

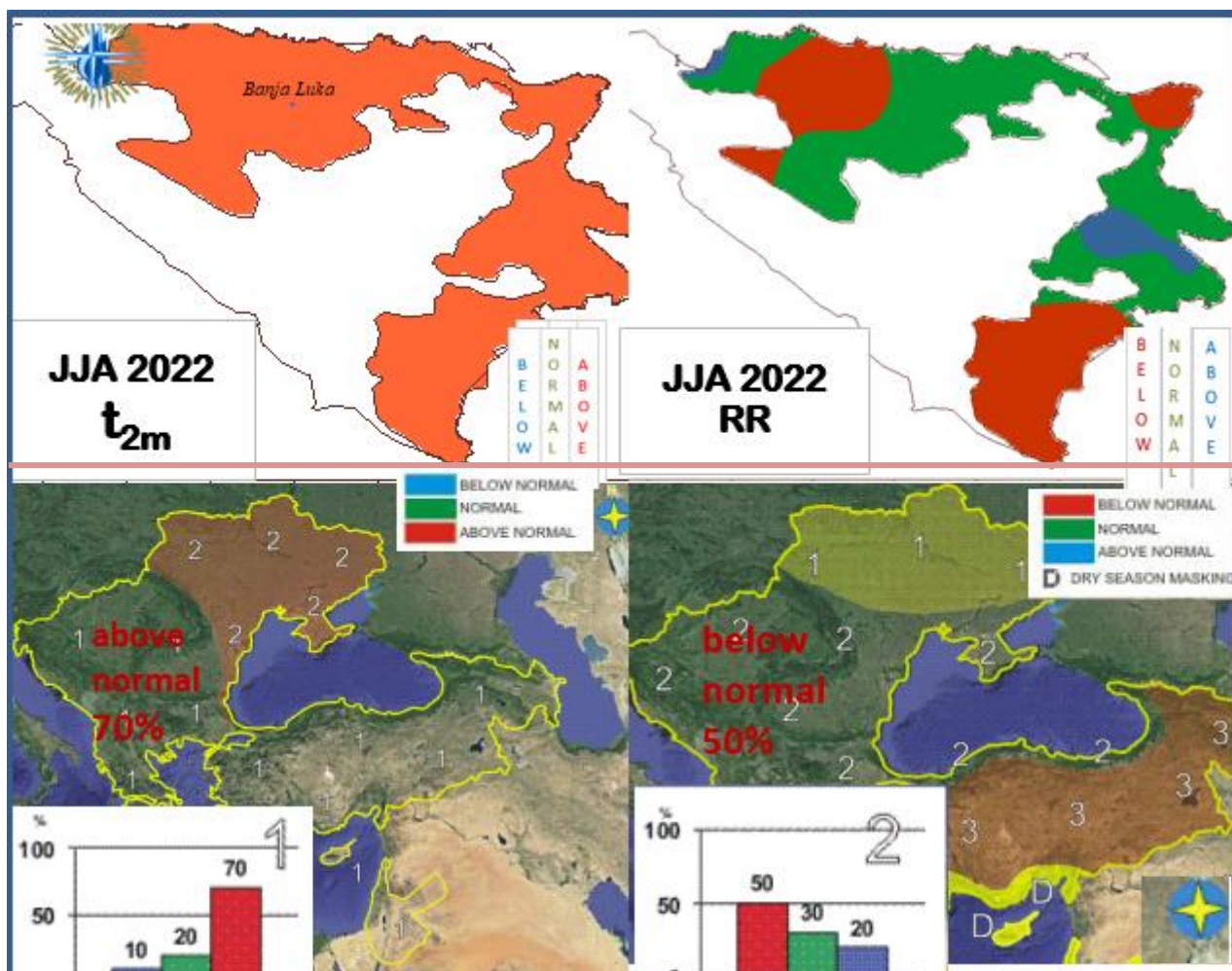


## Verification of the the JJA 2022 SEECOF outlook over The Republika Srpska, Bosnia and Herzegovina

### 1. SEECOF-27 Climate outlook for the 2022 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 2022 summer had been described as warmer than normal (the portion 1, down left). According to observed values, this climatological prognosys was correct over entire Republic of Srpska. Precipitation forecast was likely to experience drier and normal conditions, with 80% probabilities for both (the portion 2, down right). Observations showed dry to normal weather pattern over the most entity. The precipitation outlook was good, giving 50% chances for drier and 30% for normal weather pattern.



