MEDITERRANEAN CLIMATE OUTLOOK FORUM
MEDCOF-25 Online Forum

MONITORING SUMMARY MEDCOF-25

for October 2025

Final version

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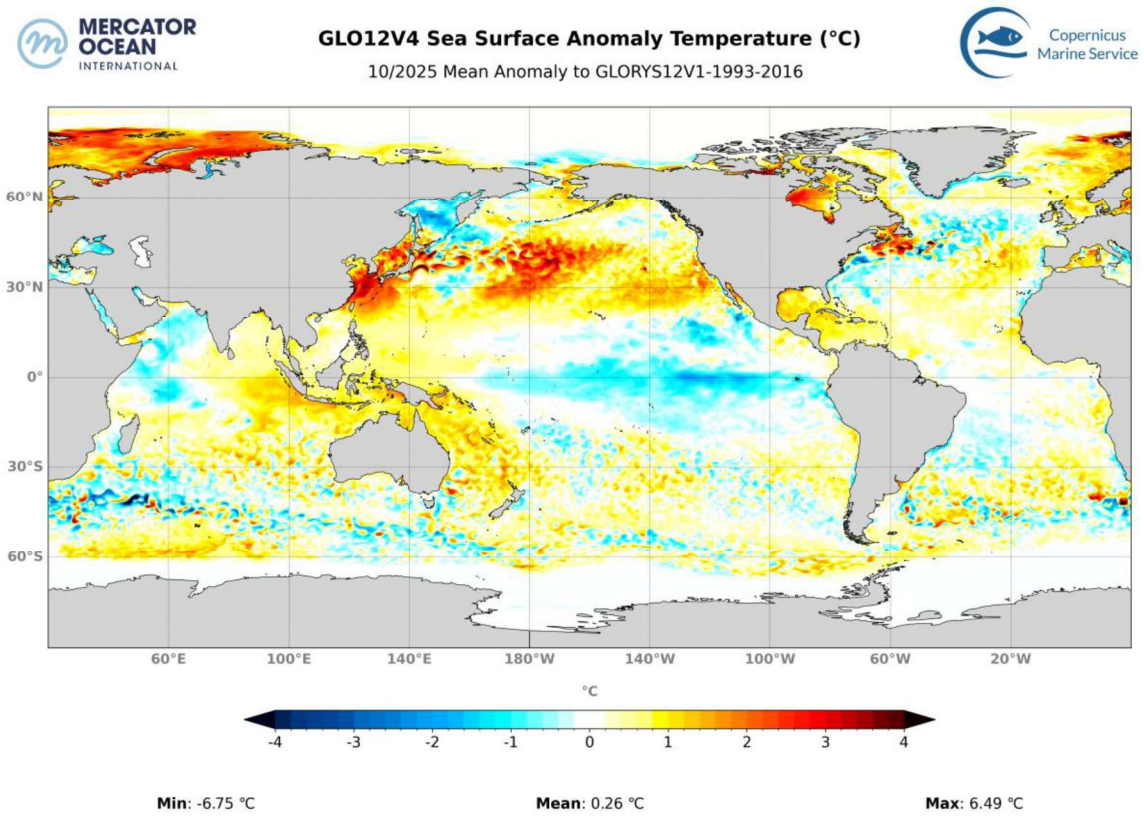
The following MedCOF monitoring summary is based on

- climate monitoring results from RA VI RCC Node-CM at DWD,
- Seasonal forecast bulletins and verification bulletins from RA VI RCC Node-LRF at Météo France,
- SEECOF monitoring report
- Assessments from NOAA CPC and BOM Australia

1 Oceanic Analysis

1.1 Sea Surface Temperature (SST) anomalies

- **Pacific Ocean :**
  - ENSO is moving to a La Niña state (Nino3.4 index has decreased since June 2025 from neutral (-0.1) to below -0,8 °C in October 2025).
  - The PDO remains in a negative phase. https://stateoftheocean.osmc.noaa.gov/atm/pdo.php
- **IOD** : Since summer 2025, a strong negative IOD phase has developed, with a monthly DMI index of -1.5 °C for October 2025, and in fact a significant west-east gradient can be seen on the October map over the Indian Ocean in the northern tropics and along the equator. However, IOD has weakened significantly in November 2025. According to BOM, the weekly IOD index changed from -1.9 °C in the last week of October to -0.6 in the third week of November: https://www.bom.gov.au/climate/enso/?ninoIndex=nino3.4&index=iod&period=weekly#tabs=Indian-Ocean
- **North Atlantic** : warmer than normal except for an area in the middle latitudes between Newfoundland and Ireland, and some coastal areas of North Africa and the Iberian Peninsula.
- The **Mediterranean Sea** was warmer than normal in the western basin, while central and eastern parts had around-normal or below-normal temperatures after Mercator Ocean data (1993-2016 reference). ERSST_v5 data from NASA show positive anomalies for the western Mediterranean between +1 °C and +2 °C, and below +1 °C or around normal for the central and eastern parts in October 2025 (1991-2020 reference). https://data.giss.nasa.gov/gistemp/maps/
- The **Black Sea** was around 0.5 °C warmer than normal according to NASA ERSST_v5, but slightly colder than normal or around normal according to Mercator Ocean.



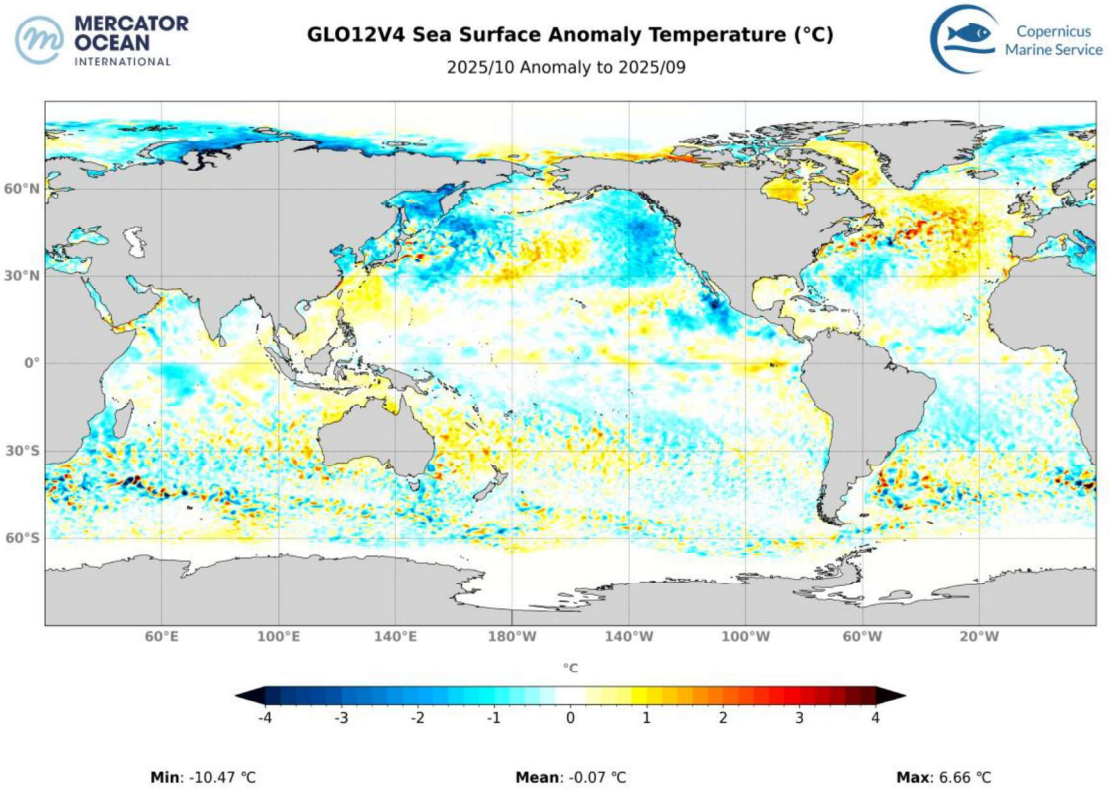


Figure 1.1: Upper map: sea surface temperature anomalies for October 2025. Lower map: anomaly differences October minus September 2025 (anomaly trend). Source: Météo France, Mercator Ocean data.

1.2 ENSO analysis of recent months and years:

After La Niña in the previous boreal winter (DJF 2024/25), we are now running again into a La Niña with a clear tendency up to present (October/November 2025, Fig. 1.2). This tendency can be seen for all Niño regions, most visible in Niño 3.4.

