

Total biomass across 13 groups- Lake Constance data documentation

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Lake name: Lake Constance

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Sampling site

Lake Constance (LC) is a temperate, large (476 km²), deep (mean depth = 101 m, max. depth 252 m), and warm-monimictic lake north of the European Alps of glacial origin. It has weak pelagic-benthic coupling, and little allochthonous input into the pelagic zone (Bäuerle and Gaedke 1998). The focal measuring site is in the north-western fjord-like arm of the lake (mean depth ca. 100 m, max. depth 146 m).

Organisms

This dataset provides the total plankton biomass in units of carbon subdivided into 13 major (mostly functional) groups ranging from bacteria to zooplankton.

Dataset overview

We provide one dataset which provides the weekly (growing season Apr-Nov) to approximately bi-weekly (winter months) biomass measurements in units of carbon for the years 1987-1996 resolved by 13 groups ordered by mean body size: Bacteria, autotrophic picoplankton (APP, i.e., cyanobacteria), heterotrophic nanoflagellates (HNF), phytoplankton (all eucaryotic phytoplankton), ciliates (protists), rotifers (small multicellular zooplankton), and the following 7 crustaceans: *Daphnia hyalina* (cladocerans, commonly known as “water fleas”), *Daphnia galeata* (cladocerans, commonly known as “water fleas”), *Bosmina spec.* (a smaller cladoceran), *Eudiaptomus spec.* (calanoid copepod), *Cyclops spp.* (cyclopoid copepods), *Leptodora spec.* (carnivorous cladoceran), *Bythotrephes spec.* (carnivorous cladoceran). The crustaceans are provided with a higher taxonomic resolution to reflect differences in e.g. their diet.

