Extreme Air Temperature at the Southwestern Slope of Pirin Mountain (Bulgaria)

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Acknowledgements: The study is supported by the project titled "Environment under climate change in the Pirin Mountain", contract N ДН 14/6, 13.12.2017, financed by National Scientific Fund, Ministry of Education and Science – Bulgaria

Motivation

- The characteristics of air temperature in mountainous areas provide important information about climate change and variability and are essential for the occurrence of various geomorphological processes as well as for touristic activities development;
- Mountain areas have a large resource potential;
- The environment in the mountainous areas is extremely sensitive to climate change and anthropogenic activity also and can be a good indicator of existing and expected climate change;
- The scientific investigation about climate in mountainous regions of Bulgaria are still insufficient due to the lack of meteorological measurements, especially in recent decades;
- Scientific project titled “Environment under climate change in the Pirin Mountain”, financed by National Scientific Fund, Ministry of Education and Science – Bulgaria;
- Environmental monitoring organized by the Department of Climatology, Hydrology and Geomorphology, Sofia University.

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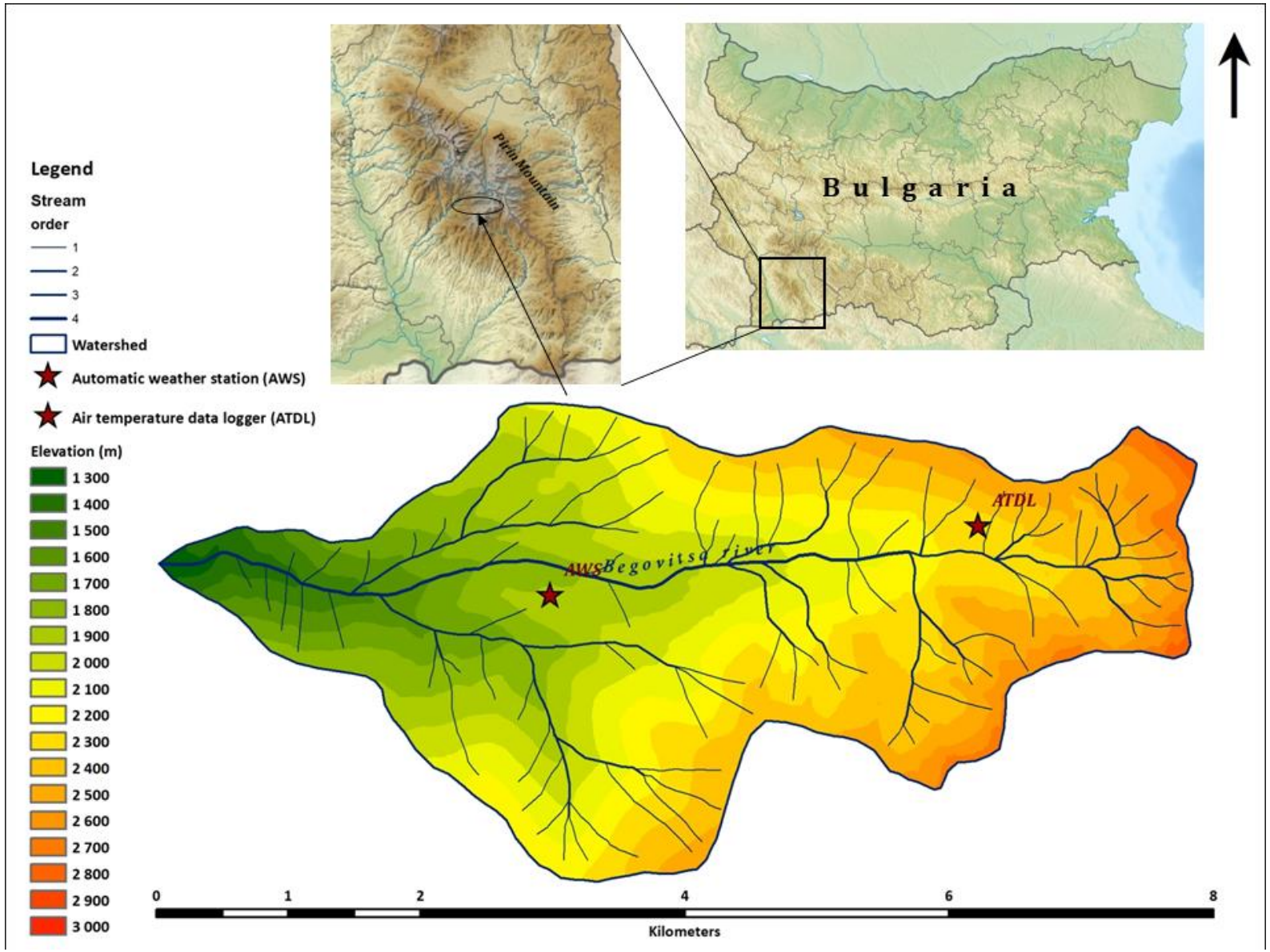
- Study area



