Schmalfuss, Clemens[1]; Firla, Gustav[1]; Lüthgens, Christopher[1]; Neuhuber, Stephanie[1]; Salcher, Bernhard[2]; Dremel, Fabian[2]; Burschil, Thomas[3]; Fiebig, Markus[1]

The paleolake deposits of Bad Aussee (Austria): New insights into pre-LGM inner-alpine landscape dynamics of the Eastern Alps

[1]BOKU University, Austria;
[2]Paris Lodron University Salzburg, Austria;
[3]Federal Institute for Geosciences and Natural Resources (BGR), Germany;
clemens.schmalfuss@boku.ac.at

Due to glacial erosion during the Last Glacial Maximum (LGM), sedimentary archives of earlier glaciations in inner-alpine regions are scarce. The Bad Aussee basin (Salzkammergut, Austria), situated in the central Northern Calcareous Alps (NCA), hosts an exceptionally thick sequence of Quaternary sediments mostly predating the LGM. A thickness of at least 880 m was confirmed by an industry drilling and has been interpreted as the result of subglacial dissolution of a salt body. Below thick subglacial till attributed to the Traun Glacier LGM, (glacio-)lacustrine and deltaic sediments are preserved. Recently, the drilled sediments have been studied in detail as part of the DOVE (Drilling Overdeepened Alpine Valleys) project, supported by the International Continental Scientific Drilling Program (ICDP). New luminescence dating results suggest that the entire drilled sequence was deposited since the penultimate glacial cycle, indicating high sedimentation rates. In large parts, the mineralogical and petrographic composition of the Bad Aussee paleolake deposits reflects a source area dominated by crystalline basement rocks, closely resembling the sediments of the modern Enns River further south. In contrast, todays Traun River catchment lies entirely within the NCA. Thus, the drillcore records a major drainage network reorganization from an initial configuration where the Upper Enns Valley drained northwards to a configuration where the Enns Valley was cut from the Aussee area and the Traun catchment became dominant. Lacustrine and deltaic sediments with a similar composition are exposed in several outcrops in the Bad Aussee basin and the adjacent Koppen Valley. Their distribution and stratigraphic position suggest that a glacial advance from the Dachstein plateau further down-valley caused the formation of an ice-dammed lake extending into the Bad Aussee Basin. Furthermore, we will present first results from a multi-method geophysical study (reflexion seismics, electrical resistivity tomography, gravity modelling), which elucidate the spatial extent and stratigraphic architecture of the basin fill and the geometry of the basin.

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