

Authors' Response to Reviewer #2

All the reviewer's comments (in **boldfaced red**) have been numbered sequentially. After each comment the authors report their answer indicating eventual modifications that will be made to the revised version of the manuscript.

1) Discussion: Please include comparison between the PLaNET estimates and the previous studies, e.g. the Burrows et al, (2009b) and microbial flux observations from other locations, for instance using the same scaling factor to total microbes as Burrows et al. (2009a) used for grasslands (302).

We would like to thank the reviewer for this comment since it allowed us to explore potential convergences between PLaNET and ECHAM5. In fact, by looking at figure 4 in Burrows et al. (2009) the authors were able to extrapolate a median value for flux of total microorganisms for grassland (as simulated by ECHAM5) of roughly 1000 organisms $\text{m}^{-2} \text{s}^{-1}$. By scaling the PLaNET model outputs for the 2008-2010 and 2015 simulations with the factor proposed by the reviewer an average net flux of 750.49 organisms $\text{m}^{-2} \text{s}^{-1}$ was found. The latter estimate is referring to the new version of the PLaNET model including the new deposition scheme (see response to reviewer #1 and #3) and is a surprising result, considering the fact that PLaNET is still in its infancy. These comparisons will be added to the discussion of the revised version of the paper.

2) Page 11, first paragraph suggests that obtaining a scaling factor to total microorganisms from the culturable fraction requires flux measurements of the total microorganisms. Why cannot the scaling factor be estimated from lower temporal resolution concentration measurements of both total microbes and the culturable fraction in the same site the flux measurements are made?

It would indeed be possible assuming that the culturability of airborne microorganisms does not change during the time span of the "slower" total microorganisms samples. The latter possibility will be added to the text as a suggestion for future experiments (around P11 L11-13 of the old version of the manuscript).

3) Page 11, lines13-18: Culturable and viable are not necessarily the same thing (see e.g Burrows et al, 2009a)

In the new version of the paper term "viability" in P11 L5 will be changed to "culturability" and it will be clarified that epifluorescence, contrary to plate incubation, may detect viable-but-nonculturable microorganisms by adding a short sentence immediately after P11 L5.

4) Page 2, line 20-23: "In the past, only few attempts have been made to quantify the flux of microorganisms from plant canopies (Lindemann et al., 1982; Lindemann and Upper, 1985; Lighthart and Shaffer, 1994) covering only some periods and some land uses." This is confusing, as later the authors themselves reference several other studies that have tried to quantify the fluxes using various methodology. Please specify that this sentence refers to direct measurements of bacterial fluxes.

The suggestion of the reviewer will be implemented by changing the sentence (at P2 L20-21) "In the past, only few attempts have been made to quantify the flux of microorganisms from plant canopies" to "In the past, only few attempts have been made to directly measure the flux of bacteria".

5) Page 4, line 23-24 "The experimental field for these previous campaigns was covered with similar herbaceous species such as cocksfoot (*Dactylis glomerata*), ryegrass, tall fescue (*Festuca arundinacea*) and alfalfa (*Medicago sativa*)." The list of species for the other field on the previous page only included clover and ryegrass, so how similar was the vegetation on these fields?

We apologize for the lack of clarity. The sentence will be corrected with “Herbaceous species with similar habitus” in the new version of the paper.

References cited by the authors in the answers

Burrows, S. M., Butler, T., Jockel, P., Tost, H., Kerkweg, A., Poschl, U., and Lawrence, M. G.: Bacteria in the global atmosphere - Part 2: Modeling of emissions and transport between different ecosystems, *Atmospheric Chemistry and Physics*, 9, 9281-9297, 2009.