

***Interactive comment on “Biogeochemical fluxes and fate of diazotroph derived nitrogen in the food web after a phosphate enrichment: Modeling of the VAHINE mesocosms experiment” by A. Gimenez et al.***

**Anonymous Referee #1**

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This manuscript describes modeling of a mesocosm experiment studying the response, in particular in diazotrophs, to phosphate addition.

If this interpretation of the intention with the experiment is correct, I am worried with the experimental design. There seems to be no control bags(?) It then seems to me that one cannot formally know whether the responses are due to the PO<sub>4</sub>-enrichment or due to the enclosure in bags? This seems to me to weaken the authors' case on time scales and bioassays. I totally agree that there are important time scale issues to consider when doing bioassays, but I am not even sure that there is any single "correct"

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answer, probably there can be different answers for different time-scales, including time scales longer than the one studied here. These worries may seem to be of more concern for the reports on the experimental data than for this modeling report. It does, however, mean that the model is challenged only with one experimental situation. The work is therefor probably not very strong as a validation of the model. The model gives, however, a background that serves well to structure the discussion of mechanisms involved.

The interactions between P and N, the role of flexible stoichiometry and the difference in grazing pressure on different phytoplankton groups makes an interesting subject for model studies and the model presented here is therefore an interesting contribution.

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