



EGUsphere, author comment AC1
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Reply on RC1

Kaikuo Wu et al.

Author comment on "Effects of mild alternate wetting and drying irrigation and rice straw application on N₂O emissions in rice cultivation" by Kaikuo Wu et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-429-AC1>, 2022

Dear editors and reviewer #1,

Thank you very much for your comments concerning our manuscript entitled "**Effects of mild alternate wetting and drying irrigation and rice straw application on N₂O emissions in rice cultivation**" (*egusphere-2022-429*). We have endeavored to fully address them. These comments are of great significance to the optimization of our work. Here, we describe our answers to these questions in detail; the line numbers refer to the Revised Manuscript.

Best regards,

Lili Zhang

Reviewer #1:

The authors conducted a laboratory pot experiment to investigate the effects of mild alternate wetting and drying (AWD) irrigation and rice straw application on N₂O emissions in rice cultivation through 15N tracer technique. Their results showed that mild AWD irrigation increased cumulative N₂O emissions by 28.8%. Adding rice straw to mild AWD irrigation further stimulated N₂O emissions. These evidences have significance for monitoring N₂O emissions in paddy fields. However, I still have some comments here for the authors to address before it's ready for publication.

Answer: We thank you for your recognition and praise of our manuscript, and hope that our research can provide valuable reference for other colleagues.

For several places, there are something important missing for the authors to have their conclusions.

For example, in abstract L33-36 "mild AWD reduced GWP by 62.9%", but there is neither GWP calculation nor CH₄ data reported, which also lacks CO₂ data.

Answer: We further refined our conclusions and supplemented the CH₄ data in the "Supplements". Please see lines 31-36.

L39-L42 Since either mild AWD or straw return increased N₂O, it is difficult to directly conclude they are promising agronomic measures to reduce greenhouse effect.

Answer: We further described our conclusions and the limitations of this study in the Abstract and Discussion. Please see lines 45-48, 419, 436-438.

L36-39 "mild AWD irrigation reduced N uptake by rice in the soil and rice aboveground biomass" This is also difficult to directly see the difference from either Fig. 4 or others. We can see adding either urea or straw increased N from N inputs instead of soil, but the difference between CF and AWD should be better presented.

Answer: We further described the conclusion that under nitrogen fertilization conditions, rice under AWD irrigation absorbed less soil-derived nitrogen than under CF irrigation. Please see lines 42-45.

In addition, the description of results was hard to follow. The authors compared their treatments of CK, S, U, U+S in all their figures and tables, but the main conclusion of this experiment was the effects of mild AWD irrigation, so the comparison between CF and mild AWD was often missing for statistics either in the figures or tables.

Answer: We added the comparative statistics of CF irrigation and mild AWD irrigation in the manuscript. Please see lines 34-42, 202-205, 282-284, 305-309.

Finally, language needs improvement throughout the manuscript. For example, nitrogen can be replaced by N after first-time mentioning.

Answer: We replaced nitrogen with N.

Minor points:

In Abstract, the description of treatments was missing.

Answer: We supplement the description of treatments in Abstract. Please see lines 27-31.

L33 Numbers of percentage increase are needed here

Answer: We increased the corresponding percentage. Please see lines 37-42.

L57 reduce water waste and environmental pollution

Answer: We perfected this sentence in the manuscript. Please see lines 62-63.

L65-67 Possible reasons to explain can be introduced here.

Answer: We added the reasons for rice yield reduction under severe AWD irrigation. Please see lines 69-72.

L70-72 It seems the balance between CH₄ and N₂O should be emphasized.

Answer: This manuscript mainly focuses on the impact of AWD irrigation and rice straw returning on N₂O emissions, but in order to make the results more referential, relevant data of CH₄ are also introduced (Supplements).

L78-81 Way too long containing two which

Answer: This sentence has been revised. Please see lines 81-84.

L95-98 Combine or rephrase the purpose of this study.

Answer: We redefined the purpose of the study. Please see lines 102-104.

L98-101 The hypotheses lack connection between each other

Answer: We've refined the hypothesis. Please see lines 102-104.

L103-107 2.1 can be combined with 2.2

Answer: We combined 2.1 with 2.2 and added the description of soil properties. Please see lines 106-139.

L184 It is not one-way ANOVA in Table 2, which is three factors instead.

Answer: Table 2 was analyzed using univariate analysis of variance. Please see lines 188-190.

Fig. 1 legend font is too large

Answer: We have scaled down the legend of Figure 1. Please see lines 646-648.

L198-202 The difference is dependent on treatments which needs to be specific.

Answer: We further detail the differences in N₂O emission peaks between different treatments. Please see lines 200-205.

L252-253 No direct evidence is from this experiment in the perspective of microorganisms.

Answer: We have redefined the sentence. Please see lines 255-256.

L401-402 Correct "mild AWD irrigation...under mild AWD irrigation"

Answer: We confirmed the sentence in the manuscript. Please see lines 407-408.

Please also note the supplement to this comment:

<https://egusphere.copernicus.org/preprints/2022/egusphere-2022-429/egusphere-2022-429-AC1-supplement.pdf>