This manuscript presents the retrieval of ozone profiles from OMPS limb observations, using wavelength pairing and the MART technique. Results are compared with the NASA official product and with correlative observations such as ozonesondes and satellite data, in an extensive way. The paper provides a quite detailed overview of the work, with well structured flow. However several explanations and descriptions need clarifications; in addition, English usage and references need an overall review. The most problematic section of the paper, in my opinion, is the error analysis, which I think needs a complete re-work. A major weakness of the presented product is that there is no dedicated retrieval of aerosol extinction, instead a climatology is used. I would suggest the authors to test the usage of already existing OMPS aerosol retrievals such as the NASA or the Bremen ones, as a feasibility test. The presented work does not offer by itself significant elements of novelty, as other 3 OMPS retrievals are currently existing and the results shown in the manuscript do not display significant improvements with respect to the NASA product, when compared with correlative observations. It is rather a feasibility study of the application of MART to OMPS data, with a perspective to improve the retrieval, include the UV information and proper aerosol extinction profiles.

Major comments

- I have several questions and issues realated to the errror analysis section.
  I find the usage of the "prior averaging kernel (AK)" matrix quite confusing. In my understanding you are assessing the sensitivity of your retrieved profile to the a-priori profile, by perturbing the a-priori values and assess the related changes in the retrieved ozone. I would introduce this concept without using the AK terminology, as it is rather a perturbation technique you are applying.
  Do you have proper AK for your retrievals (the product of G, gain matrix, and K, weighting functions, providing a measure of the sensitivity of the retrieval to a perturbation in the true state)? SCIATRAN should provide AK as output. In Fig. 5 panel (a), are you actually plotting prior AK or SCIATRAN AK? According to your reasoning at lines 263-265, higher peaks in panel (a) indicate that the retrieval is most sensitive to the a priori profile at 26 km. This is exactly what we don't want: the retrieval should be as far as possible independent from the apriori. In panel (b) however you show that the error due to apriori is small above 20 km, which is in contradiction with the previous reasoning. Ideally, the AK should look like a spike centred at the corresponding altitude, to indicate that the perturbation at that altitude is affecting only this altitude, i.e. the vertical resolution is equal to the sampling. If you compute the area of your AK, this gives you the measurement response, i.e. an estimation of the a priori contribution to the retrieved profile (see e.g. Rodgers 2000; von Clarmann et al., 2020; Arosio et al., 2022).
  Another question on Fig. 5, panel (b), are you perturbing the a-priori profiles by +5 % and then plotting the difference between the perturbed retrievals and the standard one? I cannot explain otherwise the negative values between 15 and 19 km.
  Regarding Fig. 6, are you perturbing the aerosol extinction by +30% and then plotting the results?
  It is also not clear what you have done regarding the cross section (CS) error. Did you use everywhere the CS at 223 K instead of the one at 243K? I suggest to assess this term by perturbing the CS at all temperatures by 2% (typical error value) and then see the effects of using these CS in the retrieval.
  The plot and reasoning about the retrieval noise is very confusing. How did you get a negative measurement noise error? If you perturb randomly your radiance several times and then perform the retrievals, the standard deviation of your perturbed retrievals should give you an estimate of the random noise.
- L152-162 and Fig.2. I find this figure and the preceding explanation not really informative. I suggest to reformulate this paragraph or omit this figure. The author could simply state that the CTV and the vertical distribution of ozone are highly correlated.

- At lines 233-235, there seem to be some confusion between vertical resolution and vertical sampling (gridding) of the profiles. The vertical grid can be 1 km. However, the effective vertical resolution of the retrieved profile is defined by the averaging kernel matrix: inverse of the diagonal elements of tha AK matrix times the layer width.
- In the validation part, I don't think that the panels (a) of Figs. 7, 9, 12 and 15 are really informative: this is an average of very different ozone profiles, as the standard deviation points out. It makes more sense to show only the relative differences, however depending on how they are computed. Is panel (b) simply the relative difference between the two curves in panel (a) or is this the mean absolute difference calculated for each collocation divided by the mean profile? The plots divided by latitude bands are more informative and valuable, I would suggest to make them larger.
- References need an overall check, I pointed out some inconsistencies in the minor comment section below.

