

***Interactive comment on* “Destruction and reinstatement of coastal hypoxia in the South China Sea off the Pearl River Estuary” by Yangyang Zhao et al.**

Anonymous Referee #2

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Review of Zhou et al. Destruction and reinstatement of coastal hypoxia in the South China Sea off the Pearl River Estuary. I found this manuscript to be a useful contribution to our understanding of the spatial and temporal nature of oxygen depletion as a large coastal system responds to large events. The narrative is relatively easy to follow and the results are clearly communicated with figures. I think the analysis could benefit from a small amount of additional computations, but I also think that the results and discussion section needs to be reorganized. There is substantial mixing of results and discussions between the two sections, and I think it would be best and easiest to simply combine the two sections into one “Results and Discussion” section that is reorganized into a clear narrative. Below are some specific and more general comments

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for the authors to consider:

(1) Line 49: “typhoons” should be plural

(2) Figure 1: It is a little difficult to discern the station locations of the different legs, given the overlapping in the circles. One suggestion could be to use different symbols to present (1) stations visited on all legs, (2) stations visited on legs 1+2, (3) stations visited on legs 2+3, and (4) stations visited on 1+3.

(3) Although Figure 3 nicely illustrates how stratification returned after the cyclone, it does not capture any patterns over space and it does not capture the entire coverage of the study in time. Figure 2 provides a nice, qualitative picture of the changes in water properties over time and space, but I think it might be helpful to also generate maps of the stratification changes, perhaps by plotting max N₂ over space or the difference in temperature and salinity (or density) between surface and bottom waters. This would have the benefit of showing if stratification was weaker after it was reinstated than before the typhoon, where stratification was strongest, and how it related in space to hypoxia.

(4) Figure 4 – I think it would be more interesting to also show vertical oxygen distributions on figure 4, to show where hypoxia exists relative to the vertical structure and stratification.

(5) You report on the decline in oxygen concentration in the water column after the typhoon passing as a metric of oxygen consumption rate. It would make the paper more compelling, and help the discussion, to compare these rates of oxygen depletion to similar rates published in other systems (e.g., Testa and Kemp 2014, others?)

(6) Line 315-319: Can you estimate the oxygen diffusivity rate from your data, based on any published estimates of diffusivity for the region, or estimated from your density profiles? This would allow you to be more quantitative in your comparison of OCR and diffusivity as eventually balancing. I think you could also speculate, perhaps with data,

why OCR could have possibly declined, either as the post-bloom organic material was exhausted or due to oxygen limitation of respiratory uptake?

(7) Paragraph on Line 389: This paragraph reads more like an essay on the factors driving hypoxia and vulnerable to climate change, and does not really discuss the specific details of this study. I suggest deleting it, perhaps keeping the cyclone points for the prior paragraph on cyclone effects.

(8) I think you should combine the Results and Discussion Sections into one, well-organized narrative. As it stands, there are multiple places where results are reported in the discussion, or there are even methods in the discussion. This would allow you to more clearly and sequentially tell the story of your study. Below are some specific examples to guide this effort: (a) Line 225-239 is largely results and even methods, but is included in the discussion without substantial discussion of the results in the context of the study. (b) Line 285-290. Here, you are describing the method you already described. Move to methods and remove redundancy. (c) Paragraphs beginning on lines 332 and 343 can be combined

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