Travel Impact Model (TIM)
ADVISORY COMMITTEE

TECHNICAL BRIEF

Update on communicating contrail impacts

5 November 2025

SUMMARY

This technical brief documents the updates to the contrail warming estimates of the Travel Impact Model (TIM). It compares the results of the updated estimation model with the results of the previous one, which were presented in the January 2025 technical brief. There have been three major methodological improvements to the contrail estimates of TIM: 1) the constant probability of contrail formation of 4.95% has been replaced with a regional probability of contrail formation, 2) a calibration factor that was used to scale the contrail impact has been removed, and 3) the classification system for communicating a flight's potential for contrail impact has been updated. In the updated model, classifications are based on a contrail multiplier, a multiple of the average carbon dioxide emissions of a route, and include low-risk (contrail multiplier < 0.2), medium-risk (contrail multiplier from 0.2–1.0), and high-risk (contrail multiplier > 1) categories. These methodological improvements to TIM have changed the contrail warming estimates and the distribution of flights in each classification.

TABLE OF CONTENTS

BACKGROUND

At the 5th Advisory Committee meeting (AC/5) in June 2024, the AC agreed that the Travel Impact Model (TIM) should classify flights based on a climatological estimate for contrail warming, expressed as a multiple of the average carbon dioxide (CO_2) emissions of a route. This metric is referred to as the contrail multiplier. This decision was documented in the January 2025 technical brief,[1] which evaluated multiple classification methodologies.

Over the past year, the AC has discussed the implementation of the classification methodology, examining user feedback to develop easily communicable classifications and visual representations. Through those discussions, the following implementation details were agreed upon:

1. The contrail classification will be kept separate from the CO_2 equivalent number and will be a separate output from TIM.
2. The contrail multiplier will be calculated using the 100-year global warming potential (GWP100).
3. Three classifications for contrail warming—low-, medium-, and high-risk—will be used.
4. The thresholds for the classifications will be:
    a. Flights with a contrail multiplier < 0.2 will be classified as low risk;
    b. Flights with a contrail multiplier between 0.2 and 1.0 will be classified as medium risk; and
    c. Flights with a contrail multiplier > 1.0 will be classified as high risk.
5. A best-practices document will be published alongside the release of the contrail classifications to support their use by third-party adopters of TIM.

As the AC discussed the classification methodology, the research team worked on improving the contrail warming estimates that TIM outputs. The following improvements were made:

1. The global constant probability of contrail formation was replaced by a regionally varying one.
2. A calibration factor that was used to scale the contrail impact estimates of the climatological model to previously published values was removed.

1 Travel Impact Model Advisory Committee, "Communicating Contrail Impacts," January 2025, https://travelimpactmodel.org/static/media/tim_contrails_impact.pdf.

3. The 100-year absolute global warming potential (AGWP100) of CO_2 was changed from 92.5 × 10^{-15} $Wm^{-2}yr\ kg^{-1}$ to 89.5 × 10^{-15} $Wm^{-2}yr\ kg^{-1}$ to reflect the update from the Intergovernmental Panel on Climate Change's Sixth Assessment Report (IPCC AR6).[2]

In what follows, we outline the updates to the contrail estimation model of TIM and compare the results of the updated contrail estimation model (new analysis) with the results of the previous one (old analysis), which were presented in the January 2025 technical brief. For this comparison, we use the same figures and tables that were used in the previous technical brief.

CHANGES TO THE CALCULATION OF CONTRAIL IMPACT

The Travel Impact Model provides customers with emissions information at the time of booking a future flight. Due to uncertainty in weather forecasting, it is impossible to predict the contrail warming impact of an individual flight more than 24 hours in advance. Acknowledging this challenge, a climatological analysis that relies on work done by Platt et al. was adopted to provide contrail warming estimates for future flights.[3]

In the old analysis, the climatological estimate for energy forcing per contrail meter (EFpcm) was multiplied by a constant 4.95% probability of persistent contrail formation and integrated over the flight path. The biggest methodological improvement to the contrail estimation model was to incorporate a regionally varying probability of persistent contrail formation ($p_{contrail}$) for the year 2019.[4] The $p_{contrail}$ is provided at 0.5 x 0.5 degree resolution and is defined as the kilometers of persistent contrails divided by the flight kilometers.

The new contrail estimation model is illustrated in Figure 1 using three flights as examples:

- a direct flight from San Francisco International Airport to John F. Kennedy International Airport in New York City;
- a flight from John F. Kennedy International Airport to Daniel K. Inouye International Airport in Honolulu, Hawaii, with a stop at the Phoenix Sky Harbor International Airport in Phoenix, Arizona; and
- a non-stop flight from Indira Gandhi International Airport in New Delhi, India, to Singapore Changi Airport.

