



## **Geomorphological and geophysical investigations on the complexity of periglacial landforms in a subarctic-alpine geosystem (northern Sweden)**

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In a subarctic periglacial environment in northern Sweden (Pallenvagge, south of Abisko) the spatial distribution of permafrost was investigated using different methods in order to assess the influence of permanently or seasonally frozen ground on local periglacial morphodynamics. With geomorphological mapping as a traditional standard tool for geomorphic system analysis the geomorphic process regimes were determined in the valley. An altitudinal sequence of permafrost-related landforms and processes could be deduced. In order to evaluate the permafrost distribution in the investigation area, measurements of the bottom temperature of the snow cover were carried out, and for the characterisation of the subsurface lithology 2D resistivity surveys were performed. Numerous gelifluction lobes indicate active permafrost in the slopes. Results of BTS-measurements indicate a widespread occurrence of perennially frozen ground which is expressed by patterned ground with sorted polygons in the flat parts of the investigation area. 2D resistivity tomographies carried out on typical periglacial landforms provide information of the permafrost characteristics within solifluction terraces, patterned ground and an ice-cored moraine. Geomorphological mapping represents a traditional standard method for geomorphic system analysis, in conjunction with GIS-based analysis tools and 2D geophysical surveys a more sophisticated interpretation of the complexity of periglacial landform distribution is enabled. The extent to which periglacial morphodynamic is influenced by permafrost and/or seasonal frost within this subarctic valley remains difficult to determine, however, the results indicate that future research should focus on the assessment and monitoring of

the impact of changes in permafrost conditions on geomorphic processes activity.