FEDERAL HYDROMETEOROLOGICAL INSTITUTE OF BOSNIA AND HERZEGOVINA

CLIMATOLOGICAL ANALYSIS

SEASON

WINTER 2016/2017

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BOSNIA AND HERZEGOVINA
FEDERATION OF BOSNIA AND HERZEGOVINA
FEDERAL HYDROMETEOROLOGICAL INSTITUTE

CLIMATOLOGICAL ANALYSIS OF SEASONE WINTER 2016 – 2017.

Sarajevo, March 2017.

Mean air temperatures during the climatological winter 2016 - 2017 (1st December 2015. – 29th February 2016.) ranged between -0,7 °C in Bugojno and 7,8°C in Neum. On the mountain areas air temperatures were in range of -6,3 °C on Bjelasnica to -1,9 °C on Ivan Sedlo. Temperature deviations from normal values during the winter, which covers the period (1961.-1990.), were negative. Deviation of mean temperature from average winter temperature ranged from -1,2 °C on Kalesija to 0,4 °C in Neum. Temperatures are clasified into categories of cold and normal, by percentiles.

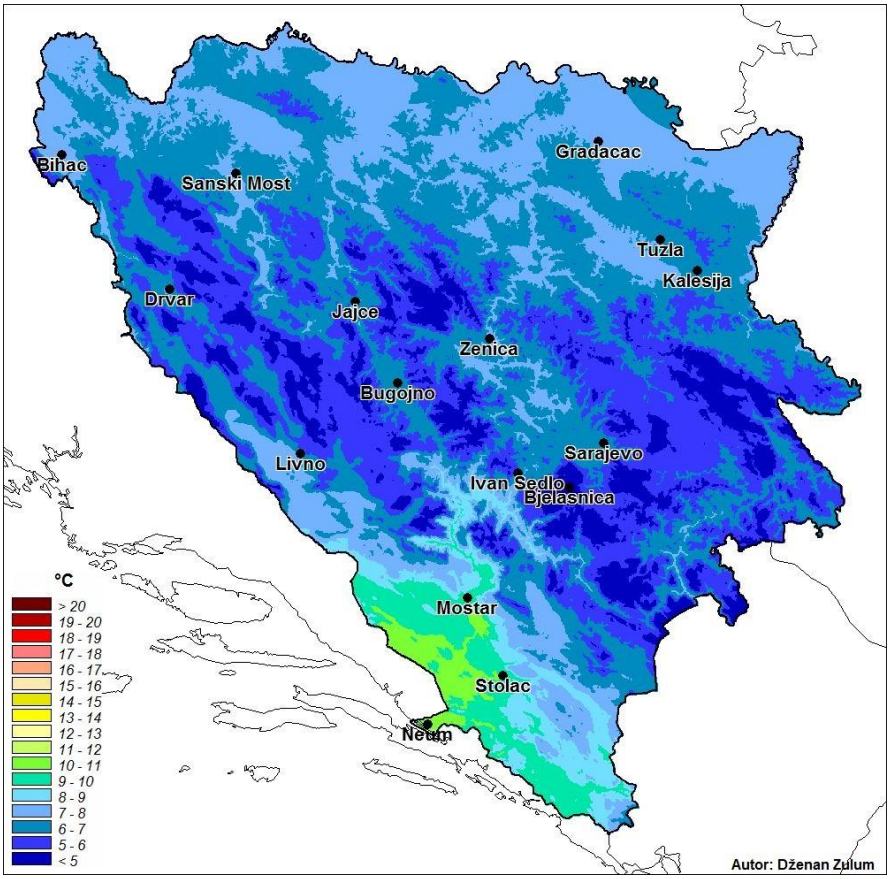
STATION	DEVIATION (ºC)				PERCENTILES
	DECEMBER	*JANUARY*	*FEBRUARY*	WINTER	
Bihać	-1,4	-3,8	3,7	-0,5	31
Bjelašnica	0,0	-4,1	2,9	-0,4	31
Bugojno	-1,1	-3,5	4,0	-0,2	38
Drvar	-1,3	-3,6	3,4	-0,5	27
Gradačac	-0,6	-3,9	3,2	-0,5	41
Ivan Sedlo	-0,2	-4,0	3,2	-0,4	37
Jajce	-1,1	-3,9	3,2	-0,7	33
Kalesija	-1,3	-5,0	2,7	-1,2	18
Livno	-0,4	-4,3	3,0	-0,6	27
Mostar	0,3	-2,6	3,0	0,2	54
Sarajevo	-1,2	-3,9	3,7	-0,5	32
Sanski Most	-1,5	-3,4	3,4	-0,5	37
Stolac	-2,3	-3,0	2,4	-0,4	33
Tuzla	-0,7	-4,4	3,1	-0,7	29
Zenica	-0,8	-3,4	3,3	-0,3	34

