

# Assessment of the SEECOF-13 seasonal climate outlook in Hungary

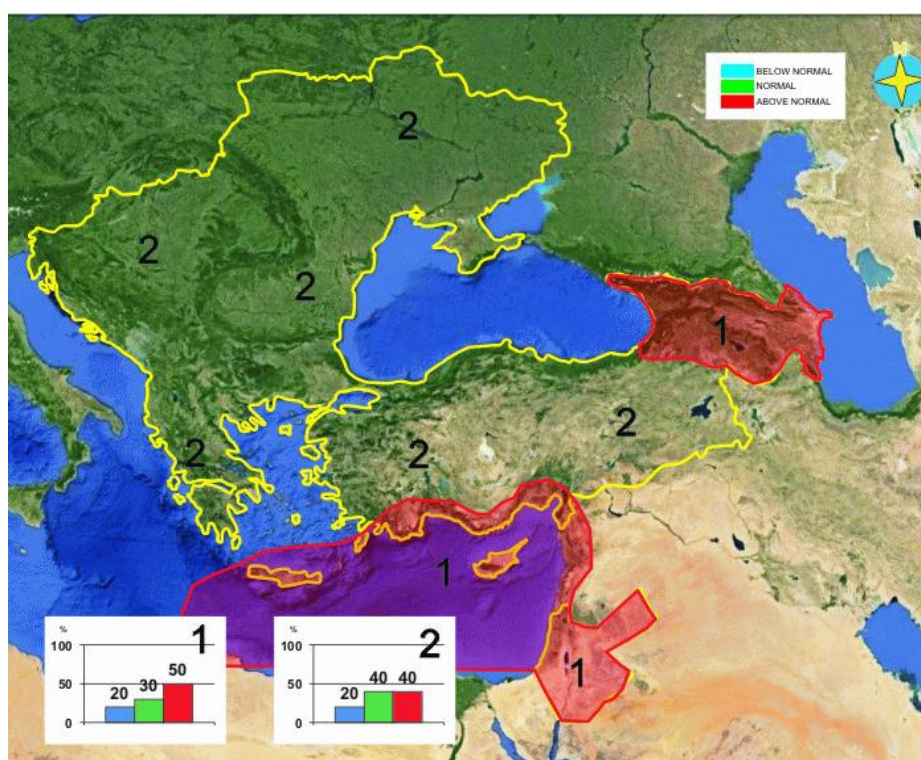
Summer 2015

Tamas Kovacs (kovacs.t@met.hu)  
Hungarian Meteorological Service

The SEECOF-13 climate outlook generally expected likelihood for above-average temperatures throughout the region. Uncertainties in regional predictions were higher for precipitation, with not such a clear spatial pattern: above normal amounts were predicted in Greece, the Aegean Sea and much of Turkey, normal or below normal in eastern Ukraine and the Caucasus region, while the outlook presented no distinct signal connected to summer precipitation in other parts of South-East Europe.

## Temperature

The following map shows the probabilistic consensus forecast for the tercile categories of anomalies for seasonal mean temperature (*Fig. 1.*), relative to the period 1981-2010. The area of Hungary is in zone 2, a territory of tendency for the middle and upper tercile.

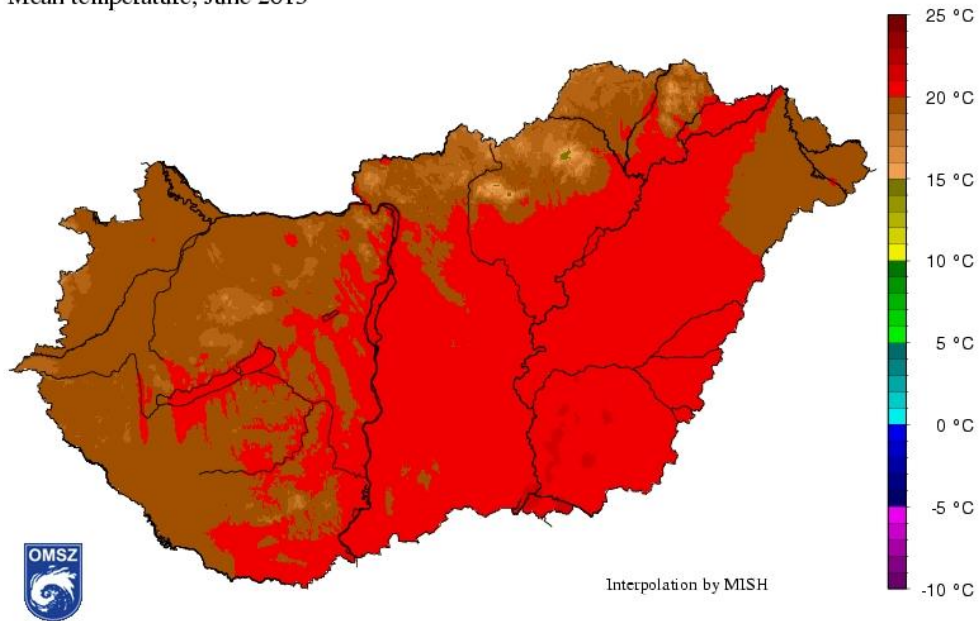


1. Figure - SEECOF-13 outlook for the 2015 summer temperature

After the summer season, we can evaluate individual summer months, as well as the season as a whole.

