

We are grateful to the reviewer for providing comments and suggestions. In the following, we report our response in blue.

While the manuscript is relatively well rounded, a few suggestions could further enhance its impact. First, the dataset covers a relatively short period (2008–2011), which may limit its utility for chemical modelers for the chemistry/dynamics related evaluations. To better showcase the new data sets unique value, I strongly recommend including a specific case study—such as a well-documented stratospheric intrusion event—where the fused product demonstrates improved agreement with ozone sonde data compared to reanalyses like CAMS or ERA5. Additionally, given the manuscript's focus on Stratosphere-Troposphere Exchange (STE) in the Himalayan region, it is noteworthy that the ozone sonde stations shown in Figure 1 are predominantly located in Europe and the United States. Incorporating independent ozone sonde data from the Himalayan region would allow for a more targeted evaluation of the fused dataset in its primary area of interest.

We thank the reviewer for these valuable suggestions.

We agree that the dataset covers a relatively short period, as also noted by Reviewer 1. The temporal extent of the dataset is constrained by the overlap between MIPAS and IASI. As explained to the first reviewer, there are instruments that provide longer time series. However, as we also pointed out in the first comment, while other limb+nadir combinations such as MLS+OMI or MLS+TROPOMI are theoretically possible, they involve greater complexity. At present, we can apply the CDF approach only when all the necessary information (profiles, a priori, CM, and AKM) is available. This requirement is met when products are retrieved using Optimal Estimation (OE) and the full CM and AKM are provided for each profile. We are currently investigating the possibility of applying CDF to products that are not retrieved with OE.

We also acknowledge that the Himalayan region suffers from lack of reference measurements such as ozonesonde profiles or lidar observations. Only a few stations provide vertical ozone profiles, and none of them coincide with the spatiotemporal coverage of our fused dataset, to our knowledge. For this reason, it

was not possible to include independent ozonesonde data from the Himalayan region in the analysis.

This limitation actually highlights the relevance of remote measurements and related analyses based on them. In this context, the fused product can provide data comparable to direct observations while enhancing their value, as it combines complementary information from nadir and limb sounding geometries. Unlike reanalyses, which blend assimilated observations-ERA5 and CAMS assimilate IASI and MIPAS, respectively-with dynamical and chemical forecast models, the fused product is a direct, measurement-based dataset that more closely represents the truth, especially in data-sparse regions. This makes it particularly valuable in areas such as the Himalayas, where observational coverage from both ground stations and remote sensing is extremely limited.

To our knowledge, well-documented case studies of stratospheric ozone intrusion events in the Himalayan region do exist in the literature, but we did not find any within our period of interest (2008–2011). However, thanks to a dataset provided by Dr. Paolo Cristofanelli and Dr. Davide Putero, who worked with the NCO-P station data, we identified a case study for 28 January–2 February 2008, and we have published on Zenodo (<https://zenodo.org/records/17590008>) the fused dataset for these six event days to very partially meet the reviewer's request.

We are currently working on the dataset to develop a methodology that demonstrates the added value of the fused product. While a comparison with reanalyses is certainly of interest, presenting such an analysis in the absence of a thorough investigation of the requested case study would require more extensive and dedicated treatment. This level of detail would go beyond the scope of the current manuscript, which is highly technical and focused on dataset production and demonstrating its validation and potential applicability.

Finally, I strongly encourage the authors to adopt an open-data policy. Making the dataset publicly available would facilitate broader evaluation and application by the research community, thereby maximizing the impact of this important work. The current statement that data is available upon request may limit its accessibility and utility.

Regarding the adoption of an open-data policy, we fully support this approach and are pleased to share the datasets used in this work and make them available to the scientific community. Specifically, we have published on Zenodo (<https://zenodo.org/records/17596981>) the fused dataset corresponding to the coincidences with ozonesondes, which were employed for the validation of the fused product. We have also published on Zenodo the MIPAS data reprocessed with OE and interpolated onto the IASI vertical grid, used for validation (<https://zenodo.org/records/17637275>), along with supplementary materials (<https://zenodo.org/records/17641663>), such as the ozonesondes used and more detailed data. In addition, we have made available (<https://zenodo.org/records/17590008>) a fused dataset for six days of stratospheric intrusion event (28 January–2 February 2008) over an extended region (5–55°N; 50–110°E) encompassing the Himalayas, which can serve as a case study. Please note that these datasets are provided in research-specific formats and may not fully comply with standard community conventions. They are intended to enable replication of validation and case study analysis. We have therefore updated the Data and Code Availability section accordingly.

In parallel, we are working to make the complete global dataset, covering the four years of analysis, publicly available. This effort is part of the EMM (Earth Moon Mars) PNRR-funded project mentioned in the financial support section, within which a dedicated platform is being developed to host and distribute these datasets. Our goal is to ensure that the data are fully compliant with Level-2 standards and presented in a user-friendly format, facilitating and ensuring reuse and integration by the scientific community.