Multiparameter probe data at Lake Dagow 1971-2024

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Data origin Data were collected by IGB (Marén Lentz, Uta Mallok).

Sampling site

Lake Dagow (53° 9‘ 4“ N, 13° 3‘ 14“ E) lies in a long glacial channel that stretches from the eastern bay of Lake Stechlin to Lake Röblin near Fürstenberg (Lehmann 1974). It was formed by melting of a dead ice block, lying within the melt water chanel (Casper 1985). The lake has an area of 24 ha and a maximum depth of 8.5 meters. The water level is 60.1 m above sea level. With an average depth of 4.95 m, the volume of Lake Dagow is 11.89×10^5 m³. The catchment area of the lake covers approximately 7 km². A drainage ditch from the Tradenrinne flows into the lake from the northwest, but it has dried up since about 1990. In years with high water levels, Lake Dagow drains above ground through a wetland (with the former Little Lake Dagow) into the eastern bay of Lake Stechlin. The water retention time is about 3-5 years. The shoreline of Lake Dagow is 2.5 km long. The village of Neuglobsow borders its shore in the southeast, and the village of Dagow is located on the west shore.

Lake Dagow was strongly polluted by carp and duck breeding in the sixties (Koschel et al. 1990). Between 1965-1969 the PO_4-P loading was 1,04 g m^{-2} yr^{-1}. In the 1970s, various measures were taken to improve the water quality of Lake Dagow: carp and duck breeding was stopped in 1970, the discharge of oxidation ponds was ended in 1972, a central sewage system was installed in Neuglobsow and sewage treatment outside the catchment area was constructed in 1980-1985, and a withdrawal of hypolimnetic water was performed in 1986/87. As a result of these measures, the PO_4-P load was reduced to 0.15 g m^{-2} yr^{-1}. Today, Lake Dagow has largely recovered from the pollution it suffered in the past.

In the 1990s, Lake Dagow was the subject of intensive research into pelagic calcite precipitation in hard water lakes (Koschel et al. 1987, 1990). In 1994, an enclosure test facility was installed on Lake Dagow, where preliminary tests on artificially induced calcite precipitation for the restoration of eutrophicated hard water lakes were conducted (Dittrich et al. 1997). Later, studies on food chain manipulation were also conducted at the facility (Rychla et al. 2014). In recent years, Lake Dagow has been the subject of intensive research into the release of greenhouse gases CO_2 and CH_4 (Casper et al 2009, Martinez-Cruz et al 2020).

Time span 1971-2024

Sampling method

Since 1971, vertical profiles were collected from the central basin at the deepest point of the lake (9.0 m, 53°9′1.76″N, 13°3′3.93″E). The sampling frequency has varied over the years: in 1971 and from 1978 to 1997, samples were taken monthly at times (up to every two weeks in summer). From 1998 to 2008, only 10 samples were taken in total, and since 2009, sampling has been carried out 3 to 6 times per year.

Before 1992, water temperature was measured using the mercury thermometer of the Ruttner sampler (Mothes 1981) and dissolved oxygen concentrations were determined by the Winkler method (Mothes 1981, Legler 1986). From 1992 onwards, multi-parameter probes were used to obtain vertical profiles (1-5 m depth intervals) of temperature, dissolved oxygen, oxygen saturation, pH, specific conductivity, and, from 2013 onwards, turbidity, chlorophyll a (chl a) and phycocyanin (PC). Until 2009 a hand-held WTW multiprobe (OXI-197, Weilheim, Germany), since 2010 a YSI multiprobe (YSI 6600, Yellow Springs, OH, USA) and since 2022 a YSI multiprobe (YSI-EXO2, Yellow Springs, OH, USA) was used. Occasionally the YSI 6600 probe was also used after 2022. Sensors were regularly calibrated in the lab according to the user manuals.

Water transparency was determined as Secchi depth on each sampling occasion. A white disc 30 cm (1970-1991) or 20 cm (1992-2020) in diameter was lowered in the water column until it was no longer visible, then raised, and the depth recorded both when the disc disappeared and when it re-appeared. The mean of both values is reported as Secchi depth. Readings were taken with a bathyscope on the shady side of a boat to reduce the influence of reflections and glittering.

Parameters

1971-2022:

- lake – sampled lake
- site – measurement site
- date – date of measurement [YYYY-MM-DD]
- depth – depth of measurement [m]
- wtemp – water temperature [°C]
- o2 – dissolved oxygen [mgL^{-1}]
- so2 – oxygen saturation [%]
- ph – pH value
- conductivity – electrical conductivity [µScm^{-1}]
- turbidity – turbidity [NTU]
- chla – chlorophyll a [µgL^{-1}]
- chla_rfu – chlorophyll a [RFU]
- bga_pc_cellsperL – blue-green algae phycocyanin [cellsL^{-1}]
- bga_pc_ugperL – blue green algae phycocyanin [µgL^{-1}]
- bga_pc_rfu – blue green algae phycocyanin [RFU]
- observer – person who collected the data
- probe – type of multiparameter probe
- comment – comments
- comment_eng – English translation of original German comments given in column

"comment"

from 2022 onwards:

- lake – sampled lake
- site – measurement site
- date – date of measurement [YYYY-MM-DD]
- time – time of measurement [HH:MM:SS]
- depth – depth of measurement [m]
- wtemp – water temperature [°C]
- o2 – dissolved oxygen [mL^{-1}]
- so2 – oxygen saturation [%]
- ph – pH value
- spc – specific conductivity [µScm^{-1}]
- conductivity – electrical conductivity [µScm^{-1}]
- turbidity – turbidity [NTU]
- chla – chlorophyll a [µgL^{-1}]
- chla_rfu – chlorophyll a [RFU]
- bga_pc_cellsperL – blue-green algae [cellsL^{-1}]
- tal_pc_ugperL – total algae phycocyanin [µgL^{-1}]
- tal_pc_rfu – total algae phycocyanin [RFU]
- tal_pc_ugperL – total algae phycocyanin [µgL^{-1}]
- tal_pc_rfu – total algae phycocyanin [RFU]
- tal_pe_ugperL – total algae phycoerythrin [µgL^{-1}]
- tal_pe_rfu – total algae phycoerythrin [RFU]
- observer – person who collected the data
- secchi – secchi depth [m]
- probe – type of multiparameter probe
- comment – comments
- comment_eng – English translation of original German comments given in column "comment"

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