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## Monthly Weather Bulletin July 2008

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# Monthly Weather Bulletin

No. 267  
JULY 2008



Keeping well wrapped up on the beach at Youghal, Co. Cork, on the 22nd- one of many cool and dull days during the month. (picture Irish Examiner)

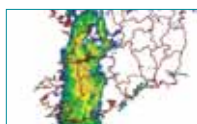
## VERY WET AND DULL IN MOST PLACES; BECOMING WARM AFTER COOL FIRST HALF

Much of the first half of July was wet and relatively cool, but warmer and drier conditions developed until the last few days of the month, when rain or showers again became widespread. High pressure was responsible for the settled conditions in the period after mid-month, but low pressure to the southwest of the country at

both the beginning and end of July brought some heavy rain or showers in all areas, with thunderstorms on several days. Rainfall totals for the month were above normal except in parts of the west and northwest and were more than twice the July normal at stations in the east and south. It was the wettest July - Continued on page 3



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Exceptionally heavy rain brings flooding on 31st- page 2

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Launch of Jason-2 satellite

Produced by Met Éireann, Glasnevin Hill, Dublin 9. Annual subscription 80 euro



For more information- tel: +353-1-8064260 fax: +353-1-8064216 climate.enquiries@met.ie www.met.ie/climate

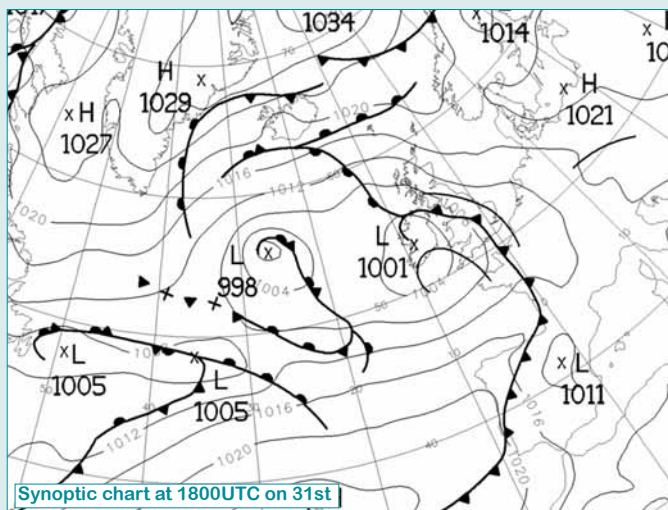
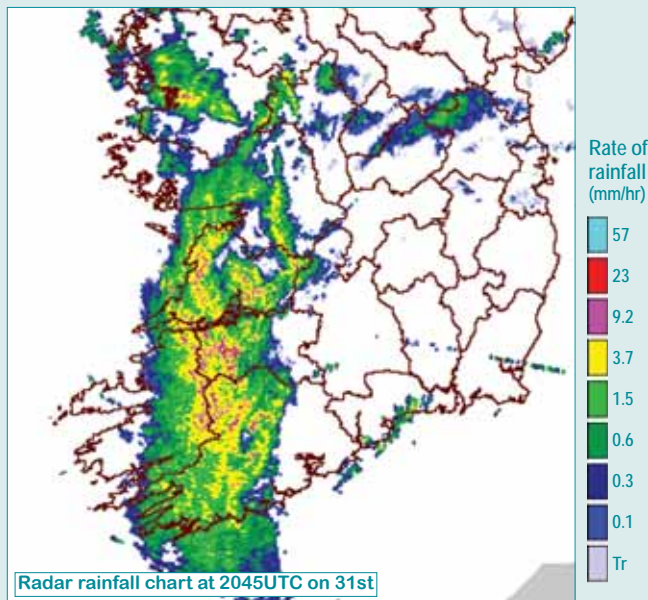
Notes on the tables and map showing location of stations appear in January issue

## EXCEPTIONAL RAINFALL IN COUNTY LIMERICK ON 31ST

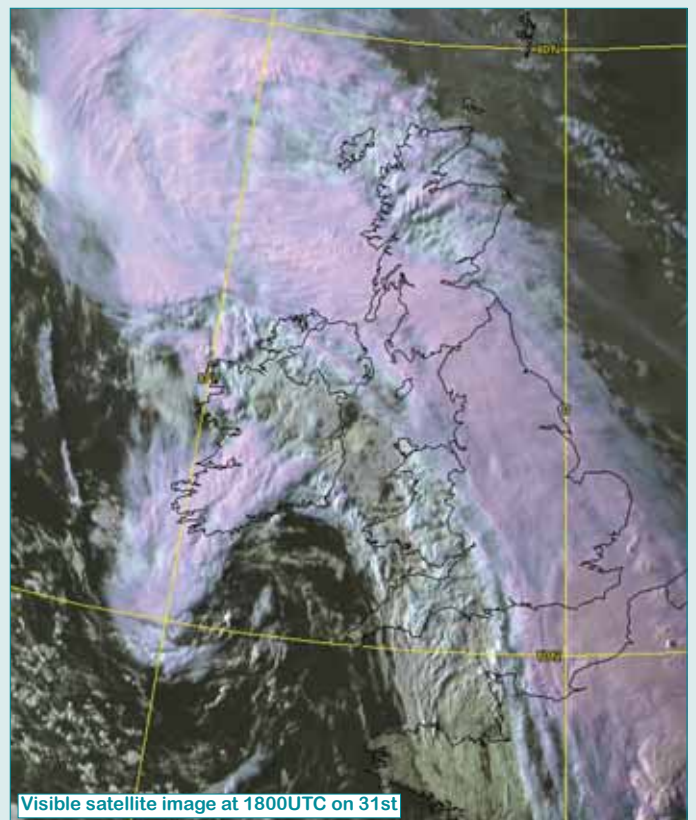
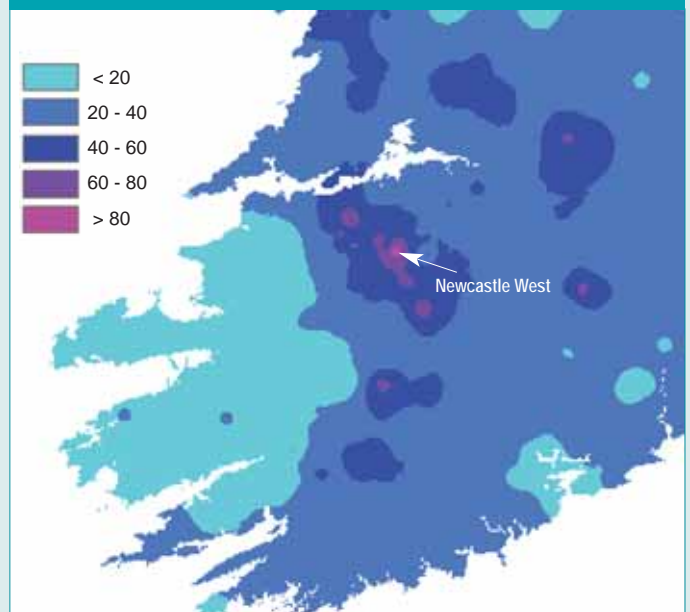
Slow-moving depressions centred near the southwest of Ireland between the 28th and 31st brought bands of heavy rain across the country. One such band crossed the country early on the 31st, bringing widespread falls of between 20mm and 40mm. Close to the depression's centre, another band of exceptionally heavy rain moved across Munster during the evening of the 31st, becoming almost stationary for a number of hours over parts of Cork, Clare and Limerick (see charts below). More than 40mm was recorded at several stations over this area, with more than 60mm measured at some stations south of the Shannon Estuary. At Castlemahon, Co. Limerick, a 24-hour fall of 90.1mm was measured at 0900UTC on August 1st, corresponding to around 10% of the station's normal total in a full year. According to the station observer's account, nearly all of this rain fell within a six-hour period between 1800 and midnight on the 31st. Such a 24-hour fall has a return period of around 250 years, while over a six-hour period the return period is significantly larger. There was unprecedented flooding in the town of Newcastle West, Co. Limerick, where the river Arra overflowed its banks and flooded many houses and businesses in the town, to a depth of over a metre.

The estimated six-hour fall of between 80mm and 90mm at Castlemahon is comparable with the highest such falls recorded in Ireland: a fall of 85mm was recorded at Glenasmole, Co. Dublin, on 26/08/1986 (Hurricane Charley), while 82mm fell at Johnstown Castle on 14/07/2001. At Ballsbridge in Dublin, 83mm fell in just over an hour during a thunderstorm on 11/06/1963, the most extreme such event recorded in Ireland.

(satellite image courtesy Wokingham Weather, [www.btinternet.com/~wokingham.weather/wwp2.html](http://www.btinternet.com/~wokingham.weather/wwp2.html))



### 24-HOUR RAINFALL (MM) MEASURED AT 0900UTC ON AUGUST 1ST



for more than 30 years at many stations in the south and southeast; here, combined June and July 2008 totals were more than twice the normal for the 2-month period. Heaviest daily falls this month were in the periods 1st to 6th and 28th to 31st. Late on the 31st, exceptionally heavy rain caused significant flooding in parts of County Limerick; a daily fall of 90mm was measured at Castlemahon, the bulk of which fell within a 6-hour spell before midnight (see opposite page). Between 12 and 16 wetdays were recorded at the majority of stations (days with 1mm or more rainfall), slightly more than normal for July. After a cool start to the month, temperatures rose above normal during the second half and mean monthly values were around half a degree above normal generally. Temperatures dipped well below normal on some nights, with slight ground frost recorded in a few places on the 21st; Casement Aerodrome's grass minimum value of  $-0.3^{\circ}\text{C}$  on this day was its lowest for July since 1971. Sunshine totals were a little higher than normal in the northwest and north of the country but it was a dull month generally, especially in the southwest.

**1st to 10th:** Areas of low pressure to the southwest or over Ireland brought frequent rain or showers, particularly during the first six days of the month. Sunny spells were

recorded on each day also, with more than 10 hours of daily sunshine in places between the 2nd and 4th, but maximum temperatures were below normal throughout. South to southwesterly winds at first veered to a more northwesterly direction later in the period; there were gale gusts recorded at many stations on the 1st.

**11th to 27th:** Pressure rose across the country as an anticyclone became established to the southwest, moving northeastwards across Ireland late in the period. Rainfall amounts were generally small, although heavy frontal rain affected northern areas on the 16th and 17th, while showers were recorded in all areas on the 18th. The weather was mainly dull during the early part of the period, but sunny spells developed more widely after the 19th, when conditions became increasingly warm and humid. Winds were generally light westerly, becoming very light and variable in direction later in the period.

**28th to 31st:** Very unsettled weather returned, with spells of heavy rain or showers each day. Isolated thundery showers on the 28th were followed by bands of more widespread heavy rain on subsequent days. Daily falls of more than 50mm were recorded during heavy thunderstorms in some midland areas on the 28th, and also in parts of the southwest on the 31st. The weather remained warm and humid, with winds from a south to southeasterly direction.

**Wind and elements:** Mean windspeeds for the month of between 6 and 14 knots (11 and 26km/h) were above normal everywhere and were the highest for July for between 5 and 15 years. The strongest winds were measured at the beginning of the month, with the highest gust, 48 knots (89km/h), recorded at both Malin Head and Belmullet on the 1st. Thunderstorms were frequent during July; they were particularly widespread on the 2nd and 28th. Hail was reported on the 10th, while fog was most widespread in the period 13th to 15th.

