Universität Basel

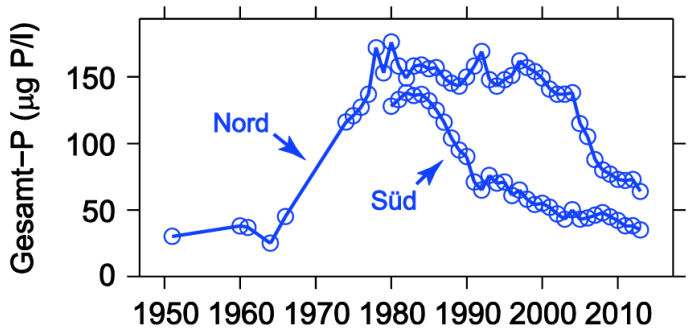
Departement
Umweltwissenschaften

D|U Departement
Umweltwissenschaften

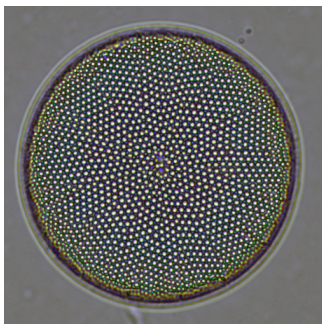
MSc-Arbeit in Biogeochemie/Paläolimnologie

Tracing eutrophication (and re-oligotrophication) through diatom-bound nitrogen isotope ratios in lake sediments

Paleoenvironmental proxy indicators allow the reconstruction of past changes in nutrient cycling (sedimentary $\delta^{15}N$) and primary productivity (sedimentary $\delta^{13}C$, biomarkers). However, diagenesis and terrestrial N input can bias the $\delta^{15}N$ of bulk sediment. Recent paleoceanographic studies thus target the organic N embedded in the shells of microfossils, such as diatoms, which is physically protected from diagenetic alteration. Up to date, this diatom-bound $\delta^{15}N$ proxy approach has never been validated in lakes. Long-term hydro- and biogeochemical data sets from ongoing monitoring programs in Lake Lugano are extremely valuable for the calibration of this and other paleolimnological proxies and for testing their sensitivity towards environmental change (e.g.,eutrophication and re-oligotrophication).



Mean annual phosphorous concentration in the Lake Lugano North and South Basins (BAFU 2016).



Diatom microfossil

MSc Thesis (earliest start date possible is spring 2019):

The goals of the MSc Thesis will be to compare the recent isotope/geochemical sedimentary record of Lake Lugano with historical data of nutrient concentrations and primary productivity, in order to calibrate the nutrient and productivity proxy indicators within the sediment archive, and to evaluate their responsiveness to the ongoing “de-eutrophication” trend. Particular emphasis will be put into the extraction and N isotopic analysis of diatom microfossils from the sediment in order to validate the diatom-bound $\delta^{15}N$ proxy in the lacustrine environment, and to assess the degree of diagenetic alteration of the bulk sedimentary organic matter.

If you have questions, please contact:

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