Adjustment of Daily Precipitation Data at Barrow Alaska for 1995-2000

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Systematic errors in precipitation measurements caused by wind-induced undercatch, wetting and evaporation losses are known to affect all types of precipitation gauges. These errors are more sensitive for solid precipitation than for rain. Thus, in Arctic regions, these systematic errors become significantly more pronounced than for other regions due to the relatively slow precipitation rates (exemplified by frequent occurrences of "trace" precipitation days), low temperatures, high winds, and low annual precipitation measurements that are characteristic of the Arctic climate. This study performed daily adjustments to measured precipitation data for a six-year period, from 1995 through 2000, for the National Weather Service (NWS) station in Barrow, Alaska. The study results show that the bias corrections increase the average monthly gauge-measured precipitation by 14-272% (with the larger percentages occurring in winter months) and increase the total precipitation for the six-year period by 58%. It is expected that these increases will impact climate monitoring, the understanding of the Arctic freshwater balance, and the assessment of atmospheric model performance in the Arctic.

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