Global Mountain Safeguard

Emerging Risks and Future Challenges for Mountain regions worldwide

Working Group "Mountain Ecosystems"

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Background and Challenges

Mountain ecosystems undergo changes related to various drivers such as encroachment of settlements, land use changes as well as climate change. Changes in the high mountain regions alter water, nutrient and sediment supply to downstream ecosystems and communities. Simultaneously, water demand is increasing in many parts of the world, driven by population growth and development.
Many high mountain regions are currently undergoing significant and faster **warming** than the global mean. At many places amount of **snow** cover, the length of the snow season and mountain glaciers are declining. As a consequence an increasing amount of **meltwater is currently discharged** in many regions. However, due to the projected **decline of mountain glaciers**, the trend in glacier runoff will revert by the end of the 21st century in many high mountains. Also the water quality undergoes changes. The melting of glaciers was shown to contribute with **persistent organic pollutants** (POPs) and mercury to glacial runoff. The changes in water temperature and the release of contaminants is potentially harmful to both humans and ecosystems.

The expected **consequences for biodiversity are manifold**. Climatic factors are shaping the **horizontal and vertical distribution** of genotypes, populations, species, and ecosystems. When climate changes distributional patterns will undoubtedly change as well. One example are the vegetation belts, which are expected and observed to **move upwards**. The direct connection between all components of our ecosystems, however, is frequently blurred by various factors derived from **land-use and ongoing land-use changes**. This is especially true for mountain regions with long-lasting human impact, such as the South-American Andes and most mountain chains in Eurasia and the Mediterranean. A human impact is also the loss of geographic dispersal barriers for many animal and plant species, i.e. diaspores and individuals can reach areas far-off from their original areal and find – due to the changing climate – conditions suitable for them. **Alien species** is a topic frequently discussed in connection with climate change.
Climate change does not only favor alterations in distribution but is likely to lead also to changes within ecosystems on one hand and within species on the other hand**. Interactions between plants and animals may change.** Many plant and animal species will show adaptive responses changing their physiology and behavior. The specific selection pressure due to rising temperatures might have genetic consequences promoting changes at the intraspecific level. More specific consequences for mountain ecosystems will be caused by the loss of glaciers and snow cover. **Glacier retreat leads to biodiversity loss** in aquatic ecosystems by a number of taxa that decrease in density with glacier cover decline. Some endemic, cold-adapted invertebrates are especially at risk.
These changes have very direct **impacts on ecosystem service provision for mountain populations**. Mountain regions are 'water towers' providing water for ecosystems and agricultural production. Rising

air temperature and shorter duration of snow cover influences the **length of the growing season and the phenology of plants** with direct **impact on agriculture.** Increasing temperatures increase evapotranspiration of natural vegetation and crops, and trigger **uphill movement of vegetation** and agriculture. However, this uphill expansion in mountain areas can be **restricted for example by drought** since irregular precipitation and increased frequency and intensity of extreme events also impact vegetation and agriculture. **Adaptation** to these changes is ongoing worldwide in both ecosystems and mountain communities.

Against these changes, the WG "Mountain Ecosystems" aims at discussing observed and projected **impacts** on mountain ecosystems, and ecosystem service provision to mountain and downstream communities. The WG also discusses the variety of **conservation, adaptation and risk reduction actions currently implemented** in mountain regions and explores how ecosystems can be also part of the solution in the context of **ecosystem-based adaptation and disaster risk reduction**.

What does this session aim to accomplish?

1. The session will provide a platform for a dialogue around observed impacts on mountain ecosystems, ecosystem services and communities as well as ongoing adaptation and risk reduction action across geographies in high mountains and discuss knowledge gaps and research priorities
2. The session will discuss the existing experience with measures undertaken for conservation, adaptation (incl. ecosystem-based) and risk reduction in various geographies to capture the variety of experiences and existing research and implementation gaps.
3. Based on the discussion working group members will jointly develop statements for the GLOMOS roadmap

Suggested format

The session will be interactive and will consist of short plenary sessions followed by breakout-group discussions.

Structure and timing

9:30 – 10:30	***Session 1 Setting the stage for mountain ecosystems***
9:30 - 9:40	Introduction to the session: Andreas Hilpold (Eurac) and Zita Sebesvari (UNU-EHS)
9:40 - 9:55	Input presentation on changes in ecosystems and biodiversity (Davnah Payne, Global Mountain Biodiversity Assessment (GMBA))
9:55 - 10:10	Input presentation on changing ecosystems´ impact communities (Erin Gleeson, The Mountain Institute)
10:10 - 10:25	Input presentation on ecosystem-based solutions (Mathias Bertram (tbc), GIZ)
11:00 – 13:00 (2 hours)	***Session 2 Identification and discussion of working group topics***
11:00 – 11:30	Reflection on impacts and solutions, collection of topics to be considered for the working group (flipchart, at the end of the session identification of 4 topics to be discussed in detail (preferably 2 related to ecosystems and 2 related to communities & solutions)
11:30-12:30	2 breakout groups focusing on two of the topics identified

12:30 – 13:00 Presentation of the groups, prioritization of “issues”, suggestions for statements for the GLOMOS roadmap

14:00 – 16:00 (2 hours) ***Session 3 Continued discussion of working group topics, synthesis***

14:00-15:00 2 breakout groups focusing on the two remaining topics identified

15:00 – 15:30 Presentation of the groups, prioritization of “issues”, suggestions for statements for the GLOMOS roadmap

15:30 – 16:00 Synthesis of the entire session, consolidation of statements and outlook (30 min)

Rapporteur: Julia Seeber and Isabell Lenz