Table 1 Deviation of middle of winter air temperatures in relation to cli standard normal and the corresponding percentiles

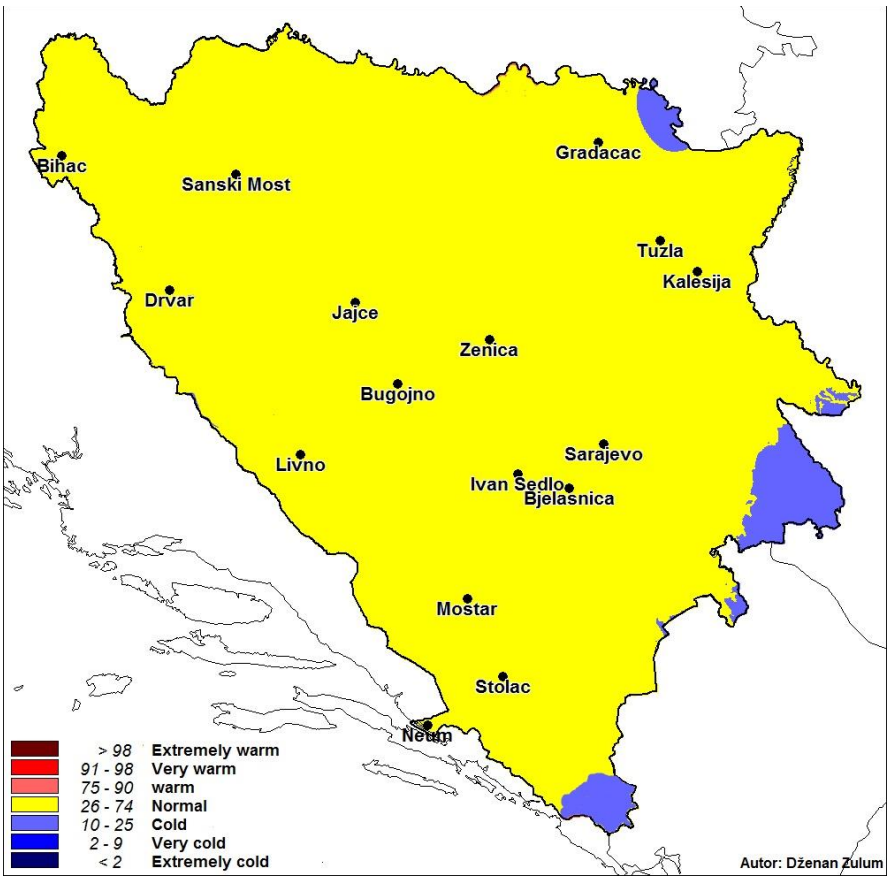
STATION	MOUNTH			STANICA	MOUNTH		
	December	January	February		December	January	February
Bihać				**Livno**			
Bjelašnica				**Mostar**			
Bugojno				**Sarajevo**			
Drvar				**Sanski Most**			
Gradačac				**Stolac**			
Ivan Sedlo				**Tuzla**			
Jajce				**Zenica**			

	Extremely warm		Very warm		Warm		Normal		Cold		Very cold		Extremely cold

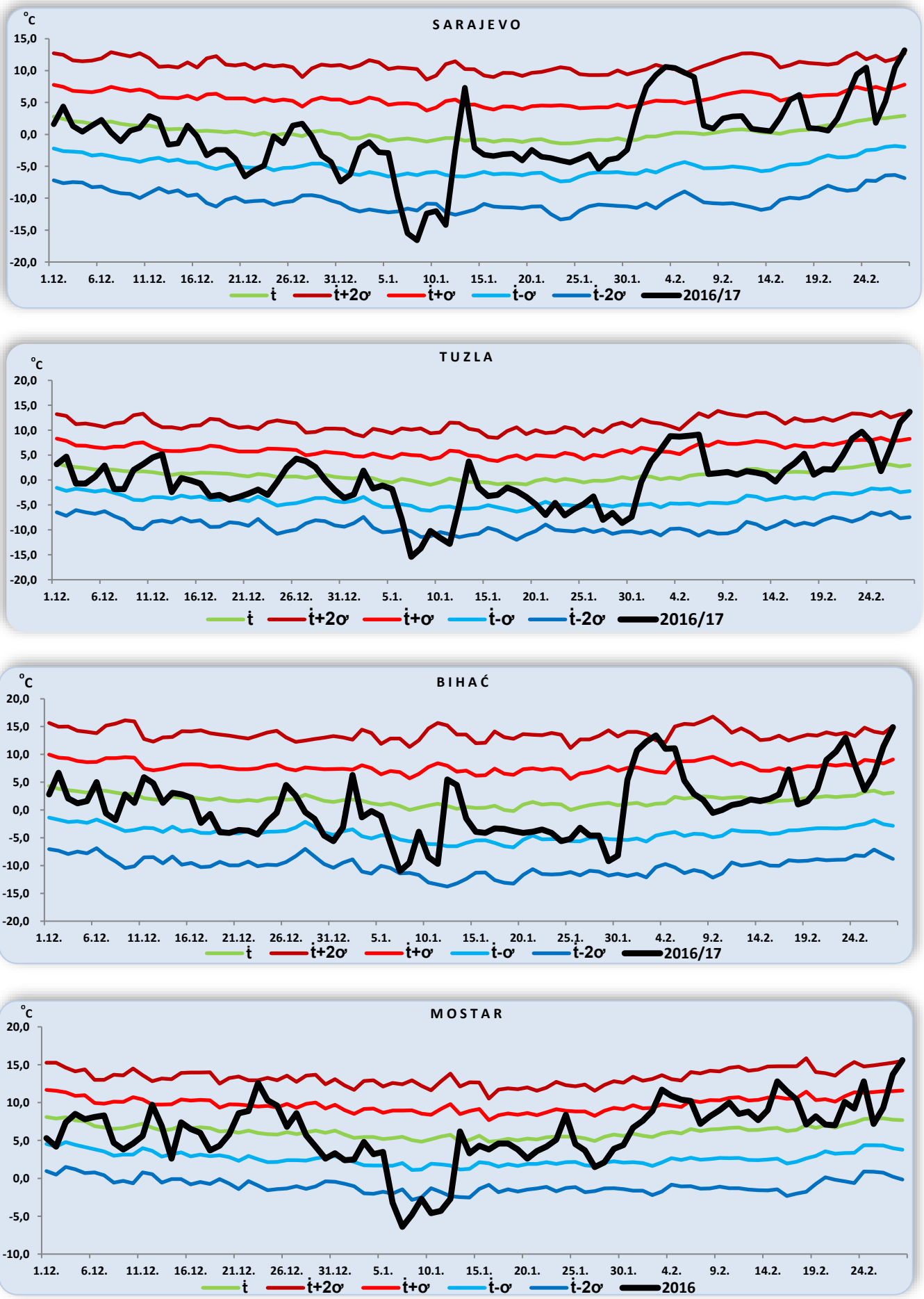
Table 2 Overview of marks mean temperature during the winter months by the method of percentiles



Map 1 Mean air temperature winter 2016/2017. year (ºC)



Map 2 Air temperature during winter 2016/2017. using percentile method compared to the 1961-1990 base period



Graph 1-4 Mean daily air temperatures during winter 2016-2017. year

Analysis of monthly amount of precipitation expressed in % of average values shows that during the winter 2016 - 2017, deviations from normal precipitation amounts ranged from 44,4 % in Stolac, to 84,3 % in Sanski Most. Precipitations are classified into categories of very dry, dry, normal and wet, by percentiles.
Measured amounts of precipitation were in the range of 100,0 mm in Bugojno to 291,0 mm in Neum.