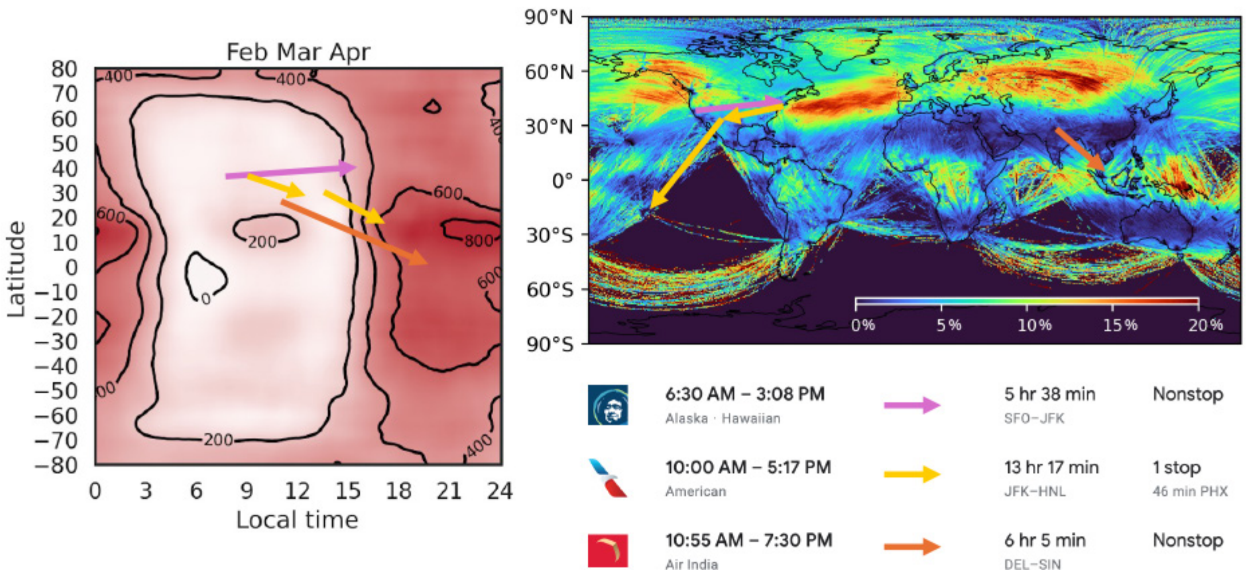
2 Chris Smith et al., "The Earth's Energy Budget, Climate Feedbacks, and Climate Sensitivity Supplementary Material," in *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. Valérie Masson-Delmotte et al. (2021), https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter07_SM.pdf.

3 John C. Platt et al., "The Effect of Uncertainty in Humidity and Model Parameters on the Prediction of Contrail Energy Forcing," *Environmental Research Communications* 6, no. 9 (September 2024): 095015, https://doi.org/10.1088/2515-7620/ad6ee5.

4 Roger Teoh et al., "Global Aviation Contrail Climate Effects from 2019 to 2021," *Atmospheric Chemistry and Physics* 24, no. 10 (May 27, 2024): 6071–93, https://doi.org/10.5194/acp-24-6071-2024.

The results of the climatological analysis are shown on the left as a contour map of the EFpcm for the spring season, expressed as a function of the local time (x-axis) and the latitude (y-axis). On the EFpcm contour map, each individual flight is represented by an arrow that connects the latitudes of the origin and destination airports at the local departure and arrival times. Similarly, for the $p_{contrail}$ map, arrows connect the geographic locations of the origin and destination airports. To calculate the contrail impact of a flight, a line integral is taken over a simulated great circle distance trajectory. For each point in the trajectory, the EFpcm is multiplied by the local $p_{contrail}$ and the product is integrated over the trajectory.

Figure 1. Energy forcing per contrail meter and probability of persistent contrail formation maps with example flights



The probability of persistent contrail formation for 2019 is shown on the right, ranging from 0% (dark blue) to 20% (dark red). In general, flights above 30 degrees north and 30 degrees south have a high probability of persistent contrails due to ice supersaturated regions linked to Hadley circulation,[5] while flights in the subtropics encounter fewer ice supersaturated regions.

From the $p_{contrail}$ color map, we see that areas that are green and going into red, like the North Atlantic, will have a higher rate of persistent contrail formation than the previous constant value of 4.95%. On the other hand, areas in the Middle East and South Asia have $p_{contrail}$ values that are lower than the previous assumption and should expect to have the estimated contrail impact reduced compared with the old analysis.

5 Hadley circulation occurs when “warm and moist air around the surface of the Equator rises to the upper troposphere, moves poleward, becomes drier and cooler, and sinks at the subtropics.” See Teoh et al., “Global Aviation.”

Another methodological improvement to the contrail estimation model was to remove a calibration factor that was being used to scale up the results of the climatological analysis to align the results with the effective radiative forcing (ERF) estimates in Lee et al.[6] The factor was removed to keep the results consistent with other Contrail Cirrus Prediction (CoCiP)-based studies. Additionally, we strive to substantiate every element of our calculations with published research, and this calibration factor did not meet that bar. This change reduces the global mean estimated contrail impact for flights.

As in the old analysis, the new analysis assumes that aircraft that have cruise altitudes below 30,000 ft (as defined by the European Environmental Agency's aviation emissions model) and flights with a great circle distance below 400 km that do not reach altitudes where contrails typically form do not produce contrail warming. We also continue to use an efficacy factor of 0.42, which is the ratio of the ERF and RF. The efficacy factor accounts for how effectively contrails produce surface temperature change compared with CO_2, which has an efficacy of 1. In a 2023 study, Bickel found that the efficacy of contrails is reduced compared with CO_2 primarily due to a reduction in natural cirrus cover because of contrail formation.[7]

COMPARISON OF RESULTS

This section compares the results of the updated contrail estimation model (new analysis) with those from the previous model (old analysis). The old analysis used ~34 million flights scheduled between May 5, 2024, and May 7, 2025. The new analysis uses ~37 million flights scheduled between January 1, 2023, and December 31, 2023. While the flight schedules are different, the distribution of the contrail estimates does not change significantly. The use of 2023 data for the new analysis is part of a forthcoming validation effort in which we will use meteorological results from a CoCiP-based analysis of 2023 flight trajectories to understand how well the climatological model approximates the meteorological results.

