

National Climate Bulletin and the assessment of the SEECOF-23
Climate state outlook for the 2020 summer season

DIVISION of CLIMATOLOGY – APPLICATIONS
HELLENIC NATIONAL METEOROLOGICAL SERVICE

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Part A

1. Temperature

1.1. Analysis of the 2020 summer air temperatures anomalies for Greece

The summer (June through August) average mean temperatures for Greece (long term data series of 31 meteorological stations were used to derive summer average mean temperature for the whole country) was nearly 26.1 °C, about 0.8 °C greater than the normals of 1971-2000 (Figure 1). The greatest mean temperature anomalies were detected over the northeast mainland and the lowest ones over the northwest and central mainland and west Crete.

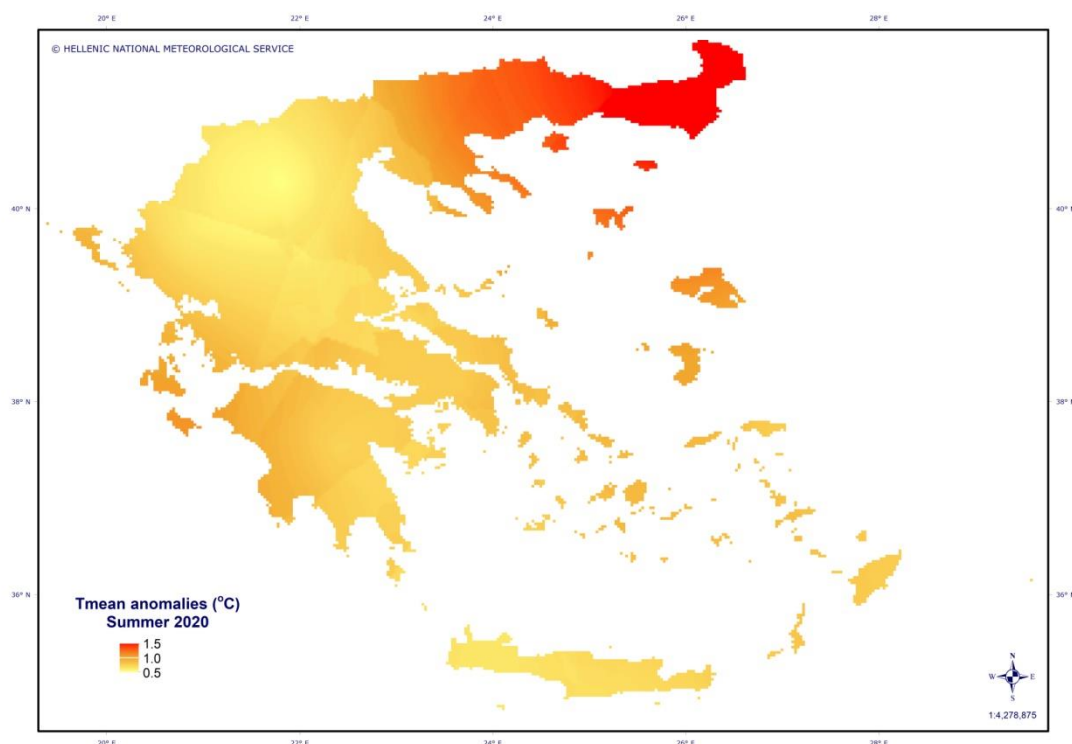


Figure 1. *Mean temperature anomalies (°C) for summer 2020 in Greece according to the 1971-2000 climatology.*

The summer average mean temperature anomalies in Greece from 1960 to 2020 are given in Figure 2. It is noticeable that the summer mean temperature remained relative low before 1992, and then started to rise and reached a local peak in 2012 which was the warmest summer on record. The second warmest summer in Greece remains 2007. Also during the last twenty summers (2001-2020) mean temperature anomaly exceeded 1.5 °C eight times.

