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Comment

## ***Interactive comment on “Methane sulfonic acid enhanced formation of molecular clusters of sulfuric acid and dimethyl amine” by N. Bork et al.***

**Anonymous Referee #1**

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In this paper, the authors quantify how MSA impacts H<sub>2</sub>SO<sub>4</sub>+DMA nucleation rates using quantum calculations and the ACDC model. They show that MSA may increase nucleation rates by up to 300% in cold regions. These results are useful for the aerosol microphysics community. The paper is very well written and is commendably concise yet complete. I recommend publication after some minor comments are addressed; however, I am not an expert on the quantum chemical methods presented here, so other reviewers will be necessary to judge these methods.

P18681 L13: “MSA concentrations \*were\*”. In this sentence are you referring to gas-phase or particle-phase concentrations?

Figure 4: Would it be possible to make the arrow width proportional to the percentages

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in the able? I realized this would require 2 panels in order to get the 2 MSA concentrations, but this would be useful for visualizing the growth. It's taken me some time to mentally map the table numbers onto the plot.

P18690 L22 and throughout: "DMA in most locations is in large excess compared to acid". Is this representative of the remote marine boundary layer or the remote free troposphere (where DMS, the MSA precursor, may have been transported out)? Are the assumed DMA concentrations in the paper representative of these locations? The authors should be sure they are not mixing continental DMA concentrations with remote MSA concentrations.

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 18679, 2014.

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