

Exceptional weather events

Type of event:

Extreme Cold Spell

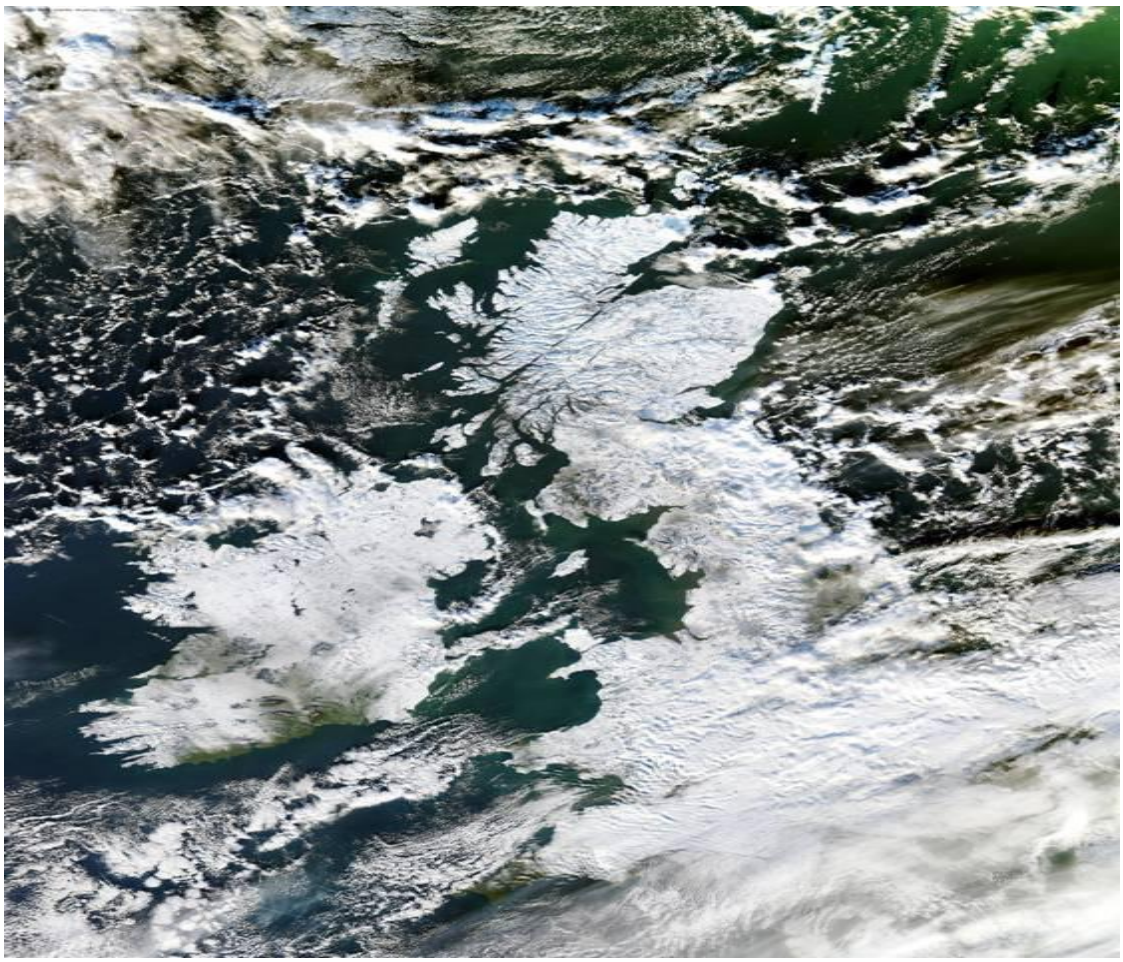
Date:

November & December 2010

The Extreme Cold Spell of November – December 2010

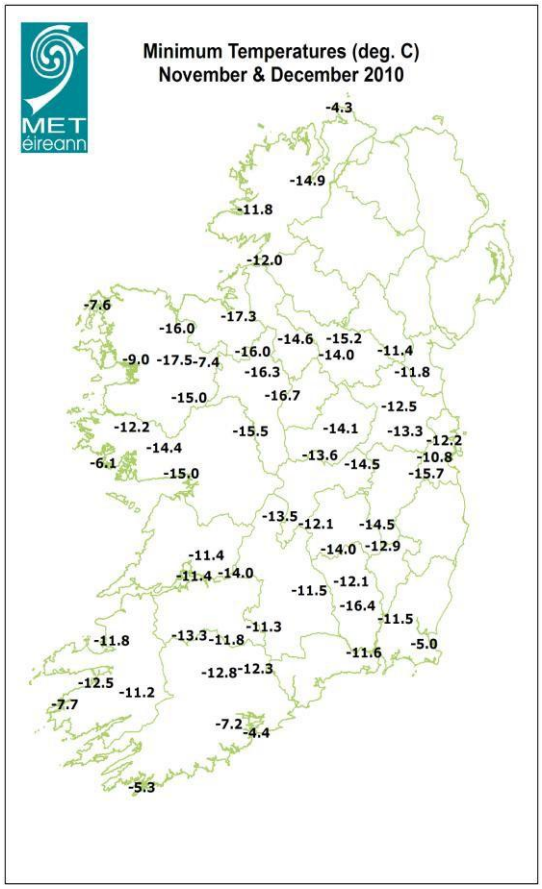
Following the middle of November 2010, the weather turned progressively colder. By the end of the month, we had accumulations of snow over most of the country, accompanied by extremely low temperatures. Both Dublin Airport (-8.4°C) and Casement Aerodrome (- 9.1°C) had their lowest November temperatures on record on the 28th.

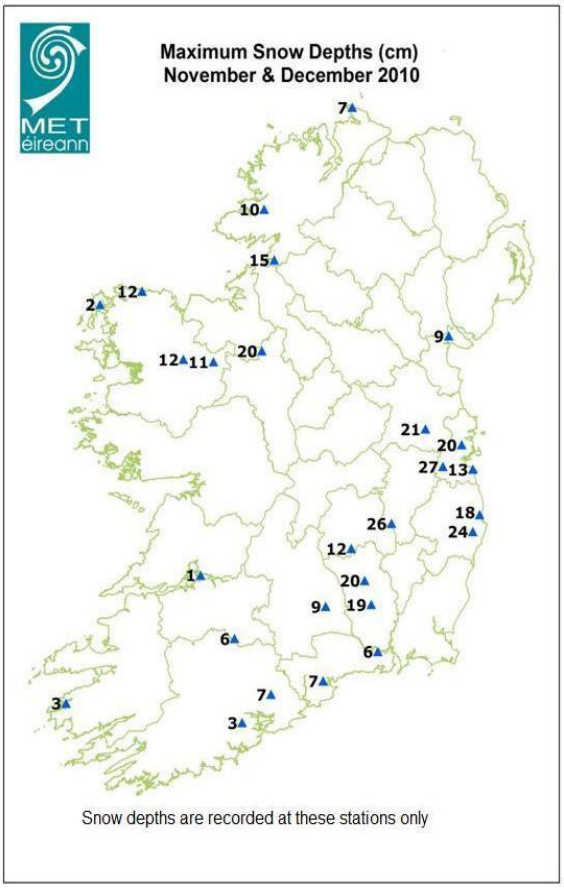
The very cold weather continued into early December with further sleet and snow, accompanied by daytime temperatures close to freezing and night-time values dropping below -10°C (-16°C at Mount Juliet on 3rd).



NEODAAS/University of Dundee satellite image of snowfall over Ireland and UK on 22nd Dec 2010

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. Daytime temperatures failed to go above freezing on many days during this period and we had 9 consecutive days when temperatures remained below zero in some areas. Night-time temperatures below -10°C became a regular feature, reaching as low as -17.5°C in Co. Mayo on 25th. Ballyhaise had the coldest day on record at any station on 21st when the temperature only got up to -9.4°C. The very low temperatures sustained over this duration allowed freezing conditions to penetrate into the ground. Soil temperatures below freezing point at a depth of 20cm were recorded at a number of our stations. Earth temperatures just below zero at a depth of 30cm were recorded at Oak Park, Carlow.



