

Biogeosciences Discuss., referee comment RC2  
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## Comment on bg-2022-152

Anonymous Referee #2

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Referee comment on "Role of phosphorus in the seasonal deoxygenation of the East China Sea shelf" by Arnaud Laurent et al., Biogeosciences Discuss.,  
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The paper investigated the impact of P limitation on hypoxic zone in the East China Sea using a coupled physical-biogeochemical model. The results shown spatio-temporal variability of P-limitation in this region in details, and provided mechanism explanation on how hypoxic region was modified by N+P, P-only, N-only scenarios from primary production to water column respiration. It also provided management suggestions that N+P reduction was the best strategy to mitigate hypoxia, and quantitative measure on how much hypoxic area would be reduced for intermediate and long-term reduction in N+P reduction.

Modelling hypoxia in China coastal ocean is a very hot topic these days. Most of them focused on mechanism explanation. The research had a very special perspective on hypoxia management strategy, which was great and important for hypoxia study in this region. The paper is very well written and organized. It should be published after minor revision.

1) Figure 1: Why zone 1 to 6 was separated like this? Any standard?

2) In results section 3.3. It mentioned the limitation factor is  $< 0.85$ . It should be mentioned in the method section, how this limitation factor is defined and why, although a citation paper has been provided. It will be wonderful to include those crucial information without go back and forth to other references

3) In the results section and Figures, except comparison for the nutrients. A comparison for surface chlorophyll concentration and salinity with satellite data, and hypoxic zone with cruise data overall should also be provided.

4) Line 270-275: A comparison with the Gulf of Mexico has been mentioned. A recent study on P-limitation on the Pearl River Estuary system. "Reversing impact of phytoplankton phosphorus limitation on coastal hypoxia due to interacting changes in surface production and shoreward bottom oxygen influx" by Yu et al. 2022 (Water research) should also be mentioned. What is the difference and similarity between the three system? Any relation with the land cover and land use change in China? (More urbanization, sewage discharge)?

5) In the code availability part. Only general ROMS code downloaded was mentioned, did the Fennel module in the most recent ROMS has incorporated all 10 state variables mentioned from Line 94-Line 100. If not, that should be uploaded to Zenodo or somewhere. Also, the parameter scheme in the biological model should be provided. I did not find that in Zhang et al. (2020)