Geophysical Research Abstracts, Vol. 7, 05171, 2005
SRef-ID: 1607-7962/gra/EGU05-A-05171

Challenges for the assessment of glacier and permafrost hazards in mountains

A. Kääb, C. Huggel and W. Haeberli

Department of Geography, University of Zurich, Switzerland (kaeaeb@geo.unizh.ch)

Glacier- and permafrost-related hazards represent a continuous and growing threat to human lives and infrastructure in mountain regions. Related disasters can kill hundreds or even thousands of people at once and cause damage with a global sum on the order of several 100 Mio. EURO as a long-term annual average. Assessment and management of glacier and permafrost hazards is presently confronted with a number of fundamental natural, technical and socio-economic challenges. The working group on "Glacier and permafrost hazards in mountains" by the Commission on Cryospheric Sciences (CCS) and the International Permafrost Association (IPA) therefore aims at compiling general guidelines, which should support and direct such assessments and lead to some international standards. In this contribution the authors would like to present a first draft of these guidelines in order to initiate discussion.

Glacier and permafrost hazard assessments should among others consider the following points:

(1) Climate change can induce disturbance in glacier and permafrost equilibrium and can shift hazard zones beyond historical knowledge. In many regions, human settlements and activities increasingly extend towards endangered zones. As a result, historical data alone are not sufficient any more for hazard assessments and have to be combined with new observation and modelling approaches.

(2) Due to the accelerated change of high-mountain environments, hazard assessments must be undertaken routinely and regularly, combined with continuous monitoring.

(3) Glacier- and permafrost-related disasters often include a combination of processes and chain reactions. Hazard assessments therefore have to be integrative and consider such variety and interaction of processes.

(4) Integrative hazard assessments should be achieved by interdisciplinary cooperation of experts, and the application of modern observation and modelling techniques designed for such integrative approaches.

(5) Modern space technologies enable initial estimation of hazard potentials to be performed by virtually everyone and everywhere, independent of political and geographical restrictions. This fundamental "democratisation" process related to high-mountain (and other) hazards involves a number of new opportunities, dangers and responsibilities, for the public, the authorities in charge, and the experts involved.

(6) The transfer and dissemination of expert hazard assessments to the authorities and to the public, and thus the efficiency of assessments, is to a large degree dependent on the socio-economic context and the hazard perception of the endangered population. Communication of results from glacier and permafrost hazard assessments should consider these circumstances.