

Interactive comment on “Spatial and temporal variability in nutrients and carbon uptake during 2004 and 2005 in the eastern equatorial Pacific Ocean” by A. P. Palacz and F. Chai

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We thank the Referee for the constructive criticism and valuable suggestions on how to improve the manuscript. Below we address Referee's general comments as well as the more technical comments.

General comments:

“While pattern of biological uptake is well presented, the physical mechanisms to explain biological signals are not sufficiently explained.”

We agree with the Referee's comment and strengthen this part of the paper in the

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revised manuscript.

“The authors may consider adding SST to Figures 3 and 6...”

Figures 6-9 will be revised to include patterns of variability in SST as well as SST fields filtered to only TIW-scale (20-35 day period).

“... and providing more detailed explanation on physical environment during 2004 and 2005 and physical mechanisms responsible for variability of PP and nutrient uptake.”

The description of the physical environment is now included based on the cruise hydrographic results published by Strutton et al. (2011). We also include a much more in-depth discussion on the role of physical processes in controlling the observed variability in biological responses.

“Authors assume that the reader is familiar with other work at the Equatorial Biocomplexity cruises. It would be beneficial to add a map of the study region and location of the cruise stations.”

The revised manuscript now includes such a map.

“The information in tables 2-4 is difficult to connect. The authors may combine this information into one table.”

We agree with the Referee. The revised manuscript has Tables 2-5 combined into one.

Detailed comments:

“Page 709, line 1: Please list hydrographic conditions.”

Here we refer to temperature, salinity, density and nutrients. This is now specifically mentioned in the revised manuscript.

“Page 712: Please add references on Redfield ratio.”

Corrected.

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"Page 716, line 19: Please explain why PP oscillated strongly on intraseasonal time scales and how is this related to changes in physical environment."

This section of the paper has been rearranged in order to match the description of variability in biological processes with changes in the physical conditions.

"Page 718, lines 23-27: Please add reference McClain et al. (2002), Satellite ocean color observations of the tropical Pacific Ocean, Deep Sea Res., Part II, 49, 2533–2560."

We thank the Referee for pointing out this important reference. It is now added to the revised manuscript.

"Figure 3: I suggest adding SST."

Instead of adding just one time series of SST to this figure, we introduce new figures following the recommendations of Referee 1 and these figures show variability in SST and filtered SST extensively in the context of TIW dynamics.

"Figure 4: The use of line styles and colors on the figure is not consistent with the text in the Figure caption."

Corrected.

"Figure 5: Please change longitude labels to 1400W, 1350E and define the time interval in caption, i.e. "end of the along equatorial transect during EB04" – what date is that?"

Modified as requested.

"Figure 6: NO₃ uptake vs. NO₃– please be consistent with terminology. Authors may add time-longitude diagram of SST to this figure. Please change longitude label format to 1400W"

We are not sure what the Referee means by NO₃-. Regardless, we have changed the labels to NO₃ in all figures that refer to this variable. Please see comments above and

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in response to Referee 1 on the revised figures in this section.

"Figure 7: Adjust the color scale, the figure is too dark. Please change longitude label format to 1400W"

Results were filtered to provide better contrast. Color scale was adjusted. Labels were fixed.

"Figure 8: Please change longitude labels to 1400W"

Corrected.

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