

Svalbard climate in the context of a two-hundred year instrumental air temperature record for the Atlantic – Arctic boundary region

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Abstract

A two-hundred year instrumental record of annual surface air temperature in the Atlantic – Arctic boundary region was reconstructed from four station-based composite time series. The new time series adds seventy-one years to the previously available record, and is well validated by ice core records, other temperature proxies, and historical evidence. This record provides new perspective on past climate fluctuations in a region where pivotal climate system processes occur and where unexplained low-frequency variations were observed during the 20th century. It is well correlated with sea-surface temperature anomalies in the Nordic Seas and in the vicinity of the North Atlantic western boundary current and southern recirculation gyre. The extended instrumental record reveals an irregular pattern of decadal-scale temperature fluctuations has occurred over the past two centuries. The early 20th century warming event is by far the most striking historical example. On a more basic level, the new regional time series provides a longer and more nuanced historical context in which to place climate fluctuations reflected in the Svalbard air temperature record.

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