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## Monthly Weather Bulletin December 2009

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# Monthly Weather Bulletin

No. 284

DECEMBER 2009



After a mild start, temperatures fell well below normal during the second half of the month- this picture was taken at The Lough in Cork on the 27th. (picture Irish Examiner)

## COLDEST DECEMBER FOR ALMOST 30 YEARS; WET IN EAST AND SOUTH

After relatively mild, wet and windy weather during the early part of December, there was a change to much colder conditions after mid-month, bringing severe frost and falls of snow in places. Mean air temperatures for the month were below normal everywhere, by around two

degrees generally. It was the coldest December for 28 years over most of the country and the coldest of any month since February 1986 at a few stations. Air and ground frost were severe in many places during the second half of the month, particularly around the Christmas period,



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snow and ice-  
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*Wettest year for more than  
50 years in places*

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

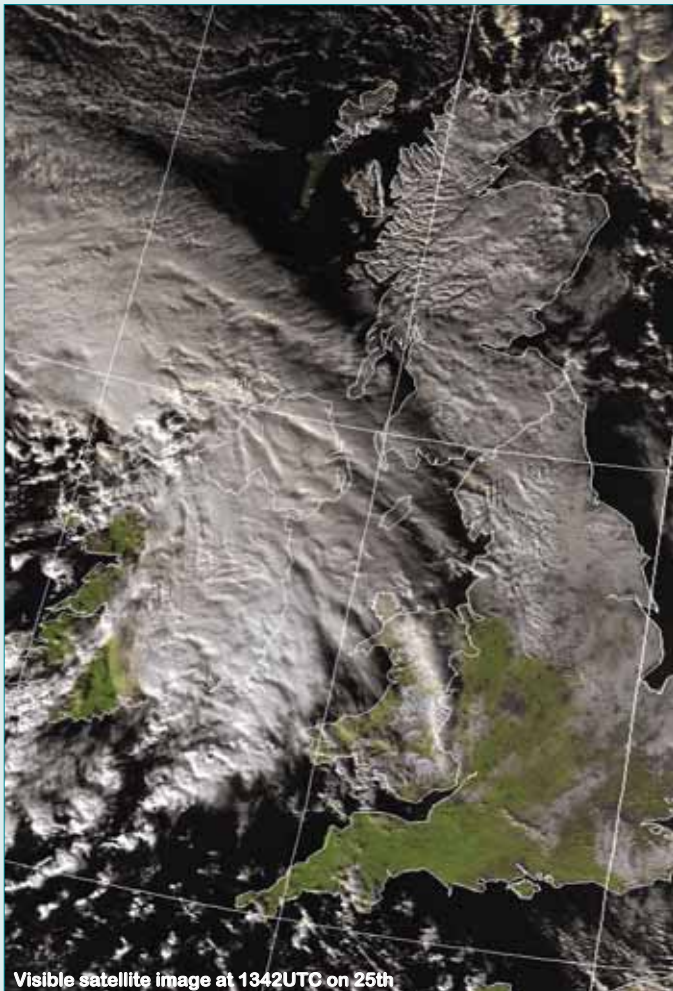
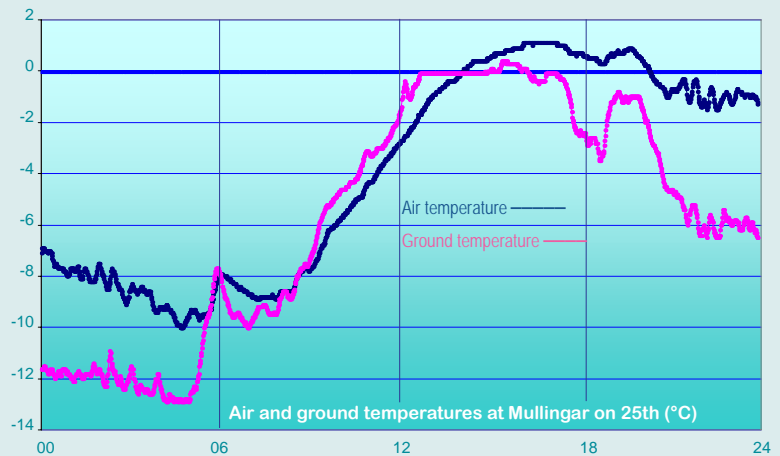
when Mullingar measured its lowest December temperatures for many years. There was a total of between 22 and 27 ground frosts during the month at inland stations, compared with the normal range for December in these areas of between 13 and 17. Some heavy rainfall was recorded during the first

and final weeks, but amounts were generally small at other times. Rainfall totals for the month were below normal at most western and northern stations and above normal elsewhere. There were falls of snow or sleet on several days during the second half of the month, especially in northern and

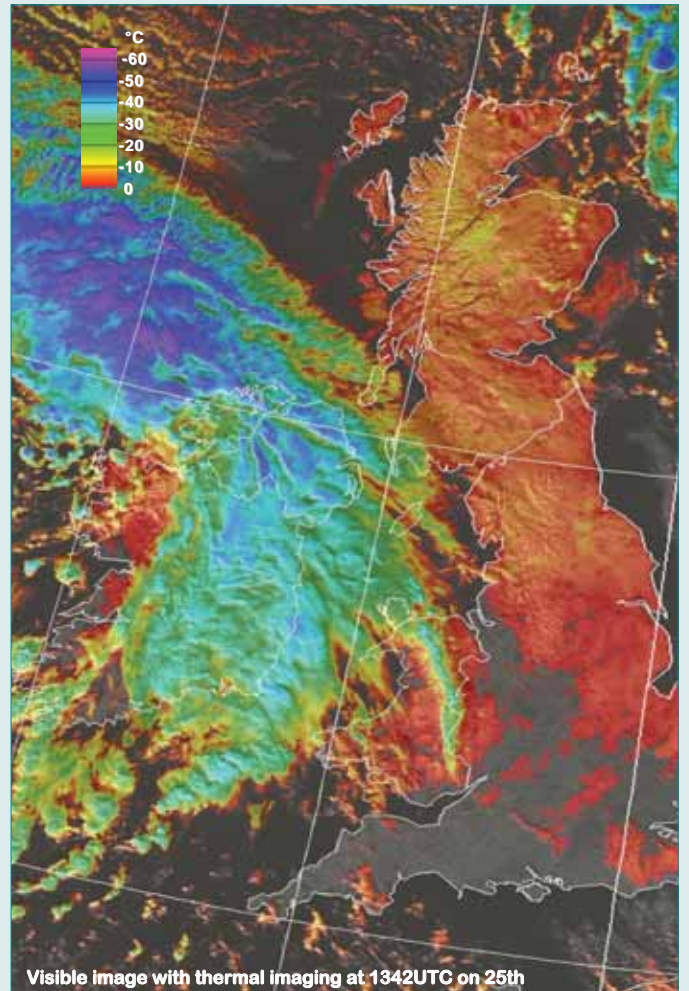
## VERY COLD CHRISTMAS PERIOD

The Christmas period brought severe air and ground frost over most parts of the country, together with snowfalls in many places. The lowest temperatures of the month were recorded between the 23rd and 25th, when freezing fog affected inland areas in particular. Mullingar recorded an air temperature of  $-10.0^{\circ}\text{C}$  and a grass minimum value of  $-13.0^{\circ}\text{C}$  on the morning of the 25th (see chart right); this was the lowest air temperature for any month at the station since January 1982 and the lowest ground temperature there for December since 1950. Later that morning, a band of rain, sleet or snow moved eastwards across the country, bringing accumulations of snow over high ground. Pictured below are satellite images from the early afternoon of the 25th, as the band of precipitation lay over the east and north of Ireland. The visible image on the left shows the extent of lying snow over northern Britain. On the right is the same image but with thermal imaging added, showing the temperature of the cloud tops and much of the land area well below freezing, while the dark grey colour reflects a relatively warm sea.

(satellite images courtesy Wokingham Weather, [www.woksat.info/wwp2.html](http://www.woksat.info/wwp2.html))



Visible satellite image at 1342UTC on 25th



Visible image with thermal imaging at 1342UTC on 25th

**upland areas. Most stations recorded between ten and 17 wetdays during the month (days with 1mm or more rainfall), but there were more than 20 wetdays in the west and southwest. Sunshine totals were above normal everywhere and were well above normal near Atlantic coasts. Most stations had their sunniest December since 2001.**

**1st to 9th:** Atlantic weather systems were the dominant influence during this period, continuing the spell of very unsettled conditions since early November. Rain or showers were recorded each day, heaviest in southern and western areas. Temperatures were above normal with little or no air frost, while winds were strong throughout, between southwesterly and northwesterly in direction.

**10th to 18th:** Pressure rose over Ireland as an anticyclone intensified to the east, later drifting northwards. This brought the first spell of mainly dry weather over Ireland for several weeks. Wintry showers developed in coastal areas later in the period, but these were mostly light. Southerly winds at first backed northeasterly later in the period, bringing a drop in temperatures and allowing frost to become widespread. Many

days during this period were sunny, especially in western areas.

**19th to 31st:** Ireland lay in a very cold northerly airstream, later veering northeasterly. Wintry showers affected coastal areas on many days, with widespread falls of rain, sleet or snow in the periods 25th/26th and 29th/30th; some falls during this latter period of over 50mm resulted in flooding in places, accompanied by northeasterly gales. Temperatures were well below normal throughout, with severe frost between the 19th and 25th; freezing fog prevented daytime temperatures from rising above 0°C in some inland areas on the 23rd and 24th.

**Wind and elements:** Mean windspeeds for the month of between 7 and 13 knots (13 and 24km/h) were near normal for December. The month's strongest winds were on the 6th and 30th, with the highest gust of 58 knots (107km/h) recorded in places on both of these days. Snow fell on most days between the 17th and 31st, especially in northern areas, while hail was most widespread between the 19th and 22nd. Isolated thunderstorms were recorded on several days, but they were more widespread in northwestern areas on the 21st/22nd.



**Right**

*By the end of the month, freezing conditions had caused ice to form on this fountain in Cork's Grand Parade. (picture Irish Examiner)*

