

Authors' answer to the second review of Schäfer et al. Simulations of primary and secondary ice production during an Arctic mixed-phase cloud case from the NASCENT campaign by anonymous referee no. 2

Thank you for your further improvement suggestions. We adjusted the text according to your comments in Section 2.2 (case study description) and 5 (Conclusions) in addition to a minor addition in Section 4.5. The changes made are listed below (line numbers refer to the track-changes document):

Lines 122-124: In the description of SIP identification in the observations we made the following modifications (added text in bold):

If the observed concentration of the newly formed ice crystals is larger than the INPC, it ~~can be concluded~~ **is likely** that SIP was occurring. **Still, this assumption includes the caveat that the actual INPC might be larger than measured since INPs in the contact mode were not assessed.**

Line 194: This is just a technical correction (replaced \citet command by \citep command for Hallett and Mossop, 1974.).

Line 446: We changed “realistic” to “more realistic” in the following sentence:

In our simulations with constrained CCNC and INPC, and thus a **more** realistic representation of primary ice production, we chose to reduce the thresholds for RS instead of removing them, [...].

Line 493-497: You're completely right, the statements made towards the end of Section 4.5 regarding SIP and PIP assumptions and contact freezing should reoccur in the conclusions. As requested, we added a few sentences on this:

As the simulated primary ice production includes contact freezing, which is not observationally constrained and generally thought to be of limited importance, it must be considered an upper bound for the plausible primary ICNC contribution in this case. If we instead assume that contact freezing was significantly less important in our case than presumed in the simulations, or even not active at all, the already greatly enhanced secondary ice production would have to be even further enhanced in order for agreement between simulated and observed ICNC to be achieved.