

Long-term permafrost monitoring in the Jungfrau East ridge

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1. Project description

The sub-horizontal borehole in the Jungfrau East ridge is located at 3590 m asl (Fig. 1) in the northern flank of the ridge. It is 20 m long and is equipped with 9 thermistors and a data logger. Rock temperatures currently vary between -3.4 and -6°C (Fig. 2). Due to the time lag with depth, the highest rock temperatures are registered in winter and the lowest ones in summer. The high elevation of the borehole and its position in a steep rock wall make it valuable for long-term permafrost monitoring, as there are only eight boreholes in high elevation rock walls in the entire Alps.

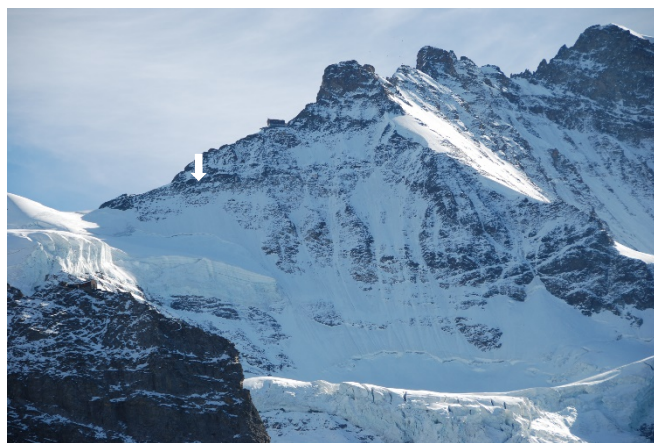


Figure 1. White arrow: Position of the borehole in the Northern flank of the Jungfrau East ridge (Photograph: M. Phillips).

The Jungfrau borehole temperature data indicate a clear warming trend at all depths, as do other borehole data measured in steep, ice-poor permafrost rock in the Swiss Alps (Phillips et al. 2020; Huss et al. 2020).

The borehole is part of the Swiss permafrost monitoring network PERMOS and the borehole temperature data can be accessed here: <http://newshinypermos.geo.uzh.ch/app/DataBrowser/>.

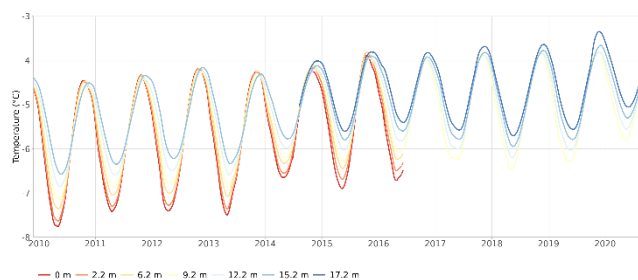


Figure 2. Borehole temperatures (2009-2020) in the Jungfrau borehole (Legend: 0 is located 6 m from the outer surface of the rock wall). Data: SLF/PERMOS

Internet data bases

www.permos.ch; <http://newshinypermos.geo.uzh.ch/app/DataBrowser>
<https://gtnp.arcticportal.org/data/data-download>

Collaborating partners / networks

PERMOS (Permafrost Monitoring Switzerland)
 GTN-P (Global Terrestrial Network for Permafrost)

Scientific publications and public outreach 2020

Refereed journal articles and their internet access

Phillips, M., A. Haberkorn, R. Kenner and J. Noetzi, Current changes in mountain permafrost based on observations in the Swiss Alps, *Swiss Bull. angew. Geol.*, **25**, 1-2, 53-63, 2020.

Data books and reports

Huss, M., A. Bauder, C. Marty, and J. Noetzi, Schnee, Gletscher und Permafrost 2018/2019, *Kryosphärenbericht für die Schweizer Alpen, Die Alpen / Les Alpes / Le Alpi*, **96**, 6, 48-53, 2020. <https://www.dora.lib4ri.ch/wsl/islandora/object/wsl:24974>

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