BALTEX Survey on

Biogeochemical Modelling Activities in the Baltic Sea Basin

Model Name	SPBEM (**S**t. **P**eters**b**urg **E**utrophication **M**odel)
Model Description	SPBEM simulates 3D seasonal ecosystem dynamics in the Baltic and White Seas. In the HD module, the sea ice model is coupled to the ocean model based on non-linear primitive equations of motion in the hydrostatic and Boussinesq approximations, and the heat and salt transport equations. The BGC module describes all the major biogeochemical fluxes: nutrient uptake by primary producers, grazing and nutrient excretion by zooplankton, mortality of plankton and sedimentation of particulate nutrients, mineralization in the water column and by the sediments, nitrogen fixation and denitrification, redox alterations of relevant processes.
State Variables	12 pelagic state variables: 3 phytoplankton groups (diatoms, cyanobacteria, and small summer species), zooplankton, detritus N, P and Si, ammonium, nitrate, phosphate silicate, and dissolved oxygen. 3 sediment state variables: bioavailable pools of N, P and Si in the top active layer of sediments.
On a scale between 1 and 10, please classify your model	1 Biogeochemical cycling, matter fluxes 2 3 4 **5** **6** 7 8 9 10 Ecosystem functioning
Dimension (0D, 1D, 2D, 3D)	3D
Modeled Area (Marine, terrestial, combined)	The Baltic Sea marine area comprising the Kattegat, the White Sea marine area
Coupled to hydrological component	No, atmospheric and hydrologic components are considered just as given boundary conditions
Suited for climate change sensitivity studies	Yes, through scenario boundary conditions
Publications	1. Bashmachnikov, I.L., O.M. Johannessen, L.H. Pettersson, G. Evensen, I.A.Neelov, O.P. Savchuk, A.V. Leonov, S. Kaitala, T. Stipa, H. Kuosa & N.N. Filatov, 2005. Numerical simulations of the White Sea hydrodynamics and marine ecosystem. In Filatov, N.N., D.V. Pozdnyakov et al. (eds), White Sea: Its Marine Environment and Ecosystem Dynamics Influenced by Global Change, Springer Praxis Books, Berlin: 337-438. 2. Neelov I.A., T.A. Eremina, A.V. Isaev, V.A. Ryabchenko, O.P. Savchuk, and R.E Vankevich. 2003. A simulation of the Gulf of Finland ecosystem with 3-D model. Proceedings Estonian Academy of Science. Biology. Ecology 52: 347-359. 3. Savchuk O.P., T.R. Eremina, A.V. Isaev and A. Neelov. 2007. Response of

	the Eastern Gulf of Finland eutrophication to nutrient load reduction scenarios. Hydrobiologia (submitted).
Institute	Department of Systems Ecology, Stockholm University Arctic and Antarctic Research Institute, St. Petersburg, Russia
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Web Site	

Remarks