ABSTRACT

GEOTECHNICAL AND THERMAL MONITORING OF SOUTH RIDGE OF ROCCIAMELONE MOUNT

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The Rocciamelone mountain (3,538 m) rises above the Susa and Cenischia valleys (Turin province) and for many centuries this peak was deemed to be the highest in Italy. In 2006-2007, a portion of its south ridge, approximately at 3,200 m of height, was affected by a rock landslide evolving in collapse and flow processes.

Although this event did not lead to any particular problems in terms of risk management for the inhabited area down below, emphasis was placed on the potential consequences that may rise if larger portions of the mountain collapsed, as suggested by the latest instability studies.

Back in autumn 2007, Arpa Piemonte installed along the south crest of Rocciamelone (between 2,850 and 3,300 m of height) a geotechnical monitoring network that includes distance-measuring bases, GPS benchmarks and a wire strain gauge. Starting from 2013, some thermometers have also been installed in the rock and in open fractures in order to check reactions between deformation and temperature in rock masses.

In fact, in the last few years landslides in alpine areas have been more and more often put in relation with climate changes and permafrost degradation, even though the lack of data, mainly temperature values inside rock masses, does not allow experts to unambiguously and definitely establish any cause-effect relationship between atmosphere warning, permafrost degradation and gravitational phenomena.

SLALOM PROBING - A SURVIVAL CHANCE OPTIMIZED PROBE LINE SEARCH STRATEGY

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Abstract. Probe line searches are an important tool for organized avalanche rescue. Since electronic search means or avalanche dogs are not always available, probe line searches still need to be applied. In France, the percentage of buried subjects which were found by probe lines in the period winter 2001/2002 to 2010/2011 was 13.2% and decreased for the period 2006/2007 to 2010/2011 only to 11%. As survival chances of avalanche burials drop rapidly with increasing burial time, the biggest drawback of probe line searches are their slow area search speed. Since the efficiency of a rescue system is based on its potential to save lives, it is important to find the highest survival chance of an avalanche burial as a balance between area search speed and probability of detection.

The ICAR Avalanche Commission task group "probe line strategies" therefore further optimized the current probe line search methods. Analysis of the physical effort and efficiency of the rescuer lead to the "Slalom Probing" method. Within this approach each rescuer covers a 1m broad strip of the avalanche debris which he or she probes walking in a "slalom" pattern across the strip. The method is designed with sufficient error tolerance to allow for uninterrupted flow of the probing activity.

The rescuer always probes right in front of his or her body, perpendicular to the slope angle. The total ergonomic and organizational benefits of our new method lead to 33-50% increase of the probed surface compared to existing probing methods.

VALGEROLA: THE AVALANCHE OF 1836 Historical avalanches and responses from local communities

C. Ruffoni

Abstract. This article presents the historical documents and evidence on the avalanche of 1836 and the work Valgerola communities have carried out for centuries to preserve forests and protect their dwellings. On the night between 29 February and 1st March 1836, an avalanche swept the hamlet of Case di Sopra, in the Gerola Alta municipality, in the Sondrio province, making 66 casualties, in addition to the loss of all livestock.

The victims recovered among ruins, 48 in total, were buried under the floor of the hamlet church, miraculously undamaged; the others, carried away to the valley bottom, were buried in the Gerola cemetery. The avalanche was so large that the last victim was only recovered after thawing, on 24 August. A direct testimony of this tragedy is contained in the "memory" written on the parish register of victims kept by father Antonio Brunati. This terrible event, with the list of victims, is also remembered by two paintings in the hamlet church and in the votive chapel built near the Gerola parish church in a more recent age.

What were the causes of this disaster? The historical documents of the valley do not bear witness to any indiscriminate felling of trees, quite the contrary; they clearly show how in the past communities used to

strongly perceive avalanche danger. In fact, back in the fifteenth century, local dwellers created "tensi" woods: in these woods (mainly those upstream to dwellings) it was severely forbidden to cut down any kind of tree. This tragic event was therefore the result of particular meteorological conditions. And this is also proved by the fact that no avalanches had ever occurred along that slope in the previous centuries and later, not even on the occasion of heavy snowfalls like those in 1917 and 1951.

FRESH SNOW DENSITY IN THE ITALIAN ALPS

M. Valt

Abstract. Density of precipitation and R ratio (snow/rain ratio) are typical of any region and range depending on the season, altitude and air temperature. With a database of over 12,000 daily measurements of density of fresh snow fallen in 24 hours, an average density of 115 kg m-3 equal to a R (8,7:1) was determined for the Italian alps. A difference of snow/rain ratio from R (9,9:1) for continental areas to R (7,7:1) for eastern Alps was also observed. Major differences for the R ratio were also found based on the different months of winter and altimetry range. The standard value of R (10:1) is achieved with a minimum air temperature in 24 hours of around -4 °C/-5 °C in continental Alps and of around -10 °C in eastern Alps.

RADAR SURVEYS FOR THE STUDY OF THE ENDOGLACIAL CHARACTERISTICS OF THE FORNI GLACIER IN ALTA VALTELLINA

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Abstract. Geophysical surveys with GEORADAR methodology were carried out in October 2105 in the upper area of the eastern tongue of the Forni Glacier (Alta Valtellina, Ortles-Cevedale group) to investigate the endoglacial characteristics of a series of concentric crevasses and an area of light subsidence.

Two types of measurements were carried out: surveys with multi-channel Georadar (center frequency 200-600 MHz) through connection with Georef system by means of satellite instrumentation and with GNSS topographic surveys in Base Rover configuration. For this kind of measures the permanent benchmark was created near the AWS automatic stations installed on the border of the surveyed area. The dielectric constant of the present materials enabled experts to verify the presence of a strong reduction of the signal starting from a depth of 20-25 m. A rapid increase in water content most likely occurs in this "critical" zone, resulting in rise of conductivity.

Based on what has emerged from surveys, the strong water content increase at this level is currently the only arguable assumption and may be connected with ongoing subsidence and crevassing.