Geophysical Research Abstracts
Vol. 14, EGU2012-9573, 2012
EGU General Assembly 2012

On the relationship between surface flow velocity and climatic conditions at three rock glaciers in central Austria

A. Kellerer-Pirklbauer (1,2) and V. Kaufmann (1)

(1) Institute of Remote Sensing and Photogrammetry, Graz University of Technology, Austria, (2) Department of Earth Sciences, University of Graz, Austria; andreas.kellerer@tugraz.at

Active rock glaciers are creep phenomena of continuous and discontinuous permafrost in high-relief environments moving slowly downvalley or downslope. It is supposed that the change of surface flow velocity of a rock glacier is primarily related to climatic conditions. Air temperature can be statistical significantly correlated with rock glacier movement changes. Besides climatic conditions, flow velocity itself depends on other factors related to the topographical setting of the rock glacier as well as to its surrounding, such as for instance slope and topography of the rock glacier bed, marginal friction, nourishment of the rock glacier by debris and ice input, and water content, thickness, ice/debris proportion, and inner structure of the rock glacier body. In this study we focus on long-term observation on the movement of three active rock glaciers located in the Hohe Tauern Range, central Austria, and present results on the combination of this movement data with ground temperature (surface and near-surface) and climatic data from the rock glacier sites itself as well as additional climate data from a nearby high-mountain climate station. The three rock glaciers have been geodetically monitored on an annual basis since 1995 (Dösen Rock Glacier/hereafter abbreviated as DOE), 1997 (Weissenkar Rock Glacier/WEI), and 1999 (Hinteres Langtalkar Rock Glacier/HLC). Data series on continuous ground temperature monitoring begin in 1997 at WEI (although with major data gaps) and in 2006 at DOE and HLC (continuous data series 2006–2011), respectively. These different data series provide a good basis for analysing the relationship between rock glacier movement and climate induced ground temperature conditions in the Eastern European Alps during the period 1995–2011. Results on this analysis at all three sites as well as general patterns are presented. Since 2006, the research activities mentioned here where funded by the three projects ALPCHANGE, PermaNET and permAfrost.