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Interactive comment on "Performance evaluation of ocean color satellite models for deriving accurate chlorophyll estimates in the Gulf of Saint Lawrence" *by* M. Montes-Hugo et al.

Anonymous Referee #2

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General comments: The Gulf of Saint Lawrence (GSL) is a productive area having rich fisheries grounds. In terms of bottom-up control, accurate estimates of chlorophyll a (chl a) concentration (a proxy of phytoplankton biomass) and phytoplankton light absorption (aph(λ) mˆ-1) are thus crucial for managing the fisheries environments. This study quantifies the impact of two atmospheric corrections (Bailey et al., 2010 Standard SeaWiFS algorithm (SA) and the coupled ocean-atmosphere model proposed by Kuchinke et al., 2009 (KU)) and three in-water algorithms (Carder et al., 2006 empirical (EC) algorithm, Lee et al., 2002 quasi-analytical algorithm (QAA), and Garver, Siegel, and Maritorena (GSM) algorithm) on estimates of phytoplankton light absorption at 443 nm (aph(443), mˆ-1) for waters in the GSL. The conclusion is that while in-water algo-

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rithm most influences the uncertainty of aph(443) estimates (43.4 %), the impact of chl a specific aph(λ) (aph*(λ), mˆ2 mgˆ-1) and atmospheric correction are also significant (uncertainty of 29 % and 24.3 %, respectively). The manuscript is well organized and written. I have only a few minor comments and suggestion as shown in my specific comments below. After the revision, the manuscript will be appropriate for publication in Biogeosciences.

Specific comments: Page 9308 -Line 3: I'm curious what kind of result you would obtain if you use aph*(λ) spectrum presented by Bricaud et al.(1995) in addition to the SEADAS default one.

Page 9310 -Line 2: λ0 of QAA is not always 555 nm; for high absorbing waters (a(λ) > 0.3 mˆ-1), Lee et al.(2002) proposes to use rrs(λ0) at 640 nm instead of that at 555 nm. -Line 6: "CDOM" that you call in the manuscript is indeed CDM (colored detrital matter = CDOM + non-algal particles). This term should be modified throughout the text to avoid confusion. -Lines 12-13: 6 centered wavelengths (412, 443, 490, 510, 555, and 670 nm) rather than 5 wavelengths. -Lines 11-22: In the original GSM algorithm, the final aCDM(443) is produced by multiplying a correction factor 0.754188 at the end (Maritorena et al., 2002, Applied Optics, Volume 41, pp. 2705-2714). This factor is no more used (Maritorena, 2010, personal communication). I'm curious what kind of result you would obtain if you remove this factor.

Page 9313 -Lines 7-9: Not clear. Do you mean that aph(443) estimates using QAA fell between those using EC and GSM? -Lines 24-26: What is the definition for low, intermediate, and high aph(443) values?

Page 9314 -Line 4: "QAA(0.83) with respect to EC(0.66) and GSM(0.29)". What are these values in the parentheses? This sentence might confuse a reader. -Line 14: td (time difference, h) should be explained both in the text and the Figure 3 caption.

Page 9315 -Lines 3-29: It's hard to read values in white-black colors of the Figure 4. This can be fixed by using difference colors.

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Page 9319 -Lines 20-21: NOMAD dataset used for SA algorithm includes many case II waters as well.

Page 9320 -Line 3: Insert “to” between “respect” and “aerosol”

Page 9320 -Lines 12-14 and 16-18: Any references?

Additional references (not shown in the manucript): Bricaud, A., Babin, M., Morel, A., and Claustre, H. (1995), Variations in the chlorophyll-specific absorption coeffi-cients of natural phytoplankton: Analysis and parameterization, J. Geophys., Res., 100(C7),13321-13332.

Interactive comment on Biogeosciences Discuss., 11, 9299, 2014.