METEO FRANCE
Toujours un temps d'avance

GLOBAL CLIMATE BULLETIN
n°149 - NOVEMBER 2011

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I. DESCRIPTION OF THE CLIMATE SYSTEM (SEPTEMBER 2011)

I.1. GLOBAL ANALYSIS

I.1.a Ocean

In the Tropical Pacific the situation shows only little evolution (fig.1) with always a cooling East to the date line and cclose to normal conditions in the warm pool. Still in the Pacific at the highest latitude of the Northern Hemisphere, the positive anomaly continue to strengthen as a result of the atmospheric forcing.
The tropical Atlantic ocean remains slightly warmer than normal especially in its northern part and over the Caribbean Basin. In the Northern Atlantic, close to the European continent, there is still a negative anomaly while a positive anomaly is present in the central part centred around 40°N. One can notice the weakening of the positive anomalies in the Atlantic South (around 40°S).
The Indian Ocean is warmer than normal in its equatorial part. Positive anomalies are still visible on the Western part of the basin, from Tanzania up to the Great Horn of Africa. In the Southern hemisphere the strip of positive SST anomaly extending from Madagascar up to Australia continue to decrease.

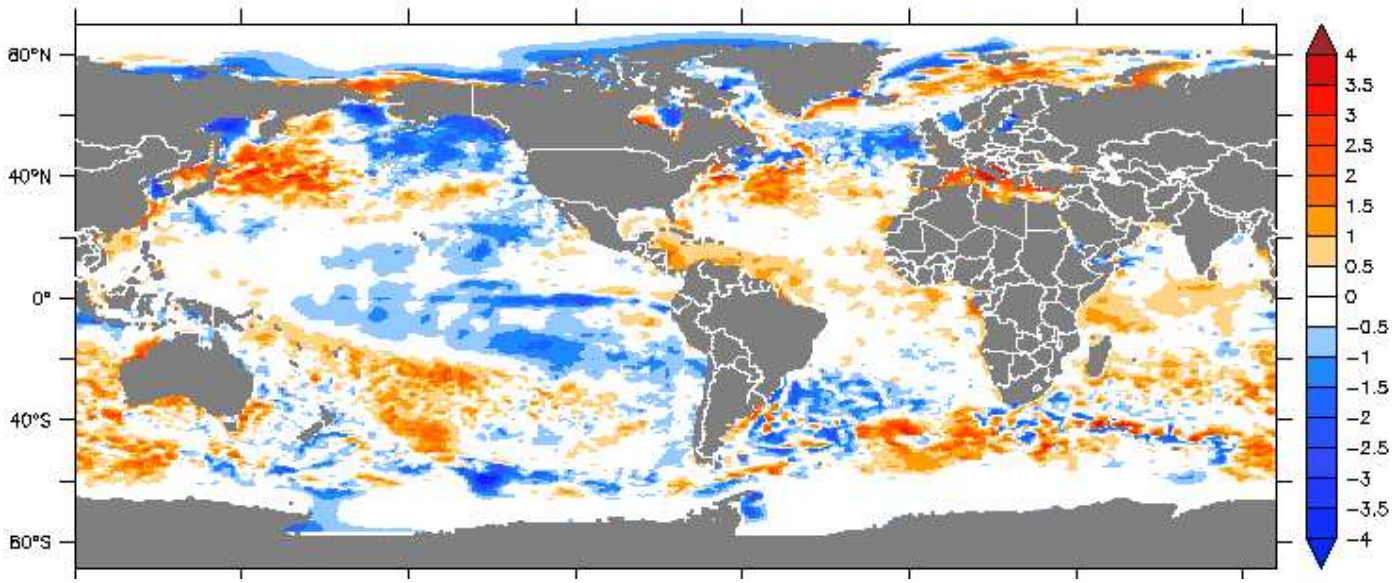


fig.1: SSTs Anomalies in September 2011 (°C). (reference Levitus 1980-2008)
http://bcg.mercator-ocean.fr/

Sur le rail équatorial de l'océan Indien, les contenus de chaleur sont supérieurs à la normale sauf à l'est du bassin jusqu'au continent maritime.
In subsurface (fig.2), in the equatorial Pacific waveguide, the heat content anomalies show some similarity with the SSTs and thermocline depth anomalies (see next figure) showing persistent in the Central and strengthened negative anomalies in the Eastern part.
In Tropical North Atlantic, the heat content anomaly is mostly positive, excepted along the eastern coast of South America. To be notice that the heat content in the Caribbean is not consistent with the SST signal. In the mid-latitude of North-East Atlantic, the heat content anomalies are similar to the previous month ; the anomalies being likely due to the atmospheric influence onto the ocean.

In the equatorial wave guide of the Indian Ocean, the anomalies have decreased. However, there is still a contrast between the central and western part (positive anomaly) and the most eastern part (negative anomaly).

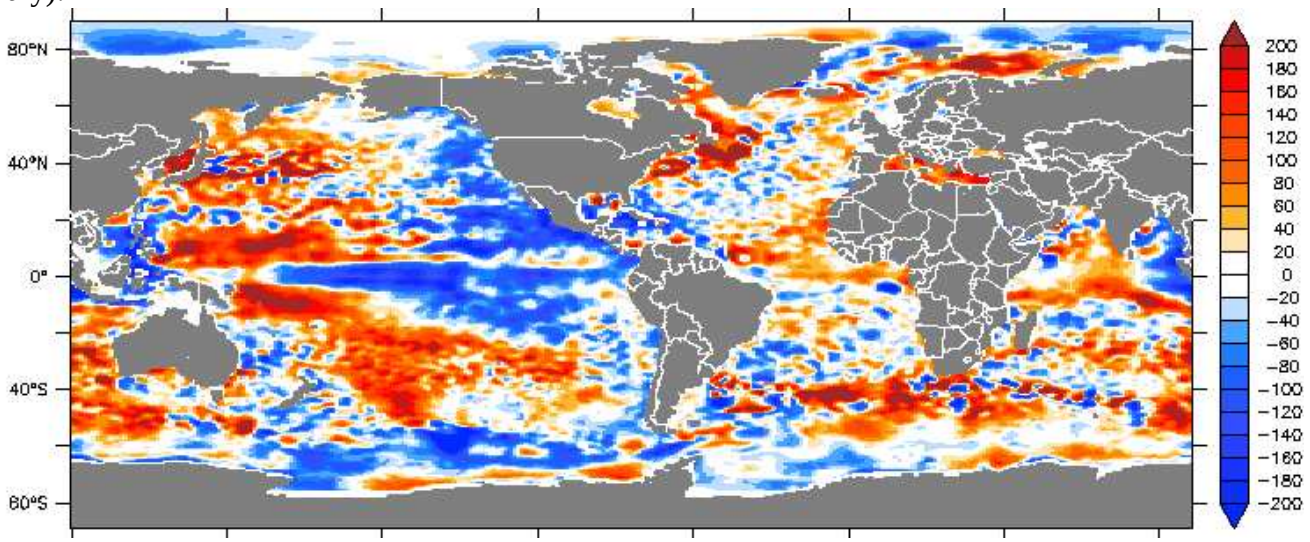


fig.2: map of Heat Content Anomalies (first 300m) in September 2011 (kJ/cm²). (reference Levitus 1980-2008)

http://bcg.mercator-ocean.fr/

In September over the Equatorial Pacific, the La Niña like dipole structure is still there (deeper than normal on western part and thinner than normal on Eastern part). Some clear trace of propagation are visible from West to East in the equatorial waveguide (which continue on October). One can notice the strengthening of the dipole at the end of September/beginning of October. Over the Atlantic, a positive anomaly is visible more or less over the whole basin. Last over the Indian ocean, the thermocline depth anomaly is negative on the most Eastern part and positive in the Central part. To be noticed the close to normal situation in the most Western part.

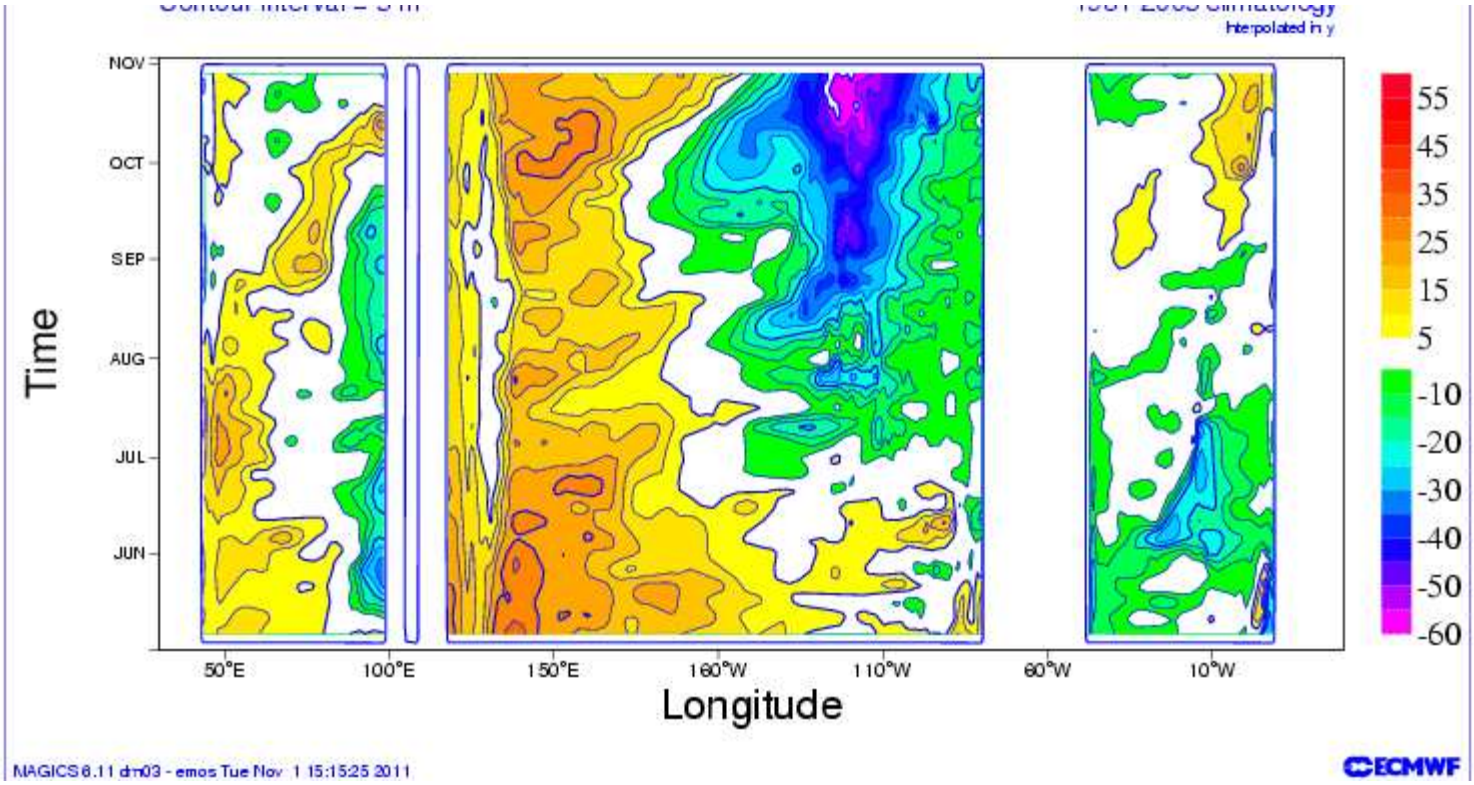


fig.3: Hovmeoller diagram of Thermocline Depth Anomalies (m) (depth of the 20°C isotherm) along the equator for all oceanic basins over a 6 month period. http://www.ecmwf.int/

I.1.b Atmosphere : General Circulation

Looking to the Velocity Potential Anomaly field in the high troposphere (fig.4), the patterns of General Circulation (especially Hadley-Walker circulations) are La Niña like patterns over most of the Pacific. East to the date line the anomaly is mostly positive (Convergent circulation anomaly. Downward motion) while West to this line, it is mostly positive (divergent circulation anomaly/Upward motion) with a strong stre,gthening of the divergence over the most western part of the Pacific Basin. Associated to these anomalies, the SOI have increased (+ 1.0) consistently with the growth of a La Niña event.. Over the African continent, the divergent circulation anomaly previously observed has dramatically decreased.

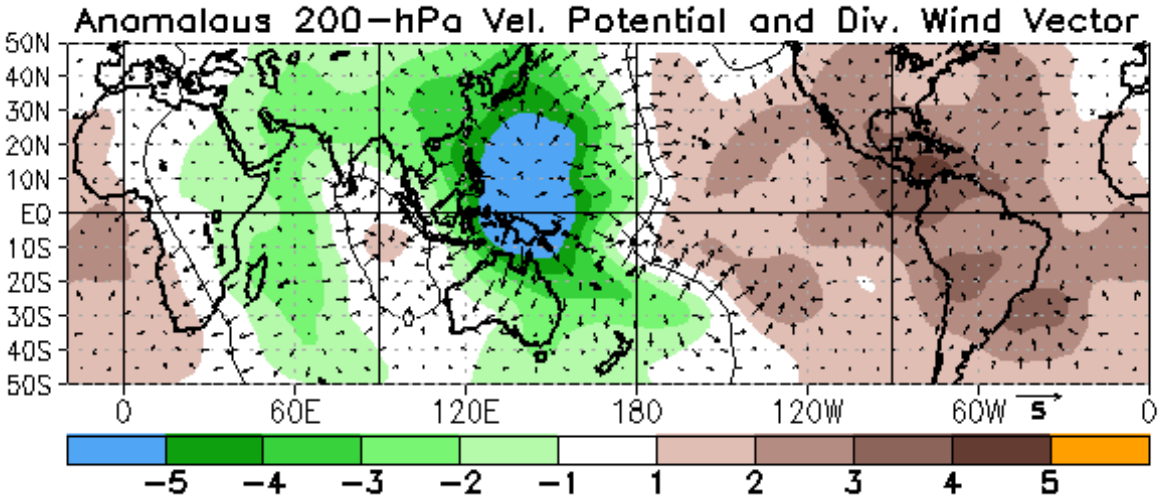


fig.4: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly for September 2011. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

Looking to the Stream Function anomalies in the high troposphere (fig. 5), with respect of the previous month one can remark that anomalies are strengthening and some teleconnections patterns seem to take place especially across the Pacific basin.

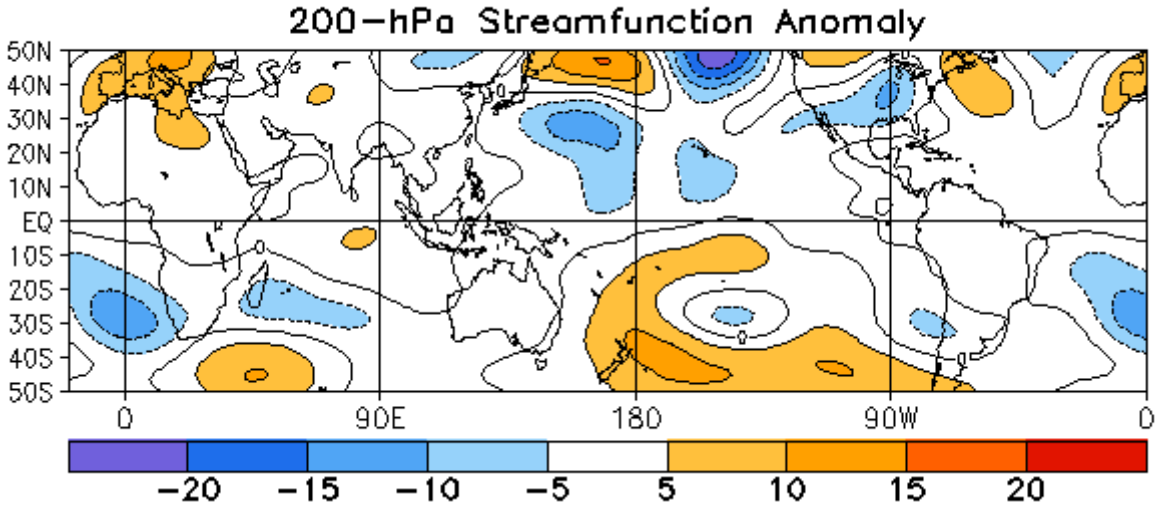


fig.5: Stream Function Anomalies at 200 hPa in September 2011.
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

Over the Northen Hemisphere planetary Rossby waves are quite well in place. The Geopotential height at 500 hPa (fig. 6) shows a positive anomalies Over Europe, North USA and Canada and West Pacific. A negative anomaly is seen on the North Atlantic sector. Consistently the most active modes of variability are the East Atlantic and the Polar modes. The NAO mode (positive phase) is partly related to the negative anomaly already quoted on the North Atlantic sector.