#### Below

The month began with massive dust storms blowing northwards and eastwards from the Arabian desert to cover large areas of the northern Persian Gulf. (image courtesy NOAA/ NASA, US Dept. of Commerce)



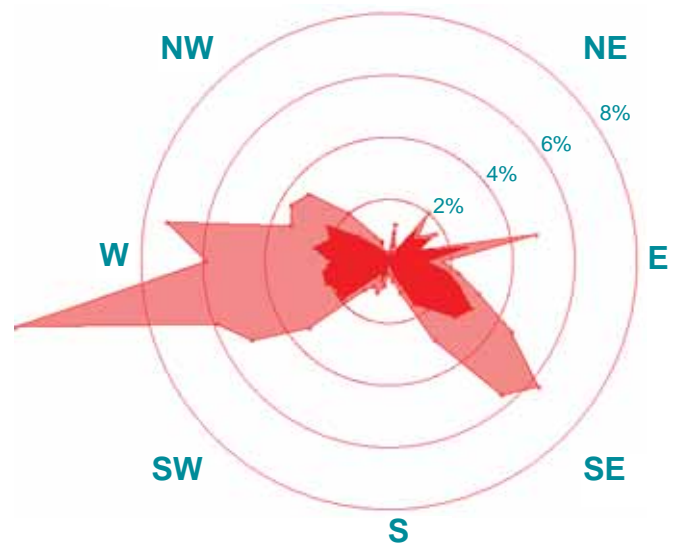
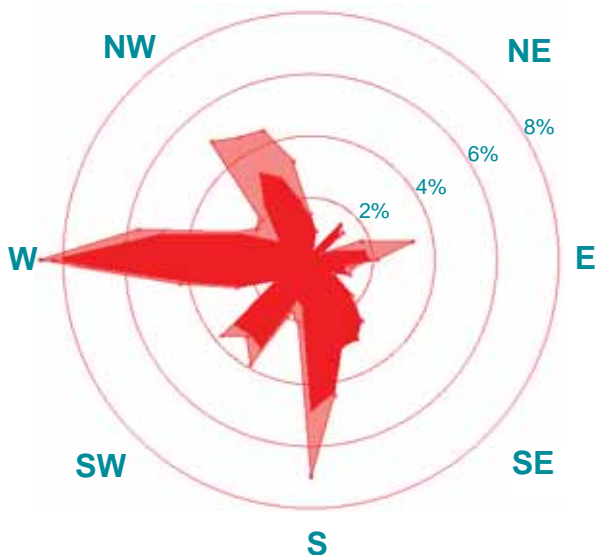
County / Station	WIND (KNOTS)										ELEMENTS				
	Mean speed	Max. dir.	10-min. speed	mean date/hour	Max. dir.	Gust speed	date/time	Days with gales	gale gusts	Hours with gale gusts	Snow	Snow Lying	Hail	Thunder	Fog
CO. CARLOW Carlow (Oak Park)	6.9	170°	22	1/02	170°	33	1/0237	0	0	0					
CO. CAVAN Ballyhaise	6.2	160°	17	1/05	160°	33	1/0449	0	0	0					
CO. CLARE Shannon Airport	8.9	160°	28	1/02	150°	38	1/0158	0	1	2	0	0	0	2	1
CO. CORK Roche's Point	10.4	160°	29	1/04	160°	37	1/0414	0	2	12					
Cork Airport	8.3	100°	26	4/19	100°	37	4/1710	0	2	9	0	0	0	2	8
CO. DONEGAL Malin Head	14.2	170°	33	1/03	170°	48	1/0235	0	11	48	0	0	0	1	0
CO. DUBLIN Dublin Airport	10.7	260°	25	15/04	160°	33	1/0918	0	0	0	0	0	0	0	3
Casement Aerodrome	9.1	190°	27	1/02	200°	39	1/0256	0	1	7	0	0	0	1	1
CO. KERRY Valentia Observatory	7.7	170°	23	1/03	100°	37	4/1822	0	2	5	0	0	0	0	2
CO. MAYO Belmullet	10.2	180°	34	30/09	170°	48	1/2124	1	4	24	0	0	0	1	2
Knock Airport	9.3	160°	24	1/03	160°	38	1/0249	0	1	2	0	0	0	0	8
CO. OFFALY Birr	6.5	180°	21	1/03	180°	31	1/0243	0	0	0		0			
CO. WESTMEATH Mullingar	5.7	160°	18	1/01	160°	30	1/0248	0	0	0					
CO. WEXFORD Johnstown Castle	6.4	80°	16	4/18	150°	26	1/0928	0	0	0					
					80°	26	4/1757				<i>Elements are not available for automatic stations</i>				

Valentia Observatory

Dublin Airport

Calm: 0.0% N

Calm: 0.1% N

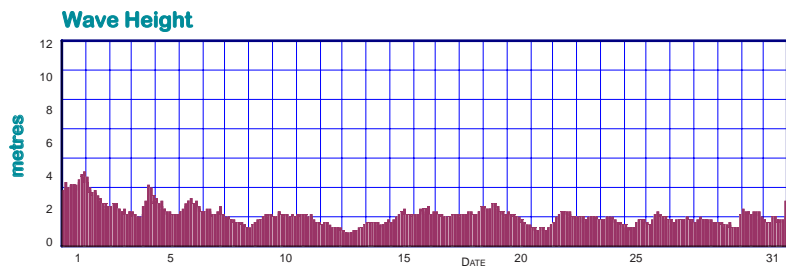
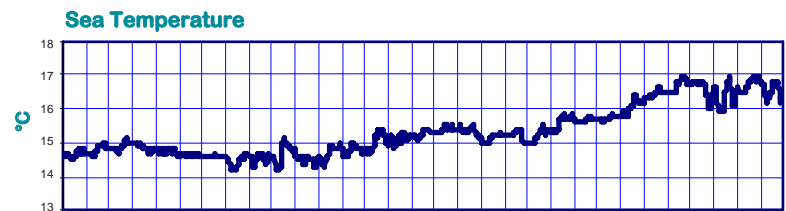
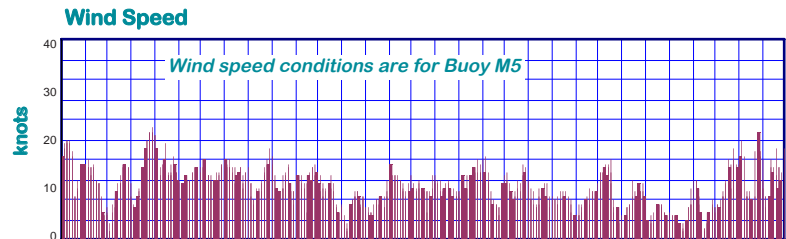
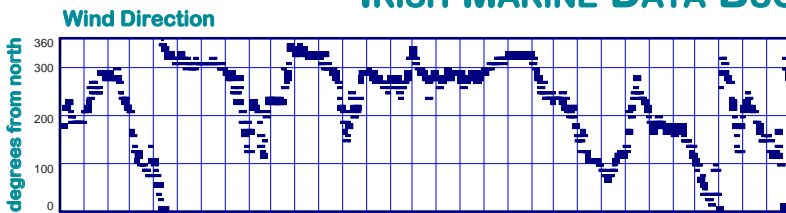


1-10 knots

>10 knots

PERCENTAGE FREQUENCY OF WIND DIRECTION

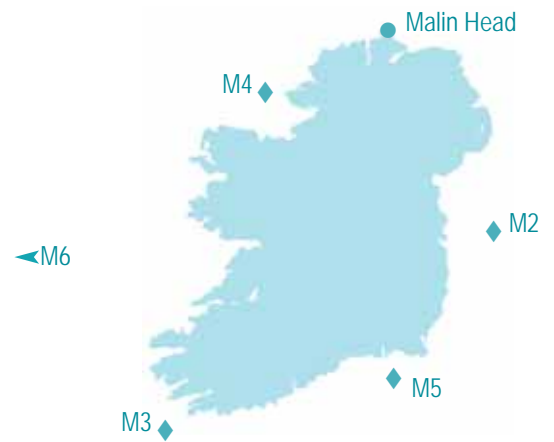
### MARINE OBSERVATIONS FROM IRISH MARINE DATA BUOY NETWORK



Hourly wind and wave conditions at M3 (51.22°N, 10.55°W)

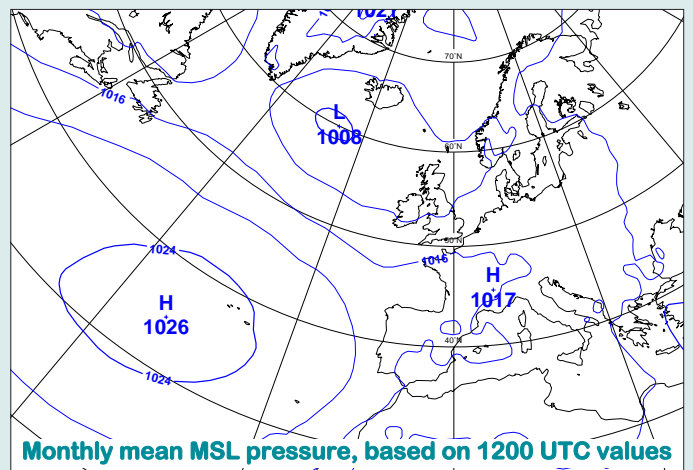
Buoy	Sea surface temp. (°C)	Mean wind speed (knots)	Max. 10-min wind (knots)	Mean wave height (m.)	Max. wave height (m.)
M2	n/a	12.8	34	0.9	2.2
M3	15.3	n/a	n/a	2.0	5.0
M4	15.1	n/a	n/a	1.7	3.3
M5	14.9	13.0	28	1.4	4.0
M6	15.1	13.9	23	1.7	3.8
Malin Head	14.3				

#### Summary of Mean Monthly Values

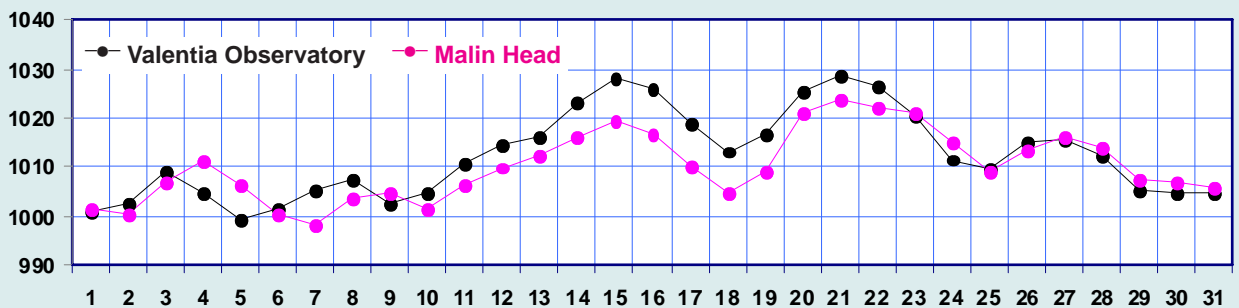


### MEAN ATMOSPHERIC PRESSURE

Mean sea level pressure values for the month varied between 1010hPa in the north and 1012hPa in the south, around 5hPa below normal values for July. Pressure was well below normal at both the beginning and end of the month, but rose above normal during mid-month. The lowest pressure value of the month, 994.3hPa, was measured at Belmullet on both the 1st and 2nd, while the month's highest value of 1030.1hPa was measured at Valentia Observatory on the 15th and 16th.

