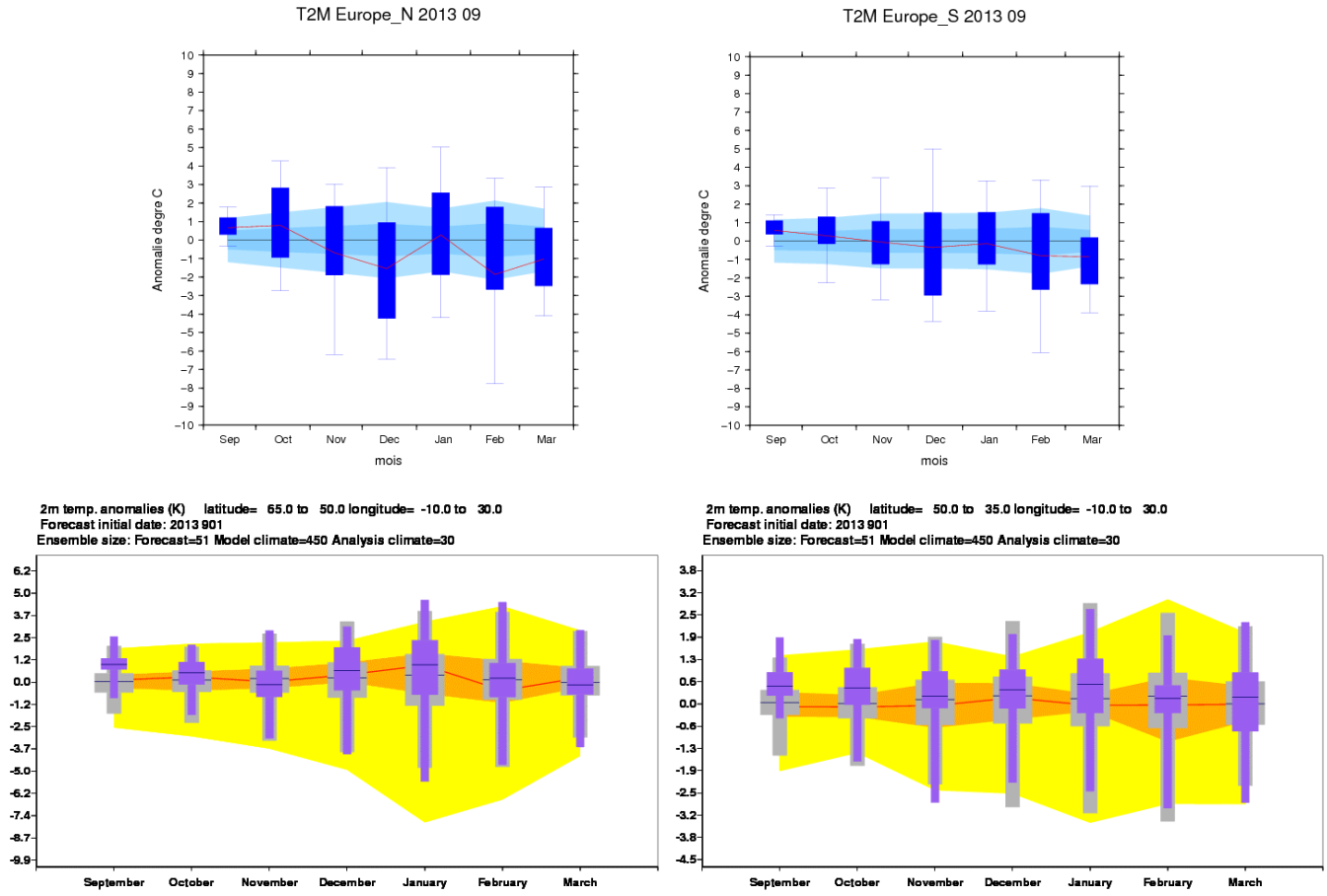


fig.37: Climagrams for T2m in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom) issued in September.

For Northern: Starting with Above normal conditions, ECMWF return close to normal in November while MF evolve toward Below normal conditions. Note the large spread (with respect of the climate reference) in both models (especially MF which is very large).

For Southern Europe: starting with Above normal conditions, ECMWF remains in such a scenario for the whole period while MF evolve toward slightly Below normal conditions. The spread is very large in both models.

Take care that due to the system change (from system 3 to system 4) the verification scores are not available yet.

In Météo-France climagrams, the distributions of area averages are displayed for the seasonal forecast (dark blue boxes and wiskers), and the climate reference on the 29-year hindcast period (blue and light blue bands). The limits of the boxes (ensemble forecast) and blue band (climate reference) correspond to the upper and lower terciles. The limits of the wiskers (ensemble forecast) and light blue band (climate reference) correspond to the mean + 1 standard deviation and the mean – 1 standard deviation. The red line corresponds to the ensemble mean.

REGIONAL PRECIPITATIONS

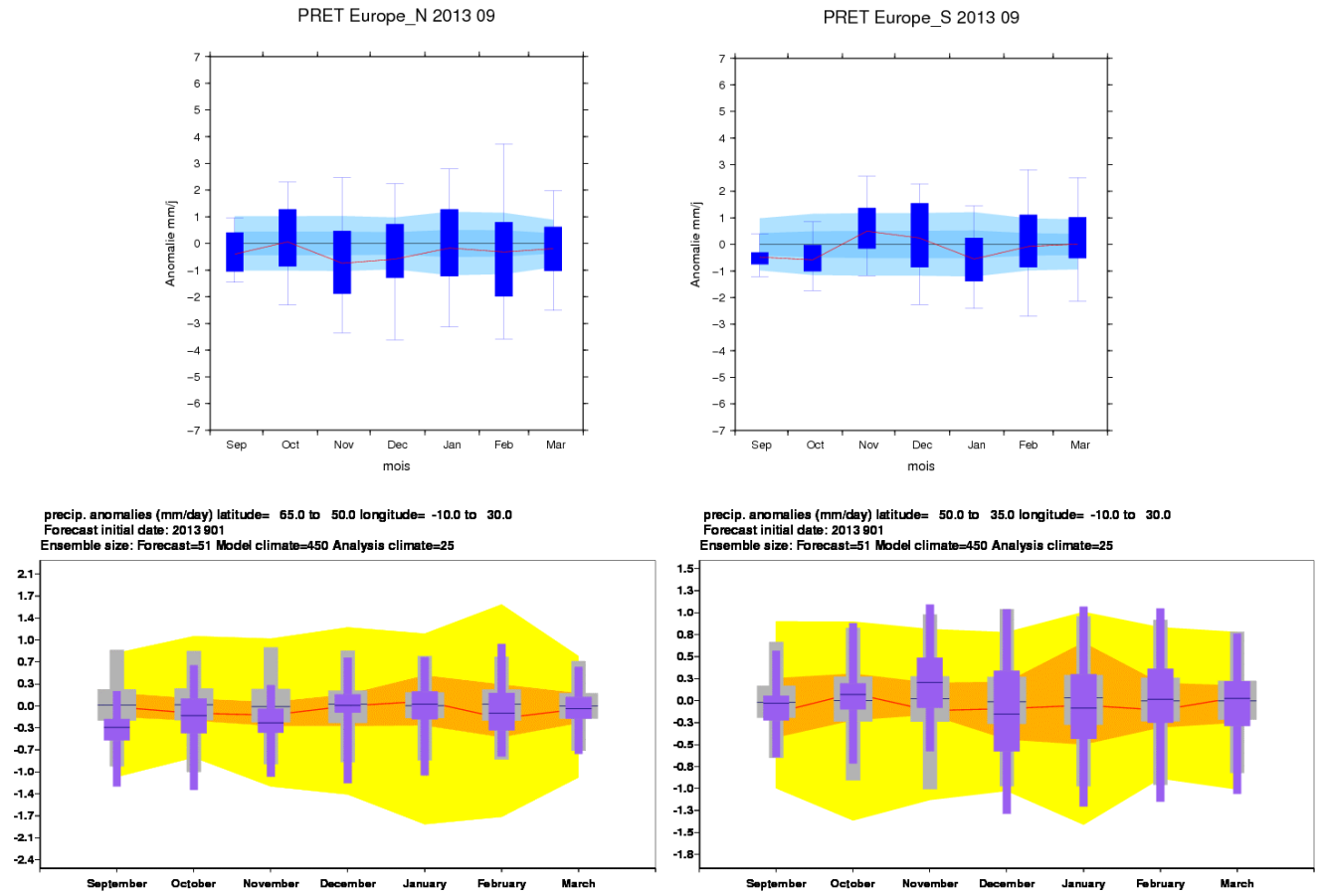


fig.38: Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom), issued in September.

