MEDITERRANEAN CLIMATE OUTLOOK FORUM
MEDCOF-6 MEETING

MONITORING SUMMARY MEDCOF-6

for April 2016

Second draft version

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The following MedCOF monitoring summary is based on

- climate monitoring working reports from RA I NA RCC-CM, RA VI RCC-CM and RA VI RCC-LRF

1. Oceanic Analysis

1.1. Global Analysis

In the Pacific ocean, El Niño conditions are still present but rapidly weakening (Figure 1), especially in the Niño 3.4 region: SST anomalies decreased to around 1.5°C in April, compared to 2.0°C in March. The easternmost part of the equatorial Pacific has even negative SST anomalies, indicating a beginning decay of El Niño. The subsurface cooling is strengthening and spreading rapidly eastward. Subsurface negative anomalies have reached the South American coastline (Figure 2). Positive anomalies are confined to a very shallow layer less than 50 meters thick. Over the north Pacific, a positive PDO pattern is strengthening.

In the Atlantic in the equatorial waveguide there are still close to neutral conditions, except in the Guinea Gulf (warmer than normal). In the Northern hemisphere, a persistent warm anomaly extends from the Gulf of Mexico to the Sargasso Sea. There is still a strong negative anomaly (cold horseshoe pattern) from Newfoundland to the British coast and extending along the West African coast. On the other hand, we note a warming trend south and south-west of Canary Islands.

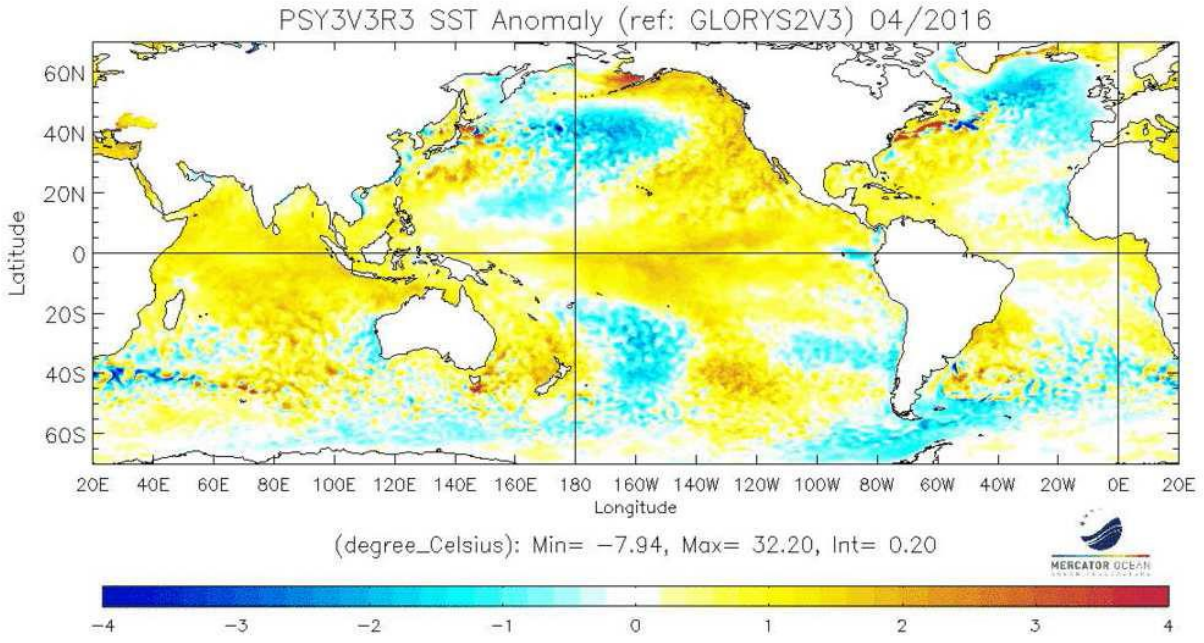

Figure 1: SST anomalies (°C) (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