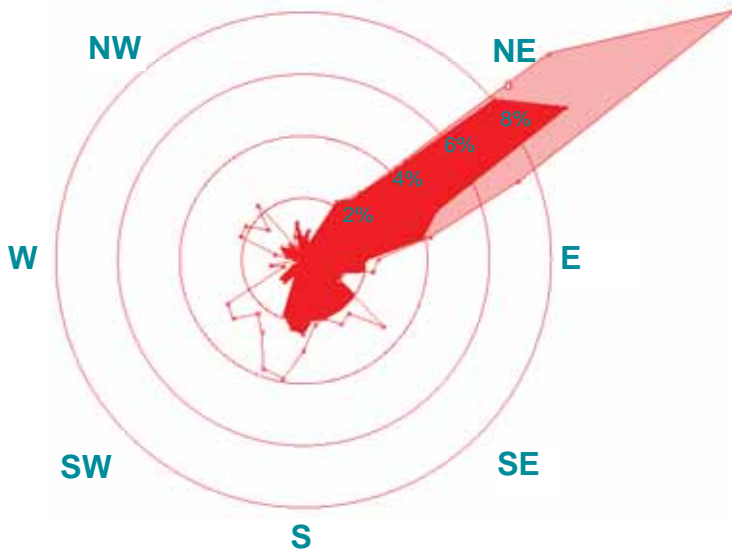
County / Station	WIND (KNOTS)										ELEMENTS				
	Mean speed	Max. dir.	10-min. speed	mean date/hour	Max. dir.	Gust speed	date/time	Days with gales	gale gusts	Hours with gale gusts	Snow	Snow Lying	Hail	Thunder	Fog
<b>CO. CARLOW</b> CARLOW (OAK PARK)	6.8	160°	22	1/14	060°	37	31/0100	0	2	2					
<b>CO. CAVAN</b> BALLYHAISE	6.0	060°	21	30/18	070°	35	30/1839	0	2	8					
<b>CO. CLARE</b> SHANNON AIRPORT	8.2	050°	32	30/24	050°	47	30/2126	0	4	24	2	0	0	0	6
<b>CO. CORK</b> ROCHE'S POINT	13.0	150°	34	1/12	070°	46	30/2342	2	13	103					
				5/16	070°	46	31/0009								
CORK AIRPORT	10.6	060°	34	31/02	070°	48	31/0117	1	8	36	3	1	0	0	6
<b>CO. DONEGAL</b> MALIN HEAD	13.0	070°	47	30/16	220°	58	6/1727	3	13	109	7	0	6	1	0
					070°	58	30/1610								
<b>CO. DUBLIN</b> DUBLIN AIRPORT	11.3	070°	37	30/17	80°	52	30/1702	1	5	51	6	0	3	0	4
CASEMENT AERODROME	9.7	080°	35	30/16	80°	55	30/1506	1	7	50	7	0	3	0	3
<b>CO. KERRY</b> VALENTIA OBSERVATORY	9.6	070°	30	29/14	60°	52	31/0020	0	14	79	1	0	4	0	0
		060°	30	31/01											
<b>CO. MAYO</b> BELMULLET	10.8	240°	34	6/15	70°	58	30/2023	1	17	131	8	0	11	2	0
KNOCK AIRPORT	8.6	060°	27	30/23	50°	45	30/1903	0	5	17	11	10	1	0	14
<b>CO. TIPPERARY</b> GURTEEN	7.6	160°	27	1/12	160°	36	1/1249	0	1	6					
<b>CO. WESTMEATH</b> MULLINGAR	5.6	060°	21	30/15	50°	37	30/2223	0	1	8					
<b>CO. WEXFORD</b> JOHNSTOWN CASTLE	7.6	080°	23	30/23	80°	38	30/2347	0	5	17					

Valentia Observatory

Dublin Airport

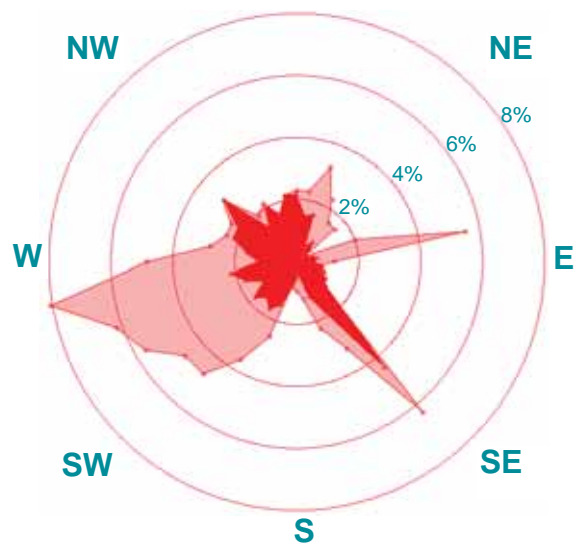
Calm: 0.4%

N



Calm: 0.0%

N

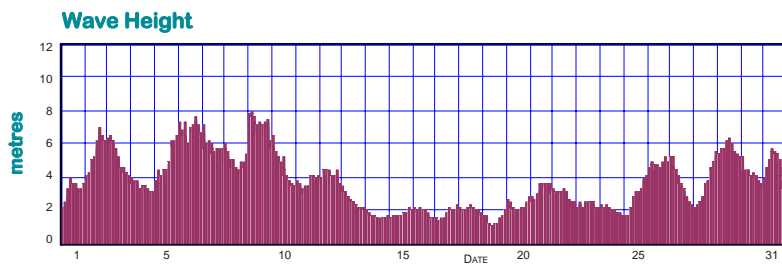
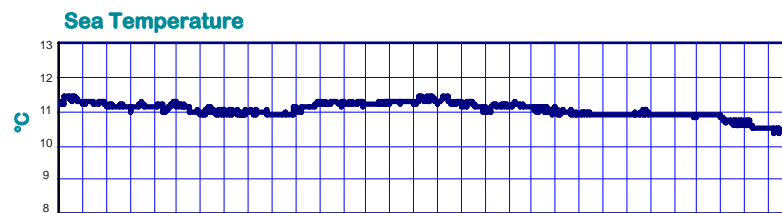
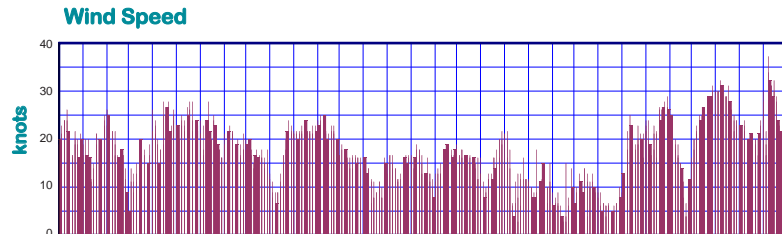
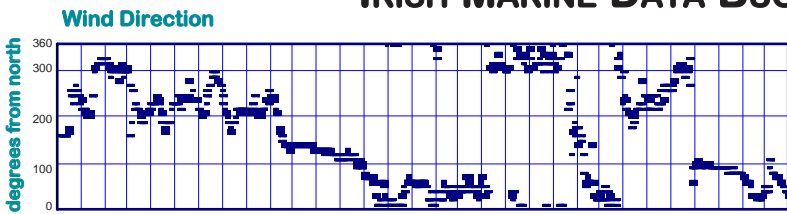


1-10 knots

>10 knots

PERCENTAGE FREQUENCY OF WIND DIRECTION

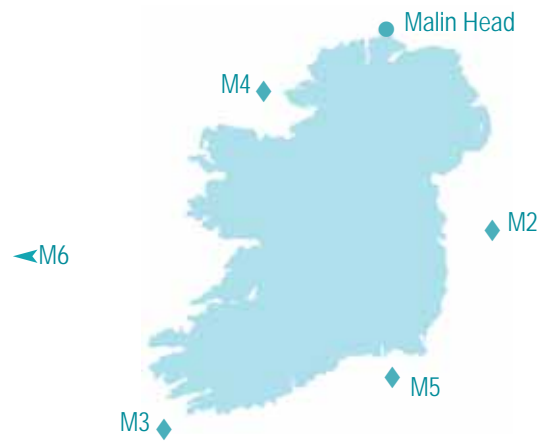
### MARINE OBSERVATIONS FROM IRISH MARINE DATA BUOY NETWORK



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

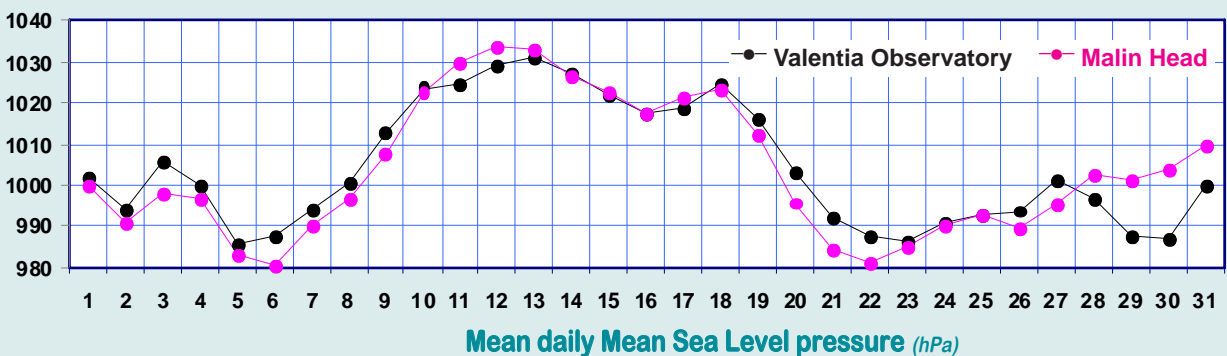
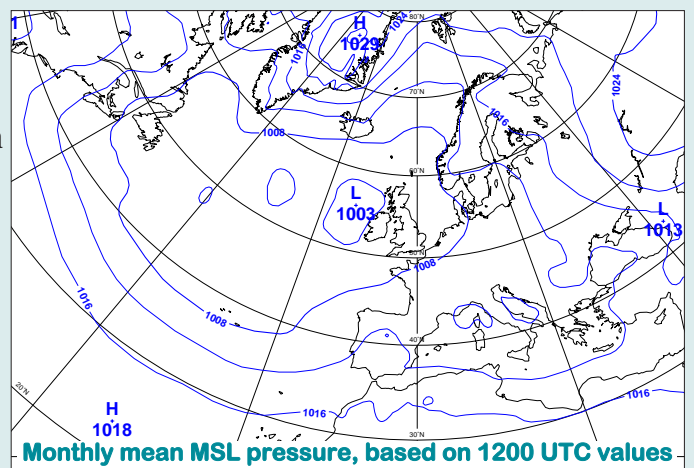
Buoy	Sea surface temp. (°C)	Mean wind speed (knots)	Max. 10-min wind (knots)	Mean wave height (m.)	Max. wave height (m.)
M2		not available			
M3	11.0	17.3	37	3.6	8.0
M4	10.7	14.2	37	3.7	9.3
M5	11.1	n/a	n/a	2.5	5.1
M6	11.8	20.6	48	4.4	9.6
Malin Head	11.1				

#### Summary of Mean Monthly Values



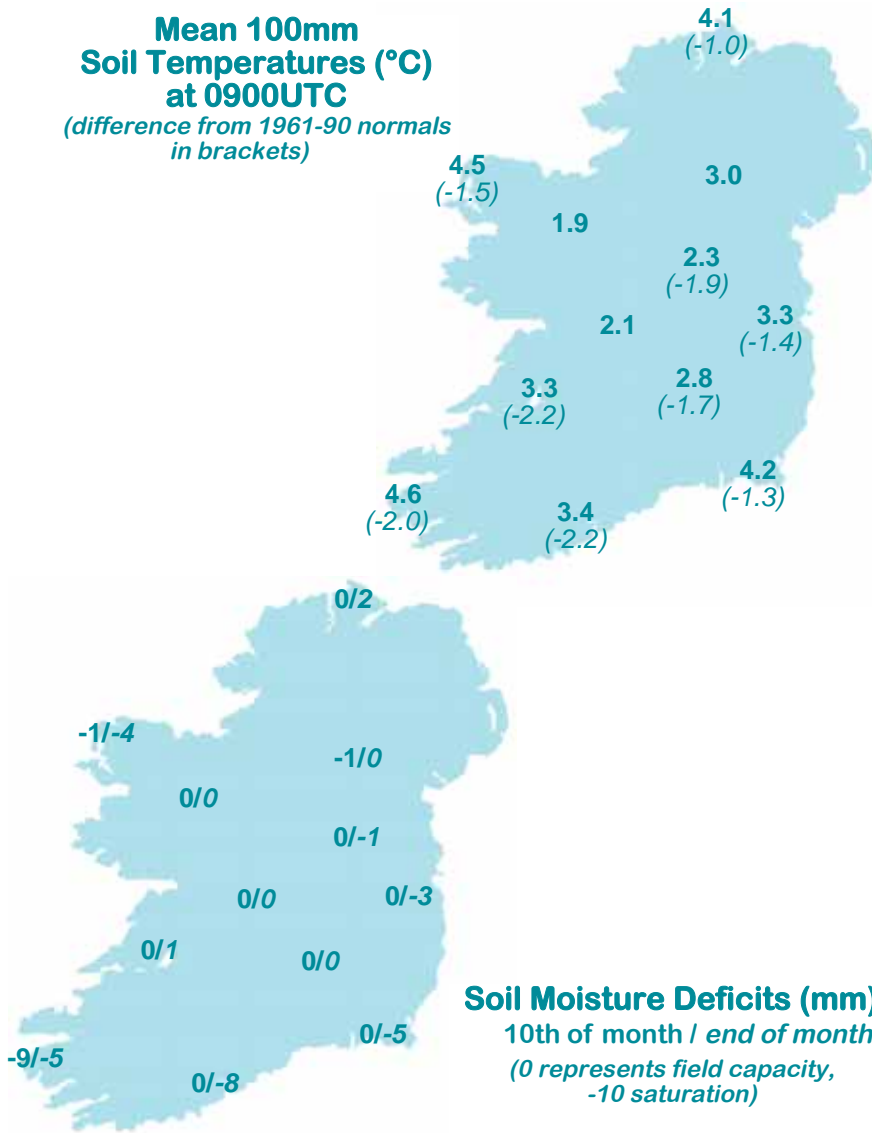
### MEAN ATMOSPHERIC PRESSURE

Mean sea level pressure values for the month were almost uniform across the country, at around 1005hPa everywhere, between 4hPa and 7hPa below normal. Pressure was low at the beginning and end of the month, but rose well above normal around mid-month, when anticyclonic conditions dominated. The month's lowest pressure value of 974.1hPa was recorded at Belmullet on the 5th, while the highest value of the month, 1036.0hPa, was measured at Malin Head on both the 12th and 13th.



