

Strong winds and heavy rain from storm Callum

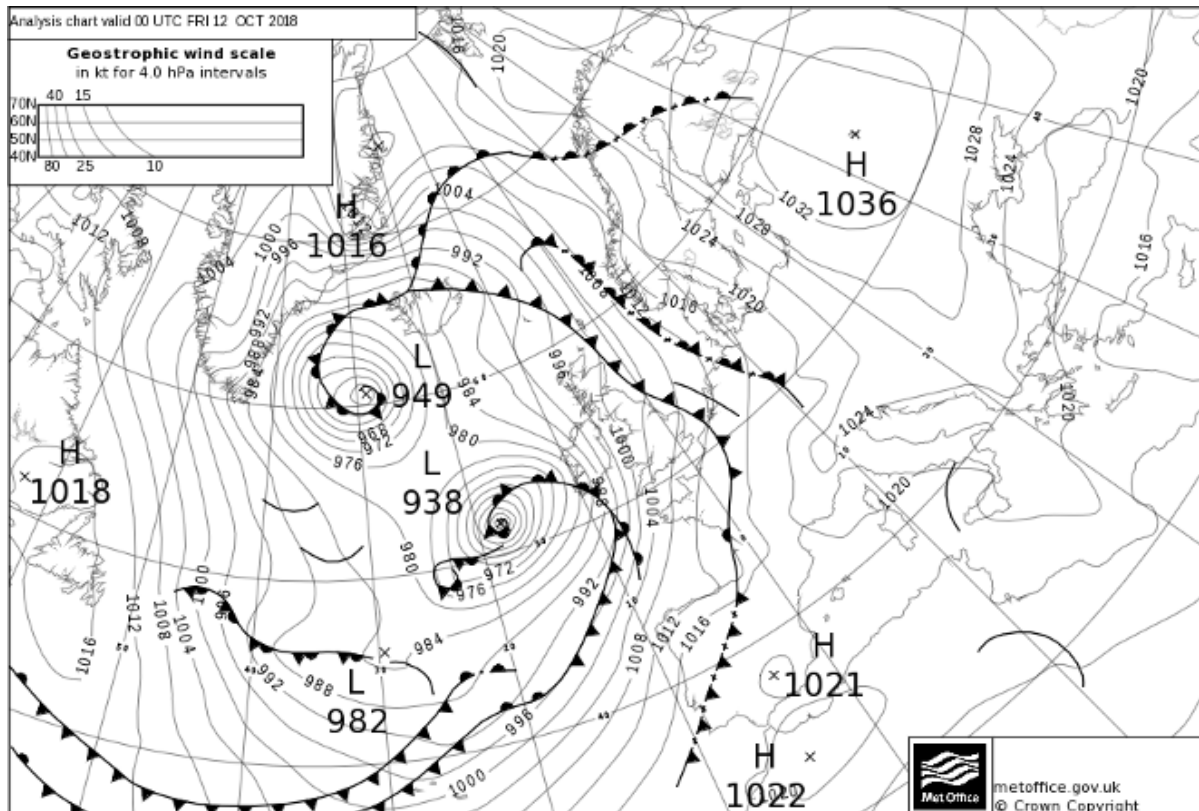
Storm Callum was the third named storm of the 2018/19 winter season, bringing strong winds and heavy rain to western areas of the UK on 11 to 12 October 2018. Persistent heavy rain continued to fall across western upland areas into the 13th from a weather front associated with the storm. The wettest area was south Wales, with much of the Brecon Beacons National Park recording 100 to 150mm of rainfall over a 2-day period, and up to 200mm across the higher ground. This was one of the most significant extreme rainfall and flood events to affect south Wales in the last 50 years. The frontal system also led to a dramatic temperature contrast of more than 10 °C and unseasonably high temperatures across parts of eastern England.