## June 2015

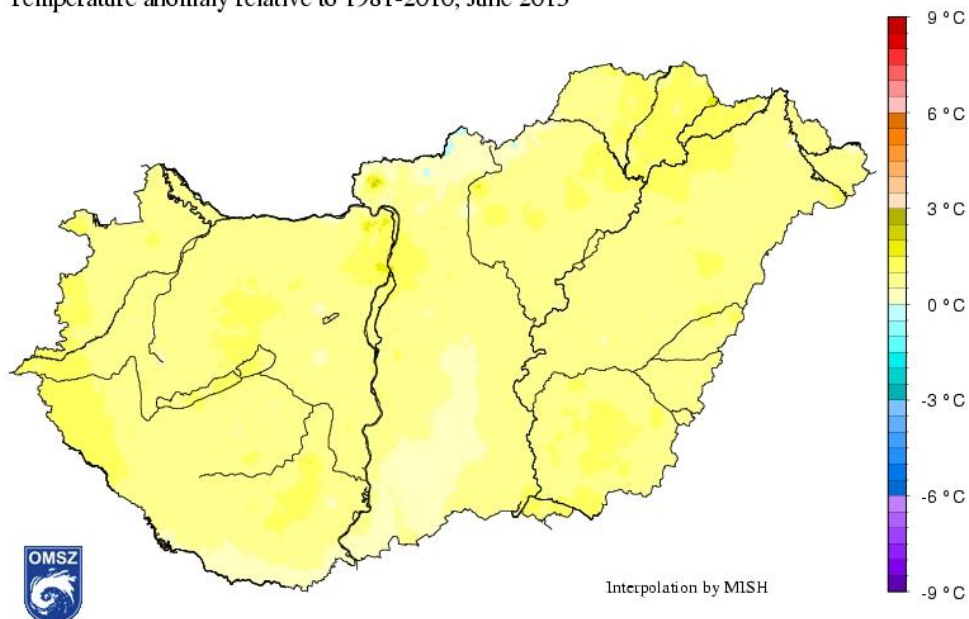
Középhőmérséklet, 2015. június  
Mean temperature, June 2015



2. Figure - Mean temperature in Hungary, June 2015

The monthly mean temperature of June in Hungary (*Fig. 2.*) was 20.0°C. Highest averages were observed in the middle and eastern parts of the country (20-21°C), while in the west, along the northern border were generally below 20°C. The month was warmer than the 1981-2010 average almost everywhere with a spatial average anomaly of +0.82°C (*Fig. 3.*).

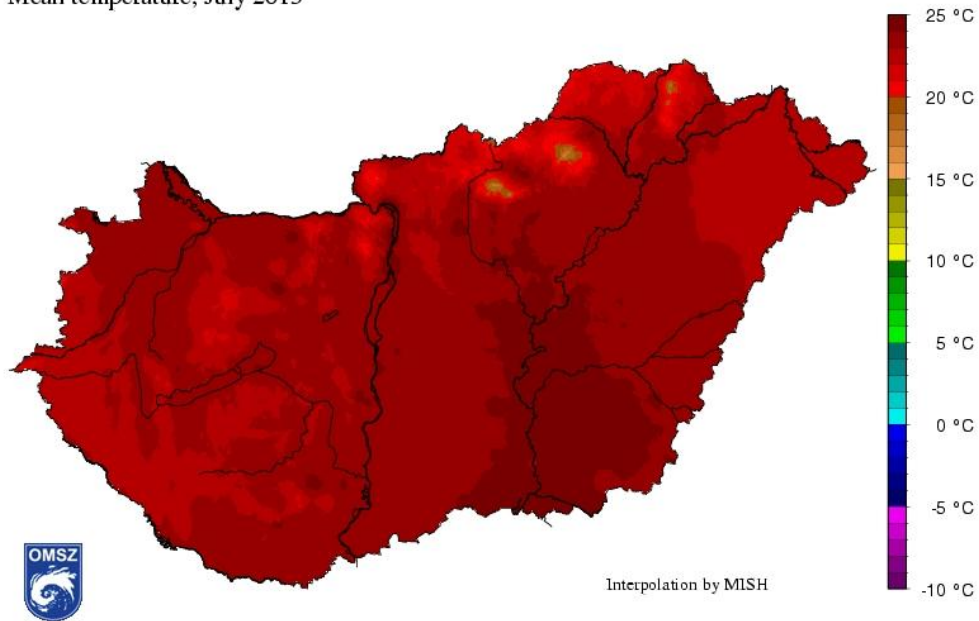
Középhőmérsékleti anomália az 1981-2010 átlaghoz viszonyítva, 2015. június  
Temperature anomaly relative to 1981-2010, June 2015



3. Figure - Temperature anomaly in Hungary relative to 1981-2010, June 2015

## July 2015

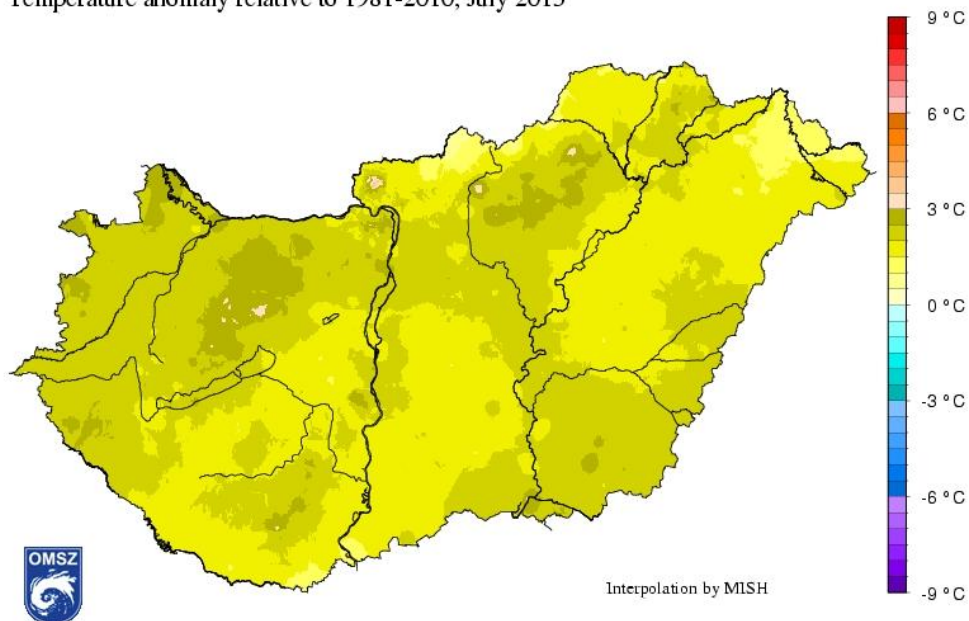
Középhőmérséklet, 2015. július  
Mean temperature, July 2015



