

## Northern Ireland: climate

Northern Ireland consists of the six counties of Antrim, Armagh, Londonderry, Down, Fermanagh and Tyrone. These encompass a variety of topographical features.

The inland basin centred on Lough Neagh (the largest lake in the UK, with an area of 385 sq km) is surrounded by upland including the Sperrin Mountains in the north-west, the Antrim Plateau to the north-east and the Mourne Mountains in the south. There are extensive areas over 200 metres, with the highest point being Slieve Donard (852 metres) in the Mourne Mountains.



The climate of Northern Ireland is characterised by equability, a consequence of the moderating effects of the Atlantic Ocean - bringing relatively mild winters and cool summers. However, the indented shape of the coastline and the presence of high ground introduce localised differences in temperature, cloud and precipitation.

### Temperature

The mean annual temperature at low altitudes in Northern Ireland varies from about 8.5 °C to 10.0 °C, with the higher values occurring around or near to the coasts. The mean annual temperature decreases by approximately 0.5 °C for each 100 metres increase in height so that, for example, Parkmore Forest in County Antrim (at 235 metres) has an annual mean temperature of 7.7 °C. On this basis, Slieve Donard (at 852 metres) would have an annual mean temperature of about 4.5 °C.

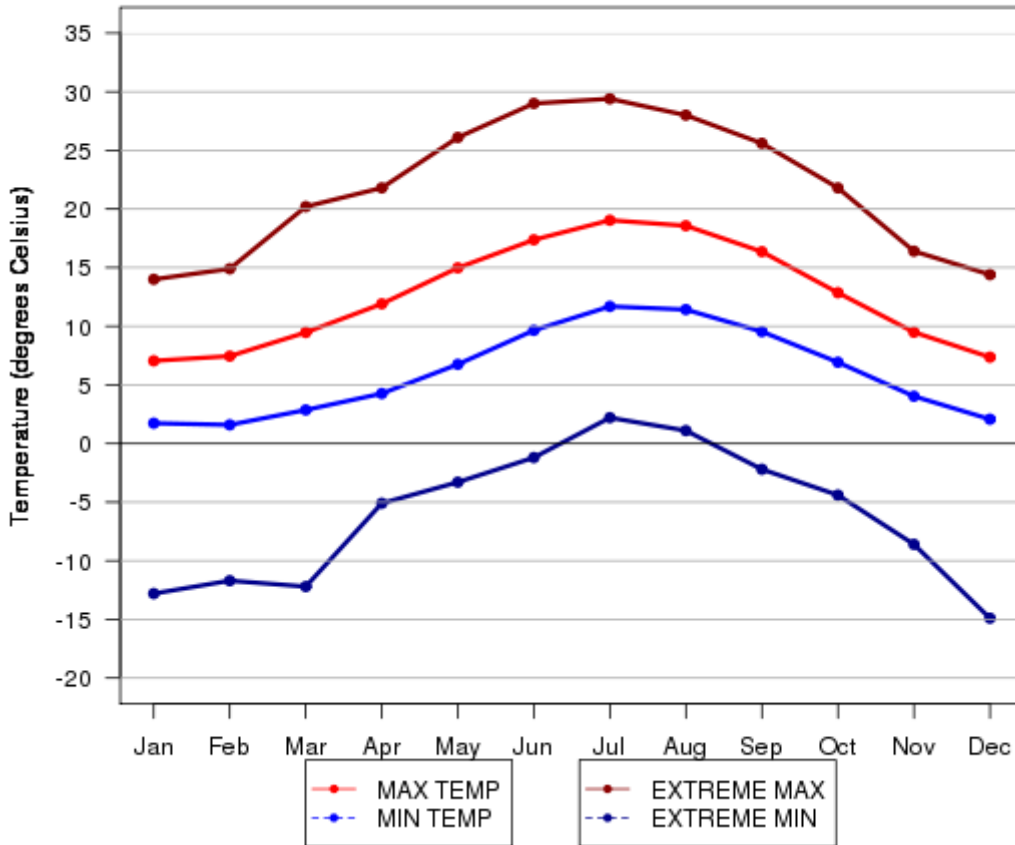
In winter, temperatures in the UK are influenced to a very large extent by those of the surface of the surrounding sea, which reach their lowest values in late February or early March. Around the coasts February is therefore normally the coldest month, but inland there is little to choose between January and February. The January mean daily minimum temperatures vary from about 0.5 °C in the upland areas to about 2.5 °C on the coast, with the highest values on the coast of County Down.

The coldest nights are those on which there is a covering of snow on the ground; the lowest temperatures occur away from the moderating influence of the sea, on the floors of inland valleys into which cold air can drain. It was under such conditions that the temperature fell to -18.7 °C, the lowest officially accepted value recorded in Northern Ireland, at Castleterg (County Tyrone) on 24 December 2010. Most coastal areas do not experience such cold nights; as an example, the lowest temperature recorded at Helens Bay in County Down in the thirty years 1981 to 2010 was -5.4 °C.

