Republika Srpska,
Bosnia and Herzegovina

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Verification of JJA 2019 outlook over

The Republika Srpska, Bosnia and Herzegovina

1. SEECOF-21, MedCOF-12 Climate outlook for the 2019 summer season:

Temperature and Precipitation

According to the seasonal forecast, based on tercile ranks and climate classification ratings, thermal conditions over the Republika Srpska for the climatological summer of 2019 had been described by the following categories: ***warmer than normal (****50% of probability) over the entire Republika Srpska (the portion 1,down left).* ***According to observed values, this prognosys was correct.*** *Precipitation forecast had no sigal (the same chances-climate dependency). Observations were in the range normal to wtter conditiions-7-yrs lasting summer drought was broken last year as the result of changing local conditions.*

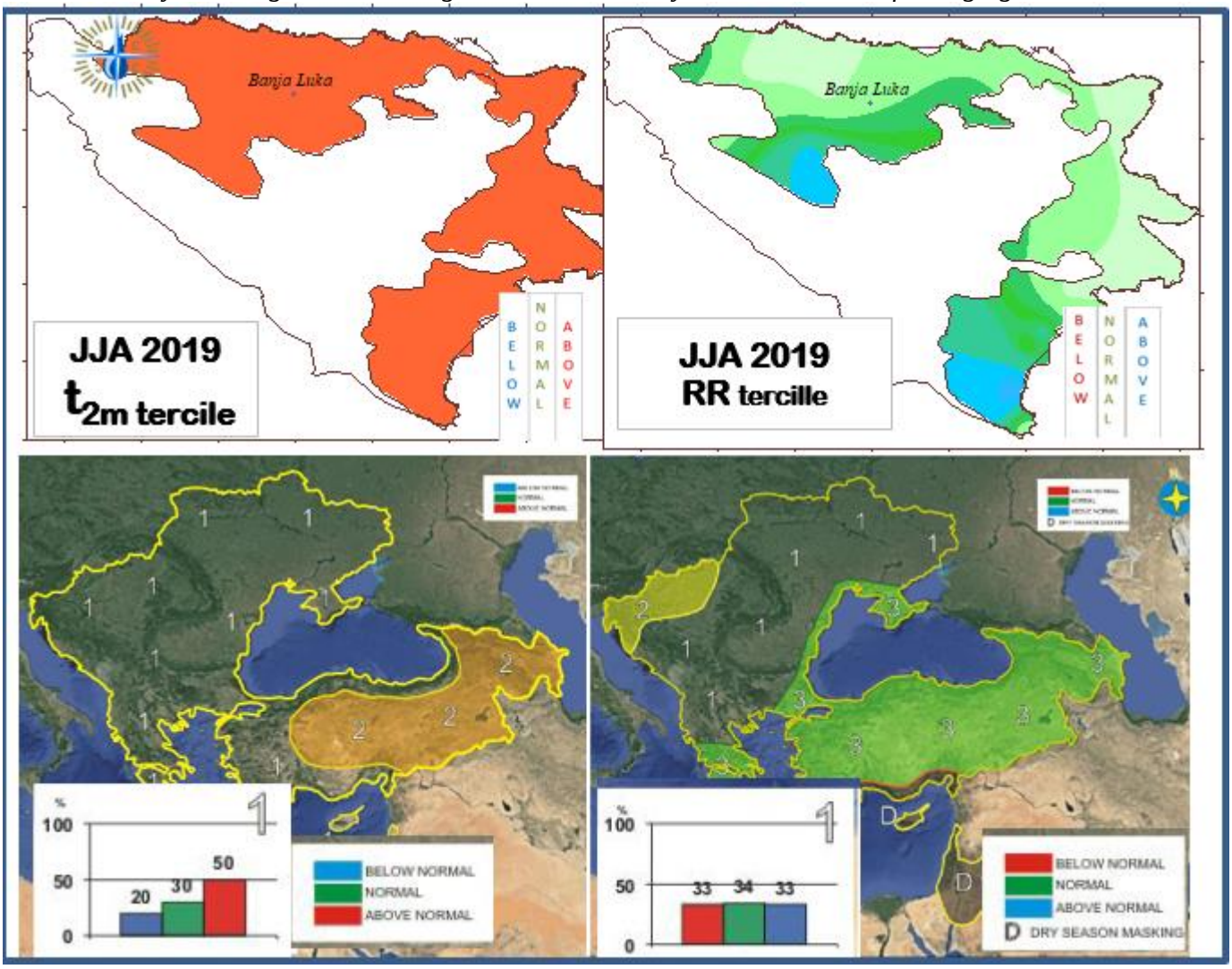


Figure1: Temp (left) and PRC tot (right) for jja2019- outlook (below) and observed values (above)

- ***The Republika Srpska (RS) registered very warm to extremelly warm weather pattern, according to percentiles, over the most of areas with reference to standard climatological normal values; Fourth hottest summer season from 1961.***
  - ***Rainfall stated over normal to dry pattern in the northern and central areas or normal to wetter in the Southern.***

1. Analysis of the 2019 Summer season

Table 1. JJA-2019 t_{mean} - statistics with reference to (ref 1981-2010) in Republika Srpska

Station	t_{mean} 1981-2010	STD	z (STI)	Percentille (NORMSDIST)	PercRank 2019	JJA 2019 (mm)	lower tercille	upper tercille	median	tercille category
Бања Лука Bana Luka	21.0	1.05	2.47	**0.99**	0.99	**23.6**	20.6	21.5	20.8	above
Приједор Priedor	21.2	1.08	1.90	**0.97**	0.97	**23.2**	20.6	21.8	21.1	above
Нови Град NoviGrad	20.2	1.13	2.15	**0.98**	0.98	**22.6**	19.6	20.5	20.1	above
Добој Doboy	20.5	1.00	2.40	**0.99**	0.99	**22.9**	20.0	21.0	20.4	above
Бијељина Bijeljina	21.5	1.17	1.96	**0.98**	0.98	**23.7**	21.1	21.9	21.4	above
Соколац Sokolac	16.3	1.02	1.91	**0.97**	0.98	**18.3**	15.8	16.9	16.3	above
Билећа Bileca	18.4	7.31	0.66	**0.75**	0.97	**23.3**	20.6	21.5	21.0	above
Гацко Gacko	17.3	0.90	2.53	**0.99**	1.00	**19.5**	16.8	17.8	17.3	above
Чемерно Cxemerno	15.7	1.08	1.14	**0.87**	0.85	**16.9**	18.0	15.7	15.5	above
Требиње Trebine	23.3	1.13	1.47	**0.93**	0.92	**25.0**	22.8	23.5	23.0	above
Дринић Drinic	16.9	1.00	2.45	**0.99**	0.99	**19.3**	16.5	17.4	16.9	above
Фоча Focxa	19.4	1.00	1.10	**0.86**	0.90	**20.5**	19.1	19.9	19.4	above
МркГрад MrkonicG	18.6	1.22	1.46	**0.93**	0.89	**20.4**	18.3	18.8	18.5	above

Temeprature was significantly above standard normals of 1981-2010 but not such as like during 2012,2003 and 2017 years.