4. Figure - Mean temperature in Hungary, July 2015

July was very hot overall, with multiple heatwaves. This was the second hottest July in Hungary since measurements began in 1901. The monthly mean temperature ([Fig. 4.](#)) was as high as 23.3°C, and in some areas along the river Tisza and in the southeast the value exceeded even 25°C! Anomalies were rather robust ([Fig. 5.](#)), July on a country average was 2.3°C hotter than the normal period of 1981-2010, some parts were even slightly more than 3°C hotter than usual.

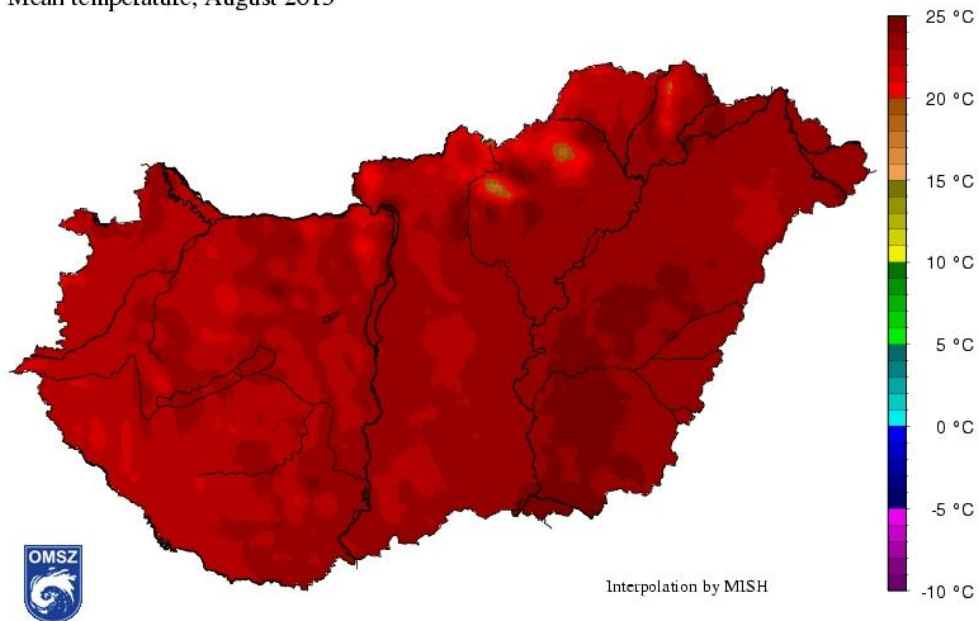
Középhőmérsékleti anomália az 1981-2010 átlaghoz viszonyítva, 2015. július  
Temperature anomaly relative to 1981-2010, July 2015



5. Figure - Temperature anomaly in Hungary relative to 1981-2010, July 2015

## August 2015

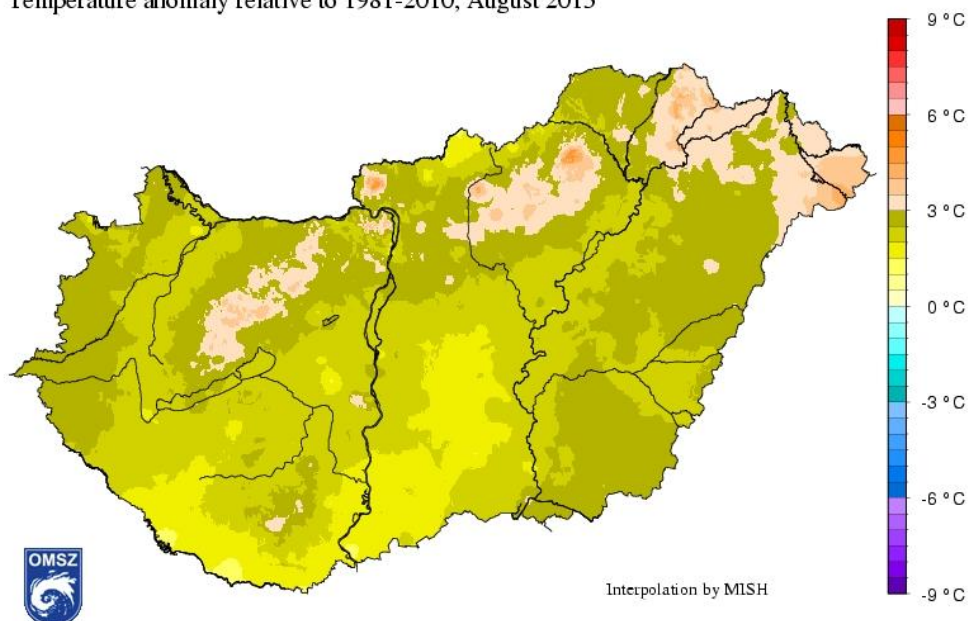
Középhőmérséklet, 2015. augusztus  
Mean temperature, August 2015



