MEDITERRANEAN CLIMATE OUTLOOK FORUM
MEDCOF-6 MEETING

MONITORING SUMMARY MEDCOF-6

for April 2016

Final approved 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,
- comments of MedCOF-6 participants.

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 shows even negative SST anomalies, indicating a beginning decay of El Niño. The subsurface cooling is intensifying and rapidly spreading 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, the equatorial waveguide is still close to neutral conditions, except in the Guinea Gulf where is 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, which extends along the West African coast. On the other hand, we note a warming trend south and south-west of Canary Islands.

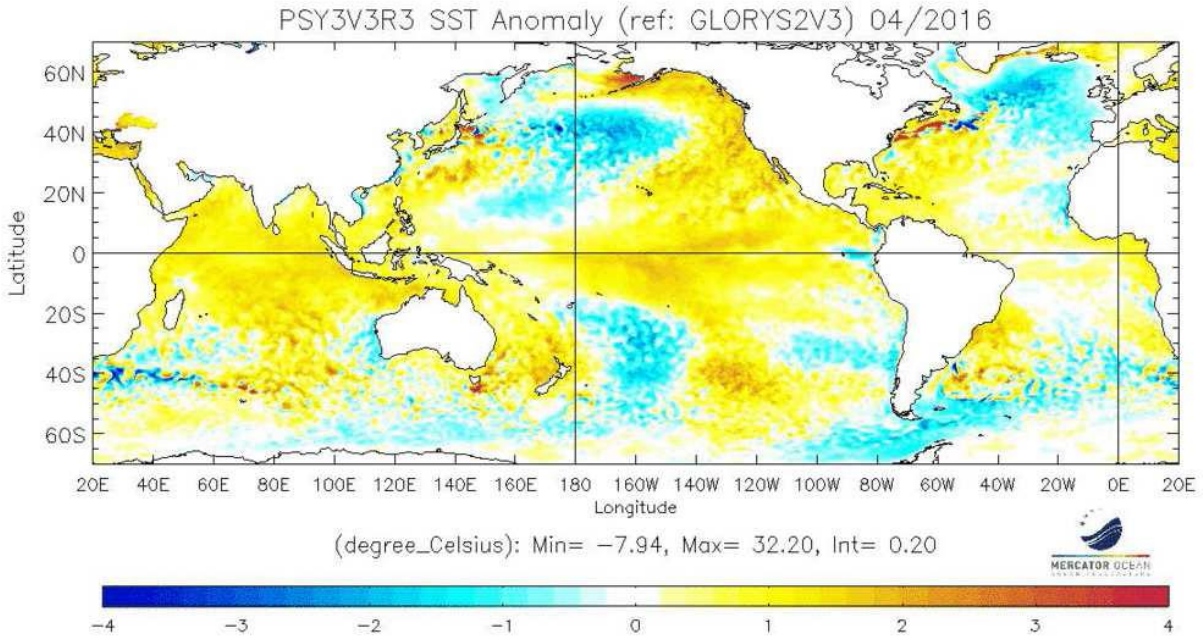

Figure 1: SST anomalies (°C) (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

