

Dear Reviewer,

We appreciated your comments which certainly helped us to improve the manuscript. As following these suggestions, we have revised the manuscript carefully. Our responses to the comments one by one are attached directly to the following text. Please don't hesitate to contact us if any open questions do remain. Thanks a lot!

Best regards,

Sincerely yours,

Chunyan Liu and coauthors

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### **Anonymous Referee #1**

The study of Yao et al. provide a good insight on the emissions of N<sub>2</sub>O and NO from Chinese tea plantations in subtropical area. This issue is of very importance and so far less investigated. This manuscript is well written, and the experimental and statistical methods are reliable. Before its acceptance for publication in BG is given, the following concerns need to be considered.

The authors aimed to emphasis organic fertilization contributes to the higher N<sub>2</sub>O and lower NO as compared with common urea application in the tea field. As noted in Section 4.2, they have ascribed the differential impacts of urea and organic fertilization on the emissions of N<sub>2</sub>O and NO partly to the differences in NH<sub>4</sub><sup>+</sup> and DOC contents between these two treatments. However, it is very difficult to tell the differences in NH<sub>4</sub><sup>+</sup> and DOC contents between TUN and TOM treatments in Fig. 2, even during the peak emission periods of both gases. The corresponding statistical results are thus strongly required to support their explanations.

**Yes, as following these suggestions, we have added the statistical results about the differences in NH<sub>4</sub><sup>+</sup> and DOC contents among the fertilizer treatments in the revised manuscript.**

**That is “Clearly, TUN and TOM significantly enhanced soil mineral N concentrations, compared to TNN (P<0.05). During the study periods, soil NH<sub>4</sub><sup>+</sup> averaged 17, 138 and 113 mg N kg<sup>-1</sup>SDW for TNN, TUN and TOM in the first year (2012-2013), respectively; and mean NH<sub>4</sub><sup>+</sup> concentrations were 5.4, 172, 106 mg N kg<sup>-1</sup>SDW for TNN, TUN and TOM in the second year (2013-2014), respectively. Compared to TUN, TOM greatly decreased soil NH<sub>4</sub><sup>+</sup> concentrations during both studied years, although this influence was not statistically significant for the first year. The mean NO<sub>3</sub><sup>-</sup> concentrations across 2012-2014 in TNN, TUN and TOM were around 5.7, 44 and 49 mg N kg<sup>-1</sup>SDW, respectively, with no significant difference between TUN and TOM for either year.”**

**And “The mean DOC concentrations across the both studied years were approximately 142, 146 and 179 mg C kg<sup>-1</sup>SDW for TNN, TUN and TOM, respectively. Obviously, TOM significantly increased mean soil DOC concentration compared to TNN and TUN (P<0.05), but there was no significant difference between TUN and TNN.”**

When they evaluated the underlying mechanisms for the high background emissions of N<sub>2</sub>O and NO in the tea field, long-term high N input and subsequent soil acidification being proposed is insufficient. However, it is well recognized that soils with vegetable cultivation are also characterized by high N input and favorable conditions for intensive nitrogenous gases production

in China. Thus, this explanation needs to be reconsidered. I may suggest that it is the high uncertainties of meta-analytic results, rather than the specific properties of the studied soil, contributing to the differences of background emissions of N<sub>2</sub>O and NO between the current study and previous studies.

**Thanks. We have added the high uncertainties of meta-analytic results as the alternative explanation for the differences of background emissions of N<sub>2</sub>O and NO between the current study and previous studies.**

**That is “It should, however, be noted that with limited data available from tea plantations of the world and consequently the high uncertainties of meta-analytic results, caution should be exercised in the interpretation of the differences in background emissions of N<sub>2</sub>O and NO between the current and previous studies.”**

**Some minor problems are as follows:**

P626 L4: Please take care of ‘2-year or 2 years’ as well in other places in this manuscript.

**Thanks. We have used the expression of “2-year” throughout the whole revised manuscript.**

P626 L15: respectively.

**Thanks. Revised.**

P640 L1: Given the context of this section, the subtitle would be replaced by ‘Fertilizer type influencing annual N<sub>2</sub>O and NO emissions’.

**Yes. Revised.**