Interactive comment on "Distribution, seasonality, optical characteristics, and fluxes of dissolved organic matter (DOM) in the Pearl River (Zhujiang) estuary, China" *by* Yang Li et al.

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Dissolved organic matter is an important component of the carbon cycle in aquatic systems and it exerts direct impact on the overall biogeochemical process in the ocean. DOM spectroscopy has emerged as a cost-effective and easy-to-measure technique for quantifying and, more recently, qualify the DOM content in the environment. The manuscript by Li and colleagues brings results on DOM amount (expressed by means of DOC and spectroscopic measurements), characterization (through EEM-PARAFAC), fluxes and seasonal variability for the Pearl River Estuary, China. The data set is robust and the methods applied align with current literature. Although the

sampling grid remains the same for the different seasons, the seasonal averages presented in the MS might be biased by the spatial variability presented within the water masses spatial distribution within the region. Therefore, I suggest the authors to have lead the MS through a more "oceanographic point of view", i.e., by investigating the seasonal changes within the water masses presented within the region. Although the manuscript is well written and reads easily, the way that sections are structure makes the manuscript repetitive when presenting and discussing results. I think it would become more concise and interesting if the authors focus on making a rearrangement of sections (by merging/condensing some of them) and on making a review through the text to avoid such repetitions. Additionally, the introduction is a bit too long and could be shortened by providing only information needed for interpretation of results from this study. Thus, to my judgment, the manuscript may be publishable after major reviews.

GENERAL COMMENTS:

- The abstract does not clearly illustrates the main findings obtained in the study.

- The hypothesis presented in section 1.3 seem weak and vague, and could be sharper. Seasonal variability in DOM flux is already expected from an estuary with marked seasonal variability in freshwater export, as documented by the authors.

- Sampling strategy: why was decided to collect the "deep water" sample near the bottom and not below the pycnocline? It can be affected by sediment resuspension, if there is any.

- Have the authors looked at the CDOM absorption spectral slope and slope ratio? It could provide more insights into the photochemical reactions along the estuarine mixing.

- The authors could also try to use multivariate analysis (e.g., PCA) to analyze the variability between the campaigns (i.e., over time) and to elucidate what are the main drivers on DOM variability within the region.

- I suggest the authors to compare their PARAFAC-derived components spectra with the OpenFluor database (https://openfluor.lablicate.com/). This would benefit the comparison established with other studies along the MS.

- With respect to the sources of DOM to region, especially the pollution-derived DOM, they could be more stressed along the MS. It is not totally clear how the findings of this study support that.

- Section 4.5 establishes comparisons among global DOM studies but I expected the discussion to bring some conclusions on the reason for such differences rather than just comparing them.

SPECIFIC COMMENTS:

L75-79: authors could give more background on anthropogenic/pollution-derived DOM, given that it is a DOM source for the region, as pointed out in this study.

L115-119: Please present values (ranges) for the variables. How much does the phytoplankton biomass vary within the seasons?

L124-125: Are there only those two studies supporting this affirmation? No study published in English?

L306-307: what do the authors mean by "freshwater input from this river appeared to have little influence on [DOC]" ?

L500-503: Missing references.

L522-526: I found the explanation for different mixing behavior weak and should be discussed more in deep.

L527-535: this paragraph/discussion could be deepened in the sense to explain the reasons for such variations.

L538-547: Why does it only have good correlations for summer and winter? What

happens with the correlations during the other seasons? Additionally, was the DOC-aCDOM correlation significant and strong? I ask that, because that correlation does not hold true for several environments.

L556-580: authors could deepen the discussion regarding the fluxes.

L615-623: what could the authors point out as the reason for such differences?

Figure 1: It would be interesting to have two panel composing this figure: one with the sampling sites and another with the city names and also the main circulation patterns.

Figs 3, 4, 5 and 8: please present the curve fits and stats.

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