

Monthly Weather Bulletin

No. 283

NOVEMBER 2009



Large parts of Cork city were flooded after mid-month when the River Lee burst its banks following persistent heavy rainfall. (picture Irish Examiner)

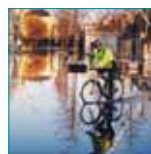
WETTEST NOVEMBER ON RECORD BRINGS WIDESPREAD FLOODING; MILD AND WINDY

Atlantic depressions passing close to Ireland brought wet and windy conditions throughout almost all of November, continuing a pattern of very unsettled weather over Ireland that began in mid-October. Persistent and often heavy rain over this period led to unprecedented levels of flooding in parts of the west and south, as

ground conditions became saturated. Rainfall totals for November were the highest on record at most stations, including the long-term stations at Malin Head and Valentia Observatory, where records extend back over 100 years. Valentia's total of 345mm was its highest of any month since observations began in the area in 1866,



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November
falls cause
widespread
flooding- page 2*

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*Wettest autumn since
2000 at some stations*

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

while its previous highest annual total of 1923mm in 2002 was also exceeded during the last week of this month, reflecting the persistence of wet weather throughout the year. More than twice the average November amounts were measured at almost all stations and over three times the normal amount fell in some places. Rain or showers were recorded on almost every day, with between 22 and 27 wetdays observed

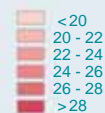
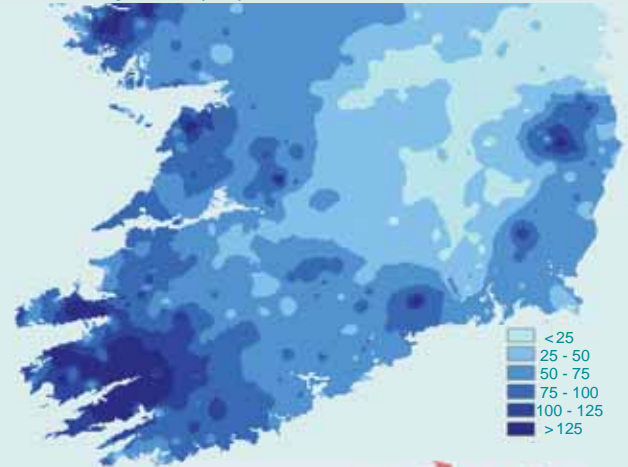
(days with 1mm or more rainfall), compared with the normal range for November of between 13 and 20 wetdays. Heaviest daily falls at most stations were recorded on the 1st, in the period 16th to 19th, and on the 29th in the east; two-day falls of over 100mm were recorded in parts of the west and southwest on the 18th/19th (*see below*). Much of November was mild with little or no frost, but temperatures fell

MONTH OF RECORD-BREAKING RAINFALL

Rainfall totals for the month were the highest on record for November in many places, while some stations recorded their highest totals of any month; among these were Valentia Observatory, where observations began in the area in 1866, with both Shannon Airport and Claremorris also having their highest ever monthly totals in over 50 years of record. The highest totals were recorded in southwestern and western areas (*see charts on page 11*), with over three times the normal monthly fall at some stations. Totals of more than 600mm were measured at a number of stations located on high ground in County Kerry; 649mm was recorded in this area at Cloone Lake, the station which holds the record for the highest daily fall in Ireland. The highest ever monthly fall in Ireland, 790mm, was measured at a nearby mountain gauge in October 1996. The heaviest daily falls this month were on the 18th and 19th, with two-day falls of over 100mm in the southwest (*see chart below*). This followed a spell of very wet weather extending back to mid-October, when significant rainfall was measured on virtually every day. More than 25 wetdays (*days with 1mm or more rainfall*) were recorded during November over the western half of the country- see below, compared with the average number of between 16 and 20 in these areas. There was extensive flooding over the west, south and midlands- pictured below is Cork on the 20th. (*picture Irish Examiner*)



Two-day rainfall (mm), 0900UTC on 18th to 0900UTC on 20th



Total number of wetdays (days with ≥ 1 mm of rain)

considerably towards the end of the month. Overall, mean air temperatures were close to a degree higher than normal generally. Air and ground frost became widespread at the end of the month, but the total of between seven and 12 ground frosts at inland stations was below normal for November. Despite the very wet weather, sunshine totals were above normal generally, especially in the south and northwest.

1st to 26th: A series of fast-moving deep Atlantic depressions brought active frontal systems across Ireland, bringing very wet and windy conditions. Spells of rain or showers gave falls of 10mm or more on many days across Connacht and Munster, while all areas received heavy falls on the 1st, 9th, in the period 16th to 19th and on the 21st. River levels reached record heights in many parts of the midlands, west and south, leading to significant flooding. The strong south to southwesterly winds for most of the period brought mild conditions, although slacker winds and clear skies allowed frost to form in midland and eastern areas between the 8th and 11th. A depression of central pressure 954hPa off

the west coast on the 21st/22nd generated storm conditions, with very high seas.

27th to 30th: Low pressure became centred to the east of Ireland, bringing a cold northerly airstream across the country. Showers in western areas died out, but a spell of heavy rain in eastern areas brought flooding here on the 29th. Both maximum and minimum temperatures were below normal, with frost becoming widespread.

Wind and elements: Mean windspeeds for the month of between 10 and 16 knots generally (19 and 30km/h) were above normal everywhere and were the highest for November for over 20 years in the south and southwest. The month's strongest winds were recorded between the 18th and 25th, with the highest gust of 72 knots (133km/h) measured at Belmullet on the 22nd. Isolated thunderstorms were frequent during the month, especially in western and southwestern areas; they were widespread along the Atlantic coast in the periods 6th/7th and 21st/22nd. A tornado was observed at Ballymahon, Co. Longford, on the 12th. Hail showers were recorded on many days in western and northern areas, especially on the 25th/26th. Fog was most widespread on the 28th.

Below

As well as being a very wet month, November was also very windy everywhere. Pictured below are coastal conditions at the Hook Lighthouse, Co. Wexford, on the afternoon of the 22nd, as a very deep depression approached the west coast of Ireland. Wave heights of over 12 metres were recorded off the southwest coast on this day - see page 5. (picture courtesy Bernadette Byrne)

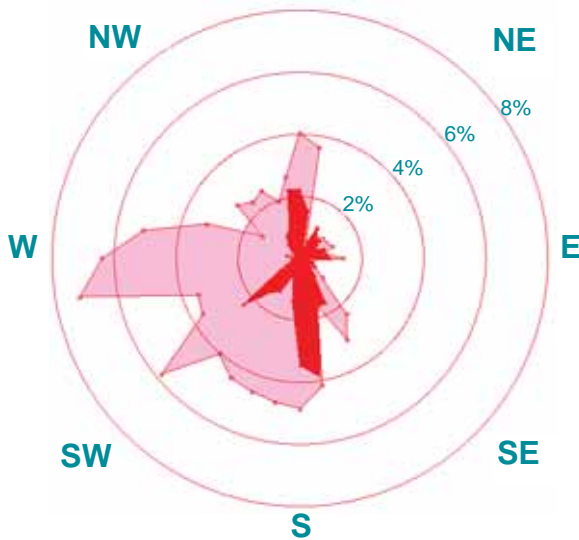


County / Station	WIND (KNOTS)										ELEMENTS				
	Mean speed	Max. dir.	10-min. speed	mean date/hour	Max. dir.	Gust speed	date/time	Days with gales	gale gusts	Hours with gale gusts	Snow	Snow Lying	Hail	Thunder	Fog
CO. CARLOW CARLOW (OAK PARK)	10.3	160°	30	21/11	160°	46	21/1044	0	8	75					
CO. CAVAN BALLYHAISE	8.1	220°	24	25/ 7	220°	42	25/0806	0	4	20					
CO. CLARE SHANNON AIRPORT	11.8	230°	36	22/14	150°	51	21/1012	1	13	54	0	0	0	0	3
CO. CORK ROCHE'S POINT	17.2	150°	41	21/ 9	160°	55	21/0953	10	22	313					
CORK AIRPORT	13.1	220°	33	18/ 3	210°	48	19/0852	0	17	110	0	0	0	0	6
		150°	33	21/ 9	210°	48	24/0915								
CO. DONEGAL MALIN HEAD	15.5	210°	43	25/ 6	240°	63	22/1528	5	24	167	0	0	8	2	0
		210°			210°	63	25/0511								
CO. DUBLIN DUBLIN AIRPORT	14.3	240°	37	25/10	230°	51	25/0801	2	14	98	0	0	0	0	0
CASEMENT AERODROME	13.6	200°	35	19/13	200°	50	19/1004	1	13	96	0	0	3	1	1
CO. KERRY VALENTIA OBSERVATORY	13.8	290°	35	7/12	290°	55	7/1143	1	19	195	0	0	5	0	0
CO. MAYO BELMULLET	13.7	240°	45	25/ 5	230°	72	22/0919	5	21	215	0	0	12	1	0
KNOCK AIRPORT	10.9	210°	30	24/12	200°	47	18/1339	0	13	66	0	0	4	0	9
CO. TIPPERARY GURTEEN	10.5	270°	29	22/14	280°	45	22/1440	0	7	49					
CO. WESTMEATH MULLINGAR	7.6	200°	21	25/ 5	220°	43	22/1532	0	3	6					
CO. WEXFORD JOHNSTOWN CASTLE	9.7	210°	24	24/13	200°	42	19/0601	0	8	107					
						170°	42	21/1052							

Valentia Observatory

Calm: 0.0%

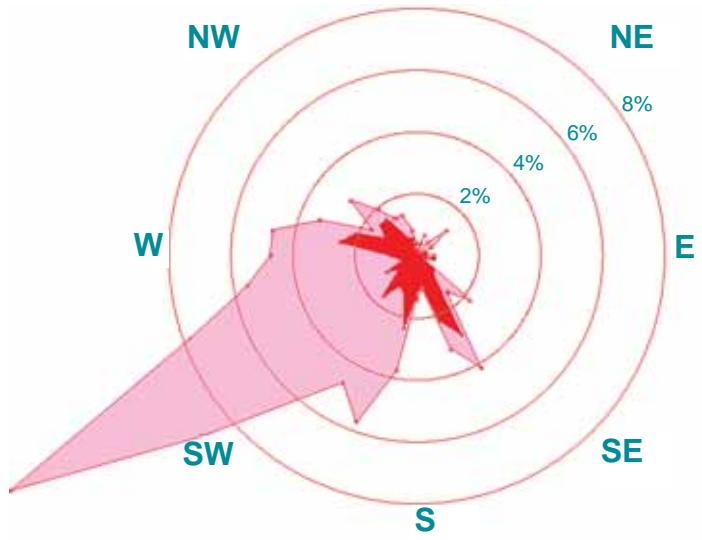
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Dublin Airport

