Storm Ciarán, 1 to 2 November 2023

Storm Ciarán was an exceptionally severe storm for the time of year, bringing damaging winds across northern France and the Channel Islands which bore the brunt on the southern flank of the storm. Winds across northern France and the Channel Islands from storm Ciarán were comparable in severity with those experienced in the south-east of England during the 'Great Storm' of 16 October 1987. While Ciarán also brought very strong winds to the South Coast, with gusts of 60 to 70Kt (69 to 81mph), the location of the storm track meant that the worst impacts occurred to the south across the English Channel. For the UK, recorded wind speeds were fairly typical for a major Atlantic storm. Storm Ciarán was also an exceptionally deep area of low pressure (with the central pressure tending to correspond with the intensity of the storm). Culdrose (Cornwall) and St Catherine's Point (Isle of Wight) recorded 953.6hPa, England's lowest November pressure on record. Ciarán also brought further significant and unwelcome heavy rainfall on top of persistent wet weather through much of October.

Impacts

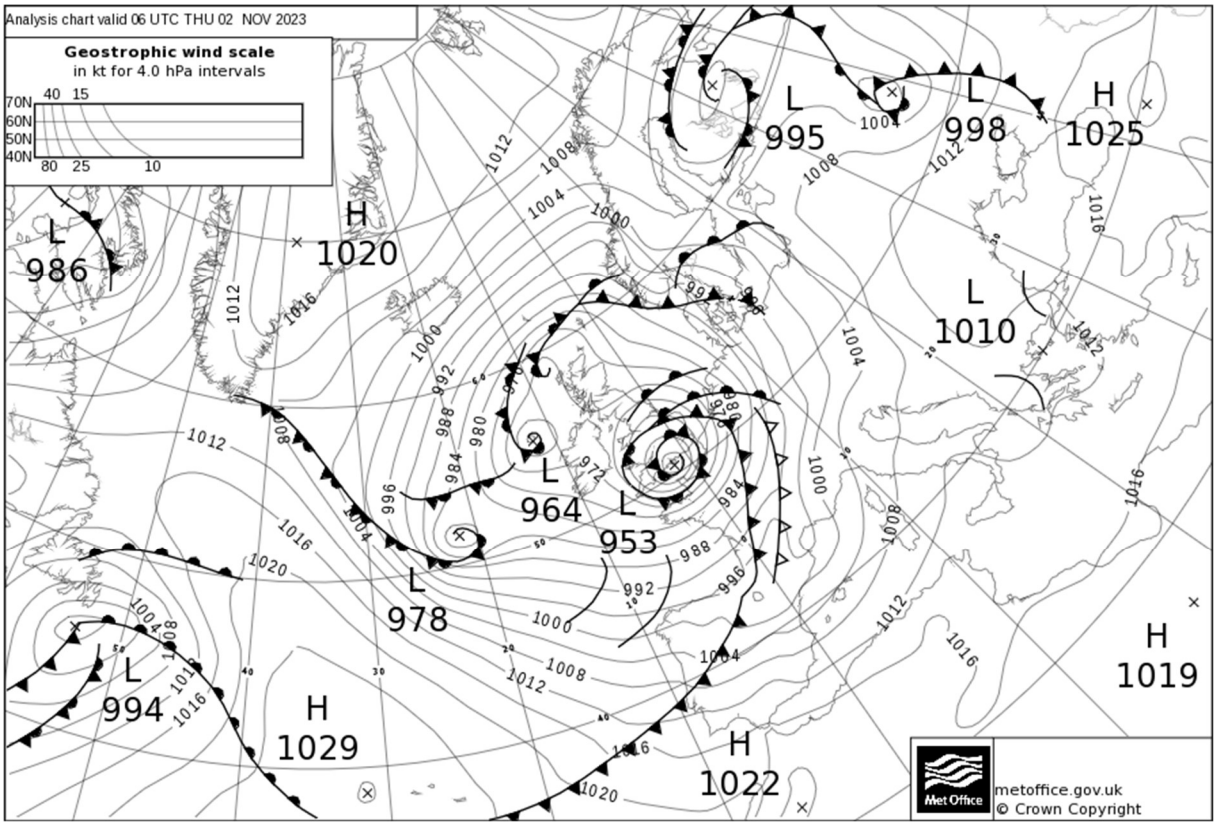
The worst of the impacts from storm Ciarán occurred across Northern France and the Channel Islands. Had this storm tracked further north with the strongest winds affecting the UK, it would have been comparable to the 'Great Storm' of October 1987. However, major advances in the ability to forecast severe storms have taken place in the last 30+ years, together with greatly improved communication of warnings – facilitated by the storm naming scheme. This allows mitigating actions to be taken well in advance – as demonstrated by the red warnings issued for storms Eunice (February 2022) and Arwen (November 2021) and amber warnings issued for Ciarán.

