March 2023 Monthly Weather Report

This document provides a summary of the UK's weather and climate statistics for March 2023.

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UK overview

March began cold and dry, under the influence of high pressure, but from the 8th onwards it was predominantly unsettled with moist, milder air pushing up from the south. For the second week the cold air was at times reluctant to move away from northern areas, with snow for some areas most especially around the 7th-10th on the northern boundary of the milder air, but from mid-month it was broadly mild everywhere. After transitory fine weather on the 27th, the month ended with a westerly pattern, very unsettled with low pressure close to the UK, maintaining a dull and wet theme.

Mean temperatures for this month ended up close to average for many areas, although it was colder across Scotland, especially in the north. The provisional UK mean temperature was 5.7 °C, which is equal to the 1991-2020 average. Rainfall was well above average in most areas, with over twice the average amount for many southern areas, and only north-western Scotland was drier than average. The UK had 155% of average rainfall for the month, and it was the sixth wettest March in records back to 1836. It was a sunnier than average month for the western side of Scotland, but rather dull for most other areas, and especially dull in the south of England and Wales with some places having barely half their average sunshine, the dullest March in a series from 1910 for certain counties.

Reference climatology used for calculating anomalies is the period 1991-2020 unless otherwise stated.

Weather impacts

- **The start of the month continued the settled theme of February, but the rest of March was predominantly cyclonic across the UK, with many parts of England, South Wales and the south of Northern Ireland receiving over 200% of the long-term average rainfall**
- **Some impacts from snowfall during the second week**
- **It was a rather cold month for Northern Scotland**

The start of the month was uneventful impacts-wise, until a southwards surge of Arctic air on the 6th introduced snow showers, locally heavy, to the Northern Isles and exposed parts northern of Scotland. Some roads in Highland and Grampian regions were closed due to snow by the 7th, along with increasing numbers of school closures. During the 7th and 8th, the boundary of the Arctic air stalled across the far south, and snowfall developed over some southern areas of England, together with South Wales. On the morning of the 8th Bristol Airport was closed to allow snow clearance, whilst the A3 in Surrey was also closed due to HGVs struggling to gain traction on the gradient sections as snow accumulated. Meanwhile snow showers continued over the Northern Isles and much of northern Scotland.

An expectation of appreciable snowfall from the North Midlands right up to the Central Highlands was realised for the 9th. A series of amber warnings for snow was issued for the Pennines and adjoining areas of Yorkshire and Derbyshire, Mid/North Wales, and the south-east of Northern Ireland. Persistent and locally heavy snowfall and strong winds duly ensued during the 9th and overnight into the 10th, the snowfall heaviest and most disruptive across the south Pennines and Peak District where almost all the main road links were reported as impassable. The M62 was blocked for many hours due to snow clearance operations being hampered by drifting in the strong winds and by HGVs struggling to negotiate the conditions. In Derbyshire a major incident was declared, with mountain rescue teams deployed to assist trapped motorists between Buxton and Ashbourne. Widespread power outages were reported across parts of Yorkshire and Derbyshire as snow accumulated on transmission cables. Unofficial reports suggested snowfall accumulations of the order of 40cm in some higher-lying Sheffield suburbs. There was also significant transport disruption with road closures and several thousand affected by power outages in Northern Ireland. A similar combination of road closures and local power outages affected parts of North Wales.

After a battle between air-masses, the cold air over northern areas was finally displaced on the 16th as an unsettled, cyclonic regime became established. Heavy rain on the 18th affected parts of South Yorkshire and Lincolnshire, with the football match between Rotherham and Cardiff abandoned due to a waterlogged pitch. Spring tides and strong south-westerly winds on the 22nd combined to cause localised coastal impacts with minor flooding in the Outer Hebrides, whilst in Cornwall several properties were flooded in Looe and Fowey. The last significant weather of the month occurred on the 31st when a small but vigorous low (named by MeteoFrance as Storm ‘Mathis’) raced across Southern England bringing strong winds to southernmost parts of the UK, and in Cornwall there were reports of trees blown down and several hundred properties without power.

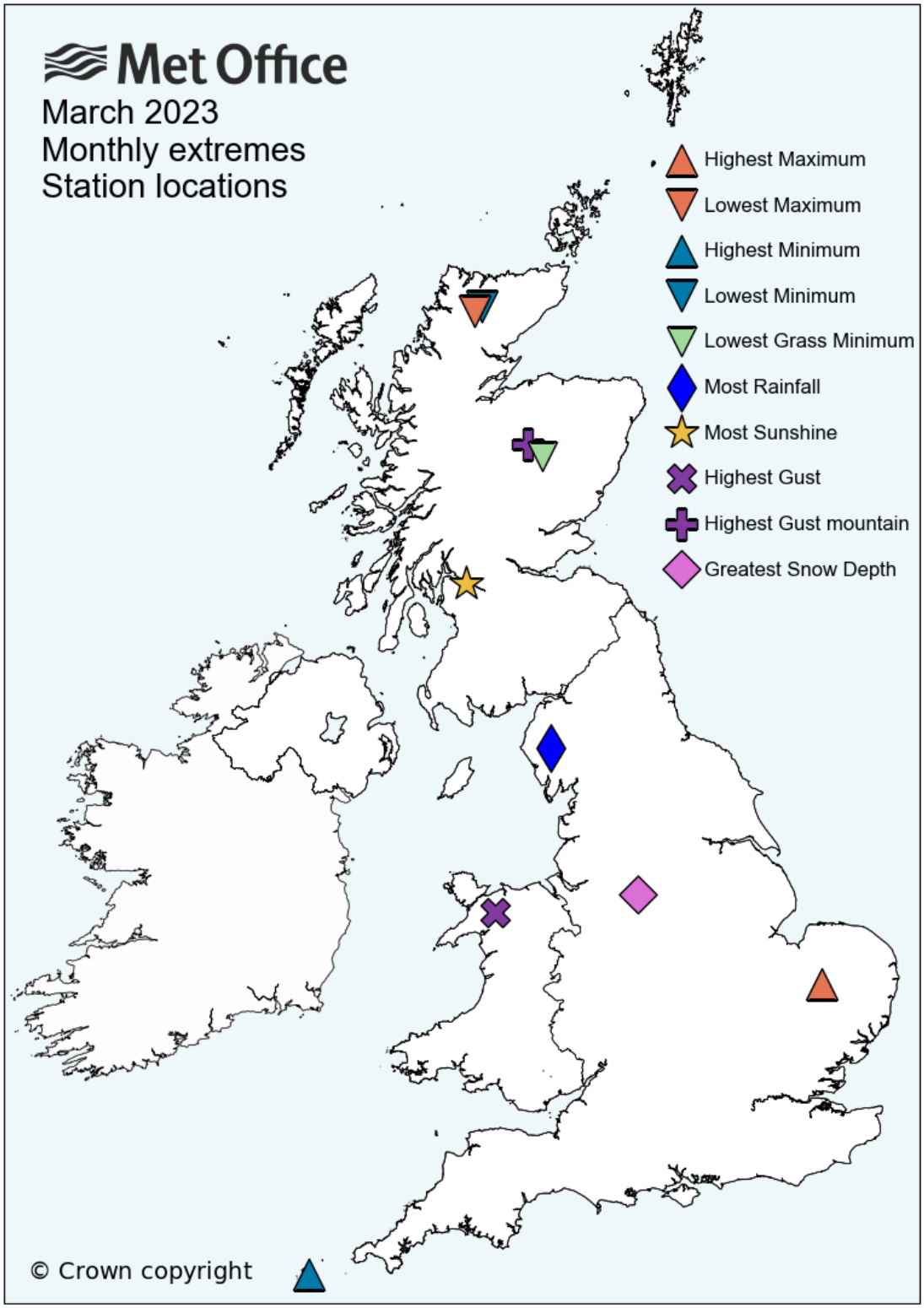
Monthly extremes

The table below lists UK monthly weather extremes recorded at individual weather stations during March 2023 from data available on 04/04/2023. The map shows the location of these stations.

