

## VERIFICATION OF THE SEECOF -21 SUMMER 2019 CLIMATE OUTLOOK FOR REPUBLIC OF NORTH MACEDONIA COMPARED TO THE 1981-2010 BASE PERIOD

Hydrometeorological Service of Republic of North Macedonia prepares regular seasonal climate analysis, based on the products of SEECOF seasonal forecasts and the forecast products from the SEVCCC. The present analysis is for the summer 2019, June, July and August, and it is based on the means of the climatological period 1981-2010.

### ➤ SUMMER 2019

The mean seasonal air temperature during summer 2019 ranged between 17.5°C in Lazaropole and Mavrovo to 27.3°C in Gevgelija. Spatial distribution of the mean seasonal air temperature is shown on Figure1. The mean air temperatures anomaly was from 0.9°C in Prilep and Kriva Palanka to 2.0°C in Gevgelija (Figure2).

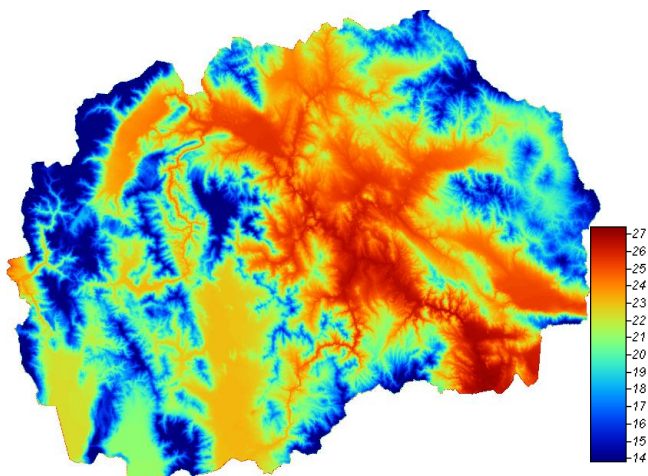


Figure 1: Spatial distribution of the mean seasonal air temperature (°C) during summer 2019

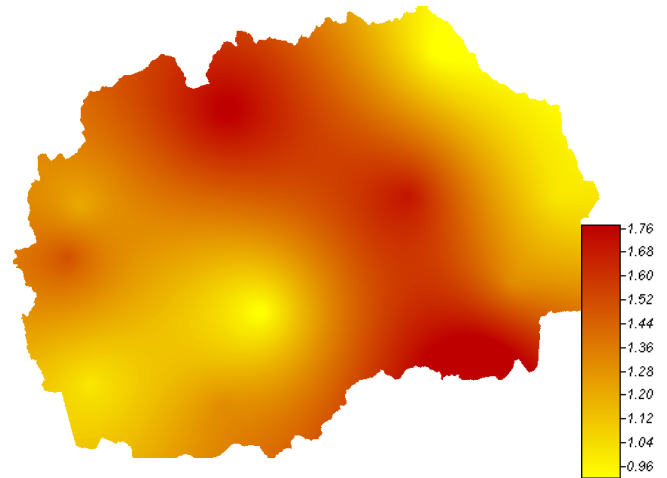


Figure 2: Mean seasonal air temperature anomaly (°C) compared to the period 1981-2010 during summer 2019

The mean maximum seasonal air temperature anomaly was above normal, with positive anomaly from 1.1°C in Prilep to 2.7°C in Gevgelija. The mean minimum seasonal air temperature was also above normal, with positive anomaly from 0.5°C in Demir Kapija to 1.7°C in Skopje. The highest daily air temperature during summer 2019 was measured 41.0°C observed on 3<sup>rd</sup> of July and 13<sup>th</sup> of August in Gevgelija. The lowest air temperature during summer 2019 was measured 3.8°C observed on 2<sup>nd</sup> of June in Mavrovo.

According to percentile calculation method most of the territory was classified as very warm but the southeast part was extremely warm, and the southwest warm (Table1).

