

Surface Water Vapour

ESSENTIAL CLIMATE VARIABLE (ECV) FACTSHEET



ECV IN BRIEF

- Domain:** Atmosphere
- Subdomain:** Surface
- Scientific Area:** Hydrosphere
- ECV Stewards:** Elizabeth Kent, Philip Jones
- Products:** Water Vapour (Relative Humidity, Dew Point)



Surface Water Vapour

The humidity of air near the surface of the Earth affects the comfort and health of humans, livestock and wildlife, the swarming behaviour of insects and the occurrence of plant disease. The humidity near the surface affects evaporation and the strength of the hydrological and energy cycles. Evaporation from the surface of the earth is the source of water in the atmosphere and so is responsible for important feedbacks in the climate system due to clouds and radiation.

ECV Product¹

PRODUCT	DEFINITION	REQUIREMENTS				
		FREQ.	RES.	REQUIRED MEASUREMENT UNCERTAINTY	STABILITY	STANDARDS/ REFERENCES
Water Vapour (Relative Humidity)	Relative humidity at a known height above surface, with the height specified in the metadata. It is the ratio of the amount of atmospheric moisture present relative to the amount that would be present if the air were saturated with respect to water or ice to be specified in the metadata (%)	Hourly	Site	RH 1%	0.5%/decade	Kate Willet
Water Vapour (Dew Point)	Temperature to which air must be cooled to become saturated with water vapour at a known height above surface, with the height specified in the metadata (K)	Hourly	Site	DP 0.1K	0.02K/decade	Kate Willet

¹ Current Products and Requirements as in the Implementation Plan 2016 (GCOS-200). GCOS is reviewing and will update the requirements until 2022. More information on: gcos.wmo.int and climatedata.wmo.int.

Data Sources²

Gridded In Situ Data:

- ▶ HadCRUH – global marine and land surface humidity
<https://www.metoffice.gov.uk/hadobs/hadcruh/>
- ▶ National Oceanography Centre Southampton (NOCS) Version 2.0 Surface Flux
<https://rda.ucar.edu/datasets/ds260.3/>

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>
- ▶ Hadley Centre Integrated Surface Database (HadISD)
<https://www.metoffice.gov.uk/hadobs/hadis/>
- ▶ International Comprehensive Ocean-Atmosphere Data Set (ICOADS)
<https://rda.ucar.edu/datasets/ds548.0/>

Reanalysis:

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

Global Surface Specific Humidity

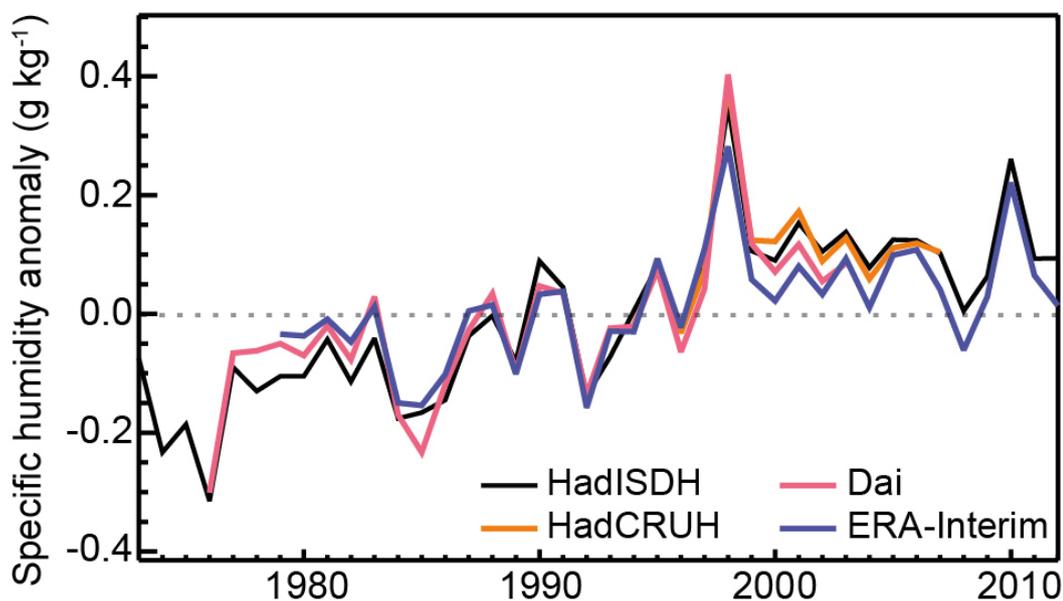


Figure: Global annual average anomalies in land surface specific humidity from Dai (2006; red), HadCRUH (Willett et al., 2013; orange), HadISDH (Willett et al., 2013; black), and ERA-Interim (Simmons et al., 2010; blue). Anomalies are relative to the 1979-2003 climatology.

Source: IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp, doi:10.1017/CBO9781107415324, Figure 2.30.

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). 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.