Highest Maximum	**17.8°C** on **30th** at Santon Downham (Suffolk, 6mAMSL)
Lowest Maximum	**-2.4°C** on **8th** at Altnaharra No 2 (Sutherland, 81mAMSL)
Highest Minimum	**11.0°C** on **30th** at Scilly: St Marys Airport (Isles Of Scilly, 31mAMSL)
Lowest Minimum	**-16.0°C** on **9th** at Altnaharra No 2 (Sutherland, 81mAMSL)
Lowest Grass Minimum	**-19.4°C** on **8th** at Braemar No 2 (Aberdeenshire, 327mAMSL)
Most Rainfall	**118.6mm** on **12th** at Honister Pass (Cumbria, 358mAMSL)
Most Sunshine	**11.9hr** on **27th** at Glasgow, Bishopton (Renfrewshire, 59mAMSL)
Highest Gust	**71Kt 82mph** on **21st** at Capel Curig No 3 (Gwynedd, 216mAMSL)
Highest Gust (mountain*)	**95Kt 109mph** on **22nd** at Cairngorm Summit (Inverness-shire, 1237mAMSL)
Greatest Snow Depth at 0900 UTC	**32cm** on **10th** at Buxton (Derbyshire, 307mAMSL)

mAMSL refers to station elevation in metres above mean sea level.

*Mountain stations are above 500mAMSL.


Met Office
March 2023
Monthly extremes
Station locations
Highest Maximum
Lowest Maximum
Highest Minimum
Lowest Minimum
Lowest Grass Minimum
Most Rainfall
Most Sunshine
Highest Gust
Highest Gust mountain
Greatest Snow Depth
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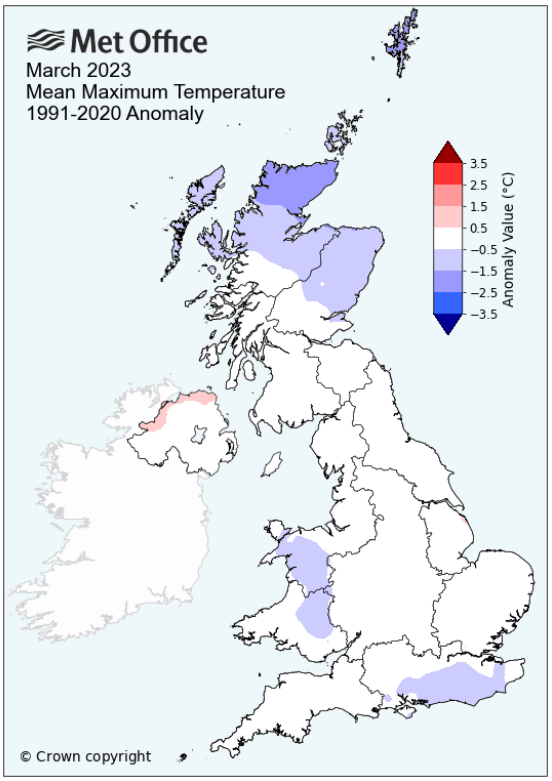
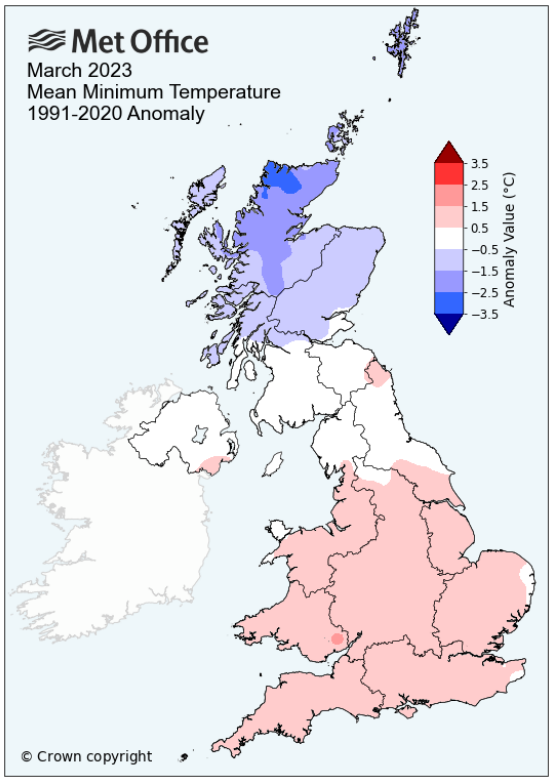
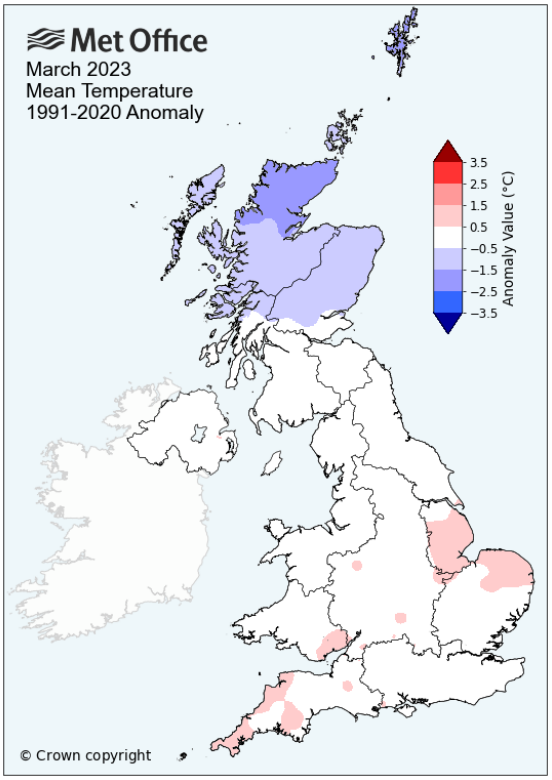
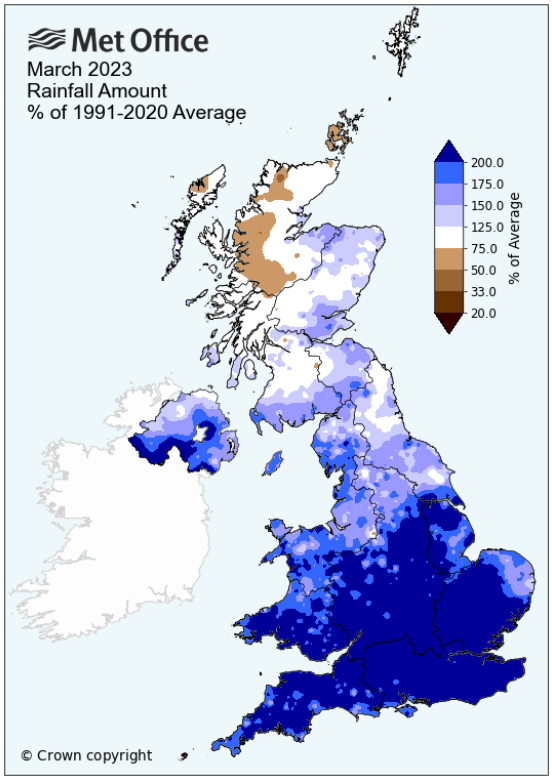
Monthly maps

These maps show monthly average daily maximum, monthly average daily minimum and monthly mean temperature and monthly rainfall for March 2023 as anomalies relative to the March 1991-2020 long term average.