Both analyses provide contrail warming impact estimates in terms of effective energy forcing (EEF) and in units of gigajoules (GJ). The EEF refers to how much heat is trapped by the contrail over its lifetime. To compare the contrail impact and the CO_2 impact of a flight, the EEF is converted into the 100-year GWP and normalized by the CO_2 emissions of the flight. The resulting value is the contrail multiplier that can be used to express the contrail warming impact of a flight as a multiple of its CO_2 impact. The contrail multiplier for a flight *i* is defined as:

6 David Simon Lee et al., "The Contribution of Global Aviation to Anthropogenic Climate Forcing for 2000 to 2018," *Atmospheric Environmen*t, 244 (January 2021): 117834, https://www.sciencedirect.com/science/article/pii/S1352231020305689.

7 Marius Bickel, "Climate Impact of Contrail Cirrus" (PhD diss., Ludwig-Maximilians-Universität München, 2023), https://elib.dlr.de/197602/.

$$X_i = \frac{EEF_{contrail,100,i}}{EEF_{CO_2,100,i}} = \frac{EEF_{contrail,100,i} \times \frac{ERF}{RF}}{EF_{CO_2,100,i}}$$

$$EF_{CO_2,100,i} = AGWP_{CO_2,100} \times (365 \times 24 \times 60^2) \times S_{Earth} \times m_{CO_2,i}$$

Where:

x_i is the contrail multiplier that we use to express the warming impact of contrails; $EEF_{contrail,100,i}$ is the EEF of the contrail over 100 years, calculated as the product of the energy forcing of contrails over 100 years ($EF_{contrail,100,i}$) and the efficacy (ERF/RF) of contrail warming (assumed to be 0.42);

$EEF_{CO_2,100,i}$ is the effective energy forcing from m kg of CO_2 over 100 years, which is equivalent to the $EF_{CO_2,100,i}$ because CO_2 has an efficacy of 1; and

$EF_{CO_2,100,i}$ is calculated by multiplying the AGWP100 ($AGWP_{CO_2,100}$) by the number of seconds in a year, the surface area of the Earth (S_{Earth}) and the amount of CO_2 emitted by flight i ($m_{CO_2,i}$).

Classifications

An implementation improvement made to the contrail estimation model was to change the classifications used to communicate the magnitude of contrail impact and the thresholds between them, based on recommendations from the AC.[8] Flights are classified based on their contrail multiplier. The thresholds for the classifications are:

1. Flights with a contrail multiplier < 0.2 will be classified as low risk;
2. Flights with a contrail multiplier between 0.2 and 1.0 will be classified as medium risk; and
3. Flights with a contrail multiplier > 1.0 will be classified as high risk.

The thresholds for the classifications were chosen to simplify communications about a flight's contrail impact to the end user of a booking platform. The rest of the comparison uses these new classifications for both analyses.

Summary statistics

We start the comparison between the old and new analyses by looking at the top-level statistics of the contrail multiplier. Table 1 lists the global average, minimum, median, and maximum contrail multiplier for the two analyses. The percentages in the parentheses under the new analysis refer to the change in the value.

The minimum and maximum values for the contrail multiplier do not change significantly. The global average contrail multiplier, which is the sum of the total

8 Previously, four classifications were used: Cooling for flights with a contrail multiplier less than -0.2, Negligible for flights with a contrail multiplier between -0.2 and 0.2, Warming for flights with a contrail multiplier between 0.2 and 0.7, and Strongly Warming for flights with a contrail multiplier higher than 0.7.

contrail impact over a year divided by the CO_2 impact over a year, is 60% lower in the new analysis than in the old analysis, while the median multiplier value is 70% lower. The meta-analysis in Lee et al., which looked at four studies that used global climate models, estimated the global contrail multiplier for the year 2018 to be 0.63. The global contrail multiplier in the new analysis is 62% lower than 0.63.

Table 1. Comparing the statistics of the contrail multiplier across the two analyses

	Old analysis	New analysis
Global average	0.59	0.24 (-60%)
Minimum	-0.31	-0.28 (+10%)
Median	0.35	0.10 (-70%)
Maximum	5.3	5.2 (-2%)

The reduction in the contrail estimates is expected due to the removal of the calibration factor that was scaling results to match the meta-analysis. While this is a significant reduction in the estimates, the new results are still within the 5%–95% uncertainty bounds estimated by Lee et al.

