

Interactive comment on “Diazotroph community succession during the VAHINE mesocosms experiment (New Caledonia Lagoon)” by K. A. Turk-Kubo et al.

Anonymous Referee #1

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General comments

Turk-Kubo and colleagues investigated the response of diazotroph communities (both abundance and composition) to a dissolved inorganic phosphorus addition during the VAHINE mesocosm experiment. Through the use of taxa specific qPCR, the authors clearly demonstrated shifts in the dominant members of the diazotroph community and presented evidence to suggest that decreasing phosphate concentrations provided the best explanation for the observed patterns. The authors also presented some interesting growth and loss rates for the specific diazotrophic groups targeted, highlighting the significant benefits of high resolution sampling regimes to determine microbial population dynamics. Overall this manuscript is well written and well structured, and it

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provides novel insights into nitrogen fixing communities within the Noumea Lagoon system.

Specific comments

P9055, L25-29: The authors suggest that the increase in UCYN-C could be due to their ability to utilize organic phosphorous when DIP concentrations become limiting. However, within the Lagoon, which experienced consistently low DIP, UCYN-C remained in low abundance. What was the availability of organic phosphorous within the lagoon? What other factors could have resulted in the significant increase in UCYN-C during P2 relative to the lagoon? These findings are very interesting but I feel this part of the manuscript requires further discussion.

P9059, L18: although the particulars of the mesocosm experimental set-up are referenced elsewhere, it would be good to mention if there are any possible aspects of the experimental design that could result in the differences observed between mesocosms.

P9060, L24: are there any studies exploring seasonal variability in Noumea Lagoon diazotroph communities or nitrogen fixation rates? Are Rhizosolenia and Hemiaulus conspicuous members of the phytoplankton community?

P9076, Figure 1: I wonder if the lines are misleading because they imply a known trend between the sampling days.

P9078, Figure 3: I didn't see this figure referred to anywhere in the text.

Technical corrections

P9044, L11: include a space between “unicellular” and “cyanobacterial”

P9047, L15: remove “the”

P9075, Table 2: missing “)”. Perhaps provide the complete terms for DNQ and UD acronyms.

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