Review of Lee et al., Two different phytoplankton blooming mechanisms over the East China Sea during El-Niño decaying summers: Round 2

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General comments

- The argument that satellite remote sensing Chla overestimate real Chl does not hold. Algorithms for validating chl a from ocean color in coastal ocean have been well developed. For example, Figure 2 of Zhang et al (2017), cited in your last response, suggests the measured Chl and remote sensing Chl are very consistent at large range of Chl a concentrations in ECS. I have to wonder if the low Chl a anomaly simulated in your study is due to some problems with the biogeochemistry model that haven't been tuned for ECS regions, or other problems due to low resolution. Modelling work by Chen et al. (2021) shows good agreements between model and remote sensing Chl a (Fig. 2 of Chen et al., 2021), with chl anomaly around 1 mg m^{-3} by visual estimation. Wu et al. (2023. Fig. 7) show that the difference in Chl a due to changes in river discharge in different phases of ENSO is between -1 and 1 mg m^{-3}. I am not sure how your modeled river discharge of water and nutrients are consistent with ground truth. It is important to have a solid discuss why the Chl anomaly is so small.

- Regarding the buoyancy-driven upwelling driven by river water plume is beyond my knowledge limit. I would appreciate any reviewers with

strong physics background to make the judge. However, As the buoyancy driven upwelling is argued to be the vector of runoff driven Chl a anomaly, but not quantified. It is only a hypothesis, and needs to be discussed, along with direct nutrient input from river water. Relevant literature that may collaborate the hypothesis should be cited.

- Regarding Equation 4, I appreciate the VIF analysis, which is robust. This should be added to the presentation of results. However, the expression of the equation 4 does not agree with your text. Following your description, I guess $\frac{\delta Chl}{\delta Runoff}$ is the partial coefficient of Runoff on Chl change in the multiple regression between Chl a and three mechanisms. Then, is $\frac{\delta Runoff}{\delta NO_3}$ the regression coefficient between ENSO index and Runoff? If that is correct, then my question is how you deal with the effects of runoff on PO_4? That maybe ok for the effects of runoff on nutrient supply, as there is no PO_4 in runoff. But how do you quantify the impact of upwelling (Ekman or buoyancy) and TS transport on PO_4, as either NO_3 or PO_4 may be limiting phytoplankton growth in your model. This needs to be clearly and rigorously explained in the equations and texts.

References

1. CHEN D., LIU Q., and YIN K., 2021. Numerical Study of the Three Gorges Dam Influences on Chlorophyll-a in the Changjiang Estuary and the Adjacent East China Sea. J. Ocean Univ. China (Oceanic and Coastal Sea Research). https://doi.org/10.1007/s11802-021-4430-z

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3. Zhang, H., Qiu, Z., Sun, D., Wang, S., and He, Y.: Seasonal and interannual variability of satellite-derived chlorophyll-a (2000-2012) in the Bohai Sea, China. Remote Sens., 9, https://doi.org/10.3390/rs9060582, 2017.