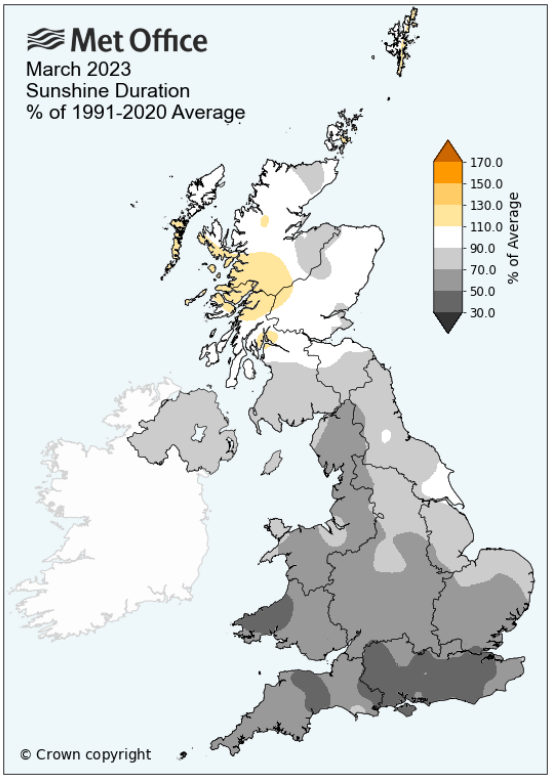


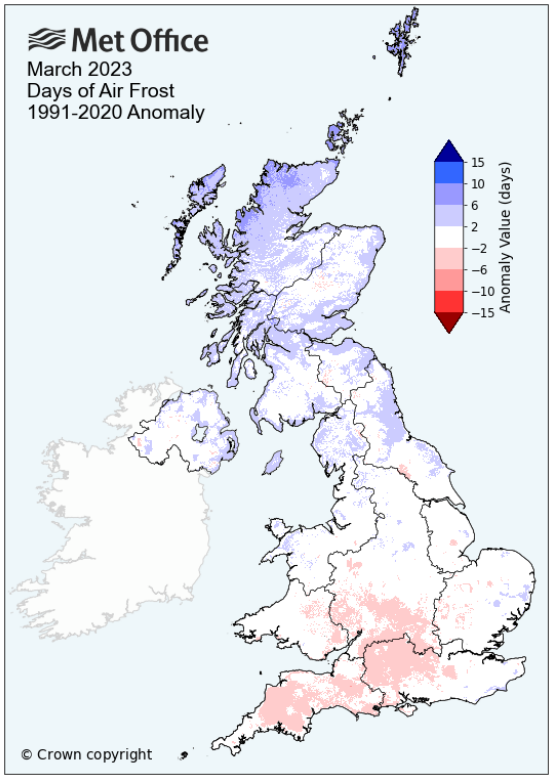


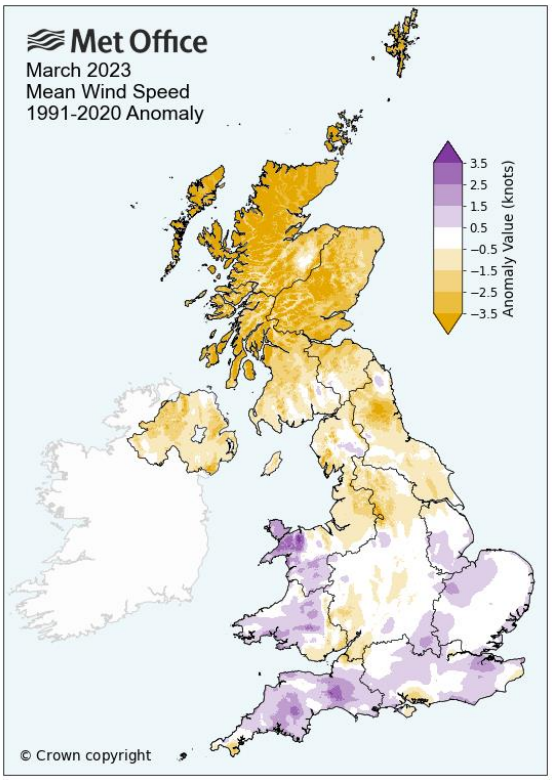


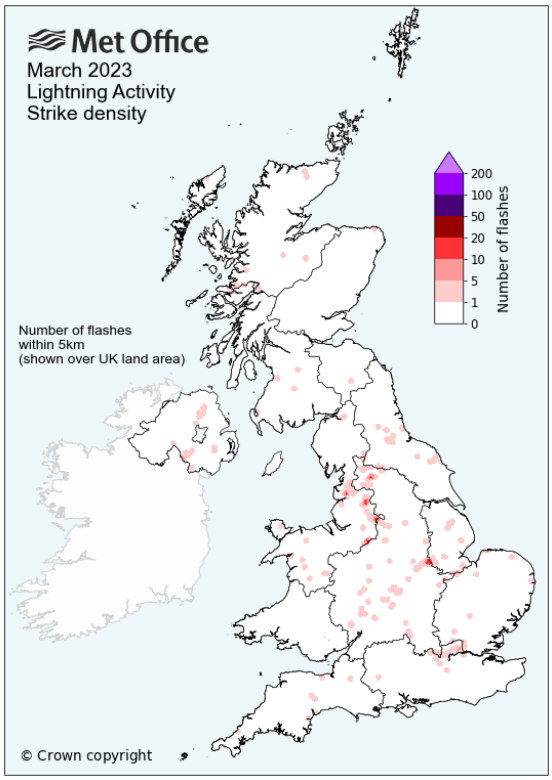


These maps show monthly sunshine, monthly air frost and monthly windspeed for March 2023 as anomalies relative to the March 1991-2020 long term average, plus a map showing lightning activity as the number of strikes within a 5km radius of any land location.









Monthly climate statistics - actuals and anomalies

These tables show the UK and national climate statistics for March 2023 for max, min and mean temperature, rainfall, sunshine and windspeed as actual values and anomalies relative to the March 1991-2020 long term average. The position of the value within the full series (in both ascending and descending order) is shown in the two ‘Rank’ columns. Central England Temperature (CET) and England & Wales Precipitation (EWP) are also included.

Mean maximum temperature

Region	Maxtemp (°C)	1991-2020 Anomaly (°C)	Rank - warmest	Rank - coldest	Series length (yrs)
UK	8.9	-0.3	56	85	140
England	10.0	-0.2	50	91	140
Wales	8.9	-0.4	57	84	140
Scotland	7.1	-0.6	69	72	140
Northern Ireland	9.9	0.3	33	108	140
Central England	10.2	-0.2	48	99	146

Mean minimum temperature

Region	Mintemp (°C)	1991-2020 Anomaly (°C)	Rank - warmest	Rank - coldest	Series length (yrs)
UK	2.4	0.2	33	108	140
England	3.5	0.8	12	129	140
Wales	3.5	1.0	16	125	140
Scotland	0.2	-1.0	89	52	140
Northern Ireland	2.6	0.2	41	100	140
Central England	3.8	0.8	19	128	146

Mean temperature

Region	Meantemp (°C)	1991-2020 Anomaly (°C)	Rank - warmest	Rank - coldest	Series length (yrs)
UK	5.7	-0.0	41	100	140
England	6.8	0.3	33	108	140
Wales	6.2	0.3	34	107	140
Scotland	3.6	-0.8	78	63	140
Northern Ireland	6.3	0.3	33	108	140
Central England	7.0	0.3	53	313	365

Rainfall

Region	Rainfall (mm)	% of 1991-2020 Average	Rank - wettest	Rank - driest	Series length (yrs)
UK	132.0	155	6	183	188
England	119.2	204	3	186	188
Wales	206.5	200	5	184	188
Scotland	130.1	104	50	139	188
Northern Ireland	151.2	174	3	186	188
EWP (England and Wales)	136.8	209	3	256	258

Sunshine

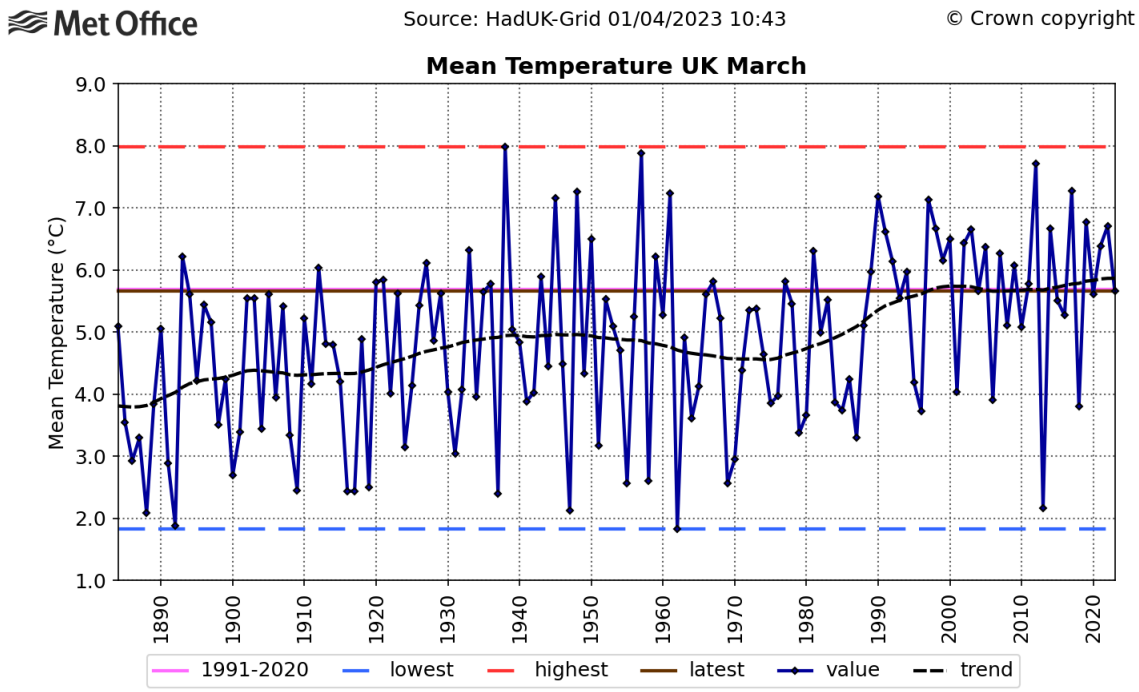
Region	Sunshine (hours)	% of 1991-2020 Average	Rank - sunniest	Rank - dullest	Series length (yrs)
UK	81.1	74	97	18	114
England	75.0	64	103	12	114
Wales	64.3	59	113	2	114
Scotland	94.6	97	63	52	114
Northern Ireland	85.3	84	85	30	114

