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Biogeosciences Discussions

Interactive comment on "Nitrogen uptake and regeneration pathways in the equatorial Pacific: a basin scale modeling study" *by* X. Wang et al.

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This study is investigating the nitrogen cycle in a basin scale biogeochemical model in the equatorial Pacific. However the study is largely focused on the ammonium cycle. Remineralization and uptake of ammonium are used to explain the Deep Ammonium Maximum (DAM) observed. Finally, a sensitivity test has been conducted regarding the parameterization of nitrification.

Major concerns:

This paper is the third one from the main author focusing on the nitrogen cycle in the equatorial Pacific (with one submitted study on the nitrification?): *Wang, X. J., Le Borgne, R., Murtugudde, R., Busalacchi, A. J., and Behrenfeld, M.: Spatial

and temporal variations in dissolved and particulate organic nitrogen in the equatorial Pacific: biological and physical influences, Biogeosciences, 5, 1705–1721, 2008, http://www.biogeosciences.net/5/1705/2008/. *Wang, X. J. and Murtugudde, R.: Nitrification implications for basin-scale distributions of inorganic nitrogen and biological production in the equatorial Pacific, Geophys. Res. Lett., submitted, 2009.

One would think that the authors should discussed the novelty of the results presented here and maybe justify why they did not publish one study investigating the whole modeled cycle of nitrogen instead of part of it in numerous papers.

I also have a concern about the sensitivity test of the nitrification. This test is conducted at 150°W. This location is in the model HLNC region (cf Fig 9. in Wang et al., 2008). Therefore phytoplankton growth is limited by iron, isn't it? If so, a change of the nitrification rate is unlikely to affect the nitrogen uptake... Basically, you just change the ratio nitrate/ammonium by adjusting nitrification rate without affecting phytoplankton or grazers. Then, results would probably have been different in the Warm Pool.

Minor comments:

Figure 9 : there is no "d", but two "c". Figure caption of figure 9 seems incorrect for a,b and c.

Page 8260: L22: I think the authors are refering to figure 9c and f.

Page 8255: L8: You should include Aumont and Bopp, 2006 in your citation (biogeochemical model use a 0.05d-1 nitrification rate in this paper).

Page 8254: L26: add reference to Aumont and Bopp, 2006.

Page 8250: L3 : I think the authors should add “regeneration” at the end of the sentence: “. . .to the subsurface surplus of ammonium regeneration.”

Interactive comment on Biogeosciences Discuss., 6, 8247, 2009.