



Paleolimnological approach to the separation of the effects of anthropogenic and natural factors on the lake ecosystems

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Studying the influence of anthropogenic factors on lakes ecosystem usually involves only the upper centimeters of lake sediments, accumulated over a short period of about 50 years. However, these "short cores", in fact, mostly cover only the industrial period (the period with significant human impact), leaving out the background conditions and the influence of the natural factors. Paleolimnological approach, i.e. obtaining data from the "long cores" (accumulated over millennia) allows us to trace average natural values of the studied parameters (the content of metals, phosphorus and organic matter) in the pre-industrial period (without human impact), as well as extreme natural values, such as those associated with climate change or changes in the lake level. The reasons of the extreme values we can explain by pollen, diatom and other analyses. The mathematical calculations based on the raw geochemical data from the continuous lake sediments ("long cores") were performed to evaluate the variation in the percentage ratio of natural and anthropogenic factors.

The new method has already been tested on several lakes. In all lakes we studied the variations in the content of metals, phosphorus and organic matter in the long sediment cores. We also obtained results of lithological, palynological, diatom analyses. We defined the stages of lakes history and established chronological boundaries of these stages. With the mathematical method, we tried to calculate the percentage of anthropogenic probability impacts for each lake, based on primary sufficiently accurate comprehensive data from study of the continuous lake sediment cores during the Holocene.