



## **Late-Glacial to early Holocene basin development of annually laminated Lake Tiefer See**

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Lake Tiefer See (N 53.59°, E 12.53°) is one of the rare lakes with a long sequence of annually laminated Holocene sediments in northern Central Europe. The lake is thus of great potential for past climate, vegetation and human land use studies. It furthermore provides a valuable link between laminated lakes in more oceanic climates of the Eifel region and NW Germany and laminated lakes in the more continental climate of Poland.

The sediments of Lake Tiefer See are not uniform but show repeated changes in varve composition and include several non-varved sequences. Interpreting these changes requires a sound understanding of the deposition processes in the lake and the development of the lake basin itself. While modern sediment deposition is studied in an extensive monitoring program, we explore lake basin development using numerous cores from the lake margins down to the bottom of the lake.

The lake is exceptionally deep (62 m) with steep slopes and may thus be susceptible to sediment re-deposition and focusing. Most marginal cores, which reach down to 10 m water depth, show a prominent basal peat layer. This peat layer indicates that basin development started by paludification of an originally flat surface following dead-ice melting. However, even in neighboring cores the timing of the onset of peat formation appears to differ substantially. While in some cores, the prominent Laacher See Tephra (12.880 cal. BP) is found at the bottom of the peat layer, it is found well above the peat basis in other cores. Dead-ice melting may thus initially have produced a pattern of shallow depressions with ongoing peat formation within a still terrestrial surface. The formation of the deep lake is then indicated by an abrupt shift to calcareous gyttjas, which show an initially increased silicate content. The lake obviously only developed long after first peat deposition, possibly in the early Holocene. Further dates to verify this hypothesis are expected. In several marginal cores, further peat layers are found within calcareous gyttjas. These layers point at lake level low stands during the early and mid Holocene.