Responses to Reviewer #1

The authors thank the referee for the detailed and helpful comments. The referee comments are in italics, and our responses are in normal font.

1. This paper describes a study of the plume exit from residential biofuel combustion, used to provide energy. The authors investigate how CCN activity varies with different assumptions about parameters, such as particle sizes, compositions, size distribution properties (mono or bimodal distributions), co-emission, mixing states and emission factors. This paper is of high scientific quality and very well written. Variations in plume exits can have various impacts on cloud formation and on aerosol indirect effects, and the findings in this paper improve the understanding of plume exits under certain conditions. I think this paper should be published and I have only minor comments.

Thank you for summarizing the paper.

2. Page 1, line 25: I suggest adding "for energy production" (or something similar) after the parenthesis.

We have updated the text as suggested

3. Page2, line 5: I suggest adding a reference to Twomey 1974.

We have added the reference in the text

4. Page 5, line 16: What is the reason for choosing 325 K as the reference temperature?

This temperature was used as representative of sampling conditions, although any value close to ambient conditions would be sufficient. For clarity, we added the sentence "although any value close to ambient conditions would suffice" to Page 5, line 16.

5. Page 7, line 25. I suggest adding the individual κ values used to calculate the average hygroscopicity in Table 2

We have updated Table 2 as suggested.

6. Page 8, line 19. Add "the" so that "…correspond to two of the eight model species…"

We have updated the text as suggested

7. Page 9, line 9. What about using Chamise instead of κ_0?

We have updated the text to say: "…the composition of Chamise in Table 2 (κ_0 of 0.11)."

8. Page 11, line 22. I suggest that there were 12 scenarios analyzed (combination of the four CMD and three κ values)

We have updated the text to say: "Figure 2a to 2c show the 12 scenarios analyzed: combinations of CMD_0 of 25, 50, 100, and 300 nm, with κ_0 of 0.004, 0.11, and 0.2."

9. Page 11, line 25: Is κ_{325} the same for all CMD_0?

κ_{325} is the same within 0.01 for all CMD_0. In line 25 we have added "with κ_{325} the same within 0.01 for the different CMD_0", and in line 27 we have added "with CMD_{325} the same within 5 nm for the different κ_0"

10. Page 12, line 4: I suggest adding: "…they can contribute substantially to the EI of CCN"

We have updated the text accordingly.

11. Page 12, lines 4-7. I believe this sentence is incomplete.

We have added "…, which eventually can become CCN."

12. Page 14, line 26. I suggest replacing "to indicate it" with "to indicate this".

We have updated the text accordingly.