

Thermal and hydrological modelling of alpine permafrost rockslopes

MOTIVATION

Thawing permafrost alters rock slope stability in twofold ways:

- ❖ High loss of strength at rock temperatures close to 0 °C
- ❖ Thawing corridors allow water to infiltrate. This may lead to hydrostatic pressures.

Knowing the distribution and state of permafrost is fundamental for projections on stability

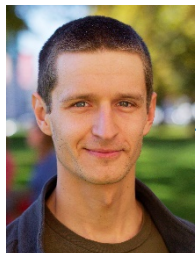
CASE SITE: Bliggspitze rock-ice avalanche in 2007; Kaunertal, Tirol

METHODS: Modelling approach (Energy Balance) using Cryogrid and/or Feflow
Data analysis of rock/snow/air temperature and precipitation

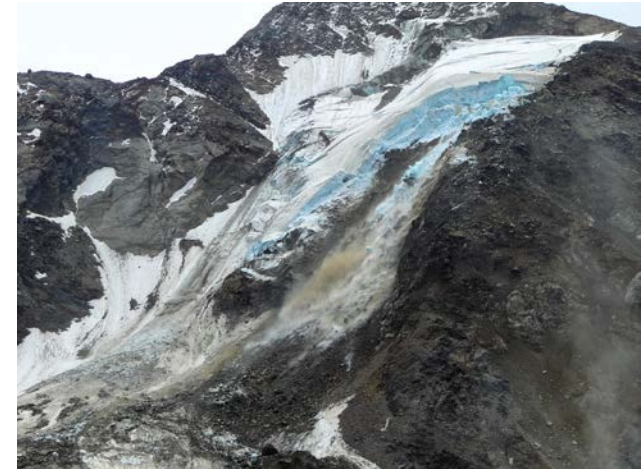
DEMANDED: High interest in understanding physical process driving permafrost degradation.
At least some experience with matlab, python or similar and motivation to dive more into it.

Suggested Research Questions:

- ❖ Conductive 1d model - what is the thermal effect of glacier covering rock slope?
- ❖ Conductive 2d model of Bliggspitze and back calculation of thermal field from present to little Ice Age considering complex topographic effects.
- ❖ Integrating hydrological considerations - water convection (hydro-thermal-model)



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Language German or English; Master Thesis or Study Project