Atmos. Chem. Phys. Discuss.,
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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Satellite evidence of substantial rain-induced soil emissions of ammonia across the Sahel" *by* Jonathan E. Hickman et al.

Anonymous Referee #2

Received and published: 6 August 2018

I have read the comments from the first reviewer and agree that this is a clear, well written and very interesting paper. I also agree that the offset between the NH3 and NO2 peaks should be discussed in slightly more depth. What does the INDAAF NO2 data show?

I do think some clarification from the authors would be helpful on the following issues:

Page 7, line 7: please add a sentence of two on the regridding technique used.

Page 7, line 11: what is the IASI detection limit in the Sahel?

Page 8, line 24: it appears that a uniform profile is assumed here. Is this really a good

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assumption?

Page 11, line 11: I don't see the increase in fire emissions in late March

Page 12, line 25: It could be helpful to rewrite this as: " except during the biomass burning season"

Page 13, line 23: at what scale where these correlations calculated: 0.25 deg or over the entire box?

Page 15, line 22: possibly repeat that IASI NH3 appears to be biased low

Page 17, line 17: only NO2 concentrations become comparable to NH3, not the fluxes

Page 18, line 8: a more sophisticated inverse modeling of the emissions? This should be made clearer, and should suggest an approach

Page 18, line 10: the increased cloud cover during the rainy season could certainly mask increased NH3. Cloud cover would also impact OMI NO2, but possibly not to the same degree. If at all possible, the authors should discuss this.

Minor comments:

Page 4, line 27: the second sentence does not follow from the first

Page 7, line 7: IASI data are only used if the pixels are 75% cloud-free, while OMI data is included only if the cloud-cover is less than 30%. While these statements are almost equivalent, it would be clearer to say 75% cloud-free and 70% cloud-free, or cloud cover less than 25% and cloud cover less than 30%.

Page 9, line 25: "burned area and fuel consumption in savannas are"

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