B04-O03

SNOW MICROSTRUCTURE AND MODELLING IN SUPPORT OF PERMAFROST SCIENCE

Martin Proksch *(WSL Institute for Snow and Avalanche research SLF, Switzerland)*
Isabelle Gouttevin *(Laboratory of Cryospheric Sciences CRYOS, Ecole polytechnique fédérale de Lausanne EPFL, Switzerland)*
Moritz Langer *(Alfred Wegener Institute for Polar and Marine Research, Germany)*
Primin Ebner *(WSL Institute for Snow and Avalanche research SLF, Switzerland)*
Charles Fierz *(WSL Institute for Snow and Avalanche research SLF, Switzerland)*
Martin Schneebeli *(WSL Institute for Snow and Avalanche research SLF, Switzerland)*

proksch@slf.ch

Permafrost underlies ~22% of the Northern Hemisphere ground surface and has been observed and projected to undergo severe degradation in the context of global warming. Yet, permafrost modelling is still a challenging task, even at monitoring stations where observations of ground properties exist. One of the main problems is the representation of the thermal properties of snow, which very much depend on snow microstructure and accumulation depth.

Here, we present the results of a spring campain lead on Samoylov Island, Lena Delta (72.4°N, 126.5°E), Siberia, where snow was investigated in terms of stratigraphy and microstructural parameters. Several snow profiles and transects were measured in order to characterise the snow over the polygonal tundra landscape. Cast snow samples were analysed by micro-computed tomography in the cold laboratory at SLF, Davos in order to calculate physical properties for relevant transport processes in the snowpack, such as thermal conductivity and permeability.

Additionally, the snow cover model SNOWPACK is applied at Samoylov, to assess its capability to represent a high-arctic snowpack. Overall, SNOWPACK predicts realistic profiles of physical and structural properties similar to the observed ones. This is an encouraging step for the application of snow modelling in support of the permafrost science community.