Rainfall totals were variable for this summer season. Spatial distribution of the precipitation sums is shown on Figure 3 and the anomaly compared to 1981-2010 base period on Figure 4.

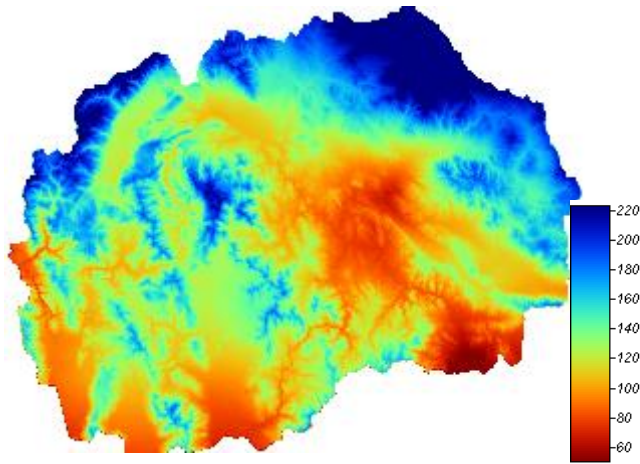


Figure 3: Spatial distribution of the precipitation sums (mm) during summer 2019

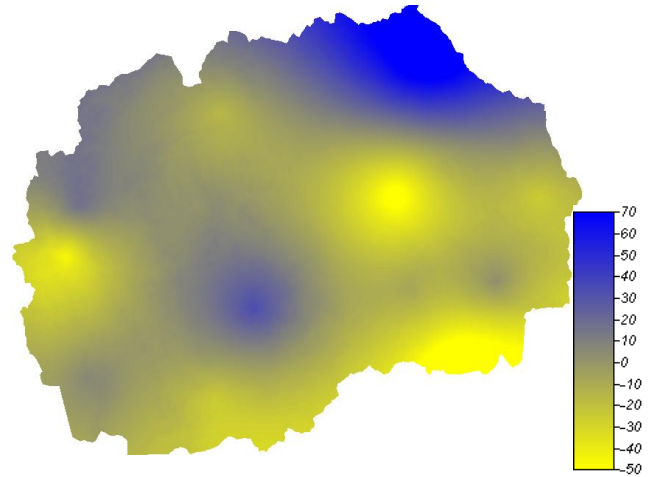


Figure 4: Spatial distribution of the precipitation sums anomaly (mm) during summer 2019

The wettest day was 3<sup>rd</sup> of June with 38.4mm measured in Skopje.

According to percentile calculation method the precipitation regime was variable, from extremely dry to normal (Table1).

Meteorological station	Temperature	Precipitation
<b>Berovo</b>	very warm	dry
<b>Kriva Palanka</b>	warm	wet
<b>Stip</b>	very warm	dry
<b>Strumica</b>	very warm	normal
<b>Demir Kapija</b>	extremely warm	normal
<b>Gevgelija</b>	extremely warm	extremely dry
<b>Skopje</b>	very warm	dry
<b>Prilep</b>	warm	wet
<b>Bitola</b>	warm	dry
<b>Ohrid</b>	warm	normal
<b>Lazaropole</b>	very warm	dry
<b>Mavrovo</b>	very warm	normal

Table1: Air temperature and precipitation classification in Republic of North Macedonia for summer 2019 using percentile method compared to 1981-2010 base period

The values of distribution of tercile for the air temperature and the precipitation sums are shown in table 2 and 3, respectively.

