



Recording and analysing high mountain rockfall events in relation to cryosphere changes

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The unusual rockfall activity registered during the hot Summer 2003 was the trigger for the PERMAdataROC Interreg project. This project is aimed at investigating the correlation between permafrost degradation and high altitude rockwall instability (Deline et al., this conference). Considered the scarcity of available quantitative data on rock-falls occurring in high mountain slopes (usually only very large events are recorded), one of the project research axes is the development of a database concerning rock-falls/avalanches in high elevation rockwalls. The database contains information collected with two different, complementary approaches: (i) a systematic survey of present-day rock-falls/avalanches carried out by local people (mountain guides, hut keepers, etc.), trained for the purpose; (ii) a collection of documented historical events, based on previous studies, document analysis, multi-temporal aerial photo interpretation. The first approach is particularly innovative and promising, though not easy to manage: in fact, it represents the only way to systematically record slope instability events of all sizes, related to climate variations in high mountains. The project study area is the Mont Blanc massif, but information on other Western alpine areas have also been collected. Each slope instability event has been localized and described, with a specific attention to the conditions of the detachment scar (time, meteorological conditions, volume, snow cover, presence of ice...). The information has been implemented in a GIS, in order to allow a subsequent data analysis by mean of spatial analysis tools, according to the main parameters which control slope stability at high elevation and in a context of permafrost degradation (slope, topography, exposition, geology, hydrology). At the moment, more than 200 rock-fall/avalanche events have been documented

in the Mont Blanc massif, but only a part of these are expected to be usable for spatial analysis, as the information is, in some cases, incomplete. The main aim of this activity is to distinguish in the slope instability events the importance of, on the one hand, the geological, meteorological and topographical parameters, and, on the other hand, the permafrost degradation. The outcomes of this research, together with those coming from the other axes of the PERMAdataROC project, will allow to quantify the effect of climate warming on the stability of high-Alpine steep rock slopes.