



Severe thunderstorm - 70 mm at Colmenar Viejo (Madrid) 21/08/2003

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Links to related threads on Meteored forum:

<http://www.meteored.com/foro/index.php?board=1;action=display;threadid=4028>

<http://www.meteored.com/foro/index.php?board=13;action=display;threadid=4029>

<http://www.meteored.com/foro/index.php?board=2;action=display;threadid=4018>

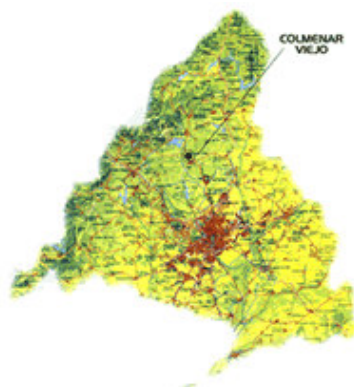
<http://www.meteored.com/foro/index.php?board=13;action=display;theadid=4057>

On August 21, 2003 the Madrid Region was affected by heavily electric thunderstorms. The Guadarrama mountains were direct witness to one of these storms, and more specifically the town of Colmenar Viejo, hit by an extremely violent cell which was born and developed over the district, moving across the area later and sweeping over a wide section of the northern Madrid Region.

According to measurements, up to 70 mm of rain were recorded in a very short time: about just one hour between 8 and 9 p.m. That day, severe storm activity affected not only Madrid, but also many other regions of the Iberian Peninsula (see the report on the F1 gustnado over La Pobla de Vallbona).

Introduction

Colmenar Viejo, at 883m above sea level, sits on the southern slopes of the Guadarrama Mountains. The town centre is 31 km from Madrid. With an area of 182.5 sq. km., Colmenar municipality ranks only second to Madrid city in the Madrid Region as regards. Some maps for location purposes:

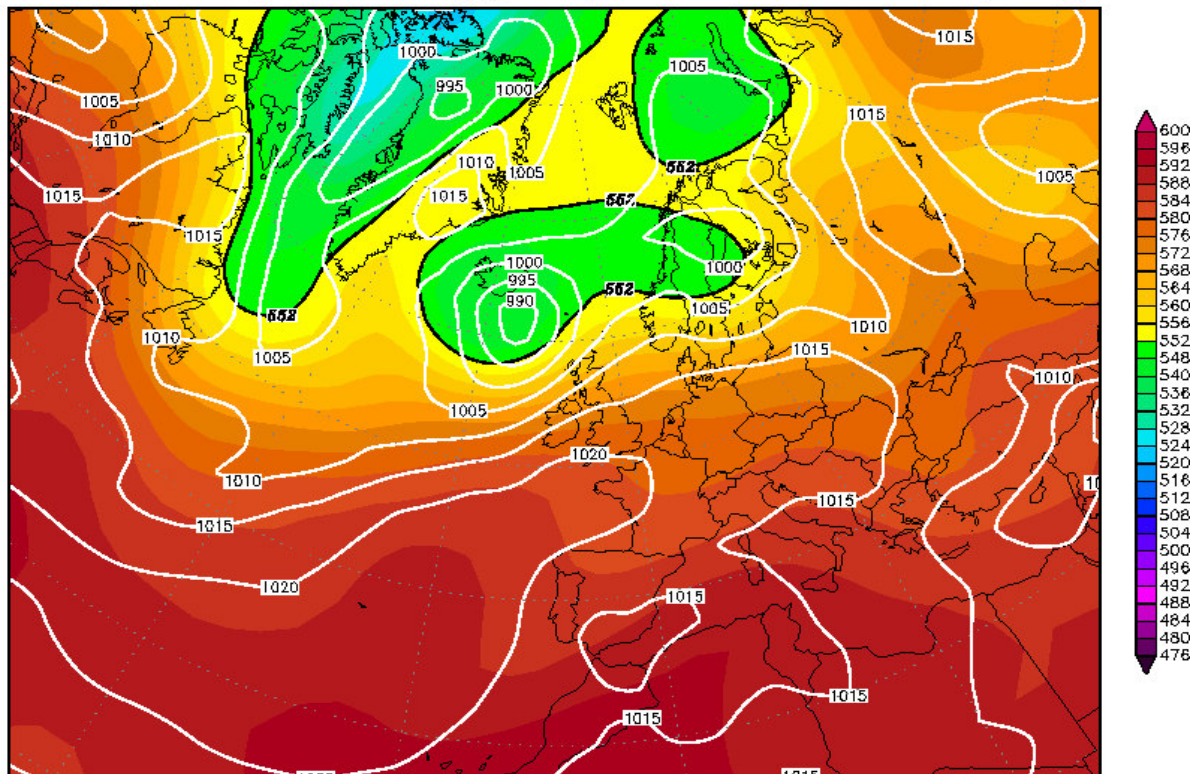


Synoptic situation

On August 21, 2003 the general synoptic situation was as follows: at 0:00h local time there was a barometric swamp at 500 hPa. Pressure at Colmenar (reduced to sea level) was 1015 hPa. A cold air trough was rapidly moving east-northeastwards. These cold outbreaks in upper levels generate a particularly intense storm activity in summer, helped as they are by the considerable heating of the superficial levels. The 850hPa map at 0:00h shows the +17°C isotherm more or less where it should be at that time of the year.

