MEDITERRANEAN CLIMATE OUTLOOK FORUM
MEDCOF-7 MEETING

MONITORING SUMMARY MEDCOF-7

for October 2016

Draft version

Last update: 20 November 2016

Compiled by

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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

Along the Equator: due to SST cooling in the eastern part, the surface anomaly now extends from the Peru coast to the dateline. In the Nino3.4 box, the monthly anomaly mean is now just below -0.5°C, threshold of "La Niña". This cold anomaly can also be seen in the sub-surface. West of the dateline and around the Maritime Continent, there are still positive anomalies despite of a cooling trend in October.

On the North Pacific, the positive PDO pattern, which was still quite remarkable in summer 2016, has weakened until October. According to SST distribution, the positive pattern can still be seen (cold anomaly in the interior of the basin, warm anomaly at the Pacific coasts), but the indices for October are either negative (NOAA: -0.9, http://www.ncdc.noaa.gov/teleconnections/pdo/) or at least smaller than in spring/summer 2016 (http://research.jisao.washington.edu/pdo/PDO.latest.txt : +0.56).

In the Indian Ocean: weakening of the east (positive anomalies) - west (neutral) contrast ==> DMI remains positive, but less intense than in September.

The cold anomaly on the North Atlantic (cold blob) still exists, but over the East Atlantic close to Europe, SST is normal to above normal. The whole Mediterranean basin is 1-2°C warmer than normal, the Black Sea mostly colder. The tropical and equatorial Atlantic up to the Caribbean Sea is still warmer than normal. The polar and arctic region (north of 60°N), in Europe in particular, is extremely warm.

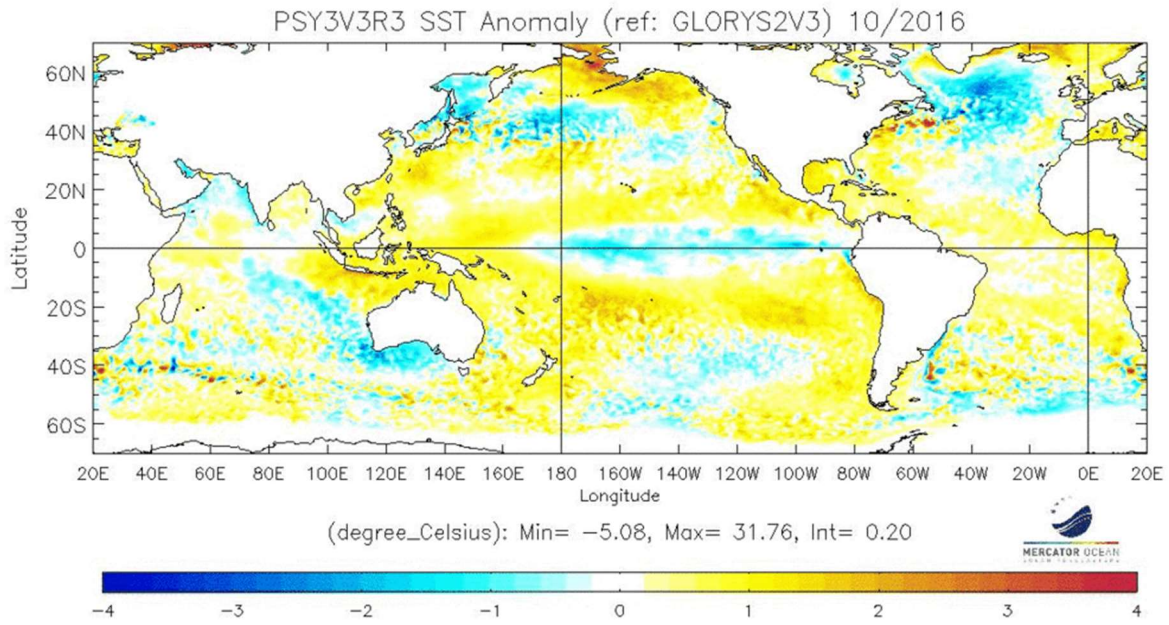

Figure 1: SST anomalies (°C) (reference Glorys 1992-2009). http://bcg.mercator-ocean.fr/

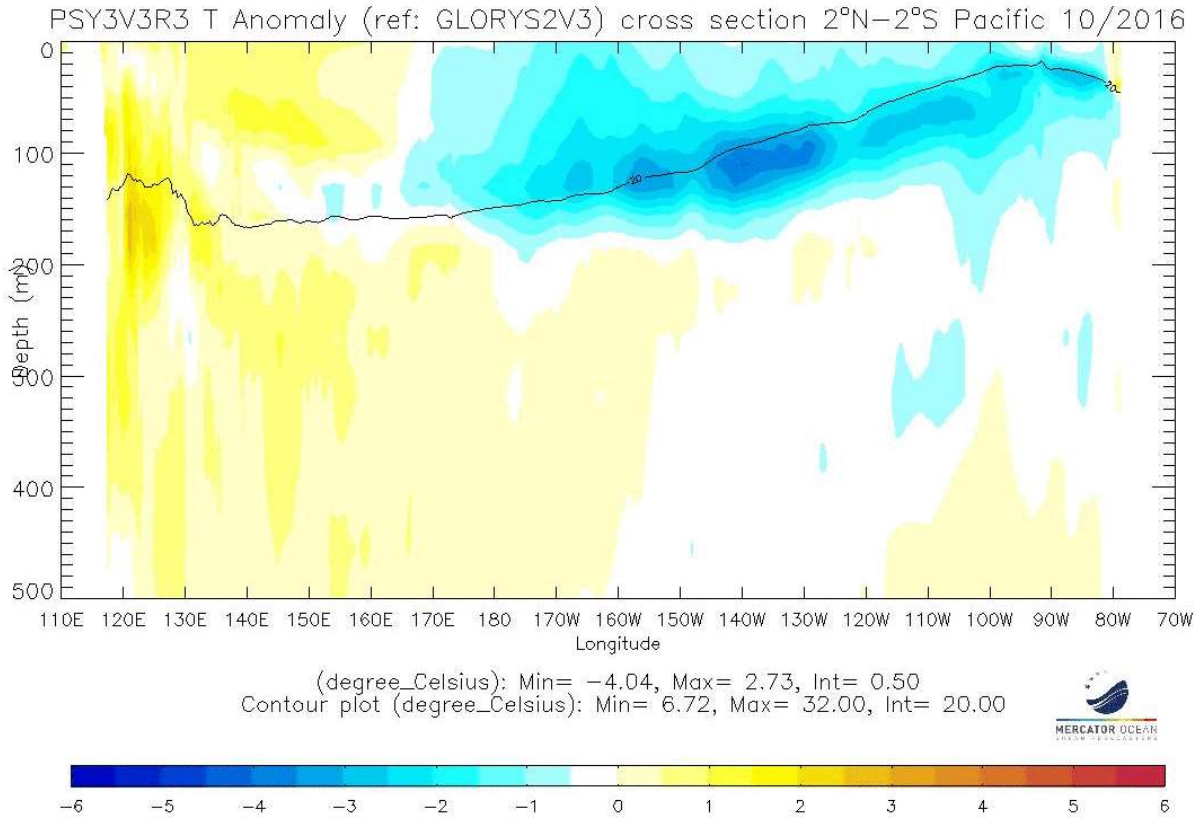

Figure 2: Oceanic temperature anomaly in the first 500 meters in the Equatorial Pacific (October 2016), http://bcg.mercator-ocean.fr

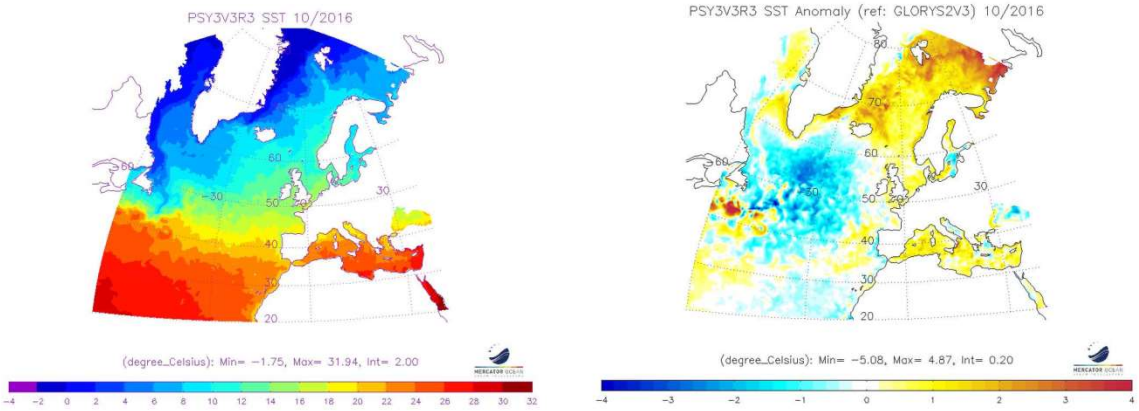

Figure 3: Mean sea surface temperature in the RA VI Region (Europe) and anomaly (reference Glorys 1992-2013). http://bcg.mercator-ocean.fr/

2. Atmospheric Analysis

Velocity Potential Anomaly field in the high troposphere (Figure 4 – insight into Hadley-Walker circulation anomalies):

The most remarkable feature in the tropics is a dipole with a large upward motion anomaly over Indonesia, due to Madden-Julian Oscillation (MJO) and a large downward motion anomaly over the western Indian Ocean, linked to a negative DMI (Dipole Mode Index).

