

## ***Interactive comment on “Introduction to the project VAHINE: VAriability of vertical and troPHic transfer of diazotroph derived N in the south wEst Pacific” by S. Bonnet et al.***

### **Anonymous Referee #2**

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This is very interesting project that captures the readers attention from both an ecological and experimental perspective. The use of mesocosms in ecological studies has a long history in some areas of research but have been barely used in other settings. Their use for open-water studies is difficult and I can only imagine the logistics involved in setting up this month long study. Sophie Bonnet should be commended for leading the mesocosm project that appears to have been successful in increasing the abundance of diazotrophs through the addition of phosphorus.

A few comments are made below designed to increase the usefulness of this introductory paper.

Page 3 line 32-34, Page 4, line 1-7 The four stated research questions could be better

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formulated. I would recommend removing the three subquestions or making them independent. Have you considered structuring them to indicate any priority in research? At the moment it sounds like you wanted to measure everything. You might also want to consider including a single sentence next to each of the research questions highlighting the results from the project to provide the reader with an immediate answer as to what was found.

Page 5 Line 7. I have not read the DUNE project work, but I recommend including some additional references to the use of mesocosms in ecological studies.

Page 16 Line 18 A black and white map would be equally useful as the color images shown demarking the position of the mesocosm experiment. I realize its bland but can be effective.

Page 7 Line 21 How was the concentration of DIP decided and what would have happened if you added more or less? Did you consider also adding iron or something micro-nutrient?

Page 8 Line 30 Why did you stop sampling after 23 days when you had the maximum fluorescence? I realize this probably relates to logistics, but clearly there were still changes occurring inside the bags that would have been good to capture

Figures: I am not sure that Figure 5a-c is necessary. I am not a big fan of the ocean data view color palette. For example it is difficult to interpret changes in fluorescence.

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