

Interactive comment on “The H Lyman- α actinic flux in the middle atmosphere” by T. Reddmann and R. Uhl

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Answer to Referee 2

1. We use the term dayglow for the diffuse component of Lyman-alpha radiation, which is explicitly included in our calculations, and also mentioned in the introduction. But indeed, for twilight conditions spherical geometry is important, which cannot be handled with our program. The diffuse component caused by collisional excitation, which may be important during night conditions, is normally four orders of magnitude smaller (see for example Fig. 6 in Bush and Chakrabarti, 1995, JGR 100, pp 19609-19625).

2. The paper is not intended to study the effect on the chemistry. In an altitude range between 70 and 80 km (for small SZA), where photons of Schumann-Runge continuum are already rare, but ozone concentration is low (about 0.2 ppm for O₃ at about 70 km altitude during daylight), we estimate the contribution to O(1D) by Ly-alpha to

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be larger than by O₃ photolysis. Therefore we think especially the expression of the O(1D) yield should be included in mesospheric chemistry modules. But as this is a rough estimation which neglects coupling effects and transport, we hesitate to give an assertive statement in the paper.

3. and 4. Text has been changed in view of referee's suggestions. Note, that the Box-Muller method appears already in Section 2.1 and has now been referenced there.

5.a The angular distribution follows from the j value of $1/2$ for the ground state and $1/2$ and $3/2$ for the fine structure components of the excited state, together with the intensity ratio of 1:2 of the transitions. Then the Stokes parameter has to be evaluated and with the help of the phase matrix the distribution can be derived. A comprehensible description seems to be outside the scope of the paper. For the reader's convenience, we have added another reference of the angular distribution where it is given explicitly.

The text has been reformulated according the suggestions.

5.b Tests for different solar conditions, which cause changes in density of H and temperature, showed no strong influence on the results. This has been also stated now in the first paragraph of Section 3.

6., 7. and 8. : Text has been changed according suggestions.

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