

National Climate Bulletin and the assessment of the SEECOF-29 Climate outlook for **CYPRUS** for summer season JJA 2023

Summary

Cyprus Department of Meteorology (DoM) prepares regular seasonal climate outlooks, based on the products of SEECOF seasonal forecasts. The present outlook concerns the outlook for the three summer months of June, July and August 2023 which is based on the deviations from the means of the climatological period 1981-2010.

Generally, from the climatological point of view, the area of East Mediterranean, but specially the area of Cyprus, during summer is characterized by the high mean maximum and minimum normal (1981-2010) temperatures. Normal accumulated precipitation is reaching minimum as a result of the general synoptic situation.

The assessment is performed bearing in mind the consensus statement of SEECOF29 which was stating that:

- The area of Cyprus as regarded from the suggested climate statement, issued on April - May 2023, for the period of Summer JJA, would have being in area 1 concerning Temperature (Figure 1) and for Precipitation in area musked as «D» (i.e. Dry musk) as presented in Figure 2. So, as shown in Figure 1, Cyprus is a part of the area where the probability of temperature being lower than normal would be 20%, 30% would be normal and 50% would be above normal. As will be presented in more details below, June had normal temperatures but July and August had above normal temperatures.
- Regarding the accumulated precipitation and as is presented in more details for each month below it must be mentioned that during summer precipitation in Cyprus is in the form of thunderstorms, an isolated meteorological phenomenon. So, for Cyprus as a part of Dry zone it can be stated that the Dry musk applies in general, but due to thundery activity accumulated precipitation during summer may be high in some places.

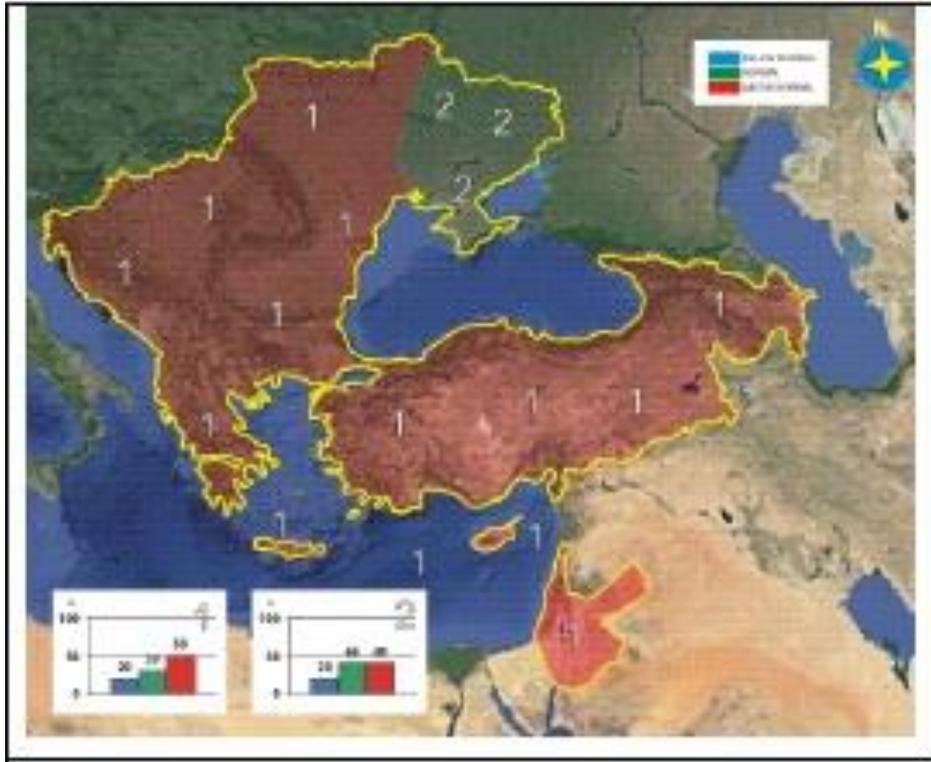


Figure 1. Graphical presentation of the 2023 summer temperature outlook

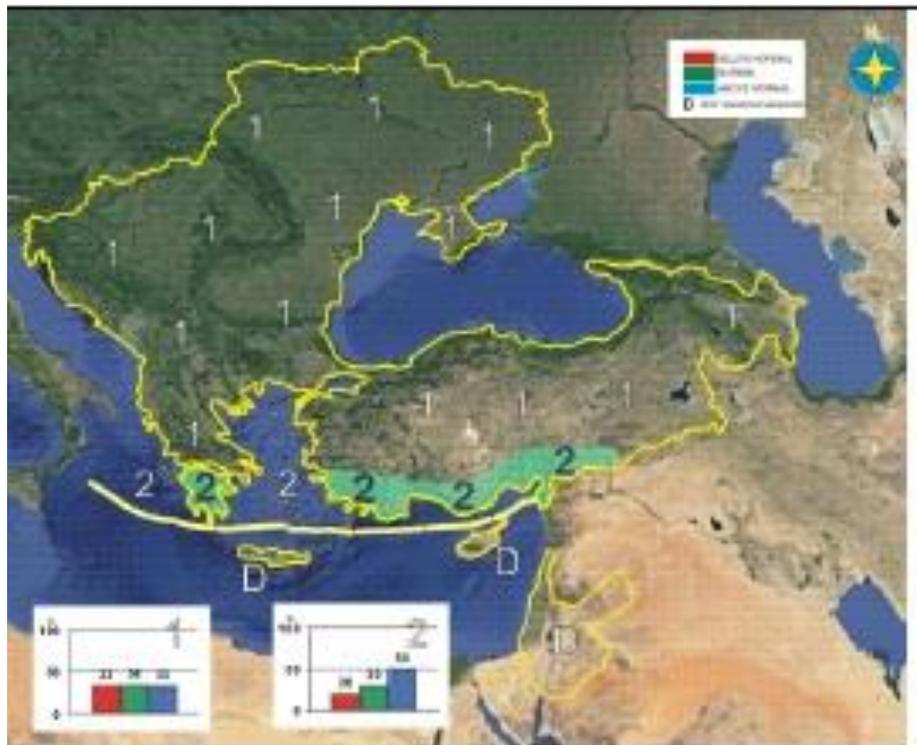


Figure 2. Graphical presentation of the 2023 summer precipitation outlook

Find also, below, a table presenting the general anomalies of SEECOF products and extreme events of the recorded summer weather.