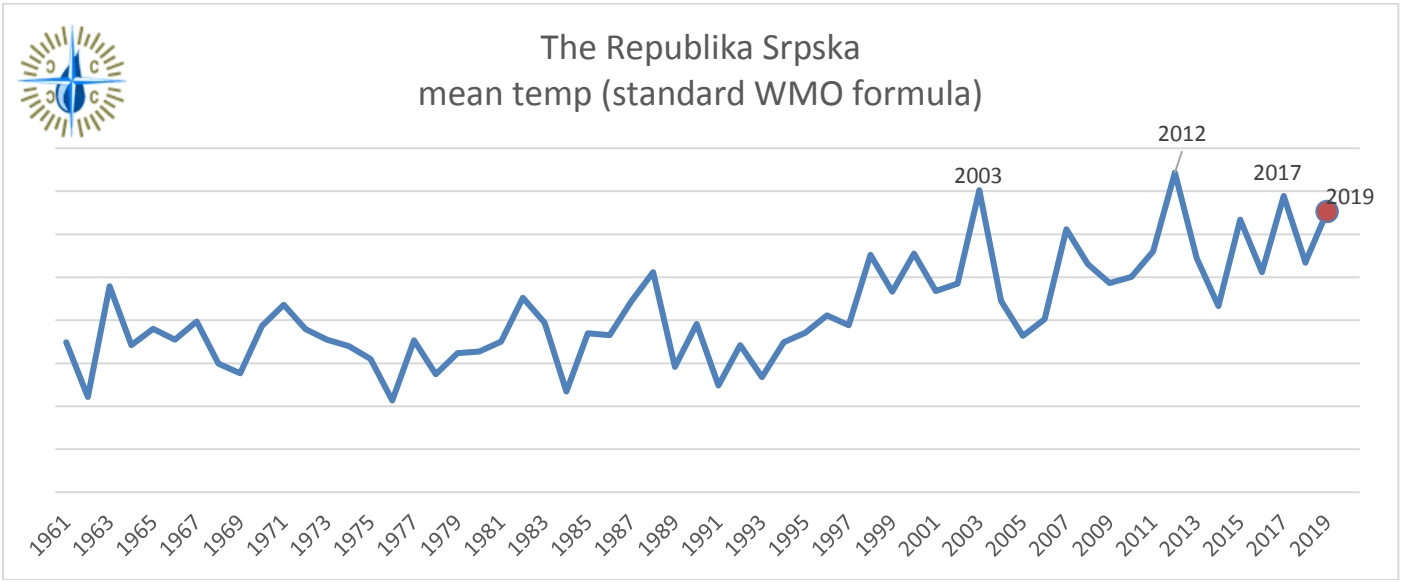


Figure2: graphical presentation of JJA 2019 mean temp over the Republika Srpska stations

extremely to very cold days (< 0.02percentile) occured on 29-July over the South: Trebinye, the coldest day from 1950; previous record of the lowest Tmax (TXN) was 2004 for 1,5C higher;

