



Slope instabilities occurred at high elevation in the Italian Alps in 2016: regional landscape fragility and meteorological framework

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The Italian side of the Alps includes some of the most fascinating and, at the same time, fragile landscapes of the European Alps (e.g. the Mont Blanc Massif, the Matterhorn and the Dolomites). The relatively low latitude and the prevalence of the exposure to the South, together with a decrease of approximately 10% of the precipitation in the last 100 years, have exacerbated more than in other parts of the European Alps the consequences of climate warming on the cryosphere. It is a fact that many Italian ridges extend in the lower fringe of the permafrost and that glacier shrinkage since the end of the Little Ice Age has been dramatic, up to the almost complete deglaciation of most of the south-western and eastern Italian Alps.

In view of this, and of the fact that 2016 has been declared as the warmest year on record globally, we analyze the natural instability events that occurred in 2016 in the Italian Alps at high elevation (> 1500 m a.s.l.). More than 20 events have been reported in the period March-October, mostly in the western and eastern Italian Alps. Rockfalls significantly outweigh other types of instabilities, but ice falls, glacial outburst floods and debris flows have also been documented. The properties and spatial occurrence of these instability processes will be discussed, as well as the synoptic meteorological context in which they developed, in order to contribute to the discussion on how ongoing environmental changes are influencing the response of glaciated and recently deglaciated slopes to meteorological forcing, and thus hazard occurrence.