

## General comments

Serena Di Pede et al. introduce the upcoming updates to L0–L1 reprocessing within the TROPOMI/S5P framework and describes the impact of adapting the new L1 product into the L2 ozone profile retrieval. The performance of the ozone profile retrieval is highly sensitive to the stability of radiometric and wavelength calibrations. In this context, the soft calibration applied to ozone profile retrieval may serve as a useful diagnostic tool for evaluating the quality of the L1 product and comparing the effects of the updated L0–L1 reprocessing. I believe this paper fits well within the scope of *Atmospheric Measurement Techniques* (AMT) and recommend its publication after addressing the following aspects.

## Major comment

1. **Introduction:** I think it is unnecessary to present the importance of ozone and the full history of space-based ozone monitoring in this paper, leading to some duplication in the companion paper by Keppens (2024). Instead, it is better to provide an important aspect on the history/current status of L1B and L2 ozone profile product. Like, the validation results and data application results. I believe there are companion papers that already address the importance of version updates related to stray light and background signal corrections and other calibration issues.
2. **Section 2.** Is the L0–L1 reprocessing planned only for the UV1 and UV2 bands? If not, please provide a brief summary of the updates across all spectral bands. If so, it would be helpful to clearly state that the reprocessing applies only to the UVN module.
3. **Section 4.** Are the updates to the version 2.9.0 ozone profile product limited only to the L1B data and its soft calibration? It appears that only three orbits per year are selected to calculate the soft calibration. I believe this sampling may be insufficient, especially after filtering out cloud-affected pixels. Additionally, the ozone fields selected each year could be inconsistent, potentially affecting the robustness of addressing the temporally varying systematic biases.
4. **Figure 2.** Please take a look at <https://www.mdpi.com/2072-4292/17/5/779>. This paper also indicates the deeper degradation at Fraunhofer lines in UV1 band over

time.

5. **Figure 13.** The OMPS-NP ozone profile product is similar to SBUV-type products, primarily designed for stratospheric ozone retrievals. However, the authors use it as a validation reference for the entire ozone profile, including the troposphere, which may not be appropriate. Additionally, the citation of Kramarova et al. (2017) is incorrect, as that reference pertains to the OMPS Limb Profiler product, not the Nadir Profiler. Moreover, for stratospheric ozone validation, OMPS-LP would be more suitable than OMPS-NP due to its superior vertical resolution.
6. The impact of the L1B updates on the soft calibration is remarkably large (Figure 9), whereas the resulting impact on the ozone product is relatively minor—only a few percent (Figure 11). It implies that the implemented soft calibration works well for addressing the systematic biases existing in both versions of L1B product.
7. To better emphasize the improvements resulting from the L1B reprocessing, I recommend comparing ozone profiles without applying soft calibration. This approach can reveal more substantial enhancements. For example, Bak et al. (2024) demonstrated improved OMI tropospheric ozone distributions using the Collection 4 L1B product without soft calibration, compared to results obtained with the Collection 3 L1B product where soft calibration was applied (see their Figure 8 vs. Figure 12).

Bak, J., Liu, X., Yang, K., Gonzalez Abad, G., O'Sullivan, E., Chance, K., and Kim, C.-H.: An improved OMI ozone profile research product version 2.0 with collection 4 L1b data and algorithm updates, *Atmos. Meas. Tech.*, 17, 1891–1911, <https://doi.org/10.5194/amt-17-1891-2024>, 2024.

8. Following previous comment, the impact of applying soft calibration on ozone profile retrievals should be significantly reduced between existing and upcoming versions, which could emphasize the improvements in both L1B and L2 products. Highlighting this reduction would help demonstrate the improvements made in both the L1B and L2 products. In particular, the decreased dependence on soft calibration is an important advancement worth emphasizing.

#### **Minor comments.**

Line 33: in (Singer et al., 1957) → in Singer et al. (1957)

First line of page 5: from (et al.) → from et al.

I think there are several unnecessary parentheses throughout the manuscript—for example, phrases like "(but on the same detector)", "(and, consequently, corrected for)", and "(and its uncertainty)" could be integrated more smoothly into the main text. Please consider editing these to improve readability and flow.

Figure 9. "residual" -> "background" in caption. Through the manuscript, the background term is used instead of residual.

No availability section is provided in particular for validation reference (OMPS-NP) and the existing operational product, a plan for the upcoming versions.