Calm: 0.0%

N

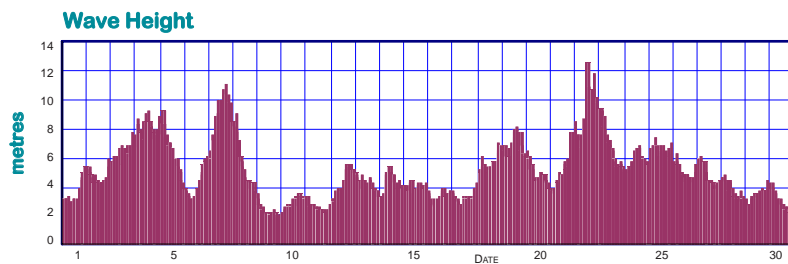
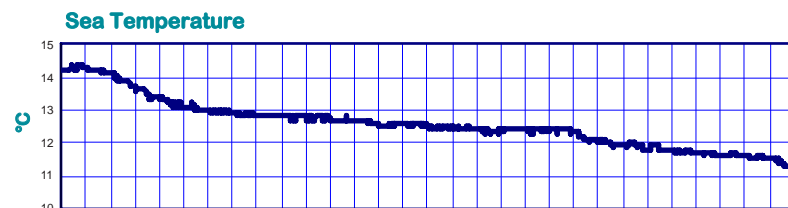
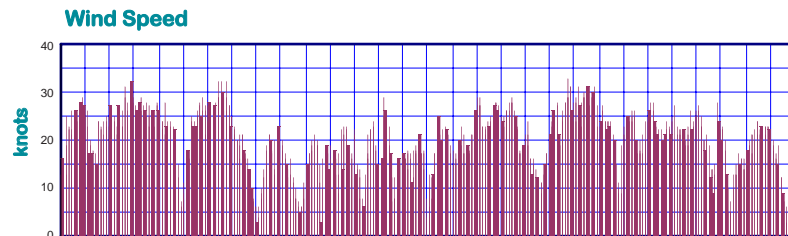
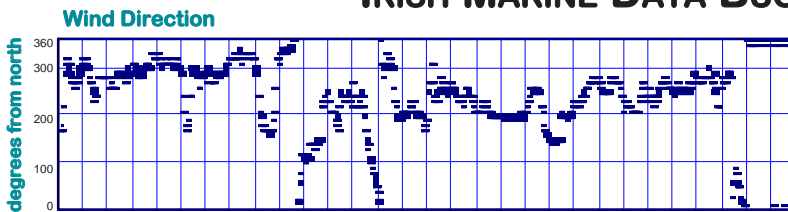


1-10 knots

>10 knots

PERCENTAGE FREQUENCY OF WIND DIRECTION

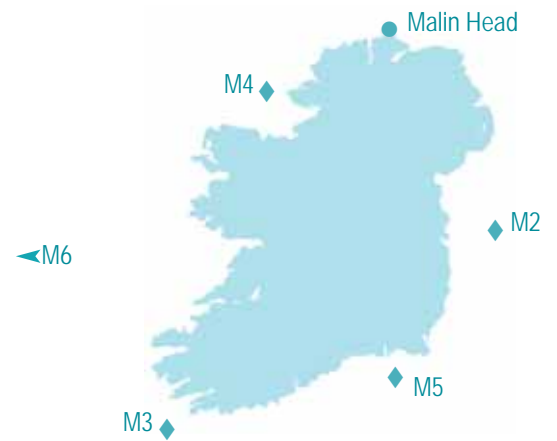
MARINE OBSERVATIONS FROM IRISH MARINE DATA BUOY NETWORK



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

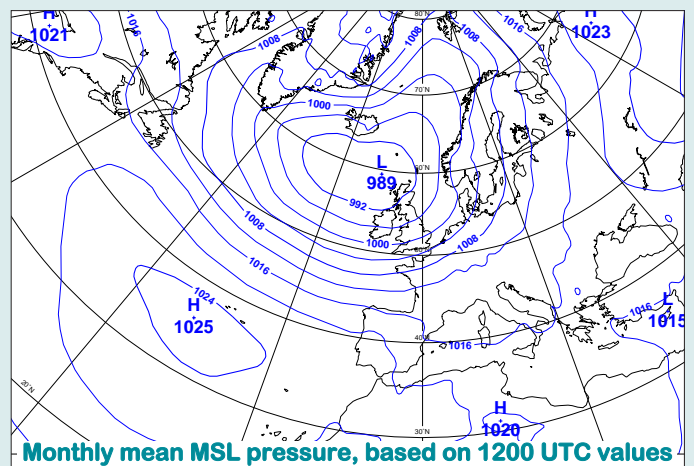
Buoy	Sea surface temp. (°C)	Mean wind speed (knots)	Max. 10-min wind (knots)	Mean wave height (m.)	Max. wave height (m.)
M2		not available			
M3	12.6	19.8	33	5.0	12.5
M4	12.0	20.5	43	4.4	11.0
M5	12.7	n/a	n/a	3.4	7.1
M6	13.0	21.8	46	4.9	13.8
Malin Head	11.1				

Summary of Mean Monthly Values

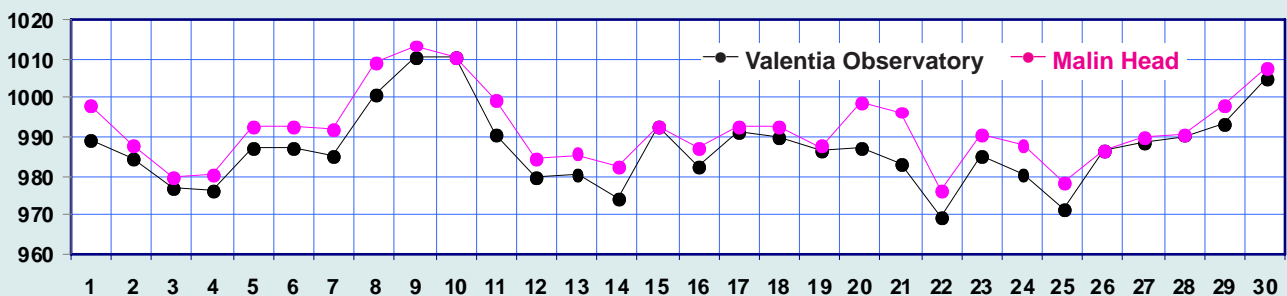


MEAN ATMOSPHERIC PRESSURE

Mean sea level pressure values for the month were exceptionally low. They varied between 992hPa in the north and 998hPa in the south, between 15hPa and 18hPa below normal for November. Successive Atlantic depressions kept pressure values below 1000hPa throughout almost all of the month. The month's lowest pressure value of 968.6hPa was recorded at Valentia Observatory on the 14th, its lowest November value since 2000. The highest value of the month, 1020.6hPa, was measured at Carlow (Oak Park) on the 9th.



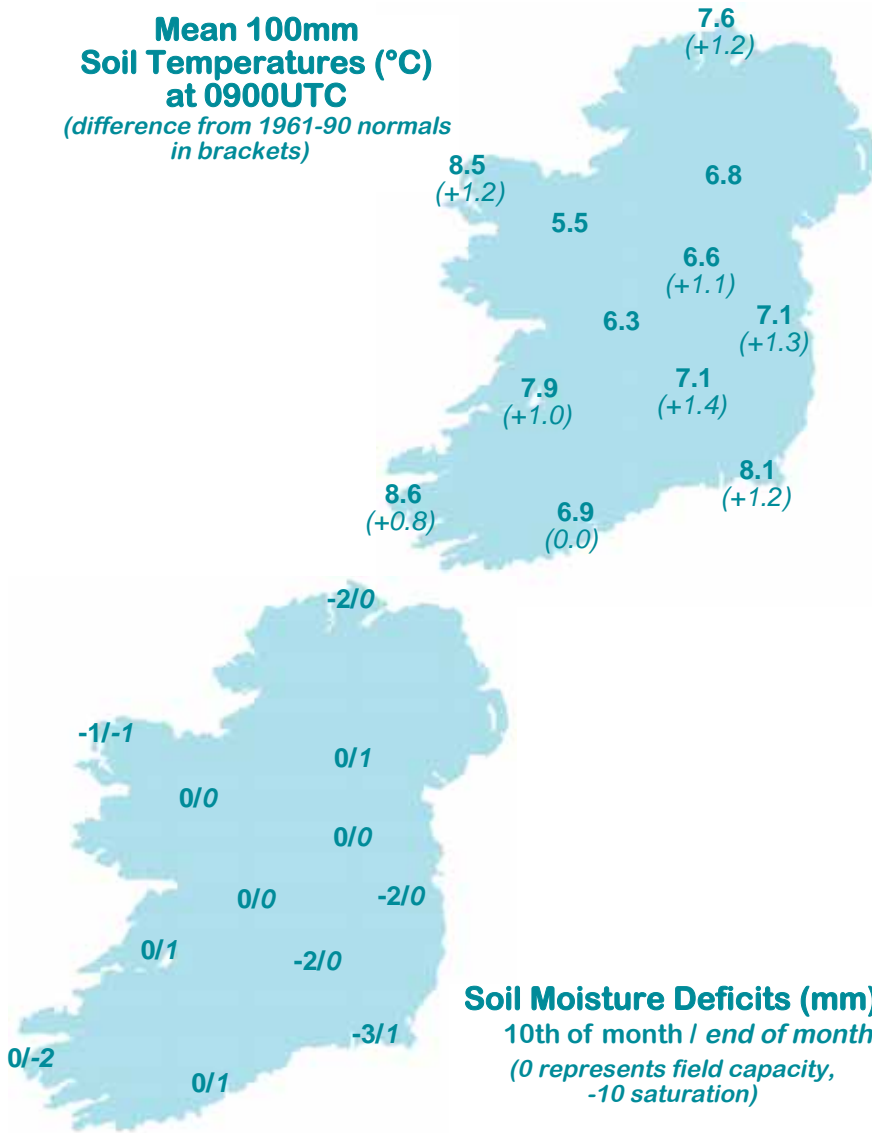
Monthly mean MSL pressure, based on 1200 UTC values



