

## ***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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We appreciate that referee #2 has spent her/his valuable time to read the manuscript, however we strongly disagree with her/his general comments. It seems further that the referee #2 has not considered the updated manuscript, which has been provided as supplemental material.

“I’m missing a scientific question..” If the investigation of what are the major factors influencing the seasonal oxygen dynamics in the Baltic Sea is not a scientific question, we would be curious to know what are scientific questions in the eyes of the referee? What is the investigation of the importance of the unresolved mixing (by internal waves)

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hidden in the turbulence model ( $K_{min}$ ) and subject of large debate in the turbulence modelling community, if it is not a scientific question? What is the investigation of the relative contribution from biological activity and physical air-sea gas-exchange, if it is not a scientific question?

“1-D models are not longer timely to investigate inhomogeneous environments..” This statement is the expected standard argument against 1-D modelling studies, but that does not make it more correct. The level of required complexity for any specific modelling study or problem is only depending on the level of complexity required to solve the scientific question. As an example it is for sure nonsense to apply the general relativity theory to investigate the falling behaviour of apples, even it would be theoretically “more correct”. We have scientific questions, which we want to answer and could answer in a simplified setup, adapted to our problem. If this inhomogeneous environment would have been so important, why we are able to demonstrate that horizontal advection in the surface layer (and practically even in the thermocline) is really negligible for simulating oxygen? Only by applying a 1-D modelling approach we are actually able to show exactly this. Another implicit fallacy in the above statement is that more complicated models are automatically better, which is simply not true. The introduction of more complexity is always accompanied by the introduction of more parameterizations and more coding errors and therefore there is no guarantee to get also better results. As an example, look at Fig. 2 of Neumann and Schernewski (2005). It shows that just applying a 3-D model does not provide any improvement in the simulation of the bottom oxygen in the Gotland Deep, because it provides exact the same continuous oxygen concentration decrease as our Fig. 5.

“Perfection is attained not when there is no longer anything to add but when there is no longer anything to take away.” (Antonie de Saint-Exupéry)

Reply to detailed comments: We agree on the most of the detailed comments and some are already considered in the updated manuscript (e.g. the role of biology/primary production). In case of acceptance these comments will be integrated in

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the manuscript. Just to clarify, we have not stated that the Omstedt model is a “simple” 1-D model, but rather that the successful application of this model confirms the validity of the 1-D approach for the Baltic Proper.

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Interactive comment on Ocean Sci. Discuss., 6, 2115, 2009.