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Biogeosciences Discussions

Interactive comment on "Estimating absorption coefficients of colored dissolved organic matter (CDOM) using a semi-analytical algorithm for Southern Beaufort Sea (Canadian Arctic) waters: application to deriving concentrations of dissolved organic carbon from space" *by* A. Matsuoka et al.

Anonymous Referee #1

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General comments: Matsuoka et al modified the eigenvectors used in a spectral optimization algorithm, so that improved retrievals of the inherent optical properties (in particular the absorption coefficient of the colored dissolved organic matter, aCDOM) could be obtained from spectral remote sensing reflectance. Further, based on field-measured data in the Southern Beaufort Sea waters, an empirical link between aC-

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DOM and concentration of DOC was established, thus made it possible to estimate DOC concentration in the surface waters via satellite-ocean color remote sensing. The authors further applied the modified/updated processing routine to MODIS data over this region and obtained reasonable estimates for this wide area. I found the manuscript is well written and fits BGD very well.

Specific comments: p.13750, lines 1 – 11, Rrs calculation. It is not clear what "The above-water global solar irradiance ... evolution in the incident light field." means here. Profiles of Lu(z) and Ed(z) were obtained, Lu(0-) was obtained through linear regression, then Rrs is calculated as 0.54 Lu(0-)/Es. Note that, more or less, Lu(z) suffers from wave focusing, but not Es. it might be more robust if Lu(z)/Ed(z) is calculated first (as both are affected by wave focusing), then propagate to 0- and then above surface. A depth range used for the regression would be helpful. p.13750, line 21. The units for S_CDM should be nm-1; and no units for η. p.13750, line 28, there is no "0.754188" as a correction factor in Maritorena et al (2002). p.13751, line 7, MODIS has listed the '551 nm' band ad '547 nm'. p.13755, line 26, "... this is the first semi-analytical algorithm for estimating CDOM absorption ..." This could be true for Arctic waters. Using bbp as an index for a_NAP, Zhu et al (2011) and Lee (1994) demonstrated the potential for waters in the Gulf of Mexico. Lee, Z.P., Visible-infrared Remote-sensing Model and Applications for Ocean Waters, in Department of Marine Science. 1994, The University of South Florida: St. Petersburg. p. 160. Zhu, W., et al., Estimation of chromophoric dissolved organic matter in the Mississippi and Atchafalaya river plume regions using above-surface hyperspectral remote sensing. Journal of Geophysical Research-Oceans, 2011. 116. p.13767. Fig.3 shows there are Rrs of extremely turbid waters (e.g. Cluster 4). It is curious what was the depth range used for the calculation of Lu(0-) (then Rrs) for such waters.

Interactive comment on Biogeosciences Discuss., 9, 13743, 2012.