



## **Morphological determinants of the course of laminated sedimentation in the basin of Lake Czechowskie (northern Poland) in the Late Glacial and Holocene**

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The analyses of the annually laminated lacustrine sediments are particularly important in the studies of global climate change. They provide information about the ecosystem response to environmental and climate changes. The condition for the laminated sedimentation with the annual resolution is the calm sedimentation environment where there is no mixing and thus there are anaerobic conditions in the benthic zone. Water mixing occurs mainly as a result of weather factors such as wind and temperature. Below a certain depth water does not undergo mixing evoked by waves and also has a constant temperature which causes its stagnation. In shallower areas such conditions are favoured by the morphology of the lake basin and the long presence of ice cover (bradymictic). The combination of these environmental features predispose to the deposition of laminated sediments.

Lake Czechowskie is situated in a deep kettle-hole type basin in the marginal zone of the maximum range of the Pomeranian Phase of the last Weichselian ice sheet. Taking into account the thickness of the lacustrine sediments, the maximum depth of the basin exceeds 70 m. Detailed surveying as well as geological drilling using the GIS techniques made it possible to reconstruct the morphology of the basin of Lake Czechowskie and its adjacent areas back to the state from before the biogenic sedimentation started in Allerød. The analysis of the morphology of the lake basin becomes the basis for modelling the sedimentation conditions considering, *inter alia*, the wind direction and velocity, fluctuations in water levels and the degree of filling the basin with the deposits in different periods of the Late Glacial and Holocene. It allows specifying the variability and sedimentation rate within the basin. The analysis shows the spatial variation of erosion and accumulation zones, and enables to determine the zones of quiet sedimentation revealing places particularly predisposed to accumulate annually laminated lacustrine sediments.

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