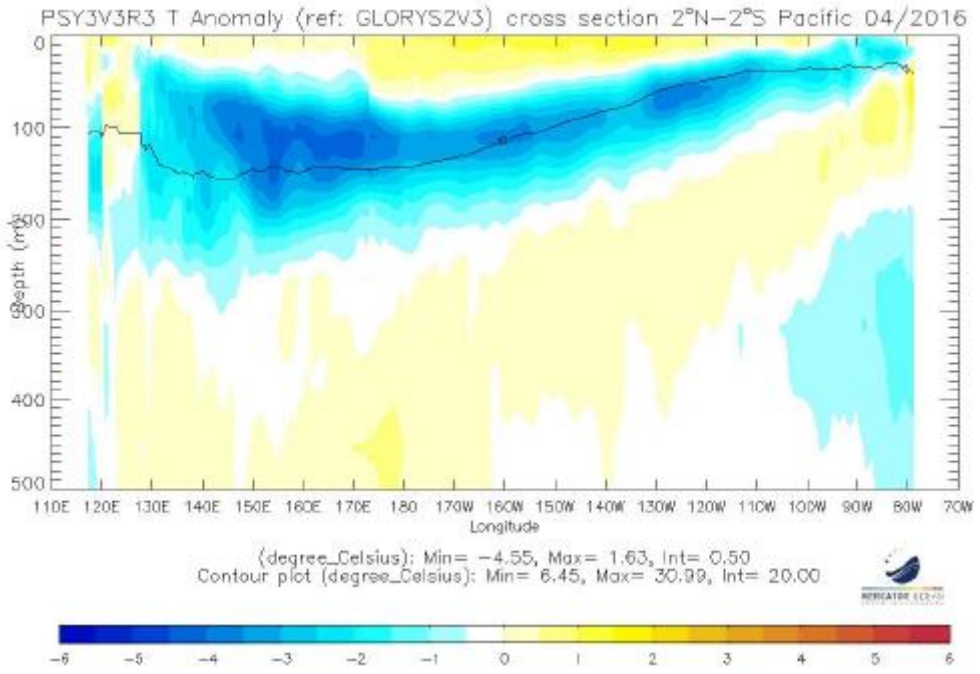

Figure 2: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (April 2016), http://bcg.mercator-ocean.fr

1.2. Near Europe and North Africa

Sea surface temperature (SST) near Europe was warmer than normal everywhere except west of Europe where a large cold anomaly on the central North Atlantic is still existing. At the coasts of Western Europe including France, northern Spain and Portugal, anomalies are very close to zero. This corresponds to monthly means of April 2016 ranging from around 9°C near northern France to 16°C near southern Portugal/Spain.

In the Mediterranean Sea, SST anomalies ranged from slightly above zero in the west to around +2°C in the east. Monthly means therefore had a large range from 14°C in the north-western Mediterranean to around 21°C near the Middle East. The Black Sea was 1-3°C warmer than normal (monthly mean around 12°C), the Caspian Sea showed anomalies from +1°C in the south to around +5°C in the north.

2. Atmospheric Analysis

I.2.a General Circulation

Also in the velocity potential anomaly field in the upper troposphere (Figure 3), typical El Niño patterns are still present but rather weak: upward motion anomaly is now confined near the equator and around the dateline. Over the Maritime Continent, a large area of anomalous subsidence with an extension to the North can be seen. Globally over the Pacific and Indian Ocean tropics, one can note very similar patterns.

Standardized SOI at -1.2 in April could be interpreted as a remnant effect of El Niño. (https://www.ncdc.noaa.gov/teleconnections/enso/indicators/soi/)

Over the Atlantic Ocean, downward motion anomalies can be found both in southern and northern tropics.

