

The influence of steep rock walls on the thermal regime of talus slopes

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Talus slopes are common features in high mountain environments, and comprises the transition between steep rock walls and the lower valley bottom in periglacial areas. In mountain permafrost areas, the talus slopes may accumulate ice, developing rock glaciers or other flow features, which are important indicative landforms for present and former permafrost distribution and thus climate conditions.

As talus slopes often consists of coarse, frictional material, non-conductive heat flow may dominate the energy balance in such systems. However, also conductive processes from steep, snow free rock faces may influence the thermal regime especially in the rooting zone of talus slopes.

In this presentation we show this influence, by applying a 2D heat conductivity model, CryoGrid 2D (Myhra et al., 2015), to simulate the ground thermal regime in a talus slope situated below a steep rock wall. Our results indicate that, under certain conditions, thermal gradients across the top of the talus slope and the lower part of the steep rock wall contribute to formation and existence of ice in talus slopes situated below steep rock walls. This process has wide implication both for frost weathering in the sensible transition zone between rock wall and talus material, and the development of dynamic flow systems such as rock glaciers.

References:

Myhra KS, Westermann S, Etzelmüller B.(in press), Modelled distribution and temporal evolution of permafrost in steep rock walls along a latitudinal transect in Norway by CryoGrid 2D. *Permafrost and Periglacial Processes*