

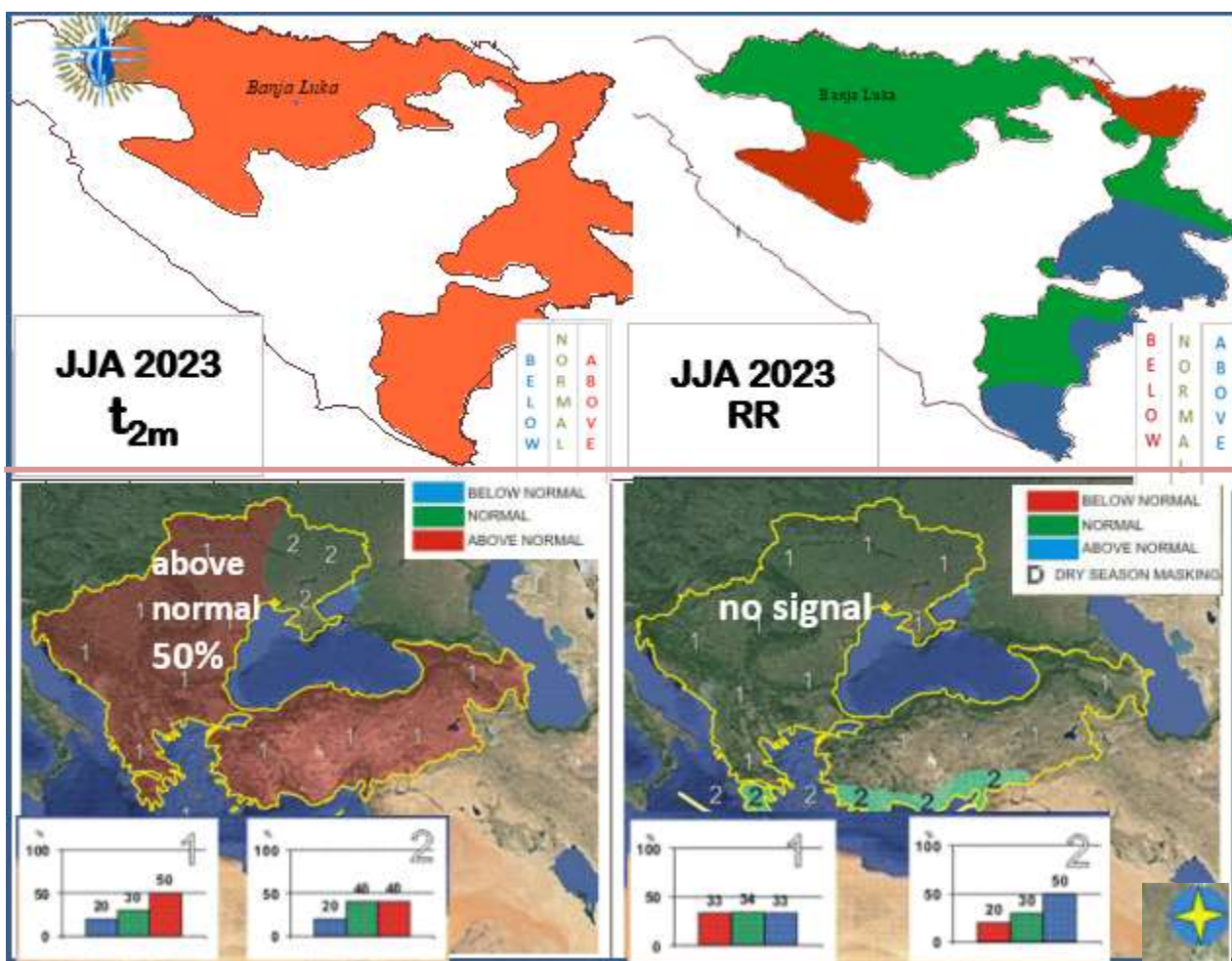


Verification of the the JJA 2023 SEECOF outlook over The Republika Srpska, Bosnia and Herzegovina

