

Interactive  
Comment

***Interactive comment on “Carbon and nitrogen uptake in the South Pacific Ocean: evidence for efficient dinitrogen fixation and regenerated production leading to large accumulation of dissolved organic matter in nitrogen-depleted waters” by P. Raimbault and N. Garcia***

**Anonymous Referee #2**

Received and published: 6 December 2007

I got involved in the review process of this manuscript rather late, and so I had the benefit of going through the excellent review by the other referee. I agree entirely with all of his comments.

This manuscript is based on a wide-ranging and painstakingly collected data set related to various aspects of N cycling along a roughly E-W transect, sampling diverse biogeochemical provinces in the eastern South Pacific that include some of the most

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

oligotrophic and most eutrophic waters in the oceans. I am very impressed with the very low values of both concentrations and rates the authors have been able to measure; however, like the other referee I also believe that the data set has not been optimally utilized, and it could be used to address some important questions concerning oceanic N cycling.

As also pointed out by the other referee, the manuscript needs extensive editing for improving the language and presentation. Sometimes the language is so poor that it is hard to understand what the authors mean (e.g. middle of page 3545: "The Fig. 5 demonstrated that no taking into account isotopic dilution leads to strong underestimation of ammonium uptake always higher than 50%. More, any relationship was found between the magnitude of underestimation and the uptake rates, clearly indicating that estimations of isotopic dilution are absolutely required to correctly quantify ammonium uptake during 24 h incubation, even in oligotrophic waters." I believe the journal can get it copy-edited at a cost.

Specific Comments:

Title: needs to be changed in response to comments by Referee 1

Introduction: too lengthy!

Units: May be changed to, for example, nM from the more cumbersome nmoles l-1.

Page 3548, line 7: I do not think the reported PP rate of 0.1 gC m<sup>-2</sup> d<sup>-1</sup> is the lowest rate ever measured in the ocean!

Page 3548, line 22: N<sub>2</sub> fixation rates were much higher off Chile (0.91 mmoles m<sup>-2</sup> d<sup>-1</sup> (Table 2)).

Page 3551, lines 18-19: What atmospheric inputs? Dust (Fe)?

Page 3552, line 29: What model? Your best fit in Fig. 9?

Page 3553, line 17: also diffusion.

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

Page 3555: The authors report that the low rates of new production in the SPG is supported largely by N<sub>2</sub>-fixation. At the same time it is stated that the the DON accumulates in the oligotrophic surface waters. This DON cannot accumulate indefinitely. At some point a steady state has to reach when the DON export equals its production, and so the DON (and DOC) must be exported, either laterally or vertically. Is the statement of the DOM "reaching levels never yet measured in oceanic waters" correct?

Page 3556, Conclusion: "The productive system" means the productivity was high in the SPG, which, of course, not the case; what do you mean by "overconsumption" of carbon? If there is "overconsumption", organic C will not accumulate!

Table 2: Some units are missing

Fig. 10: One might also fit a polynomial to these data

---

Interactive comment on Biogeosciences Discuss., 4, 3531, 2007.

**BGD**

4, S2094–S2096, 2007

---

Interactive  
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper