

# METEOROLOGICAL SERVICE



## JANUARY 1987 AGROMETEOROLOGICAL BULLETIN

### The Weather of January

A trough of low pressure at the beginning of the month was replaced by a ridge early on 3rd. This in turn was succeeded by a spell of rain and mild air on 4th. Post frontal northwesterly winds on 5th were followed by high pressure on 6th and 7th. Freshening southerly winds on 8th preceded a trough bringing another spell of rain.

The trough, however, weakened over Ireland and the country came under the influence of an easterly airflow generated by an anticyclone centred over Scandinavia and an extensive depression over the Mediterranean. This bitterly cold easterly airflow caused intermittent but extensive snow falls and blizzard conditions in the period 10th to 16th. Southern, midland and eastern areas were worst affected on the 14th. Both air and ground temperatures reached very low values and because of the strong easterly winds, the wind chill factor was considerable.

A pocket of warm air swept off the Mediterranean system was advected westwards over the country on the night of 14/15th and a sustained weak thaw set in. However it was not until the onset of milder southerly air from the Atlantic with rain on the 16th that general melting of snow took place over subsequent days.

High pressure again returned and became centred over the country; this time, however, mild air circulated about the high and subsequent weather was remarkably mild, dry and cloudy with mist or fog prevailing. As the centre of high pressure slipped in over Europe a relatively mild southeast airflow developed.

#### **Precipitation:**

Amounts were well below normal everywhere, varying from 13% of normal at Casement Aerodrome to 80% at Dungarvan (Carriglea). The wet spells occurred on 1st-5th, 8th-14th (snow) and in particular 17th-19th when daily amounts of 20-25mm were recorded in southern areas. Depth of snow (before drifting) varied from 190mm at Dublin Airport and 80-120mm in the midlands to 30mm in southern areas and zero in the southwest; some large drifts of 1m-2m were reported facing northeastern barriers. Little or no rain was recorded from 21st.

#### **Temperature:**

Mean daily air temperature was also well below normal; values varied from 0.5°C below at Shannon Airport and Kilkenny to 1.6°C above at Belmullet. A temperature of -9.2°C was recorded at Mooncoin (Siverspring) on the 13th. Air frost was widespread on 3rd/4th, 7th/8th, 11th/15th and 28th/31st. Ground frost was also widespread except in the spell 17th-21st; an absolute minimum of -17.0°C occurred at Mooncoin (Siverspring) on the 13th. An increasing range between the day-time maximum and night-time minimum was also in evidence by the end of the month. Lowest 5-day mean soil temperature (100mm for 11th-15th) was -0.1°C at Claremorris.

#### **Sunshine and Radiation:**

Sunshine hours were well below normal except in the extreme west and north. Amounts varied from 51% of normal at Roche's Point to 144% at Belmullet. Global radiation was 79% of average at Kilkenny and 91% at Cahirciveen.

#### **Wind:**

Strong winds with gale gusts occurred mainly on 1st/2nd, 4th/5th, 8th (southern areas) and 11th to 14th.

#### **Summary:**

Very cold and dull, and very dry; blizzard conditions 11th to 14th.

The data contained in this Bulletin are provisional. Some of the material in Table 1 will be published in its final form in the Monthly Weather Report; final values of Global Radiation at stations in Table 2 will be published in the annual Solar Radiation Observations.