1. SEECOF-29 Consensus Statement of the Climate Outlook for summer 2023.

Temperature and Precipitation

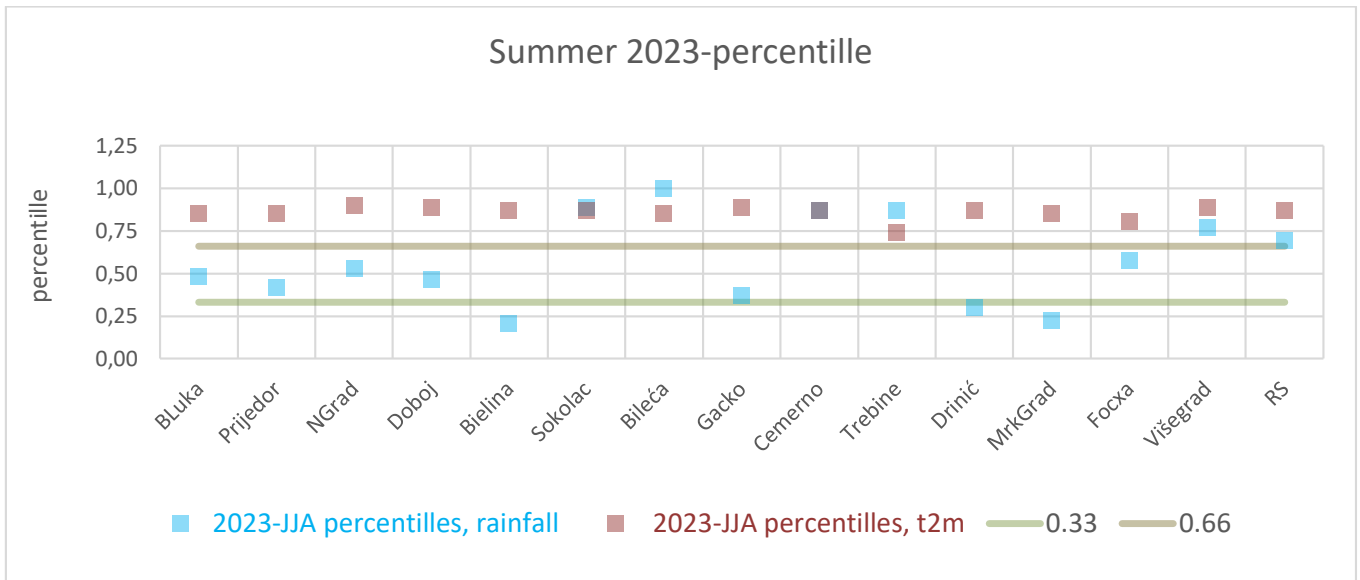
According to the seasonal forecast, based on tercile ranks and climate classification ratings, thermal conditions over the Republika Srpska for 2023 summer had been described as warmer than normal (the portion 1, down left). According to observed values, this climatological prognosys was excellent over entire Republic of Srpska. Precipitation forecast was with „no signal“ (the portion 2, down right). Analyse based on observations across The Republika Srpska territory shows normal weather pattern over the northern area, wetter in the souhern and central and drier in the east and south west. The precipitation outlook was correct, giving cahances for usual climate weather pattern and huge convective rainfal at the southern and central places..



Temp (left) and PRC tot (right) for Summer 2023- outlook (below) and observed values (above)

- ❖ 10th hottest JJA; Tmean departures ranged from plus 1-2°C (over 0,80th Percentille) for the most of the RS stations

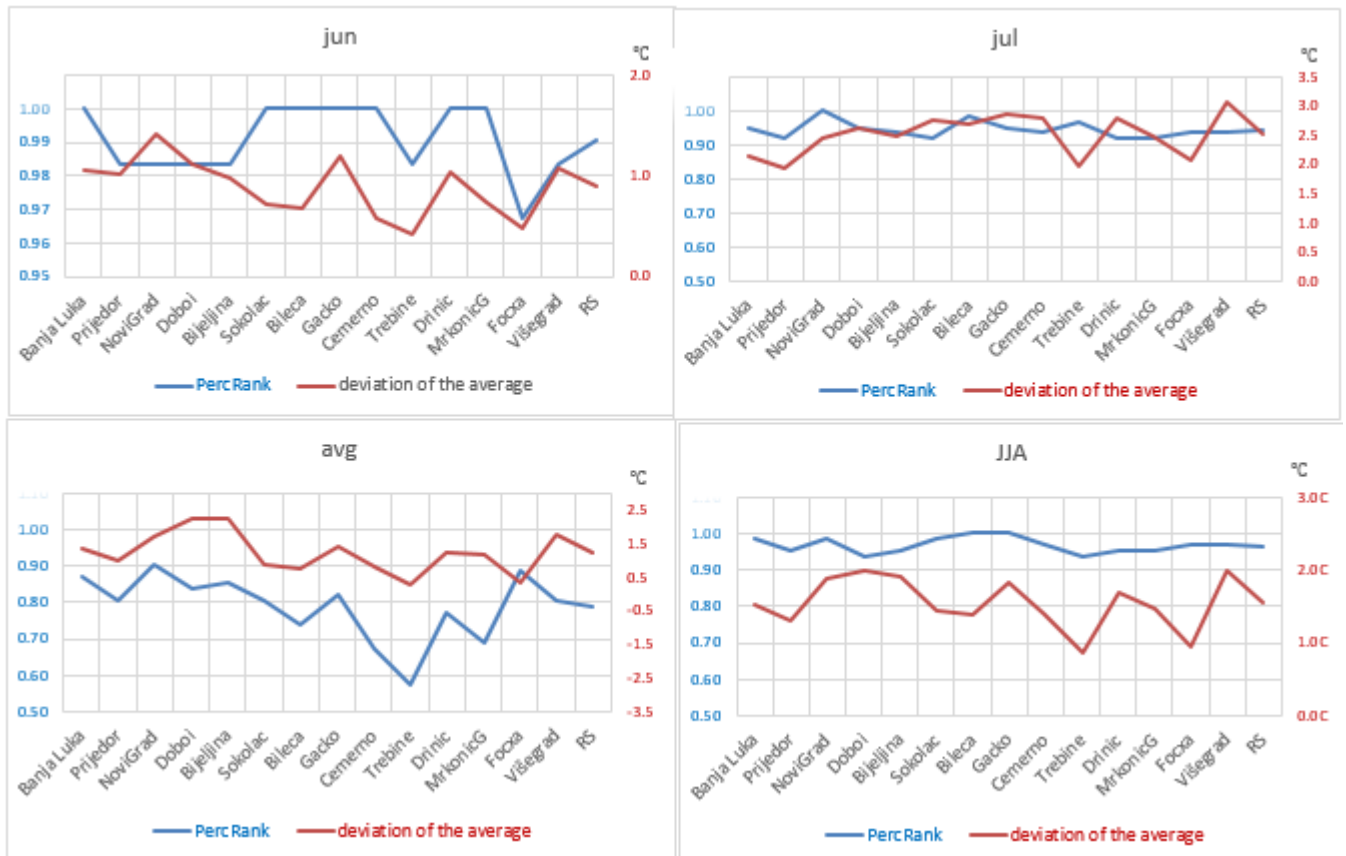
- ❖ According to Tmean percentile categories of air temperature, most summer days of 2023 were much above normal values.
- ❖ 1st highest rainfall amount for Summer season in southern places; broken previous record of JJA total and for August in Bileća



