

Interactive comment on “The relative importance of selected factors controlling the oxygen dynamics in the water column of the Baltic Sea” by S. Miladinova and A. Stips

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Received and published: 13 November 2009

We thank referee #2 for his quick answer. Nevertheless we must admit that we cannot understand the logic of his arguments. We disagree with the referee's interpretation of our investigations. The aim of our study is to explore how selected physical and biogeochemical processes affect the oxygen dynamics in the water column of the Baltic Sea.

“The k_{\min} impact is a matter of turbulence parameterization, not the process controlling oxygen in the Baltic.” Yes it is a parameter, but by changing it we are studying the influence of the vertical turbulent mixing on the oxygen dynamics and indeed k_{\min} is

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only one but important parameter that is controlling the magnitude of the vertical turbulent exchange. This minimum turbulent kinetic energy as a parameter is representing mixing processes, which are unresolved by the used turbulence model (e.g. internal waves). Our study clearly shows that these unresolved mixing processes are important for the oxygen dynamics and their description must be improved.

“I acknowledged the improvement of the air-sea fluxes; however this is parameterization too not a process study.” In the same way, the parameterisation of the air-sea gas exchange is a way to model the real process of interfacial gas exchange.

“Nobody stated 3D is better than 1D or vice versa, but a model should be able to capture first order processes” What is then the meaning of the sentence “1D models are not anymore timely” if it does not imply the recommended use of 3D models.

“Justifying 1D models by referring to a 5 years old publication is not a proper style.” Again we have no clue about the logic of this argumentation. If the results of the concerned study are correct and valid, we can clearly cite even a 100 year old study. If they results are not valid, we should not even cite a publication from today. Not the age of a publication but its scientific correctness is the important selection criterion. Does the referee question the scientific correctness of the cited study?

“Have e.g. a look at: Kari Eilola, H.E. Markus Meier, Elin Almroth, 2009: On the dynamics of oxygen, phosphorus and cyanobacteria in the Baltic Sea; A model study. *Journal of Marine Systems* 75, 163-184” We have known very well this article and even considered citation. But its objectives are different from ours, thus the methods for achieving our objectives are also different. Moreover, even the sophisticated models applied in the study of Eilola et al. (2009) cannot well simulate the dynamics of oxygen in the halocline and bottom layers (see Fig. 5 in Eilola et al. (2009)). The oxygen concentrations often are too high.