

CHANGES IN WINTER WARMING EVENTS IN THE NORDIC ARCTIC REGION AND IN POLAND

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This work presents trends in winter warming events from two geographical regions: The Nordic Arctic Region and Poland. The work is part of the WICLAP project.

In recent years extreme winter warming events have been reported in arctic areas. These events are characterized as extraordinarily warm weather episodes, occasionally combined with intense rainfall, causing ecological disturbance and challenges for arctic societies and infrastructure. Ground-ice formation due to winter rain or melting prevents ungulates from grazing, leads to vegetation browning, and impacts soil temperatures. The authors analyze changes in frequency and intensity of winter warming events in the Nordic arctic region—northern Norway, Sweden, and Finland, including the arctic islands Svalbard and JanMayen. This study identifies events in the longest available records of daily temperature and precipitation, as well as in future climate scenarios, and performs analyses of long-term trends for climate indices aimed to capture these individual events. Results show high frequencies of warm weather events during the 1920s–30s and the past 15 years (2000–14), causing weak positive trends over the past 90 years (1924–2014). In contrast, strong positive trends in occurrence and intensity for all climate indices are found for the past 50 years with, for example, increased rates for number of melt days of up to 9.2 days decade for the arctic islands and 3–7 days decade for the arctic mainland. Regional projections for the twenty-first century indicate a significant enhancement of the frequency and intensity of winter warming events. For northern Scandinavia, the simulations indicate a doubling in the number of warming events, compared to 1985–2014, while the projected frequencies for the arctic islands are up to 3 times higher.

Similar analysis using one of the climate indices have been carried out for Poland. Data included observations of temperature and precipitation from 1951 to 2014. Preliminary results show that there is an upward trend of warm across all sites with a clear south to north gradient. We show results for the individual sites in Poland.