SOUTH EAST EUROPEAN CLIMATE OUTLOOK FORUM
SEECOF-23 Online Forum

MONITORING SUMMARY SEECOF-23

for April 2020

First Draft

Last update: 15 May 2020

Compiled by

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The following SEECOF monitoring summary is based on

- Monitoring information from RA VI RCC Node-CM
- Contribution from Météo France (draft of LRF bulletin)
- Further information from various sources (BOM, NOAA-CPC)

1. Oceanic Analysis

Over the Pacific Ocean: neutral "El Niño" conditions:

- Temperatures in the tropical Pacific were mostly warmer than normal and anomalies were generally weak in April 2020
- Anomalies in the west were higher than in the east. In the very eastern tropical Pacific (near the Peruvian coast), cooling was in progress and led to a weak cold anomaly.
- In the Niño 3.4 region, anomalies always were close to the El Niño threshold of +0.5°C from January to April 2020. The present value for April 2020 was +0.55°C after NOAA CPC, +0.5 after BOM and +0.4°C from Mercator Ocean PSYV4R2 analysis (different reference periods are used).
- In the subsurface, there was notable cooling from January to April 2020, especially in the layer between 100 and 200m depth in much of the equatorial basin. The cold anomaly propagated from the west to the central part of the basin, lately also to the east. According to BOM analysis, this cooling went on in May.
- Present ENSO indicators still show neutral ENSO conditions. However, the notable cooling of the equatorial Pacific, particularly in the subsurface, gives some potential for a beginning La Niña development, and also some model forecasts show this. However, for summer 2020, neutral conditions are still likely. For more details see: http://www.bom.gov.au/climate/enso/index.shtml#tabs=Sea-sub%E2%80%93surface, https://www.ncdc.noaa.gov/teleconnections/enso/indicators/sst/ .

Over the Maritime Continent and the Indian Ocean:

- The tropical part of the Indian Ocean was still warmer than normal. There was only a slight northwest-southeast gradient in SST. This could be a first observational sign for a beginning development of a negative Indian Ocean Dipole (IOD).
- The IOD was still neutral in April 2020. However, some models forecast a negative IOD at least temporarily for July and August 2020. See http://www.bom.gov.au/climate/enso/index.shtml#tabs=Indian-Ocean for more details.
- Generally cold anomalies in the subtropics of the southern hemisphere (extending from south of Africa to the south of Australia).

Over the Atlantic:

- In the tropical Atlantic still positive, but mostly weak anomalies.
- From March to April 2020, there was a cooling in the northern tropics, especially close to the African coast.
- Outside the tropics, a dipole of anomalies existed with negative anomalies over the middle latitudes (north of 45°N) and positive anomalies over the subtropics.

Over the Mediterranean and Black Sea:

- The western Mediterranean had above-normal temperatures in April, while the eastern Mediterranean temperatures were around normal. The Black Sea was warmer than normal.

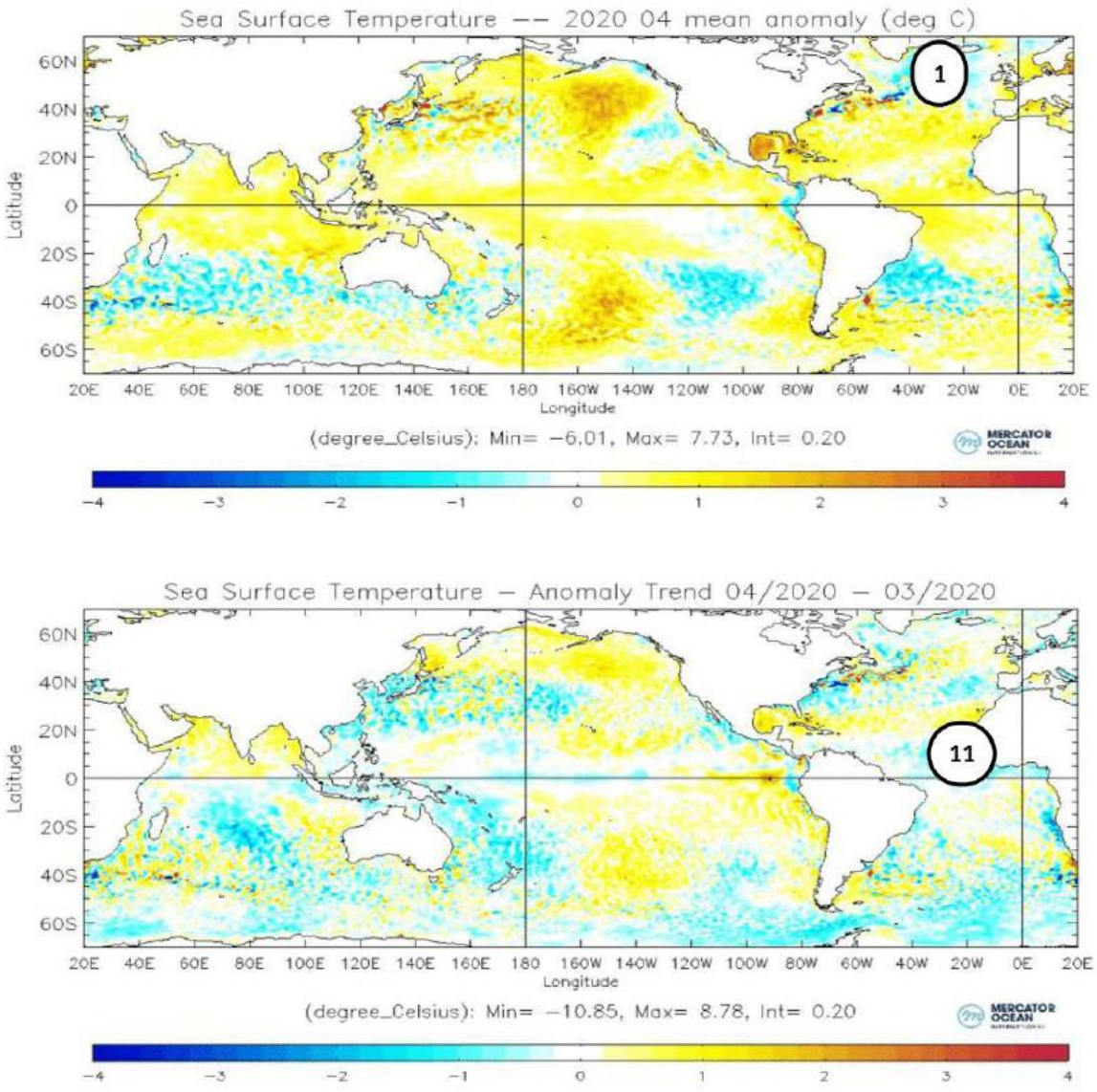

Figure 1.1: Sea surface temperature anomalies for April 2020, 1992-2013 reference. Data from Mercator Ocean, source: Météo France. Numbers: 1 – slight strengthening of the cold anomaly, 11 – quite strong cooling in April

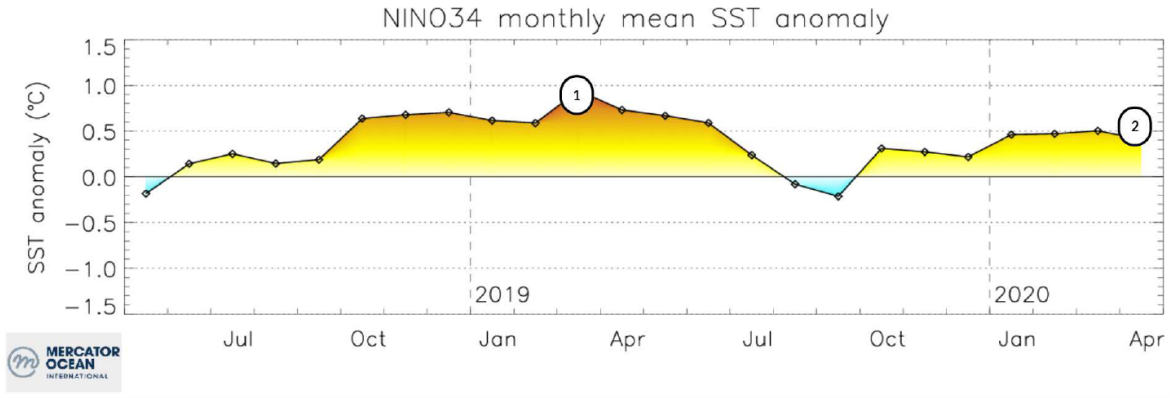

Figure 1.2: Evolution of sea surface temperature anomalies in the Niño3.4 box, 1992-2013 reference. Data from Mercator Ocean, source: Météo France. Numbers: 1 – weak El Niño during winter 2018/19 and spring 2019, 2 – current neutral conditions

