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Biogeosciences Discussions
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Interactive comment on "Apparent optical properties of the Canadian Beaufort Sea – Part 1: Observational overview and water column relationships" *by* D. Antoine et al.

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1. Some of the referred work are not in the references (e.g. Bélanger et al 2013; Hooker et al 2013). I suppose this is because these references are still under review by BGS but the titles would have been appreciated.

Answer: References have been added. They are:

Bélanger, S., Cizmeli, S., Ehn, J., Matsuoka, A., Doxaran, D., Hooker, S. B., and Babin M.: Optical properties of the southeastern Beaufort Sea, Arctic Ocean : Impact of multi-year ice melting on the light absorption and photon budgets, Biogeosciences, in revision. Hooker, S. B., Morrow, J. H., and Matsuoka, A.: Apparent optical properties

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Interactive Discussion
Discussion Paper

of the Canadian Beaufort Sea – Part 2: the 1% and 1cm perspective in deriving and validating AOP data products, Biogeosciences, in revision.

2. I recommend to the authors to include a discussion about the impact of these observations on the use of other models such as the GSM and QAA. The MM01 model is not the model of choice for many applications.

A.: See below, our answer to point 6.

3. Some recently published results should be referred to (e.g. B. Brunelle et al., 2012 who provided an overview of IOP in the Canadian Arctic). There is also Matsuoka et al., 2009 who provided IOP variability in the fall period in the Beaufort Sea. Finally, I can also think of Bélanger (2000) that provides estimates of Kd for the Northwater polynya. The omission of the last 2 references is particularly strange as the authors are part of the submitted manuscript. Considering the relatively small amount of Arctic data sets, these omissions are somewhat troubling.

A.: We have added these 3 references.

4. Page 4028: line 15: The statement about the 'unprecedented' amount of data gathered during MALINA seems to ignore the fact that earlier work in that area has been done during the CASES program (2003-04). A similar amount of multispectral light profiles data (32) was gathered during that experiment.

A.: Rewritten as: "The large number of sampled stations makes this effort appropriate to characterize the underwater light field in this region"

5. Page 4029: line 11: the authors talk about a companion paper. This should normally be Part II of the actual manuscript, not another paper in the same special issue.

A.: Rewritten as: "A second objective of this paper and especially of its companion part II paper (Hooker et al., this issue) is to. . .."

6. The authors could have tested the recently published 2-bands ratio empirical algo-

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rithm by Ben Mustapha et al. (2012) developed using the CASES data set as a way to confirm their assertion about the 'illusory colour remote sensing algorithms'.

A.: We have added one figure (new Fig. 8) that shows Chl retrievals using MM01, GSM and the 2-band algorithm of Ben Mustapha et al. (2012). By this way, we illustrate the capabilities of OC remote sensing for the derivation of Chl using global algorithms versus locally tuned algorithms. The paragraph at the end of page 4042 has been modified as follows: "As a consequence, accurately deriving Chl a in these clear waters from current ocean colour remote sensing algorithms based on global data sets seems illusory. The Chl retrievals obtained via such algorithms are shown on Fig. 8, for the OC4Me (Morel et al., 2007) and GSM (Garver and Siegel, 1997; Maritorena et al., 2002) global algorithms, and for an algorithm locally tuned to the southeast Beaufort Sea waters (Ben Mustapha et al., 2012). The GSM algorithm performs better than the MM01 because it allows for a varying CDOM component whereas MM01 assumes proportionality between Chl and CDOM absorption. Both algorithms overestimate the field determinations, however. The local and empirical algorithm performs clearly better for Chl > ∼0.2 mg m-3, yet largely underestimates Chl in clear waters." Legend of Fig. 8: Figure 8. Chl concentrations retrieved from (A) OC4Me, (B) GSM and (C) Ben Mustapha et al. (2012) algorithms (see text), as a function of the Chl value determined from field samples.

7. The Conclusion is more a Discussion section with figures and results. That section should be renamed.

A.: "Conclusion" has been changed to "discussion"

8. Unless I am wrong, I have not seen the particle absorption data used in that manuscript. Thus section 2.2.1 could be removed.

A.: That's correct (remains of a previous version). We have removed this section.

Interactive comment on Biogeosciences Discuss., 10, 4025, 2013.

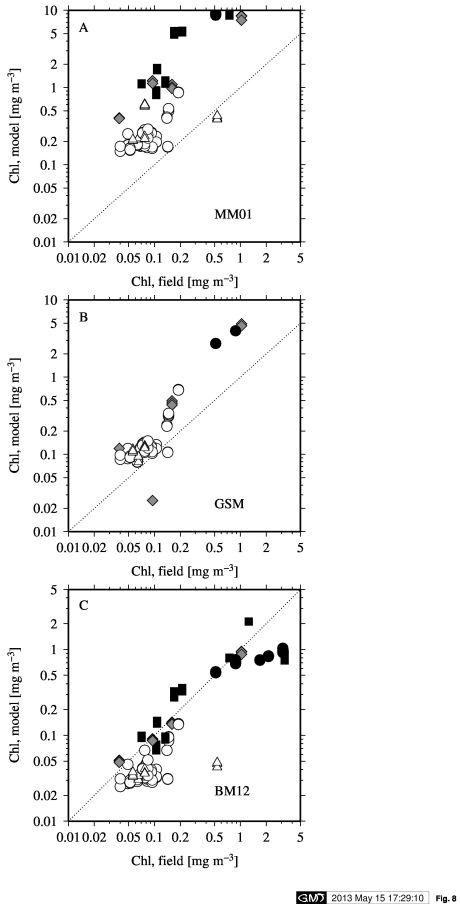

Fig. 1.

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