

Review of bg-2019-132

October 25, 2019

Dear authors,

Thank you for providing a revised version of the manuscript. From my point of view some of the aspects brought up by the reviewers could be addressed more carefully:

1. Abstract, L.10 “However, biological sources of N₂O in estuarine ecosystems remain controversial, but are of great importance for understanding global N₂O emission patterns. ”

“However, knowledge on or discrimination of biological sources of N₂O in estuarine ecosystems remains controversial, but are of great importance for understanding global N₂O emission patterns. ”

Knowing “biological sources of N₂O is of great importance for understanding global N₂O emission patterns”, not sources by themselves. Please rephrase accordingly

2. Abstract, L. 14. “Our results indicated that nitrification predominantly occurred, with significant N₂O production during ammonia oxidation, in the hypoxic waters of the upper estuary where the maximum N₂O and Δ N₂O excess concentrations were observed, although minor denitrification might be concurrent at the site with the lowest dissolved oxygen. “

This sentence is difficult to understand as it is. Do you mean this?:

“Our results indicated that nitrification predominantly occurred, with significant N₂O production during ammonia oxidation. In the hypoxic waters of the upper estuary where the maximum N₂O and Δ N₂O excess concentrations were observed, although minor denitrification might be concurrent at the site with the lowest dissolved oxygen. “

3. Page 4, L. 5. “The Pearl River Estuary (PRE) is one of the world’s most **complex** estuarine systems with a total discharge of 285.2×10^9 m³ yr⁻¹ (Dai et al., 2014). The PRE is surrounded by **complex** regions with a rich nitrogen supply that produces eutrophic waters (Dai et al., 2008).”

complex is repeated in both continuous sentences.

4. Discussion, How is that “The in situ incubation experiments **clearly** indicated that nitrification predominantly occurred ...” from Figure 5?
5. Show Lingdingyang in Fig. 1.
6. Caption Fig. 1. Biogeochemical analyses are in red and green, but gene analyses are green; same color? This is confusing for readers. Please modify
7. Figure 2. Is Upper estuary in graphs i and j same as upstream of the Humen outlet? Please normalize names and explain.
8. Page 10, lines 20-22. “Overall, upstream of the Humen outlet was characterized by hypoxic waters rich in nitrogen-based nutrients, where ammonium concentrations decreased and the sum of nitrite and nitrate concentrations increased seaward, corresponding to distinctly higher N₂O fluxes released to the atmosphere. ”
 - a) Un Fig. 2, only one data point (P01) is almost hypoxic (ca. 25 micromol O₂ /L.
 - b) “...increased seaward, corresponding to distinctly higher N₂O fluxes released to the atmosphere”. Where are you seeing “higher N₂O fluxes released” in Fig. 2d?
 - c) In the discussion, the hypoxia issue continues: “The in situ incubation experiments clearly indicated that nitrification predominantly occurred in the hypoxic waters of the upper estuary along with significant N₂O production, and suggested that denitrification could be concurrent at the lowest DO site (P01) where the maximum N₂O and Δ N₂O_{excess} concentrations were observed. ”

This aspect needs to be fixed throughout the whole ms.

9. Could you avoid non-standard abbreviations such as PRE, PA, FA, FDR, RDA, etc. It is very difficult to follow for readers

Please provide a point-to-point response how you addressed the individual aspects and if not, why you do not agree. Thank you for your patience with the evaluation process and for choosing Biogeosciences for this publication.

Sincerely yours

Silvio Pantoja
Associate Editor