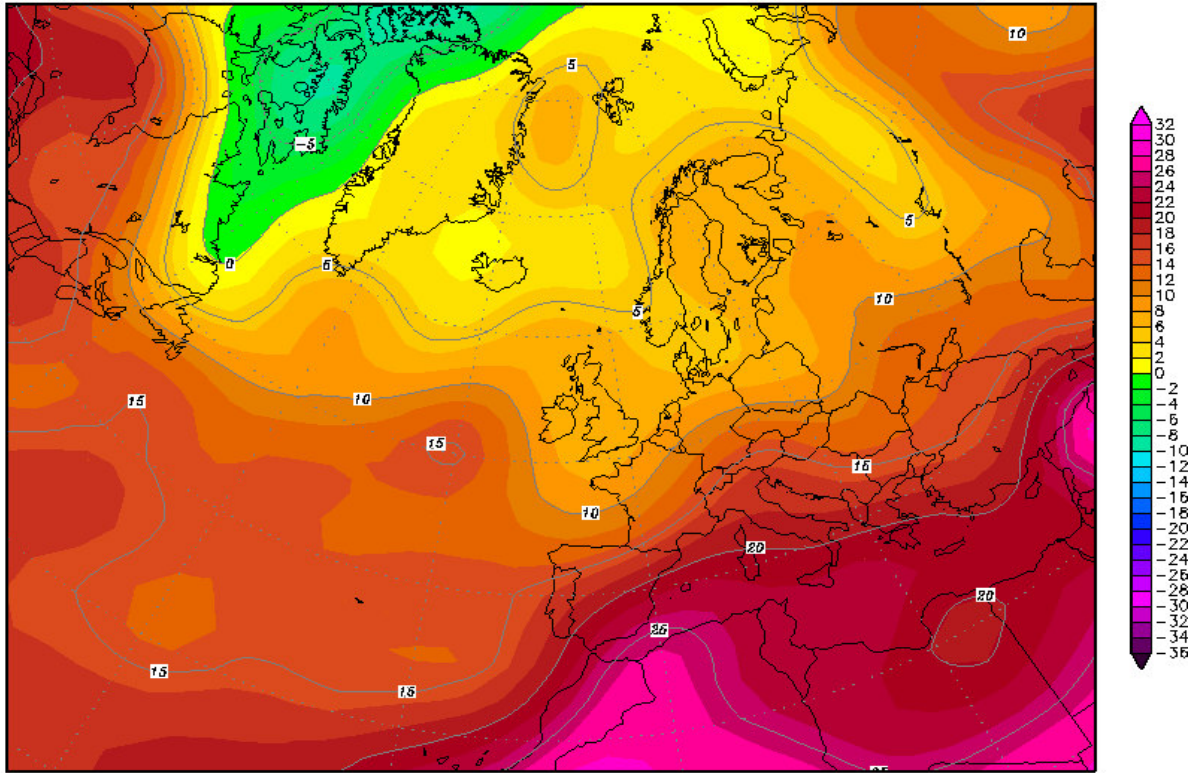
Thu, 21 AUG 2003 00Z

500 hPa Geopotential (gpm) und Bodendruck (hPa)



Daten: Reanalysis des NCEP
(C) Wetterzentrale
www.wetterzentrale.de

850 hPa Temperatur (Grad C)

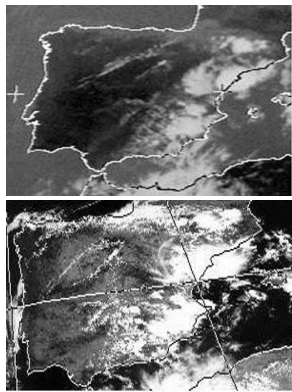


Daten: Reanalysis des NCEP
(C) Wetterzentrale
www.wetterzentrale.de

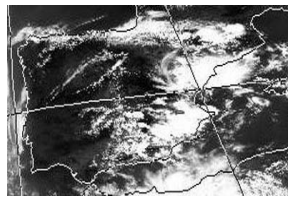
Storm evolution:

A privileged witness was the Meteosat weather satellite. Convective cloud development in the mountains started out at around 2 p.m. but it would still take some hours for a genuine multicell to develop above Colmenar, which was literally rained down. The cell moved then further on to the north and northwest of the Madrid Region, gradually fading out as it got dark.

