

Interactive comment on “Heterotrophic bacterial production and metabolic balance during the VAHINE mesocosm experiment in the New Caledonia lagoon” by F. Van Wambeke et al.

Anonymous Referee #4

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General comments: This study is based on a mesocosm experiment conducted in the New Caledonia lagoon to examine the fate of diazotroph derived nitrogen. The manuscript reports on the dynamic of bacterial production during the experiment and its link to N₂ fixation and primary production. This is an interesting and well-written manuscript addressing relevant questions on the metabolic balance of the microbial loop.

Detailed comments: The authors should address better in the discussion the differences between the three mesocosms. Considering the large variation between M3 and the other mesocosms. The authors should address the alkaline phosphatase results in

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the discussion or remove from the manuscript if not. The authors should discuss briefly that they only analyzed the free living fraction of the bacterioplankton but that particle associated bacteria may have a significant role in the system. I find the abstract misleading and I think that results from other papers presented in the special issue should not be introduced here but kept to the discussion.

Technical comments: P 19863- Line 2: The VAHINE mesocosm experiment “was” designed (...) L 13-15: rephrase this sentence P 19864- L 16-17: is 27-43% BGE what you find or what is found in oligotrophic environment? Rephrase accordingly L 20: to not be sufficient In the nutrient addition experiment the treatments are not named the same way between methods and discussion. Be consistent and use C or G for the glucose addition. Part of the C budget paragraph (method and results) could be moved to the results section. It is a bit heavy on the discussion section. Fig. 3 and 4: Show the addition of DIP and P1 and P2 phases. Fig. 4: chl.a axis, use point not comma. What about the bacterial abundance in the lagoon waters? Fig. 5: use the same legend for both graph, in general use out or lagoon water throughout the figures and tables.

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