**Mean 100mm Soil Temperatures (°C) at 0900UTC**

(difference from 1961-90 normals in brackets)

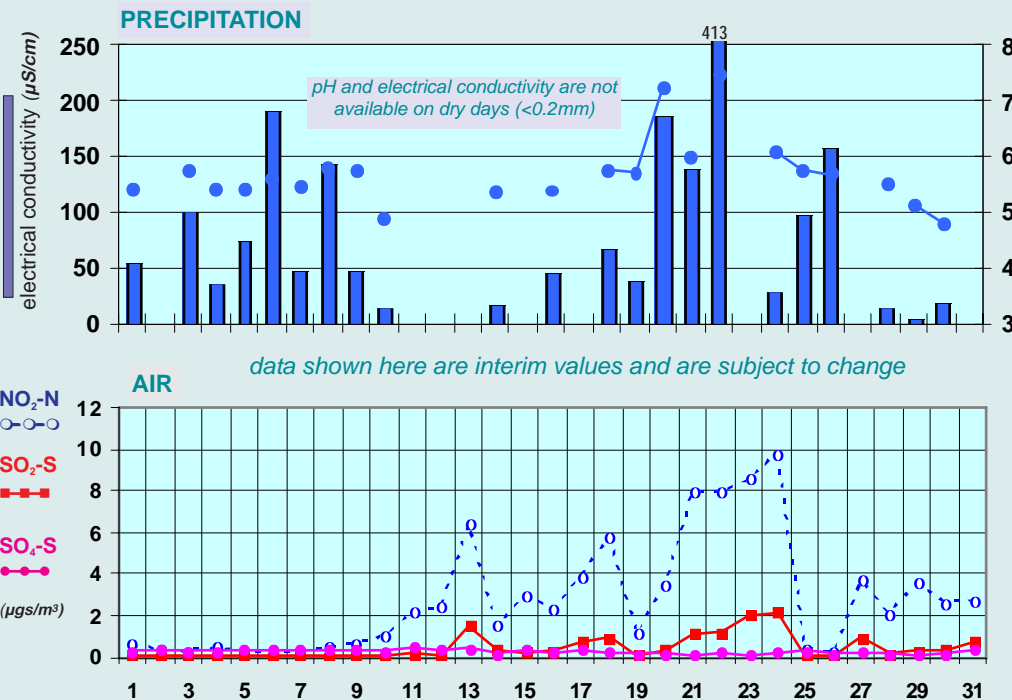


**Soil Temperatures at 0900UTC**

County/ Station	°C		
	100mm	200mm	300mm
<b>CO. CARLOW</b>			
CARLOW (OAK PARK)	2.8	3.6	3.8
<b>CO. CAVAN</b>			
BALLYHAISE	3.0	4.2	5.0
<b>CO. CLARE</b>			
SHANNON AIRPORT	3.3	4.0	5.8
CARRON	4.5		4.7
<b>CO. CORK</b>			
ROCHE'S POINT	4.5	5.7	6.1
FERMOY (MOORE PARK)	4.3	5.0	5.4
MOOREPARK	3.8	4.5	5.3
CORK AIRPORT	3.4	4.5	6.1
SHERKIN ISLAND	6.6	7.1	7.6
BALLINCURRIG (PEAFIELD)	3.3	3.4	5.3
<b>CO. DONEGAL</b>			
MALIN HEAD	4.1	5.8	7.3
<b>CO. DUBLIN</b>			
DUBLIN (PHOENIX PARK)	2.3	3.7	4.9
DUBLIN AIRPORT	2.7	3.5	4.4
CASEMENT AERODROME	3.3	4.3	5.4
<b>CO. KERRY</b>			
VALENTIA OBSERVATORY	4.6	5.6	7.0
<b>CO. LIMERICK</b>			
MOUNT RUSSELL	3.1	3.8	
<b>CO. MAYO</b>			
BELMULLET	4.5	5.4	6.2
STRAIDE	3.1		
KNOCK AIRPORT	1.9	2.9	4.9
<b>CO. MEATH</b>			
WARRENTOWN	2.3	3.5	4.0
<b>CO. TIPPERARY</b>			
GURTEEN	2.1	2.6	3.6
FETHARD (PARSONSHILL)	3.3	4.0	
<b>CO. WATERFORD</b>			
DUNGARVAN (CARRIGLEA)		4.2	4.7
<b>CO. WESTMEATH</b>			
MULLINGAR	2.3	3.4	4.5
<b>CO. WEXFORD</b>			
JOHNSTOWN CASTLE	4.2	5.0	5.2
JOHN F. KENNEDY PARK	3.1	3.9	6.0
CLONROCHE (KNOXTOWN)	3.8	5.0	5.8

**Soil Moisture Deficits (mm)**  
10th of month / end of month  
(0 represents field capacity, -10 saturation)

**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	8.1	-	2	2	6.0	-1.7	2.2	-	-4.6	18	6	8	0	-6.5	20	8	-	-	11.4	-
	21-end	26.2	-	4	3	2.6	-3.2	-0.3	-	-7.1	25	9	0	0	-9.7	25	10	-	-	9.7	-
	month	64.6	-	14	12	5.6	-0.9	2.4	-	-7.1	25	17	26	1	-9.7	25	22	-	-	32.3	-
<b>Co. Cork</b>	1-10	48.7	-	10	9	10.5	2.9	6.7	-	-1.4	1	2	28	2	-2.6	1	4	6.2	6.9	15.6	-
Fermoy	11-20	1.6	-	3	0	6.6	-0.4	3.1	-	-2.8	19	6	9	0	-3.5	19	9	4.9	6.1	21.1	-
	21-end	30.0	-	4	4	4.2	-2.9	0.7	-	-7.0	25	8	3	0	-8.2	25	10	2.1	3.4	13.5	-
	month	80.3	74	17	13	7.0	-0.2	3.4	-2.4	-7.0	25	16	40	2	-8.2	25	23	4.3	5.4	50.2	123
<b>Co. Donegal</b>	1-10	60.1	-	9	8	8.9	2.6	5.8	-	-1.9	1	2	19	0	-4.5	1	5	-	-	-	-
Glenties	11-20	16.7	-	7	6	6.8	0.3	3.6	-	-3.1	14	7	10	0	-5.8	14	8	-	-	-	-
	21-end	11.6	-	7	6	3.2	-2.2	0.5	-	-7.7	25	8	0	0	-9.8	25	11	-	-	-	-
	month	88.4	58	23	20	6.2	0.2	3.2	-2.0	-7.7	25	17	30	0	-9.8	25	24	-	-	-	-
<b>Co. Kerry</b>	1-10	48.6	-	10	10	10.6	4.6	7.6	-	-0.4	1	1	34	2	-4.3	1	2	-	-	15.0	-
Ardfert	11-20	11.3	-	5	4	6.7	-1.2	2.8	-	-4.9	18	8	10	0	-8.5	19	8	-	-	15.0	-
	21-end	79.6	-	9	8	3.9	-0.5	1.7	-	-4.3	24	6	3	0	-7.8	24	11	-	-	16.5	-
	month	139.5	-	24	22	6.9	0.9	3.9	-2.8	-4.9	18	15	46	2	-8.5	19	21	-	-	46.5	-
<b>Co. Monaghan</b>	1-10	35.8	-	9	7	8.6	1.4	5.0	-	-3.5	1	3	16	1	-3.9	1	5	-	-	-	-
Carrickmacross	11-20	2.9	-	4	1	6.2	-0.9	2.7	-	-4.6	19	5	7	0	-7.0	19	8	-	-	-	-
	21-end	22.3	-	4	3	3.1	-3.9	-0.4	-	-7.6	25	9	1	0	-7.9	25	10	-	-	-	-
	month	61.0	68	17	11	5.8	-1.2	2.3	-	-7.6	25	17	24	1	-7.9	25	23	-	-	-	-
<b>Co. Waterford</b>	1-10	70.7	-	9	8	10.5	3.0	6.8	-	-2.5	1	3	29	3	-3.5	1	3	-	6.4	15.4	-
Dungarvan	11-20	1.2	-	1	1	7.0	1.2	4.1	-	-2.6	20	3	11	0	-4.7	20	6	-	5.4	27.4	-
	21-end	69.6	-	8	7	5.1	-2.2	1.5	-	-6.5	25	8	4	0	-7.1	25	8	-	2.4	14.1	-
	month	141.5	-	18	16	7.5	0.6	4.1	-2.1	-6.5	25	14	44	3	-7.1	25	17	-	4.7	56.9	128
<b>Co. Wexford</b>	1-10	60.6	-	8	8	9.9	2.9	6.4	-	-1.4	1	2	25	1	-5.1	1	6	4.9	7.6	17.5	-
J.F.K. Park	11-20	0.9	-	2	0	6.5	1.4	4.0	-	-2.6	20	3	9	0	-6.0	20	8	3.5	6.9	19.3	-
	21-end	77.4	-	7	6	4.1	-1.7	1.2	-	-4.0	25	9	1	0	-7.2	24	9	1.2	3.9	18.8	-
	month	138.9	132	17	14	6.7	0.8	3.8	-2.5	-4.0	25	14	35	1	-7.2	24	23	3.1	6.0	55.6	123

MEASURED POTENTIAL EVAPOTRANSPIRATION (P.E.) AND SOIL MOISTURE						P.E. (Penman)		GLOBAL SOLAR RADIATION (MJ/sq.m.)				
County/Station	Period	P.E. (mm)		Soil Moisture (mm)		Station	total(mm)	1st-10th	11th-20th	21st-end	Total	
<b>Co. Kerry</b>		Amount	Deficit	Accum'ltd	Deficit	Surplus	<b>Co. Carlow</b>					
Valentia Obs.	1-10	18.9	-	0	76		Carlow (Oak Park)*	7	19.36	18.69	19.14	57.19
	11-20	8.3	-	0	19		<b>Co. Cavan</b>					
	21-end	9.4	-	0	62		Ballyhaise*	5	15.06	17.34	18.62	51.02
	month	36.6					<b>Co. Clare</b>					
<b>Co. Wexford</b>							Shannon Airport	9	global solar radiation values for stations marked * are provisional			
Johnstown Castle	1-10						<b>Co. Cork</b>					
	11-20				not available		Cork Airport	7				
	21-end						Roche's Point*		21.50	28.87	26.20	76.57
	month						<b>Co. Donegal</b>					
							Malin Head	8	14.87	14.52	15.01	44.40
							<b>Co. Dublin</b>					
							Dublin Airport	9	19.72	17.63	21.23	58.58
							Casement Aerodrome	8				
							<b>Co Kerry</b>					
							Valentia Obs.	17	19.71	28.97	25.22	73.90
							<b>Co. Mayo</b>					
							Belmullet	11	18.76	19.65	18.36	56.77
							Knock Airport	5				
							<b>Co. Tipperary</b>					
							Curteen*	6	19.08	21.14	19.94	60.16
							<b>Co. Westmeath</b>					
							Mullingar*	4	18.62	23.08	19.63	61.33
							<b>Co. Wexford</b>					
							Johnstown Castle*	10	19.49	18.44	22.14	60.07