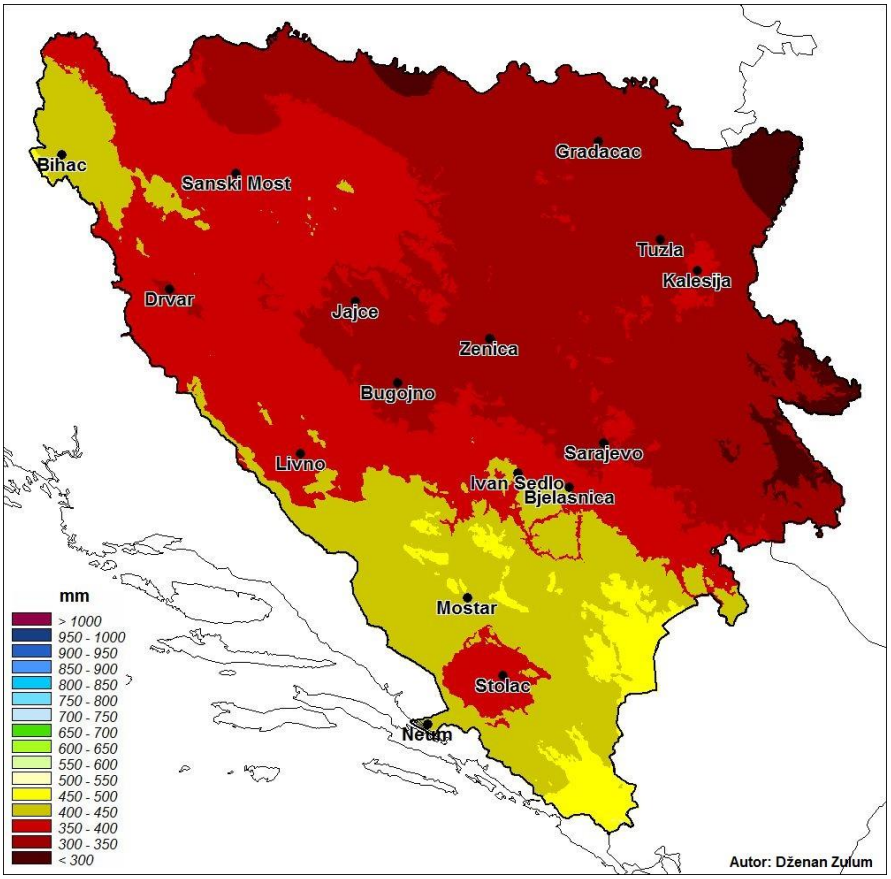
STATION	DEVIATION (%)				PERCENTILES
	DECEMBER	*JANUARY*	*FEBRUARY*	WINTER[1]	
Bihać	2,2	159,0	97,0	79,2	28
Bjelašnica	21,5	109,1	106,6	79,2	41
Bugojno	9,0	53,4	116,8	53,8	13
Drvar	3,7	70,9	97,2	52,3	18
Gradačac	10,3	77,5	116,2	66,3	22
Ivan Sedlo	11,1	76,6	72,5	81,0	34
Jajce	15,2	67,9	104,5	57,9	12
Livno	2,4	65,7	128,8	58,9	16
Mostar	0,3	53,9	93,7	47,0	12
Sarajevo	19,8	81,0	103,1	64,6	16
Sanski Most	7,6	126,7	143,0	84,3	28
Stolac	0,7	51,6	96,9	44,4	09
Tuzla	11,6	71,3	131,4	66,4	18
Zenica	13,2	80,2	107,7	60,9	15

Table 5 Deviation of summer precipitation in relation to the climatological standard normal and the corresponding percentiles

