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Discussions

Interactive comment on "Technical Note: The horizontal scale-dependence of the cloud overlap parameter alpha" *by* I. Astin and L. Di Girolamo

Anonymous Referee #1

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This note discusses a potentially important problem for cloud modeling, namely, that the degree of vertical overlap of clouds depends on the horizontal averaging scale. This could cause problems when, for instance, a model's horizontal grid spacing is changed.

The problem is nicely illustrated with idealized examples.

Major Comments:

The note up to Eq. (12) seemed clear to me. But Eqs. (12-15) and (19-21) could use some extra explanation or the presentation of intermediatel mathematical steps.

For Eq. (12), I'd note that $c_a = c_b = mu$ and that $<c_a'2> = sigma$.

C2381

For Eq. (13), I'd provide an extra step in the derivation and note that sigma and mu retain their definitions from Eq. (12) (if that's true).

For Eq. (14), I'd clarify how this equation depends on c_{max} in Eq. (11) and what the value of c_{max} is.

In Eq. (15), what are 'a' and 'b'? Are they related to the two altitude levels 'a' and 'b' (see Eq. 1)? If not, can you change the variable names? In addition, can you write mu and sigma in terms of 'a' and 'b' for the convenience of readers?

line 21, p. 9807: What is $<c_a>$ and how is it different than c_a and C_a?

I don't understand the derivation of Eqs. (19) and (20).

Minor Comments:

line 17, p. 9804: "data is discarded" should be "data are discarded".

line 19, p. 9804: This would be somewhat redundant, but I would replace "two adjacent grid boxes" with "two horizontally adjacent grid boxes".

line 10, p. 9805: Replace "Where . . ." with "where", and do not indent.

line 25, p. 9807: Replace "aproach" with "approach".

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 9801, 2014.