

Interactive comment on “UV/PAR radiations and DOM properties in surface coastal waters of the Canadian shelf of the Beaufort Sea during summer 2009” by J. Para et al.

Anonymous Referee #1

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General comments: The manuscript reports the result of semi spectral light attenuation, DOC and fluorescence/absorption properties for 27 stations during a 4 week cruise in 2009 from the Mackenzie River and out the Beaufort Sea. Overall the data appear to be of good quality and the measurements carefully and well conducted. The dataset are, however, limited and the data analysis lack originality and the presentation of data can be improved. Most of the weight in the data analysis and manuscript is on rather trivial matters like surface radiation, absolute values of K_d and relationships between CDOM absorption, K_d at different wavelengths and DOC concentrations, all issues there are well described in the literature already, and nothing new is found, except that the data is from a new cruise in an – I admit – interesting area. The most

C6703

interesting part is the dynamics of the three fluorescent components, as this is a topic where information still is limited and scattered. I suggest that the authors rewrite the manuscript, delete or down scale some of the trivial information (Fig. 3 (one panel is ok), Fig. 4, 5 and 6) and try to analysis the relationship between absorption and S, and between the three components C1-C3, and if possible their relationship to chlorophyll, primary production or another proxy for productivity, e.g. nutrient depletion. Also an analysis of the residuals from the salinity-fluorescence component relationships (Fig. 9C and 9D) would be interesting. As solution to the puzzle of a tight relationship between C2 (allochthonous) and C1 (suggested to be autochthonous) might be found in Markager, Stedmon and Søndergaard (2011, Estuarine and Coastal Shelf Science, 92, 376-388. doi: 10.1016) where the authors suggest that inorganic nutrients fuels primary production and thereby also autochthonous DOM production along a salinity gradient similar to a terrestrial DOM component. Specific components: l. 32 Values of surface irradiance is irrelevant, particularly in an abstract, depends, as stated, on the weather conditions. l. 30-35 The depth for 10% light does not depends on surface irradiance. It is better to state the K_d -values, and then the reader can calculate the depth for any percentage of surface irradiance. l. 38-39 This has been ‘suggested’ so many times that it is ‘a fact’ that we almost always see a close relationship between absorption and DOC. Deviations and the slope for this relationship is much more interesting. l. 151-157 How is α calculated, and is it correct that Chl. concentration is a factors in the equation for albedo or is it only if the equation on the web site is used to calculate the light attenuation in the water? It is not clear form the web-site reference given. Why is Chl. conc. set to $0.1 \mu\text{g l}^{-1}$. I can hardly believe that Chl concentrations were not measured on a cruise like this, at least a CTD with a fluorometer must have been on board? It would be interesting to include Chl –concentrations in the analysis of the components C1 to C3 together with salinity. Please clarify the calculation of α and include the chlorophyll concentrations or a proxy. l. 188 This technique was first published by Stedmon et al 2000 (Estuarine, Coastal and Shelf Science, 51, 267-278). It is most correct to refer to the original paper. l. 228-234 Surface irradiance is weather

C6704

depended and therefore of little interest. Consider to delete this, or argue why it is important. l. 235-258 The absolute values of K_d for wavelengths are hardly of interest to the reader, particularly since they, as stated, fall within expected values. Values are given in Table 2 so no need for further comments. The same goes for the next paragraph l. 259-266. l. 335-336 True that CDOM along a freshwater gradient often is governing light attenuation, but in this case you have one point (st. 170) where chlorophyll seem to be dominating. Again, as above, the deviation from the normal pattern is actually more interesting the standard patterns repeated over and over again. l. 425 It is very interesting that the S-values is not following a reciprocal relationship to absorption as usually found (see Stedmon and Markager *Limnology and Oceanography*, 46, 2087-2093). Maybe a plot of S versus a would be interesting.

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