

# ***Interactive comment on “Seasonal Sinking rates of Transparent Exopolymer Particles (TEP) concentrations with associated Carbon flux in adjacent Bohai Sea and Yellow Sea” by M. Shahanul Islam et al.***

## **Anonymous Referee #1**

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This is an interesting study on the seasonal distributions of transparent exopolymer particles and its impacts on carbon cycle in the north Chinese seas. The quality of the dataset, although lacking in my opinion of important aspects needed to address TEP distribution driving factors in the study area, is good and nicely approached to answer the specific scientific questions raised by the study. However, the manuscript has major drawbacks regarding its overall structure and results interpretation and I suggest that it could be considered for final publication in BG journal, but following major revision. Most importantly, the English is very poorly phrased throughout the text, making the

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manuscript hard to follow for the reader in many cases. I started to suggest a few sentence rewrites, but there are many others that need rewriting. I strongly suggest having a native English speaker do a major edit on the final version of the manuscript before resubmission.

Please follow my major and other comments below.

## INTRODUCTION SECTION

In the introduction part a large discussion is introduced on the SML. However the SML is beyond the scopus of this study. I suggest that the simple reference introduced in lines 46-47 is fairly enough on this and all other related text is removed from the manuscript (lines 64-75 and elsewhere).

- Line 38: between the - Line 38: organic carbon pools - Line 41: considered - Line 43: sourced? Please rephrase - Line 47: organically? Please rephrase - Line 51: control - Line 54: Please rephrase - Line 60: Please rephrase - Line 62: at the sea surface - Line 63: Mari et al., 2017 review addresses this issue and should be added in the references herein - Line 78: in the water column - Line 84: at the upper water column - Line 85: in summer rather than spring - Line 86: on carbon export - Line 87: The present study - Line 92: East of the BS - Lines 95-96: Please rephrase - Line 104: on TEP - Lines 108-110: Correct, but poor correlations amongst TEP and other environmental parameters has also be attributed to other biotic factors driving their distributions such as microbial breakdown of larger marine snow particles, sloppy feeding by meso- and macrozooplankton, abiotic TEP formation by bacteria and also consuming of TEP by bacteria. Please see review article of Mari et al., 2017 and references therein as an example for the relevant discussion. I suggest that a relevant part is being introduced in the introduction of the manuscript instead of the extended discussion on SML.

## MATERIALS AND METHODS SECTION

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- It is unusual in a manuscript not to have a Table outline of the sampled stations, coordinates and corresponding sampling depths. Of course this will be too long for the main body of the text and I suggest that the authors should considering adding this information as supplementary material. - In my opinion the authors should consider merging sections 2.1 and 2.2 in one section outlining study area and conducted samplings. - Lines 122-127: This part should be moved to the results section. Please follow my other comment on this issue below. - Line 141: nutrients separately? Please rephrase - Line 142: sampling bottles - Line 145: Please correct nomenclature to mL here and throughout the text. Also use L (capital) for litres throughout the text and figures/tables. - Lines 149-152: Please rephrase. The same text is introduced twice and a part of it is also being repeated above in lines 143-144 regarding Chl-a - Lines 159-160: dissolved, in all cases - Lines 162-164: Please rephrase - Line 169: were then soaked - Line 170: H<sub>2</sub>SO<sub>4</sub> for sulphuric acid - Line 170: were gently - Line 171: lied - Lines 183-184: Please rephrase - Lines 195-201: I suggest that the authors should consider removing this text from this part. - Section 2.6: I suggest that the authors should consider moving the TEP-C calculations part above in sect. 2.4 and the phytoplankton species description part in the relevant sect 2.3 above.

## RESULTS SECTION

An interesting aspect of this study in my opinion is the highlighted connection between the TEP distributions patterns and water masses characteristics in some cases. I suggest that the authors should consider elaborating a little bit more on this issue maybe providing a figure highlighting this connection. Please see the study of Parinos et al., 2017. Cont Shelf Res., 149, 112-123 for an approach on this matter. Please also check if this connection is highlighted/displayed on the clustering of stations in figure 7.

- Section 3.3: I suggest that the authors should consider merging this section with the previous one, sect 3.2, since it is expected that TEP-C distributions will be the same ones as in the case of CTEP since  $TEP-C = CTEP \times 0.75$  in all cases

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- Section 3.6: please check corresponding figure numbers! Fig. 16 is Fig. 6?? Fig. 13 is Fig. 7? Also please follow my comment below "section 4.1" regarding lines 322-327

## DISCUSSION SECTION

- Line 337: EPS include also protein-containing Coomassie stainable particles so the term EPS is not equivalent to TEPs only. TEPs are a part of EPS. - Line 339: resource? Please rephrase

-Section 4.1: In this section, see also my comment above on lines 322-327, I cannot see the connection between the various phytoplankton species and TEP distributions patterns on Fig.6. Therein the CCA analysis is nicely presented but focused on TEP-Chla relations and not individual species. I suggest that the authors should consider adding a table outlining TEP-phytoplankton species correlations in support to the discussion introduced in this section or re-phrase the paragraph.

- Line 345: the linkage between TEP and Chl-a in Figs. 6d-3-f is not at all strong in my opinion. - Line 348: Same as above for figure 6g. - Lines 374-376: but also, other than sources, to other factors consuming TEPS, i.e. consuming of TEP by bacteria, which is an aspect that cannot be addressed based on the presented dataset.

- Section 4.3: My feeling is that in order to address the potential role of TEP-C in the overall carbon cycle in the study area an essential aspect that is missing from the dataset is considering TEP carbon in respect to POC values. Taking into account the low TEP concentrations recorded overall in the study area, up to  $23.2 \mu\text{g XG eq L}^{-1}$ , and the high chl-a values recorded in summer and moreover the very high chl-a values recorded during winter 2015, TEP-C seems that it probably contributes a very small fraction to POC. Please see Ortega-Retuerta et al., 2010;2019, Bar-Zeev et al., 2011 and references therein, amongst others, as an example for the relevant discussion. If there are POC data available for the studied samples then they should be in my opinion included in the dataset and discussed in the manuscript. Overall, I believe that the relevant discussion/ interpretations introduced in section 4.3 are not fully supported by

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the presented results other than the similarity of TEP distributions with chl-a or nutrients in some cases, which cannot fully support a discussion on TEP role in carbon cycling in the study area.

- Line 426: of the carbon cycle - Line 428: the euphotic zone - Lines 441-442: zooplankton fecal pellets? This statement is not supported by the presented results

## TABLES

Nine tables seems a lot for a manuscript. I suggest that the authors should consider some structural changes as i.e.: - merging tables 2 and 3 in one major table presenting the concentrations and sinking rates of TEP reported in this study - merging tables 4-5-6 and 8 in one shorter major table presenting the concentrations of TEPs available from the literature, considering only the relevant data discussed in the text (lines 380-396) - incorporating the information provided in tables 7 and 9, especially table 9 were only data from Guo and Sun other than the ones reported in this study are provided, in the main body of the text (sect 4.2)

## FIGURES

Figure 3: Scales used for TEP concentrations should be uniform in all cases, both in min-max values and also scale stepping (step of color change).

## END OF REVIEW

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