MEDITERRANEAN CLIMATE OUTLOOK FORUM
MEDCOF-16 ONLINE MEETING

ANALYSIS AND VERIFICATION
OF THE MEDCOF-15 CLIMATE OUTLOOK
FOR THE 2020-21 WINTER SEASON
FOR THE MEDITERRANEAN REGION (MED)

Final approved version

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Compiled by

Agencia Estatal de la Meteorología (AEMET)

Madrid, Spain

WMO RA VI RCC Offenbach Node on Climate Monitoring

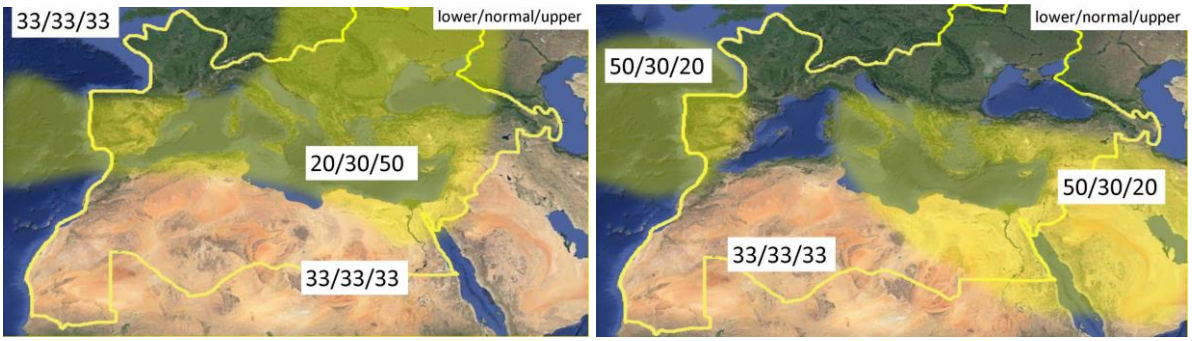
Deutscher Wetterdienst (DWD)

Offenbach, Germany

The following MedCOF verification report is based on

- the outcome of the consensus forecast of MedCOF 15,
- climate monitoring results of RA I NA RCC and RA VI RCC networks,
- national verification reports received from NMHSs or posted in RCOF forums of MedCOF, SEECOF or PRESANORD,
- SEECOF-25 verification report

1 MedCOF-15 Climate outlook for the 2020-21 winter season



(a) (b)

Figure 1: Graphical presentation of the climate outlook for the 2020-21 winter season for the Mediterranean region (a) Temperature Outlook, (b) Precipitation Outlook

1.1 General circulation

As stated in the MedCOF-15 consensus statement for the seasonal climate outlook for the 2020/2021 winter season for the Mediterranean region, a moderate La Niña event was taking place with expected peak towards the end of the year and starting to decrease from February 2021 on. The polar vortex seemed to show some slight reinforcement.

Models showed the typical atmospheric response to the La Niña event over the tropics and also over North America, with less agreement in the response over the North Atlantic. Many models showed a strong negative PNA, and positive phases of NAO, EA and SCAN modes of variability. A higher probability of blocking events was expected over Europe with some differences among models in their location.

1.2 Temperature

Within this general context, temperature should have been warmer than normal over most of the eastern part of the domain (Fig. 1a). For the western part, a privileged scenario could not be found with the exception of western Iberia where also a warmer-than-normal signal could have prevailed.

1.3 Precipitation

Precipitation forecasts showed drier-than-normal conditions over the southeastern and most western European part of the domain. For the rest of the region no large-scale precipitation signal was present in the forecasts (see figure 1b). The climatological forecast (33, 33, 33) over the southern part of the domain also implied the fact that no meaningful forecast could be provided for these seasonally dry areas.

2 Analysis of the 2020-21 winter season

Analysis of the winter season temperature and precipitation anomalies and general circulation are based on

- maps and seasonal bulletins on the climate in the WMO region I – NA and VI for the winter 2020/21:
    - WMO RA I RCC Node on Climate Monitoring: https://www.meteo.tn/en/climate-monitoring-watch
    - WMO RA VI RCC Offenbach Node on Climate Monitoring: http://www.dwd.de/rcc-cm),
- contributions from Météo France (http://seasonal.meteo.fr/),
- the Regional Climate Outlook Forum
    - for Southeastern Europe (SEECOF, http://www.seevccc.rs),
    - for North Africa (PRESANORD, http://acmad.net/rcc/presanord.php),
- national verification reports from MedCOF participants.

2.1 General circulation

2.1.1 Ocean

Sea surface temperature (SST) anomalies in the tropical Pacific had a typical La Niña pattern in winter 2020/21; they were negative in the central and eastern tropical Pacific and close to the continent of South America. The subtropical North Atlantic and the sea region close to Europe were warmer than normal, while a colder-than-normal SST area could be detected south of Greenland/Iceland. Also to be mention the relatively warm Mediterranean, especially the eastern basin, and the Black Sea as well. The tropical Indian Ocean had close-to-normal temperatures; the IOD remained neutral.

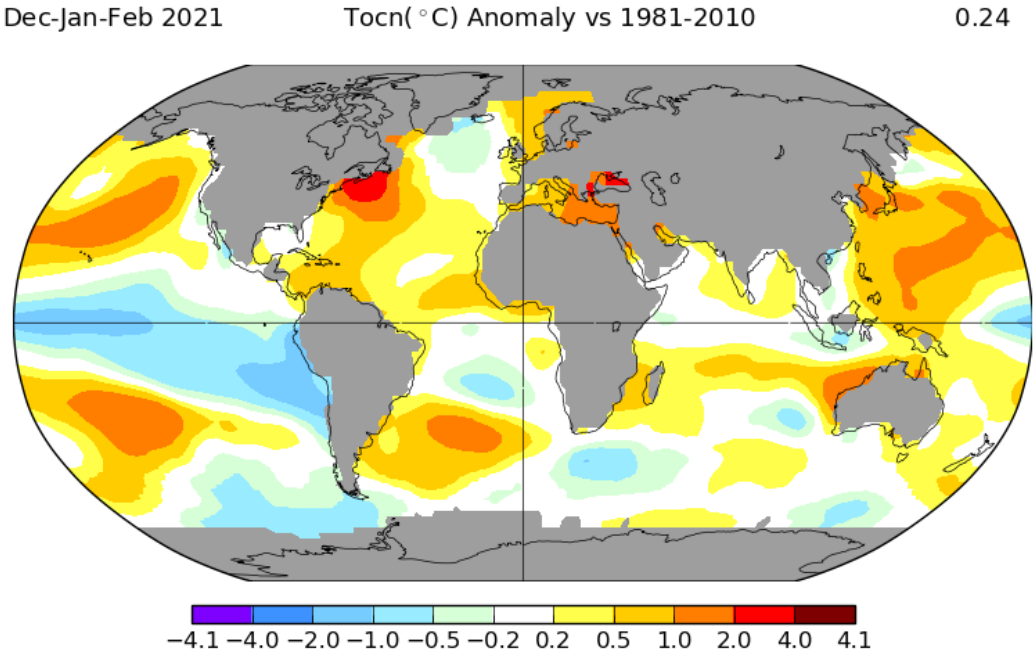


Figure 2: Sea surface temperature anomalies for boreal winter 2020-21 (December-February), 1981-2010 reference. Data from ERSSTv5 Ocean model analysis with 250km smoothing, source: NASA GISS, https://data.giss.nasa.gov/gistemp/maps/

ENSO

Looking at the standard Niño regions (Tab. 1), anomalies were negative in all these regions and all larger than the La Niña threshold of -0.5°C. The peak of the anomalies differed from region to region, but for the most relevant Niño 3.4 region, anomalies weakened from December 2020 to February 2021, which means a decrease of La Niña intensity during the season as expected.

MONTH	NIÑO 1+2		NIÑO 3		NIÑO 4		NIÑO 3.4	
	TEMP	ANOM	TEMP	ANOM	TEMP	ANOM	TEMP	ANOM
December 2020	22.16°C	-0.60°C	24.38°C	-0.83°C	27.65°C	-0.95°C	25.53°C	-1.12°C
January 2021	23.89°C	-0.64°C	25.06°C	-0.55°C	27.10°C	-1.25°C	25.58°C	-0.99°C
February 2021	25.55°C	-0.66°C	25.80°C	-0.57°C	27.20°C	-1.00°C	25.81°C	-0.92°C

Table 1: Sea surface temperature and anomalies for various Niño regions in boreal winter months 2020-21 (December-February), 1981-2010 reference. Data from OISST ocean model analysis, source: NOAA, https://www.ncdc.noaa.gov/teleconnections/enso/indicators/sst.php with definitions of Niño regions.