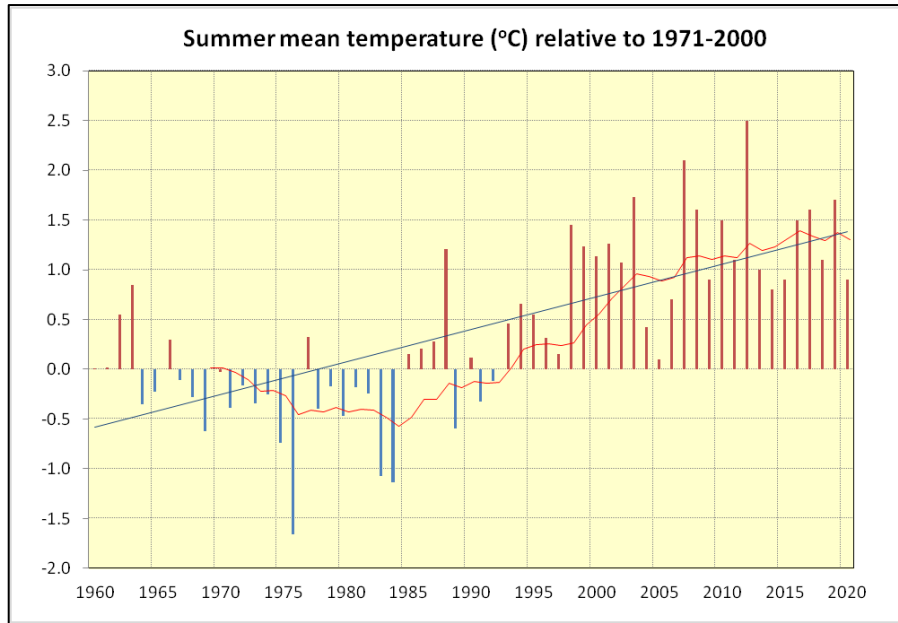


Figure 2. Summer 2020 (June through August) averages of mean surface air temperature anomalies for Greece (taking into account 31 stations) relative to 1971-2000. The red line indicates the ten-year moving average, and the blue line indicates the long-term linear trend.

In order to quantify the observed seasonal temperatures in terms of cold, warm and normal, we have used the percentile method. The percentiles were calculated for each station and are based on homogenized mean temperature series for the period 1971-2000. According to percentile ranks (Figure 3) **warm** and **very warm** conditions prevailed over Greece (83% of the examined stations) during summer 2020, while four stations have normal conditions and only one station was found to have **extremely warm** conditions.

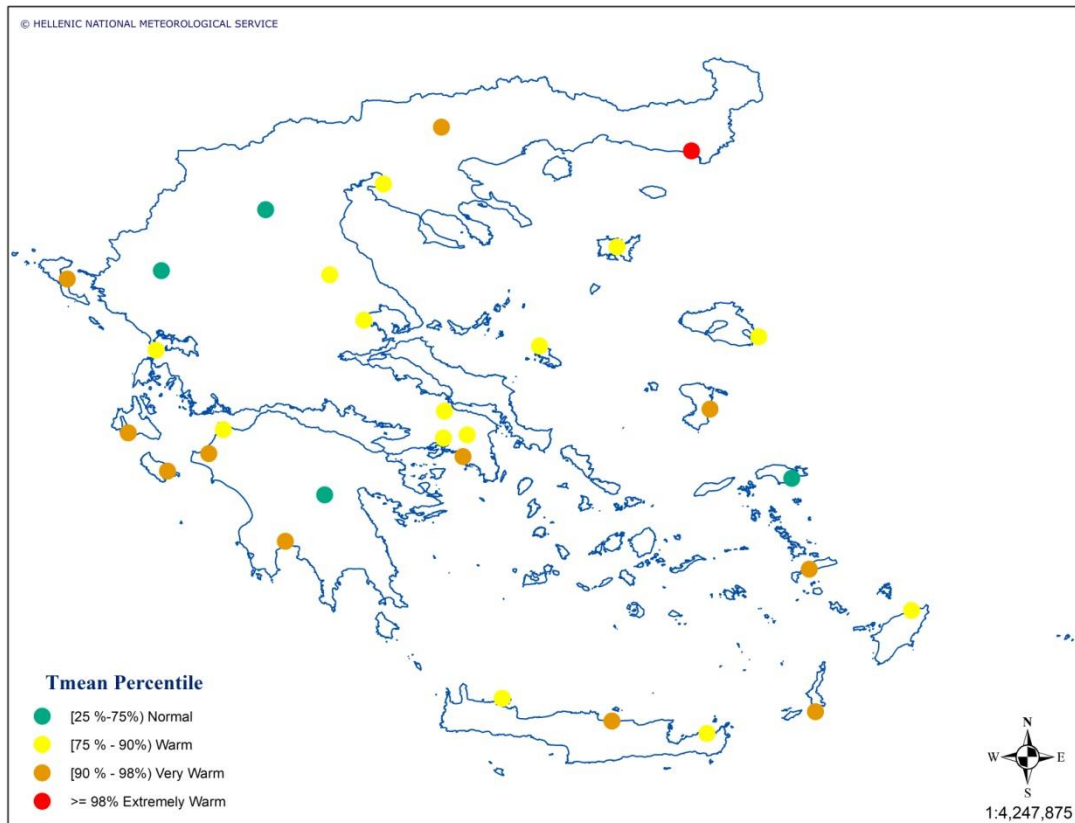


Figure 3. Mean temperature percentiles for summer 2020 (based period 1971-2000).

