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

F. Gómez et al.

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Anonymous Referee #3

I have read the manuscript and I have very little to add to the comment already posted except for the following: The methods explain that several groups of phytoplankton were not well preserved (eg cryptophytes and coccolithophorids). I therefore don't understand how it is possible for the authors to calculate relative abundances of other species, and in turn compare stations or regions. That is, how is it possible to say that P-N delicatissima accounted for more than 85% of the community if significant sections of the community were not counted. Perhaps this is just a point of misunderstanding on my part, in which case the authors should clarify. However, if I

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Interactive Discussion

Discussion Paper

am understanding the preservation issues correctly and their influence on calculations of relative abundance, the conclusions of the paper are invalid.

Response: In the material and method section, page 1539 lines 10-13, was reported: "This methodology is suitable for the counting and identification of organisms higher than 15 μm . Diatoms and dinoflagellates were well preserved, while most of the nanoplankton (i.e. cryptophytes and coccolithophorids) was lost due to the fixation treatment or the incomplete sedimentation." In the result page 1540 lines 1-4 was reported: "The microphytoplankton abundance reached up to 31000 cells L⁻¹ in the upper 60 m depth of the surrounding waters the Marquesas Islands Archipelago (Fig. 7). *Pseudo-nitzschia delicatissima* dominated the HNLC-PA with more than 85% of the total abundance." The percentage is referred to the microphytoplankton, mainly composed of diatoms and dinoflagellates. Other groups do not constitute a part of the microphytoplankton.

One other point: The discussion of domoic acid (p 1548) is not relevant because there is no suggestion that there was any production of domoic acid at any of their stations. They did not measure it.

Response: *Pseudo-nitzschia delicatissima* and in minor proportion other *Pseudo-nitzschia* species are the main members of the HNLC microphytoplankton assemblage. In the last decade the species of the genus *Pseudo-nitzschia* have received a strong attention due to the production of the neurotoxic domoic acid. Numerous studies reported that the domoic acid may bind iron (Rue and Bruland, 2001). One of the hypotheses to explain the paradox HNLC region is the iron limitation. *Pseudo-nitzschia* dominated in the HNLC-PA, and several studies demonstrated that the production of domoic acid facilitates the iron uptake of *Pseudo-nitzschia* when compared to other diatoms. For example Wells et al. 2005 (Domoic acid: The synergy of iron, copper, and the toxicity of diatoms. *Limnol. Oceanogr.*, 50, 1908-1917) reported in the abstract "Our findings indicate that domoic acid is a functional component of the unusual high-affinity iron acquisition system of these organisms. This system may help explain why *Pseudo-*

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nitzschia spp. are persistent seed populations in oceanic HNLC regions”. Only a few lines in the discussion are dedicate to describe this hypothesis to explain the dominance of Pseudo-nitzschia in oceanic HNLC regions.

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