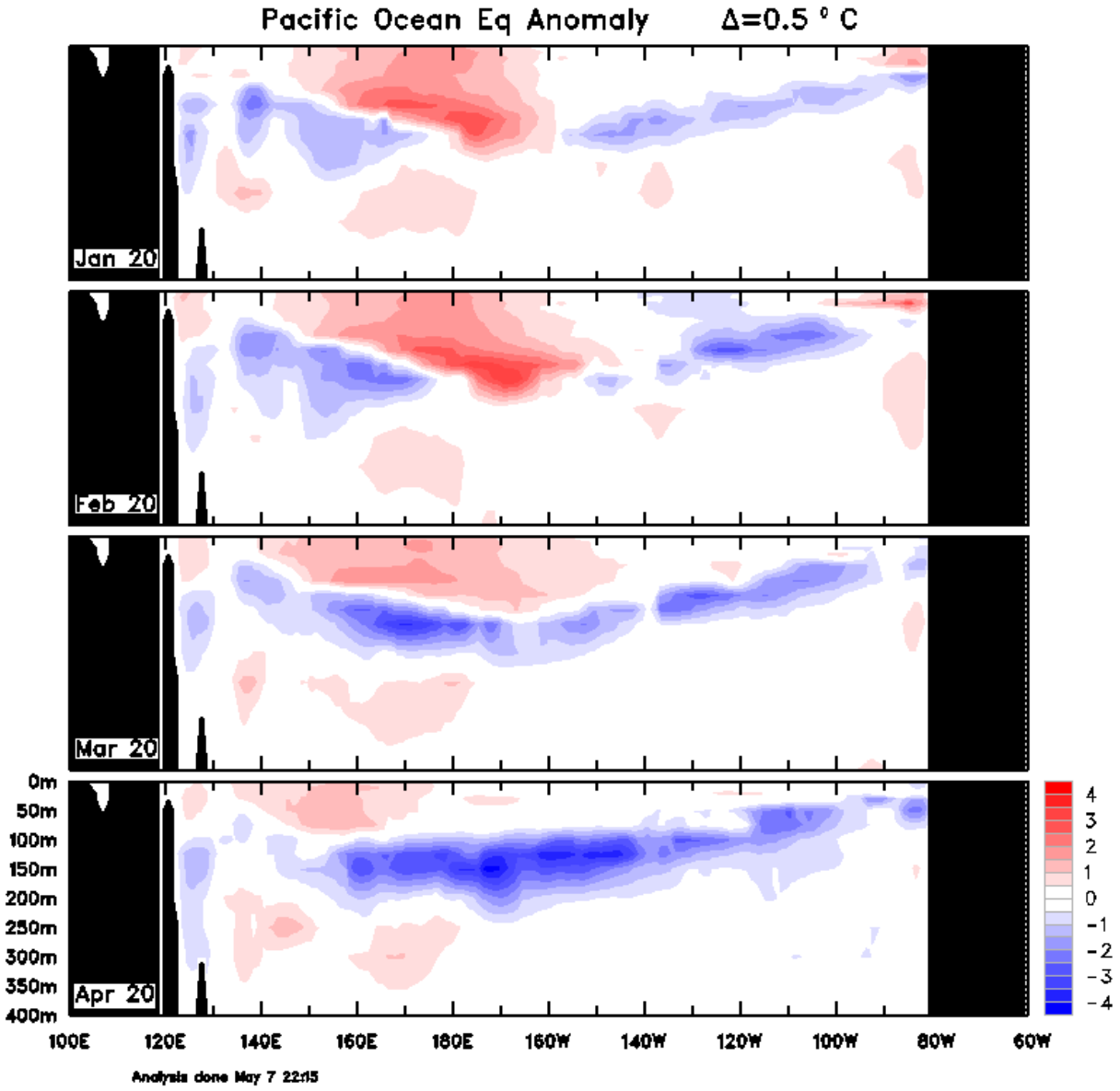

Figure 1.3: Monthly Pacific Ocean temperature anomalies in the sub-surface January-April 2020, 1900-1992 reference (Climatology after Levitus World Ocean Atlas). Source: BOM, http://www.bom.gov.au/climate/enso/index.shtml#tabs=Sea-sub%E2%80%93surface

2. Atmospheric Circulation Analysis

Velocity Potential Anomaly field in the high troposphere (fig. 2.1 – insight into Hadley-Walker circulation anomalies) and SOI:

- Upward motion anomaly over the eastern tropical Atlantic, Africa, the Indian Ocean, the maritime continent and western Pacific, downward over the eastern Pacific, Central and South America. This is in line with SST anomalies (cooling near South America, warm anomalies elsewhere in the tropics. Most velocity potential anomalies are relatively weak, but there seems to be a well-established ocean-atmosphere coupling.
- Monthly SOI for April 2020 was -0.5 for BOM, +0.2 for NOAA, which is close to zero and means mainly neutral ENSO conditions, see https://www.ncdc.noaa.gov/teleconnections/enso/indicators/soi/ , http://www.bom.gov.au/climate/current/soihtm1.shtml

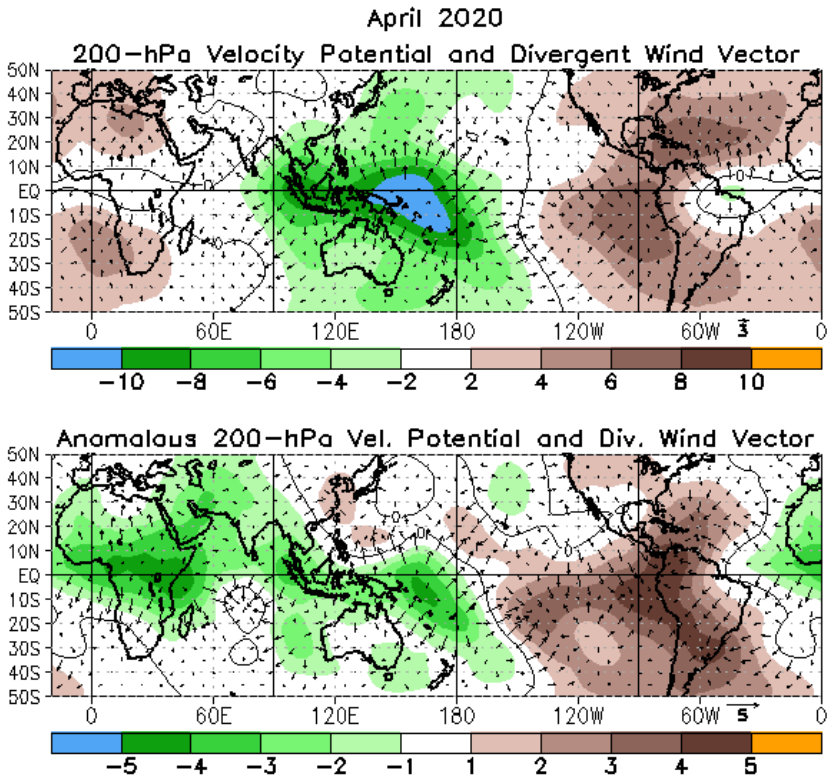

Figure 2.1.a: Velocity Potential and anomalies at 200 hPa and associated divergent circulation and anomaly for April 2020. Green (brown) indicates a divergence-upward motion/anomaly (convergence-downward motion/anomaly).
http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt24.shtml

MJO (fig. 2.1.b)

- MJO became active in April 2020 and moved from the western Pacific over Africa to the Indian Ocean. It could have contributed to some of the upward motion anomalies during the month.