1.2. Verification of the SEECOF-23 summer 2020 temperature outlook for Greece

The seasonal forecast for summer suggested that the mean temperature would be above normal in mainland areas with the greatest temperature anomaly (above 2 °C) occurring in the north northeast and central Greece (Figure 4).

Verifying the seasonal forecast for summer (although this is relative to the 1981-2010 normal values): in general, the seasonal forecast was successful for most parts of the country.

RCM-SEEVCCC: Mean 2m temp. anom. (°C) for season JUN-JUL-AUG 2020
Forecast start: 00Z01JUN2020

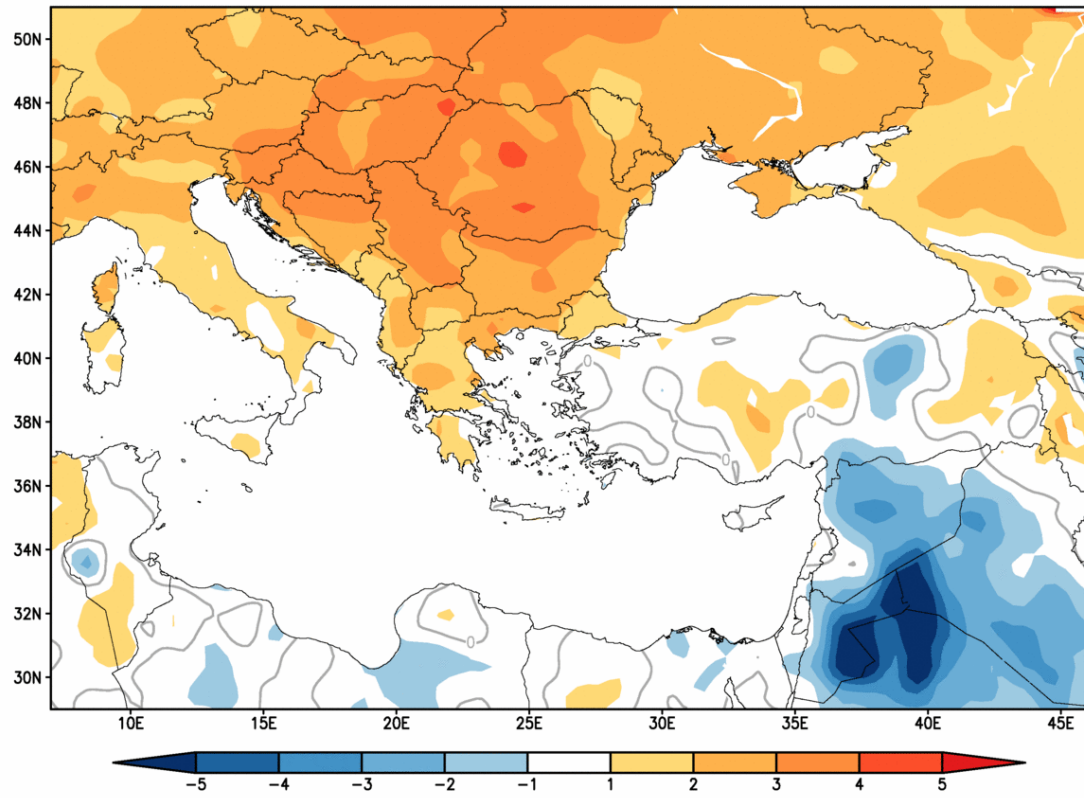


Figure 4. Mean temperature anomaly (1981-2010) for summer 2020.

