



OXYGEN DEPLETION IN STRATIFIED LAKES – WHY SHALLOW AND DEEP LAKES REACT DIFFERENTLY?

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Abstract— Oxygen is the most important ingredient in natural waters, both for aquatic organisms as well as for human consumption. Critical for hypoxic levels are the deep-waters during stagnation periods, typically during summer or warm/wet periods, when the water column is density stratified. The oxygen supply to the deep-water is then reduced and the decomposition of organic matter leads to oxygen depletion in the stratified part of the water column. Especially in shallow lakes the oxygen removal can be drastic.

In this talk, I will show how the oxygen depletion mechanisms in lakes take place and how the depletion is related to the driving factors such as the high primary

productivity (via high nutrient loads), the molecular diffusion of oxygen into the sediment, the molecular diffusion of reduced substances out of the sediment and finally the deep seasonal mixing during winter, which refills the deep oxygen reservoirs. In this talk, I will clarify how these different processes affect the oxygen budget and which of the processes can be influenced directly via the primary production (i.e. nutrients) and which processes are depending on the morphology as well as how climate change is affecting the future of lake (deep-water) oxygen budgets. The examples shown in the presentation will be set into the context of the water quality in Switzerland, which went through a drastic improvement in the last 40 years.