The results of the new analysis are consistent with recent studies that have estimated a lower ERF for contrails than Lee et al.[9] Bier and Burkhardt, Märkl et al., Quass et al., and Teoh et al. found lower contrail ERFs, while Gettelman et al. and Zhang et al. arrived at higher estimates after normalizing for flight kilometers flown in the respective years of analysis.[10] The results are also more closely aligned with the CoCiP-based contrail inventory by Teoh et al. The CoCiP-based inventories for 2019, 2020, and 2021 yielded global average contrail multipliers of 0.33, 0.28, and 0.29, respectively. Zheng et al. calculated a global ERF of 17.8 mW/m^2 for contrail impacts in 2023, yielding a global average multiplier of 0.19.[11] Teoh et al. also discussed reasons for the difference between CoCiP-based estimates and those from global climate models.

9 D.S. Lee et al., "The Contribution of Global Aviation."

10 Andreas Bier and Ulrike Burkhardt, "Impact of Parametrizing Microphysical Processes in the Jet and Vortex Phase on Contrail Cirrus Properties and Radiative Forcing," *JGR Atmospheres* 127, no. 23 (2022): e2022JD036677, https://onlinelibrary.wiley.com/doi/abs/10.1029/2022JD036677; Andrew Gettelman et al., "The Climate Impact of COVID-19-induced Contrail Changes," *Atmospheric Chemistry and Physics* 21, no. 12 (June 2021): 9405–16, https://acp.copernicus.org/articles/21/9405/2021/; Johannes Quaas et al., "Climate Impact of Aircraft-Induced Cirrus Assessed from Satellite Observations Before and During COVID-19," *Environmental Research Letters* 16, no. 6 (June 2021): 064051, https://dx.doi.org/10.1088/1748-9326/abf686; Raphael S. Märkl et al., "Powering Aircraft with 100% Sustainable Aviation Fuel Reduces Ice Crystals in Contrails," *Atmospheric Chemistry and Physics* 24, no. 6 (March 2024): 3813–37, https://doi.org/10.5194/egusphere-2023-2638; Teoh et al., "Global Aviation"; Weiyu Zhang et al., "Impact of Host Climate Model on Contrail Cirrus Effective Radiative Forcing Estimates," *Atmospheric Chemistry and Physics* 25, no. 1 (January 2025): 473–89, https://acp.copernicus.org/articles/25/473/2025/acp-25-473-2025.pdf.

11 Sola Zheng et al., *Aviation Vision 2050*: *The Potential for Climate-Neutral Growth* (International Council on Clean Transportation, 2025), https://theicct.org/publication/aviation-vision-2050-the-potential-for-climate-neutral-growth-sept25/.

Distribution of the warming impact

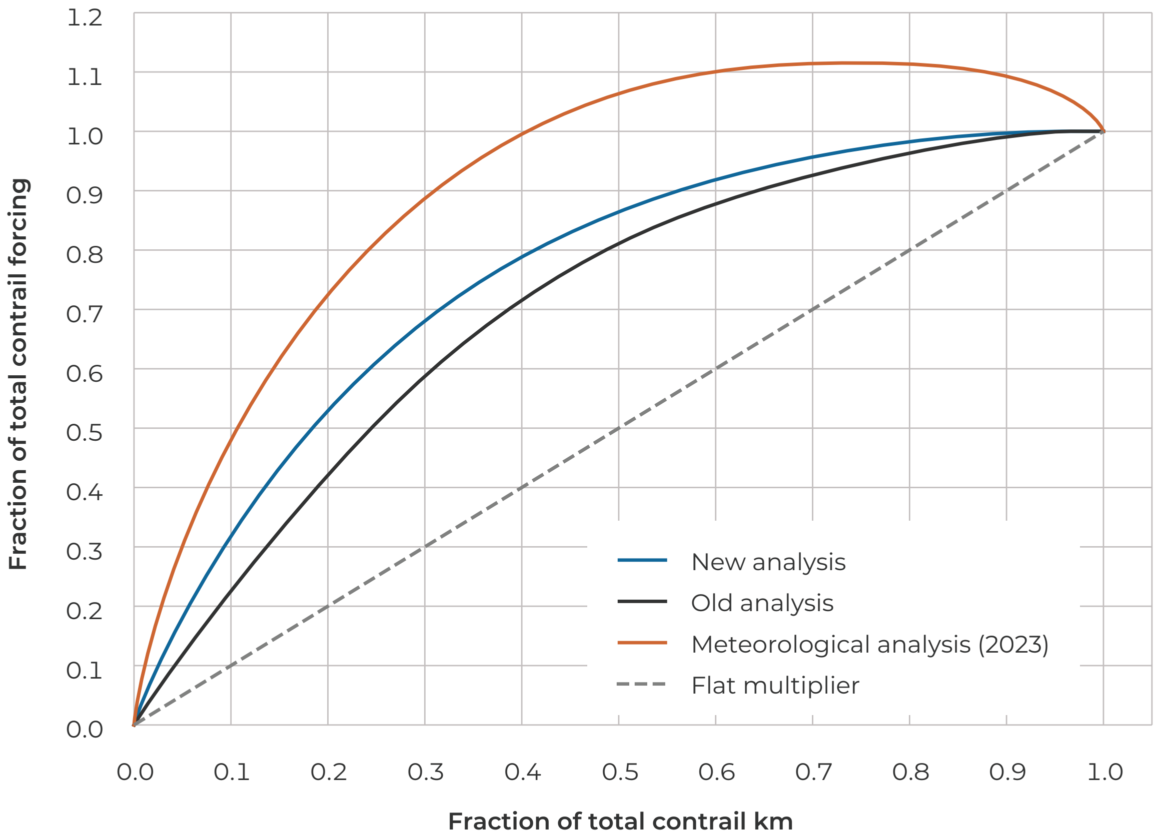
Figure 2 illustrates the cumulative distribution of total contrail forcing (y-axis) relative to the cumulative fraction of total contrail kilometers (x-axis). The gray dashed line represents what this plot would look like if we assumed every flight contributed equally to contrail warming, equivalent to using a flat multiplier on CO_2 impact for each flight. The green line represents the results of the same CoCiP model but using reanalysis meteorological data and actual flown trajectories, which are only available after the flight occurs.[12] This analysis is only possible after a flight has happened, and it would not be possible to achieve this distribution when forecasting the contrail impact of flights.

