

Interactive comment on “Depth is Relative: The Importance of Depth on TEP in the Near Surface Environment” by Tiera-Brandy Robinson et al.

Anonymous Referee #1

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General comments: Robinson et al. “Depth is Relative: The Importance of Depth on TEP in the Near Surface Environment” reports the vertical distributions of transparent exopolymer particle (TEP) concentration in the upper 2 m depth in the ocean including the surface microlayer (SML). Since the SML is the top of the ocean, their chemical character is very important for the ocean-atmospheric interactions. The authors investigated three oceans in Europe and reported their values. I considered that the data of this study is treasurable, but the manuscript is not organized. The authors must polish the draft. In particular, the “materials and methods” section is poor. I cannot understand how they observed. Also, they cannot find consistent features of TEP concentration in the SML throughout the observations; it was the weakness of this study. To overcome this weakness, detailed descriptions will be necessary as mentioned. I’m

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not a native English speaker, but the authors' English grammar is not good.

Specific comments: Title: The authors entitled as "Depth is Relative: The Importance of Depth on TEP in the Near Surface Environment", but I cannot understand what they want to say, and importance of depth was not shown in the manuscript. Please change the title.

L9: In my opinion and the authors described, TEP is not a single substance, it is a generic name; so anyone cannot say they were major or not. We cannot measure carbon of TEP or weight of TEP exactly, in particular in the field experiments.

L13 "study of TEP enrichments". Before here, the authors did not describe "enrichment", and thus very confusing. Please describe what the authors did before describing the results.

L17: I cannot understand the sentence.

L18: I cannot understand what the authors want to describe. A homogenous and heterogeneous profile of TEP concentration was observed in the same profile?

L20: Results. . .has?

L21: Why the authors can conclude the message.

L30: EPS was used only at once in the text.

L51: Is the investigation the purpose of this study? The investigation is the way to accomplish a purpose.

2.1. Please show maps for better understanding of the observations.

2.2 I cannot understand how many days and how many stations did the authors were observed. What "total" indicate? The sampling days or stations numbers whose location was different?

L80: The citation style was wrong. I think the authors use the reference manager such

as Endnote, but please review before submission. Same mistakes were observed in several parts (L108, L127, L129, L277, L292).

L84: To collect 20L of SML water, $2 \times 10^3 \text{ m}^{-2}$ are necessary when assumed the SML is $100 \mu\text{m}$ deep. Is it possible and during the sampling, how long did the sampling do? Does it mean that the waters keep their characters during the samplings?

L87: When the authors measured the temperature profiles in this scale, why they didn't discuss the stratification of physical difference between SML and ULW.

L95: Why the authors judge as near “enough”?

L99: Before measuring the POC, did the authors do the acid treatment? The authors described they use acid-washed GF/F but not mentioned after samplings.

L104: Here, the authors described they measured nitrate and phosphate as nutrients, but silicate concentration was reported in the manuscript. If they used GF/F-filtered seawater for the silicate analysis, how did they avoid the contamination of silicate during the filtering processes?

L106: Chlorophyll is not a proper noun.

L120: How many replicates did the authors were collected? In other words, how did they calculate the error bars of TEP concentrations?

L139: “Anova was significant”? Rewrite such as “the difference was significant in ANOVA”

L141: What is “subsurface bulk water”? This is very important because the authors discussed on enrichment factors.

L144: ug may be μg

L147: Table 1 and 2 should be supplemental materials. Please show them the contour figure and bar plot, respectively.

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Table 1: At L90, the parameters were averaged for 2 hours, but in Table 1, PAR was averaged for 24 hours? Which is correct?

L155: Please show the location of the fjord.

L162: Strictly, the authors defined TEP as transparent exopolymer particle"s", and so they cannot use them as the adverb.

L162: As same as Chlorophyll (L106), phosphate and silicate are not proper nouns.

L166: I cannot find the aim of this sentence. Was The Baltic sea observation the time-series observations? If so, please describe as the date.

L176: "Highest" should be "higher"

L188: Enrichment"s"?

L192: In section 2, the observations Cape Verde is described at the top, but here, at the bottom.

L199: "the" samples?

L199: "the lowest concentration" is the area mean value or a value from a sample?

L200: Phosphate level should be phosphate concentration

L210: The authors should refer to Fig. 1

L221: Vertical distributions should be shown as figures.

L224: In my opinion, the homogeneity and heterogeneity should be shown with CV. I cannot understand why the authors select variance.

L230: consumption" "(Busch. . .

L230: Please divide the results and discussion. These sentences are the discussion.

L240: When the authors want to use the TKE, please briefly describe in the Materials

and Methods section.

L241: I cannot understand the logic after “Thus”.

L250: Cite the references.

L252: “The” previous?

L253: has -> have

L262: Did the authors show biochemical processes? What processes did the authors show?

L260: Which paper assumes the homogenous environments including the SML? I know some paper assumes that chemical character is homogenous in the mixed layer, but they usually did not consider the SML.

L264: relation is not wrong, but it is usually focused on the person to person. I think the relationship is better than relation.

L265: I cannot understand this sentence.

L271: Same with L265.

L274: Why EF was related to the concentration? I cannot see the logic.

L287: Sun et al 2017 should put the end of the sentence.

L291: Same with L274.

L291-302: What is the theme of discussion here?

L303: Again, I cannot find any logics between concentration and EF.

L334: “changed daily” The observations were time-series observations? The authors did repeated observation? If not so, why they can discuss the daily variation?

L347-351: I cannot understand the English here. This sentence was too long.

L352: What indicate they? Biological sources or chemical characteristics?

4.4 The authors did not investigate the flux. I think that the authors cannot judge that TEP in the SML is produced at the SML, or transported from the ULW.

L367: These are not a new idea of the authors in the present study.

L372: Again, the authors cannot estimate the flux.

Table4: Is this correct? For example, in the column of Baltic vs Norweigan, TEP man diffs were only -0.04 and SE was 0.31; however, their difference was significant. While the Chl a concentration was different -0.3, and its SE value was limited to 0.15, however, its difference was “not” significant. Please re-check.

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