GLOBAL CLIMATE BULLETIN
n°171 - SEPTEMBER 2013

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I. DESCRIPTION OF THE CLIMATE SYSTEM (JULY 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 eastern part of the basin (respectively positive/negative anomaly). Little evolutions everywhere in the Tropics. Some noticeable warming in the mid-latitudes of the Northern hemisphere.

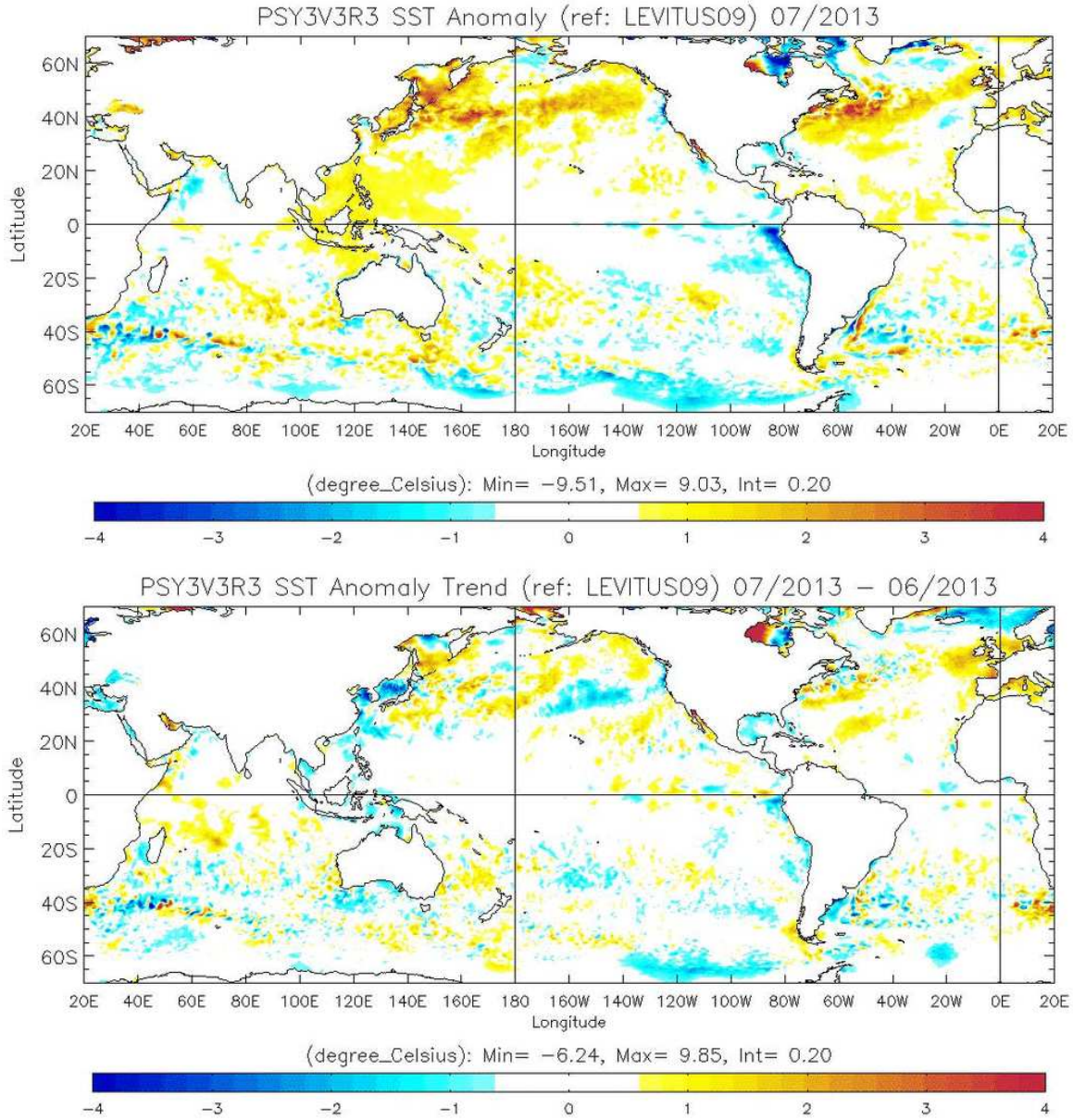


fig.1: top : SSTs Anomalies (°C) (reference 1950-2008); bottom : SST tendency (current – previous month) http://bcg.mercator-ocean.fr/

For the Atlantic : little evolution in the Tropics ; the North Tropical Atlantic remains mostly warmer than normal while the Southern Tropical Atlantic is close to Normal but slightly warming on the western side. Little evolutions in the Guinean Gulf. In the mid-latitudes of Northern hemisphere some warming over the basin, especially close to Europe and to the American Continent.
In the Indian Ocean : Little evolutions. A warming in the South-West Tropics can be noticed. Consistently the DMI is clearly on the negative side.
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) which extends toward the mid-latitudes (East to the dateline). In the SPCZ region positive anomaly extends South-East toward mid-latitudes. In the mid/high latitudes of the Northern hemisphere, great consistency with the surface signal.
In the Atlantic : in the equatorial waveguide and along the western coast of the African continent little anomalies. Persistence of the noticeable positive anomalies in the North-Eastern part of the basin (close to the sub-topics) up to the equatorial region. Over South Tropics the heat content anomalies are mostly positive.
In the Indian Ocean : heat content mostly consistent with SSTs, especially close to Australia. In the equatorial waveguide the signal is not really consistent with the negative phase of IOD.

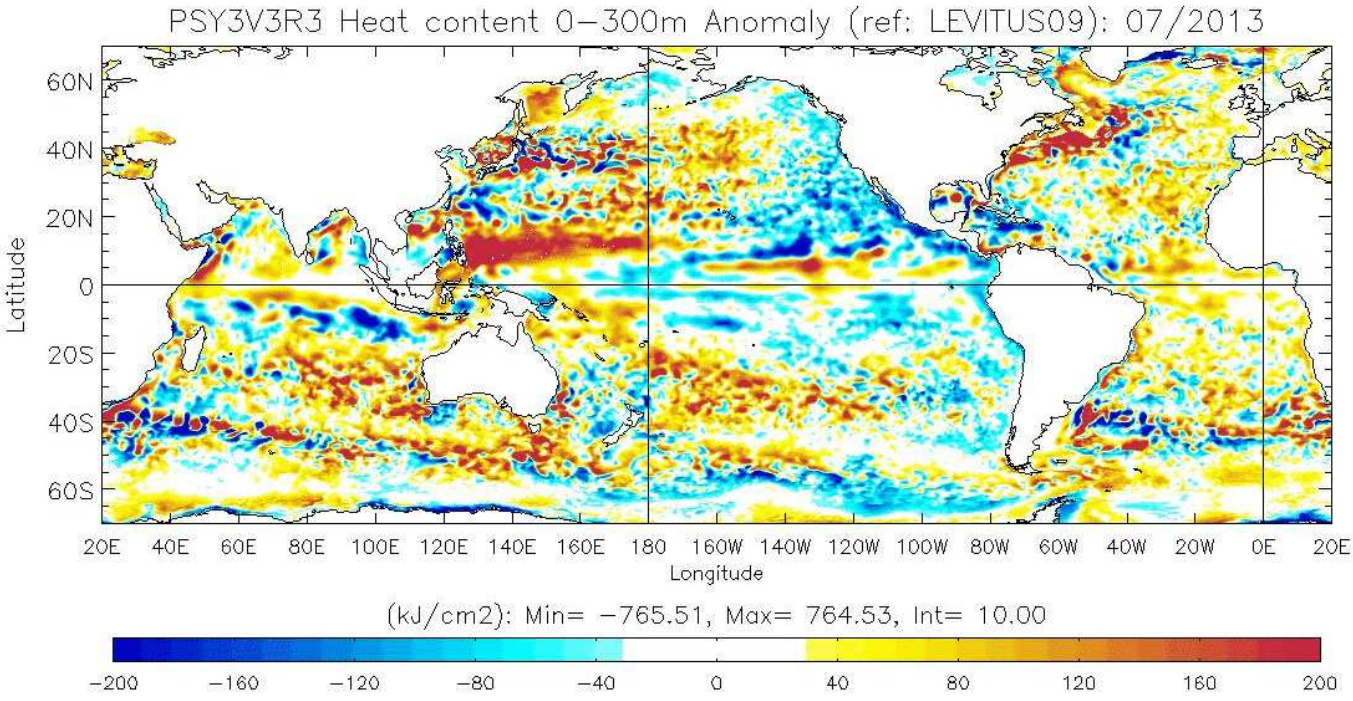


fig.2: map of Heat Content Anomalies (first 300m) (in kJ/cm²). (reference 1950-2008) http://bcg.mercator-ocean.fr/

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

A dipole pattern is visible with positive anomalies on the western side, 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 over Australia. The SOI is positive (+0.8) consistently with the dipole pattern and despite the little trade wind anomalies across the basin.

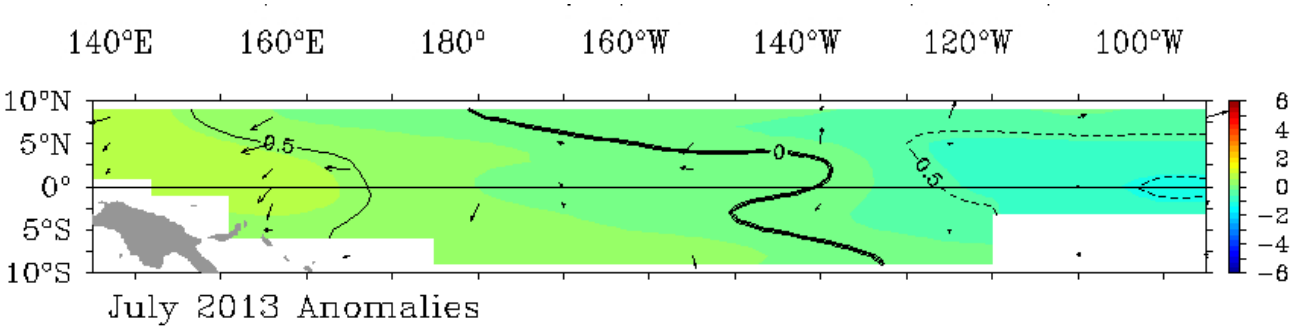


fig.3: SST Anomalies and Wind anomalies over the Equatorial Pacific from TAO/TRITON. http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html

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, -0,7°C and -1,3°C from West to East.

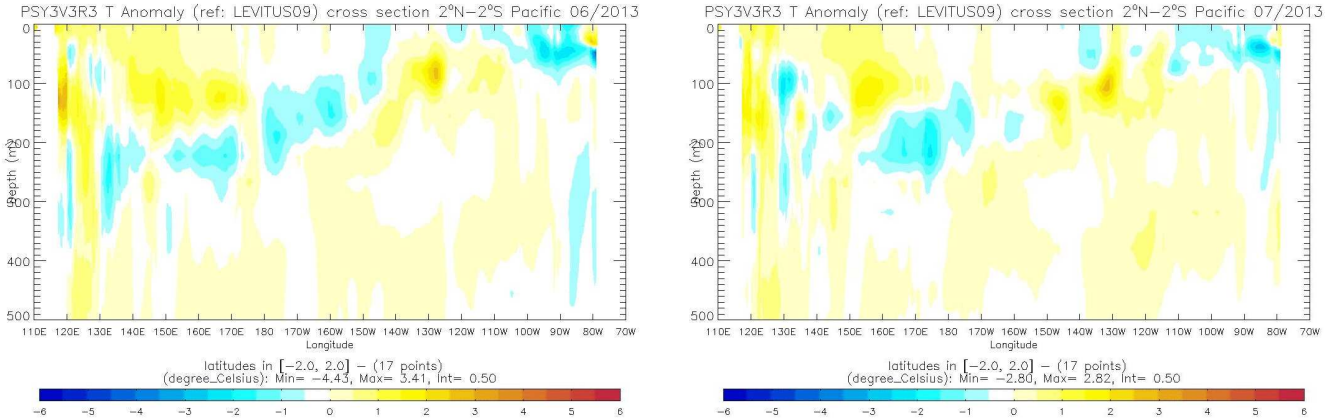


fig.4: Oceanic temperature anomaly in the first *500 metres* in the Equatorial Pacific, in previous month (left) and current month (right) http://bcg.mercator-ocean.fr/

In the equatorial waveguide (fig. 4) : still traces of propagation of Kelvin waves under the surface (warmer than normal around 150m) in July on the Western part and across the basin in the lower layers (around or below 200m).
The thermocline structure (fig. 5) : some little traces of wave propagation signal of both anomalies as already pointed out in the previous comment.

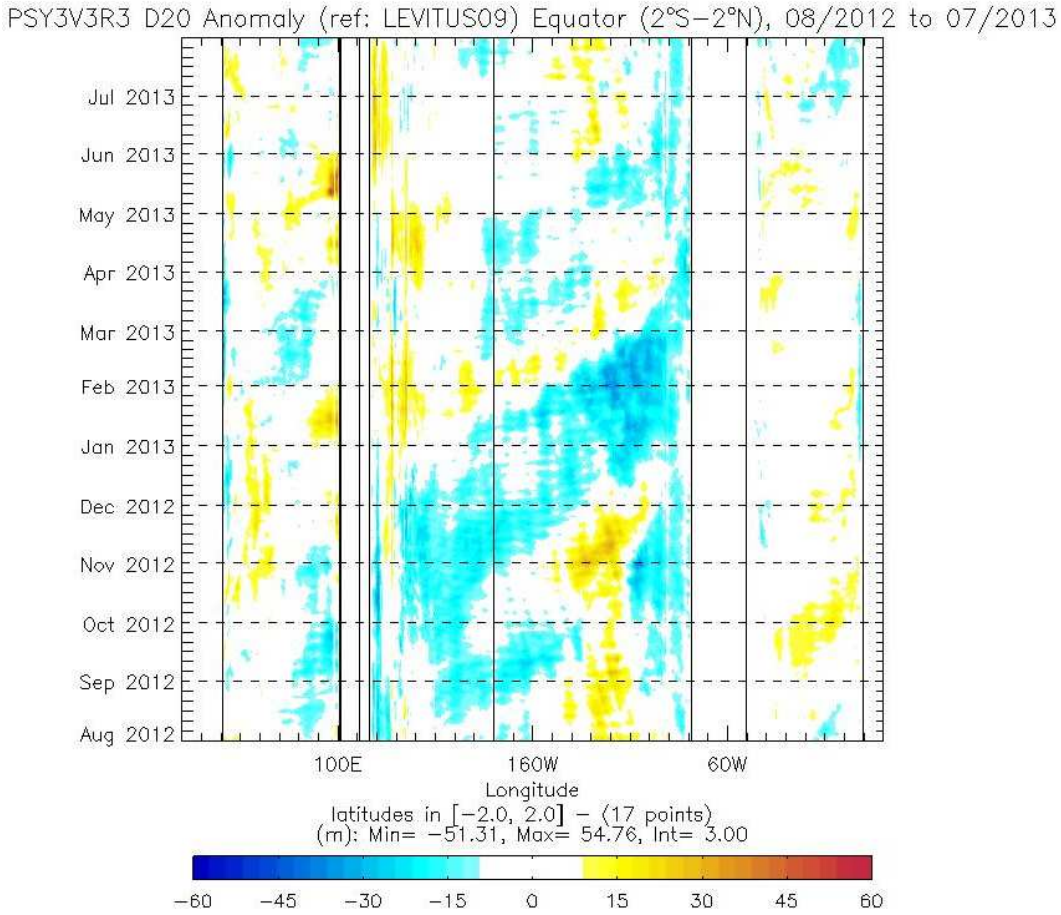


fig.5: Hovmüller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 24 month period. http://bcg.mercator-ocean.fr/

I.1.c Atlantic Basin

Northern Tropical Atlantic : slightly warmer than normal and little evolutions.
Equatorial waveguide : weak dipole structure (slightly cooler than normal on East and warmer than normal on West), with little trace of wave propagation.
The Southern Tropical Atlantic : slight warming on the western side and slightly cooler than normal on the most eastern part.

I.1.d Indian Basin

Southern Tropical Indian Ocean : slightly warming on the Western part. Still slightly warmer than normal between Australia and the maritime continent.
Equatorial waveguide : still a slight 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 variability of MJO activity (in the Tropics) and only little SST forcing (also partly related to mid-latitude atmospheric activity).
On the Pacific : Divergent circulation anomalies (upward anomaly motion) in the vicinity of Australia and the Maritime Continent (South to the Equator) and convergent circulation anomaly (downward motion

anomaly) on the most Eastern part close and North to the Equator (consistently with the SOI value). In addition, some regional Divergent and Convergent circulation anomalies in the Sub-Tropics both North and South. Note the linkage to other patterns of the Eastern Indian Ocean and of South-America.

On the Atlantic : Convergent circulation anomalies (downward anomaly motion) over the Southern Tropical Atlantic (especially close to the northern coast of South America). In the Northern hemisphere, to be quoted the positive anomaly which extends toward the mid-latitudes in the western side and the negative anomaly (Divergent Circulation anomaly) covering most of African continent North to the equator.

On the Indian Ocean : Divergent circulation anomalies (upward anomaly motion) between the maritime continent and Australia consistently with the SSTs and IOD and in the Southern sub-Tropics. Also a negative anomaly over the Arabian sea, the Arabic Peninsula and the Indian sub-continent.

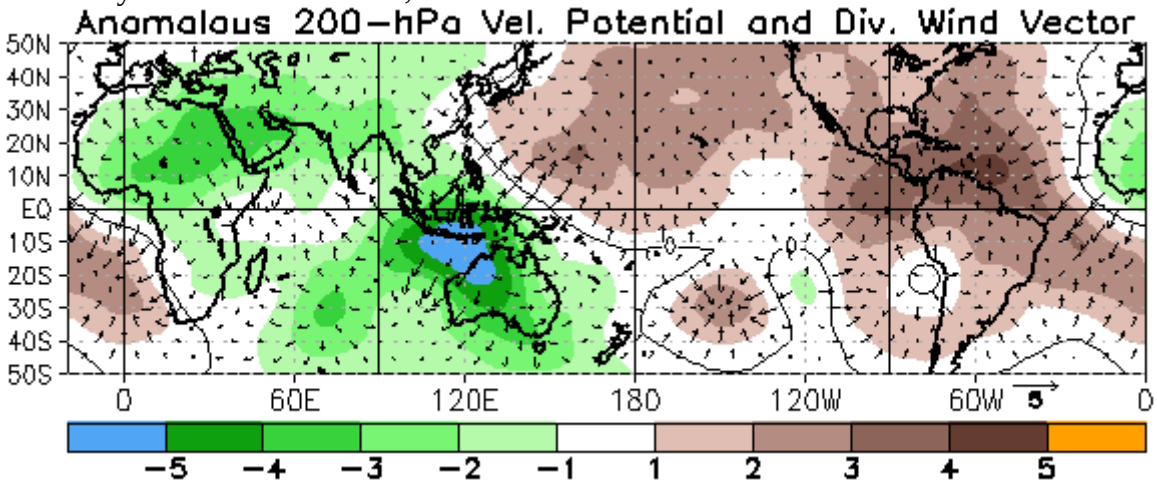


fig.6: Velocity Potential Anomalies at 200 hPa and associated divergent circulation. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

Stream Function anomalies in the high troposphere (fig. 7 – insight into teleconnection patterns tropically forced) : the strongest signal is likely related to Sub-Tropics/Mid-Latitude activity. The Tropical Velocity Potential anomalies seem to have little impact onto the atmosphere of the mid-latitudes and even in the Tropics.

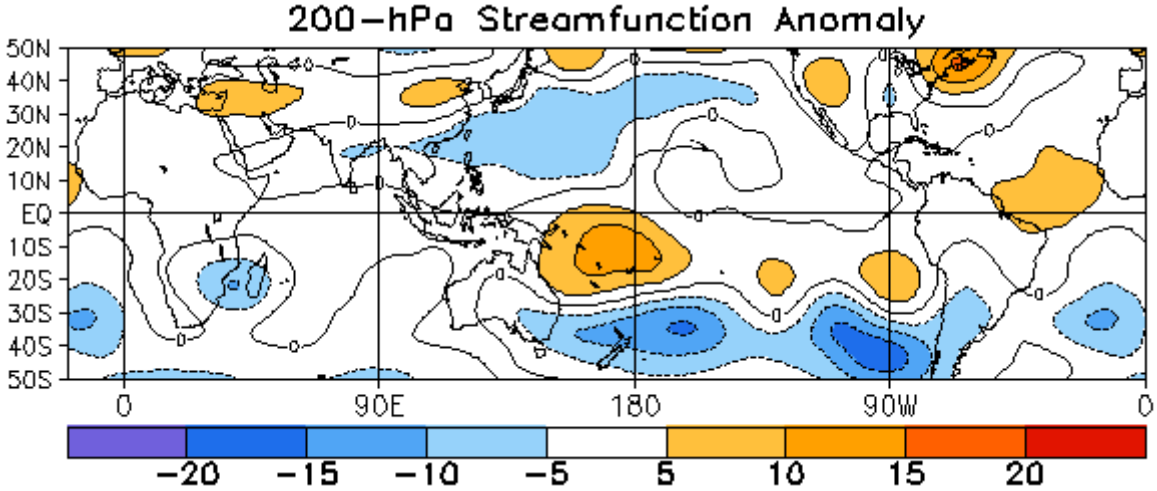


fig.7: Stream Function Anomalies at 200 hPa.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

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. The greatest anomalies are observed in the mid-latitudes of the Pacific and across the Atlantic. Over the Western façade of Europe the anomaly is consistent with the summer circulation observed. Consistently, there is only little activity in the atmospheric modes ; main active modes are found over the Pacific : WP (-0.9) and East-North Pacific (+0.9) ; over Europe, the East Atlantic (+0.6) and the NAO (+0.7).

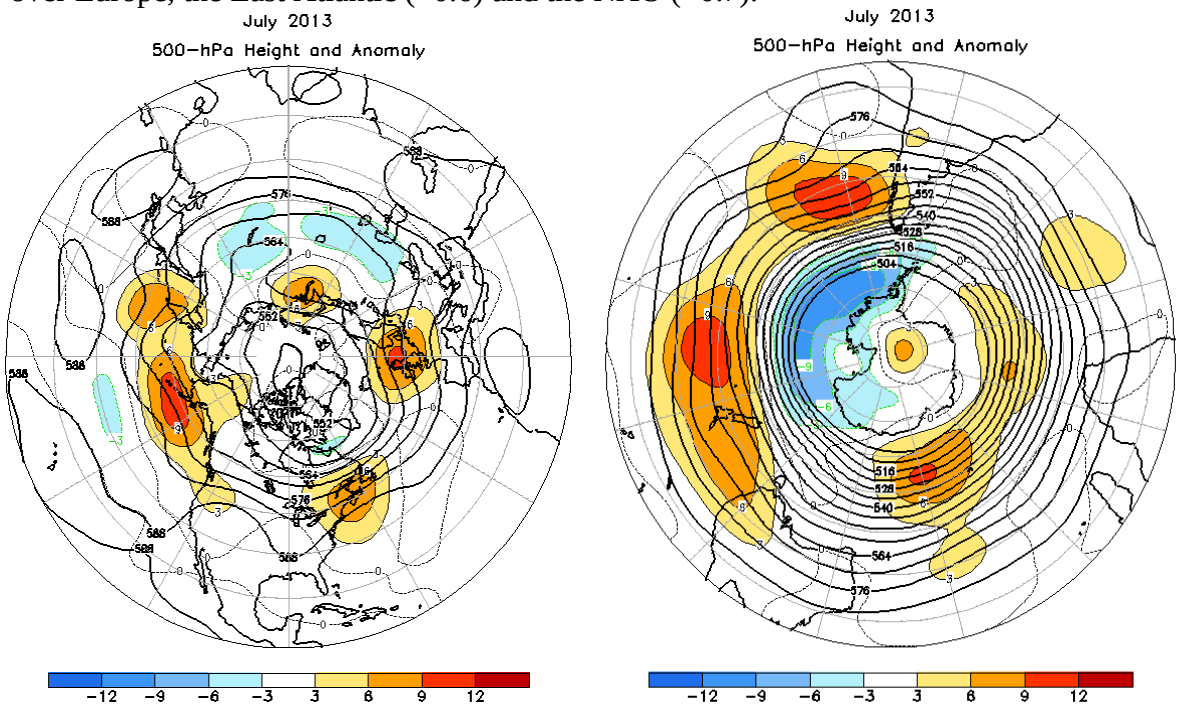


fig.8: Anomalies of Geopotential height at 500hPa (left North Hemisphere http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/fige9.shtml, and right South Hemisphere http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/fige15.shtml)

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
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
FEB 13	-1.0	0.1	1.5	-0.9	0.3	0.9	-1.3	1.0	0.3

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

I.2.b Precipitation

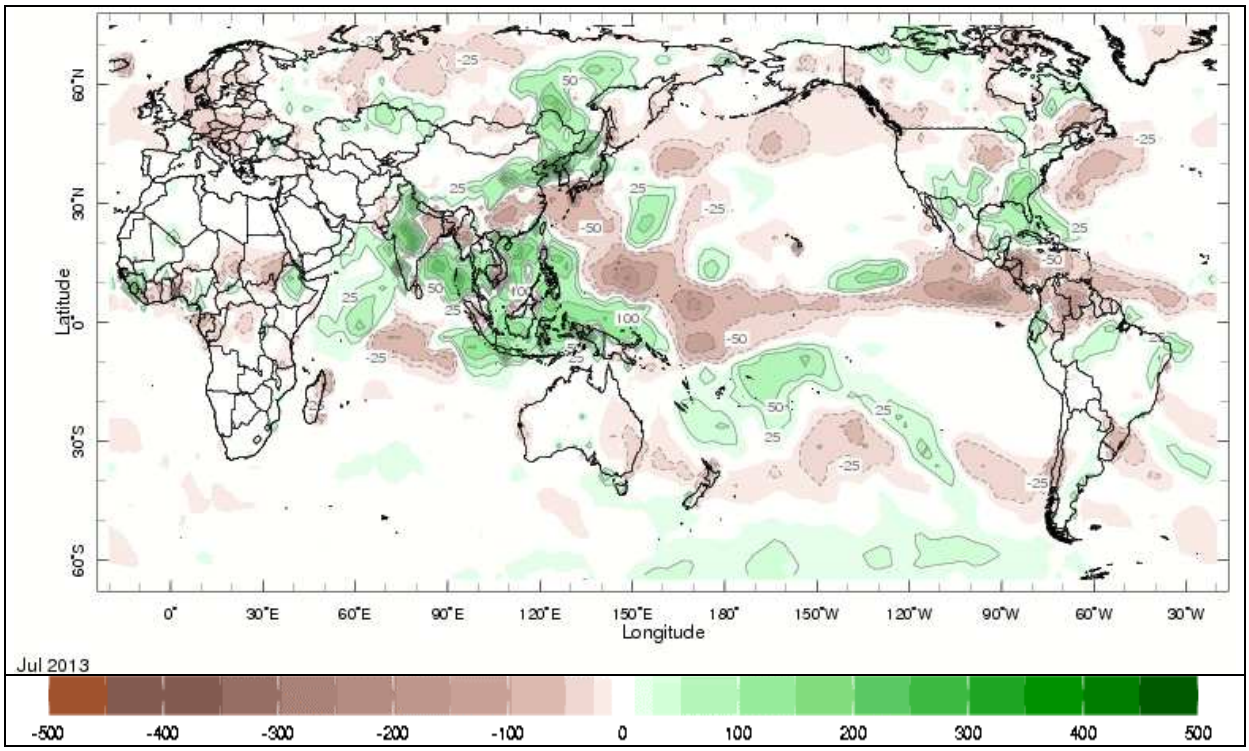


fig.9: Rainfall Anomalies (in mm) (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maproom/.Global/.Precipitation/

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

Pacific : good consistency with the Divergent circulation anomalies on the western part of the basin (positive anomaly) and the Convergent circulation anomaly on the Eastern side (negative anomaly).

Atlantic/Africa : negative anomaly along the coastal area of the Northern part of South America. Some drier than normal conditions over Equatorial Africa and Chad and Sudan.

Indian Ocean : Clear patterns of positive anomalies consistent with the velocity potential field close to the maritime continent which extend toward the Indian sub-continent. To be quoted the large positive anomaly in the North-Western ocean.

Australia : Some dry conditions over the Eastern side.

North America : Dipole pattern over the Great Plains (mostly dry/wet in the North/South) and some dry conditions across Canada. Wet conditions on Eastern USA.

Europe : mostly drier than normal over Central Europe extending toward Scandinavian regions. Some traces of wet conditions in the most Eastern countries.

I.2.cTemperature

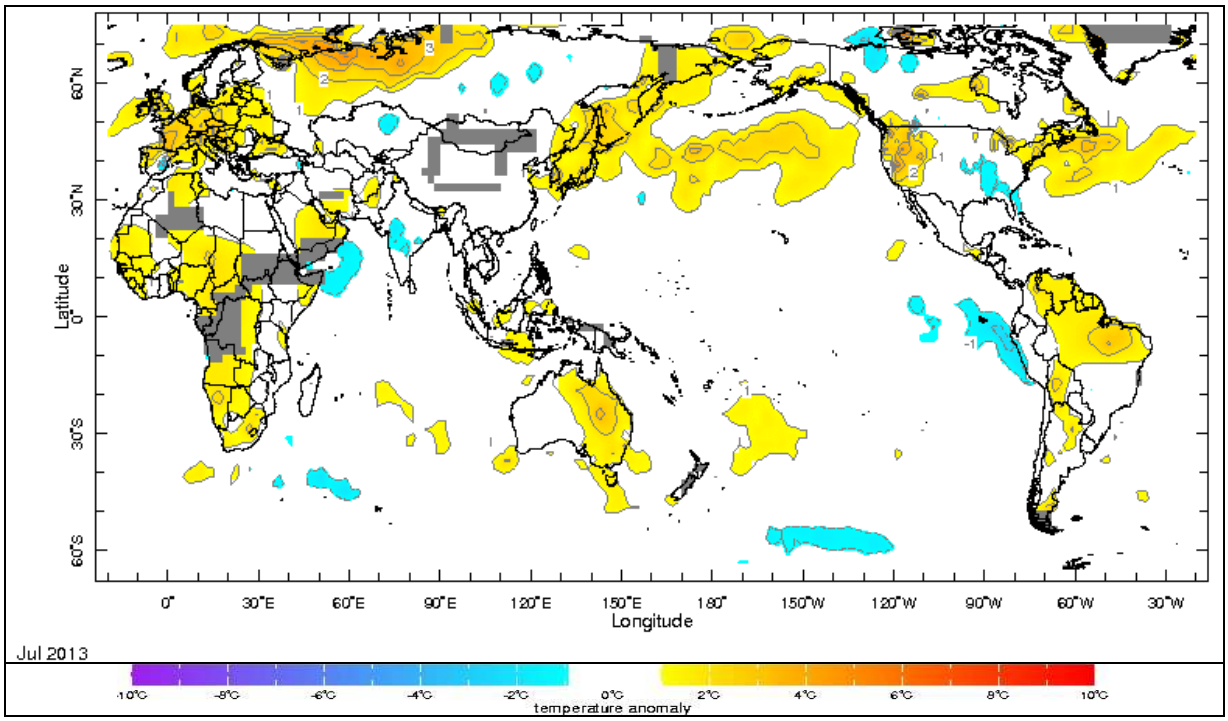


fig.10: Temperature Anomalies (in °C) (departure to the 1979-2000 normal)
http://iridl.ldeo.columbia.edu/maproom/.Global/.Atm_Temp/Anomaly.html

North-America : Positive anomalies on the Western side of USA and Eastern coastal area of Canada; some Colder than normal close to Florida.
South-America : mostly Warmer than normal conditions in the Northern part.
Australia : some traces of Warmer than normal conditions in the Eastern part.
Asia : Warm anomaly along the eastern coast.
Africa : Warmer than normal conditions over the West Africa extending over western equatorial and south-western regions.
Europe : Warmer than normal conditions over most of European regions especially France (but not only).

I.2.d Sea Ice

In Arctic (fig. 11 - left) : well below normal sea-ice extension especially over the Atlantic side (negative anomaly close to 2 standard deviation).
In Antarctic (fig. 11 - right) : well above normal sea-ice extension anomaly (on the record) with some large regional modulation.

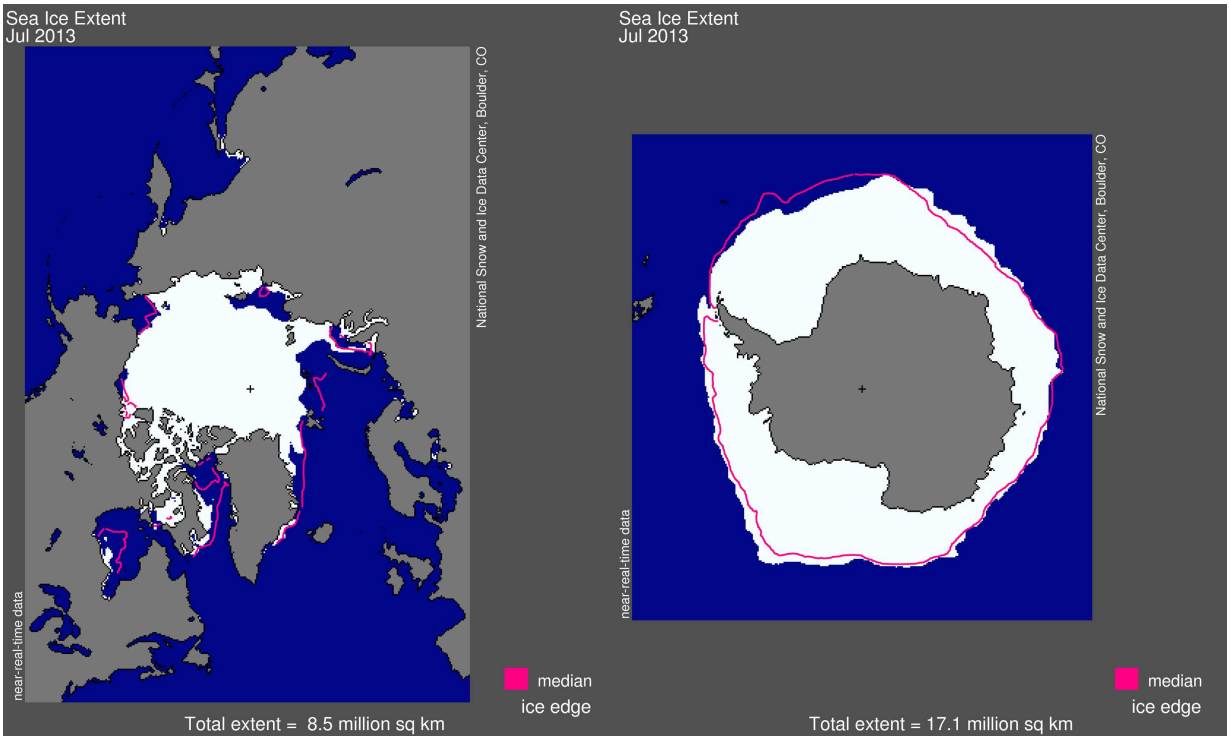


fig.11: Sea-Ice extension in Arctic (left), and in Antarctic (right). The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

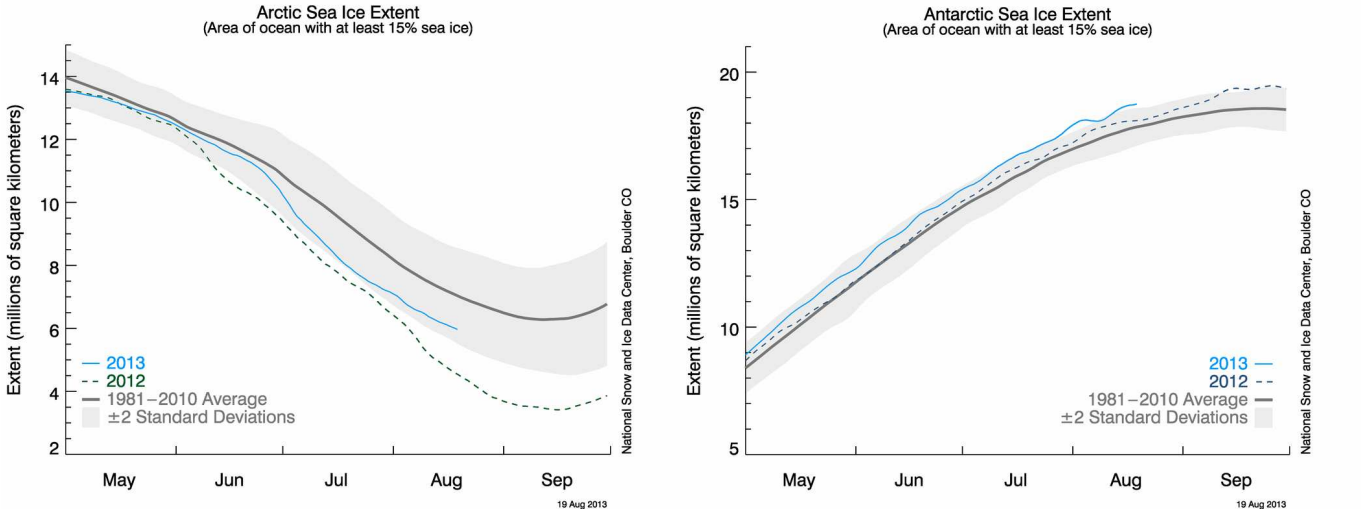


fig. 9bis : Sea-Ice extension evolution from NSIDC
http://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png

