

Interactive comment on “Relating observations of contrail persistence to numerical weather analysis output” by D. P. Duda et al.

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Received and published: 13 November 2008

I appreciate this paper on contrail representation in numerical weather analysis systems, a topic that might gain relevance if contrail formation needs to be mitigated to protect the future climate.

I have a suggestion concerning the methodology described in the introduction, p.18387, l.24-27. This is certainly true when one adopts the strategy to simulate contrails in high resolution NWP and then tries to develop parameterizations. Note that contrary to RUC and ARPS, the ECMWF IFS treats supersaturation over the ice phase since 2007.

Another option is to make use of the assumptions about the subgrid variability in rela-

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tive humidity made by cloud schemes in forecast and climate models. Exploiting these assumptions allows areas supporting contrail formation to be diagnosed in GCMs without explicit (resolved) representation of ice supersaturation (Burkhardt et al., 2008). May be the authors wish to comment on this alternative approach and its potential applicability in the NWA systems addressed here.

Another minor point is the mentioning of a few percent of ice supersaturation in the forecast model (p.18394, l.4). I believe that these slight overshoots are tied to numerical issues (i.e., at which point exactly in the code the RH_i is recorded as output), rather than such numbers appear purposely. The scheme is probably using what is called a saturation adjustment that removes any supersaturation instantly at every time step and converts the excess moisture into cloud condensate.

Reference

Burkhardt, U., B. Kärcher, M. Ponater, K. Gierens, and A. Gettelman (2008), Contrail cirrus supporting areas in model and observations. *Geophys. Res. Lett.* 35, L16808, doi:10.1029/2008GL034056.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 8, 18385, 2008.

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