

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

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Received and published: 6 November 2019

Dear reviewer, Thanks for this positive evaluation of our manuscript and for considering it a valuable contribution. I included your suggestions as follows and I believe they helped to make the manuscript clearer and better readable.

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

Author's response: This has been removed.

Line 77: 2,25 should be replaced by 2.25:

Author's response: This has been replaced.

Line 96: Cruise number should also be mentioned.:

Author's response: The cruise number is not available, but the exact dates were added

C1

to better identify the cruise.

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

Author's response: As for the ratio both, chlorophyll and POC was converted to mg m⁻³ following a study by Geider et al, 1997 in MEPS. However, the wording of the sentence was modified for better readability. It was indeed not very clear.

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.

Author's response: This is a valuable point, and supports the view of another limiting nutrient such as or the limitation of processes by oxygen iron as discussed later on in the manuscript. For better readability, we changed the sentence to ‘Based on the dissolved inorganic nitrogen (NO₃⁻ + NO₂⁻) to phosphate (PO₄³⁻) ratio which has a negative intercept with the y-axis (Fig. 3; Benitez-Nelson (2000)), primary production in BoB waters appeared nitrogen limited during the cruise assuming Redfield stoichiometry.’

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

Author's response: The ranges have been added, however in an earlier place of the manuscript, where $\delta^{15}\text{N}$ signatures were presented first (l. 219): ‘Consistent with this, $\delta^{15}\text{N}$ signatures of both the nitrate and the particulate organic nitrogen (PON) pool were only slightly decreased in the top 100 m of the water column to 5-8‰ (Fig. S3), thus not clearly supporting active N₂ fixation which would be expected to create light

C2

$\delta^{15}\text{N}$ signatures of -2- 2‰ (e.g. Dähnke and Thamdrup (2013)).'

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

Author's response: This is true, we changed this.

Line 382: RV should be ORV:

Author's response: This has been changed as suggested.

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

Author's response: Thanks for the hint, we changed this accordingly.

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

Author's response: This has been changed as suggested.

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

Author's response: The sentence has been modified to 'The model framework is based on Canfield's 5-box model (Boyle et al. 2013; Canfield 2006), using available measurements for the BoB from our cruise and other literature (Tab. M1, the complete code will be released on Pangaea).'

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.:

Author's response: Agreed and replaced

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2019-347>, 2019.