II.SEASONAL FORECASTS FOR SON FROM DYNAMICAL MODELS

II.1. OCEANIC FORECASTS

II.1.a Sea Surface Température (SST)

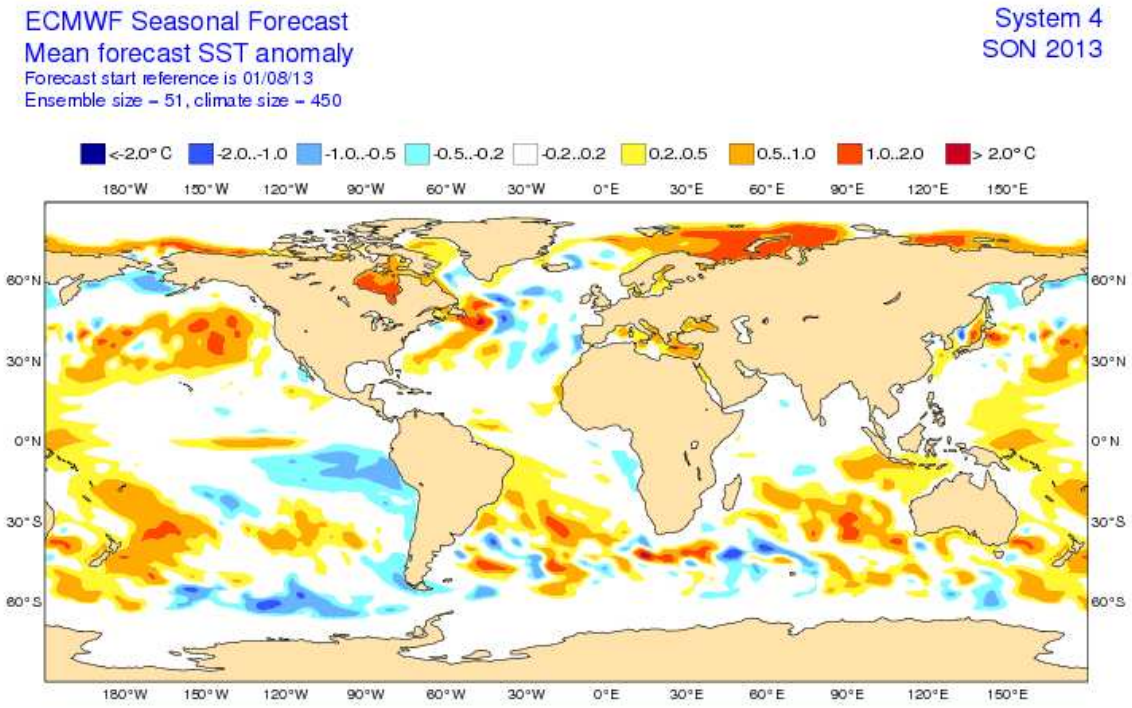


fig.12: SST anomaly forecast (in °C) from ECMWF for SON, issued in August.
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

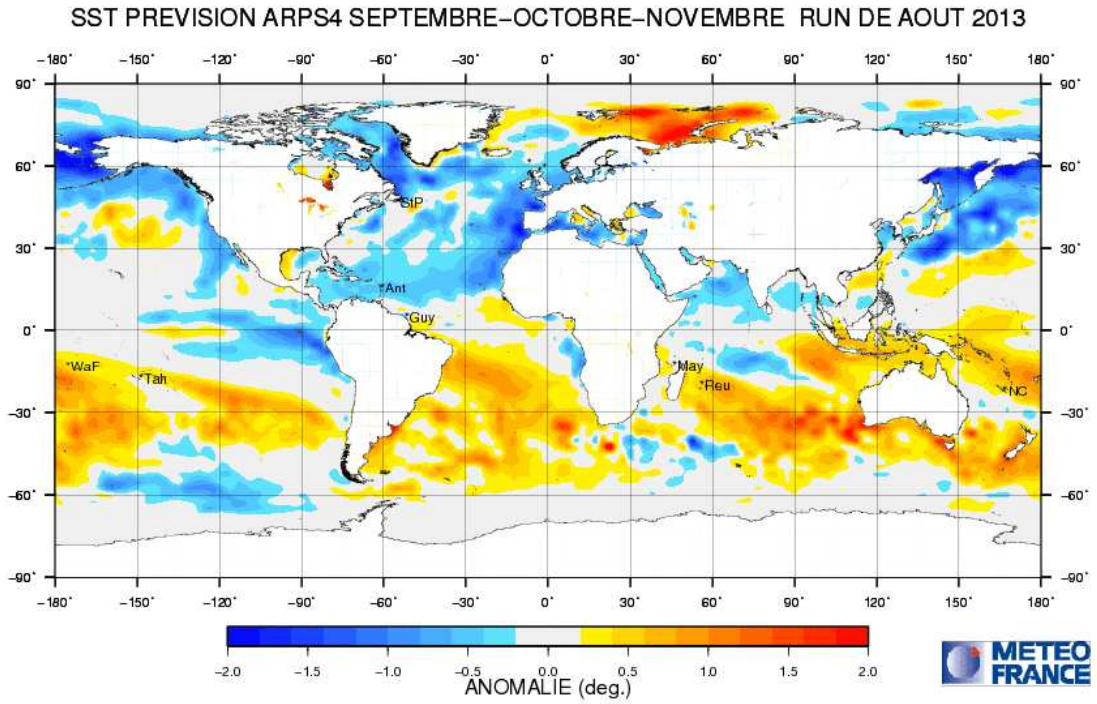


fig.13: SST Anomaly forecast (recalibrated with respect of observation) from Météo-France for SON, issued in August. http://elaboration.seasonal.meteo.fr/

For the 2 individual models :
The main difference is seen over the North Atlantic (from Tropics to mid-latitudes) 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 : along the equator weak dipole pattern in both models with cold conditions on the most eastern side and some warmer than normal conditions in the western part of the basin (mostly neutral in the central part).
Atlantic : in both model consistency in Southern Tropical (and sub-tropical) Atlantic and the equatorial waveguide. There are more differences on the Northern Hemisphere from the Caribbean up to the western façade of Europe (mostly colder than normal in MF). In ECMWF a positive anomaly close to the North Eastern coast of the continent. The difference is very likely not only related to the hindcast issue.
Indian Ocean : consistent forecast in both models. East to 90°E warmer than normal conditions especially in the vicinity of the maritime continent and Australia. Mostly warmer than normal conditions in the Southern sub-tropics (up to Madagascar) and the mid-latitudes.
In Euro-SIP :
Some robust patterns appear in the tropics and across the Atlantic.
Pacific : Equatorial waveguide : very consistent with MF and ECMWF across the basin (respectively weak positive and negative anomalies respectively on West/East sides). Cold anomaly developing along the coast of South America. Quite consistent patterns in the sub-tropics and the mid-latitudes of both hemispheres, especially the warmer than normal conditions over the South-Western Pacific.
Atlantic : Weak signal over the Tropics (both South and North) to the exception of the colder than normal conditions extending from the Caribbean up to Spain which seems to be quite robust especially on the eastern part of the basin.
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 Australia and the maritime continent.

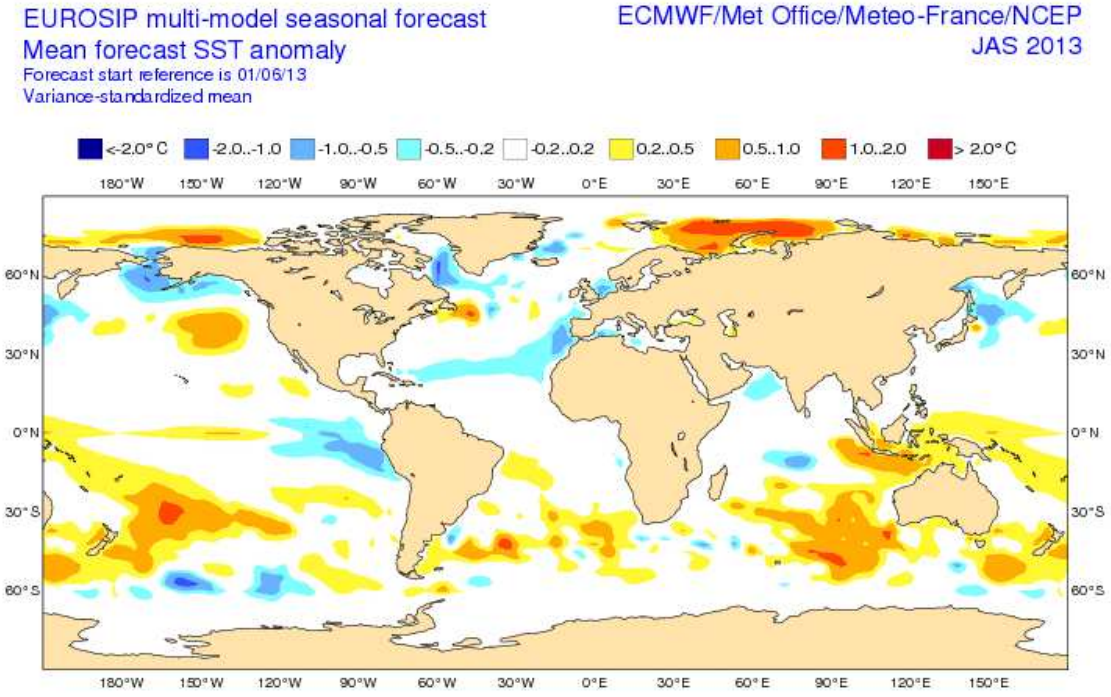


fig.14: SST Forecasted anomaly (in °C) from Euro-SIP for SON, issued in August.

II.1.b ENSO Forecast :

Forecasted Phase for SON : neutral

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

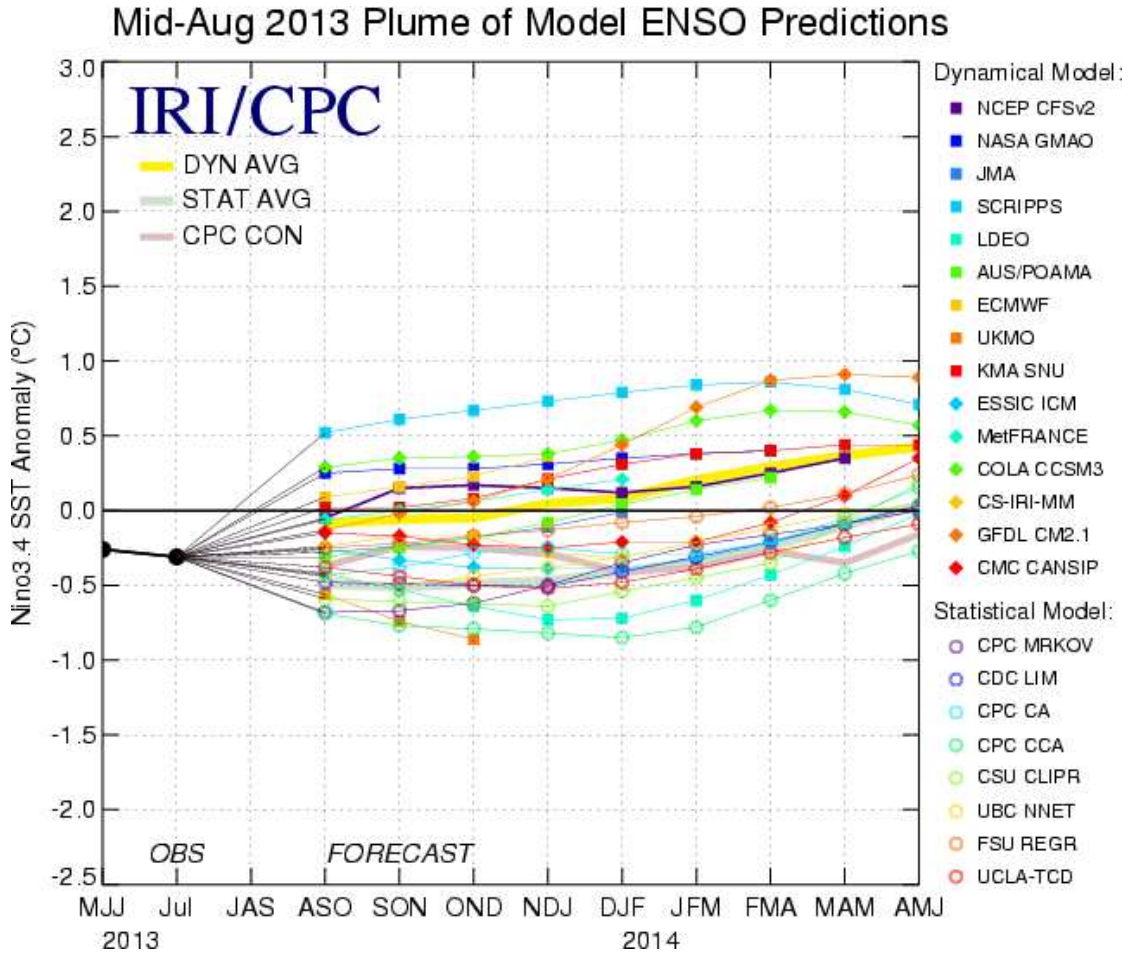


fig.15: Synthesis of Niño 3.4 forecasts (120° to 165°W) issued in August by IRI :
http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html

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 SON. Both models are indicating a progressive warming. One can notice that also in both models the spread dramatically increases from the Centre up to the East of the basin and in time. Some members are moving close to or in La Niña conditions while someothers are moving close to or in El Niño conditions. In EuroSIP Plumes, close to normal conditions on average and quite large spread indicating a quite large uncertainty.

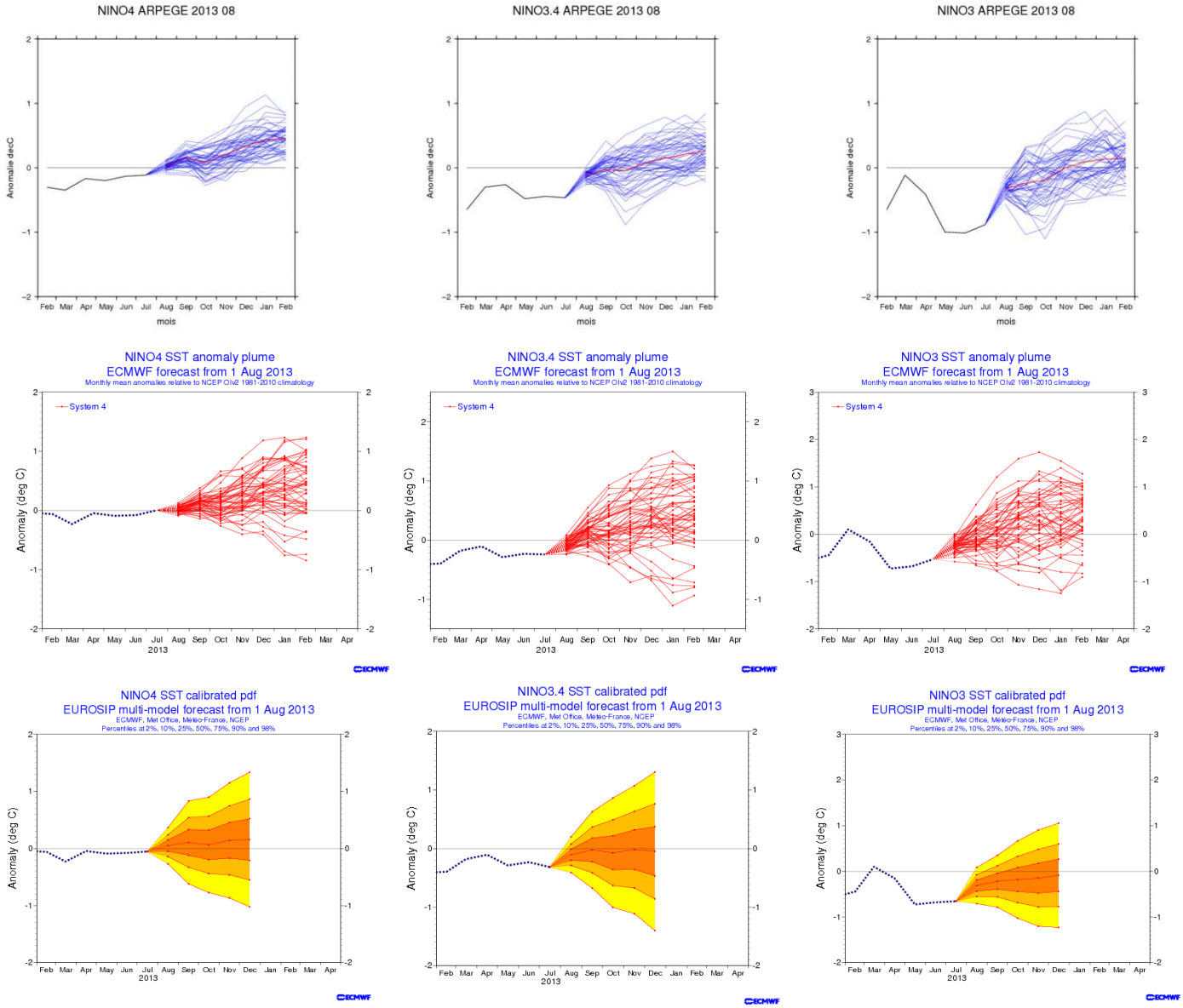


fig.16: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (middle) - monthly mean for individual members - and EuroSIP (bottom) – recalibrated distributions - issued in August (http://www.ecmwf.int/)

II.1.c Atlantic Ocean forecasts :