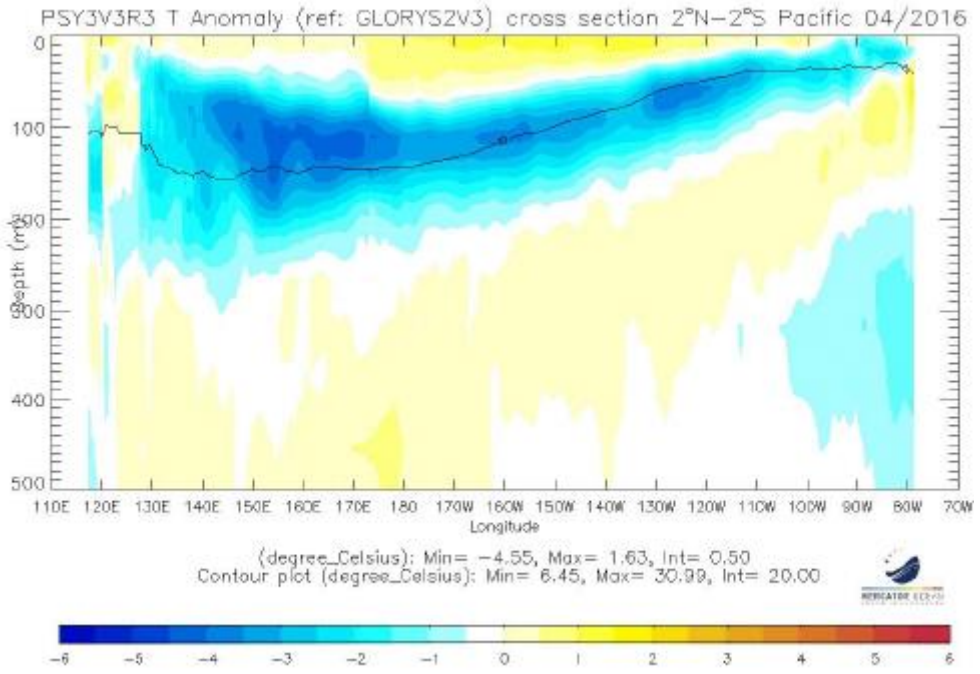

Figure 2: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (April 2016), http://bcg.mercator-ocean.fr

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 over the central North Atlantic is still existing. Along 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, spanning 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

The velocity potential anomaly field in the upper troposphere (Figure 3) shows typical El Niño patterns, but deviations from the mean are reducing. Upward motion anomaly is now confined near the equator and around the dateline, with remarkable values in the southern tropical part of Central Pacific. Over the Maritime Continent, a large area of anomalous subsidence, with an extension toward Northwest, can be seen.

The April standardized SOI value of -1.2 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, while slight upward motion is noticeable over Caribbean and Sargasso Seas.

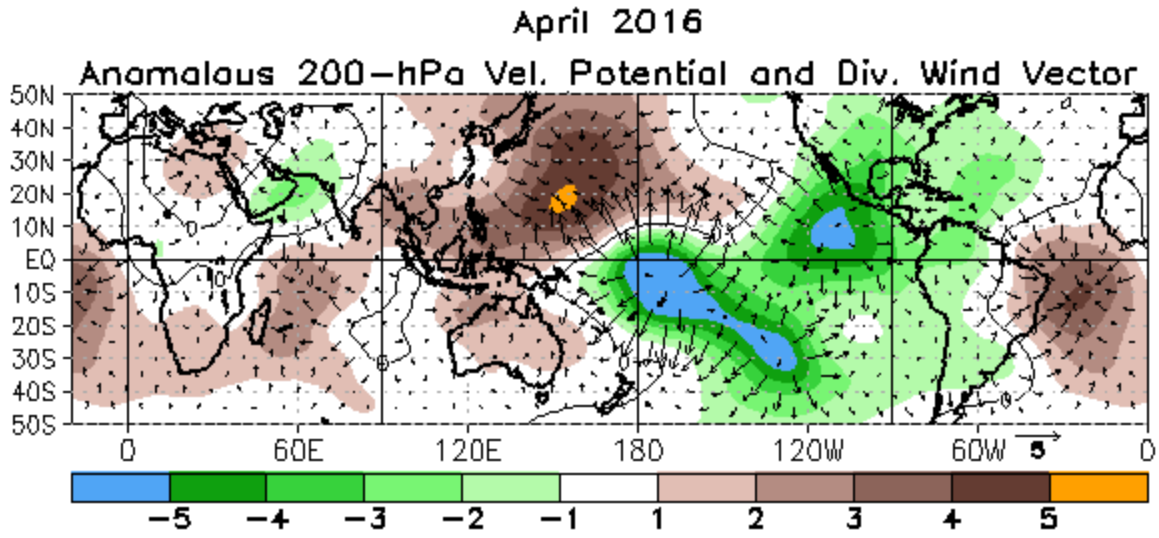

Figure 3: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).

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 the 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.