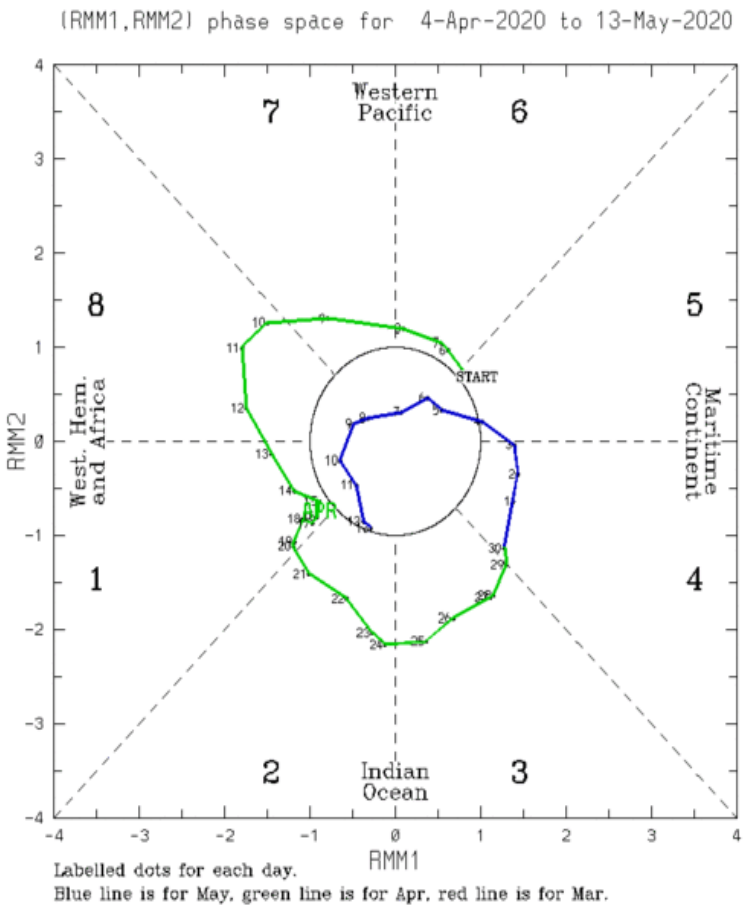

Figure 2.1.b: indices MJO

http://www.bom.gov.au/climate/mjo/

Stream Function anomalies in the high troposphere (fig. 2.2 – insight into teleconnection patterns tropically forced):

Generally rather weak anomalies in the tropics and hence no significant teleconnections.

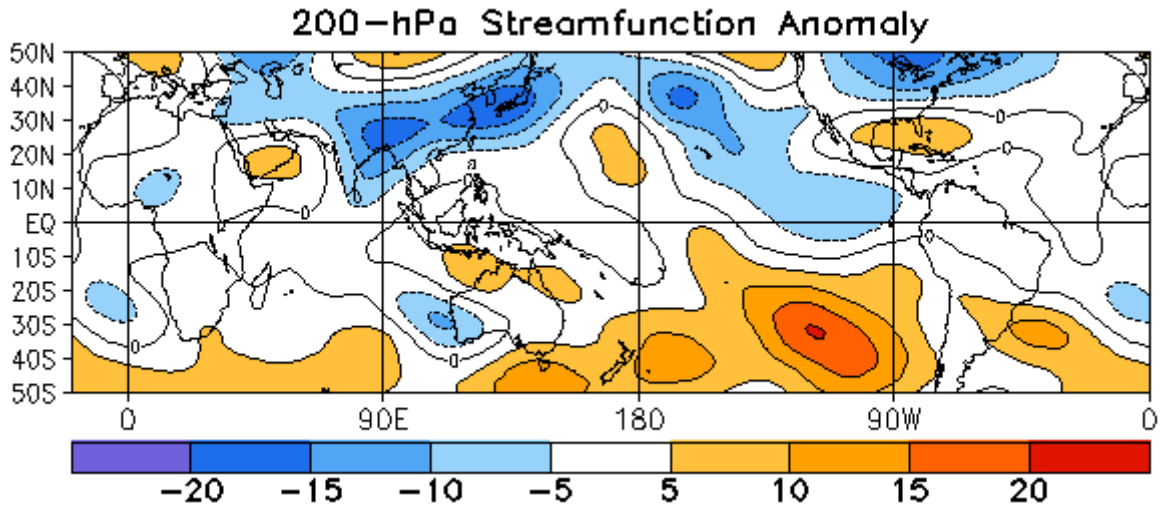

Figure 2.2: Stream Function Anomalies at 200 hPa in April 2020.

http://www.cpc.ncep.noaa.gov/products/CDB/Tropics/figt22.shtml

Geopotential height at 500 hPa(fig. 2.3 – insight into mid-latitude general circulation):

- An anticyclonic anomaly extended from Northwestern to Southeastern Europe. Eastern parts of the domain (especially eastern Ukraine, South Caucasus, eastern Turkey, and Middle East) were under cyclonic influence on monthly average.

