

Interactive comment on “Diversity and seasonal dynamics of airborne *Archaea*” by J. Fröhlich-Nowoisky et al.

Anonymous Referee #3

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General comments

The manuscript by Fröhlich-Nowoisky et al. is an important contribution to the field of microbial bioaerosol research. Information regarding the presence and dynamics of Archaeal taxa in the atmosphere has been limited to incidental findings in other studies where Bacterial taxa were the organisms of focus. The current study by Fröhlich-Nowoisky is, to my knowledge, the first to specifically focus on Archaea in the atmosphere. Overall, I think this is a valuable study, which sheds light on an understudied topic. I found the manuscript to be well written and clear. However, I do have several reservations about this manuscript, many of which were addressed in the comments from Reviewer #2.

First, I would echo the comments from Reviewer #2 regarding the use of Sanger se-

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quencing and the issues around diversity measurements with low sampling depth. I agree that the sequencing methodology should be mentioned much earlier in the manuscript. Second, I agree with Reviewer #2's statement regarding the samples from North America, China, and the UK (as they are noted in Table 1). It seems trivial to attempt to characterize the Archaeal communities present in these samples based on so few sequences/samples. I think the manuscript would be improved if these samples were omitted entirely as they do not add to the overall conclusions of the paper.

In addition, it was not clear to me why the authors chose to amplify and analyze amoA gene sequences. In the introduction (ln 57-58) the authors state that the atmosphere is likely not habitat of Archaea, so it is unclear to me why they chose to focus on metabolic groups of Archaea, specifically the ammonia oxidizers. Does information about metabolic groups explain the influence of possible source environments structuring Archaeal communities?

Specific comments

In 66 – Other studies that detected Archaea in air samples include Yooseph et al. 2013 (DOI: 10.1371/journal.pone.0081862) and Robertson et al. 2013 (DOI: 10.1128/AEM.00331-13)

In 194-201 – Why were two set of 16S primers used? This is addressed in the supplement but I suggest briefly mentioning it in the main text.

In 322-325 – I recommend removing this sentence unless there are other studies to support these claims.

In 450-451 – also see Bowers et al. 2011 (DOI: 10.1038/ismej.2010.167), also previous work by this group (Després et al. 2007, DOI: 10.5194/bg-4-1127-2007), there are also several studies using culture-based approaches including Shaffer & Lighthart 1997, and Bovallius et al. 1978

Technical corrections

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In 454-456 – Sentence wording is unclear.

In 490 – capital “C”

Table 2 – San Antonio, Texas & Mt. Bachelor, Oregon

*It is my understanding that Archaea/Archaeal should not be italicized as italicized fonts are typically reserved for genus(species) names.

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