

Interactive comment on “Microbiology and atmospheric processes: chemical interactions of Primary Biological Aerosols” by L. Deguillaume et al.

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General comment: This is an important contribution to the collection of papers in the Special Issue.

Specific comments:

The following are comments by a cloud physicist, not an atmospheric chemist. As such, they reflect interest in the paper as a survey of how much is known about the role of bioaerosols in the atmosphere, not in the details of the studies discussed.

The paper seems to overextend itself when it summarizes the large range of aerosol

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processes in the atmosphere, including cloud processes. This is meant as a framework for considering the participation of bioaerosols in these processes, and that is natural. Yet, it might be better to assume a certain degree of familiarity on the readers' part with these issues and focus more directly on the special features that relate to the bioaerosol.

Section 2 sets out to generate an appreciation for the abundance of bioaerosols. This goal is only partially accomplished. The examples seem somewhat anecdotal rather than comprehensive, and the authors do not indicate their assessments of the importance of one or another finding.

In Section 3, exemplifying the comment I made at the beginning, the first paragraph is poor, whereas the second and subsequent paragraphs are much clearer and more useful. The paper begins to "take off" with this material.

With respect to Section 4, the impression is that it is focussed on processes at the expense of directing attention to completing what is known about the cycles of PBA from sources to removal, characterization of sizes and cloud nucleating ability, and dependence on location (land, sea, land cover, ...), season, altitude, etc. That focus is in accord with the title of the paper and most of its content (except Section 2), but it is difficult to think of priorities and to consider approaches to attacking the problems listed without the perspective provided by these diagnoses.

It would be helpful if the authors settled on one set of terminology to the maximum extent possible. Now there is "air particulate matter" and "aerosol". There is "bioaerosol" and "airborne micro-organisms" and "primary biological aerosol". If some important distinctions are meant, that should be made clear, or, if they are used only for a variation in sound than their equivalence should be made evident.

Technical comments:

pg 842, In 18: This reference to the spread of diseases is probably meant as a historical

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one, in the sense that knowledge of those events constituted early diagnoses of the fact that microorganisms can spread through the air. This emphasis would be better than the current one that seems to focus on the fact itself. Also, there are broader references for this than the one given (Gregory, P. H., 1961: The microbiology of the atmosphere, Leonard Hill [Books] Ltd., London, New York, xv+251 pp.; Gregory, P. H., 1971: The Leeuwenhoek Lecture, 1970: Airborne microbes: Their significance and distribution. Proc. Roy. Soc. Lond., 177, 469-483; Edmonds, R. L., 1979: Aerobiology: The ecological systems approach. US-IBP (International Biological Program) Synthesis Series No. 10, 386 pp.)

pg 842 In 25: Vali (1996) has no co-authors.

pg 843 In 17: Remove the word "particles"

pg 844 In 14: The inclusion of 'components' in the definition may have to be refined, since PBA can become attached to other materials while in the air, as well as becoming airborne together.

pg 846 In19: Use "aerosol", not "aerosols". The list of causes of possible transformations should include radiation.

pg 846 In 23: This paragraph goes through many different measures of bacterial abundance without any ready basis for comparisons because of the variety of methods and units. This is confusing. In line 26 it is not clear if the units are per volume of air or volume of water. Would a table be more direct? Also, ranges might be as revealing as mean values.

pg 847 In 17: In Fig. 1. it appears that 'Particules' is used for non-biological material. A new definition? This just adds emphasis to the comment made earlier about consistency in terminology.

pg 847 para 1: It seems to say that the liquid phase is "exchanging chemical molecules" with the condensed phase. Too many words here without proper scrutiny. The second

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sentence ascribes the indirect effect to liquid phase chemistry; that is not correct.

pg 848 ln 1: "chemical molecules" is a redundant phrase

pg 852 ln 27: The implication of a cause-effect relationship between chemical composition and the concentration of micro-organisms is probably not what the authors meant. Some correlations maybe. In any case, shouldn't this be in Section 2?

pg 853 ln 5: Qualifying the processes here discussed as 'feed-backs' is not explained.

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