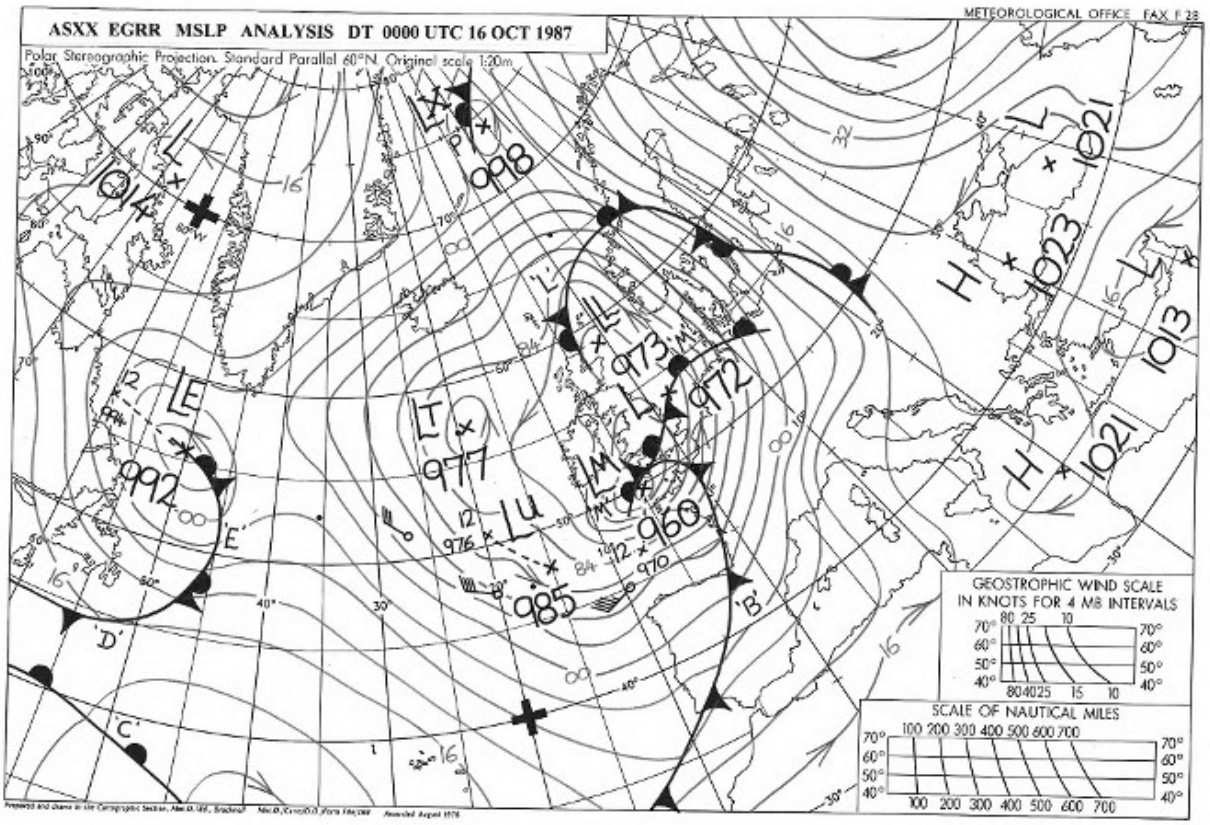
The Channel Islands and northern France experienced the worst weather impacts. In the Channel Islands were numerous fallen trees and significant damage to buildings, with a tornado reportedly affecting eastern parts of Jersey during the height of the storm together with large hail. Jersey's Met Service issued a red weather warning, schools and shops were closed and a major incident declared. In northern France, homes were damaged, while rail services and flights were cancelled, and a reported 1.2 million people were without electricity. Across western Europe more widely, heavy rain and flooding linked to storm Ciarán reportedly led to at least 13 deaths.

In the UK, the storm caused major transport disruption with the port of Dover temporarily closed and ferry services cancelled more widely. Flights and rail services were also cancelled, with the Great Western Line closed both west of St Austell, Cornwall, and between Exeter and Taunton (Somerset). Many commuters were advised to work from home. Hundreds of schools were shut and almost 150,000 homes were left without power. Large waves battered the South Coast with several vehicles swept into the sea and a major incident declared in Hampshire and the Isle of Wight. Storm Ciarán exacerbated existing flooding problems with many rivers bursting their banks. At West Bay in Dorset, a section of cliff collapsed into the sea. In Surrey, storm Ciarán caused a power outage at three water treatment plants leaving thousands without a water supply.

