



Snowfall in Ireland



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Many Irish winters are free from major snowstorms, but because of its infrequent and irregular occurrence, snow in large quantities causes serious disruption. It can completely disrupt traffic, close airports and seriously damage overhead power lines and communication lines.

January and February are the months in which snow is most frequent but it's not uncommon to have snow in any of the months November to April. Snow has been reported in May and September. On some of these occasions the falls have been considerable but the snow melted quickly. Generally snowfall in Ireland lasts on the ground for only a day or two. Some of the more notable snowfalls in recent times had snow lying on the ground lasting from 10 to 12 days. The number of days with snow cover tends to increase northwards through the Midlands corresponding to the decrease in winter air temperatures. During the winter, sea temperatures are warmer than land which can often lead to rain around the coasts but snow a few miles inland. Rain showers may fall as snow on higher ground as temperature generally decreases with altitude. The number of days with snow cover is quite variable from year to year.

Systematic records of snow depths have been made at Synoptic stations in Ireland since 1960. Based on these records an analysis is made of the snowfall patterns over the country. The mean annual number of days with snow varies from 5 in the extreme southwest to 24 in the North Midlands (Appendix 1). Extreme western and south western areas have only about 10% of the number of hours with significant snow depths as inland locations. Coastal areas have, on average, one to two days in the year with depths of 1cm or more, with no significant snowfalls over many years. Inland stations have, on average, up to 10 days with depths of 1cm or more in the year, while the higher reaches of the Wicklow mountains have an annual average of up to 30 days. A fall of at least 2cm is likely in most places about every two years while falls of at least 10cm occur every 7 to 18 years at midland locations, and in the north midlands about once every 6 to 7 years.

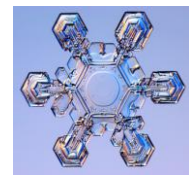
The greatest depth of snow recorded at our Synoptic stations was 45cm at Casement Aerodrome, during the winter of 1962/1963. A map displaying the maximum snow depths at 100m above mean sea level with a 50-year return period is shown in Appendix 2.

| Station | Greatest Depth of Snow (cm) 1961 to 2011 | Date |
|--------------------|---|------------|
| Belmullet | 17 | 24/01/1958 |
| Birr * | 13 | 10/01/1982 |
| Casement Aerodrome | 45 | 31/12/1962 |
| Claremorris | 20 | 27/01/1984 |
| Clones * | 25 | 15/02/1973 |
| Cork Airport | 26 | 20/2/1978 |
| Dublin Airport | 25 | 12/01/1982 |
| Kilkenny * | 18 | 27/02/1962 |
| Malin Head | 38 | 19/01/1958 |
| Mullingar | 15 | 08/03/1951 |
| Roches Point | 10 | 27/02/1962 |
| Rosslare * | 18 | 18/01/1985 |
| Shannon Airport | 6 | 11/02/1978 |
| Valentia | 12 | 22/01/1958 |

Stations closed in 2008/2009.

A marked feature of snowfall in Ireland is its variation in depth from place to place. Some heavy snowfalls can be quite localised. A deep fall of snow can be short lived if it is followed by a sudden influx of warm air from the Atlantic. Drifting complicates measurements of snow depths. Drifts of six meters or more have been reported in hilly areas. Even in flat countryside, noticeable drifting can occur especially near buildings or fences. Therefore depths are measured at points judged to be relatively free of drifting. Fresh snow to a depth of 30cm is approximately equivalent to 25mm of rain.

