IGB
Leibniz-Institut für Gewässerökologie
und Binnenfischerei

FRESHWATER RESEARCH AND ENVIRONMENTAL DATABASE

Arendsee

AR temperature and oxygen chain

FRED Package 628

In recent years, numerous lakes throughout Germany have been included in a climate impact measurement programme. Long-term climate monitoring that provides continuous series of measurements with high temporal resolution over many years is an essential basis for better understanding the interrelationships in lakes, carrying out trend analyses and developing adaptation strategies from them. In addition to measuring changes, they provide a basis for model-based management scenarios.

The Arendsee is one of the few lakes in Germany with long-term data on physical, chemical and biological parameters. The lake was studied particularly intensively between 1976 and 1985, between 1991 and 2000 and during the last 15 years.

Study site

The lake Arendsee is located in the Altmark region in Saxony-Anhalt. With an area of 514 hectares, Arendsee is one of the ten largest lakes in the federal state. As is the case with many other lakes in Germany and other countries in Europe, the lake Arendsee is also affected by eutrophication. Owing to an excessive input of phosphorus, particularly in spring and summer, there is often an excessive growth of algae and cyanobacteria, which can result in the temporary restriction in the use of the lake for bathing purposes. It is now known that the main cause of the lake's ecologically poor condition is contamination of the groundwater.

Characteristics

Area:	5.14 km ²
Maximum depth:	48 m
Average depth:	29 m
Water volume:	147 million m³
Maximum length:	3.24 km
Maximum width:	2 km

Sampling location (ca.): N 52.8905°, E 11.4599°

Measuring chain

The measuring chain consists of a rope that is kept in tension by a weight on the bottom and a pressure-resistant buoy located 1 m below the water surface. 15 loggers are attached to the rope at fixed intervals.

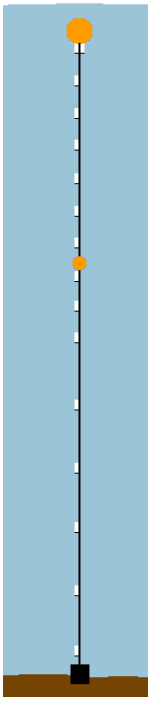


Abb. Scheme of the measurement chain with 15 autonomous loggers

Information about the depth values of the loggers

The logger depth given indicate the depth below the water surface. Due to the anchoring on the bottom, the distances of the logger from the bottom are always the same, but not when viewed from the surface. This can cause problems if the water level fluctuates, as it changes the real distance between the logger and the water surface. To record the fluctuations, a pressure sensor is attached to the measuring chain

Autonomous datalogger

For the measurements d-opto loggers from zebra-Tech Ltd, NZ, were used till 2022. The measuring field of the loggers was surrounded by a copper plate. Unfortunately, this did not help against biological growth. For this reason, the O_2 measurements in the epilimnion were strongly influenced by biofouling during this period. MiniDOT data loggers from PME (Precision Measurement Engineering, Inc.) have been used since 2023. The upper loggers are equipped with a miniWIPER, an autonomous wiper system, which keeps the measuring field mechanically clean.

Logger specifications

parameter	name	accuracy	resolution	foto
oxygen and temperature	miniDOT von Precision Measurement Engineering (PME)	according to manufacturer ± 5% ± 0.3 mg/l ± 0.1°C	0.01 mg/L 0.01 °C	
oxygen and temperature	D-Opto Logger, Zebra-Tech, LTD, NZ	according to manufacturer ± 1% ± 0.02 mg/l ± 0.1°C	0.001 mg/L 0.01 °C	
pressure and temperature	TDR 2050, RBR, Canada			

Logger depth distribution von 2012 bis 2025

2.5 m
5 m
7.5 m
10 m
12.5 m
15 m
17.5 m
20 m
22.5 m
25 m
30 m
35 m
40 m
45 m
47 m oder 48 m

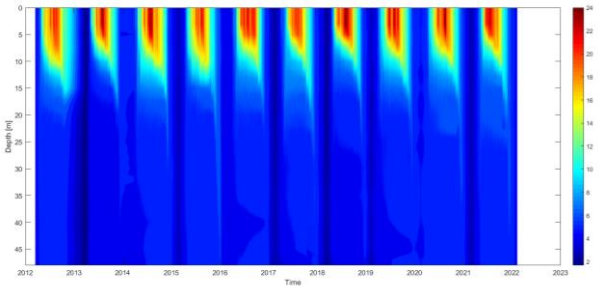
Intervall 60 min. untill 2022, 30 min. from 2023
<1min. (RBR, 47m)

Data

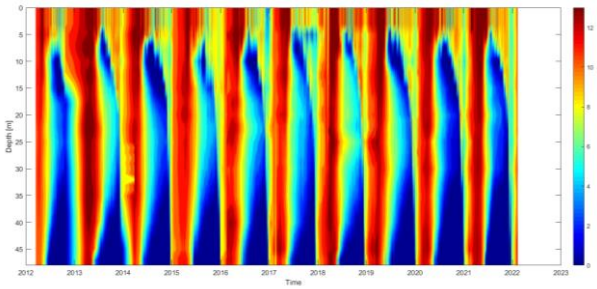
periods	15.03.2012 – 22.10.2012
	28.03.2013 – 18.12.2013
	26.03.2014 – 06.01.2015
	06.01.2015 – 16.02.2016
	16.02.2016 – 20.01.2017
	31.01.2017 – 20.03.2018
	06.04.2018 – 20.03.2019
	27.03.2019 – 15.01.2020
	04.02.2020 – 21.02.2021
	16.03.2021 – 09.02.2022
	23.02.2022 – 22.02.2023
	22.02.2023 – 08.02.2024
	08.02.2024 – 28.01.2025
	28.01.2025

The data are stored as individual .dat or .txt files in the IGB Cloud Nimbus.

temperature 2012-2021



oxygen 2012-2021



Contact

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