



## **Direct and indirect climate impact on the lake ecosystem during Late Glacial Period.**

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Climate was the main factor that influenced environment in Late Glacial. The general warming trend was interrupted by cooling periods. This fluctuations had a great impact on the lakes environment not only directly by the changing temperature and precipitation but also indirectly influencing, among others, vegetation cover changes and intensity of erosion which consecutively effected lake productivity.

In this study we analyzed the sediments of Lake Łukie located in East part of Poland in Łączna-Włodawa Lake District, beyond the reach of the last glaciation. In present time lake Łukie is shallow, eutrophic lake and its area do not extend 140ha.

The aim of this study was to find out how lake ecosystem changed in Late Glacial under the influence of the climate. In order to reconstruct those changes we did several analysis: subfossil Cladocera, macrofossil, pollen, chemical composition of the sediment (TOC, OC, IC, SiO<sub>2</sub>biog, SiO<sub>2</sub>ter). The chronology was based on palinology and correlated with the lake Perespilno chronology which was based on the laminated sediments and several 14C data (lake Perespilno is located 30 km east of Łukie lake).

Our results show that during Late Glacial lake Łukie ecosystem changed dynamically. Its history started in Older Dryas, when the lake was shallow with low biodiversity. The erosion played very important role in the sediment formation as the vegetation cover was sparse, dominated by shrubs and grasses. The Allerod warming caused the deepening of the lake and the increase of biodiversity and productivity. The pine – birch forests developed. At the end of this period fishes appeared in the lake. The Younger Dryas cooling marked very visibly in all the results but though the productivity decreased the biodiversity maintained high. The vegetation cover become more open, with high share of grasses, which caused the increase in the erosion of the catchment. At the end on YD sudden change in lake ecosystem happened, probably caused by the water level drop. This dramatic event was probably caused by the changes in the ground water circulation connected with the permafrost disappearance.