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Atmospheric Chemistry and Physics

27 August 2020

RE: revised manuscript acp-2020-537

Dear Daniel,

Thank you very much for careful reading of our revised manuscript and catching for typos and grammar. Below are point-by-point replies on your comments.

Line 536: After "several", I believe a number is missing.

Reply: The statement was replaced by the one used in the source work by Macklin (1960): "...varied from few to 140 μ m...". I believe, that due to the absence of reliable technique for droplet measurements in early 1960, the lower limit of the droplet size distribution was not well established.

Line 537: You want to define "MVD".

Reply: "MVD" was expanded to "mean volume diameter"

A suggestion here (not a must): you may consider to give a table with nomenclature for applied parameters (given in text and equations) and important abbreviations. If you think this is not necessary, no need to do it. However, my feeling is that it may benefit the reader.

Reply: Appendix A with the table describing symbols was added in the text, as suggested.

line 720 and line 725: Both lines display almost the same sentences. Not sure if this was intended as is. "...collide and nucleate....".

Reply: The repeated statement was deleted and two paragraphs were merged into one. Now it reads as follows:

"Dye and Hobbs (1968) observed during laboratory experiments that, when an ice crystal on some occasions became attached to a freezing drop, it would often break into 5 to 10 pieces as the drop froze. Sometimes, the breakup of the crystal would occur when the drop cracked. On other occasions the crystal would break without any apparent changes to the freezing drop. Later Hobbs and Farber (1972) reproduced laboratory experiments of Dye and Hobbs. They observed shattering of a dendritic crystal into several pieces after bringing it in contact with 2mm diameter supercooled drop. These observations are of considerable interest, for it suggests that the breaking up of ice crystals that collide and nucleate supercooled drops, may play an important role in increasing the concentration of ice particles in natural clouds. "

line 977: Did you mean "complete" instead of "compete". Comprehensive? Maybe you can omit it "...none of the above mechanisms have a quantitative theoretical description...". Or: "Although a complete quantitative theoretical description is missing for the above mechanisms, there is a ...".

Reply: It should be “complete”. Thanks for careful reading. Somehow both co-authors missed this typo after several readings. There are some attempts to provide a theoretical descriptions of different SIP mechanisms. However, they are far from the complete stage.

line 985: "hand" instead of "hang".

Reply: Corrected. Thanks for catching it.

The modified manuscript was uploaded at the ACPD site.

Sincerely,

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