Geosci. Model Dev. Discuss.,
https://doi.org/10.5194/gmd-2019-290-RC2, 2020

Geoscientific Model Development Discussions
Open Access
EGU

Interactive comment on "H_2SO_4-H_2O binary and H_2SO_4-H_2O-NH_3 ternary homogeneous and ion-mediated nucleation: Lookup tables for 3-D modeling application" *by* Fangqun Yu et al.

Anonymous Referee #2

Received and published: 3 February 2020

F. Yu and co-workers have developed lookup tables for quickly and efficiently obtaining new-particle formation ("nucleation") rates based on Yu's 2018 model, which includes H2SO4, NH3, H2O and ions. This is a very useful tool for researchers in the atmospheric aerosol field. Since this manuscript doesn't deal with the nucleation model as such (it's taken as a given), I won't comment on any of the potential issues with the model itself, but only on the application described here. However I will note that I fully agree with the executive editor's request of providing version numbers - while Yu 2018 is an impressive model, it is unlikely to be *perfect* in the sense that no further improvement would ever be possible.

Printer-friendly version

Discussion paper

Some minor issues to take in to account when preparing the final manuscript:

-The authors say that their rates can be compared with typical laboratory measurements. How should wall losses be accounted for in the comparison - is the idea that users should just scale the “S” parameter in the model to roughly fit the losses in the experiment? How well does this actually capture the effect of wall losses (especially in e.g. flow-tube experiments?).

-The authors say that Q ranges from 2 to 23 ion pairs / cm3; for the benefit of casual readers just skimming the text they might mention here that the Q=0 case is also covered (as they actually have separate look-up tables for this case).

-“extrapolation is allowed”: this sweeping statement sounds potentially a bit dangerous; have the authors actually tested how well extrapolations work? Perhaps give the readers some guidelines on what kind of extrapolations are recommended, and/or some caveats as to when they can be expected to work (and when not)?

-There seems to be an extra bracket in TIMN) on line page 3, 24

Interactive comment on Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2019-290, 2019.