

Validating climate proxies based on lipid biomarkers in a 12 year-long sediment trap series from Lake Tiefer See, Germany

Department: Earth Sciences

Research group: Organic Geochemistry

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Project description

Lake sediments are sensitive recorders of environmental changes in the lake itself or the surrounding catchment. This information can be extracted using various approaches. One of those approaches is based on fossil molecules, or biomarkers, which are compounds that contain information on their producer and the environment in which they lived. Consequently, downcore variations in the occurrence or isotopic composition of biomarkers in lake sediments can be used to infer past climate change.

In this project, which is a collaboration with the Organic Surface Geochemistry Lab (Prof. Dirk Sachse) at the Helmholtz Centre for Geosciences (GFZ) in Potsdam, Germany, we aim to better understand the climate signal reflected by biomarkers stored in lake sediments. To achieve this, we study lipid biomarkers in particles settling through the water column of Tiefer See, a lake in northeastern Germany [monitored by the GFZ Potsdam](#) for more than a decade. These particles have been collected every two weeks by a sediment trap close to the bottom of the lake over a period of 12 years. This allows us to assess both intra- and interannual variability in the presence and abundance of specific biomarkers used in paleoclimate reconstructions, and link them to available monitoring data.

The project is primarily laboratory-based, and involves the separation of (existing) total lipid extracts generated from the sediment trap material into different biomarker fractions using small column chromatography. The targeted biomarkers will be analyzed using gas chromatography and liquid chromatography-mass spectrometry. The student will work in the organic geochemistry research laboratories in Vening Meinesz B, and will have regular meetings with the supervisor (weekly, or whenever needed).

Job requirements

The student ideally has experience, or else a strong affinity with laboratory work and/or has followed the MSc course Organic Geochemistry.