Over the eastern equatorial Pacific there is still a week positive anomaly (downward motion anomaly), consistent with La Nina. SOI (from NOAA CPC) decreased to -0.3, which would mean no significant Southern Oscillation.

Stream Function anomalies in the high troposphere (Figure 5 – insight into teleconnection patterns tropically forced):

The stream function anomalies do not reveal any teleconnections from the tropics to the MedCOF region, neither from the western Indian Ocean nor from the La Nina region.

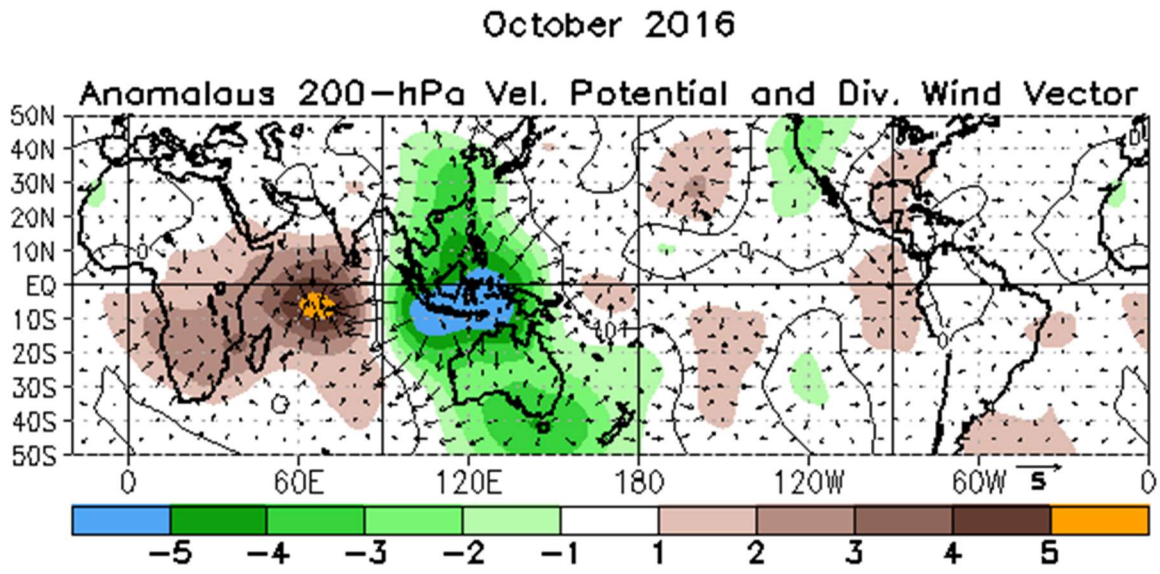

Figure 4: Velocity Potential Anomalies at 200 hPa and associated divergent circulation anomaly. Green (brown) indicates a divergence-upward anomaly (convergence-downward anomaly).

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

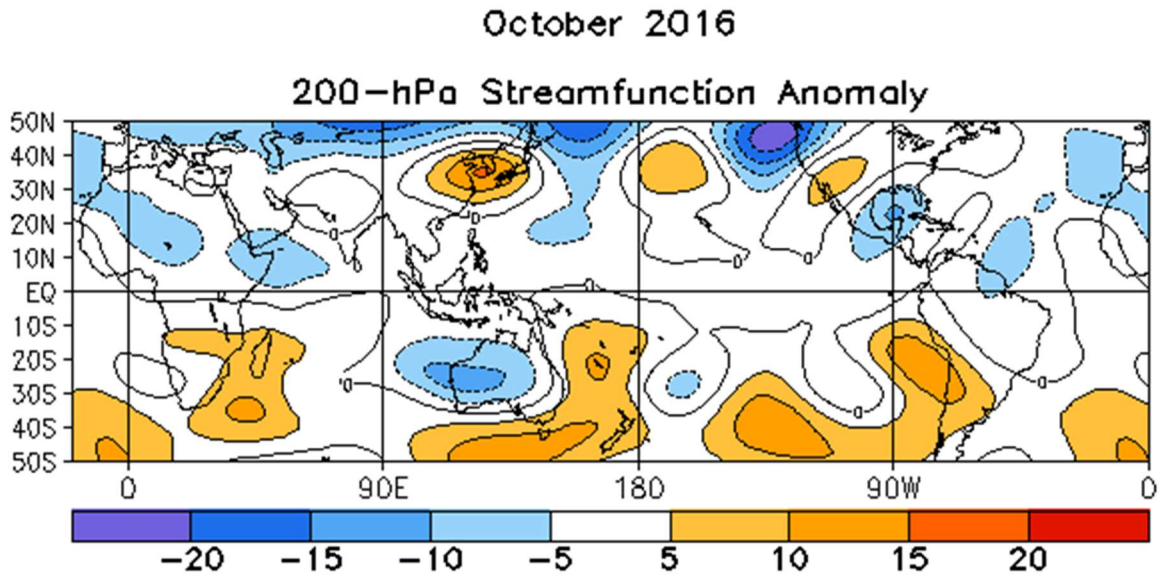

Figure 5: Stream Function Anomalies at 200 hPa. http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtm

Geopotential height at 500 hPa (Figure 6) and sea level pressure over Europe (Figure 8):

An outstandingly large positive geopotential anomaly over the whole European Arctic region stands for large-reaching high pressure conditions over that area and thus a considerable weakening of the polar vortex (POLEUR Index = -2.9, Table 1). The high pressure area also extended to Scandinavia and even to West Russia, inducing also a positive Scandinavia pattern (SCAND=1.1) and a negative East Atlantic – West Russia pattern (EATL/WRUS=-1.3). Blocking conditions, which were already to be seen in August 2016, increased further, and Scandinavian Blocking became the dominant pattern for Europe in October 2016. The NAO index is still positive at +1 (source NOAA (ftp://ftp.cpc.ncep.noaa.gov/wd52dg/data/indices/tele_index.nh), but only active over the western North Atlantic, persistent but relatively weak with little effect for Europe. The East Atlantic pattern weakened in October (EA=0.4 only), due to extending blocking High conditions even over UK/Ireland.

The weakening of the polar vortex also supports the air mass exchange between polar and middle latitudes, which induces a negative phase of the Arctic Oscillation (AO); it was outstandingly intense throughout the month of October 2016 (Figure 7).

The blocking high was also extremely intense on sea level (Figure 8). New daily records of surface pressure (>1050hPa) were measured in Norway and Sweden. Although a westerly flow was still present over the eastern North Atlantic (due to a more intense Icelandic Low), this flow was redirected to the polar latitudes west of the blocking High, thus mild air masses reached the Arctic region, weakening the polar vortex further. On the other hand, relatively cold continental air masses from central Asia flowed to Europe. High pressure influence

affected also the MedCOF region, particularly the north and decreasing to the south. The Mediterranean itself and northern Africa were still influenced by subtropical air masses.

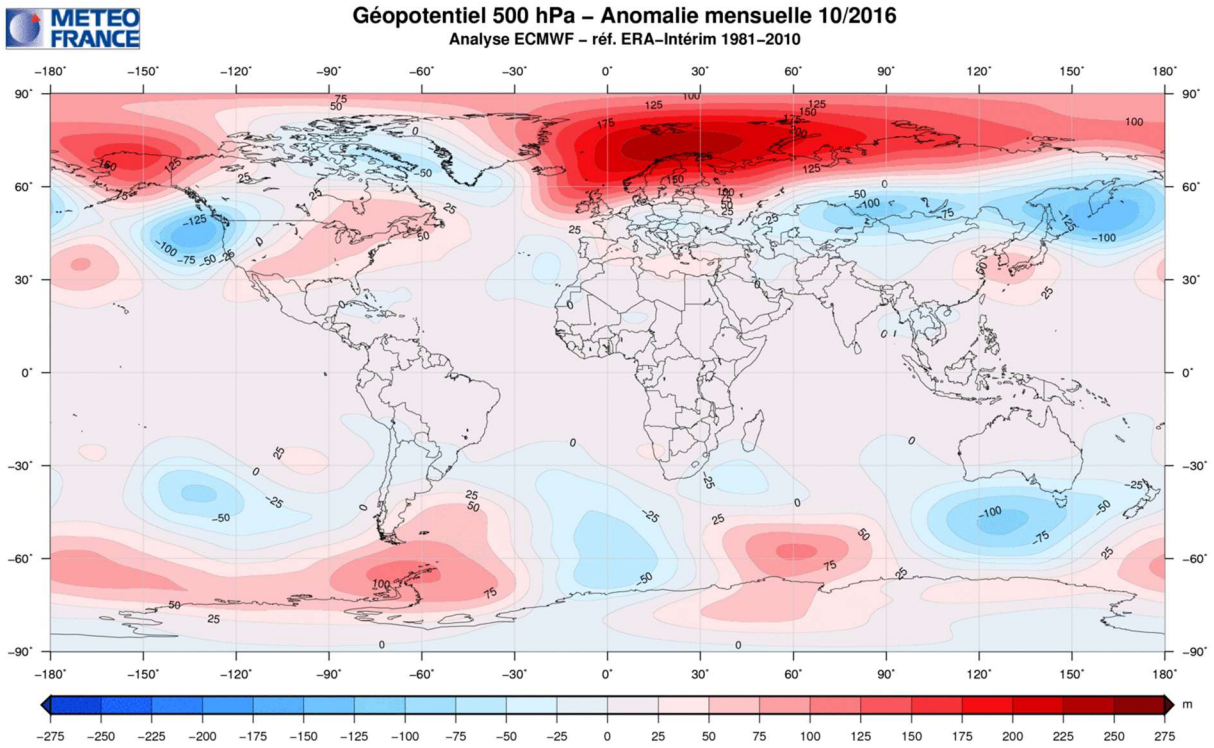

Figure 6: Anomalies of Geopotential height at 500hPa (Meteo-France)

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
OCT 16	1.0	0.4	0.5	-0.8	1.5	---	-1.3	1.1	-2.9
SEP 16	0.7	3.5	-1.8	-1.4	0.1	---	0.1	-1.0	-1.3
AUG 16	-2.2	2.1	-0.4	-0.4	-0.9	---	-3.3	-0.4	2.4
JUL 16	-1.7	1.8	-1.4	-0.4	0.5	---	-1.0	-0.7	-0.2
JUN 16	-0.1	0.4	-0.6	1.3	-0.6	---	-1.9	-1.0	-1.1
MAY 16	-0.7	0.2	0.6	0.1	-0.9	---	-2.0	1.1	-0.4

Table 1: Evolution of the main atmospheric indices for the Northern Hemisphere for the last 10 months http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/table3.shtm

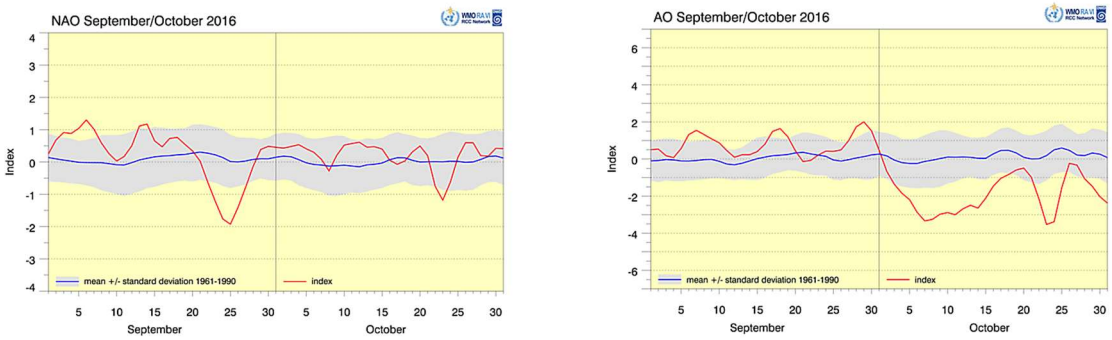

Figure 7: North Atlantic Oscillation (NAO, left) and Arctic Oscillation (AO, right) indices with 1961-1990 mean standard deviation (shading). http://www.dwd.de/rcc-cm, data from NOAA CPC: http://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtm

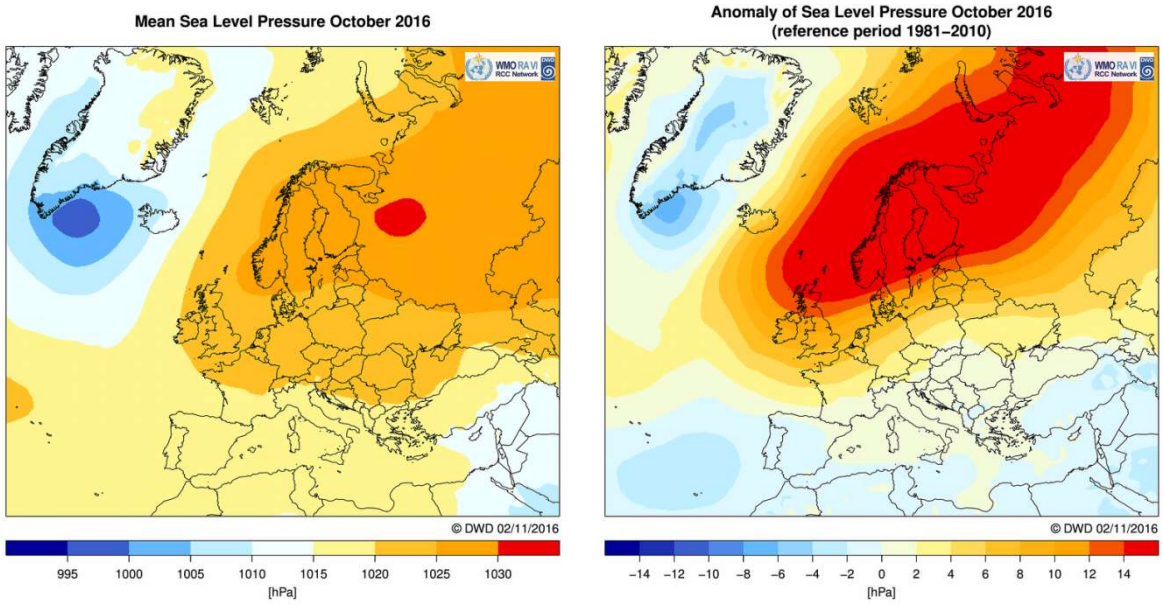

Figure 8: Mean sea level pressure (left) and its anomalies (1981-2010 reference) for October 2016. Source: DWD, http://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_ppp.html?nn=490674

3. Temperature anomalies

Europe / RA VI

Monthly mean temperature in October 2016 ranged from less than 5°C in highlands to above 25°C in southern Israel. Northern parts of the region from France to South Caucasus were all colder than normal (1981-2010 reference), locally more than 2°C colder, and in the lowest tercile. Iberia and the Mediterranean including southern Italy, southern Balkans, Turkey and Middle East were mainly warmer than normal and in the upper tercile, with highest anomalies over southwestern Turkey at more than +2°C (for 1961-1990 reference even more than +3°C).

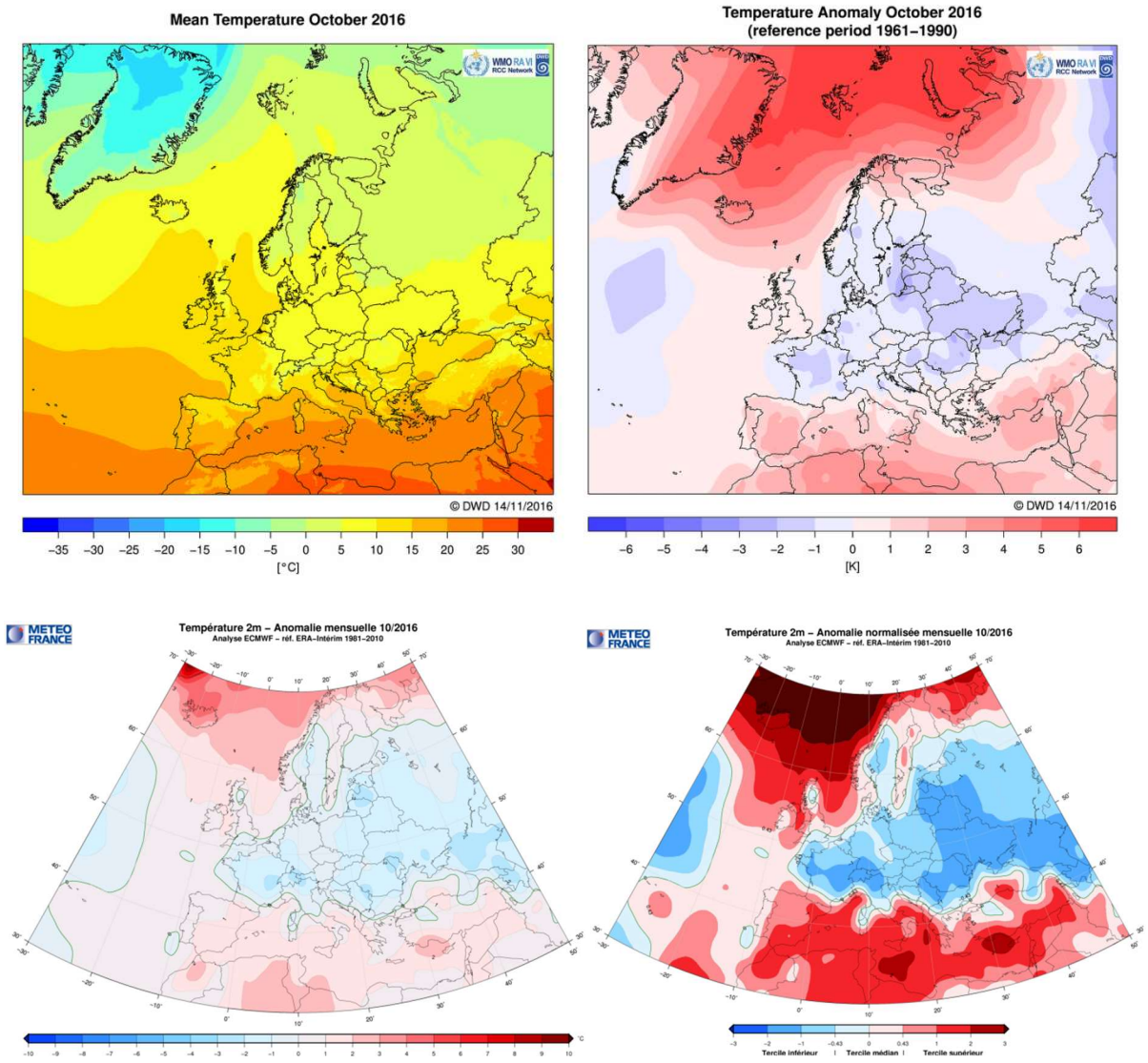

Figure 9: Mean temperature (upper left) and anomalies (1961-1990 reference, upper right) in °C in the RA VI Region (Europe) interpolated from CLIMAT station data, for October 2016. Source: DWD, http://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_ttt.html?nn=490674.

Lower left: Absolute anomaly of temperature (1981-2010 reference), lower right: Standardized temperature anomalies, from ERA-Interim Reanalysis (Source: Meteo France)

North Africa

During the month of October 2016, registered temperatures were above normal over almost all of North African Domain. The anomaly has reached more than +4°C especially in the eastern regions of Libya. Some records have been noticed at several stations. Southern regions of North African domain have registered normal to below normal temperature.

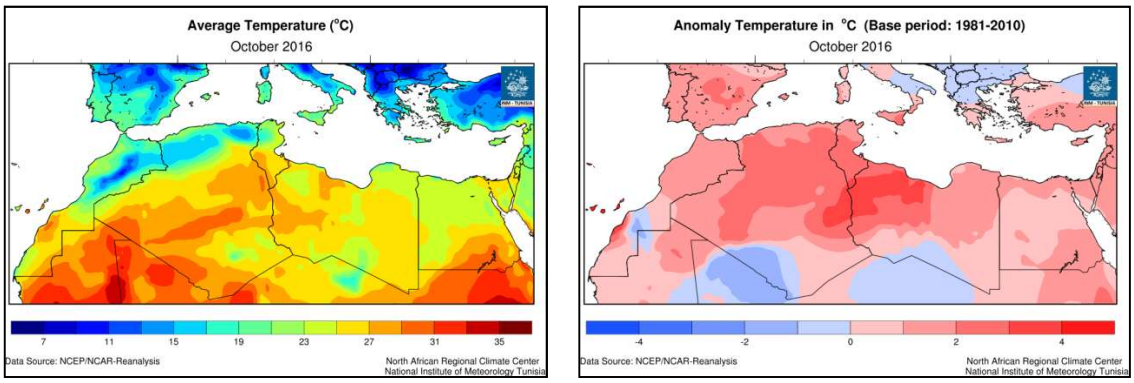

Figure 10: Left: Mean temperature; Right: Absolute anomalies of temperature in the RAI-NA Region (North Africa) Data from NCDC (National Climate Data Centre NOAA – reference 1981-2010), http://www.meteo.tn/htmlen/donnees/climatemonitoring.php.

