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## Sea surface as a source for bioaerosols in the coastal zone of the Southern Baltic Sea



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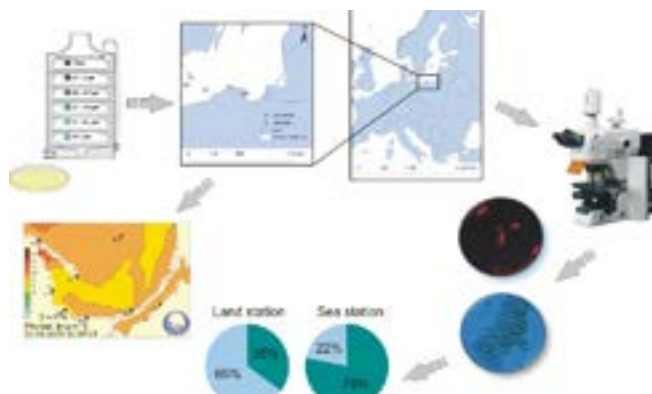
**Introduction:** While cyanobacteria and algae living in sea water are well recognized, those that are the components of aerosols are rarely the focus of scientific research, especially in the Baltic Sea region. That's why the aim of this study was to determine whether among the identified microalgae and cyanobacteria there were any capable of posing a potential threat to human health.

**Methodology & Theoretical Orientation:** Bioaerosols were collected in 2015 on land and at sea on petri dishes covered with f/2 culture medium and placed in six-step microbiological pollutant sampler (<math>1.1 \mu\text{m}</math>->7  $\mu\text{m}</math>). In all samples the taxonomic composition and number of identified taxa were analysed.$

**Findings:** It was found that cyanobacteria and microalgae having been identified both in the atmosphere over the sea and over land during the entire study period are omnipresent microbiological air pollutants. Some of them had been transported from remote areas, such as *Gloeotheca* sp. - a species not typical for the Southern Baltic Sea.

**Conclusion & Significance:** The higher the primary production in sea water and the concentration of phytoplankton in it, the greater the diversity in terms of the microorganisms observed in the collected bioaerosol samples. Other important factors were: Water temperature, accessibility of light and the amount of available phosphorus and nitrogen in the surface water. In the atmosphere over land, microorganisms dominated in aerosol particles of smaller dimensions (<math>3.3 \mu\text{m}</math> in diameter). Over the sea, there was a reverse situation. That resulted from the fact that smaller aerosols could be better distributed over long distances. Among the identified microorganisms were species

which pose a threat to human health and life. Seeing as in the surrounding air, part of the everyday environment of the human habitat, those species were incorporated into small, respirable particles, it is necessary to conduct further research.



### Recent Publications

1. Falkowska L, A R Reindl, E Szumiło, J Kwaśniak, M Staniszewska, M Beldowska, A Lewandowska, I Krause (2013) Mercury and chlorinated pesticides on the highest level of the food web in the Southern Baltic as exemplified by herring from the Southern Baltic and African penguins from the zoo. Water Air and Soil Pollution 224(5):1549.

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2. Falkowska L, A Witkowska, M Bełdowska, A Lewandowska (2013) Waste disposal sites as sources of mercury to the atmosphere in the coastal zone of the Gulf of Gdańsk (southern Baltic Sea). *Oceanological and Hydrological Studies* 42(1):99-109.
3. A U Lewandowska and L Falkowska (2013) High concentration episodes of PM10 in the air over the urbanized coastal zone of the Baltic Sea (Gdynia - Poland). *Atmospheric Research* DOI: 10.1016/j.atmosres.2012.08.002.
4. Lewandowska A, L Falkowska and J Józwiak (2013) Factors determining the fluctuation of fluoride concentrations in PM10 aerosols in the urbanized coastal area of the Baltic Sea (Gdynia, Poland). *Environmental Science and Pollution Research* 20:6109–6118.
5. Lewandowska A and L Falkowska (2013) Sea salt in aerosols over the Southern Baltic. Part 1. The generation and transportation of marigenous particles. *Oceanologia* 55(2):279-29.

## Biography

Anita U Lewandowska is an Associate Professor in the Marine Chemistry and Environment Protection Department, Faculty of Oceanography and Geography, University of Gdansk. Her primary research interests are in the field of atmospheric chemistry and oceanography with the special focus on processes of aerosol and gases exchange between the sea and the atmosphere under the influence of abiotic and biotic factors in the coastal regions of the sea. She is interested mainly in issues related to the Baltic Sea and Antarctica. She is a member of the Sea Research Committee of the Polish Academy of Sciences. She is author and co-author of dozens of scientific publications in the field of atmospheric chemistry and co-author of the book *Aerosols and Gases in Earth's Atmosphere - Global Changes and a Practical Guide for Students* *Aerosols and Gases*

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