



Structural analysis of the ablation tongue of Forni Glacier (Italy)

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The Forni Glacier, located on the Ortles-Cevedale Group (Central Alps), is the largest valley glacier of Italian Alps (13 km²). It is composed by three main accumulation basins and three main flow units jointed in a wide plain at about 2700 m.s.l.; downstream the flow units are parallel, separated by two medial moraines and producing a unique ablation tongue which flows away northwards and ends at 2500 m.s.l., above a rock sill. On the ablation tongue during summer 2004 mesoscopic fragile and ductile structures have been detected and mapped. The whole ablation tongue is characterized by a pervasive, steeply dipping, foliation, parallel to the flow lines, marked by irregular alternating layers of clear and bubbly ice. This foliation developed by continuous parallelization (transposition) of structures of different age and nature (e.g. primary stratification, isoclinal fold limbs of older foliations, crevasse traces, etc.), passively transported and continuously deformed during the ice flow; we can define this foliation as a composite one. Five main sets of crevasses and fractures with different orientation have been identified, linked to the local stress field in different sectors of the tongue (i.e. different stream directions). Comparing the present crevasse pattern with crevasses traced on the 1997 aerial photographs, an evident change has been noted and interpreted as a variation in the glacial dynamic. In fact, in 1997 the whole ablation tongue was flowing dynamically as a unique body; in summer 2004 the lateral flows have reduced their speed, and a component of external relaxation has become important: so Forni Glacier now is characterized (from a dynamic point of view) by a tripartite ablation tongue. This conclusion, based on geometrical data, must be verified by velocity field analysis, as future development of this work.