Air Temperature (°C)	summer	1981-2010	
	2019	33	67
Berovo	19.2	17.8	18.6
Kriva Palanka	20.5	19.3	20.0
Stip	25.2	23.0	24.0
Strumica	24.8	23.0	23.8
Demir Kapija	26.0	24.1	24.9
Gevgelija	27.3	25.0	26.0
Skopje	25.1	23.0	23.8
Prilep	22.5	21.3	22.1
Bitola	23.0	21.4	22.0
Ohrid	21.7	20.4	21.0
Lazaropole	17.5	15.7	16.2
Mavrovo	17.5	15.9	16.7

Table 2: Values of distribution of tercile for temperature for period 1981-2010

Precipitation sums (mm)	summer	1981-2010	
	2019	33	67
Berovo	140.0	138.8	162.8
Kriva Palanka	263.9	132.4	142.2
Stip	58.6	87.6	104.1
Strumica	121.5	85.1	180.3
Demir Kapija	87.4	75.0	210.3
Gevgelija	37.8	61.9	269.5
Skopje	99.9	86.8	110.6
Prilep	149.8	75.3	128.5
Bitola	82.6	77.6	200.8
Ohrid	103.1	65.6	238.3
Lazaropole	114.5	138.8	162.8
Mavrovo	160.7	103.2	168.4

Table 3: Values of distribution of tercile for precipitation for period 1981-2010

The SEECOF-21 forecast product for the mean temperatures for summer season puts Republic of North Macedonia in a zone 1, which is likely to experience above average summer temperatures (Figure 5). Forecast for the precipitation for JJA 2019 categorized our country in zone 1 and 2 (Figure 6). Zone 1 is likely to experience above normal summer precipitation sums and zone 2 is with high uncertainties, probabilities for below-, near-, or above- average conditions are approximately equal.

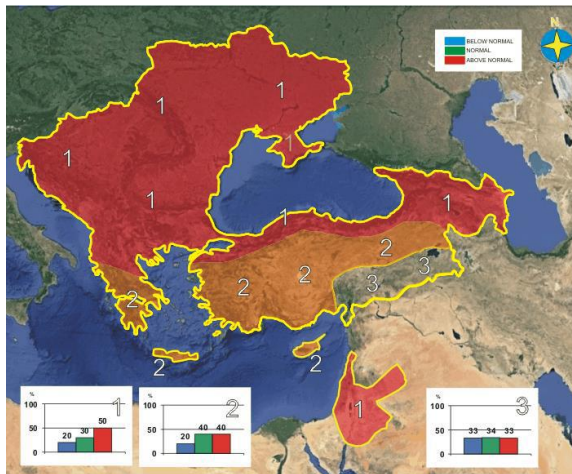


Figure 5: Graphical presentation of the 2019 summer temperature outlook

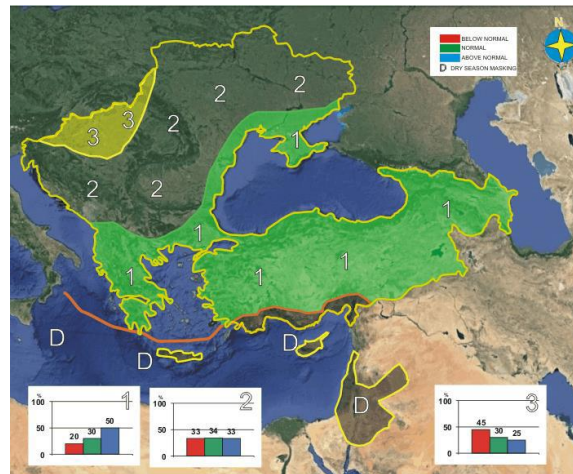


Figure 6: Graphical presentation of the 2019 summer precipitation outlook

A general judgment for the models evaluation for summer season is that the model was efficient concerning the temperature. Concerning the precipitation, evaluation of the model is difficult because of the variable regime.

## Hydrometeorological Service of Republic of North Macedonia

Meteorology Department

Climatological analysis for summer 2019

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	SEEVCCC climate outlook for temperature	Observed	SEEVCCC climate outlook for precipitation	
<b>REPUBLIC OF NORTH MACEDONIA</b>	Above average	Above average (20, 30, 50)	Below normal -variable precipitation regime	No predictive signal (33, 34, 33) and above normal (20, 30, 50)	/