HELLENIC NATIONAL METEOROLOGICAL SERVICE
ΕΘΝΙΚΗ ΜΕΤΕΩΡΟΛΟΓΙΚΗ ΥΠΗΡΕΣΙΑ

National Climate Bulletin and the assessment of the SEECOF-19 Climate state outlook for the 2018 summer season

DIVISION of CLIMATOLOGY – APPLICATIONS

HELLENIC NATIONAL METEOROLOGICAL SERVICE

A. Mamara, E. Chatziapostolou, N.Dris

Part A

1. Temperature

1.1. Analysis of the 2018 summer air temperatures anomalies for Greece

The analysis of seasonal mean air temperatures in Greece is based on data from 31 meteorological stations distributed evenly in the country.

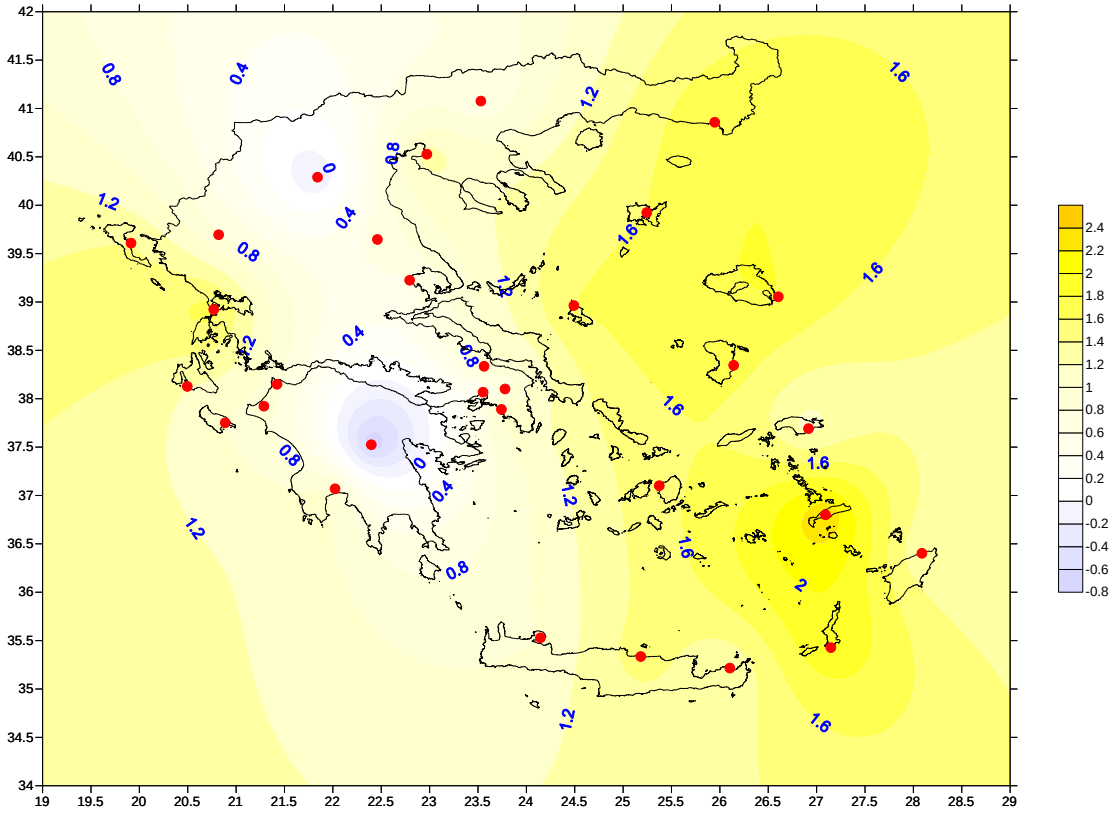

Figure 1. Mean temperature anomalies (°C) for summer 2018 in Greece according to the 1971-2000 climatology.

Mean air temperatures in summer 2018 throughout Greece were near the normal values 1971 – 2000. The greatest mean temperature anomalies were detected in areas of Aegean and Ionian Sea while the smallest ones were recorded in mainland.

Although mean temperatures were near the normal values, the minimum temperatures were 1 to 3^{o}C above normal values 1971-2000 for the greatest part of the country (Figure 2).