**Meteosat 12 a.m.
12:34 p.m. - 2**

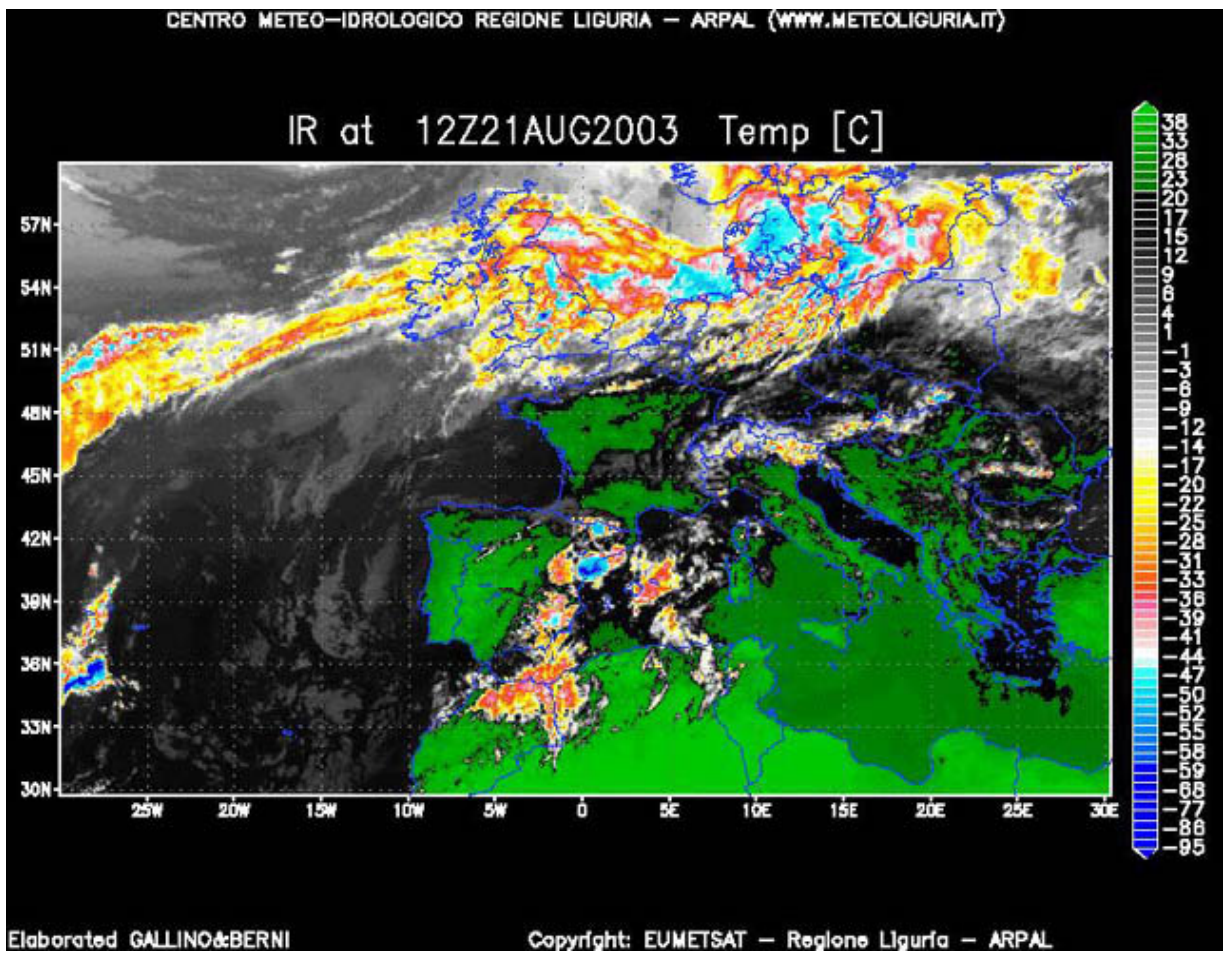


Meteosat 12:34 p.m. - 1

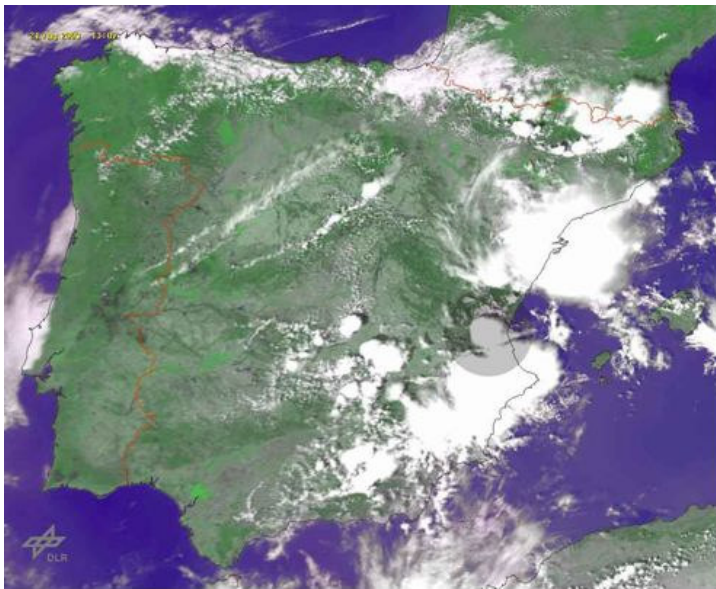


Meteosat

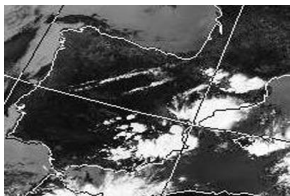
Cloud temperature at 12:00 a.m.:



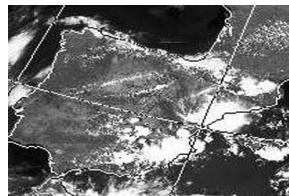
Meteosat 1:07 p.m.