Weather data

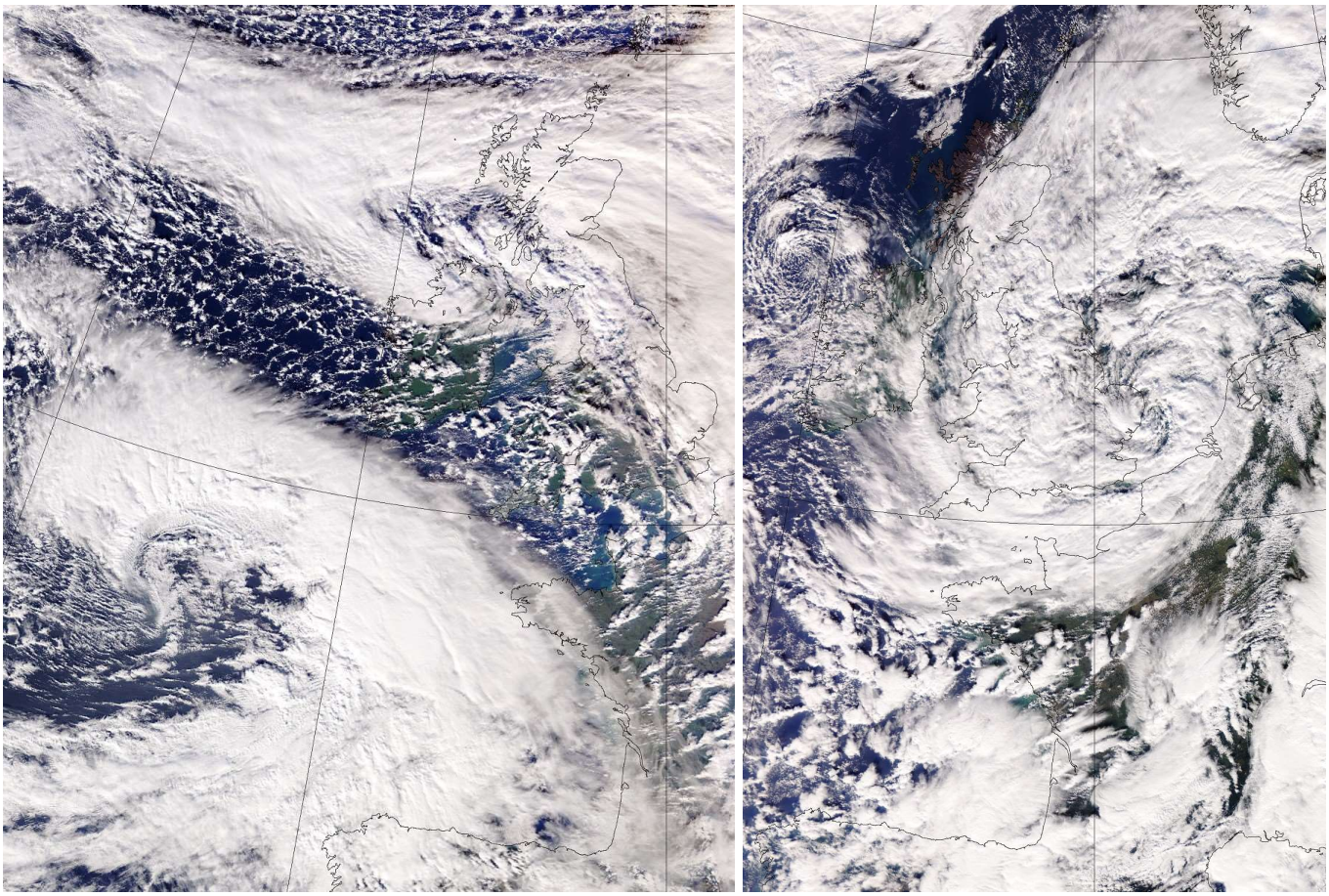
The analysis chart at 0600UTC 2 November 2023 shows storm Ciarán, with the low pressure centre over the Isle of Wight and tightly packed isobars indicating the strength of the winds along the South Coast, through the English Channel and across northern France. For comparison, the second chart shows the ‘Great Storm’ of 16 October 1987.





The satellite images show storm Ciarán rapidly approaching the UK from the south-west (left) and sweeping through the English Channel with the storm centre near the coast of East Anglia (right). The storm underwent ‘explosive cyclogenesis’ as it approached the UK, deepening rapidly and gaining strength. Images copyright Met Office / NOAA / NASA.

Left: 1344UTC 1 November 2023 Right: 1208UTC 2 November 2023



The image below shows the Met Office shipping forecast for Plymouth issued on 1 November 2023 for 0600UTC 1st to 0600UTC 2nd, with forecast wind strength violent storm 11, perhaps hurricane force 12 later.

Plymouth

GALE WARNING
Issued: 03:54 (UTC) on Wed 1 Nov 2023

Southerly gale force 8 veering westerly and increasing violent storm force 11 later

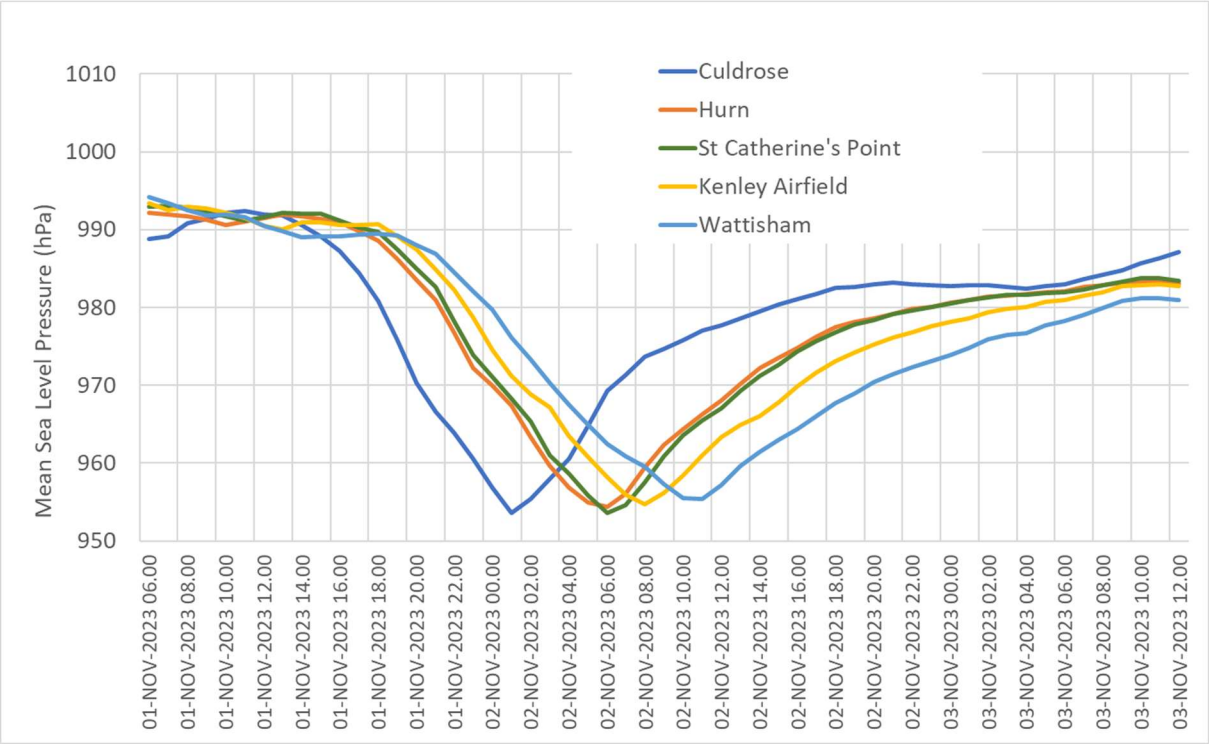
WIND
Southwest 6 to gale 8, becoming cyclonic severe gale 9 to violent storm 11, perhaps hurricane force 12 later.

