

Comments from Editor:

I am happy with your edits, except your response to the first comment raised by Reviewer 2. The reviewer is not arguing about the importance of determining the optimal ice particle model; therefore, the relevance of the second paragraph of your response to this comment is not clear to me.

In my previous decision letter, I have expressed that the use of the aggregate of solid columns will make the paper much more useful. If there is any technical difficulty or scientific argument against it, convincing explanations will be needed in the response to reviewer and in the manuscript.

Answer: Thank you very much for your constructive suggestion. Both you and the reviewer suggested that we compare the Voronoi model to the roughened hexagonal ice aggregate model. As our results show, once the ice crystals become roughened, consistent with previous results, the scattering phase functions become featureless. The Voronoi model phase function is also featureless. The roughened hexagonal ice aggregate model phase function will also be featureless, and so the resulting comparisons between the roughened hexagonal ice aggregate and all the other roughened ice models, including the Voronoi model, will be similar. We demonstrate this by comparing the scattering phase function of the Voronoi model with the Yang and Liou (1998) eight element hexagonal ice aggregate model with rough surfaces (8-agrgr clm). The results of the comparison are shown in Fig. 1 below.

The phase functions shown in Fig. 1 have been calculated at the wavelength of 0.55 μm . The figure shows that both of the phase functions are very smooth and similar to each other, except for the low scattering angle regions. Therefore, the results shown above with such similarities between the two phase functions will provide results similar to all the other roughened models used in our study. Our next paper will consider the polarization properties of the ice crystals, and this future study will include the eight element hexagonal ice aggregate model (see page 13 in the manuscript).

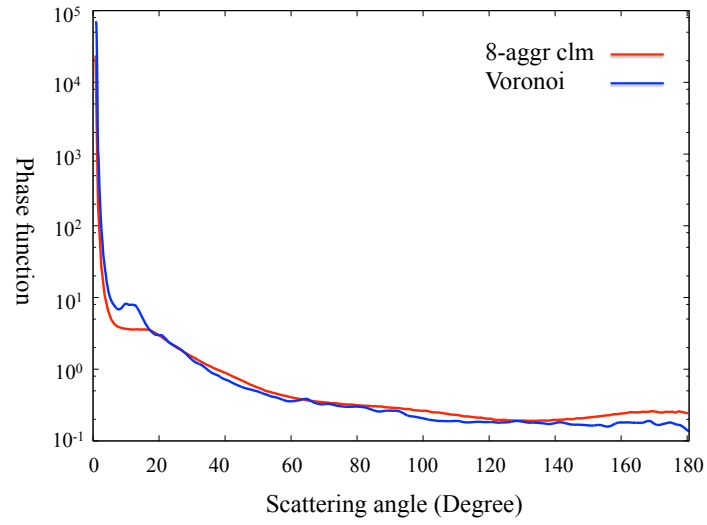


Figure 1: Comparison of the phase function between 8-aggregate column with rough surface (8-agrgr clm) and Voronoi ice particle models in wavelength of $0.55\mu\text{m}$ (8-agrgr clm: max dimension= $106\mu\text{m}$, Voronoi: max dimension: $114\mu\text{m}$).