**Reviewer:**

The lack of inner-filter correction here might be problematic here if the water sampled contained any color. The problem is that most of the indices derived from the EEMs rely on the region most affected by the IFE, that is the region typical of the protein-like at low excitation and emission wavelength. In addition to underestimating the contribution of the proteinaceous material overall, you may end up being in a situation where for a similar concentration of these compounds in a sample, your concentration estimate may be quite variable depending solely of much fluorescence is absorbed by the sample itself. Could the authors at least provide absorbance values and what would be the impact of the IFE for the samples they have measurements for (L107)?  
We have provided a range of absorbance values for the samples we measured in spring and we have responded below the impact of IFE for samples that have absorbance measurements.

L107-109: Without the absorbance, it is hard for me to judge if the IFE is a problem here. The authors should follow the paper of Kothawala et al. 2013 L&O:Methods to calculate the percent fluorescence lost due to the IFE, and provide the reader of by how much their results are likely to vary.

Absorbance was measured for spring samples only and we have updated the methods section with the range of absorbance values for these samples. We also added information on the percent fluorescence lost due to the IFE, which we calculated based on Kothawala et al. 2013. Additionally, we added that then comparing EEMs metrics calculated based on EEMs that were corrected with and without the IFC, we found <5% difference in EEMs metrics.

L110: Given the authors can fix the IFE issue mentioned above, I would suggest performing a Parallel Factor (PARAFAC) analysis of their fluorescence data as it is a more powerful tool to deal with fluorescence data.

CLAY: I have the PARAFAC analysis you did and I’ll look at using it in addition to what we’ve already done.

I did some quick analysis of the PARAFAC results in R (see attached r script and files). Looks like for all sites (but for just Summer, winter, spring) humic and authochthonous DOM components are slightly higher for buried reaches, which matches with the HUM metric, but not the HIX metric.

Because I was not able to run the fall EEMs with the rest of the seasons in the PARAFAC model, I don’t think we can compare fall with the other seasons. I attempted to do this by merging the DOM components that overlap from both models (SQ1 and SQ2) and fall has way lower humic-like DOM compared to the other seasons and is should be the opposite, based on our other results and on the literature.

Also, the reviewer said “given the authors can fix the IFE issues mentioned above…” I’m not sure what I’ve added below is sufficient to say we have fixed the IFC issues.

We could leave out the HIX results, which depends more on the IFC then the other metrics.

**And here is the associated text:**

Dissolved organic matter quality was characterized using fluorescence excitation-emission matrices (EEMs; Coble *et al.*, 1990; Coble 1996; Cory *et al.*, 2010) measured on a Fluoromax-4 spectrofluorometer (Horiba Instruments, Kyoto, Japan). This technique quantifies humic-like, fulvic-like, and protein-like fractions within the bulk DOM pool, which in turn are generally related to the lability or recalcitrance of DOM pool. EEMs were measured using excitation wavelengths at 10 nm intervals between 240-450 nm at and emission wavelengths at 2 nm intervals from 290-600 nm. Three-dimensional EEMs were then instrument corrected, blank subtracted, and normalized by the water Raman signal (Cory *et al.*, 2010) using Matlab software, but we did not measure absorbance for each sample, so we could not perform the standard inner-filter correction on the EEMs on all samples. Based on Kothawala et al. 2013, the IFC is needed when absorbance exceeds 0.042. For spring samples only we measured absorbance using a scanning spectrophotometer, and for these samples absorbance at 600 nm, ranged from 0.001 to 0.003, and absorbance at 290 nm ranges from 0.03 to 0.09, indicating that IFC is needed for our samples. Also, using equation 2 of Kothawala et al. 2013, and absorbance and EEMs data for spring samples, we calculated that the inner filter effect can cause between a 0.7 and 36% reduction in fluorescence intensity, particularly at lower wavelengths, were absorbance is highest. However, for the spring samples, which were processed with and without IFC, it was found that there is < 5% difference in all the EEM metric results, with and without IFC. Still, due to the lack of IFC for most samples, and because there can be up to a 29% reduction in fluorescence intensity without IFC, these results will be most useful for relative differences across sites and time rather than for comparison to literature values.

The EEMs were used to calculate several DOM quality indices, including the humification index (HIX; Zsolnay *et al.*, 1999; Huguet *et al.*, 2009), the biological freshness index (BIX; Huguet *et al.*, 2009), the fluorescence index (FI; McKnight *et al.*, 2001), and the protein-to-humic ratio (P/H; Coble, 1996; Stolpe *et al.*, 2010). HIX characterizes the humic or autochthonous fractions of DOM (Zsolnay *et al.*, 1999; Ohno, 2002), and it is calculated as the ratio of integrated fluorescence emission intensity between 300-345 nm and between 435-480 nm at 254 nm excitation. Higher HIX values indicate DOM with humic character whereas lower values indicate either less humic or more autochthonous DOM. BIX was calculated from the ratio of emission at 380 and 430 nm at excitation of 310 nm (Huguet *et al.*, 2009). BIX values <0.7 are associated with allochthonous DOM, values 0.8-1.0 are associated with autochthonous DOM, and values >1.0 are associated with aquatic bacterial sources; higher values indicate greater lability than lower values. FI is calculated from the ratio of the fluorescence intensity at 450 nm and 400 nm at excitation of 370 nm. FI values of about 1.9 indicate fulvic acids from microbes and values of about 1.4 indicate terrestrial-origin fulvic acids. Finally, P/H was calculated from the EEMs whereby excitation at 275 nm and emission at 340 nm is associated with protein-like organic matter and excitation at 350 and emission at 480 is associated with humic-like organic matter (Coble, 1996; Stolpe *et al.*, 2010).