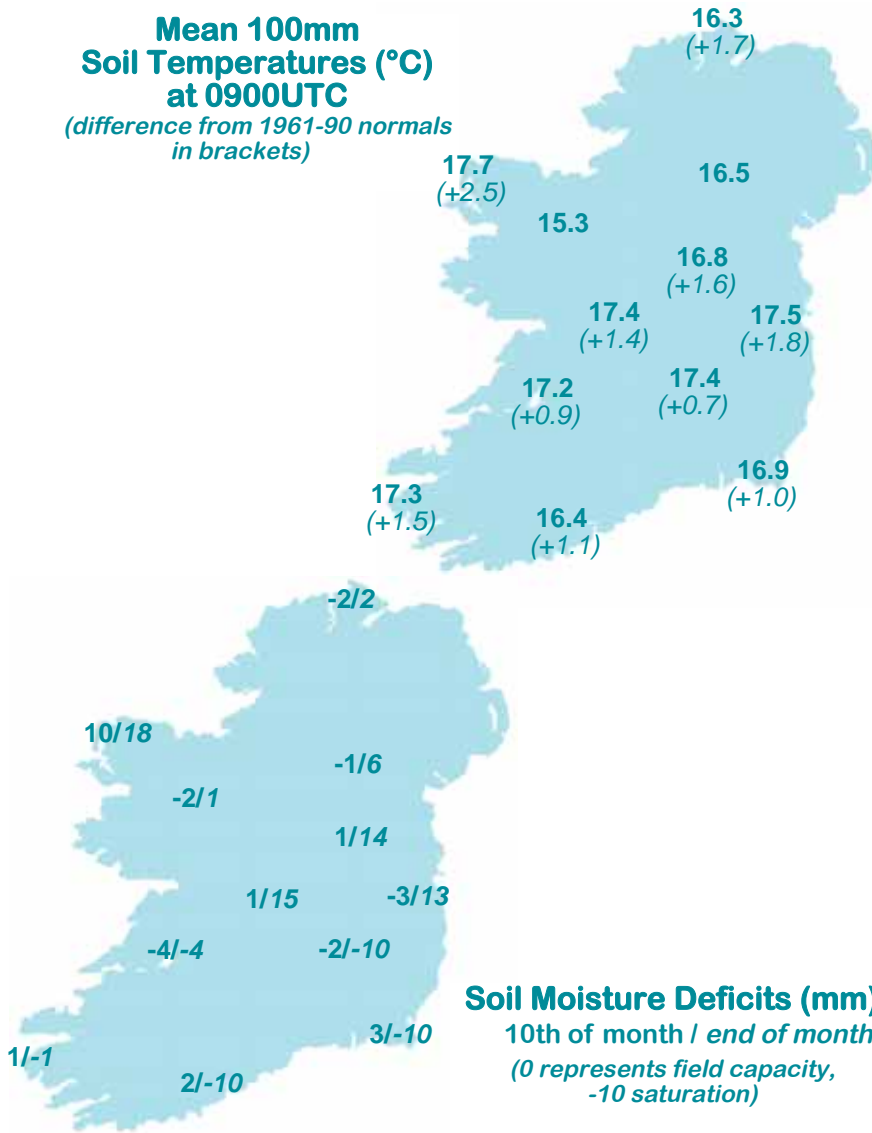


Monthly mean MSL pressure, based on 1200 UTC values



Mean daily Mean Sea Level pressure (hPa)

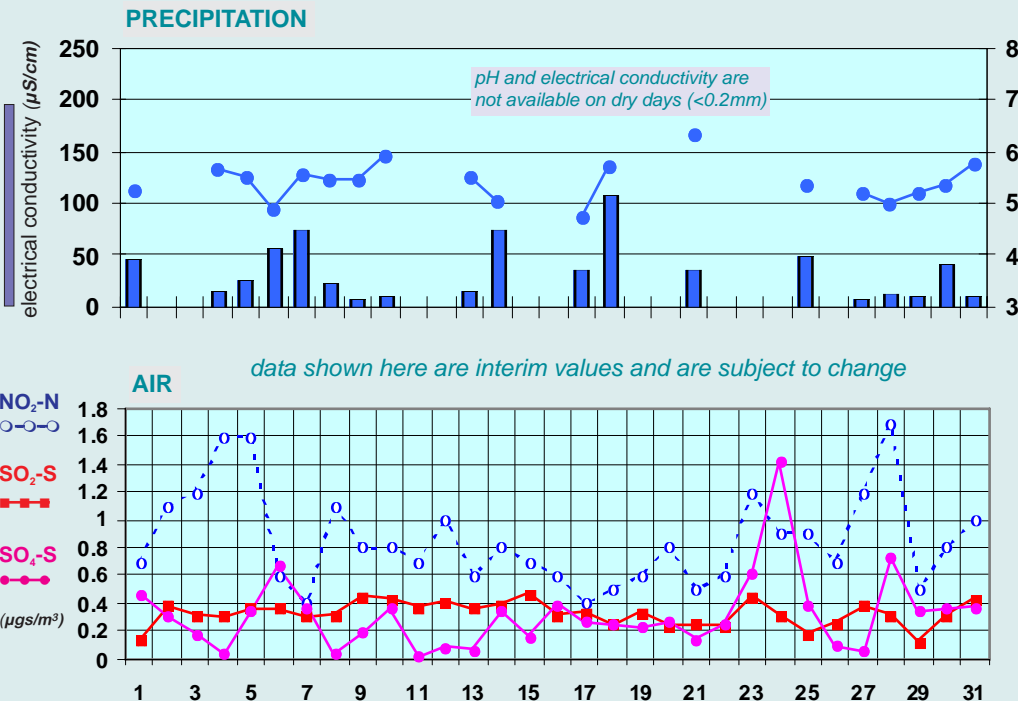
**Mean 100mm Soil Temperatures (°C) at 0900UTC**  
(difference from 1961-90 normals in brackets)



**Soil Temperatures at 0900UTC**

County/ Station	°C		
	100mm	200mm	300mm
<b>CO. CARLOW</b>			
CARLOW (OAK PARK)	17.4	17.0	16.0
<b>CO. CAVAN</b>			
BALLYHAISE	16.5	16.0	15.3
<b>CO. CLARE</b>			
SHANNON AIRPORT	17.2	17.0	16.4
CARRON	16.4		16.5
<b>CO. CORK</b>			
ROCHE'S POINT	16.9	16.5	16.1
FERMOY (MOORE PARK)	16.0	16.0	16.2
CORK AIRPORT	16.4	16.1	15.6
SHERKIN ISLAND	16.9		16.9
BALLINCURRIG (PEAFIELD)	15.4	15.6	16.6
<b>CO. DONEGAL</b>			
MALIN HEAD	16.3	15.8	15.3
<b>CO. DUBLIN</b>			
DUBLIN AIRPORT	17.2	16.8	16.4
CASEMENT AERODROME	17.5	17.1	16.1
<b>CO. KERRY</b>			
VALENTIA OBSERVATORY	17.3	17.2	17.2
<b>CO. LIMERICK</b>			
MOUNT RUSSELL	14.5	15.1	
<b>CO. LOUTH</b>			
ARDEE (BOHARNAMOE)	17.0	15.9	16.1
<b>CO. MAYO</b>			
BELMULLET	17.7	17.4	18.0
STRAIDE	15.3		
KNOCK AIRPORT	15.7	15.2	14.7
<b>CO. MEATH</b>			
WARRENSTOWN	15.9	16.1	17.1
<b>CO. OFFALY</b>			
BIRR	17.4	16.9	16.6
<b>CO. TIPPERARY</b>			
FETHARD (PARSONSHILL)	14.7	15.4	
<b>CO. WATERFORD</b>			
DUNGARVAN (CARRIGLEA)		16.5	16.8
<b>CO. WESTMEATH</b>			
MULLINGAR	16.8	16.7	16.6
<b>CO. WEXFORD</b>			
JOHNSTOWN CASTLE	16.9	16.8	17.2
JOHN F. KENNEDY PARK	17.1	16.8	17.4
CLONROCHE (KNOXTOWN)	16.2	16.2	16.5

**Chemical Analysis of Precipitation and Air Samples at Valentia Observatory**



Acid rain occurs when pollutants combine with moisture in the air to form sulphuric or nitric acid. pH is the simplest way of measuring the acidity of precipitation. Usually pH of 7.00 is considered neutral but this is not the case in rainfall samples. Pure water in the atmosphere has an equilibrium pH value of 5.65 at 20°C owing to carbon dioxide in the air dissolving to form carbonic acid. Any value below pH 5.65 is considered acid while any value above is considered alkaline.

Sulphur dioxide and sulphate in air contribute to the formation of sulphuric acid; nitrate in air contributes to the formation of nitric acid.

Conductivity measures the total ion activity in the rainfall, i.e. the higher the conductivity the greater the number of ions present.

10-DAY VALUES FOR SELECTED AGROMETEOROLOGICAL STATIONS		RAINFALL (MM)				TEMPERATURE (°C)										SUNSHINE (HOURS)					
Station	period	amount	% of average	rain days	wet days	mean max.	mean min.	mean daily	diff. from average	lowest min.	date	days with air frost	degree days > 4.4°C	degree days > 10.0°C	lowest "grass-min."	date	days with ground frost	mean 10cm at 0900h	mean 30cm at 0900h	total no. of hours	% of average
Cavan (Loreto)	11-20	5.3	-	6	2	17.9	10.9	14.4	-	6.7	13	0	100	46	-0.5	13	1	-	-	43.3	-
	21-end	30.8	-	7	5	21.5	12.5	17.0	-	5.4	21	0	139	78	1.8	21	0	-	-	53.7	-
	<b>month</b>	<b>110.0</b>	<b>-</b>	<b>23</b>	<b>16</b>	<b>19.0</b>	<b>11.5</b>	<b>15.3</b>	<b>-</b>	<b>5.4</b>	<b>21</b>	<b>0</b>	<b>337</b>	<b>167</b>	<b>-0.5</b>	<b>4</b>	<b>2</b>	<b>-</b>	<b>-</b>	<b>122.9</b>	<b>-</b>
<b>Co. Cork</b>	1-10	49.1	-	9	7	18.0	11.7	14.9	-	6.4	4	0	105	49	1.1	4	0	15.5	15.6	45.6	-
Fermoy	11-20	0.7	-	3	0	18.9	11.7	15.3	-	6.3	13	0	109	54	1.3	13	0	16.0	16.0	41.8	-
	21-end	70.3	-	6	4	19.9	12.5	16.2	-	6.8	21	0	130	70	2.2	21	0	16.6	16.9	45.8	-
	<b>month</b>	<b>120.1</b>	<b>218</b>	<b>18</b>	<b>11</b>	<b>19.0</b>	<b>12.0</b>	<b>15.5</b>	<b>0.3</b>	<b>6.3</b>	<b>13</b>	<b>0</b>	<b>343</b>	<b>173</b>	<b>1.1</b>	<b>4</b>	<b>0</b>	<b>16.0</b>	<b>16.2</b>	<b>133.2</b>	<b>91</b>
<b>Co. Donegal</b>	1-10	3.7	-	2	1	18.0	10.9	14.5	-	5.5	3	0	100	47	3.4	4	0	-	-	-	-
Glenties	11-20	48.3	-	8	8	16.7	11.1	13.9	-	5.0	13	0	95	41	2.9	13	0	-	-	-	-
	21-end	22.9	-	5	4	22.2	12.7	17.5	-	4.6	21	0	144	84	3.1	21	0	-	-	-	-
	<b>month</b>	<b>74.9</b>	<b>77</b>	<b>15</b>	<b>13</b>	<b>19.1</b>	<b>11.6</b>	<b>15.4</b>	<b>1.3</b>	<b>4.6</b>	<b>21</b>	<b>0</b>	<b>339</b>	<b>171</b>	<b>2.9</b>	<b>13</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Co. Kerry</b>	1-10	41.0	-	8	7	17.4	11.1	14.3	-	8.0	3	0	99	44	6.0	3	0	-	-	38.5	-
Ardfert	11-20	7.7	-	5	3	18.2	12.1	15.2	-	9.5	20	0	108	52	6.4	20	0	-	-	25.9	-
	21-end	52.4	-	6	4	21.2	12.6	16.9	-	9.3	21	0	137	76	6.8	21	0	-	-	47.2	-
	<b>month</b>	<b>101.1</b>	<b>-</b>	<b>19</b>	<b>14</b>	<b>19.0</b>	<b>12.0</b>	<b>15.5</b>	<b>0.5</b>	<b>8.0</b>	<b>3</b>	<b>0</b>	<b>344</b>	<b>172</b>	<b>6.0</b>	<b>3</b>	<b>0</b>	<b>-</b>	<b>-</b>	<b>111.6</b>	<b>-</b>
<b>Co. Louth</b>	1-10	76.4	-	10	10	17.2	10.5	13.9	-	5.9	4	0	94	40	2.7	4	0	16.9	15.8	-	-
Ardee	11-20	4.5	-	2	2	18.8	10.7	14.8	-	2.9	13	0	104	50	0.8	13	0	17.0	16.1	-	-
	21-end	44.9	-	7	5	21.3	11.1	16.2	-	2.6	21	0	130	71	0.2	21	0	17.2	16.5	-	-
	<b>month</b>	<b>125.8</b>	<b>237</b>	<b>19</b>	<b>17</b>	<b>19.2</b>	<b>10.8</b>	<b>15.0</b>	<b>0.4</b>	<b>2.6</b>	<b>21</b>	<b>0</b>	<b>329</b>	<b>161</b>	<b>0.2</b>	<b>21</b>	<b>0</b>	<b>17.0</b>	<b>16.1</b>	<b>-</b>	<b>-</b>
<b>Co. Waterford</b>	1-10	69.9	-	10	7	18.4	12.0	15.2	-	6.0	4	0	108	53	3.6	4	0	-	16.0	57.2	-
Dungarvan	11-20	0.1	-	0	0	20.0	11.9	16.0	-	7.0	13	0	115	60	5.0	20	0	-	16.6	52.4	-
	21-end	79.2	-	6	5	20.5	12.1	16.3	-	6.5	21	0	131	71	3.5	21	0	-	17.7	47.9	-
	<b>month</b>	<b>149.2</b>	<b>-</b>	<b>16</b>	<b>12</b>	<b>19.6</b>	<b>12.0</b>	<b>15.8</b>	<b>0.2</b>	<b>6.0</b>	<b>4</b>	<b>0</b>	<b>354</b>	<b>184</b>	<b>3.5</b>	<b>21</b>	<b>0</b>	<b>-</b>	<b>16.8</b>	<b>157.5</b>	<b>97</b>
<b>Co. Wexford</b>	1-10	76.7	-	9	8	16.9	11.8	14.4	-	8.8	4	0	99	44	7.3	4	0	15.4	15.7	41.5	-
Johnstown Castle	11-20	0.0	-	0	0	19.4	12.0	15.7	-	8.3	20	0	113	57	5.5	20	0	16.9	17.4	50.1	-
	21-end	83.9	-	7	5	19.9	13.1	16.5	-	9.2	21	0	133	72	7.2	21	0	18.4	18.5	53.1	-
	<b>month</b>	<b>160.6</b>	<b>282</b>	<b>16</b>	<b>13</b>	<b>18.8</b>	<b>12.3</b>	<b>15.6</b>	<b>0.8</b>	<b>8.3</b>	<b>20</b>	<b>0</b>	<b>346</b>	<b>173</b>	<b>5.5</b>	<b>20</b>	<b>0</b>	<b>16.9</b>	<b>17.2</b>	<b>144.7</b>	<b>85</b>

