



Exceptional weather events

**Type of event:
Heavy Rainfall**

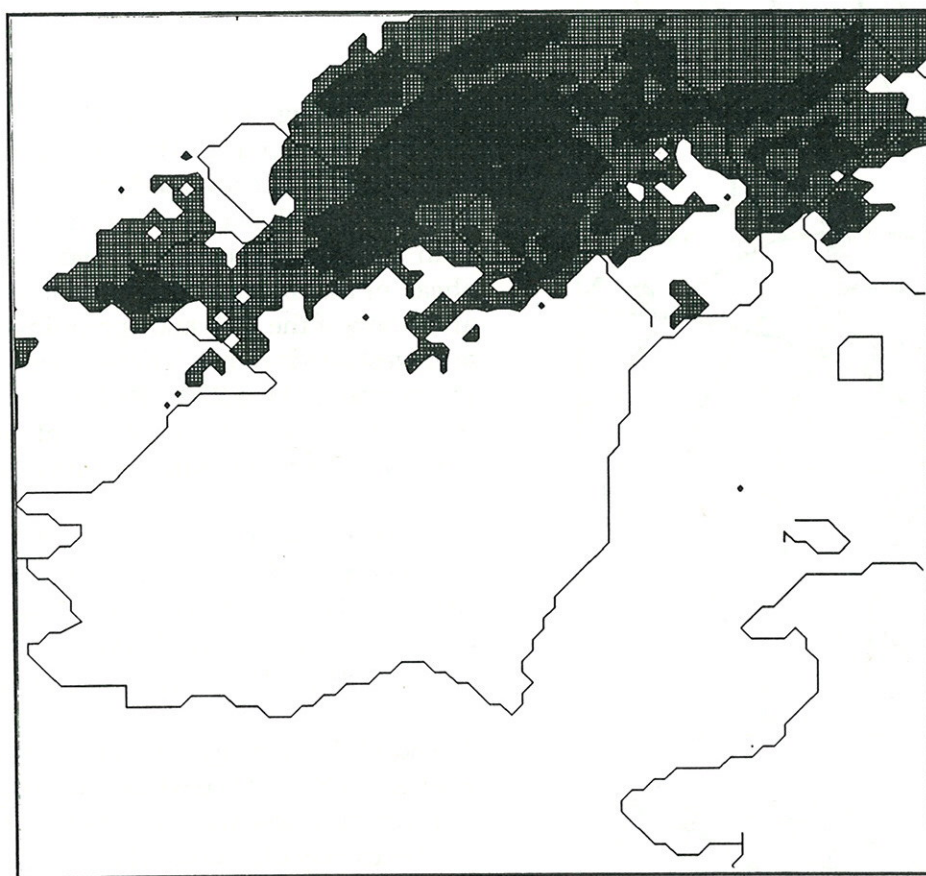
Date:

October 1989



Heavy Rainfall in the West and Northwest of Ireland

27th and 28th October 1989



Radar rainfall display 0900UTC on 27th

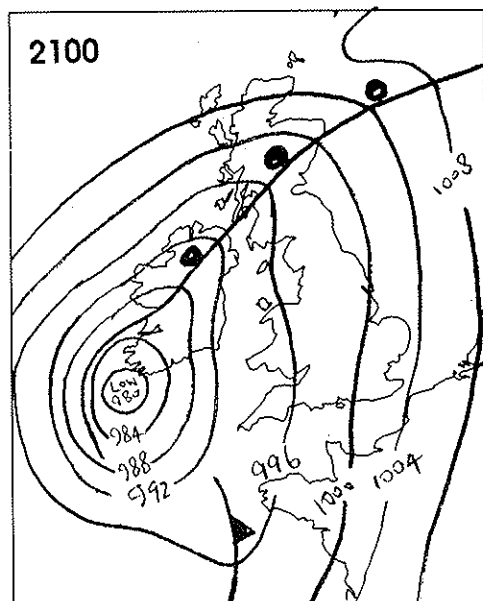
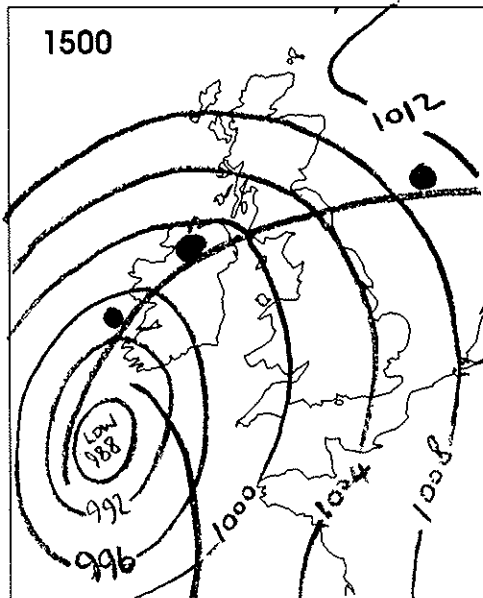
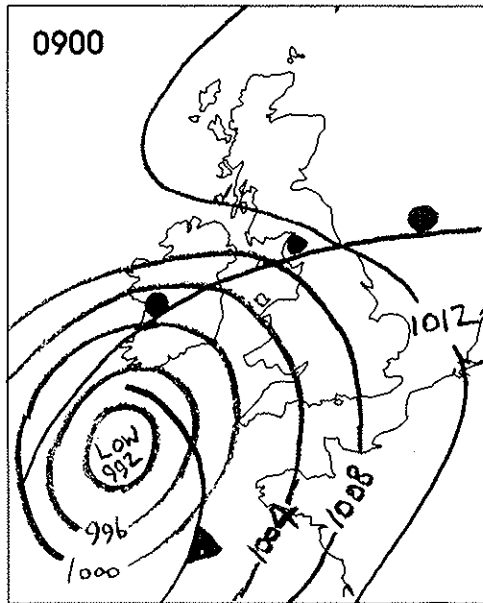
A report from the

CLIMATOLOGICAL DIVISION

November 1989

Meteorological Service

Friday 27th



A wet weekend in the west and northwest

On the evening of Thursday the 26th, a deepening depression moved slowly towards the south of the country. The southwesterly winds became variable in direction and then easterly as the warm front associated with the depression approached. As usual the rain was ahead of the front, reaching the south coast late on the afternoon of the 26th and spreading slowly northwards and westwards to reach the extreme northwest early on the morning of the 27th. Radars showed some very intense rainfall within the band of rain ahead of the front. Behind the front the rain became more intermittent.

The warm front marked the boundary between cooler air to the north and muggy, humid air from the South Atlantic. The difference in the air masses can be seen in the fact that on 27th while Rosslare had a temperature of 13°C at 0900, at Belmullet it was only 5°C.

Ahead of the front winds were easterly or northeasterly whereas behind it the wind was from a southeasterly direction and so tended to push the front in a northwesterly direction. However, with a deepening depression approaching the southwestern corner of the country, winds ahead of the warm front became more northerly during the day with the result that the progress of the front became very slow as is shown on the synoptic maps for 27th. This accounts for the fact that the position of the main cloud band changed relatively little between 0900 and 1500. The front retained its activity so that a band of persistent rain became slow-moving over the west and northwest late on the 27th.