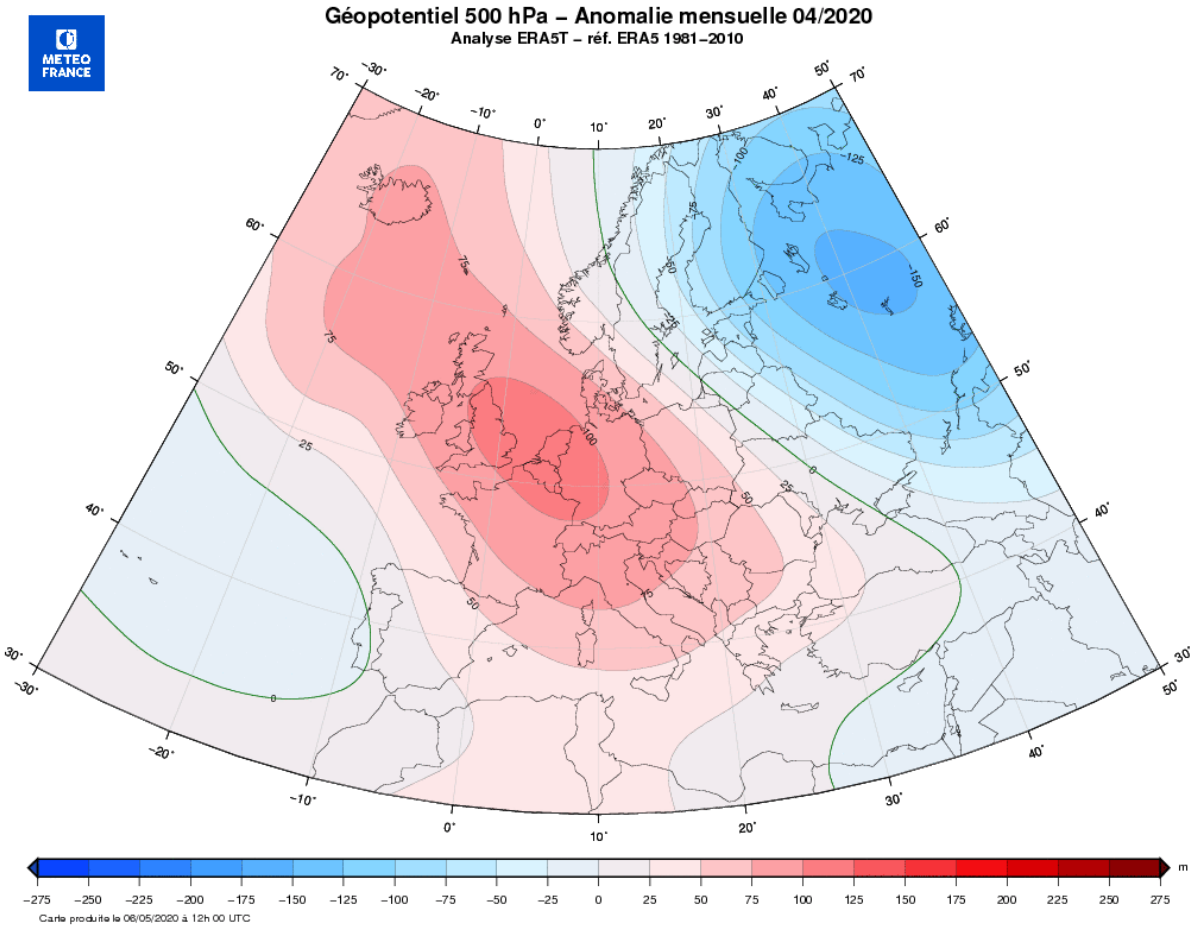

Figure 2.3: Anomalies of Geopotential height at 500hPa (Météo-France)

Sea level pressure and circulation types relevant for Europe

- High pressure conditions extended over the whole Balkan Peninsula
- Intense low pressure area over Russia also affected the northeastern Ukraine
- Low pressure influence also over the eastern Mediterranean region including Turkey, southern South Caucasus and Middle East.
- The main circulation types in April 2020 relevant for Europe were the following:
    - NAO-: after a long NAO+ phase during the whole winter 2019/20, circulation changed in late March 2020 and westerly flow from the Atlantic to Europe stopped,
    - EA/WR+: strong dipole with high pressure over the North Sea and low pressure over western Russia caused inflow of cold air into Eastern Europe,
    - SCAND-: low pressure over western Russia also extended to Scandinavia.

