Interactive comment on "Global Ozone Monitoring Experiment-2 (GOME-2) Daily and Monthly Level 3 Products of Atmospheric Trace Gas Columns" by Chan et al.

Anonymous Reviewer

November 20, 2022

The paper by Chan et al. presents the GOME-2 Level-3 data of total column ozone, total and tropospheric column nitrogen dioxide, total column water vapour, total column bromine oxide, total column formaldehyde and total column sulphur dioxide. The topic fits well to the aims and scopes of ESSD. The manuscript is overall very well-written and has a clear structure. The described methods and validation results seem reasonable. I would favorably recommend a publication after the revised manuscript could

1 Specific comments

- In Introduction, it would be nicer to mention instruments like SCIAMACHY, OMI, and TROPOMI that measure atmospheric constituents within UV-VIS.
- As you mentioned that cloud parameters done by the OCRA/ROCINN algorithms, the cloud model CRB (Clouds-as-Reflecting-Boundaries) was used for GOME-2 A/B/C. Why the cloud model CAL (Clouds-As-Layers) wasn't used since CAL has been included in OCRA/ROCINN and (Loyola et al., 2018)? A new surface albedo climatology based on hyperspectral UV-VIS measurements has been introduced for TROPOMI (Loyola et al., 2020). Would it be also applied to GOME-2 data processing as well? Please extend the discussion in the manuscript.
- Page 2, Line 13-15: Please rewrite "Together with its successors ... 25 years".
- Page 2, Line 25: Why "usually"? Any other format for expressing trace gases columns?
- Page 4, Table 1: Would it be possible to summarize the major differences between GDP 4.8 and GDP 4.9, except for different sensors?

- Page 21, Sect. 5.1.1: Different instrument characteristics like scan angle dependency and polarization sensitivity seem to have higher impact on UV species (O_3, BrO, HCHO) than VIS species (NO_2 and H_2O). Is that true?
- Page 23, Line 9: This sentence should be placed in the previous paragraph.
- Page 23, Line 17: *was* observed by ...
- Page 25, Sect. 5.2.1: If available, could the authors provide relative differences for total ozone comparison between GOME-2 and ground-based measurements, which has been widely used in the total ozone validation?
- Page 39, Sect. 6: I suggest to add a paragraph to discuss the usefulness of GOME-2 Level-3 data. As compared to TROPOMI, OMI, and other data, would the authors still recommend it to the community?

References

Loyola, D. G., Gimeno García, S., Lutz, R., Argyrouli, A., Romahn, F., Spurr, R. J. D., et al. (2018). The operational cloud retrieval algorithms from TROPOMI on board Sentinel-5 Precursor. *Atmos. Meas. Tech.* 11, 409–427. doi:10.5194/amt-11-409-2018

Loyola, D. G., Xu, J., Heue, K.-P., and Zimmer, W. (2020). Applying FP_ILM to the retrieval of geometry-dependent effective lambertian equivalent reflectivity (GE_LER) daily maps from UVN satellite measurements. *Atmos. Meas. Tech.* 13, 985–999. doi:10.5194/amt-13-985-2020