

HadCET v2.0.0.0

Release Notes, May 2022

Purpose

This document summarises changes in a revised version of the HadCET dataset published in early May 2022.

Background and aims

The development of the HadCET dataset is described in Parker et al., (1992, hereafter P92). Since the original development of HadCET the dataset has adopted two station selection changes, with Stonyhurst (Lancashire) replacing the combination of Squires Gate and Ringway from November 2004, and Pershore College replacing Malvern in January 2006, and a real-time update process was developed in the early 2000s. The purpose of the update documented in this summary has been to:

1. Reduce the number of station changes in the dataset.
2. Improve the traceability and accessibility of the dataset.
3. Improve the management of the systems and code used to generate the dataset.

The following sections outline the changes that may have an impact on users of the data.

December 1786

Daily mean temperature for the month of December 1786 were described in P92 as originating from Hoy's Syon House (Kew) record, as there was a gap in the record of Thomas Barker's Lyndon Hall (Rutland) series due to a broken thermometer, for a series that otherwise spanned 1777-1789. However December 1786 had subsequently been replaced with the repeating monthly mean value of 2.8 °C derived from the original Gordon Manley series. For version 2.0.0.0 the daily mean temperature for December 1786 have reverted to the estimates from Syon House as described in P92.

Station Changes

In order to reduce the number of station selection changes in the historical period, two changes to the stations have been implemented in this version of HadCET, with Rothamsted replacing Cambridge for 1878-1930 (see also Parker & Horton, (2005, hereafter P05)), and Pershore College replacing Malvern from November 2004 to December 2005. The number of changes since 1878 has therefore reduced from five to three. The adjustment and homogenisation process for HadCET has been rerun which means that these changes can result in changes outside of the period they directly affect.

Table 1: Stations used for daily CET, 1853-present. For details on earlier stations used, and the handling of the original Manley series for monthly data please see P92 and P05.

	HadCET previous version	HadCET v2.0.0.0
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1853 to 1877	Oxford (Radcliffe) only	Oxford (Radcliffe) only
1878 to 1930	Cambridge, Ross-on-Wye, Stonyhurst	Rothamsted, Ross-on-Wye, Stonyhurst
1931 to 1958	Rothamsted, Ross-on-Wye, Stonyhurst	
1959 to Oct.2004	Rothamsted, Malvern, 0.5(Squires Gate + Ringway)	Rothamsted, Malvern, 0.5(Squires Gate + Ringway)
Nov.2004 to Dec.2005	Rothamsted, Malvern, Stonyhurst	Rothamsted, Pershore College, Stonyhurst
2006 to date	Rothamsted, Pershore College, Stonyhurst	

Daily Differences

The tables below summarise the differences between v2.0.0.0 and the previous published version, for the period from 1853 for mean temperature and from 1878 for maximum and minimum temperature. The largest changes occur in the periods relating to station changes 1878-1930 and November 2004 to December 2005 but are still within the expected uncertainty estimates for daily values provided in P05.

Table 2: Mean and RMSD between HadCET v2.0.0.0 and the previous version for daily mean temperature

Daily Mean Temperature	Mean Difference	Root Mean Square Difference
1853 to 1877	-0.003	0.081
1878 to 1930	0.0003	0.340
1931 to 1958	0.001	0.113
1959 to 1973	0.001	0.081
Jan 1974 to Oct 2004	-0.072	0.112
Nov 2004 to Dec 2005	-0.024	0.313
2006 to 2021	0.036	0.104

Table 3: As table 2 for daily maximum temperature

Daily Maximum Temperature	Mean Difference	Root Mean Square Difference
1878 to 1930	0.021	0.343
1931 to 1958	0.002	0.116
1959 to 1973	0.014	0.106
Jan 1974 to Oct 2004	-0.0028	0.141
Nov 2004 to Dec 2005	-0.031	0.393
2006 to 2021	0.012	0.118

Table 4: As table 2 for daily minimum temperature

Daily Minimum Temperature	Mean Difference	Root Mean Square Difference
1878 to 1930	-0.024	0.343
1931 to 1958	-0.005	0.117
1959 to 1973	-0.008	0.128

Jan 1974 to Oct 2004	-0.103	0.150
Nov 2004 to Dec 2005	-0.025	0.407
2006 to 2021	0.060	0.131

Monthly Differences

The tables below summarise the difference between v2.0.0.0 and the previous published version. The monthly series are adjusted to match the original Manley series up to 1974, so the change in station selection in the earlier period has little impact, and the largest changes are in the period post-1974, but are rarely more than a few tenths different and within the expected uncertainty estimates published by P05.

Table 5: Mean and RMSD between HadCET v2.0.0.0 and the previous version for monthly mean temperature

Monthly Mean Temperature	Mean Difference	Root Mean Square Difference
1659 to 1973	-0.0002	0.009
Jan 1974 to Oct 2004	-0.07	0.121
Nov 2004 to Dec 2005	-0.033	0.115
2006 to 2021	0.032	0.104

Table 6: As table 5 for monthly maximum temperature

Monthly Maximum Temperature	Mean Difference	Root Mean Square Difference
1878 to 1973	0.01	0.04
Jan 1974 to Oct 2004	-0.033	0.122
Nov 2004 to Dec 2005	-0.017	0.187
2006 to 2021	0.014	0.114

Table 7: As table 5 for monthly minimum temperature

Monthly Minimum Temperature	Mean Difference	Root Mean Square Difference
1878 to 1930	-0.014	0.05
Jan 1974 to Oct 2004	-0.106	0.147
Nov 2004 to Dec 2005	0.0	0.153
2006 to 2021	0.053	0.138

File Formats

The file structure for the data have been modified to improve the useability of the data. Details can be found on the data download page.

Version numbering

In order to facilitate better tracking of corrections or amendments to this dataset a version numbering system has been adopted, consistent with other Hadley Centre observational datasets. The version numbering for the dataset follows a pattern x.y.z.θ where:

- X reflects a major update to the whole dataset.
- Y reflects a minor update to components of the dataset.
- Z reflects an incremental change.
- θ is reserved for identifying provisional data or versions of the dataset under development.

References

- Parker, D. E., Legg, T. P., & Folland, C. K. (1992). A new daily central England temperature series, 1772–1991. *International Journal of Climatology*, 12(4), 317–342. <https://doi.org/10.1002/joc.3370120402>
- Parker, D., & Horton, B. (2005). Uncertainties in central England temperature 1878-2003 and some improvements to the maximum and minimum series. *International Journal of Climatology*, 25(9), 1173–1188. <https://doi.org/10.1002/joc.1190>