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Dear colleagues,

On August 15, 2023, Oleg Pavlovich Savchuk¹, an outstanding scientist, a pioneer in modeling biogeochemical cycles in the Baltic and White Seas, Lakes Ladoga and Onego, passed away. He began his scientific career at the Institute of Geography at the Faculty of Geography of Leningrad State University under the guidance of Yu.N. Sergeev, Doctor of Geography. First Oleg Pavlovich worked as a senior engineer, and in 1978 he became a junior researcher at the same institute. In 1977, he defended his candidate of science (PhD) thesis ‘Mathematical modeling of nitrogen dynamics in the sea’ at Leningrad State University. In 1980, he won a competition for the position of a senior researcher at the Leningrad Branch of the N.N. Zubov State Oceanographic Institute (SOI). In 1987, he was appointed head of the Laboratory of Baltic Sea Problems in this institute. In 1981–1999, O.P. Savchuk was the deputy scientific coordinator of the Russian national project ‘The Baltic’. Within this project, he studied eutrophication, one of the key problems of the Baltic Sea. He participated in numerous international conferences on the Baltic Sea as a speaker and actively worked for the ‘Baltic University’ project at the Russian State Hydrometeorological University (RSHU). In the 2000s, when the international project ‘The Baltic Floating University’ was implemented by RSHU with support of the International Oceanographic Commission of UNESCO, Oleg Pavlovich enthusiastically lectured on the eutrophication of the Baltic Sea. As a high-skilled professional in the biogeochemistry of marine systems, in the early 1990s he was invited to Stockholm University, where he worked in the group of Professor Fredrik Wulff, first in the Department of System Ecology, and then at the Baltic Nest Institute (BNI) at Stockholm University to create a mathematical model of the Baltic Sea ecosystem. The model was developed within the Swedish MARE (Marine Research on Eutrophication) program and was advanced at the Baltic Nest Institute. These studies, later complemented by collaboration with Bo Gustafsson from the University of Gothenburg, led to the development of several long-term biogeochemical models of coupled nitrogen, phosphorus and silicon cycles in the Baltic Sea, which describe both physical and biochemical processes in the water, as well as pelagic and benthic zones interaction. Oleg Pavlovich participated in the development of several models: BALTSEM (the Baltic sea Long-Term large-Scale Eutrophication Model) under the leadership of professor F. Wulff; SPBEM (St. Petersburg Baltic Eutrophication Model) together with colleagues from P.P. Shirshov Institute of Oceanology of the Russian Academy of Sciences (RAS) and RSHU; and SPLEM (St. Petersburg Lake Ecosystem Model) together with colleagues from P.P. Shirshov Institute of Oceanology of RAS and the Institute for Northern Water Problems of the Karelian Research Centre of RAS (KarRC RAS). These models have been successfully implemented in a number of projects and are now proposed for use in decision support systems for lakes, the Baltic and White Seas.

O.P. Savchuk never lost touch with his homeland, continuing to work at the Leningrad Branch of SOI (current name — the St. Petersburg Branch of FSBI ‘SOI’), as well as at the Department of Oceanology of St. Petersburg State University, where he brilliantly delivered ‘Mathematical modeling of marine ecosystems’ and ‘Hydrometeorological foundations of environmental protection’ courses as a senior lecturer and then as an associate professor. MARE program of the Baltic Nest Institute, developed with the participation of O.P. Savchuk, was later included in the academic discipline ‘Theory of Ecosystem Modeling’ of the RSHU Faculty of Oceanology.

