

Atmos. Chem. Phys. Discuss., referee comment RC2
<https://doi.org/10.5194/acp-2021-390-RC2>, 2021
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review of Druke et al., Environmental sensitivities ...

Anonymous Referee #2

Referee comment on "Environmental sensitivities of shallow-cumulus dilution – Part 2: Vertical wind profile" by Sonja Druke et al., Atmos. Chem. Phys. Discuss.,
<https://doi.org/10.5194/acp-2021-390-RC2>, 2021

This is an excellent example of how to design and analyze a set of LES experiments to provide physical insight into the effect of shear on cloud-environment mixing in shallow convection. The authors use an initial wind profile that limits shear to the cloud layer, and show that shear-induced changes in both cloud-core updrafts and the character of the cloud shell control cloud dilution in these shallow clouds. The combination of modeling and simple theory are very well presented and the conclusion that cloud-core updraft velocity and the fraction of cloudy air in the cloud shell are controlling parameters is compelling and should will be of general interest.

Minor comment: The distinction between dilution and entrainment is an important one, and I'm happy to see it called out here (although I agree with Walter Hannah that the discussion could be sharpened). I'm less certain about the use of "purifying effect" to describe the role the cloud shell plays in mediating mixing between cloud core and environment. On a two-point mixing line, environment and cloud core are equally "pure", and I think of purification as the removal of impurities -- wouldn't "buffering" be a better fit? Not too invested in this however.