Meteosat 1:18 p.m. - 1

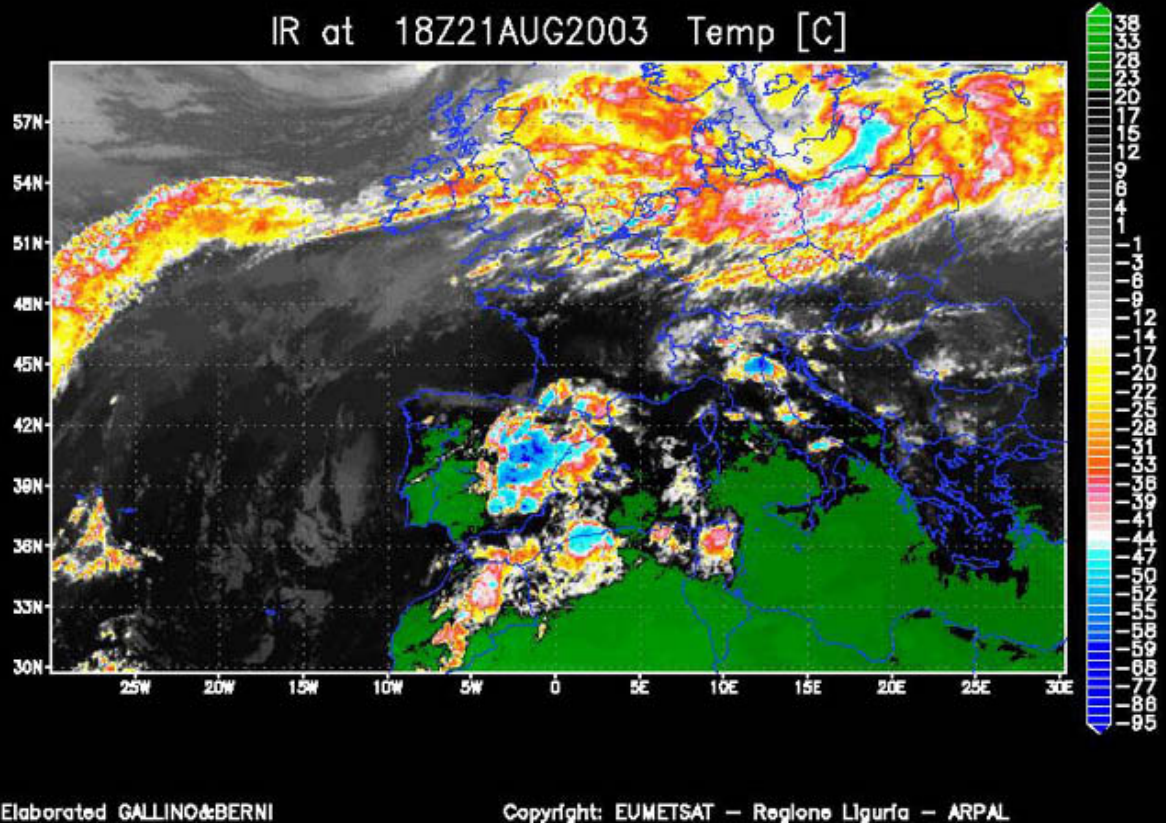


Meteosat 1:18 p.m. - 2

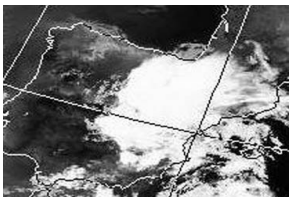


Cloud temperature at 8:00 p.m.

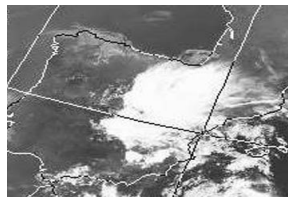
IR at 18Z21AUG2003 Temp [C]



