Atmos. Chem. Phys. Discuss., 6, S4827–S4828, 2006
www.atmos-chem-phys-discuss.net/6/S4827/2006/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Examining aerosol indirect effect under contrasting environments during the ACE-2 experiment" *by* H. Guo et al.

Anonymous Referee #3

Received and published: 25 November 2006

This is an exceptionally clear presentation of a well-designed study that explains discrepancies between previous studies of aerosol indirect effects. By performing simulations for all combinations of aerosol and meteorology observed for two different cases during ACE-2, the authors cleanly separate meteorological effects on cloud from aerosol effects. Moreover, they identify the physical mechanisms responsible for producing the dependence of the aerosol indirect effect on the meteorology. In addition, the thorough validation of the cloud model for the base configuration lends confidence to the results. My only real concern is with the incomplete aerosol observations near the cloud during ACE-2. This provides some wiggle-room for validating the cloud simulation, so I would like to see some discussion of how much the validation data was used to constrain the aerosol properties. In particular, to what extent was the compo-

sition and size distribution of the pre-existing aerosol adjusted to improve agreement with the measured droplet size distribution? Otherwise I congratulate the authors on a fine study and clear presentation.

Minor comments.

1. Page 11563, line 8. Change “values” to “value”.

2. page 1156, lines 18-20. What were the aerosol and sulfate concentrations above the boundary layer for these cases?

3. page 11566, lines 23-26. What was the assumed size distribution of the 25% of the sulfate that was no produced by aqueous chemistry? What was the assumed composition of the pre-existing aerosol? You might mention the lack of aerosol composition measurements to better constrain this assumption.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 11561, 2006.