MEASURED POTENTIAL EVAPOTRANSPIRATION (P.E.) AND SOIL MOISTURE						P.E. (Penman)		GLOBAL SOLAR RADIATION (MJ/sq.m.)			
Station	Period	P.E. (mm)		Soil Moisture (mm)		Station	total(mm)	1st-10th	11th-20th	21st-end	Total
		Amount	Deficit	Accum'td	Deficit						
<b>Co. Kerry</b>						<b>Co. Carlow</b>					
Valentia Obs.	1-10	24.9	-	0	33	Carlow (Oak Park)	76	127.70	149.79	164.72	442.21
	11-20	15.0	6	6	-	<b>Co. Cavan</b>					
	21-end	29.9	-	0	11	Ballyhaise	70	129.21	141.27	162.31	432.79
	<b>month</b>	<b>69.8</b>				<b>Co. Clare</b>					
<b>Co. Wexford</b>						Shannon Airport	76				
Johnstown Castle	1-10	18.4	-	0	60	<b>Co. Cork</b>					
	11-20	44.1	44	44	-	Cork Airport	71				
	21-end	69.9	-	42	2	Roche's Point	n/a	170.18	159.03	165.10	494.31
	<b>month</b>	<b>132.4</b>				<b>Co. Donegal</b>					
						Malin Head	67	138.41	149.58	151.84	439.83
						<b>Co. Dublin</b>					
						Dublin Airport	79	145.03	162.60	176.09	483.72
						Casement Aerodrome	81				
						<b>Co. Kerry</b>					
						Valentia Obs.	68	153.81	145.29	151.60	450.70
						<b>Co. Mayo</b>					
						Belmullet	72	170.13	153.52	160.14	483.79
						Knock Airport	70				
						<b>Co. Offaly</b>					
						Birr	76	146.44	138.48	165.95	450.87
						<b>Co. Westmeath</b>					
						Mullingar	71	118.55	145.80	165.93	430.28
						<b>Co. Wexford</b>					
						Johnstown Castle	76	149.11	163.92	171.05	484.08

MONTHLY EVAPORATION (MM) FROM CLASS A PAN			
County	Station	Monthly Rainfall (mm)	Monthly Evaporation (mm)
<b>Clare</b>	Kilmaley	n/a	n/a
<b>Cork</b>	Fermoy (Moorepark)	120.1	87.7
<b>Kerry</b>	Valentia Observatory	92.8	71.5
<b>Kildare</b>	Poulaphuca	111.8	71.6
<b>Mayo</b>	Newport (Furnace)	62.0	67.9
<b>Offaly</b>	Derrygreenagh	146.0	66.1
<b>Waterford</b>	Dungarvan (Carriglea)	149.2	86.0
<b>Wexford</b>	Johnstown Castle	160.6	110.9

**Tuesday 1st:** Rain during the night, heavy in western areas. The rain moved slowly eastwards and became heavy in most areas, with the exception of the Dublin region. Sunny spells in the west during the afternoon, with showers developing there later. Temperatures around normal, but feeling cooler in the strong breeze. Windy, with south to southeasterly gales and stronger gusts.

**Rainfall:** trace to 15mm, heaviest at Valentia, trace at Dublin Airport

**Temperature:** max. 16°C to 20°C, min. 12°C to 14°C

**Sunshine:** 1 to 7 hours, sunniest at Knock Airport, 1 hour at Dublin Airport

**Wednesday 2nd:** Heavy showers in the western half of the country early in the night gradually died out. Showers developed again during the morning and became widespread, heavy and thundery during the afternoon. The shower activity gradually declined later. Sunny in the extreme west and southwest, broken sunshine further east. Winds were light southerly, becoming very light and variable by evening.

**Rainfall:** nil to 23mm, heaviest at Malin Head, nil at Johnstown Castle

**Temperature:** max. 16°C to 19°C, min. 9°C to 12°C

**Sunshine:** 3 to 14 hours, sunniest at Belmullet, 3 hours at Cork Airport

**Thursday 3rd:** Early rain in the east and south, very heavy at times. The west and northwest were sunny, while the rest of the country had rain, continuous and very heavy at times, with some thundery showers also. The rain gradually cleared from the south during the afternoon and many parts had a fine evening. Winds were light and variable.

**Rainfall:** nil to 19mm, heaviest at Mullingar, nil at Belmullet

**Temperature:** max. 14°C to 18°C, min. 6°C to 11°C

**Sunshine:** trace to 14 hours, sunniest at Belmullet, trace at Casement Aerodrome

**Friday 4th:** Apart from scattered showers in the north and west, it was a mostly dry night, with some fog in places. Dry and sunny at first, but cloud and rain developed in the south by mid-morning. Rain in the south for the afternoon, with sunny spells further north. During the evening and night, rain spread further northwards, giving heavy outbreaks in places. The extreme north continued dry throughout. Winds were easterly, light to moderate.

**Rainfall:** trace to 23mm, heaviest at Cork Airport, trace at Ballyhaise

**Temperature:** max. 14°C to 19°C, min. 4°C to 12°C

**Sunshine:** trace to 11 hours, sunniest at Malin Head, trace at Valentia

**Saturday 5th:** Rain, heavy at times, spread northwards to most places overnight with only extreme northern areas staying dry. Heavy rain or showers continued in many areas throughout the day, accompanied by thunder. Generally dull in northern areas, but some sunny spells developed between showers in the southern half of the country. Moderate to fresh and gusty northeasterly winds backed northwesterly during the evening.

**Rainfall:** <1 to 34mm, heaviest at Dublin Airport, <1mm at Belmullet

**Temperature:** max. 14°C to 21°C, min. 11°C to 13°C

**Sunshine:** nil to 6 hours, sunniest at Dublin Airport, nil at Belmullet and Malin Head

**Sunday 6th:** Cloudy in many places at first, with rain, heavy and thundery at times, mainly in the east, north and especially the midlands. The rain spread to all parts during the night with the exception of some northern and western coasts. The heaviest falls were in the midlands and south. Sunny spells also, particularly in the east. Winds were light, east to northeasterly in direction.

**Rainfall:** nil to 20 mm, heaviest at Cork Airport, nil at Malin Head

**Temperature:** max. 14°C to 18°C, min. 11°C to 13°C

**Sunshine:** trace to 8 hours, sunniest at Dublin Airport, trace at Malin Head

**Monday 7th:** Scattered showers overnight in many areas, dying out by dawn. A few sunny spells, although mainly overcast throughout the period. Scattered showers again during the afternoon, becoming heavy and thundery by late afternoon. Winds were light to moderate, north to northeasterly.

**Rainfall:** nil to 2mm, heaviest at Malin Head

**Temperature:** max. 15°C to 19°C, min. 10°C to 12°C

**Sunshine:** 1 to 5 hours, sunniest at Dublin Airport, 1 hour at Valentia

**Tuesday 8th:** Some scattered showers overnight, mainly in the southwest and north. The showers became confined to Ulster and north Connacht during the day, generally dry elsewhere. Sunny spells throughout. Cloudy, wet weather moved into the southwest in the late afternoon and moved slowly northwards during the evening. Winds were light to moderate, variable in direction.

**Rainfall:** nil to 7 mm, heaviest at Cork Airport

**Temperature:** max. 15°C to 19°C, min. 9°C to 11°C

**Sunshine:** 3 to 8 hours, sunniest at Malin Head, 3 hours at Valentia

**Wednesday 9th:** Heavy overnight rain in the south and southeast, with showers in the midlands. The rain and showers had cleared most parts by noon and there were some sunny spells, particularly in the north. A band of heavy, thundery showers moved over the western half of the country later in the afternoon and evening, causing local flooding in parts of the west. Winds were light to moderate, variable in direction.

**Rainfall:** 2 to 14mm, heaviest at Ballyhaise, 2mm at Carlow (Oak Park)

**Temperature:** max. 15°C to 22°C, min. 9°C to 14°C

**Sunshine:** nil to 6 hours, sunniest at Malin Head, nil at Belmullet and Knock Airport

**Thursday 10th:** Heavy rain in parts of Ulster overnight, with lighter rain in Leinster and Connacht. The heavy rain cleared the north Ulster coast shortly after dawn. A band of light rain extending from Louth to Clare moved very slowly southwards, becoming more active and producing some heavy falls, particularly in the east. Sunny in the extreme south, but cloudier with sunny spells further north. Winds were variable, light to moderate, but stronger in northern regions.

**Rainfall:** nil to 11mm, heaviest at Dublin Airport, nil at Johnstown Castle

**Temperature:** max. 15°C to 19°C, min. 10°C to 13°C

**Sunshine:** trace to 10 hours, sunniest at Cork Airport, trace at Birr

**Friday 11th:** Mostly dry with some clear periods and isolated showers in the northwest. The day remained mostly cloudy with well-scattered showers, but some sunny spells developed in places during the afternoon. The evening and night continued cloudy but mainly dry. Winds were northerly, light to moderate generally, occasionally gusty along northern coasts.

**Rainfall:** nil to 2mm, heaviest at Malin Head

**Temperature:** max. 13°C to 18°C, min. 10°C to 12°C

**Sunshine:** 1 to 4 hours, sunniest at Valentia and Malin Head, 1 hour at Birr

**Saturday 12th:** Generally dry overnight with just a few light showers in northern areas. Mainly cloudy with intermittent sunny spells throughout. Showers in the east early in the afternoon cleared the east coast by evening. Winds were light, northwesterly in direction.

**Rainfall:** nil to 2mm, heaviest at Dublin Airport

**Temperature:** max. 15°C to 18°C, min. 8°C to 12°C

**Sunshine:** 2 to 5 hours, sunniest at Shannon Airport, 2 hours at Knock Airport

**Sunday 13th:** Mainly dry in the eastern half of the country with sunny spells. Cloudy elsewhere with outbreaks of rain and drizzle. Warm during the day, with afternoon temperatures near or above normal in the sunshine. Remaining mild after dark. Winds were light and variable, becoming more southwesterly during the day, moderate at times on exposed coasts.

**Rainfall:** nil to <1mm generally, 3mm at Valentia

**Temperature:** max. 15°C to 20°C, min. 4°C to 13°C

**Sunshine:** nil to 12 hours, sunniest at Dublin Airport, nil at Belmullet

**Monday 14th:** Cloudy overnight with some patchy rain and drizzle in many places. Some mist, fog and drizzle in the early morning, clearing by noon with some sunshine in parts. Rain and drizzle became confined to the northwest during the afternoon. Winds were light, southwesterly in direction.

