MICROBURST ON THE REGION OF TORRELAVEGA (Cantabria)

07/09/2004

Made by Chimpún

Date: September, 7th, 2004
Exact hour: 17.30 - 18.00 hours
Temporary extension of the storm: between 16.45 and 23.50 hours
Concrete place: Municipality of Torrelavega, between Torrelavega and Polanco (Cantabria)
Extension of the storm: a storm front with a length of about 30 km, with direction S-N, and with a wide of about 10km, with direction W-E

The day woke up so sunny, although with sultry weather: in Cabezón de la Sal (about 12 Kms to the West in straight line from where the microburst took place) there was a temperature of 27,2º with an humidity of 81% at 14h. Immediately, a Cu Congestus began to be distinguished in South-Western direction, that with an amazing speed transform into a CB incus. In fact, "the expansive wave" of the Incus arrived at Cabezón when the sky was still without clouds in a precious and strange spectacle:

Figure 1

Fig 2

That morning the Santander sounding indicated similar values to those of Cabezón in surface and some other interesting data like -12º near to 500 hPa, -46º near of the incus level, which I give about 10,000 meters of height; also it is remarkable the wind changes that in surface was from the East (80º) to later turn little by little until the Southwest (215º) at 850 meters of height. Sounding of Santander that noon:

Fig 3

08023 santander observations at 12Z 07 sep 2004

PRES hPa	HGHT m	TEMP C	DWPT C	RELH %	MIXR g/kg	DRCT deg	SKNT knot	THTA K	THTE K	THTV K
1009.0	59	24.2	21.3	84	16.08	80	5	296.6	343.2	299.4
1007.0	75	23.4	13.4	53	9.68	92	5	296.0	324.2	297.7
1000.0	129	23.4	13.4	53	9.75	135	5	296.6	325.0	298.3
925.0	805	20.2	9.2	49	7.95	215	6	300.0	323.7	301.4
897.0	1069	18.6	8.0	50	7.54	160	9	300.9	323.6	302.3
850.0	1531	15.8	5.8	51	6.85	160	13	302.7	323.5	303.9
810.0	1939	14.0	3.0	47	5.90	151	17	305.0	323.1	306.1
785.0	2198	11.8	1.6	50	5.51	145	19	305.3	322.4	306.3
726.0	2845	6.2	-1.8	57	4.64	115	17	306.1	320.6	307.0
700.0	3147	3.6	-3.4	60	4.27	115	19	306.4	319.9	307.2
683.0	3345	1.8	-4.2	64	4.13	115	20	306.6	319.6	307.4
666.0	3549	0.0	-5.0	69	3.98	123	21	306.8	319.4	307.5
634.0	3936	-2.3	-7.2	69	3.53	140	23	308.5	319.8	309.1
618.0	4137	-3.5	-8.3	69	3.31	130	26	309.3	320.0	310.0
553.0	5010	-8.8	-13.3	70	2.49	120	24	313.1	321.4	313.6
536.0	5255	-10.3	-14.7	70	2.29	141	22	314.1	321.8	314.6
529.0	5357	-9.9	-19.6	45	1.54	150	21	315.8	321.1	316.1
526.0	5401	-9.7	-21.7	37	1.29	150	21	316.5	321.0	316.8
518.0	5519	-10.5	-26.5	26	0.85	148	20	316.9	320.0	317.1
506.0	5699	-11.7	-21.7	43	1.34	146	19	317.6	322.3	317.9
501.0	5775	-11.7	-29.7	21	0.65	145	18	318.5	320.9	318.7
500.0	5790	-11.7	-29.7	21	0.66	145	18	318.7	321.1	318.8
489.0	5961	-13.1	-27.6	28	0.81	135	19	319.1	322.0	319.2
484.0	6039	-13.7	-26.7	33	0.89	138	18	319.2	322.4	319.4
467.0	6310	-15.3	-36.0	15	0.38	150	16	320.5	321.9	320.6
437.0	6813	-18.3	-53.3	3	0.06	173	20	322.9	323.1	322.9
428.0	6967	-19.5	-51.4	4	0.08	180	21	323.3	323.6	323.3
400.0	7470	-23.3	-45.3	11	0.17	170	31	324.6	325.3	324.6
399.0	7488	-23.4	-45.6	11	0.16	170	31	324.7	325.4	324.7
364.0	8151	-28.1	-56.1	5	0.05	174	26	327.1	327.3	327.1
321.0	9028	-36.0				180	18	328.1		328.1
300.0	9500	-40.3				180	21	328.4		328.4
293.0	9661	-41.9				177	23	328.4		328.4
287.0	9799	-43.0				175	24	328.8		328.8
269.0	10231	-46.4				150	26	329.9		329.9
250.0	10720	-50.3				170	27	331.1		331.1
238.0	11037	-52.4				180	27	332.7		332.7
227.0	11341	-54.4				175	26	334.2		334.2
219.0	11572	-55.9				160	31	335.3		335.3
214.0	11719	-55.7				150	35	337.8		337.8
209.0	11870	-55.5				160	30	340.4		340.4
204.0	12024	-55.3				144	27	343.1		343.1
200.0	12150	-56.1				130	24	343.8		343.8
198.0	12213	-56.5				120	24	344.1		344.1
186.0	12605	-59.2				135	25	346.0		346.0
182.0	12741	-60.1				140	28	346.6		346.6
168.0	13245	-57.5				165	38	359.0		359.0
160.0	13552	-55.9				200	30	366.7		366.7
154.0	13792	-54.7				173	15	372.8		372.8
152.0	13876	-54.5				164	9	374.6		374.6
150.0	13960	-54.9				155	4	375.3		375.3
135.0	14625	-57.2				140	3	382.7		382.7
126.0	15060	-58.7				140	8	387.5		387.5
109.0	15974	-61.9				15	10	397.9		397.9
100.0	16510	-60.7				50	11	410.2		410.2
94.0	16897	-60.5				45	10	417.8		417.8
92.0	17031	-60.5				65	11	420.5		420.5
89.0	17239	-60.4				40	4	424.7		424.7
86.0	17453	-60.3				25	10	429.1		429.1
83.0	17675	-60.2				45	19	433.7		433.7
80.0	17905	-60.1				70	14	438.5		438.5
75.0	18309	-59.9				80	5	447.0		447.0
72.0	18564	-59.8				100	19	452.5		452.5
70.0	18740	-59.7				130	15	456.3		456.3
69.0	18830	-59.6				140	5	458.5		458.5
68.0	18922	-59.5				75	2	460.6		460.6
67.0	19015	-59.3				355	11	462.9		462.9