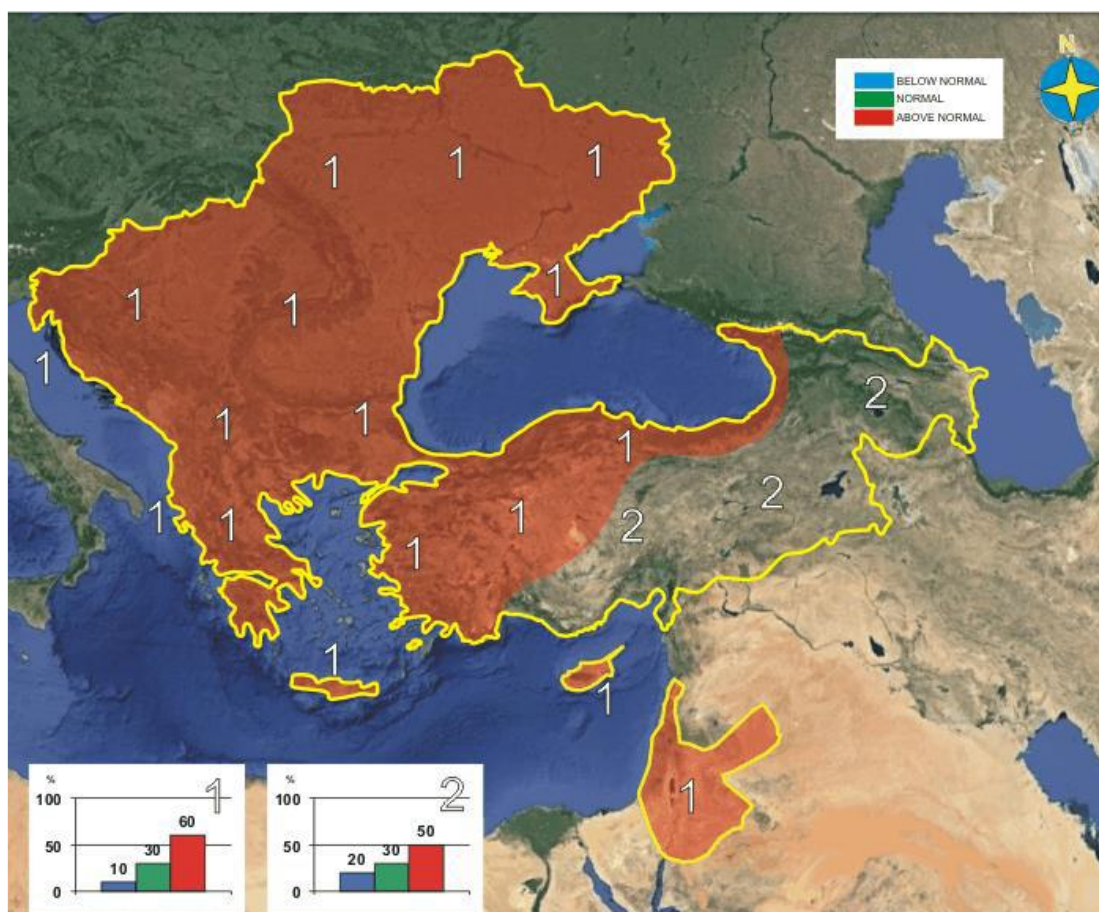


Figure 5. Graphical presentation of the 2020 summer temperature outlook.

The consensus statement of SEECOF-23 mentioned that the whole area of Greece was likely to experience above average summer temperatures relative to the period 1981-2010 (zone 1: 10% below normal, 30% around normal, 60% above normal) (Figure 5).

Verifying the seasonal forecast for summer (although this is relative to the 1981-2010 normal values): in general, the prediction was successful, because the summer mean temperatures varied above normal for most parts of the country.

Part B

2. Precipitation

2.1. Analysis of the 2020 summer precipitation anomalies in Greece

The analysis of seasonal precipitation amounts throughout Greece is based on data from 30 meteorological stations distributed evenly in the country. Figure 6 shows the total precipitation amounts in summer 2020.

Precipitation in summer 2020 was generally above or near the normal values (1971-2000) for most of the country, with the greater values occurring in west Macedonia, in the north Ionian Sea, in Attica and in the eastern Peloponnese. Total precipitation in these areas accounted for more than 200 % of normal values (1971-2000). Also few thunderstorms in June over the northeast Aegean islands, along with the fact that normal conditions are characterized by the absence of summer precipitation resulted in high summer precipitation anomalies. Precipitation in summer 2020 was below normal values in the northeast mainland, in the northwest Peloponnese, in the southeastern Aegean and the central and eastern Crete. The summer precipitation ratios to the normal values (1971-2000) (the normal values are based on homogenized data series) were computed and are given in percentages in Figure 7.