6. Figure - Mean temperature in Hungary, August 2015

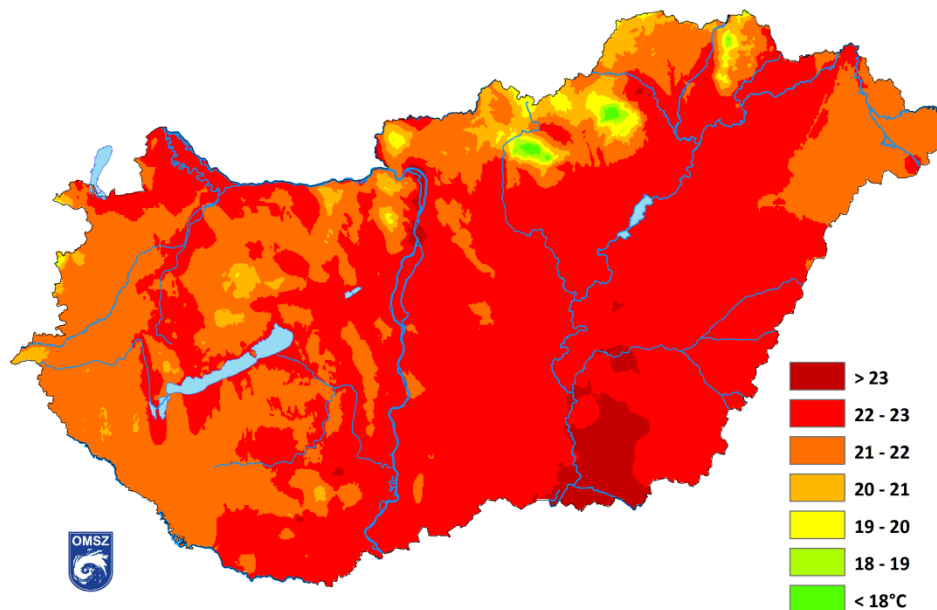
The last summer month was very hot as well ([Fig. 6.](#)), almost as hot as July, thus becoming the third hottest August in Hungary since 1901. The monthly mean temperature was 23.21°C, and again, some parts were as hot as 25°C. August temperatures were much higher than the normal ([Fig. 7.](#)). The anomaly relative to the 1981-2010 period was +2.67°C with some areas, especially in the east and in higher elevations reaching even +4°C.

Középhőmérsékleti anomália az 1981-2010 átlaghoz viszonyítva, 2015. augusztus  
Temperature anomaly relative to 1981-2010, August 2015



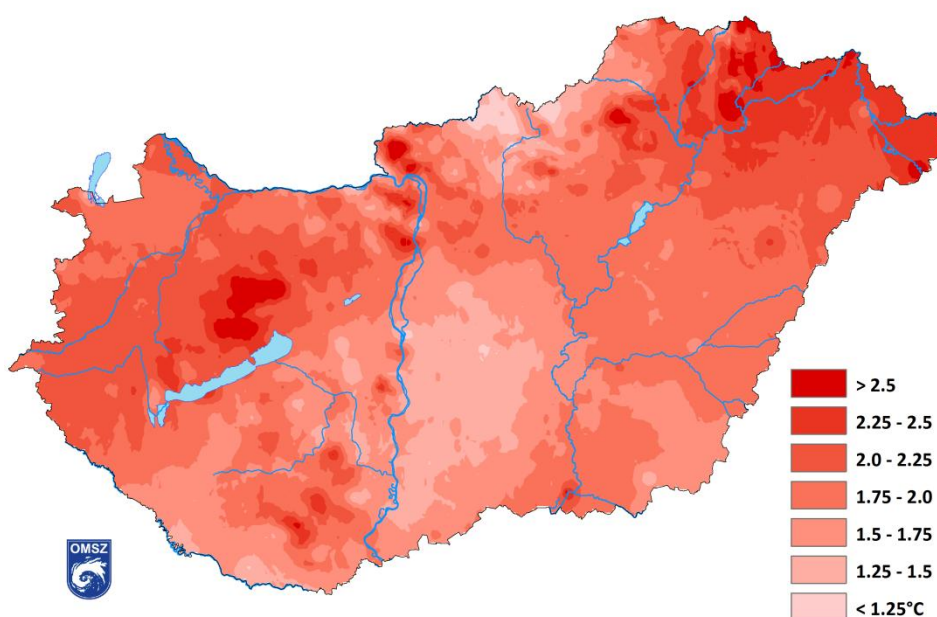
7. Figure - Temperature anomaly in Hungary relative to 1981-2010, August 2015