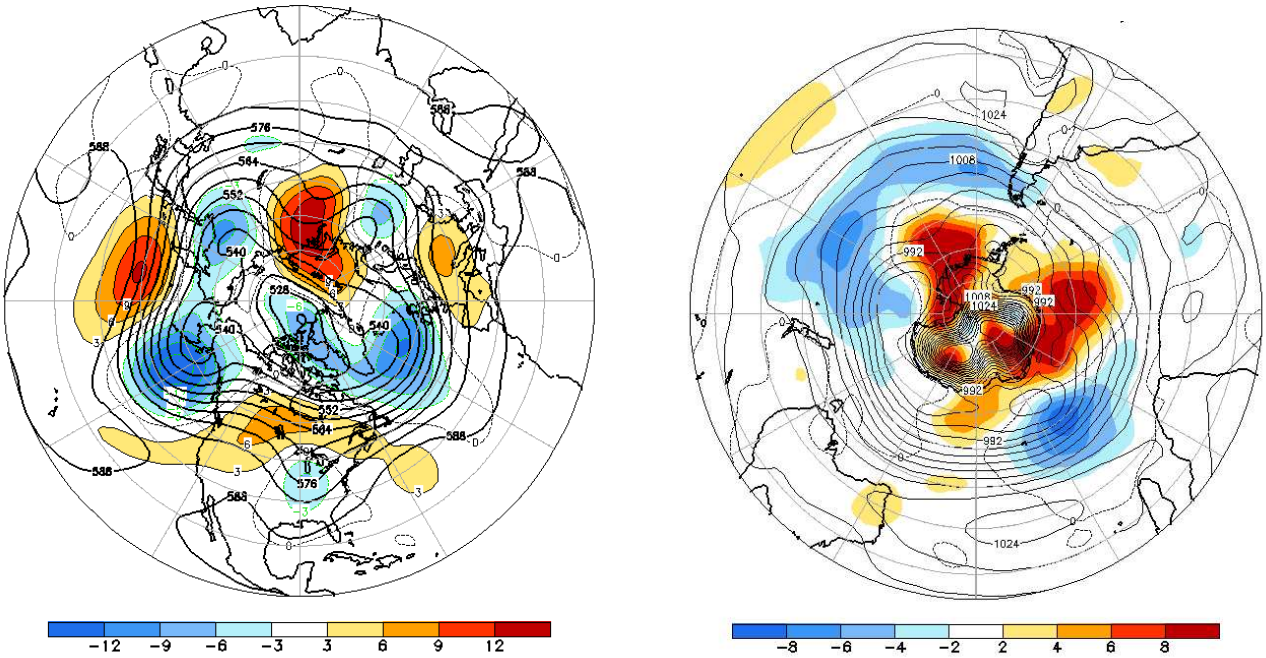


fig.6: Anomalies of Geopotential height at 500hPa in September 2011 (left North Hemisphere http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/fige9.shtml, and right South Hemisphere http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/fige15.shtml)

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
SEP 11	0.7	1.8	0.5	-0.5	-0.4	---	-0.3	-0.6	-1.1
AUG 11	-1.9	1.0	-0.5	-0.7	1.4	---	1.0	0.2	-0.3
JUL 11	-1.5	0.4	-0.3	-2.2	-0.8	---	-0.8	2.5	-0.3
JUN 11	-1.0	-0.2	0.8	-0.5	0.3	---	-0.3	-0.6	-1.1
MAY 11	0.0	-0.7	0.4	-1.2	0.3	---	-1.5	-1.1	-0.6
APR 11	2.5	-0.6	-1.9	-0.6	-1.8	---	1.2	-0.4	-0.3

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

I.1.c Precipitation

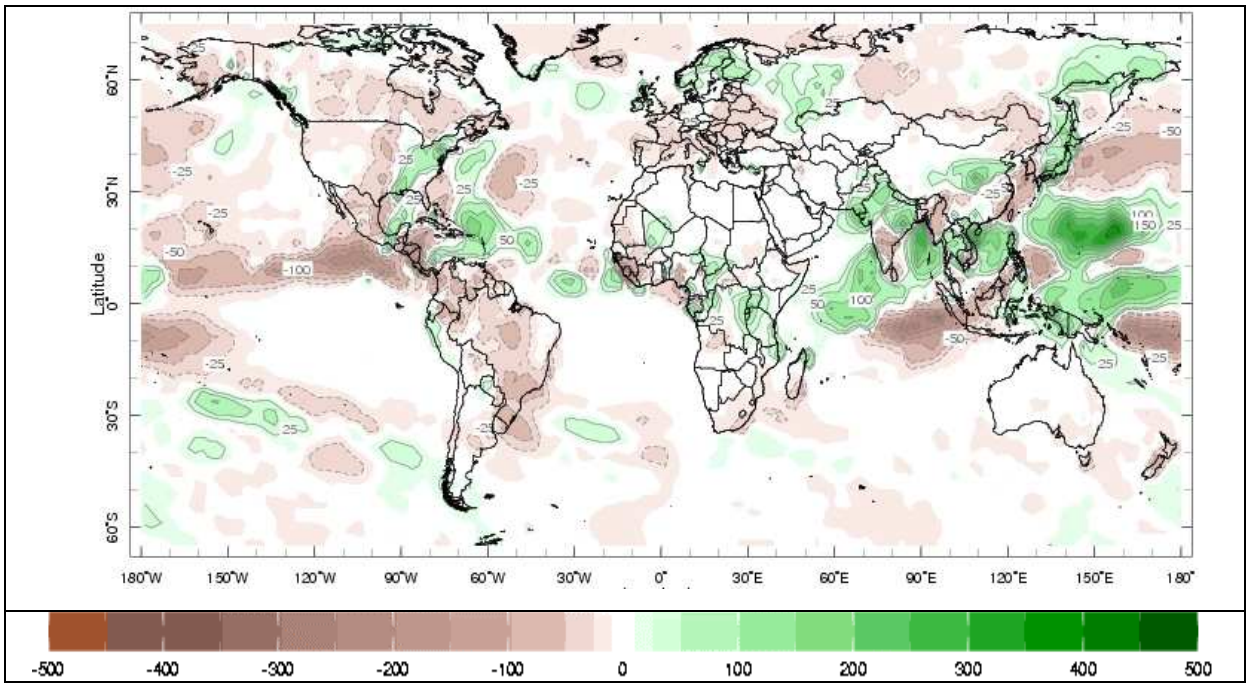


fig.7: Rainfall Anomalies (mm) in September 2011 (departure to the 1979-2000 normal) – Green corresponds to above normal rainfall while brown indicates below normal rainfall.
http://iridl.ldeo.columbia.edu/maprom/.Global/.Precipitation/

Accordingly to general Circulation patterns, the rainfall situation is below Normal over the Central and Eastern Pacific while some strong positive anomalies are present on the Western part. Extended negative anomalies are also visible across the whole American continents (both South and North). In relationship with the geopotential Height anomalies the precipitation (fig.7) has been Above normal over North-Western Europe and Below normal on most of the other part of Europe.

I.1.d Temperature

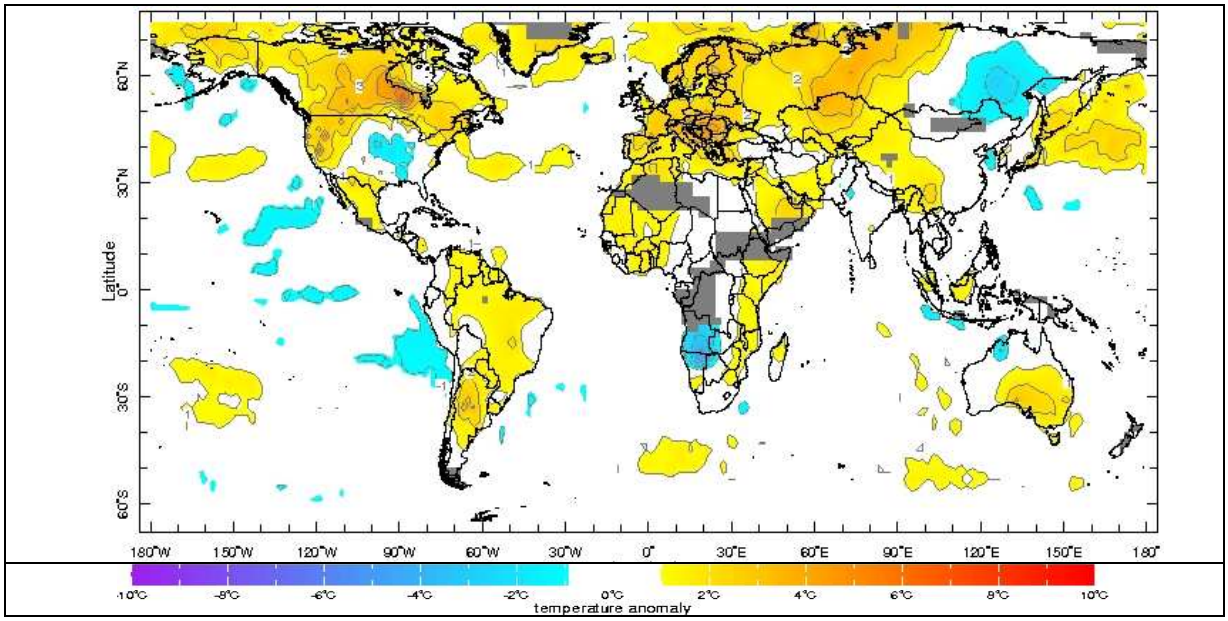


fig.8: Temperature Anomalies (°C) in September 2011 (departure to the 1979-2000 normal)
http://iridl.ldeo.columbia.edu/maproom/.Global/.Atm_Temp/Anomaly.html

In September, temperatures (fig.8) have been above normal over most of the continents and especially over Europe, Canada and the central part of Siberia. A negative anomaly has been observed over the Western part of Siberia.

I.1.e Sea Ice

In Arctic in September, the sea-ice extension (fig.9) is far below normal, excepted over the Greenland sea. It is slightly above the observed 2007 sea-ice extension – record year for the minimum reached at the end of the boreal summer (fig. 9bis – left).
In Antarctic, the sea-ice extension (fig. 9bis – right) is very close to normal.

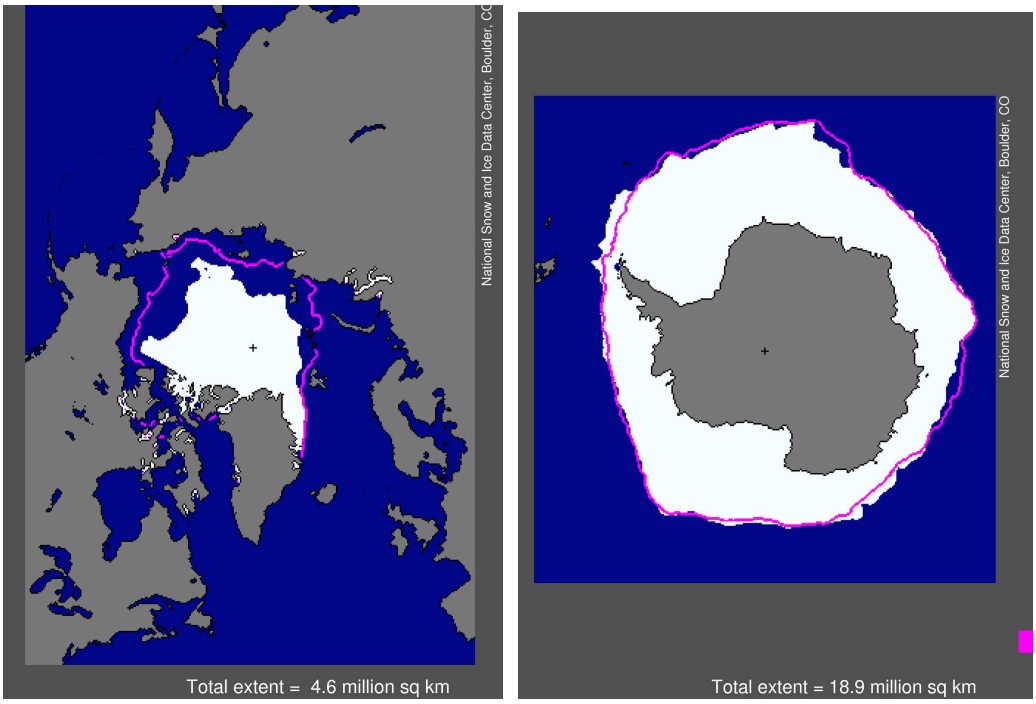


fig.9: Sea-Ice extension in Arctic (left), and in Antarctic (right) in September 2011. The pink line indicates the averaged extension (for the 1979-2000 period). http://nsidc.org/data/seaice_index/

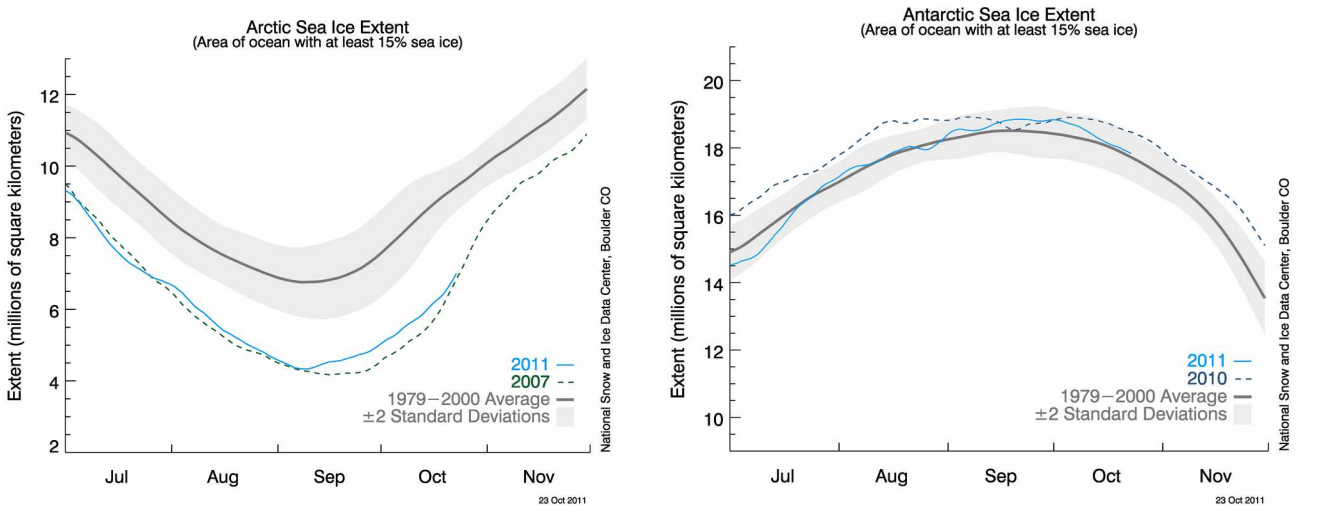


fig. 9bis : Sea-Ice extension evolution from NSIDC
http://nsidc.org/data/seaice_index/images/daily_images/N_stddev_timeseries.png

I.2. OCEANIC TROPICAL DYNAMIC

I.2.a Pacific Basin

In September, the negative anomaly in the equatorial Pacific has extended (fig.10) but without strengthening. However, the Trade Wind anomalies are increasing on the Central and Western part of the basin ; this is favourable conditions to La Niña development.

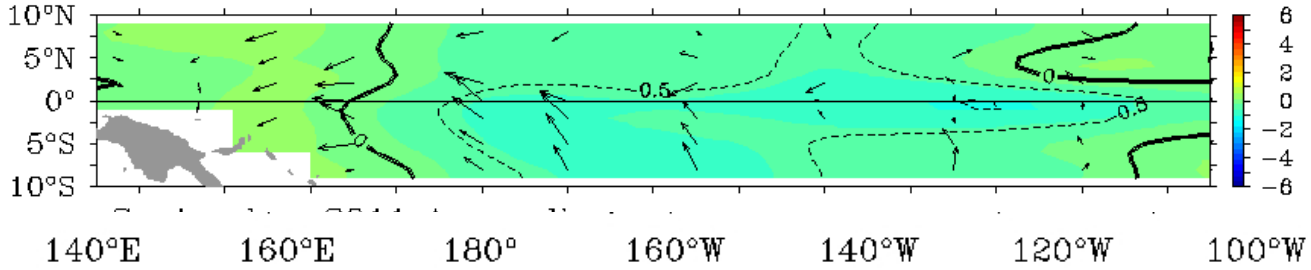


fig.10: SST Anomalies and Wind anomalies in September 2011 over the Equatorial Pacific from TAO/TRITON. http://www.pmel.noaa.gov/tao/jsdisplay/monthly-summary/monthly-summary.html

In the Niño boxes (4, 3.4, 3 et 1+2 ; see definition in Annex - fig.11) the SST anomalies are stuill negative (and have slightly increased). The monthly averages in September are respectively –0,6°C, -0,7°C,
-0,6°C et -0,6°C from West to East. To be notice that we are close to the La Niña threshold.

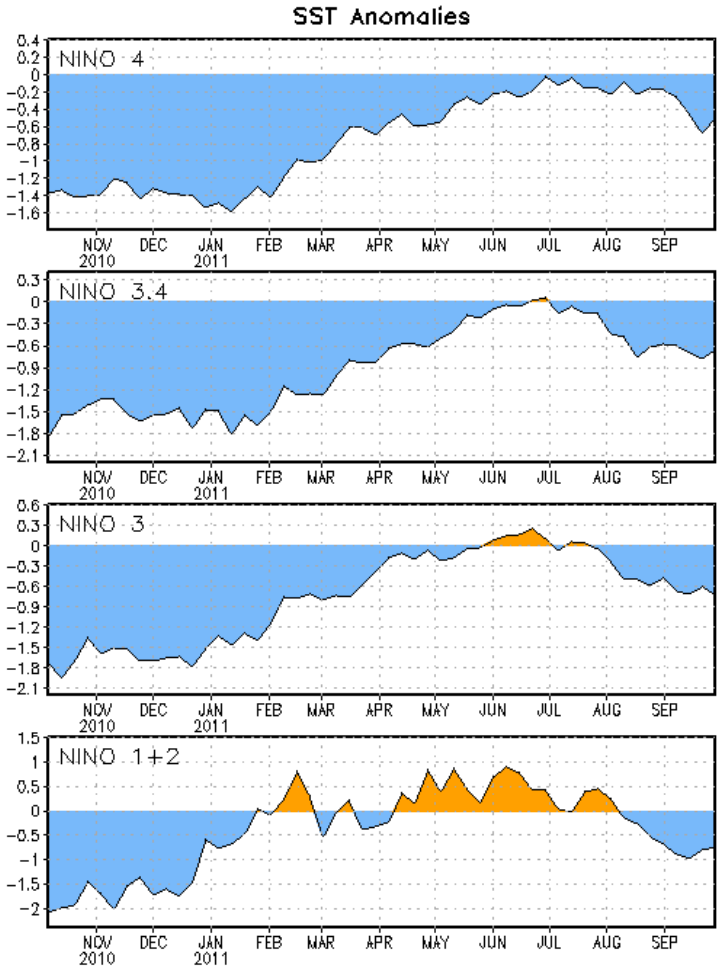


fig.11: Time series of SST anomalies in Niño boxes (departure to 1971-2000 normal - Smith and Reynolds, 1998) http://www.cpc.ncep.noaa.gv/products/analysis_motoring/enso_advisory/ensodisc.doc

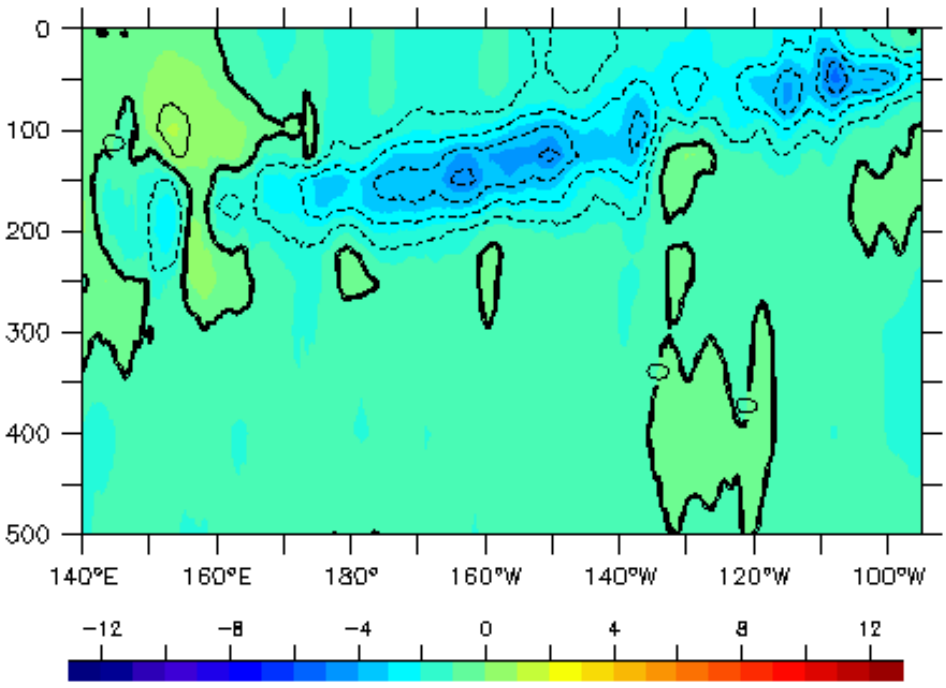


fig.12: Oceanic temperature anomaly in the first 500 metres in the Equatorial Pacific, in September 2011 (http://bcg.mercator-ocean.fr/)

In the equatorial waveguide (fig. 12) under the surface the negative cold anomaly has propagated eastward and reached the surface close to South American coast. To be quoted the behaviour on the West side with a quite weak warm reservoir and traces of cold anomalies close to 200m depth.

