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Atmospheric Measurement Techniques Discussions

Interactive comment on "Tropospheric column amount of ozone retrieved from SCIAMACHY limb-nadir-matching observations" *by* F. Ebojie et al.

Anonymous Referee #1

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This paper is a study for determination and validation of tropospheric column ozone by using the difference between total ozone from SCIAMACHY viewing geometry and stratospheric column ozone from limb viewing geometry for long period of 2003-2011. Even though there have been many studies about residual based tropospheric ozone derivation and validation, this kind of study is worth of publication. However, this paper still needs to find a better way of description about significance of this study relative to previous studies as well as results.

1. The residual ozone does not use simultaneous measurements of total and stratospheric ozone. Therefore, it is expected to have error when and where significant

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short time variation of ozone occurs. Therefore, the error should be dependent on season and location. However, authors keep insisting that SCIAMACHY-residual tropospheric ozone column is “good agreement” or “similar pattern” with ozonesonde and other residual tropospheric ozone. However, when I look at the figures from 6 to 13, some of them agree but some of them are not. So, the authors should discuss the disagreement as well as agreement.

2. The validation of SCIAMACHY tropospheric ozone is not easy because there is neither perfect ground truth because of limited ozonesounding measurements nor perfect satellite measurements. Therefore, the comparison should be performed not only based on absolute ozone value such as monthly averaged ozone, but also the variability and morphology of ozone. In this matter, the paper appears to focus on showing absolute value comparisons such as Table 4 but have a lack on showing some disagreement in variability and morphology in comparison. For example, the results used for Table 4 should find a better way of expression indicating not only monthly averaged ozone but also variability.

3. In most of cases, OMI/MLS-tropospheric ozone is always smaller than other measurements. This could be due to either MLS stratospheric ozone is larger than SCIAMACHY stratospheric ozone, or OMI total ozone is smaller than SCIAMACHY total ozone. So, I think it is relevant to compare SCIAMACHY total ozone and stratospheric ozone with OMI total ozone and MLS stratospheric ozone because the difference of two ozone results in difference in tropospheric ozone.

4. The TES has very narrow viewing geometry. I believe it has only one or two data points for a month in a given location and so does not have enough data for comparison with monthly averaged SCIMACHY tropospheric ozone shown in Figures 6 through 13. If so, the author should explain relevance of using TES data for SCIAMACHY tropospheric ozone validation.

5. In Figure 14, the highest tropospheric ozone is observed over high latitude greater

AMTD
6, C2303–C2305, 2013

than 60 degree north.. This is not very different from ground-based measurement of tropospheric ozone. The authors should explain this.

6. In Figure 15, it seems that the largest difference occurs in DJF period. I think this should be discussed.

7. This paper has too lengthy introduction. It should be reduced.

8. Even though this paper just used the ozonesounding data, Section 2.3 for ozonesondes is too much in detail.

9. In Figure 6 through 13, the latitude and longitude symbols, N or E, are missing.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 7811, 2013.