## Summer 2015



8. Figure - Mean temperature in Hungary, summer 2015

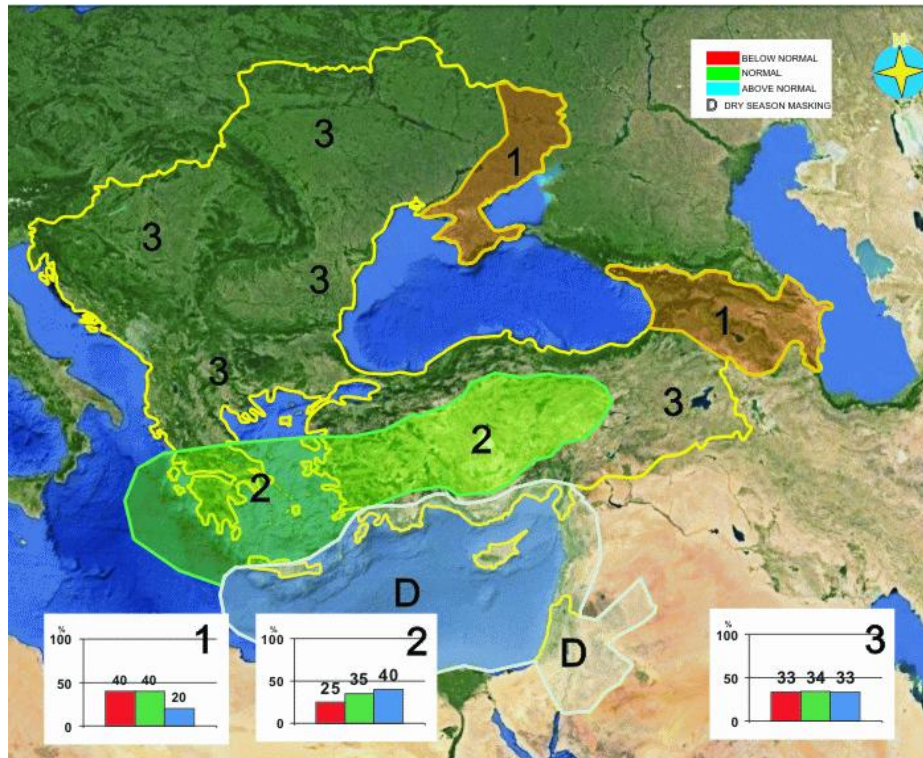
The summer season of 2015 had a mean temperature of 22.15°C. According to [Fig. 8](#), all regions excluding a few mountains had values above 21°C. The hottest areas were in the southeast, exceeding 23°C. On a country average the season was much hotter than usual with an anomaly of +1.88°C relative to the 1981-2010 average ([Fig. 9](#)). Even the mildest parts were more than 1°C hotter than the normal, and in the northwest and northeast, and in higher elevations the anomaly was higher than +2°C, sometimes reaching up to +2.5°C.



9. Figure - Temperature anomaly in Hungary relative to 1981-2010, summer 2015

## Precipitation

The following map shows the probabilistic consensus forecast for the tercile categories of anomalies for seasonal precipitation amount (*Fig. 10.*), relative to the period 1981-2010. The area of Hungary is in zone 3, a domain that shows no preference for any climate defined categories.

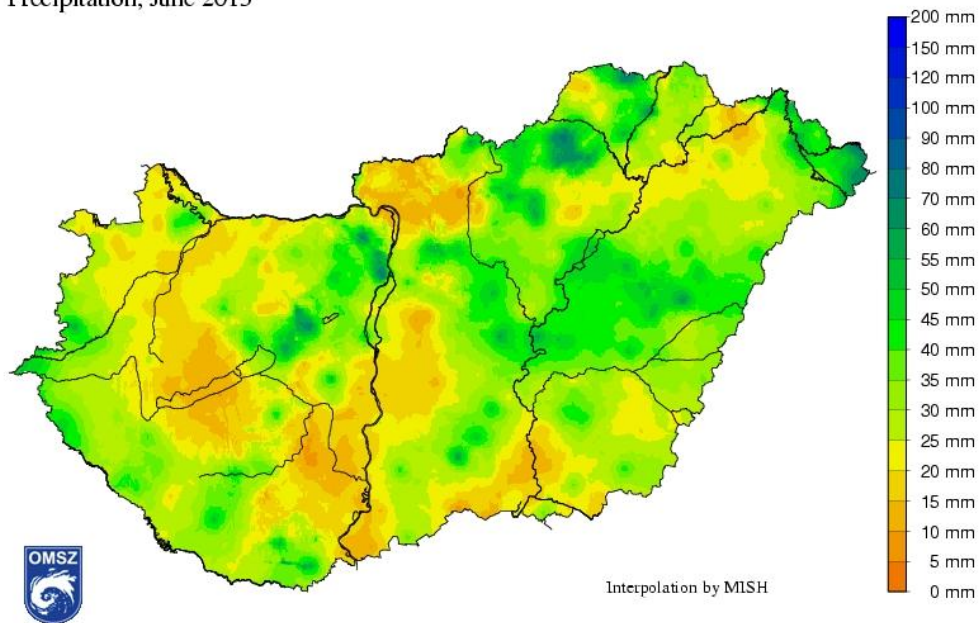


10. Figure - SEECOF-13 outlook for the 2015 summer precipitation

Measurements show that summer precipitation patterns in Hungary were rather erratic both in time and space. The season started with dry conditions, and ended with frequent excessive showers and downpours in the last weeks of August.

## June 2015

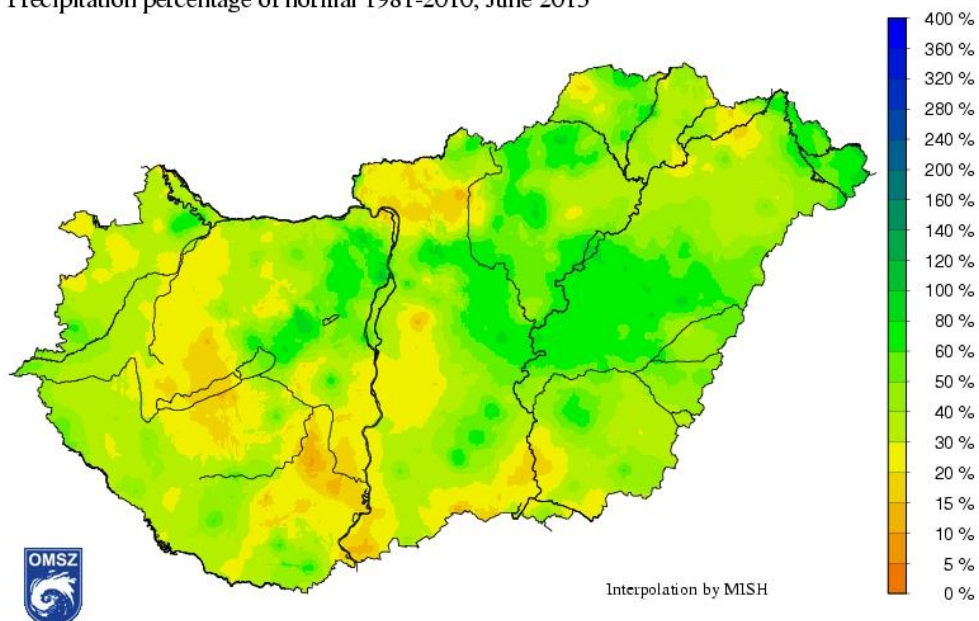
Csapadékösszeg, 2015. június  
Precipitation, June 2015