• **Analysis of the 2023 Summer season**

Thermal conditions

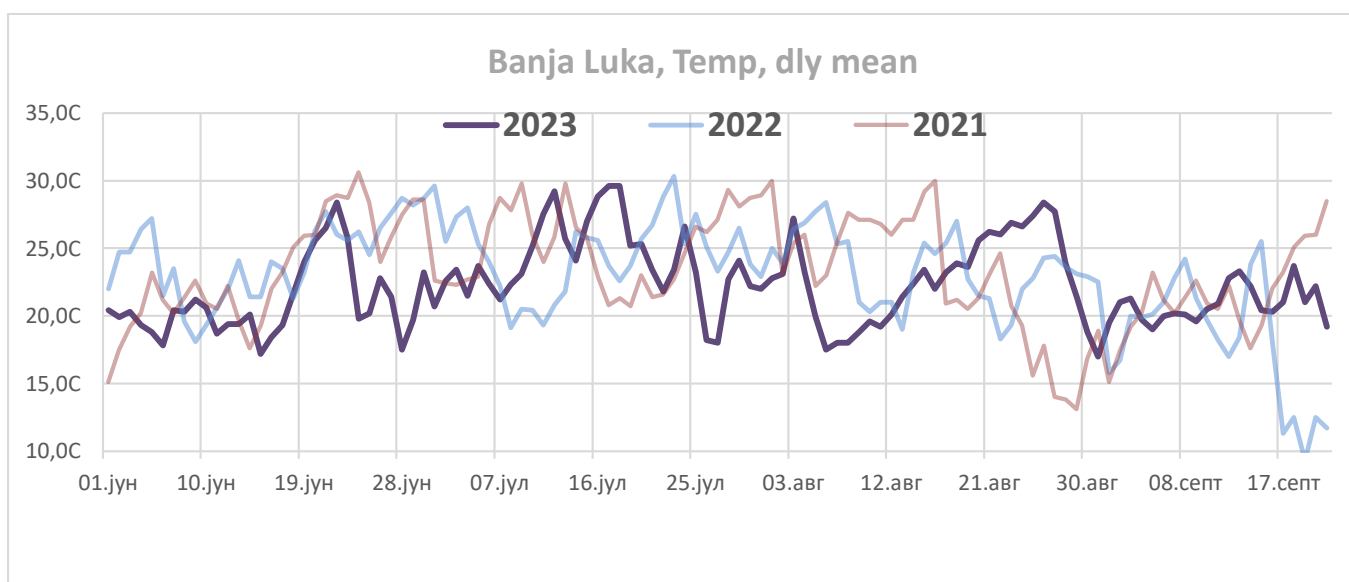
Summer temperatures much above normal (>80P), compared to the reference period 1981-2010;



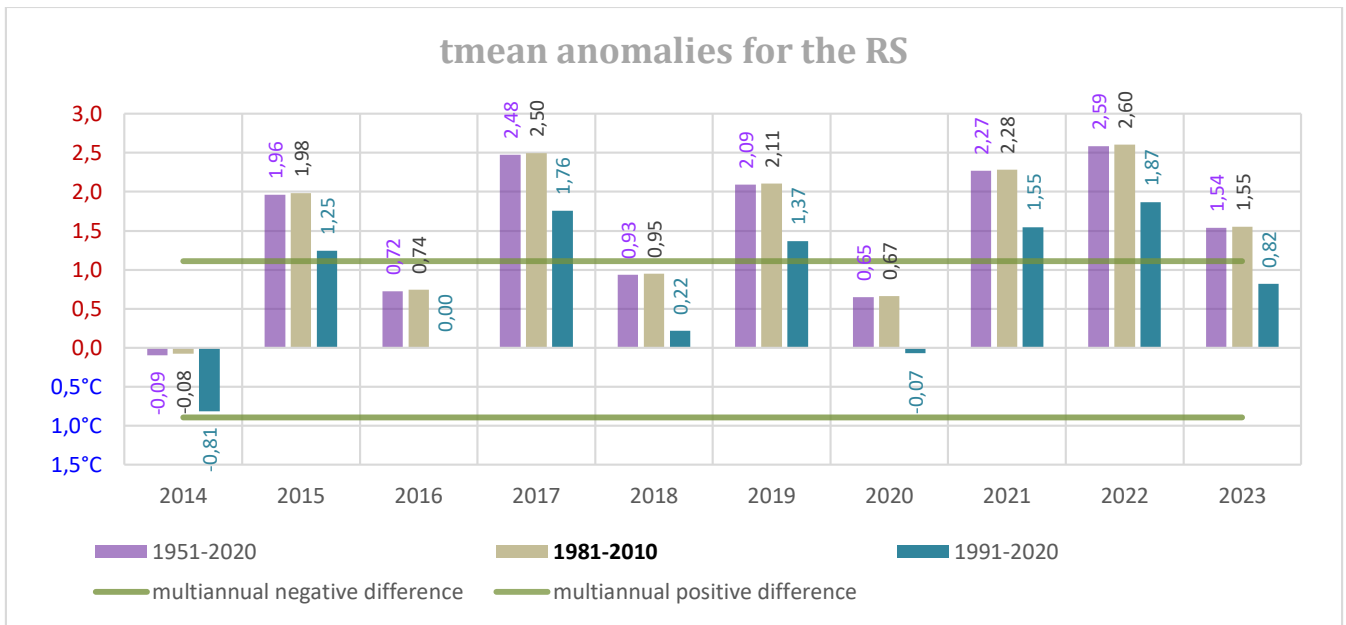
Tmean anomalies for summer 2023 for the stations in RS regarding difference of the 1981-2010 and percentile rank

t_{mean} - statistics for the JJA-2023 with reference to (ref 1981-2010) in Republika Srpska (°C)

