



Infill and mire evolution of a typical kettle hole: young ages at great depths (Jackenmoos, Austria)

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Kettle holes are very common features in former glacier forefields of Northern Europe and the Alpine Foreland. Today, myriads of small lakes are indicative of dead ice that slowly melts out after the collapse of the ice shield and the burial of glaciofluvial sediments. Many of these lakes transformed into mires in Postglacial and Holocene times. Still, little is known about the mechanisms leading to mire formation in such environments. We aim to reconstruct the shape and the postglacial history of infilling and peat accumulation of a typical dead ice kettle using 2D resistivity surveying, core-drilling, ¹⁴C dating and palynologic analyses. The kettle hole mire is located in a kame delta just south of the LGM maximum extend of the Salzach Piedmont glacier (Austria/Germany). Today, the mire is a spot of exceptional high biodiversity and under protection.

Sediment core samples extracted in the deepest and central part of the basin (c. 10-14 m) directly overlie lacustrine fine sediments and yielded young ages covering the subatlantic period only. Young ages are in agreement with palynologic results comprising e.g. pollen of *secale* (rye) and *juglans* (walnut). However, these deposits are situated beneath a massive water body (10 m), only covered by a thin (dm-thick) floating mat. A second, more distally situated drill core indicates the thinning of this water body at the expense of peat deposits covering the Late Glacial to Middle Holocene.

Multiple 2D resistivity tomographies support drilling information and enable to reconstruct the shape of the basin. The transition from lacustrine sediments to the water body above is characterised by a sharp increase in resistivity. Furthermore, the resistivity pattern within the entire kettle indicates an increase in resistivity towards the centre as a result of decreasing nutrient content.

The postglacial evolution of the investigated mire is in agreement with the concept of “floating mat terrestrialisation”, representing a horizontal growth of the floating mat from the edges toward the lake centre. This concept further includes the deposition of strongly hydrated and loose debris peat formations under the floating mat. The process leads to decreasing basal ages from the edge towards the centre of the kettle hole mires and is therefore able to explain the young ages of the deep samples in the central basin.