

Interactive comment on “A synthesis of light absorption properties of the Pan-Arctic Ocean: application to semi-analytical estimates of dissolved organic carbon concentrations from space” by A. Matsuoka et al.

Anonymous Referee #2

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This manuscript takes some in situ CDOM absorption and DOC data and attempts to use them to estimate Arctic wide surface DOC values, from Satellite retrieved aCDOM. With the high input of DOC into the Arctic and expected changes in carbon cycling, it is an important variable for us to monitor. The authors need to take more care in classifying this as a Pan-Arctic study when they have very little data from much of the Arctic and it is highly seasonal. The distinction between coastal and oceanic data seems a little arbitrary, I think the authors mean terrestrially influenced vs oceanic. It would like to see more time taken in discussing the difference between East and West

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DOC vs CDOM relationships. It appears that they have used the Western regional relationship between DOC and CDOM to estimate the Pan-Arctic surface DOC, however, these relationships have been shown to be quite different between Arctic sectors. The attempt to estimate Pan-Arctic DOC is commendable, however one is left wondering what the point of the manuscript is when the authors do not attempt to look at interannual variation, or changes over time. In Figure 11, we are only given averages, when standard deviations on those values would be useful. This paper should be expanded to include an analysis of the patterns seen in the satellite derived DOC. Specific comments. Used different CDOM vs DOC for WAO and EAO? Abstract: Line 1: Both absorption and scattering determine light propagation, not just absorption. Add scattering to this sentence.

Introduction: Line 16: Is the DOC in the base flow more refractory? I assumed that more refractory material is released in the spring and summer as permafrost melts.

Methods: Page 17074 Line 12 to 25: I would not describe this as a Pan-Arctic dataset. There is no data from the Canadian Archipelago, Siberia is sparsely covered and data is mostly from the summer. I would like to see a discussion of the limitations of the data when describing Pan-Arctic patterns. Page 17077 Line 17: When calculating SCDOM from NABOS data was it determined between each stated wavelength? Or across the range 412 to 510nm. Be a little clearer here. Page 17078 Line 20: Were measurements made on the sunny side of the ship? Page 17079 Line 2: fragment? “at 443nm values based on” this the word values a fragment, as the sentence does not read well. Page 17081 Line 9: How are you defining coastal and oceanic waters? The Chukchi really is coastal, as it is shallow and close to the coast. Do you mean riverine influenced versus oceanic? You may need different definitions here. Page 17081 Line 21: Where is the value $67 \pm 19\%$, I cannot find it in Table 1. Page 17083 Line 7: I would like to see a discussion of the low NAP absorption measured on NABOS, what is the contribution of NAP to ap is ap low or NAP?

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