11. Figure – Precipitation amount in Hungary, June 2015

Despite of being the wettest month on average, June was rather dry this year in Hungary (*Fig. 11.*). The country average precipitation amount was only 29.2 mm, but many parts in the west, north and in the middle received below 15 mm altogether. It was the 6th driest June since 1901. The first summer month was drier than usual throughout the whole country (*Fig. 12.*), with the above regions reporting less than 20% of the 1981-2010 average June amount.

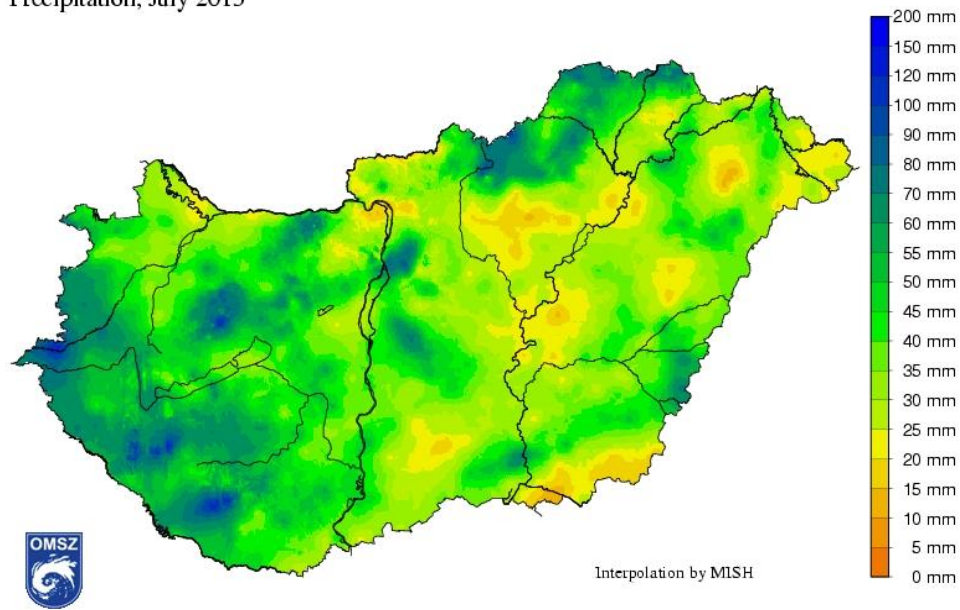
A csapadékösszeg aránya az 1981-2010 átlaghoz viszonyítva, 2015. június  
Precipitation percentage of normal 1981-2010, June 2015



12. Figure - Precipitation anomaly in Hungary relative to 1981-2010, June 2015

## July 2015

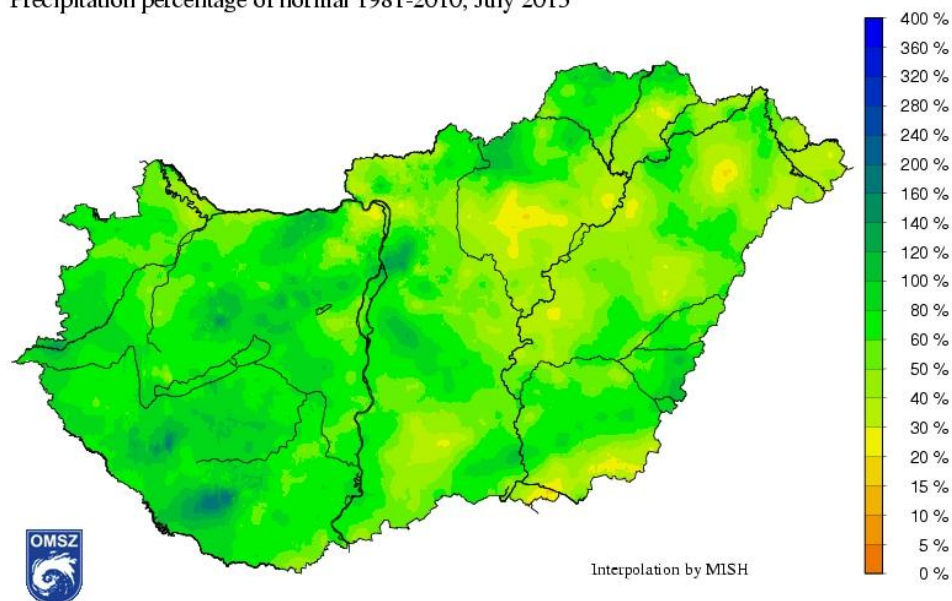
Csapadékösszeg, 2015. július  
Precipitation, July 2015



13. Figure - Precipitation amount in Hungary, July 2015

July precipitation presents a very erratic spatial distribution as seen in [Fig. 13](#). Lowest amounts were observed in some parts of the Great Plain with values as low as 10-20 mm, while some other parts, such as mountainous regions and western counties reported as much 80 mm, in some cases even more than 100 mm. On country average July precipitation was 40.8 mm, which is only 66% of the 1981-2010 average ([Fig. 14](#)). The anomaly was lowest in the aforementioned dry regions (20-40%), and highest in the southwest (100-160%).