Impacts

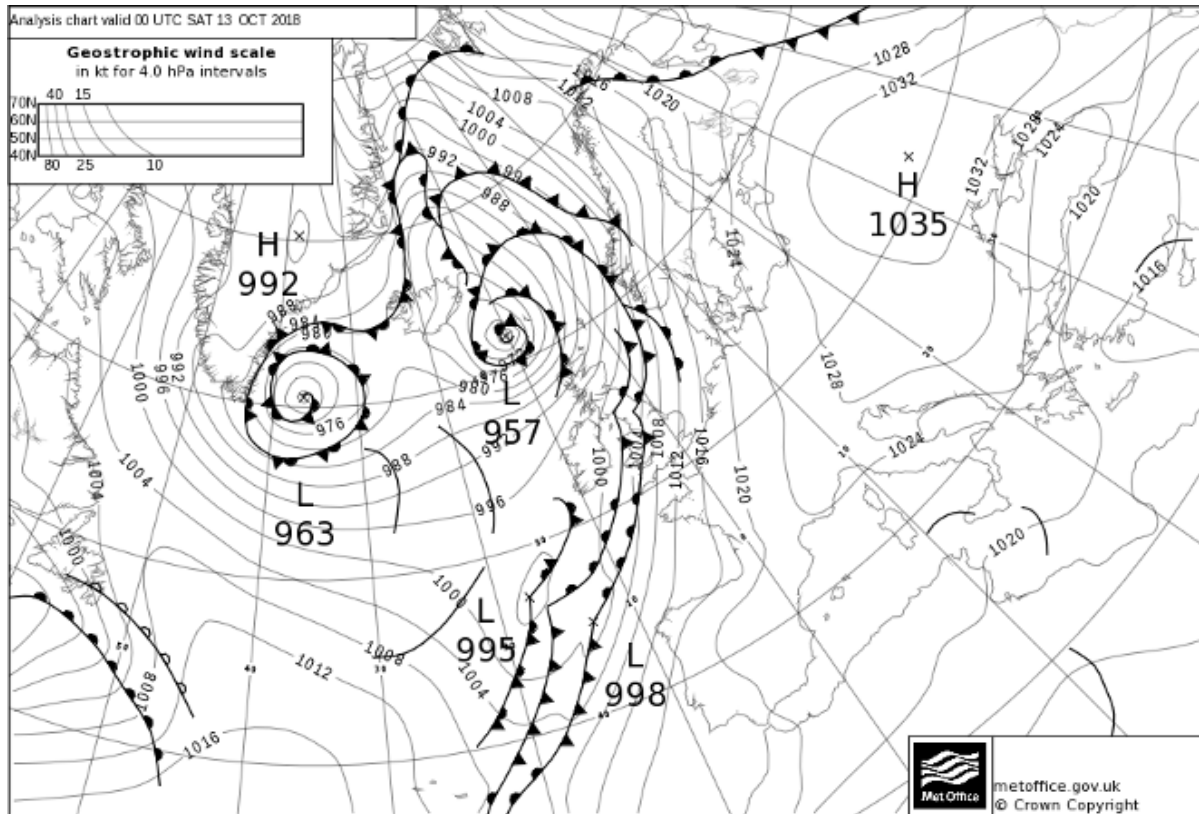
Storm Callum brought widespread travel disruption from strong winds and flooding. Large waves battered exposed coastlines in the south and west. Power cuts affected thousands of homes and there were flight cancellations, travel disruption on roads and rail cancellations due to landslips. The most severe impacts were across south Wales. Homes and businesses were flooded in Carmarthenshire, Ceredigion and Powys. One man was killed after a landslip and another man reported to be swept away by rough seas in Brighton. Around 100 sheep were swept away by floodwater in west Wales. Rail services were delayed or cancelled across Wales, south-west England and between Preston and Scotland.

Weather data

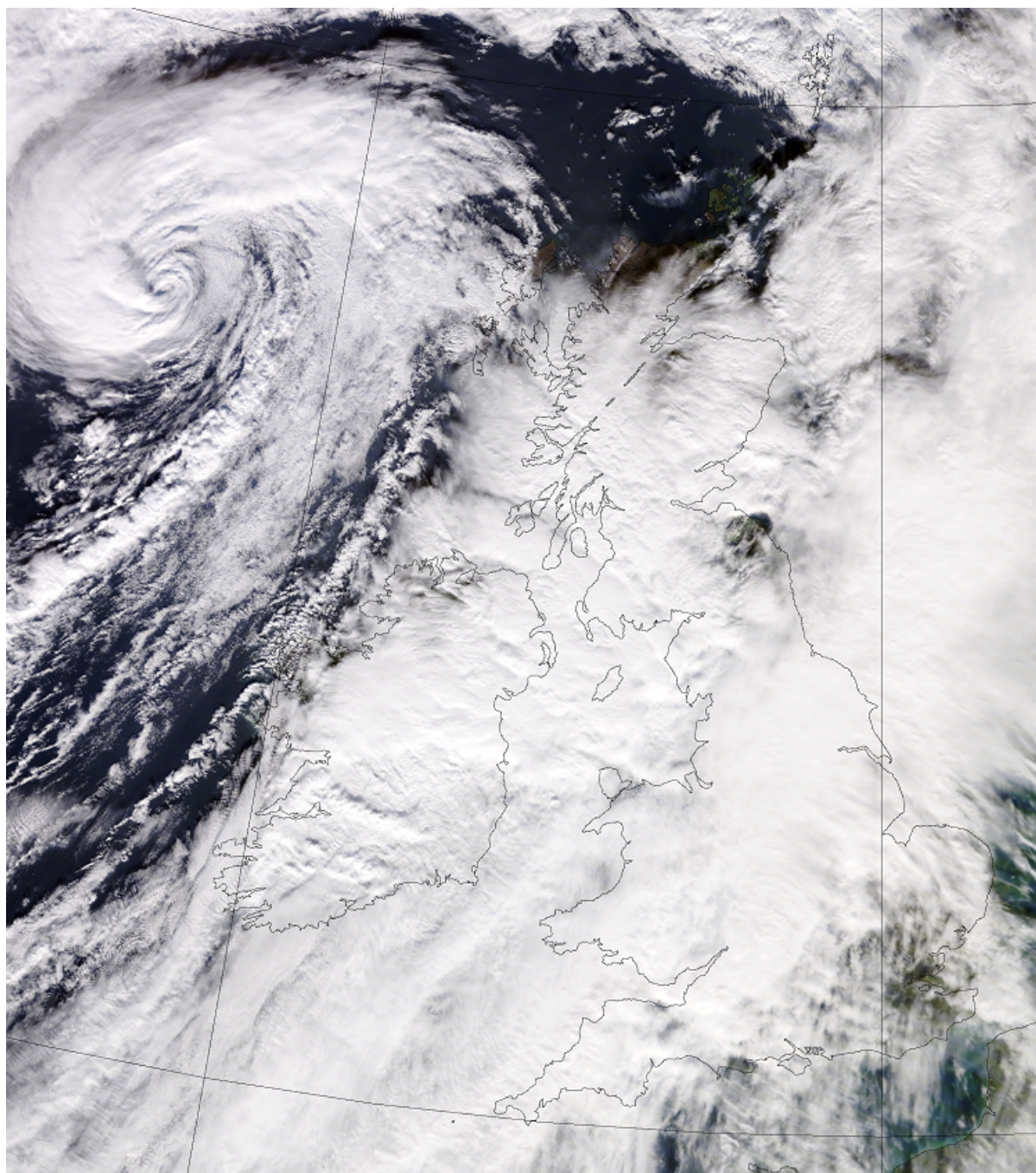
Analysis chart at 00 UTC Friday 12 October 2018 showing storm Callum centred to the west of Ireland with associated fronts approaching the south-west.



