

Biogeosciences Discuss., author comment AC1
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Reply on RC1

Heiner Dietze and Ulrike Lötien

Author comment on "Retracing hypoxia in Eckernförde Bight (Baltic Sea)" by Heiner Dietze and Ulrike Lötien, Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-31-AC1>, 2021

General:

R: This manuscript describes the use of computer simulations to understand and predict dissolved oxygen dynamics within a coastal setting. The geographical focus is a coastal inlet close to Kiel which suffers from hypoxic events. The manuscript takes advantage of long standing time-series observations in the area. Both authors are based in Kiel and their strong affinity for Eckernförde Bight and the surrounding region is evidenced throughout the manuscript. Overall, I found the manuscript to be very well-written with regards to English language and well-structured.

A: We thank the reviewer for time and effort, encouragement and helpful comments. Also, we agree with the reviewer that we can make the manuscript more appealing to a wider audience. Following her/his suggestions we will revise the manuscript starting with a more comprehensive discussion on what is known concerning oxygen dynamics in coastal areas and will make an effort to map out to what extent our results may be generalized to other regions. Simulating oceanic oxygen reliably is still a challenging task in biogeochemical ocean modelling. We regard our investigations on the localized, well observed study site as exemplarily on how to tackle other regions. Also, we anticipate that the impact of coastal mixing on dissolved oxygen is often overlooked in model studies and might require improved parametrizations when not resolved.

Specific Comments:

R 1. The key findings of the manuscript are that O₂ dynamics in Eckernförde Bight are determined by the inflow of water from the adjacent Kiel Bight and mixing processes within Eckernförde Bight. Was this unknown prior to this study? Physical processes drive most of the observed oxygen variability in coastal systems, so were these findings unexpected? This does not diminish the importance of this work, but the broader context is missing from the manuscript (see also #3 below).

A: We agree with the reviewer that this point needs clarification. We will add a more comprehensive discussion on what is known concerning oxygen dynamics in coastal areas and the Baltic Sea.

R: 2. There are 3 Tables and 23 Figures! I think some editorial evaluation is needed about whether to place some in a Supplement or prioritize the Figures for publication. Inclusion

of all the figures causes the manuscript to read more like a technical report rather than a publication. This is not a bad thing, but it did make me wonder why the authors chose Biogeosciences journal.

A: We will restructure the manuscript such that it loses its "report" style. Specifically, we will put our study into a broader context and clarify the open research questions. Also, we will move the model evaluation part into an appendix and delete unnecessary figures (such as Figure 1 and 2).

R: 3. Does this work have any wider ramifications for other coastal sites? The Discussion/Conclusion focus exclusively on Eckernförde Bight with no mention of using the simulations to improve predictions at other locations. Again, I think if the authors publish in a journal with wide readership then a broader context is needed.

A: We agree with the reviewer and will provide a broader context in the Discussion/Conclusion. We regard the EB as a test bed for simulating other regions and will clarify this in the revised version of the manuscript.