Our answers are provided in blue.

The manuscript presents a dataset on benthic dissolved inorganic phosphorus (DIP) fluxes in the Baltic Sea, highlighting spatial and temporal variations in relation to the extent of deep-water deoxygenation and the underlying sediment types. The dataset is remarkable, particularly because it was obtained through in situ measurements. I especially appreciated the effort made to harmonize the data and to ensure its robustness. This manuscript represents a valuable contribution to the marine biogeochemistry community as well as to researchers interested in coastal deoxygenation processes.

That said, several points would benefit from clarification, particularly to ensure that readers who are not specialists of the Baltic Sea can easily follow and fully grasp the information provided.

We thank the reviewer for their comments, which have enhanced the manuscript's accessibility for a wider readership.

Comments

L38-40: The sentence is ambiguous. It's not clear whether you mean that the basins differ from each other, or that they are similar to each other but differ collectively from other semi-enclosed seas. Could you please clarify?

They differ from each other; we have clarified this in the text.

L39-41: “Importantly, the basins of the Baltic Sea differ substantially from each other in environmental conditions as well as in input rates and sources of organic matter, macro and micronutrients…”

L43: The addition of surface and subsurface currents would be interesting on this map. It would help visualize circulation. Colored arrows according to salinity could make it easier to understand. L47: “The varied environmental conditions in the Baltic Sea are largely related to strong salinity gradients” - Please add the information in the map.

We have added arrows indicating currents to Figure 1.

L45: Please define this acronym. Not everyone is familiar with this agency. Please consider that some readers are not from this part of Europe.

We thank the reviewer for pointing out this oversight, we have added the full name of HELCOM to the caption.

L45: Why did you specifically choose these 3 years? Indicate data source

The caption has been expanded and now states that the three years were chosen to represent small, medium and large extents of hypoxia and anoxia, and the data source has been added.

L60: “small coastal basin” - Please clarify and give examples that can be seen on the map. If it's really more “coastal”, please indicate so.

We have modified the sentence to specify that the highest sediment accumulation rates are found in archipelago areas.

L63-65: “However, local conditions strongly affect sedimentation and the highest sediment accumulation rates are found in small coastal basins, particularly in archipelagos (Mitchell et al., 2021).”

The precise patterns in sediment accumulation rates are discussed extensively in the cited study (Mitchell et al., 2021), including detailed maps. Further details about sediment accumulation rates are outside the scope of this study.

L64: “The catchment area consists primarily of forests, and the riverine input of terrestrial material is relatively large “ - Quantify. Add an average load or average flow for comparison with other environments.

The introduction describes the relative differences between basins. Data coverage and methods for estimating the load of riverine particulate and dissolved organic matter differ considerably over the Baltic Sea are, which makes quantifications uncertain. We have therefore opted to leave the text as it is.

L108: “the big and small University of Gothenburg landers” - Can you add size? This is of interest to those interested in the effect of size on the value and accuracy of flows. add the Table 2 here.

We have restructured the text and now start the material and methods section with a subsection about the benthic chamber lander systems (Section 2.1), which includes Table 2 (now Table 1). The sizes of the chambers are stated in the table. As suggested by Reviewer 2 and Reviewer 3, we also mention that the chamber design does not impact the flux.

L118-119: “Previous intercalibration studies have shown that the chamber design does not significantly impact the measured flux (Tengberg et al., 2004, 2005).”

L113: Do the colors of the dots also refer to the type of sediment? Are the differences related to scale?

The reviewer is correct; the colour of the markers shows the sediment type as determined at sampling. We have added this to the caption.

L124-125: “... field observations of sediment cores occasionally indicated that the actual sediment type differed from that inferred from EMODnet.” - Answer to my comment above. I'll add the info anyway in the caption.

Added.

L130: Surface? Surficial.

We have rewritten the sentence.

L 154: “Indeed, the median OC content at the sediment surface (top 0-2 cm) ... “

L147: see a previous comment

Changed according to the suggestion.

L152-153: I'm not sure I understand what was done to ensure the success of incubation. Not just based on oxygen consumption? Please clarify by adding more information.

We have added further information about how the success of the incubations was confirmed.

L114-118: “Besides being used to calculate O_2 fluxes, the O_2 data also confirmed that no leakages or disturbances occurred during the incubations. Depending on the lander system, successful incubations were further corroborated by, e.g., measurements of turbidity and pressure within the chambers to confirm that resuspension did not occur and that syringes were triggered at the right time, or retrieval of the incubated sediment at the end of the deployment for visual observation (Kononets et al., 2021; Sommer et al., 2006; Witbaard et al., 2000). “

L155-157: Samples only dedicated to DIP or other nutrient ? For DIP too? or for trace metal or Fe?

The text describes how samples analysed for DIP were treated. Other solutes were measured simultaneously, from the same or different aliquots. We have clarified this in the text.

L179-180: “Other solutes were measured in parallel to DIP; these data are presented in the studies listed in Table 2.”

L195: must be presented beforehand.

The full name of HELCOM is now written out at its first occurrence in the text.

L199: ??

EMODnet, the source of the sediment type map, is presented in section 2.2.

L210: figures are not called up in order.

We have changed the text and now refer to Section 3.1 instead of Figure 6.

L217-218: impressive!!

Thank you!

L244: I guess it doesn't matter what year it is. You'd have to add a sentence to explain that it's compile, regardless of the year of collection… it refers to the station and the oxygen concentration.

We have changed the caption.

L272: “Figure 4 Compilation of all individual fluxes of dissolved inorganic phosphorus (DIP) with increasing depth…”

L249: whatever the O2 concentration

We have changed the caption.

L278: “Figure 5 Sediment-water fluxes of DIP in the Baltic Sea, as averages of all oxygen conditions and years per station.“

Table A1: 1% is missing

This was due to a rounding error and has been corrected.