

## ***Interactive comment on “Modeling the impact of river discharge and wind on the hypoxia off Yangtze Estuary” by J. Zheng et al.***

### **Anonymous Referee #2**

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This manuscript show a mechanism of the hypoxia off Yangtze estuary, that the variation of wind is the main cause of seasonal variability of hypoxia, while the river discharge can modify its magnitude. But the Fig. 10, it office the evidence that the contant wind (wind in August) can reproduce seasonal variation of hypoxia, although which is a month front to the base run. So I think the author shall make their conclusion with more confident evidence.

Major comments: 1. As mention above the Fig. 10a show the wind variation is not the role to make seasonal variation of hypoxia, which is conflicted with the main conclusion (L21-22). 2. Changing the wind direction will need another circulation pattern, which is not covered in this MS. So please do it carefully. 3. Fig. 7 show the DO had a 3-moth lag with stratification, which cannot confirm the stronger the stratification, the lower DO (L 186). There must be some other mechanisms.

## Special comments:

1. There was a significant relationship between hypoxia formation and estuarine dynamic process. But the paper does not verify the hydrodynamic process of the physical model. The circulation pattern shall be figured out.
2. L 79-83 the reference and web address for GDEM, SODA, NECP shall be listed.
3. L 87 both chlorophyll and chlorophyll-a are used in this MS, shall they be consistent?
4. Line 97-98: The initial values of phytoplankton, zooplankton and detritus concentrations were set to 0.5, 0.25 and 0.25 times of chlorophyll-a concentration, respectively. Why to set the initial values of phytoplankton, zooplankton and detritus concentrations were 0.5, 0.25 and 0.25 times of chlorophyll-a concentration? What is the basis? Need the reference to support.
5. L 108-109 the model's initial and open boundary are set by the GDEM, it is not a good idea to compare the model's result with the GDSM, at least the SST from RS can be the observed data to evaluate the model's performance.
6. L 108-116 there are several upwelling systems in east china sea, can the model reproduce them?
7. L120 Changejiang estuary and Yangtze Estuary shall be consistent.
8. L133 it is mentioned the high nitrate is along section 123E, which is from Yangtze river. But in Lin 136-137, you mention it is Taiwan warm upwelling. Please make it clear.
9. 137-138 no evidence for the Taiwan warm upwelling (why can upwelling be warm?). The high nutrients at surface in fig. 3.
10. L 154, the basic condition shall be listed
11. Table 2 the value of Q, Qconst shall be listed. The unites for N2?

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12. L180 the N2 is for the red rectangle, but the O2 is only for one point? N2 is vertical averaged?

13. Section 3.3, what is the mechanism of wind direction affect the DO? The circulation is changed in this case?

14. L 240 findings => results

15. S 4.1 what is the relation of Chlorophyll with DO? Higher river discharge will increase both N2 and Chlorophyll, both will lead to less DO at the bottom because of less DO mixing from surface and the decomposition of the organic in bottom layer. So which is more important?

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