

## ***Interactive comment on “Screening of cloud microorganisms isolated at the puy de Dôme (France) station for the production of biosurfactants” by Pascal Renard et al.***

**Anonymous Referee #1**

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Renard et al. investigate the production of biosurfactants by microorganisms isolated from cloud water. This is accomplished by measuring the surface tension of the crude extracts (supernatants from pure cultures) using a pendant drop tensiometer. The authors find that several strains produce highly surface-active compounds. Most notably, *Pseudomonas* is one of the most abundant and efficient biosurfactant-producing microorganisms in their study. This work makes a meaningful contribution to the field; many groups have investigated both the effect of biosurfactants from terrestrial samples and the effect of surfactants on atmospheric waters, but only one other group has investigated the effect of biosurfactants on atmospheric waters. This may be publishable after the following issues are addressed.

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The authors report equilibrium surface tension values for every microorganism in their study. However, it is unclear how they determine when equilibrium has been reached. All of the surface tension time profiles in Figure 2 appear to be decreasing when the measurements were stopped. That is, the reported equilibrium surface tension values are the minimum values for the time profiles given, but may not be if the time profile was extended. In section 2.3, the authors state a 30-minute maximum for surface tension measurements but give no justification for this time frame.

In Figure 2, the authors show the surface tension time profile for the R2A broth, which is the medium used for all cultures of their isolated microorganisms. However, this may not be a good baseline because incubation period lasts between six to ten days. We accept that the microorganisms are altering the composition of the broth by producing biosurfactants, but they are consuming nutrients in the broth as well. It remains to address how the removal of nutrients would impact the surface tension of the crude extracts.

Furthermore, the authors present a large amount of data regarding the surface tension of crude extracts but do not make a connection to the surface tension of cloud water, which is arguably the basis for this work. Since the authors have already collected the cloud water in order to isolate the microorganisms, it would be useful to also report surface tension values for the cloud water samples as well extend the crude extract results to cloud water.

Finally, the statistical analysis section did not seem to add much to the paper. The main takeaway was that  $\gamma$ -Proteobacteria are efficient biosurfactant producers, which reinforces conclusions from section 3.2. However, the entire analysis seems unsubstantiated. The distinction between air mass origins seems arbitrary. The distinction between chemical compositions is more logical, but the conclusions for that analysis are weaker.

The grammatical errors are too numerous to list individually. This paper would greatly

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benefit from editing by a native English speaker.

Page 5, line 2. Might be helpful to keep units consistent with Page 4, line 33. Either g (preferred) or rpm.

Page 5, line 11. Change section number from Roman to Arabic numerals.

Page 9, lines 9-10. This is a misrepresentation because the biosurfactants are reducing the surface tension of the R2A broth, not pure water.

Page 9, line 11. I think you mean surface tension values between 30 and 45 mN m<sup>-1</sup> not up to 45 mN m<sup>-1</sup>.

Page 9, line 18. Third and fourth is clearer than third and last.

Page 11, lines 12-14. There is not a significant difference between all four sectors, just between NW/N and the others, according to your supplementary information.

Page 14, lines 3-5. Citation for this sentence?

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