

MEDITERRANEAN CLIMATE OUTLOOK FORUM MEDCOF-21 ONLINE MEETING

ANALYSIS AND VERIFICATION OF THE MEDCOF-20 CLIMATE OUTLOOK FOR THE 2023 SUMMER SEASON FOR THE NORTH AFRICAN REGION (RAI-NA)

National Institute of Meteorology, (INM), Tunisia

1. MedCOF-20 Climate outlook for the 2023 summer season

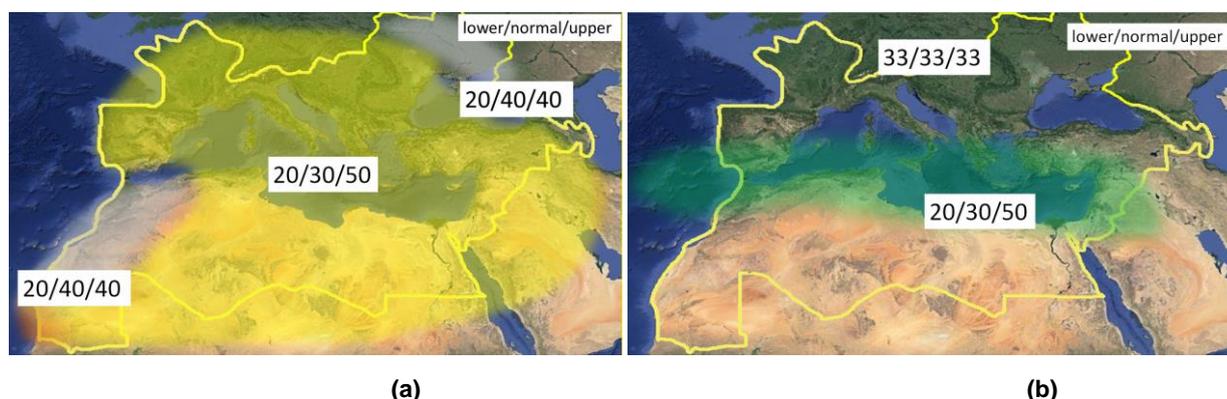


Figure 1: Graphical presentation of the climate outlook for the 2023 summer season for the Mediterranean region (a) Temperature Outlook; (b) Precipitation Outlook

1.1. Temperature

As stated in MedCOF-20 consensus statement for the seasonal climate outlook for 2023 summer season an above normal condition was expected over most of the domain (probabilities of 20% for the lower tercile, 30% for the normal tercile and 50% for the upper tercile), with the exception of Northwestern Africa and Northeastern part of MedCOF domain where normal to above temperatures are expected (probabilities of 20% for the lower tercile, 40% for the normal tercile and 40% for the upper tercile).

1.2. Precipitation

Precipitation forecasts showed a wet signal over most of the Mediterranean Sea (20% for the lower tercile, 30% for the normal tercile and probabilities of 50% for the upper tercile). Although summer is climatologically very dry over Northern Africa, models showed wet signal over North Africa, so some

precipitation events can be expected over Mountain areas of northern Morocco, Algeria and Tunisia. The climatological forecast (33%, 33%, 33%) over the Southern part of the domain also takes into account that no meaningful forecast can be provided for these seasonally dry areas.

1. Analysis of the 2022 summer season

2.1. Temperature

North Africa (RAI)

Seasonal mean temperatures ranged from 16°C to 30°C in northern parts of the domain in higher elevations mostly. Over the center of the domain, temperatures mean were ranging between 30°C to 46°C over the center-west of Algeria and over the south of Tunisia and center east of Algeria (Fig. 2).

Temperature was higher than the 1991-2020 normal in almost the entire domain (Fig. 3). They were particularly high in extreme northern parts of the domain with anomalies between +2°C and up to +4°C in northern parts of Tunisia, Algeria as well as Morocco and southern parts of Morocco. Anomalies in eastern parts of the domain were between +1°C and +2°C; places in eastern Libya and western Egypt. The south of Algeria was slightly colder than normal with anomalies up to -3°C.

In terms of terciles, temperatures were in the upper tercile in almost the entire domain (Fig. 4). Only in an area in the south of Algeria, temperatures were mainly in the lower or middle tercile.

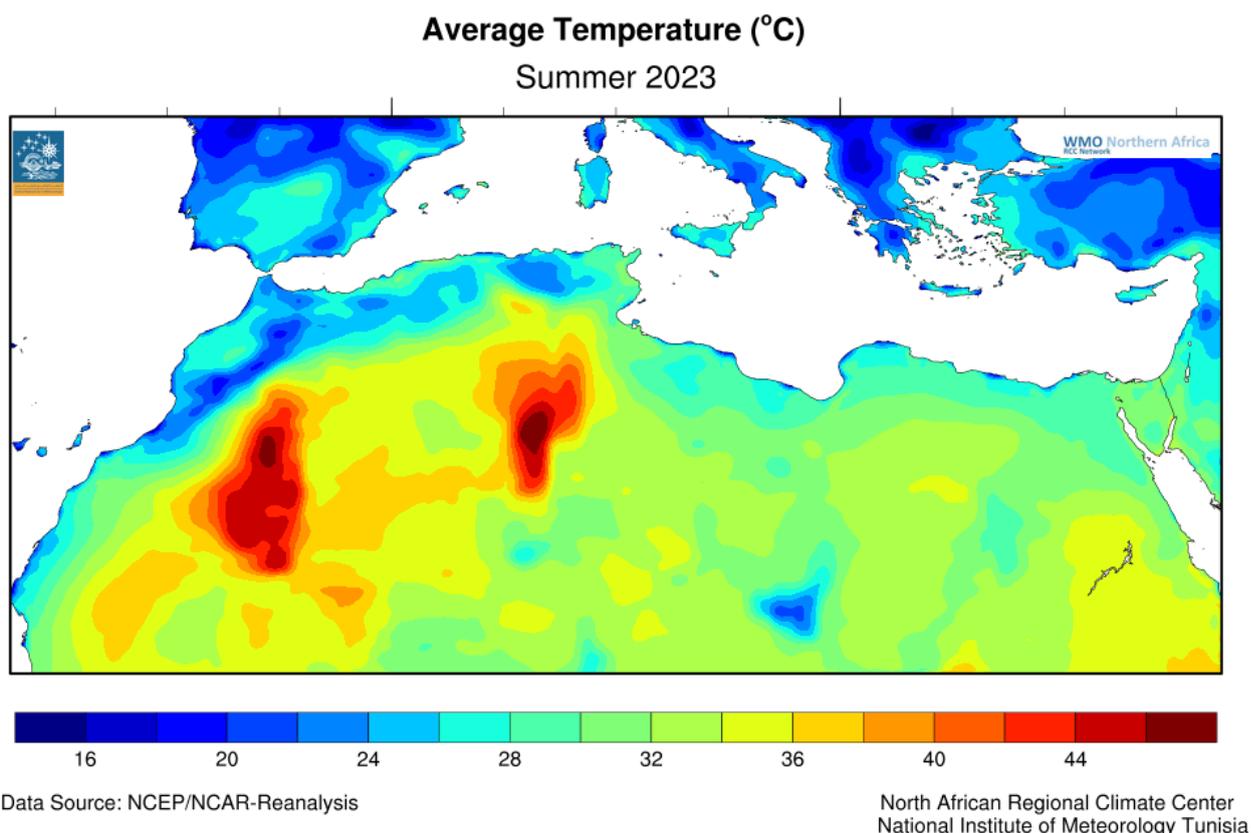
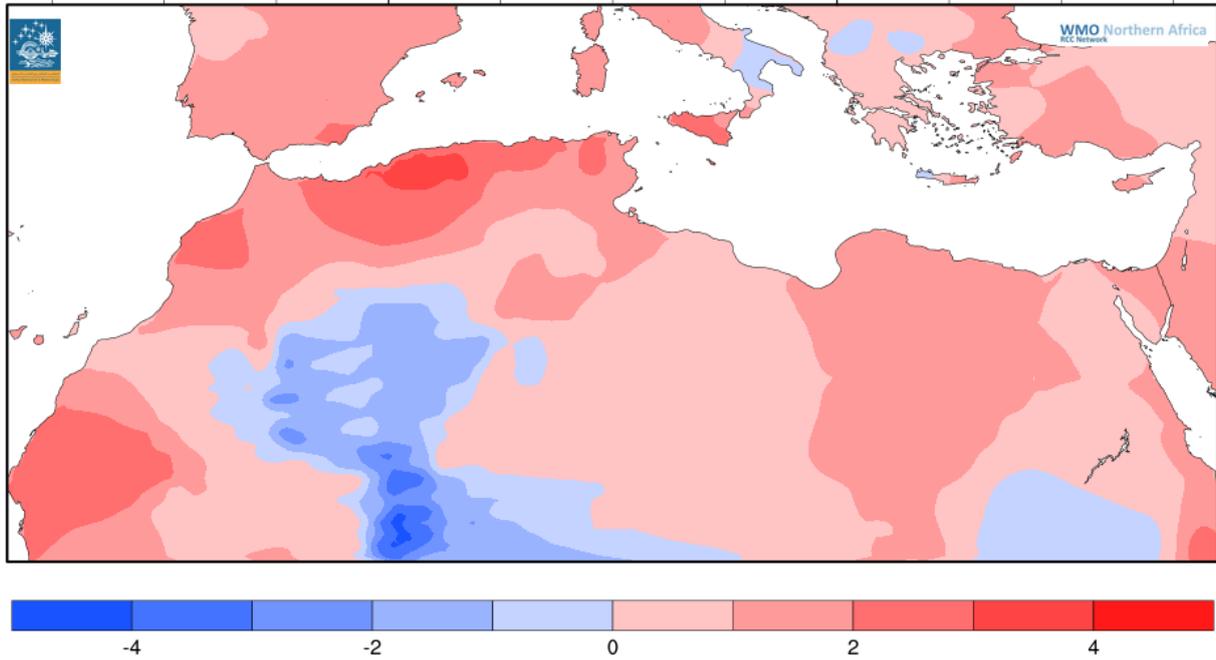


Figure 2: Mean temperature for summer season 2023 in North Africa (in °C). Source: INM, (Data from NCEP/NCAR reanalysis, <http://www.esrl.noaa.gov>)

Anomaly Temperature in °C (Base period: 1991-2020)
Summer 2023



Data Source: NCEP/NCAR-Reanalysis

North African Regional Climate Center
 National Institute of Meteorology Tunisia

Figure 3: Temperature anomaly for summer season 2023 in North Africa (in °C), reference period 1991-2010. Source: NM, Data from NCEP/NCAR reanalysis, <http://www.esrl.noaa.gov>

Temperature Terciles for Summer 2023

Data source: NCEP/NCAR-Reanalysis

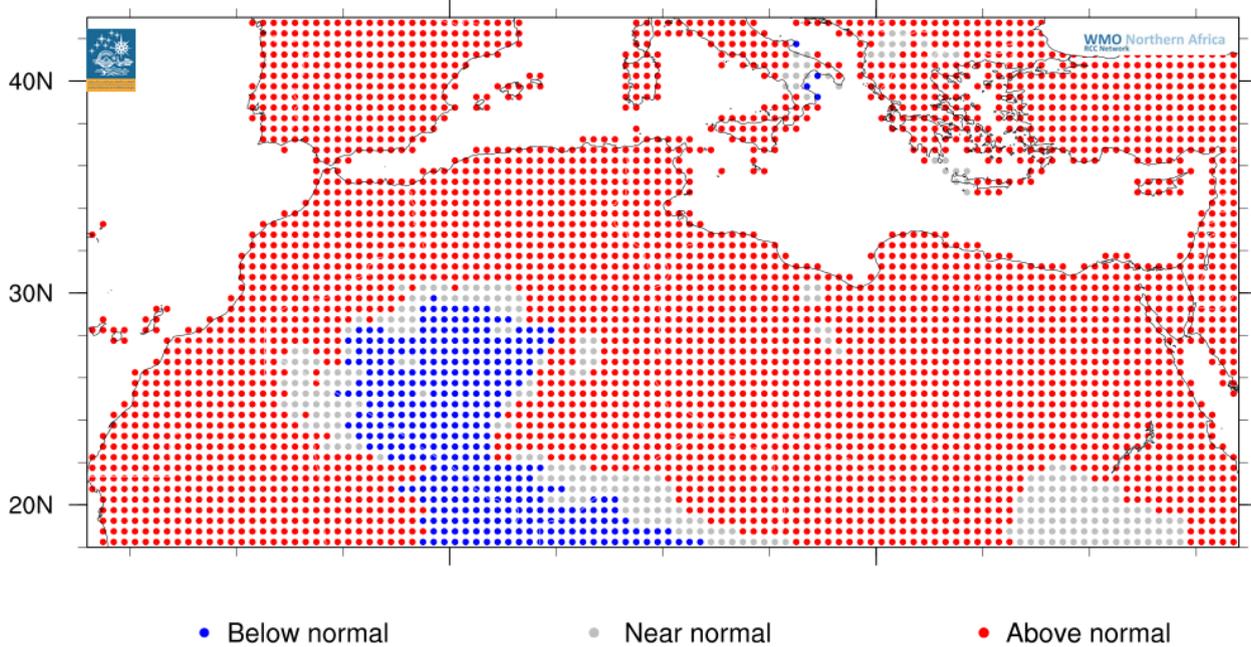


Figure 4: Tercile distribution for temperature of JJA 2023, 1991-2010 reference.

Source: INM, Data from NCEP/NCAR reanalysis, <http://www.esrl.noaa.gov>

2.2.Precipitation

North Africa (RAI)

Overall, summer 2022 has been very dry in terms of rainfall, the accumulated precipitation didn't exceed 20 mm over the most parts of the North African countries, except locally the north-east of Algeria and the north and center of Tunisia where precipitation were between 20mm and 60mm (Fig. 5).

Seasonal precipitation was characterized by positive anomalies in northeastern parts of (more than 250% of the long-term average). It was drier than normal mostly over the eastern parts of Libya, the north of Tunisia, northern and western parts of Algeria and north of Morocco. Elsewhere, seasonal precipitations were normal to slightly above normal compared to the long-term average (Fig. 6).

In terms of percentiles, precipitation was in the upper tercile particularly in all Egypt, north and eastern Libya, Tunisia, north and some parts in the south of Algeria and center of Morocco. The remaining regions were in the near normal to the below normal tercile (Fig. 7).