- ❖ The absolute daily maximum of Tmean, for the reference period 1961-2021 were broken in summer days: June 2<sup>nd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 28<sup>th</sup>, July 1<sup>st</sup>, 23<sup>rd</sup> and August 18<sup>th</sup>.
- ❖ 4<sup>h</sup> hottest JJA, Tmean departures ranged from plus 2-3°C ( over 0,95th Percentile) for the most of the RS stations; in Jun up to 4,7°C for southern region

- ❖ According to  $T_{mean}$  air temperature, most summer days of 2022 were in the category much to extremely above normal values.
- ❖ The lack of JJA rainfall total, averaged over the Republic of Srpska territory, was -40% for Jun and July; the real drought was worse than SPI showed, due to the heat and wind, which additionally dried up the soil.
- ❖ SPI-7 (january-july) 3<sup>rd</sup> lowest since 1950

## • Analysis of the 2022 Summer season

### Thermal conditions

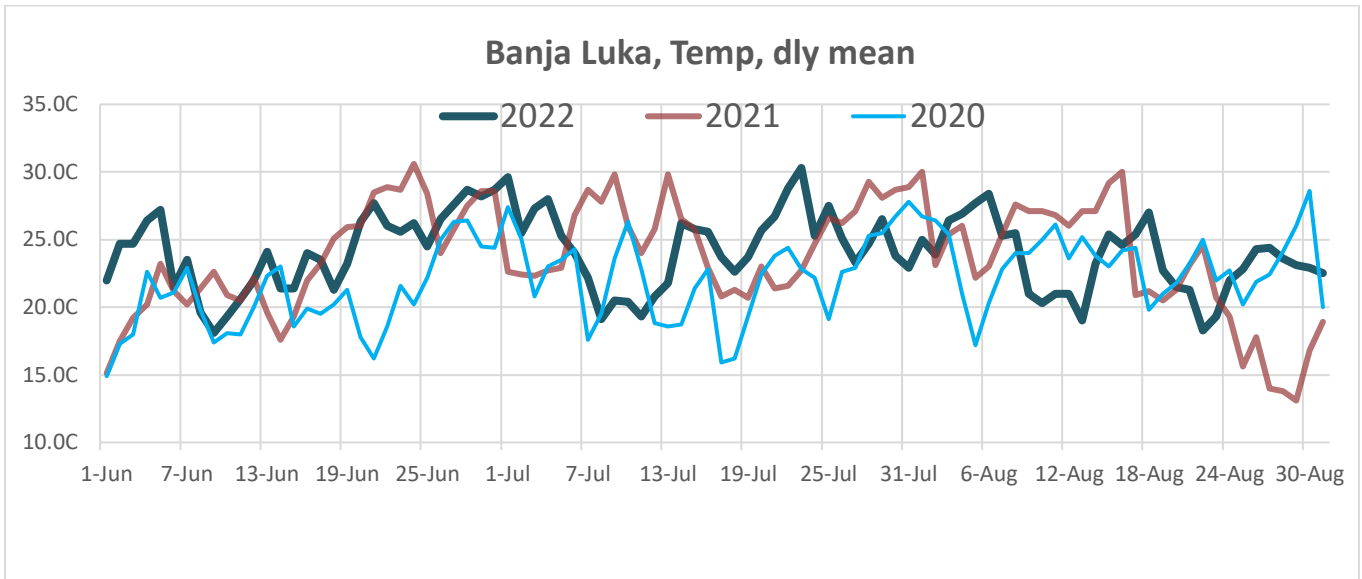
Summer temperatures exceptionally above normal (>90P), compared to the reference period 1981-2010;