TABLE 1

JANUARY 1987

STATION	PERIOD	RAINFALL (mm)				TEMPERATURE (°C)														BRIGHT SUNSHINE		WIND				
		AMOUNT	% OF AVERAGE	RAIN DAYS	WET DAYS	AIR							GROUND			SOIL (10cm)				TOTAL NO. OF HOURS	% OF AVERAGE	MEAN SPEED (ms <sup>-1</sup> )	DAYS WITH GALE GUSTS	P.E. (PENMAN) (mm)		
						MEAN MAX.	MEAN MIN.	MEAN DAILY	DIFFERENCE FROM AVERAGE	LOWEST MIN.	DATE	DAYS WITH AIR FROST	DEGREE DAYS ABOVE 4.4°C	% OF AVERAGE	DEGREE DAYS ABOVE 10.0°C	% OF AVERAGE	LOWEST °GRASS-MIN*	DATE	DAYS WITH GROUND FROST						MEAN DAILY	DIFFERENCE FROM AVERAGE
Carlow (Oak Park) Co. Carlow	1-10	10.0	-	6	4	7.4	1.1	4.2	-	-4.8	7	4	12	-	0	-	-8.0	7	6	-	-	12.1	-	4.0	-	-
	11-20	19.5	-	5	4	3.4	-1.2	1.1	-	-7.7	14	6	9	-	0	-	-8.5	13	7	-	-	4.3	-	4.5	-	-
	21-END	0.0	-	0	0	6.1	1.0	3.5	-	-5.5	31	6	11	-	0	-	-9.6	31	6	-	-	21.0	-	1.1	-	-
	MONTH	29.5	36	11	8	5.6	0.3	3.0	-	-7.7	14	16	32	-	0	-	-9.6	31	19	-	-	37.4	-	3.2	-	0
Shannon Airport Co. Clare	1-10	20.0	-	6	5	7.9	2.8	5.4	-	-4.6	7	1	18	-	0	-	-8.2	7	5	4.6	-	16.8	-	5.3	4	-
	11-20	17.3	-	5	3	5.1	0.9	3.0	-	-7.2	13	4	18	-	1	-	-9.3	13	6	2.6	-	11.9	-	5.7	2	-
	21-END	0.0	-	0	0	7.4	3.6	5.5	-	-1.2	31	2	19	-	0	-	-4.7	31	4	4.5	-	26.4	-	3.6	0	-
	MONTH	37.3	40	11	8	6.8	2.5	4.6	-0.5	-7.2	13	7	55	73	1	-	-9.3	13	15	3.9	-0.8	55.1	105	4.8	6	8
Cork Airport Co. Cork	1-10	20.8	-	7	4	7.5	2.9	5.2	-	-2.4	7	1	15	-	0	-	-5.4	7	4	4.7	-	19.2	-	6.7	5	-
	11-20	56.3	-	6	3	3.9	-0.1	1.9	-	-8.0	13	5	14	-	0	-	-9.1	14	5	3.1	-	5.2	-	7.5	3	-
	21-END	0.9	-	1	0	6.0	3.5	4.8	-	-0.7	31	1	11	-	0	-	-8.1	31	3	4.6	-	6.2	-	6.1	1	-
