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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Metrics to quantify the importance of mixing state for CCN activity" *by* Joseph Ching et al.

Anonymous Referee #1

Received and published: 16 February 2017

The manuscript with the title "Metrics to quantify the importance of mixing state for CCN activity" presents a study of simulated CCN activity with and without the consideration of the aerosol mixing state. Resulting deviations are studied as a function of mixing state and environmental supersaturation. It also presents a boundary to errors that need to be considered when neglecting mixing state information. The article is well written, conclusions are valid, and the content is scientifically relevant in the scope of ACP. I therefore recommend publication after the following comments have been addressed:

1. Figure 1 and Table 1 and 2 are 100% identical to figures and tables in Riemer et. al. 2013. Even with the authors and the Journal being the same I would consider this a questionable practice. The least the authors can do is to add a note to the captions saying "Taken from Riemer et. al. 2013".

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Discussion paper

2. Most presented findings are statistical observations. I am convinced it would add great value to the manuscript if the authors discussed potential physical origins of their findings. E.g. why do different populations experience different amounts of error cancellations (page 12, line ∼9)? What physical characteristic might explain the dependence of the relative error on supersaturation threshold (page 12&13)?

3. Figure 7: the x-axis looks like a ratio rather then %. Also, the caption mentions insets which do not seam to be there.

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