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Interactive comment on “Influence of cross-shelf water transport on nutrients and phytoplankton in the East China Sea: a model study” by L. Zhao and X. Guo

Anonymous Referee #3

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In this paper, seasonal variations in nutrients distribution and primary production in the shelf region of the East China Sea are discussed based on the numerical model including physical and biological processes. And, contribution of the nutrients intruded from the Kuroshio subsurface to the primary production is estimated with the comparison of the control case and sensitivity experiments.

The seasonal variation found in the model looks to reproduce the distribution usually observed from satellite in general, while they may have some problems about the turbidity and sedimentation. However, observation data are not shown for the horizontal distributions of chlorophyll-a. Some quantitative comparisons should be shown in the

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manuscript. Contribution of the nutrients from the Kuroshio subsurface to the primary production in the shelf region is important when we consider the biological environment in the area. The authors used a method to compare the results between the case where nutrients are artificially increased and the control one. The result that the supply of oceanic nutrients to the shelf of the ECS contributes to primary production by its element ratio is interesting, considering the role of the oceanic nutrients. The decrease in DIN offshore of the Changjiang estuary due to increase in oceanic nutrients with small N/P ratio is explained in a reasonable sense. On the other hand, for the increase in DIN anomaly is not clearly explained. It should be explained how the increase in DIN occurs caused by increase in oceanic nutrients in bio-geochemical and physical senses. Is it just caused by dispersion of the higher nutrients?

In general, appropriate validation of the ecosystem model need to be given in more quantitative senses. And physical and bio-geochemical explanations on the distribution of nutrient and chlorophyll-a anomalies for the additional oceanic nutrients should be given more clearly.

Specific comments are as follows.

1. There are two expressions on the layers, that is, the upper layer and the lower layer or the surface layer and the bottom layer. It's better to be defined clearly, concerning the relation to euphotic zone.
2. P1415,L25-p1416, L2: It is better to explain the reason for the seasonal variations, particularly on the three peaks of silicate if it is mentioned.
3. P1416,L2-: The major variations seem to be seasonal variations. Is it suitable to express with standard variation to show the seasonal variations?
4. P1416,L19-24: Although the volume transport of the intrusion from the section northeast of Taiwan is about ten times of that through the section southwest of Kyushu, the difference of nutrient transport is about three times. What is the reason for the small ratio for the nutrients?
5. P1417,L4-6: Does it mean that nutrients intruded into the shelf region from the Kuroshio subsurface would not be lifted up to the euphotic zone during the period carried to Tsushima Strait?
6. P1419,1st para.: As the annual mean transport,



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the region around PN section is located to offshore transport as shown in Fig.8. Is it suitable to discuss the onshore intrusion of nutrients using PN section? 7. Fig.9 and 11: In Fig.9 nutrient anomaly looks to exceed 0.5 in winter in the mid shelf, while it seems to be around 0.2 in the surface layer along the PN section. Is it consistent? 8. Fig. 11 and 12: It is better use another color for euphotic depth. And it is hard to see the numerals on contours. 9. P1420,L19: in model the calculation » in the model calculation

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