



Evaluation of the impact of permafrost in a subarctic periglacial environment using electrical resistivity tomography, BTS measurements and geomorphological mapping

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In a subarctic periglacial environment in northern Sweden, the spatial distribution of permafrost and its characteristics related to typical periglacial landforms was investigated using different methods. The geomorphological mapping was performed using a legend for high mountain geomorphology. The digital cartography was realized within the geographical information system software ArcGIS. In order to evaluate the permafrost distribution in the investigation area on a larger scale, measurements of the bottom temperature of the snow cover were carried out (so-called BTS-method). For the characterisation of the subsurface lithology 2D resistivity surveys were performed additionally. Bedrock consists of amphibolite, gneiss and mica schists. Numerous solifluction/gelifluction lobes indicate active permafrost in the slopes. Results of BTS-measurements in the proglacial area of two small mountain glaciers indicate a widespread occurrence of perennally frozen ground which is expressed by patterned ground with sorted polygons in the flat parts of the investigation area. Geomorphological mapping was applied in order to verify a potential altitudinal sequence of permafrost-related landforms and processes. 2D resistivity tomographies carried out on typical periglacial landforms provide detailed images of the subsurface internal structure of solifluction terraces, patterned ground with sorted polygons and an ice-cored moraine. With the combined methods the impact of permafrost on recent and ongoing periglacial morphodynamics could be assessed.