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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Measurements of nitric oxide and ammonia soil fluxes from a wet savanna ecosystem site in West Africa during the DACCIWA field campaign" *by* Federica Pacifico et al.

Anonymous Referee #2

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In "Measurements of nitric oxide and ammonia soil fluxes from a wet savanna ecosystem site in West Africa during the DACCIWA field campaign", Pacifico and colleagues measured fluxes of NO and ammonia as well as soil physicochemical properties from four different landscapes in the wet savanna of western Africa (Benin). Atmospheric measurements of this specific ecosystem are much rarer than similar analyses done in forests or urban systems, implicating the importance of a study like this. Additionally, measurements from this region of Africa are few, which makes global modeling efforts difficult. To this regard, I would argue that this manuscript is within the scope of

ACP and presents novel data on N-gas fluxes. Additionally, the authors seem to have successfully interpreted their observations within the bounds of their experiment, and briefly asses the broader significance.

While I believe the methodologies associated with atmospheric and gas flux measurements are sound, I am concerned with the soil sampling protocol and subsequent characterization, especially as it relates to mineral-N. It is not clear if the authors took 3-4 replicates for each landscape element each day, or a total of 3-4 replicates over the course of the campaign for each landscape element (lines 243-244); however, I assume it is the later. Because of this, the authors report high levels of variability in organic C and N from 06/07/2016 to 28/07/2016. Soil C should not change (to the extent reported) over the course of 3 days (Bare Soil: 06/07-09/07) and can only be attributed to environmental heterogeneity; however, the authors do somewhat account for this in their analysis by averaging all values over the course of the campaign. Prior to analysis, the authors chose to air-dry soil and store for two months. While I am sure location and resources had much to do with this, air-drying may result in large changes to ammonium concentrations. Additionally, significant changes in the amounts of ammonium can take place over prolonged storage at room temperature, even if soils are dried. It seems that the authors are aware of this issue and attempted to justify their method by citing a meta-analysis of warming experiments on N-cycle activity. (Bai et al. 2013). However, this meta-analysis found that warming and moisture reduction had no significant effect on mineralization (Bai et al, 2013: Table 1), indicating even in dried samples, pools of inorganic-N may change over time. To remedy this, the authors could have compared their ammonium concentrations to similar studies from this region; however, this was not included in the results/discussion. That being said, it is somewhat gratifying that soil emission potentials are in line with a previous study (Massad et al. 2010).

In regards to the tables and figures, the authors should strongly consider merging Figures 2-5. As they currently sit, there is a large amount of redundancy.

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