Analysis chart at 00 UTC 13 October 2018 showing associated fronts from storm Callum across England and Wales, bringing persistent heavy rainfall.

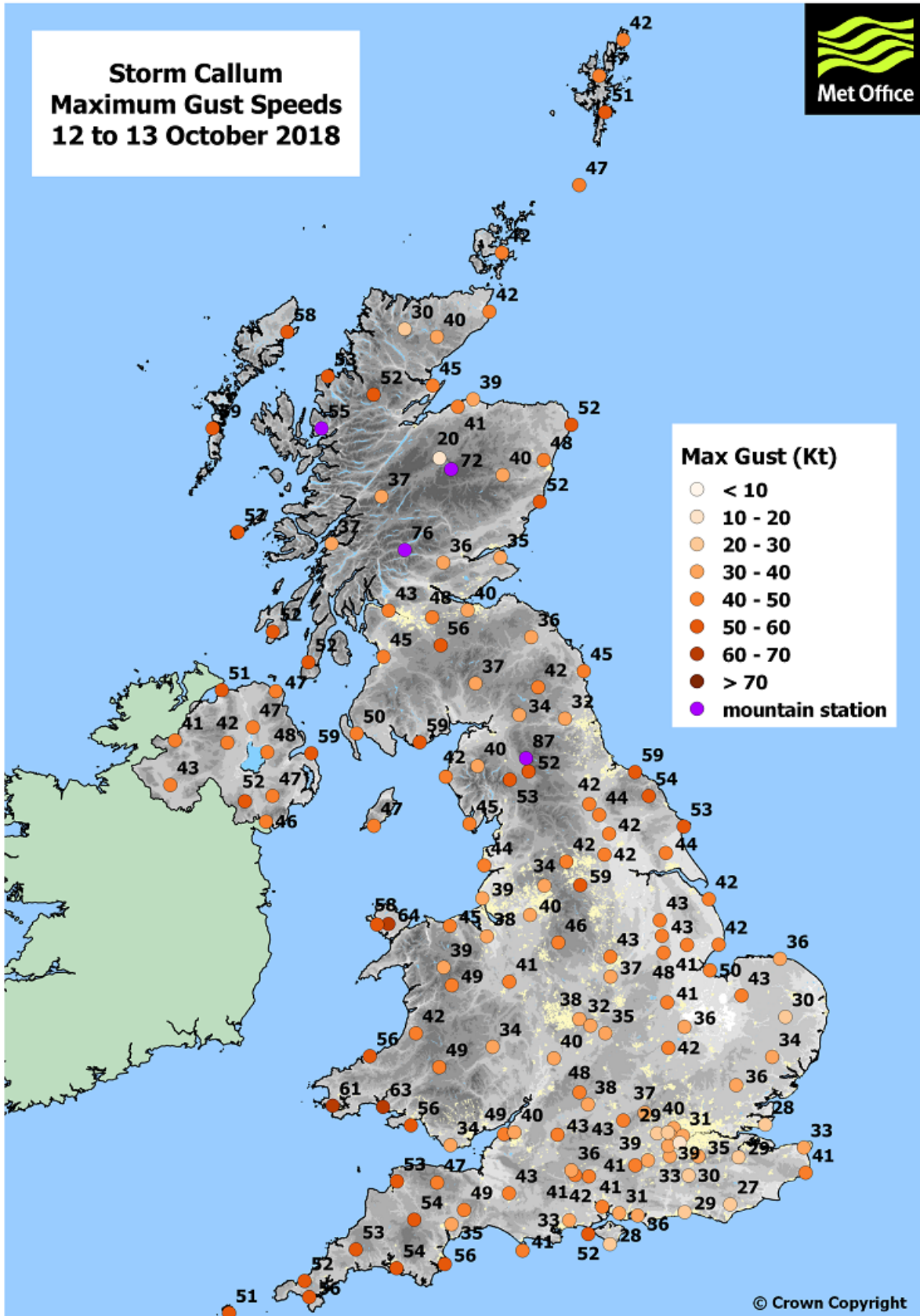


Satellite image at 1148 UTC on 12 October 2018 showing the centre of Storm Callum located to the west of Scotland (relatively close to Rockall), with associated fronts stretched across the UK and Ireland. Image copyright Met Office / NOAA / NASA.



Strong winds

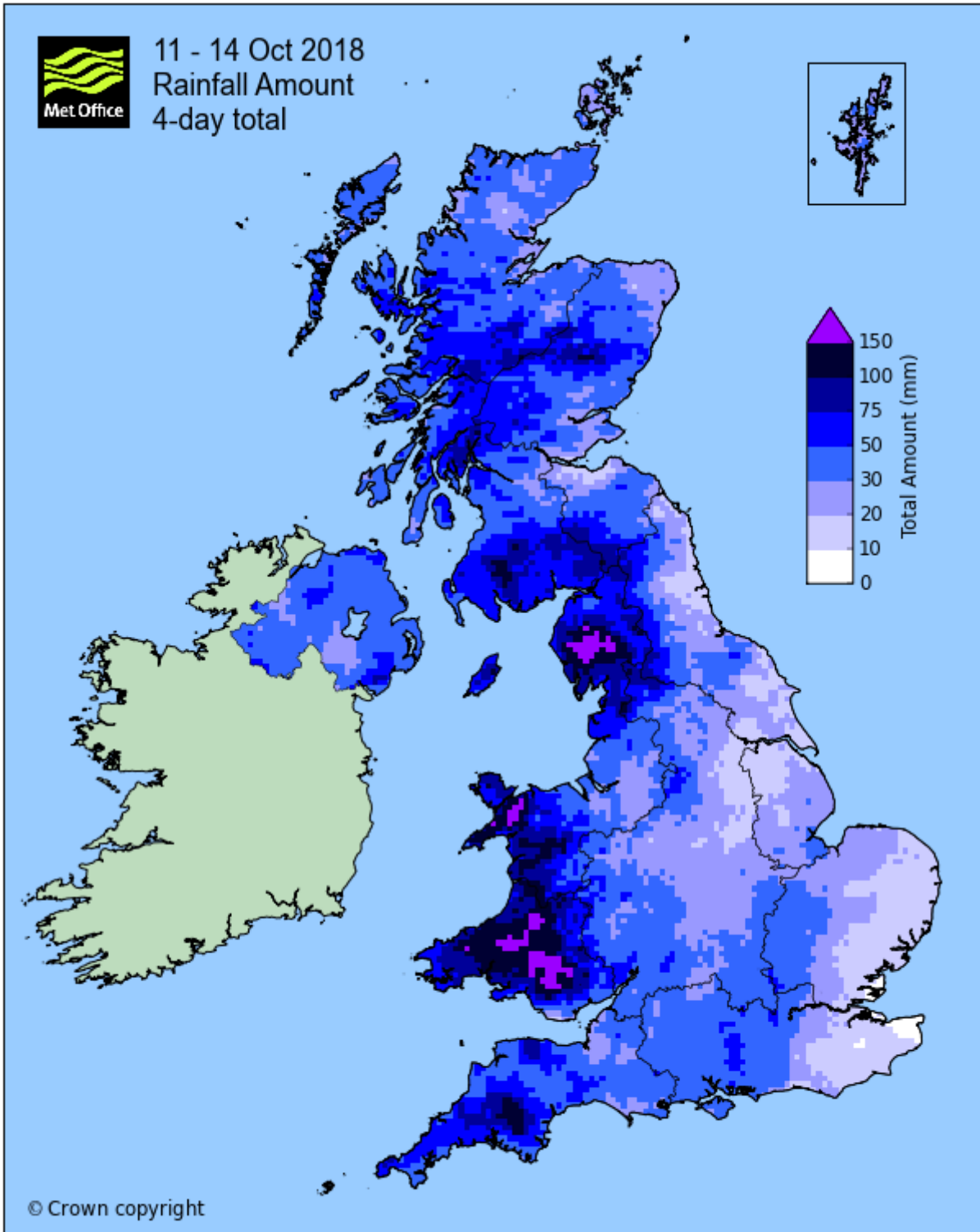
The map below shows maximum gust speeds from storm Callum. Exposed coastal locations, particularly in the west and north, recorded gust speeds of 50 to 60 Kt (58 to 69 mph) - notable but not exceptional for the time of year. The highest gusts were 64 Kt (74 mph) at Mona (Anglesey) and 63 kt (73 mph) at Pembrey Sands (Carmarthenshire).



