

## ***Interactive comment on “The potential role of methanesulfonic acid (MSA) in aerosol formation and growth and the associated radiative forcings” by Anna L. Hodshire et al.***

### **Anonymous Referee #3**

Received and published: 8 February 2019

This manuscript presents a sensitivity study estimating the potential influence of MSA, produced from oceanic DMS emission, on the submicron aerosol population and further on aerosol radiative effects in the global atmosphere. The paper relies on a set of global model simulations that cover the plausible range of parameters anticipated to affect how MSA contributes to the investigated issues. The used model has been evaluated previously in many other applications, so it can be considered appropriate for the purposes of this study. The paper is well organized, and the authors adequately discuss associated uncertainties. The conducted study itself is original and important to the scientific community.

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I have a few, rather minor, issues to be considered before accepting this paper for publication.

The last sentence of page 2 (lines 28-31) is strange. Please modify.

Strictly speaking, primary biological or organic particles should not be called "organic compounds".

Are the latest estimates on the contribution of DMS to biogenic sulfur budget and sulfur precursor emission really as far back in time as from years 1990 and 2006. I also wonder the relative accuracy of the given numbers, i.e. 50% versus 21% (page 3).

The authors use rather old binary and ternary nucleation schemes in their simulations, together with a fixed tuning factor that may or may not be valid in marine environments that are more interesting than continental regions in this study. The authors investigated the sensitivity of their results on different assumptions on whether MSA participates on nucleation or not, but do not discuss whether these results are sensitive to apparent uncertainties in the nucleation scheme itself. I would like the authors to address this point at least by discussing it shortly.

The authors should discuss more explicitly what part of aerosol-cloud interactions they are attempting to capture in their simulations. Is it the first indirect effect only or something else as well?

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Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-1022>, 2018.

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