

Reviewer 1

The manuscript "Current structure, circulation and transport in the Central Baltic Sea observed by array of moorings and gliders" is a description of one year of mooring and glider observations in the Central Baltic across roughly 58.4N. The paper is descriptive of the physical oceanography of the region. This domain displays estuarine dynamics since it is a shallow (~250 m or less), semi-enclosed, saltwater body.

Reply: Thank you for the review!

Abstract:

-combine to make one paragraph
Action: Done.

- "changes in water column habitats" is mentioned in the abstract but not discussed in the text. please remove from the abstract

Reply: We agree, this could be changed.

Action: We changed to "water column characteristics".

- The study "addresses the knowledge gap regarding the current structure and circulation in the Central Baltic Sea." The authors need to provide a better scientific background and reason for completing the study. In the last paragraph of the introduction, the authors describe 4 specific scientific goals of the study. Please describe why you are studying these four items into the first paragraph of the introduction.

Reply: The text before the 4 specific aims explained the knowledge gaps. We agree, the reasons of the study could be better highlighted.

Action: In the revised version, we conclude the motivations of the study right before the four aims are listed.

- Please remove the sentence "On the one hand, the pycnoclines determine the current shear maxima, but on the other hand, the current structure shapes the pycnoclines" - this statement is vague and not necessary in the introduction.

Reply: We agree

Action: Removed

- The introduction would benefit from a schematic showing what is known about the Central Baltic from modeling studies (and some observations). It would be relevant to the paper to synthesize what is known for the specific study region of the paper.

Reply: We think it is good idea. However, we are afraid the limit of figures is already full. We could try to present what you suggested as a highlight figure that appears next to abstract in web. This figure would include our results as well.

Action: We try to include what you suggested in the so-called highlight figure (graphical abstract).

- Similarly, the paper does not label the Faro Sill on the maps in a way that is clear to me. Please show me the location and bathymetry of Faro Sill. (Could be a part of the schematic)

Reply: We agree it could be presented better.

Action: In the revised manuscript, we show the bathymetry better in Fig. 1. The M3 station was in the Faro sill. We mention that now in several places in the modified manuscript. Also, we added the label to Fig 1.

- On figure 1, what is FD, ND, GD?

Reply: Färö Deep, Northern Deep and Gotland Deep

Action: We added information to the figure caption.

Methods:

- Please merge the paragraphs that are only one sentence.

Action: We merged.

Results:

- As part of figure 2, include a plot of wind direction

Reply: We believe wind stress components already reveal enough information about the wind direction. We are afraid adding another line to the graph would make it difficult to read.

Action: No action.

- Line 216 - since you describe there being 3 water masses, you should plot the three water masses on a T-S diagram

Reply: We agree, it would be nice to show it. But it is technically difficult to include it in the existing figures, and it would not be beneficial enough to create a new figure dedicated to this. We think it is worth citing the T-S diagram figure in Kōuts and Omstedt (1993) paper.

Action: We added citing to the Kōuts and Omstedt (1993) paper.

- In figure 2, what glider observations were used to make the temperature, salinity, and N^2 plots? All the data? How are they averaged? (in space? in time?)

Reply: Yes, it is all the data, averaged daily. There was a sentence about that in the methods chapter, but it could be that this information was difficult to link to Fig. 2.

Action: To avoid this confusion, we cite now Fig. 2 already in the methodology chapter. "Daily mean temperature and salinity profiles from glider data were calculated and presented in Fig. 2."

- Line 226 - A three layer pattern due to the plots of Fig 3 and 4 is not clear. 1) the plots do not show full water column ADCP velocity for most of the mooring sites 2) There is variable bottom depth of the different mooring locations compared to the glider locations to which you are comparing. 3) M5 shows no high shear squared region. I suggest removing this analysis because I do not think that it is strong.

Reply: It was written, "Mostly, a three-layer current structure was present during the period with seasonal stratification." We agree with your three comments, but we believe the cited statement still holds true. Elevated shear was evident around the depth of the pycnocline in most of the stations.

Action: We tried to clarify the statements by adding that we mean deep enough areas only. We also added a sentence about the M5 exception.

- Line 228 - You state that the current is weaker offshore, but this is not true at M2 and M3 where the current is stronger compared to M4 and M5.

Reply: Yes, that is correct and exactly what we mean. M2 and M3 are closer to the boundary compared to M4 and M5.

Action: We rephrased it to avoid confusion: The current was stronger near the boundaries and weaker in the middle part of the section.

- Line 249 - change speed to "speed"
Action: Fixed.

- Line 250 - Since you compare the speeds of the mean profiles, also plot the standard deviation of the mean speed profiles in figure 5.

Reply: We believe, keeping in mind the aims of the paper, that the persistency parameter is enough to describe the variability of current velocities.

- figure 9 - Clearly label the figure's color bar limits that describe the value of correlation. Alternately, make the colorbar go from zero to one.
Action: We improved the figure according to your first suggestion.

- Figure 12 - is there a weighted mean employed to achieve the plots from the glider observations? Describe in the methods if too much detail to put in the figure caption.

Reply: Arithmetic mean was used in calculations. Horizontal resolution was 0.01° (0.005°) along longitude (latitude) and vertical resolution of 1 m was used.

Action: We added this information to the figure caption.

Conclusions:

- Move the first sentence "The first results of the CABLE study were presented" to the last paragraph in the conclusion.

Action: We did as suggested.