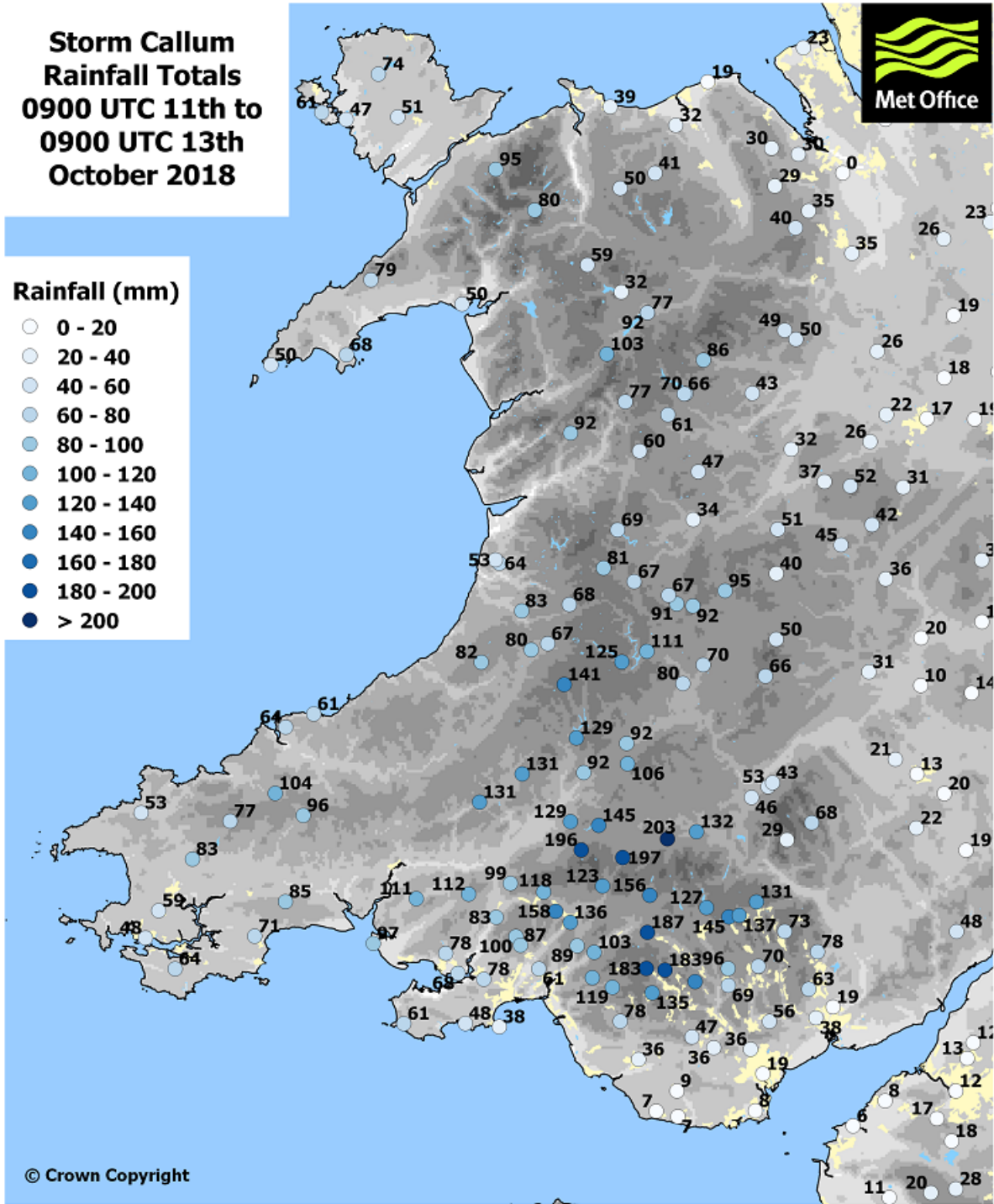
Persistent heavy rain

The rain-radar image sequence from 2200 UTC 11 October 2018 to 1600 UTC 14 October 2018 shows storm Callum and associated fronts bringing persistent heavy rain to western and northern areas from 11 to 13 October - particularly south Wales. A further pulse of heavy rain affects southern England on 14 October before finally clearing the south-east. (Thanks to Sharon Jewell, Observations R&D)

The map below shows rainfall totals for the 4 days of 11 to 14 October 2018 from this event. Western parts of the UK received well over 50mm - in particular across upland areas with 100 to 150mm or more across the higher ground of Wales and the Lake District.

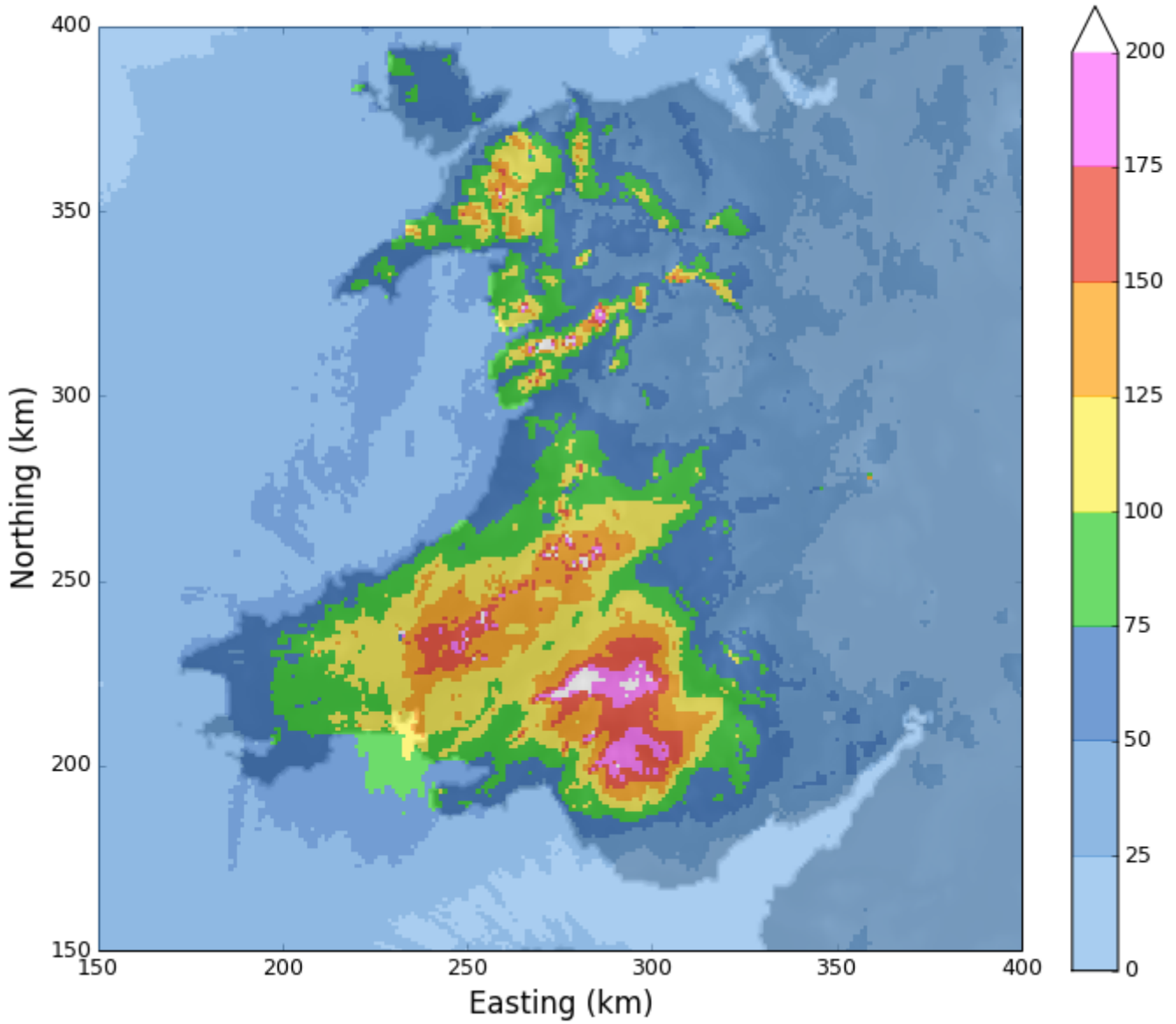


The map below shows rainfall accumulations for the two rain-days of 11 and 12 October 2018. The focus of the heaviest and most persistent rain was across the Brecon Beacons with 150 to 200mm recorded widely. There was very significant orographic enhancement of the rainfall in this area, so that the upland areas recorded 3 or 4 times as much rainfall as coastal locations around Swansea, or locations to the north-east in the rain-shadow - such as the Black Mountains. This very pronounced contrast in the spatial pattern of rainfall is very typical of such extreme rainfall events, for example 19 November 2009 or 5 December 2015.