	MONTH	78.0	53	14	7	5.8	2.2	4.0	-1.0	-8.0	13	7	39	58	0	-	-9.1	14	12	4.2	-0.1	30.6	53	6.7	9	8
Fermoy (Coolnekilla) Co. Cork	1-10	19.5	-	8	6	6.7	1.4	4.1	-	-2.5	7	3	10	-	0	-	-5.2	7	4	-	-	18.7	-	5.6	-	-
	11-20	47.9	-	6	4	3.6	-1.1	1.2	-	-8.3	13	7	11	-	0	-	N/A	7	-	-	-	4.1	-	5.9	-	-
	21-END	9.9	-	4	3	5.5	2.5	4.0	-	-2.6	31	2	7	-	0	-	-3.8	31	4	-	-	12.4	-	4.0	-	-
	MONTH	77.3	-	18	13	5.3	1.0	3.1	-	-8.3	13	12	28	-	0	-	N/A	15	-	-	-	35.2	-	5.2	-	1
Fermoy (Moore Park) Co. Cork	1-10	16.2	-	6	2	8.4	0.3	4.4	-	-6.9	7	5	17	-	1	-	-11.7	7	7	-	-	12.7	-	3.4	-	-
	11-20	31.5	-	4	4	4.6	0.3	2.5	-	-6.9	13	5	15	-	0	-	-9.7	13	7	-	-	6.0	-	4.1	-	-
	21-END	6.7	-	3	1	7.1	3.2	5.2	-	-3.6	31	2	17	-	0	-	-10.1	31	4	-	-	13.6	-	2.8	-	-
	MONTH	54.4	48	13	7	6.7	1.3	4.0	-	-6.9	13	12	49	-	1	-	-11.7	7	18	-	-	32.3	-	3.4	-	0
Roches Point Co. Cork	1-10	10.0	-	5	1	8.7	4.1	6.4	-	-0.5	7	1	23	-	1	-	-3.0	7	4	5.8	-	19.8	-	7.2	6	-
	11-20	41.1	-	6	4	4.6	0.9	2.8	-	-7.2	13	5	14	-	0	-	-9.4	13	5	3.8	-	4.9	-	7.8	5	-
	21-END	0.1	-	0	0	7.1	5.0	6.0	-	1.8	28	0	20	-	0	-	-0.3	31	2	5.5	-	7.0	-	5.4	2	-
	MONTH	51.2	50	11	5	6.8	3.4	5.1	-1.1	-7.2	13	6	57	66	1	-	-9.4	13	11	5.1	-0.8	31.7	51	6.8	13	13
Glencolumbkille Co. Donegal	1-10	67.4	-	7	6	7.2	3.1	5.1	-	-0.5	7	1	13	-	0	-	-4.6	8	3	-	-	N/A	-	5.6	-	-
	11-20	40.8	-	7	5	4.9	-0.3	2.3	-	-7.0	14	4	13	-	1	-	-10.5	14	8	-	-	N/A	-	4.4	-	-
	21-END	2.6	-	3	2	7.7	2.2	4.9	-	-2.0	29	3	18	-	0	-	-8.0	29	7	-	-	N/A	-	1.5	-	-
	MONTH	110.8	-	17	13	6.6	1.6	4.1	-	-7.0	14	8	45	-	1	-	-10.5	14	18	-	-	N/A	-	3.8	-	N/A



