

Occurrence of Cyanobacteria in the Gulf of Gdańsk (2008–2009)

Justyna Kobos^{1*}, Anna Krakowiak¹, Agata Błaszczyk¹, Anna Toruńska-Sitarz¹

¹ Faculty of Oceanography and Geography, Institute of Oceanography, University of Gdańsk (46 Marszałka Józefa Piłsudskiego Street, Gdynia, Poland)

* Correspondence author: justyna.kobos@ug.edu.pl; ORCID: [0000-0002-9360-2187](https://orcid.org/0000-0002-9360-2187)

Abstract

Blooms of cyanobacteria develop each summer in the Baltic Sea. Collecting complete data on this phenomenon is helpful in understanding the changes taking place in the Baltic Sea and forecasting the occurrence of these phenomena in the future. This dataset includes unpublished information about the occurrence of cyanobacteria in the Gulf of Gdańsk (Southern Baltic) in 2008 and 2009. The presented data combines basic physicochemical and biological parameters of the sampled waters, therein: water temperature, salinity, chlorophyll a, occurrence of diazotrophic cyanobacterial species from *Nodularia*, *Aphanizomenon* and *Dolichospermum* genera, their biomass and abundance, concentration of detected cyanotoxins. The obtained results indicate the presence of toxic cyanobacteria species in the Gulf of Gdansk. The abundance and biomass of cyanobacteria and the concentration of toxins changed during the season. The highest concentration of nodularin was recorded on 29th of July 2009 when *Nodularia spumigena* dominated in the phytoplankton.

Keywords: cyanobacteria; bloom; cyanotoxins; nodularin; *Nodularia spumigena*

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Specification table (data records)

Subject area	Earth Science/Environmental Sciences/Ecology
More specific subject area	Cyanobacterial Harmful Algal Blooms
Design Type(s)	Database creation objective/ Compilation of data from various sources

Measurement Types(s)	Salinity, Temperature, Cyanobacterial diversity, Cyanobacterial biomass, Chlorophyll a, Diversity of cyanotoxins, Concentrations of cyanotoxins in cyanobacteria cells and water
Technology Type(s)	pH/conductivity multifunction meter, Spectrophotometer, Microscope, High Performance Liquid Chromatography
Factor Type(s)	Geographic location, Temporal interval
Data source location	MOST Wiedzy Open Research Catalog, Gdańsk University of Technology, Gdańsk, Poland
Data accessibility	The dataset is accessible and is publicly and freely available for any research or educational purposes.

Background

Toxic phytoplankton blooms that appear as result of natural water eutrophication are often intensified by anthropogenic influence. Blooms change the water colour and turbidity, which looks as if it has been covered with thick paint. Their negative impact on the environment is also associated with the reduction in phytoplankton biodiversity and the presence of toxic species. In the Baltic Sea, blooms of filamentous cyanobacteria are reported regularly every year in late summer (Mazur-Marzec et al., 2006). Currently, blooms of *Aphanizomenon flosaquae* and *Nodularia spumigena* are typical phenomena for waters of the Baltic proper; whereas, *Dolichospermum* spp. occurs primarily in coastal waters. It is believed that salinity is one of the most important abiotic factors that determines the structure of phytoplankton communities and the development of cyanobacterial blooms. Water temperature, is another important determinant of the mass growth of cyanobacteria from the *Nodularia* genus. The blooms can be particularly harmful when the nodularin (NOD)-producing species, *N. spumigena*, dominates.

With EU Directive (2006/7/CE), monitoring of cyanobacterial proliferation became mandatory but no precise framework was provided for monitoring. Current WHO alert levels for bathing waters are based on parameters such as chlorophyll a (Chl a) and cyanobacterial density.

Our dataset, Cyanobacterial occurrence in the Gulf of Gdansk (<https://doi.org/10.34808/14tr-n964>), contains the results of environmental studies on cyanobacterial blooms in the waters of the Gulf of Gdansk during the summer seasons of 2008 and 2009. The data concerns more than 90 samples collected from the coastal zone and the open waters of the Gulf. The mean water temperature values measured at the Gdynia boulevard and during cruises in the central part of the Gulf of Gdańsk were similar and were about 18°C. During the summer season, average Chl a concentrations were comparable in different parts of the gulf (~ 5 µg dm⁻³, boulevard; ~7 µg dm⁻³, central part). Only in the coastal zone, high chlorophyll concentrations were recorded during phytoplankton blooms. The results indicate that when *N. spumigena* formed blooms, they were always

toxic. The mass presence of this NOD-producing species was observed sporadically at the Gdynia boulevard, with only 3 samples from 2008 and 3 samples from 2009. In the central part of the Gulf of Gdańsk, no toxins were found in the 26 samples collected in 2008. While in 2009, nodularin was identified in 3 of 26 phytoplankton samples.

The accumulation of harmful biomass of cyanobacteria in places used for bathing and recreation may pose a threat to persons who bathe in the water. Therefore, it is necessary to monitor the possibility of toxic blooms every year.

Methods

The r/v 'Oceanograf 2' of the Institute of Oceanography, University of Gdańsk, was used for sample collection in the Gulf of Gdańsk. In addition, samples were collected from one onshore station situated at the end of the pier in Gdynia. Water and phytoplankton samples were collected, extracted, and Chl a, NOD, and microscopic analysed according to the methods described by Mazur-Marzec et al. (2006).

Data quality and availability

Sampling and analysis of the samples were performed using recommended methods and protocols (HELCOM, Meriluoto and Spoof, 2005).

Dataset DOI

[10.34808/14tr-n964](https://doi.org/10.34808/14tr-n964)

Dataset License

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