Geophysical Research Abstracts, Vol. 7, 08105, 2005
SRef-ID: 1607-7962/gra/EGU05-A-08105

Geophysical applications in geomorphology: advances and limitations

L. Schrott

Department of Geography and Regional Research, University of Vienna, Austria (lothar.schrott@univie.ac.at)

Over the last decade the use of geophysical techniques has become a popular tool in many geomorphological studies. However, the correct handling of geophysical instruments and the subsequent processing of the data they yield are difficult tasks. Furthermore, the description and interpretation of geomorphologic settings to which they are apply can significantly influence the modelling procedure. In most studies and (missing) textbooks interdisciplinary aspects combining geophysics and geomorphology are poorly addressed.

The main objective of this paper is to present some examples of geomorphic studies demonstrating the powerful integration of geophysical techniques, but also to highlight some limitations of these techniques (e.g. seismic refraction vs. DC-resistivity).

Since more than three decades geophysical techniques have been successfully applied in permafrost studies. However, in many cases complex or more heterogenous subsurface structures were not adequately modelled, because of less powerful computer facilities and time consuming calculations. More recently, and also due to technical improvements, geophysical techniques have been applied to a wider spectrum of geological and geomorphological settings. Promising applications were reported from karst and loess covered landforms, complex valley fill deposits, talus slopes, block fields, and landslides. They can help to be able to answer yet unsolved questions in geomorphology.

Based on case studies it can be shown that the use of a single geophysical technique or a single interpretation tool is for many geomorphological surface and subsurface conditions not convenient and may lead to significant errors. Because of changing physical properties of the subsurface material (e.g. sediment, water content) only a

combination of two or three geophysical methods give sufficient insight to avoid serious misinterpretation.