2.1.2 Atmosphere

Seasonal averages of 500-hPa geopotential in winter 2020/21 show a negative (cyclonic) anomaly over the eastern North Atlantic and a positive (anticyclonic) over Eastern Europe and the eastern Mediterranean (Fig. 3).

An outstanding meridional pattern existed throughout all winter months, but the location of troughs and ridges showed some variability from month to month. Much of the eastern parts of the Mediterranean region had an anticyclonic anomaly in all three months, while western parts had rather a cyclonic pattern in December 2020 and January 2021, but anticyclonic conditions in February 2021.

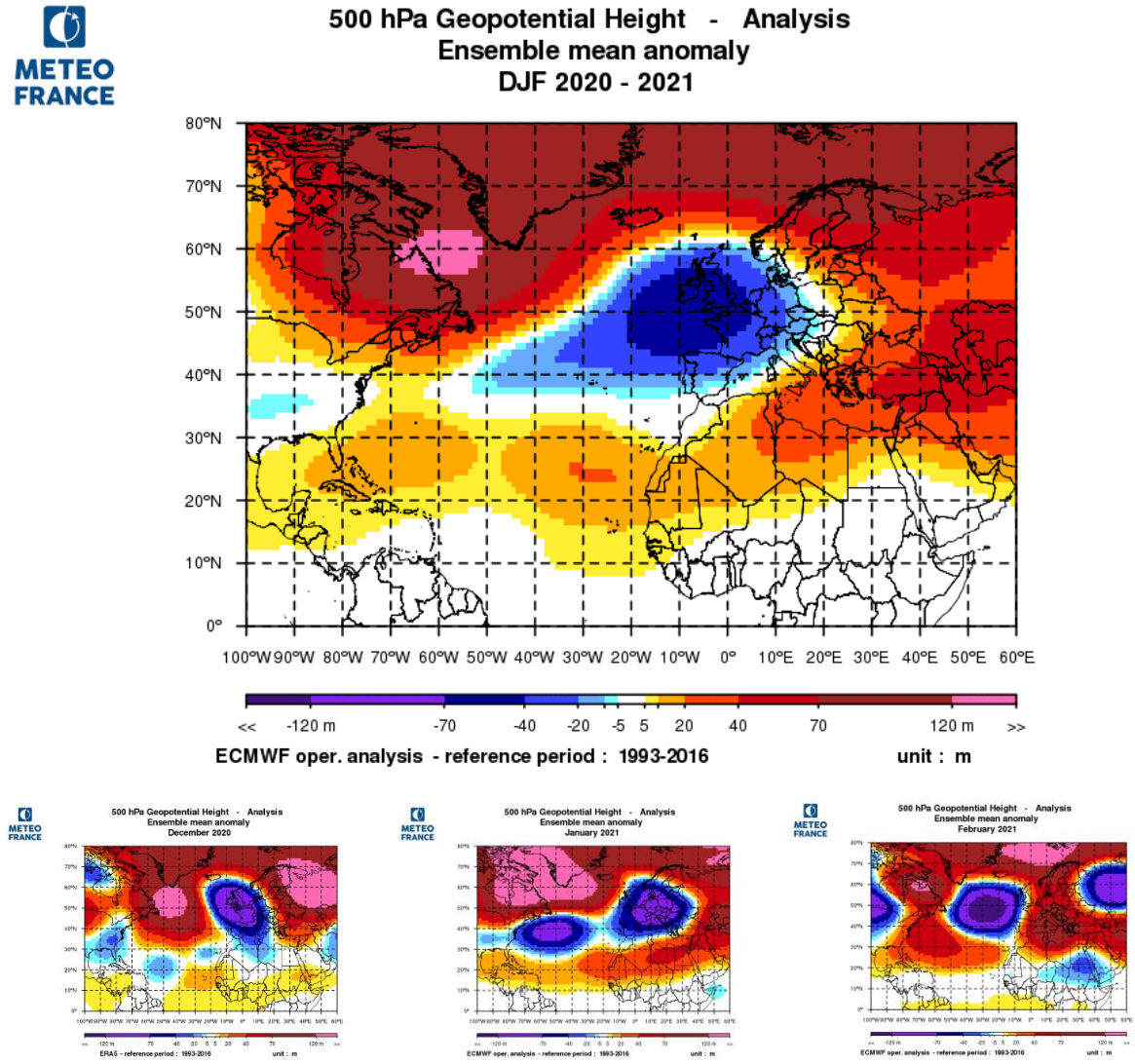


Figure 3: Upper map: seasonal anomalies of 500-hPa geopotential for winter 2020/21 (1993-2016 reference). Source: Météo France, data source: ECMWF / ERA5 reanalysis, http://seasonal.meteo.fr/content/suivi-clim-cartes-ref93-16. Lower maps: same for individual months.

On a global scale, the meridional pattern continued to North America, displaying a negative phase of the Pacific North American (PNA) pattern (Fig. 4) as expected by the outlook. A negative PNA is assumed to be correlated with La Niña (see e.g. https://www.cpc.ncep.noaa.gov/data/teledoc/pna.shtml).

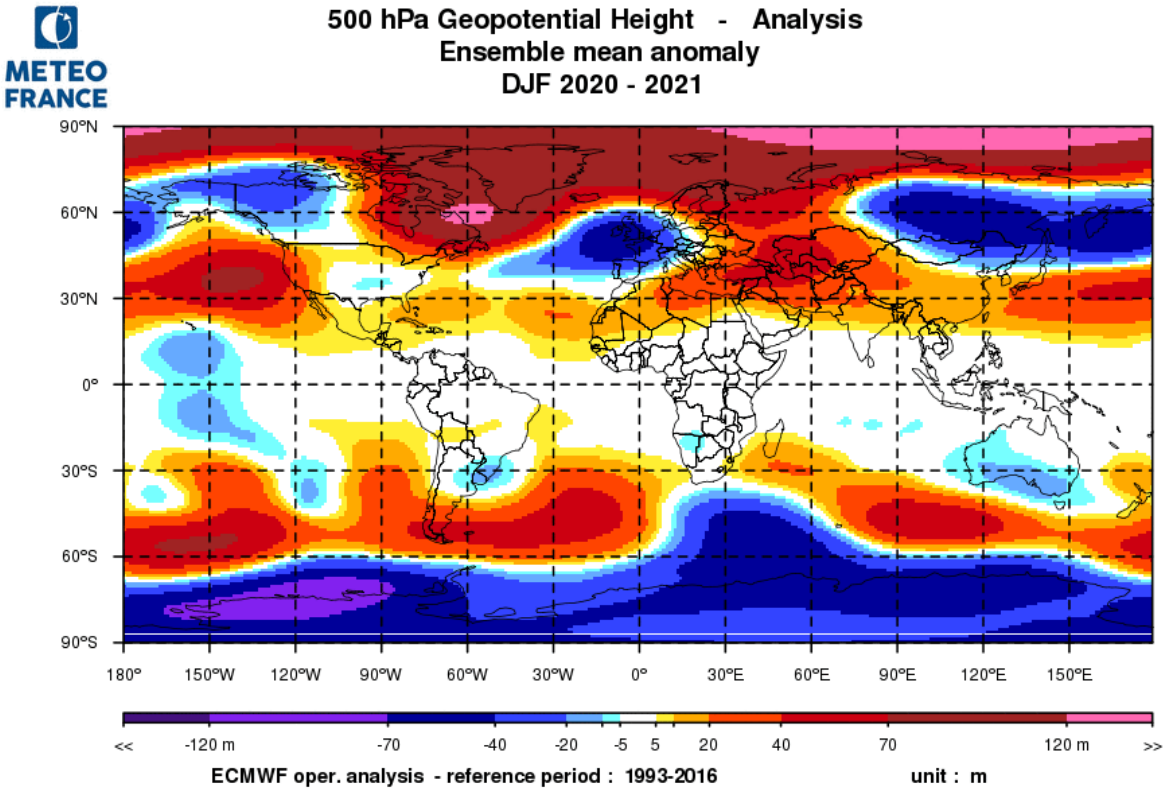


Figure 4: Seasonal 500-hPa geopotential anomalies as in Fig. 3, but for the global domain.

Monthly NOAA CPC teleconnection patterns for winter 2020/21 are shown in Table 2. The North Atlantic Oscillation (NAO) phase was negative in all three months, in contrast to the outlook and to what is expected mostly for La Niña. The East Atlantic pattern (EA) phase was negative in December 2020, but shifted to a positive phase later in the winter, similarly the East Atlantic – West Russia pattern (EA/WR). The Scandinavian pattern (SCAN) had a positive phase (high geopotential over Scandinavia) in all months as predicted, although it was relatively weak in January and February 2021.

Over North America, PNA started with a positive phase in December 2020, but switched to a negative phase in January 2021. Very notable was the development of the Polar-Eurasia pattern (POL) to a strong negative phase, indicating a more-than-normal weakening of the polar vortex, in contrary to the outlook. One reason for this unexpected weakening was a sudden stratospheric warming event in early January 2021.

In summary, the circulation patterns occurred only partly as expected by the outlook.

yyyy	mm	NAO	EA	WP	EP/NP	PNA	EA/WR	SCA	TNH	POL	PT	Expl.Var
2020	12	-0.37	-0.80	0.99	-99.90	1.28	-1.11	2.33	0.17	0.09	-99.90	60.3
2021	1	-1.80	-0.04	2.45	-0.71	-0.41	-1.34	0.31	-0.07	-1.59	-99.90	75.6
2021	2	-0.29	1.22	0.76	-0.80	-0.71	0.83	0.31	1.27	-3.23	-99.90	56.8

Table 2: Circulation indices of NOAA CPC patterns for the winter months 2020/21. Source: ftp://ftp.cpc.ncep.noaa.gov/wd52dg/data/indices/tele_index.nh

The circulation type classification of Météo France showed clearly a preference of NAO- types for winter 2020/21. They occurred almost twice as frequently than normal. Atlantic ridge patterns (which would correspond to EA- patterns) were frequent in December 2020, but did not occur at all later in that winter. NAO+ and blocking situations, which occur normally quite often in winter, had a much lower-than-normal frequency that season, in contrary to what was expected by the outlook.

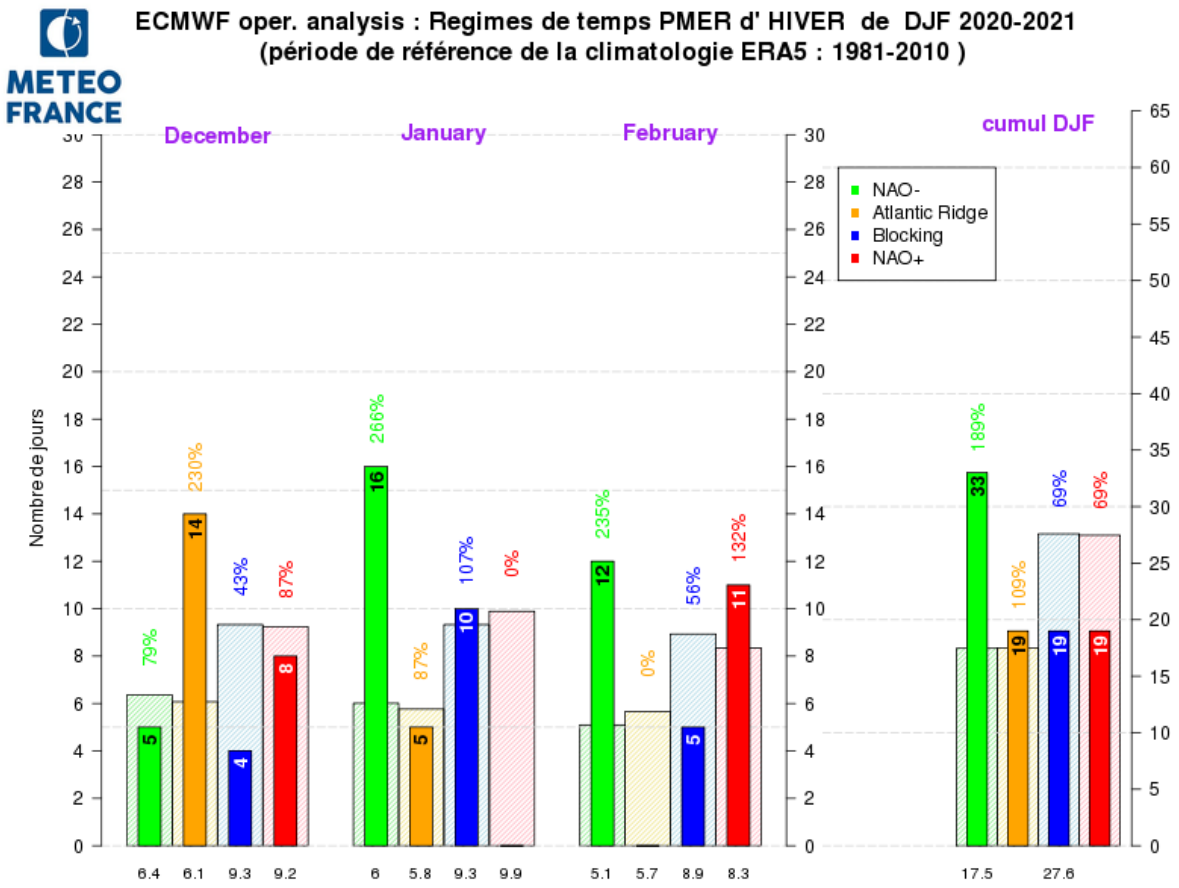


Figure 5: Number of days with circulation types of the Météo France classification for each month of the winter 2020/21 season and for the whole season (right), and in percent of the climatological frequency distribution 1981-2010. Source: Météo France, http://seasonal.meteo.fr/content/suivi-clim-regimes-trim?language=en

Seasonal mean sea level pressure in winter 2020/21 is displayed in Fig. 6. The Icelandic low was shifted further to the south with low pressure extending far into western and southern Europe, while the Azores high had the usual position, but was slightly more intense than normal. Consequently, the usual westerly flow over the North Atlantic also was shifted to the south, affecting the Mediterranean region. The Russian high was more intense than normal in the northern parts of Eastern Europe, but around normal in southern parts.

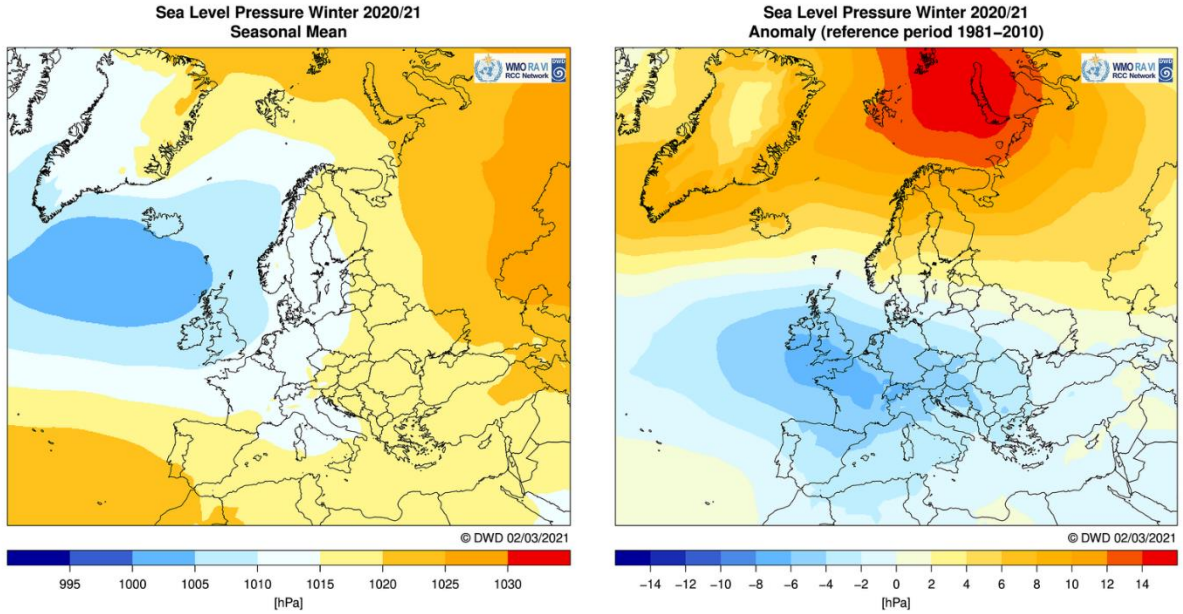


Figure 6: Seasonal mean sea level pressure and its anomalies for winter 2020/21 (1981-2010 reference). Source: Deutscher Wetterdienst (DWD), data source: DWD numerical ICON model analysis, http://www.dwd.de/EN/research/weatherforecasting/num_modelling/01_num_weather_prediction_modells/icon_description.html?nn=484268

For single months, some differences can be seen (Fig. 7). The North Atlantic flow became weaker in January 2021 compared to December 2020, but intensified again in February 2021. On the other hand, cyclonic influence extended further to the east in January 2021, while in February high pressure influence expanded from North Africa to the Mediterranean region and Europe.

