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The microclimate of glaciers

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Over the past 20 years the Institute for Marine and Atmospheric Research, Utrecht University, has conducted a series of meteorological experiments on different glaciers (Hintereisferner, Austria; Greenland ice sheet; Vatnajokull, Iceland). These detailed summer experiments have been complemented by the operation of automatic weather stations (AWS) in the melting zones of a number of glaciers. Altogether, extensive datasets have been obtained which have provided a lot of insight into the microclimate of glaciers. The response of glaciers to climate change can only be modelled if the characteristics of the glacier microclimate are known. The presence of a shallow but well-developed boundary layer over a melting glacier surface has implications for the exchange of mass and energy between glacier surface and atmosphere. A climatic signal is therefore 'filtered' on its way to the glacier surface. In this contribution the problems of operating AWS on glaciers will be discussed briefly. Next an overview will be given of what has been learned from the datasets and how the glacier microclimate can be characterised. Special attention will be given to the occurrence of katabatic flow and to the ever changing surface albedo.