Only little consistency between the 2 models.

For Northern Europe : Drier than normal in September and then on average Below normal conditions in both models over OND. The spread is smaller in ECMWF vs MF.

For Southern Europe : Some consistency for Above normal conditions (despite located at different months). The spread is large since October in ECMWF and November in MF.

Adding the low predictability and model uncertainties considerations, these intraseasonal evolutions should be considered with caution.

Take care that due to the system change (from system 3 to system 4) the verification scores are not available yet.

In Météo-France climagrams, the distributions of area averages are displayed for the seasonal forecast (dark blue boxes and wiskers), and the climate reference on the 29-year hindcast period (blue and light blue bands). The limits of the boxes (ensemble forecast) and blue band (climate reference) correspond to the upper and lower terciles. The limits of the wiskers (ensemble forecast) and light blue band (climate reference) correspond to the mean + 1 standard deviation and the mean – 1 standard deviation. The red line corresponds to the ensemble mean.

II.6. MODEL'S CONSISTENCY

II.6.a GPCs consistency maps

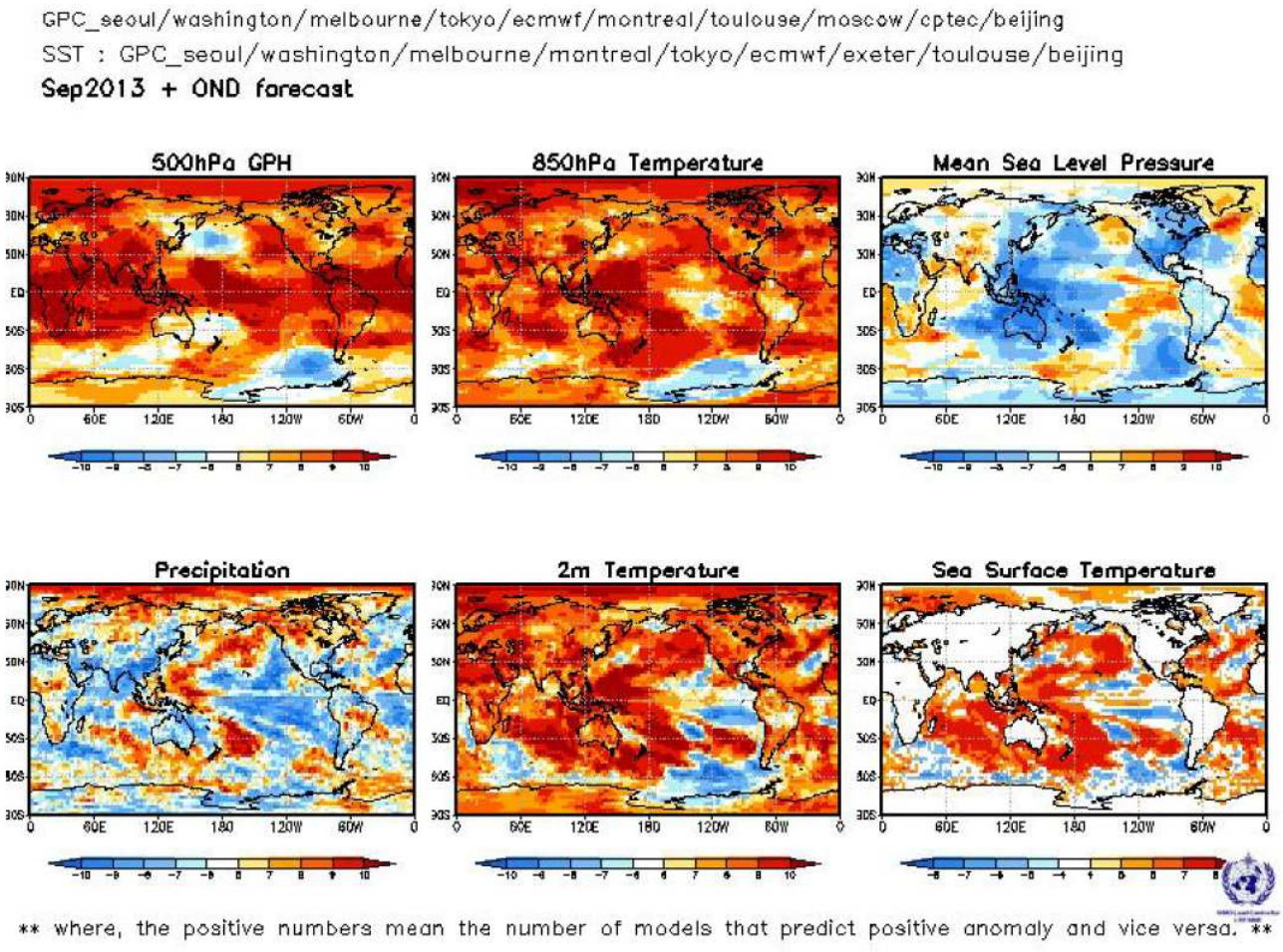


fig.39: ***GPCs Consistency maps from LC-MME*** *http://www.wmolc.org/*

For SST : Consistency over the Western Pacific (Warmer than normal). The slight warm conditions in the central equatorial wave guide is also present. In the Indian ocean, large convergence for Above normal conditions in the Eastern part and over the Southern sub-Tropics. The negative IOD is also conspicuous. For the Atlantic, consistency in the Northern Tropics and Southern Sub-Tropics and less consistency in the Southern Tropics and the high latitudes of the Northern hemisphere.

For Z500 : Large consistency over Tropics and Sub-Tropics in both hemisphere to some exception like the regions in the vicinity of Australia and Japan (however consistent with the stream function analysis).

For T2m : Consistency for Above normal conditions more or less everywhere to the exception of Brazil/Bolivia regions and some regions across Asia. To be quoted the lack of signal for Below normal conditions (climate change influence ?).

For precipitation : For Above normal conditions, some consistency in the vicinity of the warm pool and the SPCZ, over Brazil/Bolivia and Western Canada. Note some signal for Above normal conditions over Sahelian regions. For the Below normal scenario, some consistency exists over part of South-East Asia and Indian, East Africa, Guyana and East US.

