**Associate Editor Comment:** Reconsider after Minor Revisions

Thank you for your consideration of this revised manuscript.

**Reviewer 1:**
**Overview:**
I reviewed an earlier version of the manuscript, and I raised my concerns primarily on the following:

1) There's some unclearness on describing the method used for rate calculation in the earlier version, particularly if the rates were derived by integrating the paired light-dark incubation was not specified.
2) The impacts of tracer enrichment (200nM) on the measured rates and the main findings were not sufficiently discussed.

In this revision, the authors have made major revisions in responding/ addressing these issues, and have taken most of my specific suggestions. I appreciate those efforts and am satisfied with the improvement in clarifying the method and adding the associated discussion on their results and findings.
In light that the authors have addressed my major concerns and improved the manuscript in many aspects, I am glad to recommend publication of the manuscript after incorporating a few minor comments/ suggestions (see below).

Thank you for all your effort to improve this manuscript. We truly appreciate your time and your thoughts.

**Specific comments:**
Lines 178-179: I am surprised that the sensitivity of the OPA method (Holmes et al., 1999) can meet the trace $NH_4^+$ measurement in the present study (i.e., many samples <50 nM of $NH_4^+$ in Table S1). Could you clarify the detection limit and accuracy of your $NH_4^+$ measurement? Or any instrumental or experimental improvements have been made?

Thank you. Ammonium measurements made with the OPA method have a detection limit of 40nM, and this is clarified in the updated manuscript. Some of the ammonium measurements presented in Table S1 are much lower than this limit. The detection limit is also mentioned in the Table S1 caption.

- Line 140: Detection limit for this ammonia method was 30 nM

- Supplement line 7-8 "Some ammonium concentrations reported were below the 30nM detection limit for the quantitation method used."

Lines 311: Since the PN was measured using the EA-IRMS, usually, at least 10 μg of N is required for stable and accurate PN concentration and isotope analysis. Here only 300mL of samples was used for PN samples; it should be clarified that the if PN concentration is high enough to get sufficient PN for EA-IRMS analysis.

Yes, the water budget for this experimental design resulted in low volumes for analyzing particulate N uptake at the end of the time course. To work around this, the replicate bottles were combined before filtration to increase total N on each filter. This means we do not have replicate measurements for nitrite uptake rates. I have clarified the combined volumes in the manuscript.

- Line 217-218: "At the end of the incubation (24 hr), the remaining ~300 ml of water in each replicate bottles was combined in order to maximize the amount of nitrogen available for isotope analysis."

- Supplement line 10-13 “Replicate bottles for nitrite uptake measurements were combined in order to maximize particulate nitrogen content prior to isotope analysis, and therefore do not have an associated standard deviation. Nitrite uptake rates have been bolded when particulate nitrogen content was below 10 ug”

Line 387: See my comment on PN measurement above. Additional information on the detection limit and accuracy of the EA-IRMS will be helpful.

