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# Are lake sediments mere archives of degraded organic matter? – evidence of rapid biotic changes tracked in sediments of pre-alpine Lake Lunz, Austria

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Lake sediments are used as sentinels of changes in organic matter composition and dynamics within lakes and their catchments. In an effort to investigate how past and recent hydrological extreme events have affected organic matter composition in lake sediments, we investigated the biogeochemical composition of sediment cores and settling particles, using sediment traps in the pre-alpine, oligotrophic Lake Lunz, Austria. We assessed annual sedimentation rates using 137Cs and 210Pb, time integrated loads of settling particles, analyze stable carbon ($\delta$13C) and nitrogen ($\delta$15N) isotopes to track changes of carbon sources and trophic compositions, respectively, and use source-specific fatty acids as indicators of allochthonous, bacterial, and algal-derived organic matter. Preliminary results indicate that settling particles of Lake Lunz (33 m depth) contain high algae-derived organic matter, as assessed by long-chain polyunsaturated fatty acids (LC-PUFA), indicating low degradation of such labile organic matter within the water column of this lake. However, LC-PUFA decreased rapidly in sediment cores below the sediment-water interface. Concentrations of phosphorous remained stable throughout the sediment cores (40 cm), suggesting that past changes in climatic forcing did not alter the load of this limiting nutrient in lakes. Ongoing work reveals dramatic biotic changes within the top layers of the sediment cores as evidenced by high numbers of small-bodied cladocerans (e.g., Bosmina) and large-bodied zooplankton (e.g., Daphnia) are only detected at lower sediment layers. Current research on these lake sediments is aimed at investigating how organic matter sources changed during the past century as a result of recorded weather changes.