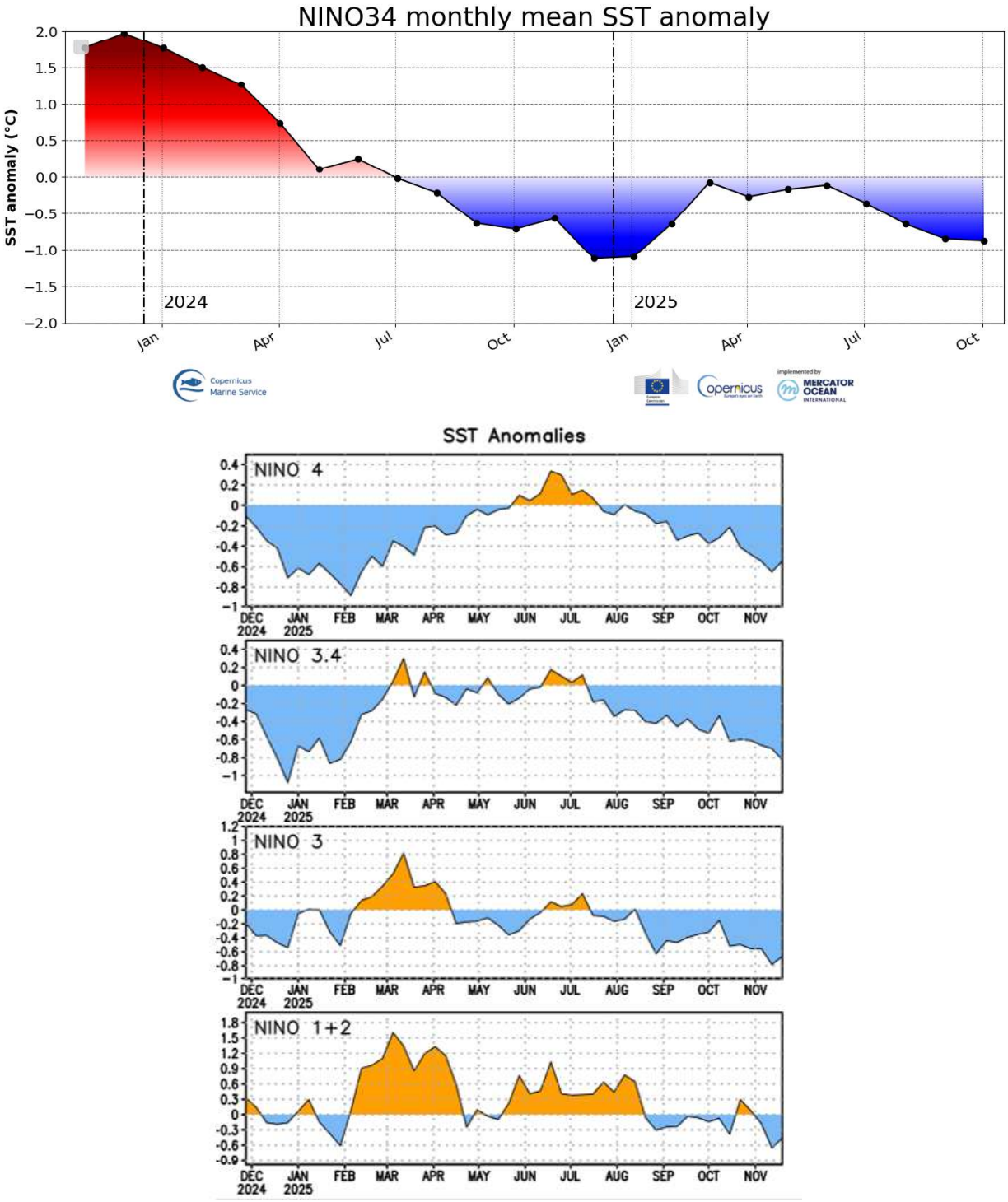


Figure 1.2: Evolution of sea surface temperature anomalies in several Niño boxes. Source: Upper map: Météo France, Mercator Ocean data. Lower map: NOAA CPC, https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml

1.3 ENSO Forecasts

According to Copernicus C3S and NMME multi-system forecasts, there is a wide range of forecasts for DJF 2025/26 from close to neutral to moderate La Niña. According to most forecasts, La Niña will weaken until end of the boreal winter 2025/26.

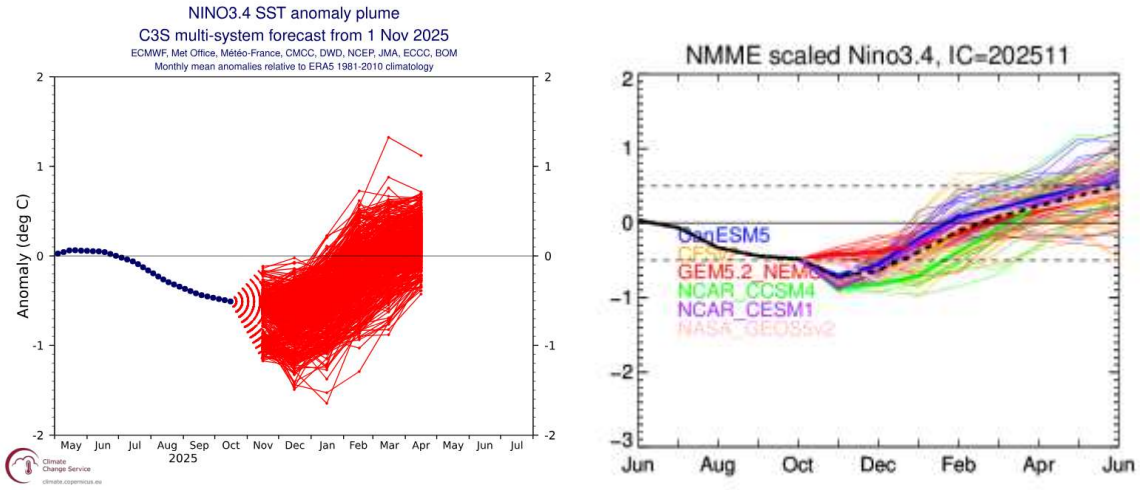


Figure 1.3: Evolution of El Niño3.4 expected temperature from C3S (left) and NMME (right) until April-June 2026. Source: C3S: https://climate.copernicus.eu/charts/packages/c3s_seasonal/products/c3s_seasonal_plume_mm ; NMME: https://www.cpc.ncep.noaa.gov/products/NMME/current/plume.html

1.4 Pacific Decadal Oscillation (PDO) analysis:

Since January 2020, PDO was negative without interruption and had a strong peak in July 2025. Thereafter, a weakening took place until October 2025 (PDO Index after NOAA was −2.1, https://stateoftheocean.osmc.noaa.gov/atm/pdo.php)

PDO- means warm SST anomalies in the interior North Pacific and cool SST anomalies along the North American coast or above average sea level pressures over the North Pacific, see https://www.ncei.noaa.gov/access/monitoring/pdo/ . A negative PDO has a tendency to intensify La Niña, but to weaken El Niño events.

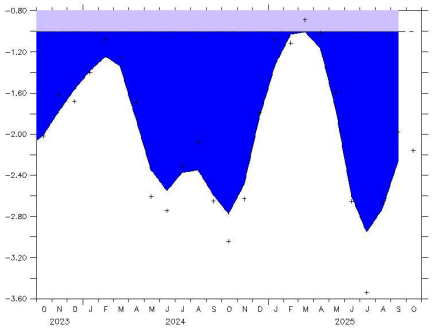


Figure 1.4: Evolution of PDO index, source: https://stateoftheocean.osmc.noaa.gov/atm/pdo.php . Crosses: monthly values, shaded areas: 3-month averages.

1.5 Indian Ocean Dipole (IOD):

The IOD according to BOM was significantly negative in October 2025 and so was also the DMI based on Mercator Ocean (Fig. 1.5). With the week ending 23 November 2025 (most recent data available), the IOD index weakened from October to November and had a value of −0.6 °C. According to forecasts, IOD will return to neutral levels soon in December 2025 and will remain so in the following months until May 2026.

IOD events typically break down in November or December with the arrival of the Asian monsoon.

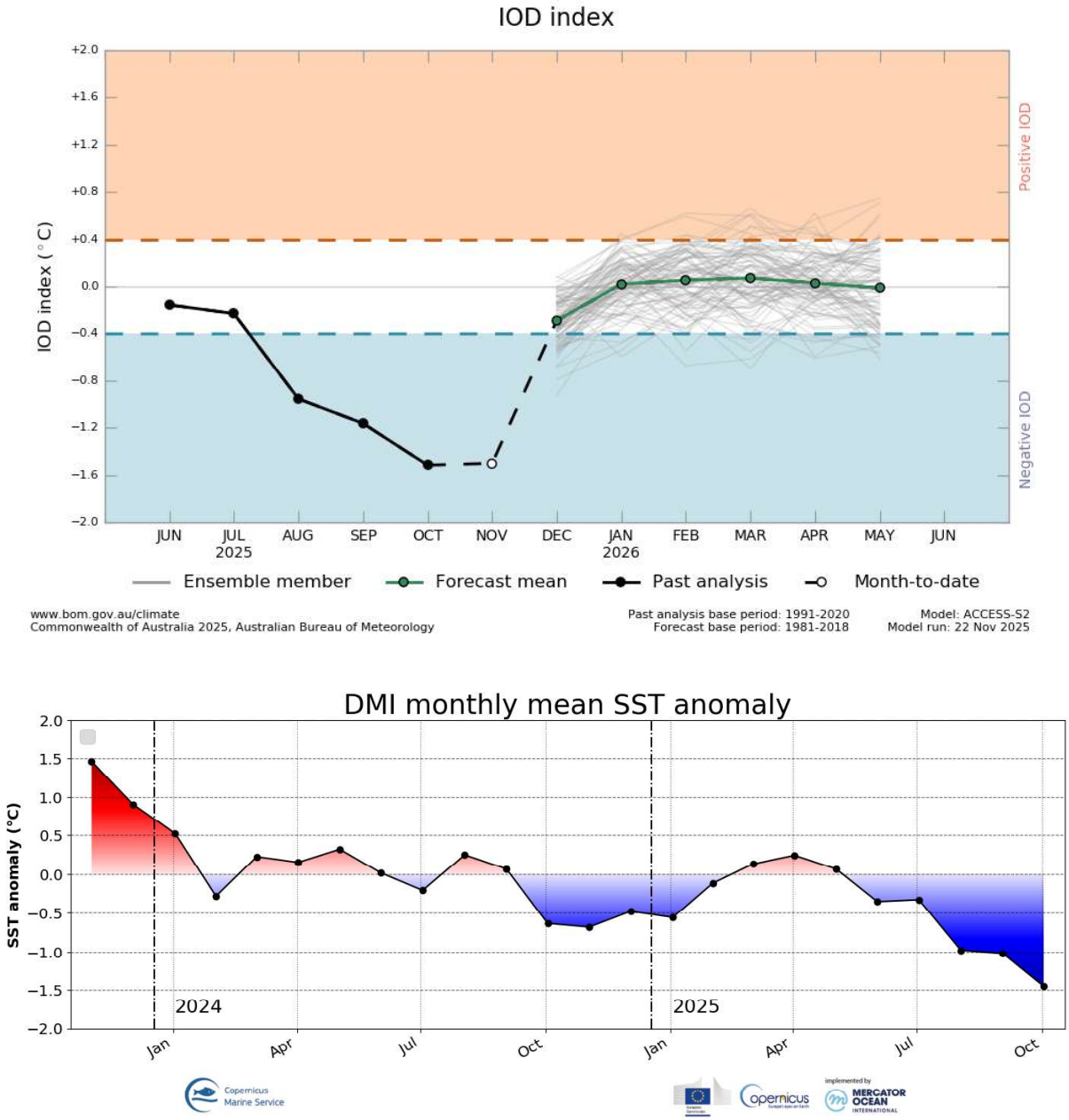


Figure 1.5 Observed and expected evolution of Indian Ocean Dipole. Source: upper map: BOM, http://www.bom.gov.au/climate/enso/index.shtml#tabs=Indian-Ocean), lower map: Météo France, Mercator Ocean data

2 Atmospheric Circulation Analysis

2.1 Velocity potential and stream function anomalies in the high troposphere

Velocity Potential 200 hPa: Downward anomaly over the centre of the Pacific as well as on the American continent, stretching from South America to South Africa. Upward anomaly on the Maritime Continent.

Stream function at 200 hPa: A dipole is present on both sides of the Equator over the Central Pacific, and another one over the Indian ocean. No clear teleconnection is visible.

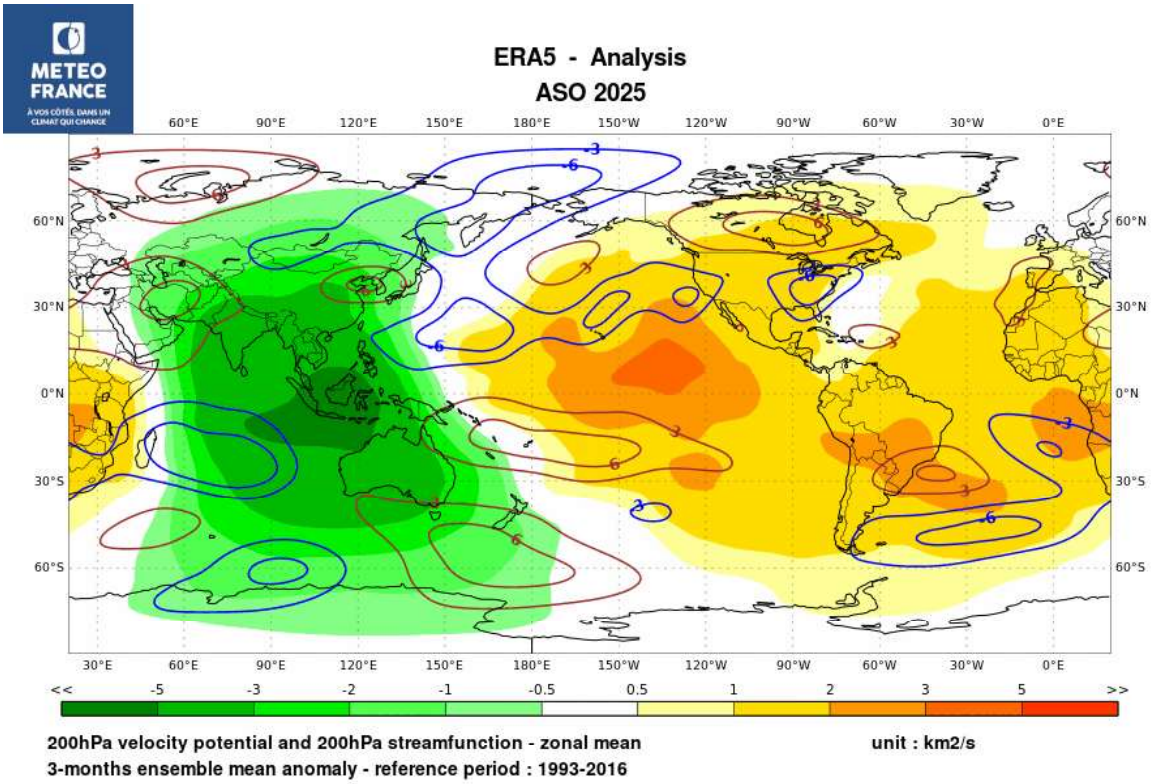


Figure 2.1: Averaged anomalies of stream function (contours) and velocity potential (shaded) average during August-October 2025. Positive shaded values (yellow/orange): convergence (downward motions). Negative ones (green): divergence (upward motions). Positive contours (red): anticyclonic circulation in the northern hemisphere, negative contours (blue): cyclonic circulation in the northern hemisphere.

Source: Météo France

2.2 SOI index:

SOI index was positive (1.1, La Niña) in October 2025, in line with SST anomalies. This means that also the atmospheric component of ENSO has developed to a La Niña state already.

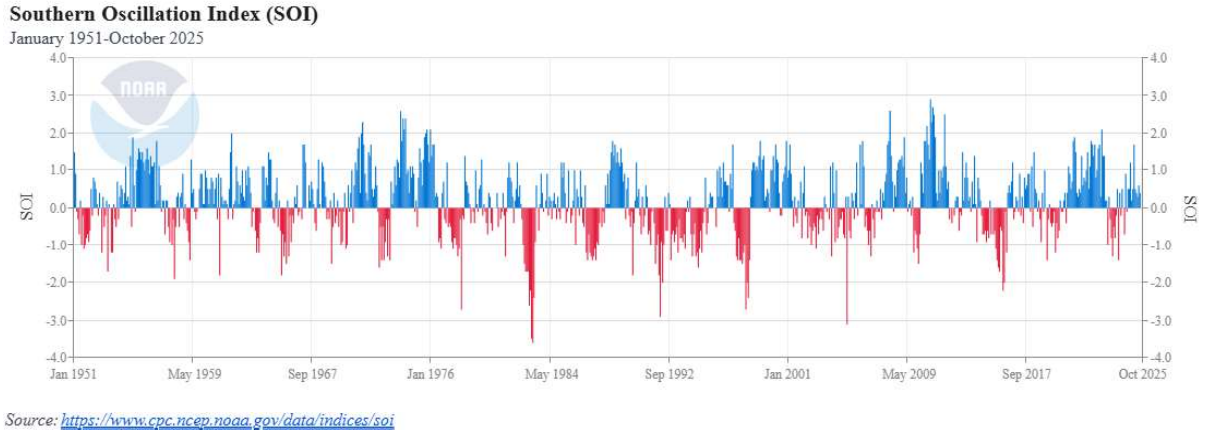


Figure 2.2: Southern Oscillation Index (SOI). Positive values mean La Niña response, negative values El Niño response. Source: https://www.ncei.noaa.gov/access/monitoring/enso/soi

2.3 Geopotential height at 500 hPa:

The 500 hPa geopotential analysis for October 2025 (Fig. 2.3) shows a distinct wave-like pattern in the northern and middle latitudes of the northern hemisphere, which implies a mainly meridional situation, particularly over the North Atlantic and Europe. Furthermore, we are currently observing a rare early-season Sudden Stratospheric Warming (SSW) event in November 2025 (https://www.severe-weather.eu/long-range-2/latest-winter-2025-2026-seasonal-snowfall-model-predictions-more-snow-united-states-canada-europe-fa/), which can cause a disruption or even a collapse of the stratospheric Polar Vortex. This could result in Arctic air outbreaks with below-normal temperatures in Europe, but not necessarily.

Concerning the MedCOF domain, anticyclonic patterns were located over western parts of Europe (Iberian Peninsula, France), generally over North Africa, the Middle East, southeastern Türkiye, Armenia, and Azerbaijan. Cyclonic conditions occurred mainly over Italy, the Balkan Peninsula, Moldova, Ukraine, and northwestern Türkiye.

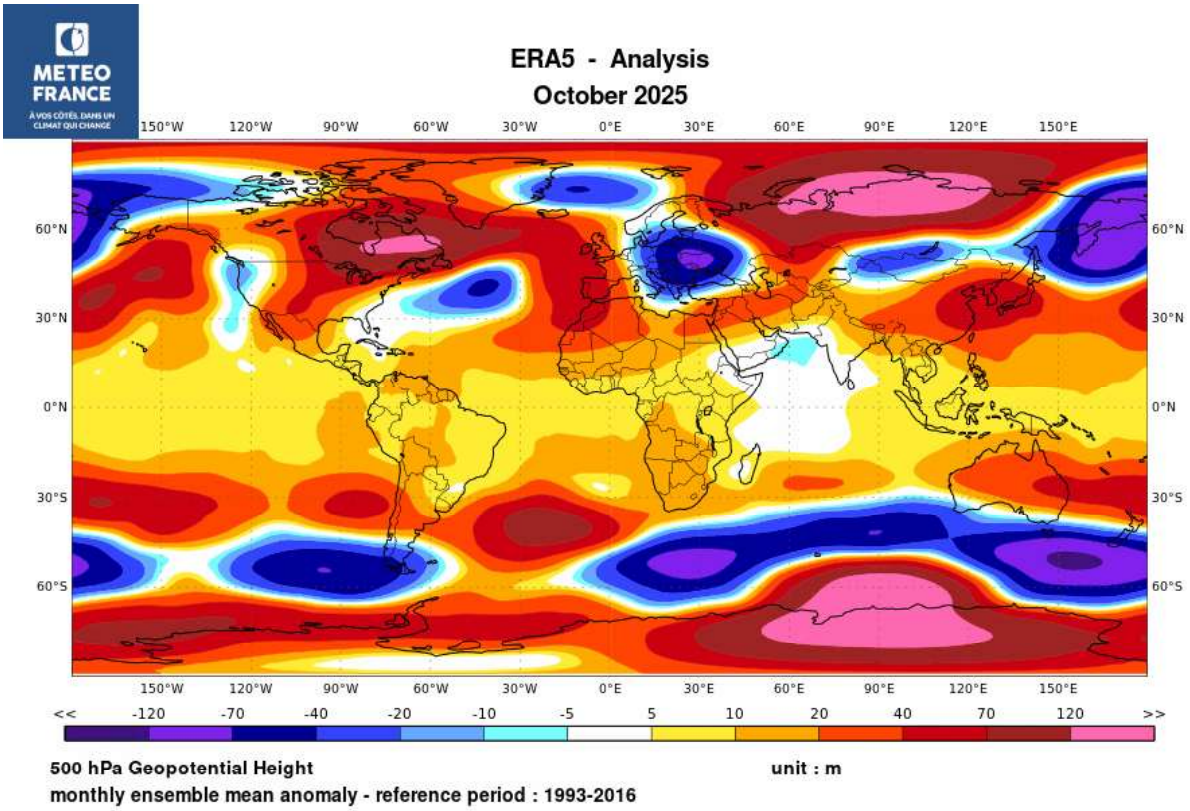


Figure 2.3: Anomalies of Geopotential height at 500hPa (Source: Météo-France, http://seasonal.meteo.fr/content/suivi-clim-cartes-ref93-16 , data from ERA5)

2.4 Sea level pressure (SLP)

Mean sea level pressure in October 2025 showed a pattern with westerly airflow particularly over northern parts of Central Europe, which mainly did not touch the MedCOF domain being on the anticyclonic side. However, cyclonic anomalies expanded from Eastern Europe to the Balkan Peninsula and Italy, similar like in the middle troposphere.

