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Uncertainties in Arctic precipitation

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Precipitation is an essential and highly variable component of the freshwater budget, and solid precipitation in particular, has a major impact on the local and global climate. The impacts of snow on the surface energy balance are tremendous, as snow has a higher albedo than any other naturally occurring surface condition. Documenting the instrumentally observed precipitation climate records presents its own challenges since the stations themselves undergo many changes in the course of their operation.Though it is crucial to accurately measure precipitation as a means to predict change in future water budgets, estimates of long-term precipitation are riddled with measurement biases. Some of the challenges facing reliable measurement of solid precipitation include missing data, gage change, discontinued stations, trace precipitation, blizzards, wetting losses when emptying the gage, and evaporation between the time of event and the time of measurement. Rain measurements likewise face uncertainties such as splashing of rain out of the gage, evaporation, and extreme events, though the magnitude of these impacts on overall measurement is less than that faced by solid precipitation. In all, biases can be so significant that they present major problems for the use of precipitation data in climate studies.