

Interactive comment on “NO₂ photolysis frequencies in street canyons” by P. Koepke et al.

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This paper describes the effects of buildings in urban streets on local values of photolysis frequencies of NO₂ which are important for air quality considerations. The approach is based on calculated photolysis frequencies from a radiation transfer model and geometrical considerations including typical surface properties and urban layout. The methodology is comprehensible and the results are clearly presented. A statement is missing on the magnitude and direction of the temperature dependence of $J(\text{NO}_2)$ resulting from the parameterisations given in Eqns. (3) and (4) (see under 6) below). The paper should be published after minor revision.

Minor points and typos:

1) Page 12828, lines 4 and 11 and throughout the text: Use italic font for RJ , as for all C3649

symbols for quantities.

2) Page 12828, line 10: The estimated 5% uncertainty of the reduction factors which refers to averaged conditions should perhaps be increased for two reasons: The red curve in Fig. 9 and Table 1 imply a higher variability, and the error estimate applies to the model streets of this work which may differ from average real world streets.

3) Page 12829, Eqn. 2: Please use ϕ rather than φ for the azimuth angle as in the following text. The same applies for Fig. 1.

4) Page 12829, line 13: Use standard citation for Keller-Rudek and Moortgat (2010).

5) Page 12833, Eqn. 3: Please include units to make the equation dimensionless, e.g. $(T/\text{K}-298)$ and $(\lambda/\text{nm}-600)$. Add zeros before the decimal points for clarity.

6) Page 12833, Eqn. 4: Please include units to make the equation dimensionless, e.g. $\exp(0.35(\lambda - \lambda_0)/\text{nm})$.

7) Page 12833, Eqn. 5: Dimensions, e.g. $\lambda_0/\text{nm} = 404+0.2 (T/\text{K}-298)$

8) The questions is why the complex parameterisations of the temperature dependence of absorption cross sections and quantum yields are stated here when they are not applied. The authors should make calculations for extreme atmospheric temperatures (e.g. 250 K and 320 K) and indicate the corresponding changes. It is then up to the reader to apply this correction or not.

9) Page 12835 Eqn. 7 and line 15: Avoid points to indicate a multiplication, also in Eqn. (10).

10) Page 12835, line 12: Use italic style for h and b .

11) Page 12835, line 13: Use ϕ rather than Φ .

12) Page 12837, line 1: Remove extra 'the'.

13) Page 12838, line 6: Use the term 'irradiance' rather than 'radiation' and introduce G as a symbol here.

14) Page 12838, line 8: Include number for equation and remove the term 'solar global irradiance' from the formula. G is sufficient. This also applies to Eqn. (10).

15) Page 12840, lines 16 and 17: Radiance rather than irradiance?

16) Page 12841, lines 1 and 3: Use 'ozone column' rather than 'ozone' to make the

point more clear.

17) Page 12841, line 22: There is an extra 's' in the index 'freessun' throughout the following text? Perhaps it would be easier to read the text and the formulas if the indices were only 'sun' and 'shad'?

18) Page 12842, Eqn. (11): What is the meaning of the * indices?

19) Page 12842, line 10: 'reduced' instead of 'reduces'.

20) Page 12842, lines 19-21 and Eqn. (13): I do not understand the equation. Is ϕ_{sun} an angle or an integral number of angles?

21) Fig. 3: An assignment of colours to the quantities of Eqn. (1) in the caption would be helpful.

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