Windspeed

Region	Windspeed (knots)	1991-2020 Anomaly (knots)	Rank - windiest	Rank - calmest	Series length (yrs)
UK	9.3	-1.0	43	13	55
England	9.2	-0.0	31	25	55
Wales	11.3	0.7	23	33	55
Scotland	9.0	-3.0	54	2	55
Northern Ireland	8.2	-1.4	47	9	55

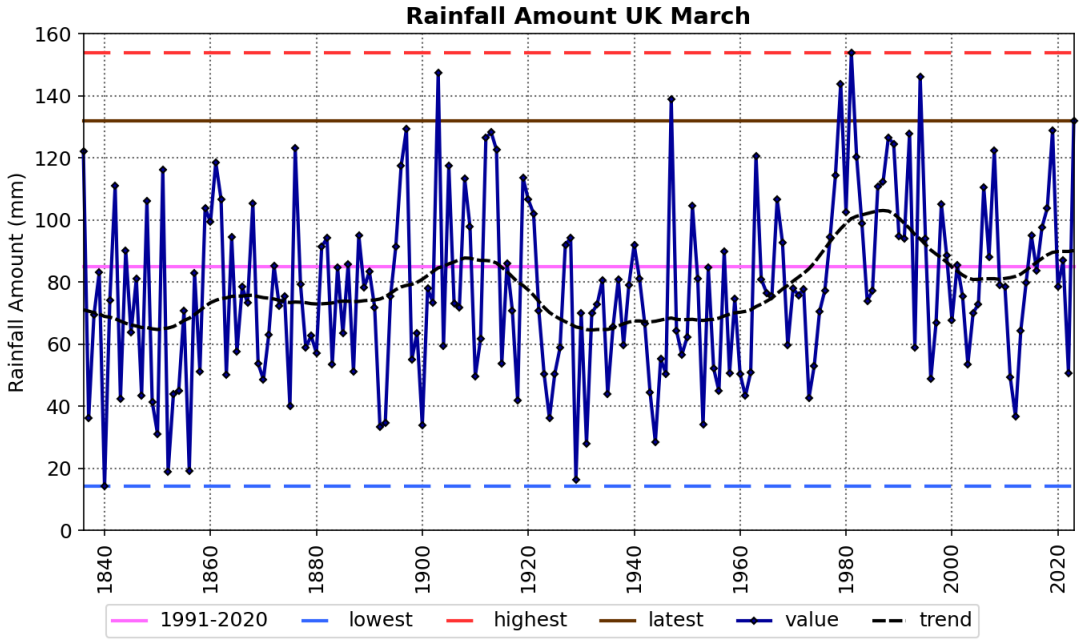
Monthly time-series

These charts show time-series for the UK for March for monthly mean temperature (from 1884), monthly rainfall (from 1836) and monthly sunshine (from 1919). The brown line shows the latest (2023) value. The hatched black line is a smoothing filter which shows the long-term trend. The tables below show statistics for the latest year, latest 10 years 2014-2023, the most recent 30-year climate reference period 1991-2020 and the 30-year baseline climate reference period 1961-1990.



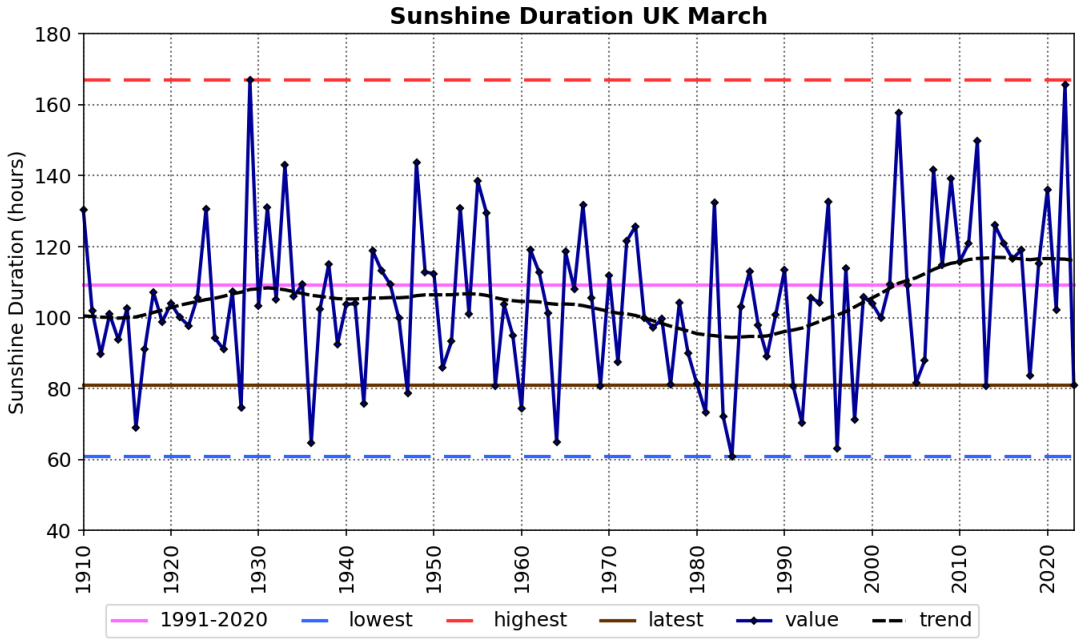
Period	1961-1990	1991-2020	2014-2023	2023
Meantemp (°C)	4.7	5.7	6.0	5.7