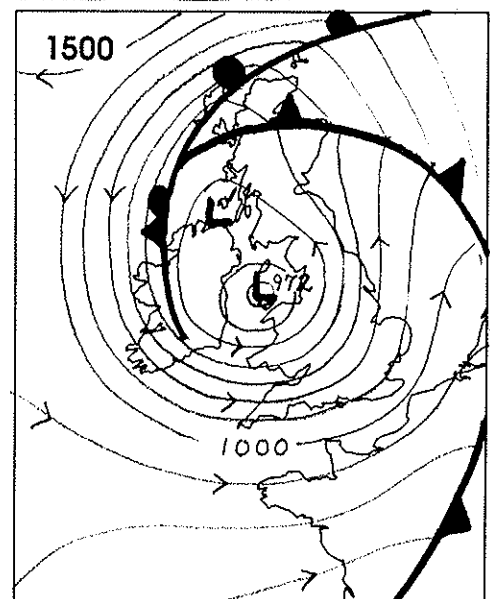
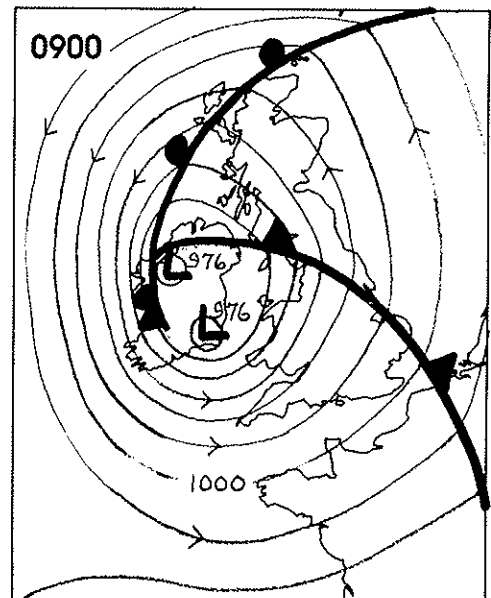
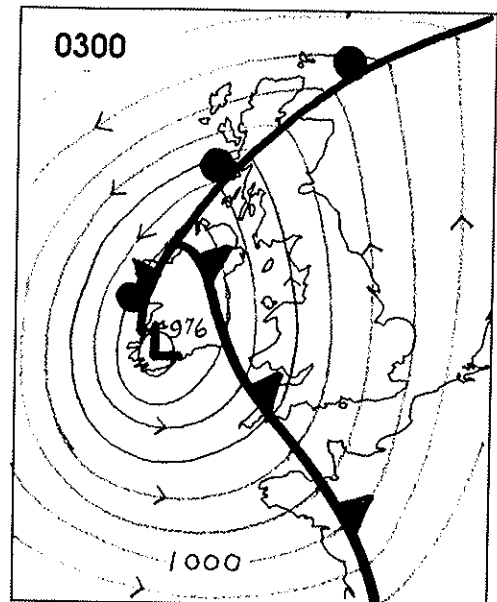
Saturday 28th

In the early hours of 28th the depression centre was just on Cahirciveen (Valentia Observatory) and it turned eastwards to be over Rosslare about 0900; it then turned northeastwards up the Irish Sea to be over Anglesey at 1500. The charts for Saturday 28th also show that a secondary depression developed over the northwest of Ireland and had the effect of sparing the north and east from the worst of the very strong winds to the west and south of the main low-pressure centre.

Early on 28th we had persistent rain near the southwest, west and north coasts and also in the northeast; elsewhere outbreaks were more sporadic but were locally heavy. As the main low pressure area moved eastwards persistent rain spread eastwards in Munster. The development of secondary depressions over the northwest prevented any clearance in the west while causing a clearance in the northeast and near the north coast in the afternoon. The secondary depressions filled in the late afternoon and early evening and the band of rain over the west and south started to move slowly northeastwards but became less intense. A clearance reached the southwest about mid-afternoon but did not reach the extreme north and northeast until the early morning of 29th when the next belt of rain was already affecting the southwest.

In this rainfall event amounts ranged from about 20 to 30 millimetres in parts of the southeast and east to over 130 mm in parts of the west and northwest. Even in the worst affected areas there were local variations with Galway having 61 mm, Claremorris having 92 mm and Belmullet over 130 mm. As there was flooding in parts of the west and northwest a fuller discussion of the falls there is given in this note.

A northerly gale affected some western coastal areas late on 27th; this veered northwesterly on 28th and with the main low moving eastwards the gale affected Munster. Winds in Munster reached gale to strong gale force for a time and reached storm force at Roches' Point. Maximum gusts in Munster reached 60-70 knots (1 knot = 1.15 m.p.h) with gusts of 70 to 75 knots at coastal stations. On the west coast Belmullet had a maximum gust of 65 knots. The development of the secondary depression saved the rest of the country from such severe winds but nevertheless gusts of 40 to 55 knots were recorded.



