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Speculations on the spatial setting and temporal evolution of a fjord-style lake

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The Inn Valley, a classical region of Quaternary research in the Alps, is bordered by terraces that extend over almost 70 km and record an ancient lake with a lake level near 750-830 m above sea level (a.s.l.), about 250-300 m above the modern valley floor. Over large distances, the terrace sediments consist mainly of laminated "Banded Clays", above ~750 m a.s.l. overlain by glaciofluvial gravel and finally, by tills that record the Upper Würmian ice advance of Marine Isotope Stage (MIS) 2. In the (former) clay pit of Baumkirchen this boundary forms the Alpine type locality for the onset of the Upper Würmian, well supported by 14C-based age control first established by Fliri (1971). On the basis of a recently cored sediment section at Baumkirchen, the >200 m thick "Banded Clays" store a continuous, largely undisturbed, highly resolved, and widely varved climatic archive of MIS 3. Major unknowns concern the location and origin of dams that may have barred the vast and deep Inn Valley lake. We discuss potential linkages to the pattern of moraines and ice advance of MIS 4 glaciers, which was less prominent than during MIS 2, thus leading to a distinct east-west segment¬ation of the run-off systems in Tyrol. East of Imst, for example, the lake was possibly barred by both a rock sill reaching up to 830 m a.s.l. and a lateral moraine deposited by an Ötz Valley glacier. 80 km further east, a lateral moraine of a glacier advancing from the Ziller Valley may have barred the ancient Inn Valley lake to the east. The final rapid coarsening of clastic lake sediments at the end of MIS 3 is widely ascribed to major climatic deter¬ioration. However, the MIS 3-2 boundary was linked to an only modest change of global climates and accordingly, different forcings may be considered. In turn, the rapid coarsening may document a date, when the Central Alpine glaciers had already filled the basin of Imst to the west of the Inn Valley lake. This ice mass may have forced the melt waters to flow across the rock sill toward east into the lake basin, with a sediment load that already records an advanced state of Alpine glaciation during the onset of MIS 2.

Fliri, F. (1971): Veröff. Museum Ferdinandeum Innsbruck, 51, 5-21.