Microfossils or eDNA, who tells the truth? – Comparing paleoecotoxicological approaches on an early 20th century tin pollution in Lake Zurich

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Paleo-ecotoxicology is an emerging discipline using sediment archives to extend the scope of ecotoxicology by looking at changes of biological proxies over decades [1]. It allows assessing the long-term dynamics of aquatic ecosystems exposed to pollutants. Here we use this approach to investigate past and long-term local ecotoxicological effects of a tin pollution in Lake Zurich dating from the early 20th Century.

We retrieved a 70 cm long sediment core from 20 m water depth in the affected area. The heavy metal load in the sediment was first assessed with XRF core-scans. Discrete sub-samples were then freeze-dried, homogenized, and acid digested in a microwave before analysis on an ICP-MS. The tin content was found to be up to 5 % dry weight in selected core sub-samples.

To assess the impact of the tin pollution on the ecosystem, we used the remains of indicator organisms found in sediment archives, specifically Diatoms and Chironomids. For our analyses, we used cores from different parts of Lake Zurich to discern between the impact of tin and the impact due to eutrophication. Furthermore, we compared the results from this traditional microfossil approach with results from environmental DNA sequencing of ancient sediments (sedaDNA) to assess the performance of the microfossil approach with respect to cryptic species and overall comparability between the two techniques.

[1] Korosi, J. B. et al. (2017), *Environ. Sci. Technol.* **51**, 9446–9457