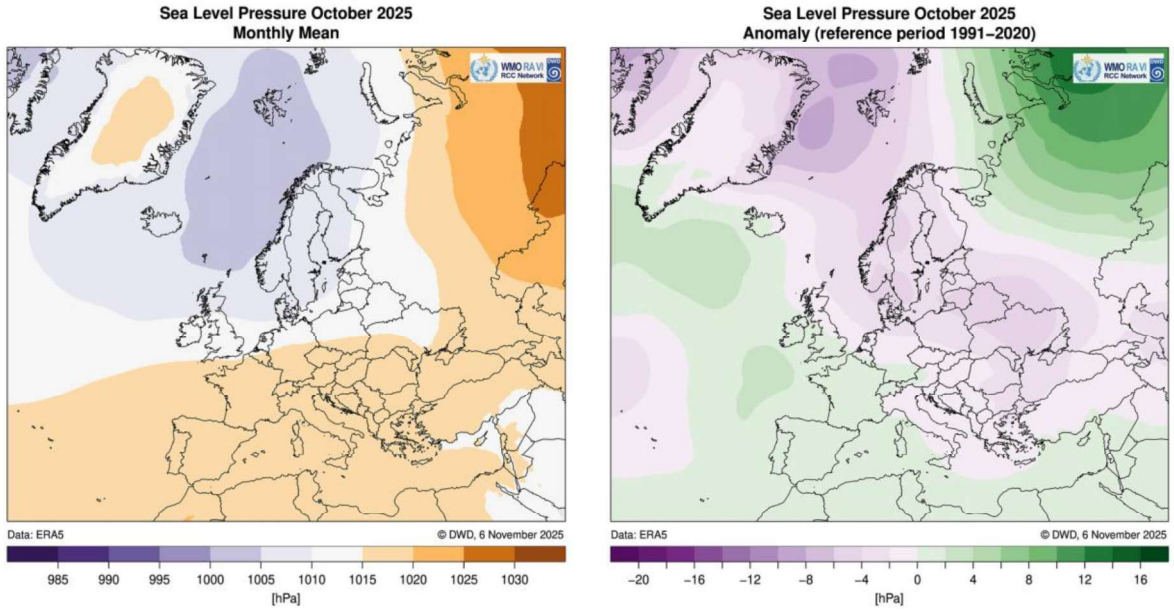


Figure 2.4: Mean sea level pressure and anomalies (1991-2020 reference) over the North Atlantic, Europe and North Africa for October 2025. Source: DWD, https://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_ppp.html?nn=490674

2.5 Circulation patterns

The main circulation patterns in October 2025 were NAO- (-0.5), EATL/WRUS (-1.0, anticyclonic over the East Atlantic, cyclonic over western Russia), SCAND- (-0.8, rather cyclonic over Scandinavia), and POLEUR- (-0.8, weaker polar vortex). Since none of these indices were very outstanding, October 2025 circulation was rather a mixture of various patterns.

Table of Teleconnection Indices

OCTOBER 2025

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
OCT 25	-0.5	0.1	0.3	-1.7	1.7	---	-1.0	-0.8	-0.8
SEP 25	-0.6	3.6	1.2	-1.5	0.6	---	-2.2	0.5	0.1
AUG 25	0.2	1.7	-0.3	-2.2	-0.4	---	-1.4	-1.6	-2.6
JUL 25	0.5	1.8	-0.6	0.4	0.3	---	-0.2	1.1	0.7
JUN 25	1.0	1.7	1.3	1.0	-1.1	---	-1.9	-2.2	0.2
MAY 25	0.5	0.0	-0.5	-1.6	-1.4	---	-0.2	-0.7	-1.0
APR 25	0.1	0.4	-0.8	-0.6	-1.1	---	0.5	-0.9	-0.7
MAR 25	-0.1	0.8	0.8	0.7	-0.4	---	0.1	-0.2	0.0
FEB 25	1.4	0.7	0.3	0.6	1.6	1.3	0.3	1.4	-2.9
JAN 25	-1.1	2.7	1.0	-0.4	0.7	2.1	-1.3	-0.7	0.2
DEC 24	1.0	-0.1	-0.3	---	1.4	0.2	0.0	-0.6	-0.6
NOV 24	-0.4	1.1	-0.2	-0.6	0.0	---	1.1	-0.8	-0.4
OCT 24	0.1	1.0	0.9	-1.8	0.2	---	-1.4	1.1	-1.0

Table 2.1: Evolution of the main atmospheric indices for the Northern Hemisphere for the last months:
http://www.cpc.ncep.noaa.gov/products/CDB/Extratropics/table3.shtml

2.6 North Atlantic Oscillation (NAO) and Arctic Oscillation (AO)

The NAO pattern was not uniform in the month of October 2025. NAO+ occurred in the first half of the month, but in the second half there was a switch to NAO-. In November 2025, too, the NAO- phase was dominant.

The AO showed much more variability compared to the NAO. However, some persistency of NAO- of several days can be identified in mid-October, and even stronger in mid-November 2025. The current SSW seems to have no significant effects in the troposphere at the moment and in the near future (neutral AO seems to be the most likely scenario until mid-December 2025), but the spread is high in both directions, implying a high uncertainty of the circulation development.

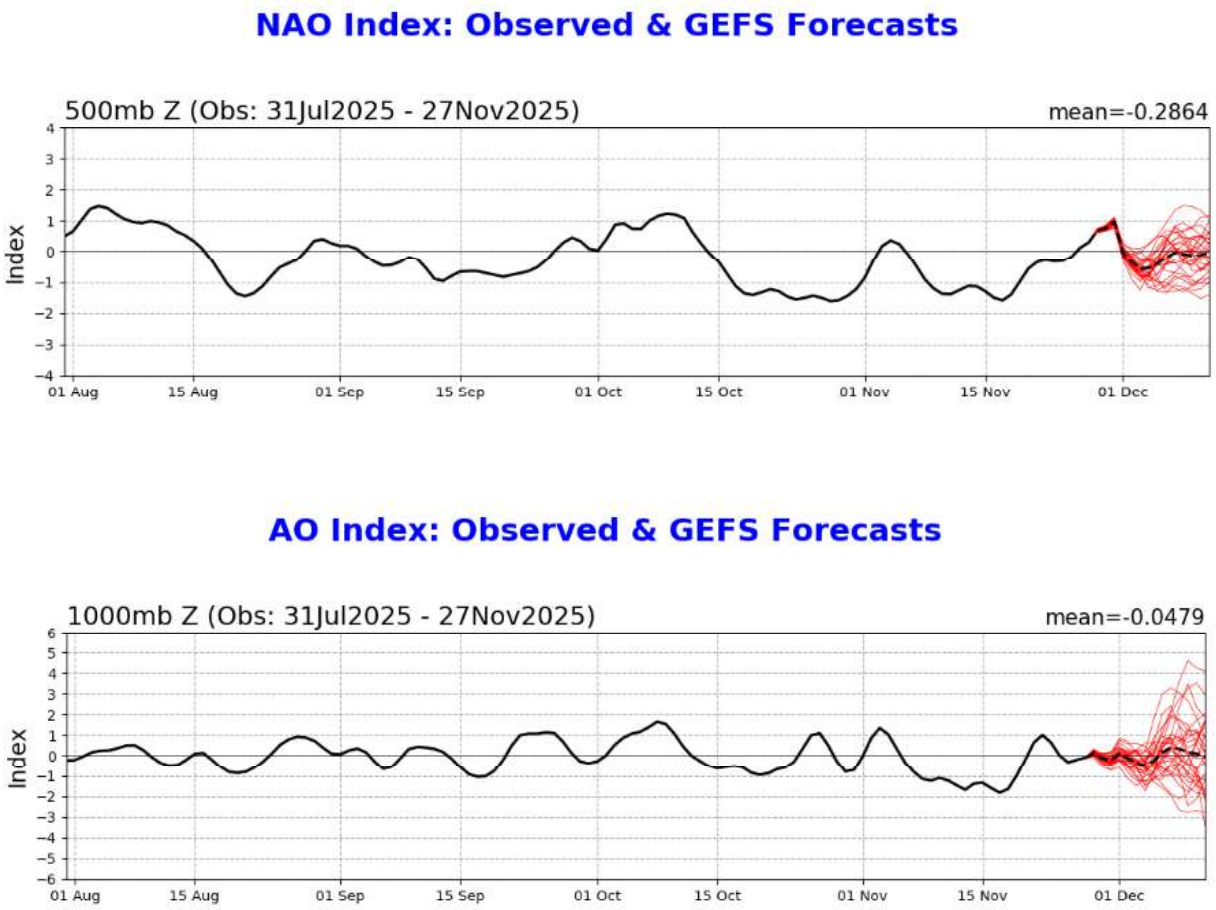


Figure 2.5: North Atlantic Oscillation (NAO) and Arctic Oscillation (AO) indices. Source: NOAA CPC, https://www.cpc.ncep.noaa.gov/products/precip/CWlink/daily_ao_index/ao.shtml

2.7 Weather regimes

Over the North Atlantic and Europe, some change of the weather regime distribution can be found for October 2025 compared to the previous months (Fig. 2.6). In August and September 2025, the Atlantic Low type was the most frequent one, but in October these were NAO- and Atlantic Ridge.