¹ On the photo: O.P. Savchuk. Source: Stockholm University. URL: <https://www.su.se/english/profiles/oleg-1.192861> (date of access: 15.04.2024)

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In general, over the past 50 years he has been developing and implementing simulation models for the ecosystems of the North, Baltic, Barents and White Seas, and from 2018 to 2023 — for Lakes Ladoga and Onego. He was invited as a competent reviewer to a number of highly rated international journals, such as *Ambio*, *Boreal Environment Research*, *Deep-Sea Research*, *Estuarine Coastal and Shelf Science*, *Hydrobiologia*, *Journal of Marine Systems*, *Marine Biology Research*, *Marine Chemistry*. As Bo Gustafsson noted in his letter in memory of O.P. Savchuk, *‘...he was a true pioneer in Baltic Sea modeling, and without his contribution there would not have been a nutrient reduction scheme in the Baltic Sea Action Plan...’* O.P. Savchuk is the author of more than 170 highly rated scientific publications, co-author of several monographs dedicated to the Baltic and White Seas and lakes. Oleg Pavlovich had broad erudition, good work capacity, critical thinking and inexhaustible optimism, and enjoyed great authority among his colleagues in Russia and abroad. He left a good memory as an ideologist, consultant and actual performer of work in the field of mathematical modeling of marine and lake ecosystems.

O.P. Savchuk had broad knowledge and interests. Among them are oceanology, limnology, marine chemistry, chemical oceanography, biogeochemistry, ecosystem functioning, eutrophication, water quality, aquatic ecosystems, modeling of ecosystems and biogeochemical cycles, coastal and estuarine ecology, carbon cycle, and assessment of climate impact on aquatic systems.

Considering great contribution of Oleg Pavlovich to oceanology, limnology, and the development of biogeochemical and ecosystem models, as well as the influence he had on the ongoing research of seas and lakes in Russian and foreign institutes and universities, the editors of the journal ‘Fundamental and Applied Hydrophysics’ prepared a special issue dedicated to his memory. This issue starts with a work in which O.P. Savchuk was directly involved. This is the article by N.N. Filatov, O.P. Savchuk and others named ‘Diagnosis of the state and changes in the ecosystem of Lake Onego and the catchment area based on an information and analytical system’. Next comes an article by T.R. Eremina, O.V. Khaimina and O.M. Vladimirova named ‘The influence of climatic and socio-economic changes on the state of the Baltic Sea ecosystems’, initiated by O.P. Savchuk. Close analysis of scenarios for socio-economic and climatic changes in the load and retention of nutrients in the Pregolya River catchment area was performed in the article by B.V. Chubarenko, Yu.A. Gorbunova and D.A. Domnin. The next article by A.V. Isaev, V.A. Ryabchenko and A.A. Konik named ‘Reproduction of the current climatic state of the Lake Ladoga ecosystem’ is based on the model of an aquatic ecosystem developed by O.P. Savchuk. The next two biological works by N.A. Berezina, N.N. Kamardin and A.N. Sharov, and A.A. Maksimov, N.A. Berezina and O.B. Maximova, are devoted to the bioaccumulation of cadmium and copper, and the current state of macrozoobenthos and its influence on biochemical processes in the eastern part of the Gulf of Finland, respectively. The next two articles examine the features of water dynamics in different areas of the Baltic. In the article by V.T. Paka, V.M. Zhurbas et al. a comparative analysis of the variability of salt water flow in the Høbørg Strait was performed on the basis of the measurements and calculations using the NEMO model. The article by E.A. Tikhonova, E.A. Zakharchuk et al. evaluates the influence of modern land reclamations on level changes in the Neva Bay during storm surges under the operating conditions of the St. Petersburg flood protection complex. The issue is closed with the article of a historical and philosophical nature by T.R. Minina, V.V. Menshutkin and N.N. Filatov named ‘On mathematical modeling in limnology, oceanology, ecology and economics in the works of V.V. Menshutkin’. Just like O.P. Savchuk, V.V. Menshutkin devoted his life to mathematical modeling. The scientists knew each other and collaborated. In the fall of 2023, Vladimir Vasilyevich Menshutkin began preparing an article in memory of O.P. Savchuk, as he decided to share his experience in using mathematical modeling in scientific research. However, he did not have time to finish it, because he only survived O.P. Savchuk by a few months.

Some of the articles collected in this issue reflect or are based on recent work and ideas of O.P. Savchuk, others present new studies of the Baltic Sea (Oleg Pavlovich’s favorite research object) by Russian scientists.

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