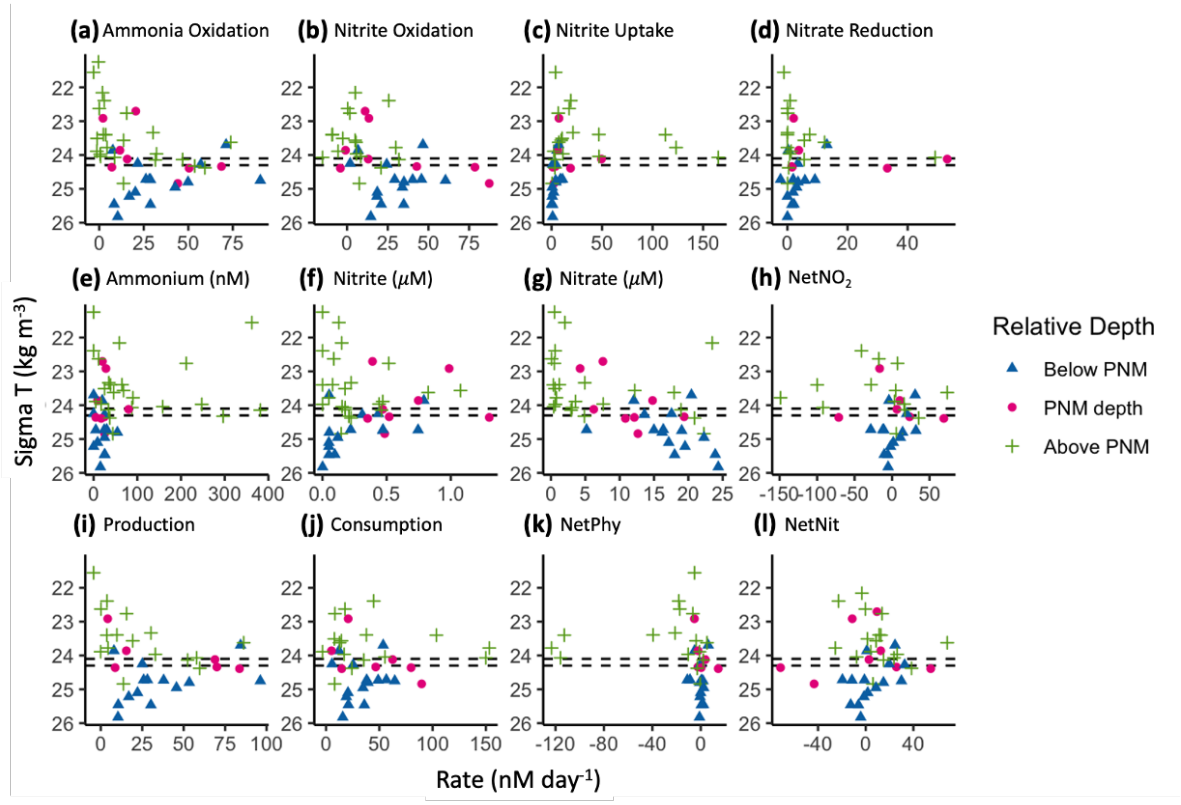
Thank you. See above.

Line 517: As the primary nitrite maximum has been defined as PNM, unless you are referring to another nitrite maximum, the ‘nitrite maximum’ (here and in many other places) can be described as PNM for short and consistent.

Yes, we agree with your comment, it is useful to have short and consistent abbreviations. For this manuscript, Primary Nitrite Maximum is defined as the entire nitrite accumulation. When referring to the feature in general, PNM is used. Specific characteristics of the PNM feature are used to describe the depth and “size” of the peak of the nitrite profile; these are depth of maximum nitrite (m) and concentration of the nitrite maximum (µm).

Lines 573: The authors described that the PNM isopycnal varied from 24.1 in the coastal stations to 24.3 in the offshores stations (e.g., line 1086). You probably can use a bar to indicate the range of PNM/ or two dashed lines with different colors to denote the isopycnal in the coastal and offshore stations.

The mean isopycnal for the PNM was not statistically different between coastal and offshore, so I have removed the reference to the separate isopycnals (line 1086). A mean coastal PNM isopycnal can be added to a version of Fig. 4 (see below), but the data depicted on the figure is not separated by coastal and offshore, and since these mean PNM isopycnals are not statistically different, this change to the figure may not provide additional insight. In Fig. 4 we can get a sense of the range in depths of the nitrite maxima from the rates colored in pink (rates collected close to the nitrite maxima peak), so we have elected not to alter the final figure.




Lines 1219-1223: I agree with the statement. Nevertheless, it should be noted that other potential sources (e.g., NO2- production from the labile DONs by the ammonia oxidizers); or the rate measurements under conditions closer to the in-situ concentrations to reduce/ correct the potential enhancement should provide more comprehensive information on the balance of NO2- budget; and thus are encouraged in future studies.

Thank you for your comment. Yes, we will note other potential sources/losses of nitrite.

- Line 863-864: Some of the discrepancy between rates and observed nitrite accumulation may also be attributable to potential enhancement of rates from tracer addition, or nitrite production from other sources not captured in our tracer experiments.

Lines 1445-1446: Reference needed?

Yes, this idea has been supported with a citation.

- Line 971-974: The correlation found in the MLR analysis between the chlorophyll-nitrate interaction term and the nitrite maxima supports the idea that higher nitrite accumulation requires the presence of higher levels of nitrate within the chlorophyll bloom (Anderson and Roels, 1981; Collos, 1998).