

Dataset: Cross-contamination risks in sediment-based resurrection studies of phytoplankton

SND-ID: 2022-55-1. **Version:** 1. **DOI:** <https://doi.org/10.5878/9y59-7a50>

Download data

2022-55.zip (39.87 KB)

Associated documentation

Metadata_Andersson2022.docx (37.05 KB)

README_geology.md (975 bytes)

README_MPN.md (5.2 KB)

Download all files

2022-55-1-1.zip (~83.07 KB)

Citation

Andersson, B., Rengefors, K., Kourtchenko, O., Johannesson, K., Berglund, O., & Filipsson, H. L. (2022) Dataset: Cross-contamination risks in sediment-based resurrection studies of phytoplankton (Version 1) [Data set]. University of Gothenburg. Available at: <https://doi.org/10.5878/9y59-7a50>

Creator/Principal investigator(s)

[Björn Andersson](#) - University of Gothenburg, Department of Marine Sciences

[Karin Rengefors](#) - Lund University, Department of Biology

Olga Kourtchenko - University of Gothenburg, Department of Marine Sciences

[Kerstin Johannesson](#) - University of Gothenburg, Department of Marine Sciences

[Olof Berglund](#) - Lund University, Department of Biology

[Helena L Filipsson](#) - Lund University, Department of Geology

Research principal

[University of Gothenburg](#) - Department of Marine Sciences

Description

The data contains sediment core measurements from two locations in the Baltic Sea. The aim of the study was to determine if the age of phytoplankton resting stages could be determined based on their vertical position or if contamination from surface population was a major confounding factor. To this end, the concentration of seven abundant species of diatoms and cyanobacteria were enumerated using the Most Probable Number (MPN) approach. Sediment sections were dated using standard radiometric methods, and surface sediment contamination was quantified using 4.5 µm microsphere tracers. Furthermore, ex-situ longevity was monitored over four years and decreased substantially withing this timeframe. In the cores, microspheres ($>2 \times 10^{-6}$ fractions) were translocated from the sediment surface and could well explain the vertical distributions and abundances of viable cells (between ~ 106 to <0.8 g sediment $^{-1}$). Our conclusion was therefore that there are substantial contamination risks, and that age determination of resting stages using only radiometric age determination of bulk sediment is flawed without additional contamination controls.

The study design consisted of two field expeditions (2017 and 2020) where six to ten, 50 cm cores were collected. Cores were inspected for signs of damage and preservation of laminated patterns, and the best cores were selected for further analysis. Selected cores were sectioned onboard for bulk radiometric dating (^{210}Pb and ^{137}Cs) and Total Organic Carbon (TOC) and Nitrogen (TN) profiles. MPN enumeration of diatom and cyanobacterial resting stages was performed on cores transported intact to Gothenburg, which were processed within two to six months (reported as initial concentration). Survival ex-situ was monitored from 2017 to 2021 in surface samples stored under dark, cold (4°C), and anoxic conditions, in 20-40 mL of sediment in 50 mL non-transparent Falcon tubes. To assess the validity of the radiometric age determination of diatoms from 2017, we quantified contamination during the 2020 sampling. Non-toxic, yellow-green fluorescing polystyrene microspheres (Thermo Scientific™ Fluoro-Max) were used to track surface sediment contamination in three VG20 cores. Microspheres were injected into the water headspace of three replicate cores (in Gothenburg) and allowed to settle onto the surface before sectioning. The translocation of microsphere from the sediment surface could then be traced in tandem with enumeration of resting stages.

See file Metadata_Andersson2022.docx for a detailed description of files and data.

Data contains personal data

No

Language

[English](#)

Time period(s) investigated

2017-06-27 - 2021-09-16

Data format / data structure

[Numeric](#)

Species and taxons

[Fragilariopsis spp](#)

[Naviculoids](#)

[Amphoroids](#)

[Thallasiosira baltica](#)

[Skeletonema marioni](#)

[Nodularia spumigena](#)

[Chaetoceros spp](#)

[Dolichospermum spp](#)

Geographic spread

Geographic location: [Östergötland County](#), [Kalmar County](#), [Baltic Sea](#)

Geographic description: Between the 27-28th of June 2017 two semi-enclosed inlets, Gropviken (GP17; 58°19.92N 16°42.35'E) and Gåsfjärden (VG17; 57°34.35'N 16°34.98'E), were sampled. On the 22nd of September 2020, Gåsfjärden (VG20; N 57°34.38', E 16°35.43') was revisited 500 m east of VG17

Responsible department/unit

Department of Marine Sciences

Other research principals

[Lund University](#)

Funding

- Funding agency: Swedish Research Council for Environment Agricultural Sciences and Spatial Planning
- Funding agency's reference number: 2016-00594
- Project name on the application: Sedimentet berättar: Hur har växtplanktonpopulationer anpassats till miljögifter under de senaste 150 åren?

Research area

[Environmental sciences](#) (Standard för svensk indelning av forskningsämnen 2011)

[Geology](#) (Standard för svensk indelning av forskningsämnen 2011)

[Microbiology](#) (Standard för svensk indelning av forskningsämnen 2011)

[Ecology](#) (Standard för svensk indelning av forskningsämnen 2011)

[Biota](#) (INSPIRE topic categories)

[Geoscientific information](#) (INSPIRE topic categories)

[Oceans](#) (INSPIRE topic categories)

Keywords

[Phytoplankton](#), [Geology](#), [Sea regions](#), [Species distribution](#), [Radiometric dating](#), [Contamination](#), [Sediment cores](#), [Longevity](#), [Resting stages](#)

Publications

Andersson, B., K. Rengefors, O. Kourtchenko, K. Johannesson, O. Berglund, and H. L. Filipsson. (2023). Cross-contamination risks in sediment-based resurrection studies of phytoplankton. *Limnology and Oceanography Letters*, 8(2), 376-384.

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Accessibility level

Access to data through SND

Data are freely accessible

Use of data

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License

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Versions

Version 1. 2022-10-25

Contacts for questions about the data

Björn Andersson

anderssonbjorn1985@gmail.com

Helena L Filipsson

helena.filipsson@geol.lu.se

Related research data in SND's catalogue

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