

The project EVERLKAKE: Formation, evolution and fate of new proglacial lakes in the deglaciating Alps

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INTRODUCTION

- In the process of Alpine deglaciation, proglacial lakes are increasing both in number and in volume, thereby becoming important elements of the Alpine landscape
- As glacier retreat continues, proglacial lakes evolve from "ice contact" to "ice distal" conditions
- An improved knowledge of the morphological and ecological characteristics of the newly forming lakes is crucial for the conservation of the Alpine habitats and biodiversity, to identify ecosystem services provided by these environments, and to base coherent management strategies in the future iceless Alps.



DEGLACIATION



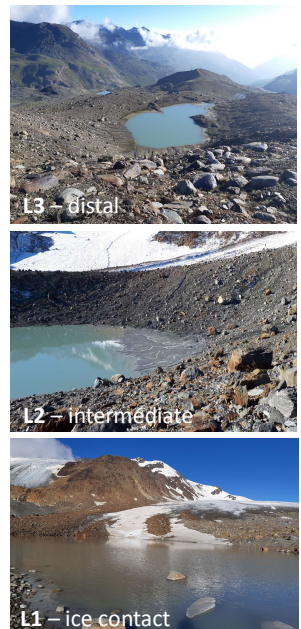
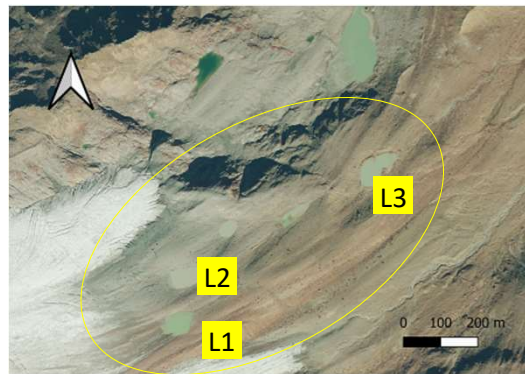
The EVERLKAKE project will focus on a system of recently formed proglacial lakes in the Ortles-Cevedale mountain group in the Central Italian Alps.

AIMS

- to characterize the lake ecosystems from a physical, chemical and biological point of view;
- to build a conceptual model for possible ecological trajectories of proglacial lake ecosystems during the progression of glacier retreat.

STUDY AREA

- The lake system is located in the upper Martello Valley, Province of Bolzano (Italy);
- It originated from the retreat of the Zufall Glacier and is composed by 5 lakes;
- Our work will focus on **3 lakes + their tributaries and outlets**.



During the ice-free season 2022/2023:
 1) June, between snowmelt and icemelt
 2) August, glacier ablation
 3) September, base flow

When?

SAMPLING

What?

PHYSICAL SYSTEM

- Bathymetry
- Discharge (salt dilution method) in tributaries and emissaries
- suspended solids
- And organic matter in water and benthic biofilm
- Water temperature
- Electrical Conductivity
- Light intensity
- Continuous monitoring

HYDROCHEMISTRY

- Lake water
 Snowmelt
 Ice melt
 Rainwater
- Water isotopic composition
- Major ions
 Trace elements
 Nutrients
 Dissolved Organic Carbon

BIOLOGY

Given the typically high turbidity and the low biomass associated with these harsh habitats, biological communities will be mainly characterized through **eDNA metabarcoding**. It will allow to obtain a broad overview of the taxonomical groups living in the lakes and to cope with the very low organism density.

16S rRNA -> Prokaryotes
 18S rRNA -> Eukaryotes

+ Biofilm Chlorophyll *a*
 + Water Chlorophyll *a*

METHODOLOGICAL APPROACH