



An alpine-wide permafrost distribution map

Lorenz Boeckli (1), Stephan Gruber (1), Jeannette Noetzli (1), and Alexander Brenning (2)

(1) Department of Geography, University of Zurich, Switzerland, (2) Department of Geography University of Waterloo, Ontario, Canada

Various permafrost distribution maps exist for different regions or countries in the Alps. All of them are based on different modelling approaches or field observations and are therefore not comparable. Additionally for some regions in the Alps (e.g. Bavaria) the spatial extend of permafrost occurrence is still unknown. We present a first alpine-wide permafrost distribution map which is consistent for the whole area and is based on statistical modelling. An alpine-wide collection of permafrost evidences, compiled within the PermaNET project (Alpine Space Program), could be used as calibration data set. Two models were developed, one for the debris covered area (debris model) and one for steep rock faces (rock model). The debris model is based on rock glacier inventories and uses a logistic regression to predict the probability of active against inactive rock glacier (binary response). The rock model predicts rock surface temperatures (continuous response) and is based on mean annual rock surface temperatures. We offer a framework to incorporate these two sub-models which additionally are based on different spatial resolution. Finally, a glacier mask and vegetation cover information derived from satellite images are used to exclude further areas of our final permafrost distribution map.