

We thank the Editor for his careful reading.

Replies by the authors are in red.

Public justification (visible to the public if the article is accepted and published):

I thank the authors for submitting this interesting and relevant manuscript to JECATS, and the reviewers for their time and effort.

I have gone over the revised version of the manuscript myself and spotted some formatting and linguistic errors, which I require to be addressed before final publication of the manuscript. My only content-specific comment is related to line 557: the authors should consider that merely as a suggestion / point of discussion. Similarly, the comment on L798 is also a suggestion.

L557: "This clearly demonstrates that the inclusion of all component effects of air traffic is essential for rerouting planning and decisions."

We could remove "clearly" and change "is essential" into "should be considered", such that "This demonstrates that the inclusion of all component effects of air traffic should be considered for rerouting planning and decisions."

L798: "These steps need to be taken successfully in order to make eco-efficient flights the routine."

Can be changed into (incl. a suggestion by the Editor):

"These steps should be taken in order proceed further to make eco-efficient flights part of routine operations."

General comments:

- The figures in the revised version of the manuscript are of very low resolution, making it hard to study them. Those in the original manuscript were fine, however.

As we submit the original figures in *.png for production, the figure quality should be sufficient then. The clean pdf version has been compiled with "original resolution", and should be better.

- The mathematical typesetting of appendix B should be re-done in order to satisfy the following:

o Consistency of symbols throughout the appendix as well as with the main text, also when it comes to use of italics. **DONE**

o Introduction of all symbols in the surrounding text, on first use. **DONE**

o Removal of general errors in typesetting such as the conditional expressions for the ozone and methane aCCFs. **DONE**

o Consistent formatting of scientific notation for large/small numbers. **DONE**

Specific comments:

- The abstract is long, and occasionally repetitive. It could therefore be shortened.

Yes, indeed. We have reformulated parts of the abstract to avoid repetitions.

- 61: the 2 in the first "CO₂" seems to be typeset incorrectly **DONE**

- 78: "operational data set" should this be "operational datasets"? **DONE**

- L84: the sentence seems to end prematurely? **DONE**

- L87: where are these additional aspects described?

One of the solutions for quieter start- and landing manoeuvres has been awarded a patent, for instance. Other results appear only in internal reports so far (thus "elsewhere").

- L109: "provided" should this be "provide" ? **DONE**

- L119: "are involved" should be removed I think. **DONE**

- L130: "various options how to implement" -> "various implementation options" **DONE**

- Figure 1: "Weather forecast" should not be hyphenated

Agreed, this will be corrected once we prepare the figures for the production.

- L154: "short and persistent ones" -> "short-lived and persistent ones" **DONE**

- L155: While the first ... This sentence ends with a comma. I suggest replacing that with a period, and then removing "While". **DONE**

- L174: "the SAC" **DONE**

- L175: "water-(supersaturated)" -> "supersaturated w.r.t. the liquid phase" is more precise, I would argue. **DONE**

- L177: "For the forecast of regions where contrails could form (ISSR)" Why is ISSR mentioned here, if one considers regions where contrails could form? **DONE**

- L235: This sentence does not read well and seems to be grammatically incorrect. **DONE**

- L237: "ACCFs" please be consistent with the spelling of abbreviations: the previous sentence uses "aCCFs". There are other cases in the paper where the spelling differs.

We think, in this case an uppercase initial letter is justified since a new sentence starts here.

- L262: please remove the period after "model" **DONE**

- L284: "conversion factors individually for each species" -> "conversion factors for the individual species" **DONE**

- L290: extra period should be removed. **DONE**

- L314: "Clima_3s" is spelled differently elsewhere in the manuscript **DONE**

- L318: "18.07.2024" in the caption of figure 3, the date is written as 18 July 2024, so I suggest to be consistent with that. There are other dates mentioned in the manuscript text to which this is applicable.

The date in the annotation of figure 3 was removed as it seems sufficient to write it once in the figure caption. Other dates in the text were adapted accordingly.

- Figure 3: It would be good to mention what the gray area in the top 4 panels is. **DONE** Additionally, if the theoretical flight is e.g. a great circle path, it would be good to mention that explicitly.

The vertical cut ("flight path") is not a great circle path. The sentence was rephrased accordingly.

