Name of research institute or organization:

Versuchsanstalt für Wasserbau, Hydrologie und Glaziologie (VAW), ETH Zürich

Title of project:

Glaciological investigations on the Grosser Aletschgletscher

Project leader and team:

Dr. Andreas Bauder, project leader
Anja Rutishauser and Dr. Daniel Farinotti

Project description:

Long-term glacier observations have been carried out to document glacier variations of Grosser Aletschgletscher and include annual length change measurements since 1880, accumulation and mass balance measurements starting in 1918, repeated map or arial photograph surveys, complemented by stream runoff in the Massa river since 1922 by BAFU, respectively.

In an ongoing project the length, area, volume, and mass changes are continuously observed applying modern remote sensing techniques as well as direct field measurements. The research activities are focused on long term trends and seasonal fluctuations. Net volume changes of the entire glacier are calculated by comparison of digital elevation models. Mass balance components with firn accumulation and ablation are measured in detail at Jungfraufirn.

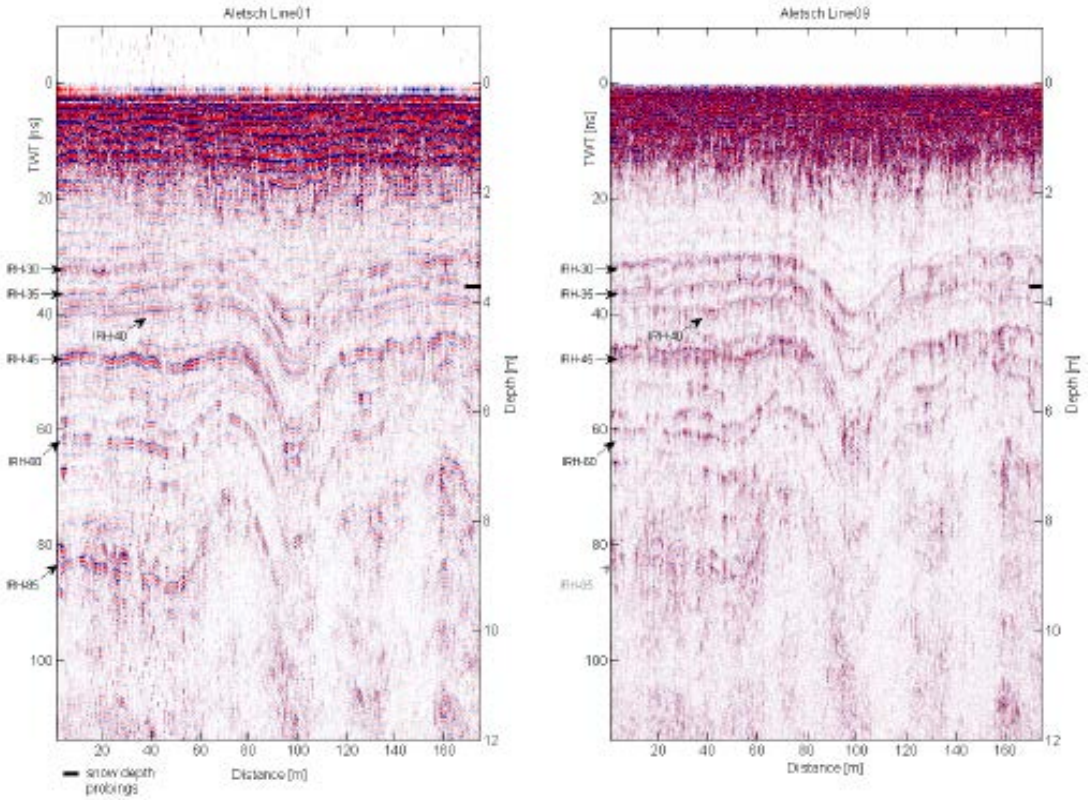

***Figure**: GPR profile acquired with 500 MHz (left) and 1000 MHz (right) antenna. Detected internal reflection horizon (IHR) and depth of independent snow depth probings are marked.*

In order to assess the spatial variability of the accumulation rate in the vicinity of the sampling site, ground penetrating radar (GPR) measurements have been performed in May 2011. Clearly visible in the figure are three distinct horizons (IRH-30, IRH-35 and IRH-40) all formed during summer 2010 overlain by the 3.5m thick homogenous layer of accumulated snow during winter 2010/11. The results show a uniform distribution of the accumulated snow layer, only interrupted by a local depression due to a buried crevasse around profile distance 100m.

Key words:

Glacier measurements, firn accumulation, ice melt, volume change, mass balance

Internet data bases:

http://www.vaw.ethz.ch/people/gz/abauder/projects/data/gz_141_variations_gr_aletschgretscher

Collaborating partners/networks:

Swiss Glacier Monitoring Network, Federal Office for the Environment (BAFU)

Scientific publications and public outreach 2011:

Book sections (for published, comprehensive conference proceedings)

Farinotti, D., Bauder, A., Huss, M., Jouvet, G., Widmer, F. and Boes, R. Future glacier evolution and impact on the runoff regime in the catchments of Alpine reservoirs: the Aletsch area, Switzerland. In *Dams in Switzerland - Source for Worldwide Swiss Dam Engineering*, Swiss Committee on Dams, 283-289, 2011.

Data books and reports

Bauder, A. and Ryser, C. eds. The Swiss Glaciers 2005/06 and 2006/07. Glaciological Report No. 127/128, Cryospheric Commission of the Swiss Academy of Sciences published by the Laboratory of Hydraulics, Hydrology and Glaciology (VAW), ETH Zürich, 99p, 2011.

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