II.7. "EXTREME" SCENARIOS

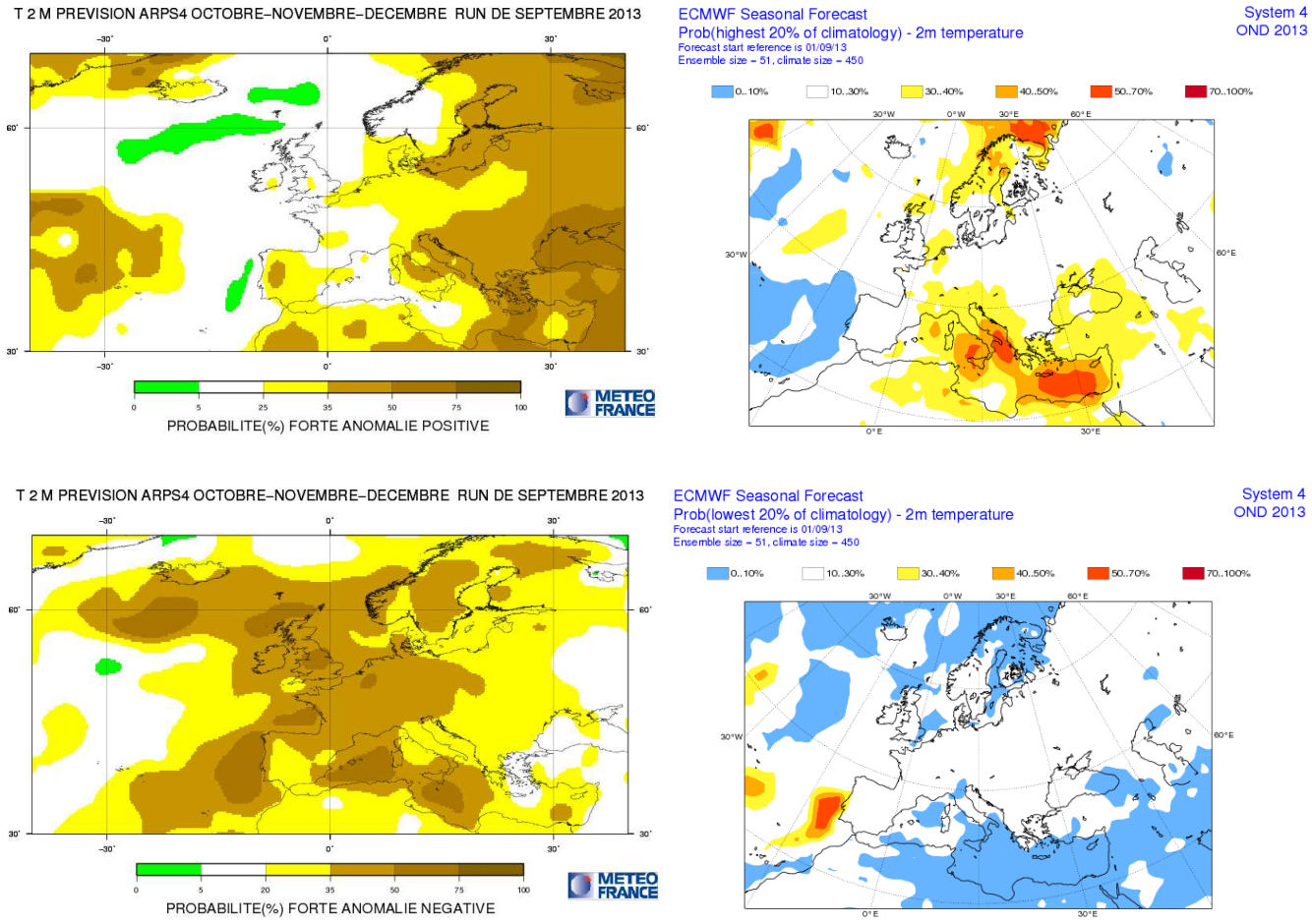


fig.40: Top : Probability of « extreme » above normal conditions for T2m for Meteo-France (left - highest ~15% of the distribution) and ECMWF (right - highest 20% of the distribution).
Bottom : Probability of « extreme » Below normal conditions for rainfall for Meteo-France (left - lowest ~15% of the distribution) and ECMWF (right – lowest 20% of the distribution).
for OND, issued in September.

No consistency between the 2 models for the Very Above scenario to the exception of regions surrounding the Mediterranean basin and especially the SEE domain.
No consistency for very Below Normal scenario which is consistent with the differences in the geopotential heigh analysis. So in relationship with the current predictability and the model uncertainties, it seems difficult to use these forecast.

Take care that due to the system change (from system 3 to system 4) the verification scores are not available yet.