Met Office Source: HadUK-Grid 01/04/2023 10:43 © Crown copyright



Period	1961-1990	1991-2020	2014-2023	2023
Rainfall (mm)	91.0	85.1	93.7	132.0

Met Office Source: HadUK-Grid 01/04/2023 10:43 © Crown copyright

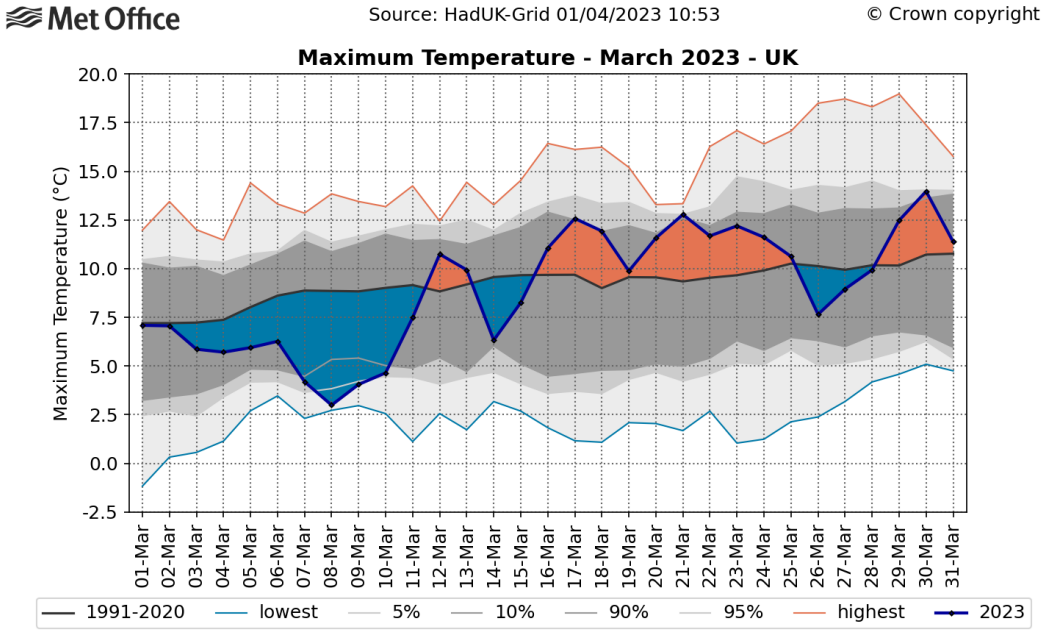


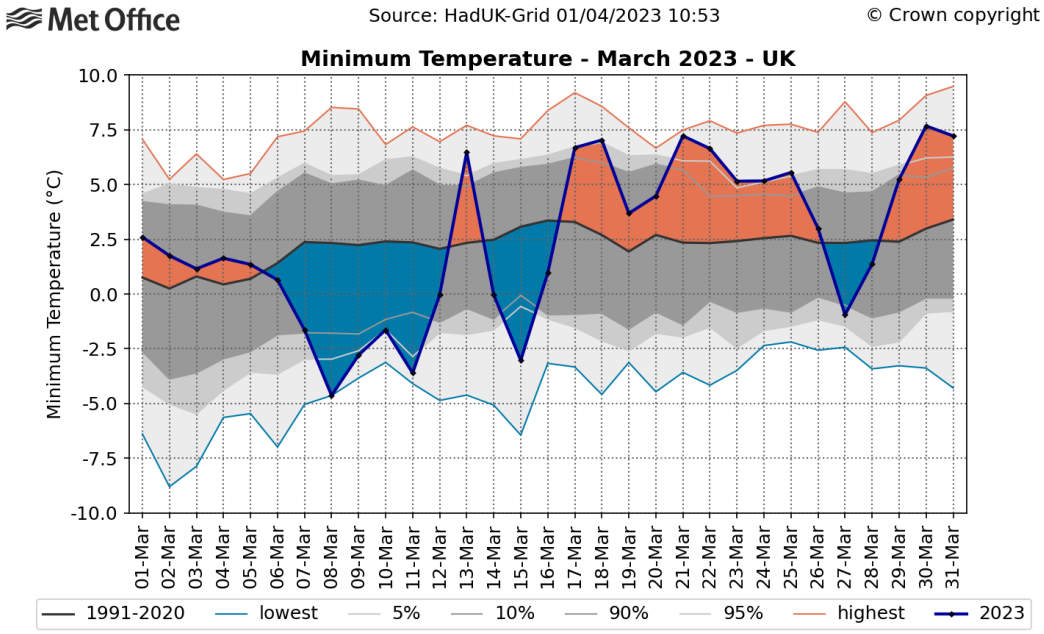
Period	1961-1990	1991-2020	2014-2023	2023
Sunshine (hours)	100.0	109.2	116.7	81.1

Daily time-series

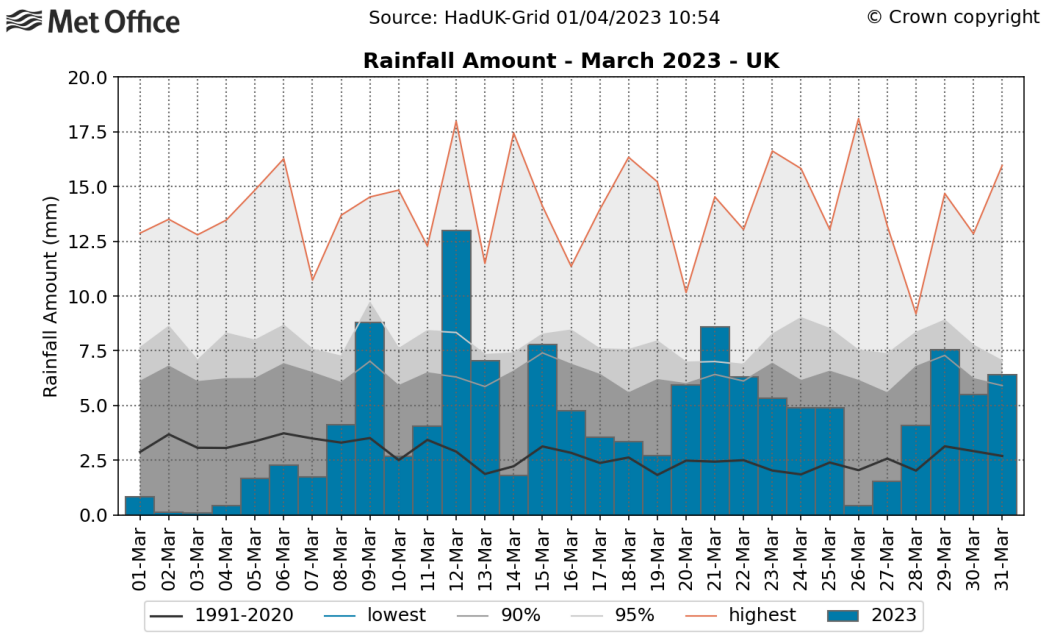
These charts show time-series of UK area-average daily maximum and daily minimum temperature and daily rainfall for each day of March 2023. The areas shaded in grey show the highest and lowest values in the daily temperature series (from 1960) and daily rainfall series (from 1891) together with percentiles and the 1991-2020 long term averages for each day. The rainfall accumulation chart shows the daily rainfall series as an accumulation through the month.

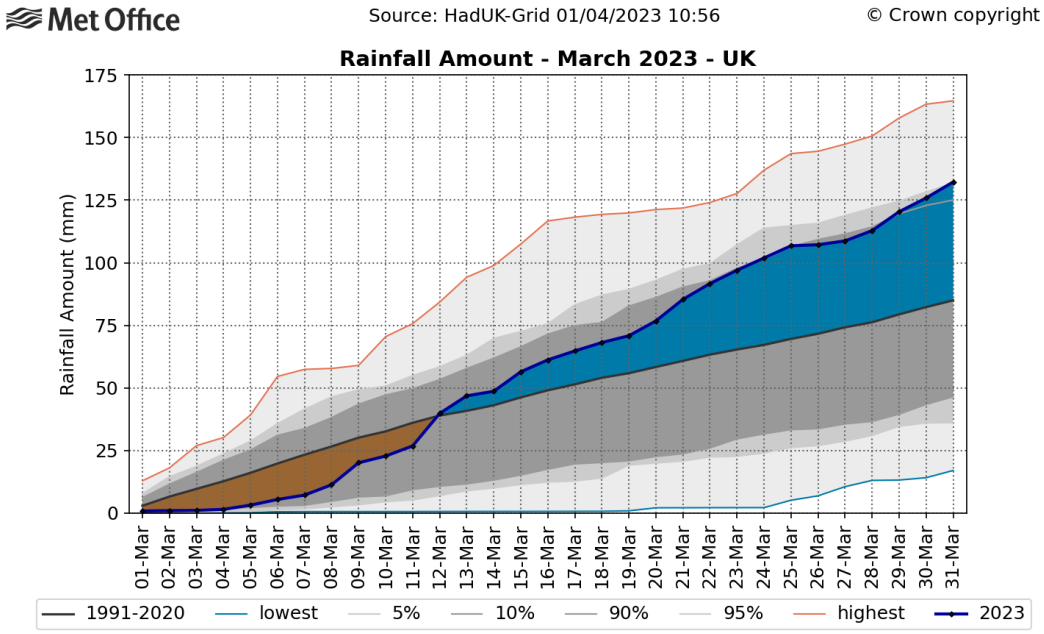
Daily maximum and daily minimum temperature