Forecasted Phase: ***close to normal in both Tropics***

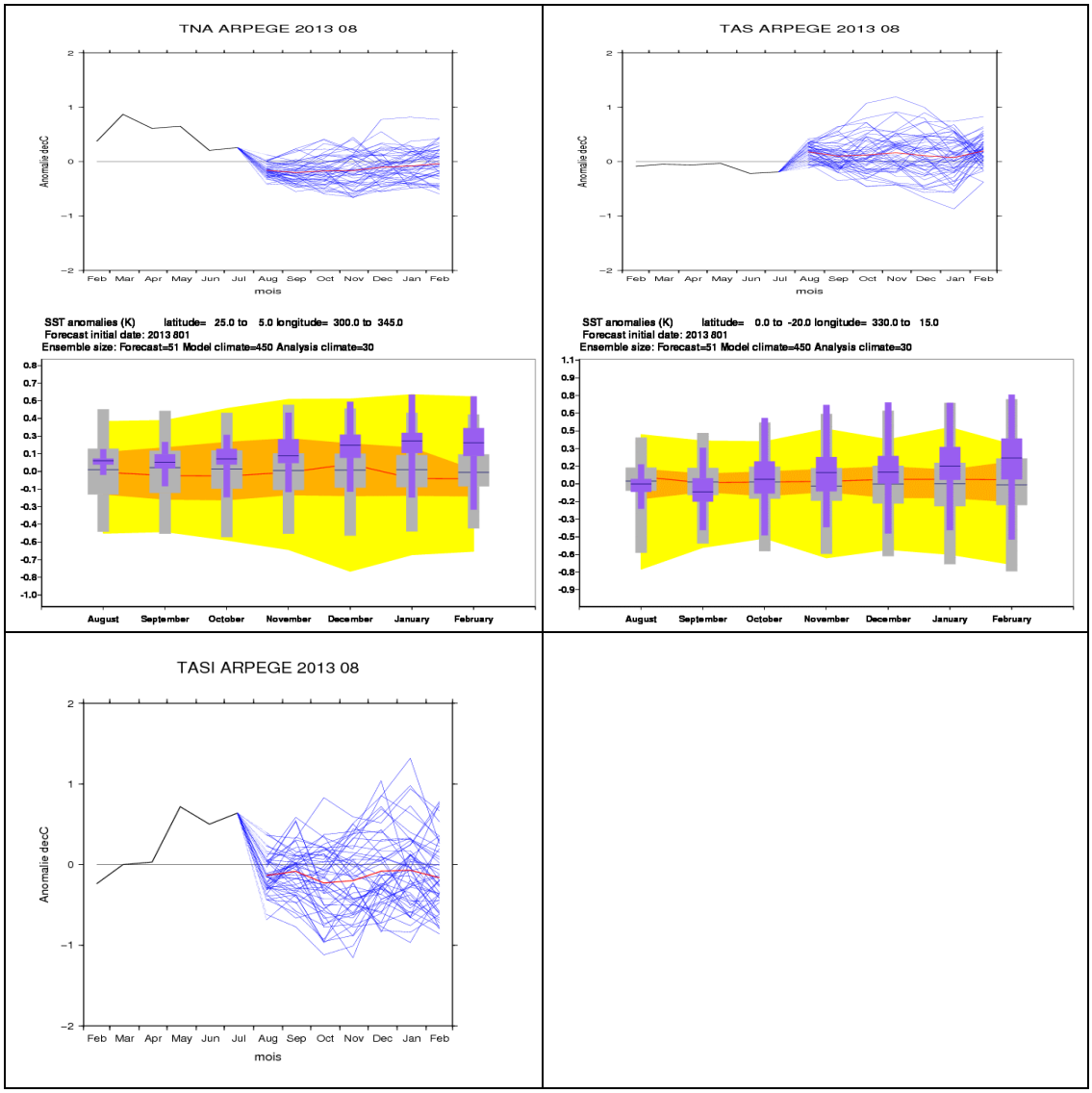
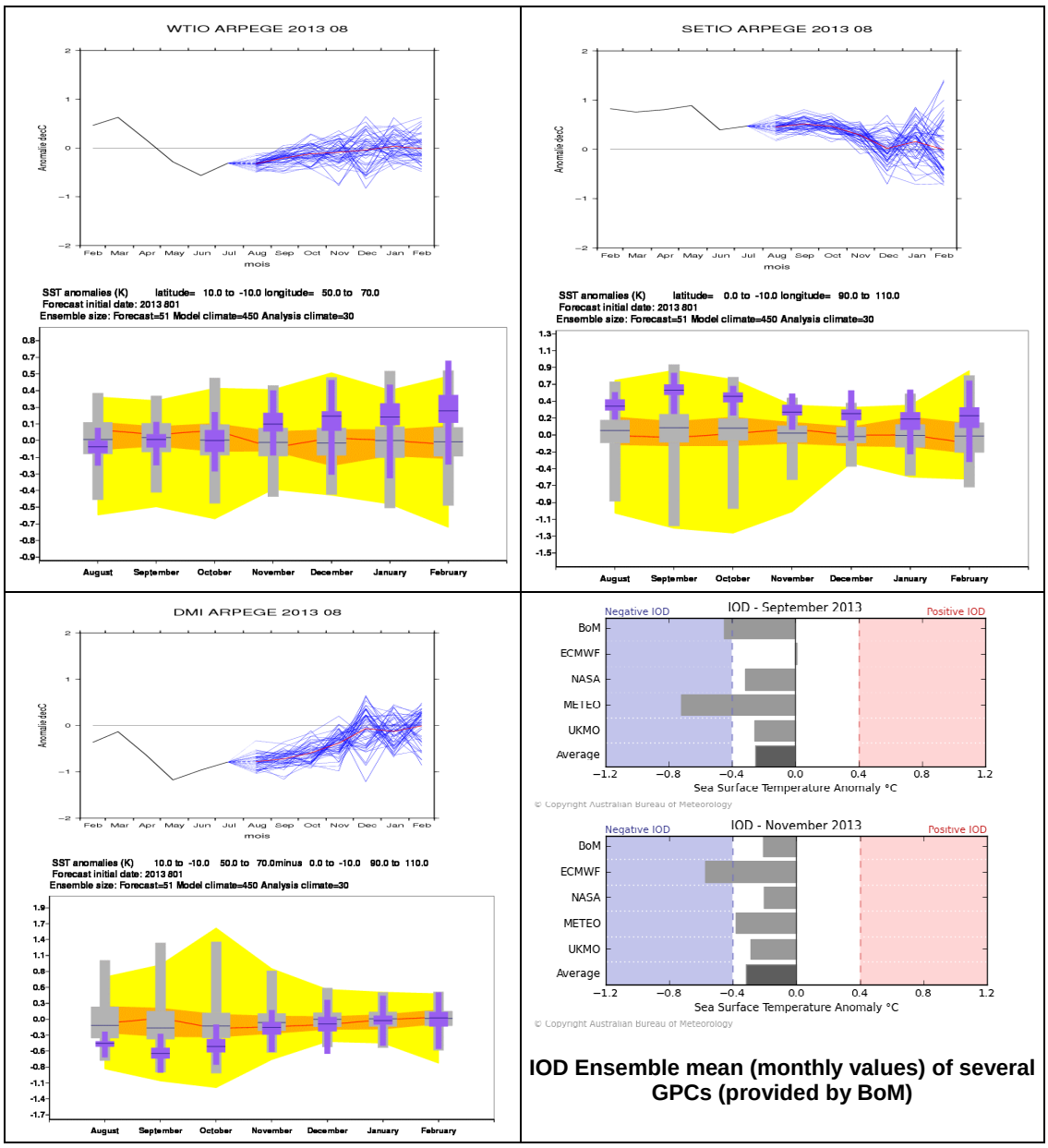


fig.17: SSTs anomaly forecasts in the Atlantic Ocean boxes from Météo-France and ECMWF, issued in August, plumes / climagrams correspond to 51 members and monthly means.

North Tropical Atlantic : slightly warmer than normal conditions in ECMWF and slightly colder than normal in MF. So taking into account the difference in hindcast periods it could be reasonably consistent (and with a reasonable spread).
South Tropical Atlantic : Slightly warmer than normal conditions in MF and slightly colder than normal in ECMWF (evolving then close to normal).
The inter-hemispheric SST gradient is not consistent between the two models (even when taking into account the hindcast issue).
TASI : the TASI index is slightly negative in SON for MF. However the spread is large and there is the hindcast issue.

II.1.d Indian Ocean forecasts :

Forecasted Phase: *IOD on the negative side*



IOD Ensemble mean (monthly values) of several GPCs (provided by BoM)

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

In WTIO : Consistent signal in both models in terms of evolutions starting with Colder than normal conditions progressively moving to close to normal and then slightly warmer than normal conditions; both models with reasonable spread and stable conditions along the whole period.
In SETIO : Above normal conditions in both models consistently with the Western Pacific SSTs behaviour. 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

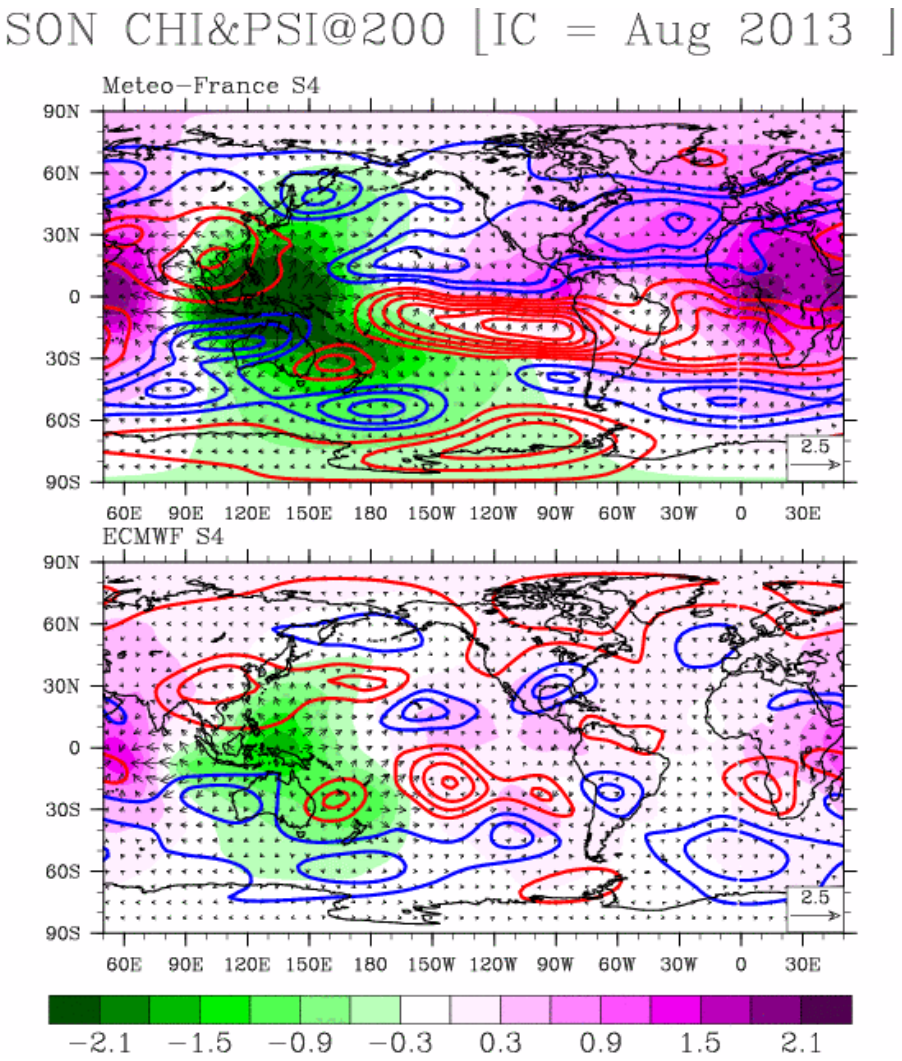


fig.19: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), associated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa for SON, issued in August by Météo-France (top) and ECMWF (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 (the later showing a large intraseasonal variability). Some weak Tropics/Mid-Latitudes linkage in the Northern Hemisphere likely in relationship with a quite large uncertainty.
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 West Tropics extending mainly toward Australia and New-Zealand. 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.

Over Atlantic : Little signal in ECMWF while in MF there are Convergent circulation (downward motion) anomalies ; a strong one in the eastern part of the Guinean Gulf (and Equatorial Africa) and a weaker one over North Tropics (extending toward eastern sub-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). However, the influence over the mid-latitudes of the Northern hemisphere is weak. Over the Atlantic there is less consistency likely related to the SST scenario differences. To be quoted in ECMWF some possible (but weak) connection with the Tropics. However it's seems difficult to infer any specific atmospheric response related to a Tropical forcing. As a conclusion the predictability is still limited over Europe and more generally over mid-latitudes regions to the exception of the Western coast of North America and North-Eastern Canada. One can infer some predictability in the Tropics over the Pacific, the Indian Ocean and Central America regions.

II.2.b North hemisphere forecast and Europe

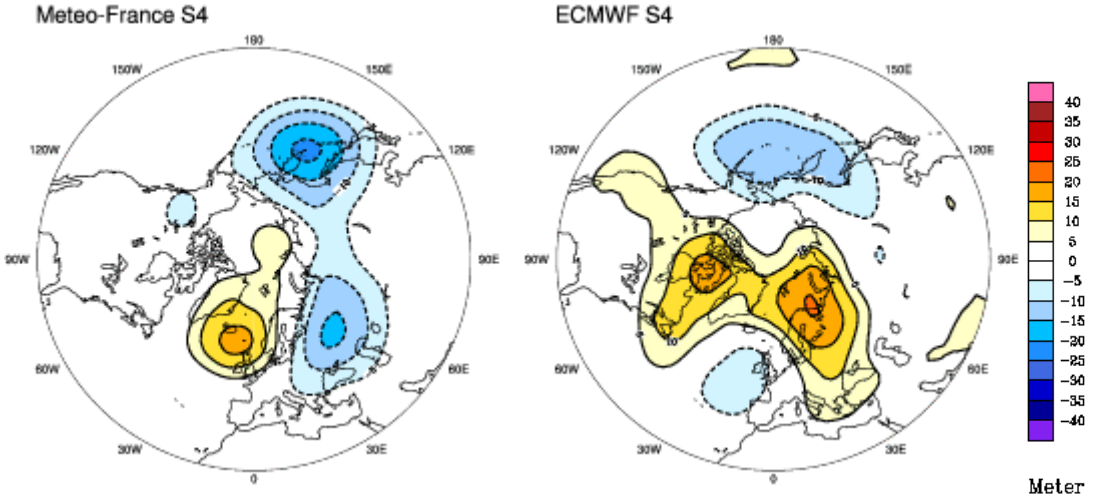


fig.20: Anomalies of Geopotential Height at 500 hPa for SON, issued in August, from Meteo-France (left) and ECMWF (right). http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip

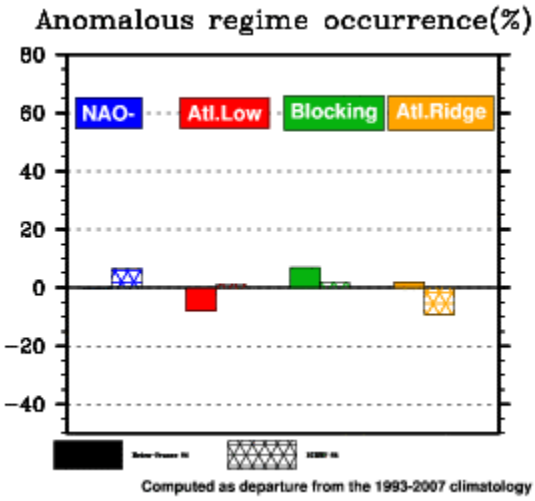


fig.21: North Atlantic Regime occurrence anomalies from Météo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

Geopotential height anomalies (fig. 20 – insight into mid-latitude general circulation anomalies) :
As seen on the Stream Function anomalies, there is a very weak signal in Stream Function Anomalies. 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 only little signal in the mid-latitudes geopotential forecasts so no signal in the regimes forecast.

General atmospheric circulation in MF in the low troposphere (see fig. 22) : the zonal and meridionnal circulation over Europe don't show strong signal. In addition, due to the limited predictability, these patterns are not directly interpretable in term of teleconnection pattern.

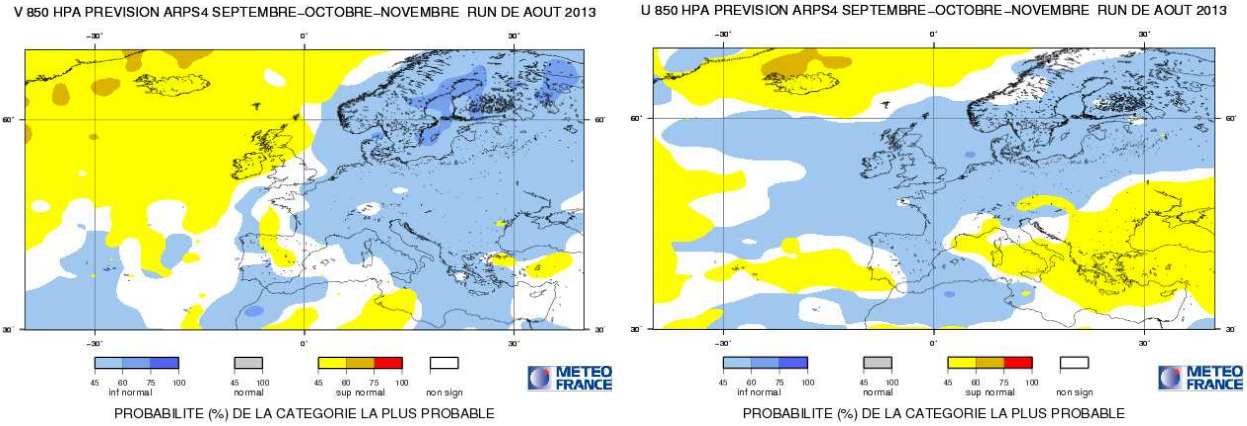


fig.22: Most likely category for the meridional (left) and zonal (right) wind at 850 hPa for SON, issued in August from Météo-France.

