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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Do supersonic aircraft avoid contrails?" *by* A. Stenke et al.

Anonymous Referee #3

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This article investigates the change of global radiative forcing due to persistent contrails when part of the aircraft fleet is replaced by supersonic aircraft. Scenarios for 2025 and 2050 are considered, assuming future air traffic based on to-date market forecasts including regional variations. The simulations are performed using a modern GCM including a contrail parametrisation.

The re-introduction of supersonic aircraft, in particular also in form of business jets, is presently an important topic of discussion and this paper adds important information to the decision finding process of this option. It is well written, structured and has a clear message. I recommend it to be published by ACP and have only some minor comments.

General comments:

Given the large uncertainties involved in this analysis the significance of the obtained

results, which show very small differences for the different scenarios, should be discussed more. Systematic uncertainties are discussed qualitatively but their quantitative importance is not so clear. E.g. the correction of 25% to the LW forcing seems a lot, given the really small differences in RF we are looking at for the different scenarios. Especially as the reason for this correction is dependent on the optical thickness of the contrail, which is a quantity quite different for contrails produced by sub-sonic or super-sonic aircraft.

Concerning the comparison of the standard model to the E39/ATTILA it would be good to see in addition to the figure also numerical results, at least for contrail cover.

Another point is the numerical precision. How sure are you that the observed differences in radiative forcing are significant? As only 4% of the subsonic fleet is replaced differences are bound to be small. Maybe is would be worth while to make a much larger change (up to a factor of 10 larger) and compare the results. I guess that the change in radiative forcing should be about linear in this region, as overlap should not be too important yet.

If possible, it would be good to include the results of the 2007 IPCC report, as they are significantly different from the quoted 1999 IPCC ones. Especially on page 12941 the global RF values from IPCC (1999) don't need to be mentioned, as they are overruled now by better estimates and their big difference with the results of this paper only raise unnecessary questions.

Technical comments:

- page 12930, line 8: form -> from

- I'm not sure about the journal's policy, but I would avoid the footnotes and put those citations into the list of references.

- page 12932, line 11: are -> is

- page 12933, line 23: on -> in

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- page 12934, line 18: respectively -> respective (or delete)

- page 12934/12935: please consider changing the order of Figure 1 and Figure 2 and their description (i.e. put 2nd paragraph of page 12935 at line 20 of page 12935). Figure 1 seems more fundamental than Figure 2.

- page 12936, line 28: delete respectively

- page 12939, line 1: what are contrails with 'extremely low' optical depth?

- page 12939, lines 7,8,10: it should be: positively and negatively

- page 12942, line 5: are -> a

- page 12943, line 3: don't mention 'personal communication' here

- table 3 caption: better: The respective values for 2050 from a study of Marquart et al. (2003) are listed for comparison.

- Figure 4: the plots are a bit small, and the legend hence difficult to read

- Figure 7: in the legend write '[0.1%]', as in the other figures

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Interactive comment on Atmos. Chem. Phys. Discuss., 7, 12927, 2007.

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Interactive Comment