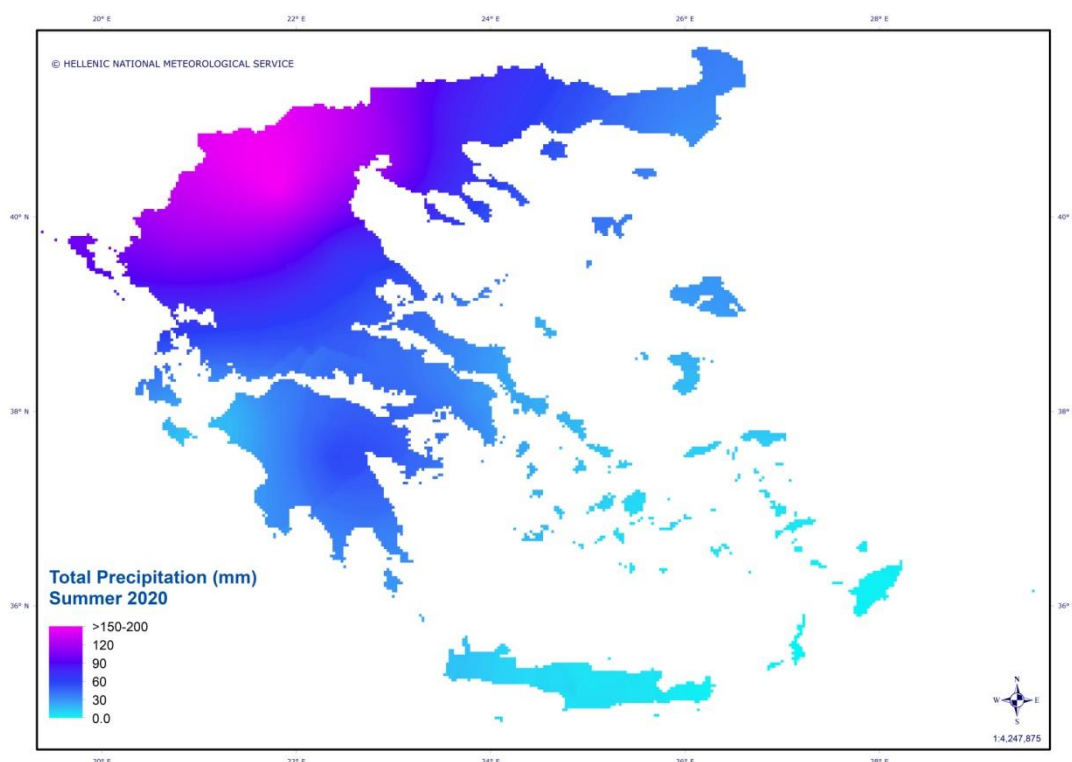


Figure 6. Spatial distribution of summer 2020 precipitation totals expressed in mm.