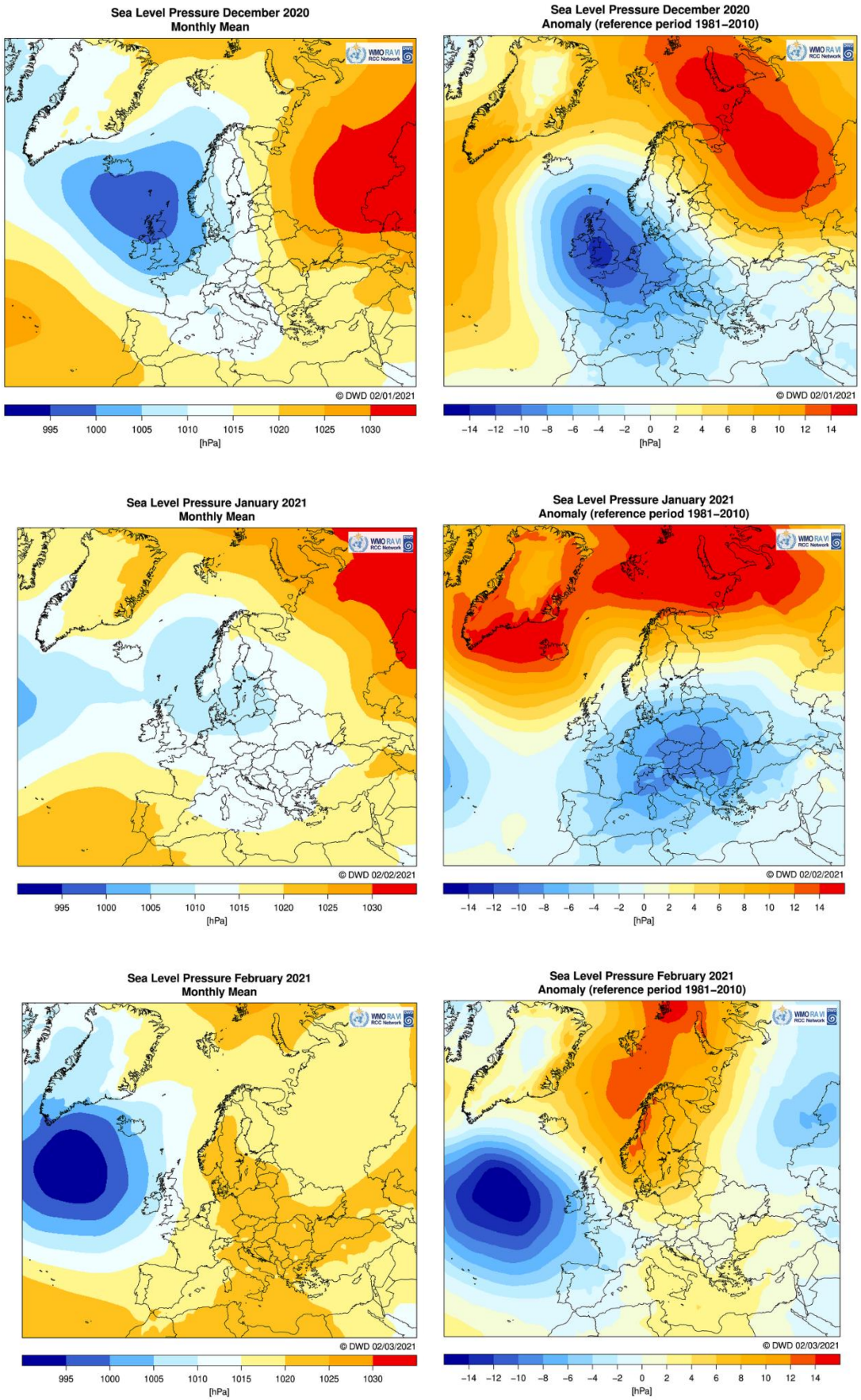


Figure 7: Same as Figure 8, but for the months December 2020 – February 2021.

2.2 Temperature

Europe and Middle East (RA VI)

Seasonal means and anomalies

Seasonal mean temperature in winter 2020/21 ranged from below -10°C in high mountain areas to around 15°C in southern Portugal and southern Israel (Fig. 8). Mostly the seasonal means ranged between 0 and -5°C in the Ukraine and in eastern Turkey, between 0°C and 5°C over much of the Balkan Peninsula, central Turkey and parts of the South Caucasus, northern Italy, eastern France and higher elevations in Spain, between 5 and 10°C in much of Iberia, western France, central and southern Italy, Greece, western and southern Turkey, and between 10 and 15°C in southern Iberia and much of the Middle East.

Temperature was above the 1981-2010 normal in almost the whole RA VI MedCOF domain. Anomalies ranged from around zero in western Iberia up to +4°C locally in Romania and Turkey.

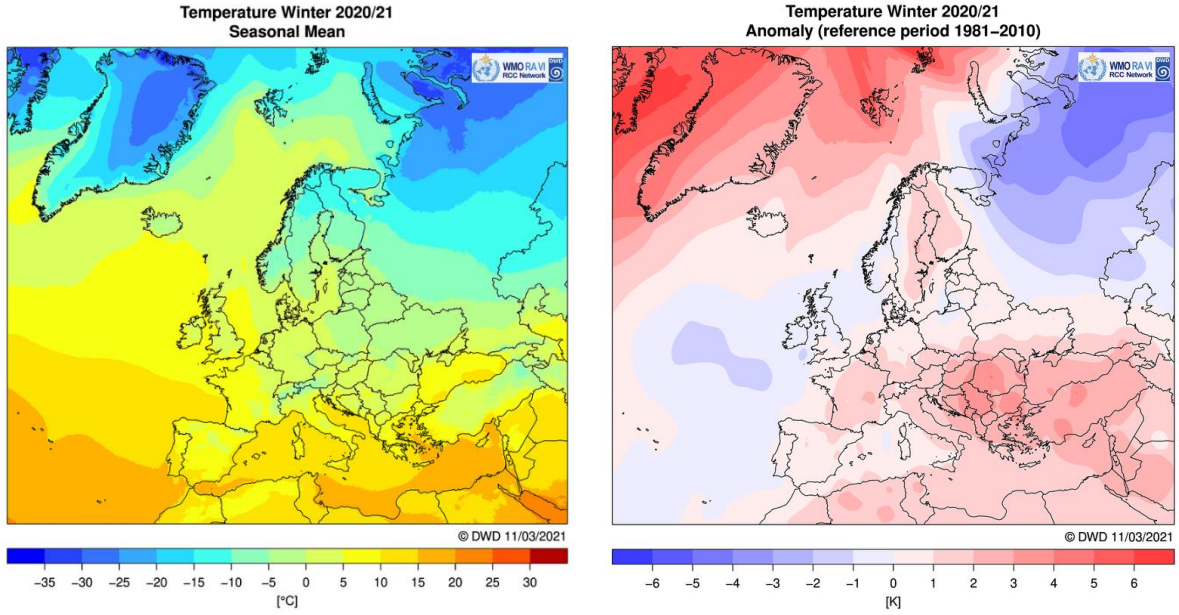


Figure 8: Surface air temperature for winter 2020/21. Left: seasonal mean, right: anomalies, 1981-2010 reference, source of both maps: WMO RAVI RCC, based on interpolated CLIMAT data, www.dwd.de/rcc-cm

Terciles

In terms of terciles, much of the RA VI MedCOF domain had temperatures in the upper tercile (Fig. 9 and 10). Some larger areas had temperatures in the middle tercile, in particular much of Iberia, northern France and the Ukraine (1981-2020 reference, ECMWF-ERA 5 reanalysis data).