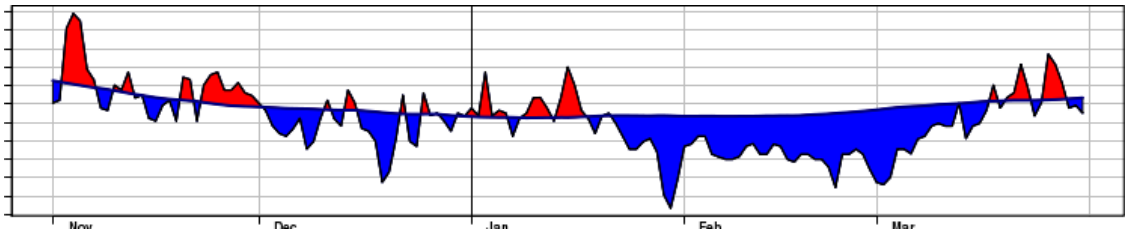


The Cold Spell in Historical Context

There is no single figure which classifies a spell of cold weather and allows fully objective comparison with previous events. Important factors are the duration of the cold weather, how cold it was and how much snow. This particular cold spell was notable for being the earliest spell of significant duration (started in November). It was also notable for the sustained extreme low temperatures. While many areas had significant and disruptive accumulations of snow, measured snow depths at stations with long records (27cm at Casement Aerodrome and 20 cm at Dublin Airport being the highest) would put December 2010 in the three biggest snow events but not the worst.

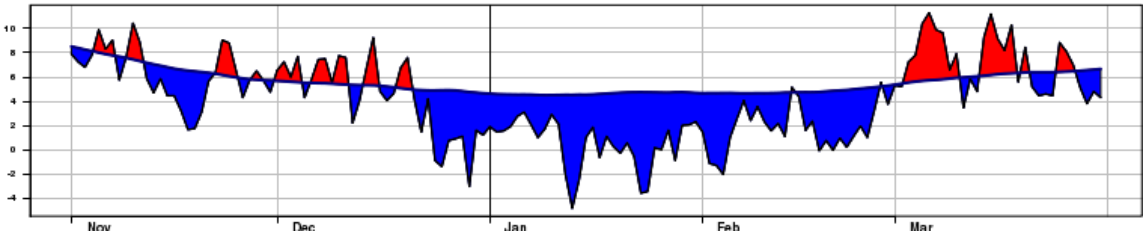
The charts below show daily mean temperatures at the long-term station at the Phoenix Park in Dublin for the December 2010 cold spell along with 2009-2010, 1981-1982, 1978-1979, 1962-1963 and 1946-1947. We would characterise December 2010 as the most extreme cold spell in terms of the “depth of cold” but the cold spell of 1963 was significantly longer.