**Rainfall:** nil to trace generally, 1mm at Valentia

**Temperature:** max. 18°C to 23°C, min. 14°C to 15°C

**Sunshine:** nil to 2 hours, sunniest at Dublin Airport, nil at Valentia

**Tuesday 15th:** Mild and humid overnight with outbreaks of rain and drizzle, mainly in the western half of the country. This dull, damp weather moved across the country during the day, giving patches of light rain and drizzle. Clearer weather with sunny spells and occasional showers followed from the north, reaching all areas later in the afternoon. Warm and breezy with afternoon temperatures around normal generally. Light to moderate and sometimes gusty southwesterly winds veered slowly west to northwesterly during the day and increased moderate to fresh and gusty in the afternoon, strongest over the northern half of the country.

**Rainfall:** nil to 1mm generally, 3mm at Malin Head

**Temperature:** max. 16°C to 22°C, min. 12°C to 14°C

**Sunshine:** 1 to 9 hours, sunniest at Casement Aerodrome, 1 hour at Valentia

**Wednesday 16th:** Dull, wet weather swept eastwards across the country during the day and evening. Mostly cloudy with short sunny spells. Rainfall amounts were generally small, however northern areas had more persistent rain during the second half of the day. The southwest remained largely dry. Light to moderate southwest to westerly winds were fresh and gusty at times, particularly in the northern half of the country.

**Rainfall:** nil to 1mm generally, 14mm at Malin Head

**Temperature:** max. 15°C to 18°C, min. 10°C to 13°C

**Sunshine:** nil to 3 hours, sunniest at Cork Airport and Malin Head

**Thursday 17th:** Generally cloudy through the period with outbreaks of rain or drizzle in most areas. Rainfall amounts were generally small except in northern areas, where there were some heavy falls. Generally cool, a little warmer in the south. Very little sunshine overall. Winds were west to southwesterly, light to moderate, but stronger at times in the north and west.

**Rainfall:** nil to 2mm generally, 18mm at Malin Head

**Temperature:** max. 15°C to 20°C, min. 11°C to 14°C

**Sunshine:** nil to 4 hours, sunniest at Cork Airport, nil at Malin Head

**Friday 18th:** Mild and humid overnight with outbreaks of rain and drizzle. It was a mostly cloudy day with outbreaks of rain and drizzle, but it remained dry in many areas, particularly in Munster and Leinster. Only short sunny spells generally, with southern coastal areas receiving most sunshine. Moderate and sometimes gusty southwest to westerly winds, fresh at times on exposed coasts.

**Rainfall:** trace to 8mm, heaviest at Malin Head, trace at Dublin Airport

**Temperature:** max. 15°C to 22°C, min. 11°C to 14°C

**Sunshine:** nil to 7 hours, sunniest at Cork Airport, nil at Valentia

**Saturday 19th:** Humid overnight with outbreaks of rain or drizzle moving southwards over the country. The day was mild and breezy with scattered showers and sunny spells. Showers became largely confined to Atlantic coastal regions in the evening. Moderate to fresh and gusty northwesterly winds were strong at times on northwestern coasts. Winds eased during the evening.

**Rainfall:** nil to 3mm, heaviest at Malin Head, nil at Cork Airport

**Temperature:** max. 15°C to 20°C, min. 8°C to 13°C

**Sunshine:** 6 to 11 hours, sunniest at Knock Airport, 6 hours at Casement Aerodrome

**Sunday 20th:** Dry and cool during the night. Mainly dry during the day with isolated light showers or patchy drizzle. Temperatures were near normal, but feeling cooler in the northerly airflow. Long periods of sunshine throughout. Dry and clear during the evening and turning significantly cooler. Winds were northwesterly, light to moderate, falling light by evening.

**Rainfall:** nil generally, <1mm at Malin Head

**Temperature:** max. 15°C to 19°C, min. 7°C to 12°C

**Sunshine:** 8 to 14 hours, sunniest at Malin Head, 8 hours at Valentia

**Monday 21st:** Drizzle or light rain during the morning in western and northern areas, dry elsewhere. The rain and drizzle petered out as the front moved eastwards to give just a light shower or spots of rain. A few sunny periods, mainly in eastern areas. Winds were light westerly, backing southerly.

**Rainfall:** nil to trace generally, 3mm at Belmullet, 1mm at Ballyhaise

**Temperature:** max. 17°C to 20°C, min. 5°C to 12°C, ground temperatures below zero at Casement Aerodrome and Birr

**Sunshine:** 1 to 7 hours, sunniest at Dublin Airport, 1 hour at Valentia

**Tuesday 22nd:** Dry conditions throughout generally, however, weak embedded fronts brought patchy rain and drizzle to southwestern, western and northern coasts. A few sunny breaks, mainly in the south. Temperatures around normal. Winds were light, southwesterly in direction.

**Rainfall:** nil to <1mm generally, 3mm at Belmullet

**Temperature:** max. 18°C to 22°C, min. 11°C to 15°C

**Sunshine:** trace to 3 hours, sunniest at Cork Airport, trace at Malin Head

**Wednesday 23rd:** Mild and dry overnight. Heavy, thundery showers moved northwards near Atlantic coasts, affecting parts of Galway and Mayo around midday. A few light showers developed during the late afternoon and evening, but there were sunny spells throughout, particularly in the southwest. Winds were light to moderate southeasterly.

**Rainfall:** nil to trace generally, 1mm at Belmullet

**Temperature:** max. 17°C to 23°C, min. 11°C to 15°C

**Sunshine:** 2 to 8 hours, sunniest at Valentia, 2 hours at Cork Airport

**Thursday 24th:** Scattered showers overnight in places. The showers were mostly light, but some turned heavy and thundery in south Leinster and also in Donegal. Showers continued throughout the day, with long dry spells in between. Some heavy thundery showers in the west during the evening. Sunny spells, mostly in the south and west. Winds were light, easterly or variable.

**Rainfall:** nil to 2mm, heaviest at Johnstown Castle

**Temperature:** max. 19°C to 25°C, min. 13°C to 15°C

**Sunshine:** trace to 7 hours, sunniest at Cork Airport, trace at Malin Head

**Friday 25th:** The day was warm, humid and mostly cloudy, with only short sunny spells, but with longer sunny periods in western coastal areas. Scattered showers also, heavy or thundery in a few places. Light to moderate southeasterly winds, fresh and gusty at times on northern and northwestern coasts, veered southwesterly and eased during the afternoon.

**Rainfall:** nil to 5mm, heaviest at Knock Airport, nil at Cork Airport

**Temperature:** max. 18°C to 22°C, min. 13°C to 15°C

**Sunshine:** <1 to 7 hours, sunniest at Valentia, <1 hour at Knock Airport

**Saturday 26th:** A dry day generally, but with some showers, the heaviest of these in the north and southwest. Sunny spells also, particularly in the north and midlands, but dull in the southwest. Temperatures around normal for the time of year. Winds were light to moderate, variable in direction.

**Rainfall:** nil to trace generally, 2mm at Malin Head, 1mm at Valentia

**Temperature:** max. 17°C to 23°C, min. 9°C to 15°C

**Sunshine:** 1 to 10 hours, sunniest at Malin Head, 1 hour at Valentia

**Sunday 27th:** Dry and mild during the night with fog in many inland areas, dense in places. The fog cleared during the morning. Dry and warm during the day with slack winds, with isolated showers in western areas. Remaining dry during the evening and staying mild. Variable amounts of sunshine, with most recorded in coastal areas. Winds were light, variable or southerly in direction.

**Rainfall:** nil to trace generally, 1mm at Claremorris and Knock Airport

**Temperature:** max. 19°C to 24°C, min. 9°C to 15°C

**Sunshine:** 4 to 11 hours, sunniest at Casement Aerodrome and Dublin Airport 4 hours at Cork Airport

**Monday 28th:** Rain, heavy at times, moved northwards over the southwest and west around dawn, giving a dull, wet day here. Elsewhere it was a mainly dry day with sunny spells and scattered showers, becoming thundery during the afternoon and evening. Another band of heavy, thundery rain moved into the southeast by evening. Winds were light to moderate, variable in direction.

**Rainfall:** nil to 12mm, heaviest at Cork Airport

**Temperature:** max. 17°C to 25°C, min. 9°C to 14°C

**Sunshine:** nil to 11 hours, sunniest at Dublin Airport, nil at Cork Airport

**Tuesday 29th:** A band of heavy rain rotated around a depression to the southeast of Ireland, giving heavy falls in the south, east and west of the country. Heavy thundery showers during the afternoon in many parts also. In northern areas it was a warm, sunny day interrupted by occasional heavy showers. Mostly overcast, wet and cooler in the south. Winds were light and variable, becoming moderate south or southeasterly.

**Rainfall:** nil to 33mm, heaviest at Valentia, nil at Malin Head

**Temperature:** max. 16°C to 23°C, min. 11°C to 15°C

**Sunshine:** nil to 8 hours, sunniest at Dublin Airport, nil at Cork Airport

**Wednesday 30th:** Rain and drizzle, heavy in many areas during the night. Heavy rain during the morning cleared most parts by noon. Becoming dry and sunny by afternoon, but heavy rain in the southeast drifted northwards during the evening. Winds were light southerly, stronger along northwestern coasts.

**Rainfall:** nil to 28mm, heaviest at Johnstown Castle, nil at Shannon Airport

**Temperature:** max. 18°C to 22°C, min. 12°C to 15°C

**Sunshine:** 4 to 12 hours, sunniest at Shannon Airport, 4 hours at Dublin Airport

**Thursday 31st:** Overnight rain and drizzle persisted during the morning, mainly in the east. During the afternoon, rain extended to all areas, with another band of very heavy and thundery rain during the evening over parts of Connacht and Munster, bringing localised flooding (see page 2). Very little sunshine, yet quite warm. Winds were light, cyclonic variable or calm.

**Rainfall:** 1 to 27mm, heaviest at Shannon Airport, 1mm at Belmullet

**Temperature:** max. 16°C to 19°C, min. 11°C to 14°C

**Sunshine:** nil to 1 hour, sunniest at Shannon Airport, nil at Malin Head

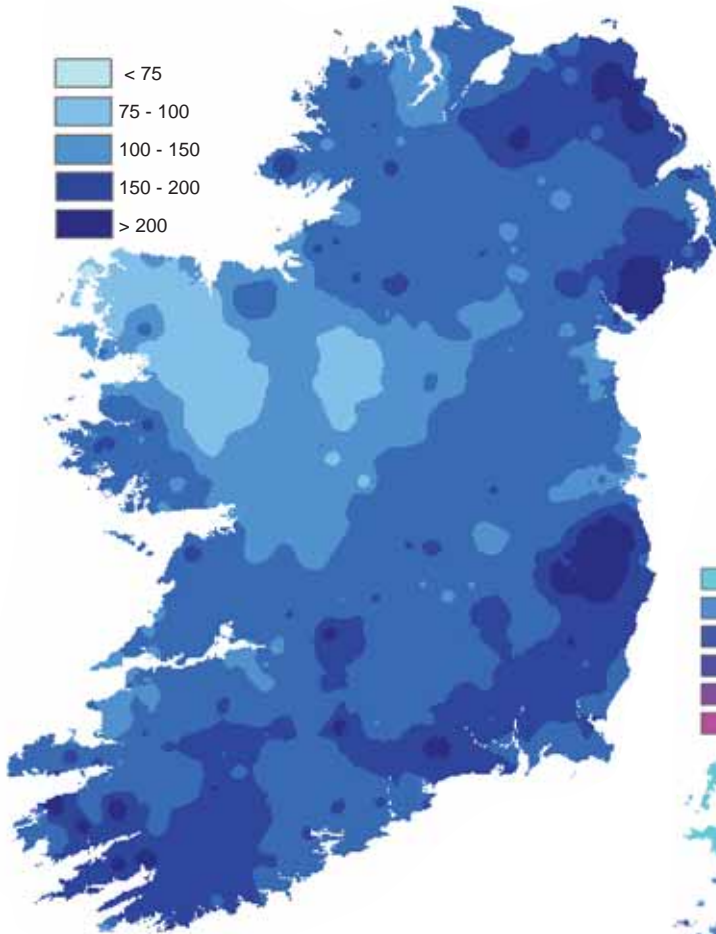
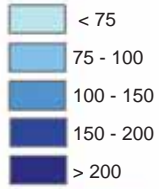
## Exceptionally wet in south and east

July rainfall totals were near normal in parts of the northwest, but it was an exceptionally wet month over most of Leinster and Munster. Monthly totals ranged from 44mm at Belmullet to 185mm at Clonroche (Knoxtown), Co. Wexford, where it was the wettest July since records began in the area in 1963. While Belmullet received only 65% of its normal July rainfall, more than three times the normal amount fell in parts of County Wicklow; the rainfall station at Roundwood recorded just over four times its normal July total - its wettest July since records began there in 1943.

