

Interactive comment on “Winter stratification phenomena and its consequences in the Gulf of Finland, Baltic Sea” by Taavi Liblik et al.

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In fairness to the authors, the editorial staff should not have requested reviews for a manuscript in such a rough state. I think it could warrant publication at some point, but as it is, the manuscript is not even ready for submission. Overall, the manuscript reports observational and model results but it fails to put these results into context and it fails to provide any motivation for the study. The science appears to be sound, but it's not clear why it was done. The manuscript requires extensive editing for grammar and style. There are too many minor grammatical errors for me to keep track of. Tell the reader early on why your work matters and how it fits into a larger context. I am sure it is important, but as it is written now, the manuscript fails to convey that importance. I recommend reading Mensh and Kording (2017) Ten simple rules for structuring papers.

C1

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Given that the manuscript lacks a clear motivation, it is difficult to evaluate it using the journals review criteria, which are listed here: https://www.ocean-science.net/peer_review/review_criteria.html

The authors may also wish to use these criteria when revising their manuscript.

+ ‘Phenomena’ is typically the plural form of phenomenon (<https://www.merriam-webster.com/dictionary/phenomenon>) So the title should read ‘... phenomena and their consequences ...’ or ‘Winter stratification and its consequences...’

+ Introduction- the first paragraph of the introduction should state the main goal or problem that the manuscript aims to address. As it is written now, the first paragraph is full of many details about the seasonal cycle of stratification in the Baltic Sea but we are left guessing as to the importance of these details. Please tell the reader the main point or what particular issue your manuscript addresses in the first few sentences and then move on to specific information that the reader needs to understand what has been done, and what is new.

+ The motivation for this manuscript is not stated until line 75 - “Details about the formation of the haline stratification in the larger areas of the Baltic Sea during wintertime is mainly unknown.” This is the new topic that you address. Please make that clear in the first paragraph and then tell us about what is known. When it's the other way around, we're left wondering why you are telling us all this information and where it is going.

+ The OSTIA product is not technically remote sensing data. It is gap-filled remote sensing data that also uses in situ observations. The most recent citation for OSTIA is Good et al. (2020) The Current Configuration of the OSTIA System for Operational Production of Foundation Sea Surface Temperature and Ice Concentration Analyses. Remote Sensing. 12:720 doi:10.3390/rs12040720

C2

- + Regarding the OSTIA data- from the text it's not clear if you used daily OSTIA fields or mean SST for the entire period from 2010-2019. Can you please clarify?
- + Section 1.2- why use nautical miles? The journal requires the use of metric units. https://www.ocean-science.net/for_authors/manuscript_preparation.html
- + What are your open boundary conditions? Relaxation? How is riverine input treated in the model? How did you spin up the model?
- + Results- since the response of the water column was very similar in each wind-driven event, perhaps describe the general behavior first - strong winds, well-mixed water column, low chl-a.
- + Line 219 - "Since freshwater originates from the east. . ." Is this statement supported by data or is it speculation? If it's speculation, please move speculative arguments to the Discussion.
- + Instead of describing what was observed in each dataset, use all the data to describe the stratification phenomena of interest. You are using widely accepted methods so there is no need to justify their use. Communicate your point clearly and succinctly
- + Line 295 - this also appears to be speculative and should be moved to the discussion
- + Figure 2 is not necessary. Simply state the r^2 , p value, and n in the manuscript
- + Figure 5 contains too many subplots. It's cluttered and difficult to take in
- + Figure 9 also contains too many subplots. Perhaps create an animation?

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