Review manuscript egusphere-2025-501

General comments

Seo et al. present a very useful study on how the preprocessing, storage and filtration of seawater samples for FDOM measurements affects the results. This work has great value to the community, and somewhat suprising such studies have not been (to my knowledge) conducted to this degree. It's well written and concise. I recommned this is published with minor revision, which are largely to improve the clarity of presentations and provide the reader with some more useful details, as per below.

➔ Thank you for your valuable comments. In the revised manuscript, we carefully incorporated the comments below to improve clarity.

In the attached annotated ms. provided several comments and suggestions, which largely would improve the clarity of presentation. For the reader its much beneficial if some more details are given on several aspects of the methods used. Some key points include;

Provide the reader with the exact make and type of membrane filter used. Please also make sure the diameter of the filters is noted, since the volumes used for washing might be depedent on the filter size (surface area), and thus the reader needs to know how the used washing volumes relate to filter surface area.

➔ Additional information, including the materials, pore-sizes, and diameters of the GF/F and membrane filters, has been added in Section 2.1 of the Methods.

Provide clearly (in a table), the initial concentrations of CDOM and FDOM in the filtered and unfiltered samples. This helps the reader judge the type of samples that have been used.

➔ The initial concentrations are presented in Section 3.2 of the Results, and will also be provided in a table for clarity.

It would be also valuable to show whether CDOM changed over the same period of time, as this could affect the inner filter correction.

➔ We agree that CDOM is beyond the scope of the current study. This research specifically focused on the characterization of FDOM; therefore, CDOM was not included in the experimental design.

Any ancillary data that could tell about particle loading (e.g. CHLA, POC, etc.) in the samples used in the study would be also very valuable for the reader to evaluate how particle loading might ahve affected the results obtained.

➔ Unfortunately, no ancillary data were available for the samples used in this study.

When in the field, sometimes neither distilled water nor HCL is available or practical to use,

then the procedure would be to use sample water to pre-rinse the filter. Would this not be as efficient as using either of the above?

➔ Pre-rinsing the filter with sample can be considered one of the available methods to reduce contamination. This recommendation has been added to the Discussion section in the revised manuscript.

[Technical comments/suggestions]

line 11. DOM needs to be written out first time its used..

➔ In the revised manuscript, “DOM” has been spelled out as “dissolved organic matter”.

line 11. Re-word; "results from FDOM measurement can depend on ..."

➔ changed as suggested

line 16. specify which type of membrane was used .. so many different membranes out there..

➔ In the revised manuscript, we have added detailed information on the materials and diameters of both the GF/F and membrane filters.

line 16. please clarify, was this used for both type of filter..

➔ Correct, we have included information regarding both filter.

line 18-19. does this suggest that T peak material is primarily associated with particulates, and samples need to be filtered to not get material from broken cells into the dissolved phase?

➔ The T peak is associated with biologically derived materials and reflects the presence of relatively larger particles produced by biological activity, in contrast to the smaller-sized humic substances represented by the C and M peaks. Therefore, this finding suggests that consistent filtration through the same pore size is necessary when comparing the relative concentrations of the T peak.

line 20. in the dark?

➔ An amber vial was used for sample storage, and this information has been added.

line 22. applies for C and M peak only, please clearly state that at the start of the sentence

➔ Throughout the manuscript, all occurrences of “$FDOM_H$” have been spelled out as “C and M peaks”.

line 22. I would disagree, does not the above statements mean that material in the T peak could in seawater be often associated with particles, and thus using an unfiltered samples could caus misleading results for this peak?

➔ This section specifically addresses the C and M peaks. To improve clarity, we have revised the text to separately describe the findings related to the C and M peaks and those for the T peak.

line 30-33. Note, it rather the CDOM part of DOM that affects the light, please be clear about that, FDOM as such, with fluorescence would have a lesser role in affecting the light.. a prerequisite for FDOM is that CDOM absorb light first ...

➔ This part has been revised to be more closely related to FDOM.

line 52. Please specify which exact type of membrane filter was used, this is a great interest to

the reader. Simply broadly stating the material, does not mean other similar membranes from other manufacturers are exactly the same. Also note what diameter the filter used was. This is related to volume needed for washing, as the larger the surface area, the more volume would be needed..

