

Name of research institute or organization:

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**WSL Institute for Snow and Avalanche Research SLF**

Title of project:

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Snow on permafrost rock walls

Project leader and team:

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Dr. Marcia Phillips (Project leader, permafrost researcher)

Anna Haberkorn (PhD Student)

Hansueli Rhyner (Mountain guide)

Robert Kenner (Surveyor)

Martin Hiller (Electronics engineer)

Project description:

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Permafrost rock walls and ridges tend to react very rapidly to temperature change as they generally lack an insulating snow cover - a heterogeneously distributed, thin layer of snow is nevertheless very often present. Changes in rock or ice temperature or modifications in ice or water content can lead to rock wall instability and the role of the snow is probably of central importance. SLF has started a new SNF DACH project entitled 'Influences of snow on permafrost rock walls' in collaboration with the Universities of Bonn, Fribourg, Zurich - and a parallel partnership with the ETH Zurich. The project aims to investigate the role of snow on the thermal regime and mechanical stability of steep rock walls. The research sites include the Sphinx North and South walls, which were equipped with various temperature and deformation logging devices by ETH and the University of Zurich in the context of the PermaSense project ([www.permasense.ch](http://www.permasense.ch)). The data obtained has kindly been made available by these institutions. Additional in-situ investigations of the snow cover on both sides of the Sphinx ridge (Fig. 1) contribute to obtaining a better understanding of the role of the snow on the thermal regime of the rock.

Data from the Jungfrau Ostgrat permafrost borehole is also used in the context of this project. The sub-horizontal borehole is located at 3590 m in the North oriented wall of the Jungfrau Ostgrat. It is 20 m long and equipped with 9 thermistors and a data logger. Rock temperatures vary between -4 and -8°C. The main form of heat transfer is conduction (Fig. 2). The high elevation of the borehole and the fact that it is located in a steep, exposed rocky ridge make the data particularly valuable.



Fig. 1. Highly variable snow cover distribution in the North rock wall of Sphinx (Photograph M. Phillips, 21. November 2012).

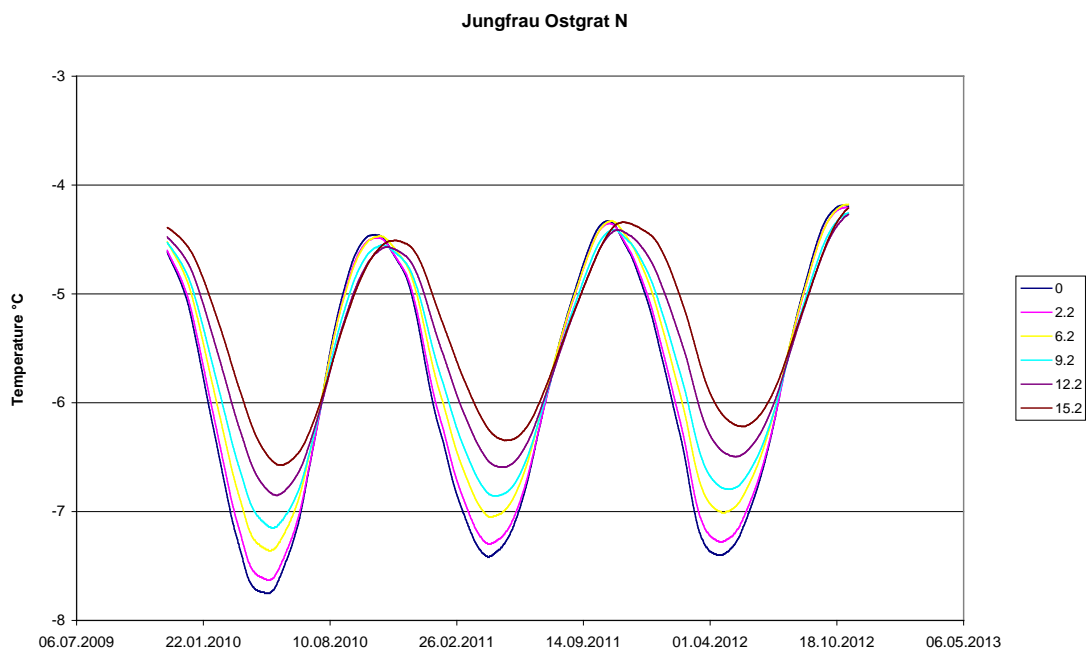


Fig. 2. Borehole temperatures in the Jungfrau Ostgrat borehole (North) between 2009 and 2012.

Key words:

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Mountain permafrost, thermal regime, active layer, rock walls, snow cover distribution

Internet data bases:

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[www.permos.ch](http://www.permos.ch)  
[www.permasense.ch](http://www.permasense.ch)

Collaborating partners/networks:

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Universities of Bonn, Fribourg and Zurich, ETHZ.  
PERMOS Network: [www.permos.ch](http://www.permos.ch) (the Jungfrau Ostgrat borehole is a candidate for PERMOS)  
PermaSense

Address:

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