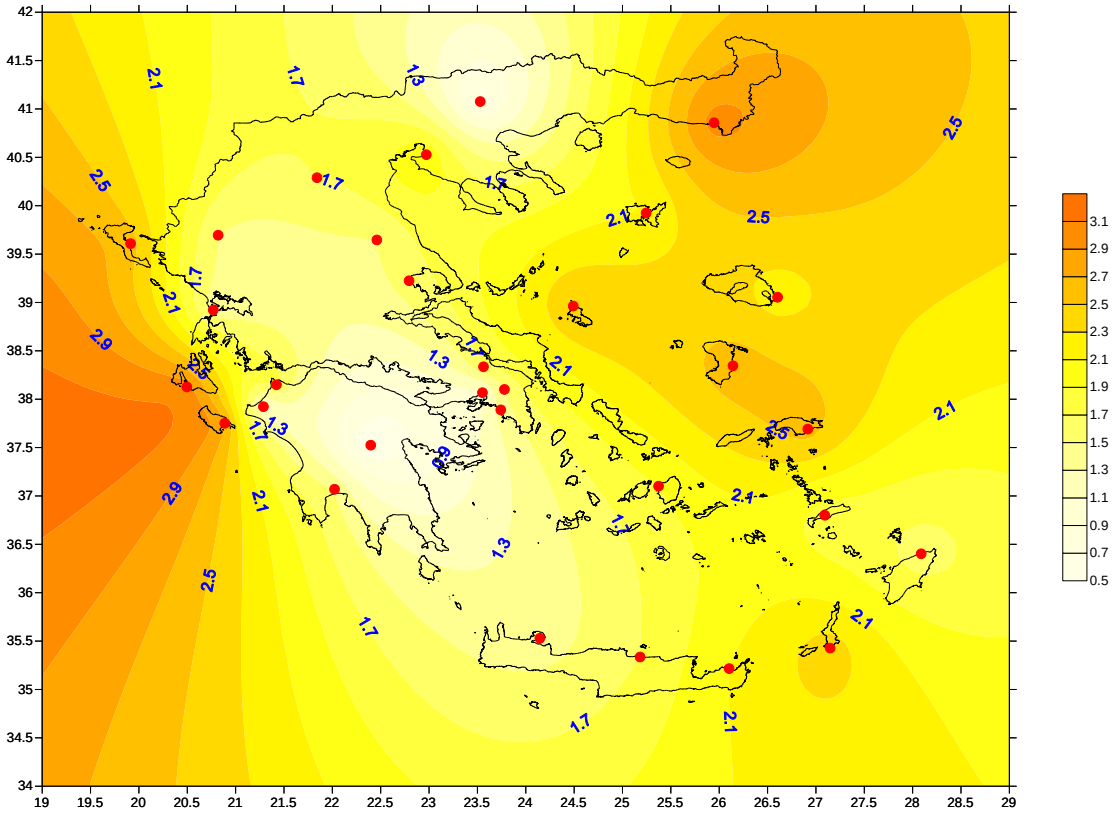

Figure 2. Minimum temperature anomalies (°C) for summer 2018 in Greece according to the 1971-2000 climatology.

In June 2018 the mean monthly temperatures were near the normal values 1971-2000.

July of 2018 was a slightly warmer than average month, comparing to the normal values 1971-2000, with temperature deviation from normal values in the range of 0.5 to 2.0 °C for the greatest part of the country.

In August of 2018 high temperatures compared to normal values 1971-2000 prevailed in most parts of Greece with the departures ranging mainly from 0.9 to 2.0 °C.

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) **very warm** and **extremely warm** conditions prevailed mainly in west Greece and in Aegean islands (63% of the examined stations) during summer 2018, while **normal or warm** conditions prevailed mainly in mainland.

