

## ***Interactive comment on “Plume-exit modeling to determine cloud condensation nuclei activity of aerosols from residential biofuel combustion” by Francisco Mena et al.***

**Anonymous Referee #1**

Received and published: 21 March 2017

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.

Page 1, line 25: I suggest adding “for energy production” (or something similar) after  
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the parenthesis. Page 2, line 5: I suggest adding a reference to Twomey 1974. Page 5, line 5: What is the reason for choosing 325K as the reference temperature? Page 7, line 17. I suggest adding the individual  $\kappa$  values used to calculate the average hygroscopicity in Table 2. Page 8, line 10. Add “the” so that “. . . correspond to two of the eight model species. . . .” Page 8, line 31. What about using Chamise instead of  $\kappa_0$ ? Page 11, line 11. I suggest that there were 12 scenarios analyzed ( combination of the four CMD and three  $\kappa$  values) Page 11, line 14: Is  $\kappa_{325}$  the same for all CMD? Page 11, line 22: I suggest adding: “. . . they can contribute substantially to the EI of CCN” Page 11, lines 22-25. I believe this sentence is incomplete. Page 14, line 12. I suggest replacing “to indicate it” with “to indicate this”

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Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2017-67, 2017.