

Surface Temperature

ESSENTIAL CLIMATE VARIABLE (ECV)
FACTSHEET



ECV IN BRIEF

Domain: Atmosphere
Subdomain: Surface
Scientific Area: Energy and Temperature
ECV Stewards: Philipp Jones, Elizabeth Kent
Products: Temperature



Surface Temperature

Surface air temperature has profound and widespread impacts on both natural systems and on human lives and activities. It affects health, agriculture, energy demand and much more. Extremes of surface air temperature, both heat waves and extreme cold periods, are particular important for human health. Surface air temperature provides a key indicator of climate change, contributing to the “global surface temperature record”. A goal of limiting changes in global surface temperature provides the measure for the Paris climate agreement.

ECV Product¹

PRODUCT	REQUIREMENTS				
	FREQUENCY	RESOLUTION	REQUIRED MEASUREMENT UNCERTAINTY	STABILITY	REFERENCES
TEMPERATURE	Hourly; Daily Tx/Tn	Site	0.1K	0.02K/decade	AOPC

Data Sources²

Gridded In Situ Data:

- ▶ Berkeley Earth Surface Temperature
www.berkeleyearth.org
- ▶ Climatic Research Unit (CRU) land surface air temperature data set (CRUTEM4)
<https://www.metoffice.gov.uk/hadobs/crutem4/>
- ▶ GISS Surface Temperature Analysis (GISTEMP)

¹ Current Products and Requirements as in the Implementation Plan 2016 (GCOS-200). GCOS is reviewing and will update the requirements as part of their contribution to the UNFCCC Global Stocktake. More information on: climatedata.wmo.int.

² This list provides sources for openly accessible data sets with worldwide coverage for which metadata is available. It is curated by the respective GCOS ECV Steward(s) and reflects the status as of 10/2018. The list does not claim to be complete. Anyone with a suitable dataset who would like it to be added to this list should contact GCOS.



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<https://data.giss.nasa.gov/gistemp/>

- ▶ Gridded Temperature And Precipitation Climate Extremes Indices (Climdex Data)
<http://www.climdex.org/datasets.html>
- ▶ Gridded Night Marine Air Temperature (HadNMAT2) Global Temperature
<https://www.metoffice.gov.uk/hadobs/hadnmat2/>
- ▶ Hadley Centre Climatic Research Unit global historical surface temperature (HadCRUT4)
<https://www.metoffice.gov.uk/hadobs/hadcrut4/>
- ▶ Japan Meteorological Agency (JMA) Global Temperature
https://ds.data.jma.go.jp/tcc/tcc/products/gwp/temp/ann_wld.html
- ▶ National Oceanic and Atmospheric Administration (NOAA) Global Temperature
<https://www.ncdc.noaa.gov/data-access/marineocean-data/noaa-global-surface-temperature-noaaglobaltemp>

In Situ Data:

- ▶ Integrated Surface Database (ISD) of the National Centers for Environmental Information (NCEI) of the National Oceanic and Atmospheric Administration (NOAA)
<https://www.ncdc.noaa.gov/isd/data-access>
- ▶ Global Historical Climatology Network Daily (GHCN-Daily) of the National Centers for Environmental Information (NCEI) of the National Oceanic and Atmospheric Administration
<https://data.noaa.gov/dataset/global-historical-climatology-network-daily-ghcn-daily-version-3>
- ▶ Hadley Centre Integrated Surface Database (HadISD)
<https://www.metoffice.gov.uk/hadobs/hadisd/>
- ▶ International Comprehensive Ocean-Atmosphere Data Set (ICOADS)
<https://rda.ucar.edu/datasets/ds548.0/>
- ▶ International Surface Temperature Initiative (ISTI)
<http://www.surface temperatures.org/>

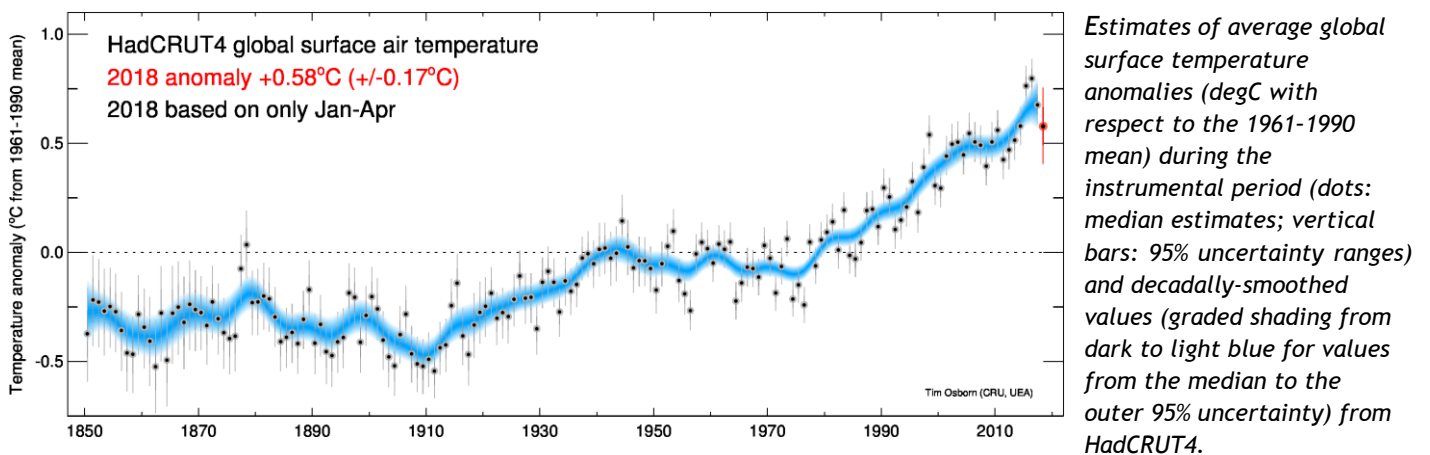
Reanalysis:

- ▶ REANALYSES.ORG (Inventory for Reanalysis)
<http://reanalyses.org>

Satellite:

- ▶ Satellite ECV Inventory by the CEOS/CGMS Working Group on Climate (WGClimate)
<http://climatemonitoring.info/ecvinventory>

Global Surface Air Temperature



Source: Tim Osborn (CRU, UEA), <https://crudata.uea.ac.uk/-timo/diag/tempdiag.htm>. HadCRUT4 data: Morice CP, Kennedy JJ, Rayner NA and Jones PD (2012) Quantifying uncertainties in global and regional temperature change using an ensemble of observational estimates: the HadCRUT4 dataset. Journal of Geophysical Research, 117, D08101, doi:10.1029/2011JD017187.



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