

Biogeosciences Discuss., referee comment RC2
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Comment on bg-2021-162

Madeleine Petersson Sjögren (Referee)

Referee comment on "Mass concentrations of autumn bioaerosol in a mature temperate woodland Free Air Carbon Dioxide Enrichment (FACE) experiment: investigating the role of meteorology and carbon dioxide levels" by Aileen B. Baird et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-162-RC2>, 2021

I believe this manuscript addresses relevant and interesting scientific questions within the scope of BG. In general, the aim, the methods and the conclusions for the study are clearly presented. I believe the authors refer to relevant references. The paper presents a novel method for measurement of biological aerosol particles. I believe you could consider including the use of low-cost sensors in the title since this is an important concept of the paper.

The abstract is clear and straight-forward. I believe the references in the introduction are relevant. When reading the introduction I was curious if the type of sensors you are using have ever been used in the same way before? I'm also wondering if it can be made clearer why you hypothesize that the fungal bioaerosol concentration should increase with increasing CO₂?

The methods section is extensive. I believe the confirmation done with the macro-fungi survey is important but I'm not sure you explain this survey thoroughly: Would it be possible to extend on this matter? I work with aerosols and bioaerosols but I am not familiar with this type of macro-fungi survey. Or put in a reference?

In the instrumentation section you make assumptions about the particle density and the refractive index, how did you chose those? Do you have a reference for the choice?

Did you look into the literature how the presumed concentrations of bioaerosols that you measure compare to the concentrations measured with other more specific instruments (e.g. WIBS and UV-APS) in forests?

In general I believe you do not report on the statistical methods used extensively enough. For instance, the Loess curve you fit is only mentioned in figure captions but not in the text. Why did you fit a Loess curve? What relationships did you expect? In row 309 a linear relationship is mentioned but I find no account of how the linearity of the relationship was assessed. What statistical tests were used to assess if there is a difference or not in row 339? When listing your conclusions, could you include significance? For instance for the decrease in bioaerosol at lower temperatures? How was this decrease measured? In scatter plots you show prediction intervals/confidence

intervals: can you explain them in the text?

On row 256 you mentioned that RH was high throughout the measurement period, clarify what you mean by high?

Text in Figure 2-Figure 7 are too small. Legends are also missing and should be put in. Make sure you clearly explain the difference between colors in the plots. For Figure 2 a difference in color intensity is mentioned in the caption but I can't detect this intensity difference, can you clarify this? For panel E and F in Figure 2, is the data hourly or daily? What is the resolution for the data displayed in Figure 3A?

At row 296-297, there is a sentence "Detecting events..", is this a conclusion you're making about the sensors? I'm not sure I follow the reasoning, can you extend on it?

When listing your conclusions, could you include significance? For instance for the decrease in bioaerosol at lower temperatures? How was this decrease measured btw?

Technical issues:

r. 34: Missing/redundant parenthesis bracket?

r. 93 (first row of method) add , UK. after "Staffordshire".

Figure 1: can you possibly mark the array pairs in some way? (to make it obvious that they are pairs)

r. 145 Perhaps you would like to include a reference for the OPC Mie scattering since you are mentioning this

r. 177 reference missing

r. 177 maybe you can refer to Table 1 here so it's clear that the OPC:s were moved around among the different arrays.

Table 1: To make the table easier to read, can possibly leave out the year and just have month and day for the date range?

Figure 4: Reference is missing here. Also check that the caption is correctly written.

Figure 5: Can these figures be adjusted to fit into one and the same frame. As they are now presented they take up a lot of space.

r. 343 reference missing.