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- Meteorological monitoring

Automatic Weather Station (AWS)

Wireless Vantage Pro2

m a.s.l

Temperature logger

LOGTAG TRIX - 8

m a.s.l

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- Data and methods

➢ Hourly – daily– monthly data

➢ Period 2015 – 2018 – January, April, July and October

❖Extremely cold days - the days with daily air temperature less than or equal to 5-th percentile for the respective month;

❖Extremely warm days - the days with daily air temperature more than or equal to 95-th percentile for the respective month

❑ synoptic situation for the extremely cold and extremely warm days

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- Data and methods

✓ number of frost days (the days with daily minimum temperature < 0 °C);

✓number of icing days (the days with daily maximum temperature < 0 °C) and

✓number of summer days (the days with daily maximum temperature > 25 °C)

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- Results

Monthly mean air temperature

	January	April	July	October
2015		4.1	15.4	6.5
2016	-4.1	6.8	14.9	6.6
2017	-5.9	2.1	15.3	5.1
2018	-1.7	7.6	13.8	7.2

Monthly minimum air temperature

	January	April	July	October
2015		0.3	10.5	6.1
2016	-6.8	3	10.3	3.2
2017	-9.1	-1.5	10.6	1.8
2018	-4.5	3.3	9.6	1.7

Monthly maximum air temperature

	January	April	July	October
2015		8.9	20.9	9.5
2016	-1.2	12.1	20.1	10
2017	-3	6.6	20.5	9.4
2018	1.3	12.8	18.7	9.2

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- Results - extremely temperature days

Extremely cold	Extremely warm
January	
01.01.2016	06.01.2016
22.01.2016	**07.01.2018**
23.01.2016	**08.01.2018**
09.01.2017	**09.01.2018**
	10.01.2018

Extremely cold	Extremely warm
April	
26.04.2016	**17.04.2016**
08.04.2017	**18.04.2016**
20.04.2017	**19.04.2016**
21.04.2017	23.04.2018
22.042017	24.04.2018

Extremely cold	Extremely warm
July	
01.07.2015	21.07.2015
16.07.2017	30.07.2015
17.07.2017	**01.07.2017**
28.07.2017	**02.07.2017**
09.07.2018	12.07.2017
10.07.2018	13.07.2017

Extremely cold	Extremely warm
October	
31.10.2015	**01.10.2016**
29.10.2017	**02.10.2016**
30.10.2017	**03.10.2016**
31.10.2017	15.10.2016
25.10.2018	16.10.2016
	17.10.2017

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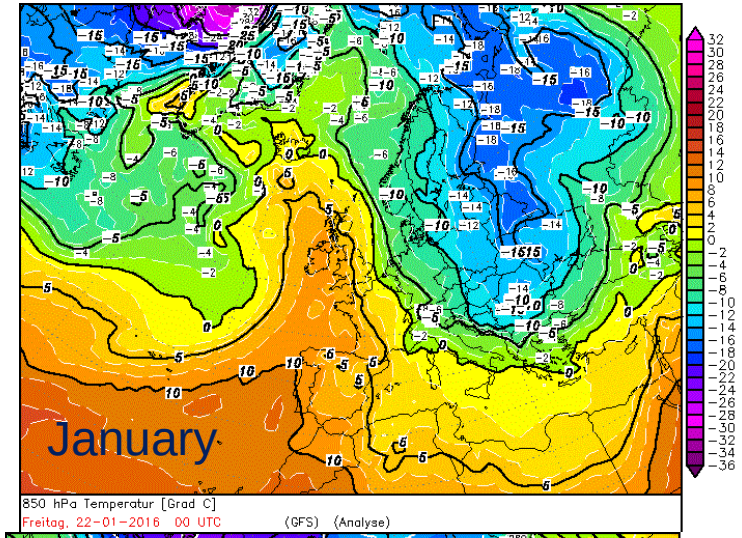
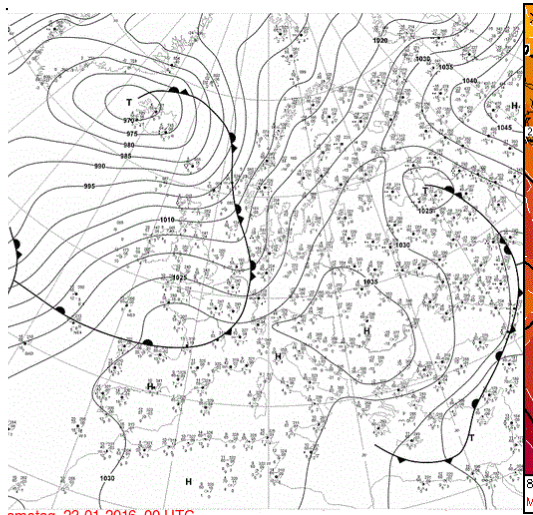
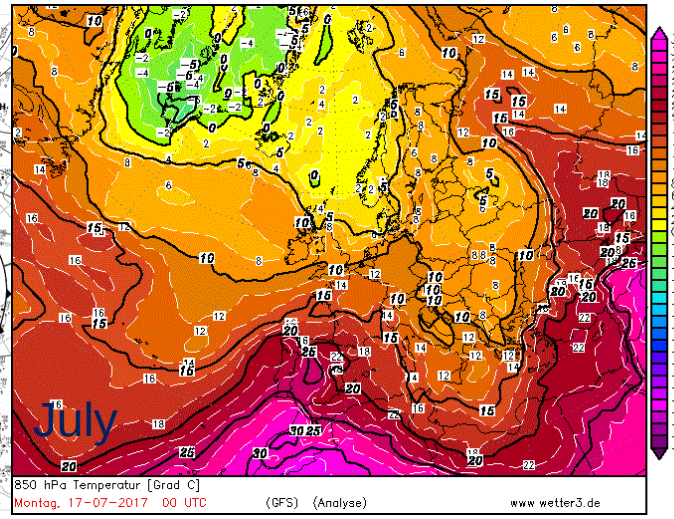
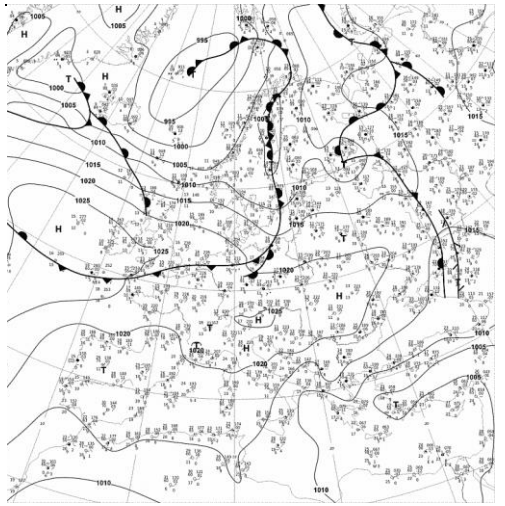
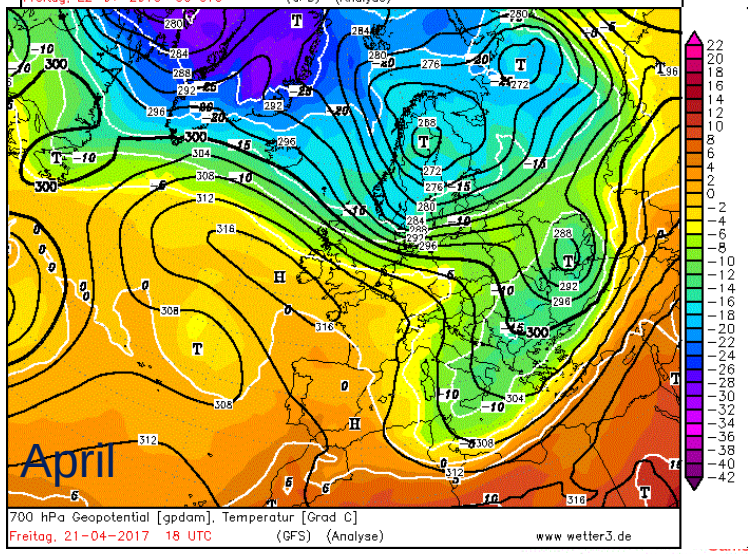
- Results – extreme cold days – synoptic conditions

