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Initial insights from the Baumkirchen Palaeo-lake Record: Sedimentology, Stratigraphy and Geochemistry of a unique Marine Isotope Stage 3 succession in the Alps

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We present preliminary results from a 150 m-long core through a lacustrine sediment sequence from the Lower Inn Valley in the Eastern Alps. The banded clay sequence of Baumkirchen is the longest (over 220 m) known continuous pre-LGM sediment sequence in the Alps. Radiocarbon dates of wood from the upper section place the sequence in Marine Isotope Stage 3. Therefore the sequence provides a unique opportunity to study the climatic and ecological impacts of Greenland/North Atlantic Dansgaard Oeschger events (high frequency-high amplitude climate fluctuations) on the European Alps in high resolution. Millimetre and micrometre-scale X-ray fluorescence records, X-ray diffraction data, thin-section analysis and visual inspection reveal complexly laminated (mm-cm) sediments mainly of silt grain size, rich in mica with occasional coarse silty to fine sandy turbidites (mm to >10 cm thick). X-ray diffraction in conjunction with X-ray fluorescence reveal high-amplitude variations in both dolomite (dominant) and calcite suggesting a clastic origin of the laminae. No evidence of authigenic calcite forming biogenic varves was found. Rare, short sections (up to 0.5 m) are unlaminated, and along with variations in lamina thickness and frequency of turbidites, show changing sedimentary conditions, giving a relative and qualitative record of environmental and climatic change through the lake's history. Future work will focus on quantitative proxies (e.g. pollen and biomarkers) and establish an age model using optically stimulated luminescence dating. A further coring campaign (summer 2013) will increase the length of the core to cover the entire lacustrine section, possibly covering the entire Marine Isotope Stage 3.