II.3. IMPACT : TEMPERATURE FORECASTS

II.3.a ECMWF

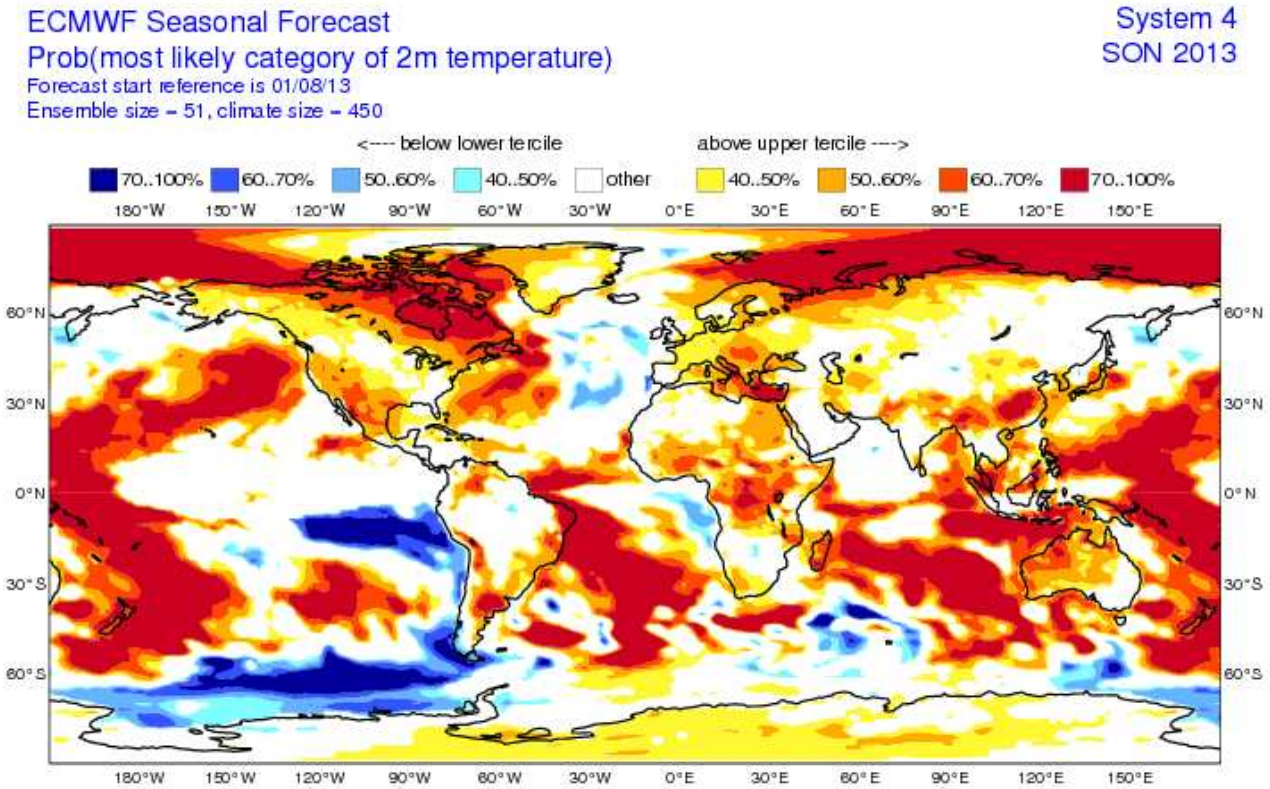


fig.23: Most likely category probability of T2m from ECMWF for SON, issued in August. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

II.3.b Météo-France

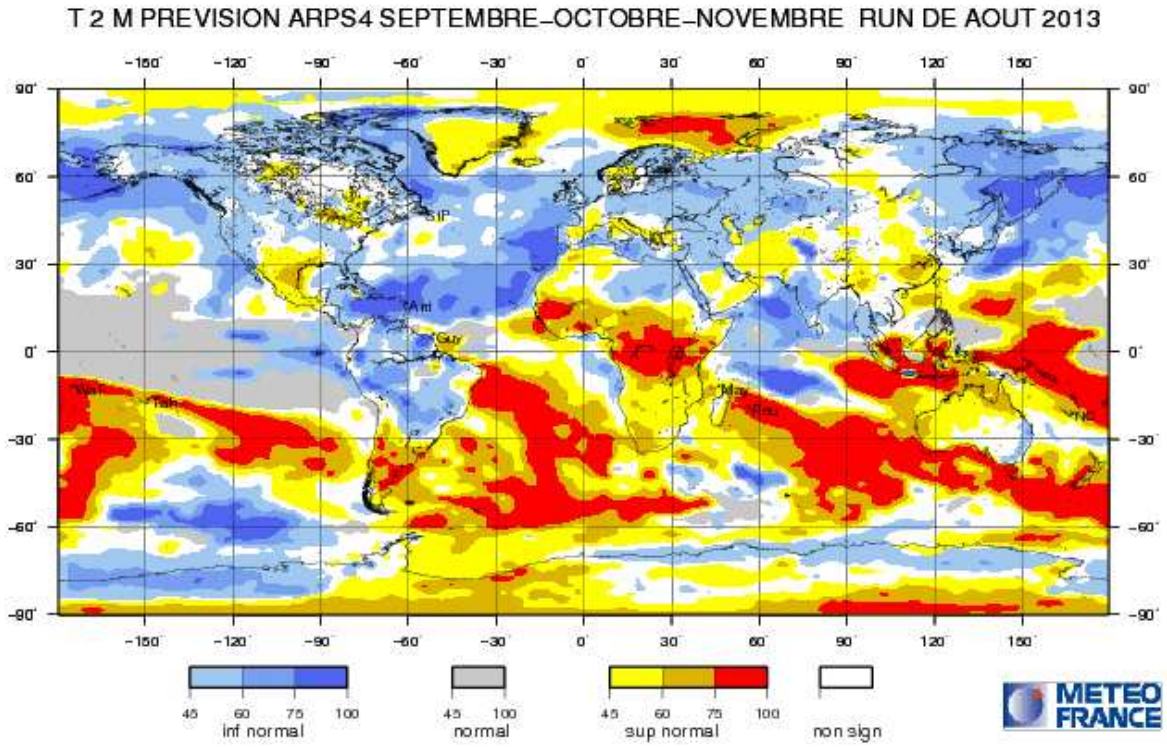


fig.24: Most likely category of T2m for SON, issued in August. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.3.c Met Office (UKMO)

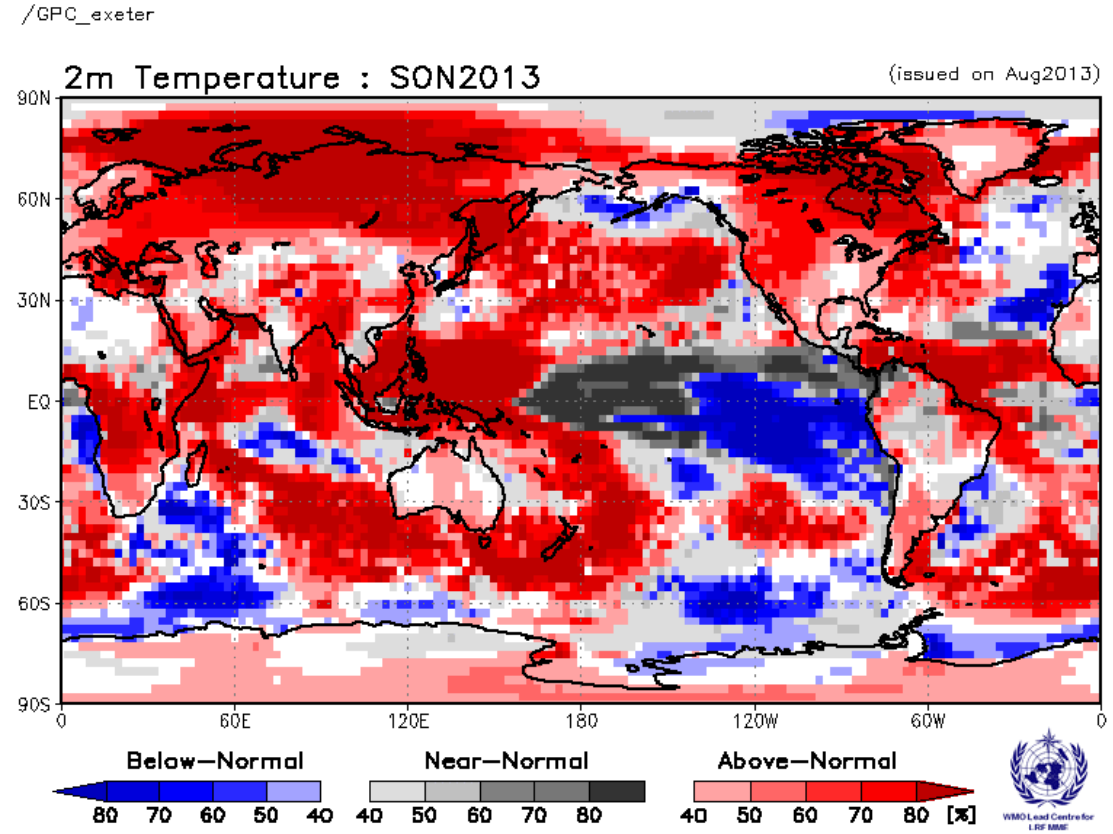


fig.25: Most likely category of T2m Anomaly for SON, issued in August from UK Met Office. https://www.wmolc.org/

II.3.d Climate Prediction Centre (CPC)

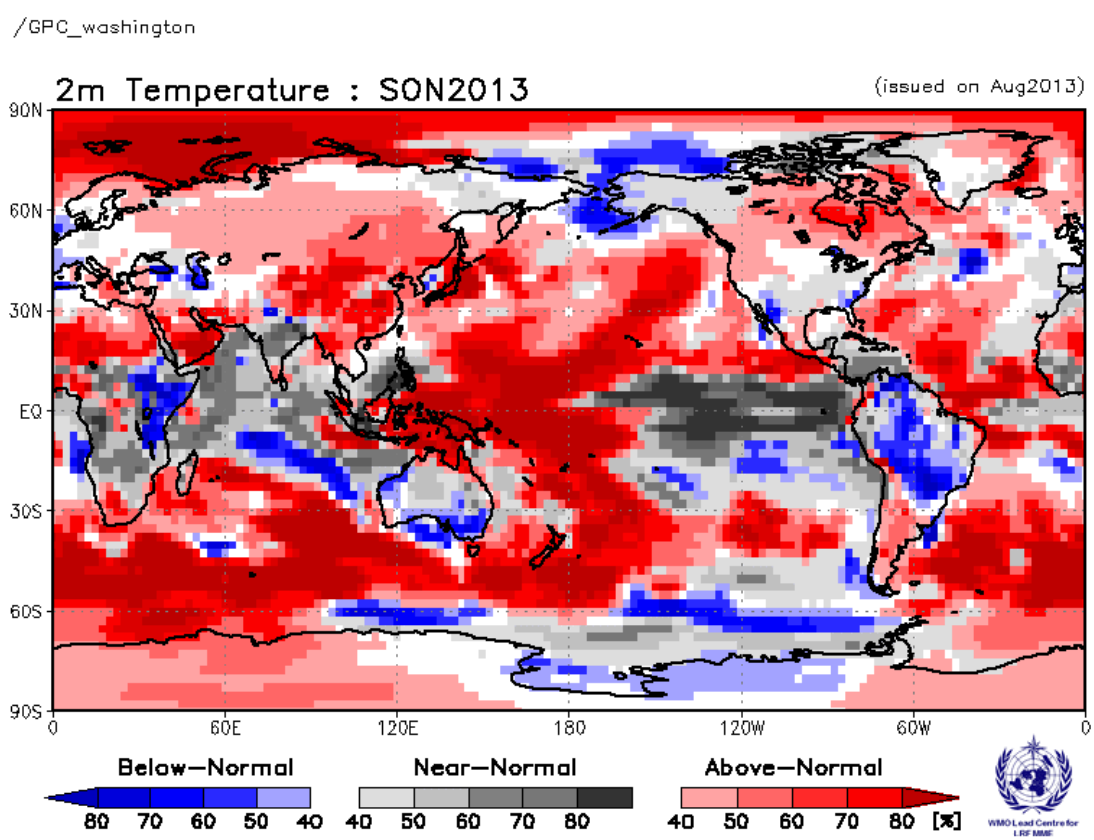


fig.26: Most likely category of T2m Anomaly for SON, issued in August from CPC. https://www.wmolc.org/

II.3.e Japan Meteorological Agency (JMA)

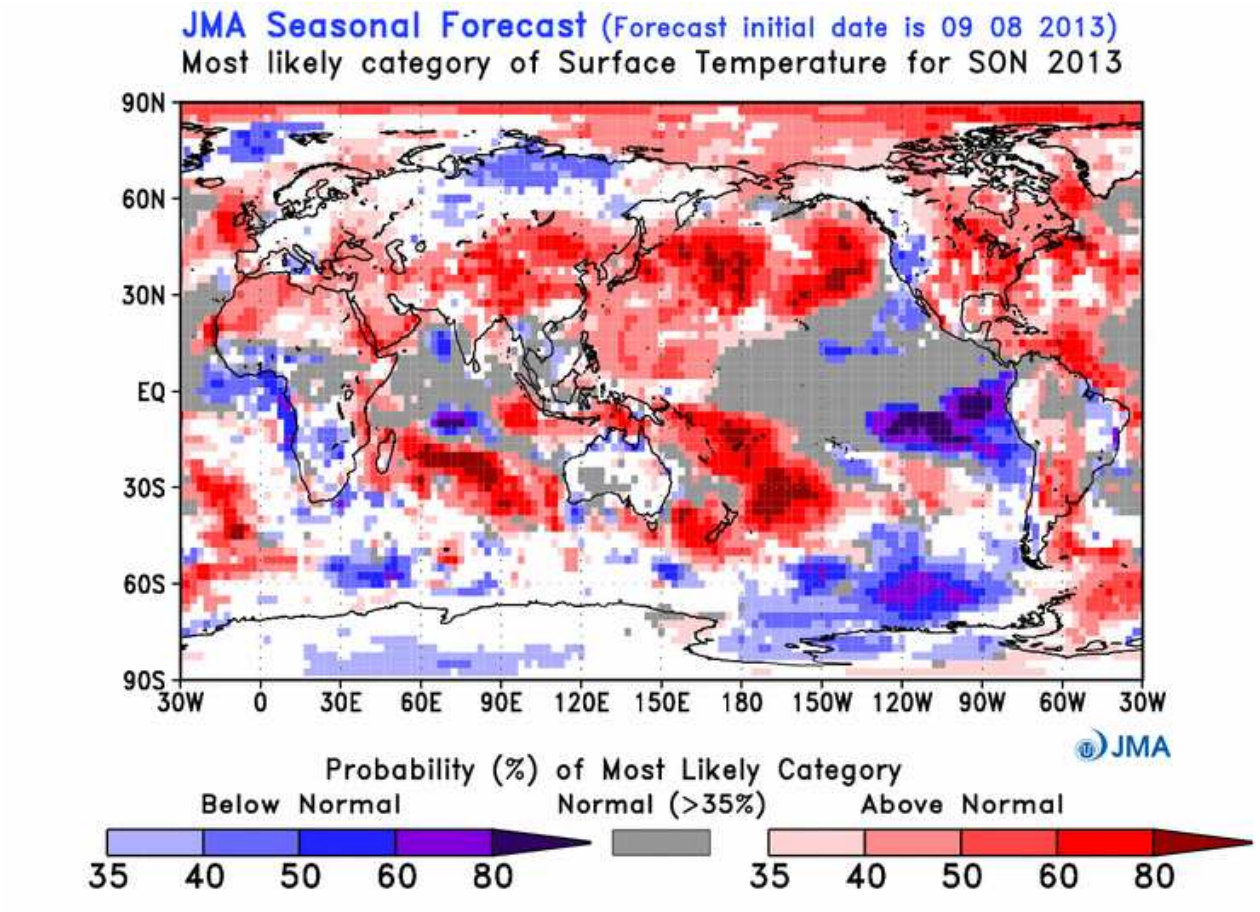


fig.27: Most likely category of T2m for SON, issued in August. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/

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

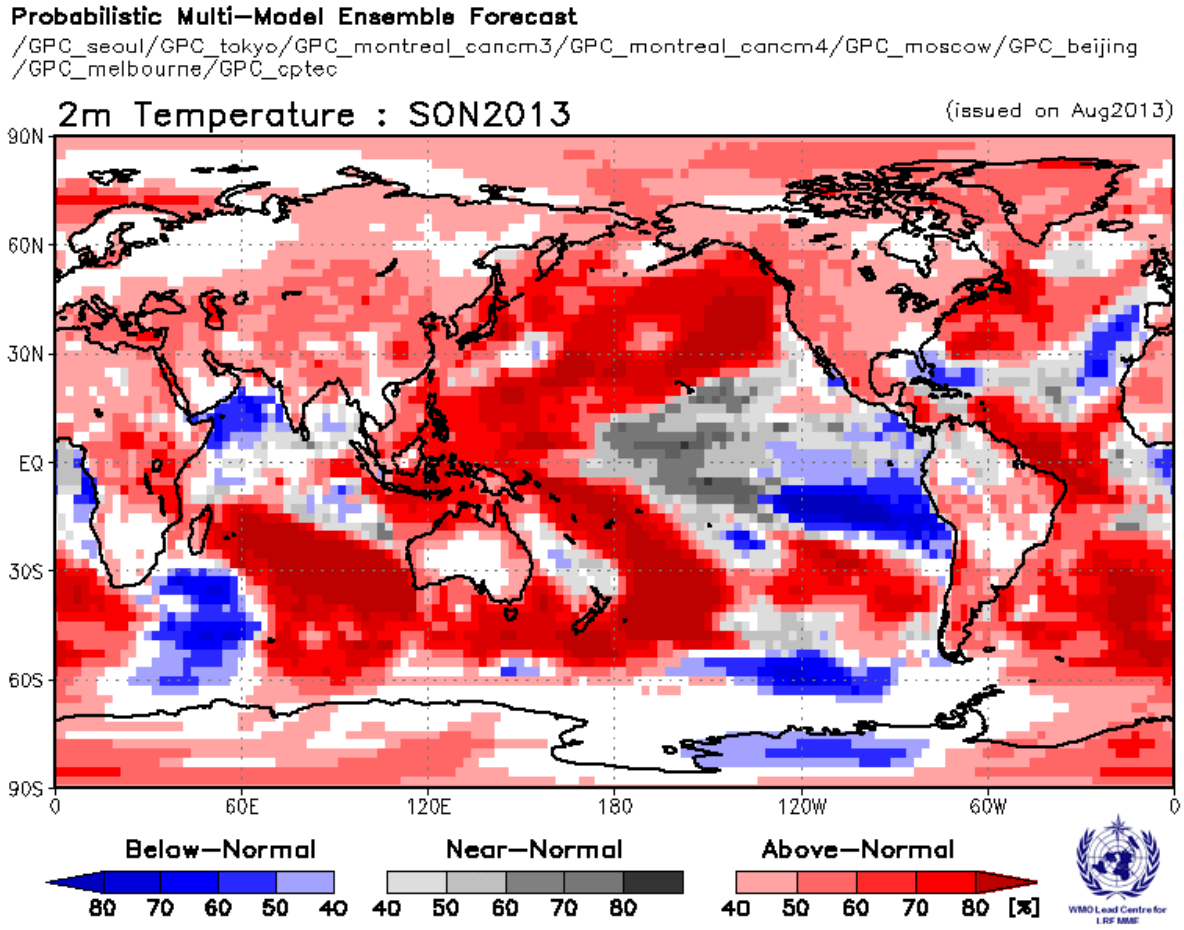


fig.28: MME most likely category of T2m for SON, issued in August from LC-MME. The MME composition corresponds to the GPCs not used in EuroSIP https://www.wmolc.org/

