



## **Modelling mountain permafrost distribution - towards a permafrost map of Austria**

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Several studies carried out in the Austrian Alps have shown a permafrost distribution above approximately 2500m. Current global warming causes in some mountain regions already a degradation of permafrost. Of particular interest are areas with discontinuous permafrost on (destabilized) steep talus slopes and rock walls. In densely populated and developed mountains (e.g. ski resorts, etc.) mapping and modelling permafrost distribution is therefore an important prerequisite to prevent natural hazards and risks.

Until recently, the permafrost distribution in Austria has been mapped and modelled only for a few local regions (e.g. parts of the Upper Tauern).

Thus, the aim of this pilot study is to model the permafrost distribution of Austria as a whole. Although such a large scale regional map has inherently a limited accuracy it allows approximations of the permafrost distribution on a nation wide scale and enables comparisons with other Alpine provinces and countries (e.g. Switzerland). In a first approach the model PERMAKART was applied on a DEM with a resolution of 50m. Since the empirical values of PERMAKART (limits of possible and probable permafrost distribution related to altitude, aspect, slope and slope foot) were originally deduced and calibrated for the Upper Engadine in the eastern Swiss Alps, they have been adjusted to the eastern Alps using empirical values of probable permafrost distribution from several mountain regions in Austria.

As a first result the permafrost map shows areas with improbable (equals no permafrost), possible, and probable permafrost and gives a good overview about the

regional differences. At first sight there is a strong dominance of permafrost occurrence in the western higher part of Austria whereas the eastern part shows a somewhat patchy distribution. The model is partly validated using BTS measurements and local permafrost evidences. An improvement of this study will be achieved by including rock glacier inventory data and additional BTS values.