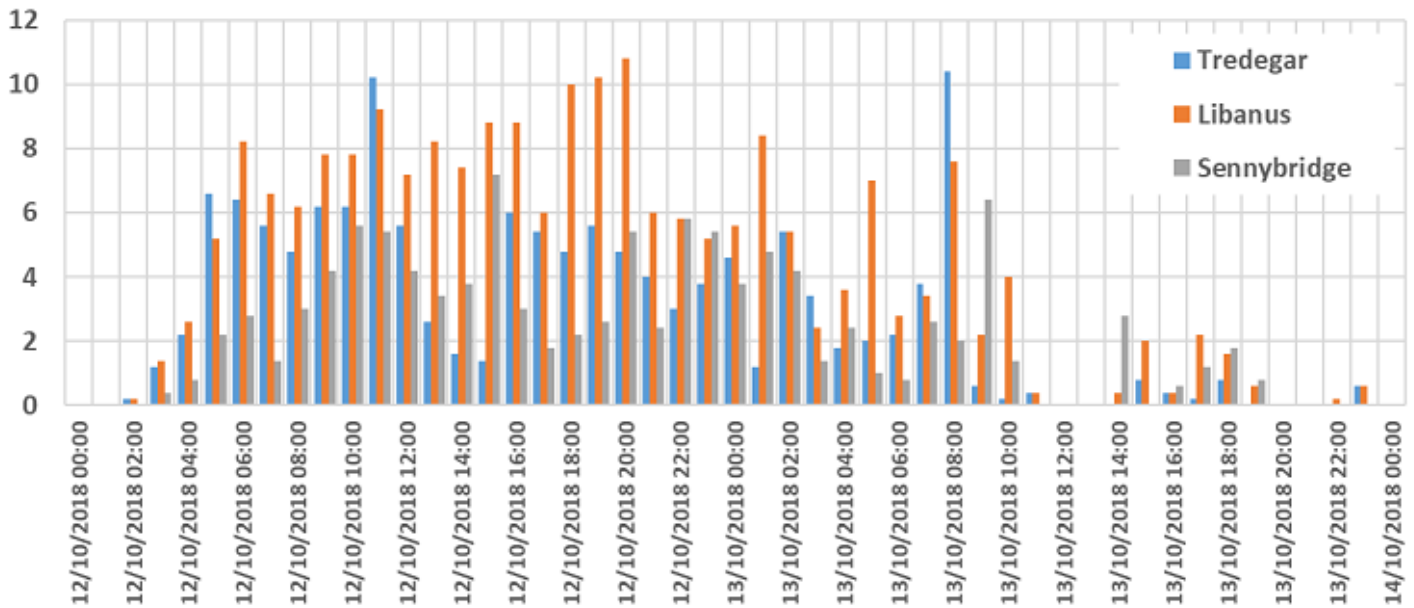
The map below shows rainfall accumulations from a merged raingauge-rain-radar product (thanks to Sharon Jewell, Observations R&D).

1km resolution Merged accumulation from 11/10/2018 09:00 Z to 13/10/2018 09:00 Z



The chart below shows hourly rainfall for three stations located in or near the Brecon Beacons: Sennybridge and Libanus (Powys) and Tredegar (Blaenau Gwent). The extreme nature of the rainfall was due to duration rather than intensity. For example at Libanus the rain-rate averaged around 6mm per hour for 34 hours.

Storm Callum hourly rainfall (mm)

