

Response to egosphere-2023-2441 reviews for RC3

**Referee comments are marked in black bold and are numbered as R3Cx with x the comment number.** Author (AC) responses are marked in black directly below the comments. **The original text from the manuscript is repeated in blue and corrected text in revised manuscript is typed in red.** Previous line numbers given in “( )” following the updated line numbers.

**R3C1: In this study Testa et al. investigates the ice nucleation activity of aviation soot that were sampled directly from the modern in-use commercial aircraft engines. The effects of engine thrust and soot particle size, mixing state, physical and chemical properties were tested in various experiments using a continuous flow diffusion chamber. Their results indicate that the overall ice nucleation abilities of real aviation soot are not so high as previously thought since in the latter case surrogate of aviation soot were used to estimate their ice nucleation activity. The study is very interesting and meaningful for further evaluating ice formation and climate effect associated with aviation. I recommend the paper to be published in ACP with minor revisions. What I suggest is that the authors may consider adding a short comment/discussion about the implication and usage of their experiment results and data for modelling work in the Conclusions.**

We thank Reviewer 3 for their comment on the manuscript. The results from this work are indeed being currently used to estimate soot-cirrus radiative properties based on the ice nucleation results of this work. This will be published in a separate study in the future.

We added the following to the conclusion in lines 575-579 (562): “[...] allow better predictive capability of aviation soot ice nucleation. Results from this study will be applied in future modelling work to update estimates of radiative forcing from aviation soot. For the most representative simulation, we suggest using the ice nucleation properties ([onset] RH for given AF) of our mixed-thrust unCS-soot sample, to closely mimic in situ aviation soot. Given the RH onset of mixed-thrust unCS-soot is close to or at  $RH_{hom}$ , we expect their effect on cirrus cloud and hence, their radiative forcing to be negligible.”