

EGU21-3868

<https://doi.org/10.5194/egusphere-egu21-3868>

EGU General Assembly 2021

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Modelling dissolved organic nutrients in the Gulf of Finland: eliminating an uncertainty in boundary conditions

Alexey Isaev, **Oksana Vladimirova**, Tatjana Eremina, Vladimir Ryabchenko, and Oleg Savchuk
Shirshov Institute of Oceanology, Russian Academy of Sciences, Moscow, Russian Federation (isaev1975@gmail.com)

The St. Petersburg model of eutrophication (SPBEM) has been modified with an explicit description of the total amounts of organic nutrients, including both dissolved and particulate forms [1, 2]. This modification allows total nutrient amounts to be fully taken into account as reported in field measurements and presented in environmental documents, thereby eliminating one of the important sources of uncertainty in boundary conditions [3].

The SPBEM-2 model was validated and verified in the Gulf of Finland using data from more than 4,000 oceanographic stations for the period from 2009 to 2014. This results showed that the presented version of SPBEM-2 is able to plausibly reproduce all the main large-scale features and phenomena of the dynamics of nutrients in the Gulf of Finland, especially in its productive layer, which, for hypsographic reasons, contains and transforms the main reserves of nutrients.

Expansion of SPBEM-2 with dissolved organic nutrients makes it possible to fully take into account the loads on the land in both historical and scenario modelling, thereby reducing the uncertainty of impact.

Acknowledgements: The authors A.I. and V.R. conducted the present study within the framework of the state assignment (theme No. 0128-2021-0014). The authors O.V. and T.E. were supported by the Government Target Project N FSZU-2020-0009 of the Ministry of Education and Science of the Russian Federation. The author O.S. from the Baltic Nest Institute was supported by the Swedish Agency for Marine and Water Management through their grant 1:11—Measures for the marine and water environment.

References

1. Vladimirova O. M., Eremina T. R., Isaev A. V., Ryabchenko V. A., Savchuk O. P. Modelling dissolved organic nutrients in the Gulf of Finland. *Fundamentalnaya i Prikladnaya Gidrofizika*. 2018, 11, 4, 90—101. doi: 10.7868/S2073667318040111.
2. Isaev A, Vladimirova O, Eremina T, Ryabchenko V, Savchuk O. Accounting for Dissolved Organic Nutrients in an SPBEM-2 Model: Validation and Verification. *Water*. 2020; 12(5):1307.
3. Meier H.E.M., Edman M., Eilola K., et al. Assessment of Uncertainties in Scenario Simulations of Biogeochemical Cycles in the Baltic Sea. *Front. Mar. Sci.*, 04 March 2019, Vol.6, Article 46. doi:

10.3389/fmars.2019.00046