Monthly Weather Bulletin

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JULY 1997

Flash flooding in Mayo on 12th
-see feature page

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WARM AND MOSTLY SUNNY AFTER COLD,unsettled START

July's weather was a combination of some warm, sunny periods and more unsettled conditions, with some heavy falls of rain on individual days. After an exceptionally cool start (see table on page 3), temperatures were above normal for most of the month, with high humidity on most days. Sunshine totals were normal or above.

The weather during the first two days of the month was more like late autumn than midsummer, as low pressure to the northeast brought a run of cold northerly winds, with showers or longer outbreaks of rain, heaviest in the north and east. The low filled and moved away eastwards on the 3rd and 4th, leaving Ireland in a cool northwesterly airstream, with rain or showers gradually dying out. The period between the 5th and 9th was dry in most places as high pressure to the southwest became centred over the country by the 7th. Light southwesterly winds brought temperatures above normal, while sunshine amounts increased throughout the period. Extensive sea fog in the Irish Sea on the 8th and 9th occasionally drifted inland to affect eastern coastal areas. The 10th began with very warm, humid conditions over the country as the anticyclone drifted eastwards; a cold front over the western half of the country brought outbreaks of thundery rain, with some severe thunderstorms in the northwest. These areas had a fall on the 11th before a trough of low pressure off the west coast on the 12th brought renewed thunderstorm activity, with heavy rain in the west and midlands becoming lighter as the front moved eastwards. An exceptional fall near Banor, Erris, Co. Mayo, late on the 12th caused severe flooding locally.

Low pressure to the north or northwest between the 13th and 17th maintained unsettled weather over the country, with outbreaks of rain each day and only short sunny intervals. As a trough cleared southeastwards on the 17th, pressure rose over the country, beginning a spell of dry, sunny weather which lasted in most places up to the 22nd. Cool northerly winds on the 17th and 18th died out and it

<table>
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<th>STATION</th>
<th>MAX TEMP °C</th>
<th>PREVIOUS LOWEST</th>
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<td>12.2 5 July 1954</td>
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<td>12.5 13 July 1980</td>
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<td>10.2</td>
<td>11.4 5 July 1978</td>
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<td>Mountfort</td>
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became very warm everywhere with only light sea breezes. Late on the 22nd, a slow-moving trough brought rain into some western areas, becoming widespread on the 23rd. Mild, humid weather with occasional rain continued over the following days as a small depression tracked eastwards over the south of the country on the 25th and 26th. The 27th and 28th were mainly dry with just a few showers, but more frontal rain associated with a deep depression to the northwest pushed eastwards across the country on the 29th, accompanied by strong southwesterly winds. The end of the month was wet and windy, as low pressure to the north of the country brought showers to all but the extreme south of the country, with heavy falls in the north and northwest.

The strongest winds of the month were recorded during this period, with the highest gust, 53 knots (61 m.p.h.) recorded at Malin Head on the 30th, the highest July gust at the station since 1988. Mean wind speeds for the month were below normal everywhere, however; the mean of 5.6 knots (6 m.p.h.) at Rossclare was the lowest on record at the station for July. There was widespread thunder on the 10th and 12th, especially in the western half of the country, but hail was only reported at Dublin Airport on the 22nd. Most fog was reported between the 7th and 10th.

**Mean Atmospheric Pressure**

Mean sea level pressure values for the month were a little above normal generally, by around 2hPa in most places. The month began with low pressure close to the east of the country, but pressure rose well above normal in the periods 4th to 8th and again between the 17th and 22nd. Valentia Observatory recorded the highest pressure of the month, 1033.0hPa on the 5th. An area of low pressure in the Irish Sea on the 2nd gave the lowest pressure values of the month, with both Dublin Airport and Casement Aerodrome measuring 1002.6hPa.
**RAINFALL**

**Below normal in southeastern half**

As much of the rainfall during July was of a showery nature, rainfall totals were rather variable across the country, but it was generally a drier than normal month in the southeastern half of the country. Percentage of normal rainfall ranged from 59% of normal at Rossalure to 155% at both Belmullet and Ballina, Co. Leitrim. Many places had their driest July for between 7 and 9 years. Most rain fell in fairly well-defined periods during the month, with little rain recorded in the periods 4th to 9th and 17th to 21st.

There were between 6 and 9 wettest days during the month in the southeast (days with 10mm or more rainfall), but 15 or more such days in the west and north. Heavy rain associated with thunder fell in western areas on the 19th and 22nd (see feature page). The rainfall recording station at Bangor Erris measured 50mm of rain in just over 2 hours on the 12th; Belmullet's daily total of 29mm on the same day was its highest for July since 1987.

![Total Rainfall Map]

**DAILY RAINFALL EXPRESSED AS % OF MONTHLY NORMAL (1951-80)**

| CITIES       | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | TOTAL |
|--------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|    |
| Cork         | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 50  |
| Galway       | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 70  |
| Limerick     | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 70  |
| Shannon      | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 70  |
| Dublin       | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 70  |
| Cork         | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 5  | 50  |
| Galway       | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 70  |
| Limerick     | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 70  |
| Shannon      | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 70  |
| Dublin       | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 7  | 70  |

**NOTE:** In the diagrams, each grid box represents the percentage of the month rainfall that fell in that grid box. Reddish areas indicate counties with a rainfall amount that is above 85% of the average monthly rainfall in Co. Galway (defined as the 1st jet).
**Temperature**

Warmer than normal everywhere

Mean air temperatures for the month ranged from 14.4°C at Connaught Airport to 17.0°C at Dublin (Merrion Square); they were at least half a degree above normal almost everywhere. Mean maximum temperatures were over a degree higher than normal generally, despite a very cold start to the month. Daytime maxima of between 10°C and 12°C on the 1st, 17th, and 22nd had almost all stations recorded their hottest day of the month on either the 9th or 22nd, the highest temperature of the month, 25.7°C, was recorded at both Ardee and Kilkenny on the 22nd.

**Sunshine**

Above normal despite dull start

After little or no sunshine over the country during the first 2 days, sunshine totals for the month were above normal almost everywhere, ranging from 116 hours at Clones to 210 hours at Rossaire; in percentage terms sunshine ranged from 95% of normal at Clones to 125% at Fermoy (Moorepark), Co. Cork. Belmullet had near normal sunshine for the month despite having a total of 11 days with values of less than 0.5 hour. Between 30% and 40% of possible sunshine for the month was recorded in most places and up to 42% of possible at Rossaire. It was the sunniest July since 1990 at around half the stations in the country.

Daily values in excess of 10 hours were recorded in most places in the periods 6th to 9th, 18th to 19th and 23rd to 24th. Belmullet had its sunniest July day since 1983 when it measured 14.5 hours on the 8th, while several other stations had their highest daily values for July in 8 or 9 years on either the 9th or 18th. One such station was Cork Airport, which recorded the highest daily value of the month, 15.3 hours on the 18th.
SEA TEMPERATURES

Sea temperatures rose consistently throughout the month, by around three degrees overall. By the end of the month, sea temperatures were close to 14°C off the north coast and in the Irish Sea, reaching over 17°C off the southwest coast. At Malin Head, the mean sea temperature for the month of 13.0°C was almost a degree below normal.