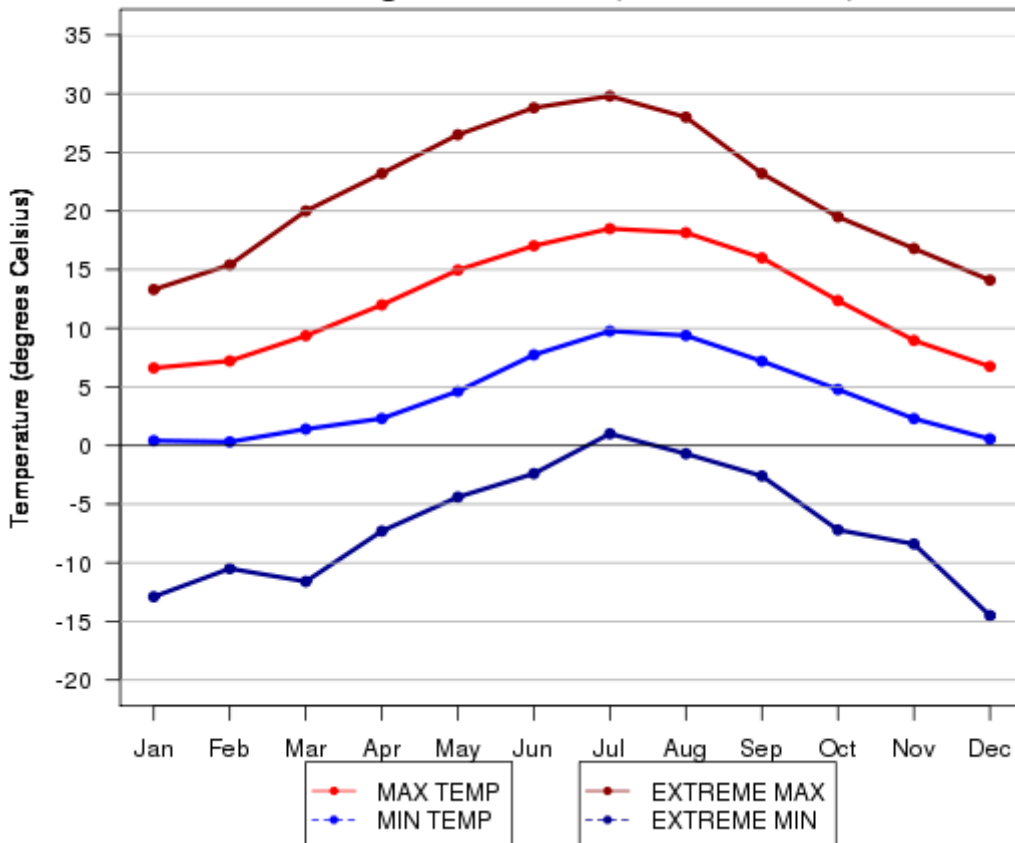
July is normally the warmest month in Northern Ireland, with mean daily maximum temperatures varying from about 17.5 °C in the upland areas and along the north coast to almost 20 °C in low lying areas south of Lough Neagh and in Fermanagh. In the UK, the highest July mean daily maxima occur in the London area (23.5 °C) whilst the lowest occur in the Shetlands (15 °C). The highest temperature ever recorded in Northern Ireland is 30.8 °C at Knockarevan in County Fermanagh on 30 June 1976, and also at Shaw's Bridge in Belfast on 12 July 1983.

The variation of mean daily maximum and minimum temperatures month by month, together with the highest and lowest temperatures recorded, is shown for Aldergrove and Lough Navar Forest.

**Mean daily maximum and minimum temperature  
(1981-2010) and extremes (1927-2014)  
at Aldergrove (62 metres amsl)**



**Mean daily maximum and minimum temperature  
(1981-2010) and extremes (1961-2014)  
at Lough Navar Forest (126 metres amsl)**

