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Modelling of permafrost in the region of the Upper Tauern, Austria

B. Ebohon (1), F. Keller (2), and L. Schrott (1)

(1) University of Salzburg, Department of Geography and Geology, Salzburg, Austria (barbara.ebohon@sbg.ac.at, +43 - (0)662 - 8044 - 525), (2) Academia Engiadina & Pädagogische Hochschule Graubünden, Samedan, Switzerland

Austria is positioned at the edge of the Alps. The absolute heights of mountain ranges decline from west to east in Austria, so that permafrost areas have their maximum extension in the western federal states. First modelling results show that approximately 2% of the territory of Austria can be assigned to mountain permafrost. This corresponds to an area of 1600 km^2. In some regions (e.g. Upper Tauern) it can be expected, that up to 25 % of the area could be underlain by permafrost.

Within the context of raising temperatures due to global climate change, detailed knowledge about permafrost distribution visualised in a new permafrost map will be a quite important tool for all decision makers concerning infrastructure in high mountain areas.

The project permalp.at aims to the modelling of the permafrost distribution for the area of the Upper Tauern by adjusted lower limits for permafrost. On the basis of a topo-climatic key originally developed by Haeberli (1975), which analyses the relation between slope, altitude, aspect and permafrost occurrence the new model will be able to show an index of probability of the permafrost occurrence. This index replaces the former used “hard“ lower borderlines of the subdivision “probable”, “possible” and “no permafrost” and therefore raises the quality of the forecast.

Additionally the implementation of modelled effect of snow cover in autumn, which is a very important variable to detect permafrost areas, is planned.

In several test-areas (e.g. Glorer Huette, Obersulzbachkees,...) new data will be gathered through BTS-measurements, long-term ground-temperature monitoring (UTL-data logger), geophysics (GPR, ERT) and additional geomorphological mapping to detect the absence and presence of permafrost.