Atmos. Chem. Phys. Discuss.,
https://doi.org/10.5194/acp-2017-894-RC2, 2018

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Global radiative effects of solid fuel cookstove aerosol emissions" *by* Yaoxian Huang et al.

Anonymous Referee #1

Received and published: 6 February 2018

The paper reports a comprehensive study of the climate and air quality impacts of residential solid fuel combustion. The paper reports the first assessment of the impacts of carbonaceous aerosol from residential solid fuel combustion through changes in ice nuclei as well as a comprehensive assessment of aerosol indirect effects through changes in liquid clouds.

The paper makes an important contribution to our understanding of residential solid fuel combustion on climate and is suitable for publication in ACP. Importantly the manuscript highlights that the overall climate impact of carbonaceous aerosol from residential solid fuel combustion is uncertain and that even the sign of the impact is still ambiguous. The paper certainly motivates further study of this important issue and highlights where some of the major uncertainties lie.

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Discussion paper

The manuscript is very well written and clear. I only have a few minor comments. I suggest publication in ACP after the following minor comments have been addressed.

Minor comments

Page 5. Have you stated the size of the emitted carbonaceous aerosol? This is important for the impacts of carbonaceous aerosol on cloud condensation nuclei and aerosol indirect effects.

Page 12. Most models do not simulate the impacts of BC on ice nuclei. I think it would be useful to provide a brief summary of how this was treated in the Methods section of the paper.

Page 15. As stated by the authors the aerosol indirect effect is considerably larger than other studies. Ward et al. (2012) also found a large aerosol indirect effect using the CAM model (although a different version) to study carbonaceous aerosol from fires. It might be useful to point this out in the text.

Fig. 4 and 5. Please clarify whether these are reported at ambient conditions or at standard temperature and pressure.

References Ward et al., Atmos. Chem. Phys., 12, 10857–10886, 2012

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Discussion paper