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Atmospheric Chemistry and Physics Discussions

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

Anonymous Referee #1

Received and published: 23 October 2007

Comments for the paper entitled "Do supersonic aircraft avoid contrails?" by A. Stenke, V. Grewe, and P. Pechtl.

General Comment

Although there is uncertainty whether any supersonic fleet will be developed, the knowledge gained from this paper on the potential impact of supersonic aircrafts on the atmosphere is important and the paper should be published.

All other Comments

1. In the Title it should be "aircrafts" and not "aircraft".

2. In the Introduction, page 12929, line 17, add "...in aviation-induced climate impact. In cold and humid air line-shaped contrails persist and create cirrus clouds (Zerefos et al., 2003)." Zerefos, C. S., Eleftheratos, K., Balis, D. S., Zanis, P., Tselioudis, G., and

Meleti, C.: Evidence of impact of aviation on cirrus cloud formation, Atmos. Chem. Phys., 3, 1633-1644, 2003.

3. In the Introduction, page 12930, line 6: It should be "11% ... is replaced by supersonic aircrafts" and not "11% ... are replaced by supersonic aircraft".

4. In the Introduction, page 12930, line 8: It should be "from" and not "form".

5. Page 12934, line 1: it should be "only the perturbation scenario...".

6. Page 12934, line 11: it is not useful to say "others".

7. Page 12934, line 21: replace "Northern Hemisphere mid-latitudes" with "the northern mid-latitudes".

8. Page 12935, lines 13: Replace "enhanced" with "increased". How much is this increase? - the authors could quantify the increases in the tropics, North Atlantic and North Pacific and provide the numbers in Tg/yr and in (%). I see that there are considerable differences in the global distribution of fuel consumption between S5 and S4, although a small percent of subsonic aircrafts (11%) is replaced by supersonic aircrafts.

9. Page 12937, line 9: replace "Northern Hemisphere mid-latitudes" with "the northern mid-latitudes".

10. Page 12937, lines 14-16: The way the sentence is written it appears that contrails in the northern extratropical lower stratosphere form only in winter, which is hard for me to believe. From Figure 3 we can see that in the northern extratropical lower stratosphere there are contrails in the summer, but not so many as during winter. So, in the northern extratropical lower stratosphere atmospheric conditions in winter are more favourable for contrail formation than in summer. Lines 13-14 in the Introduction should be also corrected.

11. Page 12937, line 27: it should be "in the perturbation scenario".

12. Page 12938, line 17-18: it should be "the global mean contrail coverage in S5".

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13. Page 12938, line 20: replace "overall" with "total".

14. Page 12938, line 22: replace "Northern Hemisphere extratropics" with "the northern extratropics".

15. Page 12938, I don't agree with lines 21-24. In Table 2, the differences for Western Europe and NPFC are very small.

16. Page 12939, line17: What changes in climate are considered?

17. Page 12941, line 21: replace "(Sect 3.1)" with "(Table 2)".

18. Page 12941, the last paragraph (lines 17-24) should be also inserted in the Conclusions.

19. Page 12942, line 5: it should be "the model shows that there are severe" and not "the model shows are severe".

20. Page 12942, line 25: replace "The results of first sensitivity simulations show" with "Preliminary results of sensitivity simulations show".

21. Page 12943, line 3: replace "will be published elsewhere" with "will not be presented here." Do not refer to (C. Fichter, personal communication, 2007).

22. Page 12944, Conclusions, lines 3-4 should be "In the case of a mixed fleet, part of subsonic aircrafts is replaced by supersonic aircrafts...".

23. Page 12944, Conclusions, lines 11-20 should be a separate paragraph.

24. Page 12944 in line 10, the authors should mention the regional differences from Table 2, i.e, reduced contrail coverage over Europe, NAFC, NPFC and increased contrail coverage over Thailand.

25. Page 12944, line 20: it should be "contrails are not" and not "contrails is not".

26. Page 12928 (lines 1, 6, 7, 8), page 12930 (lines 8, 19, 22), page 12933 (lines 9, 23, 24), page 12934 (lines 6, 23, 26), page 12935 (line 19), page 12936 (line 12),

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page 12937 (lines 24, 25), page 12938 (lines 23), page 12941 (lines 19, 24, 25), page 12943 (line 1), page 12944 (lines 3, 4, 6, 9, 17, 21, 22), it should be "aircrafts" and not "aircraft".

27. In Table 2, the authors should also provide estimates for the USA and discuss them in the text. In Table 2 at the end, the authors should provide the respective estimates from IPCC (1999) for 2050.

28. Also in Table 3 at the end, the authors should provide the respective estimates from IPCC (1999) for 2050.

29. In Figure 4 left panel (S5 mixed for January), the authors are using the zonal mean tropopause for July instead of using the zonal mean tropopause for January. This should be corrected. Lines 17-22 on page 12937, where the results of S5 in January are discussed, should be checked for their consistency.

30. In the Conclusions, the authors should comment, according to their findings, on supersonic aircrafts being a potential operational mitigation option to reduce contrail formation and RF.

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