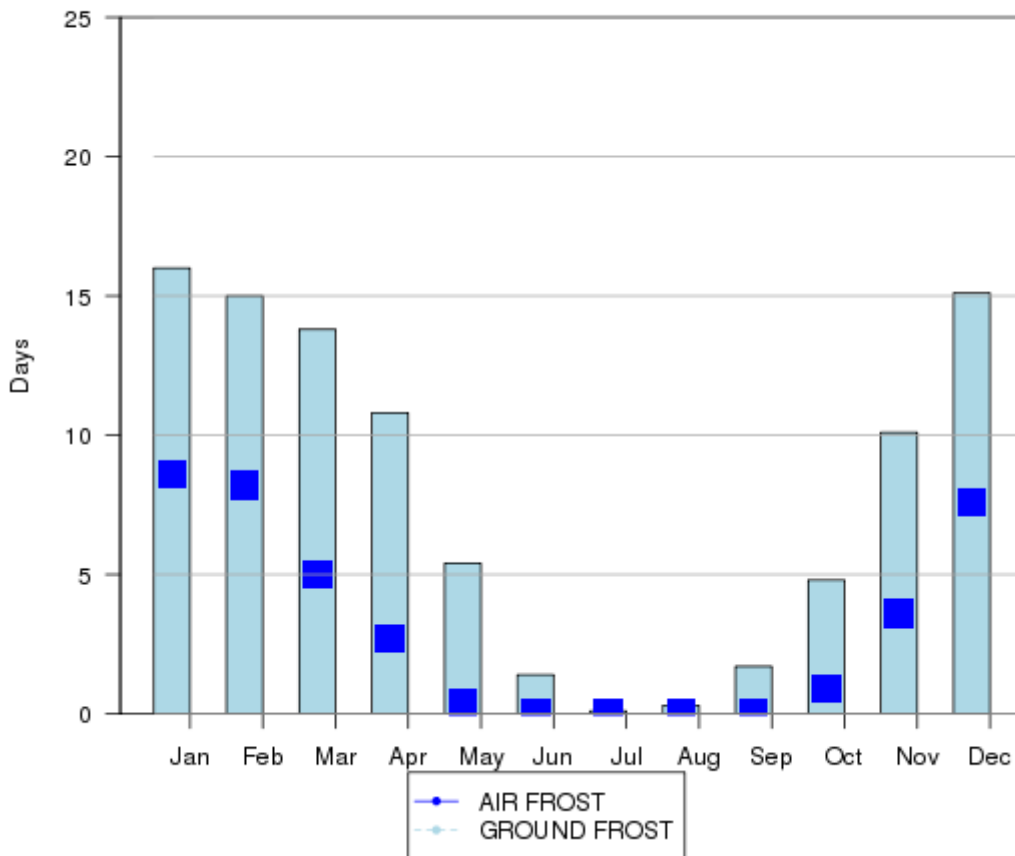


The average number of days with frost in Northern Ireland varies widely depending on the location. The main controls are distance from the sea and altitude, but the ability for cold air to drain into inland valleys is another

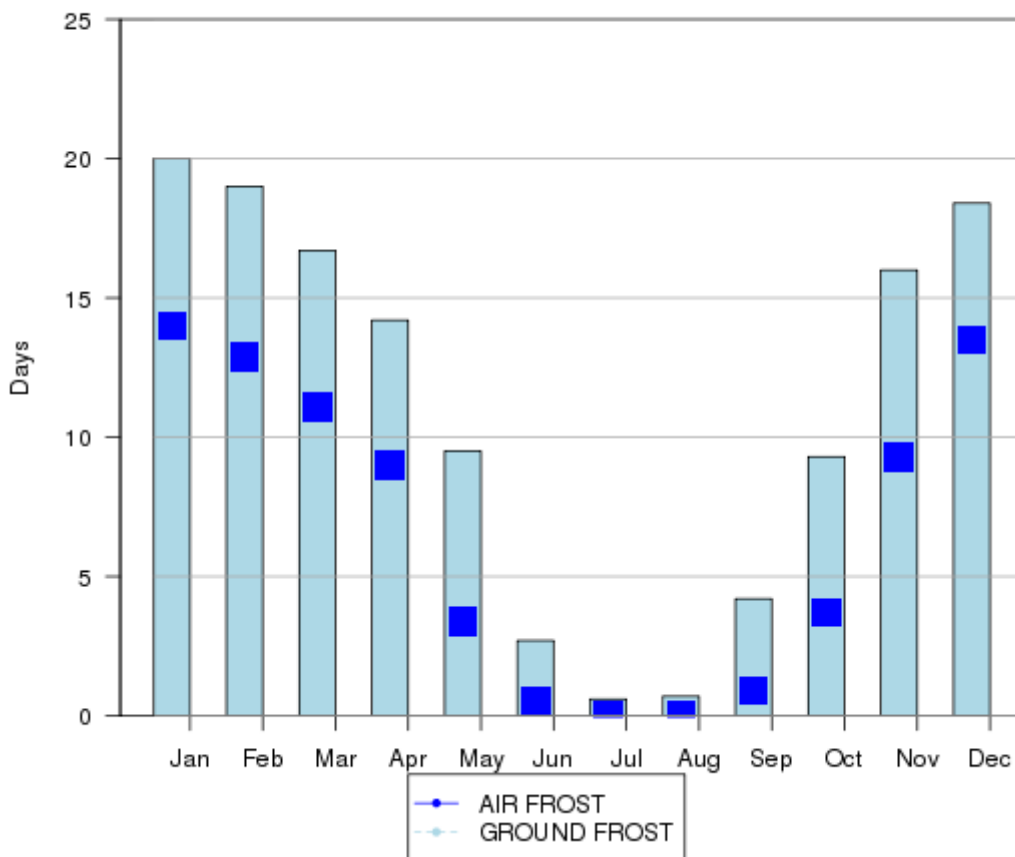
important factor. An 'air frost' occurs when the temperature at 1.25 metres above the ground falls below 0 °C, whereas incidence of a 'ground frost' refers to a temperature below 0 °C measured on a grass surface. Sites along the coast typically have fewer than 20 days of air frost each year and inland the number increases with altitude to over 55 days in the highest upland areas. Ground frost occurs on average on less than 80 days each year on the coast and over 115 days in the highest upland areas and the most frost-prone lowland locations, with a similar distribution to air frost.

The graphs show the average frequency of air and ground frost at Aldergrove and Lough Navar Forest.

