Met Office Hadley Centre observations datasets

> Home > HadCRUT4 >

HadCRUT4 Data: download

The HadCRUT4 near surface temperature data set is produced by blending data from the CRUTEM4 surface air temperature dataset and the HadSST3 sea-surface temperature dataset. Gridded data and regional time series for HadCRUT4 can be downloaded from this page. Diagrams from the HadCRUT4 paper can be found here.

All users are strongly encouraged to read the HadCRUT4 paper before using the data. Commonly asked questions about the HadCRUT4 data are answered in the HadCRUT4 FAQ.

Version information

Release notes for the current version (HadCRUT.4.5.0.0) can be found here. Previous versions of HadCRUT4 can be found here.

HadCRUT4 time series: ensemble medians and uncertainties

The following files contain time series derived from the HadCRUT4 grids for selected regions. These 'best estimate' series are computed as the medians of regional time series computed for each of the 100 ensemble member realisations. Time series are presented as temperature anomalies (deg C) relative to 1961-1990. The data are provided in the file format described here.

Quoted uncertainties are computed by integrating across the distribution described by the 100 ensemble members, together with additional uncertainties described in the HadCRUT4 paper that result from measurement and sampling error and coverage uncertainty. Gridded data for the HadCRUT4 ensemble members and measurement and sampling uncertainties can be found later on this page.

Series (file format)	Monthly	Annual	Decadally smoothed*
Global (NH+SH)/2	monthly	annual	decadally smoothed
Northern hemisphere	monthly	annual	decadally smoothed
Southern hemisphere	monthly	annual	decadally smoothed
Tropics (30 deg S to 30 deg N)	monthly	annual	decadally smoothed

*Decadally smoothed series are filtered to remove variability on time scales of less than a decade. These series are computed by application of a 21 point binomial filter to annual time series.

HadCRUT4 time series: ensemble members

The following time series are monthly, annual and decadally smoothed series for each ensemble member of the HadCRUT4 ensemble. The data are provided in the file format described here.

Additional quoted uncertainties are estimates of measurement and sampling uncertainty and of uncertainty in global and regional averages with incomplete regional coverage. These additional uncertainties are identical for all ensemble members.

Ensemble series (file format)	Monthly	Annual	Decadally smoothed*
Global (NH+SH)/2	monthly	annual	decadally smoothed
Northern hemisphere	monthly	annual	decadally smoothed
Southern hemisphere	monthly	annual	decadally smoothed
Tropics (30 deg S to 30 deg N)	monthly	annual	decadally smoothed

*Decadally smoothed series are filtered to remove variability on time scales of less than a decade. These series are computed by application of a 21 point binomial filter to annual time series.

HadCRUT4 Gridded data: ensemble members

HadCRUT4 is presented as an ensemble data set in which the 100 ensemble members sample the distribution of the systematic component of observational uncertainty described by the HadCRUT4 uncertainty model. These ensemble members are provided to allow users to assess the sensitivity of their analyses to uncertainties in the observational data set with long term correlation structures. For more details please read the HadCRUT4 and HadSST3 papers.

The data are available in two formats: either as a set of compressed plain text files in this data format, or as a set of NetCDF files.

Variable	As compressed text (file format)	As compressed NetCDF (NetCDF format)

Ensemble members 1-10	HadCRUT.4.5.0.0.anomalies.1_to_10_ascii.zip	HadCRUT.4.5.0.0.anomalies.1_to_10_netcdf.zip
Ensemble members 11-20	HadCRUT.4.5.0.0.anomalies.11_to_20_ascii.zip	HadCRUT.4.5.0.0.anomalies.11_to_20_netcdf.zip
Ensemble members 21-30	HadCRUT.4.5.0.0.anomalies.21_to_30_ascii.zip	HadCRUT.4.5.0.0.anomalies.21_to_30_netcdf.zip
Ensemble members 31-40	HadCRUT.4.5.0.0.anomalies.31_to_40_ascii.zip	HadCRUT.4.5.0.0.anomalies.31_to_40_netcdf.zip
Ensemble members 41-50	HadCRUT.4.5.0.0.anomalies.41_to_50_ascii.zip	HadCRUT.4.5.0.0.anomalies.41_to_50_netcdf.zip
Ensemble members 51-60	HadCRUT.4.5.0.0.anomalies.51_to_60_ascii.zip	HadCRUT.4.5.0.0.anomalies.51_to_60_netcdf.zip
Ensemble members 61-70	HadCRUT.4.5.0.0.anomalies.61_to_70_ascii.zip	HadCRUT.4.5.0.0.anomalies.61_to_70_netcdf.zip
Ensemble members 71-80	HadCRUT.4.5.0.0.anomalies.71_to_80_ascii.zip	HadCRUT.4.5.0.0.anomalies.71_to_80_netcdf.zip
Ensemble members 81-90	HadCRUT.4.5.0.0.anomalies.81_to_90_ascii.zip	HadCRUT.4.5.0.0.anomalies.81_to_90_netcdf.zip
Ensemble members 91-100	HadCRUT.4.5.0.0.anomalies.91_to_100_ascii.zip	HadCRUT.4.5.0.0.anomalies.91_to_100_netcdf.zip

HadCRUT4 Gridded data: measurement and sampling uncertainties

Measurement and grid box sampling uncertainties are not encoded into the HadCRUT4 ensemble members. Measurement and sampling uncertainties related to land and sea observations have different correlation structures and so are provided in separate files.

