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Delineating the internal structure of typical periglacial landforms through the application of 2D resistivity imaging

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The use of 2D resistivity imaging for the investigation of typical periglacial phenomena is shown on different case studies from the mid-latitude high-alpine and high-latitude subarctic periglacial environments. Insufficient coupling of the electrodes to the sometimes rocky ground surface and great heterogeneity of the surface terrain can lead to bad data quality resulting in noisy model interpretations of the subsurface. Nevertheless, this method is considered as the most multifunctional geophysical method and could be first choice for geomorphologists working in periglacial environments if only one single method can be applied. The resulting pseudosections yield - depending on the array geometry and chosen spacing - to detailed images of the subsurface as shown on different examples of typical periglacial landforms from the high-latitude subarctic periglacial environments (solifluction terrace, patterned ground with sorted polygons, ice-cored moraine) and mid-latitude high-alpine (glacial till underlain by permafrost, rock glacier, push moraine). Choice of the appropriate electrode configuration has to be determined from case to case. Special characteristics of the different array geometries should be considered, for instance the investigation depth and the sensitivity of the array to vertical and horizontal changes in the subsurface resistivity distribution. The Dipole-Dipole array provides superior lateral resolution and will often be the first choice for geomorphological applications with expected lateral heterogeneity. However, on rough surface conditions with high ground resistance and weak signal strength which frequently occur in periglacial terrain, the application of Dipole-Dipole surveys might be critical. Applicability and limitations of the method for delineating the subsurface structure of periglacial landforms are demonstrated. New fields of application for various research aspects within periglacial geomorphology are suggested.