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Interactive comment on "Transparent exopolymer particle binding of organic and inorganic particles in the Red Sea: Implications for downward transport of biogenic materials" *by* Abdullah H. A. Dehwah et al.

Anonymous Referee #1

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In this manuscript, the authors present survey data on organic matter pools aswell as sensor data from the Red Sea. The study strongly builds upon the circumstance that it is the very first study recording the measured parameters in the given combination at the study region over depth (down to the base of the euphotic zone). The authors are very open in this regard stating themselves that the data presented "have not been collected in a systematic manner with spatial and temporal comparisons to assess the biogeochemical cycles within the Red Sea comprehensively." Hence, the study does not come up with substantial new concepts, but rather provides a starting point for

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following up analyses of matter cycling over depth in the study region.

Below are detailed comments. Major issues are that the section describing the statistics needs to be elaborated to achieve appropriate quality of the paper. The study design is rather unbalanced, with three shallower stations sampled during spring and one deep station sampled during winter. Additional data from unrelated surveys in the region were compiled and included in the manuscript as an additional data source for measurements at surface depths.

**********General remarks**********

- The title is rather misleading since the binding capacity of TEP was not examined explicitly, as the title implies. In addition the term 'inorganic particles' seems not to be suitable here as solely the organic fraction is analysed.

- The description of the results is not completely balanced. Some parts should contain fewer details while other more relevant parts are only scratched at the surface (see further down for detailed comment on this).

- The authors should be more careful with the use of literature. For example references indicated in the text are missing in the reference list (check for example Villacorte et al. 2009).

- Overall the manuscript is clearly structured. The text is written in a honest way and the results are discussed critically.

**********Specific remarks**********

- L48: Please specify the difference between sediments and POM. In my opinion the term sediments is not ideal for matter within the water column, especially not if it is contrasted to POM. The authors should consider to choose a different term.

- L55 'some' organic matter: Please be more precise.

- Fig.1: Where is site D? The authors should be consistent and add similar labelling as

for station A-C. In general the labelling of sites does not seem optimal. My suggestion is to use different colors for the sites sampled during the present study in contrast to the stations incorporated from previous studies.

- Fig.2: This figure should rather go into the supplementary material, as it is only a technical validation/quality assessment rather than adding to the results of the study.

- L223 Overall remark on Section 2.6-Statistical methods: This section is poorly described. How did you deduce statistical significance from a scatter plot? Besides a p-value also the statistical method applied has to be indicated.

- L229 Overall remark on Section 3- Results: A substantial amount of text in the results is spent on the description of the physical/sensor data. However, these data do not contribute substantially to the following discussion. I would suggest to shorten the respective results section and to remove 'hitchhiking' parameters such as pH, dissolved oxygen and turbidity from Fig.2 and Fig.3. I guess these parameters have been recorded and published for the study region before. Otherwise the authors should put more effort into putting these parameters into context in their discussion. From the TS profiles it looks like different watermasses could be present, which could have implications for organic matter cycling. In terms of statistics the study is scratching only at the surface. My suggestion is to include further statistical tests evaluating the difference between shallow and deeper water layers. One option would be for example to pool the three stations A-C for a comparison of the different OM parameters at minimal depth against maximal depths.

- L232 biospherical licor: This aspect could be skiped from my perspective (see comment above).

- L244 'a slightly lower salinity gradient': What is the precision of the measurement? I guess the observed variation lies within the methodological range. Please correct me if I am wrong.

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- L254 oxygen variability: Was the CTD device 'acclimatised' in the water for several minutes before starting to run the profile in order to avoid methodological biases?

- Fig.8: The figure headers are quite hard too read. The authors should consider to increase the font size.

- Overall remark on Figures: The figure captions should be more elaborated in order to transport a message. Identical units should be used for all parameters within the same figures if applicable. For example in Fig.7 and Fig.8 μg/L should be used also for TOC (instead of mg/L) to facilitate comparability across parameters.

- L368 'highly effective': How do you define high effectiveness here?

- L410: As you state that TEP is presumably a significant part of TOC, it would be valuable to also calculate the respective fractions and indicate them in the manuscript (maybe even as an additional figure).

- L414: Can methodological issues such as a bursted filter be excluded?

- L464: I would be careful here as this aspect was not measured within the study scope. The authors should replace 'which are food' with 'which can be food'.

- L491 'unusual result': Nutrient concentrations would be interesting to check in this regard. The chlorophyll maximum seems to lay quite deep at station A-C.

- LL503-504 offshore vs. nearshore: This statement in the conclusion can be misleading, as season may be the more influential factor than offshore versus nearshore.

- L505: Which irregularities?

**********Technical corrections**********

- L57 LANGUAGE: The term 'caused' seems not fitting here, probably better to be replaced with e.g. 'formed'.

- L116 TYPO: 'the characterize'

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- L156 TYPO: 'there different'

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