TABLE 1 (CONTINUED)

JANUARY 1987

STATION	PERIOD	RAINFALL (mm)				TEMPERATURE (°C)														BRIGHT SUNSHINE		WIND				
		AMOUNT	% OF AVERAGE	RAIN DAYS	WET DAYS	AIR							GROUND				SOIL (10cm)			TOTAL NO. OF HOURS	% OF AVERAGE	MEAN SPEED (m/s)	DAYS WITH GALE GUSTS	P.E. (PENMAN) (mm)		
						MEAN MAX.	MEAN MIN.	MEAN DAILY	DIFFERENCE FROM AVERAGE	LOWEST MIN.	DATE	DAYS WITH AIR FROST	DEGREE DAYS ABOVE 4.4°C	% OF AVERAGE	DEGREE DAYS ABOVE 10.0°C	% OF AVERAGE	LOWEST °GRASS-MIN*	DATE	DAYS WITH GROUND FROST						MEAN DAILY	DIFFERENCE FROM AVERAGE
Cahirciveen (Valentia Obsy.) Co. Kerry	1-10	28.9	-	7	5	9.7	4.6	7.1	-	-2.0	7	1	51	-	1	-	-4.4	7	2	6.5	-	16.4	-	6.8	2	-
	11-20	46.3	-	6	5	6.2	2.2	4.2	-	-5.9	15	5	23	-	2	-	-7.8	14	5	3.8	-	13.6	-	7.4	5	-
	21-END	3.4	-	2	2	8.1	4.0	6.1	-	1.0	28	0	22	-	0	-	-3.6	31	5	5.2	-	17.1	-	4.6	3	-
	MONTH	78.6	49	15	12	8.0	3.6	5.8	-0.8	-5.9	13	4	76	75	3	-	-7.8	14	12	5.1	-0.8	47.1	27	6.2	15	12
Ardfert (Liscahane) Co. Kerry	1-10	26.8	-	7	5	9.1	3.4	6.2	-	-3.2	7	2	25	-	1	-	-8.7	7	4	-	-	12.9	-	-	-	-
	11-20	18.3	-	3	3	5.8	0.6	3.2	-	-8.3	14	4	22	-	3	-	-12.2	14	5	-	-	17.0	-	-	-	-
	21-END	1.0	-	1	1	7.5	3.3	5.4	-	-1.6	28	2	18	-	0	-	-2.9	28	4	-	-	25.0	-	-	-	-
	MONTH	46.1	-	11	9	7.4	2.5	4.9	-	-8.3	14	8	65	-	4	-	-12.2	14	12	-	-	54.9	-	-	-	-
Lullymore Co. Kildare	1-10	8.9	-	7	5	6.7	-0.3	3.2	-	-6.8	7	5	8	-	0	-	-13.1	7	7	-	-	15.6	-	3.8	-	-
	11-20	27.0	-	6	6	3.2	-1.1	1.0	-	-7.2	13	5	8	-	0	-	-6.0	12	7	-	-	7.6	-	5.8	-	-
	21-END	0.2	-	1	0	6.5	0.4	3.5	-	-7.5	31	6	12	-	0	-	-14.2	31	6	-	-	22.5	-	1.1	-	-
	MONTH	36.1	45	14	11	5.5	-0.3	2.6	-	-7.5	31	16	28	-	0	-	-14.2	31	28	-	-	39.7	-	3.3	-	0
Kilkenny Co. Kilkenny	1-10	6.7	-	6	2	7.6	1.8	4.7	-	-4.9	7	3	15	-	0	-	-11.6	7	7	4.1	-	20.4	-	3.5	3	-
	11-20	25.9	-	5	4	3.8	0.2	2.0	-	-7.0	14	4	12	-	0	-	-12.2	13	5	2.0	-	3.4	-	4.4	3	-
	21-END	0.0	-	0	0	6.8	1.7	4.3	-	-6.4	31	4	14	-	0	-	-13.1	31	6	4.2	-	16.6	-	1.3	0	-
	MONTH	32.6	37	11	6	6.1	1.2	3.7	-0.5	-7.0	14	11	41	33	1	-	-13.1	31	18	4.5	-0.4	40.4	23	3.0	6	3
Moancoin (Silverspring) Co. Kilkenny	1-10	14.3	-	6	4	8.5	1.3	4.9	-	-5.6	7	4	17	-	1	-	-12.1	7	8	-	-	16.7	-	-	-	-
	11-20	52.8	-	9	6	4.1	-0.2	1.9	-	-9.2	13	5	12	-	0	-	-17.0	13	7	-	-	1.2	-	-	-	-
	21-END	1.4	-	1	1	6.7	1.6	4.2	-	-5.5	31	3	14	-	0	-	-12.6	31	6	-	-	17.3	-	-	-	-
	MONTH	68.5	61	16	11	6.4	0.9	3.7	-	-5.2	13	15	43	-	1	-	-17.0	13	21	-	-	35.2	-	-	-	-
Bellinamore Co. Leitrim	1-10	24.2	-	6	6	6.6	0.1	3.4	-	-5.3	7	5	8	-	0	-	-11.0	7	7	-	-	11.9	-	2.8	-	-
	11-20	22.5	-	6	5	3.8	-1.3	1.2	-	-8.4	13	7	10	-	1	-	-12.2	13	7	-	-	5.1	-	3.0	-	-
	21-END	0.0	-	0	0	6.4	-0.0	3.2	-	-8.0	31	6	11	-	0	-	-12.9	31	7	-	-	19.5	-	0.8	-	-
	MONTH	46.7	40	12	11	5.6	-0.4	2.6	-	-8.4	13	18	29	-	1	-	-12.9	31	21	-	-	36.5	-	2.3	-	0
Ardee (Bohernamoe) Co. Louth	1-10	10.5	-	7	3	7.5	-0.5	3.5	-	-6.0	7	5	10	-	0	-	-13.0	7	8	-	-	-	-	-	-	-
	11-20	11.3	-	5	4	4.1	-0.7	1.7	-	-6.9	13	6	10	-	0	-	-11.0	14	8	-	-	-	-	-	-	-
	21-END	0.2	-	1	0	7.0	0.2	3.6	-	-8.9	31	7	13	-	0	-	-15.1	31	8	-	-	-	-	-	-	-
	MONTH	22.0	25	13	7	6.2	-0.3	2.9	-	-8.9	31	18	33	-	1	-	-15.1	31	24	-	-	-	-	-	-	-