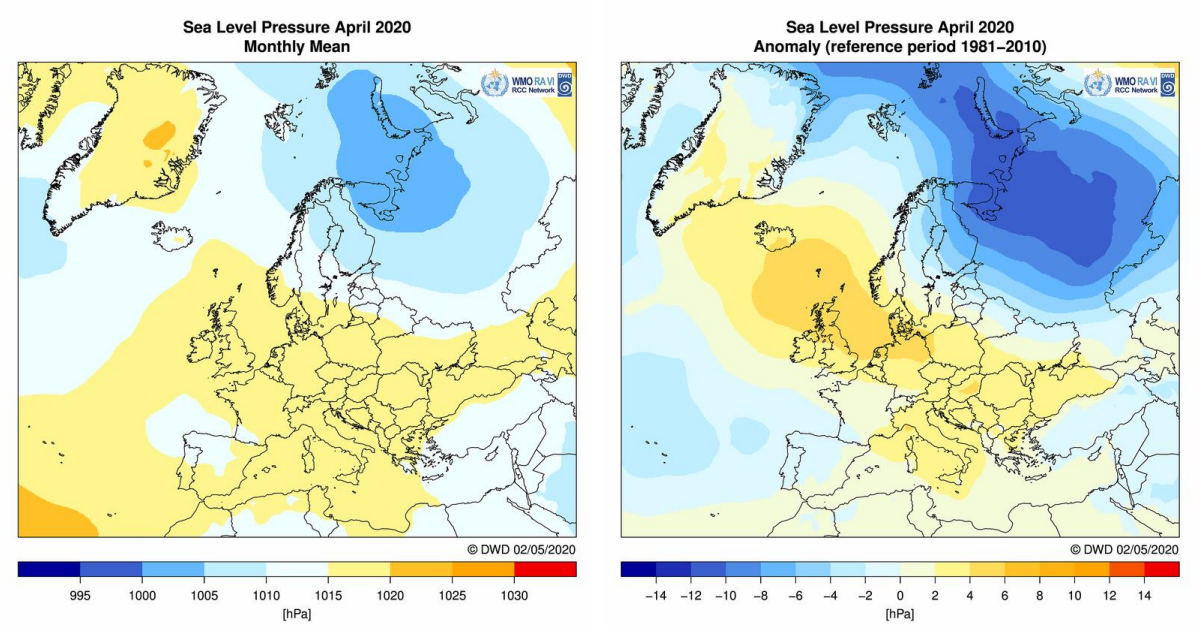

Figure 2.4: Mean sea level pressure over the North Atlantic, Europe and North Africa and 1981-2010 anomalies for April. Source: DWD, https://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_ppp.html?nn=490674

MONTH	NAO	EA	WP	EP-NP	PNA	TNH	EATL/WRUS	SCAND	POLEUR
APR 20	-1.3	0.6	-1.3	1.5	-1.4	---	1.8	-1.5	0.5
MAR 20	0.7	-0.1	1.3	0.4	-2.4	---	0.6	-0.9	1.8
FEB 20	1.0	1.4	1.5	-1.8	-0.1	1.7	-0.1	-2.7	-0.4
JAN 20	1.1	1.7	0.7	-0.6	-1.0	-0.9	0.7	-0.5	0.2
DEC 19	1.0	0.8	0.7	---	-0.1	-0.2	0.1	0.8	-0.4
NOV 19	0.2	0.1	-0.1	1.9	-0.1	---	-0.6	1.5	1.0
OCT 19	-1.0	0.7	-0.8	-0.5	-1.0	---	-0.5	0.2	-0.2
SEP 19	0.0	2.2	0.9	-1.5	1.6	---	0.8	-0.5	-0.1
AUG 19	-1.6	1.9	-2.2	-1.2	1.2	---	-1.7	-2.1	0.3
JUL 19	-1.4	0.1	-0.3	0.1	0.6	---	1.0	-0.7	-1.5
JUN 19	-0.8	1.3	-1.9	1.7	0.2	---	0.3	-0.2	-0.5
MAY 19	-2.4	-0.6	-0.6	0.3	-0.2	---	-0.7	-0.1	-0.8
APR 19	0.4	-1.0	-1.3	0.7	-0.8	---	0.8	2.1	-0.4

Table 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

NAO was in a negative phase especially in the first half of the month. In the second half, NAO became neutral. AO was neutral or slightly in a positive phase in April 2020.

In the first half of May 2020, both indices had a temporary negative phase, implying a relatively strong meridionalisation. Forecasts for the second half of May show likely a neutral phase for NAO and AO.

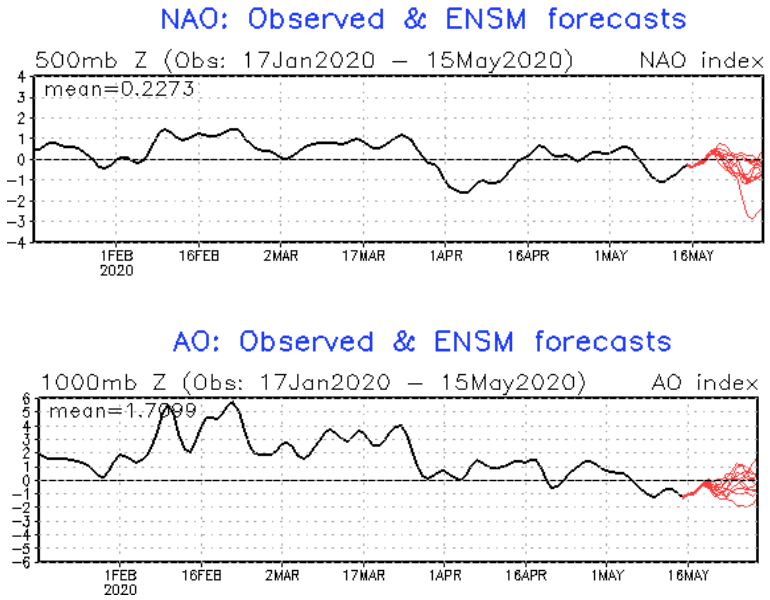

Figure 2.5: North Atlantic Oscillation (NAO) and Arctic Oscillation (AO) indices. Source: NOAA CPC, http://www.cpc.noaa.gov/products/precip/CWlink/daily_ao_index/teleconnections.shtml

