



Microseismic activity analysis for the study of the rupture mechanisms in unstable rock masses (Matterhorn, North-western Alps)

D. Amitrano (1), M. Arattano (2), M. Chiarle (2), G. Mortara (2), C. Occhiena (3), M. Pirulli (3), and C. Scavia (3)

(1) Université Joseph Fourier Grenoble, France, (2) CNR-IRPI Torino, Italy, (3) Politecnico di Torino, Italy
(cristina.occhiena@polito.it / Fax: +39 0115644899)

Rockfalls are very frequent events in alpine areas and can endanger human lives and activities. Since high mountains have been affected by an increasing number of these phenomena in the last years, a possible correlation with the effects of climate changes can be hypothesized. The permafrost degradation, causing the thaw of the ice that fills the rock discontinuities, is then investigated among possible causes of rockfalls. Therefore the monitoring of potential rock instabilities in high mountain in relation with permafrost degradation has been carried out in the frame of the Interreg IIIA ALCOTRA “PERMAdataROC” project. Within the project, a monitoring network has been installed in 2007 on the Italian side of the Matterhorn peak, close to the J. A. Carrel refuge (3829 m a.s.l.). This site is an important destination for climbers going to the Matterhorn peak and is frequently affected by rockfall events. The monitoring network consists of a set of 5 triaxial geophones, to record the existing microseismic activity, and one thermometer, to analyze the temperature trend. A preliminary data processing has concerned the classification of the recorded signals, the identification of the most important microseismic events and the analysis of their distribution in time. As far as this last aspect is concerned, first interpretations have evidenced a possible correlation between the temperature trend and the event concentrations, during particular thermal sequences. The research is still in progress and it is expected that a longer recording period of seismic events and temperatures will help to understand if the microseismic activity is mainly concentrated in some periods of the year, in some parts of the slope and if it is produced by superficial or deep events. A concentration of superficial events in some parts of the slope, together with a structural analysis of those portions, could help to focus on the areas that can be more unstable. While, their correlation with temperatures could help to understand the role of permafrost degradation in this area.