TABLE 2 GLOBAL RADIATION

STATION	PERIOD	AMOUNT MJ/m <sup>2</sup>
Malin Head Co. Donegal	1-10	14.66
	11-20	12.87
	21-end	27.66
	Month	55.19
Dublin Airport Co. Dublin	1-10	20.06
	11-20	10.37
	21-end	30.32
	Month	60.75
Cahirciveen (Valentia Obs.) Co. Kerry	1-10	22.60
	11-20	18.19
	21-end	26.32
	Month	67.11
Kilkenny Co. Kilkenny	1-10	23.35
	11-20	14.49
	21-end	25.02
	Month	62.86
Belmullet Co. Mayo	1-10	19.21
	11-20	16.04
	21-end	34.57
	Month	69.82
Clones Co. Monaghan	1-10	19.07
	11-20	12.81
	21-end	28.82
	Month	60.70
Birr Co. Offaly	1-10	22.31
	11-20	16.97
	21-end	28.38
	Month	67.66

Notes on the tables in January issue

TABLE 3 POTENTIAL EVAPOTRANSPIRATION (P.E.) AND SOIL MOISTURE

STATION	PERIOD	SOIL MOISTURE (mm)			
		P.E. (mm)	Deficit	Accumulated Deficit	Surplus
Carlow (Oak Park) Co. Carlow	1-10	-2.5	-	0	13
	11-20	N/A	N/A	N/A	N/A
	21-end	2.7	3	3	-
	Month	N/A	-	-	-
Kinsealy Co. Dublin	1-10	2.0	-	0	7
	11-20	-3.7	-	0	24
	21-end	2.4	2	2	-
	Month	0.7	-	-	-
Cahirciveen (Valentia Obs.) Co. Kerry	1-10	-3.6	-	0	40
	11-20	-3.3	-	0	51
	21-end	4.6	3	3	-
	Month	-2.3	-	-	-
Ballinamore Co. Leitrim	1-10	-4.6	-	0	29
	11-20	4.2	-	0	18
	21-end	0.3	-	0	0
	Month	-0.1	-	-	-
Glenamoy Co. Mayo	1-10	0.2	-	0	36
	11-20	1.6	-	0	31
	21-end	3.4	2	2	-
	Month	5.2	-	-	-
Johnstown Castle Co. Wexford	1-10	1.2	-	0	14
	11-20	2.7	-	0	46
	21-end	-0.9	-	0	1
	Month	3.0	-	-	-

TABLE 4 SOIL CLIMATE (MULLINGAR)

BARE SOIL TYPE	PERIOD	MEAN TEMPERATURE (°C at 100mm)			TEMPERATURE GRADIENT (to 200mm)	SOIL WATER POTENTIAL (hPa) (at depths)	
		Max.	Daily	Min.		75mm	200mm
		Peat	1-10	4.9	3.7	2.7	+0.6
	11-20	2.0	1.4	0.5	+0.7	N/A	N/A
	21-end	5.0	3.8	3.3	+0.3	N/A	N/A
Mineral	1-10	5.1	3.6	2.3	+0.5	48	48
	11-20	2.3	1.8	0.9	+0.4	N/A	N/A
	21-end	5.3	3.8	3.3	+0.5	N/A	N/A