MONTHLY EVAPORATION (MM) FROM CLASS A PAN			
County	Station	Monthly Rainfall (mm)	Monthly Evaporation (mm)
<b>Cork</b>	Fermoy (Moorepark)	80.3	4.6
<b>Kerry</b>	Valentia Observatory	186.4	26.4
<b>Kerry</b>	North Kerry Landfill	169.1	1.3
<b>Mayo</b>	Newport (Furnace)	133.8	0.3
<b>Offaly</b>	Derrygreenagh	76.8	0.1
<b>Waterford</b>	Dungarvan (Carriglea)	141.5	0.5
<b>Wexford</b>	J.F.K. Park	138.9	4.8

**Tuesday 1st:** Rain in the south and southwest early in the morning, heavy in places. The rain gradually moved northeastwards, affecting all areas, finally clearing the northeast by the evening. Just the odd sunny spell, mainly in the northwest. Some mist developed during the night with a slight ground frost in the midlands. Winds were strong and gusty, southeasterly.

**Rainfall:** 1 to 24mm, heaviest at Valentia, 1mm at Dublin Airport

**Temperature:** max. 7°C to 12°C, min. -2°C to 6°C, ground temperatures down to -7°C in the east

**Sunshine:** nil to 1 hour, sunniest at Belmullet

**Wednesday 2nd:** Scattered showers in the west overnight spread eastwards in the morning, clearing the east coast during the afternoon. Some sunny spells during the day, mainly in the northwest, generally overcast elsewhere. Winds were strong and gusty, variable in direction.

**Rainfall:** nil to 10mm, heaviest at Belmullet, nil at Malin Head

**Temperature:** max. 8°C to 11°C, min. 3°C to 8°C, ground temperatures down to -1°C at Claremorris

**Sunshine:** 1 to 4 hours, sunniest at Belmullet, 1 hour at Malin Head

**Thursday 3rd:** Rain, heaviest in parts of Ulster, moved eastwards overnight. Showers followed, affecting all areas during the morning. Sunny spells also, particularly in the east. Cold by evening with a slight to sharp ground frost in places. Winds were variable, strong and gusty, easing by evening.

**Rainfall:** nil to 5mm, heaviest at Belmullet, nil at Casement Aerodrome

**Temperature:** max. 5°C to 9°C, min. 0°C to 5°C, ground temperatures down to -5°C at Mullingar

**Sunshine:** trace to 6 hours, sunniest at Dublin Airport, trace at Valentia

**Friday 4th:** A very cold night with severe ground frost, leading to icy roads in places. Dull and overcast generally with rain or drizzle throughout. Heavy rain moved into the southwest during the afternoon and spread northeastwards during the night. Winds were light to moderate, variable in direction.

**Rainfall:** 2 to 15mm, heaviest at Johnstown Castle, 2mm at Claremorris

**Temperature:** max. 9°C to 12°C, min. -2°C to 8°C, ground temperatures down to -6°C at Mullingar

**Sunshine:** nil to <1 hour

**Saturday 5th:** Outbreaks of rain overnight, heavy at times, clearing most parts by morning. Rain moved into the southwest by mid-morning and spread quickly northeastwards over the rest of the country, heaviest in the south. Sunny spells in northern areas during the morning. Generally dry by midnight. Winds were southerly, light to moderate, increasing fresh to strong and gusty.

**Rainfall:** 2 to 23mm, heaviest at Valentia, 2mm at Casement Aerodrome

**Temperature:** max. 10°C to 12°C, min. 2°C to 8°C, ground temperatures down to -1°C at Belmullet

**Sunshine:** nil to trace generally, 3 hours at Malin Head

**Sunday 6th:** Some showers in the west overnight. The showers increased during the morning and afternoon, some of them heavy in Connacht and Ulster. Sunny in the east, cloudier further west. Winds were generally moderate, south or southwesterly, stronger in the west and north.

**Rainfall:** nil to 5mm, heaviest at Claremorris, nil at Dublin Airport

**Temperature:** max. 7°C to 10°C, min. 3°C to 7°C, ground temperatures below zero at Carlow (Oak Park)

**Sunshine:** <1 to 4 hours, sunniest in the east, <1 hour at Malin Head

**Monday 7th:** Heavy showers in the southeast during the early hours. Towards morning, a spell of heavy rain moved into the west, becoming lighter as it crossed the country. Some sunny spells in the south and west. Mostly dry countrywide by early evening. Winds were moderate southerly, veering westerly and increasing fresh in the west, decreasing southwesterly by evening.

**Rainfall:** 1 to 15mm, heaviest at Belmullet, 1mm at Dublin Airport

**Temperature:** max. 7°C to 10°C, min. 2°C to 5°C, ground temperatures below zero at Carlow (Oak Park) and Mullingar

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

**Tuesday 8th:** Generally dry overnight. Rain developed along the southwest coast and spread across most of the country during the morning, continuing in many areas during the early afternoon. Generally overcast, a few sunny breaks in the southwest. A clearance in the west spread to all areas after dark. Winds were strong and gusty, south to southwesterly in direction.

**Rainfall:** trace to 12mm, heaviest at Valentia, trace at Casement Aerodrome

**Temperature:** max. 10°C to 13°C, min. 3°C to 8°C, ground temperatures

down to -1°C at Carlow (Oak Park)

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

**Wednesday 9th:** Bands of showery rain crossed the country from northwest to southeast during the morning and afternoon, becoming dry by evening. Dull in the south and southwest, broken sunshine elsewhere. Winds were southerly, moderate to strong, becoming light by evening.

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

**Temperature:** max. 8°C to 12°C, min. 3°C to 7°C, ground temperatures down to -1°C at Claremorris

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

**Thursday 10th:** A dry day generally, apart from some isolated showers in the west. Sunny spells in most parts during the morning, becoming overcast in the afternoon. Rain moved in over the west by late evening, giving some heavy falls in the southwest. Winds were variable, light to moderate with occasional gusts.

**Rainfall:** nil to 1mm generally, 9mm at Valentia

**Temperature:** max. 6°C to 12°C, min. 0°C to 5°C, ground temperatures down to -4°C at Mullingar

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

**Friday 11th:** Rain in the west, moving northeastwards across the country overnight. Becoming dry in all parts by noon. Just a few sunny spells, mainly in the east. Winds were moderate, southeasterly in direction.

**Rainfall:** nil to 5mm, heaviest at Valentia, nil in the east

**Temperature:** max. 8°C to 12°C, min. 3°C to 10°C, ground temperatures down to -3°C at Casement Aerodrome

**Sunshine:** nil to 1 hour, sunniest at Casement Aerodrome, nil at Cork Airport

**Saturday 12th:** Overnight fog lingered in some western areas until around midday, however, it was a generally dry day with sunny spells. Becoming very cold after dark, with frost developing quickly away from southern coastal areas. Winds were variable, light to moderate.

**Rainfall:** nil to trace

**Temperature:** max. 5°C to 11°C, min. -2°C to 7°C, ground temperatures down to -6°C at Casement Aerodrome

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

**Sunday 13th:** Very cold overnight with severe frost, some mist and freezing fog patches also. The fog lingered in some sheltered areas throughout the day. A dry, cold day elsewhere with sunny spells. Mist and fog became widespread again in the evening. Winds were light, east to northerly in direction.

**Rainfall:** nil

**Temperature:** max. 1°C to 9°C, min. -4°C to 3°C, ground temperatures down to -8°C at Carlow (Oak Park) and Mullingar

**Sunshine:** trace to 7 hours, sunniest at Knock Airport, trace in the east

**Monday 14th:** Cold overnight with widespread frost and fog. The day was mostly dry with occasional drizzle, however, outbreaks of more persistent rain developed in the west late in the evening. Mostly cloudy, some sunshine in the south and southwest. Winds were north or northwesterly in direction, generally light, but moderate in the extreme north.

**Rainfall:** nil to <1mm, heaviest at Knock Airport

**Temperature:** max. 5°C to 10°C, min. -3°C to 7°C, ground temperatures below zero at all inland stations, down to -8°C at Knock Airport

**Sunshine:** nil to 5 hours, sunniest at Valentia

**Tuesday 15th:** A cloudy start to the day with patchy outbreaks of light rain or drizzle, gradually clearing from the north during the morning. Some showers developed in the evening, chiefly near the east and southeast coasts. Winds were light to moderate, north to northeasterly in direction.

**Rainfall:** nil to 9mm, heaviest at Johnstown Castle, nil at Malin Head

**Temperature:** max. 7°C to 10°C, min. -1°C to 7°C, ground temperatures down to -6°C at Gurteen

**Sunshine:** nil to 5 hours, sunniest at Knock Airport, nil at Casement Aerodrome

**Wednesday 16th:** Generally dry overnight with frost in places and mist also. Just a few showers in eastern areas. Sunny spells and scattered showers during the day with fog persisting in places. Showers continued in the early evening before dying out. Winds were light to moderate, northerly in direction.

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

**Temperature:** max. 5°C to 10°C, min. -3°C to 8°C, ground temperatures down to -7°C at Gurteen

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

**Thursday 17th:** Some showers along the northwest and east coasts during the morning, while over the rest of the country it was dry with sunny spells. The showers continued along the east coast for the afternoon and evening, some of hail or light snow. Winds were northeasterly, light to moderate.

**Rainfall:** nil to 8mm, heaviest at Casement Aerodrome

**Temperature:** max. 4°C to 9°C, min. -2°C to 5°C, ground temperatures below zero at all inland stations, down to -6°C at Gurteen

**Sunshine:** 1 to 7 hours, sunniest at Cork Airport, 1 hour at Malin Head

**Friday 18th:** An extremely cold day with temperatures barely above freezing in many places. Sunny in the south. During the afternoon a band of rain, sleet and snow moved slowly across Ulster and Leinster, but weakening as it moved southwards. Scattered snow showers during the late evening in Ulster. Winds were light, variable in direction.

**Rainfall:** nil to <1mm generally, 3mm at Malin Head, 2mm at Johnstown Castle

**Temperature:** max. 0°C to 7°C, min. -6°C to 2°C, ground temperatures below zero at all stations apart from Malin Head, down to -11°C at Gurteen

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

**Saturday 19th:** Another very cold day with some sunny spells, although generally overcast with showers. The showers were of rain, sleet and snow and moved southwards over the country during the day. Light variable winds increased during the day, strongest on northern coasts.

**Rainfall:** <1 to 6mm, heaviest at Valentia, <1mm at Cork Airport

**Temperature:** max. 3°C to 8°C, min. -4°C to 1°C, ground temperatures below zero at all stations, down to -9°C at Carlow (Oak Park)

**Sunshine:** <1 to 4 hours, sunniest at Cork Airport, <1 hour at Malin Head

**Sunday 20th:** Another bitterly cold day with a severe early frost. Remaining dry with sunny spells in parts of the south and east. Wintry showers, mainly in the north and west spread to north Leinster and west Munster for the rest of the day, heavy and thundery at times, with drifting snow caused by the strong northwesterly winds.