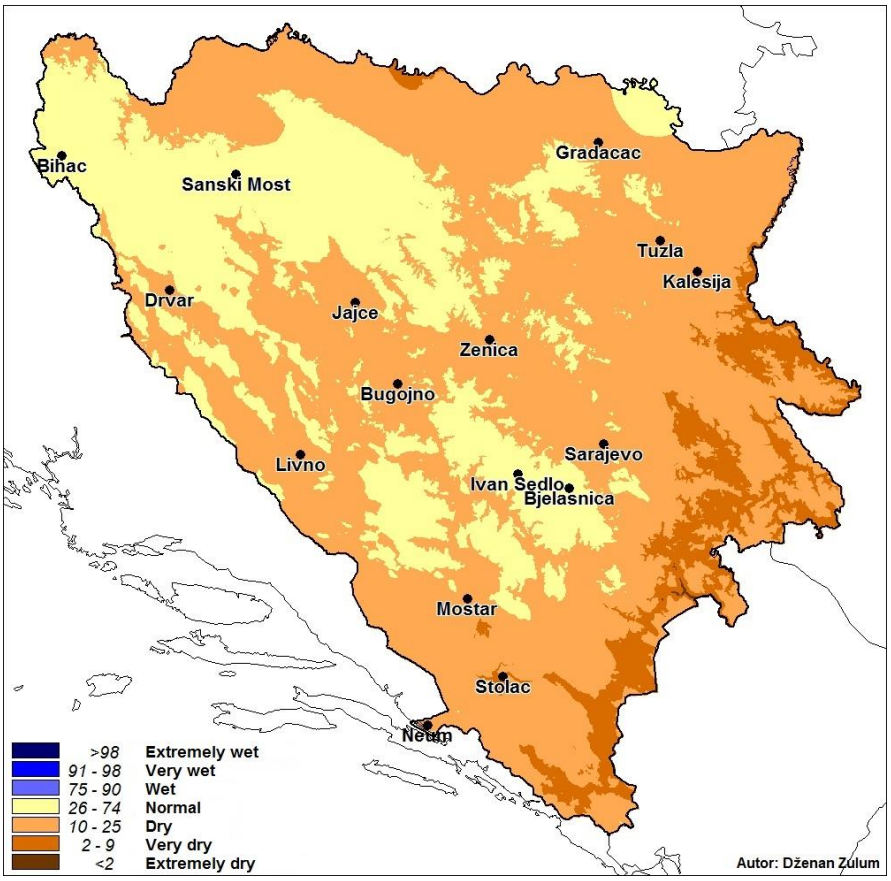
STATION	MOUNTH			STATION	MOUNTH		
	December	January	February		December	January	February
Bihać				**Livno**			
Bjelašnica				**Mostar**			
Bugojno				**Sarajevo**			
Drvar				**Sanski Most**			
Gradačac				**Stolac**			
Ivan Sedlo				**Tuzla**			
Jajce				**Zenica**			

	Extremely dry		Very dry		dry		normal		wet		Very wet		Extremely wet

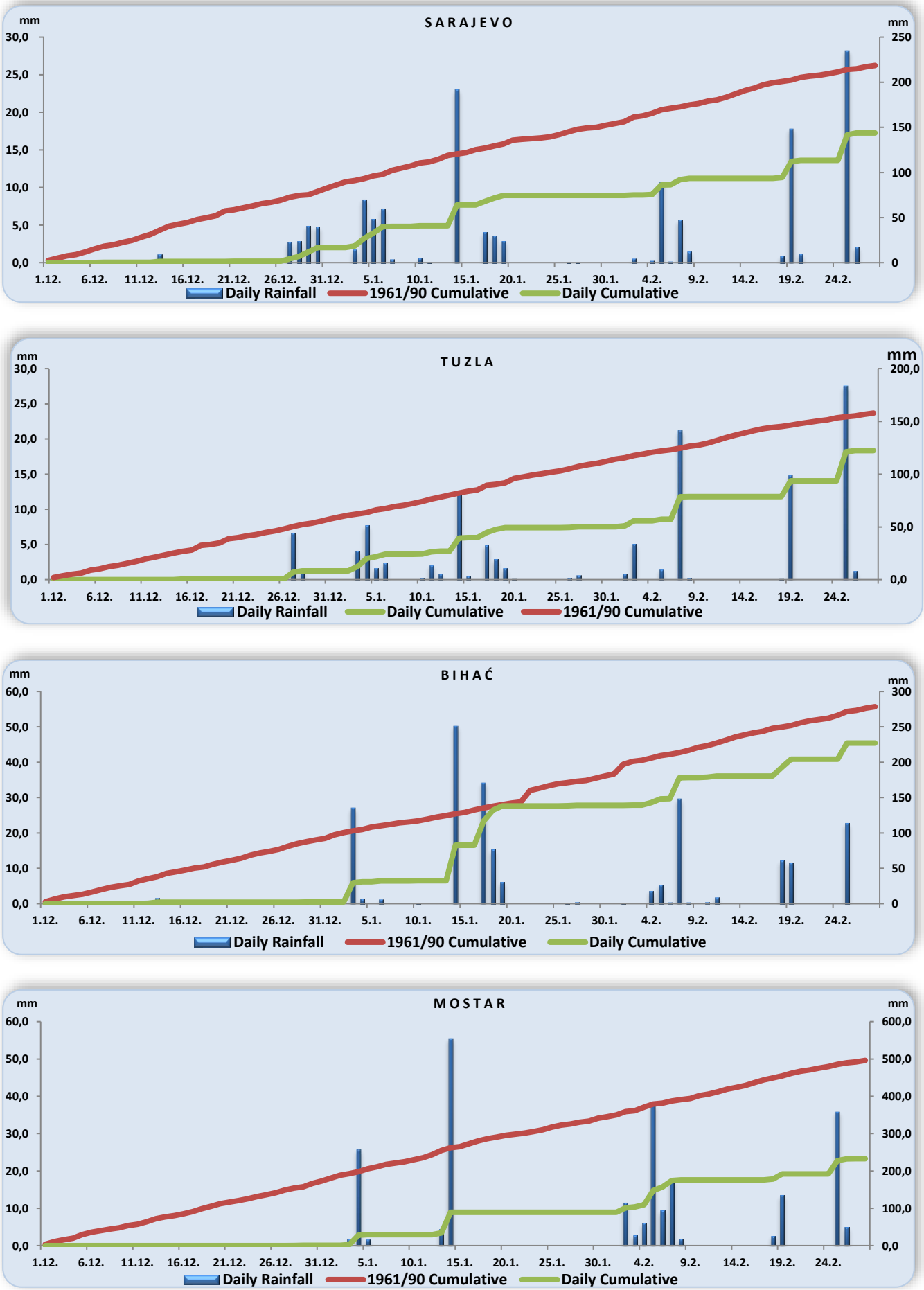
Table 6 Overview of marks on precipitation by month basis percentile



