

3rd Paleolimnology & Limnogeology International Symposium



6th-10th Oct. 2025

Abstract book



Using sediments to track the effects of multiple stressors on two lakes from N. Italy

Andrea Lami ^{*† 1}, Caterina Carabelli ¹, Monica Tolotti ², Michele Brunetti ³, Simona Musazzi ¹

¹ CNR Water Research Institute – Italy

² Fondazione Edmund Mach - Edmund Mach Foundation [Italie] – Italy

³ CNR Institute of Atmospheric Sciences and Climate – -, Italy

The large perialpine lakes are a vital feature of the Alpine landscape. Positioned at the foothills in some of the Alps most densely populated and economically active regions, these lakes serve critical socio-economic functions. They provide essential resources such as drinking water, irrigation, industrial supply, tourism opportunities, hydroelectric power, and habitats for biodiversity. However, they face numerous human-induced pressures and are particularly vulnerable to the impacts of global warming, given their connection to glacial Alpine catchments. While limnological studies have documented a consistent response to the intense nutrient pollution of the 1950s to 1970s, recent trends among these lakes have become increasingly varied and complex.

As part of the PRIN SEBINO project (*Sediment Biogeochemistry in Deep Italian Lakes Undergoing Stratification and Anoxia: Ecological and Economic Assessments*), two sediment cores were collected from Lakes Maggiore and Iseo in Northern Italy. These cores provide a continuous archive of environmental changes over the past ca. 200 years, enabling the reconstruction of historical climate patterns and the assessment of human impacts such as deforestation, agriculture, industrialization, and pollution. Here we present the first result based on sedimentary pigments and geochemical proxies. The goal of our study is to determine if we can distinguish between climate-driven changes and human-induced changes within a multi-proxy sediment dataset. Additionally, we aim to identify which sediment proxies may be most effective for long-term quantitative climate reconstructions.

Lakes Maggiore and Iseo share similar histories of human development and experience comparable climatic conditions. Their sedimentary pigment profiles reflect parallel trends of major anthropogenic influence. However, the data also indicate distinct, lake-specific responses to recent climate warming. In particular, Lake Iseo shows a marked increase in sedimentary pigments near the surface of the core, which is attributed not to further nutrient enrichment but to the onset of prolonged periods of anoxia linked to the recent warming trend.

*Speaker

†Corresponding author: andrea.lami@cnr.it