



## **Evaluation of recent changes in ablation amount of Lys glacier (Mount Rosa, Italian Alps)**

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This contribution deals with the evaluation of the ablation amount on the debris covered tongue of Lys, a valley glacier located in Aosta Valley (Mount Rosa, Italian Alps). Lys Glacier, at 9.6 km<sup>2</sup> the fourth largest Italian glacier by area, has been studied for terminus fluctuations since the beginning of the past century and several historical maps describing its surface and altimetry were drawn during the last two centuries. Moreover aerial photographs were available to process DEMs and orthophotos to calculate glacier's variations (see Carnielli and others, this volume). The surface area of the supraglacial debris cover on the Lys tongue is growing, which is causing a pronounced change of Lys Glacier surface, by making the ablation sector an actual debris covered tongue, which increases the interest for studying the pattern and the magnitude of its ablation. To evaluate the surface ablation of Lys Glacier tongue survey methods and techniques have been used. A network of ablation stakes was placed on the glacier tongue varying the debris thickness and the surface conditions (aspect) between 2350 m and 2550 m of altitude. Moreover the debris features (lithology, grain size, thickness, and thermal properties) and their influences on buried ice ablation have been investigated by field measurements and by using thermistor probes and microloggers. Moreover the availability of meteorological data collected at two AWSs located close to the glacier area permitted to evaluate the correlation among incoming radiation, debris surface temperature, air temperature and ice ablation and to calculate the degree day factor (K) used for modelling glacier mass balance. It resulted that during the summer season 2005 the ELA was located at c. 3555 m a.s.l., the quantity of ice lost by surface ablation was equal to c.  $7.9 \times 10^6$  m<sup>3</sup> which corresponds to an average on the whole glacier surface of c. -2 m w.e. Applying the K factor to the meteorological data collected at the same AWS in the period 1987-2001 it resulted a

mean annual ice loss of c.  $-3.3 \times 10^6$  m<sup>3</sup> and a average value of the ELA of c. 3100 m a.s.l. These results underline in summer 2005 an increase of the surface ablation of c. +16% respect to the 1987-2001 average value and an uplift of ELA of c. 455 m.

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