**Average annual number of days of air and ground frost (1981-2010) at Aldergrove (62 metres amsl)**



**Average annual number of days of air and ground frost (1981-2010) at Lough Navar Forest (126 metres amsl)**



## Sunshine

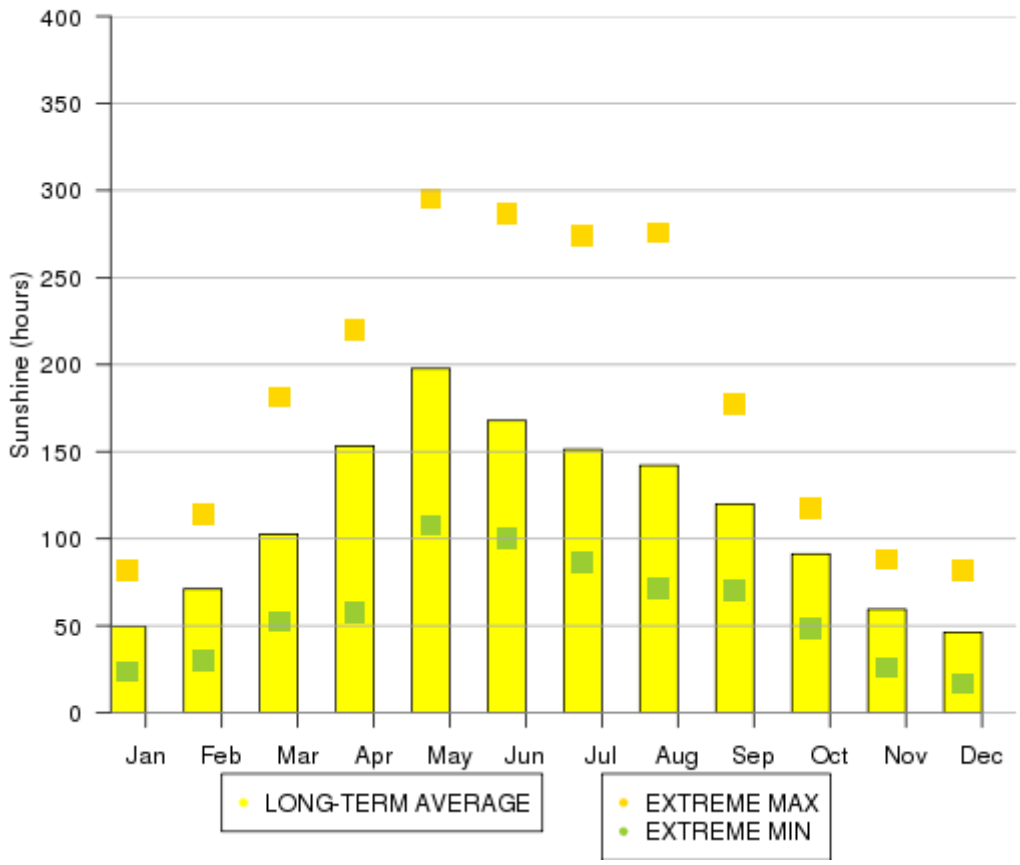
On the whole, Northern Ireland is cloudier than England, because of the hilly nature of the terrain and the proximity to the Atlantic. Even so, the coastal strip of County Down manages an annual average total of over 1450 hours of sunshine. This compares favourably with some coastal areas of England and Wales, though not with the figures of around 1750 hours achieved by many places along the south coast of England. The dullest parts of Northern Ireland are the upland areas of the north and west, with annual average totals of less than 1100 hours.

Mean monthly sunshine figures reach a maximum in May and are at their lowest in December. The key factor is, of course, the variation in the length of the day through the year, but cloud cover plays a part as well. A feature is the reduction that typically occurs in July and August, accompanied by increased cloudiness, which is associated with an increase in the prevalence of westerly winds.

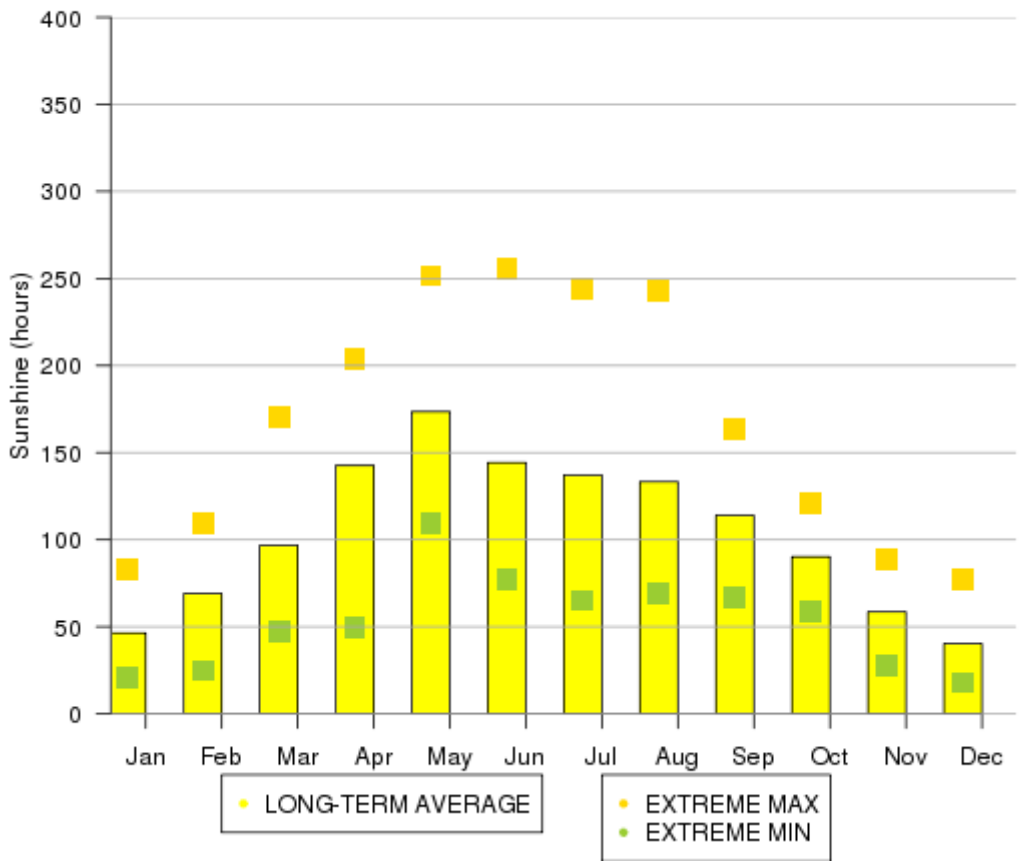
The graphs show the average monthly sunshine totals for Aldergrove and Armagh, together with the highest and lowest totals recorded in the stated periods.

