



EGUsphere, author comment AC2
<https://doi.org/10.5194/egusphere-2022-429-AC2>, 2022
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Reply on RC2

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-AC2>, 2022

Dear editors and reviewer #2,

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. However, the revised manuscript cannot be uploaded at this stage, and we await further notice from the editor.

Best regards,

Lili Zhang

Reviewer #2:

This present work aims to investigate the effects of mild alternate wetting and drying irrigation and rice straw application on N₂O emissions in rice cultivation. Your research work is interesting and somewhat innovative with ¹⁵N tracer technique, but it is suggested to repair major revision. The followings are the points need to be addressed and considered:

Answer: Thank you for your recognition and praise of our manuscript, and hereby reply to your comments as follows.

- Paper explored the effects of mild AWD irrigation combined with rice straw return on N₂O emissions and rice yield through rice pot experiments. The authors should supplement the experimental treatment concisely.

Answer: We supplement the experimental treatments. Please see lines 27-32, 113-117.

- In this study, compared with continuous flooding (CF) irrigation, mild AWD irrigation increased cumulative N₂O emissions, with an average increase of 28.8%. In addition,

adding rice straw to mild AWD irrigation further stimulated N₂O emissions. Compared with CF irrigation, mild AWD irrigation increased the yieldscaled N₂O emissions, and the addition of rice straw further promoted the yieldscaled N₂O emissions under mild AWD irrigation but reduced the global warming potential (GWP) by 62.9%. Under the condition of urea application, compared with CF irrigation, mild AWD irrigation reduced nitrogen uptake by rice in the soil and rice aboveground biomass without reducing rice yield. This is mainly due to a weak problem statement and no clear enough of the extraction of the results. It is recommended to continue in-depth research on this issue.

Answer: We've refined the hypothesis and further refined the Results and Discussion. Please see lines 36-42, 45-48, 102-104, 201-206, 269-272, 283-285, 287-290, 308-312, 351, 376, 427-438.

- In paper, it gives the illusion that introduction and conclusion was related to the effects of mild AWD irrigation, but a detailed comparison and account of mild AWD irrigation is lacking in the results.

Answer: We have added a comparison of CF irrigation and mild AWD irrigation to the results. Please see lines 200-206□282-285□304-310.

- English language should be checked and revised throughout the entire manuscript. For example, the use of abbreviations in article. -L33-36 "mild AWD reduced GWP by 62.9%", I don't see any description to greenhouse gas excepting the data of supplementary document.

Answer: We improved the language and used abbreviations such as: Nitrogen is replaced by N after first-time mentioning. 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). In addition, we have also included additional clarifications in the manuscript. Please see lines 42, 414, 419-420, 432-433.

-Line62-65: Please add reference.

Answer: We have added the reference. Please see line 69.

-Line117-119: Depth of soil?

Answer: Described here is the thickness of the water layer above the soil.

-Line119-127: Please the description of the test treatment corresponds to Line 110-114.

Answer: We further describe the experimental treatments. This experiment included two irrigation methods, two N application levels, and two rice straw return levels, with three replicates of each combination, for a total of 30 rice pots (urea and straw were labeled with ¹⁵N, respectively). Please see lines 113-117.

-L184: It involves three factors.

Answer: Table 2 was analyzed using univariate analysis of variance, and we made annotations. Please see lines 190-192.

-Line312-314: What is the purpose of description that N₂O emission is significantly affected by soil temperature?

Answer: This experiment did not explore the influence of temperature on N₂O, so this part was deleted. Please see lines 319-320.

-Line396-398: Compared with U, under CF irrigation and mild AWD irrigation, US reduced the uptake of soil-derived nitrogen by rice (the difference was not significant), please reorganize the meaning of the sentence.

Answer: Combined application of urea and rice straw may be more beneficial to the maintenance of soil fertility than single application of urea. We have rephrased this sentence so that the reader can understand it better. Please see lines 402-406.

-The abbreviation in the figures should indicate the full name.

Answer: We explain the abbreviation in each figures and tables.

-Fig. 4: It is suggested to put CF and AWD in the same picture for clearer comparison.

Answer: We put CF and AWD on the same picture. Please see Fig. 4.

Please also note the supplement to this comment:

<https://egusphere.copernicus.org/preprints/2022/egusphere-2022-429/egusphere-2022-429-AC2-supplement.pdf>