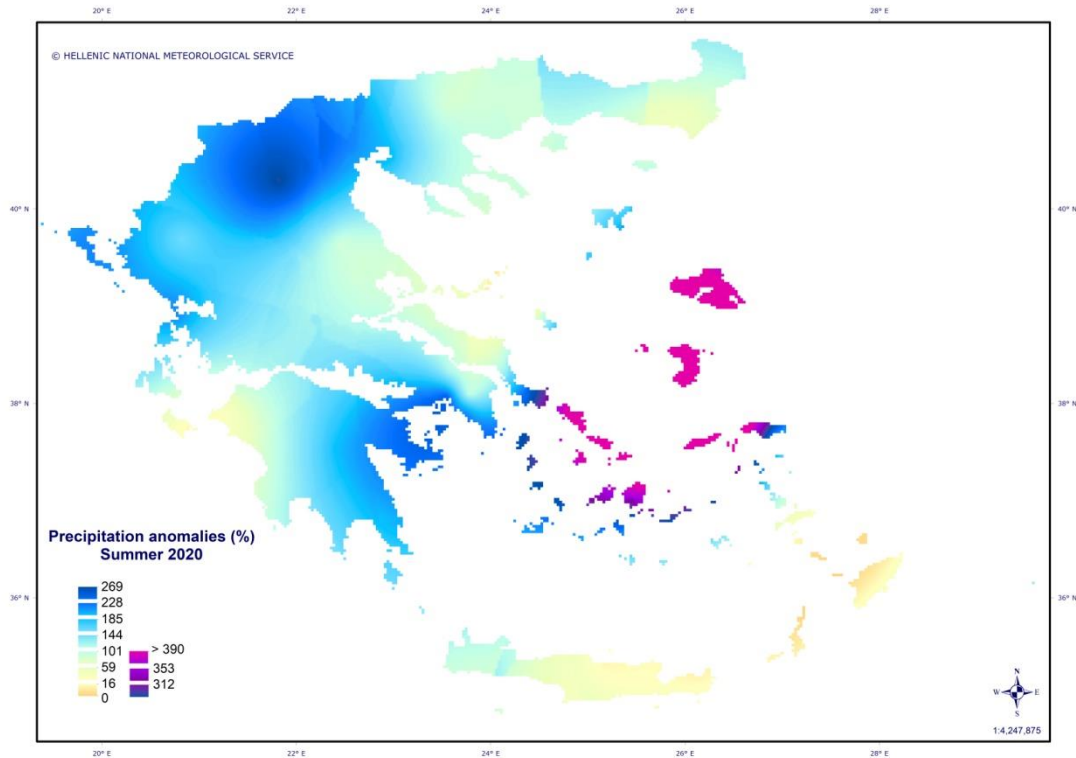


Figure 7. Summer 2020 precipitation anomalies (1971-2000) given in percentages.

In order to quantify the observed precipitation height in terms of wet, dry and normal we have used the percentile method. The percentiles were calculated for each station and are based on homogenized precipitation series for the period 1971-2000.

According to percentile ranks (Figure 8) precipitation amounts for summer 2020 have been described by the following categories:

- Normal conditions prevailed in 11 stations (36% of the examined stations).
- Wet to very wet conditions (10 stations, 33% of the examined stations).
- Extremely wet conditions (2 stations, 7% of the examined stations).
- Very dry conditions (6 stations, 20% of the examined stations).
- Dry conditions (1 station, 3% of the examined stations).

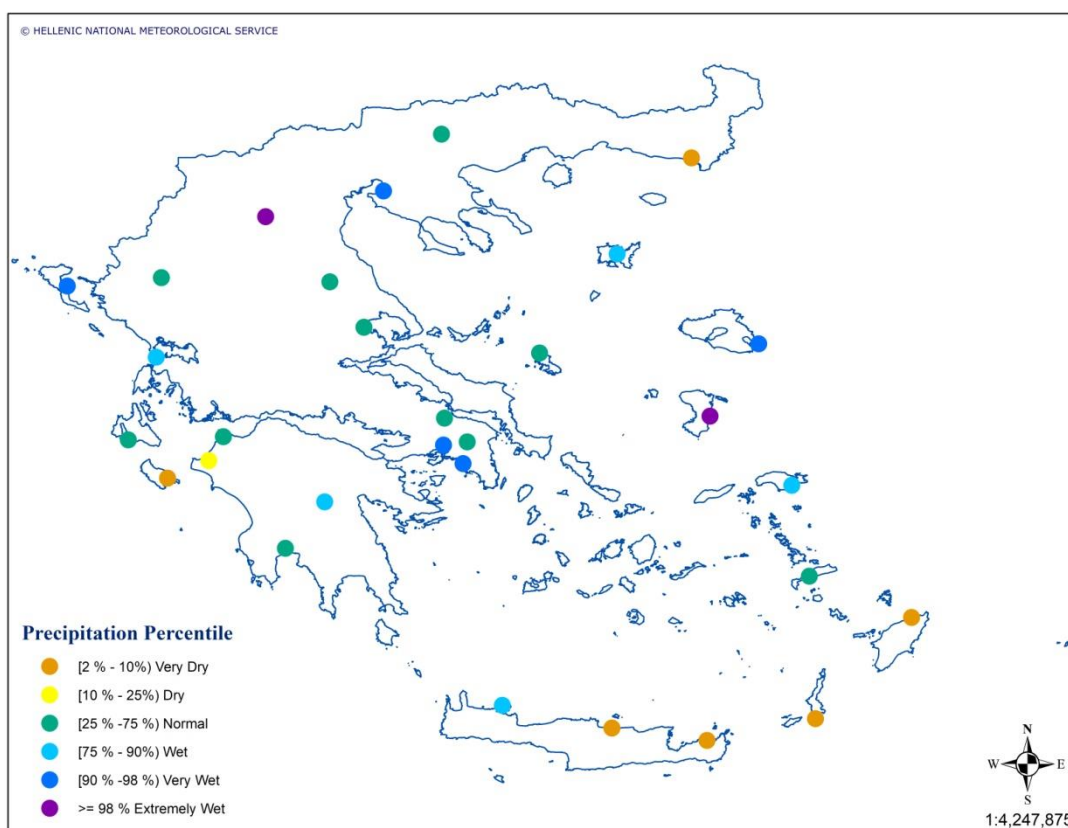


Figure 8. Precipitation percentiles for summer 2020 (based period 1971-2000).

