

Interactive comment on “Soil nitrogen oxide fluxes from lowland forests converted smallholder rubber and oil palm plantations in Sumatra, Indonesia” by Evelyn Hassler et al.

Anonymous Referee #1

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The authors present measurement results for nitrous oxide and nitric oxide emissions from natural forest and important land-uses (rubber, oil plant) for a region in Sumatra, Indonesia. As these measurements are labour and/ or capital intensive they are still scarce especially for (remote) regions of the tropics and sub-tropics. In light of the strong temporal and spatial variability of the soil-atmosphere exchange of these gases and their importance for the greenhouse gas balance and tropospheric chemistry, new field measurements are of great merit to the scientific community and publication should be promoted whenever possible. Considering the logistics and associated costs the sampling intervals are sufficient but a more frequent sampling routine and/ or (semi-)automated sampling procedures would have helped to better cover the, of-

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ten dynamic, gas exchange (but a monthly sampling interval is generally reasonable to illustrate seasonal dynamics). However, this rather low sampling frequency leads to poor (temporal) replication (as illustrated by the substantial standard errors in many sampling times) even if the spatial sampling design is sound.

A general problem I have with this manuscript is the length of many sections and the wordiness of many paragraphs. The abstract alone comes in at ~430 words and could be substantially shortened (no need to describe site replication for instance). The “Materials and Methods” section for instance is extremely long (9.5 pages) and should be streamlined.

In contrast, the discussion in particular would benefit from greater detail (and discussion with results from other regions of the world). Also to me, a clear site/ replicate nomenclature would better guide the reader through the text as the full measurement setup is rather complex (two soil landscapes, 4 land uses, 3 chamber positions at each site, 4 replicates). For instance, if the authors could define some site abbreviations (e.g., reference land uses: F (forest), JR (jungle rubber); converted uses: RP (rubber plantation), PP (oil palm plantation), they could simply use those instead to repeat the site attributes or be overly descriptive. This is also true for the naming of the three within-site chamber positions (currently: a, b, c). While their properties are described in the text, and also in the caption of table 4 it makes the digestion of the data presented unnecessary hard for the reader (maybe: F1 (fertilised area position 1 / 0.3m from stem), F2 (fertilised area position 1 (0.8m from stem), NF (non fertilised: 4.5m from stem). In lengthy paragraphs it is easy to get lost and scramble to read up what i.e. position b represents (same for the reference to the proposed hypothesis’).

Furthermore, I feel that reorganising and cleaning the tables would help the better digest the main results presented. Table A1 & A2 should be combined and added to the main text.

The figures are appropriate, but could also be improved, too (see detailed comments).

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Please also note the supplement to this comment:
<http://www.biogeosciences-discuss.net/bg-2016-357/bg-2016-357-RC1-supplement.pdf>

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2016-357, 2016.