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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Simulating the global atmospheric black carbon cycle: a revisit to the contribution of aircraft emissions" *by* J. Hendricks et al.

Anonymous Referee #2

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General Comments

The paper uses the ECHAM4 general circulation model to investigate the extent to which black carbon arising from aircraft emissions influences the black carbon budget of the upper atmosphere. This work is of relevance as few studies have examined the role of black carbon from aircraft emissions in a model that also considers surface emissions, thus the net effect of aircraft black carbon on the overall budget has been little examined.

The methodology and conclusions reached in this manuscript are scientifically sound. The paper includes original work and leads to several interesting conclusions. In general it is reasonably well written although at points it is rather long winded and lacks

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structure, especially in the methodology section. I would, therefore recommend the paper as suitable for publication in ACP following a few minor corrections.

Specific Comments

1) The methodology used is poorly explained; section 2.4 is very confusing. I recommend the inclusion of a diagram e.g. a flow chart outlining the steps involved in the parameterisation of black carbon number and mass from the aviation fuel consumption data.

2) A discussion of the error in the altitudinal variation of emission indices (EIs) for both mass and number, and the potential of this error to affect results would be beneficial.

3) A considerable section of the paper is concerned with consideration of the parameterisation of the hydrophobic properties of surface black carbon. A brief mention of this section should be made in the abstract.

4) The paper notes that there is considerable variation in the number and mass of black carbon from surface sources simulated in different models (section 3.2.3). A comment on the magnitude of the absolute contribution of aircraft emissions and an estimate of the error in the simulations in the context of the large discrepancies between models would be useful.

Interactive comment on Atmos. Chem. Phys. Discuss., 4, 3485, 2004.