

Name of research institute or organization:

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**Computer Engineering and Networks Lab, ETH Zurich**

Title of project:

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PermaSense

Project leader and team:

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Dr. Jan Beutel, ETH Zurich, project leader

Tonio Gsell, Samuel Weber, Christoph Walser, Roman Lim, Dr. Matthias Keller, ETH Zurich

Dr. Stephan Gruber, Dr. Lucas Girard, UZH

Project description:

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Topic: Understanding and monitoring of alpine permafrost

Based on the experimental setup conceived and implemented at Jungfraujoch in previous years, the measurements of steep bedrock permafrost have continued. For this, some maintenance was necessary in the first half of the year. Some of this maintenance was jointly undertaken with staff from SLF, Davos where a new collaboration has emerged.

The experiments performed at Jungfraujoch in 2012 and the successive data analysis have lead to a new project funded by nano-tera.ch: X-Sense-2. This project has just started and is expected to make use of some of the experimental infrastructure of PermaSense at Jungfraujoch.

Members of the project have consulted with SWITCH concerning the internet access to the research stations at Jungfraujoch and Gornergrat.

Discussions are ongoing to jointly develop the permafrost experiments of PermaSense and PERMOS into a reference site for permafrost data collection in Switzerland.

The experiments and instruments of PermaSense were demonstrated during a site visit to Jungfraujoch with the Schweizerische Gesellschaft fuer Eis, Gletscher und Permafrost (SEP) in summer 2013.

Key words:

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Rock mechanics, acoustic emission, weathering, permafrost, sensor networks, wireless, low-power

Internet data bases:

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<http://www.permasense.ch>

<http://data.permasense.ch>

Collaborating partners/networks:

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Dr. David Amitrano, ISTERre, CNRS / Université J. Fourier, Grenoble, France

Dr. Marcia Phillips, SLF Davos, Switzerland

Dr. Hugo Raetzo, Bundesamt fuer Umwelt, Bern, Switzerland

Dr. Jeannette Noetzli, PERMOS and UZH, Switzerland

Scientific publications and public outreach 2013:

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**Refereed journal articles and their internet access**

Girard, L., S. Gruber, S. Weber and J. Beutel, Environmental controls of frost cracking revealed through in-situ acoustic emission measurements in steep bedrock, *Geophysical Research Letters*, **40**, 9, 1748-1753, doi: 10.1002/grl.50384, 2013.

<http://onlinelibrary.wiley.com/doi/10.1002/grl.50384/abstract?globalMessage=0>

**Theses**

Keller, M., Mastering Imperfect and Partial Information in Wireless Sensing Systems, PhD Thesis, ETH Zurich, September, 2013.

[ftp://ftp.tik.ee.ethz.ch/pub/people/kellmatt/diss\\_keller.pdf](ftp://ftp.tik.ee.ethz.ch/pub/people/kellmatt/diss_keller.pdf)

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