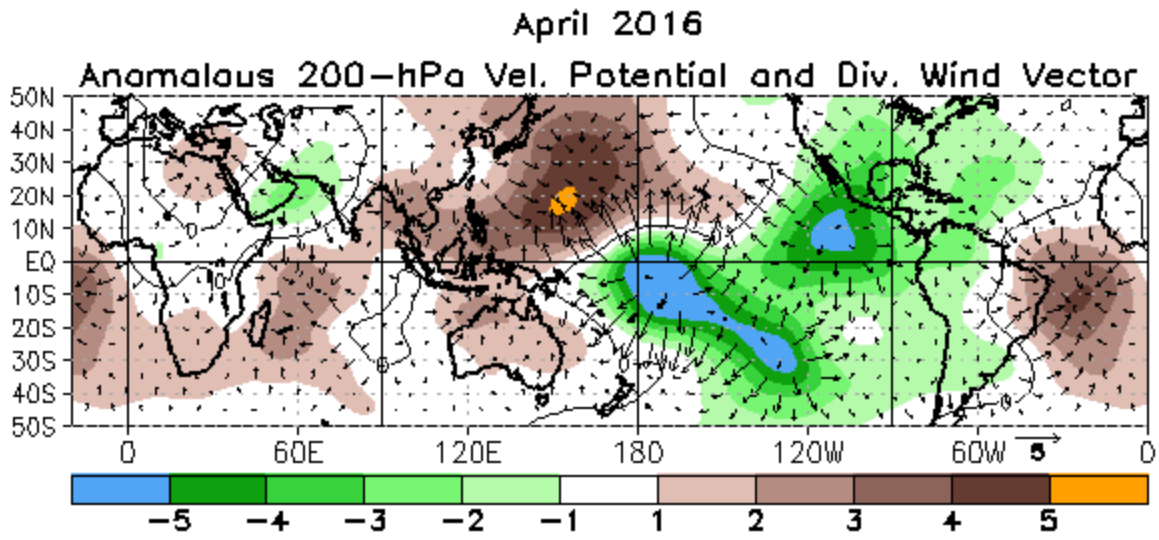

Figure 3: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).

http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

Stream Function anomalies in the high troposphere (Figure 4) show good continuity patterns over Pacific and Indian basins, up to mid-latitudes. This is probably linked to the persistence of velocity potential anomalies previously discussed. Over the Atlantic, there is not such continuity, and it's difficult to detect any tropical influence up to mid-latitudes.

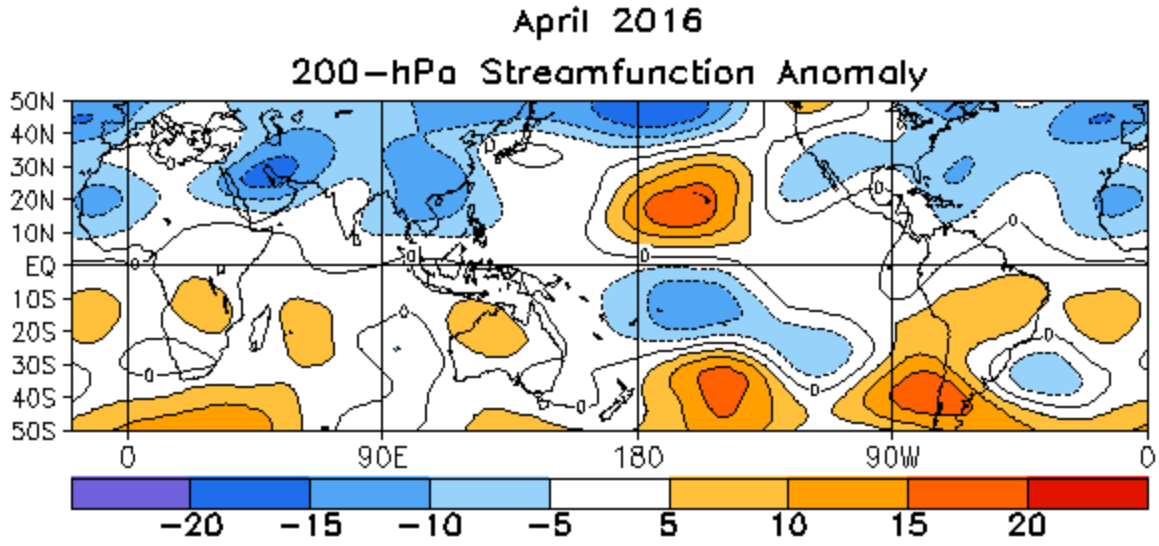

Figure 4: Stream Function Anomalies at 200 hPa. http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

Geopotential height at 500 hPa (Figure 5) and sea level pressure over Europe (Figure 6):

Around the north Pacific, the Pacific part of a positive PNA pattern is still clearly visible, with a strong negative anomaly over the Aleutians, and even the positive anomaly over Western Canada. Around the northern Atlantic and Eurasia, strong anomalies in April. Contrary to the Pacific, we do not detect a tropical forcing to explain (even partly) these anomaly poles. Close to Europe, the main dipole from East Atlantic (-), to Mediterranean Sea (+) is well described by the EA teleconnection pattern (EA index ~1, see http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/table3.shtml), with the negative core anomaly over the North Atlantic shifted quite far to the south. The Azores High was weaker than normal; it influenced still North Africa, while Western Europe, Iberia and the western Mediterranean were dominated by low pressure situations, especially in the first week of the month. Only temporarily low pressure extended also further south to northern Africa. Around the middle of the month, cyclonic influence also increased in southern parts of Central Europe, and further east (Romania, Ukraine). NAO was weak on monthly average (+0.3), but with high variability within the month pointing to very changeable weather conditions. In the last week of April, a cold Arctic air outbreak (connected with a notable negative Arctic Oscillation phase) reached particularly the northern parts of the MedCOF region.

Eastern areas of the MedCOF region and most of North Africa profited from high pressure influence most of the month.

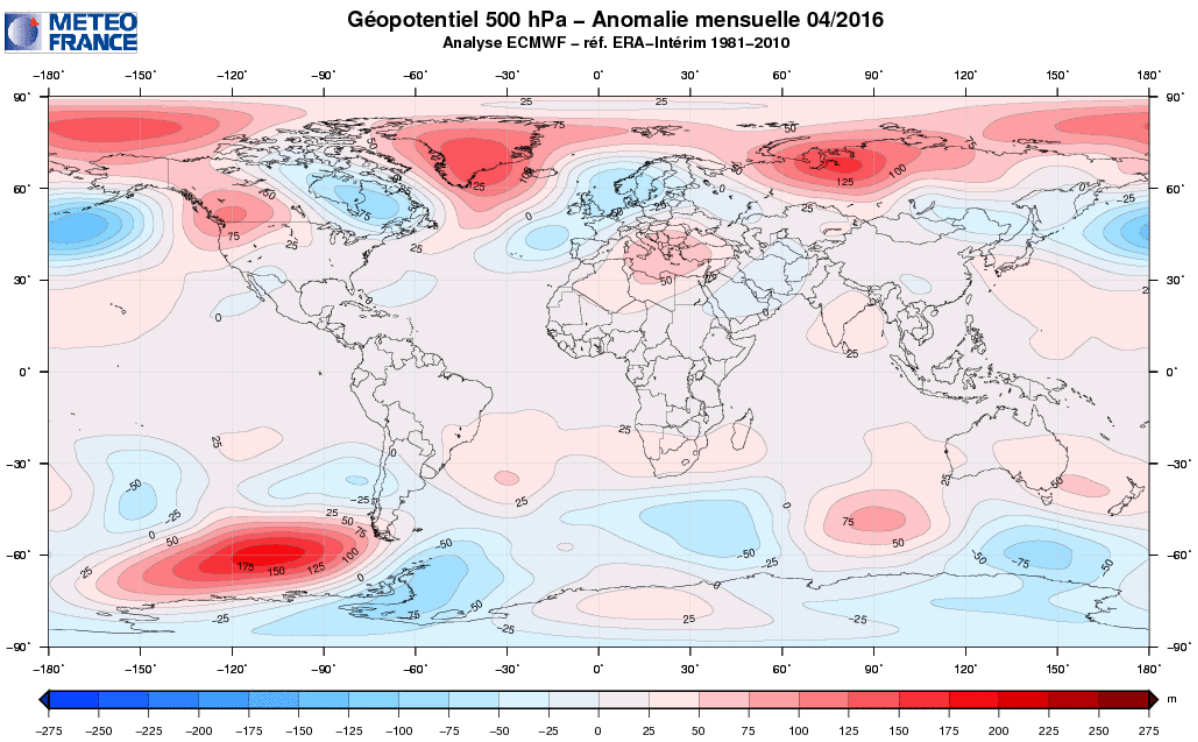

Figure 5: Anomalies of Geopotential height at 500hPa (Meteo-France)

