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Biogeosciences Discussions

Interactive comment on "The most oligotrophic subtropical zones of the global ocean: similarities and differences in terms of chlorophyll and yellow substance" *by* A. Morel et al.

Anonymous Referee #2

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General Comments: This paper presents a solid and highly relevant methodology for describing oligotrophic gyres of the global ocean using chlorophyll and CDOM indices. The authors carefully describe the covarying relationship between Chl, the CDOM index, and sat.-derived CDOM absorption at 443nm between six different oligotrophic zones that superficially resemble on another in terms of chl and CDOM content but exhibit highly variable relationships between optical properties both within and between zones. The derivation of the CDOM index and CDOM content from satellite ocean color is redescribed here and effectively tested with reprocessed SeaWiFs data. Their results illuminate the complexity of the relationship between chlorophyll biomass and CDOM content (both sources and sinks) and provide further evidence for global

variability in CDOM production/surface removal but do not greatly expand previously published insights regarding these interactions. This paper would benefit from further insights into the unique aspects of the North Pacific gyre with its decoupled chl and CDOM processes. Specific comments and edits are below.

Specific Comments:

Abstract – Although lengthy, it does provide a good summary of the results and major conclusions.

Pg. 5053, Section 3. It would be useful to have the Fougnie method for delimiting the the geographic zones explained in more detail here since the citation refers to an Ocean Optics abstract.

Pg. 5054, Lines 5-7. A preliminary study is mentioned that determined the most oligotrophic zone of the SP gyre. Is this a study by the authors or someone else? Please provide some sort of reference.

Pg. 5054, Lines 21-23. It would be helpful to include a few citations on South Indian Ocean ocean color studies (although the authors do state that it is "scarcely documented").

Pg. 5056, Line 4. The term "trophic positions" seems like a misnomer in this context since nothing is really defined regarding different tropic levels in this study. A more appropriate term might be "productivity zone" or "productivity regimes."

Pg. 5058, Lines10-15. It would be appropriate to relate the observation of Chl maxima coincident with MLD maxima to the recent papers by Boss and Behrenfeld and Behrenfeld et al. corroborating this trend in the Atl.

Pg. 5059, Line 21-22. Winter vertical mixing is reduced relative to what? Other regions at that latitude?

Pg. 5062. This disconnect between recent studies on decreasing chlorophyll in the

global ocean (should also cite Boyce et al 2010) and the lack of trend detected in this study is an important result. Any explanation as to the difference in findings?

Minor Edits: Pg. 5048, Line 15. In the Abstract, should remove the word “comprised” – not necessary.

Pg. 5050, Lines 23-25. The sub-sentence beginning with “are there in the world ocean..” is very confusing and should be re-worded. I suggest rearranging like this: “From an optical viewpoint, are there other situations in the world ocean that are identical to or approach the one encountered near Easter Island?”

Pg. 5051, Line 4. Would change sentence to: “Note that these zones are far less extensive than. . .”

Pg. 5053, Line 4. Would change “appellation” to “nomenclature.”

Pg. 5054, Line 9. Change “. . .is known for a long time” to “has been known. . .”

Pg. 5055, Lines 6-9. This one-sentence paragraph would be more appropriate in the first paragraph of this section on geographic zones, after the 3rd introductory sentence.

Pg. 5056, Line 3. Change “is the highest one” to “is greatest.”

Pg. 5057, Line 15. Clarify the opening sentence by changing “this index” to “the ïĄęïĂăindex. . .”

Pg. 5057, Line 16. Change exhibit to exhibits.

Pg. 5057, Line 20. Change “48.6%, 32.6%” to “48.6% and 32.6%...”

Pg. 5058, Line 13. Would change “contemporaneous of” to “coincident with. . .”

Pg. 5058, Line 22. There is an extra space in “As..”

Pg. 5059, Line 23. Change “nutriments” to nutrients.

Pg. 5061, Line 9. Change “in coincidence” to juts “coincident.”

Pg. 5061, Line 10. Change “the weak” to “a weak.”

Pg. 5061, Line 21. Should be “world’s largest oceanic desert.”

Pg. 5061, Line 25. Change “so low” to “such low.”

Pg. 5063, Line 1. Change “raising in” to “rise in. . .”

Pg. 5063, Line 5. Would change “development” to “growth.”

Pg. 5065, Line 18. Should be “These effects. . .”

Figs 2 and 3. Lower time axis partially cut off on both figures.

Fig. 4. The caption is not a complete sentence but appears to want to be. Would just state “Spatially averaged quantities. . ...from eight-day composites for each zone.”

Interactive comment on Biogeosciences Discuss., 7, 5047, 2010.