Daily Rainfall Values in the West and Northwest

Over 100 millimetres of rain fell in the 24 hour period 09 hours 27th to 09 hours 28th over a large area of Mayo and rather less widely in Donegal (see map). Such daily rainfall amounts are rare in Ireland: for example in Mayo 118 millimetres of rain were reported at Crossmolina (Castlehill) and 113 millimetres at Ballina. These 1 day rainfalls are far in excess of any other 1 day rainfalls in this area since records began there in 1944. One of the highest 1 day falls previously reported is 81.5 millimetres at Cloonnacool, Lough Easkey in August 1970. Other high 1 day falls in the area are in the range 75-80 millimetres and they occurred in 1959 and 1970. In Co. Donegal 1 day falls of over 100 millimetres were reported at Gweedore, Ardara and Glencolumbkille, and as was the case in Co. Mayo these 1 day falls are also in excess of previous highest 1 day falls.

Short Duration Rainfalls

The following rainfall amounts were recorded at Belmullet in the specified durations during the 27th and 28th

	<i>Duration in Hours</i>								
	1/2	1	2	3	4	6	12	24	36
27th	5.0	7.8	15.2	19.6	21.9	27.7	53.0	--	--
28th	--	9.0	15.0	20.1	23.9	26.5	47.5	87.3	130.5

The 24 hour fall at Belmullet surpasses the previous highest fall of 64.8 millimetres (records began in 1957). Examination of the rainfall chart at Glenties shows a similar pattern as the Belmullet chart and has comparable falls in the durations 30 minutes to 24 hours.

Period 26th to 28th

Rainfall charts at Belmullet show the rain commenced after 5 a.m. on 27th and continued until about 8 p.m. on 28th, giving a total of about 40 hours of almost continuous rain. Unfortunately locations reporting the highest rainfall amounts only take readings once per day and the 40 hour period is spread over 3 recording days (see rainfall charts at Belmullet). The following daily totals were reported at the specified locations in the 3 day period 26th to 28th, and are as a result of the slow approach and passage of a single depression.

Co. Mayo	<i>BALLINA</i>	<i>CROSSMOLINA</i>	<i>ATTYMAS</i>	<i>BELDERRIG</i>
26TH	8.7	7.0	18.6	15.5
27TH	102.7	118.4	108.6	106.3
28TH	18.5	31.4*	15.6	59.3

* Cumulative for 28th and 29th.

Co. Donegal	ARDARA	GWEEDORE	GLENCOLUMBKILLE	DERRYHENNY
26TH	6.0	2.8	12.1	6.2
27TH	101.5	101.9	106.7	91.5
28TH	13.4	20.5	31.2	11.2