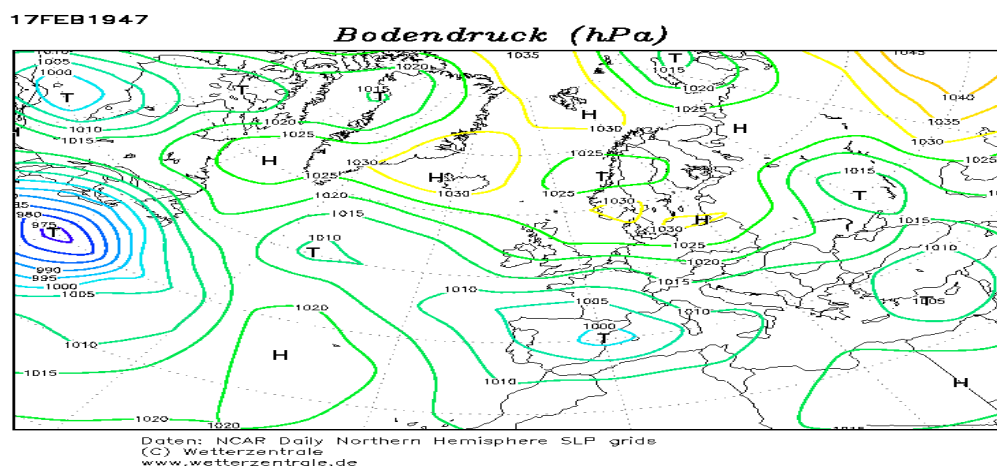
Often snow that falls from a cloud melts as it descends and reaches the ground as rain. However the melting process extracts latent heat from the surrounding air, causing the air temperature to cool and making it increasingly likely that the subsequent snow will reach the ground. The ideal conditions for snow are temperatures close to and just below zero, rather than colder temperatures. This is because the warmer the snow, the more moisture it contains and hence the bigger the flakes will be. A temperature close to zero facilitates the melting of snow, refreezing and the combination into larger flakes. Consequently very slight changes in temperature can mean the difference between rain and snow. This makes accurate forecasting of snow particularly difficult in Ireland.



Snow crystals

Snow can settle on the ground in different forms, depending on wind, temperature and humidity. Air temperatures well below freezing produce small powdery flakes. Snowflakes that form closer to 0°C are larger and wetter and tend to stick to surfaces.

In winter, snow often occurs when two different air masses collide, the cold continental air from the north or east meets the relatively mild moist maritime air from the south or west. Different parts of Ireland are more affected with snow falls that are associated with particular air masses. Snowfalls in the Northwest and West are most commonly associated with Polar Maritime and Arctic airstreams. These airstreams bring in frequent snow showers, due to convective activity and instability over the relatively warm seas. Occasionally significant snow falls under anti-cyclonic conditions in an easterly Polar Continental airflow, for example in February 1947. Under these conditions Eastern and Midland areas are more affected. Eastern and North-Eastern areas are prone to unstable north-easterly winds blowing onshore from relatively warm waters of the Irish Sea which can often produce significant snowfalls, as occurred in January 1987, 2009 and 2010.



White Christmas:

In modern times, snow is synonymous with Christmas. Christmas cards, songs and scenes from the Victorian period, notably in Charles Dickens's novels, all portray snow falling at Christmas. The origins of a White Christmas may originally have come from the 'Little Ice Age' that occurred during the period 1550-1850.

In Ireland snow occurs most frequently in the months from December to March. Countrywide snow fell on 17 Christmas days, at a least one of our Synoptic stations, since 1961 (1961, 1962, 1964, 1966, 1970, 1980, 1984, 1990, 1993, 1995, 1998, 1999, 2000, 2001, 2004, 2009 and 2010). There were 9 Christmas days (1964, 1970, 1980, 1993, 1995, 1999, 2004, 2009 and 2010) with snow lying on the ground at 09 am in the morning, during this period. The maximum dept of snow ever recorded on Christmas day was 27cm at Casement Aerodrome in 2010.

There were 200 days with snowfall in December over a 70 year period at Dublin Airport. Snow fell on Christmas day on 12 days (1950, 1956, 1962, 1964, 1970, 1984, 1990, 1993, 1995, 1999, 2000, and 2004) since records began there in 1941. The maximum dept of snow recorded at Dublin Airport on Christmas day was 20cm in 2010. This was also the only Christmas day with snow lying on the ground at 09am in the morning since records began in 1941.



Christmas 2010, Griffith Park, Dublin

For many people, a White Christmas means a complete covering of snow on the ground. However, sometimes the definition used by bookmakers is for a single snow flake to be observed falling during the 24 hours. The statistical likelihood of snow falling at Dublin Airport is approximately once every 5.9 years, as snow fell on Christmas day 12 times in the last 71 years. The accuracy of forecasting snow falling on Christmas Day falls significantly beyond about 5 days.

Ireland was almost completely covered by snow and ice on Christmas Day 2010, one of the coldest days ever recorded.



