

# ***Interactive comment on “Model-Measurement Consistency and Limits of Bioaerosol Abundance Over the Continental United States” by Maria A. Zawadowicz et al.***

## **Anonymous Referee #1**

Received and published: 4 April 2019

### **1 General comments**

Zawadowicz et al. explore a new methodology for measurements of single particles based on single particle mass spectrometry (SPMS), in order to derive vertical profiles of bioaerosols. Measurements of the latter are still scarce and hard to come by, but extremely valuable in order to improve aerosol models and gain a better understanding on the importance of bioaerosols on global precipitation patterns.

Unfortunately, the article has one flaw, which is the use of year 2000 meteorology in the model, instead of the years of each campaign. I would thus strongly suggest to

C1

rerun the model with the appropriate meteorologies in order to strengthen the results.

However, in case this isn't feasible, I would still recommend this paper for publication, as the data and insight gained through their new measurement methodology is still highly valuable and worth publishing. Fortunately, even with the “wrong” model year, the overlap of in situ measurements with the model results is highly remarkable.

Because of the value of this data for the community, I would also suggest to the authors to publish their data openly as a supplement, as it could be re-used to improve climate models that work with bioaerosols.

### **2 Specific comments**

p. 2 line 29: Citation for WIBS instrument lacking. Add link to <http://www.dropletmeasurement.com/wideband-integrated-bioaerosol-sensor-wibs-neo>, not just to articles using it in their research. Alternatively, you can add the link to page 3, line 30, where you mention which company is producing WIBS.

p. 3 line 12: Maybe add a reference to the 2015 mountaintop study you're mentioning.

p. 6 line 16: It is a pity, that the simulations run with GLOMAP were performed for the year 2000 and haven't used initial data from the years the sampling took place. Is there a reason why you did this? If so, please explain. Using the wrong year might lead to uncertainties and weaken the strength of your result. If possible, I would strongly advise for rerunning the model to match the specific year of each campaign.

p. 6 line 25: Please explain in a bit more detail how the seasons affect the mixing ratios of bioaerosol with silicates. Especially in the MACPEX campaign the ratio is rather high. Why?

p. 7 lines 9 and 10: It is very unfortunate, that the model is driven by year 2000

C2

meteorology and wasn't rerun for the years of each campaign. Convective systems are one of key factors for transporting bioaerosol into higher atmosphere levels where they can act as ice nuclei and thus influence precipitation patterns.

### **3 Style and orthography comments**

Overall, the manuscript would benefit from another read-through in order to improve the flow of language and correct typographical errors, like missing punctuation. This is however not a deal-breaker, as the science is sound and the findings important.

Here are some errors that caught my eye:

p. 2 line 5: replace "it is" with "they are"

p. 2 line 8: there is a full stop missing between "et al., 2012)" and "In order to evaluate...".

p. 2 line 8: instead of "spatially, temporally" write "spatial, temporal"

p. 2 line 12: Bioaerosol are usually treated as a plural noun. Therefore, one should write: "Bioaerosol originate from..." instead of "...originates from...".

p. 15 Table 1: space between "