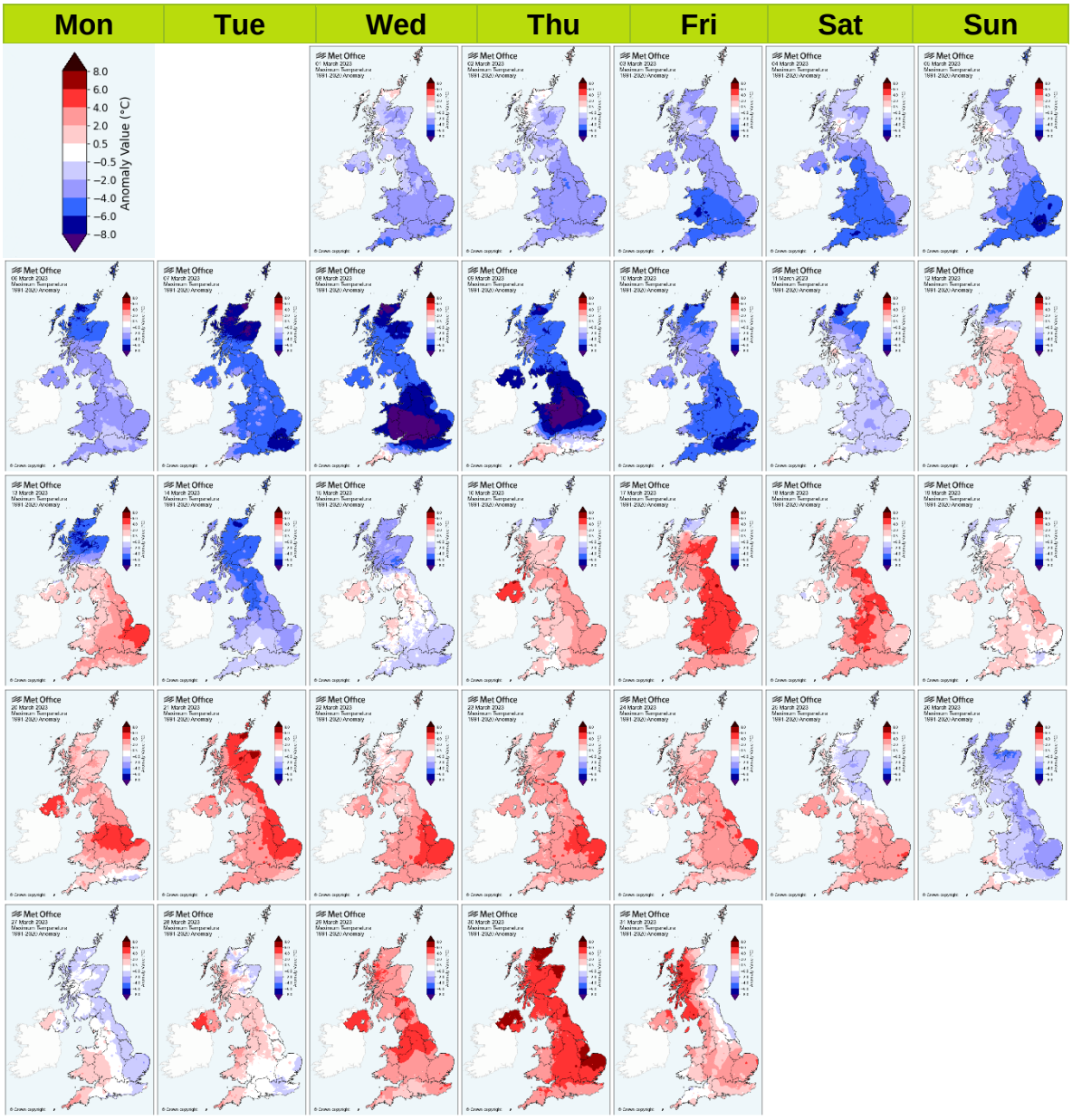
Daily rainfall and rainfall accumulation





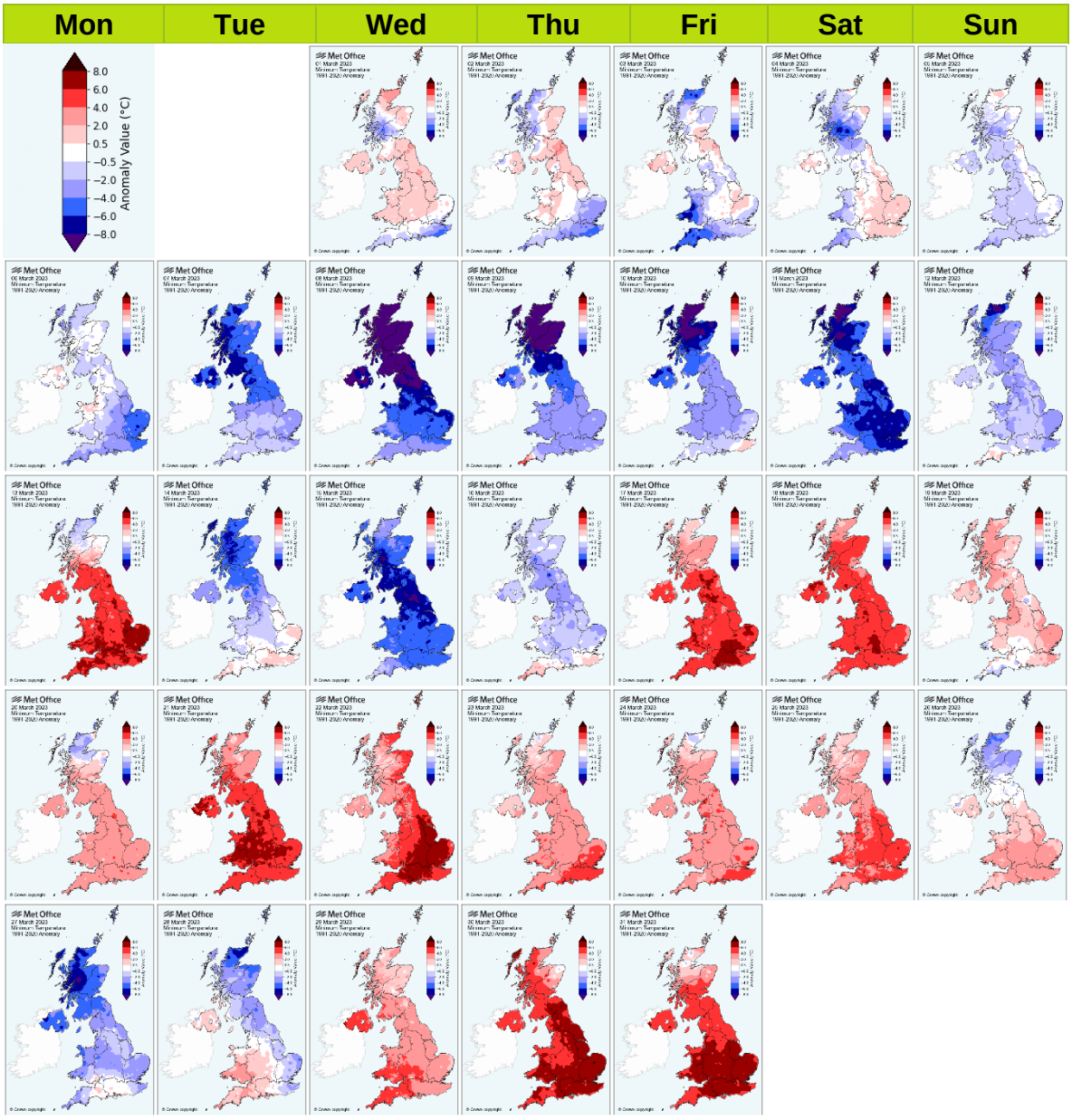
Daily maximum temperature maps - calendar view

These maps show daily maximum temperatures for each day of March 2023 as anomalies relative to the March 1991-2020 long term average. The daily maximum temperature is the maximum from 0900UTC on the day in question to 0900UTC the following day. Normally, the maximum occurs in the early afternoon.



