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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characterisation of bioaerosol emissions from a Colorado pine forest: results from the BEACHON-RoMBAS experiment" *by* I. Crawford et al.

Anonymous Referee #1

Received and published: 4 February 2014

The authors present data from a month-long campaign concentrating on bio-aerosol characterization with Ultra-Violet-Light Induced Fluorescence (UV-LIF) technique. They explore the bioaerosol temporal variability, diurnal cycles, connection to rain and humidity as well as the emissions of the bioaerosols that they classify based on cluster analysis.

The article is well written and provides important insights into bioaerosol concentrations in the forested environment. I recommend this manuscript to be published in Atmos. Chem. Phys. after my minor comments have been addressed.

General comments:

The title is somewhat confusing as it mentions bioaerosol emissions. The emission flux is only presented in Fig 16 with the note that the typical constrains for the flux estimates have been relaxed. How reliable are these estimates?

The first part of the paper discusses the cluster analysis providing the separation between the bioaerosol types. The connection between the bioaerosol concentration and relative humidy as well as rain intensity is explored in detail. I understand that there is a need to parameterize the bioaerosol as function of environmental parameters, but what is the physical justification of a polynomial fit to the data?

In my opinion, the short discussion on ice nuclei concentrations and their connection to bioaerosol concentrations is somewhat outside of the primary scope of the paper. One of the main conclusions is that canopy was identified as the main source for bioaerosols. This is not apparent from Figure 9 as the different factors show high concentrations both at the surface and inside the canopy.

Minor comments:

p. 2507: How is the variability in the refractive index taken into account in the measurements?

p. 2510: The authors state that there is a good agreement between the instruments operated with a 300-m distance between them. Were the instruments operated in laboratory / field at the same place to verify that there is no systematic bias that could explain this?

p. 2513: Do you consider OPC and/or other aerosol physical characterization data in the cluster analysis, ie. is your A3 and A4,1+A4,2 factors correlating with the accumulation mode concentrations? Also discussed in section 5.1.

Technical comments:

p. 2501, line 22: Observations on emissions and their relation to disease dynamics and pathogen dispersal one could cite Tack et al. (2014).

p. 2503, line 15: this sentence needs a reference.

p. 2505, line 16: please use SI units throughout the paper.

p. 2506, line 25: L min-1 ?

p. 2513, line 3: . . . between the clusters.

p. 2517, line 13: . . . the greatest

p. 2517, line 25: . . . the greatest

Figure 2-6, 8: use capical L for liter consistently.

Figure 9: Averaging time? Would median work better? This could be normalized to the total bioaerosol concentration.

Figure 14: . . . concentration

References:

Tack, A.J.M. et al. (2014) Genotype and spatial structure shape pathogen dispersal and disease dynamics at small spatial scales, Ecology, http://www.esajournals.org/doi/abs/10.1890/13-0518.1. (in press).

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 2499, 2014.