



## **Trends in Swiss Alpine Snow Days: The Role of Local and Large-Scale Climate Variability**

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Swiss Alpine snow cover shows large variability on the year-to-year and decadal time scale. Moreover, since the late 1980s large decreases in snow pack have been observed for stations below 1300m altitude. In this study linear statistical models are used to quantify the effect of seasonal mean local temperature and precipitation on the observed variability and trends in Swiss Alpine snow days for the period from 1958 to 1999. The role of large-scale European-North Atlantic climate variability on Swiss winter snow pack variability and trends is also discussed. Linear statistical model results show that local as well as large-scale predictor models can account for a modest fraction of 32 to 45% of the observed snow day variability. At low locations the recent decrease in snow cover can be mainly attributed to an increase in seasonal mean temperature. The influence of seasonal mean precipitation does not affect recent trends in any substantial manner. The first snow variability component is representative for most of Switzerland and predominantly linked to a sea level anomaly pattern centered over South-Eastern Europe and somewhat resembling the classical blocking pattern. The second snow variability component which distinguishes between Northern and Southern Switzerland is mainly influenced by an Eastern Atlantic like pattern, whereas the third component is linked with the North Atlantic Oscillation (NAO). Decadal snow day trends however can be explained only by a model that includes the NAO index as explanatory variable. For the Southern Swiss Alpine region the NAO is not just explaining the decadal scale trends but also a substantial part of interannual variability.

Reference: Scherrer, S. C., C. Appenzeller, and M. Laternser, 2004 Trends in Swiss Alpine snow days: The role of local- and large-scale climate variability, *Geophys. Res. Lett.*, 31, L13215, doi:10.1029/2004GL020255