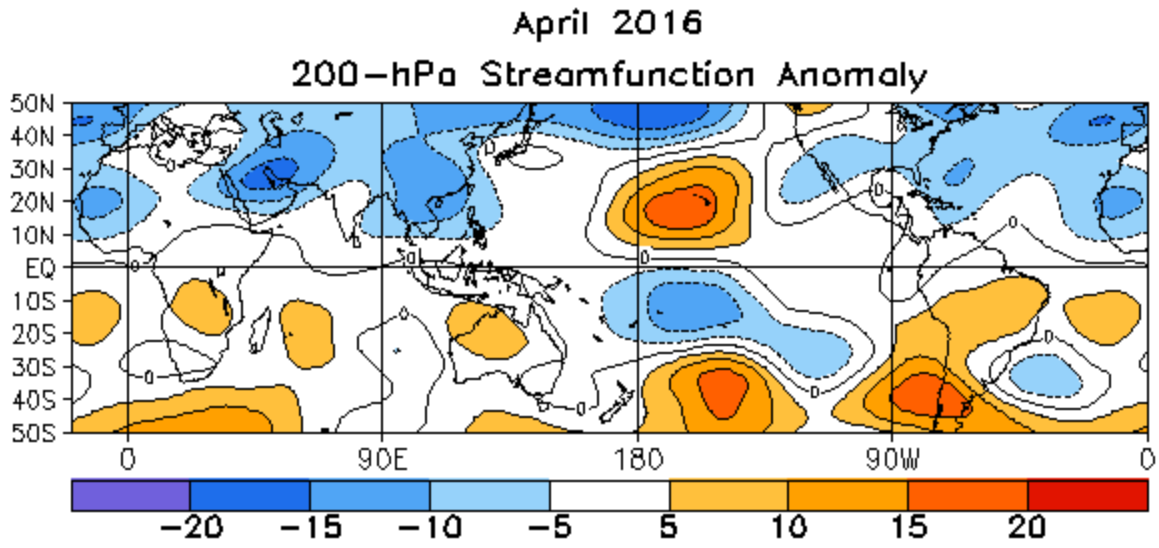

Figure 4: Stream Function Anomalies at 200 hPa. http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

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

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. In the north Atlantic and Eurasia regions, the strong anomalies shown are not linked to the tropical forcing, contrarily to the anomalies recorded in the Pacific region.

Close to Europe, the main dipole between East Atlantic (-), and the 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 south. The Azores High was weaker than normal; it was still able to influence 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 the northern part of the MedCOF region.

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

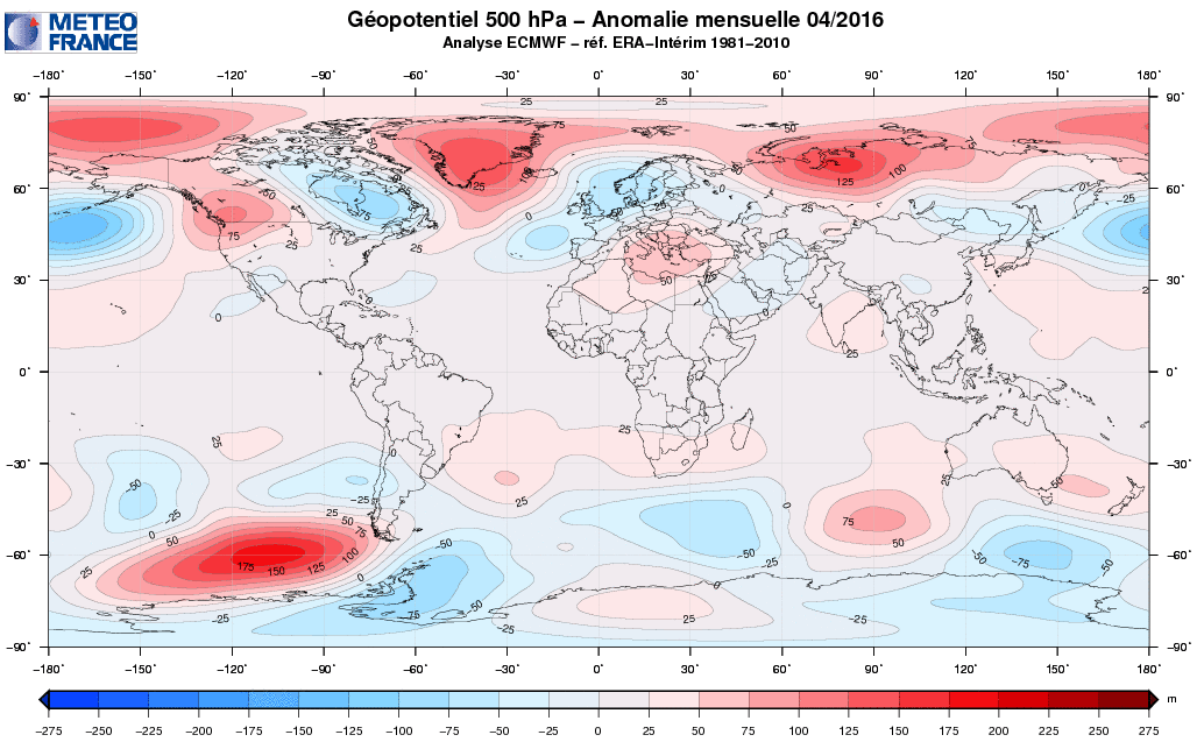

Figure 5: Anomalies of Geopotential height at 500hPa (Meteo-France)

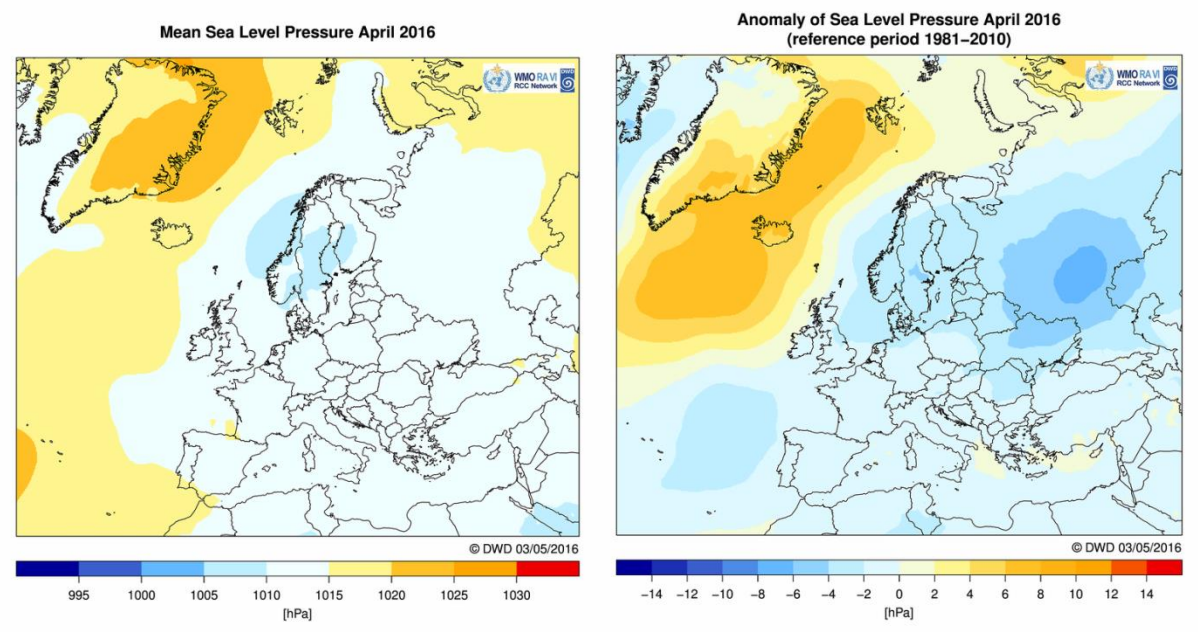

Figure 6: Mean sea level pressure (left) and its anomalies (1981-2010 reference) for April 2016. Source: DWD, http://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_ppp.html?nn=490674

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 Middle East. Anomalies were slightly below zero in most France and Iberia, while warm anomalies took place in the rest of the RA VI region, ranging from near zero in the western Mediterranean to more than +4°C in most areas overlooking central and eastern Mediterranean and the Black Sea (1981-2010 reference). Cyprus recorded anomalies up to +4°C for monthly mean daily maximum temperature and up to +3°C for minimum temperature (1981-2010 reference).

This reflects the geopotential anomaly distribution with most intense cyclonic influence in the western MedCOF region, and most intense anticyclonic influence in the eastern area, especially in the south-eastern Balkans.

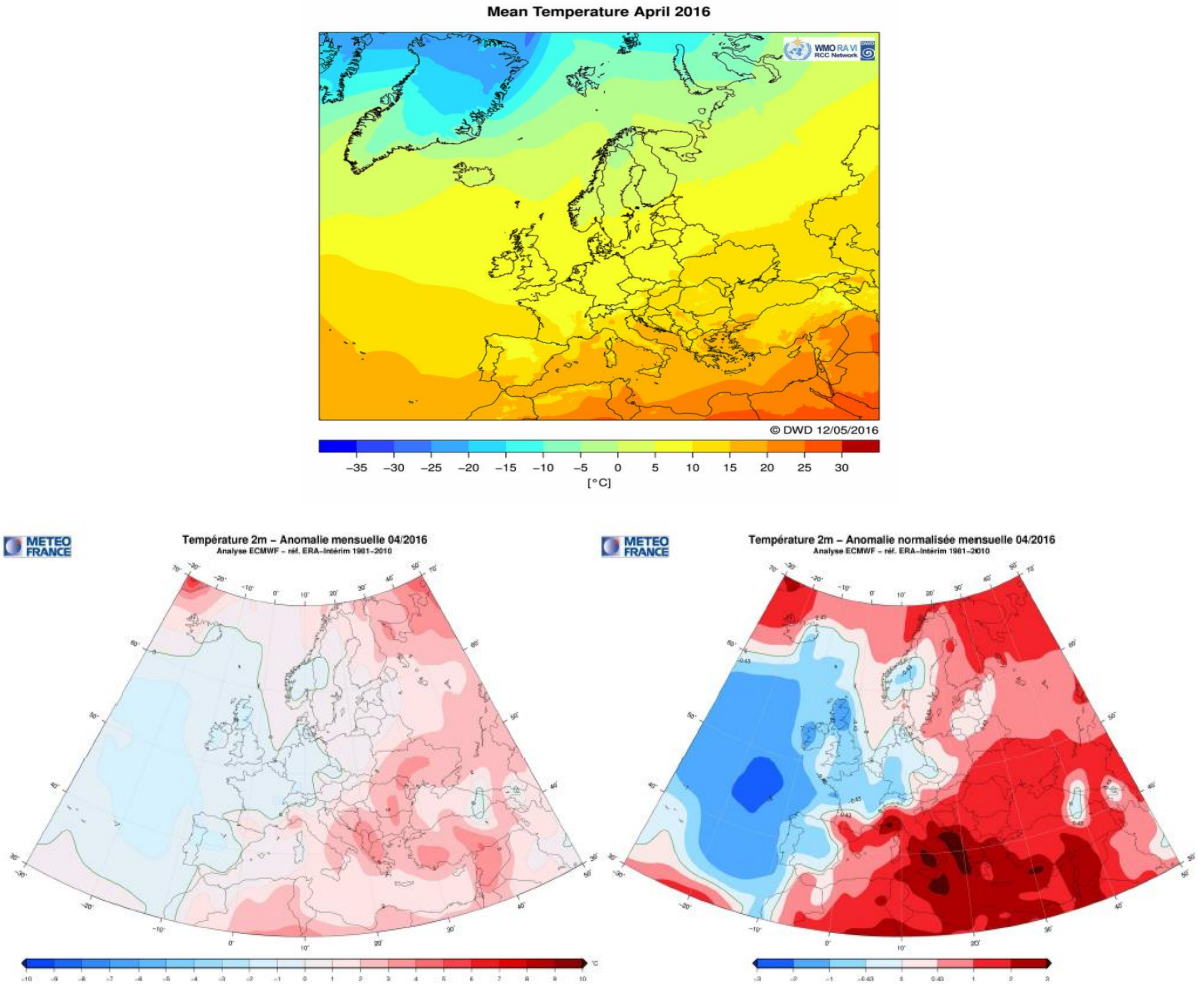

Figure 7: Mean temperature (upper graph) in °C in the RA VI Region (Europe) interpolated from CLIMAT station data, for April 2016. Source: DWD, http://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_ttt.html?nn=490674.

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 2016, above normal temperatures were recorded over almost all of North African Domain. The anomaly has passed +3 °C especially in southern regions of the domain, with hot records recorded in several stations in the region. The coastal regions of Libya, Tunisia and east Algeria were less hot. The extreme north of Morocco was the least hot region during this month.

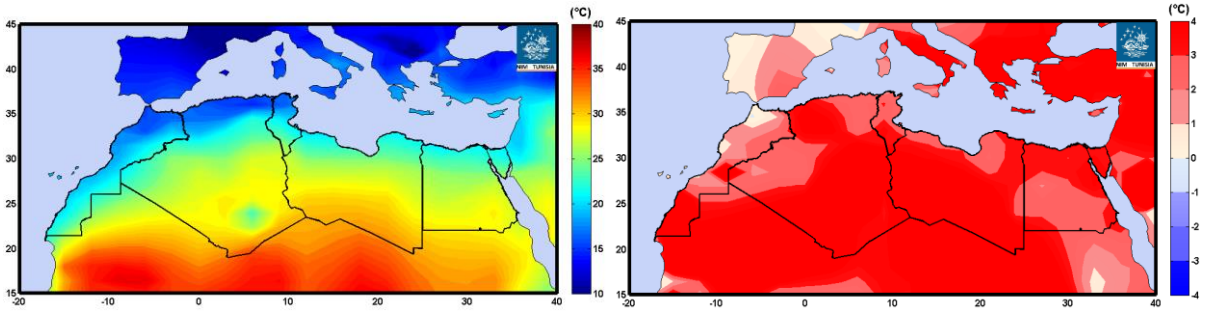

Figure 8: left: Mean temperature; Right: Absolute anomalies of temperature in the RAI-NA Region (North Africa). Data from NCDC (National Climate Data Centre NOAA – reference 1981-2010), http://www.meteo.tn/htmlen/donnees/climatemonitoring.php.

