

Accepted Manuscript

Historical analysis and visualization of the retreat of Findelengletscher, Switzerland, 1859-2010

P. Rastner, P.C. Joerg, M. Huss, M. Zemp

PII: S0921-8181(16)30069-8
DOI: doi: [10.1016/j.gloplacha.2016.07.005](https://doi.org/10.1016/j.gloplacha.2016.07.005)
Reference: GLOBAL 2450

To appear in: *Global and Planetary Change*

Received date: 25 February 2016
Revised date: 6 July 2016
Accepted date: 15 July 2016



Please cite this article as: Rastner, P., Joerg, P.C., Huss, M., Zemp, M., Historical analysis and visualization of the retreat of Findelengletscher, Switzerland, 1859-2010, *Global and Planetary Change* (2016), doi: [10.1016/j.gloplacha.2016.07.005](https://doi.org/10.1016/j.gloplacha.2016.07.005)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Historical analysis and visualization of the retreat of Findelengletscher, Switzerland, 1859-2010

P. Rastner¹, P.C. Joerg¹, M. Huss^{2,3}, M. Zemp¹

¹*Department of Geography, University of Zurich, Switzerland*

²*Department of Geosciences, University of Fribourg, Switzerland*

³*Laboratory of Hydraulics, Hydrology and Glaciology (VAW), ETH Zurich, Switzerland*

Corresponding author: Philipp Rastner (philipp.rastner@geo.uzh.ch)

Abstract

Since the end of the Little Ice Age around 1850 glaciers in Europe have strongly retreated. Thanks to early topographic surveys in Switzerland, accurate maps are available, which enable us to trace glacier changes back in time. The earliest map for all of Switzerland that is usable for a detailed analysis is the Dufour map from around 1850 with subsequent topographic maps on a ~20 year interval. Despite the large public and scientific interest in glacier changes through time, this historic dataset has not yet been fully utilized for topographic change assessment or visualization of historic glacier extents. In this study, we use eleven historical topographic maps and more recent digital datasets for the region of Zermatt to analyze geometric changes (length, area and volume) of Findelengletscher as well as for creating animations of glacier evolution through time for use in public communication. All maps were georeferenced, the contour lines digitized, and digital elevation models (DEMs) created and co-registered. Additional digital data like the SRTM X-band DEM and high resolution laser scanning data were used to extend the analysis until 2010. Moreover, one independent DEM from aerial photogrammetry was used for comparison. During the period

Download English Version:

<https://daneshyari.com/en/article/6347905>

Download Persian Version:

<https://daneshyari.com/article/6347905>

[Daneshyari.com](https://daneshyari.com)