

Interactive comment on “Multiple-factor controls on terrestrial N₂O flux over North America from 1979 through 2010” by X. F. Xu et al.

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This is a nice study on N₂O emissions from the North American Continent and the factors controlling its variability. It is comprehensive, well structured, clearly written and a very useful contribution to the scientific discussion on interactions between global change and trace gas emissions.

[Response: thanks for the positive comments.]

As an experimentalist, I am impressed by the precision of stated emissions (e.g. 1% for baseline emissions). To avoid possible misinterpretation, it would be useful to add a sentence or two to section 4.5 (Uncertainty) in which the difference between precision and accuracy of the values reported is discussed. Further, the study would benefit

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from a comparison with N₂O emissions and their trends reported by the North American countries to the UNFCCC (National Inventory Reports). Here, the issue is not to discuss which number is more likely to be true, but to embed the values of the present study in a larger context.

[Response: Thanks for pointing out the issue of accuracy and precision. We added one sentence in the uncertainty section to clarify this issue: “. . . we acknowledged that the precision is different from accuracy; more efforts are needed to increase the accuracy of estimated N₂O fluxes”. Regarding the comparison with UNFCCC report, we included one paragraph in the discussion section, i.e.: A newly developed country-level inventory data of N₂O fluxes was reported by United Nations Framework Convention on Climate Change (UNFCCC) (unfccc.int) in late 2011. A comparison shows that results from UNFCCC and this study are comparable yet different in magnitude due to different methods or datasets; for example, the UNFCCC estimates that N₂O emission from agricultural soils in US is for 0.79~0.88 TgN a⁻¹ from 1990 to 2009, while it is 0.35~0.44 TgN a⁻¹ estimated by DLEM; this might be due to the fact that UNFCCC considers all agricultural land while DLEM only considers cropland.]

Page 10952, line 15: "suppress", not "sppress"

[Response: Mistake corrected; thanks.]

Page 10946, line 7: “. . . period resulted. . .”, not “. . . period were resulted. . .” same on Page 10953, line 9, and on Page 10947, line 4.

[Response: We have revised these sentences, thanks.]

Page 10952, last line: “. . . stimulating N₂O emissions will be observed, . . .”, do you mean “. . . enhanced N₂O emissions”?

[Response: Thanks for the comment. We have revised this sentence.]