

Interactive comment on “GOMOS bright limb ozone data set” by S. Tukiainen et al.

Anonymous Referee #3

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This paper, “GOMOS bright limb ozone data set” by Tukiainen et al. and submitted to AMT, describes the GOMOS Bright Limb (GBL) ozone data set including its creation and its accuracy. The GBL ozone data set, covering a time period from 2002 to 2012, consists of over 300,000 retrieved ozone profiles covering an altitude range from 18 to 60 km with an approximate vertical resolution of 2 to 3 km. The authors have compared their retrieved profiles with data sets derived from both ground based and satellite based observations and conclude that, except for times when conditions exist that dictate significant stray light within the measured radiance spectra, their retrieved values are accurate to better than 10%. For this reason they conclude their data set is a valuable addition to the existing data and improves the GOMOS coverage to the summer poles.

General Comments

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The paper introduces the new GBL data set but misses the opportunity to indicate where this new data set can be reliably used and therefore the times and locations that it adds value to the existing data records. Since the GBL data set contains over 300,000 profiles it should not be difficult to better indicate where the data is of value. Once this is appropriately done the paper will be ready for publication.

Minor points

1) The paragraph between lines 25 and 35 needs to be reworded to better tie in with the following paragraph. The first paragraph mentions the Taha work at the beginning and needs to end with some results from this work in order to justify the first statement of the following paragraph. This first paragraph focuses too much on the removal of daytime scattered sunlight from the occultation measurements and not enough on the Taha work

2) The introduction should make some mention that the upper and lower bands were tested and it was decided that the lower band would be used in this work. It should also be mentioned that two stray light removal techniques were evaluated and a the simple average technique was selected.

3) Why did the authors choose to include the daytime occultations in Figure 5 and the discussion around it? They add nothing to the evaluation of the quality of the GBL data set.

4) Line 27 should read “heights” and not “tangent heights”

5) Line 144 “an” should go to “a”

6) The two sentences starting on line 147 with “Widely . . .” need to be reworded.

7) More discussion is needed to convince the reader that no smoothing is required in the comparisons.

8) Line 170 once again makes reference to retrievals at tangent heights instead of

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heights. This happens throughout the paper and if it is intended and indeed correct then an explanation is required. The convention is usually that radiance measurements are made along lines of sight that have associated tangent heights and retrieved ozone profiles are assigned to an altitude, not tangent altitude, grid.

9) In line 175 how is the error estimate done? Is there a reference to previous work?

Significant Issues

As mentioned in the opening remarks the two sections “Results” and “Discussion and summary” do not contain near enough detail. Many more conditions than just the latitudinal dependence of the biases need to be investigated. For this new GBL data set to be useful the community needs to know where it is trustworthy and the results included in this paper have not gone far enough in detailing these conditions. The biases between the retrieved GBL data and other well established data sets are large and appear to have structures that likely depend not only on solar zenith angle but perhaps on a large number of other conditions including altitude, season, scene albedo, the single scatter angle and a wide variety of others. All of these conditions should be thoroughly examined within this work. The results, discussion and summary should clearly indicate where the new data is useful not just where it is completely untrustworthy.

Concluding Remarks

The new GBL data set will be a valuable addition to the existing ozone data record once the conditions are identified where it has sufficiently high accuracy. This paper needs to be revised to more thoroughly examine the regions in time and space where the GBL data is of use to scientists from initiatives like the ESA ozone_cci who are interested in creating a harmonized long term, climate quality data record. Although I have selected “major revisions” I feel that the extra work is not too onerous and once the appropriate revisions are completed I will be more than happy to review the paper again.

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