



## **Micrometeorology and tree recolonization in glacier forelands: Forni Glacier campaign 2017 (Central Italian Alps)**

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The Alpine environment is rapidly changing under the current climate change. Fast modifications affect landscape evolution, surface processes and the ecological component, and involve as well human activities. The dynamics of the biological component, especially in the most sensitive areas as glacier forelands, are strictly related to weather conditions.

In this study we focused on the interactions between the valley glacier retreat (and consequently the glacier foreland widening) linked with the new tree recolonization and the atmospheric boundary layer characteristics and dynamics. Changes from glacial to paraglacial and periglacial conditions continuously modify the boundary-layer conditions, and the local wind valley circulation. Tree colonization (ecesis) is accelerating and ecesis time is reducing. Nevertheless saples and young trees are able to germinate, but often suffer in the first growth years. First investigations have been carried out in order to analyze during a short campaign forcing factors and feedbacks.

During late summer 2017, from 28th August to 11th September a micrometeorological campaign was set-up at Forni Glacier foreland (Central Italian Alps), in particular we measured the wind pattern and we tried to relate the cold katabatic wind from the glacier to the distribution of new-germinated trees.

The weather station measured temperature, wind speed and direction with a cup anemometer and heat fluxes through a sonic anemometer at 3 m above the ground.

In late summer time the glacier has relatively weak katabatic wind caused by a lower albedo (no snow left on glacier tongue), the wind patterns follow the valley wind regime, and a slightly more negative sensible heat flux than expected was measured during night-time.

Past studies on conifers germination and growth in the Forni glacier foreland observed that frequently trees survived only few years after their emergence from their stone-shelter, and their complete exposition to weather conditions. With this campaign, we investigate the possible relationship between young trees' growth and micrometeorological variables, such as sensible heat flux, momentum fluxes and the general wind circulation near the glacier.