- L349: "so is the effectiveness.." -> "as is the effectiveness" **DONE**

- Figure 4: "units of 10^{-8} K" The figure's vertical axis uses "nK" which stands for nanoKelvin, so 10^{-9} K: is the caption correct here? **Corrected. It is indeed 10^{-9} K.**

- L358: "can be evaluated in a statistical workflow" I fail to see how Figure illustrates this?

- L432: "maps view" -> "map view" ? **DONE**

- L432: double period, please remove one. **Cannot find it.**

- Figure 7: Please indicate in the caption what the green and red trajectories mean. **DONE**

- L459, L460: "aeras" -> "areas" **DONE**

- L490: "figure 5" do you mean figure 6? **Yes, corrected.**

- L496: "automatize" -> "automate" **DONE**

- L550: "were set to zero" but in line 227 you mention that these are set to the value of the NOx aCCF at 400 hPa?

We modified both sentences to remove the contradiction.

- L557: "this clearly demonstrates" is this the only effect at play? Couldn't it be the case that the difference in PPC representations between the DFS tool and the aCCF-model also leads to a discrepancy in the climate impact of the flights calculated for the reference and PPC scenario?

We have reformulated the sentence into a weaker statement, see above. Differences between the DFS PPC representation and the Clima-X (aCCFs) data are only marginal. Large changes rather are caused by using different weather input data, e.g. one set for flight planning and another one for evaluation of the effects (this is studied in the forthcoming paper by Peter et al.).

- Figure 9: How should the text in the lower left corner of the figure be interpreted? E.g. "HVL/SAL FL330-350" ? **DONE (explanations of sector names added).**

- L617: Earlier in the manuscript you state that SEVIRI has 8 spectral channels in the thermal range? Or do you mean something different with thermal infrared range? **Corrected.**

- L675: "andoptimization" -> "and optimization" **DONE**

- L675: "ofeco-efficient" -> "of eco-efficient" **DONE**

- L676: "visualiz" -> "visualize" **DONE**

- L680: "real- flight" -> "real flight" or "real-flight" ? **DONE**

- L685: "Several key lessons emerged during project" -> "Several key lessons emerged during the project". **DONE**

- L701: "As the formulation of the aCCFs provides expectation values..." **DONE**

- L705: closing parenthesis without an opening one. **DONE**
- L709: missing space between “,” and “and”. Consider re-formulating this sentence for clarity. **DONE**
- L711: Opening parenthesis without a closing one. **DONE**
- L724: space between “(“ and “C” should be removed. **DONE**
- L724: remove “an”. **DONE**
- L726: it looks like there is a double space between “might” and “cross”? **DONE**
- L727: “sign of overall climate impact uncertain”. **DONE**
- L727: “...” -> replace this with etc. or simply list all the sources if possible **DONE**
- Section 6.6: it seems to me that the text font changes within this section **DONE**
- L759: “Concepts, determining...” -> “Concepts that determine” **DONE**
- L765: “.The” -> Missing a space? **DONE**
- L765: I don't think this sentence makes sense, grammatically. Please re-formulate. **DONE**
- L789: “exist solely in prototype version” -> “are prototypes”. **DONE**
- L798: my suggestion is to change “to make eco-efficient flights the routine” into “to make eco-efficient flights part of routine operations” **DONE**
- Figure A1: “Flightlevels” -> “flight levels”.

Again, we will fix this once the figures are prepared for the final production.

- Table A1: “runPPC” should be separated **DONE**
- Table A1: “specific ice content” should this be “specific cloud ice content”? **DONE**
- Table A2: “in a certain altitude” -> “at a certain altitude” **DONE**
- Table A2: unit for ACCF_NOx -> please write as NO_2 **DONE**
- L823: “algorithmic climate response function” shouldn't this be “algorithmic climate change function”? **DONE**
- L823: “climate impact functions” shouldn't this be “algorithmic climate change functions”? **DONE**
- Table B1: shouldn't the Dietmüller et al. reference be for 2023 instead of 2022? Also happens on L863 **DONE**
- L861: Shouldn't the Yin et al. reference be for 2023 instead of 2022? **DONE**
- L867: “software codes” -> “software” or “codes” **DONE**
- L869: please include the correct citation format for the Zenodo reference. **DONE**