

Interactive comment on “Combined observational and modeling based study of the aerosol indirect effect” by T. Storelvmo et al.

T. Storelvmo et al.

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In our paper, we present relationships between aerosol and cloud properties from MODIS satellite data and the CAM-Oslo GCM. The reviewer points out that these relationships are not necessarily linear, which is the basic assumption in our statistical analysis. We fully agree on this comment, and we are thankful to the reviewer for making us consider this more carefully. We have now calculated correlation coefficients for the parameter sets for alternative relationships, and present the results in the discussion chapter of our paper.

Minor comments:

- Page 3759/13: We agree that an increase in cloud droplet number concentration may lead to increases in both cloud water content and cloud cover, and have added that.

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- Page 3761: Corrected.
- Chapter 2: The description of the model run is now improved, and a discussion of why we are not “nudging” the model is added.
- Chapter 3: The description of the MODIS data we have used is now improved. The MODIS data is interpolated to a 1X1 degree grid, while the GCM data is on a 2.5X2.5 degree grid. This implies that we have a lot more data points from MODIS than from CAM-Oslo for each region. Possibly, interpolating the MODIS data to the GCM grid would remove some of the extreme values, but we firmly believe that it would not alter our results significantly. The relationships between the parameters would in our opinion be qualitatively similar, and conclusions would hence not be altered. We agree that we should not include extremely low and extremely high values of aerosol optical depth (AOD) from MODIS in our statistical analysis. We have now replaced the original analysis with one neglecting AODs lower than 0.01 and higher than 1. The choice of limits is based on the reasoning of Remer et al. (JAS, 2004)
- Chapter 4.2: The low quality of MODIS AOD retrieved over land is now considered in the discussions of regional aerosol properties.
- Page 2768: Results now compared to Krueger and Grassl (2004).
- The aerosol indirect effect dependence on the background aerosol load is very interesting, and is now mentioned in the discussion of the Kerguelen region.
- Although we realize that Figures 2 - 7 contain many data points, we would still like to keep them as they are, as we feel that important information will be lost in e.g. a pdf representation.
- Figure 12 a: Longitudinal representation changed.

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