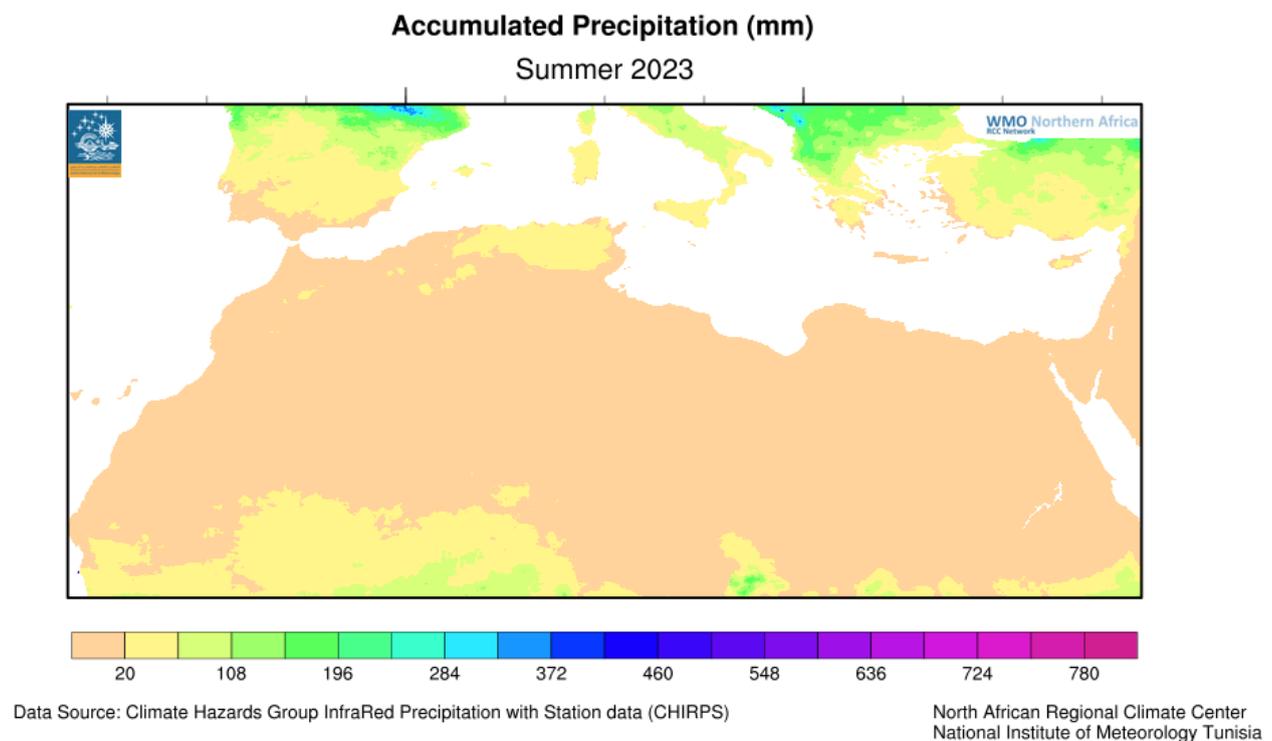
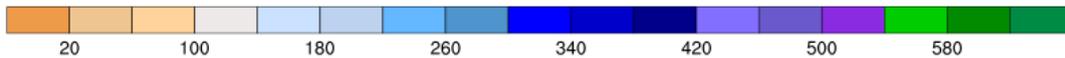
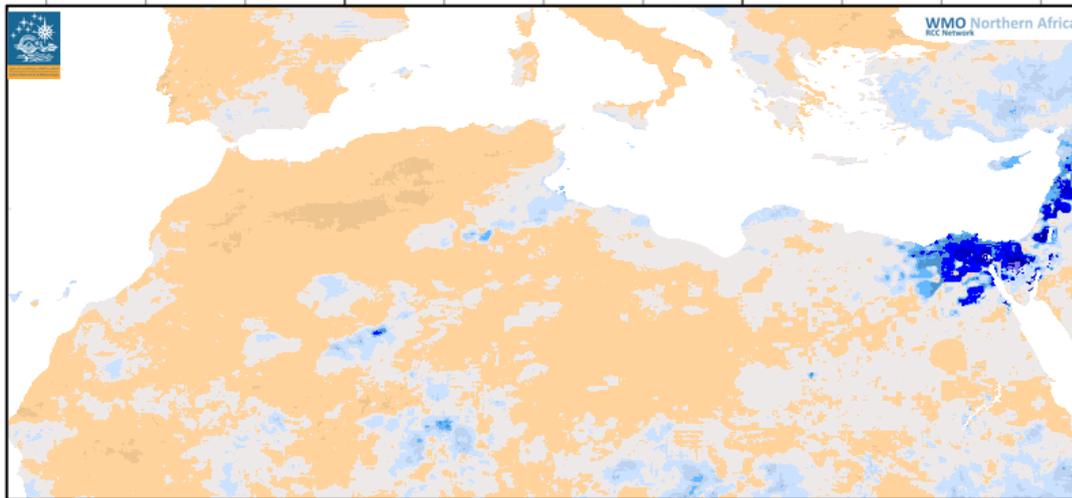


Figure 5: Total precipitation for summer season 2023 in North Africa (in mm).