II.3.g Euro-SIP

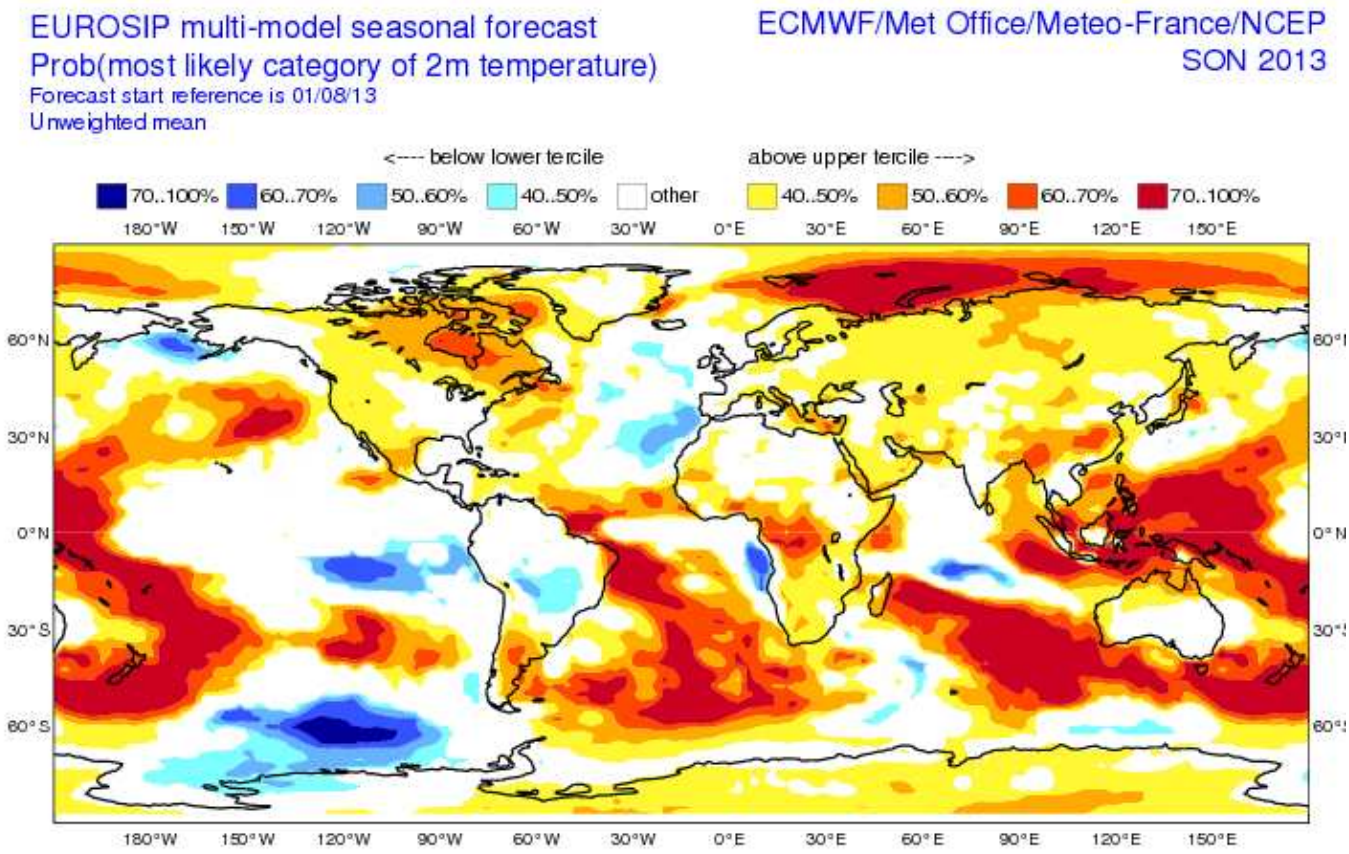


fig.29: Multi-Model Probabilistic forecasts for T2m from EuroSip for SON, issued in August. (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).

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

North-America : Noticeable enhanced probabilities North to the Great Lakes and slightly enhanced on the Western coast from Canada up to Mexico.
South-America : Some consistent signal over Brazil (colder than normal) and over the southern part of the continent (warmer than normal).
Australia : traces of warmer than normal over the Northern (and western) coastal part of the continent.
Asia : 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 South to the Equator and West Africa.
Europe : Warmer than normal conditions over the most Eastern regions including the Eastern Mediterranean basin.

II.4. IMPACT : PRECIPITATION FORECAST

II.4.a ECMWF

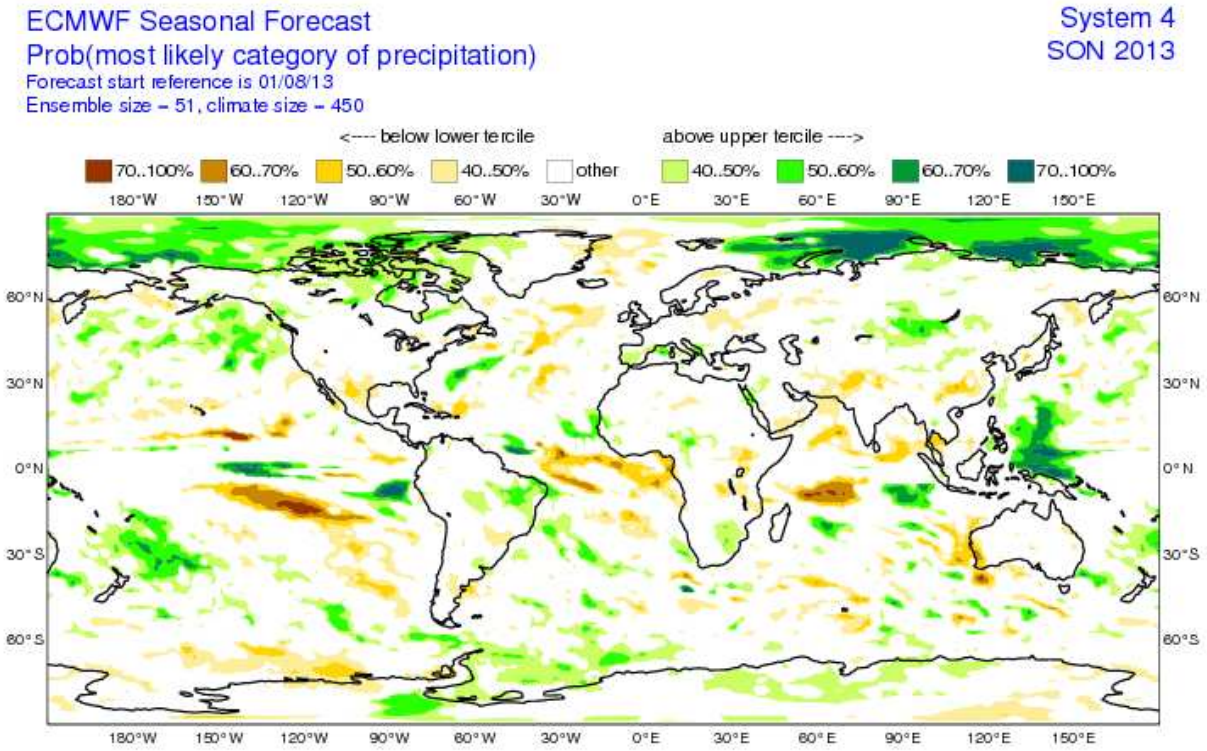


fig.30: Most likely category probability of rainfall from ECMWF for SON, issued in August. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/charts/seasonal_charts_s2/

II.4.b Météo-France

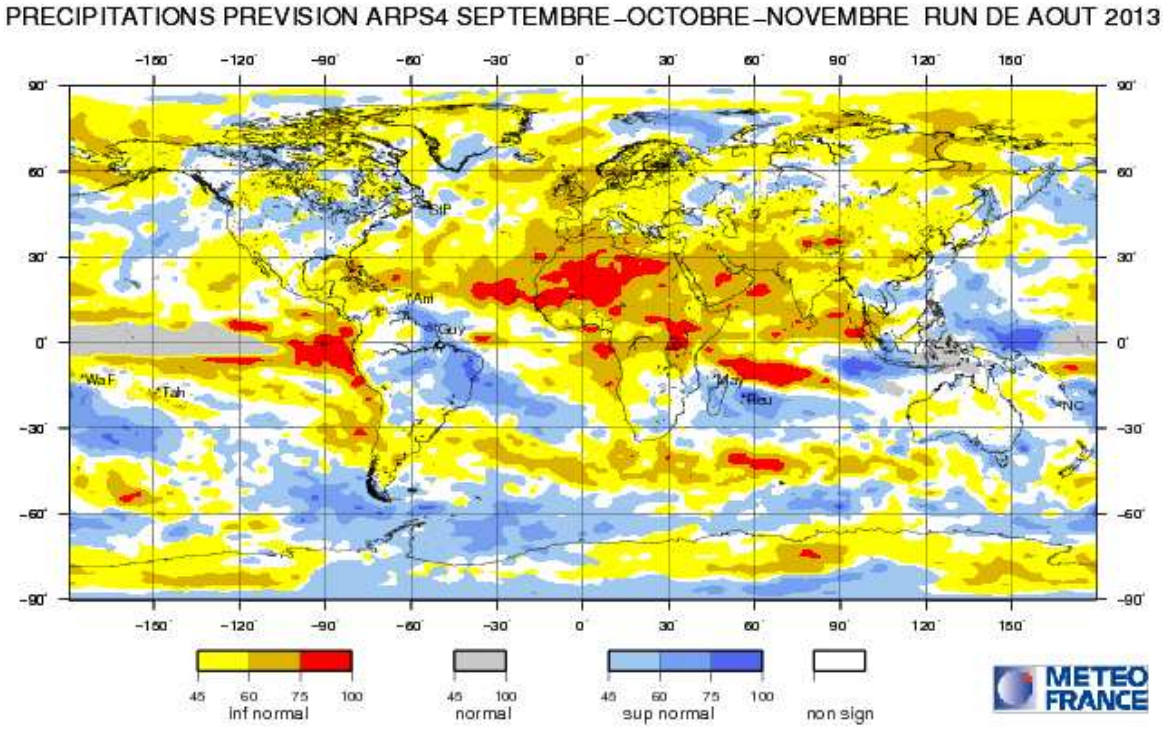


fig.31: Most likely category of Rainfall for SON, issued in August. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://elaboration.seasonal.meteo.fr/

II.4.c Met office (UKMO)

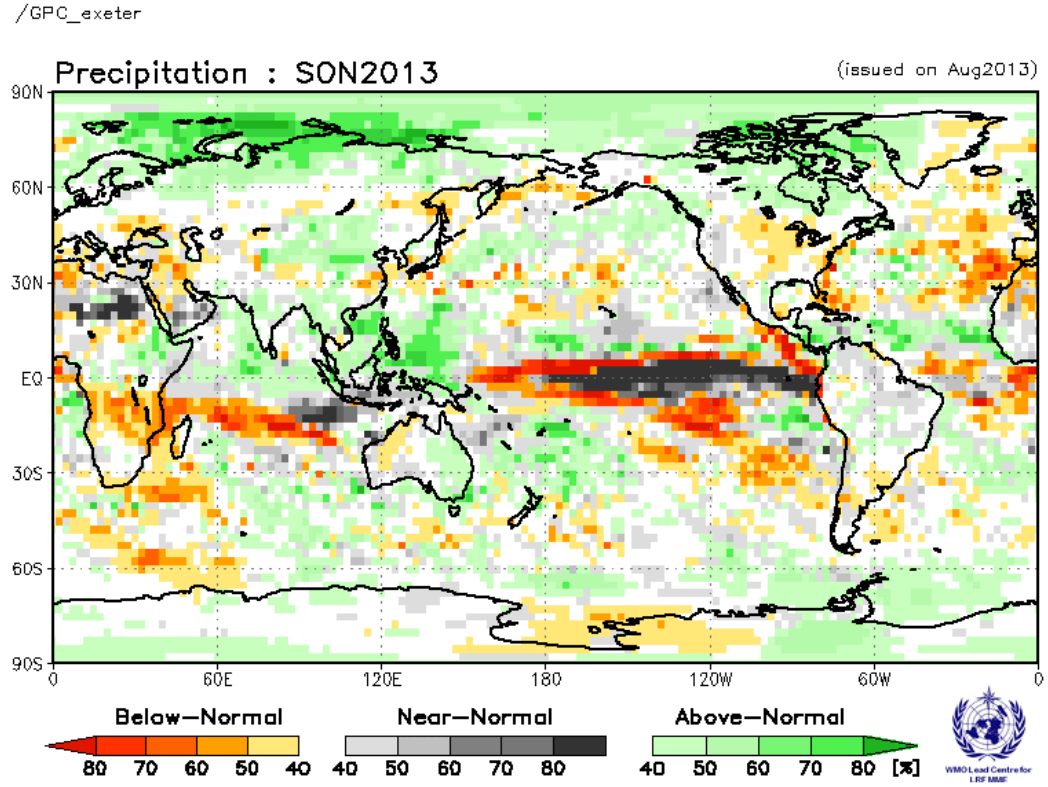


fig.32: Most likely category of T2m Anomaly for SON, issued in August from UK Met Office. https://www.wmolc.org/

II.4.dClimate Prediction Centre (CPC)

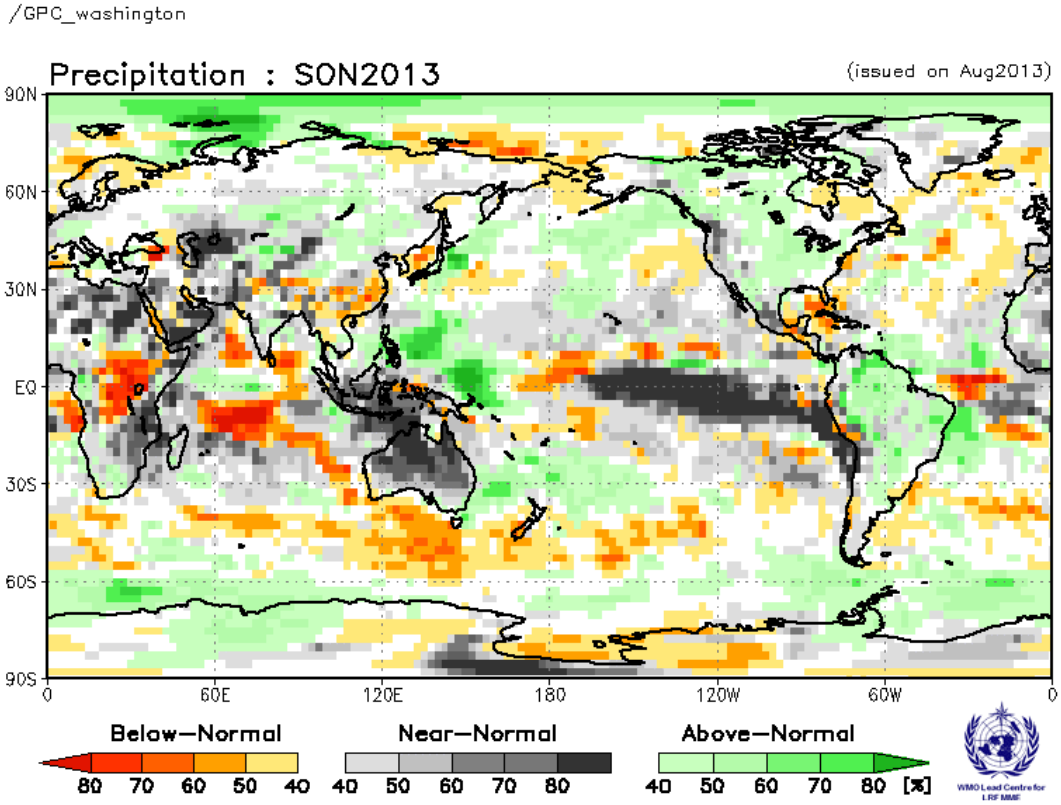


fig.33: Most likely category of Rainfall for SON, issued in August from CPC. https://www.wmolc.org/

II.4.e Japan Meteorological Agency (JMA)