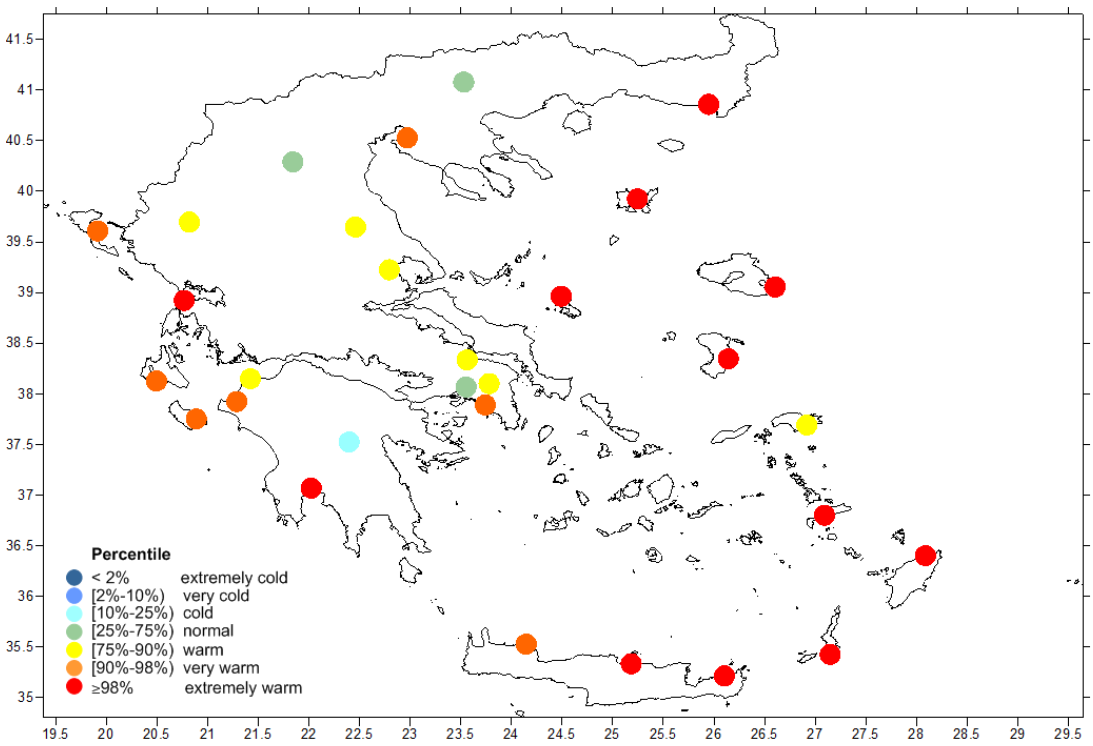

Figure 3. Mean temperature percentiles (based period 1971-2000).

1.2. Verification of the SEECOF-19 summer 2018 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 and central Greece and also in the areas of western Peloponnese (Figure 4).

Verifying the seasonal forecast for summer (although this is relative to the 1981-2010 normal values): in general, the prediction was partially successful since the seasonal mean temperatures were higher than normal 1971-2000 values but the mean temperature anomalies values were less than 2^{o}C.

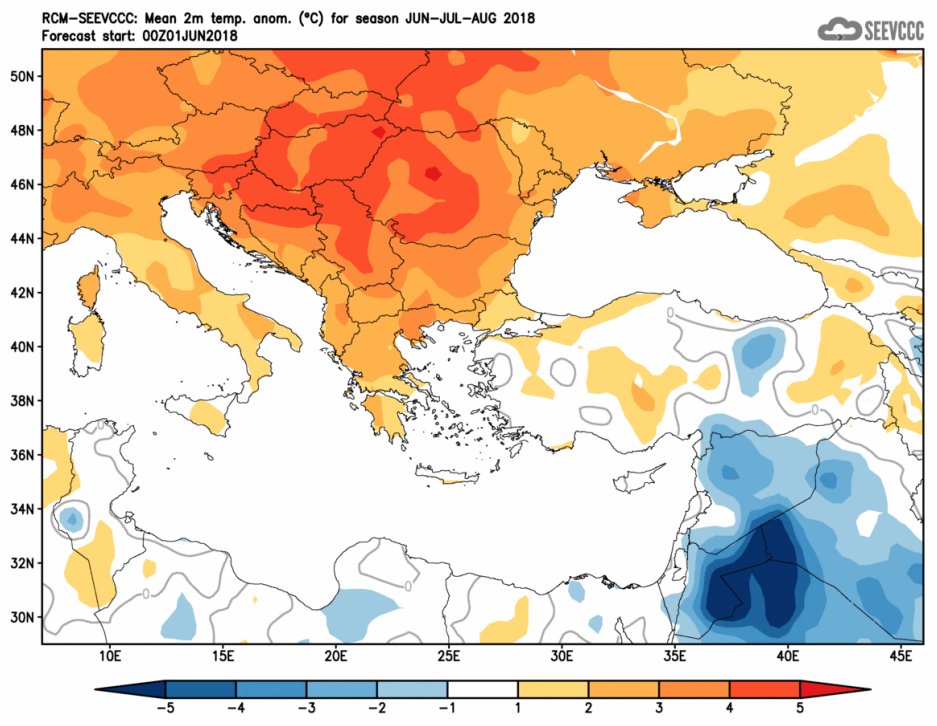

Figure 4. Mean temperature anomaly (1981-2010) for summer.

