

The North Atlantic oscillation and its links to snow cover and duration in the Swiss Alps

Martine Rebetez

Swiss Federal Institute for Forest, Snow and Landscape Research, Switzerland

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Abstract

A study of snow statistics over the past 50 years at several climatological stations in the Swiss Alps has highlighted periods in which snow was either abundant or not. Periods with relative low snow amounts and duration are closely linked to the presence of persistent high surface pressure fields over the Alpine region during late fall and in winter. These high pressure episodes are accompanied by large positive temperature anomalies and low precipitation, both of which are unfavorable for snow accumulation during the winter. The fluctuations of seasonal to annual pressure in the Alpine region is strongly correlated with anomalies of the North Atlantic Oscillation index, which is a measure of the strength of the westerly flow over the Atlantic. This implies that large-scale forcing, and not local or regional factors, plays a dominant role in controlling the timing and amount of snow in the Alps, as evidenced by the abundance or dearth of snow over several consecutive years. Furthermore, since the mid-1980s, the length of the snow season and the snow amount have substantially decreased, as a result of pressure fields over the Alps which have been far higher and more persistent than at any other time this century. A detailed analysis of a number of additional Alpine stations for the last 15 years shows that the sensitivity of the snow-pack to climatic fluctuations diminishes above 1750 m. In the current debate on anthropogenically-induced climatic change, this altitude is consistent with other studies and estimates of snow-pack sensitivity to past and projected future global warming.

Notes to readers

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To read all abstracts presented at the Global Threats to the Australian Snow Country Conference, go to: www.aias.org.au/newsletters/newslet1.html#snow

The author may be reached at:

Antenne romande of the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)
Forest ecosystems and ecological risks
P.O. Box 96
CH-1015 Lausanne
Switzerland
Phone +41 21 693 39 38
Fax +41 21 693 39 13

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