

Biogeosciences Discuss., author comment AC1  
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## Reply on RC1

Jia-Jang Hung et al.

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Author comment on "Active and passive fluxes of carbon, nitrogen, and phosphorus in the northern South China Sea" by Jia-Jang Hung et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-17-AC1>, 2021

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### Reviewer 1

- Overall, I found that the study is robust and this manuscript will be suitable for publication after some mild to moderate adjustments. For one, the use of the term "biological pumps", or "BPs" in the paper was confusing to me and I don't think it is the correct way to use that term. I think of the biological pump as a large-scale concept that is occurring in the water column; its strength can be assessed through fluxes of the C, N and P, as described in this study. Therefore, this study should use the correct terminology of what the study is really assessing (active and passive fluxes), instead of "biological pumps". I also noticed that multiple figures are distorted (i.e. stretched or compressed). Finally, the manuscript had numerous repeated grammatical errors and would thus benefit from an English proofreader.

Reply: Many thanks for comments. We agree to replace "biological pumps" as "active and passive fluxes" in the manuscript, although the "biological pump" has been widely used in published articles as an indication of total carbon flux through the euphotic zone. However, we retain the "biological pump" term in Introduction and Discussion sections for citing published articles that used the BP term in papers. In addition, we have taken care of reviewer's concerns in figures and grammatical errors.

- Specific comments:

Line 75: A figure showing a map of the SCS would be helpful here, maybe refer to Fig. 1.

Reply: Yes, we added "see Figure 1" to the statement.

Lines 85-88: Goals of this study are confusing. Does the author mean there is limited data on the BP in the NSCS? And is the ultimate goal looking at multiple biological pumps, or the biological pump in the NCSC? Use of BP terminology is unclear.

Reply: The last paragraph was revised as followings: very few studies have been conducted to address carbon transfer from the surface to the ocean's interior. Apparently, the study of active and passive fluxes is essential and urgent to realize the states and processes of carbon fluxes in the NSCS. Thus, our ultimate goals focus primarily on understanding the current strengths of active and passive fluxes and their controlling mechanisms in the oligotrophic NSCS.

Table 1: I am confused about the sampling dates for that cruise as well, please put it in the same format as the other dates.

Reply: Table 1 was revised.

Line 129: Please provide the actual depth (i.e., pressure in water column) along with the light penetration depths here.

Reply: The depth for a specific light penetration (ex: 100%, 46%, 38%, 13%, 5% and 0.6%) is different in different sampling location. Therefore, it is inappropriate to list all depths for all sampling stations in sampling methods.

Fig. 2: Please put the season and sampling year somewhere in each subplot; I don't remember which one is which with just numbering 1-11.

Reply: Ok, we have added season/year to Figures 2.

Fig 3: In TS plot, you could label (or put box around) the different waters (subsurface, winter vs. summer waters, etc)

Reply: Ok, we have added season/year to Figures 3.

Line 300: Why is the figure not shown? Maybe just remove that text

Reply: Yes, we removed it from the text.

Figure 5 caption: "data in various expeditions"- are these the expeditions that are described here (i.e. Table 1), or are they different?

Reply: the "various" was replaced by "all".

Line 383: Term "regular summer" is unclear.

Reply: "regular summer" was replaced by "typical summer (without extreme events)".

Line 390: "an overall value" – is that the mean of both the 50 m and 100 m ratios?

Reply: Yes, we have added "averaged from 50 m and 100 m ratios." To the statement.

Table 3: Replace "predicted" with "estimated"

Reply: Yes, done.

Line 575-579: "This may imply..."; what is being said here? That the NCSC has more effective C fluxes than previous data from the open Atlantic and Pacific oceans? That was not stated and it is unclear what the sentence is saying its current form.

Reply: The statements have been revised (This may imply that the NSCS was more effective than open Atlantic and Pacific oceans in mediating POC transfer from the surface to the interior of the ocean).

Line 583: This statement about 1.89% of the global flux could be strengthened by also mentioning the area / volume of the NCSC relative to the global ocean (I am guessing it is <2%).

Reply: Yes, we have added the ocean area ratio (SCS/global ocean: 0.97%) to the text.