I.2.b Atlantic Basin

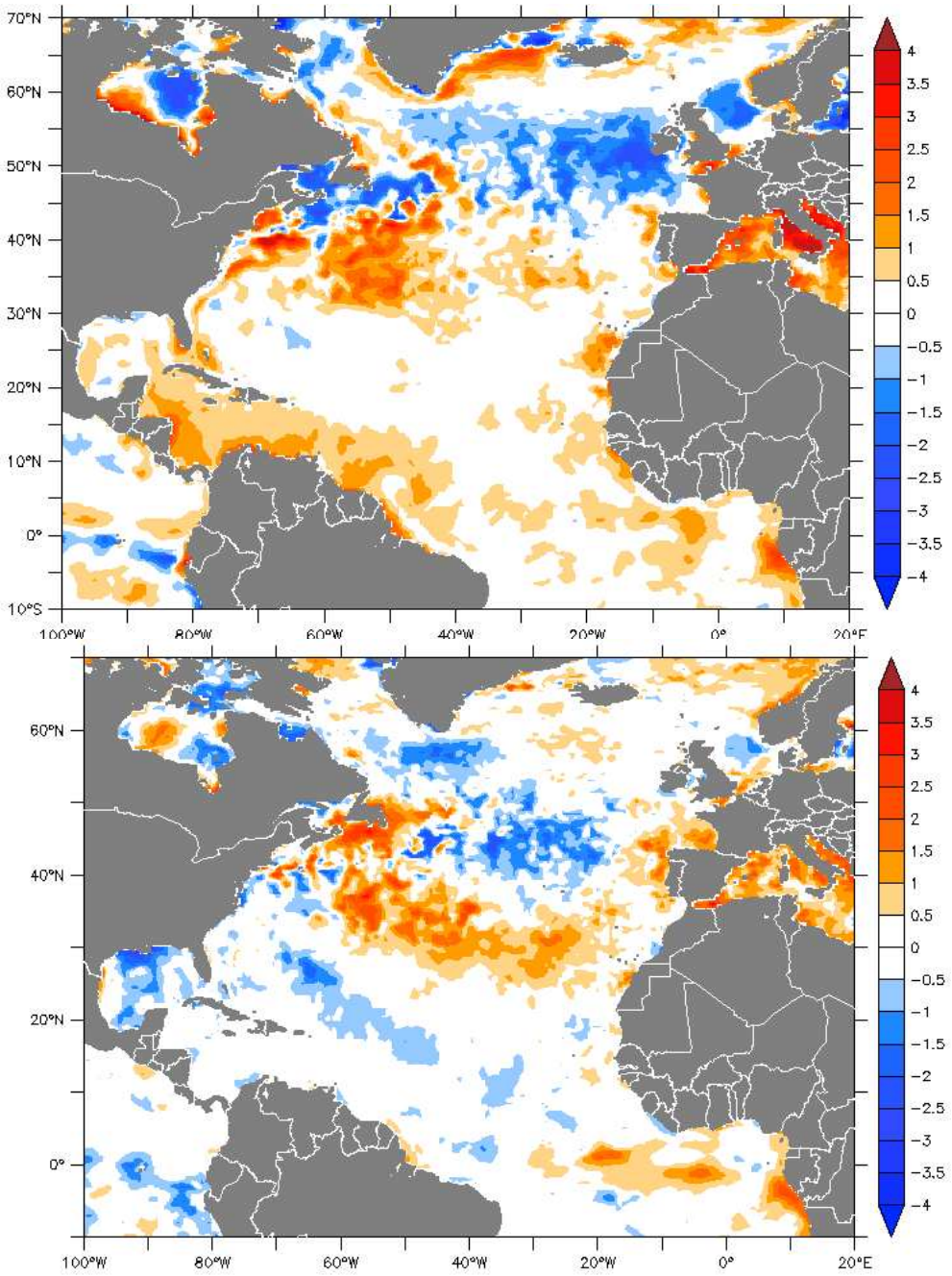


fig.13: **Top : SST Anomalies in September 2011 (reference Levitus 1950-2008). Bottom : SST anomaly time tendency (September-August) document provided by Mercator-océan (http://bcg.mercator-ocean.fr/).**

In the extra tropics North to the equator (fig. 13), there is still a negative anomalies between 45°N and 60°N on the Atlantic. However, the SSTs are warming along Western European coasts (likely related to the September weather conditions). The SSTs are warmer than normal and with a positive tendancy in the mid-latitude and western part of the basin. In the equatorial wave guide, the cold tongue in the Guinean Gulf has disappeared. In the Tropical Atlantic, one can remark warmer than normal conditions from Cuba to the Northern coast of South America..

I.2.c Indian Basin

Only the most Eastern part of the Indian oceanic basin shows negative anomalies while positive anomalies are present elsewhere (fig.1).

II. SEASONAL FORECASTS FOR NOVEMBER-DECEMBER-JANUARY FROM DYNAMICAL MODELS

II.1. OCEANIC FORECASTS

II.1.a Sea Surface Température (SST)

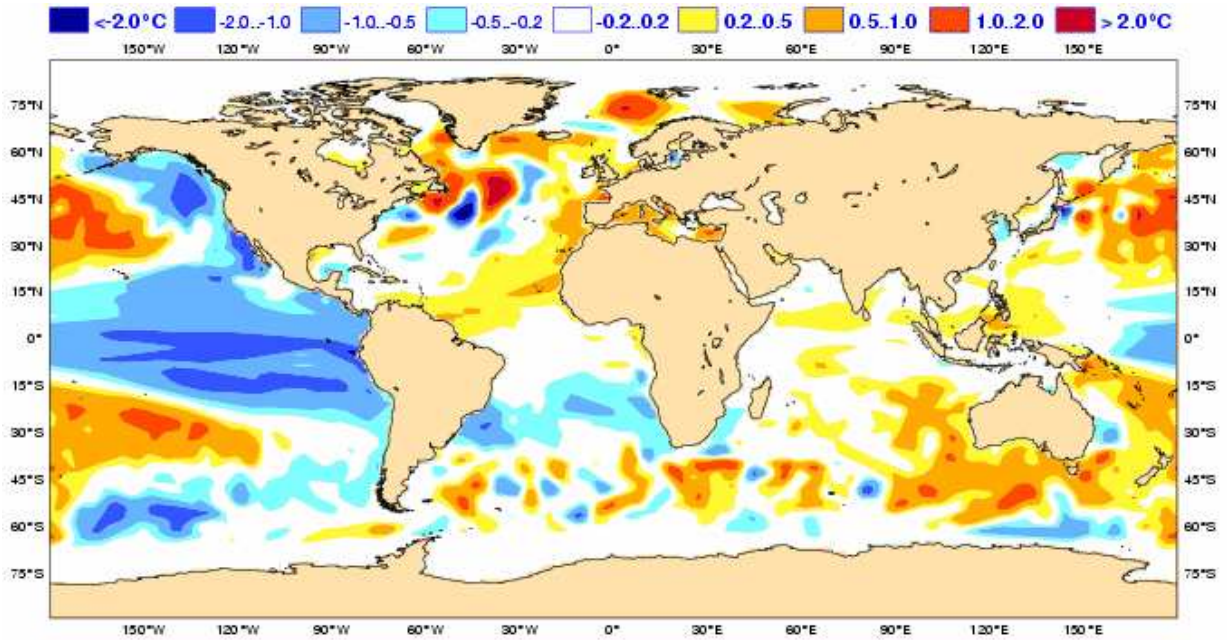


fig.14: SST anomaly forecast (in °C) from ECMWF for November-December-January, issued in October.
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

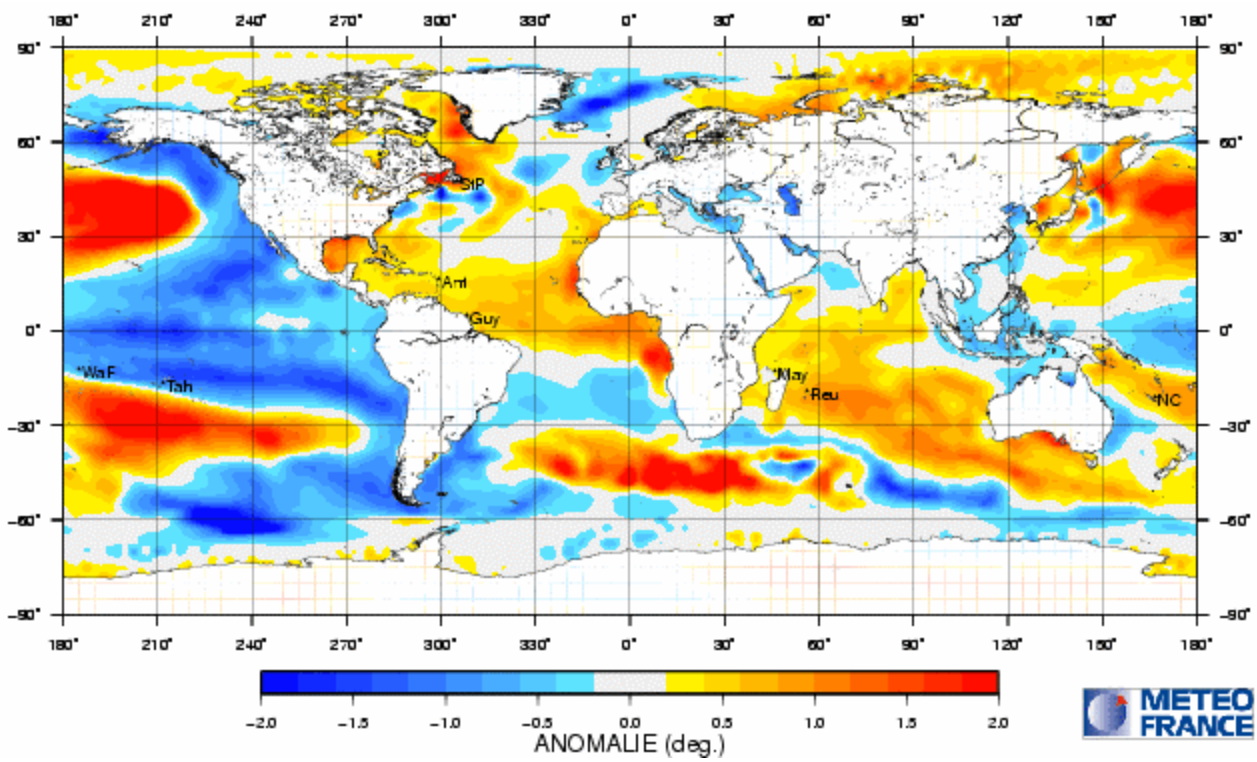


fig.15: SST Anomaly forecast (recalibrated with respect of observation) from Météo-France for November-December-January, issued in October. http://elaboration.seasonal.meteo.fr/

The 2 models are mostly consistent over all the oceanic basins even if some regional differences can be found. The main differences are in the Greenland sea and the Mediterranean sea. Most of the Tropical Pacific is colder than normal. In the Atlantic, there is large similarity even if the Meteo-France model give stronger anomalies (especially warm anomalies in the Tropics). Over the Indian Ocean, the 2 models tend to forecast above normal temperature on the Indian oceanic basin and especially a strip between Madagascar and Australia.
Because of the consistency between the individual models, in the Euro-Sip forecast the patterns are quite similar to the one already discussed just above. The cooling in the Central and Eastern Pacific is clearly visible ; it is extending close to the warm pool. The warm Tropical Atlantic is also noticeable.
Last, in the Indian Ocean, one can see the warmer than normal conditions over most of the basin.

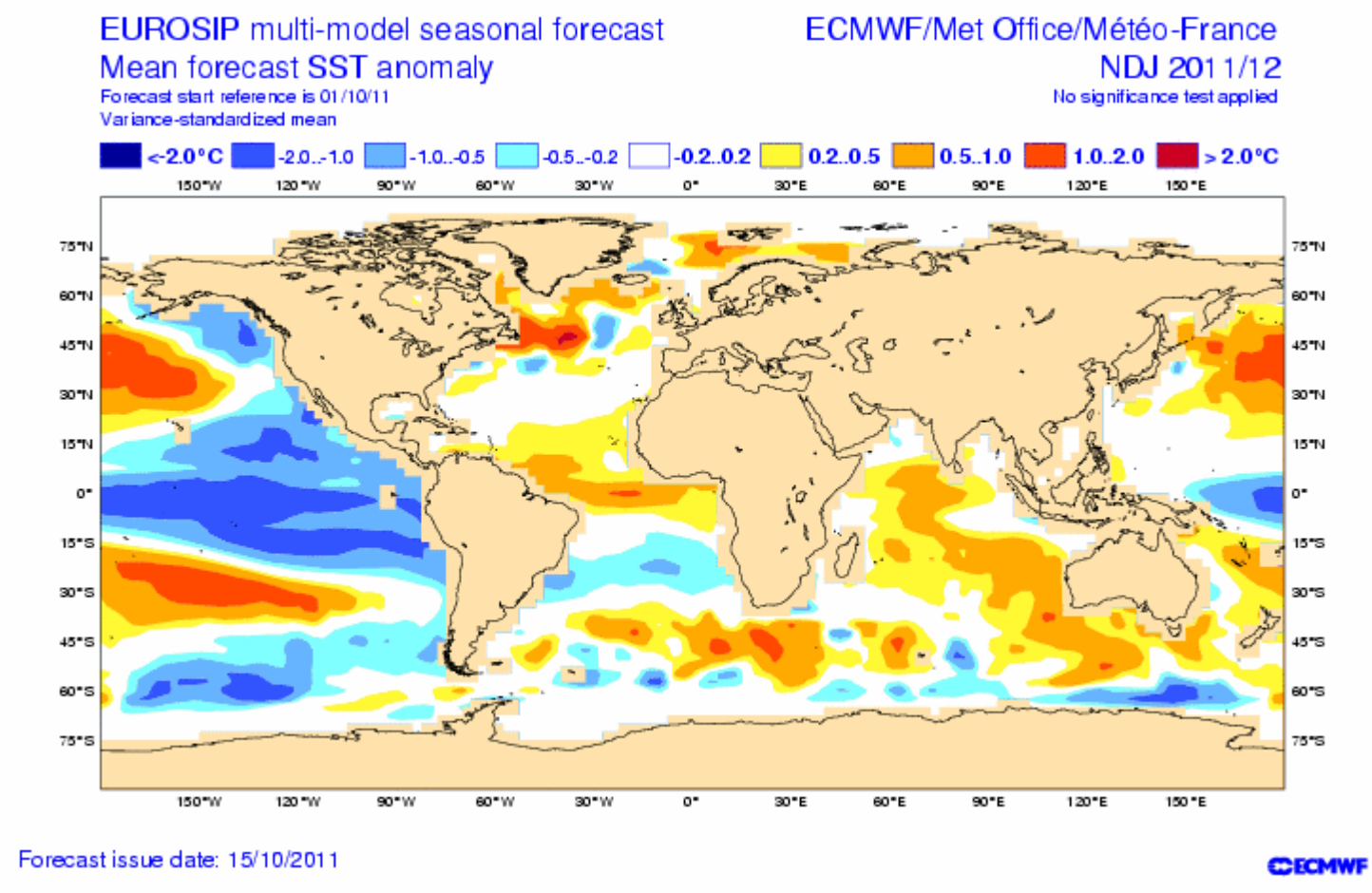


fig.16: SST Forecasted anomaly (in °C) from Euro-SIP valid for November-December-January, issued in October.

II.1.b ENSO Forecast :

Forecasted Phase : weak La Niña

IRI provide a synthesis of several model forecast for the Niño 3.4 box (see definition in Annex) including models from Euro-Sip and statistical models. The figure 17 shows the ensemble mean of these models (circle for statistical models and squares for dynamical coupled models). The yellow thick line indicate the average of all dynamical models.

For November-December-January on average, both statistical and dynamical models forecast conditions close to La Niña threshold.. Even if this La Niña scenario is less probable, this evolution becomes a possible scenario as, looking to climatology, it's possible that a strong La Niña could be followed by a weak La Niña.

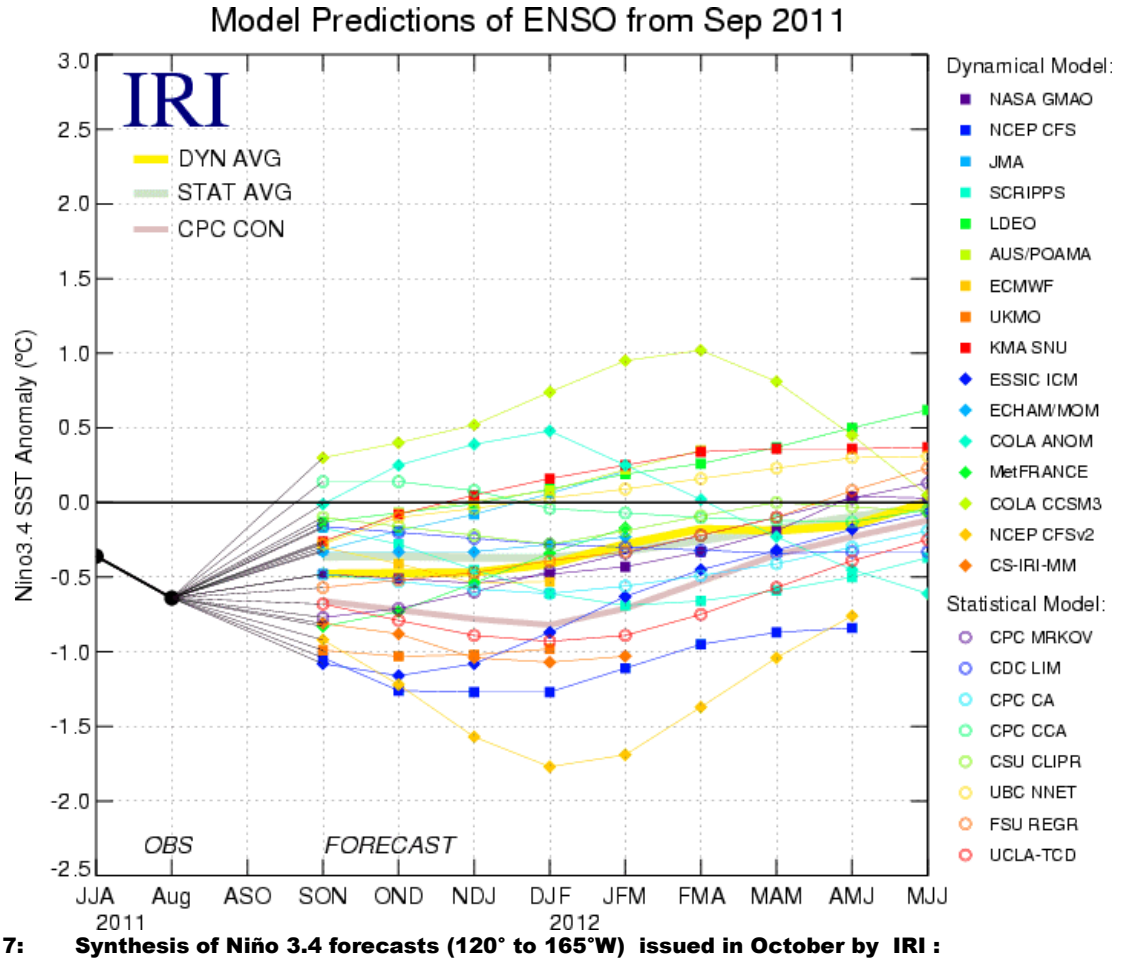


fig.17: Synthesis of Niño 3.4 forecasts (120° to 165°W) issued in October by IRI : http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html

The following table (from IRI) give the SST values currently used to decide the nature of forecasted event for the Niño3.4 box (« El Niño », « La Niña » or « neutral » : these values depend on the season and a situation is considered as « Neutral » if the forecast is within theses critical values. The 3 last lines give the 3-month mean of the different categories of models. This clearly reflect the "close to La Niña threshold" conditions which prevail for NDJ and next winter.

