

Name of research institute or organization:

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**Department of Geography, University of Zurich**

Title of project:

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Rock-face temperature monitoring

Project leader and team

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Stephan Gruber, project leader  
Dr. Martin Hoelzle,  
Adrian Zraggen, Msc student

Project description:

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Rock-wall temperatures are continuously recorded at different locations at a depth of 10 cm. Rock-faces between 2500 and 4500 m a.s.l. and all slope expositions are measured at around 20 sites in the regions: Jungfrau/Schilthorn, Zermatt and Corvatsch in order to verify the model PERMEBAL and to monitor changes in ground temperatures induced by climatic change. Data loggers are read-out and serviced once per year.

The model PERMEBAL is used to simulate a one-dimensional energy balance in complex topography and to calculate time series of rock temperatures based on meteorological data. Especially for re-analyses of rock fall events in the unusually warm summer of 2003 this model and the rock-wall temperature measurements are beneficial.

From 2003 onward, the monitoring of rock temperatures initiated in this project will be part of the Swiss permafrost monitoring program PERMOS.

Key words:

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Permafrost, rock fall, energy-balance model, PERMOS

Collaborating partners/networks:

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PERMOS – Permafrost Monitoring in Switzerland

Scientific publications and public outreach 2003:

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**Refereed journal article**

Gruber, S., Hoelzle, M. & Haeberli, W. (2003, submitted). Rock wall temperatures in the Alps. *Permafrost and Periglacial Processes*.

**Conference papers**

Gruber, S., Peter, M., Hoelzle, M., Woddhatch, I. & Haeberli, W. (2003) Surface temperatures in steep Alpine rock faces - a strategy for regional-scale measurement and modelling. In: *Proceedings of the 8th International Conference on Permafrost 2003, Zurich, Switzerland*.

Gruber, S., Haeberli, W. and Noetzli, J. (2002), The Thermal Regime of Steep Alpine Rock Faces. *AGU Fall Meeting, San Francisco*.

Gruber, S.; Hoelzle, M.; Haeberli, W. (2003) Distributed process-based models of mountain permafrost: the importance of accurate spatial input and calibration data. *EGS-AGU-EUG Joint Assembly, Nice, France, 06 - 11 April 2003*.

**Theses**

Peter, M., Untersuchung von Felstemperaturen im alpinen Permafrost, MSc Thesis, Universität Zürich, 2003.

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