SEA STATE
Very rough, becoming high or very high later.

WEATHER
Thundery rain.

VISIBILITY
Good, occasionally poor.

The chart below shows hourly mean sea level pressure recorded at Culdrose (Cornwall), Hurn (Dorset), St Catherine's Point (Isle of Wight), Kenley Airfield (Greater London) and Wattisham (Suffolk). These show the sharp drop and rise in pressure at each station as storm Ciarán progressed from west to east across the south of England over a 12-hour period. Pressure as low as this is exceptionally unusual for southern England; 953.6hPa at Culdrose and St Catherine's Point set a new November low pressure record for England. The previous record had stood for over 100 years at 959.7hPa recorded in Teignmouth (Devon) on 5 November 1916. In Wales a pressure of 958.5hPa at St Athan (Vale of Glamorgan) also set a new Welsh November low pressure record, previously 962.7hPa at Milford Haven (Pembrokeshire) on 8 November 2010.



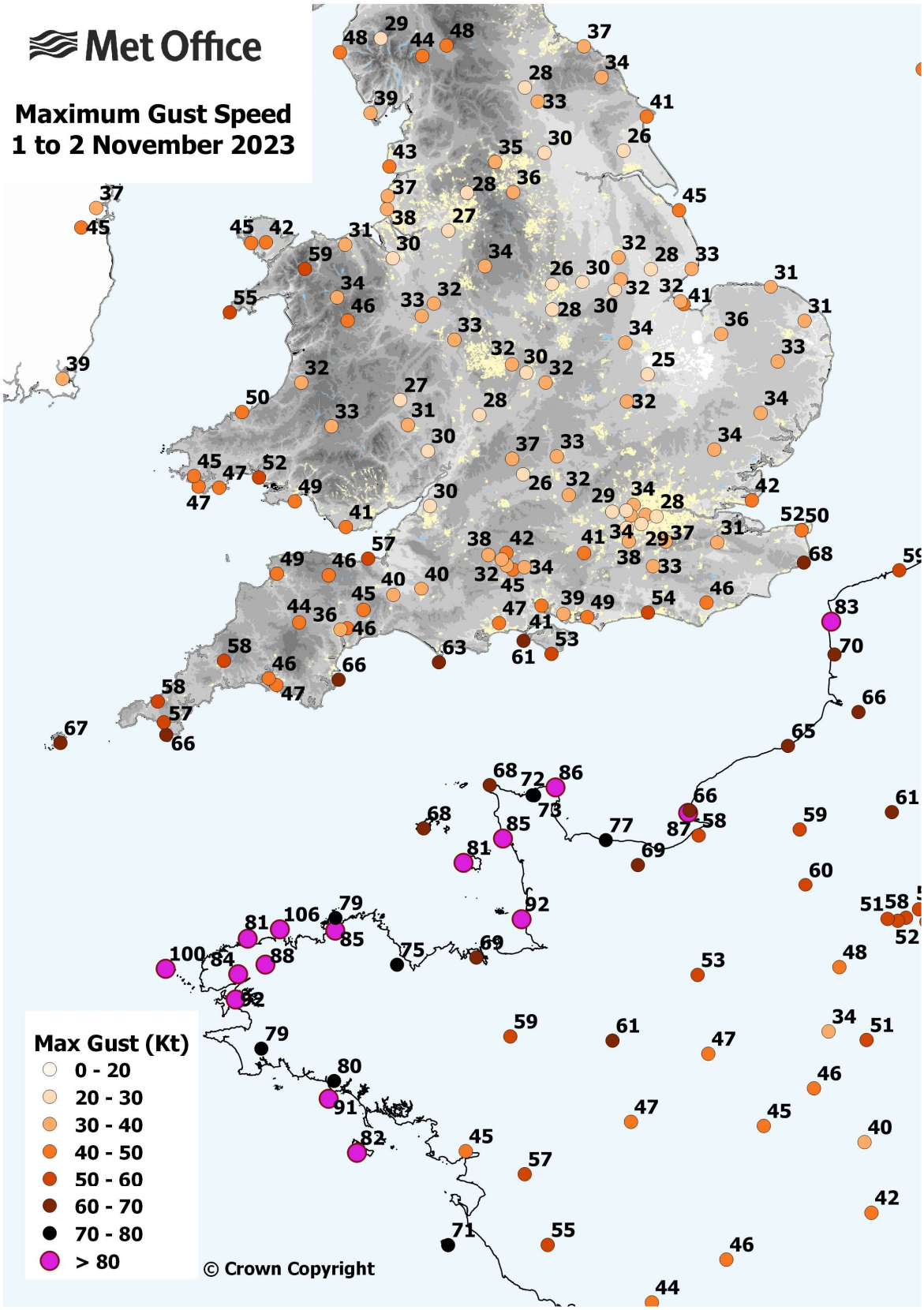
The chart below shows maximum gust speeds recorded across the UK, Channel Islands and northern France from storm Ciarán. Wind gusts along the south coast of the UK exceeded 60Kt (69mph) with 68Kt (78mph) at Langdon Bay, Kent, 67Kt (77mph) at St Mary's Airport, Isles of Scilly, 66Kt (76mph) at Berry Head, Devon and Predannack, Cornwall and 63Kt (72mph) at Isle of Portland (Dorset).

