IGB
Leibniz Institute of Freshwater Ecology and Inland Fisheries

IGB Freshwater Research and Environmental Database

FRED Package 948

Kilpisjärvi Dissolved Oxygen and Temperature Data

Logger Chain

Logger chain in Kilpisjärvi is located near the deepest point of the lake (≈ 43m) equipped with loggers of water temperature (T), dissolved oxygen (DO) , and photosynthetically active radiation (PAR) distributed across the water column along an anchored mooring line supported by a subsurface buoy placed 1.5-2.5 m and 13 m below the lake surface.

Table 1. Lake Properties

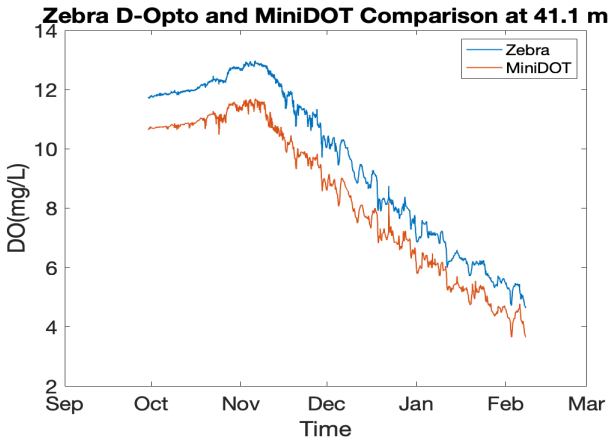
name	waterbody	lat_decdeg	lon_dec deg	country	trophic state	max depth (m)	mixing type	elevation (m)
Kilpisjärvi	lake	69.006	20.4859	Finland	oligotrophic	45	dimictic	473

Table 2. Temperature and Dissolved Oxygen Logger Specifications

Parameter	Name	Accuracy	Resolution
Water Temperature (T)	RBR (1050, 1060, Solo, Duo, TDR 2050)	±0.002°C	<0.00005°C
Dissolved Oxygen (DO), Temperature (T)	miniDOT (DO)	±5%, ±0.3 mg/l	0.001 mg/L
	miniDOT (T)	±0.1 degrees C	1 millidegree C
	Zebra D-Opto (DO)	±1%, ±0.02 mg/l	0.01%, 0.001 PPM
	Zebra D-Opto (T)	±0.1 degrees C	10 millidegree C

Bias Between Different Oxygen Loggers

In 2021-2022, we used Zebra D-Opto and MiniDOT loggers for dissolved oxygen measurements. Zebra D-Opto recorded ~1 mg/L higher values than MiniDOT at the same depth. From 2022, MiniDOT loggers were primarily used for their lower battery use and longer recording time. The bias was corrected by aligning Zebra D-Opto data to MiniDOT for consistency in future studies.



Data

We share both the raw and bias-removed datasets;

Data Format

Water Temperature in C degree :Temp_C_'depth'm
Dissolved Oxygen in mg/L :DO_mgL_'depth'm
Dissolved Oxygen in sat(%) :DO_sat_'depth'm
Time Zone: UTC

1**. Raw** DOmg, DOsat and T data obtained from Zebra D-Opto and miniDOT loggers

Time Period	DO mg/L data	DO sat.(%) data	Temp. data
01.12.2018-20.04.2019	Kilpis1819_DOmg_raw.csv	Kilpis1819_DOsat_raw.csv	Kilpis1819_Temp_raw.csv
01.12.2019-20.04.2020	Kilpis1920_DOmg_raw.csv	Kilpis1920_DOsat_raw.csv	Kilpis1920_Temp_raw.csv
01.12.2021-20.04.2022	Kilpis2122_DOmg_raw.csv	Kilpis2122_DOsat_raw.csv	Kilpis2122_Temp_raw.csv

2. **Bias-removed (BR)** DO (mg/L) data from miniDOT and D-Opto loggers, and 1-hour mean-averaged temperature (T) data from RBR loggers.

Time Period	DO mg/L data	Temp. data
01.12.2018-20.04.2019	Kilpis1819_DOmg_BR.csv	Kilpis1819_Temp_RBR.csv
01.12.2019-20.04.2020	Kilpis1920_DOmg_BR.csv	Kilpis1920_Temp_RBR.csv
01.12.2021-20.04.2022	Kilpis2122_DOmg_BR.csv	Kilpis2122_Temp_RBR.csv

Table 3 shows the locations of the Zebra D-Opto, miniDOT, and RBR loggers along the logger chain.
The miniDOT loggers (dark green) and Zebra D-Opto loggers (light green) measure dissolved oxygen concentration (DO, mg/L), oxygen saturation (DO%), and temperature (°C).
The RBR loggers (blue) measure temperature. Logger locations where the data were unsuitable or unavailable for analysis are marked in grey.

Table 3.Yearly Water Temperature and Dissolved Oxygen Logger Positions

01.12.2018-20.04.2019			01.12.2019-20.04.2020			01.12.2021-20.04.2022			
Sampling Rate	10s	1 hr	Sampling Rate	10s	1 hr	Sampling Rate	10s	1 hr	
Depth (m)	T	DO,T	Depth (m)	T	DO,T	Depth (m)	T	DO,T	
						2.4		N/A	N/A
3.5			3.4			3.6			
4.7			4.7	N/A		4.7			
5.8			5.8			5.7		N/A	
6.8			6.7			6.7			
7.8			7.8			7.7			
8.8			8.8			8.7			
9.8			9.7			9.8			
10.9		N/A	10.9			10.85	N/A		
11.95			11.95	N/A					
13			13			13			
14.05			14.05			13.95			
15.05			15.05			14.95			
16.05			16	N/A		16			
17.1			17.1			17.1			
18.2			18.2			18.1			
19.2			19.15	N/A		19.15			
20.25			20.25			20.15			
21.25			21.25			21.2			
22.3			22.3			22.2			
23.3	N/A		23.3	N/A		23.25			
24.35			24.35			24.4			
25.4			25.4			25.3			
26.4			26.4	N/A		26.4			
27.5			27.5			27.4			
28.5			28.5			28.55			
29.55			29.55	N/A		29.5			
30.6			30.6			30.5			
31.6			31.6			31.6			
32.6			32.6			32.55			
33.6	N/A	N/A	33.6	N/A		33.7			
34.65			34.65			34.6			
35.65		N/A	35.65		N/A	35.8			
36.7			36.7			36.65			
37.7			37.75	N/A		37.9			
38.75			38.75			39			
39.8			39.85			40		N/A	
40.85			40.9						
41.9			42			41.1			
42.95			42.95			42.2			
			43.8	N/A					

Contact

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