2.2. Verification of the SEECOF-23 summer 2020 precipitation outlook for Greece

The seasonal forecast for precipitation predicted a dry summer for most parts of the country, with accumulated precipitation below normal values, except of a small area in the central Macedonia where the precipitation ranged above normal values (Figure 9).

Verifying the seasonal forecast for summer (although this is relative to the 1981-2010 normal values): in general, the seasonal forecast failed to predict the observed accumulated precipitation anomalies for most parts of the country.

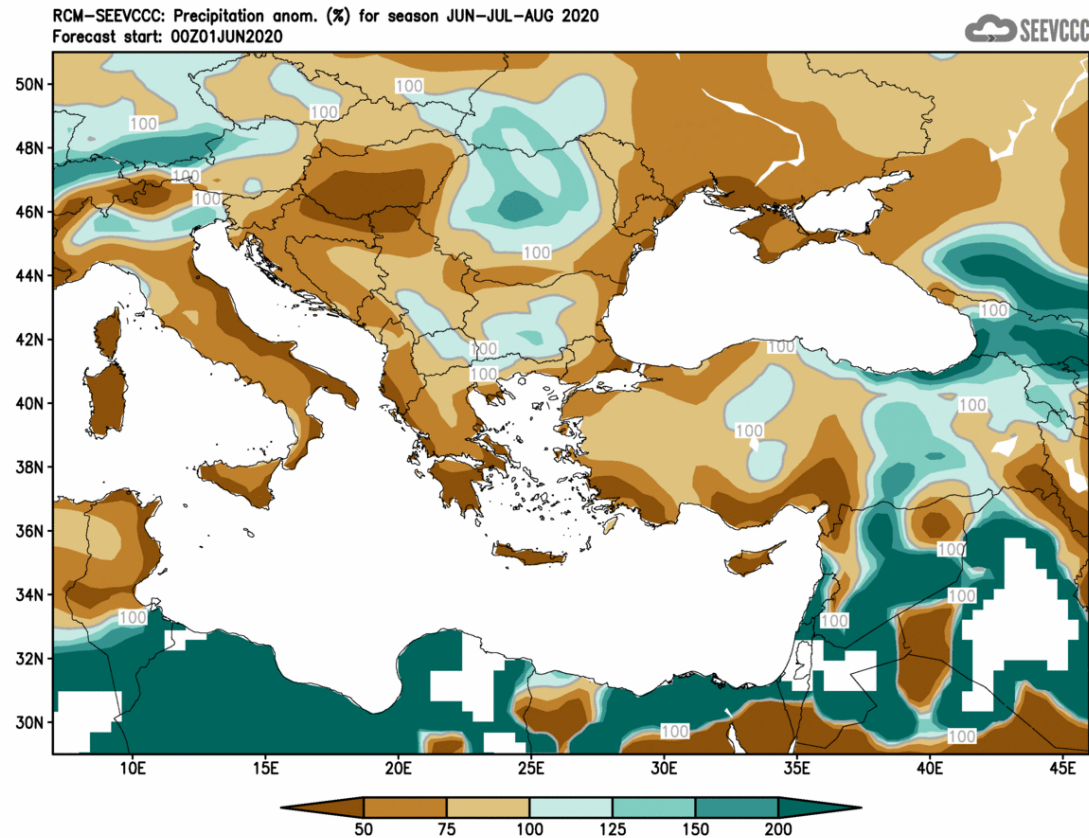


Figure 9. Precipitation anomaly (1981-2010) for summer 2020.

According to SEECOF-23, summer precipitation sums in Greece (zone 1, 50% below normal, 30% around normal, 20% above normal, in Figure 10) were likely to be below-average. It should be noted that it was not possible to forecast summer precipitation totals for Crete.

Verifying the SEECOF-23 precipitation outlook (although this is relative to the 1981-2010 normal values): the prediction was not successful for the most parts of the country.