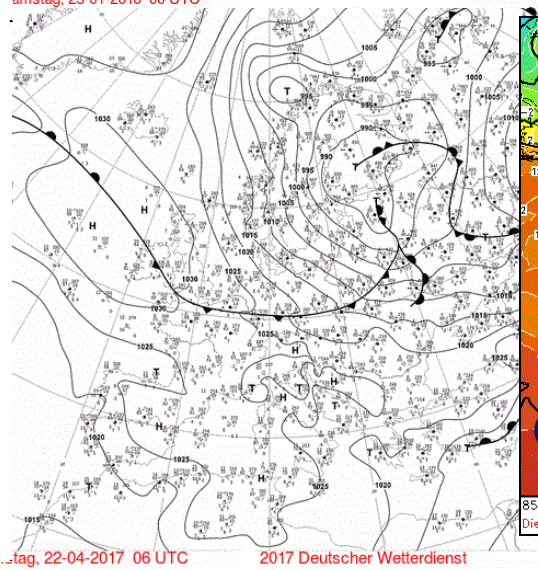


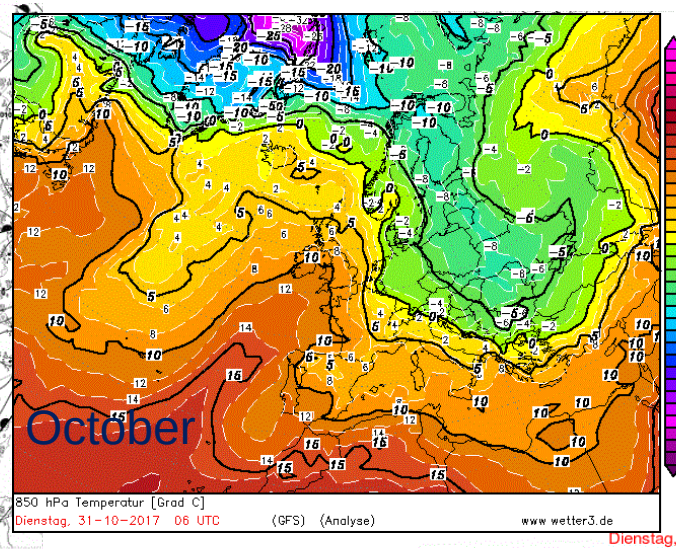


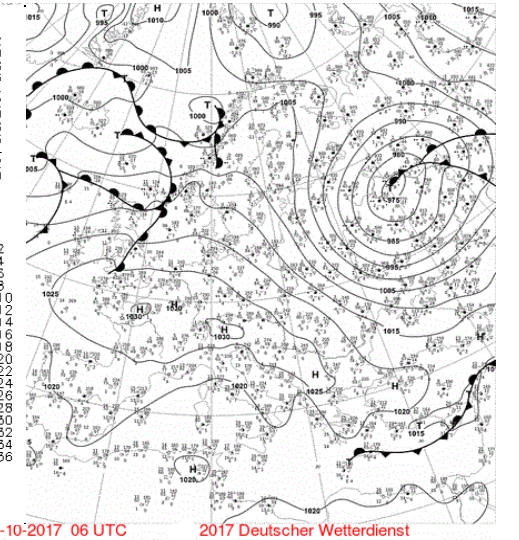












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