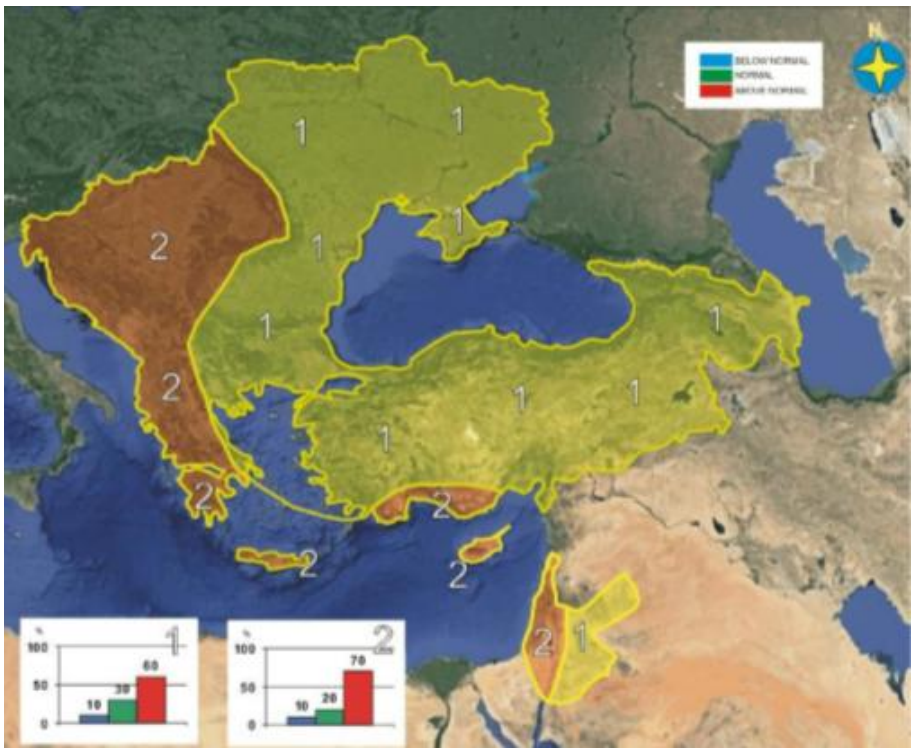

Figure 5. Graphical presentation of the 2018 summer temperature outlook.

The consensus statement of SEECOF-19 mentioned that the area of Greece was likely to experience above average summer temperatures relative to the period 1981-2010 (Figure 5). According to the consensus statement the probability for the above-average summer temperature in Greece was increasing across the areas spreading from eastern-northeastern (zone 1: 10% below normal, 30% around normal, 60% above normal) towards western and southern parts (zone 2: 10% below normal, 20% around normal, 70% above normal).

Verifying the seasonal forecast for summer (although this is relative to the 1981-2010 normal values): in general, the prediction was partially successful, because the mean summer temperatures presented values above normal especially in the areas of Aegean and Ionian Sea and were closer to the normal values in mainland.

Part B

2. Precipitation

2.1. Analysis of the 2018 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. 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.

The analysis showed that summer of 2018 was generally wetter in Greece and especially in the central and southern areas of Greece as well as in the Ionian Sea islands. The summer precipitation totals were 200 to more than 600 percent of normal values (1971-2000) in most parts of Greece. It is worth to mention that according to the climate atlas of Greece (1971-2000), the average rainfall for the greatest part of Greece except mountainous areas, in a summer month is below 30 mm and for the most Aegean islands including Crete is below 10 mm. Thus, even a non significant amount of precipitation for particular regions in summer leads to large precipitation anomalies.