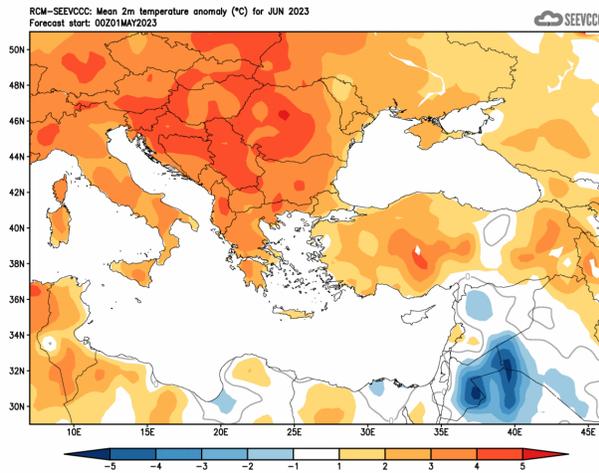
Country	Seasonal temperature (JJA)		Seasonal precipitation (JJA)		High Impact Events
	Observed	SEECOF-29 climate outlook for temperature	Observed	SEECOF-29 climate outlook for precipitation	
CYPRUS	<p>June Normal</p> <p>July Above Normal</p> <p>August Above Normal</p>	<p>June Normal</p> <p>July Normal</p> <p>August Normal</p>	<p>June Normal</p> <p>July Below normal</p> <p>August Above normal</p>	<p>June Below Normal</p> <p>July SW part below normal, NE part above Normal</p> <p>August South and East part below normal and North and West part above normal</p>	<p>June</p> <p>All of the maximum were around normal. Extreme daily maximum temperatures were also recorded with great positive deviations, such as at the station of Paphos and Achna with extreme maximum temperatures of 34.1°C and 37.5°C, respectively, which in both cases were 6.5°C above the normal maximum temperature of each station, which is 27.6°C and 31.0°C, respectively. Extremely daily minimum temperatures were also recorded with great positive deviations, like the Achna station were the minimum temperature (23.7°C) was 4.8°C higher than the normal one (18.9°C). Also, at the station of Larnaca the minimum temperature (24.1°C) was 4.7°C above normal (19.4°C).</p> <p>On the 13th of June an EMMA yellow warning was issued, concerning rain and thunderstorms.</p> <p>July</p> <p>The mean maximum and minimum temperature was above normal in all of the selected stations. Daily maximum temperatures above normal (deviating by 4°C or more from normal) were recorded, like the highest daily maximum temperature of Achna that was 42.6°C (with a normal of 33.2°C) and the highest daily maximum temperature of Paphos Airport that was 38.1°C (with a normal of 29.9°C). Highest daily minimum temperatures were also recorded, with positive departures greater than 4°C, like the station of Larnaca where a minimum of 29.9°C was by 7.9°C above station's normal (22.0°C) and the station of Achna where a minimum of 28.5°C was by 6.7°C above station's normal (21.8°C).</p> <p>During July, extremely high temperature warnings, EMMA warnings, have been issued at both the yellow risk level and</p>

					<p>the orange risk level for both the maximum and the minimum temperatures. Specifically, a total of 20 EMMA warnings for extremely high temperatures were issued; 15 of which were at the yellow risk level during the periods 13/7, 15-28/7 and 31/7, while 5 of them were at the orange risk level during the periods 13-16/7 and 23/7.</p> <p style="text-align: center;">August</p> <p>All average daily maximum and minimum temperatures were above normal, while the positive deviation from normal of both the average daily maximum and average daily minimum temperature is notable for the forest station at Prodomos, which is located at an altitude of 1736 meters.</p> <p>At all reference stations precipitation was close to normal, except from the station at Prodomos where it was below normal and the station at Athalassa where it was well above normal. At this point it is worth mentioning that the largest contribution to the total August 2023 rainfall amounts, particularly over the inland and the southeastern areas of the island, is not only due to isolated thunderstorms of thermal instability during noon and early afternoon, but also due to a disturbance which affected the island late in the evening of the 28th of August. Such disturbances, of dynamic causes, the result of which is rainfall accompanied by intense thundery activity during the evening hours, is something that does not happen often in Cyprus, especially during the month of August.</p> <p>Extreme maximum temperatures with positive deviations of more than 4°C were recorded, as at Prodomos station where the highest daily temperature 38.4°C was 10.4°C above the normal (28°C), that is the highest daily maximum temperature ever recorded at this station since its operation date. Also, at the station at Athalassa the extreme maximum (45.3°C) was 8.3°C above normal.</p> <p>Extreme minimum temperatures with positive departures of more than 4°C were also recorded. The extreme minimum (29.5°C) at Prodomos station</p>
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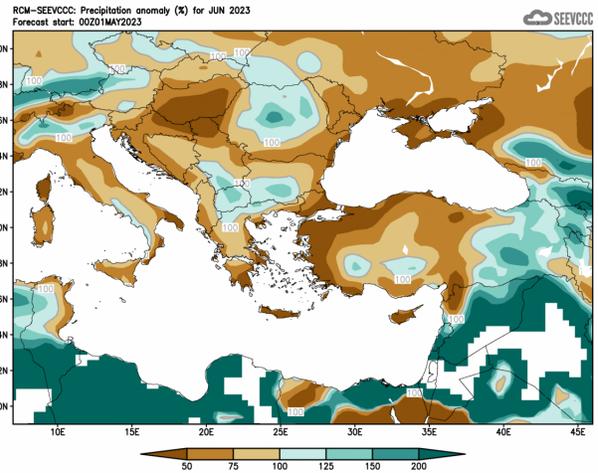
					<p>was 11.4°C above normal which is also a record regarding the highest daily minimum temperature ever recorded at this station. At Larnaka airport the extreme minimum (27.2) was 4.9°C above normal.</p> <p>For the periods 1-4, 13-19 and 22-23 of August EMMA yellow warnings were issued, concerning high temperatures. At the same time, for the period 14-17 August EMMA orange warnings, once again concerning high temperatures, were also issued.</p> <p>For the periods 22 and 27-28 of August local showers accompanied sometimes with thunderstorms were recorded, resulting in accumulated precipitation of 4.9mm (or 245% of normal).</p> <p>On the 28th of August EMMA yellow warning was issued concerning thundery activity.</p>
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Evaluation of June's seasonal forecast for the area of Cyprus

The seasonal forecast suggested that **June's** temperature would generally be normal while the Balkans and Middle East would be warmer than normal. Regarding the accumulated precipitation, Cyprus was expected to be dry without the occurrence of dynamic barometric weather systems.



