Comments 2：

Wetland is an important source of CH_4 and N_2O. Global change especially changes in precipitation and N deposition could have greatly effect on them. However, how do they affect fluxes of CH_4 and N_2O is still unclear in wetland on the Qinghai-Tibetan Plateau. This manuscript focused on the effects of nitrogen deposition on CH_4 and N_2O 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.

1. The present results are relying on the five levels of nitrogen deposition, but some levels (such as 160 kg N ha^{-1} yr^{-1}) are extremely higher compared to the local nitrogen deposition (1.08-17.81 kg N ha^{-1} yr^{-1}), could authors explain why to design the treatments?

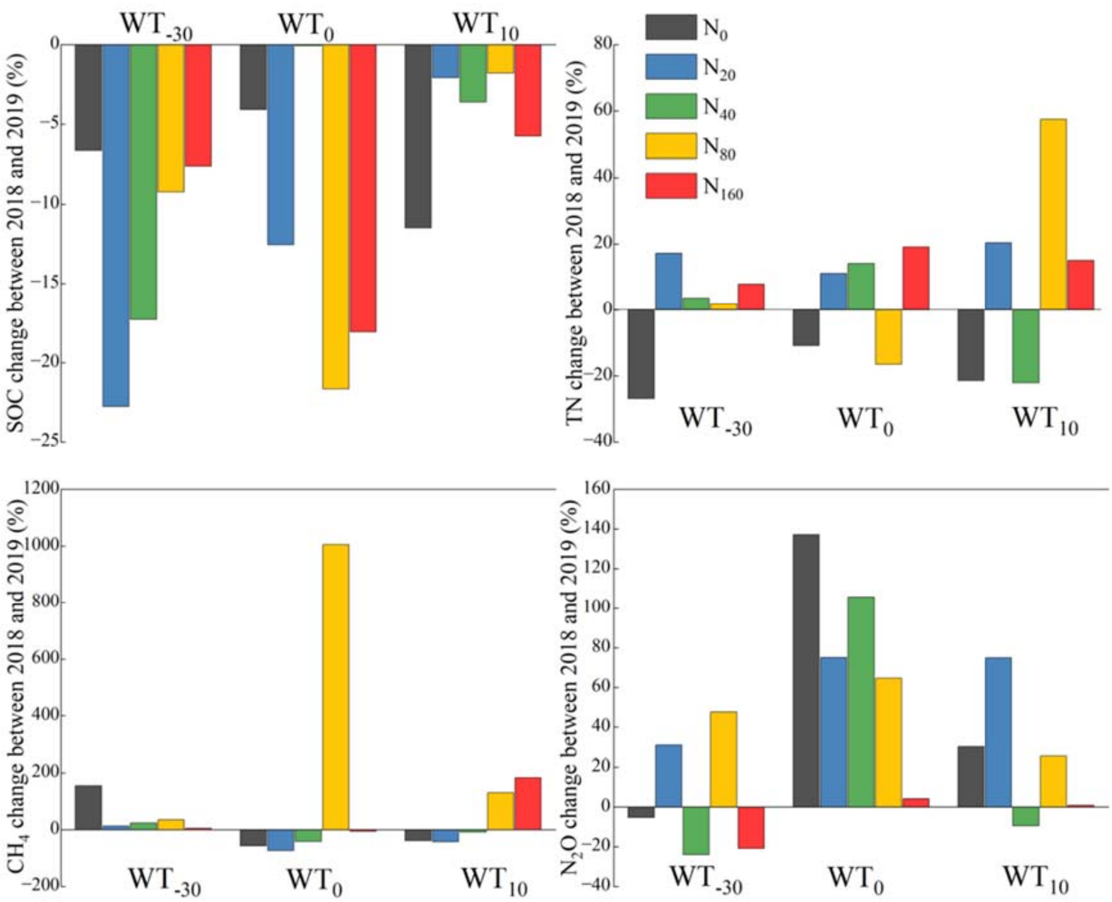
Reply: Thanks for the comments. Before initiating the experiment, we did consider about the design of N deposition levels. However, we still kept the extremely high-level N deposition is because we want to consider the excessive and possible N input from fertilizers or livestock excreta and we also believed this high-level N deposition would not hamper us to draw a conclusion, but supporting the results even further. In fact, our main results about the relationships between the GHG emissions and N deposition are based on the N deposition levels of 0-40 kg N ha^{-1} yr^{-1} or 0-80 kg N ha^{-1} yr^{-1}, and the higher level is just used to examine and confirm the relationship. Moreover, this is not the first design of such a high level of N deposition in the Qinghai-Tibetan Plateau (listed below), and we briefly added one sentence (listed below) in the methodology to support the design of such a high dose of N deposition in L106-108.

