



Acoustic emissions investigation for rock slope stability analysis in high mountain areas

Massimo Arattano (1), Marta Chiarle (1), Velio Coviello (1,2), Cristina Occhiena (2), Marina Pirulli (2), and Claudio Scavia (2)

(1) CNR IRPI, Torino, Italy, (2) Politecnico di Torino, Italy

Rock falls are very frequent events in the Alps that may cause severe damage to population, settlements and infrastructures. Since an increasing number of these phenomena affected the Alps in the last few years the existence has been supposed of a correlation with climate changes. Permafrost degradation, causing the thaw of the ice filling rock discontinuities, which subsequently freezes again, is a probable cause of the observed increase of these events, generated by induced stresses in the rock mass.

To investigate these processes, a monitoring system composed by geophones and thermometers was installed in 2007 at the Carrel hut (3829 m a.s.l., Matterhorn, NW Alps). In 2010, in the framework of the Alcotra 2007-2013 Project MASSA, the Matterhorn monitoring system has been empowered and renovated, in order to meet project's needs. Three new geophones have been installed, the acquisition and transmission system has been improved, and additional tests have been realized to improve the propagation velocity field already available.

The research in progress consists in the analysis of the recorded data to investigate the spatial-temporal distribution of microseismic activity in the rock mass, with specific attention to the relation with temperatures. The overall goal is to set up an effective monitoring system for investigating the stability of a rock mass under permafrost conditions, in order to supply the technicians with a valid tool for decision-making and the researchers with useful data to better understand the relationship between temperature and rock mass stability.