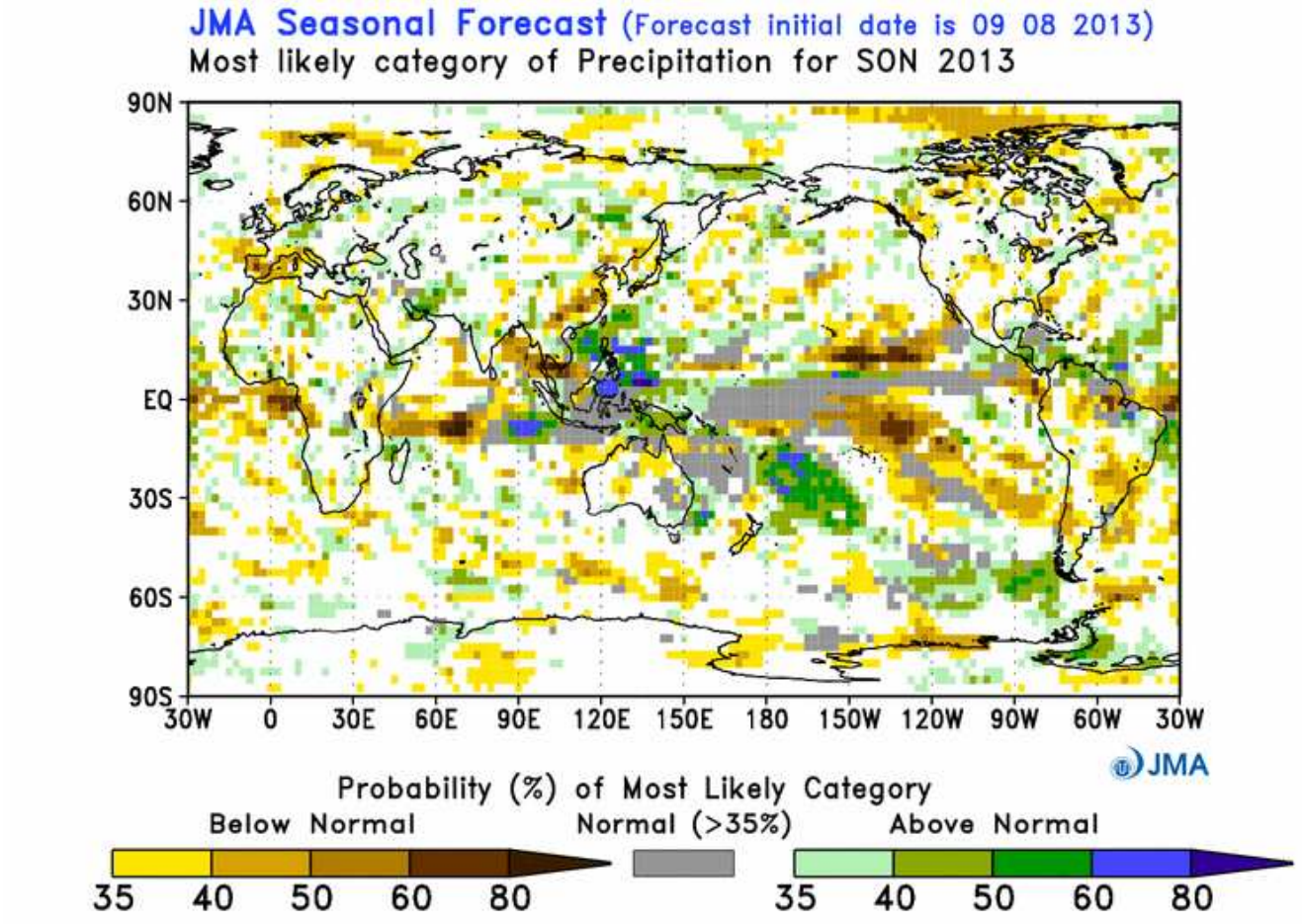


fig.34: Most likely category of Rainfall for SON, issued in August from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://ds.data.jma.go.jp/tcc/tcc/products/model/

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

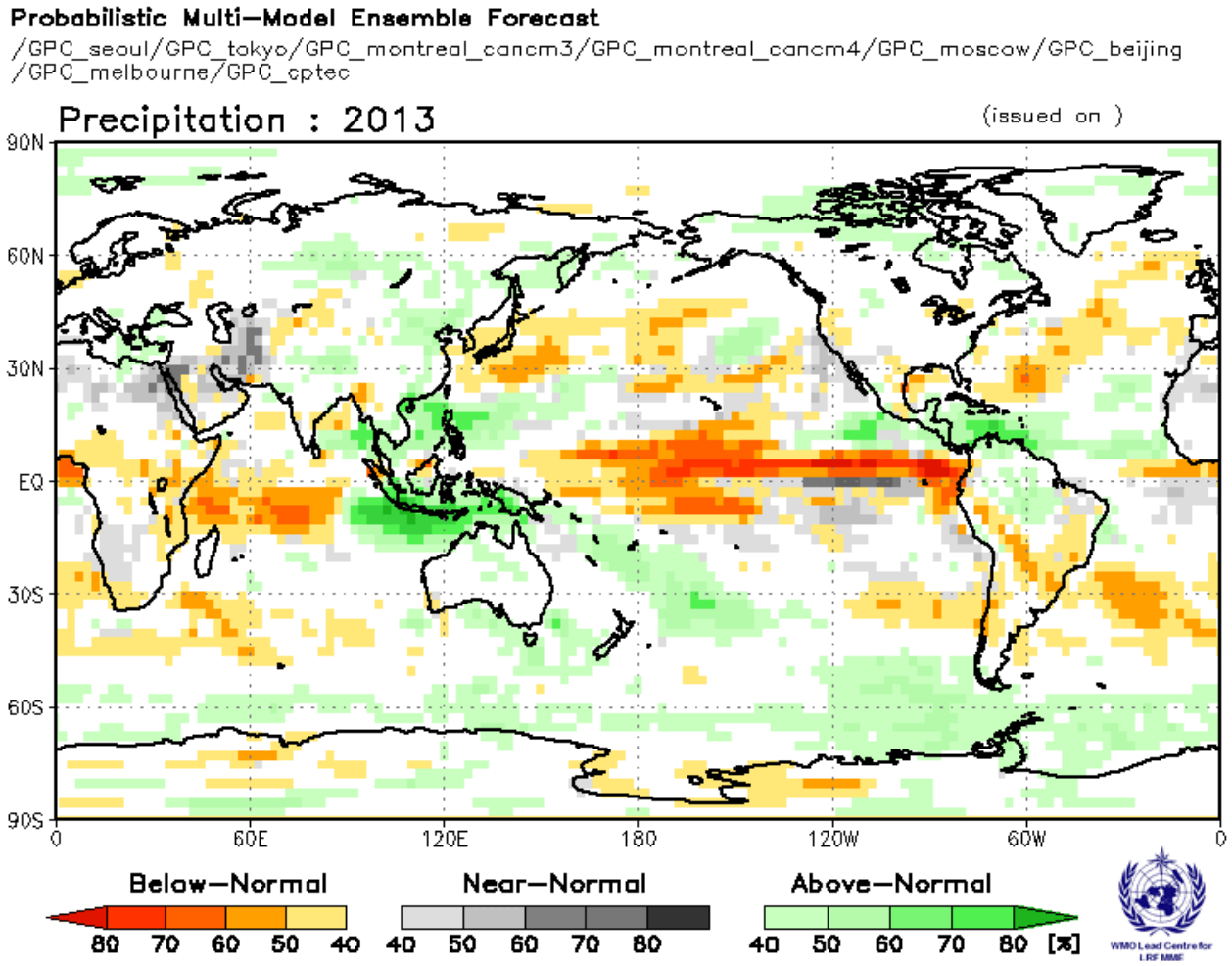


fig.35: **MME most likely category of Rainfall for SON, issued in August from LC-MME.. The MME composition corresponds to the GPCs not used in EuroSIP. https://www.wmolc.org/**

II.4.g Euro-SIP

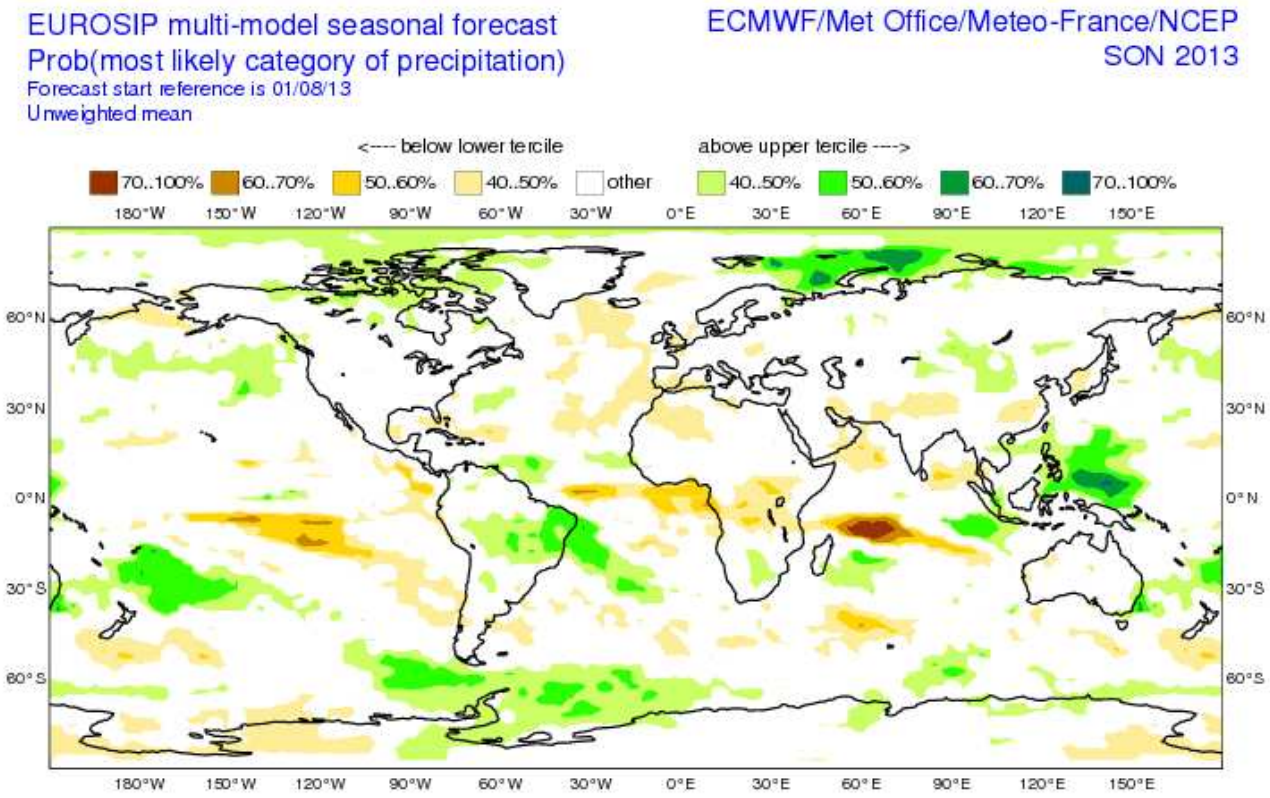


fig.36: Multi-Model Probabilistic forecasts for precipitation from EuroSip for SON, issued in August. (2 Categories, Below and Above normal – White zones correspond to No signal).

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

Some consistent signal in the Tropics ; enhanced probabilities for wet scenarios in the vicinity of the warm pool and Brazil and Amazonian regions. Enhanced probabilities for dry scenarios over East and Equatorial Africa, North-West Africa, and over the Tibetan high.

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 over part of Iberic Peninsula.

II.5. REGIONAL TEMPERATURES

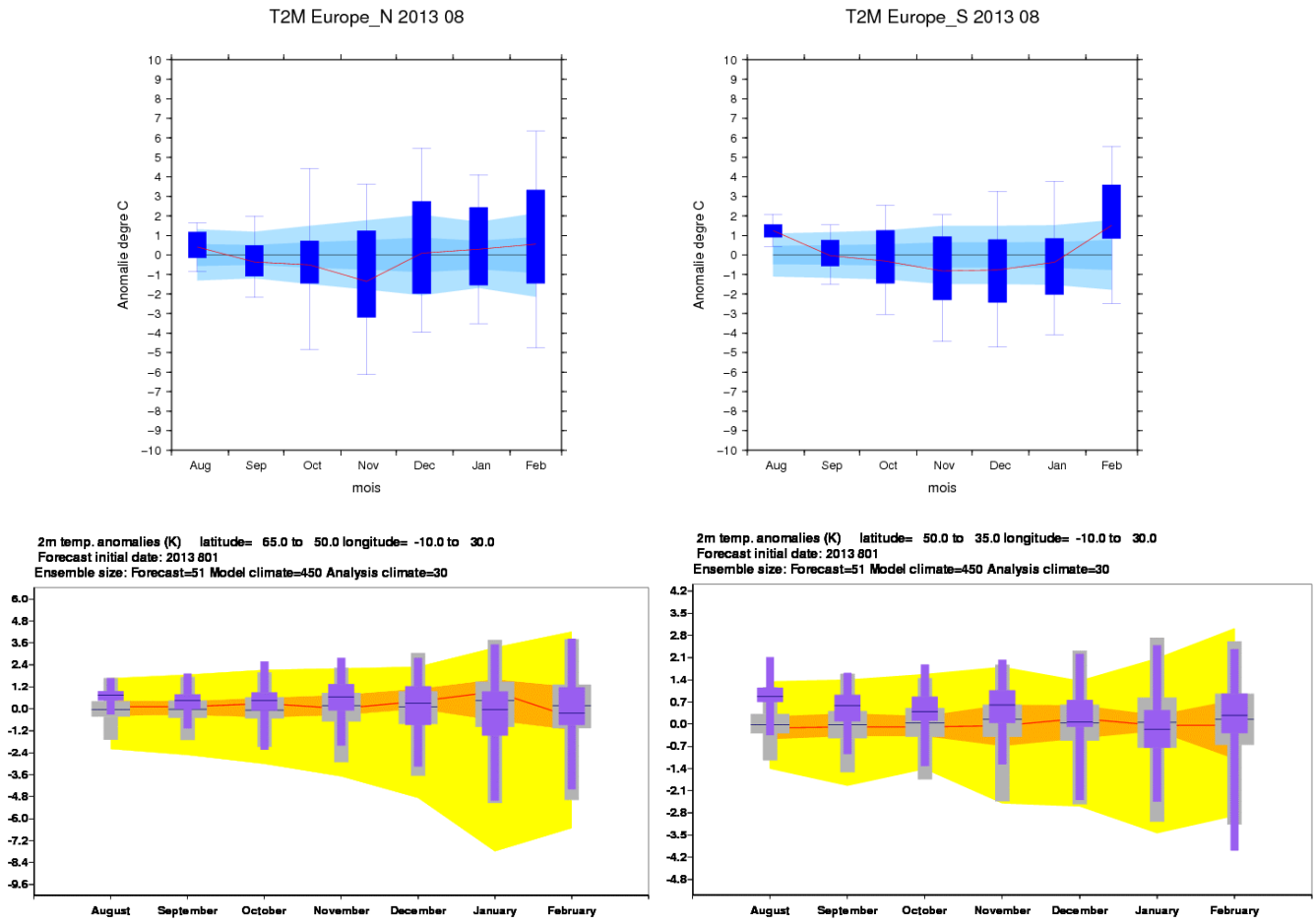


fig.37: Climagrams for T2m in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom) issued in August.

No consistency between the 2 models for both Southern and Northern Europe.

For Northern: Starting with Above normal conditions, ECMWF remains in such a scenario for the whole period while MF evolve toward Below normal conditions. Note the quite large spread (with respect of the climate reference) since September in MF and October in ECMWF.

For Southern Europe: comment quite similar to Northern Europe namely ; starting with Above normal conditions, ECMWF remains in such a scenario for the whole period while MF evolve toward Below normal conditions. The spread is larger in MF vs ECMWF.

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

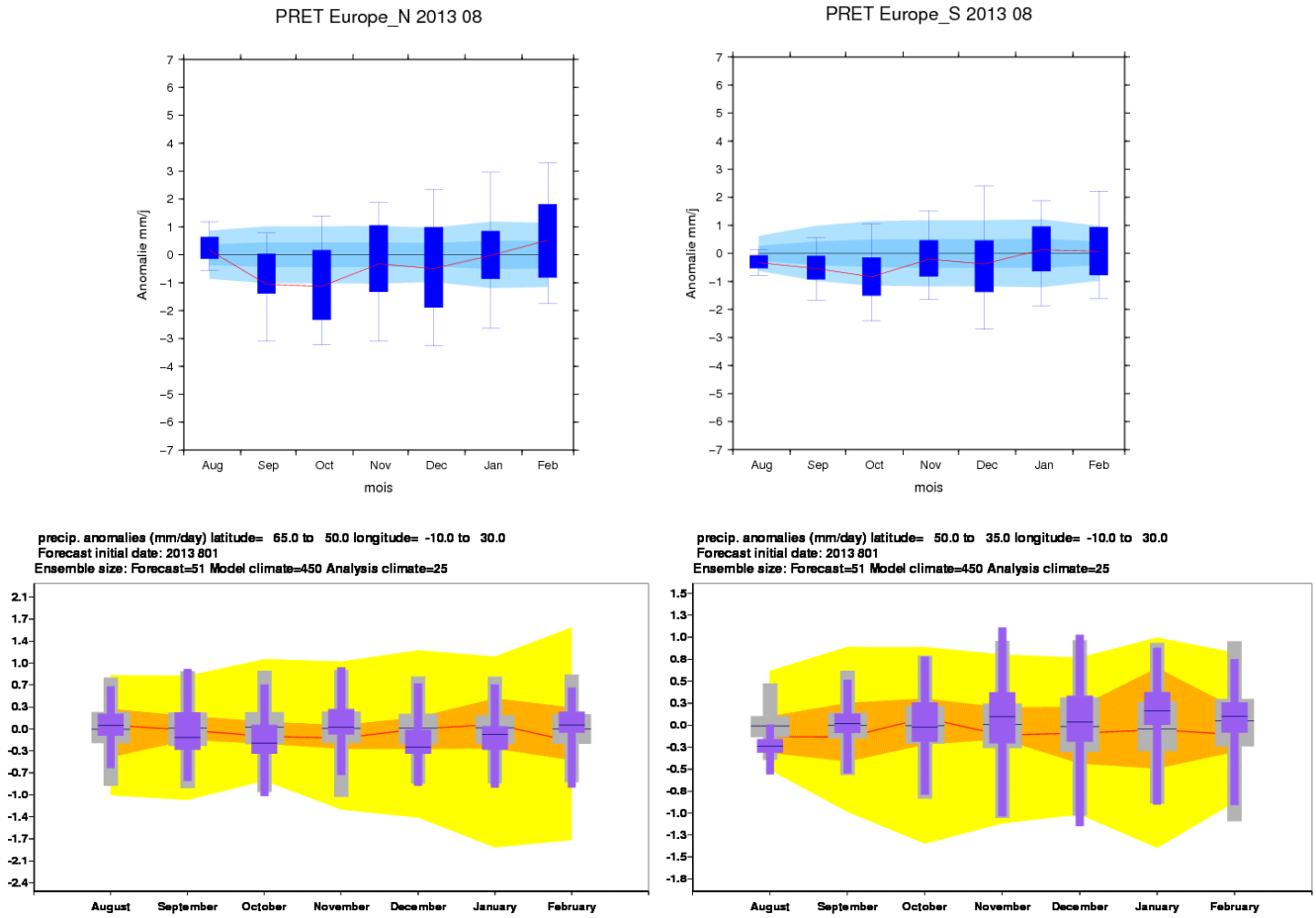


fig.38: Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France (top) and ECMWF (bottom), issued in August.

Only little consistency between the 2 models.

For Northern Europe : Large spread in the evolution of the 2 models since September. Drier than normal in SON and then returning toward normal in MF ; Below normal in SO and Above normal in N. The spread is a bit smaller in ECMWF vs MF.

For Southern Europe : Here also the spread is quite large, especially after September. In MF mostly Below normal over the SON period and then returning to Close to normal. Signal Above normal in ECMWF in September and November and close to normal in October then mostly Above normal.