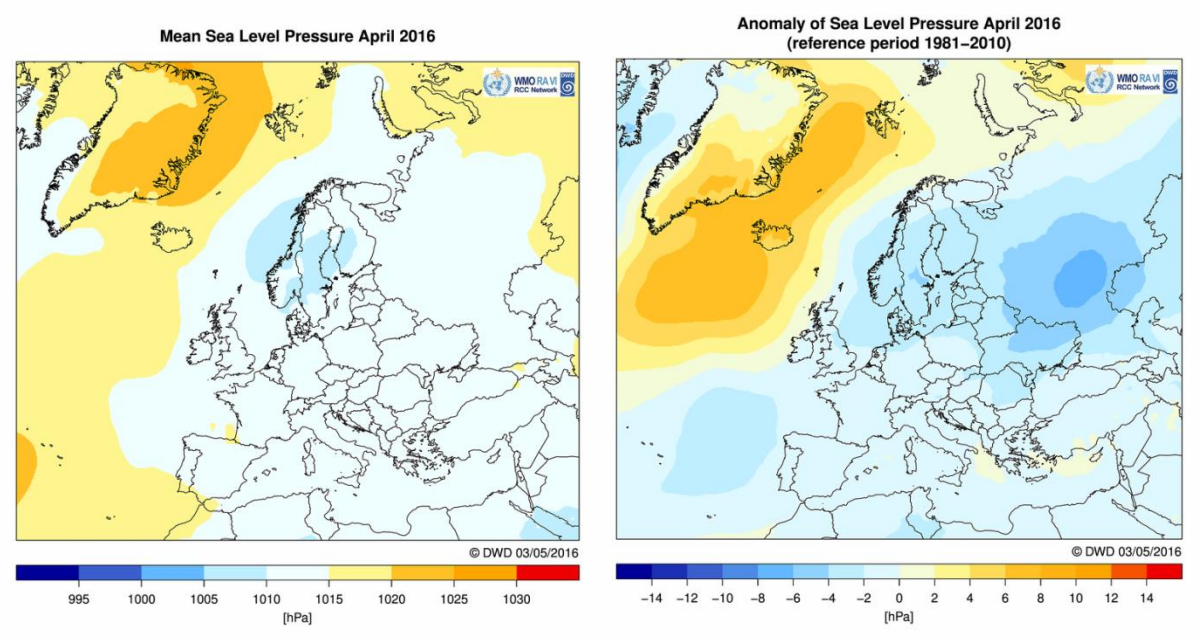

Figure 6: Mean sea level pressure (left) and its anomalies (1981-2010 reference) for April 2016. Source: DWD, http://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_ppp.html?nn=490674

3. Temperature anomalies

Europe / RA VI

Monthly mean temperature in April 2016 ranged from less than 5°C in the Alps to above 20°C in in Middle East within the RA VI part of the MedCOF region. Anomalies were slightly below zero in much of France and Iberia; there were positive in the rest of the RA VI part ranging from near zero in the western Mediterranean to more than +4°C in places of eastern RA VI areas (1981-2010 reference). This reflects the geopotential anomaly distribution with most intense cyclonic influence in western parts and most intense anticyclonic influence in eastern parts, especially in the south-eastern Balkans.

