

Anonymous Referee #2

RC#2: Interesting study and most of my comments are minor. The cited Smith paper should be cited as they identified archaea in aerosols that had crossed the Pacific. The manuscript does need a careful review for english errors. Mouse over the notes on the pdf to see suggestions on these but there are others

Please also note the supplement to this comment:

<https://www.biogeosciences-discuss.net/bg-2017-514/bg-2017-514-RC2-supplement.pdf>

AC: We thank the referee for the review and positive assessment of our manuscript, and we are grateful for the detailed comments which are very helpful for improving the manuscript. The specific comments and recommended changes concerning grammar and language have been implemented as detailed below.

Specific comment: Page 3 line 11 and Page 11 line 24:

Anonymous Referee #2:

“The cited Smith paper should be cited as they identified archaea in aerosols that had crossed the Pacific.”

AC: We gladly include the additional suggested literature -Smith, D., J. Timonen, D. Jaffe, D. Griffin, M. Birmele and M. Roberts. 2013. Intercontinental dispersal of bacteria and archaea by transpacific winds. *Applied and Environmental Microbiology*. 79(4):1134-1139

Specific comment: Page 5 line 10:

Anonymous Referee #2:

“this isn’t clear....it reads like you overlaid the fine filter with the more coarse one but two different flow rates are presented.....0.03 and 0.27.....if they were not stacked then why was the finer filter essentially free of coarse particules”

Current:

The particles with an aerodynamic diameter larger than  $\sim 3 \mu\text{m}$  and 10 % of the fine particles were collected on one glass fiber filter ( $\sim 0.03 \text{ m}^3 \text{ min}^{-1}$ ) representing the coarse fraction. The fine particles from the same air mass were collected on the corresponding second glass fiber filter ( $\sim 0.27 \text{ m}^3 \text{ min}^{-1}$ ) which was essentially free from coarse particles (Solomon et al., 1983).

AC: We change the sentence as follows to clarify the fact, that the particles are split by their aerodynamic diameter into size fractions by means of a virtual impactor and not through filter pore sizes, which is not clear in the current version:

“The particles were split according to their aerodynamic diameter by a virtual impactor. Particles with an aerodynamic diameter larger than the nominal cut-off of  $\sim 3 \mu\text{m}$  and due to the sampling device additional 10 % of the fine particles were sampled in line with the inlet on one glass fiber filter (flowrate:  $\sim 0.03 \text{ m}^3 \text{ min}^{-1}$ ) representing the coarse fraction. The fine particles were collected on a second glass fiber filter perpendicular to the inlet ( $\sim 0.27 \text{ m}^3 \text{ min}^{-1}$ ) which was essentially free from coarse particles (Solomon et al., 1983).”

Specific comment: Page 5 line 13:  
Anonymous Referee #2:  
“collecting particles....”

Current:

Except for filter pairs MZ 11 (24 h) and MZ 15 (5 d), all filter pairs were collecting air over a 7 day period (Table S1).

AC: We change the sentence as mentioned to:  
Except for filter pairs MZ 11 (24 h) and MZ 15 (5 d), all filter pairs were collecting particles over a 7 day period (Table S1).

Specific comment: Page 9 line 18 – 20:  
Anonymous Referee #2:  
“rewrite”

Current:

As on coarse particle filters many more sequences could be analysed compared to the fine particle filters, analysis of the total suspended particles (TSP) resemble the results of the coarse particles (Fig. 1).

AC: We change the sentence as follows:  
Due to the much higher number of sequences isolated from the coarse particle fraction in comparison to the fine fraction the TSP composition resembles that of the coarse particle fraction (Fig. 1).

Specific comment: Page 12 line 5 - 6:  
Anonymous Referee #2:  
“detected here, with ratios of possible emission sources like soils, surface waters and the phyllosphere”

Current:

We therefore compared the ratio here detected, with ratios of possible emission sources like upper soil, ocean, and phyllosphere.

AC: We change the sentence as follows:  
We therefore compared the detected ratios with ratios of possible emission sources like soils, surface water and the phyllosphere reported in literature.

Specific comment: Page 13 line 15 –16:  
Anonymous Referee #2:  
Proposed changes.

Current:

Although this seasonal behavior of the Euyarchaeota agrees with the findings observed in Fröhlich-Nowoisky et. al, (2014), the relative occurrence over the year seems to be larger than believed.

AC: We change the sentence as follows:  
Although the seasonal increasing or decreasing trends of the RFO values over the year are similar to Fröhlich-Nowoisky et. al, (2014) overall, they are higher.

Specific comment: Page 13 line 19 –20:  
Anonymous Referee #2:  
Proposed changes.

Current:  
The specific RFO values of these orders as presented in Fig. 5 draws, however, a slightly different picture:

AC: We agree and we change the sentence as follows:  
The RFO values of the orders shown in Fig. 5 present a slightly different picture: