

## ***Interactive comment on “H<sub>2</sub>O<sub>2</sub> modulates the energetic metabolism of the cloud microbiome” by Nolwenn Wirgot et al.***

**Anonymous Referee #2**

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The authors present data meant to demonstrate the impact of H<sub>2</sub>O<sub>2</sub> on the metabolism of bacteria in cloud water. The dataset is probably valuable but I find that the data analysis and presentation of the manuscript require major revision before it will be suitable for publication in ACP.

The authors should comment on the important differences that exist between the laboratory setup and the cloud droplet environment, namely due to the much larger volume in the laboratory. How many bacteria can we expect to live in one cloud droplet? How is bacterial population growth in a cloud droplet different from in the laboratory studies discussed here (do we even know the nature of this difference?)?

In the studies described here, while bacteria metabolism impacts the concentrations of trace species (and vice versa), the number of bacteria in the sample is also growing

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(i.e., Figure 3). The different solutions studied showed different growth profiles, as evidenced in Figure 3 - and these growth profiles are no doubt different from what would happen in the much smaller volume of a cloud droplet. Data regarding the kinetic processing of an atmospheric trace species by bacteria in a growing population is not useful, and even misleading, for atmospheric chemists who are the readership of this journal, unless the growth process can be decoupled from the chemical processing rates. One way to do this after the fact would be by normalizing the rate data by the number of bacteria in the sample at each time point. The data should be re-analyzed with this fundamental issue in mind.

The literature review in the Introduction section consists mostly of a discussion of this group's prior work. More of an effort should be made to place this study in the context of the broader scientific literature.

Finally, the language throughout the manuscript and the abstract needs editing. In many instances the language is too vague or informal for a scientific publication. The paper also needs to be edited carefully for English grammar (especially subject-verb disagreement in multiple places in the manuscript).

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