



Experimental methods applied in recording surface temperatures on glacier debris cover by using thermistor probes. Preliminary results on Miage Glacier (Italian Alps)

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The supraglacial morphology of debris covered glaciers is controlled by differential ablation, which in turn mainly depends on heat flow through the debris layer. The accurate recording of debris surface temperatures is therefore required in the study of the effects on ablation of the debris cover. Calibration of remote sensed thermal band images for “dirty glacier” monitoring, as well as temperature vs. depth investigation of their debris covers and permafrost studies on periglacial areas, all need accurate surface temperature recordings. In order to measure the effects of different sensor-debris coupling techniques, high temporal resolution data series acquired by six thermistors deployed on the debris cover of the Miage glacier (Mont Blanc Massif, Western Italian Alps) are compared and their suitability at measuring the surface temperatures is evaluated. Despite the slight inconvenience they present in field operations, probes cemented in carefully drilled holes in a debris stone proved to record the best measurements, especially when the debris surface is heated by solar radiation and accurate instantaneous values are needed, as is the case in calibrating satellite thermal images. We also describe an easier set-up still able to provide accurate data at the expense of time resolution, which would be convenient in the analysis of energy fluxes through the debris cover. Several considerations about the choice of sensor positioning, coupling technique and choice of measurement site are discussed. Data logger specification, programming, and some recommendation for field operations are detailed that can result in improved data accuracy and reduced skew of the datalogger’s internal clocks.