SEASON	OND	NDJ	DJF	JFM	FMA	MAM	AMJ	MJJ	JJA
Value « La Niña »	*-0,75*	*-0,70*	*-0,65*	*-0,55*	*-0,45*	*-0,40*	*-0,45*	*-0,50*	*-0,50*
Value « El Niño »	*0,75*	*0,70*	*0,65*	*0,50*	*0,40*	*0,40*	*0,45*	*0,45*	*0,45*
Average, statistical models	**-0,6**	**-0,6**	**-0,5**	**-0,5**	**-0,4**	**-0,3**	**-0,2**	**-0,1**	**0**
Average, dynamical models	**-0,7**	**-0,7**	**-0,7**	**-0,6**	**-0,4**	**-0,4**	**-0,4**	**-0,3**	**-0,1**
Average, all models	**-0,7**	**-0,7**	**-0,6**	**-0,6**	**-0,4**	**-0,3**	**-0,3**	**-0,2**	**-0,1**

The figure 18 shows plumes from Météo-France and ECMWF for the 3 Niño boxes (see definition in Annex). Both models below neutral conditions but with no real strengthening of the cold anomaly. The spread of the forecasts is not to much in both Météo-France and ECMWF. Last, looking to the AOGCM behaviour in the starting phase of a La Niña event, it is interesting to highlight that most of the models have some difficulties to clearly maintain the cooling of oceanic conditions over the whole forecasted period (e.g. see IRI web site).

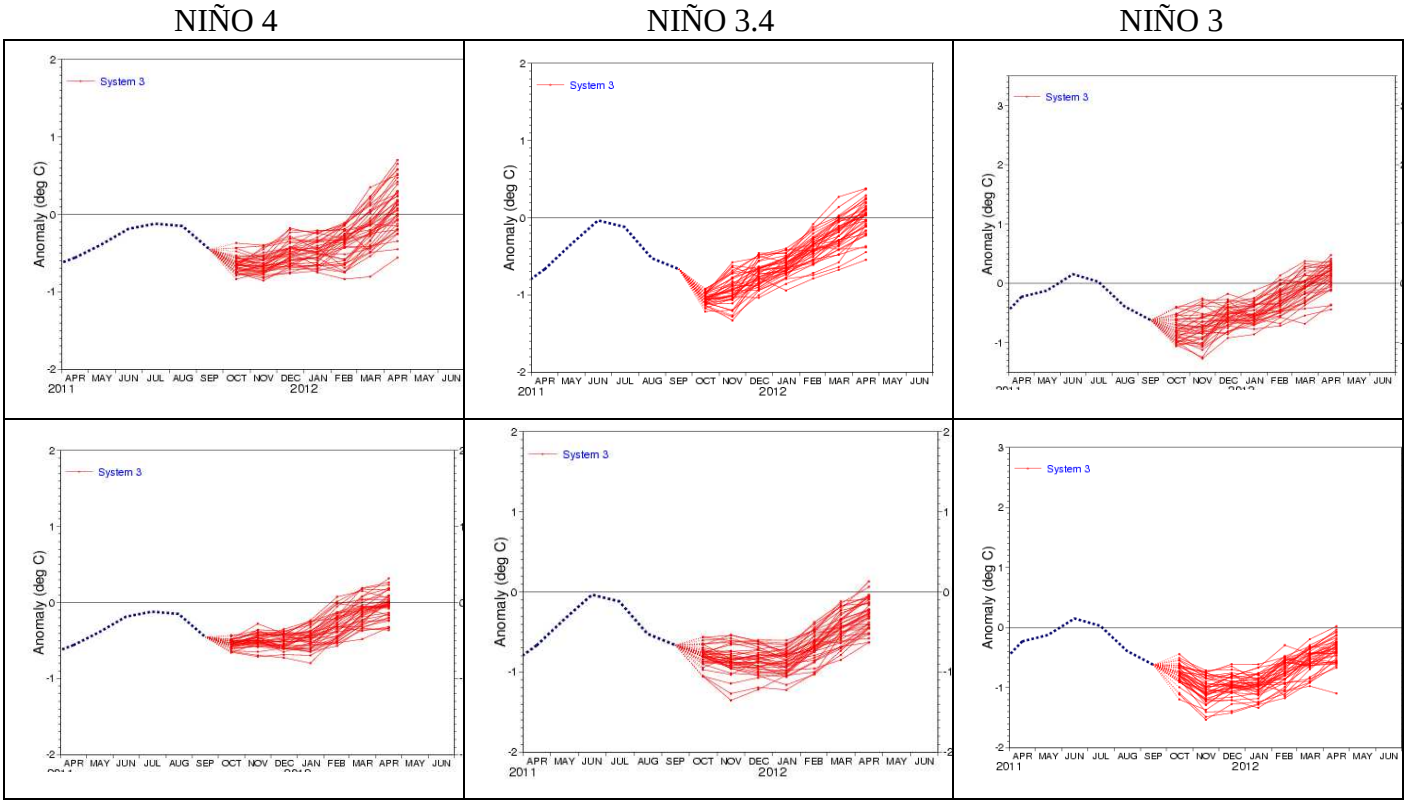


fig.18: SST anomaly forecasts in the Niño boxes from Météo-France (top) and ECMWF (bottom) issued in October, monthly mean for individual membres. (http://www.ecmwf.int/)

II.1.c Tropical Atlantic forecasts :

Forecasted Phase: close to normal conditions in the Tropical Atlantic

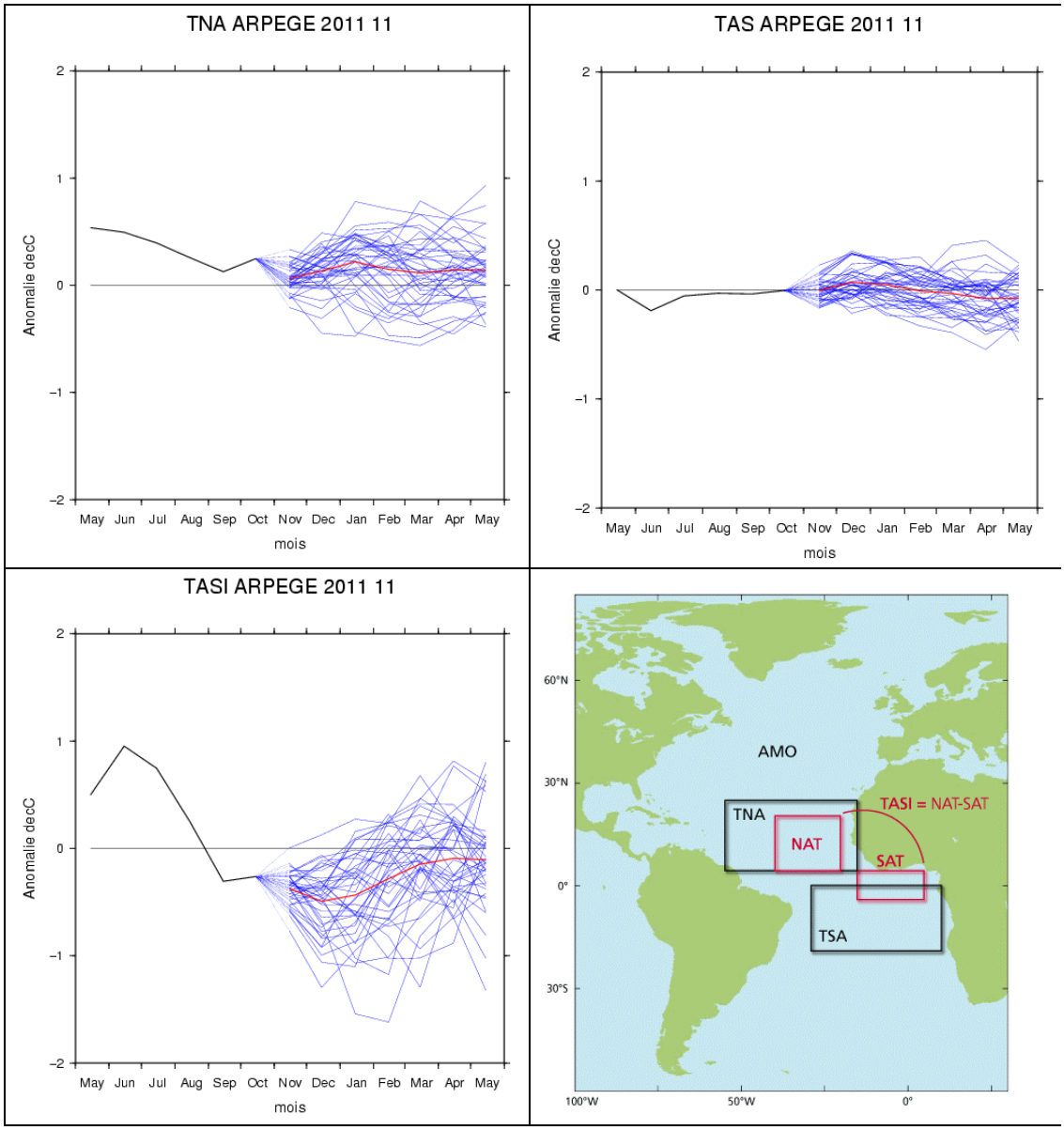


fig.19: SSTs anomaly forecasts in the Tropical Atlantic boxes from Météo-France, issued in October, plumes correspond to 41 membres and monthly means.

The Plumes confirm that on average the forecast corresponds to close to normal conditions in the Tropical Atlantic both in the North and in the South. However, one can notice the quite great dispersion of the ensemble for the TNA box. A negative value of TASI is forecasted all over the period, corresponding to a warmer temperature in the Guinean Gulf with respcet of the temperature in the East Northern tropics. However, the TASI index must be interpreted with caution because of the likely positive bias of Météo-France forecast in the Guinean Gulf and the very large spread of the ensemble.

II.1.d Indian Ocean forecasts :

Forecasted Phase: Positive phase of the DMI

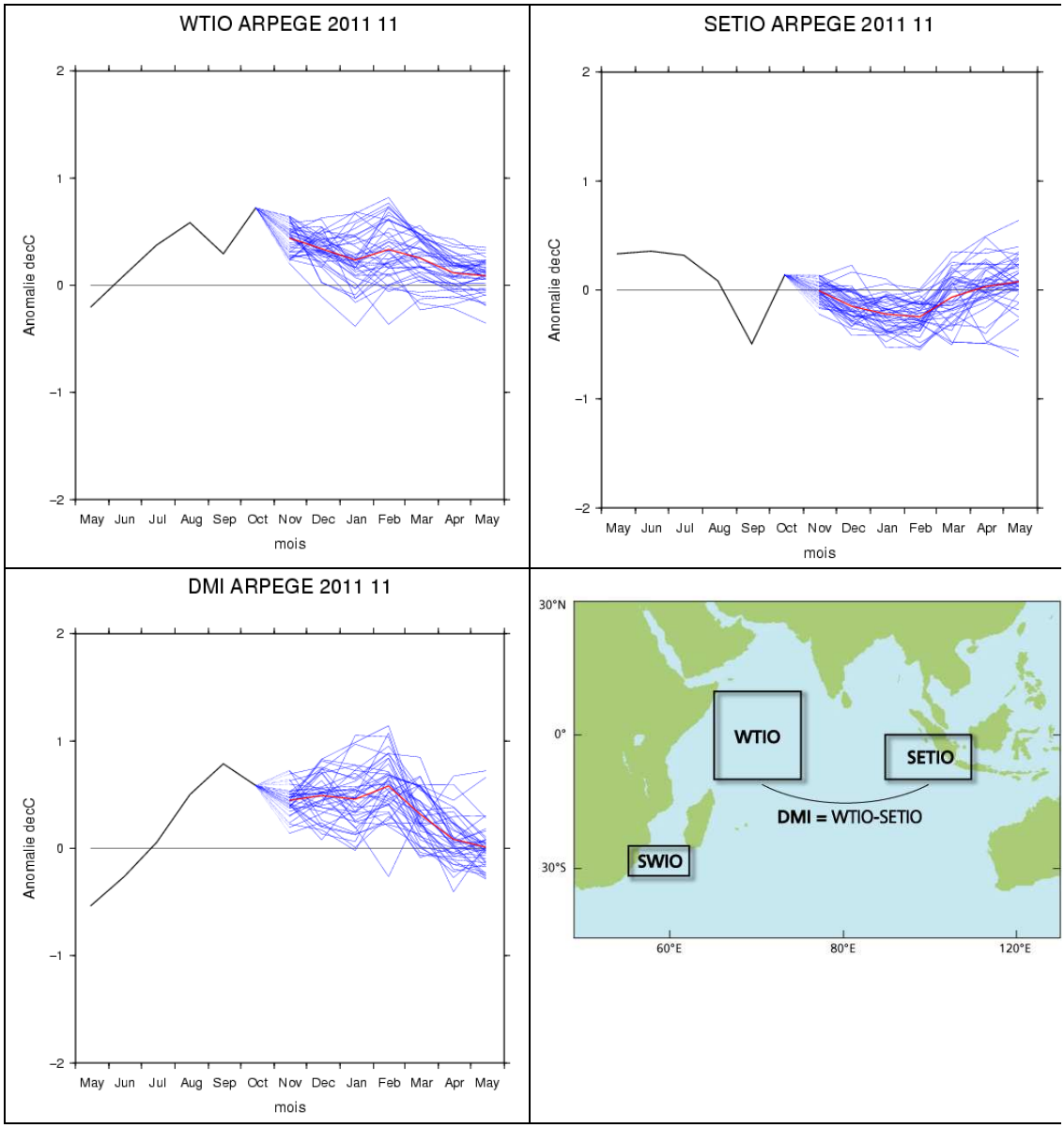


fig.20: SSTs anomaly forecasts in the Indian Ocean boxes from Météo-France, issued in October, plumes correspond to 41 membres and monthly means.

The Plumes show that most of the members are forecasting Above normal conditions in the Western Indian Ocean and Below normal conditions in the eastern part of the basin. Both indices show a quite good consistency among all members of the ensemble during all the period. As a consequence, the DMI remains in a positive phase during all the period and one can notice a limited spread (despite it remains quite large) with respect of the previous forecasts.

II.2. GENERAL CIRCULATION FORECAST

II.2.a Global Forecast

As a first glance, the velocity potential anomaly field (cf. fig.21) show in the Tropics a 1 wave number pattern in ECMWF while it is less clear in Meteo-France (more a 2 wave number pattern). In details, over the Central Pacific both models show an atmospheric La Niña response with a convergence anomaly (downward motion) East to the date line and a divergence anomaly (upward motion) over the maritime continent. The models show some consistency over the Indian ocean but with large differences in terms of intensity ; larger negative anomaly in ECMWF and weaker and southward shifted in Meteo-France.

In terms of teleconnections, the 2 models show some consistency. The main anomalies visible on the stream functions are developing first across the latitudes of the Pacific basin (in a PNA like pattern) but also (some traces) over the North Atlantic sector and especially up to the Western side of the European continent. As a conclusion, the predictability in mid-latitudes, especially over Europe, in OND should increase a bit with respect of the previous forecast, however noting that teleconnection are still not very strong.

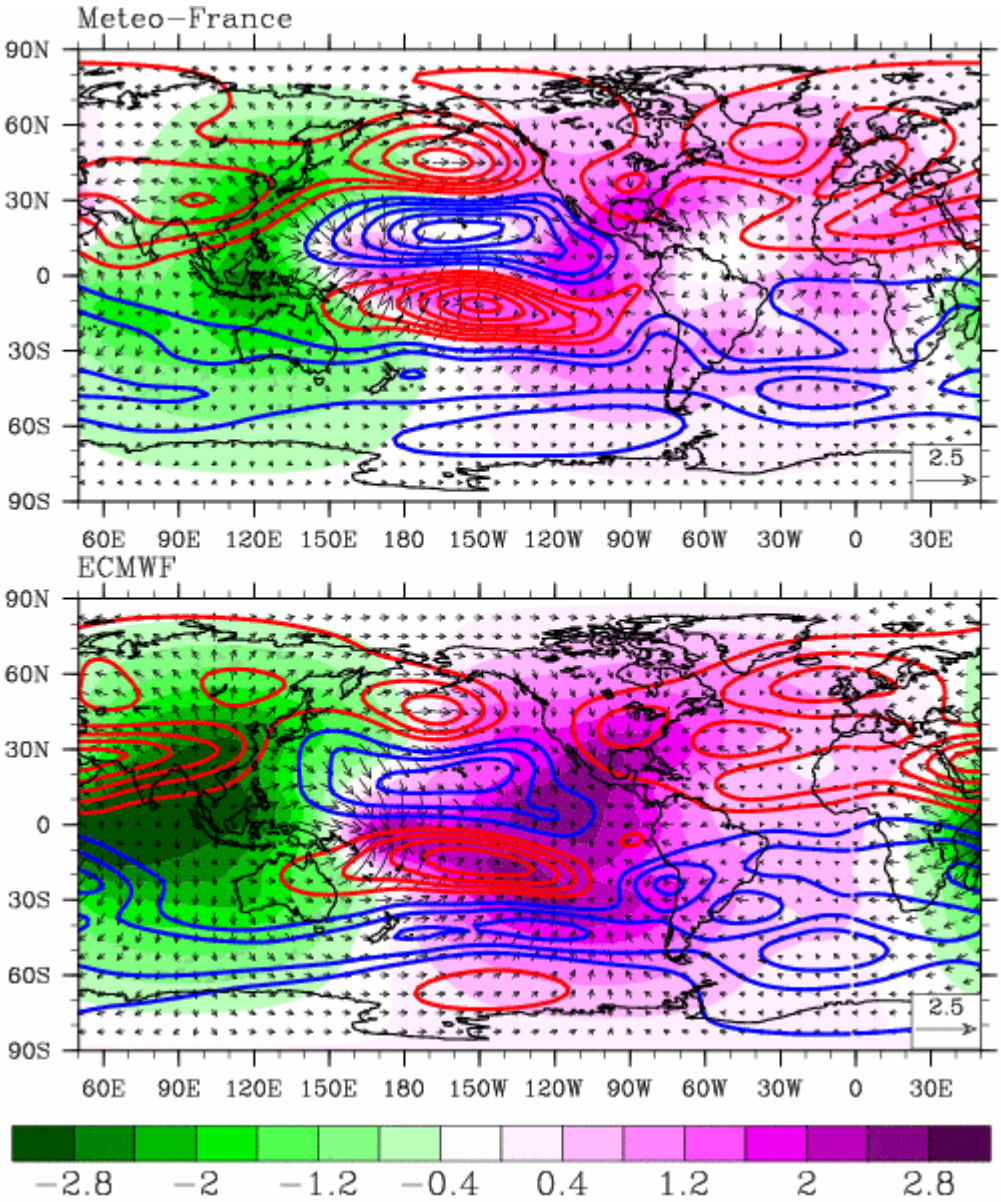


fig.21: Velocity Potential anomaly field χ (shaded area – green negative anomaly and pink positive anomaly), asociated Divergent Circulation anomaly (arrows) and Stream Function anomaly ψ (isolines – red positive and blue negative) at 200 hPa for November-December-January issued in October by Météo-France (top) and ECMWF (bottom).

