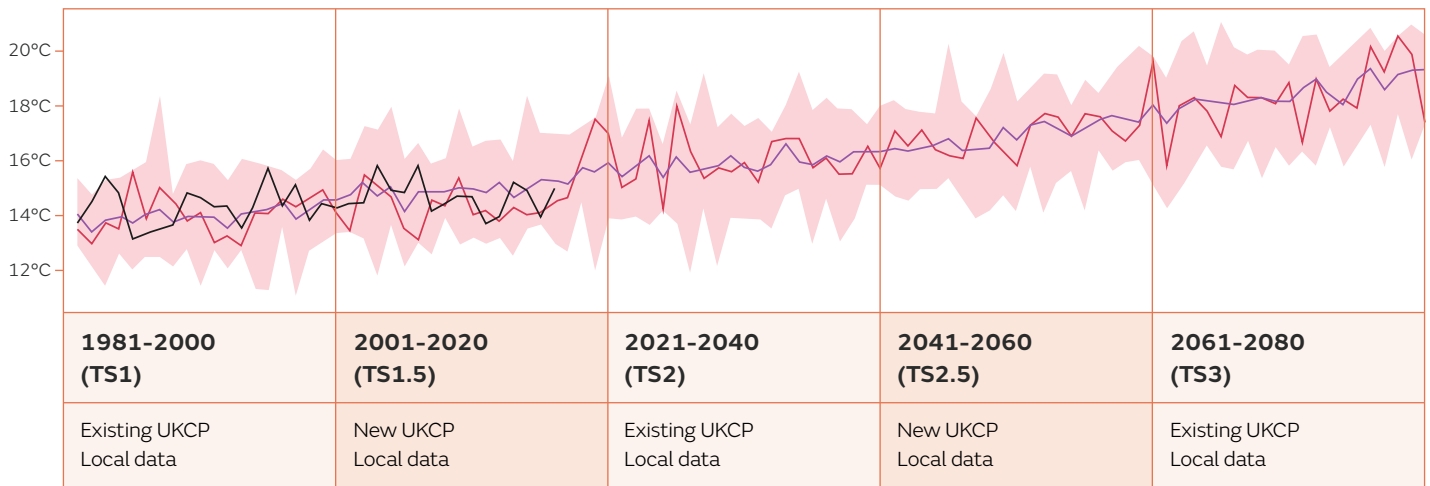


# UKCP Local Transient projections – FAQs

## What is UKCP Local and why has it been updated?

The UKCP Local projections are the highest resolution product available through the UK Climate Projections (UKCP). They are generated using a km-scale (“convection-permitting”) model that is able to better represent the small-scale behaviour seen in the atmosphere, in particular atmospheric convection – a key process driving many of our extreme weather events. Due to the high spatial resolution, compared to more traditional climate models, it also represents better the influence of mountains, coastlines and urban areas. As such the UKCP Local (2.2km) data are useful for impacts assessments that require enhanced spatial detail or information on changes in extreme weather at local and hourly timescales.

The initial UKCP Local (2.2km) projections that were released in September 2019 and updated in July 2021 provided data for three 20-year periods (1981-2000, 2021-2040 and 2061-2080). The latest update provides additional transient projections for the two time periods 2001-2020 and 2041-2060. UKCP Local now consists of a continuous 100-year dataset spanning historical, present and future climate.



The 100-year simulations, hereafter “UKCP Local Transient”, provide access to credible information on how climate change may impact extremes of weather for your local area over the coming years out to 2080. They provide a set of plausible outcomes for any given year, which is expected to be valuable to urban planners, local authorities and flood management practitioners for adaptation planning. However, it is important to note that they sample a narrower uncertainty range than the UKCP Probabilistic, Global and Probabilistic Extremes products that offer alternative sources of information for UK impacts and provide wider context on large-scale drivers and/or a more comprehensive sampling of uncertainty.

## Have the data in the original UKCP-local datasets changed?

Data is available from the [UKCP User Interface](#) or from the [CEDA archive](#). The User Interface (UI) allows users to download datasets, including UKCP Local projections regridded to the 5km Ordnance Survey National grid, and to plot graphs and maps for the UK. Some datasets are not available via the UI, such as the raw 2.2km UKCP Local projections. These instead are available for download from CEDA. The CEDA archive contains the following UKCP Local datasets:

1. UKCP Local projections at 2.2km resolution for 1980-2080
2. UKCP Local projections by Administrative Regions over the UK for 1980-2080
3. UKCP Local Projections for UK Countries for 1980-2080
4. UKCP Local Projections by UK River Basins for 1980-2080
5. UKCP Local projections on a 5km grid over the UK for 1980-2080

Data from the additional time-slices will be added to the existing CEDA entries, but with an update to the dataset description, making it clear that the entries now relate to the full UKCP Local Transient projections.

