

# 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

- I appreciate the authors for thorough revision that clarified some of the questions I raised in the previous round of review, which allows me better understand the manuscript.
- When looked at the surface Chl a anomaly (SCHL), the anomaly due to El Nino events are really small (-0.06 to +0.06 mg Chl m<sup>-3</sup>) (Figure 4). From observational measurement perspective, this magnitude of change is within the error of measurement. This is about 1/10 to 1/5 of the observed variation (Figure 10).
- Regarding the buoyancy upwelling mentioned as a mechanism for enhancing phytoplankton bloom (line 250 in the track changed document), I don't understand how that happens. I assume river runoff carries water of lower density, and the deep water upwells only when it becomes less dense than surface. I don't see how that is possible in this region. Estuary circulation may bring the subsurface water up to the surface, but it is only possible in the upstream of the estuary. I have to wonder where this may happen, and whether the location of upwelling due to estuary circulation is covered in the model domain. This mechanism is barely speculation without model data to support.

- The equation 4 is hard to follow in the context of multiple regression. The TOPAZ model resolves the NO<sub>3</sub>, and PO<sub>4</sub> limitation, and phytoplankton growths are limited by the minimum of the two nutrient limitations. This equations suggests PO<sub>4</sub> limitation is ignored. If the purpose is to understand the contribution of different variables to the Chl anomaly ( $\delta\text{Chl}$ ), then the equation should be in the form of:

$$\delta\text{Chl} = \text{Intercept} + a \delta\text{Runoff} + b \delta\text{TStranport} + c \delta\text{EkmanUpwelling}$$

where  $a$ ,  $b$ , and  $c$  are regression coefficients, which tell the importance of the variable if variables are normalized as the authors indicated. Then comes another problem. As Runoff, TS-transportations, and Ekman-upwelling are all correlated with Chl anomaly, it suggests that those independent variables in the regression are correlated with each other, that is they are not independent.

- In conclusion, I am not convinced this work provides valuable insights on the mechanism of how El Nino events affect the bloom dynamics. I can't recommend for publications before those issues are resolved.