We thank the editor for carefully reading our manuscript and helpful comments. Below, the reviewer's comments are marked in blue and our answers to the comments are written in black.

The stratospheric aerosol layer plays a critical role in the Earth's climate system through its impact on radiation, chemistry and the hydrological cycle. Impacted by large volcanic eruptions, its composition and loading can also reflect the influences of sulfur precursor emissions (SO2, OCS, DMS), extreme wildfires through Pyro-convection and the Asian Summer Monsoon transport pathways. The stratospheric aerosol layer has been studied since more than 4 decades through satellite-based solar occultation techniques, ground-based lidar and balloon-borne observations. More recently, limb observations have shown its ability to study stratospheric aerosol despite some limitations on calibration procedures, resolving complex radiation influence from scattering and absorbing and underlying assumptions on aerosol size distribution. Rozanov et al. (2024) utilizes the Ozone Mapping Profiler Suite- Limb Scatter instrument to study stratospheric aerosol extinction quasi-globally since 2012. Improvements of the retrieval algorithms are discussed in this paper and the results are compared with SAGE III/ISS and OSIRIS satellite observations. Overall, the strengths and limitations of the new algorithm are well exposed and convincing. This is a well-written, logically-structured and organized paper which merits to be published in AMT after some minor corrections can be applied and additional explanations could be provided.

1) L15P1: Solomon et al. 2011 do not report the presence of large amount of aerosols but rather an increase of stratospheric aerosols from moderate but frequent volcanic eruptions as reported by Vernier et al. (2011). I would recommend correcting this sentence.

The interpretation of the word "large" certainly depends of the reference. If the reference are post-Pinatubo conditions then the aerosol load considered by Solomon et al. 2011 is certainly not large. If one compares to background conditions around the year 2000, it is still large enough. To avoid any confusion here, we replaced "large" by "increased".

2) L25-26P2: Evan et al. 2023 report ozone loss soon after the HTHH eruption with limited explanations about the causes. Zhu et al. (2023) found that enhanced chlorine from marine sources was likely responsible of the ozone loss more than a week after the eruption rather than dynamical processes. The same study evokes a different ozone loss mechanism than traditional volcanic eruptions. I believe that some nuances could be made here.

We were not aware of Zhu et al. (2023) paper. Thank you for this hint. The information is added to the first paragraph of the introduction.

3) P2L29: This statement should be nuanced and is not fully correct. SAGE has provided quasi-global observations since 1979 but at rather low spatial sampling (30 profiles per day)

We think the statement "the availability of information .... is quite limited" is still correct, as SAGE sampling is not enough e.g. to create a latitude-longitude resolved climatology. Even considering limb-scatter and lidar instruments the information is still limited. We agree, however, that long-term measurements from SAGE instruments need to be acknowledged. To this end, we added the information suggested by the editor into the 6-th sentence of the paragraph, where we discuss occultation measurements.

4) P2L35: While describing SAGE data, some information regarding the fact that the spectra are self-calibrated through exo-atmospheric measurements might be of interest for the reader.

The information suggested by the editor is added to the text.

5) P3L62: I do not believe that this paragraph justifies well why CALIPSO is not used. As a matter of fact, I would recommend using the new stratospheric aerosol product level 3 developed recently (asdc ...). It could be used to understand the performance of OMPS algorithm when other datasets are not available (e.g. SAGE III/ISS in the polar winter regions Or near the tropopause where the variability of aerosol might be important and the influence of cirrus clouds in the tropics significant).

We think the objectives of the paper, which are the presentation of the retrieval and initial validation, are achieved using the two reference data sets (SAGE III and OSIRIS). Inclusion of CALIOP data would require a major rewriting of the paper, blow up its length and defocus the study. However, we agree with the editor that CALIOP data might be useful for upcoming studies focused on specific ranges of the atmosphere. We realized that the sentence about CALIOP data might be misunderstood as a total refusal to use these data in the comparisons. We re-formulated this sentence to highlight that we just prefer other data sources for this particular study to avoid potential ambiguity in the interpretation of the results and keep the door open for further comparisons.

In addition, I could not find how OMPS and other measurements were collocated with OSIRIS and SAGE III/ISS. Could you please clarify this

Indeed, we forgot to list the collocation criteria for the comparisons with SAGE III. They are now presented at the beginning of the Sect. 6. As stated in the third paragraph of Sect. 6, comparisons of the time series from OMPS-LP, OSIRIS and SAGE III are done using monthly zonal mean data (not collocated data).

6) P4L107: This is extremely difficult to make sense of this for non-specialist. I recommend to use some references but also to provide additional information by trying to avoid employing too many technical terms. Maybe a schematic describing the different steps of the algorithm could be useful here. Additional effort should be made here to further explain the different steps of the algorithm

The retrieval is based on the theory presented by [1], which indeed might be quite difficult to understand for a non-specialist. The work of [1] introduces some basis terms, which cannot be easily avoided. An attempt to avoid terms commonly used in the community is associated with a risk to make a description confusing even for readers who are familiar with the basics of the approach. A schematic diagram would not make much sense as the retrieval consist of one single step. All data are inverted at once without any intermediate steps. To clarify the issue we added an introductory paragraph at the beginning of Sect. 3 and some references.

References

[1] Rodgers, C. D.: Inverse methods for atmospheric sounding: Theory and practice, World Scientific, 2000.