

Interactive comment on “Ideas and Perspectives: On the emission of amines from terrestrial vegetation in the context of atmospheric new particle formation” by J. Sintermann and A. Neftel

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General comments

The manuscript summarizes state of the knowledge in amine emissions from terrestrial vegetation, and the understanding of the role of amines in new particle formation (NPF). Although, high uncertainties remain, the role of amines in NPF clearly seems to be better understood than the sources of amines from the biosphere, and the biogeochemical processes involved. This review successfully summarizes the role of one of the potential sources of amines in terrestrial ecosystems, namely vegetation. The text is enjoyable to read, the literature review is thorough and spans back to 1800's

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and ties nicely the reported amine measurements in vegetation to the role of amines in NPF. Overall, I think this paper is a valuable summary of the current understanding and I suggest it is accepted with minor revision.

In order to further improve the paper, and to make a more balanced picture of the current understanding of different terrestrial sources of amines, I suggest, despite the uncertainties, that more space is given to discuss potential for amine emissions from soils and fungi. This can be done by reorganizing the chapter 3 (Vegetation as a potentially significant source ...) so that all the other sources of amines (soils, fungi etc) are presented in the end, or preferably so that a new chapter is added (e.g. 4: soils and fungi as other potential sources for amines) to discuss amine concentrations and potential for emissions from fungi and soils. These issues are already shortly discussed in page 3221, rows 21-26 (fungi) and pages 3222-3223 (soils), and could now be given a bit more attention and deepness. Despite the fact that these topics are very little studied and the discussion may remain speculative, they may be equally important sources of amines, and hence should not be left out from the discussion. This is also closely related to the aspects of the potential impact of increased reactive nitrogen (Nr) load onto terrestrial ecosystems, as it is clear that an increase in Nr will certainly influence soil N turnover processes, which may stimulate also amine formation and emissions.

Specific comments, Page referred as P, Row as R:

P3221, R10: the word habituated is not correct here. Change e.g. to "... commonly growing in Europe...".

P3221, R11: add a comma. "... (Christensen, 1992), and has...".

P3221, R21-26: consider moving this chapter together with discussion on potential amine emissions from soils. Fungi grow inside the soil and have a large hyphae within the soil. Hence, soil processes related to decomposition of fungal hyphae and decomposition of soil organic matter refer to soil processes, which may lead to amine

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emissions. It naturally remain unclear to what extent these processes are of microbial origin, or driven by plants via stimulation of microbial activity by root exudates.

P3222, R16-17: correct “Henry constants” (R16) and “Henry coefficients” (R17) to “Henry’s law constants”.

P3223, R23-25: I think it is misleading to state “other vegetation-related amine emissions” when you list fungi and decomposing organic matter as potential sources of amines. I suggest to modify this for example to: “Potential amine emissions from non-flowering plants, fungi and decomposing organic matter probably exhibit a wider amplitude during the year with a probability to intensify towards the autumn.”

P3224, R6-8: This sentence is too long and unclear. Suggest to modify it e.g. to: The role of biogenic amine emissions remains speculative; however, amines have been suggested as key elements in the stabilization of small clusters, ...”

P3224, R18: delete “caused an”

P3224, R20: replace “by such a process” to “due to increased Nr”.

P3224, R21-25: This part of the text leaves open questions as to how, and to what direction does the human-induced climate change influence amine formation and emissions. Could you speculate this a bit more openly: what do you expect and why?

P3224, R27-29: Some clarification and rewriting is needed. I would change it e.g. to: The present discussion illustrates the potential for (what?, amine?) emissions and a significant contribution of Nr? to atmospheric amines, and underlines their (what do you refer to?) relevance to NPF.

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