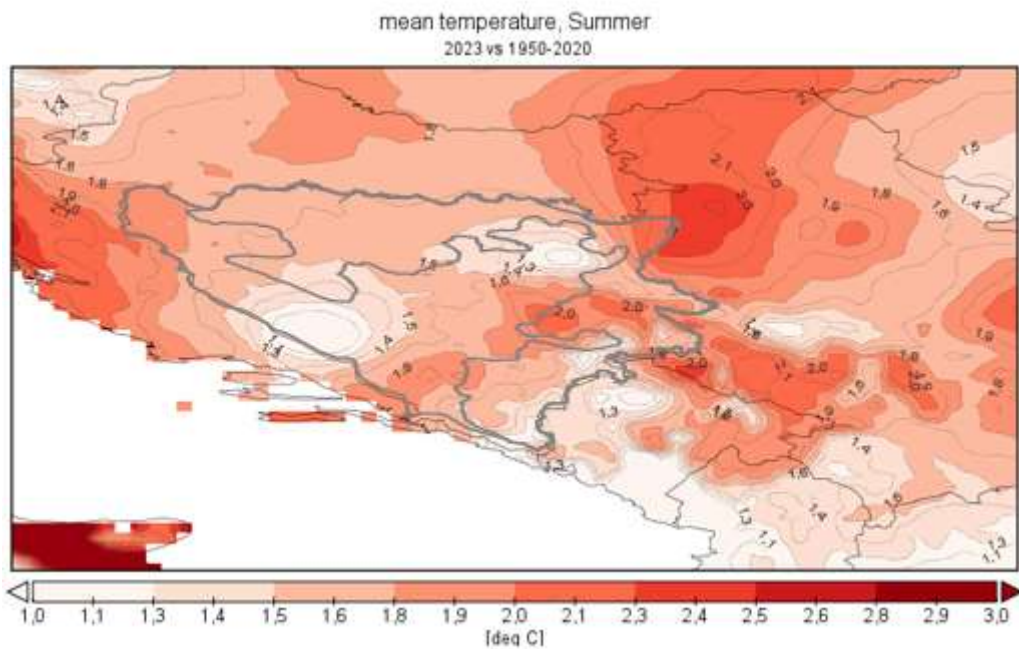
Station	jja1981-2010	STD	z (SPI)	NORMSDIST (z) (percentile)	PercRank 2023	JJA 2023 (mm)	% jja2023 (ref1981-2010)	suf/def %	33,33	66,67	50,00	tercile anom.catgeg
Бања Лука Banja Luka	21	1	1.45	0.93	0.85	23	107	7.2	21	21	21	above
Приједор Priedor	21	1	1.22	0.89	0.85	23	106	6	21	22	21	above
Нови Град NoviGrad	20	1	1.65	0.95	0.90	22	109	9	20	21	20	above
Добој Doboy	20	1	1.98	0.98	0.89	22	110	10	20	21	20	above
Бијељина Bijeljina	21	1	1.60	0.95	0.87	23	109	9	21	22	21	above
Соколац Sokolac	16	1	1.42	0.92	0.87	18	109	9	16	17	16	above
Билећа Bileca	18	7	0.58	0.72	0.85	23	123	23	21	21	21	above
Гацко Gacko	17	1	2.02	0.98	0.89	19	111	11	17	18	17	above
Чемерно Schemerno	15	1	1.50	0.93	0.87	16	109	9	14	15	15	above
Требинје Trebine	23	1	0.77	0.78	0.74	24	104	4	23	24	23	above
Дринић Drinic	17	1	1.51	0.93	0.89	19	110	10	17	17	17	above
Фоча Foca	19	1	0.95	0.83	0.81	20	105	5	19	20	19	above
МркГрад MrkonjicG	18	1	1.38	0.92	0.85	20	108	8	18	19	18	above



Summer days (astonomom.period) over last three years 2023,2022,2021 in Banja Luka, the RS/BiH