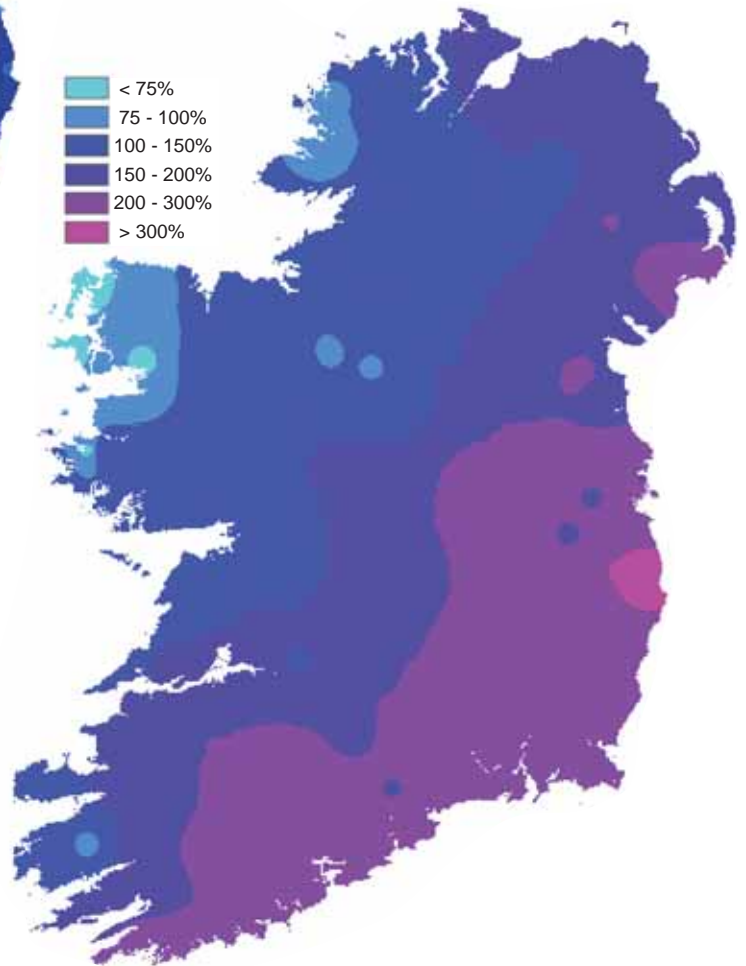
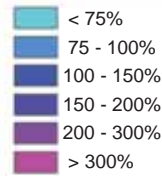
Despite the very high totals in many areas, much of the month was relatively dry, with little rainfall measured in the period 11th to 27th. Between 12 and 16 wetdays were recorded during the month at the majority of stations (*days with 1mm or more of rainfall*), only slightly more than normal for July. Very heavy falls were recorded at the beginning and end of the month, however, particularly in the periods 3rd to 5th and 28th to 31st. The exceptional rainfall over parts of Munster on the 31st is described on page 2; many other stations recorded their highest daily falls for July for between 7 and 13 years during these periods.

County/ Station	Total Amount (mm)	% of 1961-90 average	Most in a day / date		Number of	
					Raindays (≥0.2mm)	Wetdays (≥1mm)
<b>CO. CARLOW</b>						
CARLOW (OAK PARK)	142.1	253	27.9	30	18	13
<b>CO. CAVAN</b>						
BALLYHAISE	92.7	134	18.6	30	22	16
CAVAN LORETO COLLEGE	110.0		22.6	3	23	16
<b>CO. CLARE</b>						
SHANNON AIRPORT	100.8	177	38.0	31	18	13
CARRON	98.0	101	17.0	31	22	16
<b>CO. CORK</b>						
ROCHE'S POINT	129.9	217	27.7	4	19	12
FERMOY (MOORE PARK)	120.1	218	41.4	28	18	11
CORK AIRPORT	148.1	228	29.8	4	18	13
SHERKIN ISLAND	147.4	254	28.5	4	13	9
BALLINCURRIG (PEAFIELD)	153.7		33.6	28	16	12
<b>CO. DONEGAL</b>						
MALIN HEAD	125.8	175	27.7	16	20	17
GLENTIES HATCHERY	74.9	77	25.1	16	15	13
BALLYSHANNON (CATHLEEN'S FALL)	77.5	106	17.4	9	25	15
<b>CO. DUBLIN</b>						
DUBLIN (PHOENIX PARK)	102.7	204	22.1	5	18	13
DUBLIN AIRPORT	111.5		26.9	5	19	13
CASEMENT AERODROME	101.7	216	22.1	5	15	10
DUBLIN (MERRION SQUARE)	107.8	251	21.6	5	16	14
<b>CO. GALWAY</b>						
GALWAY (UNIV. COLL.)	84.2	124	29.6	9	17	12
MAAM VALLEY	93.8		30.2	9	26	14
CONNEMARA NATIONAL PARK	60.6	66	8.8	1	16	12
BALLYGAR	103.4	167	16.4	3	20	12
<b>CO. KERRY</b>						
VALENTIA OBSERVATORY	92.8	127	26.8	29	22	17
ARDFERT (LISCAHANE)	101.1		31.3	29	19	14
<b>CO. LIMERICK</b>						
MOUNT RUSSELL	183.7		39.6	31	25	19
<b>CO. LOUTH</b>						
ARDEE (BOHARNAMOE)	125.8	237	18.7	30	19	17
<b>CO. MAYO</b>						
BELMULLET	44.3	65	12.7	29	22	12
STRAIDE	74.4	118	22.9	31	20	11
KNOCK AIRPORT	80.0		16.2	9	22	12
<b>CO. MEATH</b>						
WARRENTOWN	128.8	230	29.6	29	18	13
<b>CO. OFFALY</b>						
BIRR	100.6	171	19.9	31	16	12
DERRYGREENAGH	146.0	252	21.7	2	18	15
<b>CO. SLIGO</b>						
ARDTARMON	84.2		25.2	9	21	13
<b>CO. TIPPERARY</b>						
FETHARD (PARSONSHILL)	145.8		28.0	4	21	14
<b>CO. WATERFORD</b>						
WATERFORD (TYCOR)	139.1	248	23.9	31	18	12
DUNGARVAN (CARRIGLEA)	149.2		31.4	28	16	12
<b>CO. WESTMEATH</b>						
MULLINGAR	109.3	178	15.8	5	23	14
<b>CO. WEXFORD</b>						
JOHNSTOWN CASTLE	160.6	282	37.5	30	16	13
JOHN F. KENNEDY PARK	160.8	282	29.0	30	16	14
CLONROCHE (KNOXTOWN)	184.9		41.1	30	20	14

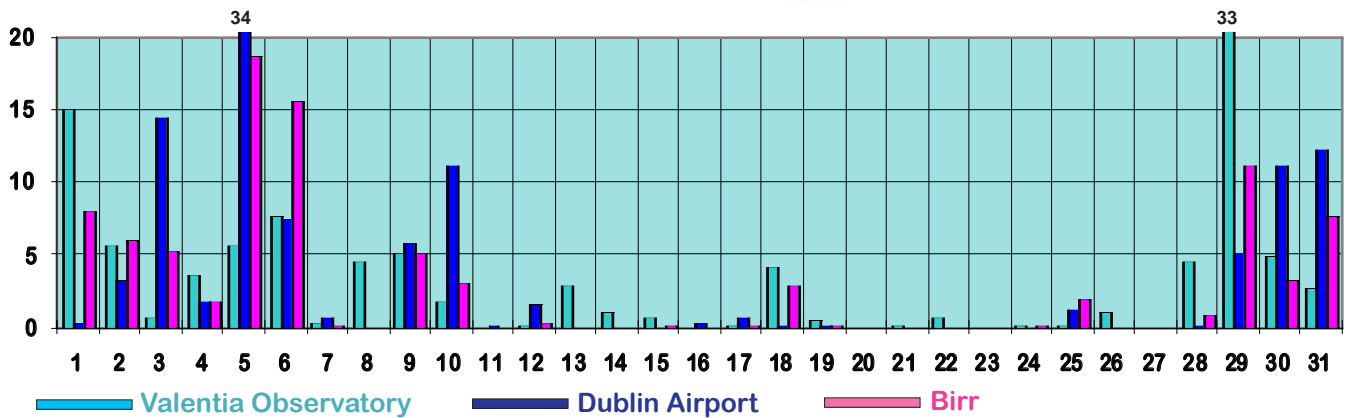
Total rainfall (mm)



Percentage of normal rainfall



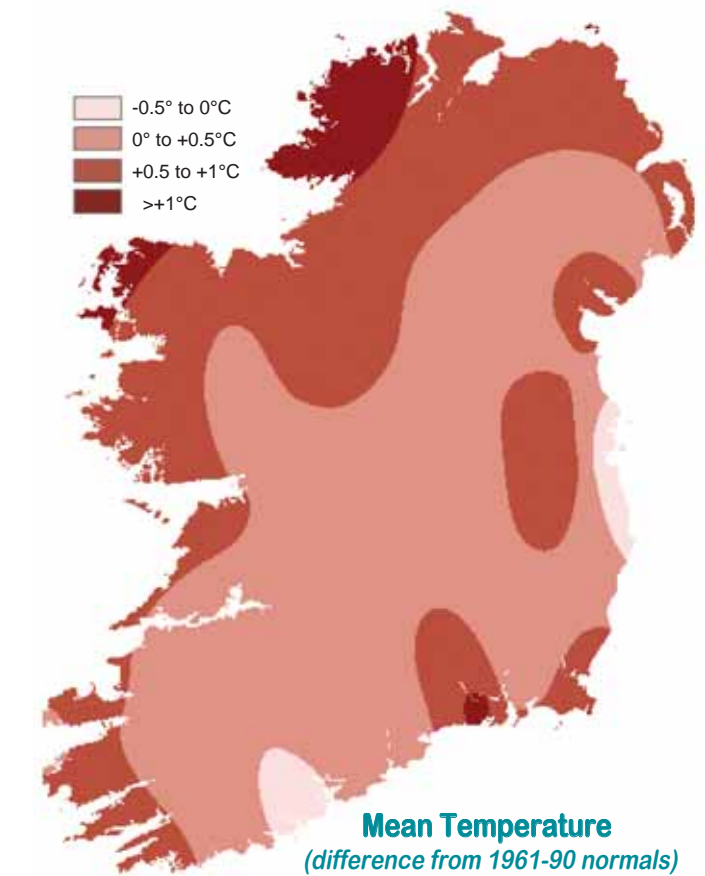
Daily 0-24h rainfall values (mm)



## A little warmer than normal in most places

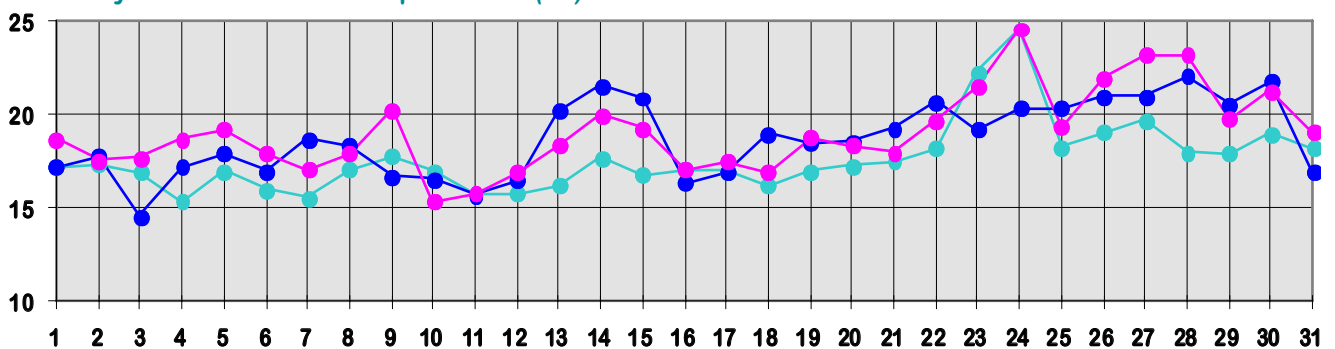
Mean air temperatures for July were close to or a little higher than normal generally, but they were slightly below normal in parts of the east and south. They ranged from 14.2°C at Knock Airport to 16.5°C at Waterford (Tycor). Mean maximum temperatures for the month were below normal in many places, but mean minimum values were a degree or more higher than normal at several stations.

