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Interactive comment on "Global indirect aerosol effects: a review" *by* U. Lohmann and J. Feichter

Anonymous Referee #2

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This paper is a wide-ranging review of this important topic, and does a good job of describing the large amount of work done on the different indirect effects of aerosols. My only general criticism is the inclusion of the semi-direct effect; this, being the consequence of the direct effect of absorbing aerosols, seems out of place in a paper reviewing their indirect effects.

Specific Points

End p.7565: The discussion of Feingold et al (2003) is so condensed that I did not find it very useful.

End p.7567 onwards: It is suggested that the large indirect effects in Menon et al (2002a) is due to their use of an empirical relation between aerosol mass and cloud number. However, other models also use an empirical relation (e.g. Williams et al) who

do not get such a large indirect effect.

p.7575, lines 15-20: It ought to be noted that the indirect effect on cirrus of the sort noted here would provide a positive radiative forcing.

p.7582, lines 5-10: It's not clear to me that "efficacy" is a quantity which can meaningfully averaged in the manner described here.

p.1782, lines 13-14: The non-linearity may also be caused by absorbing aerosols, which apparently were not considered by Gillet et al or Matthews et al.

p.7585, lines 13-23: The recommendation for using mechanistic schemes for predicting cloud droplet number, rather than empirical schemes, seems based on ideological grounds, not evidential ones. The paper by Menon et al (2003, JGR 108, D24, doi:10.1029/2003JD003902), which compared both types of scheme against data from ACE-2, showed no advantage of the mechanistic schemes.

Figure 5: This figure doesn't contribute much to the review, being the detailed presentation of the results of a specific paper, the details of which a review cannot go into.

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