

Response to Anonymous Referee #3 (Author Comments in Blue)

Minor revisions:

*The second sentence (p.1 L14) would be clear with commas between atmosphere and convection and between atmosphere and making.

This has been corrected as suggested.

*p. 3 L7 maybe “approximately moist adiabatic thermal structure”

This has been corrected as suggested, to “an approximate moist adiabatic thermal structure”

*p. 4 L3 cloud fraction changes do not determine the feedback parameter even in RCE. No change in cloud fraction but a change in cloud water path would be a non-zero feedback. Please correct.

Yes, you are absolutely correct, and we did not mean to imply that the change in cloud fraction would literally be used to compute the net feedback parameter, but see now how that sentence could have been interpreted that way. We meant that the changes in clouds contribute to the climate sensitivity (as implied in the previous sentence). We have changed the text to say “The net feedback parameter of the RCE state may be computed, which is reminiscent of...”

*p. 5 L 10 “truly determine” the word choice of “truly”: these are all model sensitivities being discussed, so there isn’t an observable truth.

That is a fair point, so we have changed the phrase to “better determine”.

*Figures do not all have the axes dimensions consistently labeled (e.g., 5 vs 4)

Figures 3, 4, 5, and 6 now all have consistent axis labels. We have also corrected a typo in the title of Figures 3 and 4.

*It’s arguably implicit in the discussion of extensions to RCEMIP, but a natural extension would be to isolate/simplify radiative effects to get a baseline of the mean state of convection permitting vs. parameterized convection simulations (goal 3) in the absence of things like cloud radiative effects that are one source of differences. This sort of goes back to the reaction to the initial submission’s focus on aggregation. If you want to study aggregation, removing some of the interactivity of the radiative cooling side is undesirable, but if you want to see how parameterized convective tendencies fair relative to CRMs, it would be interesting.

Yes, we agree that a set of simplified/non-interactive radiation simulations would be valuable, and we do mention in Section 6 (p. 20 L11-12) that a suite of simulations with cloud radiative effects turned off could be performed. In response to your comment, we have added more detail to that suggestion to make the objective more explicit. The sentence now reads “For example, a suite of simulations with cloud radiative effects turned off could be performed, which would be

useful for comparing the mean state of simulations with explicit to that of those with parameterized convection, in the absence of self-aggregation.”

Response to Anonymous Referee #4 (Author Comments in Blue)

Review of revised version of
“Radiative-Convective Equilibrium Model Intercomparison Project”
by Allison A. Wing, Kevin A. Reed, Masaki Satoh, Bjorn Stevens, Sandrine Bony, and Tomoki Ohno

The authors have put considerable effort to into answering to the review. They have replied to all of the points to my satisfaction. I thus recommend to accept the article for publication.

There are a few technical points that should be corrected:

Thanks for finding these errors!

Page 8, line 15: there is something odd with the specific humidity at the surface q_0 , it is higher in the simulations at 300K than for the simulations at 305 K. I guess it should be increasing with temperature?

This was a typo, q_0 for the simulation at 305 K should be 24 g/kg, which we have corrected.

Page 13, lines 16 and 25: there is a spurious parenthesis after coordinates.

This has been corrected.

Page 14, line 17: replace “off” by “of”

This has been corrected.

Page 18, line 10: include “be” after “can”

This has been corrected.