$t_{mean}$  - statistics for the JJA-2022 with reference to (ref 1981-2010) in Republika Srpska (°C)

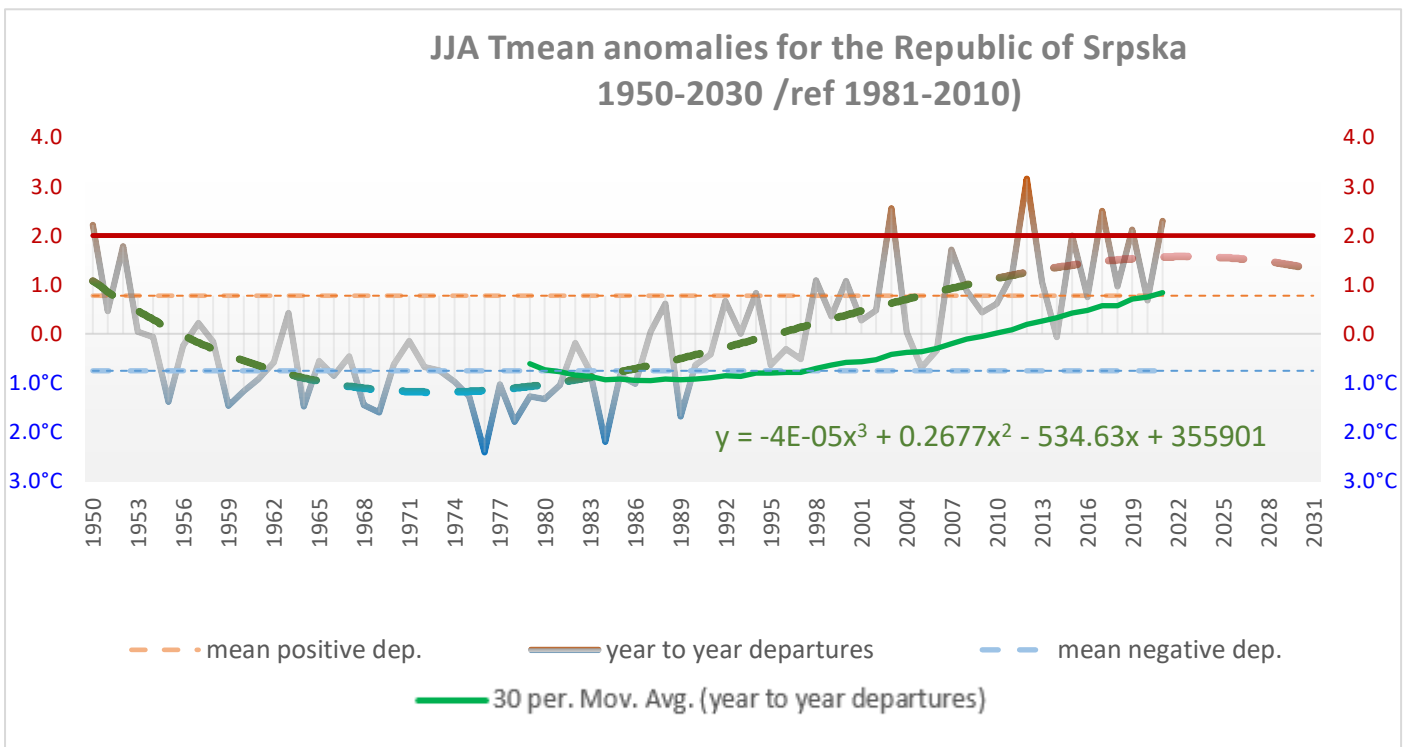
Station	$t_{mean}$ 1981- 2010	STD	$z$ (STI)	Percentile (NORMSDIST)	PercRank 2022	JJA 2022 (mm)	lower tercille	upper tercille	median	tercille category
<i>Бања Лука Вапа Лука</i>	21.0	1.05	2.90	<b>1.00</b>	0.98	<b>24.0</b>	20.6	21.5	20.8	<i>above</i>
<i>Приједор Priedor</i>	21.2	1.08	1.98	<b>0.98</b>	0.95	<b>23.3</b>	20.6	21.8	21.1	<i>above</i>
<i>Нови Град NoviGrad</i>	20.2	1.13	2.55	<b>0.99</b>	0.98	<b>23.1</b>	19.6	20.5	20.1	<i>above</i>
<i>Добој Doboy</i>	20.5	1.00	2.59	<b>1.00</b>	0.93	<b>23.1</b>	20.0	21.0	20.4	<i>above</i>
<i>Бијељина Bijeljina</i>	21.3	1.19	2.32	<b>0.99</b>	0.95	<b>24.1</b>	20.8	21.8	21.2	<i>above</i>
<i>Соколац Sokolac</i>	16.3	1.02	2.39	<b>0.99</b>	0.98	<b>18.8</b>	15.8	16.9	16.3	<i>above</i>
<i>Билећа Bileca</i>	18.4	7.31	0.81	<b>0.79</b>	1.00	<b>24.4</b>	20.6	21.5	21.0	<i>above</i>
<i>Гацко Gacko</i>	17.3	0.90	3.29	<b>1.00</b>	1.00	<b>20.2</b>	16.8	17.8	17.3	<i>above</i>
<i>Чемерно Schemerno</i>	14.8	0.92	2.64	<b>1.00</b>	0.97	<b>17.2</b>	14.4	15.2	14.9	<i>above</i>
<i>Требиње Trebine</i>	23.3	1.13	2.20	<b>0.99</b>	0.93	<b>25.8</b>	22.8	23.5	23.0	<i>above</i>
<i>Дринић Drinic</i>	17.1	1.12	2.13	<b>0.98</b>	0.95	<b>19.5</b>	16.8	17.4	17.2	<i>above</i>
<i>Фоча Focsa</i>	19.4	1.00	2.11	<b>0.98</b>	0.97	<b>21.5</b>	19.1	19.9	19.4	<i>above</i>
<i>МркГрад MrkonicG</i>	18.2	1.07	2.16	<b>0.98</b>	0.95	<b>20.6</b>	17.6	18.7	18.2	<i>above</i>