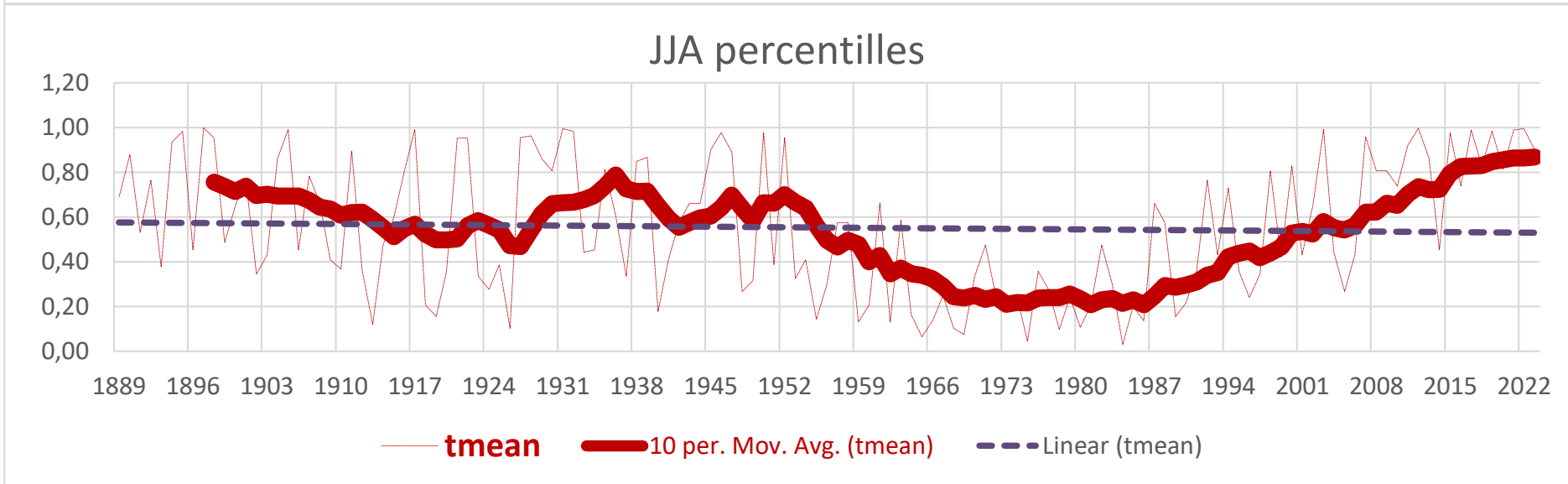
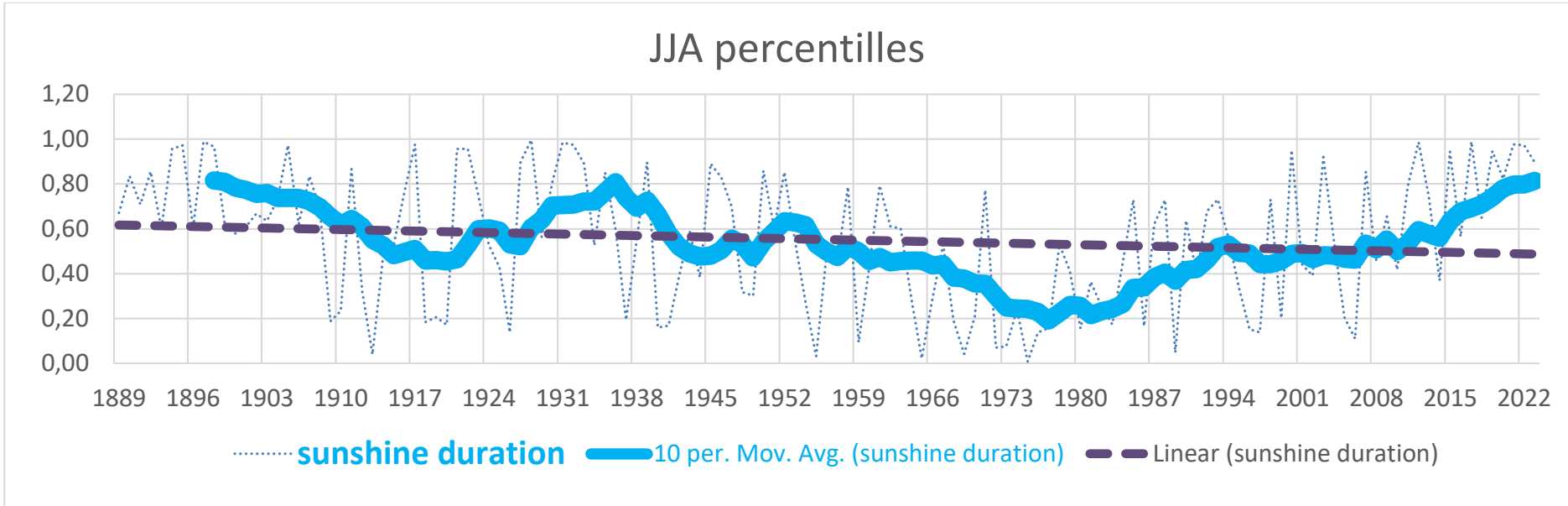
tmean anomalies, averaged over the Republika Srpska territory, regarding different reference (Normal distribution is skewed to the right because of warmer 1991-2020 period)



Spatial distribution of tmean anomalies regarding 1950-2020, according to COPERNICUS data source of daily data 1950-2023/data analysed by RHMS RS climatology