The flat multiplier represents results with no information about specific flights, while the meteorological analysis represents the results with the largest amount of information, including flight trajectory and local weather conditions at the time of the flight. The results of the climatological analyses—the new analysis (blue line) and the old analysis (brown line)—lie in between these two cases, with the new analysis performing slightly better than the old analysis in replicating the distribution of the meteorological analysis.

One way to read the graph is to look at 0.2 on the x-axis, representing 20% of contrail kilometers, and note where each line lands on the y-axis. The flat multiplier (gray dashed line) would suggest that 20% of contrail kilometers represent 20% of the contrail warming. The old analysis (brown line) would suggest that 20% of the contrail kilometers represent 43% of the contrail warming. The new analysis (blue line) would suggest that 20% of the contrail kilometers represent 53% of the contrail warming. The meteorological model (red line) would suggest that 20% of contrail kilometers are responsible for 73% of the contrail warming. The new analysis thus improves on the old analysis and captures more of the uneven distribution of contrail impacts.

12 This line extends above 1.0 and then comes back down to 1.0 at its end, due to the meteorological analysis predicting that about 10% of contrail kilometers have a cooling effect.

Figure 2. Distribution of the fraction of contrail kilometers and the warming that they cause

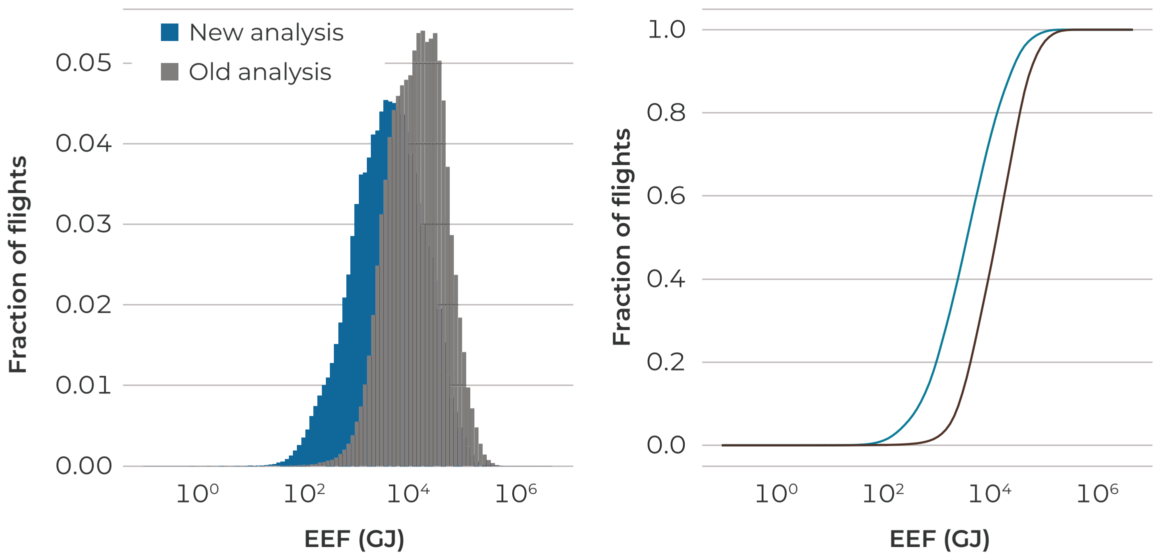


Note: Flights were first sorted in descending order of contrail impact and then plotted on this figure.

This improvement in the new analysis comes from the inclusion of regional rates of probability of persistent contrail formation. This allows us to differentiate the contrail impact between areas of low likelihood of persistent contrail formation, such as the subtropics, from areas of high likelihood of persistent contrail formation, such as the North Atlantic.

Figure 3 presents the frequency distribution (left panel) and cumulative distribution (right panel) of the EEF for all flights analyzed, in GJ. The new analysis (blue) is overlaid with the old analysis (brown). In both panels, the x-axis is on a logarithmic scale. The frequency distribution for the new analysis shows a general shift of the distribution towards lower EEF values compared with the old analysis. The peak of the distribution in the new analysis is at a lower EEF value. The cumulative distribution plot confirms this trend, with the new analysis curve rising at lower EEF values, indicating that a larger fraction of flights has a lower EEF compared with the old analysis.