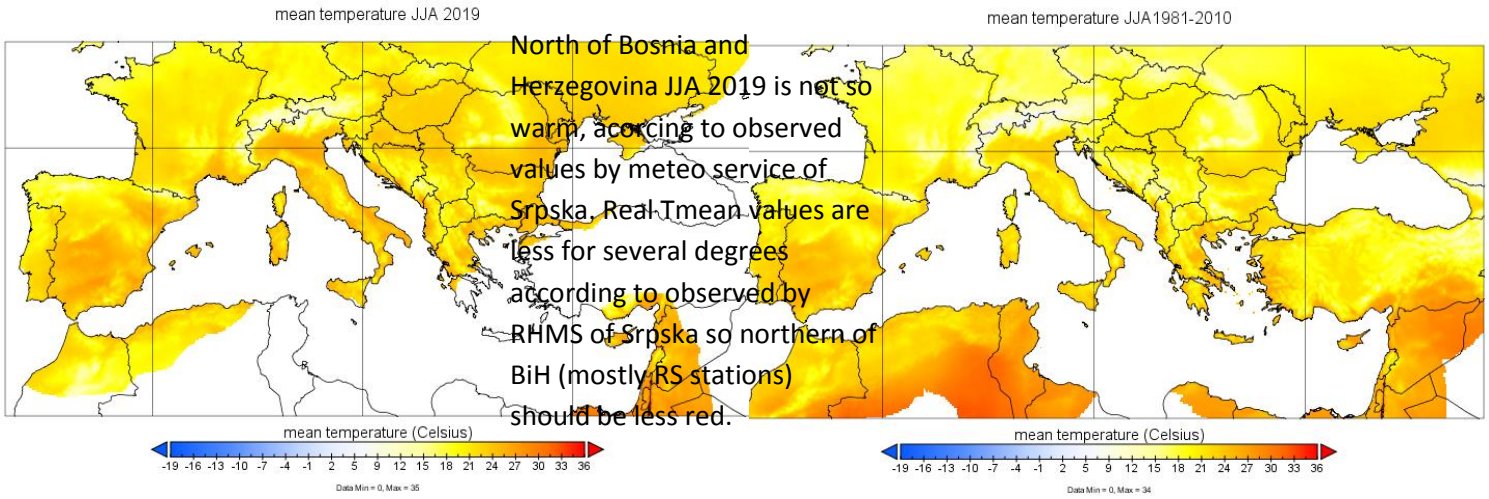


Figure 3: Spatial distribution of tmean for the reference period 1981-2010 (right) and JJA2019(left) according to ECA&D grided values (NC format). Compariing gridid values for Bosnia and Herzegovina with observed one over the entity of Srpska, realistic thermal condition is much cooler

