

Abstract Preview - Step 3/4

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Topic:

Title: THE STUDY OF SNOW AVALANCHES FROM A CLIMATE CHANGE PERSPECTIVE

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Text: In the last thirty years an increase in air temperatures, a possible increase of extreme rainfall events and an altitude increase in the snowline have been observed. These changes influence the snowpack and will therefore change the type, magnitude, frequency and dynamics of avalanches. Currently we cannot assess the influences of these changes on avalanche dynamics, due to the lack of dynamics models, which include the influence of the snowpack properties.

The STRADA project was founded in 2010 to fill this gap and to develop strategies for adaptation of the management of natural risks to climate changes in Switzerland and Italy. The project includes the development of methodologies for the study of frequent avalanches in a changing climate context. These methodologies combine the most advanced knowledge in the field of modelling avalanche dynamics and simulating the evolution of the snow. They will be used in risk mitigation strategies, such as transport links and ski-resorts management. During the project, many measurements were made at the experimental sites: mass, speed, flow regimes and runout distances of numerous avalanches were recorded. The corresponding snowpack characteristics were directly measured in the field or indirectly determined using the numerical model SNOWPACK.

The combined analysis of this data has shown, for the first time, the importance of the variation of the snowpack temperatures along the avalanche track on the avalanche dynamics and therefore on the runout distance. This analysis has also shown how the distribution and height of the snowpack can change the effective ground morphology, changing particularly the effective roughness, with a direct influence on the location and extent of the avalanche starting zones. These new findings will be implemented in RAMMS, an advanced avalanche dynamics model, which takes into consideration, in addition to the erosion processes, the characteristics of the snowpack, including its temperature.

Preferred Presentation Type: Poster

Conference: Davos Atmosphere and Cryosphere Assembly 2013 · Abstract: A-544-0000-01225 · Status: Draft

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