



Morphodynamics of the Mont Blanc massif (European Alps) in a changing cryosphere

P. Deline (1), M. Gardent (1), F. Magnin (1), L. Ravelin (1,2)

(1) Université de Savoie - CNRS, EDYTEM, Le Bourget-du-Lac, France (pdeli@univ-savoie.fr), (2) IGUL, Université de Lausanne, Switzerland

One of the most glacierized and elevated areas in the European Alps, the Mont Blanc massif illustrates how accelerated change affects the cryosphere and its related morphodynamics in high mountain environments, especially since the termination of the Little Ice Age. Contrasts between the NW side, gentle and heavily glaciated, and the SE side, steep and rocky, as between local faces of which slope angle and aspect are extremely varying, make the study of the massif particularly relevant.

Glacier shrinkage is strong at low elevation – even if less than in other Alpine massifs – whereas supraglacial debris covers develop on all the glaciers, several being debris-covered since the nineteenth century. Lowering of glacier surface also affects areas of the accumulation zone. If modern glaciology is carried out in the massif since several decades, study of the permafrost is under development since few years only, especially in the rockwalls.

Many hazards are related to glacier dynamics. Outburst floods, especially from englacial pockets, ice avalanches from warm-based to cold-based glaciers, and possible effects of glacier shrinkage on the rock slope stability, are generally increasing with the current decrease or even the vanishing of glaciers. Active permafrost degradation is likely triggering rockfalls and even rock avalanches, participating to the chains of processes resulting from the high relief of the massif. Generated hazards could increasingly endangered population and activities of the massif valleys.