II.2.b North hemisphere forecast and Europe

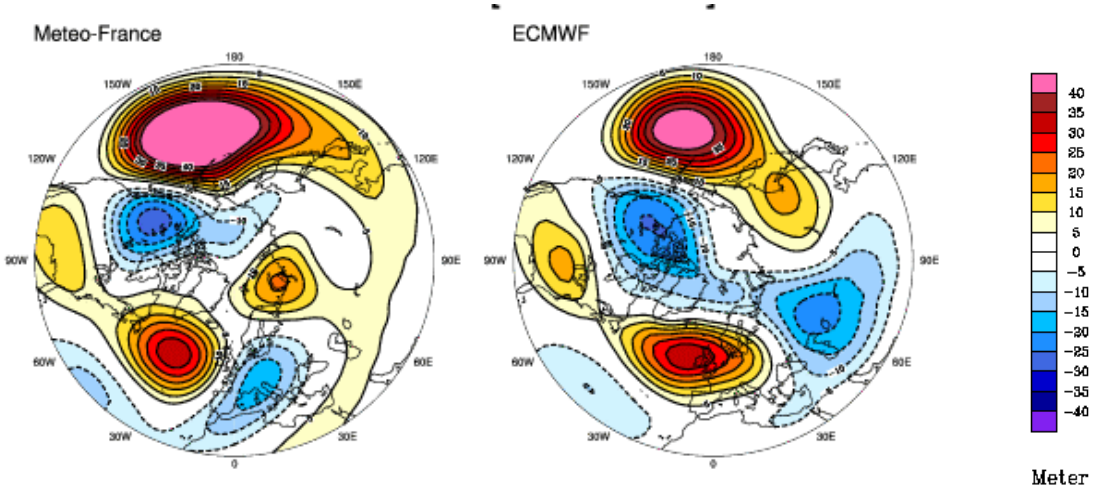


fig.22: Anomalies of Geopotential Height at 500 hPa for November-December-January issued in October from Météo-France (left) and ECMWF (right).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip

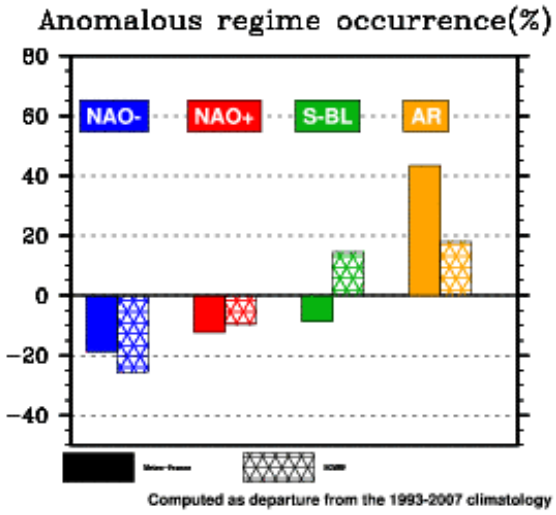


fig.23: North Atlantic Regime occurrence anomalies from Météo-France and ECMWF : vertical bars represent the excitation frequency anomaly (in %) for each of the 4 regimes.

Related to the Stream Function anomaly, the Meteo-France and ECMWF models show a positive Geopotential Height anomaly at over the North Atlantic for Meteo-France (fig. 22) and 500hPa over the Western façade of Europe for ECMWF and. This infer an Atlantic Ridge regime especially well marked in Meteo-France (fig. 23) and some enhanced frequency of blocking regime in ECMWF. One can notice that the Atlantic Ridge regime response is quite consistent with a negative phase of the ENSO at the beginning of Winter. The deficit of NAO + regime seems to be also very consistent with the general circulation response related to the expected teleconnections and SST forcings.

The General atmospheric circulation in the low troposphere (see figure 24) is clearly related and consistent with the Geopotential Height. Over most of Western Europe, both meridionnal wind show negative anomalies which is typical of an Atlantic Ridge regime predominance while the zonal wind show an oposition between regions South vs North to 50°N (weakening / strengthening of the zonal circulation).

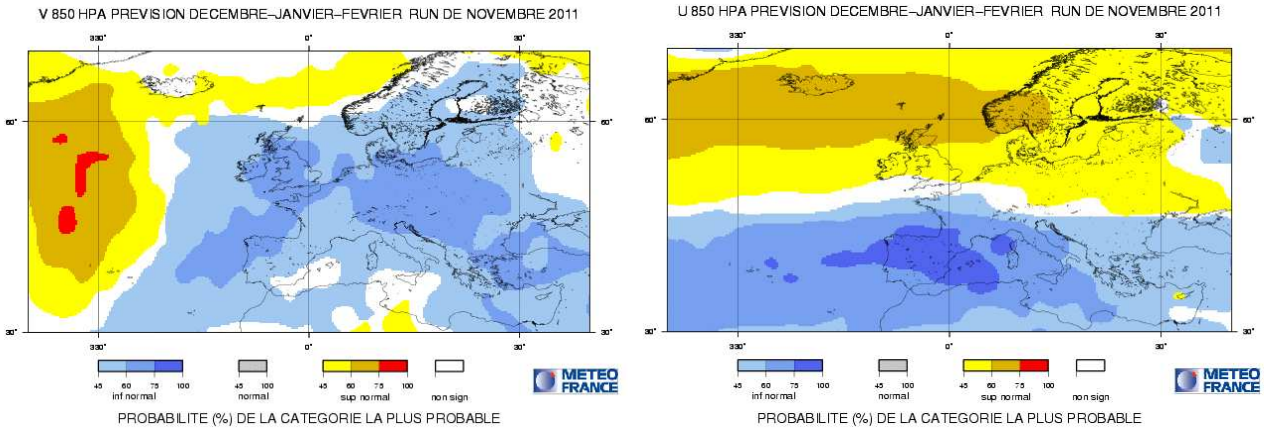


fig.24: Forecasted anomalies of meridional (left) and zonal (right) wind at 850 hPa for OND from Météo-France issued in October.

II.3. IMPACT : TEMPERATURE FORECASTS

II.3.a ECMWF

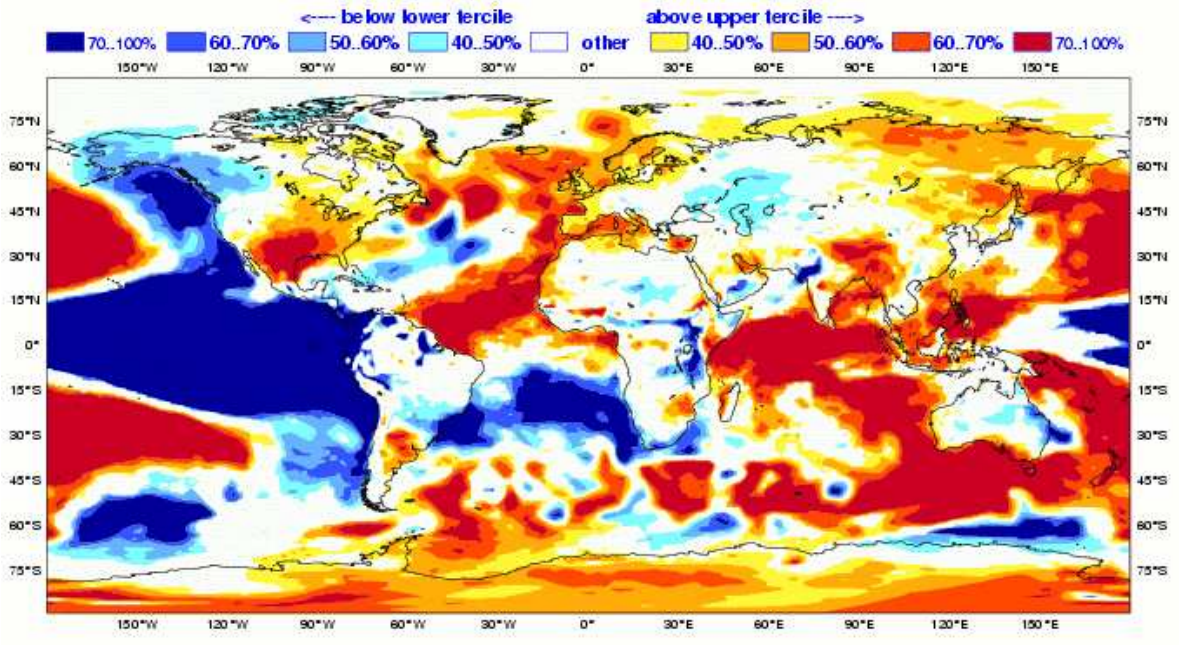


fig.25: Most likely category probability of T2m from ECMWF for November-December-January issued in October. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/group/

II.3.b Météo-France

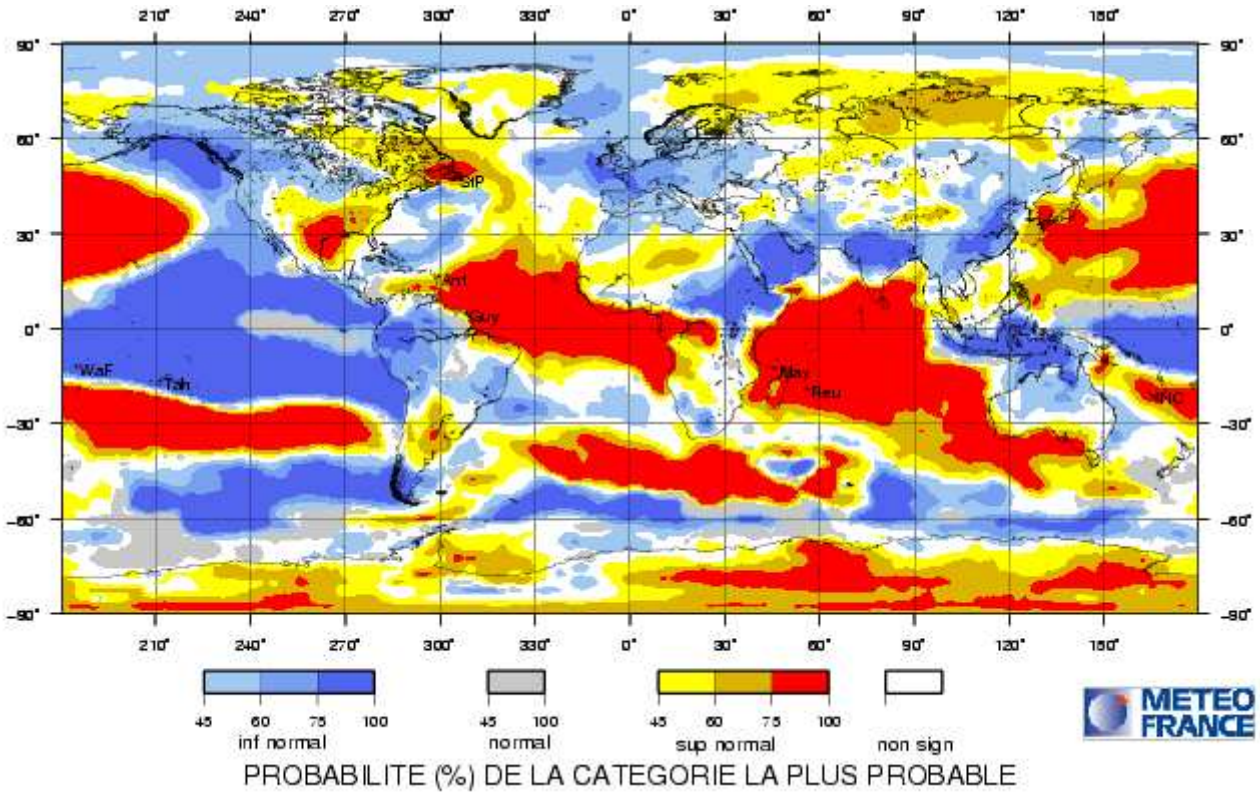


fig.26: Most likely category of T2m for November-December-January issued in October from Météo-France. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.
http://elaboration.seasonal.meteo.fr/

II.3.c Met Office (UKMO)

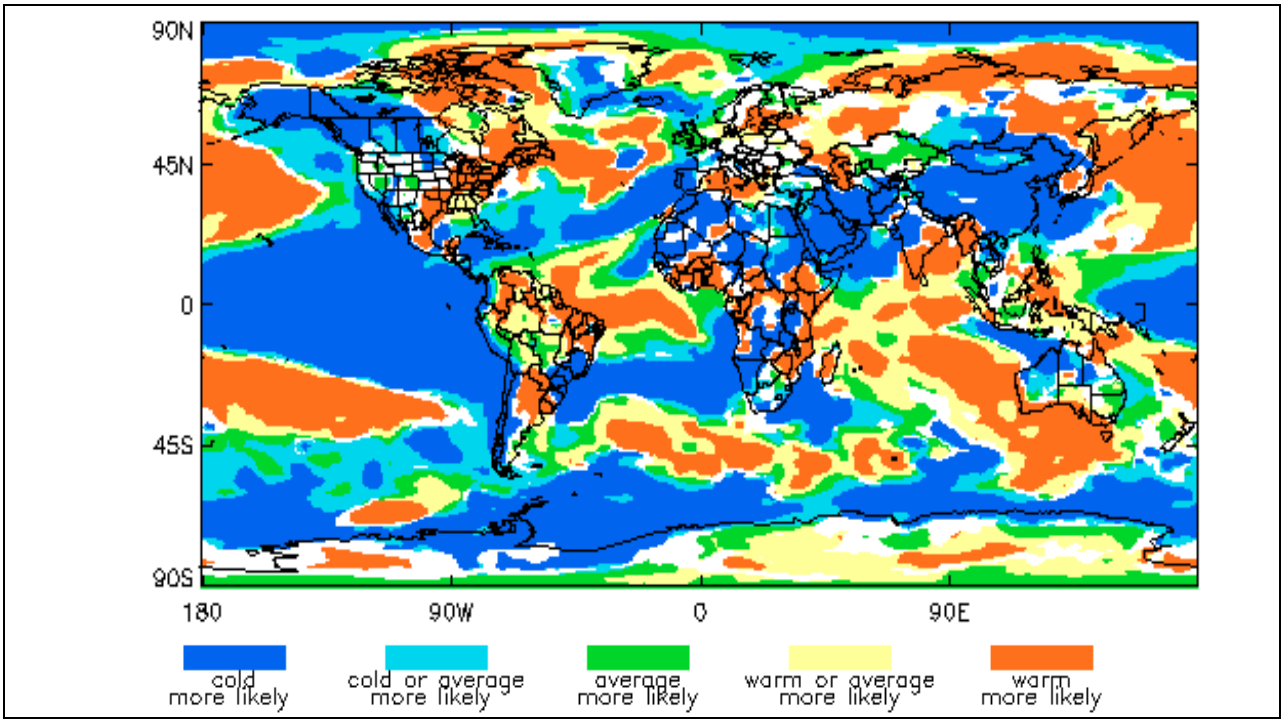


fig.27: Most likely category of T2m for November-December-January issued in October from UK Met Office. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.

http://www.metoffice.gov.uk/

II.3.d Japan Meteorological Agency (JMA)

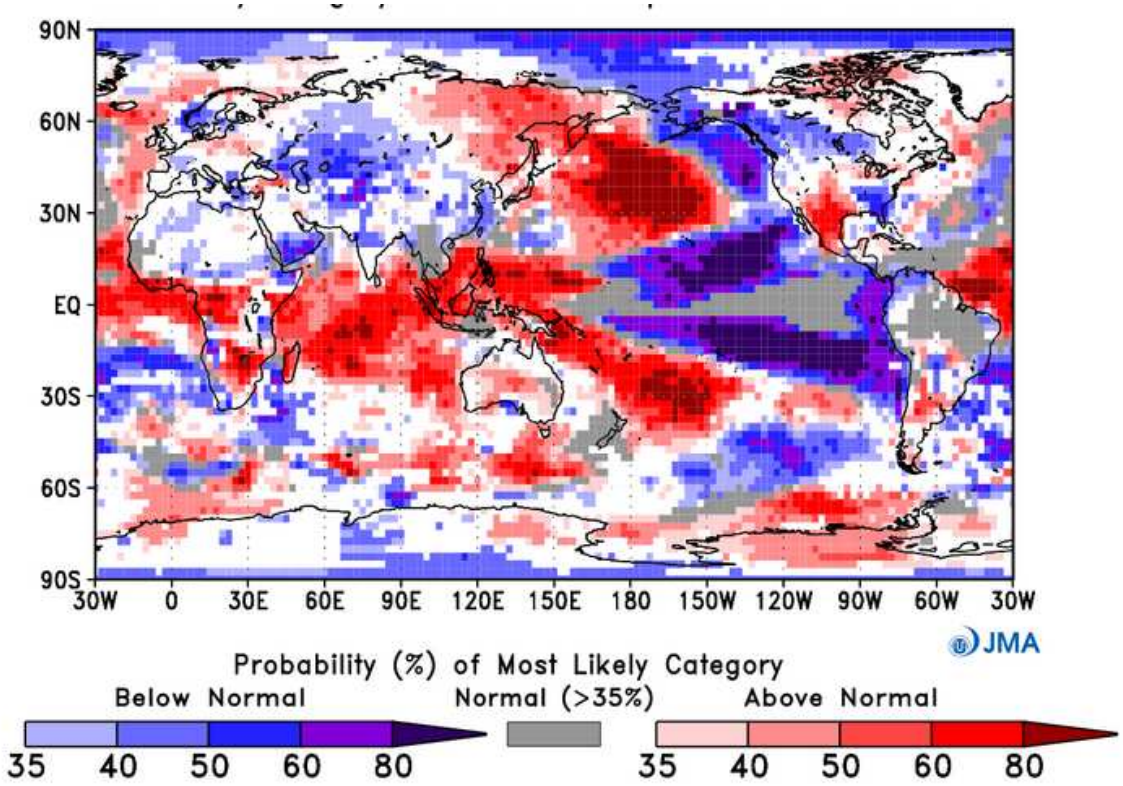


fig.28: Most likely category of T2m for November-December-January issued in October from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. .
http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.html

