

***Interactive comment on “Total aerosol effect:
radiative forcing or radiative flux perturbation?”
by U. Lohmann et al.***

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Response to reviewer 1:

We thank the referee for his/her valuable comments and suggestions. The responses to your comments are below each comment.

1) Page 25634-25635, Introduction: It is very useful with the discussion of indirect aerosol effects beyond the cloud albedo effect in the introduction. I think the semi-direct effect as well as the direct aerosol effect could be described somewhat further. This comment follow up to the main comment above that direct aerosol effect and semi-direct aerosol effect is hardly mentioned in the text.

We added more detail on the direct and semi-direct effect.

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2) Page 25635, line 6: Change ‘larger’ to ‘stronger’ since the value is actually lower only the magnitude is larger.

Done

3) Page 25635, line 13: IPCC 2007 or Haywood and Schulz (2007) would be appropriate to add as reference here.

Both references have been added.

4) Page 25639, line 4-5: Same as above change ‘smaller’ and ‘smallest’ to weaker’ and ‘weakest’

Done

5) Page 25641, line 13-22: I found this part of the description unclear and it would be useful if this was explained better.

The text has been revised.

6) Page 25642, line 1-5: Hansen et al., JGR, (1997) show that instantaneous radiative forcing at the TOA differs substantially from instantaneous radiative forcing at the tropopause (and then also to adjusted radiative forcing). This could be a useful reference to include in this part of the text.

The reference to Hansen et al. 1997 has been added.

7) Page 25642, line 14-16: I am not sure if it is correct to say that the deviation from the 1:1 line for CH₄ is dominated by the LW contribution.

Yes, it is. As shown in Figure 2, methane does not have a SW contribution in any of the five models.

8) Page 25642, line 19-28: How can you be sure this is a semi-direct effect and not related to the calculation of RF? This estimation should be better justified, since the calculations for CO₂ is far from the 1:1 line. Andrews and Forster, GRL, (2008) show

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that CO₂ has a semi-direct effect also in the clear sky.

Your point is well taken. We added that.

9) Fig 2: I think it would be useful if the same notation in Fig 2 and Table 1 had been adopted. IAE is not defined elsewhere in the paper and it should be made clear in this figure that only cloud albedo effect is included. DAE should also be defined in the figure caption.

The acronyms DAE and IAE have been added to the text and to Table 1.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 25633, 2009.