Geophysical Research Abstracts
Vol. 17, EGU2015-10935, 2015
EGU General Assembly 2015

New insights into the paleolake sequence of Baumkirchen (Austria): multiple lake phases and a minor ice advance during MIS 4?

Samuel Barrett (1), Reinhard Starnberger (1), Christoph Spötl (1), Achim Brauer (2), Rik Tjallingii (2), Peter Dulski (2), and Christof Abfalterer (1)

(1) Institute of Geology, The University of Innsbruck, Innsbruck, Austria (samuel.barrett@student.uibk.ac.at), (2) Section 5.2: Climate Dynamics and Landscape Evolution, GFZ, Helmholtz Centre, Potsdam, Germany

The sequence of pre-LGM lacustrine sediments at Baumkirchen (Austria) provides a key record in Alpine Quaternary stratigraphy. These sediments from within the boundary of the Alps potentially provide unique insights into the regional paleoclimate. Recent drilling revealed at least ∼250m (the base was not reached) of almost entirely mm- to cm-scale lacustrine sediments. The laminated sediments are comprised of alternations between clayey silt and event layers of medium silt to fine sand. The sequence is interrupted only by a short section of gravel supported in an unlaminated clay-rich matrix. Optically stimulated luminescence dating identifies two distinct sequences: the upper sequence spanning mid-late Marine Isotope Stage (MIS) 3 (∼33 to ∼45 ka BP), agreeing with existing calibrated radiocarbon ages, and the lower section dating to MIS 4 (∼59 to ∼73 ka BP). Whether the hiatus is an erosional unconformity, or if the sequences represent two separate lake phases is unclear. Although the precise location of the hiatus is hard to identify, the gravel-rich section lies at the very top of the lower sequence. Pebbles in these gravels are largely angular and contain a significant proportion of non-local, regional lithologies. Such gravels are absent in the remainder of the entire 250 m-thick sequence and hence suggest a unique event rather than e.g. an interfingering local delta gravel foresets with the basin sediments. The gravels are therefore likely to be ice-rafted debris from icebergs from nearby glaciers calving into the lake. This therefore represents the first sedimentological evidence of a MIS 4 ice advance in the Eastern Alps. X-ray fluorescence analysis (ITRAX core scanning) of event layers indicates a strong change in the geochemical composition from generally K, Zr and Ti-rich layers in the upper sequence to mainly Ca and/or Si-rich layers in the lower sequence. X-ray diffraction analysis shows the Ca and Si signals to be controlled by carbonate (both calcite and dolomite) and quartz, respectively. This suggests a change in dominant sediment source and may indicate a change in catchment or paleolake configuration, re-raising the long outstanding question of how the lake or lakes were dammed.