4. Precipitation anomalies

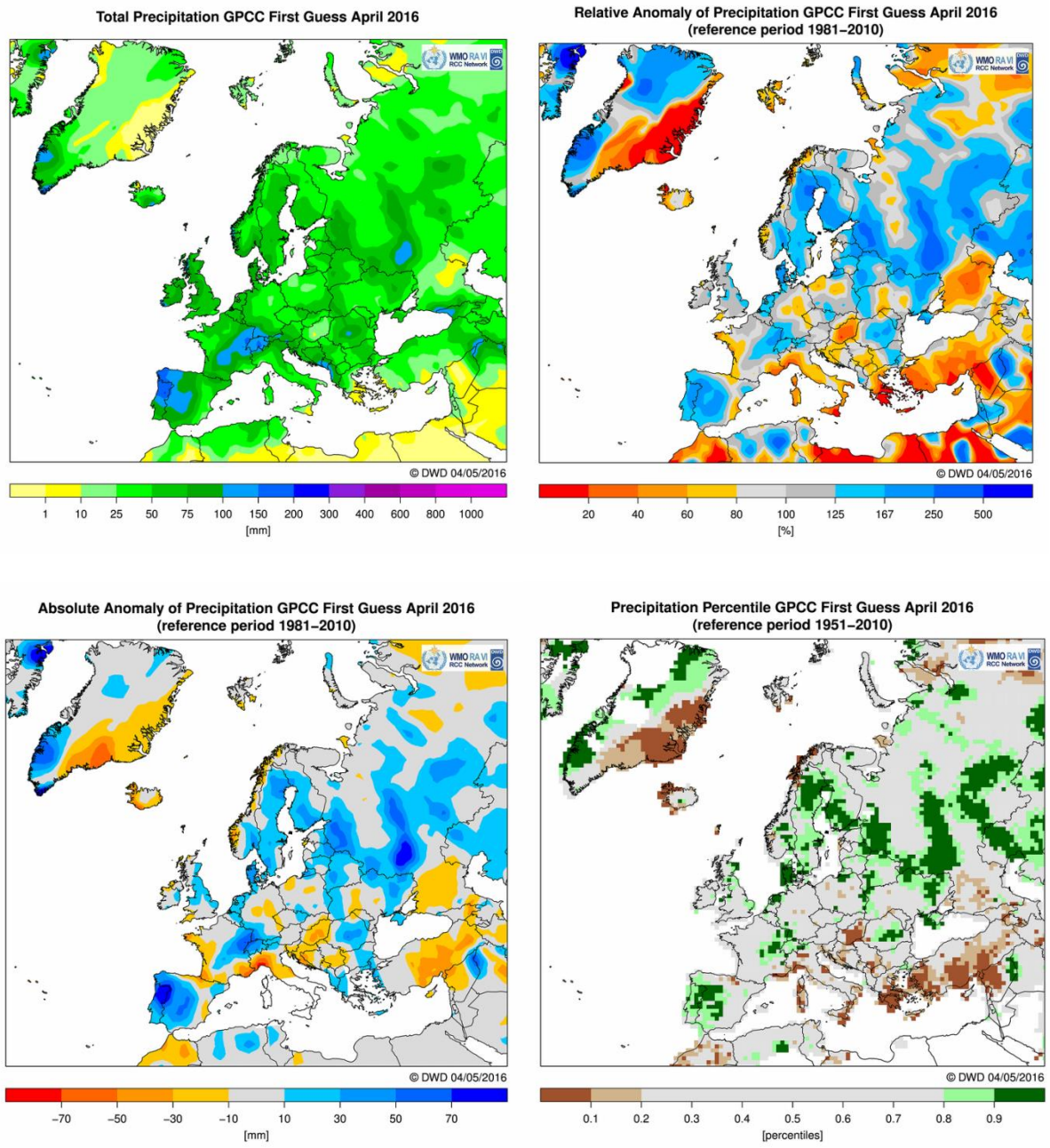

Figure 9: Monthly precipitation sum (upper left), relative anomalies (upper right), absolute anomalies (lower left), and percentiles for April 2016 (1981-2010 reference for means and anomalies, 1951-2010 for percentiles) in Europe. Data from GPCC (First Guess version). Source: DWD, http://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_rrr.html?nn=16102

Europe / RA VI

Monthly precipitation totals in April 2016 over the RA VI part of the MedCOF region ranged from below 10mm in the eastern Mediterranean coasts to more than 200mm in northern Portugal. Further areas with at least 100mm totals can be identified in Spain, in the mountainous regions of France, western Balkan coasts, and locally in Romania, coastal Georgia and 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, sometimes going beyond the 90th percentile, but they were also well above normal near the Black Sea and locally along the eastern Mediterranean coasts. On the other hand, much of the Mediterranean area has experienced a very dry month, with less than half of the normal precipitation. Cyprus recorded an average monthly total of 64% of the normal (1981-2010).

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 2016, most of the North African region had below normal total amount of precipitation. Precipitation was normal or even above normal in North Algeria and the majority of Tunisia, thanks to a wet cell in the north east of Algeria. Northern Morocco and some limited regions along the Mediterranean coast of Egypt were subject to 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.

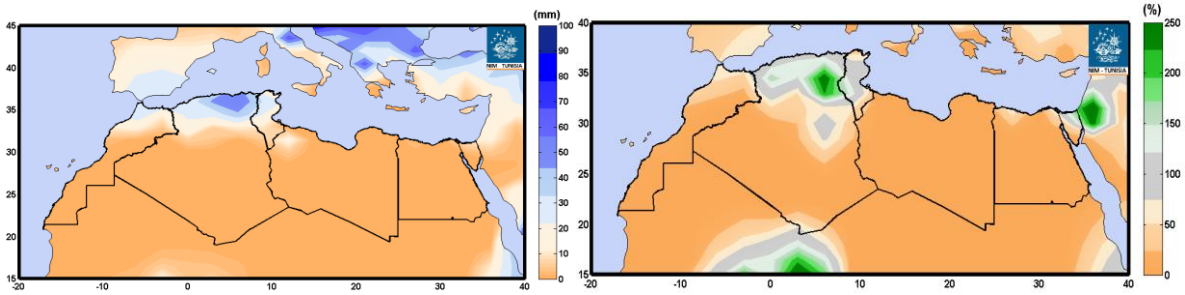

Figure 10: left: Total precipitation; Right: Absolute anomalies of precipitation in the RAI-NA Region (North Africa). Data from NCDC (National Climate Data Centre NOAA – reference 1981-2010), http://www.meteo.tn/htmlen/donnees/climatemonitoring.php.

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