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CHEMISTRY OF SNOW COVER AND ACIDIC SNOWFALL DURING A SEASON WITH HIGH LEVEL AIR POLLUTION AT HANSBREEN GLACIER, SPITSBERGEN

Krzysztof Migala (*University of Wrocław, Institute of Geography & Regional Development, Department of Climatology & Atmosphere Protection, Poland*)

Adam P. Nawrot (*Institute of Geophysics Polish Academy of Sciences, Department of Polar and Marine Research, Poland*)

Bartłomiej Luks (*Institute of Geophysics Polish Academy of Sciences, Department of Polar and Marine Research, Poland*)

Piotr Głowacki (*Institute of Geophysics Polish Academy of Sciences, Department of Polar and Marine Research, Poland*)

krzysztof.migala@uni.wroc.pl

Air pollution transported from the industrial areas of Eurasia and North America, can affect the High Arctic regions. However, low number of environmental monitoring stations reduce the quantity of information about air quality and contaminants deposition in the Arctic environment. For the above reasons seasonal snow cover is an important source of information. Chemical properties of precipitation and snow cover have been monitored at the Hornsund Polish Polar Station, Spitsbergen. Apart from the standard measurements and chemical analyses of daily totals of precipitation, the chemistry of fresh snowfall episodes and the properties of snow cover were monitored in the altitudinal profile of the Hans Glacier. Authors will present the impact of atmospheric processes on the physico-chemical properties of the seasonal snow cover. The meteorological data from the coastal synoptic station and automatic weather station on the glacier made it possible to examine in detail episodes of extreme pollutants deposition. In Spring 2006 episodes of extremely acid precipitation were identified in in snow cover structure. To identify the source area and long-range transport pathways of pollution to the European Arctic we have analysed specific synoptic situations and calculated backward trajectories with HYSPLIT model. The differences in snow chemistry in hypsometric profile demonstrate the impact of the atmospheric boundary layer on the chemical properties of precipitation and snow cover. Local climate modify hydrochemical properties of atmospheric deposits in hypsometric profile. The largest sources of SO₂ emissions and the role of nitrate in the acidification should be considered as an ongoing, serious threat to the Arctic environment.