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Biogeosciences Discussions

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

Anonymous Referee #1

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Atmospheric deposition on nutrients and excess N formation in the North Atlantic.

In this paper by Zamora et al. the authors investigate the fate of increased anthropogenic N emissions to the North Atlantic subtropical gyre (NASTG). The overall goals were to understand the workings of the NASTG nutrient system and how this region may be affected by ongoing and future changes in atmospheric N inputs. Because there has been no significant change in the surface water concentrations they examine three mechanisms that may transport the excess N from the ocean surface. These mechanisms being physical transport, preferential P remineralization of sinking particles, and nutrient uptake and export by phytoplankton at higher than Redfield N:P ratios. The authors used a 3-D global biogeochemical-ocean transport model and yr 2000 atmospheric inputs to isolate the simulated effects of these mechanisms. Based

on their study the authors suggest that the main thermocline is a major sink of anthropogenic N inputs to the surface ocean and non-Redfield dynamics need to be used to determine the biogeochemical fate of the atmospheric nutrients.

The individual sections are well written with a good summary of processes and methods. I just had a few minor suggestions and comments that I am stating below: 1. In the Introduction section where you discuss N*, DINxs, TNxs, it might be helpful to define N* as well. Also, please clarify the difference (if any) between N* and DINxs. 2. In section 3.3.1, In the last sentence the parenthesis needs to be closed.

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