

Response to the Editor

We thank the editor for his interest in our paper and highly relevant observations and comments. Below we address his comments, questions and suggestions, where we have highlighted our response in blue.

New text added on P.3, lines 82 to 89:

Please specify whether you mean number fraction or mass fraction, e.g. in lines 85 to 89. I think the referee's comment was on the relative contribution and relevance of bioaerosols to the CCN number concentration, so number fraction is more important here than mass fraction.

Here, and throughout, we have modified the text to clarify that we are talking about number concentration and number fraction, and not mass.

Check for typos and correct spelling, e.g. "bioaerosols constitute a major fraction of the total aerosol load" or "As far as urban and rural atmosphere (do you mean "environments" here?) are concerned, bioaerosols of size (radius or diameter?) greater than ...":

We have now read through the manuscript several times and made a number of corrections for typos, poor or awkward grammar and unclear language.

New text added on P.4 lines 91 to 95:

I think you should not just copy-and-paste the text from the answers to the referees to the manuscript here. Please modify and adapt the new text to the already existing text flow in this paragraph.

This was an unfortunate oversight when we were implementing the previous edits and we have rectified this error.

P.4, lines 100 to 105: "Meteorological factors are mentioned in all three sentences and statements (tropical climate, soil moisture, trade winds, high humidity, wind speed), and I did not understand why you start the third statement with the word "nevertheless". Please re-phrase and be clear about the most important factors influencing air quality and particle population in the area.

P.4, line 106: I think air pollutants can be degraded, but not air quality.

P.4, line 108: I think "considered developed" is grammatically incorrect

P.4, lines 109 to 113: Please check for correct grammar. Which data do you mean in line 111?

P.4, lines 113/114: The source of particles from biological origin was already mentioned in lines 100 to 103. Please bring added text in better context with already existing one.

The entire section referred to in the editors comments above has been rewritten and now reads:

"Puerto Rico is characterized by tropical climate, urban land cover and use, moist soils, unique topography, and dense vegetation. These factors, associated with the easterly trade

winds from the East, influence the properties of atmospheric particles (Velázquez-Lozada et al. 2006). In addition, meteorology, i.e. humidity, temperature and winds, has an important role, especially during the rainy season when fungal spores are predominantly released.. The air quality of Puerto Rico suffers at times as a result of anthropogenic activities, African dust storms and volcanic eruptions on nearby islands. Emissions from to the local pharmaceutical and power generation plants are responsible for releasing millions of pounds of air pollutant annually as well as a large number of organic compounds (e.g., n-alkanes, esters, phthalates, siloxanes, and other) including plasticizer released into the atmosphere, which could pose major health threat in this area (Torro-Heredia et al., 2020)."

P.7, line 205: "colder" instead of "cooler"
Modified as recommended.

P.7., line 208: "... and the flow rate"
Modified as recommended.

P. 8, line 243: Better "There are numerous ... "?
Modified as recommended.

P. 14, lines 356 to 359: Double-check for sentence structure and grammar and re-phrase.
Restructured and reworded as recommended.

P.24, line 521: "... larger than that of ..."
Modified as recommended.

P. 27, line 590/590: Please explain in more detail what you mean with "almost all of the fungal spores" and why you think this "is evident".
This has been changed to read "Based on a comparison of the species of spores found at the university, compared with those measured in the El Yunque rain forest, Lewis et al (2019) concluded that the rain forest was the likely source of the majority of spores identified in the city of San Juan, and hence at the university."

P.27, lines 597 to 599: I think that spores are not particularly "good" INP among all bioaerosols, and can also be transported over longer distance, means that their impact on primary ice formation in clouds may not be limited to the local area as stated in the new test added. I therefore recommend to re-formulate the statements on spores as INPs, and somehow extend this part to make the point clear to the reader.
The discussion related to bioaerosols as INP has been removed as it does not contribute to the general theme of the paper and cannot be supported without associated INP data.

Please check the figures for appropriate and well readable font sizes, in particular in the legends.

Figures 4 and 8 have been redrawn with larger fonts.

I agree to the referees that the manuscript would benefit from sentence structure, spelling and grammar check. This still holds for the revised version of the manuscript (see also comments above).

One of the authors, whose first language is English (Baumgardner) has gone through the manuscript with a fine-toothed comb and made extensive modifications to improve the readability and clarity of the text, as well as correcting some of the grammar, without changing any of the technical or scientific discussions.