

## ***Interactive comment on “Lagrangian condensation microphysics with Twomey CCN activation” by Wojciech W. Grabowski et al.***

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Received and published: 8 October 2017

I would like to recommend this paper to be published, but after minor revisions to clarify the detail.

This is an excellent paper presenting how to apply Twomey activation scheme to Lagrangian particle based cloud microphysics models. When aerosol processing is of no interest, the methodology enables tremendous reduction of the computational cost of Lagrangian particle based cloud microphysics models without losing accuracy.

The paper is well structured and clearly written. The theory is concisely explained, but well thought-out, founded on the authors' deep understanding of cloud microphysics. The validation is carried out in a simple idealized condition but sufficient enough to

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convince the community that the proposed method works very efficiently.

My only concern is on the treatment of the multiplicity of super-droplets. The authors employed the number mixing ratio as the multiplicity of super-droplets, but under Lagrangian description this is not constant in time. This point must be clarified before publishing the paper, though it does not change the main conclusion significantly anyway.

Other major/minor comments are annotated in the pdf uploaded as a supplement.

Please also note the supplement to this comment:

<https://www.geosci-model-dev-discuss.net/gmd-2017-214/gmd-2017-214-RC2-supplement.pdf>

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Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2017-214>, 2017.

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