

Biogeosciences Discuss., referee comment RC2  
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## Comment on bg-2022-53

Anonymous Referee #2

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Referee comment on "Effects of water table level and nitrogen deposition on methane and nitrous oxide emissions in an alpine peatland" by Wantong Zhang et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2022-53-RC2>, 2022

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Wetland is an important source of CH<sub>4</sub> and N<sub>2</sub>O. Global change especially changes in precipitation and N deposition could have greatly effect on them. However, how do they affect fluxes of CH<sub>4</sub> and N<sub>2</sub>O is still unclear in wetland on the Qinghai-Tibetan Plateau. This manuscript focused on the effects of nitrogen deposition on CH<sub>4</sub> and N<sub>2</sub>O emissions under three water table levels in the Zoige alpine peatland. Thus, it is an important and interesting topic. However, there are still minor flaws that should be revised prior possible publication by this journal.

- The present results are relying on the five levels of nitrogen deposition, but some levels (such as 160 kg N ha<sup>-1</sup> yr<sup>-1</sup>) are extremely higher compared to the local nitrogen deposition (1.08-17.81 kg N ha<sup>-1</sup> yr<sup>-1</sup>), could authors explain why to design the treatments?
- Authors conducted a two-year mesocosm experiment, how about the variability of soil properties and GHG emissions within the two years. Suggest you to compare the differences of SOC, TN or GHG emissions between 2018 and 2019.
- It is better to revise the second hypothesis to "The effects of N deposition on CH<sub>4</sub> and N<sub>2</sub>O emissions would be associated with WT levels" in lines 77-79.
- Discussion should be improved, some parts are just a repeat from the Introduction.
- English in the manuscript should be improved.
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Specific mistakes:

(1) delete "1% in IPCC" in the Abstract.

(2) the sentence of "the large carbon pool is nitrogen deficient and is recognized ...." in lines 32-33 is hard to understand and need to be rewritten.

(3) Delete "(mean ± SE) (n=3)" in the title of table 1.

(4) line 90: July should be revised to June.

(5) line 213: the name of Figure 1 should be changed, it is hard to see the response of GHG flux to nitrogen deposition.

(6) Line 217, "During the rowing seasons", rowing should be revised to growing.

(7)line 274: "the exposure of CH<sub>4</sub> production process to anaerobic conditions increased" might to be changed to "CH<sub>4</sub> production under anaerobic conditions was increased".

(8) Figure S1, the precipitations from the peatland in June, August and September of 2019 were extremely high, reaching more than 2500 mm in one month. You should scrutinize the raw data.

(9) line304: "show" should revised to "showed".

(10) line 305-306: "...the study of (Gao et al. 2014)" should be revised to "...the study of Gao et al. (2014)".

(11) line 306-307: revise the whole sentence to " which indicated that N<sub>2</sub>O emissions was significantly increased by N addition (5.0 g N m<sup>-2</sup> yr<sup>-1</sup>) and slightly decreased in the higher WT level in the alpine peatlands of the Qinghai-Tibetan Plateau."

(12) line 313: "soil peat" should be revised to "soil".

(13) line 327: (Gong et al. 2019) should be revised to Gong et al. (2019).