

Deciphering origins of acidic pollutants in Svalbard - Hansbreen case study

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The central Arctic is within range of air pollution transported from the industrial areas of Eurasia and North America. Poor network of weather stations reduces the quantity of information about air quality and contaminant deposition in the Arctic. Thus seasonal snow cover is an important source of information.

In early May 2006 a high pollution event was observed in the Arctic. That anthropogenic haze was a typical rapid transport of BB aerosols (smoke) from agricultural fires in Eastern Europe to the Arctic. We want to present the results from chemical analyses of fresh snowfall, and how the hydrochemical processes and the transformation of atmospheric precipitation and deposits influenced the atmospheric boundary layer.

Chemical properties of precipitation and snow cover have been monitored at the Hornsund Polish Polar Station, Spitsbergen. The chemistry of fresh snow and the properties of snow cover were monitored in the altitudinal profile of the Hansbreen Glacier. Meteorological data from the coast and from the glacier helped to precisely examine the impact of atmospheric processes on snow cover contamination. The episode with extreme acid precipitation was recorded in snow cover from spring 2006. A source area of pollution and type of synoptic situation which enhanced transfer of pollution to the European Arctic were identified. The changes of snow chemistry in hypsometric profile demonstrated the impact of the atmospheric boundary layer on the chemical properties of precipitation and snow cover. The largest sources of SO₂ emissions and the role of nitrate in the acidification should be considered as serious threat to the Arctic environment. presentation to the most appropriate session.

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Figure 1. Study area – Hornsund Polish Polar Station and Hansbreen Glacier.