ABSTRACT

CISA IKAR 2009

Stefano Pivot

The annual congress of CISA-IKAR, the International commission for avalanche rescue, took place in the Swiss city of Zermatt, right in front of the imposing Matterhorn.

The congress was attended by little less than 300 alpine rescue experts, with over 50 organizations from 30 different nations.

AVALANCHE ACCIDENTS IN THE ITALIAN ALPS 1985-2009

Valt M.

Avalanche accidents show a very high mortality rate that ranges from 60 % (Valt et al. 2003) to 70% (Ancy, 2007), i.e. much higher than that of traffic accidents (3% of casualties every 100 accidents). The study of avalanche accidents thus offers a basis to understand the dynamics of the event and search for necessary prevention strategies in a field that ranges from anthropised zones subject to preventive control to recreational and sports activi-
ties in leisure time.

In Italy, the most exhaustive database is managed by AINEVA (the snow and avalanche interregional association), whose activities also include gathering of data and information on avalanche accidents, in order to determine, from the analysis of events, behavioral lines and useful actions aimed at reducing risk (Cagnati e Valt, 1989).

This work follows the one carried out in 2003 by Valt et al. which analysed twenty years of data (1984- 2003) and, from one hand it is an update of the previous one, and from the other provides new viewpoints of the problem.

Therefore the work illustrates the results of the analyses carried out on more than 950 avalanche accidents included in the information archives of AINEVA and compared with the results from similar works carried out abroad. The period considered goes from the winter season 1984-85 to 2008-09 (25 years). For the analyses of the morphological features of avalanches,
the sample of data available is more limited (roughly 500 accidents), but is well-distributed within the period considered. For the analysis of the number of casualties the sample available is more comprehensive, going from 1967 to 2009 (41 years).

THE AVALANCHES OF 16 DECEMBER 2008 AT CERESOLE REALE (TURIN)

Maggioni M., Caimi A. Godone D., Freppaz M., Bertea A., Cordola M, Prola M.C., Bertoglio, V. and Frigo B.

December 2008 was characterized by intense precipitations, in particular in the middle of the month (14th – 17th) throughout all the Italian Western Alps. Numerous avalanches occurred causing damages to villages and affecting road conditions. In this work we describe the meteorological situation and the intense avalanche activity that affected the area around Ceresole Reale, a small village at 1,570 m asl in the upper Orco Valley in Piedmont Region. On 17th December the
snow height at the village was 250 cm, the maximum value registered in December, referring to an eighty year long snow data set. In the period between the 15th and the 16th of December many avalanches occurred. Some of them have been classified as extreme avalanches and flowed in areas where no avalanches were reported in the past, overcrossing the limits of the official avalanche map. In particular, 4 simultaneous avalanches occurred just above the village and destroyed 6 houses and 12 ha of forest. The analysis of deposit and damages has shown that the avalanches featured both a dense and a powder part. We estimated that a volume of snow of about 100,000 m3 released from 2,450 m asl and flowed into the Ceresole lake at 1,580 m asl. A first rough estimation of the avalanche intensity has been done comparing the damages with the values published in literature. A more detailed analysis should include avalanche dynamics simulations and back-analysis from the observed damages.

10 YEARS OF EXPERIENCE OF SIVA OF ARPA PIEMONTE: DEVELOPMENTS OF THE WEBGIS SERVICE AND TERRITORIAL EXPANSION

Prola M.C., Alibrando M., Lorusso B., Casullo R., B. Lorusso, R. Cassulo,

Arpa Piemonte has been investing for many years into the development of processes and products to allow users make the most of the number of information included in its database and the studies carried out in its framework, sometimes developed in synergy with the university, Politecnico or in the context of interregional projects.

It is fundamental for the technical bodies of public authorities committed to the planning and management of alpine territories to be able to use an efficient tool that offers access to all documents on issues linked to avalanche effects. SIVA , Sistema Informativo Valanghe (the avalanche information system), developed since the late 1990s, has always suited the needs

of competent authorities and, through a long and complex updating process, it has evolved from a simple tool for consulting information to an instrument that is used to get freely online thematic maps, photos, scanning of historical documents, avalanche register models and meta-documents. Other than undergoing substantial functional improvements, SIVA has also been enriched with avalanche maps covering further territories. In the last winter season, when managing mid-December critical avalanches, SIVA also turned out to be a valid instrument to determine zones subject to highest risks.

THE LIMIT OF SNOWFALLS: A PROBLEM FOR DETAILED FORECASTING OF SNOWFALLS ON A DEMANDING MOUNTAIN TERRITORY

Marigo G. and Thierry Robert-Luciani

Forecasting of snowfall limit during a precipitation event is a problem for forecasters, mainly in case a detailed forecast

is needed to cover a demanding difficult mountain or piedmont territory.

The limit of snowfalls represents the altitude value beyond which precipitations are mainly (90%) solid (Kappenberger/Kerkmann, 1997), and not the altitude beyond which snow accumulation on ground occurs. The limit of snowfalls is usually below the height of deposit on ground.

GPR: SNOW DENSITY STUDY
Snow profiles obtained with the geo-radar methodology

Stefania Burba

The purpose of this study is to test the GPR method to obtain information about snowpack density. The Ground Penetrating Radar (GPR), emits an electromagnetic signal that penetrates the investigated material in different ways related to the medium. The reflected portions of signals collected on the field are analyzed to derive some electromagnetic snow characteristics. It is possible to correlate these characteristics to the material density using

empirical models, and snow profiles of the snowpack can be obtained.

The goal is to test and validate the geo-radar methodology in the horizontal direction, analyzing each layer identified in the snowpack. We want to verify that the values derived from the application of mathematical models to experimental data are comparable to those obtained by the current manual methodology.

The results obtained are not unique depending on the analysis method chosen. In general, the methodology is extremely sensitive to the signal speed estimate and now it does not seem strong enough to produce reliable snow profiles, being only able to describe the increasing density trend of values. The reasons for that are to be found in the large spatial variability of the investigated medium, the complexity of the procedure used, the errors encountered in the probe positioning and the empirical nature of the models used.