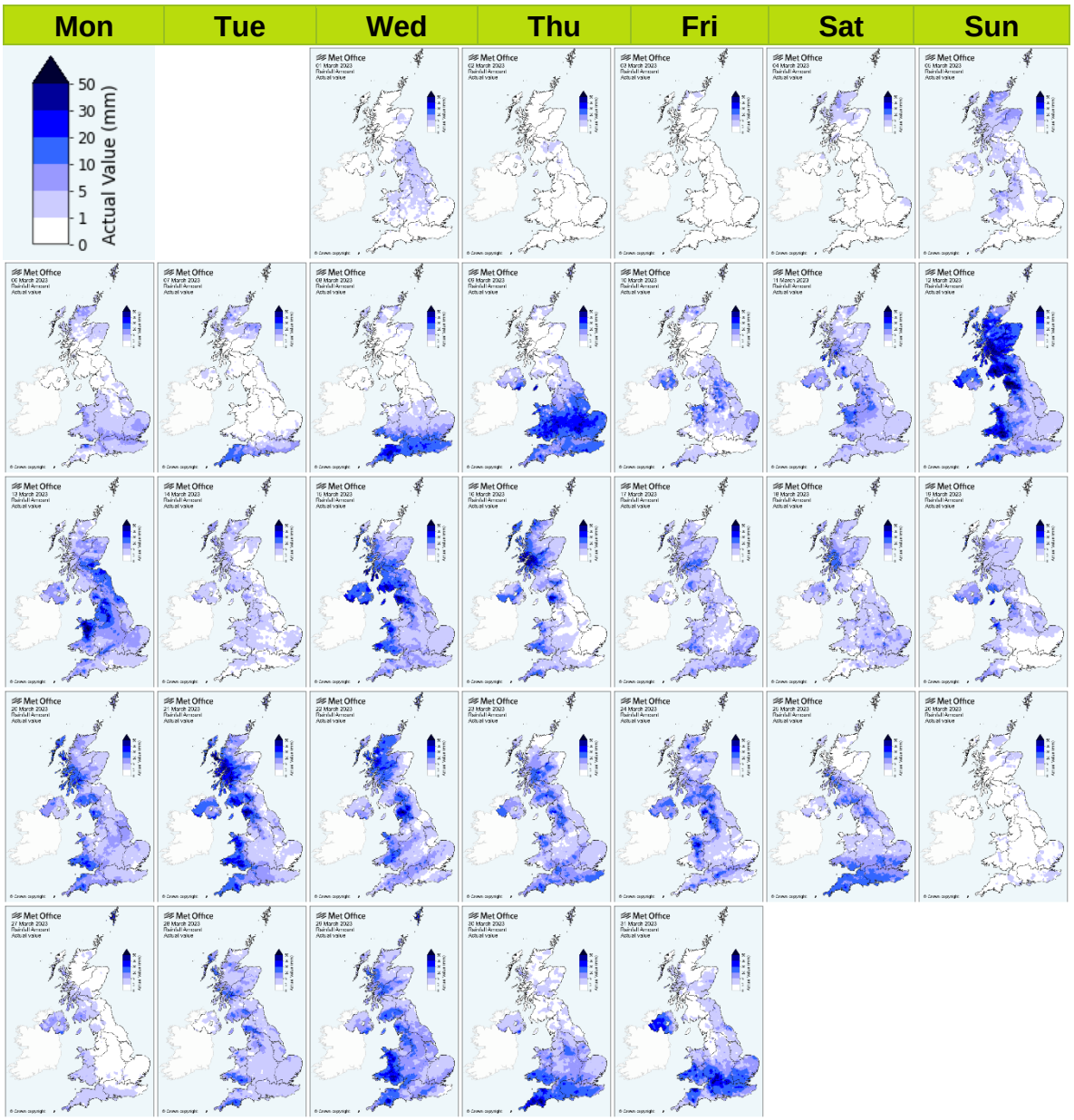
Daily minimum temperature maps - calendar view

These maps show daily minimum temperatures for each day of March 2023 as anomalies relative to the March 1991-2020 long term average. The daily minimum temperature is the minimum from 0900UTC the previous day to 0900UTC on the day in question. Normally, the minimum occurs in the early morning.



Daily rainfall maps - calendar view

These maps show daily rainfall for each day of March 2023 as daily totals. The daily rainfall is the total from 0900UTC on the day in question to 0900UTC the following day.

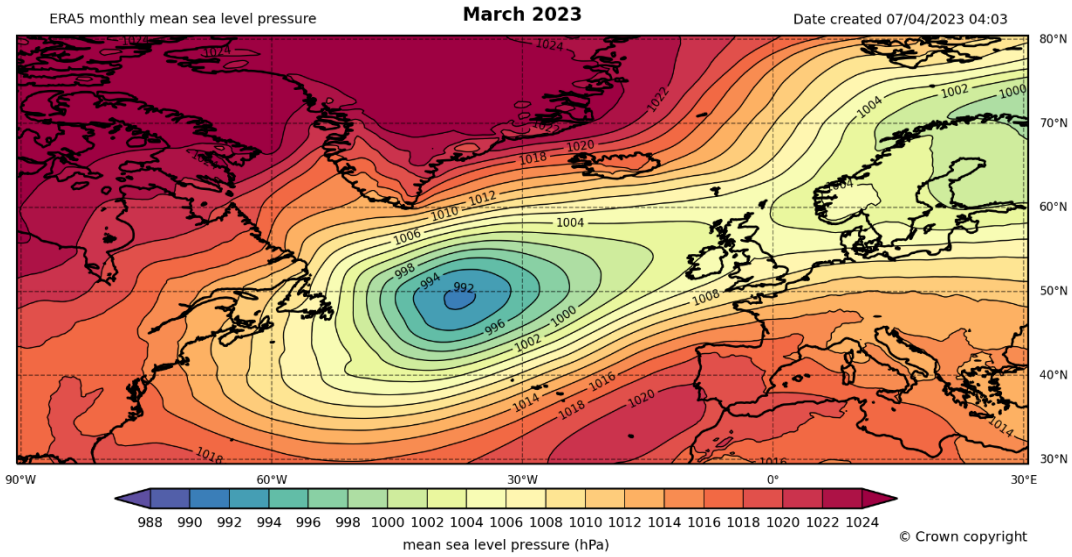


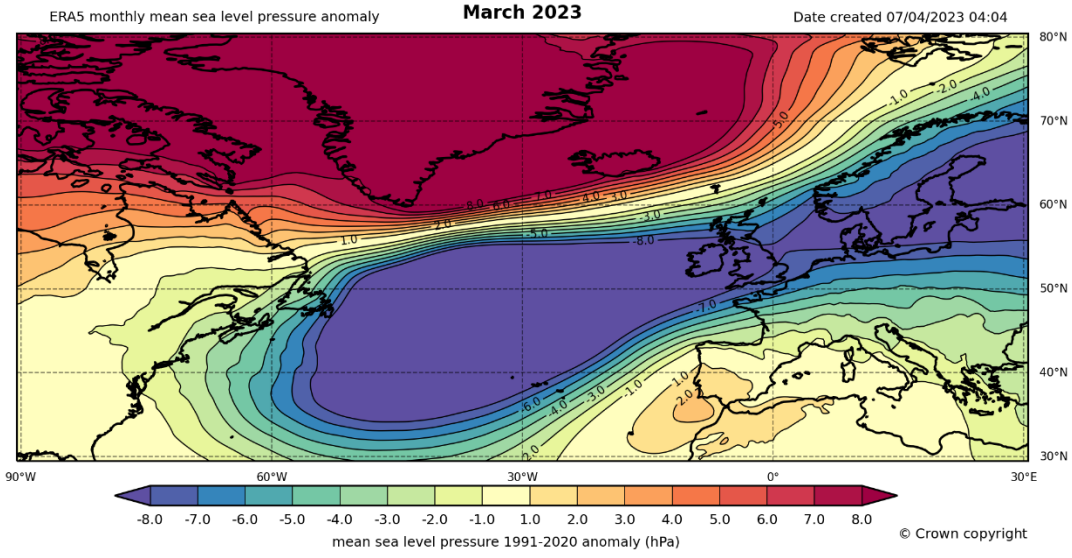
Monthly atmospheric circulation

Mean sea level pressure

These charts show the monthly mean sea level pressure for March 2023 for the UK and north Atlantic, based on the ERA5 reanalysis (Hersbach et al, 2019), both as actual values and as an anomaly relative to the March long term average. These charts provide an indication of the weather characteristics of the month overall i.e. whether the weather type has been generally settled (high pressure) or unsettled (low pressure) during the month.

Mean monthly sea-level: The Icelandic low was displaced to the south of its usual position, with high pressure over Greenland and a ridge over the Iberian peninsula. Pressure over the UK was lower than usual.