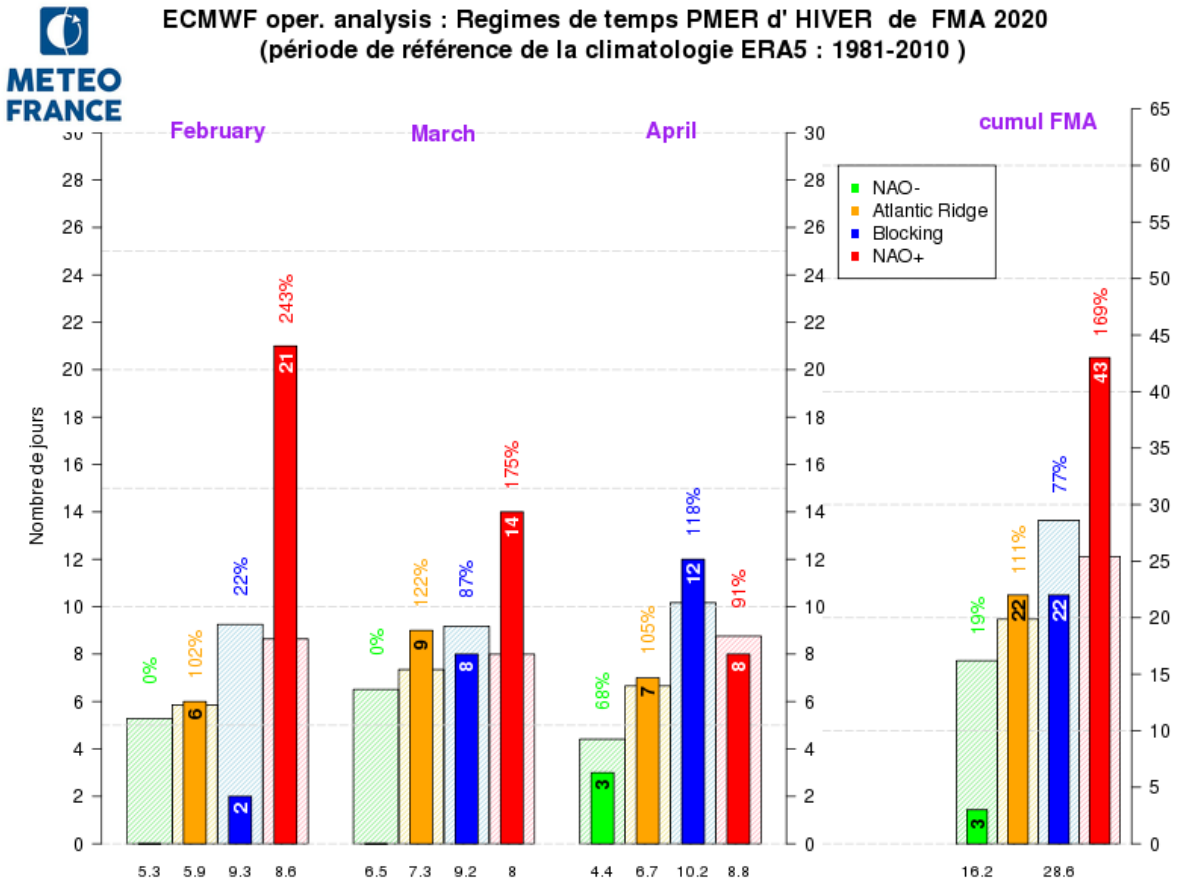

Figure 2.6: Distribution of weather types of Météo France classification (winter regime) for February-April 2020.

Source: Météo France, http://seasonal.meteo.fr/en/content/suivi-clim-regimes-trim

Météo France weather type classification shows a decrease in the number of NAO+ types from February to April and an increase of blocking types in the same period.

3. Precipitation

Monthly precipitation totals in April 2020 in the SEECOF domain were lowest in some northern parts (Hungary, Romania, Moldova, Ukraine) and in eastern parts of the Middle East (Jordan) with less than 10mm each, and highest in Armenia and eastern Turkey (above 100mm). It was much drier than normal all over the north of the domain (northern Balkans and Eastern Europe), with partly less than 20% of normal precipitation. It was also drier than normal in western and central Turkey, locally with less than 60% of the normal. Southern Balkans/Greece (except the west), much of the South Caucasus and eastern Turkey had above-normal precipitation, and also southern Israel and southern Jordan. In absolute terms, the highest precipitation deficit was recorded in the western Balkans with down to -70mm locally. Greece, Armenia and Azerbaijan had a surplus up to above +50mm.
Precipitation anomalies were partly extreme. The low precipitation in the north was mainly below the 10th percentile and the high precipitation over the Aegean Sea region and South Caucasus above the 90th percentile.

