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Terrestrial Laser Scanner survey of two small glacial formations in the Eastern Italian Alps

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A widespread retreat phase currently affects the glaciers of the European Alps. However, significant differences are observable among glaciers, ascribable to their physical characteristics, source of nourishment, and regional climate. Monitoring glacial mass variations constitutes a key element for climate-related observation strategies and planning strategies for watershed management and water storages.
In the last decade, a range of new remote sensing techniques has led to a dramatic increase in terrain information. Both Terrestrial Laser Scanner (TLS) and Airborne Laser Swath Mapping technology (ALSM), using LiDAR (Light Detection And Ranging) technology, now provide high resolution topographic data with notable advantages over traditional survey techniques. The TLS technology is really a strategic tool for the local scale observations where the required detail may reach few centimeters. This detail is difficulty achievable with traditional topographic surveys, also using airborne LiDAR.
In this work we present a TLS survey carried out during summer 2010 in two avalanche-fed glaciers located in the Italian Julian Alps (Eastern Italian Alps): the Conca Prevala glacier and the Montasio Western glacier. A distinctive feature of these glaciers is their very low altitude, due to the local climatic conditions (high precipitation) and topographic setting. In addition, they show a characteristic behaviour with respect to the most part of alpine glaciers, since an increase of their mass was observed in the last few years.