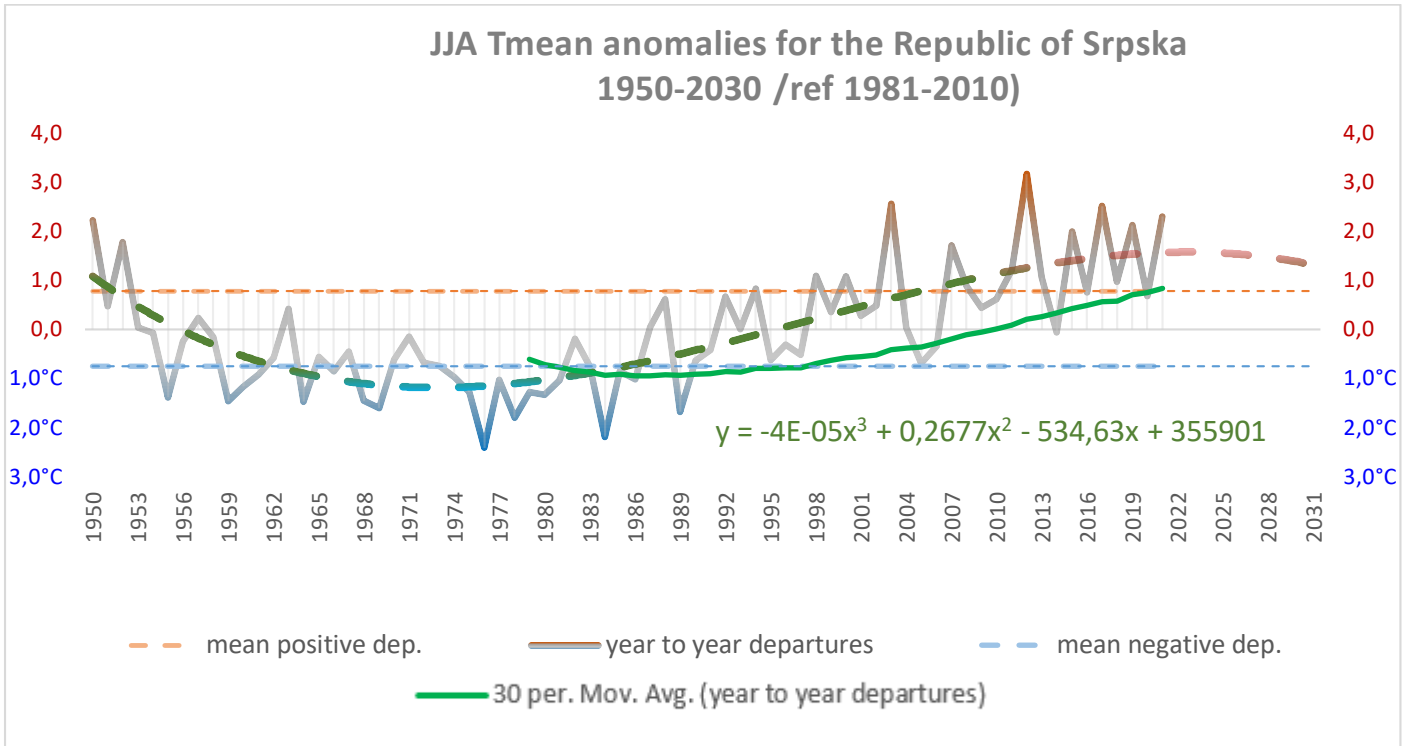
Summer 2023 weather type is clasified by **very warm, with reference to 1981-2010.**

1952, 2012,2003 the hottest; 2023 10th hottest summer since 1950.



Percentilles of sunshine (above) and tmean (below) for Banja Luka 1889-2023. Correlation of tmean/sunshine: **0.84**

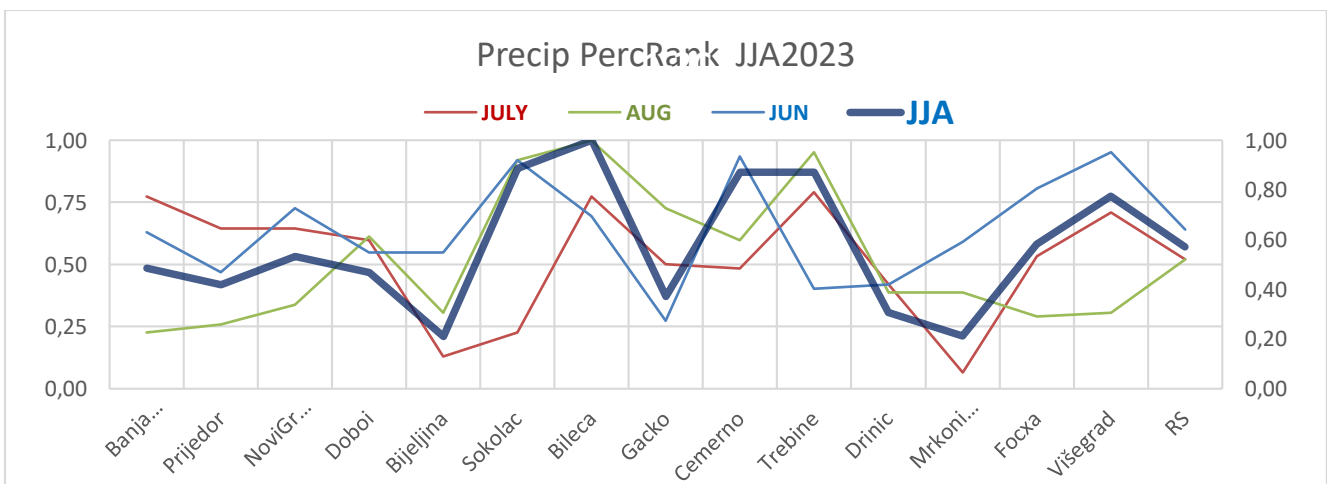
Regarding measured temperature and Sunshine duration, there is high correlation inbetween them



*Climate variability regarding Tmean [(T07+T14+2*T21)/4] averaged over The RS space; There is no signal of warming climate above 2degC n comming decade, nowadays positive anomaly (climate deviation from upper normal) has been less than 0.5 degC – green line*

