

Interactive
Comment

Interactive comment on “Nutrients limitation of primary productivity in the Southeast Pacific (BIOSOPE cruise)” by S. Bonnet et al.

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This study investigated the role of iron in low nutrient, low chlorophyll environment such as the extremely oligotrophic Southeast Pacific. This remote environment is not receiving much iron through atmospheric dust originating from the continent and consequently the dissolved iron concentration is very low. The authors concluded that photosynthesis and primary production were iron limited at the edges of the gyre but not in the center. In the center, healthy phytoplankton communities thrived that were apparently adapted to grow at very low iron levels and these communities were not limited by iron. Although these communities seemed to be limited by nitrogen, N₂ fixation was below the level of detection and the abundances of nifH transcripts was extremely low, which did not change after the addition of iron or phosphate. These observations

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are novel and very interesting. Unfortunately, this paper did not give any explanations for these observations. The authors hypothesize that the prevailing organisms must have adapted to these oligotrophic conditions and have developed strategies to scavenge the little available iron and other nutrients but that this would not be sufficient to support high-iron requiring processes such as N₂ fixation. I think that it would be highly interesting to isolate organisms from this environment and study their properties in laboratory conditions. This would eventually give answers about their acclimation to these very oligotrophic conditions. Hence, this work is obviously necessarily descriptive and comes up with many more questions than providing answers to them. This is a real nice and very well written study. There are only a few editorial comments and corrections that I would like to make. I would recommend to use N₂ fixation (or dinitrogen fixation) rather than nitrogen fixation and also to use these terms consequent throughout the manuscript. Another recommendation is either to use nitrate or NO₃⁻, but not NO₃, which is sloppy. On p. 2736, line 16, Karl et al, 2002 is not in the list of references. On page 2738, line 6, please indicate the form in which ammonium and nitrate were added, as you did for phosphate and iron. P. 2741, line 18: (2m at what setting) does obviously not belong here. P. 2742, change relatively for more or less or otherwise indicate relative to what. P. 2745, lines 2 and 6: picoeukaryotes. Line 11: delete larger and exchange (between 1 and 3 μm) by in the size class 1-3 μm. P. 2747, line 23: change à for at. Line 24: delete: very. P. 2748, line 9: delete: and easily amplified. Line 13: delete: (Karl et al., 1997); line 15: origins and delete: non-depleted; line 18: delete: very reduced. Table 1: use: NO₃⁻, PO₄³⁻, etc. Why were NH₄⁺ and NO₂⁻ not measured? Table 2: explain superscript a (last line). Excellent work!

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