Review of

the revised version of

Impact of wildfire smoke on Arctic cirrus formation, part 2: simulation of MOSAiC 2019-2020 cases

by Ansmann et al.

General comment:
The authors addressed all my comments, however, some responses are not really convincing. Nevertheless, the manuscript has improved a lot, therefore I leave it to the editor to decide about the acceptance of the manuscript. I would still recommend some revisions.

(Remaining) issues:
(1) Model description
Introducing subsections for the different processes helps a lot for the overall understanding of the model. However, the nucleation is still described in a weird way; I would like to see the differential equations, as in the case of growth. The issues with the units seems to be clarified, the time step was investigated in details, and also the discussion about the simple scheme for sedimentation leads to a better understanding.

(2) Environmental conditions
I still miss a justification of the high values of vertical updrafts. It would be good if the authors could refer to some measurements of such values during their measurement campaign. Otherwise, the argumentation using these high values is kind of academic. Generally, an idealized approach would be OK; however, the authors claim that their simulations are realistic, so then they should provide a bit more evidence from the measurements.

(3) Sensitivity
I do not agree that the choice of some case studies is enough to corroborate the hypothesis that the pollution is really triggering heterogeneous nucleation as a dominant nucleation pathway. Since the authors state that they have simulated many different cases, I do not really understand the argument to leave these simulations out. I would suggest to add a little bit more statistical evidence in terms of evaluating different initial conditions and setups statistically. Since the environmental conditions, e.g. in terms of prescribed velocity, are not really clear, a better evaluation of the sensitivity should be provided. In the end, I believe, this would lead to a much stronger corroboration of the hypotheses.