



Decreasing snow depth accompanied with mixed snowfall trends in Finland in 1961-2014

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Snow is an essential element in the whole climate system, serving as a sensitive indicator of the climatic variability and change. Snow conditions in high-latitude regions are expected to change dramatically in response to recent climate warming.

Here we analyze daily gridded snow depth, temperature and precipitation data in Finland (FMI_ClimGrid) over the period of 1961-2014 in order to discover the ongoing changes in monthly average snow depths (SN) and several snow-related indices. During the study period, the largest decrease in SN occurred in southern, western and central parts of Finland in late winter and early spring. This decrease was driven by increasing wet precipitation and especially in spring, increasing temperature. In northern Finland, snow depth decreased later in spring, but no change occurred during winter months although dry snowfall sum was found to increase in December-February. In the same months also temperature and wet precipitation sum increased which likely counteracted the effects of increasing snowfall on snow depth. The winter's maximum snow depth, typically occurring in March, was found to decrease during the study period, most strongly in western coastal areas. The other snow-related indices at the present work include the beginning and the end date of the permanent snow cover, the date of the maximum snow depth and the number of days with snow depth above a fixed threshold. The strongest trends in these were mainly detected in western and southwestern parts of Finland.

The ongoing change in snow conditions is faster in southern parts than in northern parts of Finland. In southern Finland, winters are becoming more rainfall-dominated. Still, regional differences can be relatively large even within such a small district as Finland.