

**METEOROLOGICAL AND SYNOPTIC INTERPRETATION AT THE  
REPRESENTATIVE STATIONS FROM WESTERN ROMANIA DURING THE  
SUMMER OF 2014**

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**Abstract**

In Romania, droughts occur on the background of specific synoptic configurations. It is, mainly, about the persistence of an anti-cyclone field due to the coverage of our country by some backward cyclones (of the east-European Anti-cyclone, the Azores Anti-cyclone, the Scandinavian Anti-cyclone, or the North-African Anti-cyclone), i.e. on the existence of a high pressure field because of an anti-cyclone belt made by the union of the Azores Anti-cyclone with the East-European Anti-cyclone.

**Introduction**

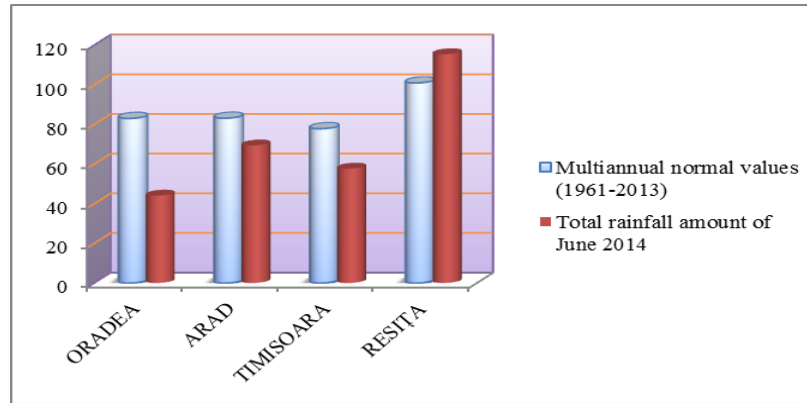
In Romania, more exactly in Western Romania, the summer of 2014 was rich in extreme meteorological phenomena, particularly periods associated rather to high atmospheric instability that marked all three summer months than to hot periods (they occurred only twice in the Banat-Crişana region). As a result, we can say that the summer of 2014 was rainy. To support this allegation, we present, in this study, an analysis of each summer month: pressure level at soil surface, geo-potential height at 500 level hPa, standard deviations of mean air temperature and of precipitations compared to the normal multi-annual values (reference interval: 1961-2013).

**Materials and methods**

We used data supplied by four representative meteorological stations in the Banat-Crişana Region – Oradea, Arad, Timişoara and Reşiţa – and we pointed out the deviations in relation to normal multi-annual values. Synoptic characterisation was done with maps of soil level pressure that show the distribution of cyclones and anti-cyclones and maps of altitudes with geo-potential at 500 hPa, i.e. at about 5,500 m.

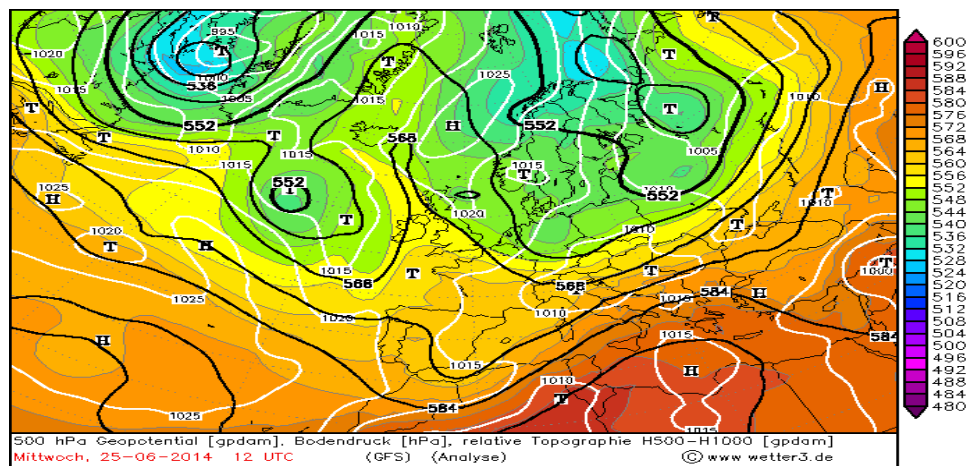
**Results and discussion**

The summer 2014 was a cold one at the beginning, with minimum temperatures in plateaus of 5°C. In June, there was a single short hot interval (6-11 June), when maximum temperature was in Oradea (35.8°C in Oradea). June is well known for being unstable, with quick shifts from nice, hot weather to unstable, cooler periods. The largest monthly amount of precipitations is supposed to fall in June (figure 1). June 2014 partially fit this pattern. The amounts of precipitations were slightly below multi-annual values in the Western Plain and Northern Crişana, while those in Southern Banat were in excess(6).