A csapadékösszeg aránya az 1981-2010 átlaghoz viszonyítva, 2015. július  
Precipitation percentage of normal 1981-2010, July 2015

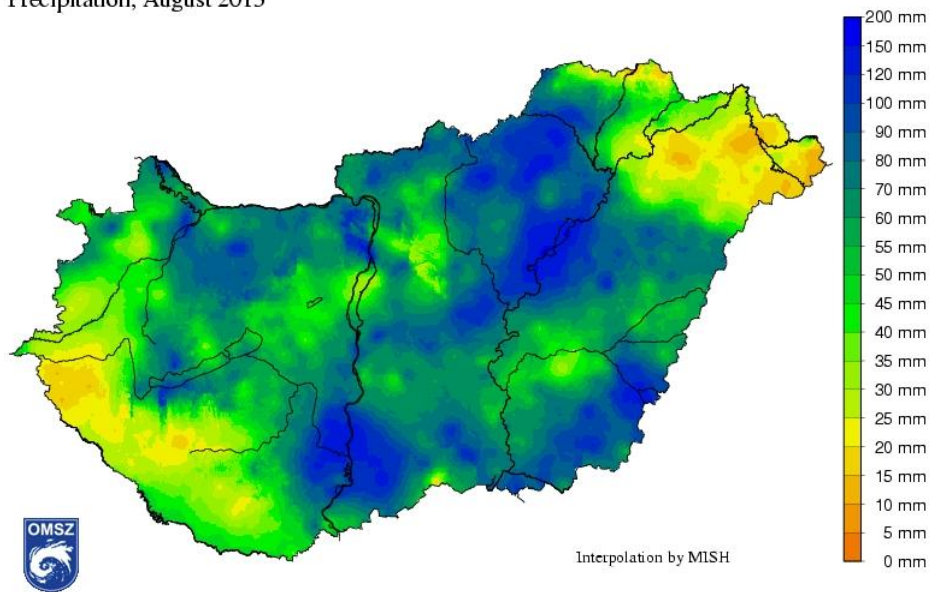


14. Figure - Precipitation anomaly in Hungary relative to 1981-2010, July, 2015



## August 2015

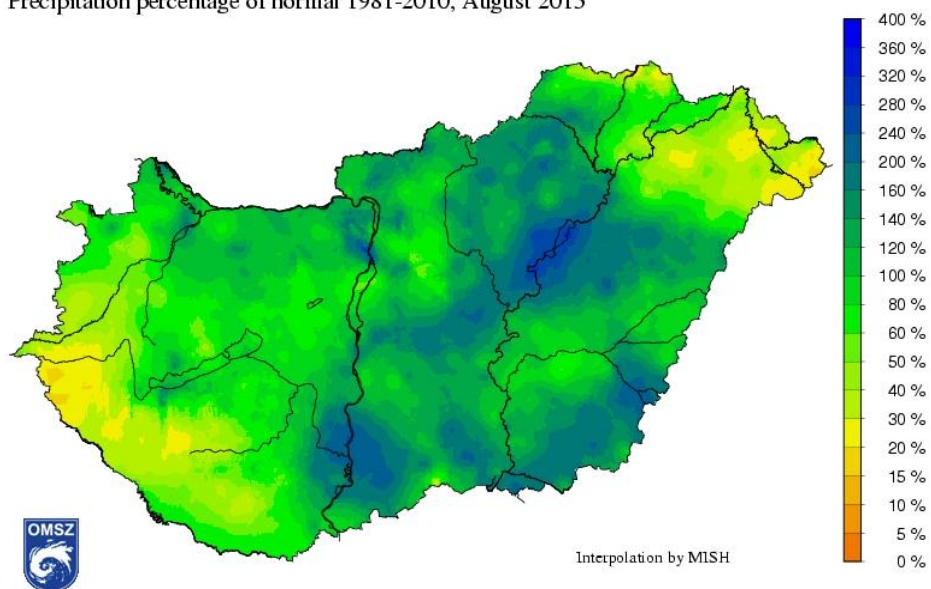
Csapadékösszeg, 2015. augusztus  
Precipitation, August 2015