**Rainfall:** nil to 10mm, heaviest at Malin Head, nil at Dublin Airport

**Temperature:** max. 0°C to 6°C, min. -3°C to 1°C, ground temperatures below zero at all stations apart from Malin Head, down to -8°C at Carlow (Oak Park)

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

**Monday 21st:** A very cold day with patches of mist or freezing fog in parts. Wintry showers in Ulster, Connacht and west Munster. The showers were more isolated elsewhere with sunny spells. Winds were southwesterly, light to moderate, northwesterly fresh and gusty in the northwest.

**Rainfall:** nil to 4mm, heaviest at Malin Head, nil at Dublin Airport

**Temperature:** max. 1°C to 6°C, min. -5°C to 2°C, ground temperatures below freezing at all stations apart from Malin Head, down to -10°C at Mullingar

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

**Tuesday 22nd:** Heavy wintry showers continued during the night in the west and northwest. Showers persisted across Ulster and on Atlantic coasts of Munster for much of the day. Cloudy in the west and north, sunny elsewhere. Winds were moderate northwesterly in the north, light westerly elsewhere.

**Rainfall:** nil to 3mm, heaviest at Knock Airport, nil in the east

**Temperature:** max. 1°C to 7°C, min. -6°C to 2°C, ground temperatures below freezing at all stations apart from Malin Head, down to -11°C at Mullingar

**Sunshine:** trace to 6 hours, sunniest at Cork Airport, trace at Belmullet

**Wednesday 23rd:** Heavy wintry showers at first in Ulster, dying out during the early hours. Elsewhere it was generally dry and very cold inland with a widespread severe frost and freezing fog. Spells of sunshine in many areas. Rain, sleet or snow moved northwards from the southeast during the evening. Winds were very light and variable in direction throughout.

**Rainfall:** nil to 7mm, heaviest at Johnstown Castle

**Temperature:** max. -1°C to 5°C, min. -7°C to 0°C, ground temperatures below zero at all stations, down to -11°C at Mullingar

**Sunshine:** nil to 6 hours, sunniest at Malin Head, nil at Cork Airport

**Thursday 24th:** Very cold overnight with a severe frost and freezing fog in places. Frost lasted through the morning, with mist in places. The afternoon was mainly dry with sunny spells in many parts. Very cold again by evening with frost setting in. Light variable winds throughout.

**Rainfall:** nil to trace

**Temperature:** max. -3°C to 5°C, min. -9°C to 0°C, ground temperatures below zero at all stations, down to -12°C at Knock Airport

**Sunshine:** 2 to 6 hours, sunniest in the west, 2 hours at Casement Aerodrome

**Friday 25th:** Very frosty overnight, a little milder in the southwest. Rain and some snow in the south and west by early morning. The rain and snow continued to move eastwards during the afternoon, bringing a rise in temperatures everywhere (see page 2). The rain cleared eastwards by early evening and clear spells developed with frost again setting in. Winds were light to moderate, variable.

**Rainfall:** 1 to 9mm, heaviest at Valentia, 1mm at Ballyhaise

**Temperature:** max. 1°C to 9°C, min. -10°C to -1°C, ground temperatures below zero at all stations, down to -13°C at Mullingar

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

**Saturday 26th:** The day was a mixture of sunny spells and scattered showers, the showers heaviest in the northwest, with most sunshine in the east. Milder than recent days. During the evening another band of rain crossed the country from the west. Winds were variable, moderate to strong and gusty.

**Rainfall:** 1 to 21mm, heaviest at Belmullet, 1mm at Carlow (Oak Park)

**Temperature:** max. 2°C to 9°C, min. -3°C to 5°C, ground temperatures below zero at all stations apart from Valentia, down to -7°C at Mullingar

**Sunshine:** nil to 5 hours, sunniest in the east, nil at Knock Airport

**Sunday 27th:** Another very cold day with scattered wintry showers and spells of sunshine. The showers were heaviest in the west, becoming dry in most parts by late evening. There was freezing fog in parts of the midlands during the evening. Winds were strong and gusty northwesterly, easing later.

**Rainfall:** nil to 5mm, heaviest at Belmullet, nil at Dublin Airport

**Temperature:** max. 3°C to 9°C, min. -4°C to 2°C, ground temperatures below zero at all stations, down to -8°C at Carlow (Oak Park)

**Sunshine:** 1 to 7 hours, sunniest at Cork Airport, 1 hour at Malin Head

**Monday 28th:** Bitterly cold overnight with freezing fog and widespread sharp to severe frost. In many areas the fog and frost only cleared for a short while in the afternoon. A generally dry day apart from wintry showers in the northwest. Very little sunshine. Rain in the southwest by evening. Winds were light northeasterly, increasing moderate to fresh and gusty in the south by evening.

**Rainfall:** nil to 3mm, heaviest at Valentia

**Temperature:** max. 1°C to 8°C, min. -6°C to 5°C, ground temperatures below zero at all stations apart from Valentia, down to -11°C at Carlow (Oak Park)

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

**Tuesday 29th:** Rain in the south moved northwards over the country during the day, giving some very heavy falls, particularly in the south and falling as sleet or snow over high ground. Fresh to strong and gusty northeasterly winds in the south overnight moved northwards over the country during the day.

**Rainfall:** <1 to 38mm, heaviest at Valentia, <1mm at Malin Head

**Temperature:** max. 2°C to 6°C, min. 0°C to 4°C, ground temperatures down to -1°C at Ballyhaise

**Sunshine:** nil

**Wednesday 30th:** Another very wet day with rain affecting all areas, falling as sleet and snow on higher ground. As the day progressed, the rain or sleet turned to snow in parts of the midlands and on high ground. Very cold. Overcast throughout. Winds were generally strong east or northeasterly, somewhat lighter inland.

**Rainfall:** <1 to 40mm, heaviest at Casement Aerodrome, <1mm at Malin Head

**Temperature:** max. 2°C to 9°C, min. 0°C to 4°C, ground temperatures below zero at Ballyhaise

**Sunshine:** nil

**Thursday 31st:** Rain and sleet in the southern half of the country continued to gradually clear southwards overnight and through the morning, finally clearing the south coast around noon. Some wintry showers along the east coast in the afternoon. A few sunny spells in the west and north, generally overcast elsewhere. Winds were strong northeasterly, becoming light by evening.

**Rainfall:** nil to 9mm, heaviest at Roche's Point

**Temperature:** max. 2°C to 7°C, min. -4°C to 1°C, ground temperatures below zero at all stations, down to -8°C at Gurteen

**Sunshine:** nil to 3 hours, sunniest at Knock Airport, nil at Valentia

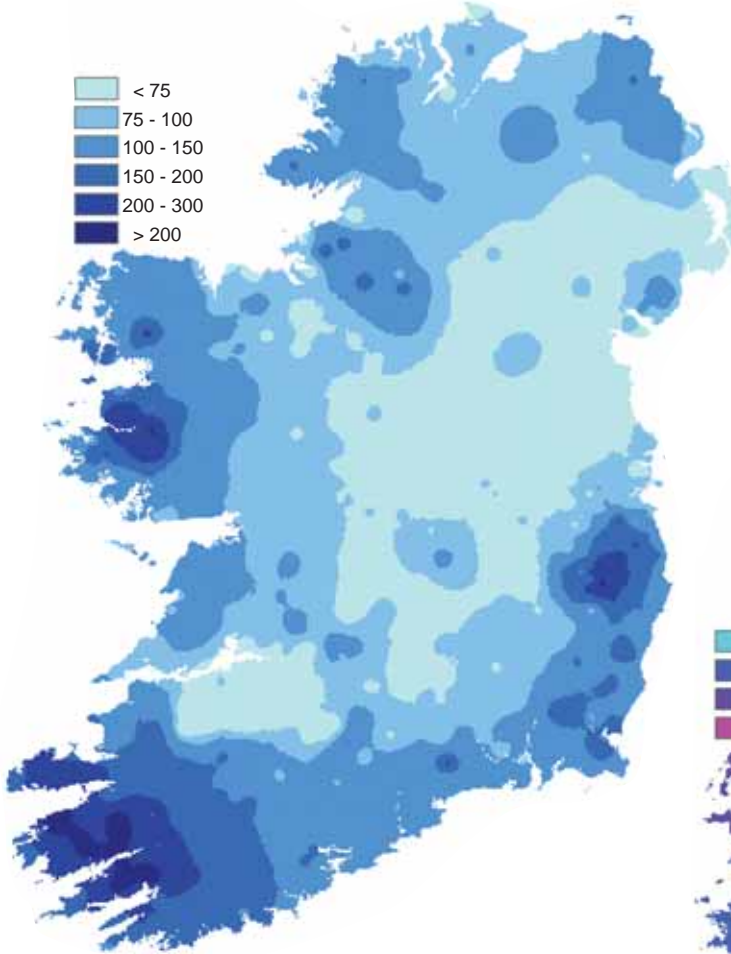
## Dry over northern half, wet in southeast

December rainfall totals were near or below normal over most of the country, but they were higher than normal at many Leinster stations. Totals ranged from 49mm at Gurteen to 232mm at Delphi Lodge, Co. Mayo, with percentage of normal values between 55% at Malin Head and 149% at Johnstown Castle, where it was the wettest December since 1989. At a number of stations in the west and northwest it was the driest December for between 6 and 8 years, while it was the driest since 1996 at Knock Airport.

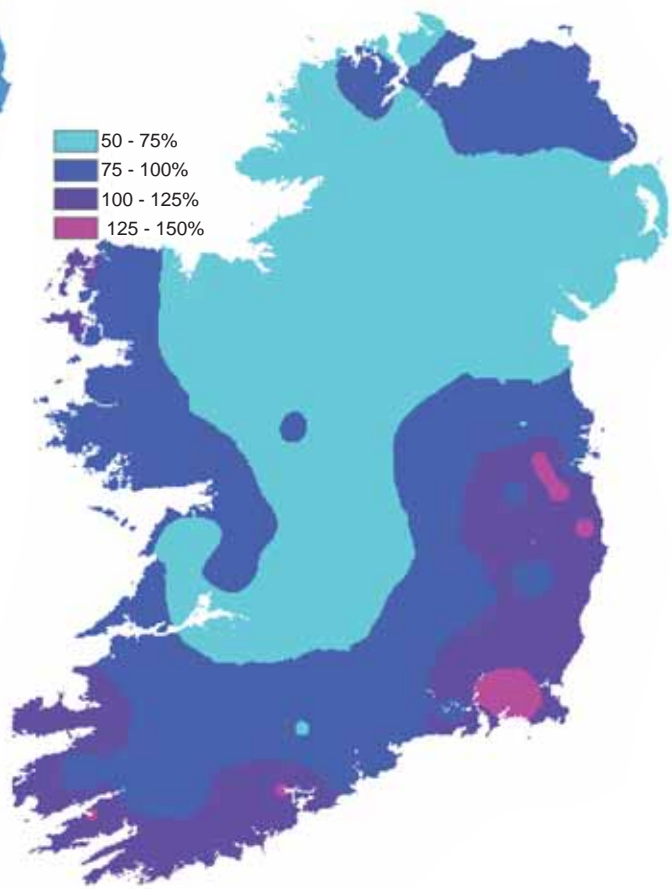
Heavy rain was recorded near the beginning and end of the month, but the period around mid-month was relatively dry. The wettest days were in the periods 4th to 7th and 29th to 30th, with the highest daily fall of 41.9mm at Cork Airport on the 30th. Two-day totals of over 50mm in many parts of the east and south between the 29th and 30th resulted in localised flooding; Casement Aerodrome's daily fall of 40.3mm up to midnight on the 30th was its highest for December since 1984. Most stations recorded a total of between 11 and 17 wetdays (*days with 1mm or more of rainfall*), slightly below the normal number for December of between 13 and 19 wetdays.

