PhD Position on measuring and modelling of heat exchange processes in permafrost

Job description

The PhD position on “Measuring and modelling of heat exchange processes and runoff in permafrost terrain” is funded for three years in the framework of the Innosuisse project “Permafrost meltwater assessment expert tool - PERMA – XT” at the Department of Geosciences, University of Fribourg, Switzerland and in collaboration with the company GEOTEST AG.

Heat exchange between the surface and the atmosphere is a dominating factor for the development of permafrost and the main driver of seasonal active layer thawing and permafrost-ice melt. The project focuses on the measurement, the analysis and the modelling of the associated heat exchange processes and aims at an improved analysis and assessment of water resources in periglacial catchments (including rock glaciers) and their temporal evolution and the expected melt water runoff. Advances are expected in the understanding of energy exchange processes between the permafrost and the atmosphere and the development of a runoff model including these processes. A further focus will be on the determination of ice content in the subsurface by the use of geophysical surveys and the application and further improvement of an existing model to quantify subsurface ice and water content.

The PhD student will be working in a team consisting of scientists and experts from the private sector on the development of suitable parametrizations of a heat exchange model aiming at the quantification of permafrost melt, including geophysical and hydrological field measurement campaigns in Switzerland (and optionally in Chile).

More about the position

The optimal starting date for the position is 1 August 2019, which is one month after kick-off of the PERMA-XT project. Flexibility with respect to the starting date exists.

This position is associated with the Cryosphere group within the Geography unit of Fribourg University. The Cryosphere group has currently a staff of c. 20 scientists with strong expertise in surface processes of glaciers and ice sheets, permafrost and geophysics. The position also includes the collaboration with experts at the implementation partner GEOTEST AG.

Qualification requirements

We seek motivated, independent and creative individuals with strong interests in glaciology, hydrology and (geo-)physics.

The following requirements for the position apply:

- The applicant must hold an MSc within geosciences, (geo-)physics, climatology or hydrology
• Computer programming skills are mandatory, preferably using R, Python, Matlab or similar languages
• The applicant must have very good verbal and written communication skills in English and verbal skills in German or French (or the willingness to acquire one or the other)

The following points represent assets for the candidates:
• Demonstrated competences in geophysical or hydrological measurements
• A solid background in the application of geophysical or hydrological models
• Experience in high mountain fieldwork or willingness to participate in field campaigns
• Experience in computational fluid dynamics
• Knowledge of Spanish language

We offer
• Gross salary of CHF 47,040 (first year) to 50,040 (3rd year) per annum (approx. net salary 40,000 to 42,500 CHF).
• A professionally stimulating working environment and the ability to shape the research strategy in collaboration with the other team members
• The opportunity to gain experience in supervision of MSc students
• Rich opportunities for culture and outdoor activities in the city and surroundings of Fribourg

How to apply
The application must include:
• Application letter (briefly summarizing your motivation to apply for the position and how you see your expertise fit with job description and required qualifications)
• CV
• Copies and transcripts of educational certificates
• Names and contact details of 2-3 references (name, affiliation, relation to applicant, e-mail and telephone number)

Please send your application merged into one pdf-file by e-mail to nicole.equey[at]unifr.ch. For further information about the position you may contact martin.scherler[at]unifr.ch. Evaluation of applications will start June 27 and continue until the position is filled.