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Interactive comment on "N_2O, NO, N_2, and CO_2 emissions from tropical savanna and grassland of Northern Australia: an incubation experiment with intact soil cores" *by* C. Werner et al.

Anonymous Referee #1

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General comments: The MS by Werner et al., deals with interesting and important topic of greenhouse gases emission from savanna ecosystem. Authors estimated CO2 and nitrogenous gases emission, including N2 emission, thus having more complete information about nitrogen losses route from soil. Incubation experiments with control conditions let the possibility to investigate the effect of main environmental factors (moisture, temperature) and soil properties on GHG emission. The data are carefully gathered and analyzed and will make good contribution to our understanding of GHG dynamics in savanna ecosystem. The MS fits to the scope of Biogeosciences and can be accepted for publication after further improvement. I have no major critical comments, but the Introduction and discussion sections should be modified, as outlined

below in specific comments.

Specific comments: Abstract (P 8401): No essential generalization was done. What is the main message of the paper? How existing data are improved? The conclusion made in the last sentence is rather uncertain - and no clue why it is so.

P8401 L13-16:Your figures (43.2%) does not match total N2 loss. Please describe more carefully what you mean - does data for N2 are presented for all tested regimes? The similar text in conclusion is more clear.

P8401-8403 (L7), Introduction from the beginning till the L7 of Page 8403 is rather far from the topic of the paper. It might be shorten substantially, omitting the general knowledge about nitrogen cycle and importance of savanna. One - two sentences with references for people looking for more detailed information would be enough. On the other side in introduction is missing clear research hypotheses - why you did the study, what you want to discover, or what are the current problems, the novelty and relevance of the research has to be clearly stated.

P8403 L21-27: Do you plan to study fire effect in your incubation experiment? If yes, the research hypotheses should be proposed. If no, this part of Introduction can be shortened.

P8404 L3-6: The importance and relevance of N2 emission measurements was not described. Is this a novel contribution in large pool of data on nitrogeneous gases emission? I would add more in this part, as it is also highly relevant to your study.

P8411 L11: The value for microbial C does not match the data presented in Table 1. Please check!

P8421-8422: Section 4.4. N2 and total nitrogen losses. I found this part most interesting and novel in the article, authors should emphasize these observations also in Introduction (the need for N2 and total N gases estimates for upland savanna soils) and in the conclusion.

BGD
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P8424L19 conclusion 4 - it would be better to say directly how moisture influence pulse intensity.

Table 1: microbial biomass C was only about 0.3% of total organic C for T1P1 and maximumum 1,1% for T1P5, that is extremly low for soil. The values of microbial C are stable and do not correlate with total C as it should be.

Technical corrections: P8405 L9-10 Mistake? the phosphorus and superphosphate is the same or not? P8418 L17: soil-atmosphere fluxes?

Interactive comment on Biogeosciences Discuss., 11, 8399, 2014.