As shown by the charts below, daily maximum temperatures were between 14°C and 18°C generally during the first 12 days of the month, around three degrees below normal for July. Daytime temperatures rose during the second half of the month, especially during the final week. The highest daily values of the month at almost all stations were measured on either the 24th or 28th, with the month's highest temperature, 25.9°C, recorded at Ardtarmon, Co. Sligo, on the 28th. The month's lowest air temperature, 2.6°C, was measured at Ardee (Boharnamoe), Co. Louth, on the 21st. Slight ground frost was recorded in a few locations, mainly on the 4th and 21st. The lowest grass minimum temperature, -0.5°C, was recorded at Cavan (Loreto

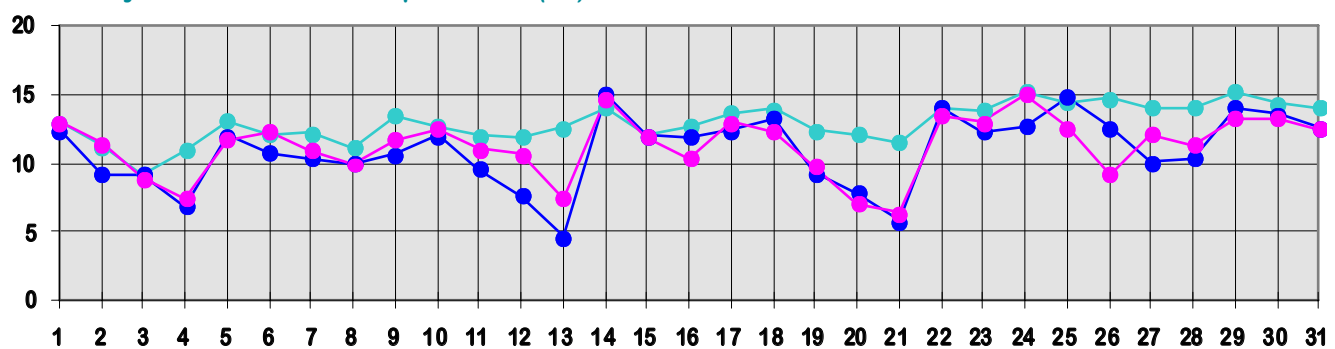


College) on the 4th and 13th; Casement Aerodrome's value of -0.3°C on the 21st was its lowest such value for July since 1971.

Daily 0-24h maximum temperatures (°C)



Daily 0-24h minimum temperatures (°C)



● Valentia Observatory

● Dublin Airport

● Birr

County/ Station	°C									
	Mean max.	Mean min.	Mean/ deviation from 1961-90 average		Highest max./date	Lowest min./date	Lowest grass min./date		Days with air frost ground frost	
<b>CO. CARLOW</b>										
CARLOW (OAK PARK)	19.4	11.9	15.7	0.4	24.6 28	5.9 13	1.9 21	0	0	
<b>CO. CAVAN</b>										
BALLYHAISE	18.5	11.5	15.0		23.2 28	5.7 21	4.6 21	0	0	
CAVAN (LORETO COLLEGE)	19.0	11.5	15.3		23.6 27	5.4 21	-0.5 4 13	0	2	
<b>CO. CLARE</b>										
SHANNON AIRPORT	19.1	12.6	15.9	0.1	25.2 24	7.9 13	4.8 13	0	0	
CARRON	18.0	11.5	14.8	0.6	23.4 24	6.4 4	1.0 20	0	0	
<b>CO. CORK</b>										
ROCHE'S POINT	17.9	12.4	15.2	0.0	22.1 18	9.7 13	3.3 4	0	0	
FERMOY (MOORE PARK)	19.0	12.0	15.5	0.3	22.3 22	6.3 13	1.1 4	0	0	
CORK AIRPORT	18.0	11.6	14.8	-0.1	21.2 14	8.3 13	2.4 4	0	0	
SHERKIN ISLAND	18.1	12.8	15.5	0.6	21.1 27	9.7 13	5.7 13 21	0	0	
BALLINCURRIG (PEAFIELD)	18.9	10.9	14.9		22.5 22	5.8 21	2.6 21	0	0	
<b>CO. DONEGAL</b>										
MALIN HEAD	17.0	12.6	14.8	0.9	22.2 23	8.9 9	6.2 9	0	0	
GLENTIES HATCHERY	19.1	11.6	15.4	1.3	25.2 27	4.6 21	2.9 13	0	0	
BALLYSHANNON (CATHLEEN'S FALL)	18.8	12.2	15.5	0.9	24.6 27	7.5 21		0		
<b>CO. DUBLIN</b>										
DUBLIN (PHOENIX PARK)	19.6	12.2	15.9	0.8	23.3 28	6.6 13	2.8 21	0	0	
DUBLIN AIRPORT	18.7	11.5	15.1		22.1 28	4.6 13	2.2 13	0	0	
CASEMENT AERODROME	19.5	11.9	15.7	0.6	23.2 28	5.4 21	-0.3 21	0	1	
DUBLIN (MERRION SQUARE)	18.9	13.2	16.1	-0.2	23.1 14	9.9 21		0		
<b>CO. GALWAY</b>										
GALWAY (UNIV. COLL.)	19.8	11.7	15.8	0.5	24.6 24	6.0 4	2.2 4	0	0	
MAAM VALLEY	18.9	12.0	15.5		24.1 24	6.2 4	3.1 3 4	0	0	
CONNEMARA NATIONAL PARK	17.9	12.2	15.1		24.0 24	9.1 4 13		0		
BALLYGAR	19.3	11.6	15.5		24.0 24 27	5.4 4	2.2 4	0	0	
<b>CO. KERRY</b>										
VALENTIA OBSERVATORY	17.7	13.1	15.4	0.5	24.6 24	9.2 3	4.9 3 4	0	0	
ARDFERT (LISCAHANE)	19.0	12.0	15.5	0.5	25.1 24	8.0 3	6.0 3 4	0	0	
<b>CO. LIMERICK</b>										
MOUNT RUSSELL	18.0	11.6	14.8		23.0 24	7.6 4	4.7 20	0	0	
<b>CO. LOUTH</b>										
ARDEE (BOHARNAMOE)	19.2	10.8	15.0	0.4	23.9 28	2.6 21	0.2 21	0	0	
<b>CO. MAYO</b>										
BELMULLET	18.1	12.5	15.3	1.2	25.0 24	8.6 13	6.0 21	0	0	
STRAIDE	18.9	11.2	15.1	0.5	24.7 24	4.2 4 21	-0.3 21	0	2	
KNOCK AIRPORT	17.3	11.1	14.2		23.2 24	7.5 21	3.1 13	0	0	
<b>CO. MEATH</b>										
WARRENSTOWN	19.5	11.8	15.7	0.8	24.0 23 27	4.7 13	0.1 21	0	0	
<b>CO. OFFALY</b>										
BIRR	19.1	11.9	15.5	0.4	24.6 24	6.4 21	-0.1 21	0	1	
DERRYGREENAGH	19.5	10.3	14.9	0.2	24.6 28	4.8 4	1.5 4	0	0	
<b>CO. SLIGO</b>										
ARDTARMON	19.6	12.3	16.0		25.9 28	7.4 13	4.8 13	0	0	
<b>CO. TIPPERARY</b>										
FETHARD (PARSONSHILL)	18.7	11.4	15.1		24.1 24	7.0 21	4.7 21	0	0	
<b>CO. WATERFORD</b>										
WATERFORD (TYCOR)	20.0	13.0	16.5	1.0	24.9 24	8.9 4		0		
DUNGARVAN (CARRIGLEA)	19.6	12.0	15.8	0.2	23.3 14	6.0 4	3.5 21	0	0	
<b>CO. WESTMEATH</b>										
MULLINGAR	18.9	11.0	15.0	0.3	23.8 27	3.6 4	0.6 4	0	0	
<b>CO. WEXFORD</b>										
JOHNSTOWN CASTLE	18.8	12.3	15.6	0.8	21.8 24	8.3 20	5.5 20	0	0	
JOHN F. KENNEDY PARK	18.9	11.6	15.3	0.2	23.4 24	7.2 4 20	2.8 4 21	0	0	
CLONROCHE (KNOXTOWN)	18.9	11.3	15.1		23.6 24	6.4 4	1.5 21	0	0	

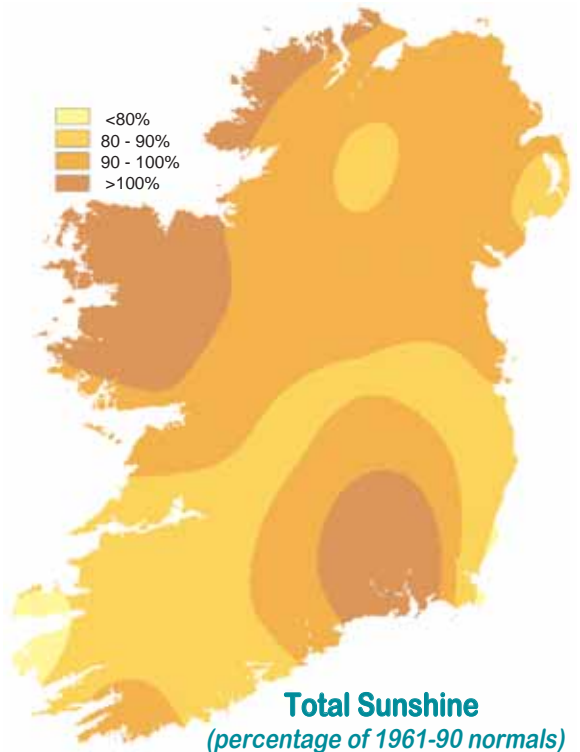
County/ Station	Daily mean (hours/day)	% of average	% of possible	Most in a day/date
<b>CO. CAVAN</b>				
CAVAN (LORETO COLLEGE)	3.96		24	10.5 26
<b>CO. CLARE</b>				
SHANNON AIRPORT	3.96	86	24	11.5 30
<b>CO. CORK</b>				
FERMOY (MOORE PARK)	4.30	91	27	10.0 26
CORK AIRPORT	4.38	81	27	11.9 3
SHERKIN ISLAND	5.82	100	36	15.0 3
BALLINCURRIG (PEAFIELD)	5.06			11.6 3
<b>CO. DONEGAL</b>				
MALIN HEAD	4.41	103	26	13.9 20
BALLYSHANNON (CATHLEEN'S FALL)	3.90	97	23	11.8 27
<b>CO. DUBLIN</b>				
DUBLIN AIRPORT	4.86	91	29	12.4 13
CASEMENT AERODROME	4.31	87	26	11.7 13
<b>CO. GALWAY</b>				
GALWAY (UNIV.COLL.)	4.59	99	28	11.9 2
<b>CO. KERRY</b>				
VALENTIA OBSERVATORY	3.46	76	21	11.1 2
ARDFERT (LISCAHANE)	3.60		22	10.1 22
<b>CO. MAYO</b>				
BELMULLET	4.53	106	27	13.6 3
STRAIDE	4.40			12.4 3
KNOCK AIRPORT	3.57			10.5 19
<b>CO. OFFALY</b>				
BIRR	3.79	89	23	9.9 19 26
<b>CO. WATERFORD</b>				
DUNGARVAN (CARRIGLEA)	5.08	97	31	12.1 20
<b>CO. WEXFORD</b>				
JOHNSTOWN CASTLE	4.67	85	29	11.5 10 27
JOHN F. KENNEDY PARK	5.61	115	35	13.6 22
CLONROCHE (KNOXTOWN)	5.16			12.1 26

Sunshine values are not available for automatic synoptic stations

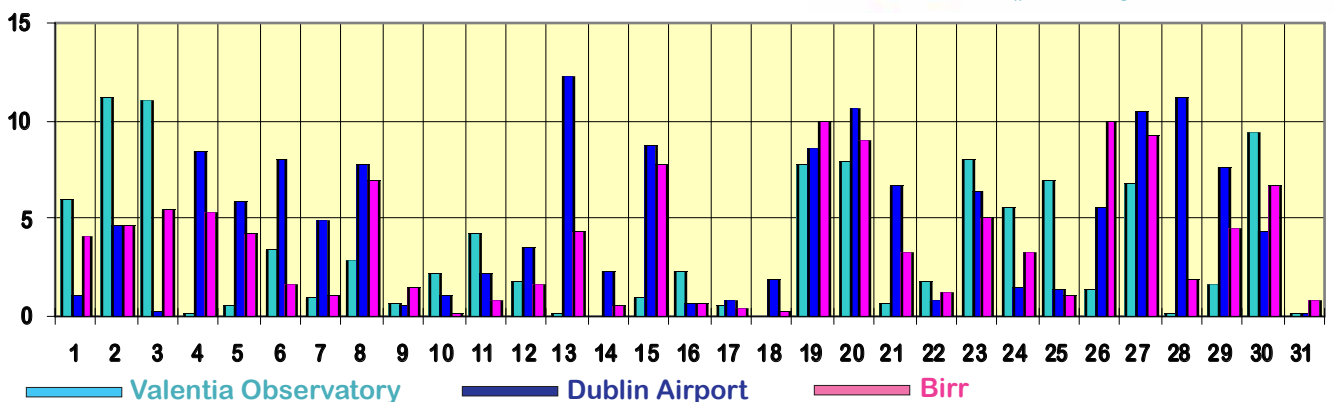
## Dull except in some coastal areas

Sunshine totals for July were below normal over most of the country and were well below normal in the southwest. Totals ranged from 107 hours at Valentia Observatory to 180 hours at Sherkin Island, Co. Cork, with percentage of normal values between 76% of normal at Valentia and 115% at John F Kennedy Park, Co. Wexford. It was the dulllest July since 2003 at several stations.