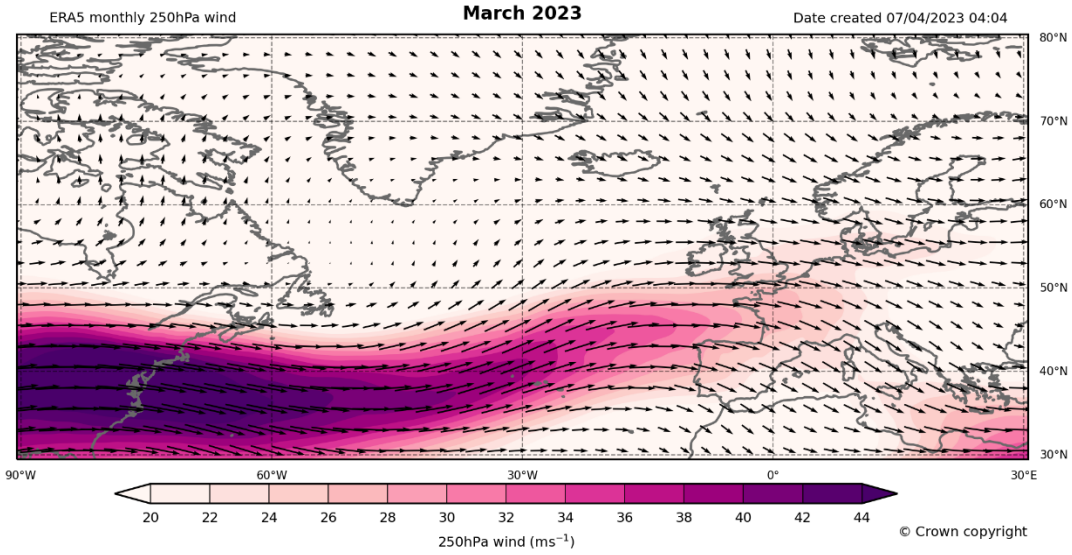


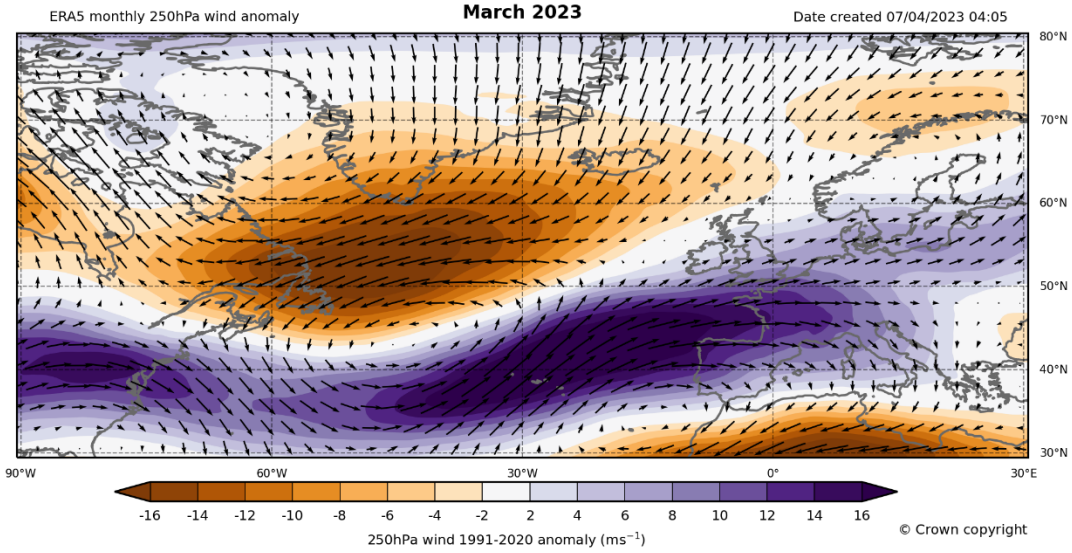


250hPa wind speed and direction

These charts show the monthly 250hPa wind speed and direction for March 2023 for the UK and north Atlantic, based on the ERA5 reanalysis (Hersbach et al, 2019), both as actual values and as an anomaly relative to the March long term average. This provides an indication of the mean strength and position of the jet stream compared to normal. The wind anomaly map shows shaded (scalar) wind speed anomalies with arrows as (vector) wind anomalies.

The jetstream was displaced to the south of its usual track, and was also weaker than usual over the European region.





Weather diary

- **Cold and dry early in the month, mild but very wet second half**

With high pressure centred to the north of the UK from the 1st to the 9th, winds were predominantly from the north or northeast, with daytime temperatures being restrained in single figures, and overnight values falling on occasions to well below freezing across all nations. Most notably, on the 8th and 9th, Altnaharra in Sutherland recorded a maximum of -2.4°C and a minimum of -16.0°C respectively.

The first sign of a change took place around the 9th as high pressure drifted away towards Greenland and was replaced with a series of Atlantic depressions finally making inroads towards the UK. We lost the northerlies and started to experience westerlies or southwesterlies, and this was to be the pattern for almost the rest of the month. Maximum temperatures exceeded 16°C at times across all nations, with Santon Downham in Norfolk reaching 17.8°C on the 30th.

However, with the higher temperatures also came the rain. Several bands of rain crossed the country on the 12th. Many sites recorded in excess of 50mm of rain in a 24-hour period, Honister Pass in Cumbria experiencing more than double that with 118.6mm. By the end of the month, dozens of stations across the UK had set new monthly totals.

Wind was a feature through the second half of the month as a succession of depressions crossed the British Isles. Apart from the 19th and 27th which saw conditions settle down briefly with transient ridges of high pressure, most days saw winds gusting in excess of 40mph. On the 21st, a particularly deep low pressure system centred just to the north of Ireland produced winds that gusted above 50mph especially around the coasts, and up to 82mph at Capel Curig in Gwynedd.

Notes

The Met Office National Meteorological Library and Archive holds a near-continuous record of monthly weather reports from 1884, and this report forms a continuation of that series. The purpose of each report is to provide an overview of the weather conditions across the UK for that month. The emphasis is mainly based on observations from the surface network of weather stations. Climate series based on from data from these stations are used to provide long term context.

This summary was produced on 11/04/2023 12:34. The statistics are a provisional assessment of the observational data available at the time of production. Ongoing data receipt and quality assurance processes may result in subsequent updates to the statistics presented.

If you have any questions or feedback about this product, spot any data errors or omissions, or wish to obtain further data, please contact the Met Office.

For historical monthly weather reports please visit the Library and Archive.

- The land-surface observations presented in this report are from the Met Office official weather station network which includes both automatic weather stations and manual climate stations operated by volunteer observers. Rainfall data are from the official registered rain-gauge network which includes rain-gauges operated by a number of key partners including the Environment Agency, Scottish Environmental Protection Agency and Northern Ireland Water.
- The observations are carefully managed such that they conform to current best-practice observational standards as defined by the World Meteorological Organization (WMO). The observations also pass through a range of quality assurance procedures at the Met Office before application for climate monitoring.
- Daily and monthly maps, monthly statistics and monthly time-series are primarily based on the HadUK-Grid dataset of 1km resolution UK gridded climate data (Hollis et al, 2019). Monthly statistics from the monthly Central England temperature series 1659 (Manley, 1974) and England and Wales precipitation series from 1766 (Wigley et al, 1984) provide long term context.
- The monthly lightning activity map is based on data from the Met Office ATDnet (Arrival Time Difference Network) system. This is an automatic lightning location network comprising around ten lightning outstation sensors located across Europe.
- The monthly maps of mean sea level pressure and 250hPa wind speed and direction are based on the ERA5 reanalysis (Hersbach et al, 2019). ERA5 is the fifth generation ECMWF reanalysis for the global climate and weather for the past 4 to 7

decades. Reanalysis combines model data with observations from across the world into a globally complete and consistent dataset using the laws of physics.

Hersbach, H., Bell, B., Berrisford, P., Biavati, G., Horányi, A., Muñoz Sabater, J., Nicolas, J., Peubey, C., Radu, R., Rozum, I., Schepers, D., Simmons, A., Soci, C., Dee, D., Thépaut, J-N. (2019): ERA5 monthly averaged data on single levels from 1959 to present. Copernicus Climate Change Service (C3S) Climate Data Store (CDS). https://doi.org/10.24381/cds.f17050d7

Hollis, D, McCarthy, MP, Kendon, M, Legg, T, Simpson, I. HadUK-Grid - A new UK dataset of gridded climate observations. Geosci Data J. 2019; 6: 151-159. https://doi.org/10.1002/gdj3.78

Manley, G. (1974), Central England temperatures: Monthly means 1659 to 1973. Q.J.R. Meteorol. Soc., 100: 389-405. https://doi.org/10.1002/qj.49710042511

Wigley, T.M.L., Lough, J.M. and Jones, P.D. (1984), Spatial patterns of precipitation in England and Wales and a revised, homogeneous England and Wales precipitation series. J. Climatol., 4: 1-25. https://doi.org/10.1002/joc.3370040102