There are many historical references to severe winters in Ireland. A huge snowfall which lasted three months is reputed to have occurred around 764 A.D., and in 1433/1434 Ireland suffered another severe winter. There was a great snow in 1635 (Boate, 1652). From the late 17th century onwards weather diaries and newspapers provided information on the weather. From 1800 onwards meteorological observations were made regularly at an increasing number of locations. Daily observations commenced at the Phoenix Park, Dublin in 1829.

The following is a record of only the most outstanding snowfall events in the past two centuries. Many other events may have merited inclusion but records are scant.

Outstanding snowstorms of the 19th century:

- 1807 On 19th and 20th November, a disastrous blizzard swept the country and many people were killed. Two transport ships were wrecked on the east coast. Heavy snow prevented the crews from realising how close they were to land. Records at the Phoenix Park detail heavy falls of snow during the winter and many people died.
- 1831, 1836-8 Records at the Phoenix Park detail heavy falls of snow during these winters.
- 1853 In a violent snowstorm on the 14th February a ship, the “Queen Victoria” struck rocks off Howth Head with a loss of 55 lives.
- 1855 February was a cold month at the Phoenix Park, with snow on the ground from the 7th to 23rd.
- 1881 The records at the Phoenix Park, Dublin recorded remarkable snowstorms in January (O’Reilly, 1981).
- 1886 A great blizzard with snow depths up to 60cm struck Northern Ireland. Later between April 7th and 10th there was heavy snow, especially in the Tipperary area.
- 1891/92 This winter saw snowfalls which were greater than those previously recorded. Railway traffic was seriously disrupted in the third week of February. Snow to a depth of 46cm was recorded in Cork, the greatest fall since 1855.
- 1895 Heavy falls occurred in February, particularly in the West and South.

During the last 25 years of the 19th century the winters of 1878/79, 1880/81 and 1894/95 were very cold. Over the Ireland and Britain the winter of 1878/95 was one of the most persistently cold and snowy in fifty years (Bonacina, 1928)

Outstanding snowfalls of the 20th century:

- 1908: Leinster was affected by heavy snow in late April.
- 1909/10 The bulk of this winter's snowfall over the British Isles came in two severe spells, the first between 15th and 22nd of December and the second between 25th and 31st of January. A depth of 33cm was reported in Sligo in the December snowfall. The January spell was more severe and counties in Munster, notably Cork, Kerry and Clare were snow covered to a great depth for several days.
- 1917 The most severe snowfalls of this century and probably of the last two centuries occurred. On the 24th January large quantities of rain, sleet and snow accompanied the south easterly gale in the south of Ireland. At Ballinacurra near Cork the measurement (of snow when melted) on the 24th was 52 mm and on the 25th 19 mm. At Seskin the total amount of snow on the 25th and 26th yielded, when melted, 47 mm of water. On the 25th, the wind strengthened to a gale in the south of Ireland, when there were heavy falls of snow covering the ground to 30 cm or more, with drifts of 300 cm or more. Over a large area of Ireland railway traffic was stopped owing to the heavy snow.
During the period 28th January to 3rd February, the low maximum temperatures prevented the snow which had fallen during the preceding week from thawing to any considerable extent. Little fresh snow fell during the week.
East Clare experienced a great snowstorm on 1st April. Snow on level ground lay to a depth was 46 cm. The greatest previous snowstorm remembered in the area occurred on February 19th 1892 when depths of snow measured 13 cm.
- 1933 On 23rd February a small depression appeared in the polar current over the extreme north of Ireland. This disturbance moved south and increased in intensity. Snow began in the west on the 23rd and spread eastwards during the 24th. Widespread and heavy snowfalls were accompanied by strong squally winds. Snow depths of 30 to 60 cm, with deep drifts, were reported. Heaviest falls were in the south and midlands. At 4 p.m. on the 24th in Broadford, Co. Clare, the snow was 30 cm deep where it had not drifted. At Hacketstown, Co. Clare, drifts of up to 300 cm were reported.
- 1947 The early months of 1947 saw one of the most persistent cold spell of the century, with snowfalls affecting all parts of the country from late January until mid-March. Although heavier individual snowfalls have been recorded, notably in January 1917, at no other time in the recent past has there been such a period of continuous cold weather. Following the disastrous harvest of 1946 and the extension of wartime rationing of food and fuel, the severe weather caused hardship for many people and disrupted the country's communication and transport facilities for several weeks. By the beginning of February there were reports of skating on frozen ponds and the unrelenting cold continued until the middle of March.