The highest known monthly sunshine total in Northern Ireland is 298 hours recorded at Mount Stewart (County Down) in June 1940. The highest UK monthly total is 383.9 hours at Eastbourne in July 1911. In the dullest winter months, less than 20 hours have been recorded - a mere 8.3 hours was recorded at Silent Valley (County Down) in January 1996, but there was none at all in December 1890 in central London.

**Mean monthly sunshine (1981-2010) and extremes (1929-2002) at Aldergrove (62 metres asl)**



**Mean monthly sunshine (1981-2010) and extremes (1929-2014) at Armagh (62 metres asl)**



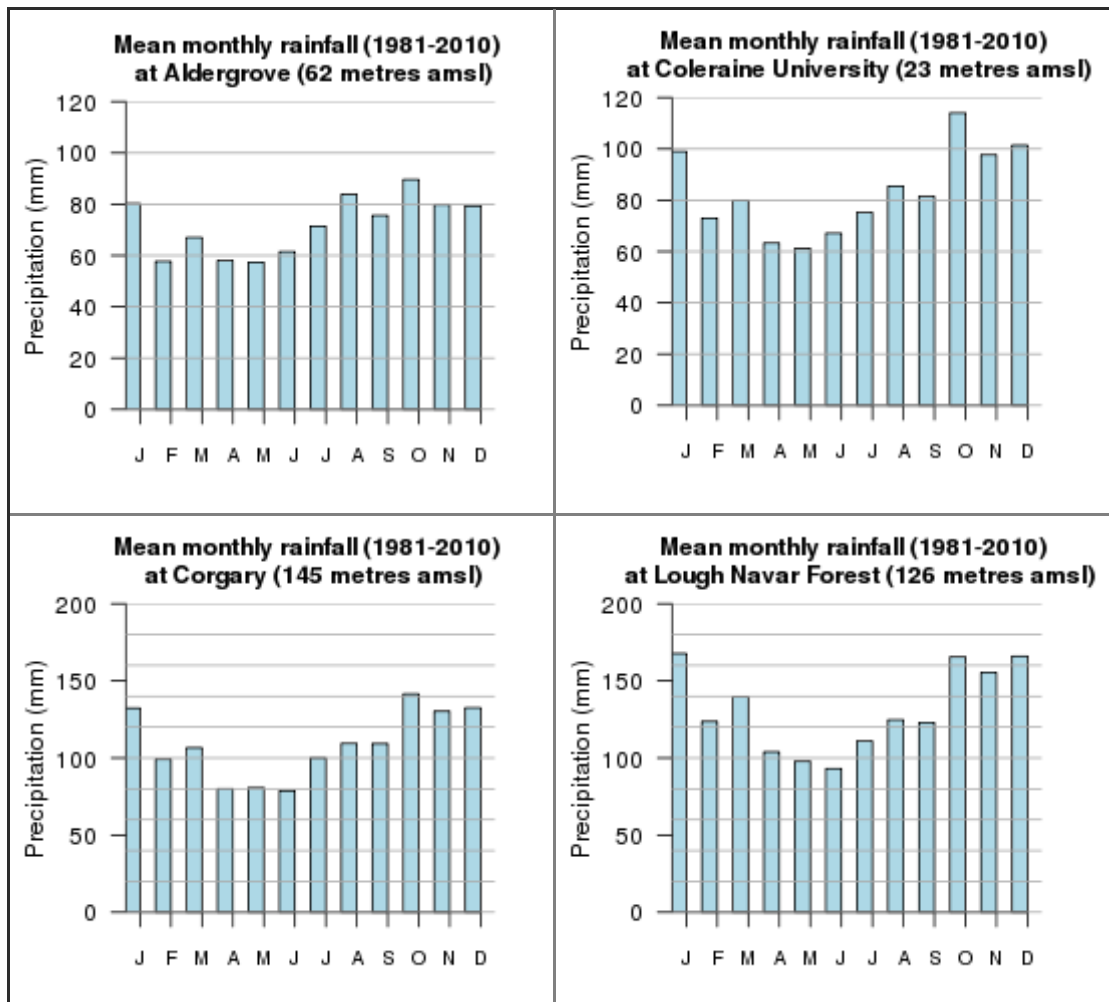
Rainfall

Rainfall is caused by the condensation of the water in air that is being lifted and cooled below its dew point. Rainfall tends to be associated with Atlantic depressions or with convection. The Atlantic Lows are more vigorous in autumn and winter and bring most of the rain that falls in these seasons. In summer, convection caused by solar surface heating sometimes forms shower clouds and a large proportion of rainfall is from showers and thunderstorms then. A further factor that greatly affects the rainfall distribution is altitude. Moist air that is forced to ascend hills may be cooled below the dew point to produce cloud and rain. A map of average annual rainfall therefore looks similar to a topographic map.

