Atmospheric
Chemistry
and Physics
Discussions

Open Access

ACPD

Interactive
comment

Interactive comment on "Implementing Gas-to-Particle Partitioning of Semi-Volatile Inorganic Compounds in UCLALES-SALSA" *by* Innocent Kudzotsa et al.

Anonymous Referee #2

Received and published: 2 December 2020

The authors present a study in which they have developed a large eddy simulator to include the condensation of inorganic semi-volatile compounds (SVCs) condensing on a particle population to assess the impact it has on cloud droplet formation and subsequently cloud microphysics. Owing to the current lack of an appropriate data set, the LES predictions are evaluated (favorably) against those acquired from cloud parcel model simulations which allow for a higher particle size resolution.

The authors find the expected result that cloud droplet nucleating potential is increased by condensation of these SVCs due to increased particle size/soluble mass, and consequently a cloud droplet spectrum with reduced mean size and therefore precipita-

Printer-friendly version

Discussion paper

tion. In this regard the paper does not present a serious lurch forward in understanding these processes/mechanisms. It would have been nice to see with the inclusion of condensing semi-volatile organic compounds in a VBS framework simultaneously, so as to ascertain whether or not there would be any interesting interaction effects, though most likely just a compounded effect on CCN activity.

At present I do not see that the paper is suitable for publication in ACP as it does not contain any new scientific insight. That said, it is nice to see these processes included in an LES and a more substantial study would certainly benefit from the increased process resolution.

Comments: Figure 2: Would be useful to clarify in the caption/y-axis that this is the change in bin radius (as opposed to number concentration) Figure 5: mean droplet sizes less than 0? Figure 7a: Could clarify in the caption that the parcel model curve correspond to "total" molar ratio Figure 3: Would be interesting to see the total variability, i.e. min/max, as well. Also, might be worth noting in the text that the CEF is negative in some cases and elaborate why this might be.