

Interactive comment on “Soil concentrations and soil-atmosphere exchange of alkylamines in a boreal Scots pine forest” by A.-J. Kieloaho et al.

Anonymous Referee #2

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The authors present an interesting analysis of soil and atmospheric concentrations of some simple alkyl amines, and use the resistance analogy to estimate the fluxes in a forest ecosystem. Because amines are considered to play an important role in new particle formation, more information about their sources and sinks is valuable. A novel aspect is the identification of fungal hyphae as an important source of amines in the soil. Overall, I think the paper is a useful contribution and should be published after some minor changes.

The main weakness of the paper is the assumption that the soil solution concentrations of amines are constant over the entire May-Oct period, and representative of the study area. This has a major impact on the quantitative (and possibly qualitative) conclusions and does not seem to have been validated in any way. Is this assumption at least consistent with the magnitude of the emissions estimated for DMA (i.e. are fluxes of

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the size likely to deplete the soil pool over the measurement period, in the absence of other processes)?

Another drawback of the analysis is that the time resolution of the atmospheric samples (weekly integration) is much lower than the timescale of variability in the conditions that drive the fluxes. Therefore the authors are forced to assume that the average concentration holds throughout the integration period, which is almost certainly not the case. I think one additional sensitivity study would help in assessing how much uncertainty this introduces to the flux estimates. For example, if an artificial diurnal cycle could be imposed on the atmospheric concentration data (giving the same average concentration), with a factor of two difference in concentrations between noon and midnight, how would this affect the calculated fluxes?

Specific comments It should be clarified in the abstract that the mixing ratio attributed to DMA could also have contributions from EA. Section 2.3 - What procedures were used to confirm that the target amines were stable in the extraction procedures described? Perhaps more relevant, can you be sure that there's no contribution from larger molecules degrading to release these simple amines during the extraction procedure? Section 2.4 - How reasonable is the assumption that the soil solution concentrations are constant over the entire May-Oct period, and representative of the study area? This has a major impact on your conclusions and does not seem to have been validated in any way.

Technical comments L24 – atmosphere is misspelled For the Sipila paper, the reference is to the Discussion rather than final version

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