Meteosat 9:28 p.m. - 1

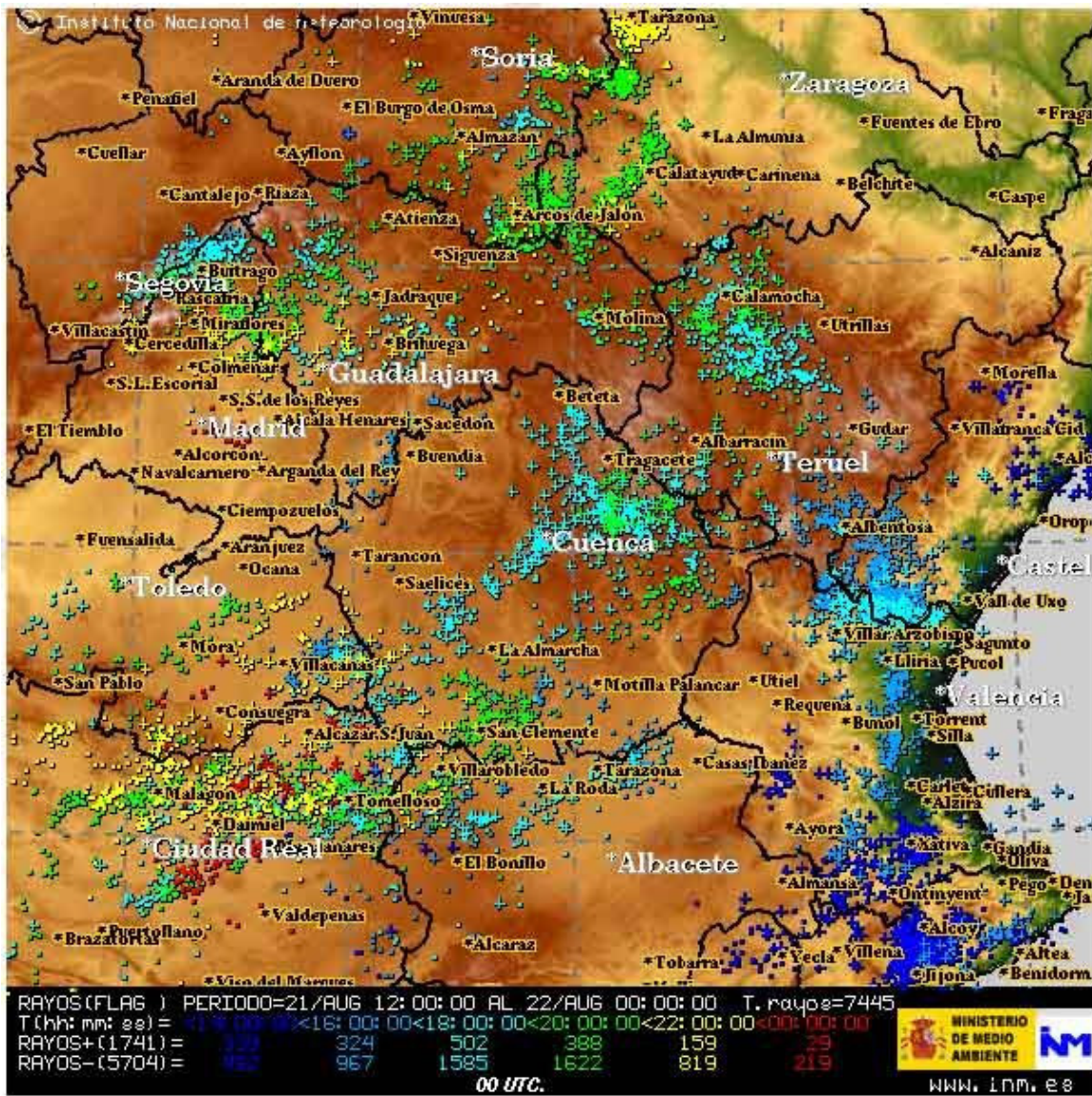


Meteosat 9:28 p.m. - 2

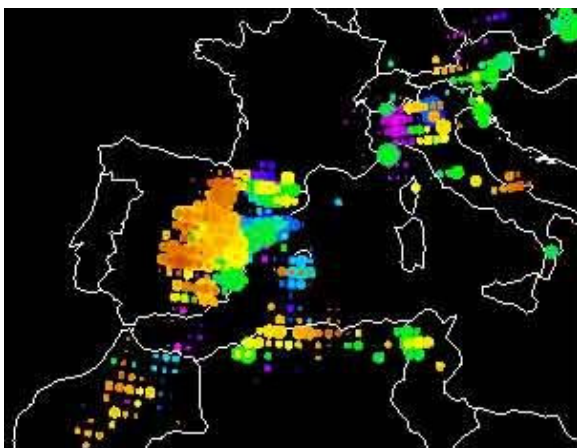


A comparison of two lightning maps, INM (Spanish Met Office) and Wetterzentrale, showing the heavy electric activity on August 21 throughout the Iberian Peninsula.

INM



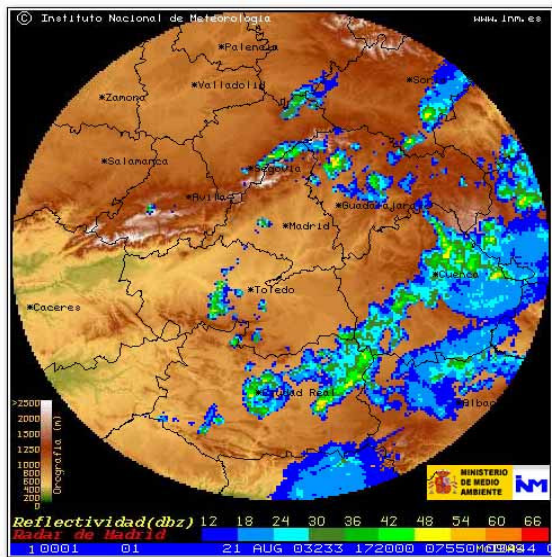
WETTERZENTRALE:



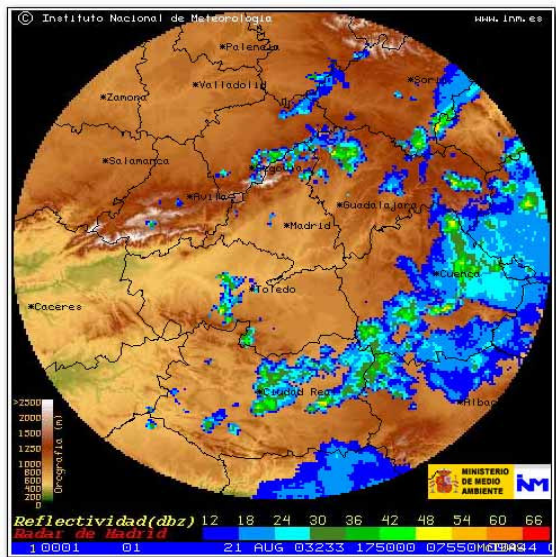
Now a set of radar pictures for the Madrid Region (INM):

5:20 p.m.