1947 Steam engine coming into Boyle Station

- 1951 Considerable snow fell on the 8th March in midland and eastern areas and was succeeded by a spell of cold easterly winds. Mullingar recorded a depth of snow of 15cm.
- 1955 A very cold northerly or easterly airstream dominated the country from the 10th to 25th February giving wintry showers and outbreaks of snow with prolonged periods of icy roads. There were 10 consecutive days with snow lying at Dublin Airport from 18th to 27th February where a depth of 13cm was recorded on the 22nd and 25th February.
- 1958 A cold north-westerly airflow set in on the 19th January, giving wintry showers, especially in the Northwest and west Munster. Malin Head recorded a depth of snow of 20cm on the 21st February. A depth of 17cm was recorded at Belmullet on the 24th, the greatest depth of snow recorded at this station.
- 1960 Snow fell countrywide on a large number of occasions in February. Dublin Airport had 9 days with snow lying from the 11th to 19th February where a depth of 11cm was recorded on the 13th February.
- 1962/63 This winter was one of the most severe in recent times. The winter of 1963 was the coldest of the twentieth century. The second coldest was 1947, when more snow fell, but average temperatures were not as low. Bitterly cold weather set in around the Christmas period and persisted with only brief milder periods until early March. During this period easterly winds were directed over Ireland by a large Scandinavian anticyclone, with occasional depressions bringing falls of snow, some of which were heavy. On the morning of the 31st December 1962, a depth of 45 cm of snow was recorded at Casement Aerodrome in an area where there was no significant drifting.



River Shannon on 3rd January 1963

- 1973 Widespread snow fell during the period 14th to 17th of February, heaviest in the Midlands. A snow depth of 25cm was recorded at Clones, Co. Monaghan.
- 1977/78 This winter had some notable snowfalls. Snow fell in most places in the period 8th – 20th February. The south and southeast were most affected, particularly on the 18th and 19th February when heavy falls of snow accompanied by strong winds contributed to the formation of large drifts. A depth of 26 cm was recorded at Cork Airport, the greatest depth recorded at this station.
- 1978/79 Appreciable falls of snow between 28th and 31st December 1978 were followed by frosts of unusual severity. This cold spell ended on January 6th but there were further snowfalls later in the month. The highest depths of snow recorded during this spell were Casement Aerodrome 26 cm, Claremorris 16cm and Cork Airport 15 cm.
- 1982 On 8th January there was widespread snow, heaviest in the East, where there was considerable drifting due to strong easterly winds. A severe cold spell followed and snow remained on the ground until 15th January. Dublin was badly affected. Snow was reported at most synoptic stations with the greatest depths as follows: Dublin Airport 25 cm, Casement Aerodrome 16 cm and Kilkenny 16cm.



The exceptional snow of January 1982 (Photo: scene at Rathfarnham, county Dublin, by P.A. O'Dwyer)

- 1987 This spell started on the 11th January. By the 14th, appreciable depths of snow were reported particularly in the East and Midlands. Moderated north- easterly winds caused drifting. Temperatures rose a little above zero on the 15th and a slow thaw set in. Highest snowfalls recorded were as follows: Dublin Airport 19 cm; Casement Aerodrome 12 cm; Birr 12cm; Mullingar 12 cm. Roches Point recorded its highest ever depth of snow at 12 cm and a minimum temperature of -7.2 degree Celsius, the lowest there since records began in 1867.

