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Interactive comment on “Spatial and temporal variations in dissolved and particulate organic nitrogen in the equatorial Pacific: biological regulations and physical influences” by X. J. Wang et al.

Anonymous Referee #1

Received and published: 5 September 2008

General Comments:

The paper does a nice job of simulating the distributions and spatial/temporal variability of organic nitrogen in the equatorial Pacific. The results will prove valuable to the community interested in N dynamics in that system. Nice insights arose from the model results, which are testable through observations.

The only thing I would have like to see is a direct linkage being established between the stocks reported (DON and PON), and the associated dynamics required for those

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stocks. No information was given on how important DON or PON were as sinks for net community production, or how export production covaried in space/time with the stocks. I realize that the paper has to have limits, but it would be nice to give the reader some insights on those linkages. If the authors can do it relatively easily, they should do so. If not, the manuscript remains strong enough to stand alone.

Specific Comments:

The last two sentences of the Abstract are somewhat incompatible with one another. First it is stated that DON is controlled by physics (and the data demonstrate that), but in the second it is stated that biology is the greatest control on ON. These should be rewritten for clarity on the controls.

Pg. 3268, line 24: should be *display*, not *displays*

Pg. 3269, line 13: should be *only two studies have reported..*

Pg. 3270, line 16: *validations of the main nitrogen*

Pg. 3271, line 16: the reference to *Fig. 12* is out of place. The figure should be renumbered so that it fits in the position (the new Fig. 2?)

Pg. 3273, lines 10-13: The authors often compare things, as done here. They state that DON has small variability (5-7 mmol m⁻³), unlike most other biogeo variables such as primary production. But I am not sure one can compare a concentration range to a range of rates, particularly when the rates are not given. It is comparing *apples to oranges*, unless it is better explained.

Pg. 3273, line 25: *than*, not *then*

Fig. 5, the values on the iron isolines are not readable. This difficulty is true for several figures.

Pg. 3275, line 16: The authors should reference a source (eg. Le Borgne et al 2002) that describes the *HNLC front*. That phrase may be regular jargon for the EqPac crowd,

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but not for everyone else.

Pg. 3276, line 24: *considerable*

Pg. 3278, line 19: Explain why high DON in the EqAtl might be *due to exclusion of ammonium in TIN measurements*

Pg. 3280, line 4: the word *researches* does not exist. Use *research has..* in the same line, I do not believe that *phyto and zoop are responsible for DON .. variations..* DON varies with vertical stability and with vertical inputs of NO₃. High input of NO₃ allows DON to be produced; high vertical stability allows it to accumulate. The authors said as much later on the same page.

Pg. 3281, lines 1-3: *biological effects exert physical influences* makes no sense. The final sentence of the manuscript needs to be crystal clear as to meaning.

Interactive comment on Biogeosciences Discuss., 5, 3267, 2008.

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