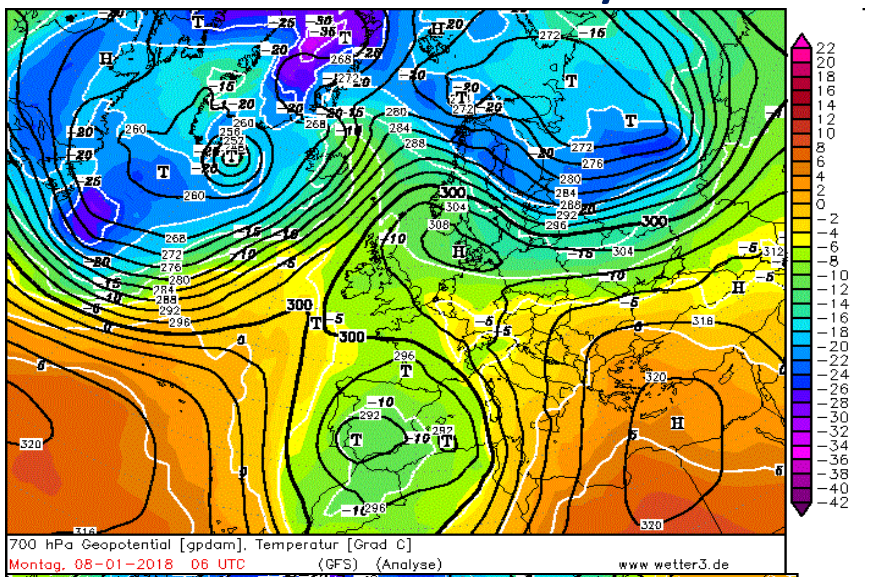
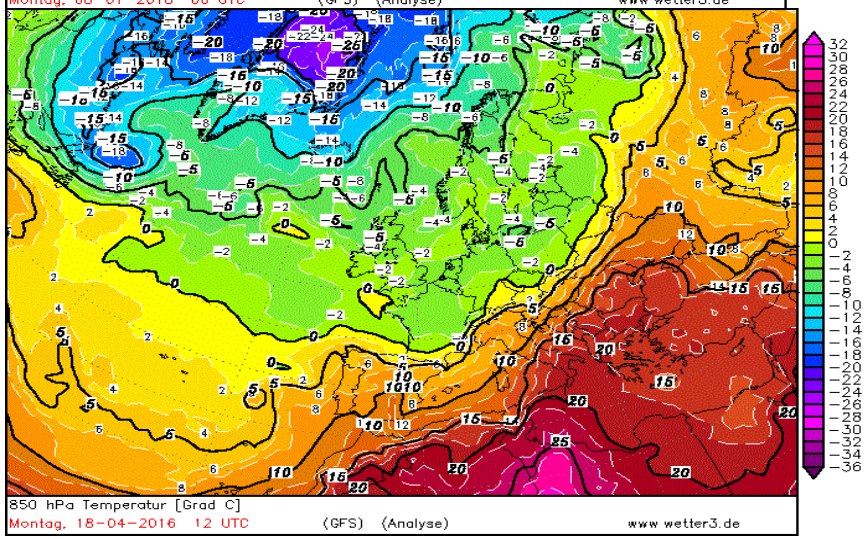
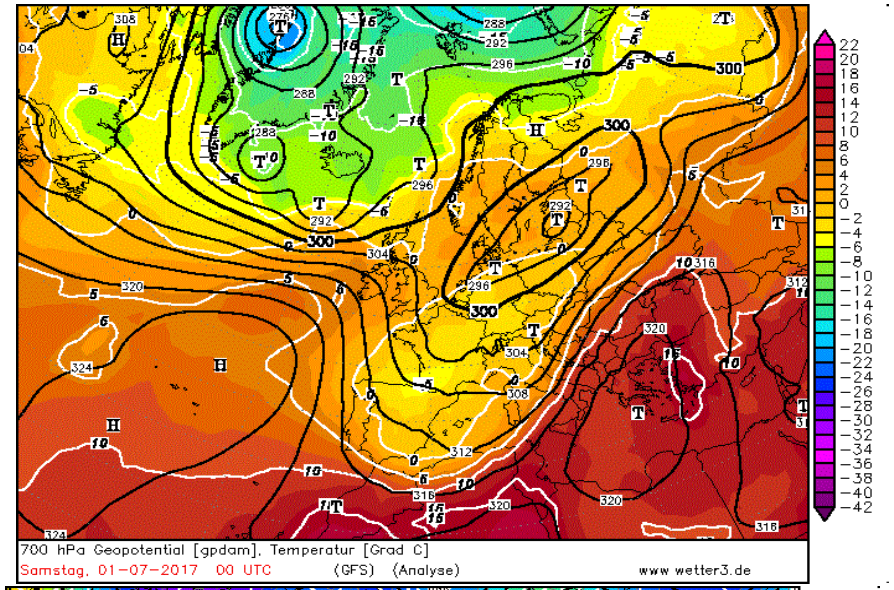
- Results – extremely warm days – synoptic conditions



