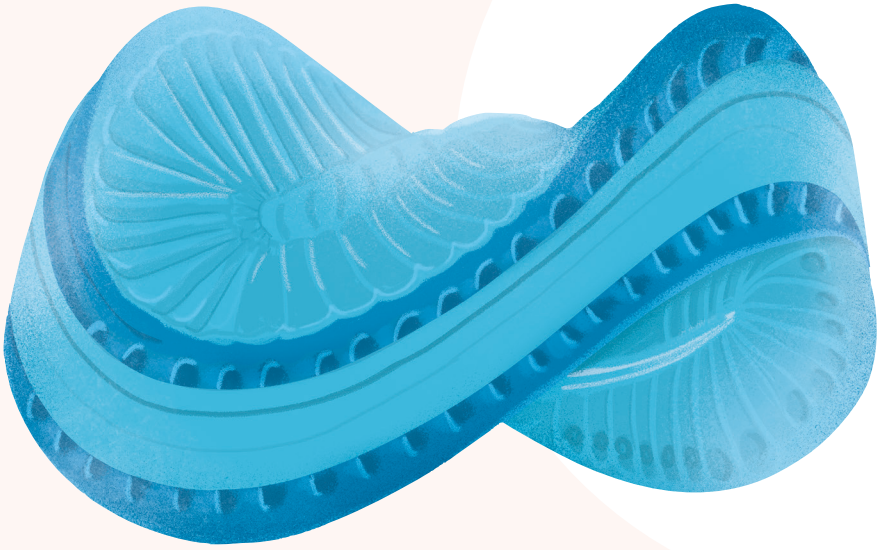
15th EUROPEAN DIATOM MEETING

Ohrid, North Macedonia



BOOK OF ABSTRACTS

Ohrid | May 7th—9th | 2024

BENTHIC DIATOM COMMUNITIES IN TWO PROGLACIAL LAKES WITH DIFFERENT GLACIAL INFLUENCE (CEVEDALE GLACIER, ITALY)

Maria Vittoria Tenci[1]*, Walter Bertoldi[1], Leonardo Cerasino[2], Marco Toffolon[1] & Monica Tolotti[2]

[1] *Department of Civil, Environmental and Mechanical Engineering, University of Trento, via Calepina, 14, 38122 Trento, Italy*
[2] *Research and Innovation Centre, Fondazione Edmund Mach, Via E. Mach 1, 38098 S. Michele all'Adige, Italy*
* mariavittoria.tenci@unitn.it

Climatic changes induce cascade effects on high mountain headwaters. Due to the current deglaciation, proglacial lakes increased worldwide in number and volume in the last decades, thus becoming more represented ecosystems in high mountain landscapes. With the progression of glacier retreat, proglacial lakes rapidly evolve from ice contact conditions towards ice distal conditions. The final evolution stage is a clear water mountain lake, with no glacial influence. In the European Alps, ice distal proglacial lakes represent the largest proportion of high mountain lakes, in comparison with ice contact ones and clear lakes. Glacial runoff is typically cold and contains large amounts of inorganic suspended solids (so called "glacial flour"). Due to low water temperature and high turbidity, proglacial lakes are highly selective habitats, where planktonic communities are taxonomically simplified and quantitatively scarce. Nonetheless, littoral habitat conditions may sustain algal growth. However, benthic assemblages have been scarcely addressed by studies on Alpine proglacial lakes regarding qualitative and especially quantitative aspects.

Here, we provide a first characterisation of the littoral diatom assemblages of two Alpine proglacial lakes with different glacial influence and discuss differences in community composition between the ice contact and the ice distal lake habitat. The two lakes are located between 2700 and 2900 m a.s.l. in the Martello Valley (Stelvio National Park, Province of Bolzano, Italy). They formed in the past decades in the depressions of the land surface shaped by the retreat of the Cevedale glacier and are both dammed by moraines. The ice contact lake (CL) receives glacial runoff flowing on debris-covered ice. The ice distal lake (DL) is about 500 m downstream and hydrologically connected to CL. In the ice-free

seasons 2022 and 2023, we collected quantitative diatom samples from colonised substrata (stones or cohesive sediment) during the different stages of the Alpine glacial summer (snow melt, glacier ablation and base flow). In parallel, we collected water samples to analyse chemical habitat conditions and installed temperature dataloggers in the water column to calibrate a 2D laterally-averaged hydrodynamic model that allowed to reconstruct lake thermal dynamics.

The two lacustrine habitats differed mainly in water turbidity, littoral water temperature and thermal dynamics, i.e., stratification patterns. In addition, we found differences in the benthic diatom communities of the two proglacial lakes. Alpha diversity was higher in the ice distal lake (DL), where we found species that were not observed in the ice contact lake (CL). In CL, diatom density peaks corresponded to the increase of *Achnanthidium minutissimum* s.l. (Kützing) Czarnecki, which was the numerically dominant species in all the samples in this lake. Density peaks in DL were characterised by different dominant species during the Alpine summer and the community composition showed a species succession. Furthermore, in DL, we observed a stable population of *Pinnularia bullacostae* Krammer & Lange-Bertalot. At the best of out knowledge, this is the first record of the species in the European Alps.