



Spatial distribution of sediment transport processes in periglacial mountain environments – a geomatics based approach

A. Bartsch (1,3), M. Gude (2), S. D. Gurney (1)

(1) Department of Geography, The University of Reading, Reading, UK, (2) Department of Geography, Friedrich-Schiller-University, Jena, Germany, (3) Now at the Institute of Photogrammetry and Remote Sensing, Vienna University of Technology, Vienna, Austria (ab@ipf.tuwien.ac.at / Fax: +43 1-58801-12299 / Phone: +43 1-58801-12221)

Geomorphological research has a long tradition in the Swedish Kärkevagge and Norwegian Okstindan mountains. In the past investigated mass movements in these periglacial mountain environments comprise solifluction, rill erosion, slope wash, rock- and boulder falls, dirty avalanches, slushflows and dissolved transport. The presented project ties in with existing research and concepts in process geomorphology. Satellite data (Landsat TM/ETM+) and digital terrain models (from aerial photographs) are combined with the aim to retrieve Geomorphic Process Units (GPUs). A set of parameters is required which have been determined by field work and literature. The decision rules of the classification scheme include simple thresholds as well as topological relationships between source and deposition area. This approach defines sediment transport process areas similar to the process domain or sediment cascade system but on a more detailed level with respect to all occurring processes, their spatial overlap and nature.

A three-stepped approach has been developed which considers the spatial scale of sediment transport process types and the data employed. Processes are grouped into categories according to their nature. The combination of those group layers results in a GPU map with 30 m x 30 m pixel spacing. This method is proven applicable for both sites, but the set of found GPUs differs between them.

Based on existing measurements a quantification is attempted for the Kärkevagge catchment. A sediment budget can be assigned to each GPU based on known recent

denudation rates. This spatially continuous information can be combined with data about the underlying sediments for the investigation of past sediment transport rates.

The presented work is based on data of a specific resolution and in a specific environment. The last step is the combination of process group layers in order to derive the GPUs. These layers could be replaced, however, by products of a different methodology of process area determination in order to transfer the GPU conception to environments outside the periglacial realm of subarctic mountainous regions and to different scales.