Geophysical Research Abstracts, Vol. 9, 08614, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08614

The influence of ice on the mobility of rapid rock-ice mass movements: a concept for systematic research

D. Schneider (1), C. Huggel (1), B. McArdell (2), P. Bartelt (3), W. Haeberli (1)

(1) Glaciology and Geomorphodynamics Group, Department of Geography, University of Zurich, Switzerland (dschneid@geo.unizh.ch), (2) Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), Birmensdorf, Switzerland, (3) Swiss Federal Institute for Snow and Avalanche Research (SLF), Davos Dorf, Switzerland

Ice containing rock avalanches, landslides and debris flows such as the catastrophic Huascarán rock/ice avalanches of 1962 and 1970 in Peru or the more recent Kolka-Karmadon 2002 avalanche, have dramatically demonstrated the possible consequences of large mass movements in glacial environments. General theoretical considerations on the mobility of large rapid mass movements have been put forward: pore fluid pressure effects, water lubrication, acoustic fluidization, dynamic fragmentation, fluctuation-dissipation relations, and even air and molten rock lubrication among others. The influence of ice on such processes, however, has not been systematically studied so far. Involved mechanisms and interactions leading to an unexpected high mobility of such avalanches are not well understood. This contribution outlines the concept of a research project that is explicitly concerned with the role of ice in mass movements. It concentrates on the possibility that ice melts during the process due to frictional heat generation. It is assumed that the thermal energy could lead to a continuous water supply into the moving mass, and in consequence results in pore fluid pressure effects and water lubrication that may enhance its mobility significantly. Laboratory experiments in a debris flow chute and in a large vertical rotating drum are planned to gain data about heat generation, mass distribution, mobility and temporal changes such as process transformations (e.g. landslide to debris flow). The results will be used to expand the functionalities of the numerical model RAMMS (Rapid Mass Movements), which is in development at the Swiss Federal Institute for Snow and Avalanche Research (SLF), and to enhance the understanding of such process interactions to improve corresponding hazard assessment. This poster presents ther-

modynamic considerations and gives an overview on how the physical models will be performed and which results are expected.