Biogeosciences Discussions

Biogeosciences Discuss., referee comment RC1
https://doi.org/10.5194/bg-2022-20-RC1, 2022

Comment on bg-2022-20

Anonymous Referee #1

Referee comment on "The influence of mesoscale climate drivers on hypoxia in a fjord-like deep coastal inlet and its potential implications regarding climate change: examining a decade of water quality data" by Johnathan Daniel Maxey et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2022-20-RC1, 2022

General Comments:

I found this to be a well-structured analysis of a complicated system with clear results to support the authors' hypotheses. The authors describe the system and all of the potential drivers and contributors of observed low oxygen in detail and leverage a unique, long-term dataset to do so. The figures were of high quality and supported the statements made by the authors well and it was clear that they are well-acquainted with the relevant literature for this system. I found their conclusions relating changes in rainfall to deep hypoxia and deep water renewal event frequency to be very convincing, though I do wonder what role eutrophication from the increased DOM resulting from large rain events might have – potential positive feedbacks? Aside from some more specific comments (see next section), my only note is regarding the connection drawn between the increased hypoxia and outgassing of greenhouse gases. While the authors provide evidence from the literature to support this hypothesis, I think their claims would be better supported with quantitative measurements to show that in this particular system, this outgassing already occurs and might increase. Overall, this paper appears to fill a notable gap in knowledge for this system and sets up the potential for future analyses on additional questions raised.

Specific Comments:

- Citation for the statement on lines 95-96?

- Figure 1: In inset map of Tasmania, put box around area that is zoomed in on in larger figure? Also in right map, it is hard to tell where the river is – can you draw a line or something to highlight its path rather than the two arrows?
- Line 155: I am not clear on how distinct functional groups support that external climatic drivers influence harbour processes.
- Line 162: At this point, I was curious to know how many basins there were in the harbor, how deep they were, etc. and was curious if there was a map or drawing of them. I see later in Figure 10 this is shown, but it may be good to have another figure earlier showing this since these deep basins are a large part of your story.
- Line 165: Please add the accuracy/precision of your YSI
- Table 1: Perhaps add maximum depth of each station?
- Figure 2: Why are there not groupings provided above A and B?
- For the final publication, note that Figures 5 and 8 are a bit blurry.
- Figure 7 was really nicely done – good way to display many different variables
- Figure 8: Because you have the y-axis crossing at 0 it becomes somewhat hard to tell where one plot ends and the next begins, and also hard to read the axes on plots that cross the y-axis. Perhaps have the y-axis cross at a negative x-value to avoid this and add a dotted line to indicate where 0 is?
- Figure 9: same comment about crossing the y-axis as in Figure 8
- Figure 10: Really informative figure, curious here about feedbacks of the increased OM loading under high flow – if this will also work to exacerbate low oxygen in combination with the lack of DWR?
- One other thing to consider is that deoxygenation of the deep waters outside the harbor will also decrease the O2 available in the water coming up during these DWR events, so this may also further inhibit relief from low oxygen?
- Data Availability: Will the dataset be made available following publication? For transparency and ethical scientific practices, the data used should be made public.

Technical Corrections:

- Title: "its" should be "the" or "their"
- Line 22 : "predicts"
- Line 62: "it" should be "they" or "these factors"
- Line 90: "it's" should be "the"
- Line 95: Please define DWR before using acronym