Soil Moisture Deficits (mm)

10th of month / End of month

Mean 10cm Soil Temperatures (°C) at 0900Z

(difference from 1961-90 normals in brackets)

15.7 (+1.1)
15.9 (+0.6)
16.3 (+1.9)
16.6 (+0.3)
16.8 (+0.5)
17.3 (+0.8)
14.8
16.2 (+1.0)
16.0 (+0.7)
16.0 (+0.7)
38/0
165/44
47/25
41/37
15/26
37/35
51/61
52/63
41/82
59/65

MEASURED POTENTIAL EVAPOTRANSPIRATION (P.E.) AND SOIL MOISTURE

Country/ Station

<table>
<thead>
<tr>
<th>County/ Station</th>
<th>Period</th>
<th>P.E. (mm)</th>
<th>Soil Moisture (mm)</th>
<th>Assimilation Surplus Deficit</th>
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<tr>
<td>Co. Dublin</td>
<td>09/19</td>
<td>38.0</td>
<td>47/25</td>
<td>41/37</td>
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<tr>
<td>Co. Laois</td>
<td>11/19</td>
<td>37/35</td>
<td>51/61</td>
<td>52/63</td>
</tr>
<tr>
<td>Co. Meath</td>
<td>09/19</td>
<td>35/30</td>
<td>41/82</td>
<td>59/65</td>
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</table>

GLOBAL SOLAR RADIATION (Mj/m²)

Country/ Station

<table>
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<th>Country/ Station</th>
<th>Total Solar Radiation</th>
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<tr>
<td>Co. Westmeath</td>
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</table>

SEE BACK PAGE FOR NOTES ON THIS DATA
**FLOODING IN CENTRAL EUROPE**

**THE WORST THIS CENTURY**

Throughout most of July, an area of low pressure persisted over Central Europe, with its associated rain belts concentrated over the Czech Republic, Slovakia and parts of Poland, Austria and Germany. This rain, at times accompanied by thunderstorms, was heaviest in the area around the northern Carpathian Mountains at the headwaters of both the Oder and the Morava, a tributary of the Danube.

The map on the right shows monthly rainfall totals in the area affected, together with percentage of normal monthly values in brackets, where available. Between three and four times the normal monthly rainfall was recorded over a wide area, with some torrential daily falls in places. Between the 6th and 12th, for example, Aleksandrowice in southern Poland recorded 241mm, while 568mm fell over the same period at the upland station of Lyas Hora, on the Czech-Slovak border.

The consequences of so much rainfall were devastating over a wide area. Over 100 deaths due to flooding were reported in Poland and the Czech Republic as major rivers overflowed, while floods and mudslides severely disrupted road and rail traffic. Tens of thousands of people were evacuated from their homes as supplies of water, power and gas were cut off.

Although rainfall amounts in eastern Germany were smaller than further south, it too was affected by severe flooding of farmland as old flood defences along the river Oder were breached.

(Reported data supplied courtesy of Overseas Consultants, British Meteorological Office)

**Exceptional Mayo Rainfall on 12th**

Pictured above is the damage caused to Glinnacull Bridge, north of Bangor Erns in County Mayo, as a result of severe flooding during a thunderstorm on the 12th. A spell of thunder weather began in western and northwestern areas on the 10th, when falls of between 20 and 30mm were recorded, power supplies to much of Donegal and Sligo were interrupted due to lightning damage. Late on the 12th, a severe thunderstorm developed in north Mayo, with 50mm of rain recorded at Bangor Erns in just over two hours. The Glinnacull river overflowed, flooding a number of houses and causing up to 500 farm animals. Rocks and debris carried by the flood and landslides blocked the Bangor to Crossmolina road (cover picture).

(Photographs courtesy Brian Corry, Western People)
Tuesday 1st: Very cool north to northwesterly wind flow was light to moderate generally but fresh to strong on coasts in Ulster and north Connacht. Generally cloudy with a few showers at times. More persistent rain in east Ulster because more widespread this evening. Rainfall at 1pm:

Rainfall at 1pm:

- Temperature: max 18°C to 24°C, min 16°C to 18°C
- Sunshine: 6 to 9 hours
- Rainfall:
  - Ulster: up to 20mm
  - Connacht: up to 30mm
  - Munster: up to 10mm

Wednesday 2nd: Cool northwesterly today but winds slacken as the depression was in the Irish Sea. Cloudy conditions with showers, some heavy and longer spells of rain, particularly in Ulster near north coast.