For the UK, these gusts are fairly typical for a major Atlantic storm i.e. they are notable although not exceptional. However, the chart illustrates the severity of winds experienced across the Channel Islands and northern France, which bore the brunt of the strongest winds on the southern flank of the low pressure centre. In the Channel Islands, Jersey Airport recorded a gust of 81Kt (93mph), the highest gust there since the 'Great Storm' of 16 October 1987 when this station recorded 85Kt (98mph). Guernsey Airport recorded 68Kt (78mph). The chart particularly emphasises the wind gusts across northern France with numerous stations on the Atlantic and Channel coasts of Brittany and Normandy, plus Boulogne, recording gusts of over 80Kt (92mph), and in places over 90Kt (104mph). Two stations in Brittany reached 100Kt (115mph) including 106Kt (122mph) at Ile de Batz.

Winds of this severity are indicative of an exceptionally severe storm, with gusts in northern France from storm Ciarán comparable to those experienced in the south-east of England from the 'Great Storm' of 16 October 1987 – where a gust of 100Kt (115mph) was recorded at Shoreham-by-Sea (West Sussex). Had the track of storm Ciarán been 150km to the north, weather impacts

would have been much more severe. The second chart below, for comparison with the same key scale, shows maximum gust speeds on 16 October 1987 ^(maximum gust speeds in France from Burt and Mansfield, 1988). Although the wind speeds from storm Ciarán in northern France were comparable to those in the south-east of the UK from the ‘Great Storm’, the chart clearly shows that overall the ‘Great Storm’ of 1987 was much more severe; gusts for example reaching 119Kt (137mph) at Pointe du Raz (Brittany).

^Burt, S.D. and Mansfield, D.A. (1988), THE GREAT STORM OF 15–16 OCTOBER 1987. Weather, 43: 90-110. https://doi.org/10.1002/j.1477-8696.1988.tb03885.x


Met Office
Maximum Gust Speed
1 to 2 November 2023
Max Gust (Kt)
0 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
> 80
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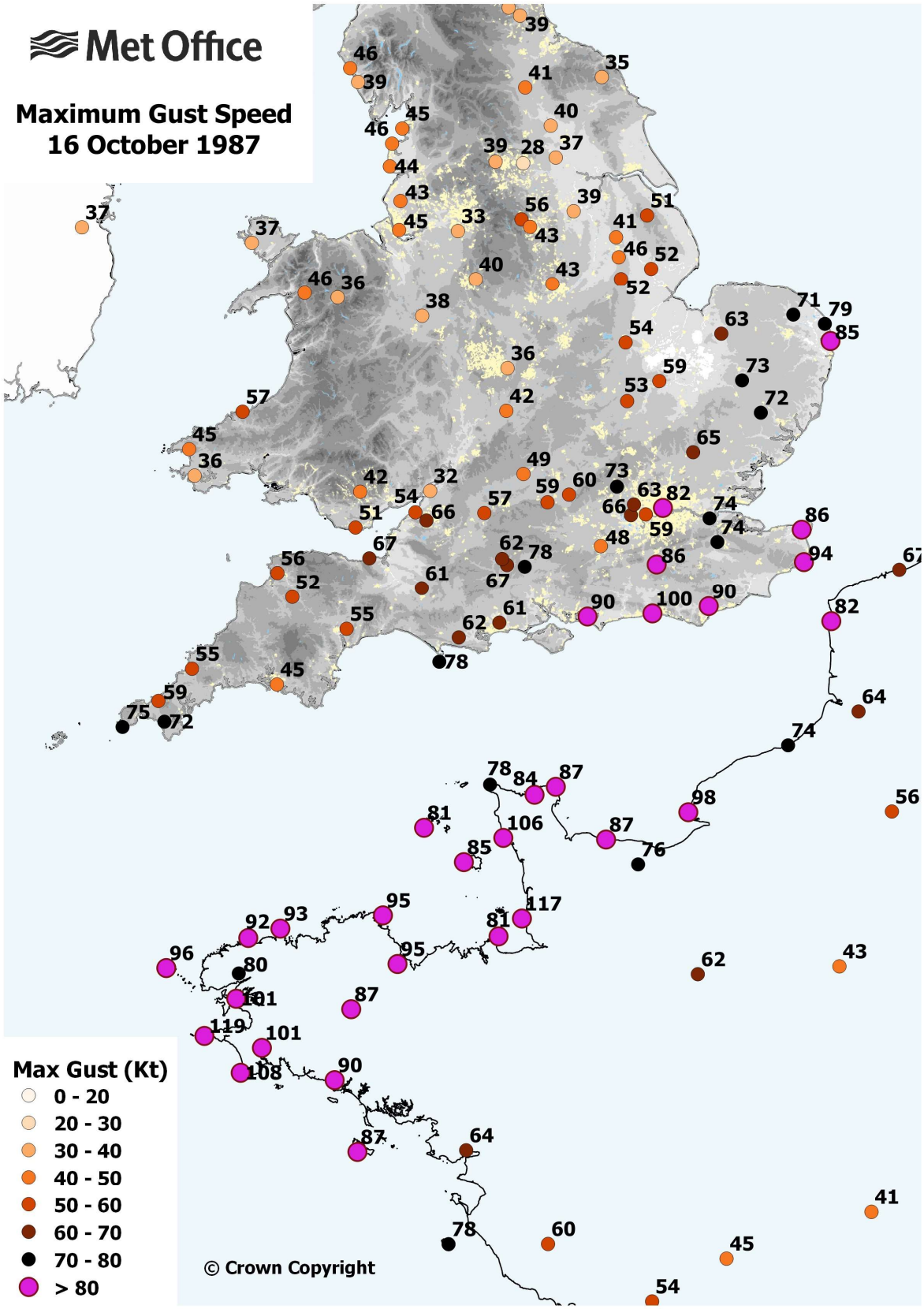
Met Office
Maximum Gust Speed
16 October 1987
Max Gust (Kt)
0 - 20
20 - 30
30 - 40
40 - 50
50 - 60
60 - 70
70 - 80
> 80
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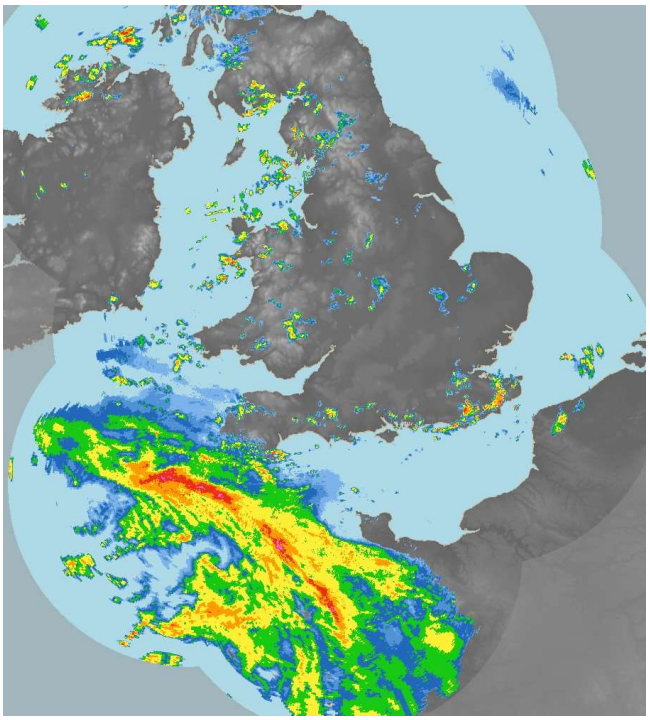
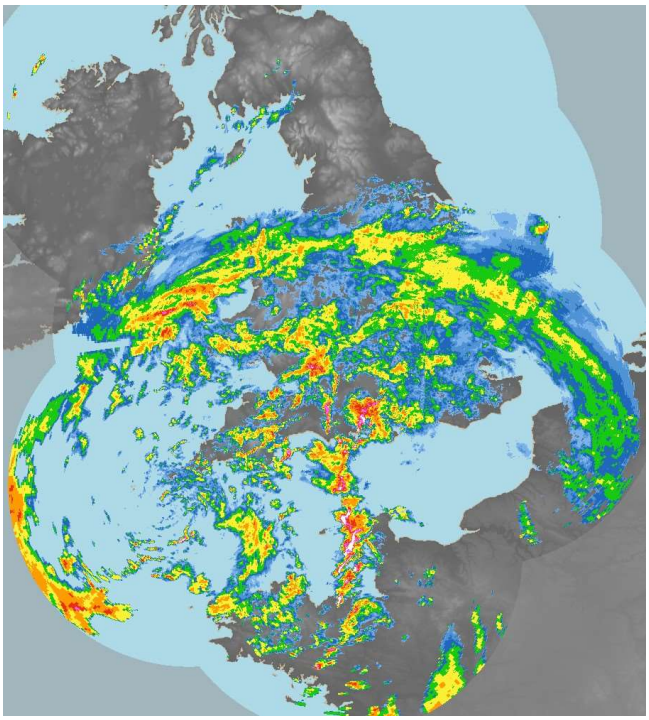
The following sequence of rain-radar images at 6-hour intervals from 1800UTC 1 November 2023 shows heavy rain associated with storm Ciarán as it swept along the South Coast overnight. The Channel Islands in particularly were affected by some bands of intense and exceptionally squally rain (shaded in white), including some very large hail and a reported tornado in Jersey.

