

## ***Interactive comment on “Atmospheric deposition of nutrients and excess N formation in the North Atlantic” by L. M. Zamora et al.***

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Review of Zamora et al., 2009

This is a very nice paper exploring the role of N and P deposition on ocean biogeochemistry to explain the high values of N in the thermocline in the North Atlantic. The ocean biogeochemistry explorations were crude, but seemed interesting and insightful, but I am an atmospheric modeler, so I may miss some of the subtleties here.

some comments:

1. How did you model the atmospheric deposition of SRP? It doesn't appear to be in the description. Or are you just comparing your estimated TP deposition to SRP observations? You appear to be saying that your TP deposition is too low by an order

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of magnitude, but SRP observations and TP modeled values match ok. I'm a little confused what you did with this information. “N deposition (e.g. Markaki et al., 2003; Chen et al., 2007), our errors in SRP deposition estimation should have only minor effects on the amount of excess N in deposition” this implies you ignored your order of magnitude error? Why bother to include P deposition if you are doing it so poorly? I'm confused. Why not just adjust your model values to match the data? But do you really want SRP instead of TP anyway? What is the relationship between SRP and TP in the atmosphere?

2. “The mechanisms and time scales by which atmospheric deposition will be transported out of the surface waters are unclear, although it appears that non-Redfield processes in the surface are important in the NASTG”: can't you get these numbers from your model?

3. Could you clarify your conclusions a bit: How much of your results are new to this paper? Be very clear in the conclusions what is new, what agrees with previous studies and what disagrees.

What are the errors in your study because you are effectively kludging nitrogen fixation, and remineralization, and denitrification, instead of including them in the model explicitly? Please be explicit in your conclusions about what is believable about your study and why.

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