Source: INM, Data from CHIRPS: <ftp://ftp.chc.ucsb.edu/>

Precipitation Anomaly in % (Base Period: 1991-2020)

Summer 2023



Data Source: Climate Hazards Group InfraRed Precipitation with Station data (CHIRPS)

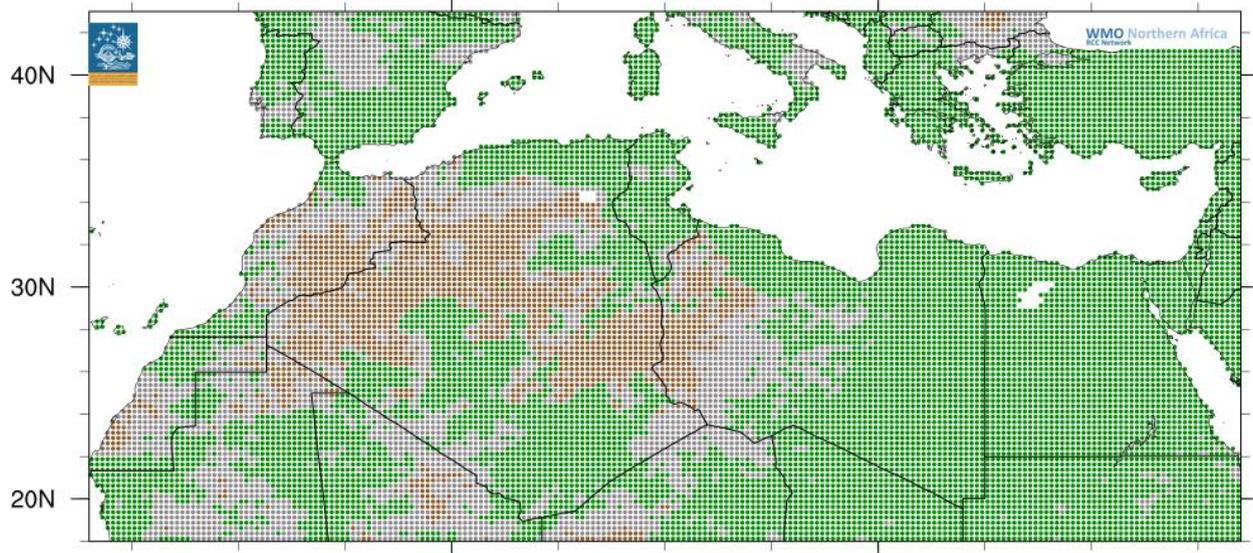
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Figure 6: Precipitation anomaly for summer season 2023 in North Africa (in %) (Reference period 1991-2010).

Source: INM, Data from CHIRPS: <ftp://ftp.chc.ucsb.edu/>

Precipitation Terciles for Summer 2023

Data source: Climate Hazards Group InfraRed Precipitation with Station data (CHIRPS)



● Below normal ● Near normal ● Above normal

Figure 4: Tercile distribution for precipitation of JJA 2023, 1991-2010 reference.

Source: INM, Data from NCEP/NCAR reanalysis, <http://www.esrl.noaa.gov>

2. Verification of the MedCOF-20 climate outlook for the 2023 summer season

3.1. Temperature

North Africa (RAI)

The MedCOF-12 climate outlook for the summer 2023 season favored the upper tercile over the entire North African domain (20%, 30%, 50%) with the exception of Northwestern Africa where normal to above temperatures were expected (20%, 40%, 40%).

The outlook of temperature was correct over almost all of the domain, except the northwestern Africa where temperature were in the above normal tercile and the south of Algeria where temperature were in the normal to below normal tercile.