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

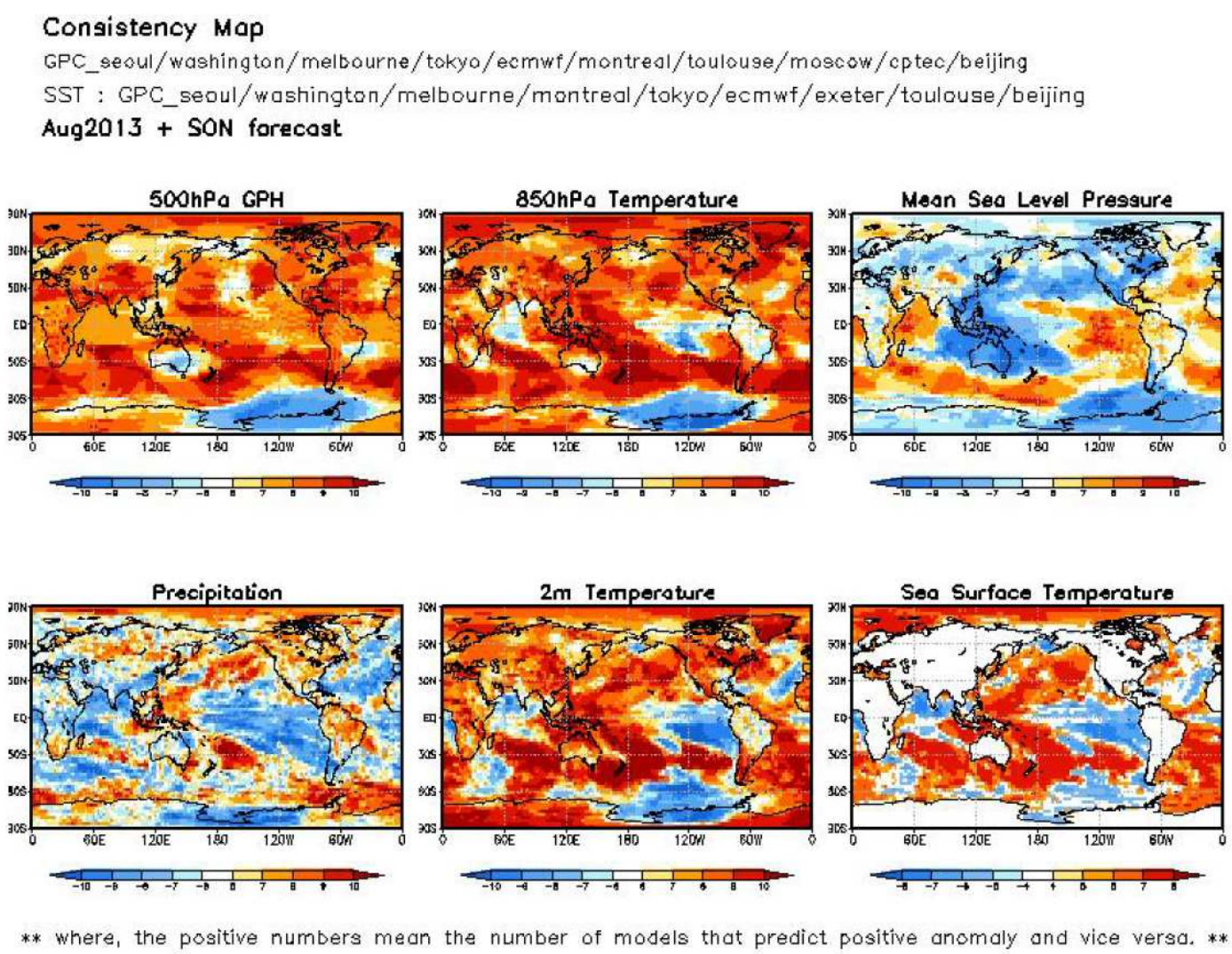


fig.39: ***GPCs Consistency maps from LC-MME*** *http://www.wmolc.org/*

For SST : Consistency across the Pacific : colder than normal in the Eastern part, warmer than normal in the Western part (both hemisphere). 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, great consistency in the Tropics and sub-Tropics of the Southern hemisphere and less consistency over the Northern hemisphere. However, Below normal conditions on the Eastern Atlantic (see EuroSIP), Above normal conditions from Brazil up to Western Africa and tendency to Below normal conditions in the Guinean Gulf.

For Z500 : Large consistency over Tropics and Sub-Tropics in both hemisphere to some exception like the Northern part of Siberia, Central Europe or eastern Sub-Tropics in the Atlantic.

For T2m : Consistency for Above normal conditions close to the maritime continent, over a large portion of Asia, North-America and the Southern part of South-America. To be quoted the lack of signal for Below normal conditions.

For precipitation : Some consistency in the vicinity of the maritime continent and the SPCZ, over Amazonian regions and Brazil and part of Canada (Above normal conditions). For the Below normal scenario, some consistency exists over part of South-East Asia, the Bay of Bengal, East Africa and the Southern part of South America.

II.7. "EXTREME" SCENARIOS

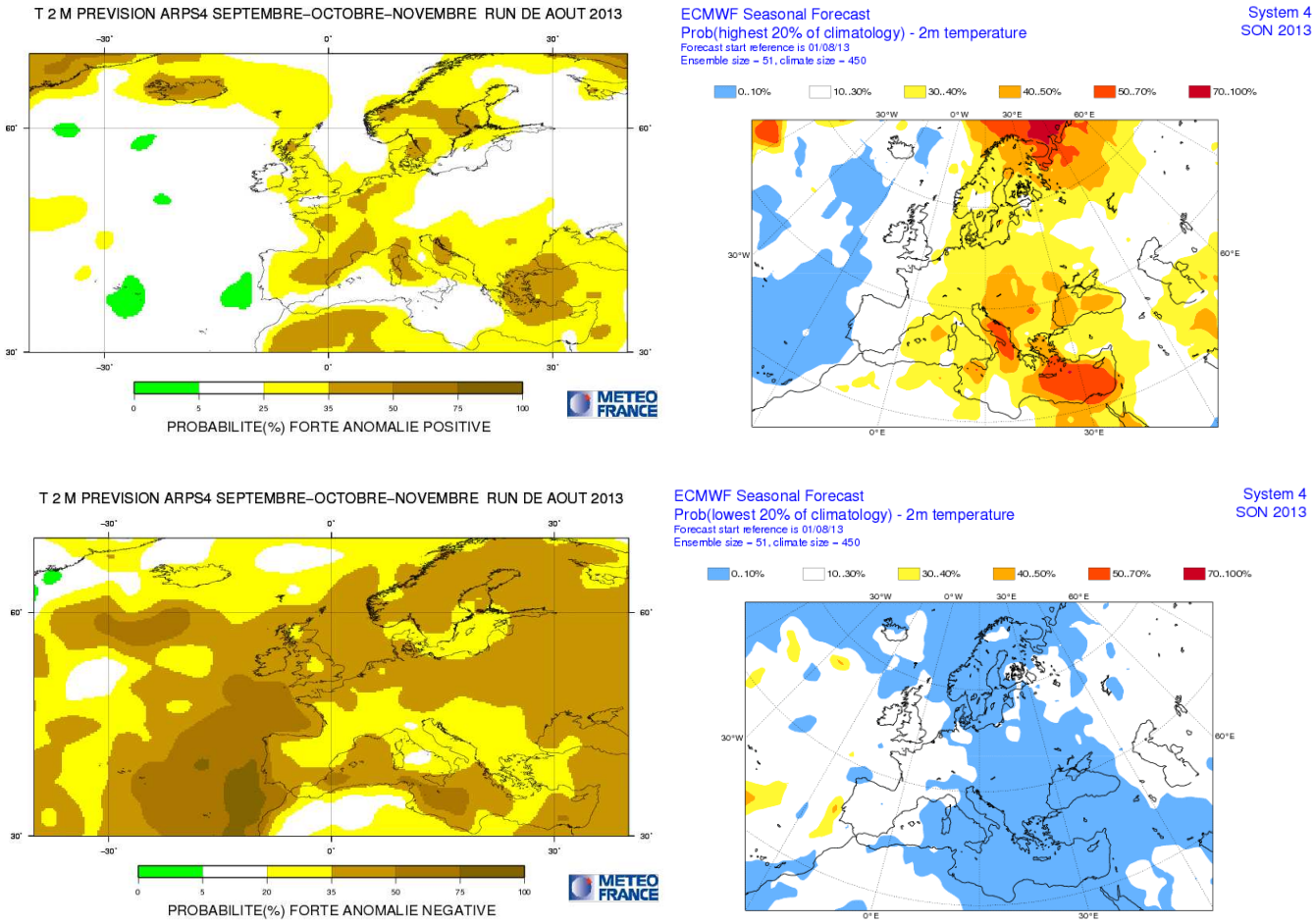


fig.40: Top : Probability of « extreme » above normal conditions for T2m for Meteo-France (left - highest ~15% of the distribution) and ECMWF (right - highest 20% of the distribution).
Bottom : Probability of « extreme » Below normal conditions for rainfall for Meteo-France (left - lowest ~15% of the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

No consistency between the 2 models for the Very Above scenario to the exception of regions surrounding the Mediterranean basin ans especially the SEE domain.
No consistency for very Below Normal scenario which is consistent with the differences in th SST scenarios across Atlantic. 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.

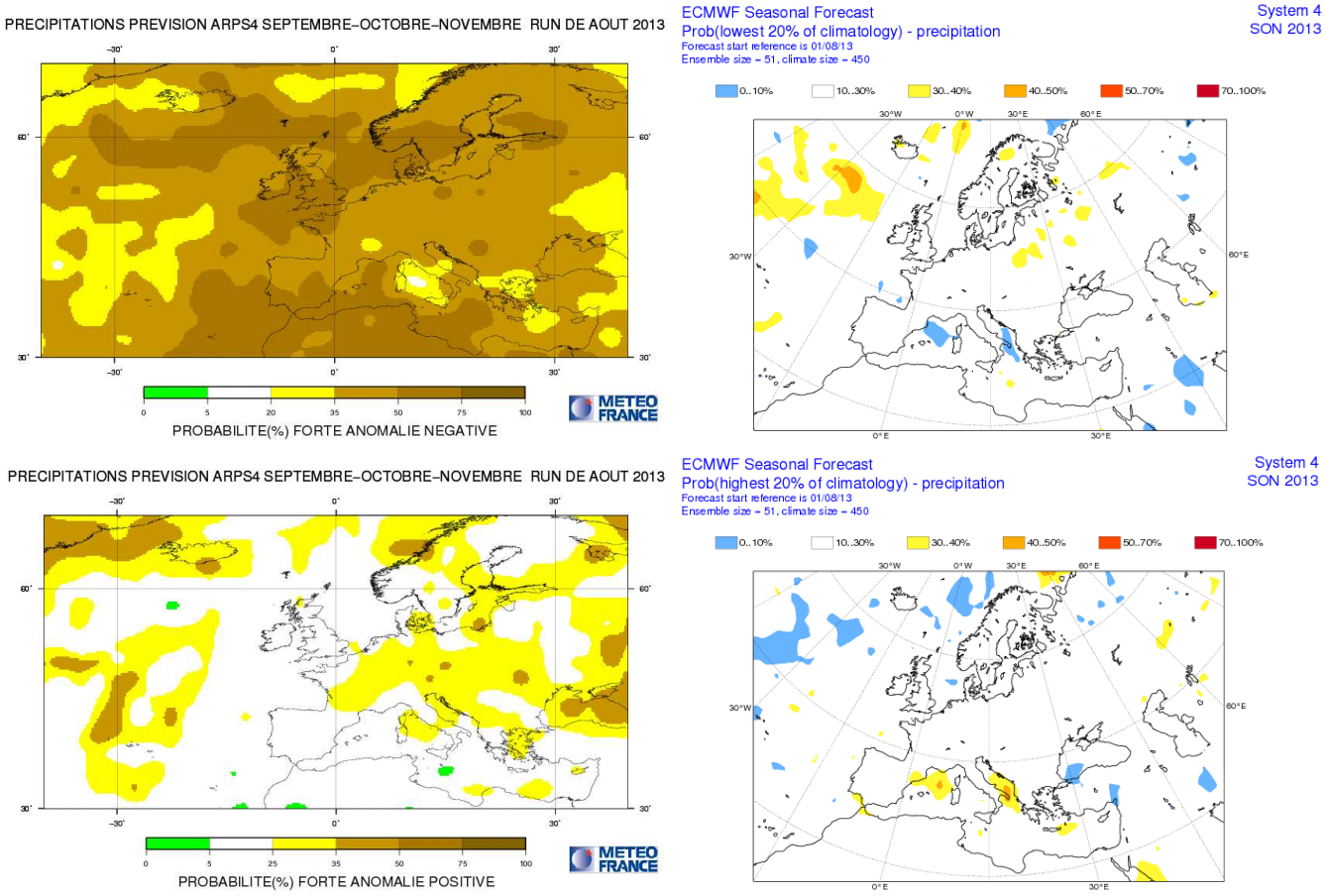


fig.41: Top : Probability of « extreme » Below normal conditions for rainfall for Meteo-France (left - lowest ~15% of the distribution) and ECMWF (right - lowest 20% of the distribution)
Bottom : Probability of « extreme » Above normal conditions for rainfall for Meteo-France (left - highest ~15% of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

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 close to the maritime continent and no teleconnection patterns toward the mid-latitudes of the Northern hemisphere seem to be very active across the Atlantics. 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 the Iberic Peninsula. **For temperature** : The Above normal scenario could be privileged for South-East Europe despite the weak predictability and also possibly for Eastern Europe. For the other sub-regions there is No Privileged scenario.
Obviously, some downscaled information could detail these scenarios for specific countries or sub-regions.

Tropical Cyclone activity

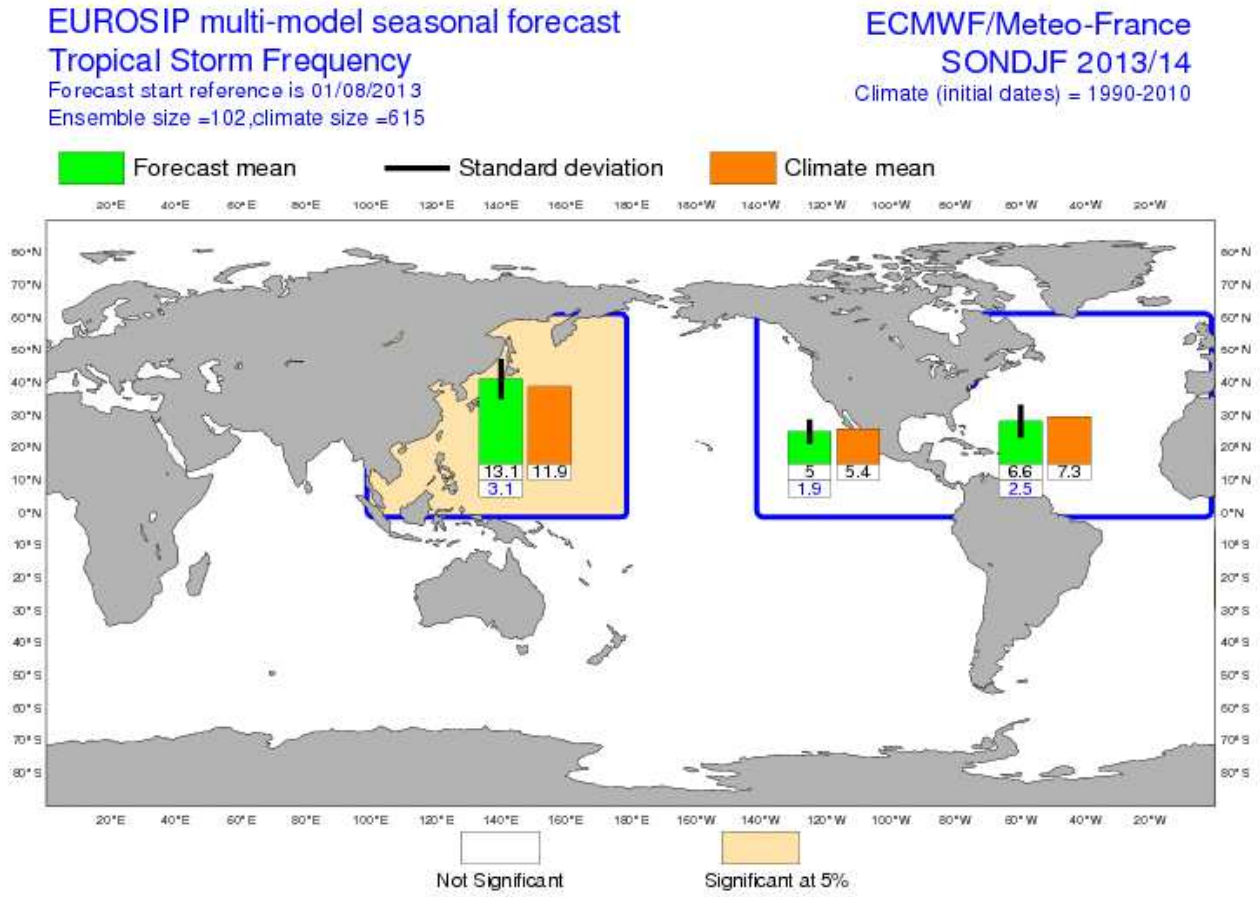


fig.42: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF) for for SONDJF period, issued in August.
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmtrop/trop_euro/eurosip_tropical_storm_frequency/

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 over the Eastern Pacific and the North Tropical Atlantic basin.

Synthesis of Temperature forecasts for September-October-November 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*	*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 September-October-November 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

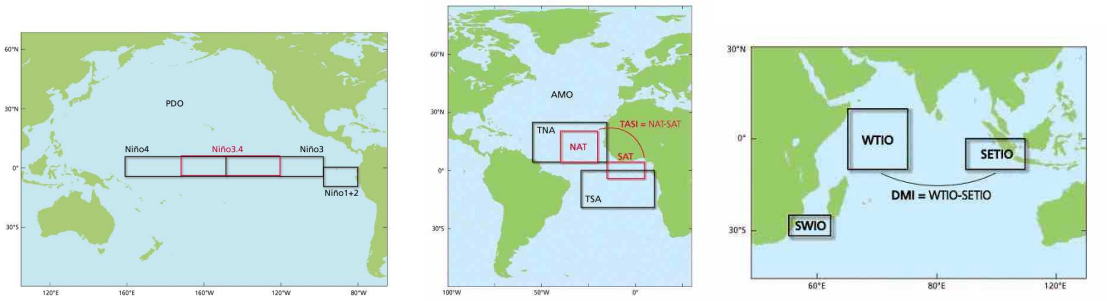
El Niño and La Niña events primarily affect tropical regions and are monitored by following the SST evolution in specific area of the equatorial Pacific.

- 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.