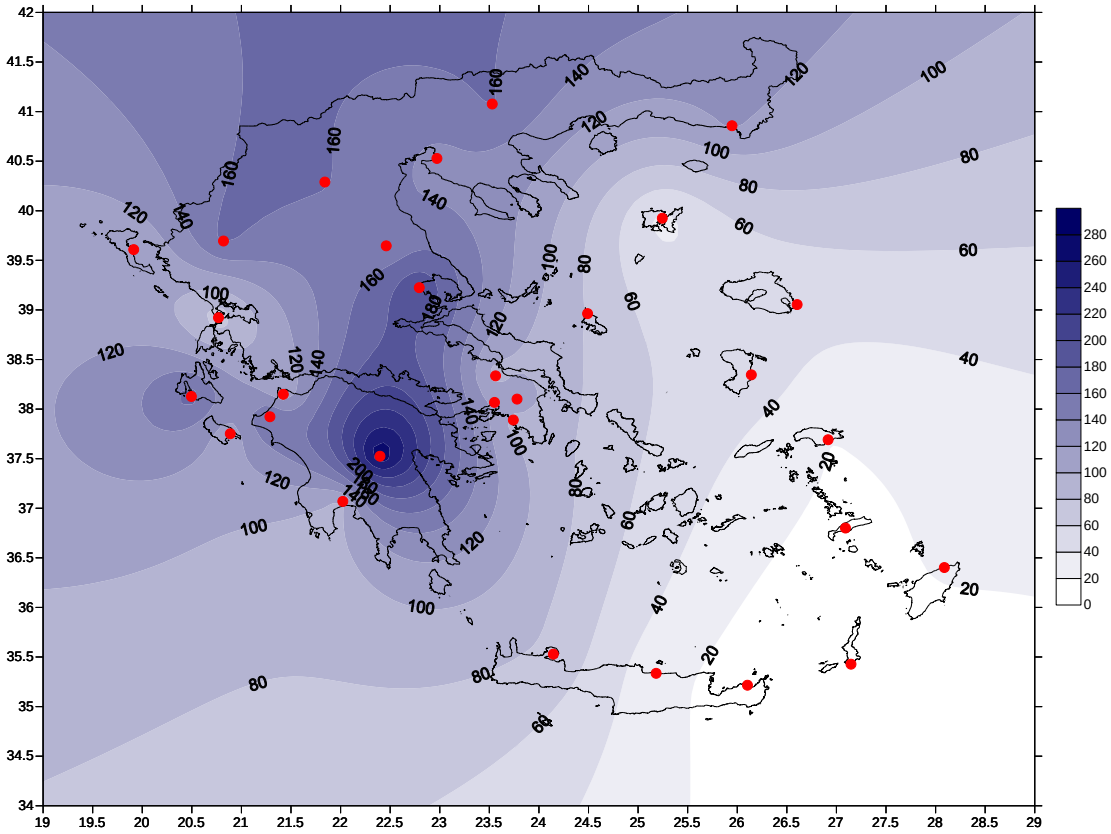

Figure 6. Spatial distribution of summer precipitation totals expressed in mm.