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

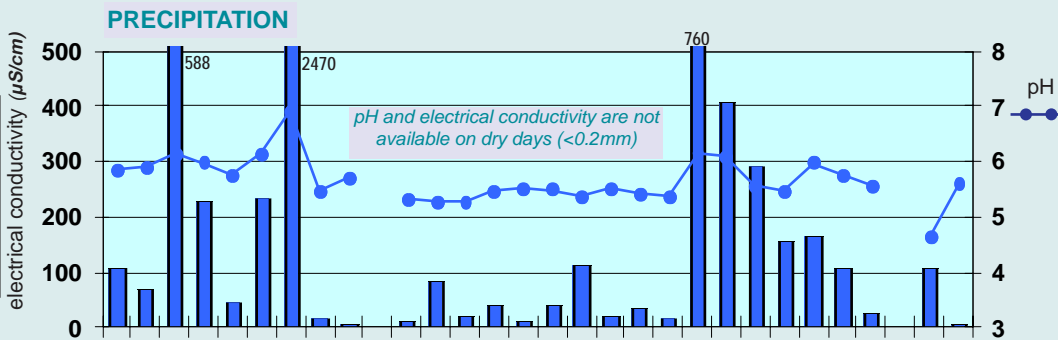
County/ Station	°C		
	100mm	200mm	300mm
CO. CARLOW			
CARLOW (OAK PARK)	7.1	8.0	8.2
CO. CAVAN			
BALLYHAISE	6.8	7.9	8.8
CO. CLARE			
SHANNON AIRPORT	7.9	8.5	9.8
CARRON	8.2		9.0
CO. CORK			
ROCHE'S POINT	8.3	9.4	9.9
FERMOY (MOOREPARK)	8.7	9.4	9.7
CORK AIRPORT	6.9	7.8	9.9
SHERKIN ISLAND	9.9	10.4	10.7
BALLINCURRIG (PEAFIELD)	7.2	7.1	9.1
CO. DONEGAL			
MALIN HEAD	7.6	9.1	10.3
CO. DUBLIN			
DUBLIN (PHOENIX PARK)	6.2	7.7	8.8
DUBLIN AIRPORT	6.4	7.3	8.5
CASEMENT AERODROME	7.1	8.2	9.2
CO. KERRY			
VALENTIA OBSERVATORY	8.6	9.4	10.7
CO. LIMERICK			
MOUNT RUSSELL	6.9	7.8	
CO. MAYO			
BELMULLET	8.5	9.3	10.0
STRAIDE	7.6		
KNOCK AIRPORT	5.5	6.8	8.4
CO. MEATH			
WARRENSTOWN	6.7	8.1	8.7
CO. TIPPERARY			
GURTEEN	6.3	6.9	7.9
FETHARD (PARSONSHILL)	7.2	8.0	
CO. WATERFORD			
DUNGARVAN (CARRIGLEA)		8.3	8.9
CO. WESTMEATH			
MULLINGAR	6.6	7.8	9.0
CO. WEXFORD			
JOHNSTOWN CASTLE	8.1	8.9	9.1
JOHN F. KENNEDY PARK	7.4	8.7	10.6
CLONROCHE (KNOXTOWN)	8.2	9.1	9.9

Chemical Analysis of Precipitation and Air Samples at Valentia Observatory

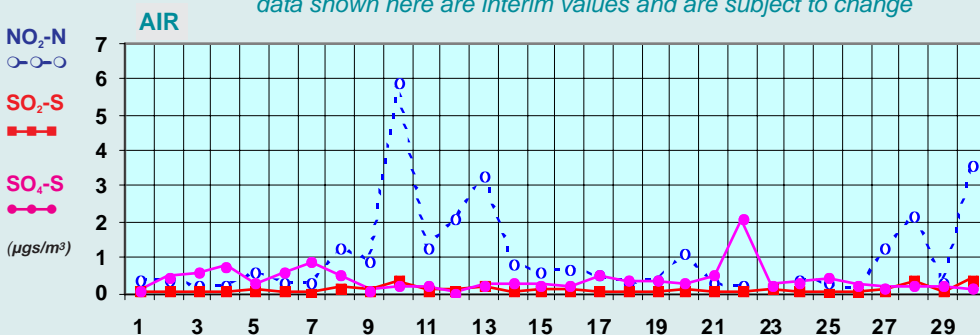
Acid rain occurs when pollutants combine with moisture in the air to form sulphuric or nitric acid. pH is the simplest way of measuring the acidity of precipitation. Usually pH of 7.00 is considered neutral but this is not the case in rainfall samples. Pure water in the atmosphere has an equilibrium 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.



data shown here are interim values and are subject to change



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	137.9	-	8	8	11.3	4.1	7.7	-	-2.0	11	1	36	4	-4.5	11	1	-	-	26.0	-
	21-end	41.4	-	7	6	9.0	3.8	6.4	-	-0.3	30	1	25	2	-3.9	30	2	-	-	16.8	-
	month	229.5	-	23	22	10.2	4.3	7.3	-	-2.0	11	2	96	8	-4.5	11	5	-	-	66.4	-
Co. Cork	1-10	76.4	-	9	8	11.6	5.9	8.8	-	3.0	7	0	44	5	1.8	7	0	9.7	11.1	32.5	-
Fermoy	11-20	138.8	-	10	9	13.4	5.2	9.3	-	0.7	11	0	51	12	-1.3	11	1	8.6	9.3	21.4	-
	21-end	39.8	-	10	10	9.3	4.0	6.7	-	0.0	28	0	28	3	-3.0	30	3	7.8	8.8	23.1	-
	month	255.0	268	29	27	11.4	5.0	8.2	1.2	0.0	28	0	123	20	-3.0	30	4	8.7	9.7	77.0	136
Co. Donegal	1-10	96.1	-	9	8	10.4	5.5	15.3	-	2.0	8	0	-	-	-0.5	8	2	-	-	-	-
Glenties	11-20	n/a	-	n/a	n/a	11.0	4.9	14.9	-	-0.9	11	1	-	-	-3.8	11	3	-	-	-	-
	21-end	n/a	-	n/a	n/a	7.8	3.7	13.5	-	-2.4	30	2	-	-	-5.1	30	4	-	-	-	-
	month	306.1	188	n/a	n/a	10.0	4.7	7.4	1.0	-2.4	30	3	-	-	-5.1	30	9	-	-	-	-
Co. Kerry	1-10	81.1	-	10	10	11.8	7.1	9.5	-	5.4	7	0	50	5	1.7	10	0	-	-	-	-
Ardfert	11-20	134.3	-	10	10	11.9	6.2	9.1	-	2.3	11	0	47	7	-1.4	11	1	-	-	-	-
	21-end	71.6	-	8	8	9.5	4.3	6.9	-	-0.4	30	1	29	3	-4.3	30	3	-	-	-	-
	month	287.0	-	28	28	11.1	5.9	8.5	0.8	-0.4	30	1	127	15	-4.3	30	4	-	-	-	-
Co. Monaghan	1-10	39.0	-	8	6	10.6	4.8	7.7	-	-1.0	9	1	36	2	-1.1	9	1	-	-	-	-
Carrickmacross	11-20	86.7	-	10	7	11.0	3.2	7.1	-	-1.8	11	2	32	3	-2.1	11	2	-	-	-	-
	21-end	23.7	-	7	4	9.0	3.2	6.1	-	-0.8	30	1	24	2	-2.7	30	3	-	-	-	-
	month	149.4	193	25	17	10.2	3.7	7.0	-	-1.8	11	4	92	8	-2.7	30	6	-	-	-	-
Co. Waterford	1-10	47.3	-	8	8	12.2	6.0	9.1	-	1.9	9	0	48	6	1.0	7	0	-	9.7	40.1	-
Dungarvan	11-20	152.6	-	10	9	13.0	5.4	9.2	-	-0.4	11	1	51	11	-0.6	11	1	-	9.2	24.2	-
	21-end	40.2	-	10	8	9.9	4.4	7.2	-	-0.4	30	1	33	4	-2.6	30	2	-	7.8	25.5	-
	month	240.1	-	28	25	11.7	5.2	8.5	1.0	-0.4	11	2	131	21	-2.6	30	3	-	8.9	89.8	105
Co. Wexford	1-10	33.8	-	8	7	11.8	5.3	8.6	-	2.2	9	0	42	6	-1.7	9	2	7.9	12.0	41.7	-
J.F.K. Park	11-20	151.5	-	9	9	12.5	5.7	9.1	-	3.2	11	0	48	8	-1.2	11	4	8.3	10.3	18.6	-
	21-end	43.7	-	7	7	9.5	4.0	6.8	-	-0.2	30	1	29	3	-4.0	30	4	6.1	9.6	22.3	-
	month	229.0	241	24	23	11.2	5.0	8.1	1.0	-0.2	30	1	118	16	-4.0	30	10	7.4	10.6	82.6	125

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
		Amount	Deficit	Accum'ltd	Deficit	Surplus					
Co. Kerry	1-10	16.2	-	0	84	Co. Carlow	14	43.62	29.62	24.52	97.76
Valentia Obs.	11-20	23.4	-	0	142	Carlow (Oak Park) *					
	21-end	8.2	-	0	87	Co. Cavan	10	31.26	26.44	18.72	76.42
	month	47.8				Ballyhaise*					
Co. Wexford	1-10					Co. Clare	16	global solar radiation values for stations marked * are provisional			
Johnstown Castle	11-20			not available		Shannon Airport					
	21-end					Co. Cork	12				
	month					Cork Airport					
						Roche's Point*		50.01	32.05	30.59	112.65
						Co. Donegal	21	31.69	18.57	18.88	69.14
						Malin Head					
						Co. Dublin	16	42.19	27.55	23.57	93.31
						Dublin Airport					
						Casement Aerodrome	15				
						Co. Kerry	27	35.11	27.93	25.49	88.53
						Valentia Obs.					
						Co. Mayo	18	32.25	23.25	22.48	77.98
						Belmullet					
						Knock Airport	10				
						Co. Tipperary	13	37.86	27.69	22.33	87.88
						Curteen					
						Co. Westmeath	10	37.20	27.68	19.39	84.27
						Mullingar*					
						Co. Wexford	15	n/a	25.91	25.72	n/a
						Johnstown Castle*					

MONTHLY EVAPORATION (MM) FROM CLASS A PAN			
County	Station	Monthly Rainfall (mm)	Monthly Evaporation (mm)
Cork	Fermoy (Moorepark)	255.0	33.6
Kerry	Valentia Observatory	345.4	n/a
Kerry	North Kerry Landfill	390.1	2.6
Mayo	Newport (Furnace)	322.6	0.6
Offaly	Derrygreenagh	175.7	1.9
Waterford	Dungarvan (Carriglea)	240.1	12.1
Wexford	J.F.K. Park	229.0	17.2

Sunday 1st: Very heavy rain in the south moved northwards overnight, affecting all areas. This rain cleared the northeast in the early afternoon. Heavy showers in the afternoon, mainly in the south and west, but with sunny spells also, mainly in the south, while remaining overcast in the north. Cool. Winds were westerly, moderate to strong and gusty.

Rainfall: 16 to 39mm, heaviest at Valentia, 16mm at Belmullet
Temperature: max. 11°C to 14°C, min. 5°C to 9°C, no ground frost
Sunshine: nil to 6 hours, sunniest at Cork Airport, nil at Malin Head

Monday 2nd: Showers overnight affected the southwest, west and north of the country. By dawn a more organised band of rain moved in over the west and spread eastwards, affecting most of the southern half of the country. During the afternoon, another band of rain moved into the southwest and affected most places by midnight. There were also heavy, thundery showers in the wake of the rain. A few sunny spells in the east. Winds were southwesterly, moderate to strong, with gale gusts along the Atlantic seaboard.

Rainfall: <1 to 13mm, heaviest at Knock Airport, <1mm at Casement Aerodrome
Temperature: max. 10°C to 14°C, min. 5°C to 9°C, no ground frost
Sunshine: nil to 1 hour, sunniest at Dublin Airport

Tuesday 3rd: Heavy showers overnight and throughout the day. The showers were most frequent in the western half of the country. Sunny spells in all areas, mainly in the east and south. Winds were south or southwesterly in direction, moderate to strong and gusty.

