Leading experts concerned by climate change impacts on mountain communities, additional efforts are needed to cope with these challenges

Evidence is growing that high mountains are experiencing rapid environmental change. Worldwide, most alpine glaciers are shrinking, permafrost is thawing, and steep cold slopes formerly covered by ice are collapsing. Lakes at the margins of glaciers are draining suddenly, producing destructive downvalley floods.

On November 10 to 13, in the lead-up to the United Nations Climate Conference in Copenhagen later this year, over 70 of the world's leading scientists on mountain hazards met in Vienna to review and discuss the changing nature of hazards facing the millions of people who live in mountain regions. The group also considered possible impacts of disasters on key infrastructure, including railways, highways, pipelines, and hydropower reservoirs.

Rapid climate warming of the past century, continuing today and likely increasing in the near future, is bringing mountain communities to their limits as they have to deal with situations that have no historical precedent. Slopes that have been frozen for centuries are now thawing, releasing landslides that threaten people and infrastructure. Snow cover in many mountains is decreasing, affecting runoff, seasonal filling of hydroelectric reservoirs, and aquatic ecosystems. New unstable natural lakes are forming at the margins of glaciers, threatening communities tens of kilometers down-valley with catastrophic flooding.

Active volcanoes covered by glaciers are able to produce floods of enormous dimension and have resulted in disasters with tens of thousands of people killed. Retreating glaciers may reduce those hazards at volcanoes but also involve new types of hazards.

The scientists, from all continents of the World, explored future scenarios of environmental change in mountains. Much discussion focused on the vulnerability of mountain people to environmental change, as the largest populations at risk live in Asia and South America and have the fewest resources to cope with the hazards they face. Risk is increasing, not only in developing countries, but also in wealthy ones such as Switzerland, USA and Canada, due to greater concentrations in human populations in mountains and to economic development in alpine valleys.

The experts concluded that most natural disasters in mountains involve a sequence, or cascade, of events, one triggered by another. A landslide, for example, may enter a glacial lake, causing it to burst out and flood the valley below. Such conditions require a comprehensive approach both to understand the hazards and to formulate effective responses. Appropriate responses also require new knowledge, technically and culturally appropriate remediation, and adaptive capacity. Moreover, socio-economic change and widespread security problems further challenge the adaptive capacities of mountain societies to respond to climate-related risks
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New databases and technologies are providing information on the rapid changes that are occurring in mountain environments around the world, on losses due to natural disasters, and on who is suffering and how. The experts concluded that a concerted, coordinated effort is needed to fill gaps in our knowledge of hazardous processes and to apply the best technology we can to reduce human suffering caused by changing climate conditions in high mountain areas.