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Biogeosciences Discussions

Interactive comment on "Effects of two contrasting biochars on gaseous nitrogen emissions and intensity in intensive vegetable soils across mainland China" *by* Changhua Fan et al.

Anonymous Referee #1

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The manuscript tries to assess the combined effects of biochar application and soil types on N2O, NO, NH3 and crop productivity. The results can provide useful information, however, the language need some final check by a professional and the manuscript also suffers from some major and minor problems.

Major comments: 1. Many results confused me in this paper. i.e. the effect of N2O mitigation induced by biochar was probably due to the decreased DEA in SX and HLJ (fig.1b), it means the denitrification is the main process for the N2O production, however, the highest N2O emission occurred in HN with the lowest DEA(table 3), the result

is in contradiction? 2. Line 264, the authors suggested that N2O nor NO emissions were neither influenced by nitrification nor by denitrification, but by other process. Then what are the other processes? I think it should be more clearly discussed.

Specific comments: 1. The NH3 volatilization result affected by biochar and soil types is not mentioned in the abstract. 2. Line 19, "Bm improved yield. . .except for HN," but the increment in SX is also not significant. 3. Line 30, According to IPCC 2013, the global warming potential of N2O is 265 times of CO2 on a 100-year horizon. Please correct the data. Line 393-394, please modify. 4. Line 111, the experiment was conducted in the greenhouse experimental station, so how to use completely random design? 5. Line 255-257, could you maybe give some explanation for why a neutrality pH soil will cause mitigation effects of N2O emission? 6. Line 293-299, please only discuss significant effects. No significant reductions of NH3 volatilization were found in this study, NH3 volatilization increased after biochar applied though the effect did not significantly. So I think the discussion of how the biochar reduce NH3 volatilization is not necessary. And your interpretation of the results includes a lot of over speculations that cannot be logically derived from the results. 7. Line 304-310 and Line 311-318, should change place. 8. Line 324-326, this is a lengthy sentence that could be maybe divided into two parts. Please split the sentence between "Additionally. . .vegetable yield". 9. Line 326-328, the two sentences are dispensable. 10. Line 331-332, the conclusions of this study are either flawed. i.e. N2O and NO in SD show no significant changes among all treatments, and the conclusion cannot be drawn from your results only. Please modify. 11. Page 19-22, all the tables should be three-line tables. 12. Page 24-27, it is better to use the same y-axis scales in the same figure.

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