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)	73.7	87	16.3	4	21	14
<b>CO. CAVAN</b>						
BALLYHAISE	69.9	78	12.9	4	17	16
CAVAN LORETO COLLEGE	64.6		11.1	4	14	12
<b>CO. CLARE</b>						
SHANNON AIRPORT	70.4	71	17.0	29	20	17
CARRON	113.6	69	17.5	29	23	20
<b>CO. CORK</b>						
ROCHE'S POINT	117.5	114	24.6	30	18	15
FERMOY (MOOREPARK)	80.3	74	10.6	5	17	13
CORK AIRPORT	157.6	115	41.9	30	19	15
SHERKIN ISLAND	150.8	118	41.3	30	18	16
BALLINCURRIG (PEAFIELD)	142.9		33.6	30	19	17
<b>CO. DONEGAL</b>						
MALIN HEAD	57.0	55	12.7	4	19	13
GLENTIES HATCHERY	98.4	58	13.1	6	23	20
BALLYSHANNON (CATHLEEN'S FALL)	69.3	65	9.3	7	24	19
<b>CO. DUBLIN</b>						
DUBLIN (PHOENIX PARK)	85.7	105	25.0	30	19	11
DUBLIN AIRPORT	71.6		20.4	29	18	11
CASEMENT AERODROME	103.6	140	34.0	29	17	13
DUBLIN (MERRION SQUARE)	53.0	73	12.5	29	17	10
<b>CO. GALWAY</b>						
GALWAY (UNIV. COLL.)	114.9	95	19.9	29	17	16
MAAM VALLEY	228.6		32.4	1	21	19
BALLYGAR	82.9	80	19.9	29	24	13
<b>CO. KERRY</b>						
VALENTIA OBSERVATORY	186.4	117	28.4	29	24	23
ARDFERT (LISCAHANE)	139.5		29.2	29	24	22
<b>CO. LIMERICK</b>						
MOUNT RUSSELL	99.1		15.6	29	22	17
<b>CO. MAYO</b>						
BELMULLET	127.9	107	16.5	25	25	25
STRAIDE	85.3	66	13.8	6	20	18
KNOCK AIRPORT	75.0		7.9	30	23	19
DELPHI LODGE II	231.8		31.9	5	23	21
<b>CO. MEATH</b>						
WARRENTOWN	66.7	74	17.5	4	18	8
<b>CO. MONAGHAN</b>						
CARRICKMACROSS (DUNOGE)	61.0	68	15.7	4	17	11
<b>CO. OFFALY</b>						
DERRYGREENAGH	76.8	86	18.6	29	15	10
<b>CO. SLIGO</b>						
ARDTARMON	91.9		12.0	2	21	19
<b>CO. TIPPERARY</b>						
GURTEEN	49.2		10.8	30		
FETHARD (PARSONSHILL)	86.8		20.6	4	19	15
<b>CO. WATERFORD</b>						
WATERFORD (TYCOR)	100.3	95	17.7	29	16	14
DUNGARVAN (CARRIGLEA)	141.5		24.3	30	18	16
<b>CO. WESTMEATH</b>						
MULLINGAR	74.2	80	23.8	29	16	12
<b>CO. WEXFORD</b>						
JOHNSTOWN CASTLE	164.5	149	26.7	29	21	19
JOHN F. KENNEDY PARK	138.9	132	27.6	30	17	14
CLONROCHE (KNOXTOWN)	173.5		30.0	29	22	15

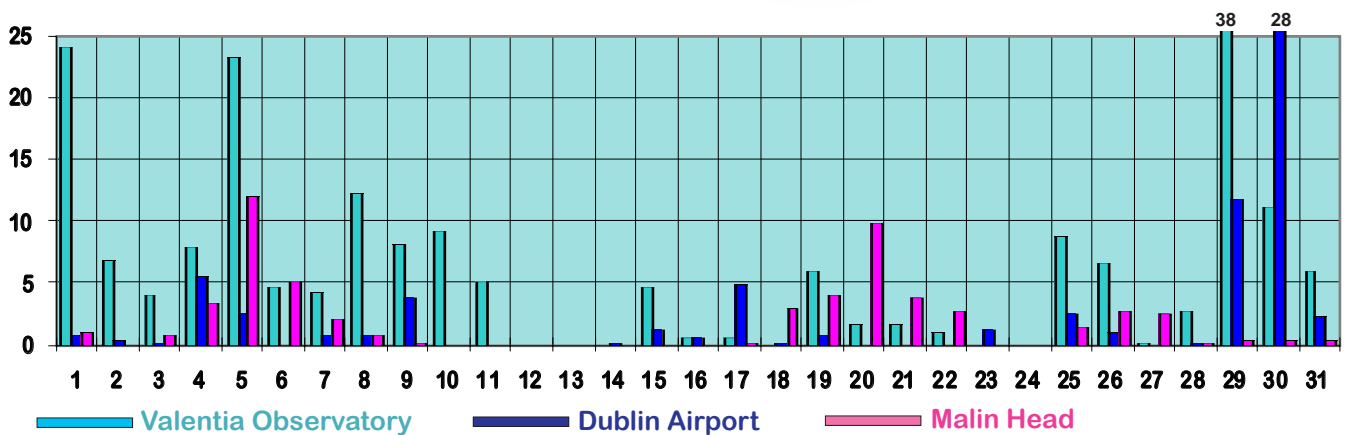
## Total rainfall (mm)



## Percentage of normal rainfall



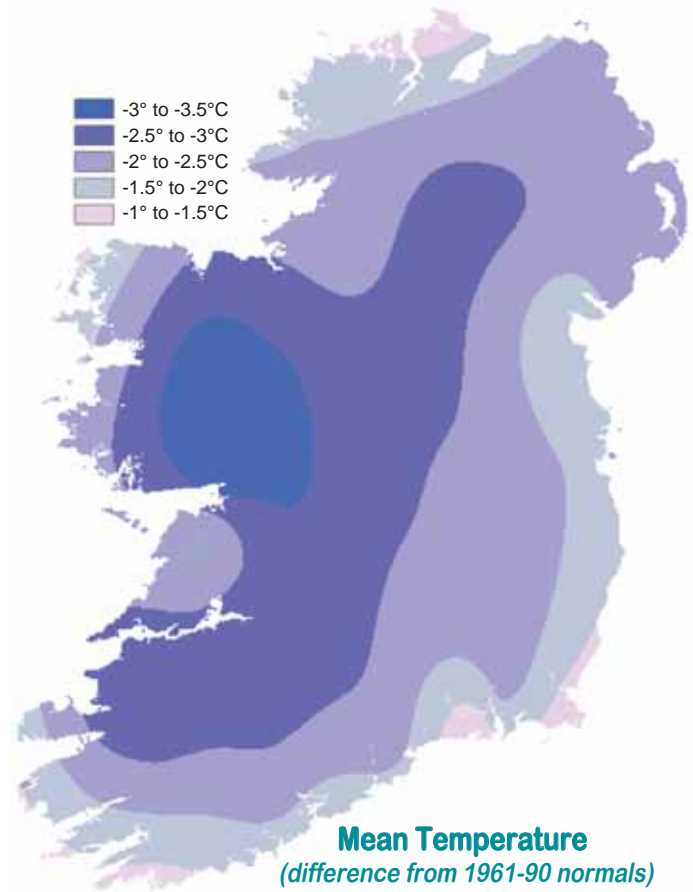
## Daily 0-24h rainfall values (mm)



## Mild at first, very cold during second half

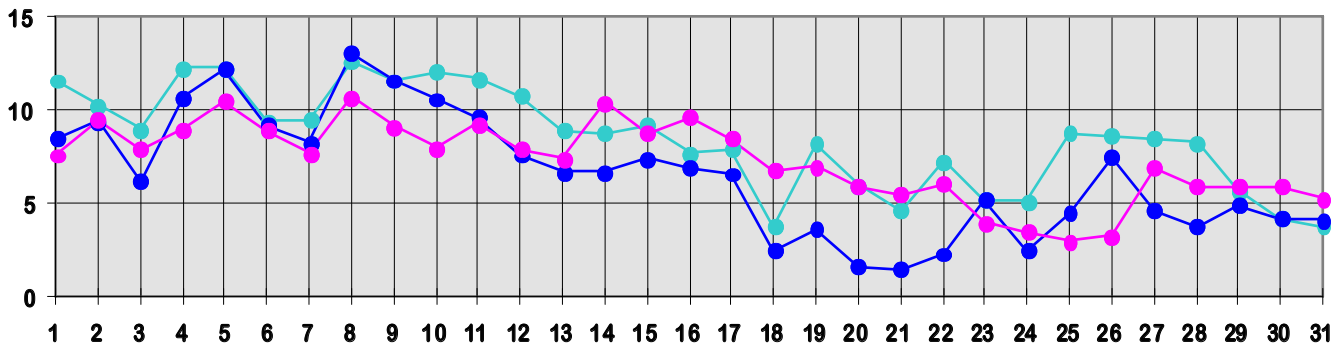
After mild weather during the early part of the month, the second half of December was exceptionally cold, bringing mean monthly air temperatures well below normal. Mean values ranged from 2.0°C at Ballyhaise to 6.3°C at Sherkin Island, Co. Cork, around two degrees below normal generally and more than three degrees lower than normal at some western stations. Over most of the country it was the coldest December for between 14 and 28 years, while Shannon Airport's mean value of 6.3°C was its lowest for December since 1950.

Temperatures were above normal during the first two weeks, by around two or three degrees on most days. The month's highest temperature, 13.9°C, was recorded at Dublin (Phoenix Park) on the 8th. Temperatures fell considerably after mid-month, leading to widespread frost and icy conditions. Both the lowest air and grass minimum temperature of the month were measured at Mullingar on the morning of the 25th, with values of -10.0 and -13.0°C respectively; these were the lowest December values at the station for 28 and 59 years.

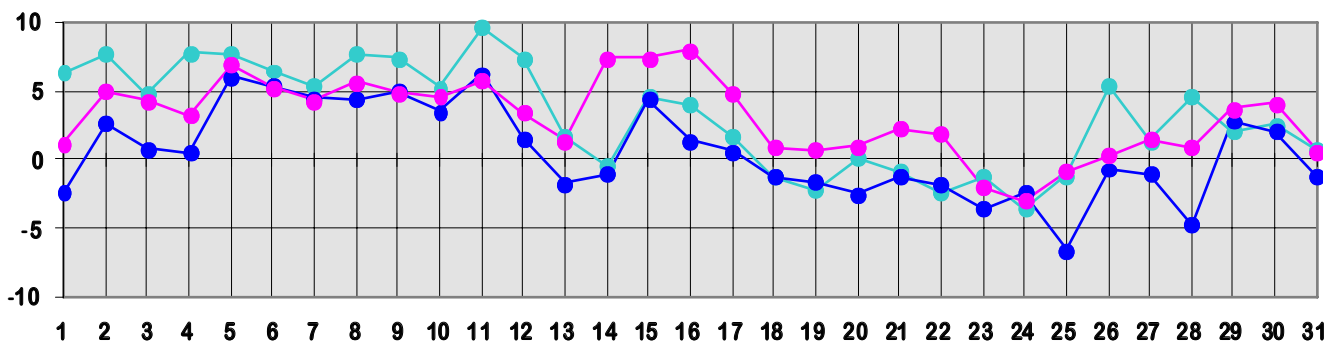


There was a total of between 22 and 26 ground frosts at most inland stations, well above the normal number for December of between 11 and 17.

