

## **EVOLUTION AND EFFECTS OF THE STORM OF JUNE 26, 2007, IN DÂMBOVIȚA COUNTY**

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**Résumé. Evolution et effets de l'orage du 26 juin 2007 dans le département de Dâmbovița.** Le phénomène météorologique qui a eu lieu pendant la nuit du 26 juin 2007 fait partie des risques météorologiques qui se manifestent pendant une période brève, mais intensément, et dont l'intensité peut conduire à des événements qui peuvent entraîner d'importants dégâts matériels. Il fait partie des orages formés à l'intérieur des masses d'air chaud qui apparaissent pendant l'été dans les masses d'air froid maritimes, à la suite des talwegs étendus. La manière de manifestation, violente, a duré environ 30 minutes et a affecté une bande étroite ayant une largeur d'environ 30 km, située au contact entre la zone de plaine haute et les Collines Souscarpatiques externes. On a pu observer que le vent a changé d'orientation, du nord-ouest vers le sud-est, sur la direction ouest-est, et l'intensité maximale d'une rafale a atteint la valeur d'environ 37 m/s (approximativement 140 km/h). A cause de la manière de manifestation violente, on a enregistré des dégâts matériels significatifs.

### **General considerations**

Situated in the central south Romania, in central Muntenia, Dâmbovița County has a surface of 4,054 km<sup>2</sup>, being one of the least extended counties of the country. It is crossed by the 45<sup>0</sup> northern latitude parallel, which corresponds to the line of the localities Tătărani - Doicești - Ocnîța - Moreni. The relief units of Dâmbovița County are distributed as follows: mountains - 10%; hills - 23%; plains and watersides - 67%. The maximum altitude is recorded at Vârful Omu (2505 m), and the minimum height is registered in Poiana Commune (128.9 m), in the Titu-Gherghița divagation plain.

This meteorological phenomenon occurred only on a narrow band about 30 km wide, along the boundary between the External Subcarpathian Hills and the high plain of Târgoviște. This fact is illustrated as well by the distribution of the quantities of precipitations recorded at the rainfall stations mentioned in Table 3.

This meteorological event belongs to the category of the storms produced

within the same air masses, which are specific for the hot season, which occur inside the cold marine air masses, following extended talwegs. It was accompanied, during its manifestation, by storm-related phenomena.



Fig. 1 - The area in Dâmbovița County affected by the storm

The storm of June 26, 2007, respects all the conditions required for the occurrence of such a phenomenon:

- high specific humidity of the air stratum at ground level (10 g/kg and over);
- instability of the air masses;
- high temperature in front of the air front (30° C and over);
- existence of a cold air front or occluded cold front characterized by significant thermal contrasts (25 - 35°C, and in the area with precipitations 8-10° C);
- significant increase of the pressure behind the air front (3-5 mb in 3

hours);

- slow movement of the cold air front, often from north-east to south-west or from north to south, especially in the upper area of the hot sector, where the pressure gradients at ground level are low;

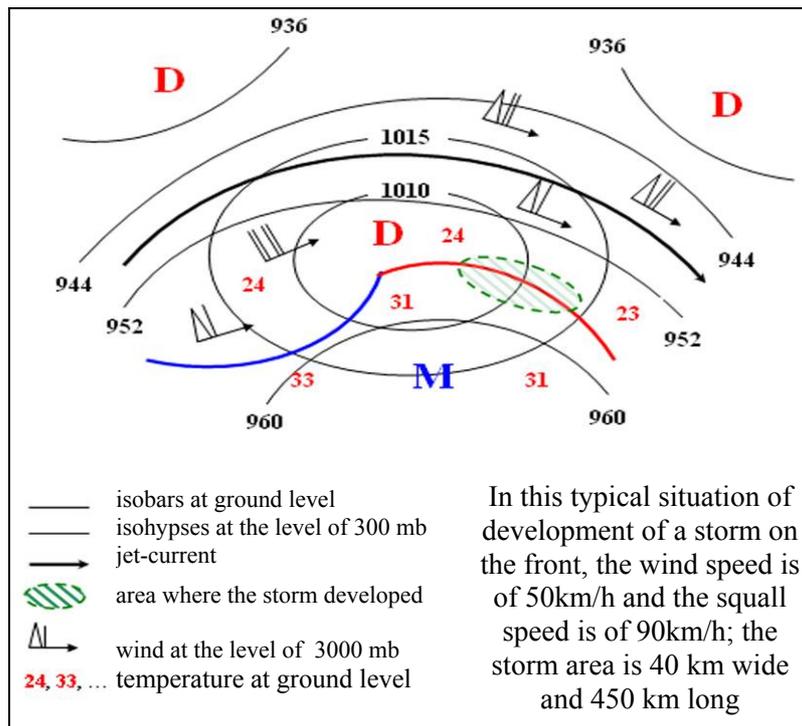


Fig. 2 - Scheme for the formation of storms within the same air mass

- divergence of the weak south or south-west currents (diffluence of the isohypses) towards the posterior, eastern side of the baric talweg in altitude (for the storms that occur in air masses);

- diffluence of the isohypses and a significant decrease of the wind speed in the area of the jet-current (for the frontal squalls); all the storms have been noticed to occur in the anticyclonic sector of the jet-current.