Outstanding snowfalls since 2000:

- 2000 On the 27th December a shallow polar depression crossed the north of the country, bringing outbreaks of snow, heavy in parts of the west and north. Snow showers were widespread in all but the southeast on the 28th, giving significant accumulation of snow in many places. A depth of 19 cm was recorded at Knock Airport.
- 2001 Bitterly cold northerly winds brought falls of snow on the 26th – 28th February, heaviest in the north and east. Snow depths up to 10cm were recorded in the east and northwest, 75cm of snow was measured in the Mourne Mountains on the 27th February.
- 2009/10 This was the coldest winter since 1962/3, temperatures were around two degrees below average. There were between 20 and 30 days with snow in many places, mainly in the form of showers, but snowfall accumulations were generally slight except on high ground.
- 2010/11 Following the middle of November 2010, the weather turned progressively colder. By the end of the month, there were accumulations of snow over most of the country, accompanied by extremely low temperatures. Both Dublin Airport (-8.4°C) and Casement Aerodrome (- 9.1°C) had their lowest November temperatures on record on the 28th. The very cold weather continued into early December with further sleet and snow, accompanied by daytime temperatures close to freezing and night-time values dropping below -10°C (-16°C at Mount Juliet on 3rd). After an improvement in temperatures for 5 or 6 days, although still cold, it became extremely cold again from 16th with snow at times leading to significant accumulations and record low December temperatures. Snow depths of between 10 and 25 cm were recorded at many locations. Casement Aerodrome recorded a depth of 27cm.



Ice and snow covered the top of Croagh Patrick, Co. Mayo, on New Year's Day 2010.

Appendix 1

Mean Number of days with snow.

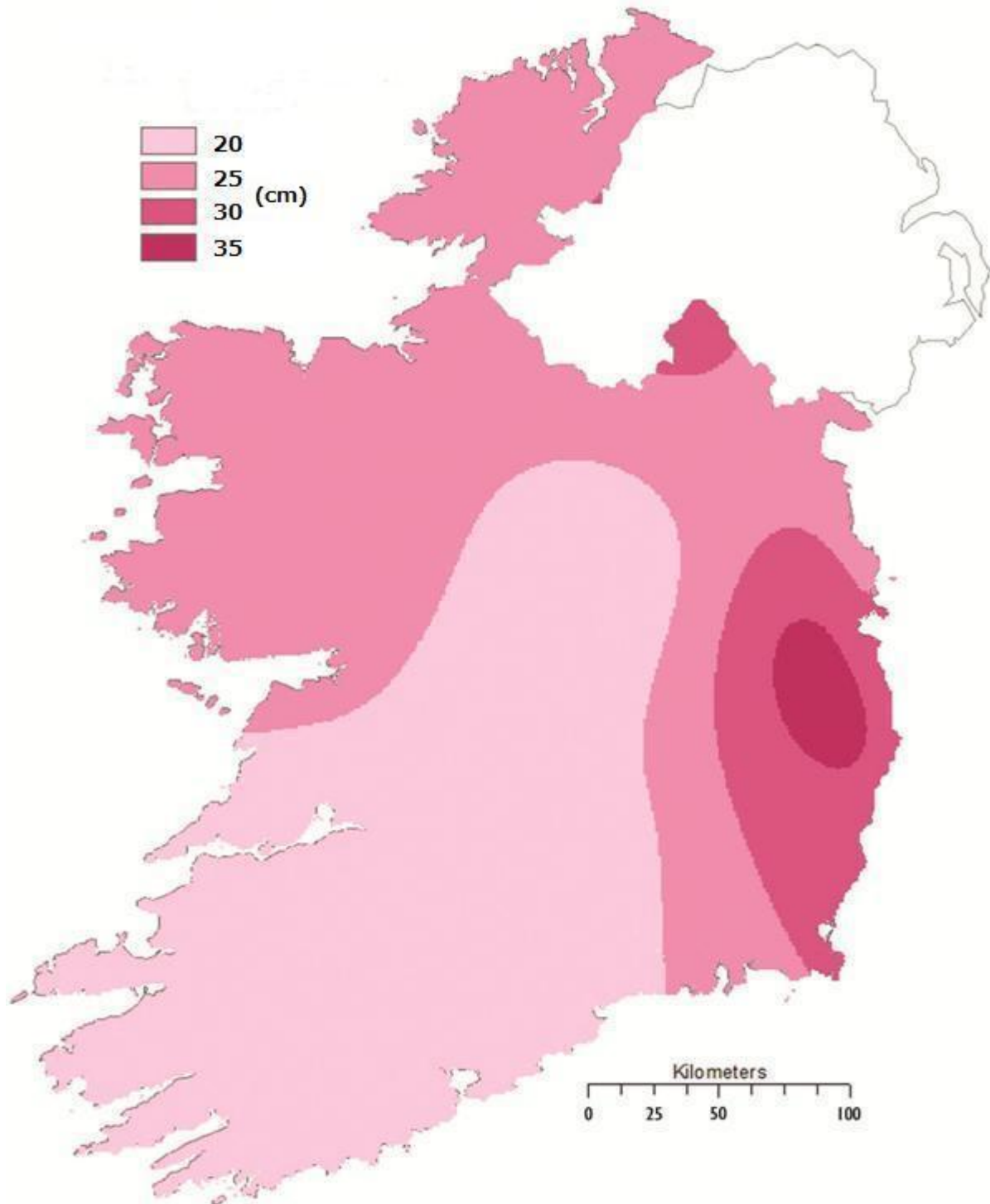
| Station | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total | Record Period |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|---------------|
| Belmullet | 4.6 | 4.3 | 3.5 | 1.7 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.7 | 2.7 | 17.6 | 1961-2000 |
| Birr | 4.5 | 3.3 | 2.4 | 1.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 2.5 | 14.3 | 1961-2000 |
| Casement Aerodrome | 4.6 | 4.4 | 3.2 | 1.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.6 | 2.2 | 16.6 | 1964-2000 |
| Claremorris | 6.5 | 5.3 | 4.5 | 1.9 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 1.6 | 3.6 | 23.7 | 1961-1995 |
| Clones | 6.2 | 5.8 | 4.4 | 1.8 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 1.6 | 3.8 | 23.9 | 1961-2000 |
| Cork Apt | 3.9 | 4.1 | 2.6 | 1.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 2.4 | 14.7 | 1962-2000 |
| Dublin Apt | 5.6 | 5.0 | 3.8 | 1.6 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.9 | 3.0 | 20.1 | 1961-2000 |
| Kilkenny | 4.5 | 4.3 | 2.7 | 0.9 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 | 2.4 | 15.3 | 1961-2000 |
| Malin Head | 6.2 | 5.7 | 4.3 | 2.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 1.8 | 4.1 | 24.6 | 1961-2000 |
| Mullingar | 6.0 | 5.3 | 3.9 | 2.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 | 3.5 | 21.9 | 1961-2000 |
| Rosslare | 2.3 | 3.1 | 1.6 | 0.7 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 1.1 | 9.0 | 1961-2000 |
| Shannon Apt | 3.1 | 2.9 | 1.6 | 0.6 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.3 | 1.5 | 9.9 | 1961-2000 |
| Valentia | 1.3 | 1.4 | 1.0 | 0.4 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.8 | 5.0 | 1961-2000 |

