



Spatial variability of ablation rates on the debris-covered tongue of Miage glacier, Italian Alps

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During the ablation season 2005 a comprehensive data set on the spatial and temporal variability of ablation rates on Miage glacier has been collected. At 27 sites, located at altitudes between 1839 and 2421 m a.s.l. with debris depths ranging between 0 and 55 cm, ablation of debris-covered and debris free ice was monitored, enabling spatial and temporal patterns of ablation rate to be evaluated. The main findings are: (1) debris depth is the most important variable in determining the sub-glacial melt rate, with mean daily values ranging between 0.3 and 5.3 cm/day at depths respectively of 55 cm and 3 cm; (2) debris properties: albedo, humidity, grain size, thermal resistance and void space are driving factors which influence the ablation rate (Brock and others, this volume); (3) the downglacier increase in debris depth leads to a positive relationship between ablation rate and elevation in the debris covered zone, the opposite to debris free glaciers; (4) elevation alone (i.e., when the effect of different debris thickness is removed) is not a sensible factor in controlling ablation rates at Miage Glacier. This last point is mainly due to the relatively low altitude differences along the whole debris covered tongue. On bare ice the ablation rates are on the order of 8.1 cm/day on sunny days at 2400 m elevation. A such high ablation rates may support on Miage the separation between accumulation and ablation zones observed at other Italian debris covered glaciers during the last years (i.e.: Brenva and Belvedere glaciers). Moreover analyzing the 2005 summer data it resulted that the first period of measurements (from 12.06 to 27.07), shorter than the second one (from 28.07 to 26.09), played a major role in contributing to the ablation amount.

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