Phoenix Park Mean Daily Temperature Departure from Average 1946/1947



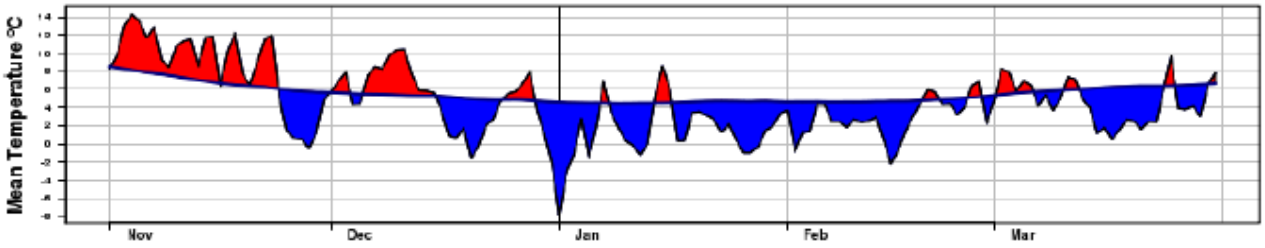
1946 1947

Phoenix Park Mean Daily Temperature Departure from Average 1962/1963



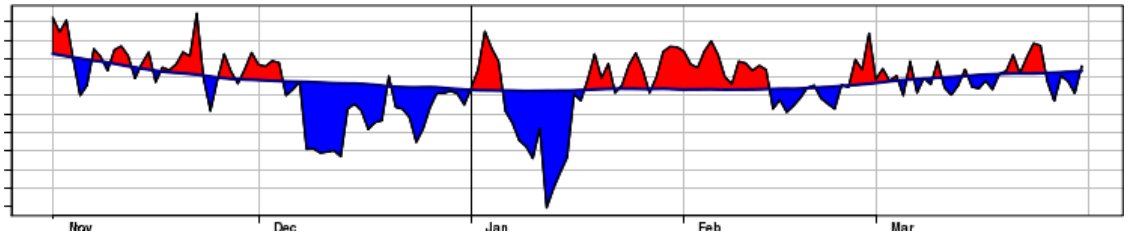
1962 1963

Phoenix Park Mean Daily Temperature Departure from Average 1978/1979



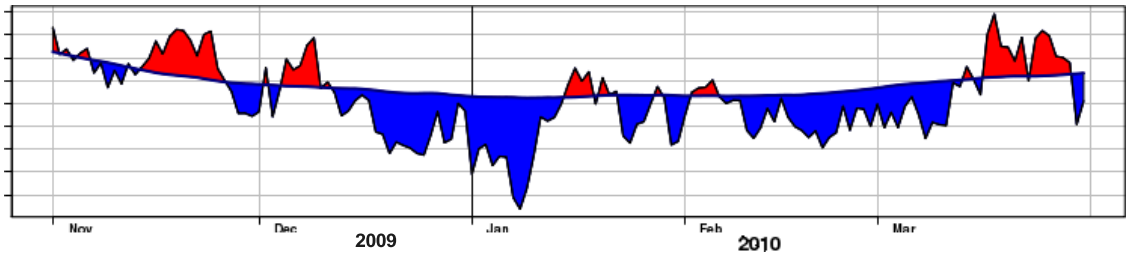
1978 1979

Phoenix Park Mean Daily Temperature Departure from Average 1981/1982



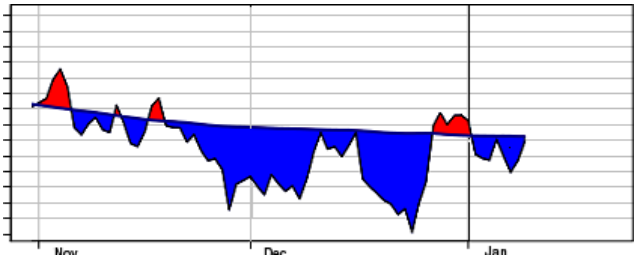
1981 1982

Phoenix Park Mean Daily Temperature Departure from Average 2009/2010



2009 2010

Phoenix Park Mean Daily Temperature Departure from Average 2010/2011



2010 2011

Weather Diary

November 2010

Mild, wet and windy weather during the first half of November was followed by a spell of drier but colder conditions, while the last few days of the month were extremely cold with widespread snowfall. At most stations it was the coldest November since 1985, due largely to exceptionally low temperatures between the 28th and 30th. Air temperatures fell below -6°C in many places on the 28th and 29th, while both Dublin Airport and Casement Aerodrome recorded their lowest November values on record on the 28th; this was also the coldest November day on record at the same stations, with maximum values not rising above -1°C. In total, between 10 and 14 days with air frost were recorded at eastern and midland stations during the month, around twice the normal number for November. The very cold period at the end of the month produced widespread wintry showers, but the heaviest falls of rain were recorded earlier in the month, associated with deep Atlantic depressions close to Ireland. Monthly rainfall totals were above normal except in the south. Heaviest daily falls were on the 7th/8th and 16th/17th, particularly in western areas, where localised flooding resulted. There were between 14 and 22 wetdays during the month at most stations (days with 1mm or more rainfall), a little higher than normal for November, while 26 wetdays were recorded at Belmullet. Despite a very dull start to the month, sunshine totals were well above normal everywhere and it was the sunniest November in over 50 years of record at Belmullet.