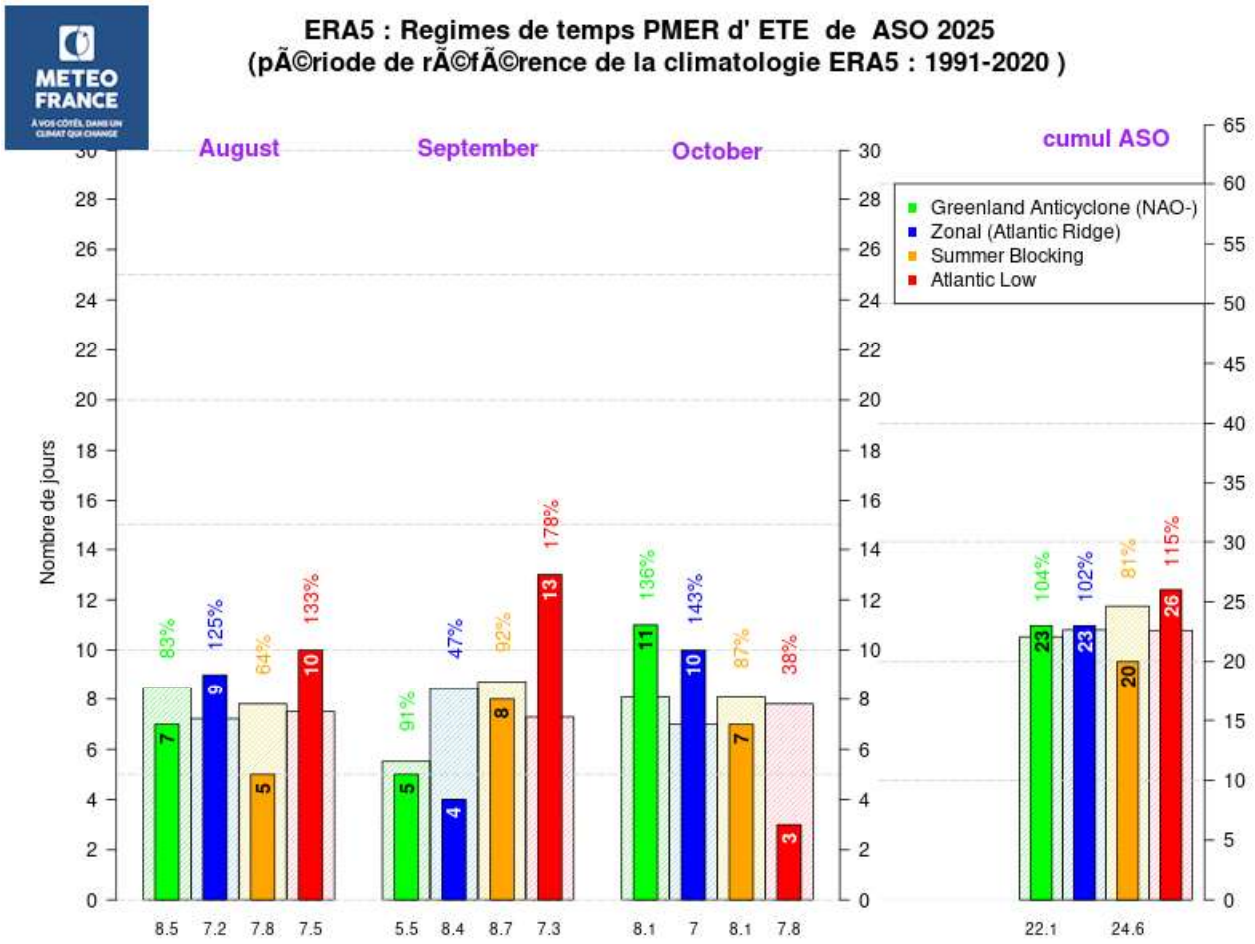


Figure 2.6: Weather regimes frequencies during ASO 2025 compared to 1991-2020 climatology and aggregation over the entire quarter, source: Météo France, data from ERA5.

2.8 Madden-Julian Oscillation (MJO)

The MJO was mainly inactive in September and early October 2025, but in mid-October, a signal developed over Africa and became stronger over the Indian Ocean and the Maritime Continent (Fig. 2.7). In November, MJO activity was mainly restricted to the Maritime Continent and the Western Pacific. Forecasts for December show some activity mainly over the Pacific, at the end of the month also weakly over Africa.

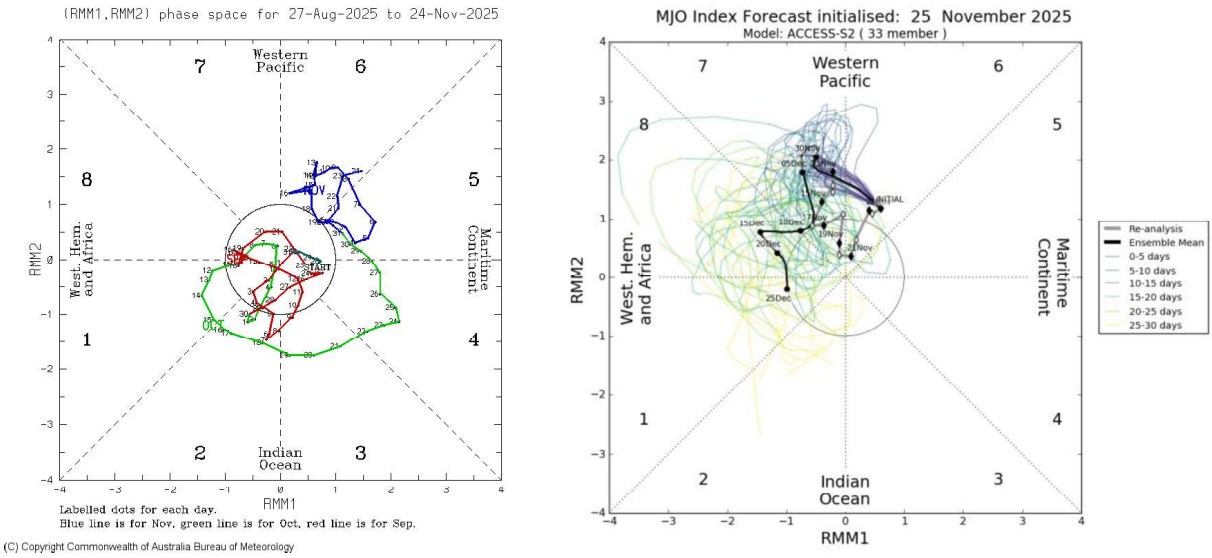


Fig. 2.7: MJO phase diagram August-November 2025 and forecast for December 2025. Source: http://www.bom.gov.au/climate/mjo/

3 Drivers

Summary

- La Niña is active and will likely persist in winter 2025/26, but no teleconnection is presently visible
- The PDO remains in a negative phase and might intensify the La Niña impact.
- IOD is strongly negative at the moment but might switch to neutral very soon, losing its impact.
- A current early SSW might affect the Polar Vortex this winter, but at the moment, no significant impact on the Arctic Circulation is visible in the troposphere. However, the circulation pattern was highly negative in October already, and NAO- occurred frequently also in November.
- At least a weak effect of MJO might be possible.

El Niño ==> Statistical effect on the Atlantic/Europe sector is different between the beginning and the end of winter

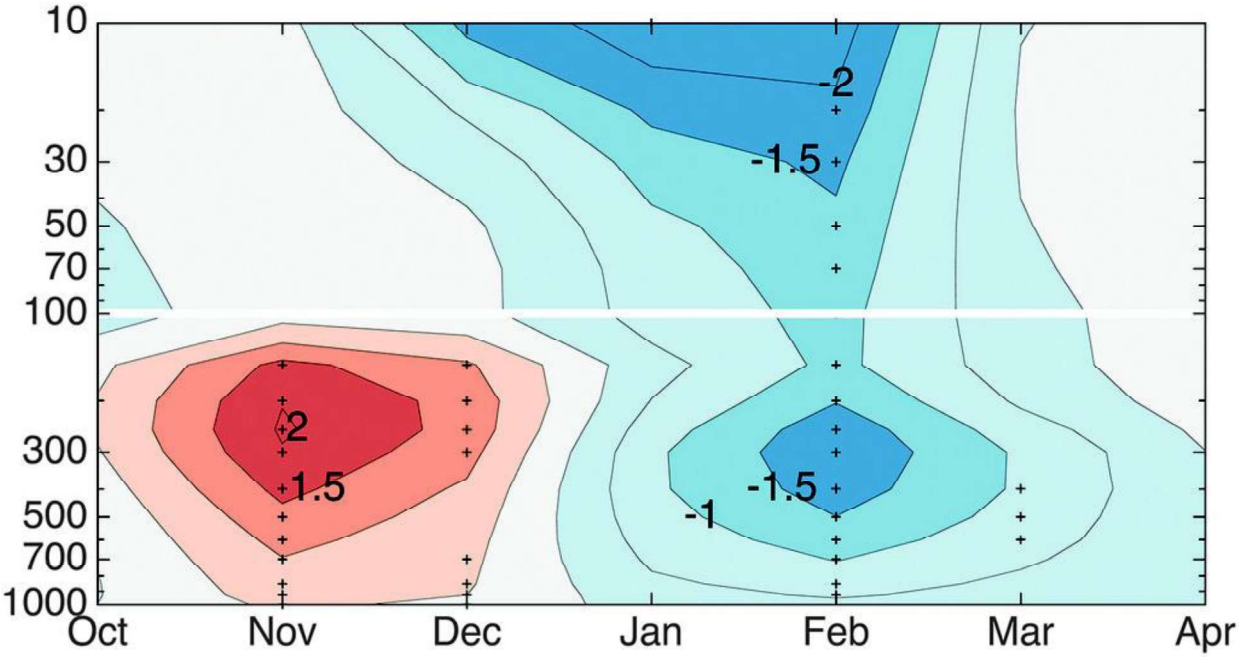


Fig 3.1: Regression of zonal wind (m s−1) on the Niño-3.4 index on a pressure level–month plane. The zonal wind time series is defined as the area average of the zonal wind in the area 40°–50°N, 90°W–0° for levels below 100 hPa, and the zonal mean is in the latitude band 50°–60°N for levels at and above 100 hPa (Citation: Martin P. King et all, Bulletin of the American Meteorological Society 99, 7; 10.1175/BAMS-D-17-0020.1)

At the end of autumn and beginning of winter, the westerly flow is reinforced, while at the end of winter and beginning of spring it is attenuated (following an increased frequency of SSW). For La Niña, it might be reversed.

