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Interactive comment on “Distribution of inorganic and organic nutrients in the South Pacific Ocean – evidence for long-term accumulation of organic matter in nitrogen-depleted waters” by P. Raimbault et al.

P. Raimbault et al.

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We greatly thank the referees for constructive review. We apologize for the very poor English of the initial version. The revised version has been corrected by a native English.

The manuscript has been modified according to the referees suggestions (see below). Two figures have been added: Figure 7 to confirm the absence of the influence of trophic levels on the $\delta^{15}\text{N}$ content of PN. Figure 12 to illustrate the relationship between the trophic states and the DOM accumulation.

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Responses to referee 1 1) The abstract has been improved with information concerning DOC (flux and source).

2) Extraction of chlorophyll: Any test of recovery was conducted during this cruise. But we have obtained quite similar results than Ras et al. (this issue) using methanol extraction with sonification. Extensive comparisons have been previously done during numerous oceanographic cruises (see in Raimbault P., Neveux J., Lantoiné F., 2004. Dosage rapide de la chlorophylle a et des phaeopigments a par fluorimétrie après extraction au méthanol. Comparaison avec la méthode classique d'extraction à l'acétone. *Oceanis*, 30(2) : 189-205). We used this method since 20 years (see Herbland A., Leboutteiller A., Raimbault P., 1985. Size structure of phytoplankton biomass in the Equatorial Atlantic Ocean. *Deep Sea Res.*, 32: 819-836). In situ Recovery tests have been done during the cruise. Curiously this extraction procedure is routinely used for freshwater, but not yet accepted in oceanography.

3) Precision of $\delta^{15}\text{N}$ measurements on glycine is now included. Information on possible influence of trophic transfer on ^{15}N enrichment has been added. A new figure showing the $\delta^{15}\text{N}$ in PON versus POC/chlorophyll ratio has been added to detect some bias from trophic transfer.

4) In agreement with the referee's remark Z_e has been chosen as depth of integration. Results on 1.5 Z_e have been deleted. 5) Sentence comparing DCM and total biomass has been deleted 6) Sentence describing well known DOM accumulation in surface has been deleted. 7) Information on possible Ekman transport has been added 8) Error on K_z calculation has been added 9) A figure (Fig. 7 in the revised version) has been added to confirm the absence of the influence of trophic levels on the ^{15}N content of PN. 9) Figure 7 (Fig. 8 in the revised version) has been changed to clarify

Responses to referee 2

1) Some precision on the determination of the euphotic layer has been added in the materials and methods section: The thickness of the euphotic layer has been deter-

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mined around local noon with a calibrated spectroradiometer (LI-1800 UW, LI-COR instrument). It is defined as the depth where the downward photosynthetic available radiation (PAR) irradiance is reduced to 1 per cent of its surface value (Morel et al., 2007). For CTD casts performed early in the morning Ze has been computed using the in situ fluorescence profiles (see Ras et al., this issue) according the model developed by Morel and Maritorena (2001).

2) Review of Lomas and Lipschultz (2006) has been now cited to date the discussion on the formation of primary nitrite maximum

3) We agree that it is well known that DCM in stratified oligotrophic waters is not a biomass maximum. The sentence on Chlorophyll packaging has been deleted.

4) Reference of Carlson (2002) has been added as an appropriate reference for DOC release by phytoplankton.

5) Table 1: the diameters of filters have been added in the legend 6) Table 2: Regression for Tchl0.2vs TchlGF/F has been included 7) Table 3: Units of diffusive fluxes are $\mu\text{moles.m}^{-2}.\text{d}^{-1}$. Directions of diffusive fluxes have been indicated. 9) Figures 2, 3, and 8 (figure 9 in the revised version): original figures are larger in the original submitted paper. 10) Figure 7 (figure 8 in the revised paper) has been modified according to referees suggestion.

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