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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Secondary Organic Aerosol from Atmospheric Photooxidation of Indole" *by* Julia Montoya et al.

Julia Montoya et al.

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See attached.

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2017-270, 2017.

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Discussion paper

Response to Anonymous Referee #1

This manuscript describes a laboratory study on the photo-oxidation of indole under low-NOx conditions. Secondary organic aerosols (SOA) were chemically characterized to determine the importance of indole chemistry in the formation of brown carbon (BrC) constituents. State of art analytical techniques (high-resolution mass spectrometers) used is this study, provide novel and important insights into the understanding of the formation of BrC in the atmosphere. In addition, the authors have evaluated the importance of their findings using a regional model and have highlighted that oxidation of indole could have an important role in SOA formation as well as BrC compounds. Since these results help to provide accurate atmospheric chemistry models for the oxidation of BVOC, they are an important contribution to the literature. While the results are interesting and are appropriate for Atmospheric Chemistry and Physics, few clarifications (c.f. comments below) should be provided and would benefit from clarifying revisions.

1.1 Page 2. Lines 7-15: The authors should consider adding some information on the emissions of indole in the atmosphere and compare them with the emissions of other BVOCs. In addition, what is the contribution of the human activities (e.g. agriculture, pharmaceutical application) in the global emission of indole?

The literature review on the emission sources of indole that was included in the introduction section manuscript was fairly comprehensive. However, we have added additional references dealing with emissions of indole from animal husbandry (see response 4.1 to reviewer #4).

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Discussion paper

1.2 Page 4. Line 5: Could the authors provide more information on the settings of the PTR as well as the time and mass resolutions?

We added information on the PTR-ToF-MS settings to the first paragraph in section 2.

Secondary Organic Aerosol from Atmospheric Photooxidation of Indole

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Abstract. Indole is a heterocyclic compound emitted by various plant species under stressed conditions or during flowering events. The formation, optical properties, and chemical composition of secondary organic aerosol (SOA) formed by low-NO_x photooxidation of indole were investigated. The SOA yield (1.~~1~~ 3 ± 0.3) was estimated from measuring the particle mass concentration with a scanning mobility particle sizer (SMPS) and correcting it for ~~the~~ wall loss effects. The high value of the SOA mass yield suggests that ~~the majority of~~most oxidized indole products eventually end up in the particle phase. The SOA particles were collected on filters and analysed offline with UV-Vis spectrophotometry to measure the mass absorption coefficient (MAC) of the bulk sample. The samples were visibly brown and had MAC values of ~2 m^2/g at λ = 300 nm and ~0.5 m^2/g at λ = 400 nm, comparable to strongly absorbing brown carbon emitted from biomass burning. The

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Comment [SN1]: The last name of the first author has changed between the ACPD and ACP submissions. Congratulations Julia!