Minor comments and typos

L14: "at the upper tangent height" → "at an upper tangent height"

L16: instrument's → instrument

L29: I suggest to remove this reference here, or find a more general one about stratospheric ozone;

L41: detect → observe

L47: "strong signal strength" → "good signal-to-noise ratio"

L53: reference not appropriate: I think, Flynn et al. 2014 is more appropriate.

L60: reference not appropriate, Flynn et al. describes the OMPS performance. Use for example, Zawada et al., 2018, https://doi.org/10.5194/amt-11-2375-2018 to reference USask product.

L74: "combined with" → "against"

L82: Reference not appropriate, rather Flynn et al., 2014.

L84: I would say "imaging" rather than "scanning".

L85: I find this sentence quite misleading, as the line of sight does not necessarily intersect the Earth's surface. The tangent point is the point along the line-of-sight having the lowest altitude.

L88: "by wavelength – reaching 1.5 nm at the short-wavelength end and 40 nm…" → "with wavelength: from 1.5 nm at short wavelengths to 40 nm…"

L92: remove "resolution"

L97: "operates in 14 orbits daily," → "completes 14 orbits daily,"; "completing approximately…" → "performing approximately…"

L115: Can you better specify which +0.1 km correction is here meant?

Sect. 2.2: I found this section too detailed for the aim of this paper: readers can find these details in the provided references, such as Kramarova et al. 2024. As the authors do no use this information for the described retrieval algorithm, this information could be summarized in the previous section.

L142: and Flittner et al. 2000.

L145: What does "thereby enhancing the specificity of the retrieved signal" mean?

Can you better state what is the difference between your choice and the triplet vector selected by NASA?

L164: There are two reference Li et al., 2013.

L165: “with a relative increment of red waves in the spectrum being higher than that of blue waves”. This is a very confusing sentence. Do you mean that the scattering by aerosol is wavelength dependent?

L168: Please remove “with different multiples” or replace with “scaling”.

L171: Below 30 km you mean?

L191: Regarding W_{ji} maybe better say: “indicating the importance of the j^{th} TH or line of sight to the ozone retrieved at altitude i“.

L213: Please clarify this sentence.

L225-226: Are you really performing forward simulation in a fully spherical atmosphere or in the pseudo-spherical approximation?

L244: “Error research” → “Error analysis”

L245: Please remove “technology“

L248: Remove DOAS and spell out Optimal Estimation.

L253: The TH corrections are already included in v2.6 of OMPS data, isn’t it?

L256: I think the proper term is “averaging kernel”.

L302-303: It is hard to follow these two sentences: what does it mean that “corrected TH are integrated”? The verb is missing in the aerosol extinction sentence.

L316 and at several other points, e.g. lines 364, 382, 416 etc.: remove “controlled” or replace it with “confined”, for example.

L318: “region” → “regions”

L319: “In the northern mid-latitude region” → “ At northern mid-high latitudes”

L322: I would say “this positive deviation reaches approximately 10% around 18 km”.

L324: Please remove “in low latitudes”.

L342: “operates along” → “completes about”

L348: I would remove “substantial”.

L353: geopotential height and temperature?

L358: Please remove “the increase”

L366: “further expands” → “increases”

L367: “The tropical shows obvious stratifications characteristics” → “In the tropical regions the differences change sign with altitude”.

Please review the paragraph at lines 385-390 to make it more clear.

L395-396: “effectiveness” → “accuracy”

L432: MLS → OSIRIS

Which AK are you taking for the smoothing of the sondes, as in Fig. 14? Do you have your own AK?

L464: “denotes” → “indicates”

L511: What do you mean with “the adjustment factor above clouds”?

L512: Why do you expect the a priori profile to be inaccurate in the low altitudes? In my opinion, the missing aerosol retrievals and the missing UV information are the main responsible of the described biases.

L544: “thanks” → “thankful”

References

Rodgers, Clive D. *Inverse methods for atmospheric sounding: theory and practice*. Vol. 2. World scientific, 2000.

von Clarmann, Thomas, et al. "Overview: Estimating and reporting uncertainties in remotely sensed atmospheric composition and temperature." *Atmospheric Measurement Techniques* 13.8 (2020): 4393-4436.

Zawada, Daniel J., et al. "Tomographic retrievals of ozone with the OMPS Limb Profiler: algorithm description and preliminary results." *Atmospheric Measurement Techniques* 11.4 (2018): 2375-2393.