15. Figure - Precipitation amount in Hungary, August 2015

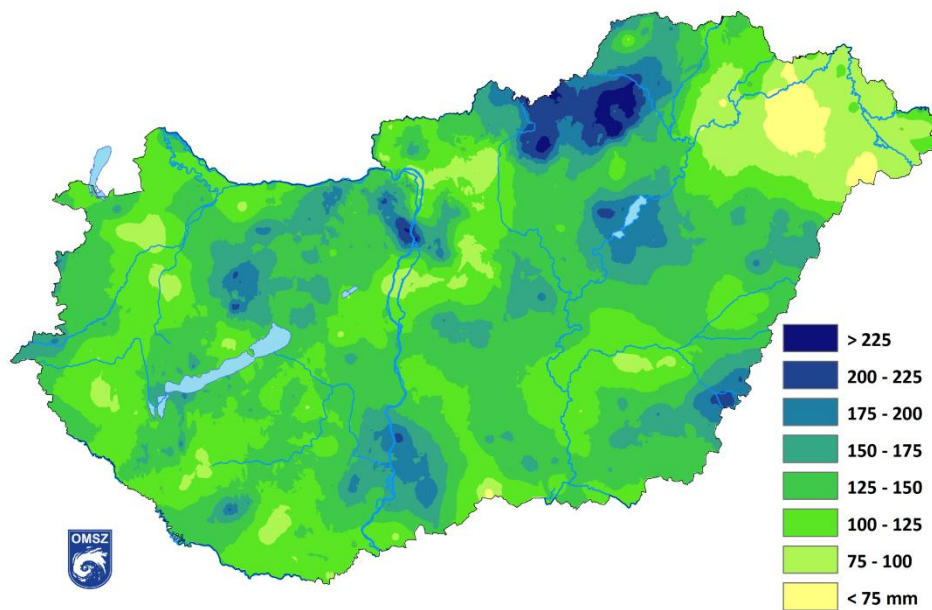
August precipitation was extreme in both time and space in Hungary this year. There were reoccurring downpours for days especially in the middle of the month that resulted in the erratic pattern presented in [Fig. 15](#). Monthly amounts ranged between 10 and 150 mm, in some cases such values are only a few 10 km away! Monthly mean precipitation was 62.3 mm, which is very close (103%) to the 1981-2010 average ([Fig. 16](#)). Relative to the normal August was the driest in the western and eastern corners of the country with values adding up only less than one third of usual, while the middle of the country in general received around 150% of the average of 1981-2010, some places reported even more than 200%.

A csapadékösszeg aránya az 1981-2010 átlaghoz viszonyítva, 2015. augusztus  
Precipitation percentage of normal 1981-2010, August 2015



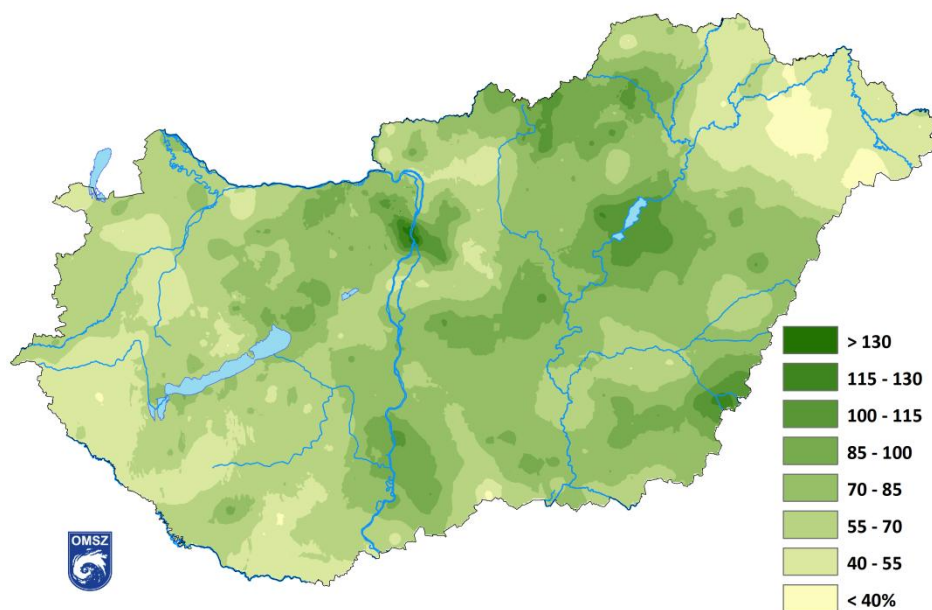
16. Figure - Precipitation anomaly in Hungary relative to 1981-2010, August, 2015

## Summer 2015



17. Figure – Precipitation amount in Hungary, summer 2015

The summer season of 2015 had a precipitation amount of 132.3 mm but with great spatial differences (*Fig. 17.*). Some parts, especially in the northeast reported less than 75 mm while in scattered locations throughout the country the seasonal amount reached 200 mm. Overall the season was drier than usual with only 68% of the average of the 1981-2010 period (*Fig. 18.*). Relative to the normal, the wettest regions were in the middle and eastern parts of the country, but even there the excess amount was not outstanding. In the northeast and the west some parts received only less than 40% of normal this summer.



18. Figure – Precipitation amount in Hungary relative to 1981-2010, summer 2015

## Summary

The SEECOF-13 outlook expected the region of Hungary to have a low chance of cooler than normal summer season. In the end, all three summer months were hotter than usual, with July and August both being in the top 3 months since 1901 respectively.

The precipitation outlook had no preference for any climate defined categories for Hungary, with an equal probability of all three terciles. According to the measurements this has proven to be incorrect, since the summer season was drier than usual with only 68% of the 1981-2010 period normal amount. Moreover, the great spatial extremities throughout the country must be emphasized.

Country	Seasonal temperature (JJA)		Seasonal precipitation (JJA)		High Impact Events
	Observed	SEECOF-13 climate outlook for temperature	Observed	SEECOF-13 climate outlook for precipitation	
Hungary	Above normal	Above normal to Normal (20/40/40)	Below normal	No signal (33/34/33)	<p>This summer had a very high number of heat days in Hungary (41 days above 30°C instead of 22). It was the 4th hottest summer since 1901. There were altogether 5 major heatwaves, with Budapest having 27 days mean temperature above 27°C instead of 1981-2010 average 3. It was the 2nd hottest July and 3rd hottest August on record.</p> <p>Precipitation pattern was very erratic. Dryness during the heatwaves in July and August was often interrupted by excessive rainfall, there were repeating downpours throughout the country. Budapest downtown received 115.4 mm on August 17 that caused severe damages due to flash floods.</p>