

Interactive comment on “No nitrogen fixation in the Bay of Bengal?” by Carolin R. Löscher et al.

Anonymous Referee #2

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Loescher et al present the first data set on Nitrogen fixation rates from the Bay of Bengal during winter. The Bay remains an enigma for biogeochemists as its western counterpart, the Arabian Sea, behaves very differently. Still, situated in the similar latitudes and divided by Indian Ocean, both basins have been hypothesized to be biogeochemically similar in the aspects of nitrogen inputs. However, until this study, no data existed on nitrogen fixation rates from the Bay, but a few studies have suggested unprecedented rates of nitrogen fixation in the Arabian Sea. Therefore, these data from the Bay are extremely valuable. Major conclusion of the study is that there was no nitrogen fixation in the oxygen minimum zones (OMZ) of the Bay, although the observed diazotrophic communities were similar to those reported to fix substantial nitrogen in other OMZ waters. This is intriguing. Overall, the manuscript reads well and extremely focused, but I have a few minor comments that authors might consider while revising the manuscript.

C1

Since authors have focused mostly in the OMZ waters, it would be appropriate to change the title to “No nitrogen fixation in the oxygen minimum zones of the Bay of Bengal?” Most of the nitrogen fixation occurs in the surface waters in the Arabian Sea (and other regions), and it might still be there in the Bay. We do not know yet.

Line 66: There seems to be an extra closing parenthesis.

Line 77: 2,25 should be replaced by 2.25

Line 96: Cruise number should also be mentioned.

Line 202: It reads a bit awkward. How can Chlorophyll be compared to POC and stated as high or low? Both have different units.

Lines 215-217: “Based on thecruise”. These data are mostly from the deeper waters so nutrients are not limited for productivity. Moreover, concentrations of both nitrate and phosphate would be higher than required for any process. Not only that, nitrate is not needed for nitrogen fixation, so stating “BoB waters were nitrogen limited” is slightly misleading. I would suggest the authors to elaborate the significance of intercept, state limiting for which process, and also define the threshold limiting values for nutrients – for N₂ fixation/C uptake, if required.

Line 248: It would be helpful to provide $\delta^{15}\text{N}$ range when denitrification or nitrogen fixation dominates.

Line 276 and 358: data are plural, so it should be “our data suggest”

Line 382: RV should be ORV

References: Kumar, S.P. and Prasanna Kumar, S. is one (same) author so such references should be clubbed.

Fig. 3: Equation on the should have decimal instead of commas. More appropriate will be to write $y = 14.2 x - 0.6$ as the data do not have precision of more than three significant figures.

C2

Supplementary, Line 2 does not read well. Some grammatical mistake.

Fig. S3: $^{15}\text{N-NO}_3$ should be replaced by $\delta^{15}\text{N-NO}_3^-$, and delta $^{15}\text{N-PON}$ should also be replaced by $\delta^{15}\text{N-PON}$ in the figure and caption both.

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