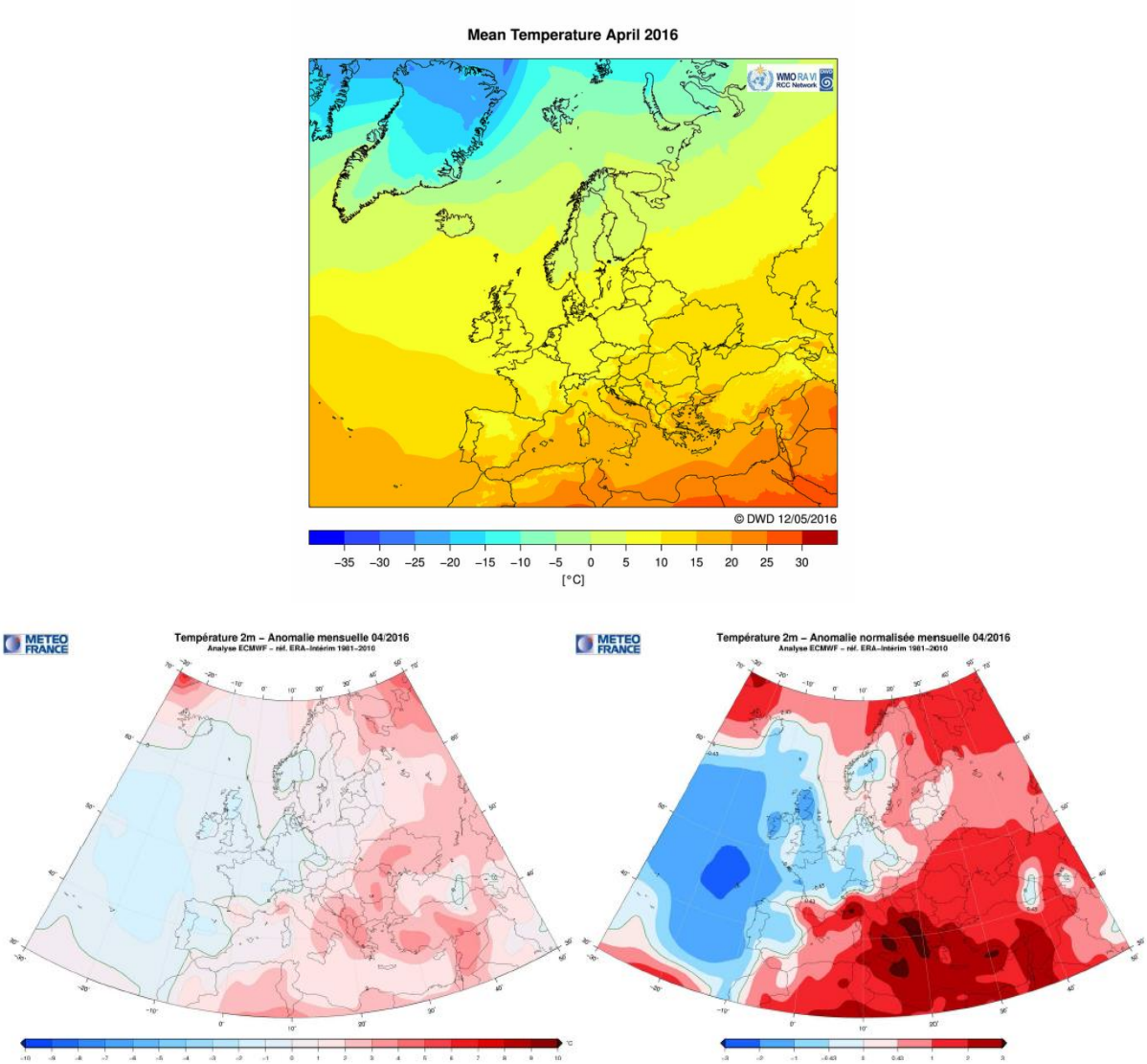

Figure 7: Mean temperature (upper graph) in °C in the RA VI Region (Europe) interpolated from CLIMAT station data, for April 2016. Source: DWD, http://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_ttt.html?nn=490674.

Lower left graph: Absolute anomaly of temperature, lower right graph: Standardized temperature anomalies, from ERA-Interim Reanalysis (Source: Meteo France)

North Africa

During the month of April 2015, registered temperatures were above normal over almost all of North African Domain. The anomaly has reached more than +3 °C especially in southern regions of the domain. Some records have been noticed in several stations in the region. North coastal region of Libya, Tunisia and east Algeria were less hot. The extreme north of Morocco was the least hot region during this month.

