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Our modern cryosphere

C. de Jong

The Mountain Institute, University of Savoy, France (carmen.dejong@institut-montagne.org)

Our cryosphere is changing rapidly and is probably the most sensitive and obvious widespread global indicator for climate change. This brings with it interesting challenges and facets of human response and adaptation to both land and sea ice in terms of benefits and risks. On the one hand, new risks may evolve on land, such as more frequent flooding with intensive sediment transport or land subsidence and water logging due to the degradation of permafrost. On the other hand, new potential economic benefits such as the evolution of agriculture e.g. potato farming in Greenland's coastal zones become evident. In other words, pristine land is being colonized and its use optimized. Over the sea, hazards such as ice-berg mobilization and decay may menace the feasibility of harbours and oil rigs and warming oceans may also reduce the yields of important economic sources such as fish industry. This contrasts with the benefits of the development of new transport routes facilitating world trade under new, evolving geopolitical boundaries.

There are significant differences in the way in which these benefits and risks are managed in polar zones as opposed to mountain regions. In the arctic, the tendency is to adapt to the newly recovered landforms and to benefit from the natural resources offered. In mountain regions, the tendencies are to compensate for the lacking cryosphere and to develop it artificially in order to maintain practices such as winter tourism. This is only possible with the help of heavy water and energy infrastructural investment and maintenance. Examples include the creation of artificial snow as well as the preservation of small glaciers. In the past, rapid climate change was coupled with increased instability of the environment as it adapted to a new potential equilibrium, e.g. by glacier retreat, slope instability, sediment transport or flooding. Thus, the impact of cryosphere change will have long-range and long-term effects with socio-

economic consequences different to the present, however many people concerned are not yet aware of this.

At present, the tendency of local, regional and national authorities to continue with business-as-usual will not be possible in the near future considering the current tendencies of change. Whilst populations in polar regions may recognize the benefits of a changing cryosphere, those in mountain regions are still trying to combat it through technical measures rather than benefiting from new options. People could benefit from revising their attitudes towards cryosphere change taking into account that the modified natural conditions are no longer sustainable.