Rainfall in Northern Ireland varies widely, with the wettest places being in the Sperrin, Antrim and Mourne Mountains. The highest areas have average annual totals of about 1600 mm, which is about half that of the English Lake District or the western Highlands of Scotland. In addition to topographic effects, greater exposure to rain-bearing winds off the Atlantic results in higher averages in the more western counties of Fermanagh, Londonderry and Tyrone. The wettest places are in the upland area around Killeter Forest in the extreme west of County Tyrone, where the annual average reaches about 2000 mm. The driest places are further east - around Strangford Lough and close to the east coast, and near to the southern and eastern shores of Lough Neagh - where the annual totals are just under 800 mm.

The seasonal variation of rainfall in Northern Ireland is less marked in the drier southern and eastern areas than in the wetter areas, but in all areas the wettest months are between October and January. This is partly a reflection of the high frequency of winter Atlantic depressions and the relatively low frequency of summer thunderstorms in Northern Ireland. For example, at Armagh, thunder occurs on an average of less than 4 days a year, compared with 15 to 20 days at many places in eastern England. Only in a few locations, mainly away from the coast, does the frequency of thunder exceed 5 days a year.

The course of mean monthly rainfall for 1981-2010 for 4 sites is shown below. The pattern of rainfall is similar at each, with the months October to January the wettest and the late spring and early summer months the driest.



Over much of Northern Ireland, the number of days with a rainfall total of 1mm or more ('wet days') tends to follow a pattern similar to the monthly rainfall totals. In the higher parts, over 55 days is the norm in winter (December to February) and over 45 days in summer (June to August). In the driest areas around Lough Neagh and eastwards to Strangford Lough, less than 45 days in winter and about 35 days in summer are typical.

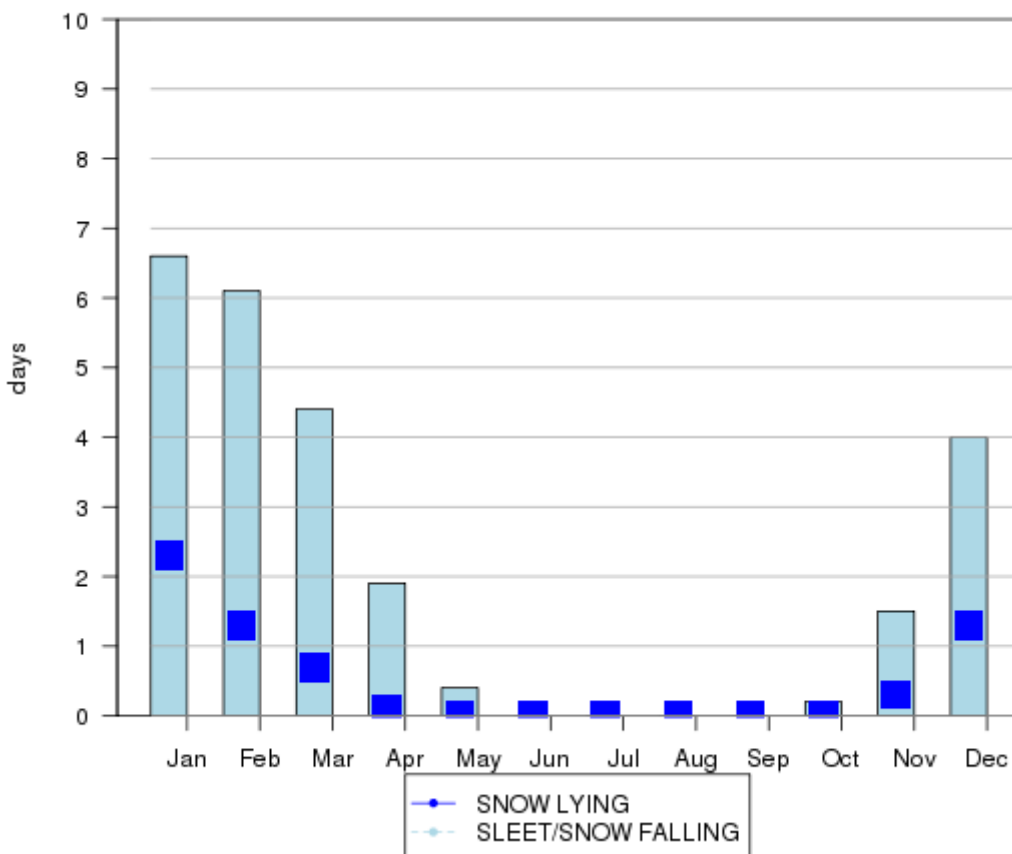
The combination of close proximity to active weather systems arriving from the Atlantic and the extensive areas of upland can lead to notable daily and monthly falls. The highest fall in a day was 158.9mm at Tollymore Forest (County Down) on 31 October 1968. Periods of prolonged rainfall can lead to widespread flooding. For example, autumn 2000 was the wettest for over 100 years with several flooding episodes and included a fall of 167 mm at Silent Valley (County Down) over 48 hours in early November.