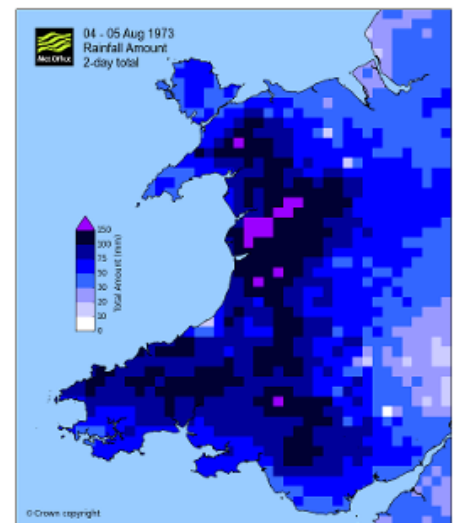
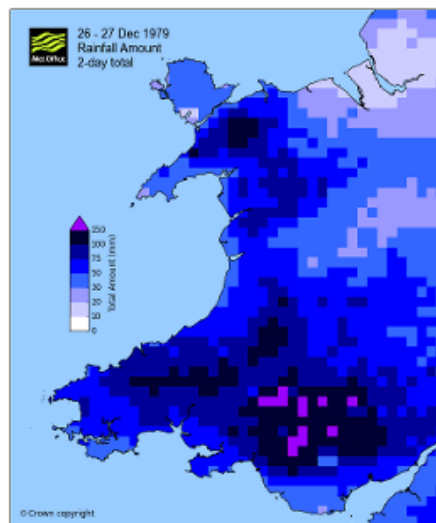
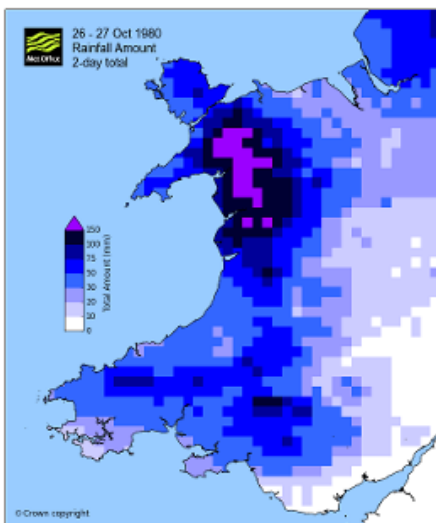
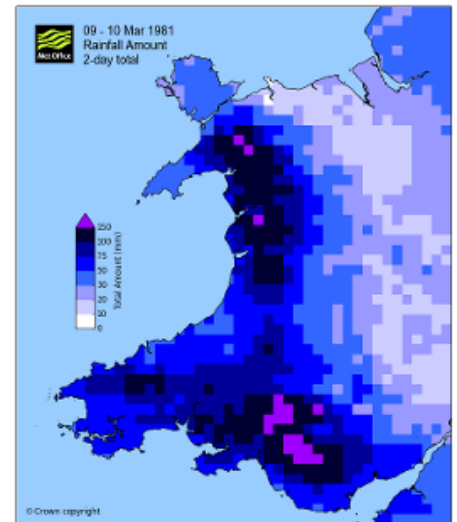
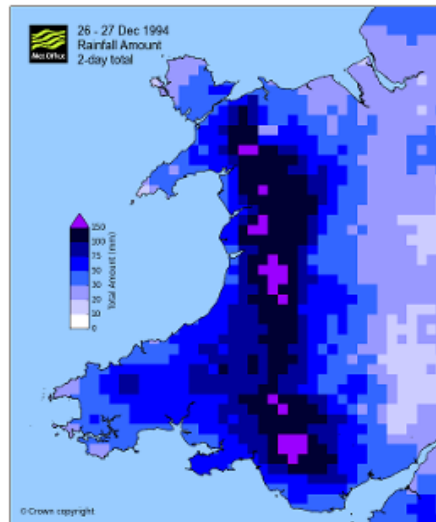
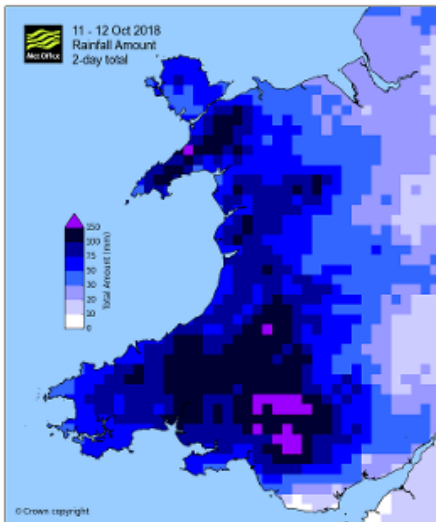


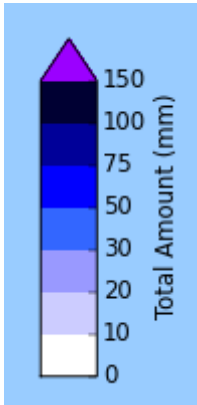
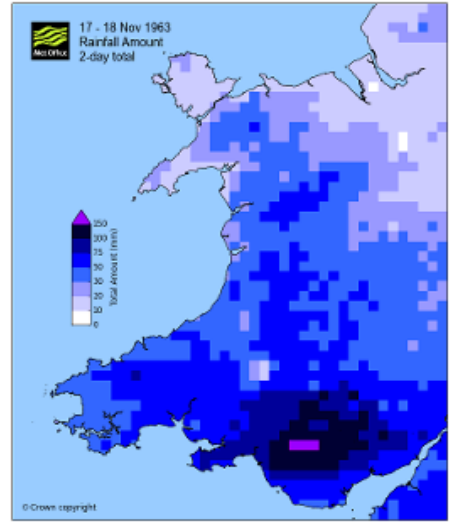
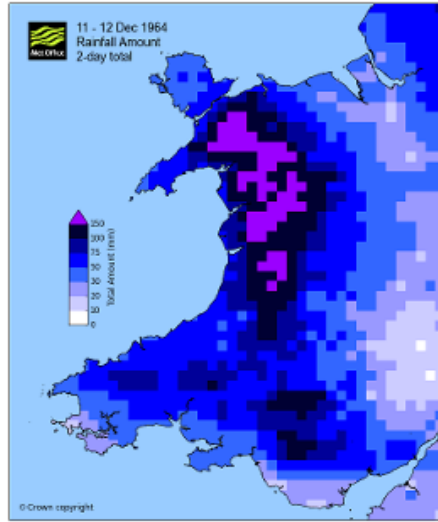
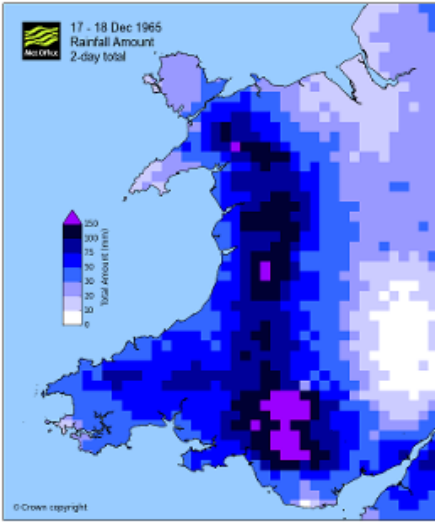
The table below shows 34-hour rainfall totals for the period 0200 UTC 12th to 1100 UTC 13th October 2018. Libanus (located just south-west of Brecon) recorded over 200mm, more than the October whole-month average rainfall (with October on average also being one of the wettest months of the year).