Divergence of the mean monthly temperature (°C)
from normal during June



Percentage of the mean monthly precipitation (%)
compared with the normal of June

Concerning the models' evaluation for **June**, a general judgment is that the model performed relatively well concerning the temperature. It must be mentioned that during summer months, precipitation is resulted mainly from thundery activity which has very localised characteristics and that judging is very difficult due to models limitations. Never the less, June recorded 6.4mm of accumulated precipitation resulting to 97% of the climatological precipitation (6.6mm), which ranks it as a normal month relative to its normal value. So, we notice that the model did not behave well enough with respect to the seasonal forecast of the mean monthly precipitation. However, it is worth mentioning the fact that a significant part of the area of Troodos mountain range, which due to the orography factor is an area that receives the most convective rainfall, recorded a significant negative deviation from the month's normal, which is something that the model in its general estimation suggested. Also, it is worth noting that June's main causes of the precipitation events were not solely the thermal characteristics building up mainly around noon and early afternoon but the main causes for these events were due to dynamic factors.

The accumulated precipitation was a result of local rain showers and thunderstorms during the periods 1-2, 5-6, 8-9, 11-14, 16-19 and on the 28th-29th of June. No hail was reported during June.

TEMPERATURE AND PRECIPITATION PROVISIONAL DATA FOR JUNE 2023

St. No.	Station Name	Mean Daily Maximum Temperature (°C)	Normal Value (1981-2010)	Difference from Normal Value	Highest Daily Maximum Temperature (°C)	Lowest Daily Maximum Temperature (°C)	Mean Daily Minimum Temperature (°C)	Normal Value (1981-2010)	Difference from Normal Value	Lowest Daily Minimum Temperature (°C)	Highest Daily Minimum Temperature (°C)	Monthly Total Precipitation (mm)	Normal Value (1981-2010)	Difference from Normal Value
41	POLIS CHRYSOCHOUS	30,6	30,3	0,3	34,5	25,7	19,5	18,5	1,0	15,6	21,8	2,0	1,8	0,2
82*	PAFOS (AIRPORT)	28,5	27,6	0,9	34,1	25,6	20,1	18,0	2,1	17,2	22,1	1,2	1,3	-0,1
225	PRODROMOS (C.F.C.)	24,8	25,0	-0,2	29,8	19,5	14,0	15,0	-1,0	9,6	17,8	4,0	27,2	-23,2
666*	ATHALASSA (RADIOSONDE)	33,9	34,0	-0,1	38,7	29,8	18,7	19,1	-0,4	14,3	23,2	3,8	11,6	-7,8
731	LARNAKA (AIRPORT)	30,0	30,2	-0,2	34,0	25,6	20,3	19,4	0,9	16,5	24,1	0,8	2,0	-1,2
800**	ACHNA (DASAKI)	30,4	31,0	-0,6	37,5	26,8	19,2	18,9	0,3	14,5	23,7	1,2	1,8	-0,6

* Pafos' and Athalassa's Station Normal Values cover the period 1983-2010

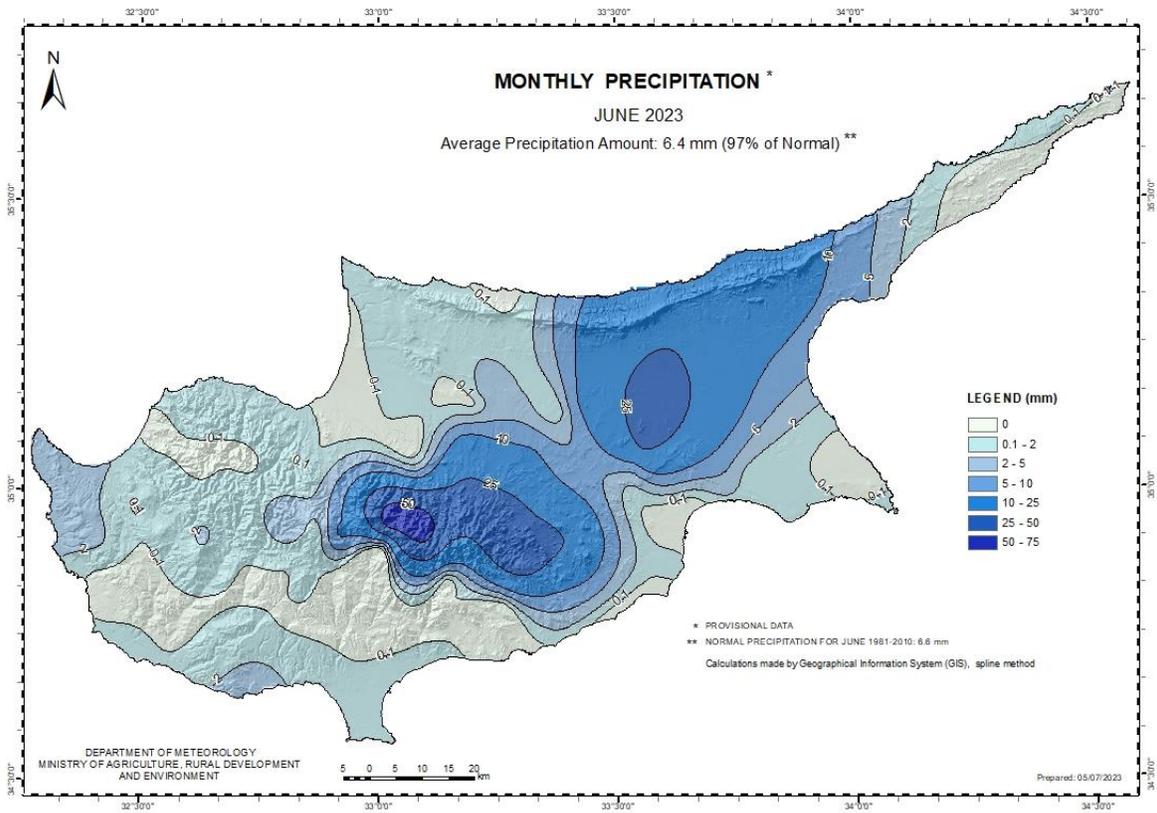
** Achna's Temperature Normal Values cover the period 1981-2007

