



Assessment of block sizes on a rock glacier using high resolution point clouds from terrestrial laserscanning

Michael Avian (1), Stefan Hergarten (2), and Gerfried Winkler (1)

(1) University of Graz, Institute of Earth Sciences Graz, Austria (michael.avian@uni-graz.at, 0043 316 380 8725), (2) University of Freiburg, Institute of Earth and Environmental Sciences - Geology

Schöneben rock glacier is a prominent relict permafrost feature in the Niedere Tauern Range, Austria (N 47°22' E 14° 40'). In 2011 the project "Ground water storage and drainage dynamics of relict rock glaciers in the Niedere Tauern Range" (RrgAlpCatch) within the EU framework of regional development was initiated. Amongst other objectives, knowledge on the statistical distribution of block sizes, anisotropy, and orientation is essential to get an insight into the internal structure of the rock glacier body. In 2013 we established a test site with an area of 380 m² to estimate block sizes, anisotropy, and orientation. For data acquisition we used a RIEGL scanner LMS-Z620 at four scanning positions located at each corner of the four-sided polygon. In order to ensure suitable registration we used nine reference points, each of them visible from all scanning positions. After filtering we received a raw point cloud of 4cm mean point distance resulting in a total amount of 1,233,564 points.

We followed two approaches to estimate block/rock sizes: (i) using regular GIS/terrain analysis packages such as ArcGIS (10) and Surfer 10 (Golden Software) and (ii) different methods of delineating individual blocks directly from the point cloud without converting it to a raster DEM. In this context we implemented algorithms based on surface gradient and curvature computed from a surface representation by a triangular irregular network as well as techniques of data clustering.