

Interactive comment on “On the Limits of Köhler Activation Theory: How do Collision and Coalescence Affect the Activation of Aerosols?” ***by Fabian Hoffmann***

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I would like to recommend this paper to be published but after major revisions.

This is an interesting paper introducing a new mechanism of cloud droplet activation named "collectional activation". The author investigated its contribution theoretically, then numerically using an LCM. Note also that this analysis could only be possible if using an LCM. One of the conclusion is that the impact is small because it seldom occurs compared to conventional "diffusional activation", but I think the community still needs to be aware of such possibility.

However, there exist at least one major issue in this manuscript. Unfortunately, the

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determination criterion of "collectional activation" the author introduced is not appropriate. Please see the attached note "Possible_collectional_activation_scenario.pdf". You can see that $r > r_{\text{crit}}$ is not a rigorous criterion to determine "collectional activation". I strongly suggest the author to examine all the materials minutely, keeping the above fact in mind, I am still not fully sure how big the revision could be, but because all the analyses are based on the above criterion, this correction could affect the paper substantially, though it probably do not change the main conclusion significantly.

Please also see other major/minor comments annotated in the attached pdf.

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/acp-2017-134/acp-2017-134-RC2-supplement.zip>

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