

Atmos. Chem. Phys. Discuss., referee comment RC1  
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## Comment on acp-2021-210

Anonymous Referee #1

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Referee comment on "The climate impact of COVID-19-induced contrail changes" by Andrew Gettelman et al., Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2021-210-RC1>, 2021

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Gettelman et al. performed a modelling study to investigate the impact of aviation contrails and aviation water vapour emissions on climate, with a special focus on the effects due to the flight reductions during the COVID-19 pandemic. The study is very timely, since there is currently a large interest in understanding the climate impacts of various consequences of the COVID pandemic, and air traffic reduction is a particularly strong signal. Two caveats on the study are that (i) the impacts of contrail cirrus are neglected (but the argument put forward by the authors that these are uncertain in general circulation models is a convincing one) and (ii) that it is purely a modelling study, with no direct observational evidence (but the authors are of course right that an analysis of observations is not straightforward). Nevertheless, it remains a useful study that is of interest to the readers of Atmos. Chem. Phys. The study is very well written and the results are clearly presented and discussed. I recommend that the paper is published after a few minor revisions.

l50 (and later) better use " $\mu\text{m}$ " rather than "microns"

l59 I propose to write "0.1%" instead of 1.e-4. What is the lifetime of the contrail?

l65 Is there an interactive ocean? Or what does it mean, that SST are "relaxed" to Merra?

l98 A brief motivation on why not daily emission change factors (since the weekly cycle is rather well known by Fig. 1A) would be useful.

I139/Table 1 IWP should have units of  $\text{g m}^{-2}$ , not  $\text{g kg}^{-1}$ . Is the cloud fraction indeed in percent, or a fraction as in Fig. 2?

I142 Add the units to the ratio  $(\text{W m}^{-2} / (\text{kg m}^{-2}) = \text{s}^{-3})$ ?

I160 "Are in equilibrium" is a debatable statement. (a) the SSTs are imposed and so it is anyway unclear how well these correspond to what the model thinks full aviation effects are, and (b) the ocean has much longer timescales than rapid evolution of the transient aviation forcing.

I208 But in the model, contrail cirrus are not considered so the fact that the simulate decrease is smaller is indeed expected, right?

I213 For the ice number, are the contrails or is indeed the water the main effect?

I245 superfluous "is"