Monitoring data collection for snow and avalanche research

Description   The WSL Institute for Snow and Avalanche Research SLF in Davos (Switzerland) has a mix of research and operational duties. For its duties, it manages an automatic weather station network (~180 stations for Switzerland), collects manual snow measurements and develops both snow cover and snow hydrology models. These models are developed based on new insights gained from research that also benefit from the collected data and the modeling efforts themselves.

An SNF-funded project has started in 2022 in collaboration with the EURAC institute in South Tyrol (IT) to better understand the interaction between the snow cover and the satellite-based SENTINEL-1 Synthetic Aperture Radar (SAR) signal. This interaction is specially poorly understood when the snow cover starts to melt. A better understanding could have major implication for melt water monitoring, which in turn leads to benefits for natural hazard prediction, hydropower production and water management and would be specially beneficial for poorly monitored, remote mountainous areas such as central Asia.

This internship consists in performing snow measurements at the Davos Weissfluhjoch test site (2546 m asl, accessible by cablecar) and comparing the assembled dataset with numerical simulations in order to better understand the snow / SAR interaction. First the modeling of liquid water transport in the snow cover model SNOWPACK (both matrix flow and preferential flow) will be compared to liquid water content measured in the field (by means of a Denoth sensor and of melting calorimetry). Then the microwave transport in the snow pack will be simulated with the SMRT model and compared with field measurements (from the Sentinel-1 SAR as well as from a radar mounted at the field site). No previous experience working with snow is necessary but autonomous snow travel abilities (by ski or snowboard) are recommended. The internship is based in Davos.

Goals   Scientific monitoring data collection in the context of an international research project, comparison between measurements and numerical modeling.

Benefits
- Getting familiar with environmental research;
- Practical experience of monitoring scientific data;
- Practical experience of comparing measured and modeled data;
- Practical experience of working in an international and multidisciplinary environment.

Required
- Working autonomously with help from the supervisor;
- Performing field work.

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