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# Debris surface temperatures on Miage Glacier (Mont Blanc Massif, Italian Alps)

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As a part of a larger project comprising both a methodological research and the actual collection of field data on Miage (debris covered) Glacier (Mont Blanc Massif, Italian Alps), different sets of thermistors were deployed during two periods: from 4thof September, 2003 to 22nd of June, 2004 and from 27th of July to 18th of October, 2004. Different locations and techniques of probe-debris coupling have been used: during the first, longer period the thermistors have been spread close to ablation stakes along the glacier longitudinal profile at altitudes ranging from 2120 m to 2350 m. The temperature probes have been located under a very light debris layer to protect their metal body from direct sunlight and temperature data have been acquired at 2 hours intervals; reliable and useful data resulted available for the first month of thermistors' activity time, after that the instruments were buried under snow cover. Data collected during the subsequent year have been most probably affected by changing conditions of the measurement sites: all of the thermistors have been found at the debris surface without a cover protecting them against direct sunlight and it is not possible to estimate with accuracy the following effect on the recorded data. In the second measurement period six thermistors have been installed in an experimental area at 2200 m altitude using six different techniques. Two thermistors were cemented in holes drilled parallel and perpendicular to the upper flat surface of a rock; two more thermistors were positioned on the surface debris cover: one covered by a light veil of sandy debris and the other one covered by some thin flat gravel. Another thermistor was exposed to the direct solar radiation and air circulations on the surface debris. The last one was

measuring air temperature: it was open to the air circulations but protected from direct solar radiation. All these data, compared with the meteorological ones collected at Courmayeur Automatic Weather Station and completed with other observations, will be used to study the thermal properties of the debris layer, to study their effects on buried ice ablation and to calibrate remote sensed thermal images (e.g. ASTER images in the frame of GLIMS Project). This work on Miage Glacier will represent the basis for testing the analytical methods to be employed on remote sites (Karakoram glaciers) studied with the same purposes by our research group.