

## ***Interactive comment on “Retrieval of ozone profiles from GOMOS limb scattered measurements” by S. Tukiainen et al.***

### **Anonymous Referee #1**

Received and published: 14 November 2010

Review of “Retrieval of ozone profiles from GOMOS limb scattered measurements” by Tukiainen et al.

This paper describes a first attempt to obtain ozone profiles from measurements of limb radiance made by the GOMOS instrument. I think this area of research is worthwhile and well suited to AMT. I think this paper has good potential but there are areas of significant concern that need to be addressed. I think the purpose of this paper should be more “on the way to” a limb retrieval product as opposed to an “start-to-finish” paper. There are a number of issues that need to be addressed in more detail here before the discussion of the retrieval algorithm.

Major Issues:

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1. There is NO mention of tangent height registration. A discussion on this needs to be added: how tangent heights are obtained, their accuracy and precision. This is a large potential source of uncertainty.
2. There is also no error analysis. There can be no validation without a discussion of error, systematic and random. I am not going so far as to insist that an error analysis needs to be included, but I do insist that without it there can only be ‘comparisons’, and not a validation.
3. I found the section on the removal of stray light hard to understand. First off, define what you mean by stray light (I assume you do not mean spectral stray light but rather off-axis light entering due to lack of a baffle?). Provide a physical basis for why this algorithm was used. Surely it can be tested in a model. This appears to be critical to the quality of the profiles and yet there is no justification and details provided. Is the fitted polynomial the amount of signal that is removed? In Figure 2, what is the point at 20 km? This would seem to be critical for the stray light algorithm. I could find no mention of where this comes from.

Other comments:

Section 2.2 – Stray Light Page 4359, Line 4: give an example of some sources

Table 2: Is the MS:SS ratio not a function of ozone in the UV, especially below 310 nm where your information on upper stratospheric ozone is coming from? I mean a function of ozone at it may depart via natural variability from climatological values (e.g., +/- 20%). Not capturing this would severely compromise the retrieval here. You need to show that this is not the case. This would be easy enough to assess with synthetic data.

Section 3.1: The GOMOS FWHM is 3 nm and OSIRIS is 1 nm. You might get improved comparisons by reducing the FWHM of the GOMOS slit function slightly to account for the finite resolution of the OSIRIS slit function.

Section 3.2: I noticed you have an OSIRIS person listed as an author. The OSIRIS

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absolute calibration was updated in the past year or so and I assume you are using this.

Section 3.3: Why is the stray-light corrected ratio noisier?

English and grammar: A large number of grammatical errors need to be corrected. A few are here:

Page 4356, Line 4: "... are proved to be..." to "... are proven to be ..."

Page 4356, Line 22: "stellar signal" to "stellar signals"

Page 4356: Line 8: "... Like for many other ..." to "As with other ..." [aside: I would not say there are "many" other limb viewing instruments]

Page 4357, Line 15: "uses THE stellar ..."

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Interactive comment on Atmos. Meas. Tech. Discuss., 3, 4355, 2010.