## Snowfall

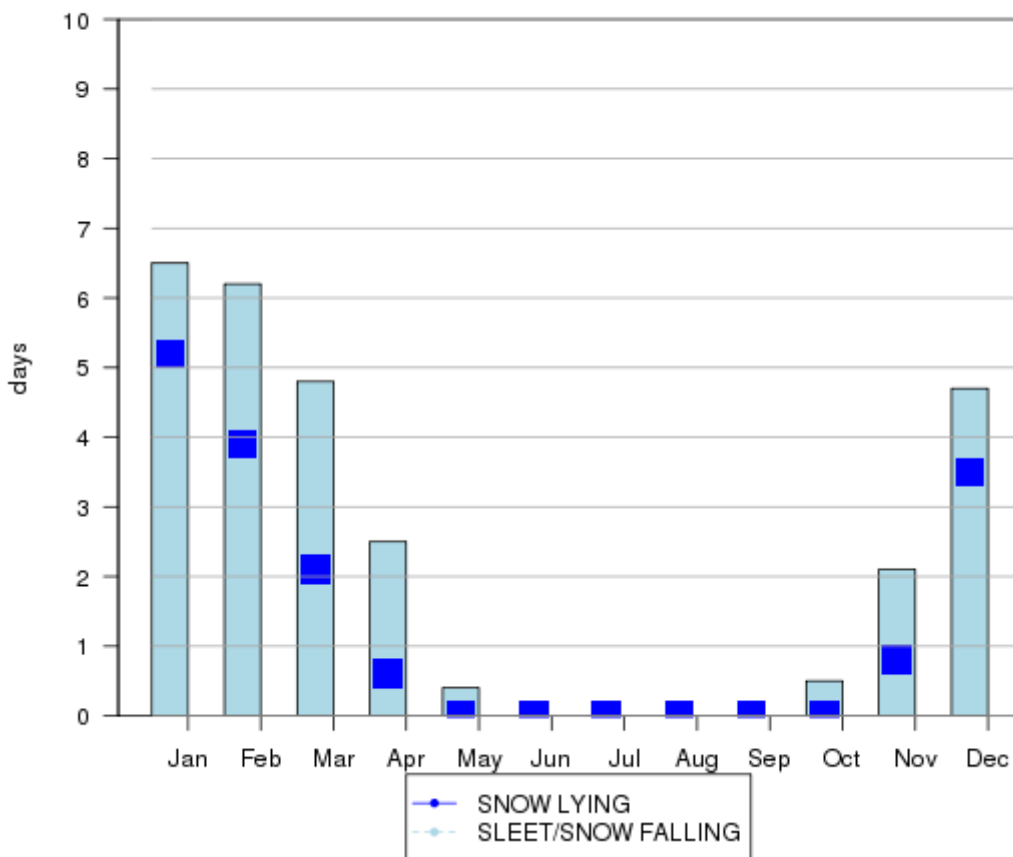
The occurrence of snow is linked closely with temperature, with falls rarely occurring if the temperature is higher than 4 °C. The numbers of days with snow falling and lying show an increase with increasing latitude and altitude, so values reflect topography. Snow is comparatively rare near sea level in Northern Ireland, but much more frequent over the hills. The average number of days each year when sleet or snow falls varies from around 15 near the east coast to over 35 in the mountains of Sperrin, Antrim and Mourne. Snow rarely lies on the ground at sea level before December or after March, and the average annual number of days with snow lying in Northern Ireland varies from less than 5 around the coasts to over 30 in the mountains. These averages can be compared with parts of the Scottish Highlands, which have about 60 days with snow lying on average and with the coasts of SW England, with less than 3 days per year.

The monthly averages of days with sleet/snow falling and lying at Aldergrove and Lough Fea are shown below (a day of lying snow is counted if the ground is more than 50 % covered at 0900).

**Average number of days per year of sleet/snow falling and snow lying (1981-2010) at Aldergrove (62 metres amsl)**



**Average number of days per year of sleet/snow falling and snow lying (1981-2010) at Lough Fea (225 metres amsl)**



The number of days of snowfall and snow cover varies enormously from year to year. At many places in the last 50 years it has ranged from none at all in several winters to in excess of 30 days during the winters of 1962/63 and 1981/82. Even places near the coast experienced prolonged snow cover during these two winters. Occasionally, in heavy snowfalls there can be quite extensive drifting of the snow in strong winds, especially over higher ground, resulting in severe dislocation to transport and power supplies. One example was 27 February 2001 when strong NE winds and heavy snow caused travel disruption for up to 5 days and brought down power lines (resulting in power cuts to 70,000 homes), mostly in Counties Antrim and Down. Another example resulted from a cold westerly airflow between 13 and 16 January 1984, when level snow depths reached 25-30 cm even at lower levels.