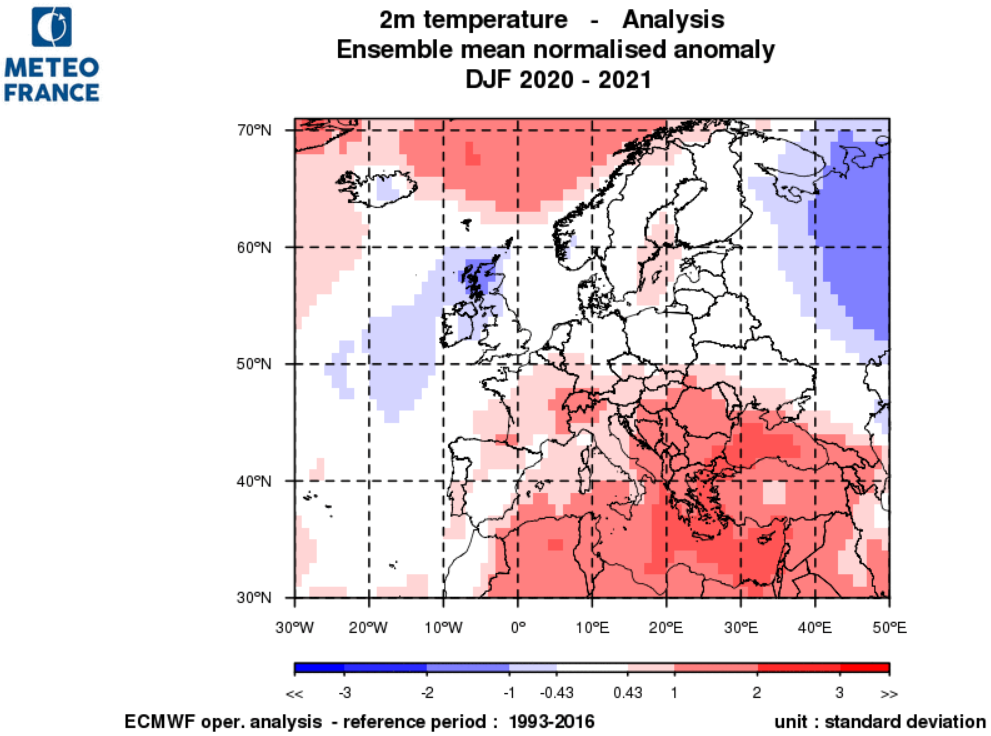


Figure 9: Seasonal normalized anomalies of winter 2020/21 2m air temperature based on ECMWF-ERA5 grid data, 1993-2016 reference. The data range between -0.43 and +0.43 represents the middle tercile, below -0.43 the lower tercile and above +0.43 the upper tercile. Source: Météo France, http://seasonal.meteo.fr/content/suivi-clim-cartes-ref93-16

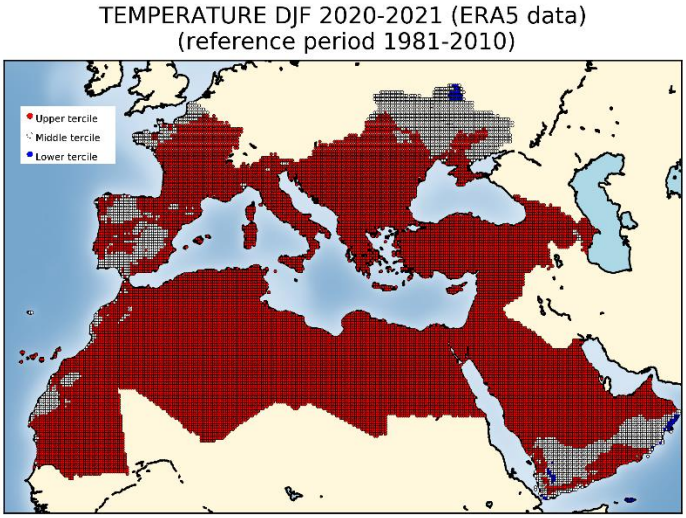


Figure 10: Terciles of winter 2020/21 surface air temperature based on ERA5 Reanalysis, 1981-2010 reference. Source: AEMET, data source https://www.ecmwf.int/en/forecasts/datasets/reanalysis-datasets/era5

E-OBS and ECA&D data show basically similar results like ERA5 (Fig. 11). Some differences, e.g. in the southern Ukraine or northern Italy might be due to missing data in the ECA&D dataset.

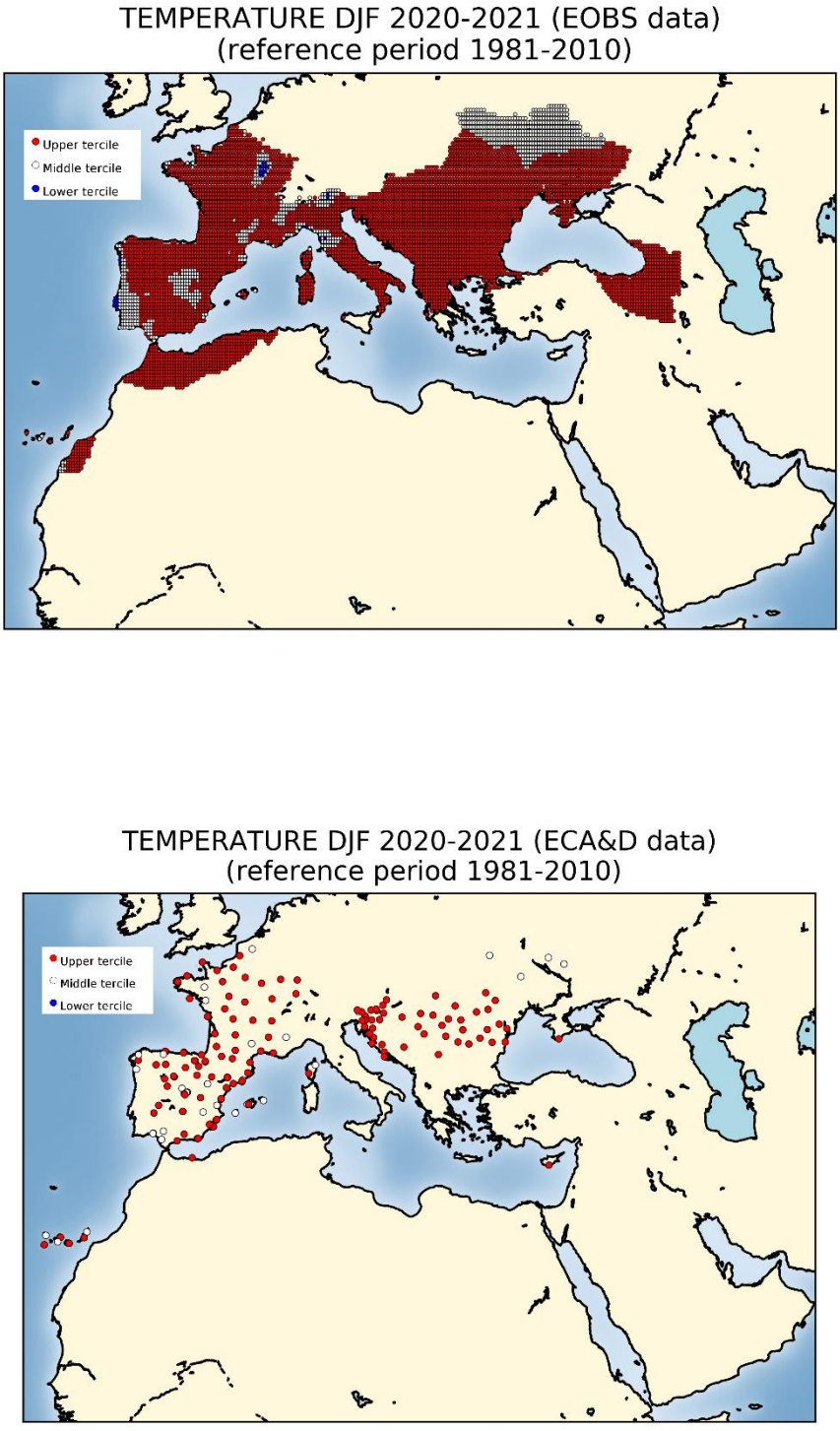


Figure 11: Terciles of winter 2020/21 surface air temperature based on interpolated E-OBS grid data (upper graph) and individual ECA&D station data (lower graph), 1981-2010 reference. Source: AEMET, data source: http://www.ecad.eu/

North Africa (RA I)

Seasonal mean temperatures in North Africa were between 10 and 15°C in much of the domain, in eastern parts partly higher, in western parts partly lower. They were mainly above normal throughout the domain; anomalies were mostly between +1 and +2°C, in western Morocco below +1°C, in Algeria and Tunisia locally above +2°C (Fig. 8).

In terms of terciles, seasonal mean temperatures were in the upper tercile in most of the domain, only in Morocco at least partly in the middle tercile, according to ERA5 reanalyses (Fig. 9 and 10).

However, a station analysis of the Egyptian Meteorological Authority (EMA) reveals some local differences at least for Egypt (Fig. 12). According to this national analysis for winter 2020/21 temperature in Egypt, above-normal conditions (upper tercile) were observed at 5 stations of Egypt (Dabaa, Alexandria, Port Said, Minya, and Hurguada), normal (middle tercile) at 3 stations (Cairo, Asyut, and Luxor), and below-normal (lower tercile) at 4 stations (Mersa Matruh, Kharga, Aswan, and El Arish).