Map 3 Amount precipitation – winter 2016/2017. year (mm)

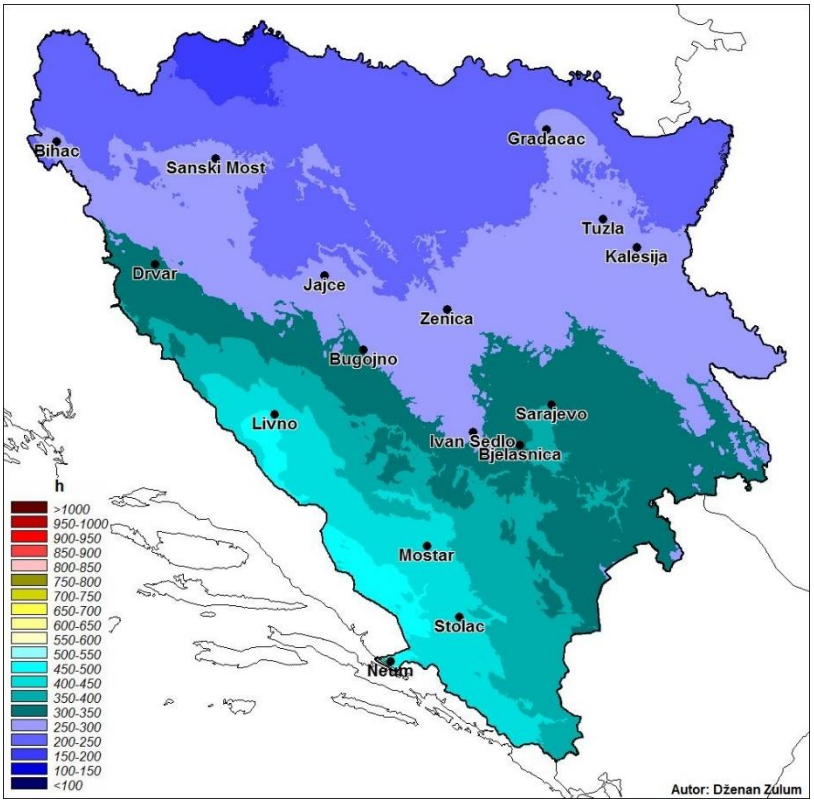


Map 4 Precipitation sums using percentile method during winter 2016/2017 compared to the base period (1961 – 1990)



Graph 5-8 daily and cumulative rainfall in the winter of 2016-2017 year

The number of hours of sunshine during the winter of 2016-2017. year, he was on all the observed meteorological stations above normal for the period (1961-1990). Minimum deviation is recorded on Bihac MS, where a total of 254 hours of sunshine, and it is up to 71 hours of normal sunshine. Largest anomaly was observed in MS Sarajevo, where any of 351 hours of sunshine or 172 hours of sunshine than normal for the winter.