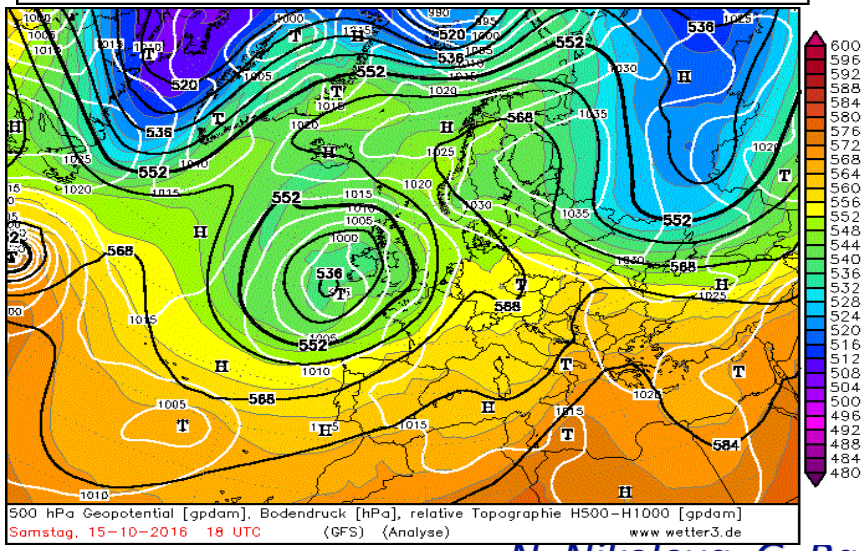
January



April



July



October

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- Results – extreme temperature indices

	January	April	October
2015		8	6
2016	27	5	3
2017	23	17	8
2018	28	21	9

number of frost days (the days with daily minimum temperature < 0 °C)

	January	April	October
2015		0	
2016	16	0	
2017	19	2	
2018	13	2	

number of icing days (the days with daily maximum temperature < 0 °C)

number of summer days (the days with daily maximum temperature > 25 °C)

	July
2015	1
2016	0
2017	5
2018	0

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- Conclusion

✓Extremely warm months have been observed mainly in 2018 ;

✓Exception is July with extremely warm 2017 where some summer days have been observed at the altitude 1800 m.

