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Interactive comment on "Phytoplankton dynamics driven by vertical nutrient fluxes during the spring inter-monsoon period in the northeastern South China Sea" *by* Q. P. Li et al.

Anonymous Referee #2

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[General Comments]

Li et al. ("Phytoplankton dynamics drive by the vertical nutrient fluxes during the spring inter-monsoon period in the northeastern South China Sea") conducted detailed investigations in the northeastern South China Sea. The manuscript is well written (in particular the Introduction part is distinguished), however, the both sampling period and location are very limited. This is the serious problem with this study. The short observation period (3 days) were not sufficient to discuss the generality of nutrient flux and phytoplankton dynamics in the SCS. The careful discussion considering the temporal scale are needed in the manuscript, though the authors recognized them (P6742, L26). At least, the spatio-temporal variations of wind curl-driven upwelling velocity can be cal-

culated and showed before and after observations. I cannot judge the downwelling in the offshore area is the typical structure or not in the SCS during the inter-monsoon period. In addition, at the transect observation, the effect of tide was ignored for the diffusive upward flux, and thus it is not clear that the estimated values are over-estimate or underestimate.

The authors said in the Abstract that vertical nutrient flux and turbulent diffusion effect to phytoplankton patchiness in the SCS. This sentence was corresponding to the first paragraph of the discussion (P6738). However, I cannot read discussion based on the authors' results, and thus the sentence in the abstract was introduced by the reviews of the previous studies by authors. In addition, this discussion was qualitative. The authors showed only percentages. Please discuss that how much percentage of new production is dominated by the vertical nutrient flux in the study area and period, and check the consistence to the authors' estimation.

The last sentence in the abstract was over-discussed. The authors did not investigate the phytoplankton composition, and they observed only one station near Dongsha. The authors pointed that the meso-scale eddies are formed near Dongsha (P6733L4), and the observation station was not considered the representative station of Dongsha.

[Specific Comments]

Abstract:

P6724 L10: What is "phytoplankton patchiness"? The abundance and/or community structure?

Introduction

P6724 L22: "while the mechanisms... are poorly understood in the SCS" I can see many previous studies as you shown in the Introduction. Why the mechanisms were poorly understood?

Materials and method

P6728 L12: Li and Hansell, 2008 is not the methodological paper and improper. The authors were measured the nutrient in the same system? P6730 L17: The dilution series was prepared 0%, but we did not see 0% at station B in Fig. 7.

Results

In this section, many discussions were seen. It is worth considering the aggregation as "results and discussion"

P6731L19: T-S diagrams are appropriate to divide the regions. Please consider to show it. T-S diagram was useful to explain the low temperature is originated to the upwelling of the deep-sea water (P6732 L6).

P6732L10: Upward transport... Please show the high resolution data obtained by the sensors instead of the discrete data in Fig. 3a, b.

P6734L14: The uplifting of nutricline and the chlorophyll maximum was not seen at station C6.

P6734L16: higher nutrient concentration at 250 m was not seen at station C11.

P6734L20: Elevated chlorophyll a was consistent with the high nutrient concentration at C11, but it was also associated with extremely high salinity. This saline water did not see in the deeper layers. I cannot agree with your discussion, which nutrient supplies from the deeper layers. I considered that this saline water indicate the importance of horizontal transport, which the authors ignored and did not discuss.

P6734L21: "below the euphotic layer" The optical sensor was attached to the CTD sensors? I cannot see in the M&M. How it was defined?

Discussion

P6740L7: The correlation was terrible. The r value was bad while the C9 was not contained.

P6741L21: The interpretation of grazing and growth was not clear. The nutrients were enriched to the bottles, and thus I think the growth rate was overestimated. How much and what type nutrient concentration were added to the bottles? Why it concluded the station A is stronger nutrient limitation than station B (P6738). How about phytoplankton community structures? I cannot agree with these discussions.

Figures

Fig.3: Salinity did not need the unit (per mill is wrong, at least).

Fig.4: What indicate the Y-axis? Depth?

Fig.6: Why the breakpoint of nutrient concentration and gradient are same depth?

Fig.7: The label of the x-axis is wrong. This indicated that the maximum dilution factor is 1%. When you did not have the data of 0% at station B, do not draw the regression lines to 0%.

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