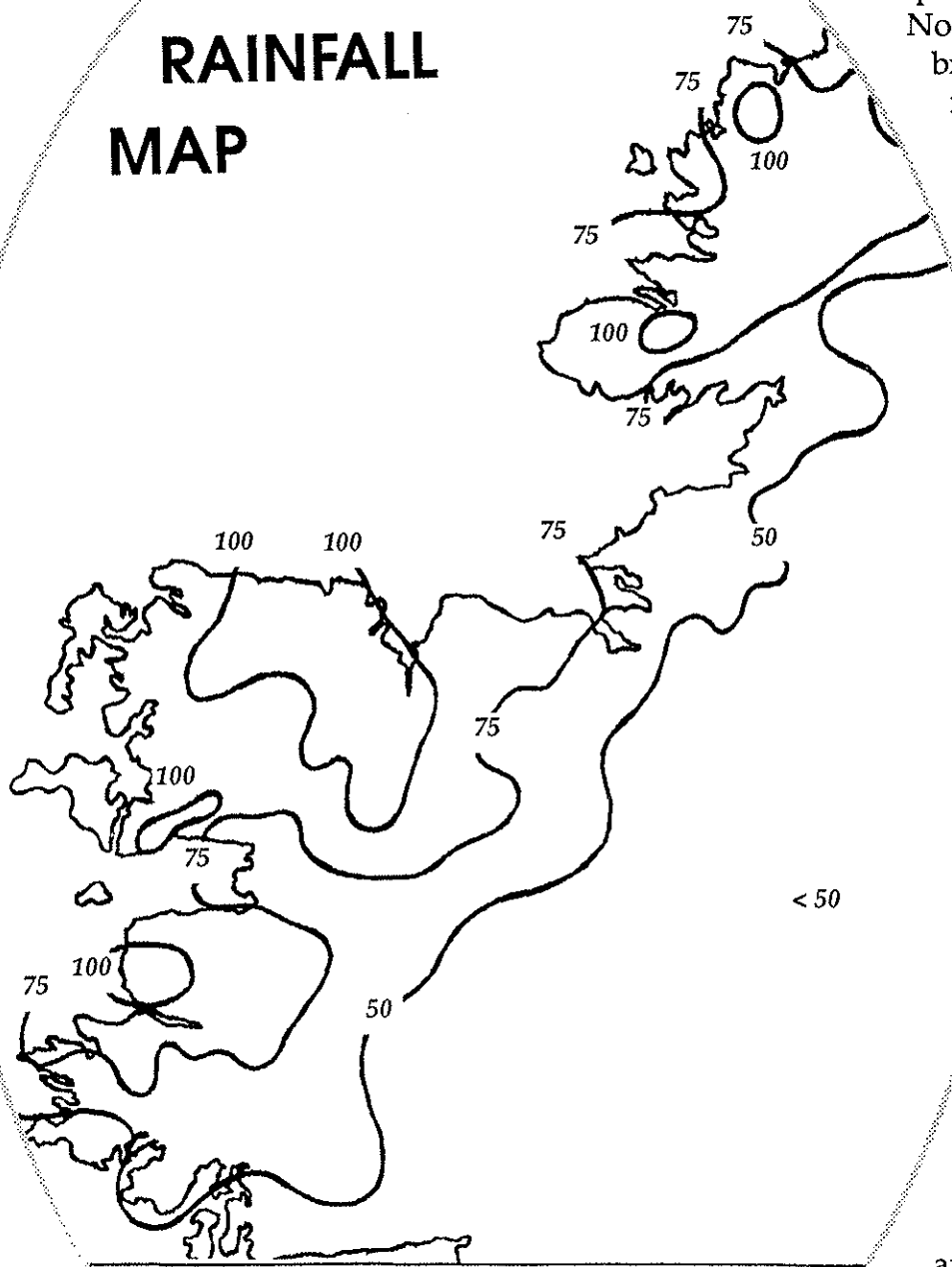
Clearance on 28th

By 17 hours on the 28th the depression had moved into the North Irish Sea (see chart) bringing a strong west to northwest airflow over the country. A clearance quickly followed in the west.

Conclusion

A significant feature of this event was the persistence and duration of the rainfalls. The shorter duration falls, for periods less than 12 hours, are not significant. However the 1 day rainfall amount has a return period in excess of 100 years at a number of locations. A similar notable rainfall occurred in the southwest on 1st and 2nd of November 1980, and on that occasion 154.2 millimetres of rain was recorded at Valentia in a 36 hour period. While failing to reach this record level for a lowland station, the 36 hour total of 130.5 at Belmullet is easily a station record and a most unusual rainfall event.