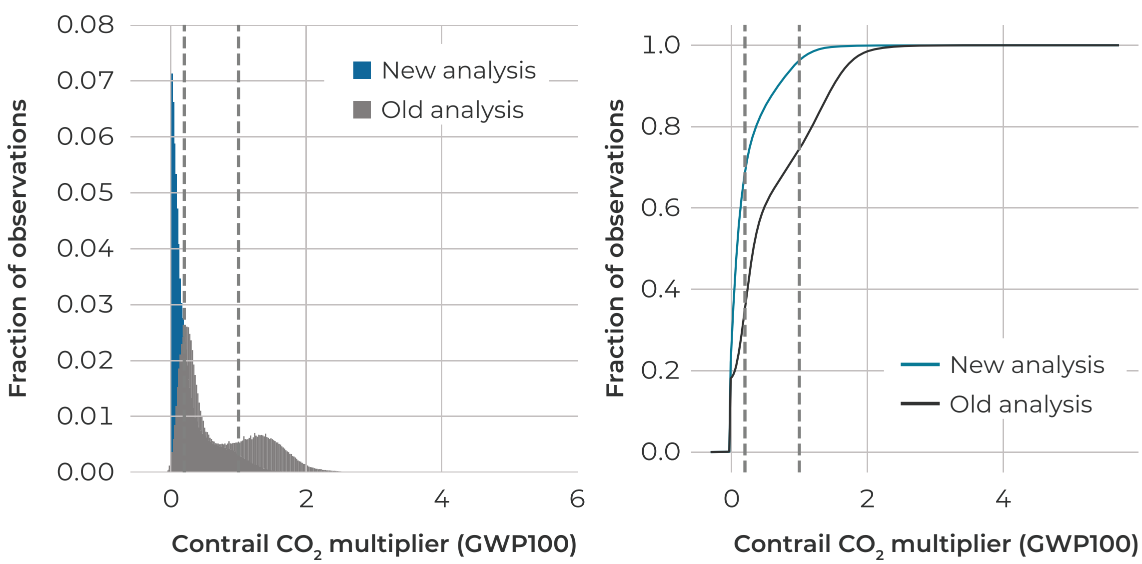
Figure 3. Frequency and cumulative distribution of EEF



Distribution of the impact relative to CO_2 emissions

Figure 4 shows the frequency distribution (left panel) and cumulative distribution (right panel) of the contrail multiplier (expressed as GWP100). For both graphs, the x-axis represents the non-CO_2 multiplier and the y-axis represents the percentage of flights. Again, the new analysis (blue) is compared with the old analysis (brown). The vertical dashed gray lines indicate the thresholds of 0.2 and 1.0 used for the low-, medium-, and high-risk classifications. From the frequency distribution on the left, we see that the primary mode (peak) of the distribution has shifted from 0.2 for the old analysis to nearly 0 for the new analysis. We also see that the second mode at ~1.2 for the old analysis is not present in the distribution of the new analysis.

Figure 4. Frequency and cumulative distribution of contrail multiplier



The cumulative distribution on the right of Figure 4 shows that a majority of flights in the new analysis now fall in the lowest classification, with multipliers less than 0.2. Table 2 presents the distribution of the contrail multiplier and the contrail warming in the different classifications. We see a doubling of the percentage of flights being classified as low risk, from 33% in the old analysis to 66% in the new analysis. There is also a large drop in the number of flights that are considered high risk, with only 4% of flights in the new analysis being classified as such. Those 4% of flights are responsible for 16% of the contrail impact. Most of the warming (63%) comes from flights classified as medium risk.

While these revised numbers are largely consistent with the understanding that most flights do not contribute to contrail warming, they fall short of retrospective meteorological analyses, which suggest that only 2% of flights are responsible for 80% of contrail warming.[13] It is important to remember that such a retrospective meteorological analysis is not possible to replicate with the data that are available at the time of booking a flight.

Table 2. Share of flights and contrail warming in each classification

Risk classification	Percentage of flights		Percentage of warming	
	Old analysis	New analysis	Old analysis	New analysis
Low	33%	66%	4%	21%
Medium	41%	30%	45%	63%
High	26%	4%	51%	16%

Consumer choice

A major goal of TIM is to provide the customer with the ability to make a more sustainable choice wherever possible. To analyze how each method impacts what a consumer sees, we grouped flights into origin-destination-season combinations. We then filtered out any combinations that have only one flight option, as that would indicate that the consumer has no choice, regardless of the contrail analysis.

