

Name of research institute or organization:

Department of Geography, University of Zurich

Title of project:

Swiss Permafrost Monitoring Network PERMOS

Part of this programme:

PERMOS

Project leader and team:

Dr. Jeannette Nötzli, project leader PERMOS
Prof. Dr. Andreas Vieli, project collaborator, head 3G

Project description:

The aim of the Swiss Permafrost Monitoring Network (PERMOS) is the systematic long-term documentation of state and changes of mountain permafrost in the Swiss Alps. PERMOS includes three types of observations which are taken at sites on different landforms in varying topographic settings in order to deliver a comprehensive picture of permafrost conditions:

- (1) Ground temperatures measured in boreholes complemented by near-surface temperature measurements at locations around the site
- (2) Changes in subsurface ice and unfrozen water content at the drill sites by geoelectrical surveys
- (3) Velocities of permafrost creep determined by geodetic surveys and photogrammetry

Due to its high elevation, the steep topography as well as the accessibility, the Jungfrauoch site is a key site for rock temperature measurements in the monitoring network. Near-surface temperatures in near-vertical rock have been continuously measured at four (at five until 2012) locations with different aspects since 2001 (Table 1, Figure 1). The temperature loggers are maintained by the University of Zurich and typically served every second year. No maintenance mission was undertaken in 2015 and the next one is planned for 2016.

The two boreholes in the Jungfrau-East-Ridge operated by the WSL Institute for Snow and Avalanche Research SLF (M. Phillips) are also part of the PERMOS Network. An integration of the near-surface rock temperature measurement into the infrastructure of the PermaSense Project with ETH Zurich is envisaged for the near future (J. Beutel).

Table 1. Locations of near-surface temperature measurements on Jungfrauoch in the scope of PERMOS.

Code	Name	Coordinates <i>SwissGrid</i>	Elevation <i>m asl.</i>	Slope °	Aspect °	Year
JFJ_R001	Eigerfenster*	643307/159034	2860	90	325	2001–2012
JFJ_R002	Eismeer	643830/158049	3150	87	100	since 2001
JFJ_R003	Moench West Ridge	642189/155603	3550	72	288	since 2001
JFJ_R004	Jungfrau East Ridge South	640816/155013	3750	70	145	since 2001
JFJ_R005	Jungfrau East Ridge North	640816/155025	3750	55	344	since 2001

* Logger lost due to smaller rock failure in 2012 and not replaced

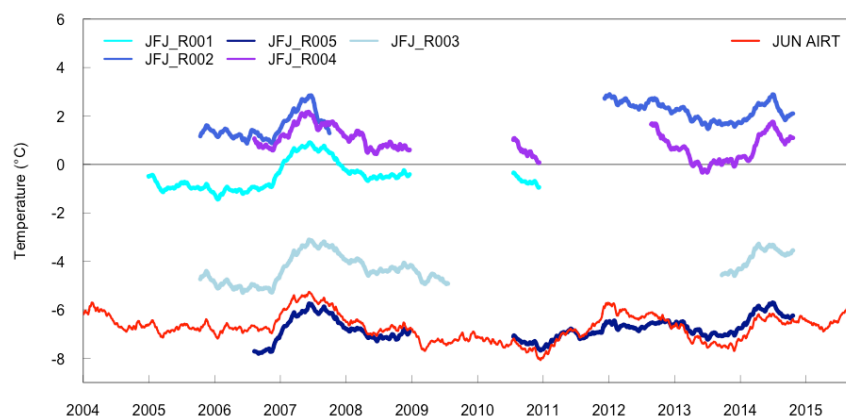


Figure 1. Running annual average of the near-surface rock temperature measurements in the scope of the PERMOS Network in the Jungfrauoch area. The rock temperatures very closely follow air temperatures in their temporal variability (air temperature measured at the MeteoSwiss station on Jungfrauoch are plain red). Data sources: rock temperatures from PERMOS; air temperatures from MeteoSwiss.

Key words:

Permafrost monitoring, rock temperatures

Internet data bases:

www.permos.ch

Collaborating partners/networks:

WSL Institute for Snow and Avalanche Research SLF
ETH Zürich, PermaSense Project

Scientific publications and public outreach 2015:

Data books and reports

Schnee, Gletscher und Permafrost 2013/2014 (Snow, Glaciers and Permafrost 2013/2014), Die Alpen/Les Alpes, 9/2015.

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