

Interactive comment on “Remote sensing of coccolithophore blooms in selected oceanic regions using the PhytoDOAS method applied to hyper-spectral satellite data” by A. Sadeghi et al.

Anonymous Referee #2

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In this manuscript the authors apply the newly developed PhytoDOAS method to identify blooms of coccolithophore and, based on comparison with model and satellite derived variables, relate them to geophysical processes. The manuscript reflects a thorough work that may be of interest to scientists from different communities.

Nevertheless, the manuscript suffers from significant drawbacks that need to address:

1. While the use of hyperspectral data in the field of sea-surface remote sensing is indeed promising, I am not convinced that the methodology used here has any advantage on standard ocean color products, which have a much better spatial resolution. This is emphasized by the fact that, as mentioned by the authors, the PhytoDOAS coc-

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colithophore retrieval is actually validated against MODIS PIC data. On the other, the very low spatial resolution associated with the SCIAMACHY data is likely to filter out much of the spatial information which is of great importance when trying to study variations in plankton dynamics.

2. I find the coarse spatial and temporal resolution used in this research, which is somewhat imposed by the instrument used, inadequate for deriving robust insights on the processes controlling the evolution of a single plankton group. This is emphasized by a careful examination of Fig. 8 that shows very little (and sometimes not at all) difference between the evolution of coccolithophore and diatoms. This implies that many of the results and conclusions are also applicable to diatoms.

Specific comments:

Page 11729 line 26: The authors should be much clearer in stating their objectives. If the main objective is “to apply the PhytoDOAS method for quantitative remote sensing of coccos using satellite data”, the comparison with geophysical parameters (which I find potentially interesting), is redundant

Page 11731 line 28: Missing units for the area. Also, the authors should explain using this size of region of interest.

Page 11735 lines 1-5: Not clear what are the missing points in the PhytoDOAS time series – they seem to be continuous.

Page 11735 lines 7: The author should specify the spatial resolution of SCIAMACHY - “coarse” is too vague.

Page 11738 line 27: It seems that the term “spatial” is mistakenly used.

Page 11738 line 3: If coccos-Chl is higher than than the total Chl it definitely overestimated, and not “seems to be” overestimated.

Page 11745 line 4: I don't see how “The outcome of the study proves that the

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PhytoDOAS coccos data show valuable results ". Overall, it seems that similar conclusion as the one presented here, would be valid for MODIS retrievals of PIC or chlorophyll.

Figure 1: Message is not clear. The authors should point out (in the text and/or in the figure caption) what are the main similar patterns. For the middle panel I recommend changing the dynamical range so that it emphasize more features.

Figures 3-5, 11: For more clarity I recommend changing the order of panels, starting at the top (panel a) and ending at the bottom.

Figure 8: The authors should be more clear in distinguishing between left and right panels – both graphically and in the caption.

Figure 9: The remarkable similarity between the time series suggests that the algorithms have little success in correctly distinguishing between the plankton groups – I recommend the authors address this issue in the text.

Figure 11: The legend should not include the line-type.

Interactive comment on Biogeosciences Discuss., 8, 11725, 2011.