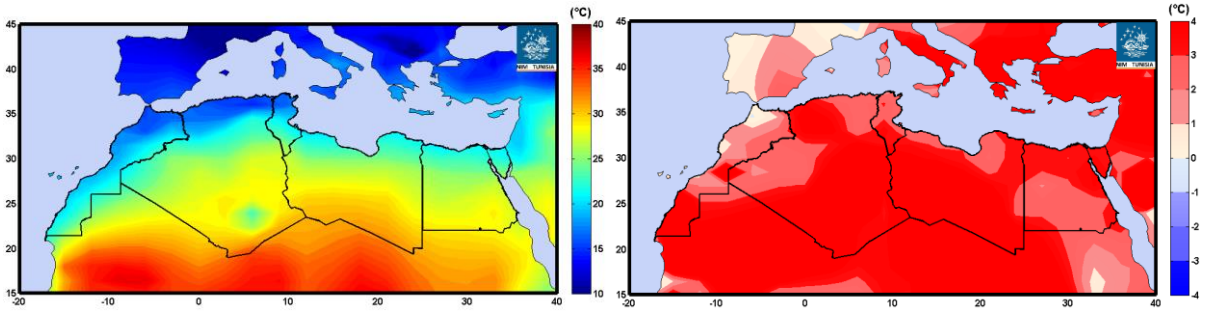

Figure 8: left: Mean temperature; Right: Absolute anomalies of temperature in the RAI-NA Region (North Africa). Data from NCDC (National Climate Data Centre NOAA – reference 1981-2010), http://www.meteo.tn/htmlen/donnees/climatemonitoring.php.

