Biogeosciences
Discussions

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Interactive comment on "Light absorption and partitioning in Arctic Ocean surface waters: impact of multi year ice melting" *by* S. Bélanger et al.

Anonymous Referee #1

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This paper presents observations of the vertical distribution of light absorption by phytoplankton, non-algal particles, and CDOM in the upper part of the Arctic Ocean, near the Mackenzie River outflow. The contribution of each category of observer is identified, with analyses of the horizontal and vertical variability of the importance of each category, along with their relationship to the different water masses in the region. The methods and analysis are sound, and along with the results they are well presented. The work provides valuable insight into a potentially important effect of the melt of multiyear sea ice, and also provides useful information for modelling and understanding radiative transfer in the upper Arctic Ocean. I suggest the paper be published after the authors have considered the following minor comments.

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Interactive Discussion

Discussion Paper

page5621/line9 The use of '0-' is not explained in the abstract, and it is not reused there either. I suggest not including it here since it could be confusing to the reader.

5624/8 It would be useful to describe what is meant by 'barge'. Zodiacs are widely used, but I picture a barge as a large unpowered ship for transport, which would create a significant shadow.

5627/20 TChla is written with subscripted and lower case chla in the rest of the MS.

5628/7 I think this should refer to Table 2

5628/13 b_p is not defined. Units should also be given for SPM used in the equation

5628/19 b_bp is not defined

5629/6-8, Tables and 2: SPM units are given sometimes as g/m3 and other times as mg/l; while they are equivalent, it would be good to consistently use one or the other.

5631/19 Basing -> Based

5631/26 - 5632/1: It's not clear in Figure 5 that offshore surface values of aNAP:aTw reach 40%. Perhaps using a log scale on the y axis would be useful in these figures since much of the focus is on the near surface.

5633/1-2 Are the 0- samples included in the vertical cross section figures?

5633/17 Should add reference for statement about organic particles dominating in the Baltic.

5635/14-16 It seems reasonable to consider these values of BC for the snow and perhaps surface ice, but would it also be present in the main body of the ice? I would expect BC concentration in the ocean water to be very different.

5636/16 Add a minus sign to the superscript 2 following m (per sqaure m)

A broader comment: It could also be useful to comment on whether the near-surface particle enrichment has any significant effect on the heating of the ocean water.

Figure 1 Is it possible to reorient the map to match Figures 3, 4, and 7. This would ease comparisons.

Figure 1 It would be useful to briefly explain the egg code.

Figure 2 legend: what is the 'T.' representing after 'River'?

Figures 4-6 In the middle panels, a_T is used, where a_T-w is used in the text.

Figures 4-6 The y-axis labels on the middle and right panels of the first and second rows could be omitted to avoid overwriting the colourbar labels.

Figure 5 The y-axis label is missing from the top-left panel.

Figure 7 Perhaps discuss the saddle pattern seen around 71.5N, 130W.

Interactive comment on Biogeosciences Discuss., 10, 5619, 2013.