

## ***Interactive comment on “Atomic oxygen retrievals in the MLT region from SCIAMACHY nightglow limb measurements” by O. Lednyts’kyy et al.***

### **Anonymous Referee #2**

Received and published: 27 November 2014

In this paper the authors present a new global dataset of vertical profiles of atomic oxygen in the mesosphere and lower thermosphere based on retrievals from SCIAMACHY/Envisat limb observations of the OI 557.7 nm green line nightglow emission. Since atomic oxygen is the major carrier of chemical energy in this part of the atmosphere and a key component for the aeronomy in this region, this new dataset will be valuable to the scientific community.

The manuscript is well written and to a large part easy to read. The retrieval method, error analysis and verification of the retrieved profiles are described in detail and first results are presented.

I have only a few minor comments and suggestions to be addressed before the

C3966

manuscript can be published.

Page 10831:

Line 14 – O(1S) should be O(1S-1D).

Line 27 – Scanning.

Last sentence - sounds strange, maybe: “The SCanning Imaging... (SCIAMACHY) on board Envisat observe the atmosphere in a dedicated mesosphere/thermosphere limb mode that enables vertically resolved measurements of the nightglow green line emission to be made.”

Page 10832:

Line 5 - O(1S) should be O(1S-1D).

Line 16 – (Liu et al., 2010) ...as in the list of references.

Page 10833:

Line 6 - ...Imager System (OSIRIS)... (not Imaging).

Line 7 – It would have been interesting to also see a comparison with the OSIRIS and ISUAL [O] data, which I’m sure could be easily accessed from the respective research groups.

Line 10 - O(1S) should be O(1S-1D).

Line 18 – SCIAMACHY is already defined on page 10831, no need to do it again.

Line 19 – I assume it is the atmospheric radiation field in the Earth’s limb that is observed.

Page 10834:

Line 20 – Maybe add a reference to the SABER instrument here, why not the paper by Russel et al., 1999 that already is in the list of references.

C3967

Line 22 – sounds better to write e.g. “. . .and NASA provides the data online. . .”

Page 10835:

Line 5 – Is it a really a valid assumption to say that the mixing ratios of O<sub>2</sub> and N<sub>2</sub> are constant also above 95-100 km? Or would it be better to use the mixing ratios from e.g. NRLMSISE-00?

Line 15 - . . .provided by the National. . .

Line 17 - . . .provided online. . .

Page 10836:

Line 4 – Same as page 10835 line 5. . . is it really a valid assumption that the O<sub>2</sub> and N<sub>2</sub> mixing ratios are constant?

Line 18 – It is not only the SAA data that is green in Figure 2, the text should be updated here (the figure caption is good).

Page 10837:

Line 7 – The SAA is already defined, no need to do it here again.

Line 16 - . . .auroral events. . .

Line 17 and afterwards- . . .auroral oval. . .

Page 10388:

Line 9-10 and afterwards – the acronym LER is already defined, no need to do it again.

Line 16 and afterwards – the acronym VER is already defined. . .

Page 10845:

Line 19 - 1S-1D should be O(1S-1D).

Page 10847:

C3968

Line 20 – I would write “unperturbed” instead of “error-free”.

Page 10851:

Line 24 – Figure 9 show data above 85 km altitude, so you must mean the altitude range from 85 to 87 km.

Page 10852:

Section 7.2-7.3 – Please specify what is meant by “much higher”, “a bit higher”, “quite similar”, “significantly higher”, “even bigger”. . . it would be good to be more quantitative.

Page 10853:

Line 13 – How good is “very good”?

Page 10855:

Line 26 – What earlier studies?

Page 10856:

Line 18 – A “4” is missing (SD-WCCAM4).

Table 1 caption: last line – remove “in”.

Figure 2 caption: add “to” between related and contaminating

Figure 7 caption: add a description what the vertical blue lines mean.

Figures 9-11: Why is the x-axis range so large? Why not limit the range to, say,  $1.2 \times 10^{12}$  or  $1.3 \times 10^{12}$  atoms/cm<sup>3</sup>.

Figure 14 caption: remove “(bottom right)” since it is already written that it is the bottom right panel.

---

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 10829, 2014.

C3969