

Atmos. Chem. Phys. Discuss., referee comment RC2
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Comment on acp-2022-188

Anonymous Referee #2

Referee comment on "Hygroscopicity and CCN potential of DMS-derived aerosol particles" by Bernadette Rosati et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2022-188-RC2>, 2022

This work mainly investigated the hygroscopicity and cloud condensation nuclei activity of aerosol particles formed through oxidation of DMS. DMS is emitted by phytoplankton species in the oceans and constitutes the largest fraction of naturally emitted sulphur to the atmosphere. Secondary aerosols formed through oxidation of DMS play significant roles in climate and their hygroscopic properties are key parameters in describing their direct and indirect climate effects. Thus, scientific findings of this study are meaningful and fits well the scope of ACP. The authors have designed comprehensive laboratory chamber experiments and performed very good measurements using a suite of aerosol instruments, especially including synthesized nano-HTDMA, HTDMA, CCN and AMS measurements. In general, experiments are well designed and discussions are insightful. I have one major concern and some minor suggestions as listed below:

Major comment: As shown in Fig.S7, organic constitutes a non-negligible fraction to formed aerosol mass, but compositions and impacts of organics on hygroscopicity are not even mentioned in the discussions. It seems that authors just neglected this part of aerosol mass, and compared measured aerosol hygroscopicity only with mixed MSA-sulfate system. Authors should explain a little bit their choice in discussions or add more discussions. Also, it would be nice to discuss possible compositions of formed organics.

Minor suggestions:

L105: More details about Kappa calculations from CCN measurements should be given

L121: "further"-> "already"?

Section 2.3.5: set-up of the two HTDMAs are overall similar, introductions of them summarized in one paragraph might be better

Section 2.4: I suggest present an brief introduction of quantum chemical calculations and needed input parameters before 2.4.1.

L268: More discussions? Elucidate why it is interesting

L282: "higher absolute concentration", higher-> lower?