

## Unlocking the archive(s) of historical glacier fluctuation data

Glacier fluctuations are recognized as high-confidence indicators of climate change with impacts on global sea level, the regional water cycle, and the local hazard situation. Glacier changes over the past decades are well documented by in-situ and remotely sensed observations. Air- and space-borne data enabled a globally almost complete picture of glacier distribution. While the recent state of glaciers is scientifically well explored, the analysis of historical glacier fluctuations is challenged by limitations of the available data. Back in time, the data sample is subject to a decreasing size and an increasing regional bias towards Europe. Assessments of current versus past rates of change, acceleration trends, and variability require a stronger focus on the retrieval and mining of data related to past glacier fluctuations. As such, the large archives of satellite images have a great potential for retrieving information on glacier distribution and changes. Also, the scientific literature can be used for mining of glacier data not (yet) made available through the international data centres. In this presentation, we provide a brief overview of the spatio-temporal coverage of the available datasets from internationally coordinated glacier monitoring ([www.gtn-g.org](http://www.gtn-g.org)) and discuss three examples unlocking the archive of historical glacier fluctuations: (i) reconstruction of glacier extents from Little Ice Age moraines and trimlines based on satellite images of the Canadian Arctic and of West Greenland, (ii) reconstruction of glacier changes in length, area, and volume since the mid-19th century from historical maps of Zermatt, Switzerland, and (iii) reconstruction of glacier front variations back to the 16th century from pictorial and written sources in the French Alps.

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