= VALUES FROM AUTOMATIC WEATHER STATION

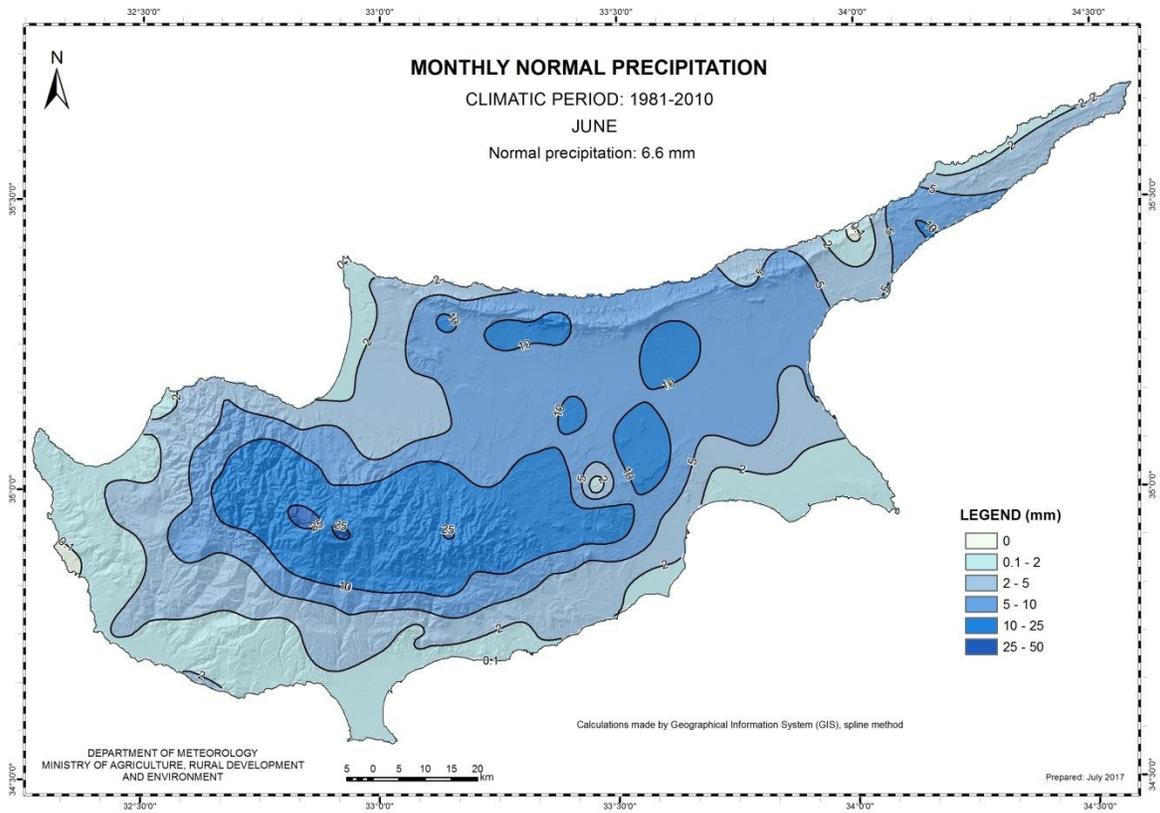
About the evaluation of the recorded temperatures, all of the maximum (table above) were around normal, as the model suggested. Extreme daily maximum temperatures were also recorded with great positive deviations, such as at the station of Paphos and Achna with extreme maximum temperatures of 34.1°C and 37.5°C, respectively, which in both cases were 6.5°C above the normal maximum temperature of each station, which is 27.6°C and 31.0°C, respectively. Extremely daily minimum temperatures were also recorded with great positive deviations, like the Achna station were the minimum temperature (23.7°C) was 4.8°C higher than the normal one (18.9°C). Also, at the station of Larnaca the minimum temperature (24.1°C) was 4.7°C above normal (19.4°C).

On the 13th of **June** an EMMA yellow warning was issued, concerning rain and thunderstorms.

For the purpose of better visualization of **June** accumulated precipitation, a chart of Cyprus with the total preliminary accumulated precipitation is presented.