IOD ==> In the case of a strong positive phase of the IOD, it is a NAO+ type circulation which is favored during winter

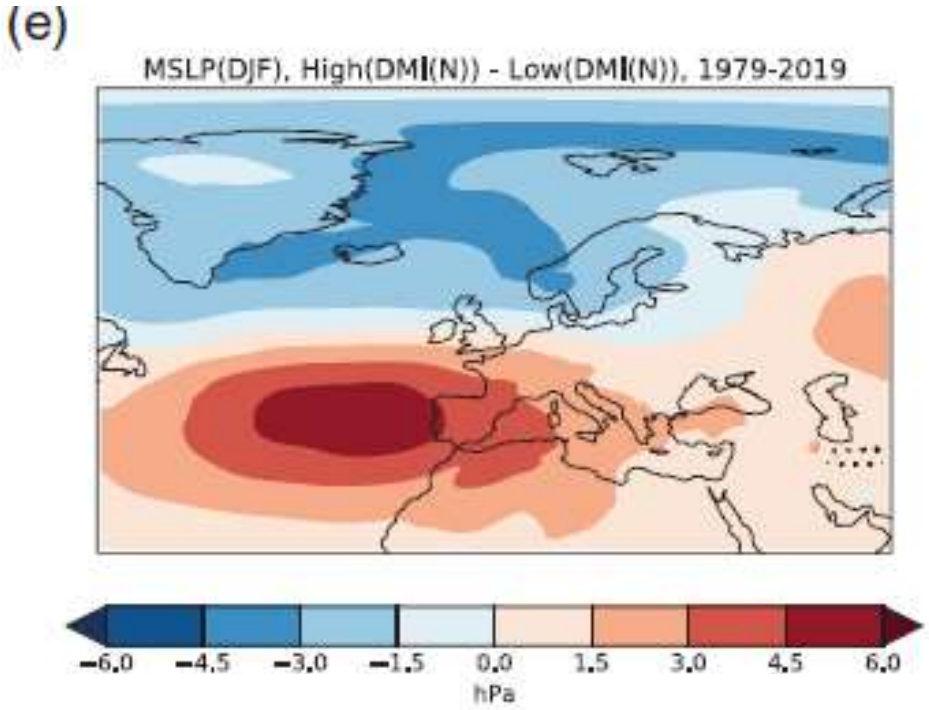


Fig 3.2: MSLP (hPa) with ENSO signal removed and stippling denoting statistical significance at the 90% level (source : Hardiman et al. Predictability of European winter 2019/20: Indian Ocean dipole impacts on the NAO. Atmospheric Science Letters, 21(12), e1005)

4 Temperature

Europe/RA VI domain

According to Copernicus data, October 2025 was 0.6 ºC warmer than the 1991-2020 average in Europe, ranking outside the ten warmest October months on record. The warming trend rate in Europe/RA VI since 1981 was about 0.44 °C per decade.

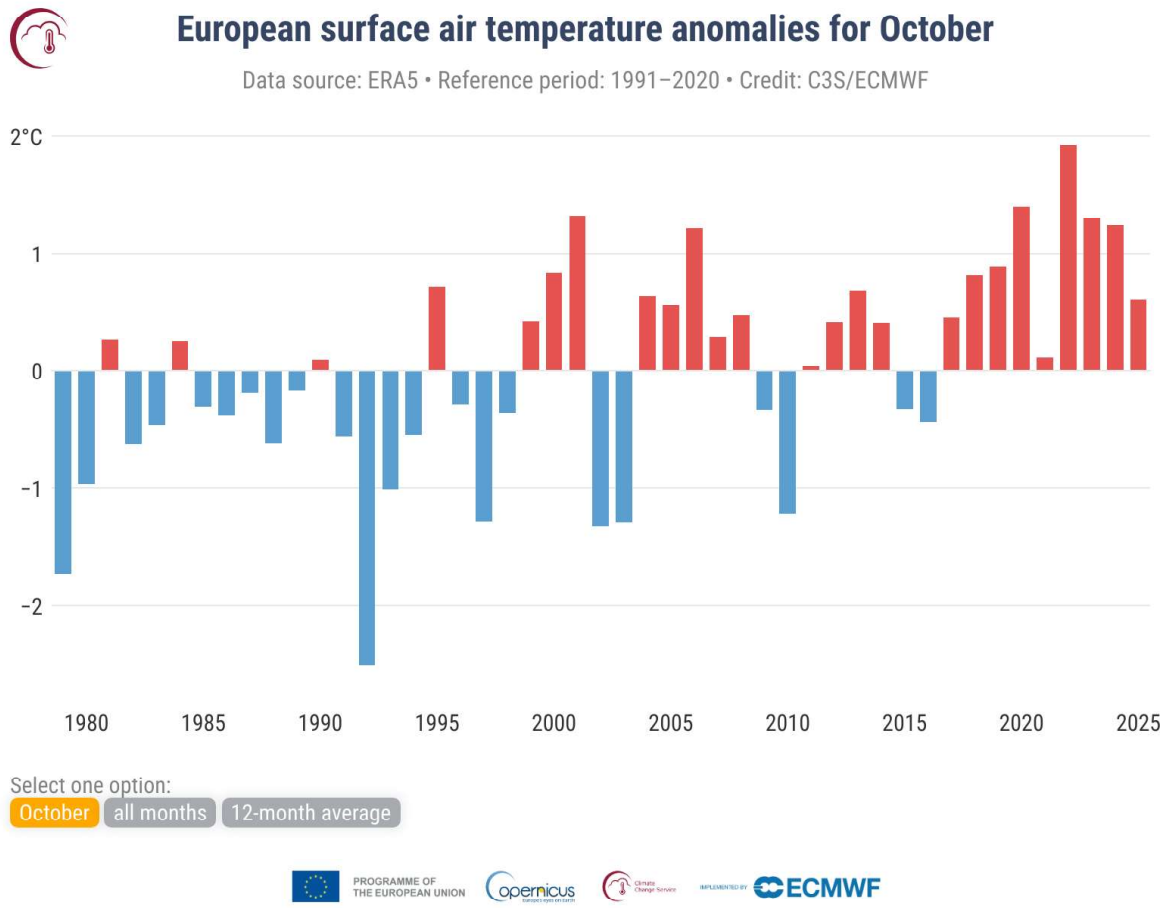


Fig. 4.1: Monthly European-mean surface air temperature anomalies relative to 1991-2020 for October months, from 1979 to 2025. Data source: ERA5. Credit: Copernicus Climate Change Service/ECMWF, https://climate.copernicus.eu/surface-air-temperature-maps

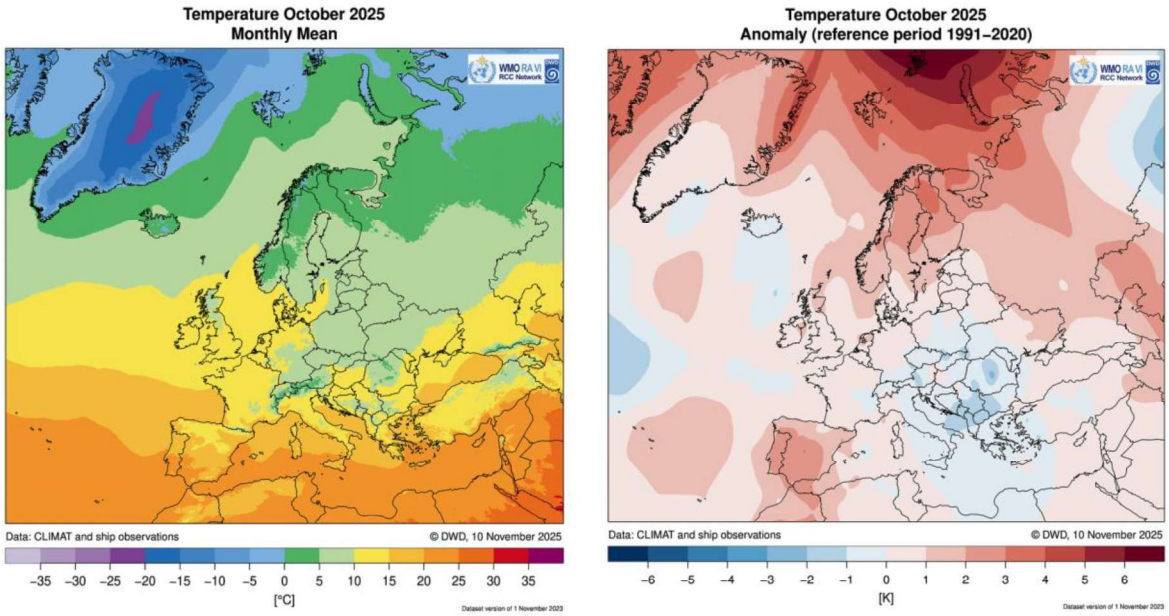


Fig. 4.2: Mean temperature (left) and anomalies (1991-2020 reference, right) in °C in the RA VI Region (Europe) interpolated from CLIMAT station data, for October 2025. Source: DWD, https://www.dwd.de/EN/ourservices/rcccm/int/rcccm_month_ttt.html

Within the RAVI MedCOF domain, monthly mean temperatures in the lowlands in October 2025 ranged from around 8 °C in northwestern Ukraine to around 25 °C in southern Israel. The month was at least 1 °C warmer than on 1991-2020 average in the west of the domain on the Iberian Peninsula (up to +3 °C anomalies), and in the east in eastern Ukraine, Azerbaijan, and southeastern Türkiye. Italy and the Balkan Peninsula were mainly slightly colder than normal partly more than 1 °C colder. The other areas had close to normal mean temperatures.

