GAPHAZ: improving knowledge management of glacier and permafrost hazards and risks in mountains

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High-mountain environments worldwide are undergoing changes at an historically unprecedented pace due to the sensitivity of the high-mountain cryosphere to climate change. Humans have settled in many mountain regions hundreds, even thousands of years ago, but recent intensive socio-economic developments have increased exposure and vulnerability of people and infrastructure to a large range of natural hazards related to high-mountain processes. Resulting risks are therefore increasing and highly dynamic. GAPHAZ, the Standing Group on Glacier and Permafrost Hazards in Mountains of the International Association of Cryospheric Sciences (IACS) and International Permafrost Association (IPA), is positioned in this context.

The objectives of GAPHAZ are to:
- improve the international scientific communication on glacier and permafrost hazards;
- stimulating and strengthen research collaborations in the field of glacier and permafrost hazards;
- compile a state of knowledge related to glacier and permafrost hazards in high mountains;
- work towards a greater transfer of information and improved communication between the scientific and governmental/policy communities;
- signpost sources of advice to international and national agencies, responsible authorities, and private companies;
- act as a focal point for information for international media during relevant crises.

Hazardous high-mountain processes

A breached moraine dam in the Cordillera Blanca, Peru

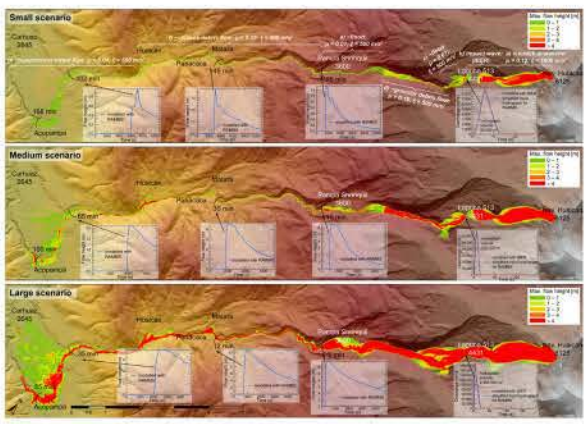
Ice-volcano interactions at Nevado del Huila Volcano, Colombia in 2007 (INGEOMINAS)

Impacts on society

Destruction of the town of Armero due to lahars from Nevado del Ruiz, Colombia in 1985

Damages in Täsch, Swiss Alps, due to a glacier lake outburst flood in 2001 (Crealp)

Monitoring, assessment and modeling of hazards & risks

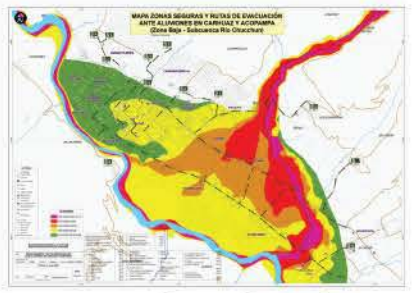


Model simulations of ice avalanche, impact waves and lake outburst flood for Laguna 513 / Carhuaz, Peru (Schneider et al. 2014). This information was used to generate hazard maps for the area.

Science-policy-community interactions

The interaction of science with policy and local communities is essential to develop and eventually implement risk management strategies (example from the Caucasus, Russia).

Contribution to risk reduction



Early warning systems are among the promising tools to reduce risks related to high-mountain hazards, and have been increasingly developed and implemented over recent years. Technical equipment such as real-time monitoring sensors (left: example rom the Cordillera Blanca, Peru); or evacuation plans for residential areas (right: example Carhuaz) are all important elements of early warning systems and based on science contributions.

Also part of a risk reduction portfolio may be structural measures such as deflection dams, sediment retention reservoirs etc. (example: construction for debris flow dams at Täschalp, Swiss Alps). The choice of appropriate risk reduction and climate adaptation measures strongly depends on local social, economic and political conditions.

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The Swiss Agency for Development and Cooperation, through the Sustainable Mountain Development for Global Change Programme (SMD4GC) is supporting GAPHAZ knowledge management and networking activities.