Recent to past record of lacustrine chalk deposition and diagenesis in Weissensee (Carinthia, Austria)

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Our field site Weissensee is located in Carinthia (Austria) at 930 meters above sea level and is widely known for its light-coloured, lacustrine chalk deposits that are partially seaming the shore of the lake. Recent findings indicate that the formation of these calcitic chalk deposits is closely related to calcium carbonate mineralization mediated by extracellular polymeric substances (EPS). However, the interactions between the hydrosphere and EPS, as well as the influence of different environmental parameters on the formation mechanisms of $CaCO_3$ are not yet fully understood. The potential of this sedimentary archive as an important local sink for CO_2 moreover demands further research. Therefore, this project aims to gain a better understanding of the underlying processes for EPS-mediated carbonate production, diagenetic alteration, and potential precursor calcium carbonate transformation. Down-core sediment sampling of two sediment cores, recovered from two different locations within Weissensee, allows a high-resolution investigation of the recent to past deposition. Mineralogy, geochemistry and micro-morphologies are studied via a multi-proxy approach in order to reveal the potential of the investigated archive as a reliable carrier for environmental (paleo)proxies. Preliminary findings at the western part of the lake (core sample E3) show that – besides biogenic components – the sediments of the upper 10–15 cm of the core are mainly composed of authigenic calcite and detrital dolomite, with a distinct shift in the calcite/dolomite ratio. This shift is correlated with a change from low-Mg calcite to high-Mg calcite. Framboidal pyrite can be observed throughout several layers of the sediment core, indicating bacterial sulfate reduction. Moreover, X-ray fluorescence data suggest an increase in detrital input in the upper part of the core. Stable C and O isotope analyses of the carbonates and radiocarbon dating of organic compounds are in progress, providing lacking evidence of depositional ages and sedimentation rates.