✓The number of frost days in April is higher than in October

✓Despite of increasing of temperature in 2017 and 2018 icing days are observed in April

✓The occurrence of extremely temperature days is connected to the meridional air transport – for high temperatures from southwest and for low temperatures – from north-northwest

✓The high air pressure over the Balkan peninsula has not a big influence for extremely high temperature but it is very important for the extremely low temperatures.

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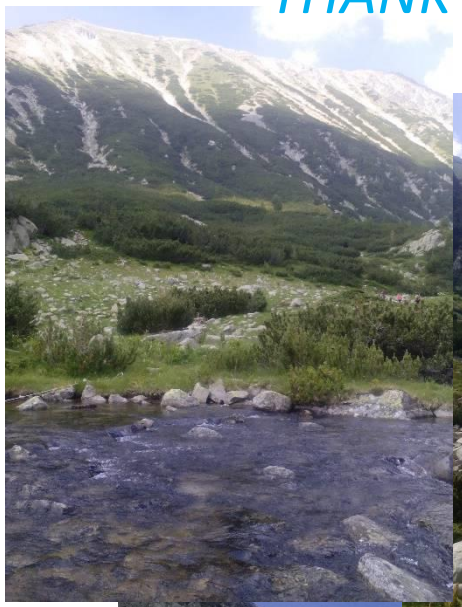
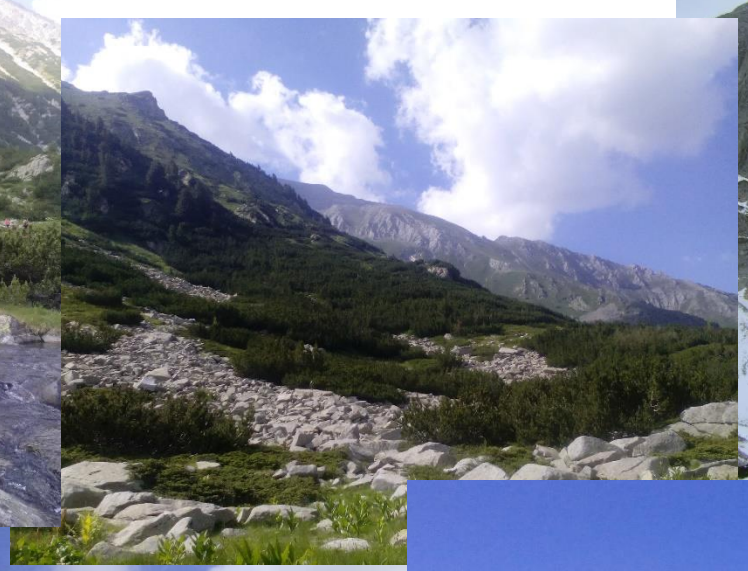
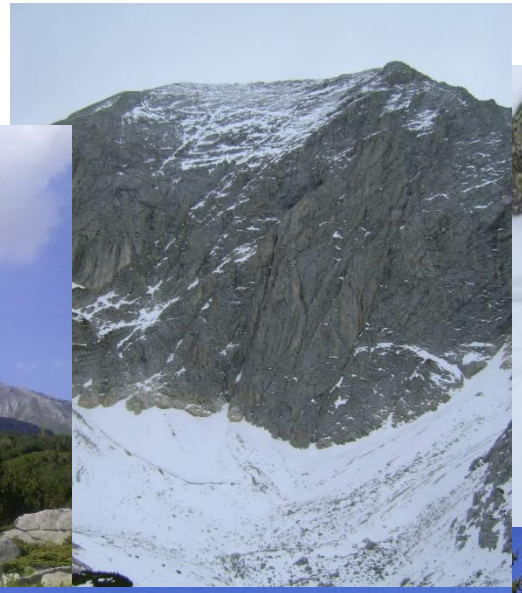
THANK YOU FOR ATTENTION





Hrvatsko meteorološko društvo

Challenges in meteorology 6,
15-16 November 2018, Zagreb, Croatia

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