Later, the storm passed through the south of my position re-fed itself per moments and as it was situated to the south it caused that the sky was darkened in a brief time interval on Cabezón de la Sal:

Fig 4

Fig 5

And also on Torrelavega-Polanco (photography of Jose Ramon Palleiro):

Fig 6

The rays were filling the sky and about 17.45 h took place the microburst on the environs of Torrelavega, whose graphic document we have thanks to Jose Ramon Palleiro in a magnificent panoramic.

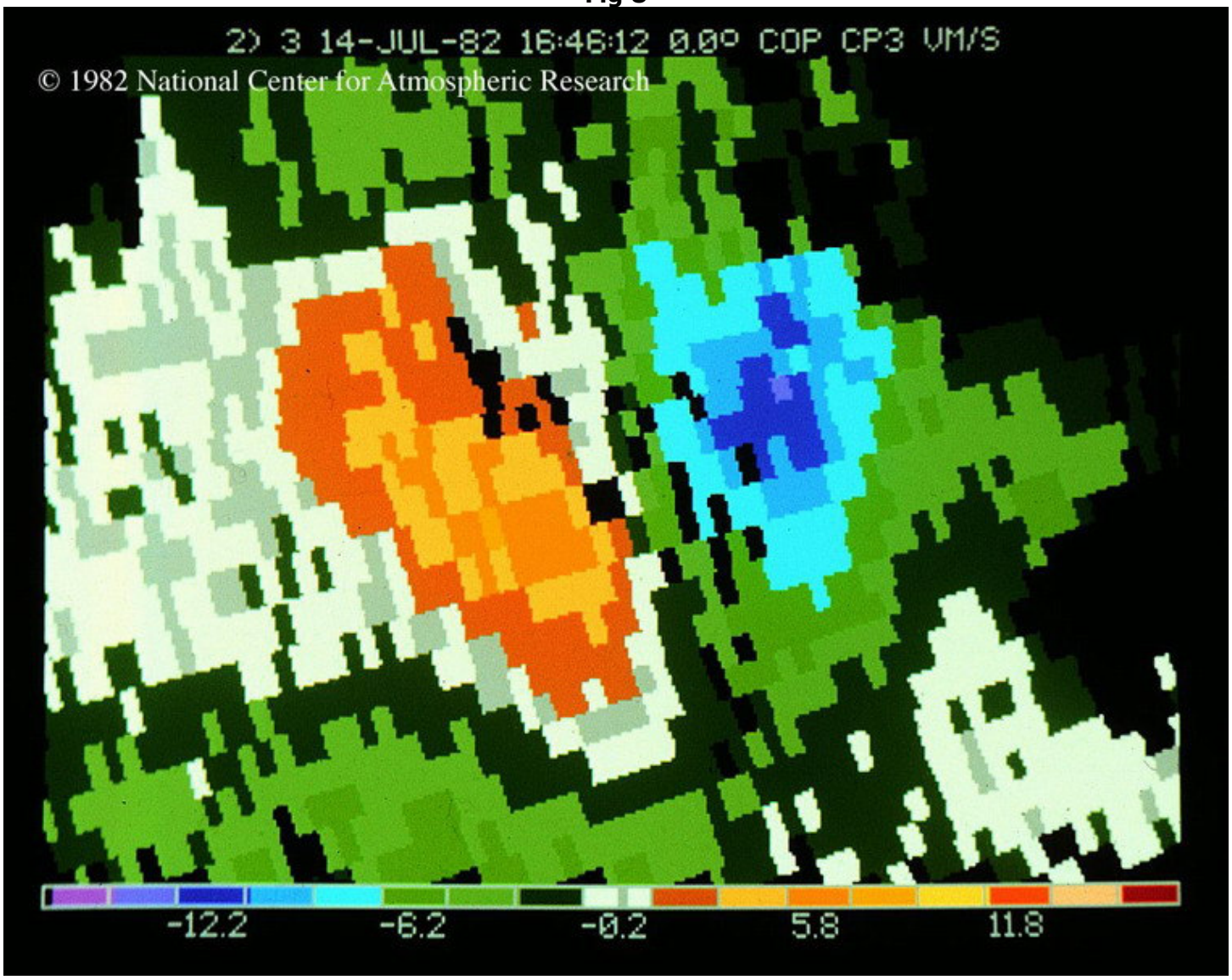
Fig 7

The damages were suffered by fruit trees and greenhouses in the zone, it fall hail of 2mm.

Let us remember that in microburst take place descendent air currents along with abundant precipitations gathered in a space not very ample. That collapse of cold air and precipitation on a relatively small area produces very strong winds with variable direction, but eccentric in general, when hitting against the ground. Frequently it can be appraised a backward movement whirl towards the place from where the wind comes. Naturally this phenomenon is feared so much for the pilots and it has convert in the guilty of diverse flight accidents mainly in the approach manoeuvres to the airports and in the landings. The studies on this phenomenon made by diverse professionals like Fujita (1985) - yes, the one of the tornado scale -, Caracena (1987) or Batchelor (1970), has shown us some extraordinary data like the fact that inside the microburst there were areas of maximum pressure with an extension of 1km2 in which the pressure can ascend up to 2 mb in seconds. This phenomenon is not distinguishable with a conventional radar, it is needed a Doppler and even so it is difficult to see and, of course, to forecast. In addition, they dissipate with certain rapidity. This year we have had a possible macroburst in Andújar with very strong winds that demolished mud walls and moved cars, and also in the Spanish East.

Here you have an image of a Doppler registering the microburst; it is taken from the NOAA:

