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Abstract

Climate in the European part of the Arctic underwent a rapid warming between the 1910s and the 1930s. Previous studies have addressed the role of atmospheric circulation in this period based on geopotential height fields because observations of upper-level winds in the Arctic are rare. Here we analyse winds over the Arctic and specifically over Spitsbergen in the “Twentieth Century Reanalyses” (20CR). We compare *in situ* upper-air wind measurements performed in 1912 and 1913 in Spitsbergen with six-hourly 20CR data. Furthermore, we compare monthly-to-seasonal 20CR winds at 700 hPa over the European Arctic with statistically reconstructed winds at 3 km altitude. Finally, we analyse long-term trends in Arctic winds in 20CR. The general agreement between observed upper-air winds and 20CR on the day-to-day scale is rather poor, which is not surprising given the paucity of observations in the Arctic at that time that constrain 20CR. In contrast, the seasonally averaged winds (which represent a larger spatial scale) in 20CR compare well with statistically reconstructed winds. The analysis of long term near-surface wind time series in 20CR shows arguably artificial trends from 1871 to around the 1950s over sparsely observed regions, particularly oceanic regions. Over the Arctic Ocean, northeastern Canada, and the northern North Pacific these trends amount to a doubling of the wind speeds. Densely observed regions such as Europe or the USA show no such trends. This analysis shows that great care needs to be taken when working with 20CR in the Arctic and other sparsely observed regions.