



POLLiCE (POLLEN in the iCE): climate history from Adamello ice cores

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Glaciers can be viewed as the most complete and effective past climate and environment archives severely threatened by climate change. These threats are particularly dramatic across European Alps. The Adamello glacier is the largest, 16.4 km², and deepest, 270 m, Italian glacier.

We aim at estimating biodiversity changes over the last centuries in relation to climate and human activities in the Adamello catchment area.

We, therefore, recently launched the POLLiCE project (pollice.fmach.it) for specifically targeting the biological component (e.g. pollen, leaves, plant remains) trapped in ice cores. Classical morphological pollen analysis will be accompanied by DNA metabarcoding. This approach has the potential to provide a detailed taxonomical identification - at least genus level- thus circumventing the limitations of microscopic analysis such as time-consuming procedures and shared features of pollen grains among different taxa. Moreover, ice cores are subjected to chemical and physical analyses - stable isotopes, ions, hyperspectral imaging, etc.- for stratigraphic and climatic determination of seasonality.

A pilot drilling was conducted on March 2015 and the resulting 5 m core has been analysed in terms of pollen spectrum, stable isotopes and ions in order to demonstrate the feasibility of the study. The first encouraging results showed that even in this superficial core a stratigraphy is evident with indication of seasonality as highlighted by both by pollen taxa and stable isotopes. Finally, DNA has been successfully extracted and amplified with specific DNA barcodes.

A medium drilling was performed on April 2016 with the extraction of a 45 m ice core. The analysis of this core constitutes the subject of a specific research project, CALICE*, just funded by Euregio Science Fund (IPN57).

The entire depth, 270 m, of the Adamello glacier is scheduled to be drilled in 2018 winter to secure the unique memory archived by the ice.

* See EGU2017 poster by Festi et al. CALICE: Calibrating Plant Biodiversity in Glacier Ice