Římov Reservoir dataset – the family silver of the Czech long-term limnological research

Analýza dlouhodobých časových řad a její výsledky na příkladu nádrže Římov

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Římov Reservoir is a small, canyon-shaped and meso-eutrophic reservoir that has been sampled at three-week intervals since it was built in the late 1970s. Analysing a multitude of environmental variables, we detected underlying trends, trend reversals and regime shifts. Most of the trend reversals in reservoir hydrochemistry occurred in the late 1980s and early 1990s as a consequence of dramatic socioeconomic changes in the Czech Republic. After a series of heavy rains in the late 1990s, an administrative decision to increase the flood-retention volume of the reservoir resulted in a significant regime shift in reservoir hydraulic conditions in 1999. In the next step, we examined if and how phytoplankton responded to these abrupt changes. We found significant differences in phytoplankton composition among the three periods delimited by these changepoints. Phytoplankton underwent a substantial compositional shift towards a dominance of pennate diatoms. Changes in overall phytoplankton assemblage were driven mainly by hydrochemical (total nitrogen) and hydrodynamic variables (inflow rate, surface level and mixing depth) and less by zooplankton dynamics. Notably, both nutrient input and water regime can be appropriately managed to support valuable ecosystem services provided by phytoplankton in freshwater reservoirs. We also attempted to evaluate the impact of extreme weather events on reservoir conditions that resulted in compositional, structural and functional changes and phenological shifts in plankton. We were particularly interested in the differences between dry and rainy years and the impact of flood events on the reservoir ecosystem.