Rainfall: 1 to 11mm, heaviest at Claremorris, 1mm at Johnstown Castle
Temperature: max. 10°C to 14°C, min. 5°C to 8°C, no ground frost
Sunshine: 2 to 6 hours, sunniest at Dublin Airport, 2 hours at Malin Head

Wednesday 4th: Heavy showers overnight in the western half of the country, spreading to the rest of the country during the morning and afternoon, then merging into longer spells of rain over Ulster. It became dry generally for a while, before further showers spread from the Atlantic later. Mostly cloudy with short sunny breaks, mainly in the south. Cool. Winds were moderate to strong and gusty, between southwesterly and northwesterly in direction.

Rainfall: 2 to 11mm, heaviest at Malin Head, 2mm at Roche's Point
Temperature: max. 9°C to 12°C, min. 5°C to 9°C, no ground frost
Sunshine: trace to 3 hours, sunniest at Cork Airport, trace at Casement Aerodrome

Thursday 5th: Scattered light showers continued during the night in the north and along western coasts. The showers spread to parts of Ulster and north Leinster for a while during the afternoon but died out countrywide by early evening. Cloudy in the west, some broken sunshine further east. Winds were fresh northwesterly, gradually decreasing to a light westerly by evening.

Rainfall: nil to 4mm, heaviest at Belmullet
Temperature: max. 9°C to 12°C, min. 5°C to 8°C, no ground frost
Sunshine: trace to 4 hours, sunniest at Cork Airport, trace at Valentia

Friday 6th: Heavy rain in the west spread eastwards overnight to all areas, clearing the east coast around noon. Showers and sunny spells during the afternoon, with showers most frequent in the west and continuing overnight in the west. Winds were southwesterly, moderate to strong and gusty.

Rainfall: 3 to 14mm, heaviest at Shannon Airport, 3mm at Dublin Airport
Temperature: max. 9°C to 14°C, min. 3°C to 7°C, ground temperatures just below zero in the midlands
Sunshine: 1 to 4 hours, sunniest at Shannon Airport, 1 hour at Malin Head

Saturday 7th: Some showers overnight, mainly in western areas. During the morning, showers became more widespread and continued in the afternoon, some heavy and with thunder. They became confined to western coasts during the evening, with clear spells developing elsewhere and ground frost in places. Winds were southwesterly, strong and gusty, veering northerly later.

Rainfall: trace to 15mm, heaviest at Gurteen, trace at Dublin Airport
Temperature: max. 8°C to 12°C, min. 2°C to 7°C, ground temperatures down to -1°C at Casement Aerodrome
Sunshine: <1 to 3 hours, sunniest at Malin Head, <1 hour at Belmullet

Sunday 8th: It was a mostly fine day with long hours of sunshine, particularly in the east. Along western Atlantic coasts there were showers at times and these persisted throughout the day, particularly in the north. By evening the showers had died out and there was widespread slight frost in the midlands and sharp frost in the east. Winds were moderate northwesterly, backing southerly and decreasing to light by evening.

Rainfall: nil to 2mm, heaviest at Malin Head

Temperature: max. 11°C to 13°C, min. 1°C to 10°C, ground temperatures down to -3°C at Casement Aerodrome

Sunshine: 2 to 7 hours, sunniest at Dublin Airport, 2 hours at Valentia

Monday 9th: A cold start to the day with widespread frost. Heavy rain moved in over the west before dawn and spread gradually eastwards, affecting all areas and causing localised flooding in places. The rain cleared the west coast by early evening and eventually cleared most parts by midnight. Just a few sunny spells, mainly in the east. Winds were southerly, light to moderate.

Rainfall: 8 to 16mm, heaviest at Malin Head, 8mm at Dublin Airport
Temperature: max. 9°C to 12°C, min. -1°C to 10°C, ground temperatures down to -5°C at Casement Aerodrome
Sunshine: nil to trace generally, >1 hour Dublin Airport

Tuesday 10th: Rain and drizzle along the east coast cleared eastwards early in the night. It was a dry day generally with sunny spells and a few scattered showers, mainly along Atlantic coastal areas. Cold after dark with mist, fog and ground frost setting in quickly. Mostly light northwesterly winds were moderate at times on exposed coasts.

Rainfall: nil to 4mm, heaviest at Johnstown Castle
Temperature: max. 10°C to 12°C, min. -1°C to 6°C, ground temperatures down to -4°C in the midlands
Sunshine: 4 to 8 hours, sunniest at Cork Airport, 4 hours at Malin Head

Wednesday 11th: Some rain along the east coast at first. Very cold with air frost in many places and a sharp ground frost in all but the coastal margins of the west and south. Clouding up in the south around dawn, with some outbreaks of rain there by mid-morning. The rain moved northeastwards, clearing all but the northeast by midnight. Winds were light and variable.

Rainfall: 2 to 19mm, heaviest at Valentia, 2mm at Malin Head
Temperature: max. 8°C to 12°C, min. -3°C to 7°C, ground temperatures down to -6°C at Gurteen
Sunshine: nil to 4 hours, sunniest at Malin Head, nil at Valentia

Thursday 12th: Rain cleared Ulster in the early hours. Heavy rain in the southwest during the night covered Munster and most of Connacht by dawn. The rain continued moving northwards through the day, eventually clearing the northeast by mid-afternoon. Heavy showers in the western half of the country during the afternoon. Sunshine for a while in the south and southwest, mostly cloudy elsewhere. Winds were light south or southeasterly, increasing fresh, before veering southwesterly and decreasing by evening.

Rainfall: 1 to 15mm, heaviest at Belmullet, 1mm at Dublin Airport
Temperature: max. 8°C to 12°C, min. 4°C to 8°C, no ground frost
Sunshine: trace to 3 hours, sunniest at Cork Airport, trace at Belmullet

Friday 13th: Heavy showers in Connacht overnight died out during the morning. Sunny over the northern half of the country, more overcast further south. Heavy rain in the southeast by evening moved northwards, affecting most areas. Winds were light southwesterly, backing easterly and increasing, later veering southwesterly, strong on south coasts.

Rainfall: nil to 28mm, heaviest at Johnstown Castle, nil at Malin Head
Temperature: max. 8°C to 13°C, min. 2°C to 7°C, ground temperatures down to -3°C at Mullingar
Sunshine: nil to 6 hours, sunniest at Malin Head, nil at Cork Airport

Saturday 14th: Rain overnight in the west and north, heavy in places. The rain cleared during the morning with just the odd shower and some sunny spells developing. Dry and sunny in the afternoon. Showers in the west by late evening. Winds were variable, moderate to strong and gusty.

Rainfall: 1 to 12mm, heaviest at Johnstown Castle, 1mm at Dublin Airport
Temperature: max. 9°C to 12°C, min. 2°C to 7°C, ground temperatures down to -3°C at Mullingar
Sunshine: 2 to 5 hours, sunniest at Valentia, 2 hours at Casement Aerodrome

Sunday 15th: Scattered showers overnight and during the morning, becoming mainly confined to the west by afternoon. By early evening heavy rain moved into the southwest and spread quickly northeastwards during the night. Southwesterly winds, initially light, increasing strong and gusty by evening.

Rainfall: nil to 15mm, heaviest at Valentia, nil at Malin Head and Dublin Airport
Temperature: max. 10°C to 13°C, min. 3°C to 10°C, ground temperatures down to -1°C at Dublin Airport
Sunshine: trace to 4 hours, sunniest at Malin Head, trace at Valentia

Monday 16th: Rain in the southwest spread northwards overnight, affecting all areas. The rain cleared all but the extreme north by the early afternoon, where it lingered until midnight. Long sunny spells in the southern half of the country during the afternoon. Winds were light southerly, veering westerly and increasing, moderate to strong and gusty.

Rainfall: 6 to 38mm, heaviest at Malin Head, 6mm at Mullingar
Temperature: max. 8°C to 12°C, min. 5°C to 8°C, no ground frost
Sunshine: nil to 7 hours, sunniest at Cork Airport, nil at Malin Head

Tuesday 17th: Scattered showers overnight and during the morning, heaviest in the west. Generally overcast with just a few sunny breaks. Rain moved into western areas by early evening and spread eastwards, giving some heavy falls, particularly in the northwest. Winds were southwesterly, light to moderate with occasional gusts.

Rainfall: 1 to 23mm, heaviest at Knock Airport, 1mm at Dublin Airport
Temperature: max. 8°C to 12°C, min. 3°C to 8°C, ground temperatures below zero at Claremorris
Sunshine: <1 to 3 hours, sunniest at Casement Aerodrome, <1 hour at Valentia

Wednesday 18th: Very wet overnight with heavy rain in places. The rain cleared most parts by noon, and the east and south were mainly dry during the afternoon. Generally overcast throughout. Further heavy rain reached the west by evening and spread eastwards. Winds were southwesterly, strong and gusty.

Rainfall: 1 to 26mm, heaviest at Claremorris, 1mm at Malin Head
Temperature: max. 12°C to 15°C, min. 4°C to 12°C, no ground frost
Sunshine: nil to trace

Thursday 19th: Very heavy rain over the western half of the country moved eastwards overnight and during the day, which led to flooding, particularly in Munster and Connacht (see map on page 2). Mild, windy and overcast. Fresh to strong and very gusty southwesterly winds, up to gale force on exposed southern coasts.

Rainfall: 7 to 51mm, heaviest at Cork Airport, 7mm at Belmullet
Temperature: max. 12°C to 15°C, min. 9°C to 13°C, no ground frost
Sunshine: nil

Friday 20th: Early rain in the east cleared into the Irish Sea. The day started dry countrywide. A few showers in the northwest during the morning, otherwise dry. Sunny in most parts of the country but less so in the north. Winds were moderate southwesterly, backing southeasterly after dark.

Rainfall: nil to 8mm, heaviest at Mullingar, nil at Roches Point
Temperature: max. 10°C to 13°C, min. 4°C to 9°C, ground temperatures down to -1°C at Mullingar
Sunshine: 2 to 7 hours, sunniest at Dublin Airport, 2 hours at Malin Head

Saturday 21st: After a dry start, rain moved in over the southwest and spread quickly northeastwards. The rain was followed by showers, heaviest in the west. Just a few sunny spells. Winds were southerly, strong and gusty.

Rainfall: 4 to 23mm, heaviest at Knock Airport, 4mm at Dublin Airport
Temperature: max. 12°C to 15°C, min. 5°C to 9°C, no ground frost
Sunshine: 1 to 3 hours, sunniest at Shannon Airport, 1 hour at Malin Head

Sunday 22nd: Scattered showers overnight with strong and gusty southwesterly winds. During the day, the showers became more widespread and heavy. Very little sunshine. The showers became less frequent during the evening and night. Winds were southwesterly, strong to gale force.

Rainfall: 1 to 17mm, heaviest at Knock Airport, 1mm at Casement Aerodrome
Temperature: max. 8°C to 11°C, min. 4°C to 7°C, no ground frost
Sunshine: nil to 2 hours, sunniest at Cork Airport, nil at Shannon Airport

Monday 23rd: Rain in places overnight with strong and gusty winds. Showers or longer spells of rain during the morning and afternoon. A few sunny spells, mainly in the northwest. Winds were westerly, strong and gusty.

Rainfall: trace to 13mm, heaviest at Gurteen, trace at Johnstown Castle
Temperature: max. 8°C to 13°C, min. 5°C to 9°C, no ground frost
Sunshine: 1 to 4 hours, sunniest at Belmullet, 1 hour at Casement Aerodrome

Tuesday 24th: Heavy rain in the west and north overnight moved southwards over the country during the morning, giving some heavy falls, particularly in the northwest. Overcast throughout. The rain cleared the southeast by early evening. Showers in the west after dark, mainly dry elsewhere. Winds were southwesterly, very strong and gusty throughout.

Rainfall: 5 to 18mm, heaviest at Knock Airport, 5mm at Johnstown Castle
Temperature: max. 11°C to 13°C, min. 4°C to 8°C, no ground frost
Sunshine: nil to trace

Wednesday 25th: Heavy showers, most frequent in western coastal counties, soon turned to a spell of rain as a trough moved quickly from the northwest and affected most parts during the morning. This was followed by heavy showers, mainly in western and northwestern areas. Little rain was recorded over the eastern half of the country. It was a clear evening, although too windy for frost. Winds were westerly, very strong and gusty, causing structural damage in places.

Rainfall: <1 to 12mm, heaviest at Gurteen
Temperature: max. 8°C to 11°C, min. 4°C to 7°C, no ground frost
Sunshine: 1 to 5 hours, sunniest at Cork Airport, 1 hour at Malin Head

Thursday 26th: Cold and windy overnight with wintry showers, some heavy and of hail, mainly in the western half of the country. Continuing cold and windy for the rest of the day with wintry showers, again most frequent and heaviest in the western half of the country. Eastern areas had fewer showers and also had some sunny spells. The showers became confined to the southwest in the evening. Moderate to fresh and gusty southwesterly winds were strong at times on exposed coasts, easing slightly by evening.

Rainfall: nil to 18mm, heaviest at Valentia, nil at Casement Aerodrome
Temperature: max. 5°C to 9°C, min. 2°C to 6°C, ground temperatures down to -1°C at Carlow (Oak Park)
Sunshine: <1 to 5 hours, sunniest at Dublin Airport, <1 hour at Belmullet

Friday 27th: Scattered wintry showers overnight, mainly in the western half of the country. It was a cold day with wintry showers and some sunny spells. The showers were more isolated in eastern areas, where most sunny spells were recorded. Becoming very cold after dark with a sharp frost developing in many areas. Winds were light to moderate westerly, fresh and gusty on Atlantic coasts overnight, easing throughout the day, light and variable by evening.

Rainfall: nil to 14mm, heaviest at Valentia, nil at Dublin Airport
Temperature: max. 5°C to 9°C, min. -1°C to 4°C, ground temperatures down to -6°C at Mullingar
Sunshine: nil to 2 hours, sunniest in the east, nil at Shannon Airport

Saturday 28th: Showers or rain in the south and southeast during the early hours. Cold with frost and fog, lingering in some areas throughout the day, mainly in the midlands. Rain in the southeast by late afternoon spread over Leinster in the evening, giving some heavy falls. Sunny in the north and west, cloudier further south. Winds were light westerly, veering northerly by evening, fresh to strong in the southeast.

Rainfall: nil to 8mm, heaviest at Johnstown Castle
Temperature: max. 1°C to 9°C, min. -3°C to 2°C, ground temperatures down to -6°C at Mullingar
Sunshine: nil to 7 hours, sunniest at Malin Head, nil at Cork Airport

Sunday 29th: Heavy rain in Leinster and east Munster overnight. The rain eventually cleared the east coast by nightfall. Mostly dry elsewhere apart from some coastal showers in the northwest. Some breaks in the cloud in the west and north, cloudy elsewhere. Winds were northeast to northwesterly overnight, moderate in the east but lighter further west.

Rainfall: nil to 35mm, heaviest at Dublin Airport
Temperature: max. 6°C to 9°C, min. -2°C to 6°C, ground temperatures down to -5°C at Belmullet
Sunshine: nil to 3 hours, sunniest at Knock Airport, nil in the east

Monday 30th: Very cold overnight. Frost cleared during the morning. Sunny spells throughout the day, with occasional scattered showers along northern and western coasts. Cold again after dark, apart from the west where temperatures rose slightly. Winds were northerly, light to moderate with occasional gusts on north and northwest coasts, easing later.

Rainfall: nil to 2mm, heaviest at Valentia
Temperature: max. 4°C to 9°C, min. -2°C to 3°C, ground temperatures below zero at all stations, down to -7°C at Mullingar
Sunshine: 2 to 7 hours, sunniest at Cork Airport, 2 hours at Malin Head

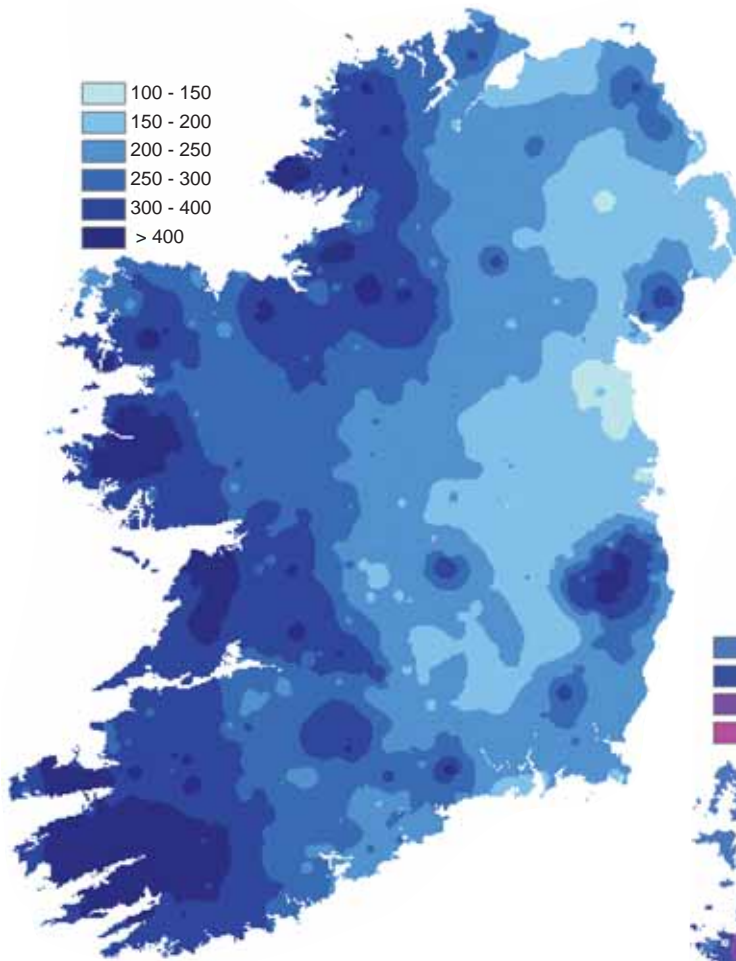
Wettest on record in many places

November rainfall totals were more than twice the normal almost everywhere and were over three times normal in parts of the west and southwest. Totals ranged from 141mm at Dublin (Merrion Square) to 465mm at Delphi Lodge, Co. Mayo, with percentage of normal values between 164% at Belmullet and 292% at Sherkin Island, Co. Cork, where it was the wettest of any month since records began in 1972. At a number of other stations in the west and southwest it was also the wettest of any month on record, including Valentia Observatory, where observations began almost 150 years ago (see page 2). At some Dublin stations, totals were just below those of another exceptionally wet November, that of 2002.

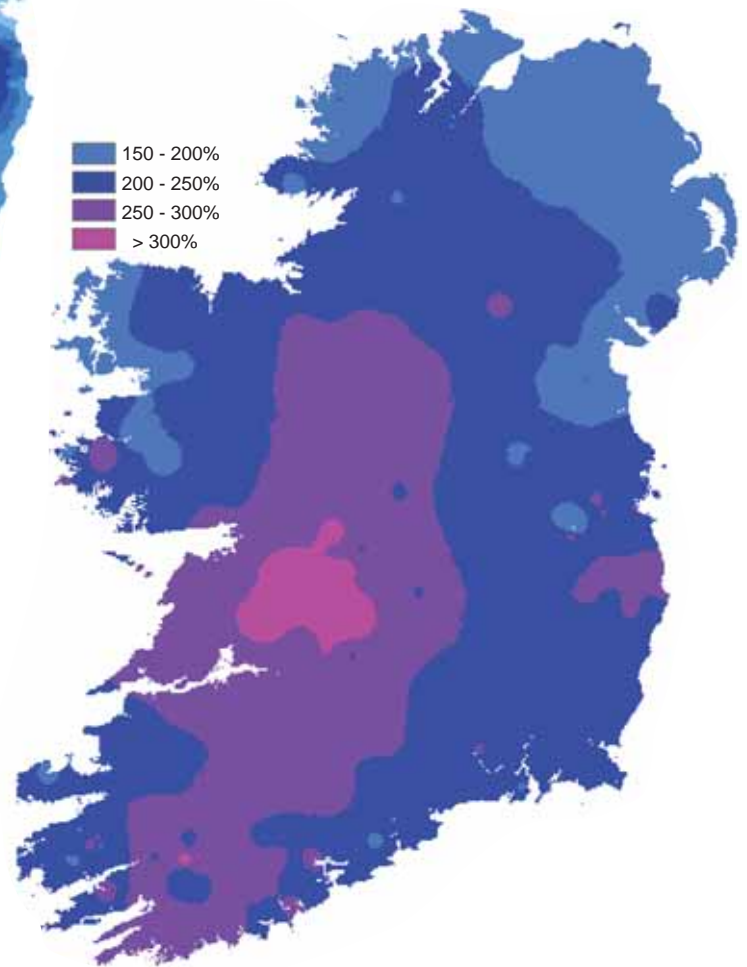
Rain was recorded on every day of the month, with stations near the Atlantic coast measuring between 26 and 29 raindays (days with 0.2mm or more of rainfall). Most other stations recorded a total of at least 24 raindays, compared with the normal number for November of between 16 and 22 raindays. There was heavy rain on many days, particularly in the period between the 16th and 19th, bringing unprecedented floods in many areas. Over 100mm of rain fell in a 2-day period between the 18th and 20th in some southwestern areas (see page 2), while Galway (University College) measured 60.8mm on the 17th, the highest November fall on record at the station. Many other stations recorded their highest daily falls for November for between 10 and 30 years.

County/ Station	Total Amount (mm)	% of 1961-90 average	Most in a day / date		Number of Raindays (>0.2mm)	Wetdays (>1mm)
CO. CARLOW						
CARLOW (OAK PARK)	191.2	266	18.2	19	26	22
CO. CAVAN						
BALLYHAISE	211.7	249	33.4	19	22	22
CAVAN (LORETO COLLEGE)	229.5		44.0	19	23	22
CO. CLARE						
SHANNON AIRPORT	245.6	259	20.4	22	27	25
CARRON	438.9	273	49.3	17	29	25
CO. CORK						
ROCHE'S POINT	191.0	217	25.5	11	30	22
FERMOY (MOOREPARK)	255.0	280	26.5	18	29	27
CORK AIRPORT	232.8	214	30.3	18	29	25
SHERKIN ISLAND	306.6	292	37.0	15	27	26
BALLINCURRIG (PEAFIELD)	248.6		32.0	18	28	26
CO. DONEGAL						
GLENTIES	306.1	188	n/a		n/a	n/a
MALIN HEAD	217.7	189	31.6	16	30	27
BALLYSHANNON (CATHLEEN'S FALL)	264.8	239	27.8	22	28	25
CO. DUBLIN						
DUBLIN (PHOENIX PARK)	156.6	227	20.6	28	25	21
DUBLIN AIRPORT	149.4		28.1	28	26	19
CASEMENT AERODROME	169.0	256	22.5	28	24	22
DUBLIN (MERRION SQUARE)	141.0	227	16.6	13	24	23
CO. GALWAY						
GALWAY (UNIV. COLL.)	329.4	286	60.8	17	27	26
MAAM VALLEY	452.6		33.5	23	28	28
BALLYGAR	273.0	265	43.0	17	29	25
CO. KERRY						
VALENTIA OBSERVATORY	345.4	235	47.2	18	28	28
ARDFERT (LISCAHANE)	287.0		29.1	18	28	28
CO. LIMERICK						
MOUNT RUSSELL	268.2		26.4	15	29	27
CO. MAYO						
BELMULLET	208.5	164	20.6	16	29	27
STRAIDE	294.6	243	35.4	15	28	26
KNOCK AIRPORT	285.5		30.1	17	29	26
DELPHI LODGE II	465.0		57.1	18	29	28
CO. MEATH						
WARRENTOWN	166.7	214	22.1	17	23	21
CO. MONAGHAN						
CARRICKMACROSS (DUNOGE)	160.4	193	28.2	17	24	17
CO. OFFALY						
DERRYGREENAGH	175.7	214	24.6	17	25	23
CO. SLIGO						
ARDTARMON	257.1		29.2	9	26	24
CO. TIPPERARY						
GURTEEN	254.2		23.3	17	27	26
FETHARD (PARSONSHILL)	191.4		20.5	13	28	25
CO. WATERFORD						
WATERFORD (TYCOR)	199.4	210	28.5	18	25	20
DUNGARVAN (CARRIGLEA)	240.1		41.8	18	28	25
CO. WESTMEATH						
MULLINGAR	191.6	204	27.2	17	25	22
CO. WEXFORD						
JOHNSTOWN CASTLE	205.8	187	34.2	13	25	19
JOHN F. KENNEDY PARK	229.0	241	34.9	18	24	23
CLONROCHE (KNOXTOWN)	270.3		44.9	18	24	22

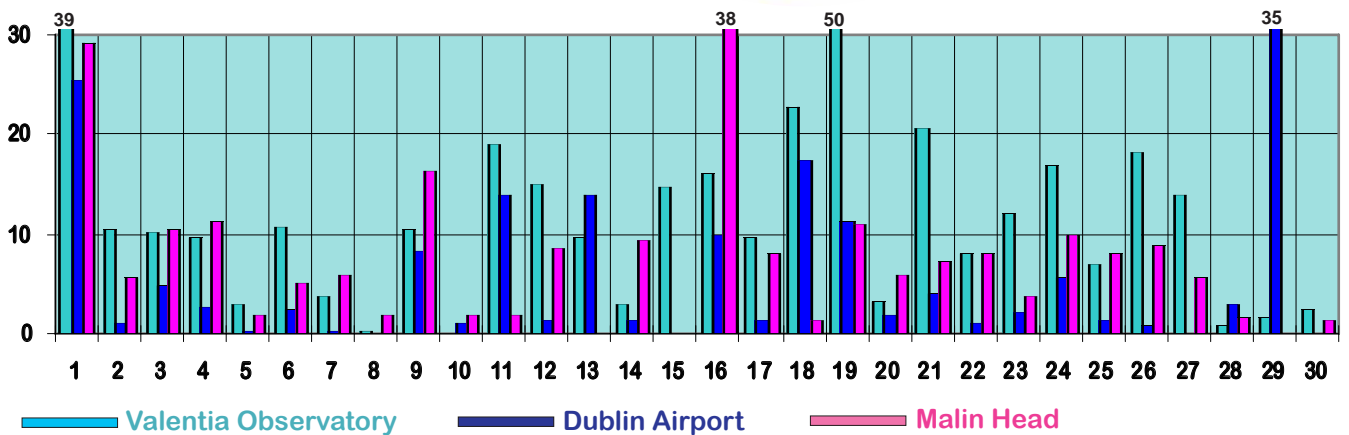
Total rainfall (mm)



Percentage of normal rainfall



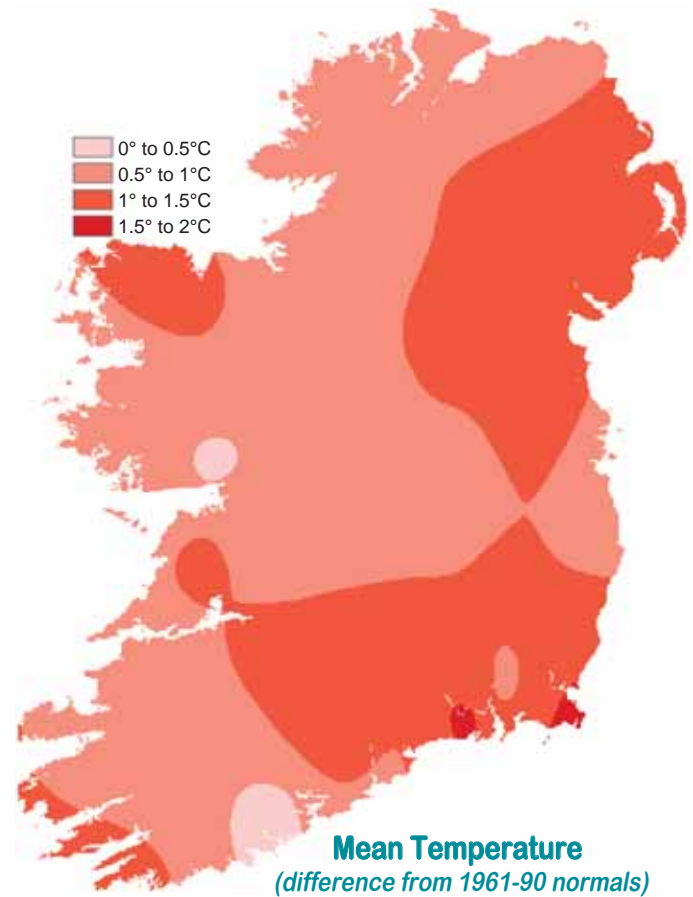
Daily 0-24h rainfall values (mm)



Warmer than normal, especially in southeast

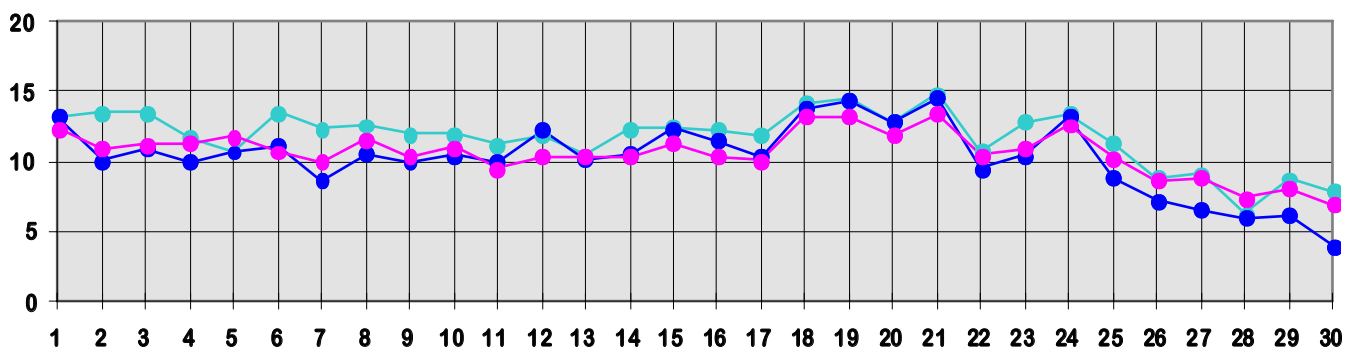
Mean air temperatures for the month were above normal everywhere, particularly over the eastern half of the country. Mean values ranged from 6.2°C at Knock Airport to 10.0°C at Sherkin Island, Co. Cork, around a degree higher than normal generally.

There was very little variation in temperature during most of November, as the very wet and windy weather brought mild conditions with little frost. Colder weather developed during the last week, however, allowing widespread ground frost to develop by the end of the month. The month's highest temperature, 16.1°C, was recorded at Dublin (Merrion Square) on the 19th, while the lowest air temperature of the month, -2.8°C, was recorded at Gurteen on the 11th. Both air and ground temperatures fell close to freezing at inland stations from the 27th onwards. The lowest grass minimum value of -6.4°C was measured at Mullingar on the 28th. Belmullet's grass minimum value of -5.2°C on the 29th was its lowest such value for November since 1996. There was a total of between seven and

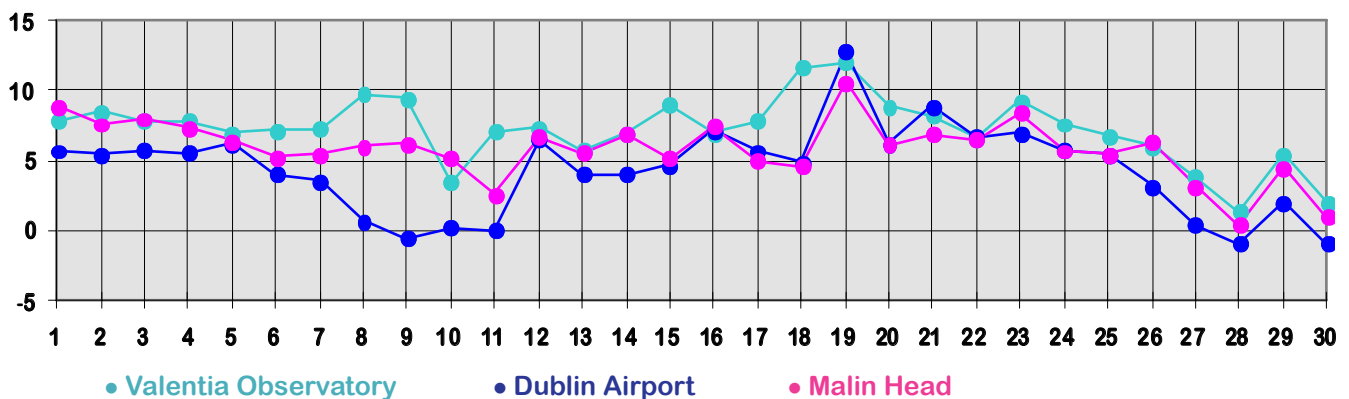


12 ground frosts at most inland stations, below the normal number for November.

