



Fresh snow density on the Italian Alps

Mauro Valt (1,2), Igor Chiambretti (2), and Paola Dellavedova (3)

(1) AVALANCHE CENTER, ARPAV, Arabba, Italy (mvalt@arpa.veneto.it), (2) AINEVA, Vicolo dell'Adige 18, 38122 Trento, Italy (aineva@aineva.it), (3) Fondazione montagna sicura - Ufficio neve e valanghe Regione Autonoma Valle d'Aosta - AINEVA (p.dellavedova@regione.vda.it)

The Italian Alps extend between 6.6-13.7 Long. East and 47.1-44.1 Lat. Nord and are characterized mainly by a Mediterranean climate.

In recent years, several studies have highlighted the snowpack differences between the southern and northern sides of the Alps and characteristic average density values have been identified subdivided by elevation. The results of such studies also define the typical grain size values by density and layer hardness, the snow line elevation, and its variation during the last century. Considering the snow cover stability, the main differences were identified more between the Pyrenees than the northern side of the Alps. Such research allowed us to improve the knowledge of the snowpack and the performance of hydrological models and snowpack evolution simulations.

In order to further implement such results for the snow characterization on the southern side of the Alps, in the present work we have analyzed the snowfalls.

Data from over 80 stations, during the last 5 winter seasons, were analyzed using more than 4600 density measurements of freshly fallen snow during a 24 hours period.

The initial findings show that the most common density values measured for snowfalls in the Italian Alps are between 50 and 175 kgm⁻³ (83% of observations).

Using measured air temperatures, during the 24 hours period for each station, fresh snow density values have also been calculated for each temperature range. With minimum air temperatures between +4° C and +1° C, the measured average fresh snow density was 188 kgm⁻³ (1% of the measurements), between 0° C and -4° C, such value increases between 160 and 114 kgm⁻³ (39 % of the measurements), between -5° C and -11° C its almost stationary (113-100 kgm⁻³ , 49% of the measurements), between -12° C and -16° C its average is of 93 kgm⁻³ (9 % of the measurements) and between -17 ° C and -21° C it decreases to 73 kgm⁻³ (2 % of the measurements).