



Recent snow cover variation and avalanche activity in the Italian southern Alps

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The study of the snow cover variation is fundamental for alpine countries for many reasons, specifically winter tourism, hydro-electricity production, avalanche activity/forecasting, and for its potential in shaping the mountain ecosystem. Snow and ice have a crucial role in the Earth's radiative balance and they are significant indicators of climate changes. Available data on the snow cover is limited if compared to other parameters (e.g. temperature) and therefore its interactions with climate are not easily quantifiable. Snow cover reduction has been documented by many authors both at the hemispheric scale and at the regional scale on the European mountainous regions. The aims of this work are: (i) to publish an up-to-date, homogenous, dataset of the historical records of snow measurements (snow duration, cumulative seasonal snowfall, maximum seasonal snow depth) collected around the southern part of the Italian Alps; and (ii) to explore the relationship between regional scale and hemispheric scale snow cover trend; (iii) evaluate the recent changes in snow cover characteristics and (iv) to assess the impact on avalanche activity.

Preliminary results from the performed analysis showed a decrease of the seasonal snow duration, the seasonal snow precipitation and of the maximum depth of snow in the last 30 years. This reduction may relate to a the decrease in winter precipitations that in turn may relate to a variation of the regimen between liquid and solid precipitation and/or to temperature increase. Northern Hemisphere and Southern Alps snow cover trends strongly correlate in the frequency domain as shown by FFT analysis. Among the dominant frequency the 11,2 period was detected that may relate the 11-year solar cycle. A linear correlation between avalanche activity and snow precipitations was detected in the last 25 years.