

Name of research institute or organization:

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**Department of Geography, University of Zurich**

Title of project:

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PERMASENSE & PERMOS: Measuring permafrost in Alpine rock walls

Project leader and team:

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Dr. Stephan Gruber, project leader  
Prof. Christian Tschudin, PERMASENSE principal investigator  
Dr. Daniel Vonder Mühll, PERMOS responsible  
Igor Talzi, PhD student (computer-science in PERMASENSE)  
Andreas Hasler, PhD student (geo-science in PERMASENSE)

Project description:

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During the year 2006, PERMASENS has started and succeeded with a first deployment under extreme environmental conditions. A set of ten sensor rods (measuring temperature and electrical conductivity profiles in rock) and protective housings were drilled into the rock faces around Sphinx, Jungfrauoch in September and October. This network of permafrost sensors is expected to deliver near real-time measurements via wireless communication amongst the sensors and a GPRS uplink to a central database. This first deployment demonstrated the feasibility of this approach to make environmental measurements in high-mountains more effective, safe and reliable. For the coming year, the sensor network will be expanded to investigate the effect that heat advection by water flow in fractures has on permafrost degradation and frost weathering.

Routine data logger based monitoring of rock temperatures (PERMOS) on the Jungfrau East Ridge, the west ridge of Mönch as well as the north and south faces of Eiger were continued like in the 5 previous years.

Key words:

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Permafrost, ground temperatures, monitoring, wireless networks, rock fall

Collaborating partners/networks:

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PERMOS, NCCR-MICS,

Scientific publications and public outreach 2006:

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**Conference papers**

Hasler, A., Gubler, HU., Talzi, I., Gruber, S., VonderMühll, D. and Tschudin, C. Investigating Heat and Moisture Fluxes in High-Alpine Rock Walls Around the Jungfrauoch with a Wireless Sensor Field. Research at Jungfrauoch "Top of Science" International conference in celebration of the 75th anniversary of the High Altitude Research Station Jungfrauoch, Interlaken, Switzerland, September 11-13, 2006.

Talzi, I., VonderMühll, D., Tschudin, C., Hasler, A. and Gruber, S. Investigating the Permafrost with a WSN in the Swiss Alps, MICS Scientific Conference 2006, Zurich, October 17-19.

Tschudin, C., Talzi, I., VonderMühl, D., Hasler, A. and Gruber, S. PermaSense Deployment September/October 2006, MICS Scientific Conference 2006, Zurich, October 17-19.

Gruber, S., Alpine permafrost in a changing climate (and a changing perspective), Research at Jungfrauoch "Top of Science" International conference in celebration of the 75th anniversary of the High Altitude Research Station Jungfrauoch, Interlaken, Switzerland, September 11-13, 2006.

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