

BayCEER Kolloquium

Lectures in Ecology and
Environmental Research

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12:15 in H6, GEO



Prof. Stefan Peiffer

Department of Hydrology, BayCEER

Effect of Global warming on Nutrient Limitations in a temperate reservoir system

Lake warming as a result of climate change can have important consequences for reservoir nutrient dynamics and has frequently been addressed by modelling studies due to a lack of data sets that monitored important trends in nutrients and anoxia over significantly long periods of time. Here, we analysed monitoring data obtained between 2000 and 2020 in the Franconian Lake District (FLD), Germany, resulting in a highly detailed data set allowing the distinguishing of trends in nutrient concentrations, thermal stratification and anoxia. The FLD consists of a cascade of 3 interconnected reservoirs starting with a highly eutrophic, shallow reservoir receiving high nutrient loads from a uplake catchment. From here water is transferred to the other deep reservoirs (eutrophic and mesotrophic, respectively). For these reservoirs, an increase in temperature in the epilimnion was observed. As a consequence, the period of stratification has been prolonging and anoxia became an increasingly persistent characteristic of the reservoir. During the stratified period, release rates of ortho-phosphate significantly increased as well as levels of ortho-phosphate in the entire lakes' volume albeit the input of P into the reservoirs remained constant. Such shifts resulted in a strongly increased internal P loading from the sediments with implications for the N:P ratios in the lake water. Our study highlights the intricate coupling between physical and biogeochemical processes that need to be considered in the discussion about the response of surface water bodies on climate change.

