# Review of: "Revisiting the challenges of ozone depletion from a prospective LCA perspective"

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Potential competing interests: No potential competing interests to declare.

Dear authors,

The topic of your manuscript is of great relevance. However, I have some concerns regarding the structure of your manuscript. Overall, the reasoning can be understood, but it seems a bit fragmented throughout the text. While there are interesting results, the discussion seems to be lacking.

Section 1:

- In the second paragraph of the introduction, the example of model simulation pertains to ozone depletion rather than recovery, which can confuse the reader and disrupt the storyline. Additionally, it would be beneficial to include information on the extensive expectation of rocket launches, stratospheric aerosol injection, and supersonic aircraft in the near future, as it is not clearly explained. Otherwise, does this imply that ODP is only relevant for LCA in those specific products/sectors? Furthermore, in the results section, you mention ODP related to construction products and heavy-duty transport, which further adds to the misleading storyline.
- It would be helpful to provide further explanation about the impact category. Why is ODP considered as relevant as climate change? Could you elaborate on the cause-and-effect chain of this impact category? This becomes especially important since you mention the IPCC A1B scenario leading to RCP 6.0, but there is no insight provided on what this scenario entails and how it differs from other scenarios. Moreover, could you please explain the mechanisms behind stratospheric ozone recovery? This is interesting but requires further explanation.

Section 2:

- Please consider including the date of the search conducted in the Web of Science and Scopus databases, as well as the inclusion and exclusion criteria that resulted in the reduction from 199 works to only 18. Was prospective LCA a requirement for inclusion?
- Since you mention databases and impact assessment methods in the results section, it would be valuable to list the ones included in the analysis within the methodology section. For instance, when you state that "To the authors' best knowledge, ReCiPe [31] is the only impact assessment model," could you also mention the other models/methods that were reviewed? Additionally, including a list of the background databases analyzed would be beneficial.
- I also found it peculiar that reference [28] appears in the first lines of the results but is not mentioned in the methodology section as one of the 18 works or other works obtained through snowball sampling. I assume it fits under

the snowball sampling category, but it is important to maintain consistency between the methodology and results sections.

Section 3.1:

- ODS has already been defined in section 1.
- Would updating the database be sufficient to address the issue of halon emissions?
- There is no need to define acronyms that are not used further in the text, such as EESC or SSP.

Section 3.3:

- You mention "Except for LIME [9], other methods," but could you clarify which other methods you are referring to?

Section 3.4:

- When you state that "This is the most likely explanation as to why no significant ozone layer recovery has been observed at mid-latitudes, despite the decrease in ODS emissions," it would be highly informative to provide a reference to support this claim.
- You mention that "indirect links between impact categories in LCA are traditionally excluded in characterization models." While I agree that this statement is relevant for interpreting LCA results, it might not be considered an issue for impact assessment itself. It would be interesting if you could further elaborate on this discussion.
- Additionally, when you refer to "the example of what has been done in premise [32]," it would be helpful if you could briefly describe the model and highlight its strengths compared to current or commonly used models.

Section 5:

- You state that "More generally, this work showcases the importance of analyzing the challenges of prospective LCA for each impact category individually and collectively due to potential interlinkages". I disagree with this statement. To me, the work showcases the challenges of ODP modeling from inventory to impact assessment. I would not say that it focuses on prospective LCA, but rather proposes prospective LCA as a solution to address these challenges. However, the choice of prospective LCA lacks a robust reasoning to defend its selection. Furthermore, you do not address each impact category individually, but you do express the interlinkages between ODP and other categories. This is related to the impact pathway of different impact categories stemming from the same emissions. It is important to note that a prospective LCI scenarios alone would not resolve the challenge of understanding these interlinkages, as this challenge is associated with the LCIA methods.
- I would appreciate a more in-depth discussion about other modeling options. Is prospective LCA indeed the best solution? If so, why? It is worth mentioning that although you discuss the issues with CFs and ODP modeling, a prospective LCI alone would not address these concerns. For future research, I would advise considering dynamic LCIA modeling as well.

I am eager to see the developments in your work. I wish you the best of luck!