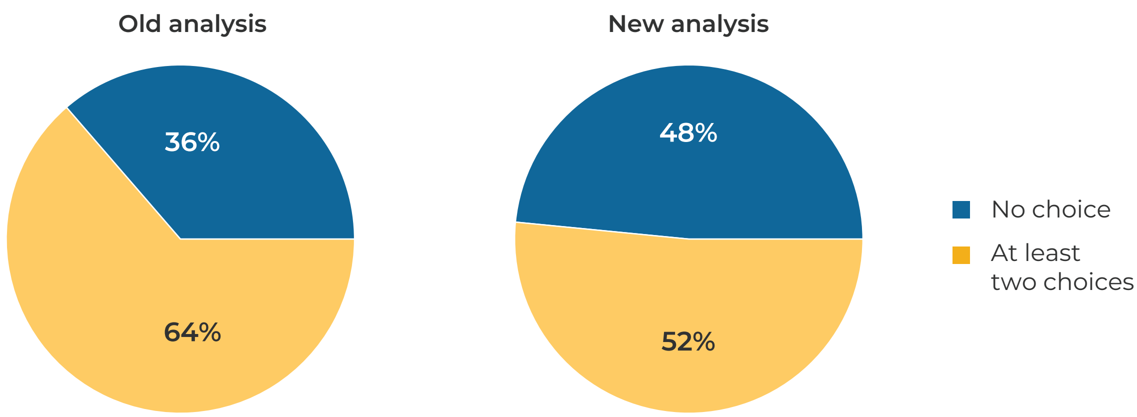
When the consumer has no choice

The consumer has no choice when all flights in an origin-destination-season combination are classified the same. A consumer has at least two choices when the flights in an origin-destination-season combination are distributed among two or more classifications. Figure 5 presents these percentages for each analysis as a pie chart, and the two percentages add up to 100%.

The new analysis provides moderately less choice to the consumer as the number of combinations with no choice increases from 36% to 48%.

13 Teoh et al., "Global Aviation."

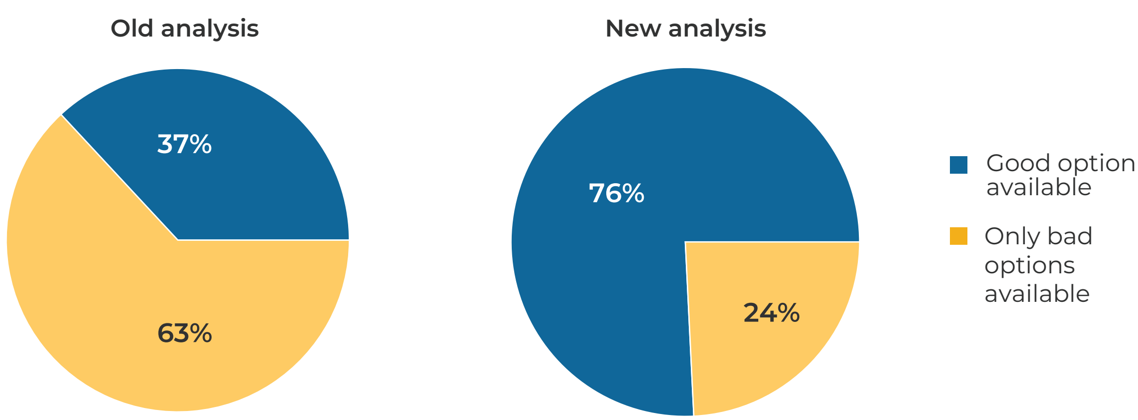
Figure 5. Percentage of origin-destination-season combinations that present the consumer with no choice or at least two choices



Good versus bad choice

A consumer is said to have a good option available if at least one flight in the origin-destination-season combination is in the low-risk classification. A consumer is said to have only bad options available if all flights for that combination are classified as either medium- or high-risk. Figure 6 presents these percentages for each analysis as a pie chart, and the two percentages add up to 100%. In this case, the new analysis has far more combinations (75%) for which at least one good option is available.

Figure 6. Percentage of origin-destination-season combinations that present the consumer with a good option or only bad options



