

ABSTRACT

WINTER SEASON 2011-2012

M Valt, P. Cianfarra

The winter season 2011 – 2012 will be remembered as a season with little snow in early and mid winter, heavy snowfalls in late January - first half of February, particularly in the central-western sectors, with snowfalls also occurring in the large cities (Turin, Milan, Bologna, Florence, Rome), for the harsh temperatures that favored permanence of snow also at low altitudes with consequent problems to circulation, and for the long periods of warm weather in late winter and early spring that caused fast melting of snowcover.

The present article provides a detailed balance of the last winter season by means of data on temperatures and snow conditions, compared with past seasons, and general considerations about avalanche danger and avalanche accidents.

CISA IKAR 2012

S. Pivot

The annual conference of the CISA-IKAR, the International commission for alpine rescue, took place in Krinica, Poland.

It was the occasion to make a report of the large deadly avalanches of the past season: near the Lyngen fiord in Norway, in the area between Jannu and Kashmir in Pakistan, on the Manaslu in Nepal and the Mont Maudit in the Mont Blanc, French side.

We will mainly remember the meeting of this year for the massive introduction of the new software programs for smartphone and, more in general, for Internet, being applied to avalanche rescue.

AVALANCHES AND AVALANCHE PROTECTION FORESTS

L. Caffo

The large avalanches that took place in winter 2008-2009 highlighted problems concerning safety of both people and infrastructures, and territory as a whole.

After a number of empirical observations, the study of avalanche pro-

tection forests has underlined the occurrence of destructive events within forest populations, offering the hint for new considerations and bringing about important practical consequences.

Venaus and Giaglione municipalities, in medium Susa valley, are subject to avalanches that originate on the high pastures on the eastern side of Punta Mulatera, above the tree line.

The Rio Supita avalanche descended through a narrow gully, whereas the Martina avalanche with its 200 m wide front reached a wood of larches and beech-trees below, first interrupting the State Road n. 25 of Moncenisio and then stopping near Venaus.

Following the avalanches of December 2008, an Emergency Plan of Civil Defence for Avalanche Risk Protection was set up (Neve e Valanghe n. 70, August 2010), followed by the arrangement and positioning of 5 snow gauges, as an integration of the existing snowpack monitoring system that includes an automatic snow measurement station that was installed near the Grange Martina station during the XX Winter Olympics of Turin 2006 (ARPA Piemonte). Afterward, weekly snow measurements were carried out in winter seasons (by CFVAS), and graduation theses were carried out aimed at studying more exhaustively avalanches making the most of "a posteriori" observations.

The short description of facts shows that forests play a modest avalanche protection role in the avalanches track zone, however the lack of forests along a slope leads to the presence of potential starting areas, even at rather low altitudes, which means a higher probability of presence of high density snow due to averagely higher temperatures and possible rain and snow mixed (sleet).

ESTIMATE OF PRECIPITATIONS AT HIGH ALTITUDE SITES Use of experimental manual and automatic



data on new snow density to establish empirical relations

K. Cugerone, P. Allamano, A. Sallandin, S.Barbero

The evaluation of the water resources available as snow at high altitude sites occurs through the determination of snow water equivalent (SWE).

SWE estimates are obtained locally by performing manual samplings or through the use of models that reproduce the evolution of the characteristics of the snowpack.

The need for improvement of the SWE estimates and of the hydrological models has led to a research collaboration between the Department of forecasting systems of Arpa Piemonte and the Department of Environment, Land and Infrastructure Engineering of Polytechnic of Turin. This cooperation aims at investigating snow water resources through the activation of experimental measurement sites and the definition of quantitative indicators of the of water resources state.

DYNAMICS OF DENSITY OF SEASONAL SNOWPACK

F. Avanzi, C. De Michele, A. Ghezzi, C. Jommi

Snow covers are complex multi-phase mixtures characterized by mechanical, hydraulic and thermic

properties which are strongly time-dependent. The snowpack mass content represents a natural reserve of water, which could be available in spring and summer for water runoff and human exploitation.

Since snow dynamics seem to be also strongly dependent on climate change, it is quite evident how a precise modeling of the snowpack mass content is a crucial information for many engineering and social aims. Snow density, coupled with snow depth, is used to calculate the snow water equivalent. Anyway, estimation of snow density is often determined through empirical relations, mainly due to its high non-linear dynamics caused by the occurrence and alternation of dry and wet conditions of snowpack.

A model for the dynamics of the mean snowpack density is here proposed, which allows, together with the modeling of snow depth, evaluation of snowpack mass content. The snow cover is assimilated to a two-component mixture: a dry part, composed by the ice structure, and a wet part, including liquid water. The model describes the dynamics of three variables: depth of the icy structure, depth of liquid water and mean density of the dry structure. The model has been calibrated and validated using some hourly data measured in a US instrumental network (SNOTEL).