

acp-2014-48. Healy et al.
Author response to reviewer #1
10-May-14

Thank you for your thoughtful review and for the recommendation to publish the manuscript with after minor amendments discussed below. Reviewer comments below are in italics.

Specific referee comments (R) and point-by-point author responses (A):

R1.1. *The first sentence of the abstract is difficult to read past "...in many environments, may thus influence..." and I suggest fragmenting this sentence.*

A1.1. In response to the reviewer's suggestion regarding the first sentence of the abstract, the authors have re-structured the opening sentence of the abstract to read as follows:

"Primary biological aerosol particles (PBAP) can contribute significantly to the coarse particle burden in many environments. PBAP can influence climate and precipitation systems as cloud nuclei while also play a role in the spread of disease to humans, animals, and plants."

R1.2. *Page 3878 line 15, consider using a comma after "Recently".*

A1.2. The authors would like to thank the reviewers for the recommendation of inserting a comma after the word recently (Page 3878 line 15) and have inserted comma as suggested.

R1.3. *Page 3878 line 17, The acronym IN first appear but is not specified.*

A1.3. *The authors have now specified IN as Ice Nuclei in the text of the manuscript as suggested.*

R1.4. *Please consider adding to the introduction a very brief description illustrating how important the context of the biological aerosol types measured by these instruments are within the bigger biological field, e.g. I would like to be able to have an indication in the text as to whether these instruments capture the full bio-aerosol picture.*

A1.4. A detailed understanding of how the UV-LIF techniques discriminate PBAP is important, but complicated. We introduce some of this complexity within the manuscript by introducing the idea that certain fungal spores (e.g. *Cladosporium* spp.) are not likely detected with high efficiency by either instrument. We also discuss that particle size is an important characteristic for detection, as it is within all optical particle sizing instruments. We appreciate the reviewer's comment, and added a short summary of this information in the introduction to introduce the main aspects of the

instruments that contribute to the ability to miss identify particles as non-biological. On Page 3879, Line 20 we inserted the following text:

“In contrast, no real-time technique for PBAP analysis is able to comprehensively detect all classes of biological material. Microorganisms too large or too small for efficient collection by UV-LIF instrument will undercount these particles and some PBAP may fluoresce too weakly to be detected in many circumstances.”

R1.5. *Within the text associated with the description of Figure 2 there are comments about how comparable the Spore concs in (a) are with the measurements FL1-3 and UV-APS (b-e). This is difficult to judge and becomes clearer once the text moves to Figure 6. Maybe this could be pointed out in the text.*

A1.5. To clarify the text as suggested by the reviewer we have added a sentence to P3888, L29:

“Correlation analysis discussed later highlights the agreement further (Fig. 6).”