Review of

Ground-based contrail observations: comparisons with flight telemetry and contrail model estimates

by **Low et al.** submitted to **AMT**

Review of the revised manuscript (iteration #1)

General comments

I acknowledge the efforts to substantially revise selected parts of the manuscript. Moreover, I appreciate the detailed point-to-point replies. However, I believe that a few aspects still require improvement. Several plots are quite fuzzy and some are not adequately described in the legend/caption or text body. Furthermore, the analysis does not fully exploit the observational data set. I believe that more conclusive results could be achieved with little additional effort.

Major specific comments

1. <u>Contrail persistence</u>
   A more conclusive analysis and comparison between observation and simulation could be achieved. In lines 190–195, three lifetime categories for contrail observations are mentioned. However, the analysis does not make significant use of the 2-10 min and >10 min categories.

2. <u>Table 1</u>
   In Table 1, CoCiP persistence is compared to "Camera observes contrail," but a more accurate comparison would be to "Camera observes contrail with lifetime > 2 min". It is recommended that a third block be added to the table using "$Y_{Camera>2min}$", which hopefully improves the agreement with CoCiP.

3. <u>Figs. 2 & 3</u>
   The intention behind showing Figs. 2 and 3 is good and the plots should be kept in the manuscript. However, the description, explanation and interpretation are left to the readers. A single sentence is insufficient to convey the full meaning of the plots;

additional clarification is necessary ("Figures 2 and 3 provide examples of the superimposed flight trajectories and/or simulated contrail properties to the video footage.").

Moreover, please ensure that the legend lists only items that do appear in the plots. The inserted text is readily legible. It would be preferable to produce plots with enhanced quality and to focus on the content that is intended to be conveyed. For instance, it is not evident why multiple black lines intersecting the contrails have been plotted. I do not see the added value of plotting all the black lines (I do not motivate them either).

4. <u>Figs. 5 & 6</u>

I am unable to understand the right panel of Fig. 5. The title indicates that only true positives are displayed, yet the legend lists all four combinations

In my opinion, the information content of the present plots is not overly high as most aspects are straightforward to interpret. For instance, the fact that all grey and blue symbols in Fig.5 are to the right of the vertical line, while the green and red ones are to the left. Fig. 5 and 6 only uses the binary information whether or not contrail formation was observed. I strongly recommend that you show analogous plots for observed lifetimes > 2 min and > 10min, which can be compared to similar CoCip categories.

As previously stated in my review of the original submission, it is recommended that the fact that individual contrails are observed over time be exploited to a greater extent.

This is the excerpt from the previous review round:

"In general, I realize that you do not really exploit the fact that you observe the evolution of specific contrails despite this sentence in the conclusion ("*Ground-based cameras provide a cost-effective way to observe contrails, and unlike satellite imagery, their higher relative spatiotemporal resolution enables effective tracking of the formation and evolution of young contrails.*"). This should be better exploited.

Minor specific comments

I. Line 40: Märkl et al (2024) focuses on measurements and the climate impact of SAF contrails. The Bier & Burkhardt (2022) paper, which

you cite a few lines below, would be a better reference, as it deals with classical contrails from kerosene and the main topic of the paper is about GCM results.

II. Around line 60: Iwabuchi et al (2012) is worth to be mentioned.

III. Fig. 4: the two red lines in the picture are not explained. Moreover, DAL73 is not explained. Would it suffice to just draw the one black line for the intersection that is depicted in the left panel?

IV. Explanation of Table 1 starting from line 263: It would be worth mentioning that $Y_{Sim=CoCiP}$ cases are a subset of the $Y_{Sim=SAC}$ cases. Hence, it is trivial that the values in the first two lines of the CoCiP block are smaller than the analogous entries the SAC block. Likewise, the values in the third and fourth line are smaller in the CoCiP block.

V. Fig. 8: I appreciate that you mention a "poor visual agreement", which is indeed the case. Nevertheless, I suggest to spend a few more lines on describing on what can be seen in the plot (cases with y=0, y=35min or x=0). Currently, the plot is described in only two lines 298-300, before starting with the plot interpretation in line 300 spanning over many lines.

VI. Fig. 9: In the figure caption, you mention that the black lines represent the "temporal evolution …". These are only the thin black lines. The thick black line is the 1:1 line.

VII. Lines 305-306: For me, an analysis using a smaller study is even more affected by sub-grid scale variations. Hence, "because of the small study domain" sounds a bit awkward. I would have expected "despite of…"

Technical corrections

i. Line 29: reaches -> exceeds?
ii. Line 127: remove ","
iii. Line 151: its
iv. Line 343: " ."
v. Line 360: Missing full stop.