Summer 2022 weather type is classified by **extremely warm, with reference to 1981-2010**.

1952, 2012, 2003 the hottest; 2022 4th hottest summer.



Summer days over last three years 2022, 2021, 2020 in Banja Luka, the RS/BH



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

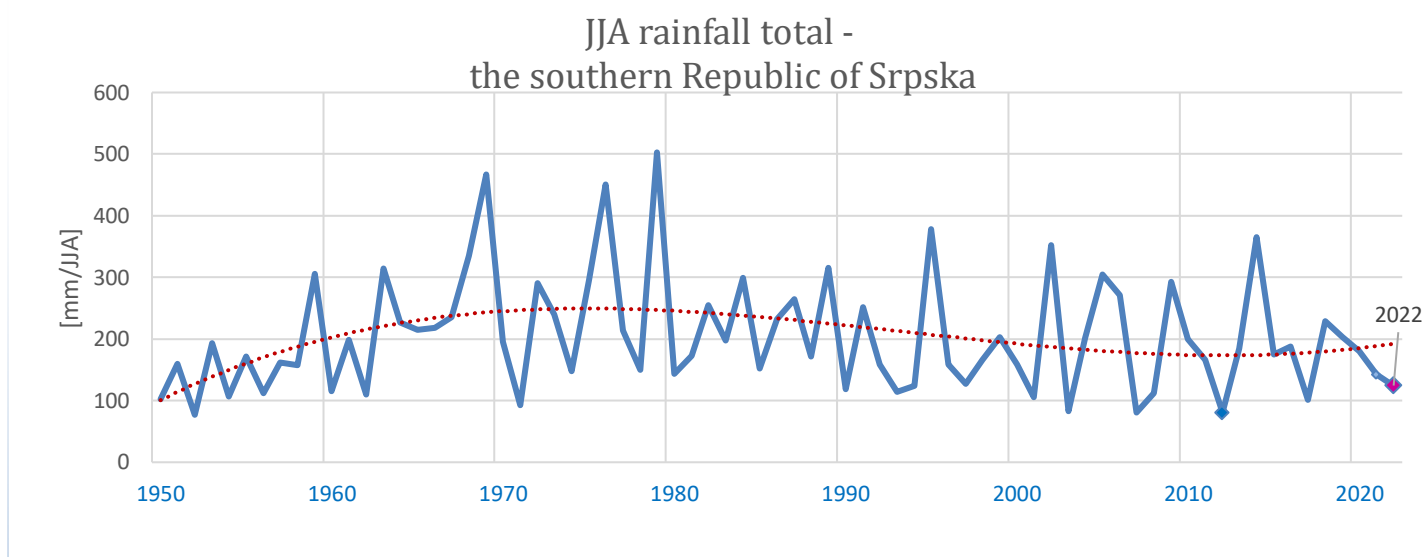
Years of the hottest days in June ever, in the wider Balkans: 1857, 1908, 1935, 1950, 2002 and 2003, 2007, 2012, 2021, **2022**