II.3.e Euro-SIP

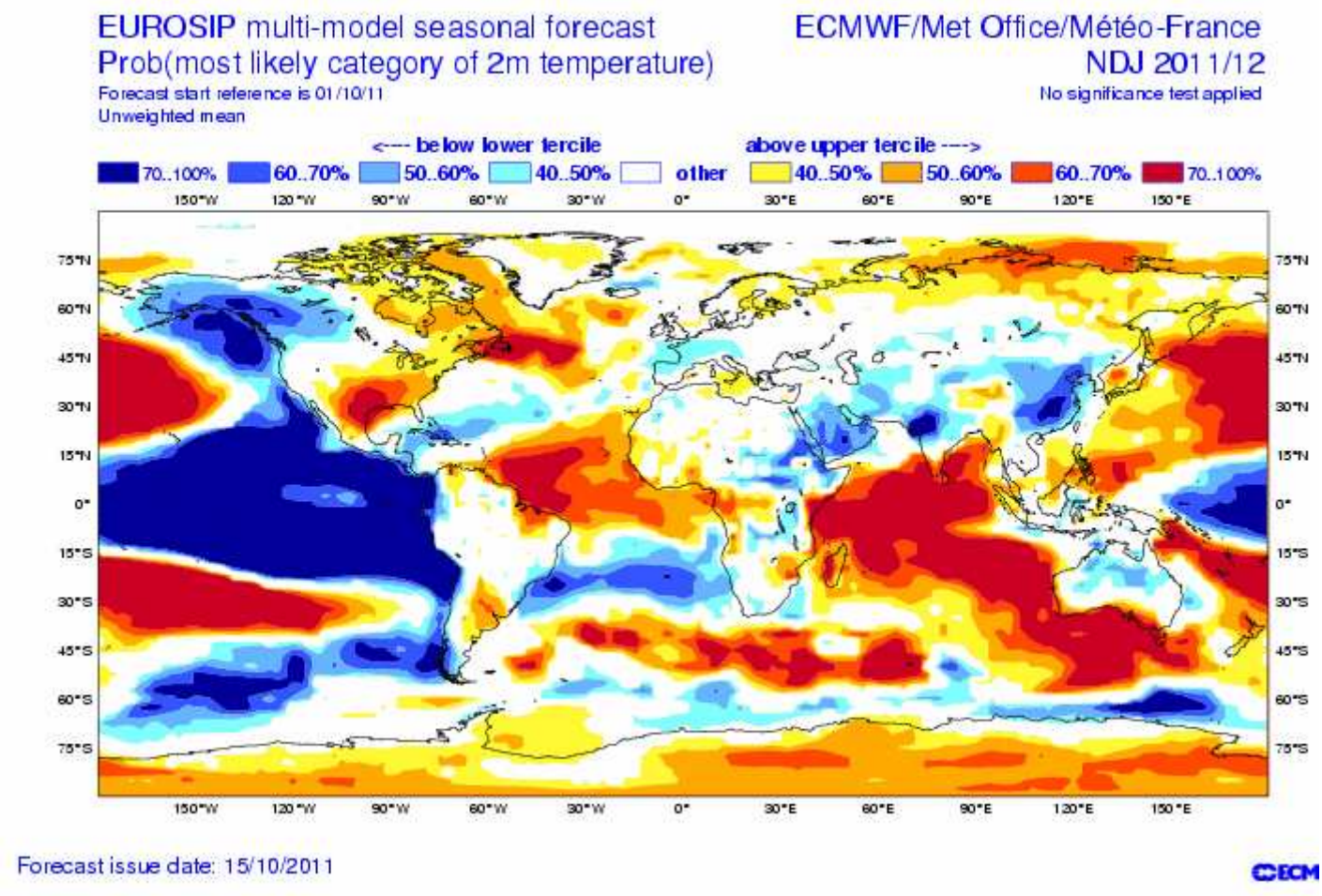


fig.29: Multi-Model Probabilistic forecasts for T2m from EuroSip for November-December-January, issued in October. (2 Categories, Below and Above normal – White zones correspond to No signal and Normal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

A PNA like pattern over the North American continent is clearly visible on the Euro-SIP forecast. The only signal which exists is over the most Western part of Europe with some enhanced probability of Below normal situation (in relationship with the Atlantic Ridge regimes). Last, we have to notice that even if the predictability has increased, the teleconnection patterns are still quite weak and consequently these forecasts should be interpreted with some caution over Europe.

II.3.f International Research Institute (IRI)

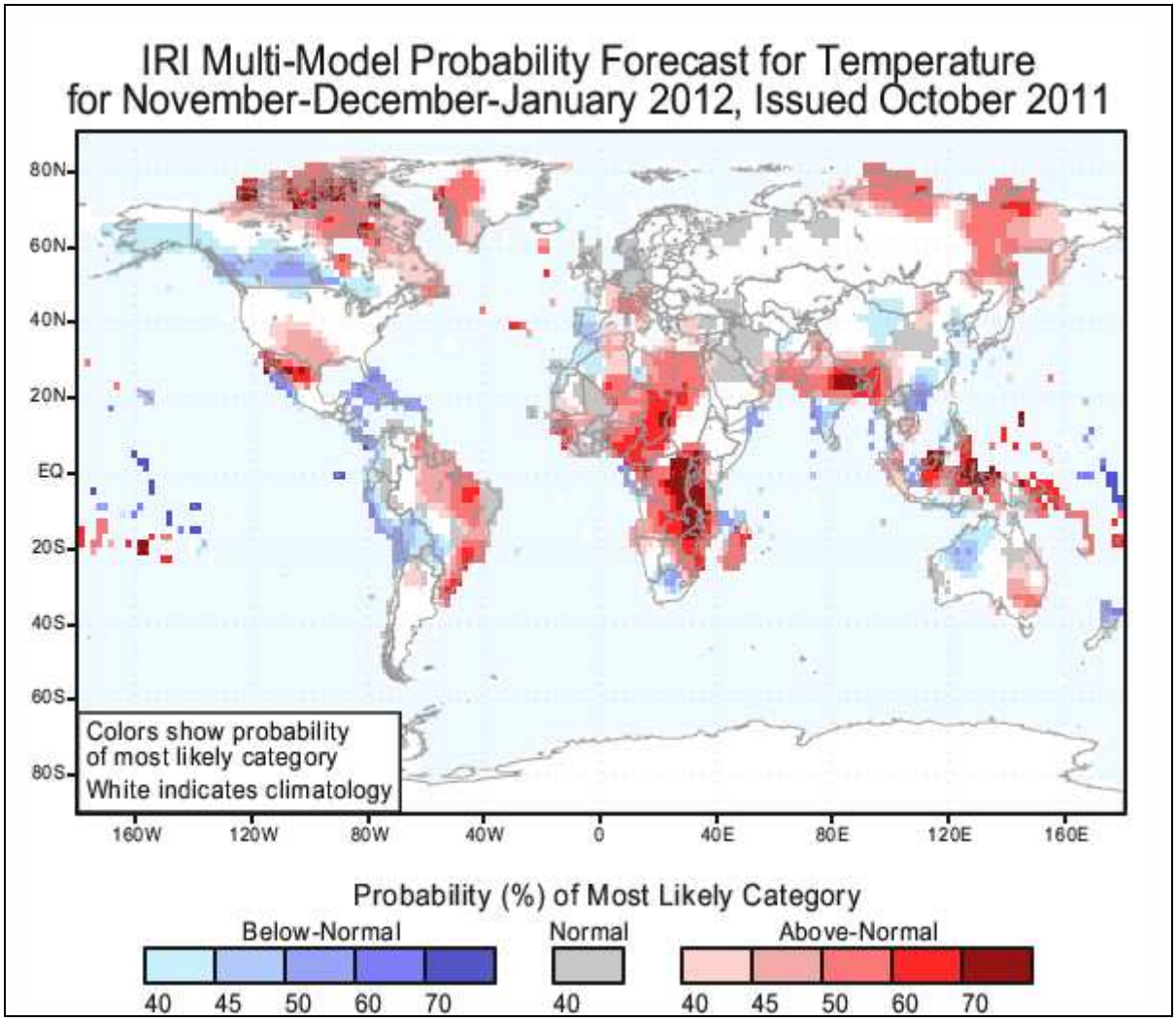


fig.30: Most likely category of T2m for November-December-January, issued in October from the IRI multi-model ensemble. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://iri.columbia.edu/climate/forecast/net_asmt/

One can notice some consistency with the Euro-Sip forecast on the most western part of Europe and the North American continent.

II.4. IMPACT : PRECIPITATION FORECAST

II.4.a ECMWF

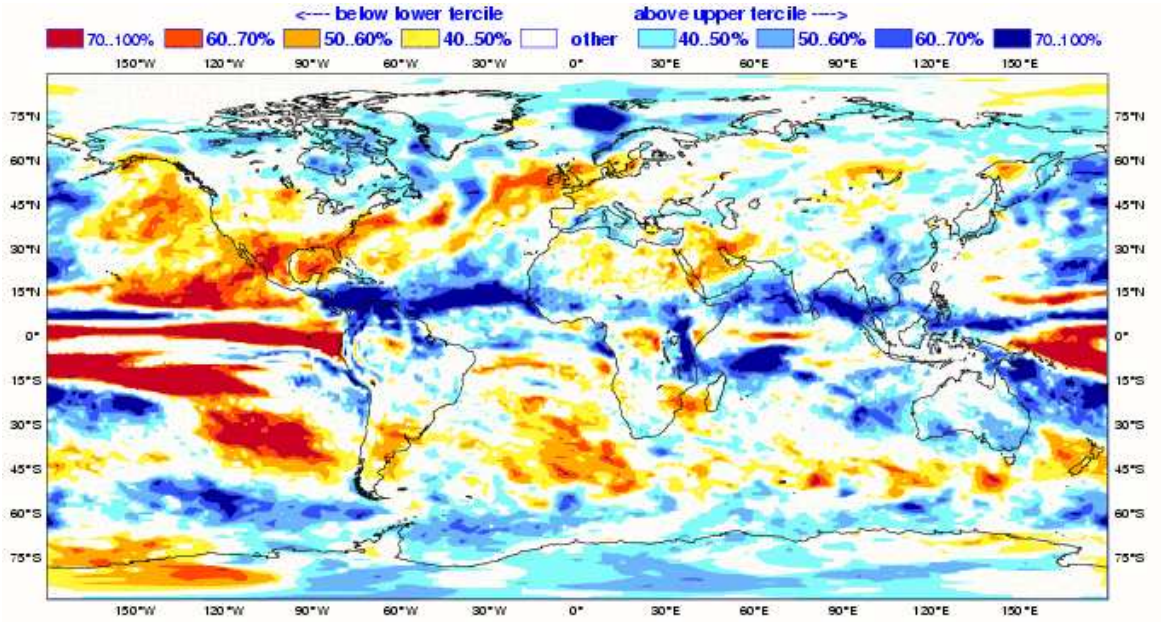


fig.31: Most likely category probability of rainfall from ECMWF for November-December-January, issued in October. Categories are Above Normal, Below Normal and « other » category (Normal and No Signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/charts/seasonal_charts_s2/

II.4.b Météo-France

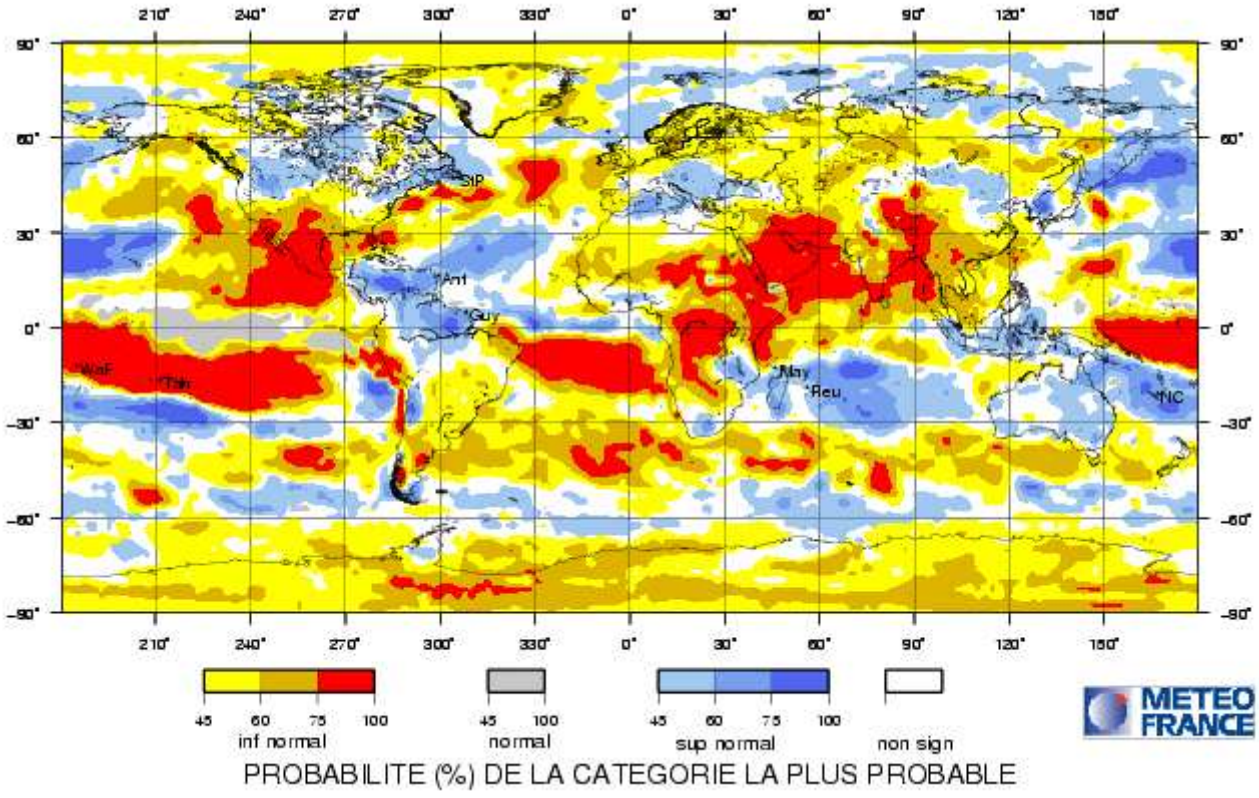


fig.32: Most likely category of Rainfall for November-December-January, issued in October from Météo-France. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.
http://elaboration.seasonal.meteo.fr/

II.4.c Met office (UKMO)

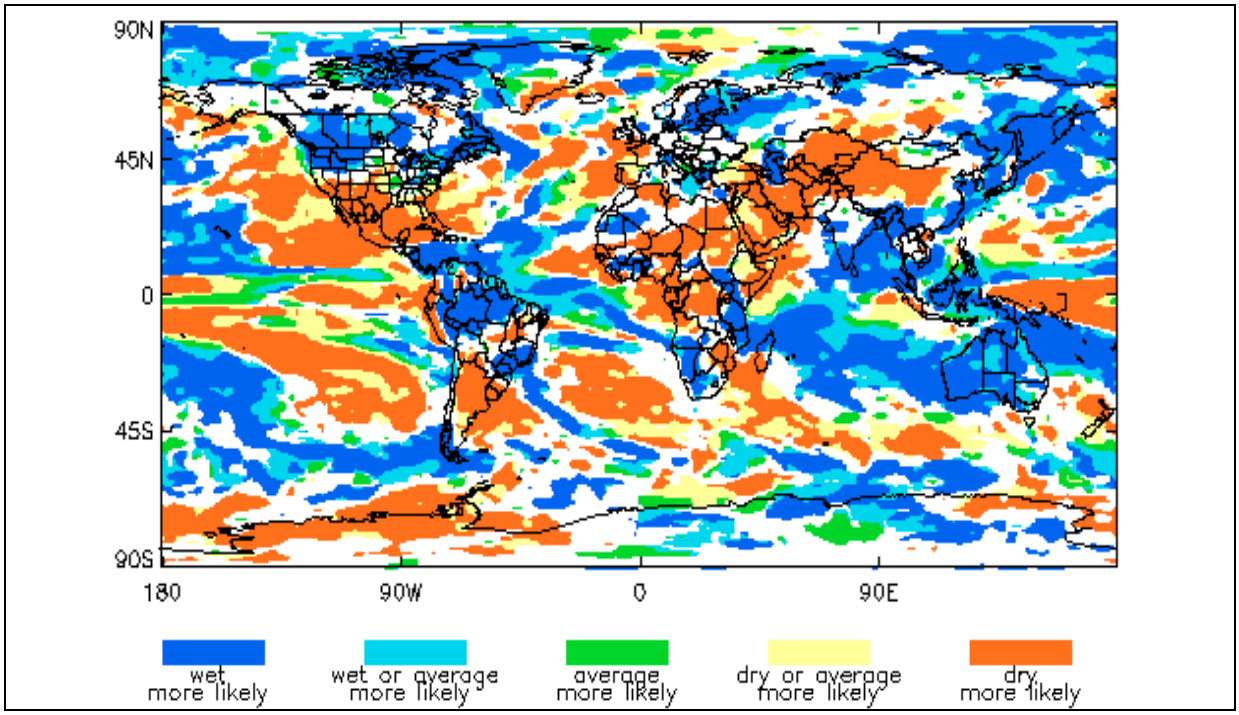


fig.33: Most likely category of Rainfall for November-December-January, issued in October from UK Met Office. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://www.metoffice.gov.uk/

II.4.d Japan Meteorological Agency (JMA)

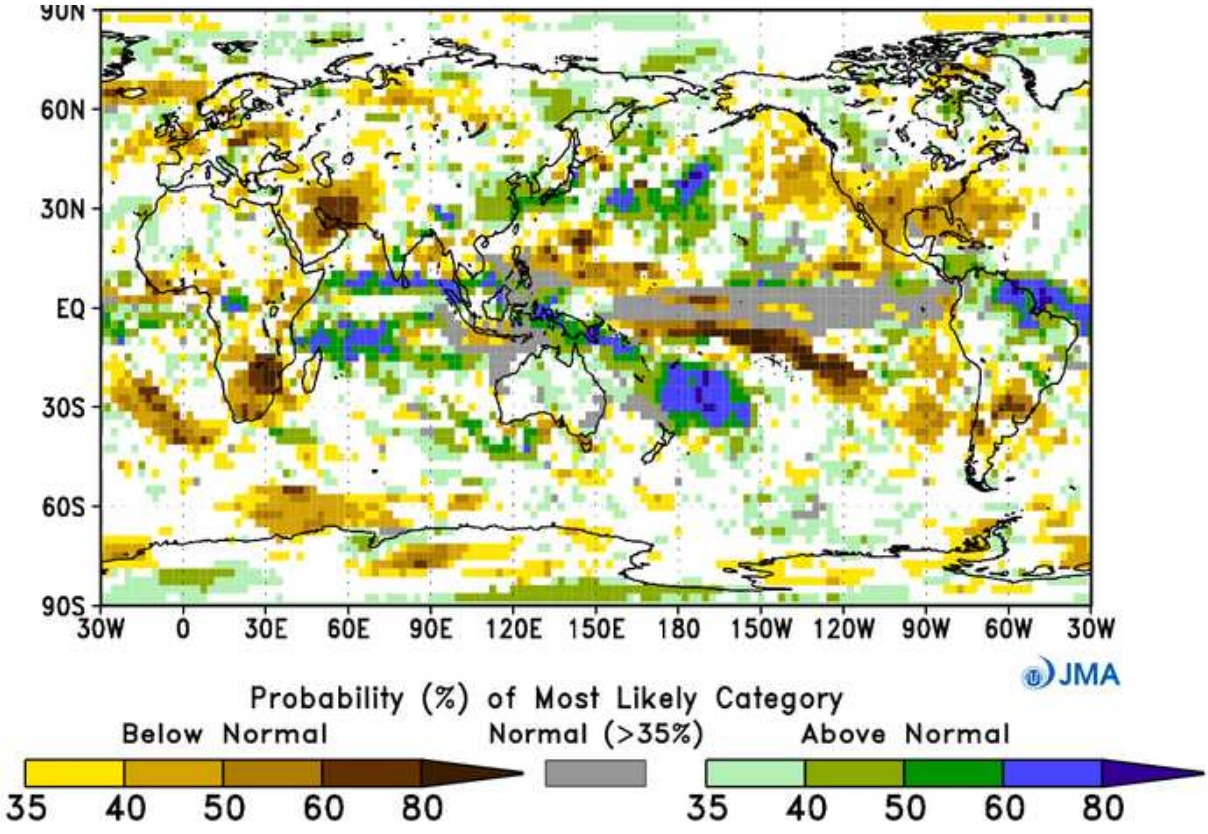


fig.34: Most likely category of Rainfall for November-December-January, issued in October from JMA. Categories are Above, Below and Close to Normal. White zones correspond to No Signal.
http://ds.data.jma.go.jp/tcc/tcc/products/model/probfcst/4mE/fcst/fcst_gl.html