At the passage of the atmospheric front, 200 km in front of it and 100 km behind it related to the prognosis point, the following are to be considered:

- the greater the cloud "power" (vertical distance between the condensation and the convection level) and the instability energy (deviation of the state curve

reported to the stratification curve on the aerologic diagram), the higher the speed of the descending air current that reaches the ground;

- the maximum possible wind speed during the storm depends on the thickness of the cloud layer between the condensation level and the isotherm of 0°C: if the cloud thickness is of 300 mb, the maximum possible wind speed will be of 40 m/s, for 340 mb - 35 m/s, for 380 mb - 30 m/s, for 420 mb - 25 m/s, for 440 mb - 20 m/s;

- a strong storm is possible only in case of a strong wind in the high atmospheric strata.

## 2. Evolution of the storm in the night of june 26/27, 2007

The synoptic situation during the period under analysis shows that at ground level, there occurred a contact between a well-organized depressionary nucleus and a dorsal of maximum pressure of the Azore anticyclone; this contact affected the Romanian territory as well. This nucleus of tropical air stagnated for a long time, which led to high temperatures, of over 30<sup>0</sup> C at day and over 25<sup>0</sup> at night. Following this contact, the atmospheric pressure was noticed to decrease, as shown in the following table:

Tab. 1- Evolution of the air pressure

Time	20.30	21.30	22.30	23.30	0.30	1.30	2.30
mb/Hg	968.4	967.2	967.8	967.9	968.1	968.4	968.9

In the same context, the temperatures were noticed to decrease, as well; the maximum temperature of the day, at 13.00 was of 32.80<sup>0</sup> C, and the ground temperature, of 59.60<sup>0</sup> C. Beginning with 20.30, the temperatures recorded an abrupt fall, according to the following data:

Tab. 2 – Evolution of the air temperature

Time	20.30	21.30	22.30	23.30	0.30	1.30	2.30
<sup>0</sup> C	28.1	24.3	18.9	18.0	17.2	17.6	17.8

In the context of these changes, the quantities of precipitations were relatively low, being present mostly as rainfalls (for 30 minutes, from the moment the phenomenon began - 22.04 -, up to 22.34) in the Subcarpathian area and to a lower degree in the mountainous and plain areas.

Tab. 3 - Evolution of the quantities of precipitations

Rainfall station	Dealu Frumos	Râul Alb	Târgoviște	Găești	Lucieni	Valea Lungă	Butimanu	Titu
l/m <sup>2</sup>	2.4	0.5	10.8	3.2	10.2	1.2	0.8	4.8

The precipitations were accompanied by frequent electrical discharges, between 21.50 and 23.02, and strong wind intensifications, which reached the warning threshold, and went beyond the aggravation threshold as well, the maximum gust of wind reaching 37 m/s, approximately 133 km/h.

Tab. 4 - Evolution of the wind per gust of wind

Time	Wind direction	Gust of wind speed (m/s)
21.40	West	8
21.50	West	12 – warning threshold; beginning of the electric discharges
22.00	West	20 – the wind speed went beyond the aggravation threshold
22.10	West	37 – maximum
22.20	West	23
22.30	West	13
22.40	North-North-West	9 – the wind speed descended below the warning threshold

### 3. Situation of the events triggered by the storm

Though the wind intensifications did not last long, the wind speed triggered significant material damages, especially in the urban and rural areas of the Subcarpathian area and at the contact between the latter and the plain.

The storm affected four towns (Fieni, Pucioasa, Târgoviște, Moreni) and 12 communes (Bezdead, Aninoasa, Bușani, Dărmănești, I.L. Caragiale, Vlădeni, Văcărești, Răzvad, Doicești, Dragomirești, Gura Ocnitei și Șotânga).

The material damages included : 63 blocks of flats and 304 houses and rural households, which were affected, 32 broken cars and 182 fallen trees, which blocked roads and railways and deteriorated over 1000 m of electric wires and about 200 m phone wires.

To these consequences were added the destruction of certain socio-cultural institutions in the rural zones, for instance cultural centers, schools and administrative headquarters in different communes.

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