Daily 0-24h maximum temperatures (°C)



Daily 0-24h minimum temperatures (°C)



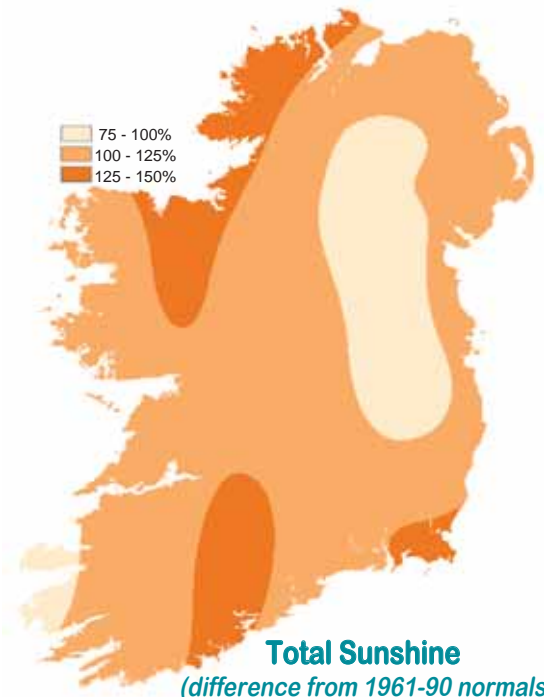
County/ Station	°C											
	Mean max.	Mean min.	Mean/ deviation from 1961-90 average		Highest max./date		Lowest min./date		Lowest grass min./date		Days with air frost ground frost	
CO. CARLOW												
CARLOW (OAK PARK)	10.7	4.5	7.6	1.1	14.3	21	-0.5	28	-5.5	28	3	10
CO. CAVAN												
BALLYHAISE	9.7	4.2	7.0		14.1	19	-1.7	11	-4.1	30	4	7
CAVAN LORETO COLLEGE	10.2	4.3	7.3		14.9	19	-2.0	11	-4.5	11	2	5
CO. CLARE												
SHANNON AIRPORT	11.1	5.9	8.5	1.0	14.7	19 18	0.0	11	-2.6	30	0	7
CARRON	10.2	4.8	7.5	1.0	13.1	18 19	-0.3	29	-4.5	28	1	9
CO. CORK												
ROCHE'S POINT	11.3	6.7	9.0	0.7	13.2	21	1.8	28	-2.2	28	0	3
FERMOY (MOOREPARK)	11.4	5.0	8.2	1.3	14.4	18 20	0.0	28 29	-3.0	30	0	4
CORK AIRPORT	10.3	4.8	7.6	0.4	12.6	21 19	-0.3	28	-3.0	28	1	8
SHERKIN ISLAND	12.4	7.6	10.0	1.1	15.4	7	2.2	28	-1.8	30	0	2
BALLINCURRIG (PEAFIELD)	10.6	4.0	7.3		14.0	1	-1.1	29	-1.5	30	3	3
CO. DONEGAL												
GLENTIES	10.0	4.7	7.4	1.0	14.2	18	-2.4	30	-5.1	30	3	9
MALIN HEAD	10.6	6.0	8.3	0.7	13.4	21	0.4	28	-1.6	28	0	3
BALLYSHANNON (CATHLEEN'S FALL)	10.3	5.1	7.7	0.8	14.0	18	0.2	30			0	
CO. DUBLIN												
DUBLIN (PHOENIX PARK)	10.7	4.6	7.7	1.1	15.3	21	-0.6	30	-4.2	30	3	9
DUBLIN AIRPORT	10.4	4.6	7.5		14.6	21	-0.9	30 28	-4.4	9	5	7
CASEMENT AERODROME	10.3	4.7	7.5	0.9	15.0	21	-1.3	30	-6.1	30	2	7
DUBLIN (MERRION SQUARE)	11.3	6.1	8.7	0.7	16.1	19	0.8	29			0	
CO. GALWAY												
GALWAY (UNIV. COLL.)	11.2	4.5	7.9	0.5	14.0	18	-2.0	11 28	-5.0	11	3	11
MAAM VALLEY	11.4	5.7	8.6		14.1	18 19	-0.4	28	-3.1	11 28	1	4
BALLYGAR	10.2	3.9	7.1		13.6	19	-2.0	28	-4.0	30	4	8
CO. KERRY												
VALENTIA OBSERVATORY	11.9	7.4	9.7	1.0	14.9	20	1.4	28	-4.6	28	0	4
ARDFERT (LISCAHANE)	11.1	5.9	8.5	0.8	14.5	18	-0.4	30	-4.3	30	1	4
CO. LIMERICK												
MOUNT RUSSELL	10.4	5.2	7.8		14.0	19	-0.8	30	-3.7	30	2	5
CO. MAYO												
BELMULLET	11.0	6.3	8.7	1.0	13.6	18	-0.3	29	-5.2	29	1	4
STRAIDE	10.4	4.5	7.5	1.0	13.5	18	-2.4	28	-4.6	28	3	11
KNOCK AIRPORT	8.7	3.7	6.2		11.9	18	-2.6	29	-6.2	28	2	4
DELPHI LODGE II	11.2	5.5	8.4		14.1	18	-1.5	29	-4.8	29	2	4
CO. MEATH												
WARRENSTOWN	10.5	4.4	7.5	1.3	14.8	21	-1.2	9	-4.1	11	5	8
CO. MONAGHAN												
CARRICKMACROSS (DUNOGE)	10.2	3.7	7.0		14.5	21	-1.8	11	-2.7	30	4	6
CO. OFFALY												
DERRYGREENAGH	10.4	2.6	6.5	0.7	14.2	21	-2.6	28			5	
CO. SLIGO												
ARDTARMON	10.5	5.6	8.1		13.3	8	-1.4	29	-2.8	11 29	1	4
CO. TIPPERARY												
GURTEEN	10.2	4.2	7.2		14.5	19	-2.8	11	-5.7	11	4	10
FETHARD (PARSONSHILL)	10.0	4.2	7.1		13.5	21	-0.8	30	-3.2	30	2	5
CO. WATERFORD												
WATERFORD (TYCOR)	11.8	5.9	8.9	1.5	14.1	17	1.0	30			0	
DUNGARVAN (CARRIGLEA)	11.7	5.2	8.5	1.0	14.0	17 21	-0.4	11 30	-2.6	30	2	3
CO. WESTMEATH												
MULLINGAR	9.8	3.8	6.8	0.9	14.0	18	-2.2	28	-6.4	28	4	12
CO. WEXFORD												
JOHNSTOWN CASTLE	11.3	6.1	8.7	1.5	13.7	21	1.1	30	-2.1	27	0	6
JOHN F. KENNEDY PARK	11.2	5.0	8.1	1.0	13.5	21	-0.2	30	-4.0	30	1	10
CLONROCHE (KNOXTOWN)	10.8	4.5	7.7		13.5	21	0.0	9	-4.6	9	0	12

County/ Station	Daily mean (hours/day)	% of average	% of possible	Most in a day/date
CO. CAVAN				
CAVAN LORETO COLLEGE	2.21		26	6.0 30
CO. CLARE				
SHANNON AIRPORT	2.25	117	26	7.8 10
CO. CORK				
FERMOY (MOOREPARK)	2.57	136	29	6.8 10
CORK AIRPORT	2.80	130	31	8.1 10
SHERKIN ISLAND	2.53	119	28	7.3 10
BALLINCURRIG (PEAFIELD)	3.01			7.9 10
CO. DONEGAL				
MALIN HEAD	1.94	133	23	6.7 28
BALLYSHANNON (CATHLEEN'S FALL)	1.96	125	23	5.7 13
CO. DUBLIN				
DUBLIN AIRPORT	2.63	112	30	7.4 8
CASEMENT AERODROME	2.07	94	24	6.5 30
CO. GALWAY				
GALWAY (UNIV. COLL.)	2.44	122	28	6.7 30
CO. KERRY				
VALENTIA OBSERVATORY	1.59	93	18	6.3 10
CO. MAYO				
BELMULLET	2.05	119	24	5.8 30
STRAIDE	1.99			6.0 30
KNOCK AIRPORT	1.88			6.8 30
CO. WATERFORD				
DUNGARVAN (CARRIGLEA)	2.99	105	34	7.4 10
CO. WEXFORD				
JOHN F. KENNEDY PARK	2.75	125	31	6.8 8
CLONROCHE (KNOXTOWN)	2.73			7.2 8

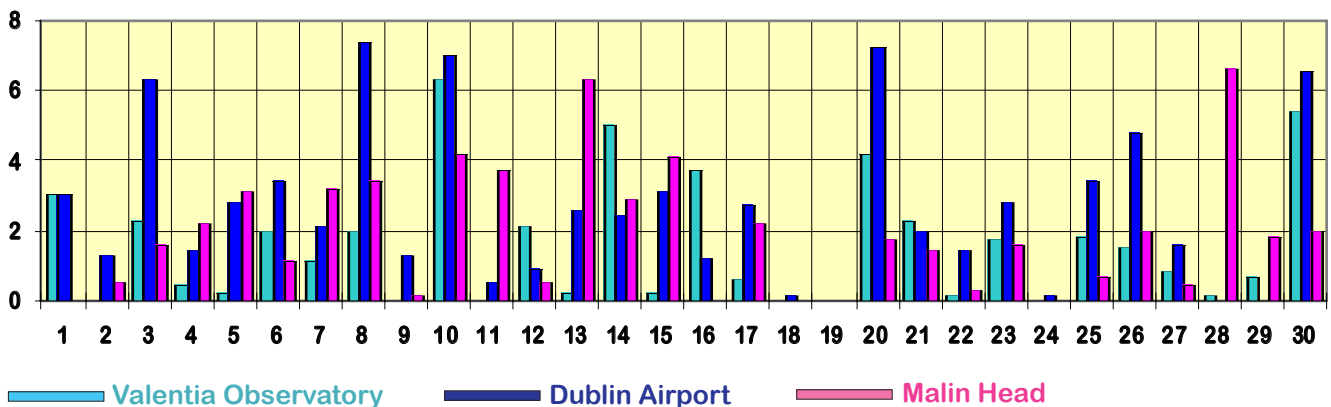
Sunnier than normal despite wet weather

Despite being a very wet month everywhere, sunshine totals for November were above normal over most of the country and were well above normal in places. They ranged from 48 hours at Valentia Observatory to almost twice that amount, 90 hours, at Ballincurrig (Peafield), Co. Cork. Percentage of normal values were between 93% at Valentia Observatory and 136% of normal at Fermoy (Moorepark), Co. Cork.