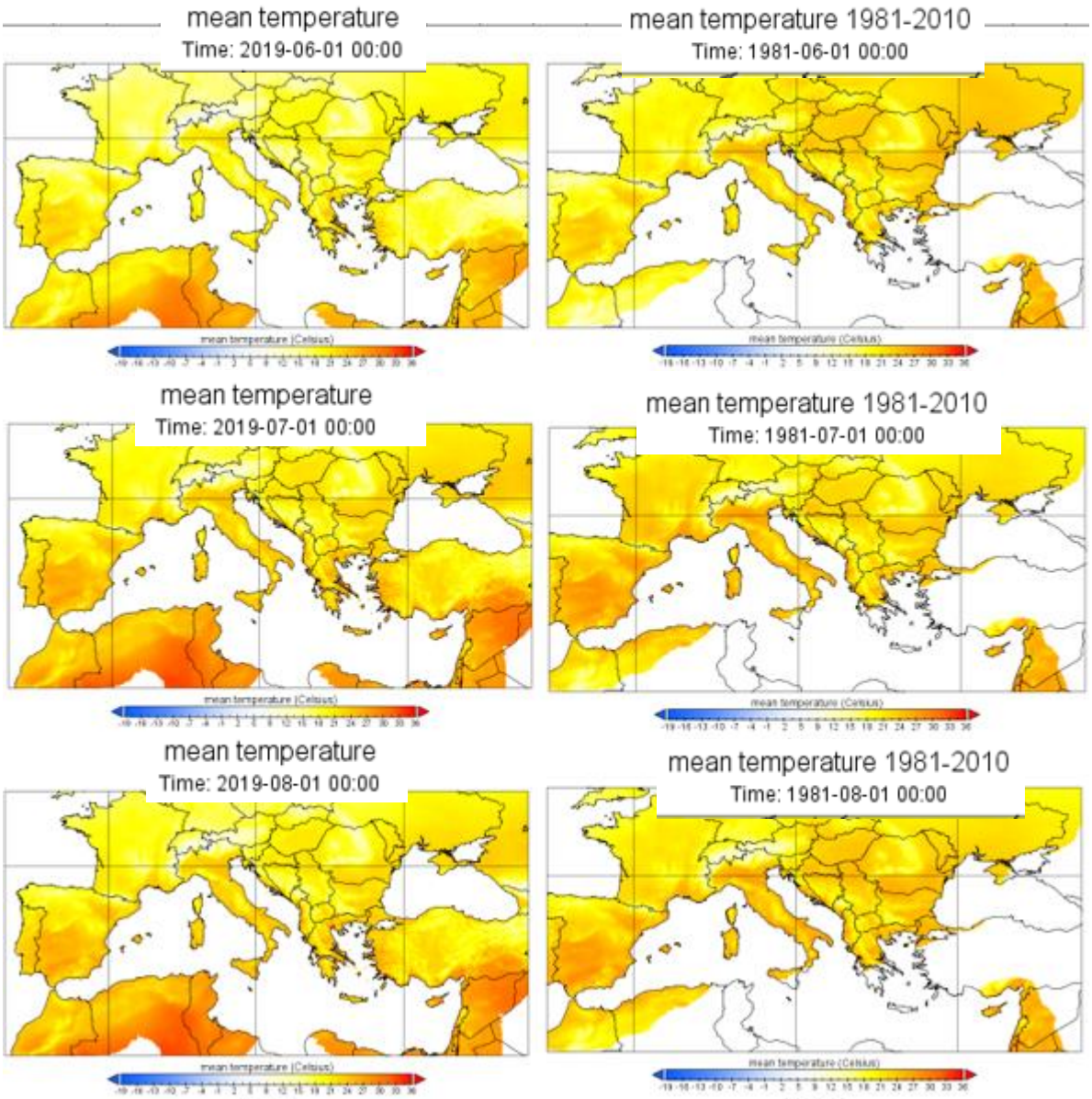


Figure 4: Spatial distribution of tmean for the individual months with reference to the 1981-2010 (right) and 2019(left) according to ECA&D (Copernicus) grided values (NC format).

July 2019 grided data for Europa have shown bias of $T_{mean:}$ realistic thermal conditions had been much cooler in RS (mostly northern and eastern B&H). This is a good example of the need for regridding global/regional/ level to local higher spatial resolution ie not chosen representative stations in european data base for BiH.

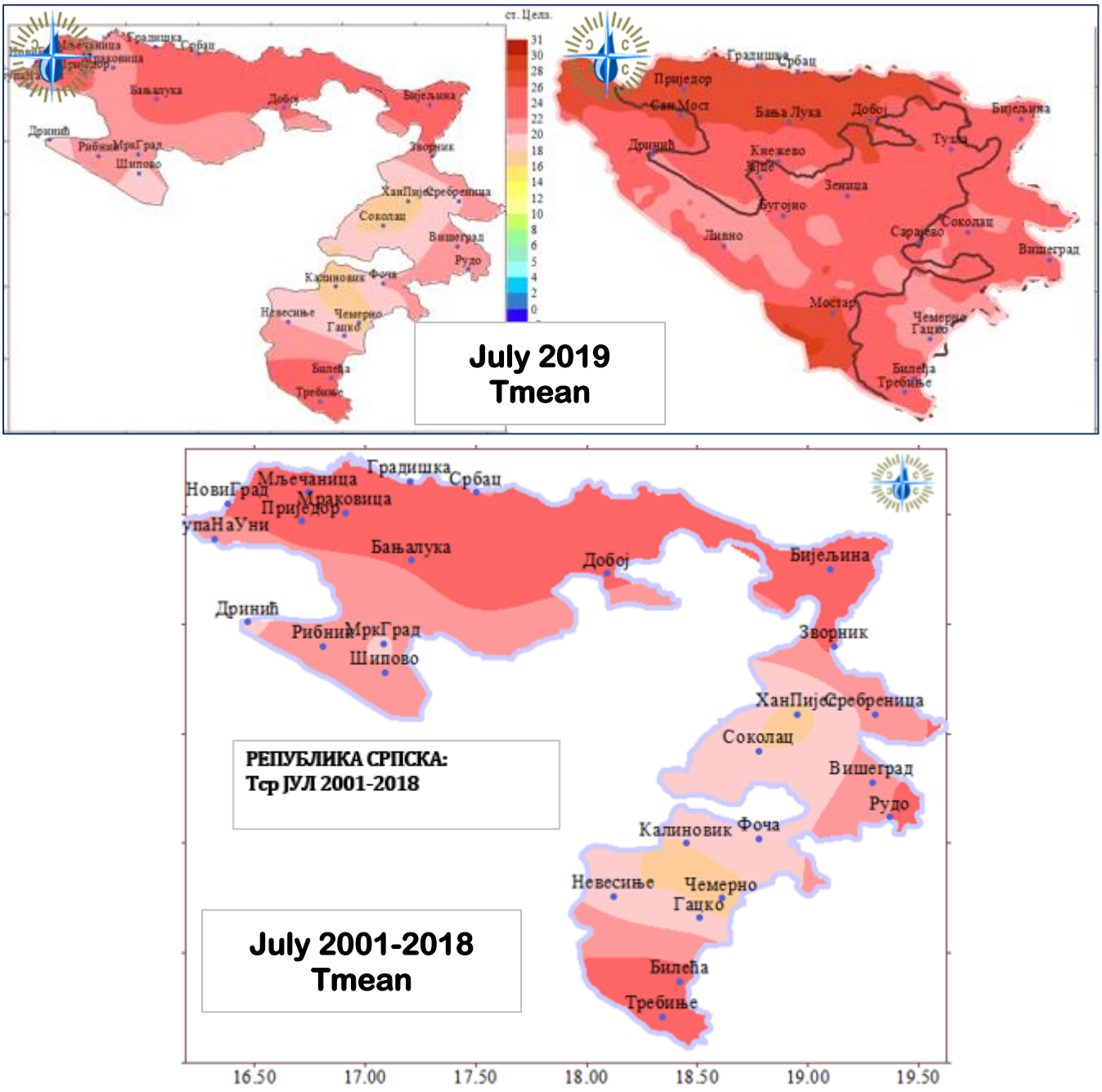


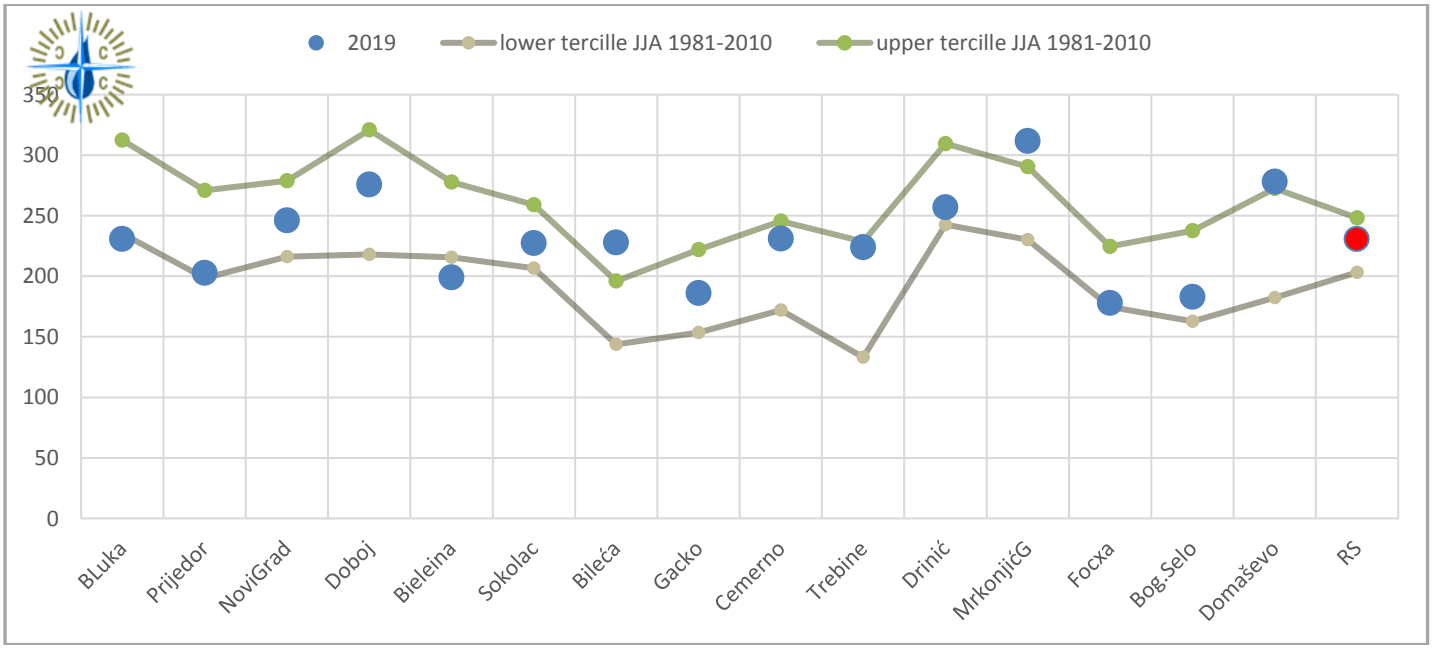
Figure 4: Observed values by RHMS Srpska (left, above) vs grided values of ECA&D (right, above) climatological data for Bosnia and Herzegovina, packed in satelite NCDF format (COPERNICUS).

