The surface energy balance of debris-covered Miage Glacier, Mont Blanc Massif, Italy

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An automatic weather station (AWS) was installed at 2030 m a.s.l. on Miage debris-covered glacier (Mont Blanc Massif, Italian Alps) throughout the 2005 ablation season, recording the long- and shortwave radiation balance (CNR1 sensor) and the wind speed, air temperature and humidity (shielded and ventilated) at 3 levels above the surface. In the 2006 ablation season the station was run in conjunction with a more basic AWS located at 2340 m a.s.l. to provide information on local lapse rates. In addition, vertical temperature and humidity profiles were measured at 4 levels within the debris cover beneath the lower AWS (debris thickness 0.23 m) and at 3 other locations across the glacier (debris thicknesses 0.14 – 0.75 m), using Hobo microsensors. Initial results will be presented, with a focus on the calculation of the sensible and latent fluxes at the debris surface, which are a key challenge for the modelling of buried ice melt rates using meteorological data. Evidence will be presented of large diurnal variations in atmospheric (in)stability in the boundary layer and of meltwater evaporation within the debris layer, which strongly influence the energy available for melting glacier ice buried by debris.