

Interactive comment on “Constraining the total aerosol indirect effect in the LMDZ and ECHAM4 GCMs using MODIS satellite data” by J. Quaas et al.

J. Quaas et al.

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We would like to thank the Reviewer for her or his detailed and constructive comments.

We regret having forgotten to mention the units in the figure captions. The colour scales have been chosen unevenly spaced since we found the figures best read like this and highlight small variabilities as well. The smaller horizontal scales of variability in the radiative forcings simulated by LMDZ compared to ECHAM4 are due to the somewhat coarser resolution of the latter model. The simulated fine-mode aerosol optical depth (Fig. 4) can be compared to the MODIS retrievals shown in Fig. 1b.

We would like to thank the reviewer for spotting the mistake with the white areas in Fig.

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5.

The reason to show the low-level cloud cover as simulated by the two models here was not to evaluate the distributions, but rather to analyse the differences in the simulated radiative forcings. We agree that for a proper simulation of the distribution of the radiative forcings by the aerosol indirect effect, a detailed evaluation of the cloud distributions would be helpful. However, this is beyond the scope of our present study.

By forward and inverse calculations of climate change we mean transient climate simulations with models of intermediate complexity and deduction of climate sensitivity from the observed climate change record and known climate forcings.

Indeed the aerosol direct effect in ECHAM4 is very small and we thus neglect its influence in the present study, which solely aims at constraining the indirect effects. However, we agree that indeed recent studies to estimate the aerosol direct forcing from satellite data indicate that this version of the ECHAM GCM simulates a too small direct effect.

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 9669, 2005.

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