

Name of research institute or organization:

---

**Department of Geography, University of Zurich**

Title of project:

---

PERMASENSE & PERMOS: Measuring permafrost in Alpine rock walls

Project leader and team:

---

Project Leaders:

Dr. Stephan Gruber, (geo-science in PERMASENSE)  
Prof. Christian Tschudin, (computer-science in PERMASENSE)  
Dr. Jan Beutel, (technical computer-science in PERMASENSE)  
Dr. Daniel Vonder Mühl, (PERMOS responsible)

Team:

Silvia Gerber, Master student (geo-science in PERMASENSE)  
Stefanie Gubler, PhD student (geo-science in PERMASENSE)  
Andreas Hasler, PhD student (geo-science in PERMASENSE)  
Dr. Jeannette Noetzli, (coordination office PERMOS)  
Igor Talzi, PhD student (computer-science in PERMASENSE)

Project description:

---

The main focus of the PERMASENSE project during 2008 was to establish a reliable operation of the wireless sensor networks (WSN) on Matterhorn and Jungfrauoch. Due to the greater number of sensor types applied at Matterhorn Hörnligrat, this site was given priority. The operation of the Matterhorn deployment was achieved at the end of August 2008 with one maintenance-visit needed in November. Since then the preparation to set up the Jungfrauoch network is undertaken. A new base station (access node between the sensor web and the internet) and a small test network, was installed in December 2008 at the Sphinx Observatory. The setup of the entire WSN on Jungfrauoch is planned for February/March 2009.

Conventional data loggers are continuously used to monitor rock surface temperatures within PERMOS on the Jungfrau East Ridge, the west ridge of Mönch as well as on the north and south faces of Eiger.

Key words:

---

permafrost, ground temperatures, monitoring, wireless sensor networks, rock fall

Internet data bases:

---

[http://pc-5225.ethz.ch/cacti/graph\\_view.php?action=tree&tree\\_id=2&leaf\\_id=58&select\\_first=true](http://pc-5225.ethz.ch/cacti/graph_view.php?action=tree&tree_id=2&leaf_id=58&select_first=true)

Website:

---

<http://www.permasense.ch/>

Collaborating partners/networks:

---

Funding: NCCR-MICS, BAFU  
Partners: University Zurich, TIK-ETHZ, PERMOS, University Basel

Scientific publications and public outreach 2008:

---

**Refereed journal articles**

Hasler, A., I. Talzi, J. Beutel, C. Tschudin, and S. Gruber, Wireless Sensor Networks in Permafrost Research – Concept, Requirements, Implementation and Challenges, submitted to Proceedings of the ninth international Permafrost Conference 2008, Fairbanks, Alaska, June 29 – July 3, 2008.

Igor Talzi, Sandro Schönborn and Christian Tschudin, Providing Data Integrity in Intermittently Connected Wireless Sensor Networks, accepted for *Proceedings of the 5th International Conference on Networked Sensing Systems (INSS'08)*, Kanazawa, Japan, June, 2008.

**Radio and Television**

“Messners Alpen” Part 3: “Vom Eiger zum Matterhorn” – Dokumentarfilm über den Wandel der Alpen mit einer Reportage über PERMASENSE, Schwenk Film GmbH. Ausgestrahlt: 1.1.2008 ARD, 5.1.2008 France 5 und weitere europäische Fernsehkanäle.

“Rückzug des Eises – Gefahren aus dem Reich der Giganten” – Dokumentarfilm über Permafrost Degradation und Gletscherrückzug, in dem PermaSense prominent porträtiert wird. Ausgestrahlt: Februar 2008 ARTE und September 2008 Bayern 3.

Address:

---

Department of Geography  
University of Zurich  
Winterthurerstr. 190  
CH-8057 Zurich, Switzerland

Tel.: +41 44 635 51 46

Fax: +41 44 635 68 41

Contacts:

---

Andreas Hasler

Tel.: +41 44 635 51 88

Fax: +41 44 635 68 41

e-mail: andreas.hasler@geo.uzh.ch