4. Precipitation anomalies

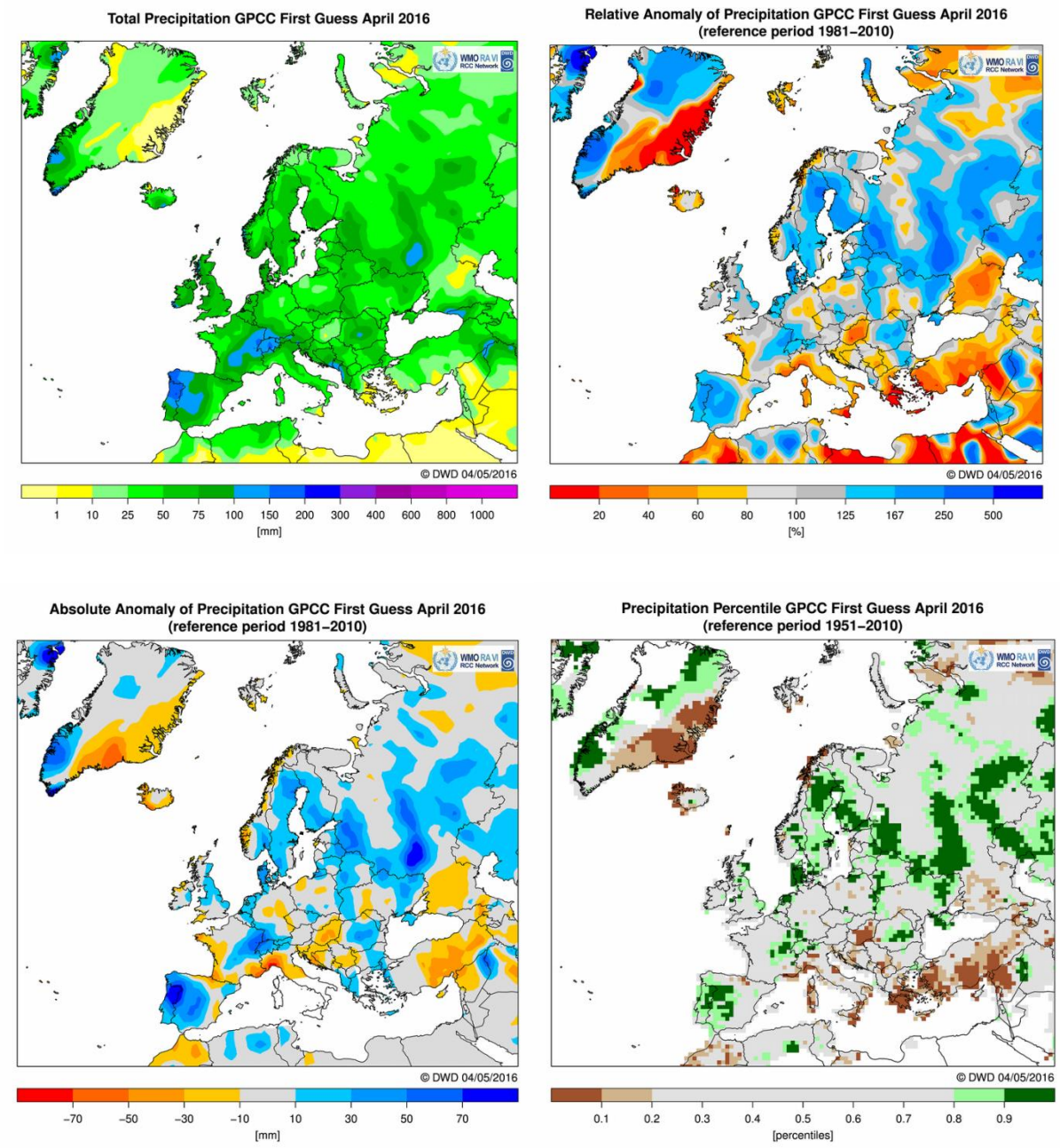

Figure 9: Monthly precipitation sum (upper left), relative anomalies (upper right), absolute anomalies (lower left), and percentiles for April 2016 (1981-2010 reference for means and anomalies, 1951-2010 for percentiles) in Europe. Data from GPCC (First Guess version). Source: DWD, http://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_rrr.html?nn=16102

Europe / RA VI

Monthly precipitation totals in April 2016 over the RA VI part of the MedCOF region ranged from below 10mm in places at eastern Mediterranean coasts to more than 200mm in northern Portugal. Further areas with at least 100mm totals can be identified in Spain, in mountainous regions of France, at western Balkan coasts, locally in Romania, in Georgia near the Black Sea, and in south-eastern Turkey.

Precipitation anomalies show a very large spatial variability across the MedCOF region. They exceeded 150% particularly in Iberia and the western Alps, partly exceeding the 90th percentile, but they were also well above normal in places near to the Black Sea and locally also near to the eastern Mediterranean. On the other hand, much of the Mediterranean area saw a very dry month with less than half of the normal precipitation.

The precipitation distribution shows again the general tendency reflected by the geopotential (more cyclonic in the west and some disturbances in the north of the MedCOF region and mainly anticyclonic in eastern parts, though with some locally heavy precipitation).

North Africa

During the month of April 2014, most of the North African region has known below normal total amount of precipitation. The north and the center east of Algeria and almost all of Tunisia have normal to above normal precipitation. A wet cell in the north east of Algeria is noticeable. The North of Morocco and some small regions in the north of Egypt have slightly below normal precipitation. Most part of the Sahara, which is known as a dry zone, was even drier during this month of the year.

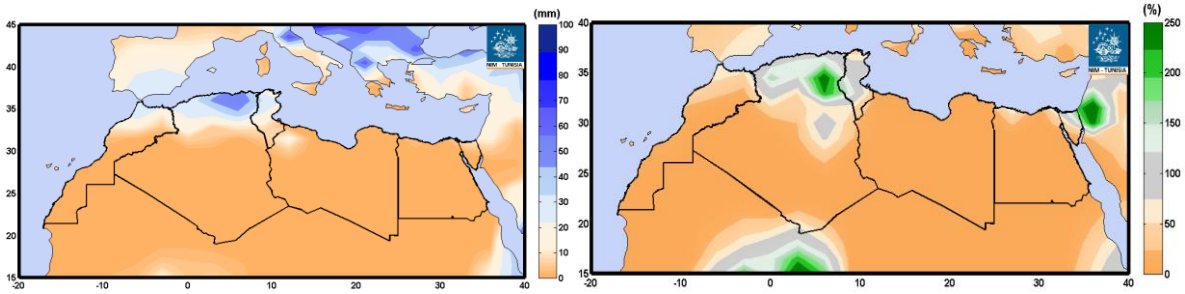

Figure 10: left: Total precipitation; Right: Absolute anomalies of precipitation in the RAI-NA Region (North Africa). Data from NCDC (National Climate Data Centre NOAA – reference 1981-2010), http://www.meteo.tn/htmlen/donnees/climatemonitoring.php.

References:

Météo France Monthly Seasonal Forecast Bulletin: http://elaboration.seasonal.meteo.fr

WMO RA I RCC Node on Climate Monitoring Website with monitoring results: http://www.meteo.tn/htmlen/donnees/climatemonitoring.php

RA VI RCC-CM Website with monitoring results: http://www.dwd.de/rcc-cm

GPCC: http://gpcc.dwd.de