

Dear authors

Thank you for the thorough revision of your manuscript. I have several questions and comments, which may be beneficial to further improve the readability and impact of the paper. Generally, I was wondering in how far it is appropriate to refer to bacteria instead of microbes in general. As far as I see, no clear characterization excluding archaea, or small eukaryotes including fungi, is available. The Live-Dead staining may be more useful for bacteria but – and correct me if I am wrong- does not exclude other organisms. It would be interesting to learn if other organisms could be transported through air, and a discussion if only in some sentences would be very interesting especially given the presented hypothesis of pathogeny but also regarding cross-fertilization of different geographic regions.

Another question which I have is that the paper describes how fractions are detached from the filters using vortexing and ultrasonic vibration. In how far can we be sure to not lose a significant fraction of organisms due to lysis induced by the latter method? Could this happen and therefore lead to an even more conservative result?

I am curious about dust transport in the context of global warming- what would be expected? How would this impact on bacteria transported by dust particles?

I also have several specific suggestions in order to improve the manuscript presentation:

L. 10 This sentence is confusing, it is unclear what is meant by 'widespread bacteria', it is also hard to understand what 'both types' refers to.

L. 11 'to be harmful'

L. 15 'blew' could be replaced by 'transported'

L. 16 please remove 'there'; 'averagely' is used frequently throughout the manuscript- I suggest rephrasing with the more common 'on average'

L. 17 please replace 'in the total bacteria' with 'of the total bacteria'

L. 20 I assume 'presented' would be more suitable than 'present'

L. 21 'substantial amounts of bacteria'

L. 22 'through the atmosphere'; I suggest replacing 'non-negligible' with 'important'

L. 23 I'm not sure what is meant by 'internally mixed assemblages'

L. 23 I suggest rephrasing as follows 'in cloud formation, in linking geographically isolated microbial communities, and possibly impact on human health.'

L. 27 'significant potential effect' is a contradiction in itself- would the effect be a potential one or is it a significant one?

L. 44 'are without any doubt'; this sentence, however, does not transport sensitive information, one way to solve the emptiness of the sentence would be to merge it with the following one.

L. 46 Please remove 'for such research'

L. 47 'have previously been investigated'

L. 48 'different survival mechanisms'- this would be clearer if phrased as 'various survival strategies'

L. 48 ff This sentence is very long and difficult to read, please consider simplifying.

L. 59 What is an Andersen cascade impactor

L. 72 'in spring 2013-2016'

Methods: I suggest moving section 2.3 to 2.1 so that it is easier to understand how atmospheric conditions were defined

L. 111/ 112: Please remove 'bacteria' after 'particle-attached' and after 'free-floating'

L.115 ff I suggest giving a short overview of the uncertainties to provide a solid basis for the statement on the potential underestimation. Like it is now, the reader doesn't have the chance to understand what this section is about. 'presented method'?

L. 120 'which were trapped'; What does 'with difficulty' tell us, how do we know this was difficult? If bacteria  $<0.43\ \mu\text{m}$  were not recovered appropriately this would mean that a significant fraction of free-floating cells is probably missing?

L. 133 Please give a short overview on the categorization details

L. 136 Some level of detail on this model would be helpful.

L. 151 ff: This section refers to size ranges while figure 1 uses the categories 'viable bacteria, non-viable bacteria, dust-like particles'. This should be unified; it is difficult to connect the text to the figure otherwise.

L. 157/ L. 159: Both sentences start with 'There were', this could be avoided by merging those sentences.

L. 168/169 Here, the standard deviations were removed, as a result the numbers show a difference of a factor of roughly two. However, this seems misleading because if the ranges are included there is no significant difference. I am aware that one reviewer recommended to remove the ranges but given the danger of misinterpretation I would recommend including them, again.

L. 169 I somewhat disagree on the term 'large'. If a significant difference is claimed a statistic evaluation would be required.

L. 172 Please rephrase this sentence, a suggestion would be 'During dust periods particle-attached bacteria accounted for 72 % of total bacterial counts, while during non-dust periods, they were recovered in slightly lower proportions of 56%.

L. 'signify' is a somewhat strong statement which I am not convinced is supported. Rephrasing to 'suggest' could solve the problem, here. In addition, how do we know where the particle-attached bacteria are transported to?

L. 175 'was in some cases higher'

L. 178 'Therefore, a substantial fraction of bacteria was free-floating.'

L. 189 – L. 192 I have difficulties understanding these two sentences- maybe this could be rephrased

Section 4.1: Consider re-naming in a way that the title refers better to the content

L. 253 'comparison'

L. 258 Does 'as warm as' mean 'up to'?

L. 308 'substantial numbers of bacterial cells'