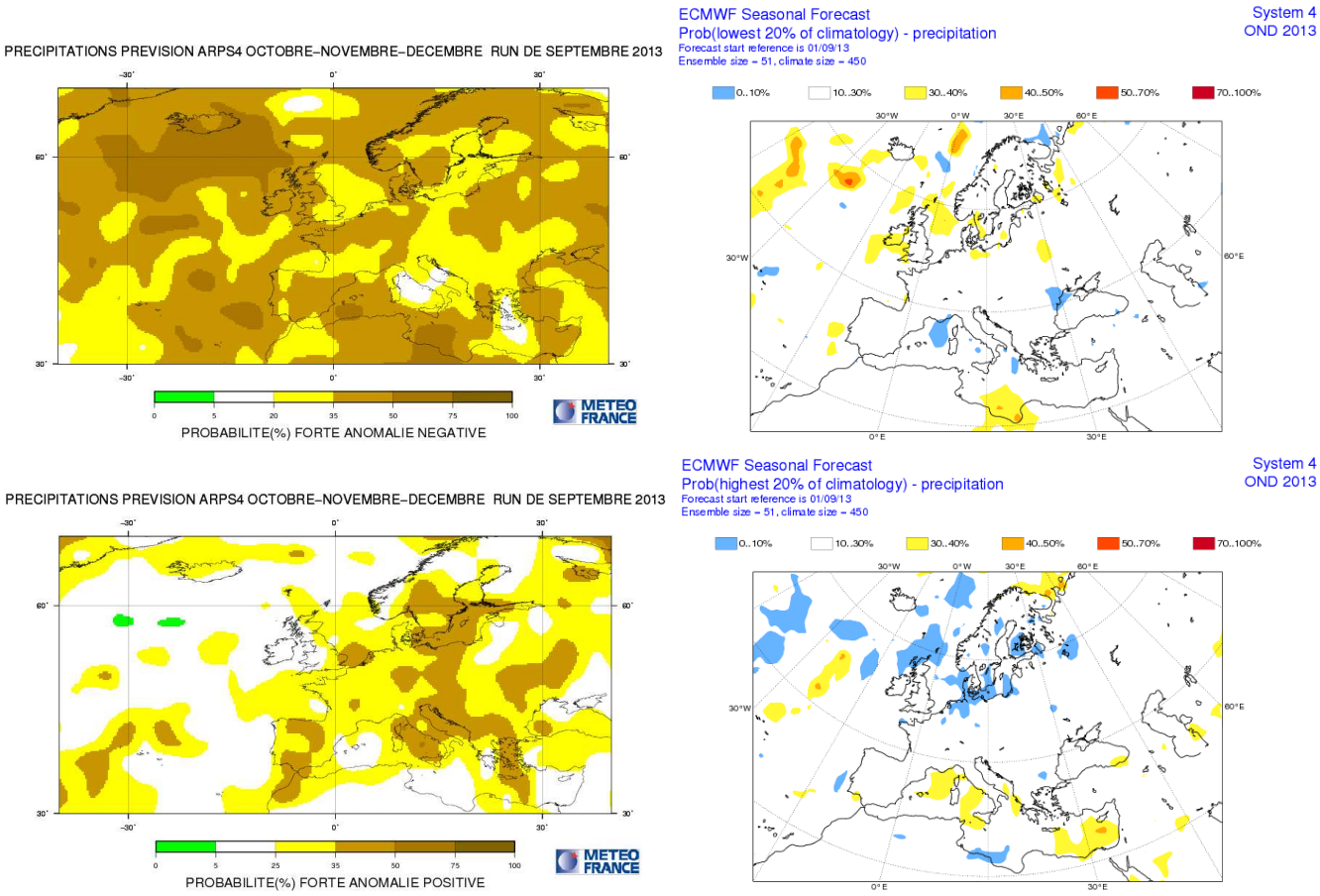


fig.41: Top : Probability of « extreme » Below normal conditions for rainfall for Meteo-France (left - lowest ~15% of the distribution) and ECMWF (right - lowest 20% of the distribution)
Bottom : Probability of « extreme » Above normal conditions for rainfall for Meteo-France (left - highest ~15% of the distribution) and ECMWF (right – highest 20% of the distribution).
for OND, issued in September.

Mostly No signal in ECMWF while there are traces of divergent scenarios in MF (strong enhanced probabilities for both very Below normal and some slight enhanced probabilities for very Above normal scenarios extreme scenarios).
So in relationship with the current predictability and the model uncertainties, it seems difficult to use these forecast.
Take care that due to the system change (from system 3 to system 4) the verification scores are not available yet.

II.8. DISCUSSION AND SUMMARY

Forecast over Europe

For this forecast the major comment is about the current predictability in the climate system. The oceanic forcing remains quite low to the exception of the most eastern Pacific and in the vicinity of the warm pool. The current predictability seems to be limited to some tropical regions. No teleconnection patterns on the North Atlantic seem to be very active despite there is some consistent signal for enhanced occurrence of NAO – circulation (noting the difficulty to infer a clear impact on temperature and rainfall because of the transition period). As a consequence for Europe **the predictability** is still limited at seasonal scales. So in such a context, the EuroSIP forecasts are likely a good synthesis of possible scenarios across the planet and more specifically over European regions. **For rainfall**, **"No Privileged Scenario"** covers most of the European continent even if the Below normal scenario could make sense for specific regions like Island or Ireland. **For temperature** : despite the weak predictability the Above normal scenario could be privileged for most of Central and Eastern Europe and especially South-East Europe. For the Western façade, there is No Privileged scenario.
Obviously, some downscaled information could detail these scenarios for specific countries or sub-regions.