July 2022 was fifth warmest for the reference period 1950-2022; August 12th the hottest (the warmest August was in 2003, 1992 and 1952 )

## Rainfall

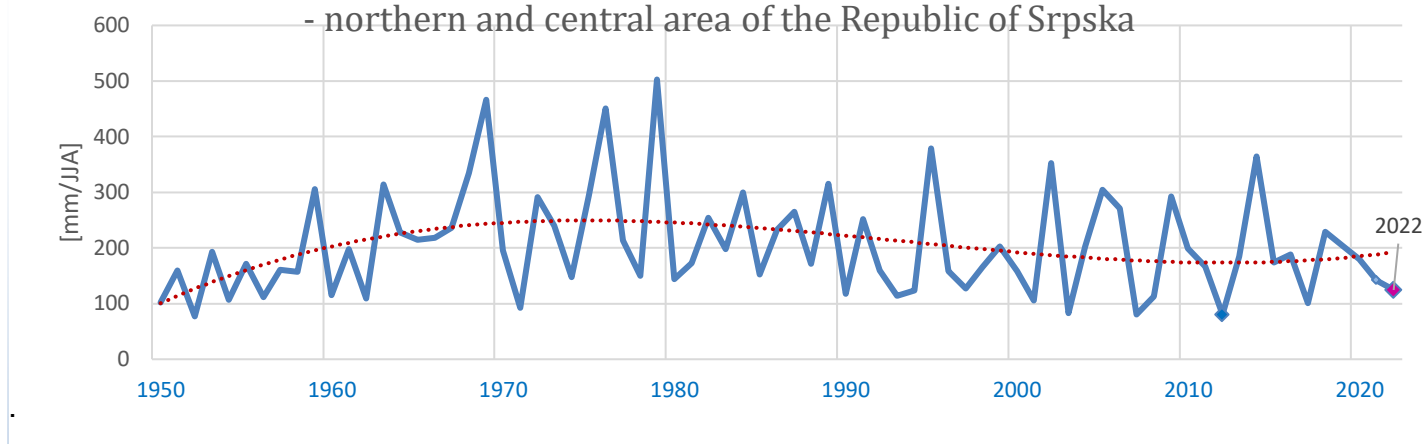
JJA-2022 precipitation statistics over RS (ref 1981-2010);