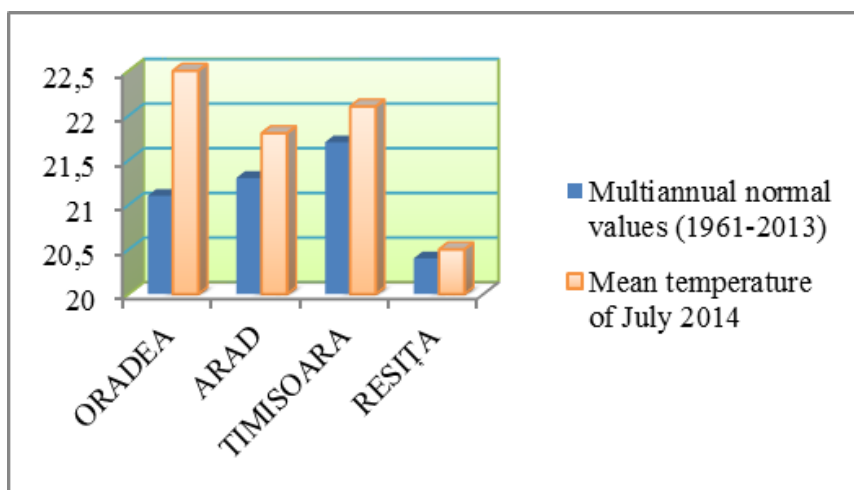
**Figure 1.** Precipitations in June 2014 compared to normal multi-annual values

As for the synoptic context, at the level of 500 hPa, on June 25, 12:00 GMT, it was on the ascending slope of the geo-potential thalweg (figure 2). At soil level, there was an area of low pressure extended from the central basin of the Mediterranean Sea (4) with several nuclei, whose cloud systems affected Western Romania.



**Figure 2.** Geo-potential at 500 hPa and pressure at soil level on June 25, 2014, 12:00 GMT

Mean air temperature in July 2014 was close to the normal value of this month, but without intense, prolonged heat waves as in previous years. Temperatures were rather modest, partly because of heavy nebulosity (figure3). Though there were many hot days, the thermal threshold of heat was reached only once (35.1°C on July 20, in Chişineu-Criş).



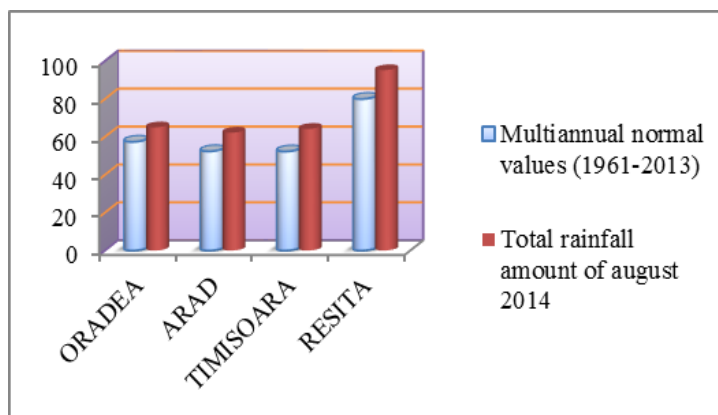
**Figure 3.** Mean air temperatures in July 2014 compared to normal multi-annual values

July 2014 was special from the perspective of precipitations. The amounts of precipitations were twice or even thrice larger than normal multi-annual values, so that we can speak of records. July 2014 was also the month with the most serious floods in Banat in the last years(6). The precipitations in excess on July 30 and 31 (for instance, in the Timiș County, 141.2 l/m<sup>2</sup> in Moravița and 127.8 l/m<sup>2</sup> in Gătaia) had devastating effects. Emergency Situations Inspectorates supplied the following data:

- Timiș County: 465 displaced people, 150 flooded households, 1 fallen house, County Road 588 linking Denta and Gătaia – closed;
- Caraș-Severin County: 4 dead people, 11 flooded houses, 96 flooded courtyards and gardens.

In August, the weather was influenced by an intense activity of the Iceland Depression. Its frontal systems reached our country and caused larger amounts of precipitations in the Crișana Region (114.0 l/m<sup>2</sup> in Ștei, 165.4 l/m<sup>2</sup> in Șiria-Cetate, 210 l/m<sup>2</sup> in Stâna de Vale), amounts recorded mainly in hill and mountain areas.

Comparing the mean air temperatures with the normal multi-annual values, we can see that mean deviations of air temperature ranged within normal limits, little above mean values in Crișana and with slightly negative deviations in Banat (up to 0.3°C), but not significant. As for the precipitations (figure 4), the amounts of water were above multi-annual values.



**Figure 4.** Precipitations in August 2014 compared to normal multi-annual values

## Conclusion

Thermal deviations in the summer of 2014 had exceptional features. There was a quick dynamics of meteorological conditions that generated higher temperatures for a short period (2-3 days), followed by lower temperatures (during intense cyclone activity in the area) and by higher temperatures repeatedly. On the other hand, the distribution of precipitations and amounts of precipitations recorded (with exceptional values in July) stirred the interest of specialists. The amounts of precipitations in June and July, though not equally large, were also above multi-annual values. In June, there was a single short hot interval (6-11 June), when maximum temperature was in Oradea. July 2014 was special from the perspective of precipitations.

Comparing the mean air temperatures with the normal multi-annual values, we can see that mean deviations of air temperature ranged within normal limits, little above mean values in Crișana and with slightly negative deviations in Banat (up to 0.3°C), but not significant. As for the precipitations, the amounts of water were above multi-annual values.

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