Rainfall:

Rainfall:

- Temperature: max 10°C to 12°C, min 8°C to 10°C
- Sunshine: nil or near 0 hours
- Rainfall:
  - Ulster: up to 2mm normally
  - Connacht: up to 3mm normally
  - Munster: nil or near 0 hours

Thursday 3rd: Mist at first, a few fog patches and scattered outbreaks of rain. Conditions brightened during the morning and during the afternoon and evening there were well-scattered but locally fairly heavy showers. Light northwesterly winds. Temperatures higher than the east.

Rainfall:

Rainfall:

- Temperature: max 14°C to 16°C, min 12°C to 14°C
- Sunshine: up to 0 hours normally
- Rainfall:
  - Ulster: 7 to 8 hours
  - Connacht: nil or near 0 hours
  - Munster: nil or near 0 hours

Friday 4th: A weak warm front gave some spots of drizzle as it crossed the country overnight and this morning but generally it was a dry day with sunny spells. Winds were light northwesterly and temperatures were near normal.

Rainfall:

Rainfall:

- Temperature: max 14°C to 20°C, min 10°C to 16°C
- Sunshine: 2 to 3 hours
- Rainfall:
  - Ulster: nil or near 0 hours
  - Connacht: nil or near 0 hours
  - Munster: nil or near 0 hours

Saturday 5th: A few spots of drizzle in places but essentially dry with variable amounts of sunshine. Light westerly winds. Temperatures this afternoon usual normal.

Rainfall:

Rainfall:

- Temperature: max 17°C to 22°C, min 15°C to 17°C
- Sunshine: 3 to 4 hours
- Rainfall:
  - Ulster: nil or near 0 hours
  - Connacht: nil or near 0 hours
  - Munster: nil or near 0 hours

Sunday 6th: Warm westerly airflow gave some mist and also hill and coastal fog in coastal areas of the north and west. Dry in most areas with the best of the sunshine near the south and southwest coast. Warm inland this afternoon.

Rainfall:

Rainfall:

- Temperature: max 17°C to 22°C, min 16°C to 19°C
- Sunshine: 3 to 4 hours
- Rainfall:
  - Ulster: nil or near 0 hours
  - Connacht: nil or near 0 hours
  - Munster: nil or near 0 hours

Monday 7th: Mist in some coastal districts and a few showers in parts of the west and north. Most areas had a dry day with temperatures near normal.

Rainfall:

Rainfall:

- Temperature: max 17°C to 20°C, min 15°C to 18°C
- Sunshine: 1 to 3 hours
- Rainfall:
  - Ulster: nil or near 0 hours
  - Connacht: nil or near 0 hours
  - Munster: nil or near 0 hours

Tuesday 8th: Mist patches clearing during the morning and it was a dry, warm day with sunny periods. Light variable winds.

Rainfall:

Rainfall:

- Temperature: max 17°C to 20°C, min 16°C to 19°C
- Sunshine: nil or near 0 hours
- Rainfall:
  - Ulster: nil or near 0 hours
  - Connacht: nil or near 0 hours
  - Munster: nil or near 0 hours

Wednesday 9th: Some fog at first, cleared during the morning but returned late in the day to some eastern and southeastern coastal districts. Dry day with sunny periods. Warm inland this afternoon.

Rainfall:

Rainfall:

- Temperature: max 18°C to 22°C, min 17°C to 19°C
- Sunshine: nil or near 0 hours
- Rainfall:
  - Ulster: nil or near 0 hours
  - Connacht: nil or near 0 hours
  - Munster: nil or near 0 hours
### Temperature (°C)

<table>
<thead>
<tr>
<th>County / Station</th>
<th>Mean max</th>
<th>Mean min</th>
<th>Mean deviation from average</th>
<th>Highest max/date</th>
<th>Lowest min/date</th>
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<td><strong>SUNSHINE (hrs)</strong></td>
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Locations of Synoptic and Climatological weather stations