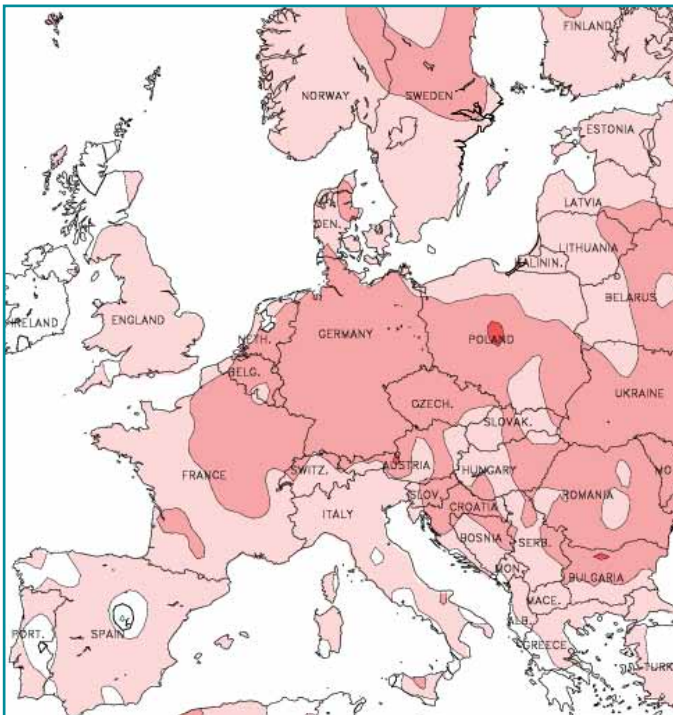
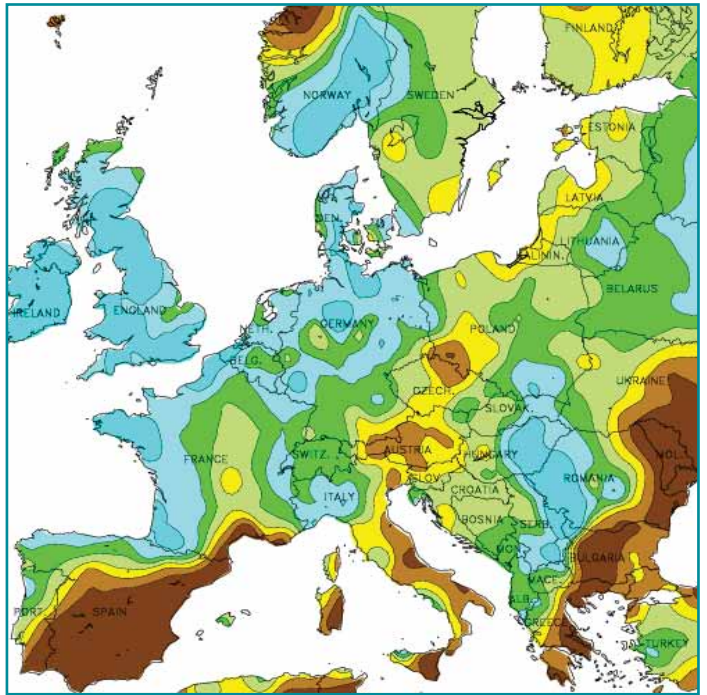
The first half of the month was sunnier than the second, with the highest daily value, 8.1 hours, recorded at Cork Airport on the 10th. Global solar radiation totals ranged from 95% of normal at Valentia Observatory to 107% at Dublin Airport.



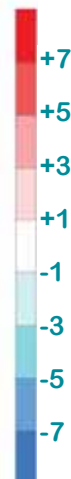
Daily sunshine values (hours)



NOVEMBER RAINFALL
(percentage of 1961-1990 normal)



°C



NOVEMBER MEAN TEMPERATURE
(difference from 1961-1990 normal)

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

The Atlantic hurricane season ended without any hurricane reaching the United States. Since June, when the season began, just nine named storms developed. Only three of them became hurricanes, and these stayed out at sea or weakened before passing over land. Two tropical storms made landfall in the U.S., causing relatively little damage.

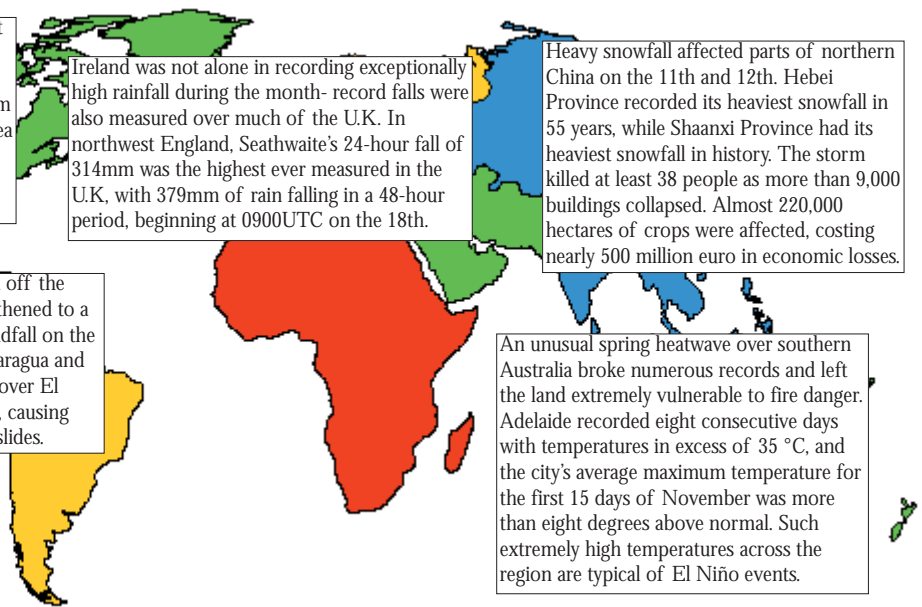
Ireland was not alone in recording exceptionally high rainfall during the month- record falls were also measured over much of the U.K. In northwest England, Seathwaite's 24-hour fall of 314mm was the highest ever measured in the U.K, with 379mm of rain falling in a 48-hour period, beginning at 0900UTC on the 18th.

Heavy snowfall affected parts of northern China on the 11th and 12th. Hebei Province recorded its heaviest snowfall in 55 years, while Shaanxi Province had its heaviest snowfall in history. The storm killed at least 38 people as more than 9,000 buildings collapsed. Almost 220,000 hectares of crops were affected, costing nearly 500 million euro in economic losses.

A late season tropical storm, **Ida**, formed off the coast of Nicaragua on the 4th and strengthened to a category one hurricane before making landfall on the 5th. Up to 280mm of rain fell across Nicaragua and Honduras. The same system later moved over El Salvador, where up to 442mm of rain fell, causing over 150 deaths due to flooding and landslides.

An unusual spring heatwave over southern Australia broke numerous records and left the land extremely vulnerable to fire danger. Adelaide recorded eight consecutive days with temperatures in excess of 35 °C, and the city's average maximum temperature for the first 15 days of November was more than eight degrees above normal. Such extremely high temperatures across the region are typical of El Niño events.

Global weather highlights of the month



The Weather of September, October and November

WETTEST AUTUMN SINCE 2000 IN PLACES;

WARMER, SUNNIER THAN NORMAL

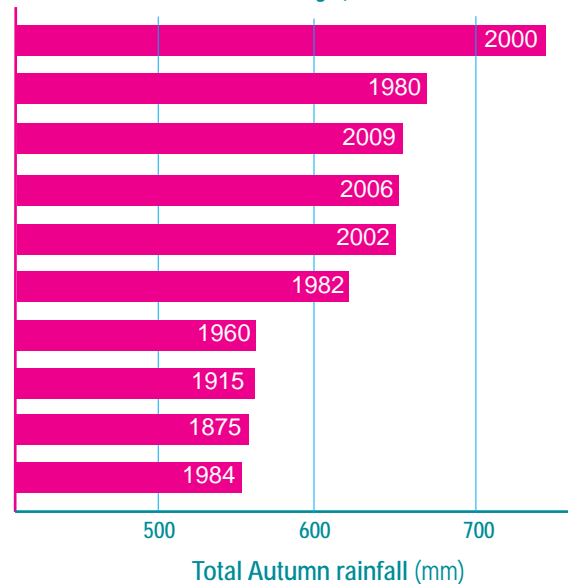
The very high rainfall totals for November brought autumn totals above normal almost everywhere, even though September was a dry month and totals for October were close to normal. Autumn totals were around 50% higher than normal at several stations and it was the wettest autumn for nine years in parts of Munster and Leinster; Valentia Observatory had its third wettest autumn in over a century of records (see chart right). The heaviest daily falls of the season almost everywhere were recorded between November 16th and 19th; the highest daily falls for autumn for 14 years were recorded at Malin Head and Cork Airport on the 16th and 19th respectively. The total number of raindays (days with 0.2mm or more rainfall) during the 3-month period was close to the normal range for autumn, however, with between 50 and 60 raindays at most stations.

Mean air temperatures for the season were close to a degree higher than average. September mean temperatures were close to normal, with few very warm days, but both October and November were mild. The season's highest temperatures were measured between September 12th and 14th in most places, but there were no maxima higher than 20°C at

several stations. The lowest temperatures were recorded during the last few days of the season, when frost became widespread. There was a total of between 16 and 21 ground frosts at most inland stations, close to the normal number for autumn.

Sunshine totals for the season were above normal except in some eastern areas. Both September and November were relatively sunny, but October was mainly dull. The highest daily values of the season were recorded between September 10th and 13th, when every station measured at least one day with over 11 hours of sunshine.

Years with highest autumn rainfall totals at Valentia Observatory (records since 1866)



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)	381.2	170	32.1 19 Nov	10.9	+1.0	21.2 -0.5				51		3				9
CO. CAVAN Ballyhaise	361.8	137	43.3 19 Nov	10.3		20.5 -1.7				60		4				5
CO. CLARE Shannon Airport	399.9	147	26.7 19 Nov	11.7	+0.9	21.9 0.0	3.16	112	11.2 11 Sep	55	0	0	0	0	10	17
CO. CORK Cork Airport	461.6	132	51.2 19 Nov	10.9	+0.6	19.7 -0.3	3.45	113	11.5 10 Sep	55	0	1	0	0	22	22
Roche's Point	354.3	133	37.2 19 Nov	11.8	+0.9	18.5 1.8				51		0				31
CO. DONEGAL Malin Head	396.0	122	38.1 16 Nov	11.2	+0.7	17.9 0.4	2.69	106	11.6 12 Sep	66	0	0	8	2	0	45
CO. DUBLIN Dublin Airport	257.2		34.7 29 Nov	10.5		19.0 -0.9	3.32	102	11.6 12 Sep	50	0	5	0	0	6	25
Casement Aerodrome	300.5	145	30.9 29 Nov	10.7	+0.7	19.3 -1.3	2.99	95	11.7 13 Sep	46	0	2	3	2	4	20
CO. KERRY Valentia Observatory	651.7	155	50.4 19 Nov	12.3	+0.8	21.4 1.4	2.74	102	11.3 11 Sep	64	0	0	5	0	0	28
CO. MAYO Belmullet	365.0	105	23.2 16 Nov	11.6	+0.7	20.8 -0.3	2.95	106	11.9 13 Sep	66	0	1	12	2	2	40
Knock Airport	452.2		30.6 16 Nov	9.8		19.9 -2.6	2.67		11.8 12 Sep	68	0	2	4	0	36	21
CO. TIPPERARY Gurteen	353.1		24.8 1 Nov	10.5		19.7 -2.8				56		4				8
CO. WESTMEATH Mullingar	339.3	104	30.4 19 Nov	10.2	+0.9	19.8 -2.2				60		5				3
CO. WEXFORD Johnstown Castle	431.9	103	44.3 6 Oct	11.5	+1.1	19.2 1.1				53		0				10