

EGU21-9528

<https://doi.org/10.5194/egusphere-egu21-9528>

EGU General Assembly 2021

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Content and variability of nutrients in the water area of Blagopoluchiya Bay (Novaya Zemlya, Kara Sea)

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In the frames of the scientific program “Investigation of the Russian Arctic ecosystems” in 2007-2020 held by Shirshov Institute of Oceanology, comprehensive studies of the bays of the Novaya Zemlya archipelago (NZA) were carried out. There is very little information in the scientific literature on the dynamics and hydrochemical structure of the waters of the bays. Our investigations have revealed that the concentration of nutrients (first of all, nitrates and silicate) in the bays of NZA was higher than in the surrounding water area of the Kara Sea. The most well studied and open for investigations is the Blagopoluchiya Bay in the northern island of NZA. Blagopoluchiya Bay is a fjord-type bay with several streams of the glacier origin.

The concentrations of nutrients (N, P, Si, C) in the streams were observed in August-September (0-1.53 μM of PO_4^{3-} , 6.4-50.2 μM of SiO_3^{2-} , 0.6-11.2 μM of $\text{NO}_2^- + \text{NO}_3^-$, 732-4815 μM of DIC). The observed content of nutrients in the waters of the bay was on average 2 times lower, but not lower than the level limiting the development of phytoplankton.

We suppose that high concentrations of nutrients in NZA bays in August-September were supported by increasing glacial runoff from NZA during the summer open water period and the removal of products of degradation of shore rocks with it. Despite the constant enrichment of nutrients, the concentration of phytoplankton in Blagopoluchiya Bay was extremely low (0.2-0.7 mkgC/l) in comparison with the adjacent marine part of the Kara Sea in all years of research. Perhaps it was due to osmotic stress of planktonic algae during desalination of the bay by the NZA runoff.

This work was supported by the State Agreement of The Ministry of Science and Education of Russian Federation (theme №0128-2019-0008); Russian Foundation for Basic Research project 18-05-60069 (processing hydrochemistry data); Russian Scientific Foundation project 19-17-00196 (data obtaining); by the Grant of the President of the Russian Federation MK-860.2020.5 (processing carbonate chemistry data).