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Permafrost distribution in Austria – new field data and preliminary modelling results

Barbara Ebohon and Lothar Schrott
University of Salzburg, Department of Geography and Geology, Salzburg, Austria (barbara.ebohon@sbg.ac.at)

Alpine permafrost responds very sensitive to climate change. Consequently, detailed knowledge about permafrost characteristics is in many alpine hazard and risk assessments an important prerequisite since steep talus slopes and rock walls can become instable.

Concerning the permafrost extent of the Austrian Alps two prior studies show, that approximately 2 % of the federal territory can be assigned to permanently frozen ground. The first assessment made by Lieb (1998) points out a permafrost area of 2000 km^2. Ebohon & Schrott (2008) presented a simulation on a digital elevation model with a resolution of 50x50 m. Based on an adapted topoclimatic-key, that results from the relation between slope, altitude, aspect, the possible and probable distribution of permafrost was calculated with the models PERMAKART und PERM. The first promising results showed a permafrost area of 1600 km^2.

In the test sites located in the western part of the “Hohe Tauern” range, geophysical (DC-resistivity and ground penetrating radar) and BTS measurements were performed in 2009 at various altitudes, settings and aspects. Additionally the DEM resolution was significantly increased to 10x10 m to improve the model-quality. The field data showing local permafrost absence or presence have been used to evaluate the accuracy of the existing model.