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Interactive comment on "Colored dissolved organic matter in shallow estuaries: the effect of source on quantification" *by* W. K. Oestreich et al.

Anonymous Referee #1

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The manuscript addresses the reliability of fluorescent dissolved organic matter (FDOM) measurements at a fixed excitation : emission pairing as a proxy for light absorption by colored dissolved organic matter (CDOM). This is an important analytical issue in estuarine and coastal waters, where FDOM measurements can be rapidly and cheaply in situ, but CDOM measurements require collection of discrete samples for analysis in the laboratory or the deployment of more involved, power hungry and labor sapping in situ probes.

The data collected appears of decent quality. However, there are some significant changes that need to be made to the data presentation and interpretation before publication is possible. These are addressed below.

1) Add the FDOM Ex:Em wavelength pairing to the abstract so that the reader knows

straightaway that FDOM here refers only to this pairing as utilized on probes and in situ sondes.

2) CDOM spectral slope needs to be calculated over consistent wavelength ranges with the same data resolution (data points per nm) for the data to be comparable. Spectral slope changes with wavelength (see Helms et al. cited in the manuscript). Either reduce the wavelength range to 340-440nm for the whole analysis or remove the WFH data from the comparison.

3) How were offsets from zero determined for the WFH CDOM spectra and were they applied for the other data? Samples are routinely zeroed at or above 600 nm (e.g. see Helms et al again) as there should be very limited CDOM light absorption at these long wavelengths. This may be important in the trends seen in Fig 3 and discussed next.

4) Figure 3. The whole paper indicates that CDOM and FDOM do not correlate well. Looking at Fig 3 these seems completely inaccurate for all but the WFH samples and two other outliers. The two outliers are: 1) The BB-S sample with CDOM of $\sim$15 and FDOM of <20. 2) the BB-N sample with FDOM >60 and CDOM <2. Looking at the rest of the data on this plot, these two samples are obviously outliers. They may have been confused with other samples or contaminated at some point in the sample processing. They look as if they may have been switched (i.e. the BB-S has the CDOM value of BB-N or vice versa). Whatever the case, the best thing to do at this point is to remove them from the correlations and/or delete the completely. Having analyzed hundreds, if not thousands of samples of this sort, the lack of coherence of these two samples with the rest of the dataset screams analytical error. For this reason, I would favor deletion. Once these samples are removed from the regressions the R2 for all the BB-N, BB-S and CB data would fall on a very tight line. From a visual appraisal of the data, it appears that a single regression for all three datasets would be insignificantly different from regressions of all 3 sample sets indicating that within NE estuaries with terrigenous DOM inputs, a single CDOM:FDOM regression can be applied.

The WFH data falls above this combined BB and CB line. This could simply be an analytical error as the sample absorbance spectra were not zeroed at 600-700nm (see comment 3). Here I am not sure how the authors should proceed. As the CDOM data obtained was not measured out to 700nm, they have no way of checking if they had a blank issue for those runs. All of these samples are at low CDOM. The analytical noise could therefore have contributed to the lack of a relationship between FDOM and CDOM within these samples. Although the above reservations cause me to question the data a little, the fact the samples all have low CDOM is consistent with the groundwater dominated WFH estuary. Therefore, if caveats are added that CDOM was low and may not have been fully corrected, then the data can be discussed and the difference between WFH and the other estuaries attributed to groundwater inputs. More references for CDOM and FDOM from groundwater systems, estuarine and otherwise should be added though.

5) A plot of CDOM absorbance versus salinity should be added and discussed.

6) A plot of Spectral Slope versus salinity should be added and discussed as a qualitative indicator of endmembers along with d13C data.

7) Try a plot of spectral slope versus d13C.

8) Page 73713. Spectral slopes become steeper, not larger.

9) Figs 4 and 5, the maps require some color, indication that part of the map is land, part ocean, etc. not just an abstract outline.

Interactive comment on Biogeosciences Discuss., 12, 7301, 2015.