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Long-term trends and variability on Spitsbergen: the extended Svalbard Airport series of daily mean temperature, 1898-present

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In 2014, a composite series of monthly mean temperatures was published. The series contains observations from Svalbard Airport, which started measurements in 1975. It was extended back to 1898 by inclusion of other series from neighbouring stations.

The whole series was homogenized, including newly discovered sources with daily data. Recent digitalization and quality control of all gathered data has made it possible to increase the resolution from monthly to daily. A new long-term series of daily air temperature for Spitsbergen will allow a broader use of the series, e.g. for degree-day calculations, threshold statistics, and for studies of the influence on temperature by atmospheric circulation.

From the series, we readily infer that the 1930s, the 1950s and in particular the last three decades (1990s to present) were warm annually, as well as seasonally. The most pronounced cold phase is seen in the 1910s, which is colder than any other decade in the whole series, and in all seasons. Another cold phase culminated in the 1960s. The decadal variations are pronounced, but never the less the trend from the start of the series to present (2018) is positive and significant on 0.01 level according to the Mann-Kendall test based on ranked data. The linear trend of annual mean temperature from the start to present amounts to 3.8°C, and since 1980 the trend is remarkably high: 5.3°C. Warming was observed in all seasons – with the strongest rate in winter and spring.

The Svalbard Airport series appeared in the journal Polar Research in 2014. Since then it has been cited more than 100 times, and is clearly the top cited paper in Polar Research in the last five years. The reason for its popularity is presumably the limited number of long-term temperature series from the high Arctic, and that broad scientific communities need reference data for their work. The new version on daily resolution will be published in a scientific journal, and it will be easily and freely available through MET Norway's climate database.

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