4. Precipitation anomalies

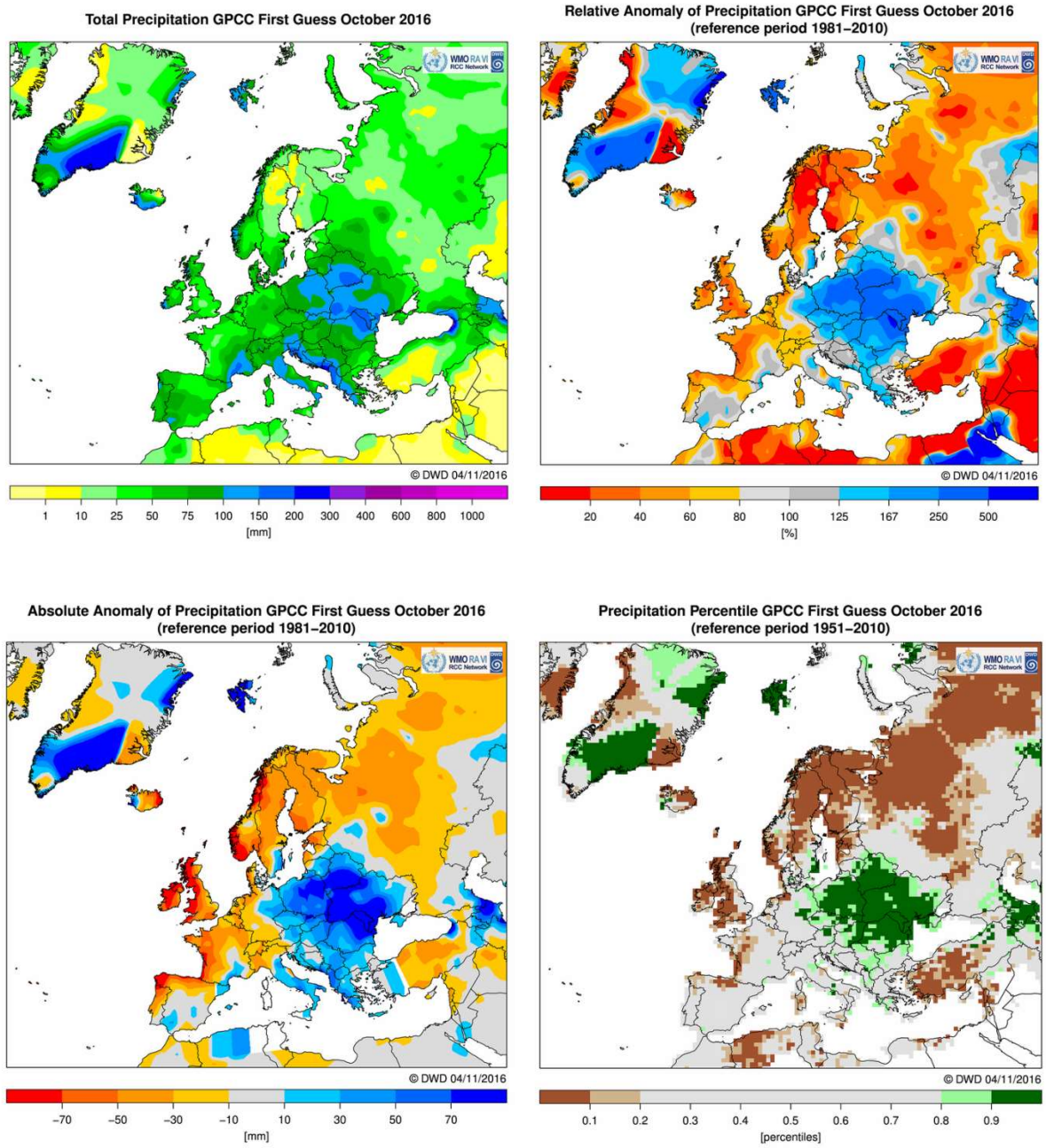

Figure 11: Monthly precipitation sum (upper left), relative anomalies (upper right), absolute anomalies (lower left), and percentiles for October 2016 (1981-2010 reference for means and anomalies, 1951-2010 for percentiles) in Europe. Data from GPCC (First Guess version). Source: DWD, http://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_rrr.html?nn=16102

Europe / RA VI

Monthly precipitation totals in October 2016 over the RA VI domain of the MedCOF region ranged from 0mm in eastern Syria and northeastern Jordan to more than 200mm at the west Balkans coast and eastern Black Sea coast. Some locally heavy precipitation fell also in northeastern Portugal, southern Spain, southern France, Italy, northeastern Romania/Moldavia/western Ukraine, and Azerbaijan. Remarkably, an extreme rain event also occurred in southern Israel / southern Jordan at the end of the month.

It was wetter than normal over almost the whole Balkan Peninsula and also further north up to Hungary and Ukraine. In northeastern Romania up to more than 500% of the normal precipitation fell. Other wetter-than-normal areas were the eastern South Caucasus / eastern Turkey, and more locally in Spain, southern France, Italy and southern Israel/Jordan. Particularly drier than normal were regions at the Atlantic coasts (Portugal, northern Spain, western France), parts of Italy and Corsica, most of Turkey and the Middle East.

North Africa

During the month of October 2016, most of the North African region had known below-normal totals of precipitation. The south of Morocco, central west Algeria, the center of Egypt and the southeast of Libya had normal to above normal precipitation. A wet cell in the center east of Egypt is noticeable. Mediterranean North African coastlines had near normal to below normal precipitation. Most parts of the Sahara, which is known as a dry zone, were even drier during this month of the year.

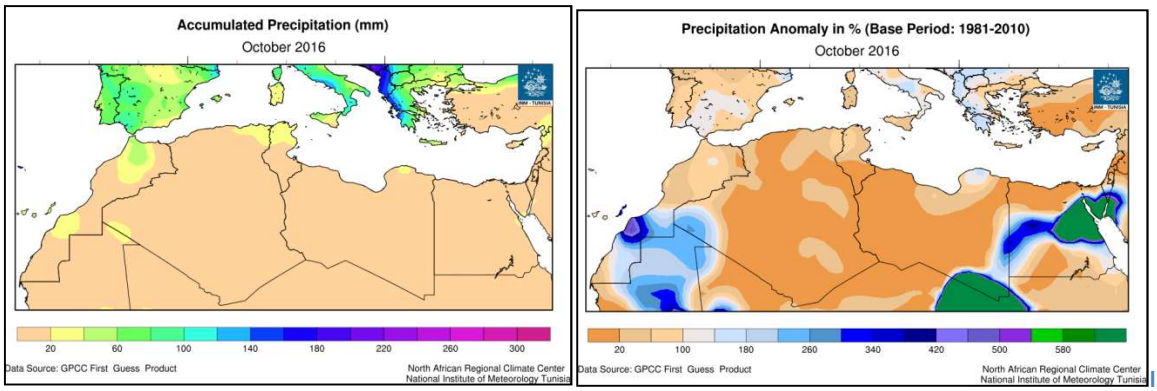

Figure 12: Left: Total precipitation; Right: Absolute anomalies of precipitation in the RAI-NA Region (North Africa) Data from NCDC (National Climate Data Centre NOAA – reference 1981-2010)
http://www.meteo.tn/htmlen/donnees/climatemonitoring.php.

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