



## ***Interactive comment on “Dimethyl sulfide and its role in aerosol formation and growth in the Arctic summer – a modelling study” by Roya Ghahreman et al.***

### **Anonymous Referee #1**

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#### **General comments**

The paper presents a modelling study on DMS in the atmosphere and the role of the DMS-derived sulfate in aerosol formation and growth. The model is fed by satellite experimental data and a comparison between model results and experimental data is carefully analyzed and clearly presented. It's a pity that the formation of MSA from DMS is only mentioned at 155-160 and not considered in the model GEM-MACH. MSA in the Arctic presents lower concentration than sulfate but it is very efficient in new particle formation and growth of existing particles, for this reason it constitute the main uncertainty in the modellization of biogenic aerosol formation. Anyway, the paper is

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focused on biogenic sulfate, results from models are compared with sulfate measurements therefore, approach, and results are correct. The paper is of high quality and surely deserve the publication on ACP with just few minor revisions.

#### **Specific comments**

Lines 40-42. Among the sources of sulfate, the volcanic is not reported here. In north hemisphere, and especially in Iceland, the presence of volcanoes and fumaroles can furnish a contribution to SO<sub>2</sub> budget.

Line 207. CLIM11 instead of CLIM1.

Lines 229-232. Here the sampling height (of mean height) of sampling has to be reported. As reported below in the paper, this information is useful as the DMS concentration depend to the height of sampling.

Lines 364-365. This sentence is not clear, what is clear from figure 8b is that the difference between DMS results from CLIM11 with and without HS+HB DMS(aq) are very low.

Lines 460-463. The size discrepancy between model and observation could be due to the effect of MSA in nucleation processes that is not considered by the model. A sentence or a very short discussion on this effect could be add here.

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