Mean number of years between occurrences of snow depths (cm).

| Station | 2 cm or more | 5 cm or more | 10 cm or more | 15cm or more | 20cm or more | Period of record |
|--------------------|--------------|--------------|---------------|--------------|--------------|------------------|
| Belmullet | 3.9 | 14.8 | - | - | - | 1958 to 2011 |
| Birr | 2.1 | 4.5 | 18 | - | - | 1955 to 2008 |
| Casement Aerodrome | 1.9 | 3.0 | 5 | 8 | 16 | 1964 to 2011 |
| Claremorris | 1.4 | 2.3 | 7 | - | - | 1950 to 1995 |
| Clones | 1.5 | 2.9 | 6 | 12 | 18 | 1955 to 2008 |
| Cork Airport | 2.4 | 4.5 | 7 | 13 | - | 1962 to 2011 |
| Dublin Airport | 2.0 | 3.3 | 7 | 9 | 22 | 1947 to 2011 |
| Kilkenny | 2.6 | 6.4 | 12 | 17 | - | 1958 to 2008 |
| Malin Head | 2.8 | 7.9 | - | - | - | 1956 to 2010 |
| Mullingar | 1.5 | 2.6 | 7 | - | - | 1951 to 2008 |
| Roches Point | 2.6 | 6.2 | - | - | - | 1957 to 1987 |
| Rosslare | 4.6 | 12.3 | 13 | 19 | - | 1958 to 1994 |
| Shannon Airport | 4.8 | - | - | - | - | 1955 to 2011 |
| Valentia | 3.6 | 10.3 | - | - | - | 1940 to 2011 |

Appendix 2

Maximum Snow Depths at 100m with return period 50 years.



Assume an increase of 4cm per 100 meters

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