

Internationally coordinated glacier monitoring – a timeline since 1894

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Fluctuations of Glaciers (FoG) Front variations

Regular observations of horizontal changes in the position of the glacier terminus have been reported and published since the end of the 19th century. Today, more than 45,000 length change observations from about 2,500 glaciers are available throughout the world. Reconstructions of glacier front variations extend the observational record back to the 16th century.

Fluctuations of Glaciers (FoG) Mass balance

Glacier-wide mass balance measurements have been carried out since the 1940s. Today, mass balance data is available from about 400 glaciers worldwide. There are 40 mass balance programmes with continuous observation series since 1976 or earlier.

Fluctuations of Glaciers (FoG) Geodetic changes

Geodetic thickness or volume changes, as derived from terrestrial or remote sensing methods, are available for 460 glaciers worldwide.

World Glacier Inventory

A first approach to compile a World Glacier Inventory (WGI) was completed in 1989 (updated in 2012), mainly based on aerial photographs and maps, resulted in a dataset of point locations and attributes for over 130,000 glaciers with an overall area of 240,000 km², and preliminary estimates for the remaining ice cover.

GLIMS database & Randolph Glacier Inventory

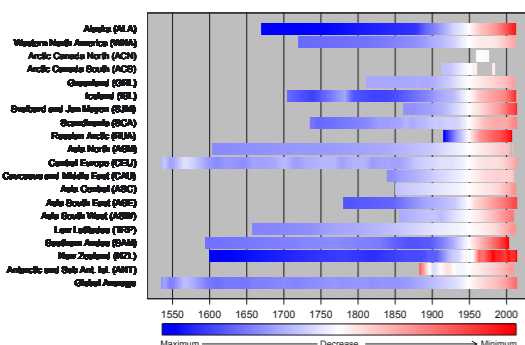
The Global Land Ice Measurements from Space (GLIMS) initiative was launched to continue the inventorying task with space-borne sensors storing glacier outlines (multi-temporal), attributes and provenance. At present, glacier inventory data are available for about 180,000 glaciers through the GLIMS database and the Randolph Glacier Inventory (RGI).

Glacier Photograph Collection (GPC)

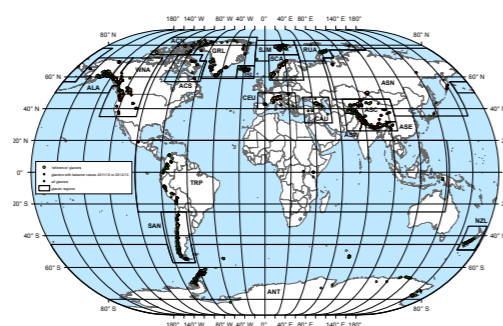
The Glacier Photograph Collection (GPC) contains more than 15,000 photographs from some 500 glaciers; photographs mostly from land and air; some repeat-photography. Those pictures, some of them dating back to the late 19th century, constitute an important historical record and valuable meta-data to the other scientific datasets.

Glacier Thickness Database (GlaThiDa)

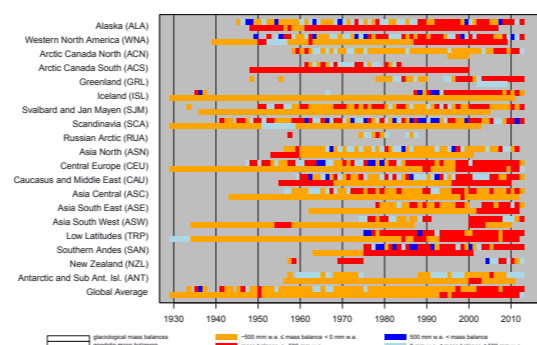
The Fluctuations of Glaciers (FoG) database is completed by specific index datasets, e.g. glacier thickness data, or special events including glacier surge events and glacier lake outburst floods (GLOFs).



Qualitative summary of cumulative mean annual front variations (FoG database)



Location of glaciers for which data is available in the FoG database



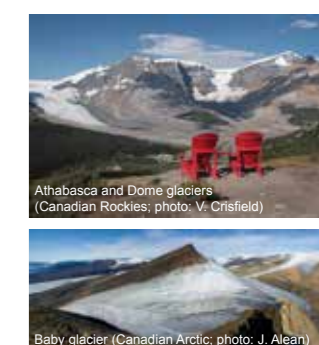
Regional mass balances (FoG database)



GLIMS glacier outlines and Randolph Glacier Inventory



Glacier photos are taken from the Glacier Photograph Collection.



1894 1927 1940s 1967 1975 1982 1986 1996 2009 2015 2016

Commission Internationale des Glaciers (CIG), 1894-1927

International Commission on Snow and Ice (ICSI), 1927-2007

Permanent Service on the Fluctuations of Glaciers (PSFG), 1967-1986

World Glacier Monitoring Service (WGMS), 1986 onwards

Global Terrestrial Network for Glaciers (GTN-G)



From the beginning...

Changes in glaciers and ice caps provide some of the clearest evidence of climate change and have impacts on global sea-level fluctuations, regional hydrological cycles and local natural hazard situations.

Internationally coordinated collection and distribution of standardized information about the state and change of glaciers and ice caps was initiated in 1894, with the periodic publication of compiled information on glacier fluctuations one year later (by F.-A. Forel).



... to a worldwide scientific collaboration network...

As a contribution to the Global Terrestrial/Climate Observing System (GTOS, GCOS), the Division of Early Warning and Assessment and the Global Environment Outlook of UNEP, and the International Hydrological Programme of UNESCO, the World Glacier Monitoring Service (WGMS) collects and publishes worldwide standardized glacier data. Thereby, the WGMS maintains a network of local investigators and National Correspondents in all countries involved in glacier monitoring.

The WGMS is a service of the International Association of the Cryospheric Sciences of the International Union of Geodesy and Geophysics (IACS, IUGG) as well as of the World Data System of the International Council for Science (WDS, ICSU) and works under the auspices of the United Nations Environment Programme (UNEP), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the World Meteorological Organization (WMO).

... to coordination through GTN-G

The Global Terrestrial Network for Glaciers (GTN-G) is jointly run by three operational bodies: the World Glacier Monitoring Service (WGMS), the US National Snow and Ice Data Center (NSIDC), and the Global Land Ice Measurements from Space (GLIMS) initiative. Since 2009, a GTN-G Steering Committee coordinates, supports and advises the operational bodies responsible for the international glacier monitoring.

Consistency and interoperability of the different glacier databases (FoG, WGI, GLIMS, GPC) are elaborated by joint efforts within the project's partners and network. Thereby, different historical developments and methodological contexts of the datasets are major challenges for linking individual glaciers throughout the databases.

GTN-G Global Glacier Browser

<http://www.gtn-g.org/>



Data access

All glacier fluctuation datasets are digitally available through the GTN-G website. All data and information is freely available for scientific and educational purposes under requirement of correct citation of the database or data source. In December 2015, the WGMS and UNESCO jointly launched a Glacier App for mobile devices:

