

Interactive comment on “Shallow Cumulus Cloud Feedback in Large Eddy Simulations – Bridging the Gap to Storm Resolving Models” by Jule Radtke et al.

Anonymous Referee #1

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The authors present a nice, clear and well worked out analysis looking to bridge the LES and convection permitting model scales in regards to subtropical cloud feedbacks. I think it is possibly worth adding to the conclusion ‘SRMs may exaggerate the trade wind cumulus cloud feedback’ that this for a SRM that is configured with a similar all-or nothing cloud scheme. It is true that most SRMs have an all or nothing scheme, but it would be interesting to get some commentary from the authors on this feature as SRMs become more the norm and include more complex cloud schemes. It would also be good to get a discussion from the others as to why their results point towards a zero cloud feedback in the trade cumulus, while previous studies do not.

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Ln 29: the parenthetical statement (‘unlike climate models’) needs to be set off from the rest of the sentence.

Ln 40: Why allegedly?

Ln 76: I think maybe ‘idealized’- while sort of technically correct this tends to be in relation to a person’s beliefs (<https://www.merriam-webster.com/dictionary/idealistic>)

Ln 96: Does the trade inversion get set by the large scale forcing imposed on the LES? I see this is discussed later.

Ln 155: In the case of uniform warming I guess the inversion strength is held fixed- so we are only really looking at what is commonly characterized as the SST dependence of subtropical cloud (Klein et al., 2017). I see this is discussed on ln 195, but it might be useful to note this here.

Fig. 9: why aren’t the unifw-P and madw simulations joined with a line?

Ln: 240: Can you comment on how much inter-LES differences in resolution might affect their inferred cloud feedback strength, or is there only a sizable shift when convection permitting simulations are examined? Also- on line 260 it is noted that other LES studies have inferred a substantial positive feedback. Can you comment on why these studies ended up with this result and the present study does not?

Klein, S. A., Hall, A., Norris, J. R., and Pincus, R.: Low-Cloud Feedbacks from Cloud-Controlling Factors: A Review, *Surv Geophys*, 38, 1307-1329, 10.1007/s10712-017-9433-3, 2017.

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