➔ Filter information including material, manufacture, pore-size, and diameter has been added in the revised manuscript.

line 62-63. stored how, and for how long before filtration?

➔ Samples were stored in refrigerator. The filtration of samples was conducted within two days after seawater sampling. To clarity, this information added in the revised manuscript.

line 64. Please specify the equipment used to do the filtration, was this on a funnel system, syringe filter, or? Please also note how this equipment was cleaned and how carry over from previous sample was avoided? And I assume samples were stored in the dark, despite being in amber vials?

➔ Filtration was performed using a 47 mm diameter funnel system that had been cleaned with 1 M HCl. Between samples, the funnel and filter system were rinsed with distilled water and next samples. Although all samples were stored in the dark container, photodegradation may have occurred during equilibration to room temperature prior to measurement.

line 98. For the reader it would be really good if a Table was prepared where the initial concentration of CDOM and FDOM for the samples used in this study are listed. This would indicate the range of CDOM and FDOM values used.

➔ The initial concentrations will be presented in the Results section and also provided in a table for clarity.

Figure 4. Also show this for CDOM, or at least make a note how CDOM changed.

➔ We acknowledge its potential importance and suggest that further investigation into the relationship between CDOM and FDOM would be a valuable topic for future studies.

Figure 5. add crosses to the legend as in the previous figure

➔ The legend has been added in the revised manuscript.

line 137. This volume must be dependent on filter surface area, so please, make sure to also disclose this information clearly, and relate to the filter surface area (i.e. volume per filter surface area)..

➔ Information on the filter diameter and the volume per filter surface area is provided in the Methods and Discussion sections.

line 139. not just activity, but that cells pass the filter, and material from these are measured as "dissolved"..?

➔ Correct. Filtration using GF/F can lead to misleading FDOM concentration due to the passage of microorganisms and cells. However, most research group that measure FDOM with DOC to trace the source of DOM have used 0.7 um pore-size filter (GF/F), owing to their advantages such as low background DOM, high flow rate, and large capacity. Additional explanation on this point has been included in the revised manuscript.

line 140. again, I would rather phrase this not only as activity,. but also such that particles might

pass the filters, and then either by abiotic processes (cell bursting?) or microbial activity be producing measurable FDOM

➔ As described above, this comment has been incorporated into the revised manuscript.

line 141. please remind the reader of the exact membrane material

➔ The material of membrane filter (mixed cellulose ester) has been provided in the revised manuscript.

line 147. Do you have any measure of e.g. CHLA or POC in these samples, to how different the samples are in terms of particle loading, please given any such data, tabulated together with CDOM and CDOM data.

➔ Unfortunately, no measurements of other parameters were conducted in this study.

line 148-149. This is a bold statement, since if there are high phytoplankton biomass, at least the T peak could be affected? Please clarify the statement, I think this is only valid, if there is low particle loading.

➔ This statement has been revised to focus on humic-like FDOM peaks. As pointed out by Reviewer 1, the discussion regarding sample filtration has also been toned down accordingly.

line 152. please simply spell out the peaks here in the text.. e.g. "humic-like C and M peaks.

➔ revised as suggested

line 153. spell out the peaks here, simply more clearer for the reader. if you always spell out the peaks..

➔ revised as suggested

line 163. Conclusion - I would have expected one clear sentence on the recommendation for how filters are cleaned..

➔ The recommendation for the sample filtration has been added as below:

"(line 168) These findings suggested a possible option for measuring FDOM without filtration in the open ocean."

line 164. also filter type?

➔ Although GF/F and membrane filters were used in this study to investigate filter blanks and pore sizes, we do not intend to recommend the exclusive use of these two filter types for FDOM analysis. Therefore, we have chosen not to specify or emphasize the filter type in the context of general recommendations.

line 169. spell out the peaks.. or refer to "humic-like C and M peaks" ...

➔ revised as suggested

line 171. spell out, "humic-like"

➔ revised as suggested