

Biogeosciences Discuss., author comment AC2
<https://doi.org/10.5194/bg-2021-17-AC2>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Reply on RC2

Jia-Jang Hung et al.

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-AC2>, 2021

Reviewer 2

General comments:

Reply:

- The gut, excretory, respiratory, and mortality fluxes have been well documented as major components of active flux and mentioned in the Methods (for instance, Hannides et al. 2009; Hernández-León et al., 2019). Many published articles may deal with some of them as active flux partly because of lacking complete data, but that may result in an underestimation of active flux. To get a complete and reliable active flux, we have tried to include all components in the estimate of active flux.
- The first reason is that organic carbon is relatively abundant compared with organic nitrogen and phosphorus; the second reason is that organic nitrogen and phosphorus are more labile than organic carbon.
- We have tried to compare with all published data. Some of published "biological pump (BP)" papers just treat sinking fluxes (POC) as BP and such types of papers were excluded for comparison.
- I am not so sure for reviewer's concerns. We have clearly indicated that floating traps were deployed at 50 m, 100 m, and 150 m, but the fluxes at 100 m were regarded as the sinking fluxes because of the euphotic zone being <100 m. The DOC flux was also calculated through the depth of 100 m. In terms of active fluxes, they were estimated from the day-night difference of migrators within the top layer of 200 m (see Methods).

Specific comments

- Ok, we used the full names (Dongsha Atoll, night/day ratio) in the text.
- The statements have been revised as followings: The vertical distribution and acoustic scattering layers of migrators recorded at frequencies of 38 kHz (depth > 1000 m) and 120 kHz (depth approx. ~300 m), respectively, clearly had strong image layers around 400 m derived from 38 kHz data during the day and approximately 100 m derived from 120 kHz data during the night.
- Many thanks for pinpoint error in the final statement of elemental ratios (C:N:P) in mesozooplankton. The statement has been revised.
- Respiratory flux did not involve in N and P fluxes because respiration only release CO₂ (DIC) but no gas states of N and P.

- The statement was revised as the following: the ratios are closer to the Redfield ratio in passive fluxes (C:N = 7.1; C:P =86.8) than in active fluxes.
- Thanks for pinpointing spelling errors. We have made correction.
- The caption of Fig. 11 was revised to show clearly the sampling period.