

Submitted Abstract

ID IMC22-FSAbstr- 742

| | |
|---|--|
| First Author First Name Last Name | Rune Strand (1) Ødegård |
| Submitting Author First Name Last Name | Rune Strand Ødegård |
| Correspondence | rune.oedegaard@ntnu.no |
| Co-Authors >> E-Mails will be not listed | Isaksen, Ketil (2) |
| Organisations | 1: Norwegian University of Science and Technology, Norway 2: Norwegian Meteorological Institute, Norway |
| Country | Norway |
| Region | Western Europe |
| Title | Changes In Winter Warming Events At High Altitude In Central Southern Norway. |
| Keywords | Warm Events, Ice Layers, Snowpack, Norway |
| Type | List Of Focus Session |
| Focus Session ID | 83 |

Abstract

Global warming is projected to result in more winter warming events. In cold climates such events can lead to the formation of thick internal ice layers in the snowpack or ice layers at the ground surface, impacting the ground vegetation. In the high-altitude areas of central Southern Norway ice layers will restrict access to winter fodder for reindeers and mosk oxen. There is also an impact on the permafrost ground thermal regime. The analysis is linked to the GLORIA-Norway project. The objective of this project is to monitor physical factors and vegetation on a local scale over regional gradients under a changing climate. GLORIA-Norway is part of the GLORIA project (Global Observation Research Initiative in Alpine Environments - www.gloria.ac.at).

The dataset used for the analysis is a subset of the gridded 1 km dataset (seNorge, from 1957) and two meteorological stations. Dombås (from 1864) is a valley station at 638 masl. and Fokstugu (from 1954) is situated on a mountain plateau at 973 masl. The winter season was defined November-March, and we have used five different climate indices following the suggestions of Vikhamar-Schuler et al. (2016) in addition to a modified Warm Spell Duration Index (WSDI). The parameters suggested by Vikhamar-Schuler was number of meltdays, accumulated positive degree days, number of meltdays with precipitation and accumulated precipitation for meltdays.

The analysis was conducted in 10-year intervals. All parameters show a significant increase during the last 30 years compared to the previous 30-year period. The 1920's and 1930's also show high values, but less than the last 30 years. The strongest signal was found for the Warm Spell Duration Index. In the original version the WSDI use daily maximum temperature as input. For this application we tested average daily temperature as input because formation of ice layers normally requires a longer period of melt.

Comparison of the valley station (Dombås) and the mountain plateau station (Fokstugu) show similar timeseries, but the mountain station has a more consistent increase since 1990's. This applies to winter- and summer season. The gridded data show a strong increase in the number for meltdays above approx. 1600 masl.

Reference:

Vikhamar-Schuler D, Isaksen K, Haugen JE, Tømmervik H, Luks B, Schuler T, Bjerke J. 2016. Changes in winter warming events in the Nordic Arctic Region. *Journal of Climate* 29, doi: 10.1175/JCLI-D-15-0763.1