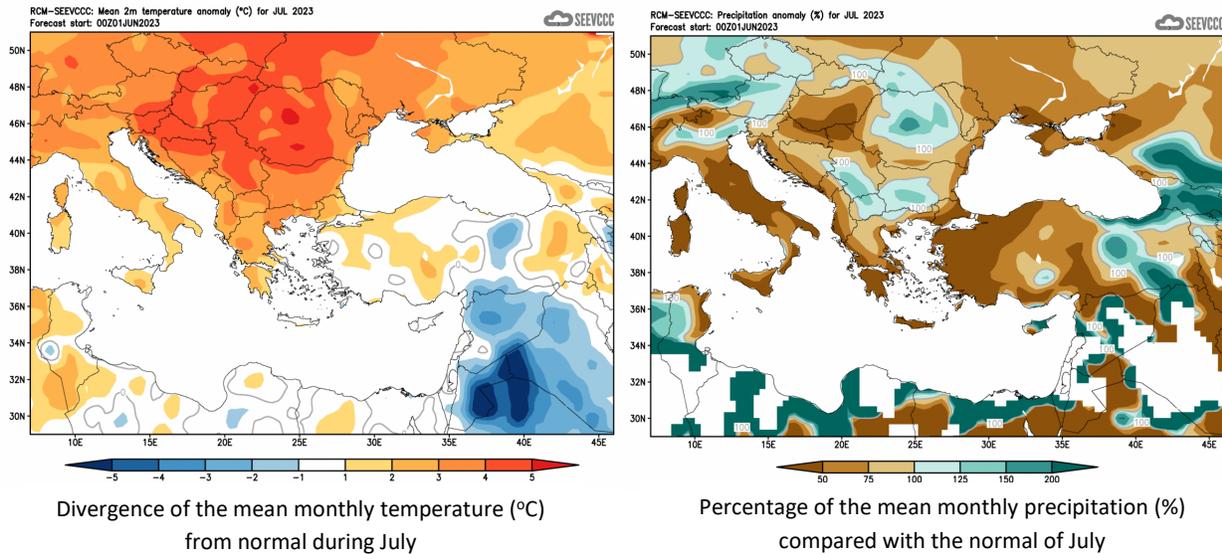


A Cyprus chart with the normal (period 1981 to 2010) accumulated precipitation for the month of **June** is also presented.



Evaluation of July's seasonal forecast for the area of Cyprus

The seasonal forecast suggested that **July's** temperature would be normal, alike Asia Minor. The Balkans were expected to be warmer than normal while Near and Middle East was expected to be colder than normal. Regarding the accumulated precipitation, Cyprus' western – southwestern half was expected to be below 50% of normal but over the eastern – northeastern half the accumulated precipitation was expected to range up to 200% above of normal.



Concerning the model's evaluation for **July**, a general judgment is that the model did not perform well at all concerning both the temperature and the seasonal accumulated precipitation. It must be mentioned that during the summer months, precipitation is resulted mainly from thundery activity which has very localised characteristics and that judging accumulated precipitation is very difficult due to models' limitations.

In a more detailed evaluation of the recorded temperatures, the mean maximum and minimum temperature (table below), was above normal in all of the selected stations. Daily maximum temperatures above normal (deviating by 4°C or more from normal) were recorded, like the highest daily maximum temperature of Achna that was 42.6°C (with a normal of 33.2°C) and the highest daily maximum temperature of Paphos Airport that was 38.1°C (with a normal of 29.9°C). Highest daily minimum temperatures were also recorded, with positive departures greater than 4°C, like the station of Larnaka where a minimum of 29.9°C was by 7.9°C above station's normal (22.0°C) and the station of Achna where a minimum of 28.5°C was by 6.7°C above station's normal (21.8°C).

TEMPERATURE AND PRECIPITATION PROVISIONAL DATA FOR JULY 2023														
St. No.	Station Name	Mean Daily Maximum Temperature (°C)	Normal Value (1981-2010)	Difference from Normal Value	Highest Daily Maximum Temperature (°C)	Lowest Daily Maximum Temperature (°C)	Mean Daily Minimum Temperature (°C)	Normal Value (1981-2010)	Difference from Normal Value	Lowest Daily Minimum Temperature (°C)	Highest Daily Minimum Temperature (°C)	Monthly Total Precipitation (mm)	Normal Value (1981-2010)	Difference from Normal Value
41	POLIS CHRYSOCHOUS	35.8	33.4	2.4	40.8	30.3	22.7	21.1	1.6	20.2	26.0	0.0	0.1	-0.1
82*	PAFOS (AIRPORT)	32.7	29.9	2.8	38.1	30.0	23.3	20.6	2.7	20.4	26.6	0.0	0.2	-0.2
225	PRODROMOS (C.F.C.)	30.8	27.9	2.9	34.5	24.1	19.8	18.2	1.6	15.0	23.4	0.0	16.4	-16.4
666*	ATHALASSA (RADIOSONDE)	40.0	37.1	2.9	44.6	35.1	23.4	22.1	1.3	18.3	28.1	0.9	4.2	-3.3
731	LARNAKA (AIRPORT)	35.0	32.5	2.5	40.4	30.7	24.6	22.0	2.6	21.8	29.9	0.4	0.5	-0.3
800**	ACHNA (DASAKI)	36.4	33.2	3.2	42.6	30.0	23.7	21.8	1.9	20.2	28.5	0.0	0.1	-0.1

* Pafos' and Athalassa's Station Normal Values cover the period 1983-2010
** Achna's Temperature Normal Values cover the period 1981-2007

☒ dew

During **July**, extremely high temperature warnings, EMMA warnings, have been issued at both the yellow risk level and the orange risk level for both the maximum and the minimum temperatures. Specifically, a total of 20 EMMA warnings for extremely high temperatures were issued; 15 of which were at the yellow risk level during the periods 13/7, 15-28/7 and 31/7, while 5 of them were at the orange risk level during the periods 13-16/7 and 23/7.

At this point and after a first evaluation if the preliminary data available to us for July 2023, it is worth noting that July 2023 is, for the island, one of the warmest Julys during which several temperature records have either been re-recorded or surpassed. For example, at 4 of the 5 main reference stations (exception being the station at the Forestry College of Prodromos), the average daily temperature recorded at each of them is the highest ever recorded, while at all stations the average daily temperature is higher than the corresponding normal for the month. Another important characteristic is the absolute 40 degrees that has been recorded as the average daily maximum temperature in Athalassa. At all stations the average temperature has a positive deviation from the corresponding normal of the month, with this deviation ranging from 2.5°C to 2.9°C.

Also, the daily maximum temperatures recorded at the stations were also very high. At all stations, a positive deviation of daily minimum temperature was recorded in relation to the corresponding normal of each station, with this deviation ranging from 1.3°C to 2.6°C.

The two coastal stations at the island's airports, i.e. the stations at Larnaka and Paphos airports, have recorded their highest average daily temperature during July this year, from the day of operation of each station, ranking them as the stations with the warmest July, while the second highest average daily temperatures have been recorded at the Athalassa Radiosonde station, at Akrotiri and at Forestry College's station at Prodromos, ranking then in the 2nd place in relation to the corresponding warmest July. In general, the average daily temperature has been fluctuated by 2.1-2.7°C above the normal for the month.

