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The observed Surface Energy Balance of ice shelves

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The Surface Energy Balance of ice sheets is important in understanding atmosphere-surface interactions. Investigating its individual components allows us to identify their separate contributions to surface melt as well as the effect on the structure of the firn layer. In a broader sense, we can study the atmospheric contribution to ice shelf melting. In addition, observations of the surface energy balance are crucial for evaluating climate models and satellite products.

In this presentation, we will present observed annual, seasonal and diurnal variations in the surface energy balance at Neumayer Station (Ekström ice shelf, Antarctica; operated by the Alfred Wegener Institute, Bremerhaven, Germany). The components are calculated based on meteorological observations covering a 25-year period, combined with a surface energy balance model. The station location experiences a very short melt season with on average 10.9 melt days, spanning only December and January in most years. Furthermore, we combine these results from Neumayer station with observations from three additional sites on ice shelves, one relatively close to Neumayer on the Riiser-Larsen ice shelf, and two on the Larsen C ice shelf, in order to investigate the spatial variability of surface melt on Antarctic ice shelves. It also allows us to look for recent trends: is there any evidence for atmospheric changes affecting the amount of surface melt that is observed?