3.2. Precipitation

North Africa (RAI)

Precipitation forecasts showed a wet signal over North Africa coastlines (20%, 30%, 50%). Some precipitation events were expected mainly over Mountain areas of northern Morocco, Algeria and Tunisia. No scenario for the rest of the domain was favored since no meaningful forecast can be provided for these seasonally dry regions.

Seasonal precipitation was characterized by positive anomalies over coastlines of North Africa including mainly extreme north of Morocco, North of Algeria and Tunisia. The outlook of precipitation was correct for the northern part of the domain. Seasonal precipitations were in the upper tercile over north and east of Libya and Egypt with a particularly positive anomaly over the extreme north of Egypt (precipitation amounts < 20mm considering a seasonally dry region).

3. Users' perceptions of the MedCOF-18 outlook

APPENDIX A: Contributors to MEDCOF-20

WMO RA I North African RCC Tunisia Node on Climate Monitoring, National Institute on Meteorology, Tunisia

APPENDIX B: Analysis and verification of the MedCOF-20 climate outlook for the summer season 2023

Country	Seasonal temperature (JJA)		Seasonal precipitation (JJA)		High impacts events
	Observed	MedCOF-20 climate outlook for temperature	Observed	MedCOF-20 climate outlook for precipitation	
Algeria*	Below normal to normal in the south Above normal elsewhere	Normal to above normal over the west (20%, 40%, 40%) Above normal (20%, 30%, 50%)	Normal to below normal in the center Above normal elsewhere	Above normal in the north (20%,30%,50%) No clear signal elsewhere (33/ 33/33)	No comment
Egypt*	Above normal	Above normal (20%, 30%, 50%)	Above normal	Above normal over coastlines (20%,30%,50%) No clear signal elsewhere (33/ 33/33)	No comment
Libya*	Above normal	Above normal (20%, 30%, 50%)	Normal to below normal over the west Above normal elsewhere	Above normal over coastlines (20%,30%,50%) No clear signal elsewhere (33/ 33/33)	No comment

Country	Seasonal temperature (JJA)		Seasonal precipitation (JJA)		High impacts events
	Observed	MedCOF-20 climate outlook for temperature	Observed	MedCOF-20 climate outlook for precipitation	
Morocco*	Above normal	Above normal in the south (20%, 30%, 50%) Normal to above normal elsewhere (20%, 40%, 40%)	Above normal in the extreme north and in the center Normal to below normal elsewhere	Above normal in the north (20%,30%,50%) No clear signal elsewhere (33/ 33/33)	No comments
Tunisia (2)	Above normal	Above normal (20%, 30%, 50%)	Above normal	Above normal (20%,30%,50%)	<p>Precipitation: June 2023 was ranked the 6th rainiest June since 1950. The rainfall amounts recorded during this month reached 208.8% of the normal for the month of June (total cumulative rainfall for the 27 main stations for the month was 520 mm, while the normal was 249 mm).</p> <p>Temperature: July 2023 was the hottest ever recorded since 1950. The average temperature (27 main stations) recorded was higher than the reference average (1991-2020) with a significant difference of +4°C. With this anomaly, July 2023 was ranked the 1st hottest July since 1950. Several new records were registered for maximum temperature: On 24/07/2023: Tunis, 49°C; Bizerte, 48.9°C; Beja, 47.7°C On 25/07/2023: Gabes, 49.1°C; Monastir, 48.3°C; Mahdia, 47.5°C; Djerba, 46.9°C On 29/07/2023: Sidi Bouzid, 47.6°C; Medenine, 49.1°C; Kebili, 48.9 °C; Matmata, 48.8°C</p>

Note:

(1) Basic climatological period (1991-2020)

*Data source: Temperature: NCEP/NCAR reanalysis, precipitation: CHIRPS

References:

MedCOF20 Outlook: <http://medcof.aemet.es/index.php/events/medcof-20>

WMO RA I RCC Node on Climate Monitoring Website: <https://www.meteo.tn/en/climate-monitoring-watch>