

Interactive comment on “Parcel model simulations of aerosol – warm phase cloud microphysics interactions over the Amazon” by A. A. Costa and S. Sherwood

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The main objective of the paper is first replicating the observed heights for warm rain with a 1-D model, and then test the sensitivity to GCCN, updrafts and thermodynamics.

The 1-D model fails to replicate even remotely the observations with the control runs which span a CCN concentration range greater than the observed range, due to the following reasons.

1. Figure 3 contain erroneous values of the height for warm rain above cloud base. The values published in Andreae et al. (2004) (A04) in their Figure 5 show 800 m for

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the blue ocean, 1200 and 1600 m for the two cases of the green ocean, 2200 m for the transition, and about 5000 m for the smoky. These true values are a lot smaller than those in Fig. 3, which separate farther the simulations from the observations. There must be an error also in CO04 if the values in Figure 3 are quoted faithfully from that paper.

2. The model appears to replicate poorly the shapes of the observed drop size distributions that were actually observed and given in figure 4 of A04. Therefore, the determination of modal size of 24 microns for onset of warm rain (DR) is no longer valid for determining height of onset of warm rain for the model cloud.

Because the development of warm rain critically depends on the width of the DSD, a point well stressed by the authors, the paper should have concentrated at the causes for differences in the shapes. Before resolving this issue, there is little point in continuing with the rest of the analyses until finding a parameter combination that will provide agreement of the simulated DR with the wrongly quoted observed DR.

The authors should go back to the drawing board.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 481, 2005.

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