VERIFICATION OF THE SEECOF - 16 (WINTER 2016/2017.)
FEDERATION OF BOSNIA AND HERZEGOVINA

The table below presents the normal (1981-2010) values (N) versus the recorded (R) values of both, temperature (mean max and mean min) and accumulated precipitation, for the winter period of December, January and February.

	MEAN DAILY MAXIMUM TEMPERATURE (°C)						MEAN DAILY MINIMUM TEMPERATURE (°C)						ACUMULATED PRECIPITATION (mm)					
Station	december		january		february		december		january		february		december		january		february	
	R	N	R	N	R	N	R	N	R	N	R	N	R	N	R	N	R	N
Sarajevo	3,3	4,2	-0,4	3,6	9,5	6,0	-4,4	-1,9	-8,6	-3,3	1,8	-2,6	16,8	84,1	57,9	66,5	69,1	62,8
Mostar	10,9	9,8	6,2	9,1	13,6	11,1	3,0	3,6	-1,0	2,4	6,1	2,9	0,6	176,2	88,8	138,9	143,6	120,2
Tuzla	5,3	5,6	-0,4	4,6	10,8	7,3	-3,8	-2,0	-9,8	-3,7	0,3	-2,6	8,3	67,6	41,8	56,8	72,2	48,6
Bihać	5,1	6,1	-0,2	4,7	10,5	6,8	-3,2	-1,0	-7,3	-2,6	2,3	-2,0	2,5	127,9	136,5	94,1	88,1	92,6
Gradačac	4,6	5,4	-1,0	4,3	9,8	6,8	-2,0	-1,0	-7,6	-2,3	1,5	-0,9	6,6	65,6	46,0	58,7	71,5	46,6
Livno	8,8	5,9	1,0	5,4	9,5	6,5	-5,6	-3,1	-9,8	-4,5	-0,3	-4,0	3,0	128,7	62,7	90,4	119,9	83,2
S Most	4,7	5,9	0,0	4,8	10,7	7,9	-4,2	-2,0	-8,1	-4,0	0,5	-3,2	6,4	91,9	85,8	66,7	89,0	64,2
Bjelašnica	-2,2	-2,9	-8,6	-3,8	-1,9	-4,7	-7,4	-7,0	-12,6	-8,2	-5,6	-9,0	17,8	108,3	85,1	86,2	89,4	99,2

Season		Air Temperature (°C)					Precipitation sums (mm)			
Station	Rank*	33	50	66	Observed value	Rank**	33	50	66	Observed Value
Sarajevo	12	0,2	0,9	1,2	-0,2	29	220	201	170	143,8
Mostar	18	5,8	6,2	6,7	6,1	31	565	386	333	233,0
Bihać	10	1,3	2,0	2,6	0,9	31	365	290	264	227,1
Tuzla	11	0,5	1,1	1,5	-0,1	30	190	169	153	122,3
Zenica	11	0,5	0,8	1,5	0,2	32	181	158	145	101,4
Bugojno	16	-0,4	0,3	0,8	-0,7	33	203	157	148	100,0
Gradačac	10	0,8	1,9	2,6	0,7	31	200	169	139	124,1
Livno	8	0,2	0,5	1,2	-0,3	30	334	268	232	185,6
S. Most	10	0,7	1,3	1,9	0,2	28	263	206	184	181,2
Bjelašnica	18	-6,5	-6,0	-5,4	6,3	20	330	252	236	192,3

*Rank – 1981-2017. (period) – coldest season
**Rank – 1981-2017. (period) – highest seasonal precipitation

Country	Seasonal temperature DJF		Seasonal precipitation DJF		High Impact Events
	Observed	SEECOF 16 – climate outlook for temperature	Observed	SEECOF 16 – climate outlook for precipitation	
Federation of Bosnia and Herzegovina	Below normal in almost entire Bosnia and Herzegovina	Near – Normal (30, 40, 30) Central and northern regions Above – Normal (20, 30, 50) Souuthern regions	Below normal in entire Bosnia and Herzegovina	No predictive signal (33, 34, 33) Central and northern regions Above normal (25, 35, 40) Souuthern regions	The winter was the fourth coldest in the central and northern regions and the seventh in the Southern region in the 21st century. December was extremely dry, driest on record on MS Bihac. January coldest in the central and northern regions since 1963, and in the south and the west regions since 1985. The lowest temperature measured on Bjelasnica -27.2 °C (07.01.)

[1] The actual amount of precipitation compared to the average sum

Photo: Miljacka river (Sarajevo – January 2017.)

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