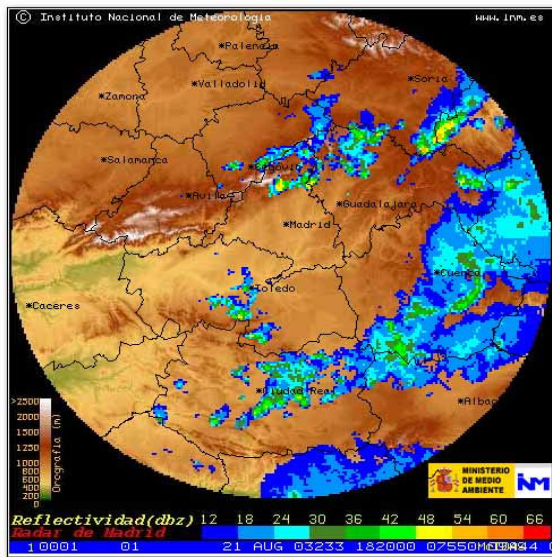
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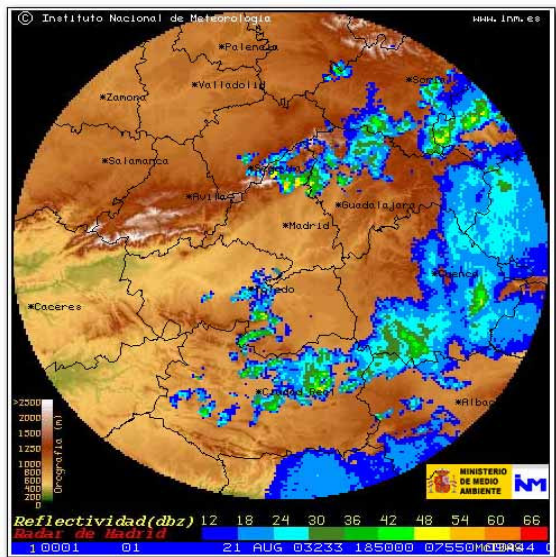
6:20 p.m.



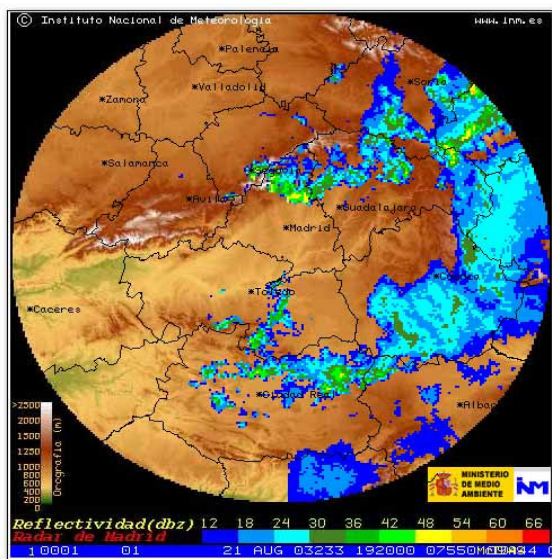
6:50 p.m.



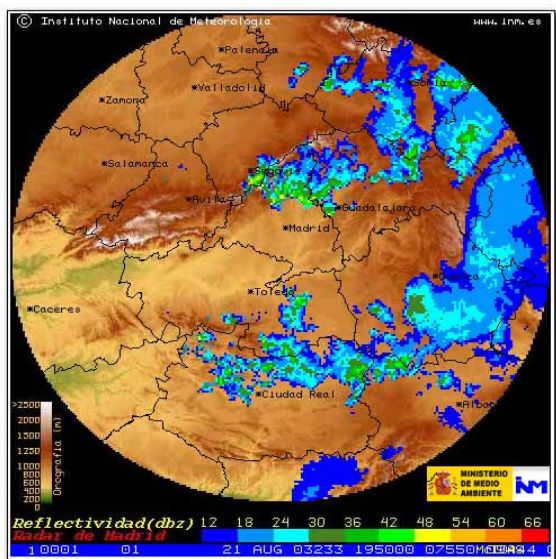
7:20 p.m.



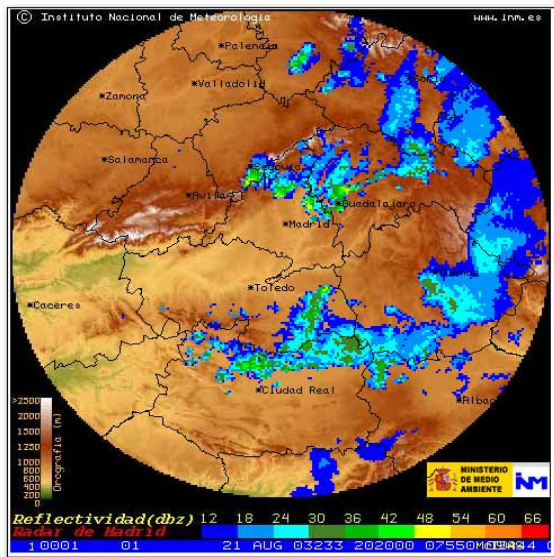
7:50 p.m.



