

Responses of Reviewer's Comment

This manuscript presents seasonal distributions and sedimentation rates of TEP in the north Chinese sea, and discusses the impact of TEP on carbon cycle in the region. This manuscript is very poorly written and has to be extensive rewritten. I strongly recommend to have a native English speaker to edit this manuscript prior to any eventual resubmission.

Responses: We understand all scientific argues done by respected reviewer and take in account of all these corrections with professional and careful hand. We revised and rephrased the manuscript according to reviewer's requirements. Authors are cordially expressing humble thanks and gratefulness for the time invested by reviewer in this manuscript. We highly appreciated the approaches.

- The data are presented as average without giving standard deviation. This should be done.

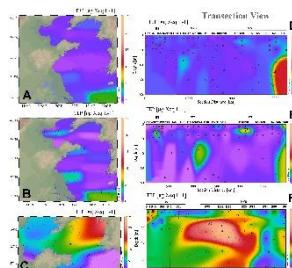
Responses: Due to the font size (12) we removed the standard deviations. However, we minimized the font size of table and provided necessary standard deviations in required places of table 1.

All the discussions are based on a comparison of the average values, but based on Figures 4 and 5, there are not differences (no statistical differences), neither between depths, region, nor seasons. Therefore, a paragraph such as “3.4 Seasonal and regional TEP sedimentation”, largely overinterpret the data.

Responses: We merged these sections with previous one for preventing overinterpretation and removed repeated data/figure from manuscript, replacing by TS diagram for interpreting TEP with water masses after following Parinos et all 2017.

- The sampling depths are not given. This should be done, and showed on the surface plots D, 3E and 3F.

Responses: The figure has been rectified with depths positions as reviewer's requirements. Sampling depths were given as supplementary data. Previously, due to irregular depths sample, basis on bottom depths; we didn't show their positions in respected figure for their randomness and scattered appearances. As follows:



- Because TEP concentration is known to vary vertically as a function of the vertical stratification, and to accumulate at the pycnocline, I my opinion it is important to show the vertical stratification at each station during sampling. Although the sampling strategy is not well described (the authors only wrote that “each station was designated with three distinguishing depths for better graphical analysis”), I understand that sampling was performed independently from the position of the pycnocline.

Responses: Sampling depths were selected on the basis of bottom depths. Different stations possessed different sampling depths as Figure 4. We also draw the aeration of TEP with other biotic parameters along pycnocline in new graph at figure 5. We provided sampling depths with lat-lon as supplementary data to avoid multiple tables in main text.

- It is not necessary to show the TEP-C, unless it is to be compared to POC data. Calculating the TEP-C concentration is only useful if one seeks to address the carbon budget.

Responses: We understand your arguments and advises about TEP-C. Hence, authors felt that despite having seasonal dataset of TEP along three seas, it is necessary to project TEP-C data for comparing with future data as references if necessary. It will also help the future researchers to calculate and compare TEP-C data with past records.

- Regarding the hydrology of the studied area, the authors wrote that “The Bohai Sea and Yellow Sea had a complex dynamic environment with various seasonal and local geophysical currents”. It is not clear if Fig. 2 has been done with data collected during their cruises, or if these data are from a published study. If it is the later, a reference should be given. If it is based on another published work, if it is as dynamic as stated by the authors, how confident can we be that the same scenario occurred during sampling?

Responses: Collaboratively modified from previous studies i.e. Hwang et al. 2014; Su 1998; Yuan et al. 2008; Isobe 2008, Zhang et al. 2003, figure 2 was generated. Authors carefully selected the physical circulations along seas from past reports after multiple seasonal comparisons in average for having general discussion. The references were noted at the end of the title of figure 2 as well as in text thoroughly in necessary places.

- Are the data of the phytoplankton community composition really useful for this study?

Responses: Due to TEP’s close correspondences with dominant species by following Guo and Sun 2018, we provided CCA of TEP with abundant taxa at figure 8 as well as TS assemblages of phytoplankton at figure 5.

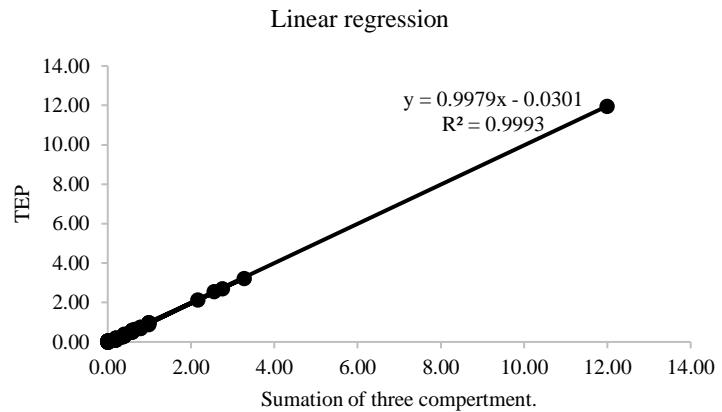
- Regarding the search for correspondence between the concentration of TEP and the other parameters (“3.6 Correspondence relationships of TEP”), the CCA analyses presented in Figure 6 do not show any relationship. Absolutely no pattern emerges from this analysis.

Responses: We rectified the CCA of TEP with dominant species along all study areas due to its previous reported correspondences with taxa according to Ortega-Retuerta et al. 2010.

- Last but not least, the approach used to estimate the sedimentation rate of TEP is questionable, as it does not allow to measure the real TEP sedimentation rate, because this approach assumes that losses from an upper layer is only due to sedimentation. This approach does not take into account other loss processes, such as inner wall attachment, or TEP accumulation at the surface. Such an approach is only valid for determining the sedimentation rate of conventional particles, which only settle down and do not stick to surfaces. As stated by the authors in their introduction,

TEP raise at the surface and accumulate in the SML. Therefore, the TEP concentration in each compartment (upper, middle, and bottom) is not only the result of losses from the upper layer towards the bottom layer due to sedimentation, but also the result of the ascent of TEP from the bottom layer towards the surface layer. In addition, all the TEP that may have accumulated in the SML, will not be taken into account in the budget, and may incorrectly be attributed to sinking. In order to validate this approach for studying the sedimentation rate of TEP, one has to be able to close the budget, i.e. to make sure that the sum of the masses of TEP in the 3 compartments equals the initial mass of TEP. If the mass of TEP is not conservative, it is not possible to estimate the actual sedimentation rate.

Responses: We have collected samples for TEP and its sinking separately, mentioned at lines 123-125. Authors observed that there is a very close linear relationship among TEP and the summation of TEPs at three compartments. As follows:



Authors discussed the sinking rates in a comparison with physical phenomenon of study areas after considering previously reported TEP's characteristics. We can provide those measured and tabulated records as supplementary data if necessary. We cordially thanking ageing for the comments of reviewer. Hope our answers will satisfy the requirements of reviewer in details.