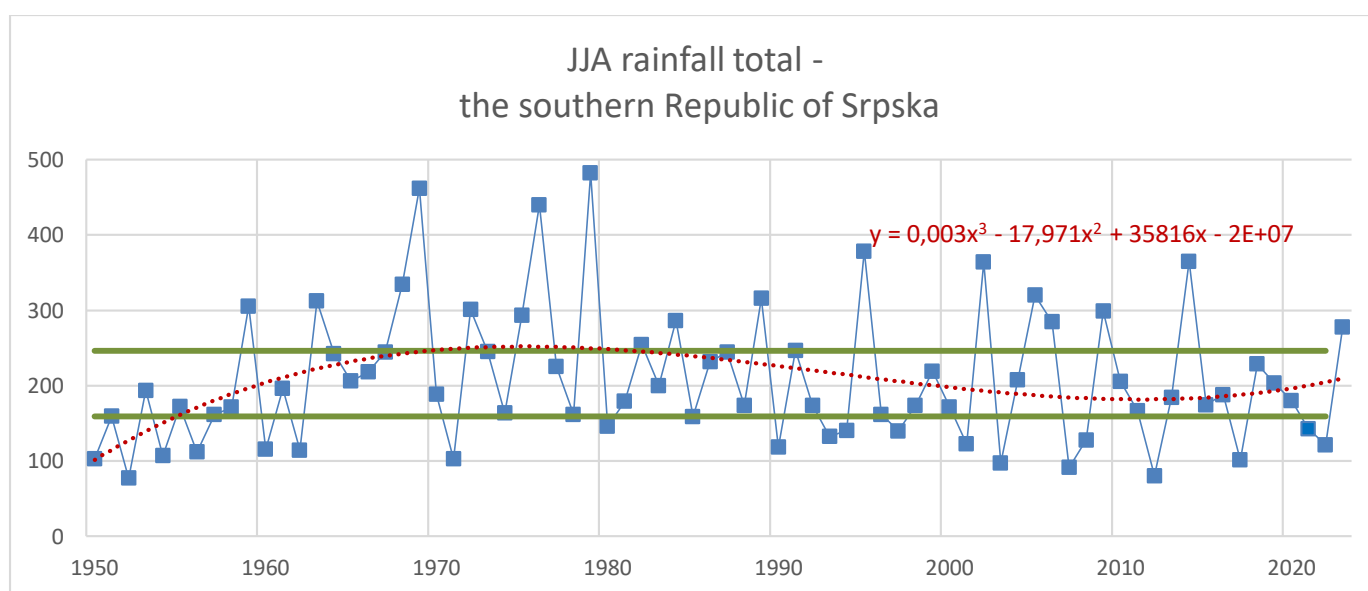
Rainfall

The monthly amount of precipitation for the 2023 summer ranges from 154mm (northeast) to 333mm (South). The average sum for Srpska, summer 2023 is 269 mm); category: slightly above (percentile 0.70); Averaged over RS area, negative deviation for summer 2023 is -38.6 mm; mean positive deviation for the summer of 2023 is 81.6 mm. The monthly deviation for summer 2023 ranges from -90 mm (northeast) to +126 mm (South). The multiannual negative deviation is -56.7 mm; multiannual positive deviation is 57.1 mm.



JJA-2023 precipitation statistics over the RS (ref 1981-2010);

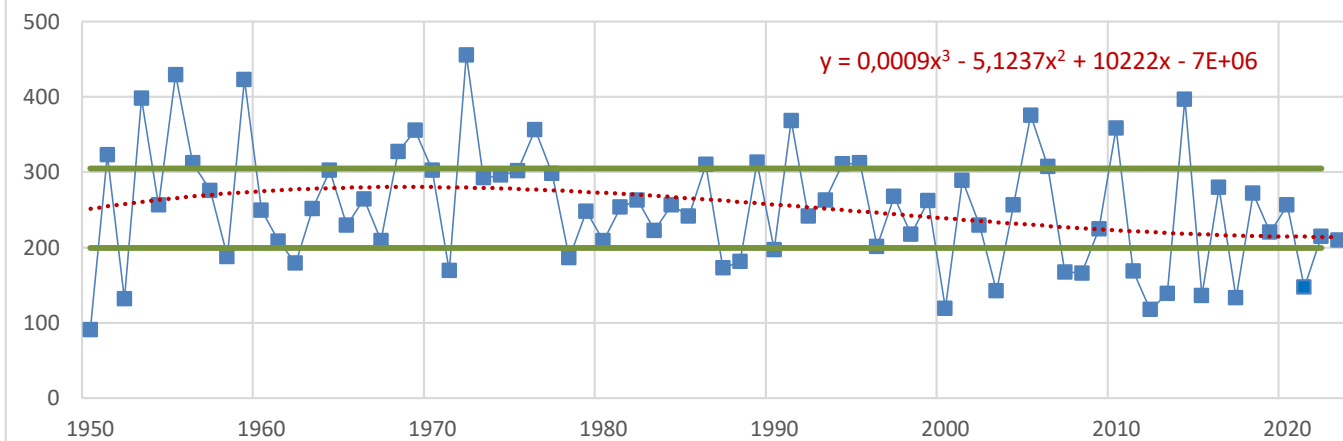
Station	jja1981-2010	STD	z (SPI)	NORMSDIST (z) (percentile)	PercRank 2023	JJA 2023 (mm)	% jja2023	suf/def %	33,33	66,67	50,00	tercile anom.catg
Бања Лука Banja Luka	276	81	-0.15	0.44	0.48	263	96	-4.5	235	313	273	normal
Приједор Priedor	243	76	-0.33	0.37	0.42	218	90	-10	198	271	219	normal
Нови Град NoviGrad	247	71	0.15	0.56	0.53	257	104	4	216	279	246	normal
Добој Doboy	284	104	-0.18	0.43	0.47	265	93	-7	218	321	272	normal
Бијељина Vijeljina	243	78	-1.24	0.11	0.21	147	60	-40	216	278	255	below
Соколац Sokolac	238	64	1.60	0.95	0.89	340	143	43	207	259	239	above
Билећа Bileca	179	71	4.49	1.00	1.00	499	278	178	144	196	175	above
Гацко Gacko	200	84	-0.29	0.39	0.37	176	88	-12	158	226	198	normal
Чемерно Schemerno	224	98	1.11	0.87	0.87	333	149	49	186	254	203	above
Требиње Trebine	179	97	1.52	0.94	0.87	327	182	82	133	229	161	above
Дринић Drinic	272	87	-0.59	0.28	0.31	221	81	-19	243	309	251	below
Фоча Focsa	215	81	0.04	0.52	0.58	219	102	2	175	225	204	normal
МркГрад MrkonicG	264	102	-0.58	0.28	0.23	204	77	-23	227	291	265	below