Fig 8

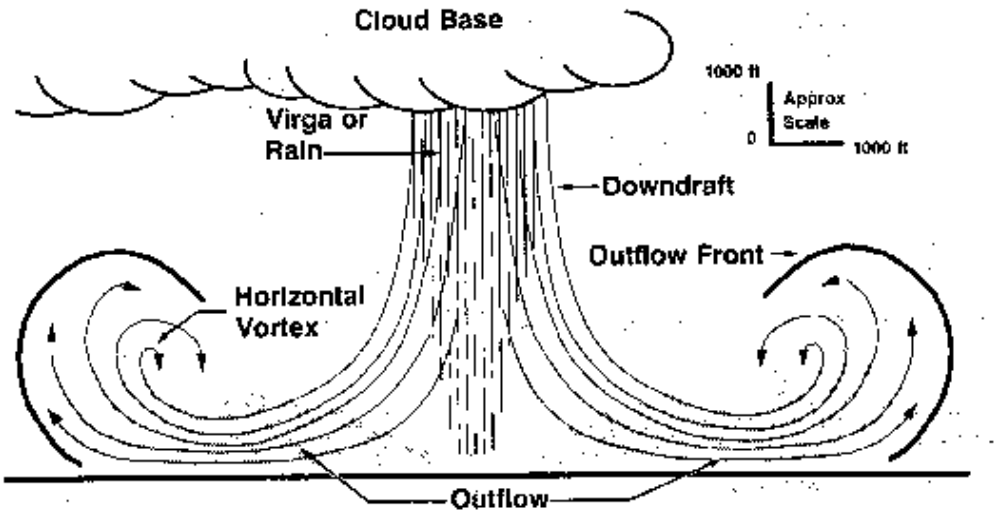


And here an image of the phenomenon in its entire splendor with imposing winds, sometimes is confused with a tornado:

Fig 9

and a drawing of the phenomenon:

Fig 10



How we know that the collapse of Torrelavega is microburst and not macroburst? Because if we

take into account the scale elaborated by Fujita, a microburst has a maximum of 2.2 miles of diameter, about 4 kilometers. And evidently in the photo the scale for which knows the zone, indicates to us that it must have 2 or 3 Km. In the picture, the most interesting thing is without a doubt the "winding" of the precipitation to the left, typical of these cases, and also the collapse of the cloud following a vertical line. Also it is frequent that takes place great electrical apparatus during and after the collapse, as soon we will see. Like curiosity, we have to know that sometimes they have produced dry microbursts, coming from diverse clouds with virgas.

Returning to our episode, later, the storm was intensified, extending to the north and the west and beginning a long series of electrical discharges in western side of the storm:

Fig 11

Fig 12

Fig 13

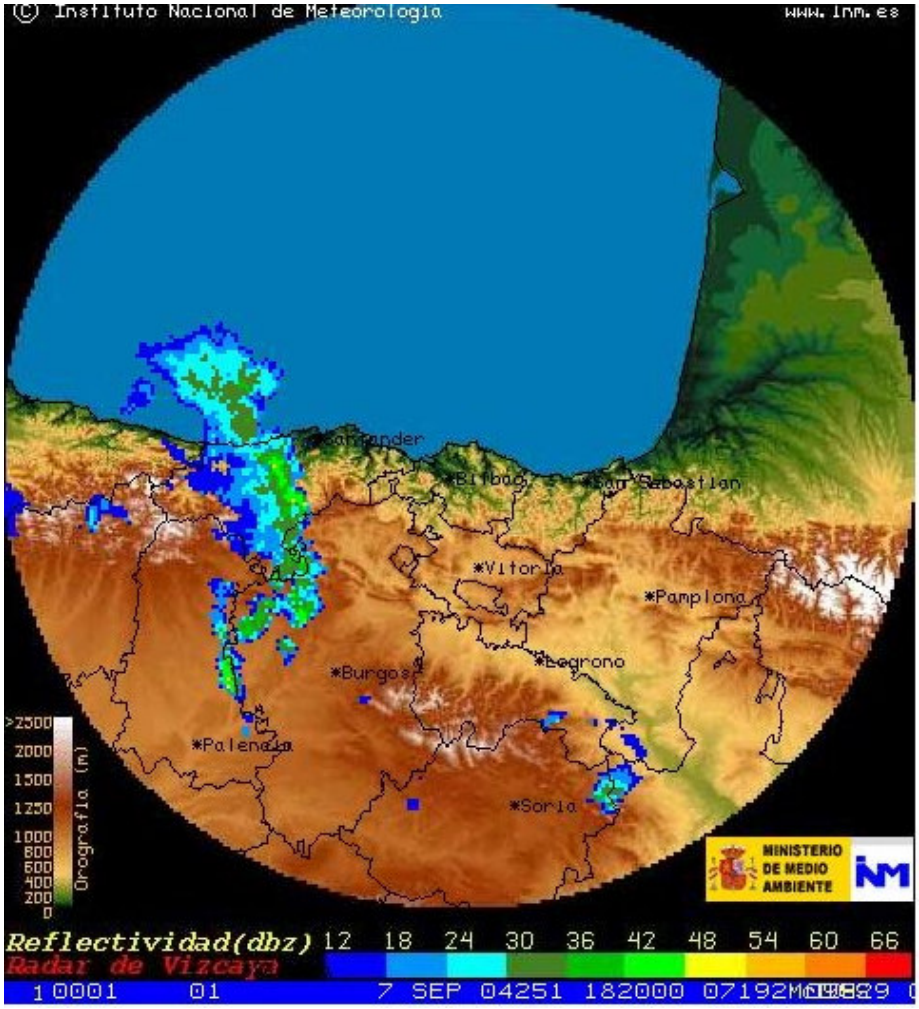
Fig 14

Fig 15

Fig 16

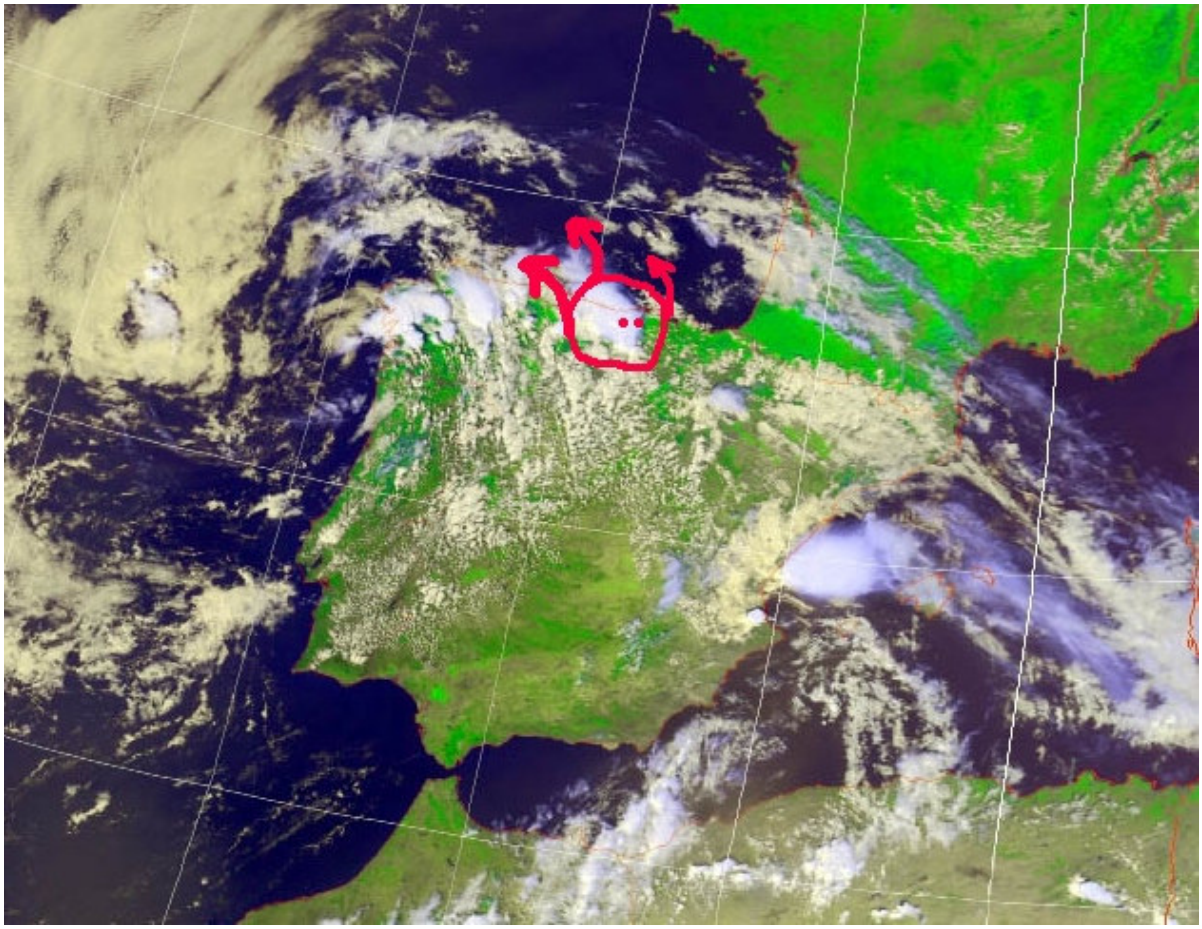
All those rays take place in the back part of the storm and a little later of the microburst; concretely, according to the camera EXIF, between the 23.00 and the 23.47 of that night. Let us see the radar of 8:30 p.m:

Fig 17



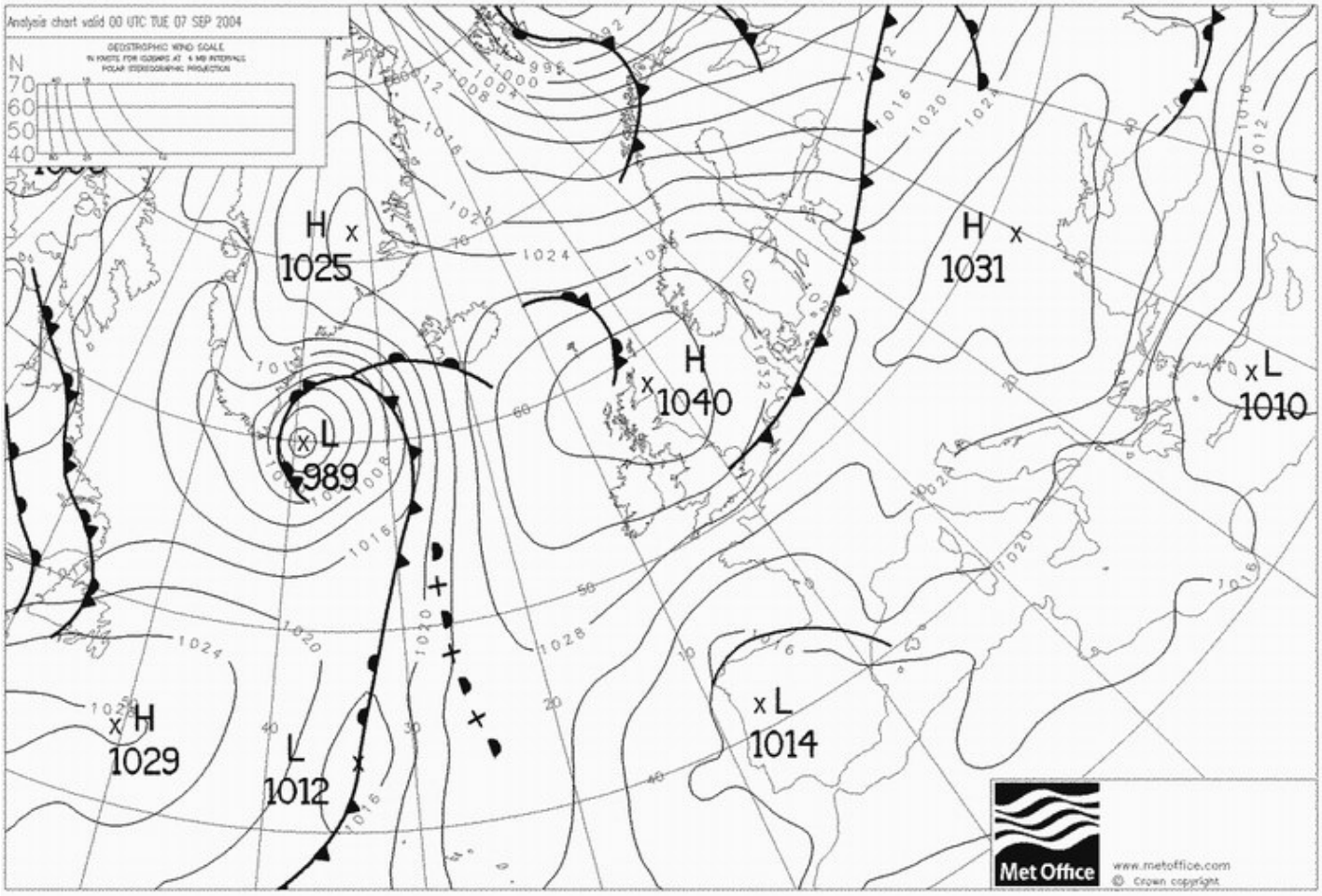
And this is the situation in a satellite image of that day about 4 of afternoon; the image is taken a little before the one from the previous radar, that is to say, the storm reactivated more to its contact with the Bay of Biscay that was that day, according to the maps of the ocean temperature, over 22º, that is to say, it generated abundant evaporation to be this zone. In red I mark the later development of the storm, and the central points correspond to the situation for the photographs of Jose Ramon Palleiro (Eastern) and my situation (Western). The photo also tells us about the high altitude reached by the evolution clouds; more white when higher:

Fig 18



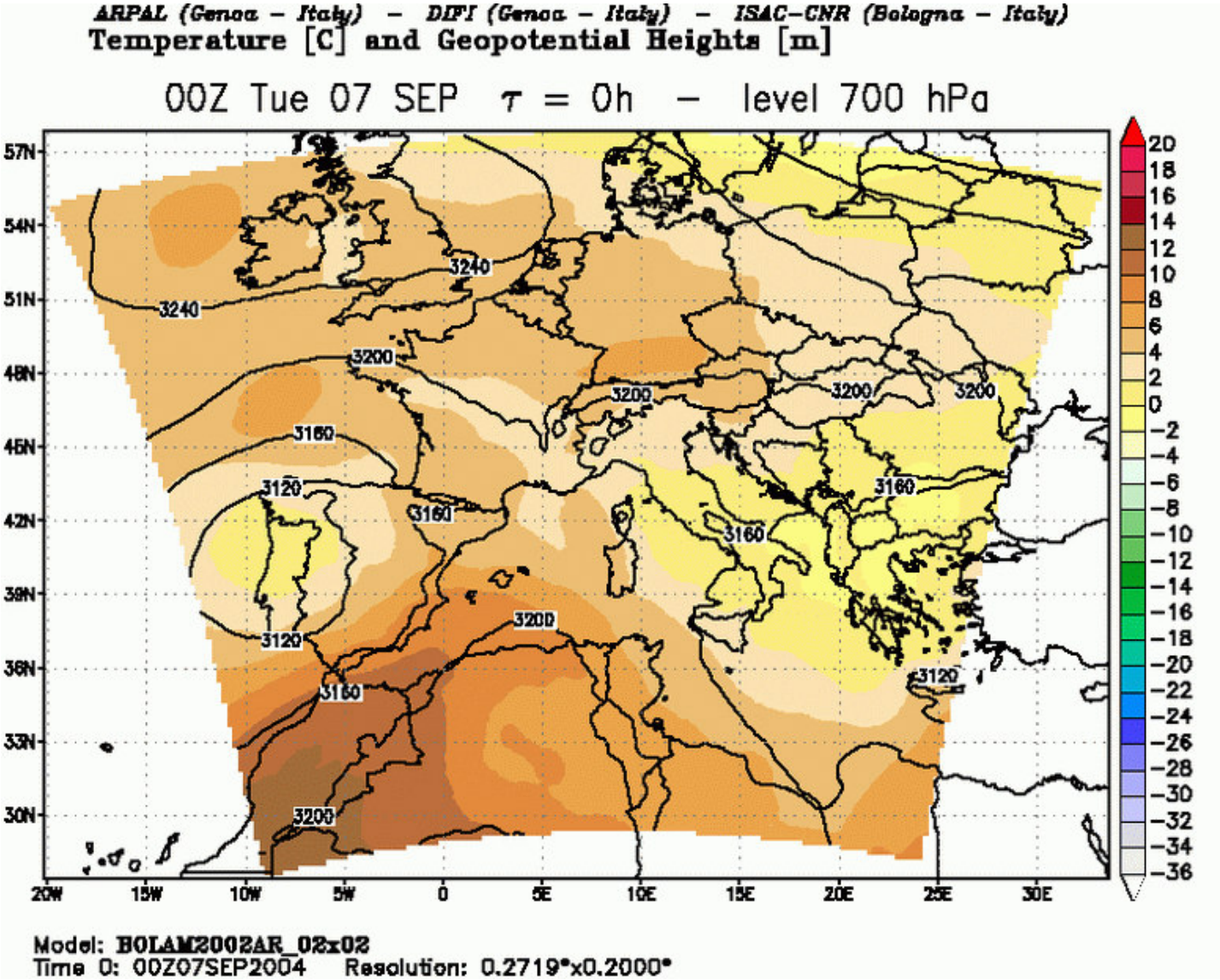
This is the analysis map made by UKMO for that night (00 UTC) in which we see relative lows on the peninsular North and West:

Fig19



And here a map of the situation at 700hPa (about 3200 meters of height, although the height for the 700 hPa in the case that occupies to us was exactly of 3,147 meters according to the sounding of Santander, is to say a cold air bubble over the peninsular Northwest that appears reflected in the BOLAM map):

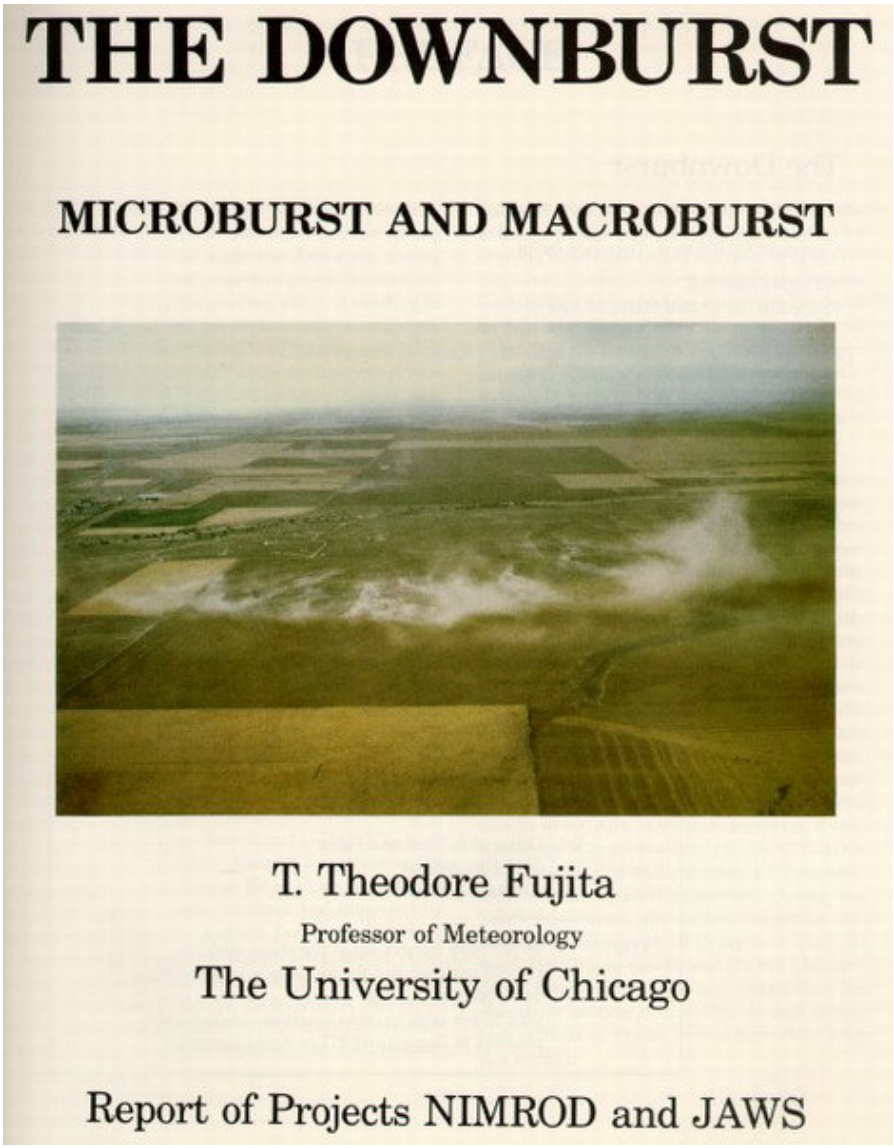
Fig20



This small cold air bubble along with the dynamic forcing of that day and the high temperature of the sea for these latitudes caused that the evolution clouds gave rise to great storms during four or five consecutive days.

For the curious, and to finish, here you are the reference book that Theodore Fujita wrote about micro and macroburst; by the way in its cover we can appreciate a dry-microburst or dry collapse, that also exist, but I leave it for another day:

Fig 21



I hope that this small report help you to understand a little more this beautiful and unforeseeable phenomenon of downburst or collapse.

A greeting

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