Daily 0-24h maximum temperatures (°C)



Daily 0-24h minimum temperatures (°C)



● Valentia Observatory      ● Dublin Airport      ● Malin Head

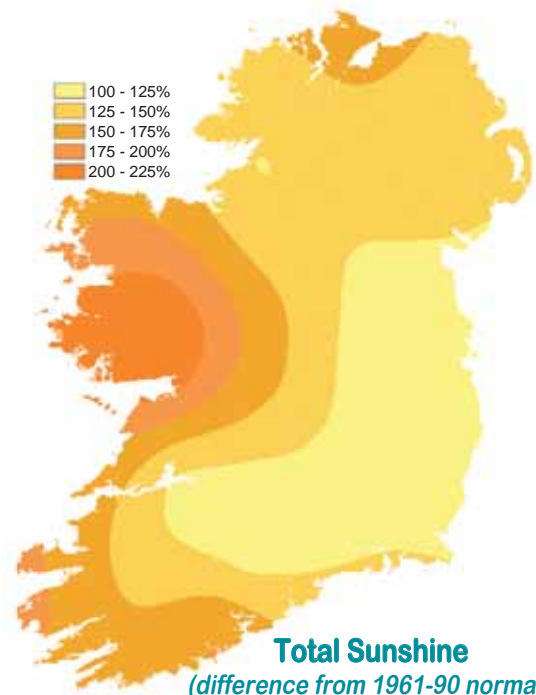
County/ Station	°C											
	Mean max.	Mean min.	Mean/ deviation from 1961-90 average		Highest max./date		Lowest min./date		Lowest grass min./date		Days with air frost ground frost	
<b>CO. CARLOW</b>												
CARLOW (OAK PARK)	5.9	-0.2	2.9	-2.3	11.8	8	-4.9	23	-10.9	23	16	26
<b>CO. CAVAN</b>												
BALLYHAISE	5.0	-1.0	2.0		11.4	5	-9.7	25	-12.8	25	16	22
CAVAN LORETO COLLEGE	5.6	-0.9	2.4		11.2	5	-7.1	25	-9.7	25	17	22
<b>CO. CLARE</b>												
SHANNON AIRPORT	6.6	0.5	3.6	-2.7	12.4	8	-5.6	25 24	-7.5	29 28	14	21
CARRON	6.0	0.4	3.2	-2.0	11.4	8	-5.6	25	-10.3	25	12	23
<b>CO. CORK</b>												
ROCHE'S POINT	7.8	3.1	5.5	-1.7	11.3	5	-1.3	21	-7.5	25	6	14
FERMOY (MOOREPARK)	7.0	-0.2	3.4	-2.4	12.0	8	-7.0	25	-8.2	25	16	23
CORK AIRPORT	6.4	1.4	3.9	-2.1	10.9	8	-2.7	21	-7.3	23	11	19
SHERKIN ISLAND	8.8	3.7	6.3	-1.3	12.4	8	-2.4	22	-5.5	25	8	13
BALLINCURRIG (PEAFIELD)	6.9	0.3	3.6		11.5	8	-5.0	25	-5.2	25	12	17
<b>CO. DONEGAL</b>												
MALIN HEAD	7.4	2.9	5.2	-1.1	10.7	8	-3.0	24	-10.0	27	4	10
GLENTIES HATCHERY	6.2	0.2	3.2	-2.0	10.6	5	-7.7	25	-9.8	25	17	24
BALLYSHANNON (CATHLEEN'S FALL)	6.4	0.7	3.6	-2.1	11.3	5	-4.6	25			11	
<b>CO. DUBLIN</b>												
DUBLIN (PHOENIX PARK)	6.7	0.5	3.6	-1.7	13.9	8	-5.0	26	-8.0	23	14	23
DUBLIN AIRPORT	6.5	0.4	3.5		13.1	8	-6.6	26 25	-10.0	25	14	18
CASEMENT AERODROME	6.4	0.1	3.3	-2.0	12.6	8	-8.3	25	-11.8	25	15	22
DUBLIN (MERRION SQUARE)	7.4	2.3	4.9	-1.8	13.3	8	-3.4	26			7	
<b>CO. GALWAY</b>												
GALWAY (UNIV. COLL.)	6.8	-0.7	3.1	-3.2	12.0	8 11	-6.0	28	-11.0	25	19	26
MAAM VALLEY	7.8	1.3	4.6		12.8	8	-6.8	24	-10.2	24	13	22
BALLYGAR	5.7	-0.6	2.6		11.3	5	-9.3	25	-10.6	25	19	23
<b>CO. KERRY</b>												
VALENTIA OBSERVATORY	8.6	3.2	5.9	-1.7	12.6	8	-3.6	25	-10.0	24	9	15
ARDFERT (LISCAHANE)	6.9	0.9	3.9	-2.8	12.4	8	-4.9	18	-8.5	19	15	21
<b>CO. LIMERICK</b>												
MOUNT RUSSELL	6.4	1.1	3.8		11.8	8	-4.1	18	-8.8	18	13	21
<b>CO. MAYO</b>												
BELMULLET	7.8	2.4	5.1	-1.5	11.6	8	-2.7	24	-7.1	14	6	20
STRAIDE	6.1	-0.9	2.6	-3.1	11.4	5	-8.6	25	-10.0	24 25	19	24
KNOCK AIRPORT	4.6	-0.3	2.2		9.9	5	-6.1	25	-12.3	25	13	19
DELPHI LODGE II	7.6	1.8	4.7		12.2	8	-5.0	24	-8.8	24	9	19
<b>CO. MEATH</b>												
WARRENSTOWN	6.1	-0.1	3.0	-2.0	12.3	8	-8.2	25	-11.1	25	15	25
<b>CO. MONAGHAN</b>												
CARRICKMACROSS (DUNOGE)	5.8	-1.2	2.3		11.4	5 8	-7.6	25	-7.9	25	17	23
<b>CO. OFFALY</b>												
DERRYGREENAGH	5.8	-1.4	2.2	-2.4	11.5	8	-7.8	25	-8.1	25	20	23
<b>CO. SLIGO</b>												
ARDTARMON	6.8	1.7	4.3		11.1	5	-4.3	24	-8.4	24 25	9	22
<b>CO. TIPPERARY</b>												
GURTEEN	5.8	-0.4	2.7		12.1	8	-6.6	24	-11.6	25	17	22
FETHARD (PARSONSHILL)	5.5	0.2	2.9		11.0	5	-6.5	25	-8.1	25	13	21
<b>CO. WATERFORD</b>												
WATERFORD (TYCOR)	7.6	1.8	4.7	-1.4	11.9	8	-4.1	21			10	
DUNGARVAN (CARRIGLEA)	7.5	0.6	4.1	-2.1	12.0	8	-6.5	25	-7.1	23 25	14	17
<b>CO. WESTMEATH</b>												
MULLINGAR	5.4	-1.1	2.2	-2.6	11.2	8	-10.0	25	-13.0	25	17	26
<b>CO. WEXFORD</b>												
JOHNSTOWN CASTLE	7.4	2.0	4.7	-1.4	11.6	8	-3.5	25	-8.5	25	11	16
JOHN F. KENNEDY PARK	6.7	0.8	3.8	-2.0	11.4	8	-4.0	21 25	-7.2	24	14	23
CLONROCHE (KNOXTOWN)	6.6	-0.1	3.3		11.5	8	-6.0	23	-10.4	23	14	25

County/ Station	Daily mean (hours/day)	% of average	% of possible	Most in a day/date
<b>CO. CAVAN</b>				
CAVAN LORETO COLLEGE	1.04		14	4.1 3
<b>CO. CLARE</b>				
SHANNON AIRPORT	1.78	125	23	6.7 18
<b>CO. CORK</b>				
FERMOY (MOOREPARK)	1.62	123	21	6.2 18
CORK AIRPORT	2.61	167	33	7.2 18
SHERKIN ISLAND	2.08	155	26	5.4 18
BALLINCURRIG (PEAFIELD)	2.36			6.4 18 27
<b>CO. DONEGAL</b>				
MALIN HEAD	1.46	162	20	6.1 23
BALLYSHANNON (CATHLEEN'S FALL)	1.24	125	17	5.0 31
<b>CO. DUBLIN</b>				
DUBLIN AIRPORT	1.90	115	25	6.4 3
CASEMENT AERODROME	1.65	110	22	5.3 3
<b>CO. GALWAY</b>				
GALWAY (UNIV. COLL.)	2.54	217	33	6.8 15 16
<b>CO. KERRY</b>				
VALENTIA OBSERVATORY	2.12	181	27	6.4 18
<b>CO. MAYO</b>				
BELMULLET	1.81	168	24	6.6 12
STRAIDE	1.92			5.8 24
KNOCK AIRPORT	1.78			6.6 13
<b>CO. WATERFORD</b>				
DUNGARVAN (CARRIGLEA)	1.84	128	24	6.6 18 27
<b>CO. WEXFORD</b>				
JOHN F. KENNEDY PARK	1.79	123	23	5.4 27
CLONROCHE (KNOXTOWN)	2.05			6.8 3

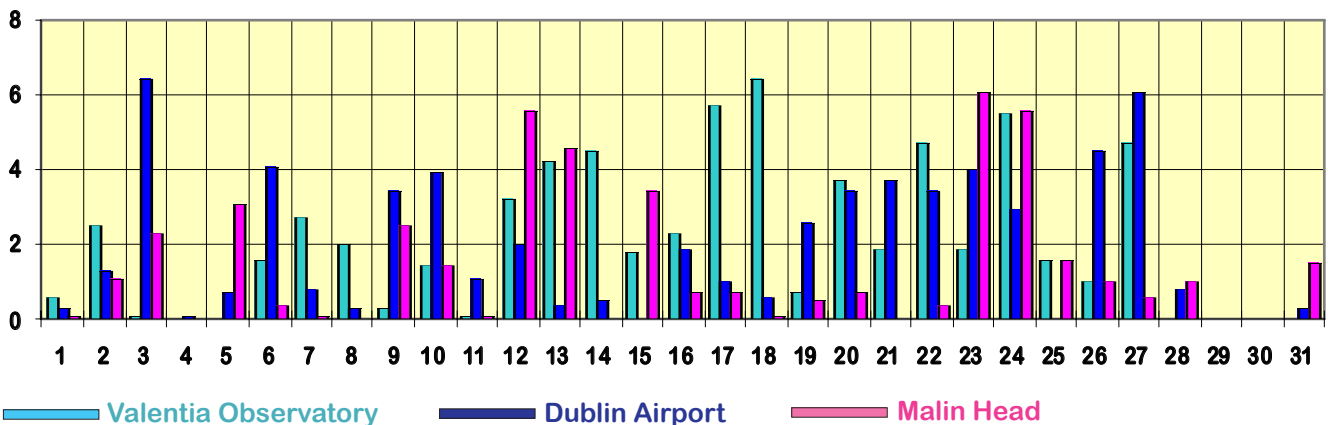
## Sunnier than normal, especially in west

Sunshine totals for December were above normal everywhere and were well above normal over the western half of the country. They ranged from 32 hours at Cavan (Loreto College) to 81 hours at Cork Airport, with percentage of normal values between 110% at Casement Aerodrome and 217% of normal at Galway (University College). At many western and southern stations it was the sunniest December since 2001.

