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Submitted Abstract

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Abstract

In early summer 2002, the Belvedere glacier experienced a surge-type evolution, which resulted in a rapid increase of ice thickness along the 4 km long glacial tongue and the formation of a huge supraglacial lake known as “Effimero Lake” which drained in summer 2003. The effects of surge were evident in the lowermost part of the tongue until 2005, and then a dramatic shrinking of the glacial tongue followed. A cumulative mass balance of -50 to -70 meters of ice was recorded until now, resulting in a generalized destabilization of LIA moraines, which are now collapsing towards the glacier with metric to decametric lowering of the moraine crest. Moreover, frequent ice and rockfalls have been recorded as a response to rapid deglaciation of the slopes surrounding the Belvedere Glacier basin. In the last couple of years, an unexpected increase of ice thickness is occurring in the uppermost part of the glacial tongue, followed by an increase of surface displacement velocity: is a new surge starting?

The glacier regime is continuously monitored by means of a network of ablation stakes that provide regular ablation and surface displacement measurements. Moreover, repeated topographic surveys with GNSS, UAV and terrestrial laser scanner are supporting a quantitative analysis of the morphological modifications occurred in periglacial areas around the Belvedere Glacier valley tongue.

By integrating the results of all measurements carried out during the last 20 years it is now possible to outline the evolution of the glacier and surrounding areas in such a unique environment, which can be undoubtedly considered a unique open-air laboratory in the Alps.