All stations have recorded extremely high maximum temperatures for the month of July. At Athalassa Radiosonde station, the highest maximum temperature recorded was 44.6°C, which ranks it in the 1st place, the same as the maximum recorded in July 2017. At Larnaka and Paphos airports, the highest maximum temperature recorded in July this year were 40.4°C and 38.1°C, respectively, ranking both these

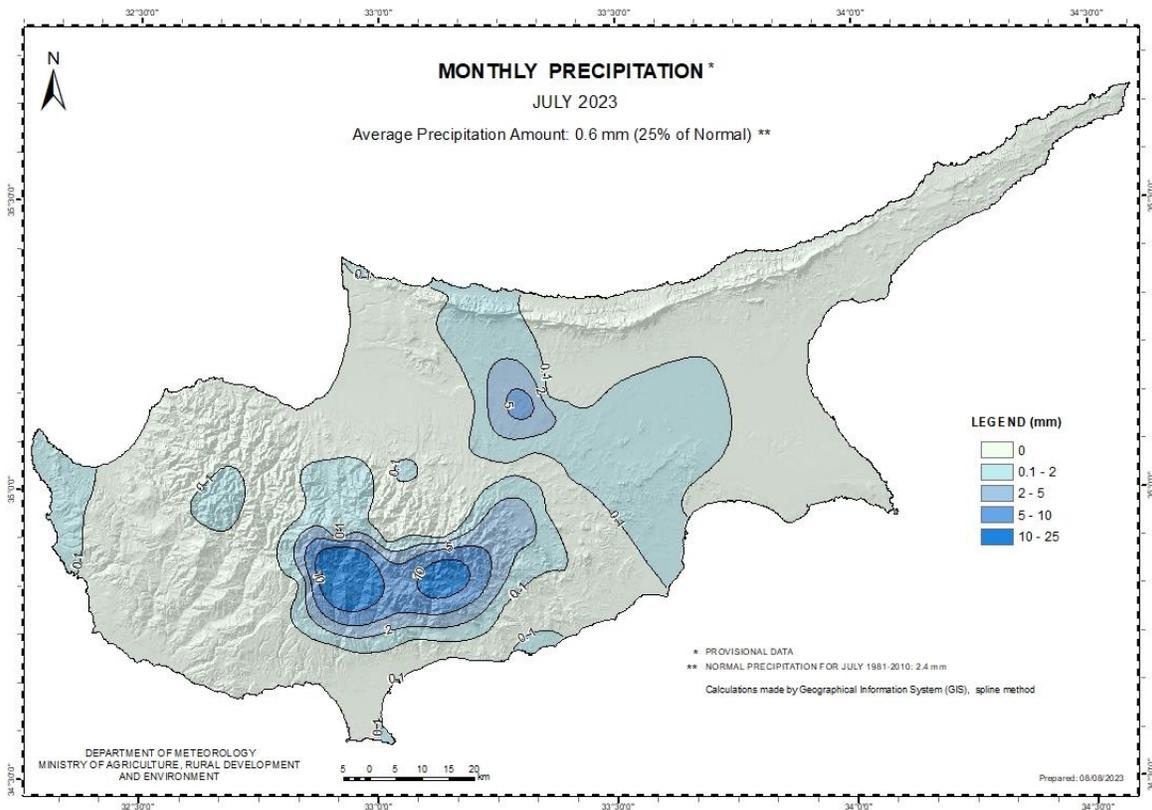
stations in the 3rd place. The extreme maximum at Larnaka airport was recorded in July 1998 (41.1°C) and at Paphos airport in July 2017 (41.6°C). At Akrotiri, the highest maximum temperature recorded in July this year was 38°C, ranking the station in the 7th place, after 1977 where the extreme maximum temperature had reach 40.2°C. Finally, the Forestry College station of Prodromos is ranked in the 8th place for this July, with its maximum temperature reaching 34.5°C, after 2017 when it took its first place with the temperature climbing to 36.7°C.

Moreover, July is a record month for Larnaka airport area, since this station ranks first in all maxima, with the sole exception of the absolute maximum temperature for which it ranks in 3rd place, after the equivalent of July 1998 with 41.1°C, which is the station's absolute maximum temperature.

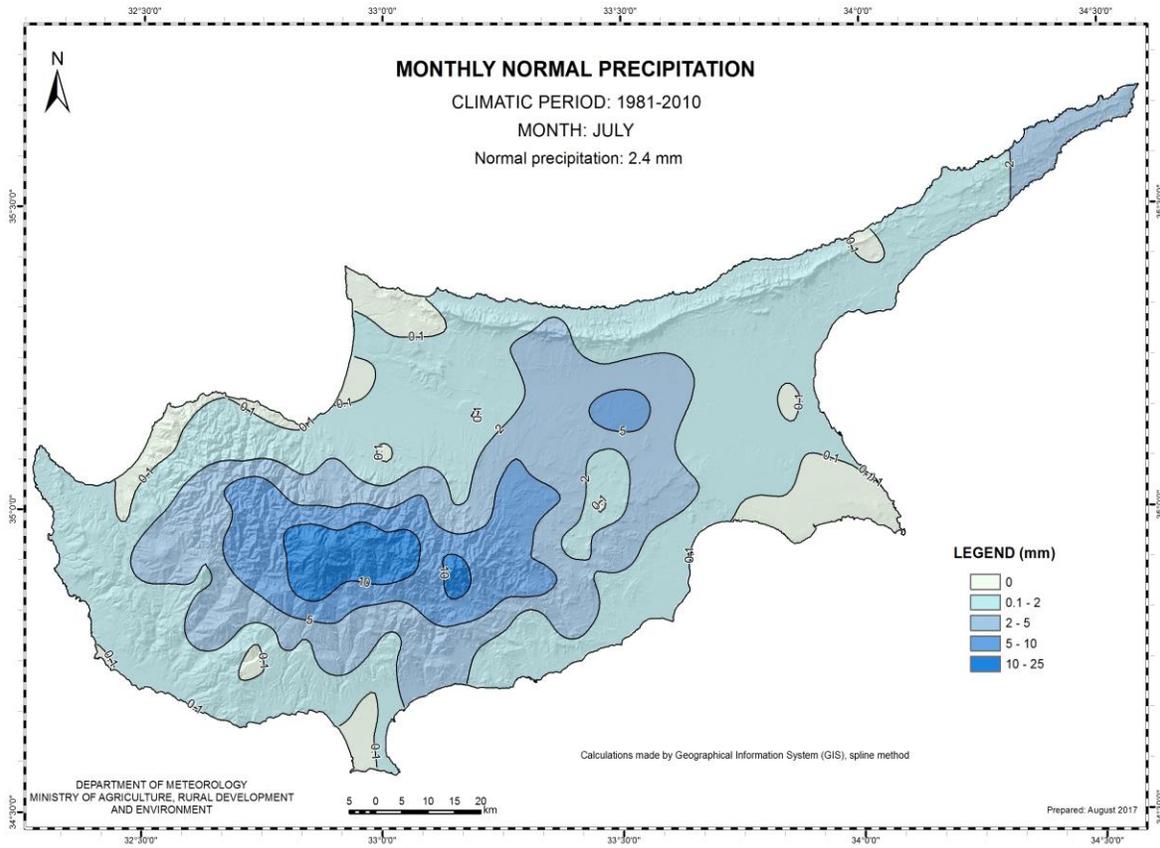
All of the above is a consequence of the extension of the Azores high pressure system which expanded from its initial position, at the beginning of July, further east towards the central and eastern Mediterranean affecting the weather of the countries of the European south in general, as well as our island, especially during the second half of the month. The main characteristic of this system was the very warm and dry air mass that accompanied it and which resulted in very high and in several cases extremely high temperatures in many areas of southern Europe. This system was given the name "Cleon". The name was given not only because of its very high temperatures (both maximum and minimum) but also because of its duration.

