Geoscientific Model Development Discussions

Geosci. Model Dev. Discuss., referee comment RC1
https://doi.org/10.5194/gmd-2021-148-RC1, 2021
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Comment on gmd-2021-148

Steven J Ghan (Referee)

Referee comment on "Evaluation of a quasi-steady-state approximation of the cloud droplet growth equation (QDGE) scheme for aerosol activation in global models using multiple aircraft data over both continental and marine environments" by Hengqi Wang et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-148-RC1, 2021

This study uses in situ measurements of aerosol, updraft velocity, and droplet number to evaluate a new method for estimating cloud droplet number concentration. In addition to quantifying the mean relative error (MRE), it isolates contributions to that error from uncertainty in various inputs. This is a valuable contribution that is presented clearly, is reproducible, and of high quality.

However, its conclusions would be much stronger if it added, as it suggests at the end, a comparison with the performance without the quasi-steady state approximation (QSSA), i.e., using a rising parcel model with the same inputs. Without such a comparison, it is difficult to draw conclusions about the contribution of the QSSA to the MRE.