II.4.e Euro-SIP

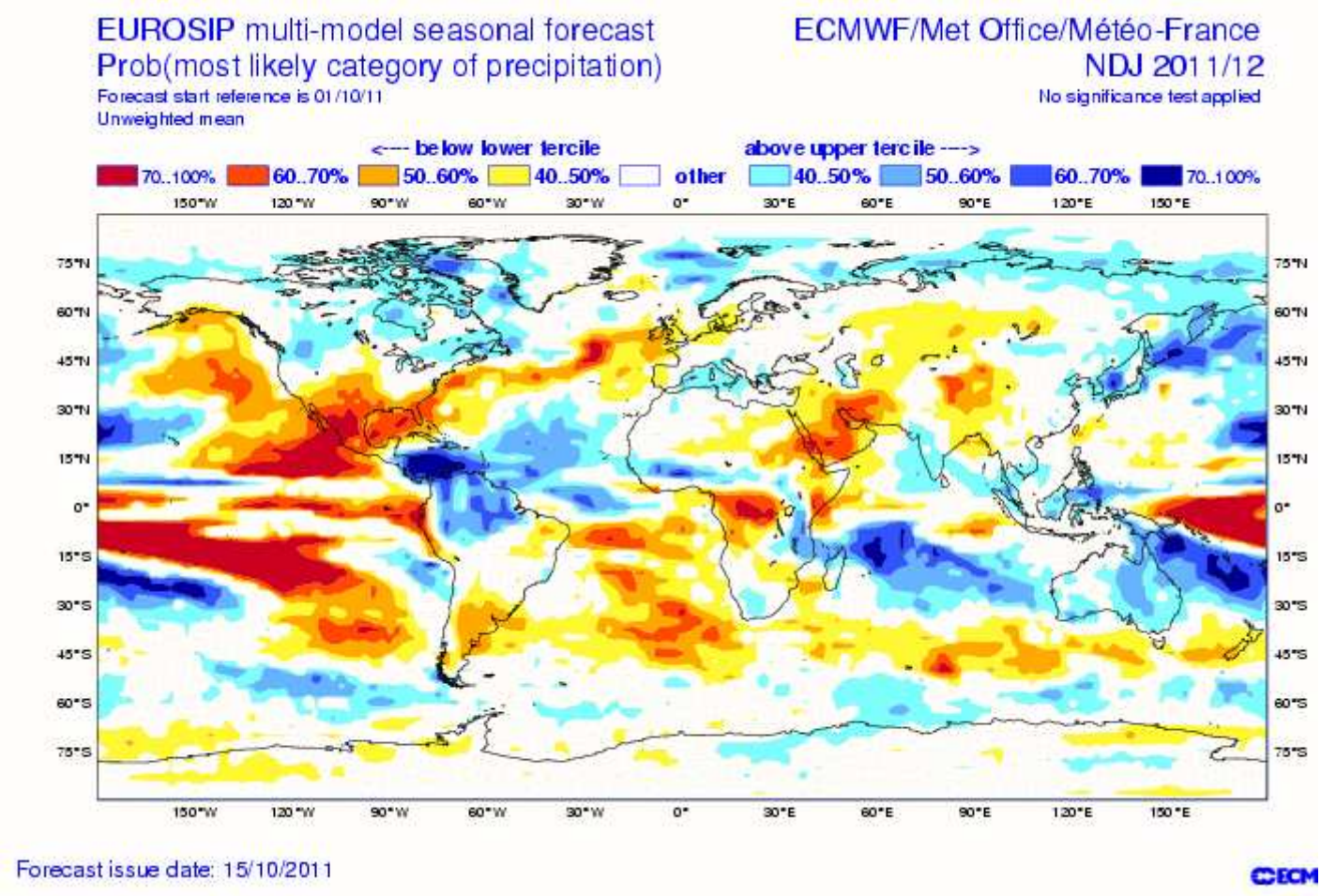


fig.35: Multi-Model Probabilistic forecasts for precipitation from EuroSip for November-December-January, issued in October. (2 Categories, Below and Above normal – White zones correspond to No signal).
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmv2/param_euro/seasonal_charts_2tm/

Even if the predictability is still limited (see previous discussion), there is some consistent signal on the most western part of Europe (related to the Atlantic Ridge circulation regime predominance). To be notice also the PNA like response in term of precipitation over the North American continent and some La Niña like patterns in the Tropics (Pacific, Australia and maritime continent, GHACOF region, …).

II.4.f International Research Institute (IRI)

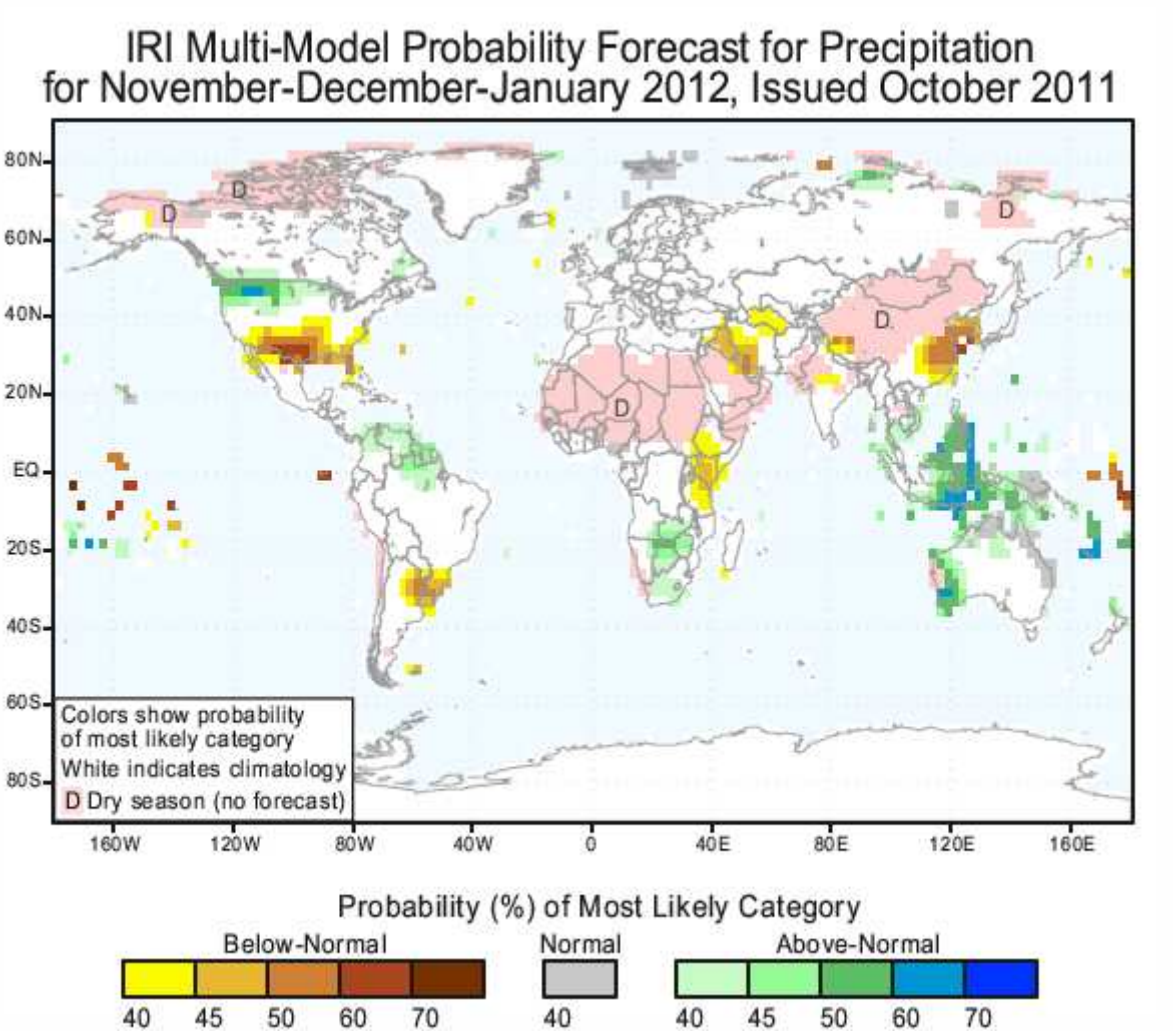


fig.36: Most likely category of Rainfall for November-December-January, issued in October from the IRI multi-model ensemble. Categories are Above, Below and Close to Normal. White zones correspond to No Signal. http://iri.columbia.edu/climate/forecast/net_asmt/

The IRI forecast are quite consistent with the Euro-SIP, especially over the maritime continent, GHACOF region, North of South America , the North American continent and the Pacific.

II.5. REGIONAL TEMPERATURES

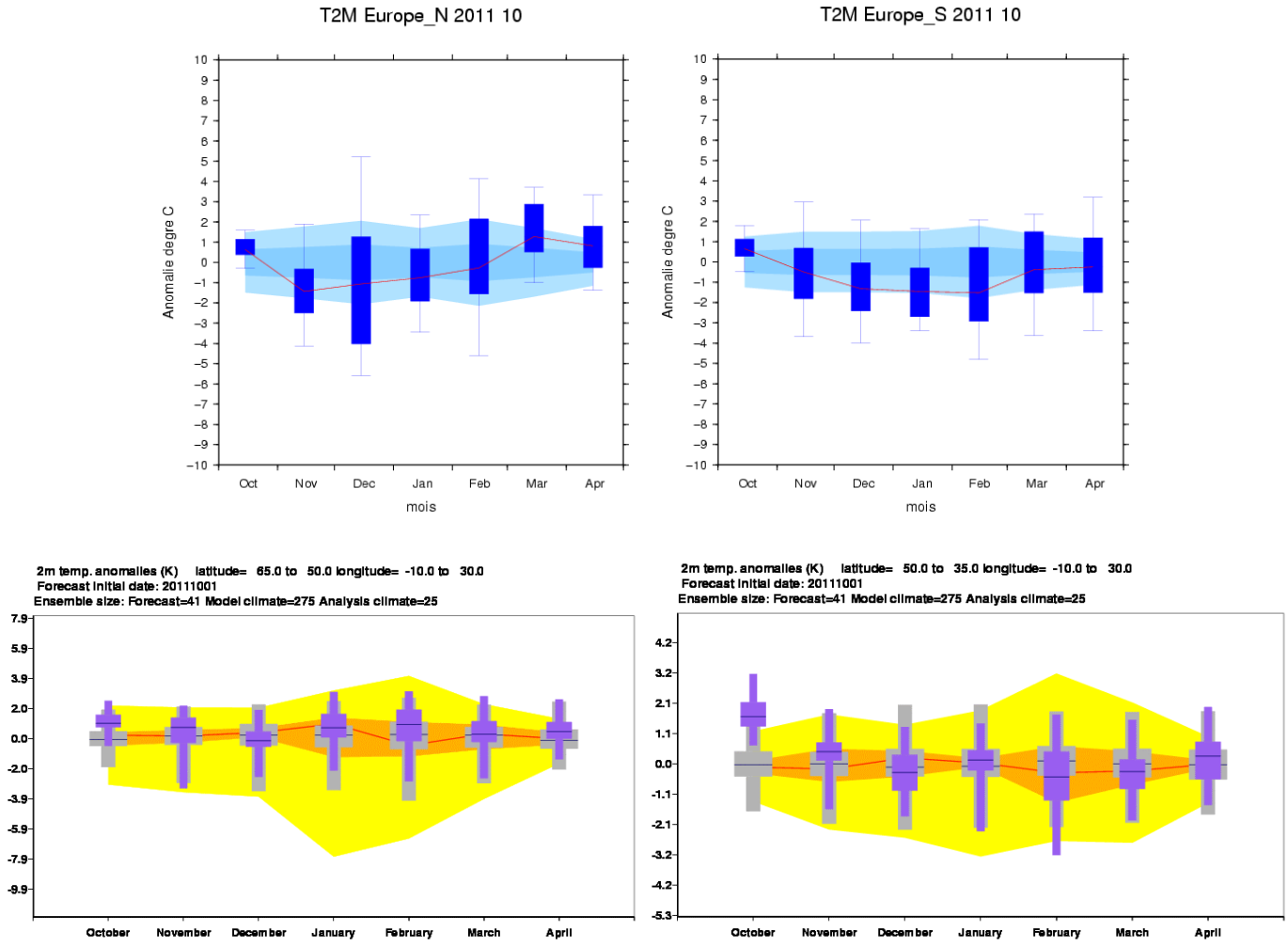


fig.37: Climagrams for T2m in Northern Europe (left) and in Southern Europe (right) from Météo-France* (top) and ECMWF (bottom) issued in October.

The differences between the two models are related to their atmospheric response differences clearly visible on the Geopotential Height and Stream function (see section II.2). So they can be related to the the model uncertainties and also to the weakness of the predictability (see discussion on teleconnection patterns). One remark also is about the size of the boxes which merge regions with different behaviour (with respect of this forecast). For Northern Europe, there is some skill in October and no skill in November and December then some skill appearing in January while for Southern Europe, there is some skill in October and November and no more skill after.

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

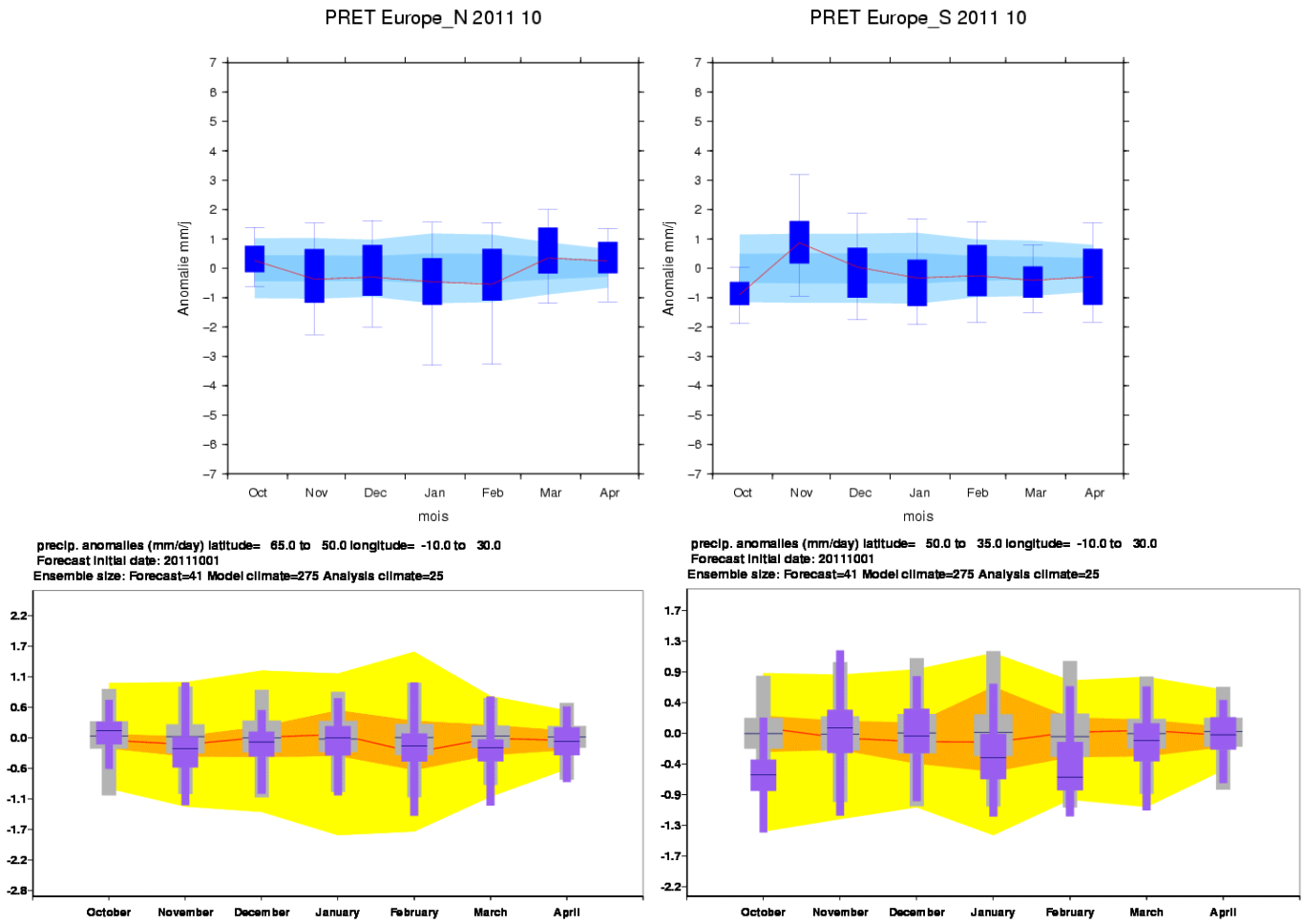


fig.38: Climagrams for Rainfall in Northern Europe (left) and in Southern Europe (right) from Météo-France* (top) and ECMWF (bottom), issued in October.

As already seen in Euro-Sip forecast, there is not so much consistency signal between the 2 models over most of the European regions (excepted on the most Western part). For Northern and Southern Europe some skills exist in October and then are close or worst than climatology excepted for January which show some enhanced skill. So these intraseasonal evolution should be interpreted with caution. The main conclusion about these graphs is the large uncertainty in the rainfall scenarios for both regions.