The added sentence: The three lowest levels (N_0, N_{20} and N_{40}) are covering the gradient of current and near-future deposition levels while the two highest levels (N_{80} and N_{160}) represent levels of N-enrichment resulting from extreme deposition possibly levels possibly combined with fertilization.

The new Referece: Qu S., Xu R., Yu J. et al. Nitrogen deposition accelerates greenhouse gas emissions at an alpine steppe site on the Tibetan Plateau[J], Science of the Total Environment, 2021, 765: 144277.

2. 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.

Reply: Thanks for the suggestion. We did check for the yearly differences of SOC, TN, CH_4 and N_2O emissions between 2018 and 2019, and the figure is as follows. Unfortunately, we haven't found any clear patterns about them, and so we did not put this figure in the manuscript.



3. It is better to revise the second hypothesis to "The effects of N deposition on CH_4 and N_2O emissions would be associated with WT levels" in lines 77-79.

Reply: We rephrased the second hypothesis listed below in L72-74.

The effects of N deposition on CH_4 and N_2O emissions would be associated with WT levels, with higher CH_4 and N_2O emissions at high WT levels.

4. Discussion should be improved, some parts are just a repeat from the Introduction.

Reply: We have carefully and thoroughly revised the whole part of discussion.

5. English in the manuscript should be improved.

Reply: We have revised the language with help of a native speaker

Specific mistakes:

(1) delete “1% in IPCC” in the Abstract.

Reply: we deleted it.

(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.

Reply: We rephrased the sentence listed below in L30-31.

Traditionally, this nitrogen-limited ecosystem is recognized as major CH_4 sources and weak N_2O sources (Frolking et al., 2011).

Frolking S., Talbot J., Jones M. C., Treat C. C., Kauffman J. B., Tuittila E.-S. , Roulet N.: Peatlands in the Earth’s 21st century climate system, Environ. Rev., 19, 371-396. https://doi.org/10.1139/a11-014, 2011.

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

Reply: Thanks for the comments, we deleted them in the title, and put them in the table foot in L180 as follows.

Each value represents mean ± SE (n=3). SWC, soil water content; SOC, soil organic carbon; TN, total nitrogen.

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

Reply: We revised it in L109 as follows:

The annual added N doses were further divided into four portions and applied at the beginning of every month from June to September in 2018 and 2019.

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

Reply: we revised the name of figure 1 in L201-202 listed below.

Figure 1. Temporal variation of growing-season CH_4 and N_2O fluxes under five levels of nitrogen deposition (0, 20, 40, 80 and 160 kg N ha^{-1} yr^{-1}) and three water table levels in 2018 and 2019. Error bars represent the SE (n=3).

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

Reply: We revised it in L205.

Figure 2. Effects of nitrogen deposition levels on cumulative CH_4 and N_2O emissions at three water table levels during the growing seasons in 2018 and 2019. Error bars represent the SE (n=3).

(7)Line 274: "the exposure of CH_4 production process to anaerobic conditions increased" might to be changed to "CH_4 production under anaerobic conditions was increased".

Reply: We rephrase it in another way in L249-251.

With higher WT levels, SWC increased and likely formed more anaerobic conditions conducive to CH_4 production, leading to elevated CH_4 emissions (Evans et al., 2021, Hoyos-Santillan et al., 2019, Zhang et al., 2020).