From the distribution of the accumulated precipitation of **July**, as is shown in the provisional chart that follows, is evident that the surface distribution was well below normal reaching 0.6mm or 25% of normal, something that shows us the uncertainty of the seasonal forecast model which must always be taken into account with a reserve.

For the purpose of better visualization of **July** accumulated precipitation, a chart of Cyprus with the total preliminary accumulated precipitation is presented.

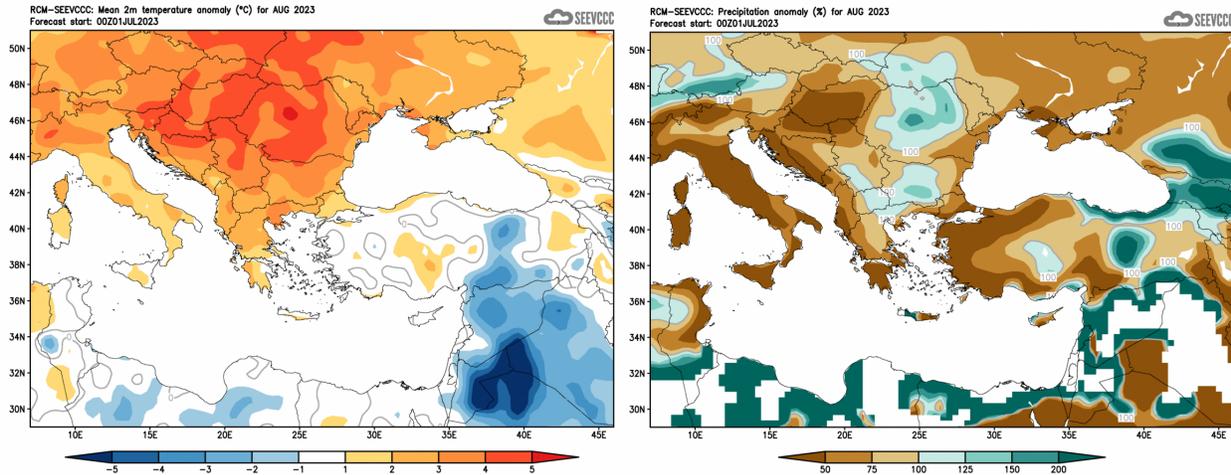


A Cyprus chart with the normal (period 1981 to 2010) accumulated precipitation for the month of **July** is presented.



Evaluation of August's seasonal forecast for the area of Cyprus

August's seasonal forecast suggested that temperature over Cyprus would generally be normal. Normal temperature would also characterize Asia Minor, while Greece and the Balkans would have been warmer than normal and Middle East would have been lower than normal. The amount of the accumulated precipitation over inland areas was expected to be around normal, while over the northern and the western part was expected to range above normal and over the southern and eastern part to range below normal.



Divergence of the mean monthly temperature (°C)
from normal during August

Percentage of the mean monthly precipitation (%)
compared with the normal of August

From the initial data, as recorded by the Department of Meteorology and presented in the table below for the selected reference stations, it appears that the seasonal model for **August** did not behave well with respect to the seasonal temperature forecast. All average daily maximum and minimum temperatures were above normal, while the positive deviation from normal of both the average daily maximum and average daily minimum temperature is notable for the forest station at Prodromos, which is located at an altitude of 1736 meters. Especially, for the cumulative amount of rain during the summer months it must be mentioned that during summer months, precipitation is resulted mainly from thundery activity which has very localised characteristics and that a quantitative judgment is very difficult due to model's limitations. However, the seasonal model for **August** showed that the expected amount of rain inland would be around normal, in the north and west would be above normal and in the south and east it would be below normal. However, at all reference stations this was close to normal, except from the station at Prodromos where it was below normal and the station at Athalassa where it was well above normal. At this point it is worth mentioning that the largest contribution to the total August 2023 rainfall amounts, particularly over the inland and the southeastern areas of the island, is not only due to isolated thunderstorms of thermal instability during noon and early afternoon, but also due to a disturbance which affected the island late in the evening of the 28th of August. Such disturbances, of dynamic causes, the

result of which is rainfall accompanied by intense thundery activity during the evening hours, is something that does not happen often in Cyprus, especially during the month of August.