## Wind

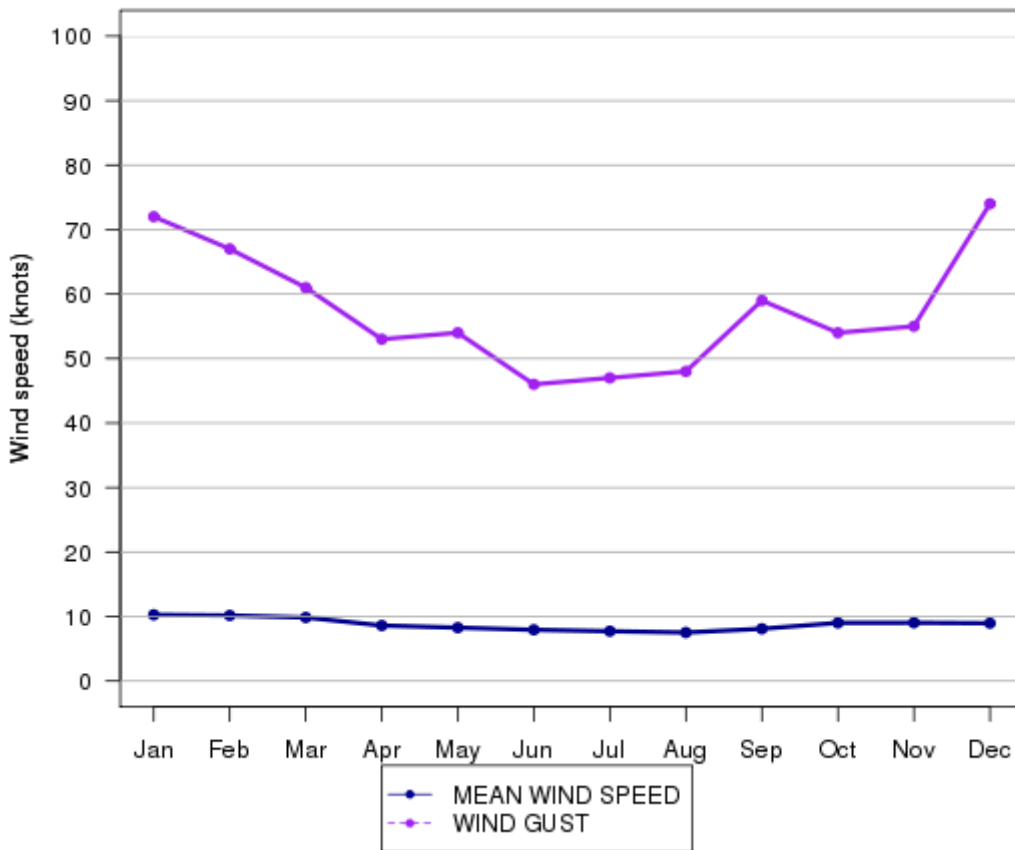
Northern Ireland is one of the windier parts of the UK, with the windiest areas being over the highest ground and along the coasts of Counties Antrim and Down.

The strongest winds are associated with the passage of deep areas of low pressure close to or across the UK. The frequency and strength of these depressions is greatest in the winter half of the year, especially from November to January, and this is when mean speeds and gusts (short duration peak values) are strongest.

The variation in monthly mean speeds (average of a continuous record) and highest gusts ('instantaneous' speed averaged over about 3 seconds) at Aldergrove is shown below.



**Monthly mean wind speed (1981-2010) and maximum gust (1928-2014) at Aldergrove (62 metres amsl)**



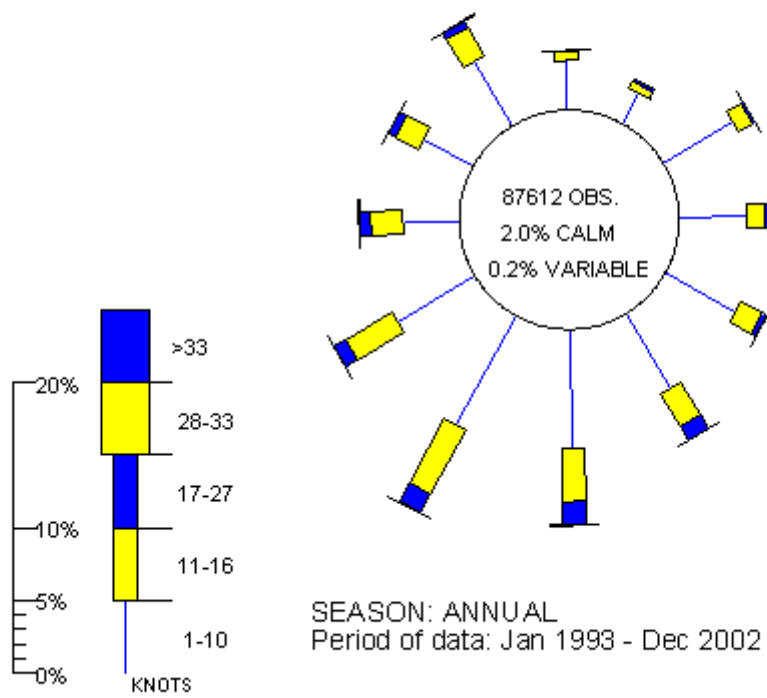
Another measure of wind exposure is the number of days when gale force is reached. If the wind reaches a mean speed of 34 knots or more over any 10 consecutive minutes, then that day is classed as having a gale. At low altitudes in Northern Ireland, gales occur most frequently on the coasts of Antrim and Down with about 15 days of gale each year on average. The number of days decreases inland to 5 days or fewer around and west of Lough Neagh. Wind speed is sensitive to local topographic effects and land use - places sheltered by hills or in urban areas will have lower wind speeds and fewer days of gale.

There have been several noteworthy gales affecting Northern Ireland, accompanied by property damage and disruption to travel and power supplies. The highest gust recorded at a low-level site is 108 knots (125 m.p.h.) at Kilkeel (Co. Down) on 12 January 1974. This storm damaged many buildings, blew down trees and interrupted the power supply to 150,000 consumers. More recently, gales on 7-8 January 2005 with gusts up to about 75 knots also caused some tree damage and power cuts to 4000 homes.

Wind direction is defined as the direction from which the wind is blowing. As Atlantic depressions pass the UK the wind typically starts to blow from the south or south west, but later comes from the west or north-west as the depression moves away. The range of directions between south and north-west accounts for the majority of occasions and the strongest winds nearly always blow from these directions.

The annual wind rose for Aldergrove is typical of low lying, inland locations in Northern Ireland, with a prevailing south-westerly wind direction through the year. However, there is a high frequency of north, north-east and easterly winds in Spring.

WIND ROSE FOR ALDERGROVE  
 N.G.R: 3147E 3798N ALTITUDE: 68 metres a.m.s.l.



### Location map



Last updated: 10 October 2016

