Review of revised manuscript by K. Leblanc et al., "Phytoplankton community structure in the VAHINE MESOCOSM experiment"

Leblanc and colleagues present a revised version of their manuscript on floristic results from a LNLC mesocosm experiment in Noumea designed to stimulate diazotrophy and follow the transfer of newly fixed N through the ecosystem. The original manuscript, though well-written and interesting, was missing key datasets and methods, which made it impossible to consider as a standalone paper. The authors have addressed those deficiencies adequately and I now recommend publication after minor revisions. I do not think another round of review is necessary; however, I ask the Editor to ensure that these remaining minor points are adequately considered by the authors:

Title: Shouldn't "MESCOCOSM" be all lower case? It doesn't appear to be an acronym.

Line 20: "phosphate" should be "phosphorus".

Line 21: "Initially, the diazotrophic community was...".

Line 23: Add comma before "which".

Line 24: Delete comma before "that".

Line 39: N_2 is "a" major source, not "the" major source of new N to the ocean.

Line 49: "diazotrophs" (plural).

Line 123: The glycerol uncoupling method for PE is an in vivo method, not an extractive method.

Line 182: What is "gentle" peristaltic pumping? Come on now...

Line 208: Was the enrichment of the ¹⁵N stock assessed by MIMS? This point needs to be made clear. In practice, the measured enrichment is typically lower than that expected from calculations, due to air N_2 contamination during preparation.

Line 212: Superscript "15".

Line 216: Need to state the chemical form of the added ¹⁴C.

Lines 232-238: The glycerol uncoupling method was developed for *Synechococcus* (very small cells); because it is not extractive, it is possible that there are packaging effects associated with larger PE-containing organisms such as *Trichodesmium* and DDAs. To my knowledge, these potential artifacts have never been characterized. That is, the method is likely only semi-quantitative for the larger organisms. This point should be made here in the context of PE changes over time.

Line 242: "whose" not "which".

Line 250: "In contrast to..." not "Contrary to...".

Line 266: "nano-phytoeukaryote" (singular).

Line 266: Delete "comprised".

Line 275: "whose" not "which".

Line 349: "diazotroph" (singular).

Line 352: I don't think it is correct to say that these rates were "among the highest ever reported". Certainly many terrestrial and freshwater systems exhibit higher N2 fixation rates, and as far as marine systems go I suspect in the Baltic, for example, rates can be extremely high. Perhaps these rates are among the highest ever reported from this lagoon. Be specific.

Line 429: Add "of" before "DDN".

Lines 449-453: Could the increase in *C. closterium* be due to a mesocosm wall effect? You do mention that they can be common in benthic environments.

Line 492: Change "clearly" to "likely".

Lines 497-500: If you are going to tell me that "Clear differences" between the mesocosms and the lagoon exist, you'll need to state the statistical test and P-value. Otherwise, use less strong wording. Figures 3, 12, 13 and 14: I'm not a fan of the funny European habit of using commas in place of decimal points; either way, you need to be consistent throughout.