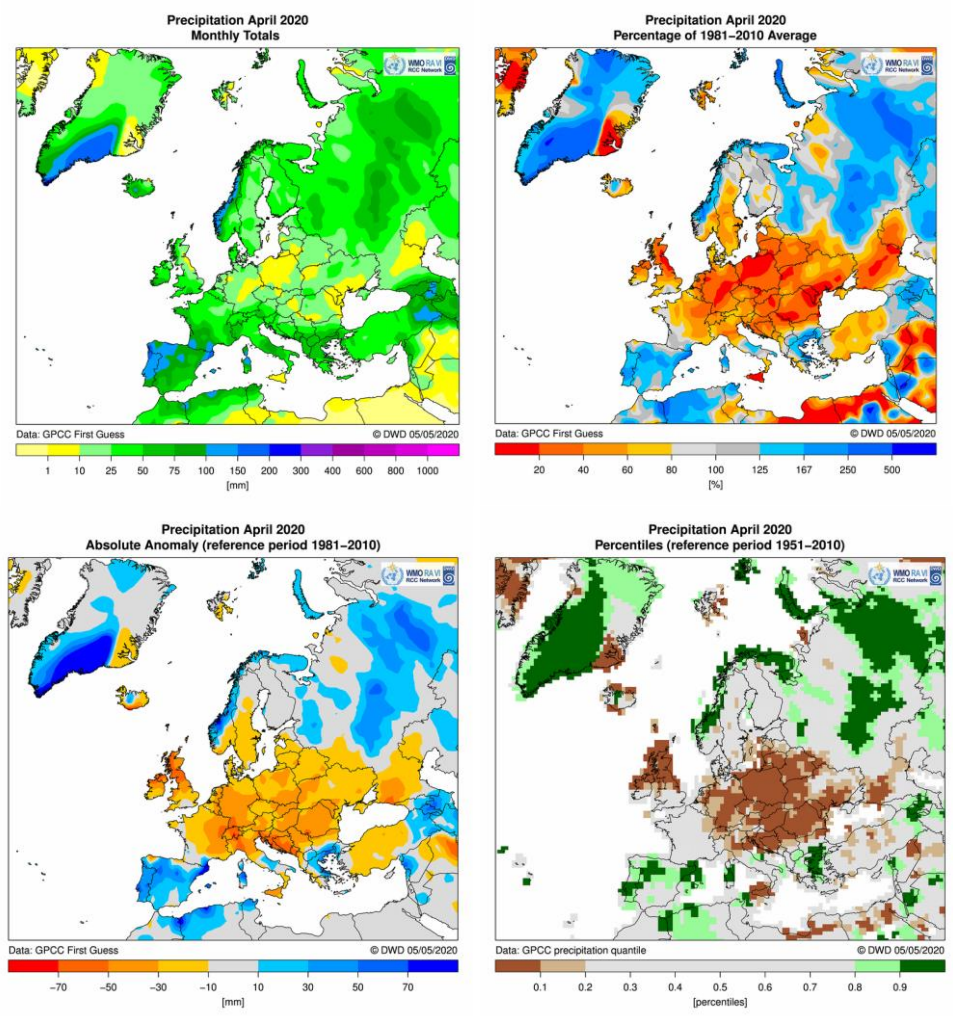

Figure 3: Monthly precipitation sum (upper left), percentage of normal (upper right), absolute anomalies (middle left), and percentiles (middle right) for April 2020 (1981-2010 reference for percentages and anomalies, 1951-2010 for percentiles) in Europe/RAVI. Data from GPCC (First Guess version). Source: DWD, http://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_rrr.html?nn=16102

4. Temperature

Monthly mean temperature in April 2020 varied between around 7°C in the northern Ukraine and around 20°C in southern Israel and Jordan.

Most of the domain had temperatures around normal (-/+1°C anomalies). It was more than 1°C colder than normal in the eastern Ukraine and the South Caucasus due to cold air inflow related to the Russian low pressure and it was more than +1°C warmer in the western Balkans within the high-pressure zone.

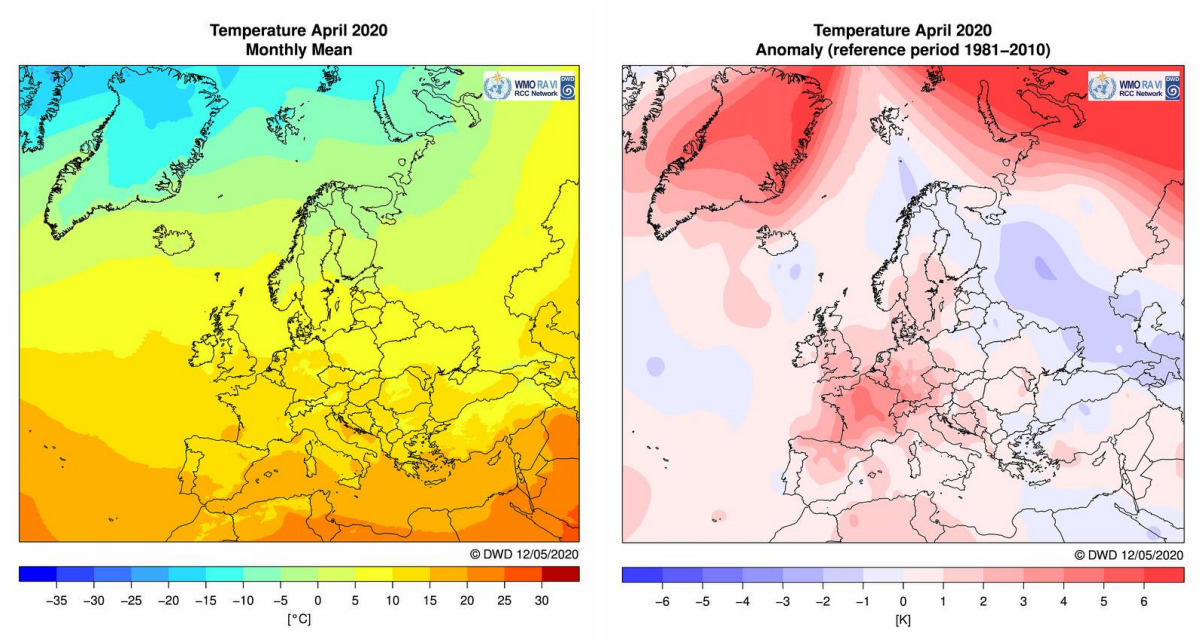

Figure 4: Mean temperature (left) and anomalies (1981-2010 reference, right) in °C in the RA VI Region (Europe) interpolated from CLIMAT station data, for April 2020. Source: DWD, http://www.dwd.de/DE/leistungen/rcccm/int/rcccm_int_ttt.html?nn=490674.

References:

Météo France Monthly Seasonal Forecast Bulletin and climate monitoring maps: http://seasonal.meteo.fr (password protected)

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

GPCC: http://gpcc.dwd.de