



Development of bias-corrected precipitation database and climatology for the high latitude regions

D. Yang (1), D. Legates (2), B. Goodison (3), D. Kane (1)

1. Water & Environmental Research Center, University of Alaska Fairbanks
2. Center for Climatic Research, University of Delaware
3. Atmospheric & Climate Science Directorate, Meteorological Service of Canada

A consistent daily bias-correction procedure was applied at 4802 stations over high latitude regions (North of 45°N) to quantify the precipitation gauge measurement biases of wind-induced undercatch, wetting losses, and trace amount of precipitation for the last 30 years. These corrections have increased the gauge-measured monthly precipitation significantly by up to 22mm for winter months, and slightly by about 5mm during summer season. Relatively, the correction factors (CF) are small in summer (10%), and very large in winter (80-120%) because of the increased effect of wind on gauge undercatch of snowfall. The CF's also vary over space particularly in snowfall season. Significant CF differences were found across the USA/Canada borders mainly due to differences in catch efficiency between the national gauges. Bias corrections generally enhance monthly precipitation trends by 5-20%. These results point to a need to review our current understanding of the Arctic fresh water budget and its change.