



## ECV IN BRIEF

**Domain:** Atmosphere  
**Subdomain:** Surface  
**Scientific Area:** Physical Properties  
**ECV Stewards:** Philip Jones, Elizabeth Kent  
**Products:** Surface Wind Speed and Direction



## Surface Wind Speed and Direction

Surface winds drive the exchange of momentum between the atmosphere and ocean, producing ocean waves and provides a key forcing of the ocean circulation responsible for the global transport of important amounts of heat and carbon. Extreme winds have huge social and economic impacts, most obviously during hurricanes and tropical cyclones, leading to loss of human life, damage to ecosystems, the destruction of infrastructure and loss of shipping.

### ECV Product<sup>1</sup>

PRODUCT	DEFINITION	REQUIREMENTS				
		FREQUENCY	RESOLUTION	REQUIRED MEASUREMENT UNCERTAINTY	STABILITY	STANDARDS/ REFERENCES
<b>Surface Wind Speed and Direction</b>	<b>Speed of air at a known height above the surface which is to be specified in the metadata (m/s). Direction from which wind is blowing at a known height above the surface which is to be specified in the metadata (degree true)</b>	3 hr	10km/NA	0.5m/s and mean quadratic statistics to 10% of the locally prevailing mean wind speed, for speed >20m/s	0.05m/s/decade	For stability: International Vector Winds Science Team Meeting (M.Bourassa)

<sup>1</sup> 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](http://gcos.wmo.int) and [climatedata.wmo.int](http://climatedata.wmo.int).



## Data Sources<sup>2</sup>

### 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/>
- ▶ Wave and Anemometer-based Sea Surface Wind (WASWind)  
<http://www.dpac.dpri.kyoto-u.ac.jp/tokinaga/waswind.html>

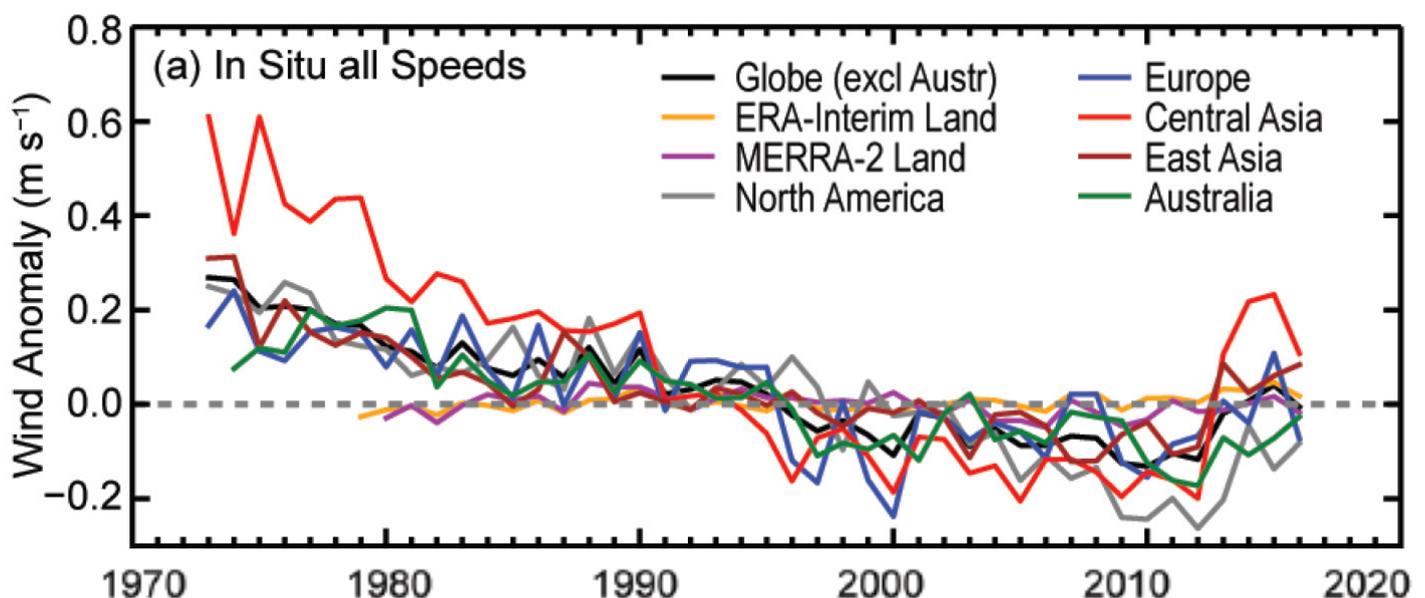
### Reanalysis:

- ▶ 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>

## Surface Wind Speed Trends



Estimates of Land surface wind speed anomalies ( $m s^{-1}$ ) for 1973–2016, relative to 1981–2010: HadISD2 for the globe (excluding Australia) and 4 regions; Australia (1974–2016) is based on an Australian dataset. ERA-interim (1979–2016) and MERRA-2 (1980–2016) anomalies, also shown, cover all land areas.

Source: Figure 2.37 (a) of Blunden, J., and D. S. Arndt, Eds., 2017: State of the Climate in 2016. Bull. Amer. Meteor. Soc., 98 (8), Si–S277, doi:10.1175/2017BAMSSStateoftheClimate.1.

<sup>2</sup> 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.



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