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Interactive comment on “Spatial variability of phytoplankton pigment distributions in the Subtropical South Pacific Ocean: comparison between in situ and predicted data” by J. Ras et al.

Anonymous Referee #2

Received and published: 12 November 2007

Review of Spatial variability of phytoplankton pigment distributions in the Subtropical South Pacific Ocean: comparison between in situ and predicted data, by J. Ras and coauthors.

This paper presents the results (pigments) obtained during BIOSOPE in the south-eastern tropical Pacific along a transect from the Marquesas Islands to the Chilean upwelling, through the very oligotrophic south Pacific subtropical gyre. This is a very useful dataset from an area which has received little attention in the past. Interestingly, these results are compared to a first guess deduced from empirical relationships between sea surface chlorophyll, the depth of the chlorophyll maximum, and the vertical

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profiles of chlorophyll in the pico-, nano- and microplankton. This points on uncommon situations such as the extremely low pigments concentration and deep chlorophyll maximum in the gyre, or the abundance of Prochlorophytes near the Marquesas Islands. The paper is clearly written, and, given the wide range of systems that has been encountered between the Marquesas and Chile, it should interest a community much wider than the sole specialists interested in the tropical Pacific. I recommend its publication.

I have a few comments :

Page 10,(results section) it is said that there is no divinyl chlorophyll (a or b) in the Chilean upwelling. Figure 2 however shows that the peaks for mono- and divinyl forms are very close, so that in cases where the monovinyl forms are very abundant (such as the Chilean upwelling) the corresponding peaks may hide those of the divinyl forms. The authors are well known for the excellence of their measurements, and I will not be vexed if they do not consider this point.

The abbreviation HEX has not been introduced. A place to do it would be page 11, line 12. Furthermore, it appears later as Hex. The authors should check the manuscript for such inconsistencies.

Page 12 line 8 : -prasincoxanthin and alloxanthin ... were never detected in the Marquesas area and hardly in the SPSG- : Dandonneau and Niang (Progr. Oceanogr, 73: 127-144) find relatively highest Prasincoxanthin in their cluster 'South Equatorial Current'; (which includes the latitude zone of the Marquesas), but lowest in other clusters representative of both the equatorial upwelling and the south Pacific subtropical gyre. They found lowest normalized alloxanthin in the South Pacific gyre.

Page 18, line 14 : something is wrong there.

Page 18, line 27 : should not transparency be preferred to clarity ?

Page 20, line 7 : Hex/TChla cannot be expressed in % units, because HEX is not part

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of TChla. Check the manuscript in case some other such mistakes have been made.

Page 20 line 10 : use nutricline (for nutrients) or nitracline for nitrate instead of nitricline which refers to nitrite.

Page 21, lines 1-8 :I remember when I started in phytoplankton studies, using a microscope, the samples from oligotrophic areas were a collection of debris and starving cells. However, sometimes, splendid and healthy diatoms appeared, especially *Plancioniella sol*. The migrating behaviour observed by Tracy Villareal, or another ignored adaptation process, may perhaps be at work in these places.

Chapter 4.2.4 : the authors point on the abnormally high percentage of picoplankton a stations 2 to 5. They say that no nitrate was detected. However, the cruise track superimposed on satellite chlorophyll (figure 1) indicates that at least stations 2 and 3 were not in 'purple' waters, but rather in the HNLC conditions which characterize the South Equatorial Current. Many papers have described and tentatively explained these HNLC conditions. Here, they are ignored.

Cannot the global model used here be summarized into a look up table so that anyone can easily compare pigments data from cruises and identify the main deviations to this first guess that were encountered ?

Interactive comment on Biogeosciences Discuss., 4, 3409, 2007.

BGD

4, S1868–S1870, 2007

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