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Biogeosciences Discussions

Interactive comment on "Two High-Nutrient Low-Chlorophyll phytoplankton assemblages: thetropical central Pacific and the offshore Perú-Chile Current" *by* F. Gómez et al.

Anonymous Referee #2

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General Comments

- This manuscript provides a nice contribution to studying the spatial aspect of phytoplankton species composition in relation to nutrients and hydrographic features of two oceanic areas (Tropical HNLC and Temperate HNLC waters). Although this study is similar to ones already reported in the journals for at least the HNLC regions of the South Pacific Ocean (Iriarte & Fryxell, 1995; Kaczmarska & Fryxell 1994; Buck & Chavez 1994; Benitez-Nelson et al 2007), the results from inorganic nutrients and taxonomic data enhance our knowledge of phytoplankton dynamics/structure at the regional scales.

- In regard to the manuscript concerning diatoms of the HNLC South Pacific, please remember that we faced complex currents (and so inorganic nutrients) in this zone, in addition to changing El Niño (ENSO) conditions, as well as La Niña. Its make a little bit difficult to compare this study (2004) with studies published 1994-1995 years, because they were actually carried out during 1992 El Niño event at the Equatorial Pacific.

- Even considering many water masses in the HNLC Pacific regions, I have always wondered at the high diversity of phytoplankton in these regions. Even thought the authors were focused in the two main diatom species (Pseudo-nitzschia delicatissima and Rhizosolenia bergonii) in the Results and Discussion sections, they did not present a list of phytoplankton taxa at least from the HNLC-PA and PCC (the main objective was focused in phytoplankton assemblages). How many species did they found in the sampled areas (HNLC-PA vs. PCC)? Did the diatoms species showed a distinctive vertical pattern associated to the fluorescence or chlorophyll-a measurements? (In figure 4, relatively high fluorescence values are observed below 50 m in both areas).

- To my knowledge, quite some of the Pacific diatoms are larger than 20 um cell size, and I might add, heavily silicified. May be, it must be advantageous to sink out of the surface at some life stages. Therefore, the authors should also explore “life stages” as an additional hypothesis (to the antigrazing strategy) for forming clumps species of P. delicatissima species. Small and large but ubiquitous heavily silicified diatoms such as Nitzchia bicapitata and Thalassiothrix spp., respectively, have been observed the near-surface water of the Equatorial and south Pacific, suggesting that been “heavy” could be an advantage in terms of their life cycle and physiology.

- section 4.1.2 “However, the nutrient limitation is a complex issue and the nutrient ratios are not suitable to infer limitations” pag. 1547, line 3 “This is evidence that silicate is an element limiting the large diatoms in the HNLC region of the South Pacific Ocean”. But Results (Fig. 6) and Discussion sections are based on N:Si ratio. Could the authors explain why they used ratio instead of concentrations to suggest “nutrient limitation” or silicate-deficiency?

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4, S512–S514, 2007

Interactive Comment

Specific comments

- pag. 1538, line 16: Where is the data for the Acoustic Doppler Current Profiler (ADCP) that authors mentioned? - the authors classified Pseudo-nitzschia delicatissima as “small pennate diatom”. However, in Figs. 10-11-12 cells are equal or larger than 100 um. What was the operational definition of cell size in this study? Actually, if I understood, the authors counted cells larger than 15 um; this is almost the microphytoplankton size class. - pag. 1541-line 24: “Chl a- nitrate ratio showedĚ”; but in Fig. 5 the legend said Nitrate:chlorophyll-a - 3.2.2 Phytoplankton, line 10: Nitzschia bicapicata; must change to Nitzschia bicapitata - I strongly suggest to authors present a table with integrated values (over the euphotic layer or the entire water column sampled) from the HNLC-PA, SPG and PCC areas with the following information: Chlorophyll a Nitrate concentrations Orthophosphate Dissolved Silicate Si/N ratio N/P ratio Diatom abundances Dinoflagellates abundances Mixed layer depth 1% light level depth

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Interactive comment on Biogeosciences Discuss., 4, 1535, 2007.