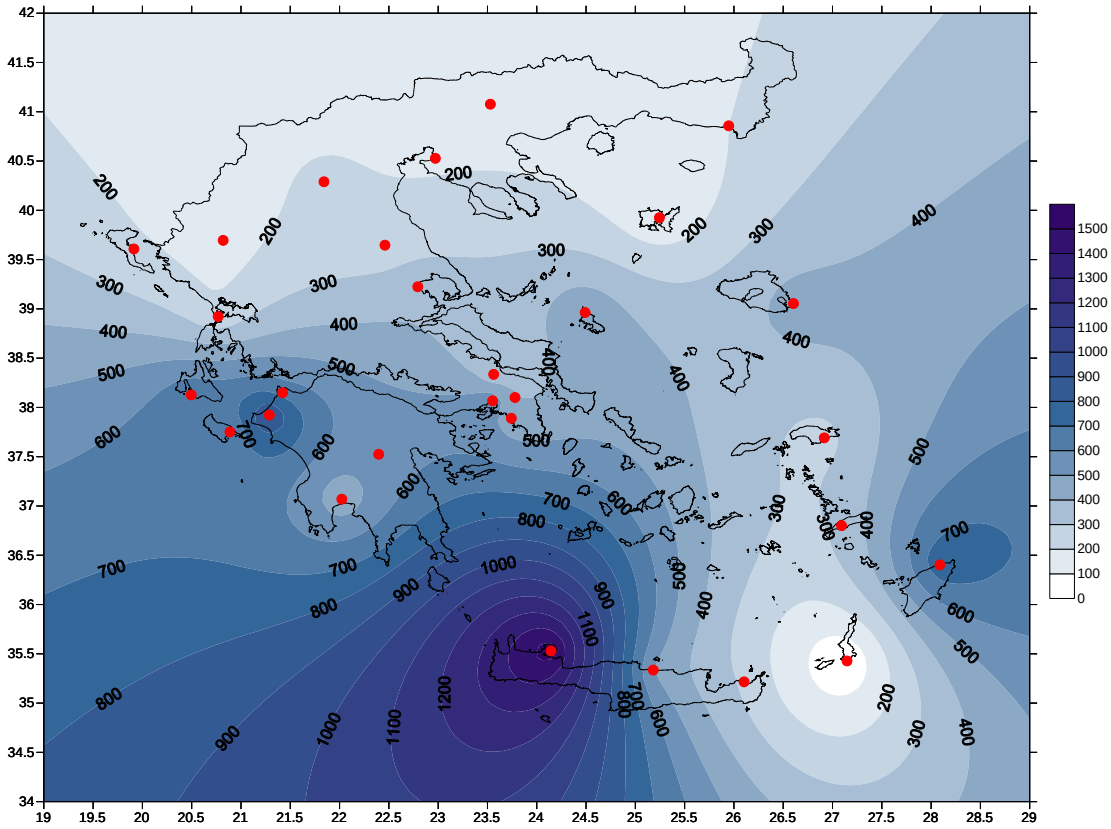

Figure 7. Summer precipitation anomalies (1971-2000) given in percentages.

June 2018 was a wetter than average month. Especially the second half of June was characterized by severe rainfall and thunderstorms that caused problems at particular regions. Most parts of Greece, except few southeastern Aegean islands, received rainfall sums that was 3 to 8 times greater than the normal month values , while many parts in the western Greece received a precipitation total, that was 10 to 23 times greater than the normal value in June. e.g Argostoli, located in the Ionian island of Kefalonia, reported 160 mm of total precipitation, while the station's normal value in June is about 7 mm.

July 2018 was in general a wetter than average month in the central and north Greece. A few wet spells during the 5 last days of July 2018 resulted in accumulated precipitation of 5 to 7 times above normal in Attica e.g Helliniko station reported monthly precipitation of 55 mm, while its monthly normal value is about 8 mm.

Some episodes of local showers and thunderstorms during 25 to 28 of August 2018 affected mainly the central and southern Greece. As a result monthly precipitation totals in these areas exceeded their average monthly precipitation values e.g Souda station in the region of west Crete recorded 76 mm, while its monthly normal value is 1.4 mm.

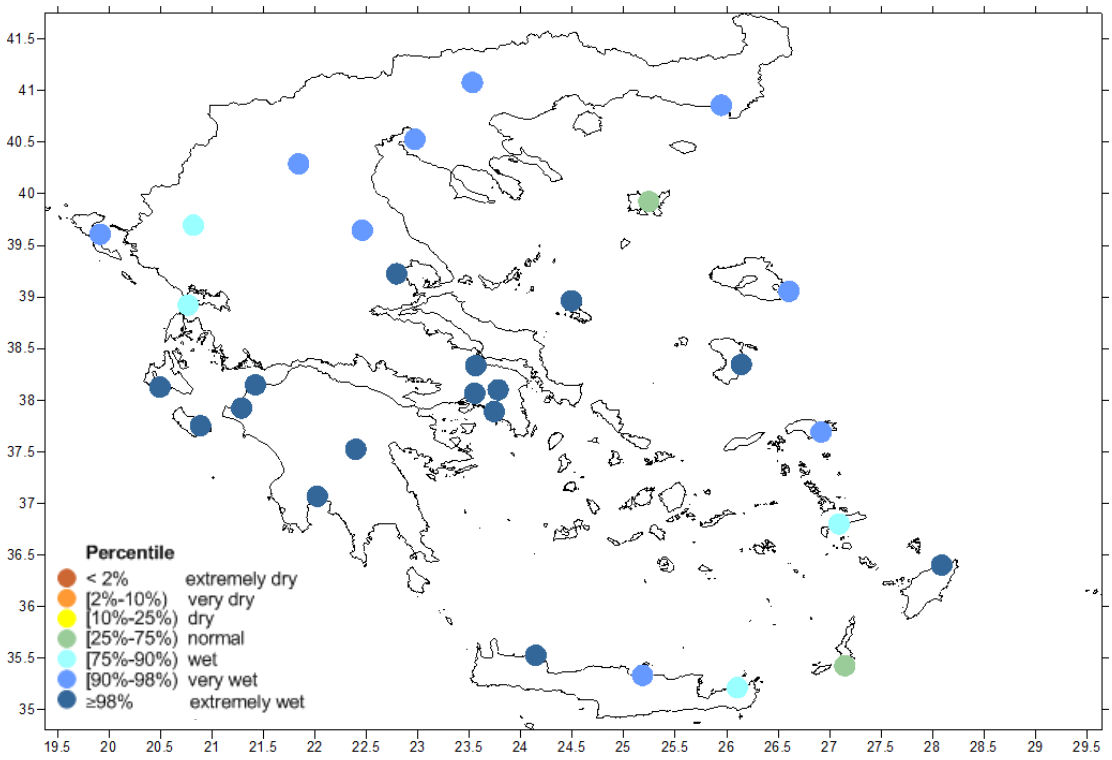

Figure 8. Precipitation percentiles (based period 1971-2000).

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 2018 have been described by the following categories:

- normal conditions (2 stations: located in the Aegean Sea)
- wet to extremely wet conditions (the remaining 28 stations covering the greatest part of the country).

2.2. Verification of the SEECOF-19 summer 2018 precipitation outlook for Greece

The seasonal forecast for precipitation predicted a dry summer for almost the whole country, with accumulated precipitation below normal values, except of the northern part of the country, where the precipitation ranges above normal (Figure 8).

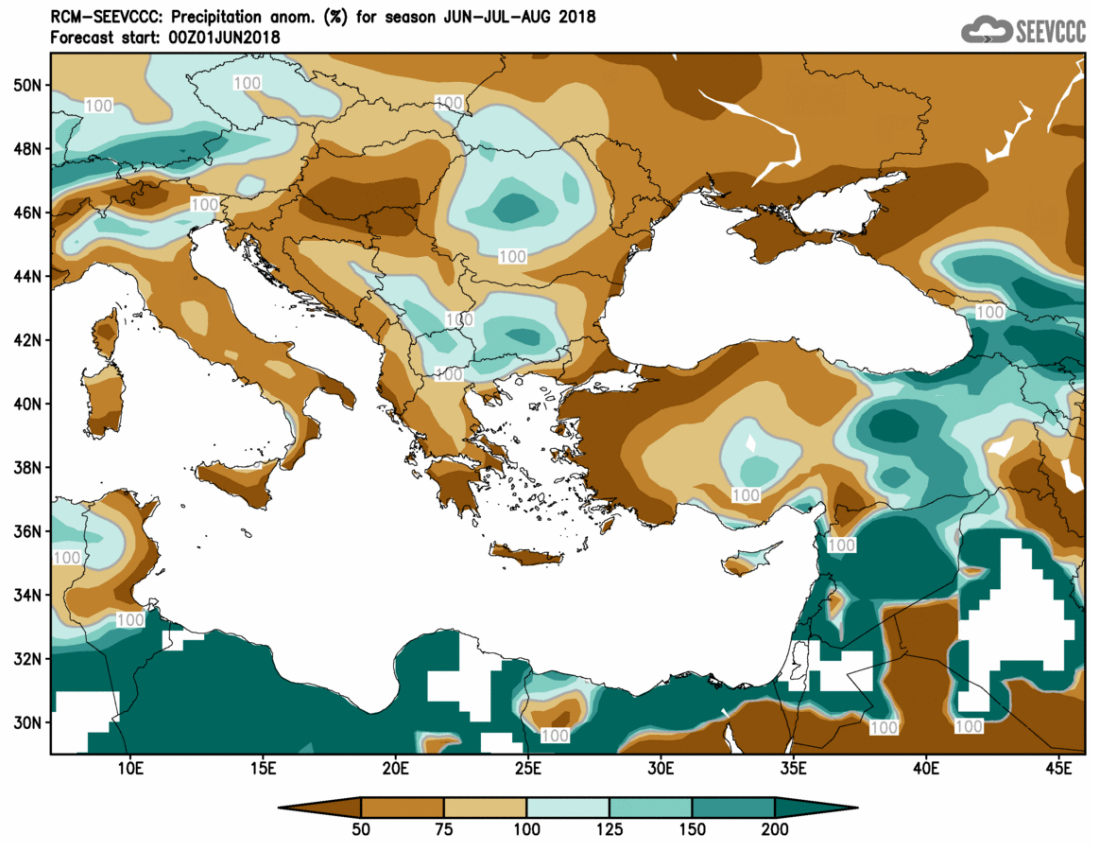

Figure 8. Precipitation anomaly (1981-2010) for summer 2018.

The model failed to predict the observed accumulated precipitation anomalies especially in the Central and Southern parts of Greece.

According to SEECOF–19, summer precipitation sums in northern Greece (zone 1 in Figure 9) were likely to be below-average, while predictions for the central and southern continental Greece, as well as the Ionian and Aegean Sea islands (zone 1 in Figure 9) indicated approximately equal probabilities for below-, near-, or above-normal averages. It should be noted that it was not possible to forecast summer precipitation totals for Crete and southern Aegean Sea islands.