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

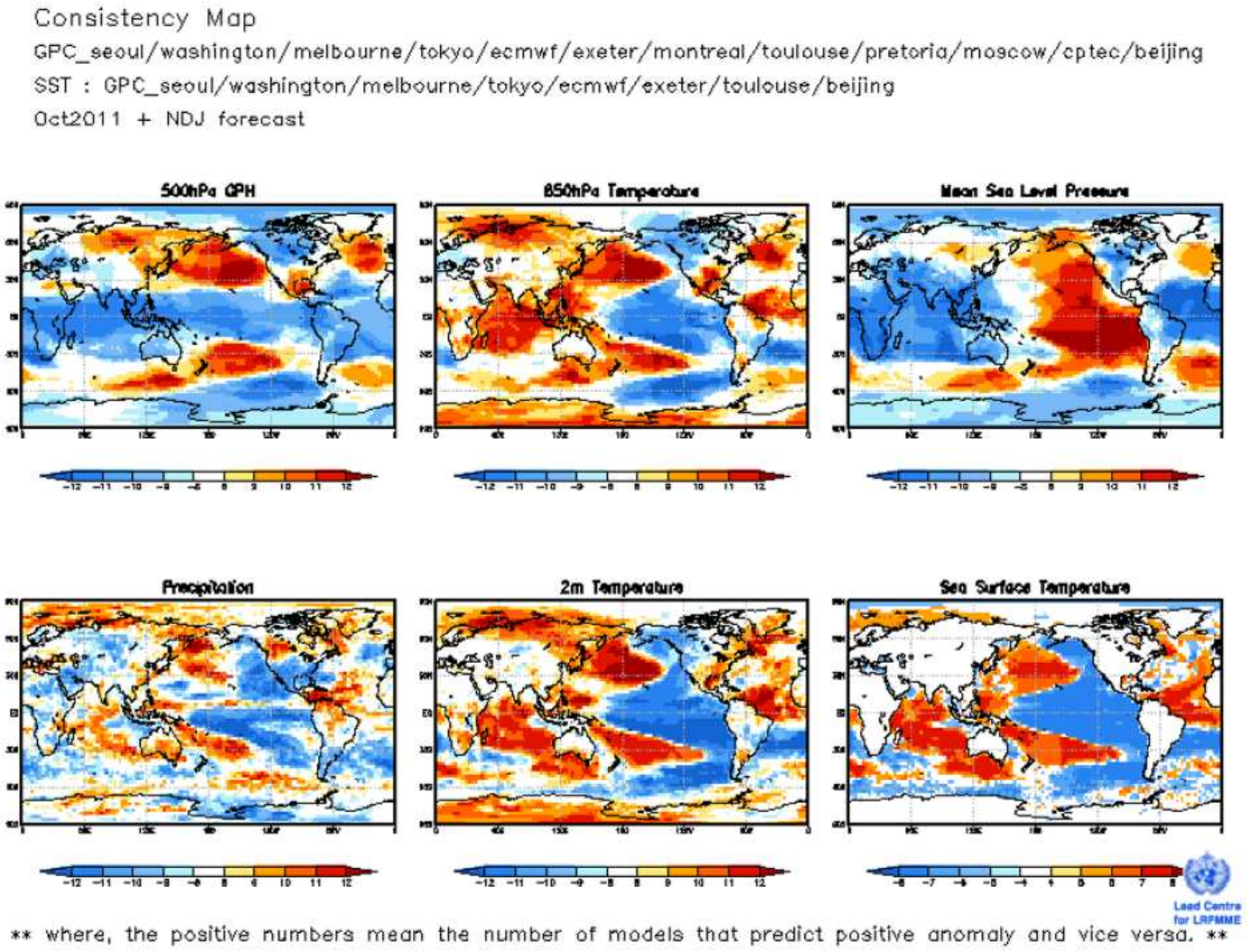


fig.39: GPCs Consistency maps from LC-MME http://www.wmolc.org/

The Atlantic Ridge predominance is quite consistent with the models behaviour over the North Atlantic sector (see Z500 map). So, the Euro-Sip conclusions seems to be applicable to the GPCs forecasts, especially for the temperature over the most Western part of Europe. For precipitation, there is little consistency over most of the regions. Last, it is important to remind that the predictability is still quite weak for this NDJ period even if it seems to progressively increase during the last month.

II.7. “EXTREME” SCENARIOS

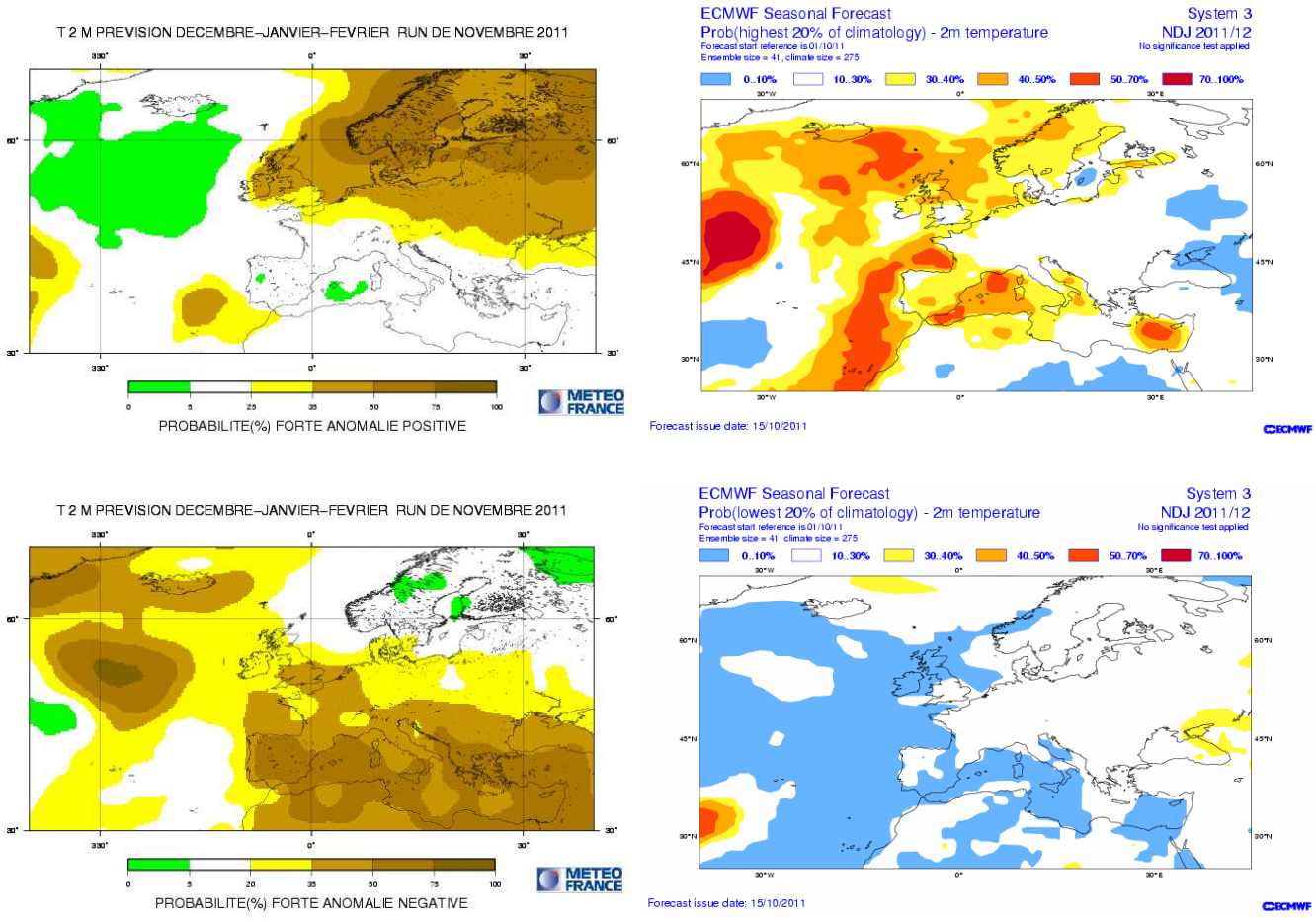


fig.40: Top : Probability of « extreme » above normal conditions for T2m for Meteo-France (left - highest ~15% of the distribution) and ECMWF (right - highest 20% of the distribution).
Bottom : Probability of « extreme » Below normal conditions for rainfall for Meteo-France (left - lowest ~15% of the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

There is little consistency in the “Extreme” scenario probabilities (related to the differences in model response and a limited predictability). However, there is some consistent signal on the Western façade of Northern Europe (enhanced probabilities of very above normal scenario) where some skill exists (especially over Scandinavia). For the very below normal scenario, the skill is not sufficient to interpret the map.

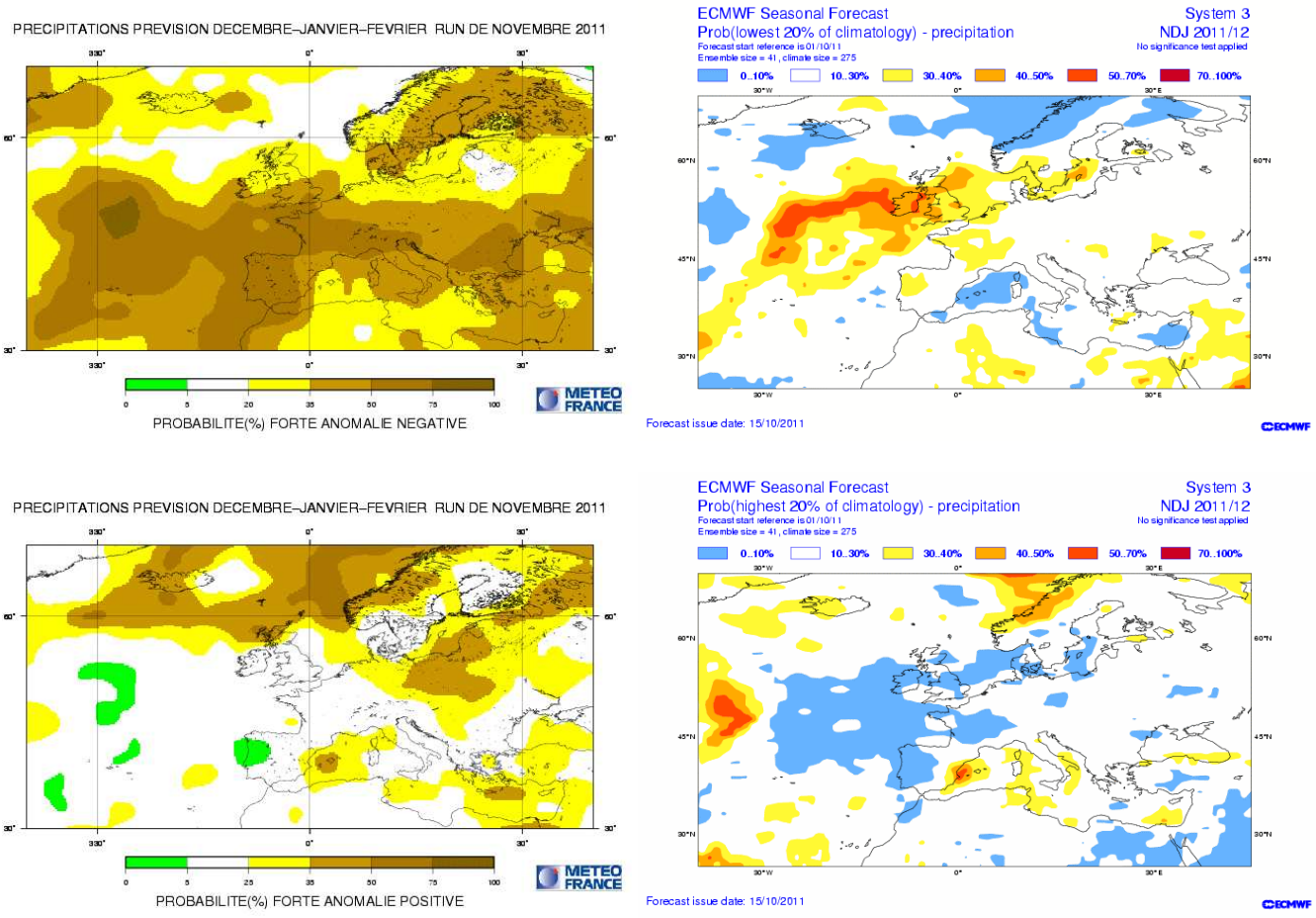


fig.41: Top : Probability of « extreme » Below normal conditions for rainfall for Meteo-France (left - lowest ~15% of the distribution) and ECMWF (right - lowest 20% of the distribution)
Bottom : Probability of « extreme » Above normal conditions for rainfall for Meteo-France (left - highest ~15% of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

Even if the probabilities are high in Meteo-France, there is not too much skill for these forecasts. So it seems a bit difficult to be confident in using this information because of the skill and because of the divergence of model responses. However, one can notice the enhancement of both extreme scenario probabilities over Scandinavia and some consistency between the 2 models.

II.8. DISCUSSION AND RESUME

Forecast over Europe

The first comment is about the predictability which seems to be still quite low (despite the development of some teleconnection patterns over the Tropical Pacific and also the North Atlantic sector – but weak). However and related to Geopotential Height forecasts, it seems that the deficit of NAO + regimes is a consistent scenario for most of the models. The Atlantic Ridge regime could be privileged at least during the first months of the forecasted period (despite it's sometime difficult to separate pseudo NAO – regimes related to Polar vortex behaviour from the previous one).
For temperature and rainfall, the low predictability, the dispersion of the different models and forecasts over European regions and the size of the boxes lead to "No privileged Scenario".
In more details in term of geographical considerations, some different scenario could be use for specific regions like the most Western part of Europe with Below normal conditions for temperature.
For Rainfall, the Below normal scenario could make sense also on the most Western part of Europe consistently with the privileged circulation regimes.

Tropical Cyclone activity

For the beginning of the season in the Southern hemisphere, Euro-Sip forecasts indicate a more active than normal cyclonic activity over the South-West Indian Ocean and a less active than normal cyclonic activity over the South Pacific. This is very consistent with the forecasted SSTs scenarios and General Circulation (see sections II.1 and II.2) in the Topics.

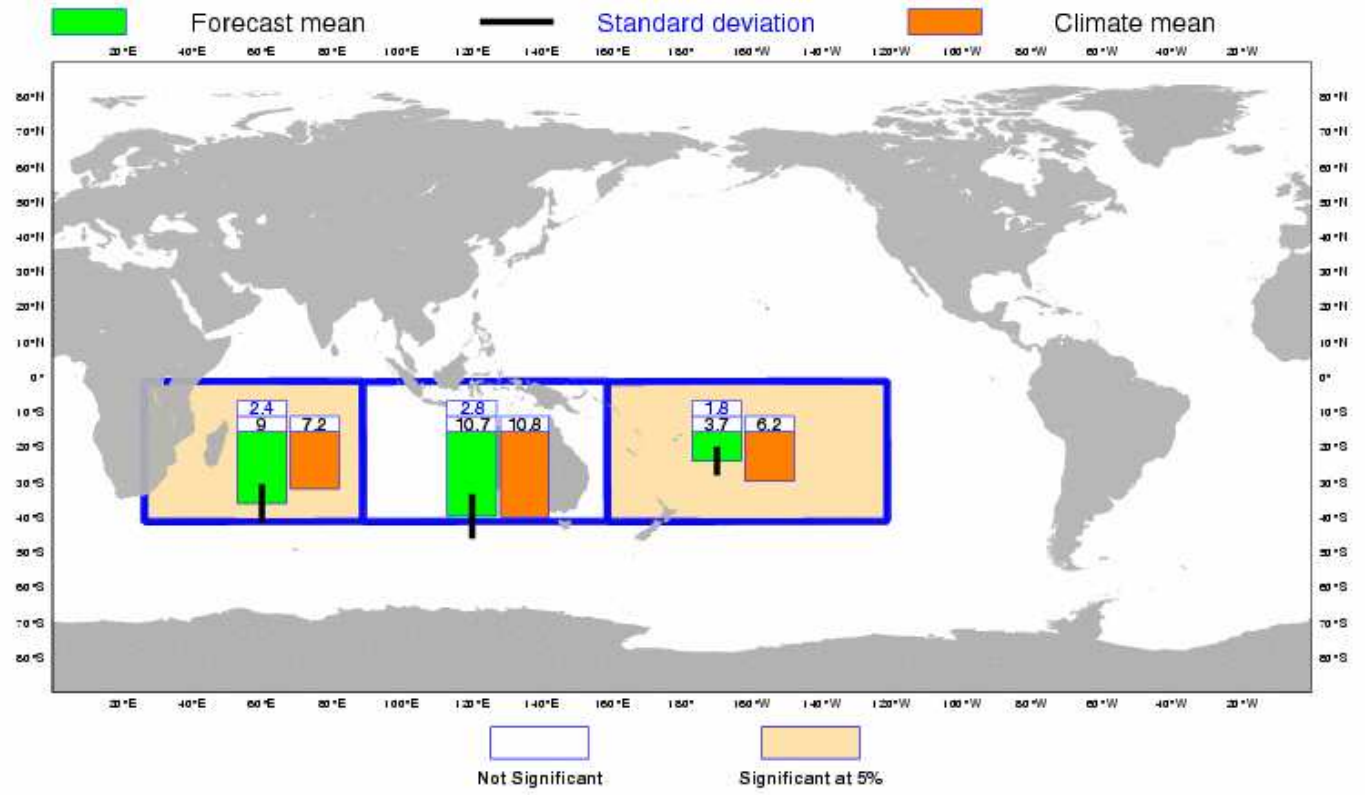


fig.42: Seasonal forecast of the frequency of Tropical Cyclones from EUROSIP (Météo-France & ECMWF) for the November 2011 to April 2012 period, issued in October.
http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/eurosip/mmtrop/trop_euro/eurosip_tropical_storm_frequency/

Synthesis of Temperature forecasts for November-December-January 2011 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									
JMA									
Synthesis	*(34)*	*(3/4)*	*(3/4)*	*(3/4)*	*(3/4)*				
Eurosip									
IRI									
Privileged Scénario by RCC-LRF Node	***No privileged scenario***	***No privileged scenario***	***No privileged scenario***	***No privileged scenario***	***No privileged scenario***				

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

Synthesis of Rainfall forecasts for November-December-January 2011 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									
JMA									
Synthesis		*(4/4)*	*(3/4)*	*(3/4)*	*(4/4)*				
Eurosip									
IRI									
Privileged Scénario 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, 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.
■ IRI and Euro-SIP provide multi-model forecasts. Euro-Sip is presently composed using 3 models (ECMWF, Météo-France and UK Met Office). IRI uses several coupled and forced models optimally combined.

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).

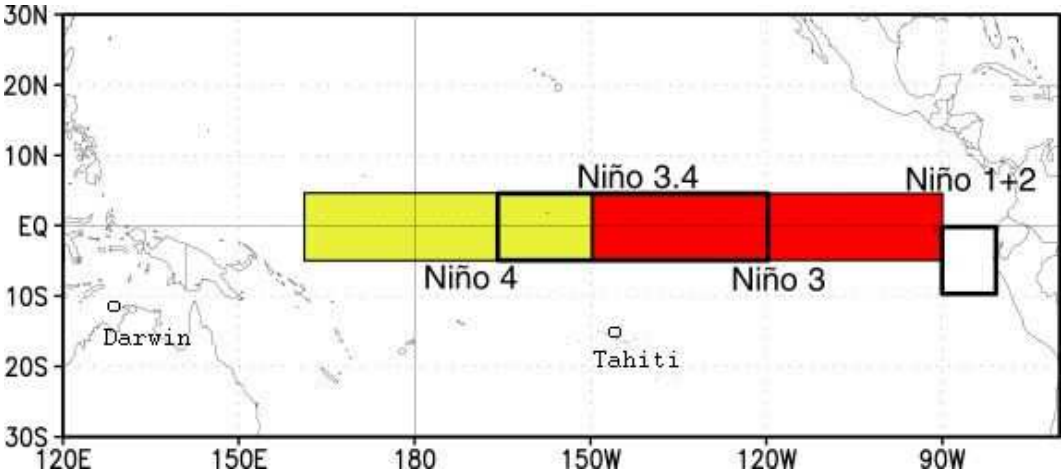
In order to better interpretate the results, it is recommended to look to verification maps and graphs which give some insight into the expected level of skill for a specific parameter, region and period. A set of scores is presented on the web-site of the Lead-Centre for Verification (see http://www.bom.gov.au/wmo/lrfvs/)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

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).

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.