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Title: *Spatial diversity of air temperature in Svalbard in the period from 1st August 2010 to 31st August 2011*

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Detailed knowledge about the spatial diversity of air temperature in the area of Svalbard during each month and season of the year is urgently needed. Until now it has been limited, mainly to two months: January and July, plus the year as a whole. In addition, existing maps are based on data obtained from too few stations, and therefore the results presented are not fully reliable. Precise information about spatial changes of air temperature in Svalbard is crucial, e.g. for reliable estimation of climate changes between historical and contemporary times. Such knowledge is necessary because meteorological observation sites in historical and contemporary times are usually different, therefore corrections are needed.

For our analysis, mean daily air temperature data from 30 stations working in the study period in Svalbard have been used. The majority were established within the *Arctic Climate and Environment of the Nordic Seas and the Svalbard - Greenland Area(AWAKE)* project. The influence of altitude on temperature was removed by reducing it to sea level using a standard lapse rate value of 0.6°C/100 m. Quality control of the data was made by comparison with data from neighbouring stations and by applying correlation analysis, as well as visual inspection. Monthly, seasonal (DJF, MAM, etc) and annual statistics have been calculated for each station, and maps showing temperature distribution in Svalbard were drawn up to 0.5°C resolution.

On the basis of having this good quality data for the largest number of stations in Svalbard, the quality of data in the recently produced Norwegian Re-Analysis 10 km (NORA10) have also been checked. For this purpose, data from grids located nearest the comparison station were used.

On average, the coldest area was NE Svalbard (-7.5 to -8.0°C) and the warmest in the west and south (-3.5 to -4.0°C). Both spatial distribution as well as

temperature values in spring were very similar to annual figures. Winter also had a similar pattern of temperature distribution as spring and the whole year, but temperature values were significantly lower and oscillated from -17°C in Nordaustlandet to -10°C in the west and south of Svalbard. The influence of latitude on temperature is the greatest in autumn. Temperature falls from 0.5°C in the south to -2.0 ÷ -2.5°C in the north. In summer, the warmest part of Svalbard was the interior and most of the continental part of Spitsbergen island (>6°C), while the coldest was in the east (2°C).