

Interactive comment on “Phytoplankton community structure in the VAHINE MESOCOSM experiment” by K. Leblanc et al.

Anonymous Referee #1

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Leblanc and colleagues present floristic results from a LNLC mesocosm experiment in Noumea designed to stimulate diazotrophy and follow the transfer of newly fixed N through the ecosystem. Specifically, they present data on chlorophyll a and phycoerythrin pigments and the abundances of pico- and nano-phytoplankton, diatoms and dinoflagellates. Following a lag period, the DIP-treated mesocosms responded with increased pigments overall, and a notable increase in *Synechococcus* and a decrease in diatoms. Diatom species composition was also affected.

The pigment and phytoplankton data in this manuscript represent a tremendous amount of careful work and should be published in some form. However, I am having difficulty reviewing this as a standalone work. It reads more like a collection of results or a data report than a cohesive paper. Because this manuscript appears to be part of a special volume, it may be that the importance of these measurements in the

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overall context of the mesocosm study would become clearer when the whole volume is considered. However, I cannot review it as such. The separation of material into individual papers appears to have been done in a rather awkward fashion. For example, this paper on phytoplankton carefully excludes diazotroph abundances – why? The whole point was to stimulate diazotrophs, and they may have become an important part of the phytoplankton community – indeed, the phycoerythrin results suggest so. In addition, data from other papers are inserted here without explanation: e.g., measurements of N₂ fixation rates, nutrient concentrations and nifH gene copy numbers in Figs. 11, 12 and S3 that were never described in the Methods section. Also, much of the Discussion section focuses on explaining results that do not appear in the present manuscript.

Technically, the paper is clearly written and the figures are nicely constructed. Although, I do not see the value of the contour plots (Figs. 2, 4-7), especially since there do not appear to be any clear depth-dependent patterns that I can see nor any discussion of depth effects on any of the measured parameters. Each 4-panel contour figure could be presented more effectively as a line plot like Fig. 3 with depth-averaged values, or, alternatively, as a box plots as in Fig. 13.

In short, I do not think this is a complete manuscript on its own, especially if diazotroph abundances are not included and other data sets are pulled from other manuscripts without explanation. I recommend that the authors reconsider how they divide up the experimental results between manuscripts. The data presented here may be best included within a more cohesive work.

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