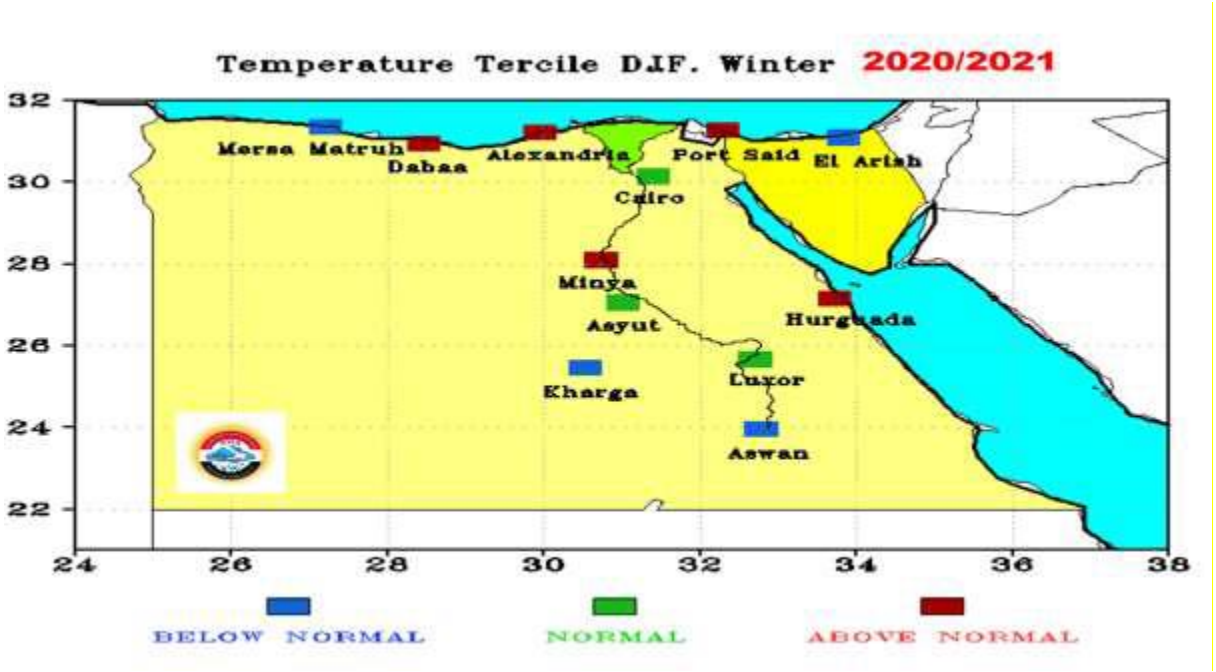


Figure 12: Winter (DJF 2020/2021) observed temperature at stations in Egypt classified by terciles, climatological period is 1981-2010 (Blue: lower tercile, green: medium tercile, red: upper tercile). Source: Egyptian Meteorological Authority (EMA), Cairo Regional Climate Center - General Administration of Scientific Research

2.3 Precipitation

Europe and Middle East (RA VI)

Seasonal means and anomalies

Seasonal precipitation totals in winter 2020/21 in the European MedCOF domain ranged from below 30mm in eastern Syria and southern Jordan to above 900mm locally in central Italy and Montenegro (Fig. 13). Especially many of the western coastal regions received above 300mm that winter.

Precipitation was above normal in most of France, northern Iberia, Italy, the Balkan Peninsula, Eastern Europe (Romania, Moldova, Ukraine), and much of the South Caucasus (especially the eastern parts). Below-normal precipitation received most southern and eastern coastal regions of Spain and southern France, Sicily, much of Turkey, Cyprus and most of the Middle East.

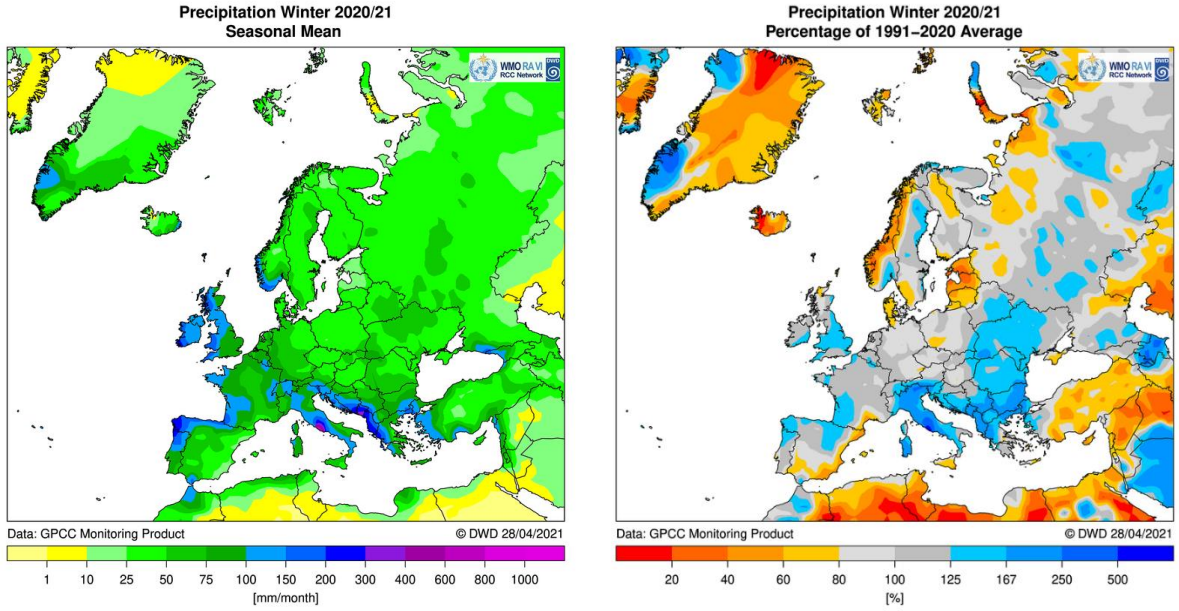


Figure 13: Precipitation for winter 2020/21 in Europe/RA VI. Left: seasonal total in mm/month, right: percentage of 1991-2020 average, source: WMO RAVI RCC, www.dwd.de/rcc-cm, data source: GPCC, http://gpcc.dwd.de

Terciles

In terms of terciles, precipitation over the RA VI MedCOF domain was mostly in the upper tercile in winter 2020/21, partly in the middle tercile. In contrary, much of Turkey and the Middle East were in the lower tercile (Fig. 14).

The results of ERA5 and GPCC were mostly very similar. Some differences can be seen especially in Western Europe (Iberia, France), where a larger area is in the middle tercile for GPCC but in the upper tercile for ERA5.

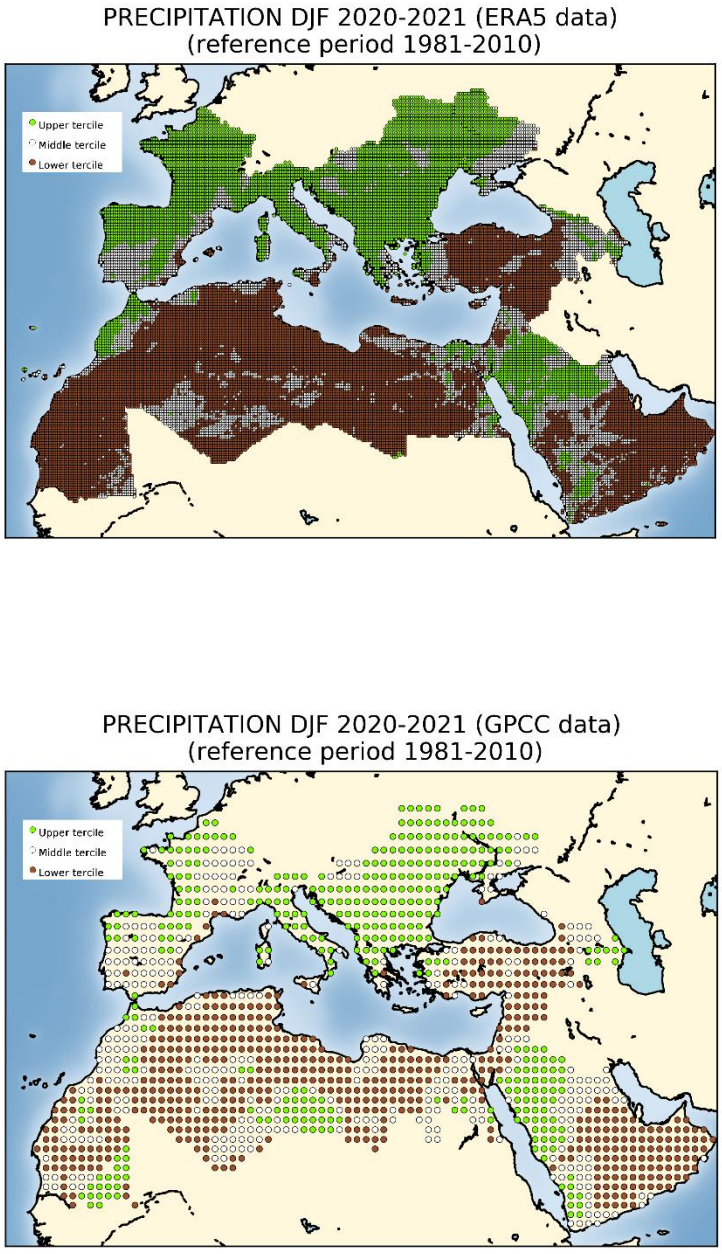


Figure 14: Terciles of winter 2020/21 precipitation based on ERA5 reanalysis (upper graph) and GPCC (lower graph) grid data, 1981-2010 reference. Source: AEMET, data reference: ERA5: https://www.ecmwf.int/en/forecasts/datasets/reanalysis-datasets/era5 , GPCC: http://gpcc.dwd.de

E-OBS and ECA&D data have mainly similar results as far as data are available, except for some smaller areas throughout the domain, which might be due to different data sampling (Fig. 15).

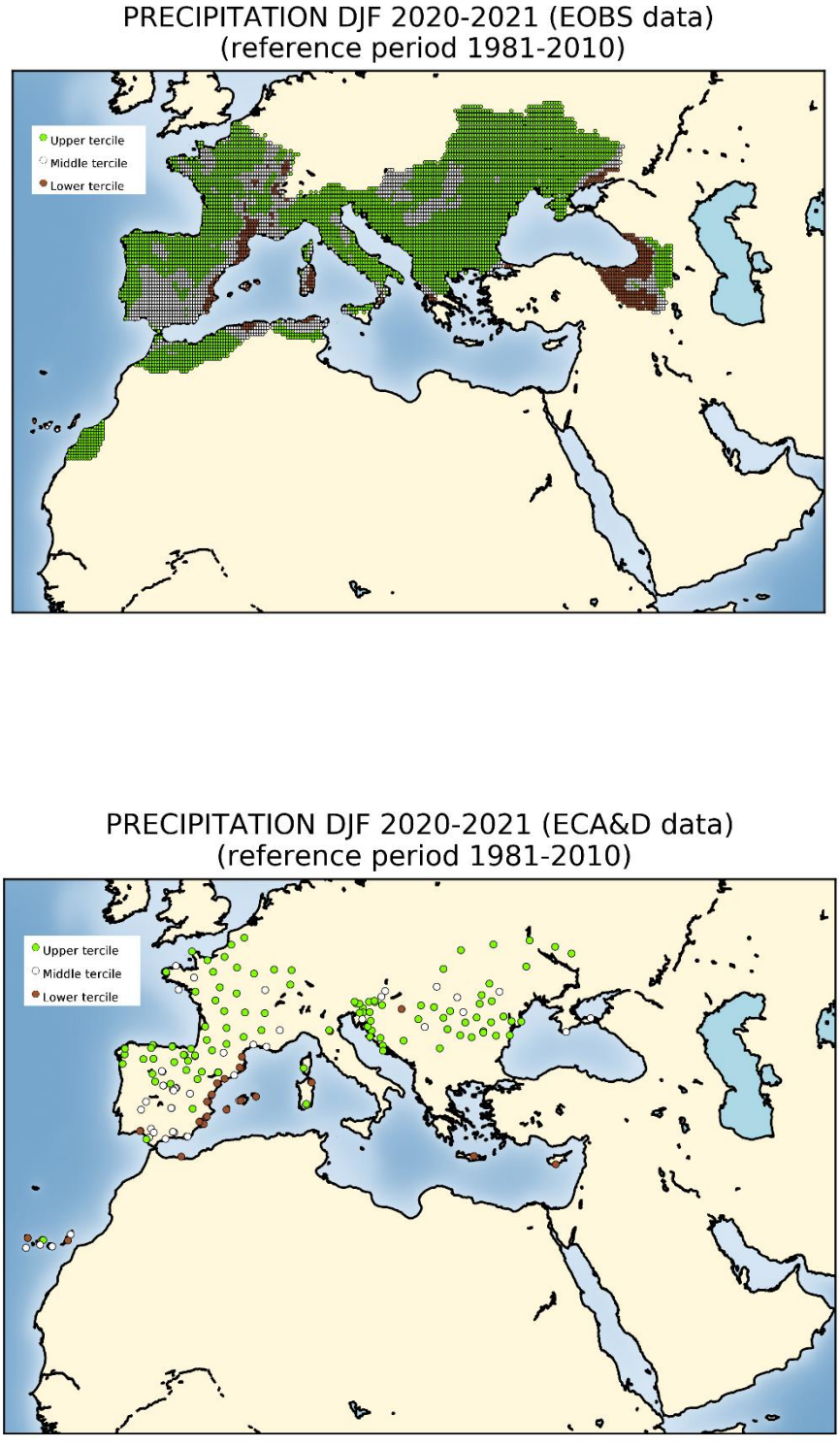


Figure 15: Terciles of winter 2020/21 precipitation based on interpolated E-OBS grid data (upper graph) and individual ECA&D station data (lower graph), 1981-2010 reference. Source: AEMET, data source: http://www.ecad.eu/

North Africa (RA I)

Seasonal totals were highest at the coasts, locally above 200mm, in northern Morocco near Gibraltar above 300mm (Fig. 13). They decreased further inland, down to zero in interior parts. Winter precipitation was below normal in most of the domain, especially in interior parts it was partly less than 20% of the normal. Only Morocco mostly had above-normal precipitation except in the east of the country, and also some local events brought above-normal precipitation in places, especially in Egypt.

In terms of terciles, precipitation mostly was in the lower tercile in North Africa, partly in the middle or upper tercile (Fig. 14-15). For Egypt, this was confirmed by the station analysis of the EMA (Fig. 16). However, there are large differences between the datasets (ERA5, GPCC, E-OBS, EMA) in the location of the tercile areas.

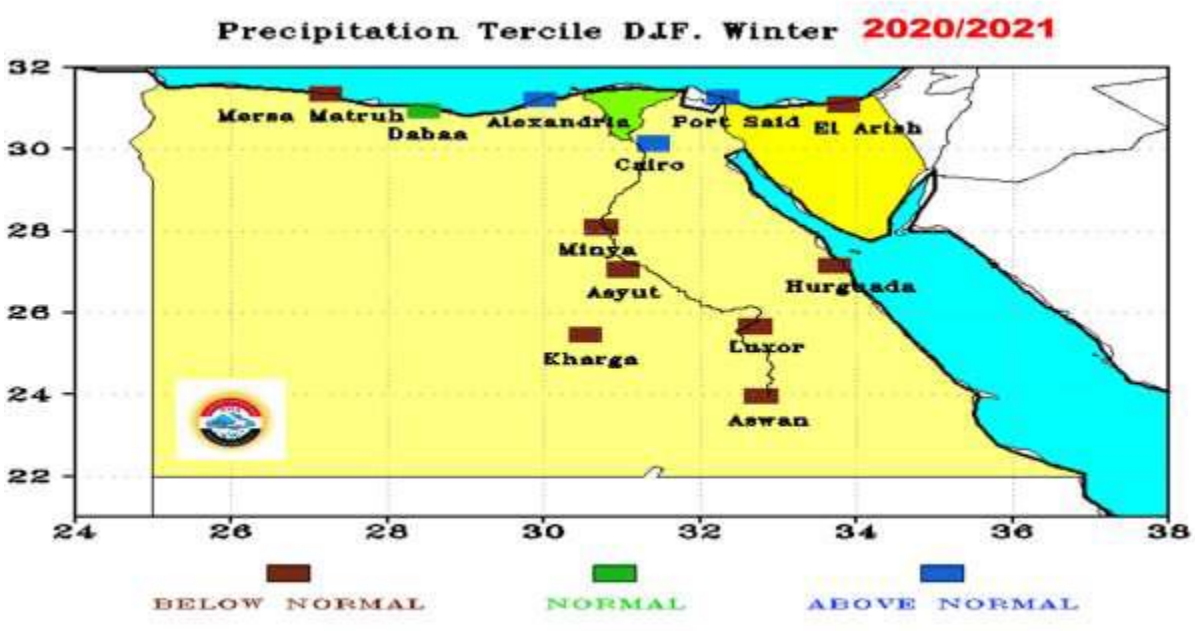


Figure 16: Winter (DJF 2020/2021) observed precipitation at stations classified by terciles, climatological period is 1981-2010 (Blue: upper tercile, green: middle tercile, red: lower tercile). Source: Egyptian Meteorological Authority (EMA), Cairo Regional Climate Center - General Administration of Scientific Research

For Egypt in general, precipitation was marked by a strong regional disparity with rainfall deficits in the south and surpluses in the north. Winter precipitations during 2020-2021 were below normal at most of the synoptic stations except Alexandria, Port Said, and Cairo stations, which were above normal, while Dabaa station was normal.

3 Verification of the MedCOF-15 climate outlook (2020-21 winter season)

3.1 Temperature

Europe/RA VI

The MedCOF-15 outlook favored the upper tercile range for almost the whole domain with 50% probability, except for France, northern Italy, the South Caucasus and eastern Turkey, where no privileged scenario was given.