Case studies

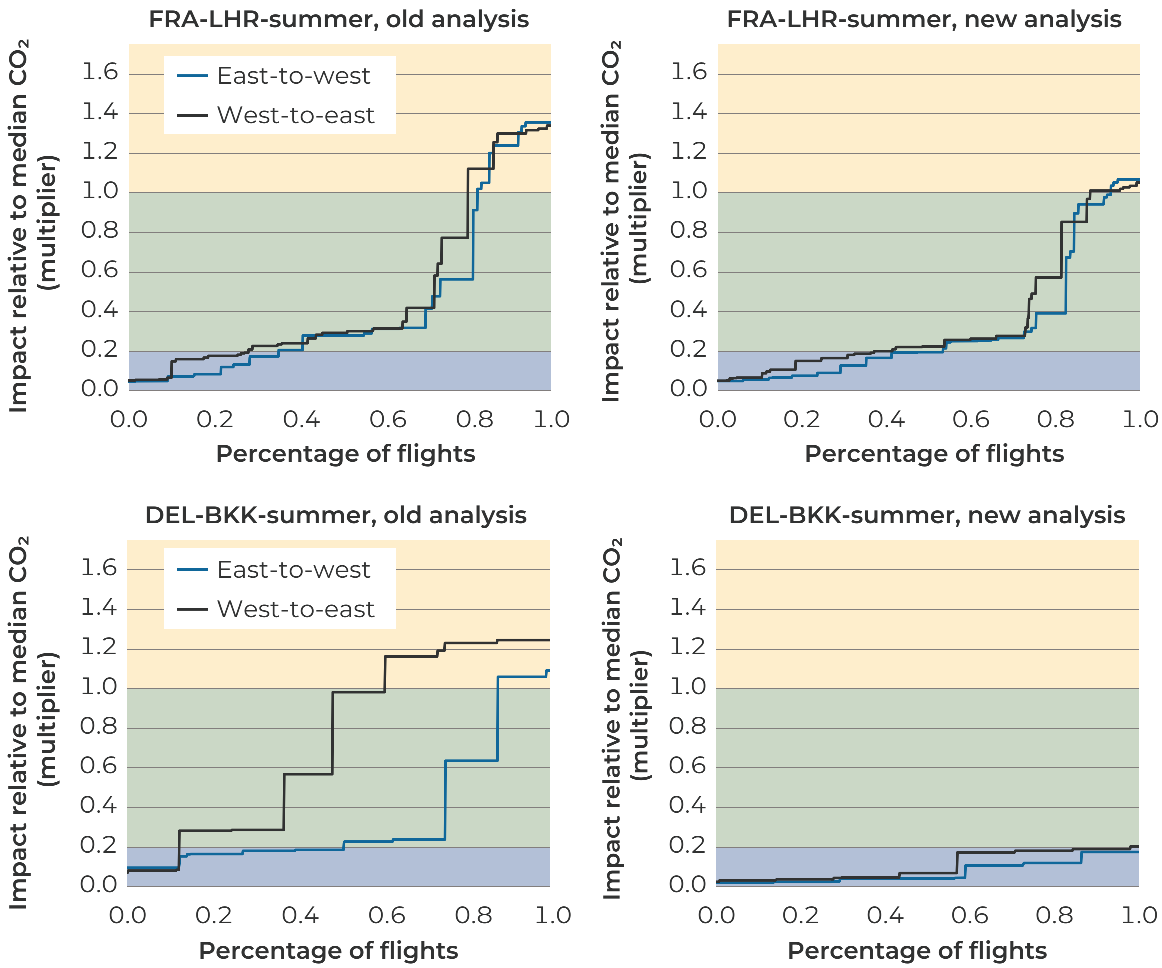
To further investigate the question of consumer choice, we present the cases of two routes in the summer season, Frankfurt to London (FRA-LHR) and New Delhi to Bangkok (DEL-BKK). FRA-LHR is an intra-Europe, short-haul route (657 km), and DEL-BKK is a medium-haul route (2,950 km). The FRA-LHR-summer combination has 2,769 flights, and the DEL-BKK-summer combination has 1,514 flights. These routes are chosen to show the impact of the regional rates of contrail formation by including one over Europe which has high $p_{contrail}$ and one over the subtropics, which has low $p_{contrail}$.

Figure 7 plots the FRA-LHR-summer results on the top and the DEL-BKK-summer results on the bottom. The left column refers to the results from the old analysis, while the right column refers to results from the new analysis. The x-axis is the percentage of flights. The blue line represents east-to-west flights, while the brown line represents the west-to-east flights. The background colors represent the buckets for each method: blue for low risk, green for medium risk, and yellow for high risk.

Focusing first on the FRA-LHR route, we see small changes in the distribution. Previously, about 20% of flights between FRA and LHR were classified as high risk in the old analysis, indicated by the blue and brown lines crossing into the yellow section at approximately 0.8 in the top-left panel of Figure 7. In the new analysis (top-right panel), about 10% of flights are classified as high risk. The changes are small because the removal of the calibration factor (reduced estimated impact) is mostly compensated by an increase in $p_{contrail}$ from the old analysis default of 4.95% to 7.3%.

Moving onto the DEL-BKK route, we see substantial changes in the distribution. Where previously the highest contrail multipliers were 1.4–1.6, the new analysis yields a maximum of 0.22. The removal of the calibration factor is compounded by the use of regional $p_{contrail}$ which is about 1.75% over India, as compared to the global default of 4.95% in the old analysis.

Figure 7. Case study of two routes in different parts of the world that show the impact of using regional probability of persistent contrail formation



CONCLUSIONS

This technical brief documented the updates to the contrail estimates of TIM and compared the results of the new estimation model with those of the previous estimation model, which were presented in the January 2025 technical brief. There are three major improvements to the contrail estimates of TIM:

- replacing the previously used constant persistent contrail formation probability (4.95%) with a more realistic regional probability of contrail formation derived from Teoh et al.;
- removing a calibration factor that was used to align results with Lee et al.; and
- use of three classifications based on the contrail multiplier for a flight, calculated using the GWP100, with flights with a contrail multiplier of less than 0.2 classified as low risk, between 0.2 and 1.0 classified as medium risk, and greater than 1.0 classified as high risk.

These methodological improvements have led to more accurate and region-specific contrail impact estimates, resulting in generally lower global average contrail multipliers. Specifically, the global average contrail multiplier has decreased by approximately 60%, aligning more closely with recent CoCiP-based contrail inventories while still falling within the established uncertainty ranges of prior research.

The updates to TIM substantially alter the distribution of flights within the classifications. Key shifts in the flight distributions from the old analysis to the new analysis include:

- The percentage of flights classified as low risk has doubled from 33% to 66%.
- The percentage of flights classified as high risk has decreased from 26% to 4%.
- While the shift to lower classifications reduces the number of choices a consumer sees, it does provide more options that have lower contrail impact.
- There is further differentiation across geographic regions, with regional probabilities of persistent contrail formation improving the fidelity of the contrail impact estimation.

Despite the updates to TIM, classifying flights based on their contrail multiplier remains an effective means of expressing a flight's contrail impact. Future refinements in contrail modeling are anticipated, and the established classification framework is well-positioned to integrate further advancements without altering the way contrail impacts of a consumer's flight choices are communicated.