Tropical Cyclone activity

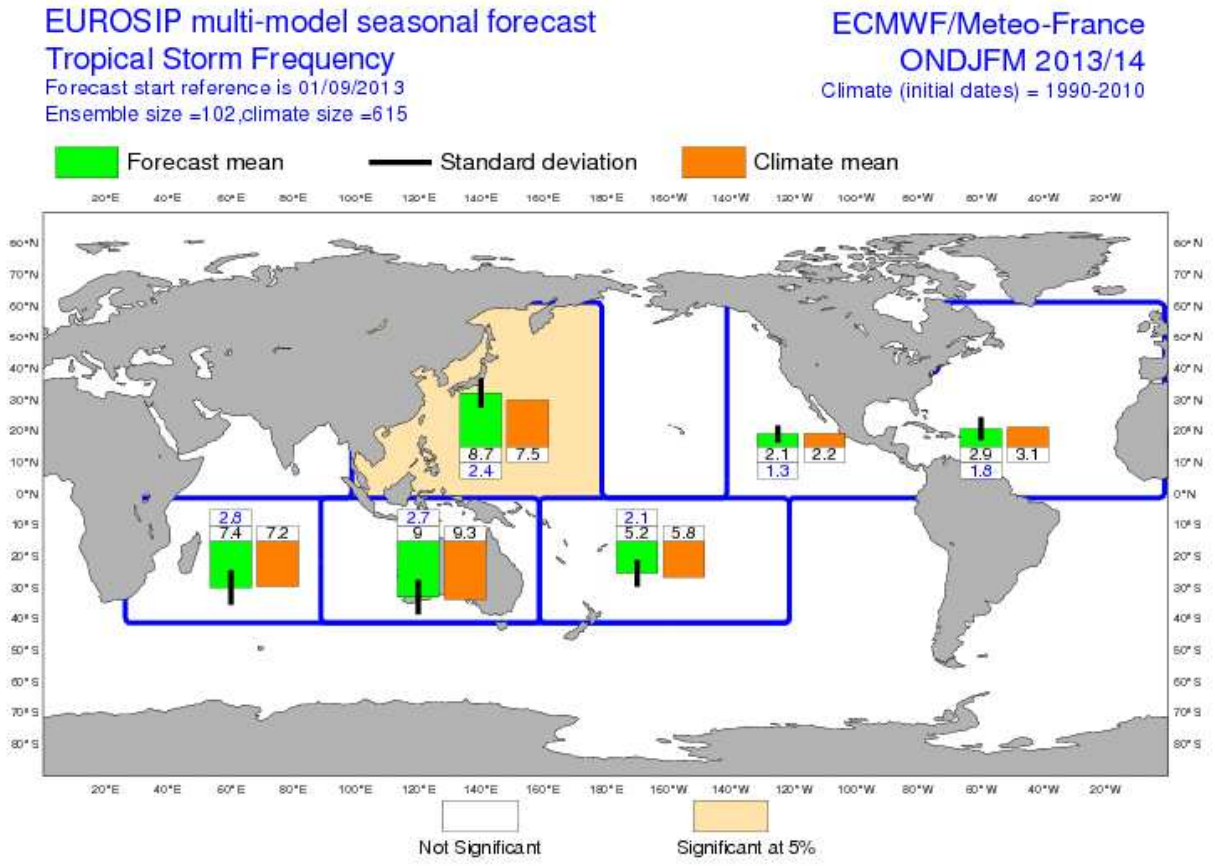


fig.42: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF) for ONDJFM period, issued in September.
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmtrop/trop_euro/eurosip_tropical_storm_frequency/

For the Tropical Cyclone season and in relationship with the SSTs scenarios, Euro-Sip forecasts indicate an enhanced Topical Cyclone activity over the Western Pacific (Northern Hemisphere), and close to normal condition elsewhere.

WMO RA VI
Pilot RCC-Network

Synthesis of Temperature forecasts for October-November-December 2013 for European regions

Results are expressed with respect of 3 possible scenarios : « Above normal », « close to normal » and « Below normal ». The limits between each category is given by the corresponding tercile such that each scenario have the same climatological probability of occurrence (33,3%). If the forecast shows no specific signal (because of low predictability and/or divergent scenarios between several models), the cell is filled in grey and “No privileged scenario” is indicated.

MODELS	Northern Europe	Southern Europe	Central Europe	Eastern Europe	SEE Region
CEP					
MF					
Met Office					
CPC					
JMA					
synthesis					
LC-MME					
Eurosip					
privileged scenario by RCC-LRF node	*no privileged scenario*	*no privileged scenario*	*above normal*	*above normal*	*above normal*

T Below normal (Cold) T close to normal T Above normal (Warm) No privileged scenario

WMO RA VI
Pilot RCC-Network

Synthesis of Rainfall forecasts for October-November-December 2013 for European regions

Results are expressed with respect of 3 possible scenarios : « Above normal », « close to normal » and « Below normal ». The limits between each category is given by the corresponding tercile such that each scenario have the same climatological probability of occurrence (33,3%). If the forecast shows no specific signal (because of low predictability and/or divergent scenarios between several models), the cell is filled in grey and “No privileged scenario” is indicated.

