

EGU21-12937

<https://doi.org/10.5194/egusphere-egu21-12937>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



Forty years record of the metalimnetic oxygen minimum in Germany's largest drinking water reservoir

Michael Seewald, Chenxi Mi, Jan Donner, and Karsten Rinke

Helmholtz-Zentrum für Umweltforschung GmbH - UFZ, Lake Research, Leipzig, Germany (michael.seewald@ufz.de)

Dissolved oxygen is a central player in water quality management of lakes and reservoirs. Low levels or absence of oxygen poses a major problem, especially in drinking water reservoirs. Usually, the focus lies on the oxygen depletion in deep water. However, in many stably stratified water bodies, significant oxygen deficits have been documented in the metalimnion, even in lakes of low trophic state. This phenomenon is known as metalimnetic oxygen minimum (MOM) and the causes of MOM have been discussed controversially. The Rappbode Dam, Germany's largest drinking water reservoir, forms a MOM every year and long-term observations indicate that the oxygen deficit may have increased in recent years. Although the data cover a long period (40 years), they are very heterogeneous in terms of temporal and spatial resolution. Our study aims at systematically analysing the available data to characterize the interannual development of the MOM with respect to existing trends and to identify relevant environmental and management factors. The results confirm increasing surfacewater temperatures and unchanged deepwater temperatures in summer (Mai to October) as well as an increasingly prolonged summer stratification in the course of global warming. In contrast to the previous working hypothesis, increasing stratification duration is not correlated with the significantly increasing (p 0.009; τ -0.26) annual maximum intensity of the MOM.