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Novel developments in automated ice sheet mass balance measurements

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The rapid demise of ice sheets and glaciers worldwide has increased the need for mass balance observations at a temporal and spatial resolution, where they can both help us understand the physical processes and also serve as validation or calibration for remote sensing data products or regional climate model output. Here we present the latest developments in measuring crucial components of the surface mass balance at automatic weather stations, including snow water equivalent, snow height in the vicinity of the station, sufficiently accurate transmitted position and elevation of the station, snow compaction and non-stake ice sheet ablation.

Immediate access to the observations is key to certain applications, such as numerical weather forecasts. Hence, we also present the complications of providing near real-time data transmission and quality-checking as well as obstacles to a wider distribution on the WMO Global Telecommunication System (GTS).

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