In terms of terciles, the Iberian Peninsula, much of the western Mediterranean, the Middle East, eastern Türkiye, most of the South Caucasus, and eastern Ukraine had temperatures in the upper tercile range. Parts of Italy and of the Balkan Peninsula recorded mean temperatures in the lower tercile range in October 2025. The rest of the domain had temperatures in the middle tercile range.

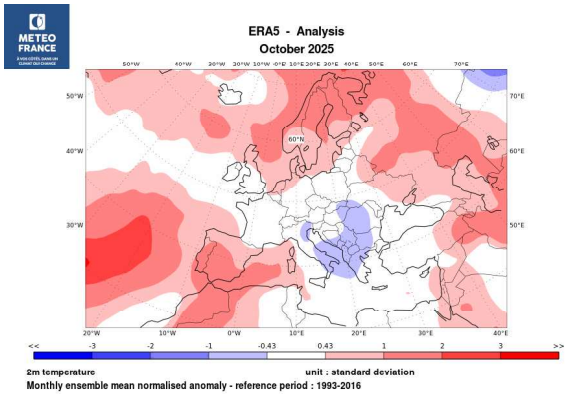


Fig. 4.3: Mean standardized temperature anomalies with terciles for October 2025. Source : Météo France, http://seasonal.meteo.fr/content/suivi-clim-cartes-ref93-16, data source : ERA5 reanalysis

Temperature in North Africa

The graph 4.4 shows the monthly trend in air temperature anomalies of October in degrees Celsius since 1979 through 2025. For each year, the positive anomaly is indicated by the red vertical bars and the negative anomaly is indicated by the blue vertical bars. The black line tracks the changes in the trend over time.

For October 2025, the land mean temperature of the North Africa region was above the 1991-2020 normal and has reached +0.5 °C. The warming rate was about 0.41°C per decade.

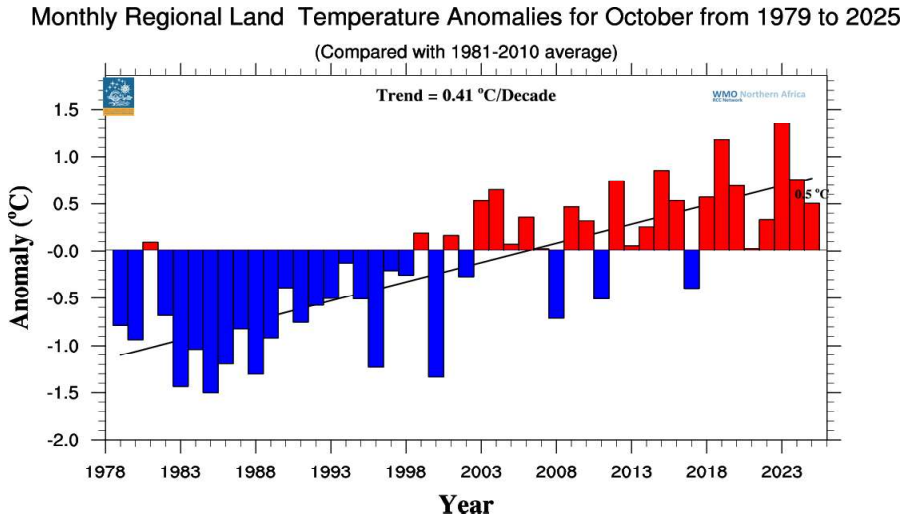


Figure 4.4: October mean temperature anomaly (until October 2025) time series plot with trend line

In October 2025, monthly mean temperature generally ranged from 22 °C to 30°C across the North African domain. Localised cooler conditions, around 14 °C, were observed in central Morocco and northern Algeria. Conversely, parts of central and southern Algeria recorded markedly warmer conditions, with mean temperatures exceeding 32 °C.

Compared to the 1991-2020 reference, temperature anomalies were above normal over most of the domain, it was in a range between +1 and +2 °C in Tunisia, Morocco, and most parts of Algeria, with small parts experiencing temperature anomalies reaching +3 °C, especially in the western center of Algeria. Temperature anomalies were below normal and mostly ranged between 0 and -1 °C over the south of Egypt, the south of Morocco and the west of Libya.

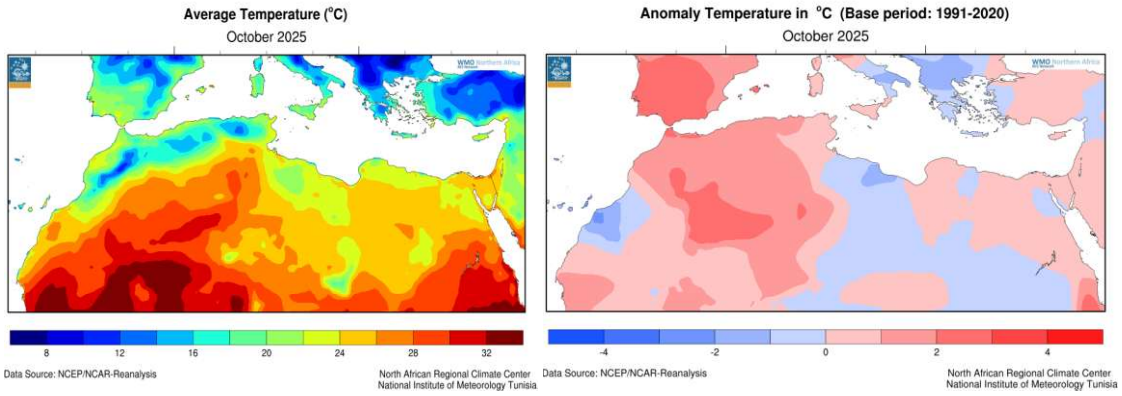


Figure 4.5: Left: Mean temperature; Right: Absolute anomalies of temperature in the RAI-NA Region (North Africa) Data from NCDC (National Climate Data Centre NOAA – reference 1991-2020),

https://www.meteo.tn/en/climate-monitoring-watch

5 Precipitation

Europe/RA VI domain

Some areas in the domain received more than 100 mm of precipitation; these were especially northwestern parts of the Iberian Peninsula, parts of Italy and the Balkan Peninsula, Moldova, southern Ukraine, western Georgia, northern and western Türkiye. Especially places in Italy and the Black Sea coast of Georgia recorded more 300 mm that month. Many other parts of the domain received 10–50 mm that month, partly more. Most of the Middle East and parts of southern Türkiye recorded less than 10 mm or even no precipitation at all.

Precipitation was above normal in places at the east coast of Spain, Italy, the central Balkan Peninsula, Moldova, most of the Ukraine, places at the Black Sea coast, western Türkiye and Greece, with anomalies partly above +70 mm. Below-normal precipitation was recorded on most of the Iberian Peninsula, in southern France, northern and southern Italy, Hungary, Bosnia and Herzegovina, but also much of Türkiye, the Middle East, and most of the South Caucasus. The monthly deficits were locally higher than 70 mm, particularly in northern Spain, southern France, northern Italy.

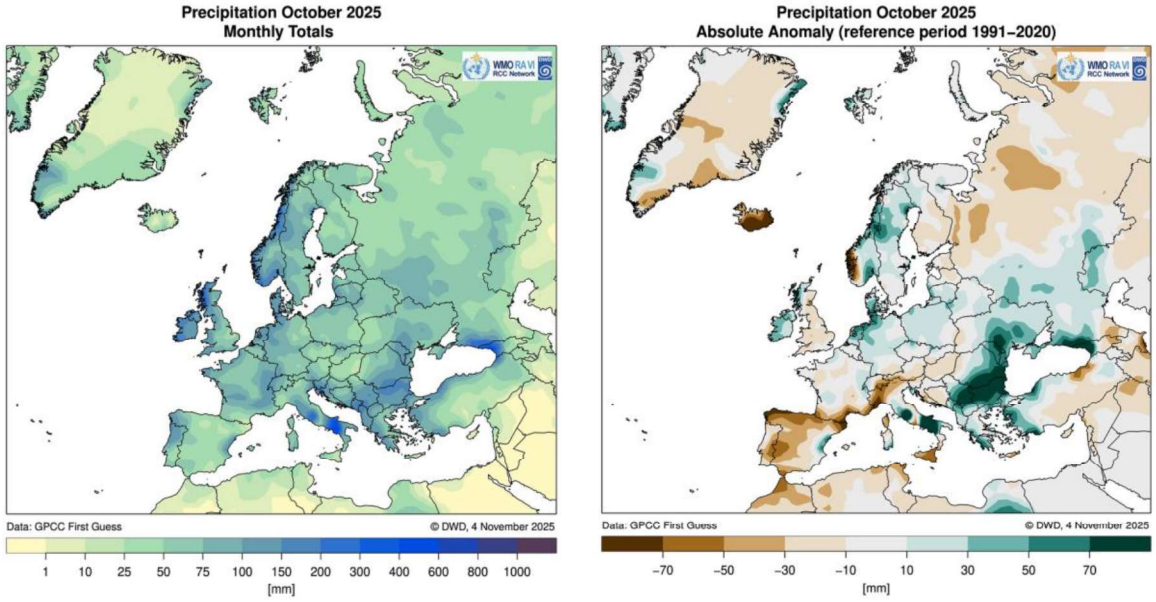


Fig. 5.1: Monthly precipitation totals (left) and percentage of 1991-2020 normal (right) for October 2025 in Europe/RAVI. Data from GPCC (First Guess version). Source: DWD, https://www.dwd.de/EN/ourservices/rcccm/int/rcccm_month_rrr.html

In terms of terciles, October 2025 precipitation was in the lower tercile range especially over much of the Iberian Peninsula, northern and southern Italy, parts of Türkiye and South Caucasus. Central Italy, much of the central eastern parts of the Balkan Peninsula, Moldova, most of the Ukraine, and western Türkiye had precipitation in the upper tercile range.

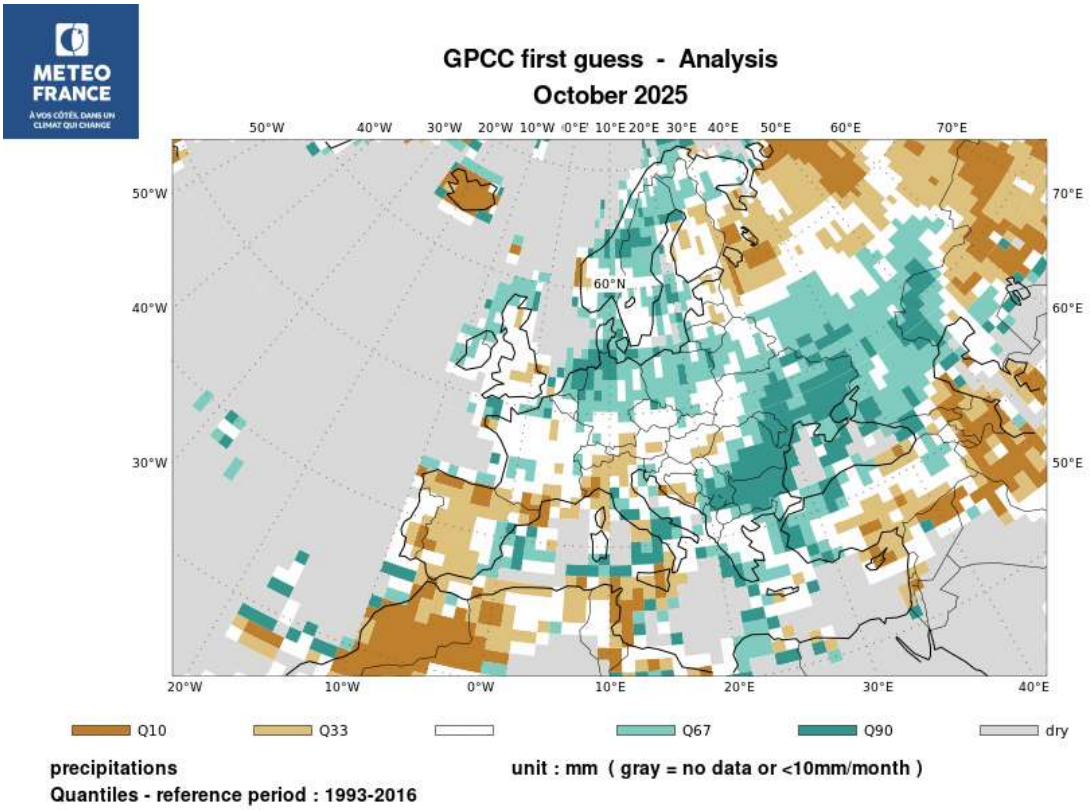


Fig. 5.2: Quantiles of monthly precipitation totals for October 2025. Source : Météo France, http://seasonal.meteo.fr/content/suivi-clim-cartes-ref93-16, data source : GPCC

Precipitation in North Africa

In October 2025, the North African region experienced very dry conditions. Overall, precipitation totals were below 20 mm. The northwest of Tunisia, the northern and the central western parts of Algeria and locally northern Morocco received the highest rainfall amounts, around 50 mm.

Regarding to the maps of the precipitation anomalies (1991-2020 reference period) , precipitation was generally below normal, with values less than 60% of the normal over Morocco, north of Algeria, western parts of Libya and all of Tunisia. Over the south of Algeria, the south and the east of Libya and over most of Egypt, the anomalies were above normal.

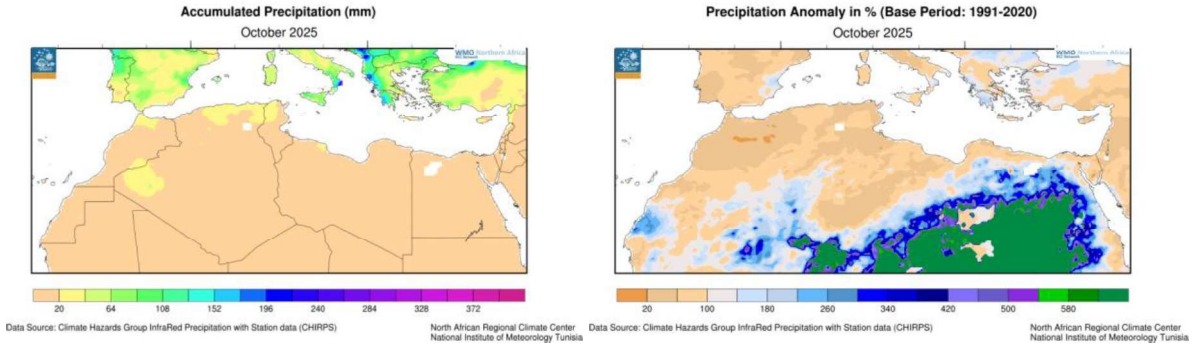


Figure 5.3: Left: Total precipitation; Right: Percentages of normal in the RAI-NA Region (North Africa)
Data from NCDC (National Climate Data Centre NOAA – reference 1991-2020)
https://www.meteo.tn/en/climate-monitoring-watch

6 Soil moisture

Europe/RA VI domain

Soil moisture was well below normal in October 2025 especially in eastern Ukraine, parts of South Caucasus, Türkiye, the coastal regions of the Middle East, and the northwestern Balkans. Above-normal soil moisture occurred only locally.

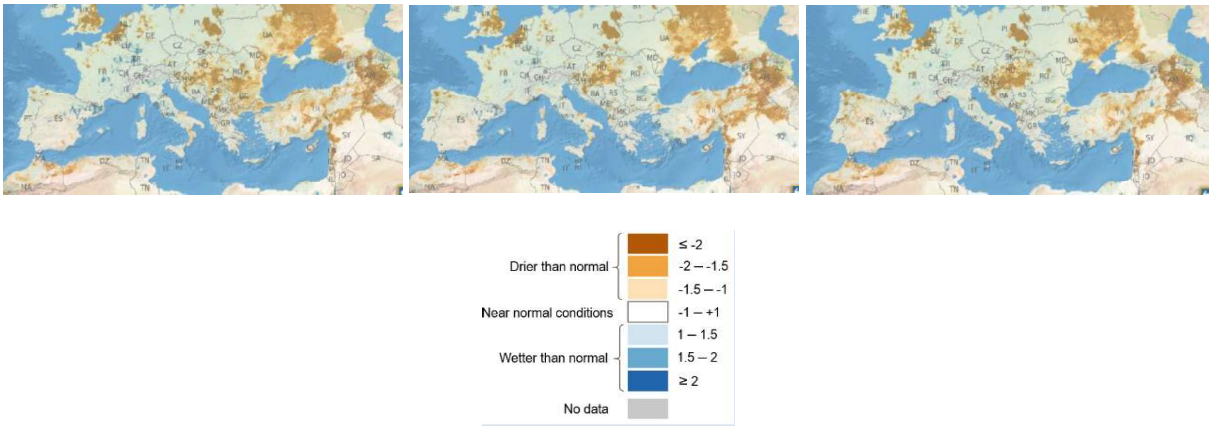


Figure 6.1: 10-day anomalies of soil moisture index (SMI) in October 2025, reference period: 1995-2024. Source: European Drought Observatory (EDO), https://edo.jrc.ec.europa.eu/edov2/php/index.php?id=1111

North Africa/RA I domain

October 2025 was marked by predominantly below-normal soil moisture across most of the region. Localized above-normal soil moisture was observed in southern and western Libya, small areas of northern Algeria, Tunisia, and Morocco, as well as in northwestern Egypt.

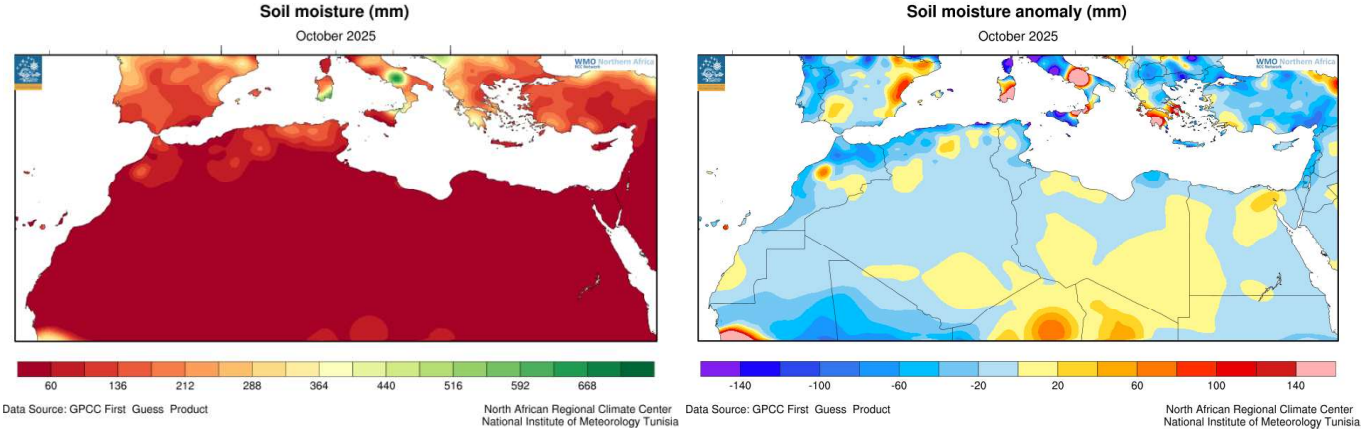


Figure 6.2: October 2025 soil moisture, left: monthly total, right: monthly anomalies with reference period 1991-2020.

References:

Météo France monthly and seasonal climate monitoring maps: http://seasonal.meteo.fr

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 on Climate Monitoring Website with monitoring results: http://www.dwd.de/rcc-cm

GPCC: http://gpcc.dwd.de

Copernicus Climate Change Service: https://climate.copernicus.eu

NOAA National Centers of Environmental Information (NCEI): https://www.ncei.noaa.gov/

Deutscher Wetterdienst (DWD), Germany: https://www.dwd.de

EU Joint Research Centre: http://edo.jrc.ec.europa.eu

Australian Government – Bureau of Meteorology: http://www.bom.gov.au