TEMPERATURE AND PRECIPITATION PROVISIONAL DATA FOR AUGUST 2023														
St. No.	Station Name	Mean Daily Maximum Temperature (°C)	Normal Value (1981-2010)	Difference from Normal Value	Highest Daily Maximum Temperature (°C)	Lowest Daily Maximum Temperature (°C)	Mean Daily Minimum Temperature (°C)	Normal Value (1981-2010)	Difference from Normal Value	Lowest Daily Minimum Temperature (°C)	Highest Daily Minimum Temperature (°C)	Monthly Total Precipitation (mm)	Normal Value (1981-2010)	Difference from Normal Value
41	POLIS CHRYSOCHOUS	33.5	33.3	0.2	37.4	31.2	23.0	21.5	1.5	20.7	25.2	0.0	0.0	0.0
82*	PAFOS (AIRPORT)	31.9	30.5	1.4	32.5	30.8	23.7	21.2	2.5	21.3	25.6	0.0	0.0	0.0
225	PRODROMOS (C.F.C.)	31.4	28.0	3.4	38.4	25.2	20.7	18.1	2.6	15.2	29.5	0.0	12.0	-12.0
666*	ATHALASSA (RADIOSONDE)	38.9	37.0	1.9	45.3	35.2	22.2	21.9	0.3	19.3	25.2	13.0	1.8	11.2
731	LARNAKA (AIRPORT)	34.0	32.9	1.1	35.7	32.7	24.6	22.3	2.3	21.8	27.2	0.4	0.3	0.1
800**	ACHNA (DASAKI)	34.6	33.5	1.1	38.4	32.2	23.8	22.0	1.8	21.4	25.8	0.2	0.1	0.1

* Pafos' and Athalassa's Station Normal Values cover the period 1983-2010
** Achna's Temperature Normal Values cover the period 1981-2007

Extreme maximum temperatures with positive deviations of more than 4°C were recorded, as at Prodromos station where the highest daily temperature 38.4°C was 10.4°C above the normal (28°C), that is the highest daily maximum temperature ever recorded at this station since its operation date. Also, at the station at Athalassa the extreme maximum (45.3°C) was 8.3°C above normal.

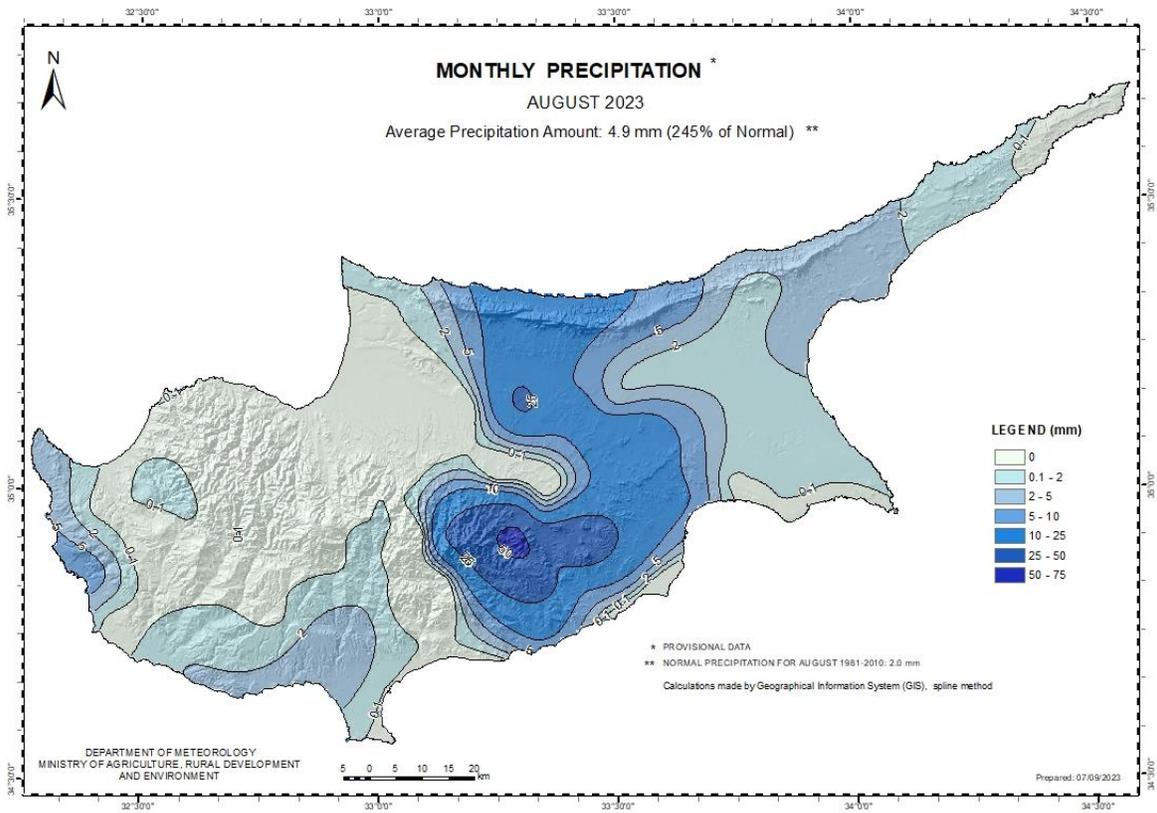
Extreme minimum temperatures with positive departures of more than 4°C were also recorded. The extreme minimum (29.5°C) at Prodormos station was 11.4°C above normal which is also a record regarding the highest daily minimum temperature ever recorded at this station. At Larnaka airport the extreme minimum (27.2) was 4.9°C above normal.

For the periods 1-4, 13-19 and 22-23 of **August** EMMA yellow warnings were issued, concerning high temperatures. At the same time, for the period 14-17 **August** EMMA orange warnings, once again concerning high temperatures, were also issued.

For the periods 22 and 27-28 of **August** local showers accompanied sometimes with thunderstorms were recorded, resulting in accumulated precipitation of 4.9mm (or 245% of normal).

On the 28th of **August** EMMA yellow warning was issued concerning thundery activity.

For the purpose of better visualization of **August** accumulated precipitation, a chart of Cyprus with the total preliminary accumulated precipitation is presented.



A Cyprus chart with the normal (period 1981 to 2010) accumulated precipitation for the month of **August** is also presented.

