



**ECV IN BRIEF**

- Domain:** Terrestrial
- Subdomain:** Cryosphere
- Scientific Area:** Snow and Ice
- ECV Stewards:** Huilin Li
- Products:** Glacier Area  
Glacier Elevation Change  
Glacier Mass Change



Glacier changes provide independent and reliable evidence of climate change. Past, current and future glacier changes impact global sea level, the regional water cycle, and may increase local hazard risks.

**ECV Product<sup>1</sup>**

PRODUCT	DEFINITION	REQUIREMENTS				
		FREQUENCY	RESOLUTION	REQUIRED MEASUREMENT UNCERTAINTY	STABILITY	STANDARDS/ REFERENCES
<b>GLACIER AREA</b>	<b>Area covered by glaciers (per glacier)</b>	Annual (at end of ablation season)	Horizontal (at the end of the ablation period) 15-30 m	5%	na	IGOS (2009), Paul et al. (2009), Zemp et al. (2013)
<b>GLACIER ELEVATION CHANGE</b>	<b>2d map of change in height of surface of glacier</b>	Decadal	Horizontal 30-100 m x vertical 1 m	2 m/decade	1 m/decade	IGOS (2009), Paul et al. (2009), Zemp et al. (2013)
<b>GLACIER MASS CHANGE</b>	<b>Annual change in total mass of glacier (at the end of the ablation period)</b>	Seasonal to annual (the latter at end of ablation period)	Vertical: 0.01 m per 10 kg/m <sup>2</sup> (at point location)	Better than 200 kg/m <sup>2</sup> /year (glacier-wide)	na	IGOS (2009), Paul et al. (2009), Zemp et al. (2013)

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

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

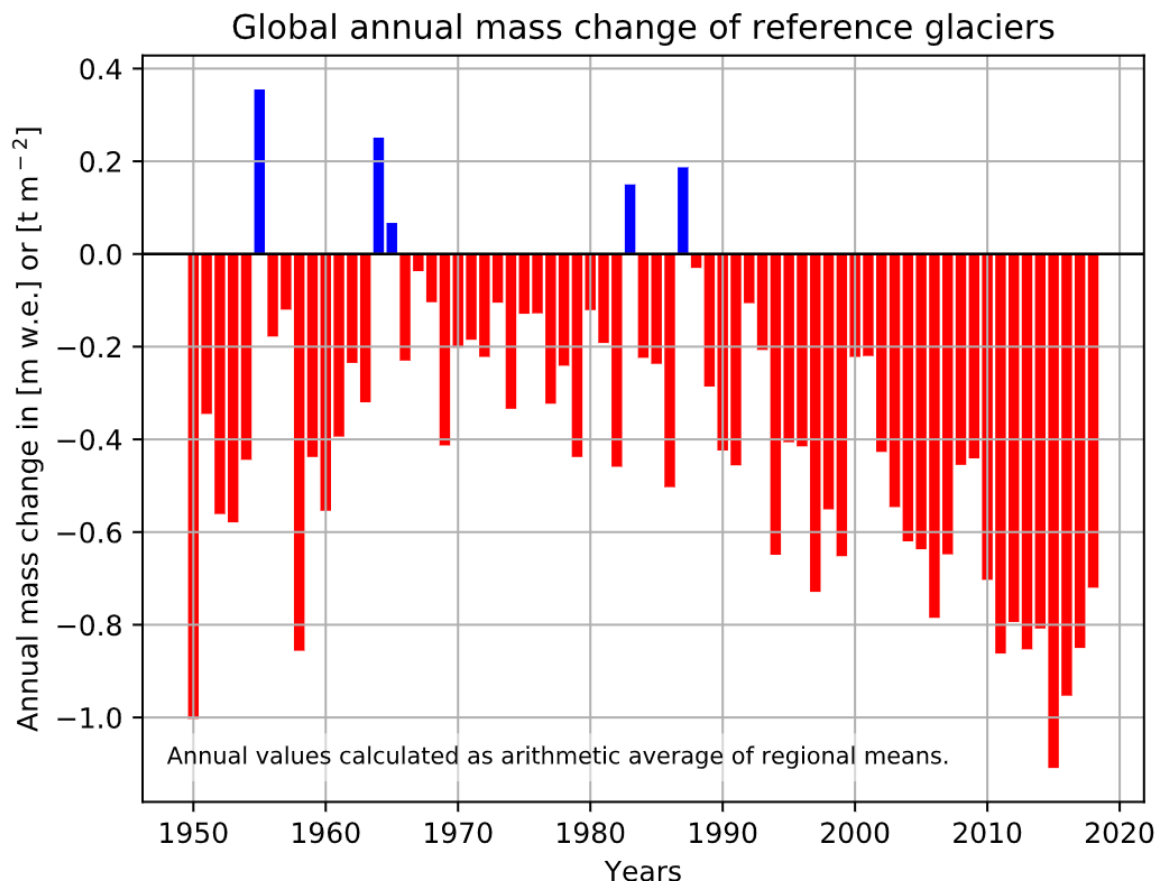
### In Situ Data:

- ▶ WGMS MetaData Browser and Data Access  
<http://wgms.ch/>
- ▶ Global Terrestrial Network for Glaciers (GTN-G) Data Explorer  
[http://www.gtn-g.org/data\\_catalogue\\_glims/](http://www.gtn-g.org/data_catalogue_glims/)
- ▶ Glacier Thickness Database (GlaThiDa)  
[https://www.gtn-g.ch/data\\_catalogue\\_glathida/](https://www.gtn-g.ch/data_catalogue_glathida/)

### Satellite:

- ▶ Satellite ECV Inventory by the CEOS/CGMS Working Group on Climate (WGClimate)  
<http://climatemonitoring.info/ecvinventory>
- ▶ GLIMS Glacier Database, NASA  
<http://glims.colorado.edu/glacierdata/>
- ▶ Randolph Glacier Inventory (RGI)  
<https://www.glims.org/RGI/>

## Change in Glacier Mass



Source : [https://wgms.ch/data/faq/\\_FAQ\\_RefGlac\\_Global\\_Annual\\_MB.svg](https://wgms.ch/data/faq/_FAQ_RefGlac_Global_Annual_MB.svg)

Source data: WGMS 2017. Global Glacier Change Bulletin No. 2 (2014-2015). Zemp, M., Nussbaumer, S. U., Gärtner-Roer, I., Huber, J., Machguth, H., Paul, F., and Hoelzle, M. (eds.), ICSU(WDS)/IUGG(IACS)/UNEP/UNESCO/WMO, World Glacier Monitoring Service, Zurich, Switzerland, 244 pp., publication based on database version: doi:10.5904/wgms-fog-2017-10. (And earlier reports)

<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) and reflects the status as of 01/2019. 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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