Location	Tredegar	Libanus	Sennybridge
34-hour total (mm)	134.2	202.4	103.8
1981-2010 October average (mm)	174.8	175.9	179.5
% of average	77	115	58

Historical context

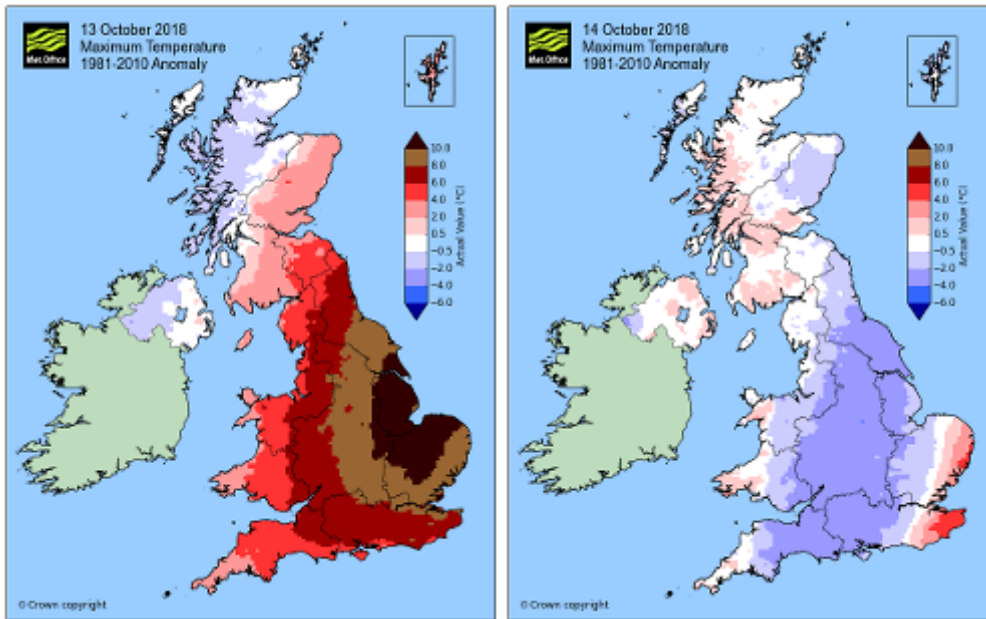
The maps below show examples of historical 2-day rainfall accumulations across upland areas of Wales of 100 to 150mm or more comparable to the event of 11 to 12 October 2018 - occurring in 1994, 1981, 1980, 1979, 1973, 1965, 1964 and 1963. Of these, the stand-out event in terms of rainfall totals across south Wales was that of 17 to 18 December 1965 with 10 raingauges recording a 2-day total of over 200mm and two of these over 250mm. In terms of historical context, 11 to 12 October 2018 was one of the most notable extreme rainfall / flood events across south Wales in the last 50 years.



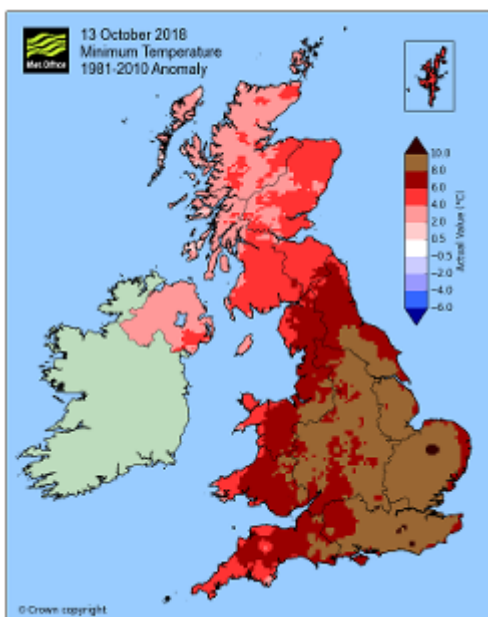


High temperatures

The frontal system associated with storm Callum which brought the extreme rainfall was also responsible for some very large temperature contrasts across the UK. On 13 October, daily maximum temperatures across Norfolk and Lincolnshire widely exceeded 25 °C, compared to less than 10 °C across Scotland's central highlands. Temperatures subsequently fell by around 10 to 15 °C the following day as the front moved eastwards - although parts of Kent still exceeded 20 °C. The highest temperature on 13 October was 26.5 °C at Donna Nook (Lincolnshire). This fell well short of the [UK October record](#) of 29.9 °C on 1 October 2011, but nevertheless was unseasonably warm so late in the year. The maps below show daily maximum temperature anomalies on 13 and 14 October 2018.



Minimum temperatures were also exceptionally high overnight 12-13 October 2018. The map below shows daily minimum temperatures for 13 October, these were widely around 16 to 17 °C across East Anglia and the south-east. Night-time minimum temperatures for the period 2100 UTC 12 to 0900 UTC 13 October were even higher at 17 to 18 °C across these areas with a 12-hour minimum of 19.6 °C at London St James's Park - exceptionally mild for the time of year. Numerous stations set October minimum temperature records, for example at Cambridge Botanic Garden and Hastings (East Sussex) in 80+ year record lengths.



Last updated: 16 October 2018