Measurement and sampling uncertainties describe the combination of basic measurement uncertainty and uncertainties in estimating average grid box anomalies from limited spatial sampling of temperatures within a grid box. Measurement and sampling uncertainties related to land observations have no spatial or temporal correlation structure.

Covariance matrices for HadCRUT4 are derived from the measurement and sampling uncertainty model of HadSST3. These describe correlated uncertainties between grid box anomalies where multiple boxes are observed by any given observing platform (e.g. a ship or drifting buoy) in a month as the platform moves from grid box to grid box. For HadCRUT4, cross covariance values of the HadSST3 measurement and sampling errors are weighted appropriately in coastal regions for grid boxes where anomalies are constructed from both land and sea observations. We strongly recommend that dataset users refer to the HadCRUT4 paper and part one of the HadSST3 paper for detailed information about these uncertainties before making use of them in their studies.

Variable	As compressed text (file format)	As compressed NetCDF (NetCDF format)
Fully uncorrelated uncertainties	HadCRUT.4.5.0.0.uncorrelated_ascii.zip	HadCRUT.4.5.0.0.uncorrelated_netcdf.zip
Error covariance matrices 1850 to 1859	Not available	HadCRUT.4.5.0.0.covariance.1850_to_1859.zip
Error covariance matrices 1860 to 1869	Not available	HadCRUT.4.5.0.0.covariance.1860_to_1869.zip
Error covariance matrices 1870 to 1879	Not available	HadCRUT.4.5.0.0.covariance.1870_to_1879.zip
Error covariance matrices 1880 to 1889	Not available	HadCRUT.4.5.0.0.covariance.1880_to_1889.zip
Error covariance matrices 1890 to 1899	Not available	HadCRUT.4.5.0.0.covariance.1890_to_1899.zip
Error covariance matrices 1900 to 1909	Not available	HadCRUT.4.5.0.0.covariance.1900_to_1909.zip
Error covariance matrices 1910 to 1919	Not available	HadCRUT.4.5.0.0.covariance.1910_to_1919.zip

Error covariance matrices 1920 to 1929	Not available	HadCRUT.4.5.0.0.covariance.1920_to_1929.zip
Error covariance matrices 1930 to 1939	Not available	HadCRUT.4.5.0.0.covariance.1930_to_1939.zip
Error covariance matrices 1940 to 1949	Not available	HadCRUT.4.5.0.0.covariance.1940_to_1949.zip
Error covariance matrices 1950 to 1959	Not available	HadCRUT.4.5.0.0.covariance.1950_to_1959.zip
Error covariance matrices 1960 to 1969	Not available	HadCRUT.4.5.0.0.covariance.1960_to_1969.zip
Error covariance matrices 1970 to 1979	Not available	HadCRUT.4.5.0.0.covariance.1970_to_1979.zip
Error covariance matrices 1980 to 1989	Not available	HadCRUT.4.5.0.0.covariance.1980_to_1989.zip
Error covariance matrices 1990 to 1999	Not available	HadCRUT.4.5.0.0.covariance.1990_to_1999.zip
Error covariance matrices 2000 to 2009	Not available	HadCRUT.4.5.0.0.covariance.2000_to_2009.zip
Error covariance matrices 2010 to 2019	Not available	HadCRUT.4.5.0.0.covariance.2010_to_2019.zip

HadCRUT4 Gridded data: additional fields

In addition to the HadCRUT4 ensemble a median file is available that contains fields of the median anomaly from the 100 ensemble members in each grid box. The 100 member HadCRUT4 ensemble has been constructed to allow exploration of the sensitivity of scientific analyses to the estimated observational bias uncertainties. If only the median is used it will not be possible to explore the sensitivity to these uncertainties.

Variable	As compressed text (file format)	As compressed NetCDF (NetCDF format)
Ensemble median	HadCRUT.4.5.0.0.median_ascii.zip	HadCRUT.4.5.0.0.median_netcdf.zip

The following files contain fields of HadCRUT4 measurement and sampling uncertainties related to SST observations without any description of correlations between grid boxes. The uncertainties presented in these files are the square root of the leading diagonal of the HadCRUT4 error covariance matrices mapped onto 5x5 degree latitude/longitude grids and are included as supplementary information for users that do not require the full error covariance matrices. These fields can be combined with the fully uncorrelated uncertainty fields resulting from land grid box uncertainties by addition of the two sets of fields in quadrature.

Variable	As compressed text (file format)	As compressed NetCDF (NetCDF format)
Square root of error covariance diagonals	HadCRUT.4.5.0.0.uncorrelated_supplementary_ascii.zip	HadCRUT.4.5.0.0.uncorrelated_supplementary_netcdf.zip

Commercial and media enquiries

You can access the Met Office Customer Centre, any time of the day or night by phone, fax or e-mail. Trained staff will help you find the information or products that are right for you.
Contact the Met Office Customer Centre

Maintained by: Colin Morice
Last updated: 15/09/2016
Hosted by: Met Office Hadley Centre