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Atmospheric Chemistry and Physics Discussions

Interactive comment on "On the importance of cumulus penetration on the microphysical and optical properties of stratocumulus clouds" *by* S. Ghosh et al.

Anonymous Referee #2

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General comments This paper highlights the importance of including cumulus penetration effects in stratocumulus related modelling studies and presents a validation of model results with observed data from ACE-2 campaign. It merits publication after minor revision.

Specific comments 1)Section 5, page 4625, lines 15-25 Please give a fuller explanation on how the aerosol distributions used for the 4 separate model runs were created. More importantly, what was different in each of the 4 model runs in the aerosol distribution so that they could adequately capture the horizontal variability? How crucial is the choice of the aerosol profile to the formation of the 4 sensitivity runs?

2) Section 6, page 4626, lines 14-24 Entrainment of dry air close to the cloud top can

have a significant effect in the small droplets number concentration. This is also a major factor of discrepancies in the model results. Why isn't this process incorporated in the model? Do you plan to add this effect to future model runs?

3) Section 6, page 4626, lines 21-27 and page 4628, lines 1-5 2 reasons are given to explain the discrepancies of the model, one has to do with lateral and cloud top entrainment of dry air, the second is attributed to chamical eefects. According to the authors which of these two reasons is the most significant? Any plans to incorporate these in model runs to improve your results?

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 4611, 2004.