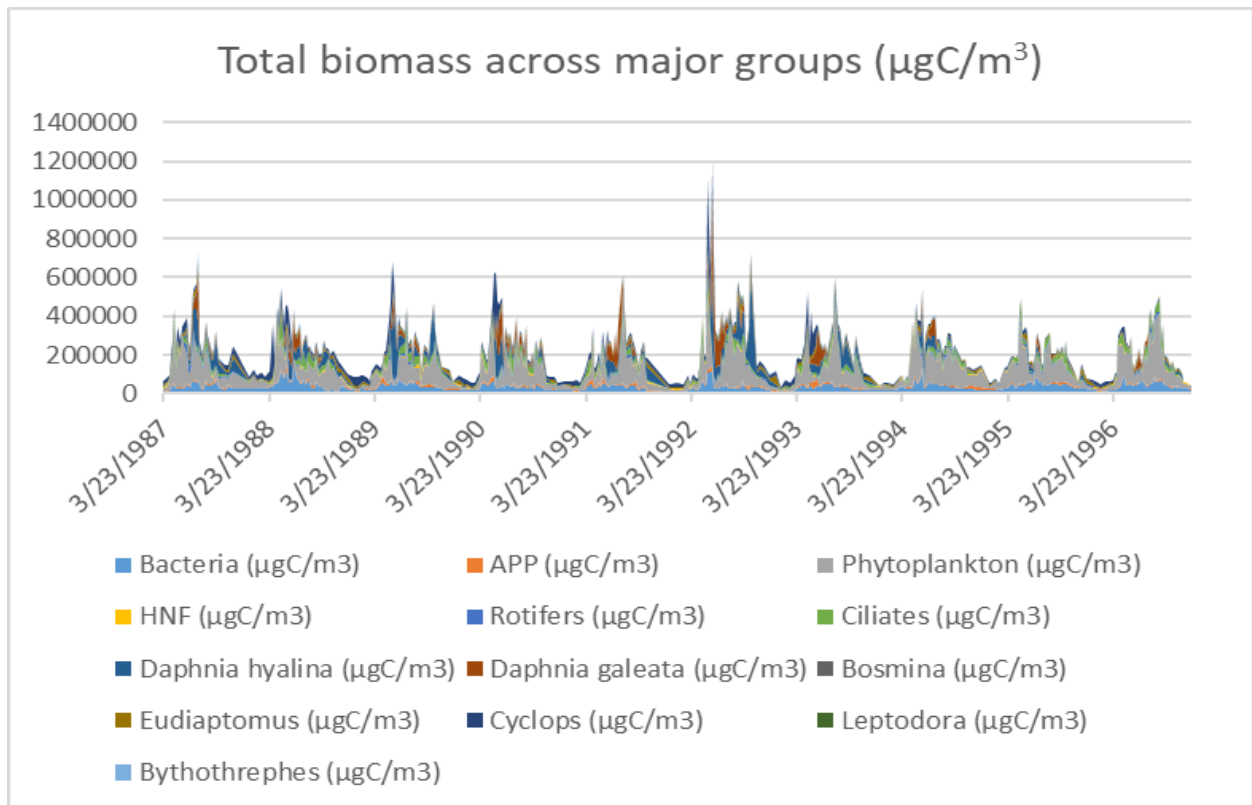


Fig. 1: Depth-averaged biomass in units of carbon ($\mu\text{gC}/\text{m}^3$) of all 13 functional groups in Lake Constance.

Sampling methods

This dataset is provided to give an overview about total biomass and its distribution across the major 13 functional groups in Lake Constance. The sampling methods are described for each functional group in the respective documentation files in LakeBase (please see there and the literature given in those files, e.g. Bäuerle & Gaedke 1998).

Depth-integration and unit conversion

Biomass in units of carbon is given here in [$\mu\text{gC}/\text{m}^3$]. This implies the biomass is averaged over the water column of the uppermost 0-20m (roughly the euphotic zone) and projected onto a volumetric unit of 1m^3 . Other authors prefer an areal unit per square meter. The conversion factor from the areal unit $\mu\text{gC}/\text{m}^2$ to $\mu\text{gC}/\text{m}^3$ is 1/20 because each cubic meter within the 20m-deep water column is thought to contain 1/20 of the depth-integrated biomass per square meter.

Dataset description

Dataset 1:

Filename: "Dataset1_LakeConstance_CarbonAllFunctionalGroups_DepthIntegrated"

This dataset (n = 377) contains the approximately weekly (Apr-Nov) to bi-weekly (Dec-Mar) total plankton biomass [$\mu\text{gC}/\text{m}^3$] resolved into 13 mostly functional groups from 1987-1996. Biomass is averaged over 0-20m depth. All groups were always sampled simultaneously but occasionally the assessment for a specific group turned out to be unreliable and had to be discarded. Here we provide only the sampling dates where measurements of all functional groups were available except for a few instances where the biomass of an individual group (of minor importance during that time) could be extrapolated from other measurements to obtain data for the complete food web. Vice versa, further measurements at other sampling dates are available for individual groups which can be found in the respective documentation and LakeBase files.

Column headers

- A. Date
- B. Bacteria [$\mu\text{gC}/\text{m}^3$]
- C. APP [$\mu\text{gC}/\text{m}^3$]
- D. Phytoplankton [$\mu\text{gC}/\text{m}^3$]
- E. HNF [$\mu\text{gC}/\text{m}^3$]
- F. Rotifers [$\mu\text{gC}/\text{m}^3$]
- G. Ciliates [$\mu\text{gC}/\text{m}^3$]
- H. *Daphnia hyalina* [$\mu\text{gC}/\text{m}^3$]
- I. *Daphnia galeata* [$\mu\text{gC}/\text{m}^3$]
- J. *Bosmina* [$\mu\text{gC}/\text{m}^3$]
- K. *Eudiaptomus* [$\mu\text{gC}/\text{m}^3$]
- L. *Cyclops* [$\mu\text{gC}/\text{m}^3$]
- M. *Leptodora* [$\mu\text{gC}/\text{m}^3$]
- N. *Bythotrephes* [$\mu\text{gC}/\text{m}^3$]

References

General references on Lake Constance

- Bäuerle E, Gaedke U (1998) *Lake Constance: characterization of an ecosystem in transition*. Stuttgart, Germany: Schweizerbartsche Verlagsbuchhandlung.
- Boit, A. & U. Gaedke (2014) Benchmarking Successional Progress in a Quantitative Food Web. *PLoS One* 9(2): e90404