

Title: Effects of mild alternate wetting and drying irrigation and rice straw application on N₂O emissions in rice cultivation

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:

1. 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.
2. 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 yield-scaled N₂O emissions, and the addition of rice straw further promoted the yield-scaled 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.

3. 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.

4. 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.

-Line62-65: Please add reference.

-Line117-119: Depth of soil?

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

-L184: It involves three factors.

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

-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.

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

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