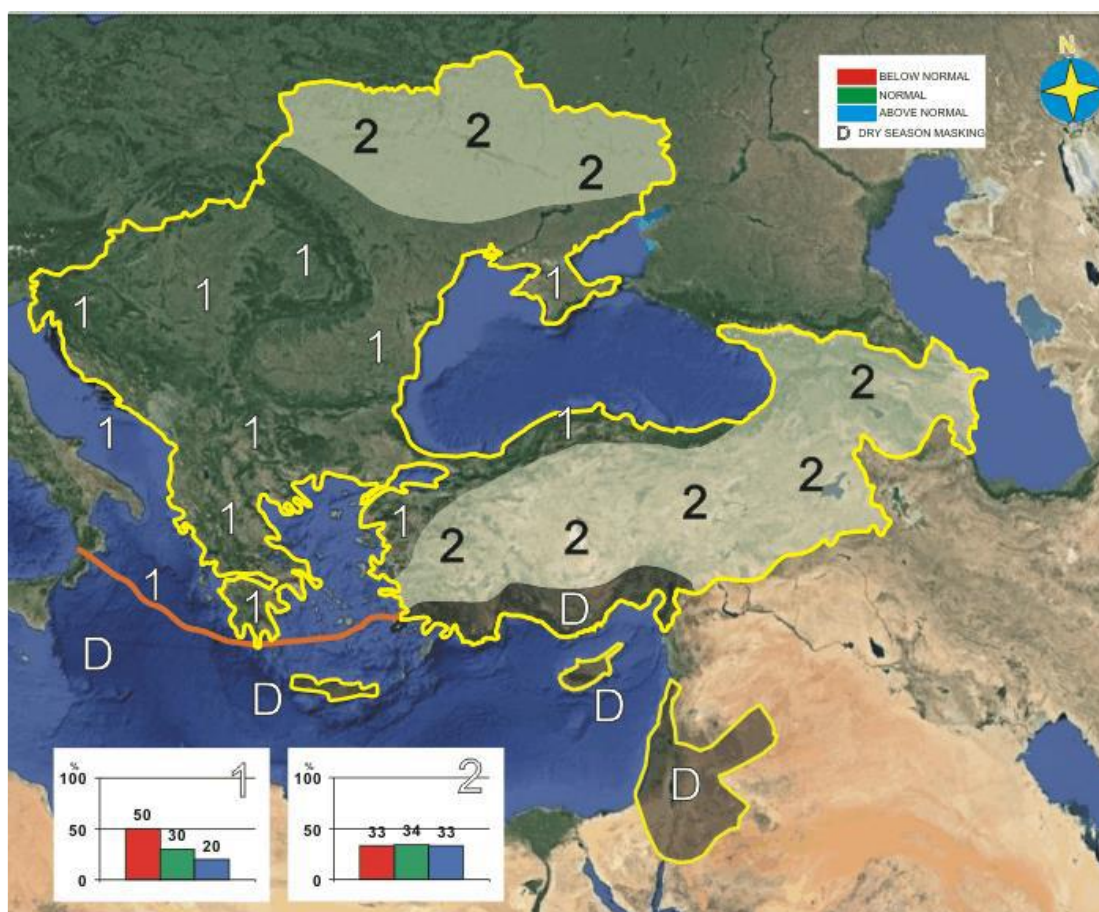


Figure 10. Graphical presentation of the 2020 summer precipitation outlook.

Table 1. Seasonal air temperature and precipitation sums - Ranks

Summer 2020		Seasonal air temperature (°C)					Seasonal precipitation sums (mm)			
Station	Rank*	33	50	66	Observed value	Rank**	33	50	66	Observed Value
Thessaloniki	5	25.4	25.8	26.1	26.7	2	54.2	64.3	84.7	145
Helliniko	2	26.6	26.8	27.3	28.2	3	7.6	16.6	21.9	52
Souda	8	25.5	25.7	26.0	26.2	8	0.1	1.4	3.4	5
Argostoli	4	24.7	25.1	25.4	26.0	10	11.9	15.3	24.5	27

*Rank: period 1971-2000 (warmest season)

**Rank: period 1971-2000 (highest seasonal precipitation)

Table 2. Verification of the SEECOF-23 Climate Outlook in Greece for Summer 2020.

Country	Seasonal temperature		Seasonal precipitation		High Impact Events
	Observed	SEECOF-23 climate outlook for temperature	Observed	SEECOF-23 climate outlook for precipitation	
Greece	Above normal (relative to the period 1971-2000) for most of the country.	Above normal for the whole area of Greece.	Above or near to normal values (1971-2000) for the most of the country with the greater values occurring in in west Macedonia, in the north Ionian Sea, in Attica and in the east Peloponnes.	Below normal for most of Greece.	Seven people including an 8-month-old baby lost their lives in heavy flooding caused by thunderstorms and torrential rains that swept the Greek island of Evia on 8 th August 2020. The flooding blocked roads and damaged houses on the island, north-east of Athens. Dozens of people were evacuated from affected areas.

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