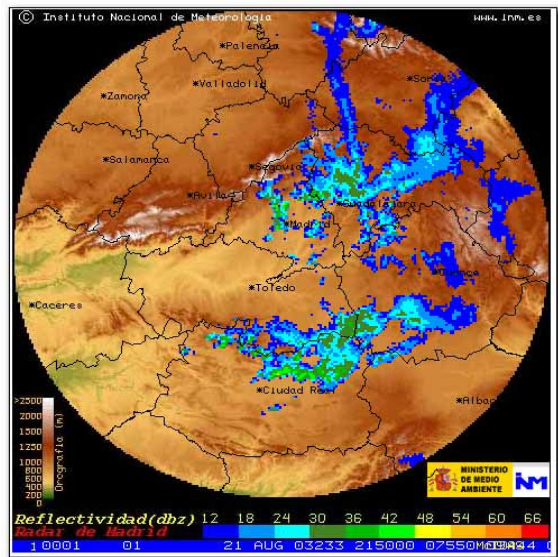
8:20 p.m.



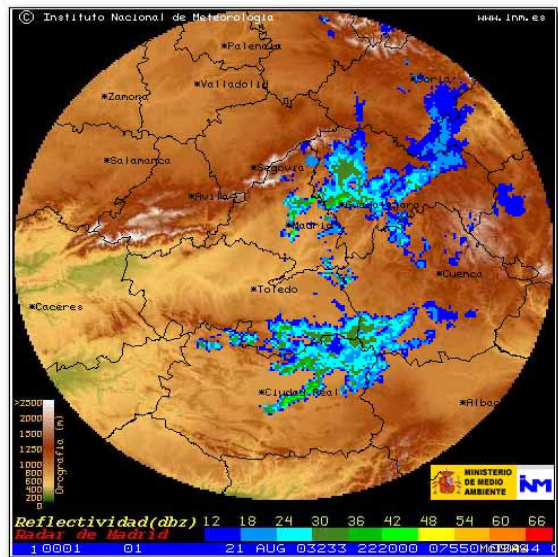
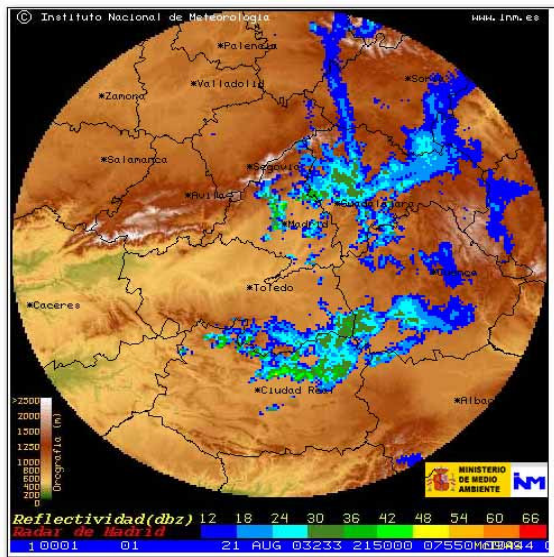
9:20 p.m.



9:50 p.m.



10:20 p.m.



Description of the storm as seen from different locations:

B950MB, Meteored forumer, N-NE Madrid city:

<< 20:05:23 >>:

"Above me, mostly clear. Cloudier to the east. Over the mountains, possible thunderstorm as towering clouds developing to the north. Light to moderate wind."

<<20:47:40 >>:

"Gee, over to the north must be getting pretty serious. I can see a few nice thunderheads from my position!"

<<21:25:49 >>:

"Wow, up north getting really dark!!! Anything coming down here to us??. Seems to be moving. I hope so!"

<<21:50:10 >>:

"Night has come and northern Madrid has put on a real show. Must be pouring up there"

"More air traffic than usual above my area. I guess they're being somewhat re-routed because of the storm"

<<22:15:38h>>

"Frequent short lightning to the north and to the east. Torn-out clouds reaching me from the east"

Miguel 890, Meteored forumer, Colmenar Viejo:

" This afternoon we've had some sky fireworks. And a terrific downpour too. The firemen and the emergency teams haven't surely been bored today. Temperature dropped from 28,4°C at 8 p.m. to 15,5°C at 9:45 p.m. "

JoseV, Cercedilla. Text and pictures:

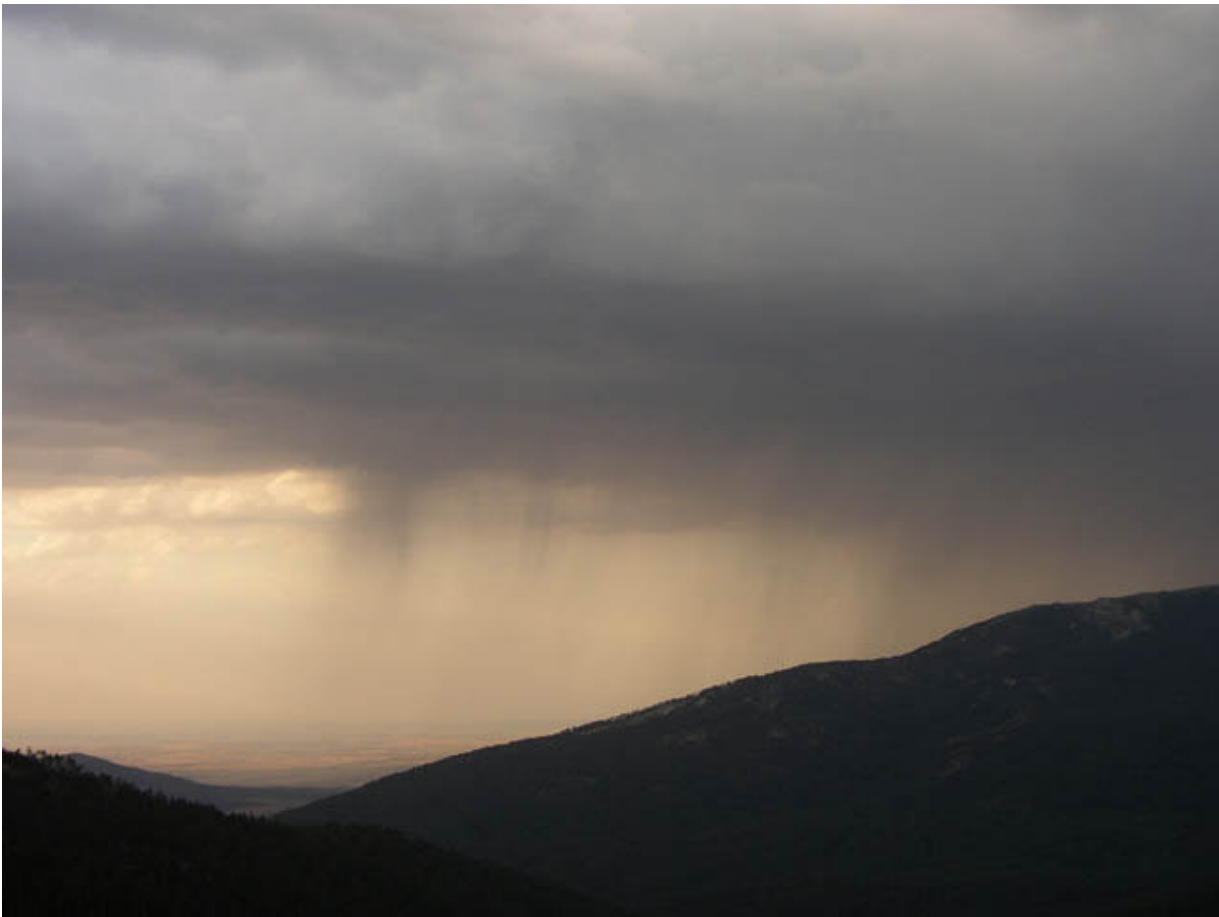
"Today in Cercedilla we finally had RAIN: a spectacular thunderstorm with about one bolt per second gave us a total 30,8 mm"

Data recorded by a DAVIS weather station at Cercedilla, Madrid on 21/08/2003::

Time	Out temp	Rain
14:30	32.5	0.00
15:30	32.2	0.00
16:30	32.1	0.00
17:30	31.2	0.00
18:30	28.6	0.00
19:45	27.3	0.00
20:45	24.6	0.00
21:45	22.6	0.00
22:00	21.7	0.20
22:15	20.2	4.40
22:30	17.2	0.60
22:45	14.4	6.80
23:00	14.4	14.00
23:15	13.7	4.20
23:30	14.0	0.40
23:45	14.0	0.00
0:00	13.9	0.00

Some of the pictures taken by JoseV. that afternoon in the Guadarrama district:





Rayo (rayo@spainsevereweather.com). Text and pictures:

"It was between 8 and 9 p.m. – a multicell dropping its load over Somosierra, in the northern Madrid Region. The pictures show all the same cell, but there were other cells too, both right and left of it, creating a light squall line.

The microfront of this multicellular system interacted with another well-organized microfront from the massive storm conglomerate located above the Cuenca and Ciudad Real provinces, south of Madrid, in such way that after 10 p.m. moderate convection with electrical activity developed over the capital city, where there was nothing only fifteen minutes before. All the pics show the Cb Arcus or shelf cloud, in the shape of longish dark cloud at the base of middle section of the Cb, which reveals its severe nature"









Pictures of lightning:

Late in the night – between midnight and 2:00 a.m. – the storm activity extended to other areas of the Madrid Region. Some people had the chance to capture on film one of the most dramatic weather events at night: cloud-to-ground lightning. Some examples:

- Coslada, Madrid – Photo by Fran (Mammatus)



- Hortaleza, Madrid – Photo by José A. Quirantes (Rayo)



- Villalba, Madrid - Photo by Alberto Lunas



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SSW-Team member
JULY 14 2004

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