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Late-glacial to Early Holocene lake basin and river valley formation within Pomeranian moraine belt near Dobbertin (Mecklenburg-Vorpommern, NE Germany)

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In central Mecklenburg-Vorpommern vast areas between the terminal moraine belts of the Frankfurt (W1F) and Pomeranian Phase (W2) were covered by glaciolacustrine basins which were embedded in the outwash plains. With deglaciation of the Pomeranian Phase around 17-18 ka BP the basins north to the villages Dobbertin and Dobbin were part of a glaciofluvial river system in combination with ice-dammed lake basins. During the late-glacial after ∼14 ka cal BP the melting of buried dead ice reshaped the lake basin morphology by new depressions, in- and outlets. We study late-glacial basin and landscape development using cores collected along a pipeline trench crossing the Dobbin-Dobbertin basin. Core analysis includes sedimentological (carbon content, grainsize distribution) and palaeoecological (pollen, plant macrofossils, Cladocera) proxies.
Radiocarbon dates indicate that peat formation started soon after the start of the Weichselian late-glacial. High resolution analysis of a basal peat layer indicates that initial organic and lacustrine sedimentation started in shallow ponding mires, evolving from buried dead ice sinks in the glaciofluvial sequence, in which telmatic plants (Carex aquatilis, Schoenoplectus lacustris) dominated. Chydorus sphaericus, the only cladocera species recorded, is ubiquitous and can survive in almost all reservoir types in very harsh conditions. Findings of Characeae than point at the formation of shallow lakes. The expansion of rich fen communities, including Scorpidium scorpoides, and a decline in Cladocera diversity show that these lakes soon again terrestrialised with peat formation. The appearance of Alona costata points at a lowering of pH values in that process. A tree trunk of birch (14.2 ka cal. BP) shows that first trees established during this first telmatic period.
At this position in the basin, the basal peat layer is covered by minerogenic sediments, which points at a period of higher water levels and fluvial dynamics, possibly related to a cold period with permafrost formation. At other positions in the basin, the basal peat layer is covered directly by calcareous and silicate gyttias. These parts may (1) either not have been affected by assumed fluvial activity or (2) peat formation as such only started later here. Finally, an extended lake filled the basin from the later parts of the late-glacial on. Its sedimentation history is well recorded in calcareous and silicate gyttjas, whereas sedimentary units derived from organic and inorganic carbon content as well as grain size distribution allows a stratigraphical comparison of different profiles. Several delta cones in lake sediments give evidence of still considerable fluvial influx.
High lake levels are indicated by lake terraces at 51 m and 43 m a.s.l., yet the timing of these high stands is still unclear. A third terrace at 41 m a.s.l. represents lower water level in historic times, during which two smaller lakes (‘Dobbiner Plage’ and ‘Klädener Plage’) existed in the basin. Both lakes vanished due to drainage after 1798. The uppermost sediment sequence in the basins is represented by a pattern of strongly decomposed peat and lacustrine sand.