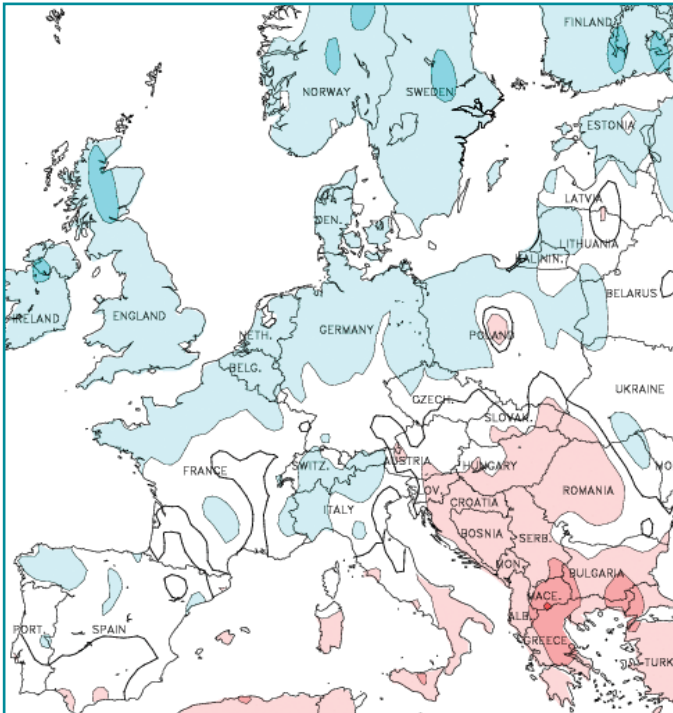
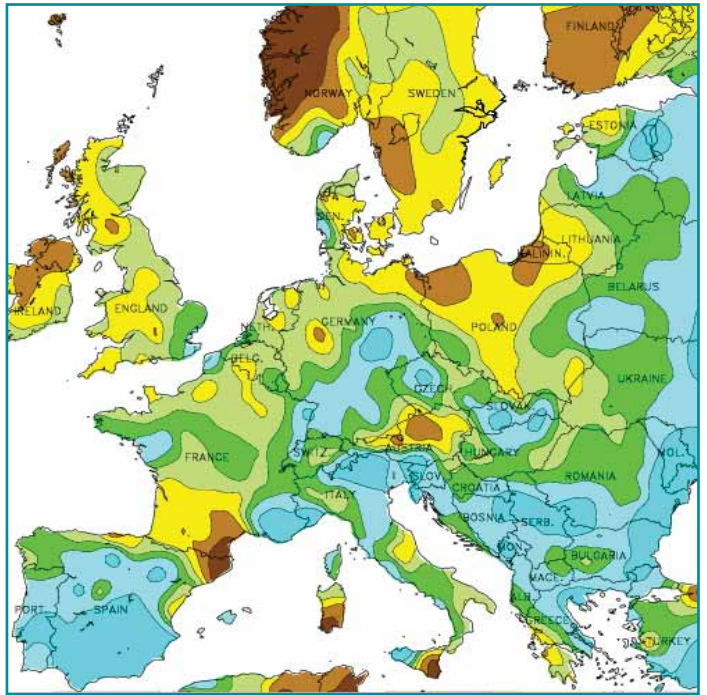
Sunshine distribution during the month varied widely across the country, but the sunniest days generally were the 3rd and 18th. The highest daily value, 7.2 hours, was recorded at Cork Airport on the 18th. Global solar radiation totals ranged from 113% of normal at Dublin Airport to 126% at Belmullet.



Daily sunshine values (hours)



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



°C



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

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

An exceptional snow storm affected the eastern U.S. between the 18th and 20th. The storm originated in the Gulf of Mexico and moved northwards along the eastern seaboard, bringing heavy snow from North Carolina to Massachusetts, resulting in closures of major airports, interstate highways and rail systems. Seven people were reported killed as up to 60cm of snow fell; this was the heaviest snow event on record during December in Washington, D.C.

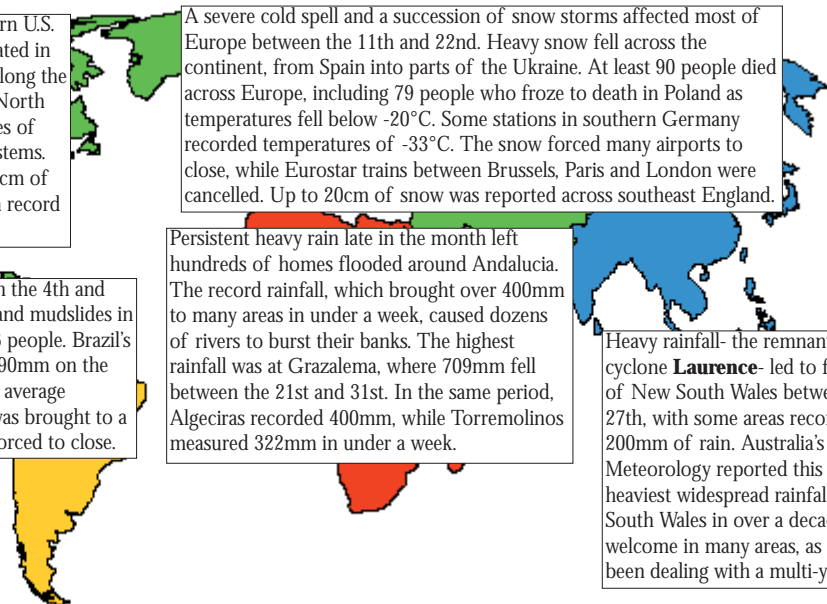
A severe cold spell and a succession of snow storms affected most of Europe between the 11th and 22nd. Heavy snow fell across the continent, from Spain into parts of the Ukraine. At least 90 people died across Europe, including 79 people who froze to death in Poland as temperatures fell below -20°C. Some stations in southern Germany recorded temperatures of -33°C. The snow forced many airports to close, while Eurostar trains between Brussels, Paris and London were cancelled. Up to 20cm of snow was reported across southeast England.

Significant rainfall events on both the 4th and 9th caused widespread flooding and mudslides in southern Brazil, killing at least 26 people. Brazil's largest city, Sao Paulo, received 190mm on the 9th, representing half of its total average December precipitation; traffic was brought to a halt and the city's airports were forced to close.

Persistent heavy rain late in the month left hundreds of homes flooded around Andalucia. The record rainfall, which brought over 400mm to many areas in under a week, caused dozens of rivers to burst their banks. The highest rainfall was at Grazaema, where 709mm fell between the 21st and 31st. In the same period, Algeciras recorded 400mm, while Torremolinos measured 322mm in under a week.

Heavy rainfall- the remnants of tropical cyclone **Laurence**- led to flooding in parts of New South Wales between the 23rd and 27th, with some areas recording upwards of 200mm of rain. Australia's Bureau of Meteorology reported this to be the heaviest widespread rainfall for inland New South Wales in over a decade. The rain was welcome in many areas, as this region has been dealing with a multi-year drought.

**Global weather highlights of the month**



## WETTER THAN NORMAL EVERYWHERE; MILD AND SUNNY

Annual rainfall totals were well above normal for the second successive year. They ranged from 918mm at Dublin Airport to 2175mm at Valentia Observatory, between 12% and 55% higher than the 30-year annual average amounts. Like the previous two years, the summer period of June to August was extremely wet, while November 2009 was the wettest November since records began at most stations and the wettest of any month on record in several places. Annual totals were the highest in over 50 years of record at both Mullingar and Johnstown Castle, while Valentia Observatory's total was its highest since observations began in the area in 1866, considerably higher than its previous highest total of 1923mm in 2002. The exceptionally heavy rainfall brought extensive flooding during the late summer and again during November, especially in the west and south. The driest months relative to normal were March and September, but the annual number of raindays (*days with 0.2mm or more rainfall*) was above normal everywhere, by between 10% and 20% generally; there were between 202 raindays at Casement Aerodrome and 272 at Valentia Observatory. Most stations measured their highest daily fall of the year during November, but there were also very heavy falls locally over short periods during the summer months, usually associated with thunderstorms.

Despite very cold weather at the end of the year, mean annual air temperatures were around half a degree above normal for the 1961-90 period at most stations. Mean values were close to those of 2008, but Valentia Observatory had its coolest year since 2002, while it was the coolest since 1996 at Cork Airport. Mean air temperatures for most months were slightly higher than normal, while values for January were near normal and December was colder than normal everywhere. The highest temperatures of the year were observed during early summer at most stations, with both Birr and Claremorris measuring 27.5°C on June 2nd. The lowest values were recorded during early January and late December. Mullingar's air and ground temperatures of -10.0°C and -13.0°C respectively on December 25th were the lowest at the station for almost 30 years. The total number of air frosts during the year of between 38 and 58 at inland stations was close to normal.

Annual sunshine totals were above normal everywhere, with Malin Head having its sunniest year since 1960. The sunniest months relative to normal were March, May and particularly June, which was the sunniest for over 50 years in places; August was the only relatively dull month generally. All stations measured their sunniest day of the year during June. Mean windspeeds for the year of between 7 and 12 knots generally (*13 and 22km/h*) were above normal and were the highest annual values for up to 15 years in places. Belmullet observed the highest gust of the year, 94 knots (*174km/h*) during a storm on January 17th, matching the previous highest gust at the station, recorded in January 1957.

County/ Station	RAINFALL (mm)			TEMPERATURE (°C)			SUNSHINE (HOURS)			NO. OF DAYS WITH:						
	Total	% of average	Most in a day amount date(s)	Mean	diff. from average	Extremes Highest Lowest	Daily mean	% of average	Most in a day amount date(s)	Rain	Snow	Air frost	Hail	Thunder	Fog	Gale gusts
CO. CARLOW Carlow (Oak Park)	1124.1	143	32.1 19 Nov	9.8	+0.4	26.8 -7.0				217	47					30
CO. CAVAN Ballyhaise	1167.9	126	43.3 19 Nov	9.4		26.5 -9.7				243	46					20
CO. CLARE Shannon Airport	1165.7	127	26.7 19 Nov	10.7	+0.6	26.9 -5.6	4.02	110	15.3 4 Jun	236	9	27	9	2	28	51
CO. CORK Cork Airport	1578.5	128	51.2 19 Nov	9.6	+0.1	23.8 -3.3	4.24	108	15.5 1 Jun	237	14	26	5	1	100	66
Roche's Point	1166.4	125	39.0 30 Jan	10.6	+0.3	23.2 -1.6				215	12					95
CO. DONEGAL Malin Head	1171.7	112	38.1 16 Nov	10.2	+0.8	24.4 -3.0	4.13	117	15.2 24 Jun	246	25	8	38	11	8	151
CO. DUBLIN Dublin Airport	917.7		42.4 2 Jul	9.7		24.5 -6.6	4.28	107	15.7 24 Jun	209	16	45	5	4	29	72
Casement Aerodrome	925.5	127	44.7 6 Jun	9.8	+0.5	24.9 -8.3	4.09	107	16.0 24 Jun	202	21	38	15	4	18	74
CO. KERRY Valentia Observatory	2174.9	155	50.4 19 Nov	11.1	+0.5	26.1 -3.6	3.63	102	15.4 1 Jun	272	4	13	30	5	7	86
CO. MAYO Belmullet	1326.3	120	25.7 7 Apr	10.6	+0.6	23.9 -2.7	4.15	112	15.0 4 Jun	274	25	15	54	10	8	149
Knock Airport	1436.5		30.6 16 Nov	8.8		25.2 -6.1	3.64	102	15.7 3 Jun	277	34	42	12	4	146	71
CO. TIPPERARY Gurteen	1076.8		30.0 30 Jan	9.6		26.6 -6.6				235	41					25
CO. WESTMEATH Mullingar	1177.5	126	32.4 23 Jul	9.4	+0.6	26.6 -10.0				243	53					7
CO. WEXFORD Johnstown Castle	1452.6	144	44.3 6 Oct	10.2	+0.6	24.2 -4.1				224	26					25