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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Modelling UV irradiances on arbitrarily oriented surfaces: effects of sky obstructions" *by* M. Hess and P. Koepke

Anonymous Referee #1

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General comments ————————-

A method is introduced that principially allows for a calculation of UV irradiances on oriented surfaces and under conditions where the sky is obscured by natural or man-made structures. Consistency checks have been performed to test the model. Two examples are presented that illustrate the application potential of the method.

The paper is well structured and the tool seems to be useful for the simulation of various conditions, although the concluding phrase: '... allows to model ... UV irradiances for all(!) applications relevant to biological systems' appears a little bit jaunty.

The authors claim that the method represents a suitable tool for systematic studies. From a practical point of view and in order to further underline the usefulness of the

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model it would certainly be interesting to know more about possible concrete applications in the field of environment, public health, and consumer protection:

- Which are the most important environmental conditions that can practically be handled, i.e. also with respect to a manageable compilation of the model input?

- Who are the main end-users, user groups, user institutions, or services that could benefit from this tool and corresponding modification factors?

- Where are the limits of the model? For example, is it really possible to account for all cloud conditions?

- Wouldn't it be useful to perform a further comparison with results of a 3-d radiative transfer model for a given input? At least since the authors state that they have upgraded a 1-d model by introducing 3-d effects.

I recommend publication after adding substance that refer to these points. Above all this would open up the new perspectives in a more coherent way. Please take also into account the following remarks. I further recommend that the paper is read by a native English speaker.

Specific comments ————————

Page 3365, Chapt. 2.5, last paragraph: Please make clearer the second sentence. In the second measuring series of the sky obtruction and tilt modification factor starting at 9.25 UT I see an increase of the SOTMF with increasing distance that is smaller than the calculated SOTMF, correct ?

Page 3366, 2. paragraph: Formulation could be clearer, for example: In other azimuth directions where the average angles of incidence relative to the mountain surface facets are larger lower UV radiances are resulting.

Page 3367, Chapt. 3.1, Figure 5: In case of snow cover the maximum SOTMF is shifted to about 9.5 UTC. Probably also a 3-d effect which could briefly be explained.

ACPD

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Page 3368, 4. paragraph, last sentence: Please formulate it more clearly.

Minor and Technical comments ————————————-

- Figure 1: It would be advantageous to have the information that AA = 0 deg corresponds to south also in the Figure caption.

- Chapter 2.3 'SKOP': Brackets under b) are redundant

- Page 3365, 3. paragraph: GMT has meanwhile be replaced by UTC (Universal Time Coordinated). Please use UTC.

- Page 3368, 3. paragraph: Please write '...between 9 and 10 UTC, ...'

- Figure 7c, caption: Please write '... for the Munich street canyon ...'

- Please write '... erythemally weighted ...'

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 3357, 2008.