The 2.2km raw data are on a rotated pole grid, whilst the 5km regridded data are on the Ordnance Survey National grid (OSGB). The data are also available for three types of aggregated areas: country regions, administrative regions and river basin regions. We note that UKCP Local (2.2km) data over the Shetland Isles are not reliable due to its proximity to the northern boundary of the model domain and should not be used. We do not include these grid cells in calculating regional averages.

For more information on accessing UKCP data, including other UKCP18 products, please see the [UKCP Guidance document on Data availability, access and formats](#). All data is provided under the Open Government Licence.

## What should I be aware of when using the UKCP Local Transient data?

These data are subject to the same caveats and limitations as the existing UKCP Local data. These are described in the UKCP Local science report.

The following additional points should be noted that are not captured in existing UKCP Local guidance:

### 'Break points' between timeslices

The UKCP Local Transient projections have been generated by joining five 20-year simulations, for each ensemble member. As a result, there is a break in the timeseries at 00:00 on the 1st December of the following years 2000, 2020, 2040 and 2060. For almost all analyses, this should not cause a problem – for example, it is fine to look at trends in seasonal metrics through time. However, care is needed where users are interested in measures of persistence or correlations between different times, as in this case it is important to exclude values that span the break points.

### Unphysical data points

A very small number of unphysical hourly rainfall and temperature values have been identified in the UKCP Local data at the raw 2.2km scale. For example, hourly rainfall values in excess of 100mm/h, and up to 170mm/h in very rare cases, occur in individual grid boxes with values in surrounding grid boxes showing

much lower values. However, these unphysical localised values are very rare and are only apparent when considering such an extreme metric as the maximum seasonal value anywhere in the UK at the local scale. For other analyses, the impact of these rare unphysical values will be negligible.

Further details of these issues and recommendations for how to address them can be found in the [UKCP Local Transient science report](#) (Kendon et al., 2023).

There are several cases where the enhanced spatial detail of the UKCP Local 2.2km data offer added value over the coarser resolution UKCP Regional 12km data. These include:

- extreme rainfall in the summer
- hail and lightning
- extreme wind-storms (specifically 'sting jets')
- analysis of sub-daily data
- heat and rainfall extremes in urban areas
- mean rainfall in winter (see Kendon et al., 2020)

Further details of these cases, and others, can be found in the [UKCP Local Factsheet](#) and the [UKCP-local science report](#).

However, the benefits of the higher temporal and spatial resolution of the UKCP Local data should also be weighed against other considerations, including:

- UKCP Regional 12km can be assessed alongside the wider EURO-CORDEX 12km dataset to capture a wider range of model uncertainty that comes from climate models from different modelling centres.
- The data processing requirements of using UKCP Local are large and UKCP Regional offers a more manageable solution.
- UKCP Local data should not be used over the Shetland islands, as they are too close to the model boundary for the data to be reliable; we recommend that UKCP Regional 12km data are used instead.

UKCP Regional 12km provides data over the wider European region, in addition to the UK.

Further guidance on which UKCP product(s) to choose and how to use them in combination is available in the [UKCP18 Guidance: How to use the UKCP18 Land Projections](#).

## Where can I read more about UKCP Local projections?

### UKCP Local Transient projections:

Kendon et al., (2023) UK Climate Projections: [UKCP Local \(2.2km\) Transient Projections: Technical Report](#) – Includes details of the evaluation of the UKCP Local Transient, examples of their application and guidance on their use.

Kendon, E.J., E.M. Fischer and C.J. Short (2023) Variability conceals emerging trend in 100yr projections of UK local hourly rainfall extremes, Nature Comms

### Broader context:

[UKCP local factsheet](#): Covering: Introduction to “convection-permitting” climate models which underpin the local projections; Providing additional advice on how to use the local projections alongside other UKCP products; Highlighting useful information from the UKCP local Science Report and other sources which could inform your use of the data.

[UKCP-local science report](#): Further technical and scientific details on the UKCP Local projections, updated in July 2021.

[UKCP18 Guidance: How to use the UKCP18 Land Projections](#). Broader guidance on the use of UKCP Land projections products, including which UKCP product(s) to choose and how to combine them.

Kendon et al. (2020) Greater future UK winter precipitation increase in new convection-permitting scenarios. J Climate. DOI: 10.1175/JCLI-D-20-0089.1