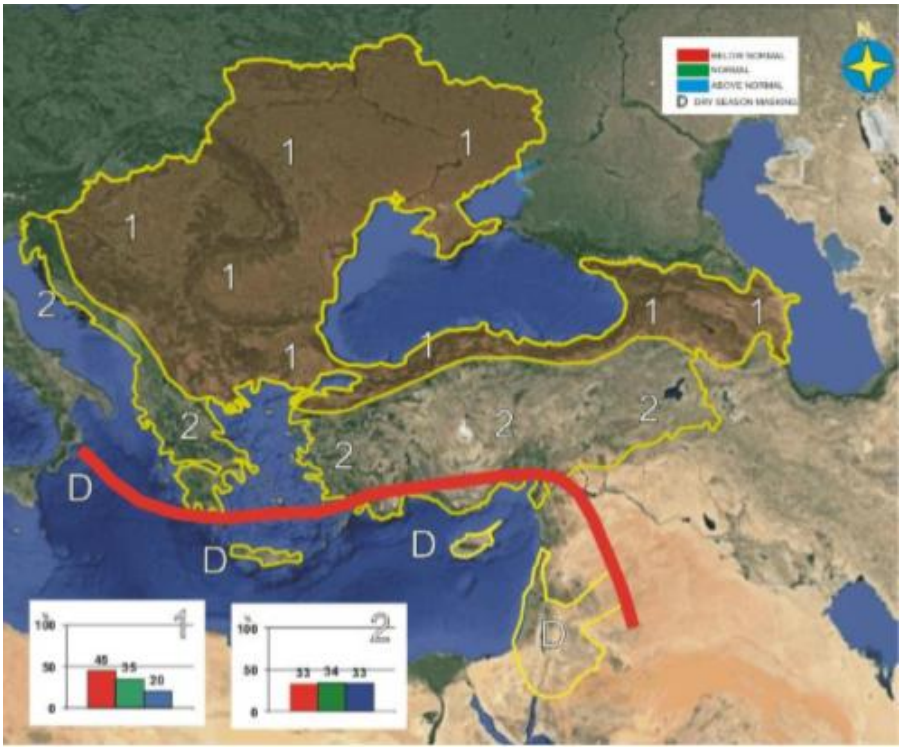

Figure 9. Graphical presentation of the 2018 summer precipitation outlook.

Verifying the SEECOF–19 precipitation outlook (although this is relative to the 1981-2010 normal values): the prediction failed, since this outlook did not forecast the wetter than climate averages season.

Summer 2018		Air Temperature (°C)					Precipitation sums (mm)			
Station	Rank*	33	50	66	Observed value	Rank*	33	50	66	Observed Value
Thessaloniki	4	25.4	25.8	26.1	27.1	2	54.2	64.3	84.7	134
Helliniko	4	26.6	26.8	27.3	28.1	2	7.6	16.6	21.9	92
Souda	4	25.5	25.7	26.0	26.8	1	0.1	1.4	3.4	77
Zakynthos	4	25.9	26.1	26.5	27.2	1	2.8	8.2	25.3	107

*Rank – 1971-2000 period (coldest/wormest season and lowest/highest seasonal precipitation)

Country	Seasonal temperature		Seasonal precipitation		High Impact Events
	Observed	SEECOF-19 climate outlook for temperature	Observed	SEECOF-19 climate outlook for precipitation	
Greece	Above normal relative to the period 1971-2000, especially in the areas of Aegean and Ionian Sea and closer to normal values in central mainland.	Above normal	Above normal especially in the central and southern areas of Greece as well as in the Ionian Sea islands	Below-normal.	During 2-3/6 two people lost their lives due to thunderstorm at the areas of Kozani and Thessaloniki. On 23 of July strong westerly winds caused destructive wildfires in the eastern parts of Attica and Peloponnese region. The worst incident took place in the area of Mati in the region of Attica, where a major destructive wildfire due to very strong westerly winds caused the death of 99 people while 164 people were injured. During 25-29/6, heavy rainfall affected several areas of Northern and Central Greece. Flash flooding occurred in the area of Mandra in Attica region that caused destructions.

Contact details
HELLENIC NATIONAL METEOROLOGICAL SERVICE
Division of Climatology - Applications
14 E. Venizelou Str.,
GR - 16777 Hellinikon, Greece
Phone: +302109699030, fax: +302109628952
http://www.hnms.gr ,
emails: 1. anna.mamara@hnms.gr
2. eleni.chatziapostolou@hnms.gr
3. ndris@hnms.gr