



Recent dynamics of Lys Glacier (Monte Rosa Massif, Italian Alps) derived from remote sensing information and field measurements

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Observations show that the strongest influence of global climate change is recorded in alpine environments and glaciers are the first to be affected by global warming. During the last years, Italian glaciers are shrinking at the highest rates registered within the last two centuries. Among these, Lys Glacier situated in Monte Rosa massif, shows an interesting shrinkage pattern. Its response to increasing temperature and reduced accumulation is similar to most of the alpine glaciers (and not only): terminus retreat, area reduction and decreasing thickness. In addition Lys Glacier exhibits some other climate related changes such as: increasing debris mantle (surface and thickness) that covers almost the entire ablation area; thermokarst features and processes; calving processes at the terminus where an ice-contact lake developed during the last years; separation of two tributaries from the main debris-covered tongue while the third tributary is still connected, but risking the separation in the next years. To better understand these observations and the described changes, an extended field campaign was carried out between 2005 and 2006 on the debris-covered tongue of Lys Glacier. Detailed temperature profiles in the debris layer and ablation measurements were performed to quantify the debris thermal influence on melting. Also Aster images were available to quantify the spatial variability of surface temperature to be used as a proxy of debris distribution and thickness. The results show that most of the observed features and their development can be related to differential melting and the specific feedback between glacier geometry and morphology and the environmental conditions.