Due to large difference in precipitation regime, the sum of the amount of rainfall in the three summer months of June, July and August, is shown on the upper graph for south, below for the North and central.

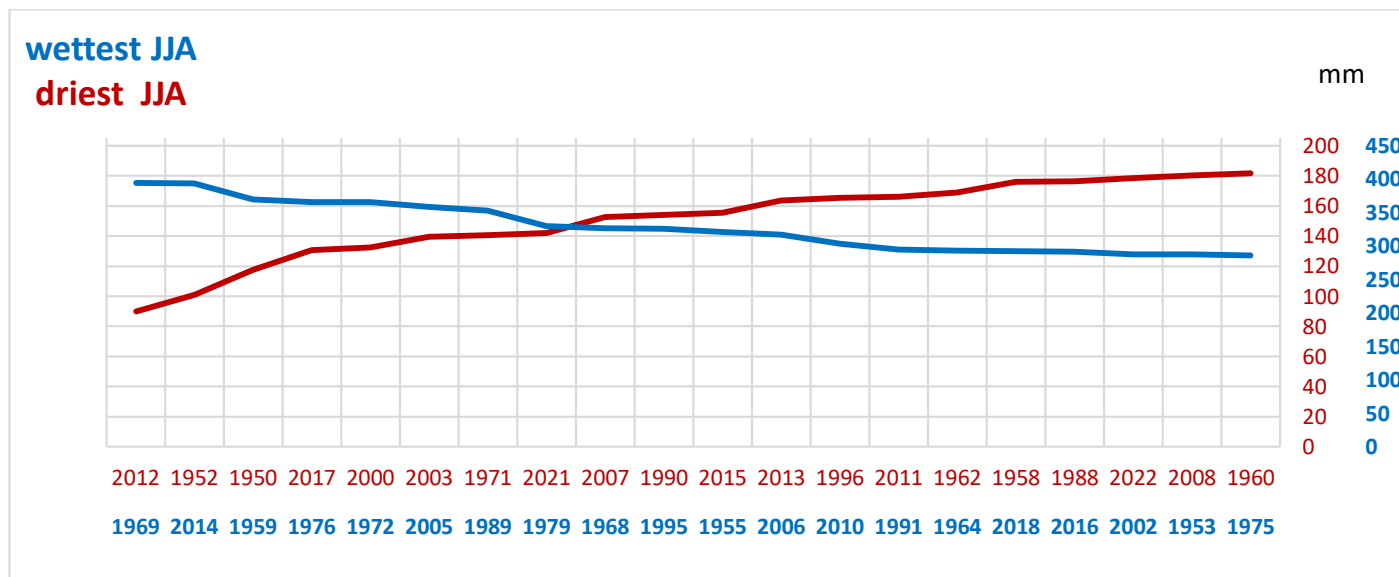
JJA rainfall total

- northern and central area of the Republic of Srpska



Polynom Trend line (red) indicates drier summers in last decades (empiric return period >070yrs). Based on difference in evaporation and rainfall, 2011 was the driest year at annual level, from 1860 onwards; 2011 and 2000 the driest over the growing season; 2003, 2017 and 2000 driest summers,

The climate of the southern Srpska (East Herzegovina) is characterized by a long dry period in the summer season. Due to the modified Mediterranean climate, drought is normal state so this summer was above normal range.



The 2023 JJA average surplus for the territory of Srpska is 19.60%. Driest summers (in red): 2012; 1952; 1950; 2017; 2000 ... The wettest summers (in blue): 1969; 2014; 1959; 1976; 1972 ...

2. High impact events:

High impact events: long lasting drought and very high temperatures caused wild fires in some parts of the Southern area, the most frequent affected region of the Republika Srpska.

3.Verification of the climate outlook for the 2023 summer

Country	Seasonal temperature (JJA)		Seasonal precipitation (JJA)	
	Observed	SEECOF, MedCOF <i>climate outlook</i>	Observed	SEECOF, MedCOF <i>climate outlook</i>
The Republika Srpska, Bosnia and Herzegovina	<i>Above over entire RS entity</i>	<i>Above (20,30,50%)</i>	normal over the most area of the RS entity	<i>No signal (33,34,33%)</i>

Assesment:

In most parts of Srpska there were emuch above temperatures and normal/drier/wetter conditions over The Republika Srpska. Locally, in the sothern (Bileća) record breaking rainfall amount, due to convective unstability.

The outlook was correct for both climate prognosys, temperature and precipitation.