Station	jja1981-2010	STD	z (SPI)	NORMSDIST (z) (percentile)	PercRank 2022	JJA 2022 (mm)	% jja2022 (ref1981-2010)	trend %	lower tercile	upper tercile	median	tercile category
<i>Бања Лука Bana Luka</i>	276	81	-1.39	<b>0.08</b>	0.15	<b>162</b>	58.9	-41.1	235	313	273	<i>below</i>
<i>Приједор Priedor</i>	243	76	-0.50	<b>0.31</b>	0.31	<b>205</b>	84.2	-15.8	198	271	219	<i>below</i>
<i>Нови Град NoviGrad</i>	247	71	1.10	<b>0.86</b>	0.80	<b>325</b>	131.7	31.7	216	279	246	<i>above</i>
<i>Добој Doboy</i>	284	104	0.24	<b>0.60</b>	0.67	<b>309</b>	108.9	8.9	218	321	272	<i>above</i>
<i>Бијељина Bijeljina</i>	243	78	-1.05	<b>0.15</b>	0.25	<b>161</b>	66.4	-33.6	216	278	255	<i>below</i>
<i>Соколац Sokolac</i>	238	64	0.54	<b>0.71</b>	0.75	<b>272</b>	114.5	14.5	207	259	239	<i>above</i>
<i>Билећа Bileca</i>	179	71	-1.18	<b>0.12</b>	0.11	<b>96</b>	53.3	-46.7	144	196	175	<i>below</i>
<i>Гацко Gacko</i>	200	84	-1.23	<b>0.11</b>	0.10	<b>97</b>	48.5	-51.5	158	226	198	<i>below</i>
<i>Чемерно Sxeterno</i>	224	98	-0.73	<b>0.23</b>	0.13	<b>152</b>	67.9	-32.1	186	254	203	<i>below</i>
<i>Требиње Trebine</i>	179	97	-0.61	<b>0.27</b>	0.28	<b>120</b>	67.0	-33.0	133	229	161	<i>below</i>
<i>Дринић Drinic</i>	272	87	-2.05	<b>0.02</b>	0.02	<b>93</b>	34.2	-65.8	243	309	251	<i>below</i>
<i>Фоча Focxa</i>	215	81	-0.62	<b>0.27</b>	0.26	<b>165</b>	76.7	-23.3	175	225	204	<i>below</i>
<i>МркГрад MrkonicG</i>	264	102	0.13	<b>0.55</b>	0.56	<b>277</b>	104.9	4.9	227	291	265	<i>normal</i>



Due to large difference in precipitation regime, the sum of the amount of rain in the three summer months of June, July and August, for the North and central part, is represented on the upper and for the south on the lower graph, over the 1950-2022.

## JJA rainfall total - northern and central area of the Republic of Srpska



Polynom Trend line (red) indicates similar dry summers in 1950s ( empiric return period >070yrs).

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, based on difference in evaporation and rainfall.



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".

However, perennial severe droughts in the north, where the Republic's largest area of crop production is located, are not a normal occurrence and are considered as a climatic variation / anomaly, with 50-70 years of return period, over which the severe drought appears at least once;

weaker droughts have a shorter return period. Jun 2021 was the the driest June over the northern and central regions since 1861;

1991-2020 cannot be considered as representative climate normal for the summer months for the Republic of Srpska, due to the significant deviation of the arithmetic mean so associated weather categorisation, based on percentiles, is far from real climate. In other words, instead to belong to 50P (supposed distribution is Normal), belonging percentile of the **1991-2020 Tmean** is above 75th Percentile. Supposed Normal distribution is skewed to the right, with decreased belonging probability.

January-June 2022 is the 8th warmest half-year period over the 1950-2022 and 3rd driest according to precipitation sum.

## 2. High impact events:

High impact events: long lasting drought and high temperatures caused wild fires in the Southern area of the Republika Srpska.

Long lasting drought from January to July, with 3rd lowest 7-month amount of precipitation over the historical period 1950-2022 with very bad influence to agriculture production and hydro potential.

## 3.Verification of the climate outlook for the 2020 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	<b>Above over entire RS entity</b>	<i>Above (70,20,10%)</i>	<b>Below-normal over the most area of the RS entity</b>	<i>Below (50,30,20%)</i>

### Assesment:

There was 70% probability for above-average summer temperature and 50%,30 % for above, normal precipitation outlook. In most parts of Srpska there were exceptionally above temperatures and much below rainfall, except central parts with around normal; Locally in the north-western part (Novi Grad) much above normal, due to local convective unstability.

The outlook was correct for temperature and precipitation.