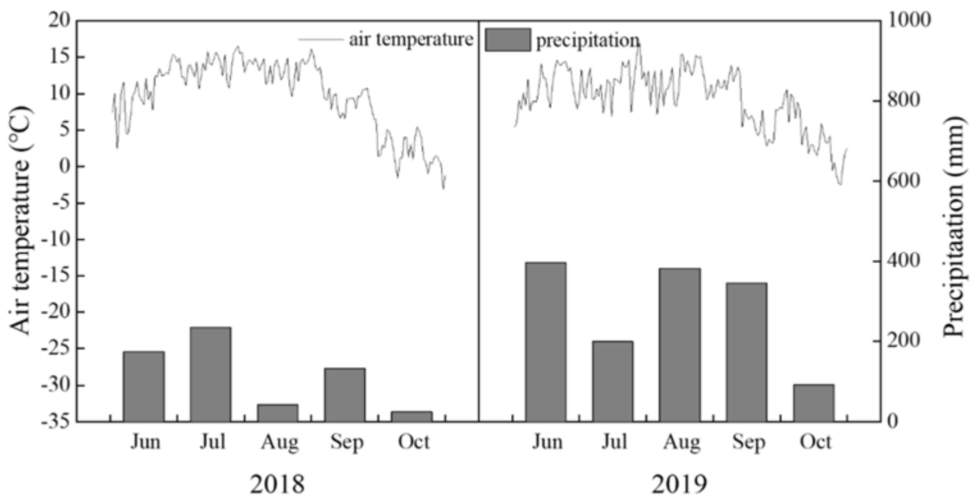
Evans C. D., Peacock M., Baird A. J., Artz R. R. E., Burden A., Callaghan N., Chapman P. J., Cooper H. M., Coyle M., Craig E., Cumming A., Dixon S., Gauci V., Grayson R. P., Helfter C., Heppell C. M., Holden J., Jones D. L., Kaduk J., Levy P., Matthews R., McNamara N. P., Misselbrook T., Oakley S., Page S., Rayment M., Ridley L. M., Stanley K. M., Williamson J. L., Worrall F. , Morrison R.: Overriding water table control on managed peatland greenhouse gas emissions, Nature., https://doi.org/10.1038/s41586-021-03523-1, 2021.

Hoyos-Santillan J., Lomax B. H., Large D., Turner B. L., Lopez O. R., Boom A., Sepulveda-Jauregui A. , Sjögersten S.: Evaluation of vegetation communities, water table, and peat composition as drivers of greenhouse gas emissions in lowland tropical peatlands, Sci. Total Environ., 688, 1193-1204. https://doi.org/10.1016/j.scitotenv.2019.06.366, 2019.

Zhang W., Wang J., Hu Z., Li Y., Yan Z., Zhang X., Wu H., Yan L., Zhang K. , Kang X.: The Primary Drivers of Greenhouse Gas Emissions Along the Water Table Gradient in the Zoige Alpine Peatland, Water Air Soil Poll., 231, 5. https://doi.org/10.1007/s11270-020-04605-y, 2020.

(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.

Reply: We recheck the original data of the precipitations from the Zoige peatland in 2019, and we found a mistake in calculating the monthly precipitation generated from the daily precipitations. We now revised it and attached the new figure S1.



(9) line304: “show” should be revised to “showed”.

Reply: We revised this whole part including L304.

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

Reply: We revised this whole part and deleted the original content in L305-306.

(11) line 306-307: revise the whole sentence to "which indicated that N_2O emissions was significantly increased by N addition (5.0 g N m^{-2} yr^{-1}) and slightly decreased in the higher WT level in the alpine peatlands of the Qinghai-Tibetan Plateau."

Reply: We revised this whole part and delete the original sentences in L306-307.

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

Reply: We revised it in L292 as follows:

The N deposition increased soil TN (F = 4.49, P = 0.002) in our study and is likely to supply more N substrate (NH_4^+ and NO_3^-) in soil (Zhu et al., 2020).

Zhu J., Chen Z., Wang Q., Xu L., He N., Jia Y., Zhang Q. , Yu G.: Potential transition in the effects of atmospheric nitrogen deposition in China, Environ. Pollut., 258, 113739. https://doi.org/10.1016/j.envpol.2019.113739, 2020.

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

Reply: We revised it in another way in L311-312, from "This is slightly lower than the levels of previous studies, for instance that of (Gong et al., 2019)" to "This is slightly lower than the levels from previous studies (Gong et al., 2019)".

Gong Y., Wu J., Vogt J. , Le T. B.: Warming reduces the increase in N_2O emission under nitrogen fertilization in a boreal peatland, Sci. Total Environ., 664, 72-78. https://doi.org/10.1016/j.scitotenv.2019.02.012, 2019.