Malin Head ●
Ballyhalbert (Rt. Head of Down) ●
Ballysaman (Carrickfergus) ●
Clontarf ●
Clontarf (Carrickfergus) ●
Clontarf (Carrickfergus) ●
Letterkenny ●
Derrygalleagh ●
Milligan Park ●
Milligan Park ●
Milligan Park ●
Warrenpoint ●
Dublin Airport ●
Kinnitty ●
Casement Aerodrome ●
O'Reilly Park ●
Strade ●
Claremorris ●
Ardeer ●
Warrenpoint ●
Dublin Airport ●
Kinnitty ●
Casement Aerodrome ●
Dunfanagan ●
Shankill ●
Ballygar ●
Mount Russell ●
Fethard ●
Cabragh Head ●
Lisburn ●
Waterford ●
Valentin ●
Rostrevor ●
Cork Airport ●
Shekin Island ●

The Monthly Weather Bulletin is produced by the Climatology and Observations Division of Met Éireann. The annual subscription to the bulletin costs £36. Further climatological information is available from the Climate Enquiries Office, Glasnevin Hill, Dublin 9, telephone 01-8064260, fax 01-8064216.

Weather Dial

The latest official weather information by phone, updated 3 times a day, every day.

Just call 1550 123 PLUS the number for your area:

Munster.....850
Leinster.....851
Connaught..852
Ulster.....853
Dublin.....854
Sea Area.....855

Notes on the Tables

A. General
1. Rainfall amounts are given in millimeters, temperature in degrees Celsius, sunshine duration in hours and wind speed in knots.
2. At all stations daily rainfall totals refer to the 24-hour period ending at 0900 UTC the following day. The term rainfall includes all forms of precipitation, such as snow and hail, and deposition from dew or frost, measured as equivalent rainfall.
3. "Rainy days" and "rainless days" are days during which the total rainfall is not less than 0.2mm and 0.1mm respectively.
4. A "day" for the purposes of this publication refers to the period from 0000 UTC on a particular day to 2359 UTC on the following day. (This is because climatological stations make their daily observations at 0900 UTC.)
5. 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).
6. Days with air frost are those during which the temperature was below 0°C. Similarly, days with ground frost indicate days when the grass minimum temperature was below 0°C. (Grass minimum temperatures are measured by a thermometer placed horizontally on grass just above the tips of short grass.)
7.Moon rise and set and Greenwich time are based on readings taken at 0900 UTC.
8. A gale is a mean wind over a 10 minute period of 14 knots or more. A gale gale lasts for 34 knots or more. All wind speeds refer to the wind at an effective height of 10 metres above the ground.
9. The value is calculated using one or more estimated readings.
10. Data from Northern Ireland is kindly provided by the Belfast Weather Centre.

B. Agmet
11. Calculated Potential Evapotranspiration (P.E.) values are based on values of temperature, sunshine, wind speed and relative humidity using the Penman formula. Because of formula limitations, negative values can occur in winter; these are replaced in the tables by zero. Measured P.E. values are those measured by means of suitable tanks sunk into the ground with their upper grass-covered ends at surface level.
12. Soil moisture deficits and surpluses 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, 1963). Soil moisture deficits are assumed to be removed by drainage and surface runoff and are not therefore carried forward from one period to the next. Soil moisture deficits are regarded as being cumulative. Where heavy rain occurs near the end of the period, the size of the deficit may be adjusted to avoid errors due to insufficient runoff.
13. Degree day totals are calculated using the method set out by McKee in the Journal of the Institution of Heating and Ventilating Engineers (Vol. 14 No. 39, Nov-Dec 1949).
14. Global solar radiation values are given in MJ/m², correlated to two decimal places (3 GMS± 0.01)

C. Laboratory
15. Daily samples of air and precipitation are taken at Valentia Obseratory at 0000 UTC each day. Monthly precipitation samples at other stations are taken at 1200 UTC on the 1st of each month.
16. Air sample data are given in micrograms per cubic meter, calculated conductivity in micro-Siemens per centimeter and pH in pH units.