As it is shown below, July mean thermal conditions are the same as those ones over the 2001-2018 – no change regarding to this period; one degree of Celsius above 1981-2010normal, averaged over all stations.

Precipitation

Table 2. JJA-2019 precipitation statistics over RS (ref 1981-2010);

Station	Jja 1981 - 2010	STD	z (SPI)	PercRank 2019	**JJA 2019 (mm)**	% jja2019 (ref1981-2010)	trend %	**lower tercille**	**upper tercille**	**median**	tercille category
Бања Лука *Bana Luka*	276	81	-0.55	0.33	**231**	83.7	-16.3	235	313	273	***below***
Приједор *Priedor*	243	76	-0.53	0.36	**203**	83.4	-16.6	198	271	219	***normal***
Нови Град *NoviGrad*	247	71	-0.01	0.51	**246**	99.6	-0.4	216	279	246	***normal***
Добој *Doboy*	284	104	-0.08	0.52	**276**	97.1	-2.9	218	321	272	***normal***
Бијељина *Bijeljina*	243	78	-0.57	0.29	**199**	81.8	-18.2	216	278	255	***below***
Соколац *Sokolac*	238	64	-0.16	0.46	**227**	95.7	-4.3	207	259	239	***normal***
Билећа *Bileca*	179	71	0.69	0.78	**228**	127.2	27.2	144	196	175	*above*
Гацко *Gacko*	191	74	-0.06	0.51	**186**	97.6	-2.4	154	222	181	***normal***
Чемерно *Cxemerno*	218	98	0.14	0.63	**231**	106.2	6.2	172	246	197	***normal***
Требиње *Trebine*	181	95	0.45	0.58	**224**	124.0	24.0	133	229	161	***normal***
Дринић *Drinic*	272	87	-0.18	0.55	**257**	94.3	-5.7	243	309	251	***normal***
Фоча *Focxa*	215	81	-0.46	0.36	**178**	82.8	-17.2	175	225	204	***normal***
МркГрад *MrkonicG*	273	90	0.43	0.72	**312**	114.3	14.3	230	291	269	*above*



2. **High impact events:**

High impact events:

- Extreemely warm weather pattern over the RS caused intense convective Cb unstability (hail, thunder, storm wind gust, showers, temperature drop) on 3-June, 5-June, 16-June, 23-June; 4-July,7-July,13-July,18-July;27-July; 13-August, 17-August;

2.Verification of the climate outlook for the 2019 summer

Country	**Seasonal temperature (JJA)**		**Seasonal precipitation (JJA)**	
	Observed	SEECOF, MedCOF *climate outlook*	Observed	SEECOF, MedCOF *climate outlook*
The Republika Srpska, BH	***Extremely warm*** +2,3^{o}C *(0.99P* r1981-2010 **)**	***(20,30,50)*** *above upper tercile*	**Normal over most areas** to wetter (southern)	*no clear signal* 33,33,33

The outlook for JJA 2019 for both elements, mean temperature and precipitation had been correct for the Republika Srpska (even thou of no signal for precipitation – local climate forsing observed changing trend).