We sincerely appreciate Editor's thorough review on the manuscript. The comments are important to improve the quality of our manuscript. We have now addressed the remaining issues. In the revised version, speculative discussions have been reorganized in the conclusion section. Furthermore, the entire manuscript has undergone professional editing to enhance grammar, sentence structure, and overall readability.

Comments

1. I have some difficulty with the fact that your results (which can be supported by direct evidence) are at times mixed with speculations that are made without firm evidence or complete information. An example of this is the speculation on the seeder-feeder process, as noted by Reviewer #1. The text on lines 310-317 is only speculative, but the way it is presented together with the results has given the reader the impression that this is a finding from your analysis. Another example is the schematic diagram shown in Figure 10. Several processes presented in the diagram are also speculative, as pointed out by Reviewer #1, but there have been no distinctions between the actual findings and speculations provided in the manuscript. I believe a more careful categorization/organization of the results and discussion is required. This is also in line with the main concern from Reviewer #1.

We have now merged the speculative discussions into the conclusion and reorganized the original conclusion. The current discussion and conclusion sections now include a summary of the key results, discussions about comparison to previous studies, and about the limitations. The specific revisions include:

(1) The discussions on the seeder-feeder process explaining the positive correlation between DCT and N_{Ice} have been moved to the "discussion and conclusions" section:

P12, Line 384: "The results revealed generally enhanced SIP when greater distance to cloud-top, which could be explained by the seeder-feeder mechanism occurring in stratiform cloud precipitation (Hobbs and Locatelli, 1978; Hobbs et al., 1980; Matejka et al., 1980): when the cloud-top is higher, more primary ice particles form at colder temperatures and fall. The ice particles can capture smaller liquid water droplets when falling, during which they can grow and the fall speed can be accelerated. This process can considerably enhance the interaction between ice and water droplets or among ice particles, which is necessary for the occurrence of ice fracturing, thereby leading to the avalanche SIP. The age of ice could be estimated on the basis of the fraction of smaller ice ($F_{\text{smaller ice}}$) here, with the assumption that recently formed ice particles are smaller in size. This implied the pronounced production of smaller ice particles by SIP processes, with $F_{\text{smaller ice}}$ reaching 70% during the developing period, whereas a lower $F_{\text{smaller ice}}$ (0.2–0.6) indicated the growth of ice and smaller ice was consumed during the dissipating stage (Fig. 4). This explanation is also similar to the results reported by Li et al. (2021), who reported that columnar ice crystals were produced at the lower level and were seeded by ice particles falling from the upper level."

(2) The diagram of ice production (Fig. 11 in the revised version) and related explanations have been placed after the discussion of the seeder-feeder process, followed by a summary of the key factors controlling the SIP rate.

P13, Line 395: "The likely schematic plot of ice production at different stages of clouds is given in Fig. 11. A higher cloud-top leads to the formation of more primary ice through the nucleation process, and the ice can grow in the upper level and during the fall. The SIP process is triggered when ice particles in the upper level fall to the lower level with supercooled water, initiating the interactions between ice and droplets. In regions with larger DCTs, ice particles in the upper level have sufficient time and distance to grow larger during the fall, and the fall speed can also be accelerated, resulting in more and larger ice particles falling to the lower level. Consequently, the intensity of the SIP process becomes stronger in this region because the falling large ice particles enhance the interactions between ice and droplets, as well as among ice particles. However, larger ice particles may also fall into the H–M zone in mature cells and trigger the SIP process. Moreover, this possible seeder-feeder process was found to extend the SIP process beyond the slightly supercooled temperature region for the typically considered H–M process. The intensity of SIP was to the first order determined by the numbers of graupel and droplets, because the collision and coalescence processes among these hydrometeors necessitated the fracturing of ice. The modelled and measurement-based calculations showed that appropriately treating the size distribution hereby the determination of collection efficiency will improve the modelling of the SIP rate."

(3) The last paragraph of the "discussion and conclusions" section provides a summary of the findings, along with relevant caveats and limitations.

P13, Line 408: "Our results indicate that once the cloud-top reaches a sufficient height, the ice initialized from nucleation may boost the avalanche glaciation process when falling ice reaches lower levels in clouds. It should be noted that whether the falling hydrometeors were the ones generated by the ice production process or were about to participate in the ice production process at the same level, may never be separated due to the short time scale of the collision process. However, this is a continuous process that may involve both already-formed and ongoing-happening particles, and the observed or modelled results are an overall net production of ice. The ice particles falling from aloft increase the number of graupel particles and the chance of collision between graupel and droplets and then trigger the SIP process; therefore, the seeder-feeder and SIP processes may occur simultaneously after the SIP process has initialized. The results concerning the microphysical properties of stratiform clouds with convective cells under different stages suggest that the falling hydrometeors associated with the cloud-top height importantly control the cloud glaciation and precipitation processes, and this information may also help find the region of supercooled water in clouds for weather modification work."

2. In view of my comment above, you could consider merging the 'discussion' material (which may contain speculative content where appropriate) with the current 'conclusion' section. ACP has provided specific guidelines for the concluding section, which can be found below.
https://www.atmospheric-chemistry-and-physics.net/policies/guidelines_for_authors.html#:~:text=ACP%20expects%20that%20the%20concluding,include%20the%20main%20quantitative%20results.
In general, ACP expects that this section will normally include a summary, synthesis/interpretation, comparison and context, caveats and limitations. Please consider incorporating all these components in your revised concluding section.

We appreciate Editor's comments and have revised the conclusion section in accordance with suggestions. The revised conclusion section more compiles with the guidelines of ACP.

3. As noted by both reviewers, there remain many instances in the current manuscript where the English text could be improved on. You stated in your response to Reviewer #2 that "we have carefully reviewed the manuscript for editing and grammar errors". However, I cannot identify any relevant revisions in your tracked changes. Indeed, in my reading of your current manuscript I have identified several grammatical errors including incorrect comma splices, fragment sentences, combining clauses incorrectly, and incorrect (e.g. non-scientific) word use, etc.. I strongly recommend that you seek professional assistance for copyediting, or thoroughly revise the manuscript to improve grammar, sentence structure, and overall fluency.

Thank Editor for pointing this out. The grammar, sentence structure, and overall readability of the manuscript have now been improved by professional editing service, and the certificate after the service is attached below.

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Microphysical view of development and ice production of mid-latitude stratiform clouds with embedded convection during an extratropical cyclone

prepared by the authors

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