

Results of Snowfall/Blowing Snow Observations in Barrow

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Systematic errors caused by wind-induced undercatch, wetting and evaporation losses in precipitation measurement have long been recognized as affecting all types of precipitation gauges. The need to correct these biases especially for solid precipitation measurement has now been more widely acknowledged, as the magnitude of the errors and their variation among gauges became known and their potential effects on regional, national and global climatological, hydrological and climate change studies were recognized.

The Arctic climate is characterized by low temperature, generally low precipitation and high winds. Arctic precipitation events generally produce small amounts but they occur frequently and often with blowing snow. Because of the special condition in the Arctic, the systematic errors of gauge measured precipitation and the factor such as wind-induced undercatch, evaporation and wetting losses, underestimates caused by not accounting for trace amount of precipitation, and over/under measurement due to blowing snow, are enhanced and need special attention. Recognizing the importance of the precipitation data quality to cold region hydrological and climatic investigations, the Japan Frontier Research System for Global Change and the Water and Environmental Research Center (WERC), University of Alaska Fairbanks (UAF) have collaboratively undertaken a gauge intercomparison experiment and blowing/drifted snow observation study at Barrow Alaska ESRL research Lab. We installed the several precipitation gauges commonly used in the arctic regions for intercomparison, such as the Double fence intercomparison reference (DFIR), the Wyoming snow gauge system, the NOAA-ETI gauge, Hellmann gauge, the Russian Tretyakov gauge and US NWS 8" non-recording gauge. We also set up an automatic weather station for blowing/drifted snow observations in winter months to investigate blowing snow mass flux as functions of wind speed, air temperature, and height, and to evaluate their impact on gauge snowfall observations. This presentation will summarize the results of field observations and recommend future research needs.



Figure 1. Wyoming-style snow fence/gauge at the Barrow ESRL site.