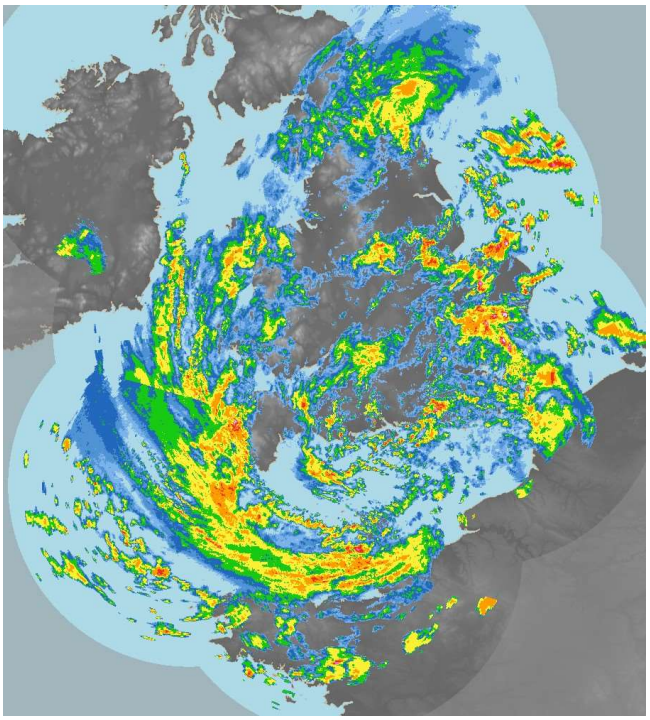
1800UTC 1 November 2023



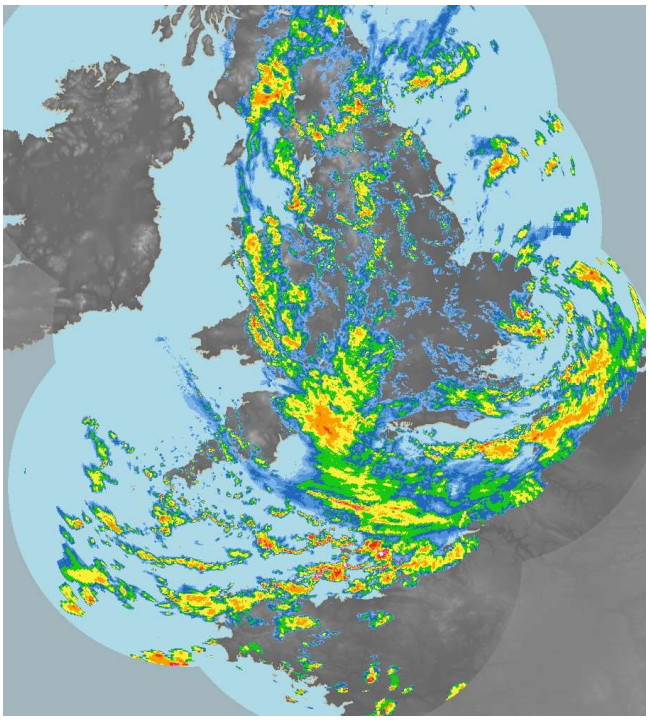
0000UTC 2 November 2023

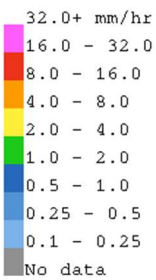


0600UTC 2 November 2023



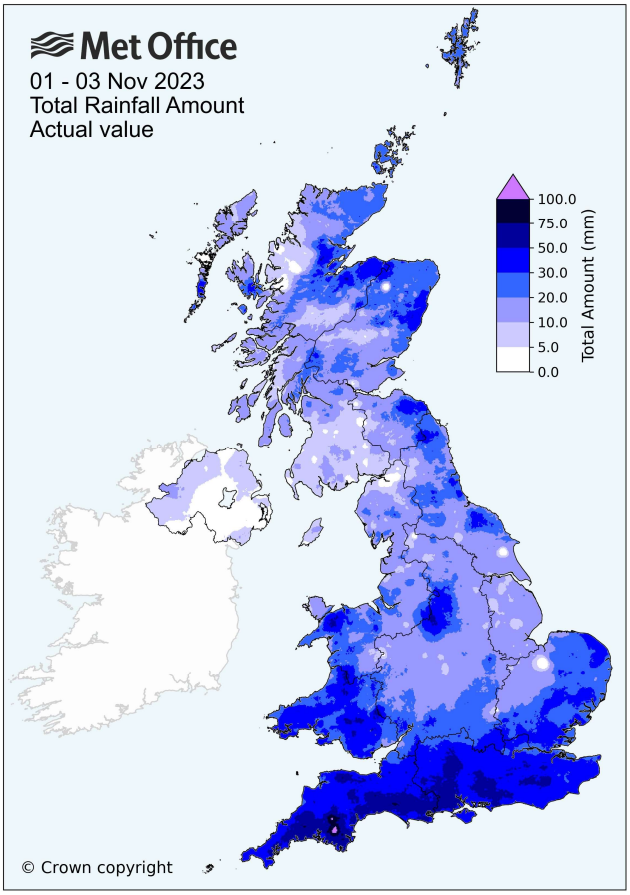
1200UTC 2 November 2023

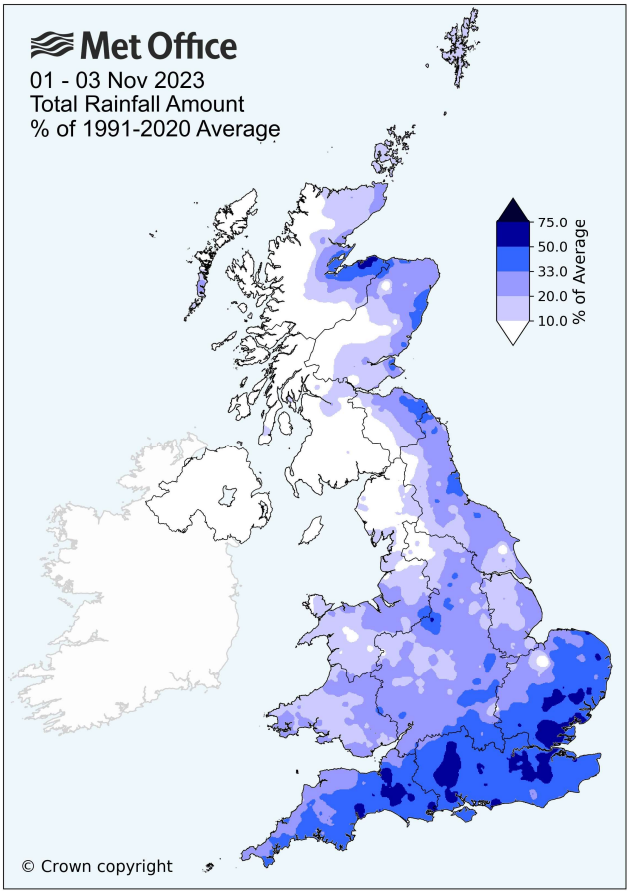




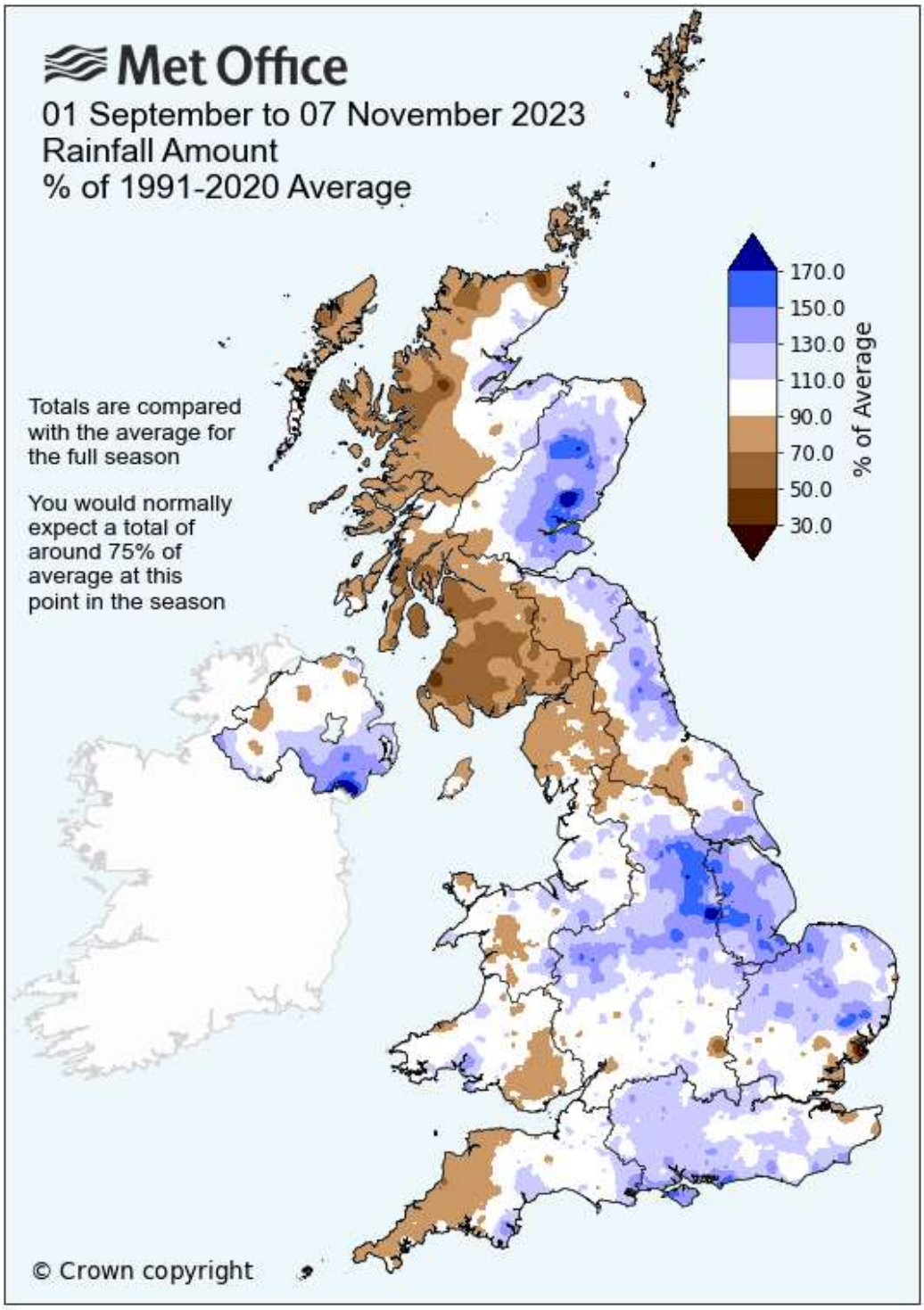
In many places through southern England, this storm resulted in a further 30mm of rainfall, with storm Ciarán slow to clear eastward, instead remaining centred in the North Sea during 2nd and 3rd with associated fronts bringing yet further rain. This was particularly unwelcome following the wet October when large areas of central and eastern England, eastern Scotland, the east of Northern Ireland parts of the South Coast recorded well over twice the monthly average rainfall.

The charts below show daily rainfall totals for the first three days of November, as totals (left) and percentage of the whole-month November average (right), the vast majority of this rain as a result of storm Ciarán. Most of southern England received 30 to 50mm from this storm, and over 50mm in the wetter areas. For most of southern and south-east England, this represents between a third and half of the November whole-month average rainfall, and more than 50% in some areas, in the first three days of the month.





The chart below shows rainfall totals from 1 September to 7 November 2023 as a percentage of average for the whole of autumn. With three weeks of November still to go, at this point in November you would normally expect around 75% of the seasonal average rainfall to have fallen. Instead, with the exception of western Scotland and parts of north-west and south-east England, most of the UK has already received the whole season average rainfall and large areas significantly more than this; for example eastern Scotland, north-east England, the south Pennines, East Midlands, much of East Anglia, some southern coastal counties and the east of Northern Ireland, with more than 150% locally – i.e. more than twice the rainfall you would normally expect at this point in the season.



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Met Office