The outlook was correct for most of the domain. Exceptions were parts of Spain (they were in the middle tercile instead of the upper tercile), in France (mostly in the upper tercile), Ukraine (in the middle tercile instead of the upper tercile) and South Caucasus / eastern Turkey (upper tercile).

North Africa (RAI)

The MedCOF-15 outlook had no privileged scenario for the domain, except for region in the north near the coast, where temperatures in the upper tercile were expected.

The outlook did not capture that mostly the upper tercile was favored in most of the domain.

3.2 Precipitation

Europe/RA VI

The MedCOF-15 outlook favored the dry scenario (lower tercile range) over Iberia and the areas over and close to the eastern Mediterranean from Italy to the Middle East (50% probability) and no privileged scenario for the northern areas from France to the South Caucasus.

The outlook was not correct for Iberia, Italy and the Balkan Peninsula, since these areas were mostly wetter than normal or at least around normal. In contrast, much of the eastern parts (Turkey and Middle East) were mostly in the lower tercile, so the outlook was mainly correct there. The northern parts were almost all in the upper tercile, which was not captured by the outlook.

North Africa

No privileged scenario was given for most of the domain by the MedCOF-15 outlook, except for northwestern Morocco and the east of the domain (Egypt and eastern Libya), where the lower tercile was favored.

In fact, precipitation was mostly in the lower tercile, so the outlook was correct for most of Egypt and eastern Libya. In northwestern Morocco, precipitation was mostly in the upper tercile, so the outlook was not correct there.

4 Users' perceptions of the MedCOF-15 outlook

Europe/RA VI:

In Spain, AEMET provides seasonal forecasts to the general public on AEMET and MedCOF webpages.

Other countries do not provide a seasonal outlook to users operationally or no feedback was given.

North Africa

No feedback was given.

Appendix A: Contributors to MEDCOF-16

- World Meteorological Organization

Europe and Middle East (RA VI)

- Climate Centres:

- WMO RA VI RCC Offenbach Node on Climate Monitoring, Deutscher Wetterdienst, Germany
- South East European Virtual Climate Change Center hosted by Republic Hydrometeorological Service of Serbia, Republic of Serbia

- National Meteorological and Hydrological Services:

- State Hydrometeorological Service, Republic of Armenia
- National Institute of Meteorology and Hydrology, Republic of Bulgaria
- Météo France, Republic of France
- Deutscher Wetterdienst, Federal Republic of Germany
- Hellenic National Meteorological Service, Greece
- Republic Hydrometeorological Service of Serbia, Republic of Serbia
- Agencia Estatal de Meteorología (AEMET), Spain

- others via SEECOF-25:

- Federal Hydrometeorological Institute, Bosnia and Herzegovina
- Republika Srpska, Bosnia and Herzegovina
- Meteorological and Hydrological Service, Republic of Croatia
- Meteorological Service, Republic of Cyprus
- National Environmental Agency, Democratic Republic of Georgia
- Israel Meteorological Service, Israel
- State Hydrometeorological Service, Republic of Moldova
- Montenegro
- Hydrometeorological Service, Republic of North Macedonia
- Slovenian Environment Agency, Republic of Slovenia
- Turkish State Meteorological Service, Republic of Turkey
- Ukrainian Hydrometeorological Centre, Ukraine

North Africa (RA VI)

- Climate Centres and National Meteorological and Hydrological Services:
- Egyptian Meteorological Authority (EMA)

APPENDIX B: **Analysis and verification of the MedCOF-15 climate outlook for the winter season 2020/2021:**

National verification results are mainly given in the verification reports of SEECOF and PRESANORD. Only for those countries, which do not participate in any of these two RCOFs, the results are presented here in the following table, as agreed in the MedCOF Management Group.

This verification summary is based on the national reports and contributions of participants of MedCOF-16.

In brackets: probabilities in % (lower, middle, upper tercile range) for the country concerned, as stated by the MedCOF outlook.

Europe (RA VI)

Country	Seasonal temperature (DJF)		Seasonal precipitation (DJF)		High Impact Events
	Observed	**MedCOF-15 climate outlook for temperature**	**Observed**	**MedCOF-15 climate outlook for precipitation**	
France (1)	Warm winter with warm anomaly all over the country	no signal in the country (tercile probabilities of 33/33/33)	At a national scale and for the whole winter, the mean anomaly of precipitation reached +32 %, corresponding to the wet tercile over France. Precipitation anomaly reached +60 % in the southwest (wet tercile)	no signal on the country (tercile probabilities of 33/33/33)	27-28 December 2020: Storm Bella: wind gusts >100 km/h, at coasts >120 km/h December 2020: Snowfalls on mountainous massifs, 2 episodes (Vosges, Jura, Alps, Pyrenees, central Massif, 20-50 cm (beginning of December) up to 90 cm on central Massif (end of December) December 2020 + January 2021: Exceptional rainfalls and floods (southwest France and extreme north of France), Floods on many rivers in the southwest, +50% anomaly of precipitations. Record: 500 mm in Brest (Britany), 782 mm in Capbreton (southwest), historic floods in Charente-Maritime and Lot-et-Garonne, perturbations on transport, damages on dwellings 14-17 January, 7-14 February 2021: 2 snow episodes in lowland areas (northern half of France) 7-14 February 2021 cold wave, 6 freezing days in the north and northeast 20-28 February 2021: Lots of records for min and max temperatures (between 20 and 22 °C in the north of the country)
Italy*	Above normal	North: no signal (33/33/33) Elsewhere: above normal (20/30/50)	Above normal South: below normal to normal	North: no predictive signal (33/33/33) Elsewhere: below normal (50/30/20)	No events
Lebanon *	Above normal	Above normal (20/30/50)	Below normal	Below normal (50/30/20)	No events
Portugal *	Normal to above normal	Above normal (20/30/50)	Around normal	Below normal (50/30/20)	No events

Spain (1)	Overall, winter was warm. This winter is ranking as the thirteenth warmest since 1961 and the sixth warmest since the beginning of the 21st century. Winter was warm or very warm in the northwest quadrant and in Valencia and Murcia Communities.	Warmer than normal in western Iberia. The rest of the region does not show any privileged scenario.	Overall winter was wet, with an average rainfall over Spain peninsula of 218 mm, a value that is 11% above the mean value of the quarter in the reference period 1981-2010. It has been about the twenty-fourth wettest winter since the start of the series in 1961 and the sixth wettest of the XXI century. Winter has been wet or very wet in the northwest quadrant and in the center of the peninsula, being extremely wet in the Cantabrian Sea, while it was dry or very dry at the coast of Catalonia and in the Valencia and Murcia Communities. In the Balearic Islands, it was dry.	Probability for drier tercile is higher over the southeastern and most western European part of the domain (50,30,20). For the rest of the region no privileged scenario for precipitation (33,33,33).	The lowest winter temperatures were observed in the early morning of January 12, in the areas of the interior of the peninsula, which were affected by the snowfall of the storm Filomena: -25.2°C (Molina de Aragón), -21.0°C (Teruel), -14.1°C (Albacete/air base) and -13.7°C (Torrejón de Ardoz) Warm episode observed during the last decade of January and the first week of February. Unusually high temperatures for the time of the year were recorded, showing a marked contrast with the low temperatures of the first decade. The highest temperatures in the main observatories were observed in the last days of January, highlighting 29.8°C (Alicante, 29 January), 28.3°C (Alicante-Elche / airport, 28 January). At the main stations of Alicante, Ibiza and Tortosa, the maximum temperature recorded at the end of January was the highest observed in winter since the beginning of the respective series. The highest values of daily winter precipitation in the main observatories: 94 mm (Ceuta, 6 January), 88 mm (Vigo / airport, 10 December), 82 mm (Pontevedra, 15 December), and 66 mm (Santiago de Compostela / airport, 21 January). In Toledo, main station, a precipitation of 37 mm in the form of snow was registered on January 8, constituting a new record in the series of maximum daily winter precipitation of this station, with data from 1983. Likewise, at the main stations of Santander / airport and Asturias / airport, the accumulated precipitation in winter was the highest of their respective series.

Country	Seasonal temperature (DJF)		Seasonal precipitation (DJF)		High Impact Events
	Observed	MedCOF-15 climate outlook for temperature	Observed	MedCOF-15 climate outlook for precipitation	
Syria *	Above normal	Above normal (20/30/50)	Below normal	Below normal (50/30/20)	No events

Note:
1 – Basic climatological period (1981-2010)
*Data base: ERA5 1981-2010 for temperature, GPCC 1981-2010 for precipitation

North Africa (RA I): See PRESANORD

References:

MedCOF-15 Outlook: http://medcof.aemet.es/images/doc_events/medcof15/step3/docStep3/Consensus_Statement_MedCOF-15.pdf

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

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

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