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**NOTES ON TABLES**

1. The term rainfall includes all forms of precipitation (snow,hail,dew) measured as equivalent rain.
  2. "Rain days" and "wet days" are days during which the total rainfall is not less than 0.2mm and 1.0mm respectively.
  3. The mean daily air temperature over a period is taken as the mean of the daily maxima and daily minima (averaged separately over the period).
  4. Degree day totals are calculated using the method set out in an article by I.F.C. McVicker in the Journal of Heating and Ventilating Engineers (Vol. 14 No. 18, Nov-Dec 1946).
  5. Monthly averages of degree days at stations marked "e" refer to the 25-year period 1958-1982 except at Casement Aerodrome (1964-1982) and Cork Airport (1962-1982). Percentages are not calculated for degree day totals less than 10.
  6. Days with air frost are those during which the minimum air temperature was below 0.0°C.
  7. "Ground" temperatures refer to temperatures measured with a thermometer placed horizontally on pegs just above the tips of short grass.
  8. Days with ground frost are those during which the minimum "ground" temperature was below 0.0°C.
  9. The mean daily soil temperature (at 100mm depth under a bare soil surface) over a period is taken as the average of the four daily readings (at 0300, 0900, 1500 and 2100 GMT) over the period.
  10. Mean daily wind speed over a period ( $\text{ms}^{-2}$ ) is taken as the average of hourly values during the period at stations marked "e". Days with gale-gusts are those during which the wind speed exceeded 17.4  $\text{ms}^{-2}$  at any time during the day. At other stations, mean daily wind speed is computed from once-daily readings of run-of-the-wind.
  11. All wind speeds refer to the wind at an effective height of 10 metres above the ground. Where measurements are made at other heights, the wind speed readings are corrected to a height of 10 metres.
  12. Deviations of monthly values of rainfall, soil temperature and bright sunshine from long-term averages are shown in Table 1 in the case of stations for which those averages are known. Averages of air temperature, bright sunshine and rainfall refer to the period 1951-1980. Averages of soil temperature refer to the period 1958-1982.
  13. Potential Evapotranspiration (P.E.) values given in Table 1 are calculated from values of temperature, sunshine, wind speed and vapour pressure using the Penman Formula. Because of formula limitations, negative values can occur in winter; these are replaced in Table 1 by zero. P.E. values given in Table 3 are those measured by means of soil-filled tanks sunk into the ground with their upper grass-covered ends at surface level.
  14. Soil moisture deficits and surpluses (in Table 3) are computed from the differences between rainfall and actual evapotranspiration (A.E.). Estimates of A.E. are derived from measured values of P.E. (See Agmet. Memo No.1,1968). Soil moisture surpluses are assumed to be removed by drainage and surface run-off and are not, therefore, carried forward from one period to the next. Soil moisture deficits are, however, regarded as being cumulative. Where heavy rain occurs near the end of the fixed period, the date of cut-off may be adjusted to avoid error due to insufficient run-off time; dates of the end/beginning of such adjusted periods are encircled.
  15. In cases where elements are not normally measured or where long-term averages are not available, a dash (-) is inserted in the appropriate space in the tables. If, in a particular month, some data which are normally given are not included in the Bulletin, this omission will be indicated by the letters N/A in the appropriate space in the tables.
  16. Data on the soil climate of Mullingar is included in Table 4. Temperature (°C) and soil water potential (hPa) are measured daily in peat and mineral bare soil patches to depths of up to 200mm. The mean daily temperature is derived from the average of the mean of four daily readings (0300,0900,1500, and 2100 GMT) taken at 100mm depth. The temperature gradient is given in °C/100mm, positive values increasing with depth.
  17. Global Radiation is given in  $\text{MJm}^{-2}$  correct to two decimal places (3.6MJ=1kWh)
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