1st to 18th: A period of very unsettled weather, as a series of deep depressions moved quickly eastwards close to or over Ireland. These produced spells of rain or showers each day, together with stormy weather at times, resulting in very high seas on western coasts. The heaviest rain fell over the west of the country, where some falls were thundery and accompanied by hail. Temperatures were above normal with infrequent air frost; the first four days of the month were particularly mild for November. After a very dull start, the period around mid-month was relatively sunny.

19th to 26th: Pressure rose over Ireland as an anticyclone developed in mid-Atlantic. Winds veered to a north or northeasterly direction, bringing progressively colder conditions, with frost becoming widespread. Rainfall amounts in most inland and southern areas were small, but showers were frequent in coastal areas and were heavy near the east coast on the 22nd. Most days during this period were sunny.

27th to 30th: As the anticyclone shifted to the far northwest of Ireland, a bitterly cold northeasterly airstream brought a sharp drop in temperatures across the country. Wintry showers, initially in coastal areas of the east and northwest, became more widespread during the period, resulting in accumulations of snow over most of the country. Showers were thundery at times in eastern areas. Exceptionally low air and ground temperatures were measured in Leinster on the 28th and 29th, but severe frost was widespread, with freezing fog in places.

December 2010

Spells of exceptionally cold weather during December brought some of the lowest temperatures ever recorded in Ireland, together with heavy snowfalls in places. There were also short periods of milder weather, while overall the month was drier and sunnier than normal. Mean air temperatures for the month were up to six degrees lower than normal in places and it was the coldest December on record almost everywhere. It was also the coldest of any month at Dublin Airport, Casement Aerodrome and Mullingar, each with over 50 years of record. The lowest December air temperature ever measured in the country, -17.5°C, was recorded at the climatological station of Straide, Co. Mayo, on the morning of the 25th, while Casement Aerodrome's minimum value of -15.7°C on the same day was the lowest value of any month ever recorded in the Dublin area. Ballyhaise's mean monthly temperature of -1.4°C represents the lowest ever measured in the country for any month; the daily value of -9.4°C at the same station on the 21st was the lowest daily maximum on record. Between 14 and 24 days with air frost were recorded during the month, over twice the normal number for December. Almost all parts of the country received snowfall at times, with most persistent falls over Leinster. Although there was some thawing of lying snow around midmonth, by Christmas Day there was 27cm of snow lying at Casement Aerodrome. Monthly rainfall totals (including snowmelt) were below normal everywhere; heaviest daily falls were on the 26th/27th in the south and southwest, as bands of
heavy rain introduced much milder conditions at the end of the month. There were between 6 and 11 wetdays during the month at most stations (days with 1mm or more rainfall), around half of the December average. Sunshine totals varied widely, but it was a very sunny month in the west and southwest, where both Belmullet and Valentia Observatory recorded their sunniest December on record.

1st to 8th: A north to northeasterly airstream over Ireland brought a continuation of the very cold spell which began in late November. Wintry showers or longer spells of sleet or snow brought further accumulations of snow, particularly in eastern, northern and western areas. Daytime temperatures were close to freezing, while minimum values dropped below -10°C in parts of Leinster, falling below -16°C at Mt. Juliet, Co. Kilkenny, on the 3rd.

9th to 15th: Pressure rose over Ireland as an anticyclone to the southwest moved northwards, bringing mostly dry but cloudy conditions with light winds. Daytime temperatures rose above freezing, bringing some thawing of lying snow, but frost remained widespread at night.

16th to 25th: A cold front moving southwards on the 16th re-introduced an arctic airstream across the country. Bitterly cold northerly winds brought snow showers in many areas, most frequently along Atlantic and Irish Sea coasts, causing considerable disruption of road and air travel. Freezing conditions persisted for long periods, with the temperature remaining below 0°C for nine consecutive days in some inland areas.

26th to 31st: Frontal systems gave spells of rain on the 26th and 27th, heavy over Munster and Connacht, while bringing considerably milder Atlantic air across the country, leading to a rapid thaw of lying snow in most areas. Mild, cloudy and damp conditions persisted for the remainder of the period, with widespread mist or fog.