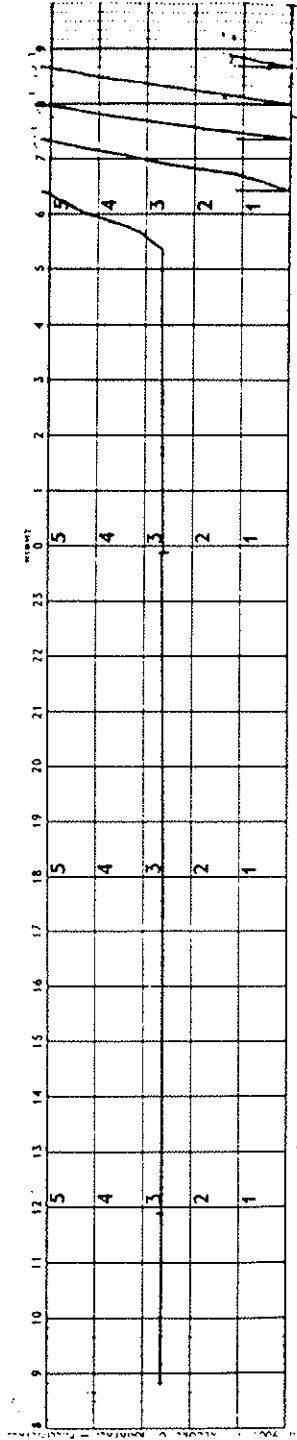
RAINFALL MAP



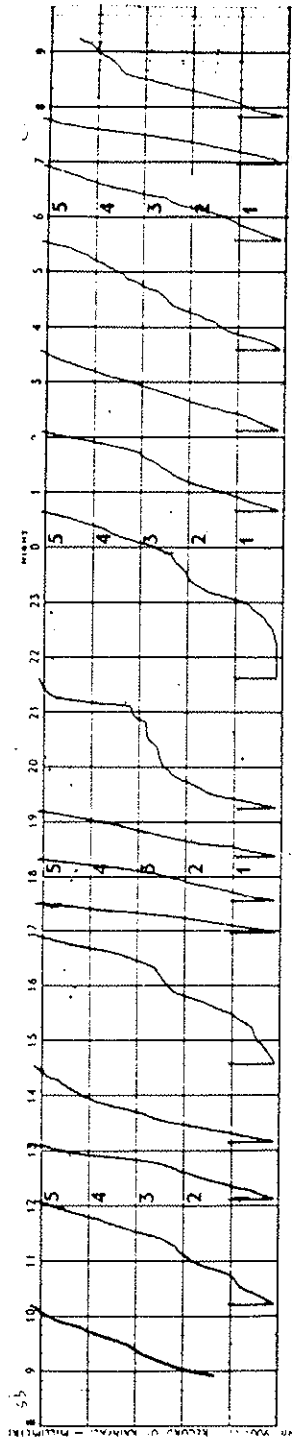
24-hour Rainfall

0900 27.10.1989 to
0900 28.10.1989

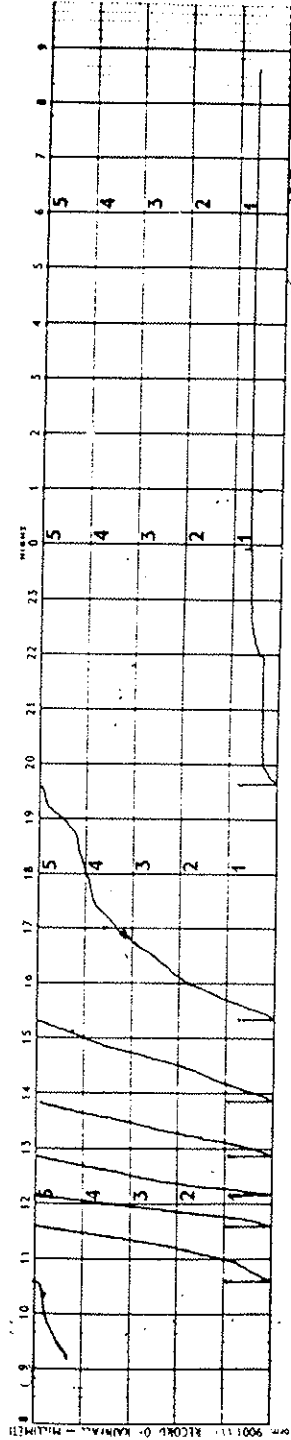
Rainfall Charts for Belmullet Co. Mayo



26/27 October: Heavy rainfall starts at about 0530 UTC on the morning of the 27th at a steady rate of about 10mm per hour.



27/28 October: Rainfall continues all day through the 27th and on to the 28th with a maximum rate of fall of 14mm per hour at 1800 UTC. Although the maximum rate of fall was not unusually high, the downpour was continuous.



28/29 October: Continuous heavy rain through to mid-afternoon on the 28th with a maximum fall of 13mm per hour at 1300 UTC. The rainfall then became moderate to light and intermittent, dying out before midnight.