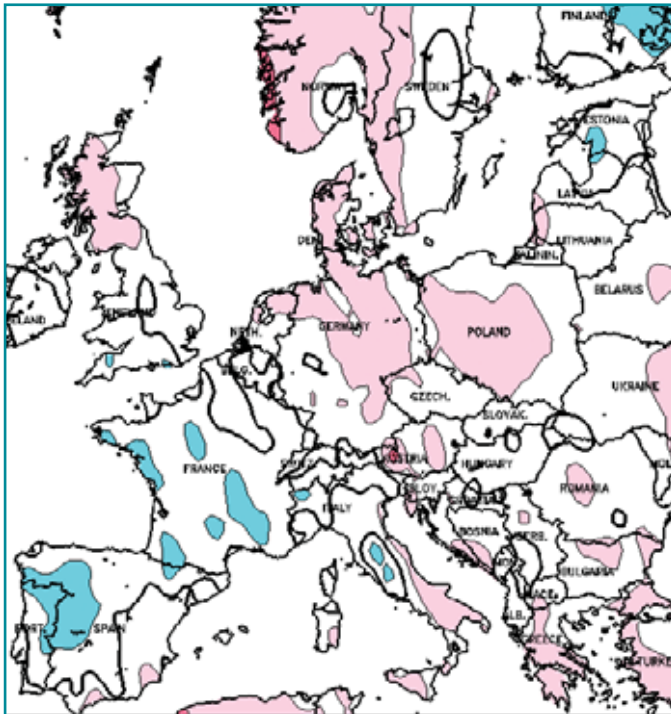
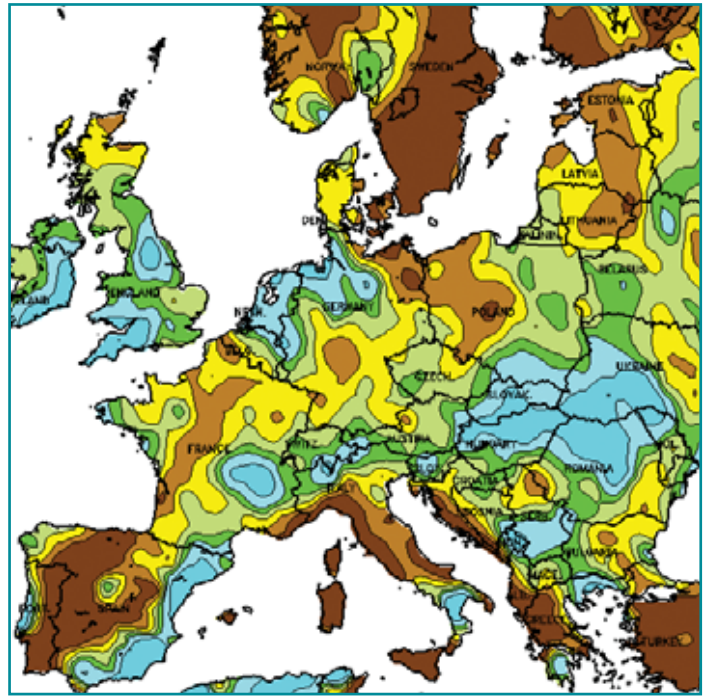
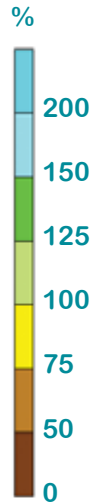
The highest daily sunshine totals were recorded early in the month in the southwest, when Sherkin Island measured 15.0 hours on the 3rd, the highest daily value for July at the station since 1989. Global solar radiation totals were below normal almost everywhere, ranging from 86% of normal at Valentia Observatory to 100% at Belmullet.



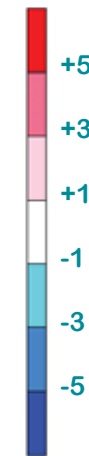
Daily sunshine values(hours)



**JULY RAINFALL**  
(percentage of 1961-1990 normal)



°C



**JULY MEAN TEMPERATURE**  
(difference from 1961-1990 normal)

Data supplied by NOAA  
Climate Prediction Centre,  
US Department of Commerce

Severe storms spawned a deadly tornado on the 24th in central New Hampshire. About 100 homes were damaged and several were completely destroyed. The strong winds brought down trees and power lines, leaving 6,000 homes without power. One fatality was reported.

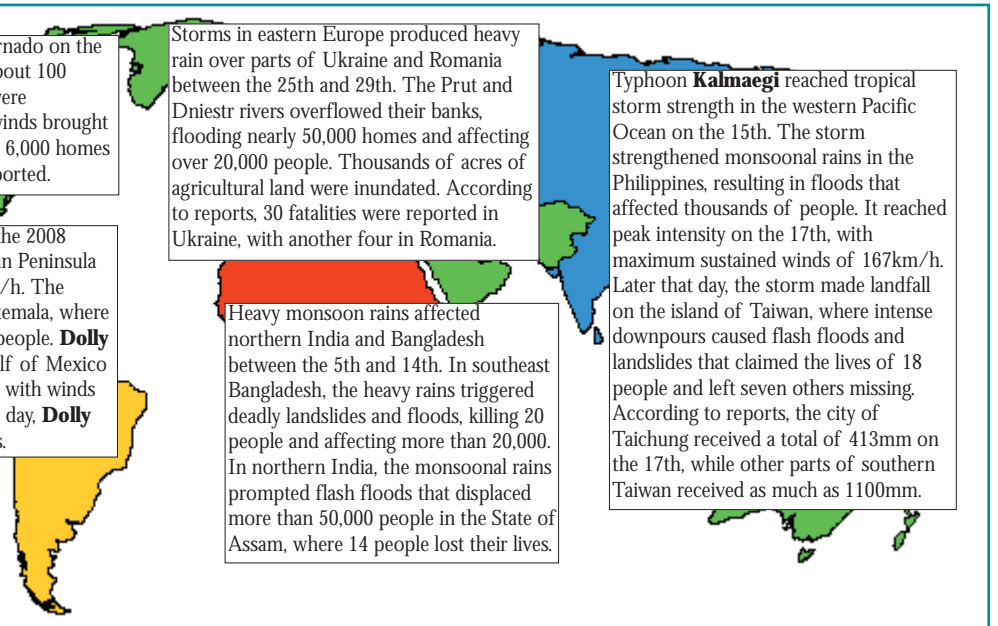
Hurricane **Dolly**, the second hurricane of the 2008 Atlantic season, made landfall in the Yucatan Peninsula on the 21st, with sustained winds of 80 km/h. The storm brought heavy rains to parts of Guatemala, where deadly landslides were triggered, killing 21 people. **Dolly** moved towards the warm waters of the Gulf of Mexico and strengthened to a category 2 hurricane, with winds near 160km/h on the 23rd. Later that same day, **Dolly** made a second landfall over southern Texas.

Storms in eastern Europe produced heavy rain over parts of Ukraine and Romania between the 25th and 29th. The Prut and Dniestr rivers overflowed their banks, flooding nearly 50,000 homes and affecting over 20,000 people. Thousands of acres of agricultural land were inundated. According to reports, 30 fatalities were reported in Ukraine, with another four in Romania.

Heavy monsoon rains affected northern India and Bangladesh between the 5th and 14th. In southeast Bangladesh, the heavy rains triggered deadly landslides and floods, killing 20 people and affecting more than 20,000. In northern India, the monsoonal rains prompted flash floods that displaced more than 50,000 people in the State of Assam, where 14 people lost their lives.

Typhoon **Kalmaegi** reached tropical storm strength in the western Pacific Ocean on the 15th. The storm strengthened monsoonal rains in the Philippines, resulting in floods that affected thousands of people. It reached peak intensity on the 17th, with maximum sustained winds of 167km/h. Later that day, the storm made landfall on the island of Taiwan, where intense downpours caused flash floods and landslides that claimed the lives of 18 people and left seven others missing. According to reports, the city of Taichung received a total of 413mm on the 17th, while other parts of southern Taiwan received as much as 1100mm.

**Global weather highlights of the month**



## LAUNCH OF JASON-2 SATELLITE FOR MAPPING OCEAN SURFACE

The Ocean Surface Topography Mission on the Jason-2 satellite (OSTM/Jason-2) was launched on June 20th 2008 from Vandenberg Air Force Base in California. Less than a month later, the satellite produced its first complete maps of global ocean surface topography, surface wave height and wind speed (see charts below). The mission's aim is to measure trends in global sea surface height and ocean circulation, in support of weather forecasting, climate monitoring and operational oceanography. The four mission participants are the European Meteorological Satellite Organisation (EUMETSAT), France's Centre National d'Études Spatiales (CNES) and two American organisations, National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA). This new mission extends a 16-year continuous record of global sea-level measurements begun by the Topex/Poseidon mission in 1992 and continued by the Jason-1 satellite, launched in 2001.

The data provided by Jason-2 will help scientists to monitor changes in global sea level and the distribution of heat in the ocean. This information is used to monitor climate change, sea-level rise and ocean circulation, and also to develop more accurate weather, ocean and climate forecasts. The data also reveal patterns of sea-level anomalies which are used by scientists to calculate the speed and direction of ocean surface currents. Data from the project to date show that mean sea levels have been rising by about three millimeters a year since 1993. Forecasters can also use the information on sea surface height anomalies to develop models to predict how hurricanes will



strengthen. Determining heat content from sea surface height is possible because warm water is less dense and hence sits higher than cooler water. In some regions, such as inside and outside the Gulf Stream current, the temperature differences result in a one meter difference in sea surface height. Estimates from sea-level variations show how much heat is stored in the upper ocean in areas where hurricanes typically develop and intensify.

The new satellite and its predecessor, Jason-1, are now flying in formation in the same orbit approximately 55 seconds apart, making nearly simultaneous measurements that are allowing scientists to precisely calibrate the new satellite's instruments. Comparisons of data from the two satellites on sea-level anomalies, significant wave height and ocean wind speed all show very close correlation of all measured parameters. The maps shown below were generated from the first 10 days of data, collected once the new satellite reached its operational orbit of 1336 kilometers on July 4th.

*Text and pictures courtesy: EUMETSAT, CNES, NOAA, NASA*  
For more information about OSTM/Jason-2, visit:  
[www.eumetsat.int/HOME/Main/What\\_We\\_Do/Satellites/Jason/index.htm](http://www.eumetsat.int/HOME/Main/What_We_Do/Satellites/Jason/index.htm)

*Below- Jason-2 satellite-derived data for the 10-day period between July 4th and 14th- left: Significant wave height (m) right: Wind speed (m/s)*

