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The recent evolution of Mount S. Matteo avalanching glacier (Ortles-Cevedale Group, Italy) as a contribution to the knowledge of the dynamics of this glacier type

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Periodic or occasional falls of ice by breaking-off mechanism which characterizes avalanching glaciers may give rise to tragic events (e.g. Allalingletscher, Switzerland, 1965; Huascaran, Peruvian Andes 1962 and 1970; Grandes Jorasses, Italy, 1993; Dzimarai-Khokh, Caucasus, 2002). These events caused an increasing interest in the instability of avalanching glaciers thus making larger the number of researches focused on this glaciological topic. This contribution comes into this context. In summer 2003 a big fracture was observed to be on the North-West ridge of Mount S. Matteo (Forni Glacier, Ortles-Cevedale Group, Italy). This phenomenon developed a big unstable ice-mass; as the fall of hanging masses can pose a severe threat to humans, starting from May 2005 it was decided to survey Mount S. Matteo avalanching glacier (whose fall could involve the West sector of Forni Glacier). The monitoring campaign consisted in collecting photographs (from May 2005 to december 2006) and in surveying the ice mass by total station (from July to November 2005). In addition, to quantify the volume of the ice mass, in May 2005 a laser scanner survey was performed (the volume resulted c. 60.000 m3). The collected photographs have been adjusted for permitting their intercomparison, thus making possible to draw the evolution of this unstable ice-mass. In the period July-November 2005 by means of the total station the positions of several points belonging to the unstable ice mass, together with those of points located on Forni Glacier and of others used as benchmarks (i.e.: fixed points located outside the glacier on mountain peaks and ridges) have been acquired. These data permitted to calculate displacements and velocities of the unstable ice-mass. A topographical network was developed to calculate the horizontal

distances among the measurement position (i.e.: the fixed point where the total station was always located) and the several points surveyed on the ice mass and outside it. By an analytical approach the vertical and horizontal components of the displacements were computed. The ice flow direction was assumed to be that one indicated by the horizontal components of the displacements. The accuracy of computations was evaluated as well. Summarizing the main results between the 20th of July and the 8th of November 2005 the average displacement of the ice- mass resulted to be 12.4 +/- 0.4 m, equal to 11.2 +/- 0.4 cm/day. The main flow direction was along the West ice mass sector. On the 8th of November (when the last topographic survey was performed) an acceleration occurred at the points located on East lower sector of the ice-mass; thus preceding the fall of this part which happened later (it was disappeared on the 22nd of November 2005). During the whole period of observations the disaggregation (i.e.: the separation of unstable ice mass into smaller ice parts due to subprocesses of fracture - Pralong and Funk, 2006 -) occurred at the lower sector and at the lateral side of the unstable ice mass was substantial; the last photograph (it dates back 5th December 2006) shows an important mass reduction and therefore a minor level of danger. Presently the large crevasses characterizing the unstable ice-mass will probably cause further disaggregation events.