MODELS	Northern Europe	Southern Europe	Central Europe	Eastern Europe	SEE Region
CEP					
MF					
Met Office					
CPC					
JMA					
synthesis					
LC-MME					
Eurosip					
privileged scenario by RCC-LRF node	*no privileged scenario*	*no privileged scenario*	*no privileged scenario*	*no privileged scenario*	*no privileged scenario*

RR Below normal (Dry) RR close to normal RR Above normal (Wet) No privileged scenario

III. ANNEX

III.1. SEASONAL FORECASTS

Presently several centres provide seasonal forecasts, especially those designated as Global Producing Centres by WMO (see http://www.wmo.int/pages/prog/wcp/wcasp/clips/producers_forecasts.html).
■ BoM, CMA, CPTEC, ECMWF, JMA, KMA, Météo-France, NCEP and UK Met Office have ocean/atmosphere coupled models. The other centres have atmospheric models which are forced by a SST evolution which is prescribed for the entire period of forecast.
■ LC-MME and Euro-SIP provide multi-model forecasts. Euro-Sip is presently composed using 4 models (ECMWF, Météo-France, NCEP and UK Met Office). LC-MME uses information coming from most of the GPCs ; providing deterministic and probabilistic combinations of several coupled and forced models.

Seasonal forecasts use the ensemble technique to sample uncertainty sources inherent to these forecasts. Several Atmospheric and/or oceanic initial states are used to perform several forecasts with slightly different initial state in order to sample the uncertainty related to imperfect knowledge of the initial state of the climate system. When possible, the model uncertainty is sampled using several models or several version of the same model. The horizontal resolution of the Global models is currently between 100 and 300km. This mean that only Large Scale feature make sense in the interpretation of the issued forecasts. Generally speaking, the temperature forecasts show better skills than rainfall forecasts. Then, it exists a natural weakness of the seasonal predictability in Spring (ref to North Hemisphere).

In order to better interpretate the results, it is recommended to look to verification maps and graphs which give some insight into the expected level of skill for a specific parameter, region and period. A set of scores is presented on the web-site of the Lead-Centre for Verification (see http://www.bom.gov.au/wmo/lrfvs/) ; scores are also available at the specific web site of each centres.

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

III.2. « NINO », SOI INDICES AND OCEANIC BOXES

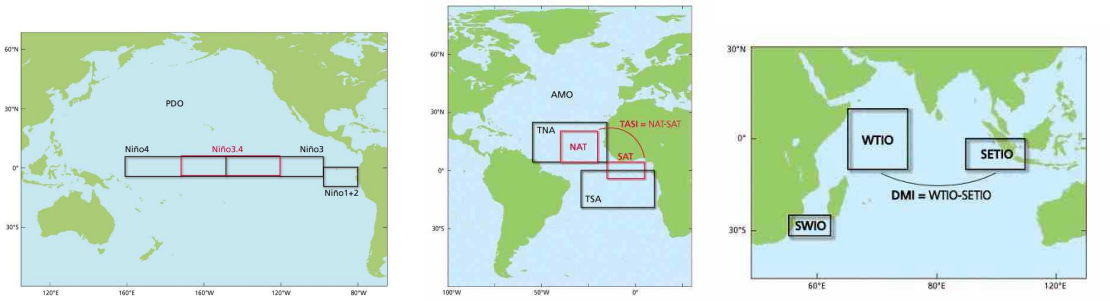
El Niño and La Niña events primarily affect tropical regions and are monitored by following the SST evolution in specific area of the equatorial Pacific.

- Niño 1+2 : 0°/10°S 80W-90W ; it is the region where the SST warming is developing first at the surface (especially for coastal events).
- Niño 3 : 5°S/5°N 90W-150W ; it is the region where the interanual variability of SST is the greatest.
- Niño 4 : 5°S/5°N 160E- 150 W ; it is the region where SST evolution have the strongest relationship with evolution of convection over the equatorial Pacific.
- Niño 3.4 : 5°S/5°N 120W-170W ; it is a compromise between Niño 3 and Niño 4 boxes (SST variability and Rainfall impact).

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

figure). It represents the Walker (zonal) circulation and its modifications. Its sign is opposite to the SST anomaly meaning that when the SST is warmer (respectively colder) than normal (Niño respectively Niña event), the zonal circulation is weakened (respectively strengthened).

Oceanic boxes used in this bulletin :



III.3.LAND BOXES

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